

## **SUPPLEMENTAL RESTRAINT SYSTEM (SRS)**

Some types of this model has an SRS which includes a driver's airbag located in the steering wheel hub and a passenger's airbag located in the dashboard above the glove box and seat belt tensioner located in the seat belt retractors.

Information necessary to safely service the SRS is included in this Shop Manual, and SRS.

Items marked with an asterisk (\*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

### **⚠ WARNING**

- To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.
- Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional deployment of the airbags.
- Do not bump the SRS unit. Otherwise, the system may fail in case of a collision, or the airbags may deploy when the ignition switch is ON (II).
- All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.
- Before trying to remove the seat belt tensioner, first set the sensor lock pin to LOCK position.

# INTRODUCTION

## How to Use This Manual

This Manual is divided into 24 sections. The first page of each section is marked with a black tab that lines up with its corresponding thumb index tab on this 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.

## 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.

**NOTICE**: The purpose of these messages it is intended to help prevent damage to the vehicle, other properly, or the environment.

NOTE: Gives helpful information.

### ▲ CAUTION

Detailed descriptions of *standard workshop procedures, safety principles and service operations* are not included. Please note that this manual contains warnings and cautions against some specific service methods which could cause **PERSONAL INJURY**, damage a vehicle or make it unsafe. Please understand that these warnings cannot cover all conceivable ways in which service, whether or not recommended by HONDA, might be done, or of the possible hazardous consequences of every conceivable way, nor could HONDA investigate all such ways. Anyone using service procedures or tools, whether or not recommended by HONDA, *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 Info



Specifications

specs

Maintenance



Engine Electrical



Engine



Cooling



Fuel and Emissions



\*Transaxle



\*Steering



Suspension



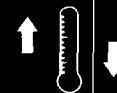
\*Brakes  
(Including ABS)



\*Body



\*Heater and  
Air Conditioning



\*Body Electrical



\*Restraints







## **General Information**

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# Chassis and Engine Numbers

## Vehicle Identification Number (VIN)

SHHMB8730WU00001

### Manufacturer, Make and Type of Vehicle

SHH: HONDA OF THE U.K.  
MFG., LTD. England.  
HONDA Passenger vehicle

### Line, Body and Engine Type

MB8: CIVIC 5-door/D14A7, D14A8  
MB9: CIVIC 5-door/D15Z8  
MC1: CIVIC 5-door/D16B2  
MC2: CIVIC 5-door/B18C4

### Body and Transmission Type

7: 5-door Wagon/  
5-speed Manual  
8: 5-door Wagon/  
4-speed Automatic

### Vehicle Grade

3: 1.4i  
4: 1.4i, 1.5i VTEC, 1.6iLS, 1.8VTi VTEC  
5: 1.4i, 1.5i VTEC, 1.6iSR  
6: 1.4iS, 1.5iLS VTEC, 1.6iES  
7: 1.4iS  
8: 1.4iSR

### Fixed Code

### Auxiliary Number

### Factory Code

U: Honda of the U.K. Manufacturing in  
England

### Model Year

0: 1998

### Serial Number

## Engine Number

D14A7 - E100001

### Engine Type

D14A7: 1.4 l SOHC 16-valves Multiport Fuel-injected 55 kW engine with catalytic converter  
D14A8: 1.4 l SOHC 16-valves Multiport Fuel-injected 66 kW engine with catalytic converter  
D15Z8: 1.5 l SOHC 16-valves Sequential Multiport Fuel-injected VTEC-E engine with catalytic converter  
D16B2: 1.6 l SOHC 16-valves Multiport Fuel-injected engine with catalytic converter  
B18C4: 1.8 l DOHC 16-valves Sequential Multiport Fuel-injected VTEC engine with catalytic converter

### Serial Number

Except B18C4: E100001~  
B18C4: 1000001~

## Transmission Number

S1LA - 4000001

### Transmission Type

S1LA: 4-speed Automatic  
1M: 5-speed Manual  
S9B: 5-speed Manual

### Serial Number

S1LA: 4000001~  
1M: 1000001~  
S9B: 1000001~

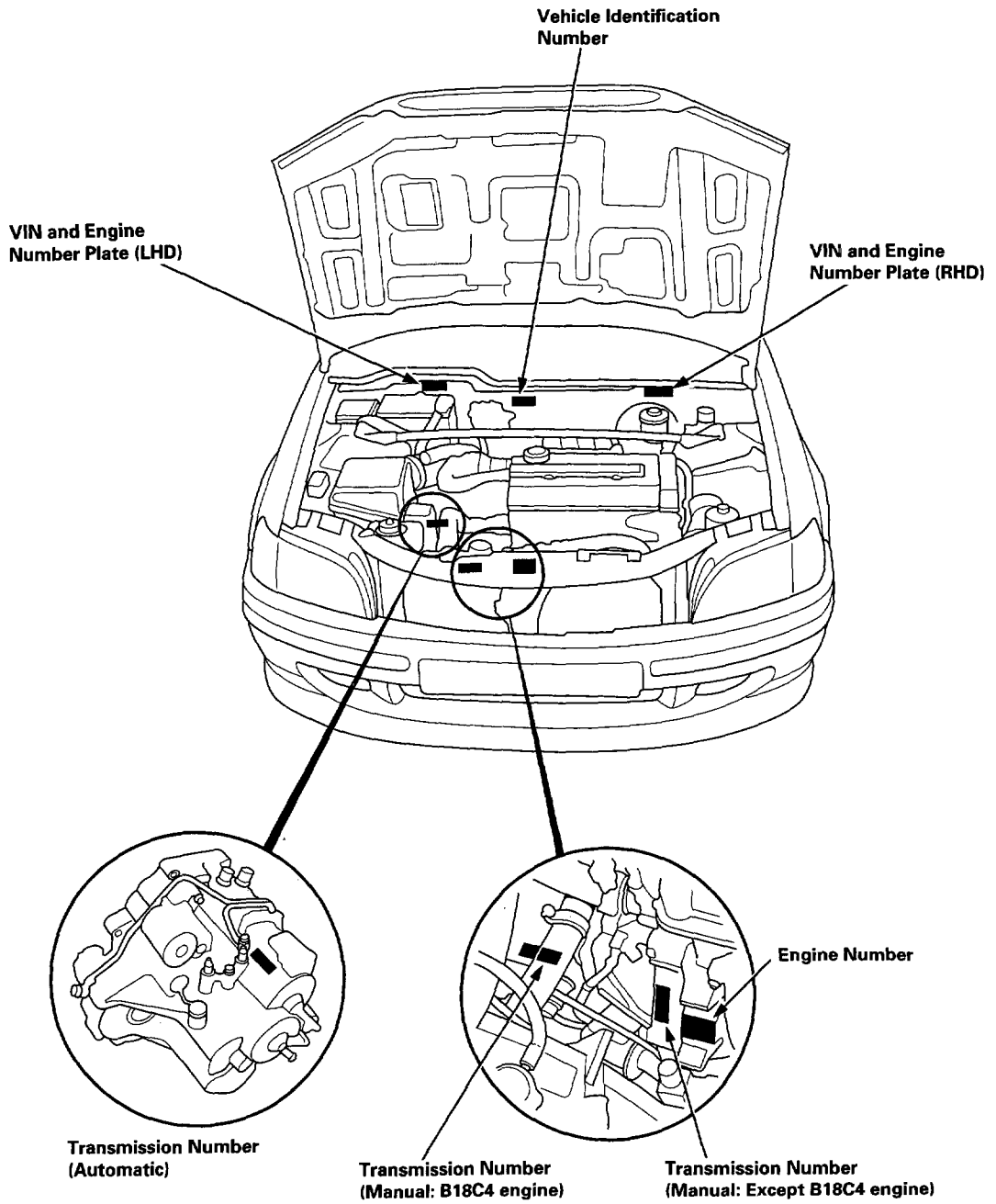


**Model/Applicable Area Code/VIN/Engine Number/Transmission Number List**

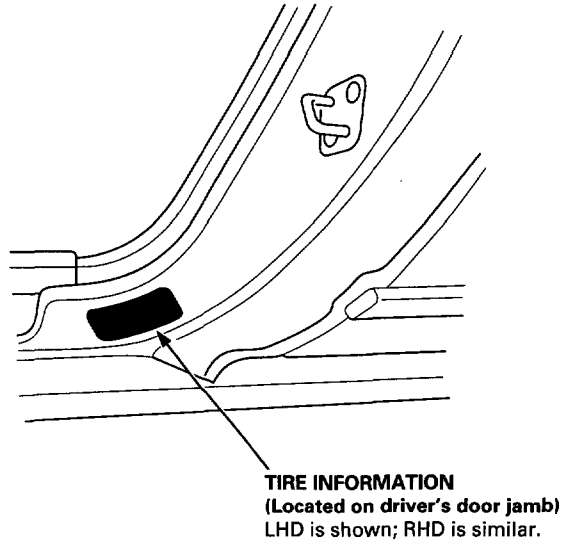
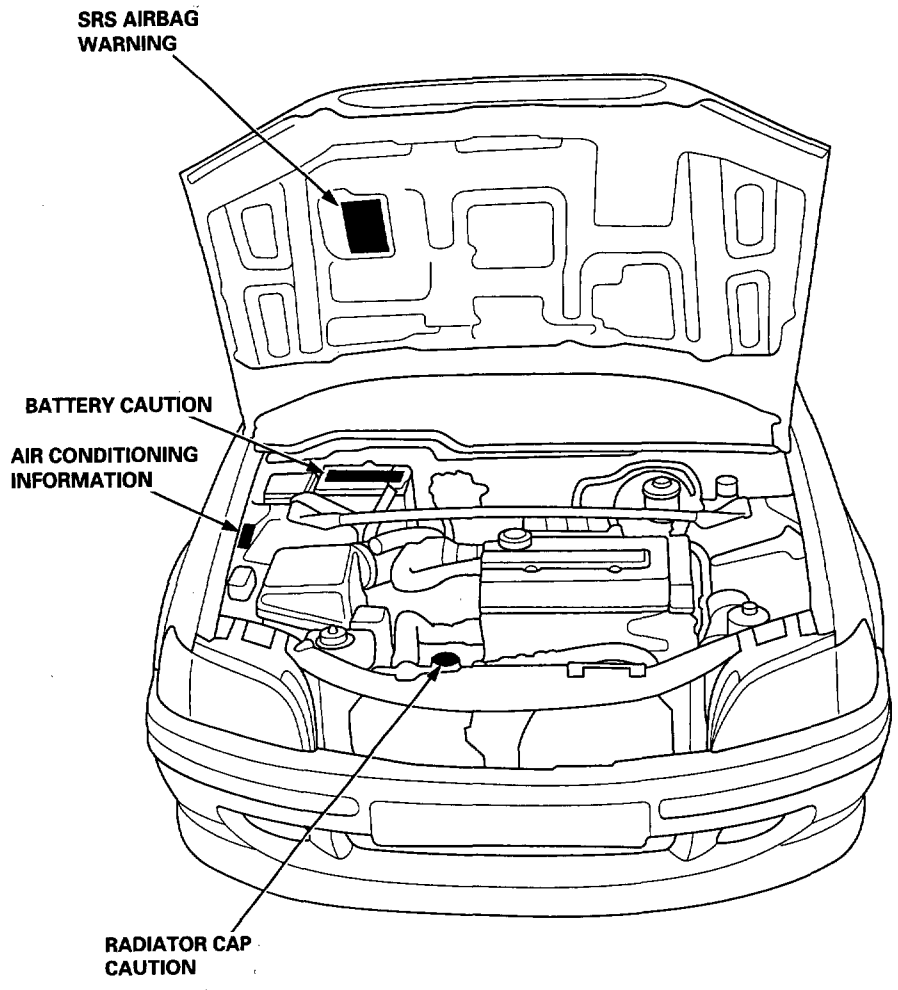
MODEL	APPLICABLE AREA CODE	HANDLE DRIVE TYPE	GRADE NAME	TRANSMISSION TYPE	VEHICLE IDENTIFICATION NUMBER	ENGINE NUMBER	TRANSMISSION NUMBER
CIVIC AERO-DECK	KG	LHD	1.4i	5MT	SHHMB8730WU000001~	D14A7-E100001~	1M-1000001~
			1.4i S	5MT	SHHMB8760WU000001~	D14A8-E100001~	1M-1000001~
			1.4i S	5MT	SHHMB8770WU000001~	D14A8-E100001~	1M-1000001~
			1.4i S	4AT	SHHMB8870WU000001~	D14A8-E100001~	S1LA-4000001~
			1.4i SR	5MT	SHHMB8780WU000001~	D14A8-E100001~	1M-1000001~
			1.5iVTEC	5MT	SHHMB9740WU000001~	D15Z8-E100001~	1M-1000001~
			1.5iVTEC	5MT	SHHMB9750WU000001~	D15Z8-E100001~	1M-1000001~
			1.5iLS VTEC	5MT	SHHMB9760WU000001~	D15Z8-E100001~	1M-1000001~
			1.6i SR	5MT	SHHMC1750WU000001~	D16B2-E100001~	1M-1000001~
			1.6i LS	4AT	SHHMC1840WU000001~	D16B2-E100001~	S1LA-4000001~
			1.8VTi VTEC	5MT	SHHMC2740WU000001~	B18C4-1000001~	S9B-1000001~
	KE	RHD	1.4i	5MT	SHHMB8740WU000001~	D14A7-E100001~	1M-1000001~
			1.4i	5MT	SHHMB8750WU000001~	D14A7-E100001~	1M-1000001~
			1.4i	4AT	SHHMB8850WU000001~	D14A7-E100001~	S1LA-4000001~
			1.5iVTEC	5MT	SHHMB9750WU000001~	D15Z8-E100001~	1M-1000001~
			1.5iLS VTEC	5MT	SHHMB9760WU000001~	D15Z8-E100001~	1M-1000001~
			1.6i LS	4AT	SHHMC1840WU000001~	D16B2-E100001~	S1LA-4000001~
			1.6i ES	5MT	SHHMC1760WU000001~	D16B2-E100001~	1M-1000001~
			1.6i ES	4AT	SHHMC1860WU000001~	D16B2-E100001~	S1LA-4000001~
	1.8VTi VTEC	5MT	SHHMC2740WU000001~	B18C4-1000001~	S9B-1000001~		
	KS	LHD	1.4i	5MT	SHHMB8740WU000001~	D14A7-E100001~	1M-1000001~
			1.5iVTEC	5MT	SHHMB9750WU000001~	D15Z8-E100001~	1M-1000001~
			1.5iLS VTEC	5MT	SHHMB9760WU000001~	D15Z8-E100001~	1M-1000001~
			1.6i LS	4AT	SHHMC1840WU000001~	D16B2-E100001~	S1LA-4000001~

# Identification Number Locations

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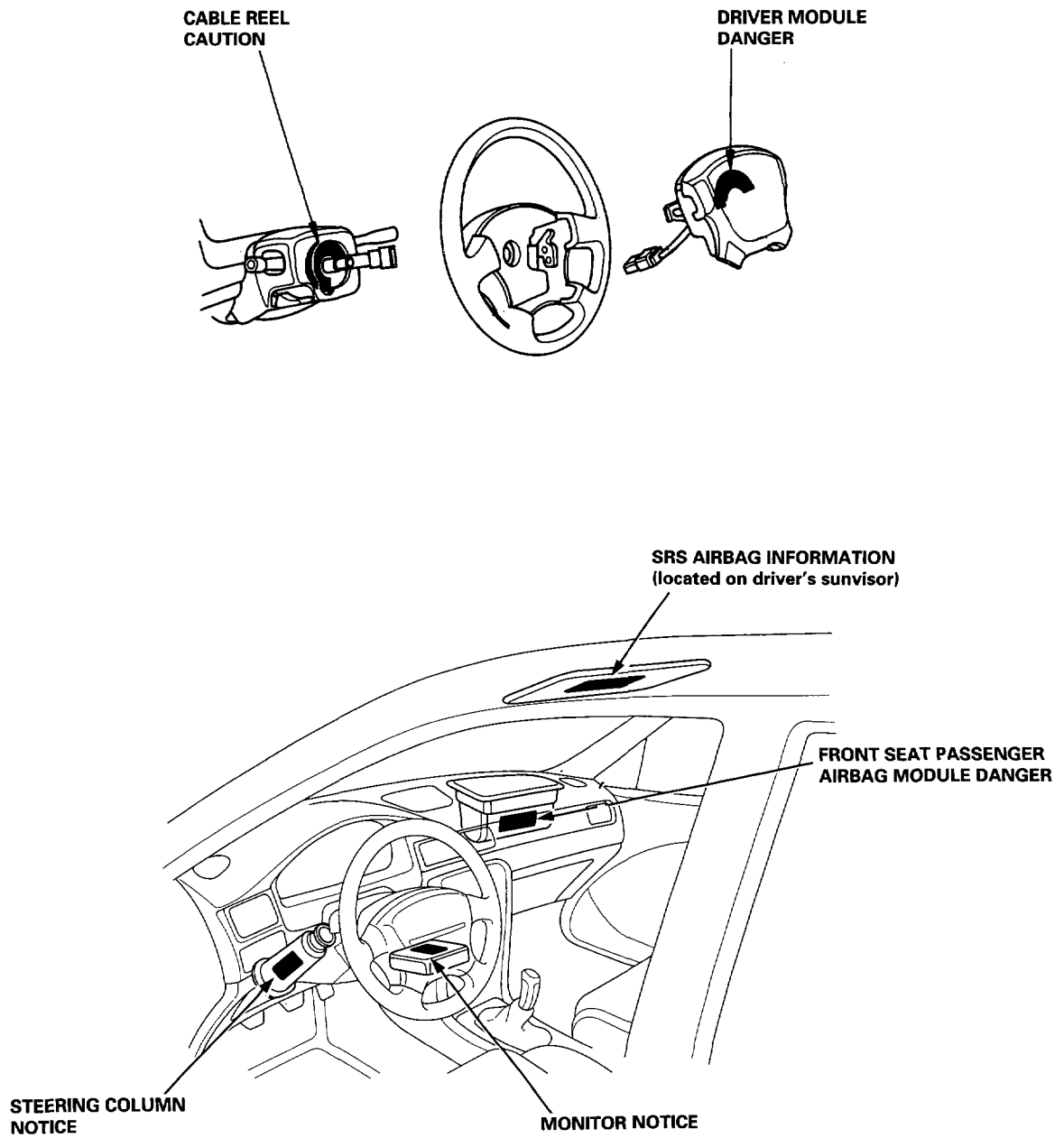
# Warning/Caution Label Locations



(cont'd)

# Warning/Caution Label Location

(cont'd)



LHD is shown; RHD is symmetrical.

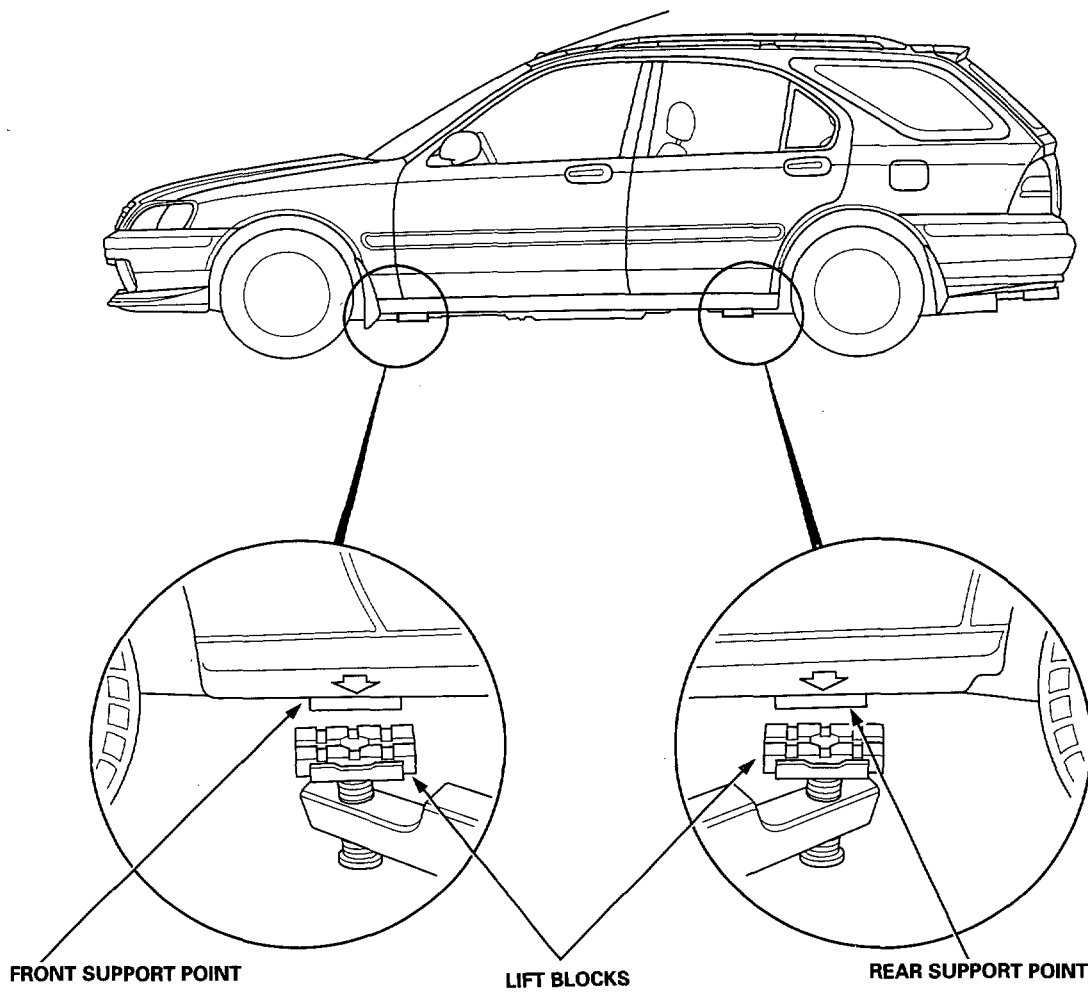
# Lift and Support Points



## Lift and Safety Stands

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

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



# Lift and Support Points

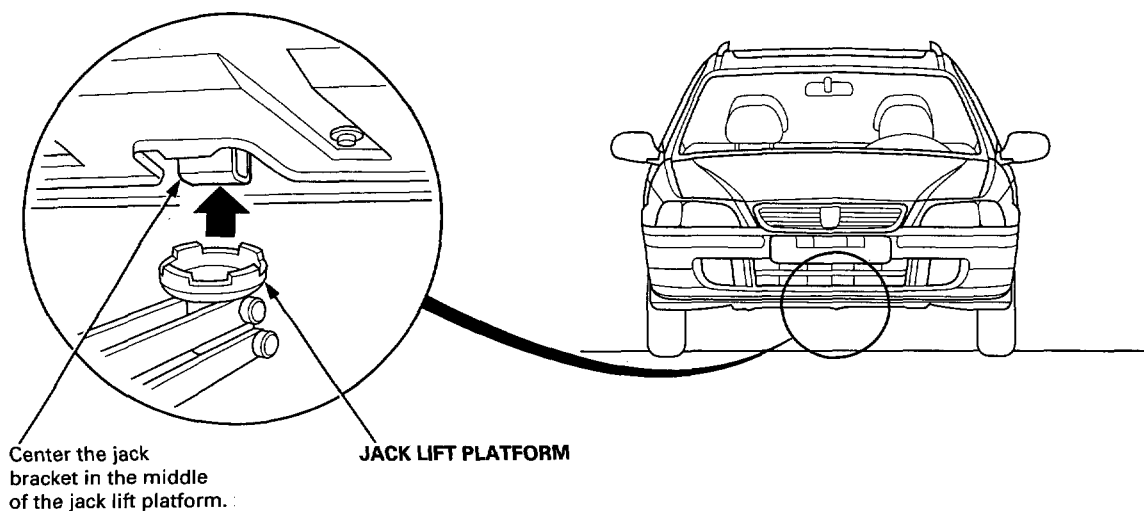
## Floor Jack

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

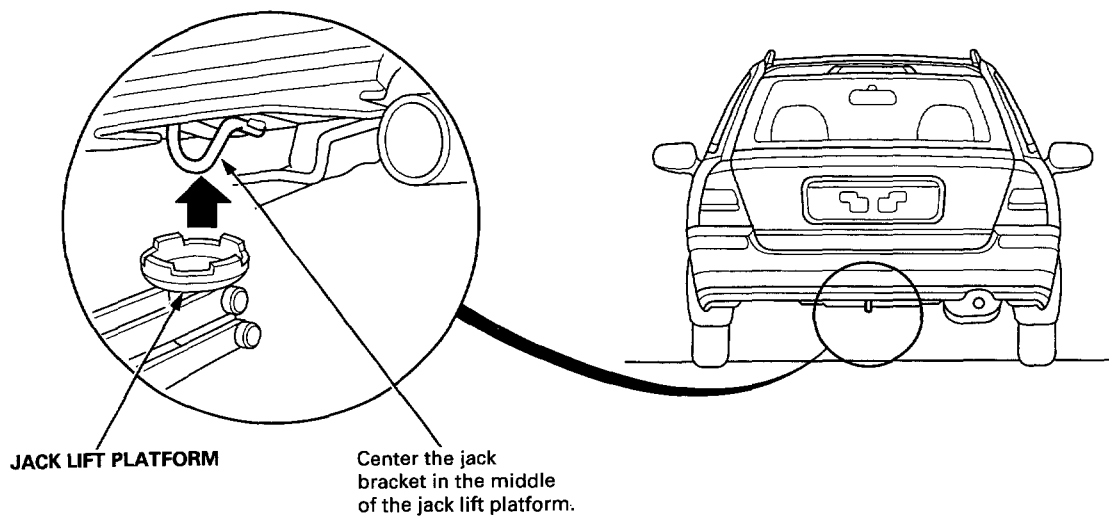
### **⚠ WARNING**

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

Front:



Rear:







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

## Emergency Towing

There are three popular methods of towing a vehicle.

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

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

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

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

### Manual Transmission

- Release the parking brake.
- Shift the transmission in Neutral.

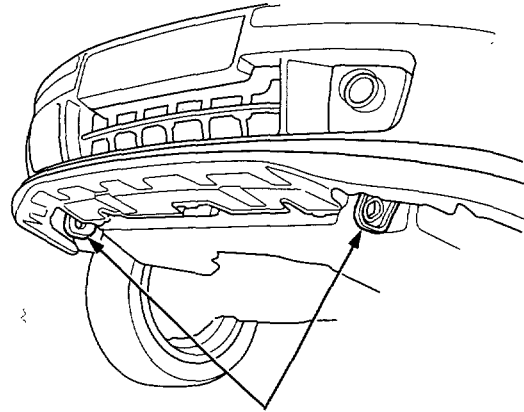
### Automatic Transmission

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

## ⚠ CAUTION

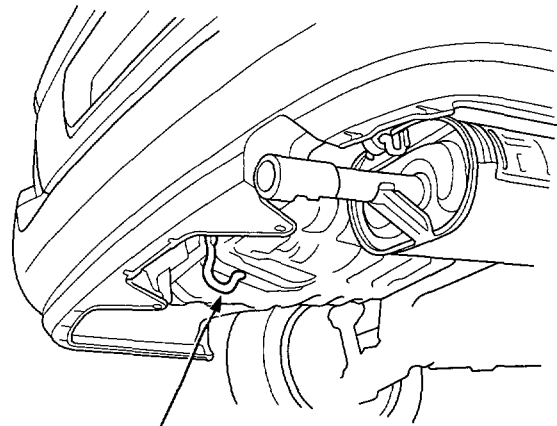
- Improper towing preparation will damage the transmission. Follow the above procedure exactly. If you cannot shift the transmission or start the engine (automatic transmission), the vehicle must be transported on a flat-bed.
- It is best to tow the vehicle no farther than 50 miles (80 km), and keep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

Front:



TOWING HOOKS and  
TIE DOWN BRACKETS

Rear:



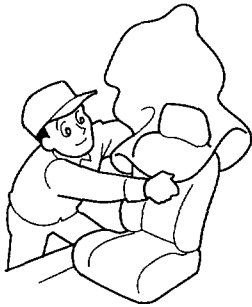
TIE DOWN BRACKET

# Preparation of Work

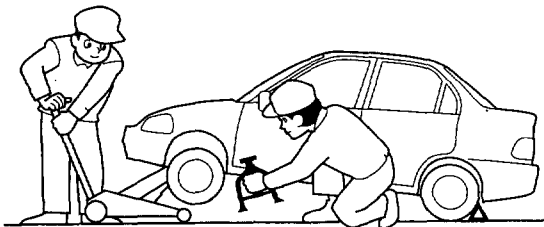
## ⚠ CAUTION

Observe all safety precautions and notes while working.

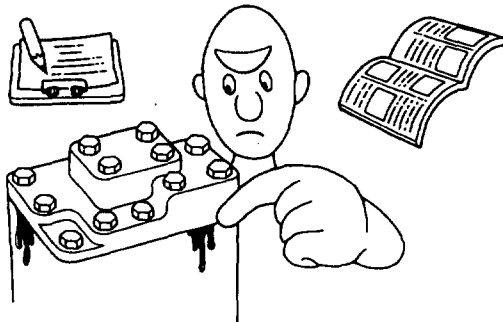
- Protect all painted surfaces and seats against dirt and scratches with a clean cloth or vinyl cover.



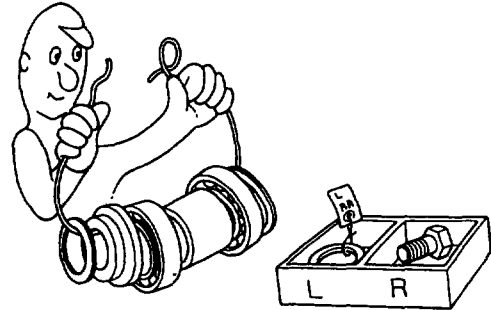
- Work safely and give your work your undivided attention. When either the front or rear wheels are to be raised, block the remaining wheels securely. Communicate at frequently as possible when work involves two or more workers. Do not run the engine unless the shop or working area is well ventilated.



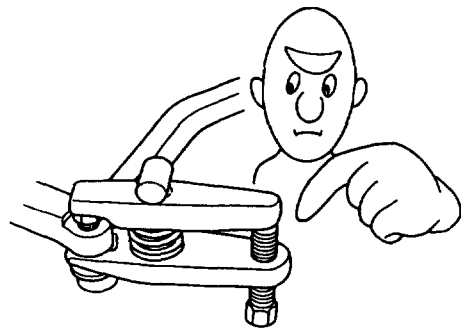
- Before removing or disassembling parts, they must be inspected carefully to isolate the cause for which service is necessary. Observe all safety notes and precautions and follow the proper procedures as described in this manual.



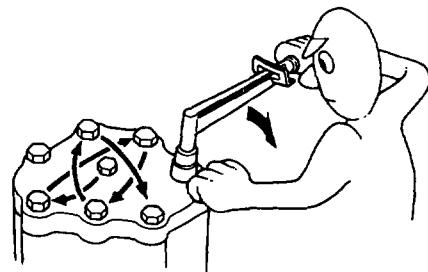
- Mark or place all removed parts in order in a parts rack so they can be reassembled in their original places.



- Use the special tool when use of such a tool is specified.

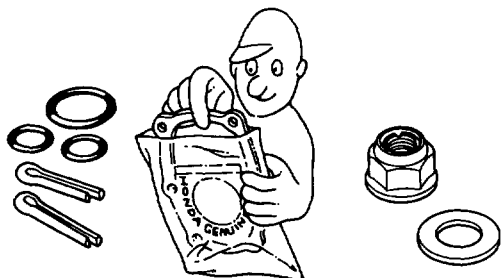


- Parts must be assembled with the proper torque according to the maintenance standards established.
- When tightening a series of bolts or nuts, begin with the center or large diameter bolts and tighten them in crisscross pattern in two or more steps.

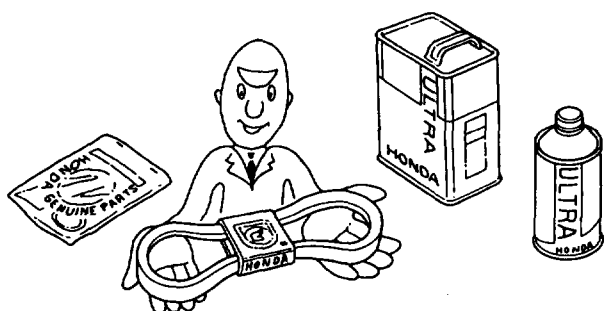




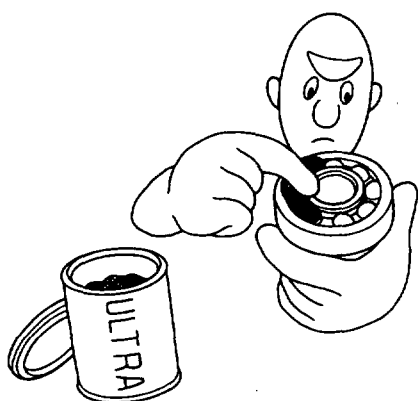
- Use new packings, gaskets, O-rings and cotter pins whenever reassembling.
- Do not reuse parts that must be required to replace. Always replace them.



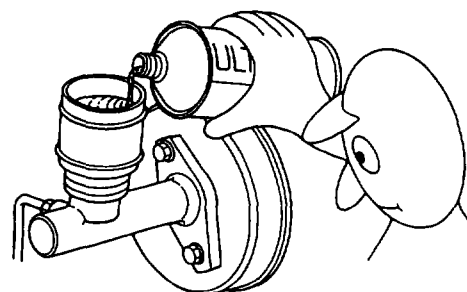
- Use genuine HONDA parts and lubricants or those equivalent. When parts are to be reused, they must be inspected carefully to make sure they are not damaged or deteriorated and are in good usable condition.



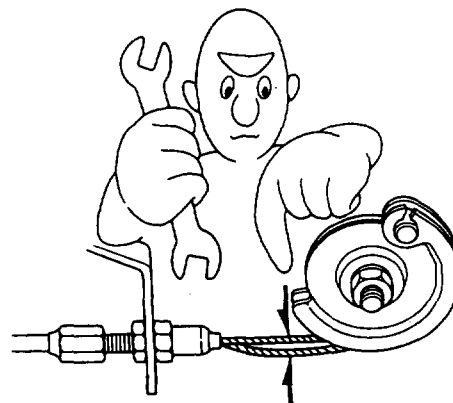
- Coat or fill parts with specified grease as specified (page 3-2). Clean all removed parts with solvent upon disassembly.



- Brake fluid and hydraulic components
  - When replenishing the system, use extreme care to prevent dust and dirt from entering the system.
  - Do not mix different brands of fluid as they may not be compatible.
  - Do not reuse drained brake fluid.
  - Because brake fluid can cause damage to painted and resin surfaces, care should be taken not to spill it on such materials. If spilled accidentally, quickly rinse it with water or warm water from painted or resin surfaces.
  - After disconnecting brake hoses or pipes, be sure to plug the openings 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.
- Avoid oil or grease getting on rubber parts and tubes, unless specified.
- Upon assembling, check every part for proper installation and operation.



# Preparation of Work

## Electrical Troubleshooting

### Before Troubleshooting

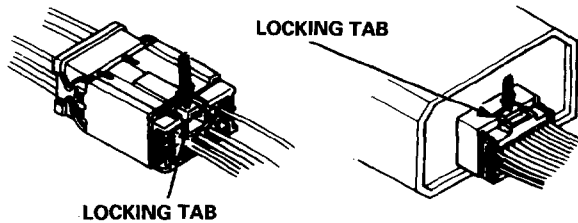
- Check applicable fuses in the appropriate fuse/relay box.
- Check the battery for damage, state of charge, and clean and tight connections.
- Check the alternator belt tension.

### CAUTION

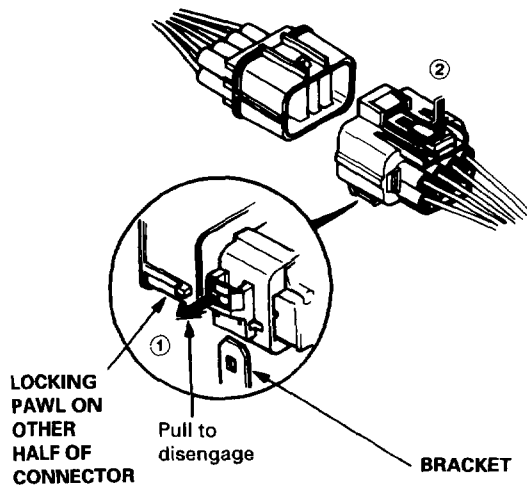
- Do not quick-charge a battery unless the battery ground cable has been disconnected, otherwise you will damage the alternator diodes.
- Do not attempt to crank the engine with the battery ground cable loosely connected or you will severely damage the wiring.

### Handling Connectors

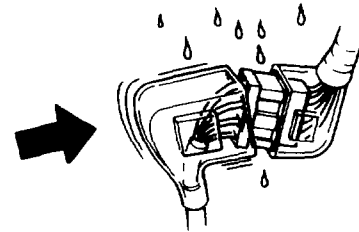
- Make sure the connectors are clean and have no loose wire terminals.
- Make sure multiple cavity connectors are packed with grease (except waterproof connectors).
- All connectors have push-down release type locks.



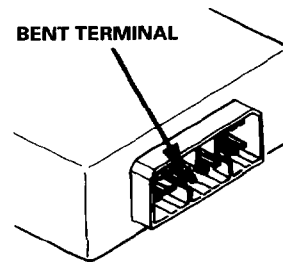
- Some connectors have a clip on their side used to attach them to a mount bracket on the body or on another component. This clip has a pull type lock.
- Some mounted connectors cannot be disconnected unless you first release the lock and remove the connector from its mount bracket.



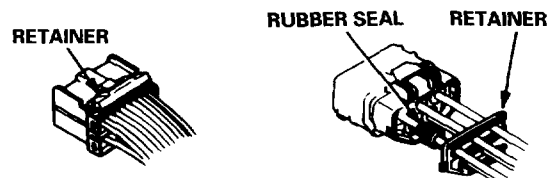
- Never try to disconnect connectors by pulling on their wires; pull on the connector halves instead.
- Always reinstall plastic covers.



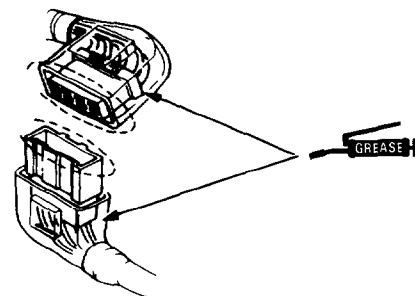
- Before connecting connectors, make sure the terminals are in place and not bent.



- Check for loose retainer and rubber seals.

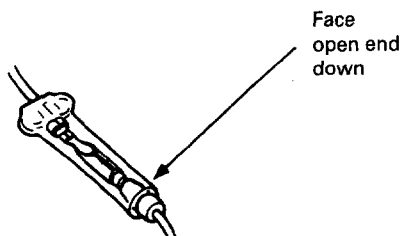


- The backs of some connectors are packed with grease. Add grease if necessary. If the grease is contaminated, replace it.



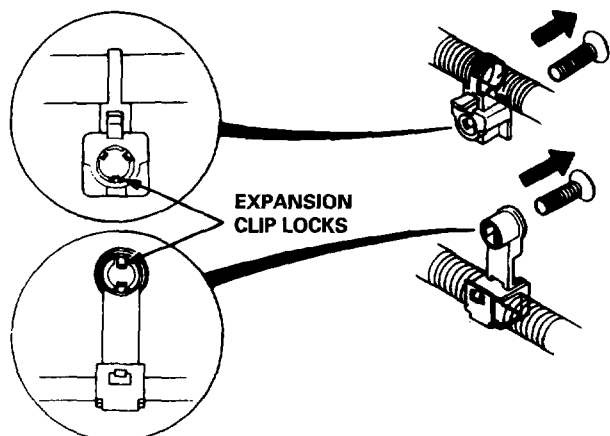


- Insert the connector all the way and make sure it is securely locked.
- Position wires so that the open end of the cover faces down.

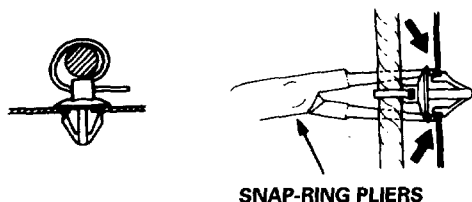


### Handling Wires and Harnesses

- Secure wires and wire harnesses to the frame with their respective wire ties at the designated locations.
- Remove clips carefully; don't damage their locks.

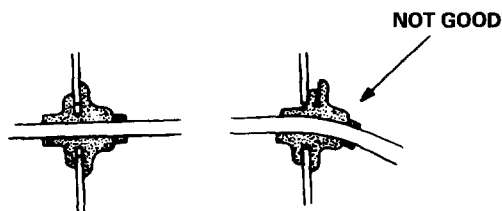


Slip pliers under the clip base and through the hole at an angle, then squeeze the expansion tabs to release the clip.



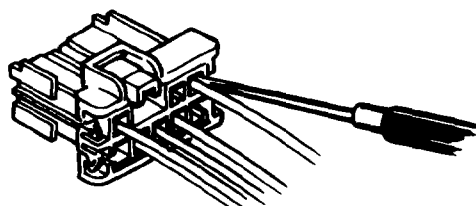
- After installing harness clips, make sure the harness doesn't interfere with any moving parts.
- Keep wire harnesses away from exhaust pipes and other hot parts, from sharp edges of brackets and holes, and from exposed screws and bolts.

- Seat grommets in their grooves properly.

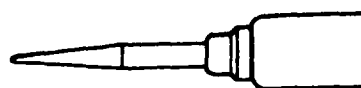


### Testing and Repairs

- Do not use wires or harnesses with broken insulation. Replace them or repair them by wrapping the break with electrical tape.
- After installing parts, make sure that no wires are pinched under them.
- When using electrical test equipment, follow the manufacturer's instructions and those described in this manual.
- If possible, insert the probe of the tester from the wire side (except waterproof connector).



- Use a probe with a sharp tester probe.



(cont'd)

# Preparation of Work

## Electrical Troubleshooting (cont'd)

### How to Read Flowcharts

#### Except SRS:

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

**START**  
(bold type)

Describes the conditions or situation to start a troubleshooting flowchart.

**ACTION**

Asks you to do something; perform a test, set up a condition etc.

**DECISION**

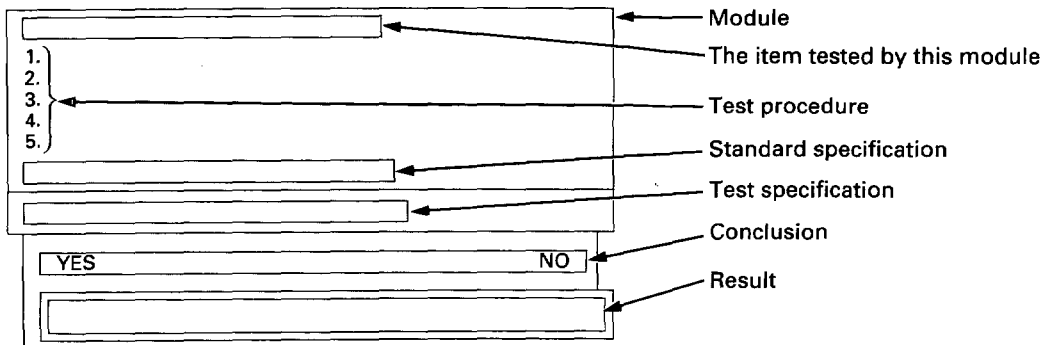
Asks you about the result of an action, then sends you in the appropriate troubleshooting direction.

**STOP**  
(bold type)

The end of a series of actions and decisions, describes a final repair action and sometimes directs you to an earlier part of the flowchart to confirm your repair.

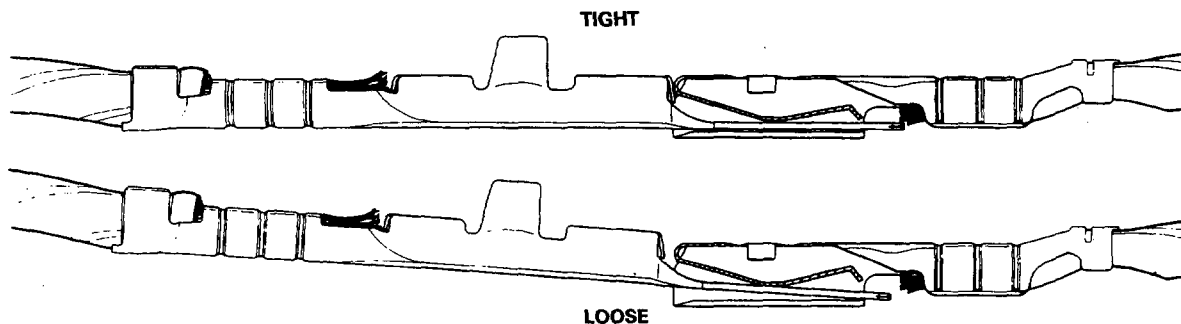
#### SRS:

SRS troubleshooting flowcharts are comprised of modules each of which contains all actions necessary to reach one decision. Except of the steps you must perform, the modules also include standard specifications of a correctly working system and test specifications. If the result of a test meets the specification shown in the module, the conclusion from this test is YES. If the specification is not met, the conclusion is NO. If you do not exactly follow the procedure described in the module, you may get wrong test result.



#### NOTE:

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





## Five-step Troubleshooting

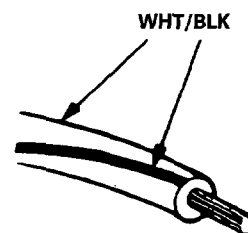
- 1. Verify The Complaint**  
Turn on all the components in the problem circuit to verify the customer complaint. Note the symptoms. Do not begin disassembly or testing until you have narrowed down the problem area.
- 2. Analyze The Schematic**  
Look up the schematic for the problem circuit. Determine how the circuit is supposed to work by tracing the current paths from the power feed through the circuit components to ground. If several circuits fail at the same time, the fuse or ground is a likely cause.  
  
Based on the symptoms and your understanding of the circuit operation, identify one or more possible causes of the problem.
- 3. Isolate The Problem By Testing The Circuit**  
Make circuit tests to check the diagnosis you made in step 2. Keep in mind that a logical, simple procedure is the key to efficient troubleshooting. Test for the most likely cause of failure first. Try to make tests at points that are easily accessible.
- 4. Fix The Problem**  
Once the specific problem is identified, make the repair. Be sure to use proper tools and safe procedures.
- 5. Make Sure The Circuit Works**  
Turn on all components in the repaired circuit in all modes to make sure you've fixed the entire problem. If the problem was a blown fuse, be sure to test all of the circuits on the fuse. Make sure no new problems turn up and the original problem does not recur.

## Wire Color Codes

The following abbreviations are used to identify wire colors in the circuit schematics:

WHT	.....	White
YEL	.....	Yellow
BLK	.....	Black
BLU	.....	Blue
GRN	.....	Green
RED	.....	Red
ORN	.....	Orange
PNK	.....	Pink
BRN	.....	Brown
GRY	.....	Gray
PUR	.....	Purple
LT BLU	.....	Light Blue
LT GRN	.....	Light Green

The wire insulation has one color or one color with another color stripe. The second color is the stripe.



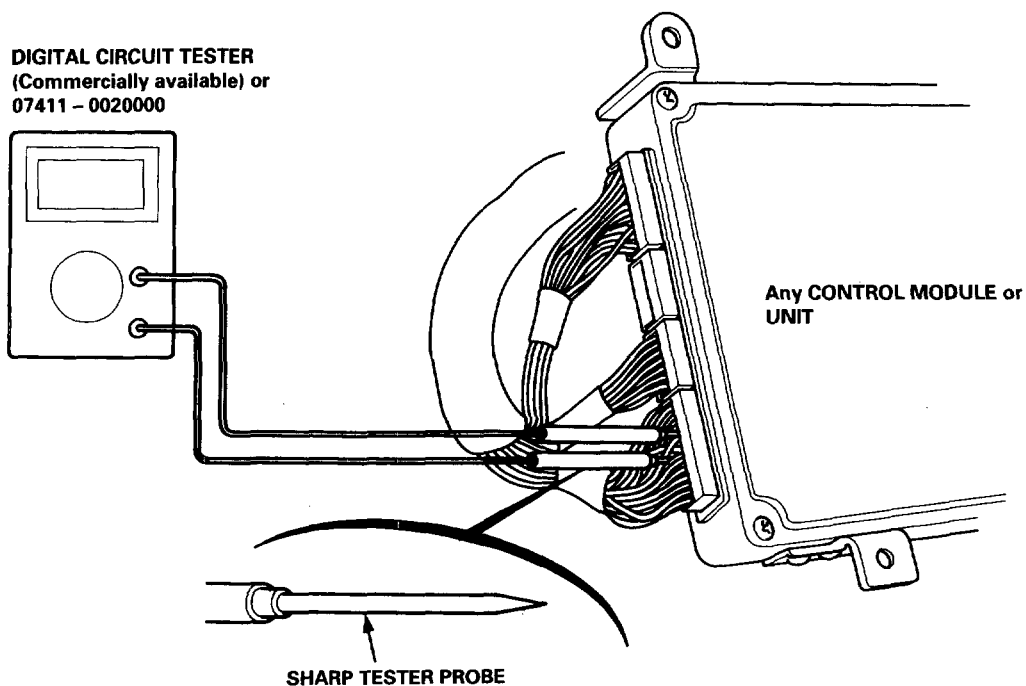
**NOTE:** Different wires with the same color in the same system have been given number suffixes to distinguish them (for example, YEL<sup>1</sup> and YEL<sup>2</sup> are not the same).

(cont'd)

# Preparation of Work

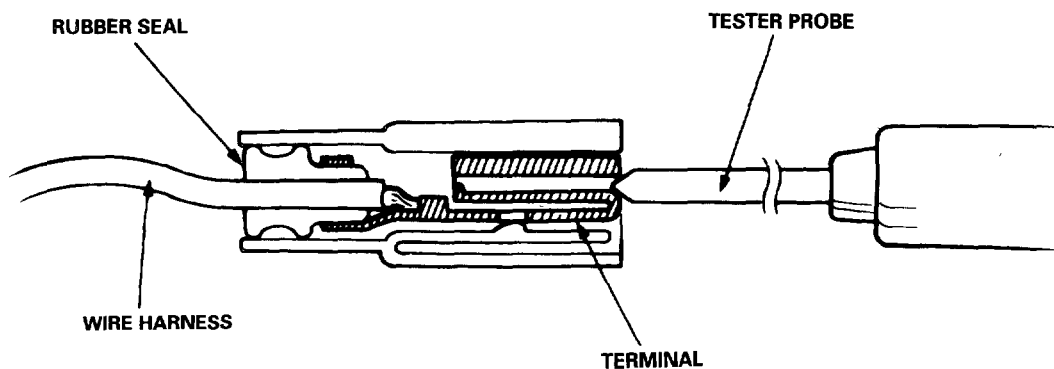
## Electrical Troubleshooting (cont'd)

When checking any control module(s) or unit(s) connector terminals, gently slide the sharp tester probe from the wire side into the connector until it comes in contact with the terminal end of the wire.



### ⚠ CAUTION

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





# Abbreviations



List of automotive abbreviations which may be used in shop manual.

ABS	Anti-lock Brake System	F	Front
A/C	Air Conditioning, Air Conditioner	FIA	Fuel Injection Air
ACL	Air Cleaner	FL	Front Left
A/F	Air Fuel Ratio	FP	Fuel Pump
ALT	Alternator	FR	Front Right
AMP	Ampere (s)	FSR	Fail Safe Relay
ANT	Antenna	FWD	Front Wheel Drive
API	American Petroleum Institute		
APPROX.	Approximately	GAL	Gallon
ASSY	Assembly	GND	Ground
A/T	Automatic Transmission		
ATDC	After Top Dead Center	H/B	Hatchback
ATF	Automatic Transmission Fluid	HC	Hydrocarbons
ATT	Attachment	HO2S	Heated Oxygen Sensor
ATTS	Active Torque Transfer System		
AUTO	Automatic	IAB	Intake Air Bypass
AUX	Auxiliary	IAC	Idle Air Control
		IAR	Intake Air Resonator
BARO	Barometric	IAT	Intake Air Temperature
BAT	Battery	ICM	Ignition Control Module
BDC	Bottom Dead Center	ID	Identification
BTDC	Before Top Dead Center	ID or I.D.	Inside Diameter
		IG or IGN	Ignition
CARB	Carburetor	IMA	Idle Mixture Adjustment
CAT	Catalytic Converter	IMMOBI.	Immobilizer (Immobiliser)
or CATA		IN	Intake
CHG	Charge	INJ	Injection
CKF	Crankshaft Speed Fluctuation	INT	Intermittent
CKP	Crankshaft Position		
CO	Carbon Monoxide	KS	Knock Sensor
COMP	Complete		
CPB	Clutch Pressure Back up	L	Left
CPC	Clutch Pressure Control	L/C	Lock-up Clutch
CPU	Central Processing Unit	LED	Light Emitting Diode
CVT	Continuously Variable Transmission	LF	Left Front
CYL	Cylinder	LH	Left Handle
CYP	Cylinder Position	LHD	Left Handle Drive
		LR	Left Rear
DI	Distributor Ignition	LSD	Limited Slip Differential
DIFF	Differential	L-4	In-line Four Cylinder (engine)
DLC	Data Link Connector		
DOHC	Double Overhead Camshaft		
DPI	Dual Point Injection		
DTC	Diagnostic Trouble Code		
ECM	Engine Control Module		
ECT	Engine Coolant Temperature		
EGR	Exhaust Gas Recirculation		
ELD	Electrical Load Detector		
EPR	Evaporator Pressure Regulator		
EPS	Electrical Power Steering		
EVAP	Evaporative		
EX	Exhaust		

(cont'd)

# Abbreviations

(cont'd)

MAP	Manifold Absolute Pressure	T	Torque
MAX.	Maximum	TB	Throttle Body
MBS	Mainshaft Brake System	T/B	Timing Belt
MCK	Motor Check	TC	Torque Converter
MCU	Moment Control Unit	TCM	Transmission Control Module
MIL	Malfunction Indicator Light	TCS	Traction Control System
MIN.	Minimum	TDC	Top Dead Center
MPI	Multi Point Injection	T/N	Tool Number
M/S	Manual Steering	TP	Throttle Position
M/T	Manual Transmission	TWC	Three Way Catalytic Converter
N	Neutral	VC	Viscous Coupling
NOx	Oxides of Nitrogen	VIN	Vehicle Identification Number
OBD	On-board Diagnostic	VSS	Vehicle Speed Sensor
O2S	Oxygen Sensor	VTEC	Variable Valve Timing & Valve Lift Electronic Control
OD or O.D.	Outside Diameter	VVIS	Variable Volume Intake System
P	Park	W	With
PAIR	Pulsed Secondary Air Injection	W/O	Without
PCM	Powertrain Control Module	WOT	Wide Open Throttle
PCV	Positive Crankcase Ventilation	2WD	Two Wheel Drive
PGM-FI	Programmed-fuel Injection	4WD	Four Wheel Drive
PGM-IG	Programmed Ignition	2WS	Two Wheel Steering
PH	Pressure High	4WS	Four Wheel Steering
PL	Pilot Light or Pressure Low	4AT	4-speed Automatic Transmission
PMR	Pump Motor Relay	5MT	5-speed Manual Transmission
P/N	Part Number	<b>P</b>	Park
PRI	Primary	<b>R</b>	Reverse
P/S	Power Steering	<b>N</b>	Neutral
PSF	Power Steering Fluid	<b>D<sub>4</sub></b>	Drive (1st through 4th gear)
PSP	Power Steering Pressure	<b>D<sub>3</sub></b>	Drive (1st through 3rd gear)
PSW	Pressure Switch	<b>2</b>	Second
Qty	Quantity	<b>1</b>	First
R	Right	<b>D</b>	Drive
REF	Reference	<b>S</b>	Second
RHD	Right Hand Drive	<b>L</b>	Low
RL	Rear Left	1ST	Low (gear)
RON	Research Octane Number	2ND	Second (gear)
RR	Rear Right	3RD	Third (gear)
SAE	Society of Automotive Engineers	4TH	Fourth (gear)
SCS	Service Check Signal	5TH	Fifth (gear)
SEC	Second Secondary		
SOHC	Single Overhead Camshaft		
SOL	Solenoid		
SPEC	Specification		
S/R	Sun Roof		
SRS	Supplemental Restraint System		
STD	Standard		
SW	Switch		

## **Specifications**

<b>Standards and Service Limits .....</b>	<b>2-2</b>
<b>Design Specifications .....</b>	<b>2-17</b>
<b>Body Specifications .....</b>	<b>2-21</b>

# Standards and Service Limits

## Engine Electrical — Section 4

	MEASUREMENT	STANDARD (NEW)	
Ignition coil* <sup>1</sup> (TEC)	Rated voltage V Primary winding resistance at 20°C (68°F) Ω Secondary winding resistance at 20°C (68°F) kΩ	12 0.63 – 0.77 12.8 – 19.2	
Ignition coil* <sup>2</sup> (LUCAS)	Rated voltage V Primary winding resistance at 20°C (68°F) Ω Secondary winding resistance at 20°C (68°F) kΩ	12 0.45 – 0.55 22.4 – 33.6	
Ignition coil* <sup>3</sup> (LUCAS)	Rated voltage V Primary winding resistance at 20°C (68°F) Ω Secondary winding resistance at 20°C (68°F) kΩ	12 0.54 – 0.66 13.6 – 20.4	
Firing order		1 – 3 – 4 – 2	
Spark plug	Type Electrode gap	Refer to Section 4 1.1 <sub>-0.1</sub> (0.043 <sub>-0.004</sub> )	
Ignition timing	At idle	16° ± 2° (Red) BTDC	
Alternator belt* <sup>4,5</sup>	Deflection with 98 N (10 kgf, 22 lbf) between pulleys	7.0 – 10.5 (0.28 – 0.41) with used belt 5.0 – 7.0 (0.19 – 0.28) with new belt	
	Tension measured with belt tension gauge N (kgf, lbf)	340 – 490 (35 – 50, 77 – 110) with used belt 640 – 780 (65 – 80, 140 – 180) with new belt	
Alternator belt* <sup>4,6</sup>	Deflection with 98 N (10 kgf, 22 lbf) between pulleys	9.0 – 11.0 (0.35 – 0.43) with used belt 6.0 – 8.0 (0.24 – 0.31) with new belt	
	Tension measured with belt tension gauge N (kgf, lbf)	340 – 490 (35 – 50, 77 – 110) with used belt 640 – 880 (65 – 90, 140 – 200) with new belt	
Alternator* <sup>5</sup> (BOSCH)	Output 13.5 V at hot A	75	
	Coil resistance (rotor) Ω	2.3	
	Slip ring O.D.	14.4 (0.567)	14.0 (0.551)
	Brush length	12.5 (0.49)	2.5 (0.10)
	Brush spring tension g (oz)	330 (11.6)	
Alternator* <sup>6</sup> (DENSO)	Output 13.5 V at hot A	90	
	Coil resistance (rotor) Ω	2.9	
	Slip ring O.D.	14.4 (0.567)	14.0 (0.551)
	Brush length	10.5 (0.41)	1.5 (0.06)
	Brush spring tension g (oz)	330 (11.6)	
Starter motor* <sup>7</sup> (VALEO 1.0 kW)	Type	Gear reduction	
Starter motor* <sup>8</sup> (MITSUBA 1.0 kW)	Type	Gear reduction	
	Mica depth	0.4 – 0.5 (0.016 – 0.020)	0.15 (0.006)
	Commutator runout	0 – 0.02 (0 – 0.001)	0.05 (0.002)
	Commutator O.D.	28.0 – 28.1 (1.102 – 1.106)	27.5 (1.083)
	Brush length	15.8 – 16.2 (0.62 – 0.64)	11.0 (0.43)
	Brush spring tension (new) N (kgf, lbf)	15.7 – 17.7 (1.60 – 1.80, 3.5 – 4.0)	

\*1, 6, 8: B18C4 engine

\*2: D15Z8 engine

\*3: D14A7, D14A8, D16B2 engines

\*4: When using a new belt, adjust deflection or tension to new belt values. Run the engine for 5 minutes then turn it off. Readjust deflection or tension to used belt values.

\*5, 7: All except B18C4 engine

**Cylinder Head/Valve Train — Section 6**  
**D14A7, D14A8, D15Z8, D16B2 engines**

		MEASUREMENT		STANDARD (NEW)		SERVICE LIMIT	
Compression	250 rpm (min <sup>-1</sup> ) and wide open throttle kPa (kgf/cm <sup>2</sup> , psi)	Nominal		1,270 (13.0, 184)			
		Minimum		930 (9.5, 135)			
		Maximum variation		200 (2.0, 28)			
Cylinder head	Warpage			92.95 – 93.05 (3.659 – 3.663)		0.05 (0.002)	
	Height						
Camshaft	End play			0.05 – 0.15 (0.002 – 0.006)		0.5 (0.02)	
	Camshaft-to-holder oil clearance			0.050 – 0.089 (0.002 – 0.004)		0.15 (0.006)	
	Total runout			0.03 (0.001) max.		0.04 (0.002)	
	Cam lobe height						
	D15Z8 engine	IN	Primary	38.427 (1.5129)		—	
			Secondary	32.292 (1.2713)		—	
		EX		38.784 (1.5269)		—	
	D16B2 engine	IN		35.019 (1.3787)*1, 34.734 (1.3674)*2		—	
		EX		37.904 (1.4923)		—	
	D14A7, D14A8 engines	IN		34.274 (1.3494)		—	
		EX		36.594 (1.4407)		—	
Valve	Valve clearance		IN	0.18 – 0.22 (0.007 – 0.009)		—	
			EX	0.23 – 0.27 (0.009 – 0.011)		—	
	Valve stem O.D.		IN	5.48 – 5.49 (0.2157 – 0.2161)		5.45 (0.2146)	
			EX	5.45 – 5.46 (0.2146 – 0.2150)		5.42 (0.2134)	
	Stem-to-guide clearance		IN	0.02 – 0.05 (0.001 – 0.002)		0.08 (0.003)	
		EX	0.05 – 0.08 (0.002 – 0.003)		0.11 (0.004)		
Valve seat	Width		IN	0.85 – 1.15 (0.033 – 0.045)		1.6 (0.062)	
			EX	1.25 – 1.55 (0.049 – 0.061)		2.0 (0.079)	
	Stem installed height		IN	53.17 – 53.64 (2.093 – 2.112)		53.89 (2.122)	
			EX	53.17 – 53.64 (2.093 – 2.112)		53.89 (2.122)	
Valve spring	Free length	D15Z8 engine	IN	56.5 (2.22)		—	
			EX	58.7 (2.31)		—	
		D14A7, D14A8, D16B2 engines	IN and EX	58.7 (2.31)		—	
Valve guide	I.D.		IN	5.51 – 5.53 (0.217 – 0.218)		5.55 (0.219)	
			EX	5.51 – 5.53 (0.217 – 0.218)		5.55 (0.219)	
	Installed height		IN	17.85 – 18.35 (0.703 – 0.722)		—	
			EX	18.65 – 19.15 (0.734 – 0.754)		—	
Rocker arm	Arm-to-shaft clearance		IN	0.017 – 0.050 (0.0007 – 0.0020)		0.08 (0.003)	
			EX	0.018 – 0.054 (0.0007 – 0.0021)		0.08 (0.003)	

\*1: Timing belt side, \*2: Distributor side

# Standards and Service Limits

## Cylinder Head/Valve Train (B18C4 engine) — Section 6

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT	
Compression	250 rpm (min <sup>-1</sup> ) and wide open throttle kPa (kgf/cm <sup>2</sup> , psi)	Nominal Minimum Maximum variation	1,520 (15.5, 220) 930 (9.5, 140) 290 (3.0, 43)		
Cylinder head	Warpage Height		141.95 – 142.05 (5.589 – 5.593)	0.05 (0.002)	
Camshaft	End play		0.05 – 0.15 (0.002 – 0.006)	0.5 (0.02)	
	Camshaft-to-holder oil clearance		0.050 – 0.089 (0.002 – 0.004)	0.15 (0.006)	
	Total runout		0.03 (0.001) max.	0.04 (0.002)	
	Cam lobe height	IN Primary		33.411 (1.3154)	—
		Mid		36.377 (1.4322)	—
		EX Primary		34.547 (1.3601)	—
	Mid		33.111 (1.3036)	—	
	Secondary		35.720 (1.4063)	—	
	Secondary		34.381 (1.3536)	—	
Valve	Valve clearance (Cold)*	IN	0.15 – 0.19 (0.006 – 0.007)	—	
		EX	0.17 – 0.21 (0.007 – 0.008)	—	
	Valve stem O.D.	IN	5.475 – 5.485 (0.2156 – 0.2159)	5.445 (0.2144)	
		EX	5.450 – 5.460 (0.2146 – 0.2150)	5.420 (0.2134)	
	Stem-to-guide clearance	IN	0.025 – 0.055 (0.0010 – 0.0022)	0.08 (0.003)	
EX		0.050 – 0.080 (0.0020 – 0.0031)	0.11 (0.004)		
Valve seat	Width	IN	1.25 – 1.55 (0.049 – 0.061)	2.0 (0.08)	
		EX	1.25 – 1.55 (0.049 – 0.061)	2.0 (0.08)	
	Stem installed height	IN	37.465 – 37.935 (1.4750 – 1.4935)	38.185 (1.5033)	
		EX	37.165 – 37.635 (1.4632 – 1.4817)	37.885 (1.4915)	
Valve spring	Free length (Reference)	IN Outer	41.05 (1.616)	—	
		Inner	36.16 (1.424)	—	
		EX NH	41.96 (1.652)	—	
		CH	41.94 (1.651)	—	
Valve guide	I.D.	IN	5.51 – 5.53 (0.217 – 0.218)	5.55 (0.219)	
		EX	5.51 – 5.53 (0.217 – 0.218)	5.55 (0.219)	
	Installed height	IN	12.55 – 13.05 (0.494 – 0.514)	—	
		EX	12.55 – 13.05 (0.494 – 0.514)	—	
Rocker arm	Arm-to-shaft clearance	IN	0.025 – 0.052 (0.0010 – 0.0020)	0.08 (0.003)	
		EX	0.025 – 0.052 (0.0010 – 0.0020)	0.08 (0.003)	

\*: Measured between the camshaft and rocker arm.

NH: NIHON HATSUJO manufacture valve spring

CH: CHUO HATSUJO manufacture valve spring

**Engine Block — Section 7**  
**D14A7, D14A8, D15Z8, D16B2 engines**

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface Bore diameter Bore taper Reboring limit	0.07 (0.003) max. 75.00 – 75.02 (2.953 – 2.954) — —	0.10 (0.004) 75.07 (2.956) 0.05 (0.002) 0.5 (0.02)
Piston	Skirt O.D. At 5 mm (0.2 in) from bottom of skirt Clearance in cylinder Groove width (for ring) Top D15Z8, D16B2 engines D14A7, D14A8 engines Second D15Z8, D16B2 engines D14A7, D14A8 engines Oil	74.980 – 74.990 (2.9520 – 2.9524) 0.010 – 0.040 (0.0004 – 0.0016) 1.020 – 1.030 (0.0402 – 0.0406) 1.220 – 1.230 (0.0480 – 0.0484) 1.220 – 1.230 (0.0480 – 0.0484) 1.520 – 1.530 (0.0598 – 0.0602) 2.805 – 2.820 (0.1104 – 0.1110)	74.970 (2.9516) 0.05 (0.002) 1.05 (0.041) 1.25 (0.049) 1.25 (0.049) 1.55 (0.061) 2.85 (0.112)
Piston ring	Ring-to-groove clearance Top D15Z8, D16B2 engines D14A7, D14A8 engines Second Ring end gap Top Second Oil D15Z8, D16B2 engines D14A7, D14A8 engines	0.035 – 0.060 (0.0014 – 0.0024) 0.030 – 0.060 (0.0012 – 0.0024) 0.030 – 0.055 (0.0012 – 0.0022) 0.15 – 0.30 (0.006 – 0.012) 0.30 – 0.45 (0.012 – 0.018) 0.20 – 0.70 (0.008 – 0.028) 0.20 – 0.80 (0.008 – 0.031)	0.13 (0.005) 0.13 (0.005) 0.13 (0.005) 0.60 (0.024) 0.70 (0.028) 0.80 (0.031) 0.90 (0.035)
Piston pin	O.D. Pin-to-piston clearance	18.994 – 19.000 (0.7478 – 0.7480) 0.010 – 0.022 (0.0004 – 0.0009)	— —
Connecting rod	Pin-to-rod interference Small end bore diameter Large end bore diameter Nominal D16B2 engine D15Z8 engine D14A7, D14A8 engines End play installed on crankshaft	0.014 – 0.040 (0.0006 – 0.0016) 18.96 – 18.98 (0.746 – 0.747) 48.0 (1.89) 45.0 (1.77) 43.0 (1.69) 0.15 – 0.30 (0.006 – 0.012)	— — — — — 0.40 (0.016)
Crankshaft	Main journal diameter D16B2 engine D14A7, D14A8, D15Z8 engines Rod journal diameter D16B2 engine D15Z8 engine D14A7, D14A8 engines Taper Out of round End play Total runout	54.976 – 55.000 (2.1644 – 2.1654) 44.976 – 45.000 (1.7707 – 1.7717) 44.976 – 45.000 (1.7707 – 1.7717) 41.976 – 42.000 (1.6526 – 1.6535) 39.976 – 40.000 (1.5739 – 1.5748) 0.0025 (0.0001) max. 0.0025 (0.0001) max. 0.10 – 0.35 (0.004 – 0.014) 0.03 (0.001) max.	— — — — — 0.005 (0.0002) 0.005 (0.0002) 0.45 (0.018) 0.04 (0.002)
Bearing	Main bearing-to-journal oil clearance No. 1 and 5 journals No. 2, 3 and 4 journals D16B2 engine Except D16B2 engine Rod bearing-to-journal oil clearance	0.018 – 0.036 (0.0007 – 0.0014) 0.024 – 0.042 (0.0009 – 0.0017) 0.020 – 0.038 (0.0008 – 0.0015) 0.020 – 0.038 (0.0008 – 0.0015)	0.05 (0.002) 0.05 (0.002) 0.05 (0.002) 0.05 (0.002)

# Standards and Service Limits

## Engine Block (B18C4 engine) — Section 7

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Cylinder block	Warpage of deck surface	0.05 (0.002) max.	0.08 (0.003)	
	Bore diameter	81.00 – 81.02 (3.189 – 3.190)	81.07 (3.192)	
	Bore taper	—	0.05 (0.002)	
	Reboring limit	—	0.25 (0.010)	
Piston	Skirt O.D. at 15 mm (0.6 in) from bottom of skirt	80.98 – 80.99 (3.188 – 3.189)	80.97 (3.188)	
	Clearance in cylinder	0.01 – 0.04 (0.0004 – 0.0016)	0.05 (0.002)	
	Groove width (For ring)	Top	1.030 – 1.040 (0.0406 – 0.0409)	1.060 (0.0417)
		Second	1.230 – 1.240 (0.0484 – 0.0488)	1.260 (0.0496)
Piston ring	Ring-to-piston groove clearance	Top	0.045 – 0.070 (0.0018 – 0.0028)	
		Second	0.040 – 0.065 (0.0016 – 0.0026)	
	Ring end gap	Top	0.20 – 0.35 (0.008 – 0.014)	
		Second	0.40 – 0.55 (0.016 – 0.022)	
Piston Pin	O.D. Pin-to-piston clearance	Oil	0.20 – 0.50 (0.008 – 0.020)	
		Oil	0.70 (0.028)	
Connecting rod	Pin-to-rod interference Small end bore diameter Large end bore diameter End play installed on crankshaft	Nominal	—	
			—	
			—	
			0.15 – 0.30 (0.006 – 0.012)	
Crankshaft	Main journal diameter	No. 1, 2, 4 and 5 journals	54.976 – 55.000 (2.1644 – 2.1654)	
		No. 3 journal	54.974 – 54.998 (2.1643 – 2.1653)	
		—		
	Rod journal diameter	44.976 – 45.000 (1.7707 – 1.7717)	—	
	Taper	0.005 (0.0002) max.	0.010 (0.004)	
	Out-of round	0.004 (0.0002) max.	0.006 (0.0002)	
	End play	0.10 – 0.35 (0.004 – 0.014)	0.45 (0.018)	
Runout	0.02 (0.0008) max.	0.03 (0.0012)		
Bearing	Main bearing-to-journal oil clearance No. 1, 2, 4 and 5 journals No. 3 journal	—		
		0.024 – 0.042 (0.0009 – 0.0017)		
		0.030 – 0.048 (0.0012 – 0.0019)		
Rod bearing-to-journal oil clearance	—			
	0.032 – 0.050 (0.0013 – 0.0020)			

## Engine Lubrication — Section 8 D14A7, D14A8, D15Z8, D16B2 engines

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US qt, Imp qt)	4.0 (4.2, 3.5) for engine overhaul 3.3 (3.5, 2.9) for oil change, including filter 3.0 (3.2, 2.6) for oil change, without filter	
Oil pump	Inner-to-outer rotor radial clearance	0.02 – 0.14 (0.001 – 0.006)	0.20 (0.008)
	Pump body-to-outer rotor radial clearance	0.10 – 0.18 (0.004 – 0.007)	0.20 (0.008)
	Pump body-to-rotor axial clearance	0.03 – 0.08 (0.001 – 0.003)	0.15 (0.006)
Relief valve	Pressure setting 80°C (176°F) kPa (kgf/cm <sup>2</sup> , psi) at idle at 3,000 min <sup>-1</sup> (rpm)	70 (0.7, 10) min. 340 (3.5, 50) min.	

## Engine Lubrication (B18C4 engine) — Section 8

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US qt, Imp qt)	4.8 (5.1, 4.2) for engine overhaul 4.0 (4.2, 3.5) for oil change, including filter 3.7 (3.9, 3.3) for oil change, without filter	
Oil pump	Inner-to-outer rotor clearance	0.04 – 0.16 (0.002 – 0.006)	0.20 (0.008)
	Pump housing-to-outer rotor clearance	0.10 – 0.19 (0.004 – 0.007)	0.20 (0.008)
	Pump housing-to-rotor axial clearance	0.02 – 0.07 (0.001 – 0.003)	0.15 (0.008)
Relief valve	Pressure setting at engine oil temp. 80°C (176°F) kPa (kgf/cm <sup>2</sup> , psi) At idle At 3,000 rpm (min <sup>-1</sup> )	70 (0.7, 10) min. 340 (3.5, 50) min.	



**Cooling — Section 10**

	MEASUREMENT	STANDARD (NEW)
Radiator	Coolant capacity ℓ (US qt, Imp qt) including engine, heater, cooling line and reservoir Reservoir capacity: B18C4 engine 0.5 ℓ (0.5 US qt, 0.4 Imp qt) All except B18C4 engine	5.0 (5.3, 4.4) for overhaul 4.5 (4.8, 3.9) for coolant change MT: 4.5 (4.8, 3.9) for overhaul 3.6 (3.8, 3.2) for coolant change AT: 4.4 (4.7, 3.9) for overhaul 3.5 (3.7, 3.1) for coolant change
Radiator cap	Opening pressure kPa(kgf/cm <sup>2</sup> , psi)	93 – 123 (0.95 – 1.25, 14 – 18)
Thermostat	Start to open °C (°F) Fully open °C (°F) Valve lift at fully open	76 – 80 (169 – 176) 90 (194) 8.0 (0.31) min.
Cooling fan	Thermoswitch "ON" temperature °C (°F) Thermoswitch "OFF" temperature °C (°F)	91 – 95 (196 – 203) Subtract 3 – 8 (5 – 15) from actual "ON" temperature

**Fuel and Emissions — Section 11**

	MEASUREMENT	STANDARD (NEW)	
Pressure regulator	Pressure with regulator vacuum hose disconnected kPa (kgf/cm <sup>2</sup> , psi) All except B18C4 engine B18C4 engine	270 – 320 (2.8 – 3.3, 40 – 47) 320 – 370 (3.3 – 3.8, 47 – 54)	
Fuel tank	Capacity ℓ (US gal, Imp gal)	55 (14.5, 12.1)	
Engine	Idle speed with headlights and cooling fan off min <sup>-1</sup> (rpm) D14A7, D14A8, D16B2 engines D15Z8 engine B18C4 engine	M/T: Neutral	A/T: <b>N</b> or <b>P</b> position
		750 ± 50 750 ± 50 800 ± 50	750 ± 50 _____ _____
	Idle CO %	0.1 max.	

**Clutch — Section 12**

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Clutch pedal	Pedal height to floor	161 (6.34)	_____	
	Stroke	130 – 140 (5.12 – 5.51)	_____	
	Total free play	12 – 21 (0.047 – 0.83)	_____	
	Pedal play	1.0 – 10.0 (0.04 – 0.37)	_____	
	Disengagement height to floor	LHD	81 (3.19) min.	_____
RHD		79 (3.11) min.	_____	
Flywheel	Clutch surface runout	0.05 (0.002) max.	0.15 (0.006)	
Clutch disc	Rivet depth	All except B18C4 engine B18C4 engine	1.3 (0.051) min. 1.2 – 1.7 (0.047 – 0.067)	0.2 (0.008) 0.2 (0.008)
	Thickness	All except B18C4 engine B18C4 engine	7.7 – 8.2 (0.30 – 0.32) 8.4 – 9.1 (0.33 – 0.36)	6.0 (0.24) 6.0 (0.24)
Pressure plate	Warpage		0.03 (0.001) max.	0.15 (0.006)
	Diaphragm spring finger alignment		0.6 (0.02) max.	0.8 (0.03)

# Standards and Service Limits

## 1M Manual Transmission — Section 13

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Transmission oil	Capacity ℓ (US qt, Imp qt)	1.9 (2.0, 1.7) for overhaul 1.8 (1.9, 1.6) for oil change		
Mainshaft	End play	0.11 – 0.18 (0.004 – 0.007)	Adjust 21.930 (0.8634)	
	Diameter of ball bearing contact area (Transmission housing side)	21.987 – 22.000 (0.8656 – 0.8661)		
	Diameter of 4th, 5th gear contact area	26.980 – 26.993 (1.0622 – 1.0627)	26.930 (1.0602)	
	Diameter of 3rd gear contact area	33.984 – 34.000 (1.3380 – 1.3386)	33.930 (1.3358)	
	Diameter of ball bearing contact area (Clutch housing side)	25.977 – 25.990 (1.0227 – 1.0232)	25.920 (1.0205)	
Mainshaft 3rd and 4th gears	Runout	0.02 (0.001) max.	0.05 (0.002)	
	I.D.	39.009 – 39.025 (1.5358 – 1.5364)	39.07 (1.538)	
	End play			
	3rd	0.06 – 0.21 (0.002 – 0.008)	0.33 (0.013)	
Thickness	4th	0.07 – 0.20 (0.003 – 0.008)	0.31 (0.012)	
	3rd	30.22 – 30.27 (1.190 – 1.192)	30.15 (1.187)	
4th	30.11 – 30.16 (1.185 – 1.187)	30.05 (1.183)		
Mainshaft 5th gear	I.D.	37.009 – 37.025 (1.4570 – 1.4577)	37.07 (1.459)	
	End play	0.06 – 0.19 (0.002 – 0.007)	0.31 (0.012)	
	Thickness	28.42 – 28.47 (1.119 – 1.121)	28.35 (1.116)	
Countershaft	Diameter of needle bearing contact area	30.000 – 30.015 (1.1811 – 1.1817)	29.950 (1.1791)	
	Diameter of 1st gear contact area	35.984 – 36.000 (1.4167 – 1.4173)	35.930 (1.4146)	
	Diameter of ball bearing contact area	24.980 – 24.993 (0.9835 – 0.9840)	24.930 (0.9815)	
	Runout	0.02 (0.001) max.	0.05 (0.002)	
Countershaft 1st gear	I.D.	41.009 – 41.025 (1.6145 – 1.6152)	41.07 (1.617)	
	End play (When tightened by the specified torque)	0.03 – 0.10 (0.001 – 0.004)	0.22 (0.009)	
	Thickness	30.41 – 30.44 (1.197 – 1.198)	30.36 (1.195)	
Countershaft 2nd gear	I.D.	44.009 – 44.025 (1.7326 – 1.7333)	44.07 (1.735)	
	End play (When tightened by the specified torque)	0.04 – 0.12 (0.002 – 0.005)	0.24 (0.009)	
	Thickness	31.91 – 31.96 (1.256 – 1.258)	31.85 (1.254)	
Spacer collar (Countershaft 2nd gear)	I.D.	33.000 – 33.010 (1.2992 – 1.2996)	33.05 (1.301)	
	O.D.	38.989 – 39.000 (1.5350 – 1.5354)	38.93 (1.533)	
	Length	32.03 – 32.06 (1.261 – 1.262)	32.01 (1.260)	
Spacer collar (Mainshaft 4th and 5th gear)	I.D.	27.002 – 27.012 (1.0631 – 1.0635)	27.06 (1.065)	
	O.D.	33.989 – 34.000 (1.3381 – 1.3386)	33.93 (1.336)	
	Length	4th	31.989 – 32.000 (1.2594 – 1.2598)	31.93 (1.257)
		5th	22.83 – 22.86 (0.899 – 0.900)	22.81 (0.898)
5th	23.53 – 23.56 (0.926 – 0.928)	23.51 (0.926)		
Reverse idler gear	I.D.	15.016 – 15.043 (0.5912 – 0.5922)	15.08 (0.594)	
	Gear-to-reverse gear shaft clearance	0.032 – 0.077 (0.0013 – 0.0030)	0.14 (0.006)	
Synchro ring	Ring-to-gear clearance (Ring pushed against gear)	0.73 – 1.18 (0.029 – 0.046)	0.4 (0.02)	
Shift fork	Fork finger thickness	6.2 – 6.4 (0.244 – 0.252)	—	
	Fork-to-synchro sleeve clearance	1st/2nd, 5th	7.4 – 7.6 (0.291 – 0.299)	—
		3rd/4th	0.35 – 0.65 (0.014 – 0.026)	1.0 (0.04)
Reverse shift fork	Fork pawl groove width	12.7 – 13.0 (0.50 – 0.51)	—	
	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-5th/reverse shift piece pin clearance	0.05 – 0.35 (0.002 – 0.014)	0.5 (0.02)	
Shift arm A	Inner diameter of shift arm C contact point	13.05 – 13.13 (0.514 – 0.517)	—	
	Shift arm A-to-shift arm C clearance	0.05 – 0.23 (0.002 – 0.009)	0.35 (0.014)	
Shift arm B	Inner diameter of shift arm B shaft contact point	13.973 – 14.000 (0.5501 – 0.5512)	—	
	Shift arm B-to-shaft clearance	0.013 – 0.070 (0.0005 – 0.0028)	0.16 (0.006)	
	Shift arm B-to-shift piece clearance	0.2 – 0.5 (0.008 – 0.020)	0.8 (0.032)	
	Diameter of shift piece contact point	12.9 – 13.0 (0.508 – 0.512)	12.78 (0.5031)	
Differential carrier	Pinion shaft bore diameter	18.010 – 18.028 (0.7091 – 0.7098)	—	
	Carrier-to-pinion shaft clearance	0.023 – 0.057 (0.0009 – 0.0022)	0.095 (0.004)	
	Driveshaft bore diameter	26.025 – 26.045 (1.0246 – 1.0254)	—	
	Carrier-to-driveshaft clearance	0.045 – 0.086 (0.0018 – 0.0034)	0.14 (0.006)	
Differential pinion gear	Backlash	0.05 – 0.15 (0.002 – 0.006)	—	
	Pinion gear bore diameter	18.042 – 18.066 (0.7103 – 0.7113)	—	
	Pinion gear-to-pinion shaft clearance	0.055 – 0.095 (0.0021 – 0.0037)	0.15 (0.006)	
Set ring-to-bearing outer race		0 – 0.1 (0 – 0.004)	Adjust with shim	

**S9B Manual Transmission — Section 13**

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US qt, Imp qt)	2.3 (2.4, 2.0) for overhaul 2.2 (2.3, 1.9) for oil change	
Mainshaft	End play	0.11 – 0.18 (0.004 – 0.007)	Adjust 27.930 (1.0996)
	Diameter of ball bearing contact area A (Clutch housing side)	27.977 – 27.990 (1.1015 – 1.1020)	
	Diameter of 3rd gear contact area B	37.984 – 38.000 (1.4954 – 1.4960)	37.930 (1.4933)
	Diameter of ball bearing contact area C (Transmission housing side)	27.987 – 28.000 (1.1018 – 1.1024)	27.940 (1.1000)
Mainshaft 3rd and 4th gears	Runout	0.02 (0.001) max.	0.05 (0.002)
	I.D.	43.009 – 43.025 (1.6933 – 1.6939)	43.08 (1.696)
	End play	0.06 – 0.21 (0.002 – 0.008)	0.3 (0.01)
Mainshaft 5th gear	Thickness	34.92 – 34.97 (1.375 – 1.377) 31.42 – 31.47 (1.237 – 1.239)	34.3 (1.350) 31.3 (1.232)
	I.D.	43.009 – 43.025 (1.6933 – 1.6939)	43.08 (1.696)
Countershaft	End play	0.06 – 0.21 (0.002 – 0.008)	0.3 (0.01)
	Thickness	31.42 – 31.47 (1.237 – 1.239)	31.3 (1.232)
	Diameter of ball bearing contact area A	24.980 – 24.993 (0.9835 – 0.9840)	24.940 (0.9818)
	Diameter of 1st gear contact area B	36.984 – 37.000 (1.4561 – 1.4567)	36.930 (1.4539)
Countershaft 1st gear	Diameter of needle bearing contact area C	33.000 – 33.015 (1.2992 – 1.2998)	32.950 (1.2970)
	Runout	0.02 (0.0008) max.	0.05 (0.002)
	I.D.	42.009 – 42.025 (1.6539 – 1.6545)	42.07 (1.656)
Countershaft 2nd gear	End play (When tightened by the specified torque)	0.045 – 0.205 (0.0018 – 0.0081)	0.25 (0.01)
	Thickness	31.45 – 31.50 (1.238 – 1.240)	—
	I.D.	47.009 – 47.025 (1.8507 – 1.8514)	47.07 (1.853)
Spacer collar (Countershaft 2nd gear)	End play (When tightened by the specified torque)	0.07 – 0.14 (0.0027 – 0.0055)	0.24 (0.009)
	Thickness	28.92 – 28.97 (1.1386 – 1.1405)	28.8 (1.134)
	I.D.	36.48 – 36.49 (1.4362 – 1.4366)	36.54 (1.439)
Spacer collar (Mainshaft 4th and 5th gear)	O.D.	41.989 – 42.000 (1.6531 – 1.6535)	41.93 (1.651)
	Length	29.07 – 29.09 (1.1444 – 1.1453)	—
	I.D.	31.002 – 31.012 (1.2205 – 1.2209)	31.06 (1.223)
Reverse idler gear	O.D.	37.989 – 38.000 (1.4956 – 1.4961)	37.94 (1.494)
	Length	56.45 – 56.55 (2.2224 – 2.2264)	—
	4th/5th gear side	26.03 – 26.08 (1.025 – 1.027)	—
Synchro ring	I.D.	20.028 – 20.049 (0.7885 – 0.7893)	20.09 (0.7909)
	Gear-to-reverse gear shaft clearance	0.028 – 0.062 (0.0011 – 0.0024)	0.16 (0.006)
Double cone	Ring-to-gear clearance (Ring pushed against gear)	0.73 – 1.18 (0.029 – 0.046)	0.4 (0.016)
	Clearance (Ring pushed against gear)		
	Outer synchro ring-to-gear	0.95 – 1.68 (0.037 – 0.066)	0.6 (0.024)
Shift fork	Inner synchro ring-to-gear	0.5 – 1.0 (0.02 – 0.04)	0.3 (0.01)
	Outer synchro ring-to-synchro cone	0.5 – 1.0 (0.02 – 0.04)	0.3 (0.01)
	Fork finger thickness	7.4 – 7.6 (0.291 – 0.299)	—
Reverse shift fork	Fork-to-synchro sleeve clearance	0.35 – 0.65 (0.015 – 0.026)	1.0 (0.04)
	Fork pawl groove width	13.0 – 13.3 (0.512 – 0.524)	—
	Fork-to-reverse idler gear clearance	0.5 – 1.1 (0.02 – 0.04)	1.8 (0.07)
	L-groove width	At 5th gear side 7.4 – 7.7 (0.29 – 0.30) At reverse side 7.05 – 7.25 (0.278 – 0.285)	—
Shift piece	Fork-to-5th/reverse shift piece pin clearance	At 5th gear side 0.4 – 0.9 (0.02 – 0.04) At reverse side 0.05 – 0.45 (0.0025 – 0.018)	—
	Shift piece-to-shift arm clearance	0.1 – 0.3 (0.004 – 0.012)	0.6 (0.02)
	Groove width of shift arm contact area	8.1 – 8.2 (0.319 – 0.323)	—
	Shift-piece-to-shift fork shaft clearance	0.2 – 0.5 (0.008 – 0.020)	0.8 (0.03)
Select arm	Width of shift fork contact area	11.9 – 12.0 (0.469 – 0.472)	—
	Select arm-to-interlock clearance	0.05 – 0.25 (0.002 – 0.01)	0.45 (0.018)
Interlock	Select arm-to-shim clearance	0.01 – 0.2 (0.0004 – 0.008)	—
	Width of select arm contact area	9.9 – 10.0 (0.390 – 0.394)	—
Change piece	Change piece-to-shift arm holder clearance	0.05 – 0.35 (0.002 – 0.014)	0.8 (0.03)
	Groove width of shift arm holder contact area	12.05 – 12.15 (0.474 – 0.478)	—
	Change piece-to-select arm clearance	0.05 – 0.35 (0.002 – 0.014)	0.5 (0.02)
	Groove width of select arm contact area	12.05 – 12.15 (0.474 – 0.478)	—
Differential taper roller bearing preload starting torque N-m (kgf-cm, lbf-ft)		2.11 – 3.04 (21.5 – 31.0, 13.0 – 18.7)	Adjust

# Standards and Service Limits

## Automatic Transmission — Section 14

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission fluid	Capacity ℓ (US qt, Imp qt)		5.9 (6.2, 5.2) for overhaul 2.7 (2.8, 2.4) for fluid change	
Hydraulic pressure kPa (kgf/cm <sup>2</sup> , psi) D16B2 engine	Line pressure at 2,000 rpm (min <sup>-1</sup> ) <b>N</b> or <b>P</b> position		830 – 880 (8.5 – 9.0, 120 – 130)	780 (8.0, 110)
	2nd clutch pressure at 2,000 rpm (min <sup>-1</sup> ) <b>D<sub>4</sub></b> position		370 – 420 (3.8 – 4.3, 54 – 61) throttle fully closed	360 (3.7, 53) throttle fully closed
	3rd clutch pressure at 2,000 rpm (min <sup>-1</sup> ) <b>D<sub>4</sub></b> position		830 – 880 (8.5 – 9.0, 120 – 130) throttle more than 2/8 opened	780 (8.0, 110) throttle more than 2/8 opened
	4th clutch pressure at 2,000 rpm (min <sup>-1</sup> ) <b>D<sub>4</sub></b> position			
	2nd clutch pressure at 2,000 rpm (min <sup>-1</sup> ) <b>2</b> position		830 – 880 (8.5 – 9.0, 120 – 130)	780 (8.0, 110)
	1st clutch pressure at 2,000 rpm (min <sup>-1</sup> ) <b>D<sub>4</sub></b> or <b>1</b> position			
	1st-hold clutch pressure at 2,000 rpm (min <sup>-1</sup> ) <b>1</b> position			
	Governor pressure at 60 km/h (38 mph)		173 – 192 (1.76 – 1.96, 25.0 – 27.9)	168 (1.71, 24)
	Throttle B pressure		Throttle fully closed 0 – 15 (0 – 0.15, 0 – 2.1) Throttle fully opened 830 – 880 (8.5 – 9.0, 120 – 130)	— 780 (8.0, 110)
	Throttle A pressure		Throttle fully closed 0 – 5 (0 – 0.05, 0 – 0.7) Throttle fully opened 525 – 540 (5.35 – 5.5, 76 – 78)	— 520 (5.3, 75)
Hydraulic pressure kPa (kgf/cm <sup>2</sup> , psi) D14A7, D14A8 engines	Line pressure at 2,000 rpm (min <sup>-1</sup> ) <b>N</b> or <b>P</b> position		780 – 830 (8.0 – 8.5, 110 – 120)	740 (7.5, 110)
	2nd clutch pressure at 2,000 rpm (min <sup>-1</sup> ) <b>D<sub>4</sub></b> position		370 – 420 (3.8 – 4.3, 54 – 61) throttle fully closed	360 (3.7, 53) throttle fully closed
	3rd clutch pressure at 2,000 rpm (min <sup>-1</sup> ) <b>D<sub>4</sub></b> position		780 – 830 (8.0 – 8.5, 110 – 120) throttle more than 2/8 opened	740 (7.5, 110) throttle more than 2/8 opened
	4th clutch pressure at 2,000 rpm (min <sup>-1</sup> ) <b>D<sub>4</sub></b> position			
	2nd clutch pressure at 2,000 rpm (min <sup>-1</sup> ) <b>2</b> position		780 – 830 (8.0 – 8.5, 110 – 120)	740 (7.5, 110)
	1st clutch pressure at 2,000 rpm (min <sup>-1</sup> ) <b>D<sub>4</sub></b> or <b>1</b> position			
	1st-hold clutch pressure at 2,000 rpm (min <sup>-1</sup> ) <b>1</b> position			
	Governor pressure at 60 km/h (38 mph)		173 – 192 (1.76 – 1.96, 25.0 – 27.9)	168 (1.71, 24)
	Throttle B pressure		Throttle fully closed 0 – 15 (0 – 0.15, 0 – 2.1) Throttle fully opened 780 – 830 (8.0 – 8.5, 110 – 120)	— 740 (7.5, 110)
	Throttle A pressure		Throttle fully closed 0 – 5 (0 – 0.05, 0 – 0.7) Throttle fully opened 525 – 540 (5.35 – 5.5, 76 – 78)	— 520 (5.3, 75)
Stall speed rpm (min <sup>-1</sup> ) (check with vehicle on level ground)		D16B2 engine 2,800 D14A7, D14A8 engines 2,550	2,650 – 2,950 2,400 – 2,700	
Clutch	Clutch initial clearance		1st, 2nd 0.65 – 0.85 (0.026 – 0.033) 3rd, 4th 0.40 – 0.60 (0.016 – 0.024) 1st-hold 0.5 – 0.8 (0.02 – 0.03)	— — —
	Clutch return spring free length		1st 31.1 (1.22) 2nd, 3rd, 4th 30.5 (1.20) 1st-hold 34.6 (1.36)	29.1 (1.15) 28.5 (1.12) 32.6 (1.28)
	Clutch disc thickness		1.88 – 2.00 (0.074 – 0.079)	Until grooves wear out
	Clutch plate thickness		1st, 1st-hold 1.55 – 1.65 (0.061 – 0.065) 2nd, 3rd, 4th 1.95 – 2.05 (0.077 – 0.081)	Discoloration Discoloration
	Clutch end plate thickness (except 1st-hold)		MARK 1 2.3 – 2.4 (0.091 – 0.094) MARK 2 2.4 – 2.5 (0.094 – 0.098) MARK 3 2.5 – 2.6 (0.098 – 0.102) MARK 4 2.6 – 2.7 (0.102 – 0.106) MARK 5 2.7 – 2.8 (0.106 – 0.110) MARK 6 2.8 – 2.9 (0.110 – 0.114) MARK 7 2.9 – 3.0 (0.114 – 0.118) MARK 8 3.0 – 3.1 (0.118 – 0.122) MARK 9 3.1 – 3.2 (0.122 – 0.126) MARK 10 3.2 – 3.3 (0.126 – 0.130) MARK 11 2.0 – 2.1 (0.079 – 0.083) MARK 12 2.1 – 2.2 (0.083 – 0.087) MARK 13 2.2 – 2.3 (0.087 – 0.091)	Discoloration ↑ ↓ Discoloration
	Clutch end plate thickness (1st-hold)		MARK 1 2.05 – 2.10 (0.081 – 0.083) MARK 2 2.15 – 2.20 (0.085 – 0.087) MARK 3 2.25 – 2.30 (0.089 – 0.091) MARK 4 2.35 – 2.40 (0.093 – 0.094) NO MARK 2.45 – 2.50 (0.096 – 0.098) MARK 6 2.55 – 2.60 (0.100 – 0.102) MARK 7 2.65 – 2.70 (0.104 – 0.106)	Discoloration ↑ ↓ Discoloration

**Automatic Transmission — Section 14**

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Transmission	Diameter of needle bearing contact area		↑ Wear or damage ↓	
	On mainshaft stator shaft bearing	23.980 – 23.993 (0.9441 – 0.9446)		
	On mainshaft 2nd gear	35.975 – 35.991 (1.4163 – 1.4169)		
	On mainshaft 4th gear collar	31.975 – 31.991 (1.2589 – 1.2595)		
	On mainshaft 1st gear collar	30.975 – 30.991 (1.2195 – 1.2201)		
	On countershaft (L. side)	36.004 – 36.017 (1.4175 – 1.4180)		
	On countershaft 3rd gear collar	35.980 – 35.996 (1.4165 – 1.4172)		
	On countershaft 4th gear	27.980 – 27.993 (1.1016 – 1.1021)		
	On countershaft reverse gear collar	31.975 – 31.991 (1.2589 – 1.2595)		
	On countershaft 1st gear collar	31.975 – 31.991 (1.2589 – 1.2595)		
	On sub-shaft (L. side)	25.991 – 26.000 (1.0233 – 1.0236)		
	On sub-shaft 4th gear collar	27.980 – 27.993 (1.1016 – 1.1021)		
	On reverse idler gear shaft	13.990 – 14.000 (0.5508 – 0.5512)		
	Inside diameter of needle bearing contact area			
	On mainshaft 1st gear	35.000 – 35.016 (1.3780 – 1.3786)		
	On mainshaft 2nd gear	41.000 – 41.016 (1.6142 – 1.6148)		
	On mainshaft 4th gear	38.000 – 38.016 (1.4961 – 1.4967)		
	On countershaft 1st gear	38.000 – 38.016 (1.4961 – 1.4967)		
	On countershaft 3rd gear	41.000 – 41.016 (1.6142 – 1.6148)		
	On countershaft 4th gear	33.000 – 33.016 (1.2992 – 1.2998)		
	On countershaft reverse gear	38.000 – 38.016 (1.4961 – 1.4967)		
	On sub-shaft 4th gear	32.000 – 32.016 (1.2598 – 1.2605)		
	On reverse idler gear	18.007 – 18.020 (0.7089 – 0.7094)		
	On reverse idler gear shaft holder	14.416 – 14.434 (0.5676 – 0.5683)		
	End play			
	Mainshaft 1st gear	0.05 – 0.16 (0.002 – 0.006)		—
	Mainshaft 2nd gear	0.05 – 0.13 (0.002 – 0.0051)		—
	Mainshaft 4th gear	0.05 – 0.16 (0.002 – 0.006)		—
	Countershaft 1st gear	0.1 – 0.5 (0.004 – 0.020)		—
	Countershaft 3rd gear	0.05 – 0.17 (0.002 – 0.0067)		—
	Countershaft 4th gear	0.10 – 0.18 (0.004 – 0.0071)		—
	Sub-shaft 4th gear	0.05 – 0.17 (0.002 – 0.007)		—
	Reverse idler gear	0.05 – 0.18 (0.002 – 0.007)		—
Countershaft reverse gear	0.10 – 0.25 (0.004 – 0.010)	—		
Selector hub O.D.	51.87 – 51.90 (2.042 – 2.043)	Wear or damage		
Mainshaft 4th gear collar length	49.50 – 49.55 (1.949 – 1.951)	—		
Mainshaft 4th gear collar flange thickness	4.435 – 4.525 (0.175 – 0.178)	Wear or damage		
Mainshaft 1st gear collar length	27.00 – 27.05 (1.063 – 1.065)	—		
Countershaft distance collar length (28 mm)				
	38.97 – 39.00 (1.534 – 1.535)	—		
	39.02 – 39.05 (1.536 – 1.537)	—		
	39.07 – 39.10 (1.538 – 1.539)	—		
	39.12 – 39.15 (1.540 – 1.541)	—		
	39.17 – 39.20 (1.542 – 1.543)	—		
	39.22 – 39.25 (1.544 – 1.545)	—		
	39.27 – 39.30 (1.546 – 1.547)	—		
	38.87 – 38.90 (1.530 – 1.531)	—		
	38.92 – 38.95 (1.532 – 1.533)	—		
Countershaft reverse gear collar length	14.5 – 14.6 (0.571 – 0.575)	—		
Countershaft reverse gear collar flange thickness	2.4 – 2.6 (0.094 – 0.102)	Wear or damage		
Countershaft 1st gear collar length	14.5 – 14.6 (0.571 – 0.575)	—		
Countershaft 1st gear collar flange thickness	2.4 – 2.6 (0.094 – 0.102)	Wear or damage		
Countershaft 3rd gear collar	20.65 – 20.70 (0.813 – 0.815)	—		
Sub-shaft 4th gear collar length	24.0 – 24.1 (0.945 – 0.949)	Wear or damage		
Sub-shaft 4th gear collar flange thickness	2.95 – 3.10 (0.116 – 0.122)	Wear or damage		

(cont'd)

# Standards and Service Limits

## Automatic Transmission (cont'd) — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Transmission (cont'd)	Mainshaft 2nd gear thrust washer thickness	3.97 – 4.00 (0.156 – 0.157) 4.02 – 4.05 (0.158 – 0.159) 4.07 – 4.10 (0.160 – 0.161) 4.12 – 4.15 (0.162 – 0.163) 4.17 – 4.20 (0.164 – 0.165) 4.22 – 4.25 (0.166 – 0.167) 4.27 – 4.30 (0.168 – 0.169) 4.32 – 4.35 (0.170 – 0.171) 4.37 – 4.40 (0.172 – 0.173) 4.42 – 4.45 (0.174 – 0.175)	↑ Wear or damage ↓ Wear or damage	
	Mainshaft ball bearing L. side thrust washer thickness	2.95 – 3.05 (0.116 – 0.120)	Wear or damage	
	Mainshaft 1st gear R. side thrust washer thickness	2.43 – 2.50 (0.096 – 0.098)	Wear or damage	
	Countershaft 3rd gear splined washer thickness	4.95 – 5.00 (0.195 – 0.197)	Wear or damage	
	Sub-shaft 4th gear thrust washer thickness	2.93 – 3.00 (0.115 – 0.118)	Wear or damage	
	One-way clutch contact area		↑	
	Countershaft 1st gear I.D.	83.339 – 83.365 (3.2810 – 3.2821)	↓	
	Parking gear O.D.	66.685 – 66.698 (2.6254 – 2.6259)	Wear or damage	
	Mainshaft feed pipe A, O.D.	8.97 – 8.98 (0.353 – 0.354)	8.95 (0.352)	
	Mainshaft feed pipe B, O.D.	5.97 – 5.98 (0.2350 – 0.2354)	5.95 (0.234)	
	Countershaft feed pipe O.D.	7.97 – 7.98 (0.3138 – 0.3142)	7.95 (0.313)	
	Sub-shaft feed pipe O.D.	7.97 – 7.98 (0.3138 – 0.3142)	7.95 (0.313)	
Mainshaft sealing ring thickness (29 mm and 35 mm)	1.87 – 1.97 (0.074 – 0.078)	1.82 (0.072)		
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 (0.355)		
Countershaft bushing I.D.	8.000 – 8.022 (0.3150 – 0.3158)	8.030 (0.3161)		
Sub-shaft bushing I.D.	8.000 – 8.015 (0.3150 – 0.3156)	8.030 (0.3161)		
Mainshaft sealing ring groove width	2.025 – 2.075 (0.080 – 0.082)	2.095 (0.0825)		
Regulator valve body	Sealing ring contact I.D.	35.000 – 35.025 (1.3780 – 1.3782)	35.050 (1.3799)	
Stator shaft	Sealing ring contact I.D.	27.000 – 27.021 (1.0630 – 1.0638)	Wear or damage	
	Torque converter side ATF pump drive gear side	29.000 – 29.013 (1.1417 – 1.1422)	Wear or damage	
Shifting device and parking brake control	Reverse shift fork finger thickness	5.90 – 6.00 (0.232 – 0.236)	5.40 (0.213)	
	Parking brake pawl	—	Wear or other defect	
	Parking gear	—		
Servo body	Shift fork shaft bore I.D.	14.000 – 14.010 (0.5512 – 0.5516)	—	
	Shift fork shaft valve bore I.D.	37.000 – 37.039 (1.4567 – 1.4582)	37.045 (1.4585)	
ATF pump	ATF pump gear side clearance	Drive	0.03 – 0.05 (0.001 – 0.002)	0.07 (0.003)
		Driven	0.03 – 0.05 (0.001 – 0.002)	0.07 (0.003)
	ATF pump gear-to-body clearance	Drive	0.1050 – 0.1325 (0.0041 – 0.0052)	—
		Driven	0.0350 – 0.0625 (0.0014 – 0.0025)	—
	ATF pump driven gear I.D.	14.016 – 14.034 (0.5518 – 0.5525)	Wear or damage	
ATF pump driven gear shaft O.D.	13.980 – 13.990 (0.5504 – 0.5508)	Wear or damage		
Differential carrier	Pinion shaft contact area I.D.	18.010 – 18.028 (0.7091 – 0.7098)	—	
	Carrier-to-pinion clearance	0.023 – 0.057 (0.0009 – 0.0022)	0.10 (0.004)	
	Driveshaft contact area I.D.	26.025 – 26.045 (1.0246 – 1.0254)	—	
	Carrier-to-driveshaft clearance	0.045 – 0.086 (0.0018 – 0.0034)	0.12 (0.005)	
	Ball bearing contact area O.D.	40.002 – 40.018 (1.5749 – 1.5755)	—	
Differential pinion gear	Backlash	0.05 – 0.15 (0.002 – 0.006)	—	
	I.D.	18.042 – 18.066 (0.7103 – 0.7113)	—	
	Pinion gear-to-pinion shaft clearance	0.055 – 0.095 (0.0022 – 0.0037)	0.15 (0.006)	
Set ring-to-bearing outer race		0 – 0.15 (0 – 0.006)	Adjust	

## Automatic Transmission — Section 14

	MEASUREMENT	STANDARD (NEW)			
		Wire Dia.	O.D.	Free Length	No. of Coils
Springs	Regulator valve spring A				
	D16B2 engine	1.8 (0.071)	14.7 (0.579)	87.8 (3.457)	16.5
	D14A7, D14A8 engines	1.8 (0.071)	14.7 (0.579)	85.4 (3.362)	16.5
	Regulator valve spring B	1.8 (0.071)	*6.0 (0.236)	44.0 (1.732)	7.5
	Stator reaction spring	4.5 (0.177)	*26.4 (1.039)	30.3 (1.193)	1.92
	Torque converter check valve spring	1.0 (0.039)	8.4 (0.331)	33.8 (1.331)	8.2
	Modulator valve spring	1.2 (0.047)	*7.0 (0.276)	27.6 (1.087)	7.7
	Relief valve spring	1.1 (0.043)	8.6 (0.339)	37.1 (1.461)	13.4
	Cooler check valve spring	1.0 (0.039)	8.4 (0.331)	33.8 (1.331)	8.2
	Governor spring A	1.0 (0.039)	18.8 (0.740)	32.9 (1.295)	4.1
	Governor spring B	0.9 (0.035)	11.8 (0.465)	27.8 (1.094)	6.0
		0.9 (0.035)	11.8 (0.465)	29.1 (1.146)	6.0
	2 – 3 orifice control valve spring	0.9 (0.035)	6.6 (0.260)	33.2 (1.307)	14.9
	4 – 3 kick down valve spring	1.0 (0.039)	6.6 (0.260)	29.9 (1.177)	14.7
	2/3 – 4 orifice control valve spring	1.0 (0.039)	8.6 (0.339)	51.9 (2.043)	19.8
	2nd ON orifice control valve spring	0.9 (0.035)	8.0 (0.315)	24.1 (0.949)	9.6
	Throttle valve A spring	1.0 (0.039)	8.5 (0.335)	22.2 (0.874)	6.0
		1.0 (0.039)	8.5 (0.335)	22.1 (0.870)	5.5
		1.1 (0.043)	8.5 (0.335)	22.3 (0.878)	8.1
		1.1 (0.043)	8.5 (0.335)	22.3 (0.878)	7.6
	Throttle valve B adjusting spring	0.8 (0.031)	6.2 (0.244)	30.0 (1.181)	8.0
	Throttle valve A adjusting spring	0.8 (0.031)	6.2 (0.244)	27.0 (1.063)	8.5
	Throttle valve B spring	1.4 (0.063)	8.5 (0.335)	41.5 (1.634)	10.5
		1.4 (0.063)	8.5 (0.335)	41.5 (1.634)	11.2
		1.4 (0.063)	8.5 (0.335)	41.6 (1.648)	12.4
	1 – 2 shift valve spring	0.45 (0.018)	5.1 (0.201)	52.8 (2.079)	29.0
	1 – 2 shift valve ball spring	0.45 (0.018)	4.5 (0.177)	10.7 (0.421)	12.7
	2 – 3 shift valve spring	0.9 (0.035)	7.1 (0.280)	65.3 (2.571)	32.1
	2 – 3 shift valve ball spring	0.45 (0.018)	4.5 (0.177)	13.3 (0.524)	8.0
	3 – 4 shift valve spring	0.9 (0.035)	9.6 (0.378)	32.5 (1.280)	10.3
	3 – 4 shift valve ball spring	0.5 (0.020)	4.5 (0.177)	11.3 (0.445)	7.4
	1st-hold accumulator spring	4.0 (0.157)	21.5 (0.846)	71.7 (2.823)	8.3
	1st accumulator spring A	2.6 (0.102)	24.3 (0.957)	101.9 (4.012)	11.6
	1st accumulator spring B	2.3 (0.091)	*9.9 (0.390)	49.0 (1.929)	4.6
	2nd accumulator spring	3.5 (0.138)	22.0 (0.866)	77.0 (3.031)	9.5
	3rd accumulator spring	2.6 (0.102)	17.5 (0.689)	91.8 (3.614)	15.8
	4th accumulator spring	2.6 (0.102)	16.0 (0.630)	90.1 (3.547)	15.6
	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	73.7 (2.902)	32.0
	Lock-up timing B valve spring	0.8 (0.031)	6.6 (0.260)	61.5 (2.421)	27.6
	Lock-up control valve spring	0.9 (0.035)	6.6 (0.260)	38.4 (1.512)	23.3
	Governor cut valve spring	0.8 (0.031)	7.6 (0.299)	44.5 (1.752)	17.0
	CPC valve spring	0.9 (0.035)	8.4 (0.331)	24.9 (0.980)	9.8
	Reverse control valve spring	0.7 (0.028)	7.1 (0.280)	40.0 (1.575)	20.8
	3 – 2 timing valve spring	1.2 (0.047)	8.6 (0.339)	45.6 (1.795)	14.7
	Servo control valve spring	0.9 (0.035)	6.4 (0.252)	34.1 (1.343)	17.5
	2 – 1 timing valve spring	0.7 (0.028)	5.6 (0.220)	33.0 (1.299)	21.7
	4th exhaust valve spring	0.9 (0.035)	6.6 (0.260)	43.3 (1.705)	22.0

\*: Inside Diameter

# Standards and Service Limits

## Power Steering — Section 17

	MEASUREMENT		STANDARD (NEW)
Steering wheel	Play at steering wheel circumference Starting load at steering wheel circumference N (kgf, lbf) Engine running		0 – 10 (0 – 0.4)  30 (3.1, 6.8)
Pump	Pump pressure with valve closed (oil temp./speed: 40°C (105°F) min./idle. Do not run for more than 5 seconds). kPa (kgf/cm <sup>2</sup> , psi)	D16B2, B18C4 engines All except D16B2, B18C4 engines	6,400 – 7,400 (65 – 75, 924 – 1,067) 5,400 – 6,400 (55 – 65, 782 – 924)
Power steering fluid	Recommended power steering fluid Fluid capacity ℓ (US qt, Imp qt)	System LHD model RHD model  Reservoir	Honda Power Steering Fluid-V, S or II 1.0 (1.06, 0.88) 0.9 (0.95, 0.79) 0.4 (0.42, 0.35)
Power steering belt*	Deflection with 98 N (10 kgf, 22 lbf) between pulleys	All except B18C4 engine B18C4 engine	10.5 – 14.0 (0.41 – 0.55) with used belt 7.5 – 10.0 (0.30 – 1.39) with new belt 11.5 – 13.5 (0.45 – 0.53) with used belt 8.0 – 10.0 (0.31 – 1.39) with new belt
	Tension measured with belt tension gauge N (kgf, lbf)	All except B18C4 engine B18C4 engine	340 – 490 (35 – 50, 77 – 110) with used belt 640 – 785 (65 – 80, 143 – 176) with new belt 390 – 540 (40 – 55, 88 – 110) with used belt 735 – 880 (75 – 90, 165 – 198) with new belt

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



**Suspension — Section 18**

		MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Wheel alignment	Camber	Front	All except B18C4 engine	0° ± 1°	_____
			B18C4 engine	-0°07' ± 1°	_____
		Rear		-0°50' ± 45'	_____
	Caster		Front	1°10' ± 1°	_____
	Total toe		Front	0 ± 2.0 (0 ± 0.08)	_____
			Rear	In 2.3 ± 2 (0.09 ± 0.08)	_____
	Front wheel turning angle	Inward wheel			_____
		All except B18C4 engine	36° ± 2°	_____	
		B18C4 engine	40° ± 2°	_____	
	Outward wheel (Reference)			_____	
		All except B18C4 engine	30°	_____	
		B18C4 engine	33°	_____	
Wheel	Rim runout	Aluminum wheel	Axial	0 - 0.3 (0 - 0.01)	1.6 (0.06)
			Radial	0 - 0.3 (0 - 0.01)	1.0 (0.04)
	Steel wheel	Axial	0 - 0.7 (0 - 0.03)	1.7 (0.07)	
		Radial	0 - 0.5 (0 - 0.02)	1.0 (0.04)	
Wheel bearing	End play	Front	0 - 0.05 (0 - 0.002)	_____	
		Rear	0 - 0.05 (0 - 0.002)	_____	

**Brakes — Section 19**

		MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Parking brake lever		Play in stroke at 196 N (20 kgf, 44 lbf) lever force		To be locked when pulled 6 - 10 notches	_____
Foot brake pedal	Pedal height (with floor mat removed)	LHD model M/T		157 (6.18)	_____
		A/T		162 (6.38)	_____
		RHD model M/T		154 (6.06)	_____
		A/T		159 (6.30)	_____
	Free play			1 - 5 (1/16 - 13/64)	_____
Disc brake	Disc thickness	B18C4 engine Front		22.9 - 23.1 (0.90 - 0.91)	19.0 (0.75)
		All except B18C4 engine Front		20.9 - 21.1 (0.82 - 0.83)	19.0 (0.75)
		Rear		9.9 - 10.1 (0.39 - 0.40)	8.0 (0.31)
	Disc runout			_____	0.10 (0.004)
	Disc parallelism				0.015 (0.0006)
Pad thickness	Front			11.0 - 11.7 (0.43 - 0.46)	1.6 (0.06)
	B18C4 engine Rear			8.3 - 9 (0.33 - 0.35)	1.6 (0.06)
	All except B18C4 engine Rear			7.3 - 8 (0.29 - 0.31)	1.6 (0.06)
Rear brake drum	I.D.			203.20 - 203.33 (8.000 - 8.005)	204 (8.03)
	Lining thickness			5.0 (0.20)	2.0 (0.08)
Brake booster	Characteristics at 196 N (20 kgf, 44 lbf) pedal force.			Vacuum mmHg (inHg)	Line pressure kPa (kg/cm², psi)
		model with Rear Drum		0 (0)	1,280 (13.1, 186)
				300 (11.8)	5,390 (55.0, 782)
				500 (19.7)	8,130 (82.9, 1,179)
		All except B18C4 engine model with Rear Disk		0 (0)	950 (9.7, 138)
				300 (11.8)	5,520 (56.3, 801)
	500 (19.7)		8,570 (87.4, 1,240)		
B18C4 engine model with Rear Disk		0 (0)	830 (8.5, 121)		
		300 (11.8)	4,840 (49.4, 702)		
		500 (19.7)	7,520 (76.7, 1,090)		

# Standards and Service Limits

Unit of length: mm (in)

Air Conditioning — Section 22		MEASUREMENT	STANDARD (NEW)
Air conditioning system	SANDEN	Lubricant type: SP – 10 (P/N 38897 – P13 – 003, 38898 – P13 – 003 or 38899 – P13 – A01) (For Refrigerant: HFC-134a (R-134a))	
	DENSO	Lubricant type: ND – OIL8 (P/N 38897 – PR7 – 003, 38898 – PR7 – 003 or 38899 – PR7 – A01) (For Refrigerant: HFC-134a (R-134a))	
		Lubricant capacity ml (fl oz, Imp oz)	Condenser Evaporator Line or hose Receiver
			15 (1/2, 0.5) 25 (5/6, 0.9) 10 (1/3, 0.4) 10 (1/3, 0.4)
Compressor	SANDEN	Lubricant type: SP – 10	
	DENSO	Lubricant type: ND – OIL8	
		Lubricant capacity ml (fl oz, Imp oz) Field coil resistance at 20°C (68°F) Ω Pulley-to-pressure plate clearance	130 (4.4, 4.6) 3.05 – 3.35 0.5 ± 0.15 (0.02 ± 0.006)
		Lubricant capacity ml (fl oz, Imp oz) Stator coil resistance at 20°C (68°F) Ω Pulley-to-pressure plate clearance	120 (4, 4.2) 3.4 – 3.8 0.5 ± 0.15 (0.02 ± 0.006)
Compressor belt*		Deflection with 98 N (10 kgf, 22 lbf) between pulleys	
		B18C4 engine	7.5 – 9.5 (0.30 – 0.37) with used belt 5.0 – 7.0 (0.20 – 0.28) with new belt
		All except B18C4 engine	7.5 – 9.5 (0.30 – 0.37) with used belt 5.0 – 6.5 (0.20 – 0.26) with new belt
		Belt tension N (kgf, lbf) Measured with belt tension gauge	
		B18C4 engine	390 – 540 (40 – 55, 88 – 120) with used belt 740 – 880 (75 – 90, 170 – 200) with new belt
		All except B18C4 engine	340 – 490 (35 – 50, 80 – 110) with used belt 690 – 830 (70 – 85, 150 – 190) with new belt

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

# Design Specifications

	ITEM		METRIC	ENGLISH	NOTES
DIMENSIONS	Overall Length		4,425 mm	174.2 in	
	Overall Width		1,695 mm	66.7 in	
	Overall Height		1,440 mm	56.7 in	
	Wheelbase		2,620 mm	103.1 in	
	Track	Front			
		B18C4 engine	1,465 mm	57.7 in	
		Except B18C4 engine	1,475 mm	58.1 in	
		Rear	1,470 mm	57.9 in	
	Wheel Arch	Front	638 mm	25.1 in	
		Rear	650 mm	25.6 in	
	Ground Clearance		150 mm	5.9 in	
	Seating Capacity		Five		
WEIGHT KE Model	Curb Weight				
	1.4i with SRS	M/T	1,143 kg	2,520 lbs	
	1.4i with SRS and S/R	M/T	1,161 kg	2,560 lbs	
	1.4i with SRS, ABS and S/R	M/T	1,171 kg	2,582 lbs	
	1.4i with SRS and S/R	A/T	1,191 kg	2,626 lbs	
	1.5i VTEC with SRS and S/R	M/T	1,161 kg	2,560 lbs	
	1.5i VTEC with SRS, ABS and S/R	M/T	1,171 kg	2,582 lbs	
	1.5i LS VTEC with SRS, ABS and S/R	M/T	1,191 kg	2,626 lbs	
	1.6i SR with SRS, ABS and S/R	A/T	1,221 kg	2,692 lbs	
	1.6i ES with SRS, ABS, S/R and A/C	M/T	1,209 kg	2,665 lbs	
	1.6i ES with SRS, ABS, S/R and A/C	A/T	1,239 kg	2,731 lbs	
	1.8VTi VTEC with SRS, ABS and S/R	M/T	1,281 kg	2,824 lbs	
	Weight Distribution (Front/Rear)				
	1.4i with SRS	M/T	642/501 kg	1,416/1,104 lbs	
	1.4i with SRS and S/R	M/T	652/509 kg	1,438/1,122 lbs	
	1.4i with SRS, ABS and S/R	M/T	659/512 kg	1,453/1,129 lbs	
	1.4i with SRS and S/R	A/T	682/509 kg	1,504/1,122 lbs	
	1.5i VTEC with SRS and S/R	M/T	652/509 kg	1,438/1,122 lbs	
	1.5i VTEC with SRS, ABS and S/R	M/T	659/512 kg	1,453/1,129 lbs	
	1.5i LS VTEC with SRS, ABS and S/R	M/T	669/522 kg	1,475/1,151 lbs	
1.6i SR with SRS, ABS and S/R	A/T	699/522 kg	1,541/1,151 lbs		
1.6i ES with SRS, ABS, S/R and A/C	M/T	689/520 kg	1,519/1,146 lbs		
1.6i ES with SRS, ABS, S/R and A/C	A/T	719/520 kg	1,585/1,146 lbs		
1.8VTi VTEC with SRS, ABS and S/R	M/T	739/542 kg	1,629/1,195 lbs		
WEIGHT K S Model	Curb Weight				
	1.4i with SRS	M/T	1,143 kg	2,520 lbs	
	1.4i with SRS and ABS	M/T	1,153 kg	2,542 lbs	
	1.5i VTEC with SRS	M/T	1,143 kg	2,520 lbs	
	1.5i VTEC with SRS and ABS	M/T	1,153 kg	2,542 lbs	
	1.5i LS VTEC with SRS and ABS	M/T	1,173 kg	2,586 lbs	
	1.6i SR with SRS and ABS	A/T	1,203 kg	2,652 lbs	
	Weight Distribution (Front/Rear)				
	1.4i with SRS	M/T	642/501 kg	1,416/1,104 lbs	
	1.4i with SRS and ABS	M/T	649/504 kg	1,431/1,111 lbs	
1.5i VTEC with SRS	M/T	642/501 kg	1,416/1,104 lbs		
1.5i VTEC with SRS and ABS	M/T	649/504 kg	1,431/1,111 lbs		
1.5i LS VTEC with SRS and ABS	M/T	659/514 kg	1,453/1,133 lbs		
1.6i SR with SRS and ABS	A/T	689/514 kg	1,519/1,133 lbs		

(cont'd)

# Design Specifications

(cont'd)

	ITEM	METRIC	ENGLISH	NOTES	
WEIGHT KG Model	Curb Weight				
	1.4i with SRS	M/T	1,143 kg	2,520 lbs	
	1.4i with SRS and S/R	M/T	1,161 kg	2,560 lbs	
	1.4i with SRS and ABS	M/T	1,153 kg	2,542 lbs	
	1.4i with SRS, ABS and S/R	M/T	1,171 kg	2,582 lbs	
	1.4iS	M/T	1,135 kg	2,502 lbs	
	1.4iS with SRS	M/T	1,143 kg	2,520 lbs	
	1.4iS with SRS and ABS	M/T	1,153 kg	2,542 lbs	
	1.4iS with SRS and S/R	M/T	1,161 kg	2,560 lbs	
	1.4iS with SRS, ABS and S/R	M/T	1,171 kg	2,582 lbs	
	1.4iS with SRS and A/C	M/T	1,161 kg	2,560 lbs	
	1.4iS with SRS, ABS and A/C	M/T	1,171 kg	2,582 lbs	
	1.4iS with SRS	A/T	1,173 kg	2,586 lbs	
	1.4iS with SRS and ABS	A/T	1,183 kg	2,608 lbs	
	1.4i SR with SRS and S/R	M/T	1,161 kg	2,560 lbs	
	1.4i SR with SRS, ABS and S/R	M/T	1,171 kg	2,582 lbs	
	1.4i SR with SRS and A/C	M/T	1,161 kg	2,560 lbs	
	1.4i SR with SRS, ABS and A/C	M/T	1,171 kg	2,582 lbs	
	1.5i VTEC with SRS	M/T	1,143 kg	2,520 lbs	
	1.5i VTEC with SRS and S/R	M/T	1,161 kg	2,560 lbs	
	1.5i VTEC with SRS, ABS and S/R	M/T	1,171 kg	2,582 lbs	
	1.5i LS VTEC with SRS	M/T	1,163 kg	2,564 lbs	
	1.5i LS VTEC with SRS, ABS and S/R	M/T	1,191 kg	2,626 lbs	
	1.5i LS VTEC with SRS, ABS and A/C	M/T	1,191 kg	2,626 lbs	
	1.6i SR with SRS and S/R	M/T	1,181 kg	2,604 lbs	
	1.6i SR with SRS, ABS and S/R	M/T	1,191 kg	2,626 lbs	
	1.6i SR with SRS, ABS and A/C	M/T	1,191 kg	2,626 lbs	
	1.6i SR with SRS, ABS and S/R	A/T	1,221 kg	2,692 lbs	
	1.6i SR with SRS, ABS and A/C	A/T	1,221 kg	2,692 lbs	
	1.8VTi VTEC with SRS, ABS and S/R	M/T	1,281 kg	2,824 lbs	
	1.8VTi VTEC with SRS, ABS and A/C	M/T	1,281 kg	2,824 lbs	
	WEIGHT	Weight Distribution (Front/Rear)			
		1.4i with SRS	M/T	642/501 kg	1,416/1,104 lbs
		1.4i with SRS and S/R	M/T	652/509 kg	1,438/1,122 lbs
		1.4i with SRS and ABS	M/T	649/504 kg	1,431/1,111 lbs
		1.4i with SRS, ABS and S/R	M/T	659/512 kg	1,453/1,129 lbs
		1.4iS	M/T	635/500 kg	1,400/1,102 lbs
		1.4iS with SRS	M/T	642/501 kg	1,416/1,104 lbs
		1.4iS with SRS and ABS	M/T	649/504 kg	1,431/1,111 lbs
		1.4iS with SRS and S/R	M/T	652/509 kg	1,438/1,122 lbs
		1.4iS with SRS, ABS and S/R	M/T	659/512 kg	1,453/1,129 lbs
1.4iS with SRS and A/C		M/T	662/499 kg	1,460/1,100 lbs	
1.4iS with SRS, ABS and A/C		M/T	669/502 kg	1,475/1,107 lbs	
1.4iS with SRS		A/T	672/501 kg	1,482/1,104 lbs	
1.4iS with SRS and ABS		A/T	679/504 kg	1,497/1,111 lbs	
1.4i SR with SRS and S/R		M/T	652/509 kg	1,438/1,122 lbs	
1.4i SR with SRS, ABS and S/R		M/T	659/512 kg	1,453/1,129 lbs	
1.4i SR with SRS and A/C		M/T	662/499 kg	1,460/1,100 lbs	
1.4i SR with SRS, ABS and A/C		M/T	669/502 kg	1,475/1,107 lbs	
1.5i VTEC with SRS		M/T	642/501 kg	1,415/1,105 lbs	
1.5i VTEC with SRS and S/R		M/T	652/509 kg	1,438/1,122 lbs	
1.5i VTEC with SRS, ABS and S/R		M/T	659/512 kg	1,453/1,129 lbs	
1.5i LS VTEC with SRS		M/T	652/511 kg	1,437/1,127 lbs	
1.5i LS VTEC with SRS, ABS and S/R		M/T	669/522 kg	1,475/1,151 lbs	
1.5i LS VTEC with SRS, ABS and A/C		M/T	679/512 kg	1,497/1,129 lbs	
1.6i SR with SRS and S/R		M/T	662/519 kg	1,460/1,144 lbs	
1.6i SR with SRS, ABS and S/R		M/T	669/522 kg	1,475/1,151 lbs	
1.6i SR with SRS, ABS and A/C		M/T	679/512 kg	1,497/1,129 lbs	
1.6i SR with SRS, ABS and S/R		A/T	699/522 kg	1,541/1,151 lbs	
1.6i SR with SRS, ABS and A/C		A/T	709/512 kg	1,563/1,129 lbs	
1.8VTi VTEC with SRS, ABS and S/R		M/T	739/542 kg	1,629/1,195 lbs	
1.8VTi VTEC with SRS, ABS and A/C	M/T	749/532 kg	1,651/1,173 lbs		
WEIGHT	Max. Permissible Weight				
	D14A7, D14A8, D15Z8 engines		1,600 kg	3,527 lbs	
	D16B2 engine		1,650 kg	3,638 lbs	
	B18C4 engine		1,710 kg	3,770 lbs	
	Max. Permissible Axle Weight				
	Front	D14A7, D14A8, D15Z8 engines		810 kg	1,786 lbs
		D16B2 engine		845 kg	1,863 lbs
		B18C4 engine		880 kg	1,940 lbs
	Rear	D14A7, D14A8, D15Z8 engines		840 kg	1,852 lbs
		D16B2 engine		840 kg	1,852 lbs
B18C4 engine			850 kg	1,874 lbs	

	ITEM	DESCRIPTION	NOTES					
ENGINE	Type	D14A7, D14A8, D16B2 engines D15Z8 engine B18C4 engine	Water-cooled, 4-stroke SOHC gasoline engine Water-cooled 4-stroke SOHC VTEC-E gasoline engine Water-cooled 4-stroke DOHC VTEC gasoline engine Inline 4-cylinder, transverse					
	Cylinder arrangement							
	Bore and Stroke	D14A7, D14A8 engines D15Z8 engine D16B2 engine B18C4 engine	METRIC	ENGLISH				
			75.0 x 79.0 mm	2.95 x 3.11 in				
			75.0 x 84.5 mm	2.95 x 3.33 in				
			75.0 x 90.0 mm	2.95 x 3.54 in				
	Displacement	D14A7, D14A8 engines D15Z8 engine D16B2 engine B18C4 engine	81.0 x 87.2 mm	3.19 x 3.43 in				
			1,396 cm <sup>3</sup> (mℓ)	85.2 cu-in				
			1,493 cm <sup>3</sup> (mℓ)	91 cu-in				
			1,590 cm <sup>3</sup> (mℓ)	97 cu-in				
	Compression Ratio	D14A7, D14A8 engines D15Z8, D16B2 engines B18C4 engine	1,797 cm <sup>3</sup> (mℓ)	110 cu-in				
				9.0				
			9.6					
Valve Train	D14A7, D14A8, D16B2 engines D15Z8 engine B18C4 engine		10.0					
			Belt driven SOHC 4 valves per cylinder Belt driven SOHC VTEC 4 valves per cylinder Belt driven DOHC VTEC 4 valves per cylinder					
Lubrication System		Forced and wet sump, trochoid pump						
Oil Pump Discharge Rate	SOHC engine DOHC engine	7.11 cm <sup>3</sup> /rev 9.32 cm <sup>3</sup> /rev	0.433 cu-in/rev 0.569 cu-in/rev					
Water Pump Discharge Rate at 6,000 rpm	SOHC engine DOHC engine		125 ℓ (132 US qt, 110 Imp qt)/minute 140 ℓ (148 US qt, 123 Imp qt)/minute					
Fuel Required			Premium UNLEADED gasoline with a Research Octane Number (RON) of 95 or higher					
STARTER	Make/Type, Output Normal Output Normal Voltage Hour Rating Direction of Rotation	VALEO, MITSUBA/Gear Reduction, 1.0 kW 1.0 kW 12 V 30 seconds Clockwise as view from gear end						
CLUTCH	Type	M/T A/T	Single plate dry, diaphragm spring Torque converter					
	Facing Area	All M/T Except B18C4 engine M/T B18C4 engine	176 cm <sup>2</sup> 203 cm <sup>2</sup>   27 sq-in 31 sq-in					
TRANSMISSION	Type	M/T A/T	Synchronized 5-speed forward, 1 reverse 4-speed automatic with lock-up clutch, 1 reverse Direct/1 : 1					
	Primary Reduction	Type/Ratio						
	Manual Transmission	Gear Ration	1st	3.250	3.250	3.250	3.250	3.230
			2nd	1.782	1.782	1.782	1.909	1.900
			3rd	1.172	1.172	1.250	1.250	1.360
			4th	0.937	0.937	0.937	0.937	1.034
			5th	0.750	0.750	0.750	0.771	0.848
			Reverse	3.153	3.153	3.153	3.153	3.000
			Final	4.437	4.437	3.888	4.058	4.266
	Automatic Transmission	Gear Ration	1st	2.600				
2nd			1.393					
3rd			0.926					
4th			0.673					
Reverse			1.954					
Final Reduction Gear	Ratio	4.357						
	Type	Single helical gear						

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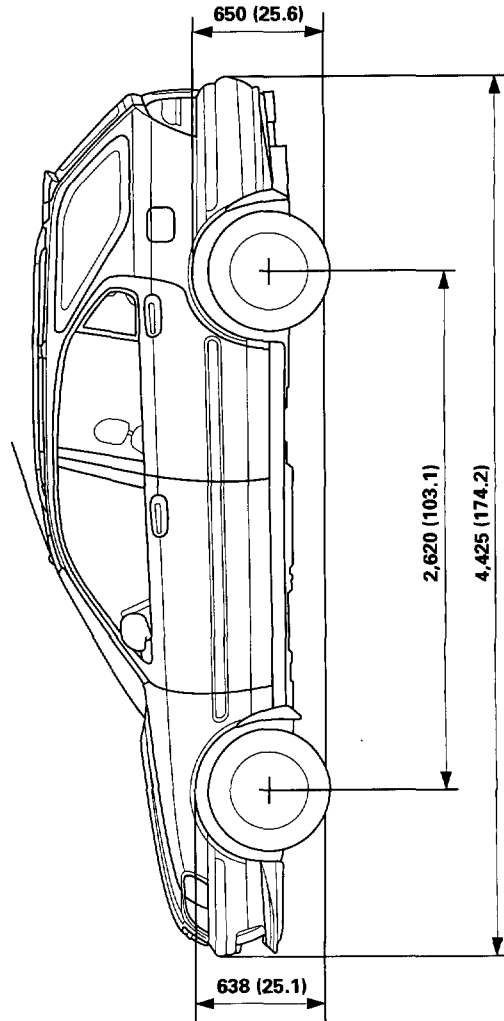
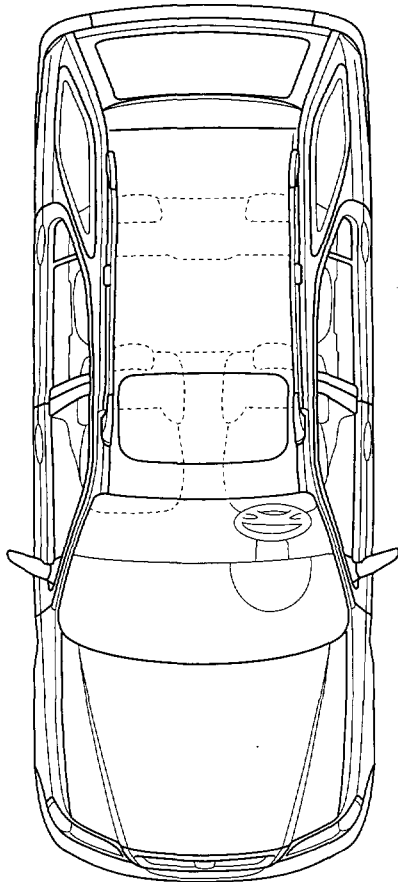
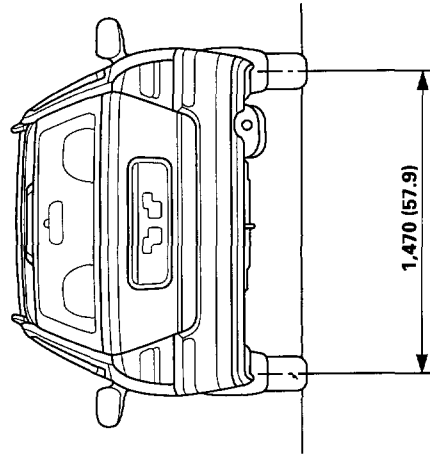
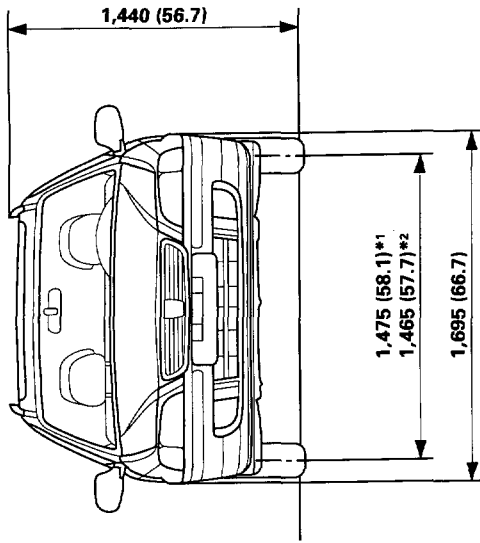
# Design Specifications

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	ITEM	METRIC	ENGLISH	NOTES
AIR CONDITIONING	Cooling Capacity	4,040 kcal/h	16,030 BTU/h	
	Compressor: SANDEN	Type	Scroll	
		Capacity	85.7 cm <sup>3</sup> /rev	5.22 cu-in/rev
	DENSO	Max. Speed	10,000 rpm (min <sup>-1</sup> )	
		Lubricant Type	SP - 10	
		Lubricant Capacity	130 cm <sup>3</sup>	4.4 fl oz, 4.6 imp oz
		Type	Swash-plate	
		No. of Cylinder	10	
Capacity		155.3 cm <sup>3</sup> /rev	94.7 cu-in/rev	
Max. Speed	7,600 rpm (min <sup>-1</sup> )			
Lubricant Type	ND - OIL8			
Lubricant Capacity	120 cm <sup>3</sup>	4 fl oz, 4.2 imp oz		
Condenser	Type	Corrugated fin		
Evaporator	Type	Corrugated fin		
Blower	Type	Sirocco fan		
	Motor Input	200 W/12 V max.		
	Speed Control	4-speed		
	Max. Capacity	410 m <sup>3</sup> /h	14,500 cu-ft/h	
Temp. Control	Type	Air Mix		
Compressor Clutch	Type	Dry, single plate, poly-V belt drive		
	Power Consumption	42 W max/12 V		
	SANDEN	40 W max/12 V		
	DENSO			
Refrigerant	Type	HFC - 134a (R - 134a)		
	Quantity	500 - 550 g	18 - 19 oz	
STEERING SYSTEM	Type	Power assisted, rack and pinion		
	Overall Ratio	All except B18C4 engine 17.1		
	Turns, Lock-to-Lock	B18C4 engine 17.5		
		All except B18C4 engine 3.48		
Steering Wheel Dia.	380 mm	15.0 in		
SUSPENSION	Type	Front	Independent double wishbone, coil spring with stabilizer	
		Rear	Independent double wishbone, coil spring with stabilizer	
Shock Absorber	Front and Rear		Telescopic, hydraulic nitrogen gas-filled	
WHEEL ALIGNMENT	Camber	Front	0°*1, 0°07'*2	
		Rear	-0° 50'	
	Caster	Front	1° 10'	
	Total Toe	Front	0 mm	
		Rear	In 2.3 mm	
			0 in	
			In 0.09 in	
BRAKE SYSTEM	Type	Front	Power-assisted self-adjusting ventilated disc	
		Rear	Power-assisted self-adjusting drum	
	Pad Surface Area	All except B18C4 engine	Front	48.7 cm <sup>2</sup> x 2
		B18C4 engine	Front	7.6 sq-in x 2
	All except B18C4 engine	B18C4 engine	Rear	58.0 cm <sup>2</sup> x 2
		B18C4 engine	Rear	9.0 sq-in x 2
Lining Surface Area	All except B18C4 engine	Rear	20.4 cm <sup>2</sup> x 2	
	B18C4 engine	Rear	3.2 sq-in x 2	
Parking Brake		Rear	28.3 cm <sup>2</sup> x 2	
		Rear	4.4 sq-in x 2	
		Rear	65.7 cm <sup>2</sup> x 2	
		Rear	10.2 sq-in x 2	
		Type	Mechanical actuating, rear two wheel brakes	
TIRE	Size and Pressure	See tire label (see page 1-5)		
ELECTRICAL	Battery	12 V - 36 AH/5 HR		
	Starter	12 V - 1.0 kW		
	Alternator	12 V - 75 A, *90 A		
	Fuses	In Under-dash Fuse/Relay Box	7.5 A, 10 A, 15 A, 20 A, 30 A	
		In Under-hood Fuse/Relay Box	7.5 A, 10 A, 15 A, 20 A, 30 A	
		In under-hood ABS Fuse Box	40 A, 50 A, 80 A, *100 A	
	Headlights	High/Low	20 A, 40 A	
			12 V - 60/55 W (H4)	
	Front Turn Signal Lights		12 V - 21 W	
	Front Parking Lights		12 V - 5 W	
	Side Turn Signal Lights		12 V - 5 W	
	Rear Turn Signal Lights		12 V - 21 W	
	Brake/Tail-lights		12 V - 21/5 W	
	Back-up Lights		12 V - 21 W	
	Front Fog Light*1		12 V - 55 W	
	Rear Fog Light		12 V - 21 W	
	License Plate Lights		12 V - 5 W	
	Front Ceiling Light		12 V - 5 W	
	Rear Ceiling Light		12 V - 5 W	
	Gauge Lights		12 V - 3.4 W	
	Glove Box Light		12 V - 5 W	
	Indicator Lights		12 V - 0.84 W, 0.91 W, 1.12 W, 1.4 W	
	Illumination and Pilot Lights		12 V - 0.56 W, 0.84 W, 0.91 W, 1.12 W, 1.2 W, 1.4 W, LED	
	Heater Illumination Lights		12 V - 1.4 W	
	High mount brake Light		12 V - 21 W	
			LED	

# Body Specifications

Unit: mm (in)



\*1: All except B18C4 engine  
\*2: B18C4 engine



## **Maintenance**

**Lubrication Points ..... 3-2**

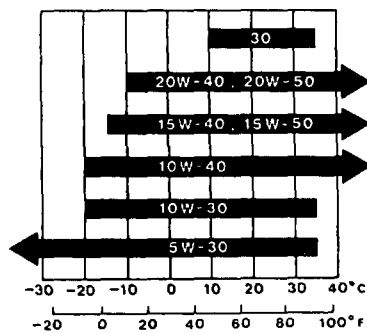
**Maintenance Schedule ..... 3-4**



# Lubrication Points

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

No.	LUBRICATION POINTS	LUBRICANT
1	Engine	Always use a fuel-efficient oil is that says "API Service SG, SH or SJ." SAE Viscosity: See chart below.
2	Transmission	Manual
		Automatic
3	Brake line (Includes Anti-lock brake line)	Brake fluid DOT3 or DOT4*2
4	Clutch line	Brake fluid DOT3 or DOT4*2
5	Release fork (Manual transmission)	Urea Grease UM264 (P/N 41211 - PY5 - 305)
6	Throttle cable end (Dashboard lower panel hole)	Silicone grease
7	Throttle cable end (Throttle link)	Multi-purpose grease
8	Brake master cylinder pushrod	
9	Clutch master cylinder pushrod	
10	Hood hinges and hood lock	
11	Battery terminals	
12	Fuel fill lid	
13	Door hinges, upper and lower	
14	Door open detent	
15	Tailegate hinges	
16	Rear brake calipers (Connection holes parking brake lever to parking brake cable)	Rust-preventive agent
17	Power steering system	Honda power steering fluid (V, II or S)
18	Air conditioning compressor	Compressor oil: SANDEN: SP-10 (P/N 38897 - P13 - 003, 38898 - P13 - 003 or 38899 - P13 - A01) DENSO: ND-OIL8 (38897 - PR7 - 003, 38898 - PR7 - 003 or 38899 - PR7 - A01) (For Refrigerant: HFC-134a (R-134a))



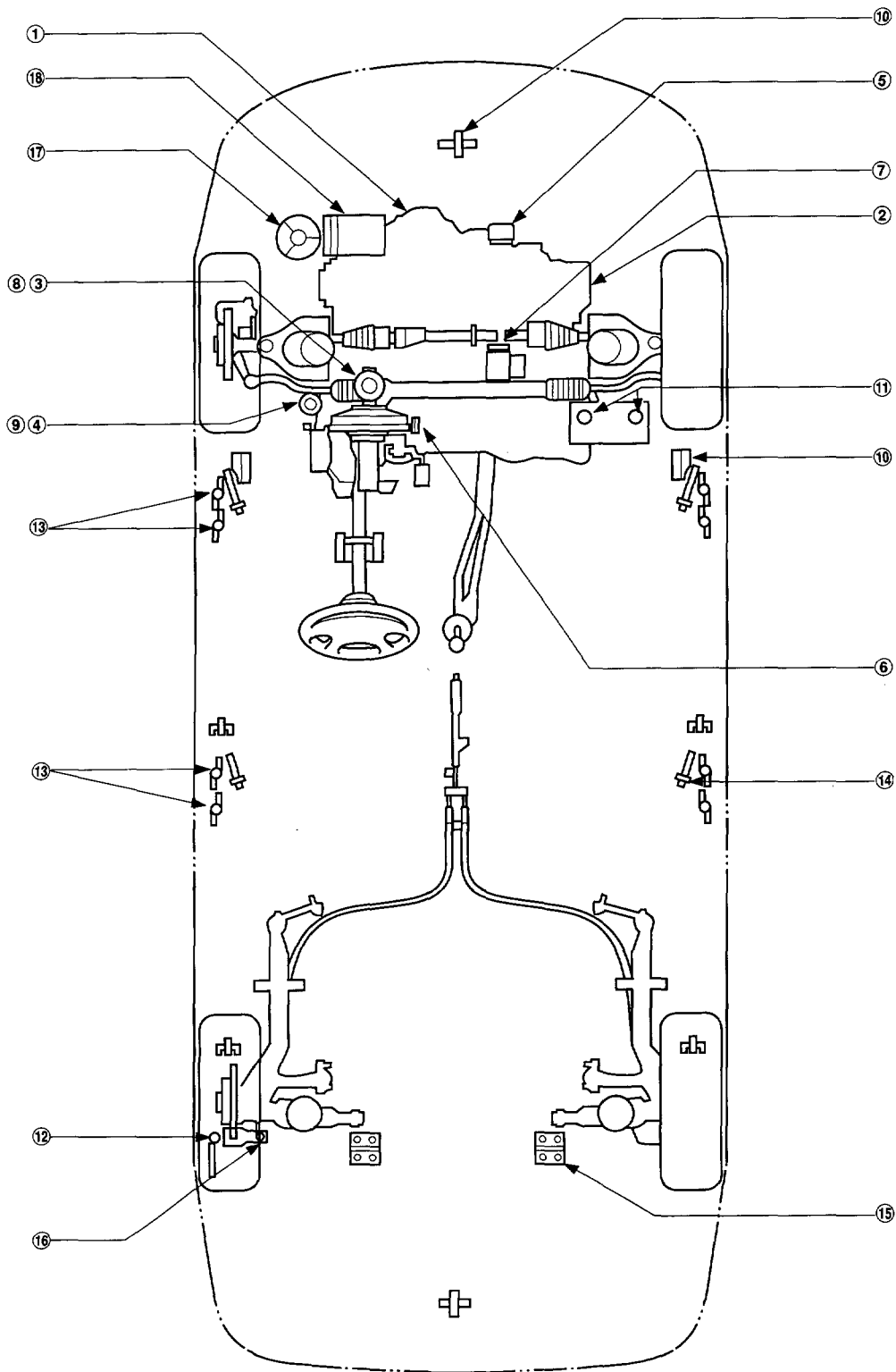
Recommended engine oil  
Engine oil viscosity for  
ambient temperature ranges

## CAUTION

Used engine oil may cause skin cancer if repeatedly left in contact with the skin for prolonged periods. Although this is unlikely unless you handle used oil on a daily basis, it is still advisable to thoroughly wash your hands with soap and water as soon as possible after handling used oil.

\*1: If Honda MTF is not available, you may use an API service SG or SH-rated motor oil with a viscosity of SAE 10W-30 or 10W-40 temporarily. Motor oil can cause increased transmission wear and higher shifting effort.

\*2: We recommend Genuine Honda Brake Fluid.



# Maintenance Schedule

## Normal Conditions

Follow the Normal Maintenance Schedule if the severe driving conditions specified in the Severe Conditions Maintenance Schedule on pages 3-6 and 3-7 do not apply.

Service at the indicated distance or time whichever comes first.	km x 1,000		15	30	45	60	75	90	105	120	135	150	165	NOTES	SECTION and PAGE
	miles x 1,000	months	9	18	27	36	45	54	63	72	81	90	99		
Replace engine oil and oil filter			●	●	●	●	●	●	●	●	●	●	●		8-6, 7, 8, 9
Replace air cleaner element			●												11-A-84
Inspect valve clearance				●										Check the valve clearance.	6-10 6-52
Replace fuel filter				●											11-A-73 11-B-66
Replace spark plugs				●											4-28
Replace timing belt and inspect water pump										●				Check water pump for signs of seal leakage.	6-17 6-57 10-14
Inspect and adjust drive belts				●							●			• Check for cracks and damage. • Check deflection and tension.	4-41 17-14 22-39
Inspect idle speed									●						11-A-60 11-B-58
Replace engine coolant							○							Check specific gravity for freezing point.	10-7
Replace transmission fluid (○: Inspect)	M/T													• Honda Genuine MTF	13-3
	A/T						●			○		●		• Genuine Honda ATF PREMIUM (Automatic Transmission Fluid-PREMIUM) or DEXRON II or III ATF.	14-54
Inspect front and rear brakes			●	●	●	●	●	●	●	●	●	●	●	• Check the brake pad and disc thickness. Check for damage or cracks. • Check the brake linings for cracking, glazing, wear, or contamination. • Check the callipers for damage, leaks, and tightness.	19-A-9, 11, 13, 14, 15, 20, 22, 23, 25, 28, 29
Replace brake fluid			Every 3 years											Use only DOT3 or DOT4* fluid. Check that brake fluid level is between the upper and lower marks on the reservoir.	19-A-7
Check parking brake adjustment			●	●	●	●	●	●	●	●	●	●	●	Check the parking brake operation.	19-A-6
Replace pollen filter			Every 30,000 km (18,000 miles) or 12 months												21-22 22-18
Check lights alignment			●	●	●	●	●	●	●	●	●	●	●	Check the position of the headlights.	23-D-8
Test drive (noise, stability, dashboard operations)			●	●	●	●	●	●	●	●	●	●	●	Check for road stability, noise, vibrations and dashboard operation.	—

\*1: We recommend Genuine Honda Brake Fluid.



Service at the indicated distance or time whichever comes first.	km x 1,000		15	30	45	60	75	90	105	120	135	150	165	SECTION and PAGE	
	miles x 1,000		9	18	27	36	45	54	63	72	81	90	99		
	months		12	24	36	48	60	72	84	96	108	120	132		
<b>Visually inspect the following items:</b>															
Tie rod ends, steering gearbox, and boots														<ul style="list-style-type: none"> <li>• Check for correct installation and position, check for cracks, deterioration, rust, and leaks.</li> <li>• Check tightness of screws, nuts, and joints. If necessary, retighten.</li> <li>• Check rack grease and steering linkage.</li> <li>• Check the boot for damage and leaking grease.</li> <li>• Check the fluid line for damage and leaks.</li> </ul>	17-24, 25
Suspension components														<ul style="list-style-type: none"> <li>• Check the bolts for tightness.</li> <li>• Check the all dust cover for deterioration and damage.</li> </ul>	18-8, 9, 10, 23, 24, 25
Driveshaft boots														<ul style="list-style-type: none"> <li>• Check boots and boot band for cracks.</li> <li>• Check rack grease.</li> </ul>	18-3
Brake hoses and lines (including ABS)														<ul style="list-style-type: none"> <li>• Check the master cylinder, proportioning control valve and ABS modulator for damage and leakage.</li> </ul>	19-A-4, 17, 18, 29
Exhaust system														<ul style="list-style-type: none"> <li>• Check the catalytic converter heat shield, exhaust pipe and muffler for damage, leaks and tightness.</li> </ul>	9-8, 9, 10, 11
Fuel lines and connections														<ul style="list-style-type: none"> <li>• Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged parts.</li> </ul>	11-A-62
Tyre condition														<ul style="list-style-type: none"> <li>• Check for pressure, puncture or cuts and irregular thread wear.</li> </ul>	

# Maintenance Schedule

## Severe Conditions

Service at the indicated distance or time whichever comes first.	km x 1,000												SECTION and PAGE				
	7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	82.5	90		97.5	105	112.5	120
Replace engine oil and oil filter	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	8-6, 7, 8, 9
Replace air cleaner element — Use normal schedule except in dusty conditions		•				•			•						•		11-A-84
Inspect valve clearance						•						•					6-10 6-52
Replace fuel filter						•						•					11-A-73 11-B-66
Replace spark plugs						•						•					4-28
Replace timing belt and inspect water pump																	6-17 6-57 10-14
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\*1: We recommend Genuine Honda Brake Fluid.  
 \*2: Replace the timing belt at 75,000 km or 45,000 mile if the vehicle regularly is driven in one or more of these conditions:

- In very high temperatures (over 43°C, 110°F).
  - In very low temperatures (under -29°C, -20°F).
- Replace the timing belt at the intervals on the Normal Conditions Maintenance Schedule except the vehicle is driven in the above conditions.



Service at the indicated distance or time whichever comes first.	km x 1,000		7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	82.5	90	97.5	105	112.5	120	SECTION and PAGE	
	miles x 1,000	months	4.5	9	13.5	18	22.5	27	31.5	36	40.5	45	49.5	54	58.5	63	67.5	72		
<b>Visually inspect the following items:</b>																				
Tie rod ends, steering gearbox, and boots			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	17-24, 25
			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Suspension components			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	18-8, 9, 10, 23, 24, 25
Driveshaft boots																				16-3
Brake hoses and lines (including ABS)																				19-A-4, 17, 18, 29
Exhaust system																				9-8, 9, 10, 11
Fuel lines and connections																				11-A-62
Tyre condition																				

Follow the Severe Maintenance Schedule if the customer's vehicle is driven MAINLY under one or more of the following conditions:

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

NOTE: If the customer's vehicle is driven OCCASIONALLY under severe condition, you should follow the Normal Conditions Maintenance Schedule on pages 3-4 and 3-5.

# Engine Electrical

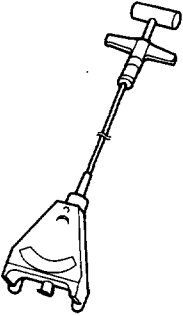


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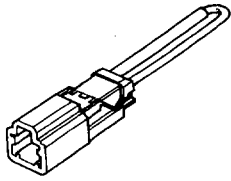
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# Special Tools

Ref. No.	Tool Number	Description	Qty	Remark
①	07JGG - 0010101	Belt Tension Gauge	1	
②	07PAZ - 0010100	SCS Short Connector	1	

①



②

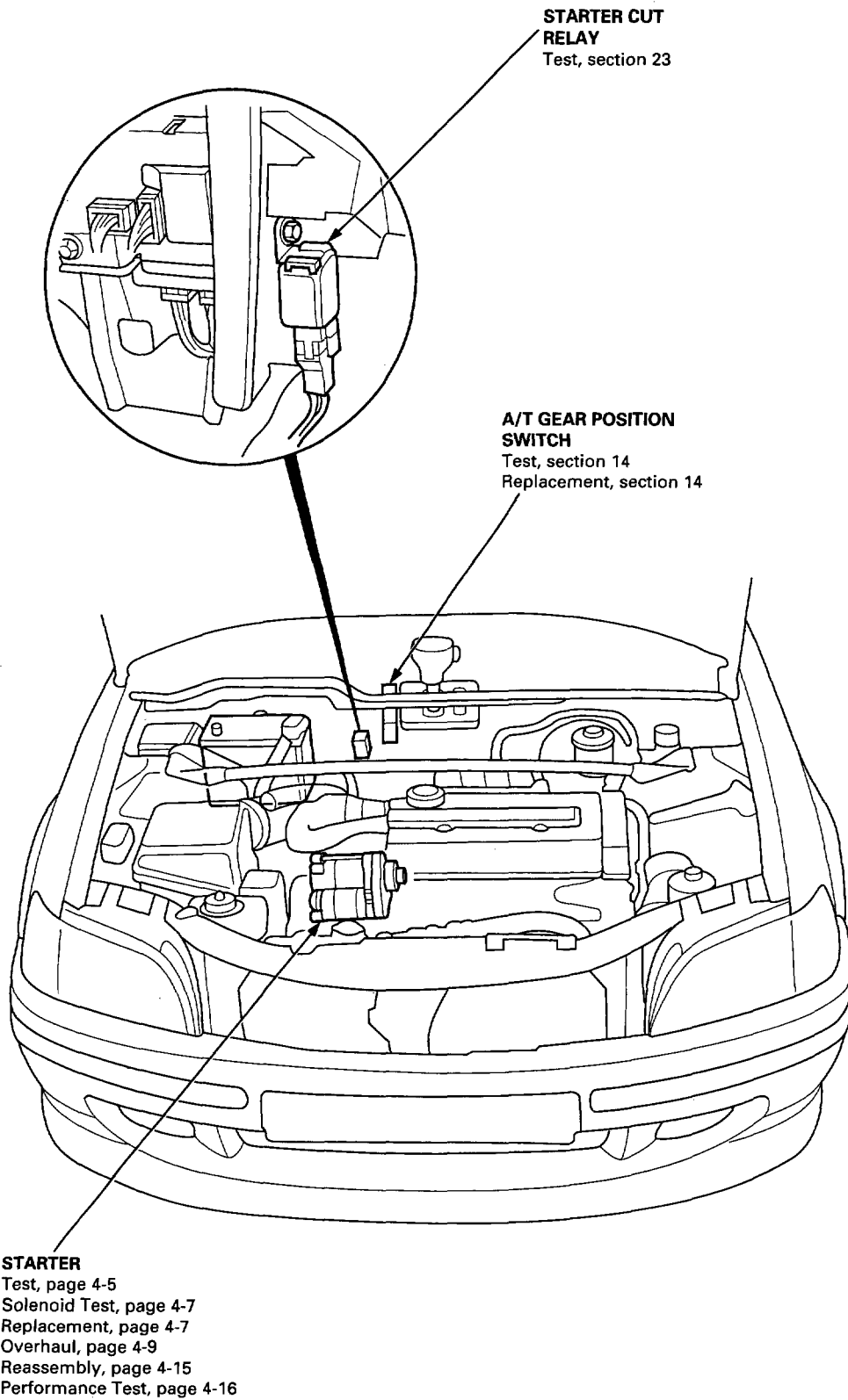


# Starting System



## Component Location Index

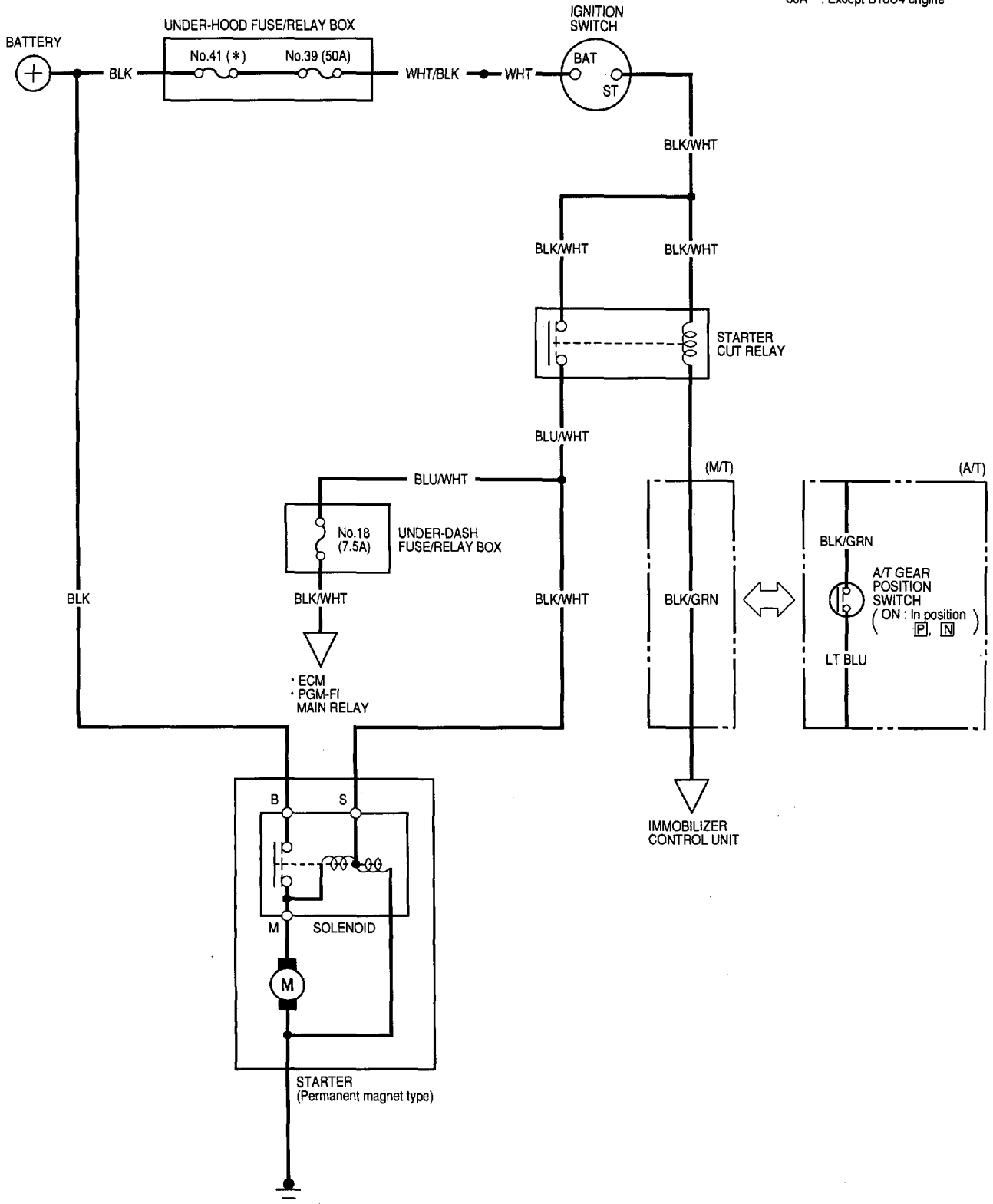
NOTE: LHD type is shown, RHD type is similar.



# Starting System

## Circuit Diagram

\* 100A : B18C4 engine  
80A : Except B18C4 engine



## Starter Test

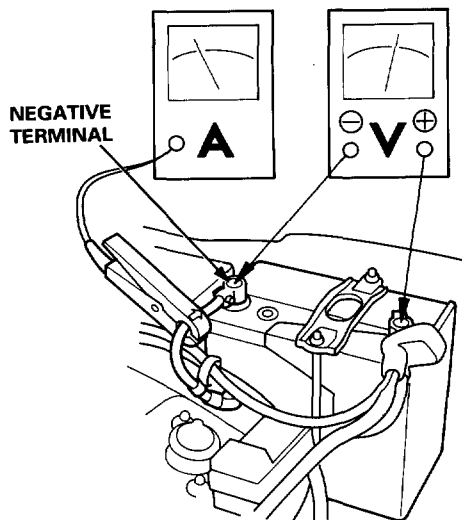
**NOTE:** The air temperature must be between 15 and 38°C (59 and 100°F) before testing.

### Recommended Procedure:

- Use a starter system tester.
- Connect and operate the equipment in accordance with the manufacturer's instructions.
- Test and troubleshoot as described.

### Alternate Procedure:

- Use following equipment:
  - Ammeter, 0 - 400 A
  - Voltmeter, 0 - 20 V (accurate within 0.1 volt)
  - Tachometer, 0 - 1,200 rpm (min<sup>-1</sup>)
- Hook up a voltmeter and ammeter as shown.



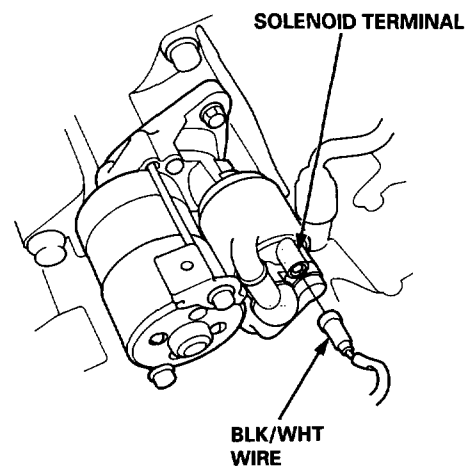
**NOTE:** After this test, or any subsequent repair, reset the ECM to clear any codes (see section 11).

### Check the Starter Engagement:

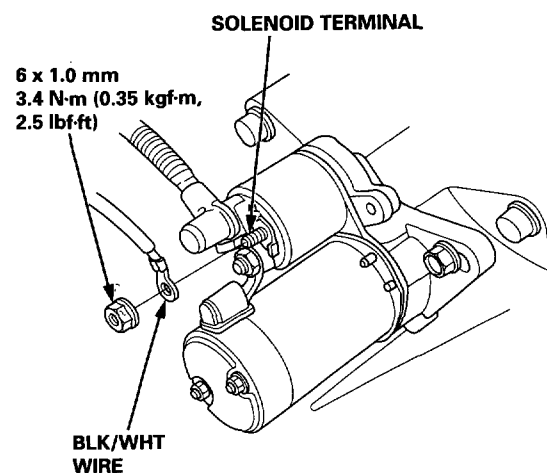
1. Remove the No. 31 (15 A) fuse from the under-hood fuse/relay box.
2. Turn the ignition switch to START (III) with the shift lever in **N** or **P** position (A/T) or neutral position (M/T). The starter should crank the engine.
  - If the starter does not crank the engine, go to step 3.
  - If it cranks the engine erratically or too slowly, go to "Check for Wear and Damage" on the next page.

3. Check the battery, battery positive cable, ground, starter cut relay, and the wire connections for looseness and corrosion. Test again. If the starter still does not crank the engine, go to step 4.
4. Unplug the connector (BLK/WHT wire and solenoid terminal) from the starter.
5. Connect a jumper wire from the battery positive (+) terminal to the solenoid terminal. The starter should crank the engine.

### B18C4 engine:



### Except B18C4 engine:



- If the starter still does not crank the engine, remove it, and diagnose its internal problem.
- If the starter cranks the engine, go to step 6.

(cont'd)

# Starting System

## Starter Test (cont'd)

6. Check the ignition switch (see section 23).
7. Check the starter cut relay (see section 23).
8. Check the A/T gear position switch (see section 14).
9. Check for an open in the wire between the ignition switch and starter.
10. Check the immobilizer system (see section 23).

### Check for Wear and Damage

The starter should crank the engine smoothly and steadily. If the starter engages, but cranks the engine erratically, remove it, and inspect the starter drive gear and torque converter or 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.
  - If damaged, replace the gears.

### Check Cranking Voltage and Current Draw

Cranking voltage should be no less than \*1 volts.  
Current draw should be no more than \*2 amperes.

\*1 Valeo: 8.0  
Mitsuba: 8.5

\*2 Valeo: 300  
Mitsuba: 350

If cranking voltage is too low, or current draw too high, check for:

- dead or low battery.
- open circuit in starter armature commutator segments.
- starter armature dragging.
- shorted armature winding.
- excessive drag in engine.

### Check Cranking rpm

Engine speed during cranking should be above 100 rpm ( $\text{min}^{-1}$ ).

If speed is too low, check for:

- loose battery or starter terminals.
- excessively worn starter brushes.
- open circuit in commutator segments.
- dirty or damaged helical spline or drive gear.
- defective drive gear overrunning clutch.

### Check Starter Disengagement

With the shift lever in **N** or **P** position (A/T) or neutral position (M/T), turn the ignition switch to START (III), and release to ON (II).

The starter drive gear should disengage from the torque converter or flywheel ring gear when you release the key.

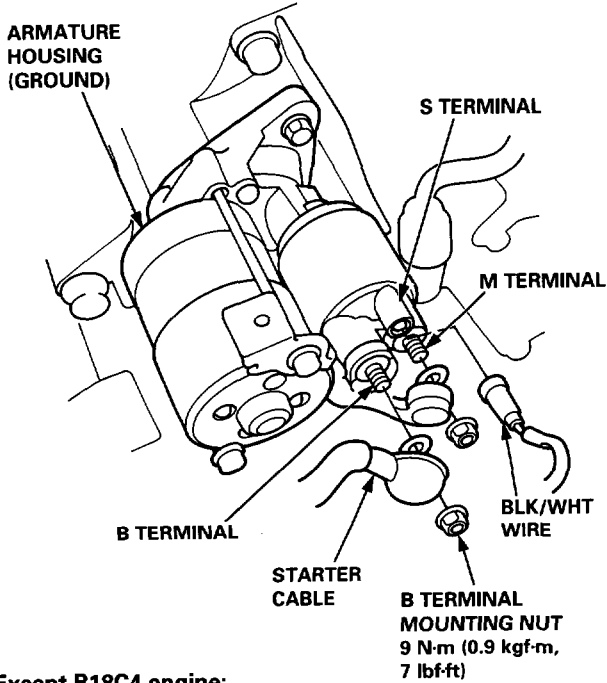
If the drive gear hangs up on the torque converter or flywheel ring gear, check for:

- solenoid plunger and switch malfunction.
- dirty drive gear assembly or damaged overrunning clutch.

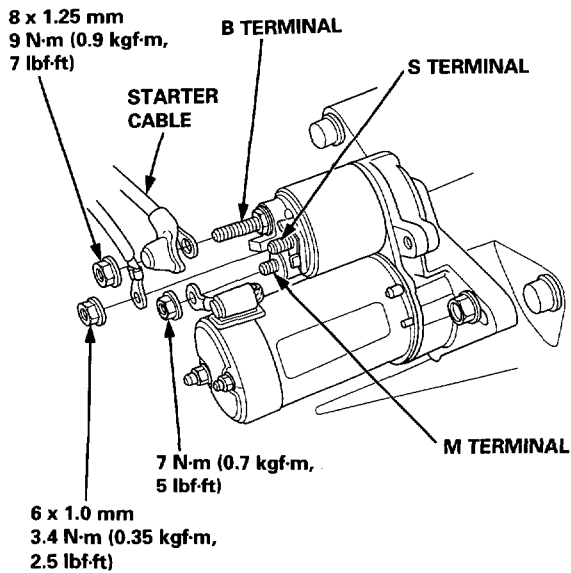
## Starter Solenoid Test

1. Check the hold-in coil for continuity between the S terminal and the armature housing (ground). The coil is OK if there is continuity.

**B18C4 engine:**



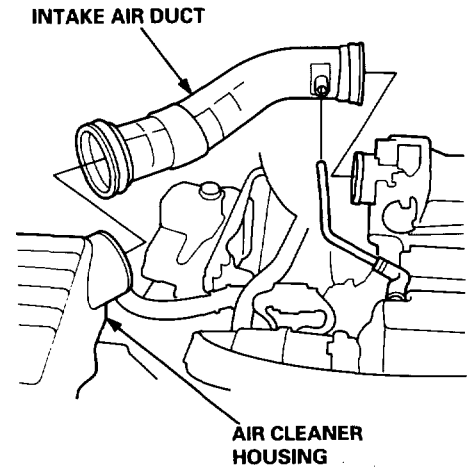
**Except B18C4 engine:**



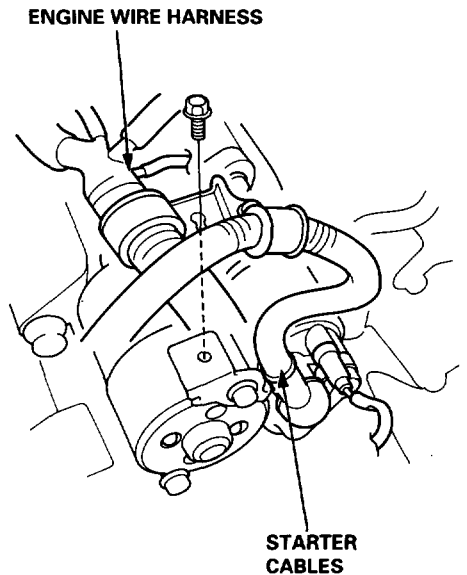
2. Check the pull-in coil for continuity between the S and M terminals. The coil is OK if there is continuity.

## Starter Replacement

1. Disconnect the negative cable from the battery.
2. Remove the intake air duct.



3. Remove the engine wire harness and starter cables from their brackets.



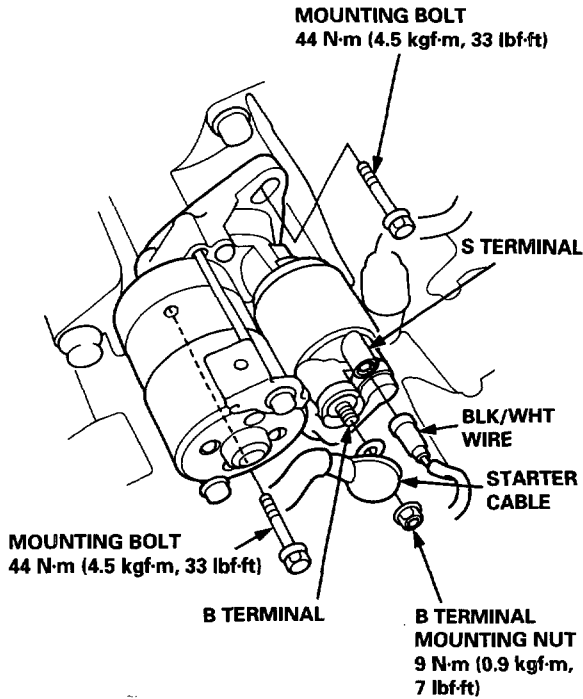
(cont'd)

# Starting System

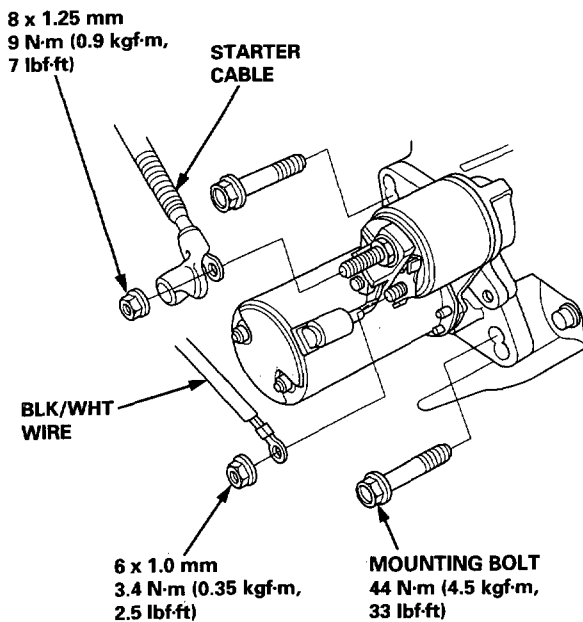
## Starter Replacement (cont'd)

4. Disconnect the starter cable from the B terminal on the solenoid, then disconnect the BLK/WHT wire from the S terminal.

**B18C4 engine:**



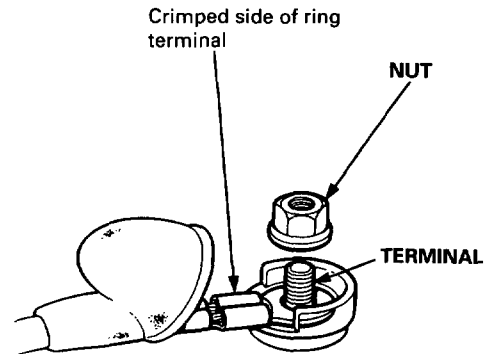
**Except B18C4 engine:**



5. Remove the two bolts holding the starter, then remove the starter.

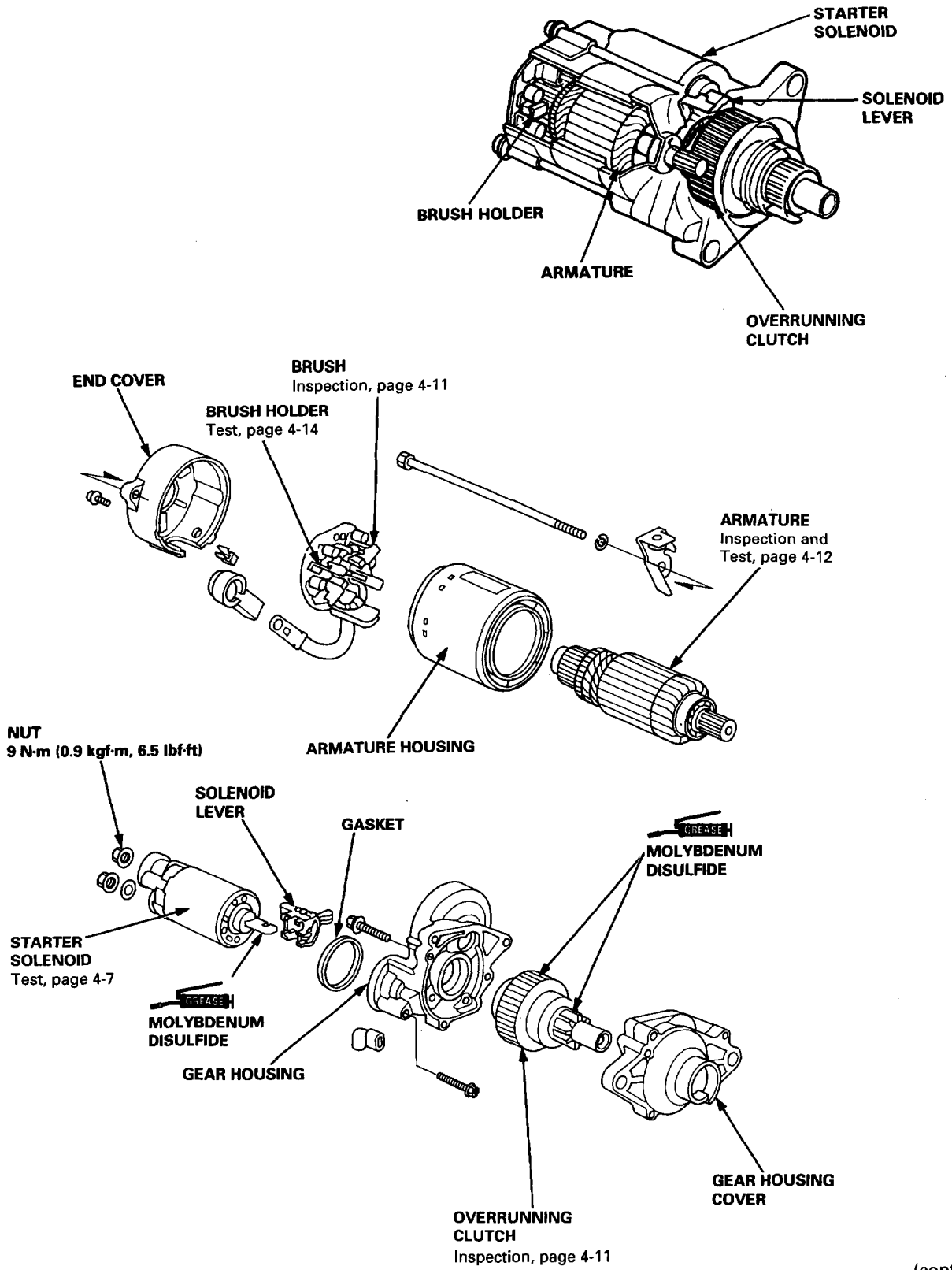
6. Install in the reverse order of removal.

**NOTE:** When installing the starter cable, make sure that the crimped side of the ring terminal is facing out.



7. Connect the battery positive cable and negative cable to the battery.

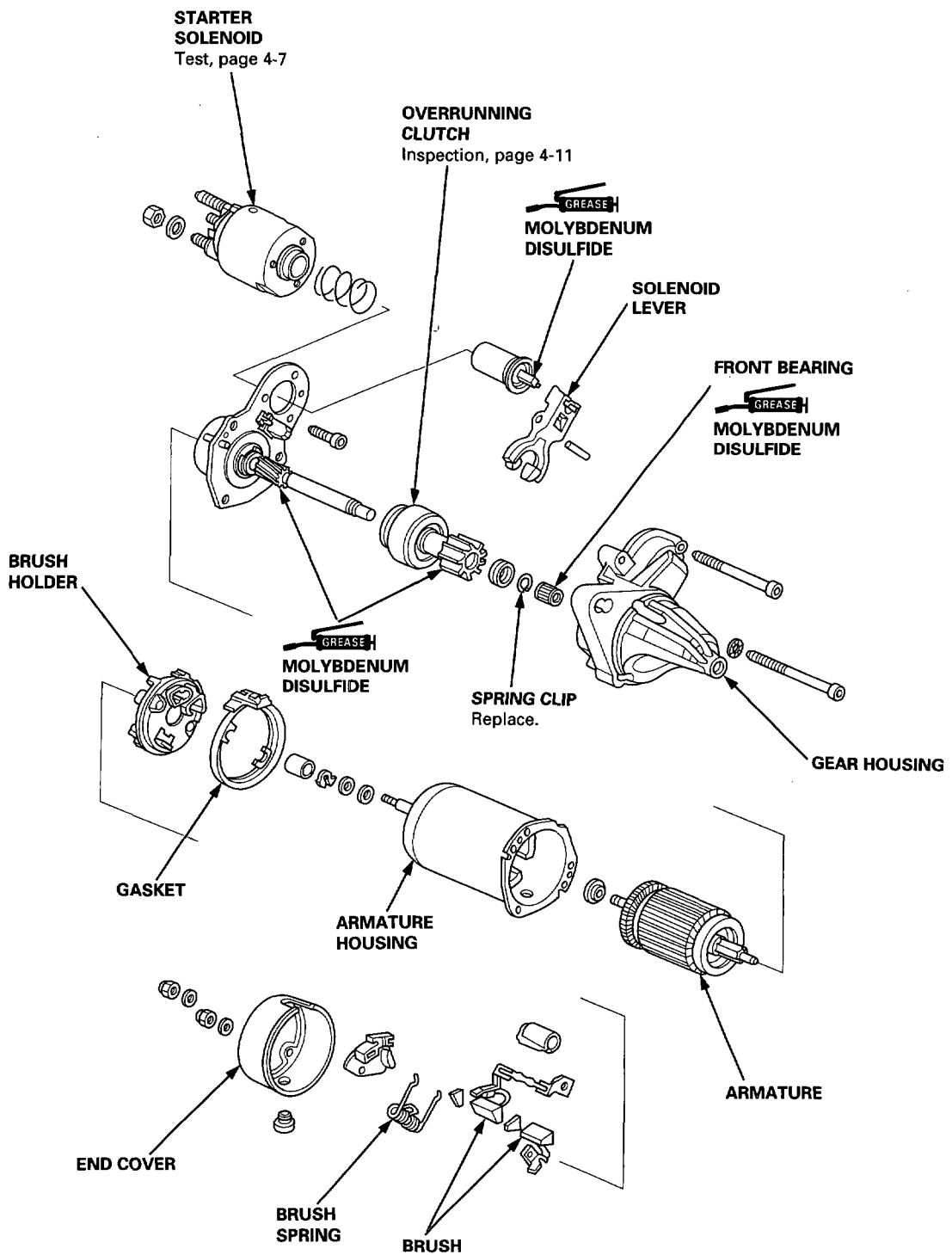
# Starter Overhaul (Mitsuba)



(cont'd)

# Starting System

## Starter Overhaul (cont'd) (VALEO)





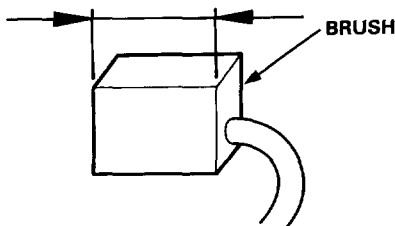
## Brush Inspection

Measure the brush length. If not within the service limit, replace the brush (or brush holder assembly).

### Brush Length

	Standard (NEW)	Service Limit
Mitsuba	15.8 – 16.2 mm (0.62 – 0.64 in)	11.0 mm (0.43 in)

NOTE: Exchange the starter of VALEO with assembly.

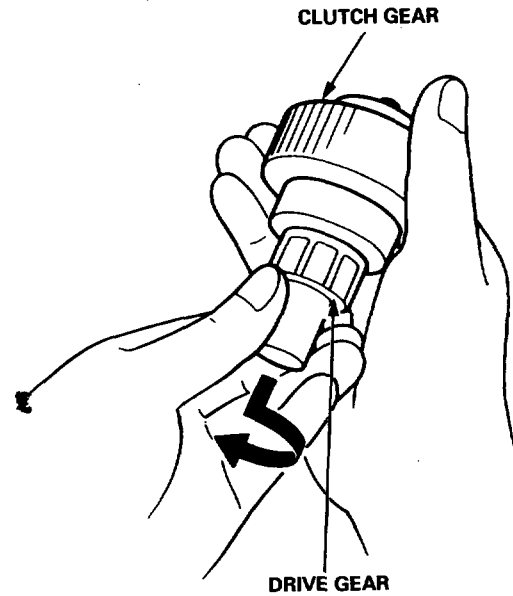


NOTE: To seat new brushes after installing them in their holders, slip a strip of #500 or #600 sandpaper, with the grit side up, over the commutator and smoothly rotate the armature. The contact surface of the brushes will be sanded to the same contour as the commutator.

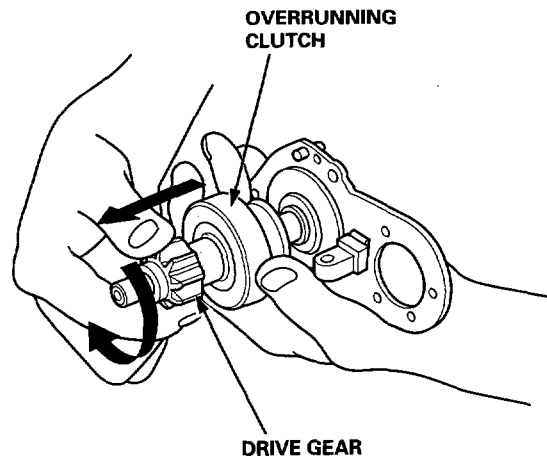
## Overrunning Clutch Inspection

1. Slide the overrunning clutch along the shaft. Does it move freely? If not, replace it.
2. Rotate the overrunning clutch both ways. Does it lock in one direction and rotate smoothly in reverse? If it does not lock in either direction or it locks in both directions, replace it.

**Mitsuba:**



**Valeo:**



3. If the starter drive gear is worn or damaged, replace the overrunning clutch assembly; the gear is not available separately.
4. Check the condition of the flywheel or torque converter ring gear if the starter drive gear teeth are damaged.

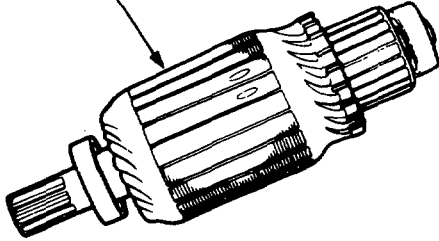
# Starting System

## Armature Inspection and Test (MITSUBA)

1. Inspect the armature for wear or damage due to contact with the permanent magnet or field winding.

- If there is wear or damage, replace the armature.

Inspect for damage.



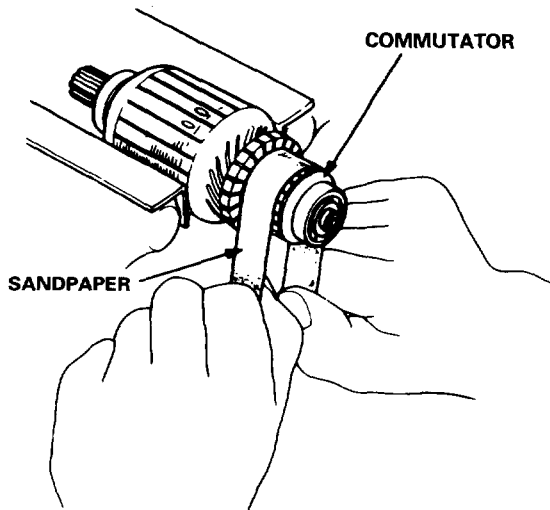
2. Check commutator surface and diameter.

- If the surface is dirty or burnt, resurface with emery cloth or a lathe within the following specifications, or recondition with #500 or #600 sandpaper.
- If commutator diameter is below the service limit, replace the armature.

### Commutator Diameter

Standard (New): 28.0 – 28.1 mm (1.102 – 1.106 in)

Service Limit: 27.5 mm (1.083 in)



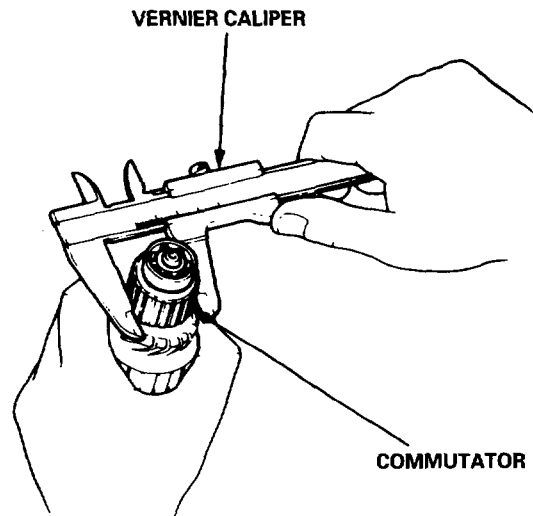
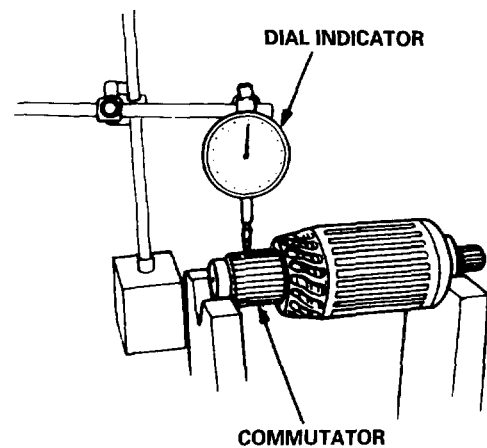
3. Measure the commutator runout.

- If the commutator runout is within the service limit, check the commutator for carbon dust or brass chips between the segments.
- If the commutator runout is not within the service limit, replace the armature.

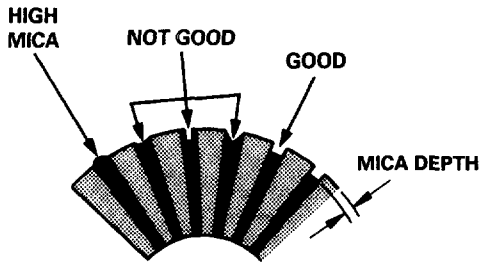
### Commutator Runout

Standard (New): 0 – 0.002 mm (0 – 0.0008 in)

Service Limit: 0.05 mm (0.002 in)



4. Check for mica depth. If necessary, undercut mica with a hacksaw blade to achieve proper depth. If service limit cannot be maintained, replace the armature.

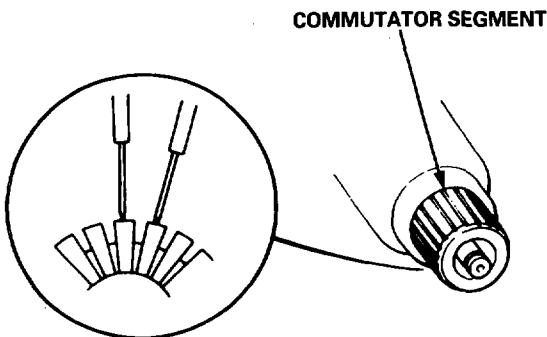


**Commutator Mica Depth**

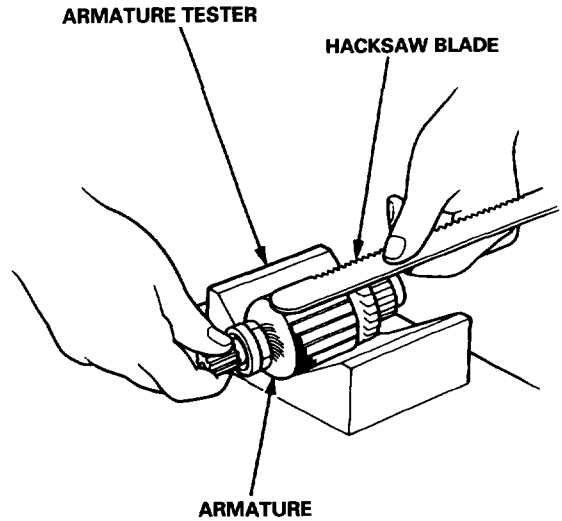
**Standard (New): 0.4 – 0.5 mm (0.016 – 0.020 in)**

**Service Limit: 0.15 mm (0.006 in)**

5. Check for continuity between the segments of the commutator. If an open circuit exists between any segments, replace the armature.

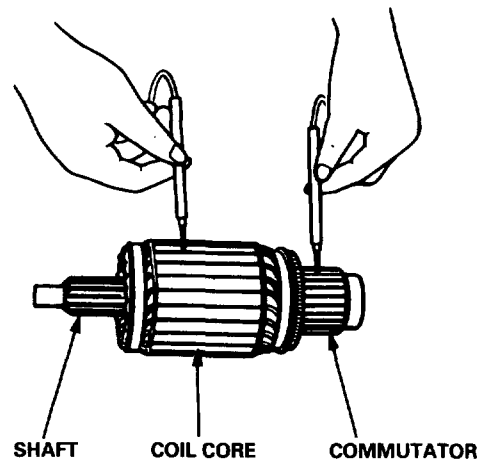


6. Place the armature on an armature tester. Hold a hacksaw blade on the armature core.



- If the blade is attracted to the core or vibrates while the core is turned, the armature is shorted. Replace the armature.

7. Check with an ohmmeter that no continuity exists between the commutator and armature coil core, and between the commutator and armature shaft. If there is continuity, replace the armature.

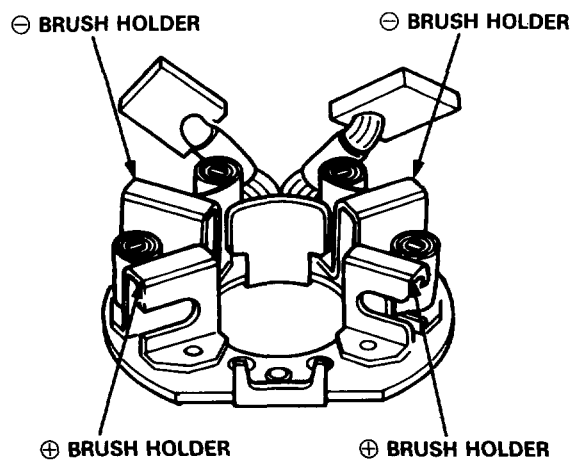


# Starting System

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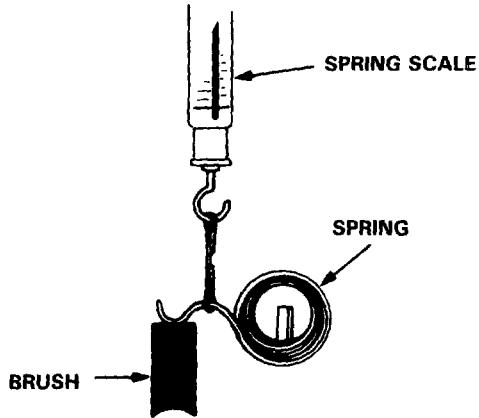
## Brush Holder Test (MITSUBA)

1. Check that there is no continuity between the ⊕ and ⊖ brush holders.  
If there is continuity, replace the brush holder assembly.



## Brush Spring Inspection

1. Insert the brush into the brush holder, and bring the brush into contact with the commutator, then attach a spring scale to the spring. Measure the spring tension at the moment the spring lifts off the brush.



	Spring Tension
Mitsuba	18.5 – 23.5 N (1.85 – 2.35 kgf, 4.1 – 5.2 lbf)

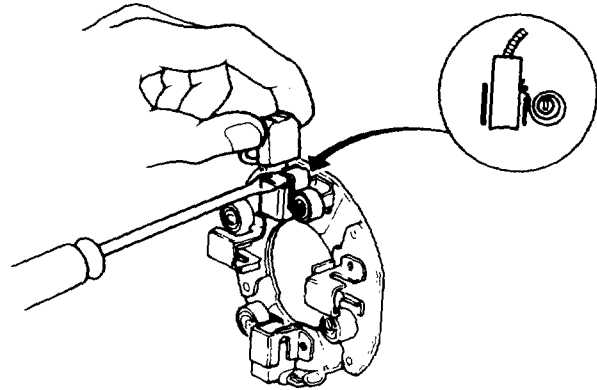
NOTE: Exchange the starter of VALEO with assembly.

## Starter Reassembly

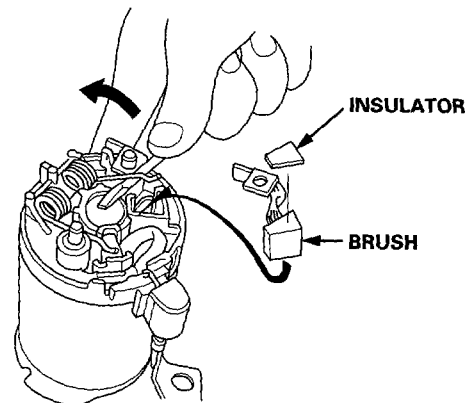
NOTE: Use the illustration on pages 4-9, 10 as reference for reassembly.

1. Pry back each brush spring with a screwdriver, then position the brush about halfway out of its holder and release the spring to hold it there.

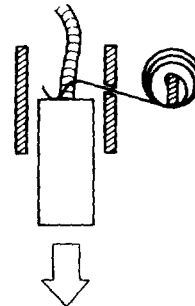
Mitsuba:



Valeo:



2. Install the armature in the housing. Next, pry back each brush spring again, and push the brush down until it seats against the commutator, then release the spring against the end of the brush.

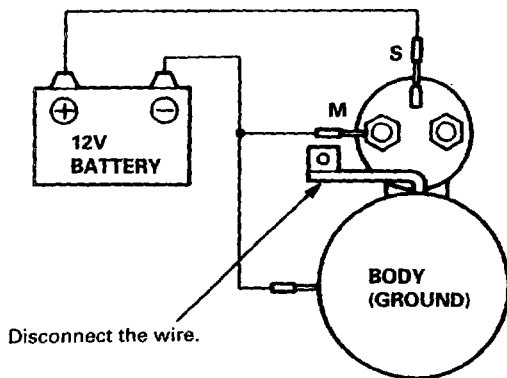


3. Install the end cover on the brush holder.

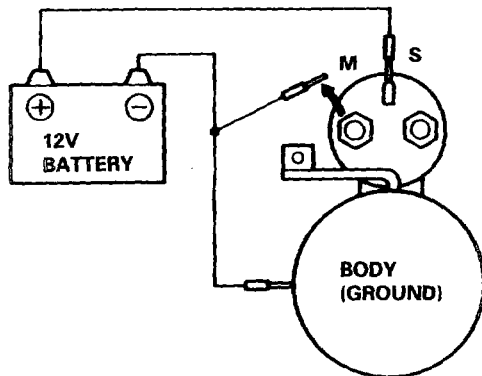
# Starting System

## Performance Test

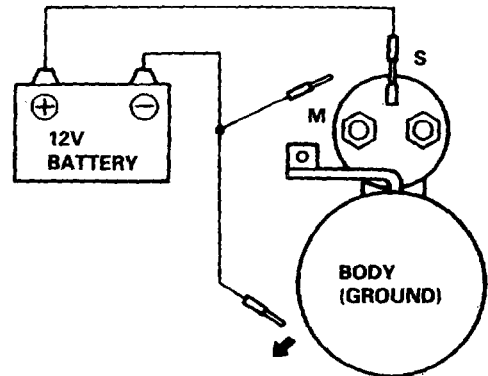
1. Disconnect the wire from terminal M.
2. Make a connection as described below using as heavy a wire as possible (preferably equivalent to the wire used for the vehicle).
3. Connect the battery as shown. If the starter pinion pops out, it is working properly. To avoid damaging the starter, do not leave the battery connected for more than 10 seconds.



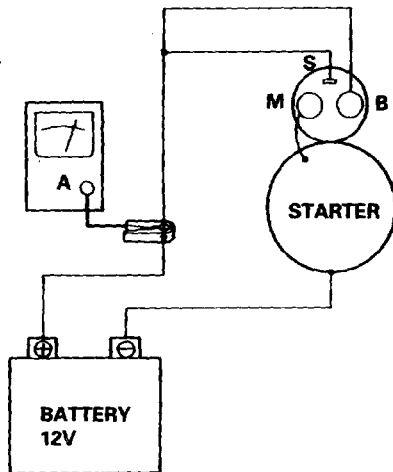
4. Disconnect the battery from the M terminal. If the pinion does not retract, the hold-in coil is working properly. To avoid damaging the starter, do not leave the battery connected for more than 10 seconds.



5. Disconnect the battery also from the body. If the pinion retracts immediately, it is working properly. To avoid damaging the starter, do not leave the battery connected for more than 10 seconds.



6. Clamp the starter firmly in a vise.
7. Connect the starter to the battery as described in the diagram below, and confirm that the motor starts and keeps rotating.



8. If the electric current and motor speed meet the specifications when the battery voltage is at 11.5 V, the starter is working properly.

### Specifications:

Maker	Electric current	Motor speed
Mitsuba	80 A or less	2,600 rpm (min <sup>-1</sup> ) or more
Valeo	70 A or less	2,700 rpm (min <sup>-1</sup> ) or more

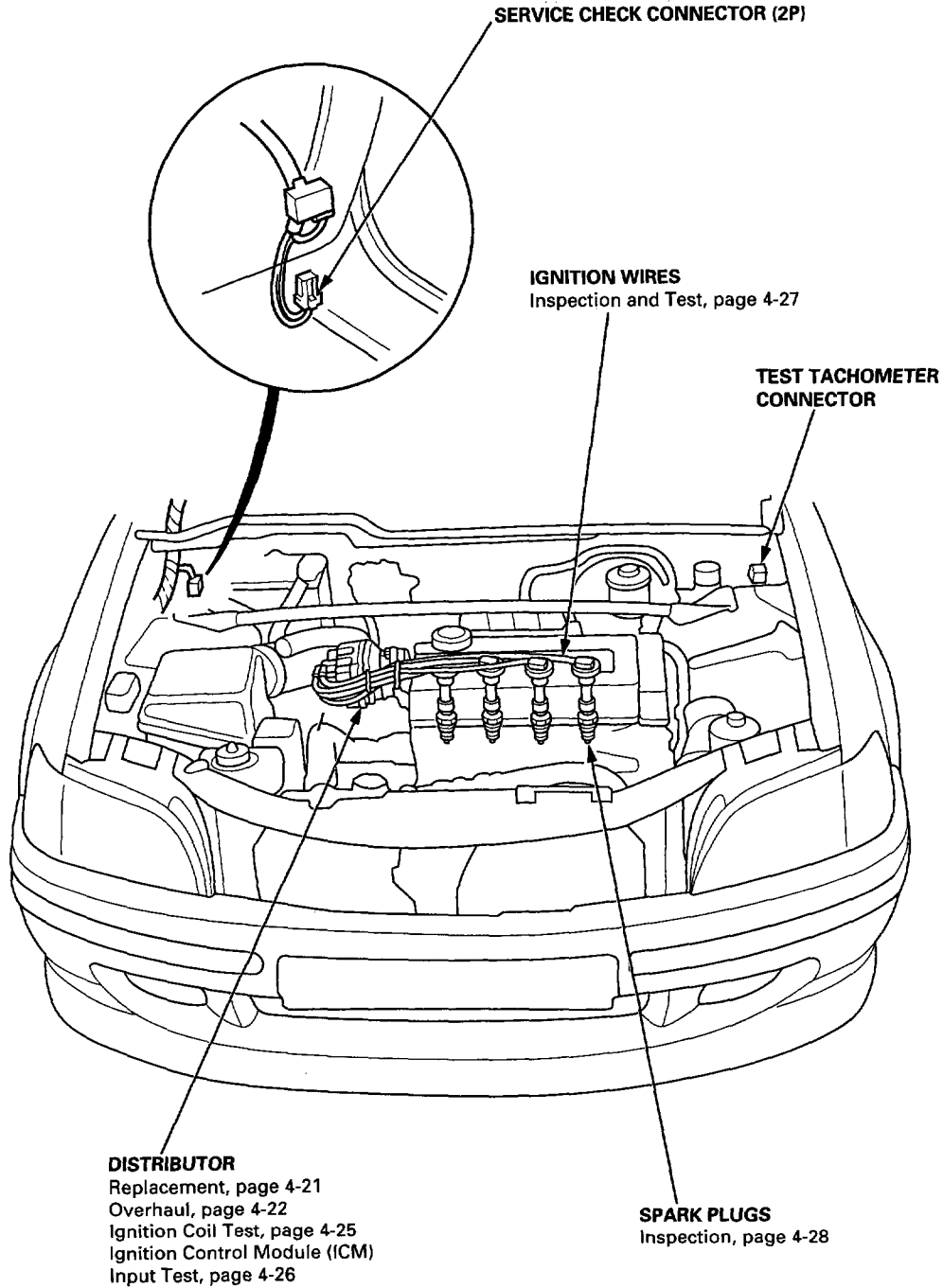


## Component Location Index

NOTE: LHD type is shown, RHD type is similar.

### IGNITION TIMING CONTROL SYSTEM

- Troubleshooting, section 11
- Idle speed Inspection/Adjustment, section 11
- Inspection and Setting, page 4-20

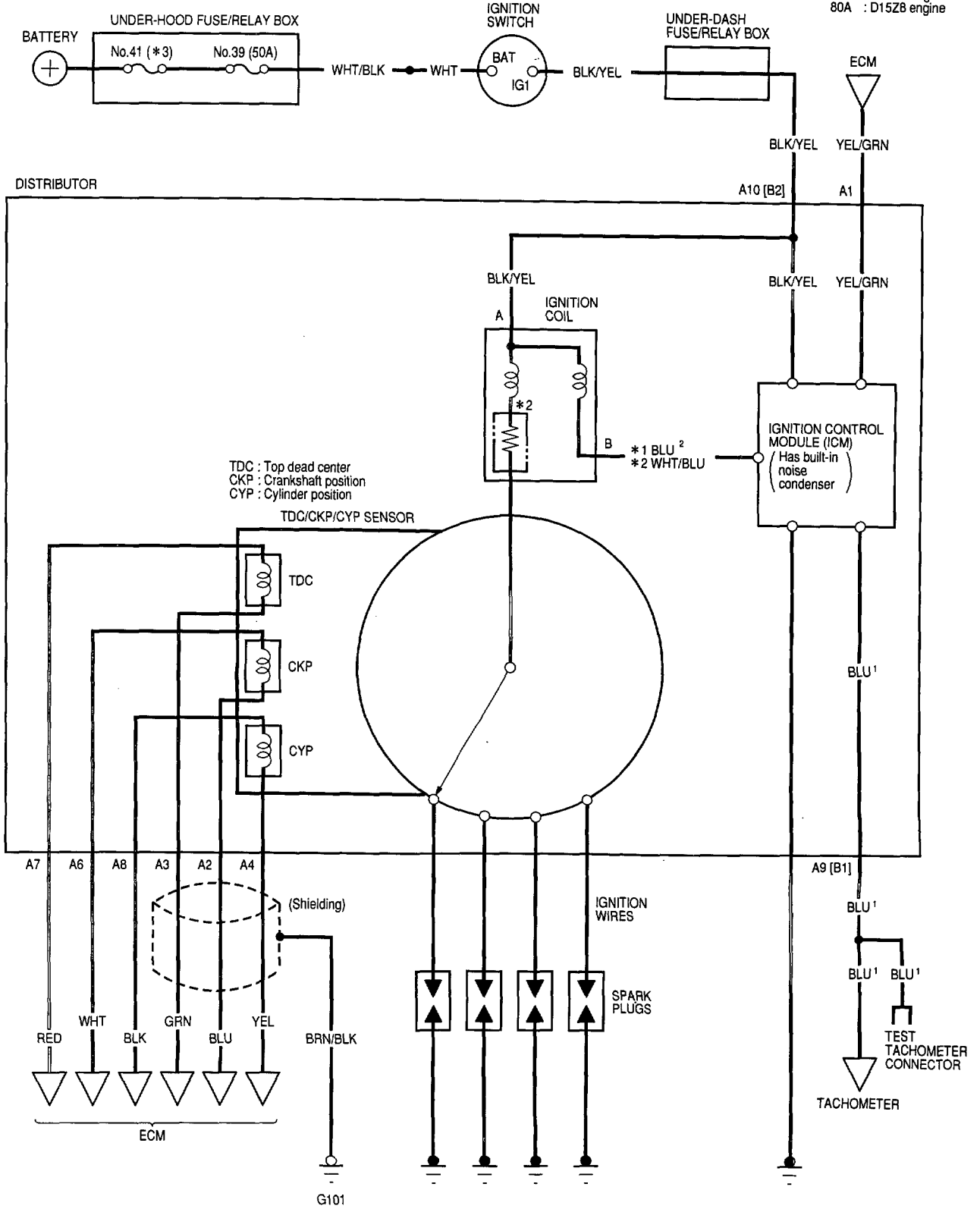


# Ignition System

## Circuit Diagram

D15Z8, B18C4 engines:

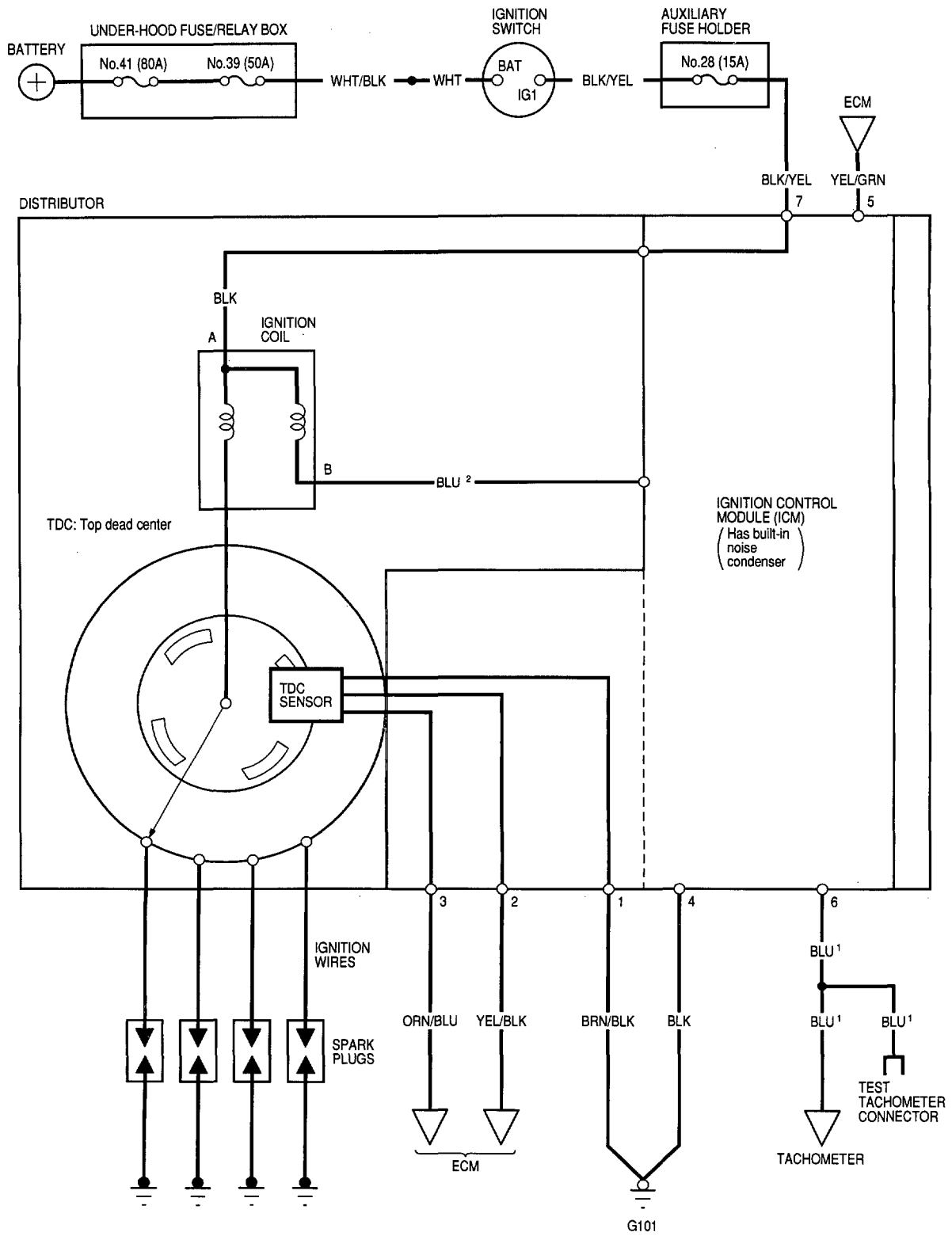
- [ ] : D15Z8 engine
- \*1 : LUCAS
- \*2 : TEC
- \*3 : 100A : B18C4 engine  
80A : D15Z8 engine







**D14A7, D14A8, D16B2 engines:**



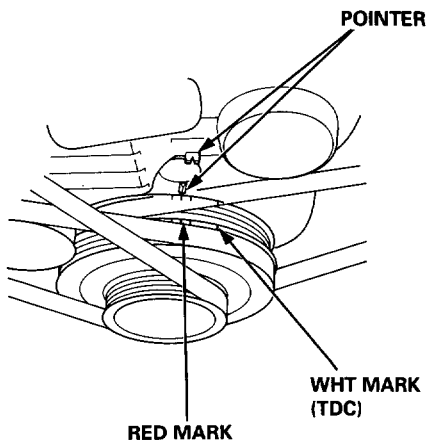
# Ignition System

## Ignition Timing Inspection and Setting

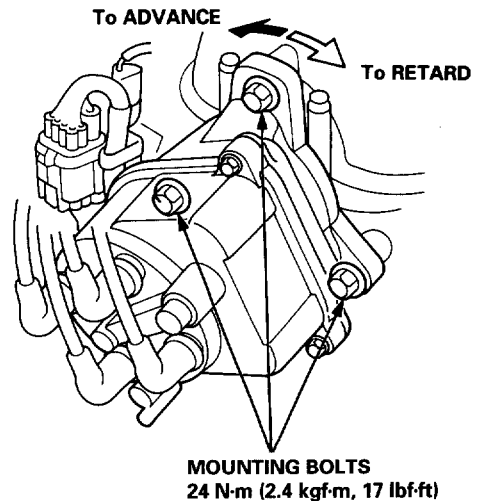
1. Check the idle speed, and adjust it if necessary (see section 11).
2. Pull out the service check connector 2P (BRN and BLK wires) from the connector holder located under the dash on the front passenger side, then connect the SCS short connector (P/N 07PAZ - 0010100) to it.
3. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (A/T in **N** or **P**, M/T in neutral) until the radiator fan comes on, then let it idle.
4. Connect the timing light to the No. 1 ignition wire, then point the light toward the pointer on the timing belt cover.
5. Check the ignition timing in no load conditions: headlights, blower fan, rear window defogger, and air conditioner are not operating.

### Ignition Timing:

M/T	$16^{\circ} \pm 2^{\circ}$ BTDC (RED) during idling in neutral
A/T	$16^{\circ} \pm 2^{\circ}$ BTDC (RED) during idling in <b>N</b> or <b>P</b>



6. Adjust the ignition timing if necessary, as follows. Loosen the distributor mounting bolts, and turn the distributor ignition (DI) housing counterclockwise to advance the timing, or clockwise to retard the timing.

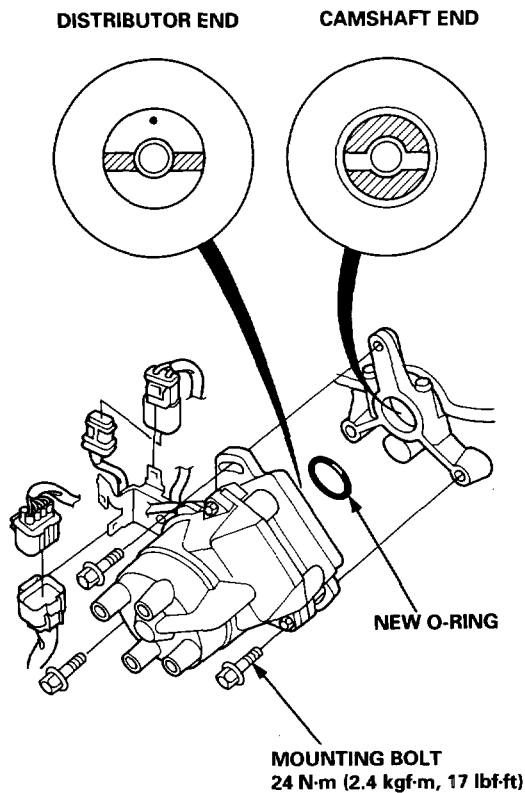


7. Tighten the distributor mounting bolts, and recheck the ignition timing.
8. Disconnect the SCS short connector from the service check connector.

## Distributor Replacement

### Removal:

1. Disconnect the connector from the distributor.
2. Disconnect the ignition wires from the distributor ignition (DI) cap.
3. Remove the mounting bolts from the distributor, then remove the distributor from the cylinder head.



### Installation:

**NOTE:** Before you install the distributor, bring the No. 1 piston to compression stroke TDC.

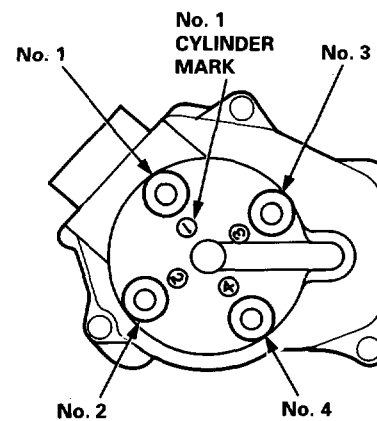
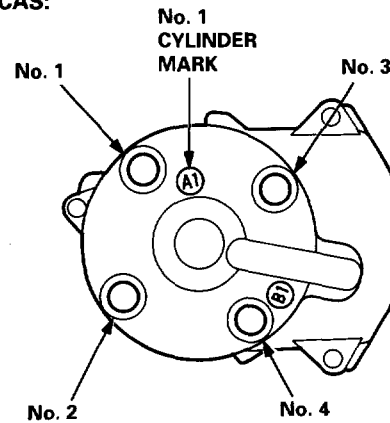
1. Coat a new O-ring with engine oil, then install it.
2. Slip the distributor into position.

**NOTE:** The lug on the end of the distributor and its mating grooves in the camshaft end are both offset to eliminate the possibility of installing the distributor 180° out of time.

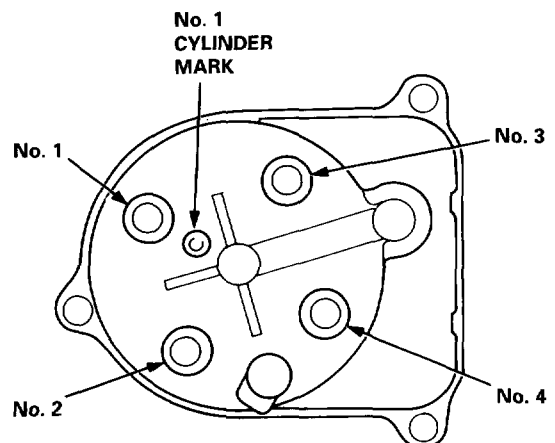
3. Install the mounting bolts, and tighten them lightly.

4. Connect the ignition wires to the distributor ignition (DI) cap as shown.

### LUCAS:



### TEC:

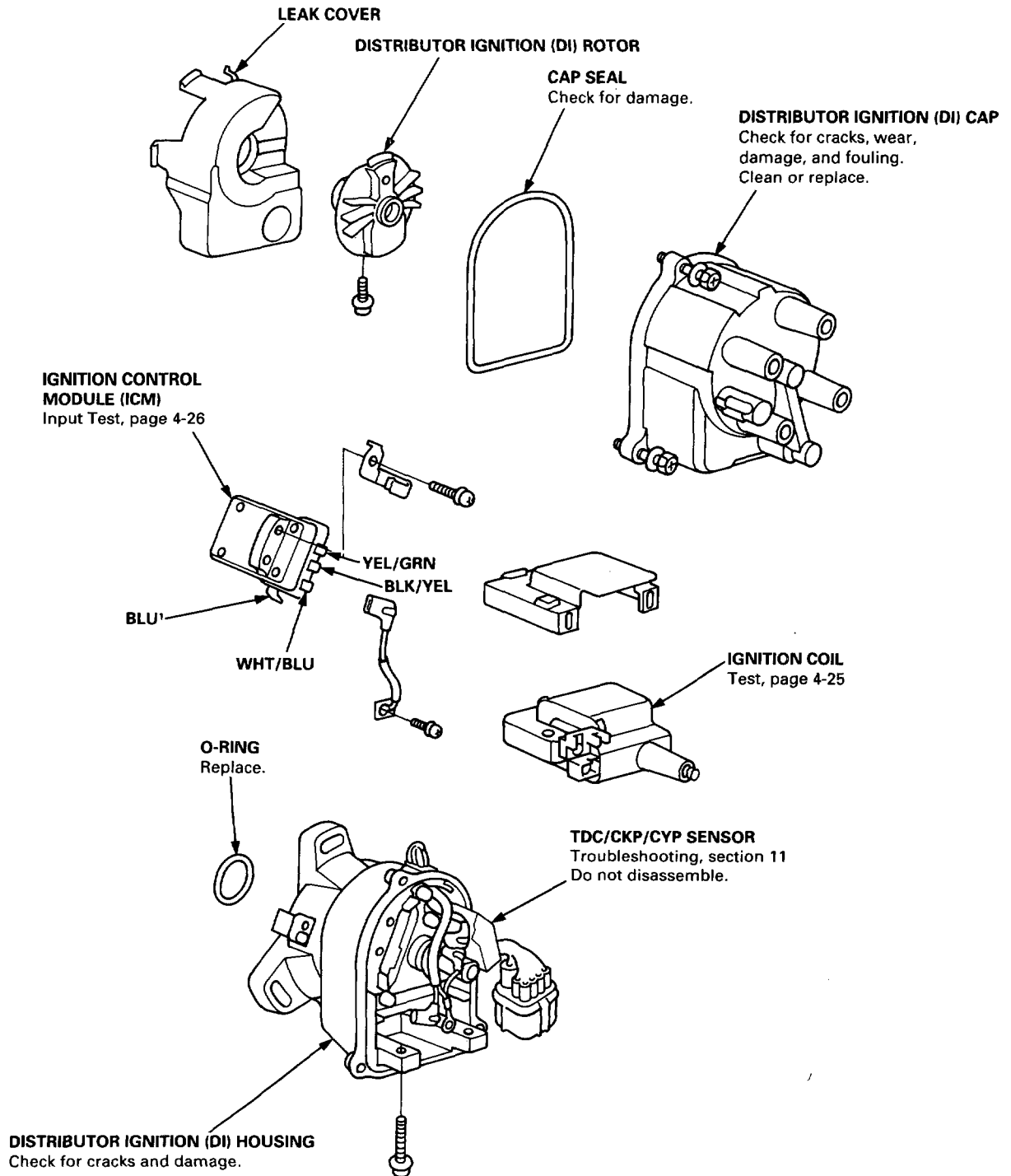


5. Connect the connector to the distributor.
6. Set the ignition timing (see previous page).
7. After setting the ignition timing, tighten the mounting bolts.

# Ignition System

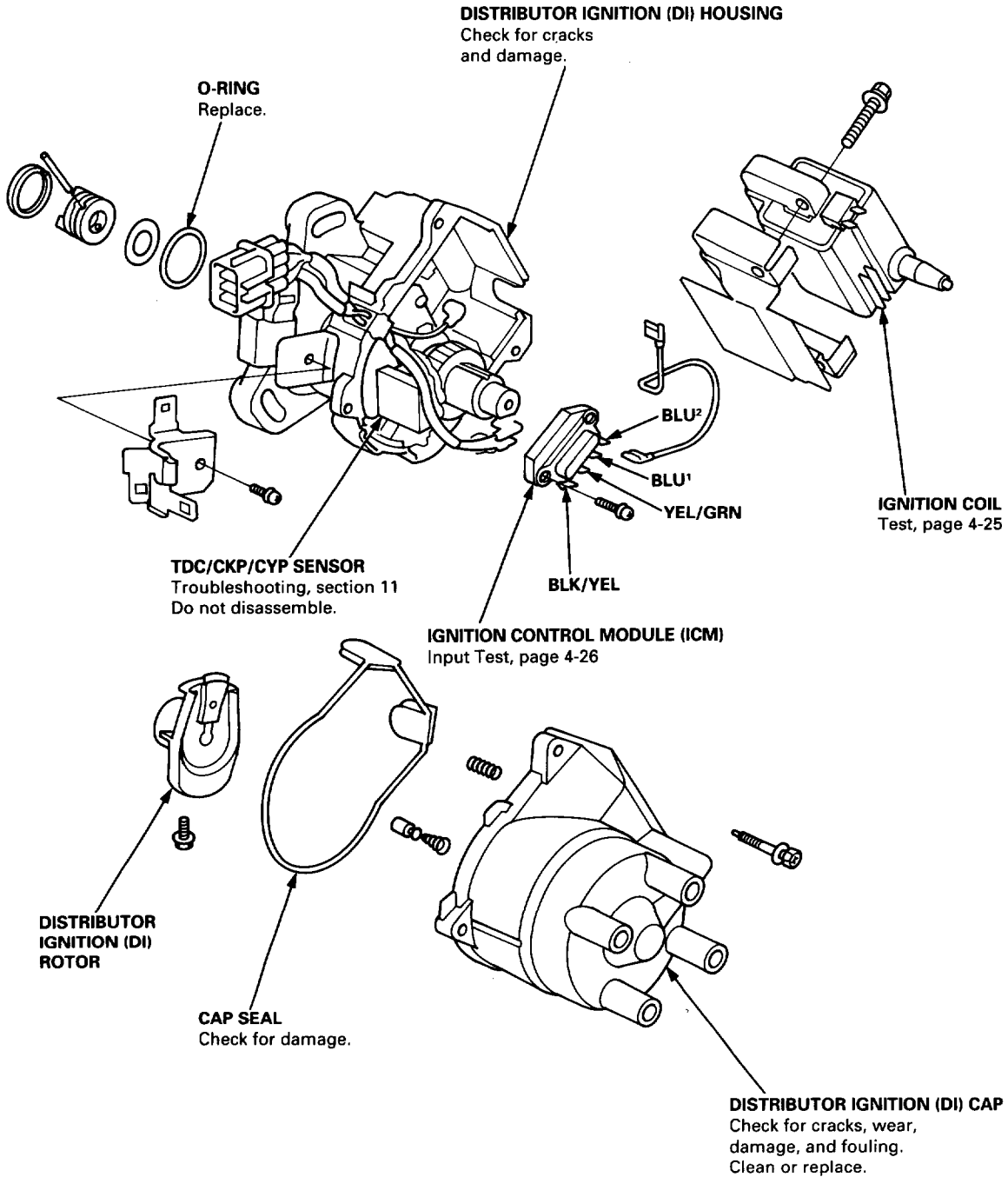
## Distributor Overhaul (B18C4 engine)

TEC:



# Distributor Overhaul (D15Z8 engine)

LUCAS:

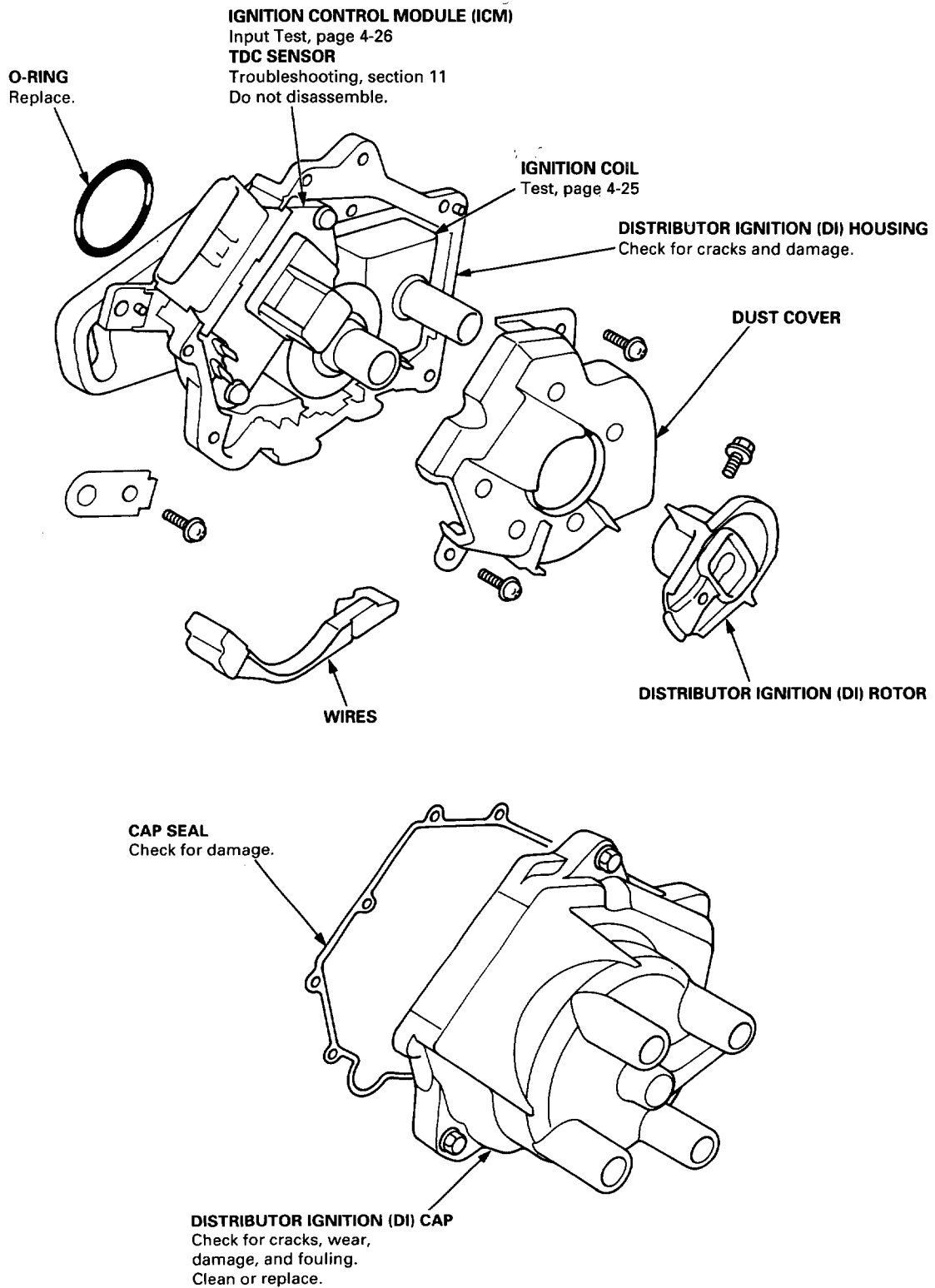


(cont'd)

# Ignition System

## Distributor Overhaul (cont'd) (D14A7, D14A8, D16B2 engine)

LUCAS:



## Ignition Coil Test

### LUCAS:

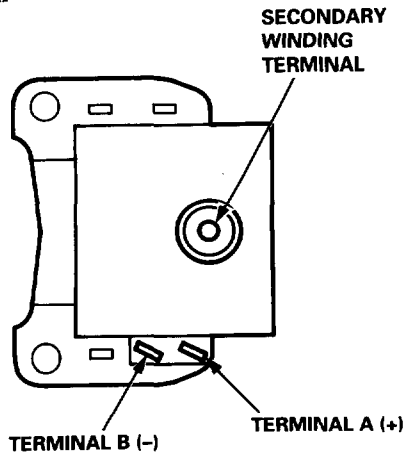
Using an ohmmeter, measure resistance between the terminals. If the resistance is not within specifications, replace the distributor ignition (DI) housing assembly (Type A) or the ignition coil (Type B).

NOTE: Resistance will vary with the coil temperature; specifications are at 20°C (68°F).

#### Type A:

**Primary Winding Resistance**  
(Between the A and B terminals):  
0.54 – 0.66 Ω

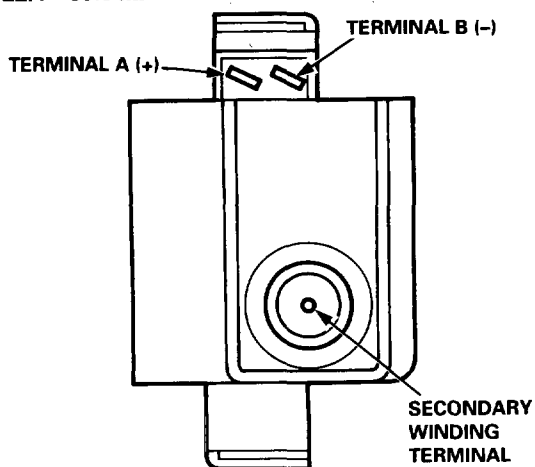
**Secondary Winding Resistance**  
(Between the A and secondary winding terminals):  
13.6 – 20.4 kΩ



#### Type B:

**Primary Winding Resistance**  
(Between the A and B terminals):  
0.45 – 0.55 Ω

**Secondary Winding Resistance**  
(Between the A and secondary winding terminals):  
22.4 – 33.6 kΩ



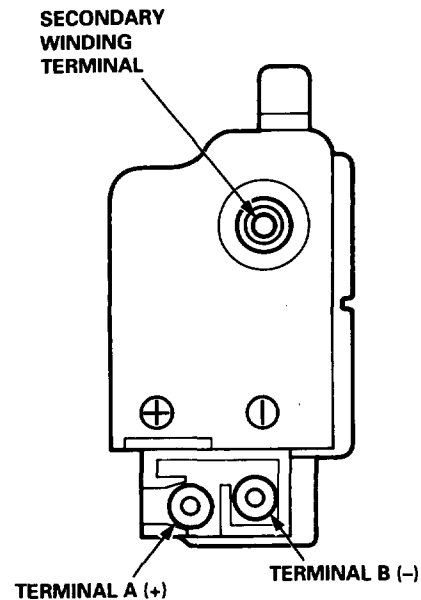
### TEC:

Using an ohmmeter, measure resistance between the terminals. If the resistance is not within specifications, replace the ignition coil.

NOTE: Resistance will vary with the coil temperature; specifications are at 20°C (68°F).

**Primary Winding Resistance**  
(Between the A and B terminals):  
0.63 – 0.77 Ω

**Secondary Winding Resistance**  
(Between the A and secondary winding terminals):  
12.8 – 19.2 kΩ



# Ignition System

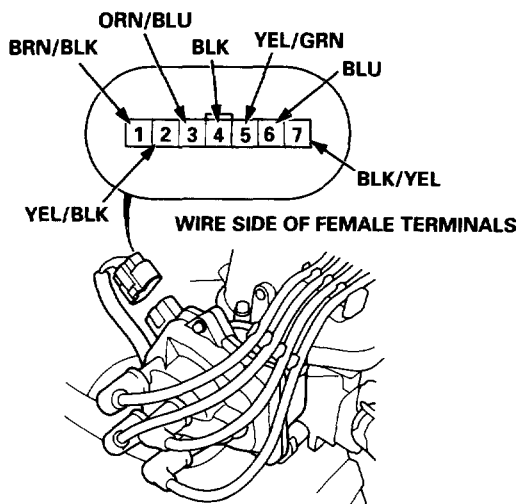
## Ignition Control Module (ICM) Input Test

**NOTE:**

- See section 11 when the malfunction indicator lamp (MIL) turned on.
- Perform an input test for the ignition control module (ICM) after finishing the fundamental tests for the ignition system and the fuel and emissions systems.

**D14A7, D14A8, D16B2 engines:**

1. Disconnect the 7P connector from the distributor.



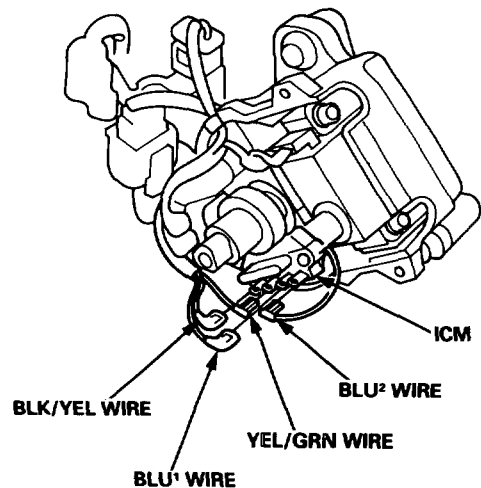
2. Turn the ignition switch ON (II), check for voltage between the No. 7 terminal and body ground.
  - There should be battery voltage.
  - If there is no battery voltage, check for an open in the BLK/YEL wire between the auxiliary fuse holder and the ICM, or blown No. 28 (15 A) fuse.
3. Turn the ignition switch OFF, check for continuity between the No. 4 terminal and body ground.
  - There should be continuity.
  - If there is no continuity, check for an open in the BLK wire between the ICM and body ground, or poor ground at G101.
4. Check for continuity between the No. 6 terminal and the test tachometer connector.
  - There should be continuity.
  - If there is no continuity, check for an open in the BLU wire between the test tachometer connector and the ICM.
5. Check for continuity between the No. 6 terminal and body ground.
  - There should be no continuity.
  - If there is continuity, check for a short in the BLU wire between the test tachometer connector and the ICM to body ground.

6. Remove the distributor ignition (DI) cap, the distributor ignition (DI) rotor and the dust cover. Check the BLK and BLU wires, and test the ignition coil (see previous page).
7. If all the tests are normal, replace the distributor ignition (DI) housing assembly.

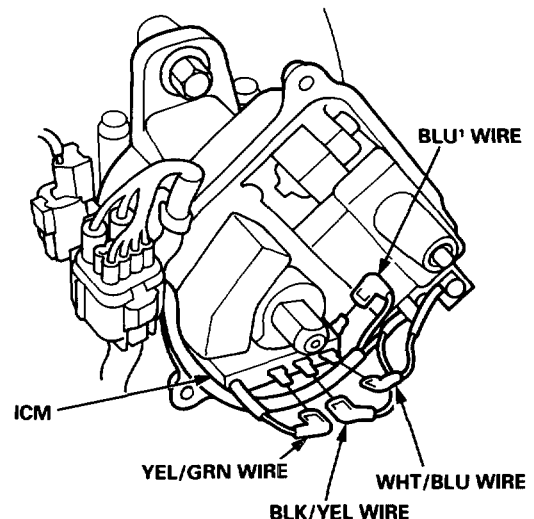
**D15Z8, B18C4 engine:**

1. Remove the distributor ignition (DI) cap, the distributor ignition (DI) rotor and the leak cover (TEC).
2. Disconnect the wires from the ICM.

**LUCAS:**



**TEC:**



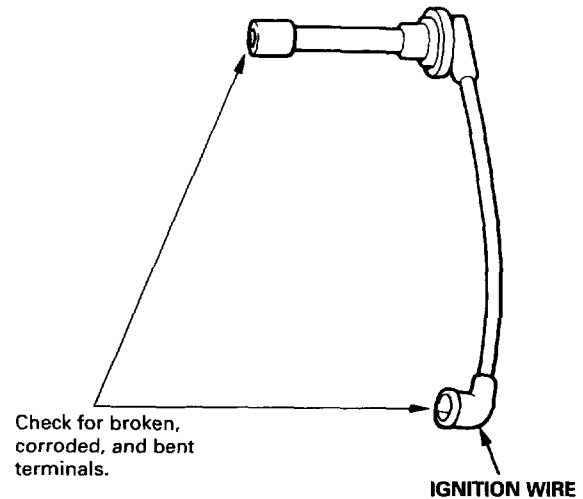


## Ignition Wire Inspection and Test

3. Turn the ignition switch ON (II). Check for voltage between the BLK/YEL wire and body ground. There should be battery voltage.
    - If there is no battery voltage, check the BLK/YEL wire between the under-dash fuse/relay box and the ICM.
    - If there is battery voltage, go to step 4.
  4. Turn the ignition switch ON (II). Check for voltage between the \*1 wire and body ground. There should be battery voltage.
    - If there is no battery voltage, check:
      - the ignition coil.
      - the \*1 wire between the ignition coil and the ICM.
    - If there is battery voltage, go to step 5.
- \*1: BLU<sup>2</sup> wire (LUCAS)  
WHT/BLU wire (TEC)
5. Check for continuity on the BLU<sup>1</sup> wire between the test tachometer connector and the ICM. There should be continuity.
  6. Check for continuity on the BLU<sup>1</sup> wire to body ground. There should be no continuity.
  7. If all the tests are normal, replace the ICM.

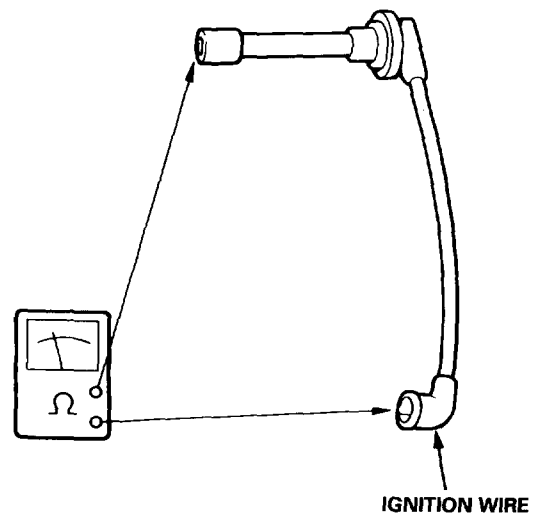
NOTE: Carefully remove the ignition wires by pulling on the rubber boots. Do not bend the wires; you might break them inside.

1. Check the condition of the ignition wire terminals. If any terminal is corroded, clean it, and if it is broken or distorted, replace the ignition wire.



2. Connect ohmmeter probes and measure resistance.

**Ignition Wire Resistance:**  
25 k $\Omega$  max. at 20°C (68°F)

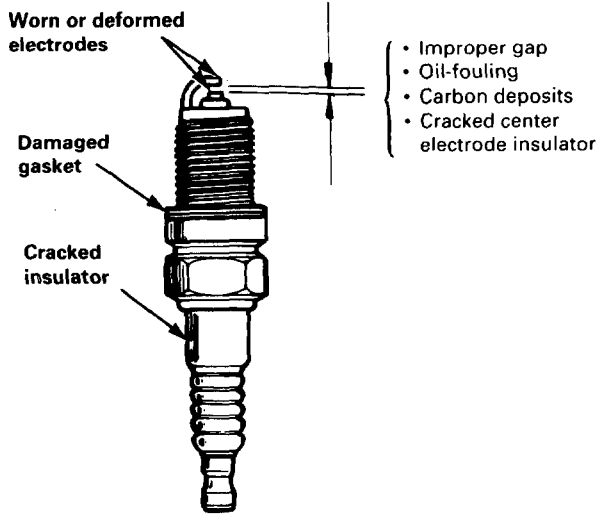


3. If resistance exceeds 25 k $\Omega$ , replace the ignition wire.

# Ignition System

## Spark Plug Inspection

1. Inspect the electrodes and ceramic insulator for:



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

- Advanced ignition timing
- Loose spark plug
- Plug heat range too low
- Insufficient cooling

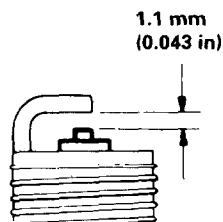
**Fouled plug may be caused by:**

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

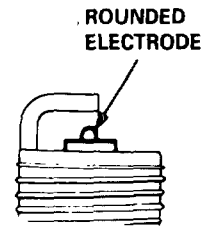
2. Adjust the gap with a suitable gapping tool.

**Electrode Gap:**

Standard	1.1 <sup>0</sup> / <sub>-0.1</sub> mm (0.043 <sup>0</sup> / <sub>-0.004</sub> in)
----------	---



3. Replace the plug if the center electrode is rounded as shown below:



NOTE: Do not use spark plugs other than those listed below, because these plugs are a new type (ISO standard).



These marks are sealed on the timing belt cover.

### Spark Plug

Engine Type	Spark Plug Type
D14A7	ZFR5F-11 (NGK)
D14A8	ZFR6F-11 (NGK)
D15Z8	ZFR6S-11 (NGK)
D16B2	KJ20CR-L11 (DENSO)
B18C4	BKR6E-N11 (NGK) BKR7E-N11 (NGK) K20PR-L11 (DENSO) K22PR-L11 (DENSO)

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

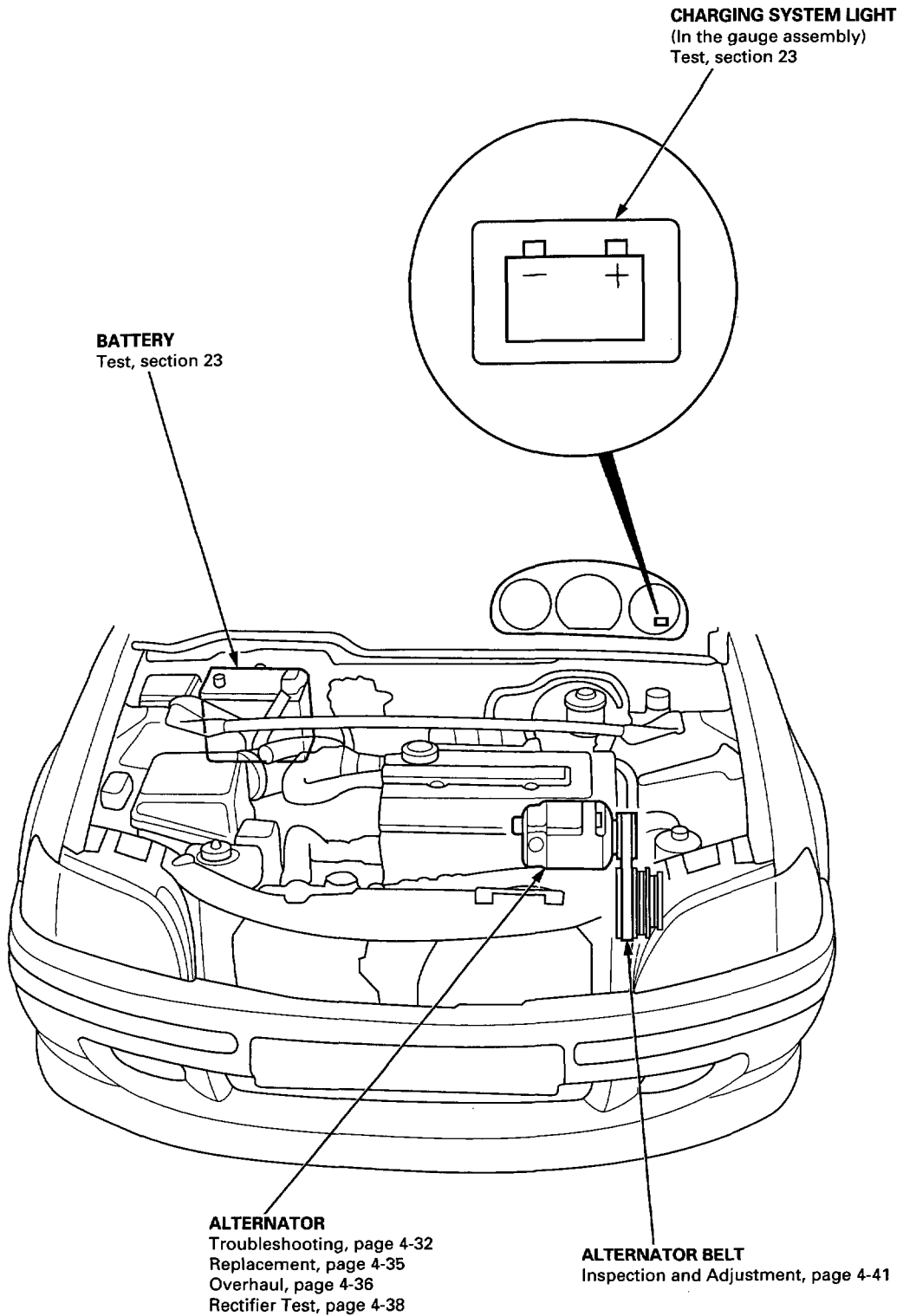
NOTE: Apply a small quantity of anti-seize compound to the plug threads before installing.

# Charging System



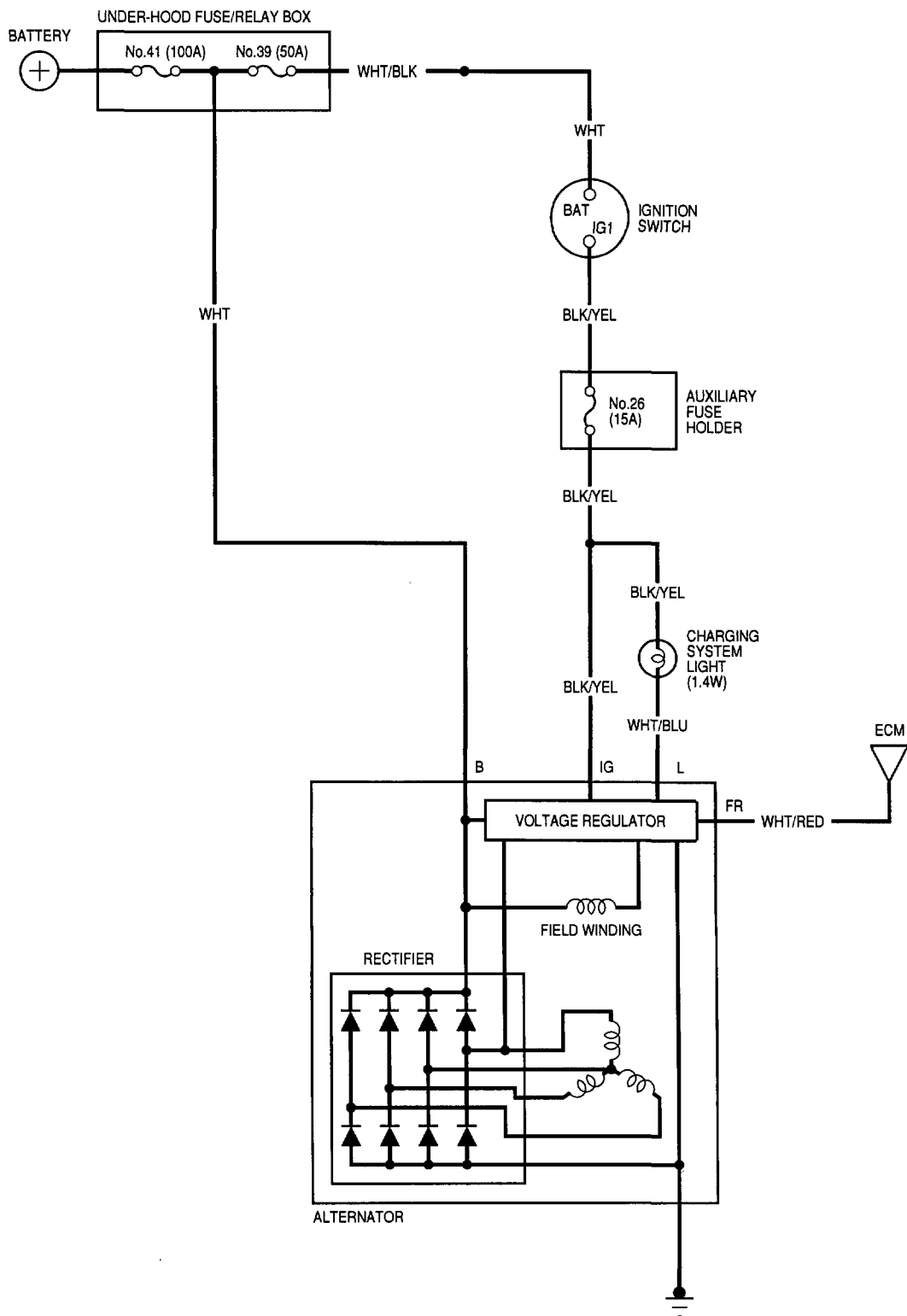
## Component Location Index

NOTE: LHD type is shown, RHD type is similar.



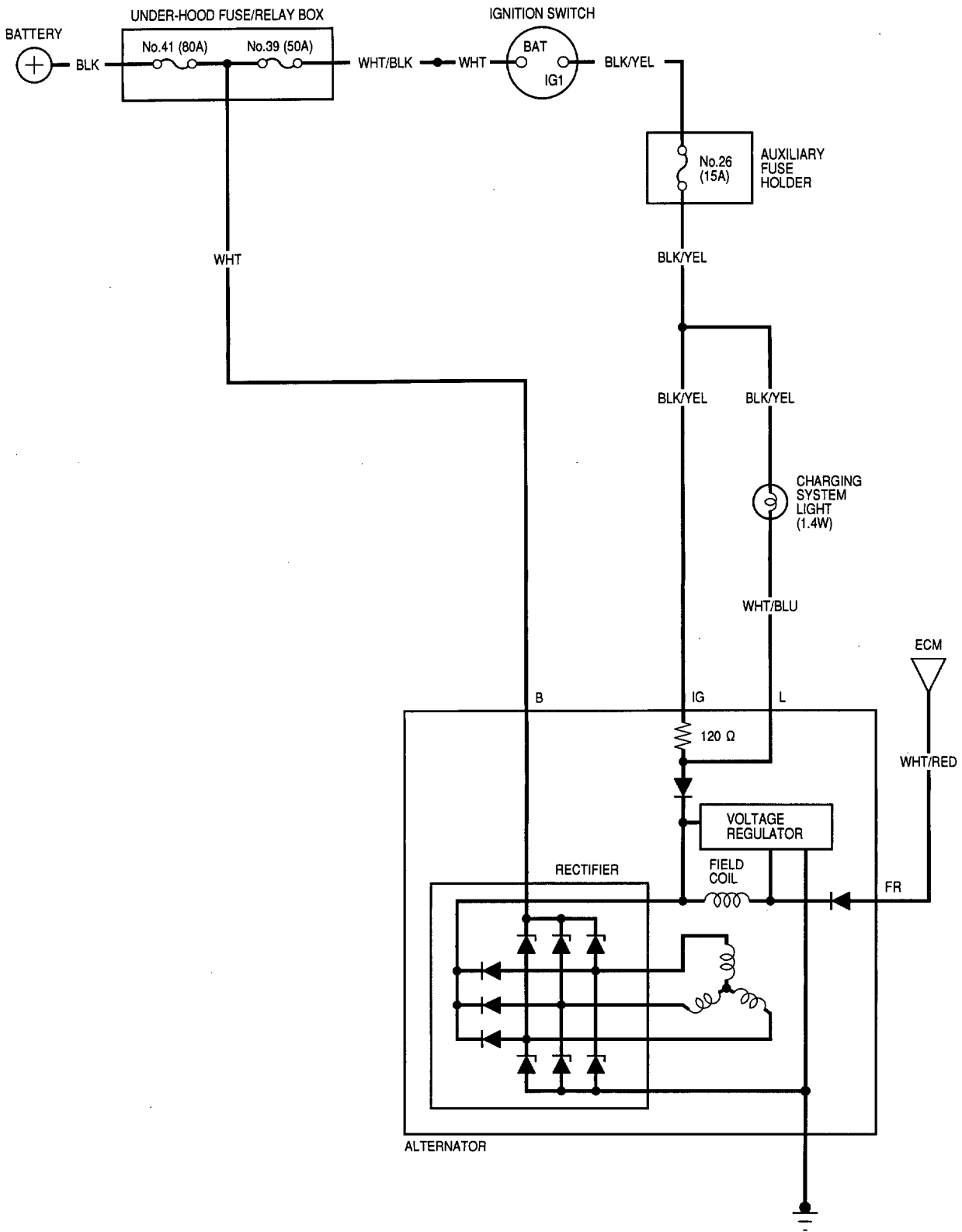
# Charging System

## Circuit Diagram (B18C4 engine)





# Circuit Diagram (Except B18C4 engine)



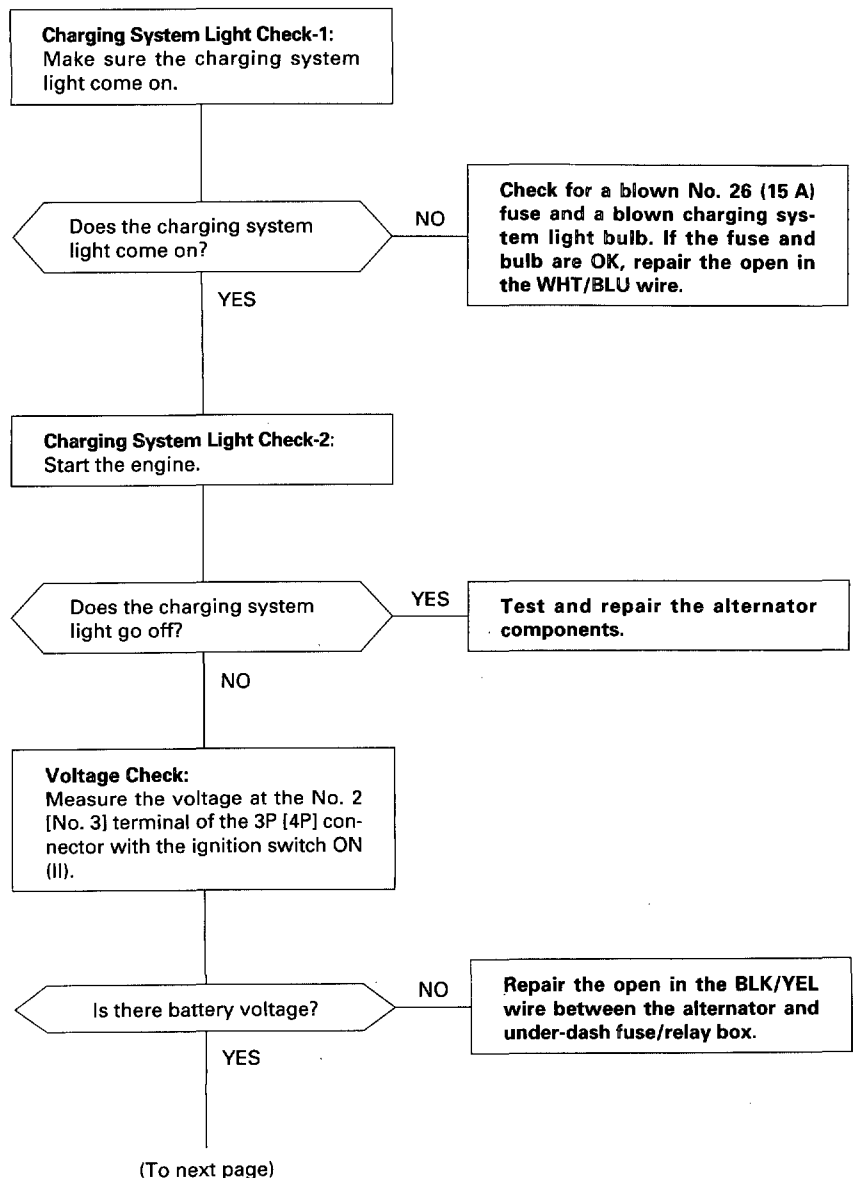
# Charging System

## Troubleshooting

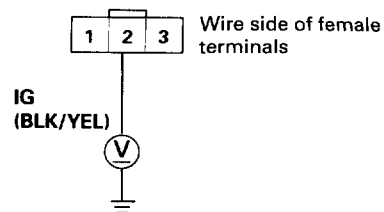
If the charging system light does not come on or does not go off, or the battery is dead or low, test the following items in the order listed below:

1. Battery (see section 23)
2. Charging system light
3. Voltage
4. Alternator/regulator

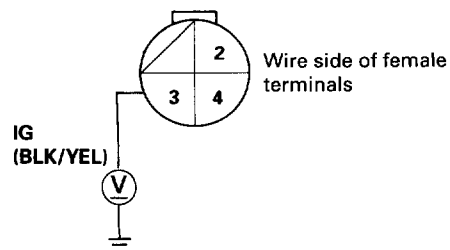
### Charging System Light Test



**ALTERNATOR 3P CONNECTOR  
(B18C4 engine)**



**ALTERNATOR 4P CONNECTOR  
(Except B18C4 engine)**



[ ]: Except B18C4 engine



(From previous page)

**Check for an open in the L circuit-1:**

1. Turn the ignition switch OFF.
2. Disconnect the 3P [4P] connector from the alternator.
3. Ground the No. 3 [No. 4] terminal of the 3P [4P] connector.
4. Turn the ignition switch ON (II).

Does the charging system light come on?

NO

Turn the ignition switch OFF, and repair the open in the WHT/BLU wire.

YES

**Check for an open in the L circuit-2:**  
Disconnect the No. 3 [No. 4] terminal of the 3P [4P] connector from the ground.

Does the charging system light go off?

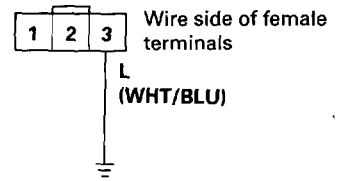
YES

Test and repair the alternator components.

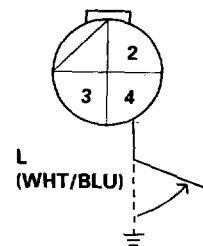
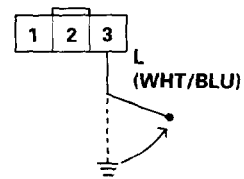
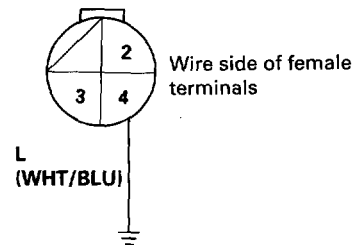
NO

Turn the ignition switch OFF, and repair the short to ground in the WHT/BLU wire.

**ALTERNATOR 3P CONNECTOR (B18C4 engine)**



**ALTERNATOR 4P CONNECTOR (Except B18C4 engine)**



[ ]: Except B18C4 engine

(cont'd)

# Charging System

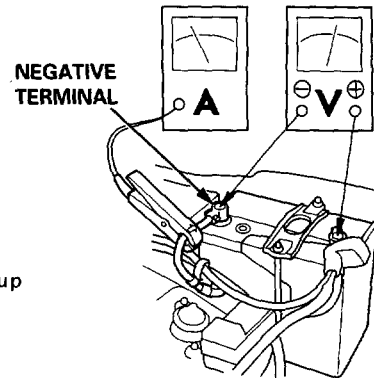
## Troubleshooting (cont'd)

### Alternator/Regulator Test

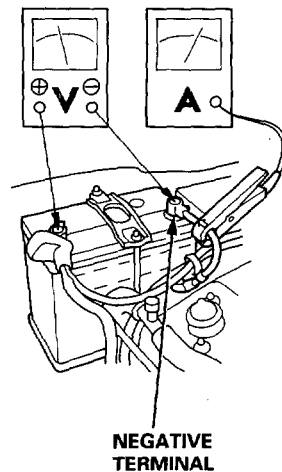
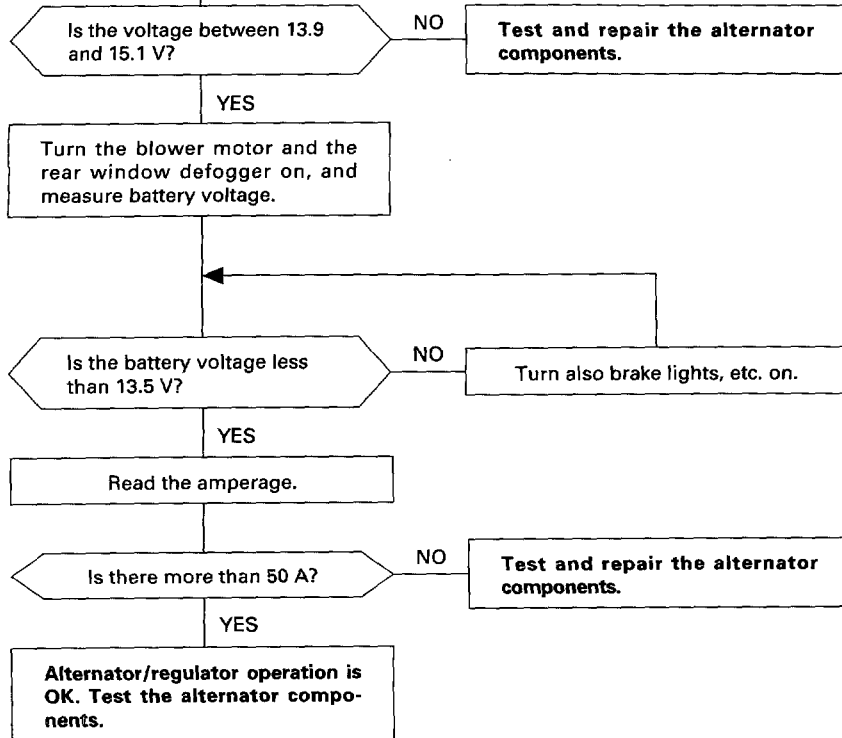
NOTE: Be sure to use an ammeter capable of measuring amperages higher than 120 A.

**Alternator/Regulator Test:**

1. Shift to **P** or **N**, and start the engine.
2. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load until the radiator fan comes on, then let it idle.
3. Raise the engine speed to 2,000 rpm ( $\text{min}^{-1}$ ), and hold it there.
4. Turn the headlights (high beam) on, and measure voltage at the battery terminals.



NOTE: As the headlights warm up considerably, do not cover them.



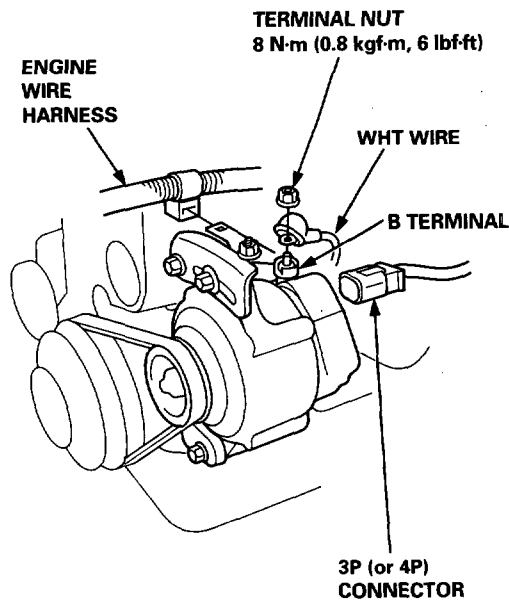


## Alternator Replacement

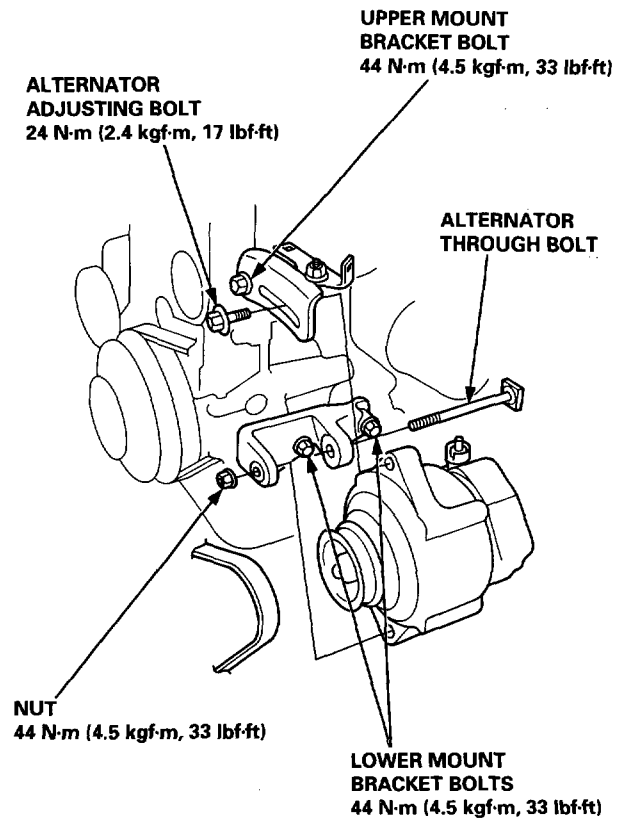
### NOTE:

- LHD type: Remove the alternator from below the car. (If it is a car with intermediate shaft, first remove the shaft, then remove the alternator.)
- RHD type: Remove the battery and battery tray, then remove the alternator.

1. Remove the battery negative cable, then disconnect the positive cable.
2. Disconnect the 3P (or 4P) connector from the alternator.
3. Remove the terminal nut and the WHT wire from the B terminal.



4. Remove the adjusting bolt and through bolt nut, then remove the alternator belt from the pulley.
5. Pull out the alternator through bolt, then remove the alternator.



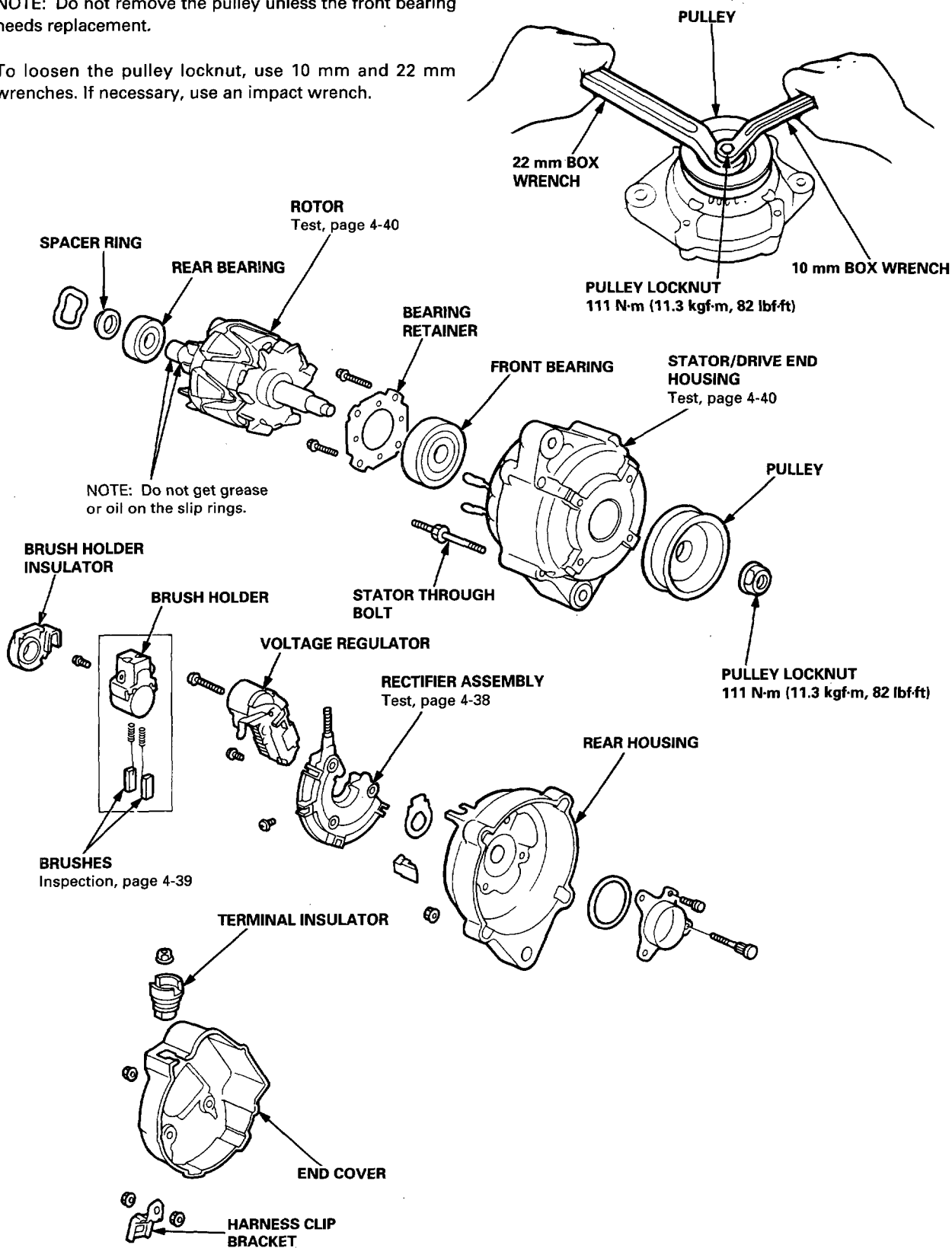
6. If necessary, remove the mount bracket bolts, and the upper and lower mount brackets.
7. Adjust the alternator belt tension after installation (see page 4-41).

# Charging System

## Alternator Overhaul (B18C4 engine)

NOTE: Do not remove the pulley unless the front bearing needs replacement.

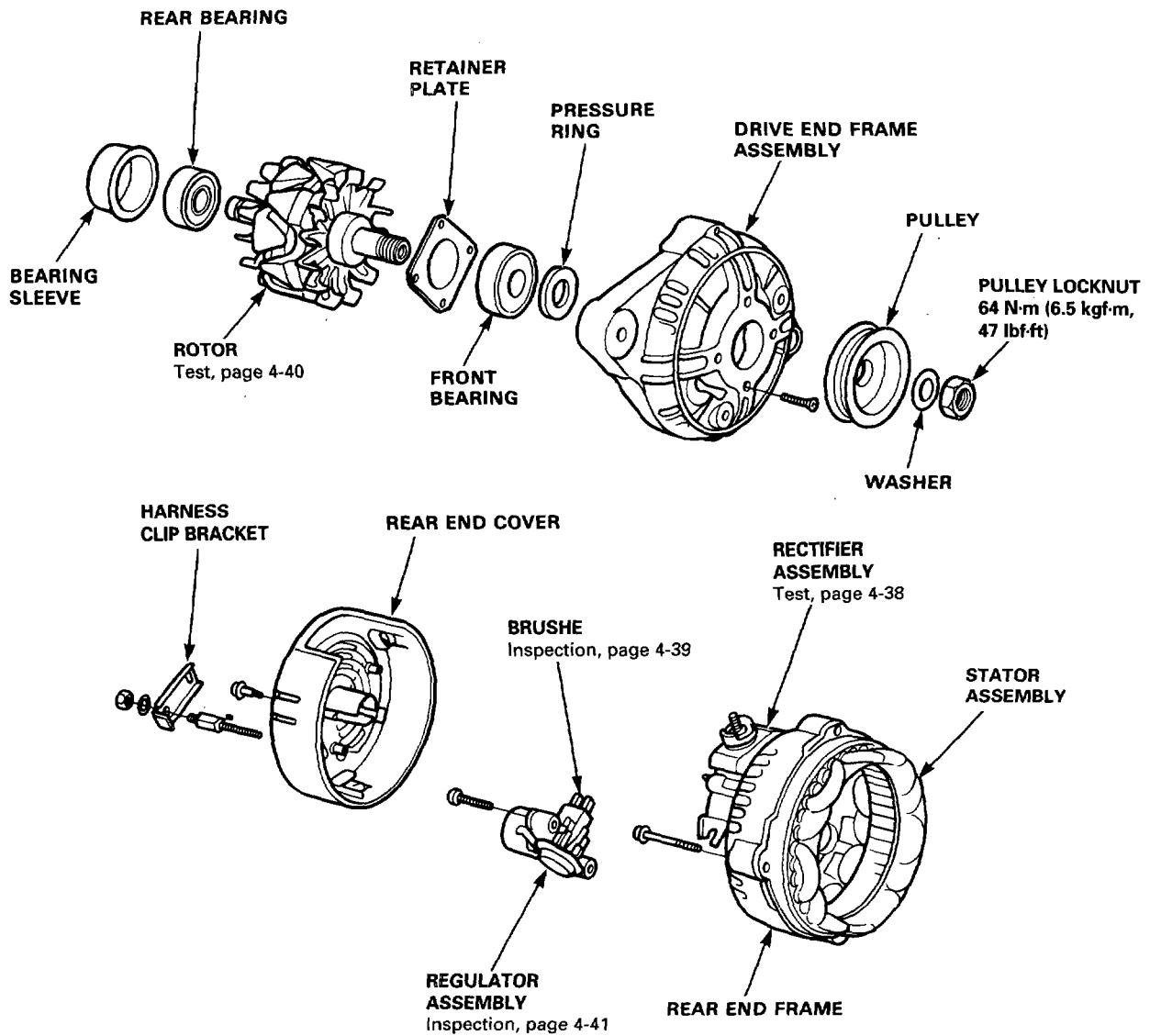
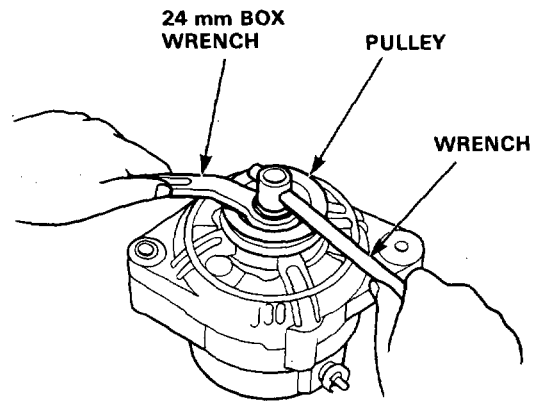
To loosen the pulley locknut, use 10 mm and 22 mm wrenches. If necessary, use an impact wrench.



## Alternator Overhaul (Except B18C4 engine)

NOTE: It is necessary to separate the pulley, drive end housing and rotor only when the front bearing needs replacement.

Loosen the locknut with wrenches to remove the pulley from the rotor. If necessary, use an impact wrench.



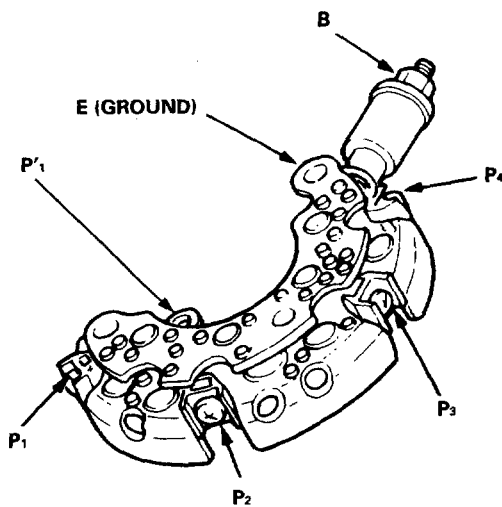
# Charging System

## Rectifier Test

### B18C4 engine:

NOTE: The diodes are designed to allow current to pass in one direction while blocking it in the opposite direction. Since the alternator rectifier is made up of eight diodes (four pairs), each diode must be tested for continuity in both directions with an ohmmeter that has diode checking capability; a total of 16 checks.

1. Check for continuity in each direction between  
— the B and P terminals.  
— E (ground) and P terminals.  
All diodes should have continuity in only one direction.

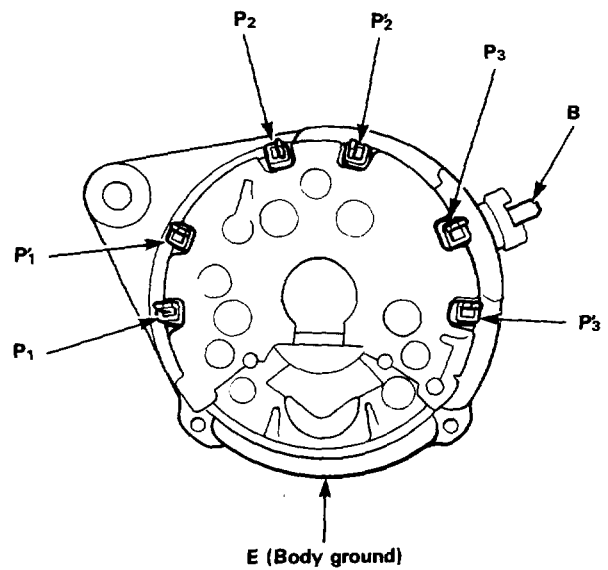


2. If any of the diodes fails, replace the rectifier assembly. (Diodes are not available separately.)

### Except B18C4 engine:

NOTE: The diodes are designed to allow current to pass in one direction while blocking it in the opposite direction. Since the alternator rectifier is made up of nine [or eleven] diodes, each diode must be tested for continuity in both directions with an ohmmeter that has diode checking capability; a total of 12 checks.

1. Check for continuity in each direction between  
— the B and P terminals.  
— E (ground) and the P terminals.  
All diodes should have continuity in only one direction.



2. If any of the diodes fails, replace the rectifier assembly. (Diodes are not available separately.)

## Alternator Brush Inspection

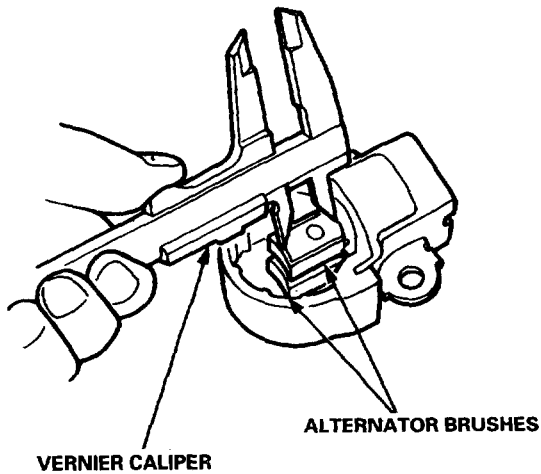
### B18C4 engine:

1. Remove the end cover, then take out the brush holder by removing its two screws.
2. Measure the length of the brushes with a vernier caliper.

#### Alternator Brush Length:

Standard (New): 10.5 mm (0.41 in)

Service Limit: 1.5 mm (0.06 in)



3. If the brushes are less than the service limit, replace the alternator brush assembly.

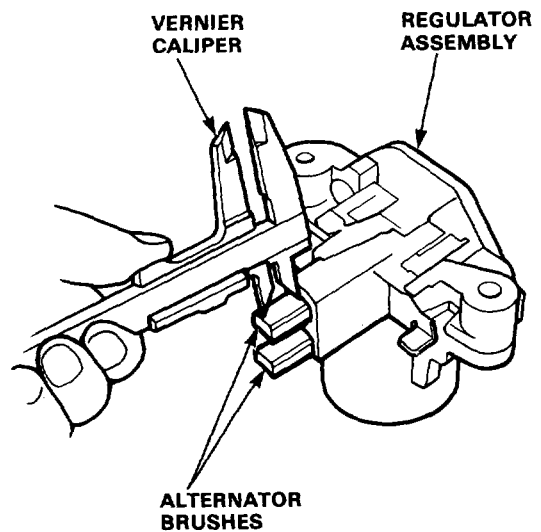
### Except B18C4 engine:

1. Remove the end cover, then take out the brush holder by removing its two screws.
2. Measure the length of the brushes with a vernier caliper.

#### Alternator Brush Length:

Standard (New): 12.5 mm (0.49 in)

Service Limit: 2.5 mm (0.10 in)

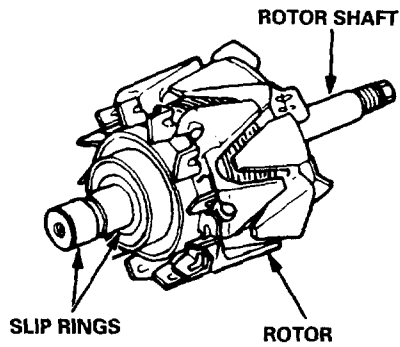


3. If the brushes are less than the service limit, replace the regulator assembly.

# Charging System

## Rotor Slip Ring Test

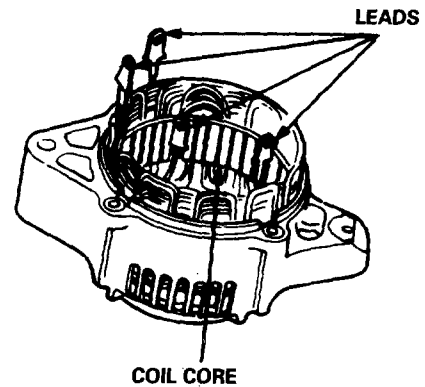
1. Check the resistance between the slip rings. There should be 1.8 – 3.0 ohms.
  - If resistance meets the specification, go to step 2.
  - If resistance does not meet the specification, replace the alternator.



2. Check that there is no continuity between the slip rings and the rotor or rotor shaft.
3. If the rotor fails either continuity check, replace the alternator.

## Stator Test (B18C4 engine)

1. Check that there is continuity between each pair of leads.

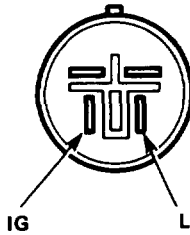


2. Check that there is no continuity between each lead and the coil core.
3. If the coil fails either continuity check, replace the alternator.

## Regulator Assembly Inspection (Except B18C4 engine)

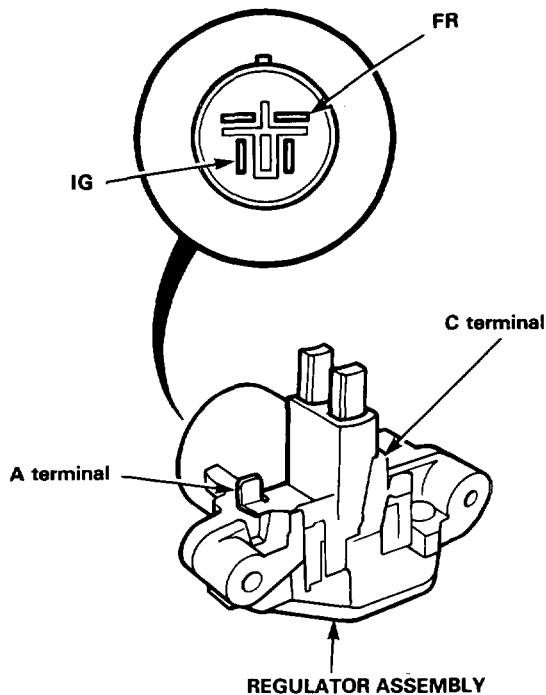
1. Measure the resistance between the L and IG terminals.

**Standard: 120  $\Omega$  (about)**



If the resistance is not within the standard, replace the regulator assembly.

2. Check for continuity between the IG and A, FR and C terminals. There should be continuity in only one direction.



If there is continuity in both directions, replace the regulator assembly.

## Alternator Belt Inspection and Adjustment

**NOTE:** When using a new belt, first adjust the deflection or tension to the values for the new belt, then readjust the deflection or tension to the values for the used belt after running engine for five minutes.

### Deflection method:

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

### Deflection:

**B18C4 engine:**

**Used Belt: 9.0 – 11.0 mm (0.35 – 0.43 in)**

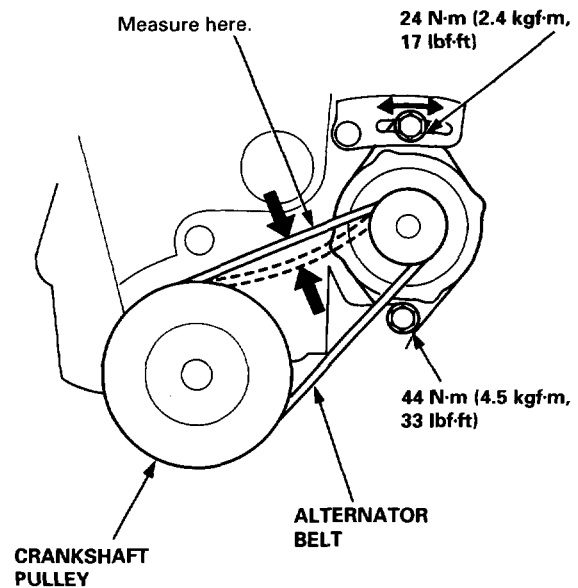
**New Belt: 6.0 – 8.0 mm (0.24 – 0.31 in)**

**Except B18C4 engine:**

**Used Belt: 7.0 – 10.5 mm (0.28 – 0.41 in)**

**New Belt: 5.0 – 7.0 mm (0.19 – 0.28 in)**

**NOTE:** If the belt is worn or damaged, replace it.



### If adjustment is necessary:

1. Loosen the lower mounting nut and the upper mounting bolt.
2. Move the alternator to obtain the proper belt tension, then retighten the upper mounting bolt and the lower mounting nut to the specified torques.
3. Recheck the deflection of the belt.

(cont'd)

# Charging System

## Alternator Belt Inspection and Adjustment (cont'd)

### Belt tension gauge method:

Attach the belt tension gauge to the belt and measure the tension. Follow the gauge manufacturer's instructions.

### Tension:

#### B18C4 engine:

Used Belt: 340 – 490 N (35 – 50 kgf, 77 – 110 lbf)

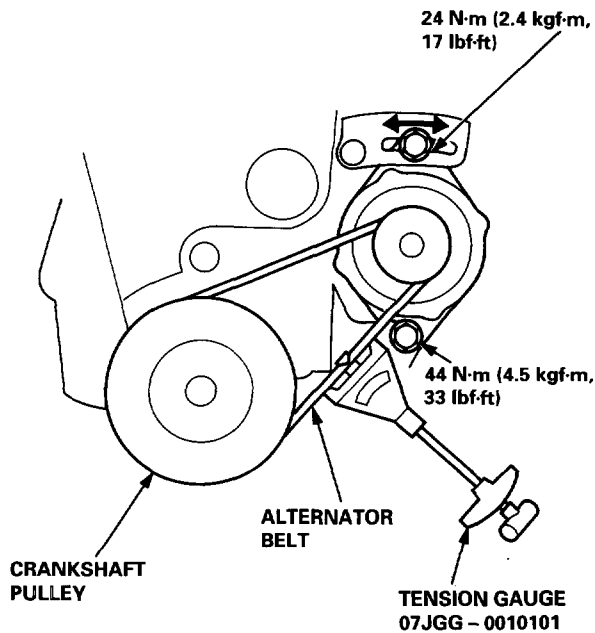
New Belt: 640 – 880 N (65 – 90 kgf, 140 – 200 lbf)

#### Except B18C4 engine:

Used Belt: 340 – 490 N (35 – 50 kgf, 77 – 110 lbf)

New Belt: 640 – 780 N (65 – 80 kgf, 140 – 180 lbf)

NOTE: If the belt is worn or damaged, replace it.



### If adjustment is necessary:

1. Loosen the lower mounting nut and the upper mounting bolt.
2. Move the alternator to obtain the proper belt tension, then retighten the upper mounting bolt and the lower mounting nut to the specified torques.
3. Recheck the tension of the belt.



# Engine Removal/Installation

## Engine Removal/Installation

Removal .....	5-2
Installation .....	5-12



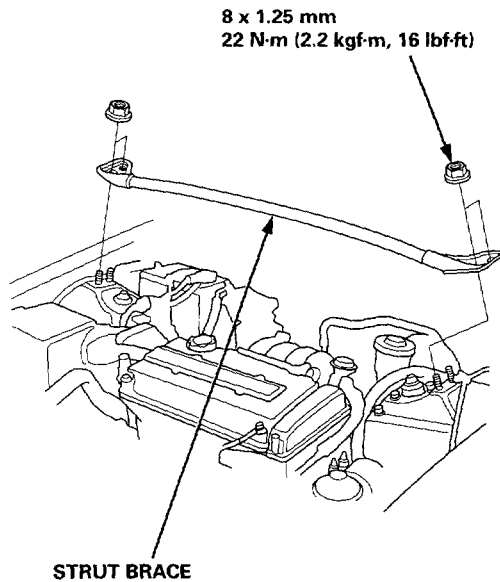
# Engine Removal/Installation

## Removal

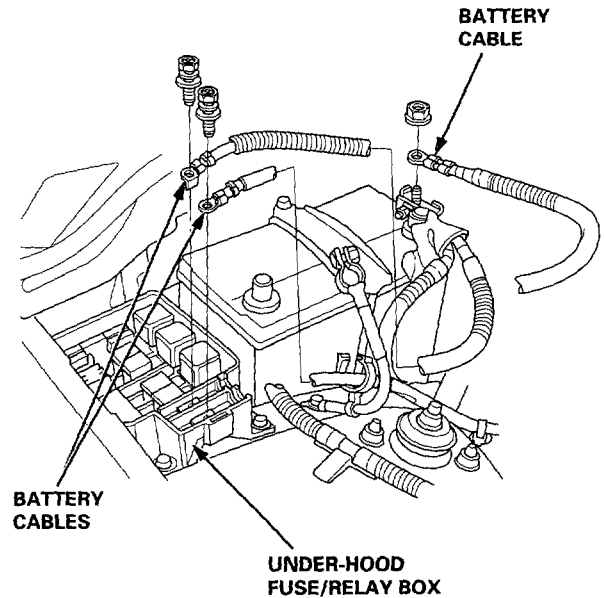
### NOTE:

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

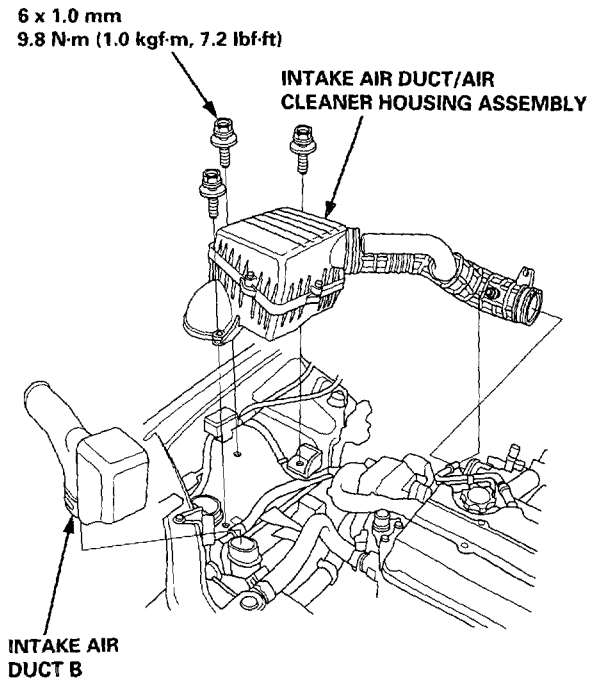
1. Secure the hood in the open as possible.
2. Disconnect the battery negative terminal first, then the positive terminal.
3. Remove the strut brace.



4. Disconnect the battery cables from the under-hood fuse/relay box and battery positive terminal.

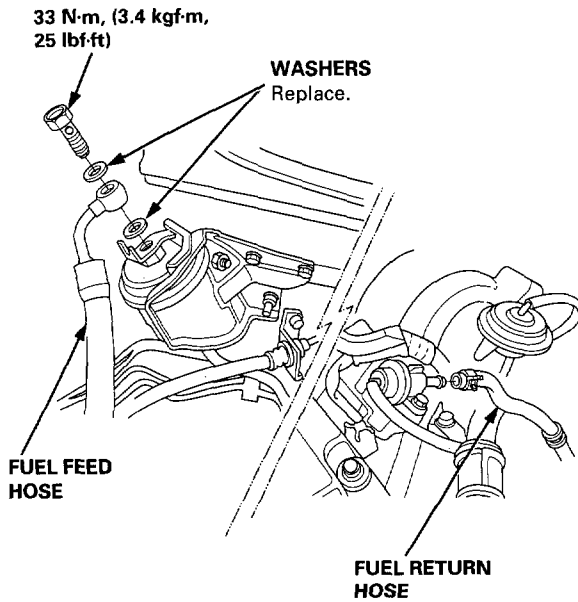


5. Remove the intake air duct B and intake air duct/air cleaner housing assembly.



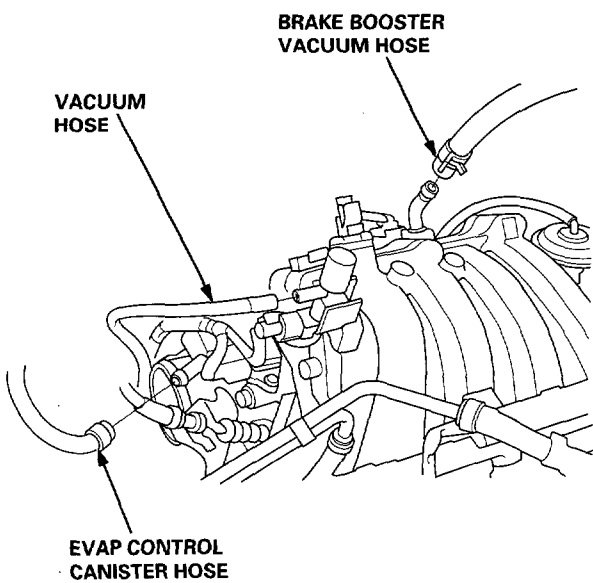


6. Relieve fuel pressure (see section 11).
7. Remove the fuel feed hose and fuel return hose.

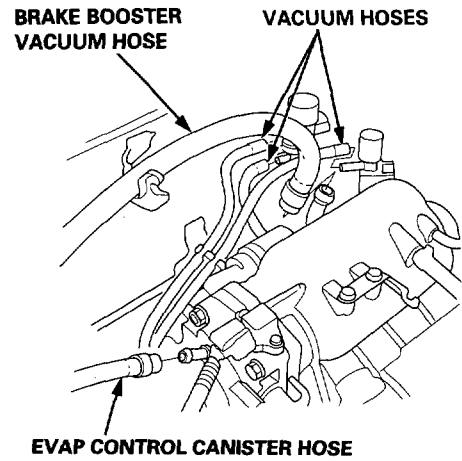


8. Remove the brake booster vacuum hose, evaporative emission (EVAP) control canister hose and vacuum hose.

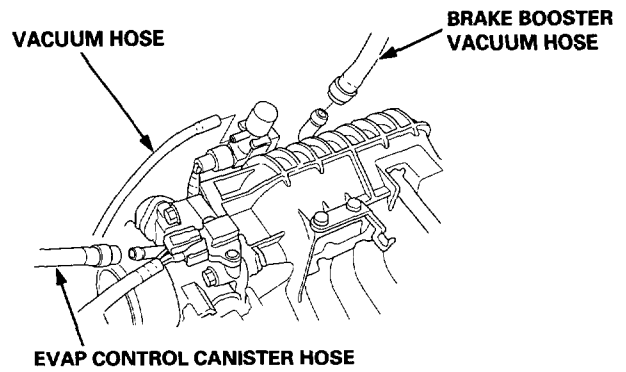
**B18C4 engine:**



**D15Z8 engine:**



**Except B18C4, D15Z8 engines:**

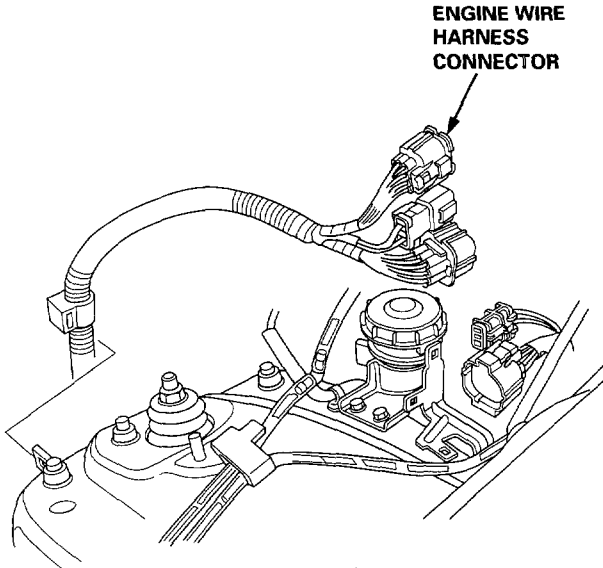


(cont'd)

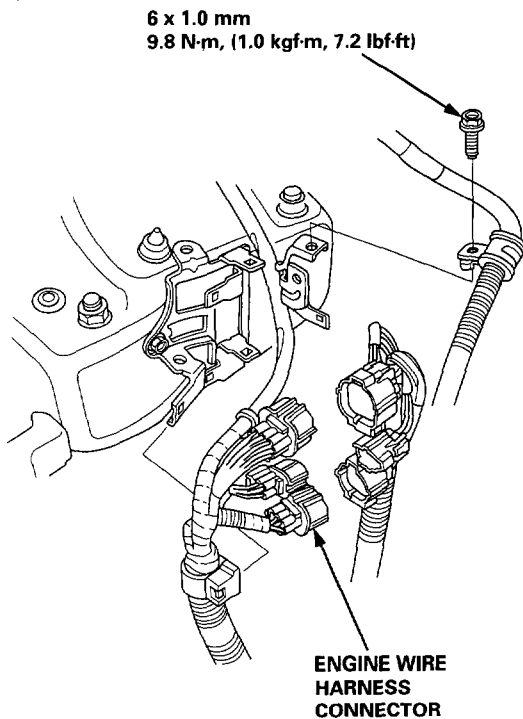
# Engine Removal/Installation

## Removal (cont'd)

9. Disconnect the engine wire harness connectors on the left side of the engine compartment.



10. Disconnect the engine wire harness connectors on the right side of the engine compartment.

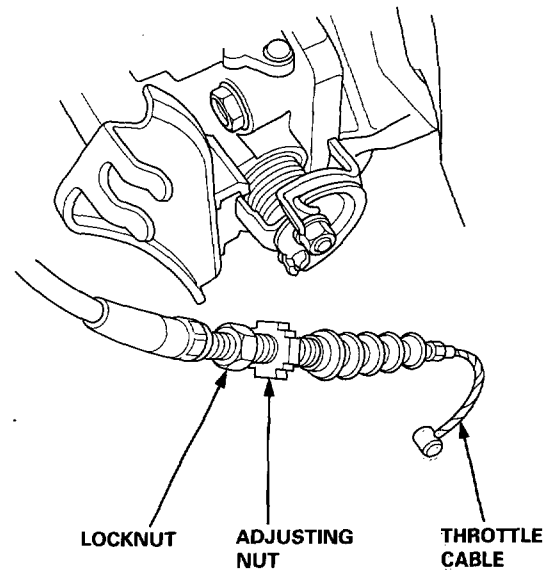


11. Remove the throttle cable by loosening the locknut then slip the cable end out of the accelerator linkage.

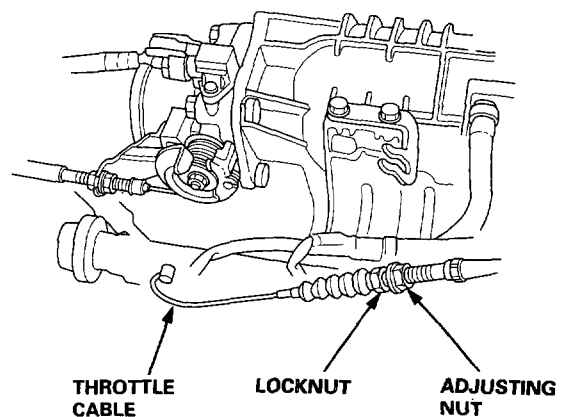
### NOTE:

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

### B18C4 engine:



### Except B18C4 engine:

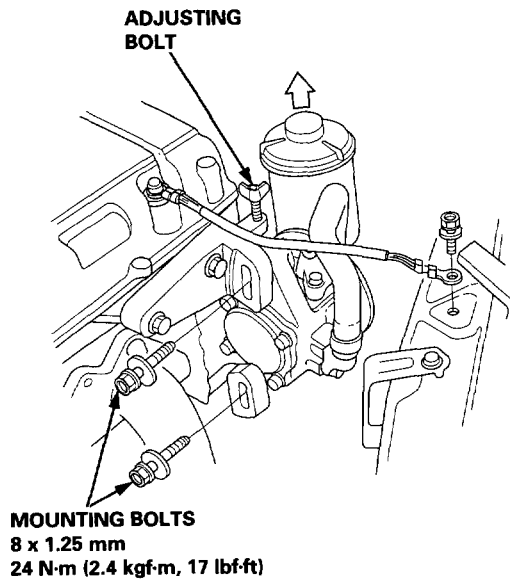




12. Remove power steering (P/S) pump belt and pump without disconnecting the P/S hoses.

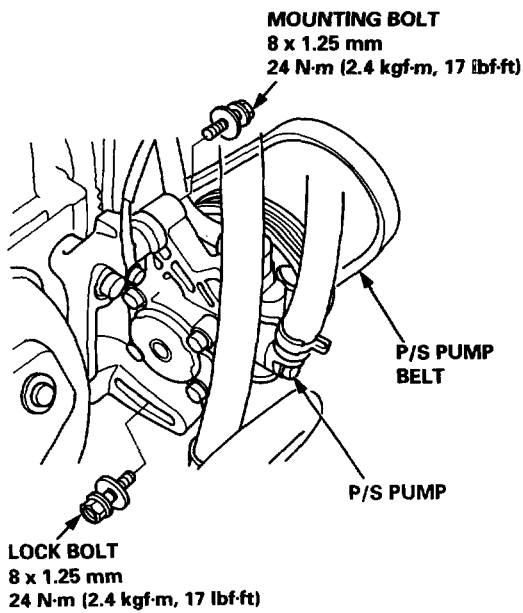
**B18C4 engine:**

- 1. Remove the adjusting bolt and mounting bolts, then remove the P/S pump belt and pump.



**Except B18C4 engine:**

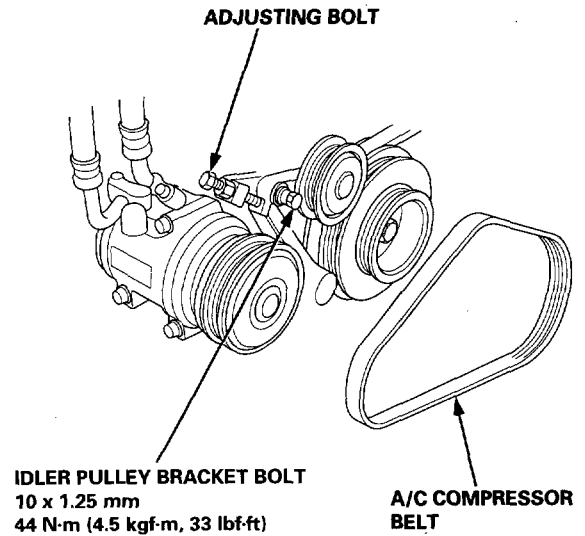
- 1. Remove the lock bolt and mounting bolt, then remove the P/S pump belt and pump.



13. Remove the air conditioning (A/C) compressor belt.

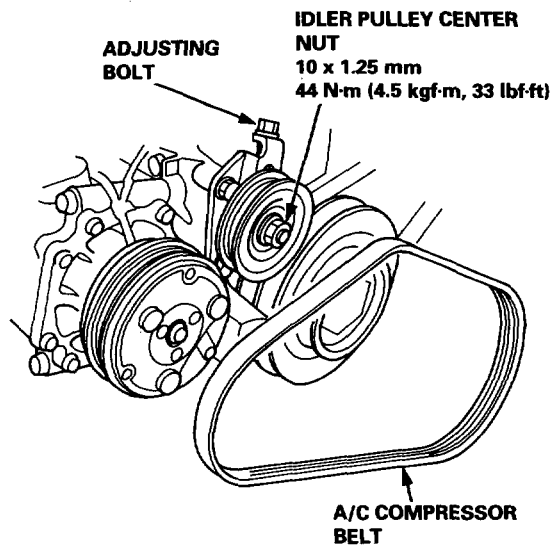
**B18C4 engine:**

- 1. Loosen the idler pulley bracket bolt and adjusting bolt, then remove the A/C compressor belt.



**Except B18C4 engine:**

- 1. Loosen the idler pulley center nut and adjusting bolt, then remove the A/C compressor belt.

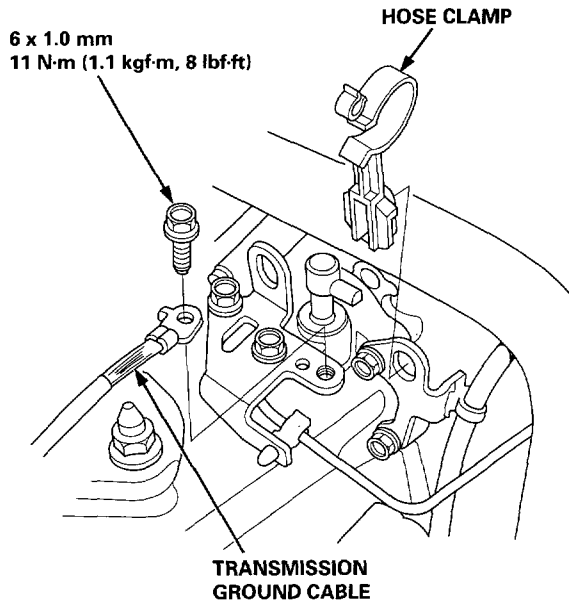


(cont'd)

# Engine Removal/Installation

## Removal (cont'd)

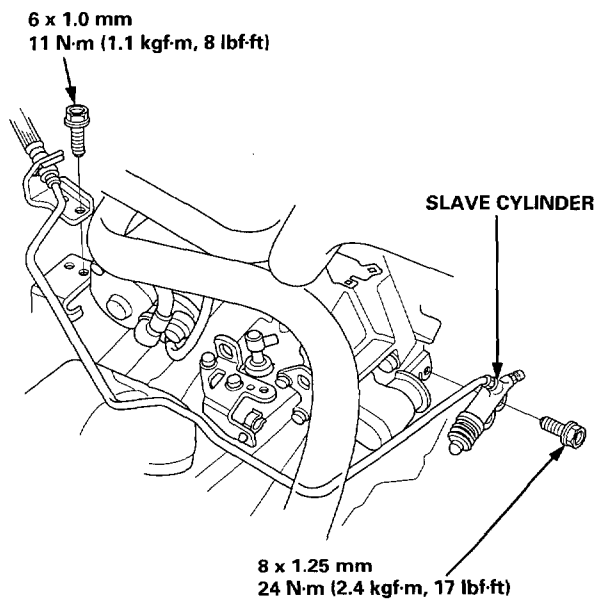
14. Remove the transmission ground cable and hose clamp.



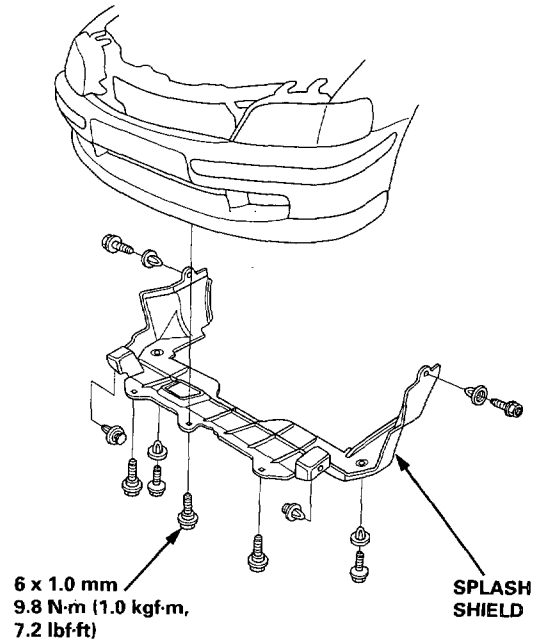
15. Remove the clutch slave cylinder and line/hose assembly (M/T).

**NOTE:**

- Do not disconnect the line/hose assembly.
- Do not operate the clutch pedal once the slave cylinder has been removed.
- Take care not to bend the line.



16. Remove the radiator cap.
17. Raise the hoist to full height.
18. Remove the front tires/wheels.
19. Remove the splash shield.

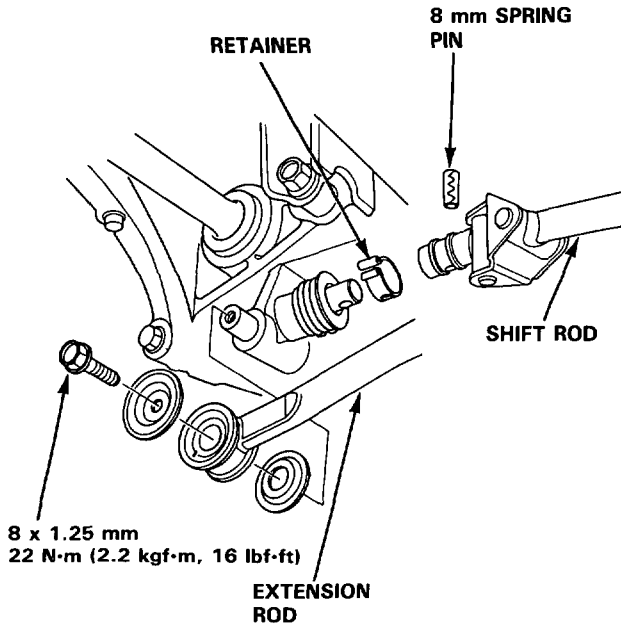


20. Loosen the drain plug in the radiator, drain the engine coolant (see page 10-7).
21. Drain the transmission oil or fluid. Reinstall the drain plug using a new washer (see section 13 (M/T) or section 14 (A/T)).
22. Drain the engine oil. Reinstall the drain bolt using a new washer (see page 8-5).

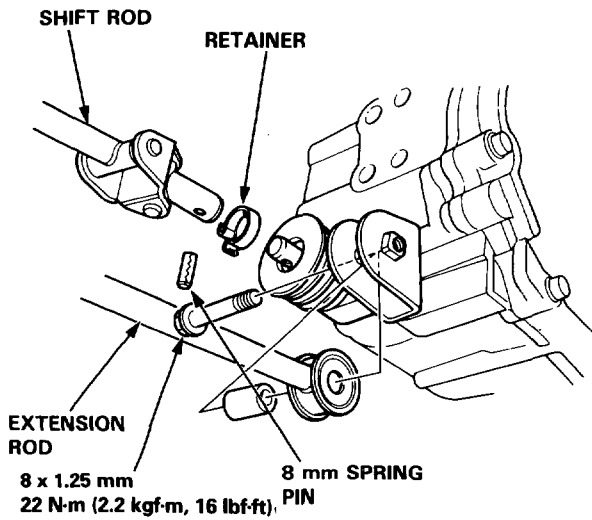


23. Remove the shift rod and extension rod (M/T).

**B18C4 engine:**



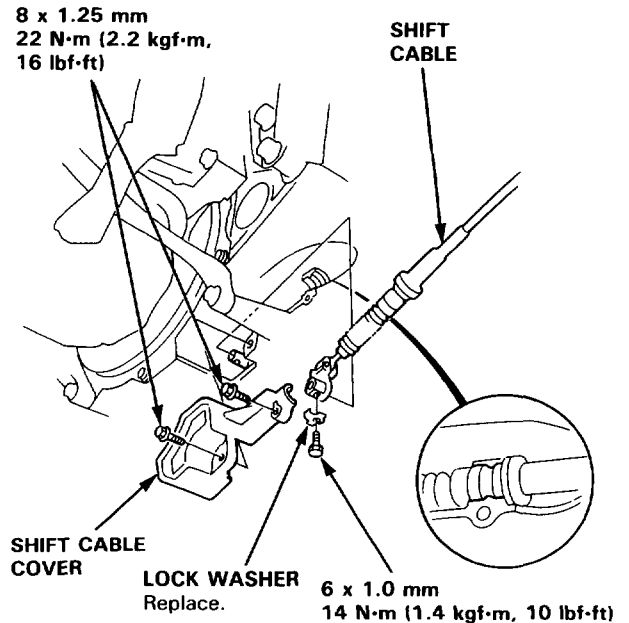
**Except B18C4 engine:**



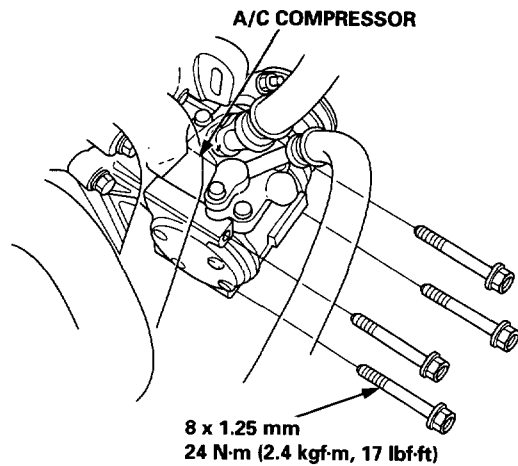
24. Remove the shift cable (A/T).

**NOTE:**

- Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.
- Adjust the shift cable when installing (see section 14).



25. Remove the air conditioning (A/C) compressor without disconnecting the A/C hoses.



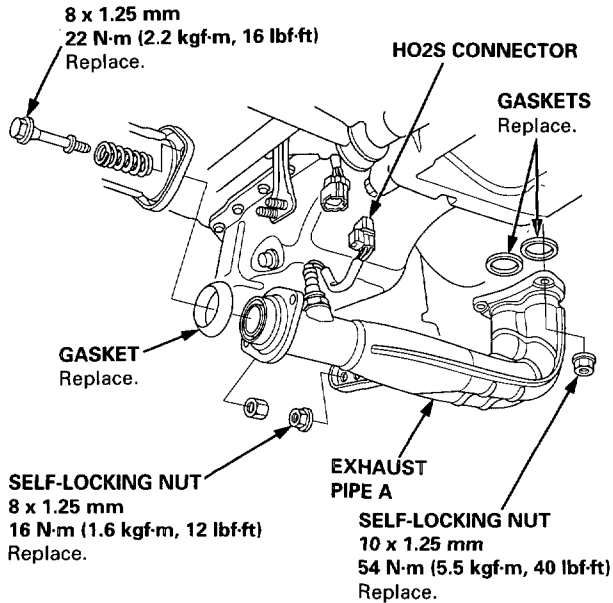
(cont'd)

# Engine Removal/Installation

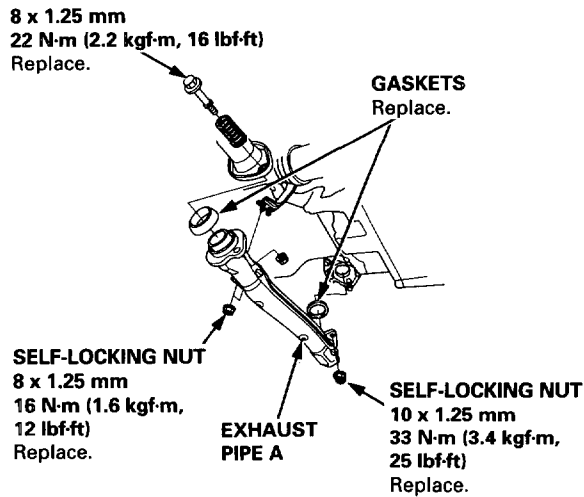
## Removal (cont'd)

26. Disconnect the heated oxygen sensor (HO2S) connector (B18C4 engine).
27. Remove exhaust pipe A.

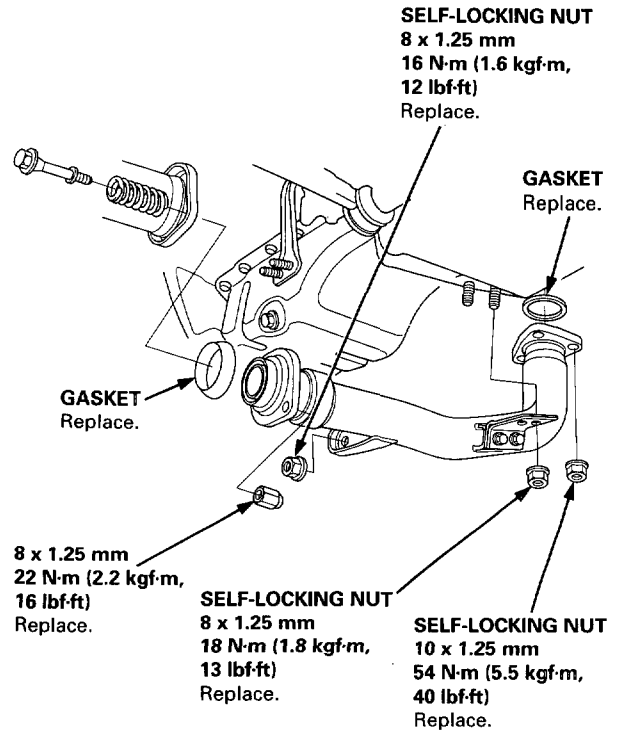
### B18C4 engine:



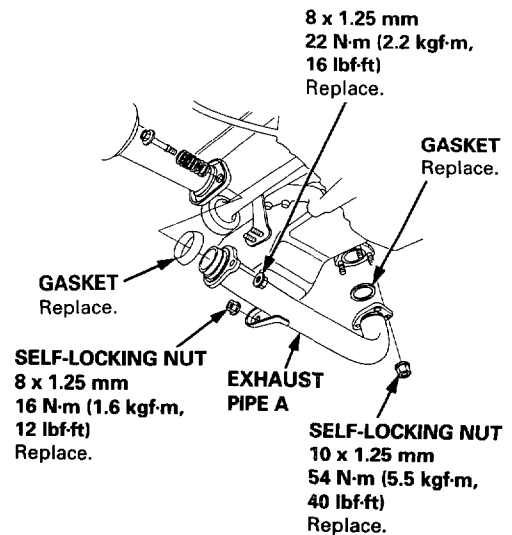
### D15Z8 engine:



### D16B2 engine:



### D14A7, D14A8 engines:



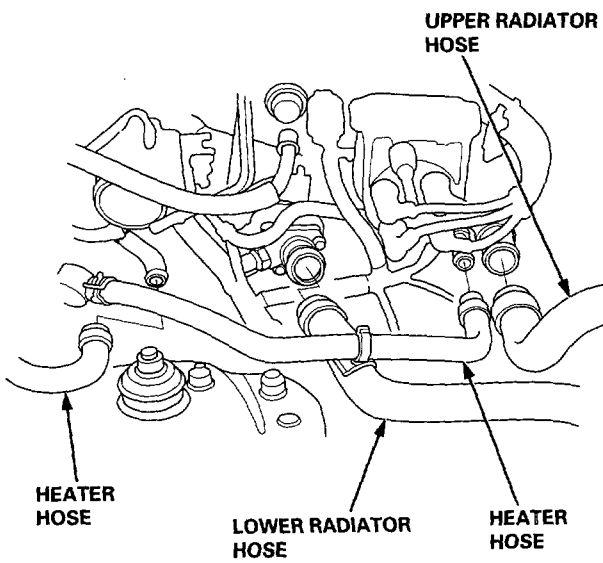




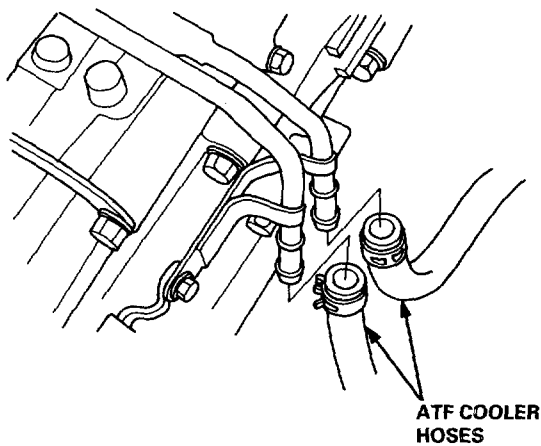
28. Remove the damper fork (see section 18).
29. Disconnect the suspension lower arm ball joints (see section 18).
30. Remove the driveshafts (see section 16).

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

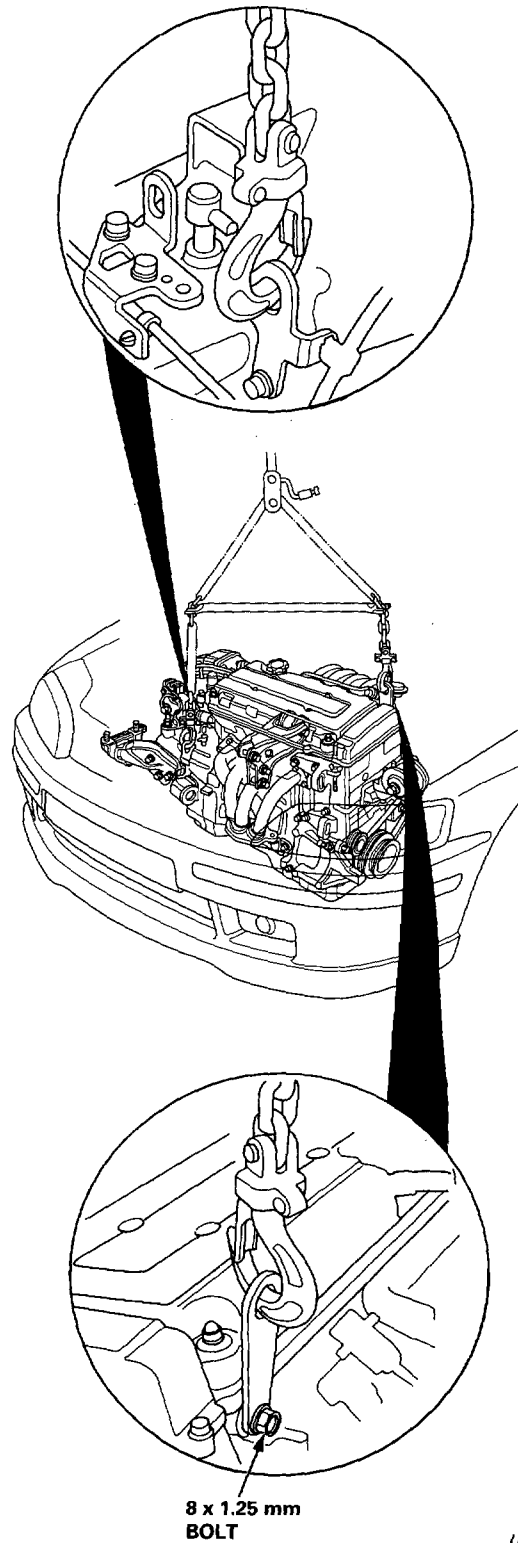
31. Lower the hoist, then remove the upper radiator hose, lower radiator hose and the heater hoses.



32. Remove the ATF cooler hoses, then plug the ATF cooler hoses and lines (A/T).



33. Attach the chain hoist to the engine as shown.

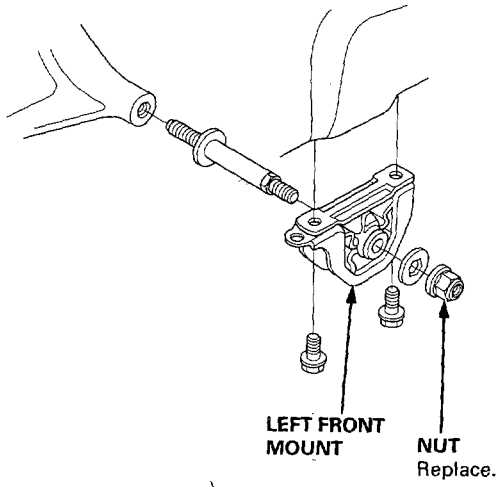


(cont'd)

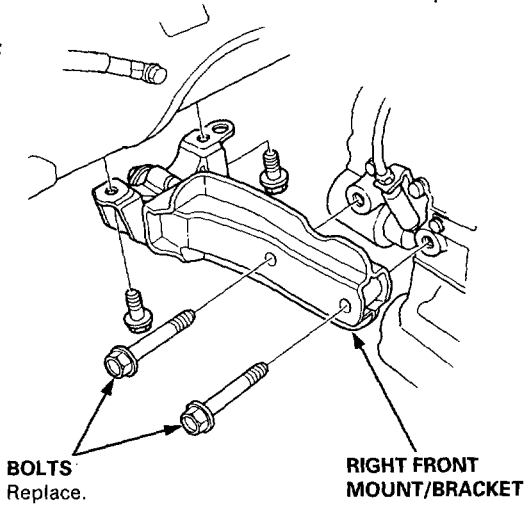
# Engine Removal/Installation

## Removal (cont'd)

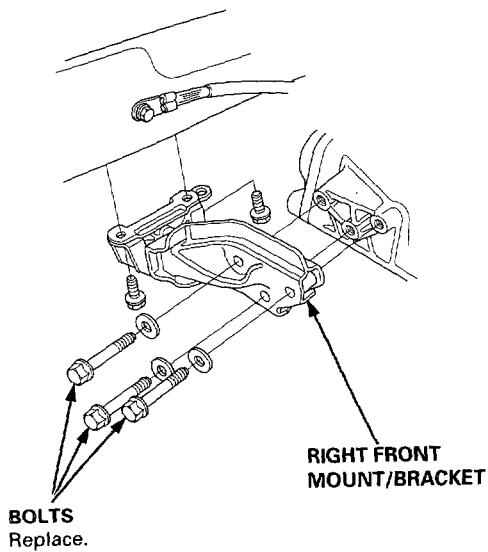
34. Remove the left and right front mount and bracket.



AT:

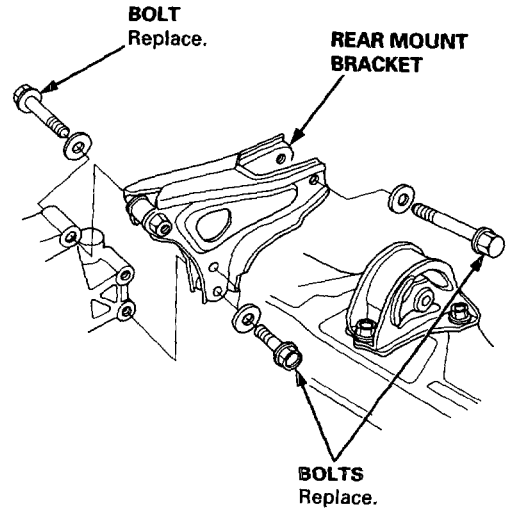


MT:

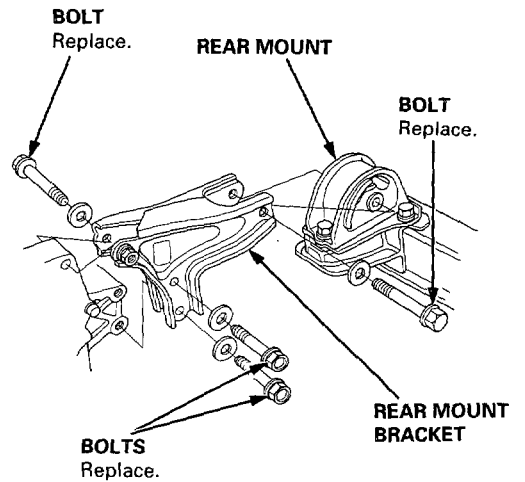


35. Remove the rear mount bracket.

Except B18C4 engine:

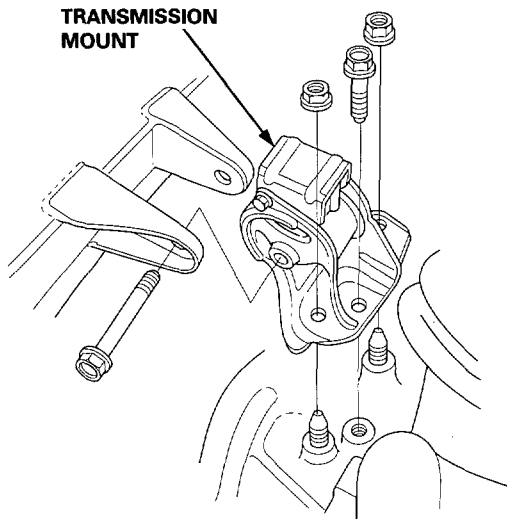


B18C4 engine:

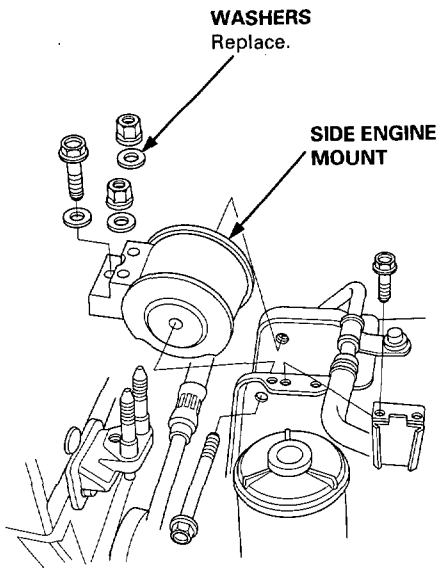




36. Remove the transmission mount.



37. Remove the side engine mount.



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

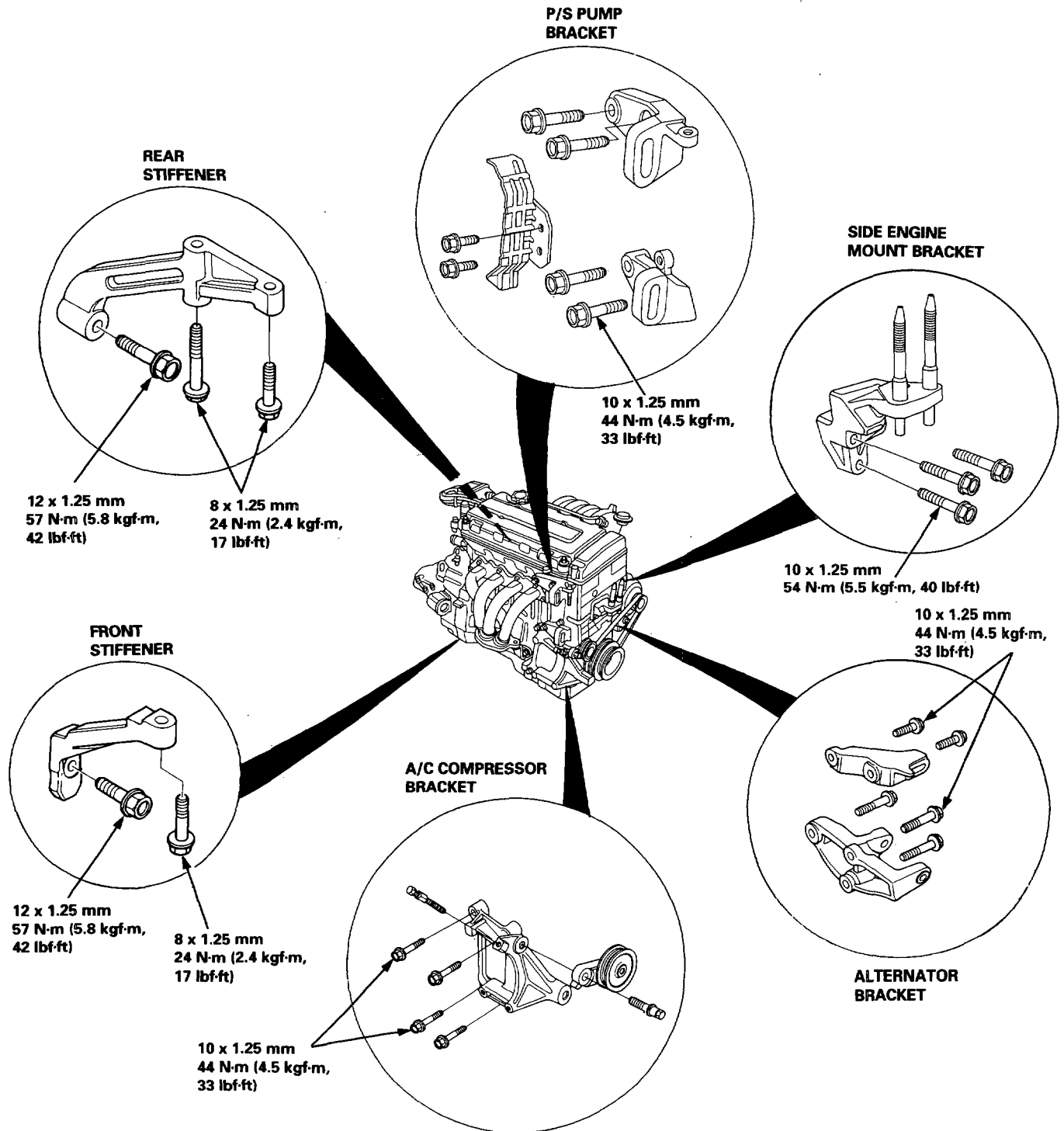
39. Slowly raise the engine approximately 150 mm (6 in). Check once again that all hoses and wires are disconnected from the engine/transmission.

40. Raise the engine all the way, and remove it from the vehicle.

# Engine Removal/Installation

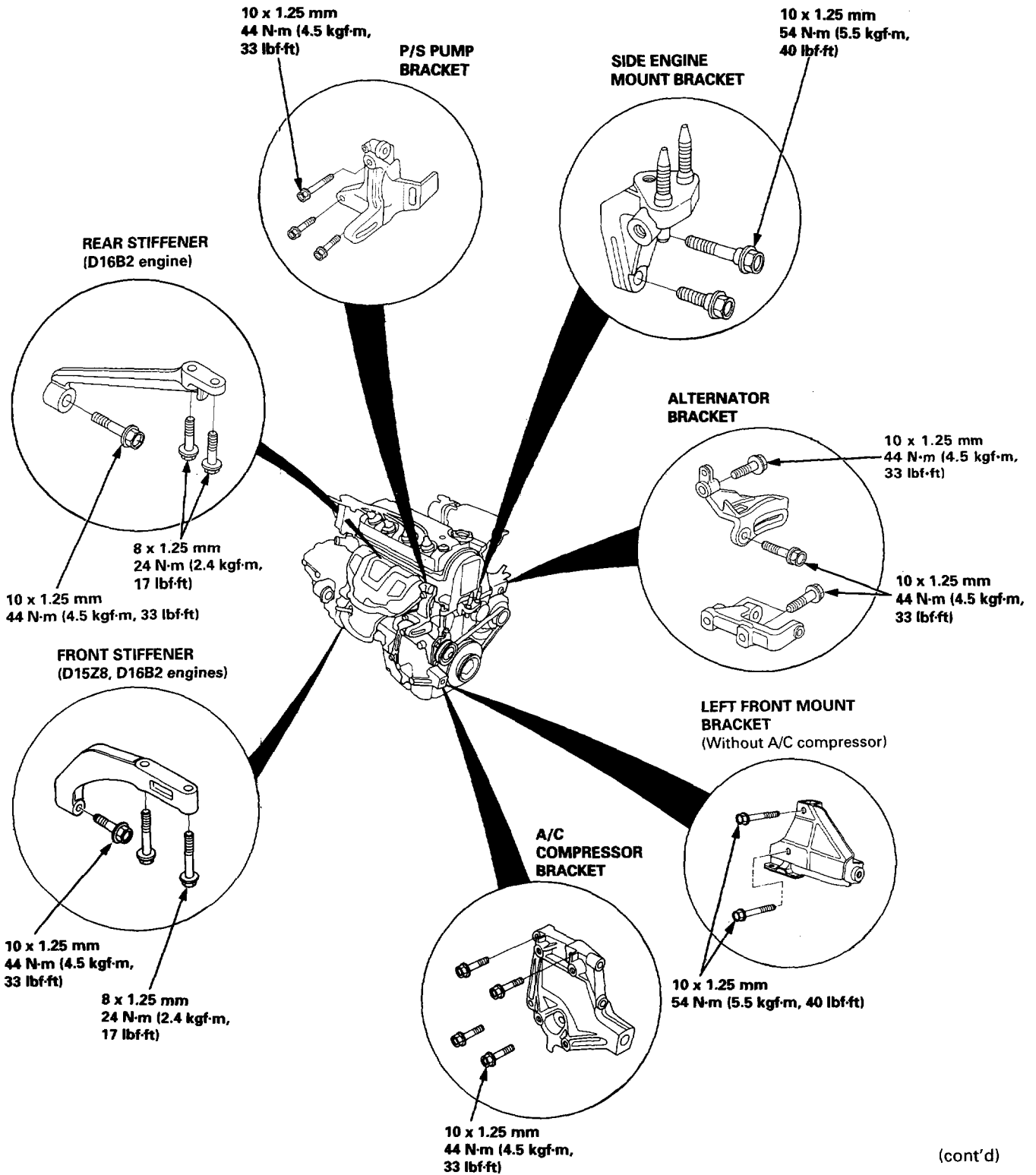
## Installation

Bracket Bolts Torque Specifications:  
B18C4 engine:





**Bracket Bolts Torque Specifications:**  
Except B18C4 engine:



(cont'd)

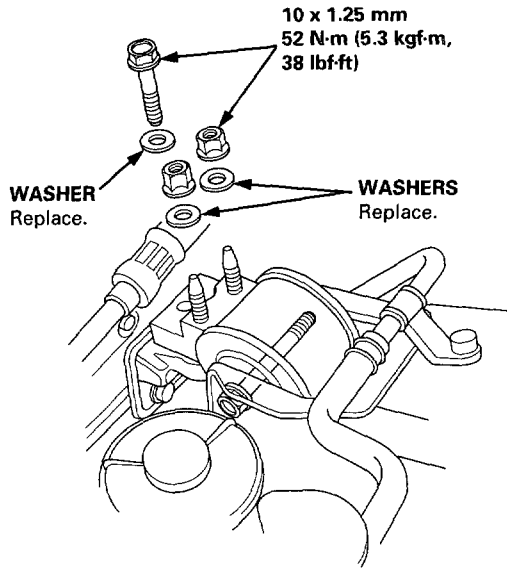
# Engine Removal/Installation

## Installation (cont'd)

### Engine Installation

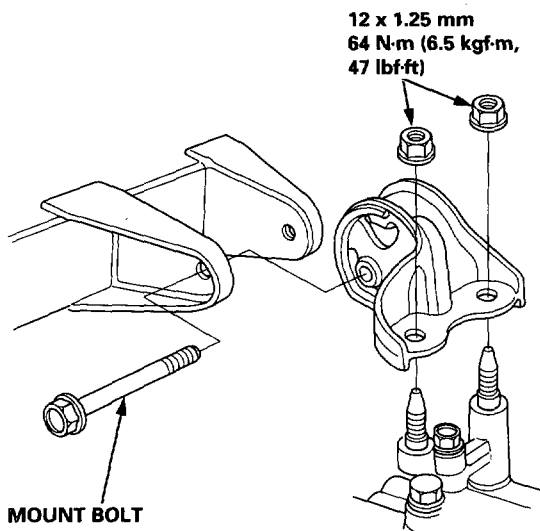
Install the engine in the reverse order of removal. Reinstall the mount bolts/nuts in the following sequence. Failure to follow these procedures may cause excessive noise and vibration, and reduce bushing life.

1. Install the side engine mount, then tighten the bolt/nuts on the engine side. Leave the mount bolt loose.

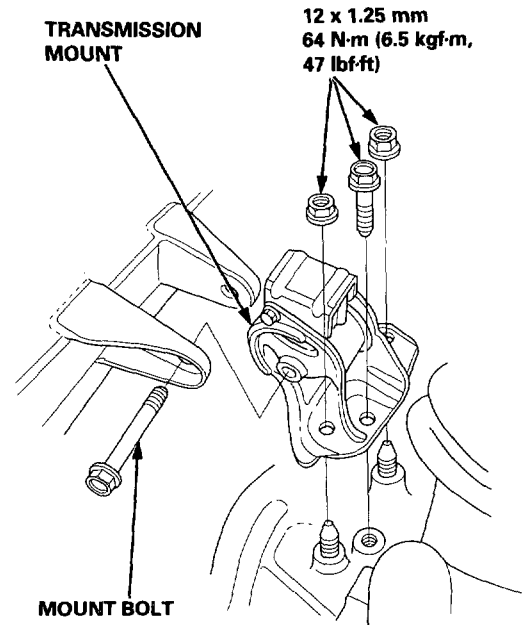


2. Install the transmission mount, then tighten the bolts/nuts on the frame side. Leave the mount bolt loose.

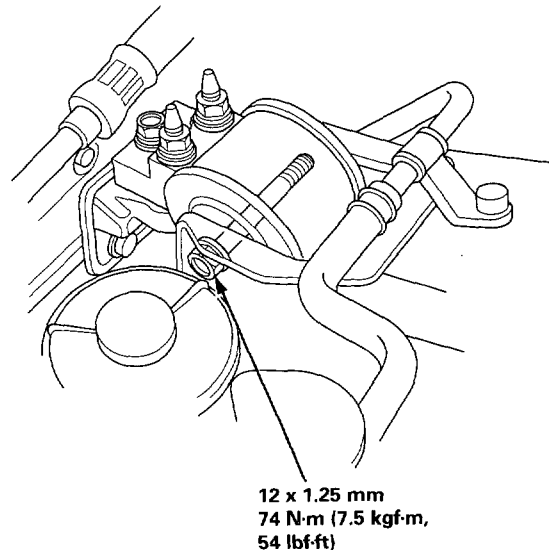
AT:



MT:



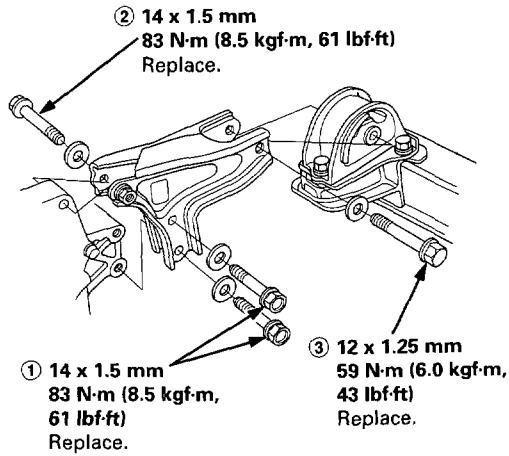
3. Tighten the mount bolt on the side engine mount.



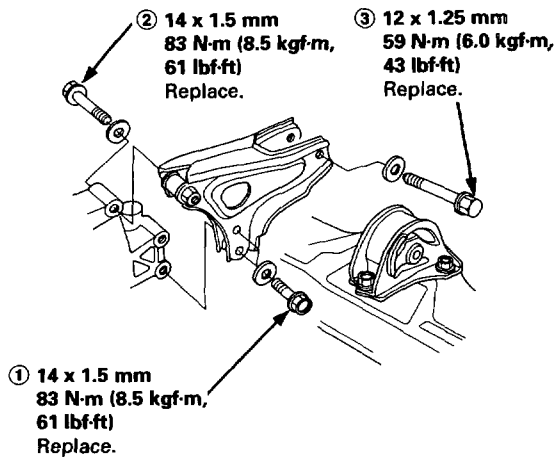


4. Install the rear mount bracket, then tighten the bolts in the numbered sequence shown (① - ③).

**B18C4 engine:**

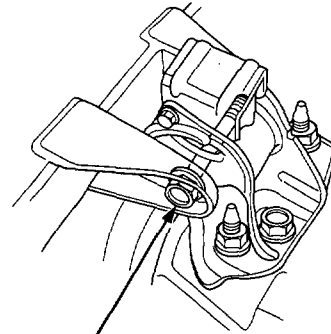


**Except B18C4 engine:**



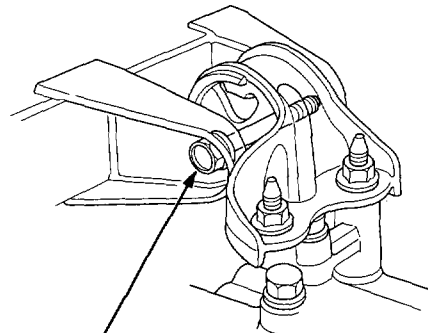
5. Tighten the mount bolt on the transmission mount.

**MT:**



12 x 1.25 mm  
74 N-m (7.5 kgf-m,  
54 lbf-ft)

**AT:**



12 x 1.25 mm  
74 N-m (7.5 kgf-m,  
54 lbf-ft)

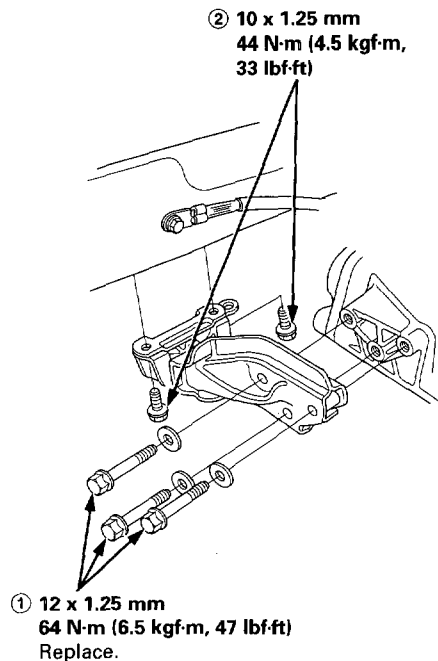
(cont'd)

# Engine Removal/Installation

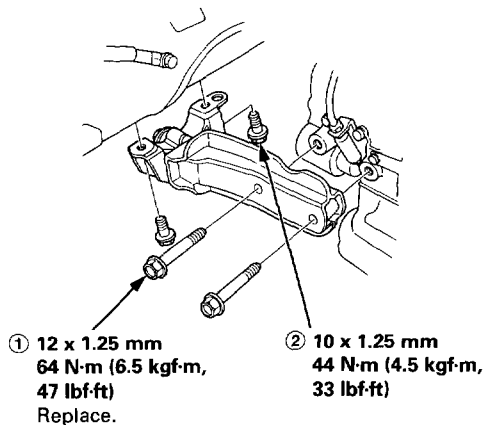
## Installation (cont'd)

6. Tighten the bolts on the right front mount/bracket in the numbered sequence as shown (① - ②).

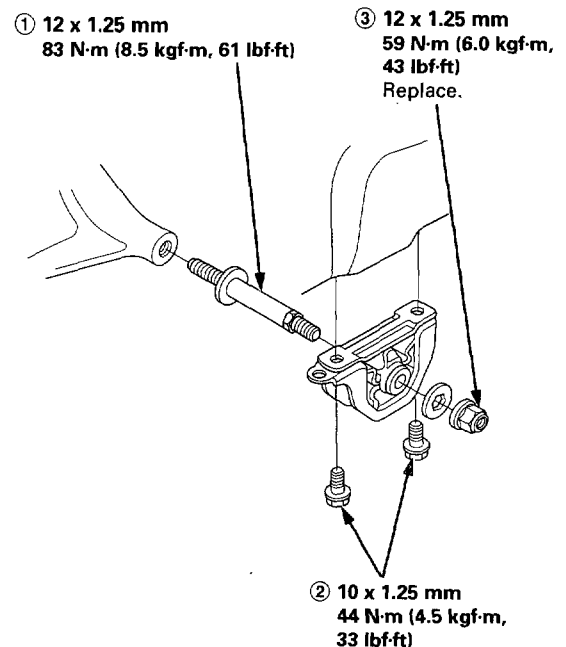
MT:



AT:



7. Tighten the bolts/nut on the left front mount in the numbered sequence as shown (① - ③).



8. Adjust and make sure as follows:

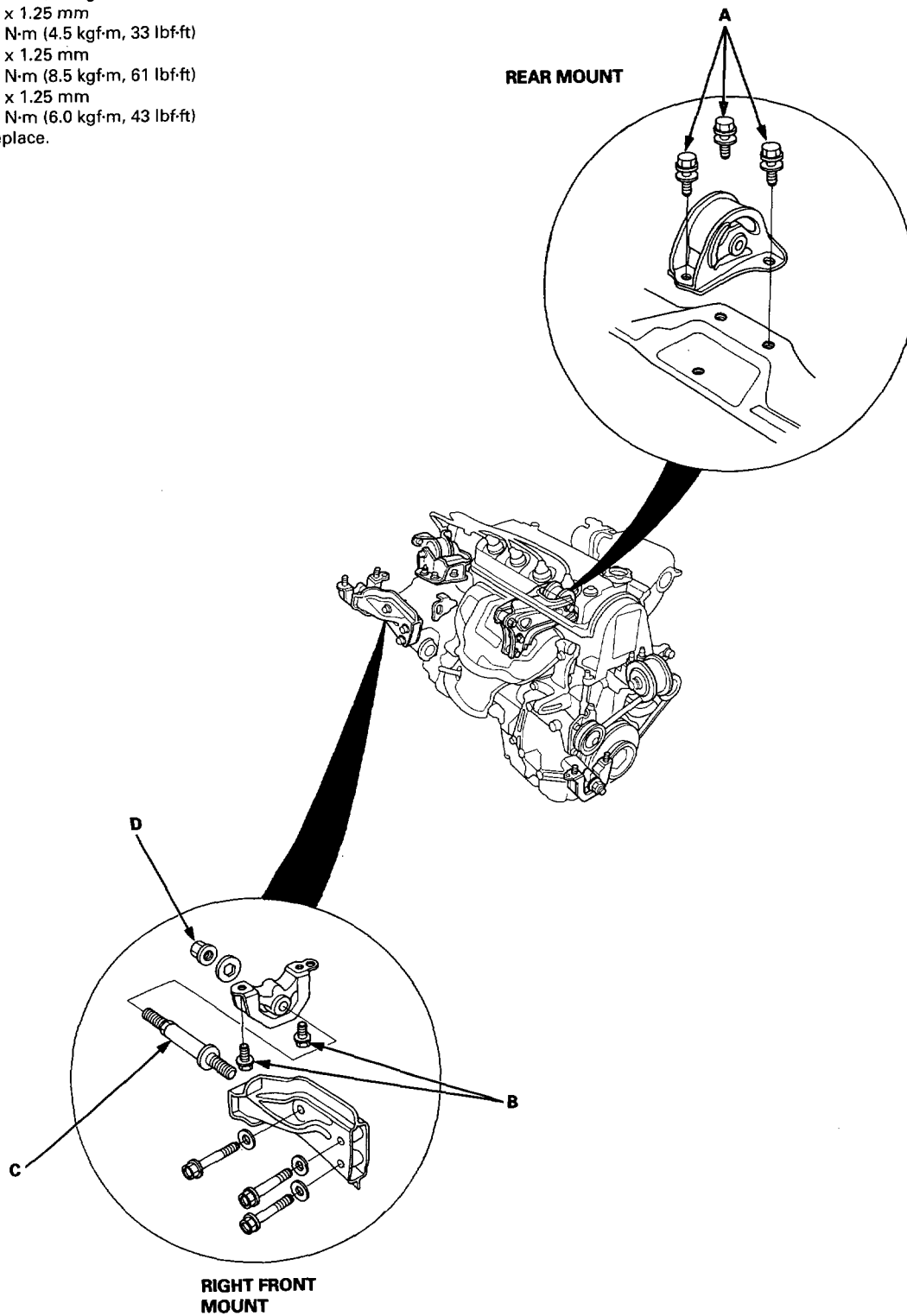
- Clean the areas where the driveshaft(s) and the intermediate shaft contact the transmission (differential) thoroughly with solvent or carburetor cleaner, and dry with compressed air.
- Check that the set ring on the ends of the driveshaft and intermediate shaft set rings into place.
- Adjust the shift cable.
- Adjust the throttle cable.
- Refill the engine with engine oil.
- Refill the transmission with fluid.
- Refill the radiator with engine coolant.
- Bleed air from the cooling system.
- Clean the battery posts and cable terminals with sandpaper, assemble them, then apply grease to prevent corrosion.
- Inspect for fuel leakage.
  - After assembling fuel line parts, turn on (II) the ignition switch (do not operate the starter) so that the fuel pump operates for approximately two seconds and the fuel line pressurizes. Repeat this operation two or three times, and check for fuel leakage at any point in the fuel line.





**Mount and Bracket Bolts/Nuts Torque Value Specifications:**

- A: 10 x 1.25 mm  
64 N·m (6.5 kgf·m, 47 lbf·ft)
- B: 10 x 1.25 mm  
44 N·m (4.5 kgf·m, 33 lbf·ft)
- C: 12 x 1.25 mm  
83 N·m (8.5 kgf·m, 61 lbf·ft)
- D: 12 x 1.25 mm  
59 N·m (6.0 kgf·m, 43 lbf·ft)  
Replace.



## Cylinder Head/Valve Train

D14A7, D14A8, D15Z8, D16B2 engines .....	6-3
B18C4 engine .....	6-45



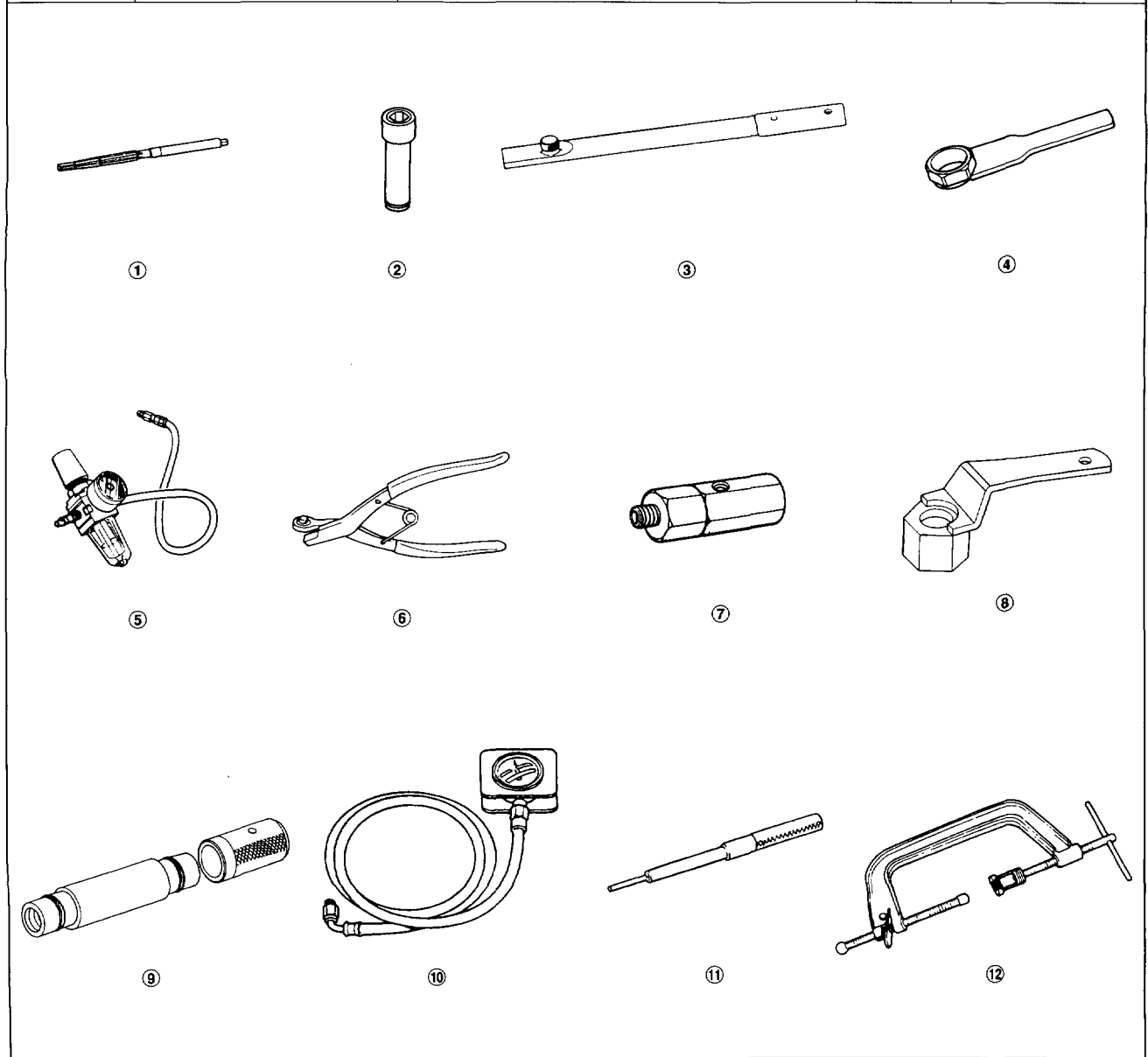
# Cylinder Head/Valve Train D14A7, D14A8, D15Z8, D16B2 engines

Special Tools .....	6-4	Rocker Arms	
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Warpage .....	6-36		
Installation .....	6-41		



# Special Tools

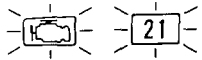
Ref. No.	Tool Number	Description	Qty	Remark
①	07HAH - PJ70100	Valve Guide Reamer, 5.525 mm	1	
②	07JAA - 0010100	Socket Wrench, 17 mm	1	
③	07JAB - 0010200	Handle	1	
④	07JAB - 0010400	Pulley Holder Attachment, HEX 50 mm	1	
⑤	07LAJ - PR30101	Valve Inspection Set	1	
⑥	07LAJ - PR30201	Air Stopper	1	
⑦	07NAJ - P070100	Oil Pressure Gauge Attachment	1	
⑧	07MAB - PY30100	Pulley Holder Attachment, HEX 50 mm	1	
⑨	07PAD - 0010000	Stem Seal Driver	1	
⑩	07406 - 0070001	Low Pressure Gauge	1	
⑪	07742 - 0010100	Valve Guide Driver, 5.5 mm	1	
⑫	07757 - 0010000	Valve Spring Compressor	1	



# Variable Valve Timing and Valve Lift Electronic Control (VTEC) Solenoid Valve



## Troubleshooting Flowchart (D15Z8 engine)



The Malfunction indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 21: A problem in the VTEC Solenoid Valve circuit.

Refer to page 11-B-14 through 11-B-22 before troubleshooting.

— The MIL has been reported on.  
— With the SCS short connector connected, code 21 is indicated.

**Check the VTEC Control System:**

1. Do the engine control module (ECM) reset procedure (see section 11).
2. Start the engine.
3. Warm up engine to normal operating temperature (cooling fan comes on).
4. Do the Road Test.\*

\* Road Test:

Accelerate in 1st gear to an engine speed over 3,000 rpm (min<sup>-1</sup>). Hold that engine speed for at least two seconds. If the MIL does not come on during the first road test, repeat this test two more times.

Is MIL on and does it indicate code 21?

NO

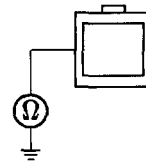
**Intermittent failure, system is OK at this time.**  
**Check for poor connections or loose wires at VTEC solenoid valve and ECM.**

YES

**Test the VTEC Solenoid Valve:**

1. Turn the ignition switch OFF.
2. Disconnect the VTEC solenoid valve connector.
3. Check for continuity between VTEC solenoid valve connector terminal and body ground.

**VTEC SOLENOID VALVE CONNECTOR**



Terminal side of male terminal

Is there 14 – 30 Ω?

NO

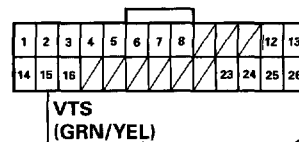
**Replace the VTEC solenoid valve.**

YES

**Test the VTEC Solenoid Valve Wire:**  
Check for continuity between VTEC solenoid valve connector terminal and A15 terminal on the ECM connector.

**ECM CONNECTOR A (26P)**

**VTEC SOLENOID VALVE CONNECTOR**



Wire side of female terminals

Is there continuity?

NO

**Repair open in the GRN/YEL wire between the ECM (A15) and VTEC solenoid valve connector.**

YES

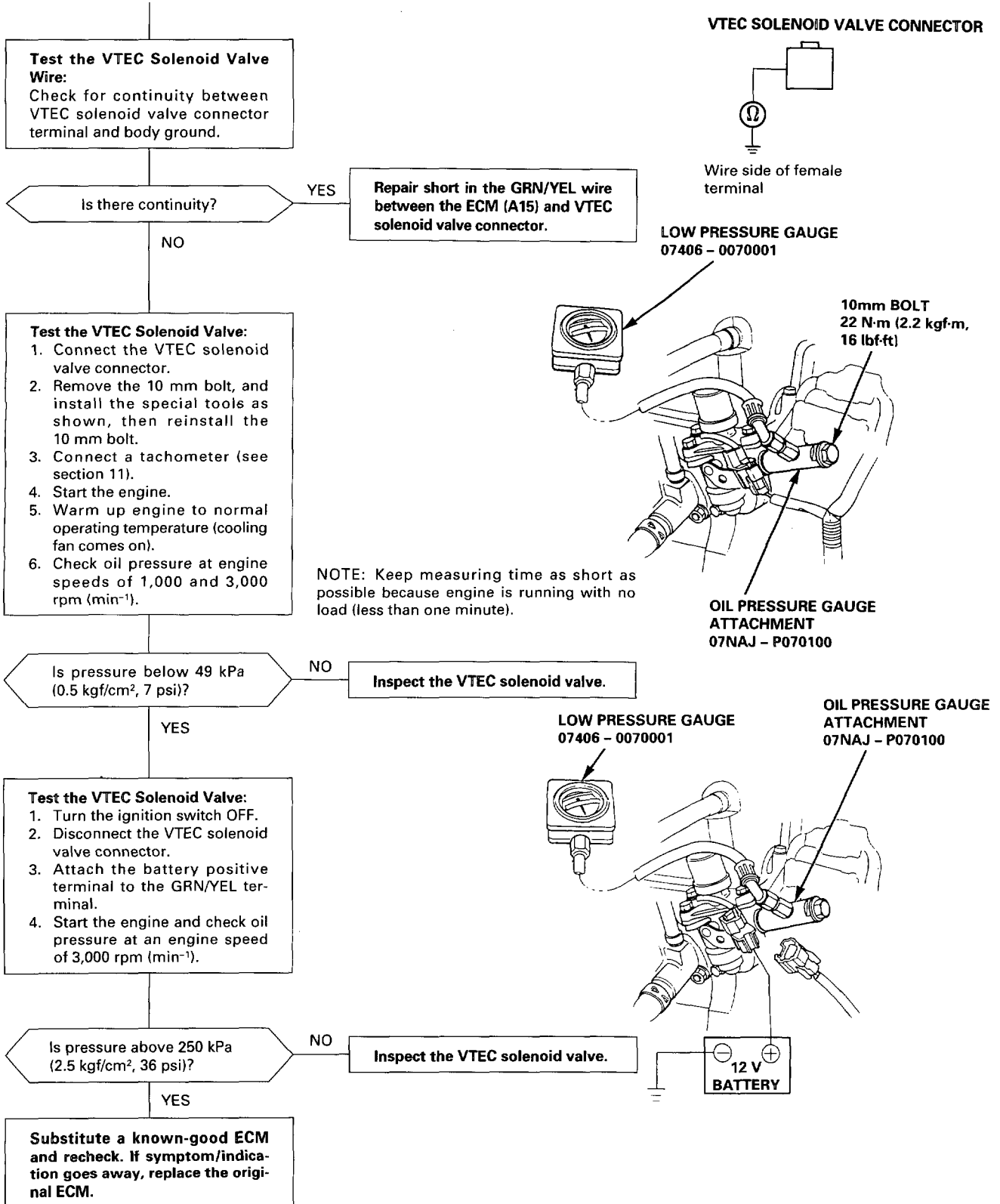
(To page 6-6)

(cont'd)

# VTEC Solenoid Valve

## Troubleshooting Flowchart (D15Z8 engine) (cont'd)

(From page 6-5)



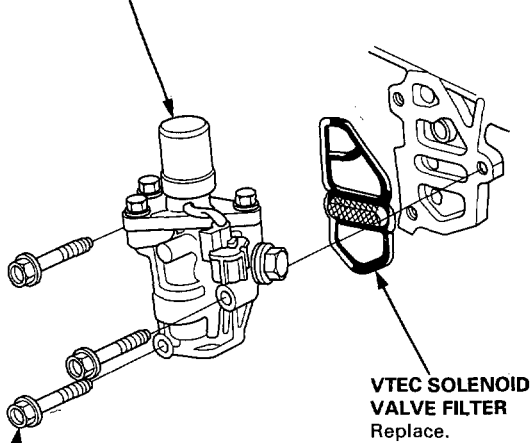


## Inspection

1. Remove the VTEC solenoid valve assembly from the cylinder head, and check the VTEC solenoid valve filter for clogging.

- If there is clogging, replace the engine oil filter and engine oil.

VTEC SOLENOID VALVE ASSEMBLY



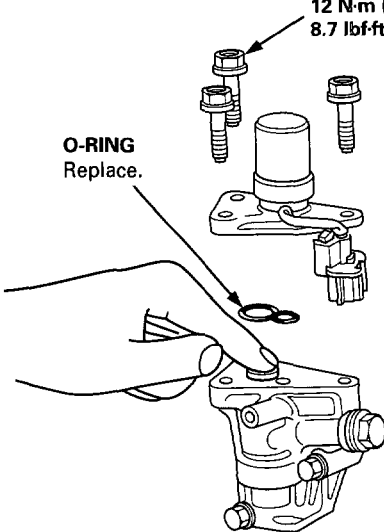
6 x 1.0 mm  
12 N·m (1.2 kgf·m, 8.7 lbf·ft)

2. If the filter is not clogged, push the VTEC solenoid valve with your finger and check its movement.

- If the VTEC solenoid valve is normal, check the engine oil pressure.

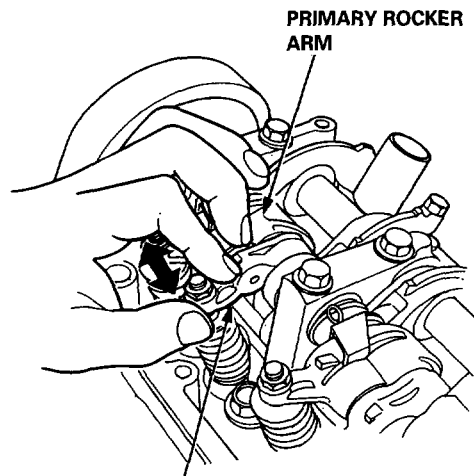
6 x 1.0 mm  
12 N·m (1.2 kgf·m,  
8.7 lbf·ft)

O-RING  
Replace.



## Manual Inspection (D16Z8 engine)

1. Set the No. 1 piston at TDC.
2. Remove the cylinder head cover.  
  
NOTE: Refer to page 6-42 when installing cylinder head cover.
3. Move the intake secondary rocker arm on the No. 1 cylinder manually.
4. Check that the intake secondary rocker arm moves independently of the primary intake rocker arm.



SECONDARY  
ROCKER ARM  
• Push and pull.

5. Check the intake secondary rocker arm of each cylinder at TDC.
  - If the intake secondary rocker arm does not move, remove the primary and secondary intake rocker arms as an assembly and check that the pistons in the secondary and primary rocker arms move smoothly.
  - Replace the intake rocker arms as an assembly if there is any abnormality.

# VTEC Rocker Arms

## Inspection Using Special Tools (D15Z8 engine)

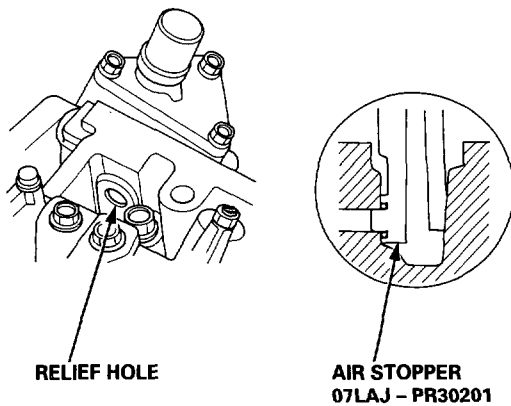
**NOTE:**

- Before using the Valve Inspection Tool, make sure that the air pressure gauge on the air compressor indicates over 400 kPa (4 kgf/cm<sup>2</sup>, 57 psi).
- Inspect the valve clearance before rocker arm inspection.
- Cover the timing belt with a shop towel to protect the belt.
- Check the intake secondary rocker arm of each cylinder at TDC.

1. Remove the cylinder head cover.

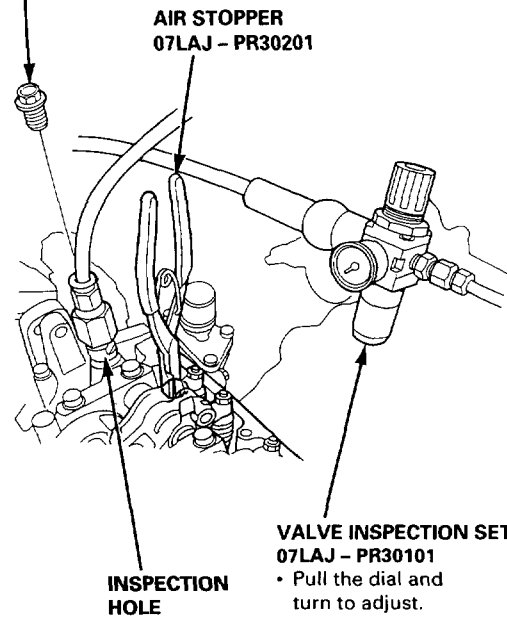
NOTE: Refer to page 6-42 when installing cylinder head cover.

2. Plug the relief hole with the special tool (Air Stopper).



3. Remove the sealing bolt from the inspection hole and connect the Valve Inspection Tool.

10 x 1.0 mm  
SEALING BOLT  
20 N·m (2.0 kgf·m,  
14 lbf·ft)



4. Apply specified air pressure to the intake rocker arm timing piston, after loosening the regulator valve on the valve inspection set.

**Specified Air Pressure:**  
250 kPa (2.5 kgf/cm<sup>2</sup>, 36 psi)

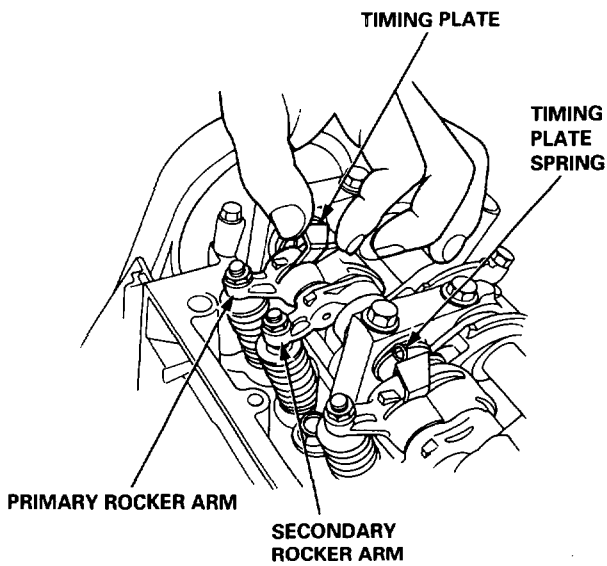




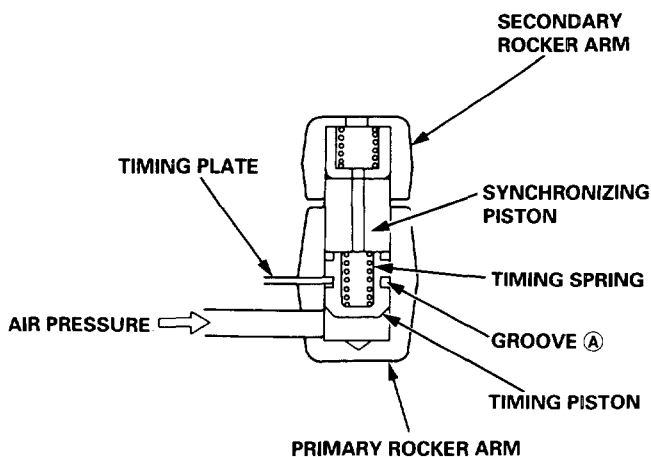
5. With the specified air pressure applied, push up the timing plate; the synchronizing piston will pop out and engage the intake secondary rocker arm. Visually check the engagement of the synchronizing piston.

**NOTE:**

- The synchronizing piston can be seen in the gap between the secondary and primary rocker arms.
- When the timing plate is engaged in the groove A on the timing piston, the piston will be locked in the pushed out position.



**At High RPM:**

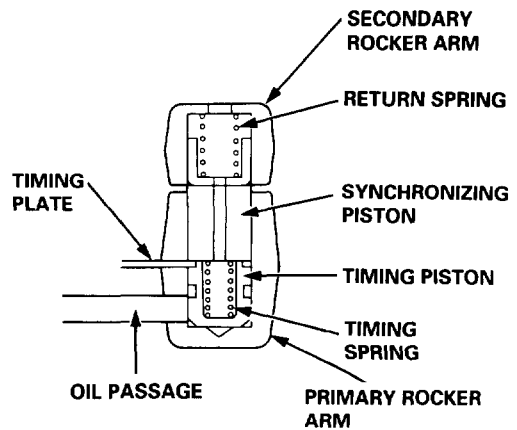


6. Stop applying air pressure and push up the timing plate; the synchronizing piston will return to its original position with a click. Visually check the disengagement of the synchronizing pistons.

**NOTE:**

- When the timing plate is pushed up, it will disengage the timing piston letting the synchronizing piston return to its original position by the return spring.
- Replace the intake rocker arms as an assembly if there is any abnormality.

**At Low RPM:**



7. Remove the special tools.
8. After inspection, check that the MIL does not come on.

# Valve Clearance

## Adjustment

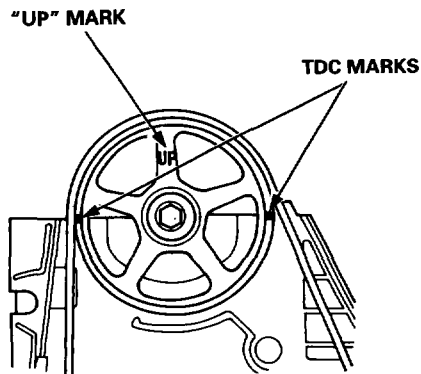
### NOTE:

- Valves should be adjusted only when the cylinder head temperature is less than 38°C (100°F).
- After adjusting, loosen the crankshaft pulley bolt, then retorque the crankshaft pulley bolt to 20 N·m (2.0 kgf·m, 14 lbf·ft) + 90°.

1. Remove the cylinder head cover.

NOTE: Refer to page 6-42 when installing the cylinder head cover.

2. Remove the upper cover (see page 6-17).
3. Set the No. 1 piston at TDC. "UP" mark on the camshaft pulley should be at top, and TDC marks should align with the cylinder head upper surface.



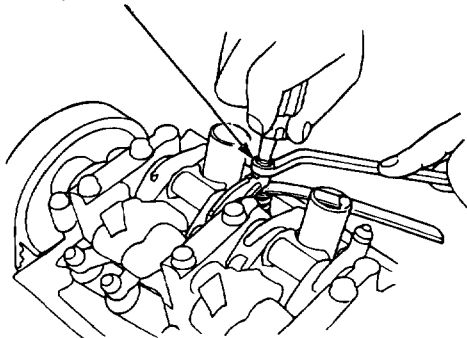
4. Adjust valves on No. 1 cylinder.

Intake: 0.18 – 0.22 mm (0.007 – 0.009 in)  
Exhaust: 0.23 – 0.27 mm (0.009 – 0.011 in)

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

### D15Z8 engine:

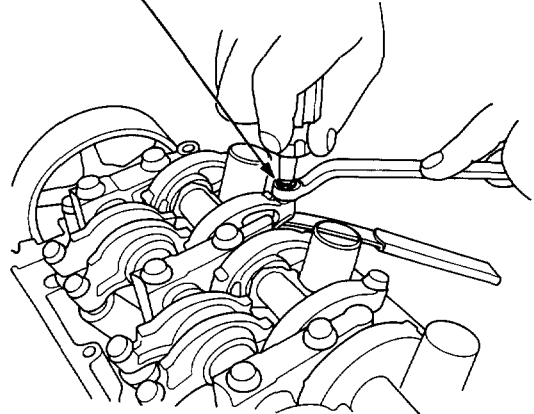
INTAKE and EXHAUST VALVE  
LOCKNUTS  
20 N·m (2.0 kgf·m, 14 lbf·ft)



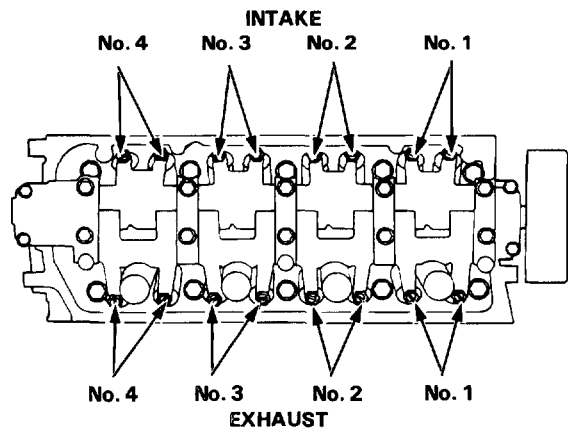
### Except D15Z8 engine:

NOTE: Do not overtighten the locknuts, for the rocker arms are made of aluminum.

INTAKE and EXHAUST VALVE  
LOCKNUTS  
18 N·m (1.8 kgf·m, 13 lbf·ft)

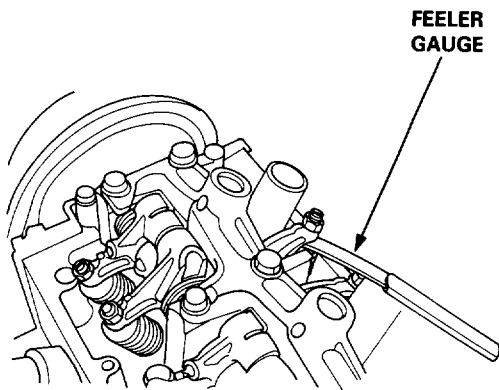


### Adjusting screw location:

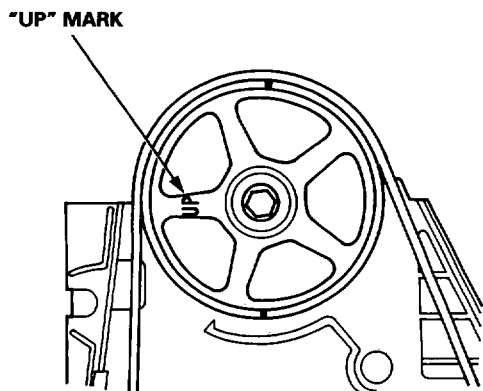




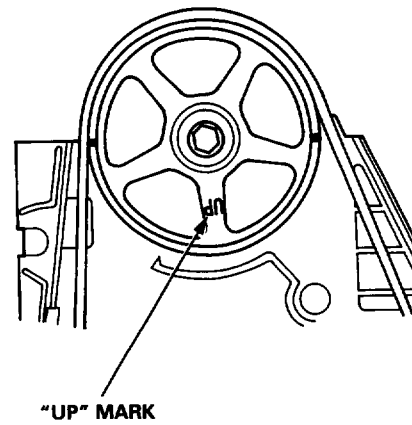
6. Tighten the locknut, and check clearance again. Repeat the adjustment if necessary.



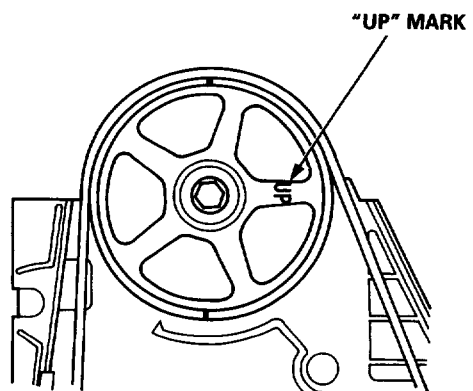
7. Rotate the crankshaft 180° counterclockwise (camshaft pulley turns 90°). The "UP" mark should be on the exhaust side. Adjust valves on No. 3 cylinder.



8. Rotate the crankshaft 180° counterclockwise to bring No. 4 piston to TDC. Both TDC grooves are once again visible. Adjust valves on No. 4 cylinder.



9. Rotate the crankshaft 180° counterclockwise to bring No. 2 piston to TDC. The "UP" mark should be on the intake side. Adjust valves on No. 2 cylinder.

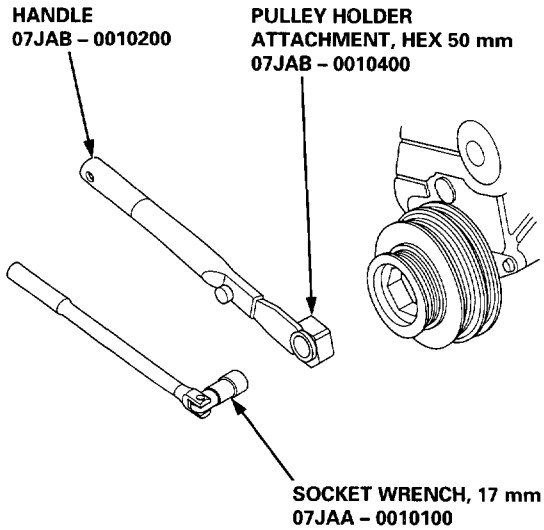


# Crakshaft Pulley and Pulley Bolt

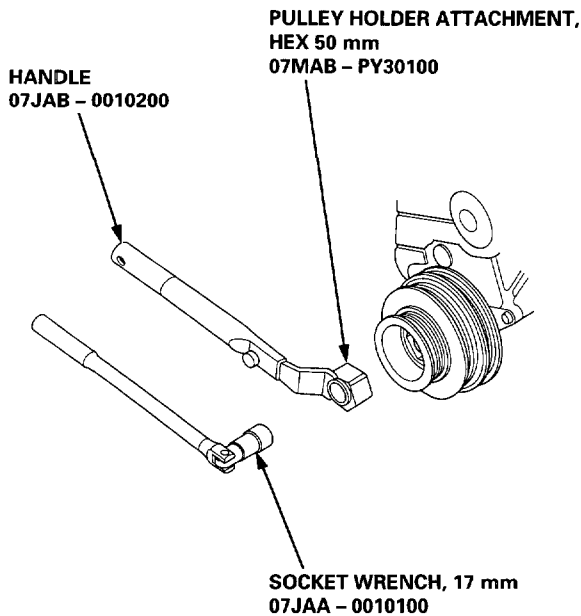
## Replacement

1. Hold the pulley with handle and pulley holder attachment, then remove the pulley bolt.

**D15Z8, D16B2 engines:**



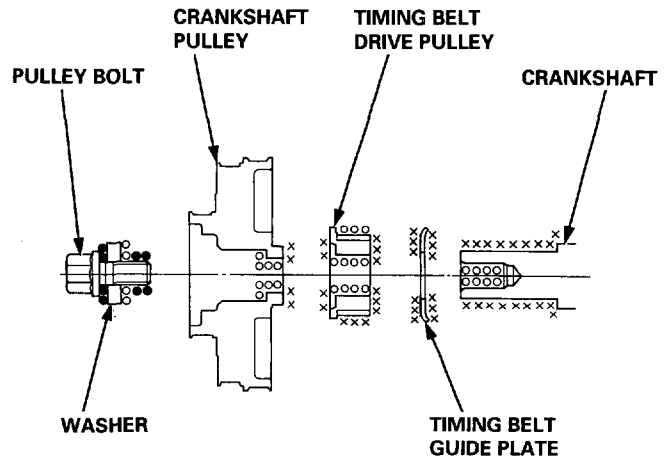
**D14A7, D14A8 engines:**



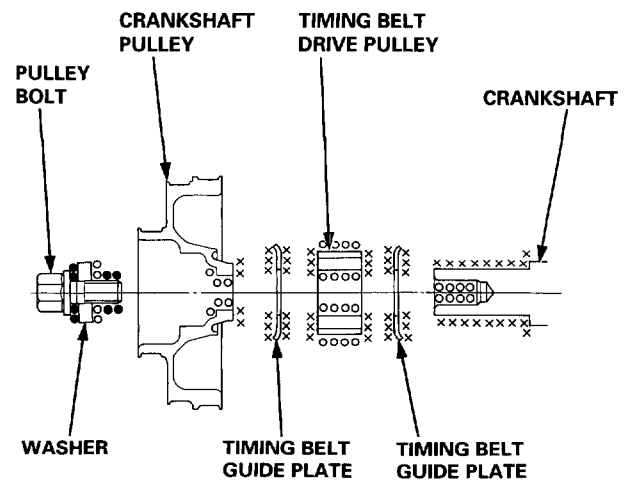
2. Remove any oil from the pulleys, crankshaft, bolt and washer. Clean and lubricate as shown below.

- : Clean
- ×: Remove any oil
- : Lubricate

**D15Z8 engine:**



**Except D15Z8 engine:**

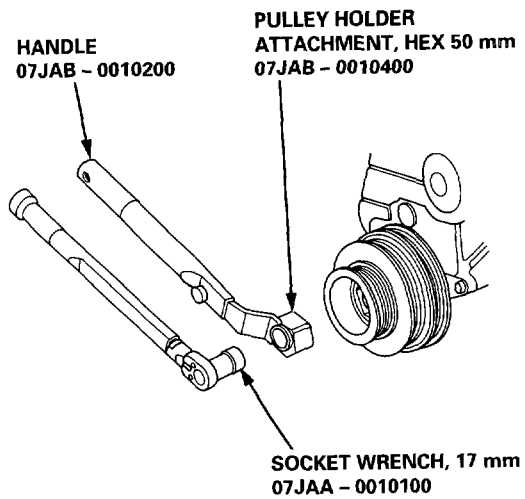




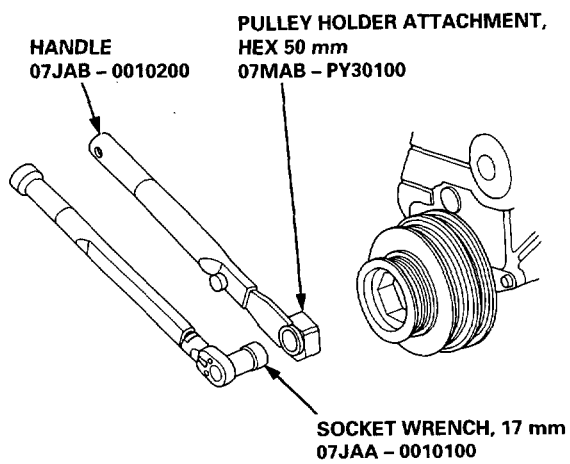
3. Tighten the pulley bolt to the specified torque.

Torque: 20 N·m (2.0 kgf·m, 14 lbf·ft)

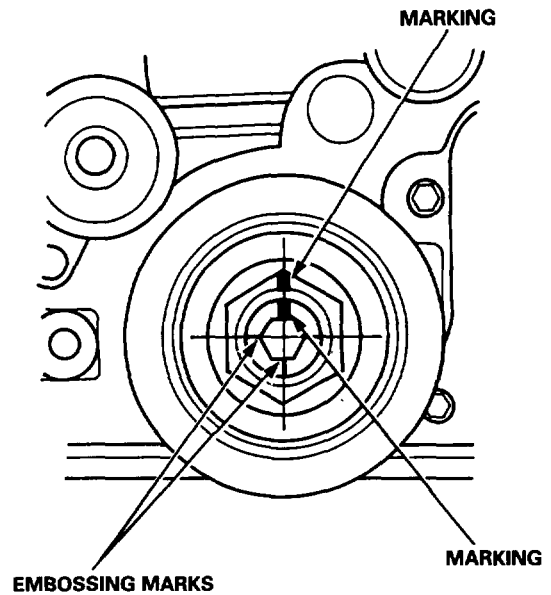
D15Z8, D16B2 engines:



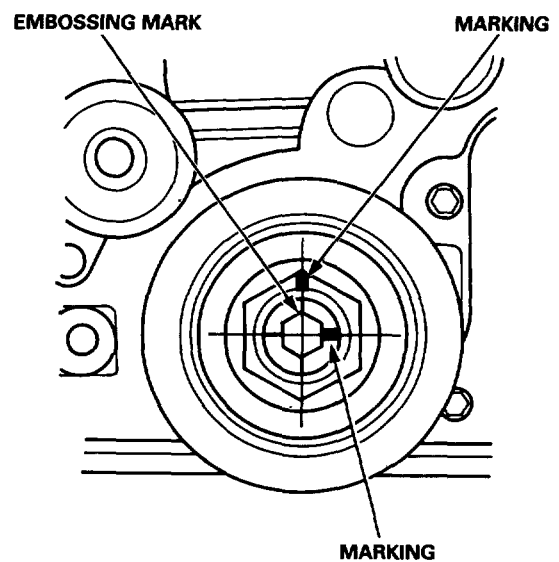
D14A7, D14A8 engines:



4. Use a felt tip pen to mark the pulley bolt head and washer.



5. Tighten the pulley bolt an additional 90°.



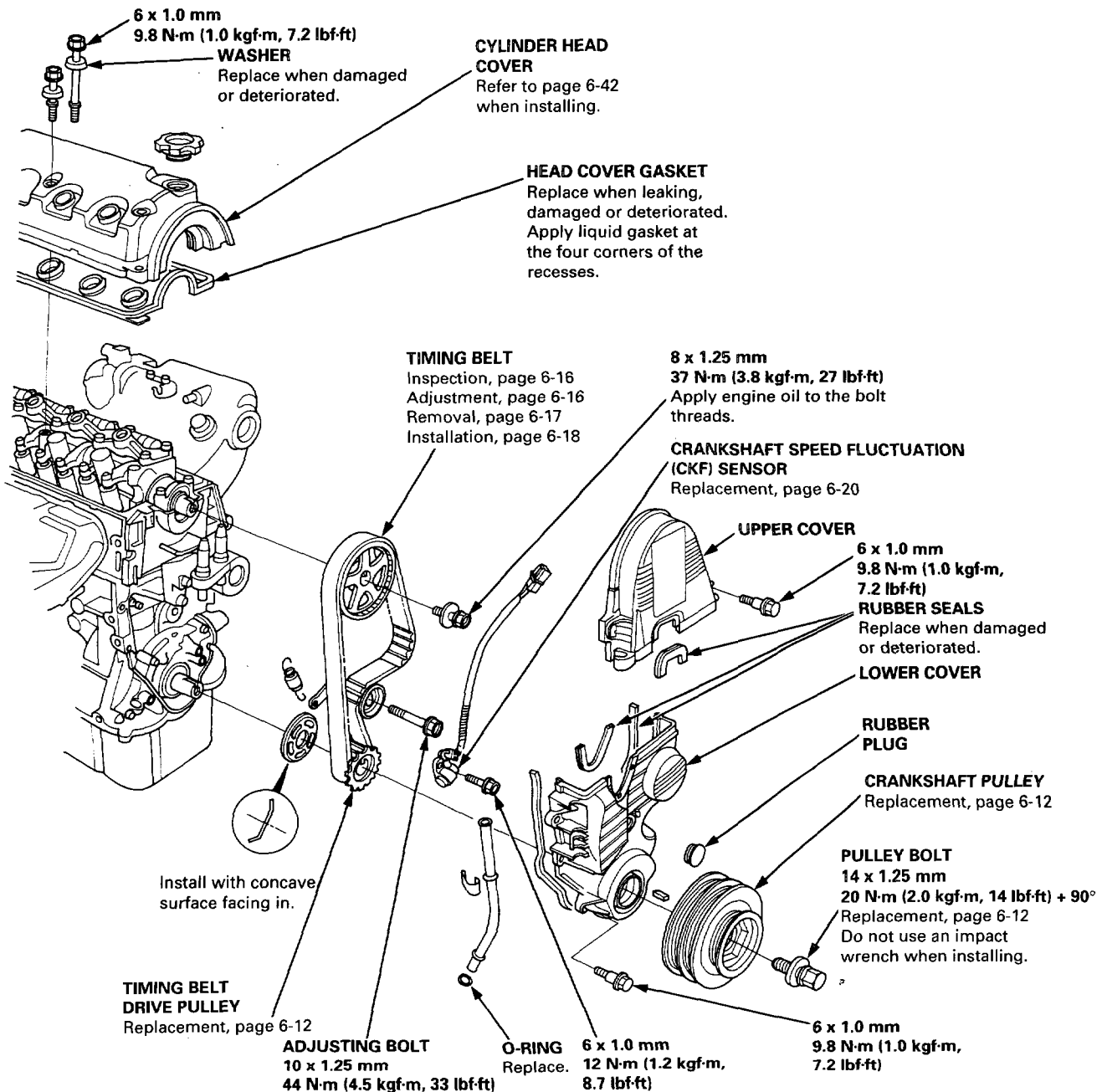
# Timing Belt

## Illustrated Index

### NOTE:

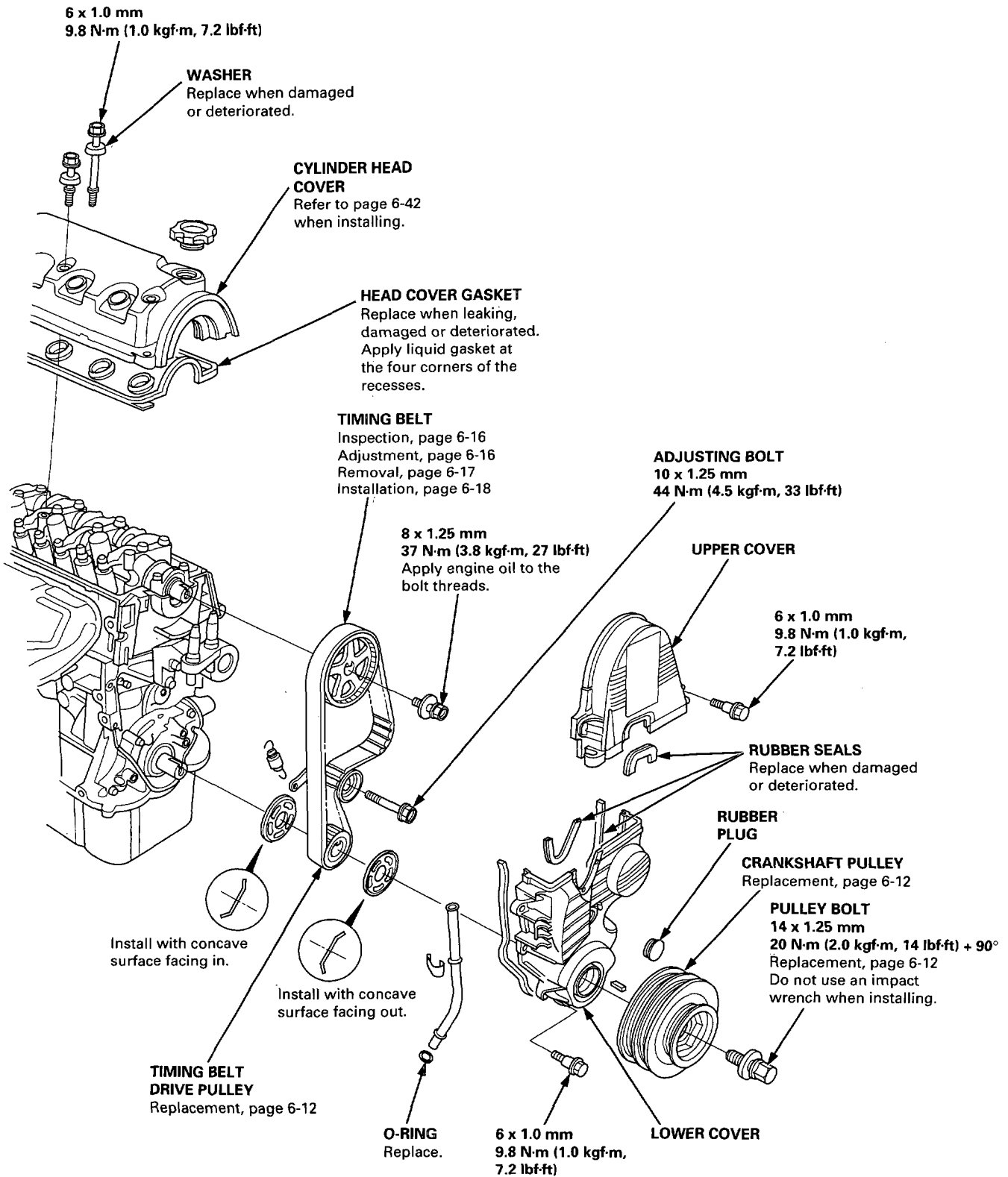
- Refer to page 6-18 for how to position the crankshaft and pulley before installing the belt.
- Mark the direction of rotation on the belt before removing.
- Do not use the upper cover and lower cover for storing removed items.
- Clean the upper cover and lower cover before installing.
- Replace the camshaft seals and crankshaft seals if there is oil leakage.

### D15Z8 engine:





Except D15Z8 engine:



# Timing Belt

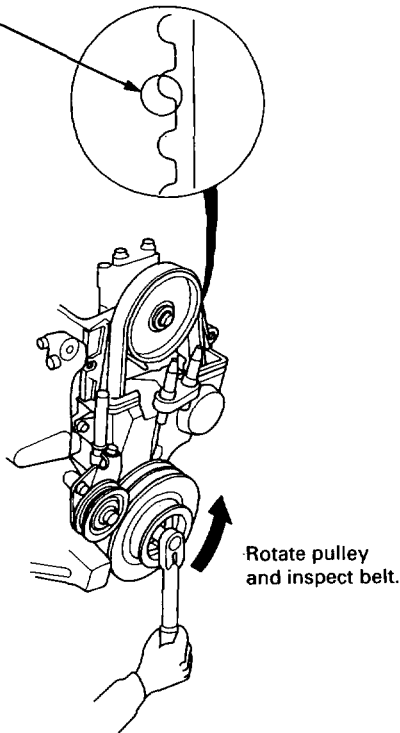
## Inspection

1. Remove the cylinder head cover.
  - Refer to page 6-42 when installing.
2. Remove the upper cover (see page 6-17).
3. Inspect the timing belt for cracks and oil or coolant soaking.

### NOTE:

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

Inspect this area for wear.



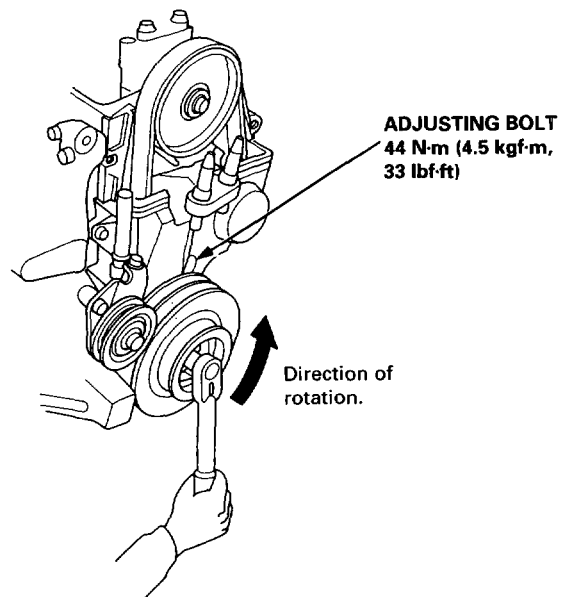
4. After inspecting, loosen the crankshaft pulley bolt, then retorque the crankshaft pulley bolt to 20 N·m (2.0 kgf·m, 14 lbf·ft) + 90°.

## Tension Adjustment

### NOTE:

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

1. Remove the cylinder head cover.
  - Refer to page 6-42 when installing.
2. Remove the upper cover (see page 6-17).
3. Rotate the crankshaft five or six revolutions to set the belt.
4. Set the No. 1 piston at TDC (see page 6-19).
5. Loosen the adjusting bolt 180°.



6. Rotate the crankshaft counterclockwise three teeth on the camshaft pulley.
7. Tighten the adjusting bolt.
8. After inspecting, loosen the crankshaft pulley bolt, then retorque the crankshaft pulley bolt to 20 N·m (2.0 kgf·m, 14 lbf·ft) + 90°.



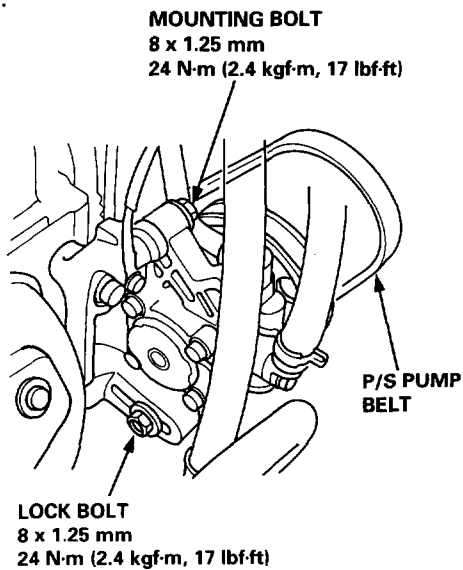


## Removal

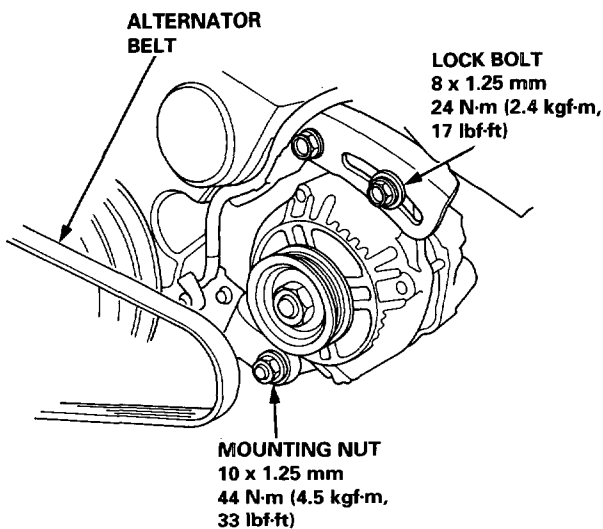
### NOTE:

- Turn the crankshaft pulley so the No. 1 piston is at top dead center (TDC) before removing the belt (see page 6-19).
- Inspect the water pump before installing the timing belt (see page 10-14).

1. Remove the splash shield (see page 5-6).
2. Loosen the mounting bolt and lock bolt, then remove the power steering (P/S) pump belt and pump.

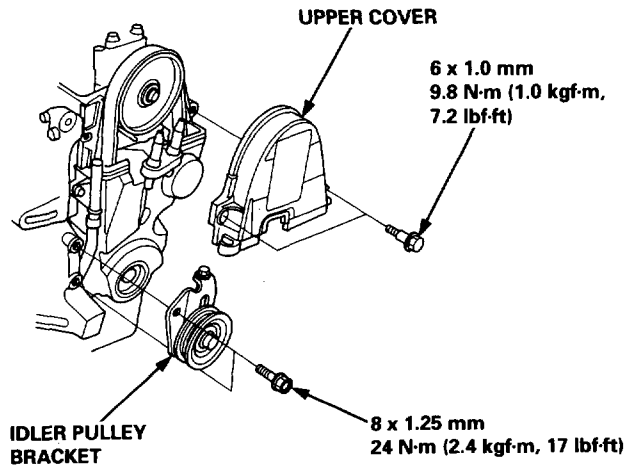


3. Loosen the idler pulley center nut and adjusting bolt, then remove the air conditioning (A/C) compressor belt (see page 5-5).
4. Loosen the mounting nut and lock bolt, then remove the alternator belt.



5. Remove the dipstick, then remove upper cover and idler pulley bracket.

NOTE: Do not use the upper cover for storing removed items.



6. Remove the side engine mount (see page 6-26).

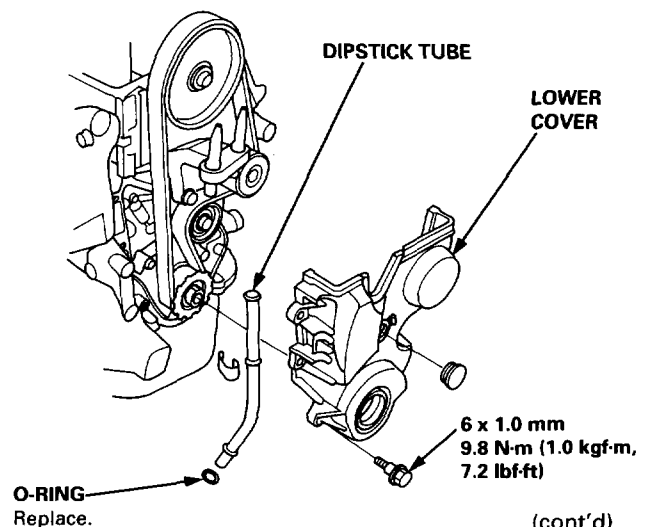
### NOTE:

- Use the jack to support the engine before the side engine mount is removed.
- Make sure to place a cushion between the oil pan and the jack.

7. Remove the crankshaft pulley (see page 6-12).

8. Remove the lower cover and dipstick tube.

NOTE: Do not use the lower cover for storing removed items.

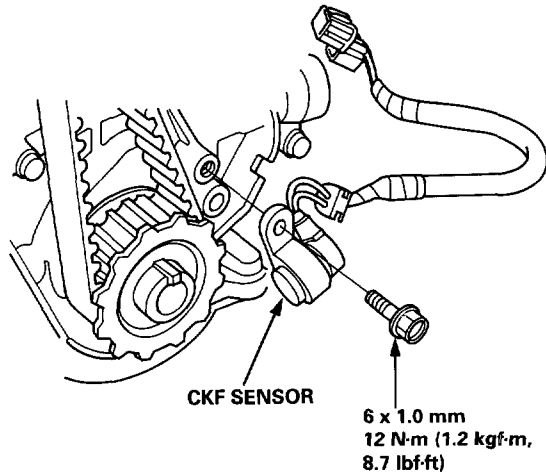


(cont'd)

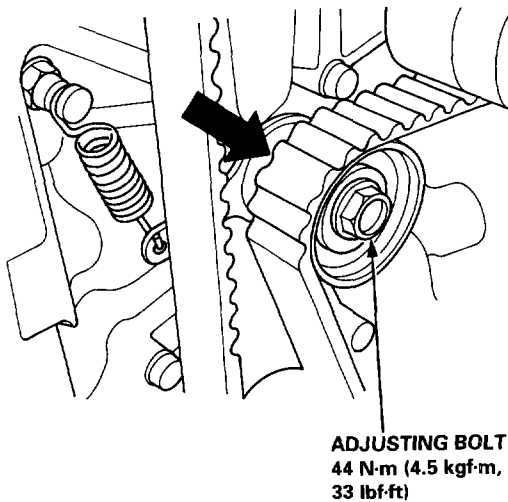
# Timing Belt

## Removal (cont'd)

9. Remove the crankshaft speed fluctuation (CKF) sensor from the oil pump (D15Z8 engine).



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

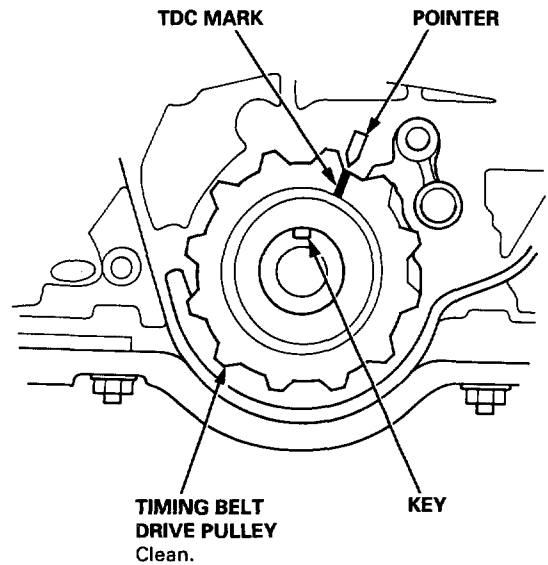


11. Remove the timing belt.

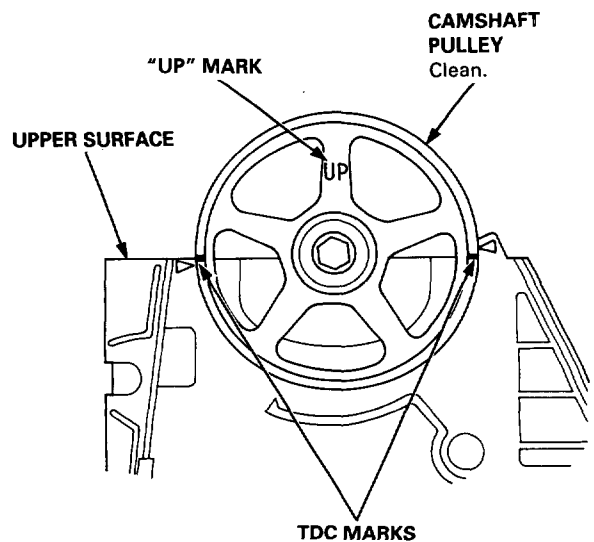
## Installation

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

1. Set the timing belt drive pulley so that the No. 1 piston is at top dead center (TDC). Align the groove on the timing belt drive pulley to the pointer on the oil pump.



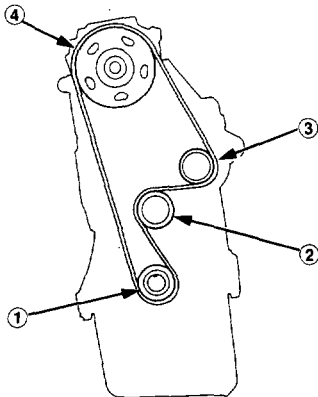
2. Set the camshaft pulley so that the No. 1 piston TDC. Align the TDC marks on the camshaft pulley with the cylinder head upper surface.





3. Install the timing belt tightly in the sequence shown.  
 ①Timing belt drive pulley (crankshaft) →②Adjusting pulley →③Water pump pulley →④Camshaft pulley.

NOTE: Make sure the timing belt drive pulley and camshaft pulley are at TDC.



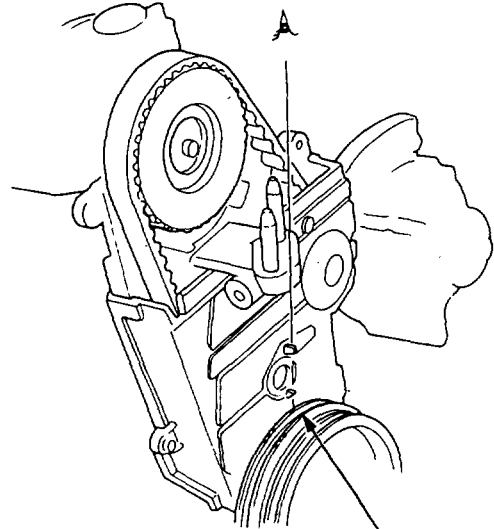
4. Loosen and retighten the adjusting bolt to tension the timing belt.  
 5. Install the lower cover and upper cover.

NOTE: Clean the upper and lower covers before installation.

6. Install the crankshaft pulley, then tighten the pulley bolt (see page 6-12).  
 7. Rotate the crankshaft pulley about five or six turns counterclockwise so that the timing belt positions on the pulleys.  
 8. Adjust the timing belt tension (see page 6-16).

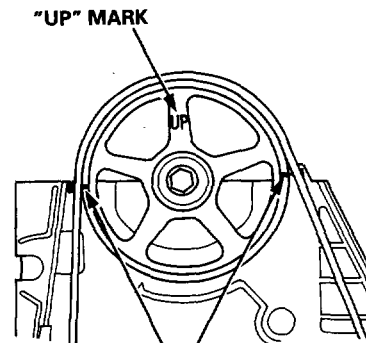
9. Check that the crankshaft pulley and camshaft pulley are both at TDC.

**CRANKSHAFT PULLEY:**



TDC MARK  
(WHITE)

**CAMSHAFT PULLEY:**



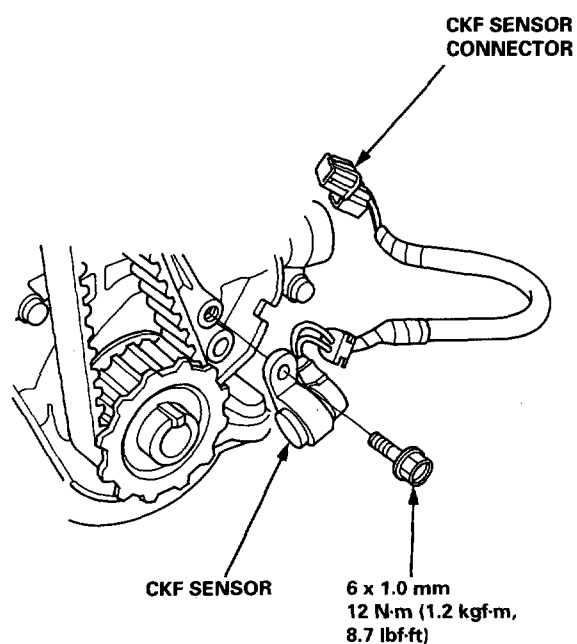
TDC MARK

10. If the camshaft and crankshaft pulleys are not positioned at TDC remove the timing belt, and adjust the position following the procedure on page 6-18, then reinstall the timing belt.
11. After installation, adjust the tension of each belt.
- See section 4 for alternator belt tension adjustment.
  - See section 22 for A/C compressor belt tension adjustment.
  - See section 17 for P/S pump belt tension adjustment.

# CKF Sensor

## Replacement (D15Z8 engine)

1. Remove the cylinder head cover.  
**NOTE:** Refer to page 6-42 when installing.
2. Remove the crankshaft pulley (see page 6-12).
3. Remove the upper cover and idler pulley bracket (see page 6-17).
4. Remove the dipstick tube, then remove lower cover (see page 6-17).
5. Disconnect the CKF sensor connector, then remove the CKF sensor.



6. Install the CKF sensor in reverse order of removal.

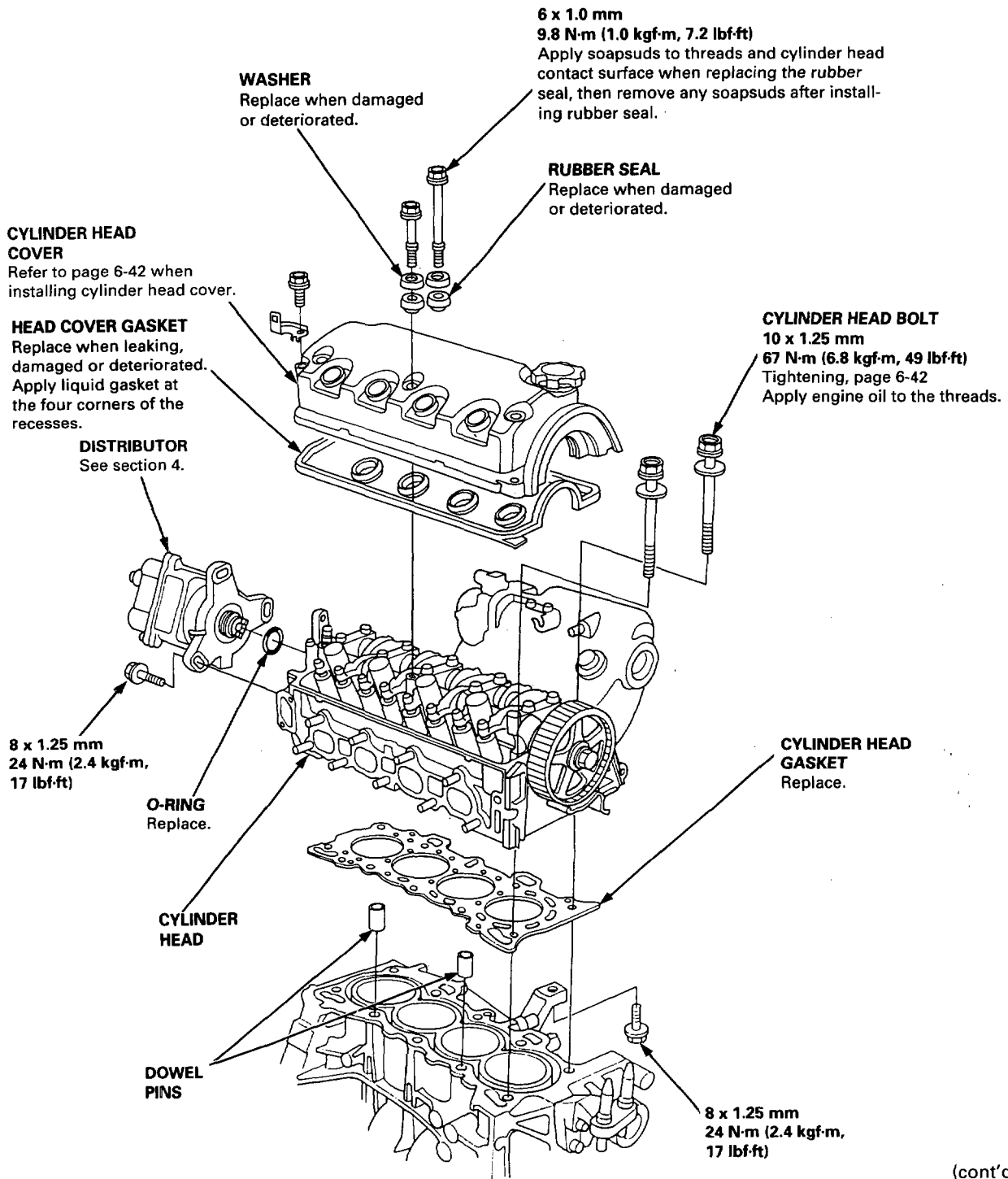
# Cylinder Head



## Illustrated Index

### NOTE:

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



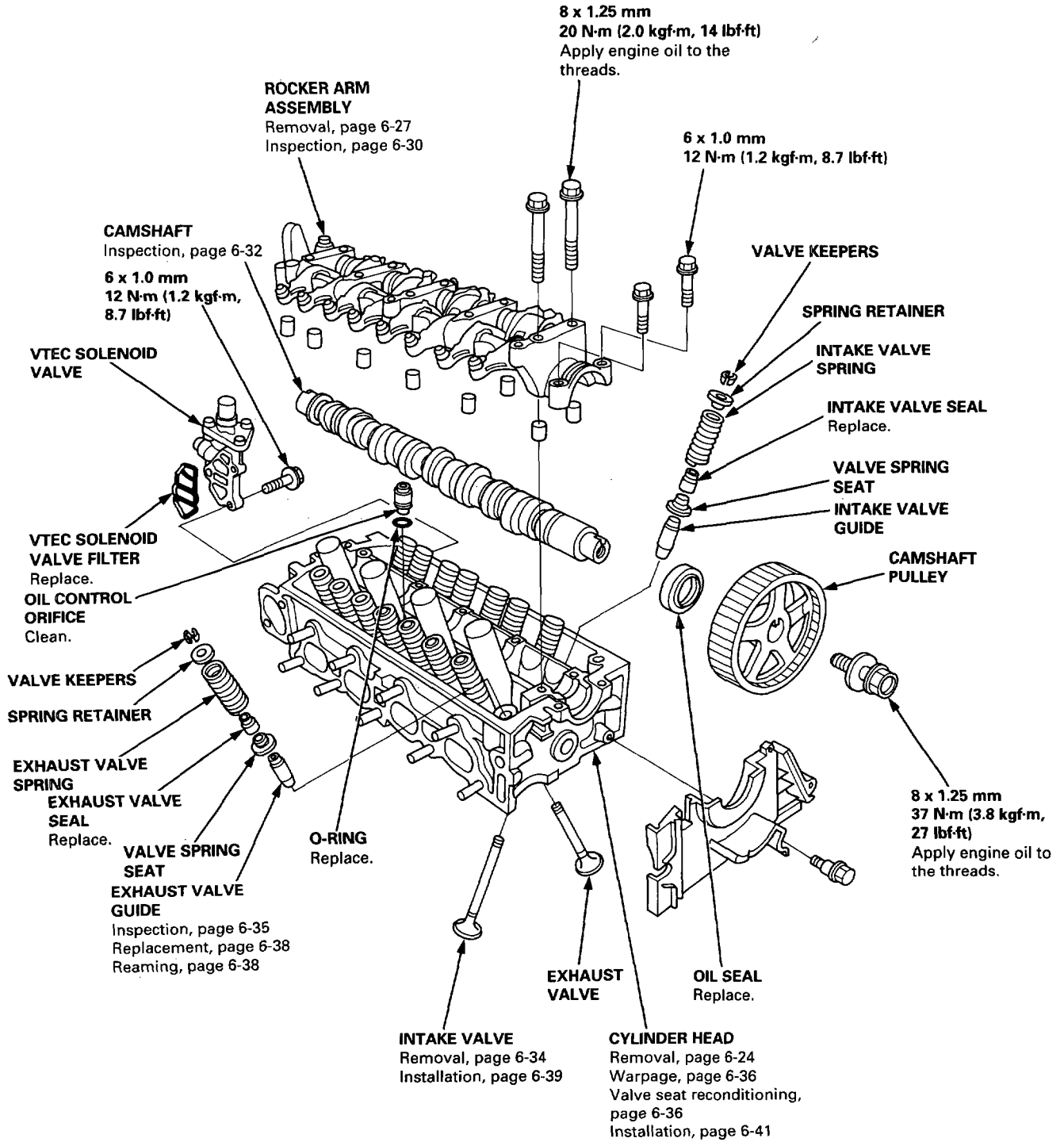
(cont'd)

# Cylinder Head

## Illustrated Index (cont'd)

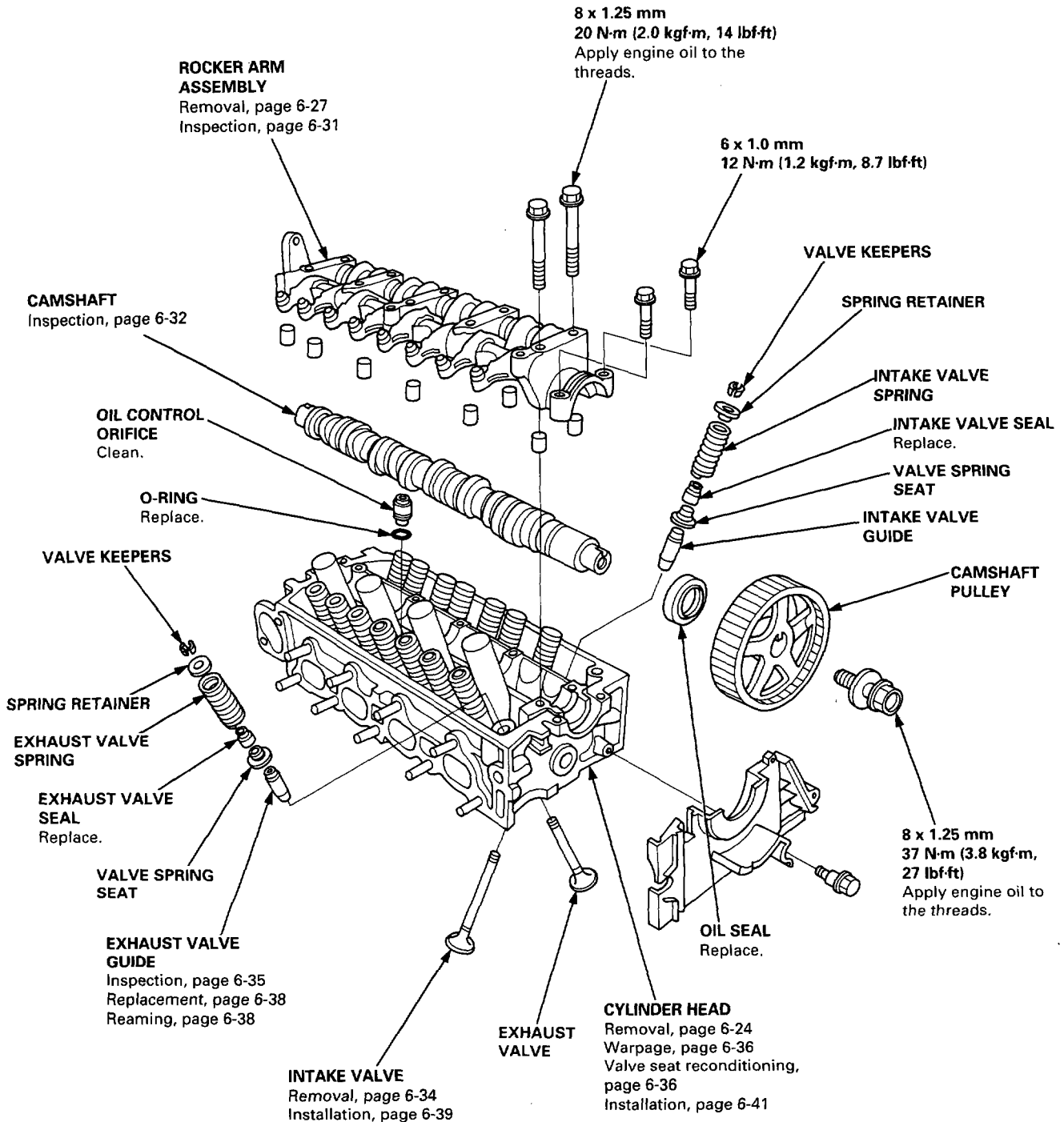
 Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact parts.

D15Z8 engine:





Except D15Z8 engine:



# Cylinder Head

## Removal

Engine removal is not required for this procedure.

**NOTE:**

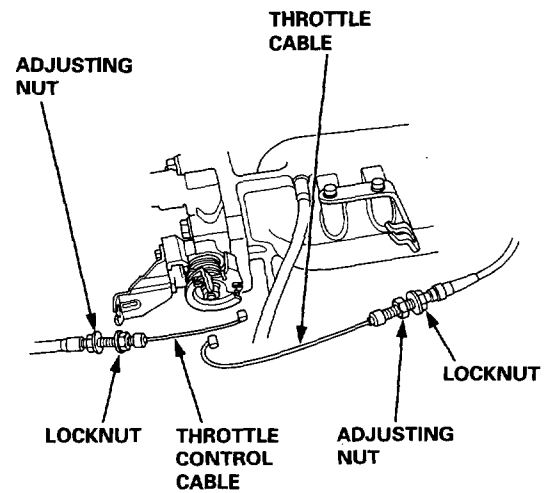
- Use fender covers to avoid damaging painted surfaces.
- Unplug the wiring connectors carefully while holding the connector portion to avoid damage.
- To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 38°C (100°F) before loosening the retaining bolts.
- Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses, or interfere with other parts.

1. Disconnect the negative terminal from the battery.
2. Drain the engine coolant (see page 10-7).
  - Remove the radiator cap to speed draining.
3. Remove the intake air duct and air cleaner housing (see page 5-2).
4. Remove the mounting bolt and lock bolt, then remove the power steering (P/S) pump belt and pump (see page 5-5).
5. Loosen the idler pulley center nut and adjusting bolt, then remove the air conditioning (A/C) compressor belt (see page 5-5).
6. Loosen the mounting nut and lock bolt, then remove the alternator belt (see page 6-17).
7. Remove the P/S pump bracket (see page 5-13).

8. Remove the throttle cable and throttle control cable by loosening the locknut, then slip the cable end out of the throttle linkage.

**NOTE:**

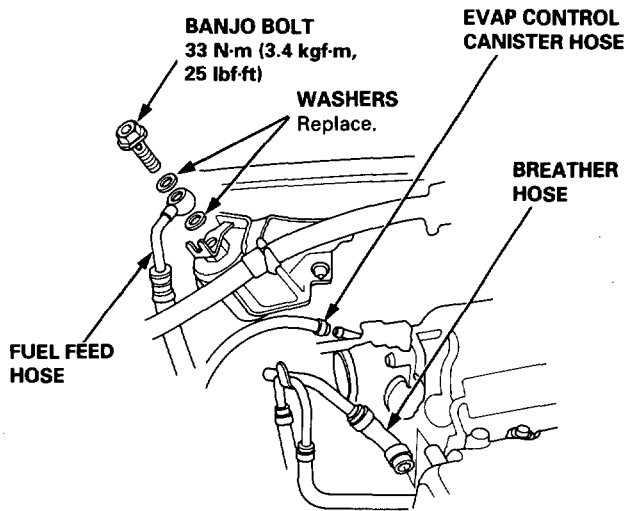
- Take care not to bend the cable when removing it. Always replace any kinked cable with a new one.
- Adjust the throttle cable when installing (see section 11).
- Adjust the throttle control cable when installing (see section 14).



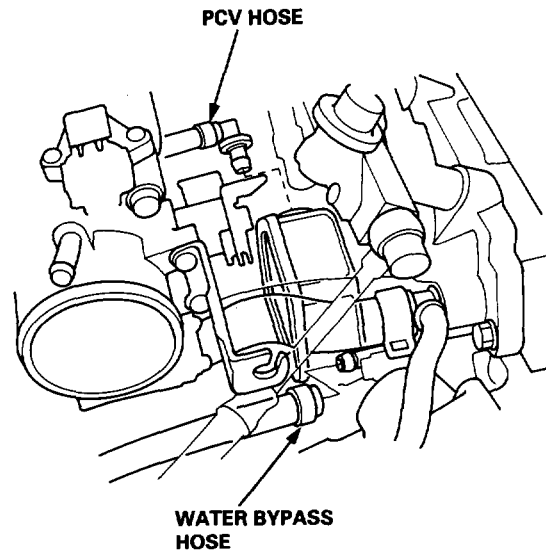




9. Relieve fuel pressure (see section 11).
10. Remove the evaporative emission (EVAP) control canister hose, fuel feed hose and breather hose.



11. Remove the brake booster vacuum hose, fuel return hose and vacuum hose (see page 5-3).
12. Remove the water bypass hose and positive crank-case ventilation (PCV) hose.

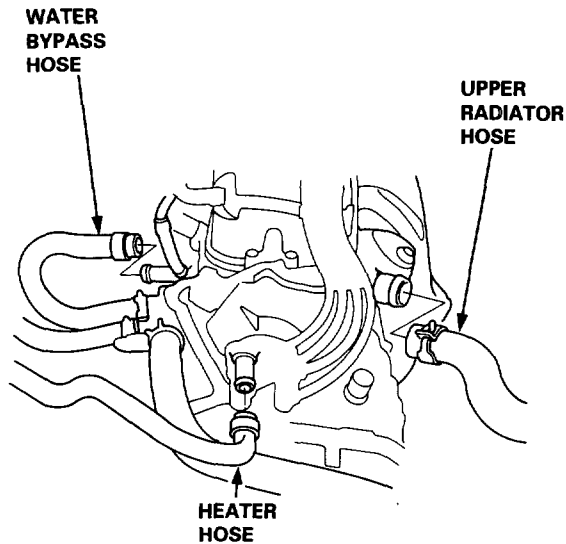


(cont'd)

# Cylinder Head

## Removal (cont'd)

13. Remove the upper radiator hose, heater hose and water bypass hose.



14. Remove the engine wire harness connectors and wire harness clamps from the cylinder head and the intake manifold.

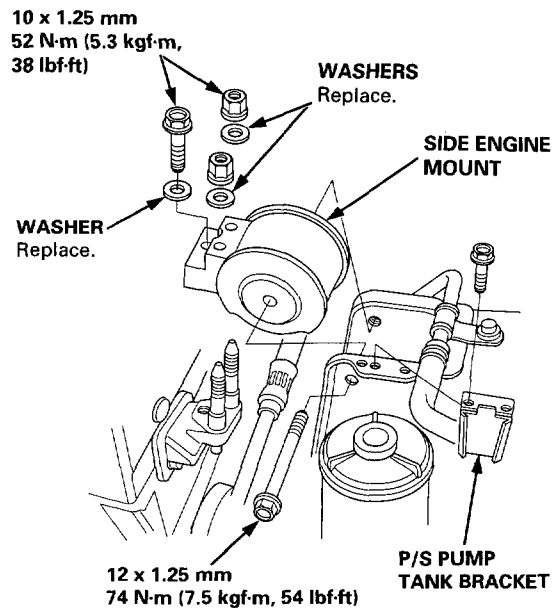
- Four fuel injector connectors
- Engine coolant temperature (ECT) sensor connector
- Radiator fan switch connector
- Coolant temperature gauge sending unit connector
- Throttle position sensor connector
- Manifold absolute pressure (MAP) sensor connector
- Heated oxygen sensor (HO2S) connector
- Exhaust gas recirculation (EGR) valve lift sensor connector (D15Z8 engine)
- VTEC solenoid valve connector (D15Z8 engine)
- Idle air control (IAC) valve connector

15. Remove the spark plug caps and distributor form the cylinder head.

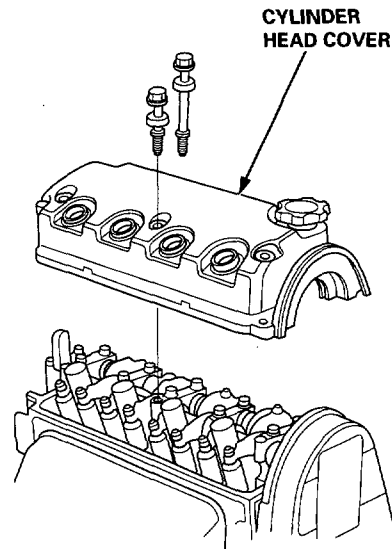
16. Remove the side engine mount and P/S pump tank bracket.

### NOTE:

- Use the jack to support the engine before the side engine mount is removed.
- Make sure to place a cushion between the oil pan and the jack.

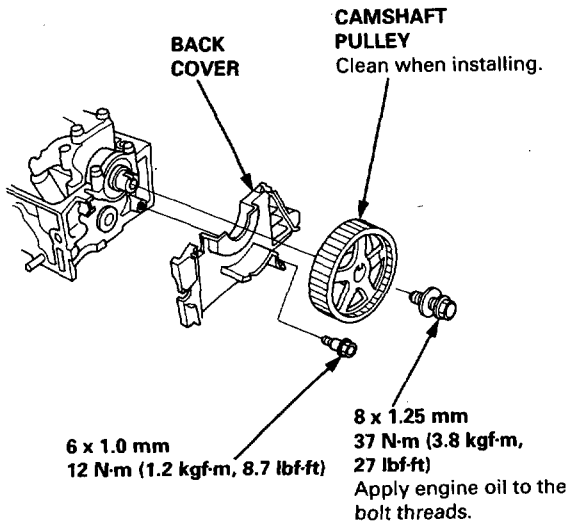


17. Remove the cylinder head cover.



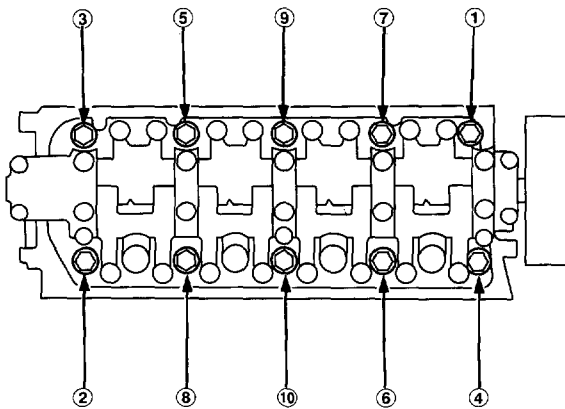


18. Remove the timing belt (see page 6-17).
19. Remove the camshaft pulley and back cover.



20. Remove the exhaust manifold (see pages 9-6, 7).
21. Remove the intake manifold (see pages 9-3, 4).
22. Remove the cylinder head bolts. To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

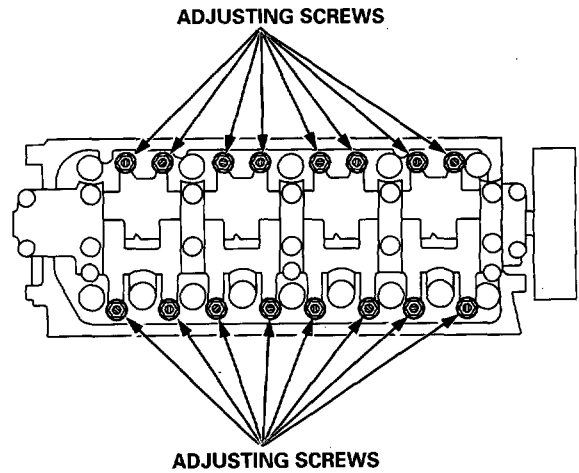
**CYLINDER HEAD BOLTS LOOSENING SEQUENCE:**



23. Remove the cylinder head.

## Removal

1. Loosen the adjusting screws.

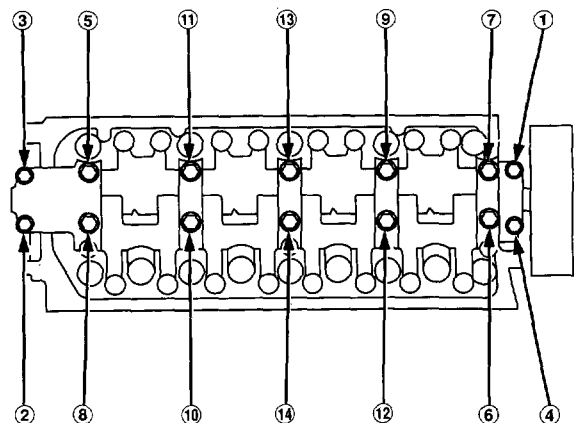


2. Unscrew the camshaft holder bolts, then remove the rocker arm assembly.

**NOTE:**

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

**CAMSHAFT HOLDER BOLTS LOOSENING SEQUENCE:**



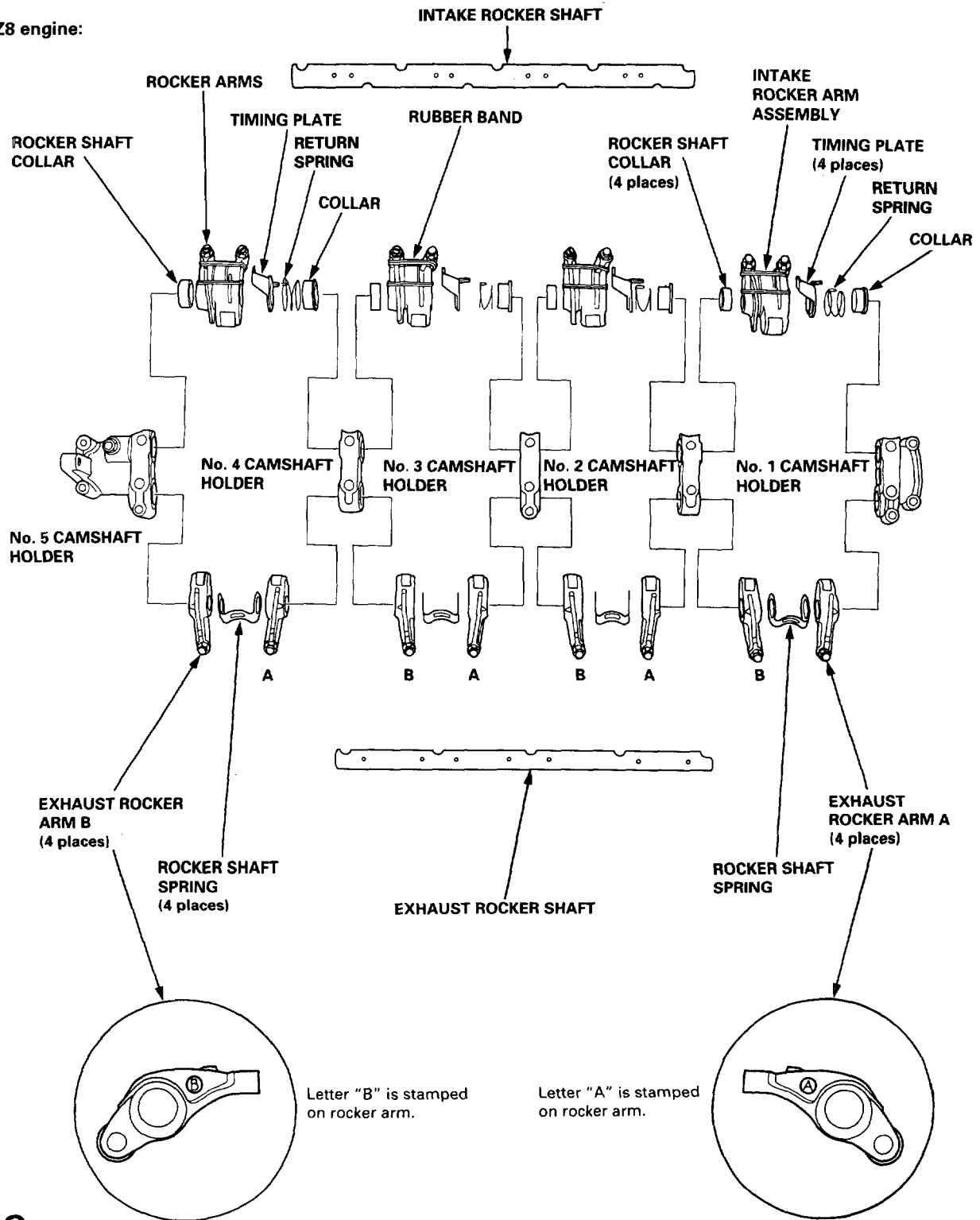
# Rocker Arms

## Disassembly/Reassembly

**NOTE:**

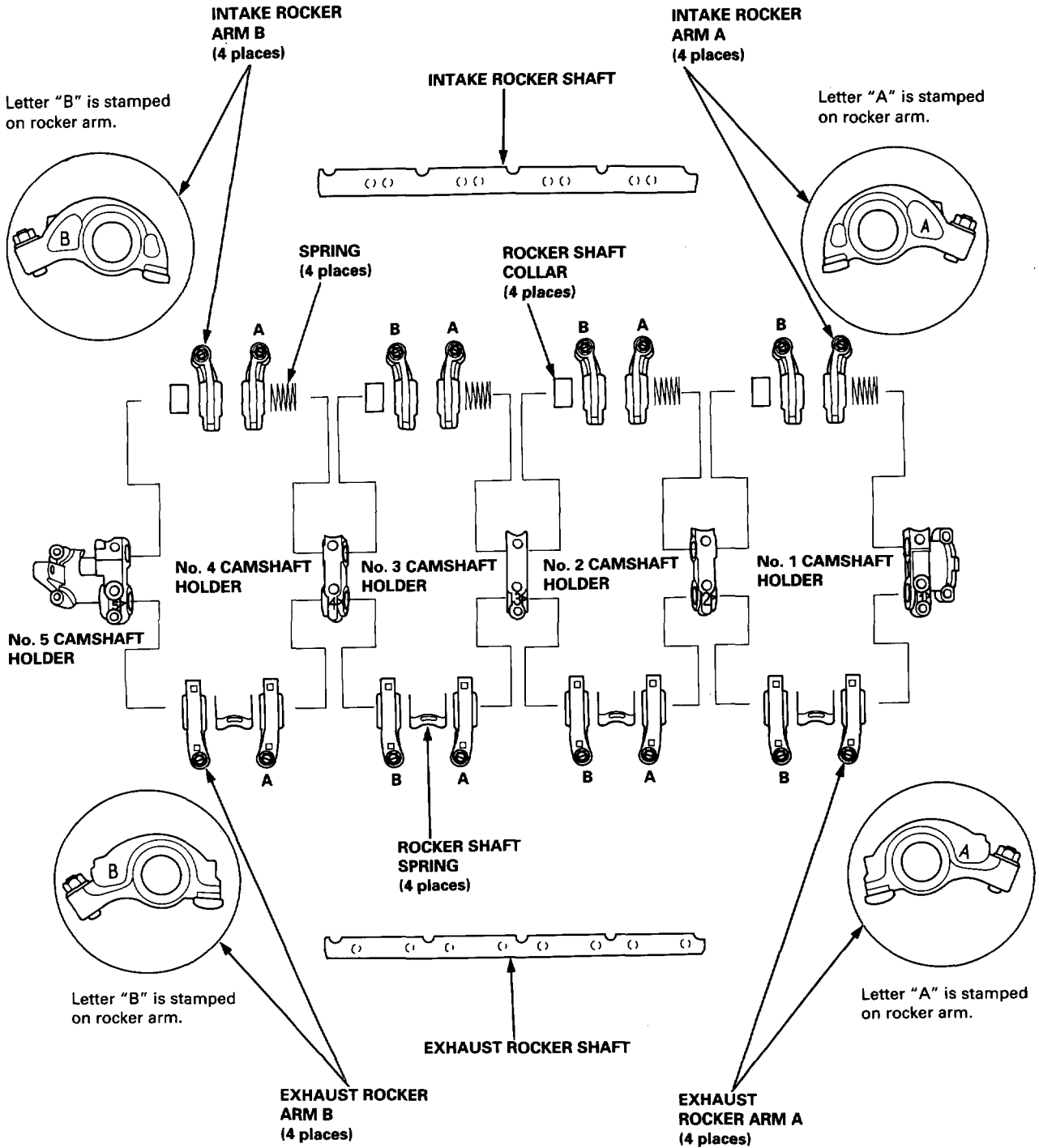
- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect rocker shafts and rocker arms (see page 6-30).
- Rocker arms must be installed in the same position if reused.
- When removing or installing rocker arm assembly, do not remove the camshaft holder bolts. The bolts will keep the holders, springs and rocker arms on the shaft.

D15Z8 engine:





Except D15Z8 engine:

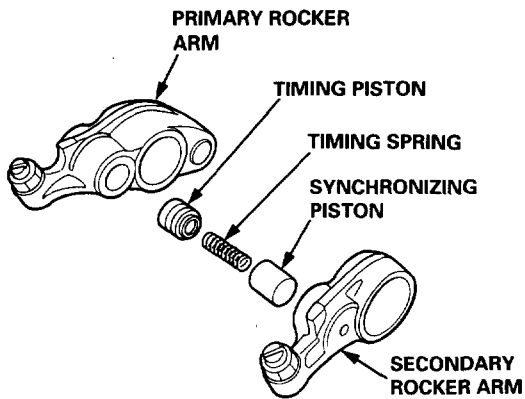


# Rocker Arms

## Inspection (D15Z8 engine)

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

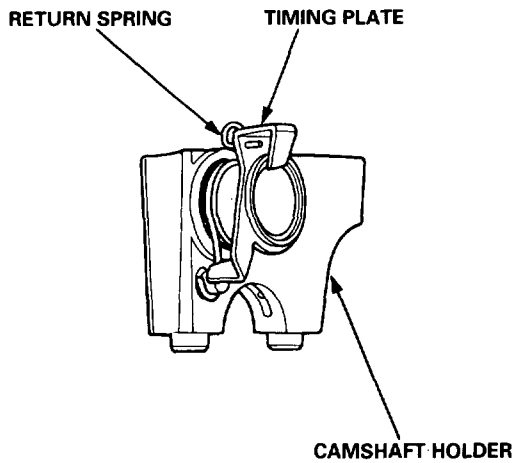
1. Inspect the rocker arm piston. Push it manually.  
— If it does not move smoothly, replace the rocker arm assembly.



NOTE:

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

2. Set the timing plate and return spring as shown below.

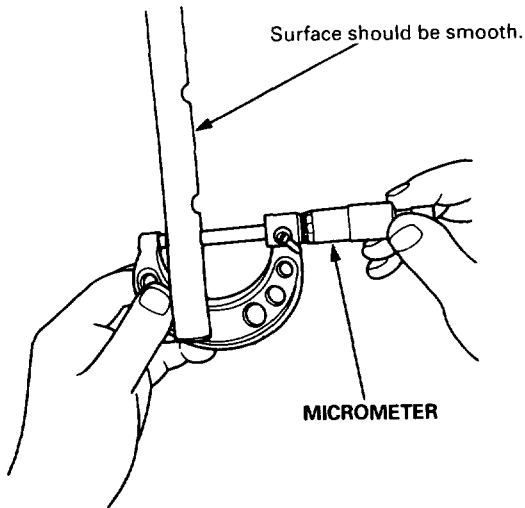




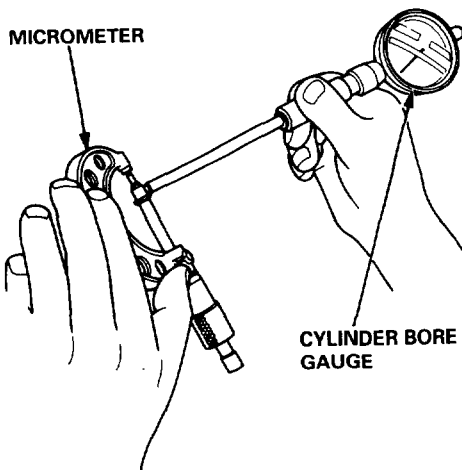
## Clearance Inspection

Measure both the intake rocker shaft and exhaust rocker shaft.

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



2. Zero the gauge to the shaft diameter.



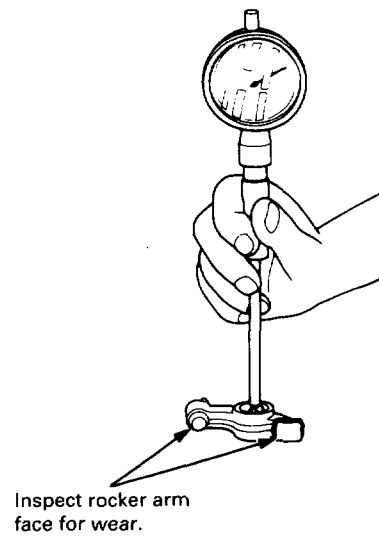
3. Measure inside diameter of rocker arm and check for out-of-round condition.

**Rocker Arm-to-Shaft Clearance:**  
**Standard (New):**

Intake: 0.017 – 0.050 mm  
(0.0007 – 0.0020 in)

Exhaust: 0.018 – 0.054 mm  
(0.0007 – 0.0021 in)

**Service Limit: 0.08 mm (0.003 in)**



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

# Camshaft

## Inspection

### NOTE:

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

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

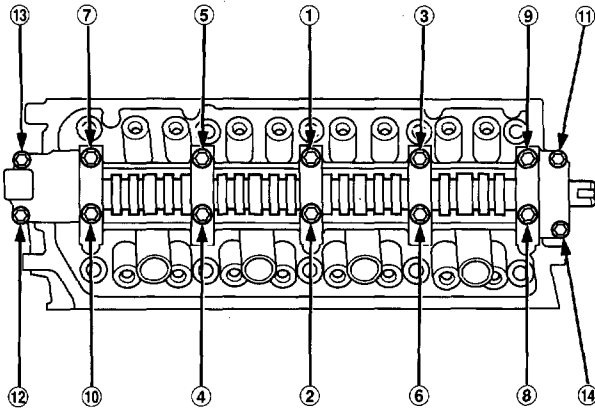
### Specified torque:

8 mm bolts: 20 N·m (2.0 kgf·m 14 lbf·ft)

Apply engine oil to the threads.

6 mm bolts: 12 N·m (1.2 kgf·m 8.7 lbf·ft)

6 mm bolts: ⑪, ⑫, ⑬, ⑭

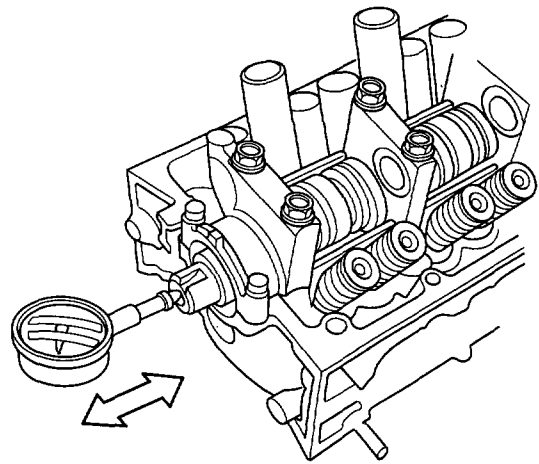


2. Seat the camshaft by pushing it toward the rear of the cylinder head.
3. Zero the dial indicator against the end of the camshaft. Push the camshaft back and forth, and read the end play.

### Camshaft End Play:

Standard (New): 0.05 – 0.15 mm  
(0.002 – 0.006 in)

Service Limit: 0.5 mm (0.02 in)



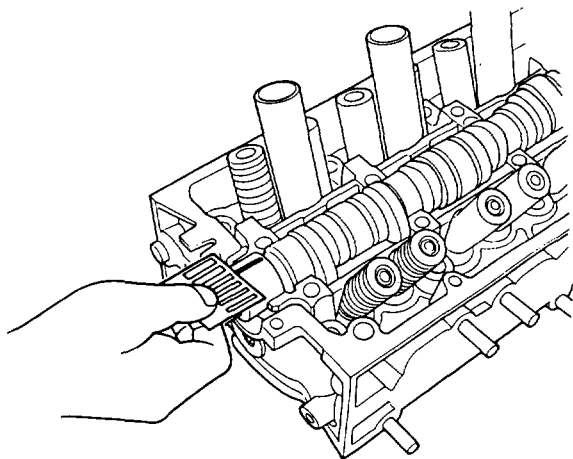
4. Remove the bolts, then remove the camshaft holders from the cylinder head.
  - Lift camshaft out of cylinder head, wipe clean, then inspect lift ramps. Replace camshaft if lobes are pitted, scored, or excessively worn.
  - Clean the camshaft bearing surfaces in the cylinder head, then set camshaft back in place.
  - Insert plastigage strip across each journal.
5. Install the camshaft holders and tighten the bolts to the specified torque.





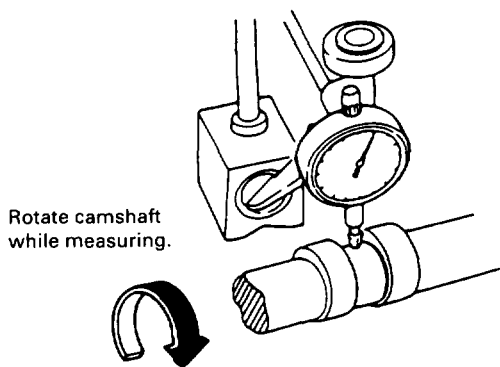
6. Remove the camshaft holders, then measure the widest portion of the plastigage on each journal.

**Camshaft-to-Holder Oil Clearance:**  
**Standard (New): 0.050 – 0.089 mm**  
 (0.002 – 0.004 in)  
**Service Limit : 0.15 mm (0.006 in)**



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

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



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

8. Check the cam lobe height wear.

Cam lobe height standard (New)

Unit mm (in)

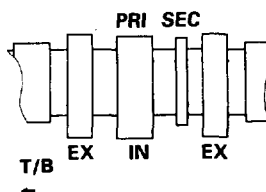
		INTAKE	EXHAUST
D15Z8 engine	PRI	38.427 (1.5129)	38.784 (1.5269)
	SEC	32.292 (1.2713)	
D16B2 engine		A: 35.019 (1.3787) B: 34.734 (1.3675)	37.904 (1.4923)
D14A7, D14A8 engines		A, B: 34.274 (1.3494)	36.594 (1.441)

PRI: Primary SEC: Secondary

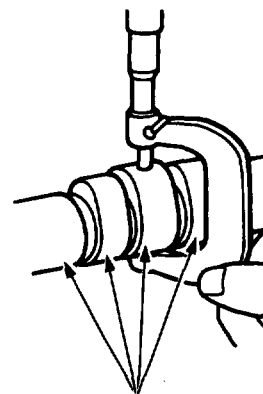
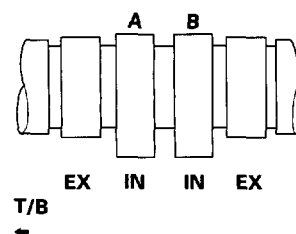
T/B: Timing belt

IN: Intake, EX: Exhaust

**D15Z8 engine:**



**Except D15Z8 engine:**



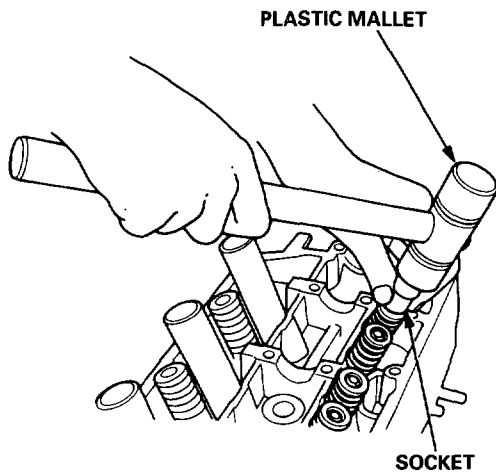
Check this area for wear.

# Valves, Valve Springs and Valve Seals

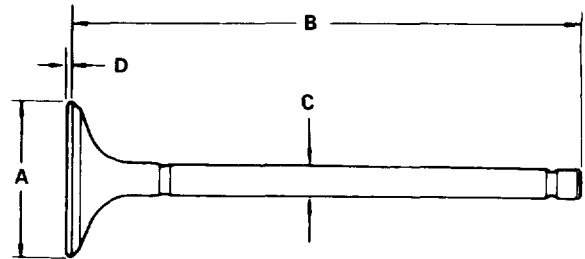
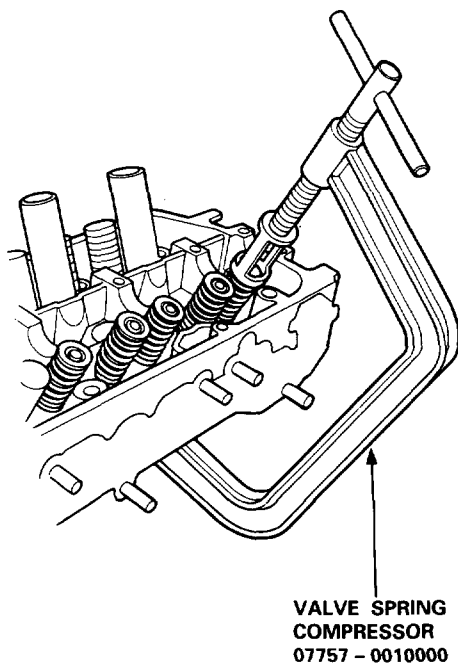
## Removal

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

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



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



D15Z8 engine:

### Intake Valve Dimensions

- A Standard (New): 29.85 – 30.15 mm (1.175 – 1.187 in)
- B Standard (New): 117.42 – 117.72 mm (4.623 – 4.635 in)
- C Standard (New): 5.48 – 5.49 mm (0.2157 – 0.2161 in)
- C Service Limit: 5.45 mm (0.2146 in)
- D Standard (New): 0.85 – 1.15 mm (0.033 – 0.045 in)
- D Service Limit: 0.65 mm (0.026 in)

### Exhaust Valve Dimensions

- A Standard (New): 25.85 – 26.15 mm (1.018 – 1.030 in)
- B Standard (New): 114.60 – 114.90 mm (4.512 – 4.524 in)
- C Standard (New): 5.45 – 5.46 mm (0.2146 – 0.2150 in)
- C Service Limit: 5.42 mm (0.2134 in)
- D Standard (New): 1.05 – 1.35 mm (0.041 – 0.053 in)
- D Service Limit: 0.95 mm (0.037 in)



## Valve Movement

D14A7, D14A8, D16B2 engines:

### Intake Valve Dimensions

- A Standard (New): 29.9 – 30.1 mm  
(1.18 – 1.19 in)
- B Standard (New): 117.42 – 117.72 mm  
(4.623 – 4.635 in)
- C Standard (New): 5.48 – 5.49 mm  
(0.2157 – 0.2161 in)
- C Service Limit: 5.45 mm (0.2146 in)
- D Standard (New): 0.75 – 1.25 mm  
(0.030 – 0.049 in)
- D Service Limit: 0.55 mm (0.022 in)

### Exhaust Valve Dimensions

- A Standard (New): 25.9 – 26.1 mm  
(1.02 – 1.03 in)
- B Standard (New): 114.60 – 114.90 mm  
(4.512 – 4.524 in)
- C Standard (New): 5.45 – 5.46 mm  
(0.2146 – 0.2150 in)
- C Service Limit: 5.42 mm (0.2134 in)
- D Standard (New): 0.95 – 1.45 mm  
(0.037 – 0.057 in)
- D Service Limit: 0.85 mm (0.033 in)

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

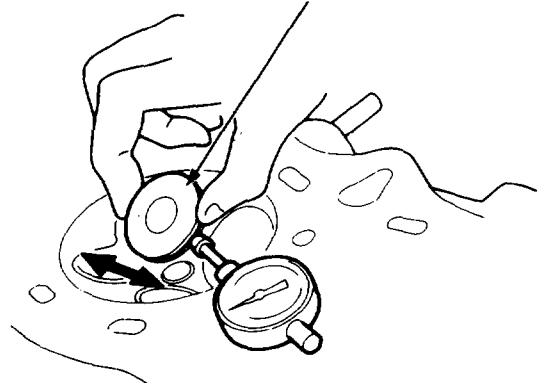
### Intake Valve Stem-to-Guide Clearance:

- Standard (New): 0.04 – 0.10 mm  
(0.002 – 0.004 in)
- Service Limit: 0.16 mm (0.006 in)

### Exhaust Valve Stem-to-Guide Clearance:

- Standard (New): 0.10 – 0.16 mm  
(0.004 – 0.006 in)
- Service Limit: 0.22 mm (0.009 in)

Valve extended 10 mm out from seat.



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

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

### Intake Valve Stem-to-Guide Clearance:

- Standard (New): 0.02 – 0.05 mm  
(0.001 – 0.002 in)
- Service Limit: 0.08 mm (0.003 in)

### Exhaust Valve Stem-to-Guide Clearance:

- Standard (New): 0.05 – 0.08 mm  
(0.002 – 0.003 in)
- Service Limit: 0.11 mm (0.004 in)

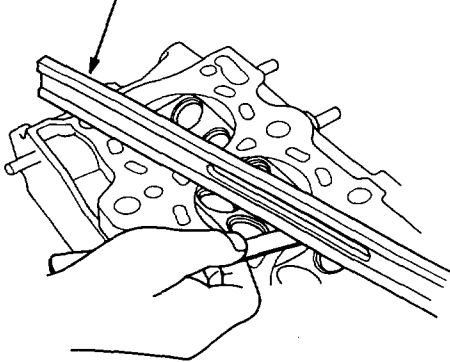
## Warpage

NOTE: If the camshaft-to-holder oil clearances (see page 6-32) are not within specification, the cylinder head cannot be resurfaced.

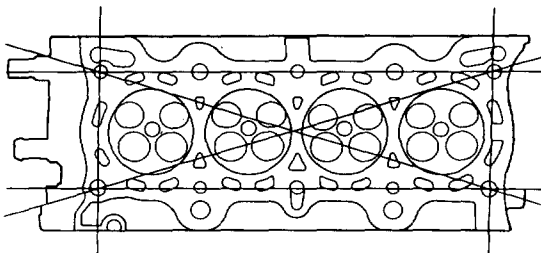
If the camshaft-to-holder oil clearances are within specifications, check the cylinder head for warpage.

- If warpage is less than 0.05 mm (0.002 in) cylinder head resurfacing is not required.
- If warpage is between 0.05 mm (0.002 in) and 0.2 mm (0.008 in), resurface cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in) based on a height of 93 mm (3.66 in).

PRECISION STRAIGHT EDGE



Measure along edges, and three ways across center.



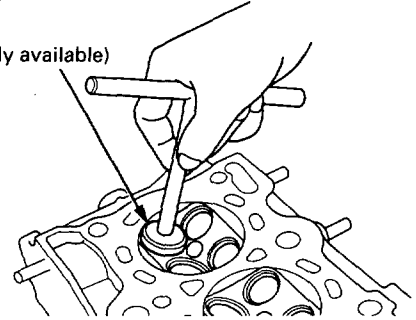
**Cylinder Head Height:**  
**Standard (New):** 92.95 – 93.05 mm  
 (3.659 – 3.663 in)

## Reconditioning

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

NOTE: If the guides are worn (see page 6-35), replace them (see page 6-38) before cutting the valve seats.

**VALVE SEAT CUTTER**  
 (Commercially available)



2. Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.
3. Bevel the upper edge of the seat with the 30° cutter and the lower edge of the seat with the 60° cutter. Check the width of seat and adjust accordingly.
4. Make one more very light pass with the 45° cutter to remove any possible burrs caused by the other cutters.

**Valve Seat Width:**

**Standard (New):**

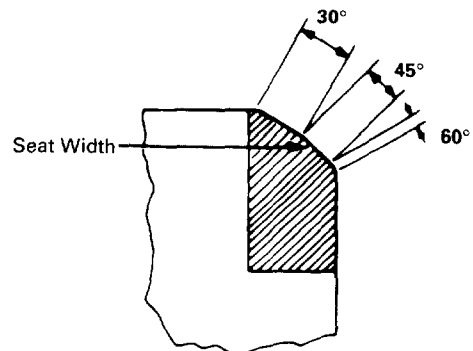
**Intake:** 0.85 – 1.15 mm (0.033 – 0.045 in)

**Exhaust:** 1.25 – 1.55 mm (0.049 – 0.061 in)

**Service Limit:**

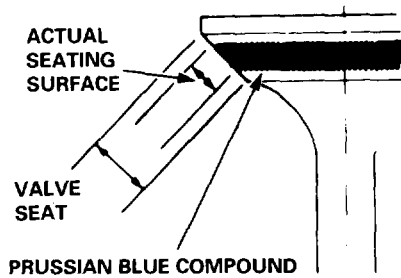
**Intake:** 1.6 mm (0.063 in)

**Exhaust:** 2.0 mm (0.079 in)





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



6. The actual valve seating surface, as shown by the blue compound, should be centered on the seat.
  - If it is too high (closer to the valve stem), you must make a second cut with the 60° cutter to move it down, then one more cut with the 45° cutter to restore seat width.
  - If it is too low (closer to the valve edge), you must make a second cut with the 30° cutter to move it up, then one more cut with the 45° cutter to restore seat width.

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

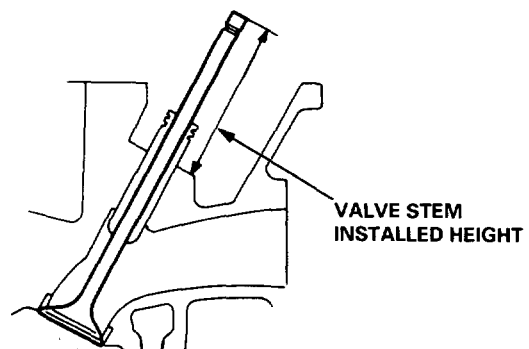
7. Insert the intake and exhaust valves in the head and measure the valve stem installed height.

**Intake, Exhaust Stem Installed Height:**

**Standard (New): 53.17 – 53.64 mm  
(2.093 – 2.112 in)**

**Service Limit: 53.89 mm (2.122 in)**

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



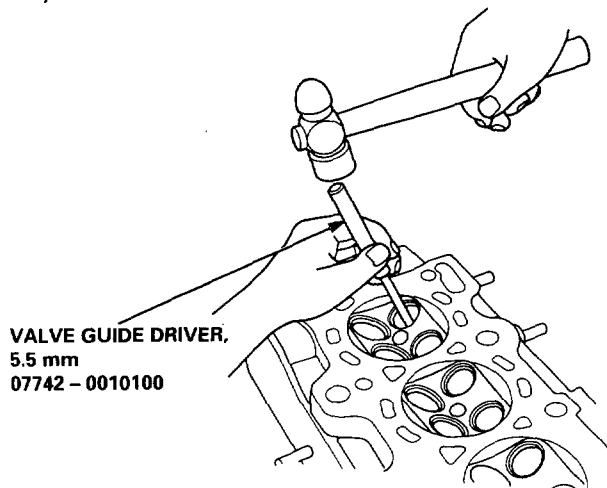
# Valve Guides

## Replacement

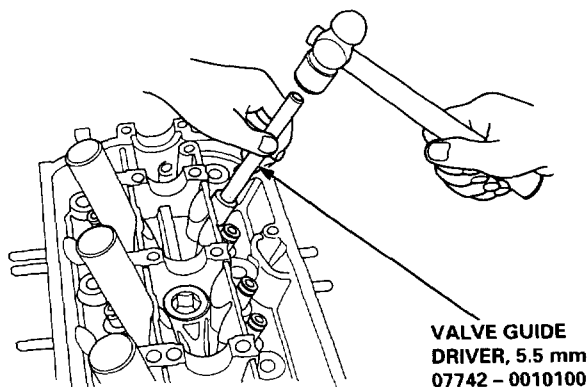
**NOTE:**

- For best results, heat cylinder head to 150°C (300°F) before removing or installing guides.
- It may be necessary to use an air hammer to remove some valve guides.

1. Drive the valve guide out from the bottom of the cylinder head.



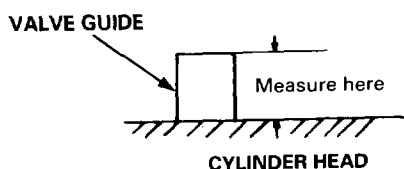
2. Drive in a new valve guide to the specified depth.



**Valve Guide Installed Height:**

**Intake: 17.85 - 18.35 mm (0.703 - 0.722 in)**

**Exhaust: 18.65 - 19.15 mm (0.734 - 0.754 in)**

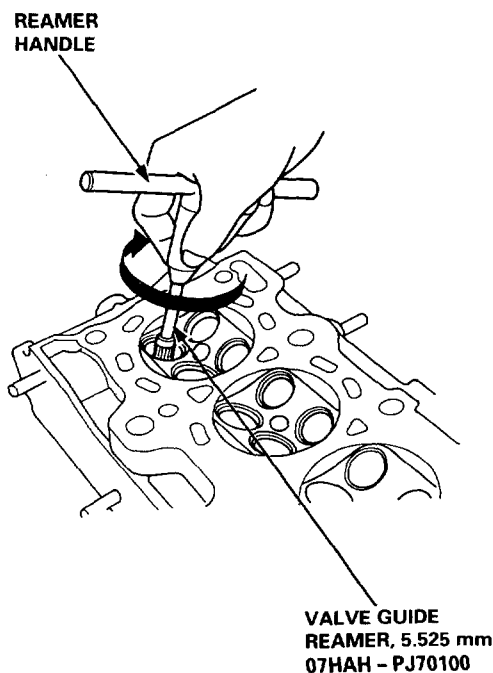


## Reaming

**NOTE:** For new valve guides only.

1. Coat both the reamer and valve guide with cutting oil.
2. Rotate the reamer clockwise the full length of the valve guide bore.
3. Continue to rotate the reamer clockwise while removing it from the bore.
4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
5. Check the clearance with a valve (see page 6-35).  
— Verify that the valve slides in the valve guide without exerting pressure.

Turn reamer in clockwise direction only.



# Valves, Valve Springs and Valve Seals



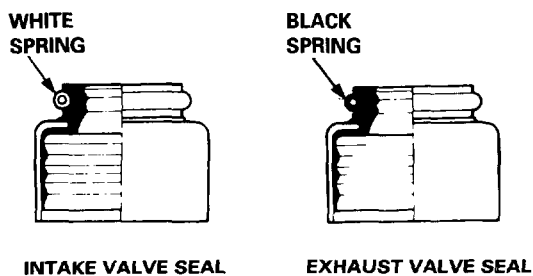
## Installation

1. Insert the valves into the valve guides, coat the valve stems with engine oil before inserting the valves.

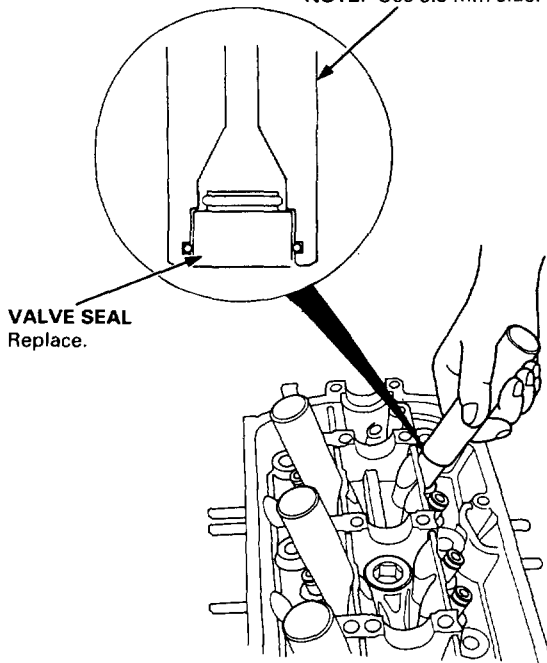
NOTE: Check the valves move up and down smoothly.

2. Install the spring seats on the cylinder head.
3. Install the valve seals using the special tool.

NOTE: Exhaust and intake valve seal are not interchangeable.

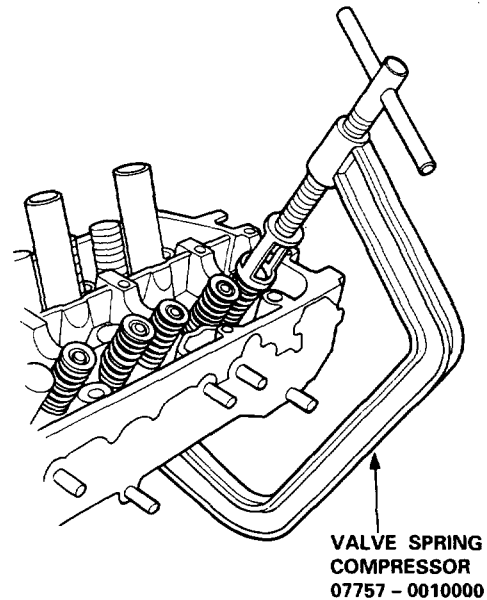


STEM SEAL DRIVER,  
07PAD - 0010000  
NOTE: Use 5.5 mm side.



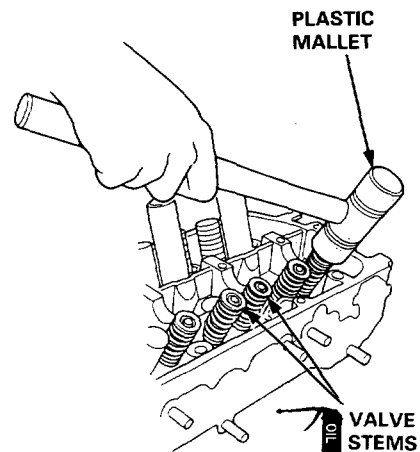
4. Install the valve spring and valve retainer, then install the valve spring compressor. Compress the spring, and install the valve keepers.

NOTE: Place the end of valve spring with closely wound coils toward the cylinder head.



5. Lightly tap the end of each valve stem two or three times with a plastic mallet to ensure proper seating of valve and valve keepers.

NOTE: Tap the valve stem only along its so you do not bend the stem.



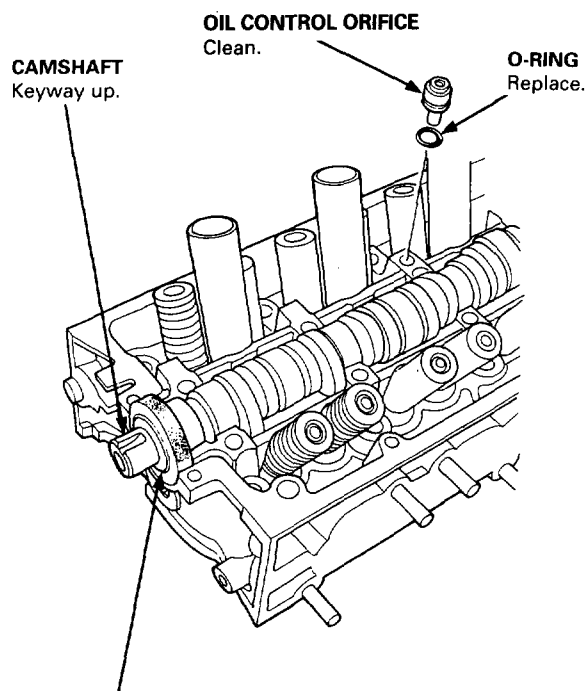
# Camshaft/Rocker Arms and Camshaft Seal/Pulley

## Installation

**NOTE:**

- Make sure that all rockers are in alignment with valves when torquing rocker assembly bolts.
- Valve locknuts should be loosened and adjusting screws backed off before installation.
- To prevent rocker arm assembly from coming apart, leave camshaft holder bolts in the holes.

1. After wiping down the camshaft, camshaft seal and journals in the cylinder head, lubricate both surfaces and install the camshaft.
2. Clean and install the oil control orifice with new O-ring.



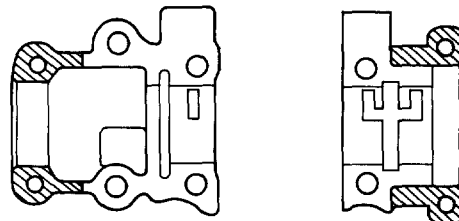
**CAMSHAFT SEAL**  
Seal housing surface should be dry. Apply a light coat of oil to camshaft and inner lip of seal.

3. Turn the camshaft until its keyway is facing up (No. 1 piston TDC).

4. Apply liquid gasket (P/N 08C70 – X0134SEB, 08C70 – X0231SEB, 08C70 – K0234MEB or 08C70 – K0334MEB) to the head mating surfaces of the No. 1 and No. 5 camshaft holders.

**NOTE:** Clean and dry the cylinder head mating surfaces before applying liquid gasket.

— Apply liquid gasket to the shaded areas.



No. 5

No. 1

5. Set the rocker arm assembly in place and loosely install the bolts.

— Make sure that the rocker arms are properly positioned on the valve stems.

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

**NOTE:** Wipe off the excess of liquid gasket from No. 1 and No. 5 camshaft holders with a shop towel.

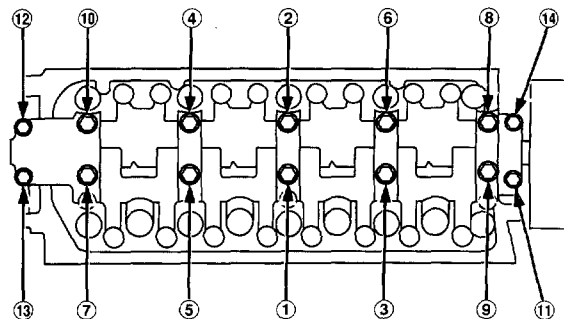
**Specified torque:**

8 mm bolts: 20 N·m (2.0 kgf·m, 14 lbf·ft)

Apply engine oil to the threads.

6 mm bolts: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)

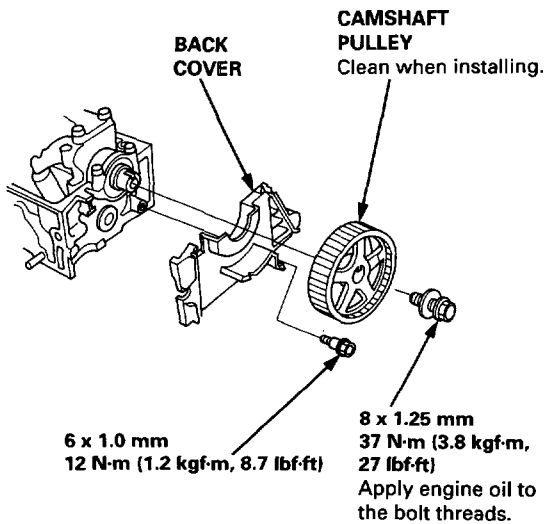
6 mm bolts: ⑪, ⑫, ⑬, ⑭







7. Install the back cover, then install the camshaft pulley.



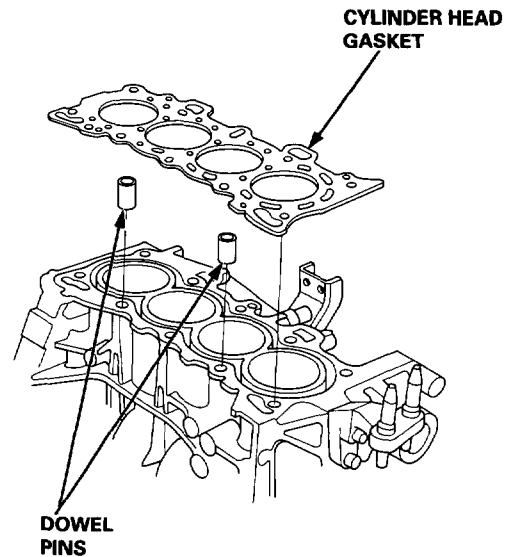
## Installation

Install the cylinder head in the reverse order of removal:

### NOTE:

- Always use a new head gasket.
- Cylinder head and cylinder block surface must be clean.
- "UP" mark on camshaft pulley should be at the top.
- Turn the crankshaft so the No. 1 piston is at TDC (see page 6-18).
- Clean the oil control orifice before installing.
- Do not use the upper cover and lower cover for storing items disassembled.
- Clean the upper cover and lower cover before installation.

1. Cylinder head dowel pins must be aligned.



(cont'd)

# Cylinder Head

## Installation (cont'd)

- Position the camshaft correctly (see page 6-18).
- Tighten the cylinder head bolts sequentially in four steps.

1st step: ① - ⑩ 20 N·m (2.0 kgf·m, 14 lbf·ft)

2nd step: ① - ⑩ 49 N·m (5.0 kgf·m, 36 lbf·ft)

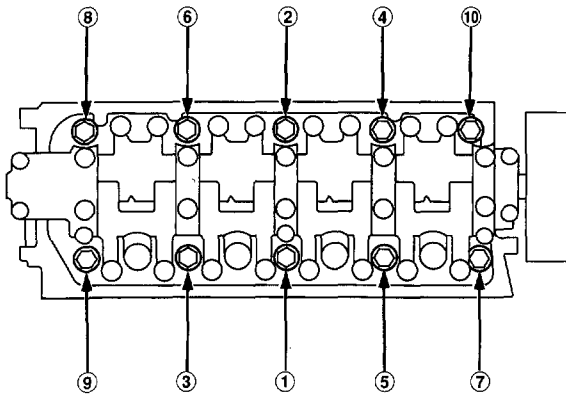
3rd step: ① - ⑩ 67 N·m (6.8 kgf·m, 49 lbf·ft)

4th step: ①, ② 67 N·m (6.8 kgf·m, 49 lbf·ft)

### NOTE:

- We recommend using a beam-type torque wrench. When using a preset-type torque wrench, be sure to tighten slowly and not to overtighten.
- If a bolt makes any noise while you are torquing it, loosen the bolt, and retighten it from the 1st step.

### CYLINDER HEAD BOLTS TORQUE SEQUENCE:

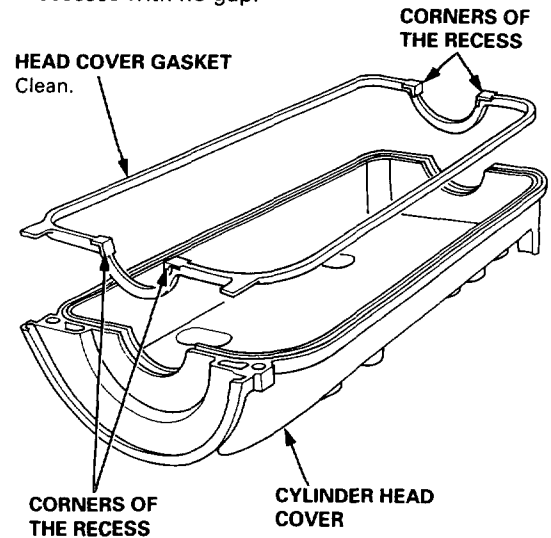


- Install the intake manifold and tighten the nuts in a crisscross pattern in two or three steps, beginning with the inner nuts (see pages 9-3, 4).
  - Always use a new intake manifold gasket.
- Install the exhaust manifold and tighten the nuts in a crisscross pattern in two or three steps, beginning with the inner nut (see pages 9-6, 7).
  - Always use a new exhaust manifold gasket.
- Install the exhaust manifold bracket, then install the exhaust pipe A and the bracket, and then install the cover.

- Install the timing belt (see page 6-18).
- Adjust the valve clearance (see page 6-10).
- Install the head cover gasket in the groove of the cylinder head cover. Seat the recesses for the camshaft first, then work it into the groove around the outside edges.

### NOTE:

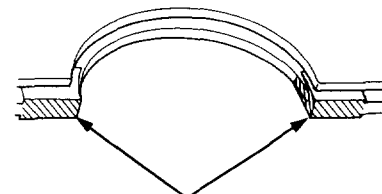
- Before installing the head cover gasket, thoroughly clean the seal and the groove.
- When installing, make sure the head cover gasket is seated securely in the corners of the recesses with no gap.



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

### NOTE:

- Use liquid gasket, Part No. 08C70 - X0134SEB, 08C70 - X0231SEB, 08C70 - K0234MEB or 08C70 - K0334MEB.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Do not install the parts if five minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.



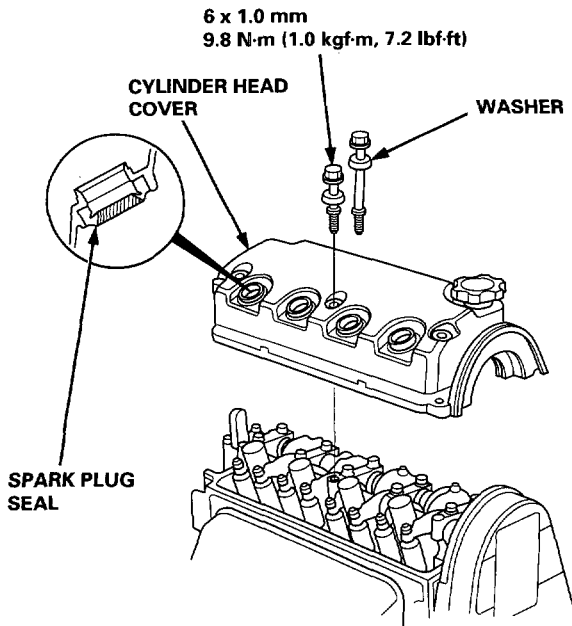
Apply liquid gasket to the shaded areas.



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

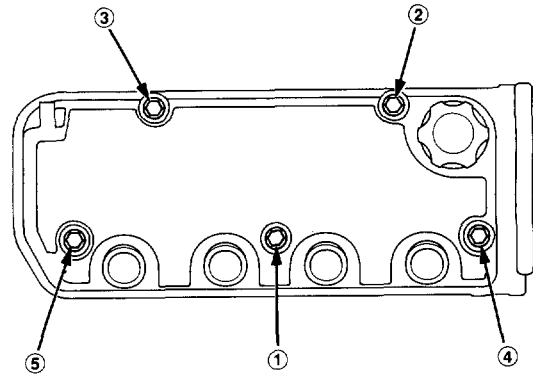
**NOTE:**

- Before installing the cylinder head cover, clean the cylinder head contacting surfaces with a shop towel.
- Do not touch the parts where liquid gasket was applied.
- Take care not to damage the spark plug seal when installing the cylinder head cover.
- Visually check the spark plug seal for damage.
- Replace the washer when damaged or deteriorated.



12. Tighten the nuts in two or three steps. In the final step, tighten all bolts, in sequence, to 9.8 N·m (1.0 kgf·m, 7.2 lbf·ft).

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



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

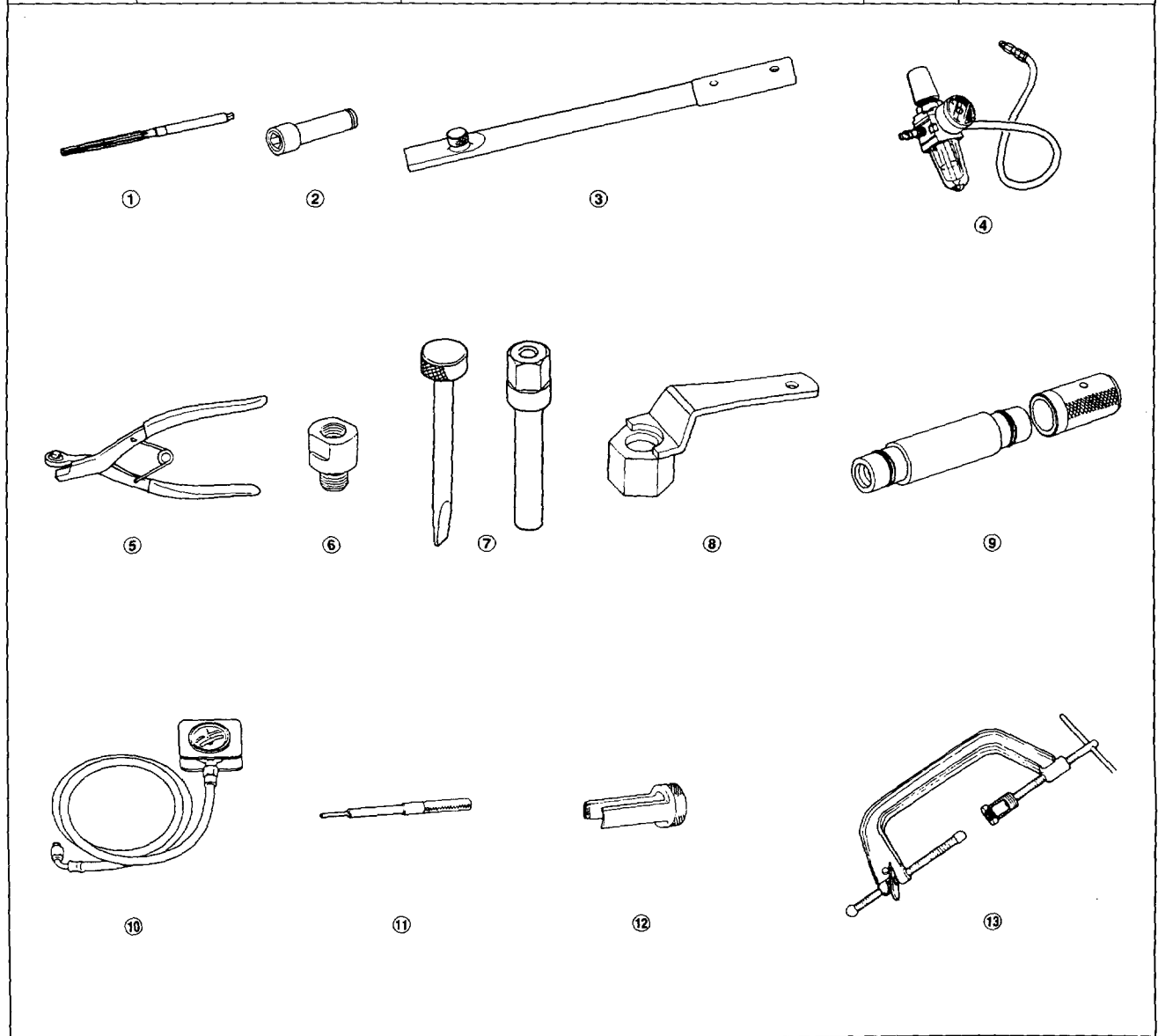
# Cylinder Head/Valve Train B18C4 engine

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# Special Tools

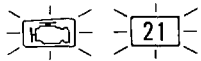
Ref. No.	Tool Number	Description	Qty	Remark
①	07HAH - PJ70100	Valve Guide Reamer, 5.525 mm	1	
②	07JAA - 0010200	Socket Wrench, 19 mm	1	
③	07JAB - 0010200	Handle	1	
④	07LAJ - PR30101	Valve Inspection Set	1	
⑤	07LAJ - PR30201	Air Stopper	1	
⑥	07LAK - PR30100	Oil Pressure Gauge Attachment	1	
⑦	07MAA - PR70100	Tappet Adjuster Wrench Set	1	
⑧	07MAB - PY30100	Pulley Holder Attachment, HEX 50 mm	1	
⑨	07PAD - 0010000	Stem Seal Driver	1	
⑩	07406 - 0070001	Low Pressure Gauge	1	
⑪	07742 - 0010100	Valve Guide Driver, 5.5 mm	1	
⑫	07757 - PJ10100	Valve Spring Compressor Attachment	1	
⑬	07757 - 0010000	Valve Spring Compressor	1	



# Variable Valve Timing and Valve Lift Electronic Control (VTEC) Solenoid Valve



## Troubleshooting Flowchart



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 21: A problem in the VTEC Solenoid Valve circuit.

Refer to page 11-B-14 through 11-B-22 before troubleshooting.

— The MIL has been reported on.  
— With the SCS short connector connected, code 21 is indicated.

**Check the VTEC Control System:**

1. Do the engine control module (ECM) Reset Procedure (see section 11).
2. Start the engine.
3. Warm up engine to normal operating temperature (cooling fan comes on).
4. Do the Road Test.\*

\* Road Test:  
Accelerate in 1st gear to an engine speed over 6,000 rpm (min<sup>-1</sup>). Hold that engine speed for at least two seconds. If the MIL does not come on during the first road test, repeat this test two more times.

Is MIL on and does it indicate code 21?

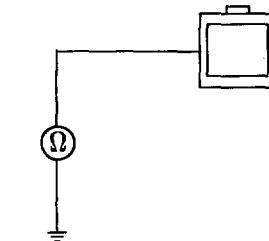
NO  
**Intermittent failure, system is OK at this time. Check for poor connections or loose wires at VTEC solenoid valve and ECM.**

YES

**Test the VTEC Solenoid Valve:**

1. Turn the ignition switch OFF.
2. Disconnect the VTEC solenoid valve connector.
3. Check for continuity between VTEC solenoid valve connector terminal and body ground.

VTEC SOLENOID VALVE CONNECTOR



Terminal side of male terminal

Is there 14 – 30 Ω?

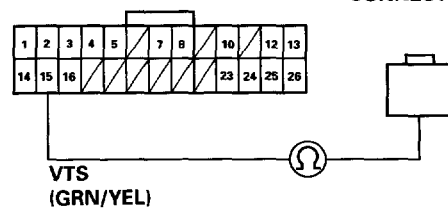
NO  
**Replace the VTEC solenoid valve.**

YES

**Test the VTEC Solenoid Valve Wire:**  
Check for continuity between VTEC solenoid valve connector terminal and A15 terminal on the ECM connector.

ECM CONNECTOR A (26 P)

VTEC SOLENOID VALVE CONNECTOR



VTS (GRN/YEL)

Wire side of female terminals

Is there continuity?

NO  
**Repair open in the GRN/YEL wire between the ECM (A15) and VTEC solenoid valve connector.**

YES

(To page 6-48)

(cont'd)

# VTEC Solenoid Valve

## Troubleshooting Flowchart

(From page 6-47)

**Test the VTEC Solenoid Valve Wire:**  
Check for continuity between VTEC solenoid valve connector terminal and body ground.

Is there continuity?

YES

Repair short in the GRN/YEL wire between the ECM (A15) and VTEC solenoid valve connector.

NO

**Test the VTEC Solenoid Valve:**

1. Connect the VTEC solenoid valve connector.
2. Remove the 10 mm bolt, and install the special tools as shown.
3. Connect a tachometer (see section 11).
4. Start the engine.
5. Warm up engine to normal operating temperature (cooling fan comes on).
6. Check oil pressure at engine speeds of 1,000, 3,000 and 5,000 rpm (min<sup>-1</sup>).

Is pressure below 49 kPa (0.5 kgf/cm<sup>2</sup>, 7 psi)?

NO

Inspect the VTEC solenoid valve.

YES

**Test the VTEC Solenoid Valve:**

1. Turn the ignition switch OFF.
2. Disconnect the VTEC solenoid valve connector.
3. Attach the battery positive terminal to the GRE/YEL terminal.
4. Start the engine and check oil pressure at an engine speed of 5,000 rpm (min<sup>-1</sup>).

Is pressure above 390 kPa (4.0 kgf/cm<sup>2</sup>, 57 psi)?

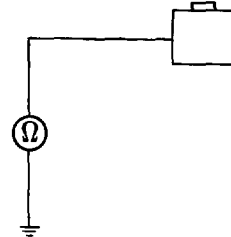
NO

Inspect the VTEC solenoid valve.

YES

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

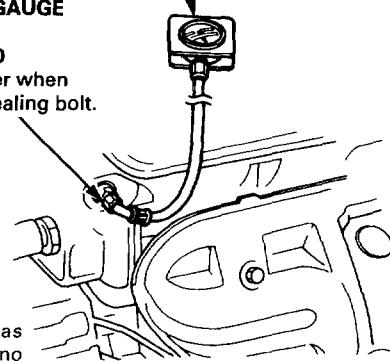
VTEC SOLENOID VALVE CONNECTOR



Wire side of female terminal

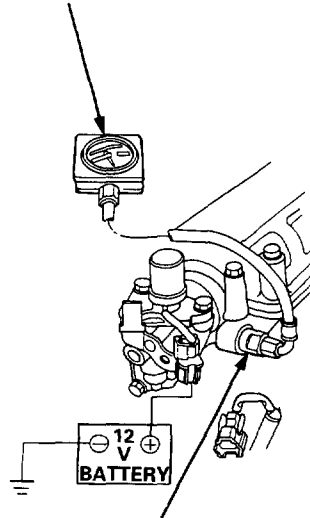
LOW PRESSURE GAUGE 07406 - 0070001

OIL PRESSURE GAUGE ATTACHMENT 07LAK - PR30100  
• Use new washer when installing the sealing bolt.



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

LOW PRESSURE GAUGE 07406 - 0070001



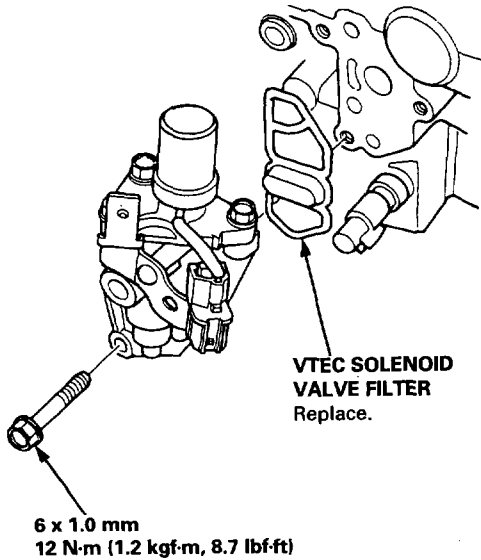
OIL PRESSURE GAUGE ATTACHMENT 07LAK - PR30100  
• Use new washer when installing the sealing bolt.



## Inspection

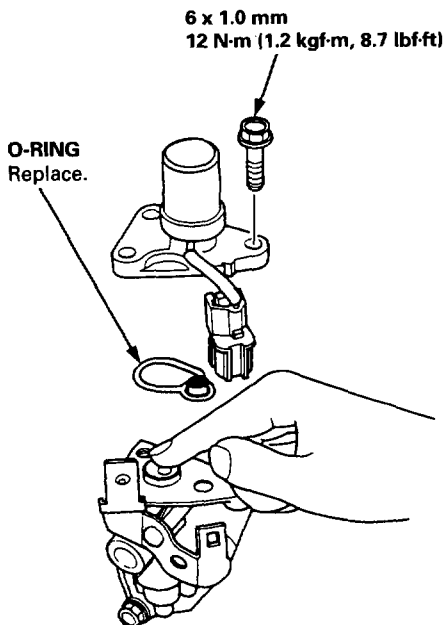
1. Remove the VTEC solenoid valve assembly from the cylinder head, and check the VTEC solenoid valve filter for clogging.

- If there is clogging, replace the engine oil filter and engine oil.



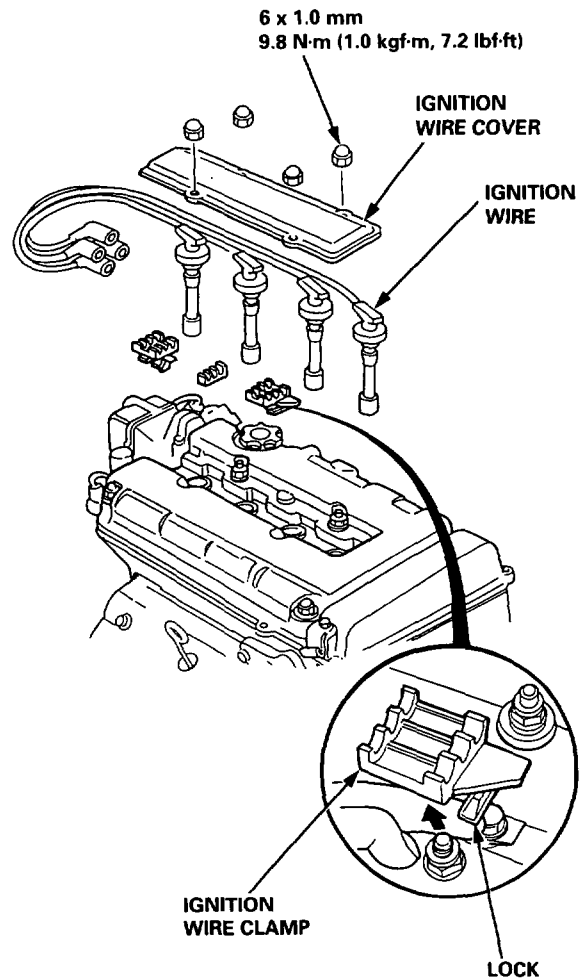
2. If the filter is not clogged, push the VTEC solenoid valve with your finger and check its movement.

- If the VTEC solenoid valve is normal, check the engine oil pressure.



## Manual Inspection

1. Set the No. 1 piston at TDC.
2. Remove the ignition wire cover and the wires.
3. Remove the ignition clamps while pulling up on the lock.



(cont'd)



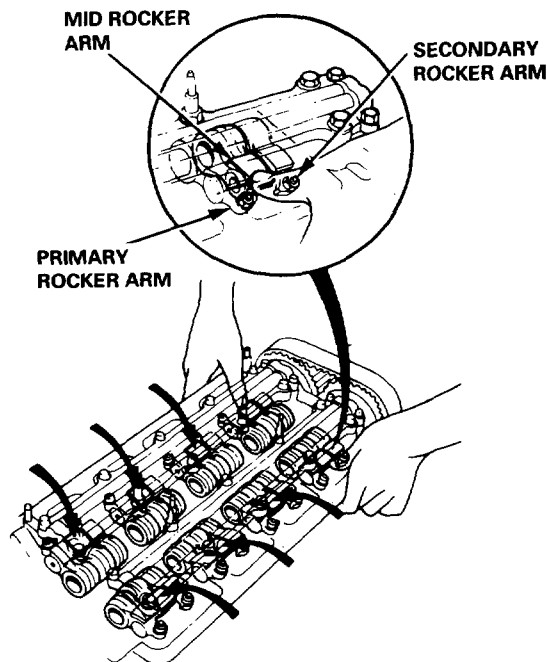
# VTEC Rocker Arms

## Manual Inspection (cont'd)

4. Remove the cylinder head cover.

NOTE: Refer to page 6-80 when installing the cylinder head cover.

5. Push the mid rocker arm on the No. 1 cylinder manually.
6. Check that the mid rocker arm moves independently of the primary and secondary rocker arms.



7. Check the mid rocker arm of each cylinder at TDC.
  - If the mid rocker arm does not move, remove the mid, primary and secondary rocker arms as an assembly and check that the pistons in the mid and primary rocker arms move smoothly.
  - If any rocker arm needs replacing, replace the primary, mid, and secondary rocker arms as an assembly.

## Inspection Using Special Tools

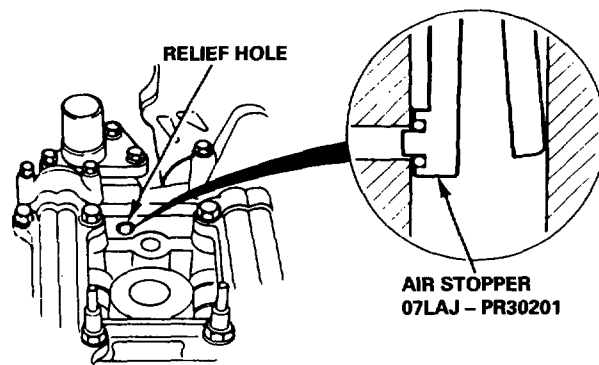
NOTE:

- Before using the valve inspection tool, make sure that the air pressure gauge on the air compressor indicates over 400 kPa (4 kgf/cm<sup>2</sup>, 57 psi)
- Inspect the valve clearance before rocker arm inspection.
- Cover the timing belt with a shop towel to prevent getting oil on the belt.
- Check the mid rocker arm of each cylinder at TDC.

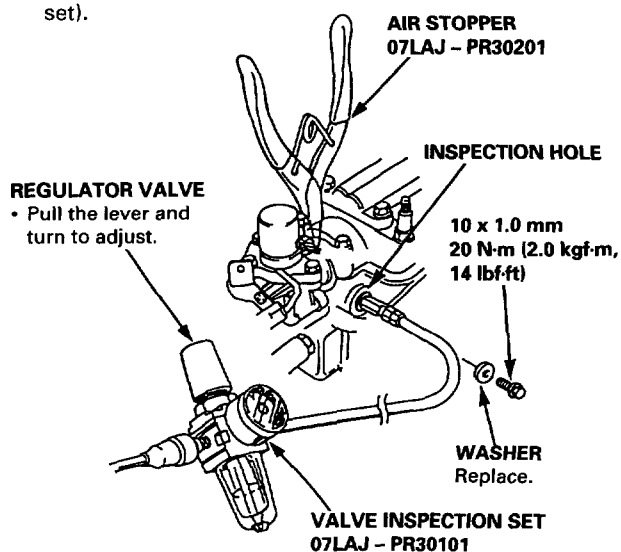
1. Remove the cylinder head cover.

NOTE: Refer to page 6-80 when installing the cylinder head cover.

2. Plug the relief hole with the special tool (Air Stopper).



3. Remove the bolt and washer from the inspection hole and connect the special tool (Valve Inspection set).





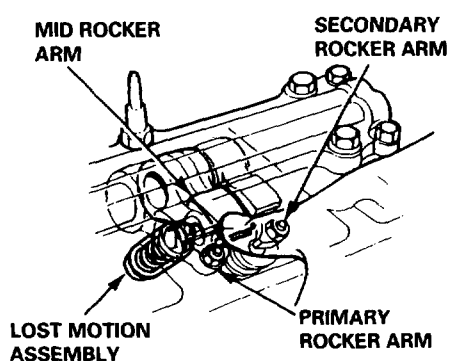
4. Apply specified air pressure to the rocker arm pistons after loosening the regulator valve on the valve inspection set.

**Specified Air Pressure:**

**250 kPa (2.5 kgf/cm<sup>2</sup>, 36 psi)**

**— 490 kPa (5.0 kgf/cm<sup>2</sup>, 71 psi)**

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



- If any mid rocker arm moves independently of the primary and secondary rocker arms, replace the rocker arms as a set.
6. Remove the tools.
  7. Check the operation of the lost motion assembly by pushing on the mid rocker arm. The lost motion assembly should compress fully and operate smoothly through its full stroke. Replace the assembly if it does not work smoothly.
  8. After inspection, check that the Malfunction Indicator Lamp (MIL) does not come on.

# Valve Clearance

## Adjustment

### NOTE:

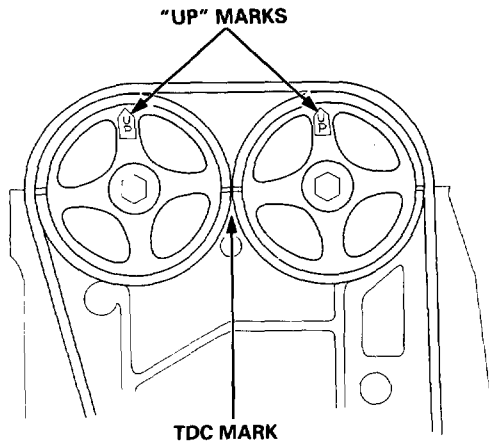
- Valves should be adjusted only when the cylinder head temperature is less than 38°C (100°F).
- After adjusting, retorque the crankshaft pulley bolt to 177 N·m (18.0 kgf·m, 130 lbf·ft)

1. Remove the cylinder head cover.

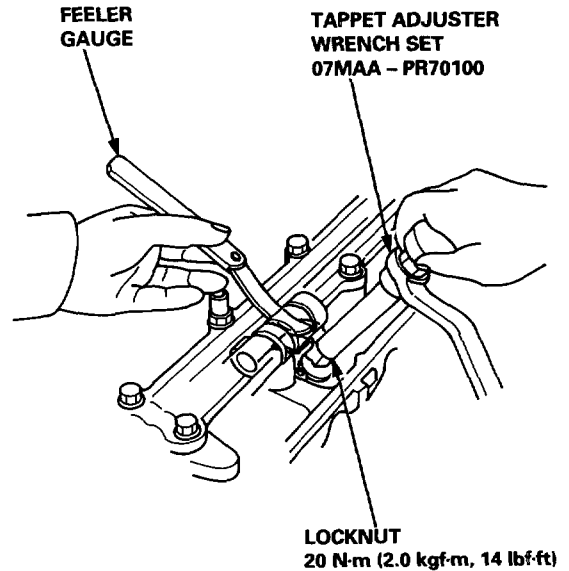
NOTE: Refer to page 6-80 when installing the cylinder head cover.

2. Set No. 1 piston at TDC. "UP" mark on the pulley should be at top, and TDC grooves on the pulley should align with the pointer on back cover. TDC grooves (white paint) on the crankshaft pulley should align with pointer on the timing belt lower cover.

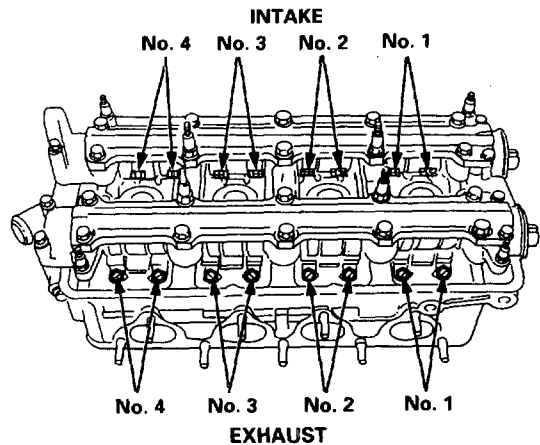
Number 1 piston at TDC:



3. Adjust valves on No. 1 cylinder.  
**Intake: 0.15 – 0.19 mm (0.006 – 0.007 in)**  
**Exhaust: 0.17 – 0.21 mm (0.007 – 0.008 in)**
4. Loosen the locknut, and turn the adjusting screw until the feeler gauge slides back and front with a slight amount of drag.

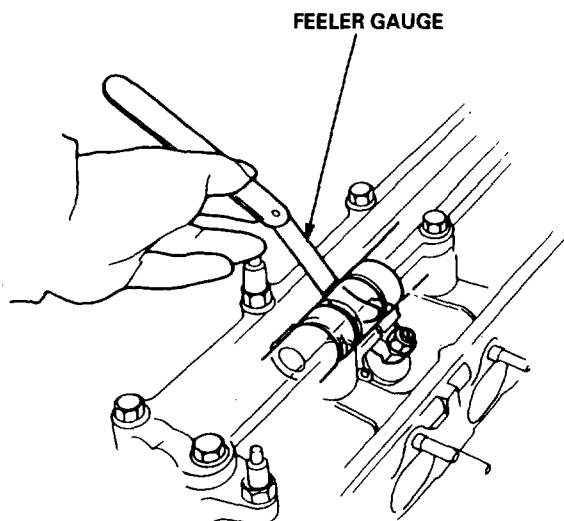


Adjusting screw location:

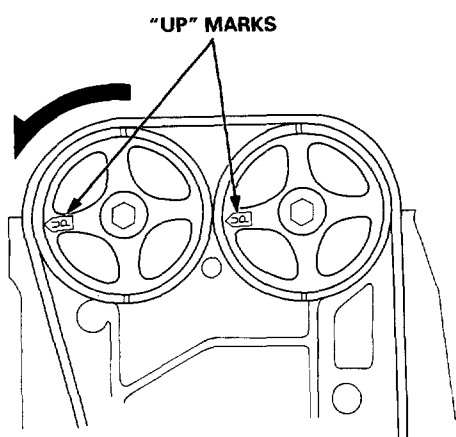




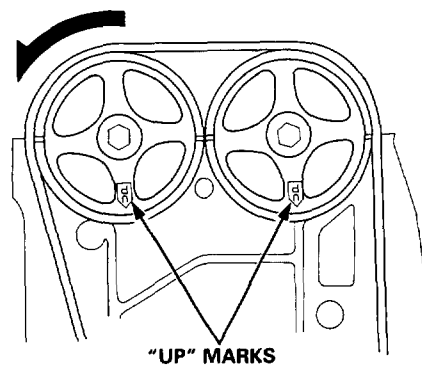
5. Tighten the locknut and recheck clearance again. Repeat adjustment if necessary.



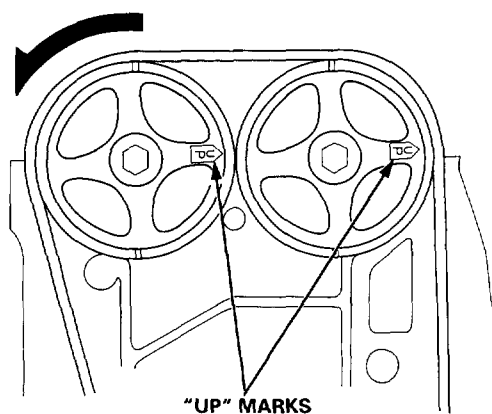
6. Rotate the crankshaft 180° counterclockwise (camshaft pulley turns 90°). The "UP" mark should be on the exhaust side. Adjust valves on No. 3 cylinder.



7. Rotate crankshaft 180° counterclockwise to bring No. 4 piston to TDC. The "UP" mark should be pointing straight down. Adjust valves on No. 4 cylinder.



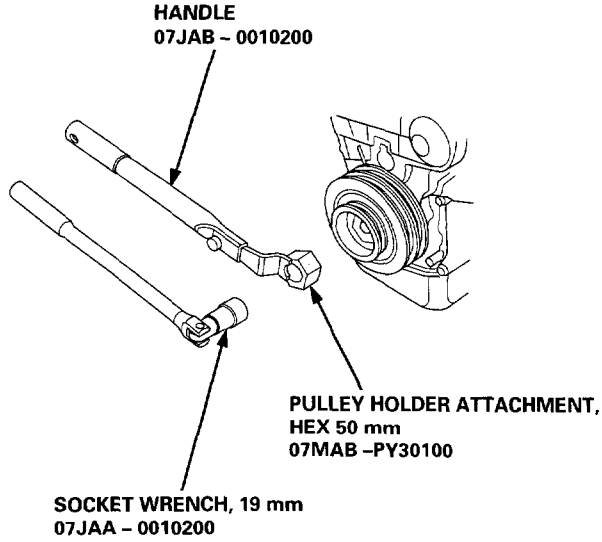
8. Rotate crankshaft 180° counterclockwise to bring No. 2 piston to TDC. The "UP" marks should be on the intake side. Adjust valves on No. 2 cylinder.



# Crankshaft Pulley and Pulley Bolt

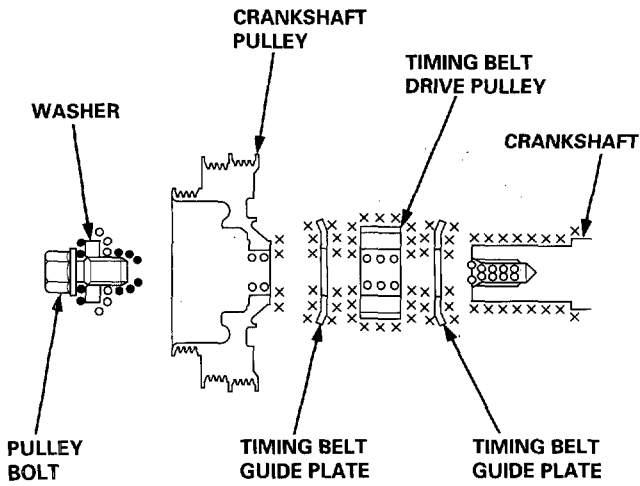
## Replacement

1. Hold the pulley with handle and pulley holder attachment, then remove the pulley bolt.



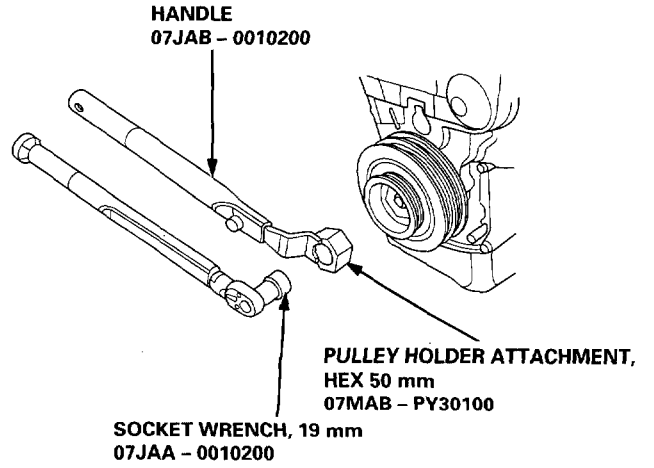
2. Remove any oil from the pulleys, crankshaft, bolt and washer. Clean and lubricate as shown below.

- : Clean
- ×: Remove any oil
- : Lubricate



3. Tighten the pulley bolt to the specified torque.

Torque: 177 N·m (18.0 kgf·m, 130 lbf·ft)



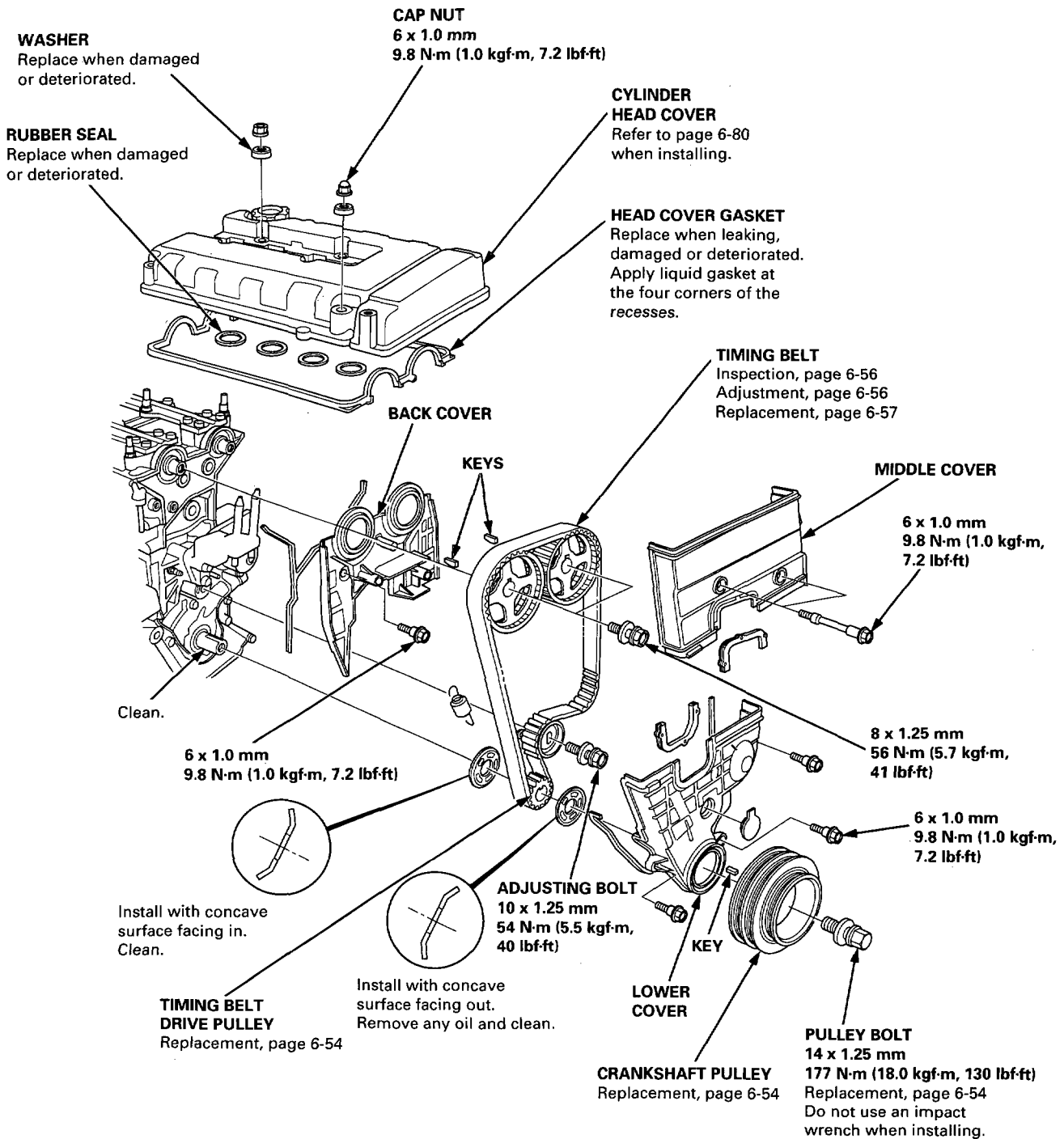
# Timing Belt



## Illustrated Index

### NOTE:

- Refer to page 6-58 for positioning crankshaft and pulley before installing belt.
- Mark the direction of rotation on the belt before removing.
- Replace the rubber seals for oil leakage between the cylinder head and cover.
- Do not use the middle cover and lower cover for storing items disassembled.
- Clean the middle cover and lower cover before installation.
- Replace the camshaft and crankshaft seals when oil leakage.



# Timing Belt

## Inspection

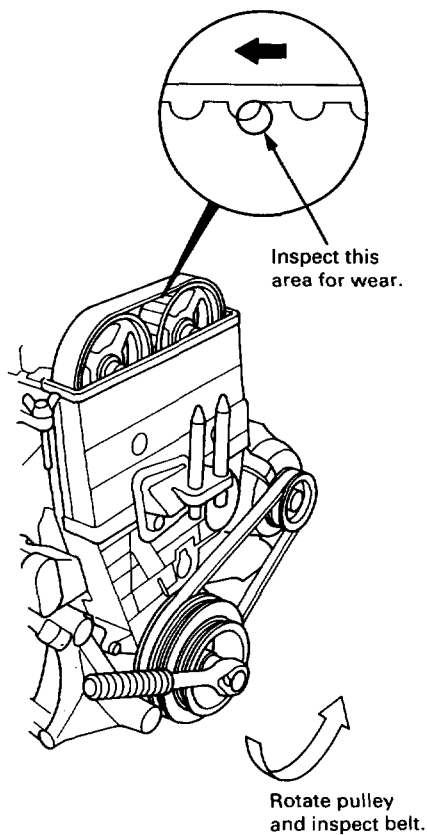
1. Remove the cylinder head cover.

NOTE: Refer to page 6-80 when installing the cylinder head cover.

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

NOTE:

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



3. After inspecting, retorque the crankshaft pulley bolt to 177 N·m (18.0 kgf·m, 130 lbf·ft).

## Tension Adjustment

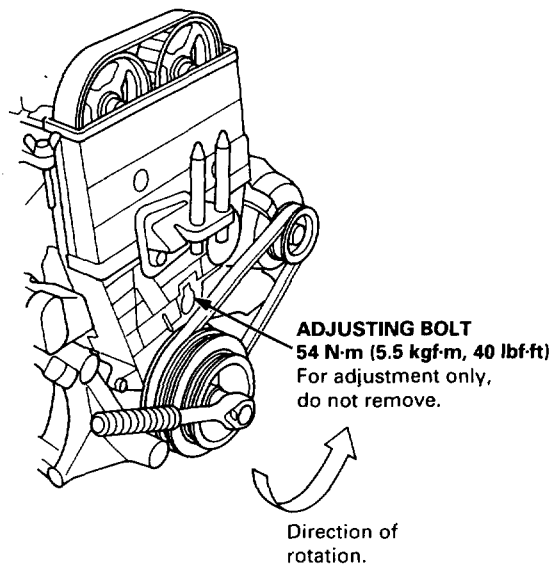
NOTE:

- Always adjust timing belt tension with the engine cold.
- The tensioner is spring-loaded to apply proper tension to the belt automatically after making the following adjustment.
- Always rotate the crankshaft counterclockwise when viewed from the pulley side. Rotating it clockwise may result in improper adjustment of the belt tension.

1. Remove the cylinder head cover.

NOTE: Refer to page 6-80 when installing the cylinder head cover.

2. Set the No. 1 piston at TDC (see page 6-59).
3. Rotate the crankshaft 5-6 revolutions to set the belt.
4. Set the No. 1 piston at TDC.



5. Loosen the adjusting bolt 180°.
6. Rotate the crankshaft counterclockwise three teeth on the camshaft pulley.
7. Tighten the adjusting bolt.
8. After adjusting, retorque the crankshaft pulley bolt to 177 N·m (18.0 kgf·m, 130 lbf·ft).

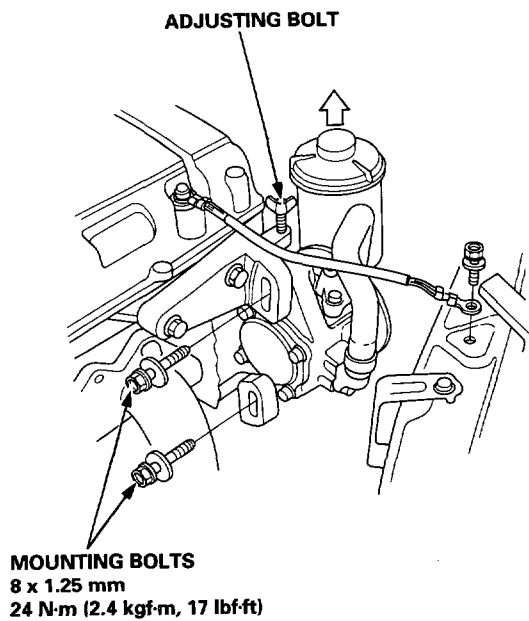


## Removal

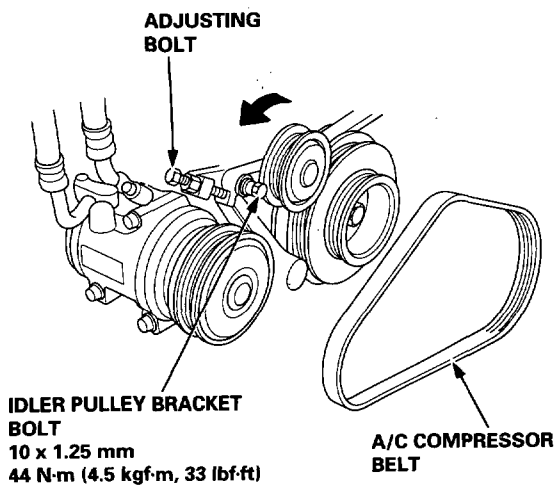
### NOTE:

- Turn the crankshaft pulley so the No. 1 piston is at top dead center (TDC) before removing the belt (see page 6-59).
- Inspect the water pump when removed the timing belt (see page 10-14).

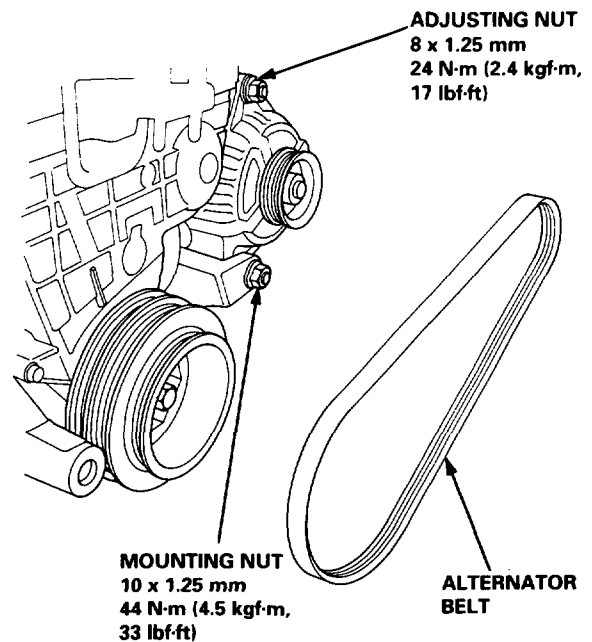
1. Remove the wheel well splash shield (see page 5-6).
2. Loosen the adjusting bolt and mounting bolts, then remove the power steering (P/S) pump belt.



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



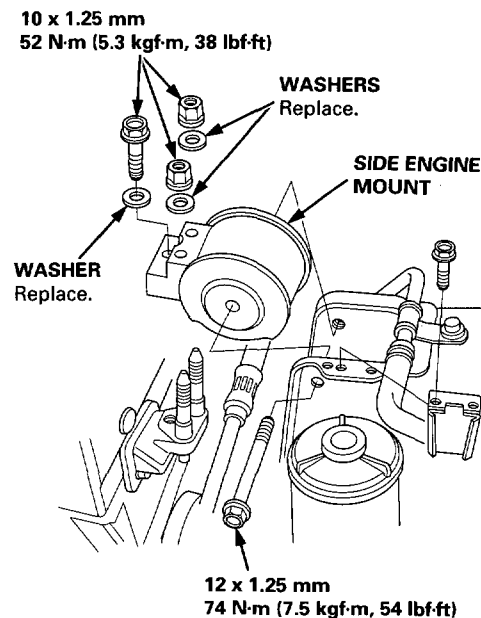
4. Loosen the adjusting nut and mounting nut, then remove the alternator belt.



5. Remove the side engine mount.

### NOTE:

- Use the jack to support the engine before the side engine mount is removed.
- Make sure to place a cushion between the oil pan and the jack.



(cont'd)



# Timing Belt

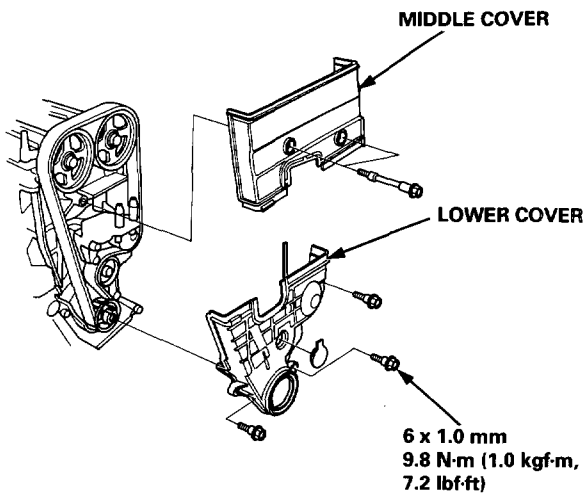
## Removal (cont'd)

6. Remove the crankshaft pulley (see page 6-54).
7. Remove the cylinder head cover.

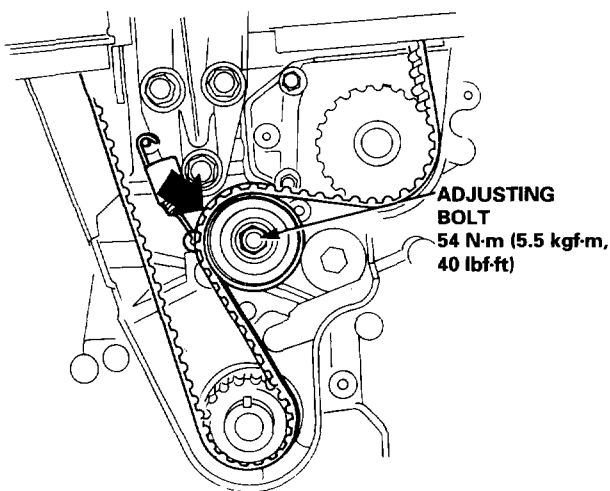
NOTE: Refer to page 6-80 when installing the cylinder head cover.

8. Remove the middle cover and lower cover.

NOTE: Do not use the middle and lower covers for storing removed items.



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

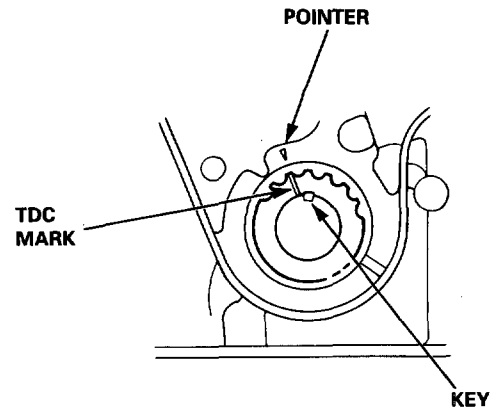


10. Remove the timing belt.

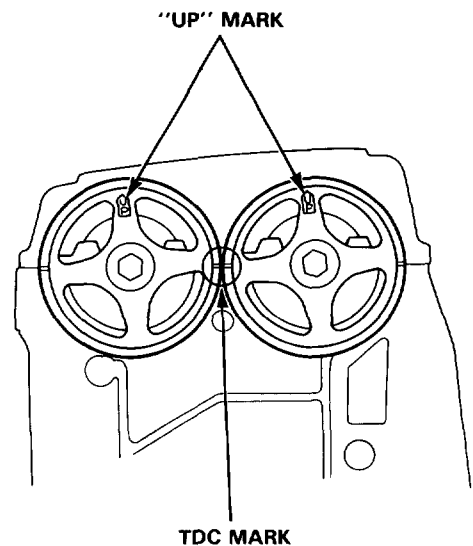
## Installation

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

1. Set the timing belt drive pulley so that the No. 1 piston is at top dead center (TDC). Align the groove on the timing belt drive pulley to the  $\nabla$  pointer on the oil pump.



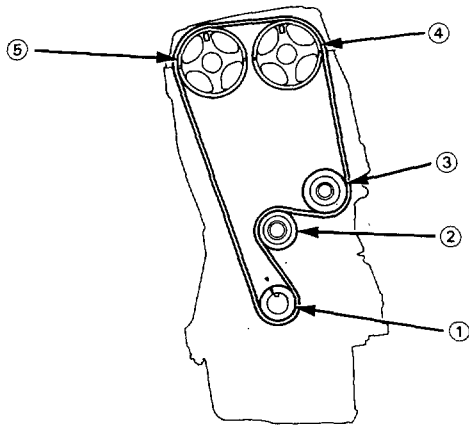
2. Set the camshaft pulleys so that the No. 1 piston TDC. Align the TDC marks of the intake and exhaust camshaft pulleys.





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

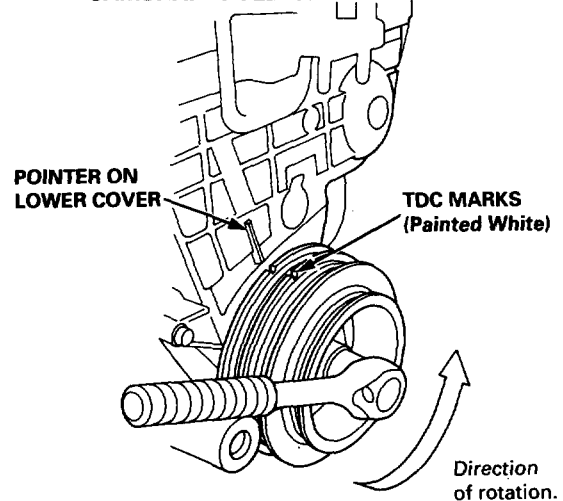
NOTE: Make sure the timing belt drive pulley and camshaft pulleys are at TDC.



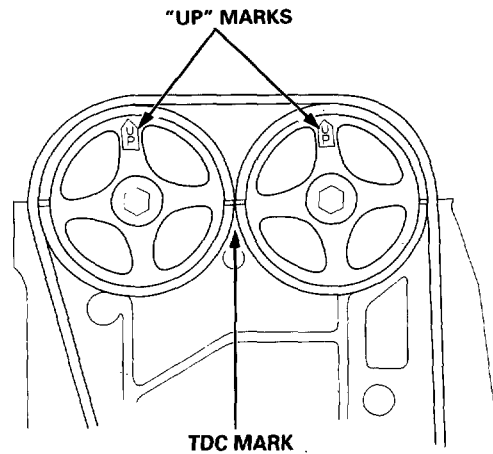
4. Loosen and retighten the adjusting bolt to tension the timing belt.
5. Install the lower cover and middle cover.
- NOTE: Clean the middle and lower covers before installing.
6. Install the crankshaft pulley, then tighten the pulley bolt (see page 6-54).
7. Rotate the crankshaft pulley about five or six turns counterclockwise so that the timing belt positions on the pulleys.
8. Adjust the timing belt tension (see page 6-56).

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

**CAMSHAFT PULLEY:**



**CAMSHAFT PULLEY:**



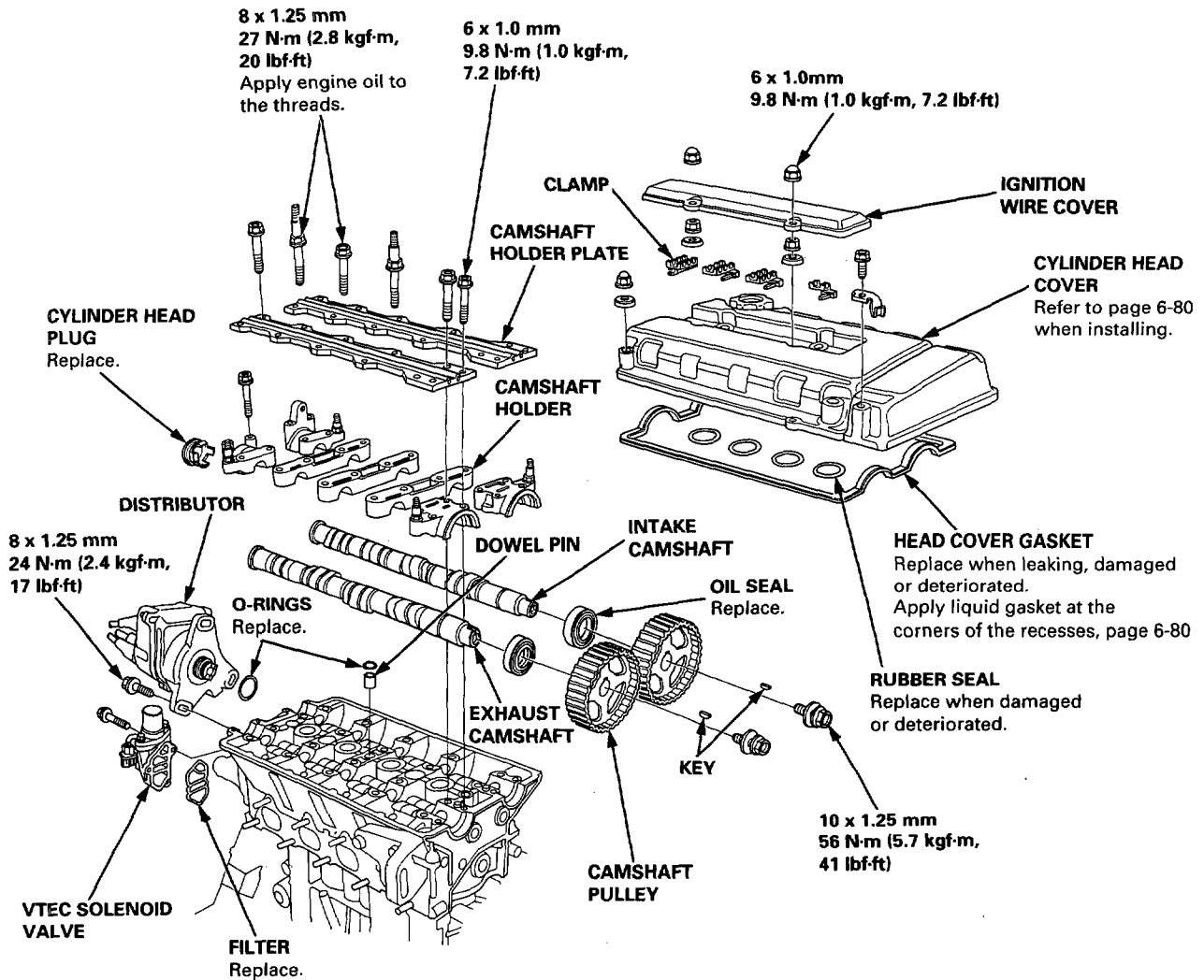
10. If the camshaft and crankshaft pulleys are not positioned at TDC remove the timing belt, and adjust the position following the procedure on page 6-56, then reinstall the timing belt.
11. After installation, adjust the tension of each belt.
- See section 4 for alternator belt tension adjustment.
  - See section 22 for A/C compressor belt tension adjustment.
  - See section 17 for P/S pump belt tension adjustment.

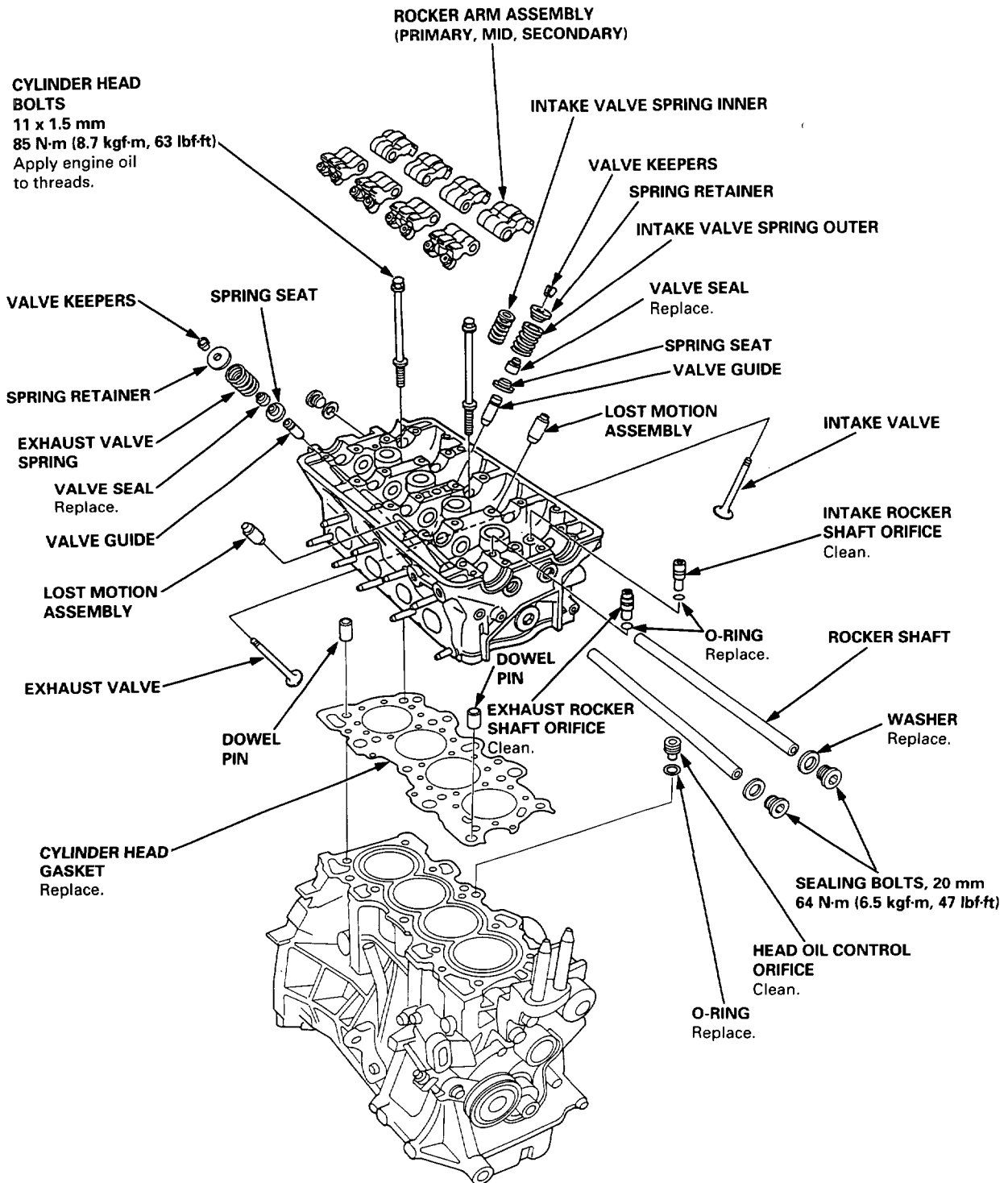
# Cylinder Head

## Illustrated Index

### NOTE:

- To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 38°C (100°F) before removing it.
- In handling a metal gasket, take care not to fold it or damage the contact surface of the gasket.
- Use new O-rings and gaskets when reassembling.





# Cylinder Head

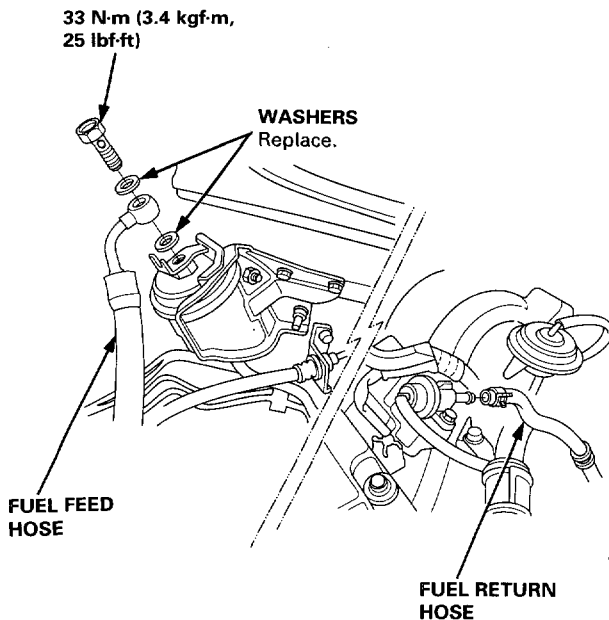
## Removal

Engine removal is not required this procedure.

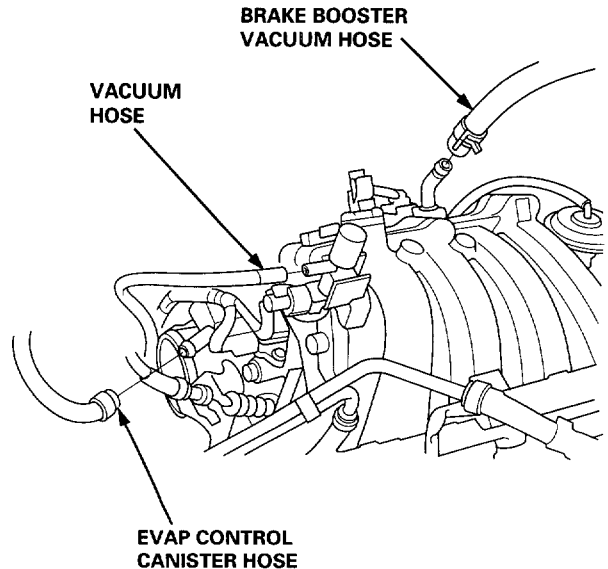
### NOTE:

- Use fender covers to avoid damaging painted surfaces.
- To avoid damage, unplug the wiring connectors carefully while holding the connector portion.
- To avoid damaging the cylinder head, wait until the engine coolant temperature drops below 38°C (100°F) before loosening the retaining bolts.
- Mark all wiring and hoses to avoid misconnection. Also, be sure that they do not contact other wiring or hoses, or interfere with other part.

1. Disconnect the battery negative terminal.
2. Drain the engine coolant (see page 10-7).
3. Remove the strut brace (see page 5-2).
4. Remove the intake air duct and air cleaner housing assembly (see page 5-2).
5. Remove the adjusting bolt and mounting bolts, then remove the power steering (P/S) pump belt and pump (see page 5-5).
6. Loosen the idler pulley bracket bolt and adjusting bolt, then remove the air conditioning (A/C) compressor belt (see page 5-5).
7. Loosen the mounting nut and locknut, then remove the alternator belt (see page 6-57).
8. Relieve fuel pressure (see section 11).
9. Remove the fuel feed hose and fuel return hose.



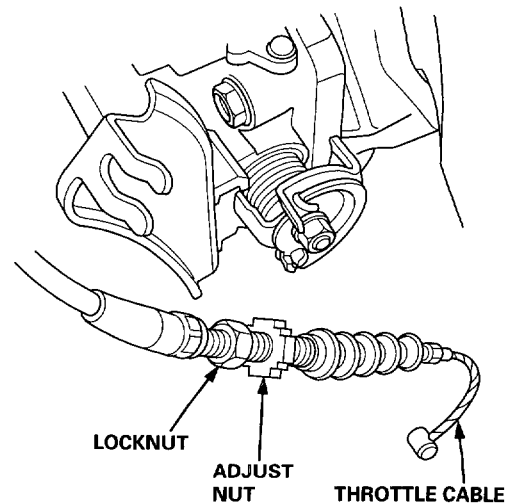
10. Remove the brake booster vacuum hose, evaporative emission (EVAP) control canister hose and vacuum hose.



11. Remove the throttle cable by loosening the locknut then slip the cable end out of the accelerator linkage.

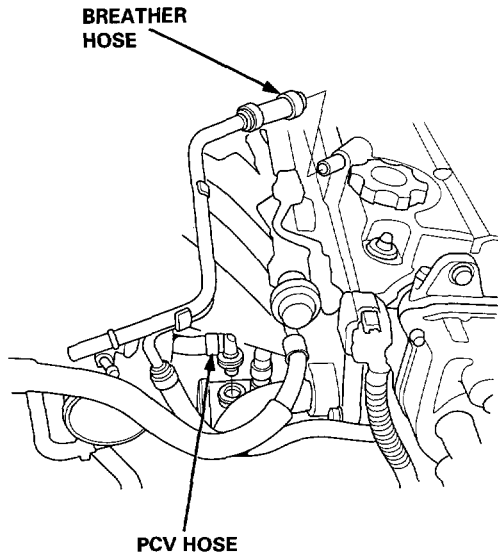
### NOTE:

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

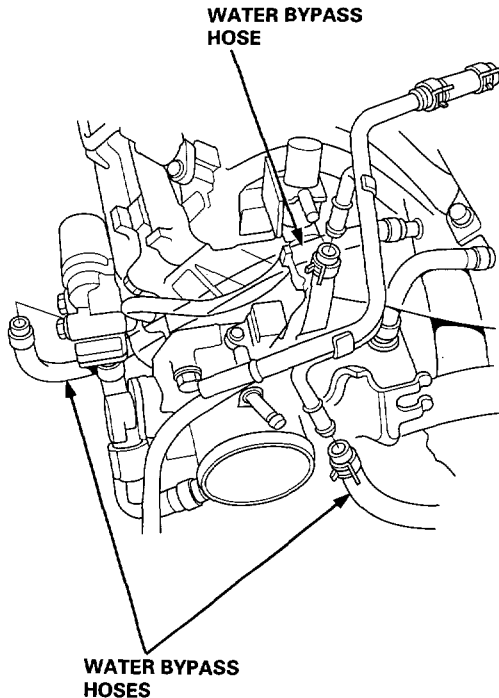




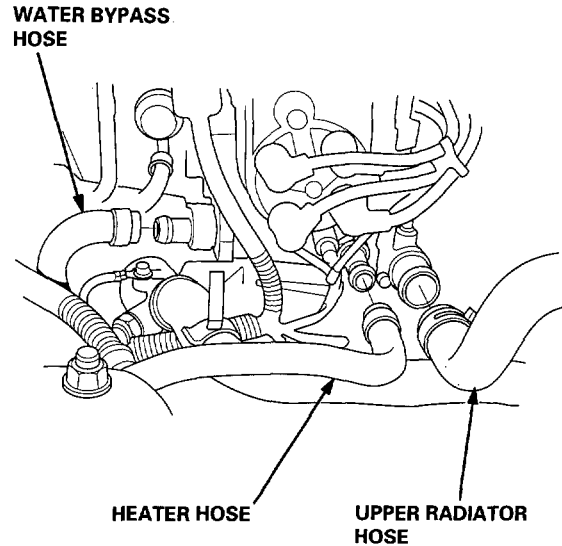
12. Remove the breather hose and positive crankcase ventilation (PCV) hose.



13. Remove the water bypass hoses.



14. Remove the upper radiator hose, heater hose and water bypass hose.



15. Remove the engine wire harness connectors and wire harness clamps from the cylinder head and the intake manifold.

- Four fuel injector connector
- Intake air temperature (IAT) sensor connector
- Engine coolant temperature (ECT) sensor connector
- Radiator fan switch connector
- Coolant temperature gauge sending unit connector
- Idle air control (IAC) valve connector
- Manifold absolute pressure (MAP) sensor connector
- Intake air bypass (IAB) control solenoid valve connector
- Throttle position sensor connector
- Heated oxygen sensor (HO2S) connector
- VTEC solenoid valve connector
- Distributor connector

16. Remove the spark plug caps and distributor from the cylinder head.

17. Remove the side engine mount (see page 5-11).

**NOTE:**

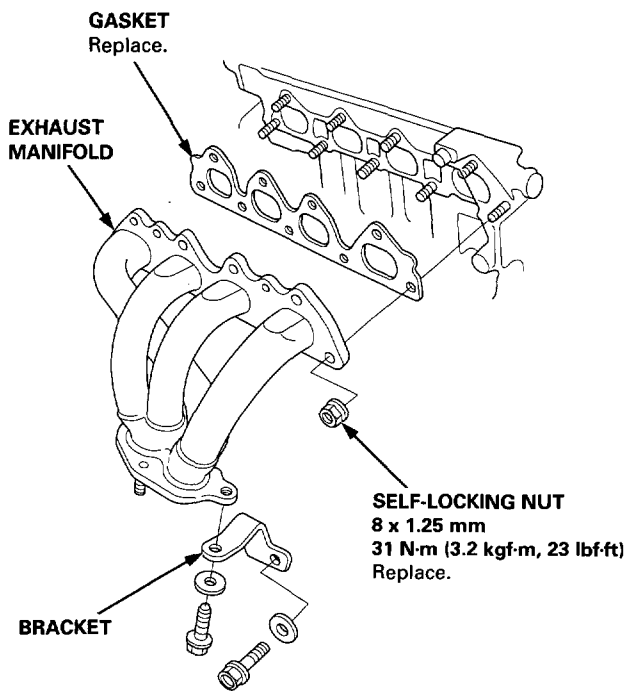
- Use the jack to support the engine before the side engine mount is removed.
- Make sure to place a cushion between the oil pan and the jack.

(cont'd)

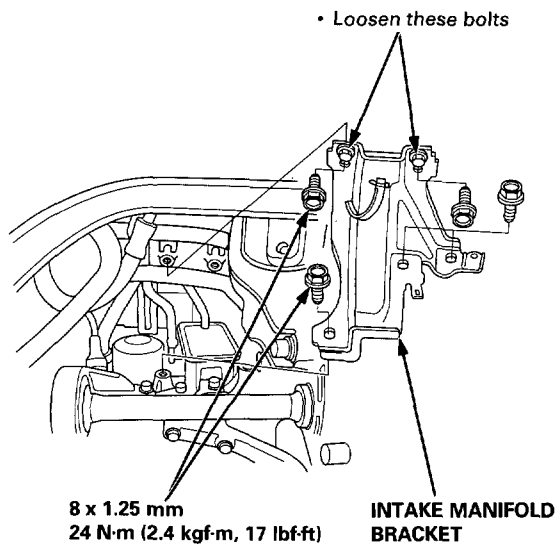
# Cylinder Head

## Removal (cont'd)

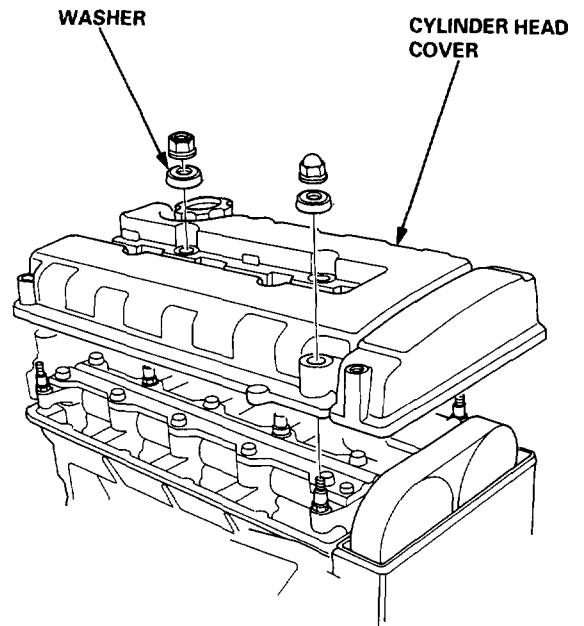
18. Remove the exhaust manifold.



19. Remove the intake manifold bracket.

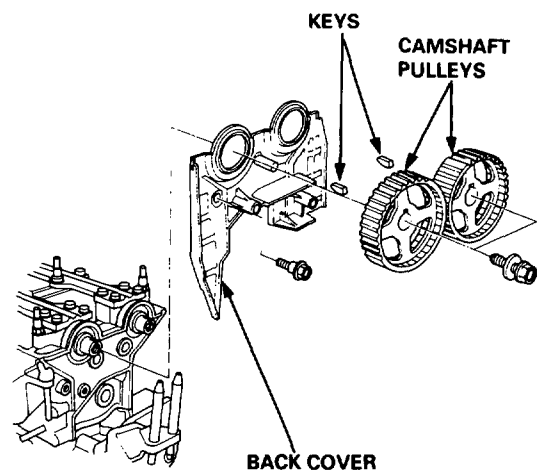


20. Remove the cylinder head cover.



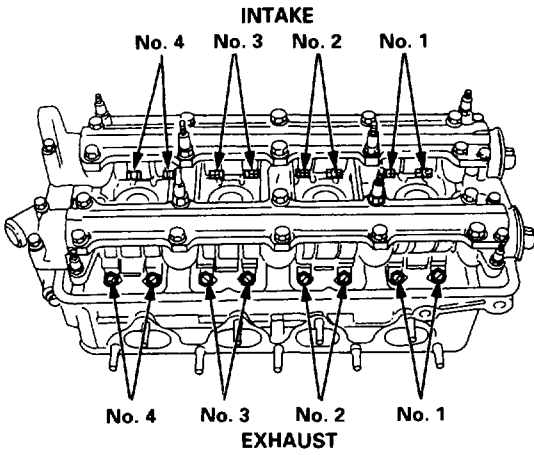
21. Remove the timing belt (see page 6-57).

22. Remove the camshaft pulley and back cover.

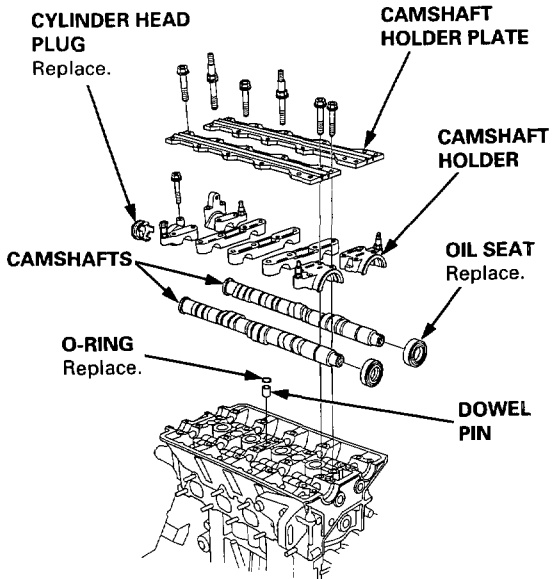




23. Loosen the adjusting screws.

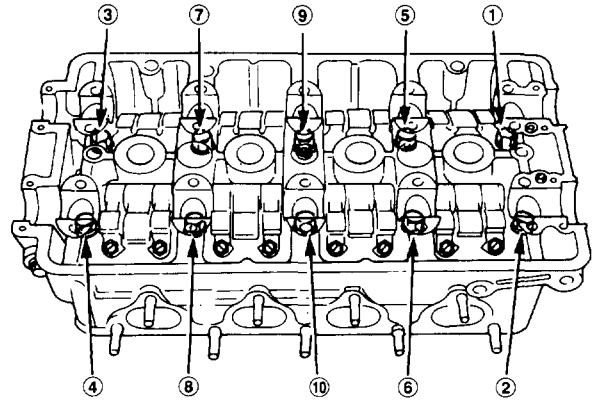


24. Remove the camshaft holder plates, camshaft holders and camshafts.



25. Remove the cylinder head bolts. To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time: repeat the sequence until all bolts are loosened.

**CYLINDER HEAD BOLT LOOSENING SEQUENCE:**



26. Remove the cylinder head.

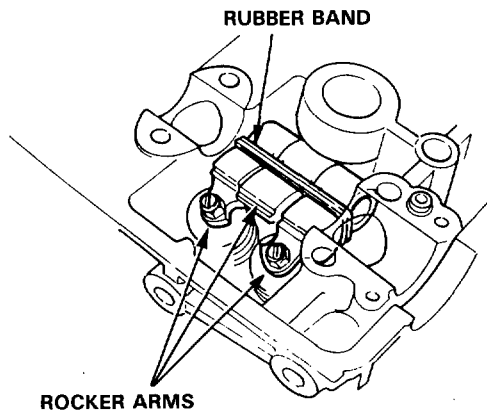
27. Remove the intake manifold (see page 9-2).



# Rocker Arms

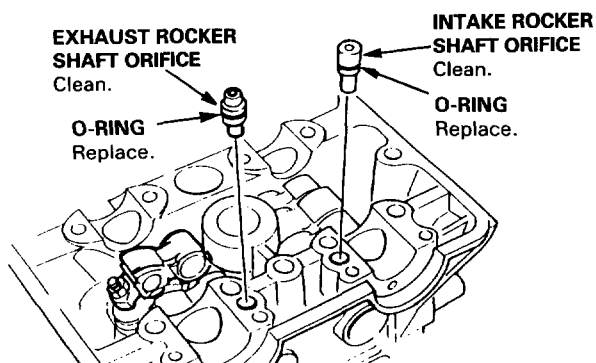
## Removal

1. Hold the rocker arms together with a rubber band to prevent them from separating.

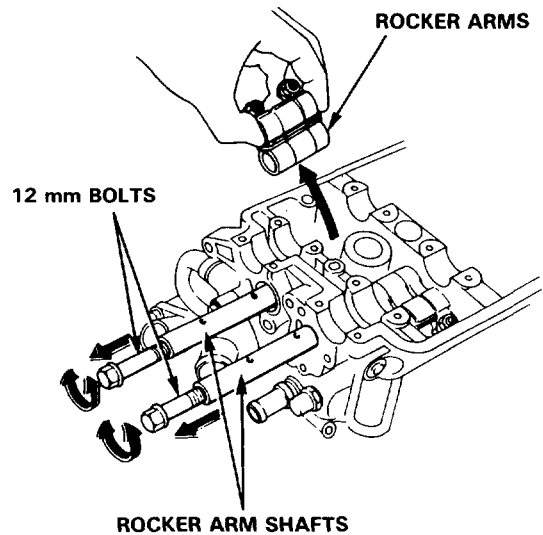


2. Remove the intake and exhaust rocker shaft oil control orifices, then remove the VTEC solenoid valve and the sealing bolts.

NOTE: The shapes of the oil control orifices of the intake and exhaust are different. Identify the parts as they are removed to ensure reinstallation in the original locations.



3. Screw 12 mm bolts into the rocker arm shafts. Remove each rocker arm set while slowly pulling out intake and exhaust rocker arm shafts.





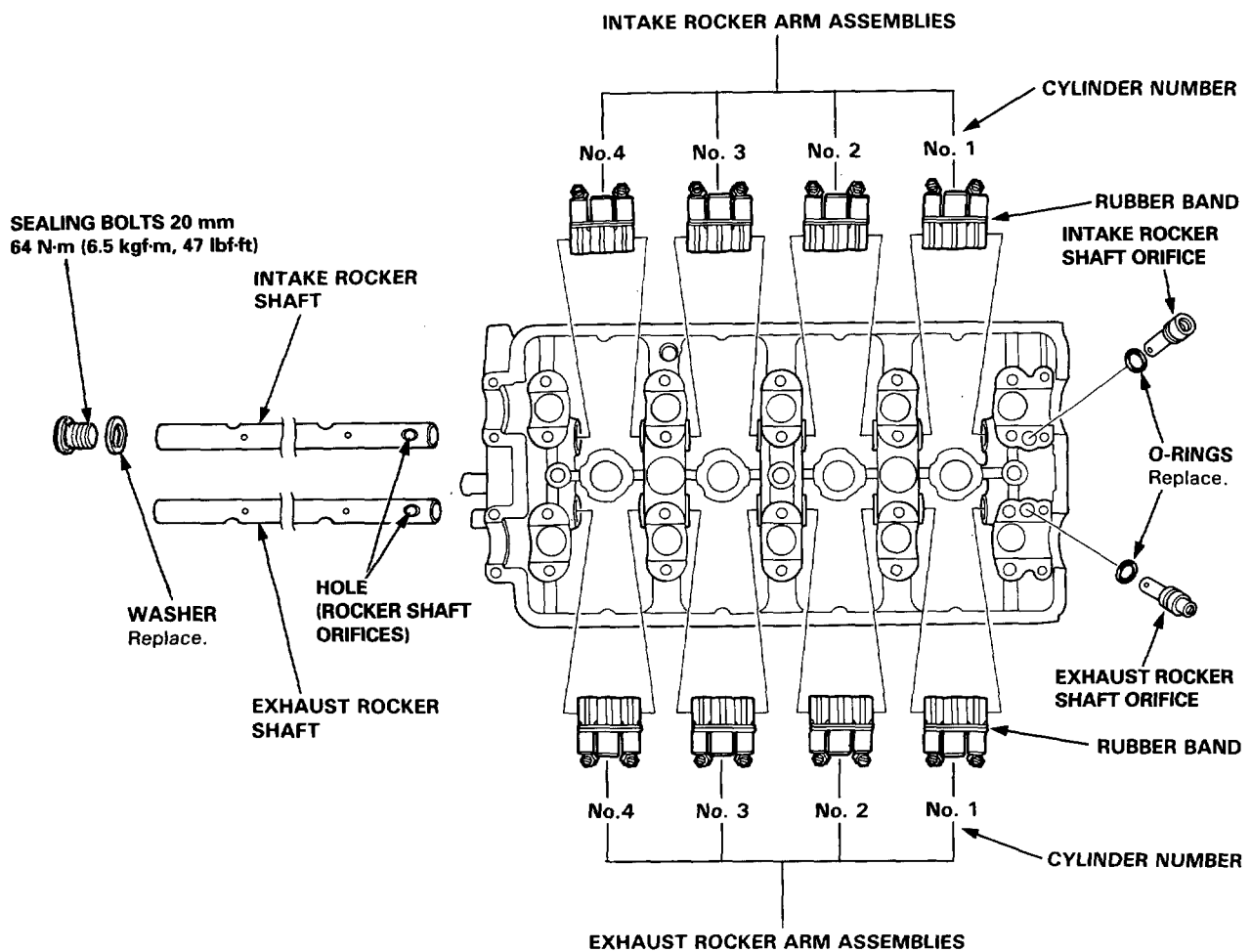
## Disassembly/Reassembly

### NOTE:

- After installing the rocker shaft orifice, try to turn the rocker shaft to make sure that the orifice is correctly inserted in the hole of rocker shaft. If the orifice is in place, it should not turn.
- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect rocker shafts and rocker arms (see page 6-68).
- Rocker arms must be installed in the same position if reused.
- Clean the rocker shaft orifices when installing.



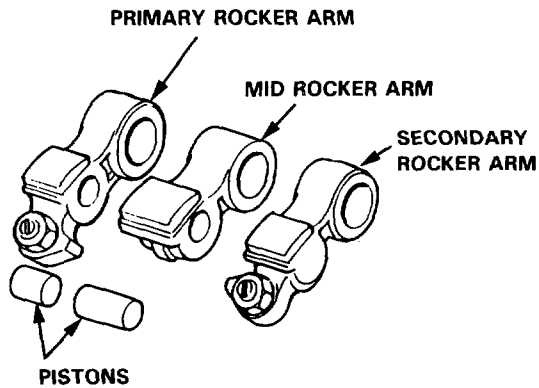
Prior to reinstalling, clean all the parts in solvent, dry them and apply lubricant to any contact surfaces.



# Rocker Arms and Lost Motion Assemblies

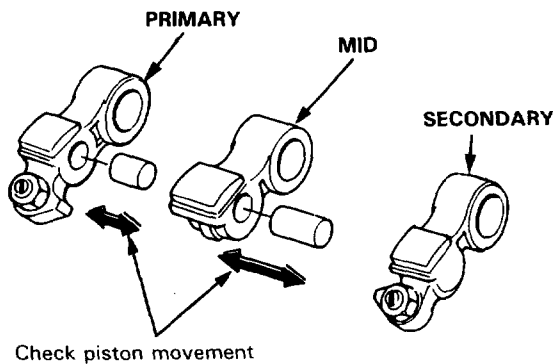
## Inspection

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



1. Inspect the rocker arm piston. Push it manually.

— If it does not move smoothly, replace the rocker arm assembly.

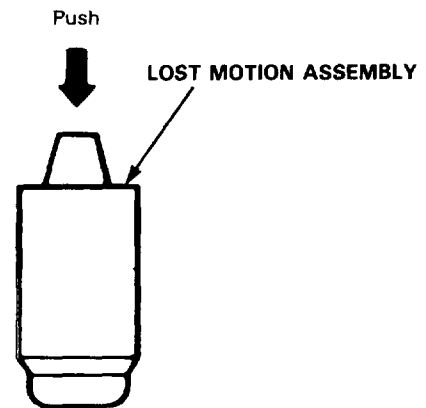


NOTE:

- Apply oil to the pistons when reassembling.
- Bundle the rocker arms with a rubber band to keep them together as a set.

2. Remove the lost motion assembly from the cylinder head and inspect it. Test it by pushing the plunger with your finger.

— If the lost motion assembly does not move smoothly, replace it.



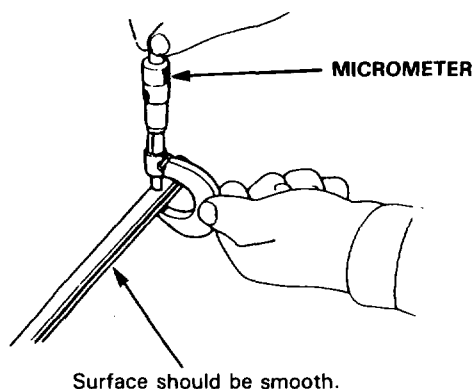


# Rocker Arms and Shafts

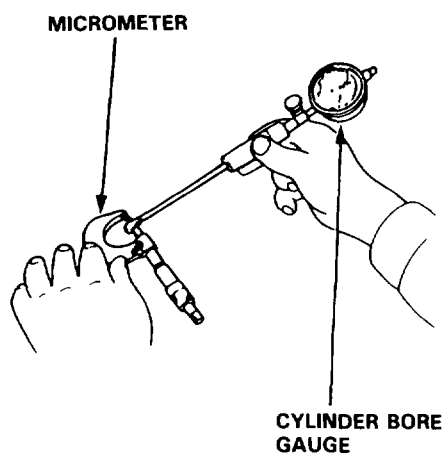
## Clearance Inspection

Measure both the intake rocker shaft and exhaust rocker shaft.

1. Measure diameter of shaft at first rocker location.

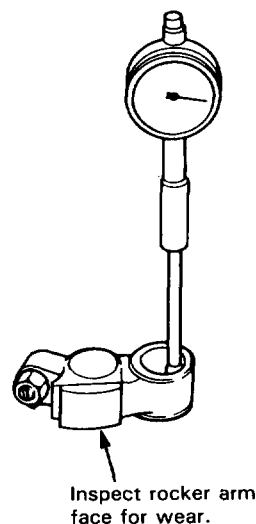


2. Zero gauge to shaft diameter.



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

**Rocker Arm-to-Shaft Clearance:**  
**Intake and Exhaust**  
**Standard (New):** 0.025 – 0.052 mm  
(0.0010 – 0.0020 in)  
**Service Limit:** 0.08 mm (0.003 in)



Repeat for all rockers.

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

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

# Camshafts

## Inspection

### NOTE:

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

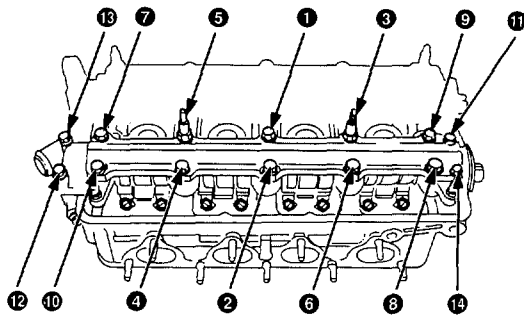
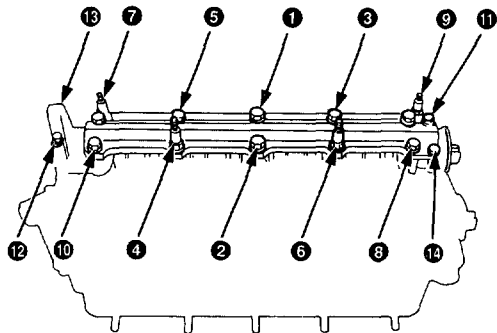
1. Put the camshafts and camshaft holders on the cylinder head, and then tighten the bolts to the specified torque.

### Specified Torque:

① - ⑩: 8 mm bolts 27 N·m (2.8 kgf·m, 20 lbf·ft)

Apply engine oil to the threads.

⑪ - ⑭: 6 mm bolts 9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)

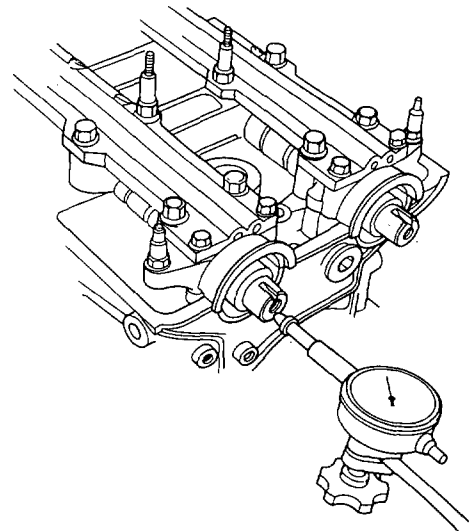


2. Seat the camshaft by pushing it toward distributor end of the cylinder head.
3. Zero the dial indicator against end of distributor drive, then push the camshaft back and forth, and read the end play.

### Camshaft End Play:

Standard (New): 0.05 - 0.15 mm  
(0.002 - 0.006 in)

Service limit: 0.5 mm (0.02 in)



4. Remove the bolts, then remove the camshaft holders from the cylinder head.

- Lift camshaft out of cylinder head, wipe clean, then inspect lift ramps. Replace camshaft if lobes are pitted, scored, or excessively worn.
- Clean the camshaft bearing surfaces in the cylinder head, then set camshaft back in place.
- Insert plastigage strip across each journal.

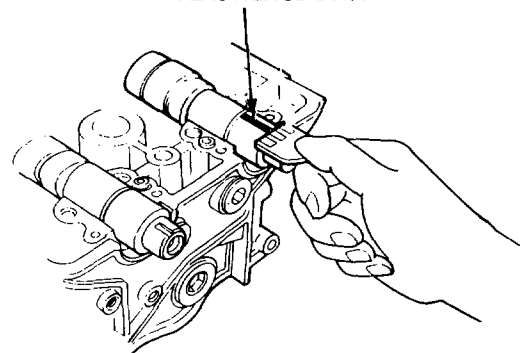
5. Put the camshaft on the cylinder head, then install the camshaft holders, and then tighten the bolts to the specified torque, as shown in the left column on this page.
6. Remove the camshaft holders, then measure the widest portion of the plastigage on each journal.

### Camshaft-to-Holder Oil Clearance:

Standard (New): 0.050 - 0.089 mm  
(0.002 - 0.004 in)

Service Limit: 0.15 mm (0.006 in)

### PLASTIGAGE STRIP





7. If the camshaft-to-holder oil clearance is out of tolerance:

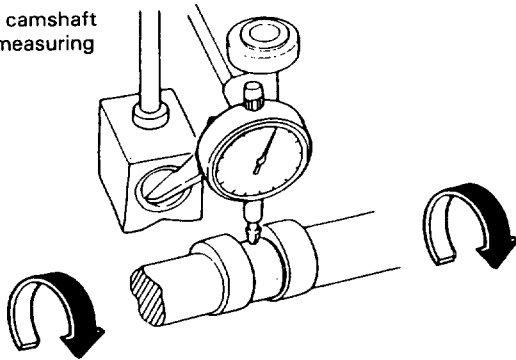
- And the camshaft has already been replaced, you must replace the cylinder head.
- If the camshaft has not been replaced, first check the total runout with the camshaft supported on V-blocks.

**Camshaft Total Runout:**

**Standard (New): 0.03 mm (0.001 in) max.**

**Service Limit: 0.04 mm (0.002 in)**

Rotate camshaft while measuring

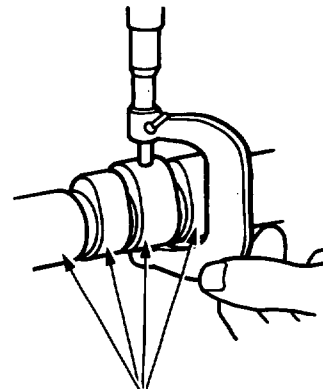


- If the total runout of the camshaft is within tolerance, replace the cylinder head.
- If the total runout is out of tolerance, replace the camshaft and recheck. If the bearing clearance is still out of tolerance, replace the cylinder head.

8. Check the cam lobe height.

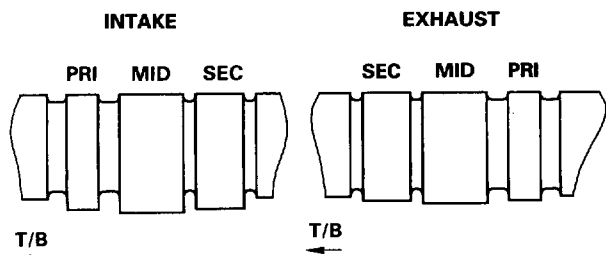
**Cam lobe height standard (New):**

	INTAKE	EXHAUST
<b>PRIMARY</b>	33.411 mm (1.3154 in)	33.111 mm (1.3036 in)
<b>MID</b>	36.377 mm (1.4322 in)	35.720 mm (1.4063 in)
<b>SECONDARY</b>	34.547 mm (1.3601 in)	34.381 mm (1.3536 in)



Check this area for wear.

**Cam Position**



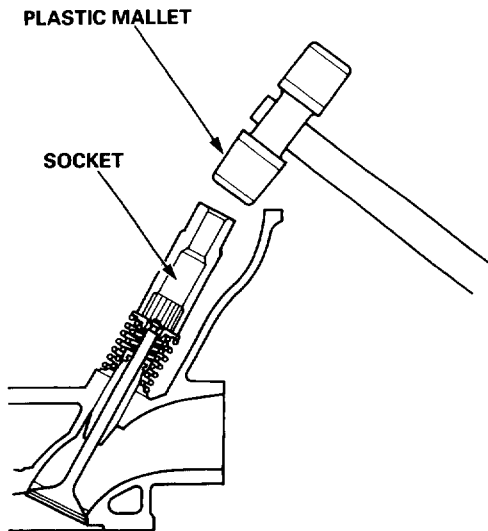
T/B: TIMING BELT  
 PRI: PRIMARY  
 MID: MID  
 SEC: SECONDARY

# Valves, Valve Springs and Valve Seals

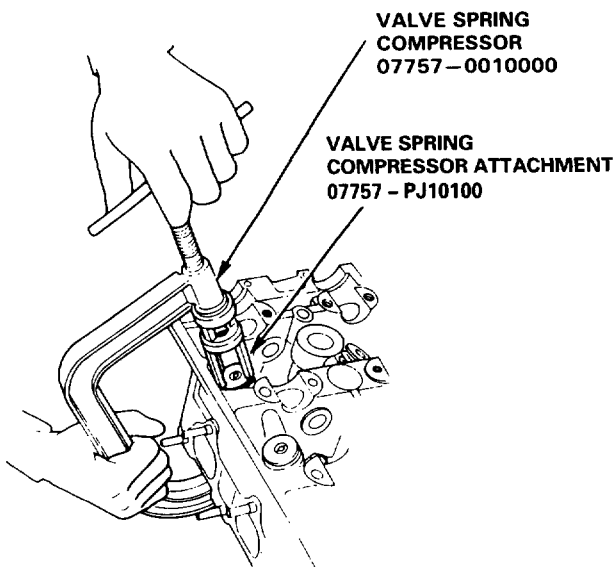
## Removal

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

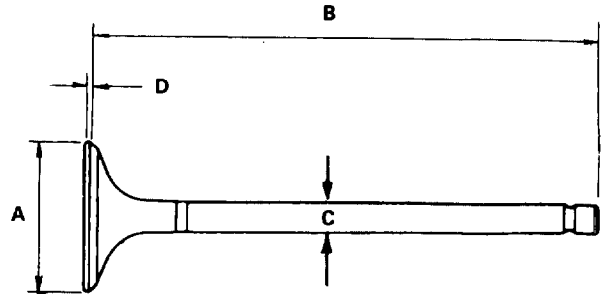
1. Using an appropriate-sized socket and plastic mallet, lightly tap the valve retainer to loosen the valve keepers before installing the valve spring compressor.



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



## Valve Dimensions



### Intake Valve

A Standard (New):	32.90 – 33.10 mm (1.295 – 1.303 in)
B Standard (New):	101.00 – 101.30 mm (3.976 – 3.988 in)
C Standard (New):	5.475 – 5.485 mm (0.2156 – 0.2159 in)
C Service Limit:	5.445 (0.2144 in)
D Standard (New):	1.05 – 1.35 mm (0.041 – 0.053 in)
D Service Limit:	0.85 mm (0.033 in)

### Exhaust Valve

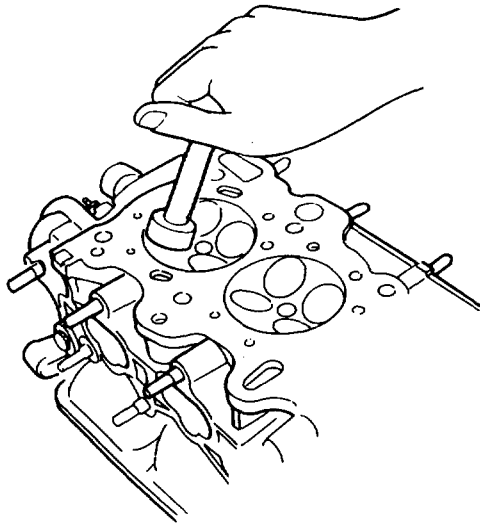
A Standard (New):	27.90 – 28.10 mm (1.098 – 1.106 in)
B Standard (New):	100.60 – 100.90 mm (3.961 – 3.972 in)
C Standard (New):	5.450 – 5.460 mm (0.2146 – 0.2150 in)
C Service Limit:	5.420 (0.2134 in)
D Standard (New):	1.65 – 1.95 mm (0.065 – 0.077 in)
D Service Limit:	1.45 mm (0.057 in)



## Reconditioning

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

**NOTE:** If guides are worn, replace them before cutting the valve seats.

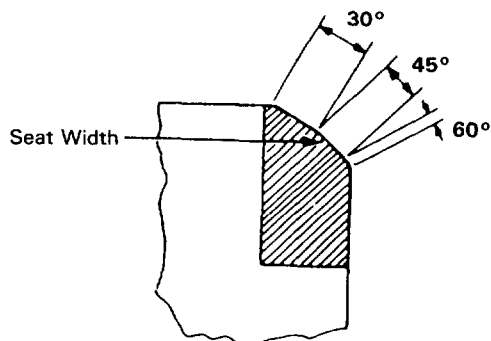


2. Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.
3. Bevel the upper edge of the seat with the 30° cutter and the lower edge of the seat with the 60° cutter. Check width of seat and adjust accordingly.
4. Make one more very light pass with the 45° cutter to remove any possible burrs caused by the other cutters.

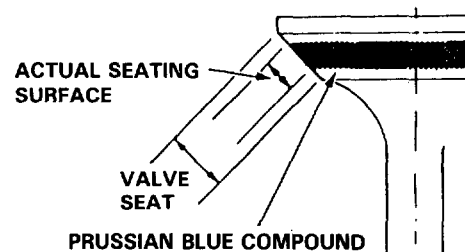
### Valve Seat Width:

**Standard (New):** 1.25 – 1.55 mm (0.049 – 0.061 in)

**Service Limit:** 2.0 mm (0.08 in)



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



6. The actual valve seating surface, as shown by the blue compound, should be centered on the seat.
  - If it is too high (closer to the valve stem), you must make a second cut with the 60° cutter to move it down, then one more cut with the 45° cutter to restore seat width.
  - If it is too low (closer to the valve edge), you must make a second cut with the 30° cutter to move it up, then one more cut with the 45° cutter to restore seat width.

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

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

### Intake Valve Stem Installed Height:

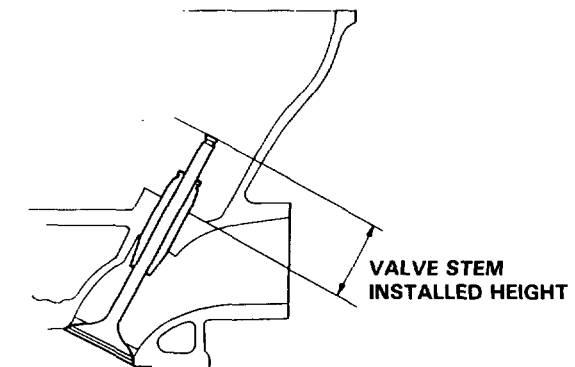
**Standard (New):** 37.465 – 37.935 mm  
(1.4750 – 1.4935 in)

**Service Limit:** 38.185 mm (1.5033 in)

### Exhaust Valve Stem Installed Height:

**Standard (New):** 37.165 – 37.635 mm  
(1.4632 – 1.4817 in)

**Service Limit:** 37.885 (1.4915 in)



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



# Cylinder Head

# Valve Guides

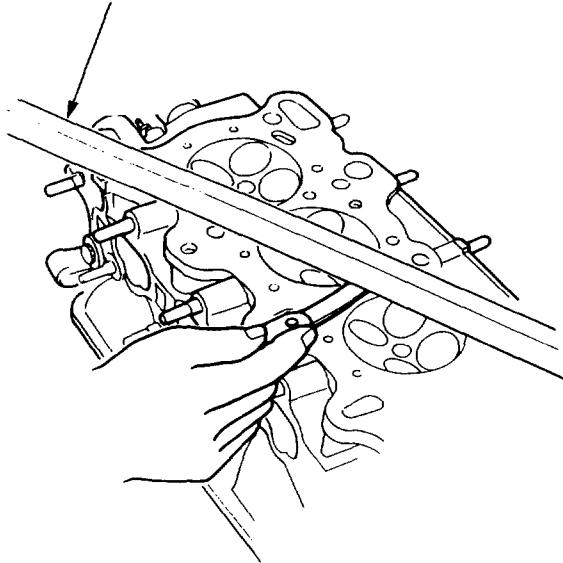
## Warpage

NOTE: If camshaft-to-holder oil clearances (see page 6-70) are not within specification, the head cannot be resurfaced.

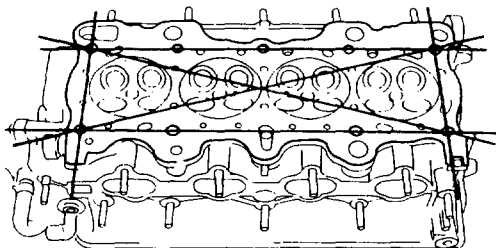
If camshaft-to-holder oil clearance are within specifications, check the head for warpage.

- If warpage is less than 0.05 mm (0.002 in) cylinder head resurfacing is not required.
- If warpage is between 0.05 mm (0.002 in) and 0.2 mm (0.008 in), resurface cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in) based on a height of 142 mm (5.59 in).

PRECISION STRAIGHT EDGE



Measure along edges, and three ways across center.



Cylinder Head Height:  
Standard (New): 141.95 – 142.05 mm  
(5.589 – 5.593 in)

## Valve Movement

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

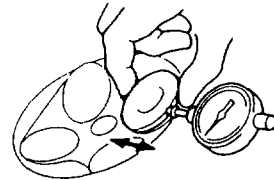
### Intake Valve Stem-to-Guide Clearance:

Standard (New): 0.05 – 0.11 mm  
(0.0020 – 0.0043 in)  
Service Limit: 0.15 mm (0.0059 in)

### Exhaust Valve Stem-to-Guide Clearance:

Standard (New): 0.10 – 0.16 mm  
(0.0039 – 0.0063 in)  
Service Limit: 0.24 (0.0094 in)

Valve extended 10 mm out from seat.



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

NOTE: An alternate method of checking guide to stem clearance is to subtract the O.D. of the valve stem, measured with a micrometer, from the I.D. of the valve guide, measured with an inside micrometer or ball gauge.

Take the measurements in three places along the valve stem and three places inside the valve guide.

The difference between the largest guide measurement and the smallest stem measurement should not exceed the service limit.

### Intake Valve Stem-to-Guide Clearance:

Standard (New): 0.025 – 0.055 mm  
(0.0010 – 0.0022 in)  
Service Limit: 0.08 mm (0.003 in)

### Exhaust Valve Stem-to Guide Clearance:

Standard (New): 0.050 – 0.080 mm  
(0.0020 – 0.0031 in)  
Service Limit: 0.11 mm (0.004 in)

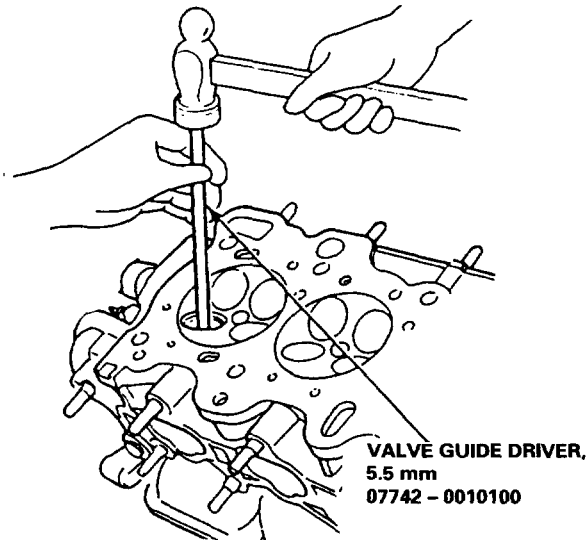


## Replacement

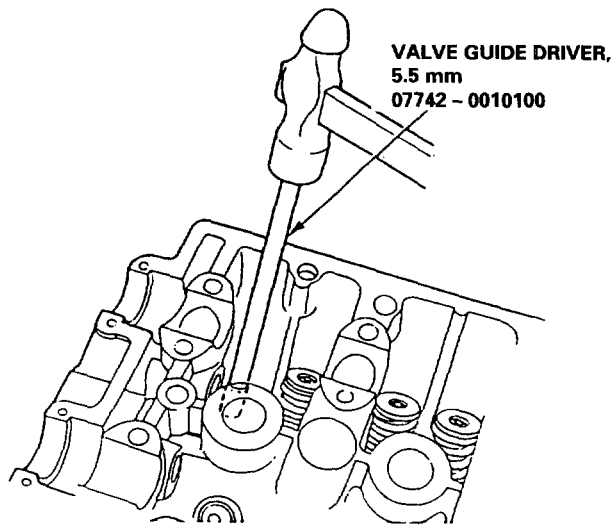
### NOTE:

- For best results, heat cylinder head to 150°C (300°F) before removing or installing guides.
- It may be necessary to use an air hammer to remove some valve guides.

1. Drive the valve guide out from the bottom of the cylinder head.



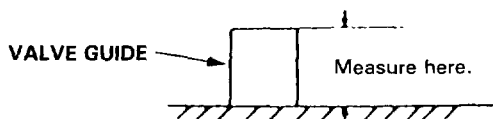
2. Drive in a new valve guide to the specified depth.



### Valve Guide Installed Height:

Intake: 12.55 - 13.05 mm (0.494 - 0.514 in)

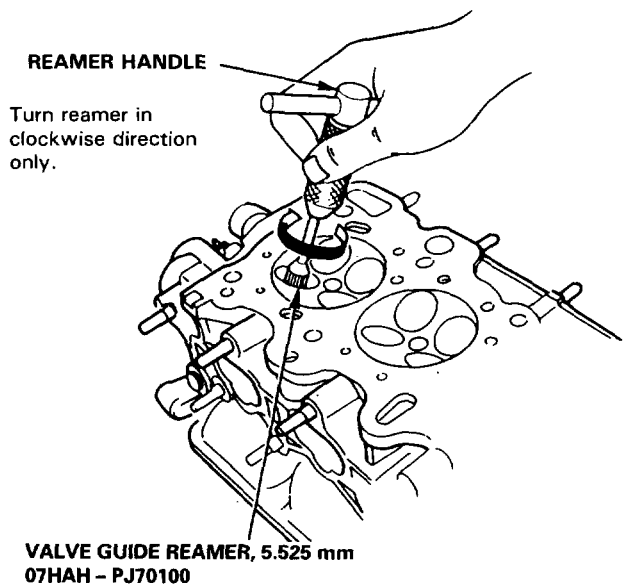
Exhaust: 12.55 - 13.05 mm (0.494 - 0.514 in)



## Reaming

NOTE: For new valve guides only.

1. Coat both reamer and valve guide with cutting oil.
2. Rotate the reamer clockwise the full length of the valve guide bore.
3. Continue to rotate the reamer clockwise while removing it from the bore.
4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
5. Check clearance with a valve (see page 6-74).
  - Verify that the valve slides in the intake and exhaust valve guides without exerting pressure.



# Valves, Valve Springs and Valve Seals

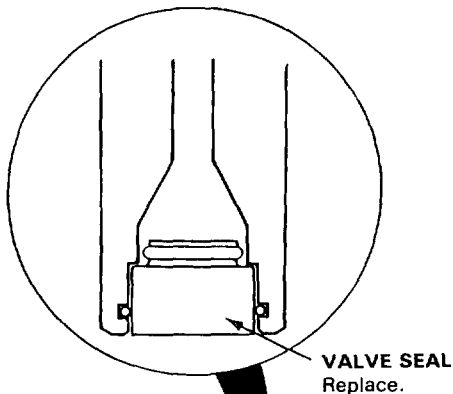
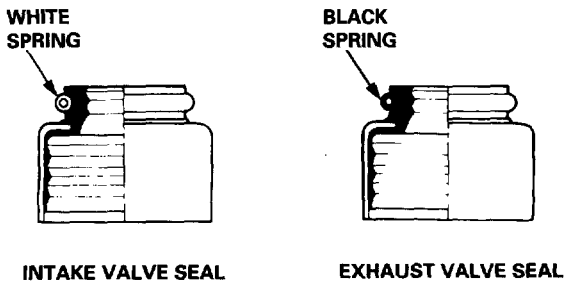
## Installation

1. Insert valves in to valve guides, coat valve stems with engine oil before inserting the valves.

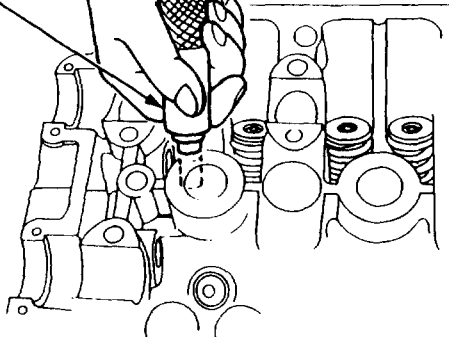
NOTE: Check valves move up and down smoothly.

2. Install the spring seats on the cylinder head.
3. Install the valve seals using the special tool.

NOTE: Exhaust and intake valve seal are not interchangeable.

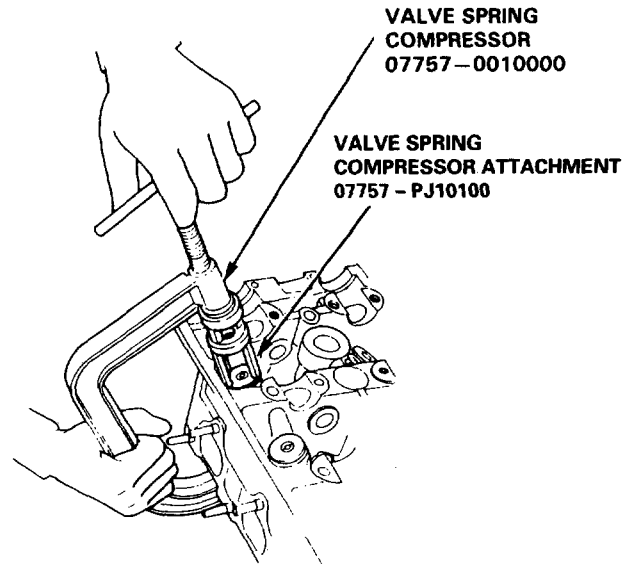


STEM SEAL DRIVER,  
07PAD - 0010000  
NOTE: Use 5.5 mm side.



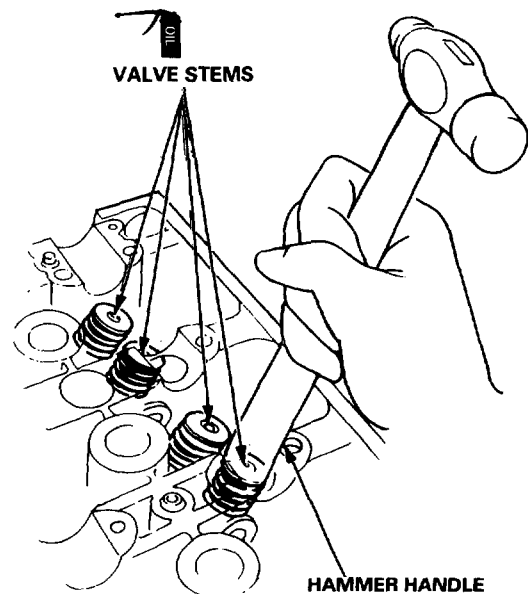
4. Install the valve spring and valve retainer, then install the valve spring compressor. Compress the spring, and install the valve keepers.

NOTE: Place the end of valve spring with closely wound coils toward the cylinder head.



5. Lightly tap the end of each valve stem two or three times with the wooden handle of a hammer to ensure proper seating of valve and valve keepers.

NOTE: Tap the valve stem only along its so you do not bend the stem.



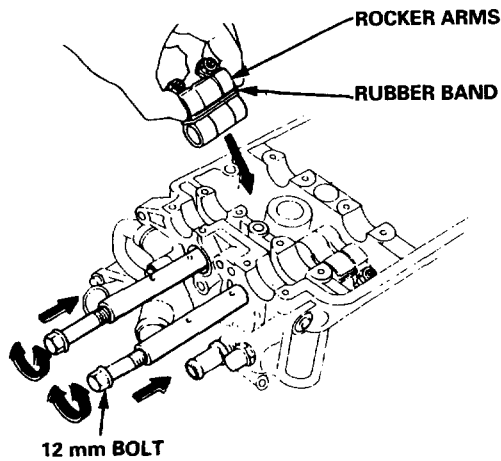
# Rocker Arms



## Installation

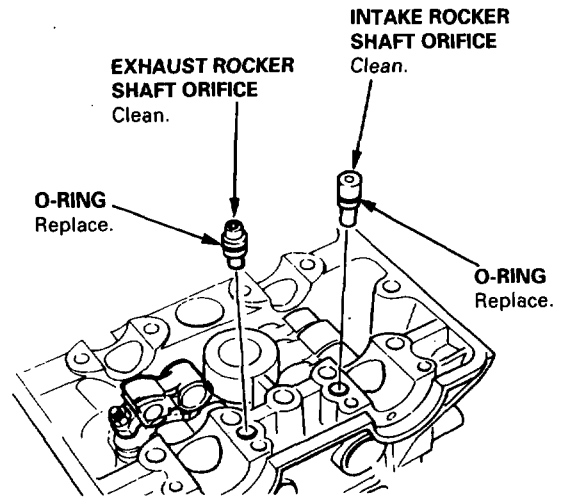
1. Install the rocker arms in the reverse order of removal:
  - Valve adjusting locknuts should be loosened and adjusting screw backed off before installation.
  - The component parts must be reinstalled in the original locations.
2. Install the lost motion assemblies.
3. Install the rocker arms while inserting the rocker arm shaft into the cylinder head.

NOTE: Remove the rubber band after installing the rocker arms.



4. Clean and install the rocker shaft orifices with new O-rings. If the holes in the rocker arm shaft and cylinder head are not in line with each other, screw a 12 mm bolt into the rocker arm shaft and rotate the shaft.

NOTE: The shapes of the rocker shaft orifices for the intake and exhaust are different. The orifices must be installed in the original locations.



# Cylinder Head

## Installation

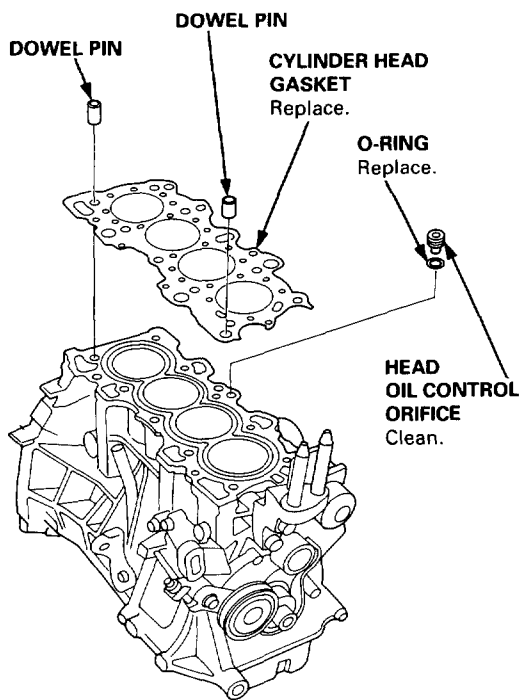
Install the cylinder head in the reverse order of removal:

**NOTE:**

- Always use a new head and manifold gasket.
- The cylinder head gasket is a metal gasket. Take care not to bend it.
- Rotate the crankshaft, set the No. 1 piston at TDC (see page 6-58).
- Do not use the middle cover and lower cover for storing items disassembled.
- Clean the middle cover and lower cover before installation.
- Replace the washer when damaged or deteriorated.

1. Install the cylinder head gasket, dowel pins and the head oil control orifice on the cylinder head.

**NOTE:** Clean the oil control orifice when installing.



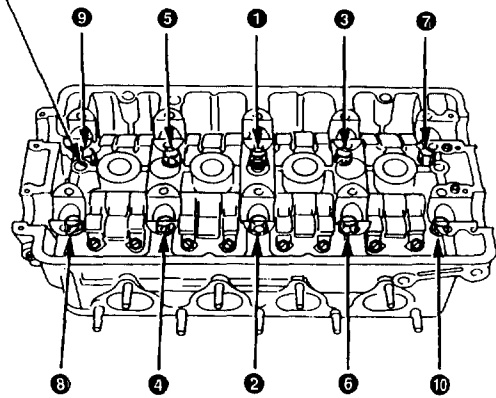
2. Tighten cylinder head bolts in two steps. In the first step, tighten all bolts in sequence to about 29 N-m (3.0 kgf-m, 22 lbf-ft). In the final step, tighten in same sequence to 85 N-m (8.7 kgf-m, 63 lbf-ft).

**NOTE:**

- Apply clean engine oil to the bolt threads and under the bolt head.
- We recommend using a beam-type torque wrench. When using a preset-type torque wrench, be sure to tighten slowly and not to overtighten.
- If a bolt makes any noise while you are torquing it, loosen the bolt, and retighten it from the 1st step.

### CYLINDER HEAD BOLT TORQUE SEQUENCE

11 x 1.5 mm  
83 N-m (8.5 kgf-m, 61 lbf-ft)



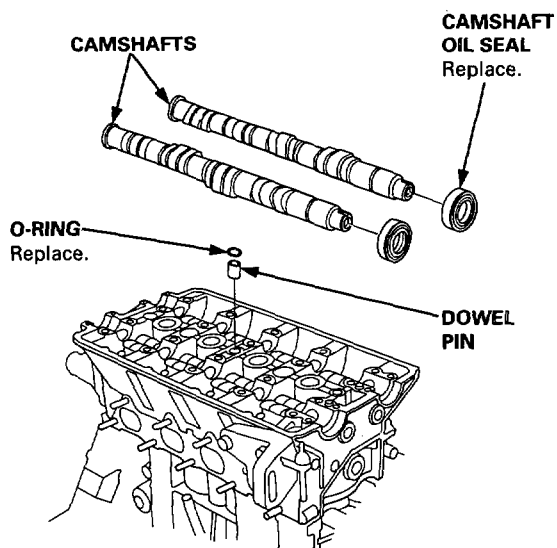
3. Install the intake manifold and tighten the nuts in a crisscross pattern in two or three steps, beginning with the inner nuts.
  - Always use a new intake manifold gasket.
4. Install the exhaust manifold and tighten the new self-locking nuts in a crisscross pattern in two or three steps, beginning with the inner nuts.
  - Always use a new exhaust manifold gasket.



5. Install the camshaft and camshaft oil seals.

NOTE:

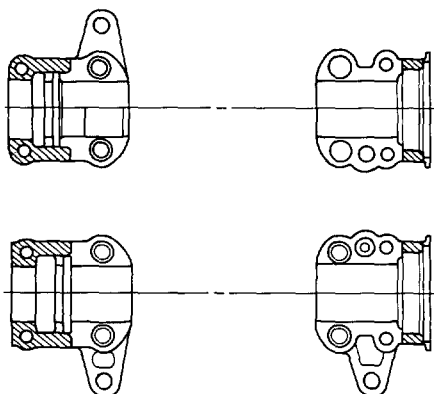
- Install the camshafts with keyway facing up.
- Install the oil seal with the spring side facing in.
- The oil seal housing surface should be dry.
- Set the O-ring and dowel pin in the oil passage of the No. 3 camshaft holder.



6. Apply liquid gasket (P/N 08C70 - X0134SEB, 08C70 - X0231SEB, 08C70 - K0234MEB or 08C70 - K0334MEB) to the head mating surfaces of the No. 1 and No. 5 camshaft holders on both the intake and exhaust side.

NOTE: Clean and dry the cylinder head mating surfaces before applying liquid gasket.

— Apply liquid gasket to the shaded areas.

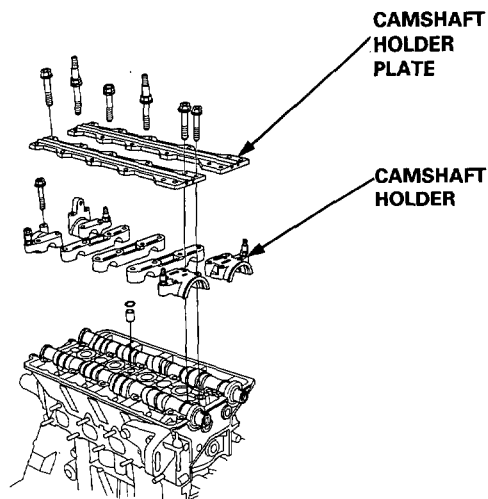


No. 5

No. 1

7. Install the camshaft holders and camshaft holder plate.

NOTE: The arrows marked on the camshaft holders should point to the timing belt.



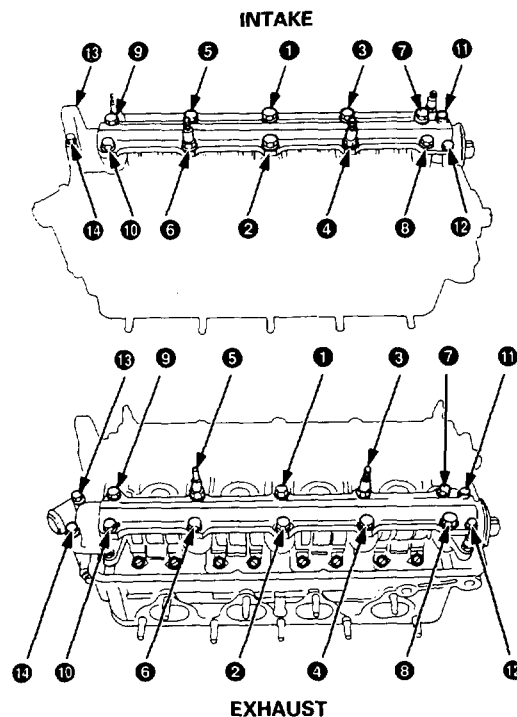
8. Tighten each bolt two turns at a time in the sequence shown below.

NOTE: Wipe off the excess of liquid gasket from No. 1 and No. 5 camshaft holders with a shop towel.

① - ⑩: 8 x 1.25 mm 27 N·m (2.8 kgf·m, 20 lbf·ft)

Apply engine oil to the threads.

⑪ - ⑭: 6 x 1.0 mm 9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



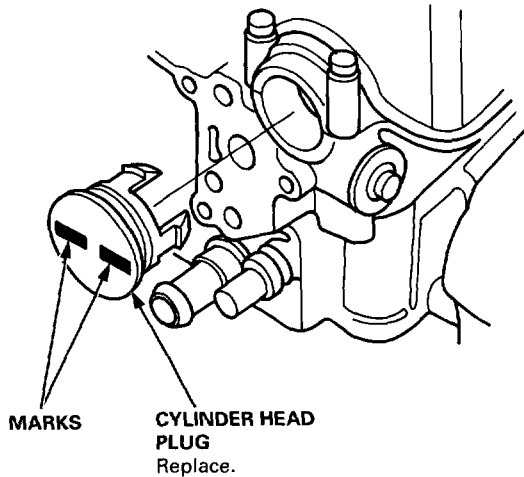
9. Install the back cover and camshaft pulleys.

(cont'd)

# Cylinder Head

## Installation (cont'd)

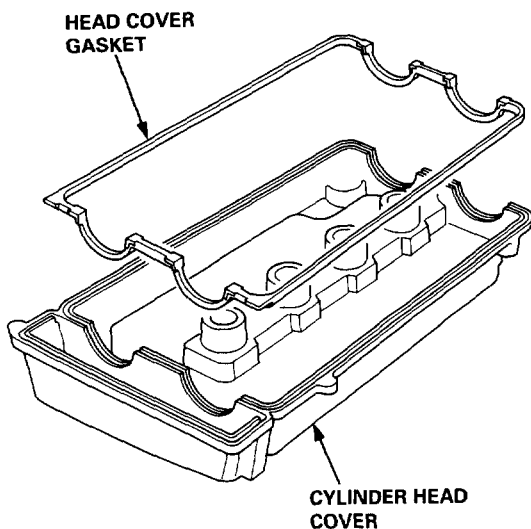
- Align the marks on the cylinder head plug to the cylinder head upper surface, then install the cylinder head plug in the cylinder head to the end.



- Install the timing belt (see page 6-58).
- Adjust the valve clearance (see page 6-52).
- Install the head cover gasket in the groove of the cylinder head cover. Seat the recesses for the camshaft first, then work it into the groove around the outside edges.

### NOTE:

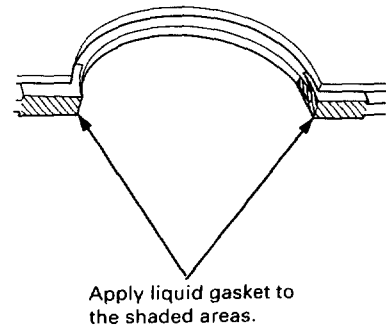
- Before installing the head cover gasket, thoroughly clean the head cover gasket and the groove.
- When installing, make sure the head cover gasket is seated securely in the corners of the recesses with no gap.



- Apply liquid gasket to the head cover gasket at the eight corners of the recesses.

### NOTE:

- Use liquid gasket, Part No. 08C70 - X0134SEB, 08C70 - X0231SEB, 08C70 - K0234MEB or 08C70 - M0334MEB.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Do not install the parts if five minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.



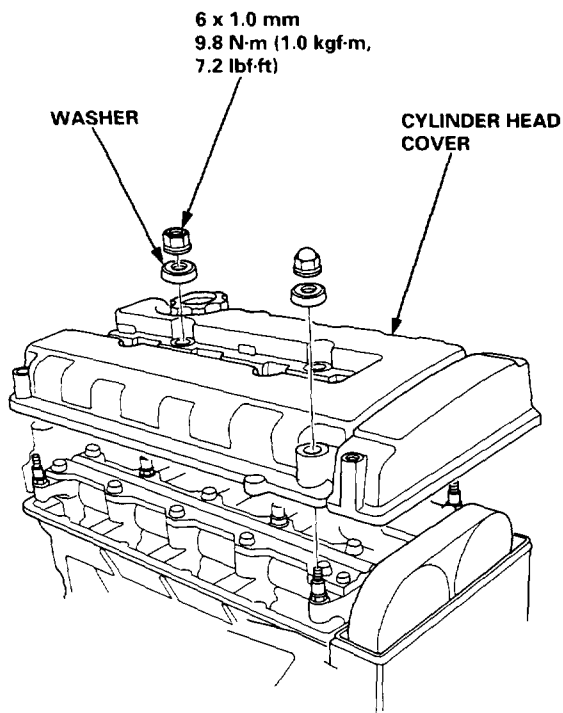


15. When installing the cylinder head cover, hold the head cover gasket in the groove by placing your fingers on the camshaft holder contacting surfaces (top of the semicircles).

Once the cylinder head cover is on the cylinder head, slide the cover slightly back and forth to seat the head cover gasket.

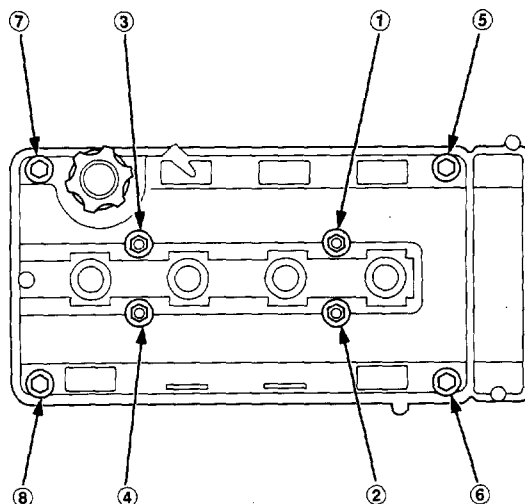
**NOTE:**

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



16. Tighten the nuts in two or three steps. In the final step, tighten all nuts, in sequence, to 9.8 N·m (1.0 kgf·m, 7.2 lbf·ft).

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



17. After installing, check that all tubes, hoses and connectors are installed correctly.



# Engine Block

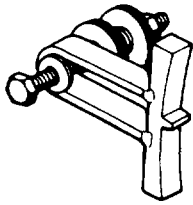
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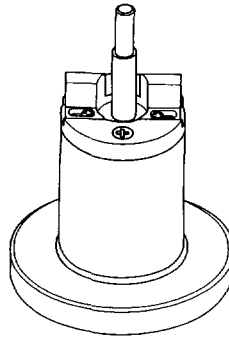


# Special Tools

Ref. No.	Tool Number	Description	Qty	Remark
①	07LAB - PV00100	Ring Gear Holder	1	
②	07PAF - 0010000	Piston Pin Assembly Tool Set	1	
②-1	07PAF - 0010650	Pilot Collar, O.D. 19 mm	1	
②-2	07PAF - 0010670	Pilot Collar, O.D. 21 mm	1	
③	07749 - 0010000	Handle Driver	1	
④	07948 - SB00101	Driver Attachment, 96 mm	1	



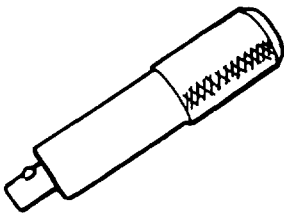
①



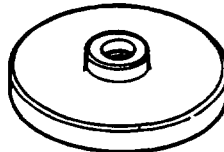
②



②-1, ②-2



③




④

# Illustrated Index

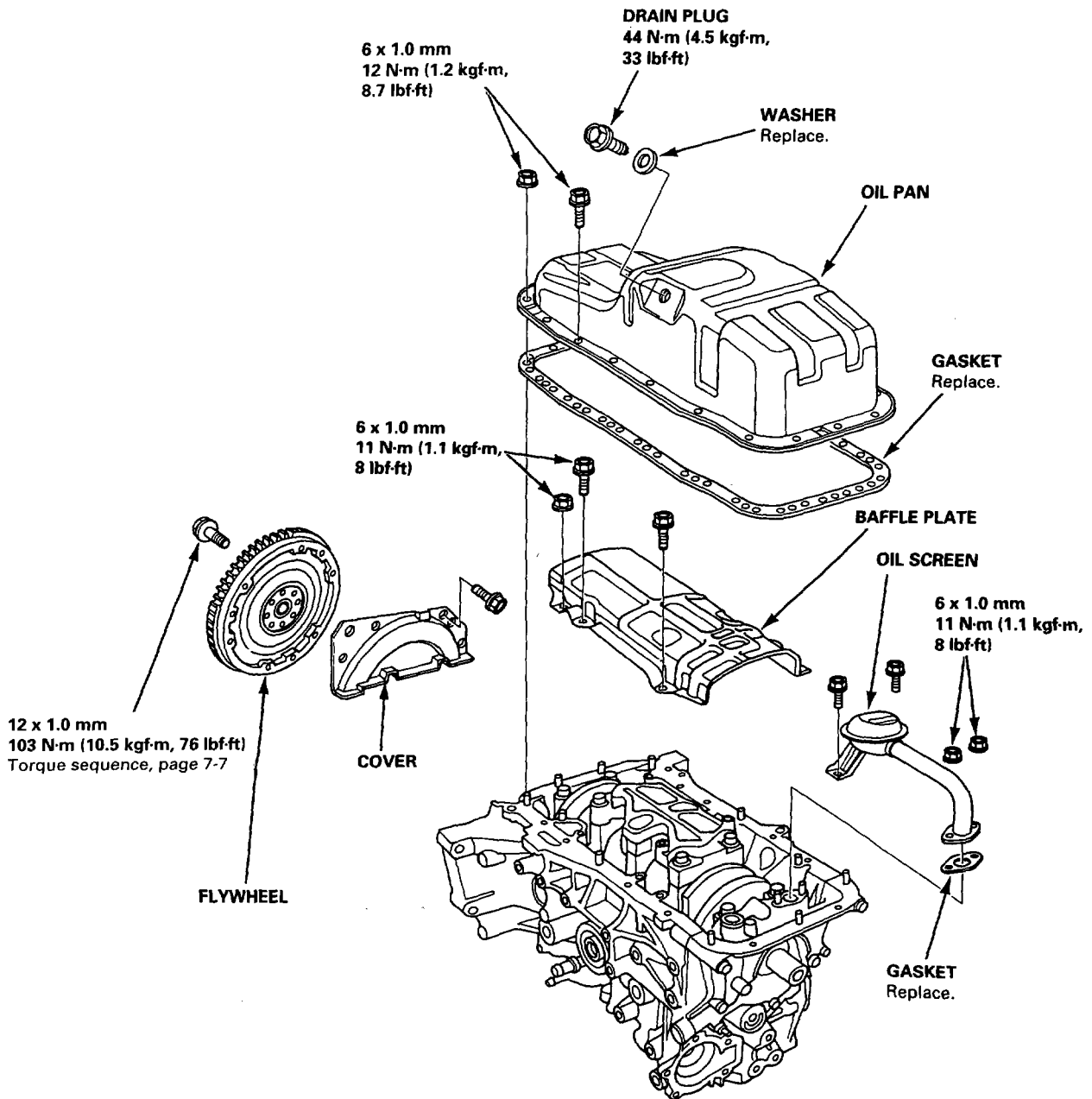


## NOTE:

- Apply liquid gasket to the mating surfaces of the right side cover and oil pump housing before installing them.
- Use liquid gasket, part No. 08C70 – X0134SEB, 08C70 – X0231SEB, 08C70 – K0234MEB or 08C70 – K0334MEB.
- Clean the oil pan gasket mating surfaces before installing it.

 Lubricate all internal parts with engine oil during reassembly.

## B18C4 engine:

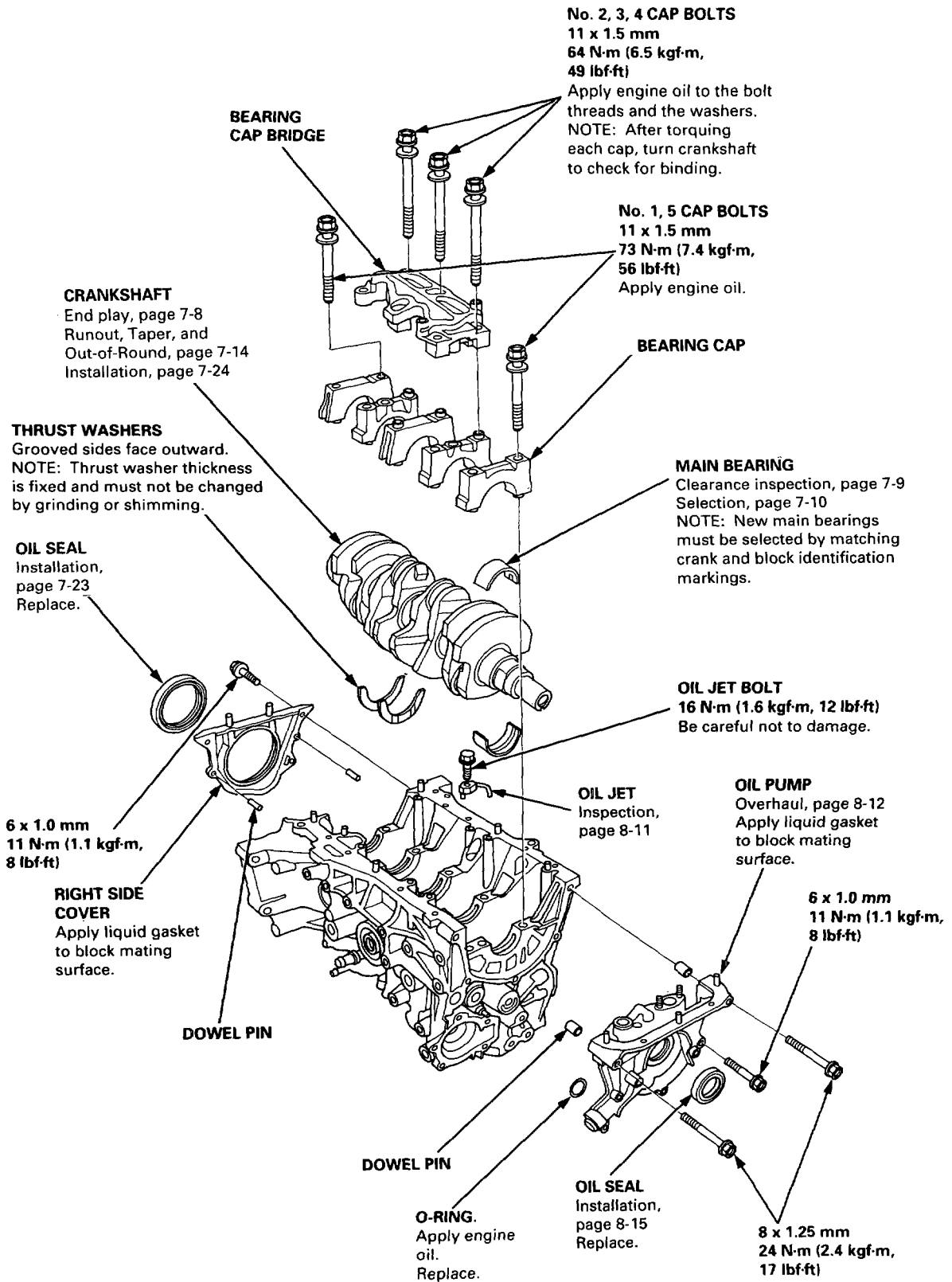


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# Illustrated Index

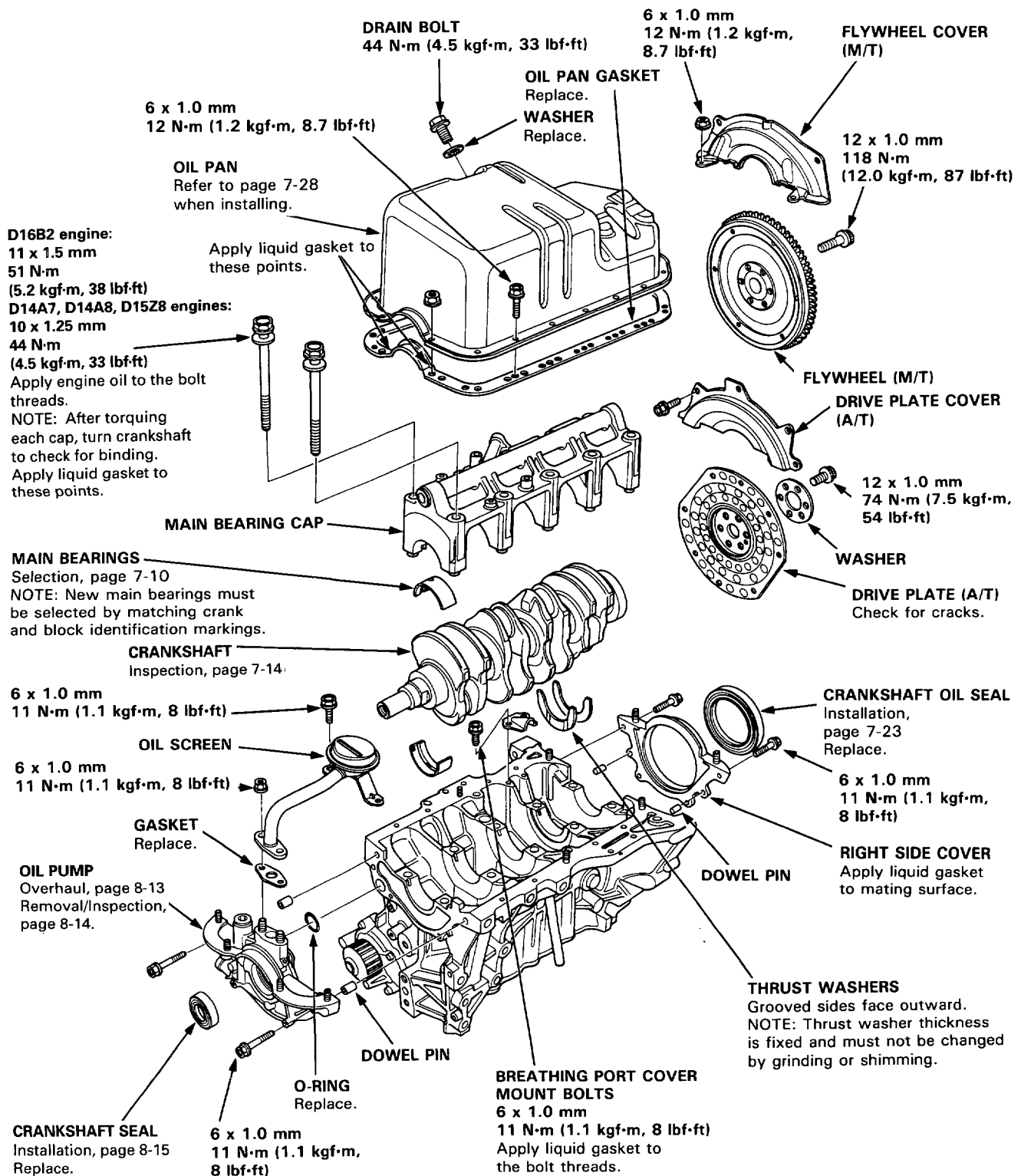
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B18C4 engine:





Except B18C4 engine:




(cont'd)

# Illustrated Index

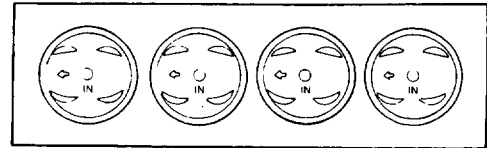
(cont'd)

NOTE: New rod bearings must be selected by matching connecting rod assembly and crankshaft identification markings (see page 7-11).

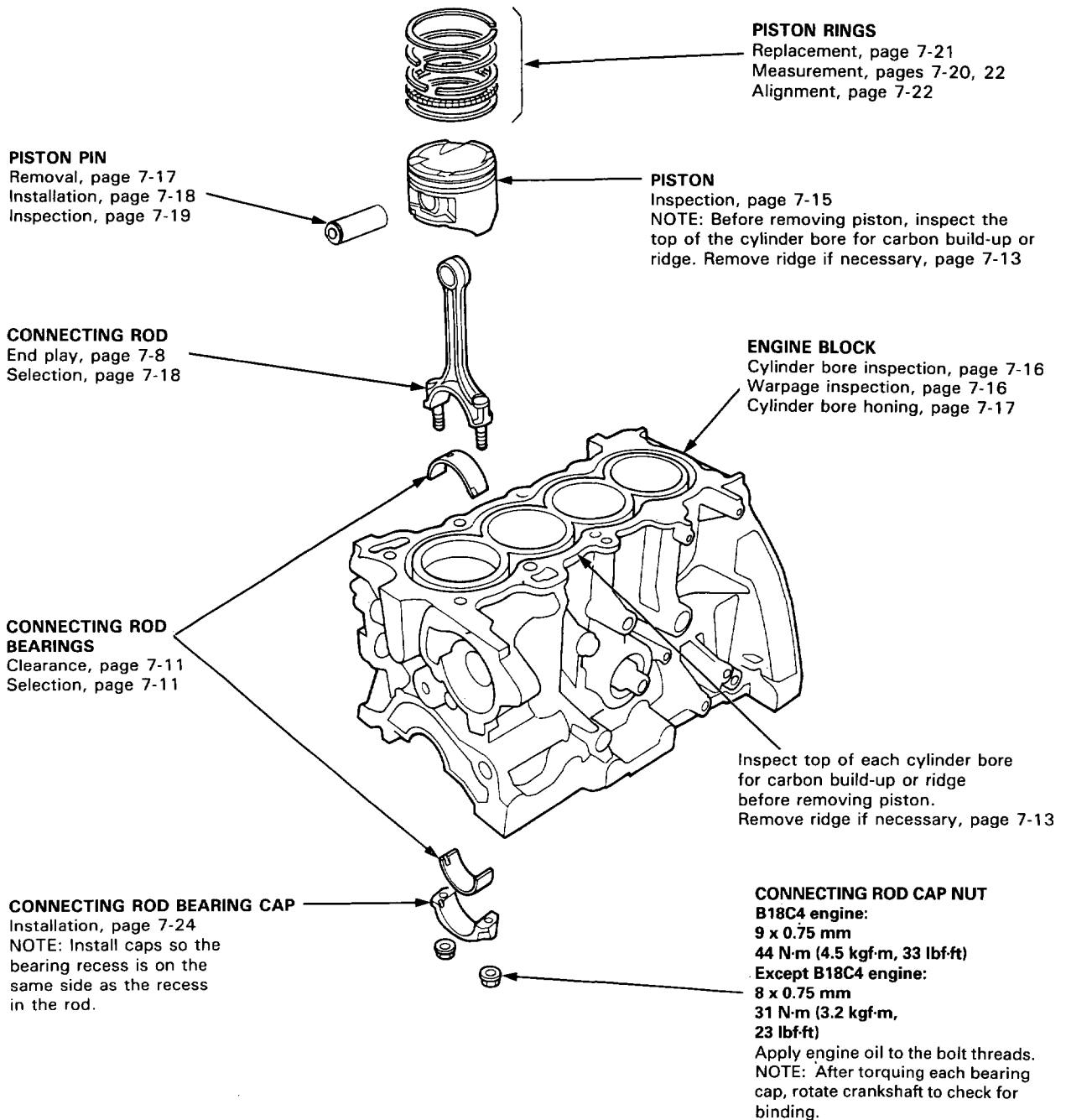
 Lubricate all internal parts with engine oil during reassembly.

## PISTON INSTALLATION DIRECTION:

EXHAUST



INTAKE



# Flywheel and Drive Plate

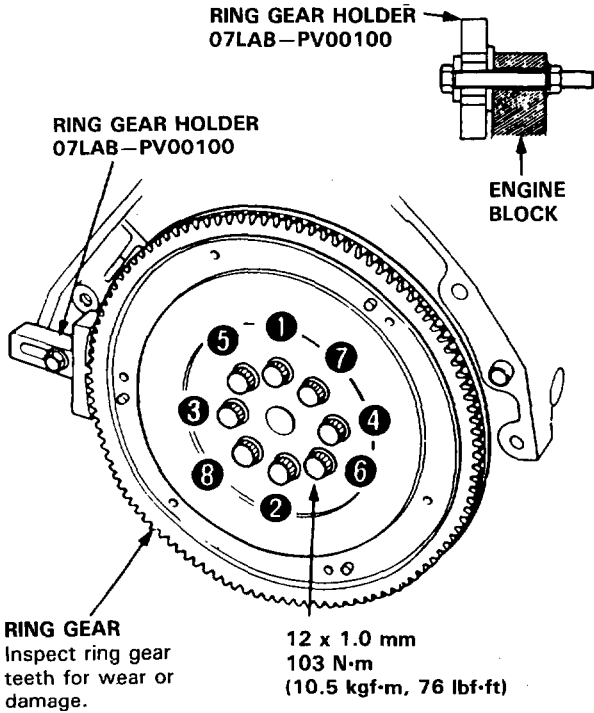


## Replacement

### Manual Transmission:

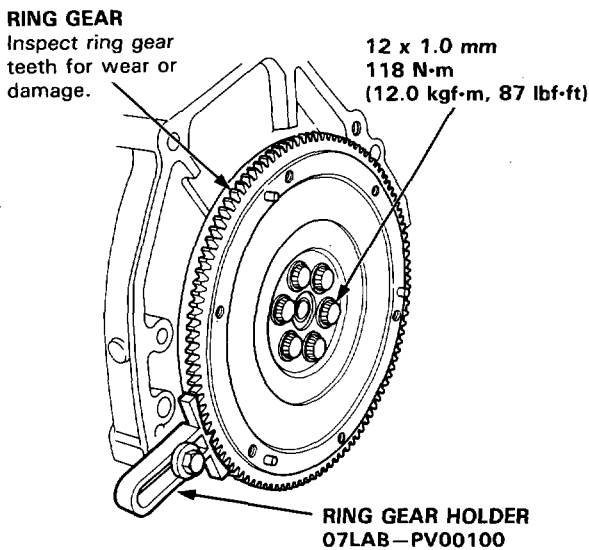
#### B18C4 engine:

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



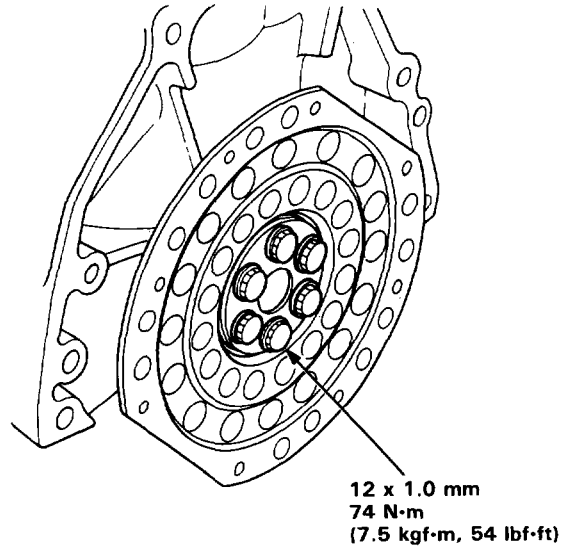
#### Except B18C4 engine:

Remove the six flywheel bolts, then separate the flywheel from the crankshaft flange. After installation, tighten the bolts in a crisscross pattern.



### Automatic Transmission:

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



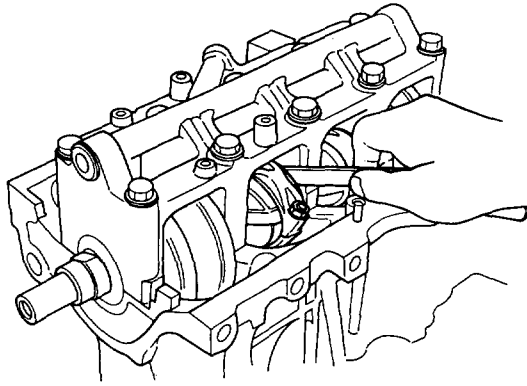
# Connecting Rod and Crankshaft

## End Play

### Connecting Rod End Play:

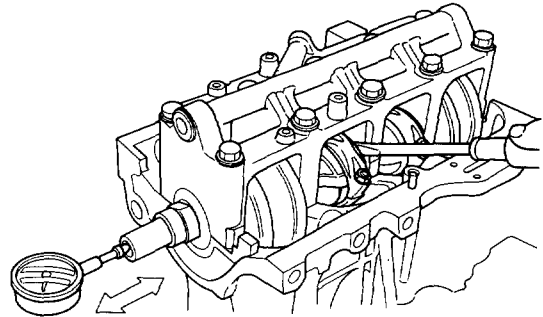
**Standard (New):** 0.15 – 0.30 mm  
(0.006 – 0.012 in)

**Service Limit:** 0.40 mm (0.016 in)



- If out-of-tolerance, install a new connecting rod.
- If still out-of-tolerance, replace the crankshaft (pages 7-12 and 7-24).

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



### Crankshaft End Play:

**Standard (New):** 0.10 – 0.35 mm  
(0.004 – 0.014 in)

**Service Limit:** 0.45 mm (0.018 in)

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

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





## Clearance

1. To check main bearing-to-journal oil clearance, remove the main caps and bearing halves.
2. Clean each main journal and bearing half with a clean shop towel.
3. Place one strip of plastigage across each main journal.

**NOTE:** If the engine is still in the car when you bolt the main cap down to check clearance, the weight of the crankshaft and flywheel will flatten the plastigage further than just the torque on the cap bolt, and give you an incorrect reading. For an accurate reading, support the crank with a jack under the counterweights and check only one bearing at a time.

4. Reinstall the bearings and caps, then torque the bolts.

**1st step: 25 N·m (2.5 kgf·m, 18 lbf·ft)**

**Final step:**

**B18C4 engine:**

**No. 1, 5 cap bolts 73 N·m (7.4 kgf·m, 56 lbf·ft)**

**No. 2, 3, 4 cap bolts 64 N·m (6.5 kgf·m, 49 lbf·ft)**

**D16B2 engine:**

**51 N·m (5.2 kgf·m, 38 lbf·ft)**

**D14A7, D14A8, D15Z8 engines:**

**44 N·m (4.5 kgf·m, 33 lbf·ft)**

**NOTE:** Do not rotate the crankshaft during inspection.

5. Remove the cap and bearing again, and measure the widest part of the plastigage.

### Main Bearing-to-Journal Oil Clearance:

**B18C4 engine:**

**Standard (New):**

**No. 1, 2, 4, 5 Journals:**

**0.024 – 0.042 mm (0.0009 – 0.0017 in)**

**No. 3 Journal:**

**0.030 – 0.048 mm (0.0012 – 0.0019 in)**

**Service Limit: 0.06 mm (0.002 in)**

**D16B2 engine:**

**Standard (New):**

**No. 1, 5 Journals:**

**0.018 – 0.036 mm (0.0007 – 0.0014 in)**

**No. 2, 3, 4 Journals:**

**0.024 – 0.042 mm (0.0009 – 0.0017 in)**

**Service Limit: 0.05 mm (0.002 in)**

**D14A7, D14A8, D15Z8 engines:**

**Standard (New):**

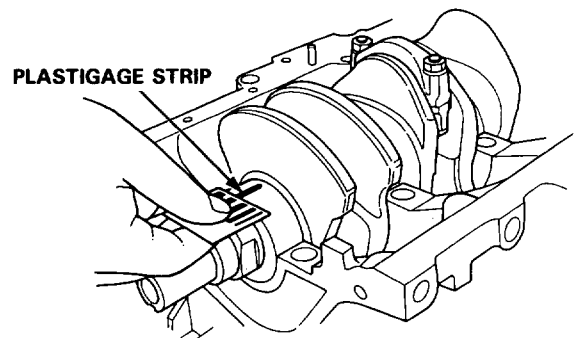
**No. 1, 5 Journals:**

**0.018 – 0.036 mm (0.0007 – 0.0014 in)**

**No. 2, 3, 4 Journals:**

**0.020 – 0.038 mm (0.0008 – 0.0015 in)**

**Service Limit: 0.05 mm (0.002 in)**



6. If the plastigage measures too wide or too narrow, (remove the engine if it's still in the car), remove the crankshaft, and remove the upper half of the bearing. Install a new, complete bearing with the same color code (select the color as shown on the next page), and recheck the clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check again.

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

# Main Bearing

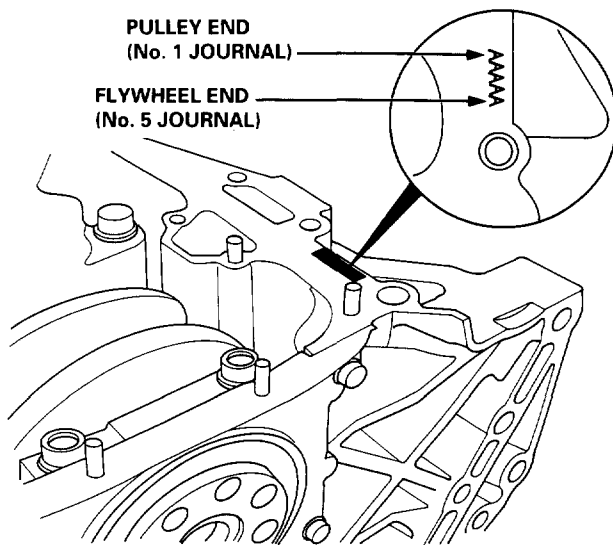
## Selection

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

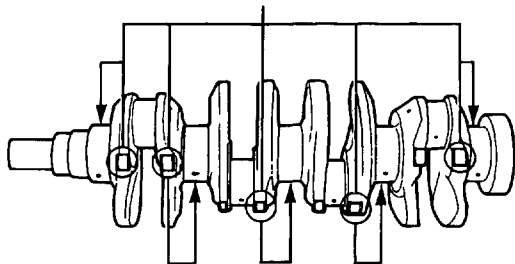
### Crankshaft Bore Code Location

#### B18C4 engine:

Letters have been stamped on the end of the block as a code for the size of each of the 5 main journal bores. Use them, and the numbers or bars stamped on the crank (codes for main journal size), to choose the correct bearings.

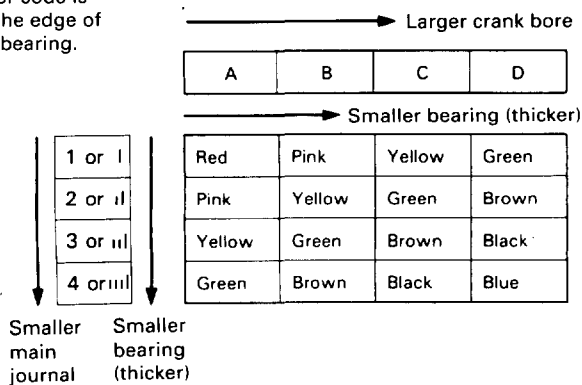


Main Journal Code Locations (Numbers or Bars)



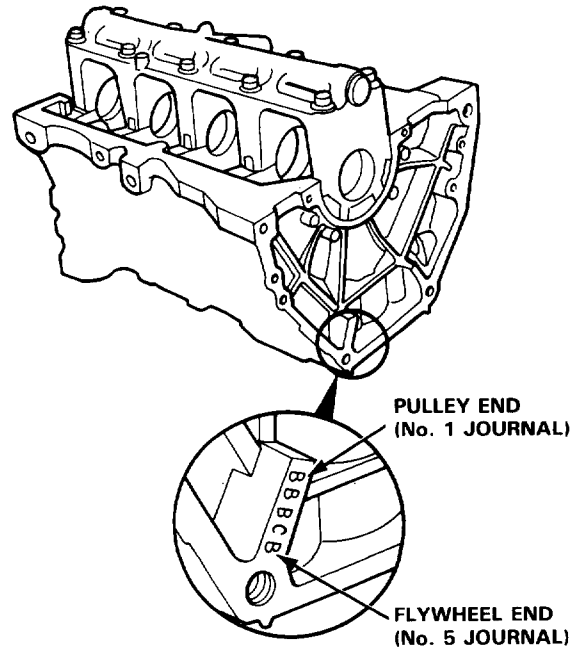
#### Bearing Identification

Color code is on the edge of the bearing.

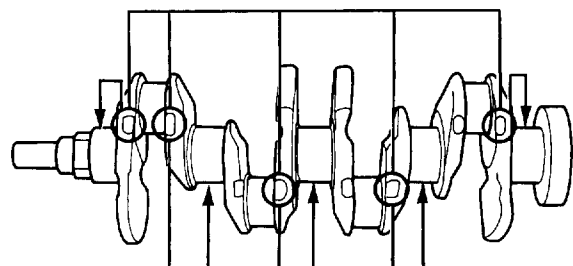


#### Except B18C4 engine:

Letters have been stamped on the end of the block as a code for the size of each of the 5 main journal bores. Use them, and the numbers stamped on the crankshaft (codes for main journal size), to choose the correct bearings.

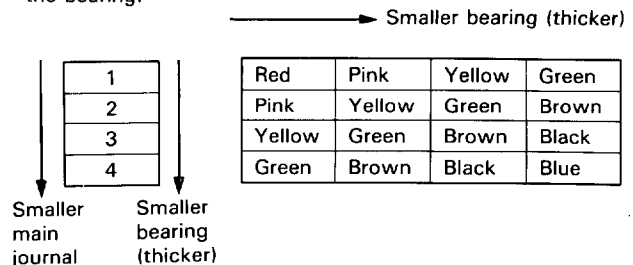


Main Journal Code Location (Numbers)



#### Bearing Identification

Color code is on the edge of the bearing.





# Connecting Rod Bearings

## Clearance

1. Remove the connecting rod cap and bearing half.
2. Clean the crankshaft rod journal and bearing half with a clean shop towel.
3. Place the plastigage across the rod journal.
4. Reinstall the bearing half and cap, and torque the nuts.

### Torque

**B18C4 engine: 44 N·m (4.5 kgf·m, 33 lbf·ft)**

**Except B18C4 engine: 31 N·m (3.2 kgf·m, 23 lbf·ft)**

NOTE: Do not rotate the crankshaft during inspection.

5. Remove the rod cap and bearing half and measure the widest part of the plastigage.

### Connecting Rod Bearing-to-Journal Oil Clearance:

**B18C4 engine:**

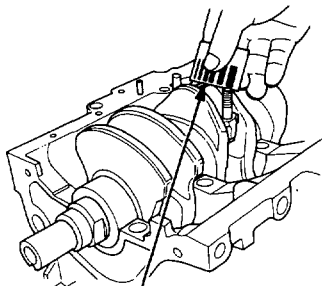
**Standard (New): 0.032 – 0.050 mm**  
(0.0013 – 0.0020 in)

**Service Limit: 0.06 mm (0.002 in)**

**Except B18C4 engine:**

**Standard (New): 0.020 – 0.038 mm**  
(0.0008 – 0.0015 in)

**Service Limit: 0.05 mm (0.002 in)**



**PLASTIGAGE STRIP**

6. If the plastigage measures too wide or too narrow, remove the upper half of the bearing, install a new, complete bearing with the same color code (select the color as shown in the right column), and recheck the clearance.
7. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing (the color listed above or below that one), and check clearance again.

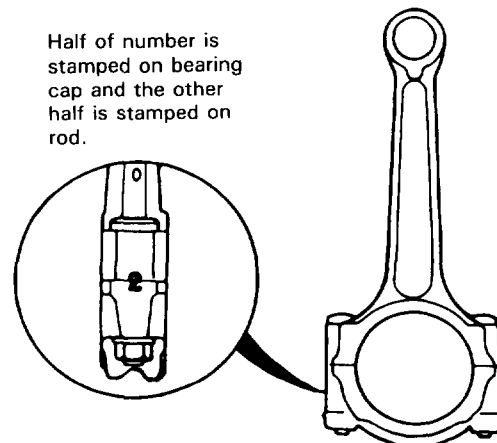
NOTE: If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over.

## Selection

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

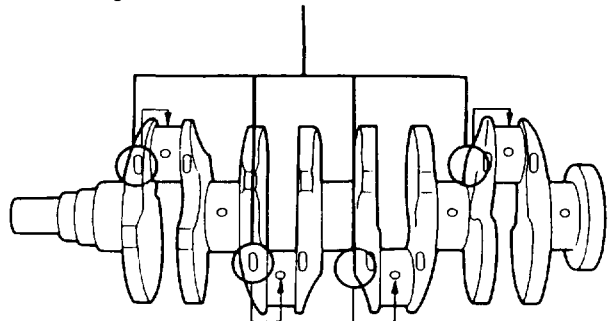
### Connecting Rod Code Location

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



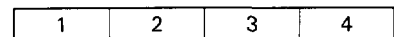
Half of number is stamped on bearing cap and the other half is stamped on rod.

### Connecting Rod Journal Code Locations (Letters)



### Bearing Identification

Color code is on the  $\longrightarrow$  Larger big end bore edge of the bearing.



$\downarrow$  Smaller rod journal  
 $\downarrow$  Smaller bearing (thicker)

$\longrightarrow$  Smaller bearing (thicker)

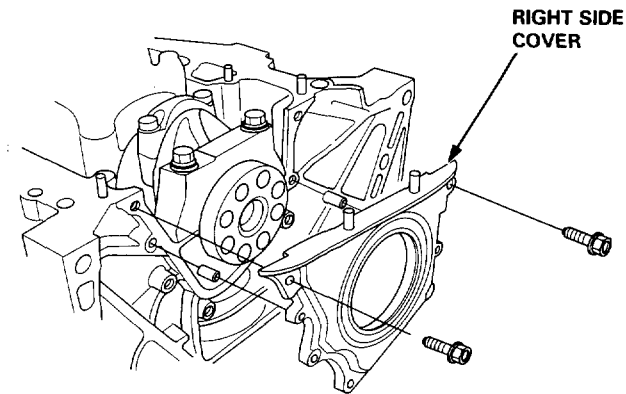
Red	Pink	Yellow	Green
Pink	Yellow	Green	Brown
Yellow	Green	Brown	Black
Green	Brown	Black	Blue

# Pistons and Crankshaft

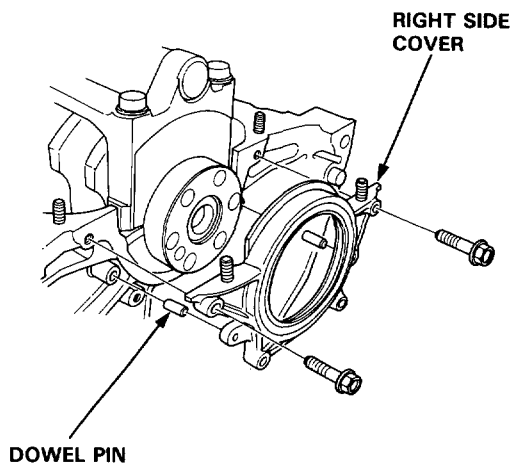
## Removal

1. Remove the oil pan assembly.
2. Remove the right side cover.

**B18C4 engine:**

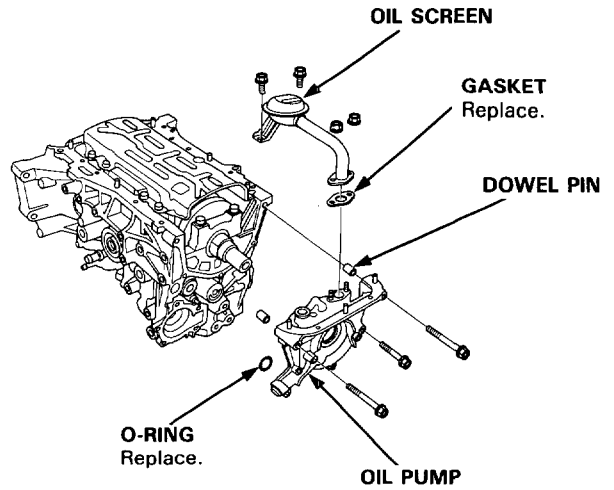


**Except B18C4 engine:**

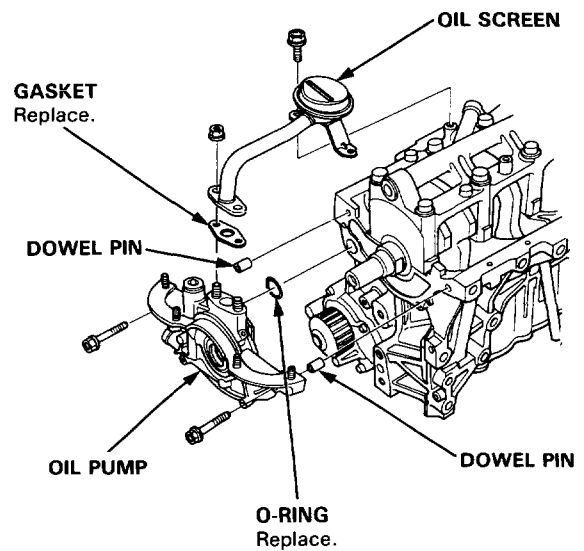


3. Remove the oil screen.
4. Remove the oil pump.

**B18C4 engine:**



**Except B18C4 engine:**

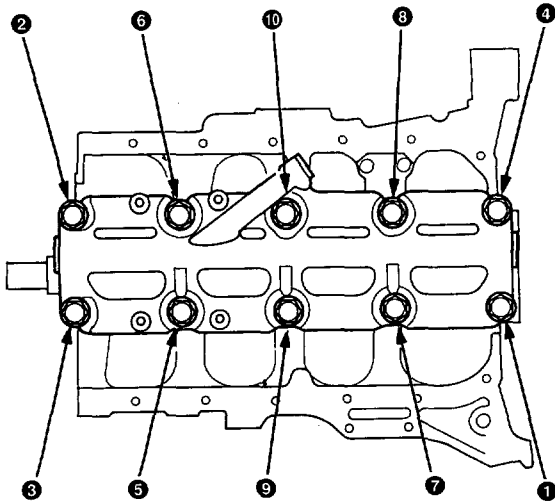


5. Remove the baffle plate (B18C4 engine).

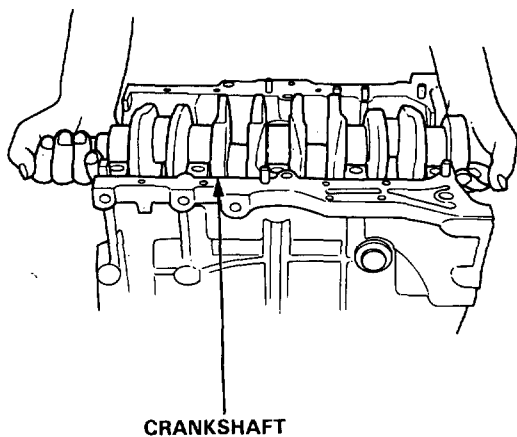


- Remove the bolts. To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened, then remove the bearing cap.

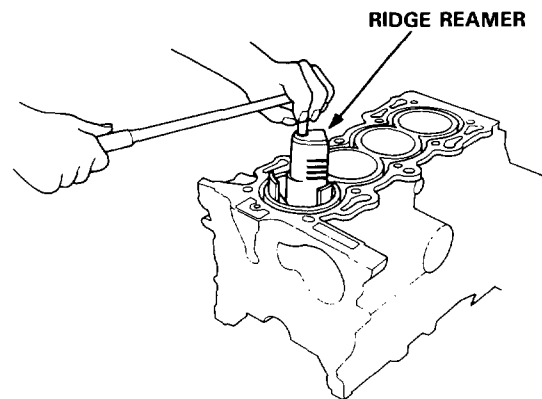
#### MAIN BEARING CAP BOLTS LOOSENING SEQUENCE



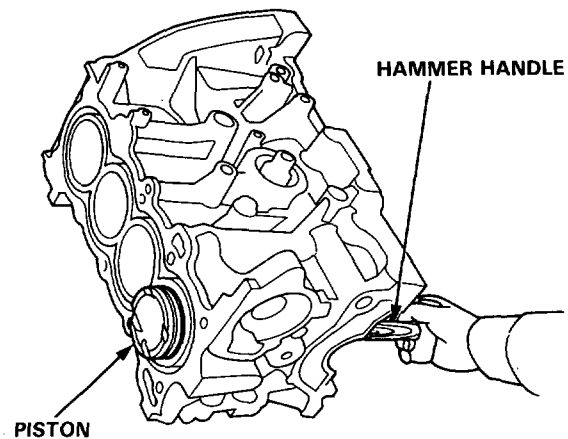
- Remove the rod caps/bearings and main caps/bearings. Keep all caps/bearings in order.
- Lift the crankshaft out of the engine, being careful not to damage journals.



- Remove the upper bearing halves from the connecting rods and set them aside with their respective caps.
- Reinstall the main caps and bearings on the engine in proper order.
- If you can feel a ridge of metal or hard carbon around the top of each cylinder, remove it with a ridge reamer. Follow the reamer manufacturer's instructions. If the ridge is not removed, it may damage the pistons as they are pushed out.



- Use the wooden handle of a hammer to drive the pistons out.



- Reinstall the connecting rod bearings and caps after removing each piston/connecting rod assembly.
- Mark each piston/connecting rod assembly with its cylinder number to avoid mixup on reassembly.

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

# Crankshaft

## Inspection

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

### Alignment

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

### Crankshaft Total Indicated Runout:

#### B18C4 engine:

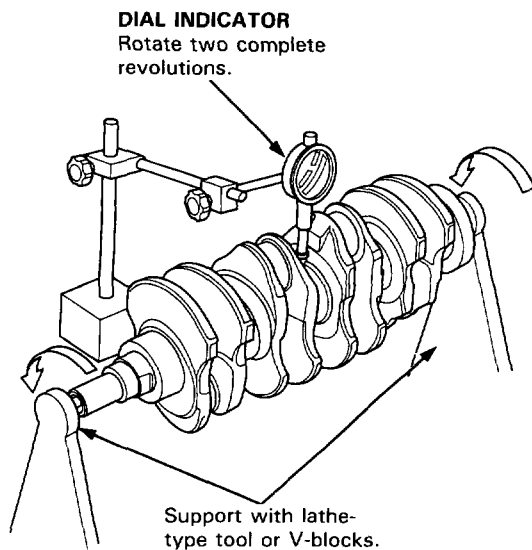
Standard (New): 0.020 mm (0.0008 in) max.

Service Limit: 0.030 mm (0.0012 in)

#### Except B18C4 engine:

Standard (New): 0.03 mm (0.001 in) max.

Service Limit: 0.04 mm (0.002 in)



### Out-of-Round and Taper

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

#### Journal Out-of-Round:

##### B18C4 engine:

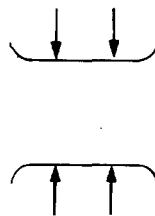
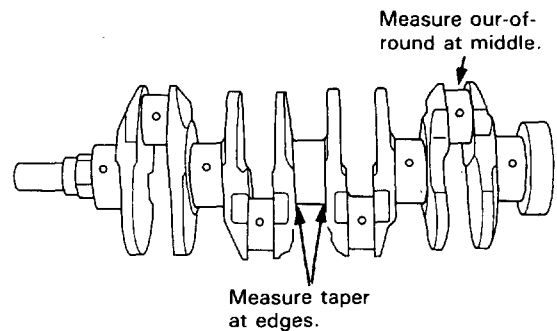
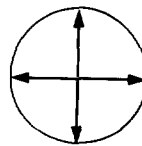
Standard (New): 0.0004 mm (0.0002 in) max.

Service Limit: 0.006 mm (0.0002 in)

##### Except B18C4 engine:

Standard (New): 0.0025 mm (0.0001 in) max.

Service Limit: 0.005 mm (0.0002 in)



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

#### Journal Taper:

##### B18C4 engine:

Standard (New): 0.005 mm (0.0002 in) max.

Service Limit: 0.010 mm (0.004 in)

##### Except B18C4 engine:

Standard (New): 0.0025 mm (0.0001 in) max.

Service Limit: 0.005 mm (0.0002 in)



## Inspection

1. Check the piston for distortion or cracks.

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

2. Measure piston diameter at a point A from bottom of skirt.

**B18C4 engine:**

**A: 15 mm (0.6 in)**

**Except B18C4 engine:**

**A: 5 mm (0.2 in)**

**Piston Diameter:**

**B18C4 engine:**

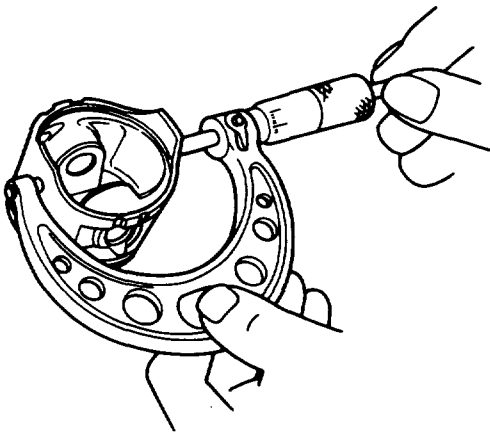
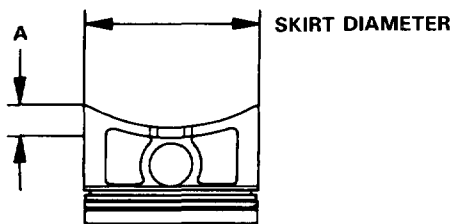
**Standard (New): 80.980 – 80.990 mm  
(3.1882 – 3.1886 in)**

**Service Limit: 80.970 mm (3.1878 in)**

**Except B18C4 engine:**

**Standard (New): 74.980 – 74.990 mm  
(2.9520 – 2.9524 in)**

**Service Limit: 74.970 mm (2.9516 in)**

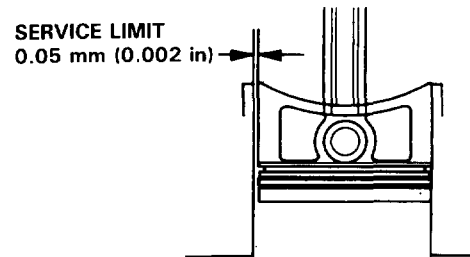


3. Calculate difference between cylinder bore diameter (see page 7-16) and piston diameter.

**Piston-to-Cylinder Clearance**

**Standard (New): 0.010 – 0.040 mm  
(0.0004 – 0.0016 in)**

**Service Limit: 0.05 mm (0.002 in)**



If the clearance is near or exceeds the service limit, inspect the piston and cylinder block for excessive wear.

**Oversize Piston Diameter**

**B18C4 engine:**

**0.25: 81.23 – 81.24 mm (3.1980 – 3.1984 in)**

**Except B18C4 engine:**

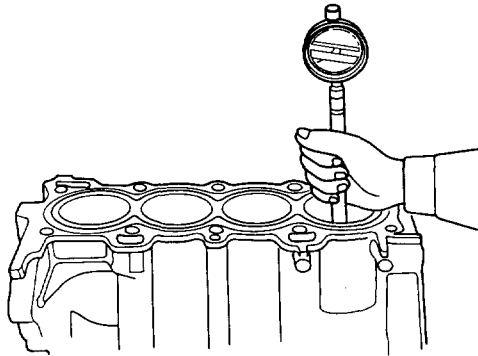
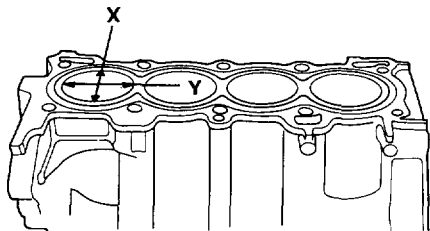
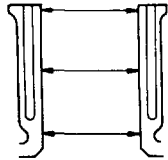
**0.25: 75.23 – 75.24 mm (2.9618 – 2.9622 in)**

**0.50: 75.48 – 75.49 mm (2.9716 – 2.9720 in)**

# Cylinder Block

## Inspection

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



### Cylinder Bore Size:

#### B18C4 engine:

Standard (New): 81.00 – 81.02 mm  
(3.189 – 3.190 in)

Service Limit: 81.07 mm (3.192 in)

#### Except B18C4 engine:

Standard (New): 75.00 – 75.02 mm  
(2.953 – 2.954 in)

Service Limit: 75.07 mm (2.956 in)

### Oversize

#### B18C4 engine:

0.25: 81.25 – 81.27 mm (3.199 – 3.200 in)

#### Except B18C4 engine:

0.25: 75.25 – 75.27 mm (2.9626 – 2.9634 in)

0.50: 75.50 – 75.52 mm (2.9724 – 2.9732 in)

### Bore Taper

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

- If measurements in any cylinder are beyond Oversize Bore Service Limit, replace the block.
- If block is to be rebored, refer to Piston Clearance Inspection (see page 7-15) after reboring.

NOTE: Scored or scratched cylinder bores must be honed.

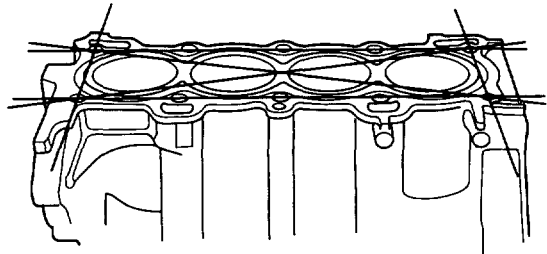
### Reboring Limit:

B18C4 engine: 0.25 mm (0.01 in)

Except B18C4 engine: 0.50 mm (0.02 in)

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

### SURFACES TO BE MEASURED



### Engine Block Warpage:

#### B18C4 engine:

Standard (New): 0.05 mm (0.002 in) max.

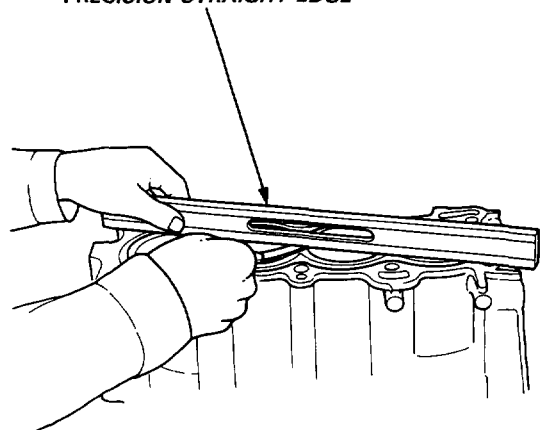
Service Limit: 0.08 mm (0.003 in)

#### Except B18C4 engine:

Standard (New): 0.07 mm (0.003 in) max.

Service Limit: 0.10 mm (0.004 in)

### PRECISION STRAIGHT EDGE





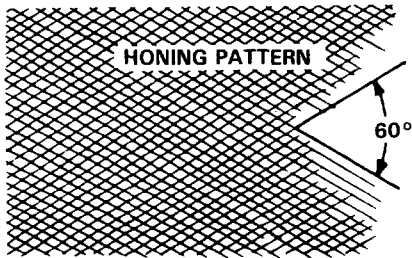


## Bore Honing

1. Measure cylinder bores as shown on page 7-16. If the block is to be reused, hone the cylinders and remeasure the bores.
2. Hone cylinder bores with honing oil and a fine (400 grit) stone in a 60 degree cross-hatch pattern.

**NOTE:**

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

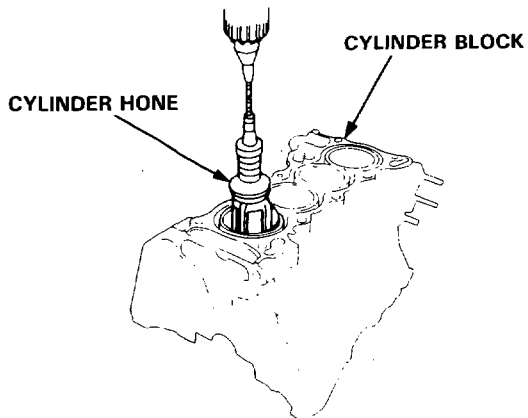


3. When honing is complete, thoroughly clean the engine block of all metal particles. Wash the cylinder bores with hot soapy water, then dry and oil immediately to prevent rusting.

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

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

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



**NOTE:**

- After honing, clean the cylinder thoroughly with soapy water.
- Only a scored or scratched cylinder bore must be honed.

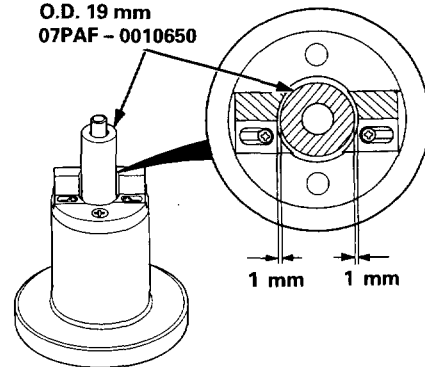
## Removal

**NOTE:**

- Use the piston pin assembly tool set (No. 07PAF - 0010000) for removal of piston pins.
- Be sure to use the pilot collar of correct No. as designated.

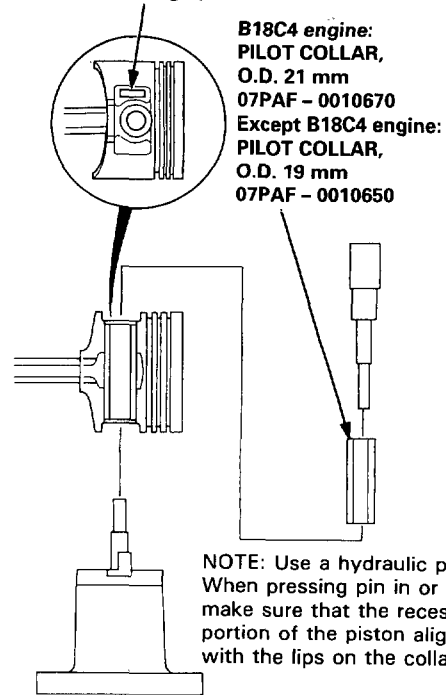
1. Set the special tools as shown.

**B18C4 engine:**  
**PILOT COLLAR,**  
**O.D. 21 mm**  
**07PAF - 0010670**  
**Except B18C4 engine:**  
**PILOT COLLAR,**  
**O.D. 19 mm**  
**07PAF - 0010650**



2. Place the piston on the special tools and press the pin out using a hydraulic press.

Embossed mark facing up.



**B18C4 engine:**  
**PILOT COLLAR,**  
**O.D. 21 mm**  
**07PAF - 0010670**  
**Except B18C4 engine:**  
**PILOT COLLAR,**  
**O.D. 19 mm**  
**07PAF - 0010650**

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

# Connecting Rods

## Selection

Each rod falls into one of four tolerance ranges (from 0 to + 0.024 mm (0 to + 0.0009 in), in 0.006 mm (0.0002 in) increments) depending on the size of its big end bore. It's then stamped with a number (1, 2, 3, or 4) indicating the range. You may find any combination of 1, 2, 3, or 4 in any engine.

### Normal Bore Size:

**D14A7, D14A8 engines:**

43.0 mm (1.69 in)

**D15Z8 engine:**

45.0 mm (1.77 in)

**Except D14A7, D14A8, D15Z8 engines:**

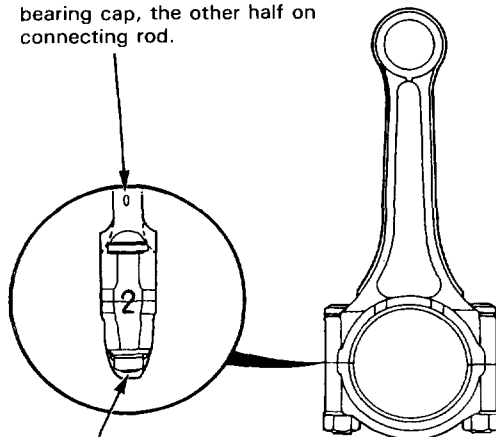
48.0 mm (1.89 in)

### NOTE:

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

### CONNECTING ROD BORE REFERENCE NUMBER

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



Inspect bolts and nuts for stress cracks.

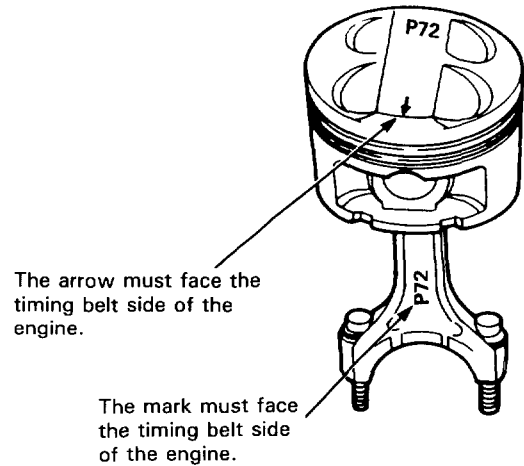
# Piston Pins

## Installation

### B18C4 engine:

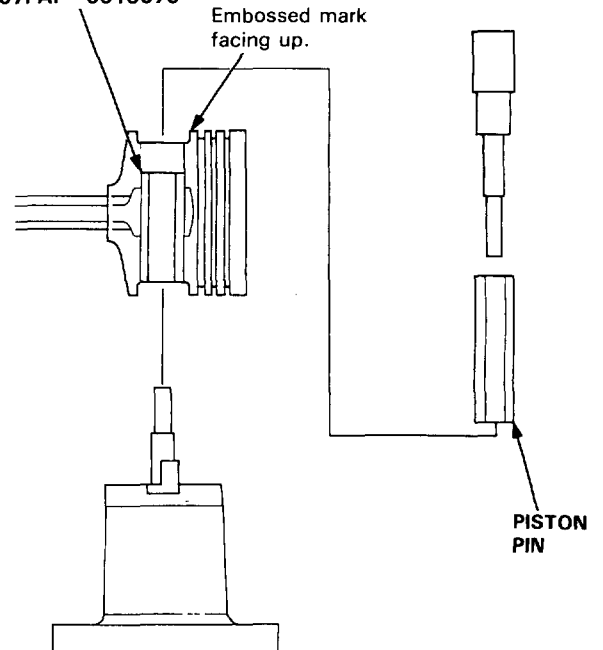
### NOTE:

- Use the piston pin assembly tool set (No. 07PAF – 0010000) with a hydraulic press.
- Be sure to use the pilot collar of correct No. as designated.



1. Install the piston pin as shown.

### PILOT COLLAR. O.D. 21 mm 07PAF-0010670





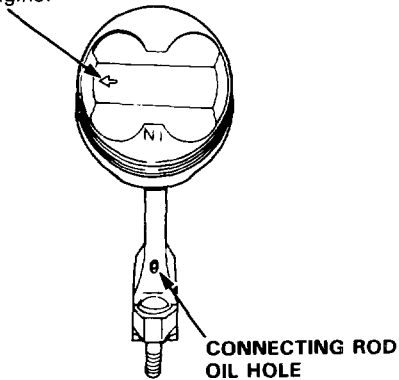
## Inspection

**Except B18C4 engine:**

**NOTE:**

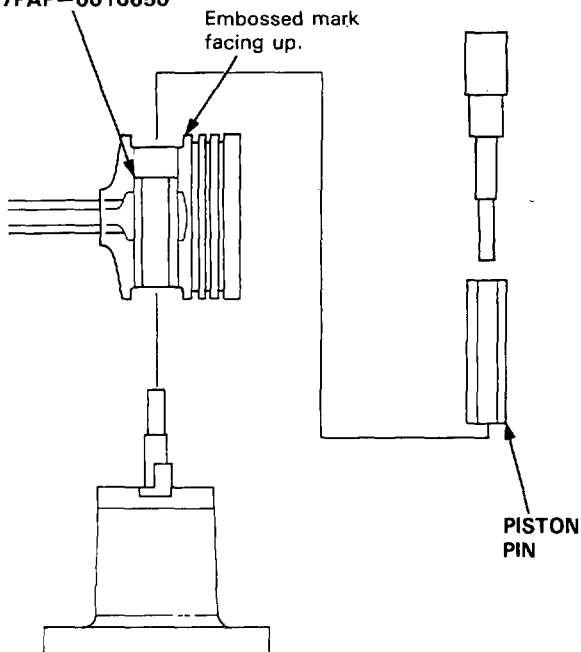
- Use the piston pin assembly tool set (No. 07PAF – 0010000) with a hydraulic press.
- Be sure to use the pilot collar of correct No. as designated.

The arrow must face the timing belt side of the engine and the connecting rod oil hole must face the rear of the engine.



1. Install the piston pin as shown.

**PILOT COLLAR,  
O.D. 19 mm  
07PAF-0010650**



**NOTE:** Install the assembled piston and rod with the oil hole facing the intake manifold.

1. Measure the diameter of the piston pin.

**B18C4 engine:**

**Piston Pin Diameter:**

**Standard (New):** 20.994 – 21.000 mm  
(0.8265 – 0.8268 in)

**Oversize:** 20.997 – 21.003 mm  
(0.8267 – 0.8269 in)

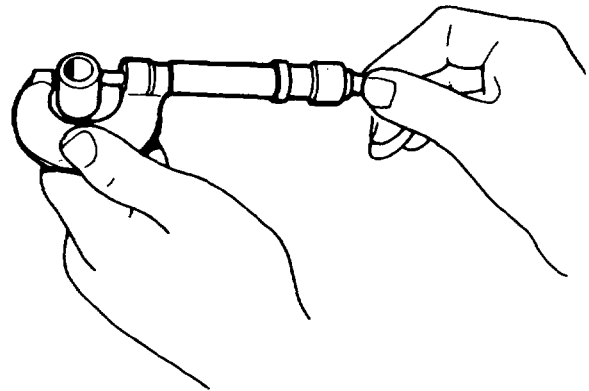
**Except B18C4 engine:**

**Piston Pin Diameter:**

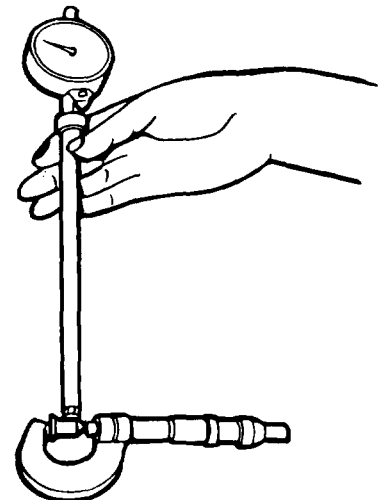
**Standard (New):** 18.994 – 19.000 mm  
(0.7478 – 0.7480 in)

**Oversize:** 18.997 – 19.003 mm  
(0.7479 – 0.7481 in)

**NOTE:** All replacement piston pins are oversize.



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



(cont'd)

# Piston Pins

# Piston Rings

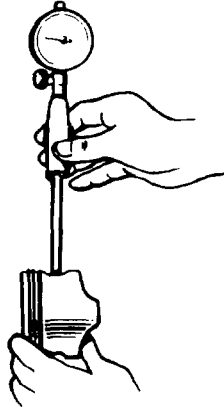
## Inspection (cont'd)

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

NOTE: Check the piston for distortion or cracks.

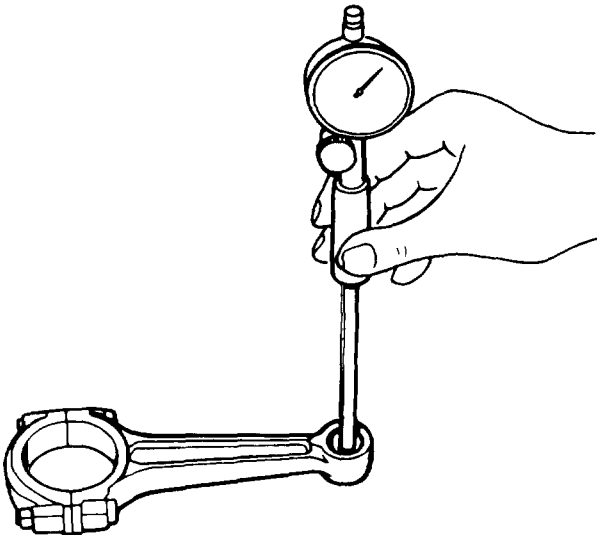
If the piston pin clearance is greater than 0.024 mm (0.0009 in), remeasure using an oversized piston pin.

**Piston Pin-to-Piston Clearance:**  
Standard (New): 0.010 – 0.022 mm  
(0.0004 – 0.0009 in)



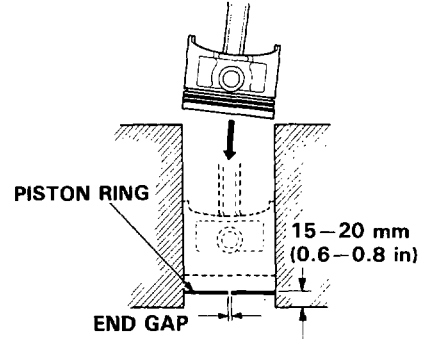
4. Check the difference between piston pin diameter and connecting rod small end diameter.

**Piston Pin-to-Connecting Rod Interference:**  
B18C4 engine:  
Standard (New): 0.017 – 0.032 mm  
(0.0007 – 0.0013 in)  
Except B18C4 engine:  
Standard (New): 0.014 – 0.040 mm  
(0.0006 – 0.0016 in)



## End Gap

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



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

- If the gap is too small, check to see if you have the proper rings for your engine.
- If the gap is too large, recheck the cylinder bore diameter against the wear limits on page 7-15. If the bore is over the service limit, the cylinder block must be rebored.

### Piston Ring End-Gap:

**Top Ring**  
B18C4 engine:  
Standard (New): 0.20 – 0.35 mm  
(0.008 – 0.014 in)  
Service Limit: 0.60 mm (0.024 in)  
Except B18C4 engine:  
Standard (New): 0.15 – 0.30 mm  
(0.006 – 0.012 in)  
Service Limit: 0.60 mm (0.024 in)

**Second Ring**  
B18C4 engine:  
Standard (New): 0.40 – 0.55 mm  
(0.016 – 0.022 in)  
Service Limit: 0.70 mm (0.028 in)  
Except B18C4 engine:  
Standard (New): 0.30 – 0.45 mm  
(0.012 – 0.018 in)  
Service Limit: 0.70 mm (0.028 in)



## Replacement

### Oil Ring

#### B18C4 engine:

**Standard (New):** 0.20 – 0.50 mm  
(0.008 – 0.020 in)

**Service Limit:** 0.70 mm (0.028 in)

#### D15Z8, D16B2 engines:

**Standard (New):** 0.20 – 0.70 mm  
(0.008 – 0.028 in)

**Service Limit:** 0.80 mm (0.031 in)

#### D14A7, D14A8 engines:

**Standard (New):** 0.20 – 0.80 mm  
(0.008 – 0.031 in)

**Service Limit:** 0.90 mm (0.035 in)

1. Using a ring expander, remove the old piston rings.
2. Clean all ring grooves thoroughly.

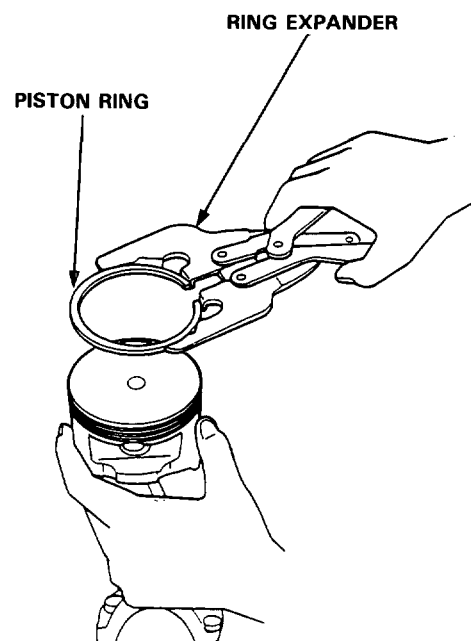
#### NOTE:

- Use a squared-off broken ring or ring groove cleaner with blade to fit piston grooves.
- Top ring groove is 1.2 mm (0.047 in) wide (D14A7, D14A8 engines) or 1.0 mm (0.039 in) wide (except D14A7, D14A8 engines).
- Second ring groove is 1.5 mm (0.059 in) wide (D14A7, D14A8 engines) or 1.2 mm (0.047 in) wide (except D14A7, D14A8 engines).
- Oil ring groove is 2.8 mm (0.11 in) wide.
- File down blade if necessary.
- Do not use a wire brush to clean ring lands, or cut ring lands deeper with cleaning tool.

3. Install new rings in proper sequence and position (see page 7-23).

#### NOTE:

- Do not reuse old piston rings.
- If piston is to be separated from connecting rod, do not install new rings yet.



# Piston Rings

## Ring-to-Groove Clearance

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

### Top Ring Clearance

Standard (New):

B18C4 engine:

0.045 – 0.070 mm (0.0018 – 0.0028 in)

D15Z8, D16B2 engines:

0.035 – 0.060 mm (0.0014 – 0.0024 in)

D14A7, D14A8 engines:

0.030 – 0.060 mm (0.0012 – 0.0024 in)

Service Limit: 0.13 mm (0.005 in)

### Second Ring Clearance

Standard (New):

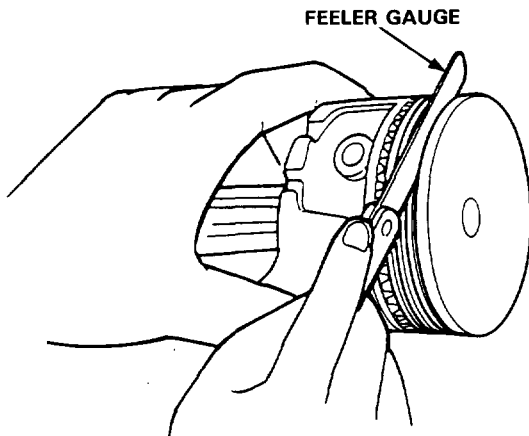
B18C4 engine:

0.040 – 0.065 mm (0.0016 – 0.0026 in)

Except B18C4 engine:

0.030 – 0.055 mm (0.0012 – 0.0022 in)

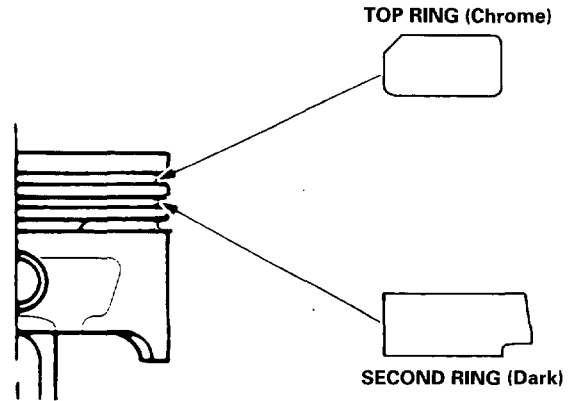
Service Limit: 0.13 mm (0.005 in)



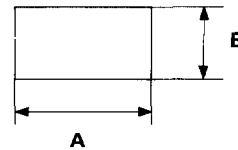
## Alignment

1. Install the rings as shown.

NOTE: The manufacturing marks must be facing upward.



### Piston Ring Dimensions:



#### Top Ring (Standard)

Unit mm (in)

	A	B
B18C4 engine	2.8 (0.11)	1.0 (0.04)
D15Z8, D16B2 engines	2.6 (0.10)	1.0 (0.04)
D14A7, D14A8 engines	2.8 (0.11)	1.2 (0.05)

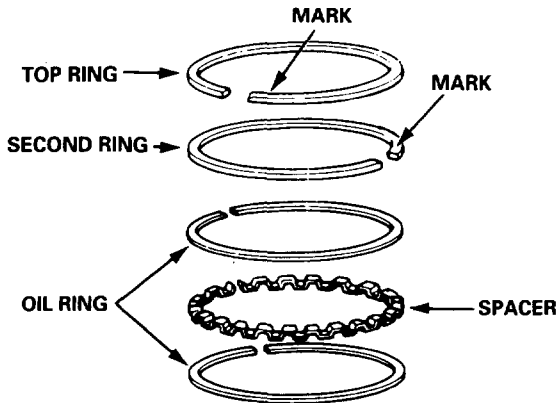
#### Second Ring (Standard)

Unit mm (in)

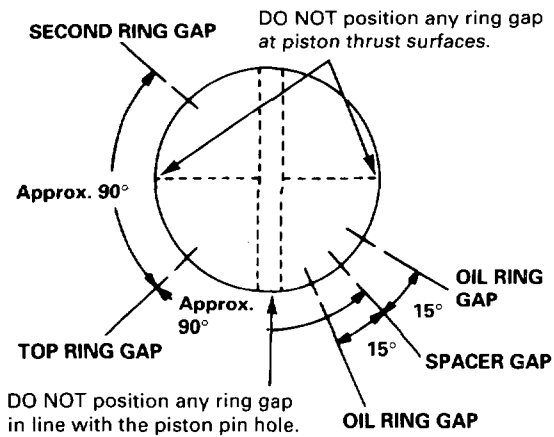
	A	B
B18C4 engine	3.3 (0.13)	1.2 (0.05)
D15Z8, D16B2 engines	3.0 (0.12)	1.2 (0.05)
D14A7, D14A8 engines	3.2 (0.13)	1.5 (0.06)



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



3. Position the ring end gaps as shown:

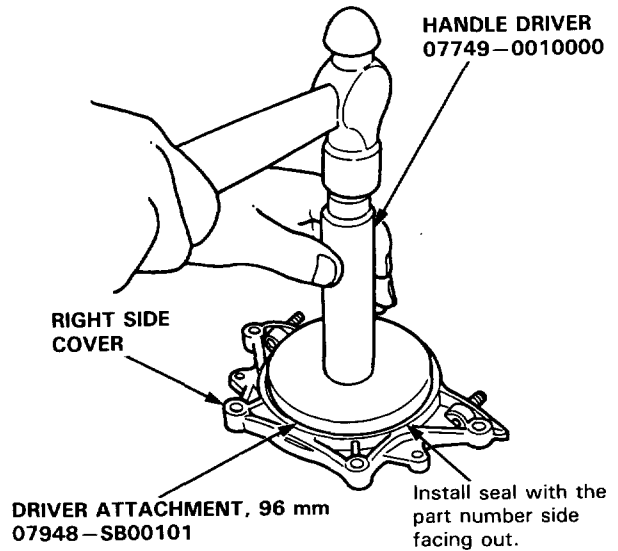


## Installation

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

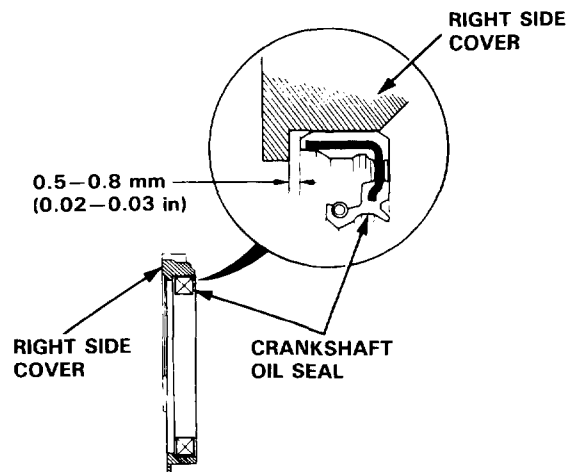
1. Drive in crankshaft oil seal against right side cover.

NOTE: Drive the crankshaft oil seal in squarely.



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


Clearance: 0.5 – 0.8 mm (0.02 – 0.03 in)



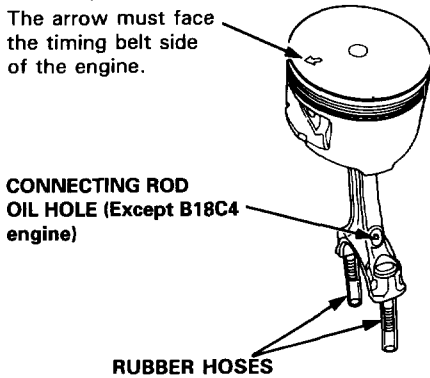
NOTE: Refer to page 8-15 for installation of the oil pump side crankshaft oil seal.

# Pistons

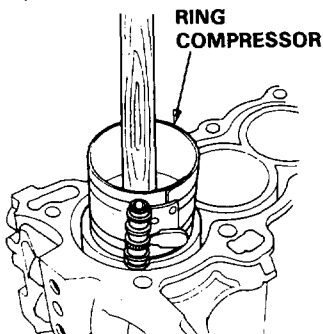
## Installation

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

1. If the crankshaft is already installed:
  - Set the crankshaft to BDC for each cylinder.
  - Remove the connecting rod caps, and slip short sections of rubber hose over the threaded ends of the connecting rod bolts.
  - Install the ring compressor, check that the bearing is securely in place, then position the piston in the cylinder, and tap it in using the wooden handle of a hammer.
  - Stop after the ring compressor pops free, and check the connecting rod-to-crank journal alignment before pushing piston into place.
  - Install the rod caps with bearings, and torque the nuts to:  
B18C4 engine:  
44 N·m (4.5 kgf·m, 33 lbf·ft)  
Apply engine oil to the bolt threads.  
Except B18C4 engine:  
31 N·m (3.2 kgf·m, 23 lbf·ft)  
Apply engine oil to the bolt threads.
2. If the crankshaft is not installed:
  - Remove the rod caps and bearings, install the ring compressor, then position the piston in the cylinder, and tap it in using the wooden handle of a hammer.
  - Position all pistons at top dead center.




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

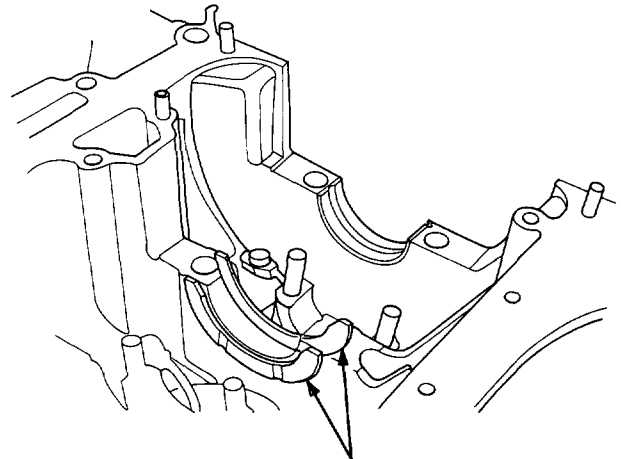


# Crankshaft

## Installation

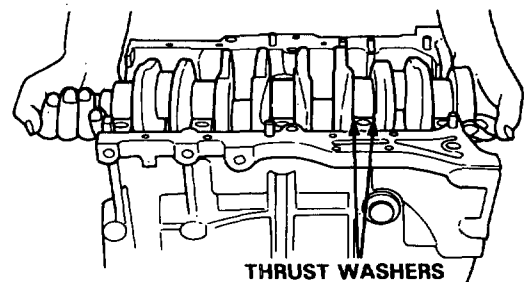
 Before installing the crankshaft, apply a coat of engine oil to the main bearings and rod bearings.

1. Insert the thrust washers in the No. 4 journal of the cylinder block.



**THRUST WASHERS**  
Grooved side facing outward.

2. Insert bearing halves in the cylinder block and connecting rods.
3. Hold the crankshaft so rod journals for cylinders No. 2 and No. 3 are straight down.
4. Lower the crankshaft into the block, seating the rod journals into connecting rods No. 2 and No. 3, and install the rod caps and nuts finger-tight.



**THRUST WASHERS**  
Grooved sides face outward.

5. Rotate the crankshaft clockwise, seat journals into connecting rods No. 1 and No. 4, and install the rod caps and nuts finger-tight.

NOTE: Install caps so the bearing recess is on the same side as the recess in the rod.





6. Check rod bearing clearance with plastigage (see page 7-11), then torque the capnuts.

**B18C4 engine:**

1st step: 20 N·m (2.0 kgf·m, 14 lbf·ft)

2nd step: 44 N·m (4.5 kgf·m, 33 lbf·ft)

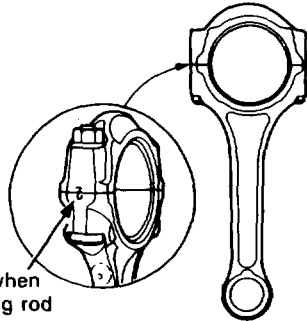
**Except B18C4 engine:**

31 N·m (3.2 kgf·m, 23 lbf·ft)

Apply engine oil to the bolt threads.

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

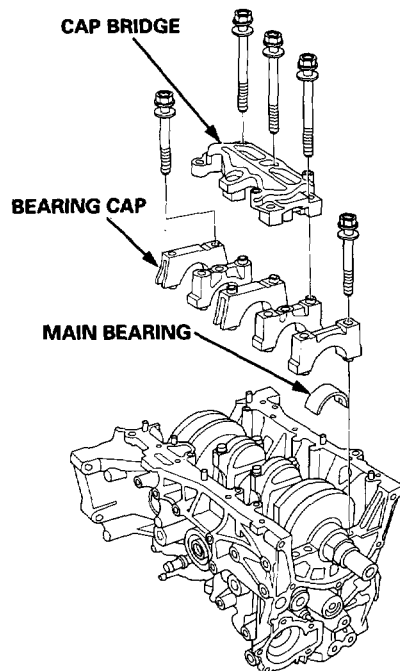
7. Install the thrust washers on the No. 4 journal. Oil the thrust washer surfaces.



Line up the mark when installing connecting rod cap.

8. Install the main bearings/caps and cap bridge (B18C4 engine).

NOTE: Coat the bolt threads with oil.



9. Install the main bearing caps (except B18C4 engine).
10. Check clearance with plastigage (see page 7-9), then tighten the bearing cap bolts in 2 steps.

**B18C4 engine:**

1st step: 29 N·m (3.0 kgf·m, 22 lbf·ft)

2nd step:

No. 1, 5 cap bolts: 73 N·m (7.4 kgf·m, 56 lbf·ft)

No. 2, 3, 4 cap bolts: 64 N·m (6.5 kgf·m, 49 lbf·ft)

**Except B18C4 engine:**

1st step: 25 N·m (2.5 kgf·m, 18 lbf·ft)

2nd step:

D16B2 engine: 51 N·m (5.2 kgf·m, 38 lbf·ft)

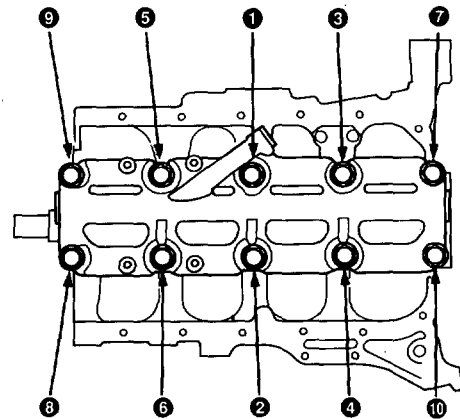
D14A7, D14A8, D15Z8 engines:

44 N·m (4.5 kgf·m, 33 lbf·ft)

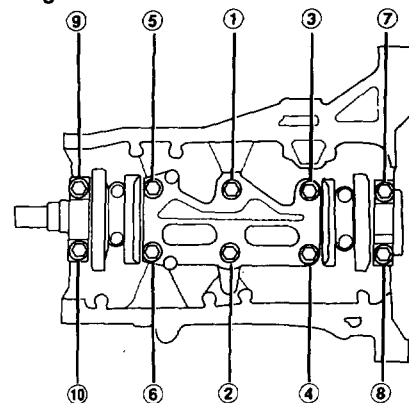
NOTE: Coat the thrust washer surfaces and bolt threads with oil.

**MAIN BEARING CAP BOLTS TIGHTENING SEQUENCE**

Except B18C4 engine:



B18C4 engine:



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

# Crankshaft

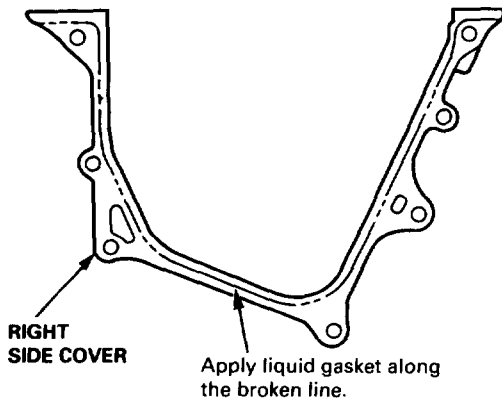
## Installation (cont'd)

**NOTE:**

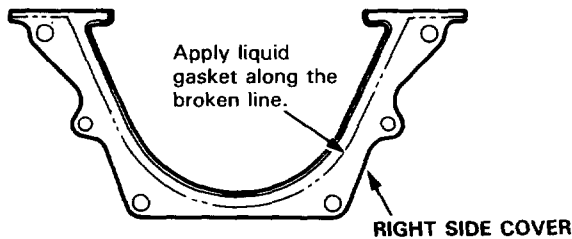
- Use liquid gasket, part No. 08C70 – X0134SEB, 08C70 – X0231SEB, 08C70 – K0234 MEB or 08C70 – K0334MEB.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket evenly, being careful to cover all the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if five minutes or more have elapsed since applying the liquid gasket. Instead, reapply liquid gasket after removing the old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

11. Apply liquid gasket to the block mating surface of the right side cover, then install it on the cylinder block.

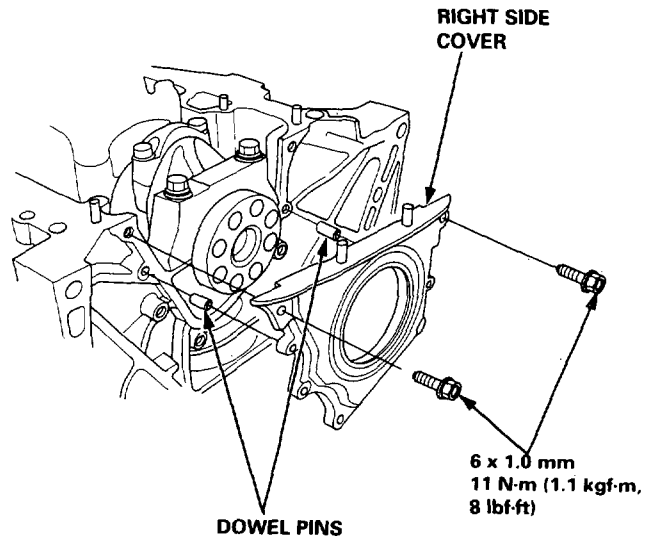
**B18C4 engine:**



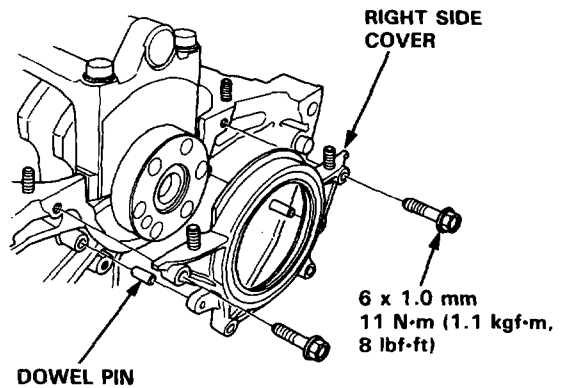
**Except B18C4 engine:**



**B18C4 engine:**



**Except B18C4 engine:**

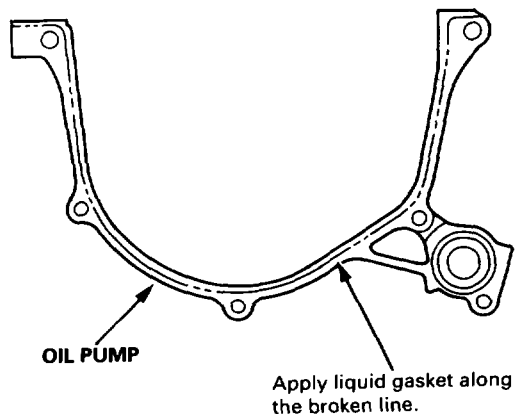




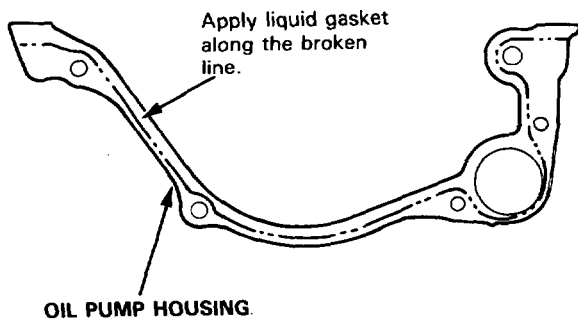
12. Apply liquid gasket to the oil pump mating surface of the block, then install the oil pump on the cylinder block.

- Apply grease to the lips of the oil seals. Then, install the oil pump while aligning the inner rotor with the crankshaft. When the pump is in place, clean any excess grease off the crankshaft, then check that the oil seal lips are not distorted.

**B18C4 engine:**



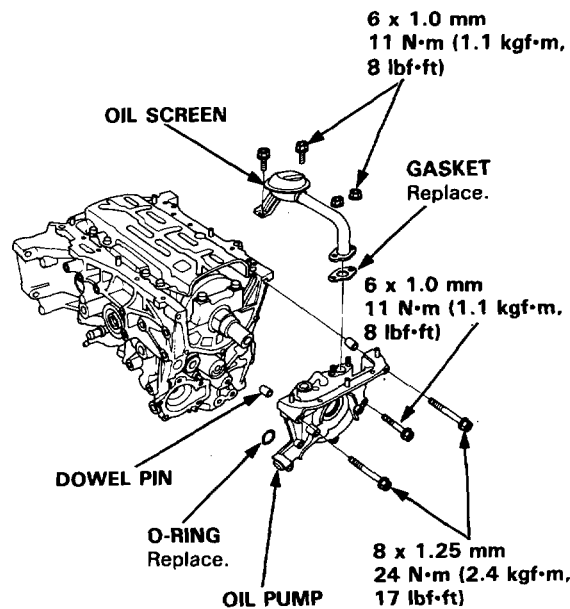
**Except B18C4 engine:**



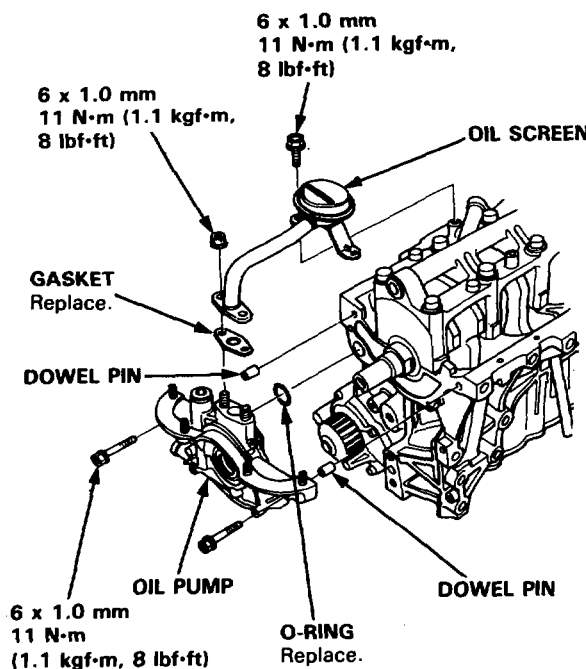
**NOTE:**

- Apply a light coat of oil to the crankshaft and to the lip of seal.
- Use new O-rings and apply oil when installing them.

**B18C4 engine:**



**Except B18C4 engine:**



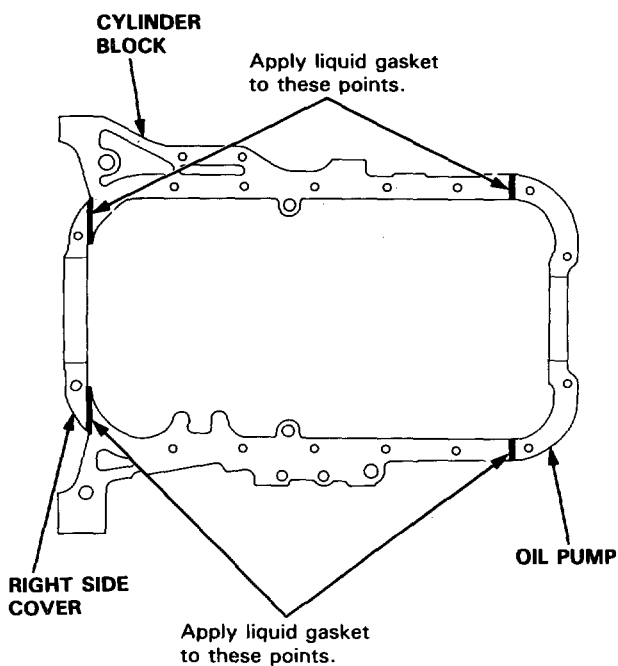
# Oil Pan

## Installation

### NOTE:

- Use liquid gasket, part No. 08C70 – X0134SEB, 08C70 – X0231SEB, 08C70 – K0234MEB or 08C70 – K0334MEB.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket as an even bead, centered between the edges of the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if five minutes or more have elapsed since applying the liquid gasket. Instead, reapply liquid gasket after removing the old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

1. Apply liquid gasket on the oil pump and right side cover mating areas as shown below.

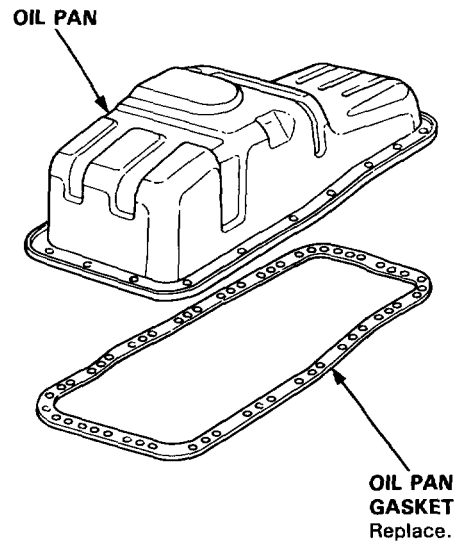


2. Install the oil pan gasket and oil pan.

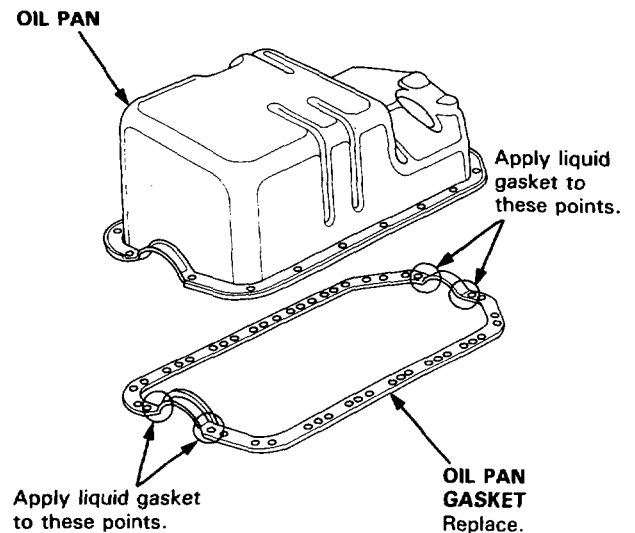
### NOTE:

- Use a new oil pan gasket.
- Install oil pan no more than five minutes after liquid gasket applied.

### B18C4 engine:

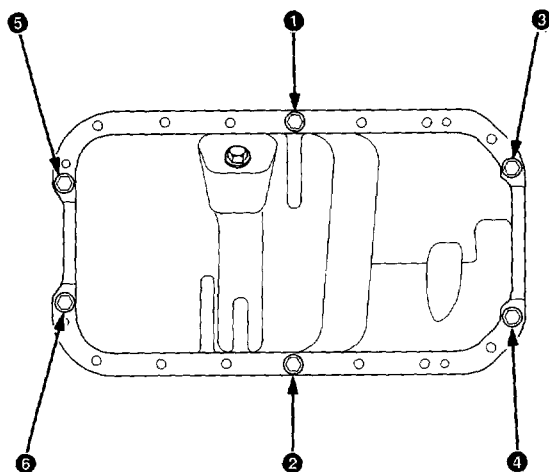


### Except B18C4 engine:





3. Tighten bolts and nuts finger tight at six points as shown below.



4. Tighten all bolts and nuts, starting from bolt ①, clockwise in these steps.

NOTE: Excessive tightening can cause distortion of oil pan gasket and oil leakage.

**Torque: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)**

## Engine Lubrication

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Testing .....	8-10
Oil Pressure	
Testing .....	8-10
Oil Jet (B18C4 engine)	
Inspection .....	8-11
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Overhaul .....	8-12
Removal/Inspection/Installation .....	8-14

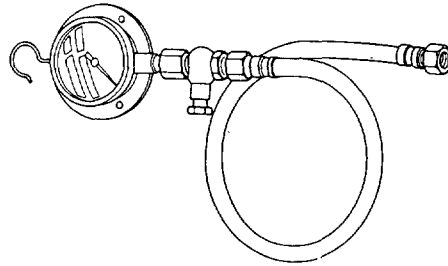


# Special Tools

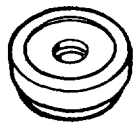
Ref. No.	Tool Number	Description	Qty	Remark
①	07406 - 0030000	Oil Pressure Gauge Attachment	1	
②	07506 - 3000000	Oil Pressure Gauge	1	
③	07746 - 0010400	Driver Attachment, 52 x 55 mm	1	
④	07749 - 0010000	Handle Driver	1	
⑤	07912 - 6110001	Oil Filter Wrench	1	



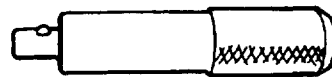
①



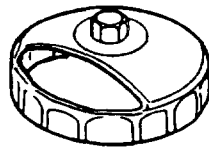
②



③



④



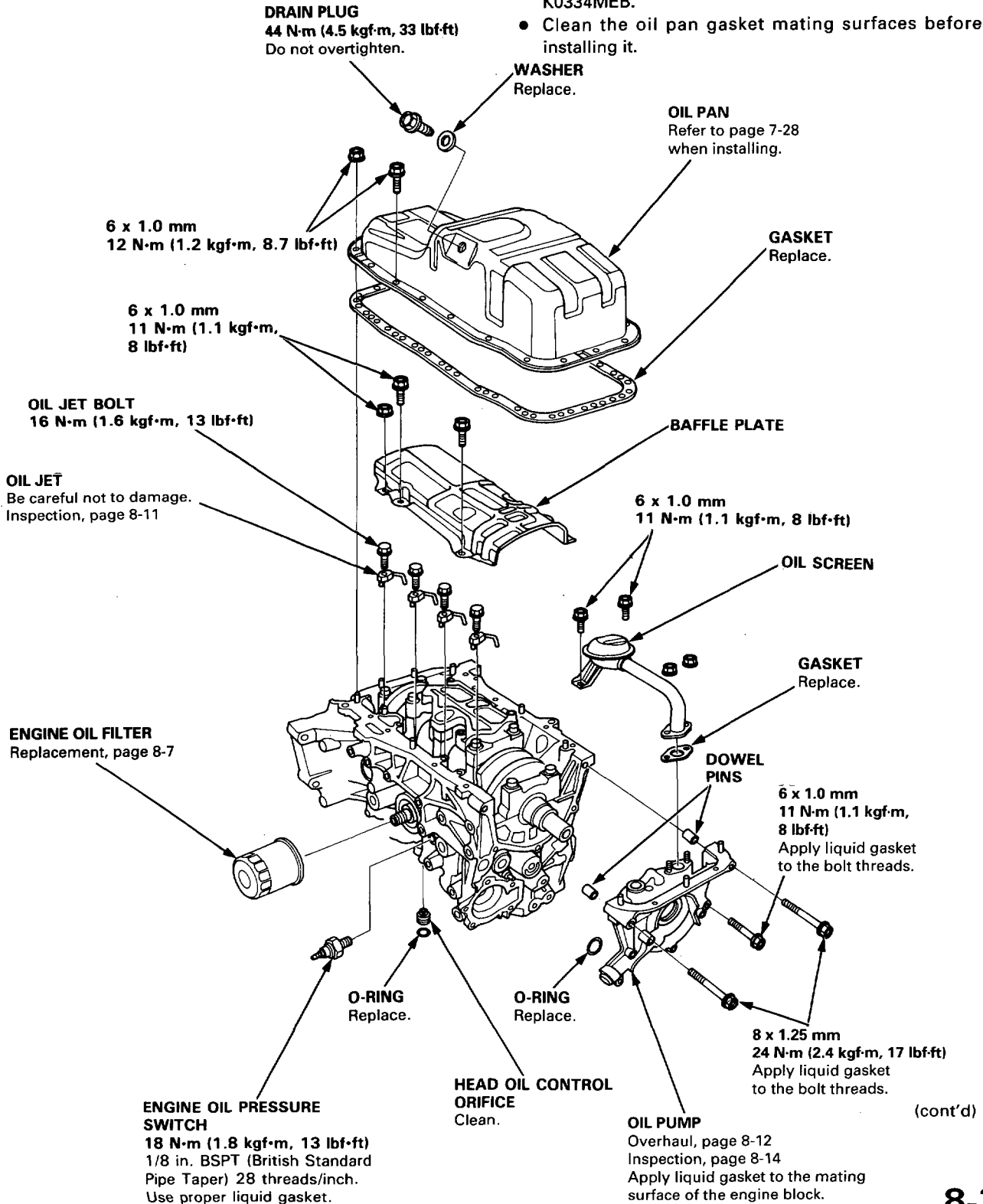
⑤



**D18C4 engine:**

**NOTE:**

- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part No. 08C70 – X0134SEB, 08C70 – X0231SEB, 08C70 – K0234MEB or 08C70 – K0334MEB.
- Clean the oil pan gasket mating surfaces before installing it.



(cont'd)



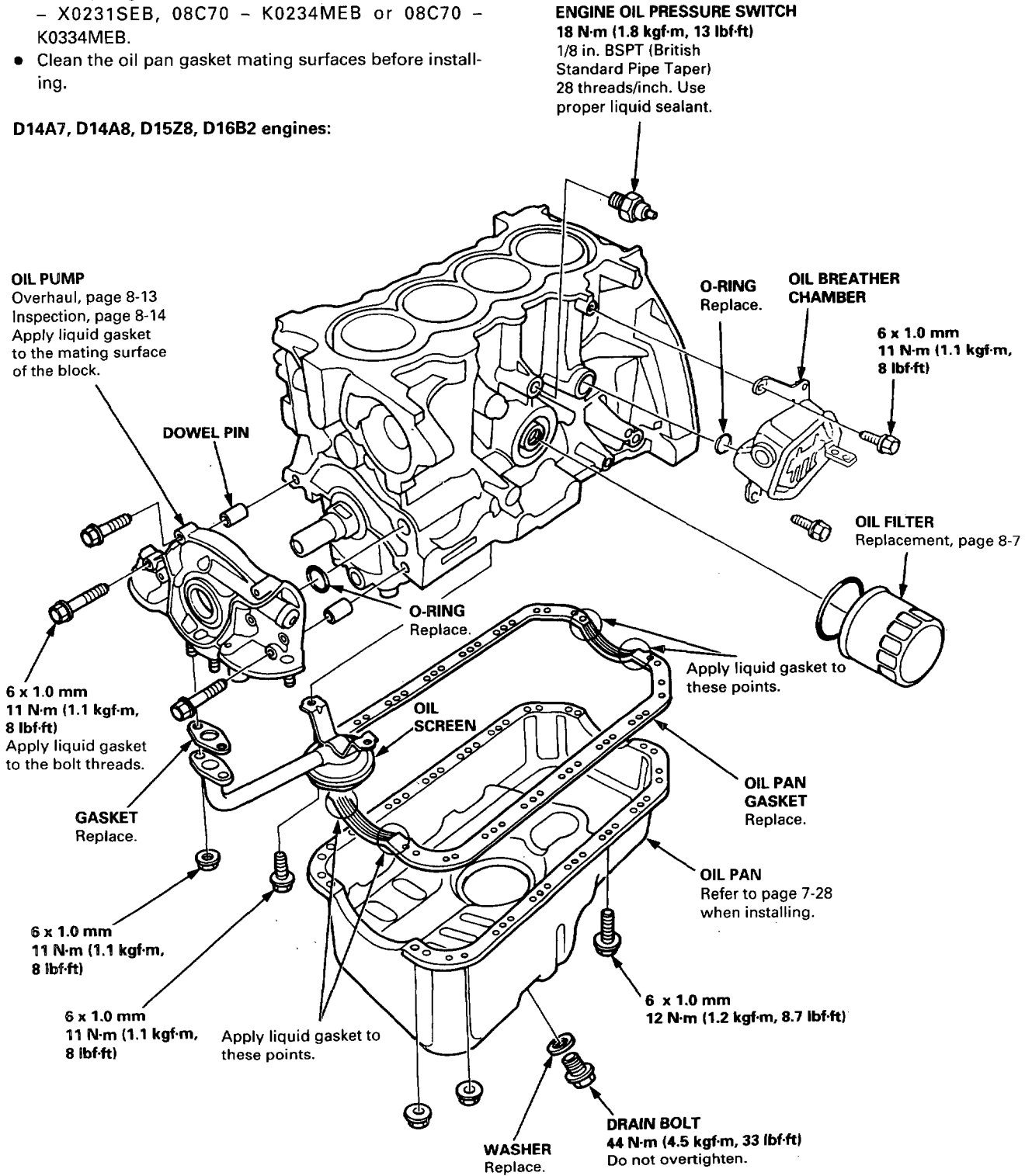
# Illustrated Index

(cont'd)

**NOTE:**

- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part No. 08C70 – X0134SEB, 08C70 – X0231SEB, 08C70 – K0234MEB or 08C70 – K0334MEB.
- Clean the oil pan gasket mating surfaces before installing.

**D14A7, D14A8, D15Z8, D16B2 engines:**

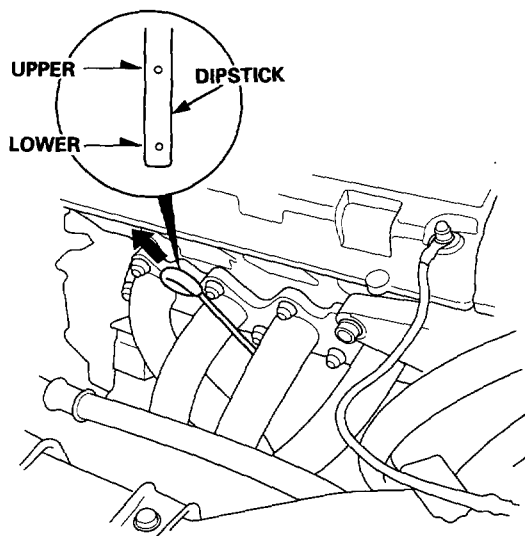




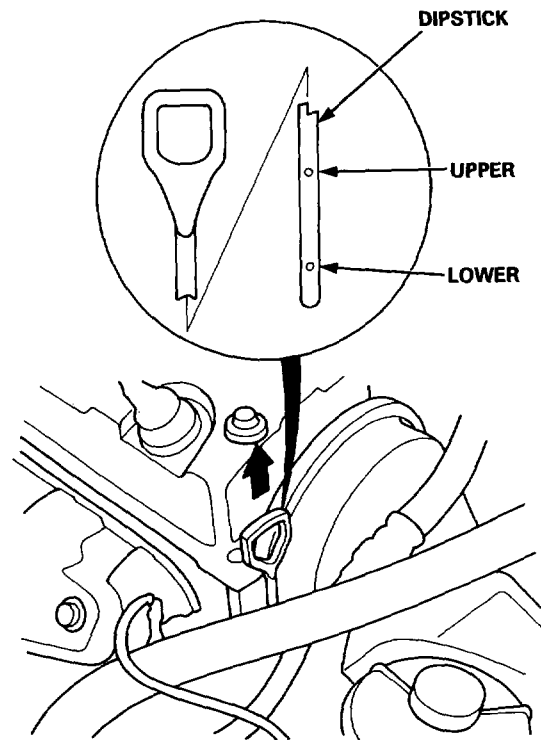
## Inspection

1. Park the vehicle on level ground, and turn off the engine. Allow the oil a few minutes to drain back into the oil pan so the dipstick will show the actual level.
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.

**B18C4 engine:**



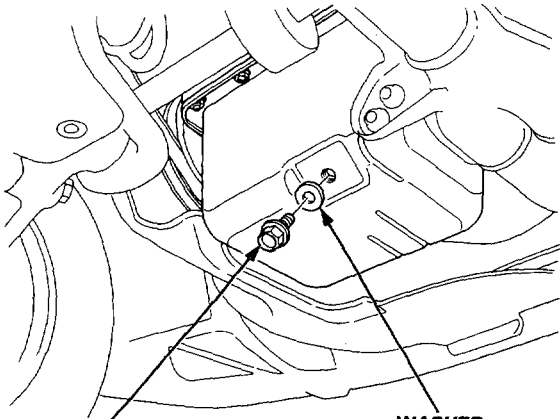
**Except B18C4 engine:**



# Engine Oil

## Replacement

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



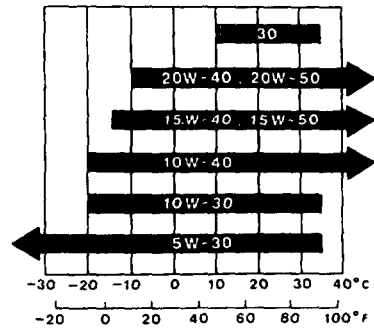
**DRAIN BOLT**  
**44 N·m (4.5 kgf·m, 33 lbf·ft)**  
 Do not overtighten.

**WASHER**  
 Replace.

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

Requirement	Always use a fuel-efficient oil is that says "API Service SG, SH or SJ". SAE Viscosity: See chart below.
Capacity	B18C4 engine: 3.7 ℓ (3.9 US qt, 3.3 Imp qt) at oil change. 4.0 ℓ (4.2 US qt, 3.5 Imp qt) at oil change, including filter. 4.8 ℓ (5.1 US qt, 4.2 Imp qt) after engine overhaul. Except B18C4 engine: 3.0 ℓ (3.2 US qt, 2.6 Imp qt) at oil change. 3.3 ℓ (3.5 US qt, 2.9 Imp qt) at oil change, including filter. 4.0 ℓ (4.2 US qt, 3.5 Imp qt) after engine overhaul.
Change	Every 15,000 km (9,000 miles) or 12 months (Normal condition). Every 7,500 km (4,500 miles) or 6 months (Severe condition).

### Engine Oil SAE Viscosity for Outside Temperature Ranges.



Ambient temperature ranges

4. Fill the engine with oil up to the specified level, run the engine for more than three minutes, then check for oil leakage and oil level.

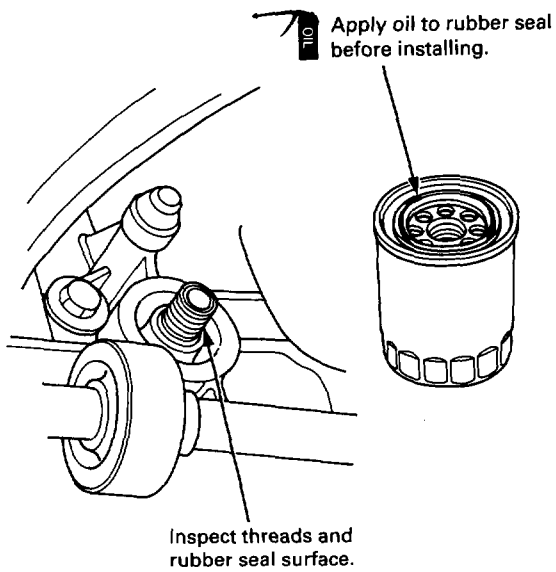


## Replacement

### A type oil filter:

1. Remove the oil filter with the oil filter wrench.
2. Inspect the threads and rubber seal on the new filter. Wipe off seat on engine block, then apply a light coat of oil to the filter rubber seal.

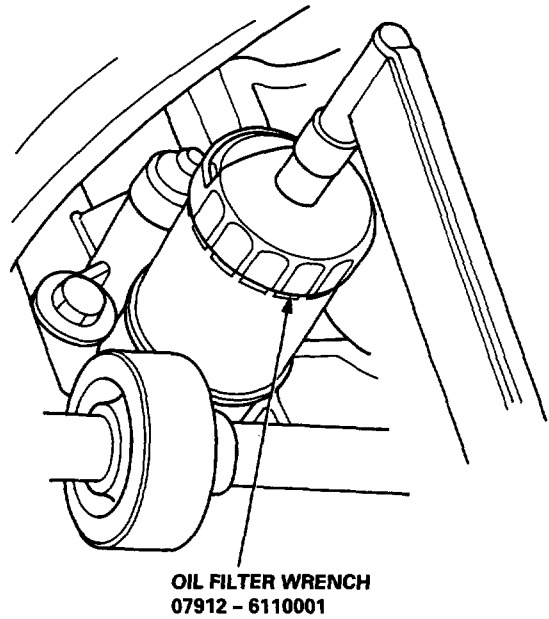
**NOTE:** Use only filters with a built-in bypass system.



3. Install the oil filter by hand.
4. After the rubber seal seats, tighten the oil filter clockwise with the tool.

**Tighten: 7/8 turn clockwise.**

**Tightening torque: 22 N·m (2.2 kgf·m, 16 lbf·ft)**



(cont'd)

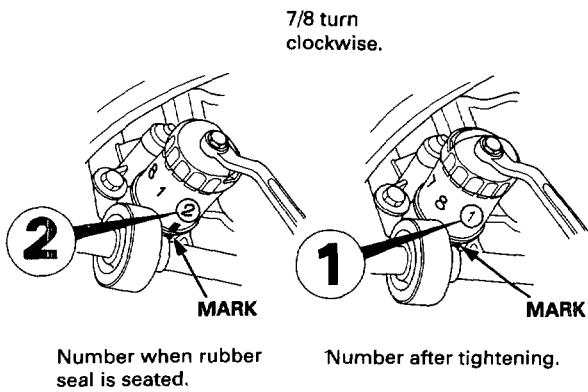
# Oil Filter

## Replacement (cont'd)

Eight numbers (1 to 8) are printed on the surface of the filter.

The following explains the procedure for tightening filters using these numbers.

- 1) Make a mark on the engine block under the number that shows at the bottom of the filter when the rubber seal is seated.
- 2) Tighten the filter by turning it clockwise seven numbers from the marked point. For example, if a mark is made under the number 2 when the rubber seal is seated, the filter should be tightened until the number 1 comes up to the marked point.



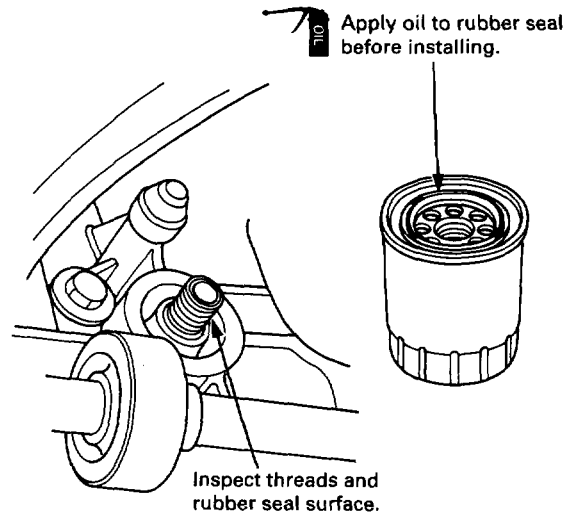
Number when rubber seal is seated	1	2	3	4	5	6	7	8
Number after tightening	8	1	2	3	4	5	6	7

5. After installation, fill the engine with oil up to the specified level, run the engine for more than three minutes, then check for oil leakage.

### B type oil filter:

1. Remove the oil filter with the oil filter wrench.
2. Inspect the threads and rubber seal on the new filter. Wipe off seat on engine block, then apply a light coat of oil to the filter rubber seal.

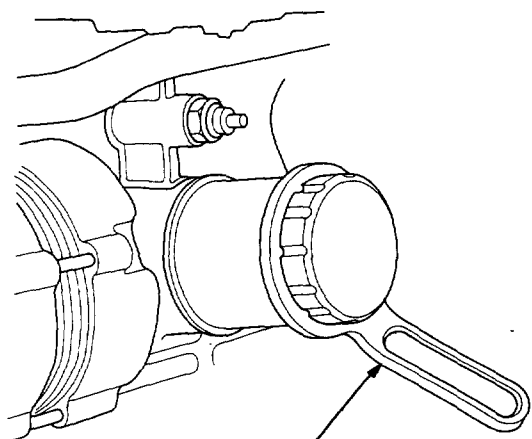
NOTE: Use only filters with a built-in bypass system.





3. Install the oil filter by hand.
4. After the rubber seal seats, tighten the oil filter clockwise with the tool.

**Tighten: three quarter turn clockwise.**  
**Tightening torque: 22 N·m (2.2 kgf·m, 16 lbf·ft)**

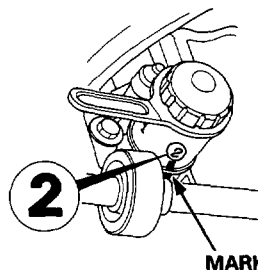


**LABINAL-Purflux 76**  
**COMMERCIALY-AVAILABLE**

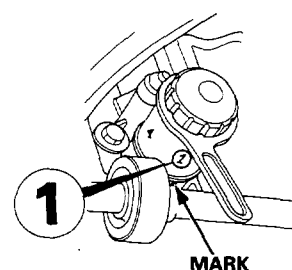
Four numbers (1 to 4) are printed on the surface of the filter.

The following explains the procedure for tightening filters using these numbers.

- 1) Make a mark on the engine block under the number that shows at the bottom of the filter when the rubber seal is seated.
- 2) Tighten the filter by turning it clockwise three numbers from the marked point. For example, if a mark is made under the number 2 when the rubber seal is seated, the filter should be tightened until the number 1 comes up to the marked point.



Number when rubber seal is seated.



Number after tightening.

Number when rubber seal is seated	1	2	3	4
Number after tightening	4	1	2	3

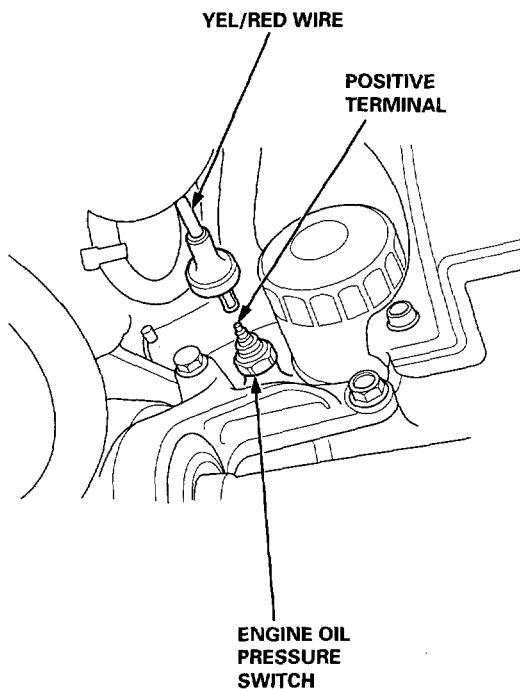
5. After installation, fill the engine with oil up to the specified level, run the engine for more than three minutes, then check for oil leakage.

# Oil Pressure Switch

# Oil Pressure

## Testing

1. Remove the YEL/RED wire from the engine oil pressure switch.
2. Check for continuity between the positive terminal and the engine (ground).
  - There should be continuity with the engine stopped.
  - There should be no continuity with the engine running.

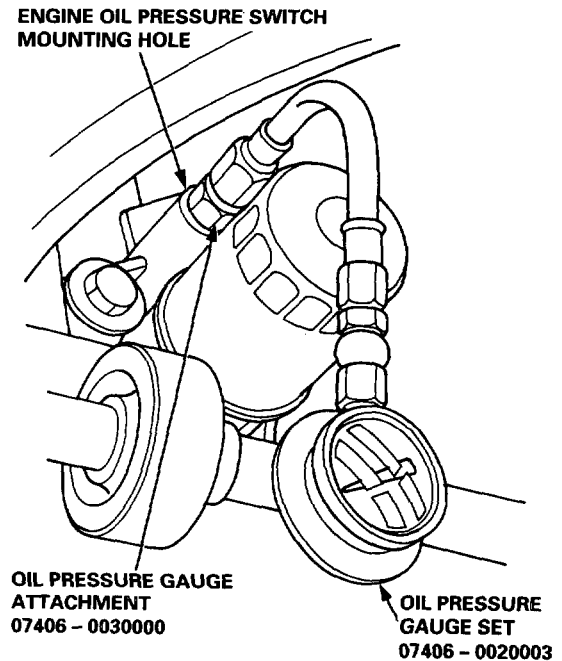


3. If the switch fails to operate, check the engine oil level. If the engine oil level is OK, check the engine oil pressure.

## Testing

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

1. Connect a tachometer.
2. Remove the engine oil pressure switch and install an oil pressure gauge.



3. Start the engine. Shut it off immediately if the gauge registers no oil pressure. Repair the problem before continuing.
4. Allow the engine to reach operating temperature (fan comes on at least twice). The pressure should be:

**Engine Oil Temperature: 80°C (176°F)**

**Engine Oil Pressure:**

**At Idle: 70 kPa (0.7 kgf/cm<sup>2</sup>, 10 psi) minimum**

**At 3,000 rpm (mm<sup>-1</sup>): 340 kPa (3.5 kgf/cm<sup>2</sup>, 50 psi) minimum**

- If oil pressure is NOT within specifications, inspect the oil pump (page 8-14).



## Inspection

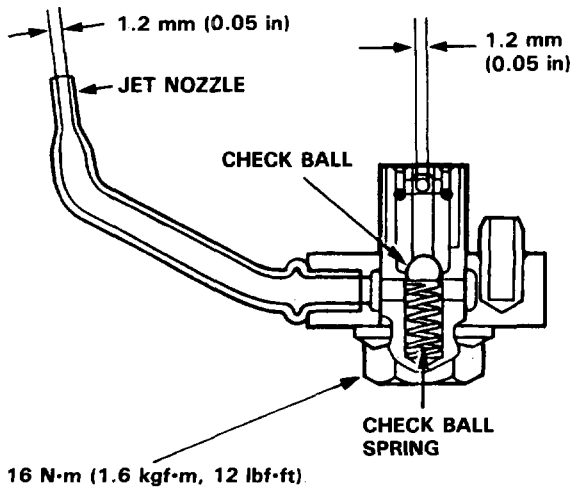
1. Remove the oil jet (see page 8-3) and inspect it as follows.

- Make sure that a 1.1 mm (0.04 in) diameter drill will go through the nozzle hole (1.2 mm (0.05 in) diameter).
- Insert the other end of the same 1.1 mm (0.04 in) drill into the oil intake (1.2 mm (0.05 in) diameter).

Make sure the check ball moves smoothly and has a stroke of approximately 4.0 mm (0.16 in).

- Check the oil jet operation with an air nozzle. It should take at least 200 kPa (2.0 kgf/cm<sup>2</sup>, 28 psi) to unseat the check ball.

NOTE: Replace the oil jet assembly if the nozzle is damaged or bent.



2. Mounting torque is critical. Be very precise when installing.

**Torque: 16 N·m (1.6 kgf·m, 12 lbf·ft)**



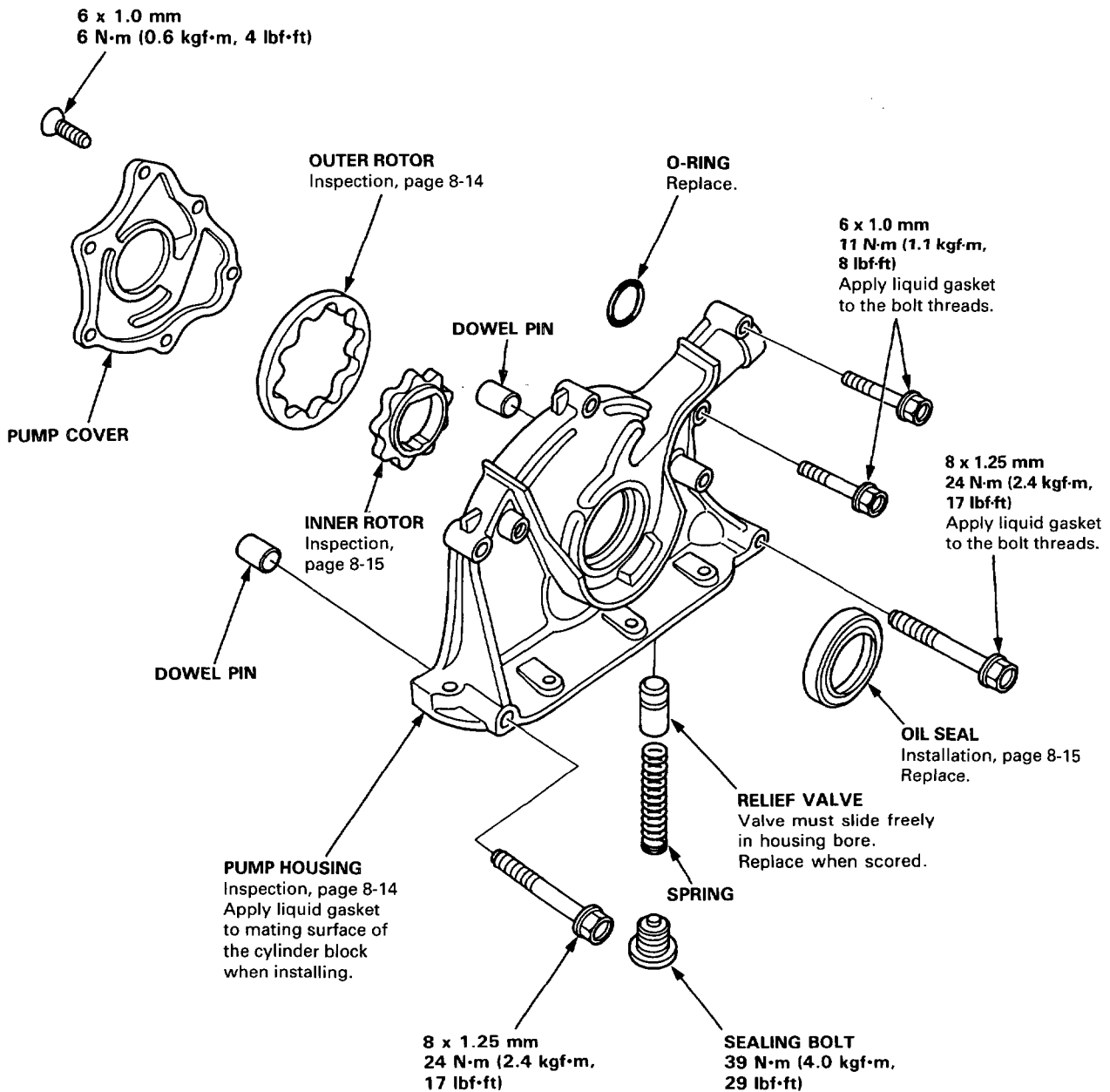
# Oil Pump

## Overhaul

### NOTE:

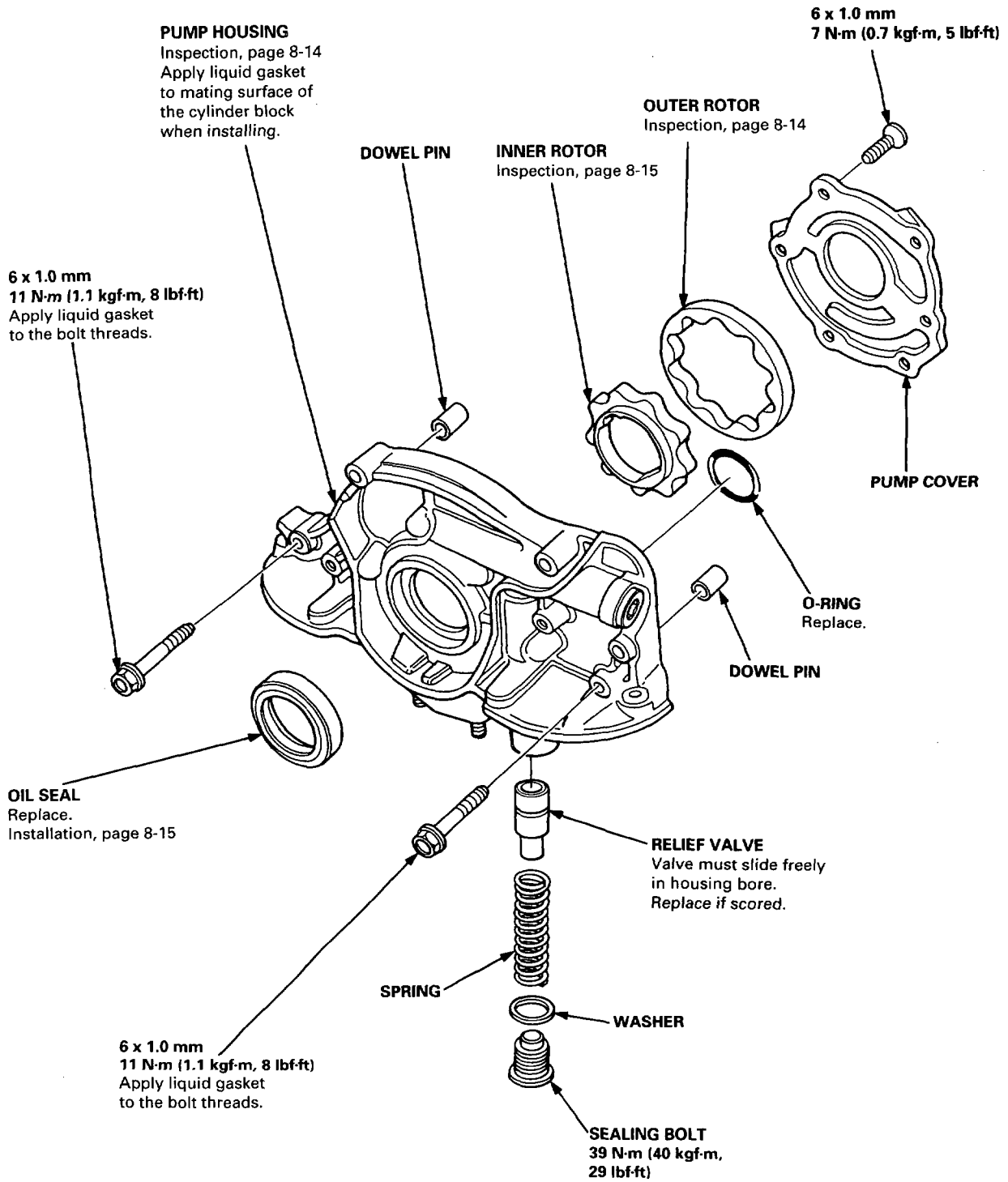
- Use new O-rings when reassembling.
- Apply oil to O-rings before installation.
- Use liquid gasket, Part No. 08C70 – X0134SEB, 08C70 – X0231SEB, 08C70 – K0234MEB or 08C70 – K0334MEB.
- The rotors must be installed to the same direction in order.
- After reassembly, check that the rotors move without binding.

### B18C4 engine:





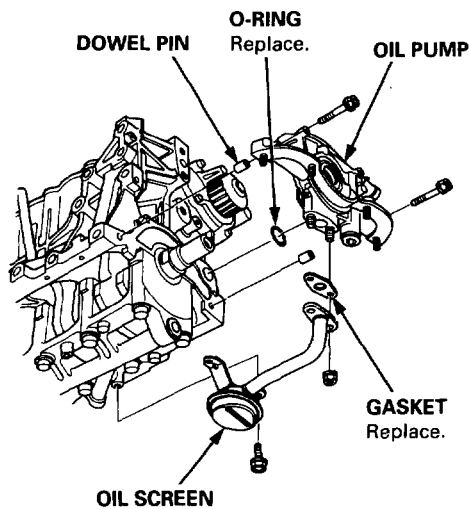
Except B18C4 engine:



# Oil Pump

## Removal/Inspection/Installation

1. Drain the engine oil.
2. Turn the crankshaft and align the white groove on the crankshaft pulley with the pointer on the lower cover.
3. Remove the cylinder head cover and upper cover.
4. Remove the power steering pump belt, air conditioner belt and the alternator belt.
5. Remove the crankshaft pulley and remove the lower cover.
6. Remove the timing belt.
7. Remove the drive pulley.
8. Remove the oil pan and oil screen.
9. Remove the oil pump.



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

### Inner Rotor-to-Outer Rotor Radial Clearance

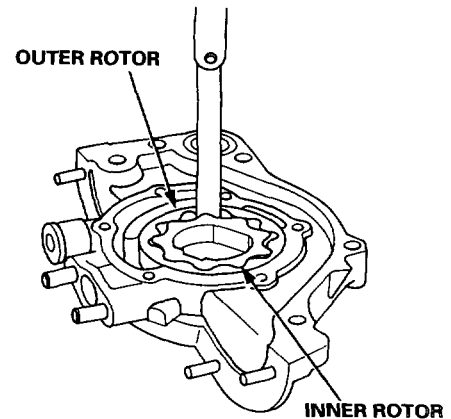
#### Standard (New):

**B18C4 engine:** 0.04 – 0.16 mm (0.002 – 0.006 in)

**Except B18C4 engine:**

0.02 – 0.14 mm (0.001 – 0.006 in)

**Service Limit:** 0.20 mm (0.008 in)



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

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

### Housing-to-Rotor Axial Clearance

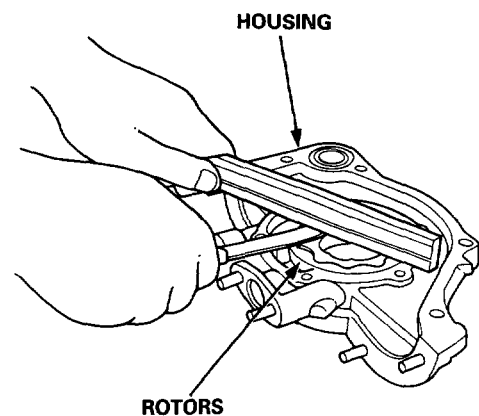
#### Standard (New):

**B18C4 engine:** 0.02 – 0.07 mm (0.001 – 0.003 in)

**Except B18C4 engine:**

0.03 – 0.08 mm (0.001 – 0.003 in)

**Service Limit:** 0.15 mm (0.006 in)



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



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

**Housing-to-Outer Rotor Radial Clearance:**

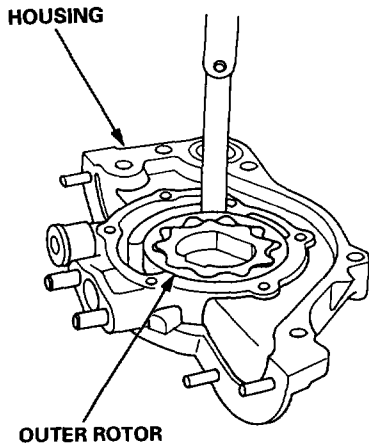
**Standard (New):**

**B18C4 engine: 0.10 – 0.19 mm (0.004 – 0.007 in)**

**Except B18C4 engine:**

**0.10 – 0.18 mm (0.004 – 0.007 in)**

**Service Limit: 0.20 mm (0.008 in)**



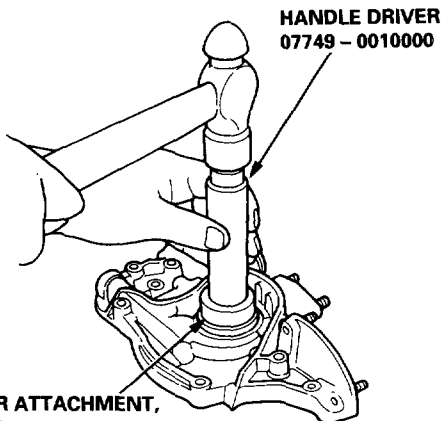
— If the housing-to-outer rotor radial clearance exceeds the service limit, replace the set of inner and outer rotors and/or the pump housing.

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

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

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

NOTE: The oil seal alone can be replaced without removing the oil pump.



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

18. Check that the oil pump turns freely.

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

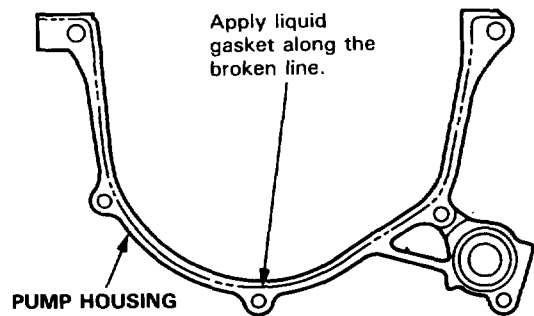
20. Install the two dowel pins and new O-ring on the oil pump.

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

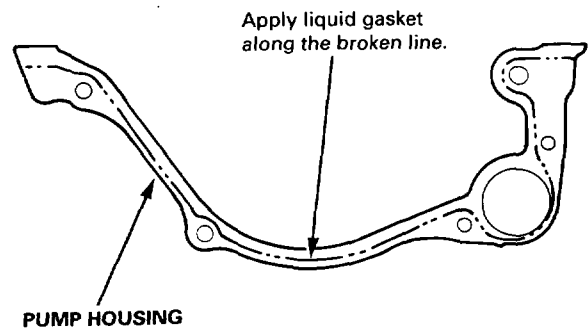
**NOTE:**

- Use liquid gasket, Part No. 08C70 – X0134SEB, 08C70 – X0231SEB, 08C70 – K0234MEB or 08C70 – K0334MEB.
- Check that the mating surfaces are clean and dry before applying liquid gasket.
- Apply liquid gasket evenly, in a narrow bead centered on the mating surface.
- To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
- Do not install the parts if five minutes or more have elapsed since applying liquid gasket. Instead, reapply liquid gasket after removing the old residue.
- After assembly, wait at least 30 minutes before filling the engine with oil.

**B18C4 engine:**



**Except B18C4 engine:**



(cont'd)

# Oil Pump

## Removal/Inspection/Installation (cont'd)

22. Install the oil pump on the cylinder block.
  - Apply grease to the lip of the oil pump seal. Then, install the oil pump onto the crankshaft. When the pump is in place, clean any excess grease off the crankshaft and check that the oil seal lip is not distorted.
23. Install the oil screen.

### B18C4 engine:

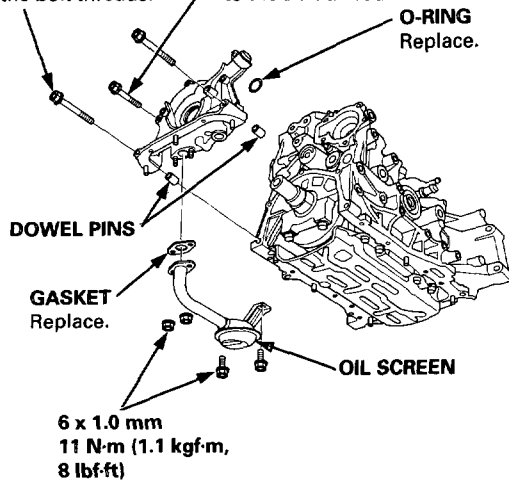
8 x 1.25 mm  
24 N·m (2.4 kgf·m,  
17 lbf·ft)

Apply liquid gasket  
to the bolt threads.

6 x 1.0 mm  
11 N·m (1.1 kgf·m,  
8 lbf·ft)

Apply liquid gasket  
to the bolt threads.

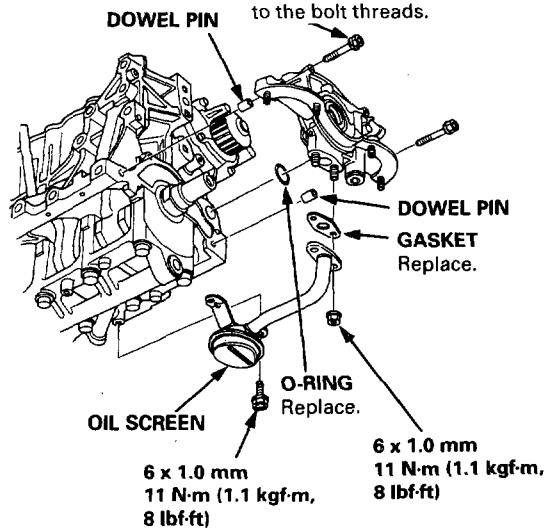
**O-RING**  
Replace.



### Except B18C4 engine:

6 x 1.0 mm  
11 N·m (1.1 kgf·m,  
8 lbf·ft)

Apply liquid gasket  
to the bolt threads.



24. Install the oil pan (see page 7-28).

## **Intake Manifold/Exhaust System**

### **Intake Manifold**

**Replacement ..... 9-2**

### **Exhaust Manifold**

**Replacement ..... 9-5**

### **Exhaust Pipe and Muffler**

**Replacement ..... 9-8**

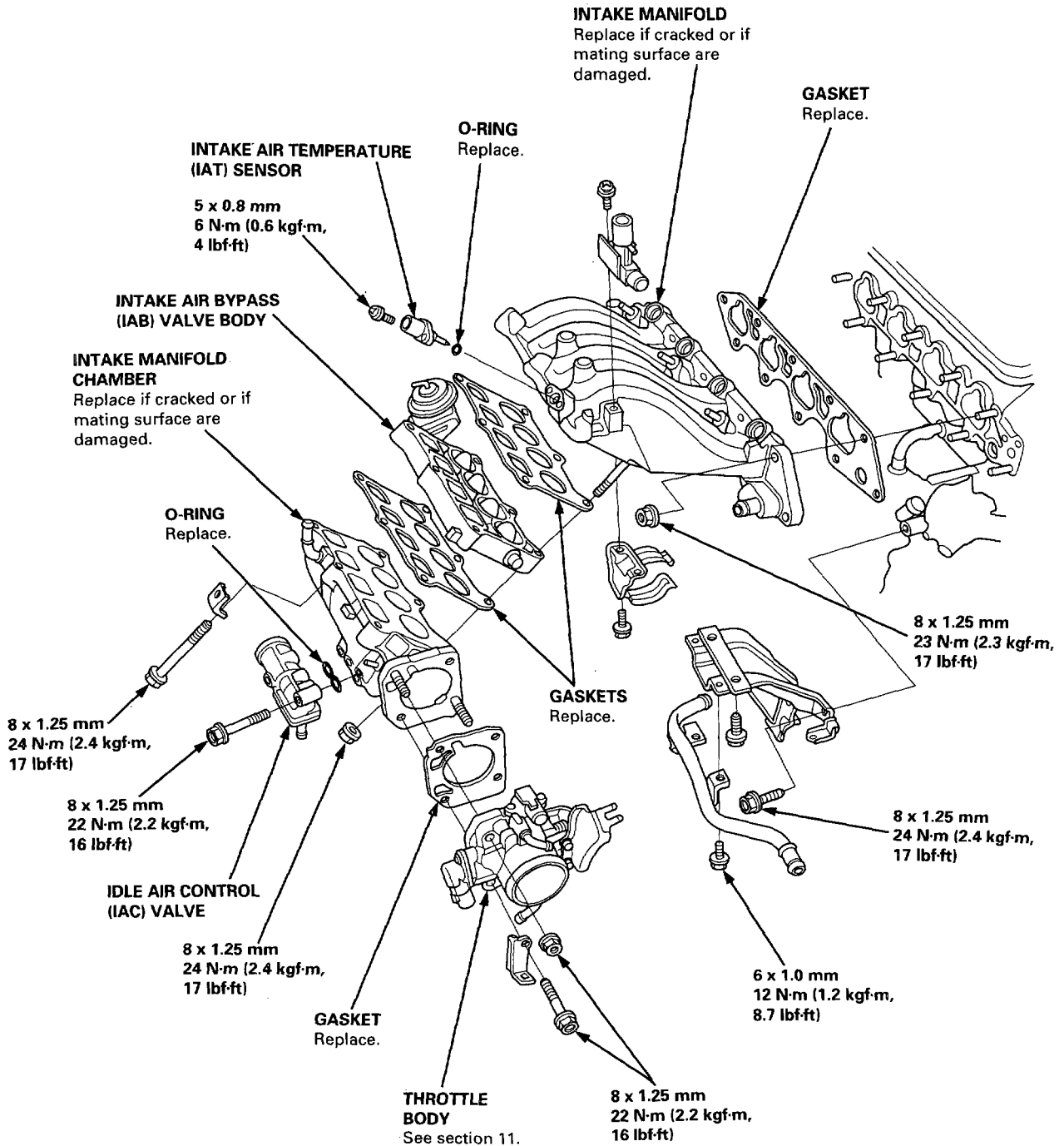


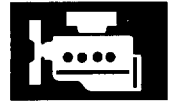
# Intake Manifold

## Replacement

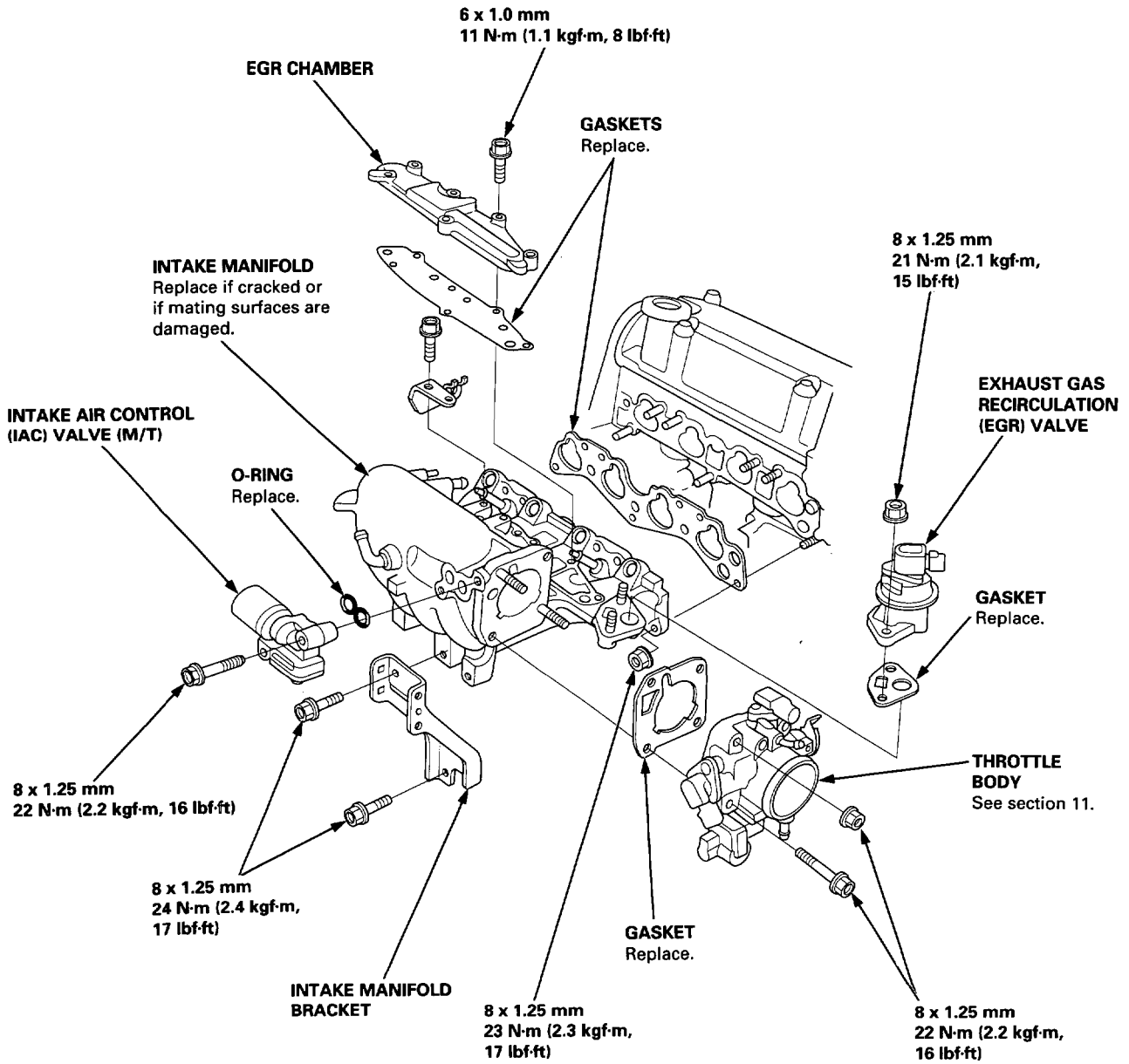
NOTE: Use new O-rings and gaskets when reassembling.

B18C4 engine:





D15Z8 engine:



(cont'd)

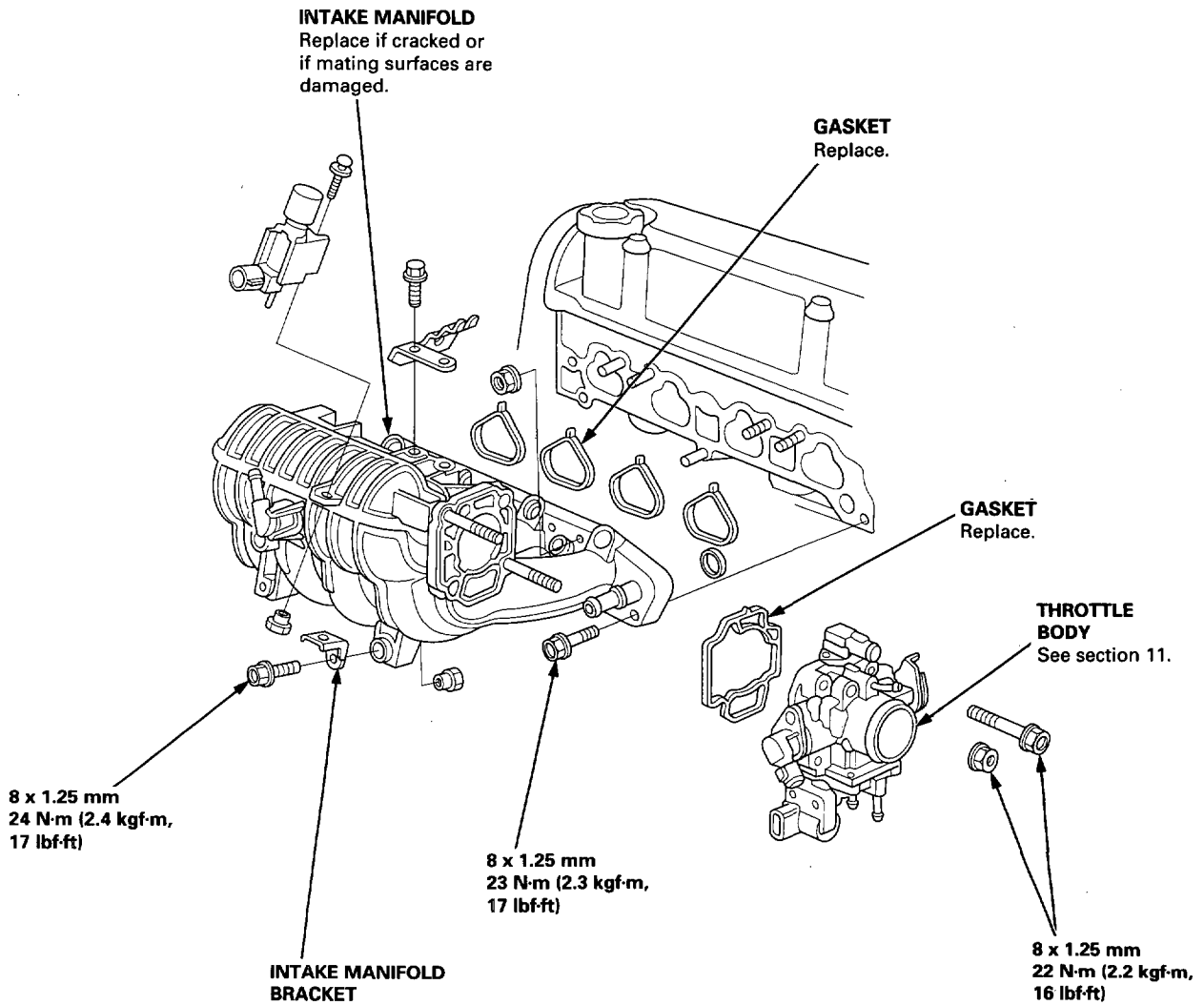


# Intake Manifold

## Replacement (cont'd)

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

D14A7, D14A8, D16B2 engines:



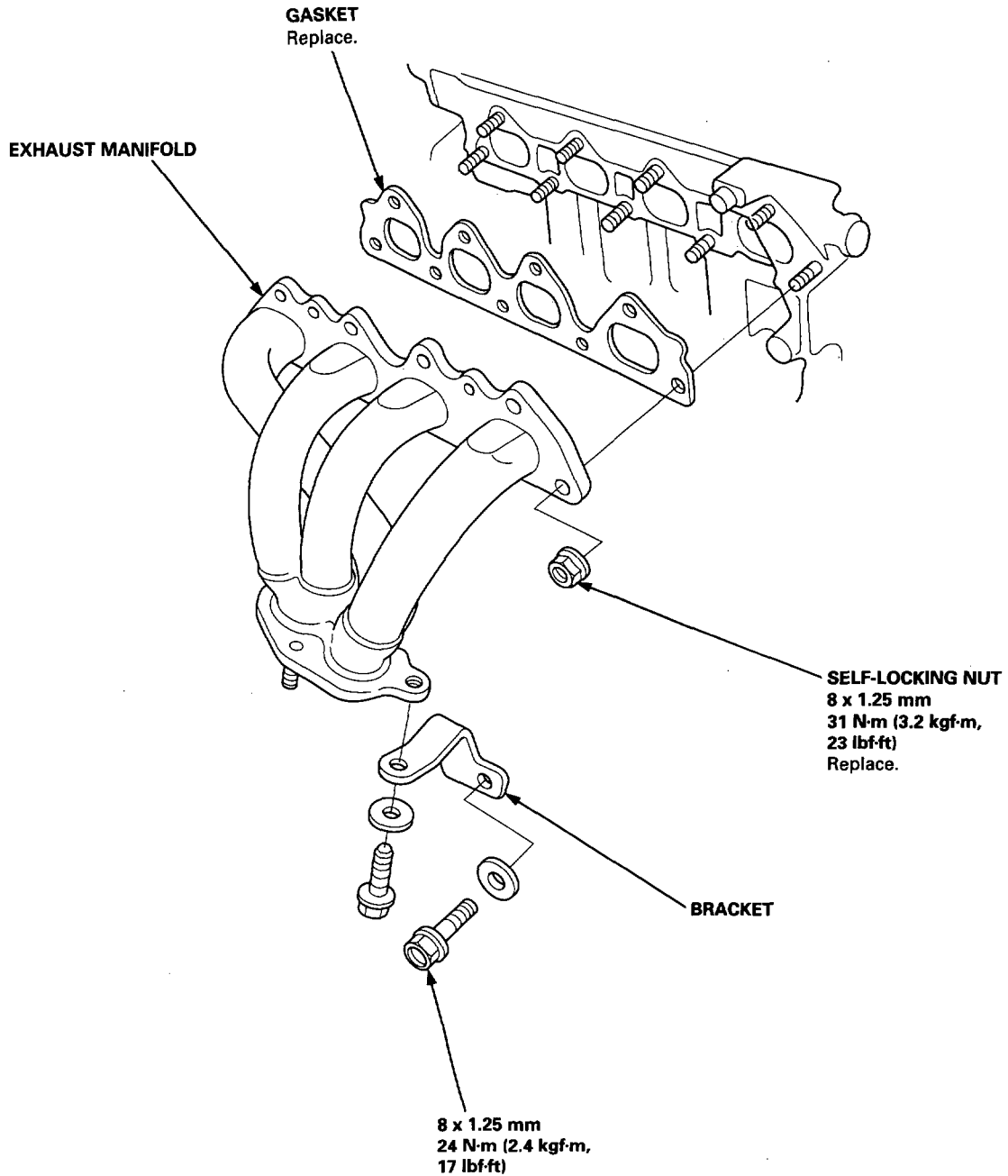


# Exhaust Manifold

## Replacement

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

B18C4 engine:



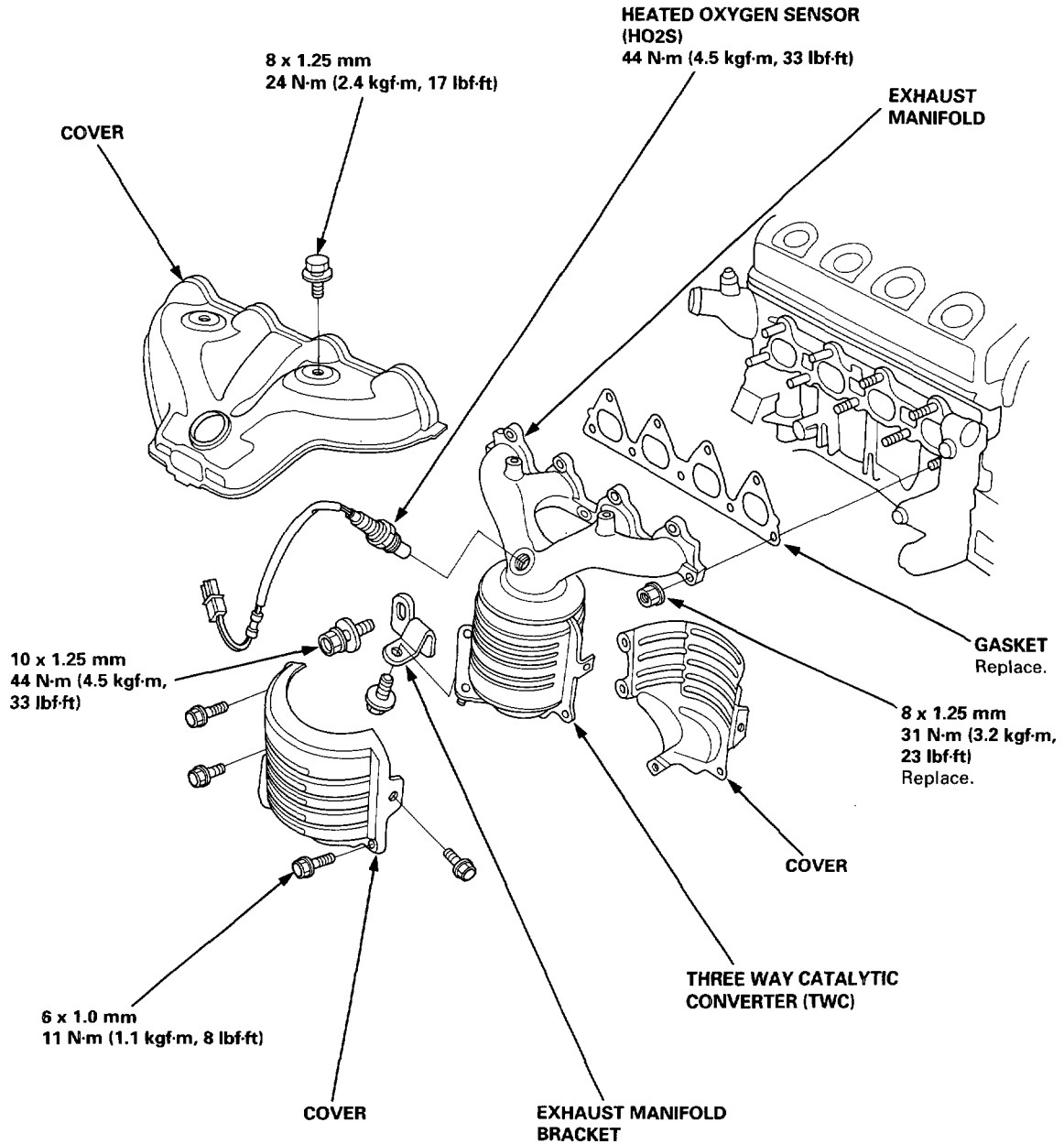
(cont'd)

# Exhaust Manifold

## Replacement (cont'd)

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

D15Z8 engine:





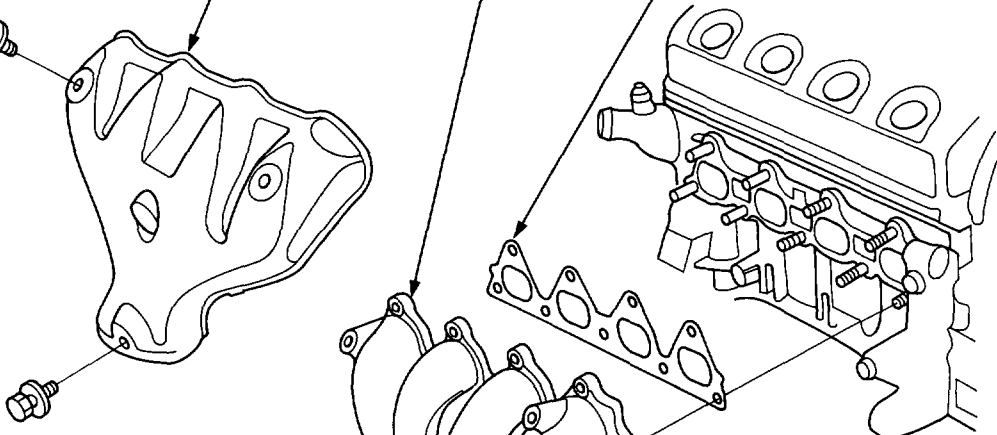
D14A7, D14A8, D16B2 engines:

8 x 1.25 mm  
24 N-m (2.4 kgf-m, 17 lbf-ft)

COVER

EXHAUST  
MANIFOLD

GASKET  
Replace.



8 x 1.25 mm  
31 N-m (3.2 kgf-m, 23 lbf-ft)  
Replace.

HO2S  
44 N-m (4.5 kgf-m, 33 lbf-ft)

EXHAUST MANIFOLD  
BRACKET

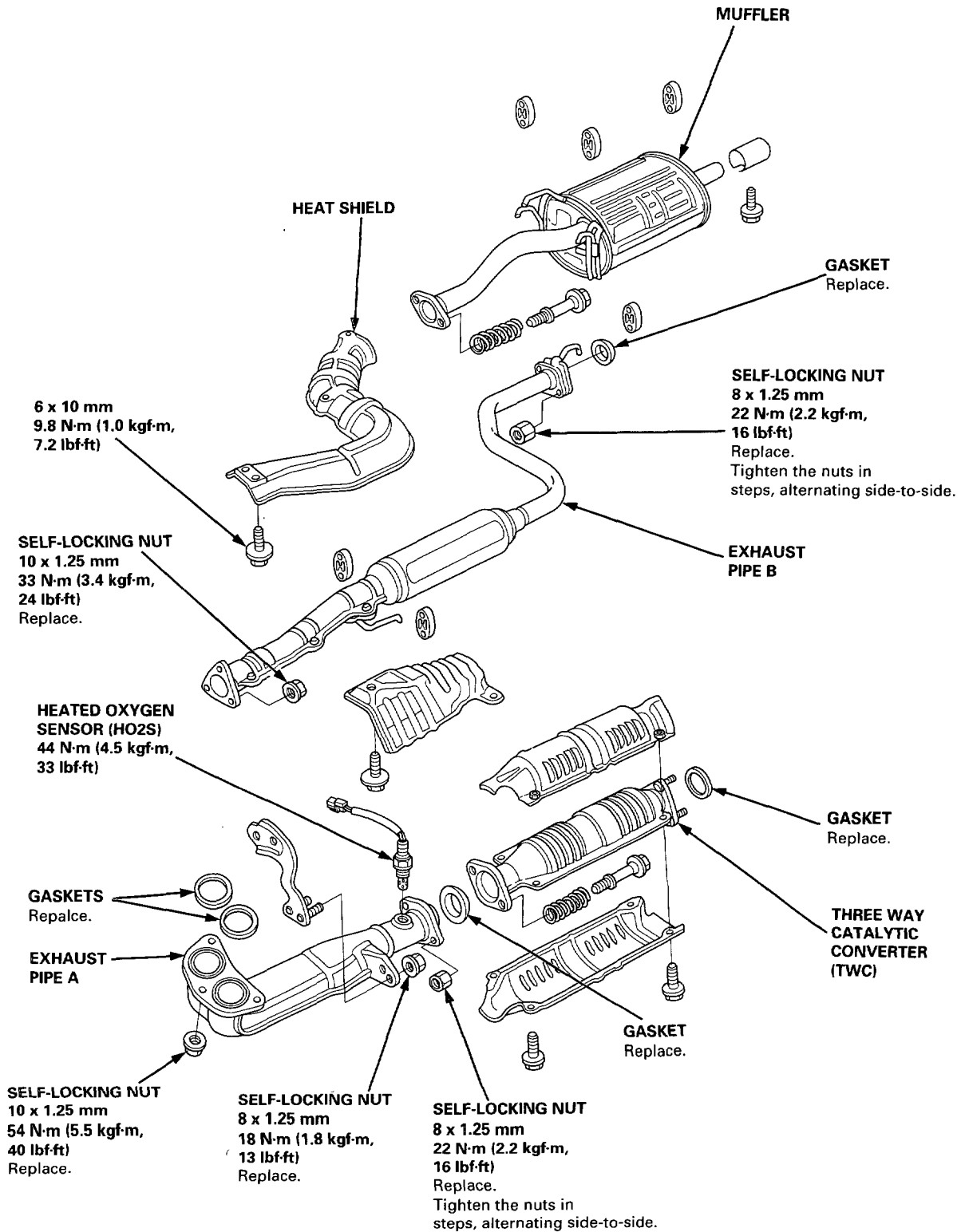
10 x 1.25 mm  
44 N-m (4.4 kgf-m, 33 lbf-ft)

# Exhaust Pipe and Muffler

## Replacement

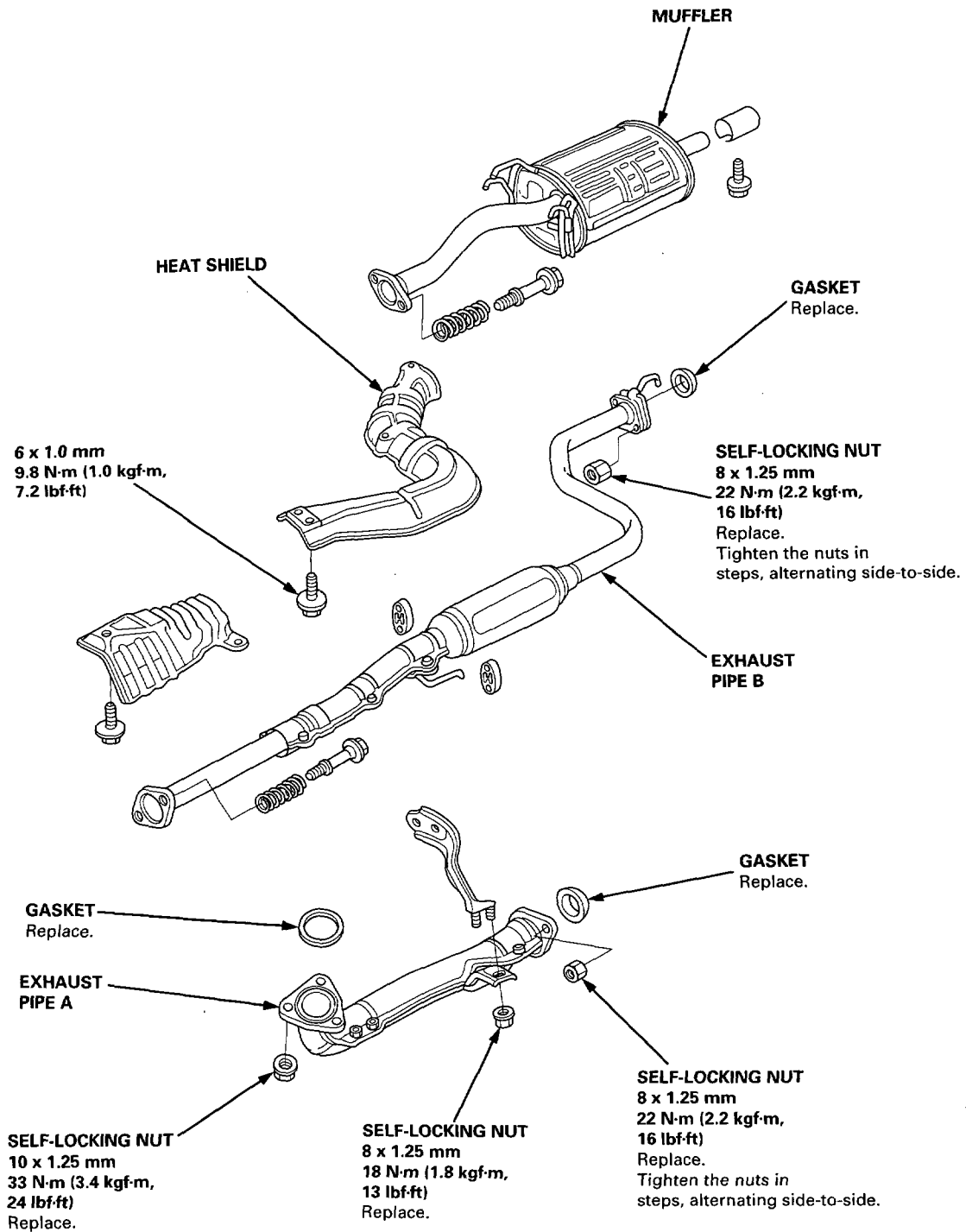
NOTE: Use new gaskets and self-locking nuts when reassembling.

B18C4 engine:





D15Z8 engine:



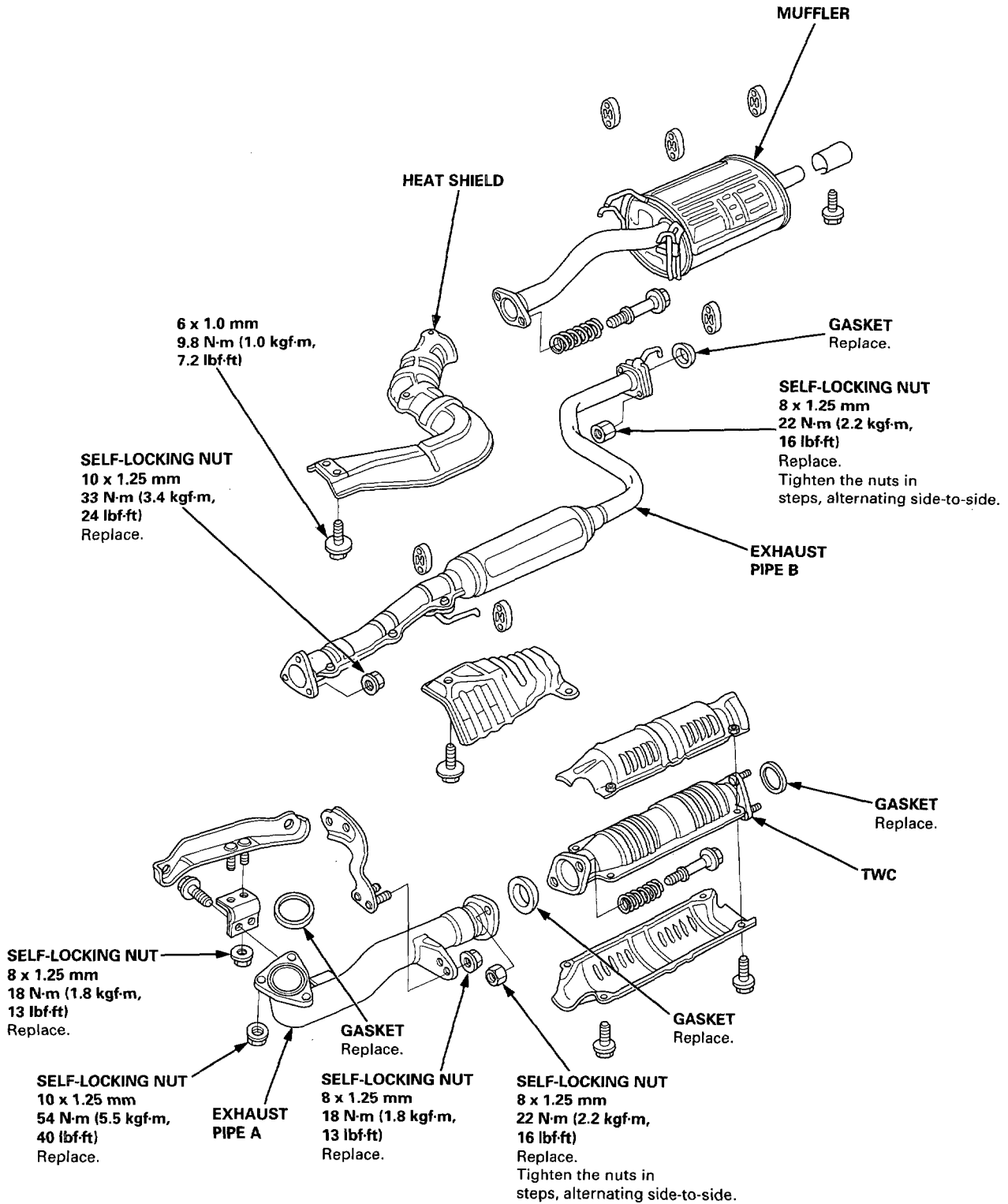
(cont'd)

# Exhaust Pipe and Muffler

## Replacement (cont'd)

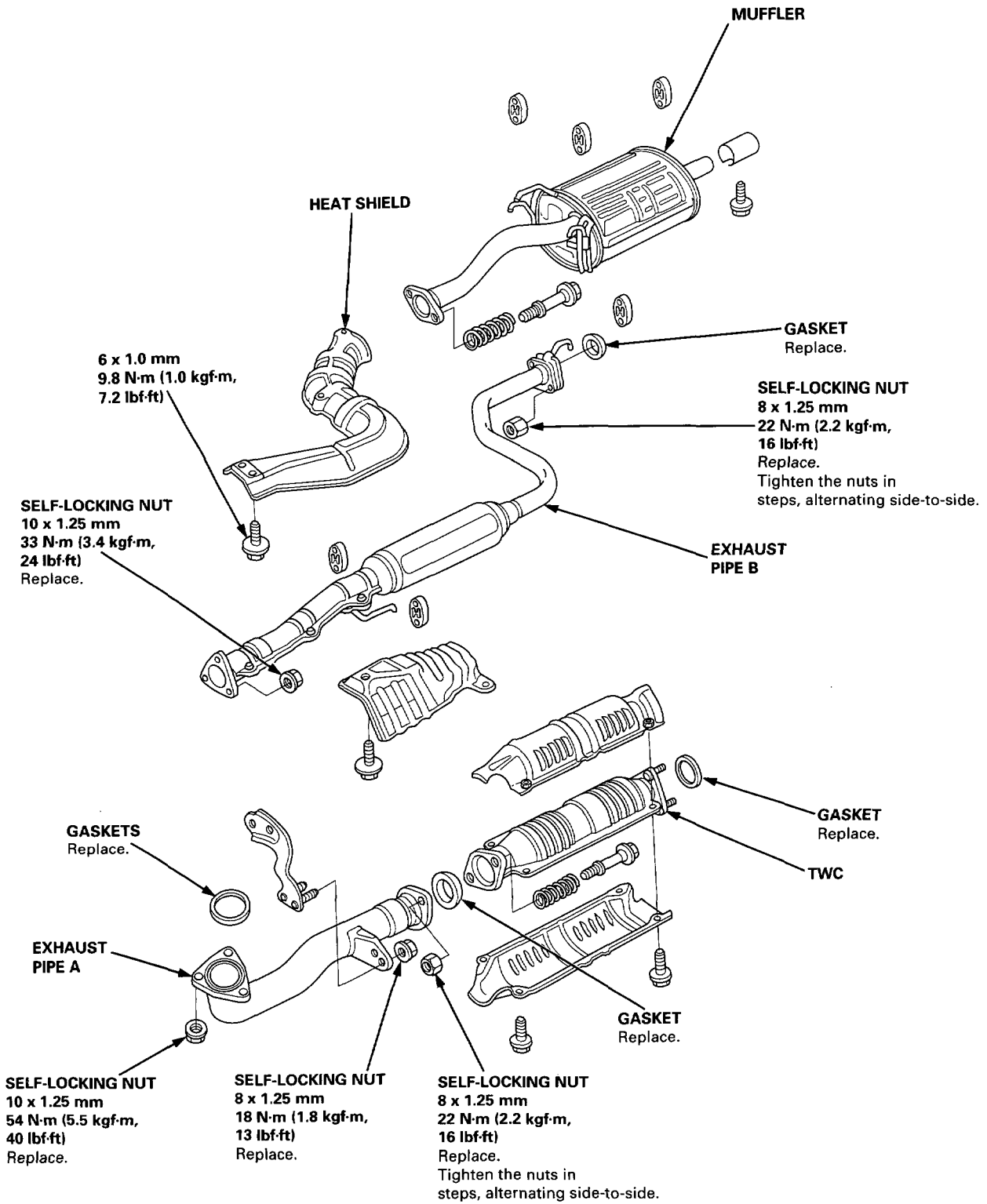
NOTE: Use new gaskets and self-locking nuts when reassembling.

D16B2 engine:





D14A7, D14A8 engines:





## **Cooling**

<b>Illustrated Index .....</b>	<b>10-2</b>
<b>Radiator</b>	
<b>Replacement .....</b>	<b>10-6</b>
<b>Engine Coolant Refilling and     Bleeding .....</b>	<b>10-7</b>
<b>Cap Testing .....</b>	<b>10-9</b>
<b>Testing .....</b>	<b>10-9</b>
<b>Thermostat</b>	
<b>Replacement .....</b>	<b>10-10</b>
<b>Testing .....</b>	<b>10-11</b>
<b>Water Pump</b>	
<b>Illustrated Index .....</b>	<b>10-12</b>
<b>Inspection .....</b>	<b>10-14</b>
<b>Replacement .....</b>	<b>10-14</b>
<b>Fan Control</b>	
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<b>Circuit Diagram .....</b>	<b>10-16</b>
<b>Fan Motor Testing .....</b>	<b>10-17</b>
<b>Radiator Fan Switch Testing .....</b>	<b>10-17</b>
<b>Codant Temperature Gauge</b>	
<b>Gauge Testing .....</b>	<b>10-18</b>
<b>Sending Unit Testing .....</b>	<b>10-18</b>



# Illustrated Index

Total Cooling System Capacity (Including heater and reservoir)

**B18C4 engine:**

5.0 ℓ (5.3 US qt, 4.4 Imp qt)

**Except B18C4 engine:**

M/T: 4.5 ℓ (4.8 US qt, 4.0 Imp qt)

A/T: 4.4 ℓ (4.6 US qt, 3.9 Imp qt)

**Reservoir capacity: 0.5 ℓ (0.5 US qt, 0.4 Imp qt)**

**NOTE:**

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

**RADIATOR**

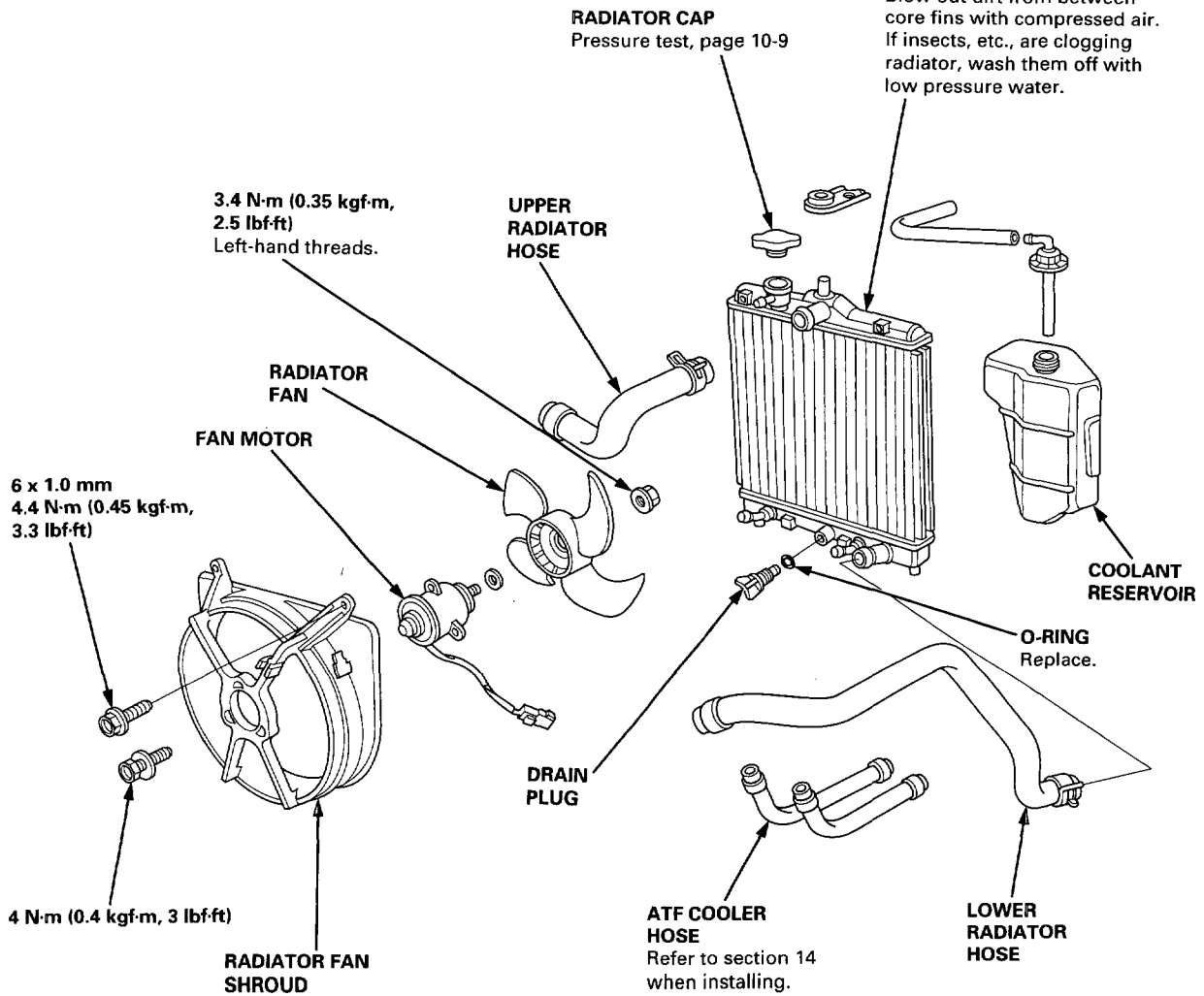
Engine coolant refilling and bleeding, page 10-7

Leak test, page 10-9

Inspect soldered joints and seams for leaks.

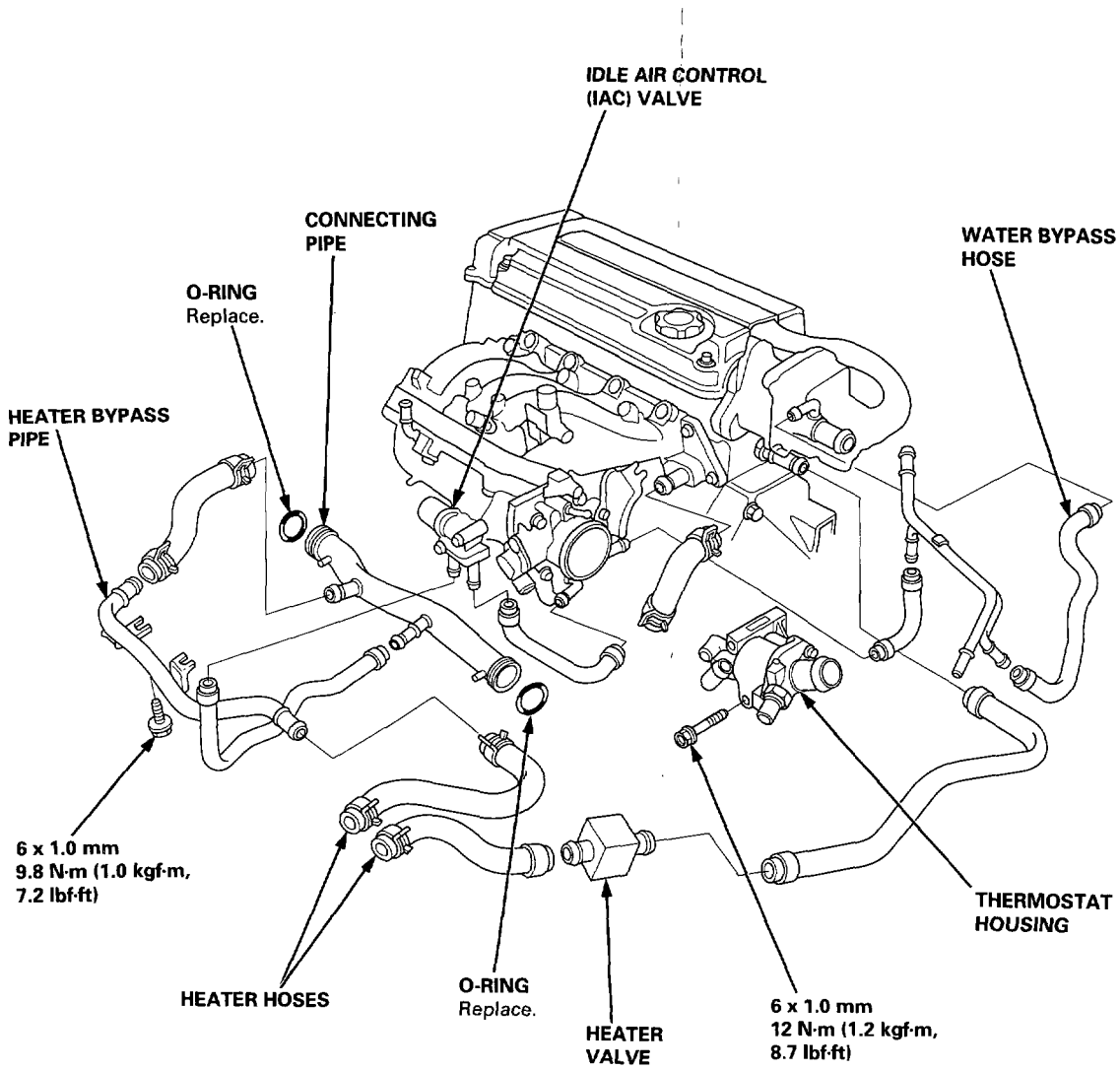
Blow out dirt from between core fins with compressed air.

If insects, etc., are clogging radiator, wash them off with low pressure water.





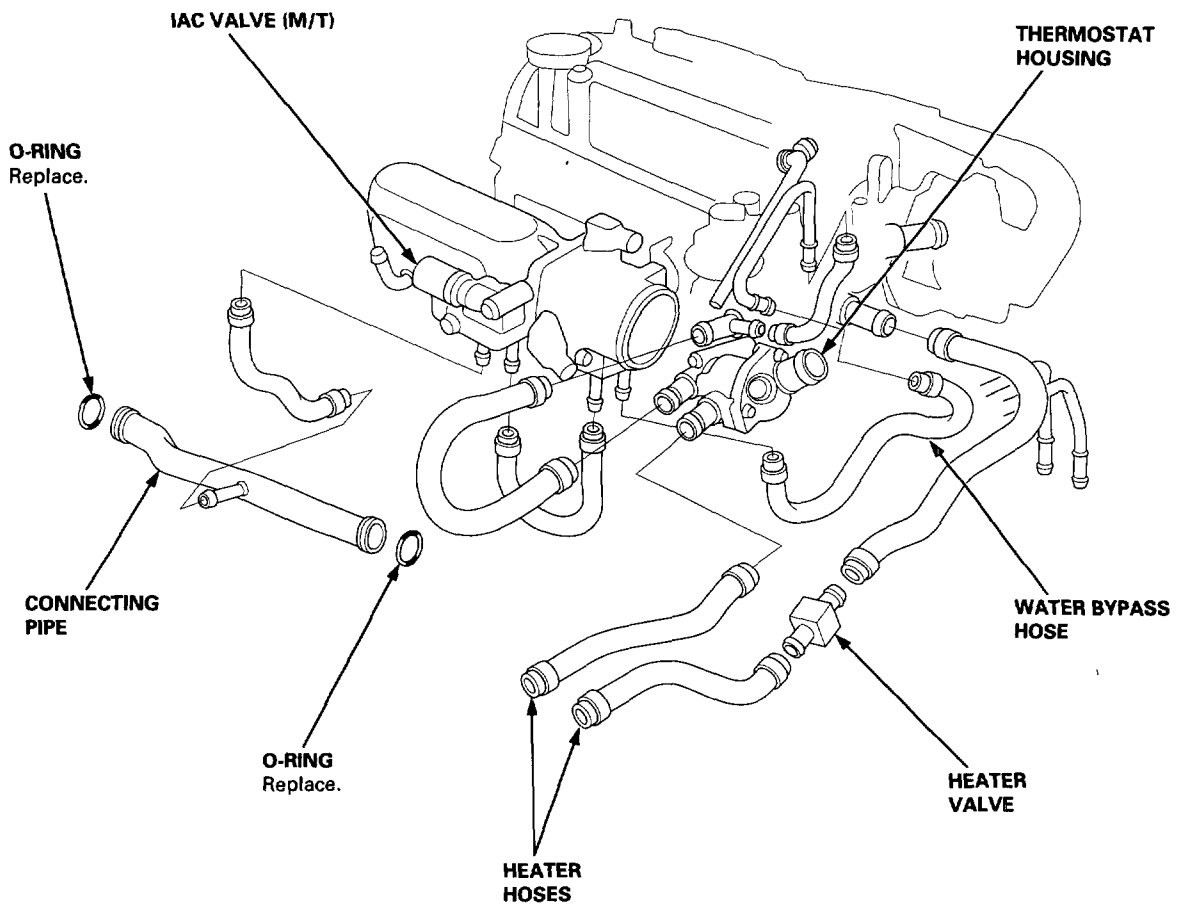
**Engine Hose Connection:  
B18C4 engine:**



# Illustrated Index

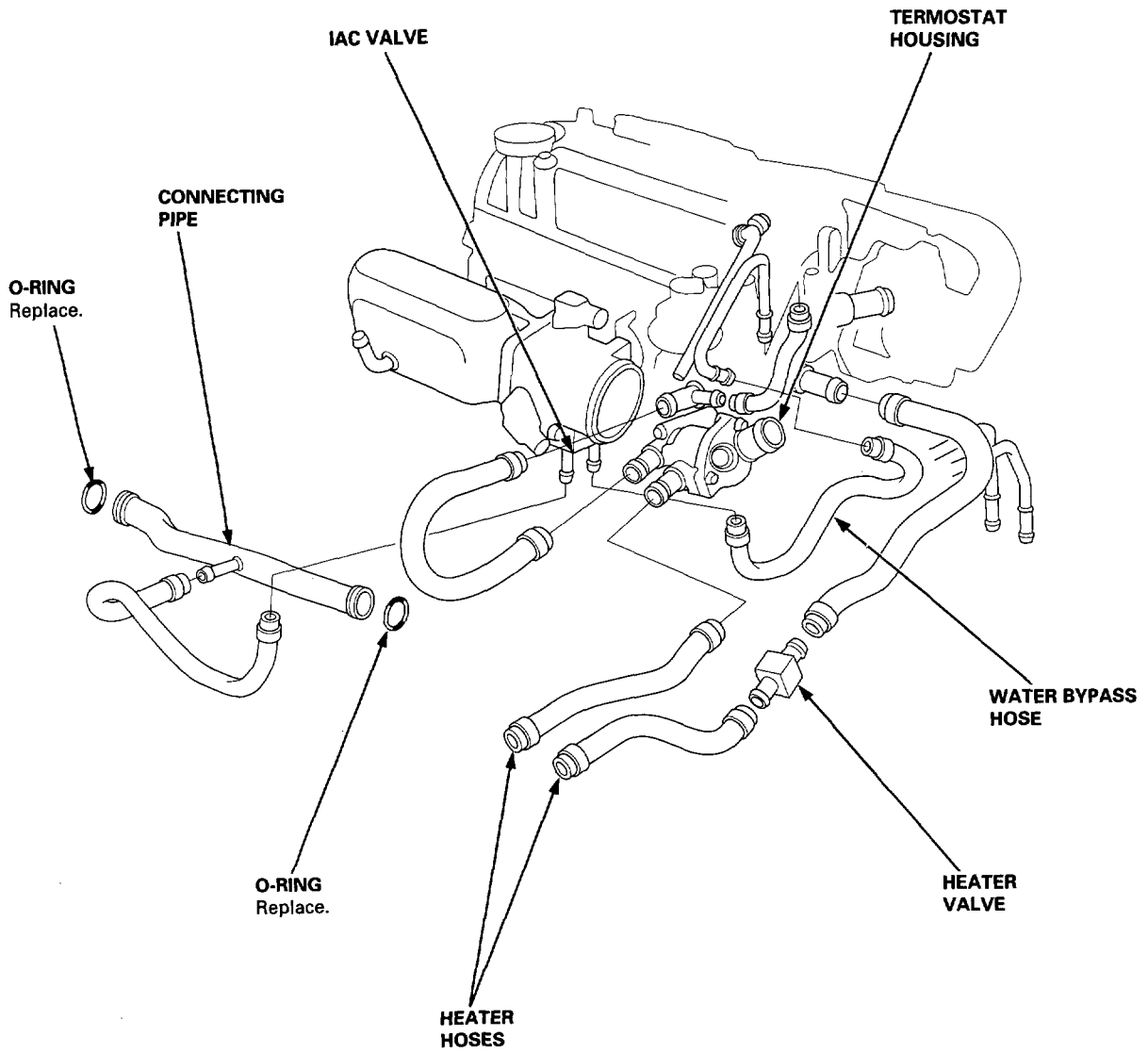
(cont'd)

Engine Hose Connection:  
D15Z8 engine:





D14A7, D14A8, D16B2 engines:



# Radiator

## Replacement

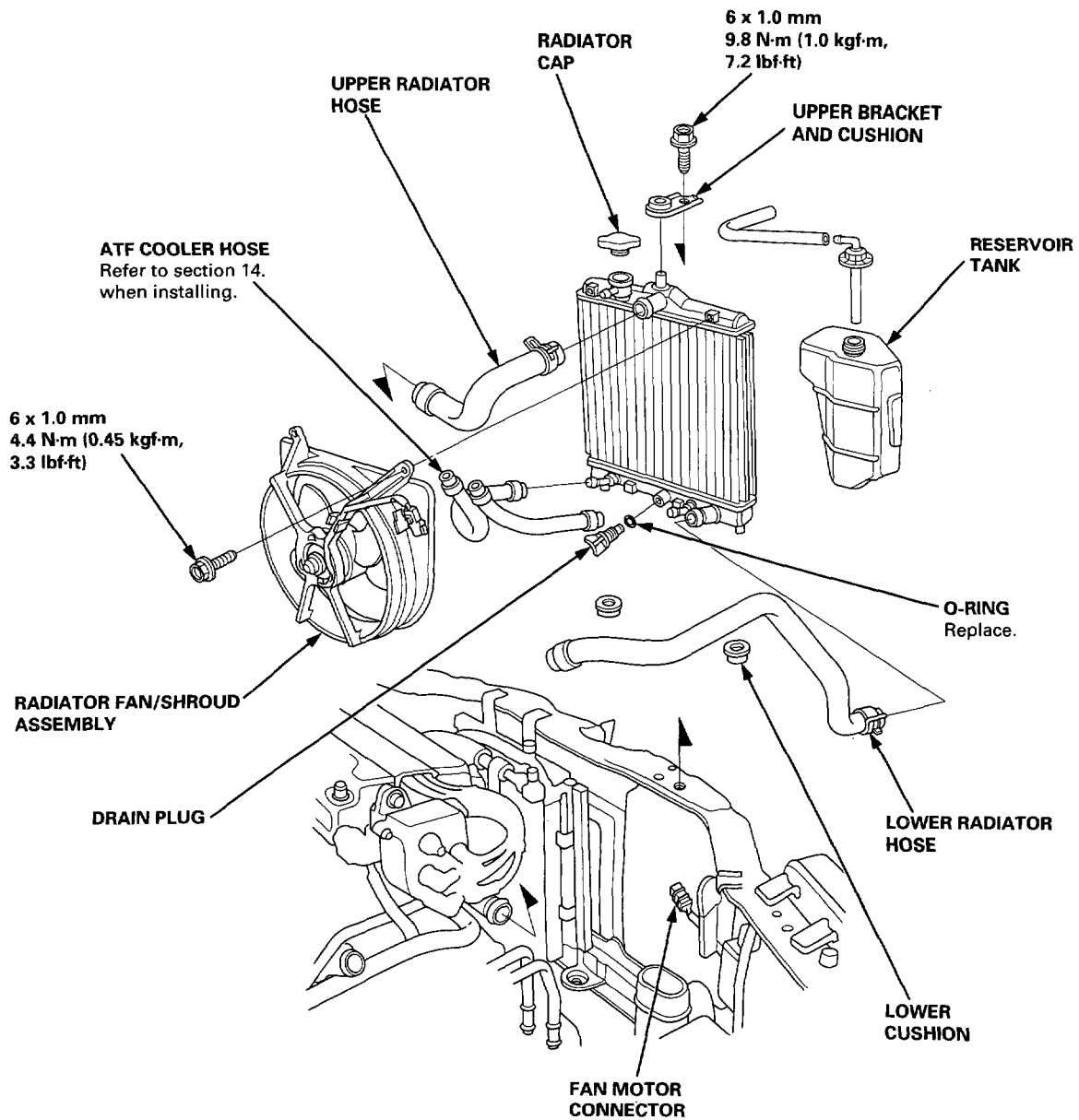
1. Drain the engine coolant.
2. Remove the upper and lower radiator hoses, and ATF cooler hoses.
3. Disconnect the fan motor connector.
4. Remove the radiator upper bracket, then pull up the radiator.

5. Remove the fan shroud assemblies and other parts from radiator.

Install the radiator in the reverse order of removal:

**NOTE:**

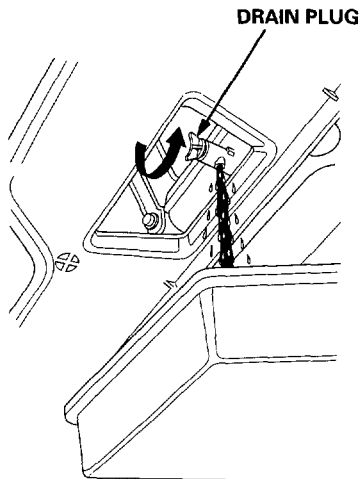
- Set the upper and lower cushions securely.
- Fill the radiator with engine coolant and bleed the air.





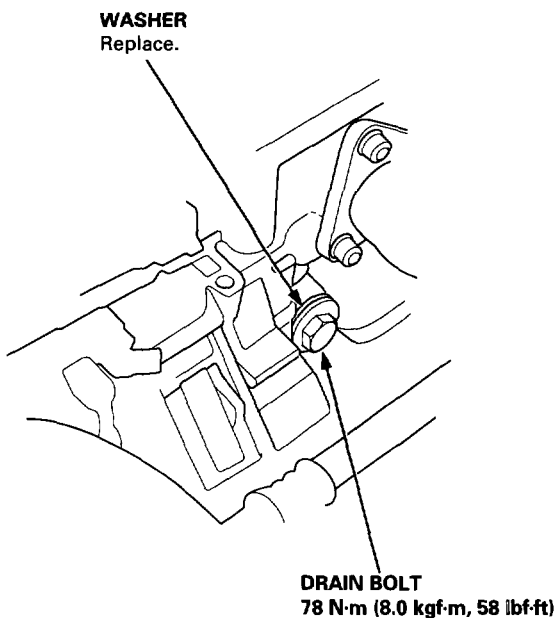
## Engine Coolant Refilling and Bleeding

1. Slide the heater temperature control lever to maximum heat.  
Make sure the engine and radiator are cool to the touch.
2. Remove the radiator cap.
3. Loosen the drain plug, and drain the coolant.

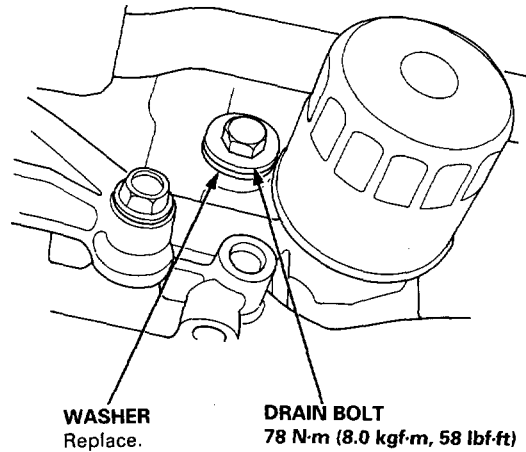


4. Remove the drain bolt from the cylinder block.

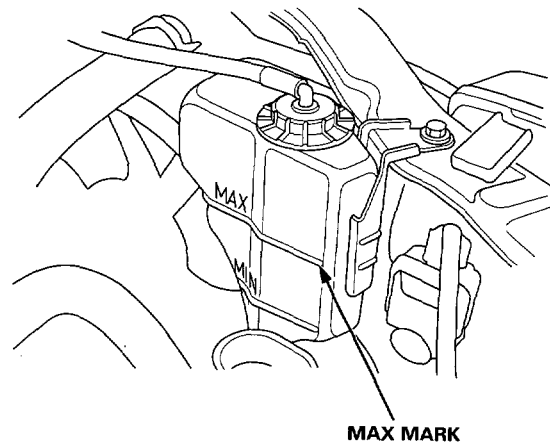
### B18C4 engine:



### Except B18C4 engine:



5. Apply liquid gasket to the drain bolt threads, then reinstall the bolt with a new washer and tighten it securely.
6. Tighten the radiator drain plug securely.
7. Remove, drain and reinstall the reservoir. Fill the tank halfway to the MAX mark with water, then up to MAX mark with antifreeze.



(cont'd)

# Radiator

## Engine Coolant Refilling and Bleeding (cont'd)

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

**NOTE:**

- Use only genuine Honda antifreeze/coolant.
- For best corrosion protection, the coolant concentration must be maintained year-round at 50% minimum. Coolant concentrations less than 50% may not provide sufficient protection against corrosion or freezing.
- Coolant concentrations greater than 60% will impair cooling efficiency and are not recommended.
- Do not use additional rust inhibitors or anti-rust products; they may not be compatible with the coolant.

**Engine Coolant Refill Capacity [including reservoir (0.5 l (0.5 US qt, 0.4 Imp qt))]:**

**B18C4 engine:**

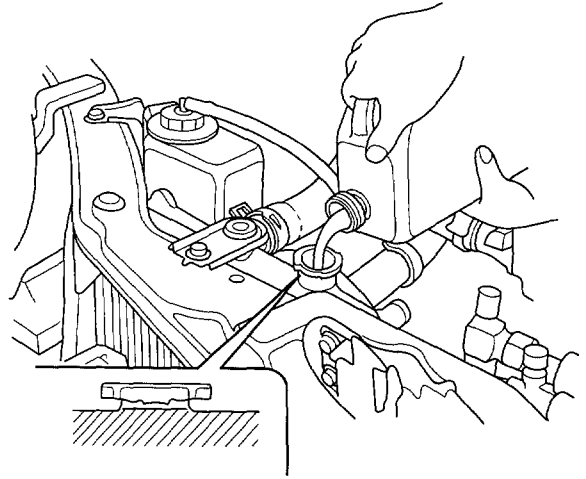
5.0 l (5.3 US qt, 4.4 Imp qt)

**Except B18C4 engine:**

**M/T: 4.5 l (4.8 US qt, 4.0 Imp qt)**

**A/T: 4.4 l (4.6 US qt, 3.9 Imp qt)**

- Pour coolant into the radiator up to the base of the filler neck.



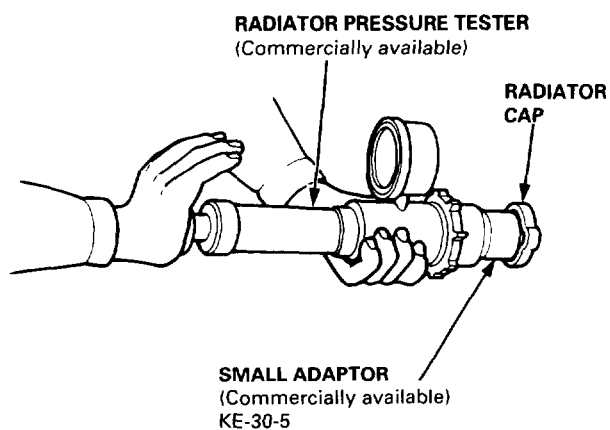
- Start the engine and let it run until it warms up (the radiator fan comes on at least twice).
- Turn off the engine. Check the level in the radiator, add coolant if needed.
- Put the radiator cap on tightly, then run the engine again and check for leaks.





## Cap Testing

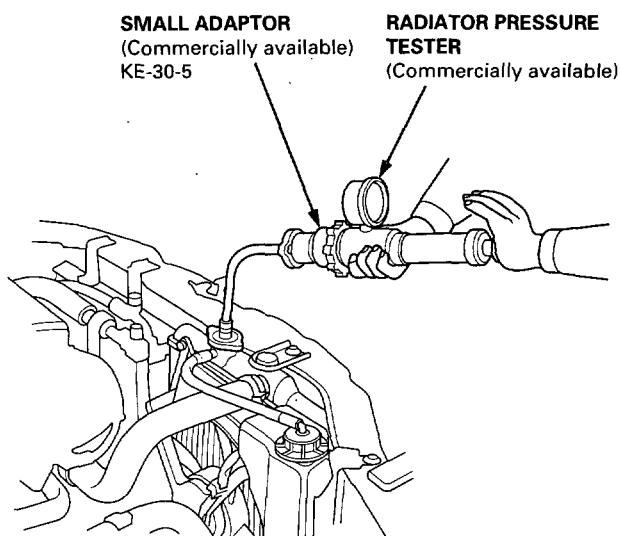
1. Remove the radiator cap, wet its seal with engine coolant, then install it on the pressure tester.
2. Apply a pressure of 93 – 123 kPa (0.95 – 1.25 kgf/cm<sup>2</sup>, 14 – 18 psi).
3. Check for a drop in pressure.
4. If the pressure drops, replace the cap.



## Testing

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

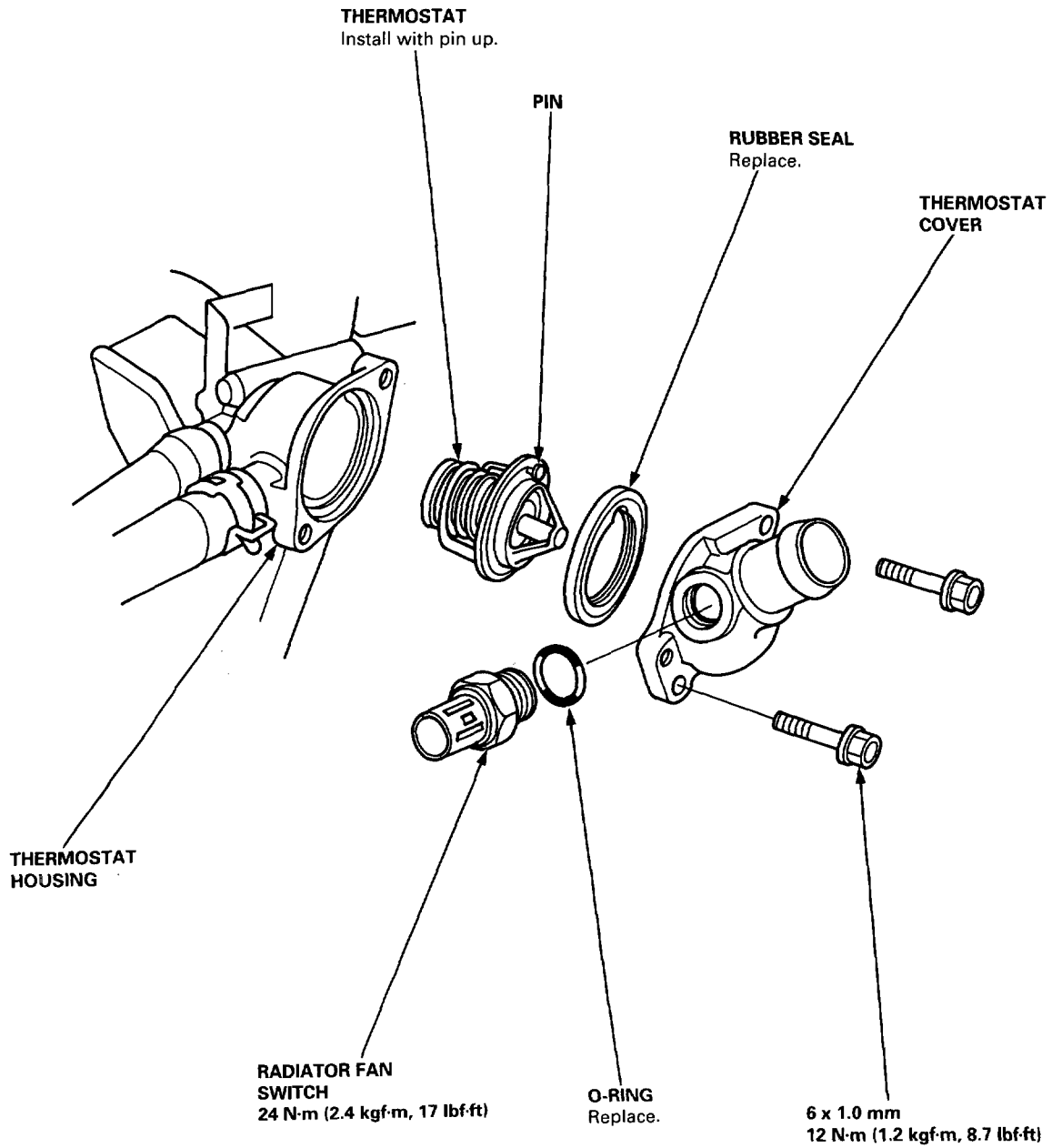
NOTE: Check for engine oil in the coolant and/or coolant in the engine oil.



# Thermostat

## Replacement

NOTE: Use new O-ring when reassembling.





## Testing

Replace the thermostat if it is open at room temperature.

To test a closed thermostat:

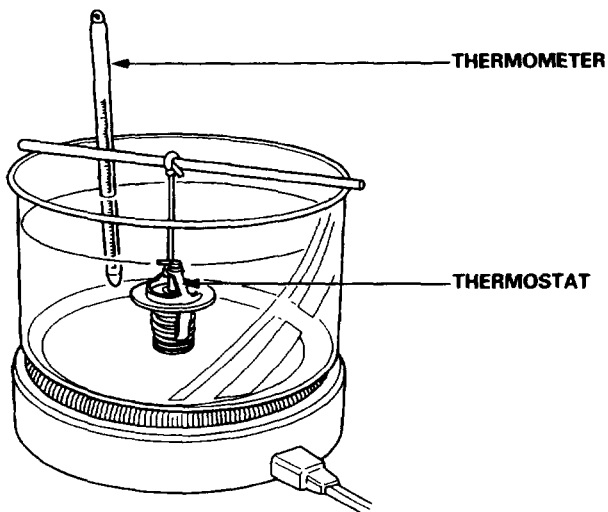
1. Suspend the thermostat in a container of water as shown.
2. Heat the water, and check the temperature with a thermometer. Check the temperature at which the thermostat first opens, and at which it is fully open.
3. Measure lift height of the thermostat when fully open.

### STANDARD THERMOSTAT

Lift height: above 8.0 mm (0.31 in)

Starts opening: 76 – 80°C (169 – 176°F)

Fully open: 90°C (194°F)



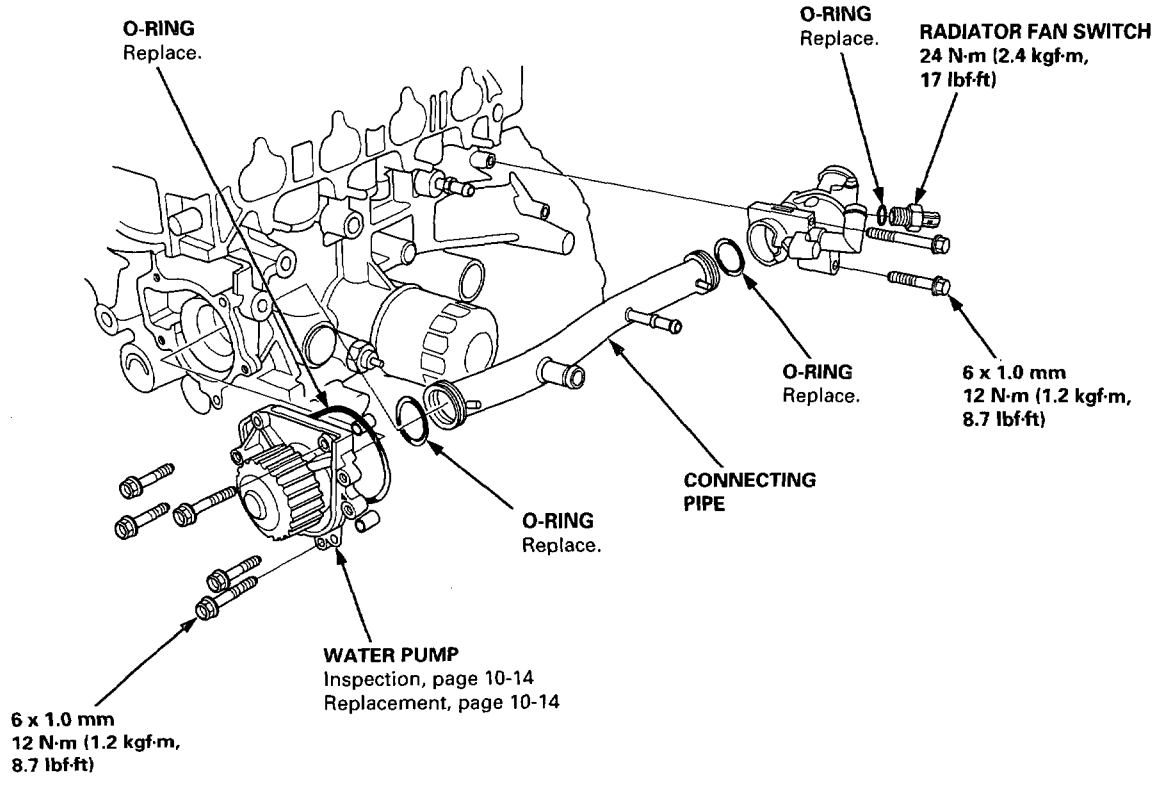
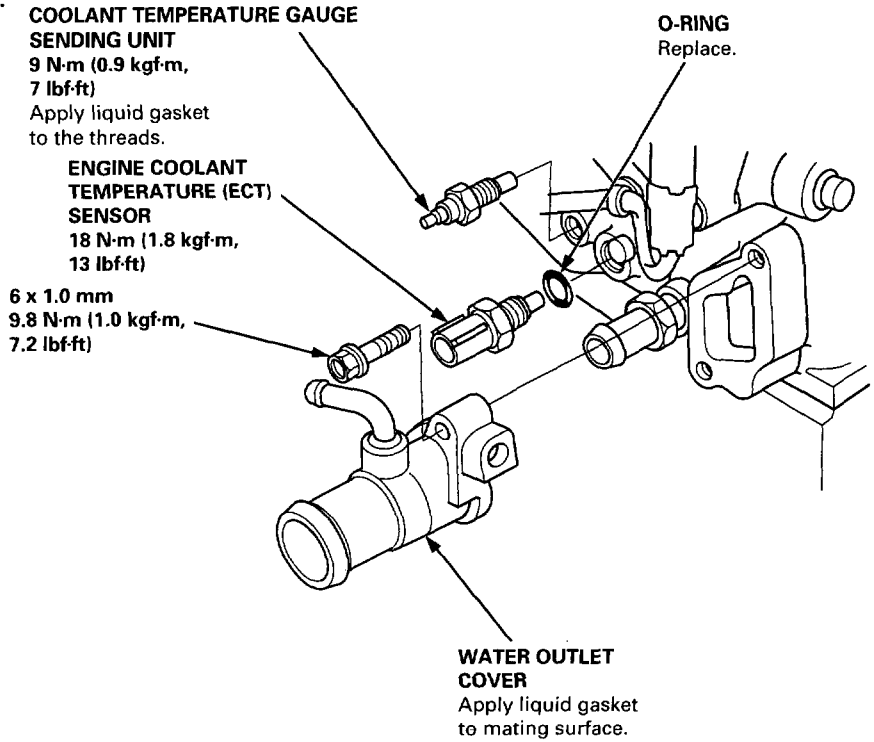
# Water Pump

## Illustrated Index

**NOTE:**

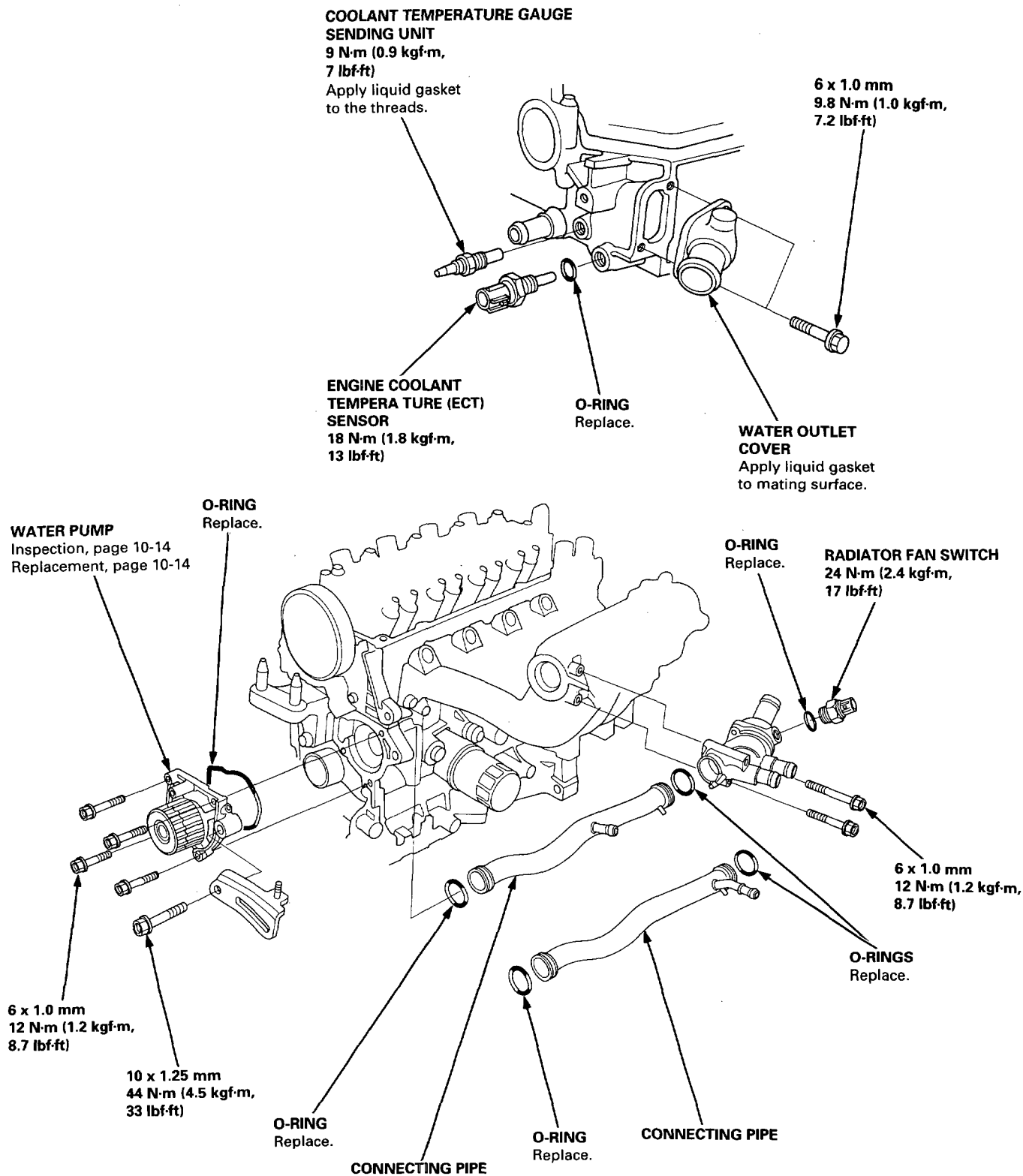
- Use new O-ring when reassembling.
- Use liquid gasket, Part No. 08C70 – X0134SEB, 08C70 – X0231SEB, 08C70 – K0234MEB or 08C70 – K0334MEB.

**B18C4 engine:**





Except B18C4 engine:



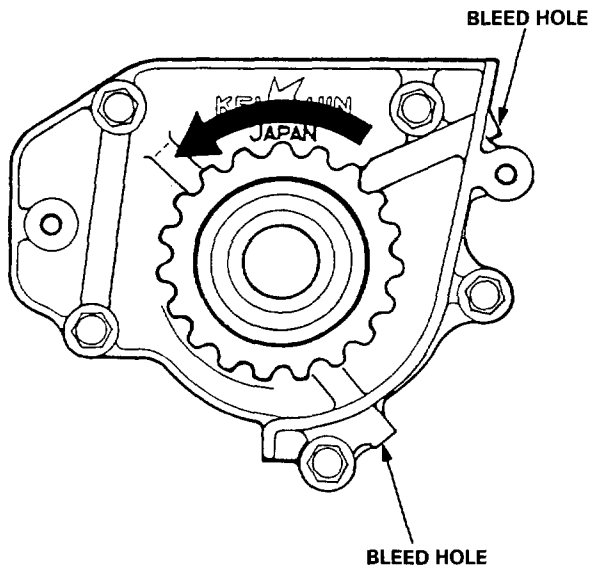
# Water Pump

## Inspection

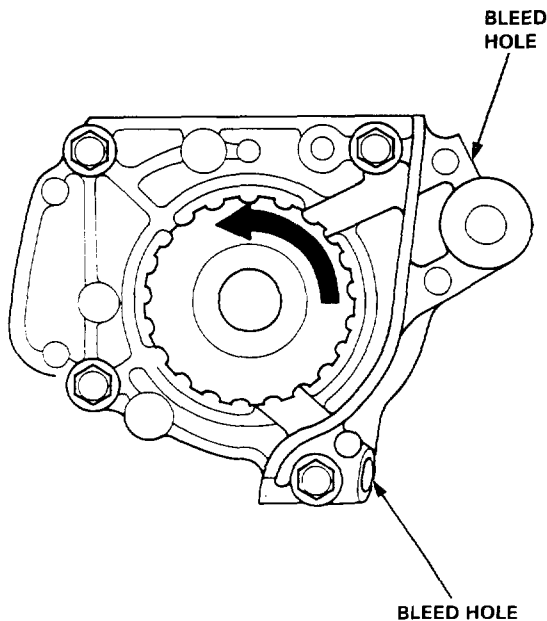
1. Remove the timing belt (see section 6).
2. Check that the water pump pulley turns counter-clockwise.
3. Check for signs of seal leakage.

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

**B18C4 engine:**



**Except B18C4 engine:**

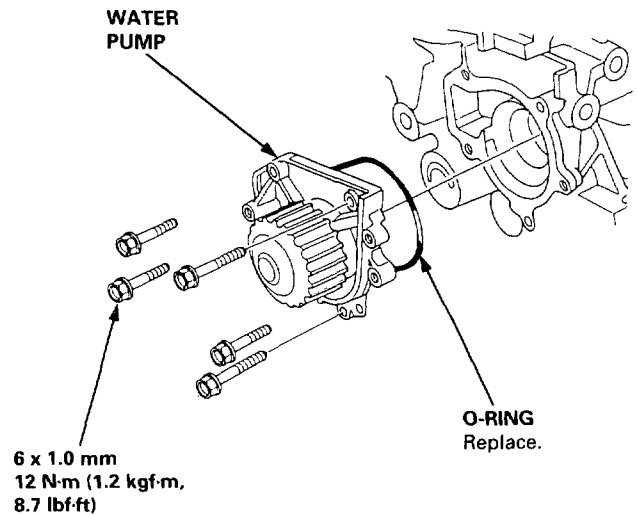


## Replacement

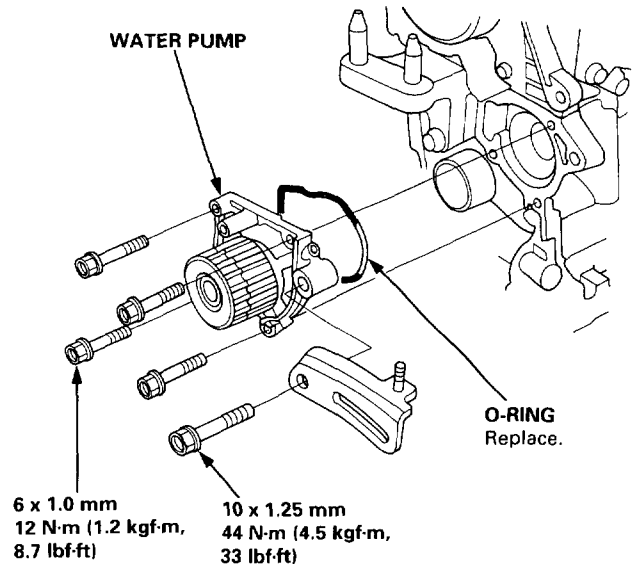
1. Remove the timing belt (see section 6).
2. Remove the water pump by removing five bolts.

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

**B18C4 engine:**



**Except B18C4 engine:**



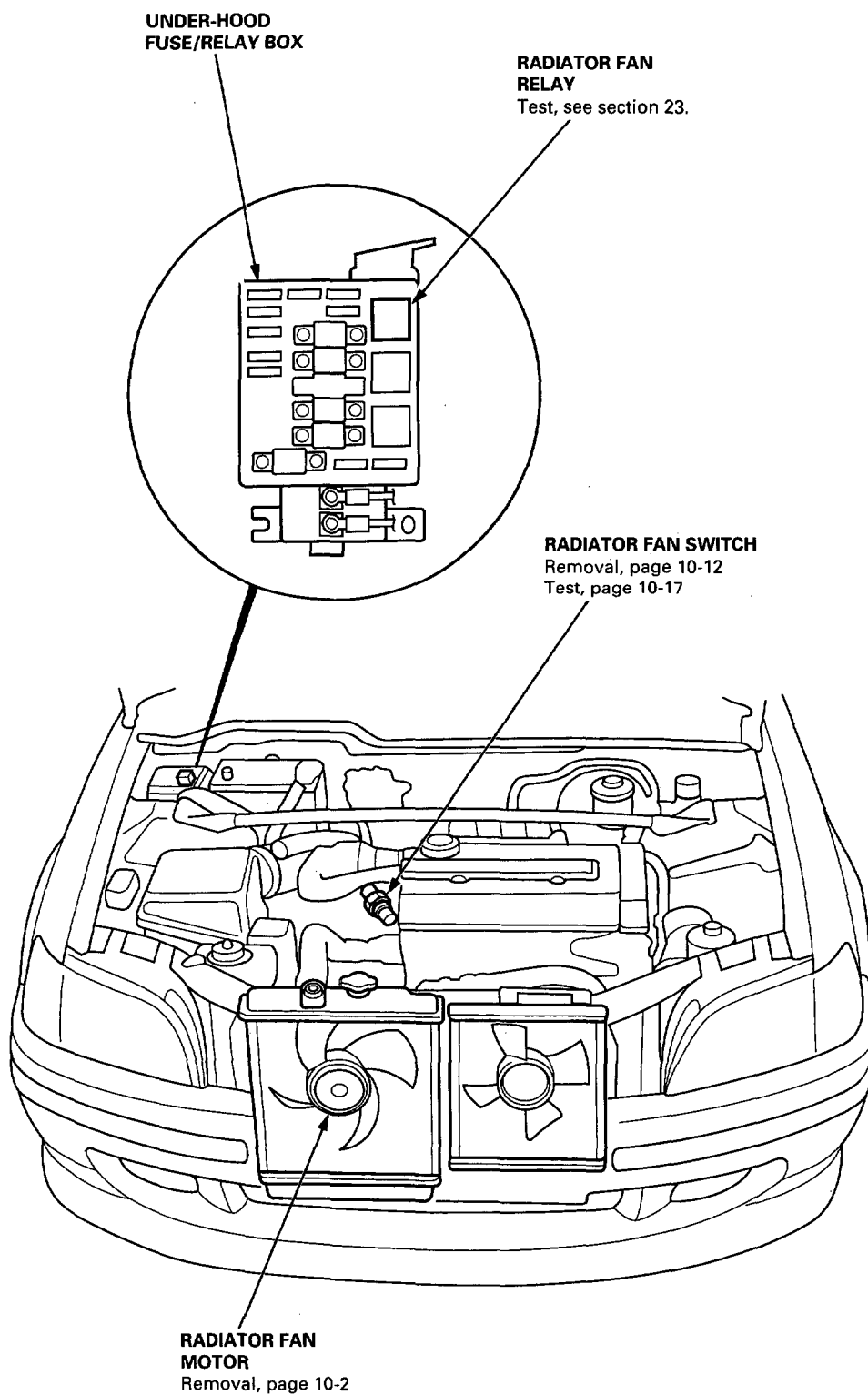
3. Install the water pump in the reverse order of removal.

NOTE:

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



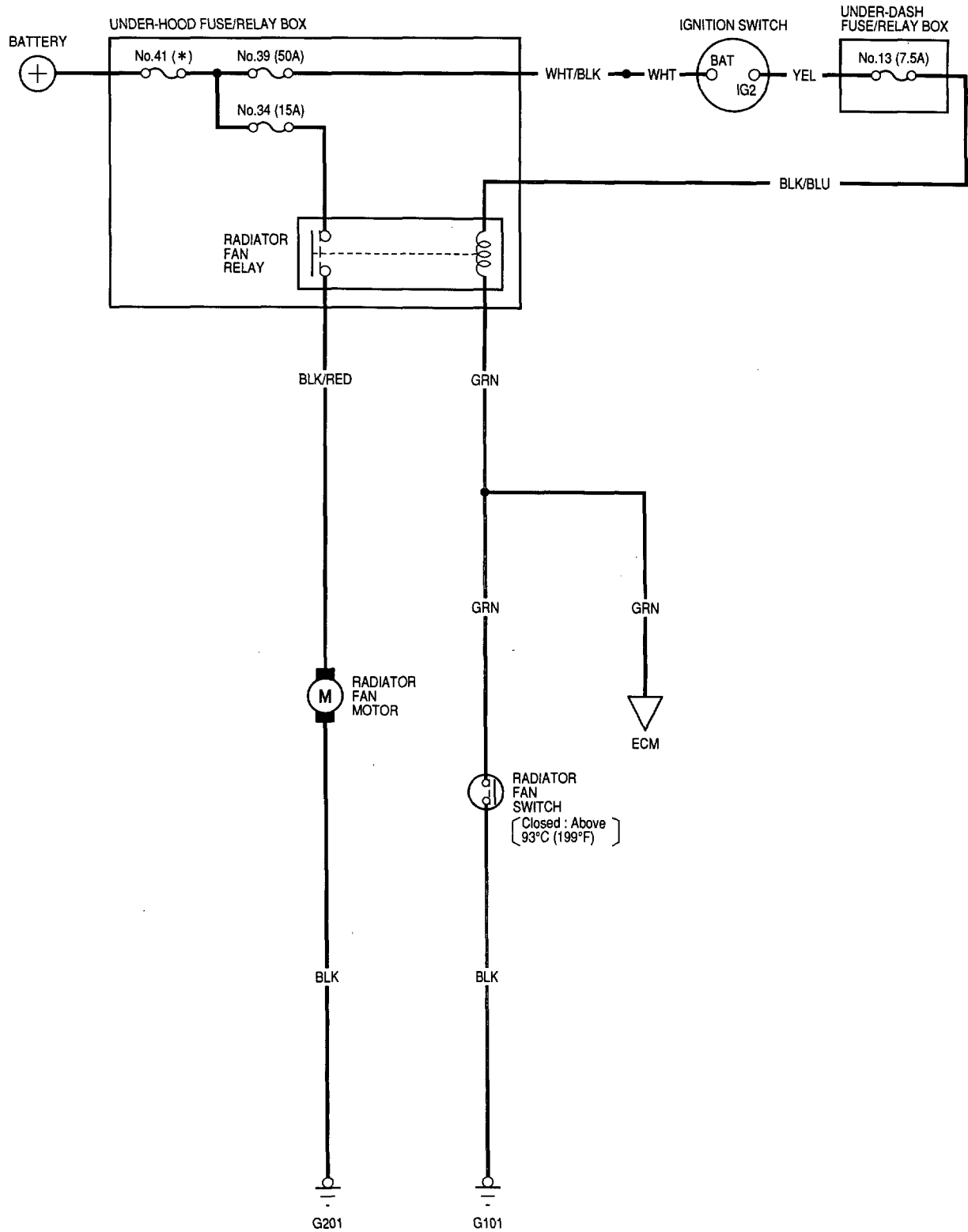
## Component Location Index



# Fan Control

## Circuit Diagram

\*100A : B18C4 engine  
\*80A : Except B18C4 engine

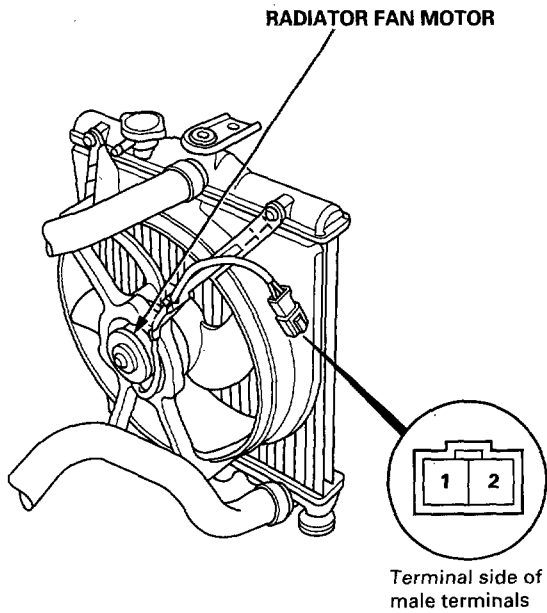






## Fan Motor Testing

1. Disconnect the 2P connector.

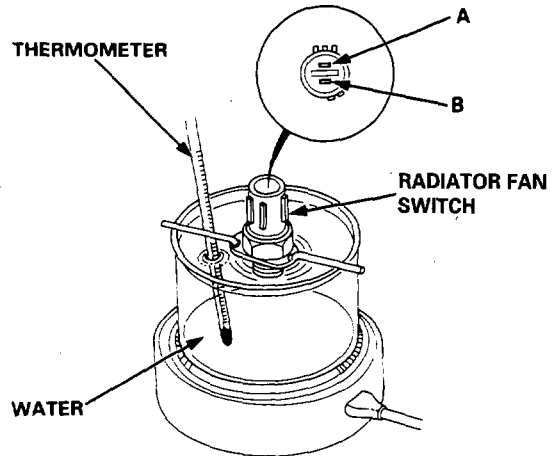


2. Test the motor by connecting battery power to the No. 2 terminal and ground to the No. 1 terminal.
3. If the motor fails to run or does not run smoothly, replace it.

## Radiator Fan Switch Testing

NOTE: Bleed air from the cooling system after installing the radiator fan switch (see page 10-7).

1. Remove the radiator fan switch from the thermostat housing (see page 10-12).
2. Suspend the radiator fan switch in a container of water as shown.



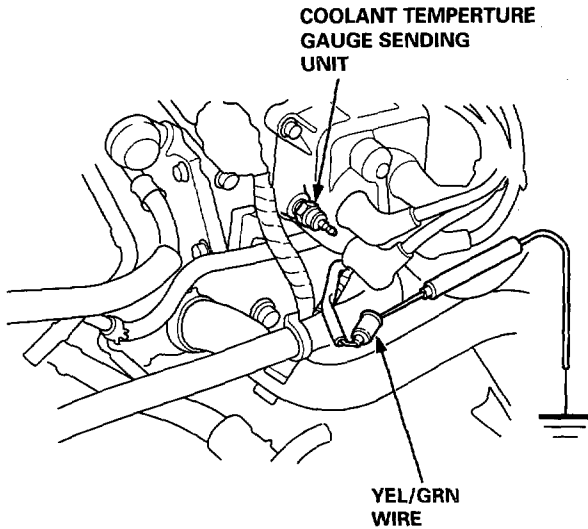
3. Heat the water and check the temperature with a thermometer.
4. Measure the continuity between the A and B terminals according to the table.

Operation		Temperature	Terminal	
			A	B
SWITCH	ON	91° - 95°C (196° - 203°F)	○	○
	OFF	3° - 8°C (5° - 15°F) lower than the temperature when it goes on		

# Coolant Temperature Gauge

## Gauge Testing

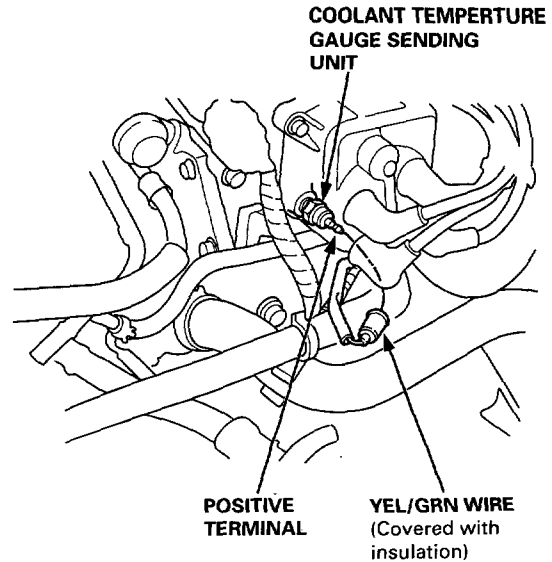
1. Check the No. 15 (10 A) fuse in the under-dash fuse/relay box before testing.
2. Make sure the ignition switch is OFF, then disconnect the YEL/GRN wire from the coolant temperature gauge sending unit, and ground it with a jumper wire.



3. Turn the ignition switch ON (II). Check that the pointer of the coolant temperature gauge starts moving toward the "H" mark. Turn the ignition switch OFF before the pointer reaches "H" on the gauge dial. Failure to do so may damage the gauge.
  - If the pointer of the gauge does not move at all, check for an open in the YEL/GRN wire. If the wires are OK, replace the coolant temperature gauge.
  - If the coolant temperature gauge works, test the coolant temperature gauge sending unit.

## Sending Unit Testing

1. Disconnect the YEL/GRN wire from the coolant temperature gauge sending unit.



2. Using an ohmmeter, measure the change in resistance between the positive terminal and the engine (ground) with the engine cold and with the engine at operating temperature.

Temperature	133°F (56°C)	185°F (85°C) – 212°F (100°C)
Resistance (Ω)	137	46 – 30

3. If the obtained readings are substantially different from the specifications above, inspect the coolant level and the cooling system. If the cooling system is OK, replace the sending unit.

## **Fuel and Emissions**

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<b>D15Z8, B18C4 Engine .....</b>	<b>11-B-1</b>



# D14A7, D14A8, D16B2 Engine

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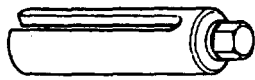
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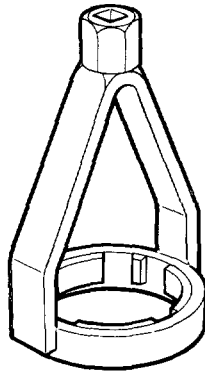


# Special Tools

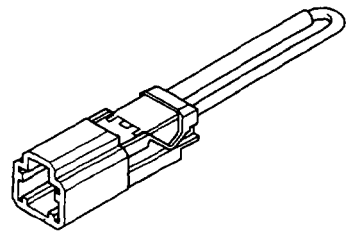
Ref. No.	Tool Number	Description	Qty	Remark
①	07LAA - PT50101	O <sub>2</sub> Sensor Socket Wrench	1	
②	07NAC - SR20100	Fuel Sender Wrench	1	
③	07PAZ - 0010100	SCS Short Connector	1	
④	07406 - 0040002	Fuel Pressure Gauge Set	1	
④-1	07406 - 0040202	Fuel Pressure Hose Assembly	(1)	Component Tools



①



②



③



④

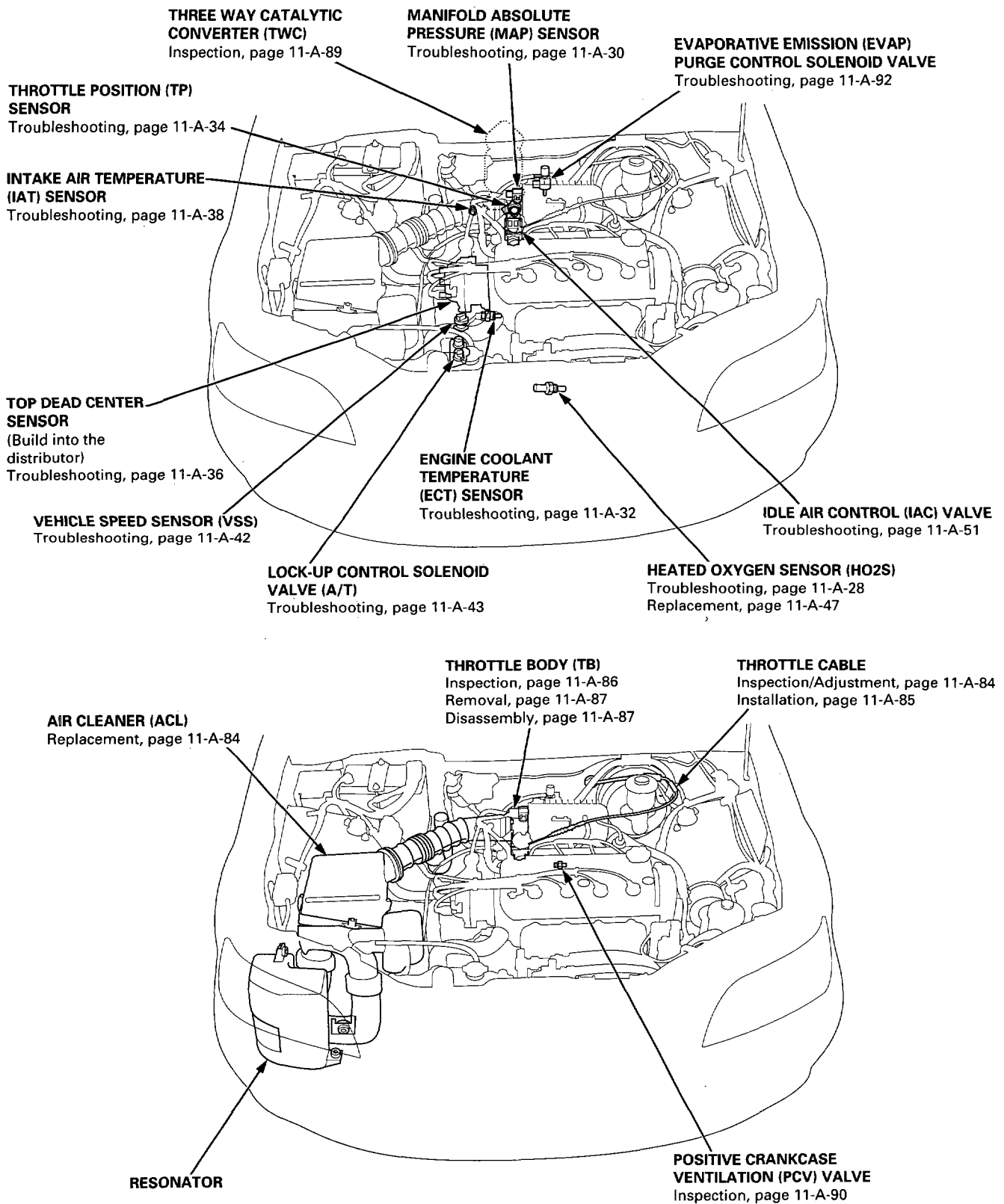


④-1

# Component Locations



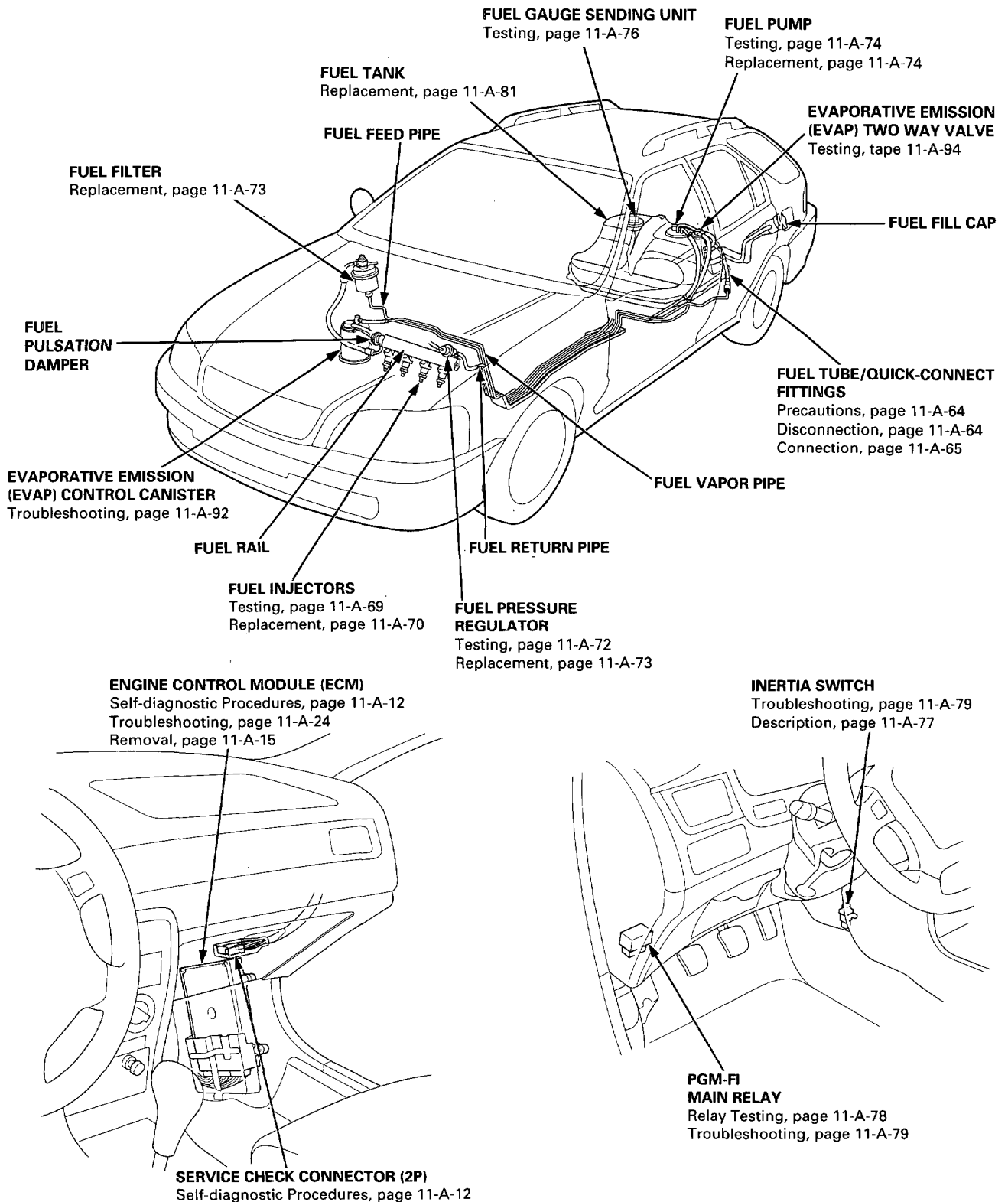
## Index



(cont'd)

# Component Locations

## Index (cont'd)



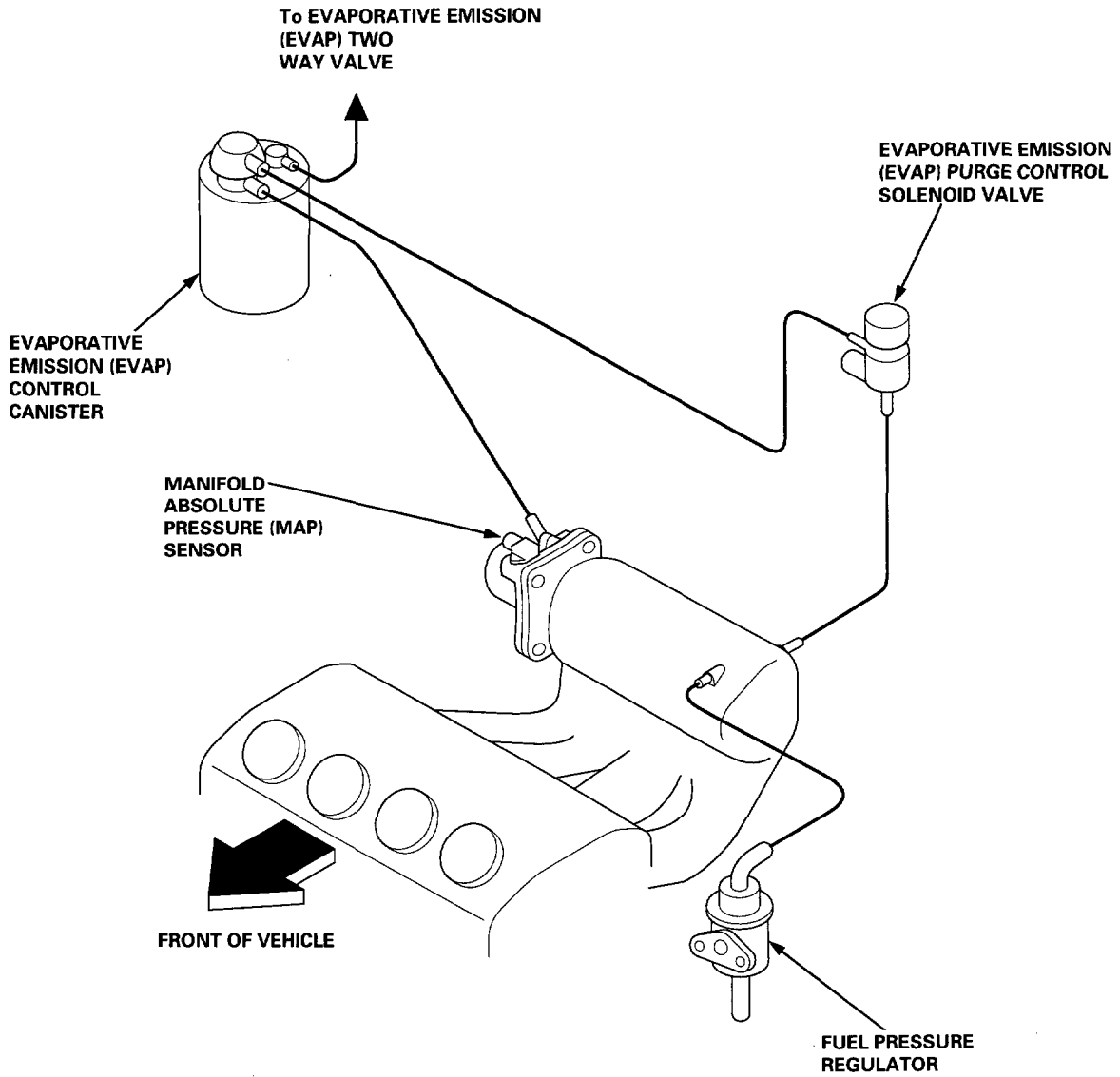
The illustration shows LHD type. RHD type is symmetrical.

The illustration shows LHD type. RHD type is symmetrical.

# System Description



## Vacuum Connections

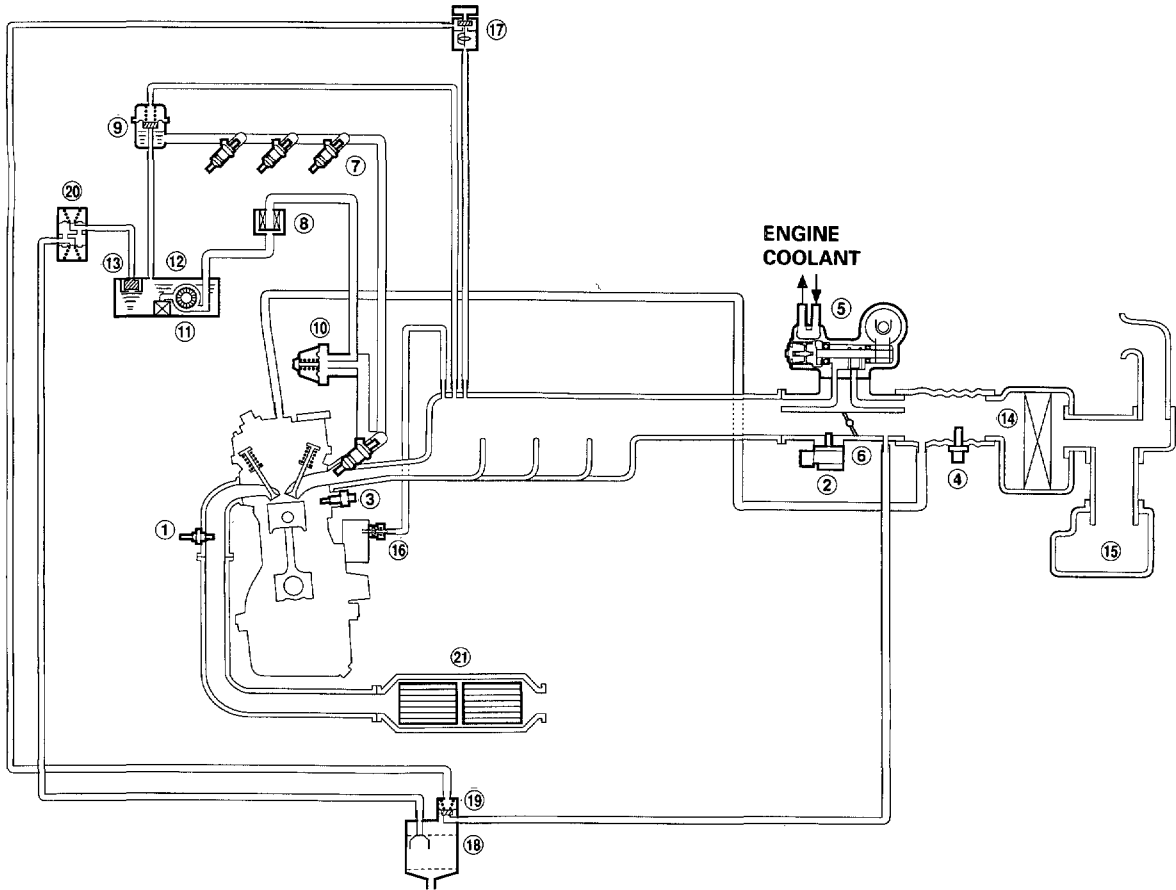


(cont'd)



# System Description

## Vacuum Connections (cont'd)

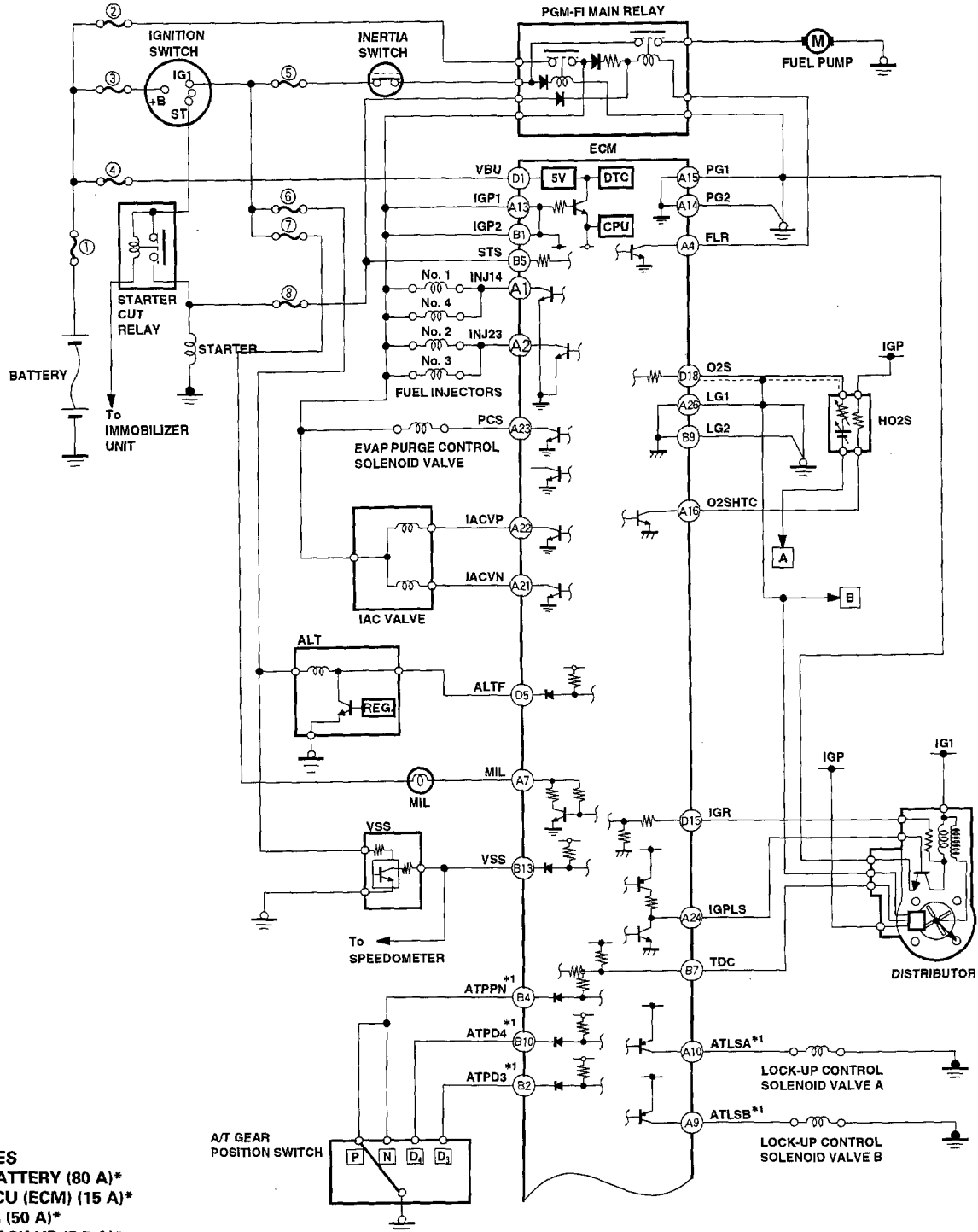


- ① HEATED OXYGEN SENSOR (HO2S)
- ② MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
- ③ ENGINE COOLANT TEMPERATURE (ECT) SENSOR
- ④ INTAKE AIR TEMPERATURE (IAT) SENSOR
- ⑤ IDLE AIR CONTROL (IAC) VALVE
- ⑥ THROTTLE BODY (TB)
- ⑦ FUEL INJECTOR
- ⑧ FUEL FILTER
- ⑨ FUEL PRESSURE REGULATOR
- ⑩ FUEL PULSATION DAMPER
- ⑪ FUEL PUMP (FP)
- ⑫ FUEL TANK

- ⑬ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE
- ⑭ AIR CLEANER
- ⑮ RESONATOR
- ⑯ POSITIVE CRANKCASE VENTILATION (PCV) VALVE
- ⑰ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE
- ⑱ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER
- ⑲ EVAPORATIVE EMISSION (EVAP) CONTROL PURGE DIAPHRAGM VALVE
- ⑳ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE
- ㉑ THREE WAY CATALYTIC CONVERTER (TWC)



# Electrical Connections



**FUSES**

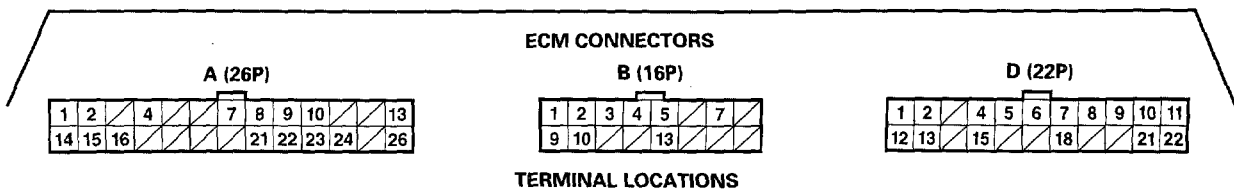
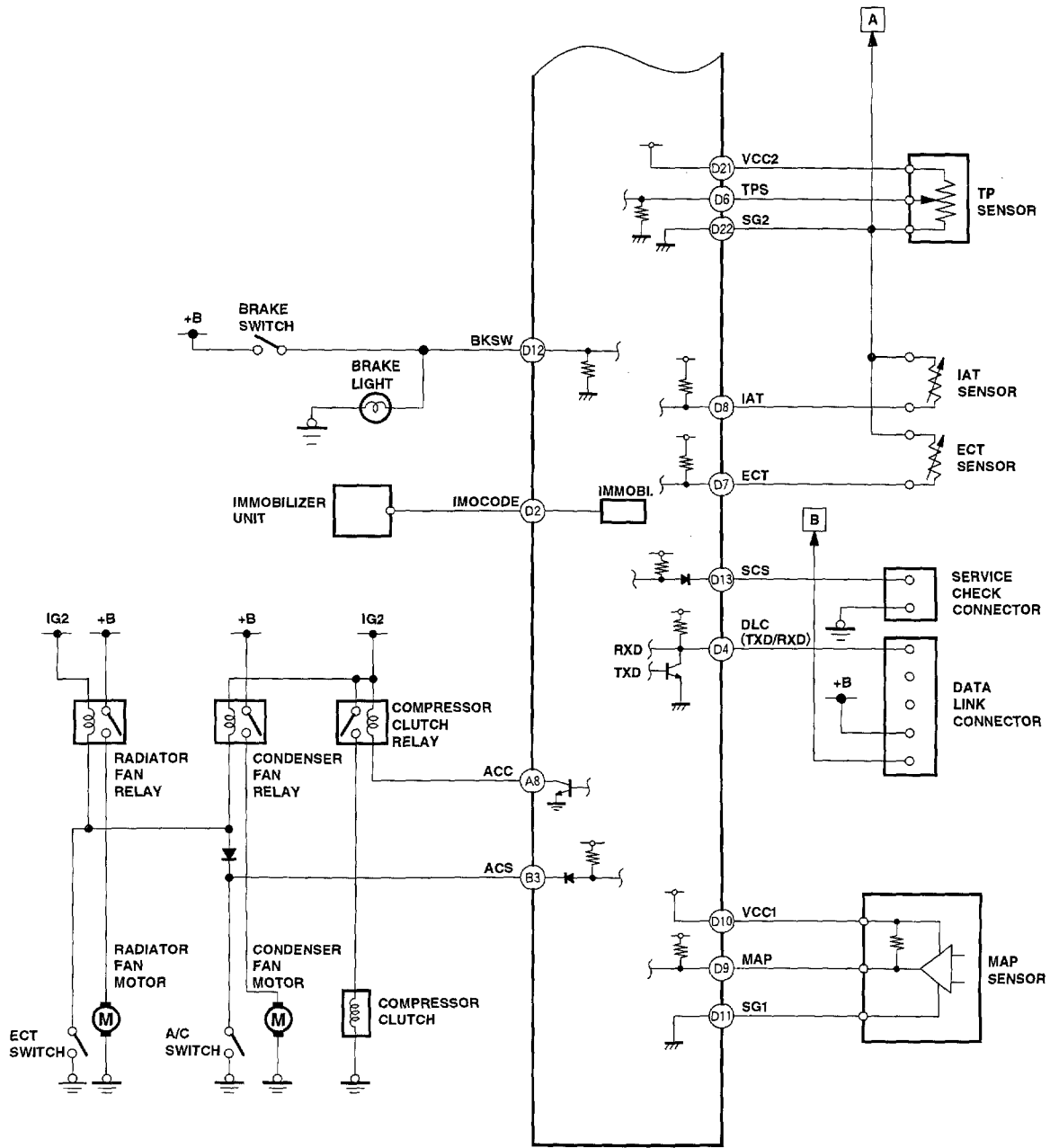
- ① BATTERY (80 A)\*
  - ② ECU (ECM) (15 A)\*
  - ③ IG (50 A)\*
  - ④ BACK UP (7.5 A)\*
  - ⑤ With SRS model: No. 24 FUEL PUMP (15 A)  
Without SRS model: No. 12 FUEL PUMP (15 A)
  - ⑥ ACG (15 A)\*\*
  - ⑦ No. 15 BACK UP LIGHTS (10 A)
  - ⑧ No. 18 STARTER SIGNAL (7.5 A)
- \*: in the under-hood fuse/relay box  
 \*\*: in the fuse holder (located at the under-dash fuse/relay box)

\*1: A/T

(cont'd)

# System Description

## Electrical Connections (cont'd)





# Troubleshooting

## Troubleshooting Guide

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

PAGE	SYSTEM	PGM-FI							
		ENGINE CONTROL MODULE	OXYGEN SENSOR	MANIFOLD ABSOLUTE PRESSURE SENSOR	ENGINE COOLANT TEMPERATURE SENSOR	THROTTLE POSITION SENSOR	TOP DEAD CENTER SENSOR	INTAKE AIR TEMPERATURE SENSOR	IGNITION PULSE SIGNAL
	SYMPTOM	11-A-24	11-A-28, 44	11-A-30	11-A-32	11-A-34	11-A-36	11-A-38	11-A-40
	MALFUNCTION INDICATOR LAMP (MIL) TURNS ON								
	MALFUNCTION INDICATOR LAMP (MIL) BLINKS								
	ENGINE WON'T START	①					③		③
	DIFFICULT TO START ENGINE WHEN COLD	ⓑ		③	①		③		
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	ⓑ			③				
	ROUGH IDLE	ⓑ		③					
	WHEN WARM ENGINE SPEED TOO HIGH	ⓑ			③				
	WHEN WARM ENGINE SPEED TOO LOW	ⓑ							
FREQUENT STALLING	WHILE WARMING UP	ⓑ			③				
	AFTER WARMING UP	ⓑ							
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	ⓑ		②			③		
	FAILS EMISSION TEST	ⓑ	③	②					
	LOSS OF POWER	ⓑ		③		②			

If the engine won't start and MIL doesn't blink, first take 8 second of cranking to set DTC 8. If not go to step ①.







\* If codes other than those listed above are indicated, count the number of blinks again. If the MIL is in fact blinking these codes, replace the ECM.

ⓑ If the MIL is on while the engine is running, connect the SCS short connector to the service check connector. If no code is displayed (MIL stays on steady), the back-up system is in operation.

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

\*1: A/T model



PGM-FI		IDLE CONTROL		FUEL SUPPLY		INTAKE AIR	EMISSION CONTROL SYSTEM
VEHICLE SPEED SENSOR	LOCK-UP CONTROL SOLENOID VALVE*1	IDLE AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTORS	OTHER FUEL SUPPLY		
11-A-42	11-A-43	11-A-51	11-A-48	11-A-68	11-A-61	11-A-82	11-A-88
							
							
					②		
					②		
		①	②				
		①	②	②			
		①	②				
		①	②	②			
		①	②		③		
		③			①		
				①			
							①
				③	①	③	③

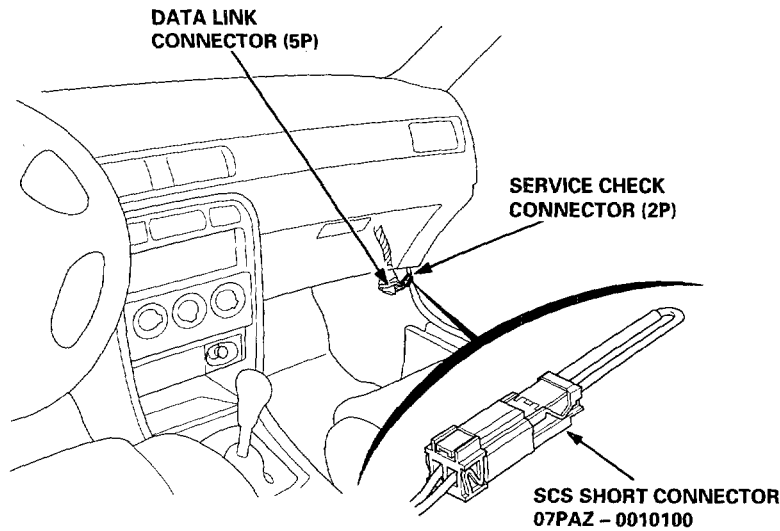
# Troubleshooting

## Self-diagnostic Procedures

1. When the Malfunction Indicator Lamp (MIL) has been reported on, check the Diagnostic Trouble Code (DTC) as following:

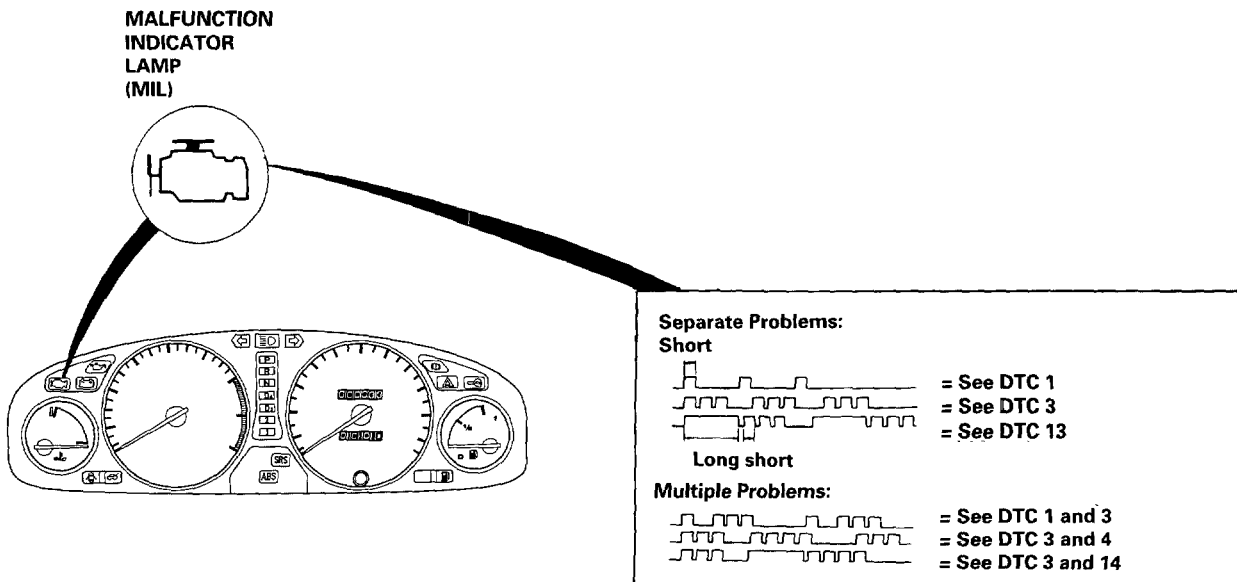
NOTE: You can also read DTCs with Honda PGM Tester connected to data link connector (5P).

1. Connect the SCS short connector to Service Check Connector as shown (The 2P Service Check Connector is located under the dash on the passenger side of the car). Turn the ignition switch ON (II).



The illustration shows LHD type. RHD type is symmetrical.

2. Note the Diagnostic Trouble Code (DTC): The MIL indicates a code by the length and number of blinks. The MIL can indicate multiple problems by blinking separate codes, one after another. Codes 1 through 9 are indicated by individual short blinks. Codes 10 through 41 are indicated by a series of long and short blinks. The number of long blinks equals the first digit, the number of short blinks equals the second digit. Sometimes the first blink is difficult to see; always count the blinks at least twice to verify the code.

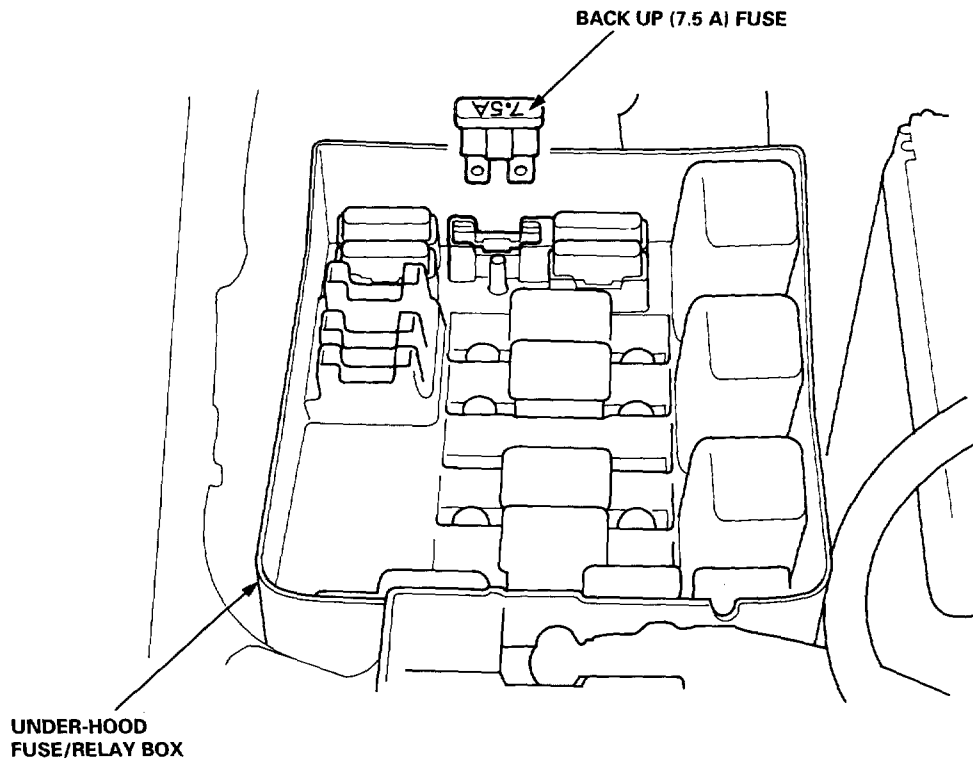




## II. Engine Control Module (ECM) Reset Procedure

NOTE: You can also reset the ECM with Honda PGM Tester.

1. Turn the ignition switch off.
2. Remove the BACK UP (7.5 A) fuse from the *under-hood fuse/relay box* for 10 seconds to reset the ECM.



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

1. Remove the SCS Short Connector.

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

2. Do the ECM Reset Procedure.

## IV. Known-Good ECM Substitution

The ECM is part of the immobilizer system. If you substitute a known-good ECM, the ECM will have a different immobilizer code. In order for the engine to start, you must rewrite the immobilizer code with the Honda PGM Tester.

(cont'd)



# Troubleshooting

## Self-diagnostic Procedures (cont'd)

DIAGNOSTIC TROUBLE CODE (DTC)	SYSTEM INDICATED	Page
0	ENGINE CONTROL MODULE (ECM)	11-A-24
1	HEATED OXYGEN SENSOR (HO2S)	11-A-28
3	MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR	11-A-30
6	ENGINE COOLANT TEMPERATURE (ECT) SENSOR	11-A-32
7	THROTTLE POSITION (TP) SENSOR	11-A-34
8	TOP DEAD CENTER POSITION (TDC) SENSOR	11-A-36
10	INTAKE AIR TEMPERATURE (IAT) SENSOR	11-A-38
14	IDLE AIR CONTROL (IAC) VALVE	11-A-51
15	IGNITION PULSE SIGNAL	11-A-40
17	VEHICLE SPEED SENSOR (VSS)	11-A-42
19	LOCK-UP CONTROL SOLENOID VALVE A/B*1	11-A-43
41	HEATED OXYGEN SENSOR (HO2S) HEATER	11-A-44

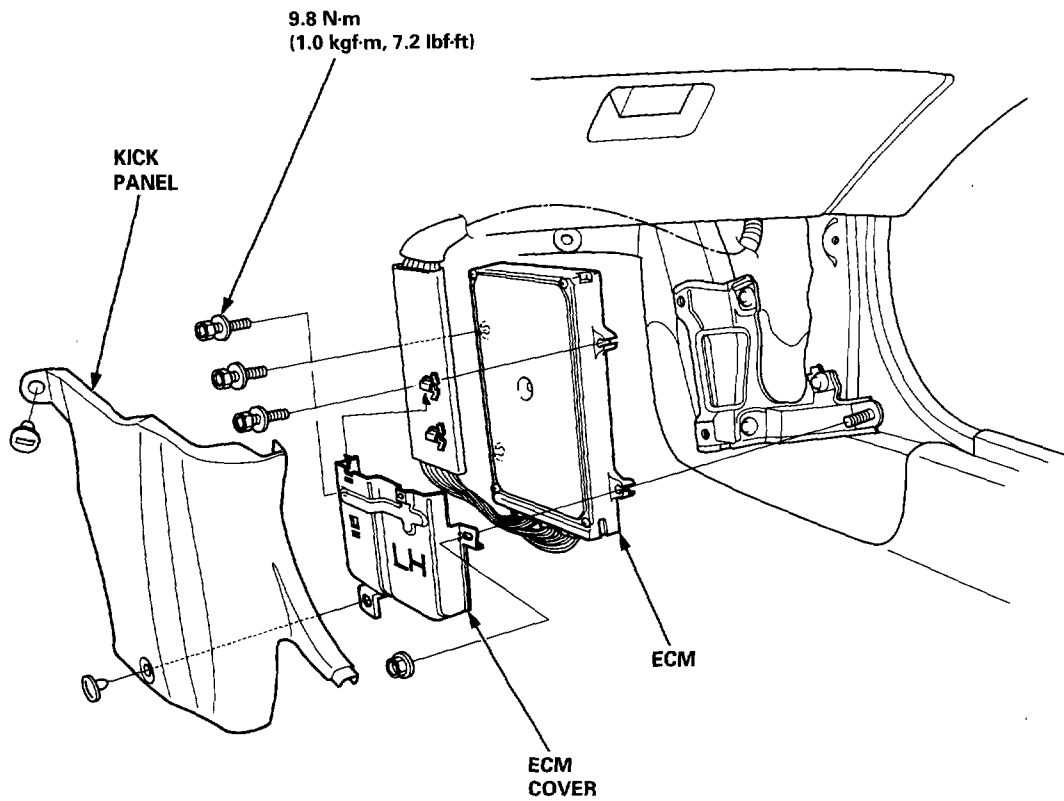
\*1: A/T model

- If codes other than those listed above are indicated, verify the code. If the code indicated is not listed above, replace the ECM (see page 11-A-15).
- The MIL 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.



## ECM Removal

If the inspection for a particular code requires voltage or resistance checks at the ECM connectors, remove the passenger kick panel. Pull the carpet back to expose the ECM. Unbolt the ECM bolt.



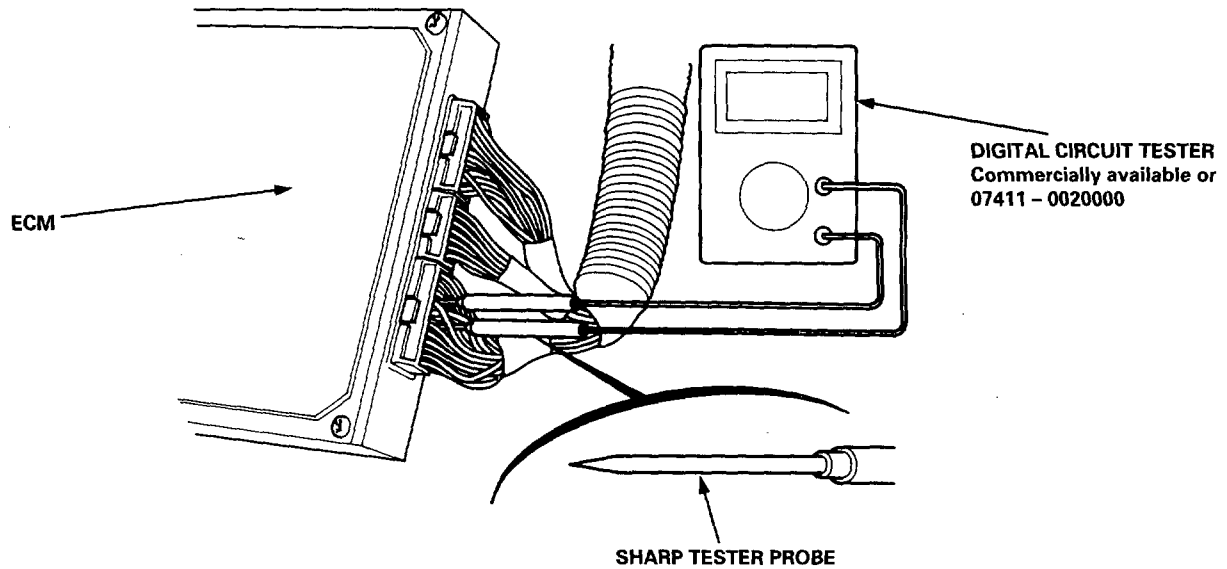
LHD type is shown, RHD type is symmetrical.

(cont'd)

# Troubleshooting

## Self-diagnostic Procedures (cont'd)

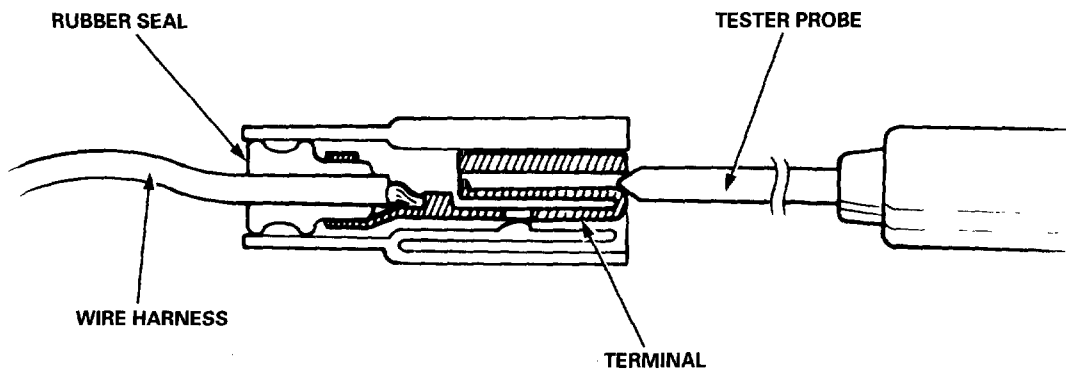
When checking the ECM connector terminals, gently slide the sharp tester probe from the wire side into the connector until it comes in contact with the terminal end of the wire.



### NOTICE

For testing at connectors, 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 force insert the probe.

Puncturing the insulation on a wire can cause poor or intermittent electrical connections.





## Engine Control Module Terminal Arrangement

ECM CONNECTOR A (26P)

1	2		4		7	8	9	10		13
INJ14	INJ23		FLR		MIL	ACC	ATLSB	ATLSA		IGP1
14	15	16				21	22	23	24	26
PG2	PG1	O2SHTC				IACV N	IACV P	PCS	IGPLS	LG1

Wire side of female terminals

ECM CONNECTOR A (26P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	BRN	INJ1 4 (No. 1 No. 4 FUEL INJECTOR)	Drives No. 1 No 4 fuel injectors	With engine running: pulses
2	RED	INJ2 3 (No. 2 No. 3 FUEL INJECTOR)	Drives No. 2 No 3 fuel injectors	
4	GRN/YEL	FLR (FUEL PUMP RELAY)	Drives fuel pump relay	0 V for two seconds after turning ignition switch ON (II), then battery voltage
7	GRN/ORN	MIL (MALFUNCTION INDICATOR LAMP)	Drives MIL	With MIL turned ON: 0 V With MIL turned OFF: battery voltage
8	RED	ACC (A/C CLUTCH RELAY)	Drives A/C clutch relay	With compressor ON: 0 V With compressor OFF: battery voltage
9*1	GRN/BLK	ATLSB (LOCK-UP CONTROL SOLENOID VALVE B)	Drives lock-up control solenoid valve B	With lock-up ON: battery voltage With lock-up OFF: 0 V
10*1	YEL	ATLSA (LOCK-UP CONTROL SOLENOID VALVE A)	Drives lock-up control solenoid valve A	With lock-up ON: battery voltage With lock-up OFF: 0 V
13	YEL/BLK	IGP1 (POWER SOURCE)	Power source for the ECM control circuit	With ignition switch ON (II): battery voltage With ignition switch OFF: 0 V
14	BLK	PG2 (POWER GROUND)	Ground for the ECM power circuit	Less than 1.0 V at all times
15	BLK	PG1 (POWER GROUND)	Ground for the ECM power circuit	Less than 1.0 V at all times
16	BLK/WHT	O2SHTC (HEATED OXYGEN SENSOR HEATER CONTROL)	Drives heated oxygen sensor heater	With ignition switch ON (II): battery voltage With fully warmed up engine running: 0 V
21	ORN	IACV N (IDLE AIR CONTROL VALVE NEGATIVE SIDE)	Drives IACV (negative side)	With engine running: pulses
22	BLK/BLU	IACV P (IDLE AIR CONTROL VALVE POSITIVE SIDE)	Drives IACV (positive side)	With engine running: pulses
23	RED	PCS (EVAP PURGE CONTROL SOLENOID VALVE)	Drives EVAP purge control solenoid valve	With engine running, engine coolant below 75°C (167°F): battery voltage With engine running, engine coolant above 75°C (167°F): 0 V
24	YEL/GRN	IG PLS (IGNITION PULSE)	Sends ignition pulse	With ignition switch ON (II): 0 V With engine running: about 4 V (depending on engine speed)
26	BRN/BLK	LG1 (LOGIC GROUND)	Ground for the ECM control circuit	Less than 1.0 V at all times

\*1: A/T

(cont'd)

# Troubleshooting

## Engine Control Module Terminal Arrangement (cont'd)

ECM CONNECTOR B (16P)

1	2	3	4	5		7	
IGP2	ATPD3	ACS	ATPPN	STS		TDC	
9	10			13			
LG2	ATPD4			VSS			

Wire side of female terminals

ECM CONNECTOR B (16P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	YEL/BLK	IGP2 (POWER SOURCE)	Power source for the ECM control circuit	With ignition switch ON (II): battery voltage With ignition switch OFF: 0 V
2*1	GRN/BLU	ATPD3 (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal	In <b>D<sub>3</sub></b> position: 0 V In any other position: battery voltage
3	BLU/RED	ACS (A/C SWITCH SIGNAL)	Detects A/C switch signal	With A/C switch ON: 0 V With A/C switch OFF: battery voltage
4*1	GRN	ATPPN (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal	In <b>N</b> or <b>P</b> position: 0 V In any other position: battery voltage
5	BLK/WHT	STS (STARTER SWITCH SIGNAL)	Detects starter switch signal	With starter switch ON: battery voltage With starter switch OFF: 0 V
7	GRN	TDC (TDC SENSOR SIGNAL)	Detects TDC sensor signal	With engine running: pulses
9	BRN/BLK	LG2 (LOGIC GROUND)	Ground for the ECM control circuit	Less than 1.0 V at all times
10*1	GRN/BLK	ATPD4 (A/T GEAR POSITION SWITCH)	Detects A/T gear position switch signal	In <b>D<sub>4</sub></b> position: 0 V In any other position: battery voltage
13	BLU/WHT	VSS (VEHICLE SPEED SENSOR)	Detects VSS signal	With ignition switch ON (II) and front wheels turned: cycles 0 V – 5 V or battery voltage

\*1: A/T



**ECM CONNECTOR D (22P)**

1	2		4	5	6	7	8	9	10	11
VBU	IMO CODE		DLC	ALTF	TPS	ECT	IAT	MAP	VCC1	SG1
12	13		15			18			21	22
BKSW	SCS		IGR			O2S			VCC2	SG2

Wire side of female terminals

**ECM CONNECTOR D (22P)**

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	WHT/BLU (RHD: WHT/ BLK)	VBU (VOLTAGE BACK UP)	Power source for the ECM control circuit Power source for the DTC memory	Battery voltage at all times
2	RED	IMO CODE (IMMOBILIZER CODE)	Detects Immobilizer signal	
4	LT BLU	DLC (TXD/RXD)	Sends and receive Honda PGM Tester signal	With ignition switch ON (II): about 5 V
5	WHT/RED	ALTF (ALTERNATOR FR SIGNAL)	Detects alternator FR signal	With fully warmed up engine running: 0 V – 5 V (depending on electrical load)
6	RED/BLK	TPS (THROTTLE POSITION SENSOR)	Detects TP sensor signal	With throttle fully open: about 4.8 V With throttle fully closed: about 0.1 V
7	RED/WHT	ECT (ENGINE COOLANT TEMPERATURE SENSOR)	Detects ECT sensor signal	With ignition switch ON (II): about 0.1 – 4.8 V (depending on engine coolant temperature)
8	RED/YEL	IAT (INTAKE AIR TEMPERATURE SENSOR)	Detects IAT sensor signal	With ignition switch ON (II): about 0.1 – 4.8 V (depending on intake air temperature)
9	RED/GRN	MAP (MANIFOLD ABSOLUTE PRESSURE SENSOR)	Detects MAP sensor signal	With ignition switch ON (II): about 3 V During idling: about 1.5 V (depending on engine speed)
10	YEL/RED	VCC1 (SENSOR VOLTAGE)	Power source for MAP sensor	With ignition switch ON (II): about 5 V
11	GRN/WHT	SG1 (SENSOR GROUND)	Ground for MAP sensor	Less than 1.0 V at all times
12	GRN/WHT	BK SW (BRAKE SWITCH)	Detects brake switch signal	With brake pedal released: 0 V With brake pedal depressed: battery voltage
13	BRN	SCS (SERVICE CHECK SIGNAL)	Detects service check connector signal (the signal causing a DTC indication)	With the connector connected: 0 V With the connector disconnected: about 5 V
15	BLU	IG R (IGNITION PULSE RETURN SIGNAL)	Detects ignition pulse return signal	With engine running: about 10 V (depending on engine speed)
18	WHT/RED	O2S (OXYGEN SENSOR)	Detects oxygen sensor signal	With throttle fully opened during idling of fully warmed up engine: above 0.6 V With throttle quickly closed: below 0.4 V
21	YEL/BLU	VCC2 (SENSOR VOLTAGE)	Power source for TP sensor	With ignition switch ON (II): about 5 V With ignition switch OFF: 0 V
22	GRN/BLK	SG2 (SENSOR GROUND)	Sensor ground	Less than 1.0 V at all times

\*1: A/T

# Troubleshooting

## How to Read Flowcharts

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

**START**

(bold type)

Describes the conditions or situation to start a troubleshooting flowchart.

**ACTION**

Asks you to do something; perform a test, set up a condition etc.

**DECISION**

Asks you about the result of an action, then sends you in the appropriate troubleshooting direction.

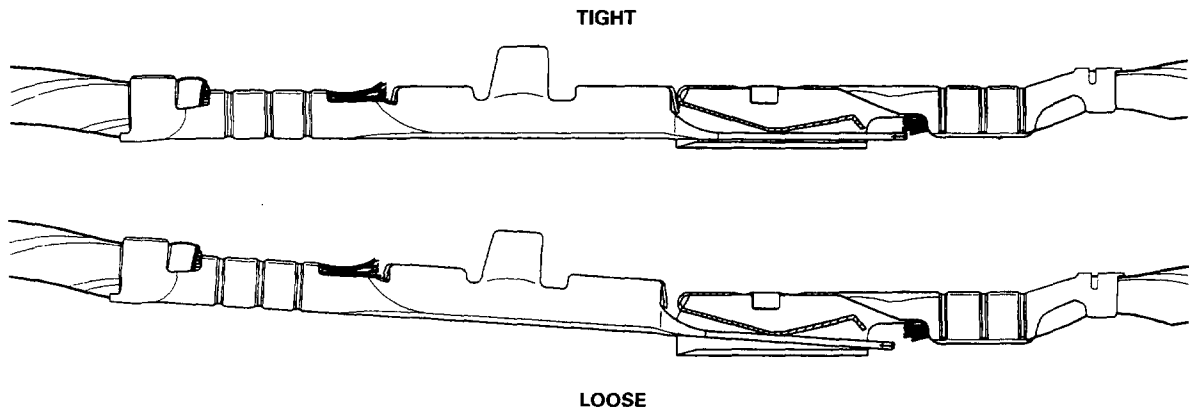
**STOP**

(bold type)

The end of a series of actions and decisions, describes a final repair action and sometimes directs you to an earlier part of the flowchart to confirm your repair.

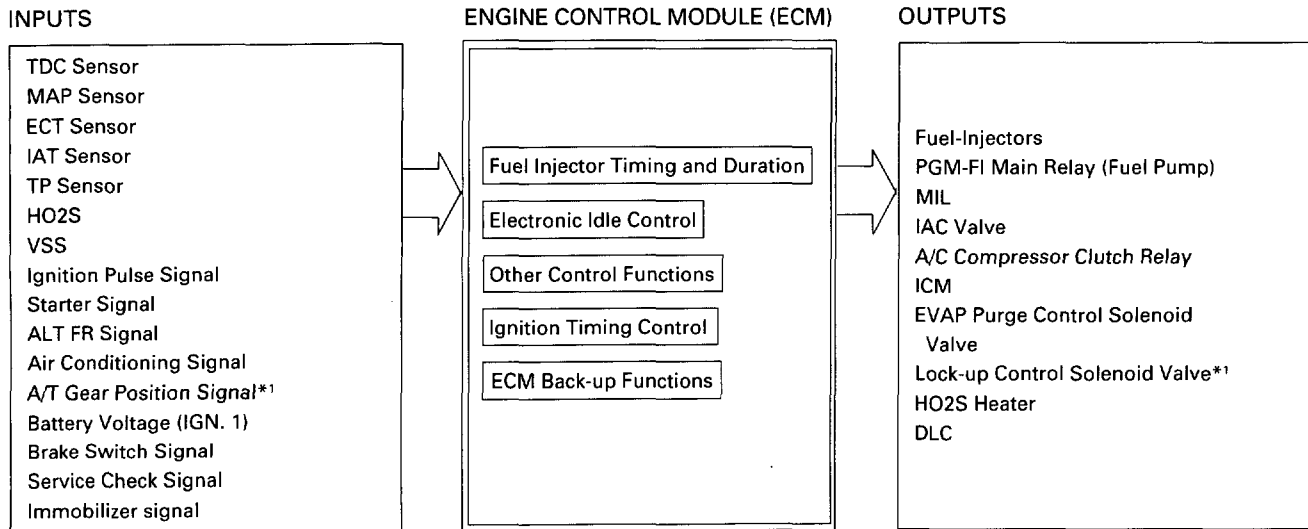
**NOTE:**

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





## System Description



\*1: A/T model

### PGM-FI System

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

#### Fuel Injector Timing and Duration

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

#### Idle Air Control

Idle Air Control Valve (IAC Valve)

When the engine is cold, the A/C compressor is on, the transmission is in gear, the brake pedal is depressed, or the alternator is charging, the ECM controls current to the IAC Valve to maintain the correct idle speed.

#### Ignition Timing Control

The ECM contains memories for basic ignition timing at various engine speeds.

#### Other Control Functions

##### 1. Starting Control

When the engine is started, the ECM provides a rich mixture by increasing fuel injector duration.

##### 2. Fuel Pump Control

- When the ignition switch is initially turned ON (II), the ECM supplies ground to the PGM-FI main relay that supplies current to the fuel pump for two seconds to pressurize the fuel system.
- When the engine is running, the ECM supplies ground to the PGM-FI main relay that supplies current to the fuel pump.
- When the engine is not running and the ignition is ON (II), the ECM cuts ground to the PGM-FI main relay which cuts current to the fuel pump.

(cont'd)



# PGM-FI System

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## System Description (cont'd)

### 3. Fuel Cut-off Control

- During deceleration with the throttle valve closed, current to the fuel injectors is cut off to improve fuel economy at speeds over 990 rpm ( $\text{min}^{-1}$ ).
- Fuel cut-off action also takes place when engine speed exceeds, 6,900 rpm ( $\text{min}^{-1}$ ), regardless of the position of the throttle valve, to protect the engine from over-revving.

### 4. A/C Compressor Clutch Relay

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

### 5. Evaporative Emission (EVAP) Purge Control Solenoid Valve

When the engine coolant temperature is below 75°C (167°F), the ECM supplies a ground to the EVAP purge control solenoid valve which cuts vacuum to the EVAP purge control canister.

## ECM Fail-safe/Back-up Functions

### 1. Fail-safe Function

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

### 2. Back-up Function

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

### 3. Self-diagnosis Function [Malfunction Indicator Lamp (MIL)]

When an abnormality occurs in a signal from a sensor, the ECM supplies ground for the MIL and stores the code in erasable memory. When the ignition is initially turned ON (II), the ECM supplies ground for the MIL for two seconds to check the MIL bulb condition.

### 4. Two Trip Detection Method

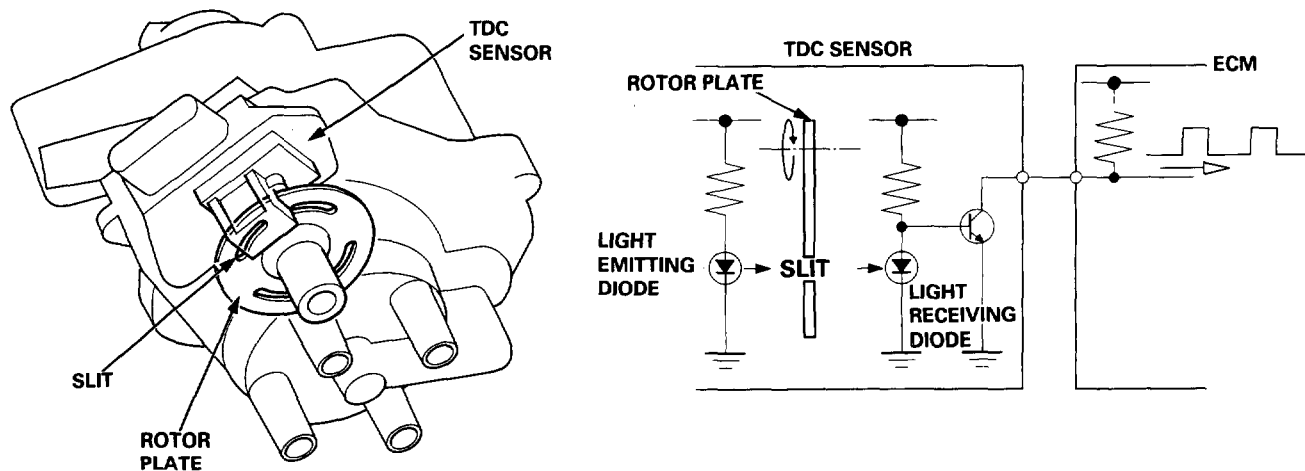
To prevent false indications, the "two trip detection method" is used for the HO2S self-diagnostic functions. When an abnormality occurs, the ECM stores it in its memory. When the same abnormality recurs after the ignition switch is turned OFF and ON (II) again, the ECM informs the driver by lighting the MIL.

However, to ease troubleshooting, this function is cancelled when you short the service check connector. The MIL will then blink immediately when an abnormality occurs.

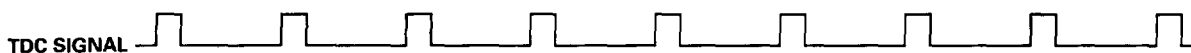


A system was adopted which has a TDC sensor to monitor the top dead centers of all cylinders. Only the TDC sensor signals are used to control fuel injection time and ignition time.

A light emitting diode sends light through the slits of a rotor plate built into the distributor. Due to the rotation of the rotor plate, the emitted light is repeatedly interrupted and passed through to a light receiving diode. The light receiving diode converts these changes into ON and OFF voltage pulses which are input into the ECM.



After every second TDC signal, fuel is injected one time (groupwise fuel injection method). When starting the engine, the necessary amount of fuel is injected simultaneously into each cylinder at every TDC signal to improve starting characteristics. For better performance during acceleration, the necessary amount of fuel is injected additionally into the cylinders at the time when they normally would receive no fuel.



	Injection		Injection		Injection		Injection	
No. 1 CYL STROKE	Combustion	Exhaust	Intake	Compression	Combustion	Exhaust	Intake	Compression
No. 3 CYL STROKE	Compression	Combustion	Exhaust	Intake	Compression	Combustion	Exhaust	Intake
No. 4 CYL STROKE	Intake	Compression	Combustion	Exhaust	Intake	Compression	Combustion	Exhaust
No. 2 CYL STROKE	Exhaust	Intake	Compression	Combustion	Exhaust	Intake	Compression	Combustion

(Example shows injection pattern during normal operation.)

# PGM-FI System

## Engine Control Module (ECM)

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

**Check the fuse:**  
Turn the ignition switch ON (II).

Is the low oil pressure light on?

NO

— Repair short in the wire between No. 15 BACK UP LIGHTS (10 A) fuse and gauge assembly.  
— Replace No. 15 BACK UP LIGHTS (10 A) fuse.

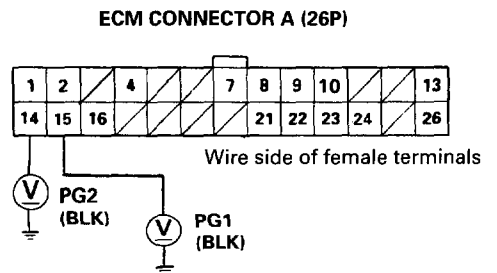
YES

**Check the engine starting:**  
Try to start the engine.

Does the engine start?

NO

**Check for an open in the wires (PG1, PG2 lines):**  
1. Turn the ignition switch OFF.  
2. Turn the ignition switch ON (II).  
3. Measure voltage between body ground and ECM connector terminals A14, A15.



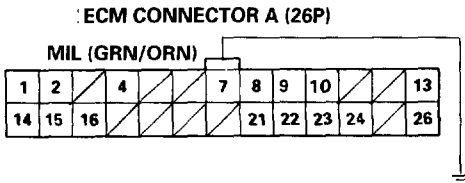
Is there less than 1.0 V?

NO

Repair open in the wire(s) between ECM (A14, A15) and G101 that had more than 1.0 V.

YES

Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.



**Check the MIL:**  
1. Turn the ignition switch OFF.  
2. Connect the ECM connector terminal A7 to body ground.  
3. Turn the ignition switch ON (II).

Is the MIL on?

NO

— Replace the MIL bulb.  
— Repair open wire between the ECM (A7) and the gauge assembly.

YES

Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.

NOTE: If this symptom is intermittent, check for a loose No. 15 BACK UP LIGHTS (10 A) fuse in the under-dash fuse/relay box, a poor connection at ECM terminal A7, or an intermittent open in the GRN/ORN wire between the ECM (A7) and the gauge assembly.



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

**Check the inertia switch:**  
Press the inertia switch button.

Does the MIL remain on?

NO  
**Intermittent failure, system is OK at this time.**

YES  
**Check the inertia switch:**  
1. Disconnect the inertia switch 3P connector.  
2. Connect the inertia switch 3P connector terminals No. 1 and No. 3 with a jumper wire.

Does the MIL remain on?

NO  
**Replace the inertia switch.**

YES  
**Check for a Diagnostic Trouble Code (DTC):**  
1. Connect the SCS short connector to the service check connector (see page 11-A-12).  
2. Turn the ignition switch ON (II).

Does the MIL indicate any DTC?

YES  
**Go to troubleshooting guide (see page 11-A-10).**

NO  
**Check the engine starting:**  
1. Remove the SCS short connector from the service check connector.  
2. Try to start the engine.

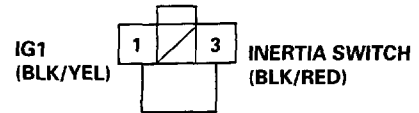
Did the engine start?

YES  
**Check the ECM output voltage (SCS line):**  
1. Turn the ignition switch OFF.  
2. Turn the ignition switch ON (II).  
3. Measure voltage between ECM connector terminals D13 and body ground.

Is there approx. 5 V?

NO  
**Repair short in the wire between the ECM (D13) and the service check connector.**

**INERTIA SWITCH 3P CONNECTOR**



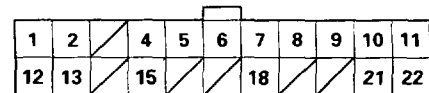
**JUMPER WIRE**

Wire side of female terminals

**NOTE:**

- When there is no code stored, the MIL will stay on if the service check connector is shorted and the ignition switch is ON (II).
- If this symptom is intermittent, check for:
  - A loose ECU (ECM) (15 A) fuse in the under-hood fuse/relay box.
  - A loose No. 24 (without SRS model: No. 12) FUEL PUMP (15 A) fuse in the under-dash fuse/relay box.
  - An intermittent short in the BRN wire between the ECM (D13) and the service check connector.
  - An intermittent open in the BLK wire between the service check connector and G401.
  - An intermittent short in the GRN/ORN wire between the ECM (A7) and the gauge assembly.
  - An intermittent short in the YEL/RED wire between the ECM (D10) and the MAP sensor.
  - An intermittent short in the YEL/BLU wire between the ECM (D21) and the TP sensor.

**ECM CONNECTOR D (22P)**



SCS (BRN)

Wire side of female terminals

**Check for an open in the wire (SCS line):**  
1. Connect the SCS short connector to service check connector (see page 11-A-12).  
2. Measure voltage between ECM connector terminals D13 and body ground.

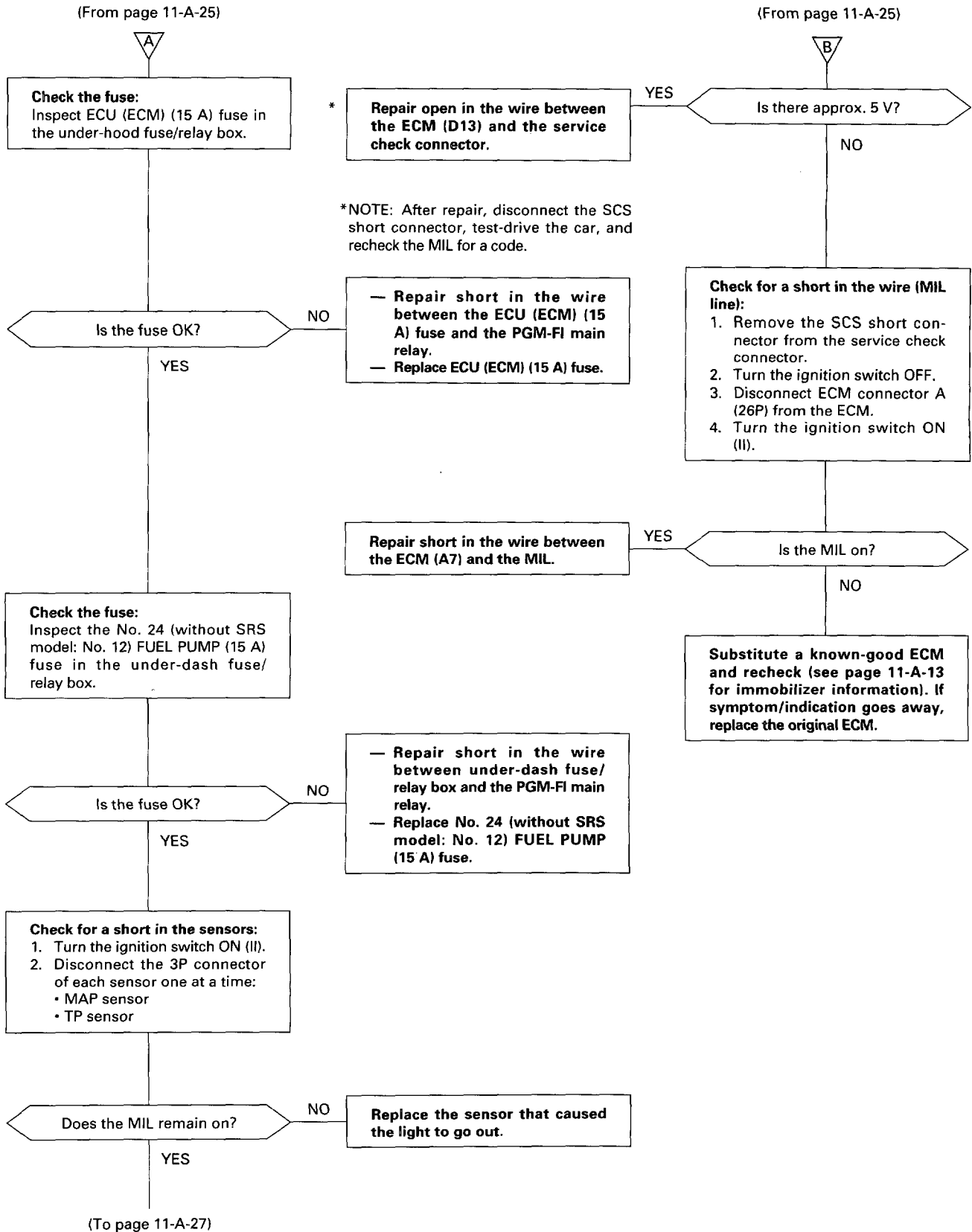


(To page 11-A-26) (cont'd)

(To page 11-A-26)

# PGM-FI System

## Engine Control Module (ECM) (cont'd)





(From page 11-A-26)

**Check for a short in the wires (VCC1, VCC2 lines):**

1. Turn the ignition switch OFF.
2. Disconnect ECM connector D (22P) from the ECM.
3. Check for continuity between body ground and ECM connector terminals D10 and D21 individually.

Is there continuity?

YES

- Repair short in the wire between the ECM (D10) and the MAP sensor.
- Repair short in the wire between the ECM (D21) and the TP sensor.

NO

**Check for an open in the wires (IGP1, IGP2 lines):**

1. Disconnect the fuel injectors, EVAP purge control solenoid valve, HO2S, distributor and IAC valve connectors.
2. Turn the ignition switch ON (II).
3. Measure voltage between body ground and ECM connector terminals A13, B1 individually.

Is there battery voltage?

NO

- Repair open in the wire(s) between ECM (A13, B1) and PGM-FI main relay.
- Check for poor connections or loose wires at the PGM-FI main relay.

YES

**Check for an open in the wires (LG1, LG2 lines):**

1. Reconnect all the sensor connectors.
2. Reconnect ECM connector D (22P) to the ECM.
3. Turn the ignition switch ON (II).
4. Measure voltage between body ground and ECM connector terminals A26, B9 individually.

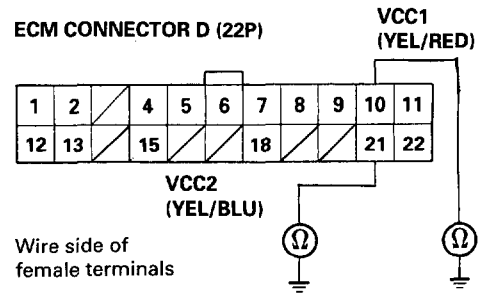
Is there less than 1.0 V?

NO

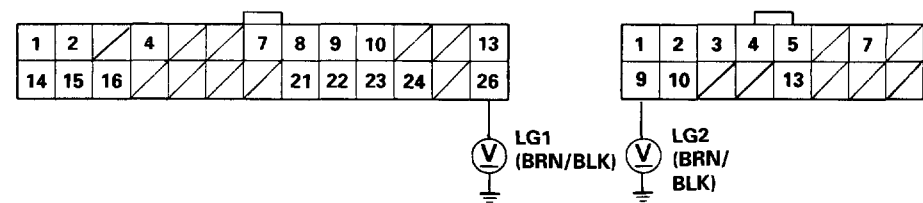
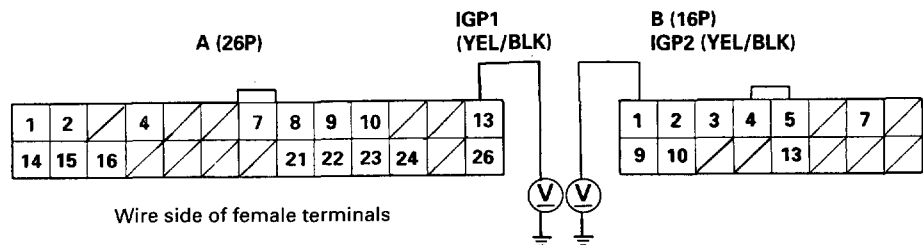
Repair open in the wire(s) between the ECM (A26, B9) and G101.

YES

Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.

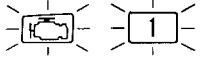


ECM CONNECTORS



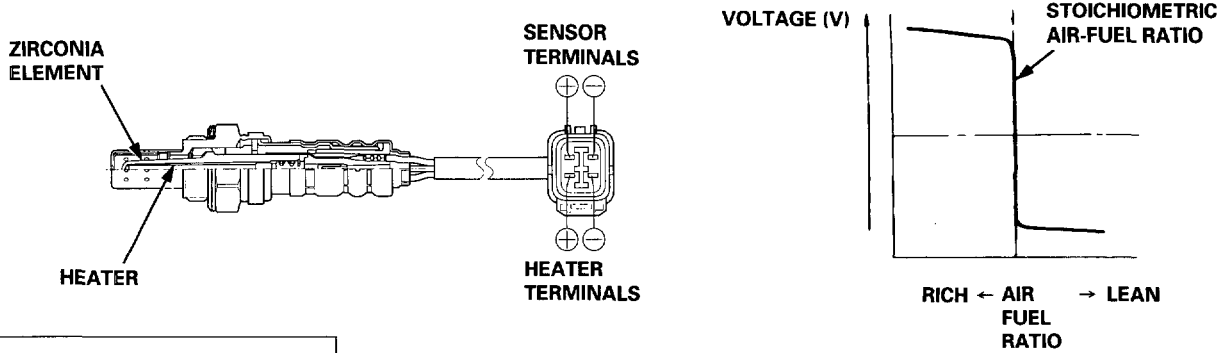
# PGM-FI System

## Heated Oxygen Sensor (HO2S)



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 1: A problem in the Heated Oxygen Sensor (HO2S) circuit.

The Heated Oxygen Sensor (HO2S) detects the oxygen content in the exhaust gas and signals the ECM. In operation, the ECM receives the signals from the sensor and varies the duration during which fuel is injected. To stabilize the sensor's output, the sensor has an internal heater. The HO2S is installed in the exhaust manifold.



— The MIL has been reported on.  
 — With the SCS short connector connected (see page 11-A-12), code 1 is indicated.

**Problem verification:**

1. Do the ECM Reset Procedure (see page 11-A-13).
2. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (in Park or neutral) until the radiator fan comes on, then let it idle for at least one minute before test-driving.
3. Connect the SCS short connector to the service check connector (see page 11-A-12).
4. Test-drive A/T in **2** position, M/T in 4th gear. Starting at 1,600 rpm ( $\text{min}^{-1}$ ), accelerate using wide open throttle for at least 5 seconds. Then decelerate for at least 5 seconds with the throttle completely closed.

Does the MIL blink and does it indicate code 1?

NO: Intermittent failure, system is OK at this time. Check for poor connections or loose wires between the HO2S and the ECM.

YES

**Check the fuel pressure:**

1. Inspect fuel pressure (see page 11-A-68).

Is it normal?

NO: Go to page 11-A-61 Fuel Supply System.

YES  
 (To page 11-A-29)

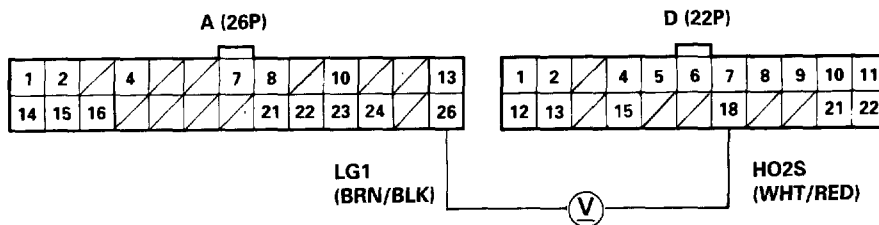


(From page 11-A-28)

**Check the ECM input voltage:**

1. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (in Park or neutral) until the radiator fan comes on, then let it idle for at least one minute before test-driving.
2. Measure voltage between ECM connector terminals D18 and A26.
3. Open the throttle wide open, then quickly release it.

**ECM CONNECTORS**



Wire side of female terminals

Is the voltage above 0.6 V at wide open throttle to 4,500 rpm ( $\text{min}^{-1}$ ) and below 0.4 V when the throttle is quickly released from 4,500 rpm ( $\text{min}^{-1}$ )?

YES

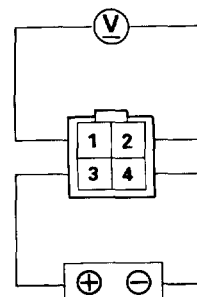
**Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

NO

**Check the HO2S:**

1. Turn the ignition switch OFF.
2. Disconnect the 4P connector from the HO2S.
3. At the HO2S harness side, connect the battery positive terminal to terminal No. 3 and battery negative terminal to terminal No. 4.
4. Start the engine.
5. After two minutes, measure voltage between HO2S 4P connector terminals No. 1 and No. 2.

**HO2S 4P CONNECTOR**



Terminal side of male terminals

Is the voltage above 0.6 V at wide open throttle to 4,500 rpm ( $\text{min}^{-1}$ ) and below 0.4 V when the throttle is quickly released from 4,500 rpm ( $\text{min}^{-1}$ )?

NO

**Replace the HO2S (see page 11-A-47).**



YES

**Repair open or short in the wire ECM (D18) and the HO2S.**



# PGM-FI System

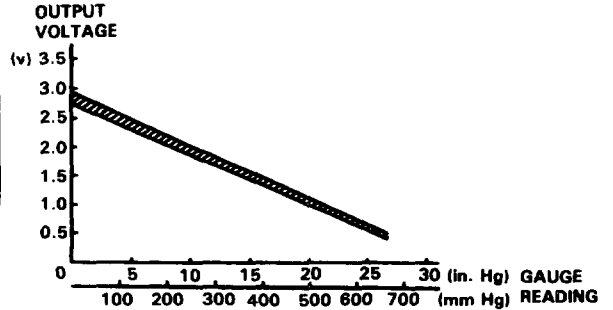
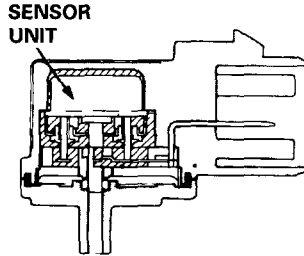
## Manifold Absolute Pressure (MAP) Sensor

  The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 3: An electrical problem in the Manifold Absolute Pressure (MAP) Sensor circuit.

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

— The MIL has been reported on.  
— With the SCS short connector connected (see page 11-A-12), code 3 is indicated.

**Problem verification:**  
1. Do the ECM Reset Procedure (see page 11-A-13).  
2. Start the engine and allow it to idle.

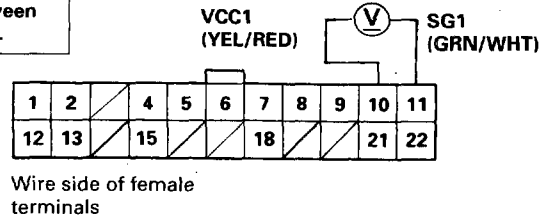


Is the MIL on and does it indicate code 3?

NO  
**Intermittent failure, system is OK at this time (test-drive may be necessary). Check for poor connections or loose wires between the MAP sensor and the ECM.**

ECM CONNECTOR D (22P)

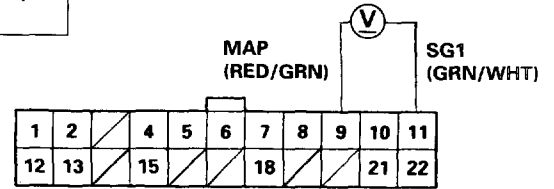
YES  
**Check the ECM output voltage (VCC1 line):**  
1. Turn the ignition switch OFF.  
2. Turn the ignition switch ON (II).  
3. Measure voltage between ECM connector terminals D10 and D11.



Is there approx. 5 V?

NO  
**Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

YES  
**Check the ECM output voltage (MAP line):**  
Measure voltage between ECM connector terminals D9 and D11.

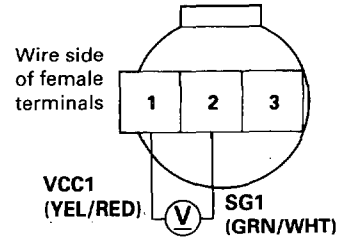


Is there approx. 3 V?

YES  
**Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

MAP SENSOR 3P CONNECTOR

NO  
**Check for an open in the wire (SG1 line):**  
Measure voltage between MAP sensor 3P connector terminals No. 1 and No. 2.



Is there approx. 5 V?

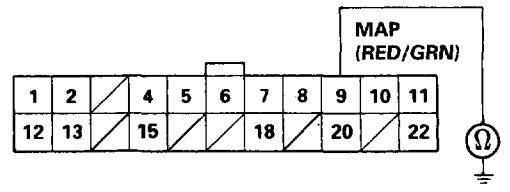
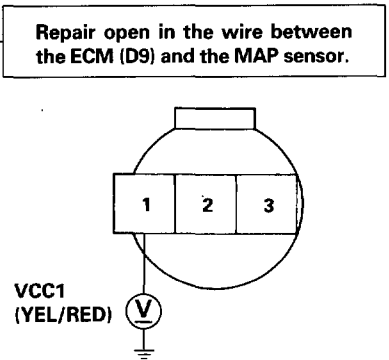
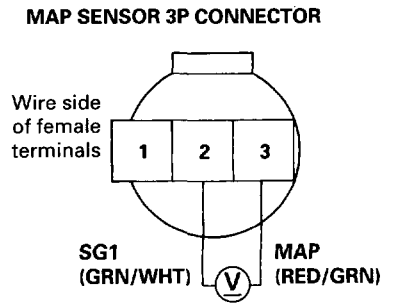
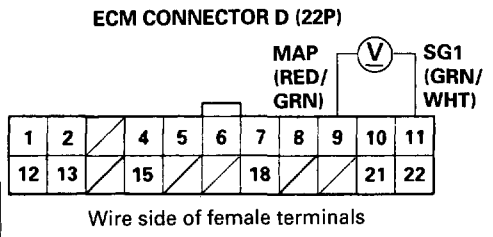
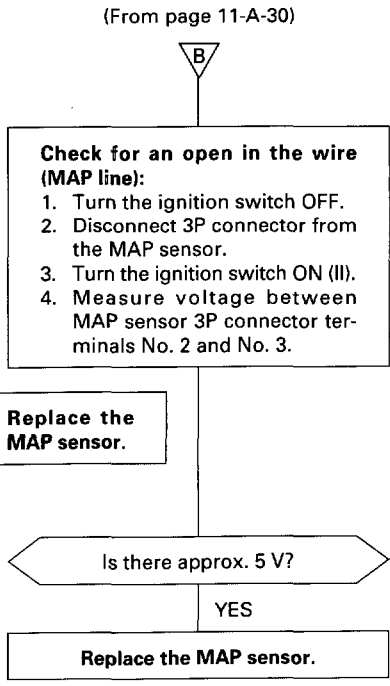
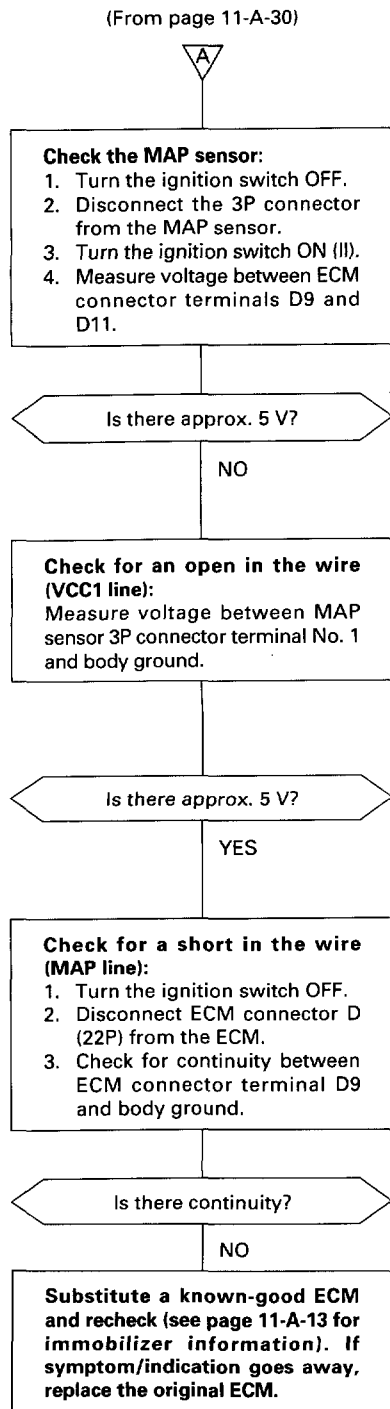
YES  
**Repair open in the wire between the ECM (D11) and the MAP sensor.**

A

(To page 11-A-31)

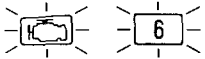
B

(To page 11-A-31)



# PGM-FI System

## Engine Coolant Temperature (ECT) Sensor



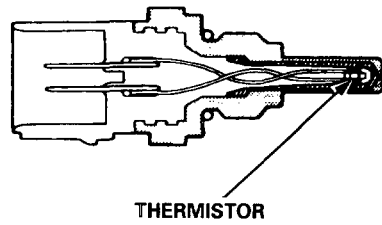
The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 6: A problem in the Engine Coolant Temperature (ECT) Sensor circuit.

The ECT sensor is a temperature dependent resistor (thermistor). The resistance of the thermistor decreases as the engine coolant temperature increases as shown below.

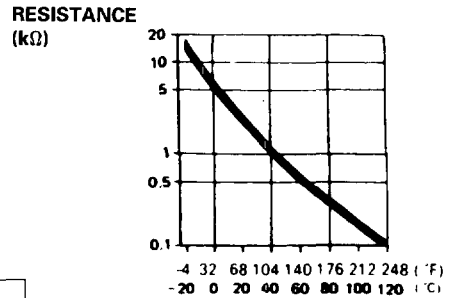
- The MIL has been reported on.
- With the SCS short connector connected (see page 11-A-12), code 6 is indicated.

- Problem verification:**
1. Do the ECM Reset Procedure (see page 11-A-13).
  2. Turn the ignition switch ON (II).

Is the MIL on and does it indicate code 6?



THERMISTOR

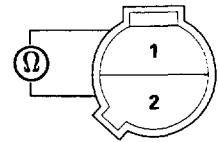


ENGINE COOLANT TEMPERATURE

Intermittent failure, system is OK at this time (test-drive may be necessary). Check for poor connections or loose wires between the ECT sensor and the ECM.

- Check the sensor resistance:**
1. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
  2. Turn the ignition switch OFF.
  3. Disconnect the 2P connector from the ECT sensor.
  4. Measure resistance between the 2 terminals on the ECT sensor.

ECT SENSOR 2P CONNECTOR

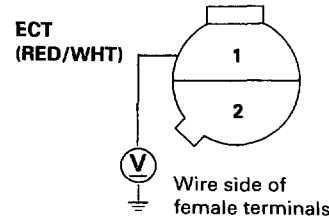


Terminal side of male terminals

Is there 200 – 400 Ω?

Replace the ECT sensor.

ECT SENSOR 2P CONNECTOR

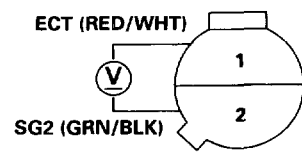


Wire side of female terminals

- Check the ECM output voltage (ECT line):**
1. Turn the ignition switch ON (II).
  2. At the engine harness side, measure voltage between the ECT sensor 2P connector terminal No. 1 and body ground.

Is there approx. 5 V?

- Check for an open in the wire (SG2 line):**  
Measure voltage between the ECT sensor 2P connector terminals No. 1 and No. 2.



Is there approx. 5 V?

Repair open in the wire between the ECM (D22) and ECT sensor.

Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.

(To page 11-A-33)



(From page 11-A-32)

**Check for an open in the wire (ECT line):**  
Measure voltage between ECM connector terminal D7 and body ground.

Is there approx. 5 V?

YES

**Repair open in the wire between the ECM (D7) and ECT sensor.**

NO

**Check for a short in the wire (ECT line):**  
1. Turn the ignition switch OFF.  
2. Disconnect ECM connector D (22P) from the ECM.  
3. Check the continuity between ECM connector terminal D7 and body ground.

Is there continuity?

YES

**Repair short in the wire between the ECM (D7) and ECT sensor.**

NO

**Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

**ECM CONNECTOR D (22P)**

**ECT (RED/WHT)**

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22

Wire side of female terminals



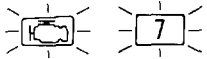
**ECT (RED/WHT)**

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22



# PGM-FI System

## Throttle Position (TP) Sensor



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 7: A problem in the Throttle Position (TP) Sensor circuit.

The TP sensor is a potentiometer. It is connected to the throttle valve shaft. As the throttle position changes, the throttle position sensor varies the voltage signal to the ECM.

- The MIL has been reported on.
- With the SCS short connector connected (see page 11-A-12), code 7 is indicated.

**Problem verification:**

1. Do the ECM Reset Procedure (see page 11-A-13).
2. Start the engine.

Is the MIL on and does it indicate code 7?

YES

**Check the sensor output voltage:**

1. Turn the ignition switch OFF.
2. Turn the ignition switch ON (II).
3. Measure voltage between ECM connector terminals D6 and D22.

Is the voltage approx. 0.5 V at full close throttle, and approx. 4.5 V at full open throttle?  
NOTE: There should be a smooth transition as the throttle is depressed.

NO

**Check the TP circuit:**

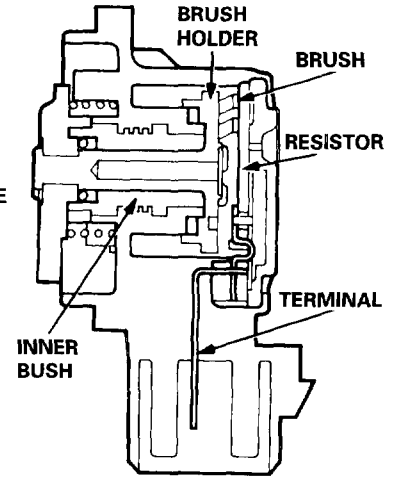
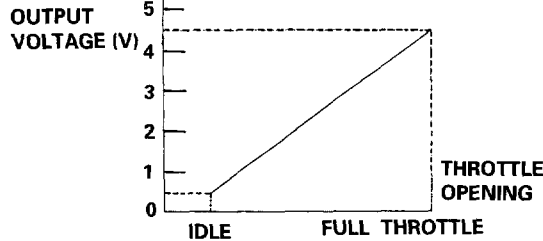
1. Turn the ignition switch OFF.
2. Disconnect 3P connector from the TP sensor.
3. Turn the ignition switch ON (III).
4. At the engine harness side, measure voltage between the TP sensor 3P connector terminal No. 3 and body ground.

Is there approx. 5 V?

YES



(To page 11-A-35)



Intermittent failure, system is OK at this time (test-drive may be necessary). Check for poor connections or loose wires between the TP sensor and the ECM.

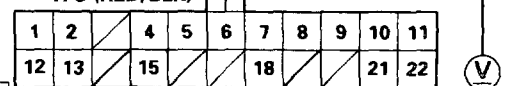
NO

Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.

YES

ECM CONNECTOR D (22P)

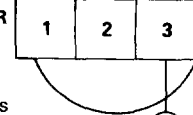
TPS (RED/BLK)



SG2 (GRN/BLK)

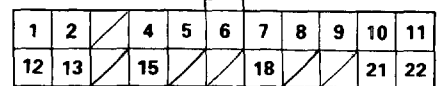
Wire side of female terminals

TP SENSOR 3P CONNECTOR



Wire side of female terminals

ECM CONNECTOR D (22P)



Wire side of female terminals

VCC2 (YEL/BLU)

Check for an open in the wire (VCC2 line): Measure voltage between ECM connector terminal D21 and body ground.

Is there approx. 5 V?

YES

Repair open in the wire between the ECM (D21) and TP sensor.

NO

Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.



(From page 11-A-34)



**Check for an open in the wire (SG2 line):**  
At the engine harness side, measure voltage between the TP sensor 3P connector terminals No. 1 and No. 3.

Is there approx. 5 V?

NO

**Repair open in the wire between the ECM (D22) and TP sensor.**

YES

**Check for a short in the wire (TPS line):**  
1. Turn the ignition switch OFF.  
2. Disconnect 3P connector from the TP sensor.  
3. Disconnect ECM connector D (22P) from the ECM.  
4. Check for continuity between ECM connector terminal D6 and body ground.

Is there continuity?

YES

**Repair short in the wire between the ECM (D6) and TP sensor.**

NO

**Check for an open in the wire (TPS line):**  
Check for continuity between ECM connector terminal D6 and the TP sensor 3P connector terminal No. 2.

Is there continuity?

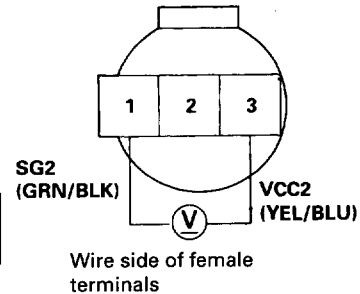
YES

**Replace the throttle body.**

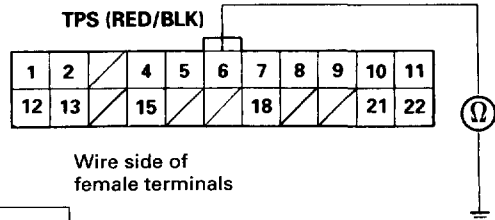
NO

**Repair open in the wire between the ECM (D6) and TP sensor.**

**TP SENSOR 3P CONNECTOR**

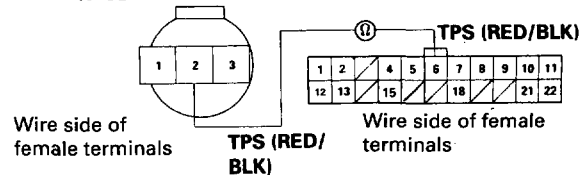


**ECM CONNECTOR D (22P)**



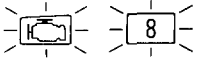
**ECM CONNECTOR D (22P)**

**TP SENSOR 3P CONNECTOR**



# PGM-FI System

## TDC Sensor

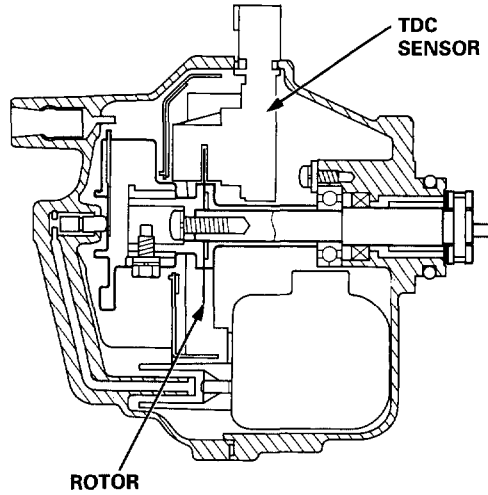


The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 8: A problem in the Top Dead Center (TDC) Sensor circuit.

The TDC Sensor determines ignition timing and fuel injection timing. The TDC Sensor is built into the distributor.

— The MIL has been reported on.  
— With the SCS short connector connected (see page 11-A-12), code 8 is indicated.

**Problem verification:**  
1. Do the ECM Reset Procedure (see page 11-A-13).  
2. Turn the ignition switch START (III) position for at least 8 seconds.



Is the MIL on and does it indicate code 8?

NO  
Intermittent failure, system is OK at this time (test-drive may be necessary).  
Check for poor connections or loose wires between the distributor and the ECM.

YES

**Check for an open in the wire (LG1 line):**  
1. Turn the ignition switch OFF.  
2. Disconnect the 7P connector from the distributor.  
3. Check for continuity between body ground and the distributor 7P connector terminals No. 1.

Is there continuity?

NO  
Repair open in the wire between the distributor and G101.

YES

**Check for an open in the wire (IGP line):**  
1. Turn the ignition switch ON (II).  
2. Measure voltage between the distributor 7P connector terminals No. 1 and No. 2.

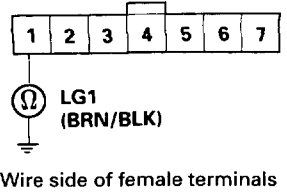
Is there battery voltage?

NO  
Repair open in the wire between the PGM-FI main relay and distributor.

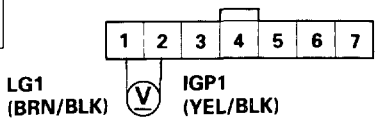
YES

(To page 11-A-37)

DISTRIBUTOR 7P CONNECTOR



Wire side of female terminals





(From page 11-A-36)



**Check the ECM output voltage (TDC line):**  
Measure voltage between the distributor 7P connector terminals No. 3 and body ground.

Is there approx. 5 V?

YES

NO

**Check for a short in the wire (TDC line):**  
1. Turn the ignition switch OFF.  
2. Disconnect ECM connector D (22P) from the ECM.  
3. Check for continuity between the distributor 7P connector terminals No. 3 and body ground.

Is there continuity?

NO

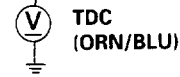
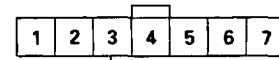
**Check for an open in the wire (TDC line):**  
Check for continuity between ECM connector terminal B7 and distributor 7P connector terminal No. 3.

Is there continuity?

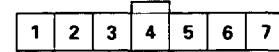
YES

**Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

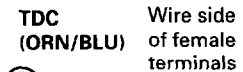
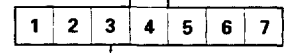
**DISTRIBUTOR 7P CONNECTOR**



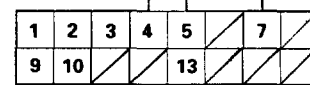
Wire side of female terminals



**DISTRIBUTOR 7P CONNECTOR**



ECM CONNECTOR D (22P)  
TDC (GRN)



Wire side of female terminals

**Repair open in the wire between the distributor and ECM (B7).**

**Check the TDC sensor:**  
1. Turn the ignition switch OFF.  
2. Reconnect the 7P connector to the distributor.  
3. Turn the ignition switch ON (II).  
4. Slowly rotate crankshaft counterclockwise and measure voltage between ECM connector terminals B7 and A26.  
NOTE: Do not start the engine.

Does voltage pulse 0 V and approx. 5 V?

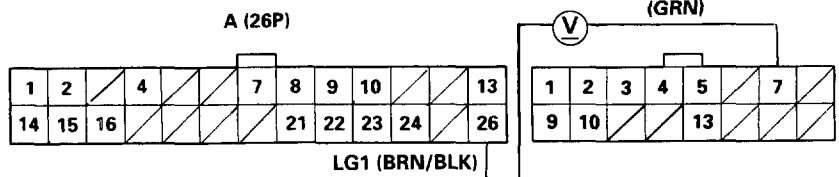
YES

NO

**Replace the distributor ignition housing (see section 4).**

**Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

**ECM CONNECTORS**





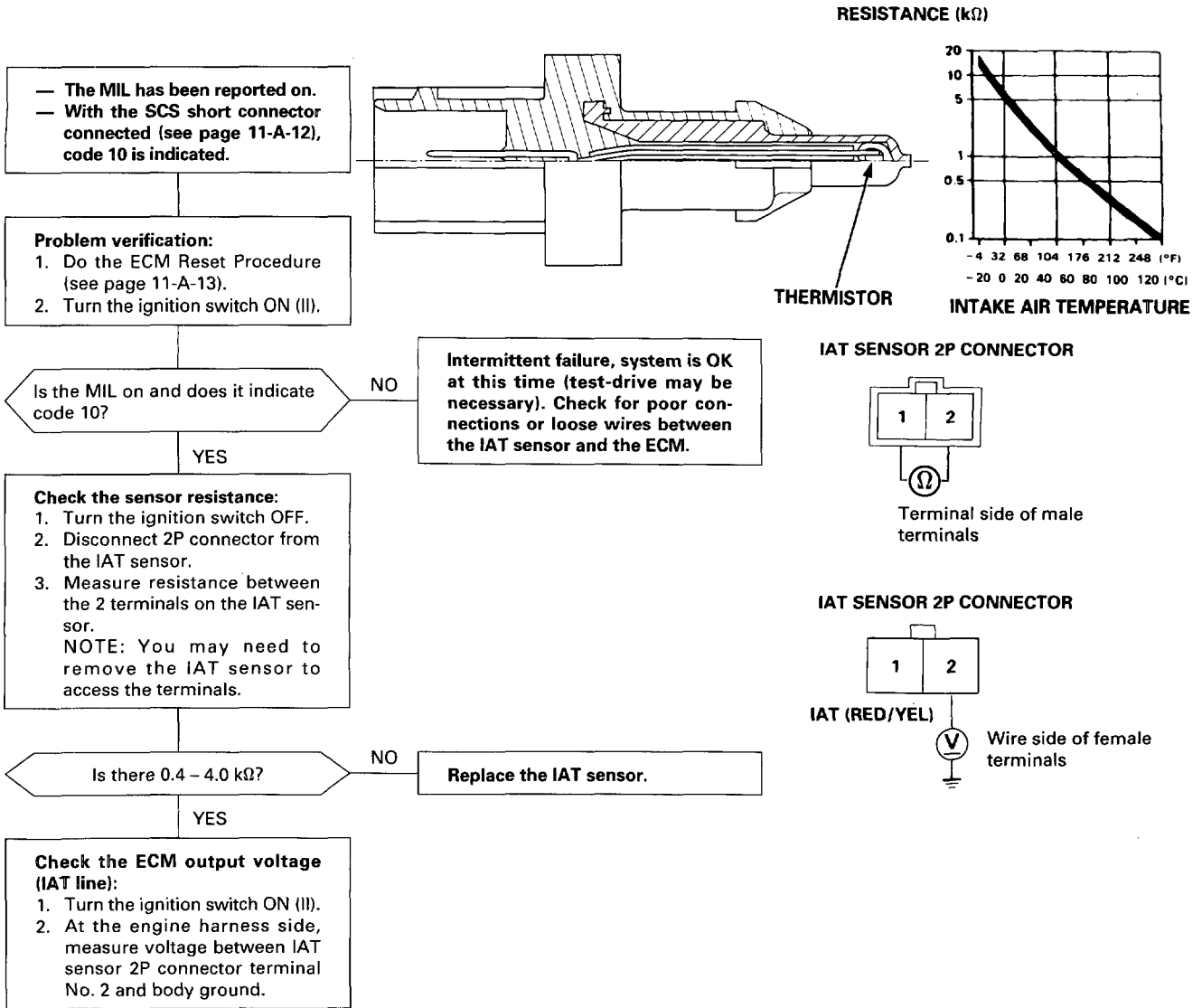
# PGM-FI System

## Intake Air Temperature (IAT) Sensor



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 10: A problem in the Intake Air Temperature (IAT) Sensor circuit.

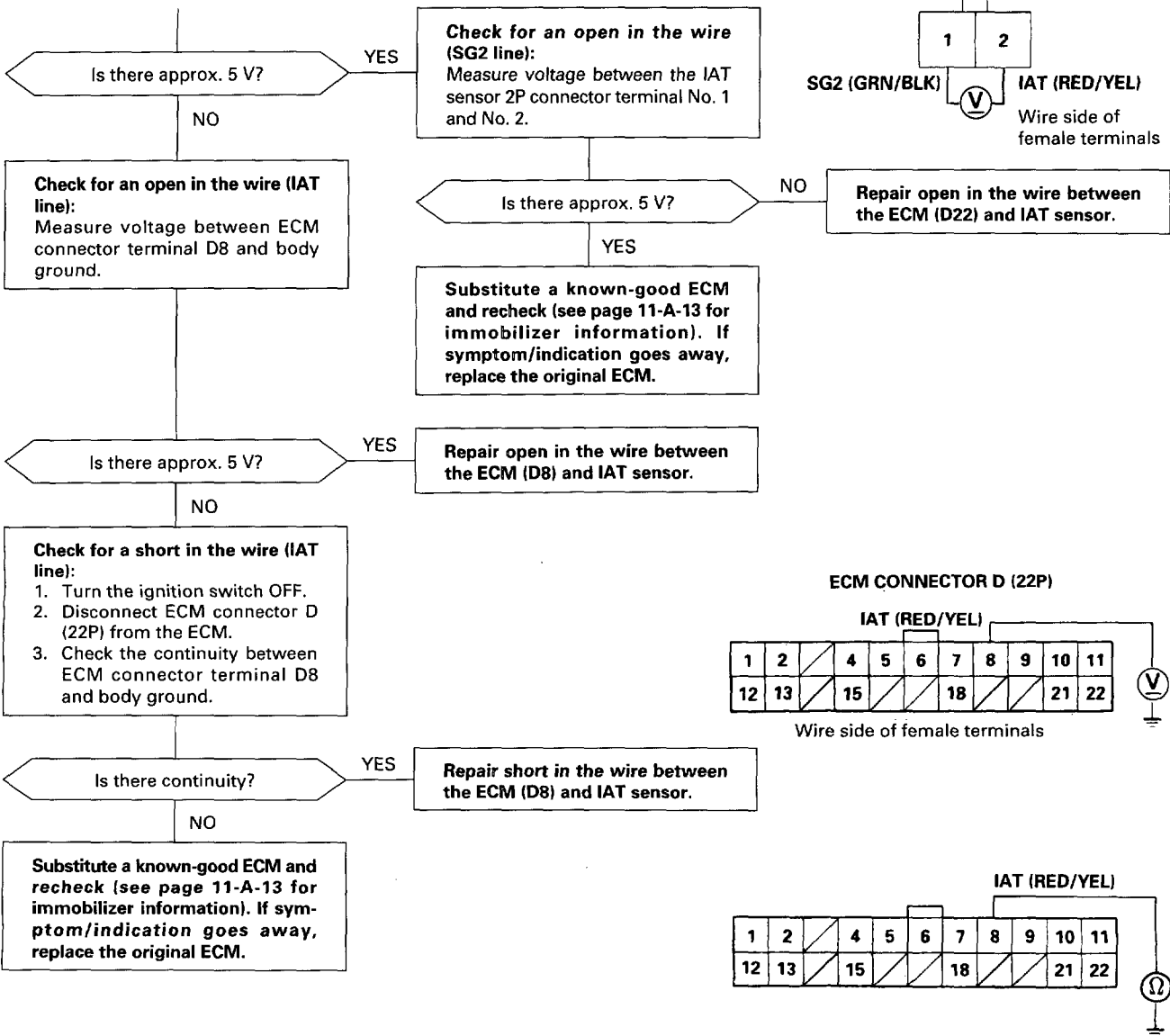
The ECT sensor is a temperature dependent resistor (thermistor). The resistance of the thermistor decreases as the air temperature increases as shown below.



(To page 11-A-39)

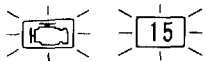


(From page 11-A-38)



# PGM-FI System

## Ignition Pulse Signal



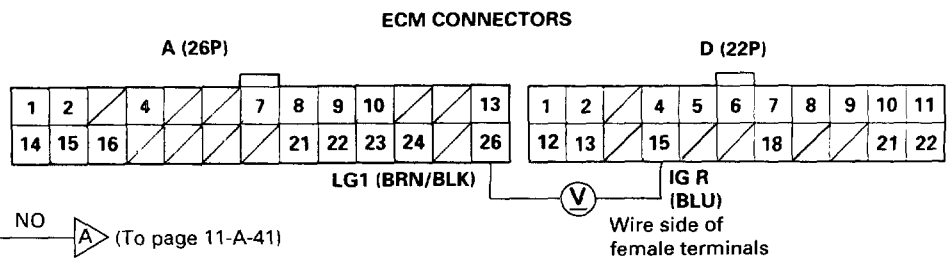
The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 15: A problem in the Ignition Input/Output Signal circuit.

— The MIL has been reported on.  
— With the SCS short connector connected (see page 11-A-12), code 15 is indicated.

**Problem verification:**  
1. Do the ECM Reset Procedure (see page 11-A-13).  
2. Start the engine.

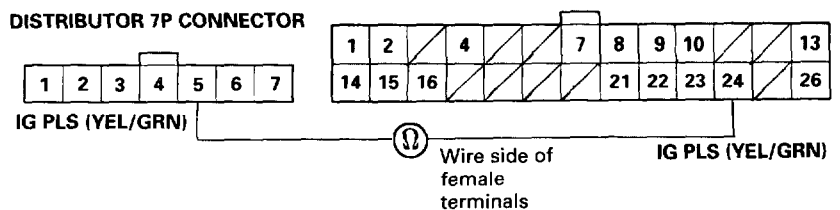
Is the MIL on and does it indicate code 15?  
NO → Intermittent failure, system is OK at this time (test-drive may be necessary). Check for poor connections or loose wires between the distributor and the ECM.

**Check the ICM output voltage:**  
1. Turn the ignition switch OFF.  
2. Turn the ignition switch ON (II).  
3. Measure voltage between ECM connector terminals D15 and A26.



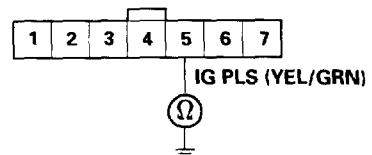
Is there battery voltage?  
NO → A (To page 11-A-41)  
YES →

**Check for an open in the wire (IG PLS line):**  
1. Turn the ignition switch OFF.  
2. Disconnect the distributor 7P connector.  
3. Disconnect the ECM connector A (26P) from the ECM.  
4. Check for continuity between distributor 7P connector terminal No. 5 and ECM connector terminal A24.



Is there continuity?  
NO → Repair open in the wire between distributor and ECM (A24).  
YES →

**Check for a short in the wire (IG PLS line):**  
Check for continuity between distributor 7P connector terminal No. 5 and body ground.



Is there continuity?  
YES → Repair short in the wire between distributor and ECM (A24).  
NO →

Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.



(From page 11-A-40)



**Check for an open in the wire (IG R line):**  
1. Turn the ignition switch OFF.  
2. Disconnect ECM connector D (22P) from the ECM.  
3. Disconnect the distributor 7P connector.  
4. Check for continuity between the distributor 7P connector terminal No. 6 and ECM connector terminal D15.

Is there continuity?

NO

**Repair open in the wire between the distributor and ECM (D15).**

YES

**Check for a short in the wire (IG R line):**  
Check for continuity between body ground and ECM connector terminal D15.

Is there continuity?

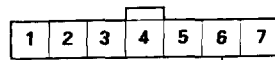
YES

**Repair short in the wire between the distributor, test tachometer connector and ECM (D15).**

NO

**Replace the distributor ignition housing (see section 4).**

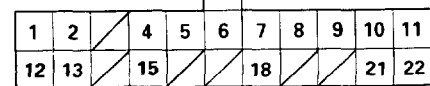
**DISTRIBUTOR 7P CONNECTOR**



IG R (BLU)

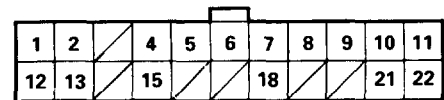
Wire side of female terminals

**ECM CONNECTOR D (22P)**



IG R (BLU)

Wire side of female terminals



IG R (BLU)



# PGM-FI System

## Vehicle Speed Sensor (VSS)



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 17: A problem in the Vehicle Speed Sensor (VSS) circuit.

The VSS generates a pulsing signal when the front wheels turn.

- The MIL has been reported on.
- With the SCS short connector connected (see page 11-A-12), code 17 is indicated.

### Problem verification:

1. Do the ECM Reset Procedure (see page 11-A-13).
2. Test-drive with M/T in 2nd gear, A/T in **2** position, accelerate to 4,000 rpm (min<sup>-1</sup>), then decelerate to 1,500 rpm (min<sup>-1</sup>) with throttle fully closed for at least 5 seconds.

Is the MIL on and does it indicate code 17?

NO

**Intermittent failure, system is OK at this time. Check for poor connections or loose wires between the VSS and the ECM.**

YES

### Check the ECM input voltage:

1. Turn the ignition switch OFF.
2. Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.
3. Turn the ignition switch ON (II).
4. Block the right front wheel and slowly rotate left front wheel and measure voltage between ECM connector terminal B13 and A26.

Does voltage pulse 0 V and approx. 5 V or battery voltage?

YES

**Substitute a known-good ECM and recheck (see page 11-A-13 immobilizer information). If symptom/indication goes away, replace the original ECM.**

NO

### Check the circuit (VSS line):

1. Turn the ignition switch OFF.
2. Disconnect ECM connector B (16P) from the ECM.
3. Turn the ignition switch ON (II).
4. Block the right front wheel and slowly rotate left front wheel and measure voltage between ECM connector terminals B13 and A26.

Does voltage pulse 0 V and approx. 5 V or battery voltage?

NO

- Repair short in the wire between the ECM (B13) and the VSS.
- Repair open in the wire between ECM (B13) and the VSS.
- If wire is OK, test the VSS (see section 23).

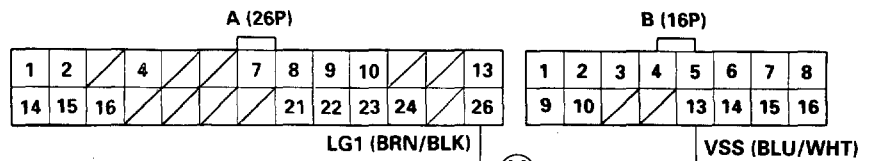
YES

**Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

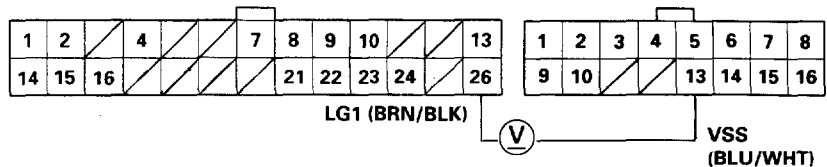
### WARNING

Make sure lifts, jacks and safety stands are placed properly (see section 1).

### ECM CONNECTORS

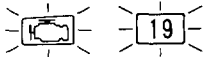


Wire side of female terminals





# Lock-up Control Solenoid Valve (A/T)



The Malfunction Indicator Lamp (MIL) Diagnostic Trouble Code (DTC) 19: A problem in the lock-up Control Solenoid Valve A and/or B.

— The MIL has been reported on.  
— With the SCS short connector connected (see page 11-A-12), code 19 is indicated.

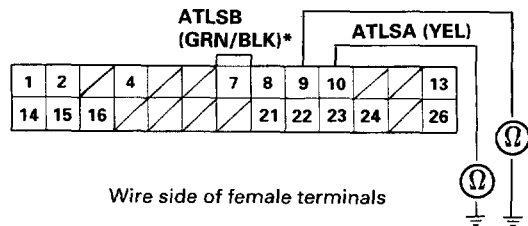
**Problem verification:**  
1. Do the ECM Reset Procedure (see page 11-A-13).  
2. Road-test necessary.  
Drive the car for several miles so that the transmission upshifts and downshifts several times.

Does the MIL blink and does it indicate code 19?  
NO  
YES

Intermittent failure, system is OK at this time. Check for poor connections or loose wires between the lock-up control solenoid valve A/B and the ECM.

**Check for a short in the wire (ATLSA and/or ATLSB\* line):**  
1. Turn the ignition switch OFF.  
2. Disconnect the ECM connector A (26P) from the ECM.  
3. Disconnect the lock-up control solenoid valve A/B 2P connector.  
4. Check for continuity between body ground and ECM connector terminals A10 and/or A9\* individually.

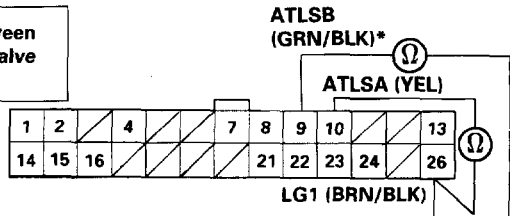
ECM CONNECTOR A (26P)



Is there continuity?  
YES  
NO

Repair short in the wire between the lock-up control solenoid valve A/B and ECM (A10, A9\*).

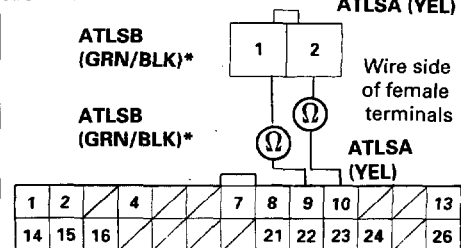
**Check the lock-up control solenoid valve A/B:**  
1. Reconnect the 2P connector.  
2. Measure resistance between ECM connector terminals A10 and A26 and/or A9\* and A26\*.



Is there 10 - 22 Ω?  
YES  
NO

**Check for an open in the wire (LC A and/or LC B\* line):**  
Check for continuity between lock-up control solenoid valve 2P connector terminal No. 2 and ECM connector terminal A10 (lock-up control solenoid valve 2P connector terminal No. 1 and ECM connector terminal A9)\*.

LOCK-UP CONTROL SOLENOID VALVE CONNECTOR



**Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

Is there continuity?  
YES  
NO

Replace the lock-up control solenoid valve (see section 14).

Repair open in the wire between the lock-up control solenoid valve A/B and ECM (A10, A9\*).

\*: Lock-up control solenoid valve B

# PGM-FI System

## Heated Oxygen Sensor Heater



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 41: A problem in the Heated Oxygen Sensor (HO2S) Heater circuit.

— The MIL has been reported on.  
— With the SCS short connector connected (see page 11-A-12), code 41 is indicated.

**Problem verification:**  
1. Do the ECM Reset Procedure (see page 11-A-13).  
2. Start the engine.

Is the MIL on and does it indicate code 41?

NO  
**Intermittent failure, system is OK at this time. Check for poor connections or loose wires between the HO2S and the ECM.**

YES  
**Check the ECM input voltage:**  
1. Turn the ignition switch OFF.  
2. Turn the ignition switch ON (II).  
3. Measure voltage between ECM connector terminals A16 and A15.

Is there battery voltage?

NO → (To page 11-A-45)

YES  
**Check the ECM input voltage:**  
With the voltmeter still connected between ECM connector terminals A16 and A15, start the engine.

Is there less than 1.4 V?

NO  
**Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

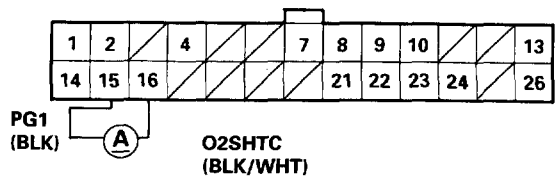
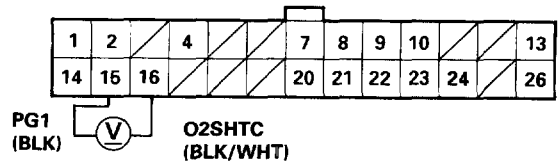
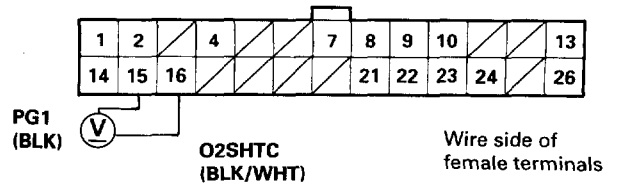
YES  
**Check the ECM input current:**  
1. Turn the ignition switch OFF.  
2. Disconnect ECM connector A (26P) from the ECM.  
3. Connect an ammeter between ECM connector terminals A16 and A15.  
4. Turn the ignition switch ON (II).

Is the current less than 0.1 A?\*

YES  
**Replace the HO2S (see page 11-A-47).**

NO  
**Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

ECM CONNECTOR A (26P)





(From page 11-A-44)



**Check for an open in the wire (IGP line):**  
 1. Turn the ignition switch OFF.  
 2. Disconnect the 4P connector from the HO2S.  
 3. Turn the ignition switch ON (II).  
 4. At the engine wire harness, measure voltage between HO2S connector terminal No. 3 and body ground.

Is there battery voltage?

NO

Repair open in the wire between the HO2S and PGM-FI main relay.

YES

**Check the HO2S resistance:**  
 1. Turn the ignition switch OFF.  
 2. At the HO2S harness, measure resistance between No. 3 and No. 4 terminal.

Is there 10 - 40 Ω?

NO

Replace the HO2S (see page 11-A-47).

YES

**Check for a shorted HO2S:**  
 Check for continuity between body ground and terminals No. 3 and No. 4 individually.

Is there continuity?

YES

Replace the HO2S (see page 11-A-47).

NO

**Check for a shorted HO2S:**  
 Check for continuity between terminal No. 4 and terminals No. 1 and No. 2 individually.

Is there continuity?

YES

Replace the HO2S (see page 11-A-47).

NO

**Check for an open in the wire (O2SHTC line):**  
 1. Disconnect ECM connector A (26P) from the ECM.  
 2. Check for continuity between ECM connector terminal A16 and HO2S connector terminal No. 4 on the engine wire harness side.

Is there continuity?

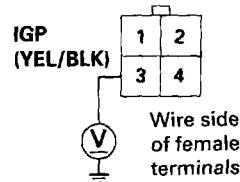
NO

Repair open in the wire between the HO2S and the ECM (A16).

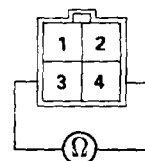
YES

(To page 11-A-46)

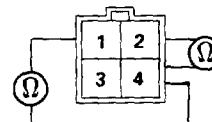
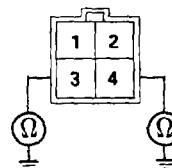
HO2S 4P CONNECTOR



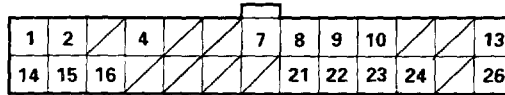
HO2S 4P CONNECTOR



Terminal side of male terminals



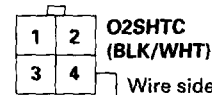
ECM CONNECTOR A (26P)



O2SHTC (BLK/WHT)

Wire side of female terminals

HO2S 4P CONNECTOR



Wire side of female terminals

(cont'd)



# PGM-FI System

## Heated Oxygen Sensor Heater (cont'd)

(From page 11-A-45)

**Check for a short in the wire (O2SHTC line):**  
Check for continuity between ECM connector terminal A16 and body ground.

Is there continuity?

YES

**Repair short in the wire between the HO2S and ECM (A16).**

NO

**Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

ECM CONNECTOR A (26P)

1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	26

O2SHTC  
(BLK/WHT)

Wire side of female terminals

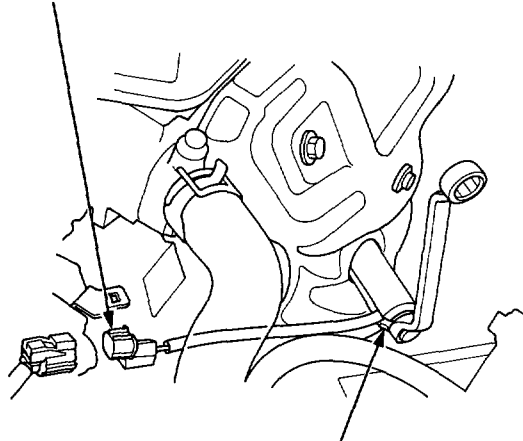
# Heated Oxygen Sensor



## Replacement

1. Disconnect the HO2S 4P connector, then remove the HO2S.

HO2S 4P  
CONNECTOR



O: SENSOR SOCKET  
WRENCH  
07LAA - PT50101  
44 N·m (4.5 kgf·m, 33 lbf·ft)

2. Install the HO2S in reverse order of removal.

# Idle Control System

## System Troubleshooting Guide

**NOTE:**

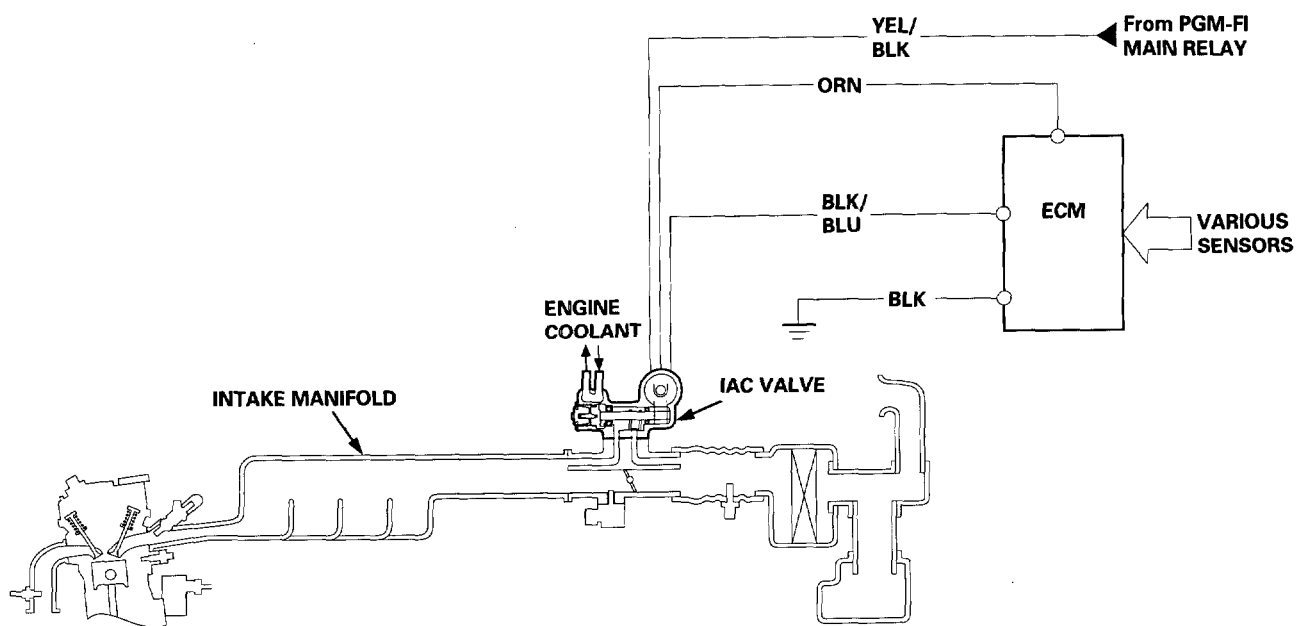
- Across each row in the chart, the sub-systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- If the idle speed is out of specification and the Malfunction indicator Lamp (MIL) does not blink Diagnostic Trouble Code (DTC) 14, go to inspection described on page 11-A-50.

PAGE	SUB-SYSTEM	IDLE ADJUST- ING SCREW	IDLE AIR CONTROL VALVE	AIR CONDITIONING SIGNAL	ALTERNATOR FR SIGNAL	BRAKE SWITCH SIGNAL	STARTER SWITCH SIGNAL	AUTOMATIC TRANSAXLE GEAR POSITION SIGNAL (A/T)	HOSES AND CONNECTIONS
		11-A-60	11-A-51	11-A-53	11-A-55	11-A-56	11-A-57	11-A-58	—
	SYMPTOM								
	DIFFICULT TO START ENGINE WHEN COLD		②				①		
	WHEN COLD FAST IDLE OUT OF SPEC (1,000 – 2,000 rpm (min <sup>-1</sup> ))		②						①
	ROUGH IDLE		②						①
	WHEN WARM ENGINE SPEED TOO HIGH	③	②	②	②			②	①
WHEN WARM RPM TOO LOW	Idle speed is below specified engine speed (no load)	②	①						
	Idle speed does not increase after initial start up.		①						
	On models with automatic transmis- sion, the idle speed drops in gear		②					①	
	Idle speeds drops when air condi- tioner in ON		②	①					
	Idle speed fluctu- ates with electrical load		②		①				
FRE- QUENT STALLING	WHILE WARMING UP		①						
	AFTER WARMING UP	②	①						
	FAILS EMISSION TEST								①



## System Description

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

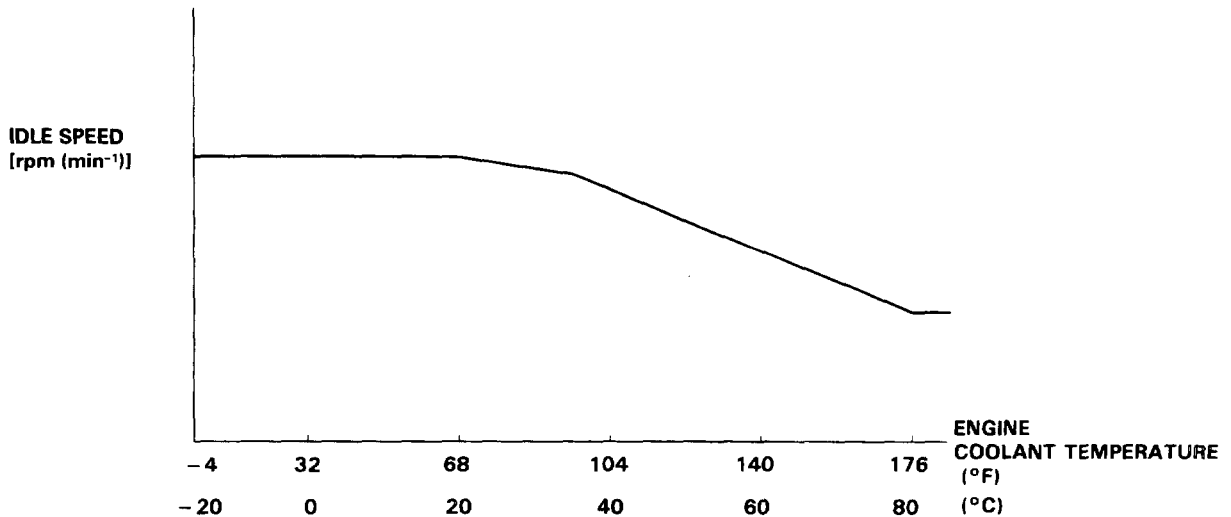


(cont'd)

# Idle Control System

## System Description (cont'd)

1. After the engine starts, the IAC valve opens for a certain time. The amount of air is increased to raise the idle speed about 150 – 300 rpm (min<sup>-1</sup>).
2. When the coolant temperature is low, the IAC valve is opened to obtain the proper fast idle speed. The amount of bypassed air is thus controlled in relation to the engine coolant temperature.



1. When the idle speed is out of specification and the Malfunction Indicator Lamp (MIL) does not blink Diagnostic Trouble Code (DTC) 14, check the following items:
  - Adjust the idle speed (see page 11-A-60)
  - Air conditioning signal (see page 11-A-53)
  - ALT FR signal (see page 11-A-55)
  - Brake switch signal (see page 11-A-56)
  - Starter switch signal (see page 11-A-57)
  - A/T gear position signal (see page 11-A-58)
  - Hoses and connections
  - IAC valve and its mounting O-rings
2. If the above items are normal, substitute known-good IAC valve and readjust the idle speed (see page 11-A-60).
  - If the idle speed still cannot be adjusted to specification (and the MIL does not blink code 14) after IAC valve replacement, substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom goes away, replace the original ECM.

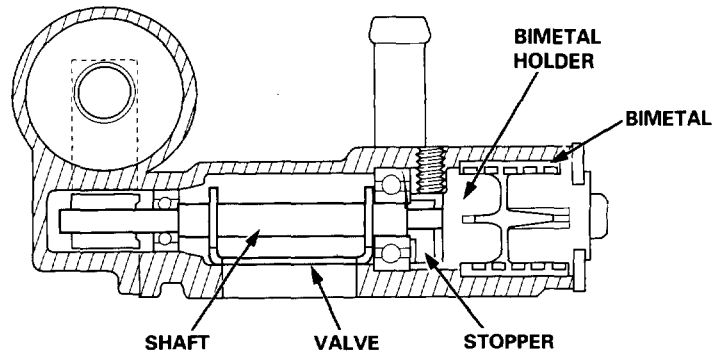


# Idle Air Control (IAC) Valve



The Malfunction Indicator Lamp (MIL) Diagnostic Trouble Code (DTC) 14: A problem in the Idle Air Control (IAC) Valve.

The IAC Valve changes the amount of air bypassing the throttle body in response to a current signal from the ECM in order to maintain the proper idle speed.



— The MIL has been reported on.  
— With the SCS short connector connected (see page 11-A-12), code 14 is indicated.

**Problem verification:**  
1. Do the ECM Reset Procedure (see page 11-A-13).  
2. Turn the ignition switch ON (II).

Does the MIL blink and does it indicate code 14?

NO  
**Intermittent failure, system is OK at this time. Check for poor connections or loose wires between the IAC Valve and the ECM.**

YES

**Check the ECM input voltage:**  
Measure voltage between body ground and ECM connector terminals A22, A21\* individually.

Is there battery voltage?

NO → A (To page 11-A-52)

YES

**Check the IAC Valve:**  
1. Turn the ignition switch OFF.  
2. Disconnect the IAC Valve 3P connector.  
3. Measure resistance between IAC Valve 3P connector terminals No. 1 and No. 3.

Is there 16 – 28 Ω?

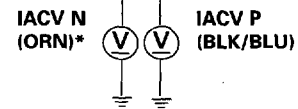
NO → **Replace the IAC Valve.**

YES

**Substitute a known- good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

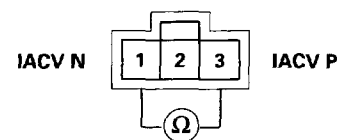
ECM CONNECTOR A (26P)

1	2	3	4	5	6	7	8	9	10	11	12	13
14	15	16	17	18	19	20	21	22	23	24	25	26



Wire side of female terminals

IAC VALVE 3P CONNECTOR



Terminal side of male terminals

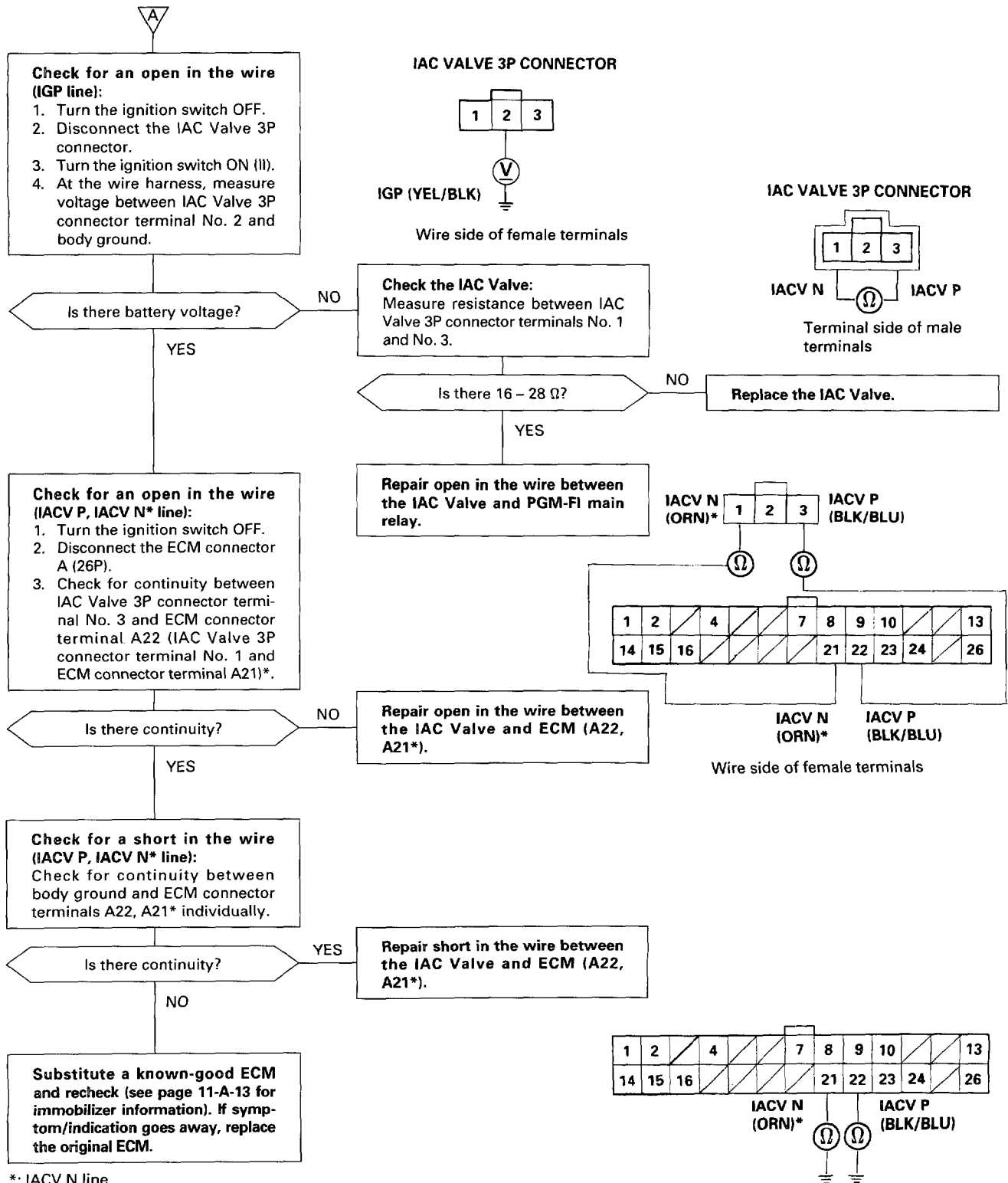
\*: IACV N line

(cont'd)

# Idle Control System

## Idle Air Control (IAC) Valve (cont'd)

(From page 11-A-51)



\*: IACV N line



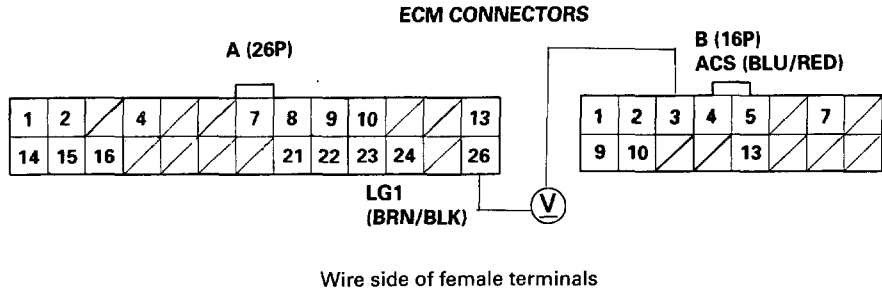
# Air Conditioning Signal

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

**Inspection of Air Conditioning Signal.**

**Check the ECM output voltage (ACS line):**

1. Turn the ignition switch OFF.
2. Disconnect the 2P connector from the A/C pressure switch.
3. Turn the ignition switch ON (II).
4. Measure voltage between ECM connector terminals B3 and A26.



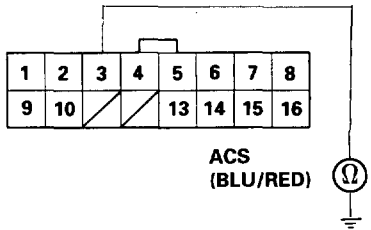
Is there approx. 5 V?

YES

NO

**Check for a short in the wire (ACS line):**

1. Turn the ignition switch OFF.
2. Disconnect ECM connector A (26P) from the ECM.
3. Check for continuity between ECM connector terminal B3 and body ground.



Is there continuity?

YES

**Repair short in the wire between the ECM (B3) and the A/C pressure switch.**

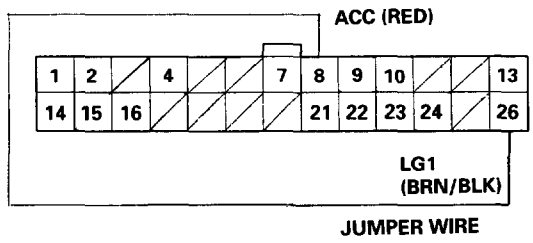
NO

**Check the A/C compressor clutch:**

1. Turn the ignition switch OFF.
2. Reconnect the A/C pressure switch 2P connector to the A/C pressure switch.
3. Turn the ignition switch ON (II).
4. Momentarily connect ECM connector terminals A8 and A26 several times.

- Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If prescribed voltage is now available, replace the original ECM.
- See the air conditioner inspection (see section 22).

(To page 11-A-54)



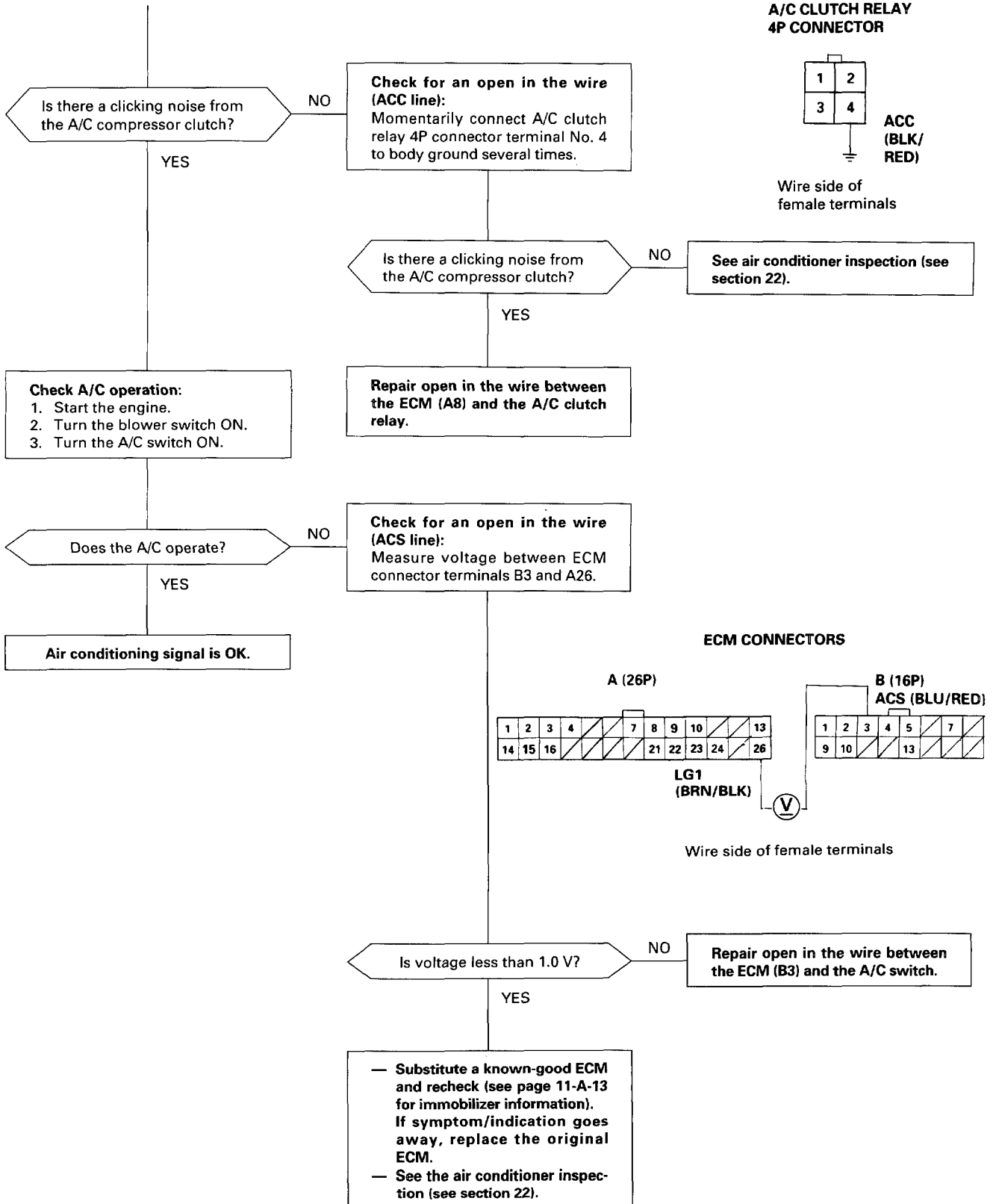
(cont'd)



# Idle Control System

## Air Conditioning Signal (cont'd)

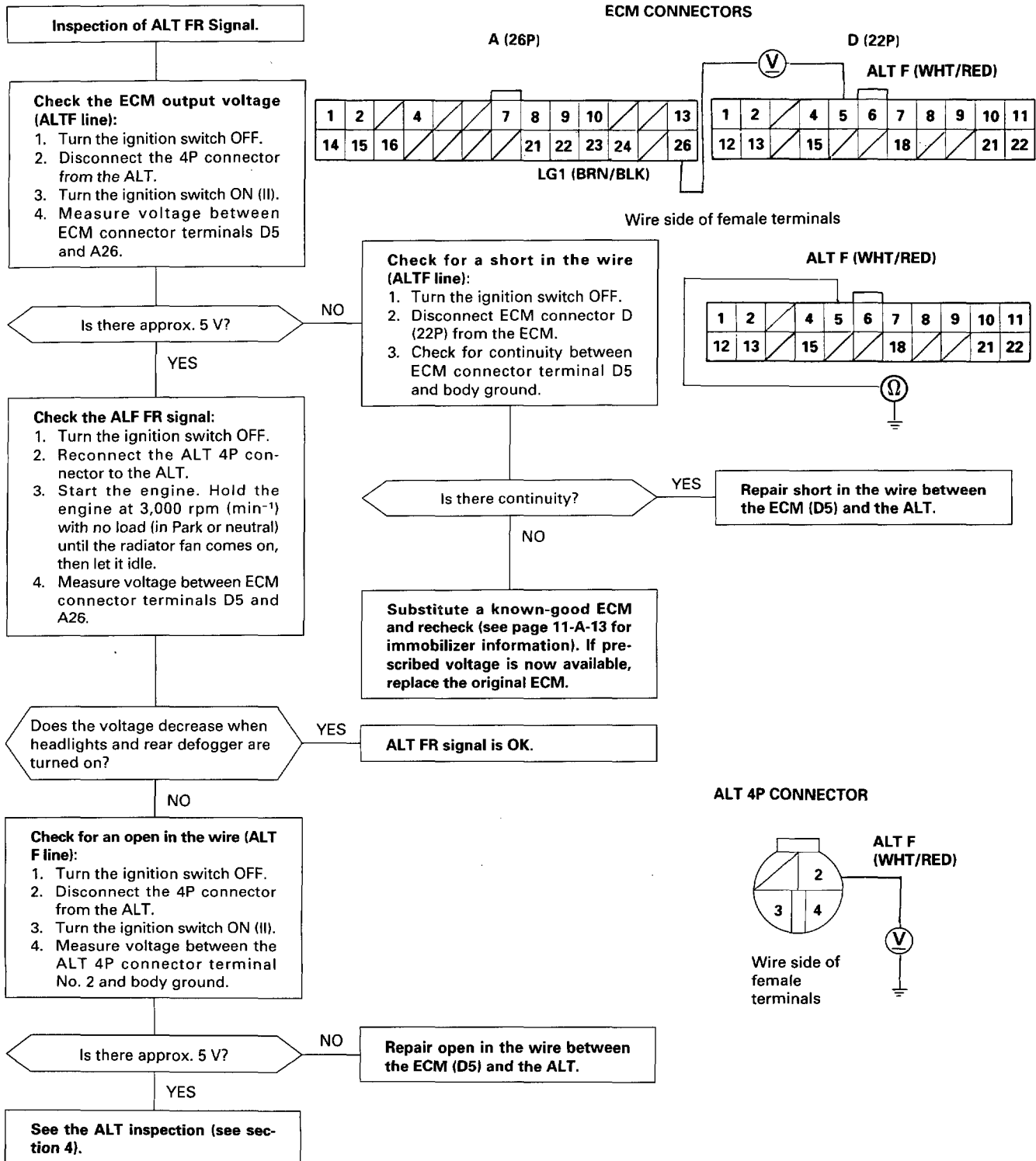
(From page 11-A-53)





# Alternator (ALT) FR Signal

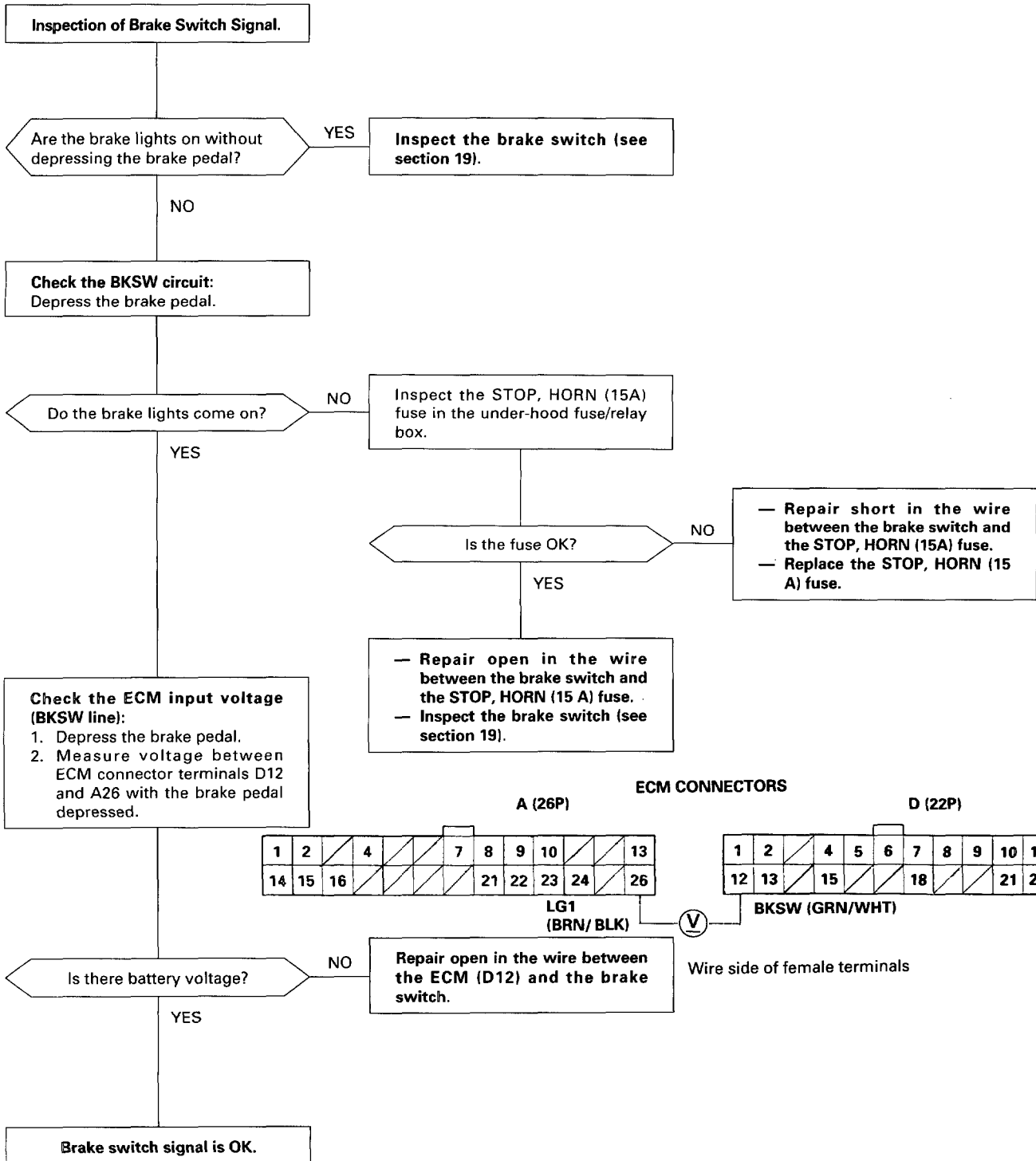
This signals the ECM when the Alternator (ALT) is charging.



# Idle Control System

## Brake Switch Signal

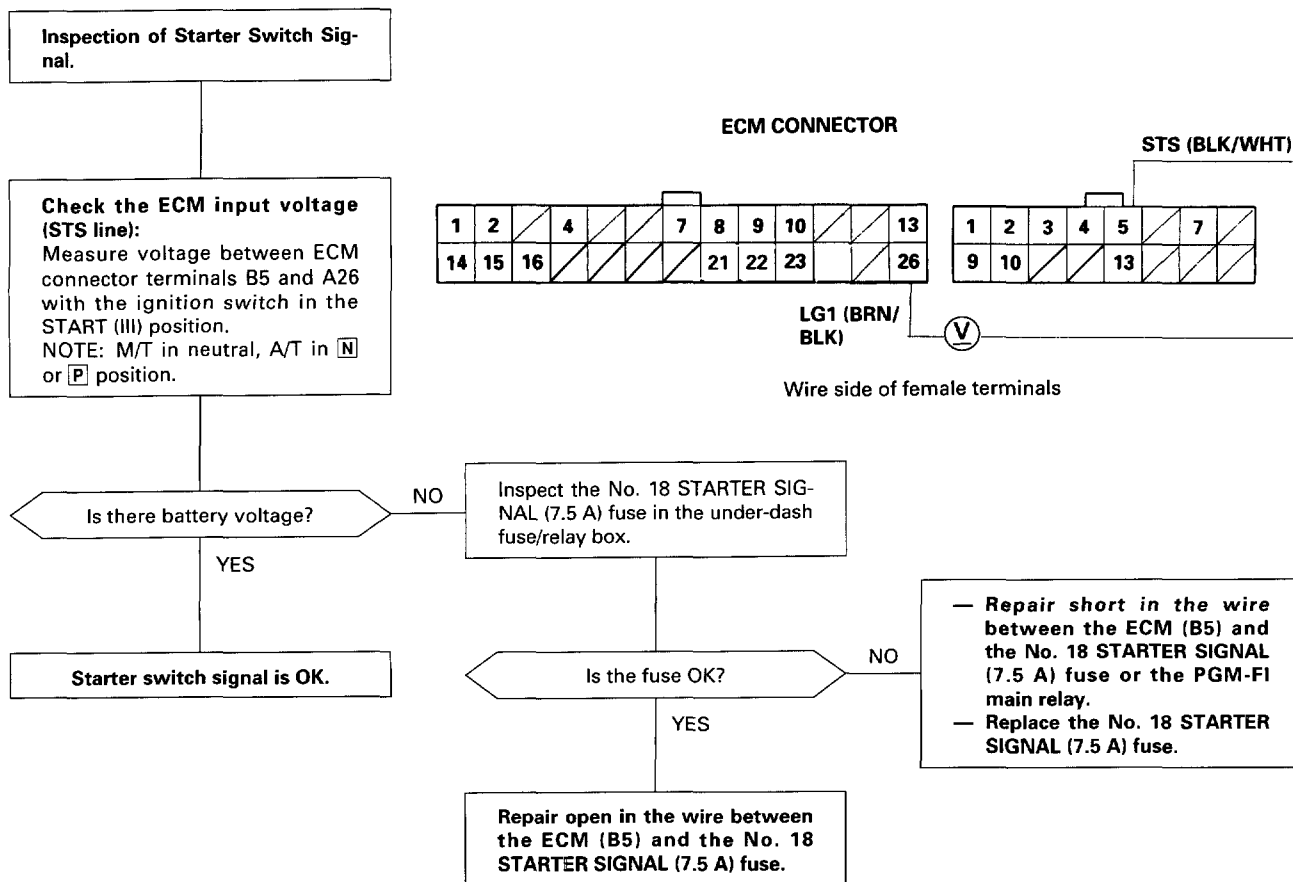
This signals the ECM when the brake pedal is depressed.





## Starter Switch Signal

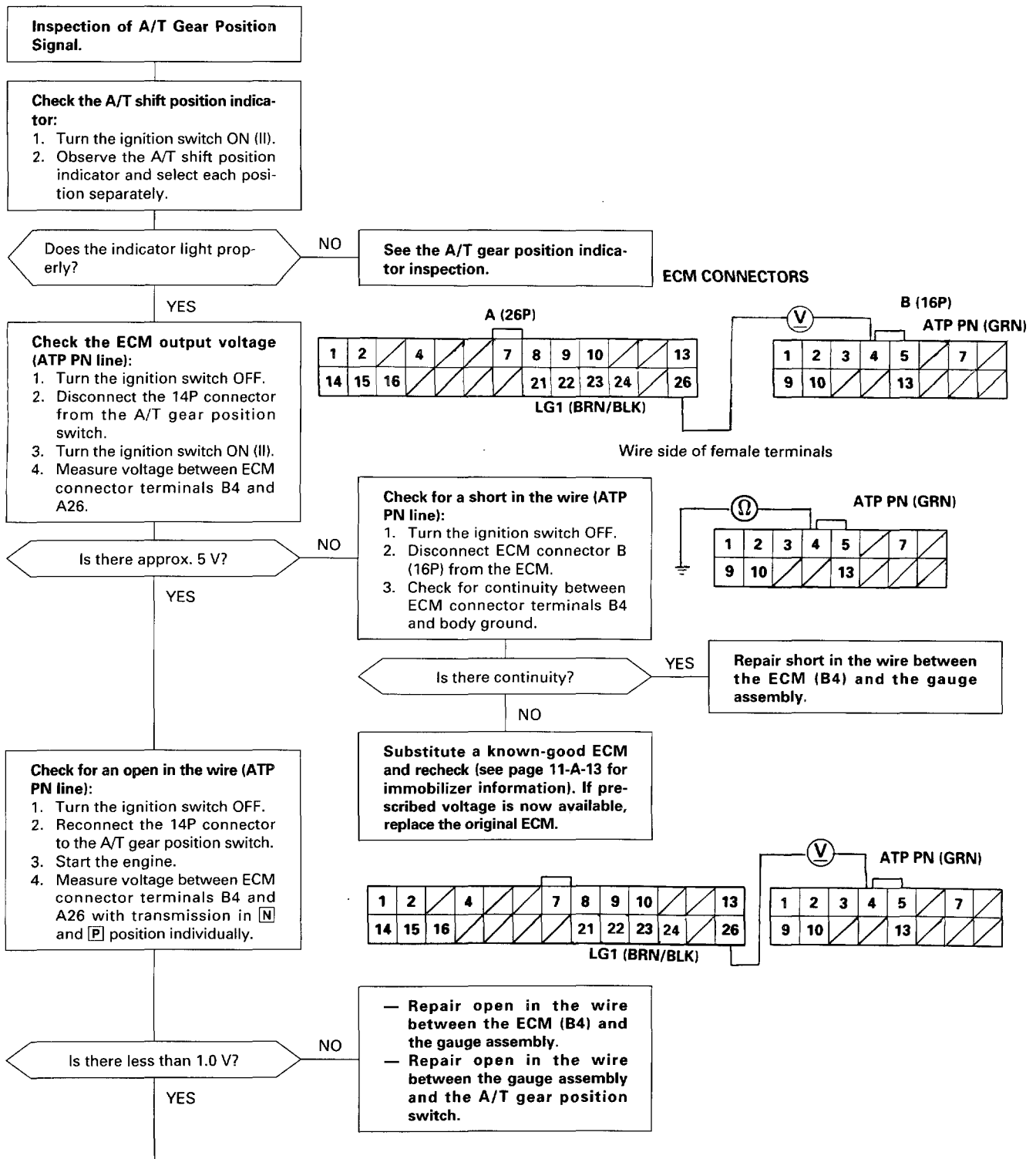
This signals the ECM when the engine is cranking.



# Idle Control System

## Automatic Transaxle (A/T) Gear Position Signal (A/T)

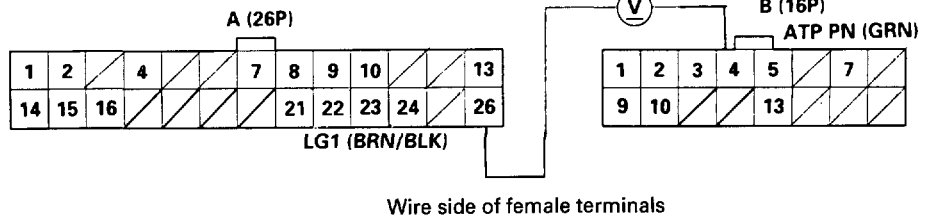
This signals the ECM when the transmission is in **P**, **N**, **D<sub>4</sub>** or **D<sub>3</sub>** position.





(From page 11-A-58)

ECM CONNECTORS



Wire side of female terminals

**Check for a short in the wire (ATP PN line):**  
Measure voltage between ECM connector terminals B4 and A26 with the transmission in gear.

Is there battery voltage?

NO

**Repair short in the wire between ECM (B4) and gauge assembly.**

YES

**Check for an open in the wire (ATPD4, ATPD3 line):**  
Measure voltage between ECM connector terminals B2 or B10\* and A26 with the transmission in **D<sub>3</sub>** or **D<sub>4</sub>** position individually.

Is there less than 1.0 V?

NO

**Repair open in the wire between ECM (B2 or B10\*) and A/T gear position switch.**

YES

Measure voltage between ECM connector terminals B2 or B10\* and A26 with the transmission in **N** or **P** position individually.

Is there approx. 10 V?

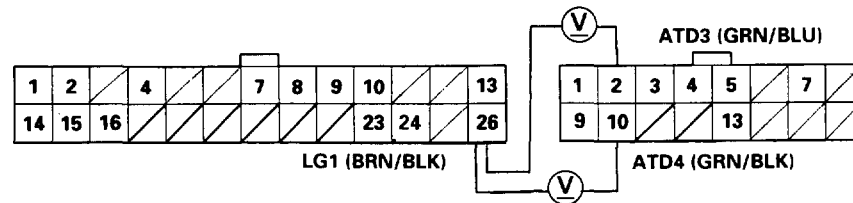
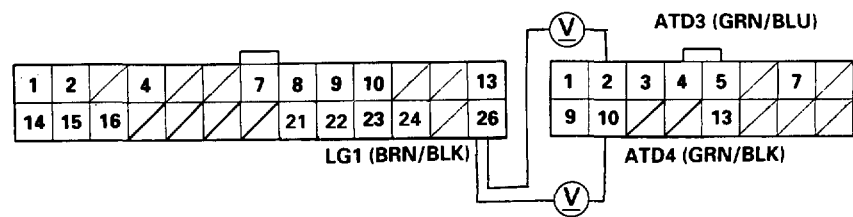
NO

**Repair short in the wire between ECM (B2 or B10\*) and A/T gear position switch.**

YES

**A/T Gear position signal is OK.**

\*: **D<sub>4</sub>**



# Idle Control System

## Idle Speed Setting

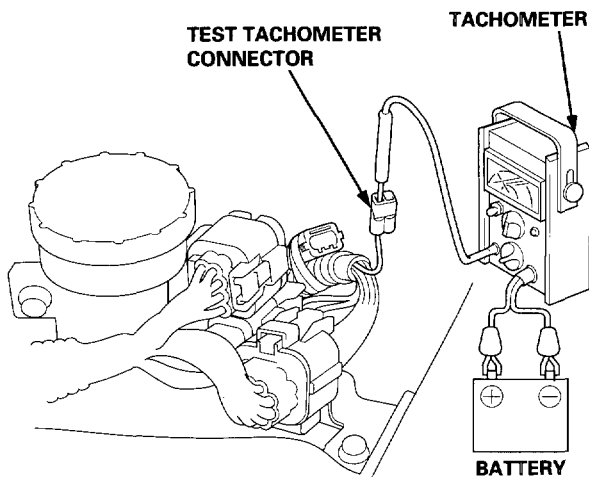
### Inspection/Adjustment

Adjust the idle speed by means of a Honda PGM Tester. If not, check the following:

NOTE: Before setting the idle speed, check the following items:

- The MIL has not been reported on.
- Ignition timing
- Spark plugs
- Air cleaner
- PCV system

1. Connect a tachometer.



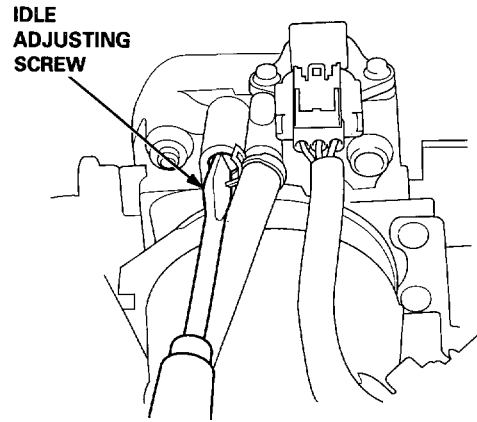
2. Start the engine. Hold the engine at 3,000 rpm (min<sup>-1</sup>) with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
3. Check the idle speed with no-load conditions: headlights, blower fan, rear defogger, radiator fan, and air conditioner are not operating.

NOTE: (KS model) Remove No. 16 RUNNING LIGHT RELAY (7.5 A) fuse in the under-dash fuse box, then check that the headlights and side marker lights are off.

Idle speed should be:

M/T	750 ± 50 rpm (min <sup>-1</sup> )
A/T	750 ± 50 rpm (min <sup>-1</sup> ) (in <b>N</b> or <b>P</b> position)

4. Adjust the idle speed, if necessary, by turning the idle adjusting screw 1/2-turn clockwise or counterclockwise.



5. After 1/2-turn the idle adjusting screw, check the idle speed again. If it is out of spec, turn the idle adjusting screw 1/2-turn again.

NOTE: Do not turn the idle adjusting screw more than 1/2-turn without checking the idle speed.

6. Idle the engine for one minute with heater fan switch at HI and air conditioner on, then check the idle speed. **Idle speed should be:**

M/T	810 ± 50 rpm (min <sup>-1</sup> )
A/T	810 ± 50 rpm (min <sup>-1</sup> ) (in <b>N</b> or <b>P</b> position)

NOTE:

- Do not turn the idle adjusting screw when the air conditioner on.
- If the idle speed is not within specification, see System Troubleshooting Guide on page 11-A-48.

# Fuel Supply System



## System Troubleshooting Guide

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

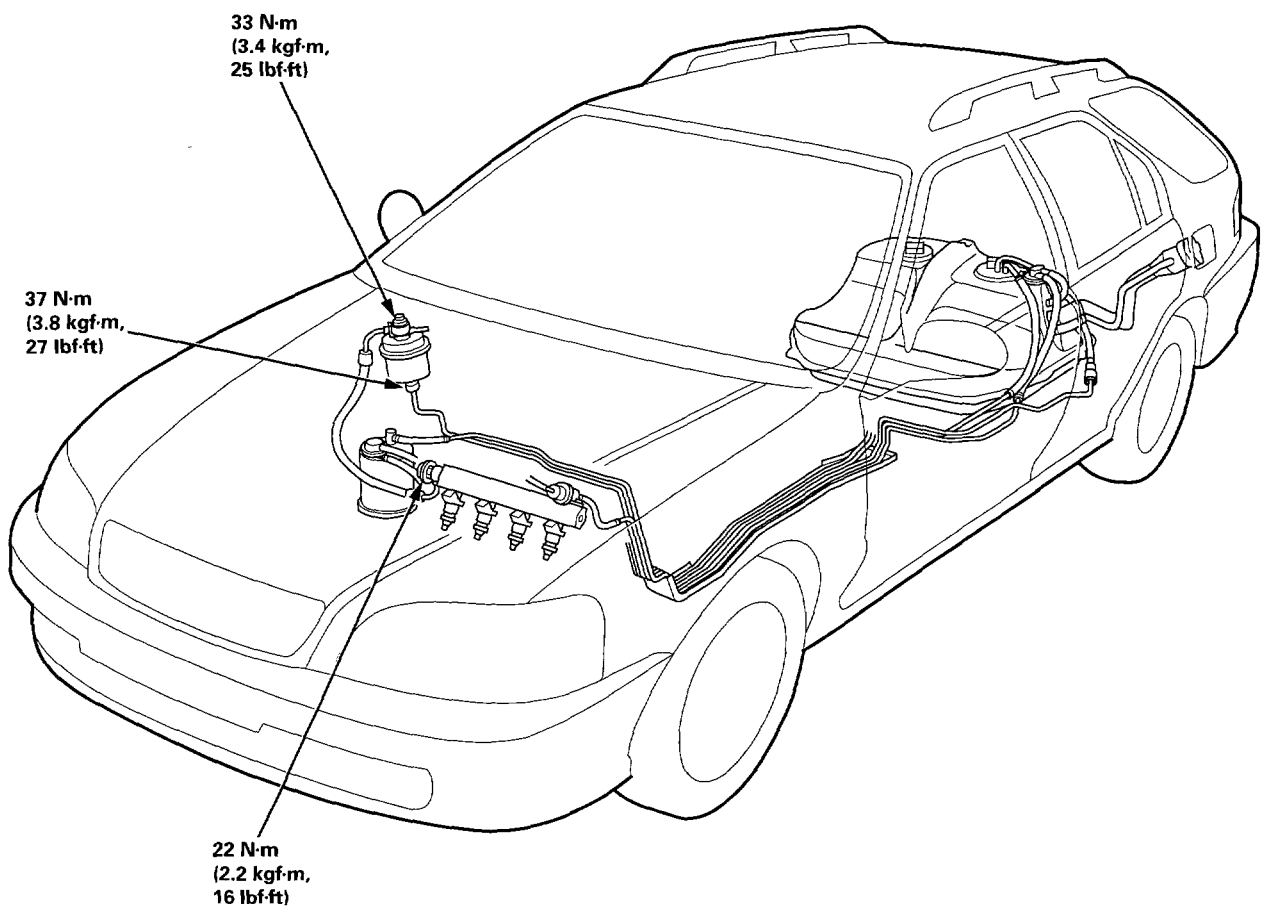
PAGE	SUB-SYSTEM	FUEL LINES	FUEL INJECTOR	FUEL PRESSURE REGULATOR	FUEL FILTER	FUEL PUMP	PGM-FI MAIN RELAY	CONTAMINATED FUEL
		11-A-62	11-A-68	11-A-72	11-A-73	11-A-74	11-A-78	—
	ENGINE WON'T START		③		③	①	②	
	DIFFICULT TO START ENGINE WHEN COLD OR HOT				①	②		
	ROUGH IDLE		①					②
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING		①	②				②
	FAILS EMISSION TEST		②	①				
	LOSS OF POWER		③		②	①		
FREQUENT STALLING	WHILE WARMING UP			①				
	AFTER WARMING UP			①				



# Fuel Supply System

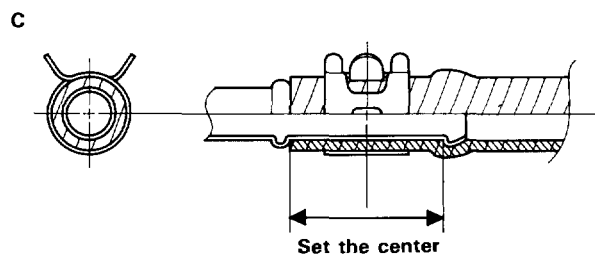
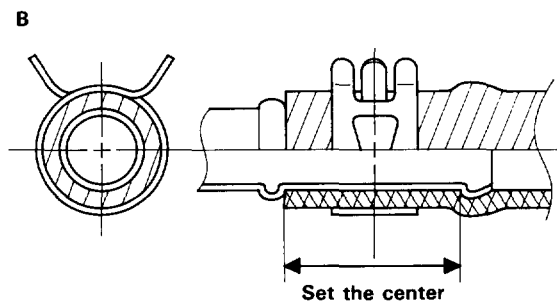
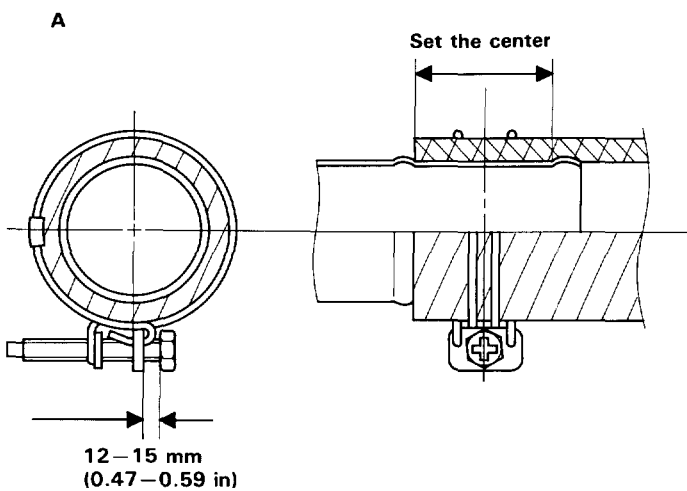
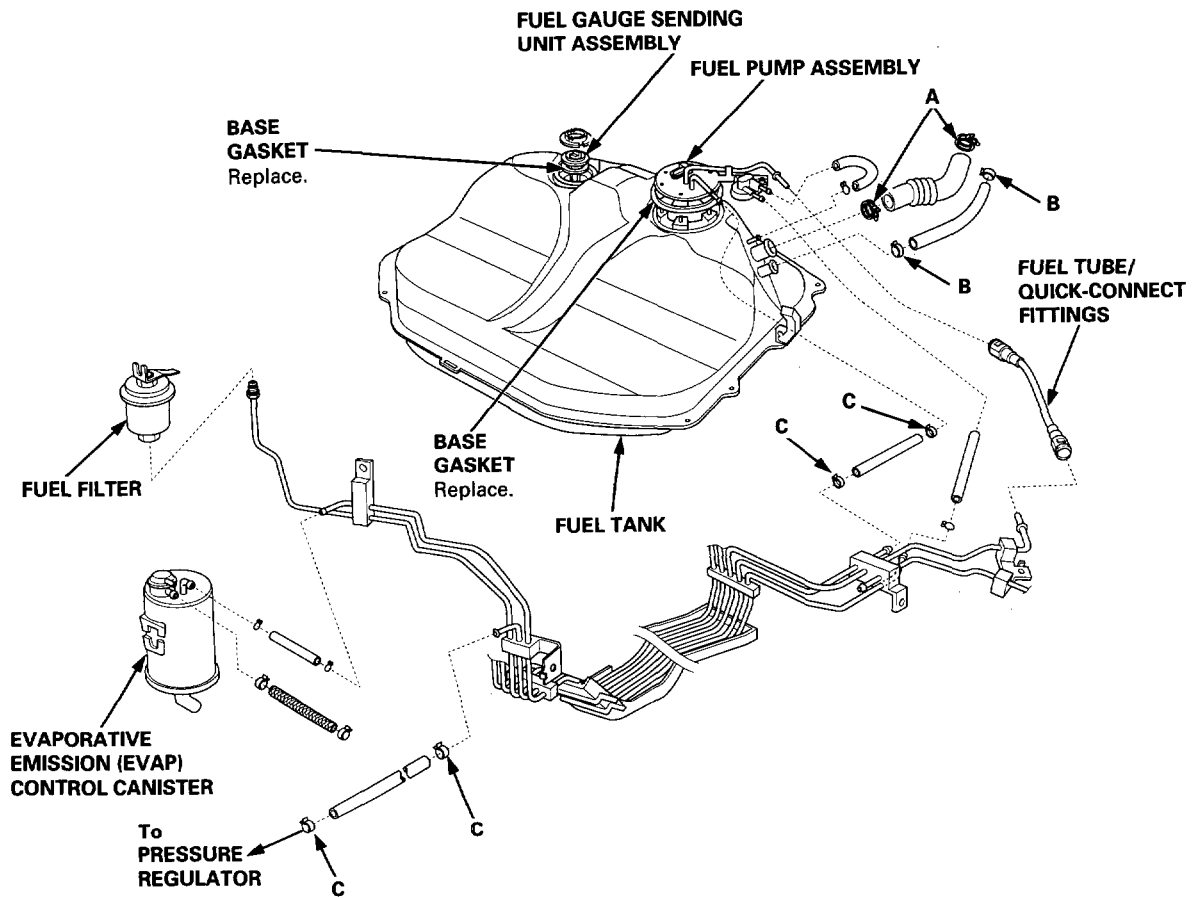
## Fuel Lines

Check fuel system lines, hoses, fuel filter, and other components for damage, leaks or deterioration, and replace if necessary.





Check all hose clamps and retighten if necessary.



# Fuel Supply System

## Fuel Tube/Quick-Connect Fittings

### Precautions

#### **⚠ WARNING**

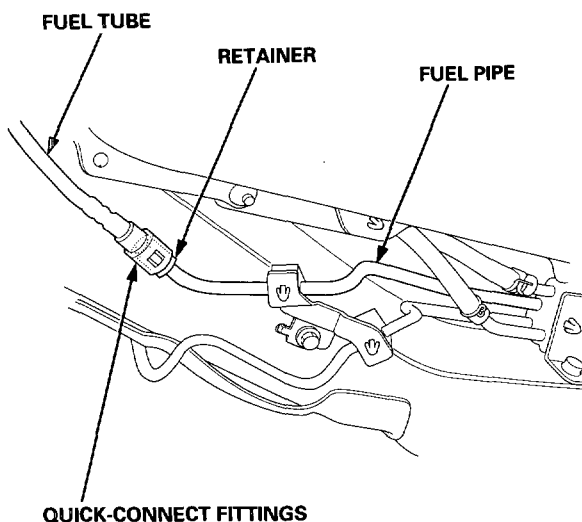
Do not smoke while working on the fuel system.  
Keep open flame or sparks away from the work area.

The fuel tube/quick-connect fittings assembly connects the in-tank fuel pump with the fuel feed pipe. For removing or installing the fuel pump and fuel tank, it is necessary to disconnect or connect the quick-connect fittings. Pay attention to following:

- The fuel tube/quick-connect fittings assembly is not heat-resistant; be careful not to damage it during welding or other heat-generating procedures.
- The fuel tube/quick-connect fittings assembly is not acid-proof; do not touch it with a shop towel which was used for wiping away battery fluid. Replace the fuel tube/quick-connect fittings assembly if it came into contact with battery fluid or similar.
- When connecting or disconnecting the fuel tube/quick-connect fittings assembly, be careful not to bend or twist it excessively. Replace it in case of damage.

A disconnected quick-connect fittings can be reconnected, but the retainer on the mating pipe cannot be reused once it was removed from the pipe. Replace the retainer when

- Replacing the fuel pump.
- Replacing the fuel feed pipe.
- It was removed from the pipe.
- It is damaged.



### Disconnection

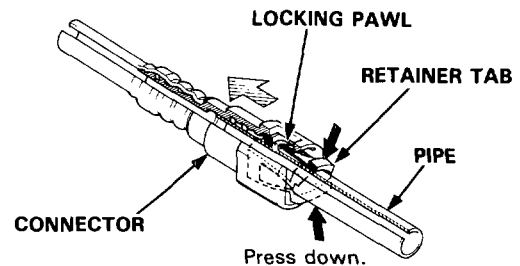
#### **⚠ WARNING**

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

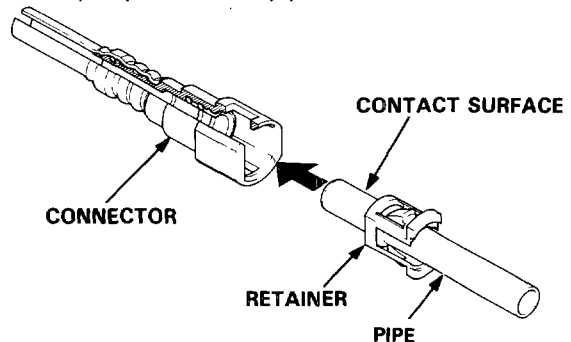
1. Disconnect the battery negative cable.
2. Relieve fuel pressure (see page 11-A-67).
3. Remove the fuel fill cap, and relieve fuel pressure in the tank.
4. Check the fuel quick-connect fittings for dirt, and clean if necessary.
5. Holding the connector with one hand and pressing down the retainer tabs with the other, pull the connector off.

#### NOTE:

- Be careful not to damage the pipe or other parts. Do not use tools.
- If the connector does not move, keep the retainer tabs pressed down, and alternately pull and push the connector until it goes off easily.
- Do not remove the retainer from the pipe; a removed retainer must be replaced with a new one.

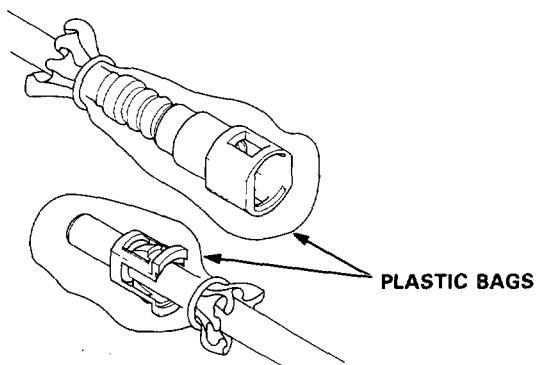


6. Check the contact surface of the pipe for dirt and damage.
  - If the surface is dirty, clean it.
  - If the surface is rusty or damaged, replace the fuel pump or fuel feed pipe.





7. To prevent damage and the intrusion of foreign matter, cover the disconnected connector and pipe end with plastic bags or similar.

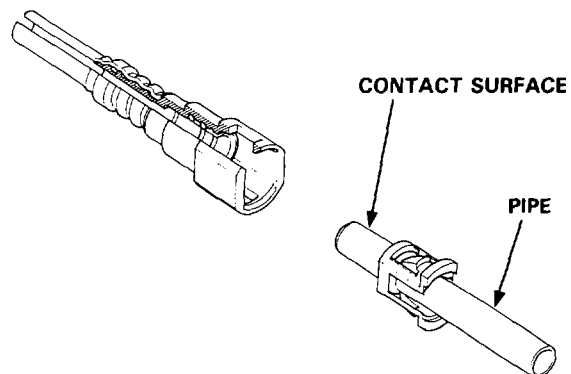


### Connection

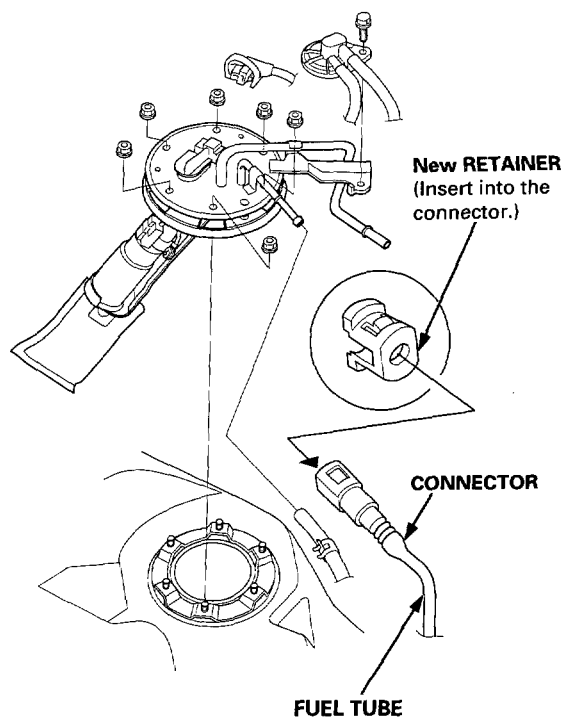
## ⚠ WARNING

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

1. Check the pipe end for dirt and damage, and clean if necessary.



2. Insert a new retainer into the connector if the retainer is damaged, or after
- replacing the fuel pump.
  - replacing the fuel feed pipe.
  - removing the retainer from the pipe.

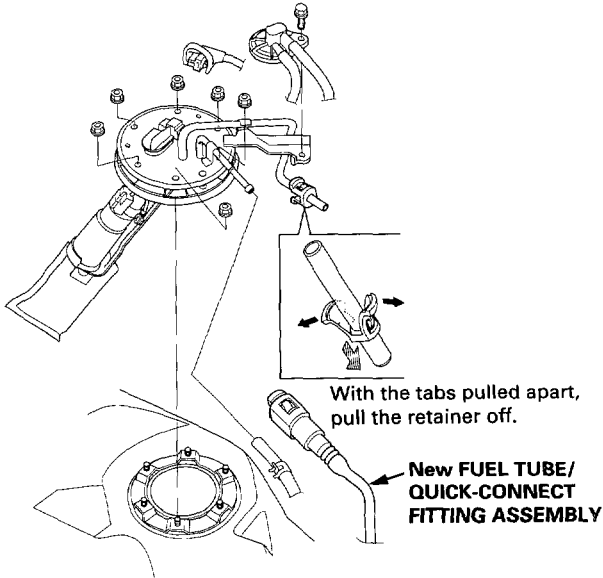


(cont'd)

# Fuel Supply System

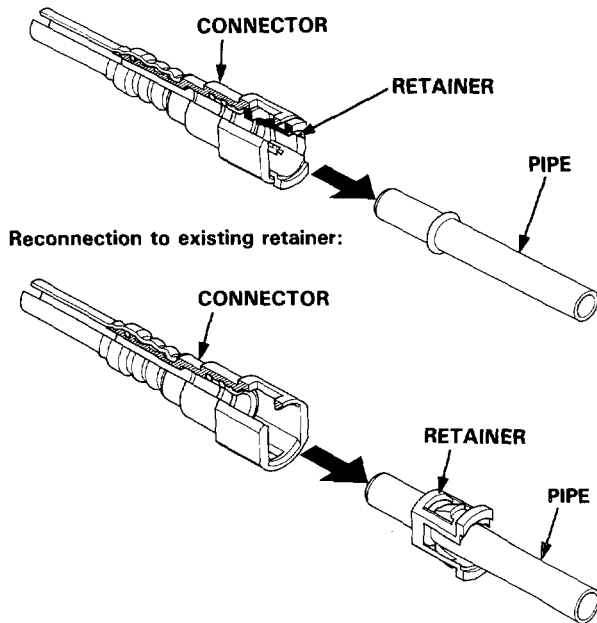
## Fuel Tube/Quick-Connect Fittings (cont'd)

Before connecting a new fuel tube/quick-connect fitting assembly, remove the retainer from the mating pipe.

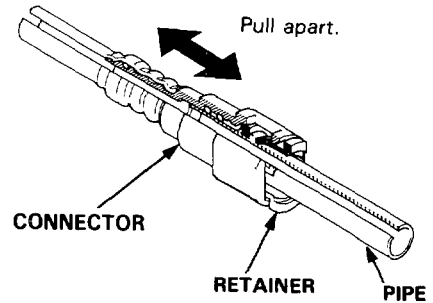


3. Align the quick-connect fittings with the pipe, and align the retainer locking pawls with the connector grooves. Then press the quick-connect fittings onto the pipe until both retainer pawls lock with a clicking sound.

NOTE: If it is hard to connect, put a little amount of new engine oil on the pipe end.



4. Check visually and by pulling at the connector that the connection is secure and that the pawls are firmly locked into place.



5. Reconnect the battery negative cable, and turn the ignition switch ON; the fuel pump will work for about two seconds, and fuel pressure will rise. Repeat two or three times, and check that there is no leakage in the fuel supply system.



## System Description

The fuel supply system consists of a fuel tank, in-tank high-pressure fuel pump, PGM-FI main relay, fuel filter, fuel pressure regulator, fuel injectors, and fuel delivery and return lines. This system delivers pressure-regulated fuel to the fuel injectors and cuts the fuel delivery when the engine is not running.

## Fuel Pressure

### Relieving

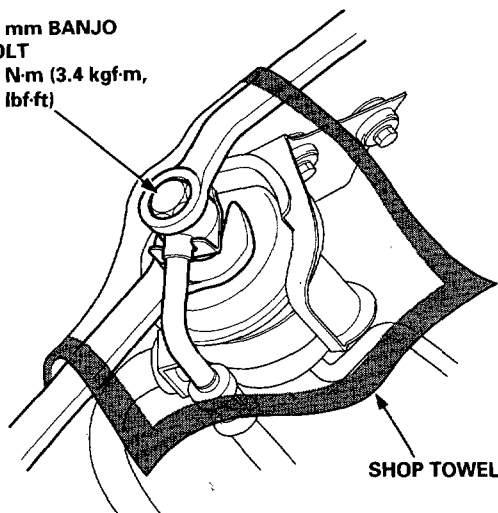
Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the 12 mm banjo bolt on top of the fuel filter.

### ⚠ WARNING

Do not smoke while working on the fuel system. Keep open flame or sparks away from the work area. Be sure to relieve fuel pressure while the ignition switch is off.

1. Disconnect the battery negative cable from the battery negative terminal.
2. Remove the fuel fill cap.
3. Use a box end wrench on the 12 mm banjo bolt at the fuel filter, while holding the fuel filter with another wrench.
4. Place a rag or shop towel over the 12 mm banjo bolt.
5. Slowly loosen the 12 mm banjo bolt one complete turn.

12 mm BANJO  
BOLT  
33 N·m (3.4 kgf·m,  
25 lbf·ft)



NOTE: Replace the washers whenever the 12 mm banjo bolt is loosened or removed.

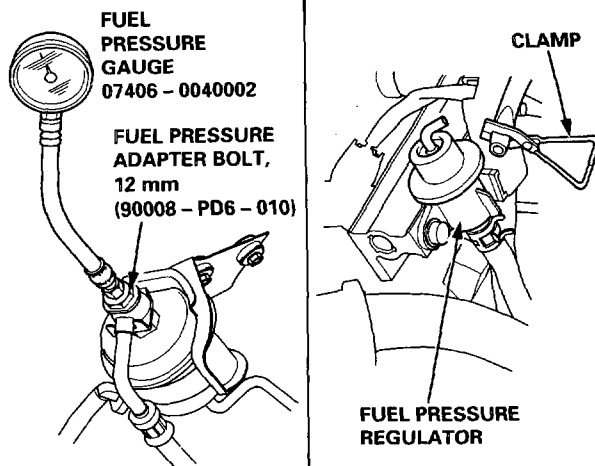
(cont'd)

# Fuel Supply System

## Fuel Pressure (cont'd)

### Inspection

1. Relieve fuel pressure (see page 11-A-67).
2. Remove the 12 mm banjo bolt from the fuel filter while holding the fuel filter with another wrench. Attach the fuel pressure adapter bolt, 12 mm (90008 - PD6 - 010) and the special tool.



3. Start the engine. Measure the fuel pressure with the engine idling and the vacuum hose of the fuel pressure regulator disconnected from the fuel pressure regulator and pinched. If the engine will not start, turn the ignition switch ON (II), wait for two seconds, turn it off, then back on again and read the fuel pressure.

**Pressure should be:**  
270 - 320 kPa (2.8 - 3.3 kgf/cm<sup>2</sup>, 40 - 47 psi)

4. Reconnect vacuum hose to the fuel pressure regulator.

**Pressure should be:**  
211 - 260 kPa (2.15 - 2.65 kgf/cm<sup>2</sup>, 31 - 38 psi)

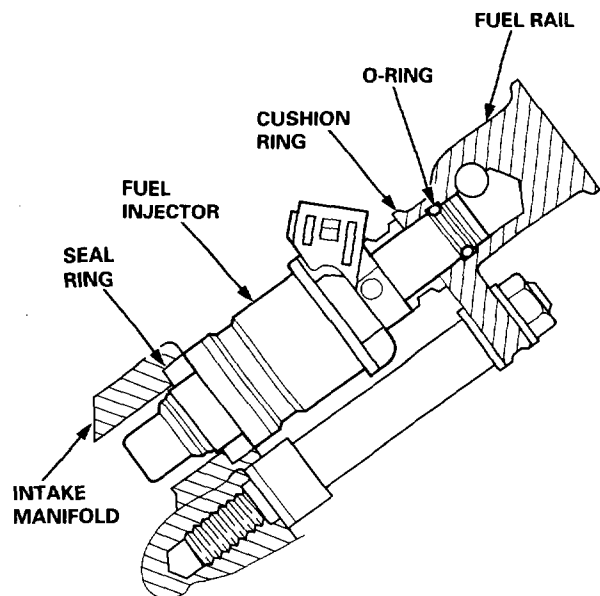
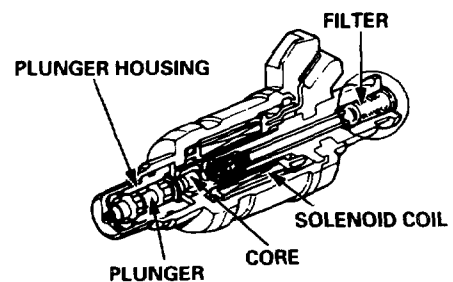
If the fuel pressure is not as specified, first check the fuel pump (see page 11-A-74). If the fuel pump is OK, check the following:

- o If the fuel pressure is higher than specified, inspect for:
  - Pinched or clogged fuel return hose or line.
  - Faulty fuel pressure regulator (see page 11-A-72).
- o If the fuel pressure is lower than specified, inspect for:
  - Clogged fuel filter.
  - Faulty fuel pressure regulator (see page 11-A-72).
  - Fuel line leakage.

## Fuel Injectors

### Description

The fuel injectors are a solenoid-actuated constant-stroke, pintle-type consisting of a solenoid, plunger needle valve and housing. When current is applied to the solenoid coil, the valve lifts up and pressurized fuel is injected. Because the needle valve lift and the fuel pressure are constant, the injection quantity is determined by the length of time that the valve is open (that is the duration the current is supplied to the solenoid coil). The fuel injector is sealed by an O-ring and seal ring at the top and bottom. These seals also reduce operating noise.



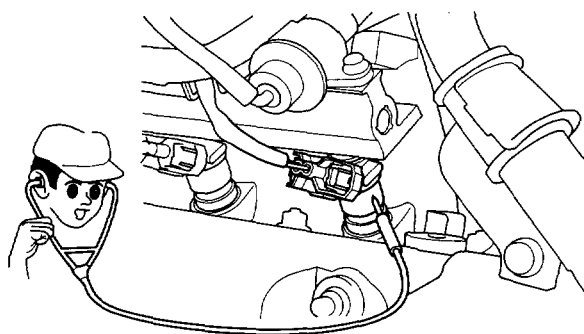


## Testing

NOTE: Check the following items before testing: idle speed, ignition timing and idle CO%.

### If the engine runs:

1. With the engine idling, disconnect each fuel injector connector individually and inspect the change in the idle speed.
  - If the idle speed drop is almost the same for each cylinder, the fuel injectors are normal.
  - If the idle speed or quality remains the same when you disconnect a particular fuel injector, replace the fuel injector and retest.
2. Check the clicking sound of each fuel injector by means of a stethoscope when the engine is idling.



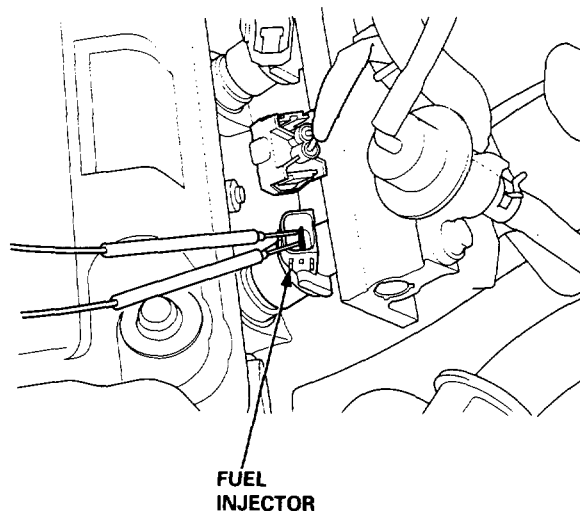
- If any fuel injector fails to make the typical clicking sound, check the sound again after replacing the fuel injector.
- If clicking sound is still absent, check the following:
  - Whether there is any short-circuiting, wire breakage or poor connection in the YEL/BLK wire between the PGM-FI main relay and the junction connector.
  - Whether the junction connector is open or corroded.
  - Whether there is any short-circuiting, wire breakage or poor connection in the YEL/BLK wire between the junction connector and the fuel injector.
  - Whether there is any short-circuiting, wire breakage or poor connection in the wire between the fuel injector and the ECM.

If all is OK, check the ECM (see page 11-A-24) and PGM-FI main relay (see page 11-A-78).

### If the engine cannot be started:

1. Remove the connector of the fuel injector, and measure the resistance between the 2 terminals of the fuel injector.

Resistance should be: 10 – 13  $\Omega$



- If the resistance is not as specified, replace the fuel injector.
- If the resistance is as specified, check the fuel pressure (see page 11-A-68).
- If the fuel pressure is as specified, check the following:
  - Whether there is any short-circuiting, wire breakage or poor connection in the YEL/BLK wire between the PGM-FI main relay and the junction connector.
  - Whether the junction connector is open or corroded.
  - Whether there is any short-circuiting, wire breakage, or poor connection in the YEL/BLK wire between the junction connector and the fuel injector.
  - Whether there is any short-circuiting, wire breakage or poor connection in the wire between the fuel injector and the ECM.

If all is OK, check the ECM (see page 11-A-24).

(cont'd)



# Fuel Supply System

## Fuel Injectors (cont'd)

### Replacement

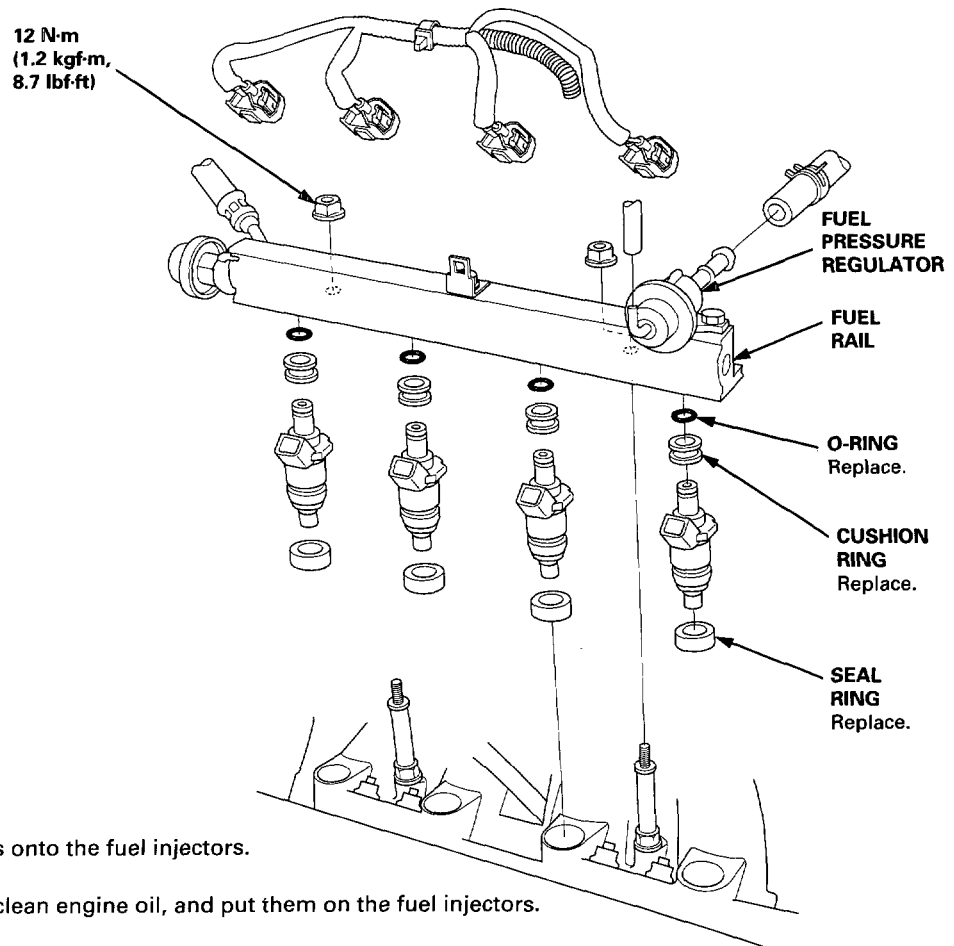
#### **⚠ WARNING**

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

1. Relieve the fuel pressure (see page 11-A-67).
2. Disconnect the connectors from the fuel injectors.
3. Disconnect the vacuum hoses and fuel return hose from the fuel pressure regulator.

NOTE: Place a rag or shop towel over the hoses before disconnecting them.

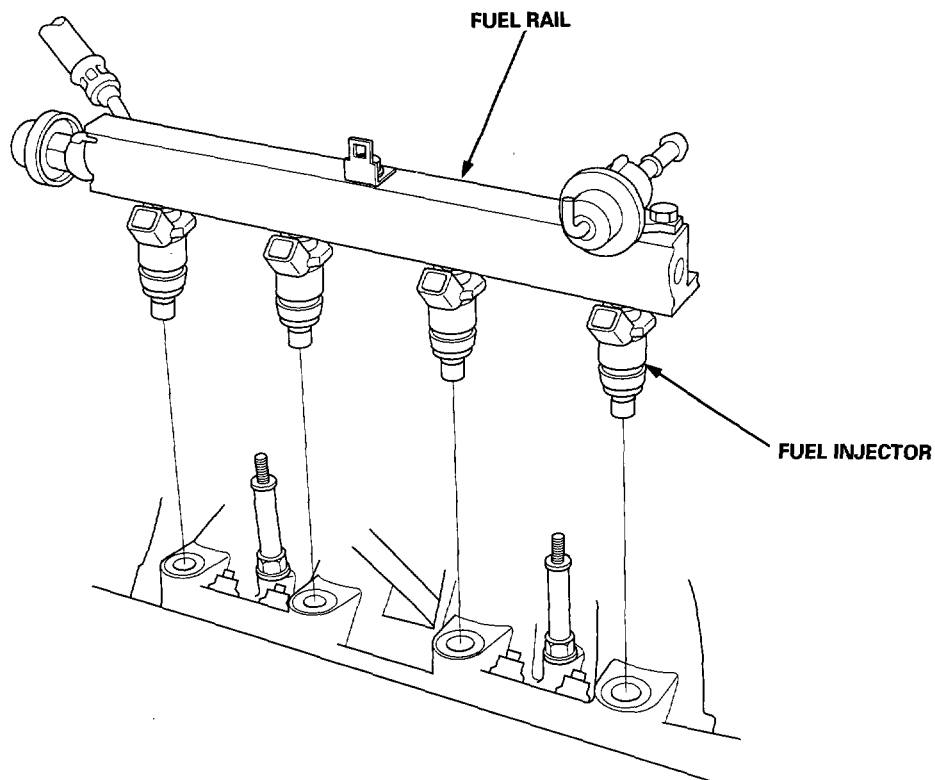
4. Loosen the retainer nuts on the fuel rail.
5. Disconnect the fuel rail.
6. Remove the fuel injectors from the intake manifold.



7. Slide new cushion rings onto the fuel injectors.
8. Coat new O-rings with clean engine oil, and put them on the fuel injectors.
9. Insert the fuel injectors into the fuel rail first.
10. Coat new seal rings with clean engine oil, and press them into the intake manifold.



11. Install the fuel injectors and fuel rail assembly on the intake manifold.
12. To prevent damage to the O-rings, install the fuel injectors in the fuel rail first, then install them in the intake manifold.



13. Install and tighten the retainer nuts.
14. Connect the vacuum hoses and fuel return hose to the fuel pressure regulator.
15. Install the connectors on the fuel injectors.
16. Turn the ignition switch ON (II), but do not operate the starter. After the fuel pump runs for approximately two seconds, the fuel pressure in the fuel line rises. Repeat this two or three times, then check whether there is any fuel leakage.

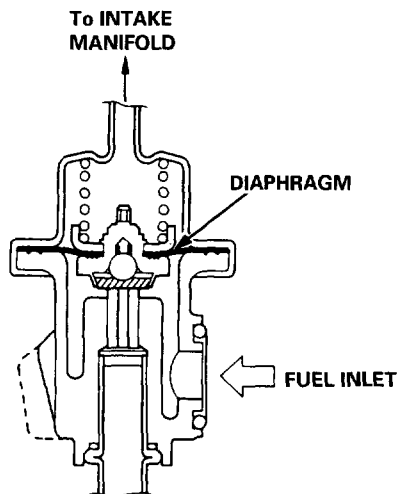
# Fuel Supply System

## Fuel Pressure Regulator

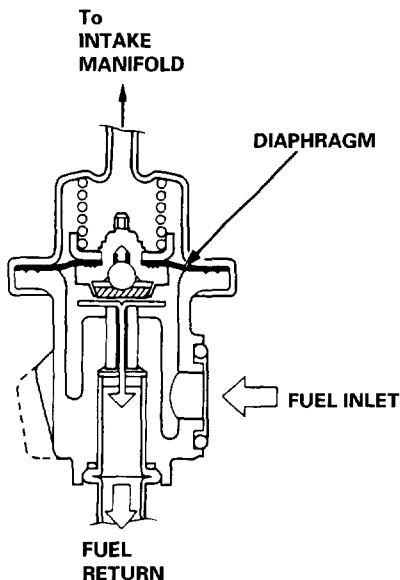
### Description

The fuel pressure regulator maintains a constant fuel pressure to the fuel injectors. When the difference between the fuel pressure and manifold pressure exceeds 294 kPa (3.0 kgf/cm<sup>2</sup>, 43 psi) the diaphragm is pushed upward, and the excess fuel is fed back into the fuel tank through the return line.

### CLOSED:



### OPEN:

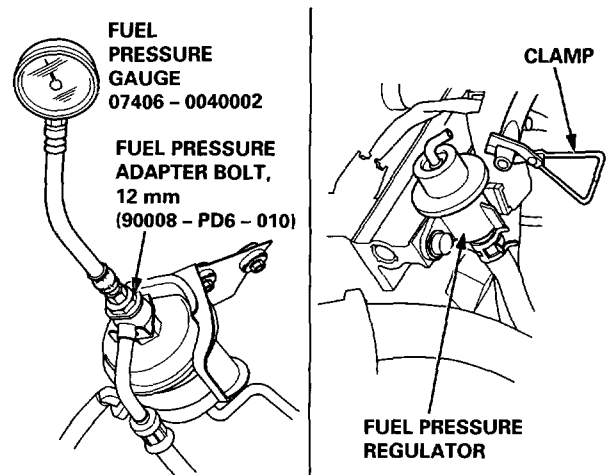


### Testing

## ⚠ WARNING

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

1. Attach the fuel pressure adapter bolt, 12 mm (90008 - PD6 - 010) and the special tool (see page 11-A-68).



### Pressure should be:

270 - 320 kPa (2.8 - 3.3 kgf/cm<sup>2</sup>, 40 - 47 psi)

(with the fuel pressure regulator vacuum hose disconnected and pinched)

2. Reconnect the vacuum hose to the fuel pressure regulator.
3. Check that the fuel pressure rises when the vacuum hose from the fuel pressure regulator is disconnected again.

If the fuel pressure did not rise, replace the fuel pressure regulator.



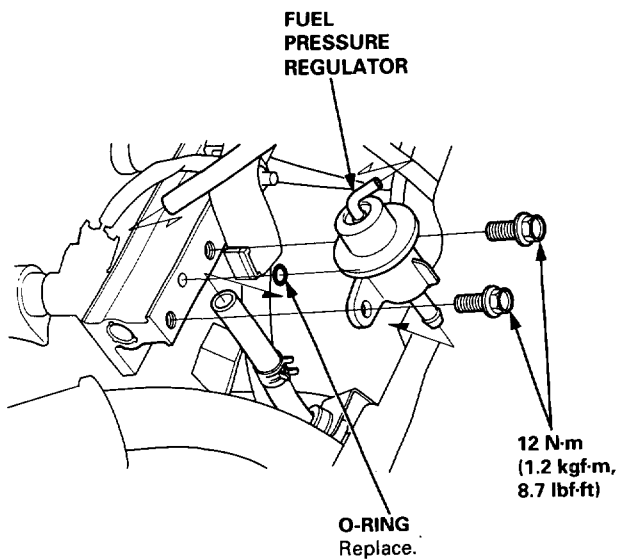
## Fuel Filter

### Replacement

#### ⚠ WARNING

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

1. Place a shop towel under the fuel pressure regulator, then relieve fuel pressure (see page 11-A-67).
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the two 6 mm retainer bolts.



4. Apply clean engine oil to a new O-ring and carefully install it into its proper position.
5. Install the fuel pressure regulator in the reverse order of removal.

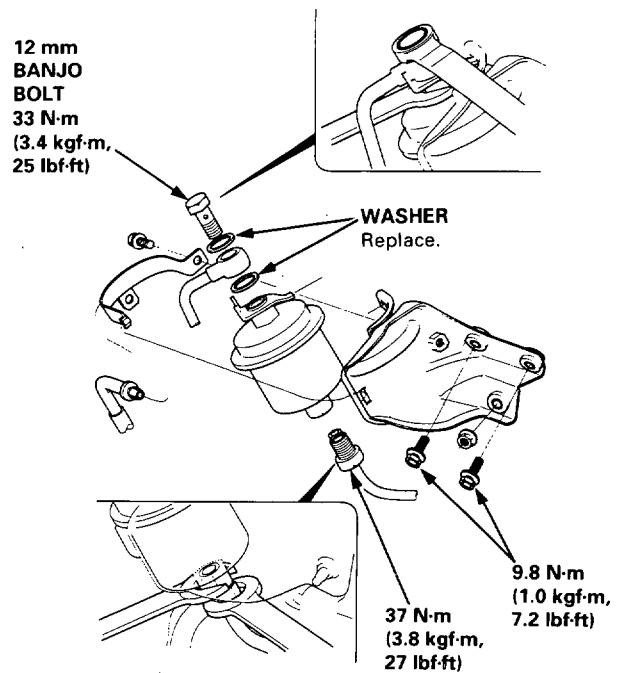
### Replacement

#### ⚠ WARNING

Do not smoke while working on the fuel system.  
Keep open flame or sparks away from the work area.  
While replacing the fuel filter, be careful to keep a safe distance between battery terminals and any tools.

The fuel filter should be replaced whenever the fuel pressure drops below the specified value 270 – 320 kPa (2.8 – 3.3 kgf/cm<sup>2</sup>, 40 – 47 psi) with the fuel pressure regulator vacuum hose disconnected and pinched] after making sure that the fuel pump and the fuel pressure regulator are OK.

1. Place a shop towel under and around the fuel filter.
2. Relieve fuel pressure (see page 11-A-67).
3. Remove the special bolt and the fuel feed pipe from the fuel filter, while supporting it with the another wrench, as shown.
4. Remove the fuel filter clamp and fuel filter.
5. Install the new fuel filter in the reverse order of removal, and note these items:
  - When assembling, use new washers as shown.
  - Clean the flared joint of high pressure hoses thoroughly before reconnecting them.



# Fuel Supply System

## Fuel Pump

### Testing

#### ⚠ WARNING

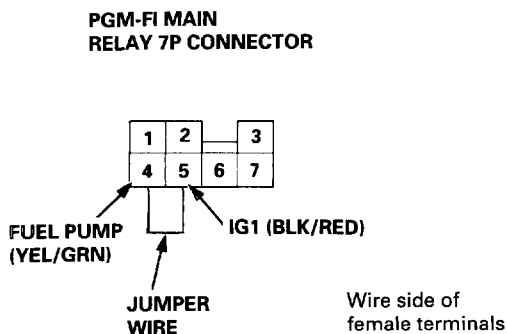
Do not smoke while working on the fuel system.  
Keep open flame or sparks away from the work area.

If you suspect a problem with the fuel pump, check that the fuel pump actually runs; when it is ON (II), you will hear some noise if you hold your ear to the fuel fill port with the fuel fill cap removed. The fuel pump should run for two seconds when ignition switch is first turned ON (II). If the fuel pump does not make noise, check it as follows:

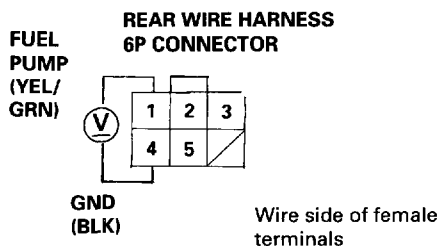
1. Jack up the car and support with jackstands.
2. Disconnect the 6P connector from the fuel unit wire harness.

**CAUTION:** Be sure to turn the ignition switch OFF before disconnecting the wires.

3. Connect the PGM-FI main relay 7P connector terminal No. 4 and No. 5 with a jumper wire.



4. Check that battery voltage is available between the rear wire harness 6P connector terminal No. 1 and No. 4 when the ignition switch is turned ON (II).



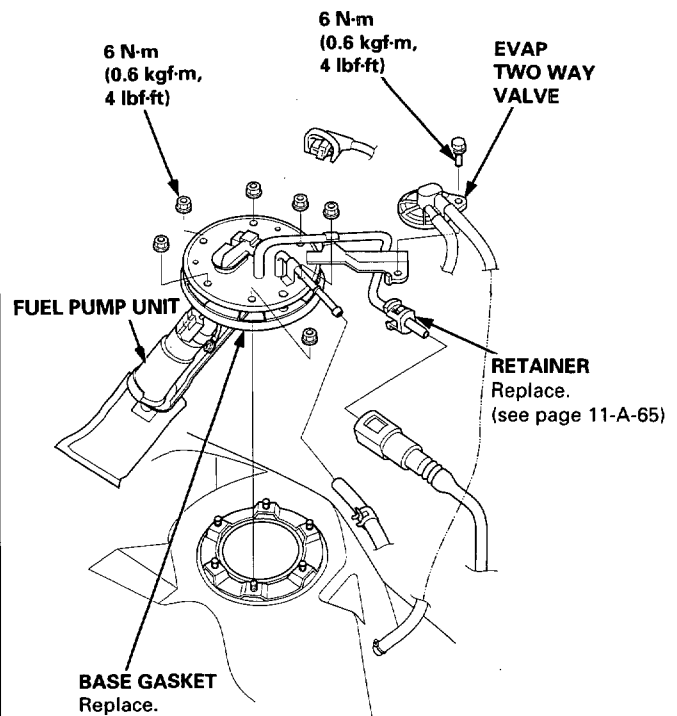
- If battery voltage is available, check the fuel unit wire harness, and replace the fuel pump.
- If there is no voltage, check the fuel pump ground and wire harness (see page 11-A-79).

### Replacement

#### ⚠ WARNING

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

1. Relieve fuel pressure (see page 11-A-67).
2. Remove the fuel tank (see page 11-A-81).
3. Disconnect the fuel lines and connector from fuel pump.
4. Remove the EVAP two way valve.
5. Remove the fuel pump mounting nuts.
6. Remove the fuel pump from the fuel tank.



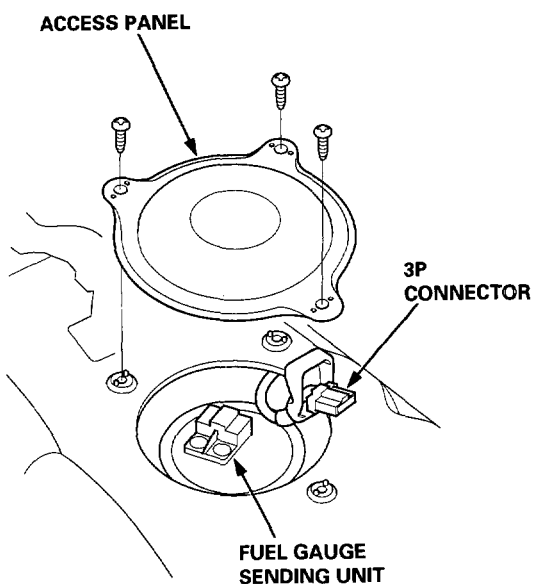


## Fuel Gauge

### Testing

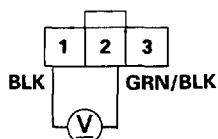
NOTE: Refer to section 23 for the fuel gauge system circuit.

1. Check the No. 15 BACK UP LIGHTS (10 A) fuse in the under-dash fuse/relay box before testing.
2. Remove the seat cushion and pull the carpet (see section 20).
3. Remove the access panel from the floor.
4. Disconnect the 3P connector from the fuel gauge sending unit.



5. Measure voltage between the 3P connector terminals No. 1 and No. 2 with the ignition switch ON (II). There should be between 5 and 8 V.

#### FUEL GAUGE SENDING UNIT CONNECTOR (3P)



Wire side of female terminals

- If the voltage is as specified, go to step 6.
- If the voltage is not as specified, check for:
  - an open in the GRN/BLK or BLK wire.
  - poor ground (G504).

6. Turn the ignition switch OFF.
7. Attach a jumper wire between the No. 1 and No. 2 terminals, then turn the ignition switch ON (II).
8. Check that the pointer of the fuel gauge starts moving toward the "1 (Full)" mark.

**CAUTION: Turn the ignition switch OFF before the pointer reaches "1 (Full)" on the gauge dial. Failure to do so may damage the fuel gauge.**

NOTE: The fuel gauge is a bobbin (cross-coil) type, hence the fuel level is continuously indicated even when the ignition switch is OFF, and the pointer moves more slowly than that of a bimetal type.

- If the pointer of the fuel gauge does not move at all, replace the gauge.
- If the gauge is OK, inspect the fuel gauge sending unit.

# Fuel Supply System

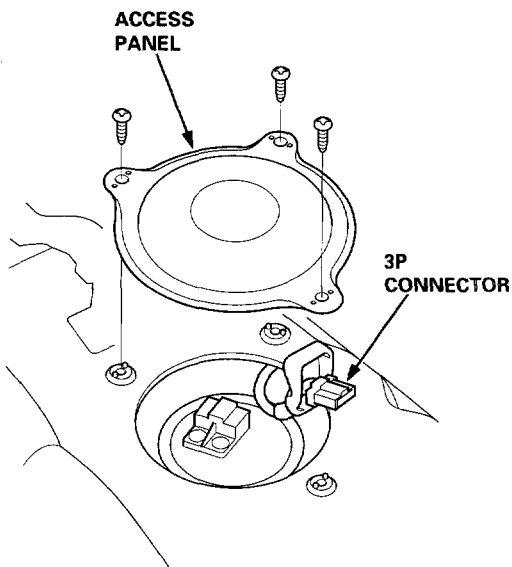
## Fuel Gauge Sending Unit

### Testing

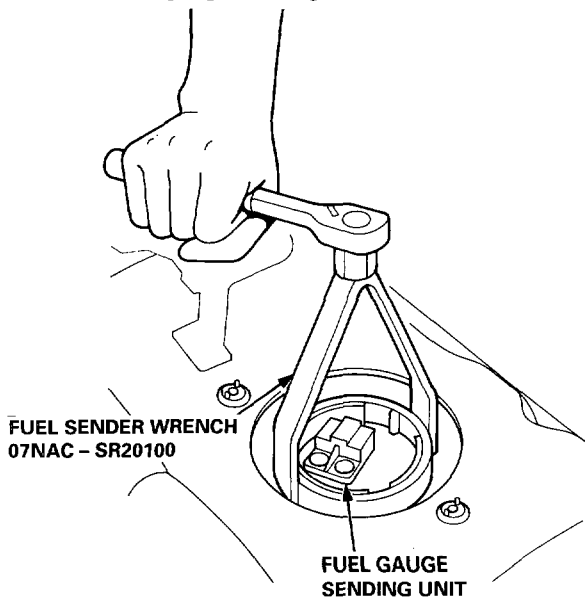
#### **⚠ WARNING**

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

1. Open the tailgate.
2. Remove the fuel tank access panel.
3. With the ignition switch OFF, disconnect the 3P connector from the fuel gauge sending unit.

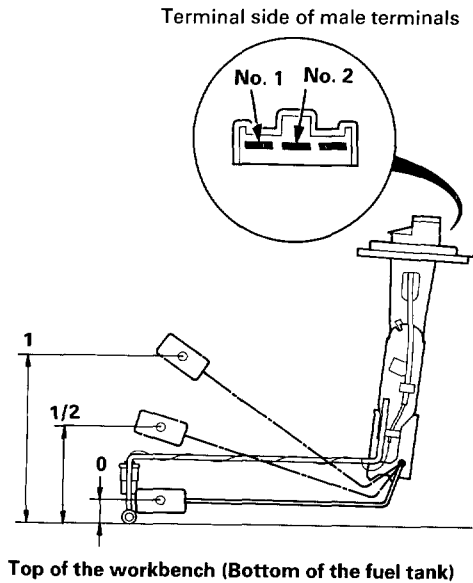


4. Take the fuel gauge sending unit out of the fuel tank.



5. Measure the resistance between the No. 1 and No. 2 terminals at 0 (EMPTY), 1/2 (HALF FULL) and 1 (FULL) by moving the float.

Float Position	0	1/2	1
Resistance ( $\Omega$ )	105 - 110	25.5 - 39.5	2 - 5



If unable to obtain the above readings, replace the fuel gauge sending unit.



## Low Fuel Indicator System

### Indicator Light Testing

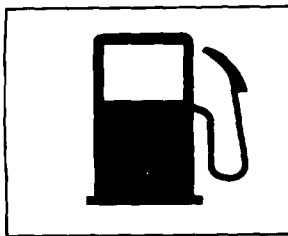
NOTE: Refer to section 23 for the low fuel indicator circuit.

1. Check the No. 15 BACK UP LIGHTS (10 A) fuse in the under-dash fuse/relay box before testing.
2. Park the vehicle on level ground.

### ⚠ WARNING

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

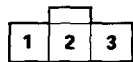
3. Drain the fuel into an approved container.
4. Add less than 8 ℓ (1.8 U.S. Gal, 2.1 Imp. Gal) of fuel, and turn the ignition switch ON (II). The low fuel indicator light should come on within four minutes.



LOW FUEL INDICATOR LIGHT

- If the light comes on within four minutes, go to step 8.
  - If the light does not come on within four minutes, go to step 5.
5. Remove the seat cushion (see section 20).
  6. Remove the fuel tank access panel from the floor, and disconnect the 3P connector from the fuel gauge sending unit.
  7. Connect the No. 1 and No. 3 terminals with a jumper wire.
    - If the light comes on, check the sending unit.
    - If the light does not come on, check for:
      - an open in the GRN/RED wire between the fuel unit and fuel gauge assembly.
      - blown bulb.
      - poor ground (G504).

#### FUEL GAUGE SENDING UNIT 3P CONNECTOR



JUMPER WIRE

BLK          GRN/RED

Wire side of female terminals

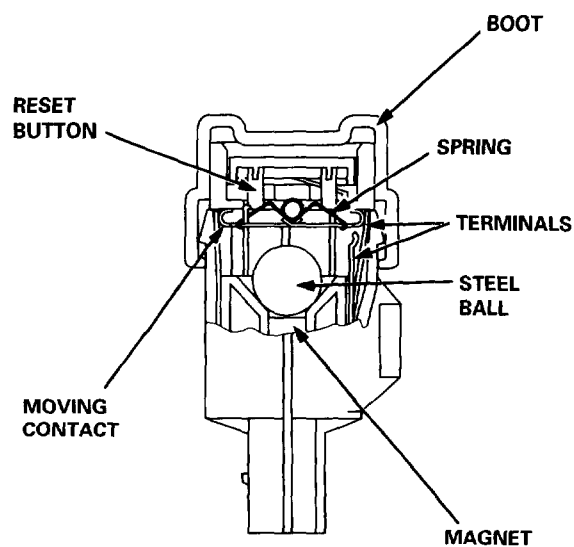
8. Add 4 ℓ of fuel (1.1 U.S. Gal, 0.9 Imp. Gal). The light should go off within four minutes.

## Inertia Switch

### Description

The inertia switch is a safety device which automatically cuts off the fuel supply in the event of a collision or sudden impact.

The switch is located under the dashboard lower cover. After an impact, the switch must be reset by pressing the button before the engine can be restarted.



MAGNET

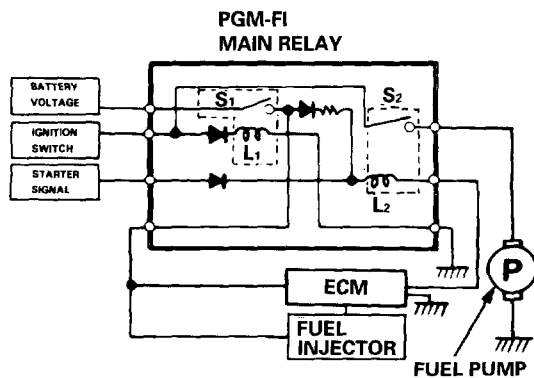


# Fuel Supply System

## PGM-FI Main Relay

### Description

The PGM-FI main relay actually contains two individual relays. This relay is located at the driver side of the cowl. One relay is energized whenever the ignition is on which supplies the battery voltage to the ECM, power to the fuel injectors, and power for the second relay. The second relay is energized for two seconds when the ignition is switched on, and when the engine is running, to supply power to the fuel pump.

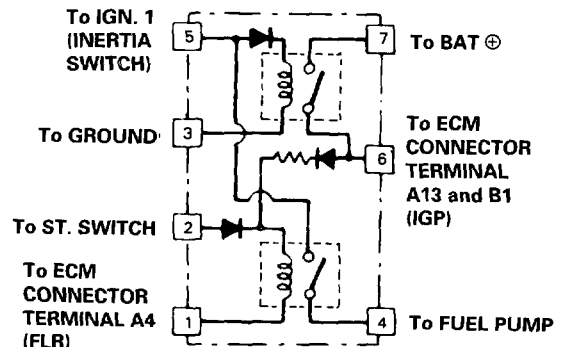
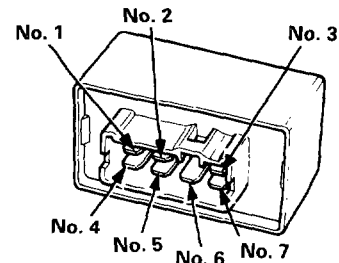


### Relay Testing

NOTE: If the engine starts and continues to run, the PGM-FI main relay is OK.

1. Remove the PGM-FI main relay.
2. Attach the battery positive terminal to the No. 2 terminal and the battery negative terminal to the No. 1 terminal of the PGM-FI main relay. Then check for continuity between the No. 5 terminal and No. 4 terminal of the PGM-FI main relay.

- If there is continuity, go on to step 3.
- If there is no continuity, replace the PGM-FI main relay and retest.



3. Attach the battery positive terminal to the No. 5 terminal and the battery negative terminal to the No. 3 terminal of the PGM-FI main relay. Then check that there is continuity between the No. 7 terminal and No. 6 terminal of the PGM-FI main relay.

- If there is continuity, go on to step 4.
- If there is no continuity, replace the PGM-FI main relay and retest.

4. Attach the battery positive terminal to the No. 6 terminal and the battery negative terminal to the No. 1 terminal of the PGM-FI main relay. Then check that there is continuity between the No. 5 terminal and No. 4 terminal of the PGM-FI main relay.

- If there is continuity, the PGM-FI main relay is OK.
- If there is no continuity, replace the PGM-FI main relay and retest.



## Troubleshooting

— Engine will not start.  
 — Inspection of PGM-FI main relay and relay harness.  
 NOTE: The inertia switch must be reset by pressing the button.

**Check for an open in the wire (GND line):**  
 1. Turn the ignition switch OFF.  
 2. Disconnect the PGM-FI main relay connector.  
 3. Check for continuity between the PGM-FI main relay 7P connector terminal No. 3 and body ground.

Is there continuity?

NO

Repair open in the wire between the PGM-FI main relay and G101.

YES

**Check for an open or short in the wire (BAT line):**  
 Measure voltage between the PGM-FI main relay 7P connector terminal No. 7 and body ground.

Is there battery voltage?

NO

— Replace the ECU (ECM) (15 A) fuse in the under-hood fuse/relay box.  
 — Repair open or short in the wire between the PGM-FI main relay and the ECU (ECM) (15 A) fuse.

YES

**Check for an open or short in the wire (IG1 line):**  
 1. Turn the ignition switch ON (II).  
 2. Measure the voltage between the PGM-FI main relay 7P connector terminal No. 5 and body ground.

Is there battery voltage?

NO

**Check the inertia switch:**  
 1. Turn the ignition switch OFF.  
 2. Disconnect the 3P connector from the inertia switch.  
 3. Turn the ignition switch ON (II).  
 4. Measure voltage between the inertia switch 3P connector terminals No. 1 and No. 3.

YES

**Check for an open or short in the wire (STS line):**  
 1. Turn the ignition switch to the START (III) position.  
 NOTE: in Park or neutral.  
 2. Measure the voltage between the PGM-FI main relay 7P connector terminal No. 2 and body ground.

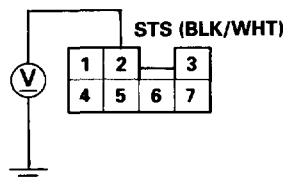
(To page 11-A-80)

Is there battery voltage?

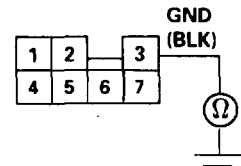
NO

— Replace the No. 24 (without SRS model: No. 12) FUEL PUMP (15 A) fuse in the under-dash fuse/relay box.  
 — Repair open or short in the wire between the inertia switch and No. 24 (without SRS model: No. 12) FUEL PUMP (15 A).  
 — Repair open in the wire between the PGM-FI main relay and inertia switch.

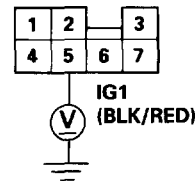
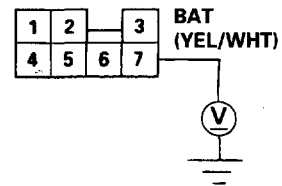
YES  
 Replace the inertia switch.



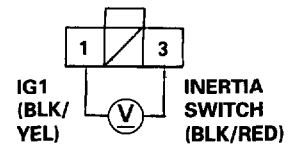
### PGM-FI MAIN RELAY CONNECTOR



Wire side of female terminals



### INERTIA SWITCH CONNECTOR



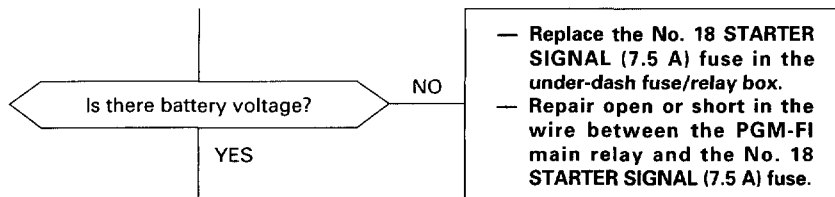
Wire side of female terminals

(cont'd)

# Fuel Supply System

## PGM-FI Main Relay (cont'd)

(From page 11-A-79)

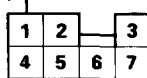


**Check for an open in the wire (FLR line):**

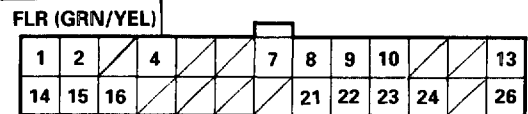
1. Turn the ignition switch OFF.
2. Disconnect the ECM connector A (26P).
3. Check for continuity between the PGM-FI main relay 7P connector terminal No. 1 and ECM connector terminal A4.

PGM-FI MAIN RELAY CONNECTOR

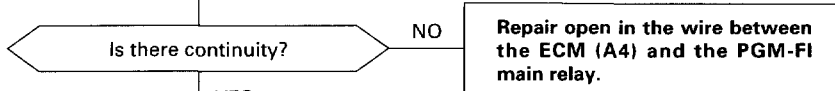
FLR (GRN/YEL)



ECM CONNECTOR A (26P)



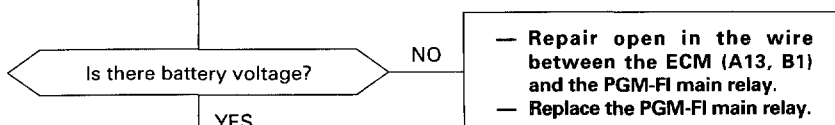
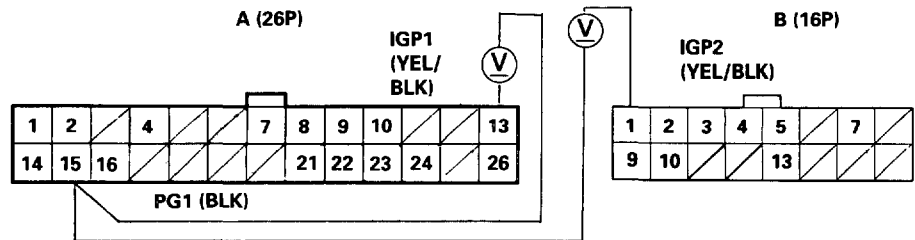
Wire side of female terminals



**Check for an open in the wires (IGP1, IGP2 lines):**

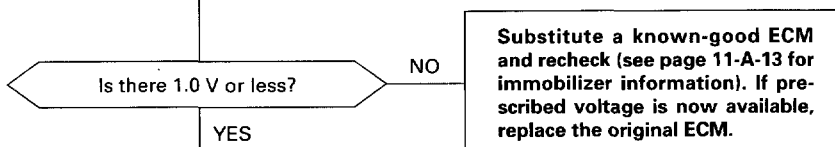
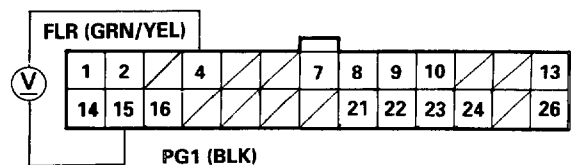
1. Reconnect the ECM connector A (26P).
2. Reconnect the PGM-FI main relay connector.
3. Turn the ignition switch ON (II).
4. Measure voltage between ECM connector terminals A13, B1 and A15.

ECM CONNECTORS



**Check for an open in the ECM:**

1. Turn the ignition switch OFF.
2. Measure voltage between ECM connector terminals A4 and A15 when the ignition switch is first turned ON (II) for two seconds.



**Check the PGM-FI main relay (see page 11-A-78).**



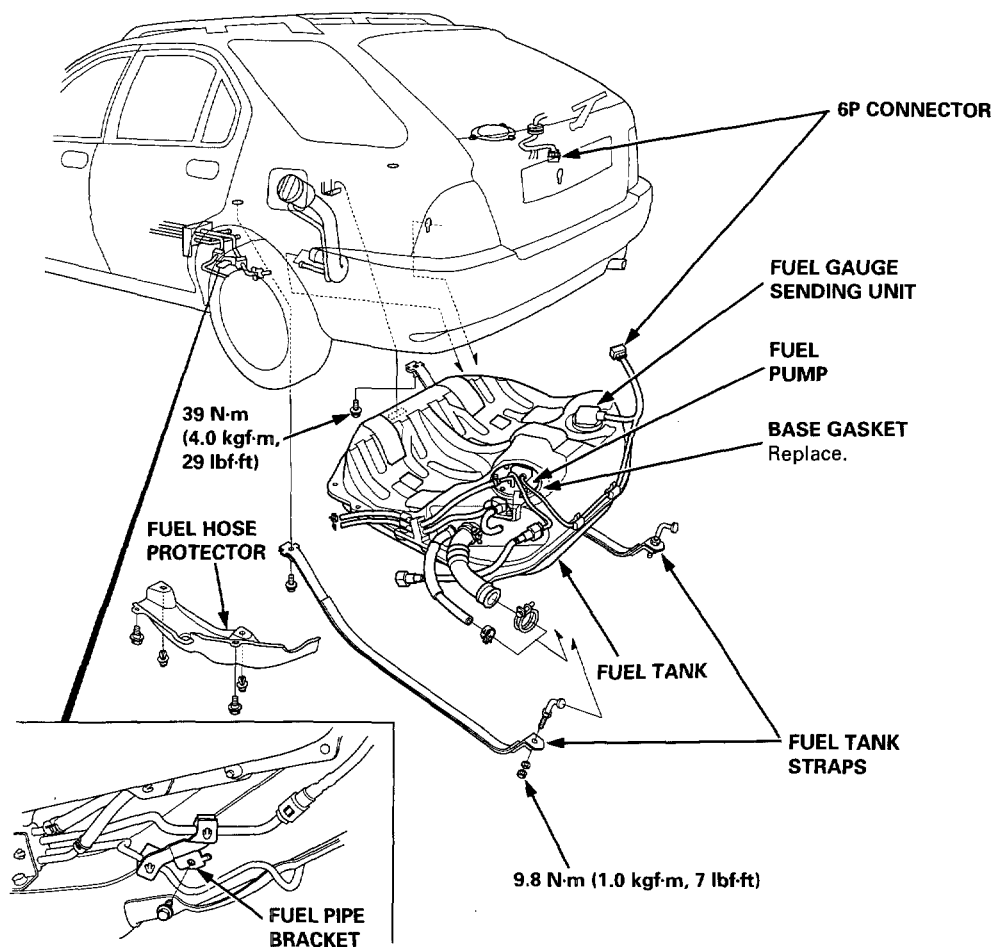
## Fuel Tank

### Replacement

#### **⚠ WARNING**

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

1. Relieve the fuel pressure (see page 11-A-67).
2. Jack up the car and support with jackstands.
3. Remove the fuel hose protector.
4. Remove the fuel pipe bracket.
5. Disconnect the hoses (see page 11-A-63). Slide back the clamps, then twist hoses as you pull, to avoid damaging them and quick-connect fittings (see page 11-A-64).
6. Disconnect the 6P connector.
7. Place a jack, or other support, under the tank.
8. Remove the strap nuts and let the straps fall free.
9. Remove the fuel tank.  
*If it sticks on the undercoat applied to its mount, carefully pry it off the mount.*
10. Install the drain bolt with a new washer, then coat the drain bolt with Noxrust 124B or equivalent. Allow the Noxrust or equivalent to dry for 20 minutes.
11. Install the remaining parts in the reverse order of removal.



# Intake Air System

## System Troubleshooting Guide

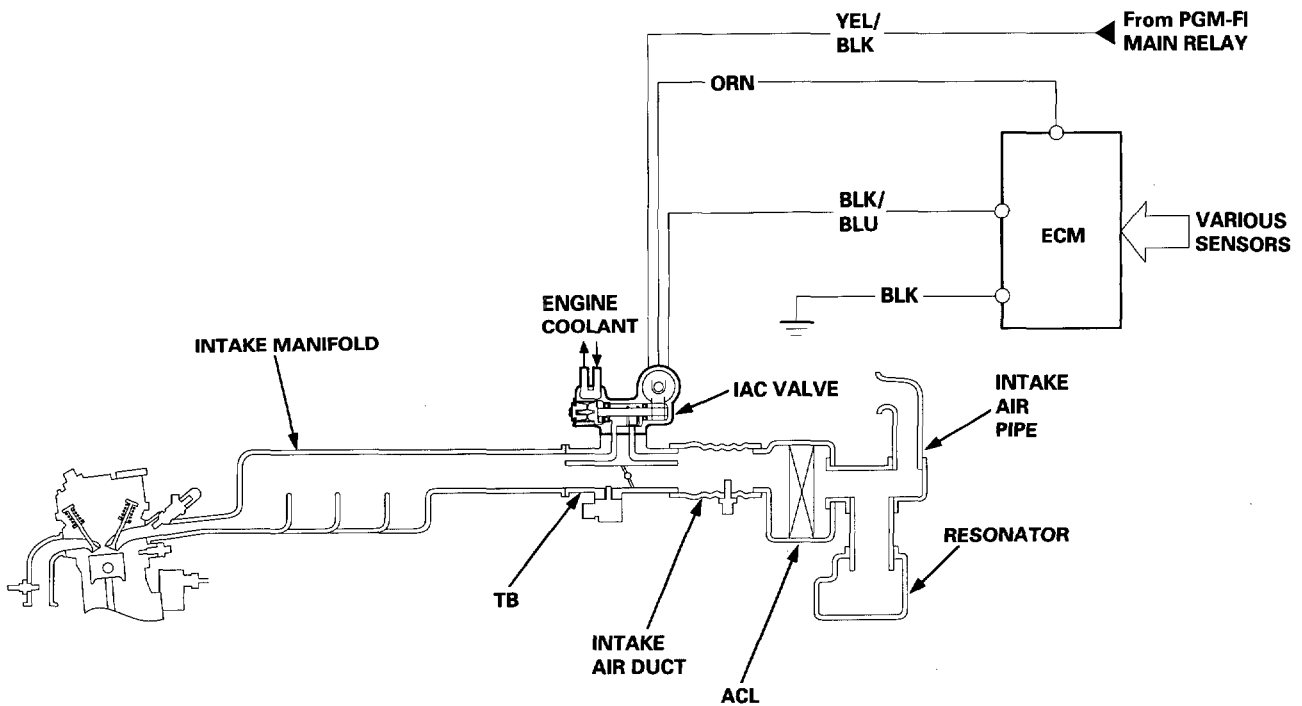
NOTE: Across each row in the chart, the sub-systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows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

PAGE	SUB-SYSTEM	AIR CLEANER AND INTAKE AIR DUCT	THROTTLE CABLE	THROTTLE BODY
		11-A-84	11-A-84	11-A-85
	WHEN COLD FAST IDLE OUT OF SPEC			①
	WHEN WARM IDLE SPEED TOO HIGH		②	①
	LOSS OF POWER	②	①	①



## System Description

The system supplies air for all engine needs. It consists of the intake air pipe, Air Cleaner (ACL), intake air duct, Throttle Body (TB), Idle Air Control (IAC) Valve, and intake manifold. A resonator in the intake air pipe provides additional silencing as air is drawn into the system.

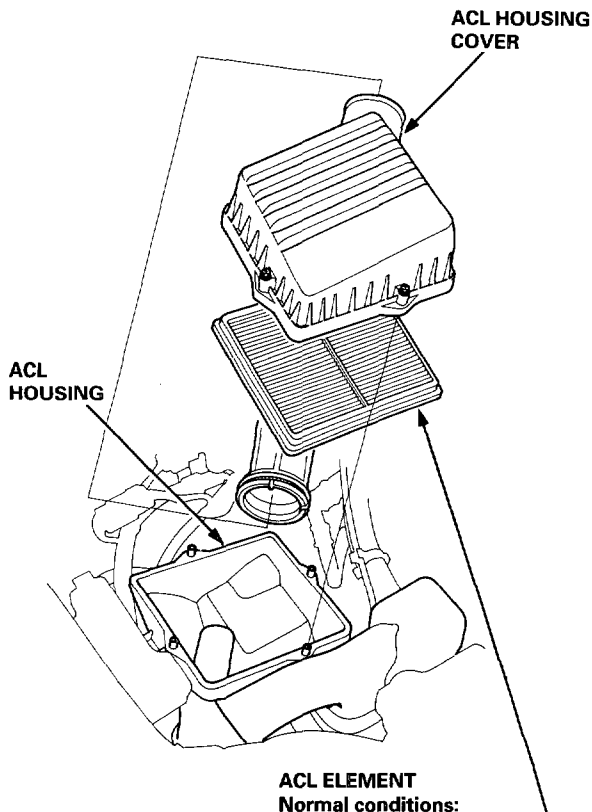


# Intake Air System

## Air Cleaner (ACL)

### ACL Element Replacement

NOTE: Do not blow the ACL element by compressed air.

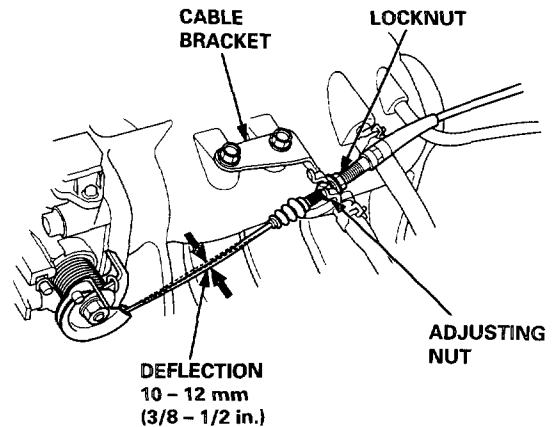


**ACL ELEMENT**  
**Normal conditions:**  
Replace air cleaner element every 40,000 km (24,000 miles) or 24 months whichever comes first.  
**Severe conditions:**  
(Use normal schedule except in dusty conditions)  
Replace air cleaner element every 20,000 km (12,000 miles) or 12 months whichever comes first.

## Throttle Cable

### Inspection/Adjustment

1. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Check cable free play at the throttle linkage. Cable deflection should be 10 – 12 mm ( $3/8 - 1/2$  in.).



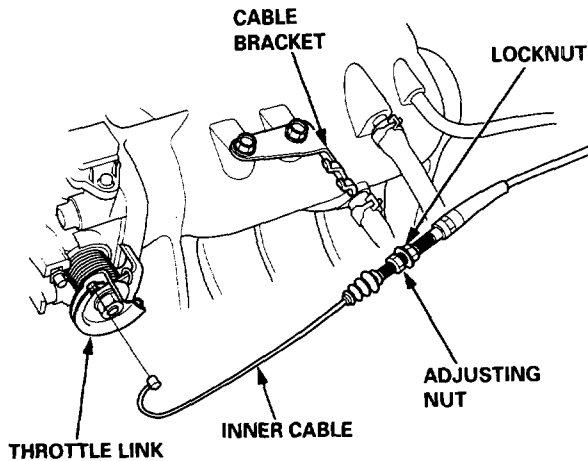
4. If deflection is not within specs, loosen the locknut, turn the adjusting nut until the deflection is as specified, then retighten the locknut.
5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure it returns to the idle position whenever you release the accelerator pedal.



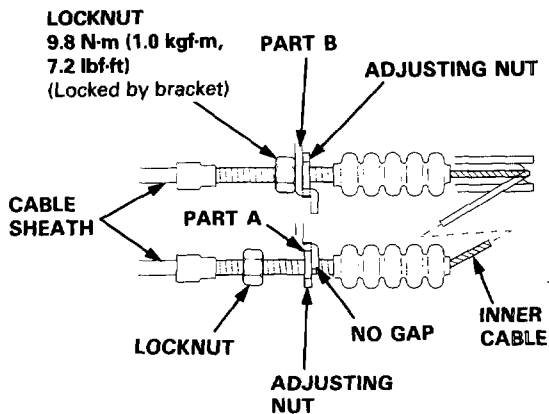
## Throttle Body

### Installation

1. Fully open the throttle valve, then install the throttle cable in the throttle linkage, and install the cable housing in the cable bracket.



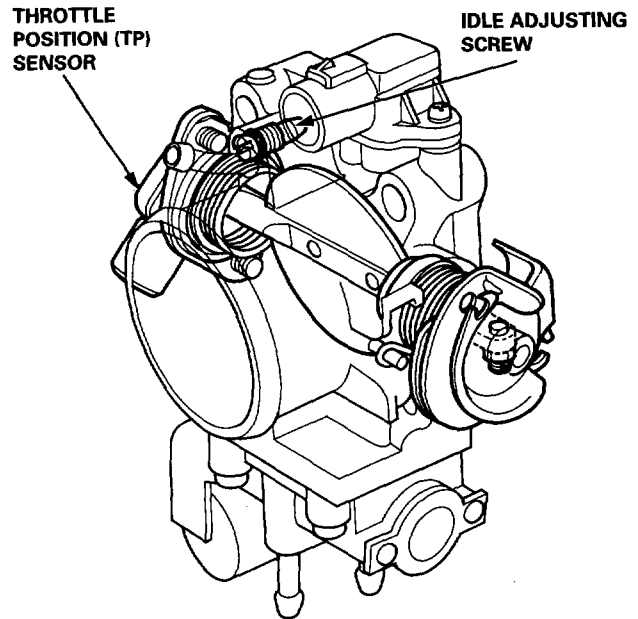
2. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
3. With part A of the cable bracket, support the cable sheath so that there is no inner wire free play. Turn the adjusting nut until it touches part A, leaving a gap between the locknut and adjusting nut.
4. Move the cable sheath to part B of the cable bracket that so the bracket slides into the gap between the locknut and adjusting nut. Tighten the locknut.



5. The cable deflection should now be 10 – 12 mm ( $3/8 - 1/2$  in.). If not, see Inspection/Adjustment.

### Description

The throttle bodies are of the single-barrel side-draft type. The lower portion of the throttle valve is heated by engine coolant from the cylinder head. The idle adjusting screw which increases/decreases bypass air and the Evaporative Emission (EVAP) Control Canister port are located on the top of the throttle body.



(cont'd)

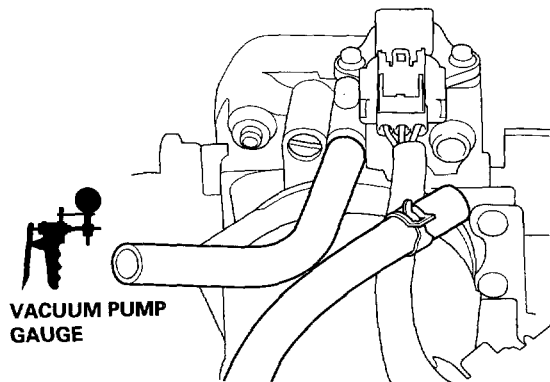


# Intake Air System

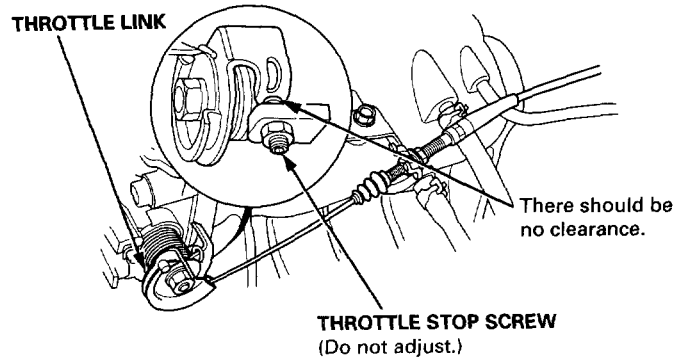
## Throttle Body (cont'd)

### Inspection

1. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
2. Disconnect the vacuum hose (to the EVAP control canister) from the throttle body; connect a vacuum gauge to the throttle body.



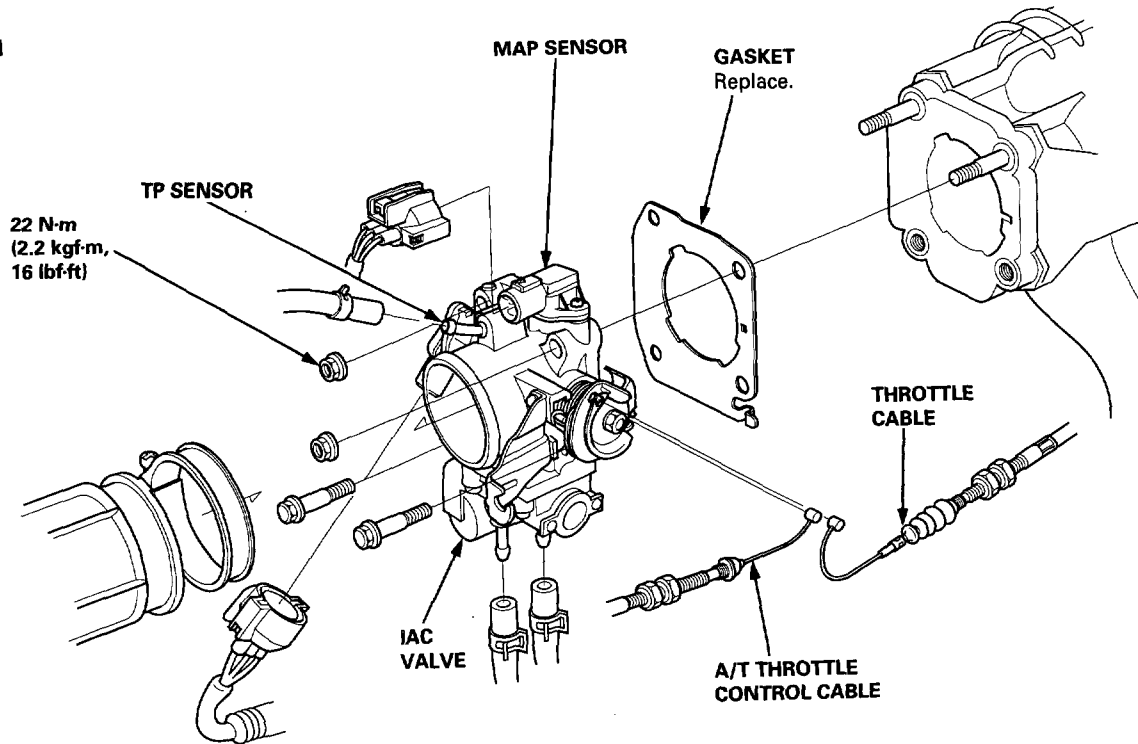
3. Allow the engine to idle, and check that the gauge indicates no vacuum.
  - If there is vacuum, check the throttle cable (see page 11-A-84).
4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.
  - If the gauge indicates no vacuum, check the throttle body port. If the throttle body port is clogged, clean it with carburetor cleaner.
5. Stop the engine, and check that the throttle cable operates smoothly without binding or sticking.
  - 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.



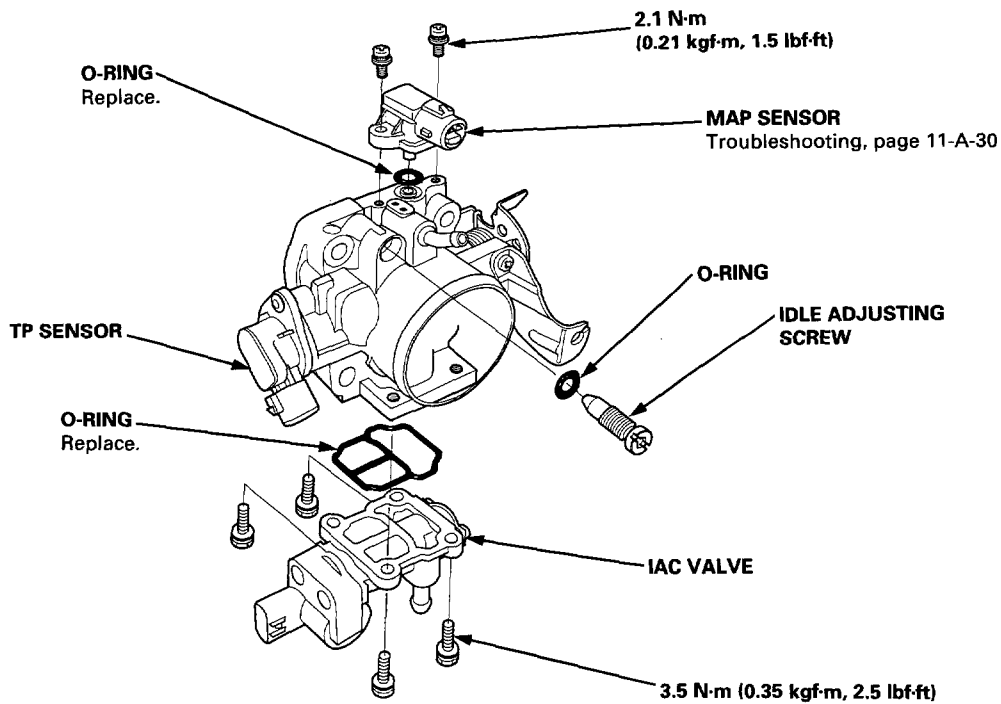
## Removal



## NOTE:

- The throttle stop screw is non-adjustable.
- After reassembly, adjust the throttle cable (see page 11-A-84), and A/T throttle control cable (see section 14).
- The TP sensor is not removable.

## Disassembly



# Emission Control System

## System Troubleshooting Guide

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

PAGE	SUB-SYSTEM	THREE WAY CATALYTIC CONVERTER	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
		11-A-89	11-A-90	11-A-91
	ROUGH IDLE		①	
	FREQUENT STALLING AFTER WARMING UP			
	POOR PERFORMANCE FAILS EMISSION TEST	①		②
	POOR PERFORMANCE LOSS OF POWER	①		



## System Description

The emission control system includes a Three Way Catalytic Converter (TWC), Positive Crankcase Ventilation (PCV) system and Evaporative Emission (EVAP) Control system.

## Tailpipe Emission

### Inspection

#### **⚠ WARNING**

Do not smoke during this procedure.  
Keep open flame or sparks away from the work area.

1. Connect a tachometer.
2. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
3. Check idle speed and adjust the idle speed, if necessary (see page 11-A-60).
4. Warm up and calibrate the CO meter according to the meter manufacture's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

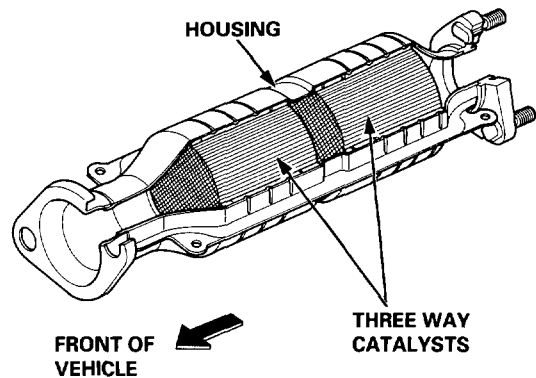
#### **Specified CO: 0.1% maximum**

- If unable to obtain this reading, see ECM troubleshooting guide (page 11-A-24).

## Three Way Catalytic Converter (TWC)

### Description

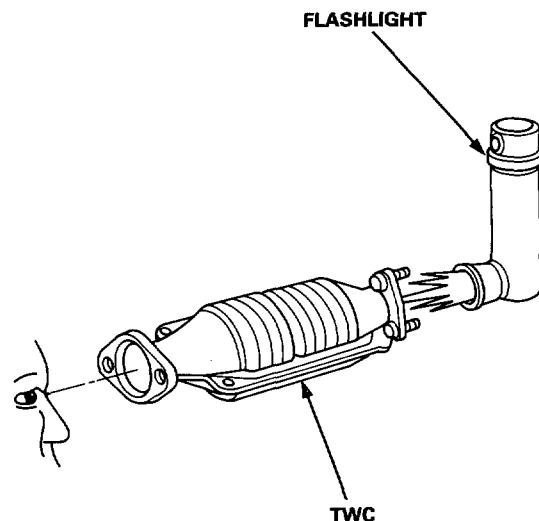
The Three Way Catalytic Converter (TWC) is used to convert hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx) in the exhaust gas, to carbon dioxide ( $\text{CO}_2$ ), dinitrogen ( $\text{N}_2$ ) and water vapor.



### Removal/Installation (see section 9)

### Inspection

If excessive exhaust system back-pressure is suspected, remove the TWC from the vehicle and using a flashlight, make a visual check for plugging, melting or cracking of the catalyst. Replace the TWC if any of the visible area is damaged or plugged.

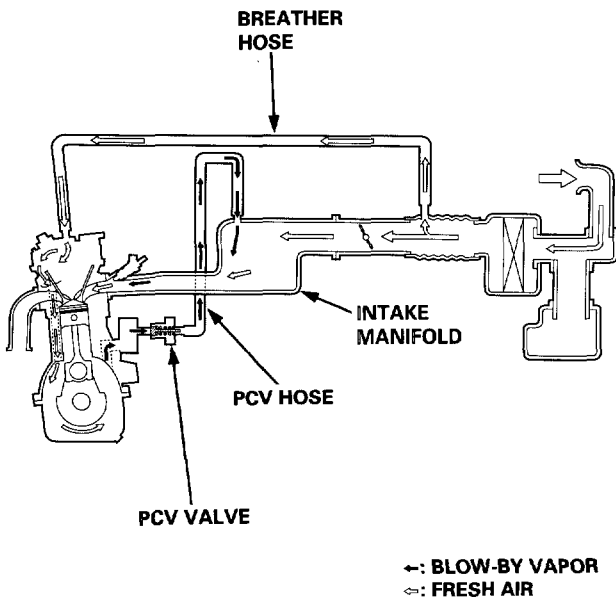


# Emission Control System

## Positive Crankcase Ventilation (PCV) System

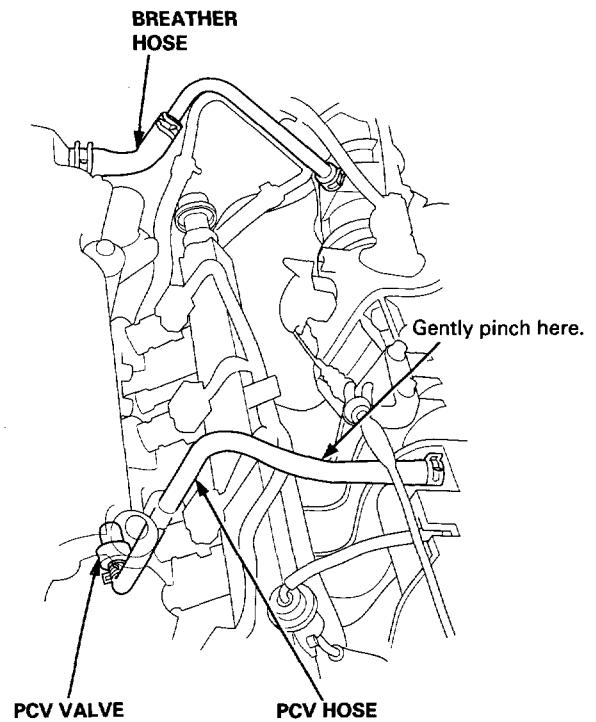
### Description

The Positive Crankcase Ventilation (PCV) system is designed to prevent blow-by gas from escaping to the atmosphere. The PCV valve contains a spring-loaded plunger. When the engine starts, the plunger in the PCV valve is lifted in proportion to intake manifold vacuum and the blow-by gas is drawn directly into the intake manifold.



### Inspection

1. Check the PCV hoses and connections for leaks and clogging.
2. At idle, make sure there is a clicking sound from the PCV valve when the hose between PCV valve and intake manifold is lightly pinched with your fingers or pliers.



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



## Evaporative Emission (EVAP) Controls

### Description

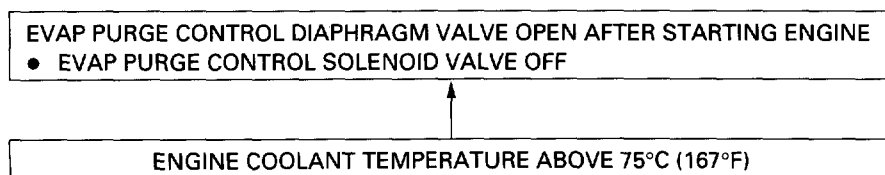
The evaporative emission controls are designed to minimize the amount of fuel vapor escaping to the atmosphere. The system consists of the following components:

#### A. Evaporative Emission (EVAP) Control Canister

An EVAP control canister is used for the temporary storage of fuel vapor until the fuel vapor can be purged from the EVAP control canister into the engine and burned.

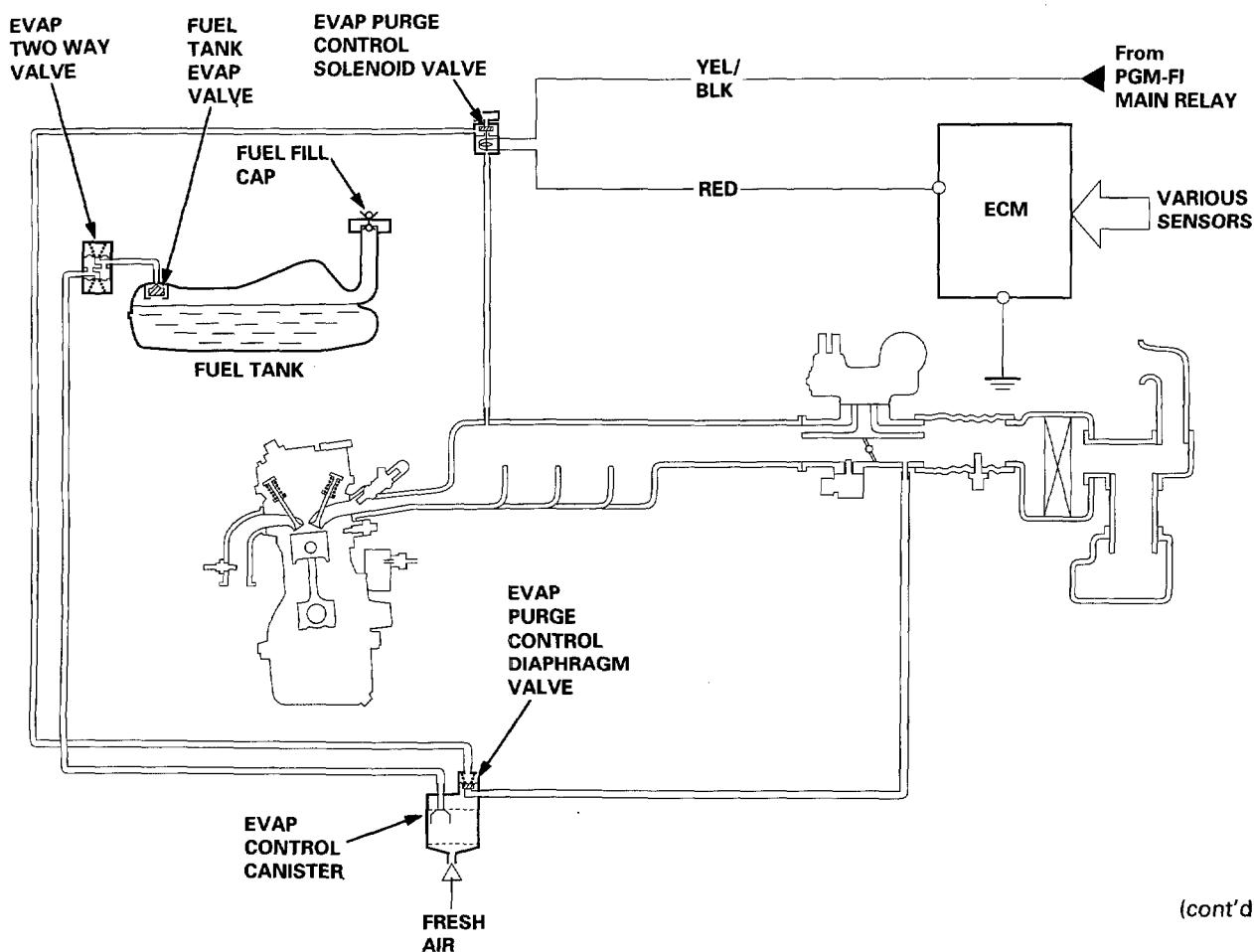
#### B. Vapor Purge Control System

EVAP control canister purging is accomplished by drawing fresh air through the EVAP control canister and into a port on the throttle body. The purging vacuum is controlled by the EVAP purge control diaphragm valve and the EVAP purge control solenoid valve.



#### C. Fuel Tank Vapor Control System

When fuel vapor pressure in the fuel tank is higher than the set value of the EVAP two way valve, the valve opens and regulates the flow of fuel vapor to the EVAP control canister.



(cont'd)

# Emission Control System

## Evaporative Emission (EVAP) Controls (cont'd)

### Troubleshooting

**Inspection of Evaporative Emission Controls**

**Check the vacuum when cold:**

1. Disconnect the vacuum hose from the EVAP purge control canister and connect a vacuum gauge to the hose.
2. Start the engine and allow it to idle.

NOTE: Engine coolant temperature must be below 75°C (167°F).

Is there vacuum?

NO

YES

**Check the EVAP purge control valve:**

1. Turn the ignition switch OFF.
2. Disconnect the 2P connector from the EVAP purge control solenoid valve.
3. Start the engine.
4. At the harness side, measure voltage between the EVAP purge control solenoid valve 2P connector terminal No. 1 and No. 2.

Is there battery voltage?

NO

YES

**Check for an open in the wire (IGP line):**  
At the harness side, measure voltage between the EVAP purge control solenoid valve 2P connector terminal No. 1 and body ground.

Is there battery voltage?

YES

NO

**Check for an open in the wire (PCS line):**

1. Turn the ignition switch OFF.
2. Reconnect the 2P connector to the EVAP purge control solenoid valve.
3. Turn the ignition switch ON (II).
4. Measure voltage between ECM connector terminals A23 and A15.

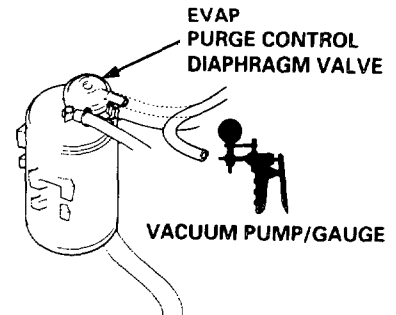
Is there battery voltage?

YES

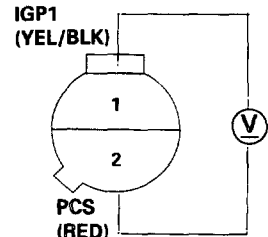
NO

**Substitute a known-good ECM and retest (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

(To page 11-A-93)

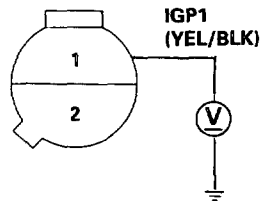


EVAP PURGE CONTROL SOLENOID VALVE 2P CONNECTOR



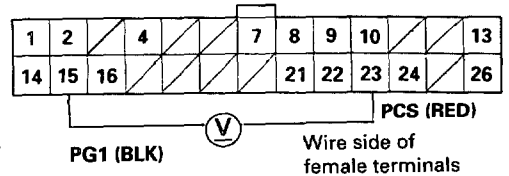
Wire side of female terminals

Inspect vacuum hose routing. If OK, replace EVAP purge control solenoid valve.



Repair open in the wire between EVAP purge control solenoid valve and the PGM-FI main relay.

ECM CONNECTOR A (26P)



PG1 (BLK)

Wire side of female terminals

Repair open in the wire between the EVAP purge control solenoid valve and the ECM (A23).



(From page 11-A-92)

**Check the vacuum when hot:**

1. Start the engine. Hold the engine at 3,000 rpm (min<sup>-1</sup>) with no load (in Park or neutral) until the radiator fan comes on, then let it idle.
2. Check for vacuum at the vacuum hose after starting the engine.

Is there vacuum?

YES

NO

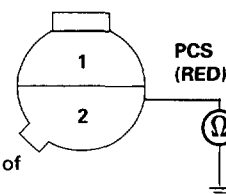
**Check the EVAP purge control solenoid valve:**  
Disconnect the 2P connector from the EVAP purge control solenoid valve.

Is there vacuum?

YES

Inspect vacuum hose routing. If OK, replace the EVAP purge control solenoid valve.

**EVAP PURGE CONTROL SOLENOID VALVE 2P CONNECTOR**



**Check for a short in the wire (PCS line):**

1. Turn the ignition switch OFF.
2. Disconnect ECM connector A (26P).
3. Check for continuity between the EVAP purge control solenoid valve 2P connector terminal No. 2 and body ground.

Is there continuity?

YES

Repair short in the wire between the EVAP purge control solenoid valve and the ECM (A23).

NO

**Substitute a known-good ECM and recheck (see page 11-A-13 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

**Check the EVAP control canister:**

1. Reconnect the vacuum hose to the EVAP purge control solenoid valve.
2. Remove the fuel fill cap.
3. Connect a vacuum gauge to canister purge air hose.
4. Start the engine and raise speed to 3,500 rpm (min<sup>-1</sup>).

Does vacuum appear on gauge within 1 minute?

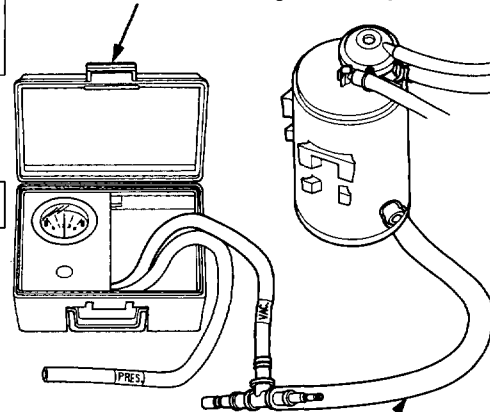
YES

NO

Replace the EVAP control canister.

**See EVAP two way valve test to complete. Evaporative emission controls are OK.**

**VACUUM/PRESSURE GAUGE 0 - 100 mmHg (0 - 4 in.Hg)**



PURGE AIR HOSE

(cont'd)



# Emission Control System

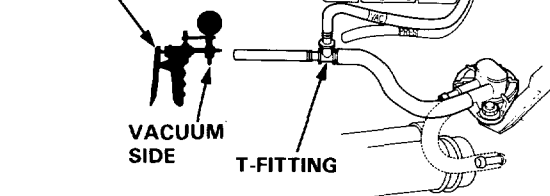
## Evaporative Emission (EVAP) Controls (cont'd)

### Testing

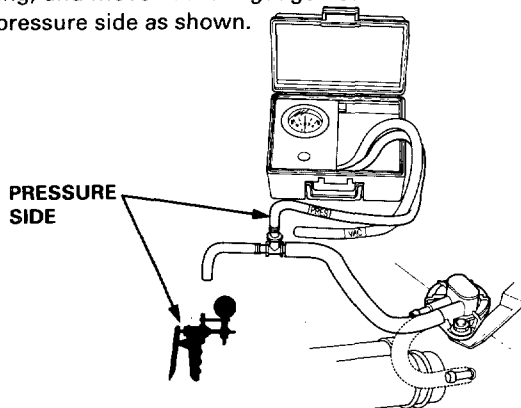
1. Remove the fuel fill cap.
2. Remove vapor line from the fuel tank and connect to T-fitting from vacuum gauge and vacuum pump as shown.

VACUUM/PRESSURE GAUGE  
0 – 100 mmHg (0 – 4 in.Hg)

VACUUM PUMP/  
GAUGE



3. Apply vacuum slowly and continuously while watching the gauge. Vacuum should stabilize momentarily at 0.7 – 2.0 kPa (5 – 15 mmHg, 0.2 – 0.6 in.Hg).
  - If vacuum stabilizes (valve opens) below 0.7 kPa (5 mmHg, 0.2 in.Hg) or above 2.0 kPa (15 mmHg, 0.6 in.Hg), install new EVAP two way 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 2.0 – 5.3 kPa (15 – 40 mmHg, 0.59 – 1.57 in.Hg).
  - If pressure momentarily stabilizes (valve opens) at 2.0 – 5.3 kPa (15 – 40 mmHg, 0.59 – 1.57 in.Hg), the valve is OK.
  - If pressure stabilizes below 2.0 kPa (15 mmHg, 0.59 in.Hg) or above 5.3 kPa (40 mmHg, 1.57 in.Hg), install a new EVAP two way valve and retest.

# D15Z8, B18C4 Engine

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## Emission Control System

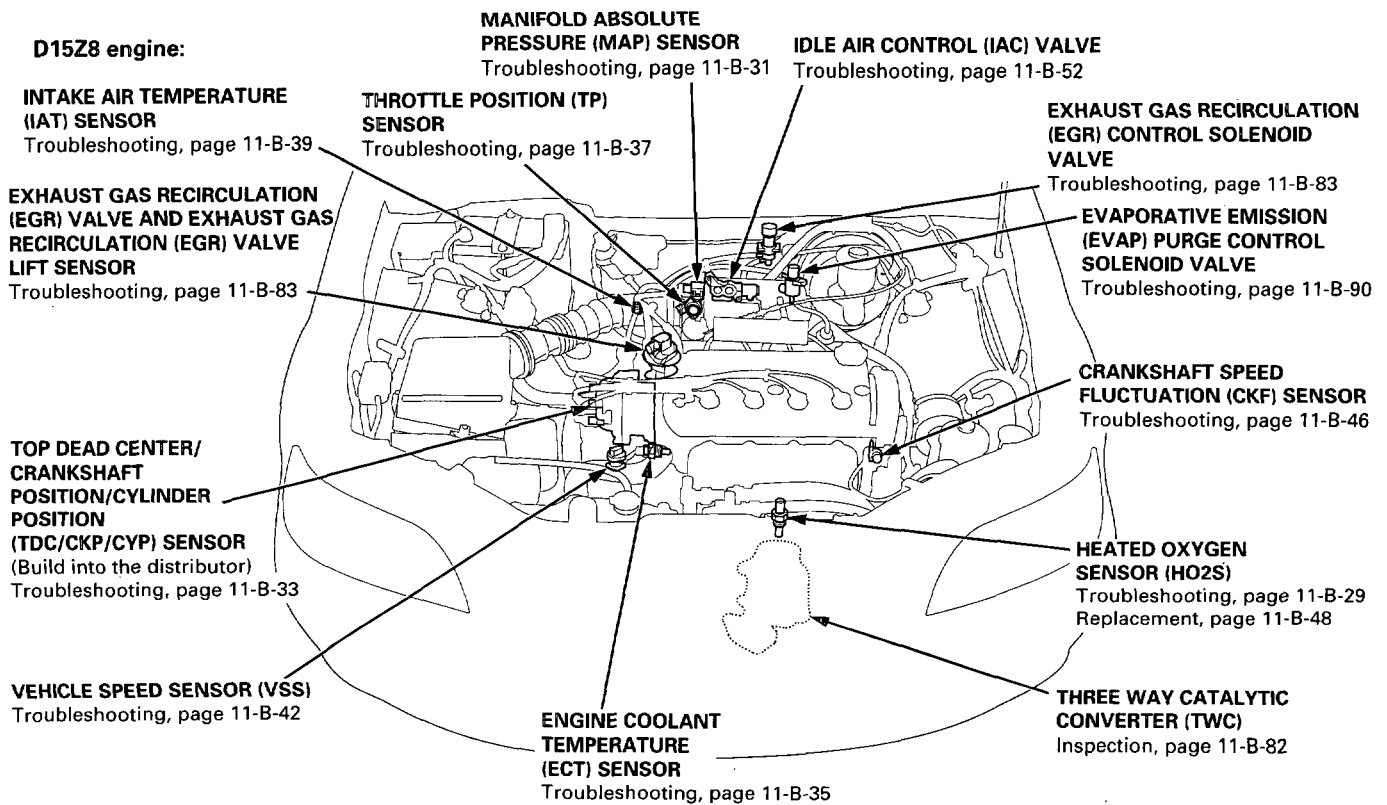
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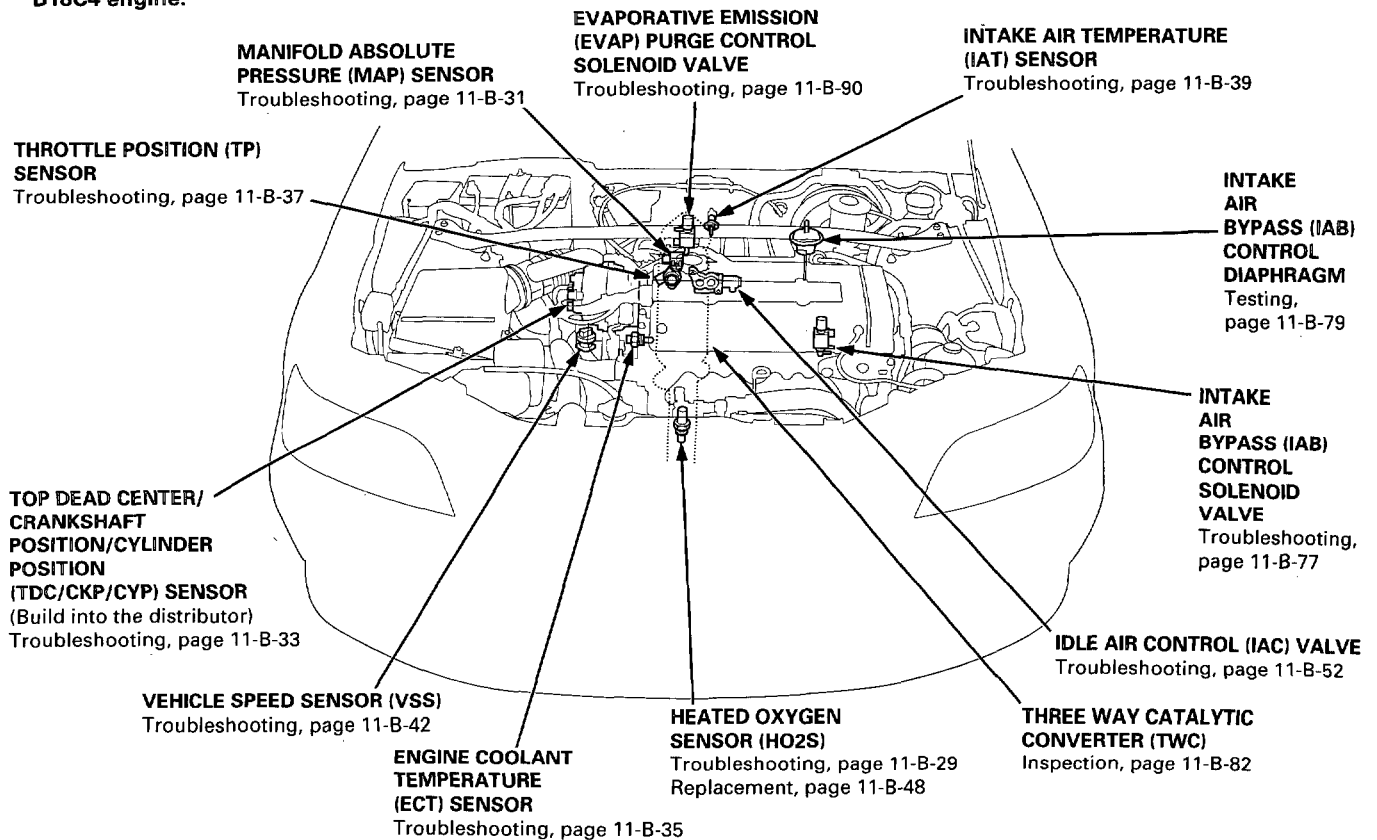
# Component Locations

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### D15Z8 engine:



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**D15Z8 engine:**

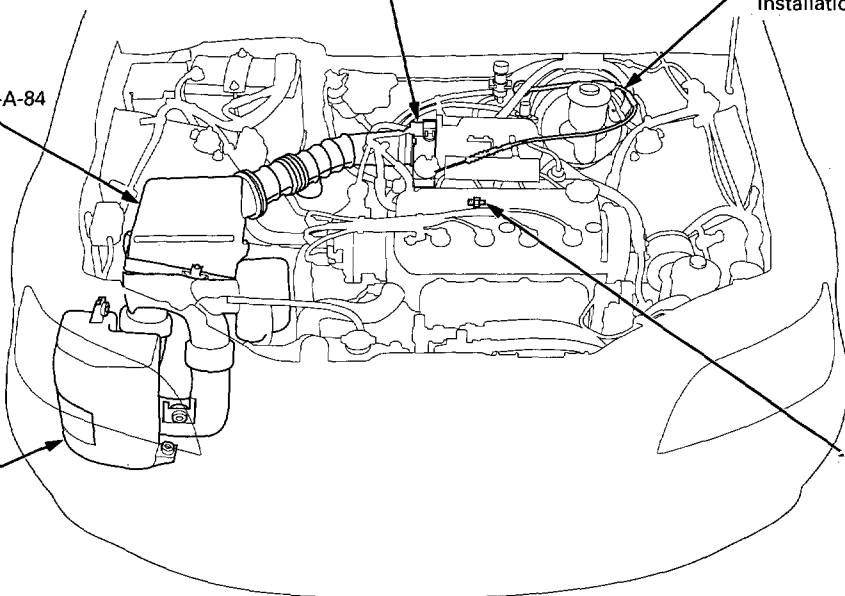
**THROTTLE BODY (TB)**  
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**RESONATOR**

**POSITIVE CRANKCASE VENTILATION (PCV) VALVE**  
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**B18C4 engine:**

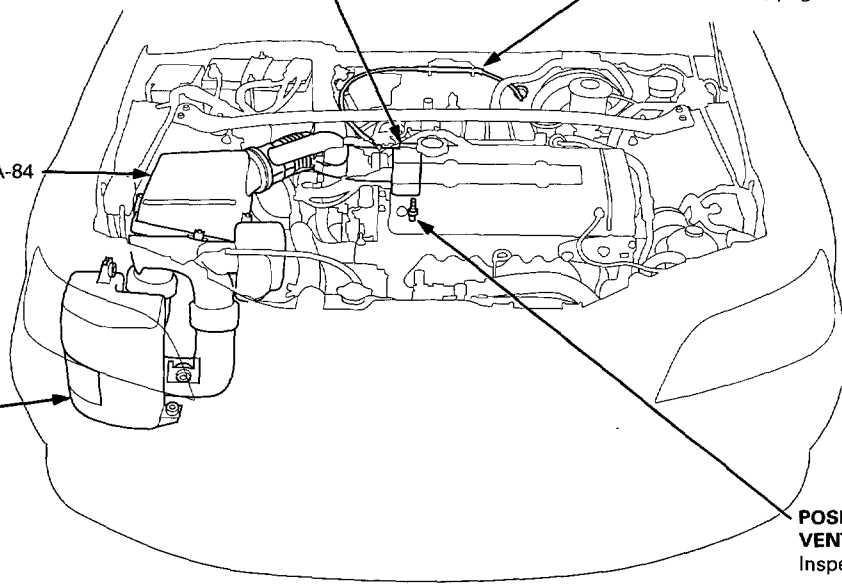
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**RESONATOR**

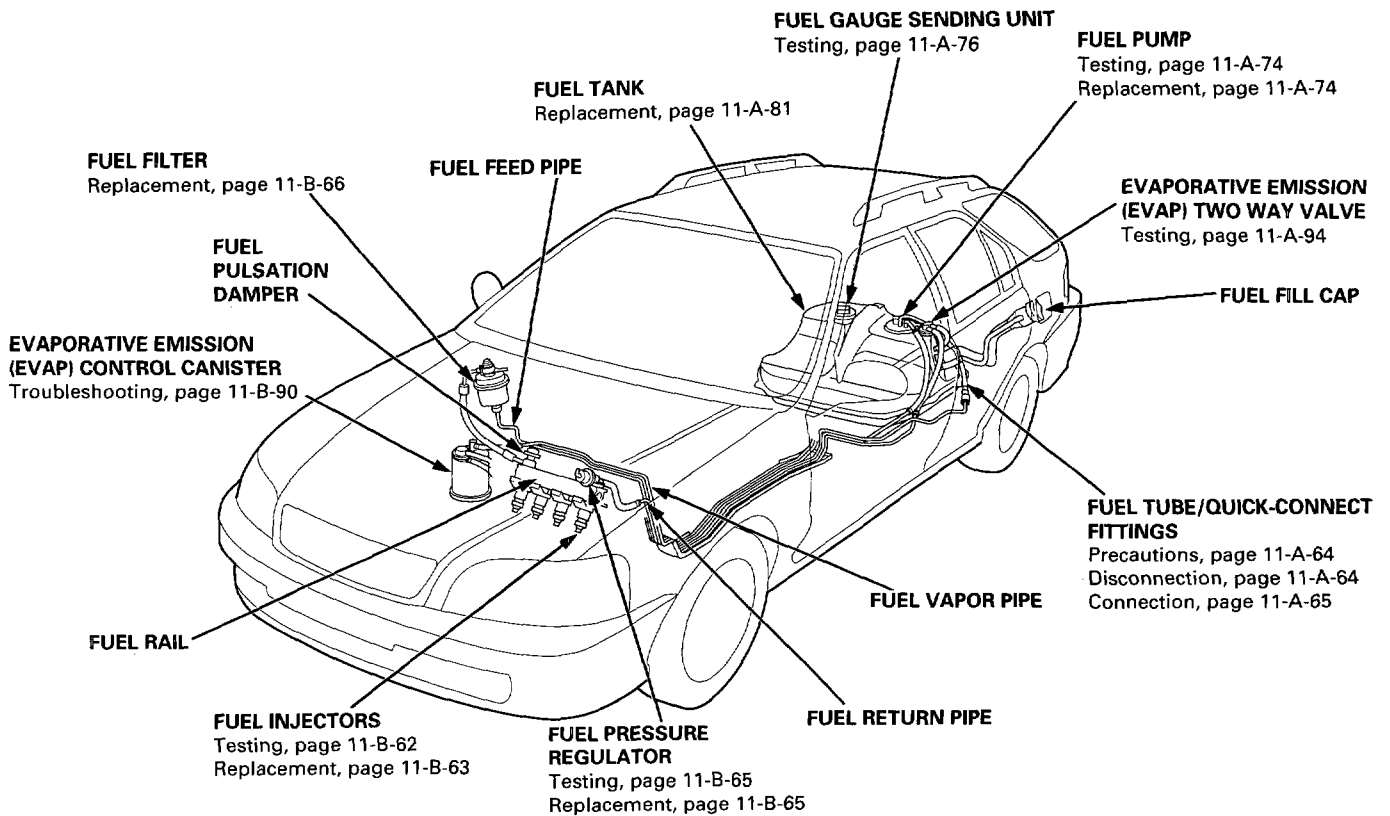
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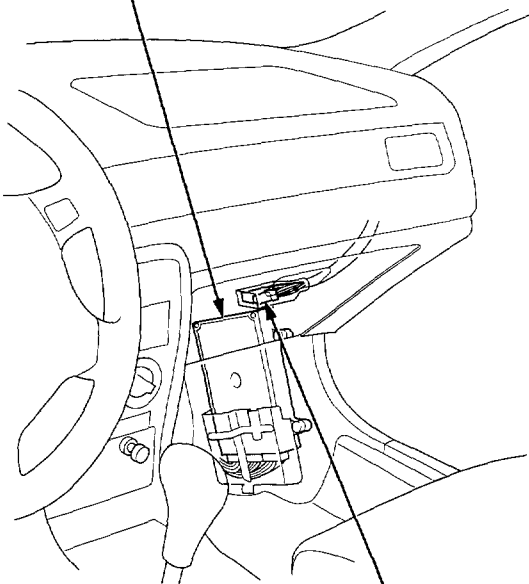
(cont'd)

# Component Locations

## Index (cont'd)

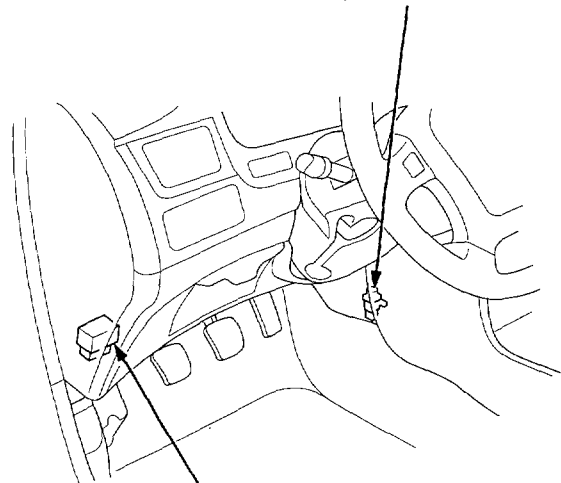


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**SERVICE CHECK CONNECTOR (2P)**  
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**PGM-FI MAIN RELAY**  
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Troubleshooting, page 11-B-67

The illustration shows LHD type. RHD type is symmetrical.

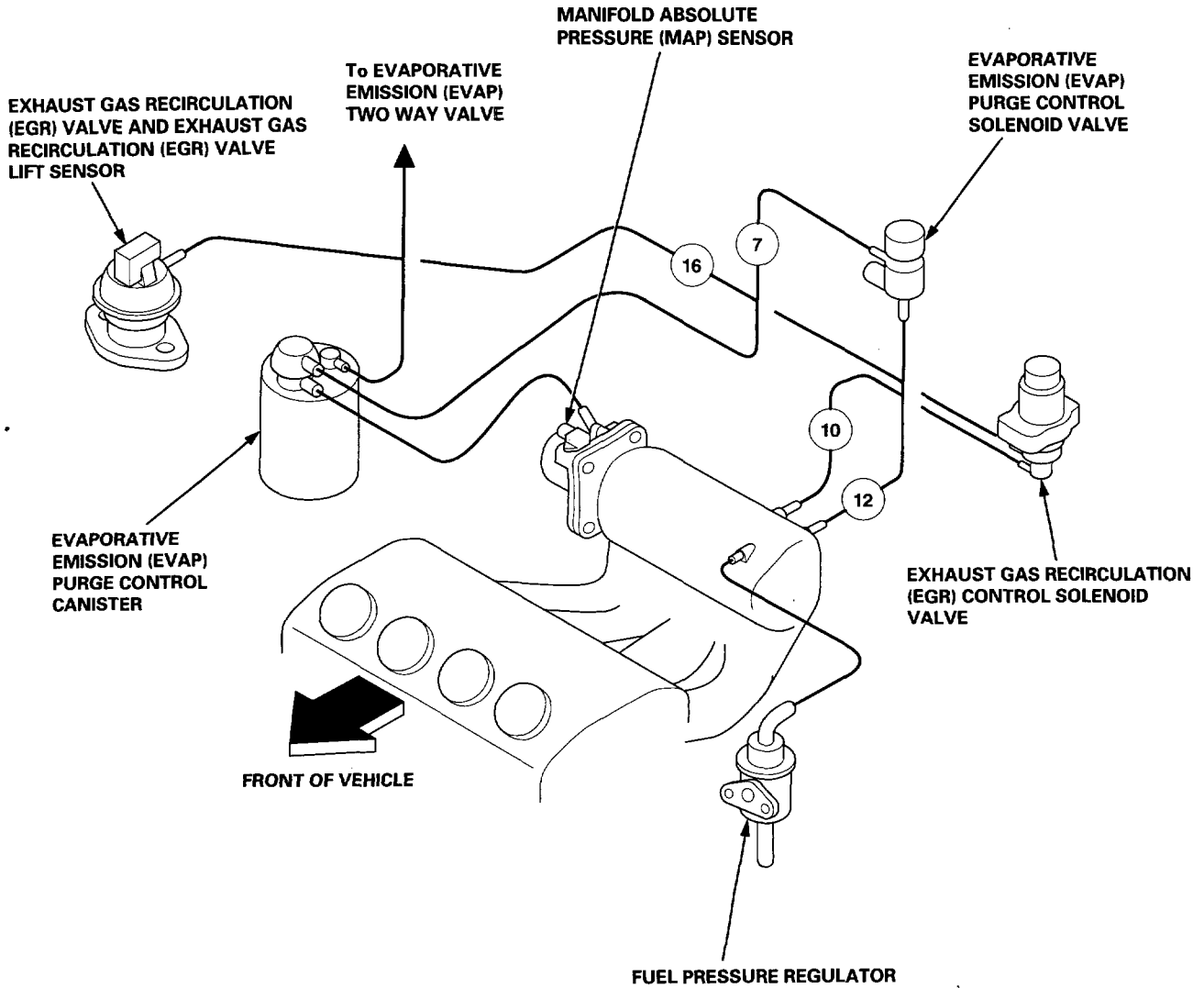
The illustration shows LHD type. RHD type is symmetrical.

# System Description



## Vacuum Connections

D15Z8 engine:



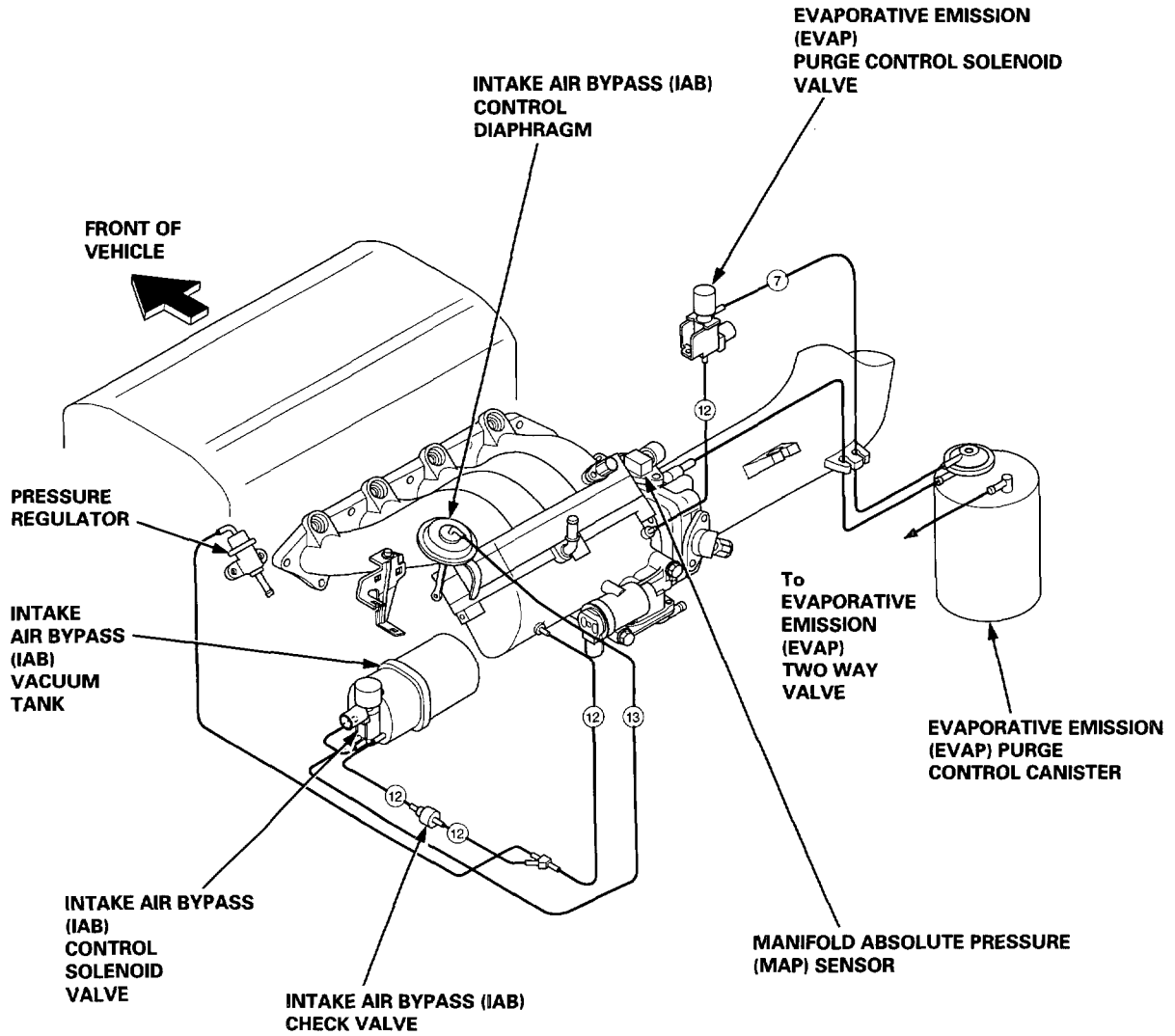
○: Vacuum hose NO.

(cont'd)

# System Description

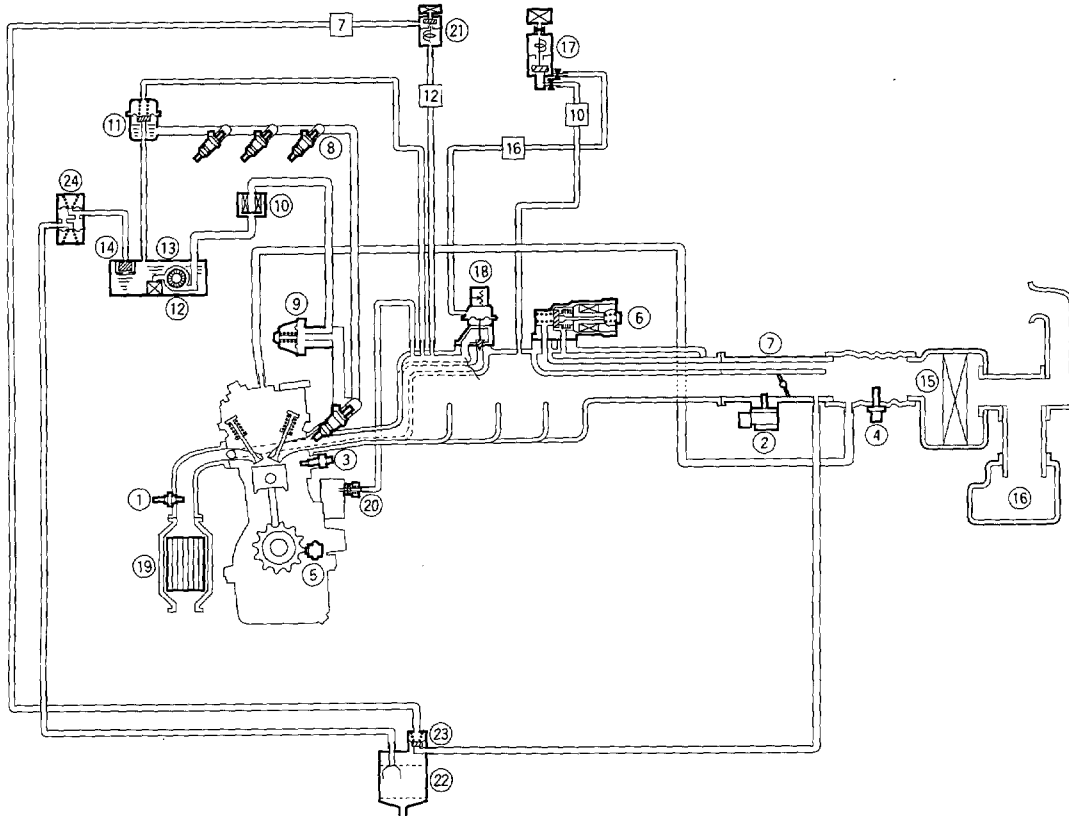
## Vacuum Connections (cont'd)

B18C4 engine:





**D15Z8 engine:**



□: Vacuum hose No.

- |   |   |
|---|---|
| ① HEATED OXYGEN SENSOR (HO2S)                 | ⑮ AIR CLEANER   |
| ② MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR     | ⑯ RESONATOR   |
| ③ ENGINE COOLANT TEMPERATURE (ECT) SENSOR     | ⑰ EXHAUST GAS RECIRCULATION (EGR) CONTROL SOLENOID VALVE    |
| ④ INTAKE AIR TEMPERATURE (IAT) SENSOR         | ⑱ EXHAUST GAS RECIRCULATION (EGR) VALVE AND LEFT SENSOR     |
| ⑤ CRANKSHAFT SPEED FLUCTUATION (CKF) SENSOR   | ⑲ THREE WAY CATALYTIC CONVERTER (TWC)                       |
| ⑥ IDLE AIR CONTROL (IAC) VALVE                | ⑳ POSITIVE CRANKCASE VENTILATION (PCV) VALVE                |
| ⑦ THROTTLE BODY (TB)                          | ㉑ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE  |
| ⑧ FUEL INJECTOR                               | ㉒ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER              |
| ⑨ FUEL PULSATION DAMPER                       | ㉓ EVAPORATIVE EMISSION (EVAP) CONTROL PURGE DIAPHRAGM VALVE |
| ⑩ FUEL FILTER                                 | ㉔ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE                 |
| ⑪ FUEL PRESSURE REGULATOR                     |   |
| ⑫ FUEL PUMP (FP)                              |   |
| ⑬ FUEL TANK                                   |   |
| ⑭ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE |   |

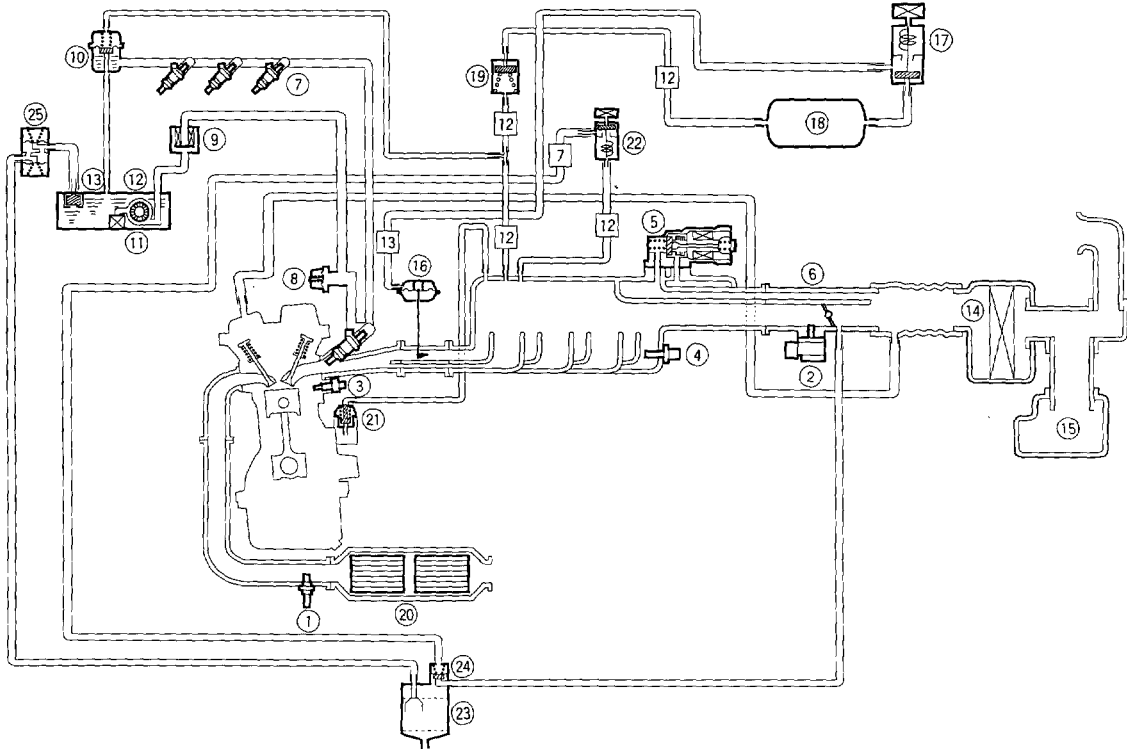
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# System Description

## Vacuum Connections (cont'd)

B18C4 engine:



□: Vacuum hose No.

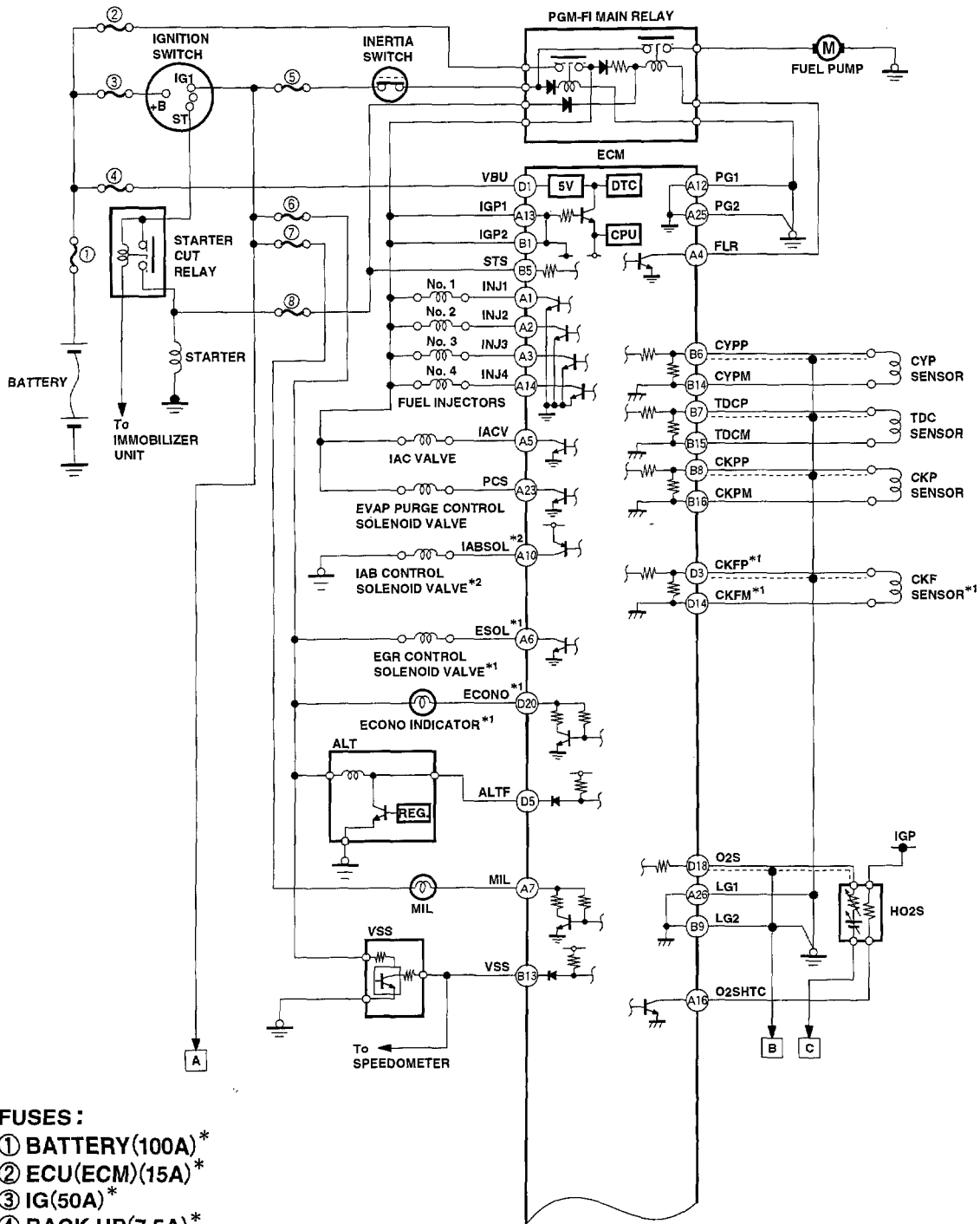
- ① HEATED OXYGEN SENSOR (HO2S)
- ② MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
- ③ ENGINE COOLANT TEMPERATURE (ECT) SENSOR
- ④ INTAKE AIR TEMPERATURE (IAT) SENSOR
- ⑤ IDLE AIR CONTROL (IAC) VALVE
- ⑥ THROTTLE BODY (TB)
- ⑦ FUEL INJECTOR
- ⑧ FUEL PULSATION DAMPER
- ⑨ FUEL FILTER
- ⑩ FUEL PRESSURE REGULATOR
- ⑪ FUEL PUMP (FP)
- ⑫ FUEL TANK
- ⑬ FUEL TANK EVAPORATIVE EMISSION (EVAP) VALVE
- ⑭ AIR CLEANER

- ⑮ RESONATOR
- ⑯ INTAKE AIR BYPASS (IAB) CONTROL DIAPHRAGM VALVE
- ⑰ INTAKE AIR BYPASS (IAB) CONTROL SOLENOID VALVE
- ⑱ INTAKE AIR BYPASS (IAB) VACUUM TANK
- ⑲ INTAKE AIR BYPASS (IAB) CHECK VALVE
- ⑳ THREE WAY CATALYTIC CONVERTER (TWC)
- ㉑ POSITIVE CRANKCASE VENTILATION (PCV) VALVE
- ㉒ EVAPORATIVE EMISSION (EVAP) PURGE CONTROL SOLENOID VALVE
- ㉓ EVAPORATIVE EMISSION (EVAP) CONTROL CANISTER
- ㉔ EVAPORATIVE EMISSION (EVAP) CONTROL PURGE DIAPHRAGM VALVE
- ㉕ EVAPORATIVE EMISSION (EVAP) TWO WAY VALVE

# System Description



## Electrical Connections



### FUSES :

- ① BATTERY(100A)\*
  - ② ECU(ECM)(15A)\*
  - ③ IG(50A)\*
  - ④ BACK UP(7.5A)\*
  - ⑤ With SRS model : No. 24 FUEL PUMP(15A)  
Without SRS model : No. 12 FUEL PUMP(15A)
  - ⑥ ACG(15A)\*\*
  - ⑦ No. 15 BACK UP LIGHTS(10A)
  - ⑧ No. 18 STARTER SIGNAL(7.5A)
- \*: in the under-hood fuse/relay box  
\*\*: in the fuse holder(located at the under-dash fuse/relay box)

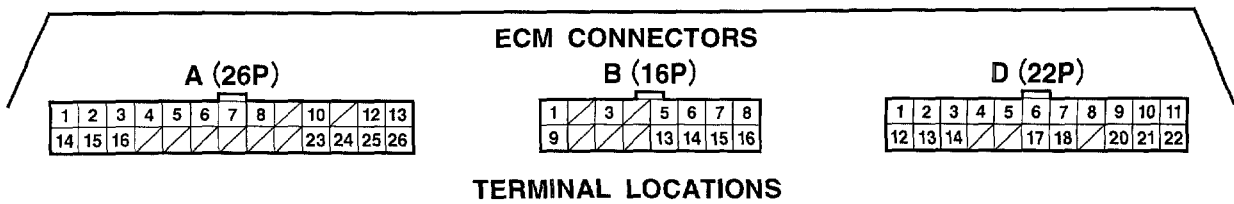
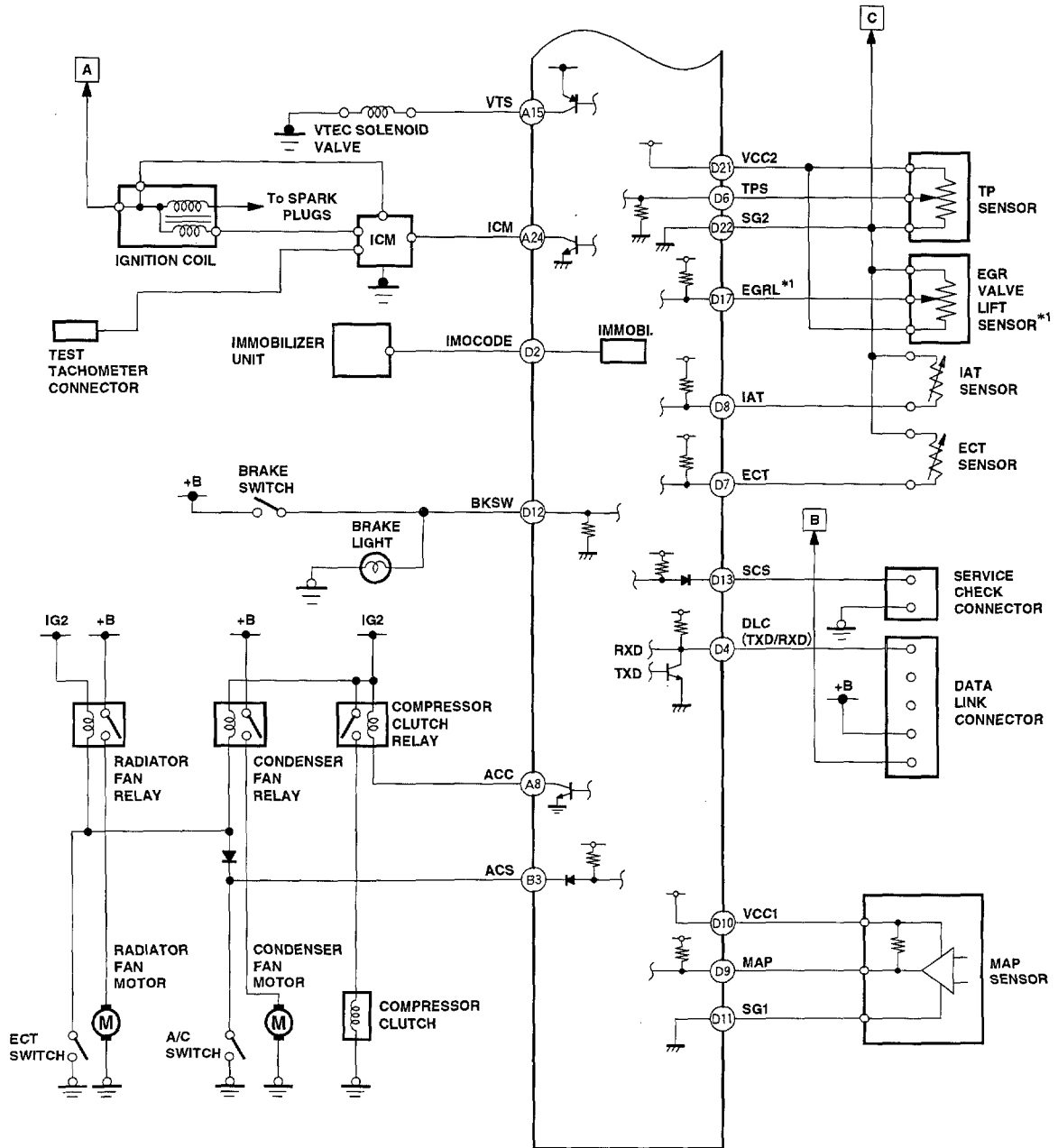
\*1 : D15Z8 engine

\*2 : B18C4 engine

(cont'd)

# System Description

## Electrical Connections (cont'd)





# Troubleshooting

## Troubleshooting Guide

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

PAGE	SYSTEM	PGM-FI							
		ENGINE CONTROL MODULE	HEATED OXYGEN SENSOR	MANIFOLD ABSOLUTE PRESSURE SENSOR	TOP DEAD CENTER/ CRANKSHAFT POSITION/ CYLINDER POSITION SENSOR	ENGINE COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR	INTAKE AIR TEMPERATURE SENSOR	IGNITION OUTPUT SIGNAL
SYMPTOM		11-B-25	11-B-29, 43	11-B-31	11-B-33	11-B-35	11-B-37	11-B-39	11-B-41
	MALFUNCTION INDICATOR LAMP (MIL) TURNS ON								
	MALFUNCTION INDICATOR LAMP (MIL) BLINKS								
	ENGINE WON'T START	①			③				③
	DIFFICULT TO START ENGINE WHEN COLD	BU		③	③	①			
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	BU				③			
	ROUGH IDLE	BU		③					
	WHEN WARM ENGINE SPEED TOO HIGH	BU				③			
	WHEN WARM ENGINE SPEED TOO LOW	BU							
FREQUENT STALLING	WHILE WARMING UP	BU				③			
	AFTER WARMING UP	BU							
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	BU		②	③				
	FAILS EMISSION TEST	BU	③	②					
	LOSS OF POWER	BU		③			②		

\* If codes other than those listed above are indicated, count the number of blinks again. If the MIL is in fact blinking these codes, replace the ECM.

BU If the MIL is on while the engine is running, connect the SCS short connector to the service check connector. If no code is displayed (MIL stays on steady), the back-up system is in operation.

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

\*1: D15Z8 engine



PGM-FI			IDLE CONTROL		FUEL SUPPLY		INTAKE AIR	EMISSION CONTROL	
VEHICLE SPEED SENSOR	VTEC SOLENOID VALVE	CRANKSHAFT SPEED FLUCTUATION SENSOR*1	IDLE AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTOR	OTHER FUEL SUPPLY		EXHAUST GAS RECIRCULATION (EGR) CONTROL SYSTEM*1	OTHER EMISSION CONTROL SYSTEM
11-B-42	SECTION 6	11-B-46	11-B-52	11-B-49	11-B-62	11-B-60	11-B-69	11-B-83	11-B-80
						②			
						②			
			①	②					
			①	②	②			③	
			①	②					
			①	②	②				
			①	②		③			
			③			①		②	
					①			③	
									①
					③	①	③		③

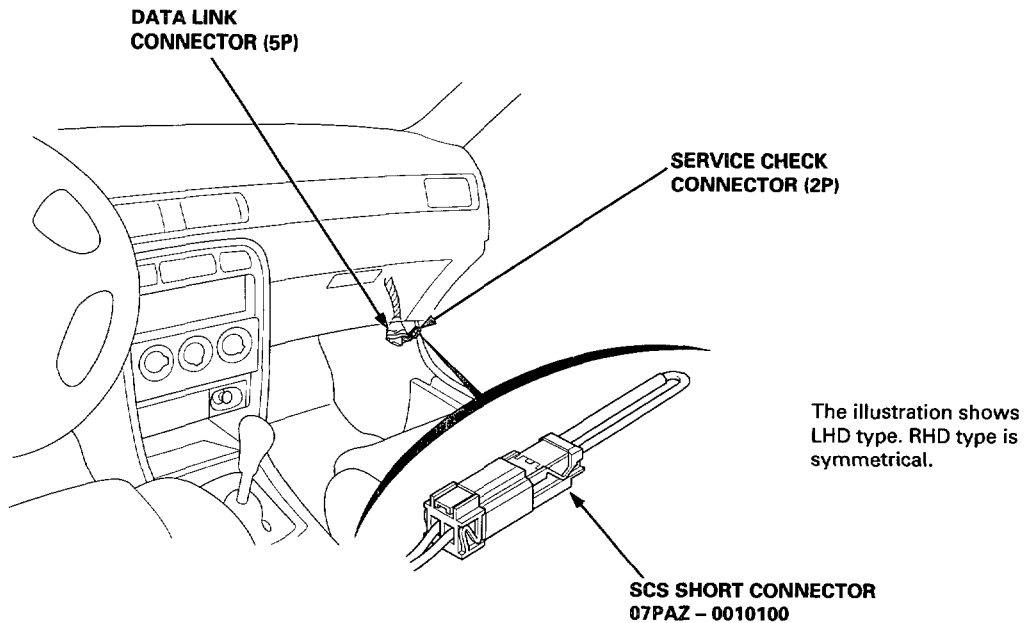
# Troubleshooting

## Self-diagnostic Procedures

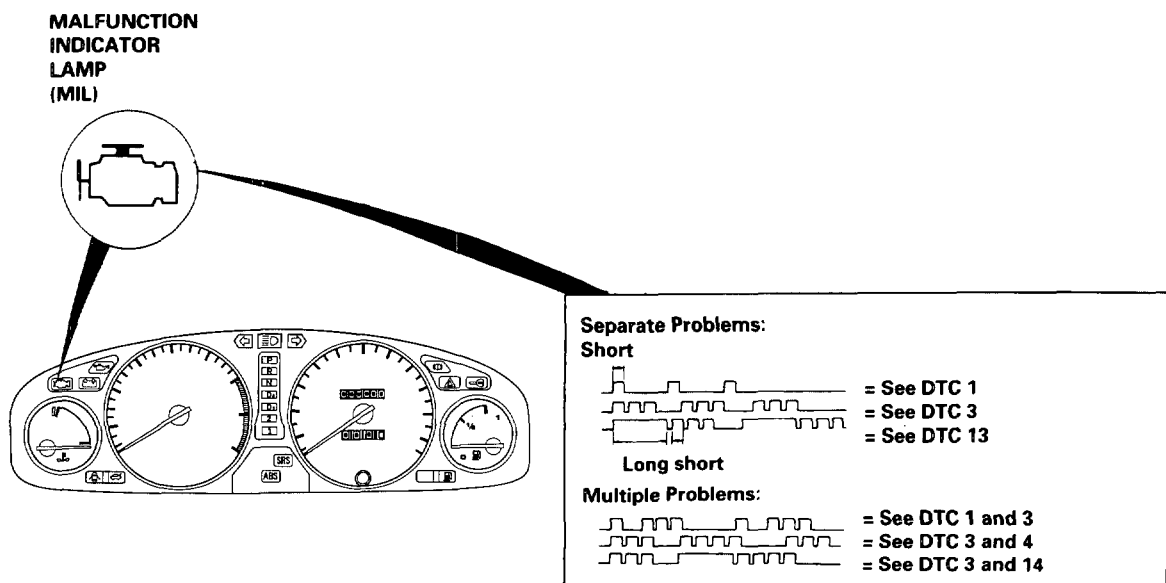
1. When the Malfunction Indicator Lamp (MIL) has been reported on, check the Diagnostic Trouble Code (DTC) as following:

NOTE: You can also read DTCs with Honda PGM Tester connected to data link connector (5P).

1. Connect the SCS short connector to Service Check Connector as shown (The 2P Service Check Connector is located under the dash on the passenger side of the car.) Turn the ignition switch ON (II).



2. Note the Diagnostic Trouble Code (DTC): The MIL indicates a code by the length and number of blinks. The MIL can indicate multiple problems by blinking separate codes, one after another. Codes 1 through 9 are indicated by individual short blinks. Codes 10 through 54 are indicated by a series of long and short blinks. The number of long blinks equals the first digit, the number of short blinks equals the second digit. Sometimes the first blink is difficult to see; always count the blinks at least twice to verify the code.

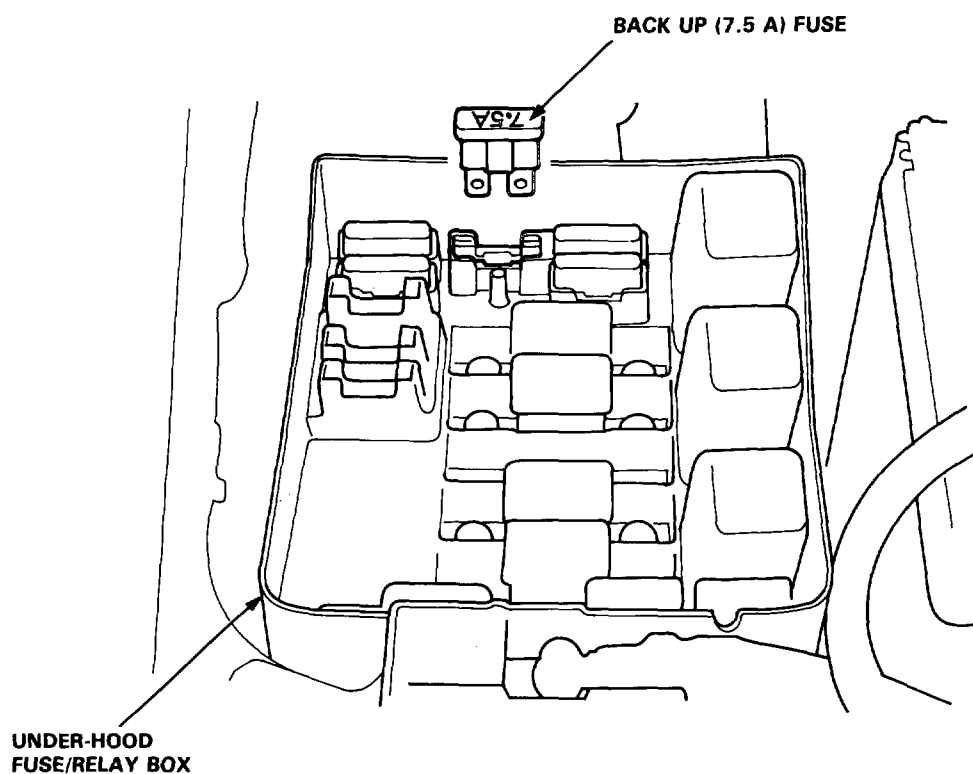




## II. Engine Control Module (ECM) Reset Procedure

NOTE: You can also reset ECM with Honda PGM Tester.

1. Turn the ignition switch off.
2. Remove the BACK UP (7.5 A) fuse from the under-hood fuse/relay box for 10 seconds to reset the ECM.



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

1. Remove the SCS Short Connector.

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

2. Do the ECM Reset Procedure.

## IV. Known-good ECM Substitution

The ECM is part of the Immobilizer System. If you substitute a known-good ECM, the ECM will have a different immobilizer code. In order for the engine to start, you must rewrite the immobilizer code with the Honda PGM Tester.

(cont'd)



# Troubleshooting

## Self-diagnostic Procedures (cont'd)

DIAGNOSTIC TROUBLE CODE (DTC)	SYSTEM INDICATED	Page
0	ENGINE CONTROL MODULE (ECM)	11-B-25
1	HEATED OXYGEN SENSOR (HO2S)	11-B-29
3	MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR	11-B-31
4	CRANKSHAFT POSITION (CKP) SENSOR	11-B-33
6	ENGINE COOLANT TEMPERATURE (ECT) SENSOR	11-B-35
7	THROTTLE POSITION (TP) SENSOR	11-B-37
8	TOP DEAD CENTER POSITION (TDC) SENSOR	11-B-33
9	No. 1 CYLINDER POSITION (CYP) SENSOR	11-B-33
10	INTAKE AIR TEMPERATURE (IAT) SENSOR	11-B-39
12	EXHAUST GAS RECIRCULATION (EGR) VALVE LIFT SENSOR*1	11-B-83
14	IDLE AIR CONTROL (IAC) VALVE	11-B-52
15	IGNITION OUTPUT SIGNAL	11-B-41
17	VEHICLE SPEED SENSOR (VSS)	11-B-42
21	VTEC SOLENOID VALVE	SECTION 6
41	HEATED OXYGEN SENSOR (HO2S) HEATER	11-B-43
54	CRANKSHAFT SPEED FLUCTUATION (CKF) SENSOR*1	11-B-46

\*1: D15Z8 engine

- If codes other than those listed above are indicated, verify the code. If the code indicated is not listed above, replace the ECM (see page 11-A-15).
- The MIL 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.



## Engine Control Module Terminal Arrangement

### ECM CONNECTOR A (26P)

1	2	3	4	5	6	7	8		10		12	13
INJ1	INJ2	INJ3	FLR	IACV	ESOL	MIL	ACC		IAB SOL		PG1	IGP1
14	15	16							23	24	25	26
INJ4	VTS	O2SHTC							PCS	ICM	PG2	LG1

Wire side of female terminals

### ECM CONNECTOR A (26P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	BRN	INJ1 (No. 1 FUEL INJECTOR)	Drives No. 1 fuel injector	With engine running: pulse
2	RED	INJ2 (No. 2 FUEL INJECTOR)	Drives No. 2 fuel injector	
3	BLU	INJ3 (No. 3 FUEL INJECTOR)	Drives No. 3 fuel injector	
4	GRN/YEL	FLR (FUEL PUMP RELAY)	Drives fuel pump relay	0 V for two seconds after turning ignition switch ON (II), then battery voltage
5	BLK/BLU	IACV (IDLE AIR CONTROL VALVE)	Drives IACV	With engine running: pulse
6*1	RED	ESOL (EGR CONTROL SOLENOID VALVE)	Drives EGR control solenoid valve	With EGR operating during driving with fully warmed up engine: duty controlled With EGR not operating: battery voltage
7	GRN/ORN	MIL (MALFUNCTION INDICATOR LAMP)	Drives MIL	With MIL turned ON: 0 V With MIL turned OFF: battery voltage
8	RED	ACC (A/C CLUTCH RELAY)	Drives A/C clutch relay	With compressor ON: 0 V With compressor OFF: battery voltage
10*2	RED/BLU	IAB SOL (INTAKE AIR BYPASS CONTROL SOLENOID VALVE)	Drives IAB control solenoid valve	With engine running, engine speed below 5,750 rpm (min <sup>-1</sup> ): battery voltage With engine running, engine speed above 5,750 rpm (min <sup>-1</sup> ): 0 V
12	BLK	PG1 (POWER GROUND)	Ground for the ECM power circuit	Less than 1.0 V at all times
13	YEL/BLK	IGP1 (POWER SOURCE)	Power source for the ECM control circuit	With ignition switch ON (II): battery voltage With ignition switch OFF: 0 V
14	YEL	INJ4 (No. 4 FUEL INJECTOR)	Drives No. 4 fuel injector	With engine running: pulse
15	GRN/YEL	VTS (VTEC SOLENOID VALVE)	Drives VTEC solenoid valve	With engine at low engine speed: 0 V With engine at high engine speed: battery voltage
16	BLK/WHT	O2SHTC (HEATED OXYGEN SENSOR HEATER CONTROL)	Drives heated oxygen sensor heater	With ignition switch ON (II): battery voltage With fully warmed up engine running: 0 V
23	RED	PCS (EVAP PURGE CONTROL SOLENOID VALVE)	Drives EVAP purge control solenoid valve	With engine running, engine coolant below 65°C (149°F): battery voltage With engine running, engine coolant above 65°C (149°F): 0 V
24	YEL/GRN	ICM (IGNITION CONTROL MODULE)	Sends ignition pulse	With ignition switch ON (II): battery voltage With engine running: about 10 V (depending on engine speed)
25	BLK	PG2 (POWER GROUND)	Ground for the ECM power circuit	Less than 1.0 V at all times
26	BRN/BLK	LG1 (LOGIC GROUND)	Ground for the ECM control circuit	Less than 1.0 V at all times

\*1: D15Z8 engine

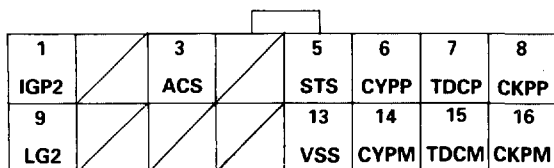
\*2: B18C4 engine

(cont'd)

# Troubleshooting

## Engine Control Module Terminal Arrangement (cont'd)

ECM CONNECTOR B (16P)



Wire side of female terminals

ECM CONNECTOR B (16P)

NOTE: Standard battery voltage is 12 V.

Terminal number	Wire color	Terminal name	Description	Signal
1	YEL/BLK	IGP2 (POWER SOURCE)	Power source for the ECM control circuit	With ignition switch ON (II): battery voltage With ignition switch OFF: 0 V
3	BLU/RED	ACS (A/C SWITCH SIGNAL)	Detects A/C switch signal	With A/C switch ON: 0 V With A/C switch OFF: battery voltage
5	BLK/WHT	STS (STARTER SWITCH SIGNAL)	Detects starter switch signal	With starter switch ON: battery voltage With starter switch OFF: 0 V
6	YEL	CYPP (CYP SENSOR P SIDE)	Detects for CYP sensor signal	With engine running: pulse
7	GRN	TDCP (TDC SENSOR P SIDE)	Detects for TDC sensor signal	With engine running: pulse
8	BLU	CKPP (CKP SENSOR P SIDE)	Detects for CKP sensor signal	With engine running: pulse
9	BRN/BLK	LG2 (LOGIC GROUND)	Ground for the ECM control circuit	Less than 1.0 V at all times
13	BLU/WHT	VSS (VEHICLE SPEED SENSOR)	Detects VSS signal	With ignition switch ON (II) and front wheels turned: cycles 0 V – 5 V or battery voltage
14	BLK	CYPM (CYP SENSOR M SIDE)	Ground for CYP sensor	With engine running: pulse
15	RED	TDCM (TDC SENSOR M SIDE)	Ground for TDC sensor	With engine running: pulse
16	WHT	CKPM (CKP SENSOR M SIDE)	Ground for CKP sensor	With engine running: pulse

\*1: D15Z8 engine

\*2: B18C4 engine



ECM CONNECTOR D (22P)

1	2	3	4	5	6	7	8	9	10	11
VBU	IMO CODE	CKF P	DLC	ALTF	TPS	ECT	IAT	MAP	VCC1	SG1
12	13	14	/	/	17	18	/	20	21	22
BKSW	SCS	CKFM	/	/	EGRL	O2S	/	ECONO	VCC2	SG2

Wire side of female terminals

ECM CONNECTOR D (22P)

NOTE: Standard battery voltage is 12 V.

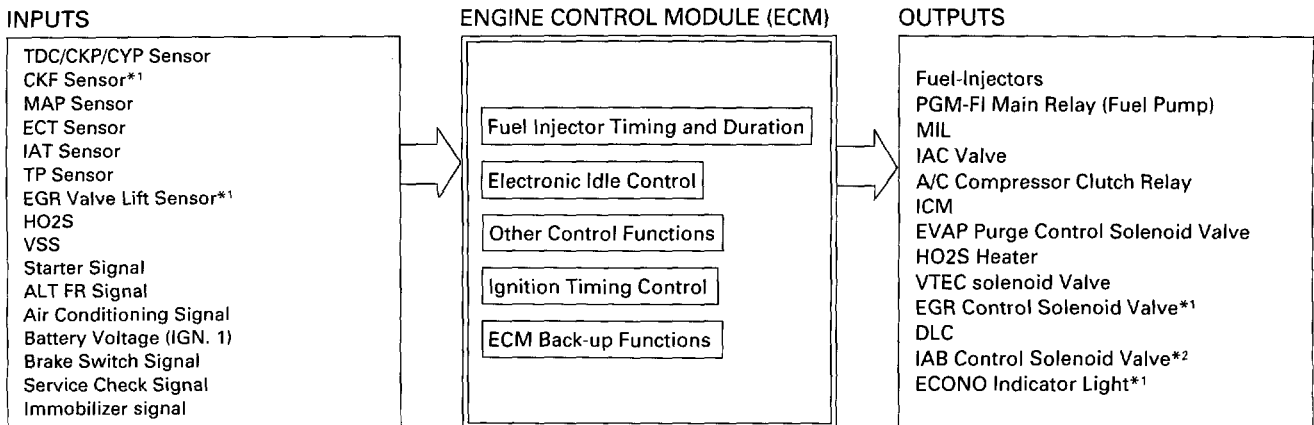
Terminal number	Wire color	Terminal name	Description	Signal
1	WHT/BLU (RHD: WHT/BLK)	VBU (VOLTAGE BACK UP)	Power source for the ECM control circuit Power source for the DTC memory	Battery voltage at all times
2	RED	IMO CODE (IMMOBILIZER CODE)	Detects Immobilizer signal	
3*1	BLU/RED	CKFP (CKF SENSOR P SIDE)	Detects for CKF sensor signal	With engine running: pulse
4	LT BLU	DLC (TXD/RXD)	Sends and receive Honda PGM Tester signal	With ignition switch ON (II): about 5 V
5	WHT/RED	ALTF (ALTERNATOR FR SIGNAL)	Detects alternator FR signal	With fully warmed up engine running: 0 V – 5 V (depending on electrical load)
6	RED/BLK	TPS (THROTTLE POSITION SENSOR)	Detects TP sensor signal	With throttle fully open: about 4.8 V With throttle fully closed: about 0.1 V
7	RED/WHT	ECT (ENGINE COOLANT TEMPERATURE SENSOR)	Detects ECT sensor signal	With ignition switch ON (II): about 0.1 – 4.8 V (depending on engine coolant temperature)
8	RED/YEL	IAT (INTAKE AIR TEMPERATURE SENSOR)	Detects IAT sensor signal	With ignition switch ON (II): about 0.1 – 4.8 V (depending on intake air temperature)
9	RED/GRN	MAP (MANIFOLD ABSOLUTE PRESSURE SENSOR)	Detects MAP sensor signal	With ignition switch ON (II): about 3 V During idling: about 1.5 V (depending on engine speed)
10	YEL/RED	VCC1 (SENSOR VOLTAGE)	Power source for MAP sensor	With ignition switch ON (II): about 5 V
11	GRN/WHT	SG1 (SENSOR GROUND)	Ground for MAP sensor	Less than 1.0 V at all times
12	GRN/WHT	BKSW (BRAKE SWITCH)	Detects brake switch signal	With brake pedal released: 0 V With brake pedal depressed: battery voltage
13	BRN	SCS (SERVICE CHECK SIGNAL)	Detects service check connector signal (the signal causing a DTC indication)	With the connector connected: 0 V With the connector disconnected: about 5 V
14*1	WHT/BLU	CKFM (CKF SENSOR M SIDE)	Ground for CKF sensor	With engine running: pulse
17*1	WHT/BLK	EGRL (EGR VALVE LIFT SENSOR)	Detects EGR valve lift sensor signal	During idling without vacuum: about 1.2 V With 27 kPa (200 mmHg, 8 in.Hg): about 4.3 V
18	WHT/RED	O2S (OXYGEN SENSOR)	Detects oxygen sensor signal	With throttle fully opened during idling of fully warmed up engine: above 0.6 V With throttle quickly closed: below 0.4 V
20*1	PNK/GRN	ECONO	Drive ECONO indicator	With ECONO indicator turned ON: 0 V With ECONO indicator turned OFF: battery voltage
21	YEL/BLU	VCC2 (SENSOR VOLTAGE)	Power source for TP, EGR valve lift sensor*1	With ignition switch ON (II): about 5 V With ignition switch OFF: 0 V
22	GRN/BLK	SG2 (SENSOR GROUND)	Sensor ground	Less than 1.0 V at all times

\*1: D15Z8 engine

\*2: B18C4 engine

# PGM-FI System

## System Description



\*1: D15Z8 engine

\*2: B18C4 engine

### PGM-FI System

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

#### Fuel Injector Timing and Duration

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

#### Idle Air Control

Idle Air Control Valve (IAC Valve)

When the engine is cold, the A/C compressor is on, the brake pedal is depressed, or the alternator is charging, the ECM controls current to the IAC Valve to maintain the correct idle speed.

#### Ignition Timing Control

The ECM contains memories for basic ignition timing at various engine speeds and manifold pressure. Ignition timing is also adjusted for engine coolant temperature.

#### Other Control Functions

##### 1. Starting Control

When the engine is started, the ECM provides a rich mixture by increasing fuel injector duration.

##### 2. Fuel Pump Control

- When the ignition switch is initially turned ON (II), the ECM supplies ground to the PGM-FI main relay that supplies current to the fuel pump for two seconds to pressurize the fuel system.
- When the engine is running, the ECM supplies ground to the PGM-FI main relay that supplies current to the fuel pump.
- When the engine is not running and the ignition is ON (II), the ECM cuts ground to the PGM-FI main relay which cuts current to the fuel pump.



### 3. Fuel Cut-off Control

- During deceleration with the throttle valve closed, current to the fuel injectors is cut off to improve fuel economy at speeds over following engine speed:
- D15Z8 engine: 1,050 rpm ( $\text{min}^{-1}$ )
- B18C4 engine: 1,100 rpm ( $\text{min}^{-1}$ )
- Fuel cut-off action also takes place when engine speed exceeds, 6,900 rpm ( $\text{min}^{-1}$ ) (B18BC4 engine: 8,100 rpm ( $\text{min}^{-1}$ )), regardless of the position of the throttle valve, to protect the engine from over-revving.

### 4. A/C Compressor Clutch Relay

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

### 5. Evaporative Emission (EVAP) Purge Control Solenoid Valve

When the engine coolant temperature is below 68°C (154°F), the ECM supplies a ground to the EVAP purge control solenoid valve which cuts vacuum to the EVAP purge control canister.

### 6. Exhaust Gas Recirculation (EGR) Control Solenoid Valve\*<sup>1</sup>

When the EGR is required for control of oxides of nitrogen (NOx) emissions, the ECM controls the EGR control solenoid valve which supplies regulated vacuum to EGR valve.

### 7. Intake Air Bypass (IAB) Control Solenoid Valve\*<sup>2</sup>

When the engine speed is below 5,750 rpm, the IAB control solenoid valve is activated by a signal from the ECM, intake air flows through the smaller chamber, then high torque is delivered. At speeds higher than 5,750 rpm, the solenoid valve is deactivated by the ECM, and intake air flows through the larger chamber in order to reduce the resistance in airflow.

## ECM Fail-safe/Back-up Functions

### 1. Fail-safe Function

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

### 2. Back-up Function

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

### 3. Self-diagnosis Function [Malfunction Indicator Lamp (MIL)]

When an abnormality occurs in a signal from a sensor, the ECM supplies ground for the MIL and stores the code in erasable memory. When the ignition is initially turned ON (II), the ECM supplies ground for the MIL for two seconds to check the MIL bulb condition.

### 4. Two Trip Detection Method

To prevent false indications, the "two trip detection method" is used for the HO<sub>2</sub>S and EGR system\*<sup>1</sup> self-diagnostic functions. When an abnormality occurs, the ECM stores it in its memory. When the same abnormality recurs after the ignition switch is turned OFF and ON (II) again, the ECM informs the driver by lighting the MIL.

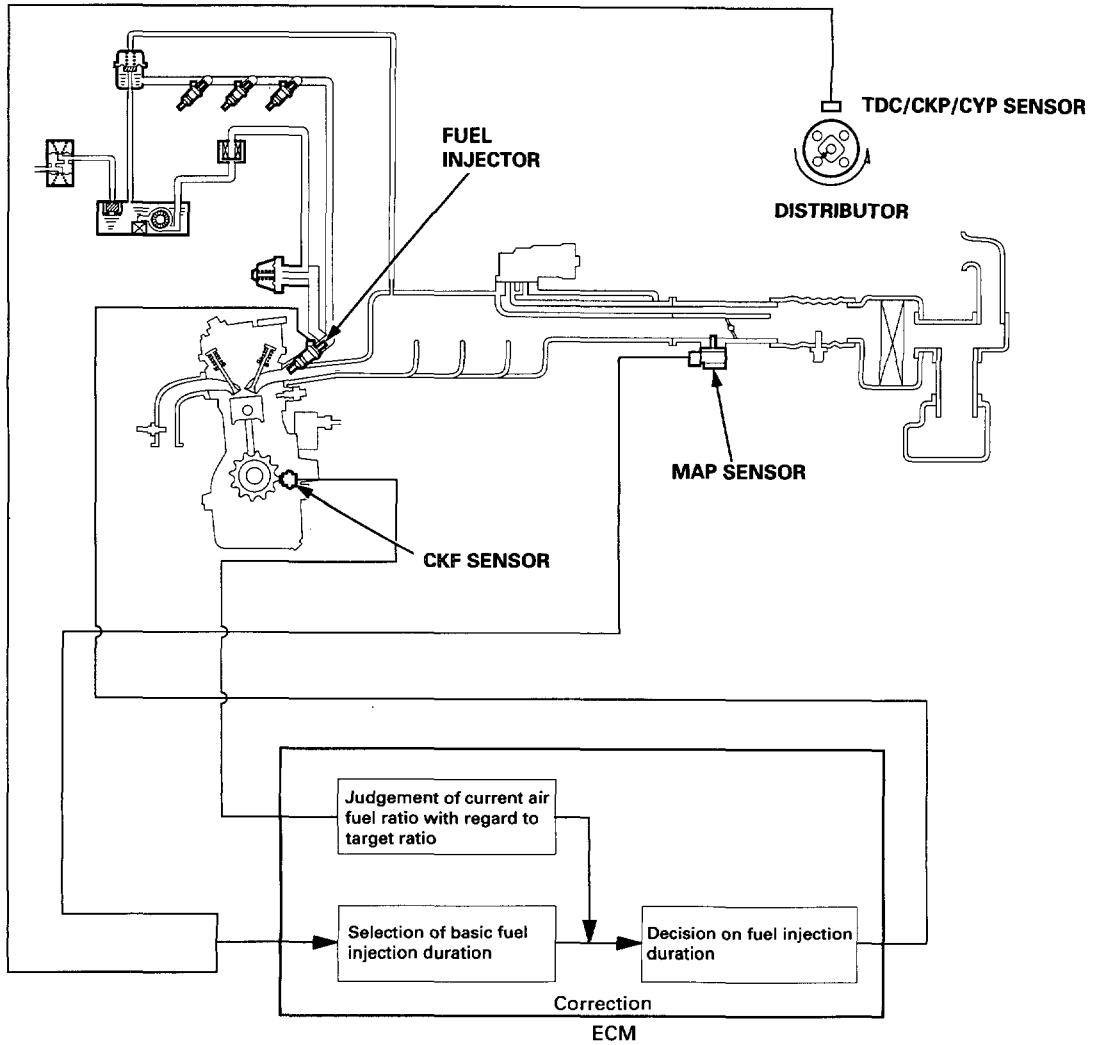
However, to ease troubleshooting, this function is cancelled when you short the service check connector. The MIL will then blink immediately when an abnormality occurs.

(cont'd)

# PGM-FI System

## System Description (cont'd)

Lean Burn Control (D15Z8 engine)



For lean burn control, a system was adopted whose function is based on the characteristic increase in crankshaft angular acceleration which sets in when the air-fuel ratio is getting leaner.

The CKF sensor, which is mounted on the crankshaft, monitors engine speed. If crankshaft angular acceleration falls below a certain level (target air-fuel ratio level), the amount of injected fuel is reduced.

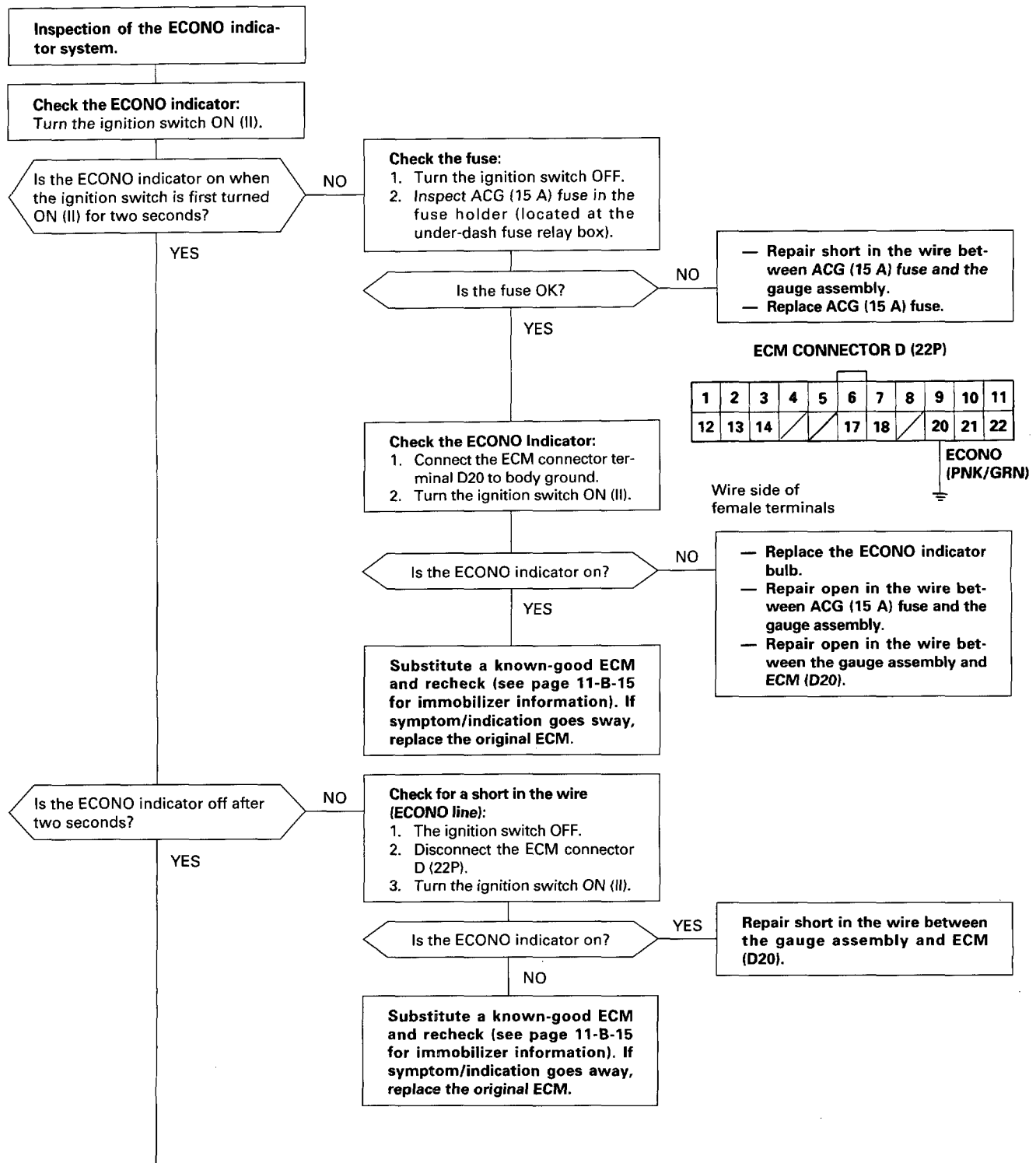
If crankshaft angular acceleration exceeds this level, the amount of fuel is increased.

This system improves fuel economy and driveability by controlling the amount of injected fuel in the lean burn range immediately before combustion starts to deteriorate.



## ECONO Indicator (D15Z8 engine)

The ECONO indicator's purpose is to get better fuel economy. It does this by lighting to inform of the most economical driving operation.



(To page 11-B-24)

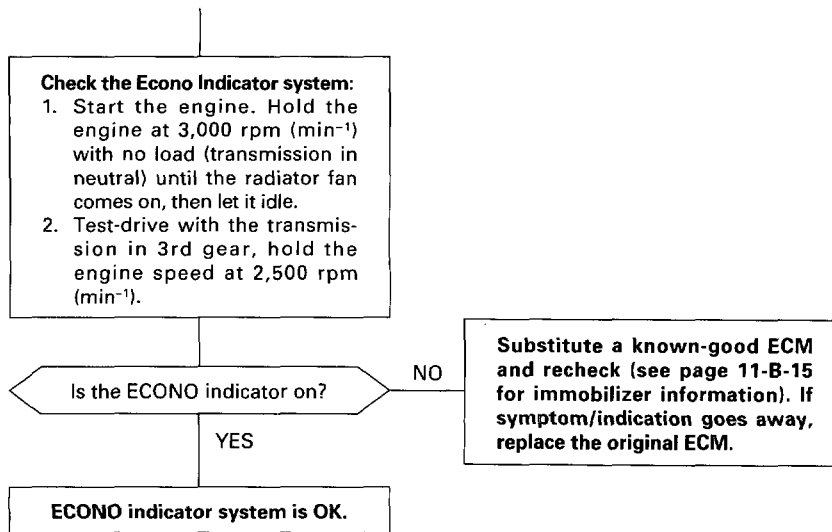
(cont'd)



# PGM-FI System

## ECONO Indicator (D15Z8 engine) (cont'd)

(From page 11-B-23)





## Engine Control Module (ECM)

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

NOTE: If this symptom is intermittent, check for a loose No. 15 BACK UP LIGHTS (10 A) fuse in the under-dash fuse/relay box, a poor connection at ECM terminal A7, or an intermittent open in the GRN/ORN wire between the ECM (A7) and the gauge assembly.

**Check the fuse:**  
Turn the ignition switch ON (II).

Is the low oil pressure light on?

NO

— Repair short in the wire between No. 15 BACK-UP LIGHTS (10 A) fuse and gauge assembly.  
— Replace No. 15 BACK-UP LIGHTS (10 A) fuse.

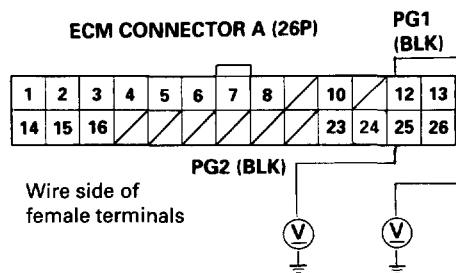
YES

**Check the engine starting:**  
Try to start the engine.

Does the engine start?

NO

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



YES

Is there less than 1.0 V?

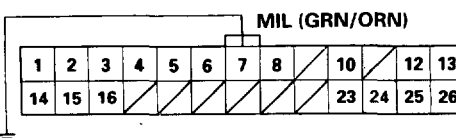
NO

Repair open in the wire(s) between ECM (A12, A25) and G101 (located at thermostat housing that had more than 1.0 V).

YES

**Check the MIL:**  
1. Turn the ignition switch OFF.  
2. Connect the ECM connector terminal A7 to body ground.  
3. Turn the ignition switch ON (II).

Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.



Is the MIL on?

NO

— Replace the MIL bulb.  
— Repair open wire between the ECM (A7) and the gauge assembly.

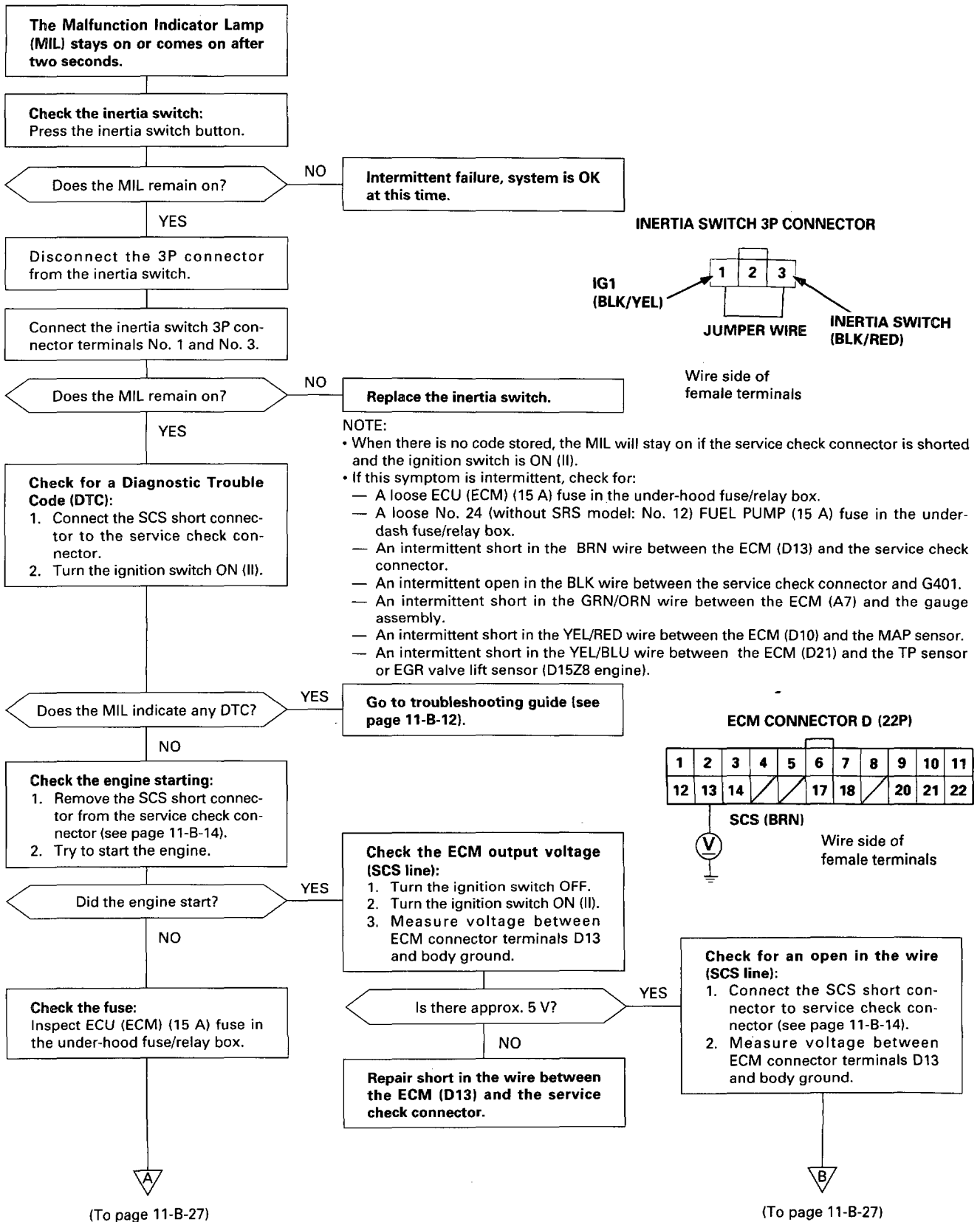
YES

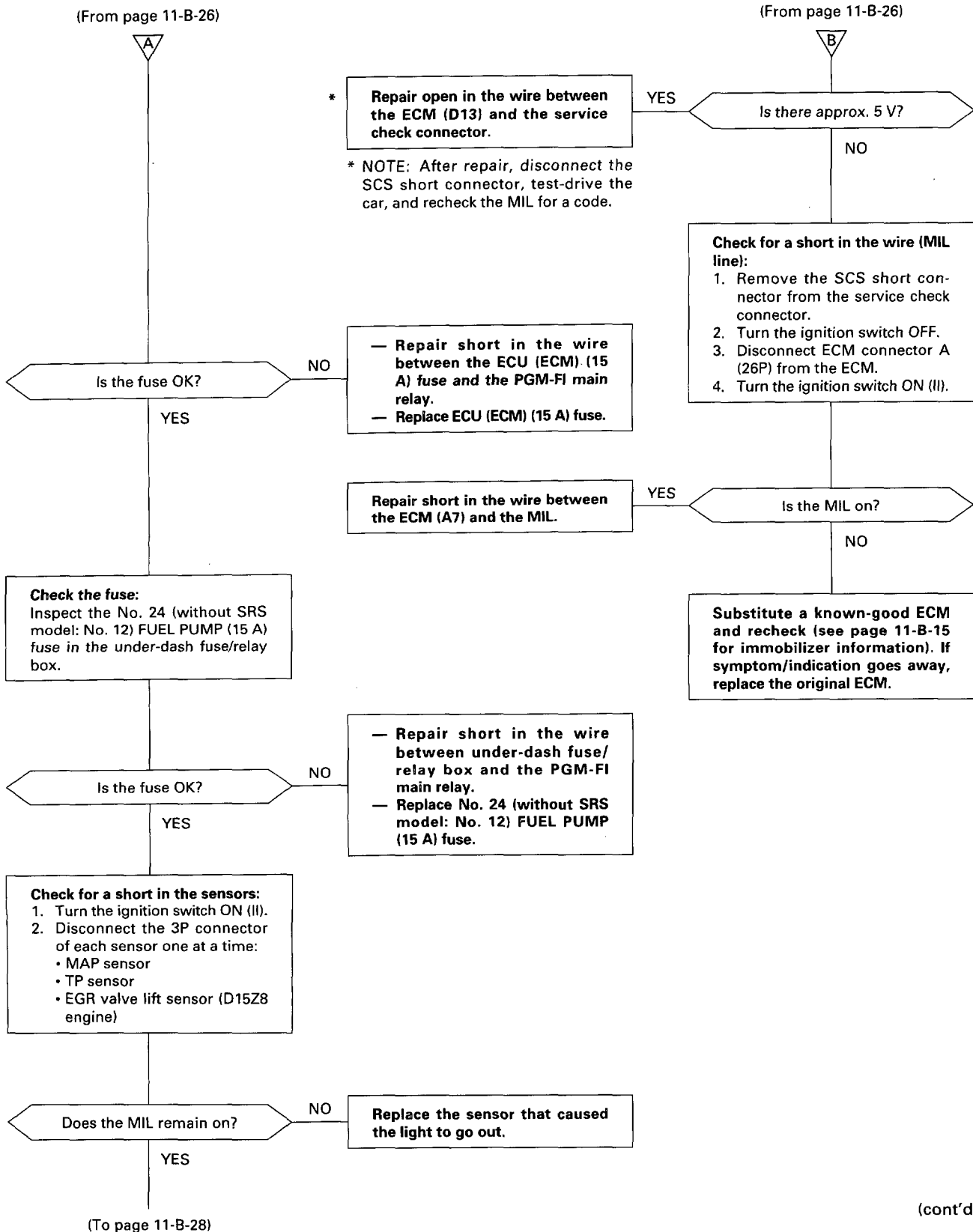
Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.

(cont'd)

# PGM-FI System

## Engine Control Module (ECM) (cont'd)

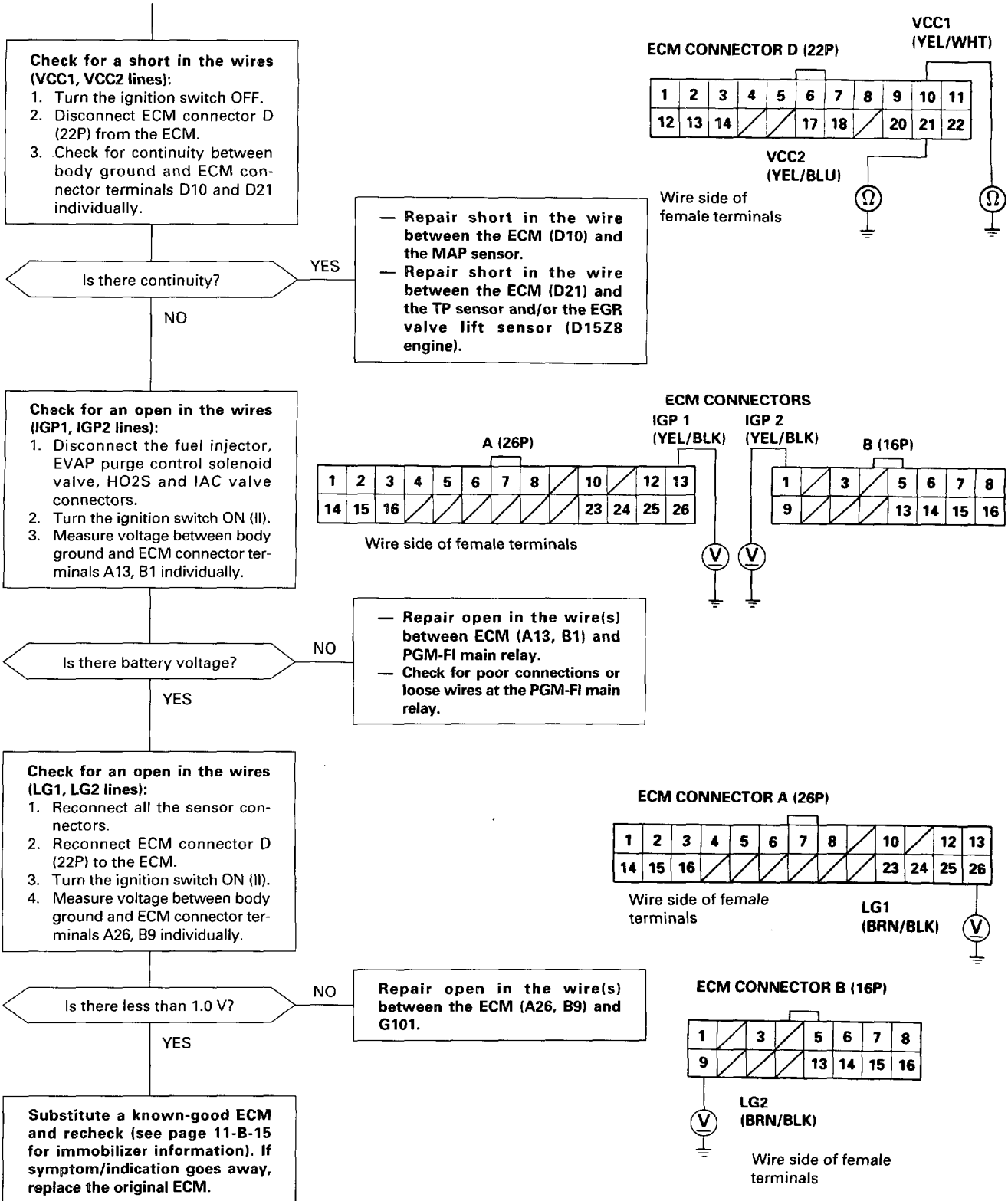




# PGM-FI System

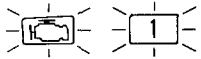
## Engine Control Module (ECM) (cont'd)

(From page 11-B-27)



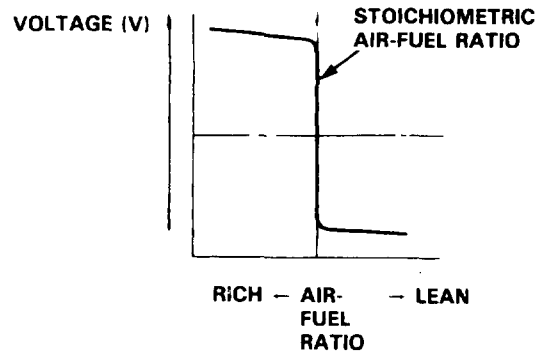
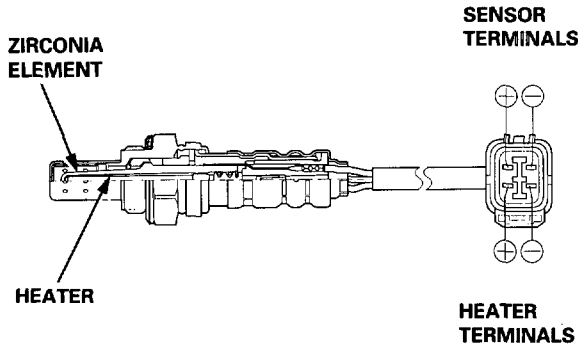


## Heated Oxygen Sensor (HO2S)



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 1: A problem in the Heated Oxygen Sensor (HO2S) circuit.

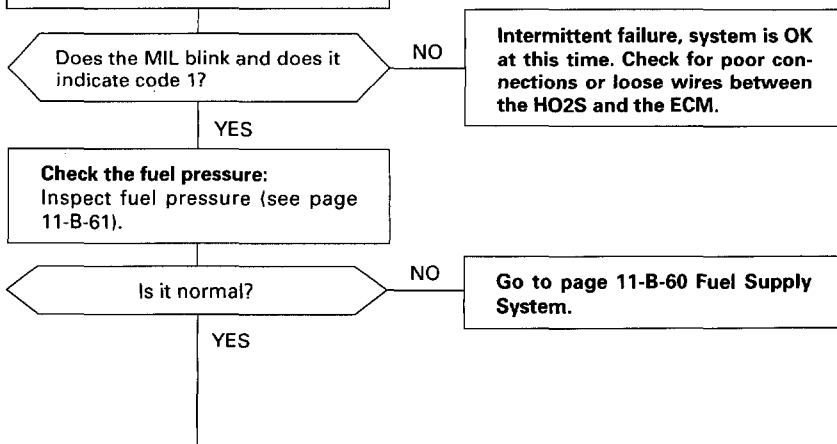
The Heated Oxygen Sensor (HO2S) detects the oxygen content in the exhaust gas and signals the ECM. In operation, the ECM receives the signals from the sensor and varies the duration during which fuel is injected. To stabilize the sensor's output, the sensor has an internal heater. The HO2S is installed in the exhaust pipe A (B18C4 engine: in the exhaust pipe A).



- The MIL has been reported on.
- With the SCS short connector connected (see page 11-B-14), code 1 is indicated.

### Problem verification:

1. Do the ECM Reset Procedure (see page 11-B-15).
2. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (transmission in neutral) until the radiator fan comes on, then let it idle for at least one minute before test-driving.
3. Connect the SCS short connector to the service check connector (see page 11-B-14).
4. Test-drive in 4th gear. Starting at 1,600 rpm ( $\text{min}^{-1}$ ), accelerate using wide open throttle for at least 5 seconds. Then decelerate for at least 5 seconds with the throttle completely closed.



(To page 11-B-30)

(cont'd)

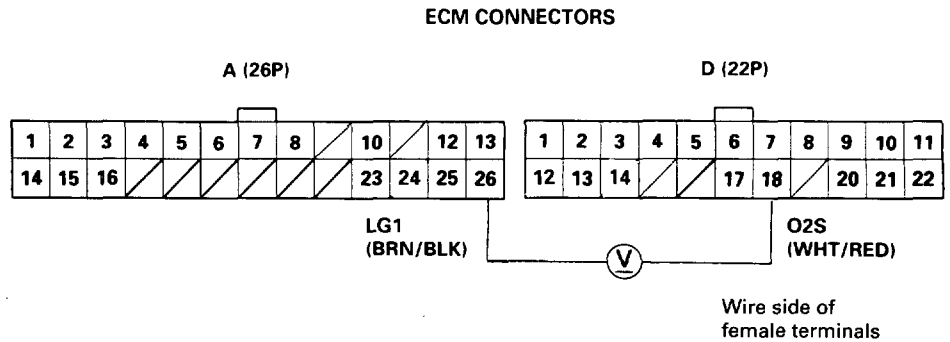
# PGM-FI System

## Heated Oxygen Sensor (HO2S) (cont'd)

(From page 11-B-29)

### Check the ECM input voltage:

1. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (transmission in neutral) until the radiator fan comes on, then let it idle for at least one minute before test-driving.
2. Measure voltage between ECM connector terminals D18 and A26.
3. Open the throttle wide open, then quickly release it.



Is the voltage above 0.6 V at wide open throttle to 4,500 rpm ( $\text{min}^{-1}$ ) and below 0.4 V when the throttle is quickly released from 4,500 rpm ( $\text{min}^{-1}$ )?

YES

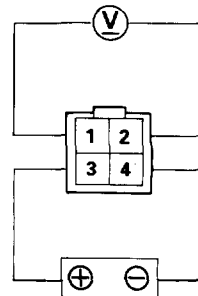
**Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

NO

### Check the HO2S:

1. Turn the ignition switch OFF.
2. Disconnect the 4P connector from the HO2S.
3. At the HO2S harness side, connect the battery positive terminal to terminal No. 3 and battery negative terminal to terminal No. 4.
4. Start the engine.
5. After two minutes, measure voltage between HO2S 4P connector terminals No. 1 and No. 2.

### HO2S 4P CONNECTOR



Terminal side of male terminals

Is the voltage above 0.6 V at wide open throttle to 4,500 rpm ( $\text{min}^{-1}$ ) and below 0.4 V when the throttle is quickly released from 4,500 rpm ( $\text{min}^{-1}$ )?

NO

**Replace the HO2S (see page 11-B-48).**

YES

**Repair open or short in the wire ECM (D18) and the HO2S.**



# Manifold Absolute Pressure (MAP) Sensor

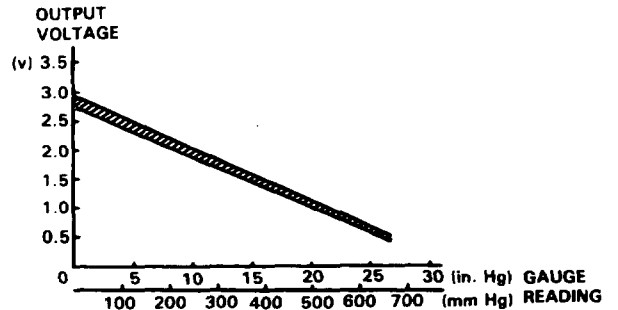
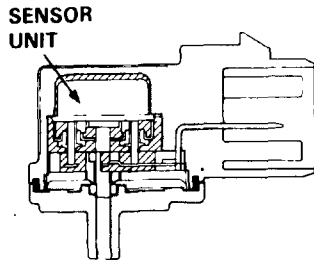


3

The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 3: An electrical problem in the Manifold Absolute Pressure (MAP) Sensor circuit.

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

— The MIL has been reported on.  
— With the SCS short connector connected (see page 11-B-14), code 3 is indicated.

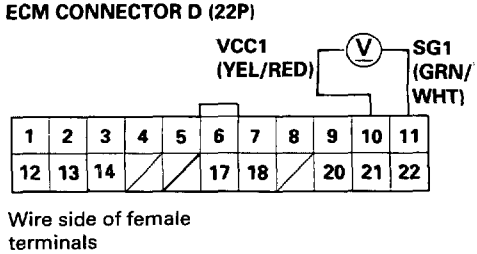


**Problem verification:**  
1. Do the ECM Reset Procedure (see page 11-B-15).  
2. Start the engine and allow it to idle.

Is the MIL on and does it indicate code 3?

NO  
**Intermittent failure, system is OK at this time (test-drive may be necessary). Check for poor connections or loose wires between the MAP sensor and the ECM.**

YES  
**Check the ECM output voltage (VCC1 line):**  
1. Turn the ignition switch OFF.  
2. Turn the ignition switch ON (II).  
3. Measure voltage between ECM connector terminals D10 and D11.



Is there approx. 5 V?

NO  
**Check the ECM output voltage (VCC1 line):**  
1. Turn the ignition switch OFF.  
2. Disconnect the 3P connector from the MAP sensor.  
3. Turn the ignition switch ON (II).  
4. Measure voltage between ECM connector terminals D10 and D11.

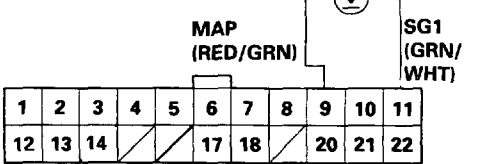
Wire side of female terminals

YES

Is there approx. 5 V?

YES  
**Replace the MAP sensor.**

**Check the ECM output voltage (MAP line):**  
Measure voltage between ECM connector terminals D9 and D11.



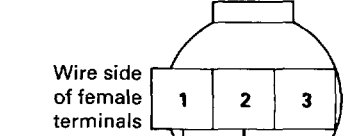
Is there approx. 3 V?

NO  
**Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

MAP SENSOR 3P CONNECTOR

YES

**Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.**



Is there approx. 5 V?

**Check for an open in the wire (SG1 line):**  
Measure voltage between MAP sensor 3P connector terminals No. 1 and No. 2.

NO  
**Repair open in the wire between the ECM (D11) and the MAP sensor.**

NO

(To page 11-B-32)

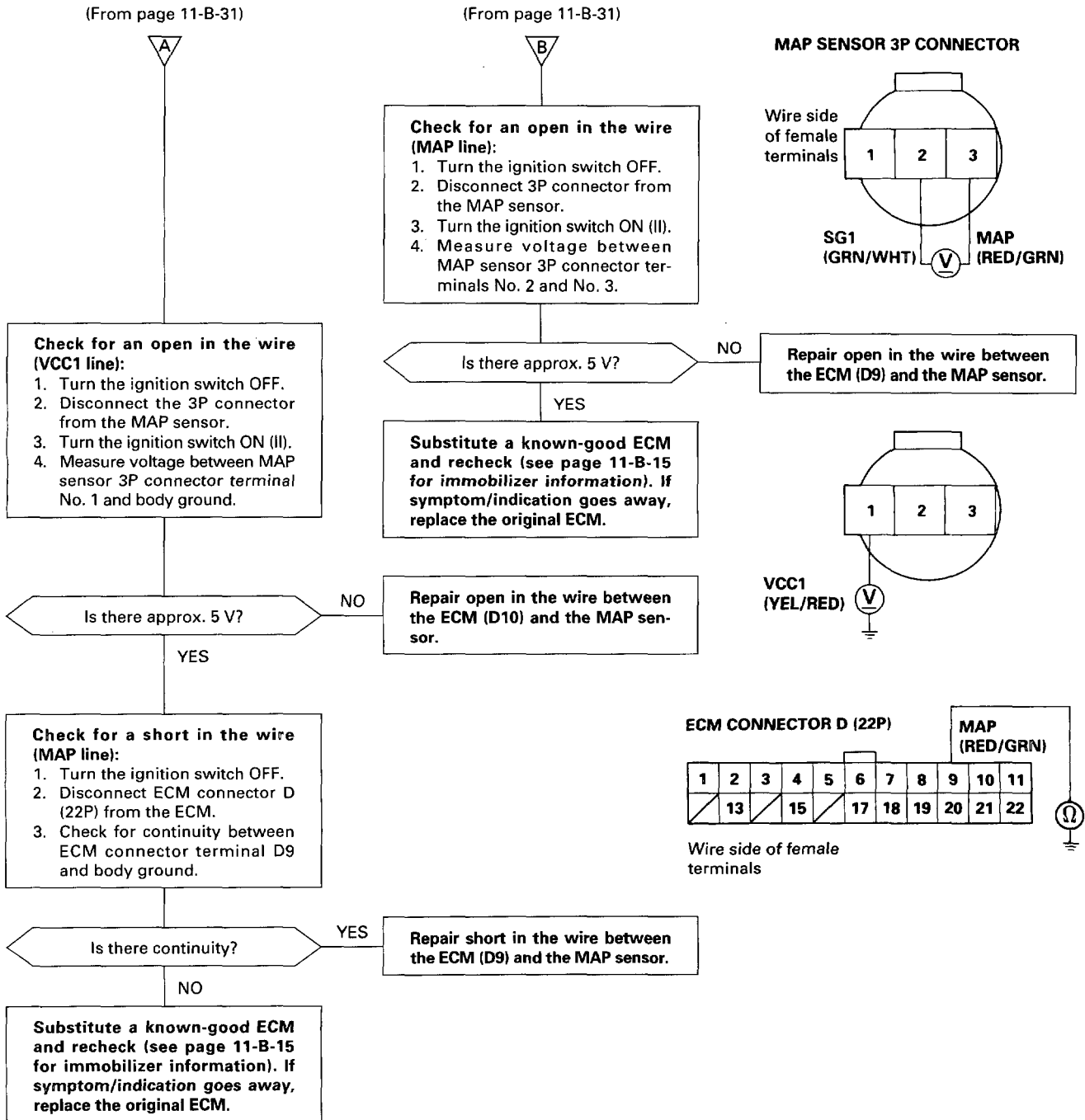
(To page 11-B-32)

(cont'd)



# PGM-FI System

## Manifold Absolute Pressure (MAP) Sensor (cont'd)

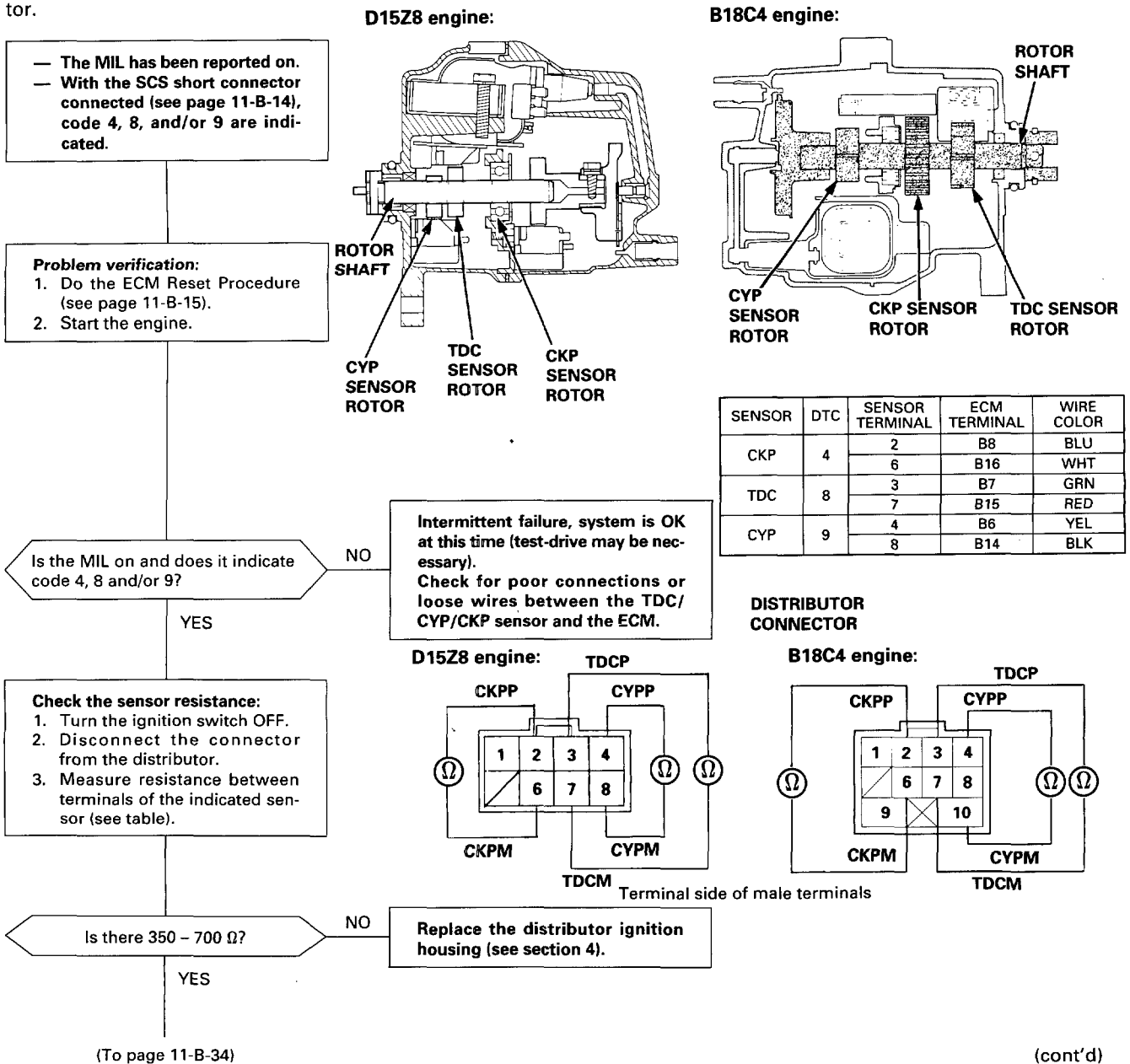




## TDC/CKP/CYP Sensor

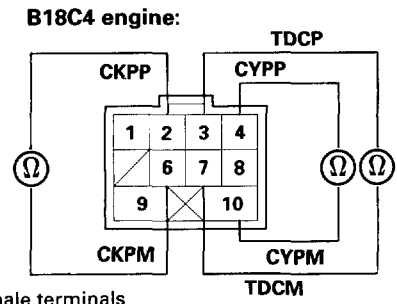
- The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 4: A problem in the Crankshaft Position (CKP) Sensor circuit.
- The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 8: A problem in the Top Dead Center (TDC) Sensor circuit.
- The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 9: A problem in the Cylinder Position (CYP) Sensor circuit.

The CKP Sensor determines timing for fuel injection and ignition of each cylinder and also detects engine speed. The TDC Sensor determines ignition timing at start-up (cranking) and when crank angle is abnormal. The CYP Sensor detects the position of No. 1 cylinder for sequential fuel injection to each cylinder. The TDC/CKP/CYP Sensor is built into the distributor.



SENSOR	DTC	SENSOR TERMINAL	ECM TERMINAL	WIRE COLOR
CKP	4	2	B8	BLU
		6	B16	WHT
TDC	8	3	B7	GRN
		7	B15	RED
CYP	9	4	B6	YEL
		8	B14	BLK

### DISTRIBUTOR CONNECTOR



# PGM-FI System

## TDC/CKP/CYP Sensor (cont'd)

(From page 11-B-33)

**Check the sensor for a short:**  
Check for continuity to body ground on both terminals of the indicated sensor.

Is there continuity?

YES

Replace the distributor ignition housing (see section 4).

NO

**Check for an open in the wire (TDC/CKP/CYP lines):**  
1. Reconnect the 8P connector.  
2. Disconnect ECM connector B (16P) from the ECM.  
3. Measure resistance between ECM connector terminals of the indicated sensor (see table).

Is there 350 – 700 Ω?

NO

Repair open in the indicated sensor wires (see table).

YES

**Check for a short in the wire (TDC/CKP/CYP lines):**  
Check for continuity between body ground and ECM connector terminals B6, B7 and/or B8 individually.

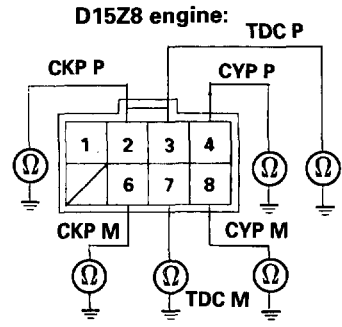
Is there continuity?

YES

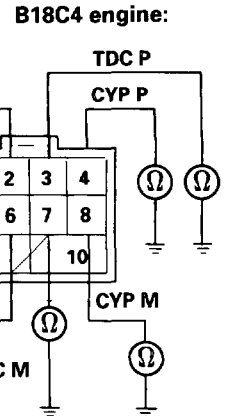
Repair short to body ground in the indicated sensor wires (see table).

NO

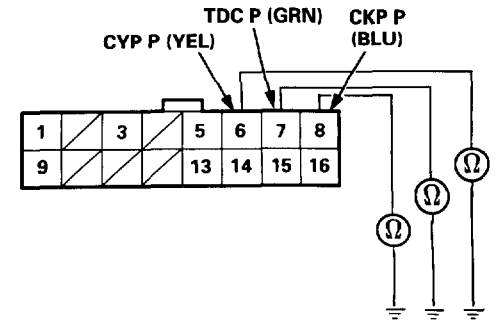
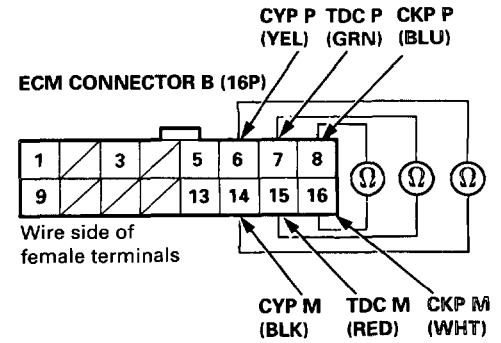
Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.



**DISTRIBUTOR CONNECTOR**



Terminal side of male terminals





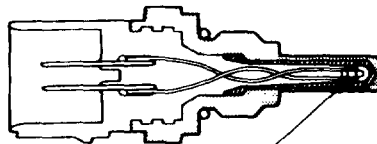
# Engine Coolant Temperature (ECT) Sensor

The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 6: A problem in the Engine Coolant Temperature (ECT) Sensor circuit.

The ECT sensor is a temperature dependent resistor (thermistor). The resistance of the thermistor decreases as the engine coolant temperature increases as shown below.

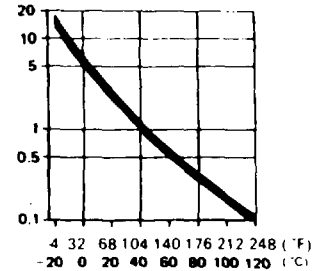
- The MIL has been reported on.
- With the SCS short connector connected (see page 11-B-14), code 6 is indicated.

- Problem verification:**
1. Do the ECM Reset Procedure (see page 11-B-15).
  2. Turn the ignition switch ON (II).



**THERMISTOR**

**RESISTANCE**  
(kΩ)



**ENGINE COOLANT TEMPERATURE**

Is the MIL on and does it indicate code 6?

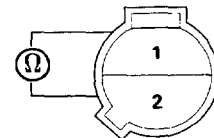
NO

Intermittent failure, system is OK at this time (test-drive may be necessary). Check for poor connections or loose wires between the ECT sensor and the ECM.

YES

- Check the sensor resistance:**
1. Start the engine. Hold the engine at 3,000 rpm (min<sup>-1</sup>) with no load (transmission in neutral) until the radiator fan comes on, then let it idle.
  2. Turn the ignition switch OFF.
  3. Disconnect the 2P connector from the ECT sensor.
  4. Measure resistance between the 1 terminals on the ECT sensor.

**ECT SENSOR 2P CONNECTOR**



Terminal side of male terminals

Is there 200 – 400 Ω?

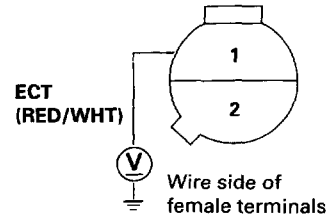
NO

Replace the ECT sensor.

YES

- Check the ECM output voltage (ECT line):**
1. Turn the ignition switch ON (II).
  2. At the engine harness side, measure voltage between the ECT sensor 2P connector terminal No. 2 and body ground.

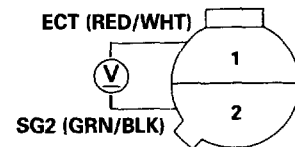
**ECT SENSOR 2P CONNECTOR**



Is there approx. 5 V?

YES

- Check for an open in the wire (SG2 line):**  
Measure voltage between the ECT sensor 2P connector terminals No. 1 and No. 2.



Is there approx. 5 V?

NO

Repair open in the wire between the ECM (D22) and ECT sensor.

NO

Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.

(To page 11-B-36)

(cont'd)

# PGM-FI System

## Engine Coolant Temperature (ECT) Sensor (cont'd)

(From page 11-B-34)

**Check for an open in the wire (ECT line):**  
Measure voltage between ECM connector terminal D7 and body ground.

Is there approx. 5 V?

YES

**Repair open in the wire between the ECM (D7) and ECT sensor.**

NO

**Check for a short in the wire (ECT line):**  
1. Turn the ignition switch OFF.  
2. Disconnect ECM connector D (22P) from the ECM.  
3. Check the continuity between ECM connector terminal D7 and body ground.

Is there continuity?

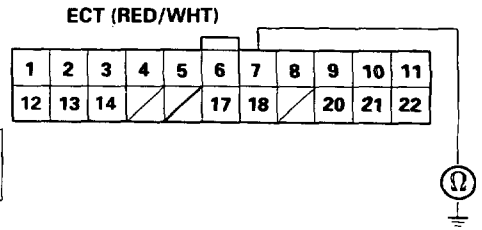
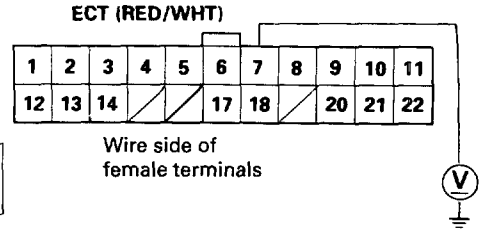
YES

**Repair short in the wire between the ECM (D7) and ECT sensor.**

NO

**Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

ECM CONNECTOR D (22P)





# Throttle Position (TP) Sensor



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 7: A problem in the Throttle Position (TP) Sensor circuit.

The TP sensor is a potentiometer. It is connected to the throttle valve shaft. As the throttle position changes, the throttle position sensor varies the voltage signal to the ECM.

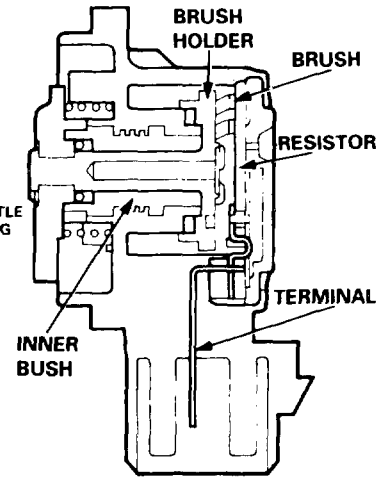
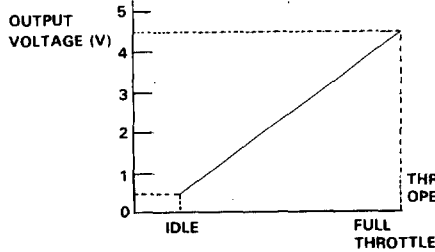
- The MIL has been reported on.
- With the SCS short connector connected (see page 11-B-14), code 7 is indicated.

- Problem verification:**
1. Do the ECM Reset Procedure (see page 11-B-15).
  2. Start the engine.

Is the MIL on and does it indicate code 7?

NO

YES



Intermittent failure, system is OK at this time (test-drive may be necessary). Check for poor connections or loose wires between the TP sensor and the ECM.

- Check the sensor output voltage:**
1. Turn the ignition switch OFF.
  2. Turn the ignition switch ON (II).
  3. Measure voltage between ECM connector terminals D6 and D22.

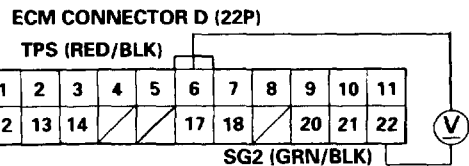
Is the voltage approx. 0.5 V at full close throttle, and approx. 4.5 V at full open throttle?

NOTE: There should be a smooth transition as the throttle is depressed.

YES

NO

Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.



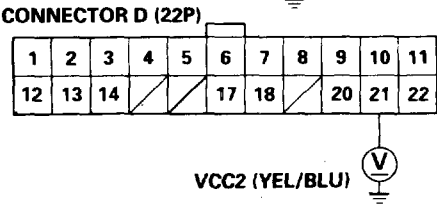
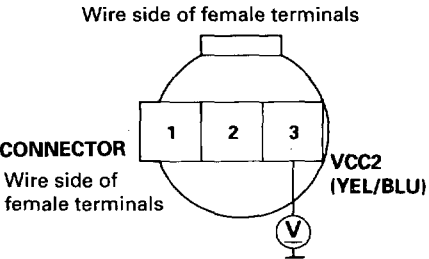
- Check the TP circuit:**
1. Turn the ignition switch OFF.
  2. Disconnect 3P connector from the TP sensor.
  3. Turn the ignition switch ON (II).
  4. At the engine harness side, measure voltage between the TP sensor 3P connector terminal No. 3 and body ground.

Is there approx. 5 V?

NO

YES

**Check for an open in the wire (VCC2 line):**  
Measure voltage between ECM connector terminal D21 and body ground.



Is there approx. 5 V?

YES

NO

Repair open in the wire between the ECM (D21) and TP sensor.

Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.

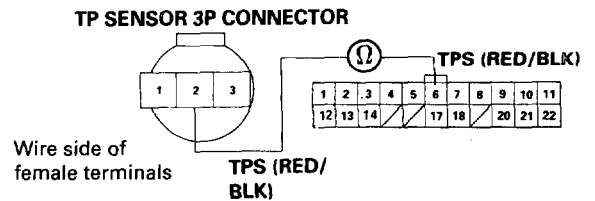
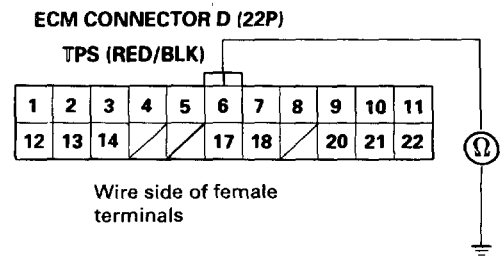
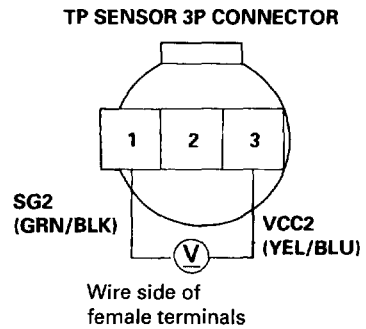
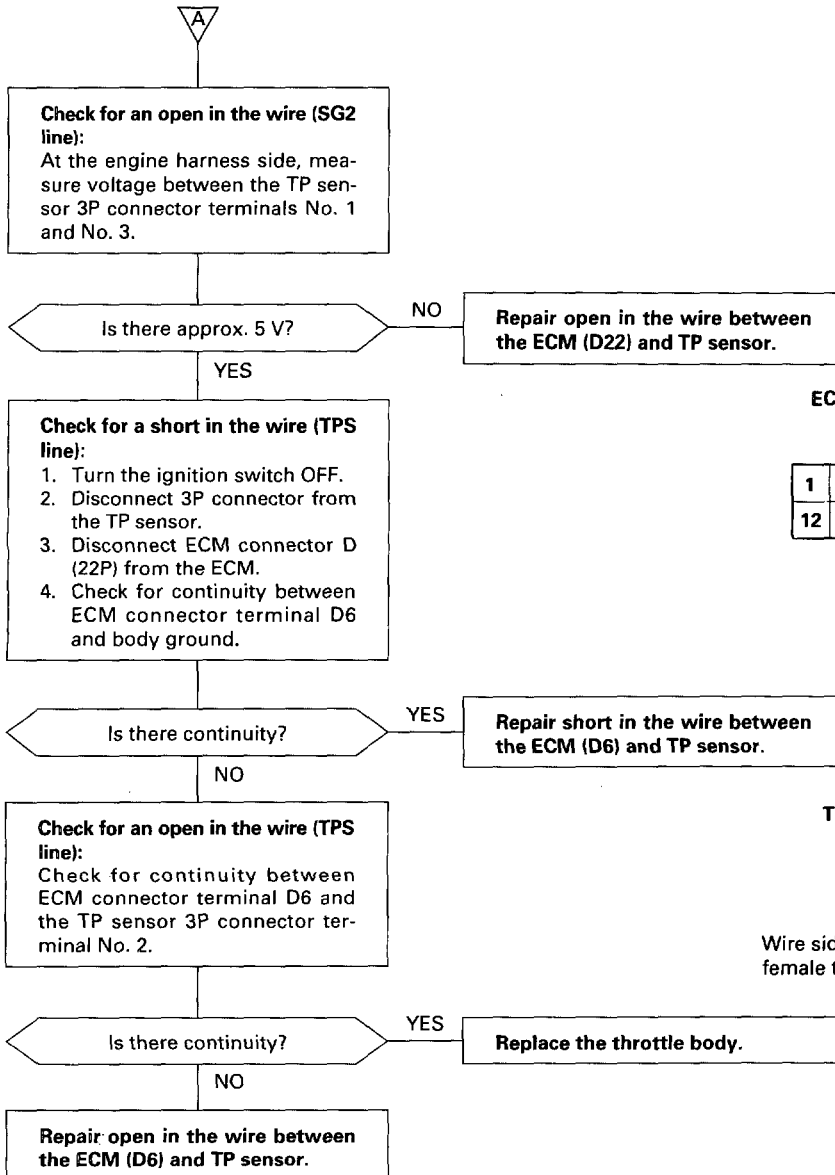
(To page 11-B-38)

(cont'd)

# PGM-FI System

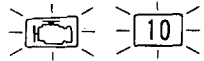
## Throttle Position (TP) Sensor (cont'd)

(From page 11-B-37)





# Intake Air Temperature (IAT) Sensor



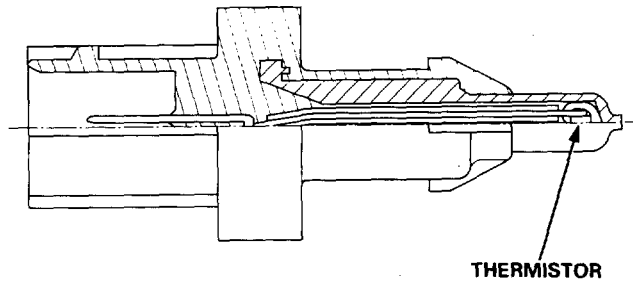
The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 10: A problem in the Intake Air Temperature (IAT) Sensor circuit.

The IAT sensor is a temperature dependant resistor (thermistor). The resistance of the thermister decreases as the air temperature increases as shown below.

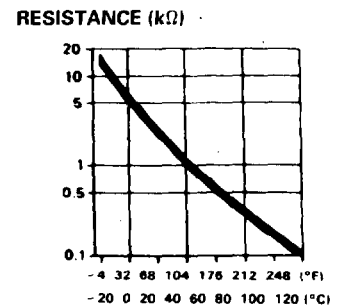
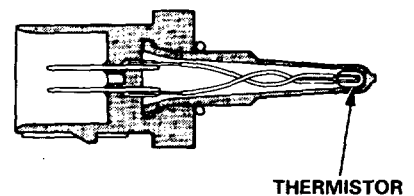
— The MIL has been reported on.  
— With the SCS short connector connected (see page 11-B-14), code 10 is indicated.

**Problem verification:**  
1. Do the ECM Reset Procedure (see page 11-B-15).  
2. Turn the ignition switch ON (II).

**D15Z8 engine:**



**B18C4 engine:**



Is the MIL on and does it indicate code 10?

NO

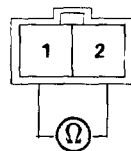
Intermittent failure, system is OK at this time (test-drive may be necessary). Check for poor connections or loose wires between the IAT sensor and the ECM.

YES

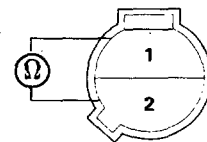
**Check the sensor resistance:**  
1. Turn the ignition switch OFF.  
2. Disconnect 2P connector from the IAT sensor.  
3. Measure resistance between the 2 terminals on the IAT sensor.  
NOTE: You may need to remove the IAT sensor to access the terminals

**IAT SENSOR 2P CONNECTOR**

**D15Z8 engine:**



**B18C4 engine:**



Terminal side of male terminals

Is there 0.4 – 4.0 kΩ?

NO

Replace the IAT sensor.

YES

(To page 11-B-40)

(cont'd)

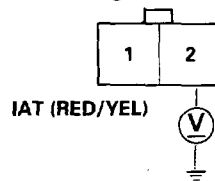


# PGM-FI System

## Intake Air Temperature (IAT) Sensor (cont'd)

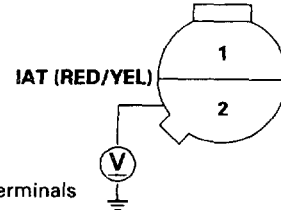
(From page 11-B-39)

**D1528 engine:**

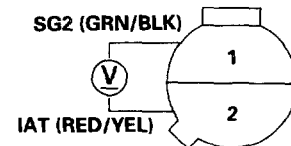
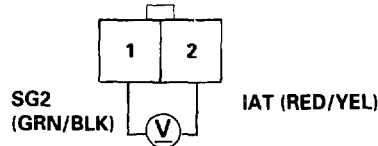


**IAT SENSOR 2P CONNECTOR**

**B18C4 engine:**



Wire side of female terminals



**Check the ECM output voltage (IAT line):**  
 1. Turn the ignition switch ON (II).  
 2. At the engine harness side, measure voltage between IAT sensor 2P connector terminal No. 2 and body ground.

Is there approx. 5 V?  
 YES  
 NO

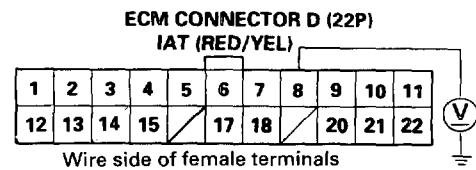
**Check for an open in the wire (SG2 line):**  
 Measure voltage between the IAT sensor 2P connector terminal No. 1 and No. 2.

Is there approx. 5 V?  
 YES  
 NO

**Repair open in the wire between the ECM (D22) and IAT sensor.**

**Check for an open in the wire (IAT line):**  
 Measure voltage between ECM connector terminal D8 and body ground.

**Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.**



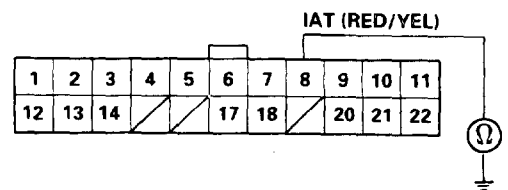
Is there approx. 5 V?  
 YES  
 NO

**Repair open in the wire between the ECM (D8) and IAT sensor.**

**Check for a short in the wire (IAT line):**  
 1. Turn the ignition switch OFF.  
 2. Disconnect ECM connector D (22P) from the ECM.  
 3. Check the continuity between ECM connector terminal D8 and body ground.

Is there continuity?  
 YES  
 NO

**Repair short in the wire between the ECM (D8) and IAT sensor.**



**Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.**



# Ignition Output Signal



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 15: A problem in the Ignition Output Signal circuit.

— The MIL has been reported on.  
— With the SCS short connector connected (see page 11-B-14), code 15 is indicated.

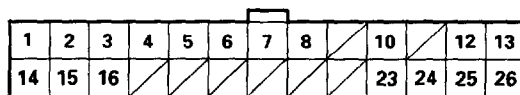
**Problem verification:**  
1. Do the ECM Reset Procedure (see page 11-B-15).  
2. Start the engine.

Is the MIL on and does it indicate code 15?

NO

Intermittent failure, system is OK at this time (test-drive may be necessary). Check for poor connections or loose wires between the distributor and the ECM.

ECM CONNECTOR A (26P)



ICM (YEL/GRN) LG1 (BRN/BLK)

Wire side of female terminals

**Check the ICM output voltage:**  
1. Turn the ignition switch OFF.  
2. Turn the ignition switch ON (II).  
3. Measure voltage between ECM connector terminals A24 and A26.

Is there battery voltage?

YES

Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.

NO

**Check the ICM input voltage:**  
1. Turn the ignition switch OFF.  
2. Disconnect 2P connector from the distributor.  
3. Turn the ignition switch ON (II).  
4. Measure voltage between the distributor 2P connector terminal No. 2 and body ground (B18C4 engine: Measure voltage between the distributor 10P connector terminal No. 10 and body ground).

Is there battery voltage?

NO

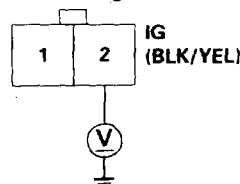
Repair open in the wire between the distributor and the ignition switch.

YES

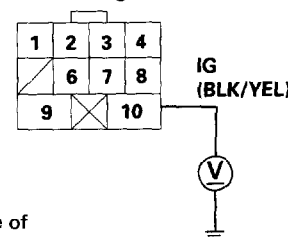
— Replace the ICM.  
— Repair open or short in the wire between the ICM and the ECM (A24).  
NOTE: If the YEL/GRN wire was shorted, the ICM may be damaged.

DISTRIBUTOR CONNECTOR

D15Z8 engine:



B18C4 engine:



Wire side of female terminals

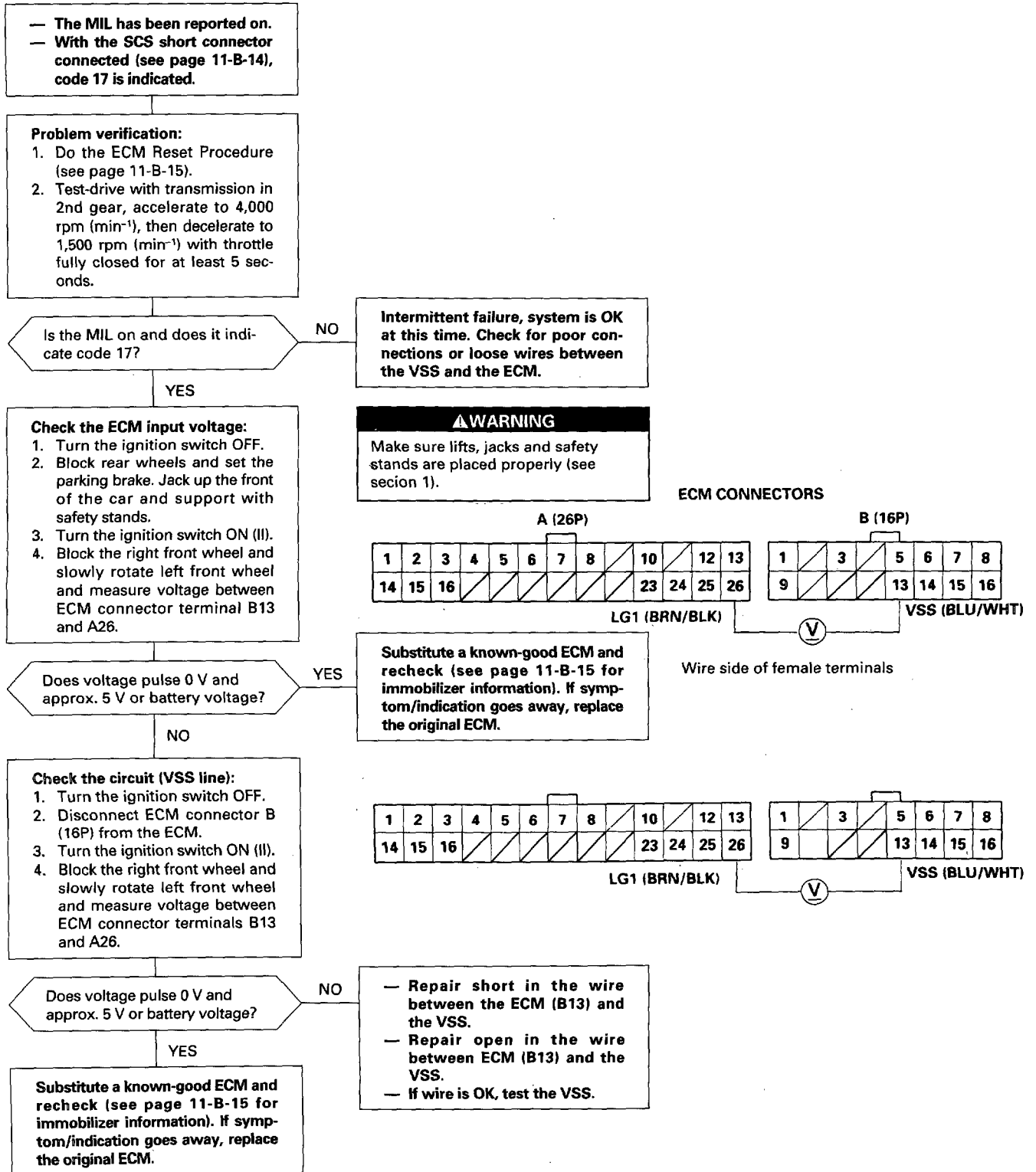
# PGM-FI System

## Vehicle Speed Sensor (VSS)



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 17: A problem in the Vehicle Speed Sensor (VSS) circuit.

The VSS generates a pulsing signal when the front wheels turn.





# Heated Oxygen Sensor Heater

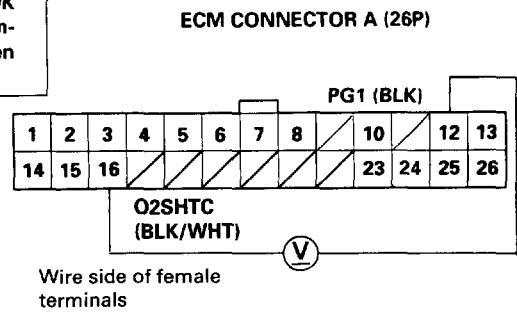
The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 41: A problem in the Heated Oxygen Sensor (HO2S) Heater circuit.

— The MIL has been reported on.  
— With the SCS short connector connected (see page 11-B-14), code 41 is indicated.

**Problem verification:**  
1. Do the ECM Reset Procedure (see page 11-B-15).  
2. Start the engine.

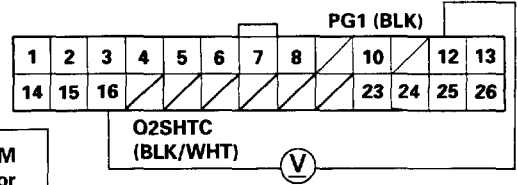
Is the MIL on and does it indicate code 41?  
NO → Intermittent failure, system is OK at this time. Check for poor connections or loose wires between the HO2S and the ECM.

YES  
**Check the ECM input voltage:**  
1. Turn the ignition switch OFF.  
2. Turn the ignition switch ON (II).  
3. Measure voltage between ECM connector terminals A16 and A12.



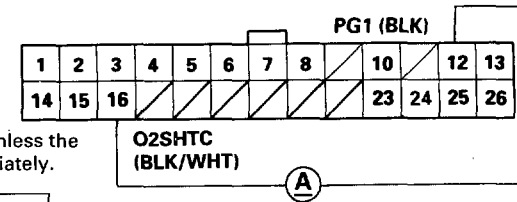
Is there battery voltage?  
NO → A (To page 11-B-44)  
YES

**Check the ECM input voltage:** With the voltmeter still connected between ECM connector terminals A16 and A12, start the engine.



Is there less than 0.1 V?  
NO → Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.  
YES

**Check the ECM input current:**  
1. Turn the ignition switch OFF.  
2. Disconnect ECM connector A (26P) from the ECM.  
3. Connect an ammeter between ECM connector terminals A16 and A12.  
4. Turn the ignition switch ON (II).



Is the current less than 0.1 A\*?  
YES → Replace the HO2S (see page 11-B-48).  
NO

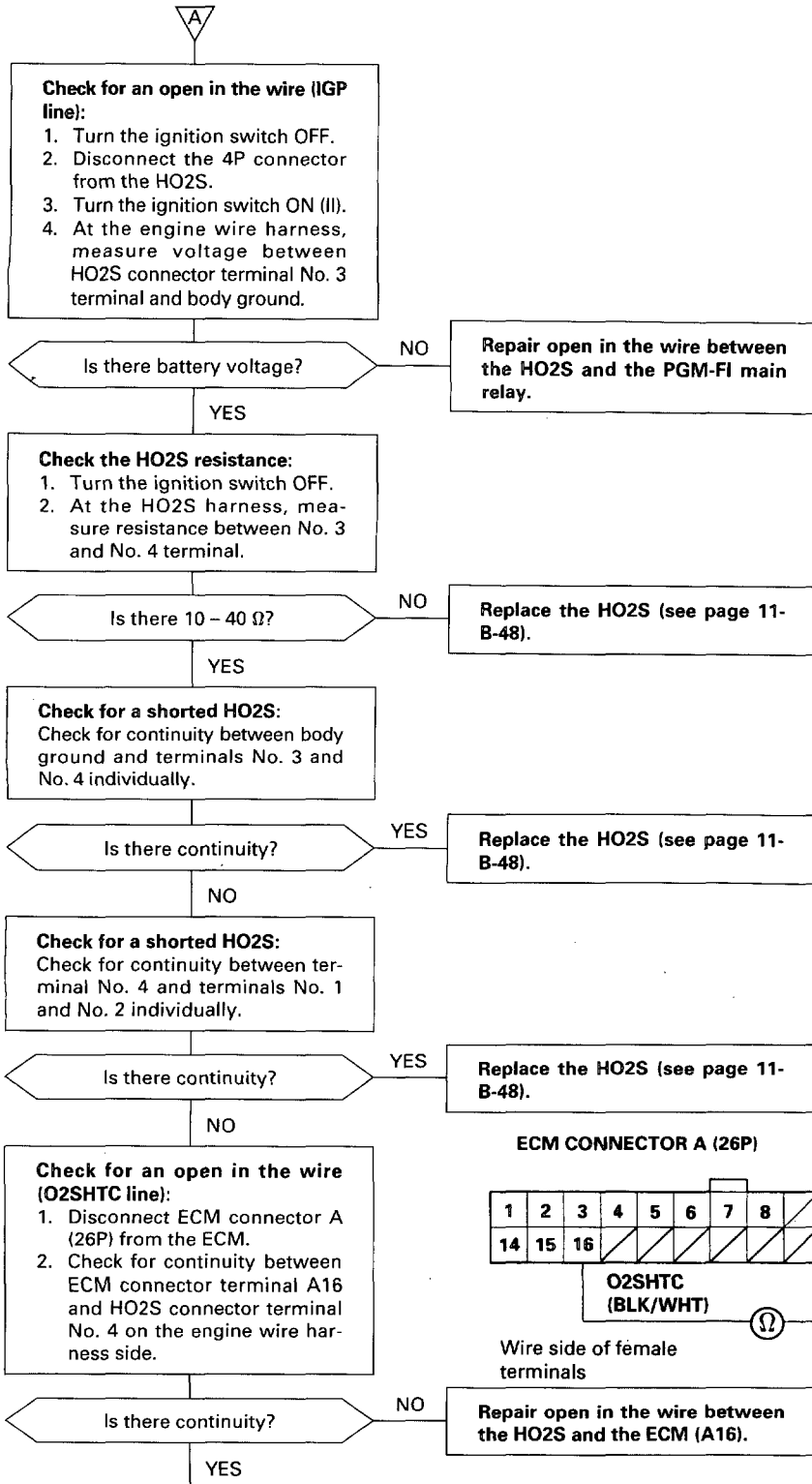
Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.

(cont'd)

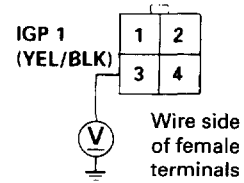
# PGM-FI System

## Heated Oxygen Sensor Heater (cont'd)

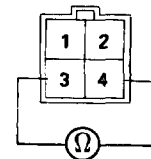
(From page 11-B-43)



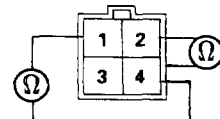
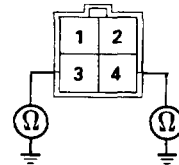
HO2S 4P CONNECTOR



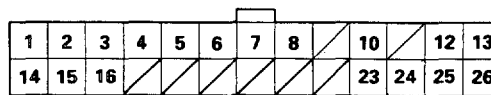
HO2S 4P CONNECTOR



Terminal side of male terminals



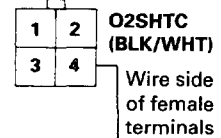
ECM CONNECTOR A (26P)



O2SHTC (BLK/WHT)

Wire side of female terminals

HO2S 4P CONNECTOR



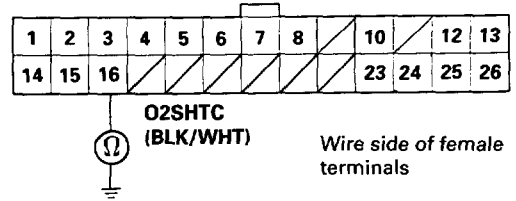
Wire side of female terminals

(To page 11-B-45)



(From page 11-B-44)

ECM CONNECTOR A (26P)



**Check for a short in the wire (O2SHTC line):**  
Check for continuity between ECM connector terminal A16 and body ground.

Is there continuity?

YES

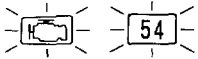
Repair short in the wire between the HO2S and ECM (A16).

NO

Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.

# PGM-FI System

## CKF Sensor (D15Z8 engine)



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 54: A problem in the Crankshaft Speed Fluctuation Sensor circuit.

The diagnostic system has a pulser rotor on the crankshaft and a pulse pick-up sensor on the engine block. The ECM monitors the crankshaft speed fluctuation based on the CKF sensor signal, and judges that the air-fuel ratio.

- The MIL has been reported on.
- With the SCS short connector connected (see page 11-B-14), code 54 is indicated.

### Problem verification:

1. Do the ECM Reset Procedure (see page 11-B-15).
2. Start the engine.



CKF SENSOR

Is the MIL on and does it indicate code 54?

NO

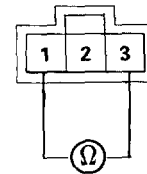
Intermittent failure, system is OK at this time (test-drive may be necessary). Check for poor connections or loose wires between the CKF sensor and the ECM.

YES

### Check the sensor resistance:

1. Turn the ignition switch OFF.
2. Disconnect the CKF sensor 3P connector.
3. Measure resistance between the CKF sensor 3P connector terminals No. 1 and No. 3.

CKF SENSOR 3P CONNECTOR



Terminal side of male terminals

Is there 1.6 – 3.2 k $\Omega$ ?

NO

Replace the CKF sensor.

YES

(To page 11-B-47)



(From page 11-B-46)

**Check the sensor for a short:**  
Check for continuity to body ground on the CKF sensor 3P connector terminals No. 1 and No. 3 individually.

Is there continuity?

YES

Replace the CKF sensor (see section 6).

NO

**Check for an open in the wire:**  
1. Reconnect the 3P connector.  
2. Disconnect ECM connector D (22P) from the ECM.  
3. Measure resistance between ECM connector terminals D3 and D14.

Is there 1.6 – 3.2 k $\Omega$ ?

NO

— Repair open in the wire between ECM (D3) and CKF sensor.  
— Repair open in the wire between ECM (D14) and CKF sensor.

YES

**Check for a short in the wire (CKF line):**  
Check for continuity between body ground and ECM connector terminal D3.

Is there continuity?

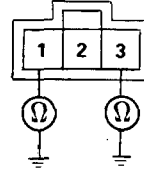
YES

Repair short in the wire between ECM (D3) and CKF sensor.

NO

Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.

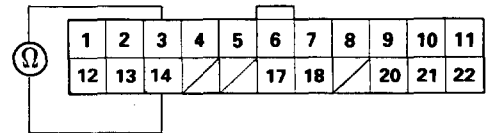
CKF SENSOR  
3P CONNECTOR



Terminal side of male terminals

ECM CONNECTOR D (22P)

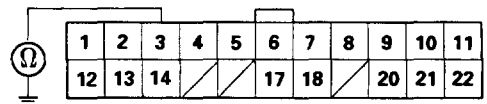
CKF P  
(BLU/RED)



CKF M  
(WHT/BLU)

Wire side of female terminals

CKF P  
(BLU/RED)





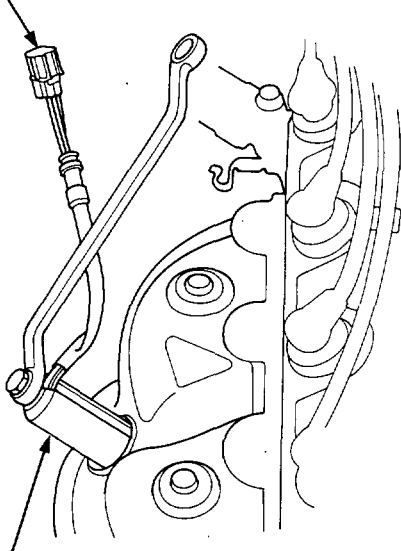
# Heated Oxygen Sensor

## Replacement

1. Disconnect the HO2S 4P connector, then remove the HO2S.

**D15Z8 engine:**

HO2S 4P  
CONNECTOR

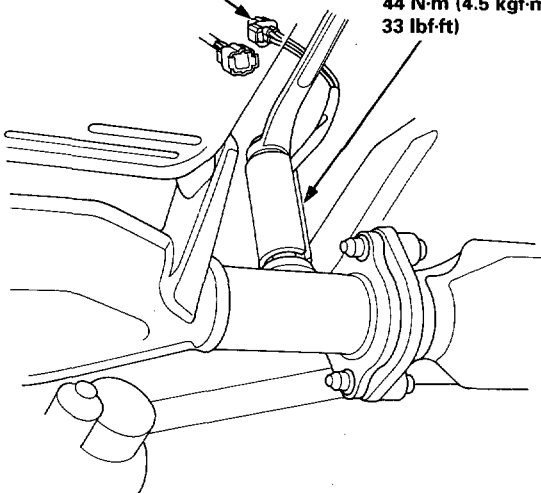


O<sub>2</sub> SENSOR SOCKET  
WRENCH  
07LAA - PT50101  
44 N·m (4.5 kgf·m, 33 lbf·ft)

**B18C4 engine:**

HO2S 4P CONNECTOR

O<sub>2</sub> SENSOR SOCKET  
WRENCH  
07LAA - PT50101  
44 N·m (4.5 kgf·m,  
33 lbf·ft)



2. Install the HO2S in reverse order of removal.



## System Troubleshooting Guide

### NOTE:

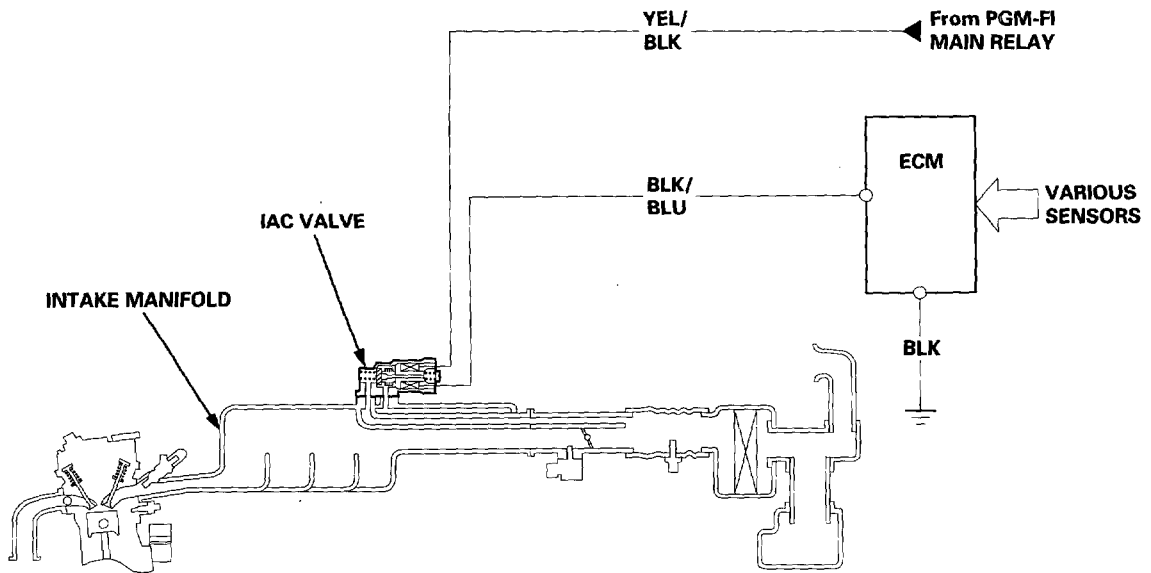
- Across each row in the chart, the sub-systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- If the idle speed is out of specification and the Malfunction indicator Lamp (MIL) does not blink Diagnostic Trouble Code (DTC) 14, go to inspection described on page 11-B-51.

PAGE	SUB-SYSTEM	IDLE ADJUSTING SCREW	IDLE AIR CONTROL VALVE	AIR CONDITIONING SIGNAL	ALTERNATOR FR SIGNAL	BRAKE SWITCH SIGNAL	STARTER SWITCH SIGNAL	HOSES AND CONNECTIONS
		11-B-58	11-B-52	11-B-53	11-B-55	11-B-56	11-B-57	—
	SYMPTOM							
	DIFFICULT TO START ENGINE WHEN COLD						①	
	WHEN COLD FAST IDLE OUT OF SPEC [1,000 – 2,000 rpm (min <sup>-1</sup> )]	②	①					
	ROUGH IDLE		②					①
	WHEN WARM ENGINE SPEED TOO HIGH	②	①					②
WHEN WARM RPM TOO LOW	Idle speed is below specified engine speed (no load)	②	①					
	Idle speed does not increase after initial start up.		①					
	Idle speeds drops when air conditioner in ON		②	①				
	Idle speed fluctuates with electrical load		②		③			①
FREQUENT STALLING	WHILE WARMING UP	②	①					
	AFTER WARMING UP	①	②					
	FAILS EMISSION TEST							①

# Idle Control System

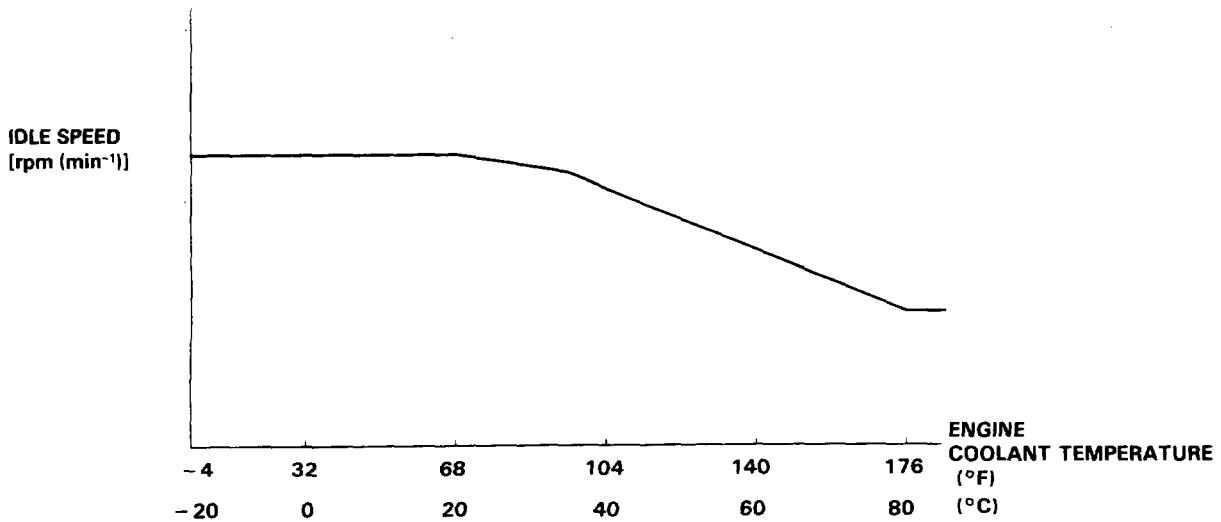
## System Description

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





1. After the engine starts, the IAC valve opens for a certain time. The amount of air is increased to raise the idle speed about 150 – 300 rpm ( $\text{min}^{-1}$ ).
2. When the coolant temperature is low, the IAC valve is opened to obtain the proper fast idle speed. The amount of bypassed air is thus controlled in relation to the engine coolant temperature.



1. When the idle speed is out of specification and the Malfunction Indicator Lamp (MIL) does not blink Diagnostic Trouble Code (DTC) 14, check the following items:
  - Adjust the idle speed (see page 11-B-58)
  - Air conditioning signal (see page 11-B-53)
  - ALT FR signal (see page 11-B-55)
  - Brake switch signal (see page 11-B-56)
  - Starter switch signal (see page 11-B-57)
  - Hoses and connections
  - IAC valve and its mounting O-rings
2. If the above items are normal, substitute known-good IAC valve and readjust the idle speed (see page 11-B-58).
  - If the idle speed still cannot be adjusted to specification (and the MIL does not blink code 14) after IAC valve replacement, substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom goes away, replace the original ECM.

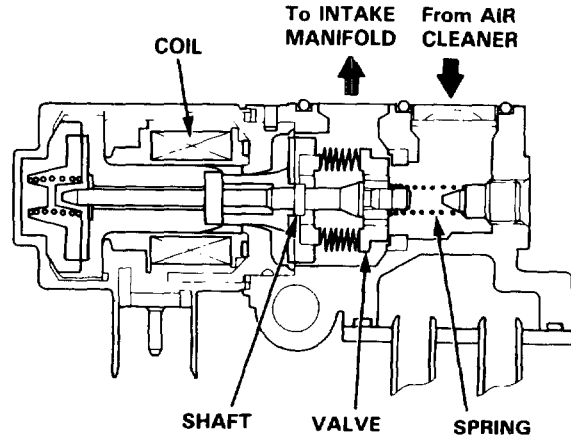
# Idle Control System

## Idle Air Control (IAC) Valve



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 14: A problem in the Idle Air Control (IAC) Valve circuit.

The IAC Valve changes the amount of air bypassing the throttle body in response to a current signal from the ECM in order to maintain the proper idle speed.



— The MIL has been reported on.  
— With the SCS short connector connected (see page 11-B-14), code 14 is indicated.

**Problem verification:**

1. Do the ECM Reset Procedure (see page 11-B-15).
2. Start the engine.

Is the MIL on and does it indicate code 14?

NO

**Check the IAC valve:**

1. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (transmission in neutral) until the radiator fan comes on, then let it idle.
2. With the engine running and the accelerator pedal released, disconnect the 2P connector from the IAC valve.

Is there a reduction in engine rpm?

YES

Intermittent failure, system is OK at this time (test-drive may be necessary).  
Check for poor connections or loose wires between the IAC valve and the ECM.

NO

Substitute a known-good IAC valve and retest. If symptom goes away, replace the original IAC valve.

**Check for an open in the wire (IGP line):**

1. Disconnect the 2P connector from the IAC valve.
2. At the engine wire harness measure voltage between the IAC valve 2P connector terminal No. 2 and body ground.

Is there battery voltage?

NO

Repair open in the wire between the IAC valve and the PGM-FI main relay.

YES

**Check the circuit:**

1. Turn the ignition switch OFF and reconnect the 2P connector to the IAC valve.
2. Disconnect ECM connector A (26P) from the ECM.
3. Turn the ignition switch ON (II).
4. Momentarily connect ECM connector terminals A5 to A12 several times.

Does the IAC valve click?

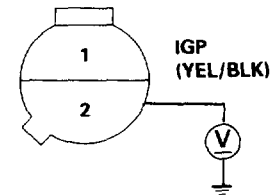
YES

Substitute a known-good ECM and retest (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.

NO

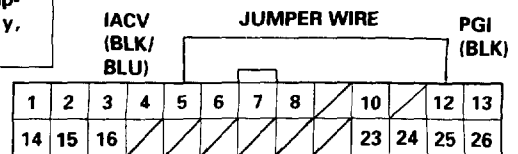
Check for an open or short in the wire between the ECM (A5) and the IAC valve. If wire is OK, replace the IAC valve.

IAC VALVE 2P CONNECTOR



Wire side of female terminals

ECM CONNECTOR A (26P)



Wire side of female terminals

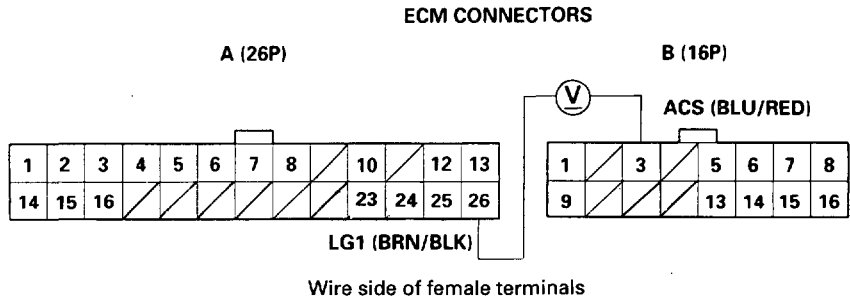


# Air Conditioning Signal

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

**Inspection of Air Conditioning Signal.**

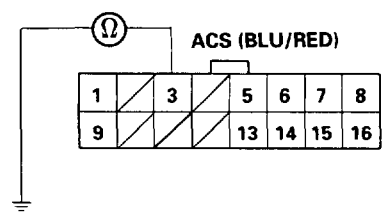
**Check the ECM output voltage (ACS line):**  
 1. Turn the ignition switch OFF.  
 2. Disconnect the 2P connector from the A/C pressure switch.  
 3. Turn the ignition switch ON (II).  
 4. Measure voltage between ECM connector terminals B3 and A26.



Is there approx. 5 V?

YES

**Check for a short in the wire (ACS line):**  
 1. Turn the ignition switch OFF.  
 2. Disconnect ECM connector B (16P) from the ECM.  
 3. Check for continuity between ECM connector terminal B3 and body ground.



Is there continuity?

YES

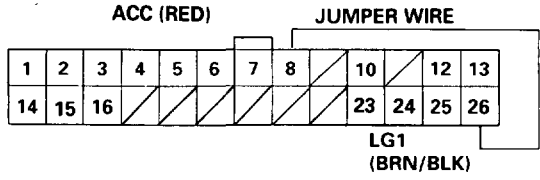
NO

**Repair short in the wire between the ECM (B3) and the A/C pressure switch.**

**Check the A/C compressor Clutch:**  
 1. Turn the ignition switch OFF.  
 2. Reconnect the A/C pressure switch 2P connector to the A/C pressure switch.  
 3. Turn the ignition switch ON (II).  
 4. Momentarily connect ECM connector terminals A8 and A26 several times.

— Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If prescribed voltage is now available, replace the original ECM.  
 — See the air conditioner inspection (see section 22).

(To page 11-B-54)

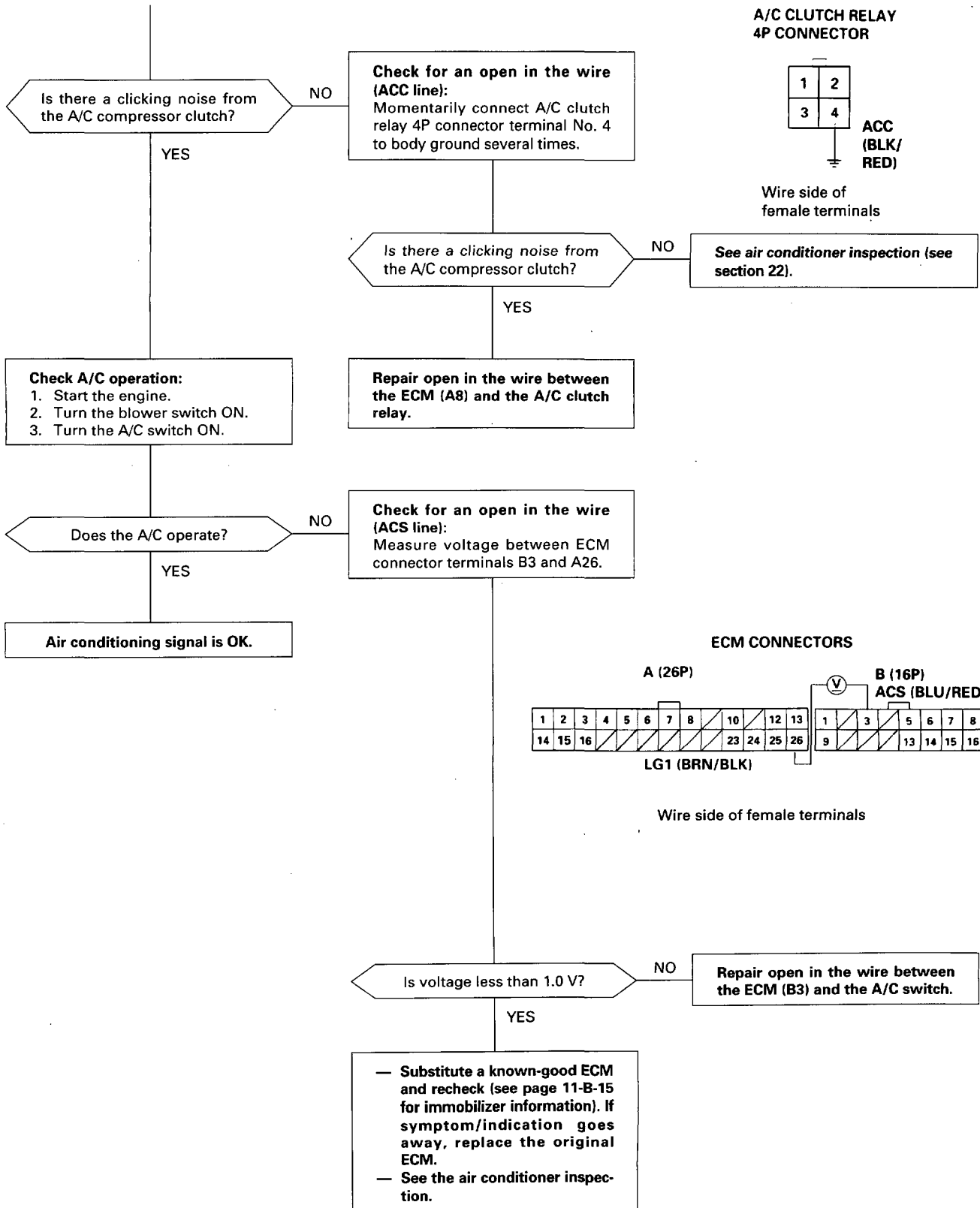


(cont'd)

# Idle Control System

## Air Conditioning Signal (cont'd)

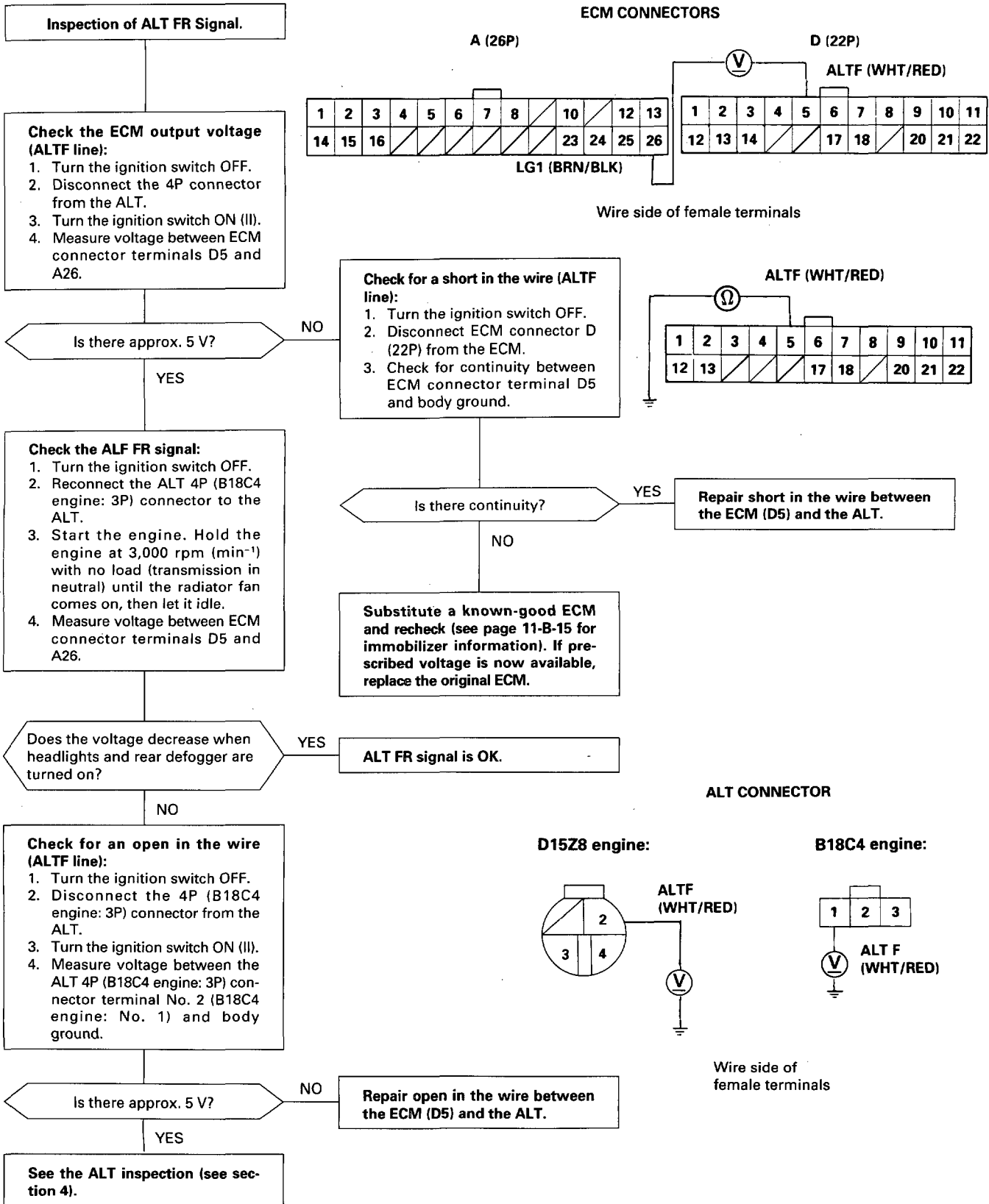
(From page 11-B-53)





# Alternator (ALT) FR Signal

This signals the ECM when the Alternator (ALT) is charging.

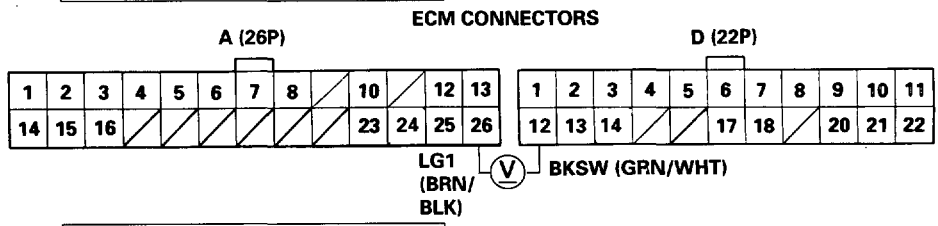
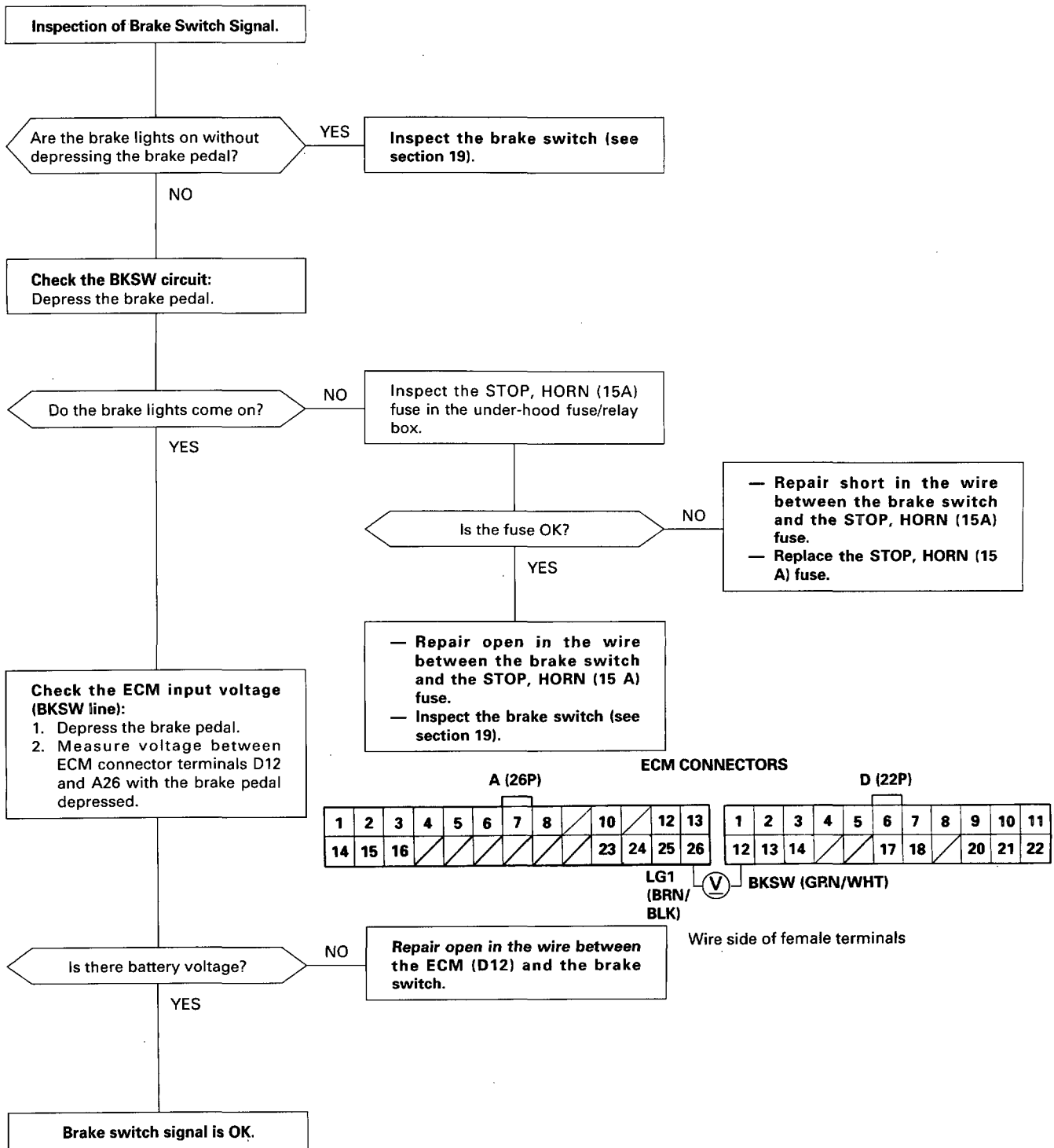




# Idle Control System

## Brake Switch Signal

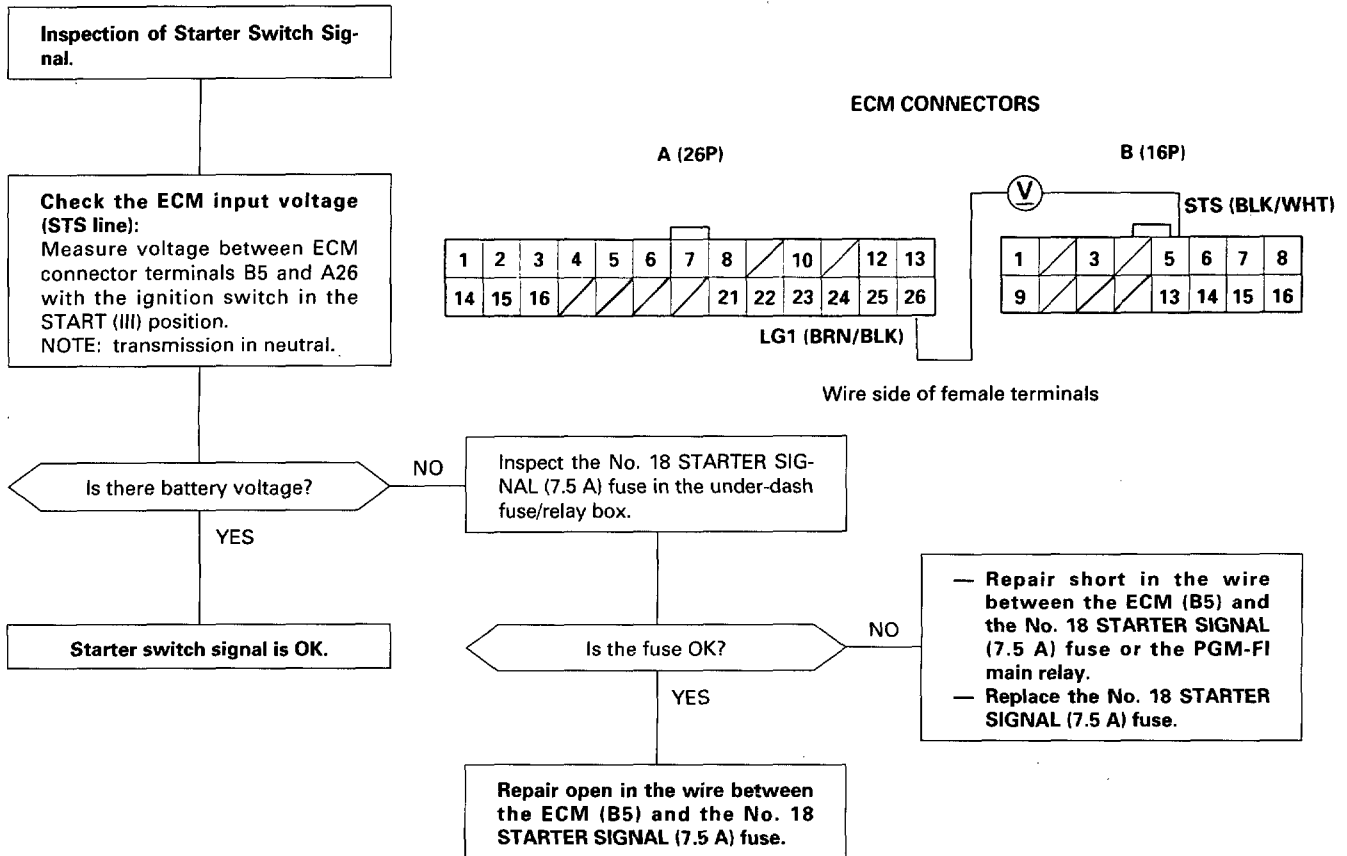
This signals the ECM when the brake pedal is depressed.





## Starter Switch Signal

This signals the ECM when the engine is cranking.



# Idle Control System

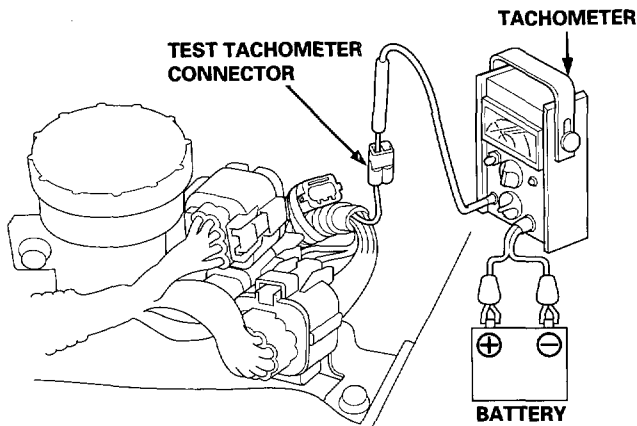
## Idle Speed Setting

### Inspection/Adjustment

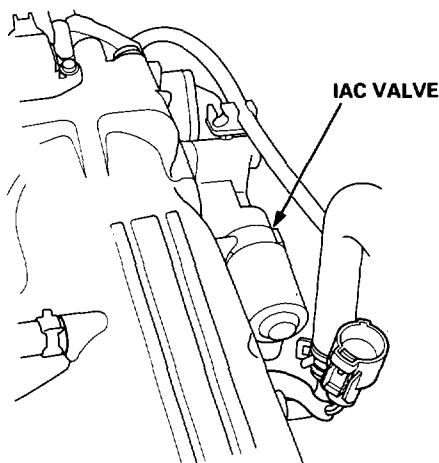
NOTE: Before setting the idle speed, check the following items:

- The MIL has not been reported on.
- Ignition timing
- Spark plugs
- Air cleaner
- PCV system

1. Connect a tachometer.



2. Start the engine. Hold the engine at 3,000 rpm (min<sup>-1</sup>) with no load (transmission in neutral) until the radiator fan comes on, then let it idle.
3. Disconnect the 2P connector from the Idle Air Control (IAC) valve.



4. Start the engine with the accelerator pedal slightly depressed. Stabilize the engine speed at 1,000 rpm (min<sup>-1</sup>), then slowly release the pedal until the engine idles.

5. Check idling in no-load conditions: headlights, blower fan, rear defogger, radiator fan, and air conditioner are not operating.

NOTE: (KS model) Remove No. 16 RUNNING LIGHT RELAY (7.5 A) fuse in the under-dash fuse box, then check that the headlights and side marker lights are off.

Idle speed should be:

D15Z8 engine:

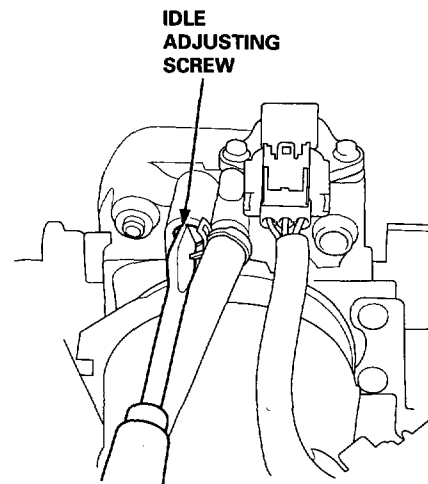
450 ± 50 rpm (min<sup>-1</sup>)

B18C4 engine:

480 ± 50 rpm (min<sup>-1</sup>)

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

NOTE: After adjusting the idle speed in this step, check the ignition timing (see section 4). If it is out of spec, go back to step 4.



6. Turn the ignition switch OFF.
7. Reconnect the 2P connector on the IAC valve, then remove the BACK UP (7.5 A) fuse in the under-hood fuse/relay box for 10 seconds to reset the ECM.



- 
8. Restart and idle the engine with no-load conditions for one minute, then check the idle speed.

NOTE: (KS model) Remove No. 16 RUNNING LIGHT RELAY (7.5 A) fuse in the under-dash fuse box, then check that the headlights and side marker lights are off.

**Idle speed should be:**

**D15Z8 engine:**

750 ± 50 rpm (min<sup>-1</sup>)

**B18C4 engine:**

800 ± 50 rpm (min<sup>-1</sup>)

9. Idle the engine for one minute with headlights (Low) ON and check the idle speed.

**Idle speed should be:**

**D15Z8 engine:**

750 ± 50 rpm (min<sup>-1</sup>)

**B18C4 engine:**

800 ± 50 rpm (min<sup>-1</sup>)

10. Turn the headlights off.  
Idle the engine for one minute with heater fan switch at HI and air conditioner on, then check the idle speed.

**Idle speed should be:**

**D15Z8 engine:**

810 ± 50 rpm (min<sup>-1</sup>)

**B18C4 engine:**

870 ± 50 rpm (min<sup>-1</sup>)

NOTE: If the idle speed is not within specification, see System Troubleshooting Guide on page 11-B-49.

# Fuel Supply System

## System Troubleshooting Guide

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

PAGE	SUB-SYSTEM	FUEL LINES	FUEL INJECTOR	FUEL PRESSURE REGULATOR	FUEL FILTER	FUEL PUMP	PGM-FI MAIN RELAY	CONTAMINATED FUEL
		11-A-62	11-B-62	11-B-65	11-B-66	11-A-74	11-B-66	—
	ENGINE WON'T START		③		③	①	②	
	DIFRICULT TO START ENGINE WHEN COLD OR HOT				①	②		
	ROUGH IDLE		①					②
POOR PERFOR- MANCE	MISFIRE OR ROUGH RUNNING		①	②				②
	FAILS EMISSION TEST		②	①				
	LOSS OF POWER		③		②	①		
FREQUENT STALLING	WHILE WARMING UP			①				
	AFTER WARMING UP			①				



## Fuel Pressure

### Relieving

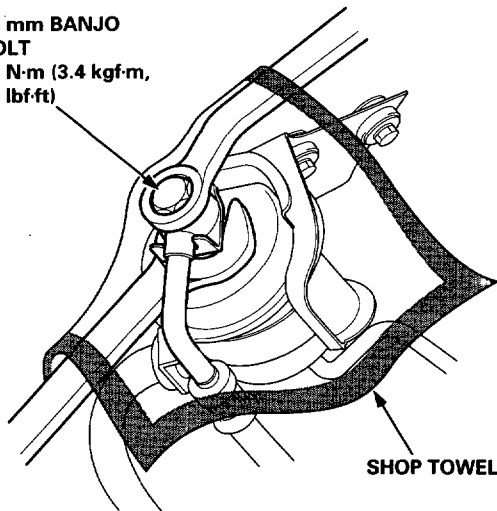
Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the 12 mm banjo bolt on top of the fuel filter.

### ⚠ WARNING

Do not smoke while working on the fuel system. Keep open flames or sparks away from the work area. Be sure to relieve fuel pressure while the ignition switch is off.

1. Disconnect the battery negative cable from the battery negative terminal.
2. Remove the fuel fill cap.
3. Use a box end wrench on the 12 mm banjo bolt at the fuel filter, while holding the fuel filter with another wrench.
4. Place a rag or shop towel over the 12 mm banjo bolt.
5. Slowly loosen the 12 mm banjo bolt one complete turn.

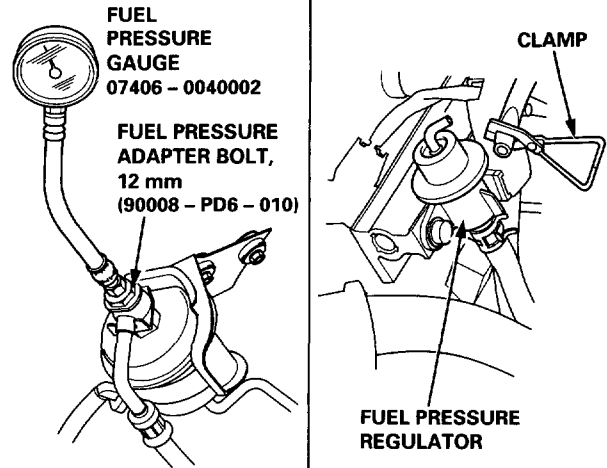
12 mm BANJO BOLT  
33 N·m (3.4 kgf·m,  
25 lbf·ft)



NOTE: Replace all washers whenever the 12 mm banjo bolt is loosened or removed.

### Inspection

1. Relieve fuel pressure.
2. Remove the 12 mm banjo bolt from the fuel filter while holding the fuel filter with another wrench. Attach the fuel pressure adapter bolt, 12 mm (90008 - PD6 - 010) and the special tool.



3. Start the engine. Measure the fuel pressure with the engine idling and the vacuum hose of the fuel pressure regulator disconnected from the fuel pressure regulator and pinched. If the engine will not start, turn the ignition switch ON (II), wait for two seconds, turn it off, then back on again and read the fuel pressure.

#### Pressure should be:

##### D15Z8 engine:

270 - 320 kPa (2.8 - 3.3 kgf/cm<sup>2</sup>, 40 - 47 psi)

##### B18C4 engine:

320 - 370 kPa (3.3 - 3.8 kgf/cm<sup>2</sup>, 47 - 54 psi)

4. Reconnect vacuum hose to the fuel pressure regulator.

#### Pressure should be:

##### D15Z8 engine:

211 - 260 kPa (2.15 - 2.65 kgf/cm<sup>2</sup>, 31 - 38 psi)

##### B18C4 engine:

260 - 310 kPa (2.7 - 3.2 kgf/cm<sup>2</sup>, 38 - 46 psi)

If the fuel pressure is not as specified, first check the fuel pump (see page 11-A-74). If the fuel pump is OK, check the following:

- If the fuel pressure is higher than specified, inspect for:
  - Pinched or clogged fuel return hose or line.
  - Faulty fuel pressure regulator (see page 11-B-65).
- If the fuel pressure is lower than specified, inspect for:
  - Clogged fuel filter.
  - Faulty fuel pressure regulator (see page 11-B-65).
  - Fuel line leakage.

# Fuel Supply System

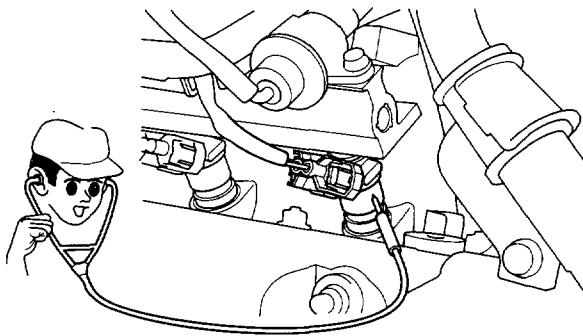
## Fuel Injectors

### Testing

NOTE: Check the following items before testing: idle speed, ignition timing and idle CO%.

#### If the engine runs:

1. With the engine idling, disconnect each fuel injector connector individually and inspect the change in the idle speed.
  - If the idle speed drop is almost the same for each cylinder, the fuel injectors are normal.
  - If the idle speed or quality remains the same when you disconnect a particular fuel injector, replace the fuel injector and retest.
2. Check the clicking sound of each fuel injector by means of a stethoscope when the engine is idling.



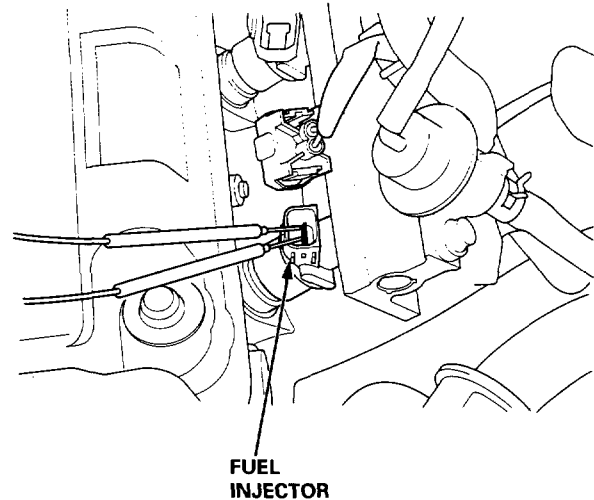
- If any fuel injector fails to make the typical clicking sound, check the sound again after replacing the fuel injector.
- If clicking sound is still absent, check the following:
  - Whether there is any short-circuiting, wire breakage or poor connection in the YEL/BLK wire between the PGM-FI main relay and the junction connector.
  - Whether the junction connector is open or corroded.
  - Whether there is any short-circuiting, wire breakage or poor connection in the YEL/BLK wire between the junction connector and the fuel injector.
  - Whether there is any short-circuiting, wire breakage or poor connection in the wire between the fuel injector and the ECM.

If all is OK, check the ECM (see page 11-B-25) and PGM-FI main relay (see page 11-B-66).

#### If the engine cannot be started:

1. Remove the connector of the fuel injector, and measure the resistance between the 2 terminals of the fuel injector.

Resistance should be: 10 – 13  $\Omega$



- If the resistance is not as specified, replace the fuel injector.
- If the resistance is as specified, check the fuel pressure (see page 11-B-61).
- If the fuel pressure is as specified, check the following:
  - Whether there is any short-circuiting, wire breakage or poor connection in the YEL/BLK wire between the PGM-FI main relay and the junction connector.
  - Whether the junction connector is open or corroded.
  - Whether there is any short-circuiting, wire breakage, or poor connection in the YEL/BLK wire between the junction connector and the fuel injector.
  - Whether there is any short-circuiting, wire breakage or poor connection in the wire between the fuel injector and the ECM.

If all is OK, check the ECM (see page 11-B-25).



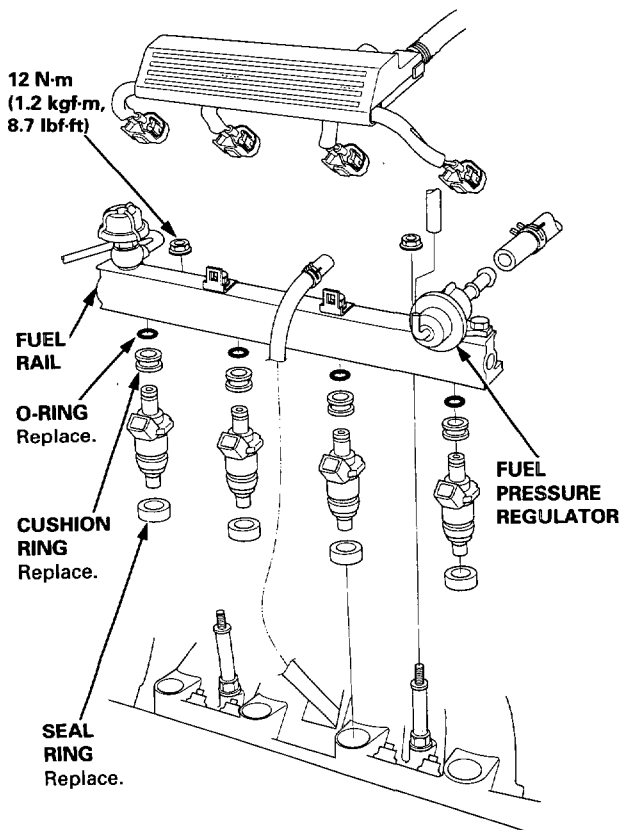
## Replacement

### **⚠ WARNING**

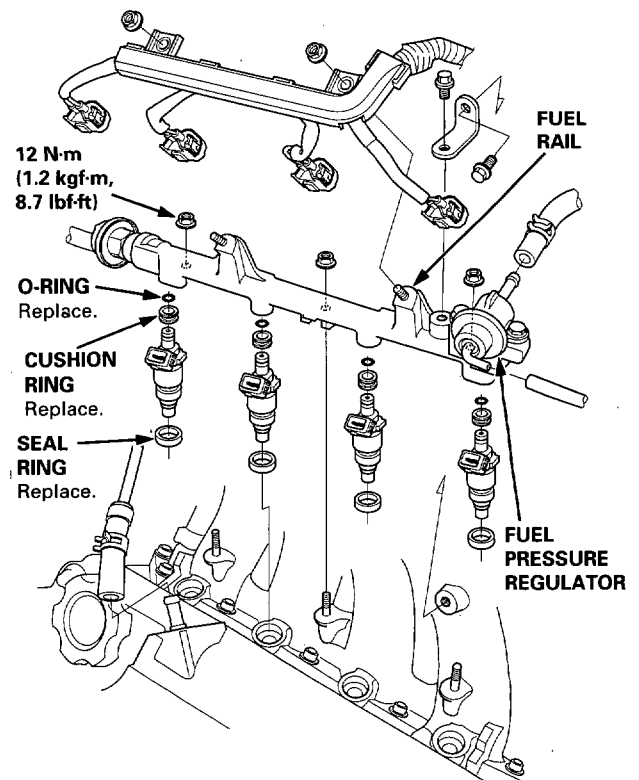
Do not smoke when working on the fuel system.  
Keep open flames away from your work area.

1. Relieve the fuel pressure (see page 11-B-61).
2. Disconnect the connectors from the fuel injectors.
3. Disconnect the vacuum hoses and fuel return hose from the fuel pressure regulator.  
NOTE: Place a rag or shop towel over the hoses before disconnecting them.
4. Loosen the retainer nuts on the fuel rail.
5. Disconnect the fuel rail.
6. Remove the fuel injectors from the intake manifold.

#### D15Z8 engine:



#### B18C4 engine:



7. Slide new cushion rings onto the fuel injectors.
8. Coat new O-rings with clean engine oil, and put them on the fuel injectors.
9. Insert the fuel injectors into the fuel rail first.
10. Coat new seal rings with clean engine oil, and press them into the intake manifold.

(cont'd)

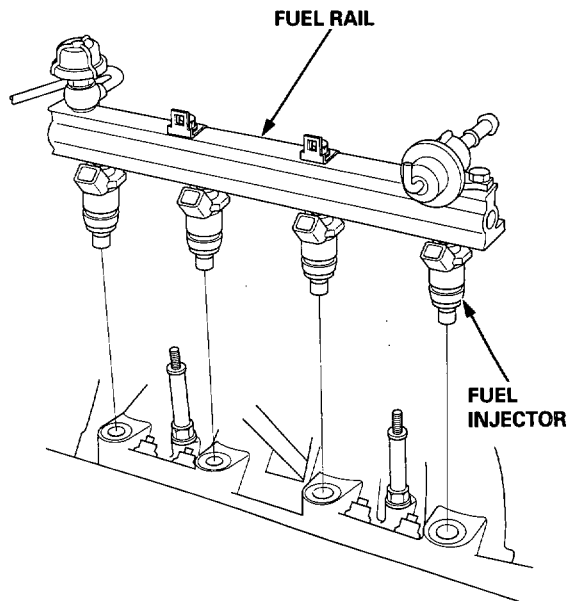


# Fuel Supply System

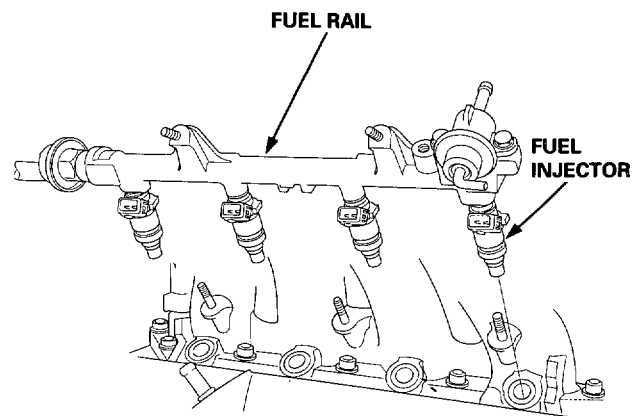
## Fuel Injectors (cont'd)

11. Install the fuel injectors and fuel rail assembly in the intake manifold.
12. To prevent damage to the O-rings, install the fuel injectors in the fuel rail first, then install them in the intake manifold.

D15Z8 engine:



B18C4 engine:



13. Install and tighten the retainer nuts.
14. Connect the vacuum hoses and fuel return hose to the fuel pressure regulator.
15. Install the connectors on the fuel injectors.
16. Turn the ignition switch ON (II), but do not operate the starter. After the fuel pump runs for approximately two seconds, the fuel pressure in the fuel line rises. Repeat this two or three times, then check whether there is any fuel leakage.



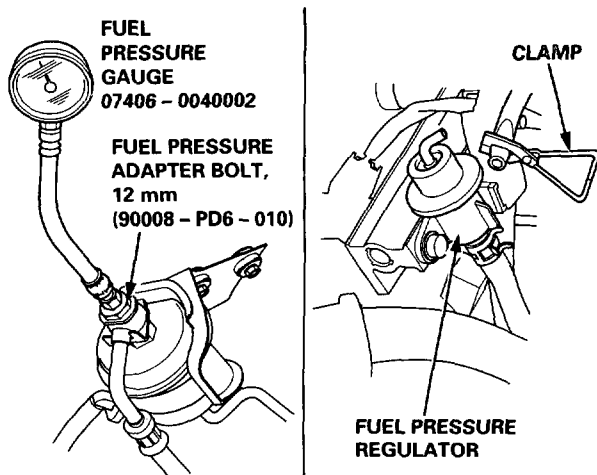
## Fuel Pressure Regulator

### Testing

#### **⚠ WARNING**

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

1. Attach the fuel pressure adapter bolt, 12 mm (90008 - PD6 - 010) and the special tool (see page 11-B-61).



Pressure should be:

**D15Z8 engine:**

270 - 320 kPa (2.8 - 3.3 kgf/cm<sup>2</sup>, 40 - 47 psi)

**B18C4 engine:**

320 - 370 kPa (3.3 - 3.8 kgf/cm<sup>2</sup>, 47 - 54 psi)

(with the fuel pressure regulator vacuum hose disconnected and pinched)

2. Reconnect the vacuum hose to the fuel pressure regulator.
3. Check that the fuel pressure rises when the vacuum hose from the fuel pressure regulator is disconnected again.
  - If the fuel pressure did not rise, replace the fuel pressure regulator.

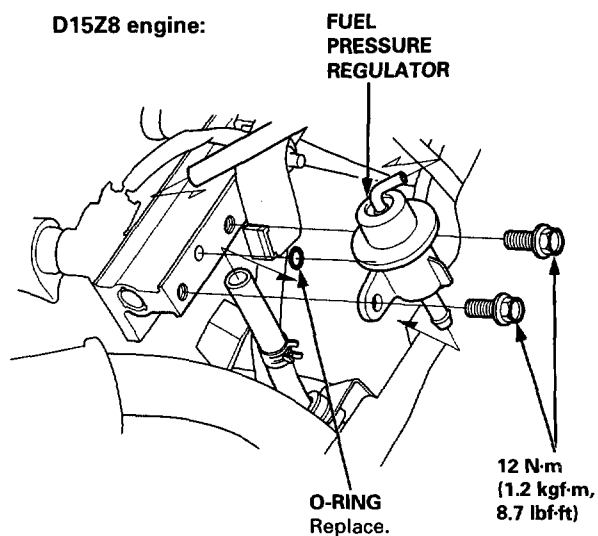
### Replacement

#### **⚠ WARNING**

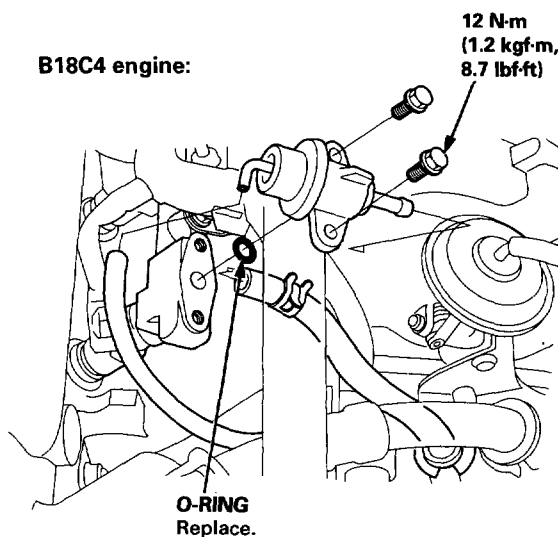
Do not smoke while working on the fuel system.  
Keep open flame or sparks away from the work area.

1. Place a shop towel under the fuel pressure regulator, then relieve fuel pressure (see page 11-B-61).
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the two 6 mm retainer bolts.

**D15Z8 engine:**



**B18C4 engine:**



4. Apply clean engine oil to a new O-ring and carefully install it into its proper position.
5. Install the fuel pressure regulator in the reverse order of removal.

# Fuel Supply System

## Fuel Filter

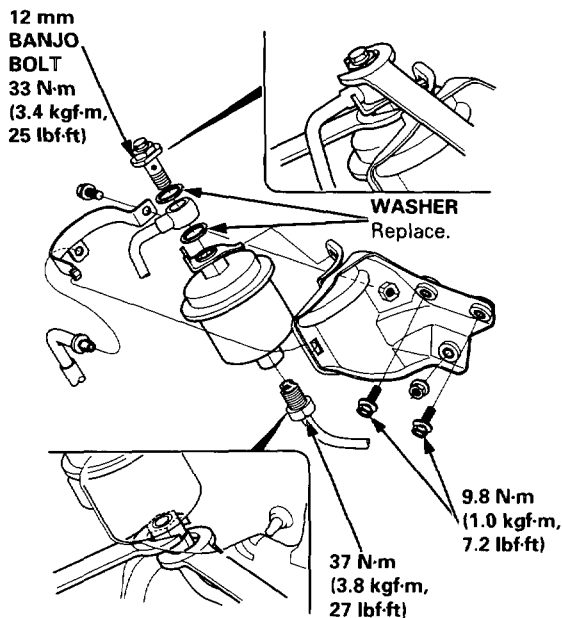
### Replacement

#### ⚠ WARNING

Do not smoke while working on the fuel system. Keep open flame or sparks away from the work area. While replacing the fuel filter, be careful to keep a safe distance between battery terminals and any tools.

The fuel filter should be replaced whenever the fuel pressure drops below the specified value [D15Z8 engine: 270 – 320 kPa (2.8 – 3.3 kgf/cm<sup>2</sup>, 40 – 47 psi) B18C4 engine: 320 – 370 kPa (3.3 – 3.8 kgf/cm<sup>2</sup>, 47 – 54 psi)] with the fuel pressure regulator vacuum hose disconnected and pinched] after making sure that the fuel pump and the fuel pressure regulator are OK.

1. Place a shop towel under and around the fuel filter.
2. Relieve fuel pressure (see page 11-B-61).
3. Remove the special bolt and the fuel feed pipe from the fuel filter, while supporting it with the another wrench, as shown.
4. Remove the fuel filter clamp and fuel filter.
5. Install the new fuel filter in the reverse order of removal, and note these items:
  - When assembling, use new washers as shown.
  - Clean the flared joint of high pressure hoses thoroughly before reconnecting them.



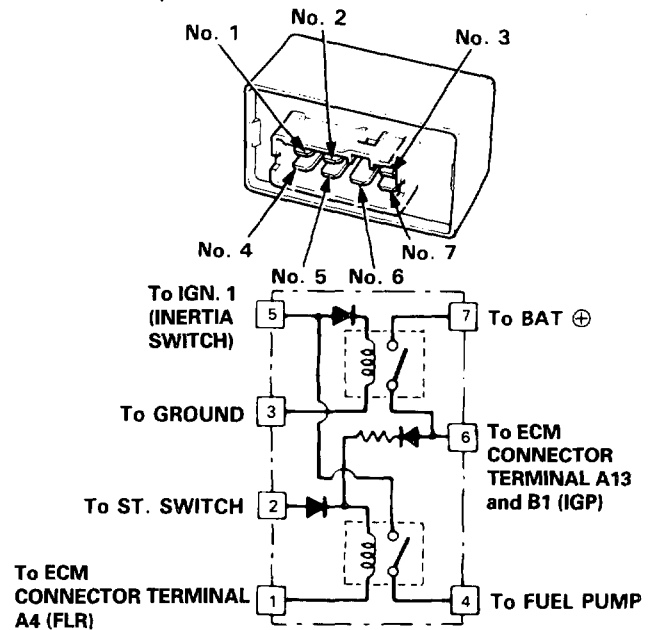
## PGM-FI Main Relay

### Relay Testing

NOTE: If the car starts and continues to run, the PGM-FI main relay is OK.

1. Remove the PGM-FI main relay.
2. Attach the battery positive terminal to the No. 2 terminal and the battery negative terminal to the No. 1 terminal of the PGM-FI main relay. Then check for continuity between the No. 5 terminal and No. 4 terminal of the PGM-FI main relay.

- If there is continuity, go on to step 3.
- If there is no continuity, replace the PGM-FI main relay and retest.



3. Attach the battery positive terminal to the No. 5 terminal and the battery negative terminal to the No. 3 terminal of the PGM-FI main relay. Then check that there is continuity between the No. 7 terminal and No. 6 terminal of the PGM-FI main relay.

- If there is continuity, go on to step 4.
- If there is no continuity, replace the PGM-FI main relay and retest.

4. Attach the battery positive terminal to the No. 6 terminal and the battery negative terminal to the No. 1 terminal of the PGM-FI main relay. Then check that there is continuity between the No. 5 terminal and No. 4 terminal of the PGM-FI main relay.

- If there is continuity, the PGM-FI main relay is OK.
- If there is no continuity, replace the PGM-FI main relay and retest.



— Engine will not start.  
 — Inspection of PGM-FI main relay and relay harness.  
 NOTE: The inertia switch must be reset by pressing the button.

**Check for an open in the wire (GND line):**  
 1. Turn the ignition switch OFF.  
 2. Disconnect the 7P connector from the PGM-FI main relay.  
 3. Check for continuity between the PGM-FI main relay 7P connector terminal No. 3 and body ground.

Is there continuity?

NO — Repair open in the wire between the PGM-FI main relay and G101.

YES  
**Check for the circuit (BAT line):**  
 Measure the voltage between the PGM-FI main relay 7P connector terminal No. 7 and body ground.

Is there battery voltage?

NO — Repair open or short in the wire between the PGM-FI main relay and the ECU (ECM) (15 A) fuse.  
 — Replace the ECU (ECM) (15 A) fuse in the under-hood fuse/relay box.

YES  
**Check for the circuit (IG 1 line):**  
 1. Turn the ignition switch ON (II).  
 2. Measure the voltage between the PGM-FI main relay 7P connector terminal No. 5 and body ground.

Is there battery voltage?

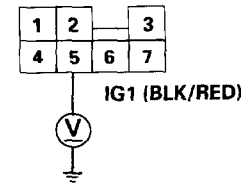
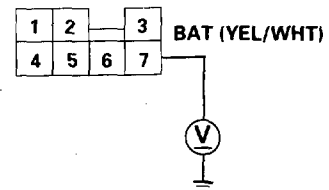
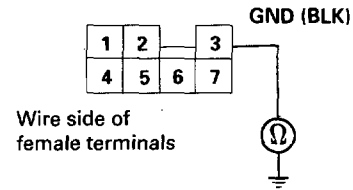
NO — Check the inertia switch:  
 1. Disconnect the 3P connector from the inertia switch.  
 2. Measure the voltage between the inertia switch 3P connector terminal No. 1 and No. 3.

YES  
**Check the circuit (ST SW line):**  
 1. Turn the ignition switch to the START (III) position.  
 NOTE: Transmission in neutral.  
 2. Measure the voltage between the PGM-FI main relay 7P connector terminal No. 2 and body ground.

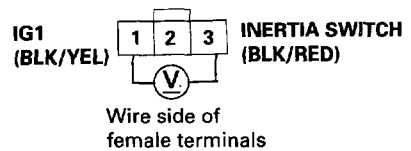
Is there battery voltage?

NO — Replace the inertia switch.

PGM-FI MAIN RELAY 7P CONNECTOR



INERTIA SWITCH 3P CONNECTOR



— Replace the No. 24 (without SRS model: No. 12) FUEL PUMP (15 A) fuse in the under-dash fuse/relay box.  
 — Repair open in the wire between the inertia switch and the No. 24 (without SRS model: No. 12) FUEL PUMP (15 A) fuse.  
 — Repair open in the wire between the PGM-FI main relay and inertia switch.

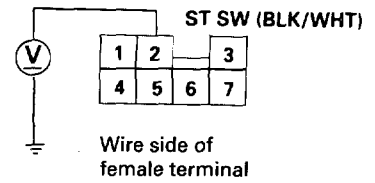
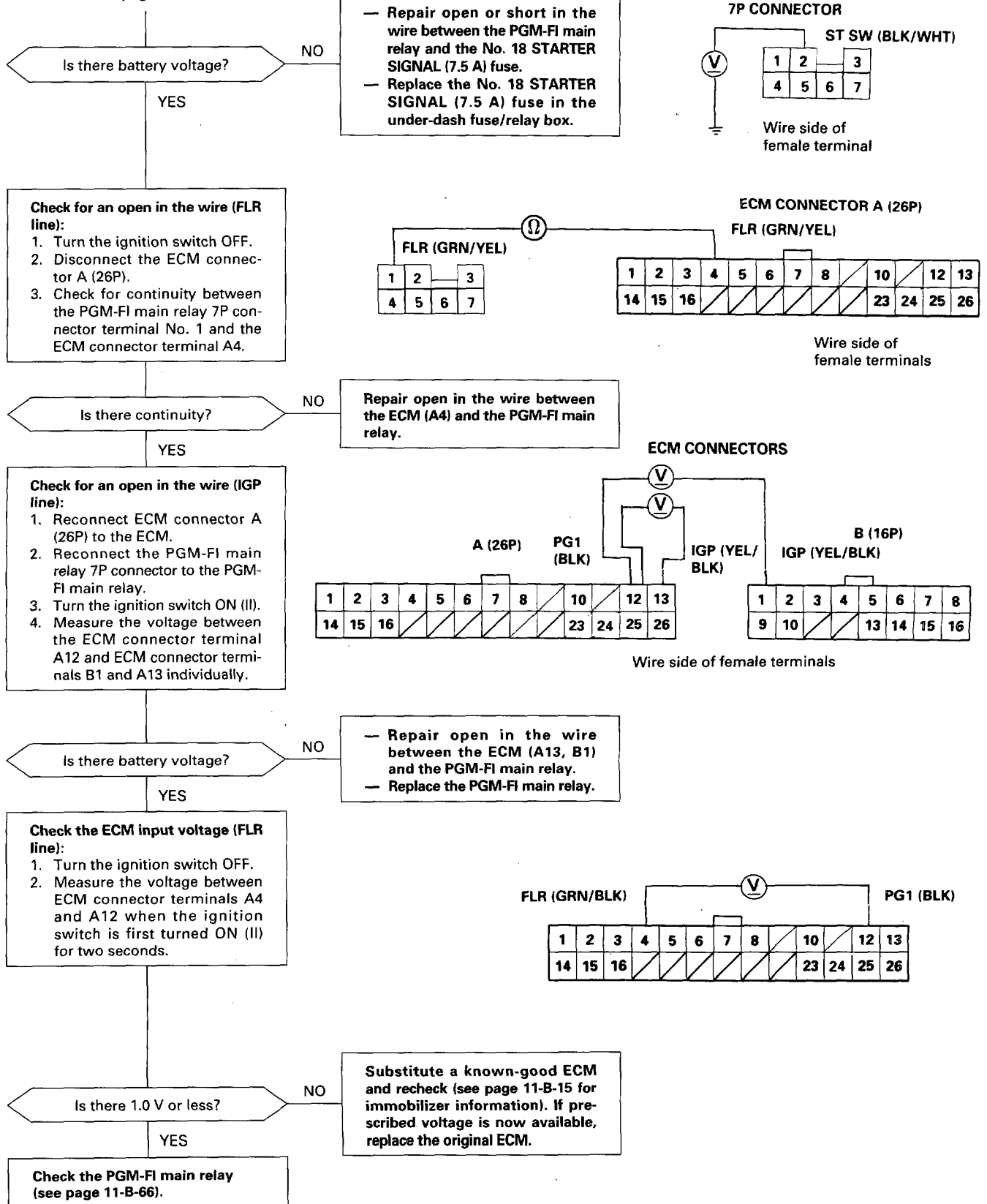
(To page 11-B-68)

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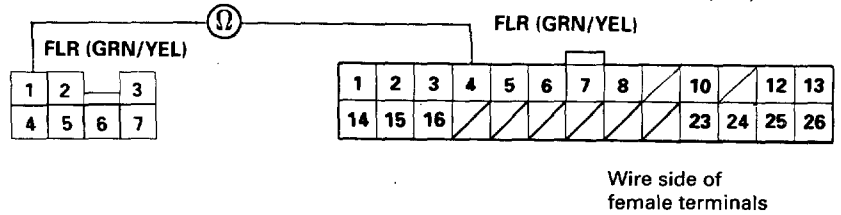
# Fuel Supply System

## PGM-FI Main Relay (cont'd)

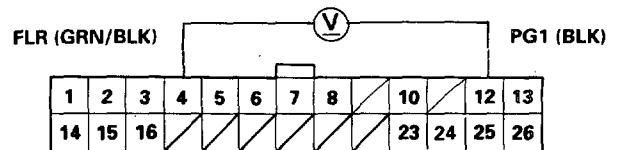
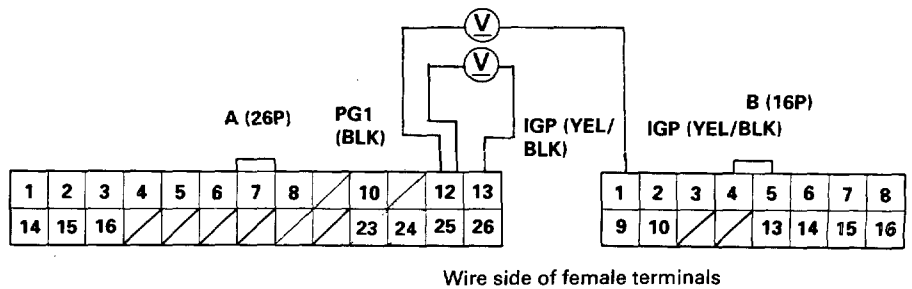
(From page 11-B-67)



ECM CONNECTOR A (26P)  
FLR (GRN/YEL)



ECM CONNECTORS



# Intake Air System



## System Troubleshooting Guide

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

PAGE	SUB-SYSTEM	AIR CLEANER AND INTAKE AIR DUCT	THROTTLE CABLE	THROTTLE BODY	INTAKE AIR BYPASS (IAB) CONTROL*
		11-A-84	11-B-71	11-B-72	11-B-76
	WHEN COLD FAST IDLE OUT OF SPEC			①	
	WHEN WARM IDLE SPEED TOO HIGH		②	①	
	LOSS OF POWER	②	①	①	②

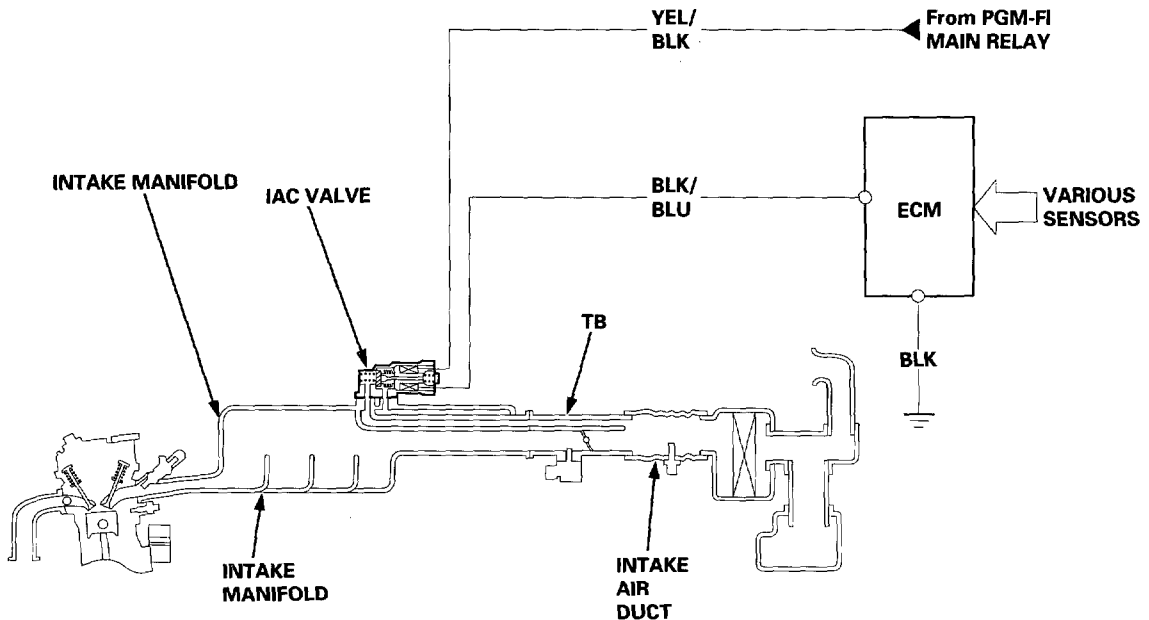
\*: B18C4 engine

# Intake Air System

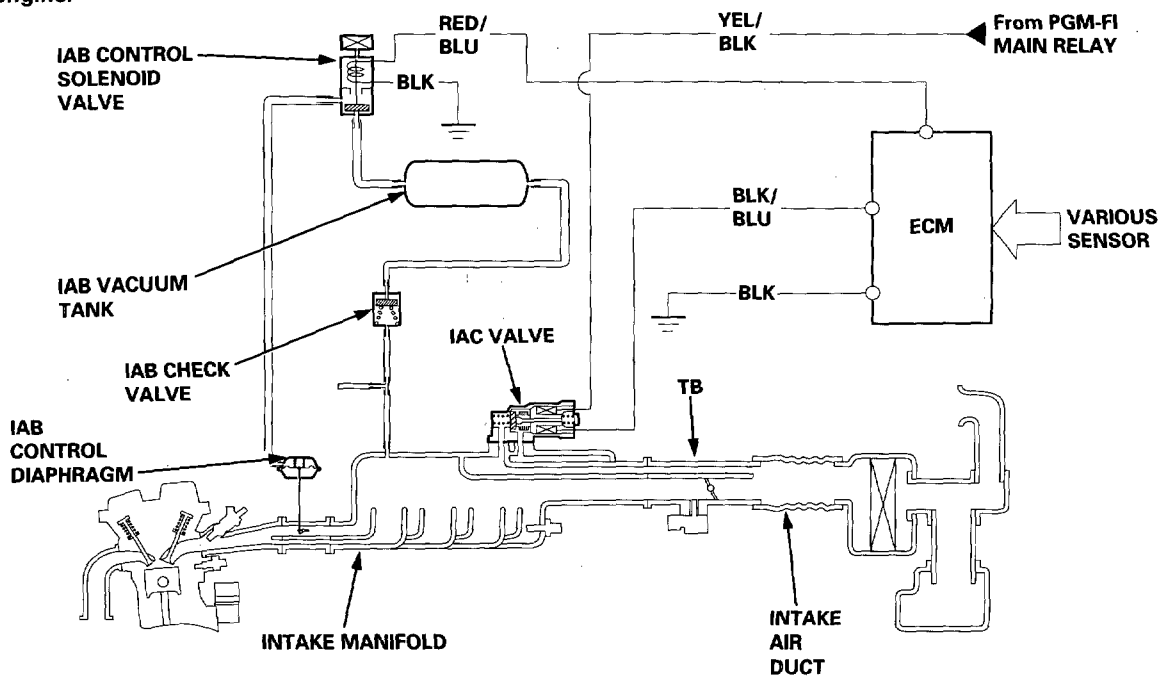
## System Description

The system supplies air for all engine needs. It consists of the intake air pipe, Air Cleaner (ACL), intake air duct, Throttle Body (TB), Idle Air Control (IAC) Valve, fast idle thermo valve and intake manifold. A resonator in the intake air pipe provides additional silencing as air is drawn into the system.

D15Z8 engine:



B18C4 engine:



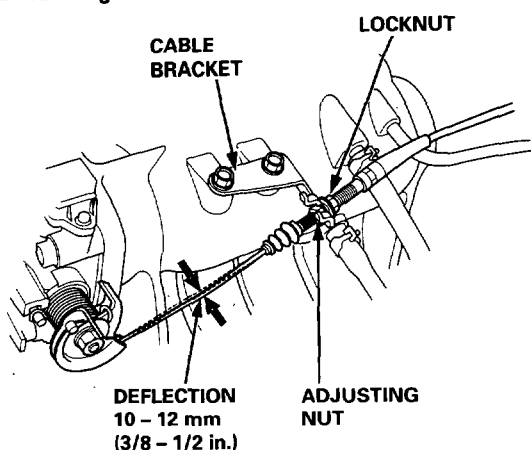


## Throttle Cable

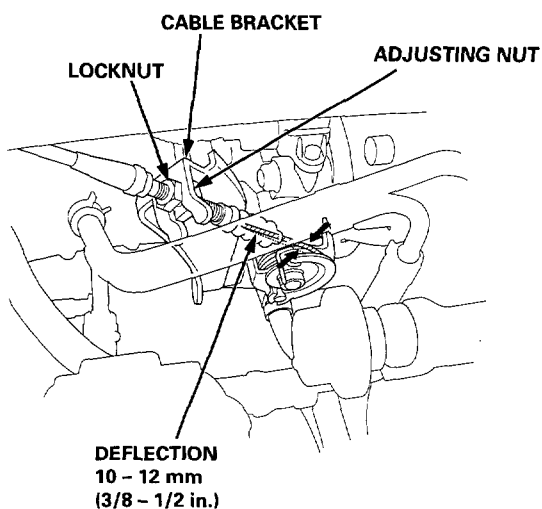
### Inspection/Adjustment

1. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (transmission in neutral) until the radiator fan comes on, then let it idle.
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Check cable free play at the throttle linkage. Cable deflection should be 10 – 12 mm ( $3/8 - 1/2$  in.).

#### D15Z8 engine:



#### B18C4 engine:

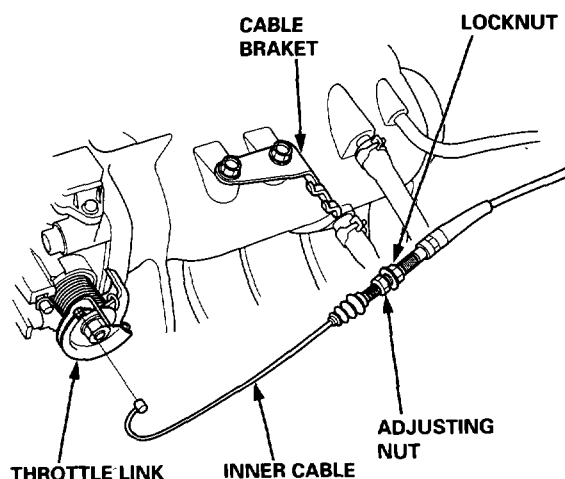


4. If deflection is not within specs, loosen the locknut, turn the adjusting nut until the deflection is as specified, then retighten the locknut.
5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure it returns to the idle position whenever you release the accelerator pedal.

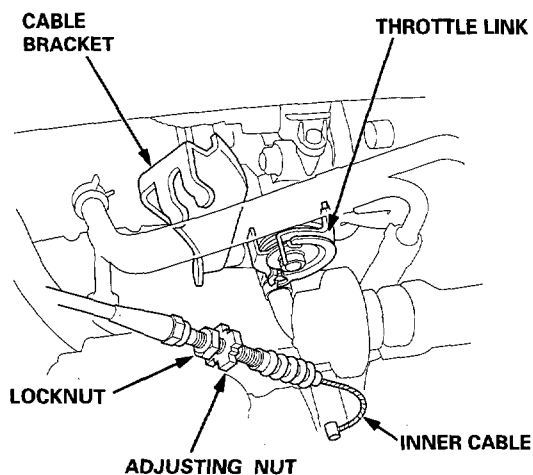
### Installation

1. Fully open the throttle valve, then install the throttle cable in the throttle linkage, and install the cable housing in the cable bracket.

#### D15Z8 engine:



#### B18C4 engine:



2. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (transmission in neutral) until the radiator fan comes on then let it idle.

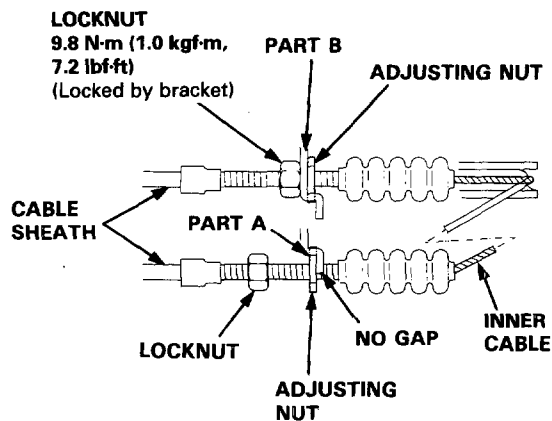
(cont'd)



# Intake Air System

## Throttle Cable (cont'd)

3. With part A of the cable bracket, support the cable sheath so that there is no inner wire free play. Turn the adjusting nut until it touches part A, leaving a gap between the locknut and adjusting nut.
4. Move the cable sheath to part B of the cable bracket that so the bracket slides into the gap between the locknut and adjusting nut. Tighten the locknut.

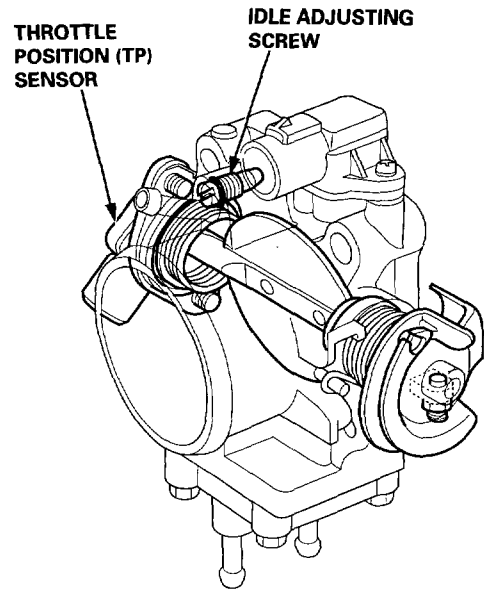


5. The cable deflection should now be 10 – 12 mm (3/8 – 1/2 in.). If not, see Inspection/Adjustment.

## Throttle Body

### Description

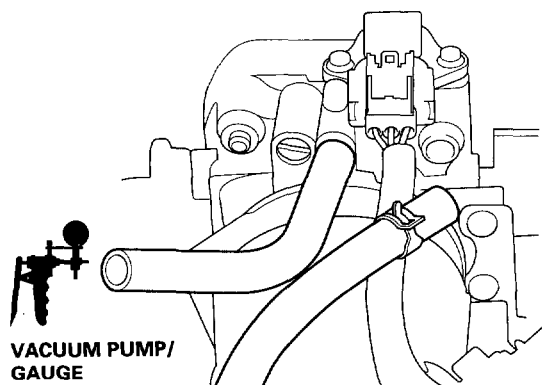
The throttle bodies are of the single-barrel side draft type. The lower portion of the throttle valve is heated by engine coolant from the cylinder head. The idle adjusting screw which increases/decreases bypass air and the Evaporative Emission (EVAP) Control Canister port are located on the top of the throttle body.





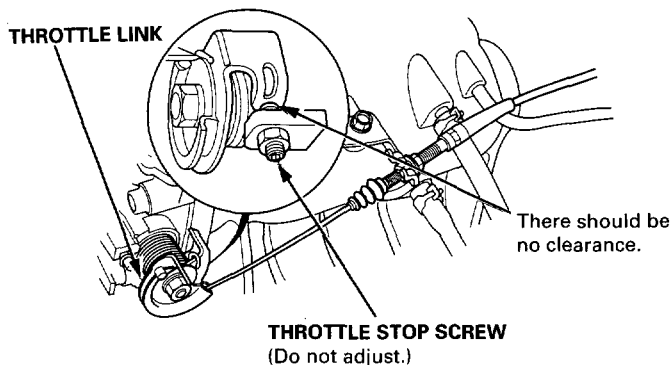
### Inspection

1. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (transmission in neutral) until the radiator fan comes on, then let it idle.
2. Disconnect the vacuum hose (to the EVAP control canister) from the top of the throttle body; connect a vacuum gauge to the throttle body.

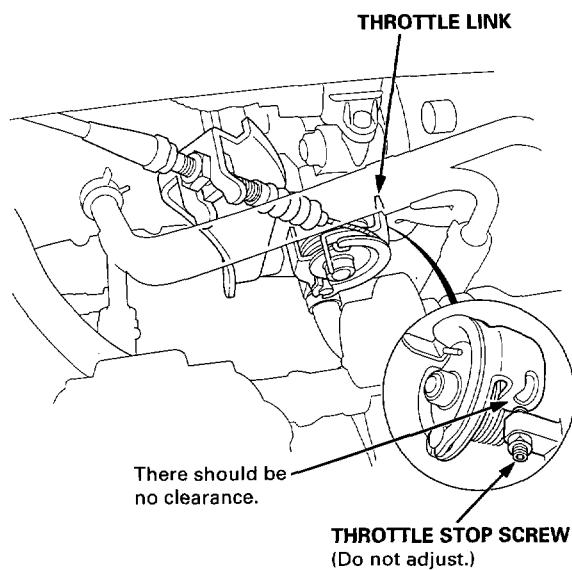


3. Allow the engine to idle, and check that the gauge indicates no vacuum.
  - If there is vacuum, check the throttle cable (see page 11-B-71).
4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.
  - If the gauge indicates no vacuum, check the throttle body port. If the throttle body port is clogged, clean it with carburetor cleaner.
5. Stop the engine, and check that the throttle cable operates smoothly without binding or sticking.
  - If there are any abnormalities in the above steps, check for:
    - Excessive wear or play in the throttle valve shaft.
    - Sticky or binding throttle lever at full close position.
    - Clearance between throttle stop screw and throttle lever at the fully closed position.

### D15Z8 engine:



### B18C4 engine:



Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

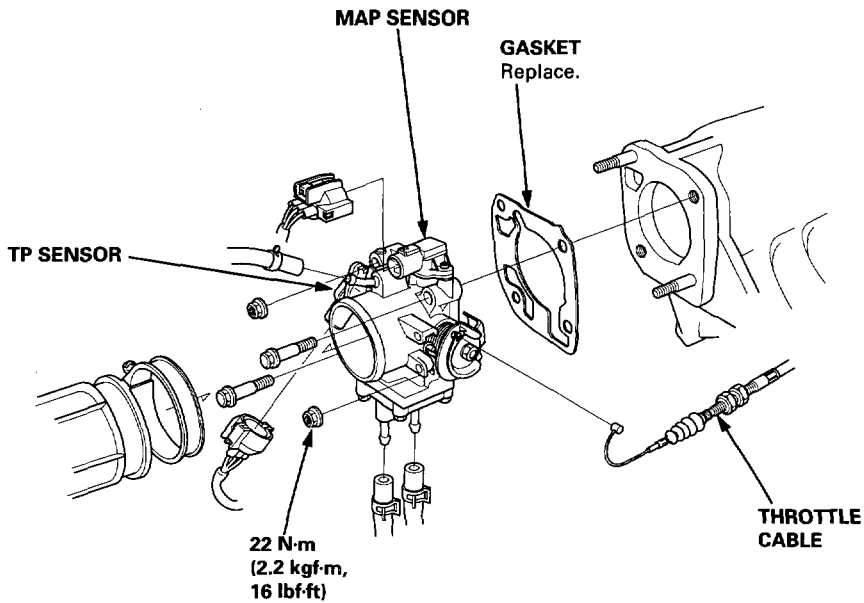
(cont'd)

# Intake Air System

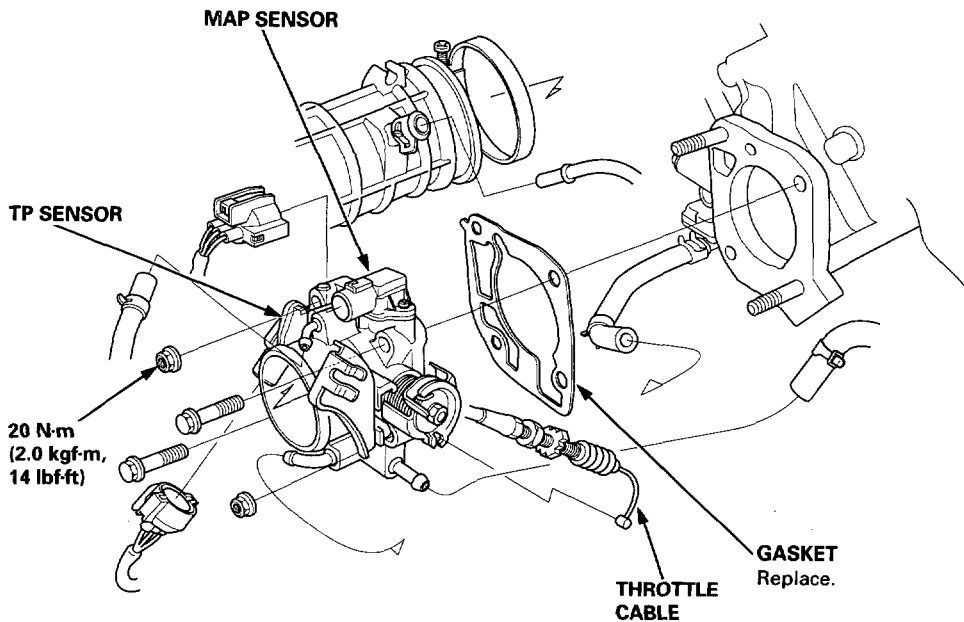
## Throttle Body (cont'd)

### Removal

D15Z8 engine:



B18C4 engine:



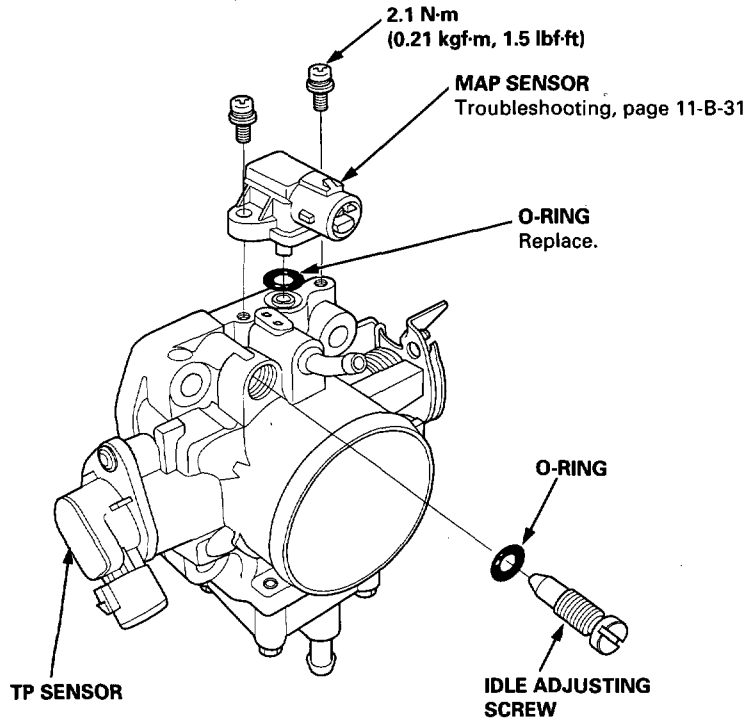
### NOTE:

- The throttle stop screw is non-adjustable.
- After reassembly, adjust the throttle cable (see page 11-B-71).
- The TP sensor is not removable.

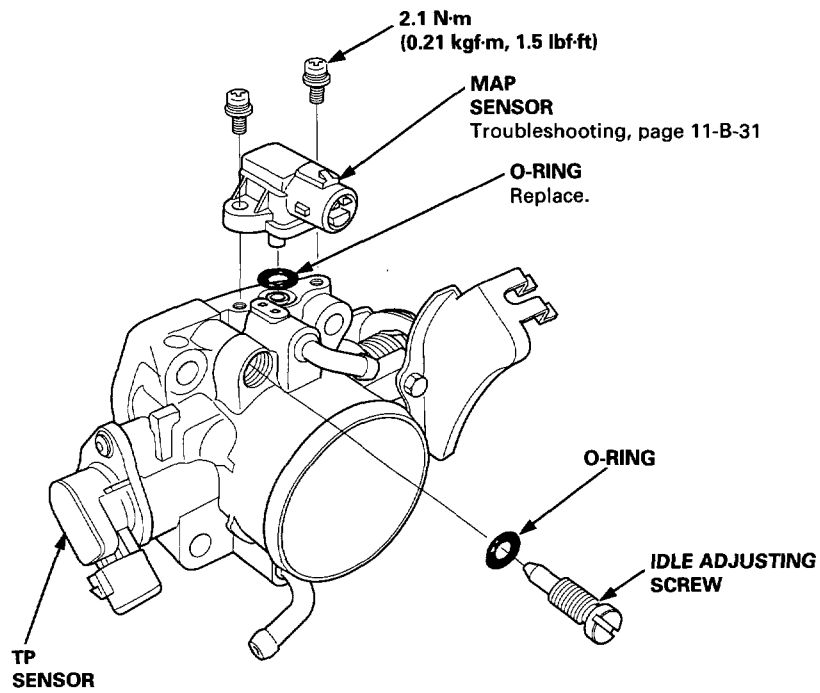


**Disassembly**

**D15Z8 engine:**



**B18C4 engine:**



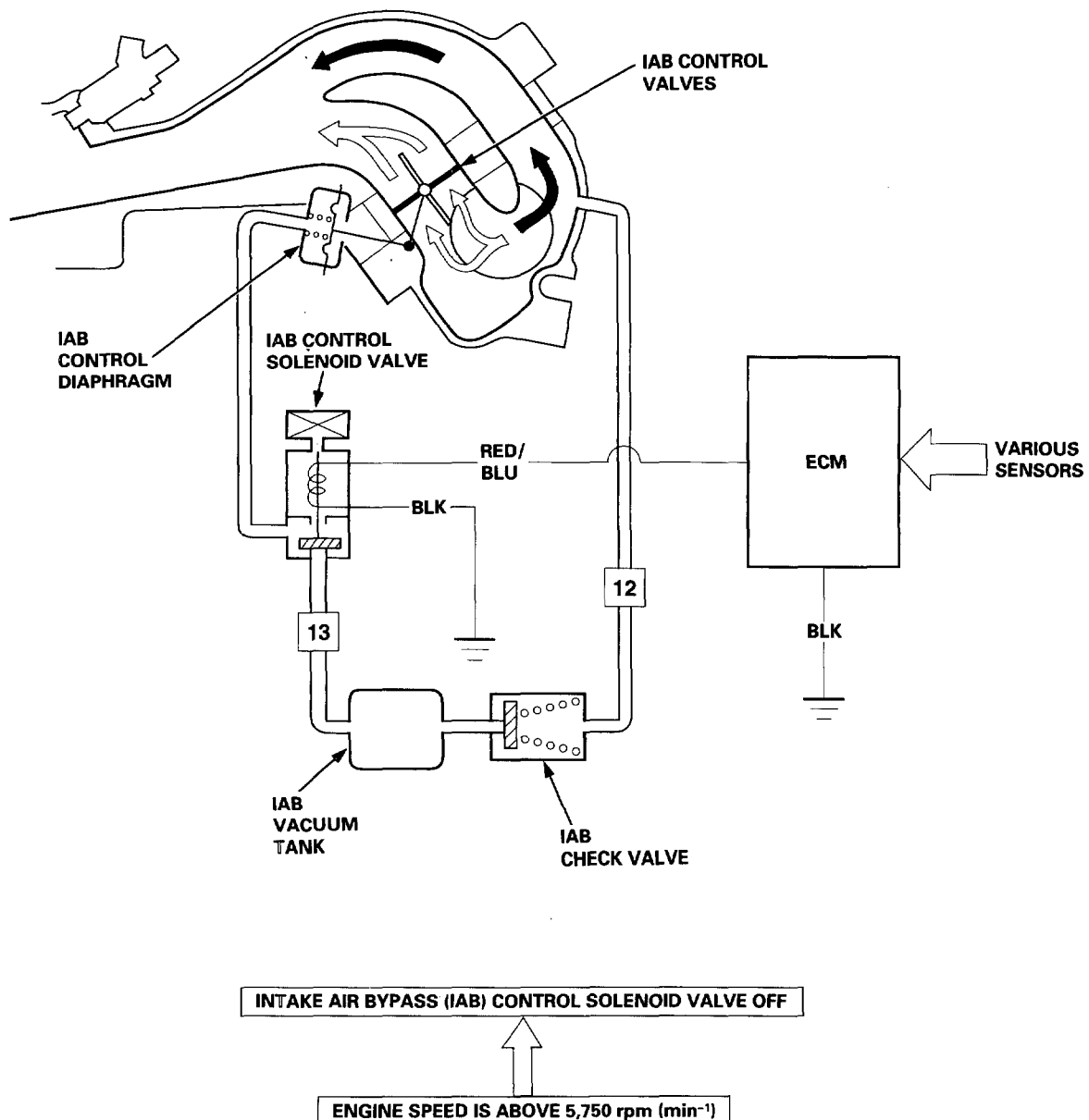
# Intake Air System

## Intake Air Bypass (IAB) Control System (B18C4 engine)

### Description

Two air intake paths are provided in the intake manifold to allow the selection of the intake path most favorable for a given engine speed.

Satisfactory power performance is achieved by closing and opening the intake air bypass (IAB) control valves. High torque at low engine speed is achieved when the valves are closed, whereas high power at high engine speed is achieved by when the valves are opened.





### Troubleshooting

Inspection of IAB Control System.

**Check for vacuum at idle:**  
1. Start the engine and allow it to idle.  
2. Remove the No. 13 vacuum hose from the IAB control diaphragm and connect vacuum gauge to the hose.

Is there vacuum?

YES



(To page 11-B-78)

NO

**Check for vacuum at IAB vacuum tank:**  
Remove No. 13 vacuum hose from the IAB vacuum tank, then check for vacuum at the IAB vacuum tank.

Is there vacuum?

YES

**Check for an open in the wire (IAB SOL line):**  
1. Turn the ignition switch OFF.  
2. Disconnect the IAB control solenoid valve connector.  
3. Turn the ignition switch ON (II).  
4. Measure voltage between the IAB control solenoid valve 2P connector terminals No. 1 and No. 2.

Is there battery voltage?

NO

**Check for an open in the wire (GND line):**  
Check for continuity between body ground and the IAB control solenoid valve 2P connector terminal No. 2.

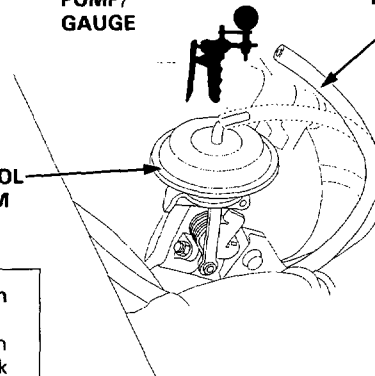


(To page 11-B-78)

VACUUM PUMP/ GAUGE

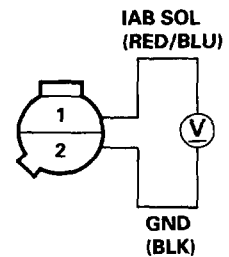
No. 13 HOSE

IAB CONTROL DIAPHRAGM



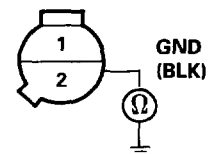
Repair the blockage or vacuum leak between the IAB vacuum tank and the intake manifold.

IAB CONTROL SOLENOID VALVE 2P CONNECTOR



Wire side of female terminals

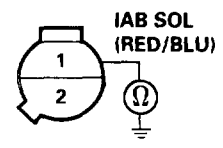
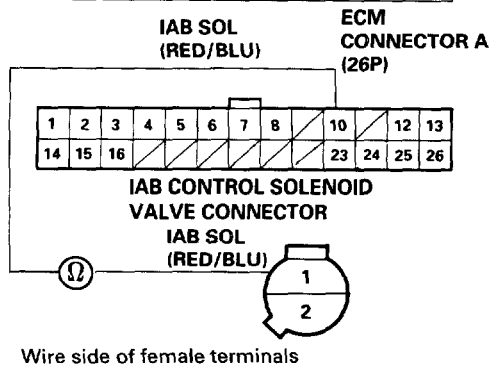
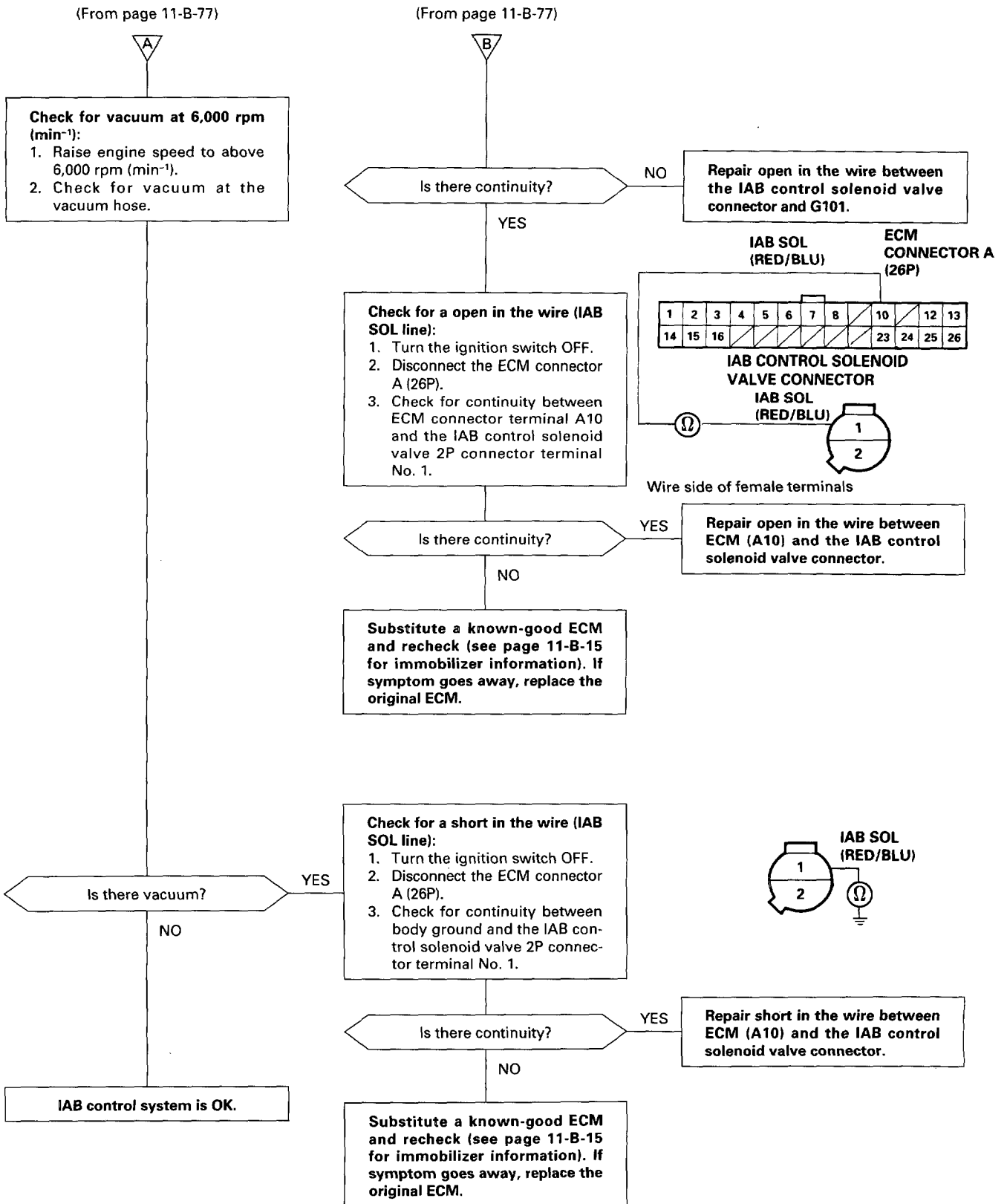
Replace the IAB control solenoid valve.



(cont'd)

# Intake Air System

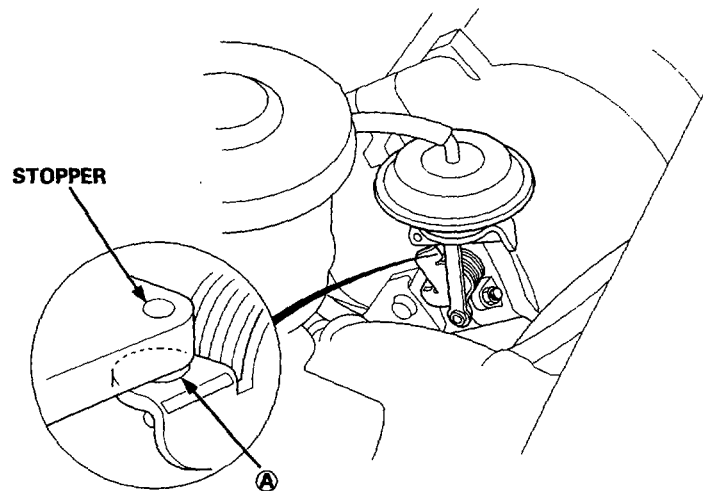
## Intake Air Bypass (IAB) Control System (B18C4 engine) (cont'd)



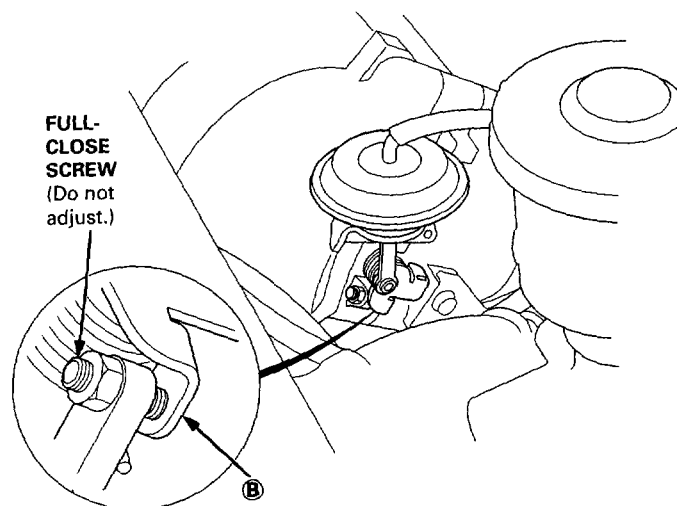


### IAB Valve Testing

1. Check the IAB control valve shaft for binding or sticking.
2. Check the IAB control valve for smooth movement.
3. With the engine at idle, check that **(A)** of the IAB control valve is in close contact with the stopper when vacuum hose is disconnected.



4. With the engine at idle, check that **(B)** of the IAB control valve is in close contact with the full-close screw when the vacuum hose is connected.



If any fault is found, clean the linkage and shafts with carburetor cleaner. If the problem still exists after cleaning, disassemble the intake manifold and check the IAB valve body assembly.



# Emission Control System

## System Troubleshooting Guide

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

PAGE	SUB-SYSTEM	THREE WAY CATALYTIC CONVERTER	EXHAUST GAS RECIRCULATION SYSTEM*	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
	SYMPTOM	11-B-81	11-B-83	11-B-88	11-B-89
	ROUGH IDLE		①	②	
FREQUENT STALLING	AFTER WARMING UP		①		
POOR PERFORMANCE	FAILS EMISSION TEST	①			②
	LOSS OF POWER	①			

\*: D15Z8 engine



## System Description

The emission control system includes a Three Way Catalytic Converter (TWC), Exhaust Gas Recirculation (EGR) system\*, Positive Crankcase Ventilation (PCV) system and Evaporative Emission (EVAP) Control system.

\*: D15Z8 engine

## Tailpipe Emission

### Inspection

#### **⚠ WARNING**

Do not smoke during this procedure.  
Keep open flame or sparks away from the work area.

1. Connect a tachometer.
2. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (transmission in neutral) until the radiator fan comes on, then let it idle.
3. Check idle speed and adjust the idle speed, if necessary (see page 11-B-58).
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: 0.1% maximum**

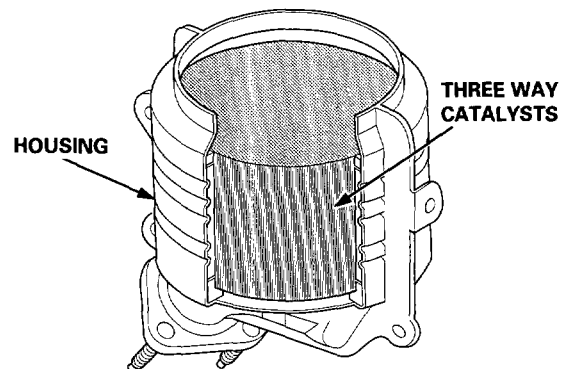
- If unable to obtain this reading, see ECM troubleshooting guide (page 11-B-25).

## Three Way Catalytic Converter (TWC)

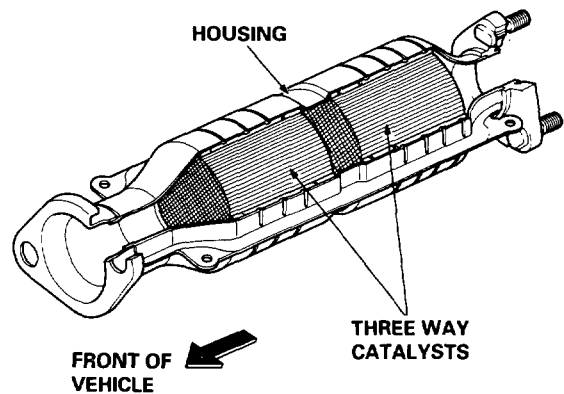
### Description

The Three Way Catalytic Converter (TWC) is used to convert hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen ( $\text{NO}_x$ ) in the exhaust gas, to carbon dioxide ( $\text{CO}_2$ ), dinitrogen ( $\text{N}_2$ ) and water vapor.

#### D15Z8 engine:



#### B18C4 engine:



(cont'd)

# Emission Control System

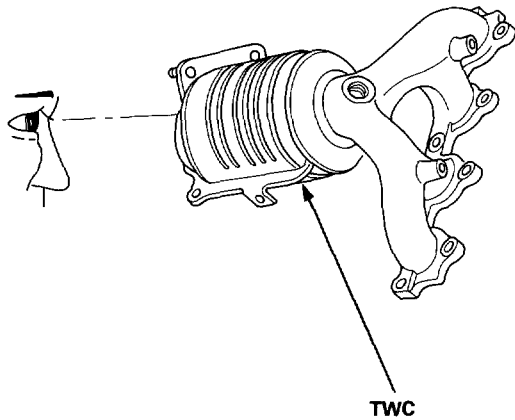
## Three Way Catalytic Converter (TWC) (cont'd)

**Removal/Installation**  
(see section 9)

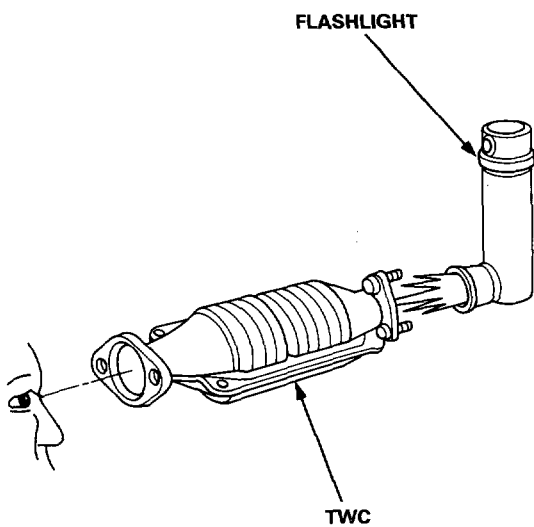
### Inspection

If excessive exhaust system back-pressure is suspected, remove the TWC from the car and using a flashlight, make a visual check for plugging, melting or cracking of the catalyst. Replace the TWC if any of the visible area is damaged or plugged.

**D15Z8 engine:**



**B18C4 engine:**

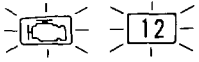


**11-B-82**



## Exhaust Gas Recirculation System (D15Z8 engine)

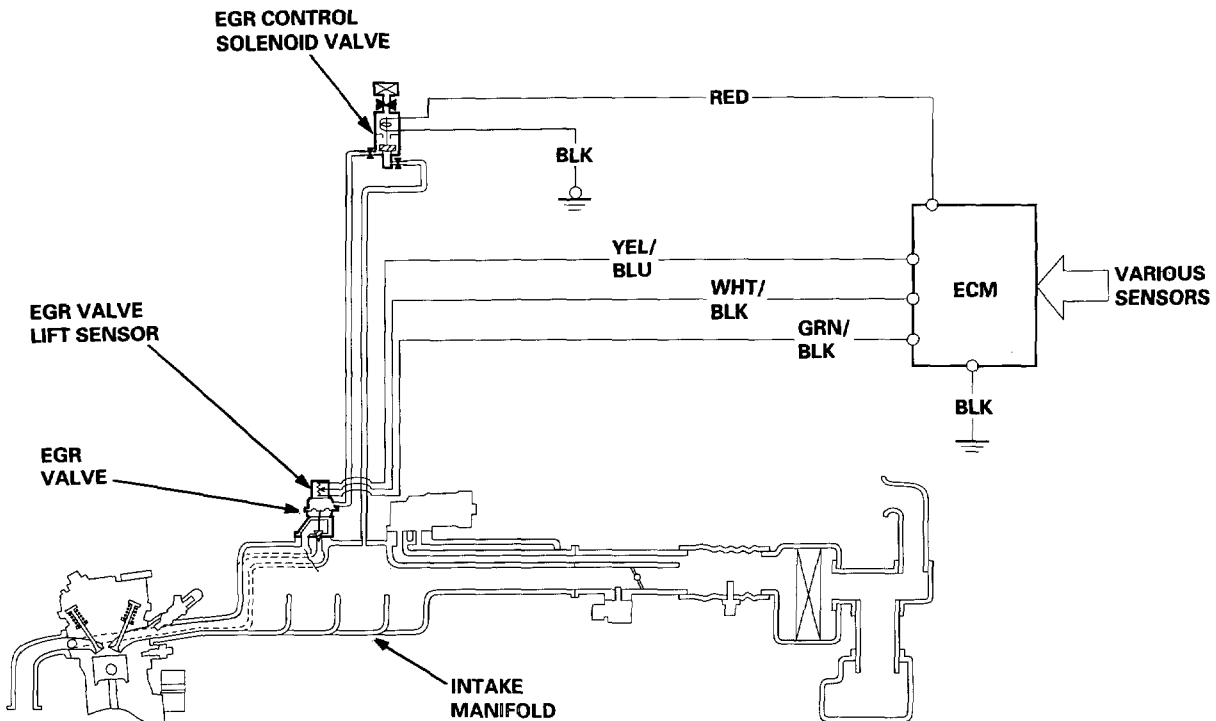
### Troubleshooting Flowchart



The Malfunction Indicator Lamp (MIL) indicates Diagnostic Trouble Code (DTC) 12: A problem in the Exhaust Gas Recirculation (EGR) system.

The EGR system is designed to reduce oxides of nitrogen emissions (NO<sub>x</sub>) by recirculating exhaust gas through the EGR valve and the intake manifold into the combustion chambers. It is composed of the EGR valve, EGR vacuum control valve, EGR control solenoid valve, ECM and various sensors.

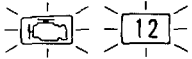
The ECM contains memories for ideal EGR valve lifts for varying operating conditions. The EGR valve lift sensor detects the amount of EGR valve lift and sends the information to the ECM. The ECM then compares it with the ideal EGR valve lift which is determined by signals sent from the other sensors. If there is any difference between the two, the ECM cuts current to the EGR control solenoid valve to reduce vacuum applied to the EGR valve.



(cont'd)

# Emission Control System

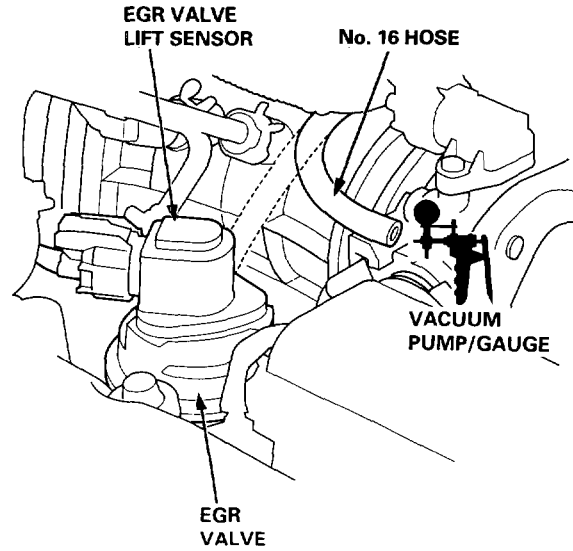
## Exhaust Gas Recirculation System (D15Z8 engine) (cont'd)



— The MIL has been reported on.  
 — With the SCS short connector connected (see page 11-B-14), code 12 is indicated.

**Problem verification:**

1. Do the ECM Reset Procedure (see page 11-B-15).
2. Connect the SCS short connector to the service check connector (see page 11-B-14).
3. Test-drive necessary: Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with not load (transmission in neutral) until the radiator fan comes on, then let it idle. Drive the car on the road for approx. 10 minutes. Try to keep the engine speed in the 1,700 – 2,500 rpm ( $\text{min}^{-1}$ ) range.



Does the MIL blink and does it indicate code 12?

NO  
 Intermittent failure, system is OK at this time. Check for poor connections or loose wires between the EGR valve lift sensor, the EGR control solenoid valve and the ECM.

YES

**Check the vacuum:**  
 With the engine at idle, disconnect the No. 16 hose from the EGR valve and connect a vacuum pump/gauge to the hose.

Is there any vacuum?

YES  
**Check the vacuum:**  
 1. Disconnect the 2P connector from the EGR control solenoid valve.  
 2. Check the No. 16 hose for vacuum again.

NO

Is there any vacuum?

YES  
 Check vacuum hose routing of the entire EGR system. If hose routing is OK, replace EGR control solenoid valve.

NO

Substitute a known-good ECM and retest (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.

(To page 11-B-85)

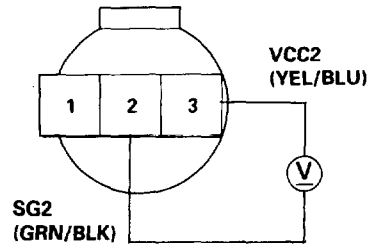


(From page 11-B-84)

**Check the ECM output voltage (VCC2 line):**

1. Turn the ignition switch OFF.
2. Disconnect the 3P connector from the EGR valve lift sensor.
3. Turn the ignition switch ON (II).
4. At the harness side, measure voltage between the EGR valve lift sensor 3P connector terminals No. 3 and No. 2.

**EGR VALVE LIFT SENSOR  
3P CONNECTOR**



Wire side of female terminals

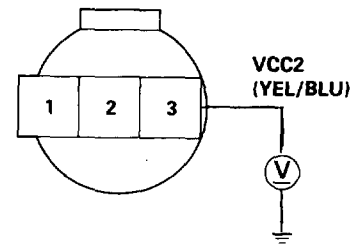
Is there approx. 5 V?

YES

NO

**Check for an open in the wire (SG2 line):**

Measure voltage between the EGR valve lift sensor 3P connector terminal No. 3 and body ground.



Is there approx. 5 V?

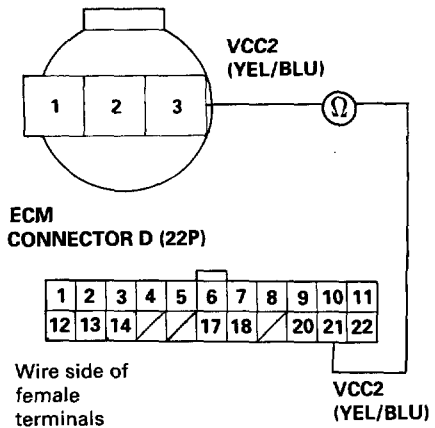
YES

**Repair open in the wire between the EGR valve lift sensor and the ECM.**

NO

**Check for an open in the wire (VCC2 line):**

1. Turn the ignition switch OFF.
2. Disconnect ECM connector D (22P) from the ECM.
3. Check for continuity between ECM connector terminal D21 and the EGR valve lift sensor 3P connector terminal No. 3.



Wire side of female terminals

Is there continuity?

NO

**Repair open in the wire between the EGR valve lift sensor and the ECM (D21).**

YES

**Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.**

(To page 11-B-86)

(cont'd)

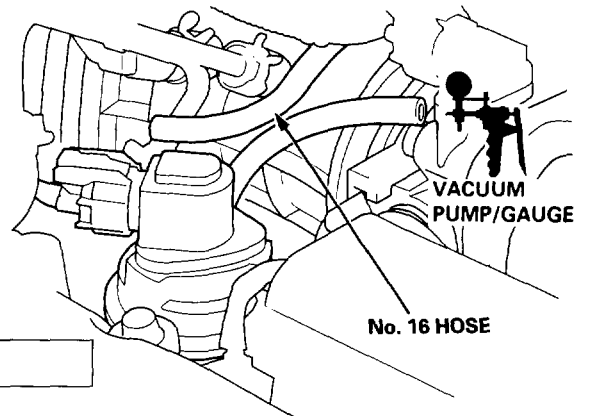
# Emission Control System

## Exhaust Gas Recirculation System (D15Z8 engine) (cont'd)

(From page 11-B-85)

**Check the EGR valve:**

1. Move the vacuum pump/gauge to the EGR valve.
2. Start the engine.
3. With the engine at idle, apply 27 kPa (200 mmHg, 8 in.Hg) of vacuum to the EGR valve.



Does the engine stall or run rough and does the EGR valve hold vacuum?

NO

Replace the EGR valve.

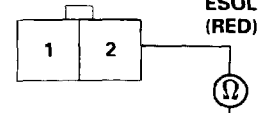
YES

**Check for an open in the wire (E SOL line):**

1. Turn the ignition switch OFF.
2. Disconnect the 2P connector from the EGR control solenoid valve.
3. Disconnect the ECM connector A (26P) from the ECM.
4. Check for continuity between ECM connector terminal A6 and the EGR control solenoid valve 2P connector terminal No. 2.

EGR CONTROL SOLENOID VALVE 2P CONNECTOR

Wire side of female terminals



ECM CONNECTOR A (26P)

1	2	3	4	5	6	7	8	10	12	13	
14	15	16						23	24	25	26

Wire side of female terminals

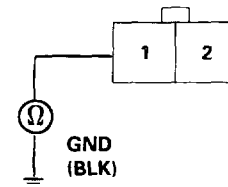
Is there continuity?

NO

Repair open in the wire between the EGR control solenoid valve and the ECM (A6).

YES

**Check for an open in the wire (GND line):**  
Check for continuity between the EGR control solenoid valve 2P connector terminal No. 1 and body ground.



Is there continuity?

NO

Repair open in the wire between the EGR control solenoid valve and G301.

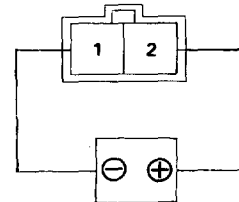
YES

**Check the vacuum line:**

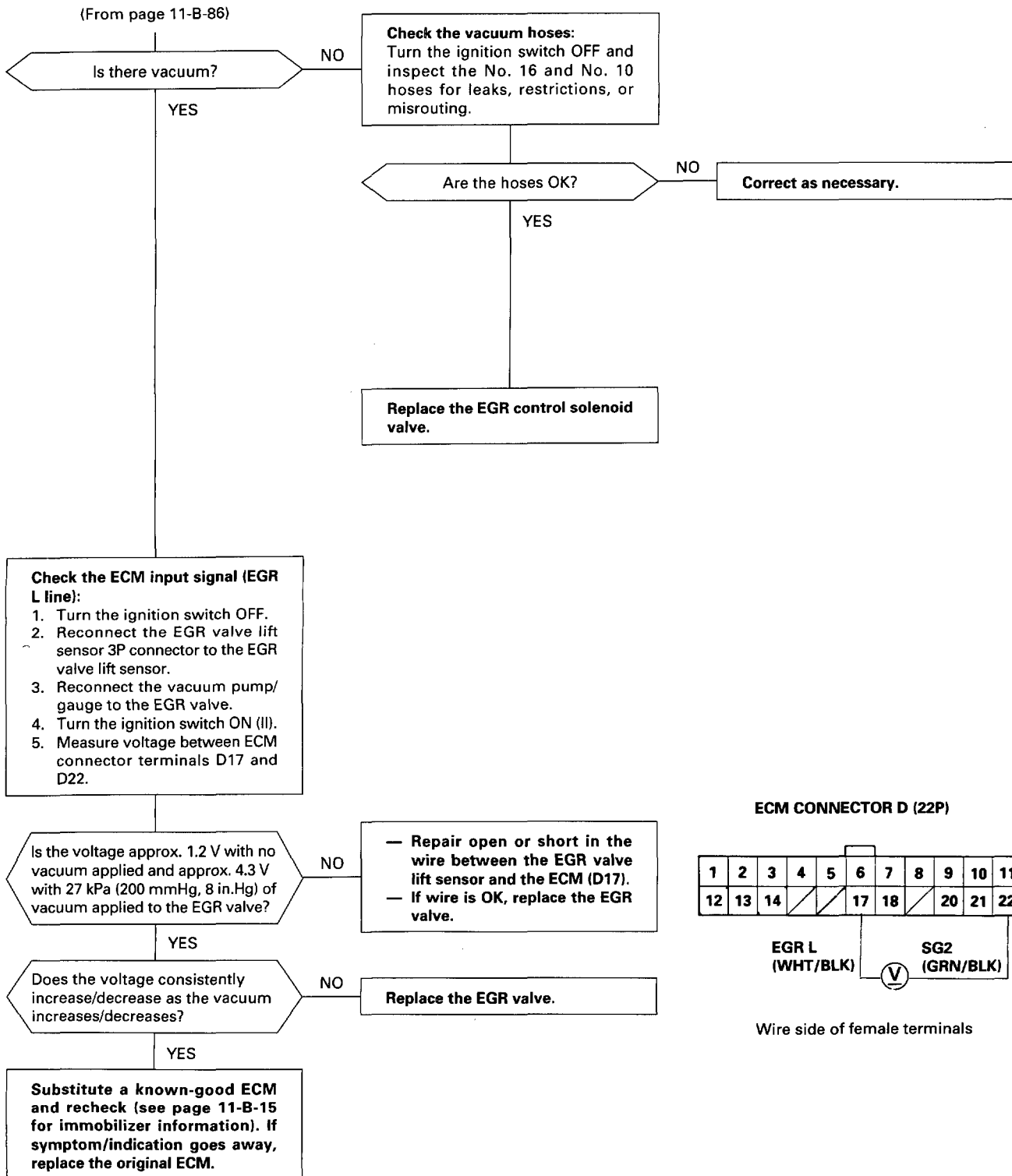
1. Reconnect the vacuum pump/gauge to the No. 16 hose.
2. Reconnect the ECM connector A (26P) to the ECM.
3. Start the engine and allow it to idle.
4. At the EGR control solenoid valve, connect the battery positive terminal to terminal No. 2 of the 2P connector. While watching the vacuum gauge, connect the battery negative terminal to terminal No. 1.

EGR CONTROL SOLENOID VALVE 2P CONNECTOR

Terminal side of male terminals



(To page 11-B-87)



ECM CONNECTOR D (22P)

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

EGR L  
(WHT/BLK)

SG2  
(GRN/BLK)



Wire side of female terminals

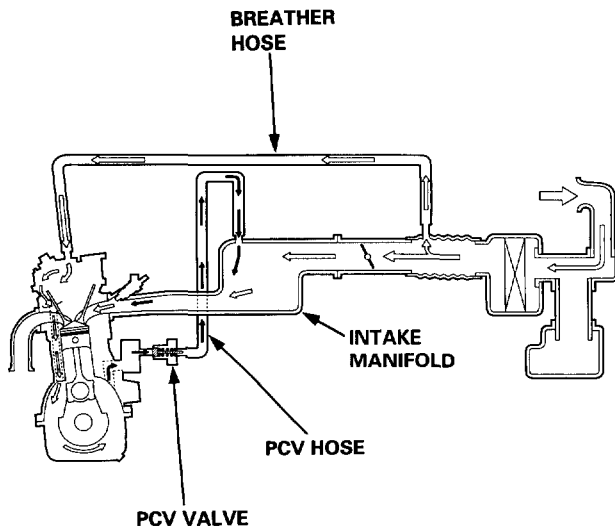


# Emission Control System

## Positive Crankcase Ventilation (PCV) System

### Description

The Positive Crankcase Ventilation (PCV) system is designed to prevent blow-by gas from escaping to the atmosphere. The PCV valve contains a spring-loaded plunger. When the engine starts, the plunger in the PCV valve is lifted in proportion to intake manifold vacuum and the blow-by gas is drawn directly into the intake manifold.

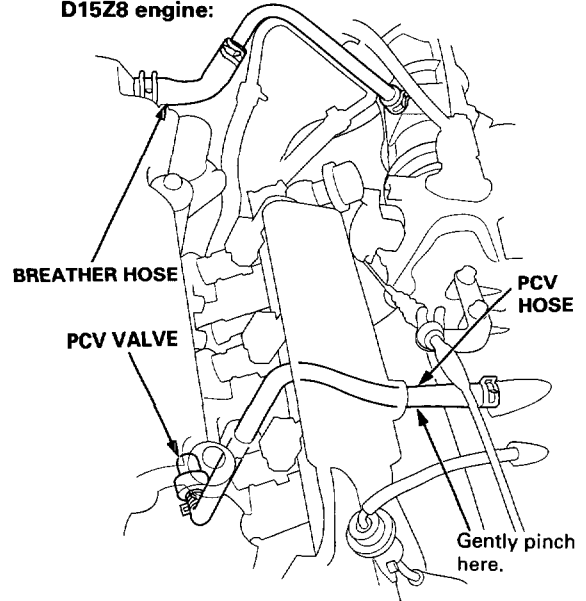


←: BLOW-BY VAPOR  
⇄: FRESH AIR

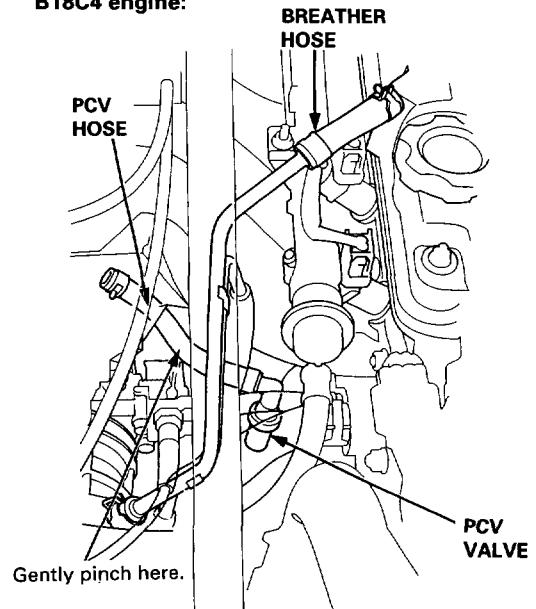
### Inspection

1. Check the PCV hoses and connections for leaks and clogging.
2. At idle, make sure there is a clicking sound from the PCV valve when the hose between PCV valve and intake manifold is lightly pinched with your fingers or pliers.

#### D15Z8 engine:



#### B18C4 engine:



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



## Evaporative Emission (EVAP) Controls

### Description

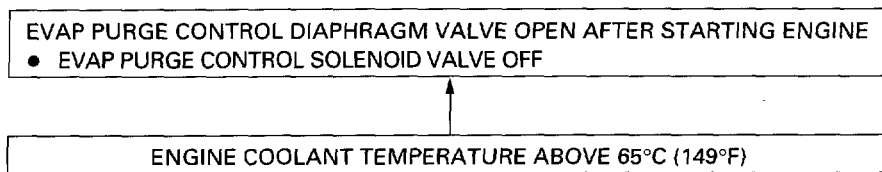
The evaporative emission controls are designed to minimize the amount of fuel vapor escaping to the atmosphere. The system consists of the following components:

#### A. Evaporative Emission (EVAP) Control Canister

An EVAP control canister is used for the temporary storage of fuel vapor until the fuel vapor can be purged from the EVAP control canister into the engine and burned.

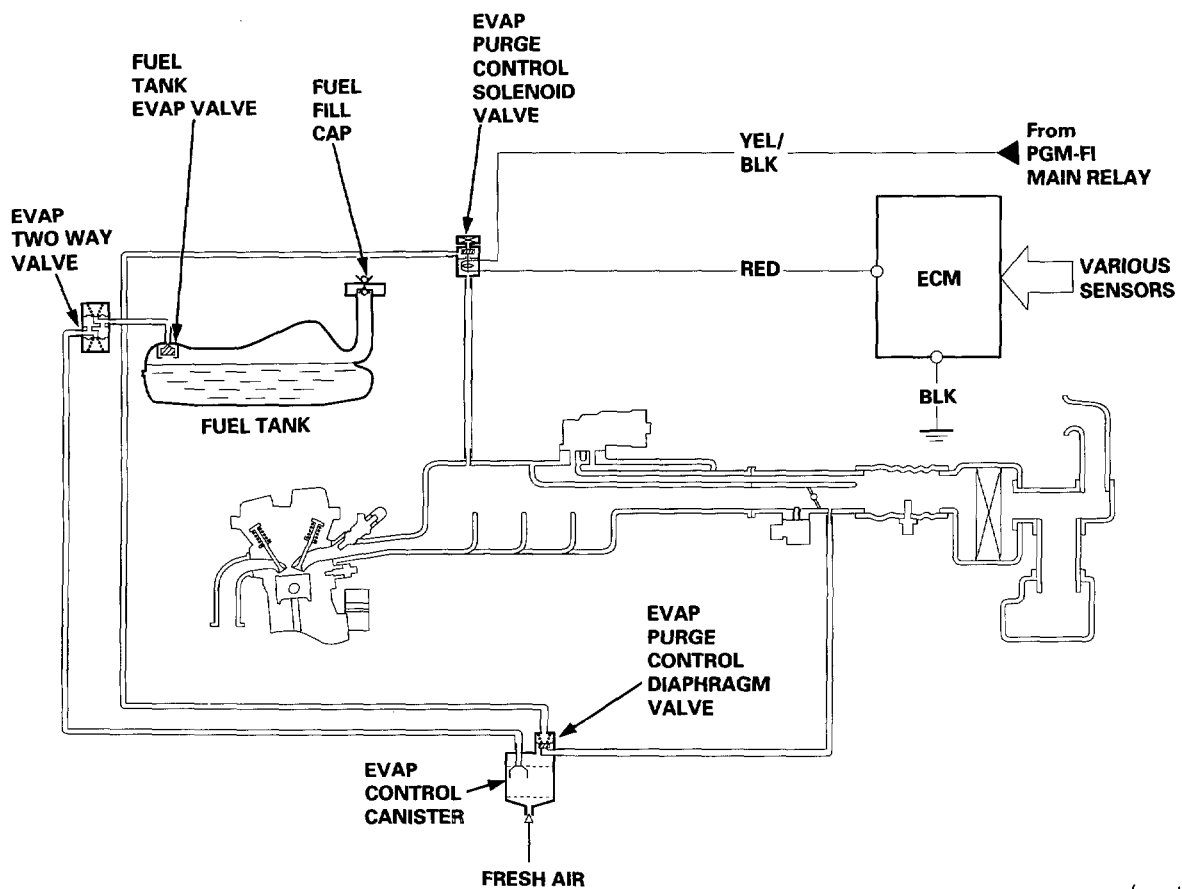
#### B. Vapor Purge Control System

EVAP control canister purging is accomplished by drawing fresh air through the EVAP control canister and into a port on the throttle body. The purging vacuum is controlled by the EVAP purge control diaphragm valve and the EVAP purge control solenoid valve.



#### C. Fuel Tank Vapor Control System

When fuel vapor pressure in the fuel tank is higher than the set value of the EVAP two way valve, the valve opens and regulates the flow of fuel vapor to the EVAP control canister.



(cont'd)

# Emission Control System

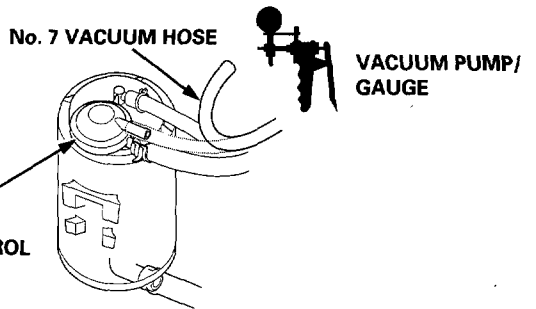
## Evaporative Emission (EVAP) Controls (cont'd)

### Inspection of Evaporative Emission Controls

**Check the vacuum when cold:**

1. Disconnect the No. 7 vacuum hose from the EVAP purge control canister and connect a vacuum gauge to the hose.
2. Start the engine and allow it to idle.

**NOTE:** Engine coolant temperature must be below 65°C (149°F)



Is there vacuum?

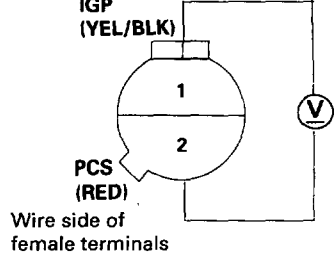
YES

NO

**Check the EVAP purge control valve:**

1. Turn the ignition switch OFF.
2. Disconnect the 2P connector from the EVAP purge control solenoid valve.
3. Start the engine.
4. At the harness side, measure voltage between the EVAP purge control solenoid valve 2P connector terminal No. 1 and No. 2.

### EVAP PURGE CONTROL SOLENOID VALVE 2P CONNECTOR



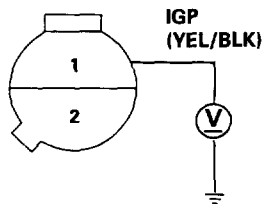
Is there battery voltage?

YES

Inspect vacuum hose routing. If OK, replace EVAP purge control solenoid valve.

NO

**Check for an open in the wire (IGP line):**  
At the harness side, measure voltage between the EVAP purge control solenoid valve 2P connector terminal No. 1 and body ground.



Is there battery voltage?

NO

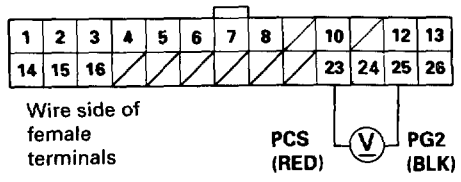
Repair open in the wire between EVAP purge control solenoid valve and the PGM-FI main relay.

YES

**Check for an open in the wire (PCS line):**

1. Turn the ignition switch OFF.
2. Reconnect the 2P connector to the EVAP purge control solenoid valve.
3. Turn the ignition switch ON (II).
4. Measure voltage between ECM connector terminals A23 and A25.

### ECM CONNECTOR A (26P)



Is there battery voltage?

NO

Repair open in the wire between the EVAP purge control solenoid valve and the ECM (A23).

YES

Substitute a known-good ECM and retest (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.

(To page 11-B-91)



(From page 11-B-90)

**Check the vacuum when hot:**  
1. Start the engine. Hold the engine at 3,000 rpm ( $\text{min}^{-1}$ ) with no load (transmission in neutral) until the radiator fan comes on, then let it idle.  
2. Check for vacuum at the vacuum hose after starting the engine.

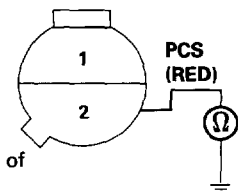
Is there vacuum?  
NO  
YES

**Check the EVAP purge control solenoid valve:**  
Disconnect the 2P connector from the EVAP purge control solenoid valve.

Is there vacuum?  
NO  
YES

Inspect vacuum hose routing.  
If OK, replace the EVAP purge control solenoid valve.

**EVAP PURGE CONTROL SOLENOID VALVE 2P CONNECTOR**



Wire side of female terminals

**Check for a short in the wire (PCS line):**  
1. Turn the ignition switch OFF.  
2. Disconnect ECM connector A (26P).  
3. Check for continuity between the EVAP purge control solenoid valve 2P connector terminal No. 2 and body ground.

Is there continuity?  
YES  
NO

Repair short in the wire between the EVAP purge control solenoid valve and the ECM (A23).

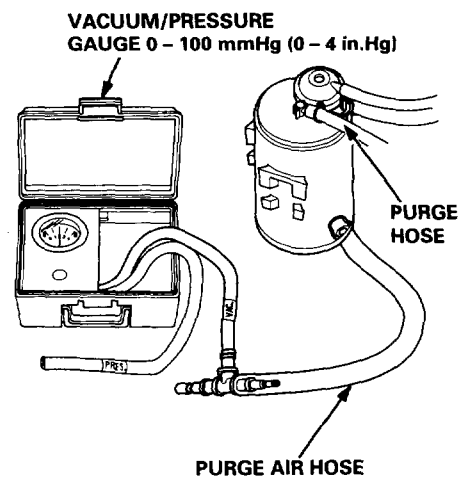
**Check the EVAP control canister:**  
1. Reconnect the vacuum hose to the EVAP purge control solenoid valve.  
2. Remove fuel fill cap.  
3. Connect a vacuum gauge to canister purge air hose.  
4. Start the engine and raise speed to 3,500 rpm ( $\text{min}^{-1}$ ).

Does vacuum appear on gauge within 1 minute?  
NO  
YES

Substitute a known-good ECM and recheck (see page 11-B-15 for immobilizer information). If symptom/indication goes away, replace the original ECM.

Replace the EVAP control canister.

See EVAP two way valve test to complete.  
Evaporative emission controls are OK.



## **Transaxle**

<b>Clutch .....</b>	<b>12-1</b>
<b>Manual Transmission .....</b>	<b>13-1</b>
<b>Automatic Transmission .....</b>	<b>14-1</b>
<b>Driveshafts .....</b>	<b>16-1</b>



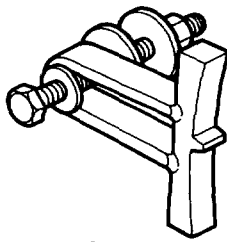
## **Clutch**

<b>Special Tools .....</b>	<b>12-2</b>
<b>Illustrated Index .....</b>	<b>12-3</b>
<b>Clutch Pedal</b>	
<b>Adjustment .....</b>	<b>12-4</b>
<b>Clutch Master Cylinder</b>	
<b>Overhaul/Inspection .....</b>	<b>12-5</b>
<b>Removal/Installation .....</b>	<b>12-6</b>
<b>Disassembly/Reassembly .....</b>	<b>12-7</b>
<b>Slave Cylinder</b>	
<b>Overhaul/Inspection .....</b>	<b>12-8</b>
<b>Removal/Installation .....</b>	<b>12-9</b>
<b>Pressure Plate</b>	
<b>Removal/Inspection .....</b>	<b>12-10</b>
<b>Clutch Disc</b>	
<b>Removal/Inspection .....</b>	<b>12-11</b>
<b>Flywheel</b>	
<b>Inspection .....</b>	<b>12-12</b>
<b>Replacement .....</b>	<b>12-12</b>
<b>Clutch Disc, Pressure Plate</b>	
<b>Installation .....</b>	<b>12-13</b>
<b>Release Bearing</b>	
<b>Removal/Inspection .....</b>	<b>12-14</b>
<b>Installation .....</b>	<b>12-15</b>

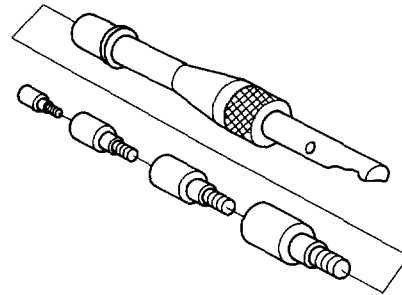


# Special Tools

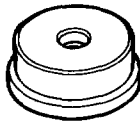
Ref. No.	Tool Number	Description	Qty	Remark
①	07LAB - PV00100 or 07924 - PD20003	Ring Gear Holder	1	
②	07PAF - 0020000	Clutch Alignment Tool Set	1	
③	07746 - 0010100	Attachment, 32 x 35 mm	1	
④	07749 - 0010000	Handle Driver	1	



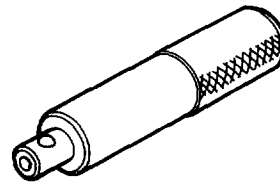
①



②



③

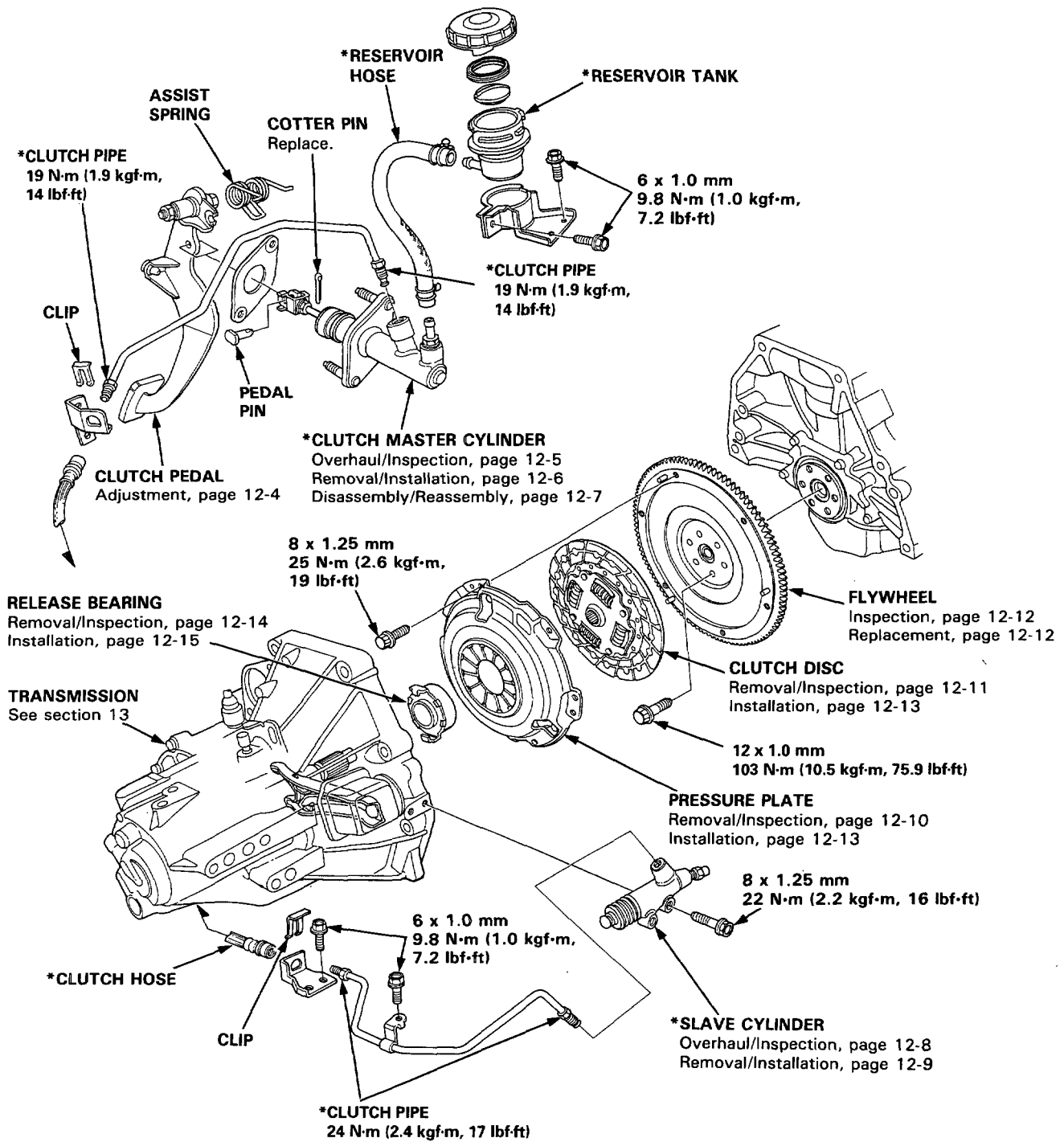


④



**NOTE:**

- Whenever the transmission is removed, clean and grease the release bearing sliding surface.
- If the parts marked \* are removed, the clutch hydraulic system must be bled (see page 12-9).
- Inspect the hoses for damage, leaks, interference, and twisting.
- LHD type is shown. RHD type is similar.





# Clutch Pedal

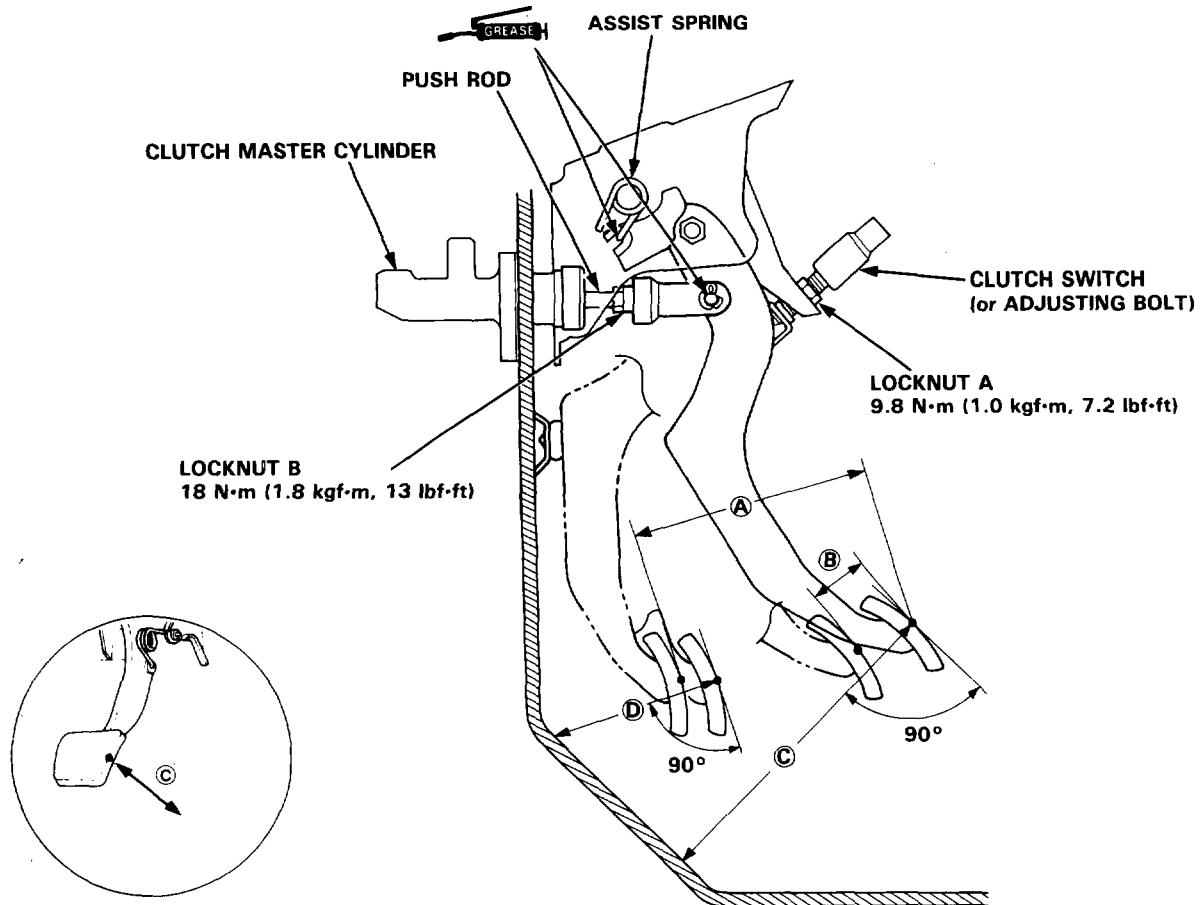
## Adjustment

**NOTE:**

- To check the clutch switch, see section 23.
- The clutch is self-adjusting to compensate for wear.

**CAUTION:** If there is no clearance between the clutch master cylinder piston and push rod, the release bearing is held against the diaphragm spring, which can result in clutch slippage or other clutch problems.

1. Loosen locknut A, and back off the clutch switch (or adjusting bolt) until it no longer touches the clutch pedal.
2. Loosen locknut B, and turn the push rod in or out to get the specified stroke (A) and height (C) at the clutch pedal.
3. Tighten locknut B.
4. Turn the clutch switch (or adjusting bolt) in until it contacts the clutch pedal.
5. Turn the clutch switch (or adjusting bolt) in an additional 3/4 to 1 full turn.
6. Tighten locknut A.



- (A) (STROKE at PEDAL): 130 – 140 mm (5.12 – 5.51 in)
- (B) (TOTAL CLUTCH PEDAL FREE PLAY): 12 – 21 mm (0.47 – 0.83 in) include the pedal play 1 – 10 mm (0.04 – 0.39 in)
- (C) (CLUTCH PEDAL HEIGHT): LHD: 161 mm (6.34 in) to the floor  
RHD: 161 mm (6.34 in) to the floor
- (D) (CLUTCH PEDAL DISENGAGEMENT HEIGHT): LHD: 81 mm (3.19 in) minimum to the floor  
RHD: 79 mm (3.11 in) minimum to the floor

# Clutch Master Cylinder




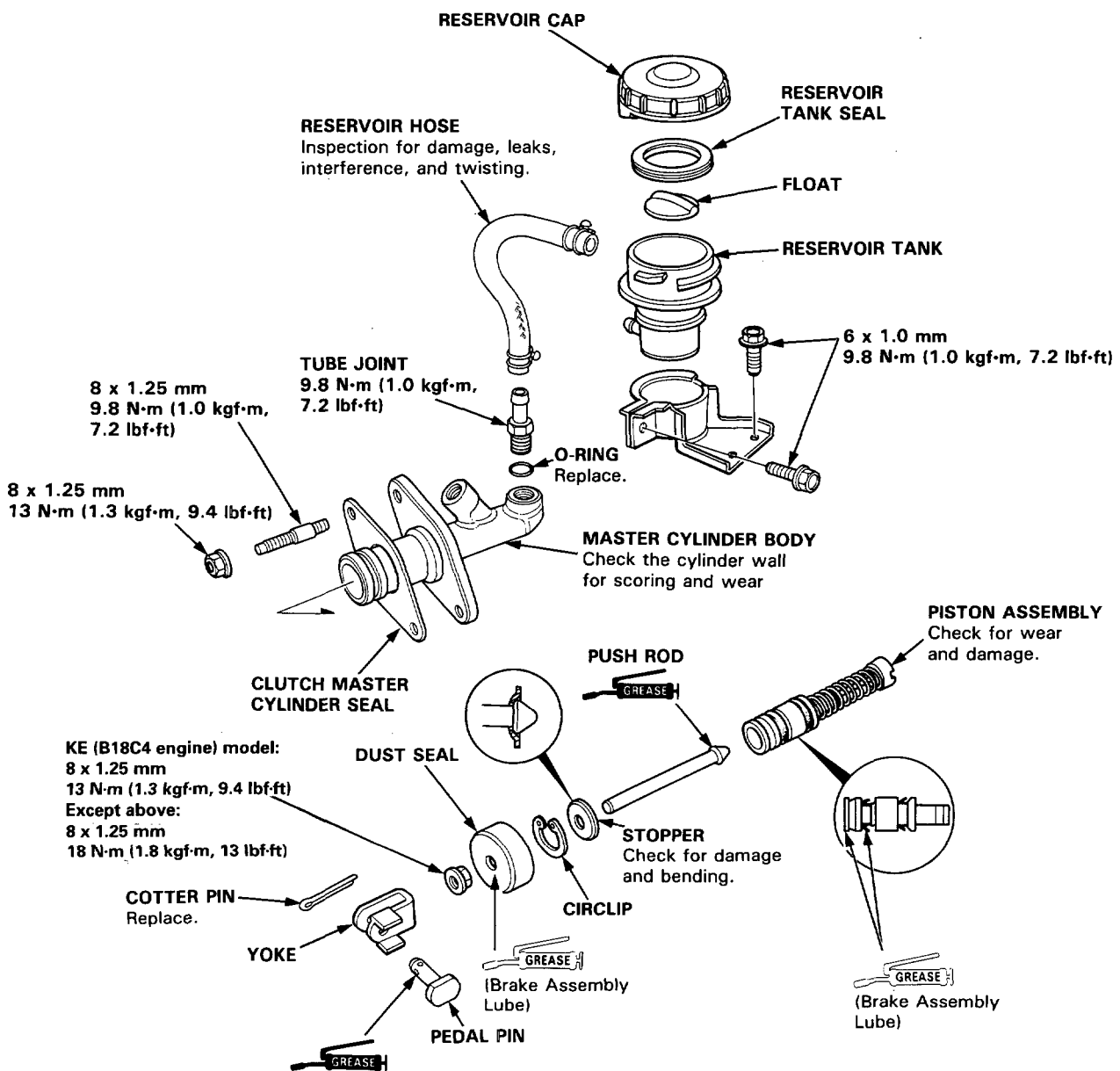
## Overhaul/Inspection

### 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.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only Genuine Honda Brake Fluid or an equivalent DOT 3 or DOT 4 brake fluid.

NOTE: LHD type is shown. RHD type is similar.

: Brake Assembly Lube or equivalent rubber grease.



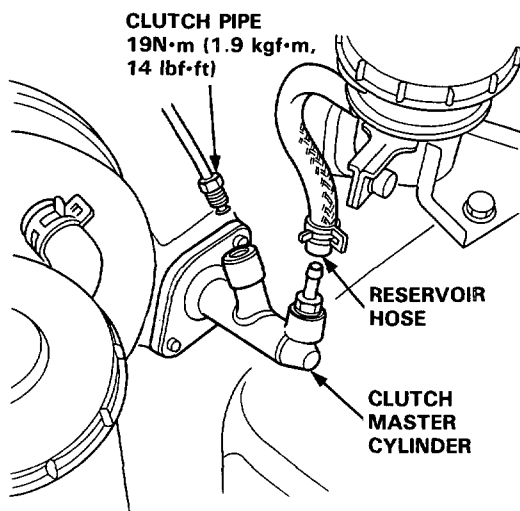
# Clutch Master Cylinder

## Removal/Installation

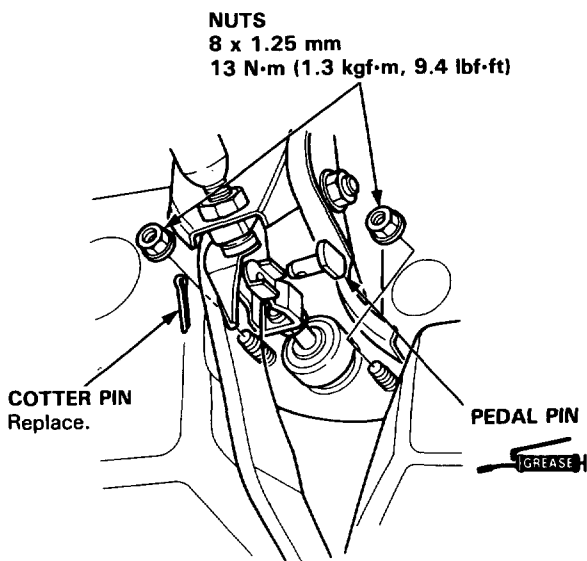
### ⚠ CAUTION

- 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.
- Plug the end of the clutch pipe and reservoir hose with a shop towel to prevent brake fluid from coming out.

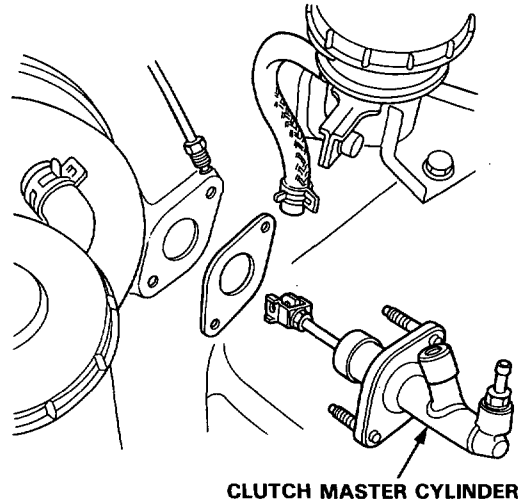
1. The brake fluid may be sucked out through the top of the master cylinder reservoir with a syringe.
2. Disconnect the clutch pipe and reservoir hose from the clutch master cylinder.



3. Pry out the cotter pin, and pull the pedal pin out of the yoke. Remove the nuts.



4. Remove the clutch master cylinder.



5. Install the clutch master cylinder in the reverse order of removal.

NOTE: Bleed the clutch hydraulic system (see page 12-9).

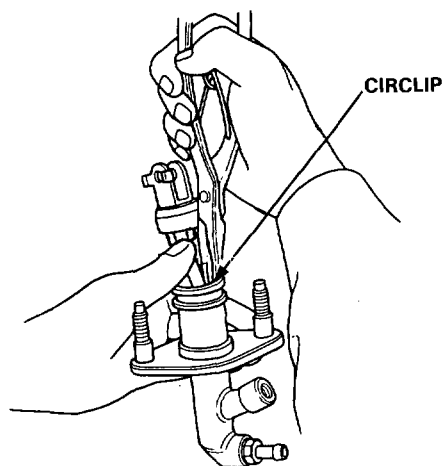


## Disassembly/Reassembly

### ⚠ 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.

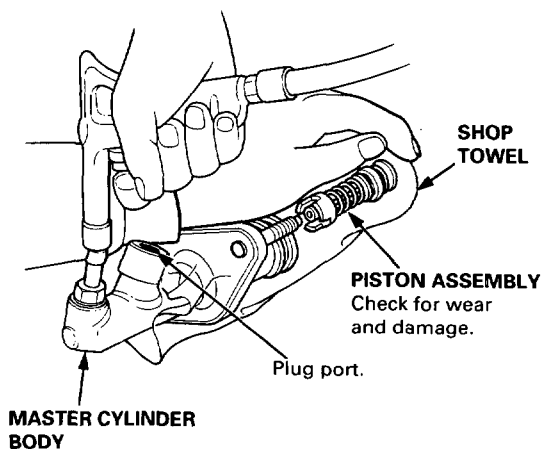
1. Remove the dust seal from the clutch master cylinder.
2. Pry the circlip off the clutch master cylinder.



3. Carefully remove the piston by applying air pressure through the clutch line hole.

### ⚠ CAUTION

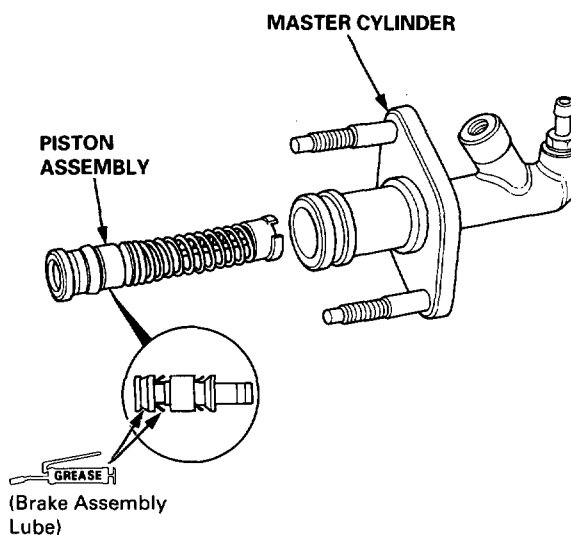
- Hold a shop towel over the clutch master cylinder, to stop the piston in case it comes out suddenly.
- Plug the end of the clutch hose port with a shop towel to prevent fluid from coming out.
- Clean all disassembled parts in solvent and blow through all ports and passages with compressed air.



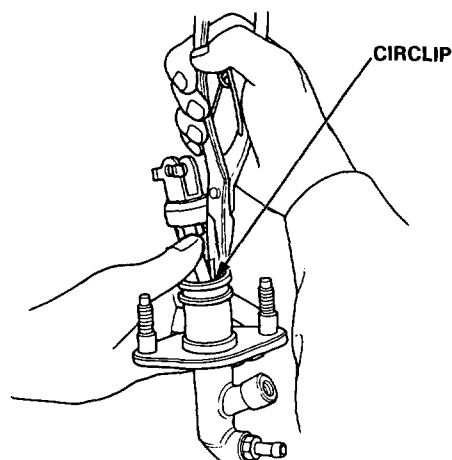
### ⚠ CAUTION

- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- 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 reuse the drained fluid. Use only Genuine Honda Brake Fluid or an equivalent DOT 3 or DOT 4 brake fluid.

4. Slide the piston assembly into the clutch master cylinder.



5. Install the circlip in the groove of the clutch master cylinder.




6. Install the dust seal.


# Slave Cylinder

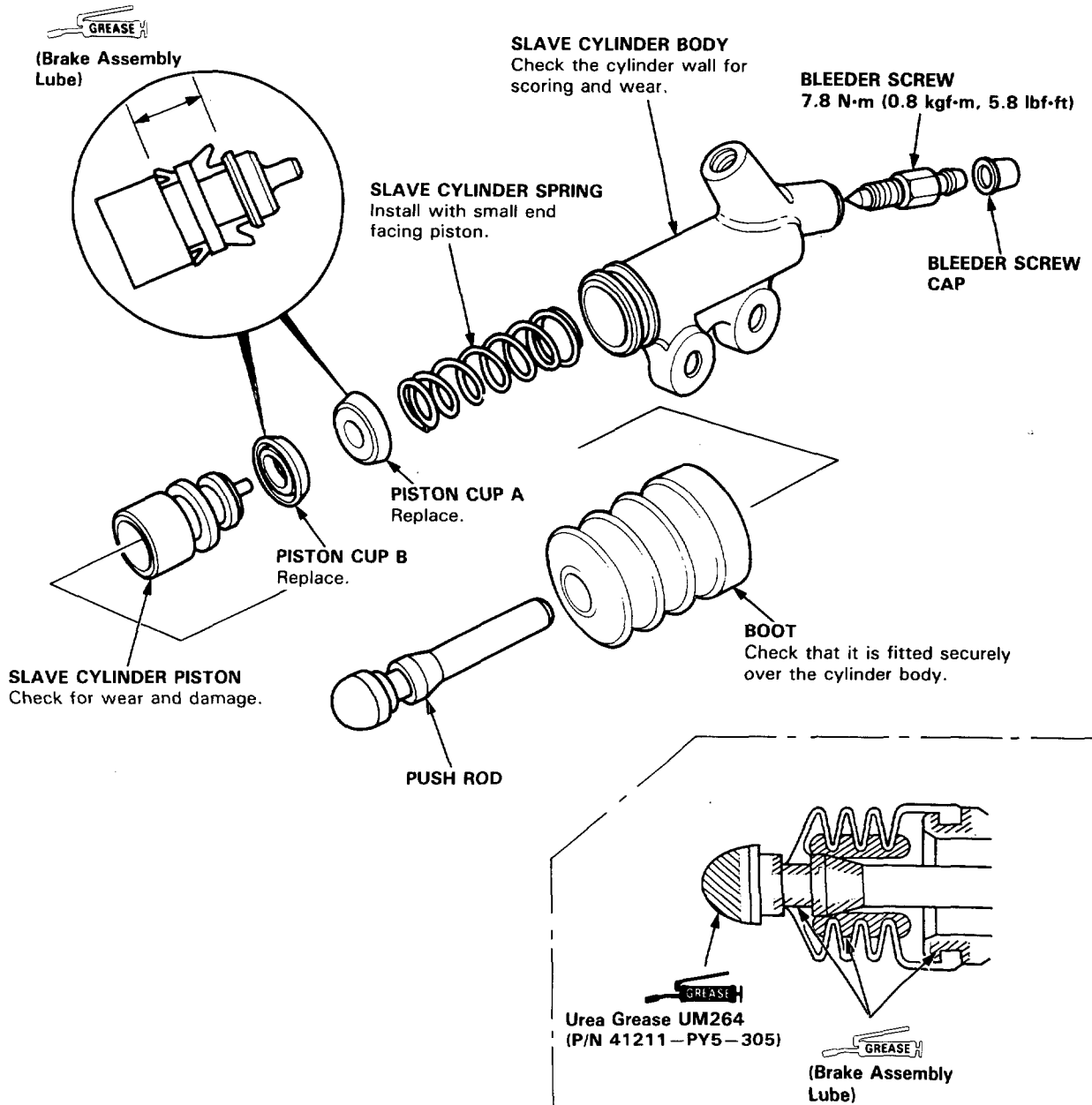
## Overhaul/Inspection

### ⚠ 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.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid. Use only Genuine Honda Brake Fluid or an equivalent DOT 3 or DOT 4 brake fluid.

 **GREASE**: HONDA Genuine Urea Grease UM264 (P/N41211 – PY5 – 305).

 **GREASE**: Brake Assembly Lube or equivalent rubber grease.







## Removal/Installation

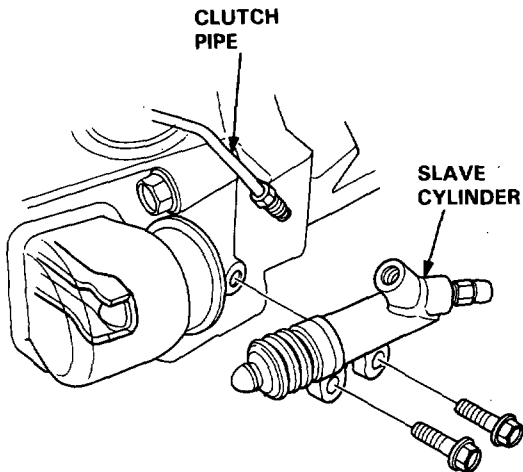
### CAUTION

- 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.
- Plug the end of the clutch pipe with a shop towel to prevent brake fluid from coming out.

 **GREASE**: HONDA Genuine Urea Grease UM264 (P/N41211 - PY5 - 305).

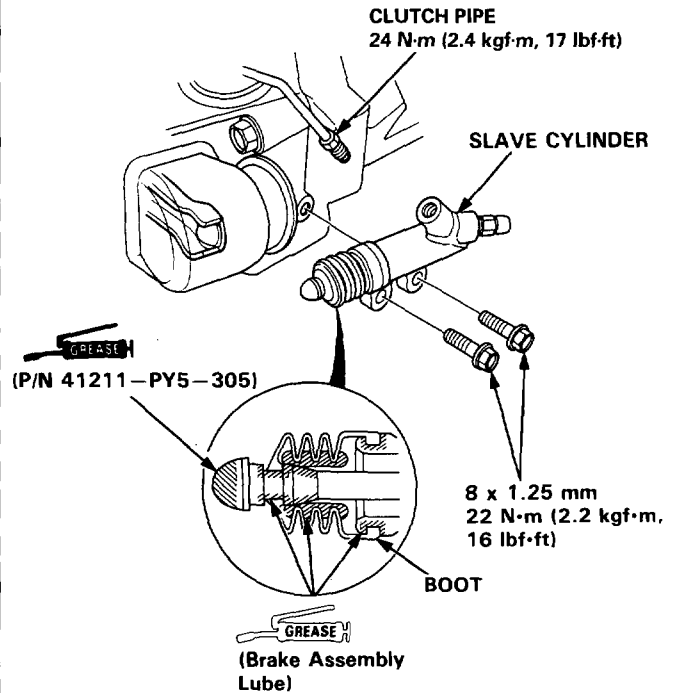
 **GREASE**: Brake Assembly Lube or equivalent rubber grease.

1. Disconnect the clutch pipe from the slave cylinder.
2. Remove the slave cylinder from the clutch housing.



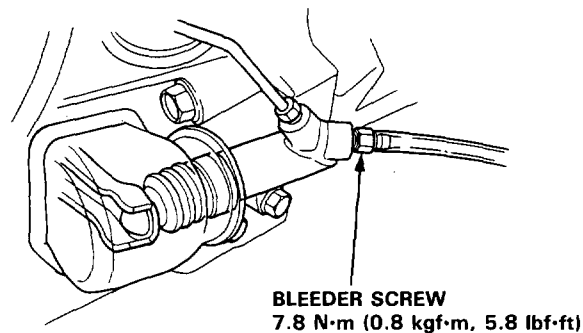
3. Install the slave cylinder in the reverse order of removal.

**NOTE:** Make sure the boot is installed on the slave cylinder.



4. Bleed the clutch hydraulic system.

- Attach a hose to the bleeder screw, and suspend the hose in a container of brake fluid.
- Make sure there is an adequate supply of fluid at the clutch master cylinder, then slowly pump the clutch pedal until no more bubbles appear at the bleeder hose.
- Refill the clutch master cylinder with fluid when done.
- Use only Genuine Honda Brake Fluid or an equivalent DOT 3 or DOT 4 brake fluid.
- Confirm clutch operation, and check for leaking fluid.

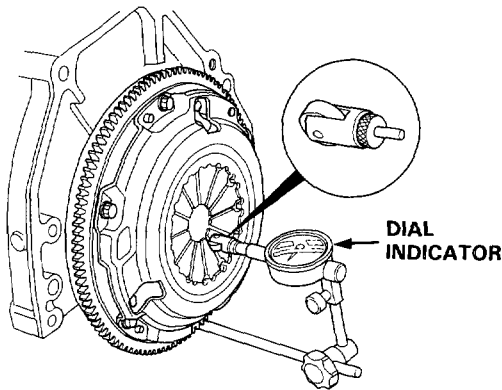


# Pressure Plate

## Removal/Inspection

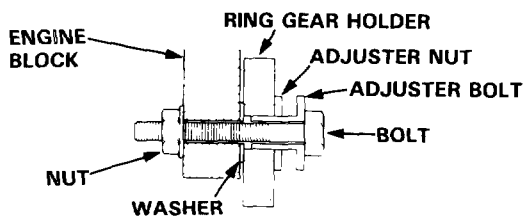
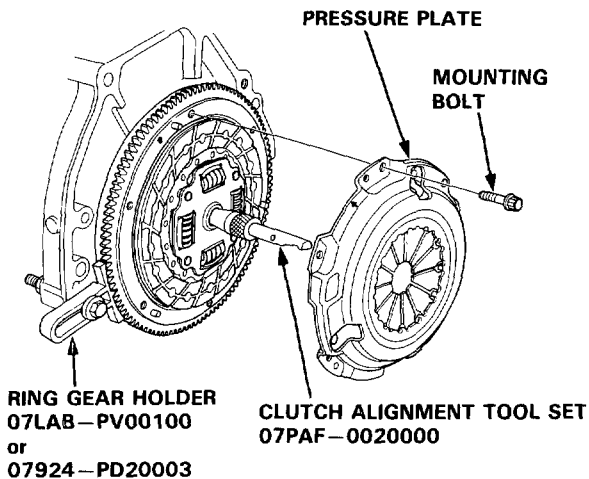
1. Check the diaphragm spring fingers for height using the dial indicator.

**Standard (New):** 0.6 mm (0.02 in) max.  
**Service Limit:** 0.8 mm (0.03 in)

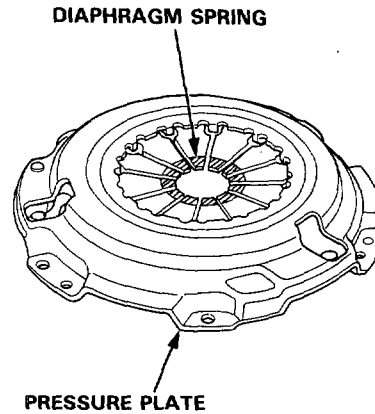


- If the height is more than the service limit, replace the pressure plate.

2. Install the special tools as shown.
3. To prevent warping, unscrew the pressure plate mounting bolts in a crisscross pattern in several steps, then remove the pressure plate.



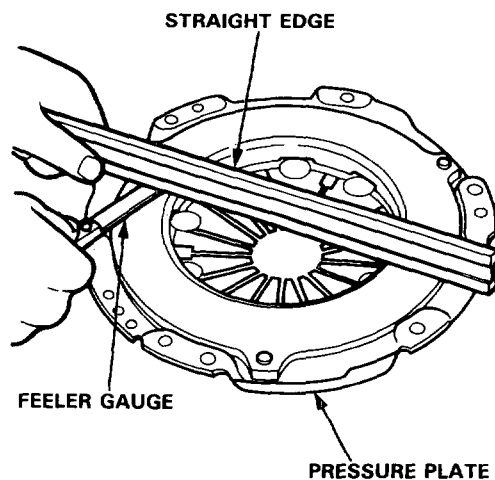
4. Inspect the pressure plate surface for wear, cracks, and burning.
5. Inspect the fingers of the diaphragm spring for wear at the release bearing contact area.



6. Inspect for warpage using a straight edge and feeler gauge.

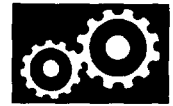
**NOTE:** Measure across the pressure plate at three points.

**Standard (New):** 0.03 mm (0.001 in) max.  
**Service Limit:** 0.15 (0.006 in)



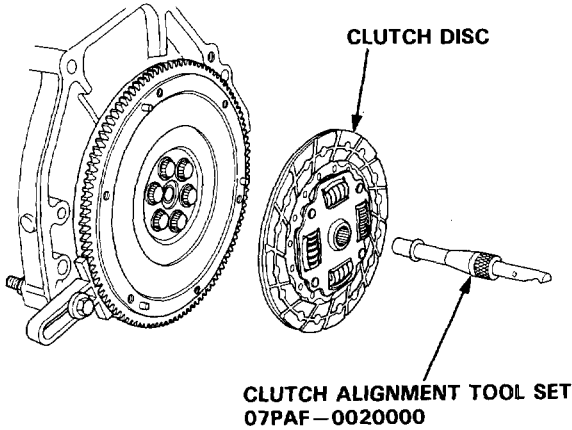
- If the warpage is more than the service limit, replace the pressure plate.

# Clutch Disc



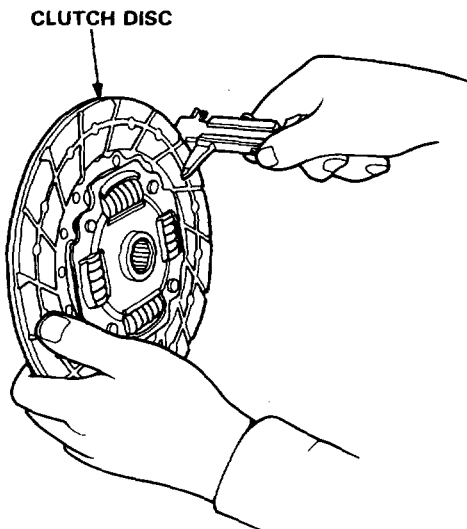
## Removal/Inspection

1. Remove the clutch disc and special tools.
2. Inspect the lining of the clutch disc for signs of slipping or oil. If the clutch disc is burned black or oil soaked, replace it.



3. Measure the clutch disc thickness.

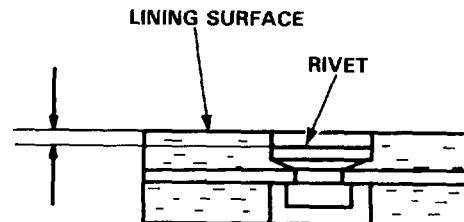
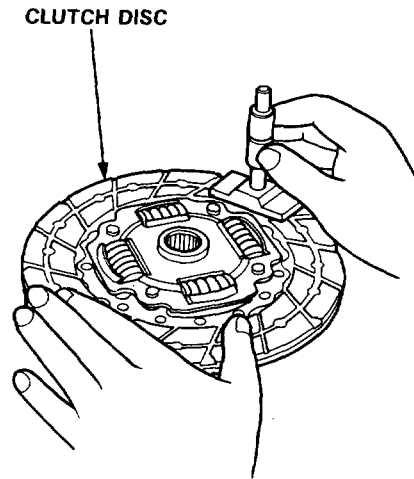
**Standard (New): B18C4 engine:**  
8.4 – 9.1 mm (0.331 – 0.358 in)  
**Except B18C4 engine:**  
7.7 – 8.2 mm (0.303 – 0.323 in)  
**Service Limit:** 6.0 mm (0.22 in)



- If the thickness is less than the service limit, replace the clutch disc.

4. Measure the rivet depth from the lining surface to the rivets, on both sides.

**Standard (New): B18C4 engine:**  
1.2 – 1.7 mm (0.047 – 0.067 in)  
**Except B18C4 engine:**  
1.3 mm (0.051 in) min.  
**Service Limit:** 0.2 mm (0.008 in)



- If the rivet depth is less than the service limit, replace the clutch disc.



# Flywheel

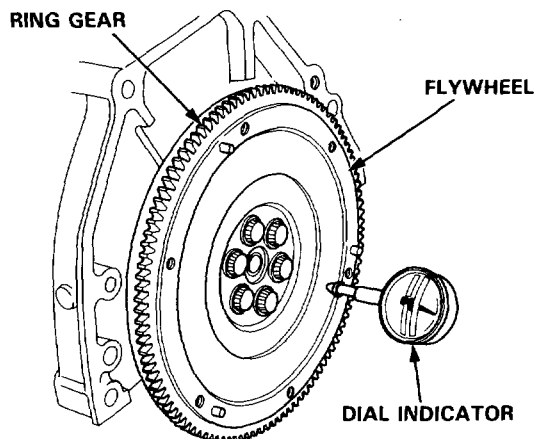
## Inspection

1. Inspect the ring gear teeth for wear and damage.
2. Inspect the clutch disc mating surface on the flywheel for wear, cracks, and burning.
3. Measure the flywheel runout using a dial indicator through at least two full turns. Push against the flywheel each time you turn it to take up the crankshaft thrust washer clearance.

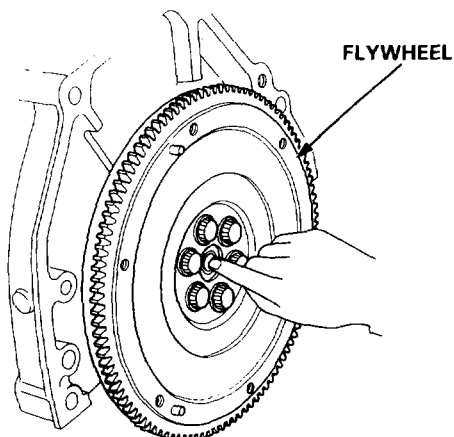
NOTE: The runout can be measured with engine installed.

**Standard (New): 0.05 mm (0.002 in) max.**  
**Service Limit: 0.15 mm (0.006 in)**

If the runout is more than the service limit, replace the flywheel and recheck the runout.

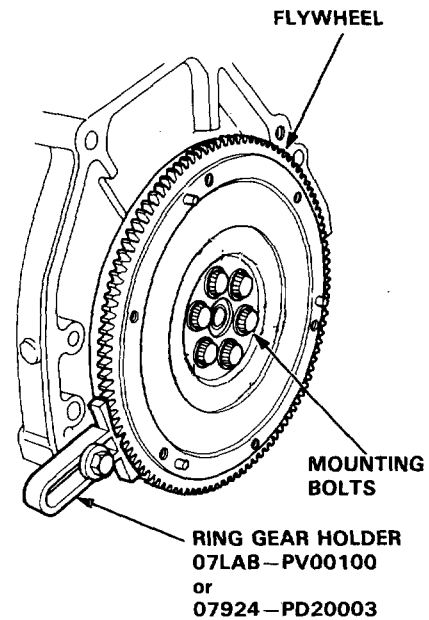


4. Turn the inner race of the flywheel bearing with your finger. The bearing should turn smoothly and quietly. Check that the bearing outer race fits tightly in the flywheel. If the race does not turn smoothly, quietly, or fit tight in the flywheel, replace the bearing.

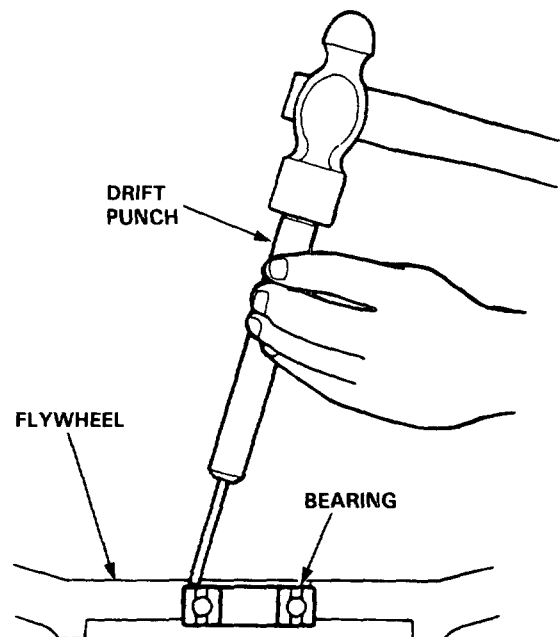


## Replacement

1. Install the special tool as shown.
2. Remove the flywheel mounting bolts in a crisscross pattern in several steps, and remove the flywheel.



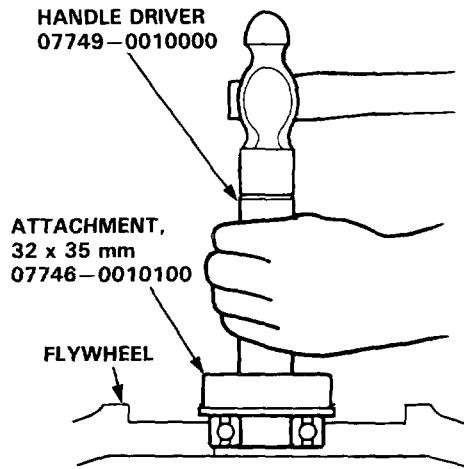
3. Remove the ball bearing from the flywheel.



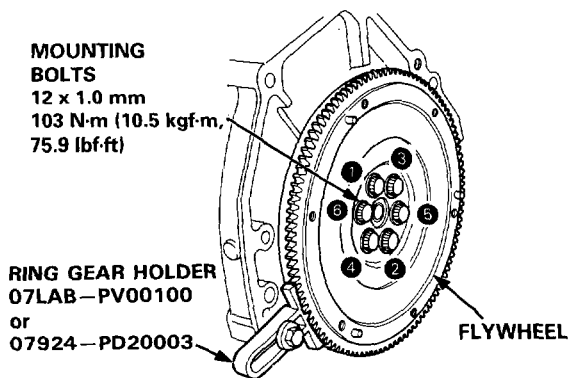


## Installation

4. Drive the new bearing into the flywheel using the special tools as shown.

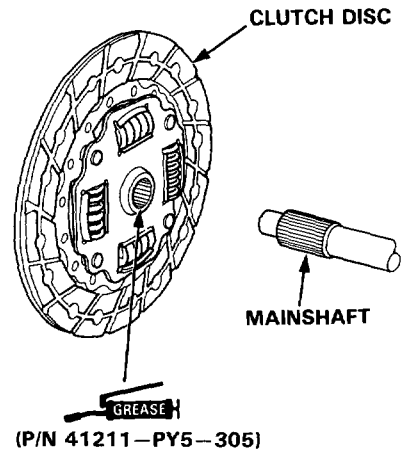


5. Align the hole in the flywheel with the crankshaft dowel pin, and install the flywheel. Install the mounting bolts finger-tight.
6. Install the special tool, then torque the flywheel mounting bolts in a crisscross pattern in several steps as shown.

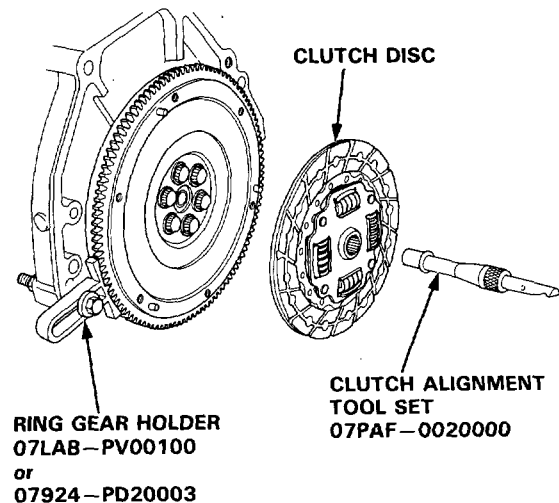


1. Apply grease to inner dia. Spline thinly and uniformly, mate and slide mainshaft, and remove extra overflow grease.

**NOTE:** Use only HONDA Genuine Urea Grease UM264 (P/N 41211-PY5-305).



2. Install the ring gear holder.
3. Install the clutch disc using the special tools as shown.



(cont'd)

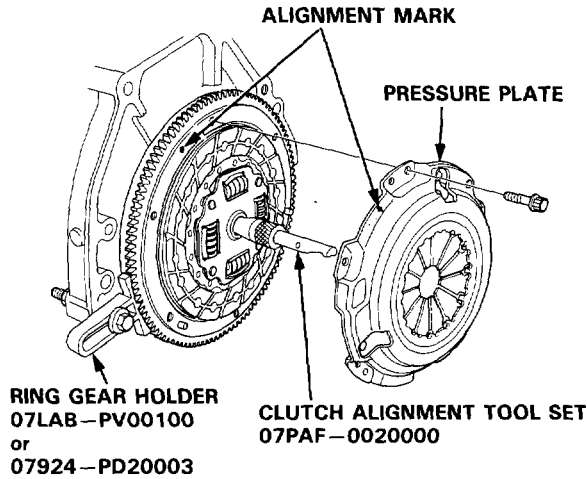
# Clutch Disc, Pressure Plate

# Release Bearing

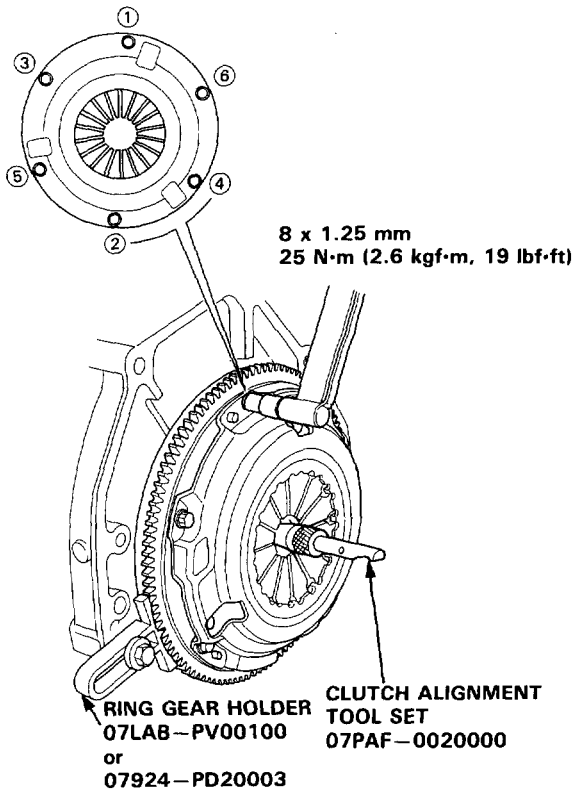
## Installation (cont'd)

4. Install the pressure plate.

NOTE: Align the mark on the flywheel with the mark on the pressure plate.



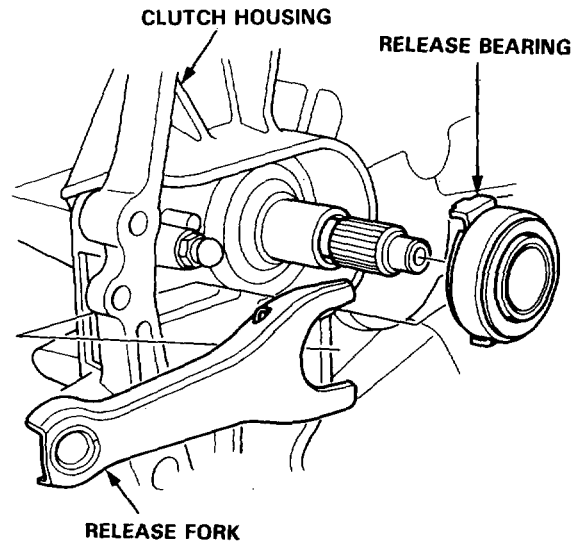
5. Torque the mounting bolts in a crisscross pattern as shown. Tighten the bolts in several steps to prevent warping the diaphragm spring.



6. Remove the special tools.
7. Check the diaphragm spring fingers for height (see page 12-10).

## Removal/Inspection

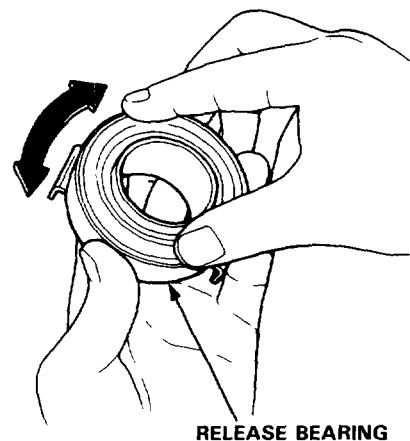
1. Remove the release fork boot from the clutch housing.
2. Remove the release fork from the clutch housing by squeezing the release fork set spring with pliers. Remove the release bearing.



3. Check the release bearing for play by spinning it by hand.

### CAUTION

The release bearing is packed with grease. Do not wash it in solvent.



- If there is excessive play, replace the release bearing with a new one.



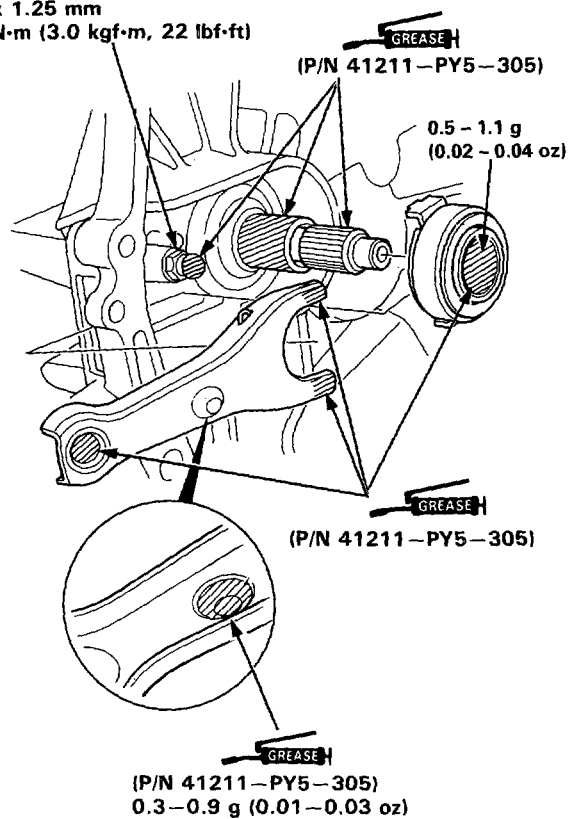
## Installation

NOTE: Use only HONDA Genuine Urea Grease UM264 (P/N 41211 - PY5 - 305).

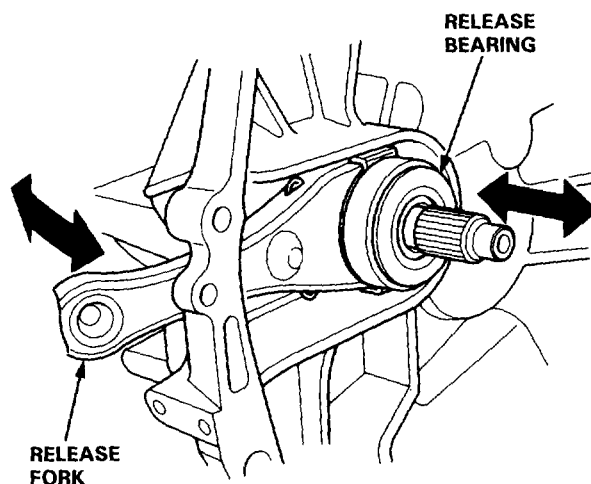
1. With the release fork slid between the release bearing pawls, install the release bearing on the mainshaft while inserting the release fork through the hole in the clutch housing.
2. Align the detent of the release fork with the release fork bolt, then press the release fork over the release fork bolt squarely.

### RELEASE FORK BOLT

12 x 1.25 mm  
29 N·m (3.0 kgf·m, 22 lbf·ft)



3. Move the release fork right and left to make sure that it fits properly against the release bearing, and that the release bearing slides smoothly.
4. Install the release fork boot; make sure the boot seals around the release fork and clutch housing.



# **Manual Transmission**

## **9A Model**

**Manual Transmission ..... 13-1**

## **S9B Model**

**Manual Transmission ..... 13-49**



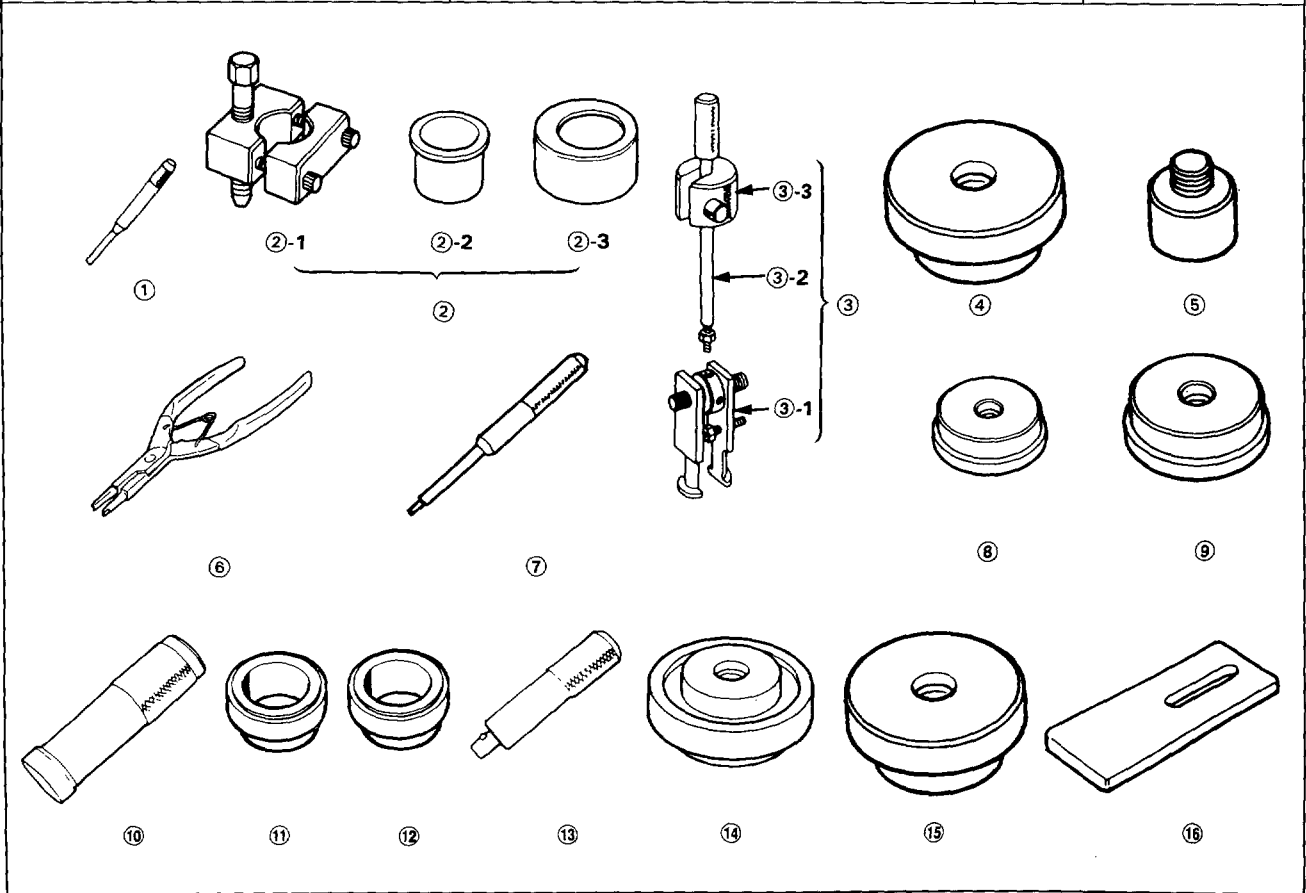
# 9A Model Manual Transmission (All except B18C4 engine model)

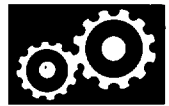
<b>Special Tools</b> .....	13-2	<b>Shift Fork Assembly</b>	
<b>Maintenance</b>		<b>Index</b> .....	13-25
<b>Transmission Fluid</b> .....	13-3	<b>Clearance Inspection</b> .....	13-26
<b>Back-up Light Switch</b>		<b>MBS Shift Piece Inspection</b> .....	13-27
<b>Test/Replacement</b> .....	13-3	<b>Synchro Sleeve, Synchro Hub</b>	
<b>Troubleshooting</b> .....	13-4	<b>Inspection/Installation</b> .....	13-27
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<b>Overhaul</b> .....	13-5	<b>Inspection</b> .....	13-28
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<b>Reverse Shift Holder</b>		<b>Bearing Replacement</b> .....	13-31
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<b>Reverse Idler Gear</b>		<b>Thrust Shim Adjustment</b> .....	13-32
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<b>Mainshaft, Countershaft, Shift Fork</b>		<b>Replacement</b> .....	13-34
<b>Disassembly</b> .....	13-14	<b>Mainshaft Thrust Clearance</b>	
<b>Mainshaft Assembly</b>		<b>Adjustment</b> .....	13-36
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<b>Clearance Inspection</b> .....	13-16	<b>Reassembly</b> .....	13-39
<b>Disassembly</b> .....	13-17	<b>Oil Seals</b>	
<b>Inspection</b> .....	13-18	<b>Replacement</b> .....	13-43
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<b>Countershaft Assembly</b>		<b>Installation</b> .....	13-45
<b>Index</b> .....	13-20		
<b>Clearance Inspection</b> .....	13-21		
<b>Disassembly</b> .....	13-22		
<b>Inspection</b> .....	13-23		
<b>Reassembly</b> .....	13-23		



# Special Tools

Ref. No.	Tool Number	Description	Qty	Remark
①	07GAD - PG20100	Pin Driver, 5.0 mm	1	
②	07GAJ - PG20102	Mainshaft Clearance Inspection Tool Set	1	
②-1	07GAJ - PG20110	Mainshaft Holder	(1)	Component Tools
②-2	07GAJ - PG20120	Collar	(1)	
②-3	07GAJ - PG20130	Mainshaft Base	(1)	
③	07JAC - PH80000	Adjustable Bearing Remover Set	1	
③-1	07JAC - PH80100	Bearing Remover Attachment	(1)	Component Tools
③-2	07JAC - PH80200	Remover Handle Assembly	(1)	
③-3	07741 - 0010201	Remover Weight	(1)	
④	07JAD - PH80101	Seal Driver Attachment	1	
⑤	07JAD - PH80200	Pilot, 26 x 30 mm	1	
⑥	07LGC - 0010100	Snap Ring Pliers	1	
⑦	07744 - 0010600	Pin Driver, 8.0 mm	1	
⑧	07746 - 0010300	Driver Attachment, 42 x 47 mm	1	
⑨	07746 - 0010400	Driver Attachment, 52 x 55 mm	1	
⑩	07746 - 0030100	Driver, 40 mm	1	
⑪	07746 - 0030400	Driver, 35 mm	1	
⑫	07746 - 0030300	Driver, 30 mm	1	
⑬	07749 - 0010000	Handle Driver	1	
⑭	07947 - SD90200	Seal Driver Attachment	1	
⑮	07947 - 6110501 or 07947 - 6110500	Seal Driver Attachment	1	
⑯	07979 - PJ40001	Magnet Stand Base	1	





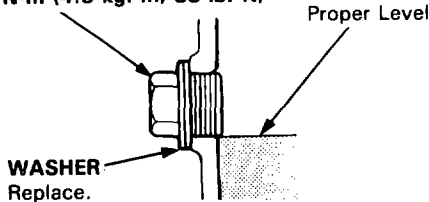
## Transmission Fluid

NOTE: Check the fluid with the engine OFF and car on level ground.

1. Remove the filler plug, then check the level and condition of the fluid.

### FILLER PLUG

44 N·m (4.5 kgf·m, 33 lbf·ft)



2. The oil level must be up to the filler hole. If it is below the hole, add fluid until it runs out, then reinstall the filler plug with a new washer.
3. If the transmission fluid is dirty, remove the drain plug and drain the fluid.
4. Reinstall the drain plug with a new washer, and refill the transmission fluid to the proper level.

NOTE: The drain plug washer should be replaced at every fluid change.

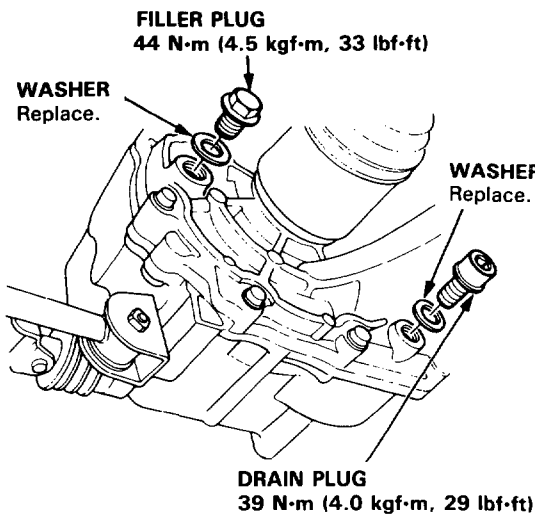
5. Reinstall the filler plug with a new washer.

### Fluid Capacity

1.8 ℓ (1.9 US qt, 1.6 Imp qt) at fluid change

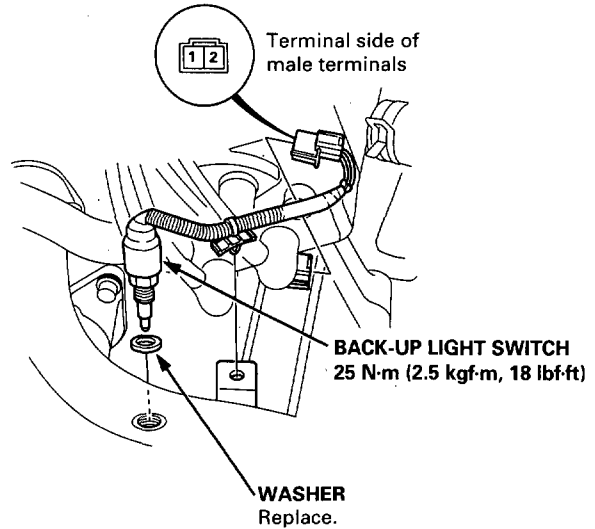
1.9 ℓ (2.0 US qt, 1.7 Imp qt) at overhaul

Always use genuine Honda manual transmission fluid (MTF). If it is not available, you may use an API service SG or SH grade motor oil with a viscosity of SAE 10W-30 or 10W-40 as a temporary replacement.



## Test/Replacement

1. Disconnect the connectors from the switch.



2. Check for continuity between the No. 1 and No. 2 terminals.
  - There should be continuity when the shift lever into reverse.
  - There should be no continuity when the shift lever in position except reverse.
3. If necessary, replace the switch.



# Troubleshooting

## Reverse Gear Noise Reduction System

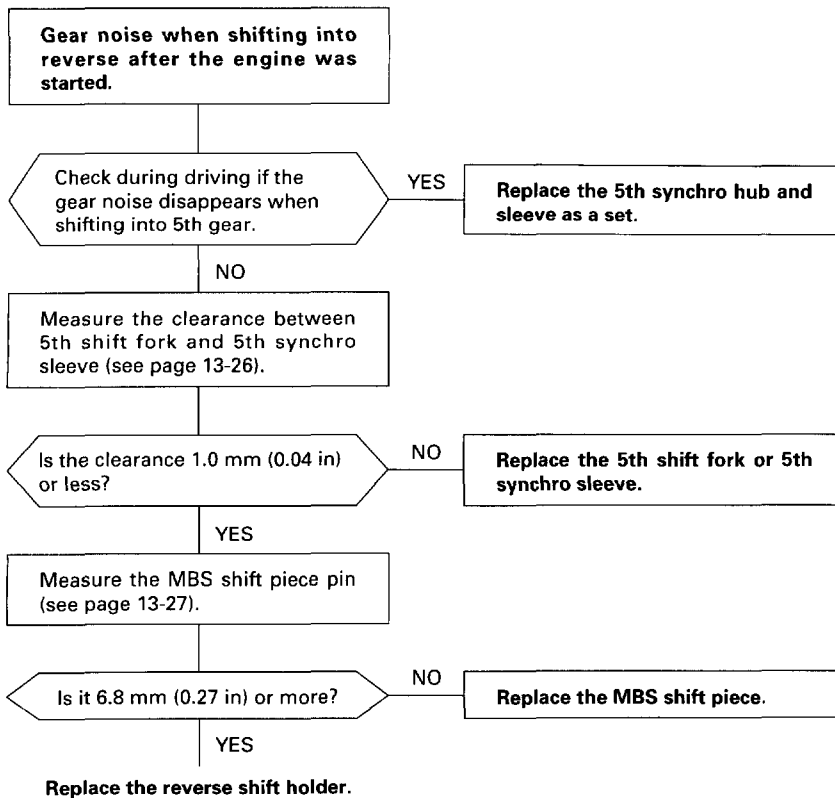
After the clutch pedal was depressed to shift into Reverse, the mainshaft continues to rotate because of its inertia. The resulting speed difference between mainshaft and reverse idler gear produces gear noise.

The reverse gear noise reduction system employs a cam plate which was added to the reverse shift holder. When shifting into Reverse, the 5th/reverse shift piece-connected to the shift lever-rotates the cam plate. This causes the 5th synchro set to stop the rotating mainshaft. As there is no speed difference between mainshaft and reverse idler gear, there will be less gear noise.

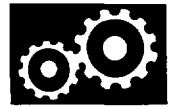
NOTE: This system is not a fully-synchronized gear noise reduction system.

Therefore, you may hear gear noise when

- ① you shift into Reverse with the car not yet completely stopped.
- ② you shift speedily during fast idling.



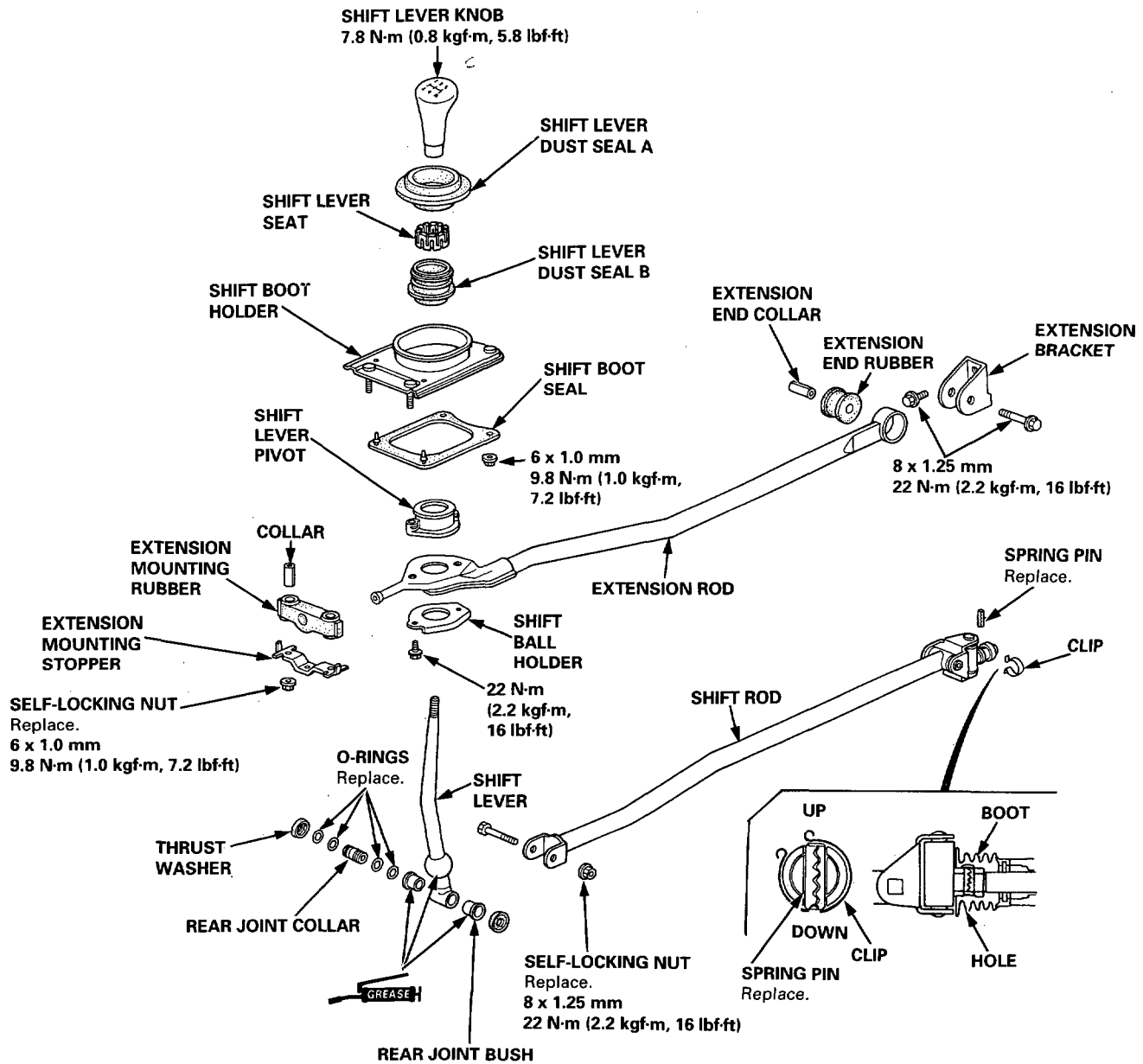
# Gearshift Mechanism



## Overhaul

### NOTE:

- Inspect rubber parts for wear and damage when disassembling, replace any worn or damaged parts.
- Install the clip as shown.
- Turn the boot so the hole is facing down as shown.
- Make sure the boot is installed on the shift rod.



# Transmission Assembly

## Removal

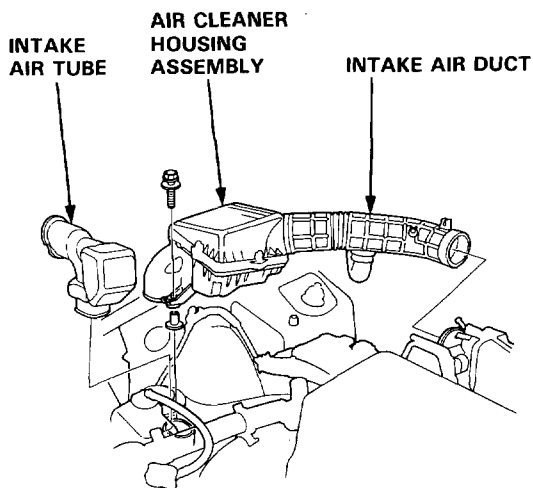
### **⚠ WARNING**

- Make sure jacks and safety stands are placed properly (see section 1).
- Apply parking brake and block rear wheels so car will not roll off stands and fall on you while working under it.

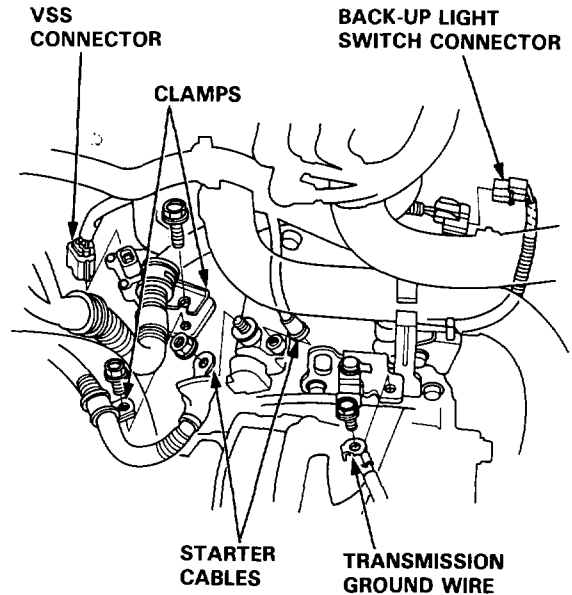
### **⚠ CAUTION**

Use fender covers to avoid damaging painted surfaces.

1. Disconnect the negative (-) cable first, then the positive (+) cable from the battery.
2. Remove the intake air tube, intake air duct and air cleaner housing assembly.
3. Drain transmission fluid (see page 13-3).



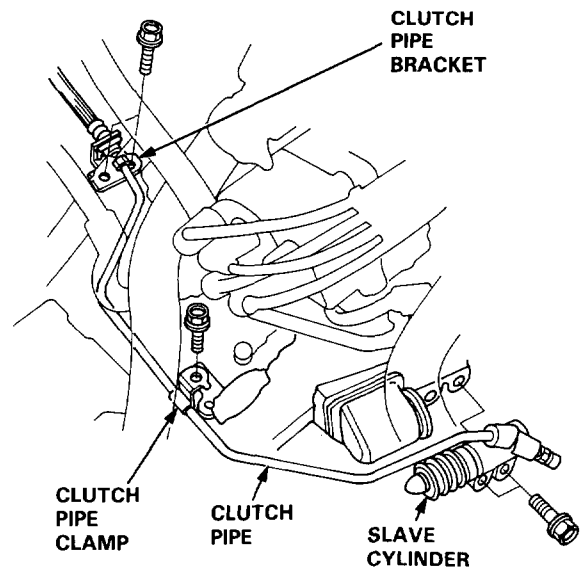
4. Disconnect the starter motor cables and transmission ground wire.
5. Remove the wire harness clamps.
6. Disconnect the back-up light switch connector and vehicle speed sensor (VSS) connector.



7. Remove the clutch pipe bracket, clutch pipe clamp, and slave cylinder.

### **⚠ CAUTION**

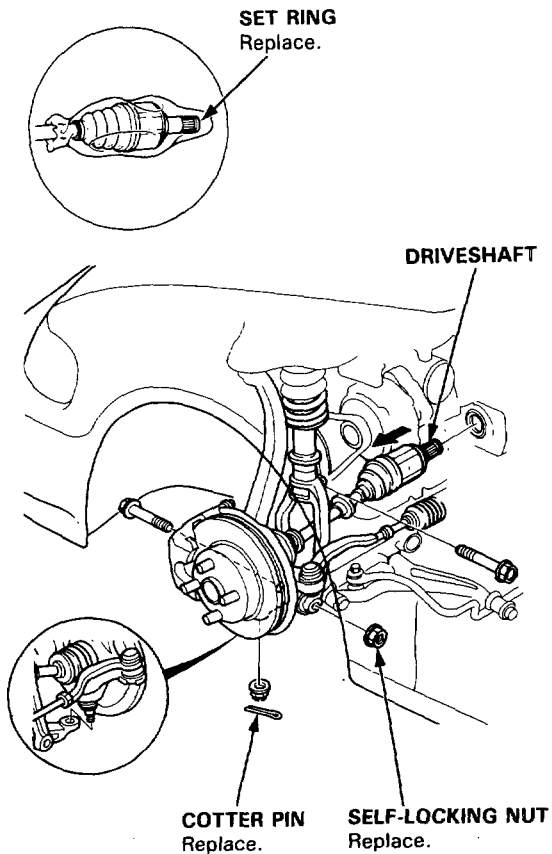
- Do not operate the clutch pedal once the slave cylinder has been removed.
- Take care not to bend the clutch pipe.



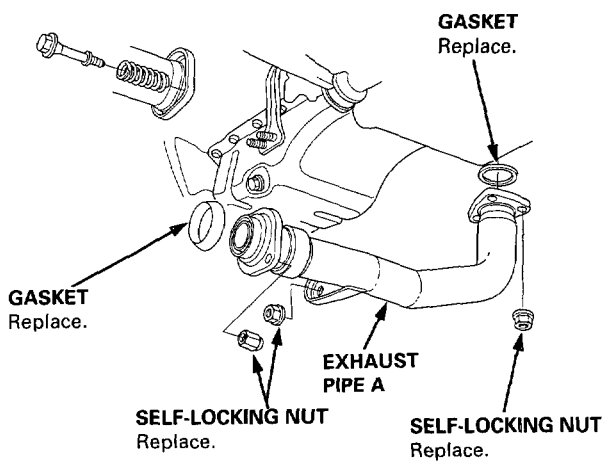


8. Remove the driveshafts (see section 16).

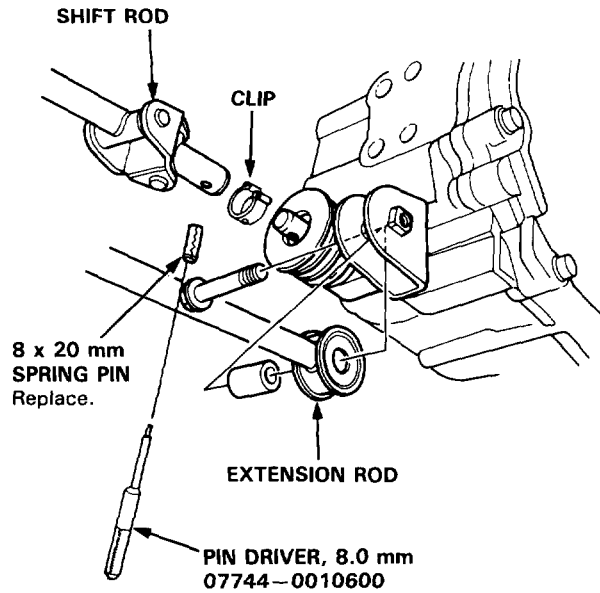
NOTE: Coat all the precision finished surfaces with clean engine oil or grease. Tie plastic bags over the driveshaft ends.



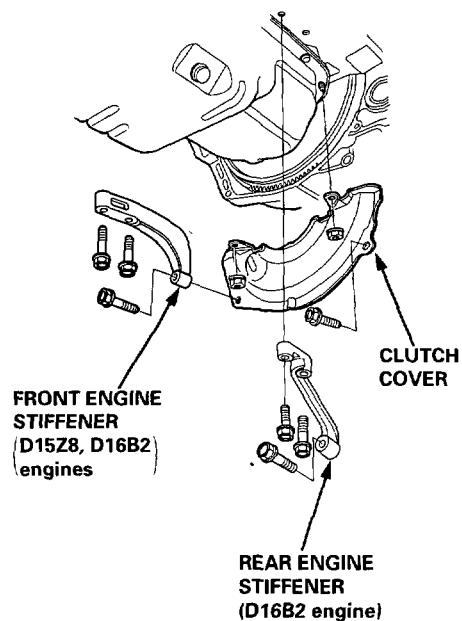
9. Remove exhaust pipe A.



10. Remove the shift rod and extension rod.



11. Remove the rear engine stiffener and clutch cover.

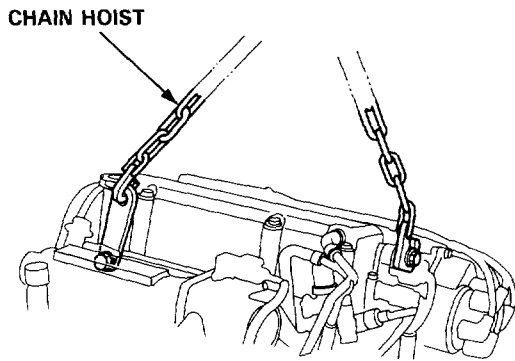


(cont'd)

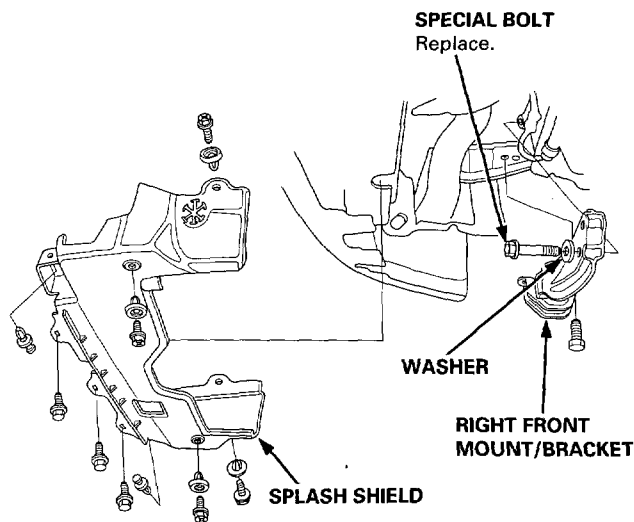
# Transmission Assembly

## Removal (cont'd)

12. Install the bolts in the cylinder head and attach a chain hoist to the bolts, then lift the engine slightly to unload the mounts.

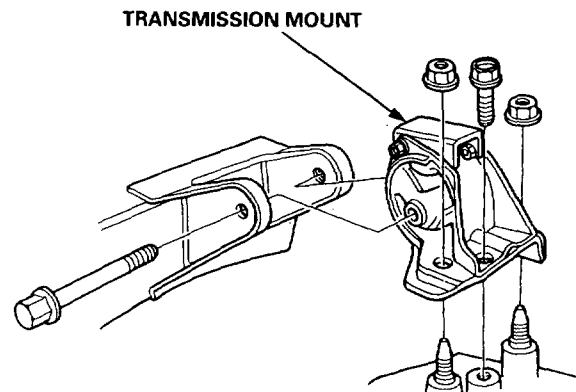


13. Remove the splash shield and right front mount/bracket.

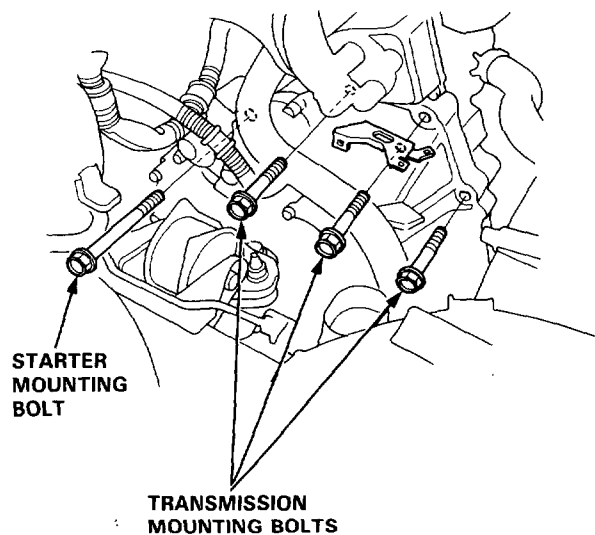


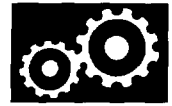
14. Place a jack under the transmission.

15. Remove the transmission mount.



16. Remove the three upper transmission mounting bolts and the lower starter mounting bolt.

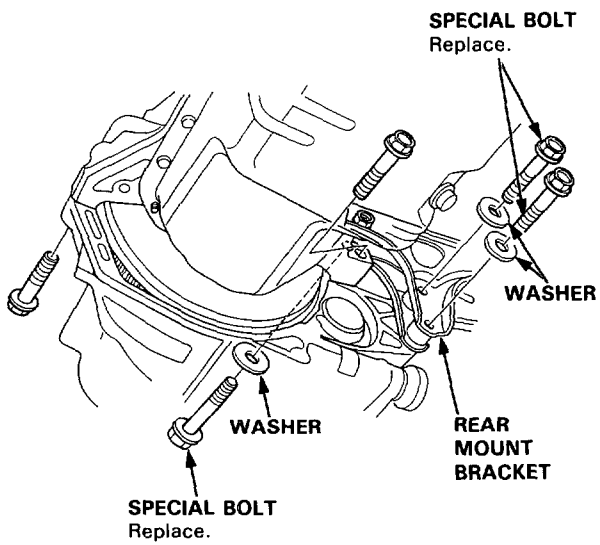




17. Remove the rear mount bracket bolts and transmission mounting bolts.
18. Pull the transmission away from the engine until it clears the mainshaft, then lower it on the transmission jack.

**⚠ CAUTION**


Take care not to bend the clutch pipe.



# Transmission Assembly

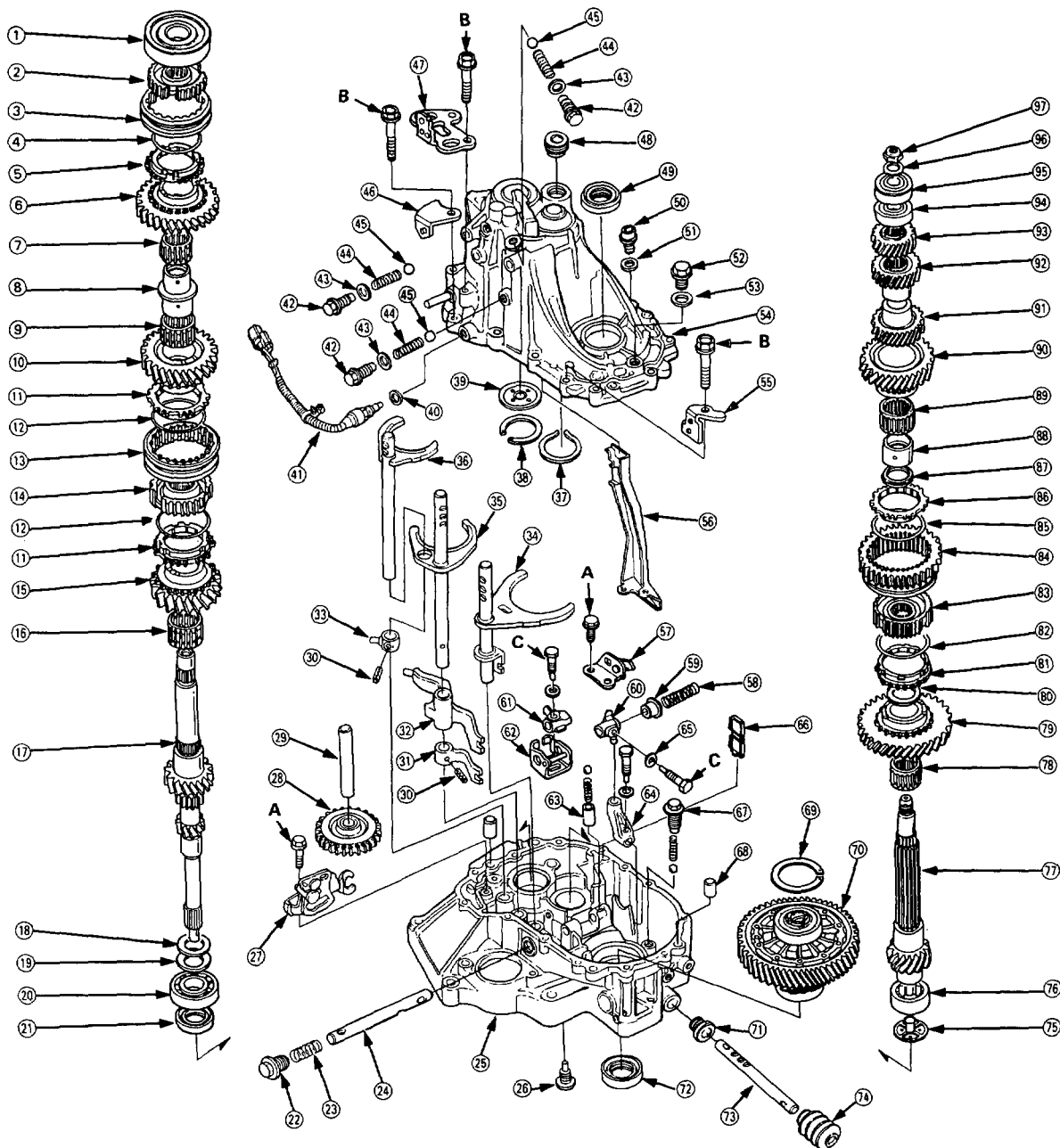
## Index

Refer to the drawing below for transmission disassembly/reassembly.  
Clean all the parts thoroughly in solvent and dry with compressed air.

 Lubricate all the parts with oil before reassembly.

### NOTE:

- This transmission uses no gaskets between the major housings; use liquid gasket (P/N 08C70 - X0134SEB/08C70 - X0231SEB or 08C70 - K0234MEB/08C70 - K0334MEB).
- Always clean the magnet **66** whenever the transmission housing is disassembled.
- Inspect all the bearings for wear and operation.





### Torque Value

A - 15 N·m (1.5 kgf·m, 11 lbf·ft)  
 B - 27 N·m (2.8 kgf·m, 20 lbf·ft)  
 C - 31 N·m (3.2 kgf·m, 23 lbf·ft)

- |   |   |  |
|---|---|--|
| <ul style="list-style-type: none"> <li>① BALL BEARING</li> <li>② 5TH SYNCHRO HUB</li> <li>③ 5TH SYNCHRO SLEEVE</li> <li>④ SYNCHRO SPRING</li> <li>⑤ SYNCHRO RING</li> <li>⑥ 5TH GEAR</li> <li>⑦ 32 x 37 x 23.5 mm<br/>NEEDLE BEARING</li> <li>⑧ SPACER COLLAR</li> <li>⑨ 34 x 39 x 23 mm<br/>NEEDLE BEARING</li> <li>⑩ 4TH GEAR</li> <li>⑪ SYNCHRO RING</li> <li>⑫ SYNCHRO SPRING</li> <li>⑬ 3RD/4TH SYNCHRO SLEEVE</li> <li>⑭ 3RD/4TH SYNCHRO HUB</li> <li>⑮ 3RD GEAR</li> <li>⑯ 34 x 39 x 27.5 mm<br/>NEEDLE BEARING</li> <li>⑰ MAINSHAFT</li> <li>⑱ WASHER</li> <li>⑲ SPRING WASHER</li> <li>⑳ BALL BEARING<br/>Check for wear and<br/>operation.</li> <li>㉑ 26 x 42 x 7 mm OIL SEAL<br/>Replace.</li> <li>㉒ 28 mm PLUG BOLT<br/>54 N·m (5.5 kgf·m, 40 lbf·ft)</li> <li>㉓ 1ST/2ND SELECT SPRING<br/>L. 36.26 mm (1.428 in)</li> <li>㉔ SHIFT ARM SHAFT</li> <li>㉕ CLUTCH HOUSING</li> <li>㉖ INTERLOCK GUIDE BOLT<br/>39 N·m (4.0 kgf·m, 29 lbf·ft)</li> <li>㉗ REVERSE SHIFT HOLDER</li> <li>㉘ REVERSE IDLER GEAR</li> <li>㉙ REVERSE IDLER GEAR SHAFT</li> <li>㉚ 5 x 22 mm SPRING PIN<br/>Replace.</li> <li>㉛ 3RD/4TH SHIFT PIECE</li> <li>㉜ 5TH/REVERSE SHIFT PIECE</li> <li>㉝ MBS SHIFT PIECE</li> <li>㉞ 1ST/2ND SHIFT FORK</li> <li>㉟ 3RD/4TH SHIFT FORK</li> </ul> | <ul style="list-style-type: none"> <li>㊱ 5TH/REVERSE SHIFT FORK</li> <li>㊲ 52 mm SNAP RING</li> <li>㊳ 65 mm THRUST SHIM (*1)</li> <li>㊴ 70 mm THRUST SHIM (*2)<br/>Selection, page 13-36</li> <li>㊵ OIL GUIDE PLATE</li> <li>㊶ WASHER Replace.</li> <li>㊷ BACK-UP LIGHT SWITCH<br/>25 N·m (2.5 kgf·m, 18 lbf·ft)</li> <li>㊸ SET SCREW<br/>22 N·m (2.2 kgf·m, 16 lbf·ft)</li> <li>㊹ WASHER Replace.</li> <li>㊺ SPRING L. 26.0 mm (1.02 in)</li> <li>㊻ STEEL BALL (5/16 in)</li> <li>㊼ BACK-UP LIGHT<br/>SWITCH HARNESS STAY</li> <li>㊽ TRANSMISSION HANGER</li> <li>㊾ 32 mm SEALING BOLT<br/>25 N·m (2.5 kgf·m, 18 lbf·ft)</li> <li>㊿ 35 x 62 x 8 mm OIL SEAL<br/>Replace.</li> <li>① OIL DRAIN PLUG<br/>39 N·m (4.0 kgf·m, 29 lbf·ft)</li> <li>② WASHER Replace.</li> <li>③ FILLER PLUG<br/>44 N·m (4.5 kgf·m, 33 lbf·ft)</li> <li>④ WASHER Replace.</li> <li>⑤ TRANSMISSION HOUSING</li> <li>⑥ RELEASE PIPE STAY</li> <li>⑦ OIL GUTTER PLATE</li> <li>⑧ REVERSE LOCK CAM</li> <li>⑨ REVERSE SELECT SPRING<br/>L. 63.4 mm (2.496 in)</li> <li>⑩ REVERSE SELECT RETAINER</li> <li>⑪ SHIFT ARM C</li> <li>⑫ SHIFT ARM B</li> <li>⑬ INTERLOCK</li> <li>⑭ COLLAR</li> <li>⑮ SHIFT ARM A</li> <li>⑯ SPRING WASHER</li> <li>⑰ MAGNET</li> <li>⑱ SET BALL SPRING BOLT<br/>22 N·m (2.2 kgf·m, 16 lbf·ft)</li> <li>⑲ 14 x 20 mm DOWEL PIN</li> </ul> | <ul style="list-style-type: none"> <li>⑳ 72 mm THRUST SHIM (*1)</li> <li>㉑ 80 mm THRUST SHIM (*2)<br/>Selection, page 13-33</li> <li>㉒ DIFFERENTIAL ASSEMBLY<br/>See page 13-30</li> <li>㉓ 14 x 25 x 17.5 mm OIL SEAL<br/>Replace.</li> <li>㉔ 35 x 56 x 8 mm OIL SEAL<br/>Replace.</li> <li>㉕ SHIFT ROD</li> <li>㉖ BOOT</li> <li>㉗ OIL GUIDE PLATE<br/>30 x 47 x 21 mm<br/>NEEDLE BEARING (*1)<br/>30 x 55 x 21 mm<br/>NEEDLE BEARING (*2)</li> <li>㉘ COUNTERSHAFT</li> <li>㉙ 36 x 41 x 25.5 mm<br/>NEEDLE BEARING<br/>Check for wear and<br/>operation.</li> <li>㉚ 1ST GEAR</li> <li>㉛ FRICTION DAMPER</li> <li>㉜ SYNCHRO RING</li> <li>㉝ SYNCHRO SPRING</li> <li>㉞ 1ST/2ND SYNCHRO HUB</li> <li>㉟ REVERSE GEAR</li> <li>① SYNCHRO SPRING</li> <li>② SYNCHRO RING</li> <li>③ FRICTION DAMPER</li> <li>④ SPACER</li> <li>⑤ 39 x 44 x 27 mm<br/>NEEDLE BEARING</li> <li>⑥ 2ND GEAR</li> <li>⑦ 3RD GEAR</li> <li>⑧ 4TH GEAR</li> <li>⑨ 5TH GEAR</li> <li>⑩ BALL BEARING (*1)<br/>NEEDLE BEARING (*2)</li> <li>⑪ BALL BEARING</li> <li>⑫ SPRING WASHER</li> <li>⑬ LOCKNUT Replace.<br/>108 → 0 → 108 N·m<br/>(11.0 → 0 → 11.0 kgf·m,<br/>79.6 → 0 → 79.6 lbf·ft)</li> </ul> |
|---|---|--|

\*1: D14A7, D14A8 engines

\*2: D15Z8, D16B2 engines

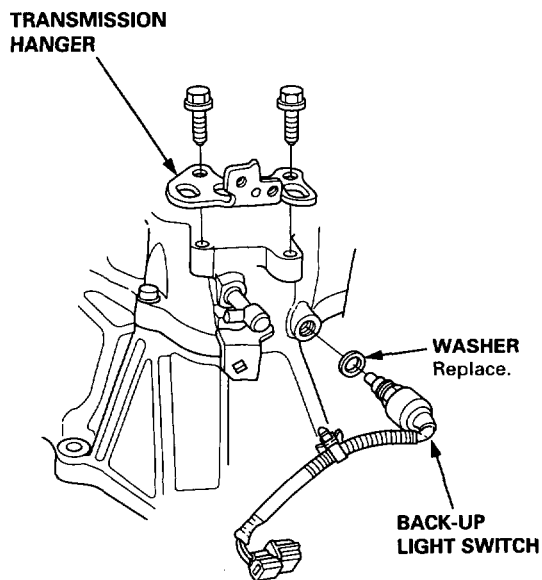


# Transmission Housing

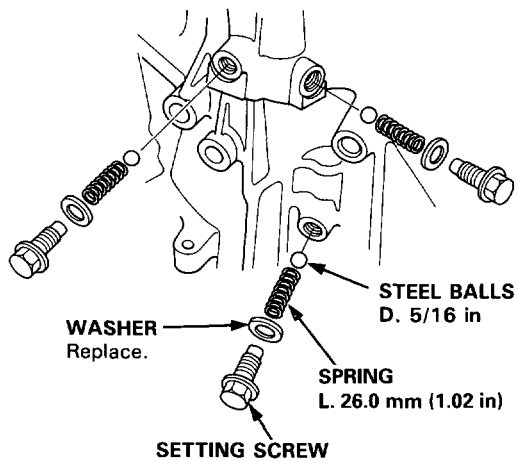
## Removal

NOTE: Place the clutch housing on two pieces of wood thick enough to keep the mainshaft from hitting the workbench.

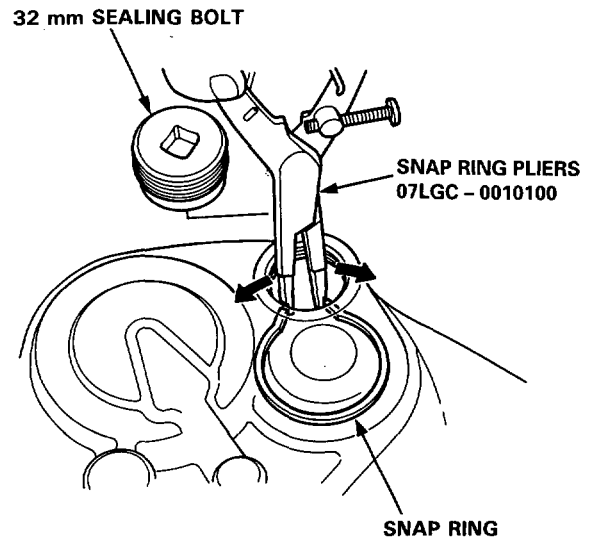
1. Remove the back-up light switch.
2. Remove transmission hanger.



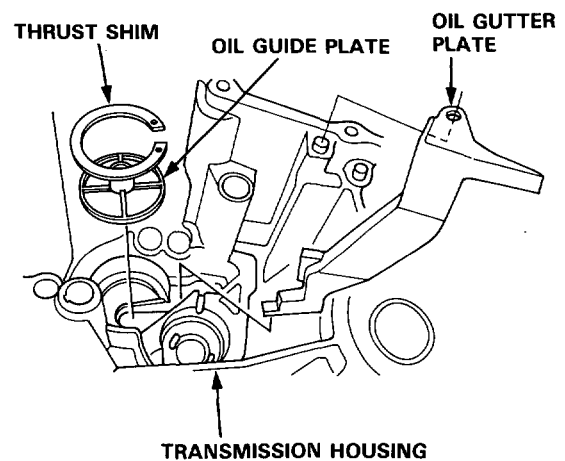
3. Remove the setting screws, washers, springs, and steel balls.



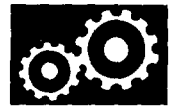
4. Loosen the transmission housing attaching bolts in a crisscross pattern in several steps, then remove them.
5. Remove the 32 mm sealing bolt.
6. Expand the snap ring on the countershaft ball bearing, and remove it from the groove using a pair of snap ring pliers.



7. Separate the transmission housing from the clutch housing, and wipe it clean of the sealant.
8. Remove the thrust shim, oil guide plate, and oil gutter plate from the transmission housing.



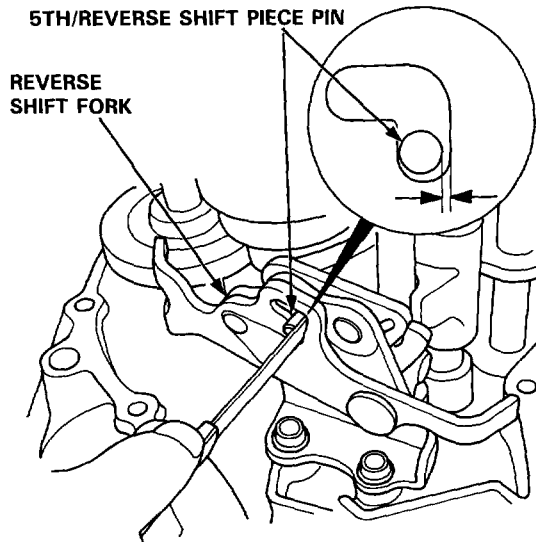
# Reverse Shift Holder



## Clearance Inspection

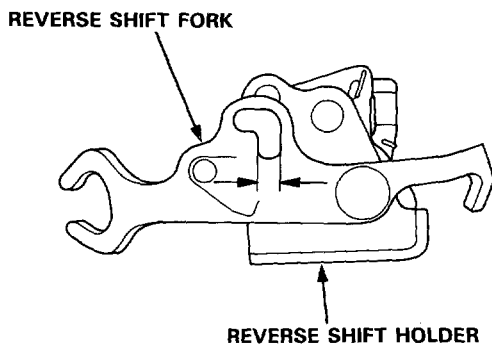
1. Measure the clearance between the reverse shift fork and 5th/reverse shift piece pin.

**Standard:** 0.05 – 0.35 mm (0.002 – 0.014 in)  
**Service Limit:** 0.5 mm (0.02 in)



2. If the clearances are more than the service limit, measure the widths of the groove in the reverse shift fork.

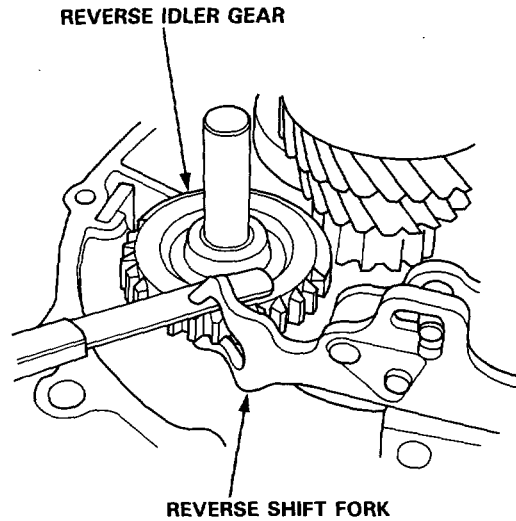
**Standard:** 7.05 – 7.25 mm (0.278 – 0.285 in)



- If the widths of the grooves are not within the standard, replace the reverse shift holder with a new one.
- If the width of the grooves are within the standard, replace the 5th/reverse shift piece with a new one.

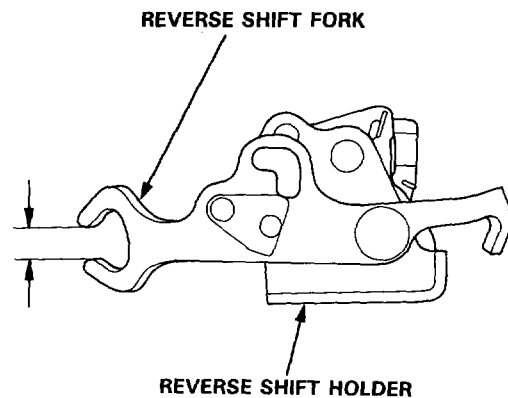
3. Measure the clearance between the reverse idler gear and the reverse shift fork.

**Standard:** 0.5 – 1.1 mm (0.02 – 0.04 in)  
**Service Limit:** 1.8 mm (0.07 in)



4. If the clearance is more than the service limit, measure the width of the reverse shift fork.

**Standard:** 12.7 – 13.0 mm (0.500 – 0.512 in)



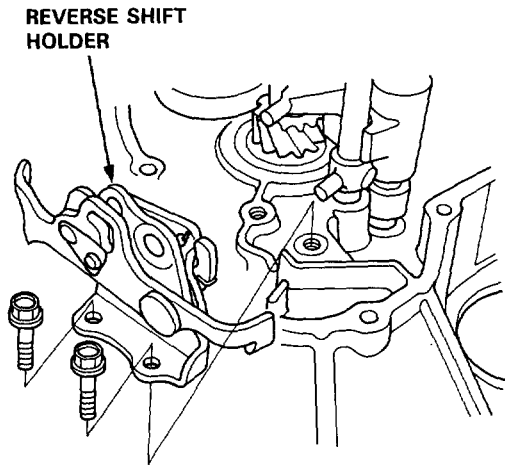
- If the width is not within the standard, replace the reverse shift holder with a new one.
- If the width is within the standard, replace the reverse idler gear with a new one.

# Reverse Idler Gear

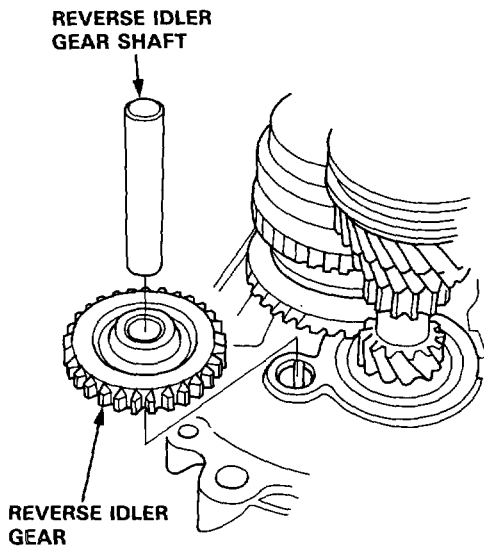
# Mainshaft, Countershaft, Shift Fork

## Removal

1. Remove the reverse shift holder.

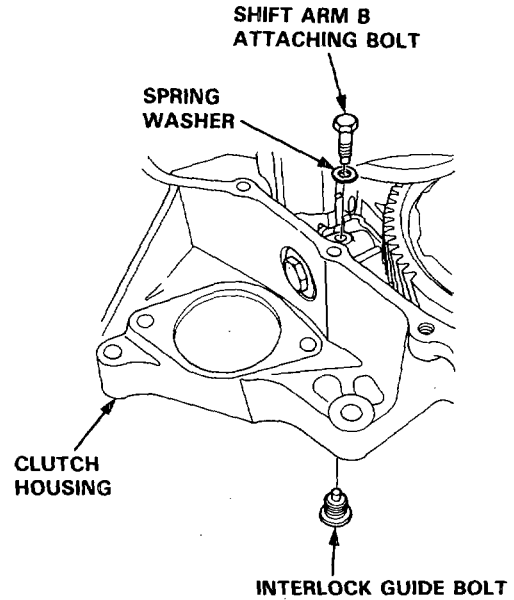


2. Remove the reverse idler gear shaft and reverse idler gear.



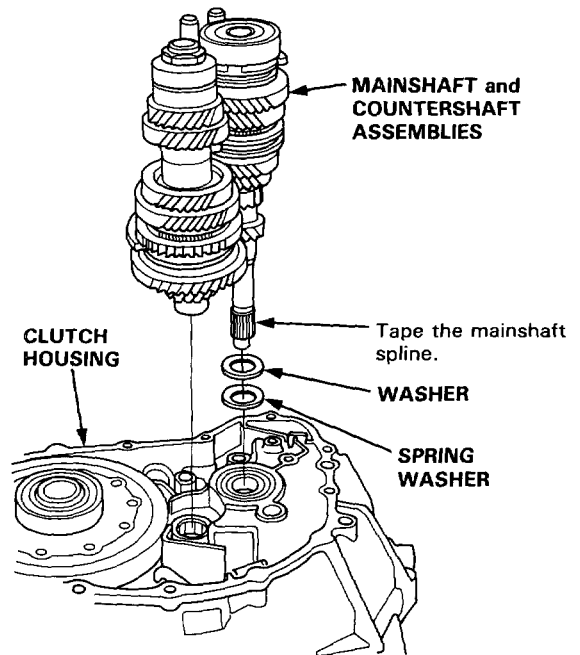
## Disassembly

1. Remove the interlock guide bolt from under the clutch housing.
2. Remove the shift arm B attaching bolt.

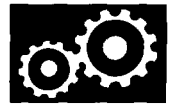


3. Remove the mainshaft and countershaft assemblies with the shift fork from the clutch housing.

NOTE: Before removing the mainshaft and countershaft assemblies, tape the mainshaft spline to protect it.




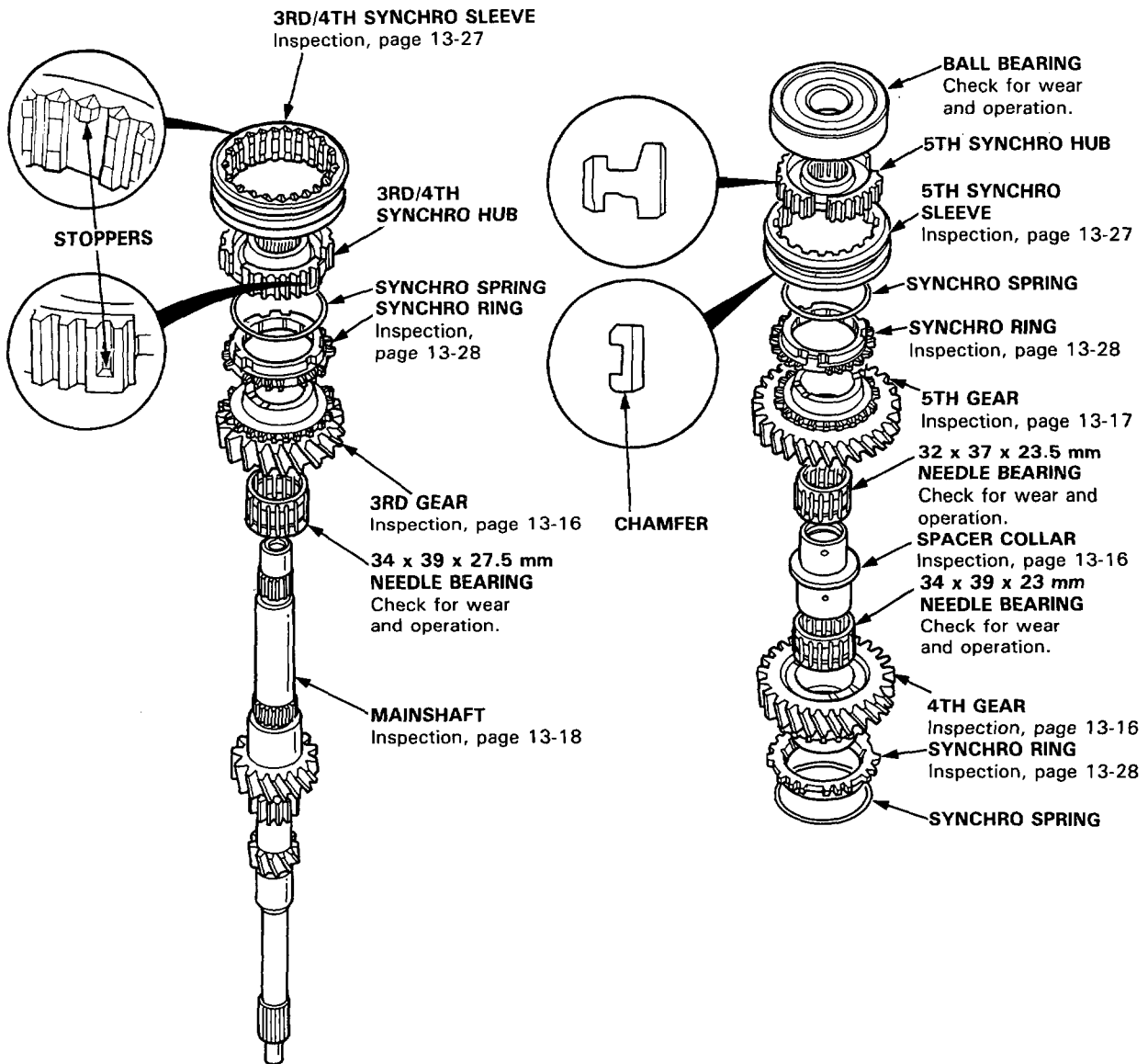
# Mainshaft Assembly



## Index

NOTE: The 3rd/4th and 5th synchro hubs are installed with a press.

 Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact surfaces. The 3rd/4th and 5th synchro hubs, however, should be installed with a press before lubricating them.



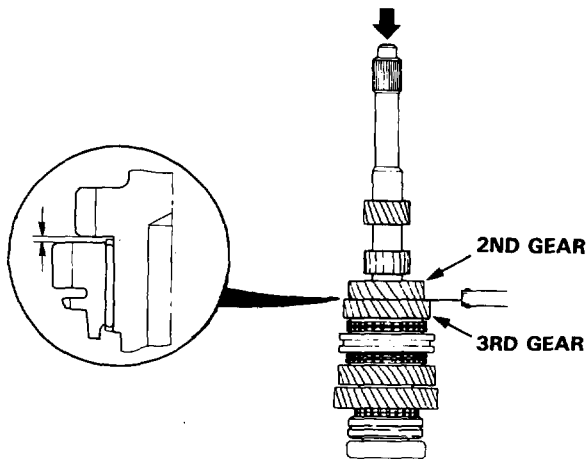
# Mainshaft Assembly

## Clearance Inspection

NOTE: If replacement is required, always replace the synchro sleeve and hub as a set.

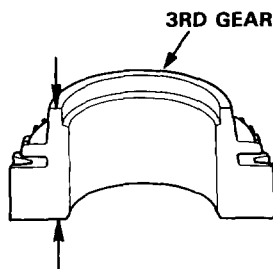
1. Measure the clearance between 2nd and 3rd gears.

**Standard:** 0.06 – 0.21 mm (0.002 – 0.008 in)  
**Service Limit:** 0.33 mm (0.013 in)



2. If the clearance is more than the service limit, measure the thickness of 3rd gear.

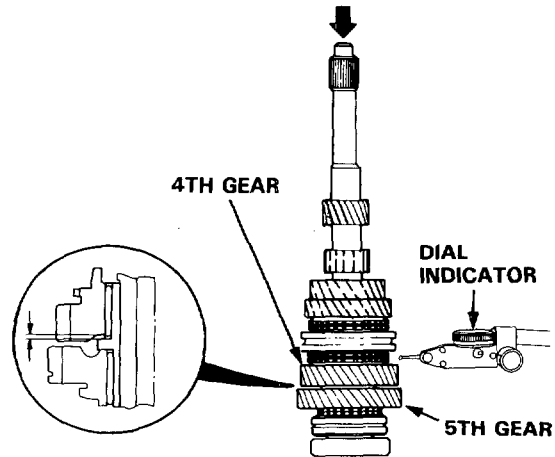
**Standard:** 30.22 – 30.27 mm  
 (1.190 – 1.192 in)  
**Service Limit:** 30.15 mm (1.187 in)



- If the thickness of 3rd gear is less than the service limit, replace 3rd gear with a new one.
- If the thickness of 3rd gear is within the service limit, replace the 3rd/4th synchro hub with a new one.

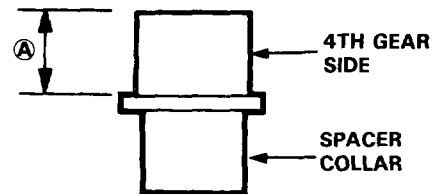
3. Measure the clearance between 4th gear and the spacer collar.

**Standard:** 0.07 – 0.20 mm (0.003 – 0.008 in)  
**Service Limit:** 0.31 mm (0.012 in)



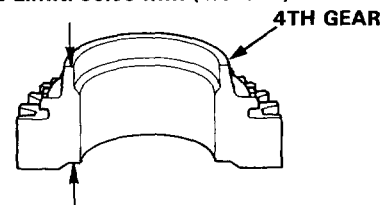
4. If the clearance is more than the service limit, measure distance (A) on the spacer collar.

**Standard:** 22.83 – 22.86 mm  
 (0.898 – 0.900 in)  
**Service Limit:** 22.81 mm (0.898 in)



5. If distance (A) is less than the service limit, replace the spacer collar with a new one. If distance (A) is within the service limit, measure the thickness of 4th gear.

**Standard:** 30.11 – 30.16 mm  
 (1.185 – 1.187 in)  
**Service Limit:** 30.05 mm (1.183 in)



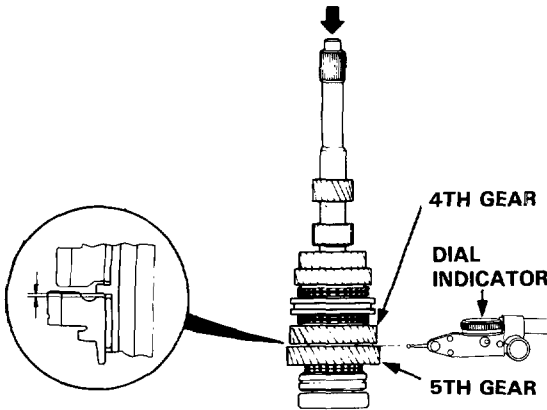
- If the thickness of 4th gear is less than the service limit, replace 4th gear with a new one.
- If the thickness of 4th gear is within the service limit, replace the 3rd/4th synchro hub with a new one.



## Disassembly

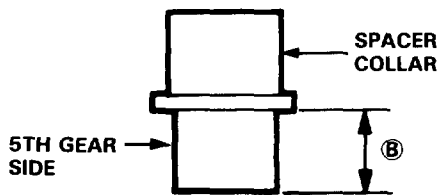
6. Measure the clearance between the spacer collar and 5th gear.

**Standard:** 0.06 – 0.19 mm (0.002 – 0.007 in)  
**Service Limit:** 0.31 mm (0.012 in)



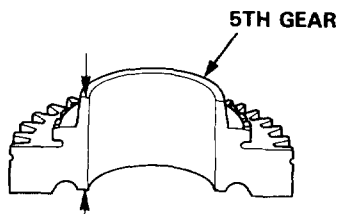
7. If the clearance is more than the service limit, measure distance **B** on the spacer collar.

**Standard:** 23.53 – 23.56 mm  
 (0.926 – 0.928 in)  
**Service Limit:** 23.51 mm (0.926 in)



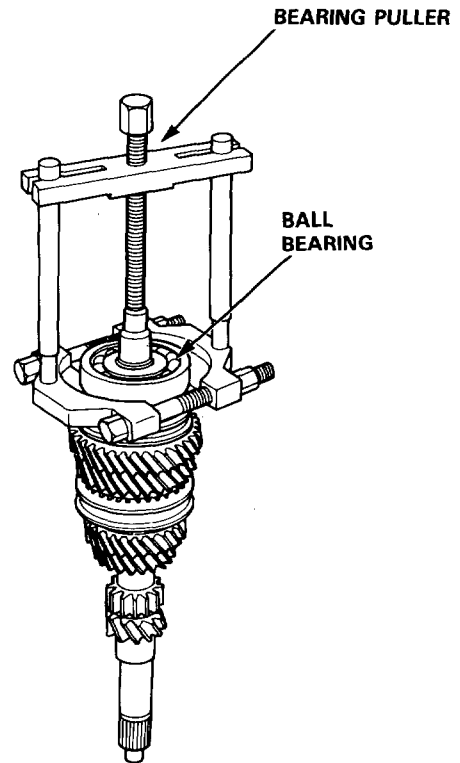
8. If distance **B** is less than service limit, replace the spacer collar with a new one. If distance **B** is within the service limit, measure thickness of 5th gear.

**Standard:** 28.42 – 28.47 mm  
 (1.119 – 1.121 in)  
**Service Limit:** 28.35 mm (1.116 in)



- If the thickness of 5th gear is less than the service limit, replace 5th gear with a new one.
- If the thickness of 5th gear is within the service limit, replace the 5th synchro hub with a new one.

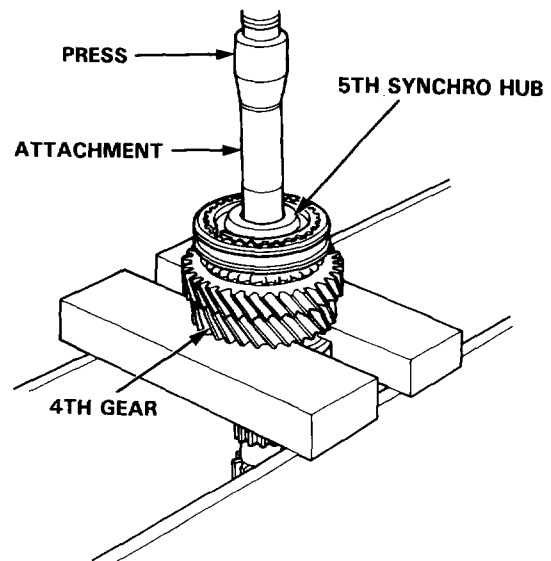
1. Remove the ball bearing using a bearing puller as shown.



### CAUTION

Remove the synchro hubs using a press and steel blocks as shown. Use of a jaw-type puller can cause damage to the gear teeth.

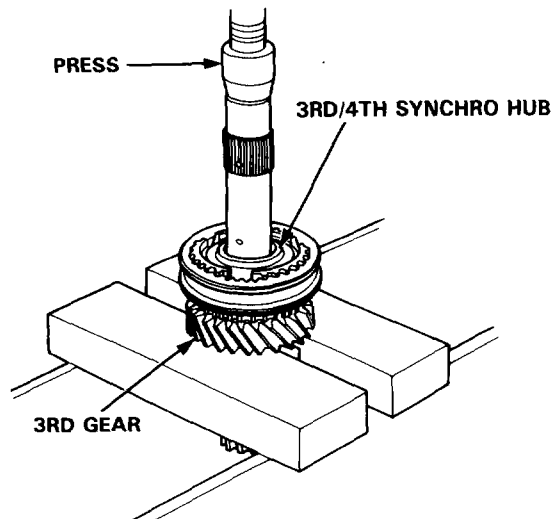
2. Support 4th gear on steel blocks, and press the mainshaft out of the 5th synchro hub as shown.



# Mainshaft Assembly

## Disassembly (cont'd)

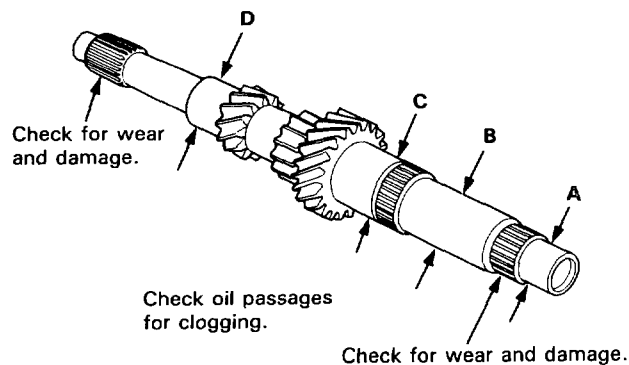
3. Support the 3rd gear on steel blocks, and press the mainshaft out of the 3rd/4th synchro hub as shown.



## Inspection

1. Inspect the gear surface and the bearing surface for wear and damage, then measure the mainshaft at points A, B, C, and D.

<b>Standard:</b>	<b>A:</b> 21.987 – 22.000 mm (0.8656 – 0.8661 in)
	<b>B:</b> 26.980 – 26.993 mm (1.0622 – 1.0627 in)
	<b>C:</b> 33.984 – 34.000 mm (1.3380 – 1.3386 in)
	<b>D:</b> 25.977 – 25.990 mm (1.0227 – 1.0232 in)
<b>Service Limit:</b>	<b>A:</b> 21.930 mm (0.8634 in)
	<b>B:</b> 26.930 mm (1.0602 in)
	<b>C:</b> 33.930 mm (1.3358 in)
	<b>D:</b> 25.920 mm (1.0205 in)

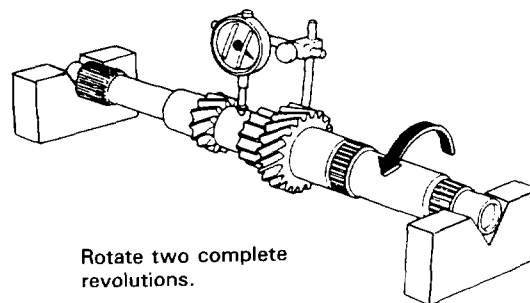


- If any part of the mainshaft is less than the service limit, replace it with a new one.

2. Inspect for runout.

**Standard:** 0.02 mm (0.001 in) max.  
**Service Limit:** 0.05 mm (0.002 in)

**NOTE:** Support the mainshaft at both ends as shown.



- If the runout is more than the service limit, replace the mainshaft with a new one.



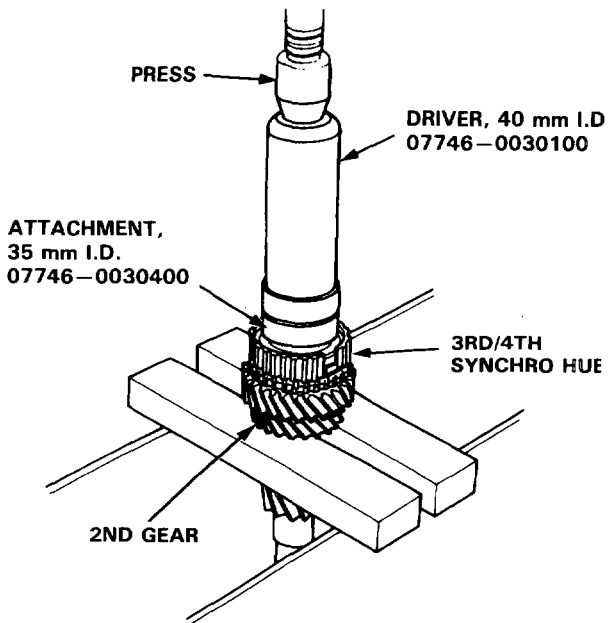
## Reassembly

### CAUTION

When installing the 3rd/4th and 5th synchro hubs, support the shaft on steel blocks, and install the synchro hubs using a press.

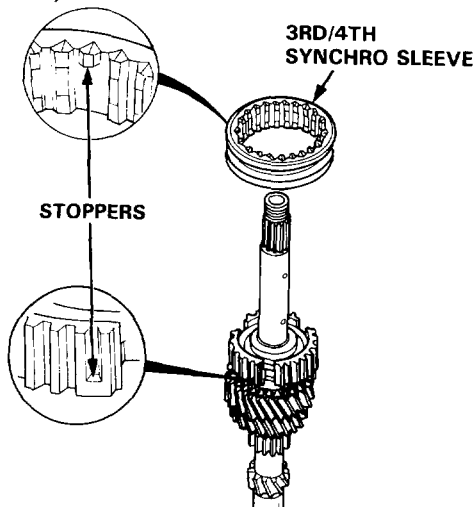
NOTE: Refer to page 13-15 for reassembly sequence.

1. Support 2nd gear on steel blocks, then install the 3rd/4th synchro hub using the special tools and a press as shown.

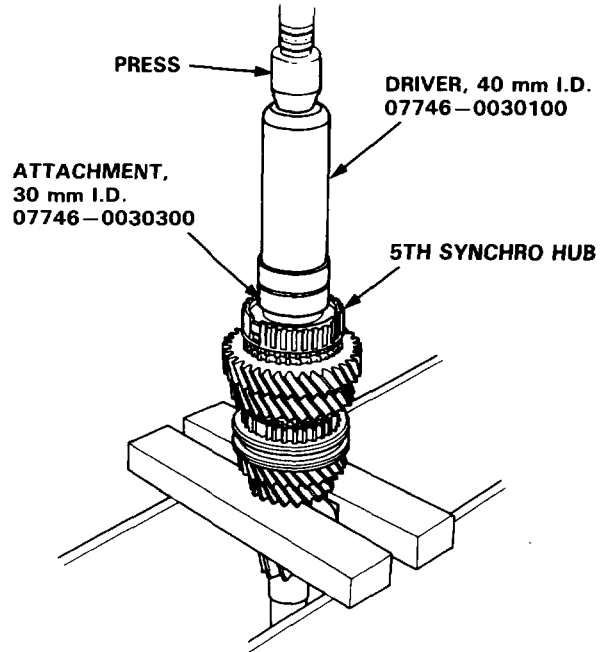


2. Install the 3rd/4th synchro sleeve by aligning the stoppers of the 3rd/4th synchro sleeve and hub.

NOTE: After installing, Check the operation of the 3rd/4th synchro hub set.

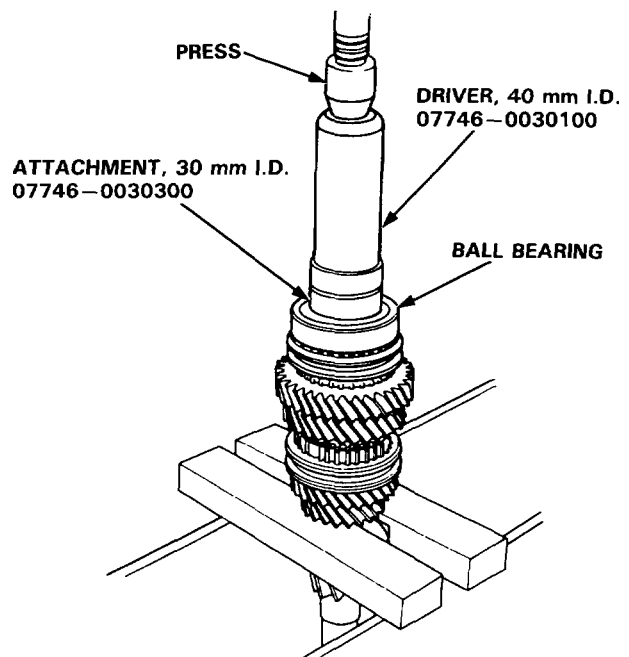


3. Install the 5th synchro hub using the special tools and a press as shown.



4. Install the ball bearing using the special tools and a press as shown.

NOTE: Install the ball bearing with the tapered end facing down.




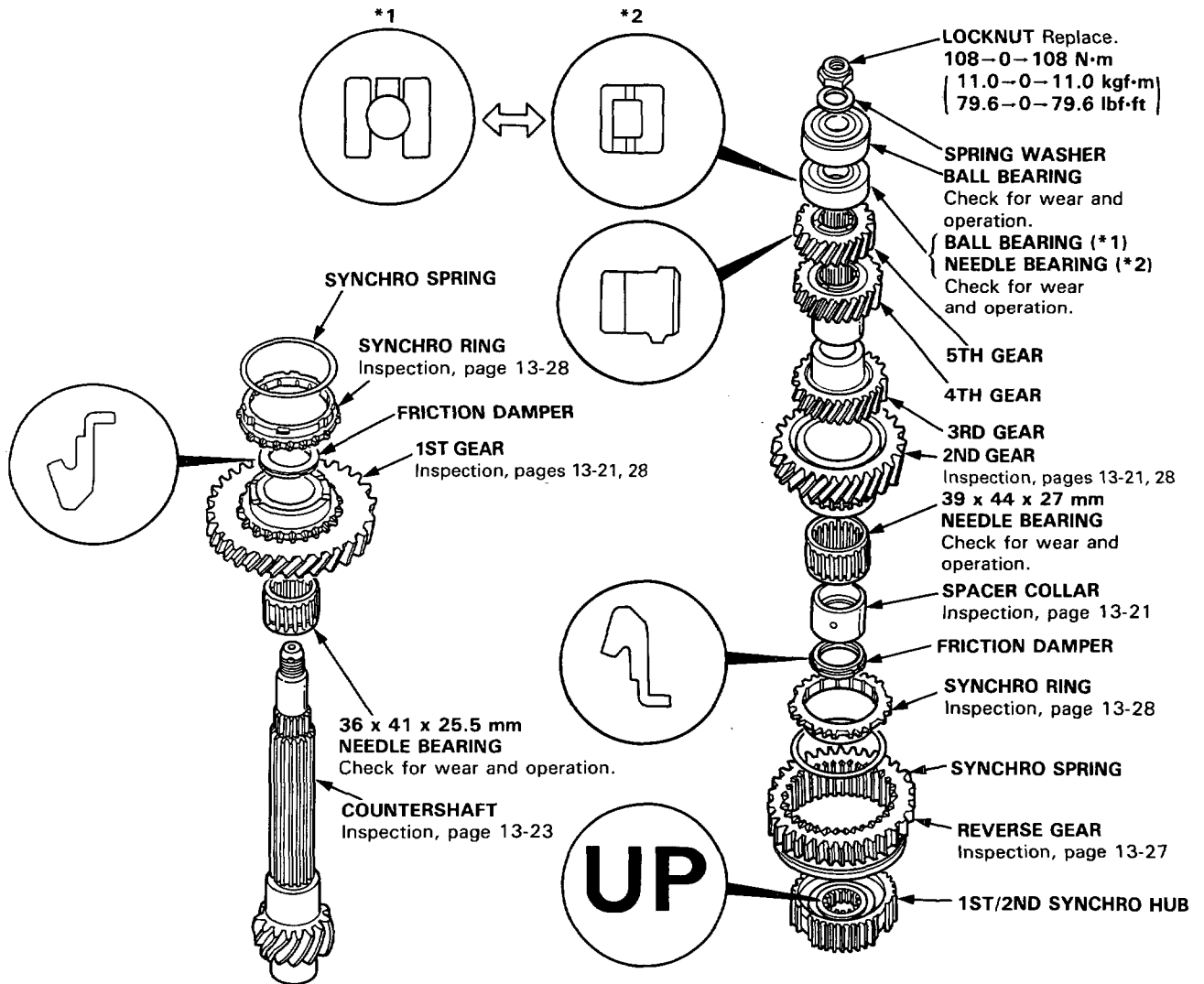


# Countershaft Assembly

## Index

NOTE: The 3rd, 4th, and 5th gears are installed with a press.

 Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact surfaces. The 3rd, 4th, and 5th gears, however, should be installed with a press before lubricating them.



\*1: D14A7, D14A8 engines  
\*2: D15Z8, D16B2 engines

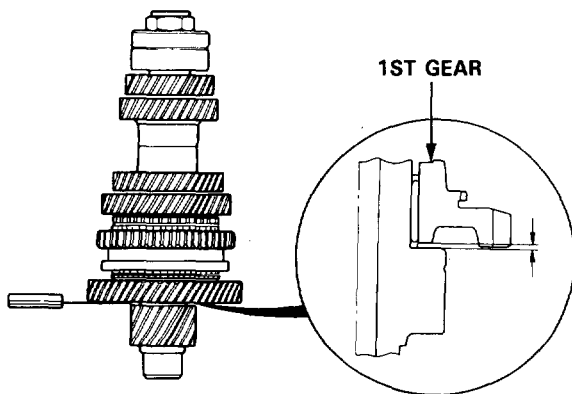


## Clearance Inspection

NOTE: If replacement is required, always replace the synchro sleeve and hub as a set.

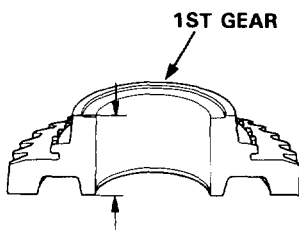
1. Measure the clearance between the countershaft and 1st gear.

**Standard:** 0.03 – 0.10 mm  
(0.001 – 0.004 in)  
**Service Limit:** 0.22 (0.009 in) mm



2. If the clearance is more than the service limit, measure the thickness of 1st gear.

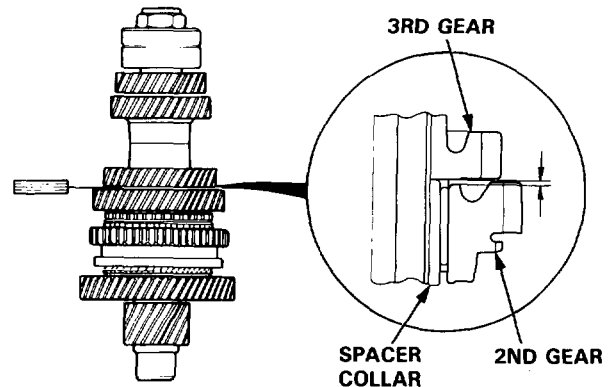
**Standard:** 30.41 – 30.44 mm  
(1.197 – 1.198 in)  
**Service Limit:** 30.36 mm (1.195 in)



- If the thickness of 1st gear is less than the service limit, replace 1st gear with a new one.
- If the thickness of 1st gear is within the service limit, replace the 1st/2nd synchro hub with a new one.

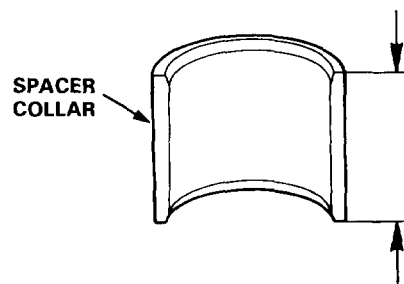
3. Measure clearance between 2nd and 3rd gears.

**Standard:** 0.04 – 0.12 mm (0.002 – 0.005 in)  
**Service Limit:** 0.24 mm (0.009 in)



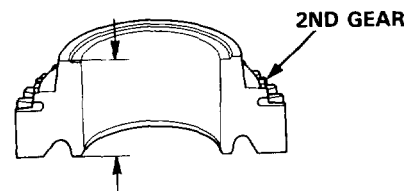
4. If the clearance is more than the service limit, measure the thickness of the spacer collar.

**Standard:** 32.03 – 32.06 mm (1.261 – 1.262 in)  
**Service Limit:** 32.01 mm (1.260 in)



5. If the thickness is less than the service limit, replace the spacer collar with a new one.  
If the thickness is within the service limit, measure the thickness of 2nd gear.

**Standard:** 31.91 – 31.96 mm (1.256 – 1.258 in)  
**Service Limit:** 31.85 mm (1.254 in)



- If the thickness of 2nd gear is less than the service limit, replace 2nd gear with a new one.
- If the thickness of 2nd gear is within the service limit, replace the 1st/2nd synchro hub with a new one.

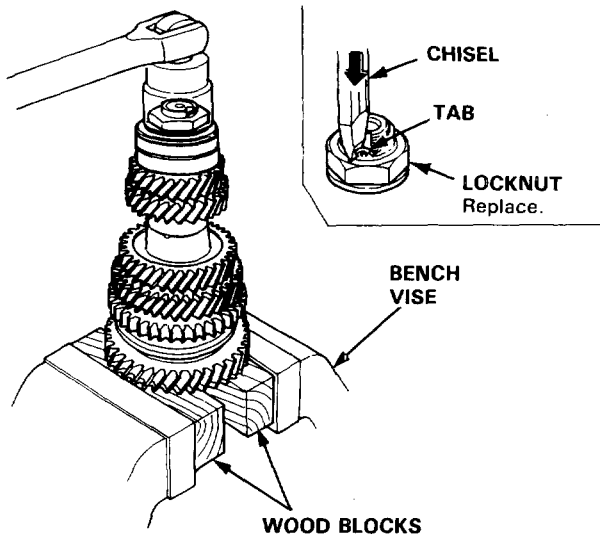
# Countershaft Assembly

## Disassembly

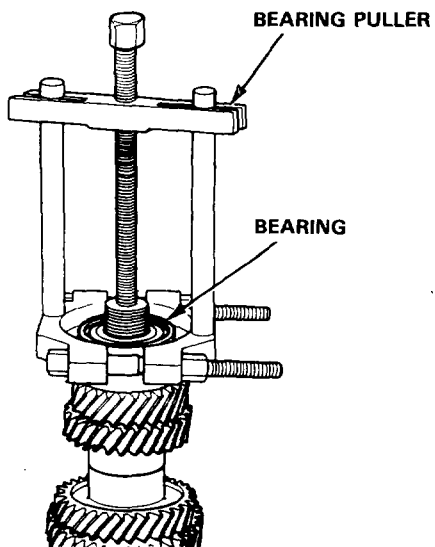
### CAUTION

Remove the gears using a press and steel blocks as shown. Use of a jaw-type puller can damage the gear teeth.

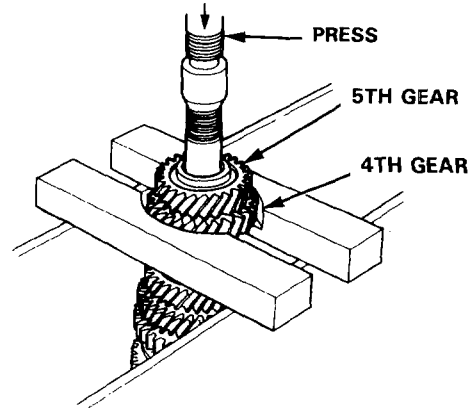
1. Securely clamp the countershaft assembly in a bench vise with wood blocks.
2. Raise the locknut tab from the groove of the countershaft, then remove the locknut and the spring washer.



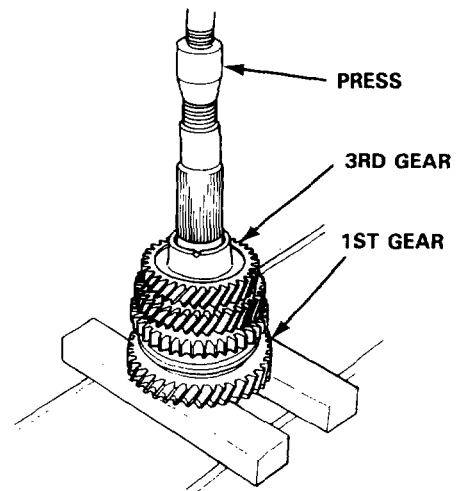
3. Remove the bearings using a bearing puller as shown.



4. Support 4th gear on steel blocks, and press the countershaft out of 5th and 4th gears as shown.



5. Support 1st gear on steel blocks, and press the countershaft out of 3rd gear as shown.

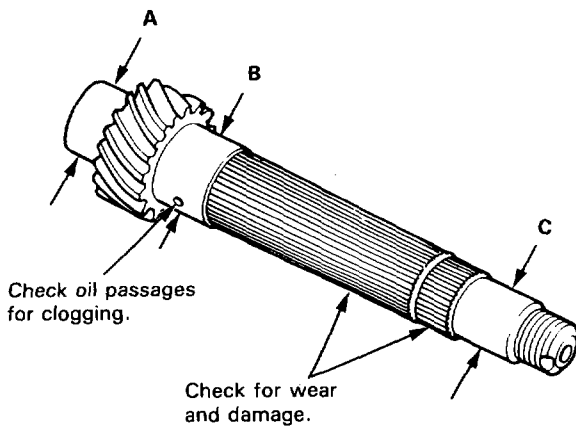




## Inspection

1. Inspect the gear surfaces and bearing surfaces for wear and damage, then measure the countershaft at points A, B, and C.

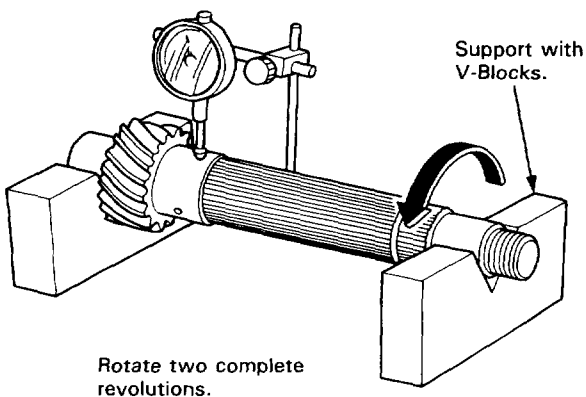
<b>Standard:</b>	<b>A:</b> 30.000 – 30.015 mm (1.1811 – 1.1817 in)
	<b>B:</b> 35.984 – 36.000 mm (1.4167 – 1.4173 in)
	<b>C:</b> 24.980 – 24.993 mm (0.9835 – 0.9840 in)
<b>Service Limit:</b>	<b>A:</b> 29.950 mm (1.1791 in)
	<b>B:</b> 35.930 mm (1.4146 in)
	<b>C:</b> 24.930 mm (0.9815 in)



- If any part of the countershaft is less than the service limit, replace it with a new one.

2. Inspect for runout.

<b>Standard:</b>	<b>0.02 mm (0.001 in) max.</b>
<b>Service Limit:</b>	<b>0.05 mm (0.002 in)</b>



- If the runout is more than the service limit, replace the countershaft with a new one.

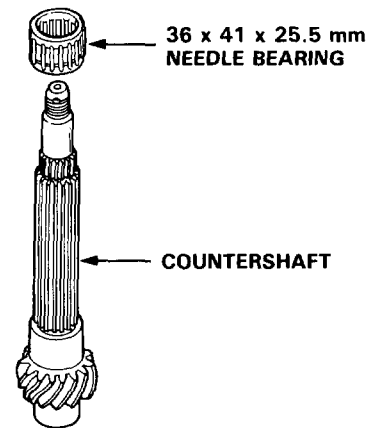
## Reassembly

### CAUTION

- Press the 3rd, 4th, and 5th gears on the countershaft without lubrication.
- When installing the 3rd, 4th, and 5th gears, support the shaft on steel blocks and install the gears using a press.

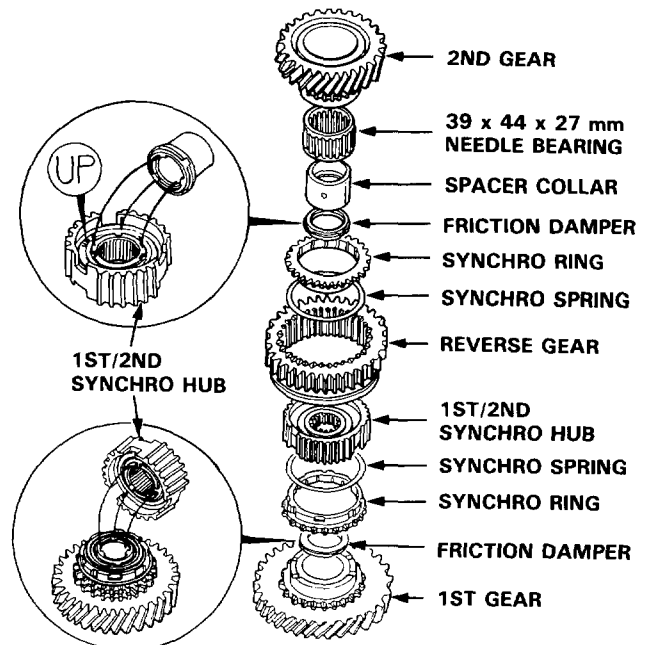
NOTE: Refer to page 13-20 for reassembly sequence.

1. Install the needle bearing on the countershaft.



2. Assemble the parts below as shown.

NOTE: Check that the fingers of the friction damper are securely set in the grooves of the 1st/2nd synchro hub.

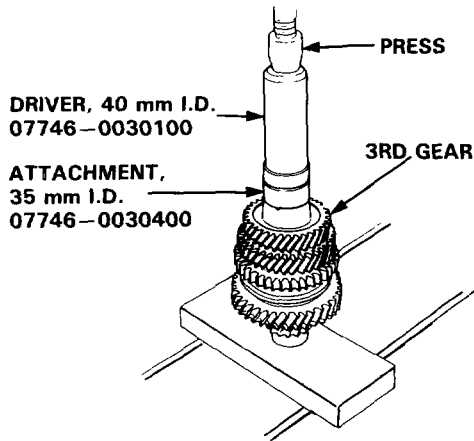


3. Install the parts on the countershaft. (cont'd)

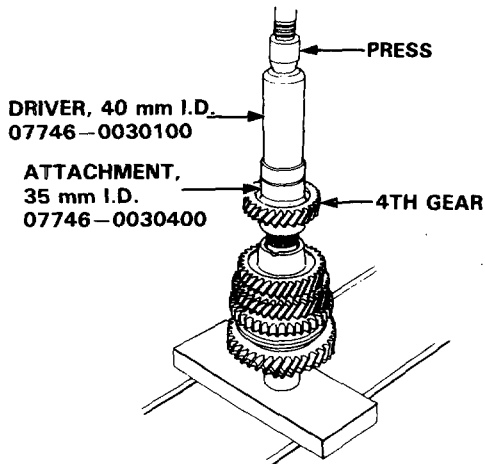
# Countershaft Assembly

## Reassembly (cont'd)

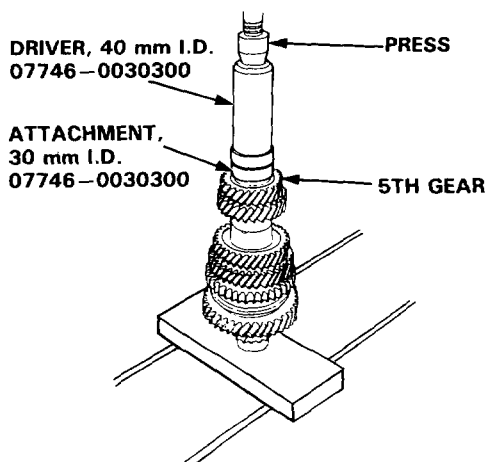
4. Support the countershaft on a steel block as shown and install 3rd gear using the special tools and a press as shown.



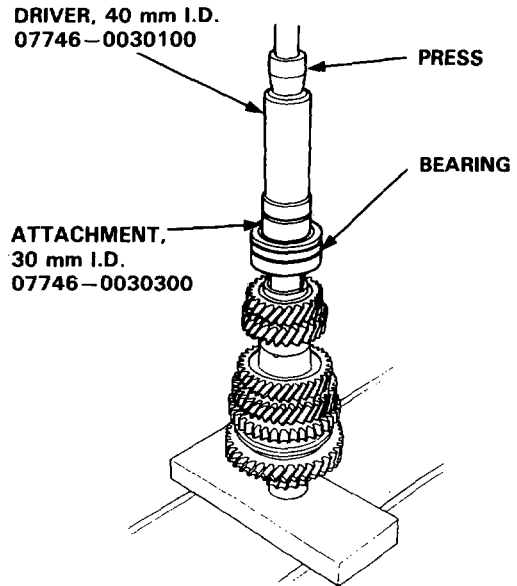
5. Install 4th gear using the special tools and a press as shown.



6. Install 5th gear using the special tools and a press as shown.



7. Install the bearings using the special tools and a press as shown.



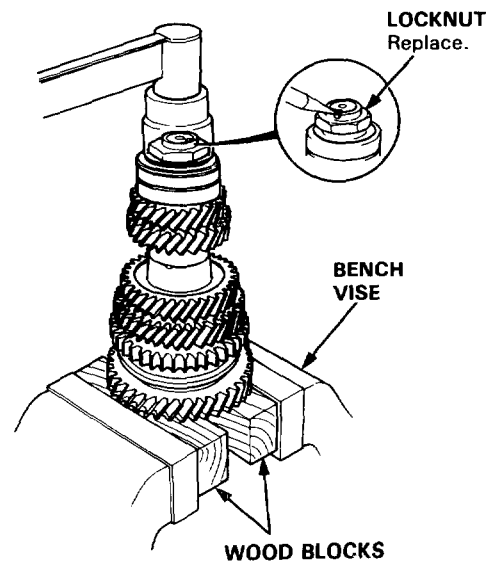
8. Securely clamp the countershaft assembly in a bench vise with wood blocks.

9. Install the spring washer, tighten the locknut, then stake the locknut tab into groove.

### LOCKNUT

108 → 0 → 108 N·m

(11.0 → 0 → 11.0 kgf·m, 79.6 → 0 → 79.6 lbf·ft)

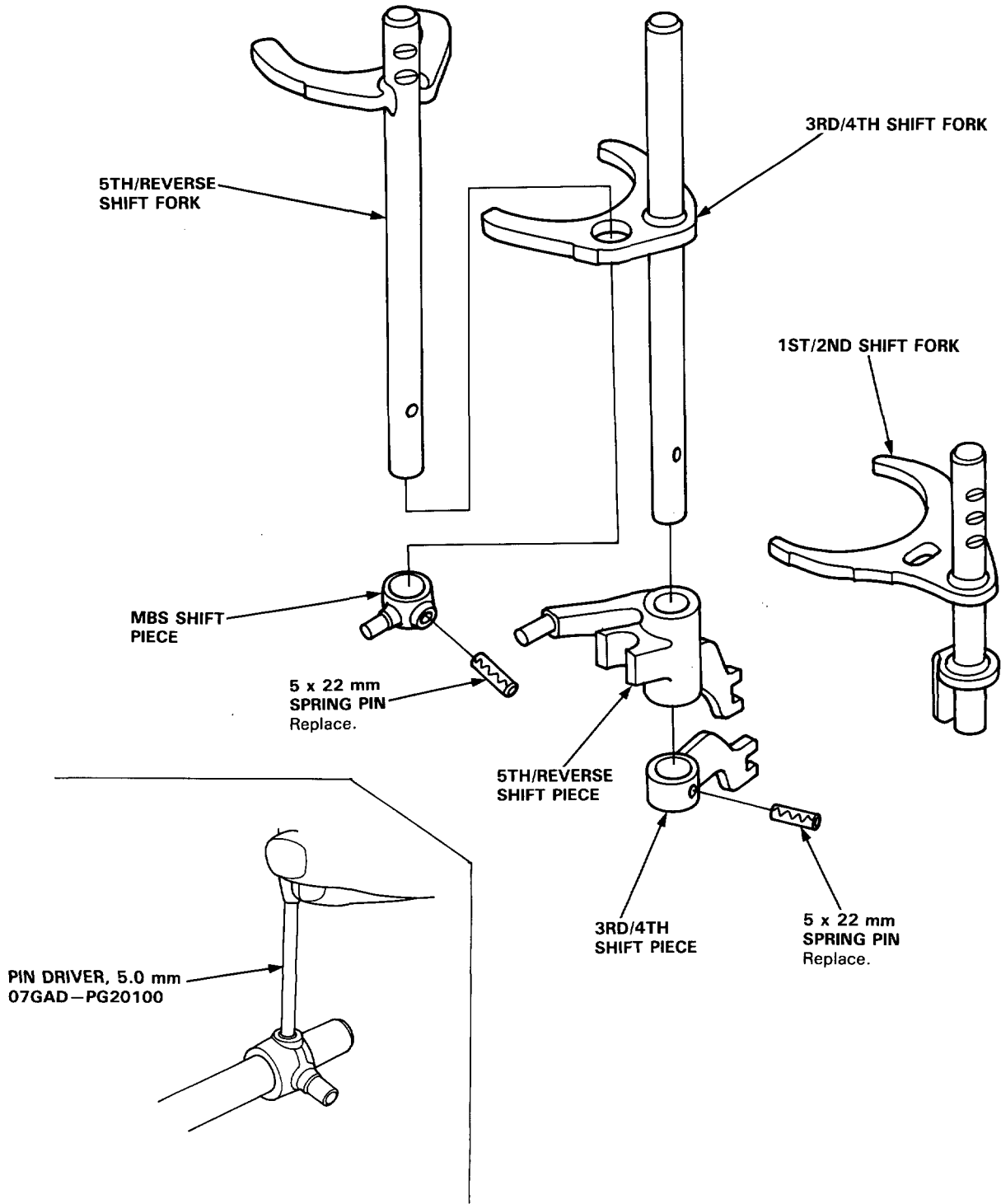


# Shift Fork Assembly



## Index

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



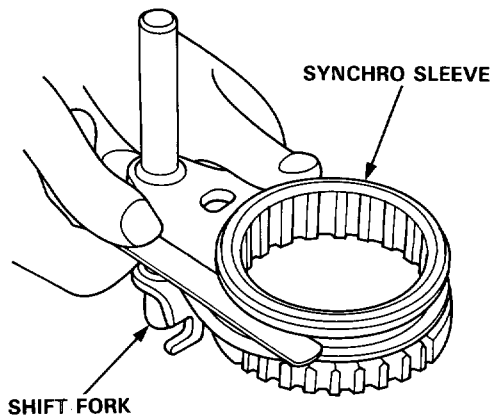
# Shift Fork Assembly

## Clearance Inspection

NOTE: The synchro sleeve and the synchro hub should be replaced as a set.

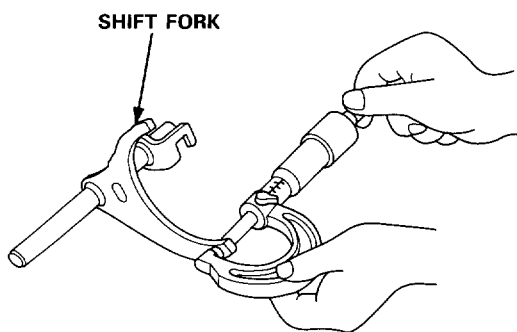
1. Measure the clearance between each shift fork and its matching synchro sleeve.

**Standard:** 0.35 – 0.65 mm (0.014 – 0.026 in)  
**Service Limit:** 1.0 mm (0.04 in)



2. If the clearance is more than the service limit, measure the thickness of the shift fork fingers.

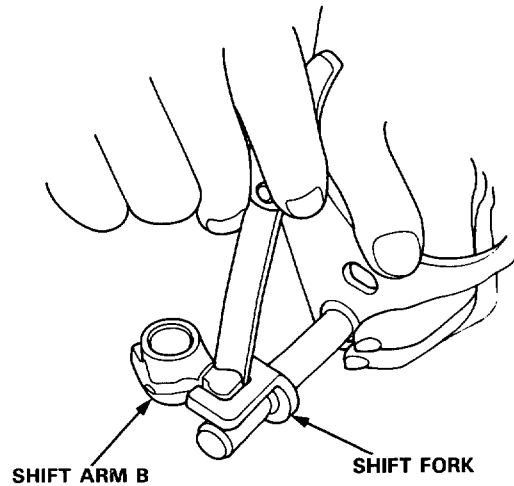
**Standard:**  
3rd/4th: 7.4 – 7.6 mm (0.291 – 0.299 in)  
1st/2nd, 5th: 6.2 – 6.4 mm (0.244 – 0.252 in)



- If the thickness of the shift fork fingers is not within the standard, replace the shift fork with a new one.
- If the thickness of the shift fork fingers is within the standard, replace the synchro sleeve with a new one.

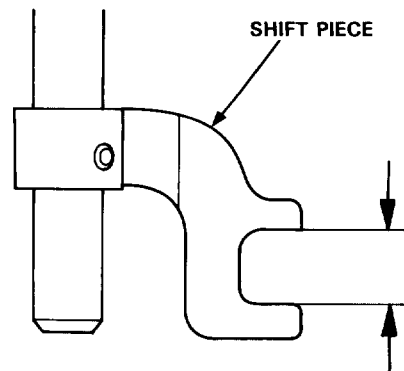
3. Measure the clearance between the shift piece or shift fork and the shift arm B.

**Standard:** 0.2 – 0.5 mm (0.008 – 0.02 in)  
**Service Limit:** 0.8 mm (0.03 in)



4. If the clearance is more than the service limit, measure the groove of the shift piece or shift fork.

**Standard:** 13.2 – 13.4 mm (0.520 – 0.528 in)



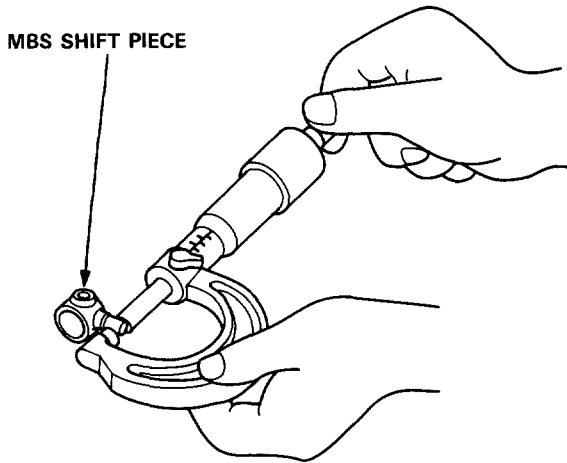
- If the groove of the shift piece or shift fork is not within the standard, replace the shift piece or shift fork with a new one.
- If the groove of the shift piece or shift fork is within the standard, replace the shift arm B with a new one.



## MBS Shift Piece Inspection

1. Measure the width of the MBS shift piece.

Standard: 6.9 – 7.1 mm (0.27 – 0.28 in)

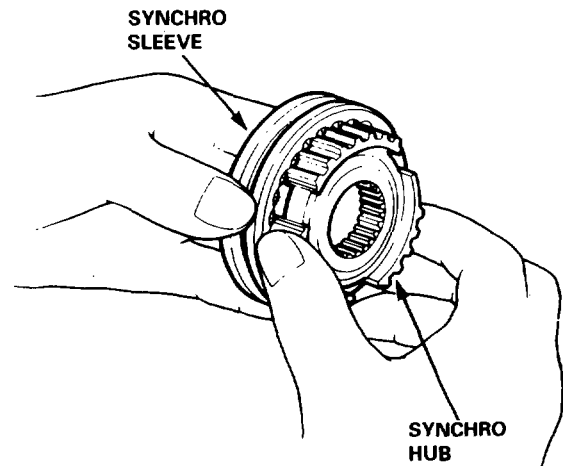


- If the width of the MBS shift piece is not within the standard, replace the MBS shift piece.

## Inspection/Installation

1. Inspect gear teeth on all synchro hubs and synchro sleeves for rounded off corners, which indicate wear.
2. Install each synchro hub in its mating synchro sleeve, and check for freedom of movement.

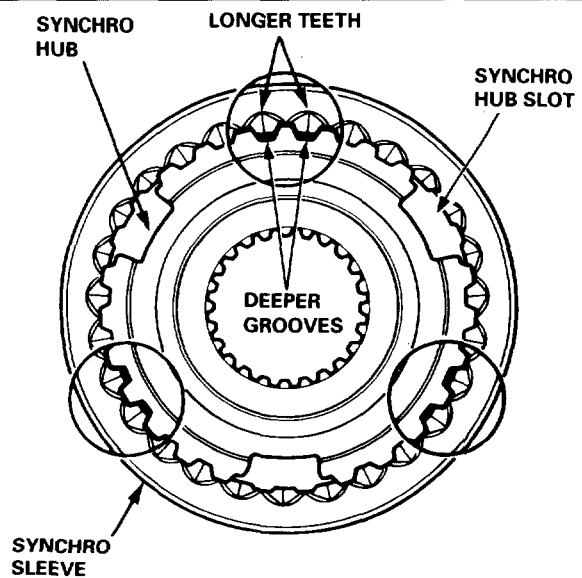
NOTE: If replacement is required, always replace the synchro sleeve and synchro hub as a set.



3. When assembling the synchro sleeve and synchro hub, be sure to match the three sets of longer teeth (120 degrees apart) on the synchro sleeve with the three sets of deeper grooves in the synchro hub.

### CAUTION

Do not install the synchro sleeve with its longer teeth in the synchro hub slots because it will damage the spring ring.





# Synchro Ring, Gear

## Inspection

1. Inspect the synchro ring and gear.

A: Inspect the inside of the synchro ring for wear.

B: Inspect the synchro sleeve teeth and matching teeth on the synchro ring for wear (rounded off).



C: Inspect the synchro sleeve teeth and matching teeth on the gear for wear (rounded off).



D: Inspect the gear hub thrust surface for wear.

E: Inspect the cone surface for wear and roughness.

F: Inspect the teeth on all gears for uneven wear, scoring, galling, and cracks.

2. Coat the cone surface of the gear with oil, and place the synchro ring on the matching gear. Rotate the synchro ring, making sure that it does not slip.

Measure the clearance between the synchro ring and gear all the way around.

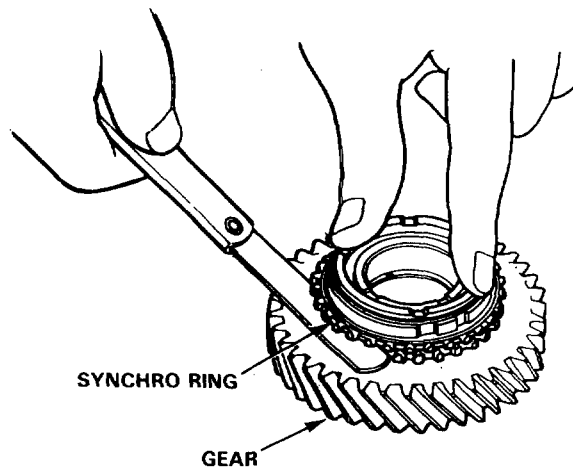
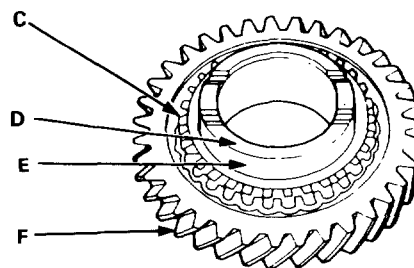
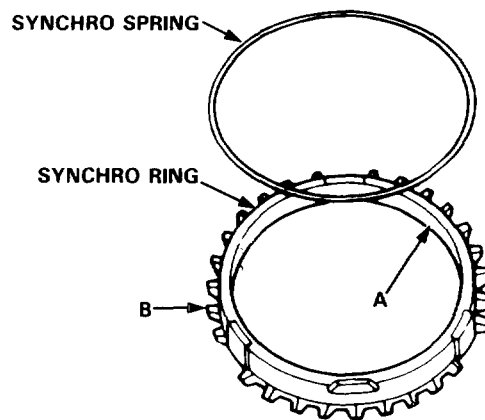
**NOTE:** Hold the synchro ring against the gear evenly while measuring the clearance.

### Synchro Ring-to-Gear Clearance

**Standard:** 0.73 – 1.18 mm (0.029 – 0.046 in)

**Service Limit:** 0.4 mm (0.02 in)

If the clearance is less than the service limit, replace the synchro ring and synchro cone.



# Shift Rod



## Removal

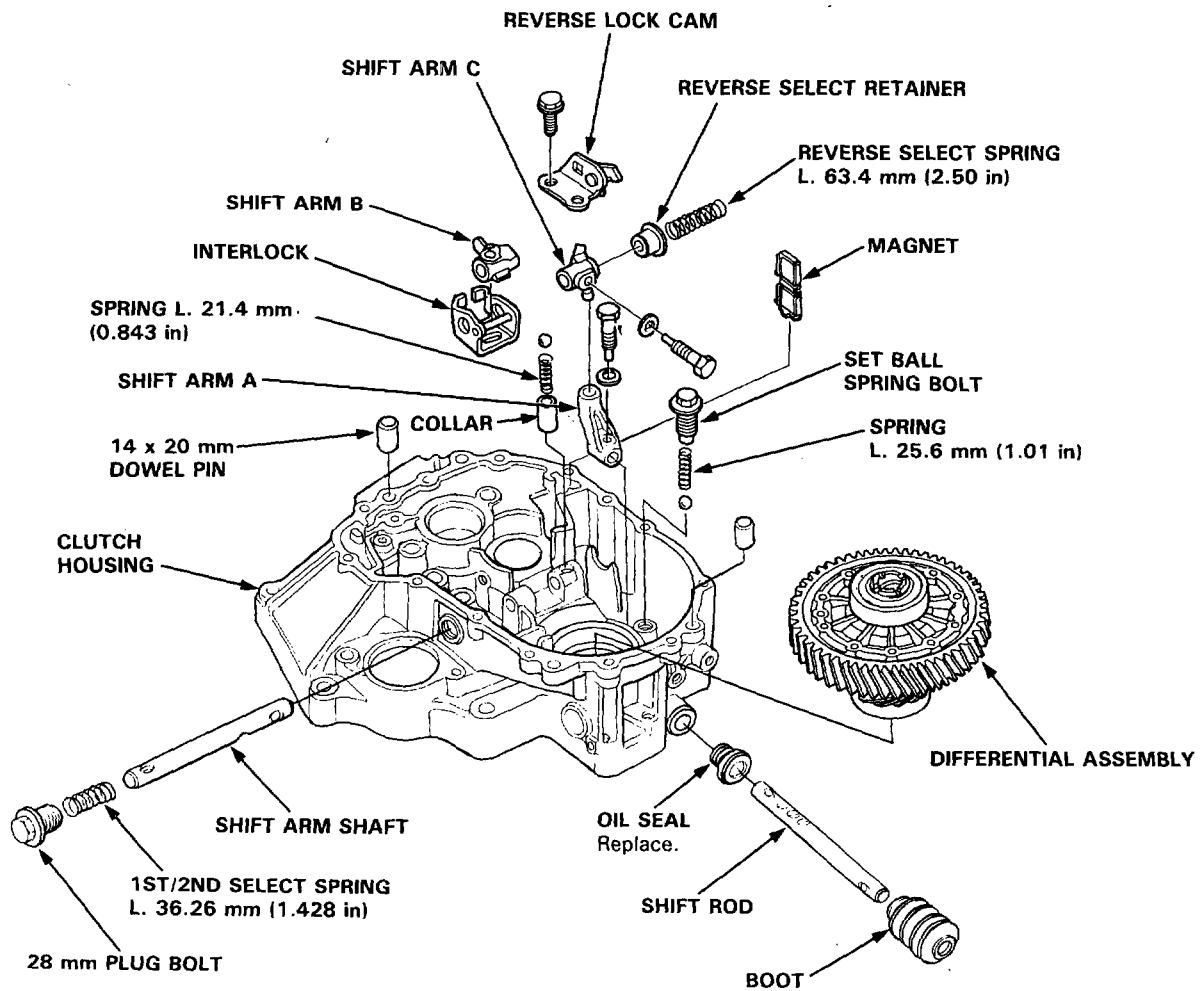
NOTE: The steel balls are all of the same size (5/16 in).

1. Remove the differential assembly.
2. Remove the 28 mm plug bolt and 1st/2nd select spring.
3. Remove the shift arm C attaching bolt.
4. Remove the shift arm shaft.

NOTE: Be careful not to lose the steel ball.

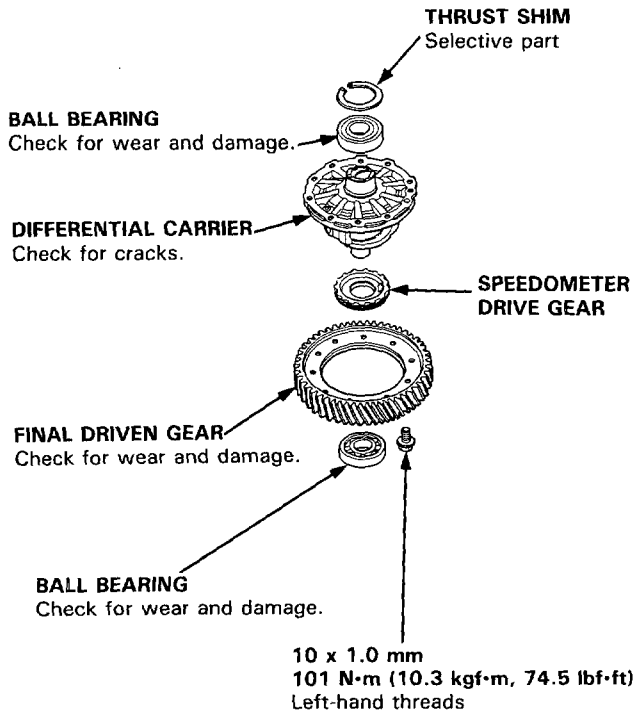
5. Remove the steel ball, spring, and collar.

6. Remove shift arms C and B, and the interlock, then remove the reverse select spring and retainer.
7. Remove the shift arm A attaching bolt, the set ball spring bolt, set spring, and steel ball.
8. Remove the shift rod, then remove the shift arm A.
9. Remove the reverse lock cam.
10. Remove the magnet.



# Differential

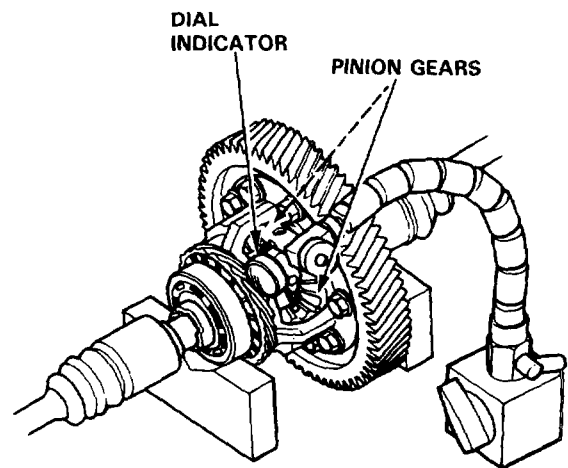
## Index



## Backlash Inspection

1. Place differential assembly on V-blocks and install both driveshafts.
2. Measure backlash of both pinion gears.

**Standard (New): 0.05 – 0.15 mm (0.002 – 0.006 in)**



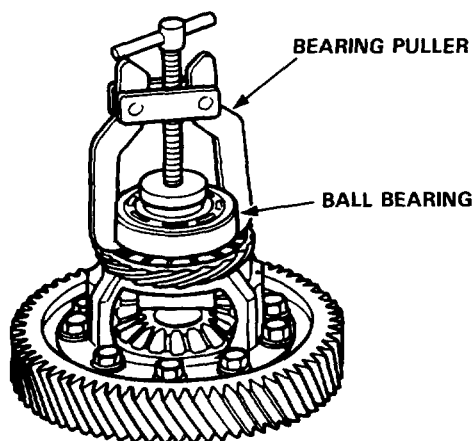
3. If the backlash is not within the standard, replace the differential carrier.



## Bearing Replacement

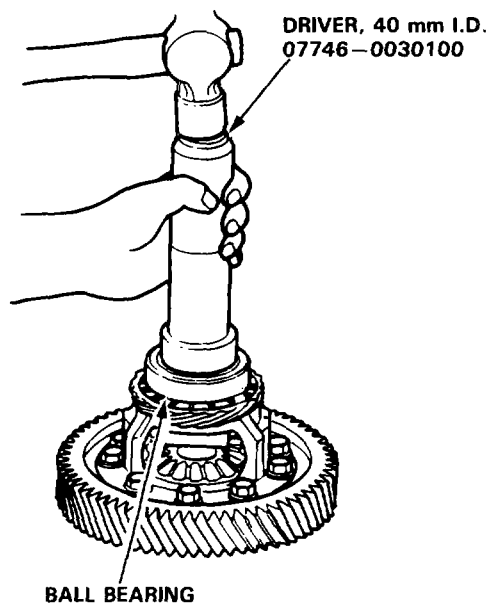
NOTE: Check bearings for wear and rough rotation. If bearings are OK, removal is not necessary.

1. Remove ball bearings using a bearing puller as shown.



2. Install new ball bearings using the special tool as shown.

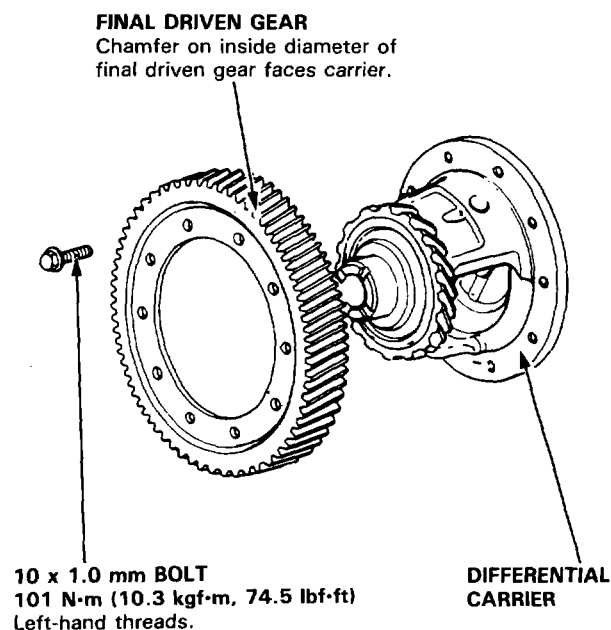
NOTE: Drive the bearings squarely until they bottom against the carrier.



## Final Driven Gear Replacement

1. Remove the bolts in a crisscross pattern in several steps, then remove the final driven gear from the differential carrier.

NOTE: The final driven gear bolts have left-hand threads.

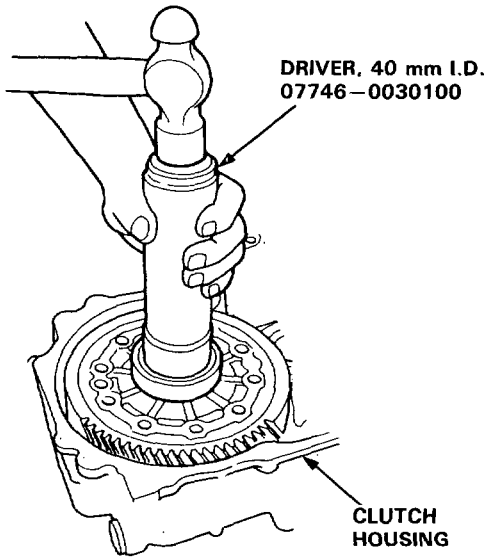


2. Install the final driven gear by tightening the bolts in a crisscross pattern in several steps.

# Differential

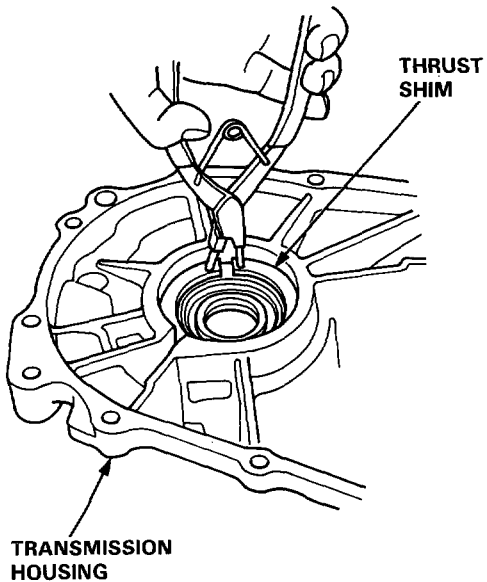
## Thrust Shim Adjustment

1. Install the differential assembly, making sure it bottoms in the clutch housing, using the special tool as shown.



2. Install the thrust shim.

NOTE: Install the same size thrust shim that was removed.



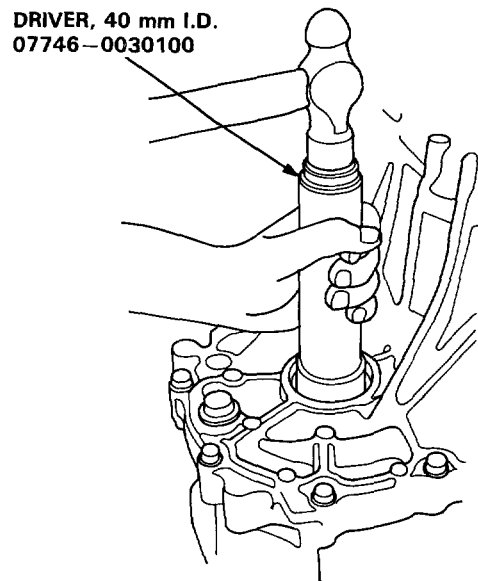
3. Install the transmission housing (see page 13-41).

NOTE: Do not apply liquid gasket to the mating surface of the clutch housing.

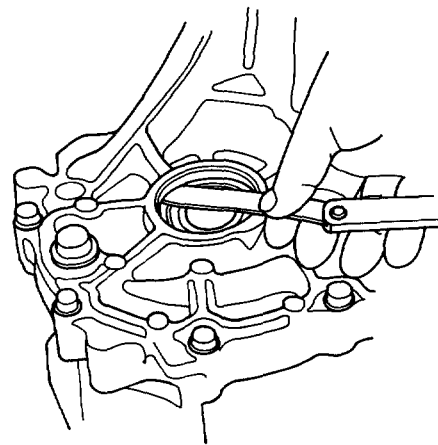
4. Tighten the transmission housing attaching bolts (see page 13-42).

8 x 1.25 mm  
27 N·m (2.8 kgf·m, 20 lbf·ft)

5. Use the special tool to bottom differential assembly in the clutch housing.



6. Measure clearance between thrust shim and bearing outer race in transmission housing.





7. If the clearance is more than the standard, select a new thrust shim from the following table.

NOTE: If the clearance measured in step 6 is within the standard, go to step 10.

Standard: 0 – 0.10 mm (0 – 0.004 in)

**72 mm THRUST SHIM: D14A7, D14A8 engines**

Part Number	Thickness
41441 – PL3 – A00	1.0 mm (0.0394 in)
41442 – PL3 – A00	1.1 mm (0.0433 in)
41443 – PL3 – A00	1.2 mm (0.0472 in)
41444 – PL3 – A00	1.3 mm (0.0512 in)
41445 – PL3 – A00	1.4 mm (0.0551 in)
41446 – PL3 – A00	1.5 mm (0.0591 in)
41447 – PL3 – A00	1.6 mm (0.0630 in)
41448 – PL3 – A00	1.7 mm (0.0669 in)
41449 – PL3 – A00	1.8 mm (0.0709 in)
41450 – PL3 – A00	1.05 mm (0.0413 in)
41451 – PL3 – A00	1.15 mm (0.0453 in)
41452 – PL3 – A00	1.25 mm (0.0492 in)
41453 – PL3 – A00	1.35 mm (0.0532 in)
41454 – PL3 – A00	1.45 mm (0.0571 in)
41455 – PL3 – A00	1.55 mm (0.0610 in)
41456 – PL3 – A00	1.65 mm (0.0650 in)
41457 – PL3 – A00	1.75 mm (0.0689 in)

**80 mm THRUST SHIM: D15Z8, D16B2 engines**

Part Number	Thickness
41441 – PL3 – B00	1.0 mm (0.0394 in)
41442 – PL3 – B00	1.1 mm (0.0433 in)
41443 – PL3 – B00	1.2 mm (0.0472 in)
41444 – PL3 – B00	1.3 mm (0.0512 in)
41445 – PL3 – B00	1.4 mm (0.0551 in)
41446 – PL3 – B00	1.5 mm (0.0591 in)
41447 – PL3 – B00	1.6 mm (0.0630 in)
41448 – PL3 – B00	1.7 mm (0.0669 in)
41449 – PL3 – B00	1.8 mm (0.0709 in)
41450 – PL3 – B00	1.05 mm (0.0413 in)
41451 – PL3 – B00	1.15 mm (0.0453 in)
41452 – PL3 – B00	1.25 mm (0.0492 in)
41453 – PL3 – B00	1.35 mm (0.0532 in)
41454 – PL3 – B00	1.45 mm (0.0571 in)
41455 – PL3 – B00	1.55 mm (0.0610 in)
41456 – PL3 – B00	1.65 mm (0.0650 in)
41457 – PL3 – B00	1.75 mm (0.0689 in)

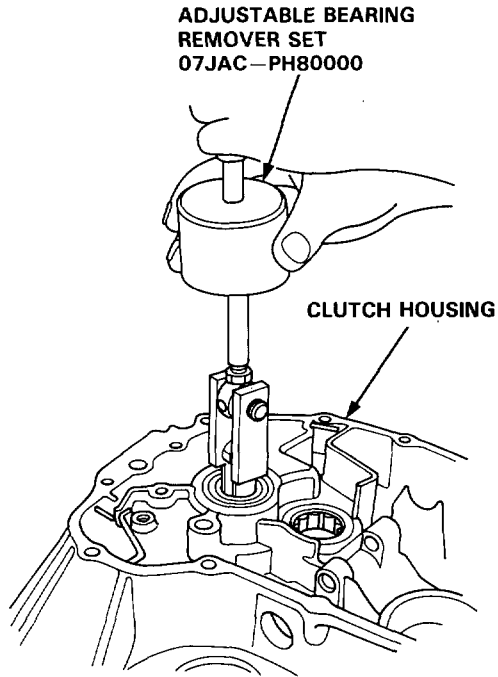
8. Remove the bolts and transmission housing.
9. Replace the thrust shim selected in step 7, then recheck the clearance.
10. Remove the bolts and transmission housing. Apply liquid gasket to the surface of the transmission housing and reassemble.

# Clutch Housing Bearing

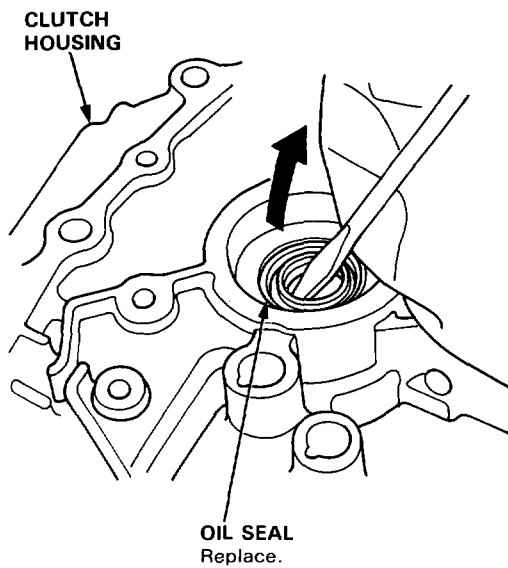
## Replacement

### Mainshaft

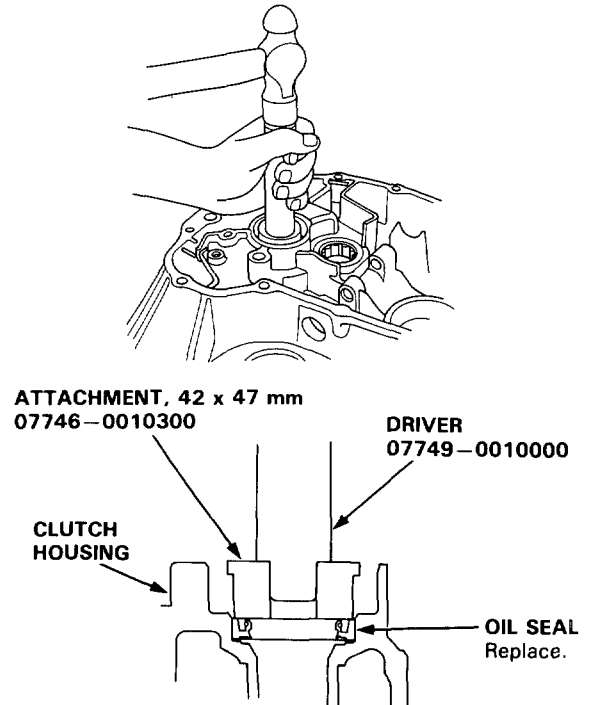
1. Remove the ball bearing using the special tool as shown.



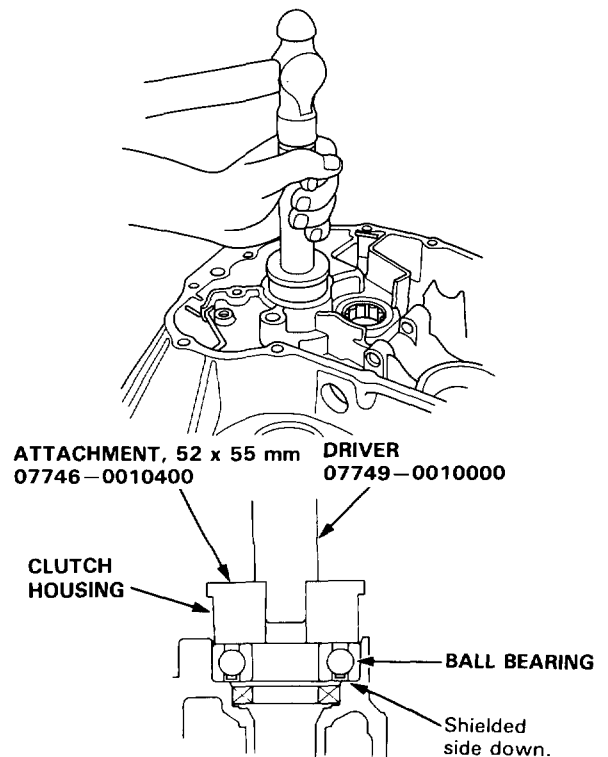
2. Remove the oil seal from the clutch housing.



3. Drive the new oil seal into the clutch housing using the special tools as shown.



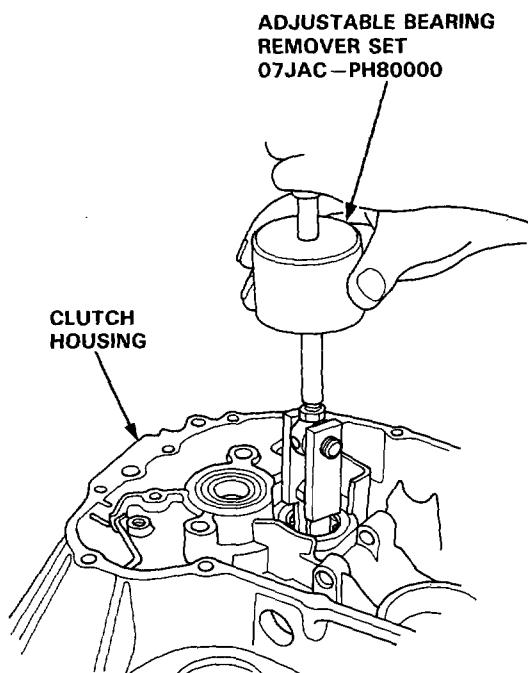
4. Drive the ball bearing into the clutch housing using the special tools as shown.



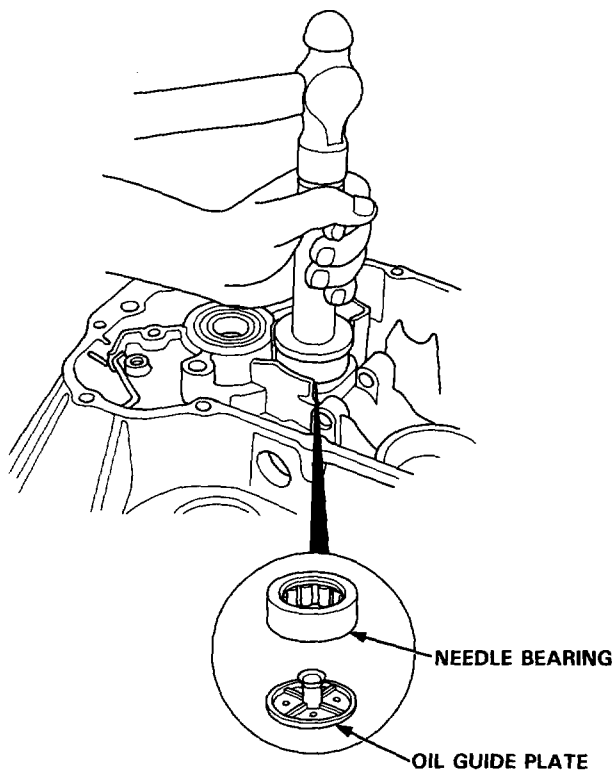


### Countershaft

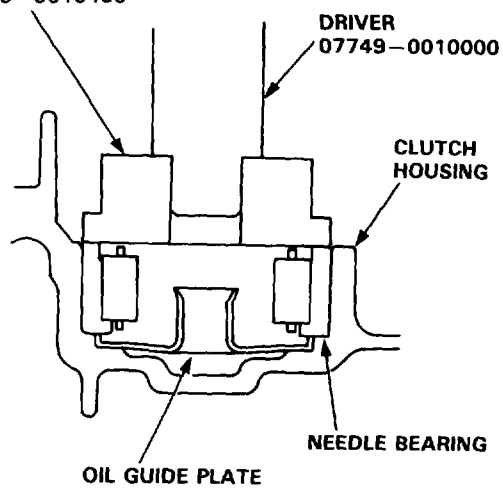
1. Remove the needle bearing using the special tool as shown, then remove the oil guide plate.



2. Install the oil guide plate, then drive the needle bearing into the clutch housing using the special tools as shown.



- \*1: ATTACHMENT, 42 x 47 mm  
07746-0010300
- \*2: ATTACHMENT, 52 x 55 mm  
07746-0010400



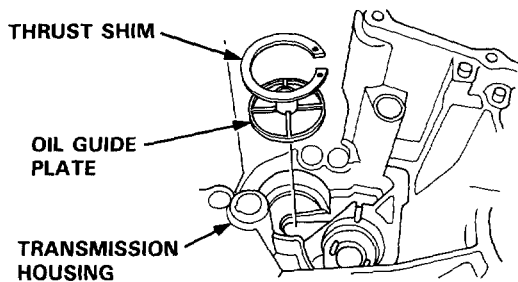
- \*1: D14A7, D14A8 engines
- \*2: D15Z8, D16B2 engines



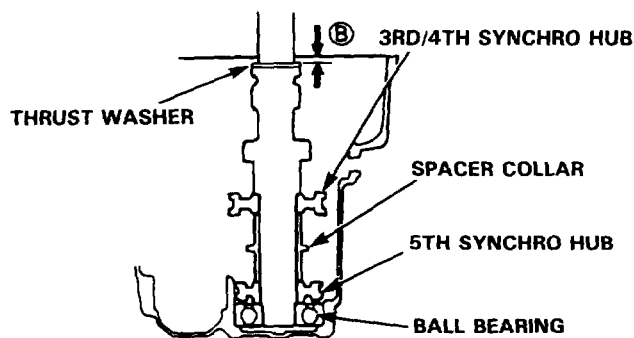
# Mainshaft Thrust Clearance

## Adjustment

1. Remove the thrust shim and oil guide plate from the transmission housing.



2. Install the 3rd/4th synchro hub, spacer collar, 5th synchro hub, ball bearing, and thrust washer on the mainshaft. Install the assembly in the transmission housing.



3. Measure the distance (B) between the end of the transmission housing and thrust washer.

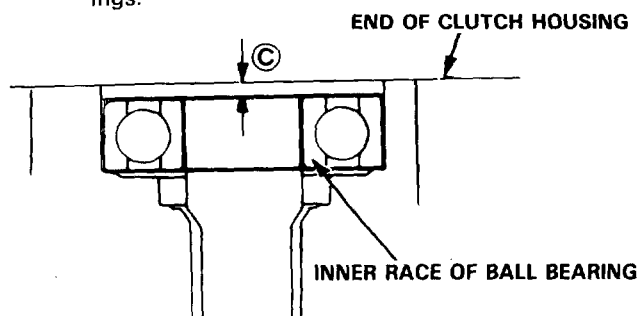
**NOTE:**

- Use a straight edge and vernier caliper.
- Measure at three locations and average the readings.

4. Measure the distance (C) between the surfaces of the clutch housing and bearing inner race.

**NOTE:**

- Use a straight edge and depth gauge.
- Measure at three locations and average the readings.



5. Select the proper shim on the basis of the following calculations:

**NOTE:** Use only one thrust shim.

(Basic Formula)

$$(B) + (C) - 0.95 = \text{shim thickness}$$

**Example of calculation:**

$$\text{Distance (B) (2.00 mm) + Distance (C) (0.09 mm) = 2.09 mm}$$

subtract the spring washer height (0.95 mm) = the required thrust shim (1.14 mm)

**65 mm THRUST SHIM: D14A7, D14A8 engines**

	Part Number	Thickness
A	23931 - PL3 - A10	0.60 mm (0.0236 in)
B	23932 - PL3 - A10	0.63 mm (0.0248 in)
C	23933 - PL3 - A10	0.66 mm (0.0260 in)
D	23934 - PL3 - A10	0.69 mm (0.0272 in)
E	23935 - PL3 - A10	0.72 mm (0.0283 in)
F	23936 - PL3 - A10	0.75 mm (0.0295 in)
G	23937 - PL3 - A10	0.78 mm (0.0307 in)
H	23938 - PL3 - A10	0.81 mm (0.0319 in)
I	23939 - PL3 - A10	0.84 mm (0.0331 in)
J	23940 - PL3 - A10	0.87 mm (0.0343 in)
K	23941 - PL3 - A10	0.90 mm (0.0354 in)
L	23942 - PL3 - A10	0.93 mm (0.0366 in)
M	23943 - PL3 - A10	0.96 mm (0.0378 in)
N	23944 - PL3 - A10	0.99 mm (0.0390 in)
O	23945 - PL3 - A10	1.02 mm (0.0402 in)
P	23946 - PL3 - A10	1.05 mm (0.0413 in)
Q	23947 - PL3 - A10	1.08 mm (0.0425 in)
R	23948 - PL3 - A10	1.11 mm (0.0437 in)
S	23949 - PL3 - A10	1.14 mm (0.0449 in)
T	23950 - PL3 - A10	1.17 mm (0.0461 in)
U	23951 - PL3 - A10	1.20 mm (0.0472 in)
V	23952 - PL3 - A10	1.23 mm (0.0484 in)
W	23953 - PL3 - A10	1.26 mm (0.0496 in)
X	23954 - PL3 - A10	1.29 mm (0.0508 in)
Y	23955 - PL3 - A10	1.32 mm (0.0520 in)
Z	23956 - PL3 - A10	1.35 mm (0.0531 in)
AA	23957 - PL3 - A10	1.38 mm (0.0543 in)
AB	23958 - PL3 - A10	1.41 mm (0.0555 in)
AC	23959 - PL3 - A10	1.44 mm (0.0567 in)
AD	23960 - PL3 - A10	1.47 mm (0.0579 in)
AE	23961 - PL3 - A10	1.50 mm (0.0591 in)
AF	23962 - PL3 - A10	1.53 mm (0.0602 in)
AG	23963 - PL3 - A10	1.56 mm (0.0614 in)
AH	23964 - PL3 - A10	1.59 mm (0.0626 in)
AI	23965 - PL3 - A10	1.62 mm (0.0638 in)
AJ	23966 - PL3 - A10	1.65 mm (0.0650 in)
AK	23967 - PL3 - A10	1.68 mm (0.0661 in)
AL	23968 - PL3 - A10	1.71 mm (0.0673 in)
AM	23969 - PL3 - A10	1.74 mm (0.0685 in)
AN	23970 - PL3 - A10	1.77 mm (0.0697 in)
AO	23971 - PL3 - A10	1.80 mm (0.0709 in)



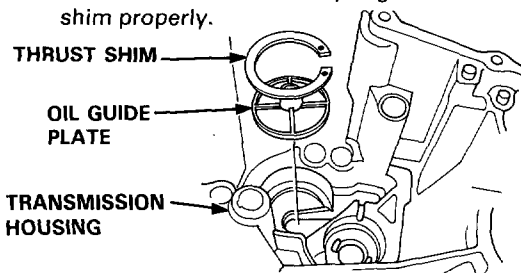
**70 mm THRUST SHIM: D15Z8, D16B2 engines**

	Part Number	Thickness
A	23931 - PL3 - B00	0.60 mm (0.0236 in)
B	23932 - PL3 - B00	0.63 mm (0.0248 in)
C	23933 - PL3 - B00	0.66 mm (0.0260 in)
D	23934 - PL3 - B00	0.69 mm (0.0272 in)
E	23935 - PL3 - B00	0.72 mm (0.0283 in)
F	23936 - PL3 - B00	0.75 mm (0.0295 in)
G	23937 - PL3 - B00	0.78 mm (0.0307 in)
H	23938 - PL3 - B00	0.81 mm (0.0319 in)
I	23939 - PL3 - B00	0.84 mm (0.0331 in)
J	23940 - PL3 - B00	0.87 mm (0.0343 in)
K	23941 - PL3 - B00	0.90 mm (0.0354 in)
L	23942 - PL3 - B00	0.93 mm (0.0366 in)
M	23943 - PL3 - B00	0.96 mm (0.0378 in)
N	23944 - PL3 - B00	0.99 mm (0.0390 in)
O	23945 - PL3 - B00	1.02 mm (0.0402 in)
P	23946 - PL3 - B00	1.05 mm (0.0413 in)
Q	23947 - PL3 - B00	1.08 mm (0.0425 in)
R	23948 - PL3 - B00	1.11 mm (0.0437 in)
S	23949 - PL3 - B00	1.14 mm (0.0449 in)
T	23950 - PL3 - B00	1.17 mm (0.0461 in)
U	23951 - PL3 - B00	1.20 mm (0.0472 in)
V	23952 - PL3 - B00	1.23 mm (0.0484 in)
W	23953 - PL3 - B00	1.26 mm (0.0496 in)
X	23954 - PL3 - B00	1.29 mm (0.0508 in)
Y	23955 - PL3 - B00	1.32 mm (0.0520 in)
Z	23956 - PL3 - B00	1.35 mm (0.0531 in)
AA	23957 - PL3 - B00	1.38 mm (0.0543 in)
AB	23958 - PL3 - B00	1.41 mm (0.0555 in)
AC	23959 - PL3 - B00	1.44 mm (0.0567 in)
AD	23960 - PL3 - B00	1.47 mm (0.0579 in)
AE	23961 - PL3 - B00	1.50 mm (0.0591 in)
AF	23962 - PL3 - B00	1.53 mm (0.0602 in)
AG	23963 - PL3 - B00	1.56 mm (0.0614 in)
AH	23964 - PL3 - B00	1.59 mm (0.0626 in)
AI	23965 - PL3 - B00	1.62 mm (0.0638 in)
AJ	23966 - PL3 - B00	1.65 mm (0.0650 in)
AK	23967 - PL3 - B00	1.68 mm (0.0661 in)
AL	23968 - PL3 - B00	1.71 mm (0.0673 in)
AM	23969 - PL3 - B00	1.74 mm (0.0685 in)
AN	23970 - PL3 - B00	1.77 mm (0.0697 in)
AO	23971 - PL3 - B00	1.80 mm (0.0709 in)

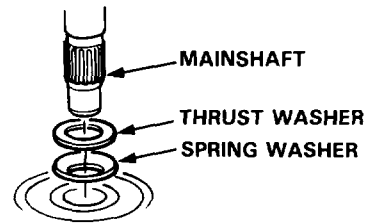
6. Install the oil guide plate and selected thrust shim in the transmission housing.

NOTE:

- Clean the thrust washer, spring washer and thrust shim thoroughly before installation.
- Install the thrust washer, spring washer and thrust shim properly.



7. Install the thrust washer and spring washer in the mainshaft.



8. Install the mainshaft in the clutch housing.

9. Place the transmission housing over the mainshaft and onto the clutch housing.

10. Tighten the clutch and transmission housings with several 8 mm bolts.

NOTE: It is not necessary to use sealing agent between the housings.

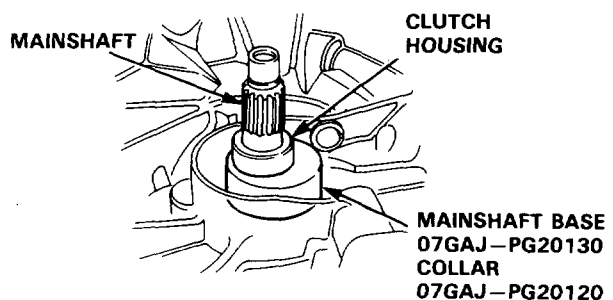
**8 x 1.25 mm**  
**27 N·m (2.8 kgf·m, 20 lbf·ft)**

11. Tap the mainshaft with a plastic hammer.

12. Check the thrust clearance in the manner described below.

**CAUTION**  
Measurement should be made at room temperature.

a. Slide the mainshaft base and the collar over the mainshaft.



(cont'd)

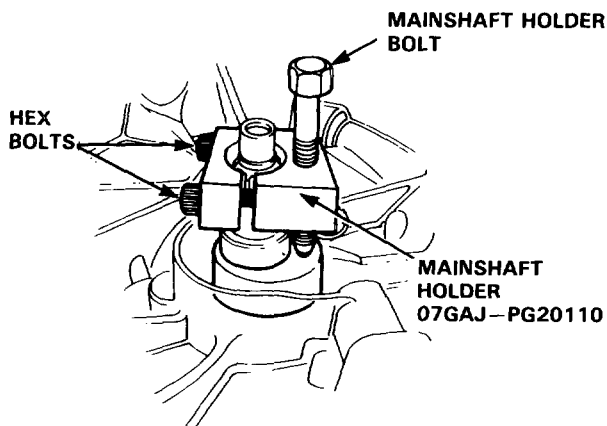
# Mainshaft Thrust Clearance

## Adjustment (cont'd)

- b. Attach the mainshaft holder to the mainshaft as follows:

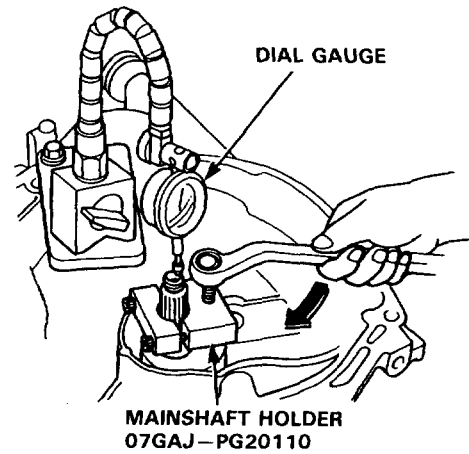
**NOTE:**

- Back-out the mainshaft holder bolt and loosen the two hex bolts.
- Fit the holder over the mainshaft so its lip is towards the transmission.
- Align the mainshaft holder's lip around the groove at the inside of the mainshaft splines, then tighten the hex bolts.



- c. Seat the mainshaft fully by tapping its end with a plastic hammer.  
d. Thread the mainshaft holder bolt in until it just contacts the wide surface of the mainshaft base.

- e. Zero a dial gauge on the end of the mainshaft.



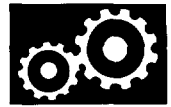
- f. Turn the mainshaft holder bolt clockwise; stop turning when the dial gauge has reached its maximum movement. The reading on the dial gauge is the amount of mainshaft end play.

### **CAUTION**

Turning the mainshaft holder bolt more than 60 degrees after the needle of the dial gauge stops moving may damage the transmission.

- g. If the reading is within the standard, the clearance is correct.  
If the reading is not within the standard, recheck the shim thickness.

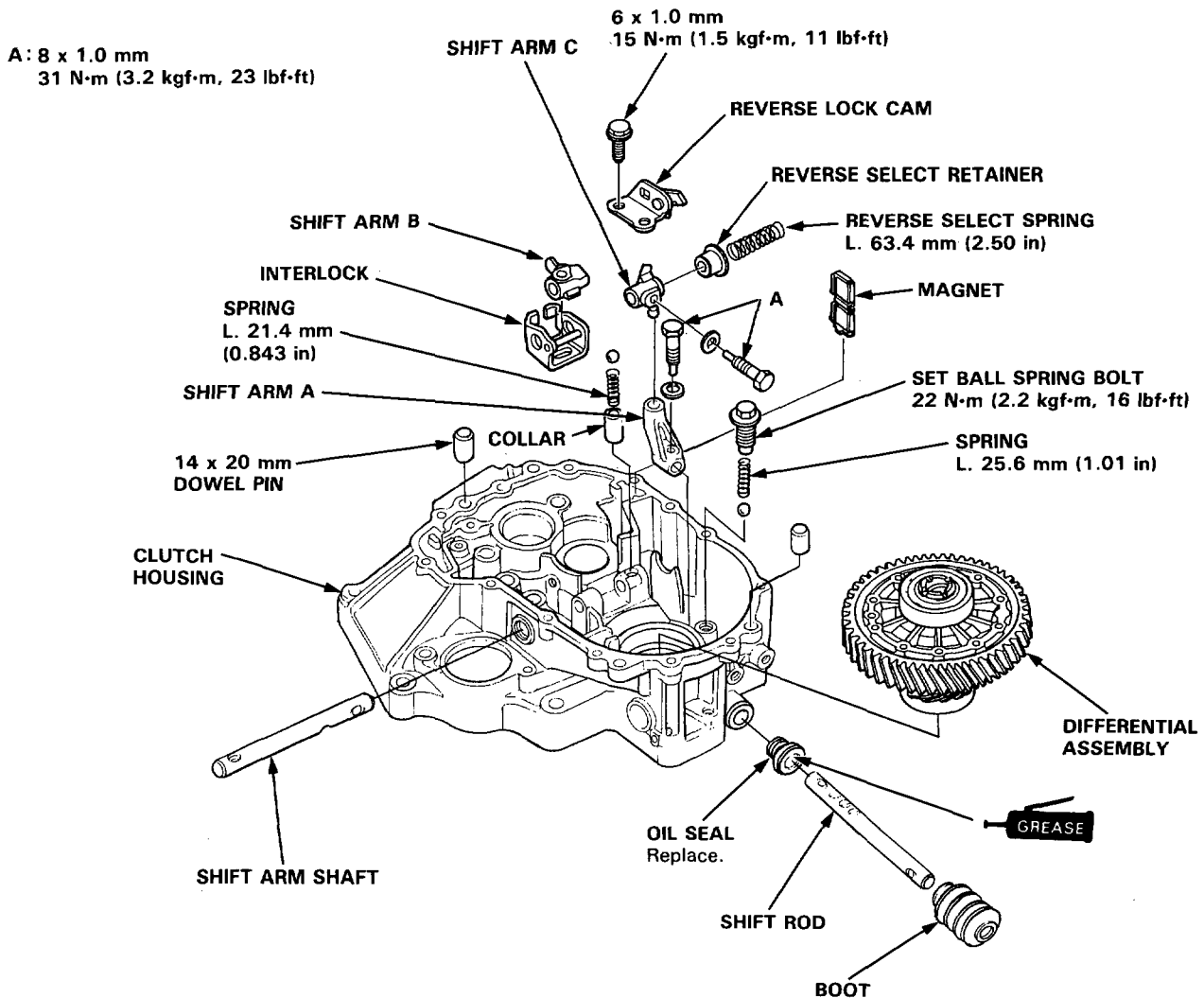
**Standard: 0.11 – 0.18 mm (0.004 – 0.007 in)**



## Reassembly

NOTE: The steel balls are all of the same size (5/16 in).

1. Install the magnet and reverse lock cam.
2. Set shift arm A on the clutch housing, then install the shift rod.
3. Install the spring washer and shift arm A attaching bolt.
4. Install the steel ball, spring, and set ball spring bolt.
5. Install shift arm B in the interlock, then set it on the clutch housing.
6. Insert shift arm shaft in the clutch housing.
7. Install the collar, spring, and steel ball into the case. Compress the ball and insert the shift arm shaft.
8. Install shift arm C in shift arm A, then insert the shift arm shaft.
9. Install the reverse select retainer and reverse select spring onto shift arm shaft.
10. Install the differential assembly.



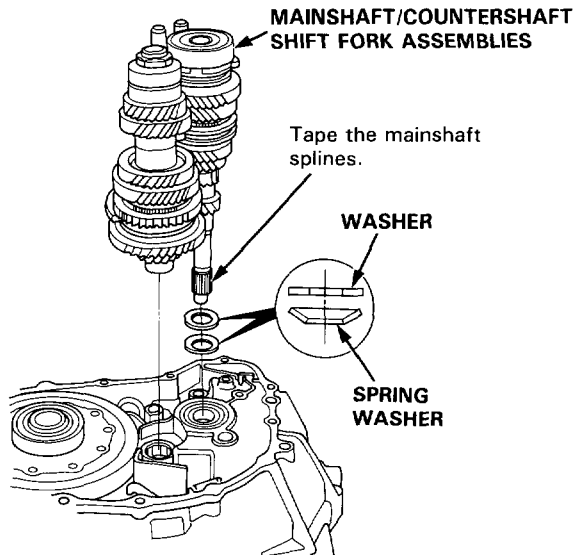
(cont'd)

# Transmission

## Reassembly (cont'd)

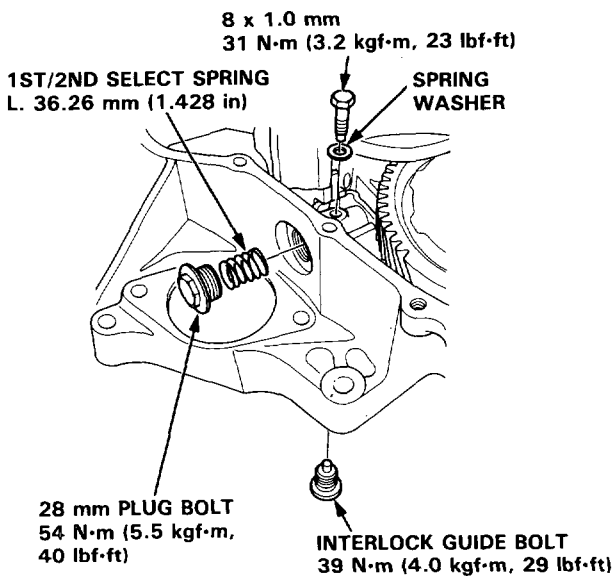
11. Set the 36 mm spring washer and washer.
12. Install the mainshaft, countershaft, and shift fork assemblies.

NOTE: Align the finger of the interlock with the groove in the shift fork shaft.

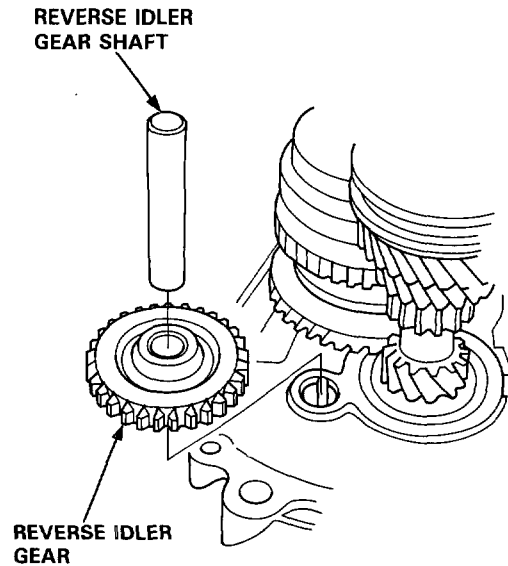


13. Install the spring washer and shift arm B attaching bolt.
14. Install the 1st/2nd select spring, 28 mm plug bolt, and interlock guide bolt.

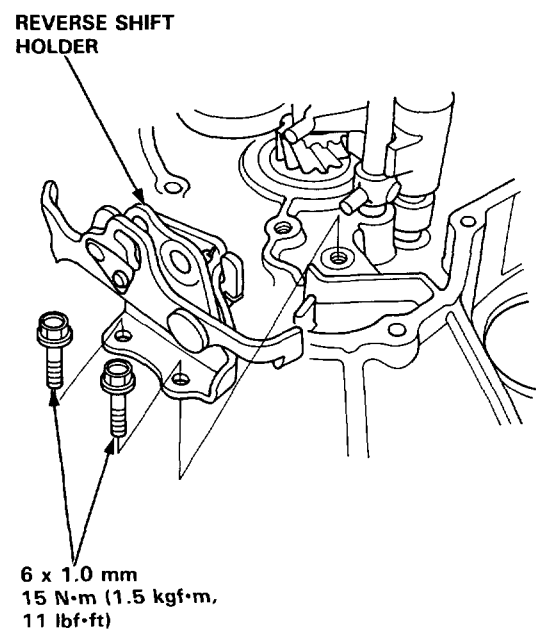
NOTE: Apply liquid gasket (P/N 0Y740 - 99986 or 08C70 - X0134S) to the threads of the 28 mm plug bolt and interlock guide bolt.

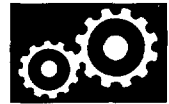


15. Install the reverse idler gear and reverse idler gear shaft.

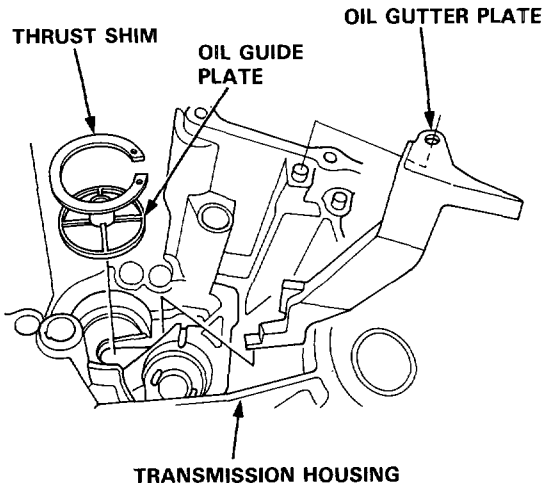


16. Install the reverse shift holder.





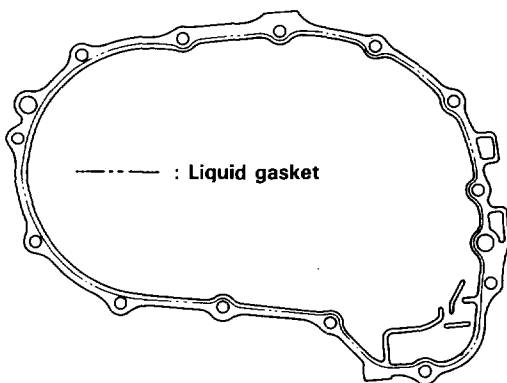
17. Install the oil gutter plate.
18. Install the oil guide plate and thrust shim on the transmission housing.



19. Apply liquid gasket to the surface of the transmission housing mating with the clutch housing as shown.

**NOTE:**

- Use liquid gasket (P/N 08C70 - X0134SEB/08C70 - X0231SEB or 08C70 - K0234MEB/08C70 - K0334MEB).
- Remove the dirty oil from the sealing surface.
- If 20 minutes have passed after applying liquid gasket, reapply it and assemble the housings.
- Allow it to cure at least 20 minutes after assembly before filling the transmission with oil.



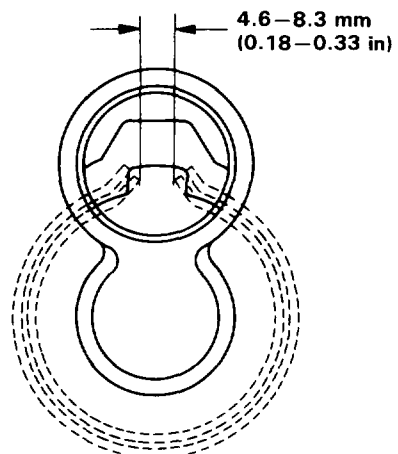
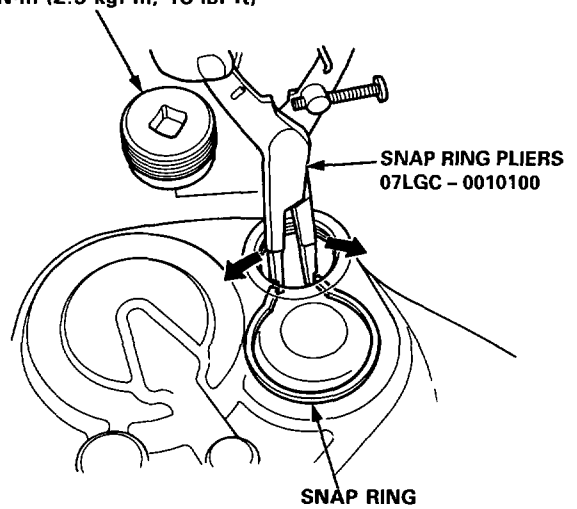
20. Install the dowel pins and the transmission housing.
21. Lower the transmission housing with the snap ring pliers, and set the snap ring into the groove of the countershaft bearing.

**NOTE:** Check that the snap ring is securely seated in the groove of the countershaft bearing.

22. Install the 32 mm sealing bolt.

**NOTE:** Apply liquid gasket (P/N 0Y740 - 99986 or 08C70 - X0134S) to the threads.

**32 mm SEALING BOLT**  
25 N·m (2.5 kgf·m, 18 lbf·ft)



(cont'd)

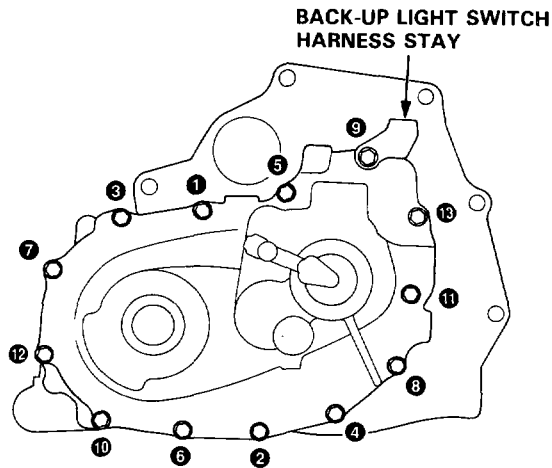
# Transmission

## Reassembly (cont'd)

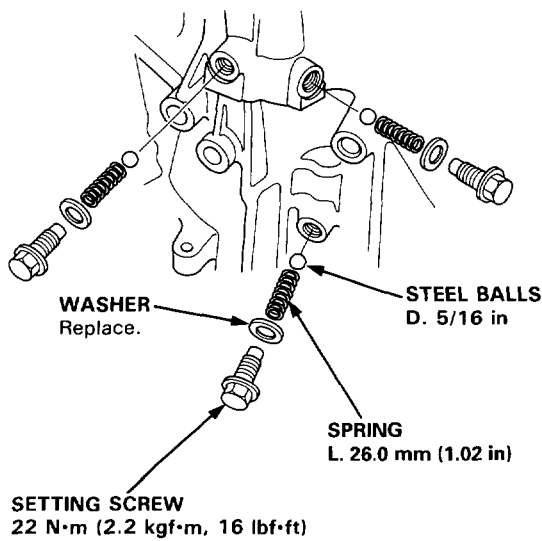
23. Tighten the transmission housing attaching bolts in the numbered sequence in several steps shown below.

8 x 1.25 mm

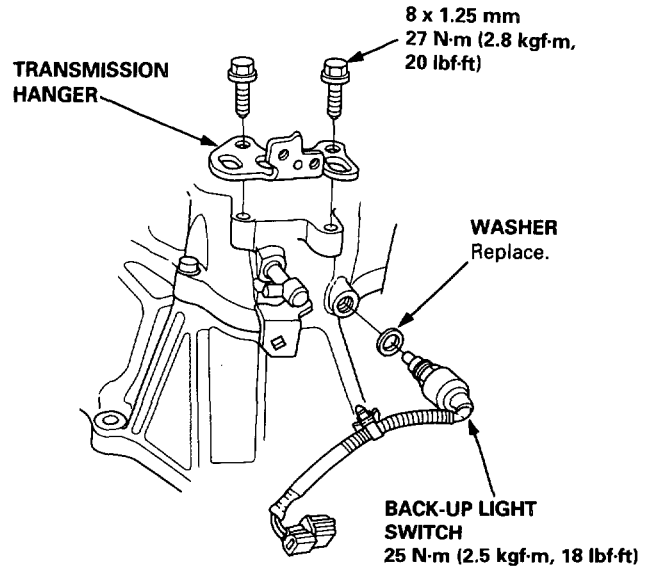
Torque: 27 N·m (2.8 kgf·m 20 lbf·ft)



24. Install the steel balls, springs, and set screws.



25. Install the back-up light switch and transmission hanger.

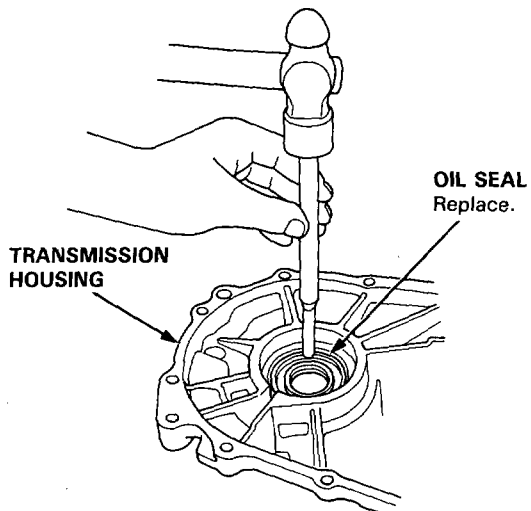




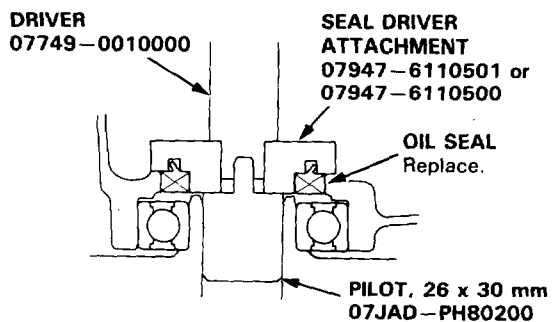
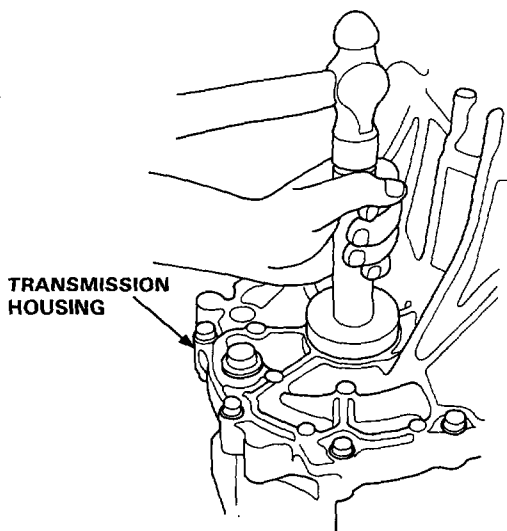
## Replacement

### Transmission Housing:

1. Remove the oil seal from the transmission housing.

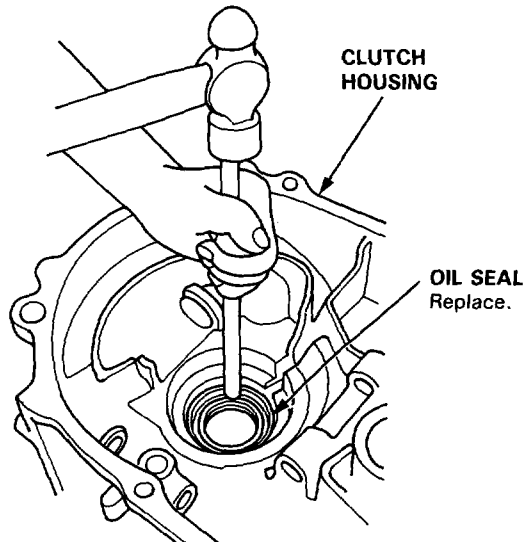


2. Install the oil seal into the transmission housing using the special tools as shown.

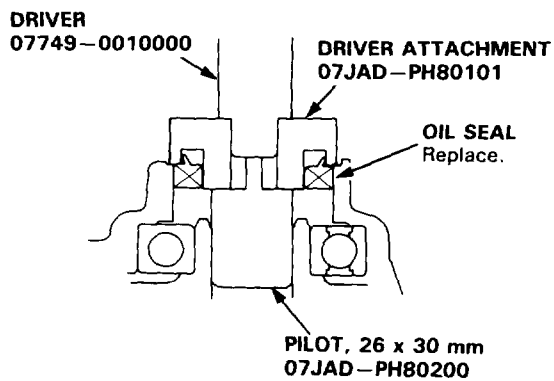
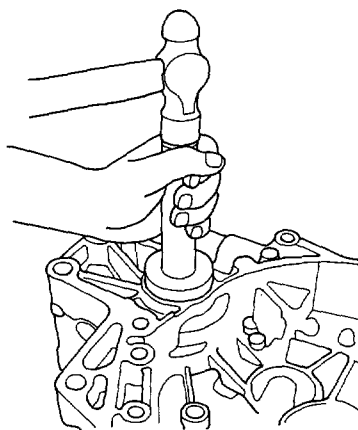


### Clutch Housing:

1. Remove the oil seal from the clutch housing.



2. Install the oil seal into the clutch housing using the special tools as shown.

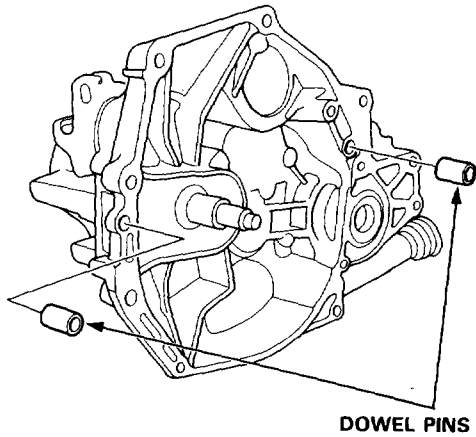




# Transmission Assembly

## Installation

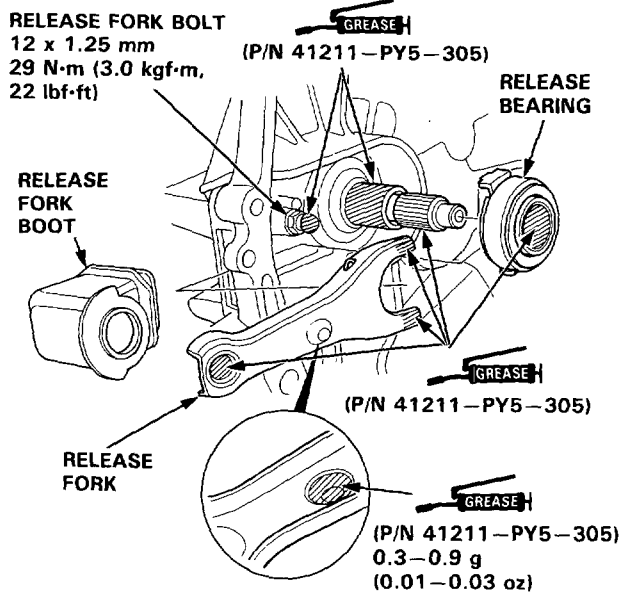
1. Install the dowel pins.



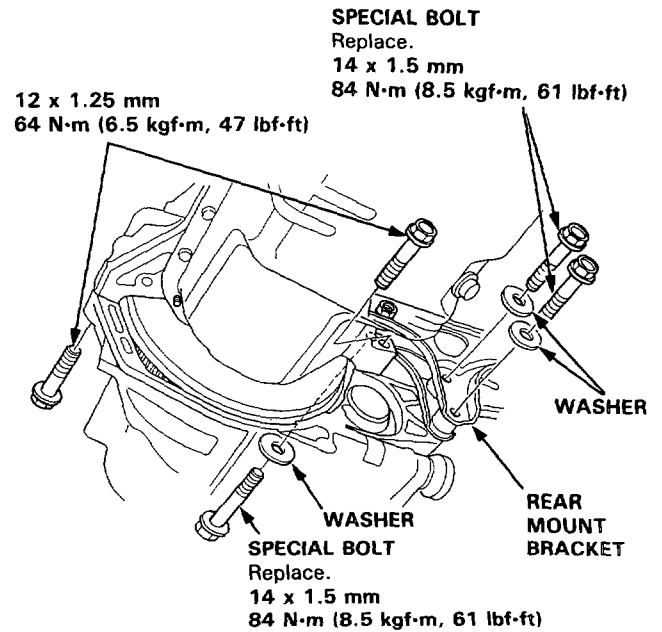
2. Apply grease to the parts as shown, then install the release fork and release bearing.

**NOTE:** Use only HONDA Genuine Urea Grease UM264 (P/N 41211-PY5-305).

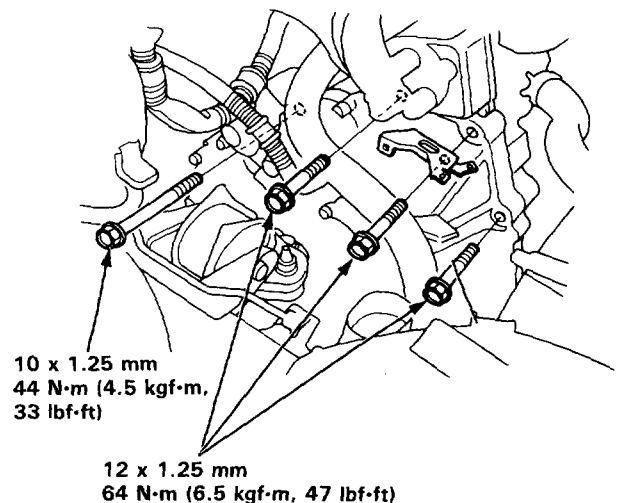
3. Install the release fork boot.



4. Place the transmission on the transmission jack, and raise it to the engine level.
5. Install the transmission mounting bolts and rear mount bracket bolts.



6. Install the three upper transmission mounting bolts and the lower starter mounting bolt.

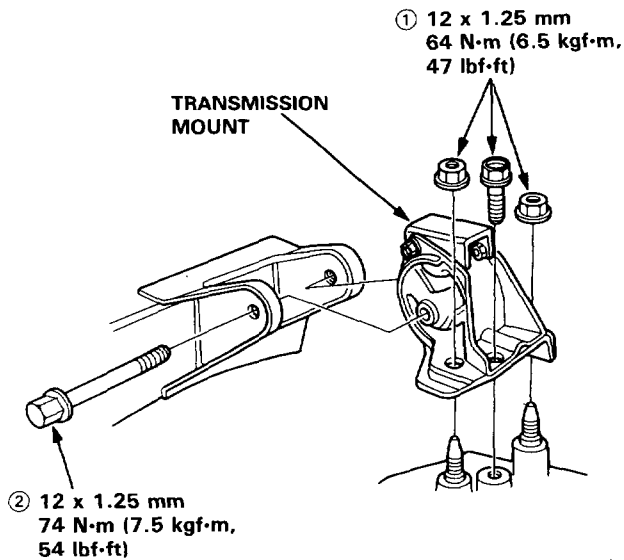




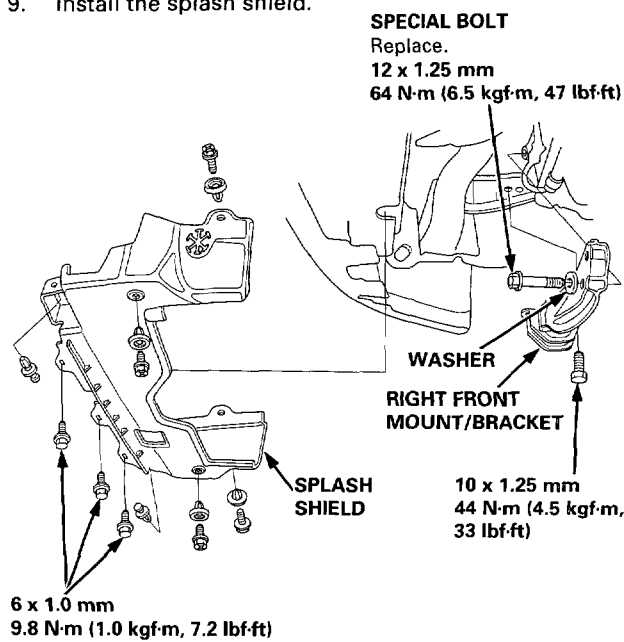
7. Raise the transmission, then install the transmission side mount.

**NOTE:**

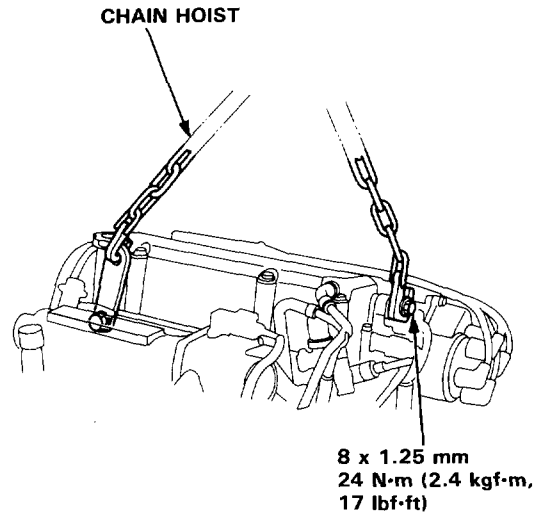
- Torque the mounting bolt and nuts in the sequence shown.
- Check that the bushings are not twisted or offset.



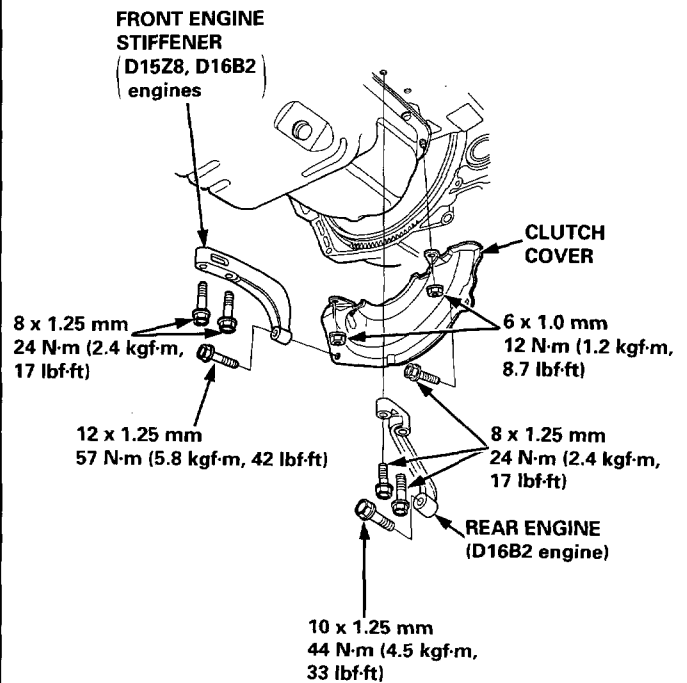
8. Install the right front mount/bracket.  
9. Install the splash shield.



10. Remove the chain hoist, then reinstall the distributor mounting bolt.



11. Install the clutch cover and the rear engine stiffener.



(cont'd)

# Transmission Assembly

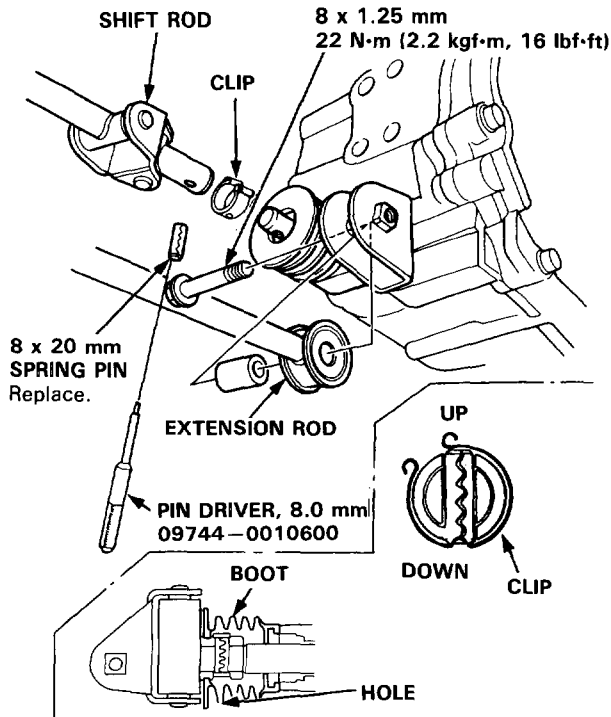
## Installation (cont'd)

12. Install the shift rod, spring pin, and clip.

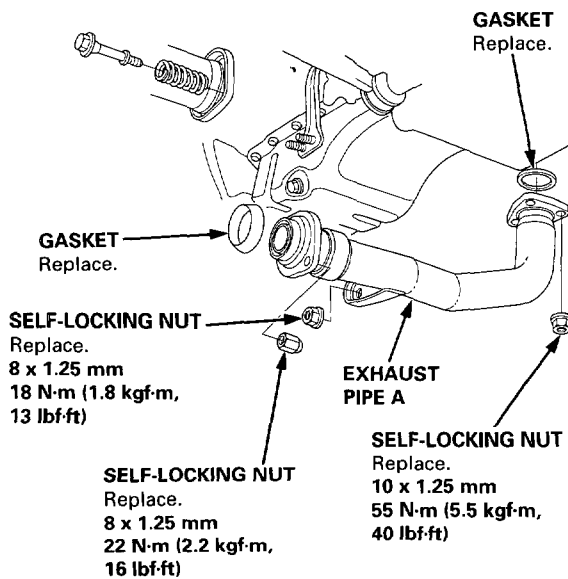
**NOTE:**

- Install the clip as shown.
- Turn the boot so the hole is facing down.
- Make sure the boot is installed on the shift rod.

13. Install the extension rod.



14. Install exhaust pipe A.

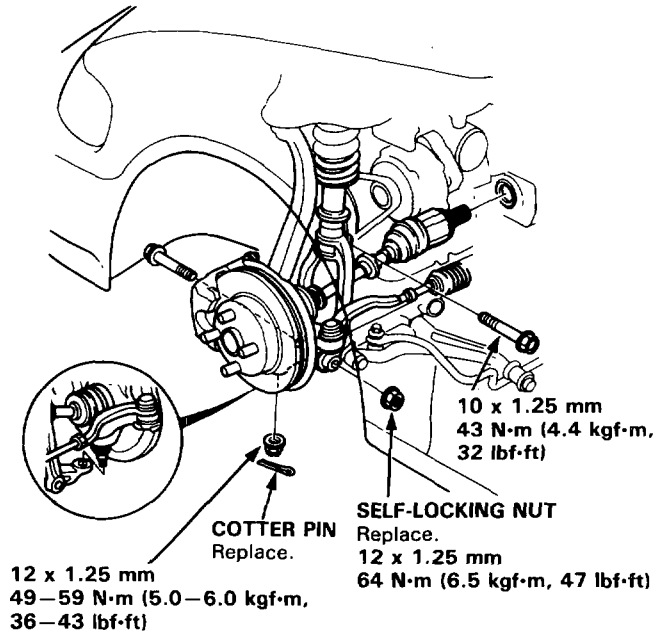


15. Install the driveshafts (see section 16).

**NOTE:** Replace the set rings with new ones.

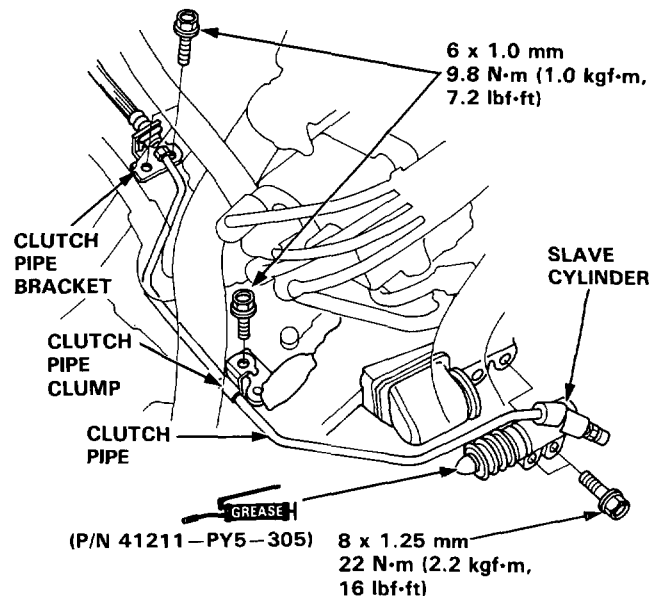
16. Install the ball joint onto the lower arm (see section 16).

17. Install the damper fork.



18. Install the slave cylinder, then install the clutch pipe stay.

**NOTE:** Use only HONDA Genuine Urea Grease UM264 (P/N 41211-PY5-305).

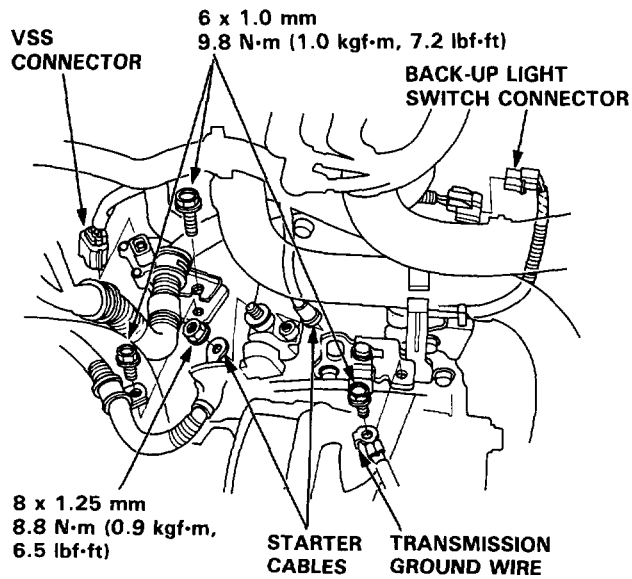




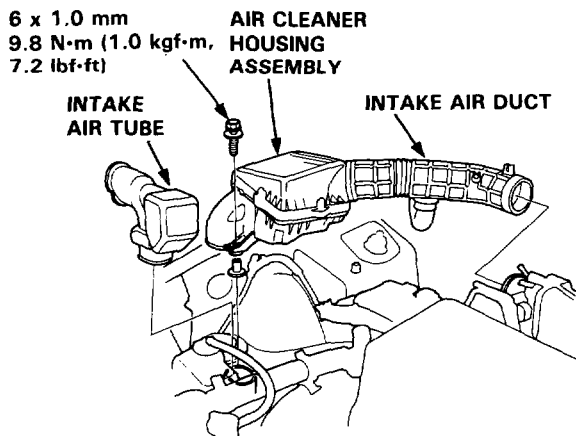
19. Connect the vehicle speed sensor (VSS), back-up light switch connectors, transmission ground wire, and starter cables.

NOTE: When installing the starter cable, make sure that the crimped side of the ring terminal is facing out (see section 4).

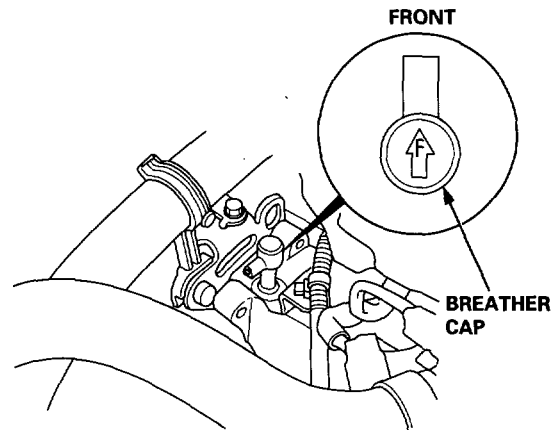
20. Install the wire harness clamp.



21. Install the intake air duct, air cleaner housing assembly, and intake air tube.



22. Turn the breather cap so that "F" mark points at the front of the vehicle as shown.



23. Refill the transmission with oil (see page 13-3).
24. Connect the positive (+) cable first, then the negative (-) cable to the battery.
25. Check the clutch operation.
26. Shift the transmission and check for smooth operation.
27. Adjust ignition timing (see section 4).
28. Check the front wheel alignment (see section 18).

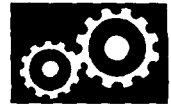
## S9B Model Manual Transmission (B18C4 engine model)

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# Special Tools

Ref. No.	Tool Number	Description	Qty	Remark
①	07GAD - PG20100	Pin Driver, 5.0 mm	1	
②	07GAJ - PG20110	Mainshaft Holder	1	
③	07GAJ - PG20130	Mainshaft Base	1	
④	07JAD - PH80101	Seal Driver Attachment	1	
⑤	07JAC - PH80000	Adjustable Bearing Remover Set	1	Component Tools
⑤-1	07JAC - PH80100	Bearing Remover Attachment	(1)	
⑤-2	07JAC - PH80200	Remover Handle Assembly	(1)	
⑤-3	07741 - 0010201	Remover Weight	(1)	
⑥	07TAJ - ST70100	Preload Inspection Tool	1	
⑦	07NAD - PX40100	Driver Attachment	1	
⑧	07746 - 0010300	Attachment, 42 x 47 mm	1	
⑨	07746 - 0010400	Attachment, 52 x 55 mm	1	
⑩	07746 - 0030100	Driver, 40 mm I.D.	1	
⑪	07746 - 0030300	Attachment, 30 mm I.D.	1	
⑫	07746 - 0030400	Attachment, 35 mm I.D.	1	
⑬	07746 - 0041100	Pilot, 28 mm	1	
⑭	07749 - 0010000	Driver	1	
⑮	07947 - SD90200	Seal Driver Attachment	1	



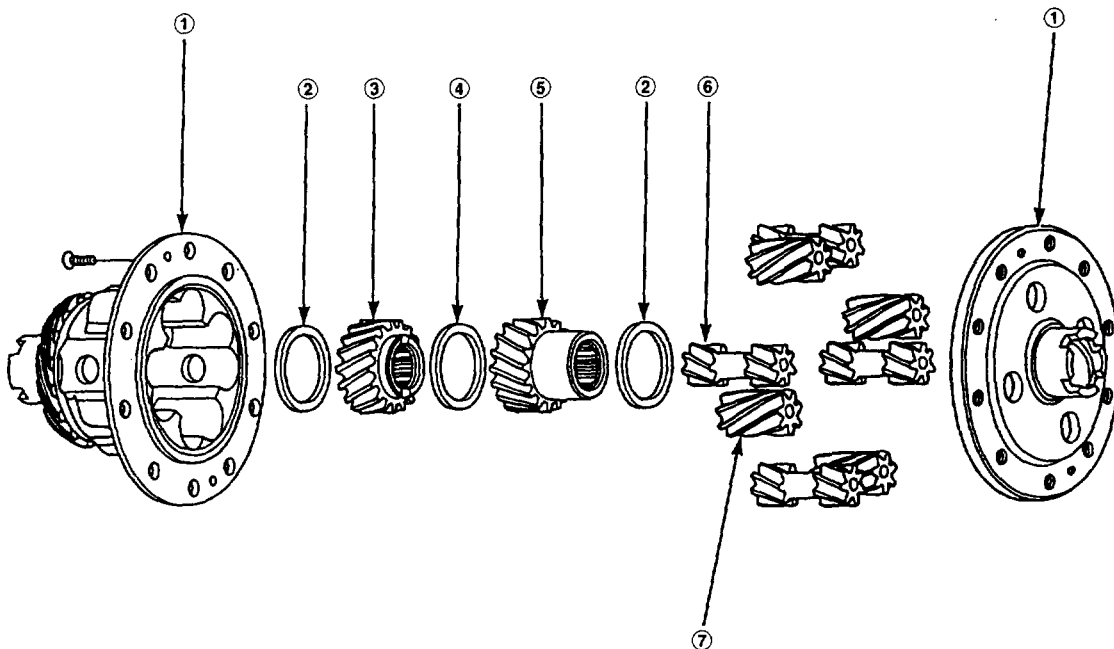
## Limited Slip Differential (LSD)

### 1. Function

Operation of the helical type limited slip differential (LSD) is dependent upon the eight pinion gears that are in mesh with the two side gears. They transfer the driving power to the driving axles as well as permit the outside wheel to turn more times than the inside wheel when the vehicle goes around a turn. All gears are helically cut so that this differential action is limited by the friction created between each gear and differential carrier when either wheel slips.

### 2. Construction

The unit consists of the two side gears, four short pinion gears, four long pinion gears, two thrust washers, a center washer, and a carrier that houses the gears and washers. One short and one long pinion gear are in mesh with each other and are allowed to walk around the side gears.



- ① Differential carrier
- ② Thrust washer
- ③ Left side gear
- ④ Center washer
- ⑤ Right side gear
- ⑥ Pinion gear (long)
- ⑦ Pinion gear (short)

### 3. Operation

#### • Straight-load driving

The differential carrier and gears rotate together as a unit when both wheels rotate at the same speed. Turning effort from the final driven gears are directly transmitted to both wheels.

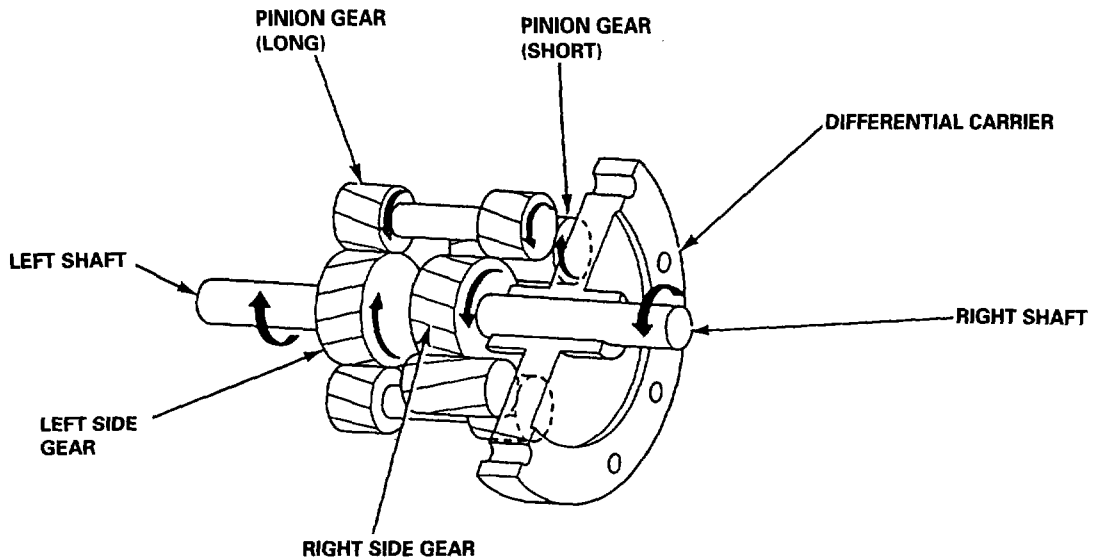
(cont'd)

# Description

## Limited Slip Differential (LSD) (cont'd)

- When rounding a curve

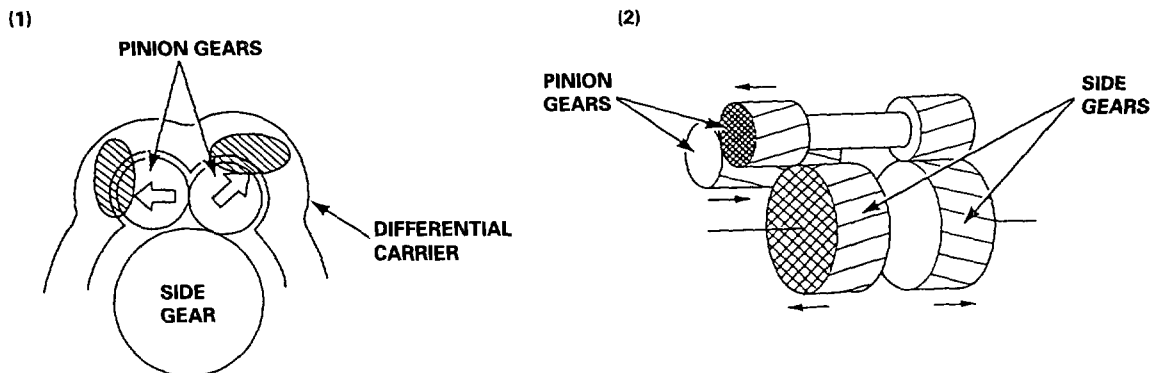
When the vehicle rounds a curve, the differential allows the outer wheel to rotate a little faster than the inner wheel. When this takes place, the short and long pinion gears rotate, and walk around the side gears in the directions shown. If, for example, the right shaft is rotated in a counterclockwise direction with the differential carrier held stationary, the force is transmitted through the right side gear, short pinion gears and long pinion gears to the left side gear, causing the left shaft to rotate in a clockwise direction. This allows the outer wheel to turn more times than the inner wheel when the vehicle goes around a turn.



- When limiting differential action

The limited slip differential (LSD) acts to limit the differential action when either wheel slips on ice or snow or on turn. This is done by using the friction created between each gear and differential case:

- (1) The pinions are forced against the differential carrier by the force as they are rotated and repelled outward in engagement.
- (2) The ends of the pinion gears are held firmly against the differential carrier due to the side thrust from the helically cut gears.



With the pinion gears locked, the torque applied to the slipping wheel is reduced and the torque delivered to the other wheel is increased.

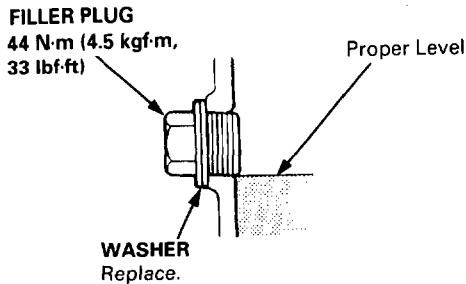




## Transmission Fluid

NOTE: Check the fluid with the engine OFF, and the car on level ground.

1. Remove the filler plug, then check the level and condition of the fluid.



2. The fluid level must be up to the filler hole. If it is below the hole, add fluid until it runs out, then reinstall the filler plug.
3. If the transmission fluid is dirty, remove the drain plug and drain the fluid.
4. Reinstall the drain plug with a new washer, and refill the transmission fluid to the proper level.

NOTE: The drain plug washer should be replaced at every fluid change.

5. Reinstall the filler plug with a new washer.

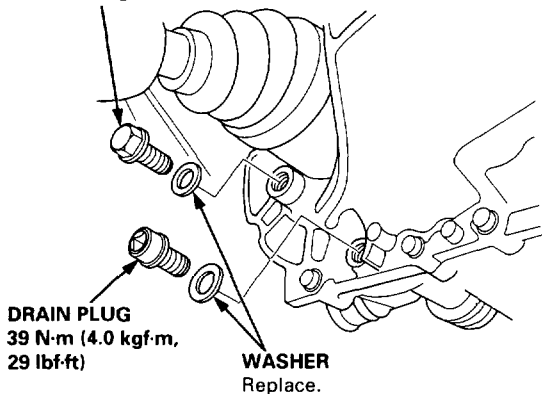
### Fluid Capacity

2.2 l (2.3 US.qt, 1.9 Imp.qt) at oil change.

2.3 l (2.4 US.qt, 2.0 Imp.qt) at overhaul.

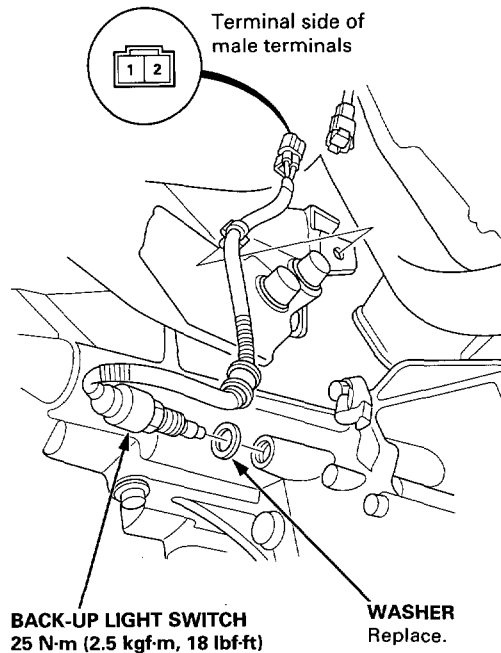
Always use genuine Honda manual transmission fluid (MTF). If it is not available, you may use an API service SG or SH grade motor oil with a viscosity of SAE 10W-30 or 10W-40 as a temporary replacement.

**FILLER PLUG**  
44 N·m (4.5 kgf·m, 33 lbf·ft)



## Test/Replacement

1. Disconnect the connectors from the switch.



2. Check for continuity between the No. 1 and No. 2 terminals.
  - There should be continuity when the shift lever into reverse.
  - There should be no continuity when the shift lever in position except reverse.
3. If necessary, replace the switch.

# Limited Slip Differential (LSD)

## Operational Check

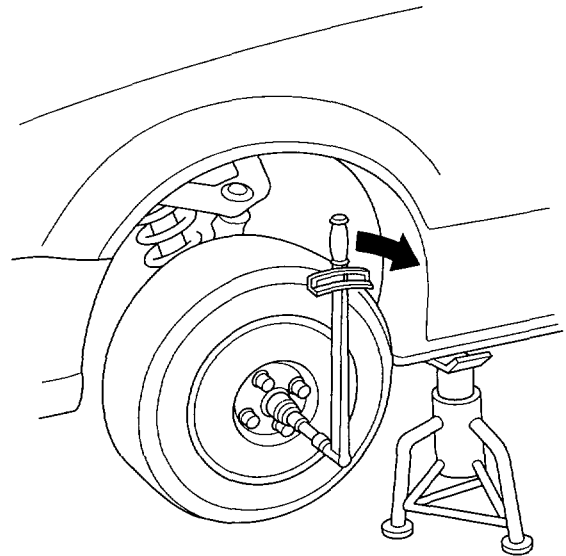
### ⚠ CAUTION

The helical type limited slip differential (LSD) distributes optimum power between the two driving axles according to difference in torque as demanded by the driving wheels. Under no circumstances should the engine be started with either wheel raised off the ground, such as when adjusting wheel balance with a on-the-vehicle wheel balancer or when transporting the vehicle in the event of accident.

1. Set the parking brake and block the rear wheels.
2. Raise the front of the vehicle, and support it with safety stands in the proper locations (see section 1).
3. With the engine off, shift the transmission into 1st gear.
4. Rotate either front wheel by hand and check that the other wheel rotates in the opposite direction.
5. If the opposite front wheel does not rotate, or if you cannot spin the front wheels at all, the limited slip differential is faulty and should be replaced.

## Rotating Torque Check

1. Setting parking brake and block the rear wheels.
2. Raise the front of the vehicle, and support it with safety stands in proper locations (see section 1).
3. With the engine off, shift the transmission into Neutral.
4. Measure the rotating torque with a beam-type torque wrench in the direction shown. Rotate the torque wrench more than two complete turns and take the maximum reading.



5. Shift the transmission into 1st gear and measure the rotating torque again.
6. Calculate the rotating torque:  
Service Limit:  
$$\frac{\text{Measurement from step 5}}{\text{Measurement from step 4}} \geq 2.5$$
7. Repeat step 3 through 6 for the other wheel.
8. Replace the limited slip differential assembly if the rotating torque is lower than the service limit.



## Removal

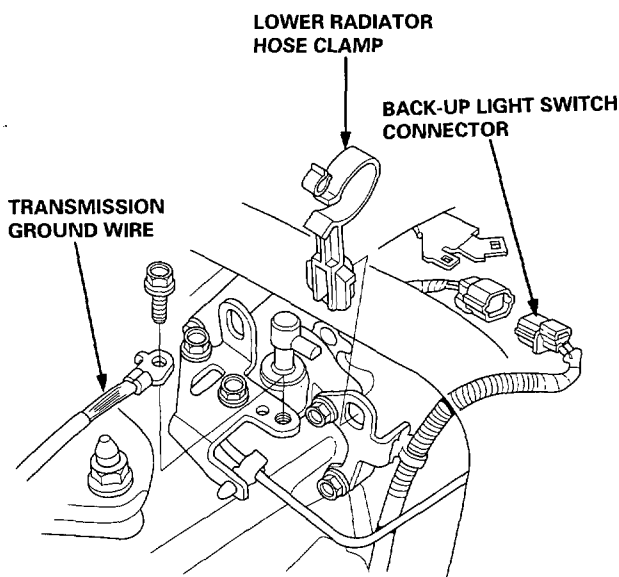
### ⚠ WARNING

- Make sure jacks and safety stands are placed properly (see section 1).
- Apply parking brake and block rear wheels so vehicle will not roll off stands and fall on you while working under it.

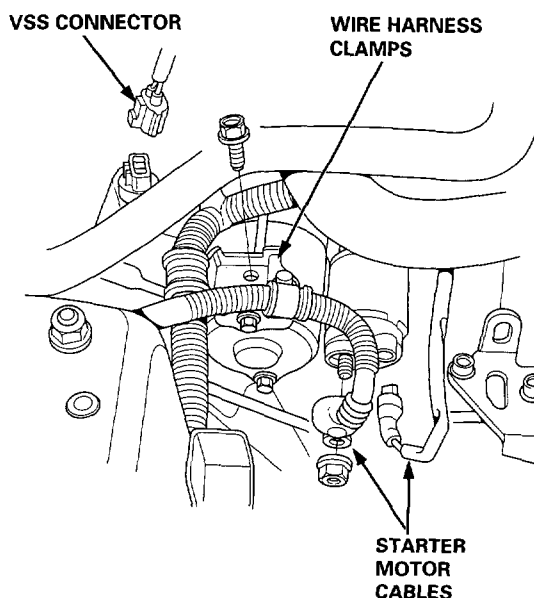
### ⚠ CAUTION

Use fender covers to avoid damaging painted surfaces.

1. Disconnect the negative (-) cable from the battery, then the positive (+) cable.
2. Drain the transmission oil, then reinstall the drain plug with a new washer (see page 13-19).
3. Remove the intake air duct and the air cleaner housing assembly (see section 5).
4. Disconnect the back-up light switch connector and the transmission ground wire.
5. Remove the lower radiator hose clamp from the transmission hanger.

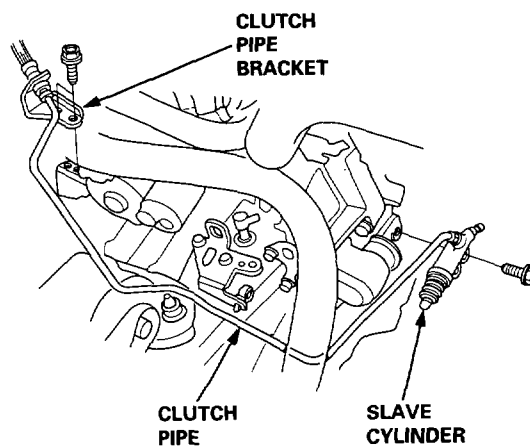


6. Remove the wire harness clamps.
7. Disconnect the starter motor cables and the vehicle speed sensor (VSS) connector.



8. Remove the clutch pipe bracket and the slave cylinder.

NOTE: Do not operate the clutch pedal once the slave cylinder has been removed.

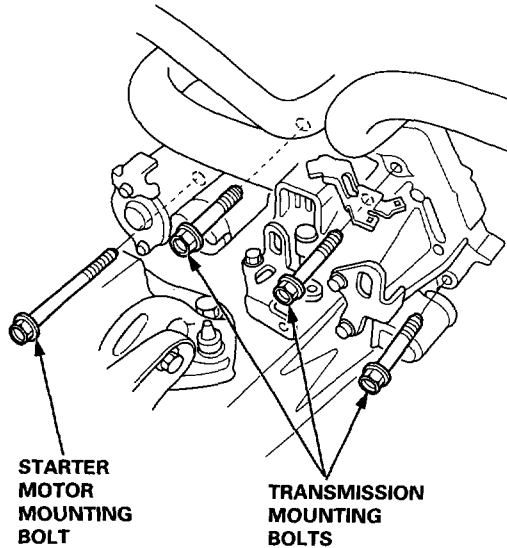


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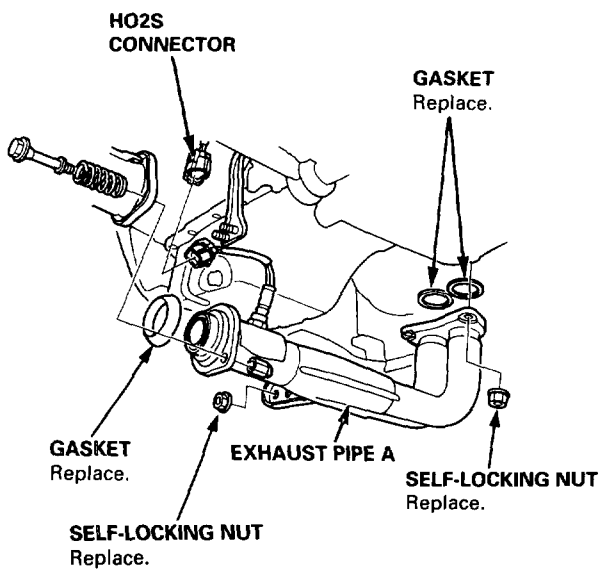
# Transmission Assembly

## Removal (cont'd)

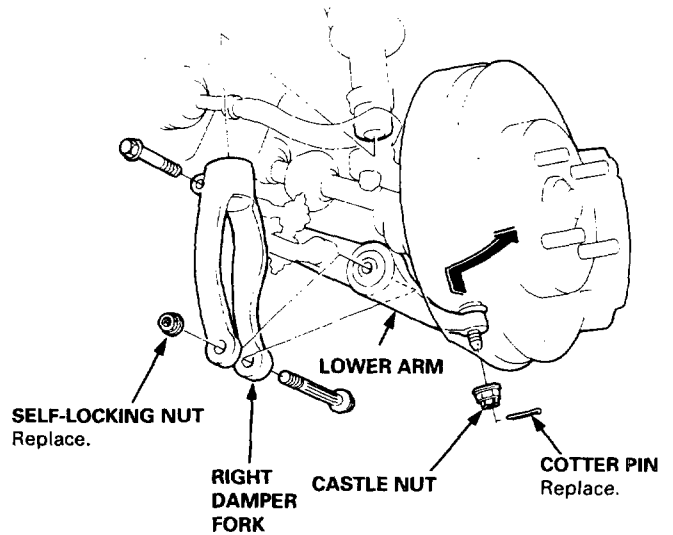
9. Remove the three upper transmission mounting bolts and lower starter motor mounting bolt.



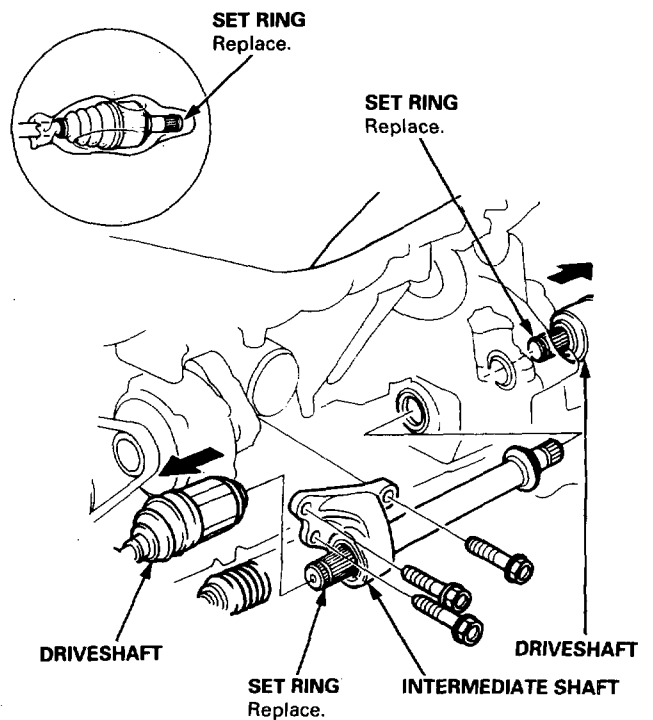
10. Disconnect the heated oxygen sensor (HO2S) connector, then remove exhaust pipe A.



11. Remove the cotter pins and loosen the castle nuts, then separate the ball joints from the lower arm (see section 18).  
12. Remove the right damper fork.

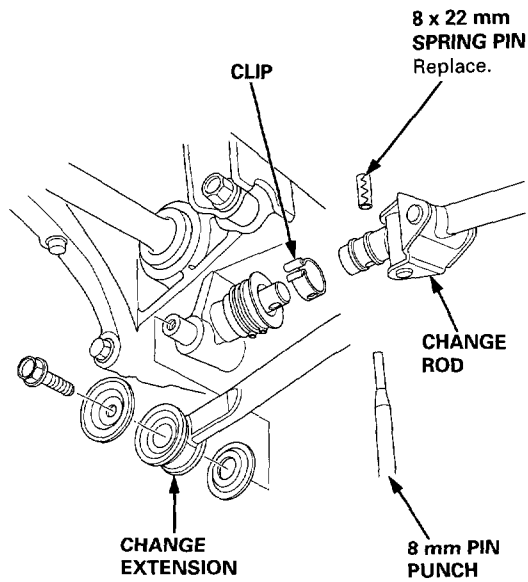


13. Remove the driveshafts and the intermediate shaft (see section 16).  
NOTE: Coat all precision the finished surfaces with clean engine oil or grease. Tie plastic bags over the driveshaft ends.

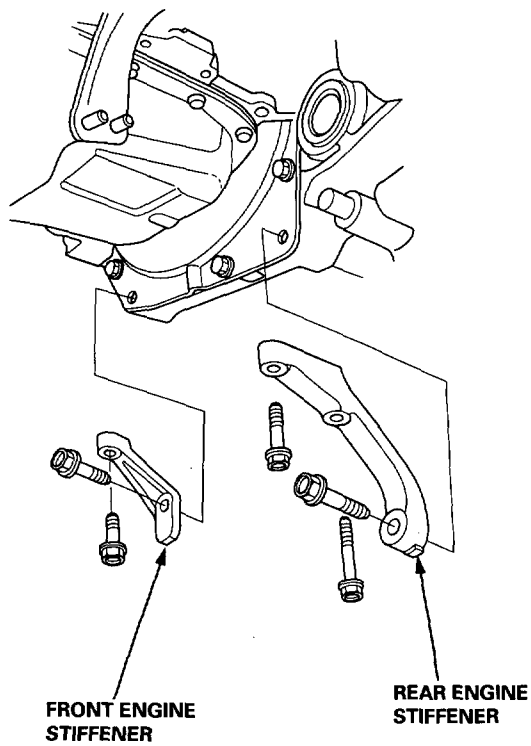




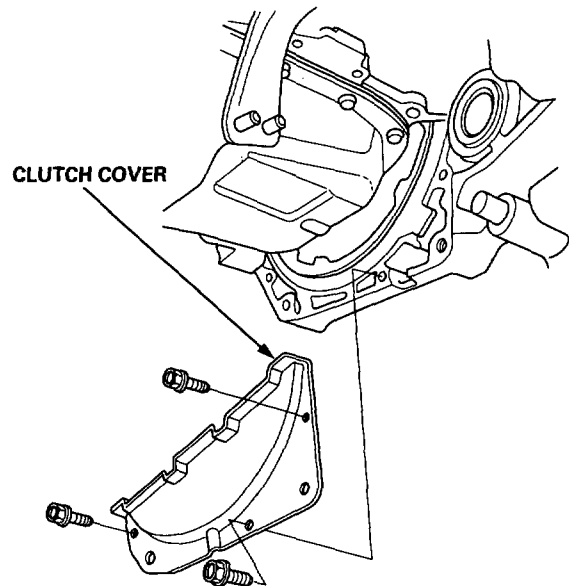
14. Remove the bolt, then disconnect the change extension.
15. Remove the clip and the spring pin, then disconnect the change rod.



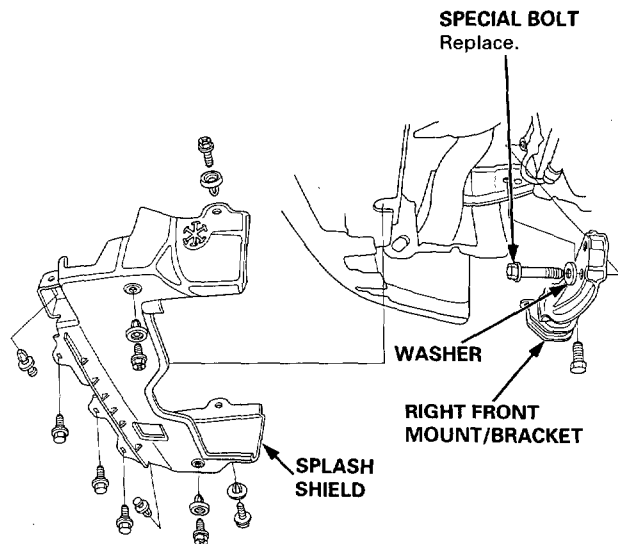
16. Remove the front and the rear engine stiffeners.



17. Remove the clutch cover.



18. Remove the splash shield and right front mount/bracket.

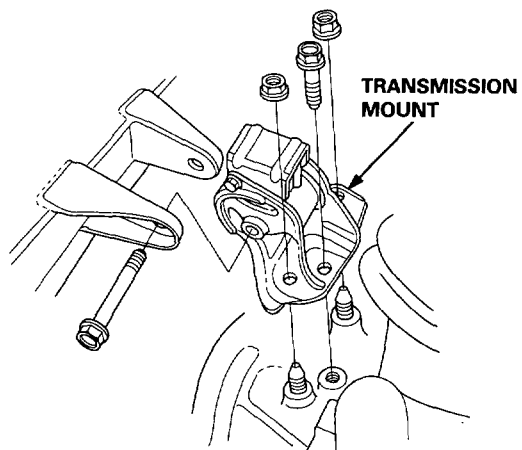


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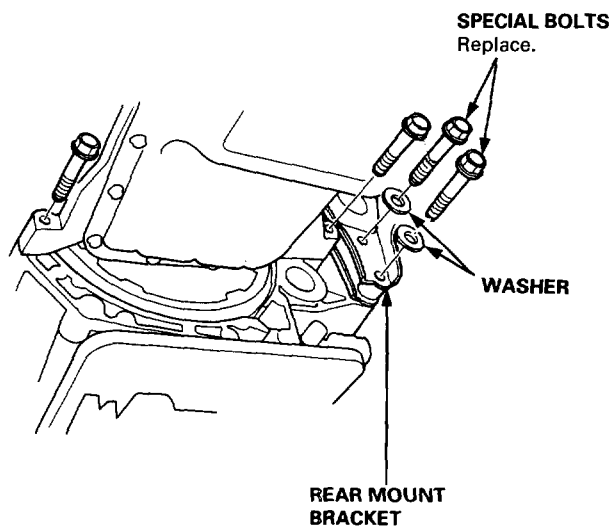
# Transmission Assembly

## Removal (cont'd)

19. Place a transmission jack under the transmission and a jack stand under the engine.
20. Remove the transmission mount.



21. Remove the rear mount bracket bolts (special bolts) and the transmission mounting bolts.



22. Pull the transmission away from the engine until it clears the mainshaft, then lower it on the transmission jack.

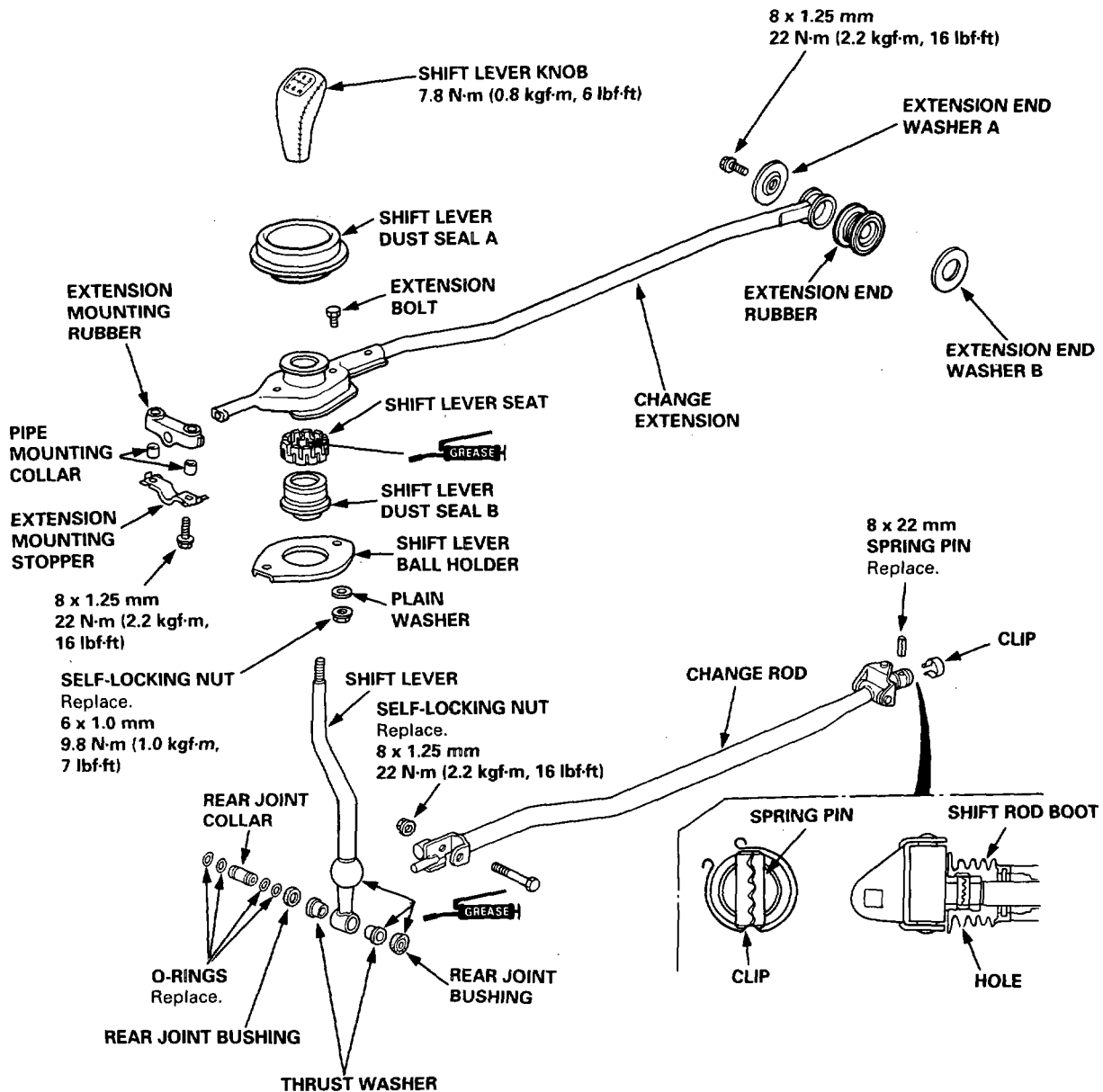
# Gearshift Mechanism



## Overhaul

### NOTE:

- Inspect rubber parts for wear and damage when disassembling; replace any worn or damaged parts.
- Install the spring pin and the clip on the change joint as shown.
- Turn the shift rod boot so the hole is facing down as shown.
- Make sure the shift rod boot is installed on the change rod.



# Transmission Assembly

## Index

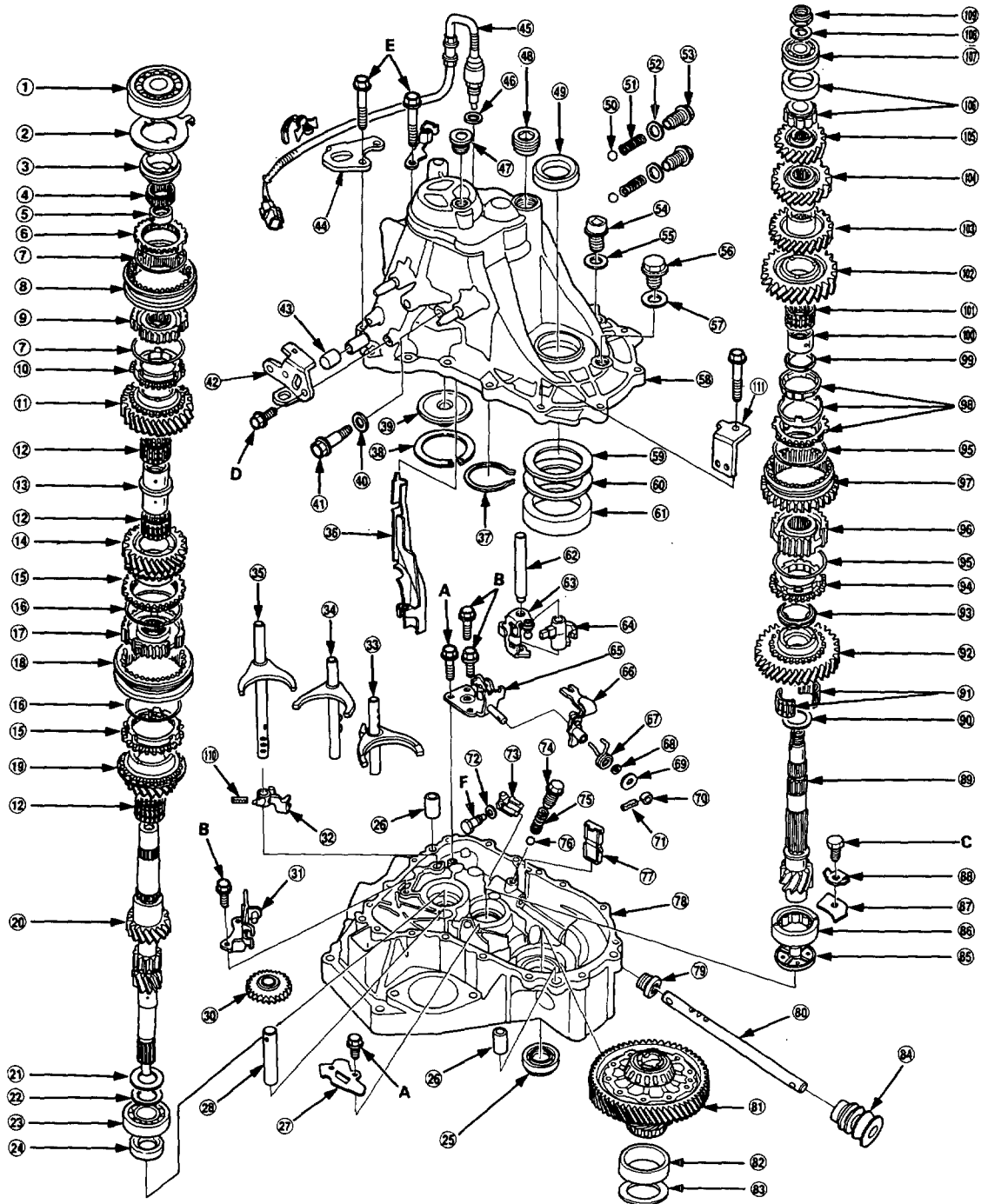
Refer to the drawing below for the transmission disassembly/reassembly.  
Clean all the parts thoroughly in solvent and dry with compressed air.



Lubricate all the parts with oil before reassembly.

### NOTE:

- This transmission uses no gaskets between the major housings; use liquid gasket (P/N 08C70 – X0134SEB/08C70 – X0231SEB or 08C70 – K0234MEB/08C70 – K0334MEB) (see page 13-101).
- Always clean the magnet ⑦ whenever the transmission housing is disassembled.
- Inspect all the bearings for wear and operation.







	Bolt Size	Torque Value
A	6 x 1.0 mm	12 N·m (1.2 kgf·m, 8.7 lbf·ft)
B	6 x 1.0 mm	15 N·m (1.5 kgf·m, 11 lbf·ft)
C	8 x 1.0 mm	15 N·m (1.5 kgf·m, 11 lbf·ft)
D	8 x 1.25 mm	24 N·m (2.4 kgf·m, 17 lbf·ft)
E	8 x 1.25 mm	27 N·m (2.8 kgf·m, 20 lbf·ft)
F	8 x 1.0 mm	30 N·m (3.1 kgf·m, 22 lbf·ft)

- ① BALL BEARING
- ② STOPPER RING
- ③ TAPER RING
- ④ NEEDLE BEARING
- ⑤ SPACER
- ⑥ SYNCHRO RING
- ⑦ SYNCHRO SPRING
- ⑧ 5TH/REVERSE SYNCHRO SLEEVE
- ⑨ 5TH/REVERSE SYNCHRO HUB
- ⑩ SYNCHRO RING
- ⑪ 5TH GEAR
- ⑫ 38 x 43 x 26 mm NEEDLE BEARING
- ⑬ SPACER COLLAR
- ⑭ 4TH GEAR
- ⑮ SYNCHRO RING
- ⑯ SYNCHRO SPRING
- ⑰ 3RD/4TH SYNCHRO HUB
- ⑱ 3RD/4TH SYNCHRO SLEEVE
- ⑲ 3RD GEAR
- ⑳ MAINSHAFT
- ㉑ WASHER
- ㉒ SPRING WASHER
- ㉓ BALL BEARING
- ㉔ 28 x 41 x 7 mm OIL SEAL Replace.
- ㉕ 35 x 56 x 8 mm OIL SEAL Replace.
- ㉖ 14 x 20 mm DOWEL PIN
- ㉗ OIL CHAMBER PLATE
- ㉘ REVERSE IDLER GEAR SHAFT
- ㉙ REVERSE IDLER GEAR
- ㉚ REVERSE CHANGE HOLDER
- ㉛ 5TH/REVERSE SHIFT PIECE
- ㉜ 1ST/2ND SHIFT FORK
- ㉝ 3RD/4TH SHIFT FORK
- ㉞ 5TH/REVERSE SHIFT FORK
- ㉟ OIL GUTTER PLATE
- ㊱ SNAP RING
- ㊲ 72 mm THRUST SHIM
- ㊳ OIL GUIDE PLATE
- ㊴ 10 mm WASHER Replace.
- ㊵ REVERSE IDLER GEAR SHAFT BOLT  
54 N·m (5.5 kgf·m, 40 lbf·ft)
- ㊶ TRANSMISSION HANGER B
- ㊷ BREATHER CAP
- ㊸ TRANSMISSION HANGER A
- ㊹ BACK-UP LIGHT SWITCH  
25 N·m (2.5 kgf·m, 18 lbf·ft)
- ㊺ 14 mm WASHER Replace.
- ㊻ 16 mm SEALING BOLT  
29 N·m (3.0 kgf·m, 22 lbf·ft)
- ㊼ 32 mm SEALING BOLT  
25 N·m (2.5 kgf·m, 18 lbf·ft)
- ㊽ 40 x 62 x 9 mm OIL SEAL Replace.
- ㊾ STEEL BALL D. 5/16 in
- ㊿ SPRING L. 30 mm (1.2 in)
- ① 12 mm WASHER Replace.
- ② SET SCREW  
22 N·m (2.2 kgf·m, 16 lbf·ft)
- ③ OIL DRAIN PLUG  
39 N·m (4.0 kgf·m, 29 lbf·ft)
- ④ WASHER Replace.
- ⑤ OIL FILLER PLUG  
44 N·m (4.5 kgf·m, 33 lbf·ft)

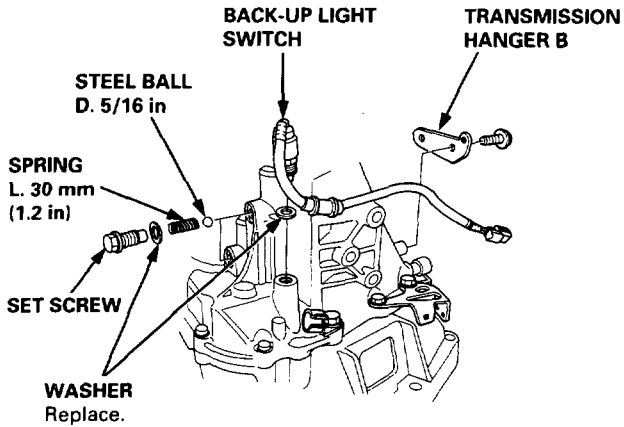
- ⑥ WASHER Replace.
- ⑦ TRANSMISSION HOUSING
- ⑧ 79.5 mm SHIM
- ⑨ THRUST SHIM  
T. 2.0 mm (0.079 in)
- ⑩ BEARING OUTER RACE
- ⑪ SHIFT PIECE SHAFT
- ⑫ INTERLOCK
- ⑬ SHIFT PIECE
- ⑭ SHIFT ARM HOLDER
- ⑮ SELECT ARM
- ⑯ SELECT RETURN SPRING
- ⑰ 10 mm SHIM
- ⑱ 10 mm WASHER
- ⑲ LOCK COLLAR
- ㉑ 3 x 16 mm SPRING PIN Replace.
- ㉒ 8 mm SPRING WASHER
- ㉓ CHANGE PIECE
- ㉔ SET SCREW  
22 N·m (2.2 kgf·m, 16 lbf·ft)
- ㉕ SPRING L. 25.6 mm (1.01 in)
- ㉖ STEEL BALL D. 5/16 in
- ㉗ MAGNET
- ㉘ CLUTCH HOUSING
- ㉙ 14 x 25 x 16 mm OIL SEAL Replace.
- ㉚ SHIFT ROD
- ㉛ DIFFERENTIAL ASSEMBLY
- ㉜ BEARING OUTER RACE
- ㉝ THRUST SHIM  
T. 2.5 mm (0.098 in)
- ㉞ SHIFT ROD BOOT
- ㉟ OIL GUIDE PLATE
- ① 33 x 60 x 20 mm NEEDLE BEARING
- ② BEARING RETAINER PLATE
- ③ LOCK WASHER Replace.
- ④ COUNTERSHAFT
- ⑤ THRUST SHIM
- ⑥ 37 x 42 x 25 mm NEEDLE BEARING
- ⑦ 1ST GEAR
- ⑧ FRICTION DAMPER
- ⑨ SYNCHRO RING
- ⑩ SYNCHRO SPRING
- ⑪ 1ST/2ND SYNCHRO HUB
- ⑫ REVERSE GEAR
- ⑬ DOUBLE CONE SYNCHRO
- ⑭ FRICTION DAMPER
- ⑮ SPACER
- ⑯ 42 x 47 x 24 mm NEEDLE BEARING
- ⑰ 2ND GEAR
- ⑱ 3RD GEAR
- ⑲ 4TH GEAR
- ⑳ 5TH GEAR
- ㉑ NEEDLE BEARING
- ㉒ BALL BEARING
- ㉓ SPRING WASHER
- ㉔ LOCKNUT Replace.  
108 → 0 → 108 N·m  
(11.0 → 0 → 11.0 kgf·m,  
80 → 0 → 80 lbf·ft)
- ㉕ 5 x 22 mm SPRING PIN Replace.
- ㉖ RELEASE PIPE STAY

# Transmission Housing

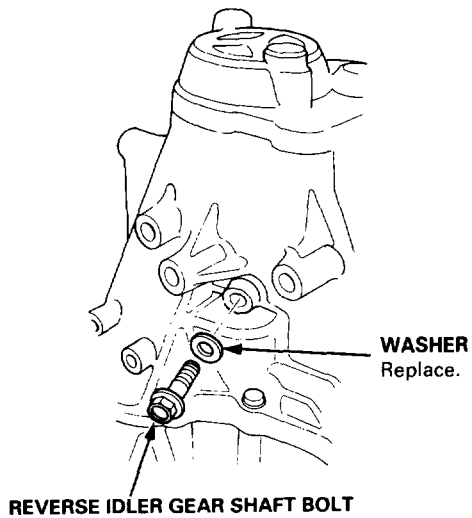
## Removal

NOTE: Place the clutch housing on two pieces of wood thick enough to keep the mainshaft from hitting the workbench.

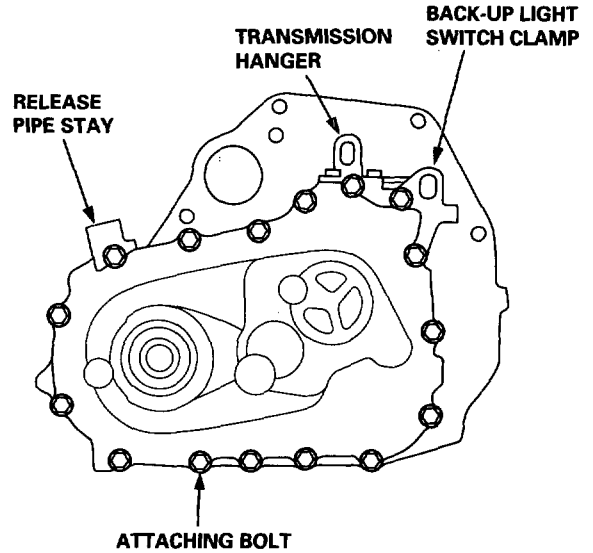
1. Remove the back-up light switch.
2. Remove transmission hanger B.
3. Remove the set screws, the springs, and the steel balls.



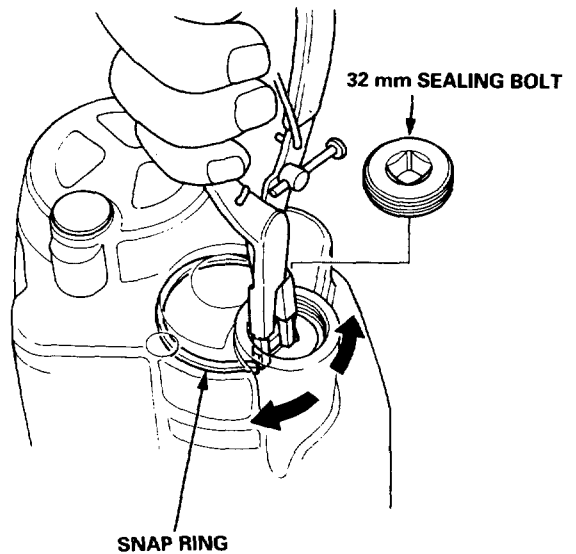
4. Remove the reverse idler gear shaft bolt.



5. Loosen the transmission housing attaching bolts in a crisscross pattern in several steps, then remove them.



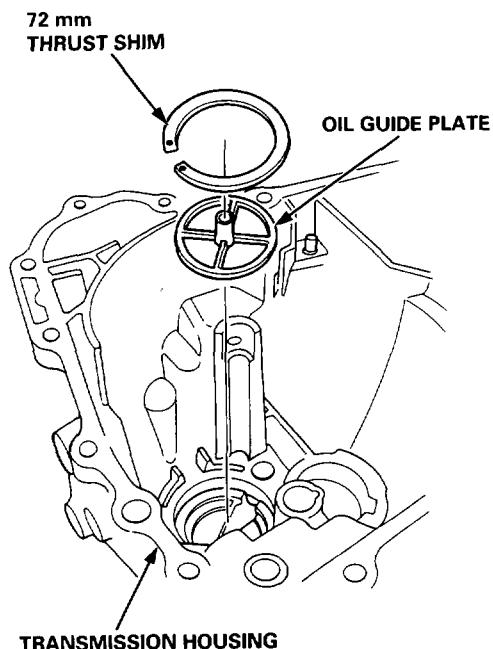
6. Remove the 32 mm sealing bolt.
7. Expand the snap ring on the countershaft ball bearing, and remove it from the groove using a pair of snap ring pliers.



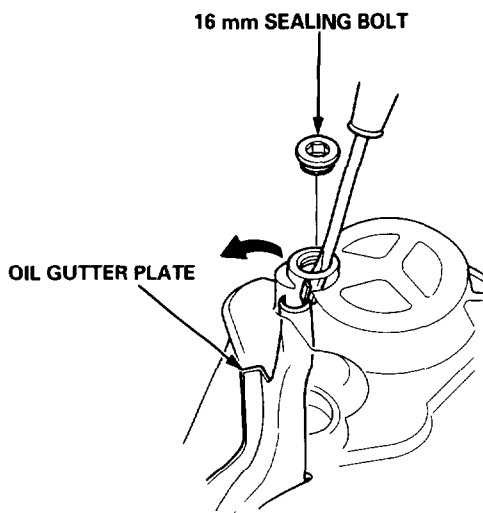


## Clearance Inspection

8. Separate the transmission housing from the clutch housing, and wipe it clean of the sealant.
9. Remove the 72 mm thrust shim and the oil guide plate from the transmission housing.



10. Remove the 16 mm sealing bolt and the oil gutter plate.



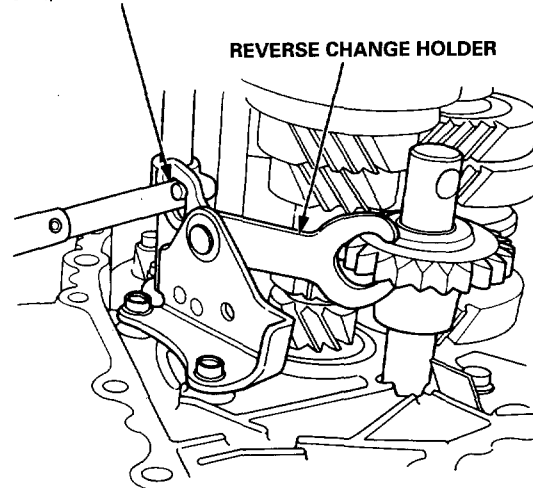
1. Measure the clearance between the reverse change holder and the 5th/reverse shift piece pin.

**Standard:**

**Reverse Side:** 0.05 – 0.45 mm (0.002 – 0.018 in)

**5th Side:** 0.4 – 0.9 mm (0.02 – 0.04 in)

**5TH/REVERSE SHIFT PIECE PIN**



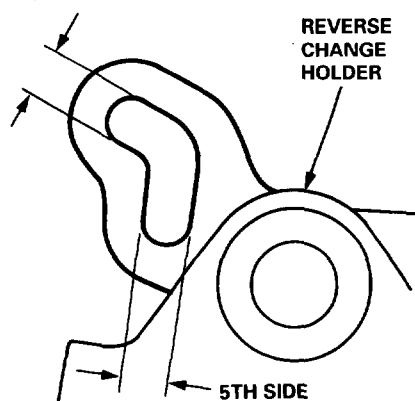
2. If the clearance are not within the standard, measure the width of the grooves in the reverse change holder.

**Standard:**

**Reverse Side:** 7.05 – 7.25 mm (0.278 – 0.285 in)

**5th Side:** 7.4 – 7.7 mm (0.29 – 0.30 in)

**REVERSE SIDE**



- If the width of the grooves are not within the standard, replace the reverse change holder with a new one.
- If the width of the grooves are within the standard, replace the 5th/reverse shift piece with a new one.

(cont'd)

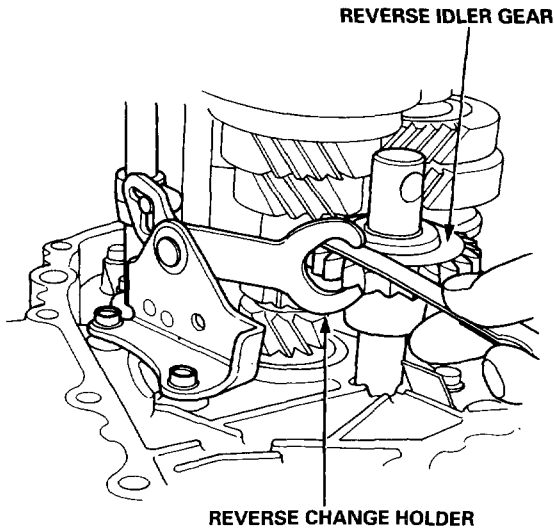
# Reverse Change Holder, Reverse Idler Gear

## Clearance Inspection (cont'd)

3. Measure the clearance between the reverse idler gear and the reverse change holder.

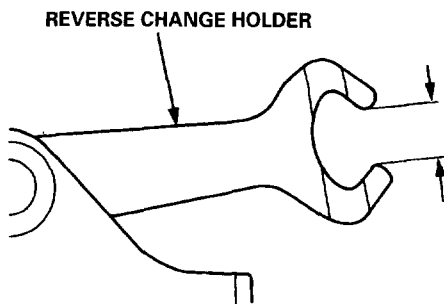
**Standard:** 0.5 – 1.1 mm (0.02 – 0.04 in)

**Service Limit:** 1.8 mm (0.07 in)



4. If the clearance is more than the service limit, measure the width of the reverse change holder.

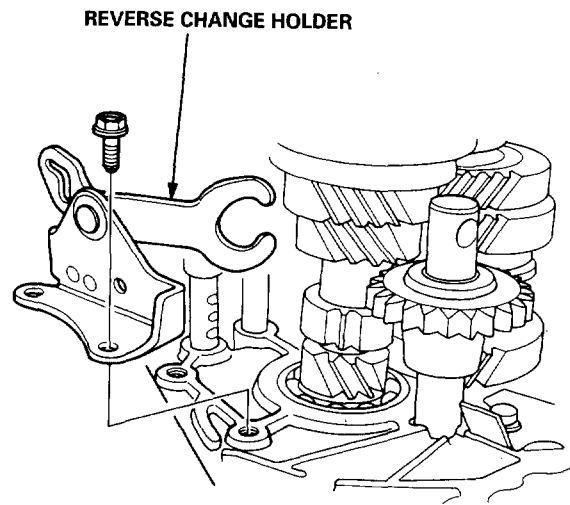
**Standard:** 13.0 – 13.3 mm (0.512 – 0.524 in)



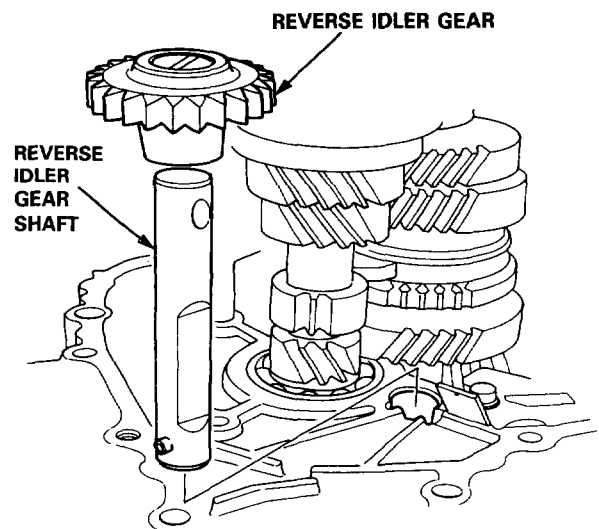
- If the width is not within the standard, replace the reverse change holder with a new one.
- If the width is within the standard, replace the reverse idler gear with a new one.

## Removal

1. Remove the reverse change holder.



2. Remove the reverse idler gear and the reverse idler gear shaft.

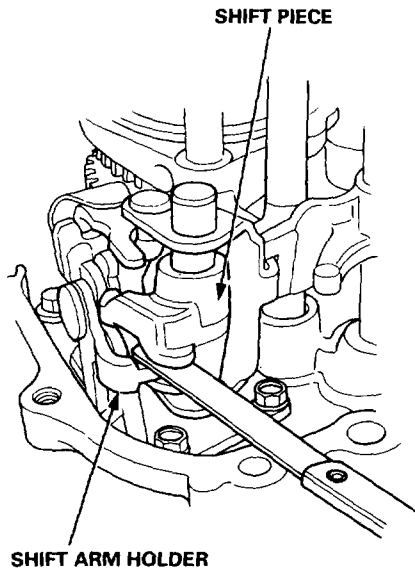




## Clearance Inspection

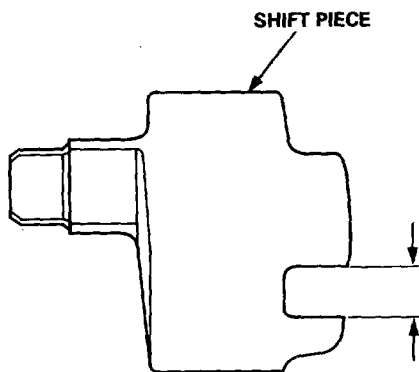
1. Measure the clearance between the shift piece and the shift arm holder.

**Standard:** 0.1 – 0.3 mm (0.004 – 0.012 in)  
**Service Limit:** 0.6 mm (0.02 in)



2. If the clearance is more than the service limit, measure the width of the groove in the shift piece.

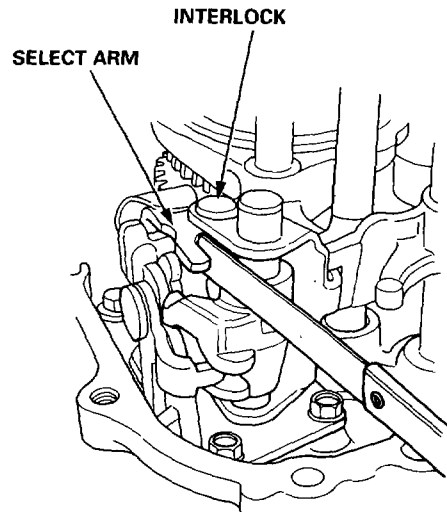
**Standard:** 8.1 – 8.2 mm (0.319 – 0.323 in)



- If the width of the groove is not within the standard, replace the shift piece with a new one.
- If the width of the groove is within the standard, replace the shift arm holder with a new one.

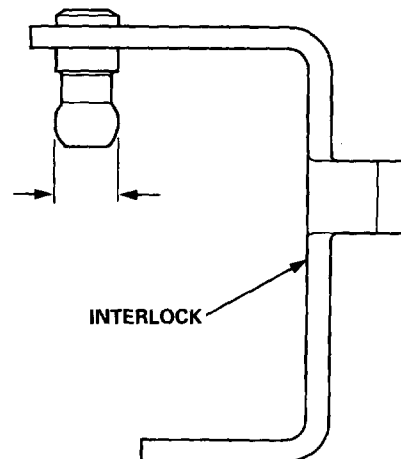
3. Measure the clearance between the select arm and the interlock.

**Standard:** 0.05 – 0.25 (0.002 – 0.001 in)  
**Service Limit:** 0.45 mm (0.018 in)



4. If the clearance is more than the service limit, measure the width of the interlock.

**Standard:** 9.9 – 10.0 mm (0.390 – 0.394 in)



- If the width is not within the standard, replace the interlock with a new one.
- If the width is within the standard, replace the select arm with a new one.

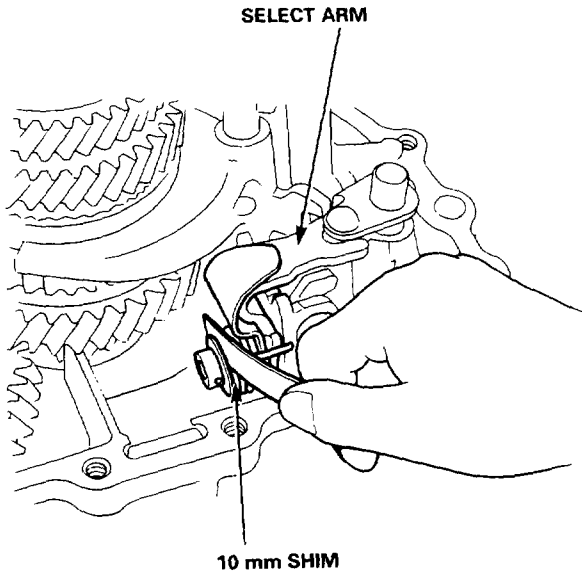
(cont'd)

# Change Holder Assembly

## Clearance Inspection (cont'd)

5. Measure the clearance between the select arm and the 10 mm shim.

**Standard: 0.01 – 0.2 mm (0.0004 – 0.008 in)**



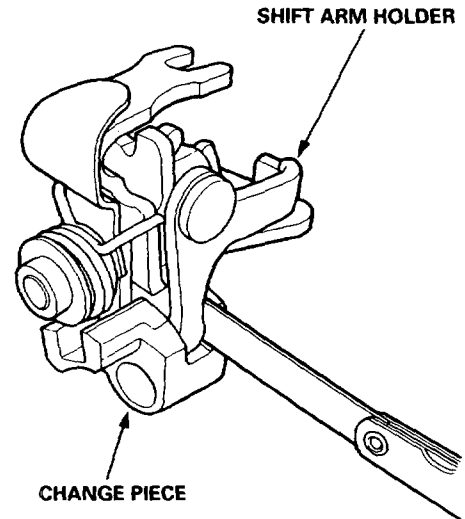
6. If the clearance is not within the standard, select and install the appropriate 10 mm shim for the correct clearance from the chart below.

### 10 mm Shim

	Part Number	Thickness
A	24435 – 689 – 000	0.8 mm (0.031 in)
B	24436 – 689 – 000	1.0 mm (0.039 in)
C	24437 – 689 – 000	1.2 mm (0.047 in)
D	24438 – 689 – 000	1.4 mm (0.055 in)
E	24439 – 689 – 000	1.6 mm (0.063 in)

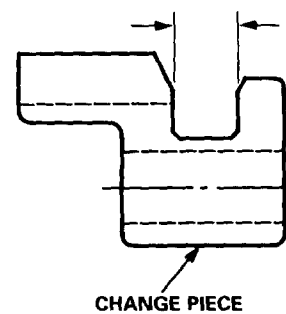
7. Measure the clearance between the shift arm holder and the change piece.

**Standard: 0.05 – 0.35 (0.002 – 0.014 in)**  
**Service Limit: 0.8 mm (0.03 in)**

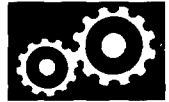


8. If the clearance is more than the service limit, measure the groove of the change piece.

**Standard: 12.05 – 12.15 mm (0.4744 – 0.4783 in)**



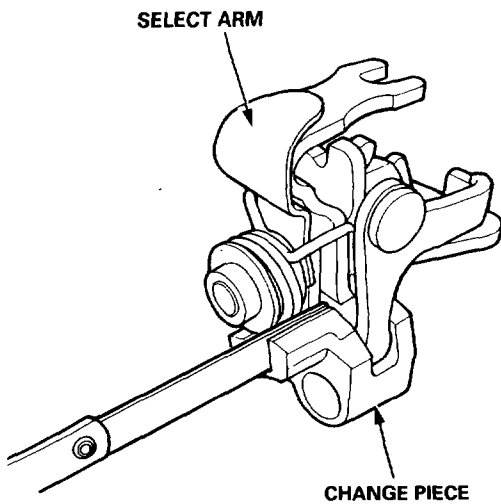
- If the groove is not within the standard, replace the change piece with a new one.
- If the groove is within the standard, replace the shift arm holder with a new one.



## Removal

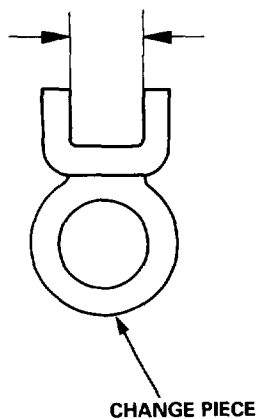
9. Measure the clearance between the select arm and the change piece.

**Standard:** 0.05 – 0.35 mm (0.002 – 0.014 in)  
**Service Limit:** 0.5 mm (0.02 in)



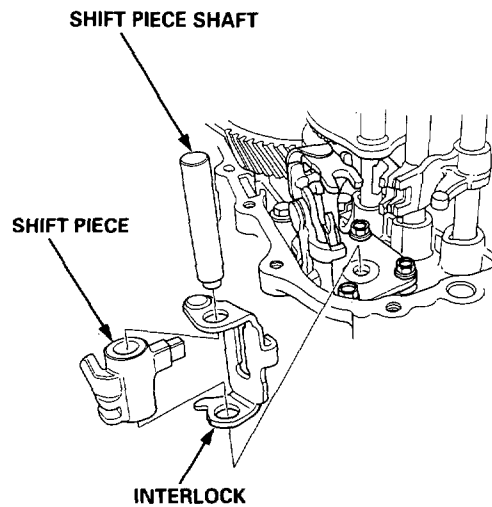
10. If the clearance is more than the service limit, measure the width of the change piece.

**Standard:** 12.05 – 12.15 mm (0.4744 – 0.4783 in)

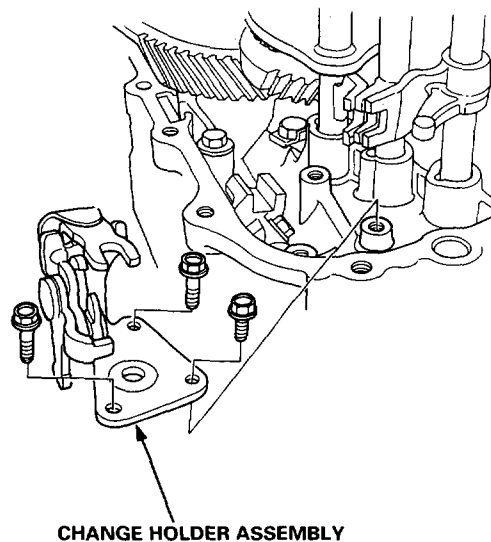


- If the width is not within the standard, replace the change piece with a new one.
- If the width is within the standard, replace the select arm with a new one.

1. Remove the shift piece shaft, then remove the shift piece and the interlock.




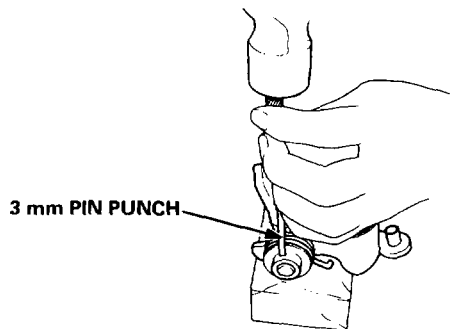
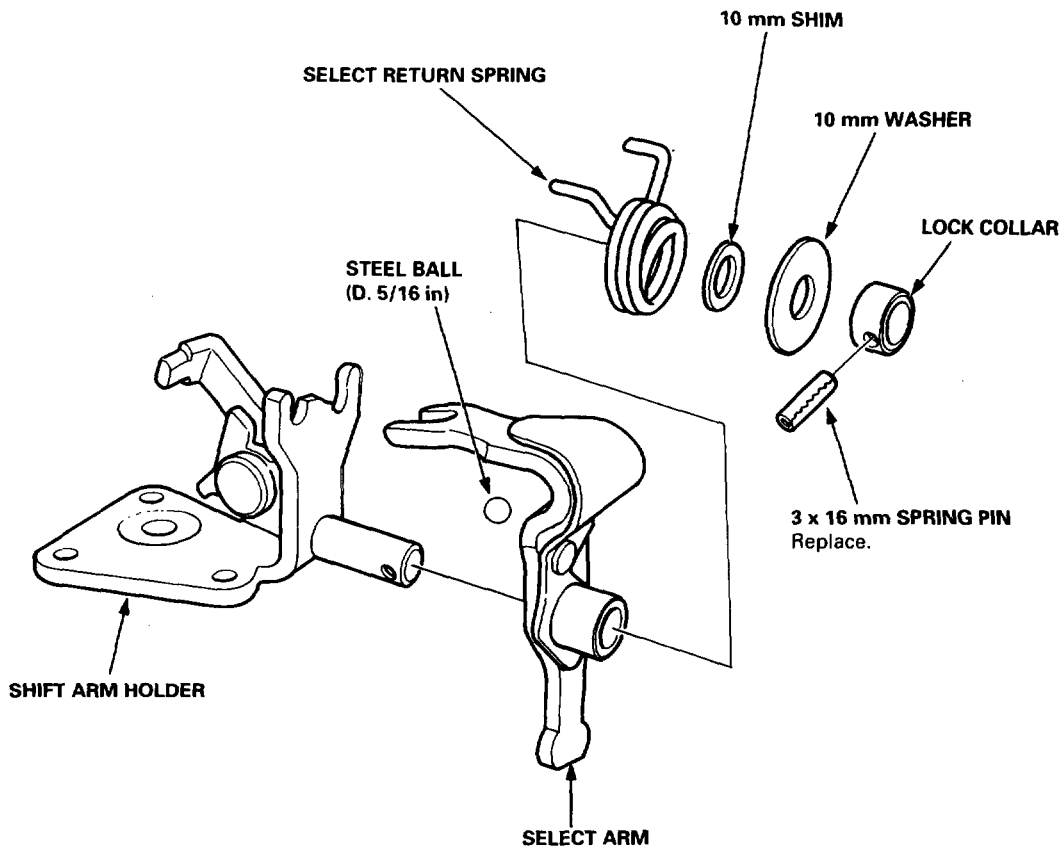
2. Remove the change holder assembly.



# Change Holder Assembly

## Disassembly/Reassembly

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





# Mainshaft, Countershaft, Shift Fork

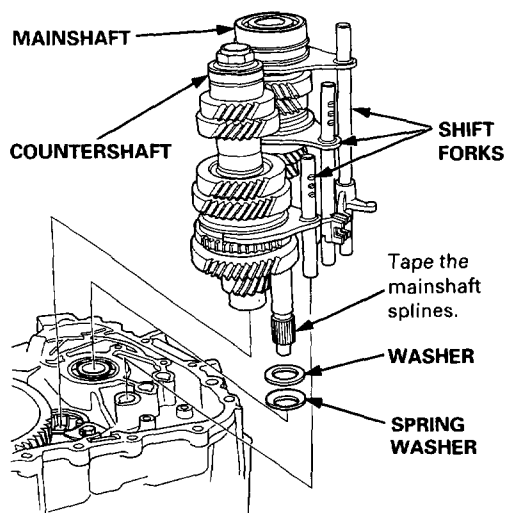


## Removal

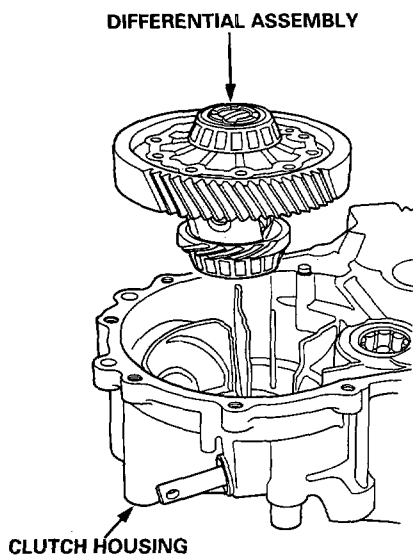
1. Remove the mainshaft and the countershaft assemblies with the shift forks from the clutch housing.

NOTE: Tape the mainshaft spline before removing the mainshaft and the countershaft assemblies.

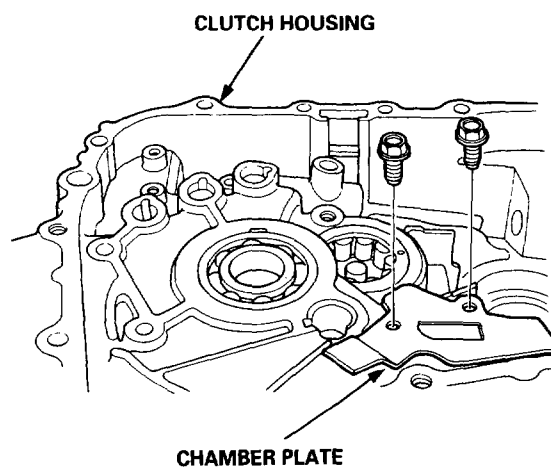
2. Remove the spring washer and the washer.



3. Remove the differential assembly from the clutch housing.



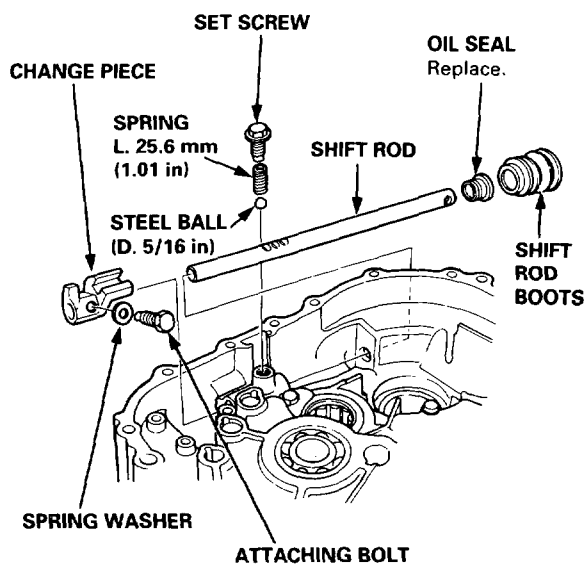
4. Remove the chamber plate.



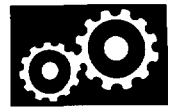
# Shift Rod

## Removal

1. Remove the shift rod boots.
2. Remove the change piece attaching bolt and the spring washer.
3. Remove the set screw, then remove the spring and the steel ball.
4. Remove the shift rod, then remove the change piece.
5. Remove the oil seal.

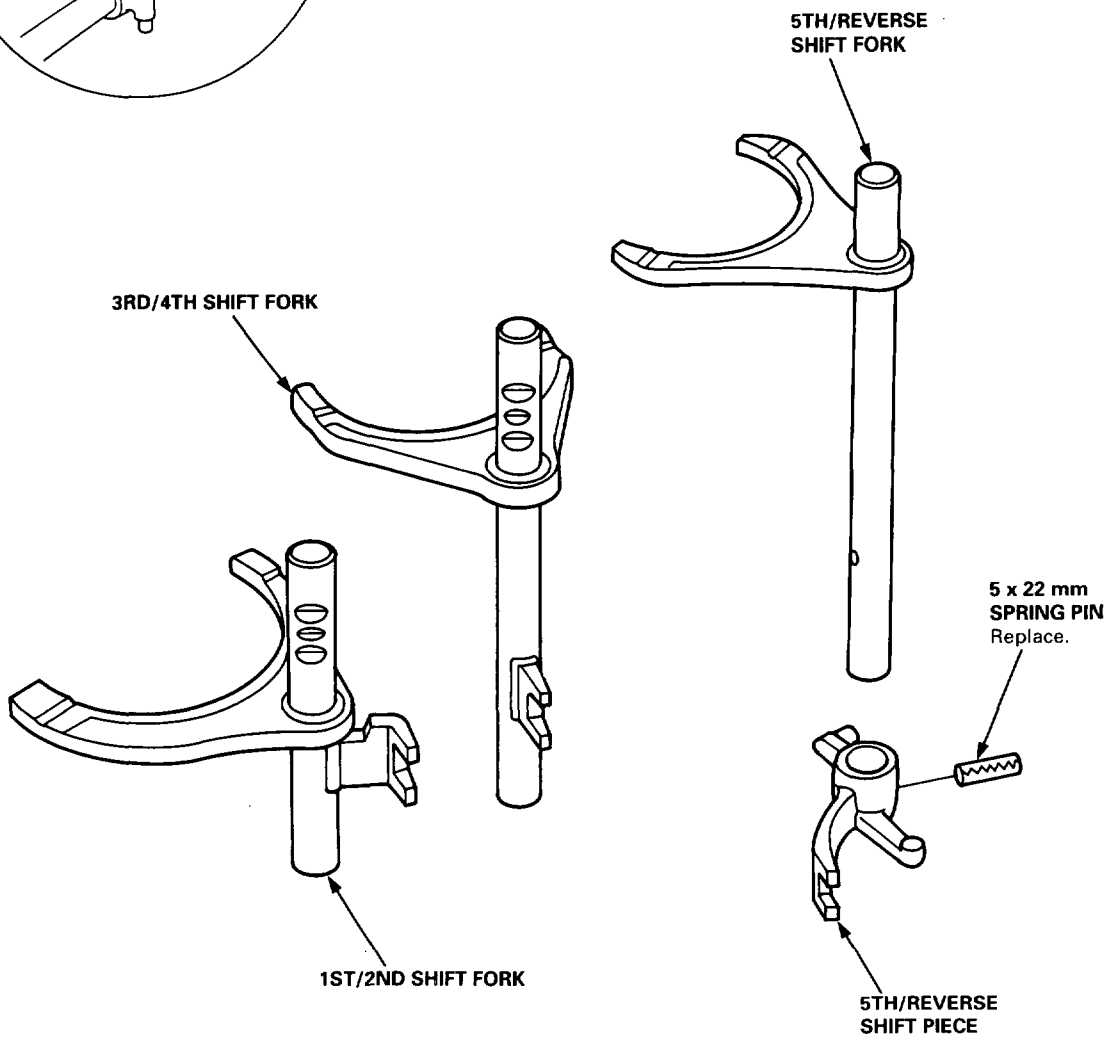
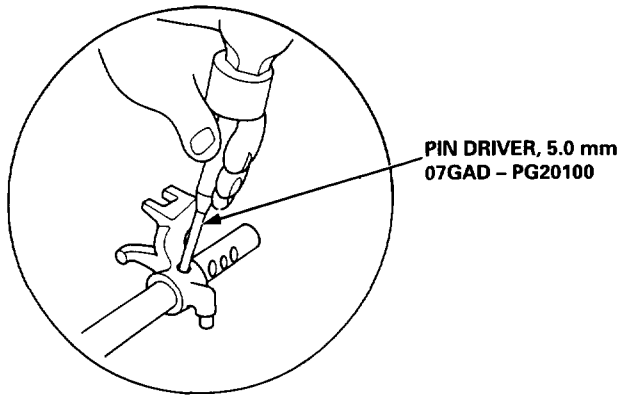


# Shift Fork Assembly



## Index

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



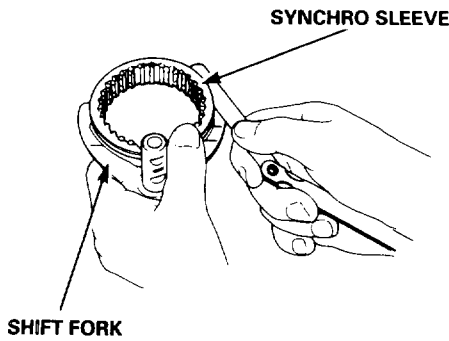
# Shift Fork Assembly

## Clearance Inspection

NOTE: The synchro sleeve and the synchro hub should be replaced as a set.

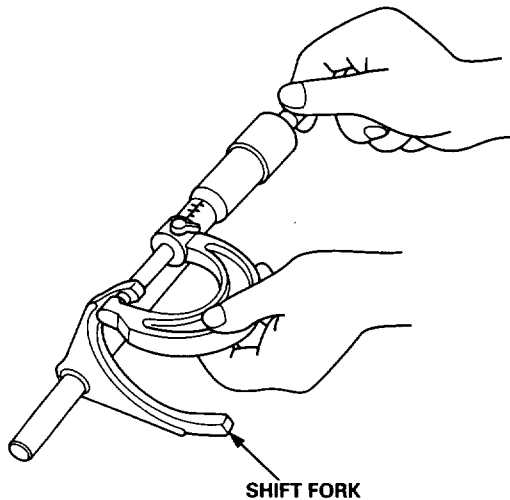
1. Measure the clearance between each shift fork and its matching synchro sleeve.

**Standard:** 0.35 – 0.65 mm (0.014 – 0.026 in)  
**Service Limit:** 1.0 mm (0.04 in)



2. If the clearance is more than the service limit, measure the thickness of the shift fork fingers.

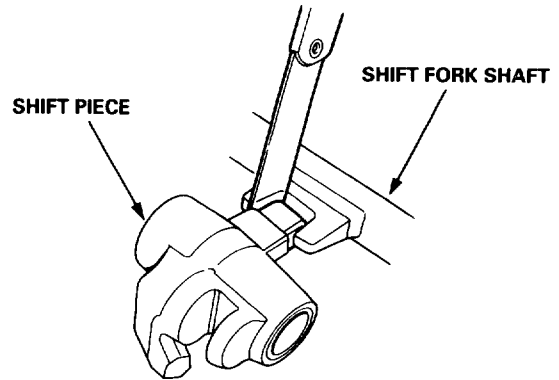
**Standard:** 7.4 – 7.6 mm (0.291 – 0.299 in)



- If the thickness of the shift fork fingers is not within the standard, replace the shift fork with a new one.
- If the thickness of the shift fork fingers is within the standard, replace the synchro sleeve with a new one.

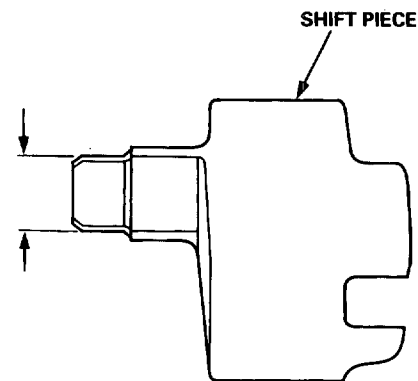
3. Measure the clearance between the shift piece and the shift fork shafts.

**Standard:** 0.2 – 0.5 mm (0.008 – 0.02 in)  
**Service Limit:** 0.8 mm (0.03 in)



4. If the clearance is more than the service limit, measure the width of the shift piece.

**Standard:** 11.9 – 12.0 mm (0.469 – 0.472 in)




- If the width of the shift piece is not within the standard, replace the shift piece with a new one.
- If the width of the shift piece is within the standard, replace the shift fork with a new one.

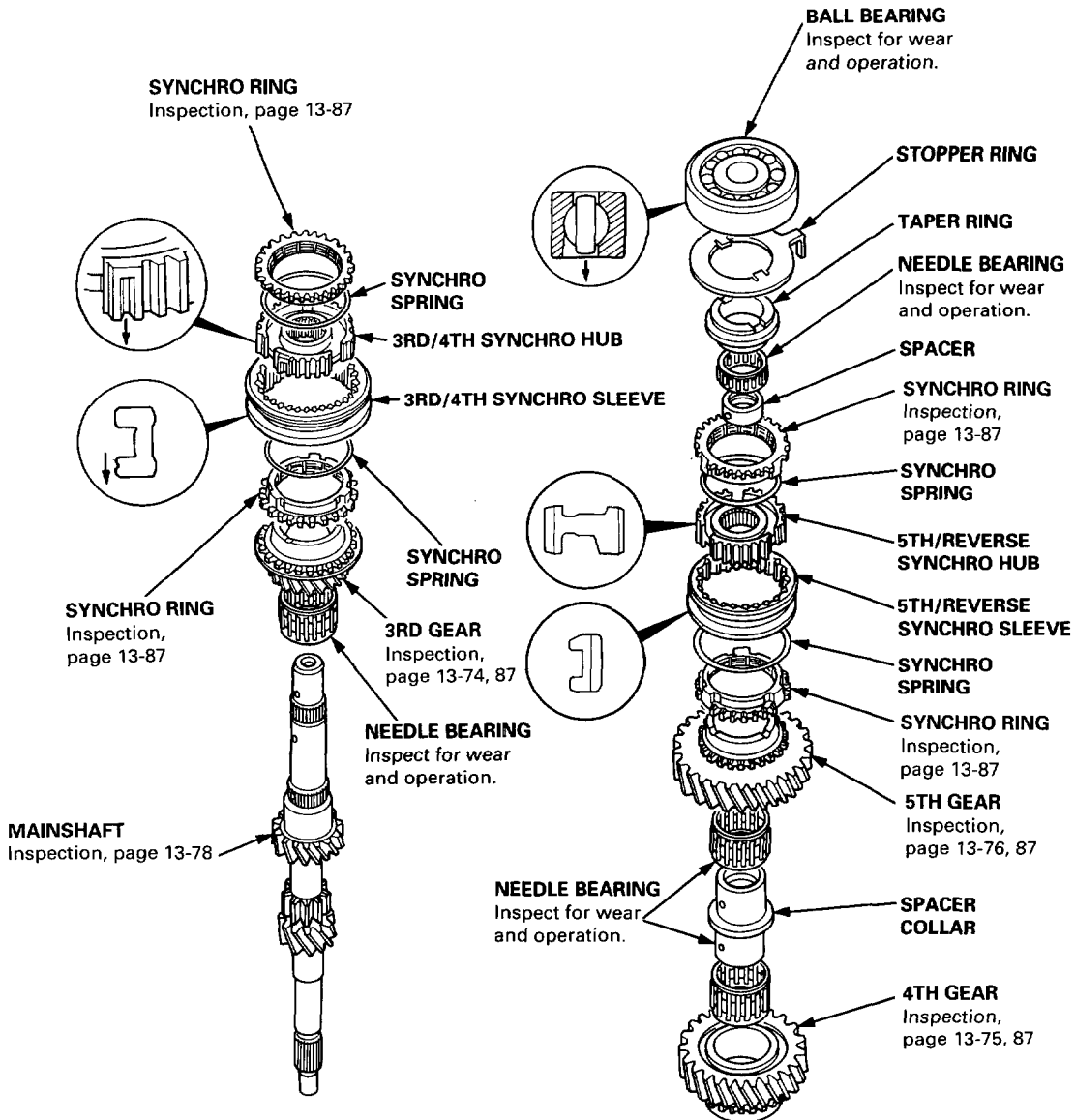
# Mainshaft Assembly



## Index

NOTE: The 3rd/4th and the 5th synchro hubs are installed with a press.

 Prior to reassembling, clean all the parts in solvent, dry them, and apply lubricant to any contact surfaces. The 3rd/4th and the 5th synchro hubs, however, should be installed with a press before lubricating them.



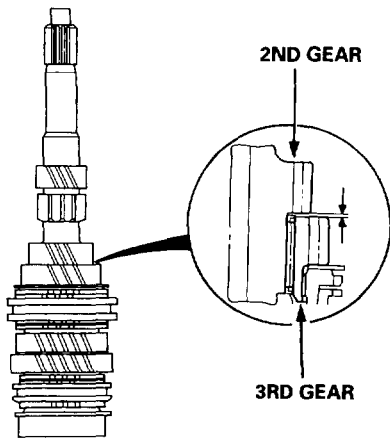
# Mainshaft Assembly

## Clearance Inspection

NOTE: If replacement is required, always replace the synchro sleeve and the synchro hub as a set.

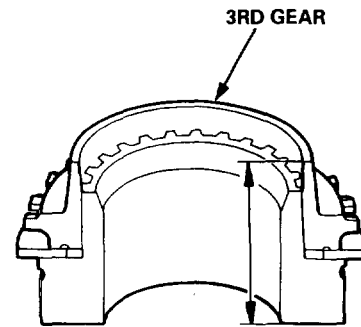
1. Measure the clearance between 2nd and 3rd gears.

**Standard:** 0.06 – 0.21 mm (0.002 – 0.008 in)  
**Service Limit:** 0.3 mm (0.01 in)



2. If the clearance is more than the service limit, measure the thickness of 3rd gear.

**Standard:** 34.92 – 34.97 mm (1.375 – 1.377 in)  
**Service Limit:** 34.3 mm (1.350 in)

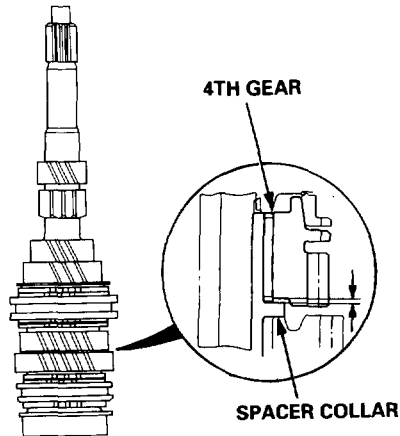


- If the thickness of 3rd gear is less than the service limit, replace 3rd gear with a new one.
- If the thickness of 3rd gear is within the service limit, replace the 3rd/4th synchro hub with a new one.



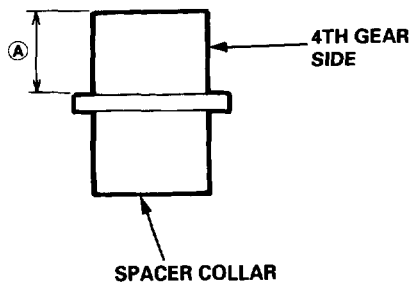
3. Measure the clearance between 4th gear and the spacer collar.

**Standard:** 0.06 – 0.21 mm (0.002 – 0.008 in)  
**Service Limit:** 0.3 mm (0.01 in)



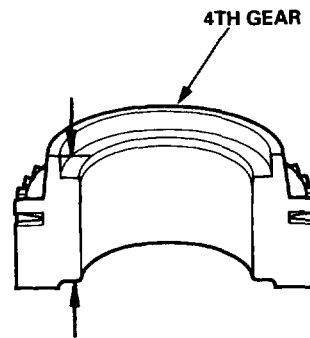
4. If the clearance is more than the service limit, measure distance (A) on the spacer collar.

**Standard:** 26.03 – 26.08 mm (1.025 – 1.027 in)



5. If distance (A) is not within the standard, replace the spacer collar with a new one. If distance (A) is within the standard, measure the thickness of 4th gear.

**Standard:** 31.42 – 31.47 mm (1.237 – 1.239 in)  
**Service Limit:** 31.3 mm (1.232 in)



- If the thickness of 4th gear is less than the service limit, replace 4th gear with a new one.
- If the thickness of 4th gear is within the service limit, replace the 3rd/4th synchro hub with a new one.

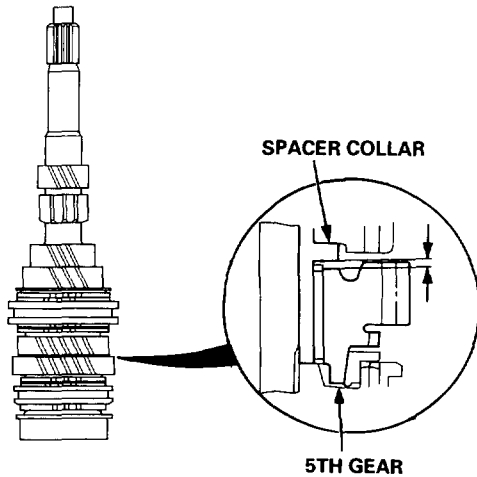
(cont'd)

# Mainshaft Assembly

## Clearance Inspection (cont'd)

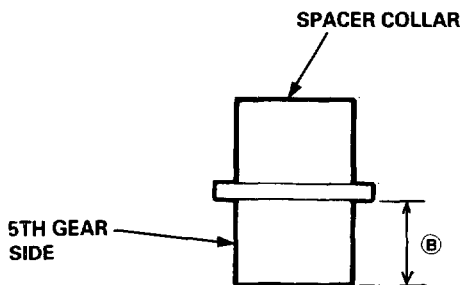
6. Measure the clearance between 5th gear and the spacer collar.

**Standard:** 0.06 – 0.21 mm (0.002 – 0.008 in)  
**Service limit:** 0.3 mm (0.012 in)



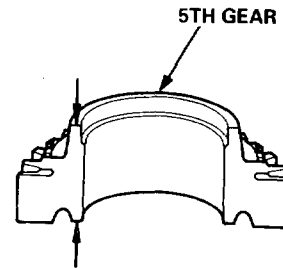
7. If the clearance is more than the service limit, measure distance ⑥ on the spacer collar.

**Standard:** 26.03 – 26.08 mm (1.025 – 1.027 in)



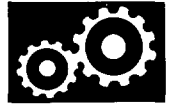
8. If distance ⑥ is not within the standard, replace the spacer collar with a new one.  
If distance ⑥ is within the standard, measure the thickness of 5th gear.

**Standard:** 31.42 – 31.47 mm (1.237 – 1.239 in)  
**Service Limit:** 31.3 mm (1.232 in)



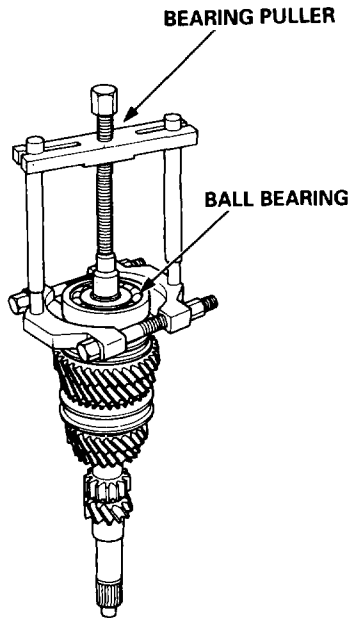
- If the thickness of 5th gear is less than the service limit, replace 5th gear with a new one.
- If the thickness of 5th gear is within the service limit, replace the 5th synchro hub with a new one.





## Disassembly

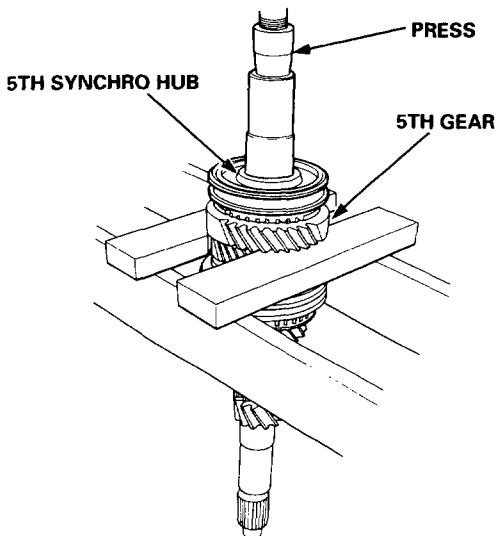
1. Remove the ball bearing using a bearing puller as shown.



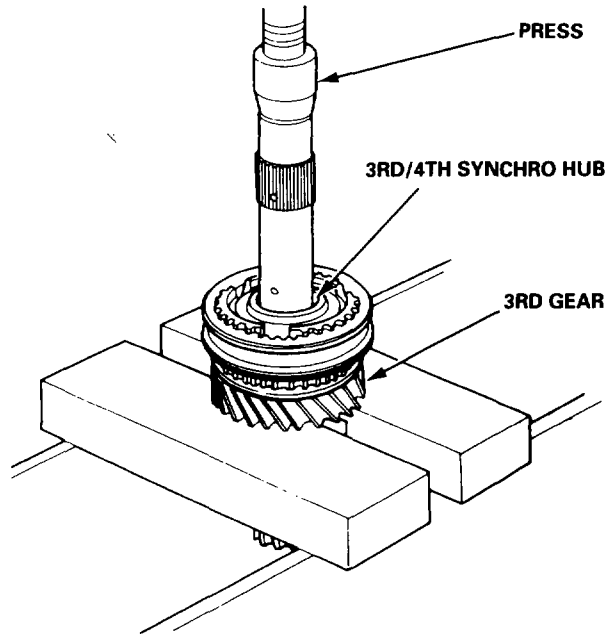
### **CAUTION**

Remove the synchro hubs using a press and the steel blocks as shown. Use of a jaw-type puller can cause damage to the gear teeth.

2. Support 5th gear on steel blocks, and press the mainshaft out of the 5th synchro hub, as shown.



3. Support 3rd gear on steel blocks, and press the mainshaft out of the 3rd/4th synchro hub, as shown.



# Mainshaft Assembly

## Inspection

1. Inspect the gear surfaces and the bearing surfaces for wear and damage, then measure the mainshaft at points A, B, and C.

**Standard:**

**A:** 27.977 – 27.990 mm (1.1015 – 1.1020 in)

**B:** 37.984 – 38.000 mm (1.4954 – 1.4960 in)

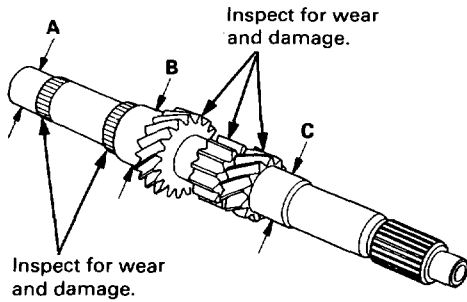
**C:** 27.987 – 28.000 mm (1.1018 – 1.1024 in)

**Service Limit:**

**A:** 27.930 mm (1.0996 in)

**B:** 37.930 mm (1.4933 in)

**C:** 27.940 mm (1.1000 in)



Inspect for wear and damage.

Inspect for wear and damage.

Inspect oil passages for clogging.

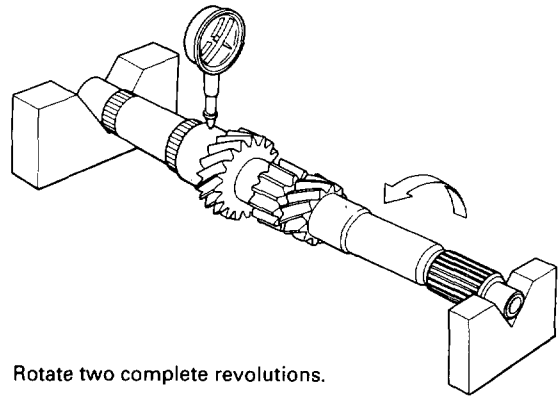
- If any parts of the mainshaft are less than the service limit, replace mainshaft with a new one.

2. Inspect for runout.

**Standard:** 0.02 mm (0.0008 in) max.

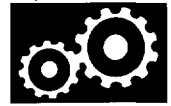
**Service Limit:** 0.05 mm (0.002 in)

NOTE: Support the mainshaft at both ends as shown.



Rotate two complete revolutions.

- If the runout is more than the service limit, replace the mainshaft with a new one.



## Reassembly

### CAUTION

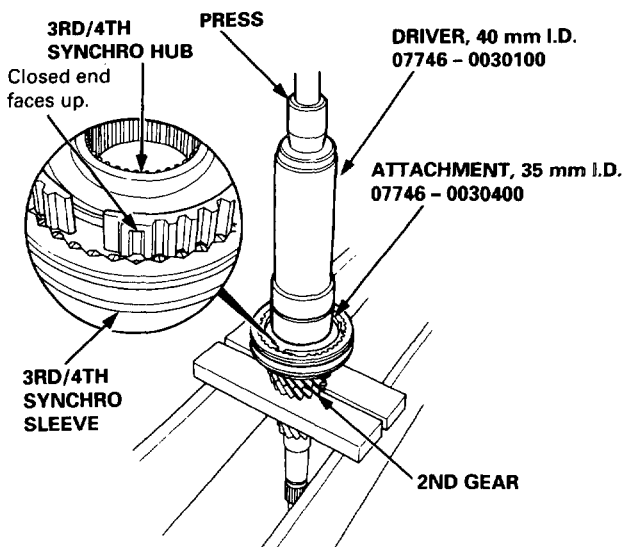
- Press the 3rd/4th and the 5th synchro hubs on the mainshaft without lubrication.
- When installing the 3rd/4th and the 5th synchro hubs, support the mainshaft on steel blocks, and install the synchro hubs using a press.
- Install the 3rd/4th and the 5th synchro hubs with a maximum pressure of 19.6 kN (2,000 kg, 14,466 lb).

NOTE: Refer to page 13-73 for reassembly sequence.

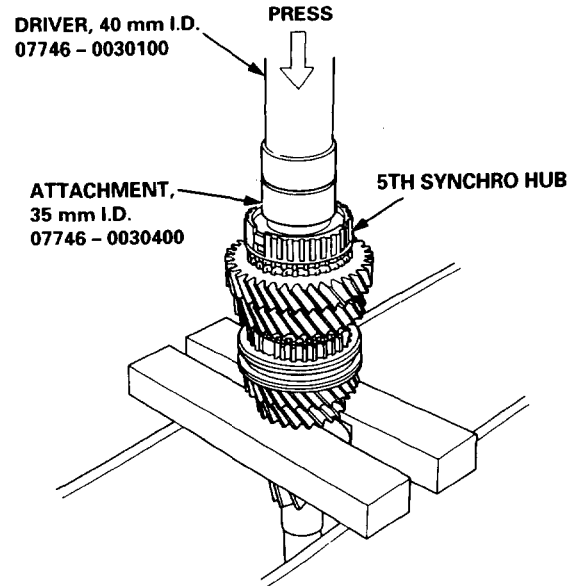
1. Support 2nd gear on steel blocks, then install the 3rd/4th synchro hub using the special tools and a press, as shown.

NOTE:

- After installing, check the operation of the 3rd/4th synchro sleeve and hub.
- Assemble the 3rd/4th synchro hub and sleeve together before installing them on the mainshaft.

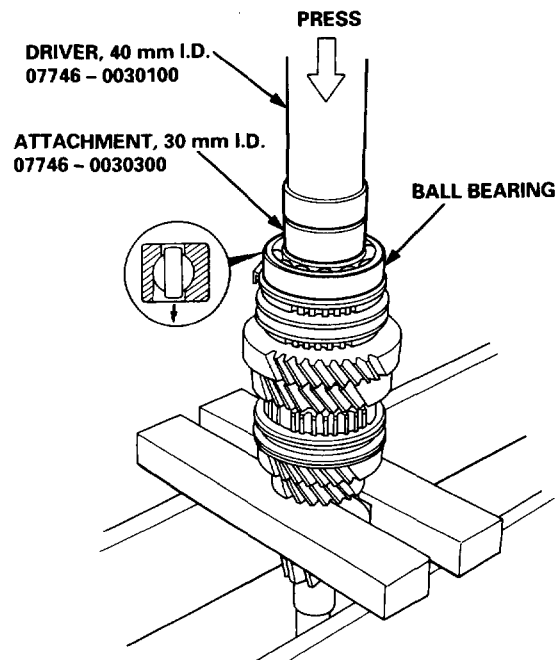


2. Install the 5th synchro hub using the special tools and a press as shown.



3. Install the ball bearing using the special tools and a press as shown.


NOTE: Install the ball bearing with the tapered end facing down.

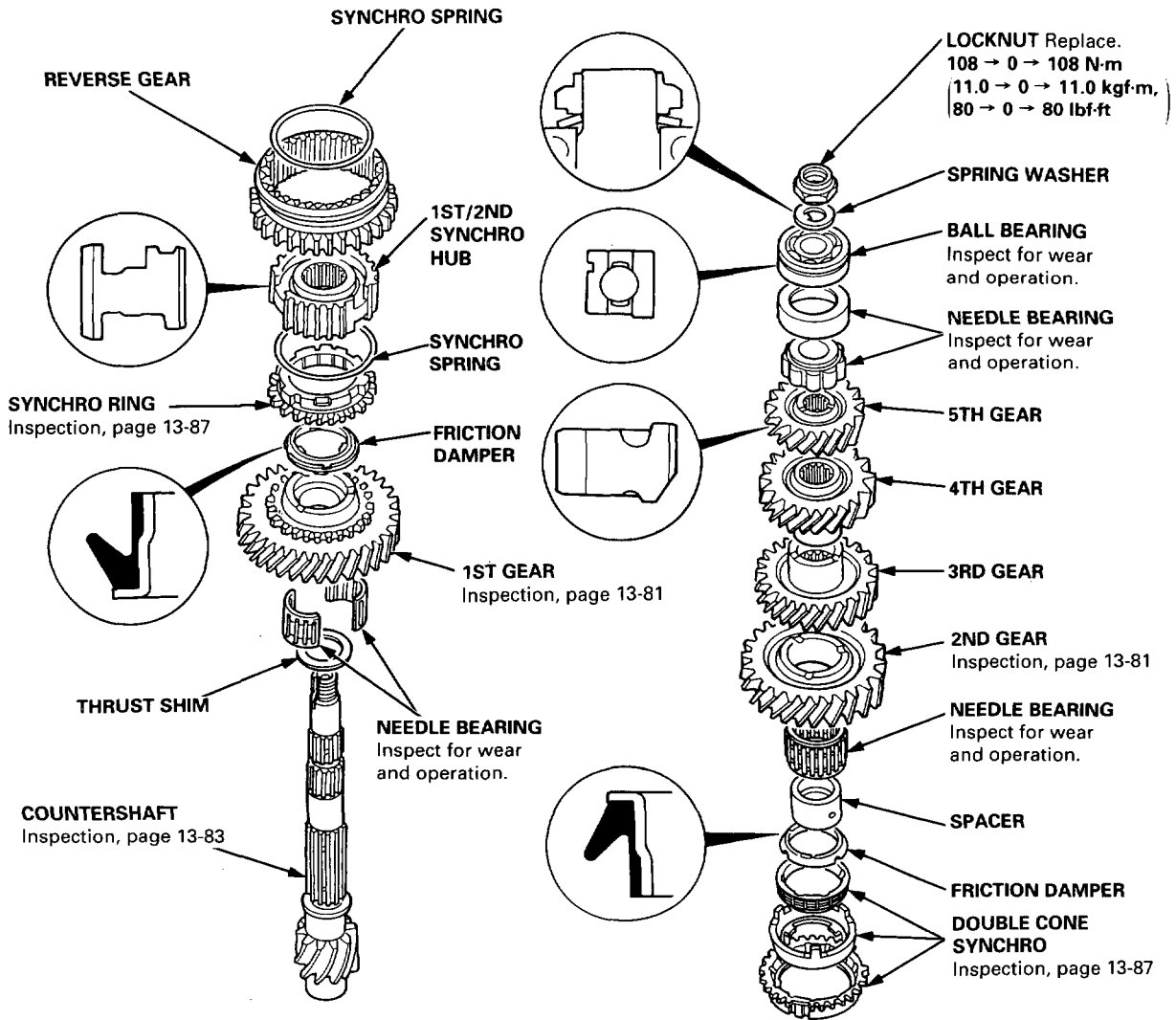


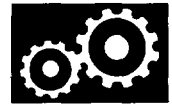
# Countershaft Assembly

## Index

NOTE: The 4th and 5th gears are installed with a press.

 Prior to reassembling, clean all the parts in solvent, dry them and apply lubricant to any contact surfaces. The 4th and 5th gears, however, should be installed with a press before lubricating them.



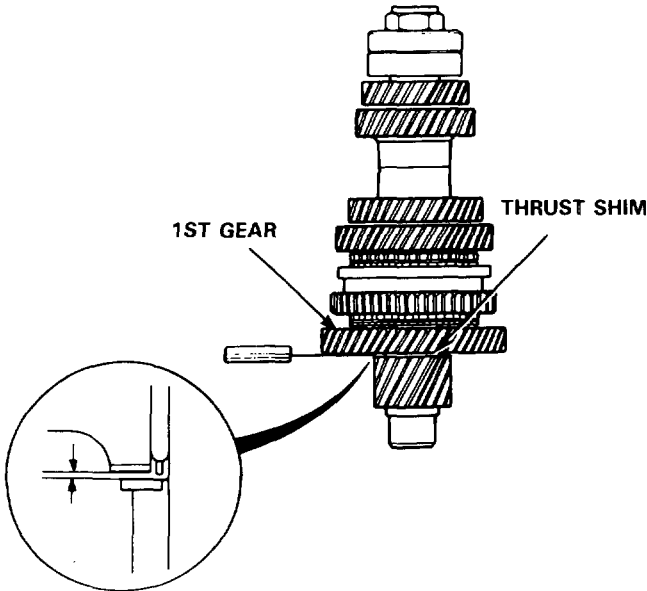


## Clearance Inspection

1. Measure the clearance between the 1st gear and thrust shim.

**Standard:** 0.045 – 0.205 mm  
(0.002 – 0.008 in)

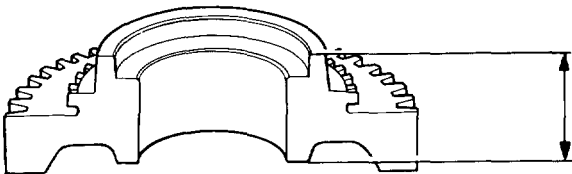
**Service Limit:** 0.25 mm (0.01 in)



2. If the clearance exceeds the service limit, measure the thicknesses of 1st gear and thrust shim.

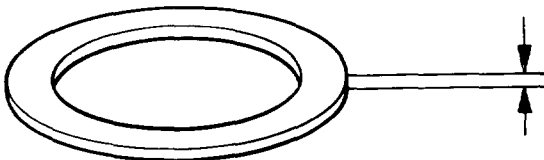
### 1ST GEAR

**Standard:** 31.45 – 31.50 mm (1.238 – 1.240 in)



### THRUST SHIM

**Standard:** 1.945 – 1.955 mm (0.0766 – 0.0770 in)

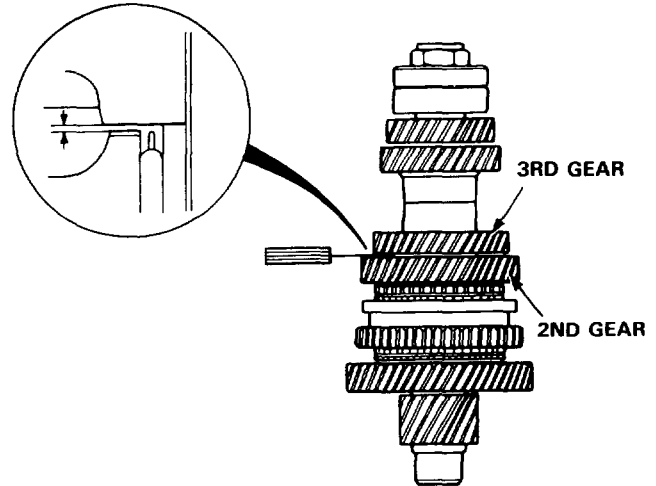


- If the thicknesses of 1st gear and thrust shim are less than the standard, replace with a new one.
- If the thicknesses of 1st gear and thrust shim are within the standard, replace the 1st/2nd synchro hub with a new one.

3. Measure the clearance between the 2nd and 3rd gears.

**Standard:** 0.07 – 0.14 mm  
(0.003 – 0.006 in)

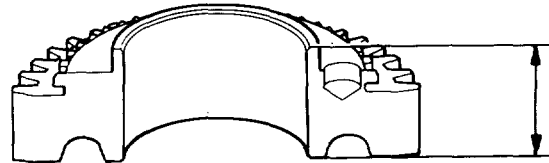
**Service Limit:** 0.24 mm (0.009 in)



4. If the clearance exceeds the service limit, measure the thicknesses of 2nd gear and spacer collar.

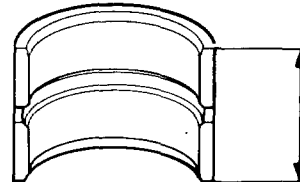
### 2ND GEAR

**Standard:** 28.92 – 28.97 mm (1.139 – 1.141 in)



### SPACER COLLAR

**Standard:** 29.07 – 29.09 mm (1.144 – 1.145 in)

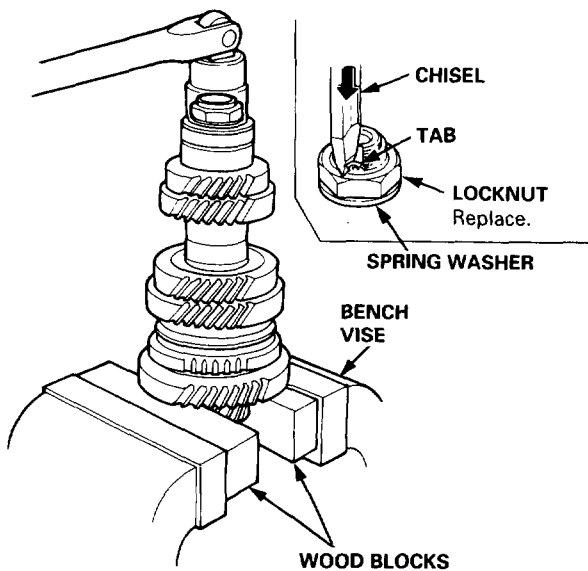


- If the thicknesses of 2nd gear and spacer collar are less than the standard, replace with a new one.
- If the thicknesses of 2nd gear and spacer collar are within the standard, replace the 1st/2nd synchro hub with a new one.

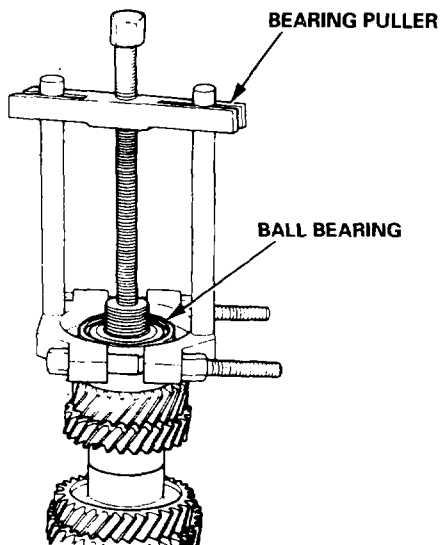
# Countershaft Assembly

## Disassembly

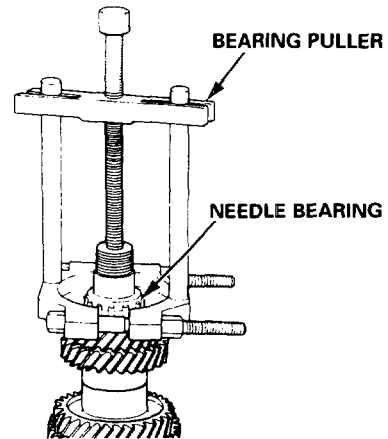
1. Securely clamp the countershaft assembly in a bench vise with wood blocks.
2. Raise the locknut tab from the groove in the countershaft, then remove the locknut and the spring washer.



3. Remove the ball bearing using a bearing puller as shown.



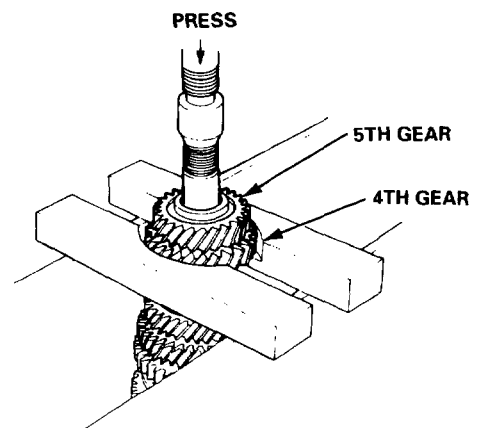
4. Remove the bearing outer race, then remove the needle bearing using a bearing puller as shown.



## CAUTION

Remove the gears using a press and the steel blocks as shown. Use of a jaw-type puller can cause damage to the gear teeth.

5. Support 4th gear on steel blocks, and press the countershaft out of 5th and 4th gears, as shown.





## Inspection

1. Inspect the gear surfaces and the bearing surfaces for wear and damage, then measure the countershaft at points A, B, and C.

### Standard:

A: 24.980 – 24.993 mm (0.9835 – 0.9840 in)

B: 36.984 – 37.000 mm (1.4561 – 1.4567 in)

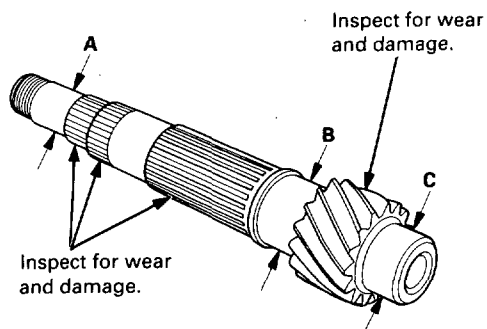
C: 33.000 – 33.015 mm (1.2992 – 1.2998 in)

### Service Limit:

A: 24.940 mm (0.9819 in)

B: 36.930 mm (1.4539 in)

C: 32.950 mm (1.2972 in)



Inspect oil passage for clogging.

- If any parts of the countershaft are less than the service limit, replace countershaft with a new one.

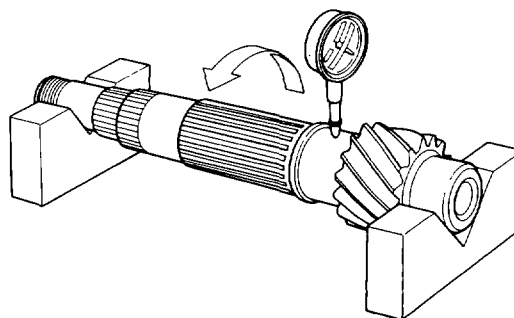
2. Inspect for runout.

**Standard:** 0.02 mm (0.0008 in) max.

**Service Limit:** 0.05 mm (0.002 in)

**NOTE:** Support the countershaft at both ends as shown.

Rotate two complete revolutions.



- If the runout is more than the service limit, replace the countershaft with a new one.

# Countershaft Assembly

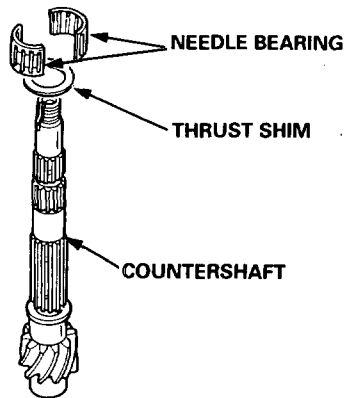
## Reassembly

### CAUTION

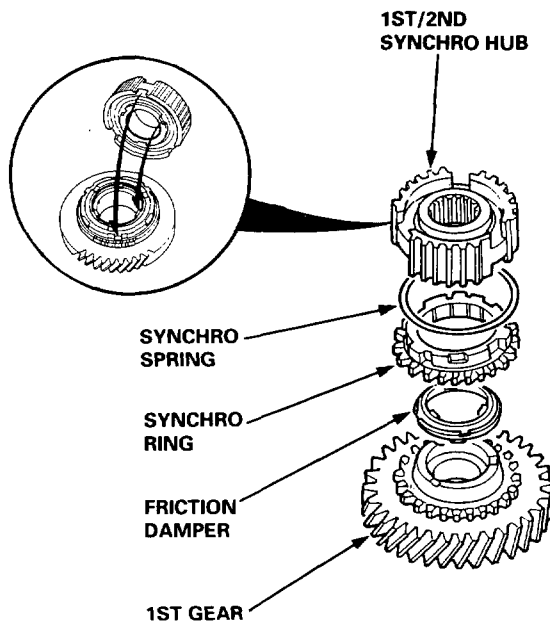
- Press 4th and 5th gears on the countershaft without lubrication.
- When installing 4th and 5th gears, support the shaft on steel blocks, and install the gears using a press.
- Install 4th and 5th gear with a maximum pressure of 25.5 kN (2,600 kgf, 18,806 lbf).

NOTE: Refer to page 13-80 for reassembly sequence.

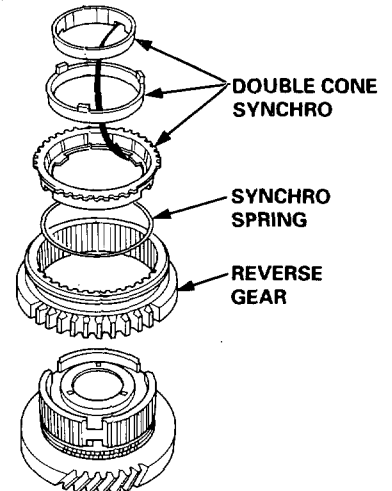
1. Install the thrust shim and the needle bearings on the countershaft.



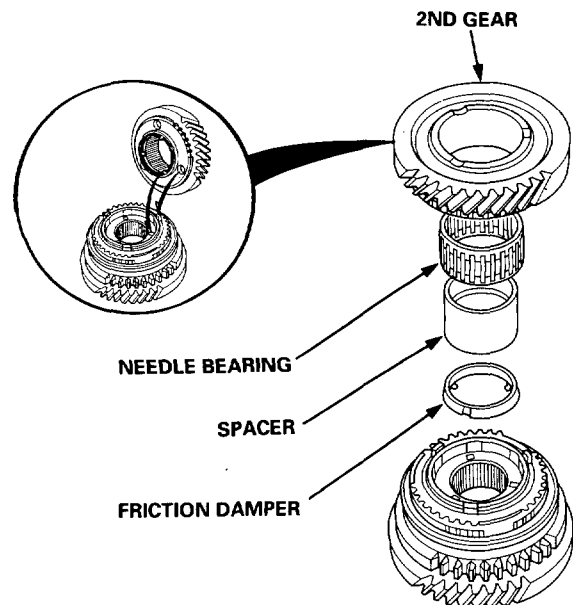
2. Install the friction damper, the synchro ring, and the synchro spring on 1st gear.
3. Install the 1st/2nd synchro hub by aligning the fingers on the friction damper and the grooves in the 1st/2nd synchro hub, as shown.



4. Install the reverse gear.
5. Install the synchro spring, and the double cone synchro as shown.



6. Assemble the friction damper, the needle bearing, and 2nd gear, then install them by aligning the fingers on the friction damper and the grooves in the 1st/2nd synchro hub with the fingers of the double cone synchro and the grooves on 2nd gear, as shown.
7. Install the spacer.

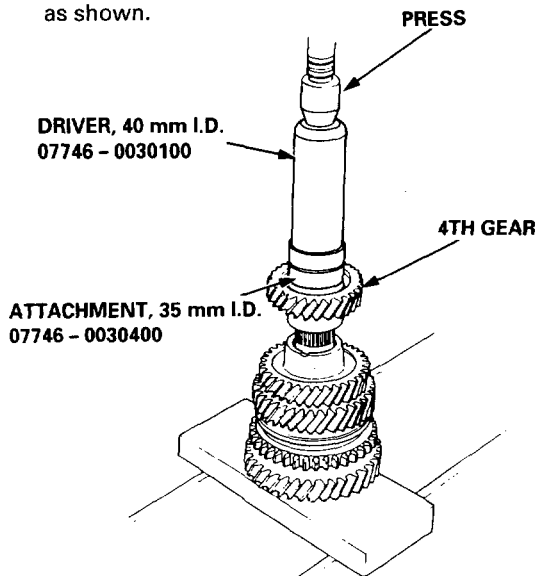


8. Install the parts assembled in steps 2 - 6 on the countershaft.

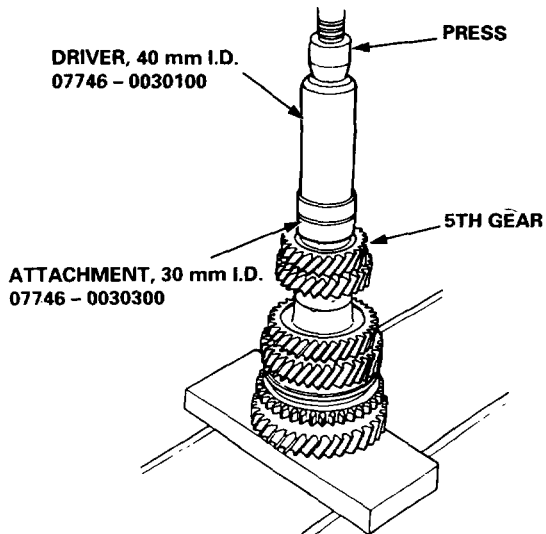




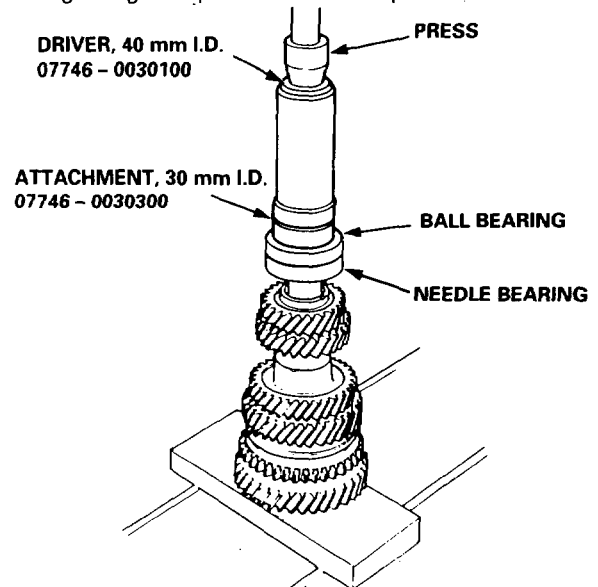
9. Support the countershaft on a steel block, and install 4th gear using the special tools and a press, as shown.



10. Support the countershaft on a steel block, and install 5th gear using the special tools and a press, as shown.



11. Install the needle bearing, then install the ball bearing using the special tools and a press as shown.

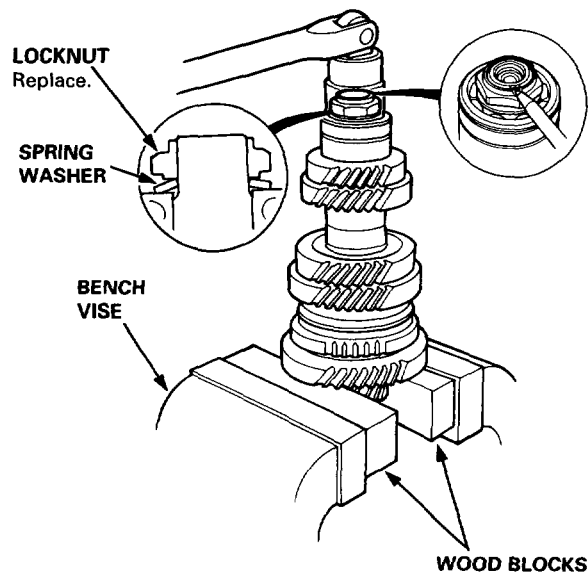


12. Securely clamp the countershaft assembly in a bench vise with wood blocks.

13. Install the spring washer, tighten the locknut, then stake the locknut tab into the groove.

**LOCKNUT**

108 → 0 → 108 N·m (11.0 → 0 → 11.0 kgf·m,  
80 → 0 → 80 lbf·ft)

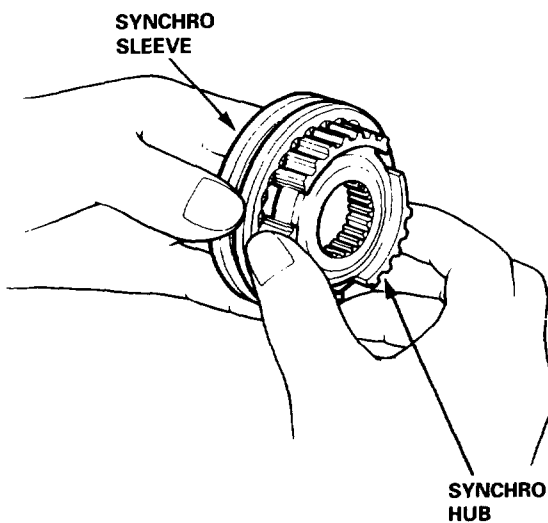


# Synchro Sleeve, Synchro Hub

## Inspection

1. Inspect gear teeth on all synchro hubs and synchro sleeves for rounded off corners, which indicates wear.
2. Install each synchro hub in its mating synchro sleeve and check for freedom of movement.

NOTE: If replacement is required, always replace the synchro sleeve and synchro hub as a set.

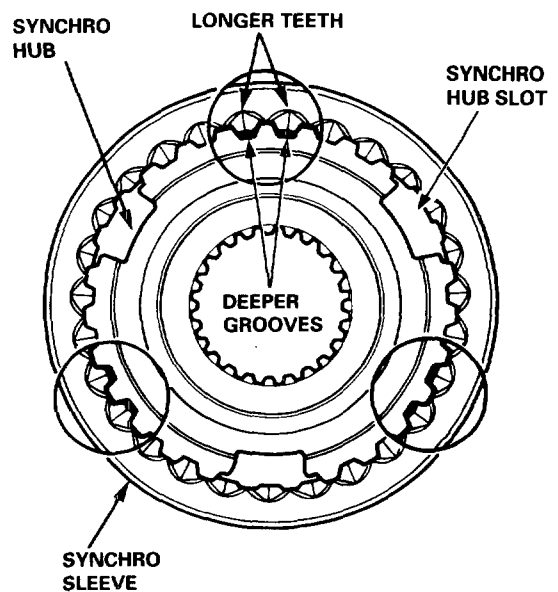


## Installation

When assembling the synchro sleeve and synchro hub, be sure to match the three sets of longer teeth (120 degrees apart) on the synchro sleeve with the three sets of deeper grooves in the synchro hub.

### **CAUTION**

Do not install the synchro sleeve with its longer teeth in the synchro hub slots, because it will damage the spring ring.

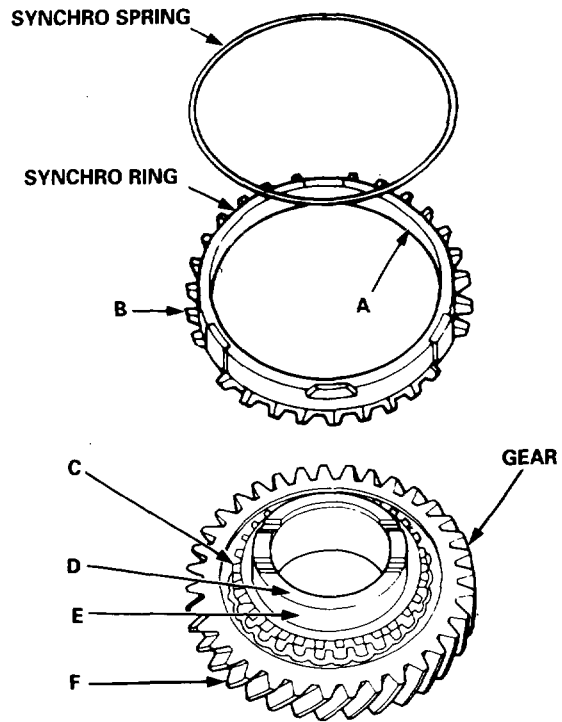


# Synchro Ring, Gear



## Inspection

1. Inspect the synchro ring and gear.
  - A: Inspect the inside of the synchro ring for wear.
  - B: Inspect the synchro sleeve teeth and matching teeth on the synchro ring for wear (rounded off).
  - C: Inspect the synchro sleeve teeth and matching teeth on the gear for wear (rounded off).
  - D: Inspect the gear hub thrust surface for wear.
  - E: Inspect the cone surface for wear and roughness.
  - F: Inspect the teeth on all gears for uneven wear, scoring, galling, and cracks.
2. Coat the cone surface of the gear with oil, and place the synchro ring on the matching gear. Rotate the ring, making sure that it does not slip.



Measure the clearance between the synchro ring and gear all the way around.

NOTE: Hold the synchro ring against the gear evenly while measuring the clearance.

### Synchro Ring-to-Gear Clearance

Standard: 0.73 – 1.18 mm  
(0.029 – 0.046 in)  
Service Limit: 0.4 mm (0.02 in)

### Double Cone Synchro-to-Gear Clearance

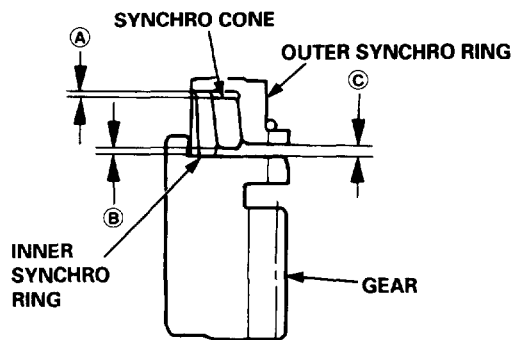
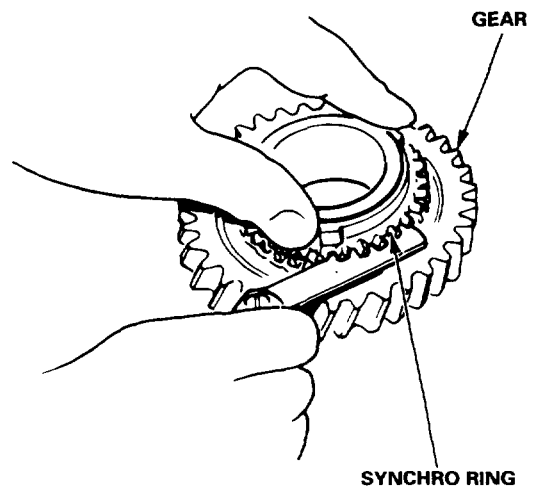
Standard:

- Ⓐ: (Outer Synchro Ring to Synchro Cone)  
0.5 – 1.0 mm (0.02 – 0.04 in)
- Ⓑ: (Synchro Cone to Gear)  
0.5 – 1.0 mm (0.02 – 0.04 in)
- Ⓒ: (Outer Synchro Ring to Gear)  
0.95 – 1.68 mm (0.037 – 0.066 in)

Service Limit:

- Ⓐ: 0.3 mm (0.01 in)
- Ⓑ: 0.3 mm (0.01 in)
- Ⓒ: 0.6 mm (0.02 in)

If the clearance is less than the service limit, replace the synchro ring and synchro cone.

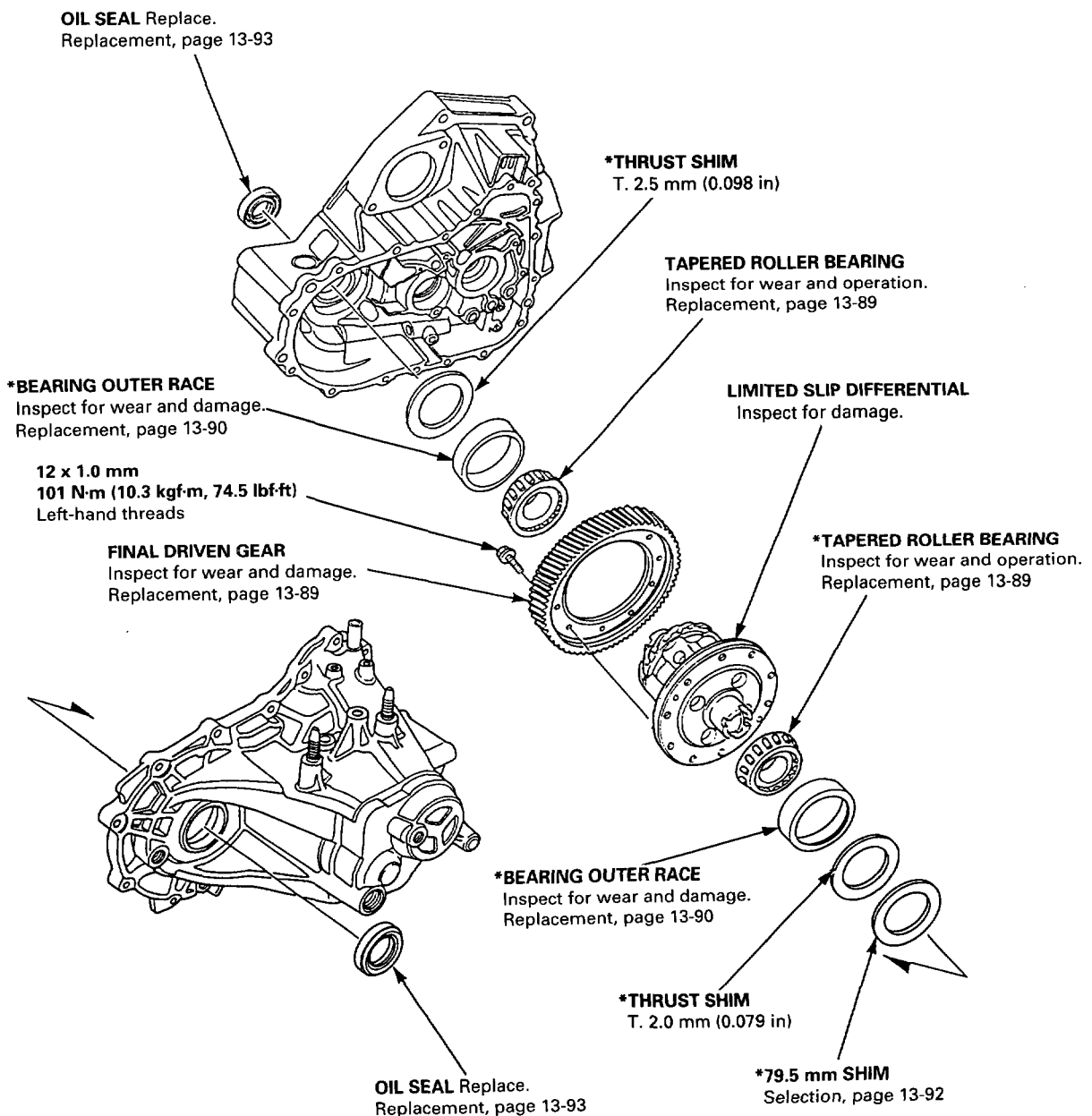


# Limited Slip Differential (LSD)

## Index

### NOTE:

- If parts mark with an asterisk(\*) were replaced, the tapered roller bearing preload must be adjusted (see page 15-9).
- The limited slip differential assembly is non-rebuildable, replace it if it is damaged.

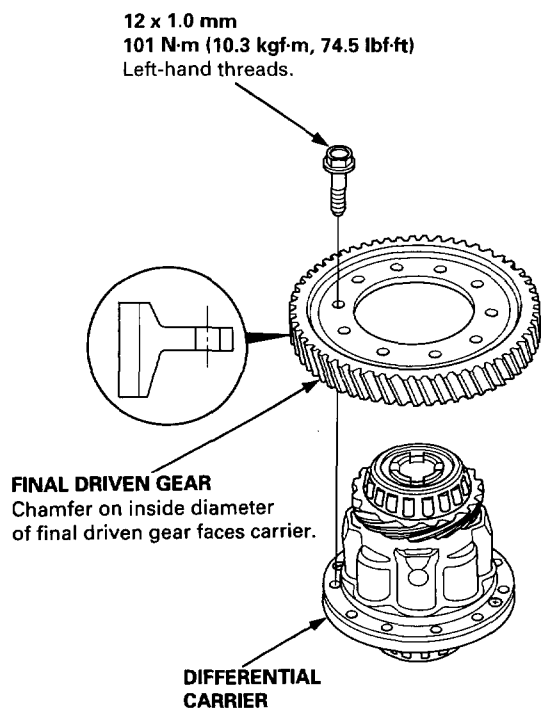




## Final Driven Gear Replacement

1. Remove the bolts in a crisscross pattern in several steps, and remove the final driven gear from the differential carrier.

NOTE: The final driven gear bolts have left-hand threads.



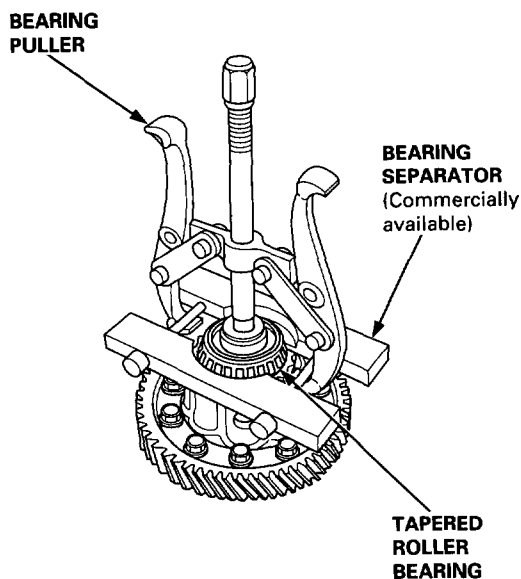
2. Install the final driven gear by tightening the bolts in a crisscross pattern in several steps.

## Tapered Roller Bearing Replacement

NOTE:

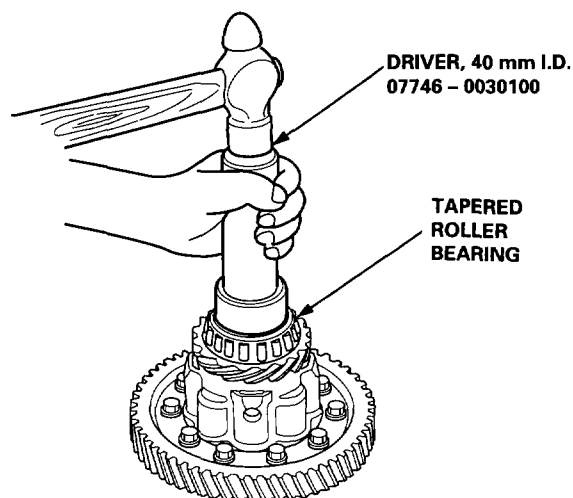
- The tapered roller bearing and bearing outer race should be replaced as a set.
- Inspect and adjust the tapered roller bearing preload whenever the tapered roller bearing is replaced.
- Check the tapered roller bearings for wear and rough rotation. If tapered roller bearings are OK, removal is not necessary.

1. Remove the tapered roller bearings using a bearing puller and bearing separator as shown.



2. Install new tapered roller bearings using the special tool as shown.

NOTE: Drive the tapered roller bearings on until they bottom against the differential carrier.



# Limited Slip Differential (LSD)

## Bearing Outer Race Replacement

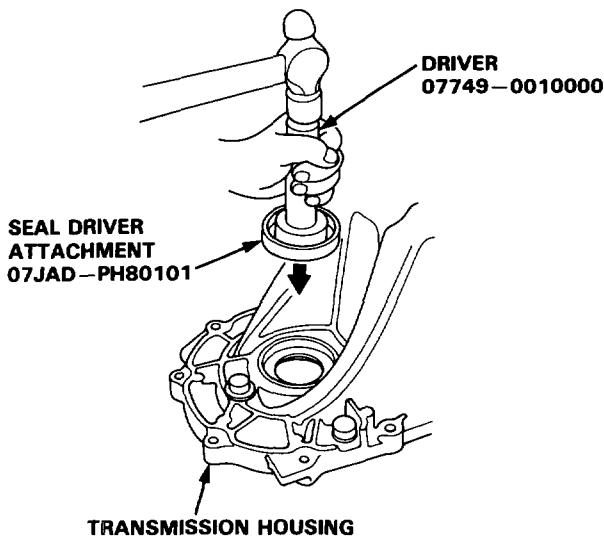
### CAUTION

Do not reuse the thrust shim and the 79.5 mm shim if the outer race was driven out.

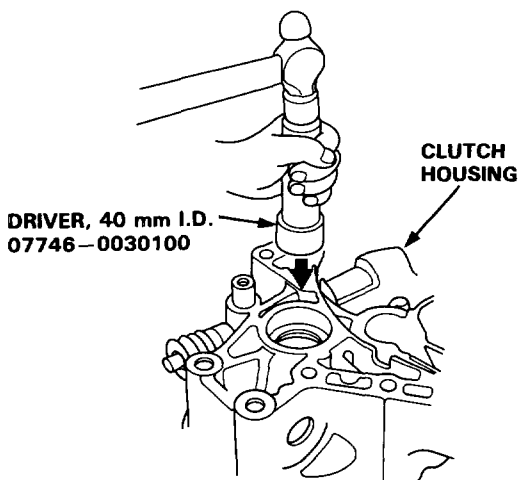
#### NOTE:

- The bearing outer race and tapered roller bearing should be replaced as a set.
- Inspect and adjust the tapered roller bearing preload whenever the tapered roller bearing is replaced.

1. Remove the oil seals from the transmission housing and clutch housing (see page 13-93).
2. Remove the bearing outer race, the thrust shim, and the 79.5 mm shim from the transmission housing.



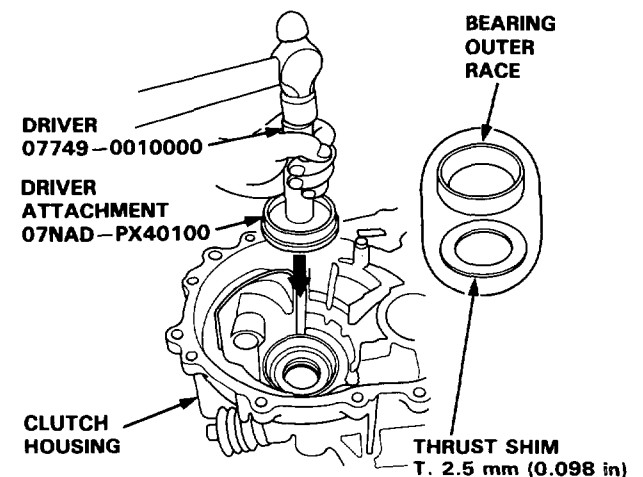
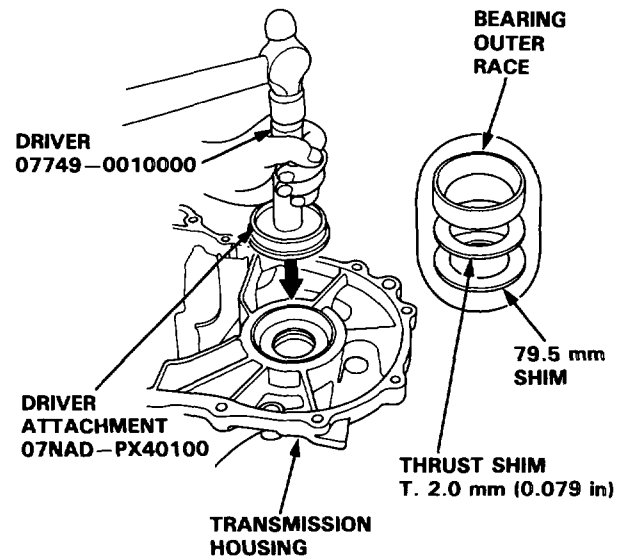
3. Remove the bearing outer race and thrust shim from the clutch housing.



4. Install the new thrust shim and 79.5 mm shim, then drive the bearing outer races in the both housings using the special tools as shown.

#### NOTE:

- Install the bearing outer race squarely.
- Check that there is no clearance between the bearing outer race, thrust shim, and transmission housing.



5. Install the oil seal (see page 13-93).



## Tapered Roller Bearing Preload Adjustment

NOTE: If any of the items listed below were replaced, the tapered roller bearing preload must be adjusted.

- Transmission housing
- Clutch housing
- Helical type limited slip differential assembly
- Tapered roller bearing and bearing outer race
- Thrust shim
- 79.5 mm shim

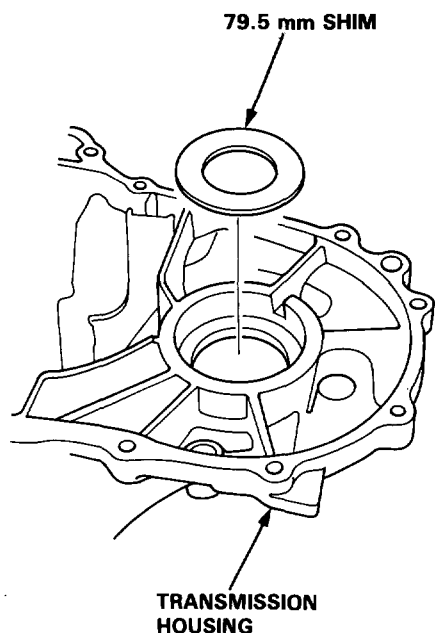
1. Remove the bearing outer race, the thrust shim, and the 79.5 mm shim from the transmission housing (see page 15-8).

**CAUTION:** Do not reuse the thrust shim and the 79.5 mm shim if the bearing outer race was driven out.

2. First try the same size 79.5 mm shim that was removed.

### CAUTION

Do not use more than two shims.



3. Install the thrust shim and 79.5 mm shim, then drive the bearing outer race in the transmission housing (see page 13-90).

NOTE:

- Install the bearing outer race squarely.
- Check that there is no clearance between the bearing outer race, thrust shim and transmission housing.

4. With the mainshaft and countershaft removed, install the differential assembly, and torque the clutch housing and transmission housing.

**8 x 1.25 mm**  
**27 N·m (2.8 kgf·m, 20 lbf·ft)**

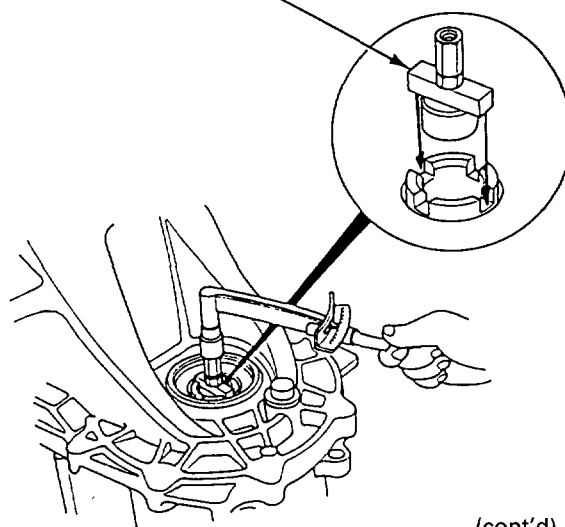
NOTE: It is not necessary to use sealing agent between the housings.

5. Rotate the differential assembly in both directions to seat the tapered roller bearings.
6. Measure the starting torque of the differential assembly with the special tool and a torque wrench.

NOTE: Measure the tapered roller bearing preload in both directions.

**STANDARD: 2.11 – 3.04 N·m**  
**(21.5 – 31.0 kgf·cm,**  
**18.7 – 26.9 lbf·in)**

**Preload Inspection Tool**  
**07TAJ – ST70100**



# Limited Slip Differential (LSD)

## Tapered Roller Bearing Preload Adjustment (cont'd)

7. If the tapered roller bearing preload is not within the standard, select the 79.5 mm shim from the following table which will give the tapered roller bearing preload closest to the standard mean value of 2.50 N·m (25.5 kgf·cm, 22 lbf·in).

NOTE: Changing the 79.5 mm shim to the next size will increase or decrease tapered roller bearing preload about 0.3 – 0.4 N·m (3 – 4 kgf·cm, 2.6 – 3.5 lbf·in).

### 79.5 mm SHIM

	Part Number	Thickness
AA	41460 – P5D – 000	0.66 mm (0.0260 in)
AB	41461 – P5D – 000	1.17 mm (0.0461 in)
AC	41462 – P5D – 000	1.20 mm (0.0472 in)
AD	41463 – P5D – 000	1.23 mm (0.0484 in)
AE	41464 – P5D – 000	1.26 mm (0.0496 in)
AF	41465 – P5D – 000	1.29 mm (0.0508 in)
AG	41466 – P5D – 000	1.32 mm (0.0520 in)
AH	41467 – P5D – 000	1.35 mm (0.0531 in)
AI	41468 – P5D – 000	1.38 mm (0.0543 in)
AJ	41469 – P5D – 000	1.41 mm (0.0555 in)
AK	41470 – P5D – 000	1.44 mm (0.0567 in)
AL	41471 – P5D – 000	1.47 mm (0.0579 in)
AM	41472 – P5D – 000	1.50 mm (0.0591 in)
AN	41473 – P5D – 000	1.53 mm (0.0602 in)
AO	41474 – P5D – 000	1.56 mm (0.0614 in)
AP	41475 – P5D – 000	1.59 mm (0.0626 in)
AQ	41476 – P5D – 000	1.62 mm (0.0638 in)
AR	41477 – P5D – 000	1.65 mm (0.0650 in)
AS	41478 – P5D – 000	1.68 mm (0.0661 in)
AT	41479 – P5D – 000	1.71 mm (0.0673 in)
AU	41480 – P5D – 000	1.74 mm (0.0685 in)
AV	41481 – P5D – 000	1.77 mm (0.0697 in)
AW	41482 – P5D – 000	1.80 mm (0.0709 in)
AX	41483 – P5D – 000	1.83 mm (0.0720 in)

8. Recheck the tapered roller bearing preload.

9. How to select the correct 79.5 mm shim:

- 1) Compare the tapered roller bearing preload you get with the 79.5 mm shim that was removed with the specified mean preload of 2.50 N·m (25.5 kgf·cm, 22 lbf·in).
- 2) If your measured tapered roller bearing preload is less than specified, subtract your's from the specified.  
If your's is more than specified, subtract the specified from your measurement.

For example with a 1.38 mm (0.0543 in) shim:

$$\begin{array}{r} \textcircled{A} \text{ specified } 2.50 \text{ N}\cdot\text{m} \text{ (25.5 kgf}\cdot\text{cm, 22 lbf}\cdot\text{in)} \\ - \text{ you measure } 0.54 \text{ N}\cdot\text{m} \text{ (5.5 kgf}\cdot\text{cm, 5 lbf}\cdot\text{in)} \\ \hline 2.0 \text{ N}\cdot\text{m} \text{ (20 kgf}\cdot\text{cm, 18 lbf}\cdot\text{in)} \text{ less} \end{array}$$

$$\begin{array}{r} \textcircled{B} \text{ you measure } 3.29 \text{ N}\cdot\text{m} \text{ (33.5 kgf}\cdot\text{cm, 29 lbf}\cdot\text{in)} \\ - \text{ specified } 2.50 \text{ N}\cdot\text{m} \text{ (25.5 kgf}\cdot\text{cm, 22 lbf}\cdot\text{in)} \\ \hline 0.8 \text{ N}\cdot\text{m} \text{ (8 kgf}\cdot\text{cm, 7 lbf}\cdot\text{in)} \text{ more} \end{array}$$

- 3) Each shim size up or down from standard makes about 0.3 – 0.4 N·m (3 – 4 kgf·cm, 2.6 – 3.5 lbf·in) difference in tapered roller bearing preload.

- In example  $\textcircled{A}$ , your measured tapered roller bearing preload was 2.0 N·m (20 kgf·cm, 18 lbf·in) less than standard so you need a 79.5 mm shim five sizes thicker than standard (try the 1.53 mm (0.0602 in) shim and recheck).
- In example  $\textcircled{B}$ , your's was 0.8 N·m (8 kgf·cm, 7 lbf·in) more than standard, so you need a thrust shim two sizes thinner (try the 1.32 mm (0.0520 in) shim and recheck).

10. After adjusting the tapered roller bearing preload, assemble the transmission, and install the transmission housing (see page 13-102).

**8 x 1.25 mm  
27 N·m (2.8 kgf·m, 20 lbf·ft)**

11. Rotate the differential assembly in both directions to seat the tapered roller bearings.

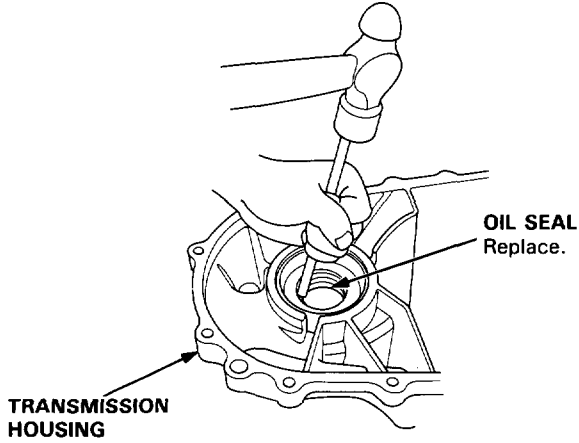




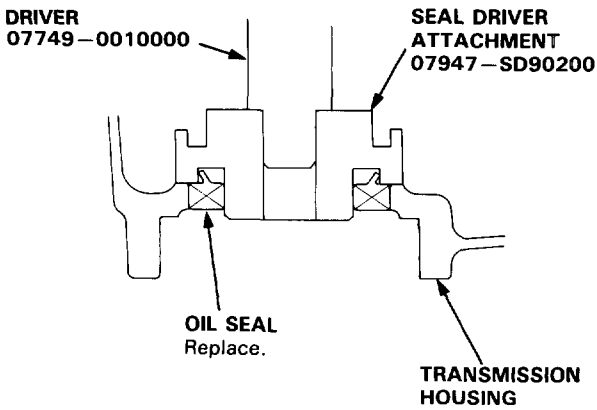
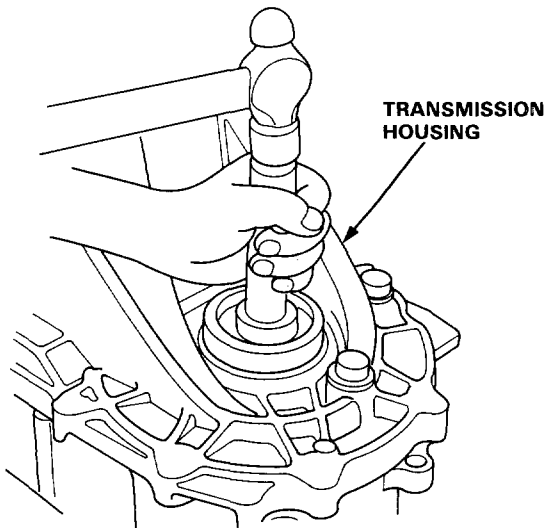
## Replacement

### Transmission Housing:

1. Remove the oil seal from the transmission housing.

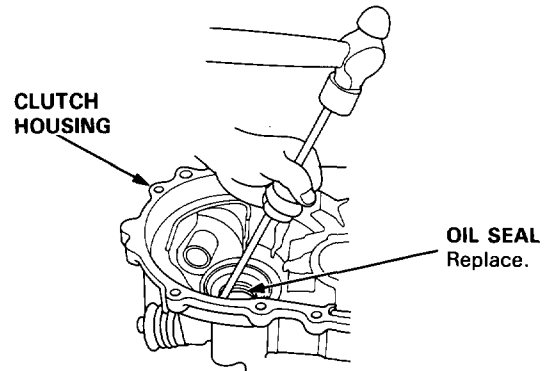


2. Install the oil seal into the transmission housing using the special tools as shown.

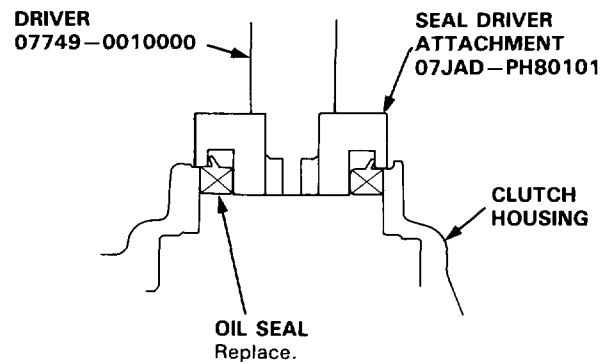
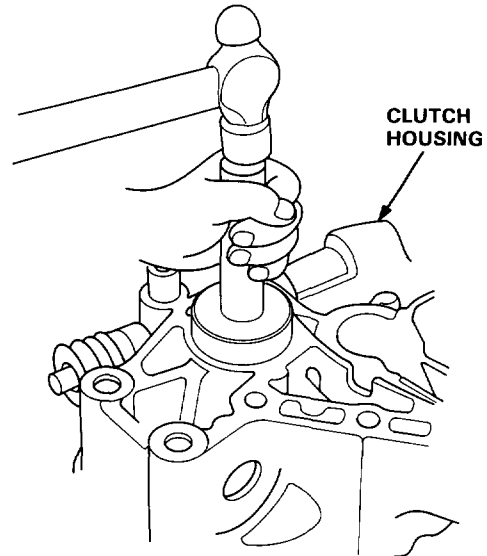


### Clutch Housing:

1. Remove the oil seal from the clutch housing.



2. Install the oil seal into the clutch housing using the special tools as shown.

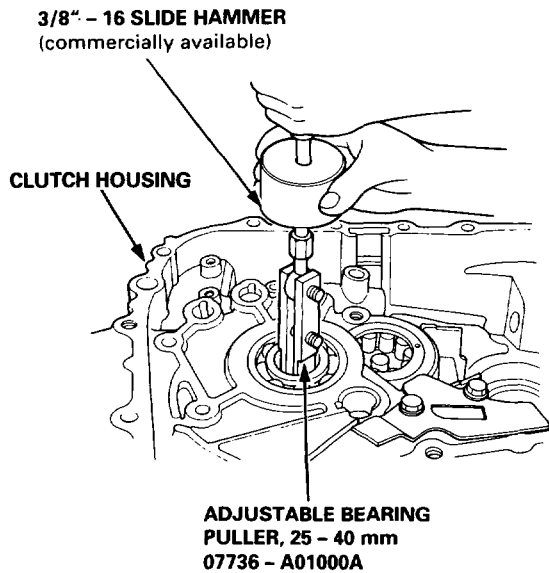


# Clutch Housing Bearing

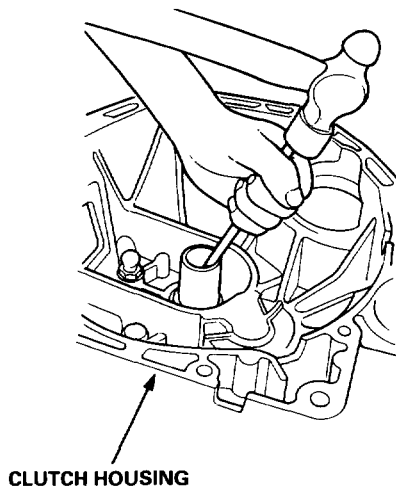
## Replacement

### Mainshaft:

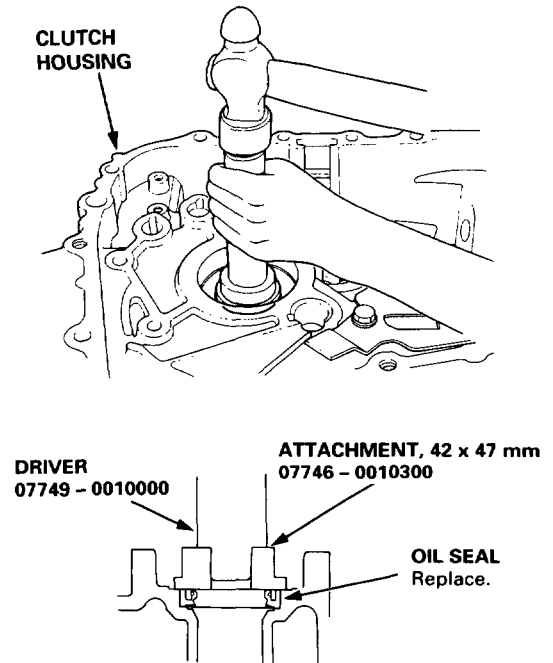
1. Remove the ball bearing using the special tools as shown.



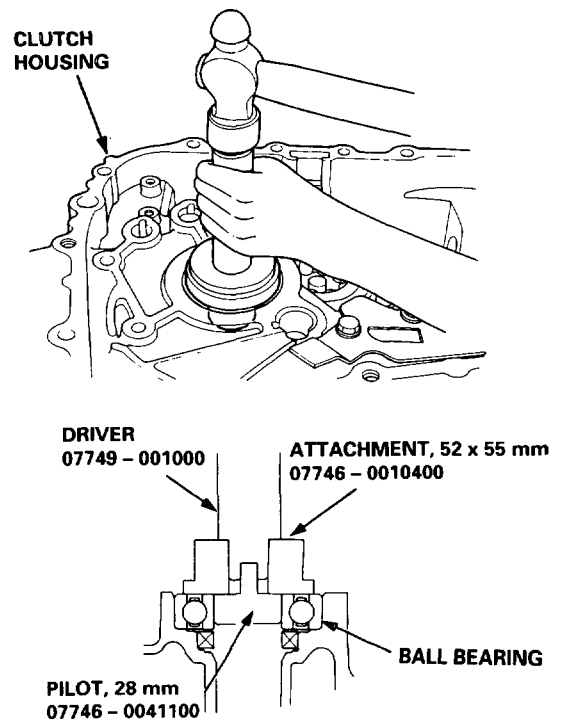
2. Remove the oil seal from the clutch housing.



3. Drive the new oil seal into the clutch housing using the special tools as shown.



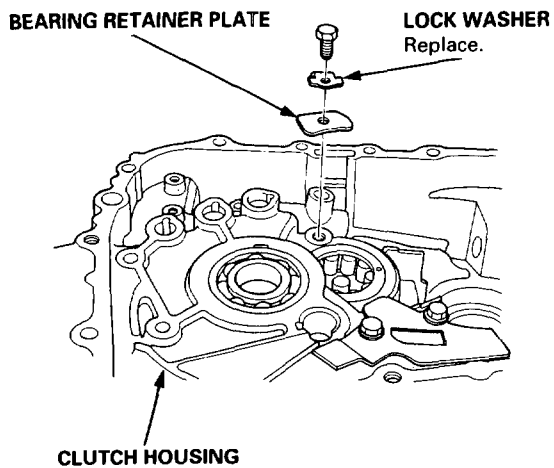
4. Drive the ball bearing into the clutch housing using the special tools as shown.





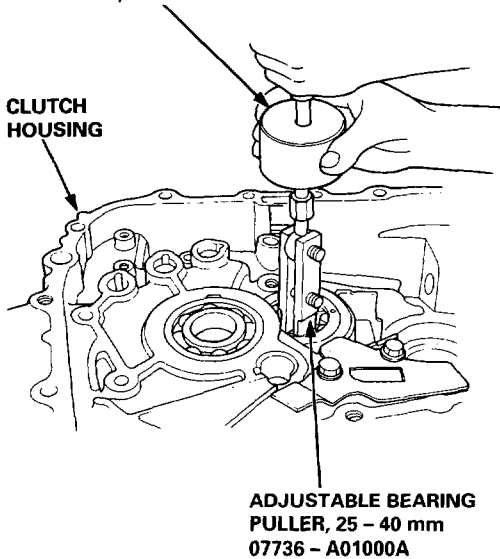
**Countershaft:**

1. Bend the tab on the lock washer down, then remove the bolt and bearing retainer plate.



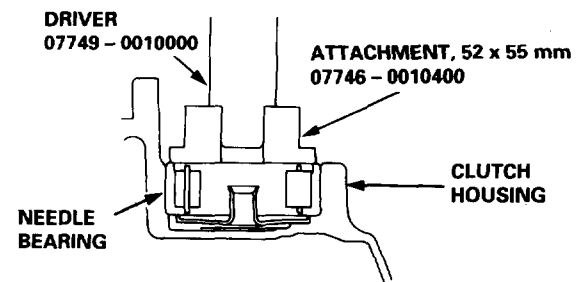
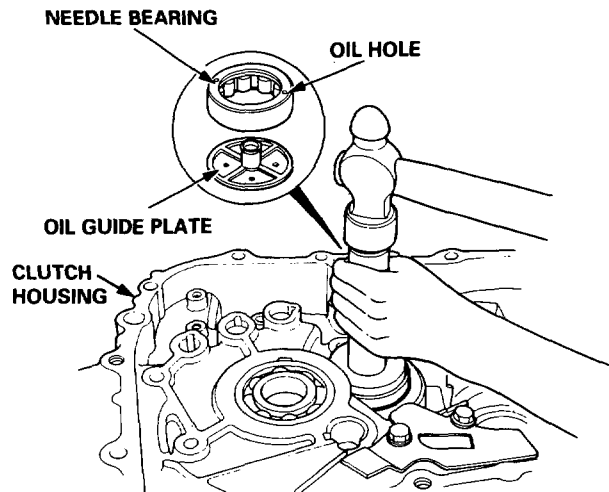
2. Remove the needle bearing using the special tools as shown, then remove the oil guide plate.

**3/8" - 16 SLIDE HAMMER**  
(Commercially available)

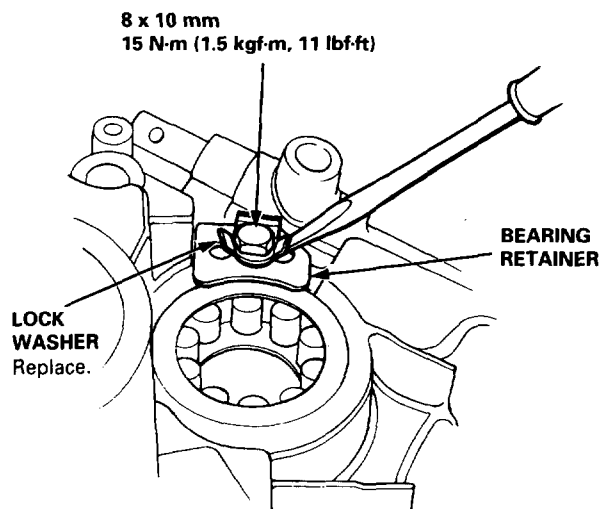


3. Position the oil guide plate and new needle bearing in the bore of the clutch housing, then drive in the needle bearing using the special tools as shown.

NOTE: Position the needle bearing with the oil hole facing up.



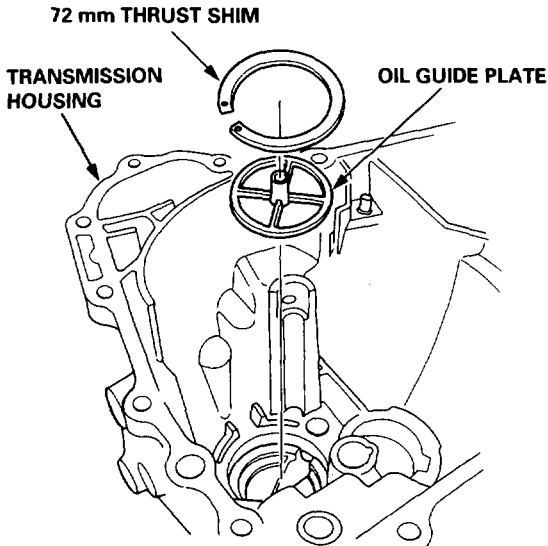
4. Install the bearing retainer plate and new lock washer, then bend the tab against the bolt head.



# Mainshaft Thrust Clearance

## Adjustment

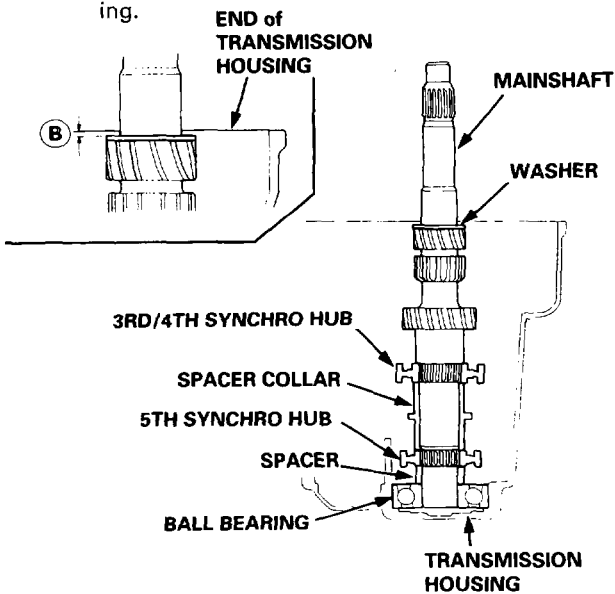
1. Remove the 72 mm thrust shim and oil guide plate from the transmission housing.



2. Install the 3rd/4th synchro hub, spacer collar, 5th synchro hub, spacer, and ball bearing on the mainshaft, then install the above assembly in the transmission housing.
3. Install the washer on the mainshaft.
4. Measure distance **B** between the end of the transmission housing and washer.

**NOTE:**

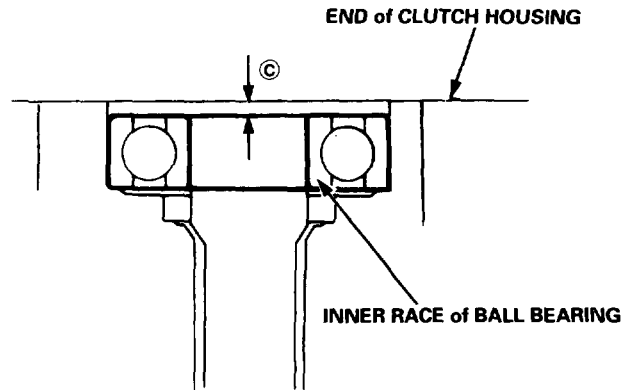
- Use a straight edge and vernier caliper.
- Measure at three locations and average the reading.



5. Measure distance **C** between the end of the clutch housing and bearing inner race.

**NOTE:**

- Use a straight edge and depth gauge.
- Measure at three locations and average the readings.



6. Select the proper 72 mm thrust shim from the chart by using the formula below.

**NOTE:** Use only one 72 mm thrust shim.

**Shim Selection Formula:**

From the measurements you made in steps 4 and 5:

- 1. Add distance **C** (step 5) to distance **B** (step 4).
- 2. From this number, subtract 0.93 (which is the midpoint of the flex range of the clutch housing bearing spring washer).
- 3. Take this number and compare it to the available shim sizes in the chart.

(For example)

$$\begin{array}{r}
 \text{B: } 2.39 \\
 + \text{ C: } 0.22 \\
 \hline
 = 2.61
 \end{array}
 \qquad
 \begin{array}{r}
 \xrightarrow{\quad} 2.61 \\
 - 0.93 \\
 \hline
 = 1.68
 \end{array}$$

- Try the 1.68 mm (0.0661 in) shim.



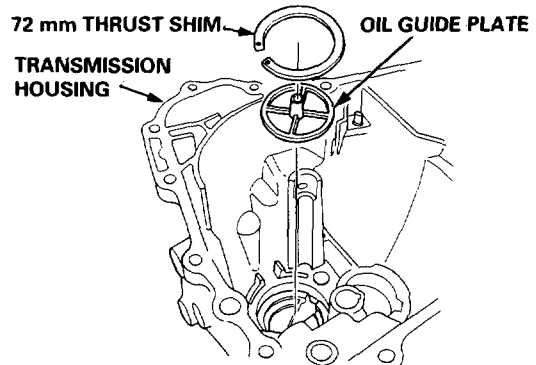
### 72 mm Thrust Shim

	Part Number	Thickness
A	23931 - P21 - 000	0.60 mm (0.0236 in)
B	23932 - P21 - 000	0.63 mm (0.0248 in)
C	23933 - P21 - 000	0.66 mm (0.0260 in)
D	23934 - P21 - 000	0.69 mm (0.0272 in)
E	23935 - P21 - 000	0.72 mm (0.0283 in)
F	23936 - P21 - 000	0.75 mm (0.0295 in)
G	23937 - P21 - 000	0.78 mm (0.0307 in)
H	23938 - P21 - 000	0.81 mm (0.0319 in)
I	23939 - P21 - 000	0.84 mm (0.0331 in)
J	23940 - P21 - 000	0.87 mm (0.0343 in)
K	23941 - P21 - 000	0.90 mm (0.0354 in)
L	23942 - P21 - 000	0.93 mm (0.0366 in)
M	23943 - P21 - 000	0.96 mm (0.0378 in)
N	23944 - P21 - 000	0.99 mm (0.0390 in)
O	23945 - P21 - 000	1.02 mm (0.0402 in)
P	23946 - P21 - 000	1.05 mm (0.0413 in)
Q	23947 - P21 - 000	1.08 mm (0.0425 in)
R	23948 - P21 - 000	1.11 mm (0.0437 in)
S	23949 - P21 - 000	1.14 mm (0.0449 in)
T	23950 - P21 - 000	1.17 mm (0.0461 in)
U	23951 - P21 - 000	1.20 mm (0.0472 in)
V	23952 - P21 - 000	1.23 mm (0.0484 in)
W	23953 - P21 - 000	1.26 mm (0.0496 in)
X	23954 - P21 - 000	1.29 mm (0.0508 in)
Y	23955 - P21 - 000	1.32 mm (0.0520 in)
Z	23956 - P21 - 000	1.35 mm (0.0531 in)
AA	23957 - P21 - 000	1.38 mm (0.0543 in)
AB	23958 - P21 - 000	1.41 mm (0.0555 in)
AC	23959 - P21 - 000	1.44 mm (0.0567 in)
AD	23960 - P21 - 000	1.47 mm (0.0579 in)
AE	23961 - P21 - 000	1.50 mm (0.0591 in)
AF	23962 - P21 - 000	1.53 mm (0.0602 in)
AG	23963 - P21 - 000	1.56 mm (0.0614 in)
AH	23964 - P21 - 000	1.59 mm (0.0626 in)
AI	23965 - P21 - 000	1.62 mm (0.0638 in)
AJ	23966 - P21 - 000	1.65 mm (0.0650 in)
AK	23967 - P21 - 000	1.68 mm (0.0661 in)
AL	23968 - P21 - 000	1.71 mm (0.0673 in)
AM	23969 - P21 - 000	1.74 mm (0.0685 in)
AN	23970 - P21 - 000	1.77 mm (0.0697 in)
AO	23971 - P21 - 000	1.80 mm (0.0709 in)

7. Check the thrust clearance in the manner described below.

NOTE: Carry out the measurement at normal room temperature.

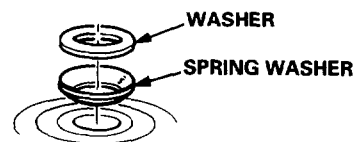
- 1. Install the thrust shim selected and oil guide plate in the transmission housing.



- 2. Install the spring washer and washer on the ball bearing.

NOTE:

- Clean the spring washer, washer and thrust shim thoroughly before installation.
- Install the spring washer, washer and thrust shim properly.



- 3. Install the mainshaft in the clutch housing.
- 4. Place the transmission housing over the mainshaft and onto the clutch housing.
- 5. Tighten the clutch and transmission housings with several 8 mm bolts.

NOTE: It is not necessary to use sealing agent between the housings.

**8 x 1.25 mm  
27 N·m (2.8 kgf·m, 20 lbf·ft)**

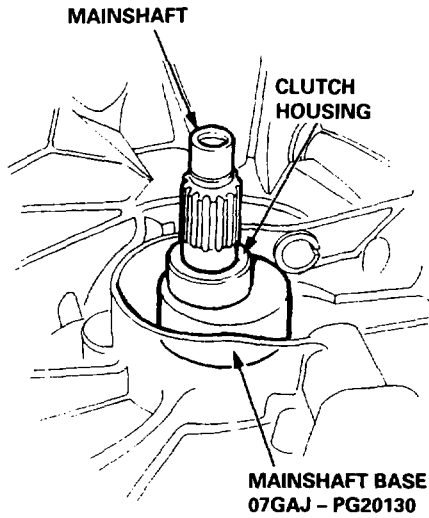
- 6. Tap the mainshaft with a plastic hammer.

(cont'd)

# Mainshaft Thrust Clearance

## Adjustment (cont'd)

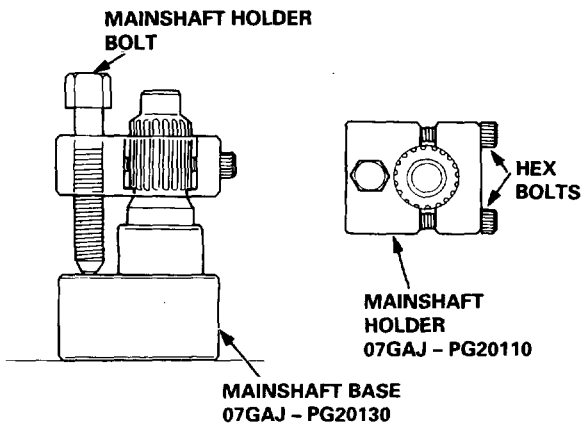
-7. Slide the mainshaft base over the mainshaft.



-8. Attach the mainshaft holder to the mainshaft as follows:

**NOTE:**

- Back-out the mainshaft holder bolt and loosen the two hex bolts.
- Fit the holder over the mainshaft so its lip is towards the transmission.
- Align the mainshaft holder's lip around the groove at the inside of the mainshaft splines, then tighten the hex bolts.



-9. Seat the mainshaft fully by tapping its end with a plastic hammer.

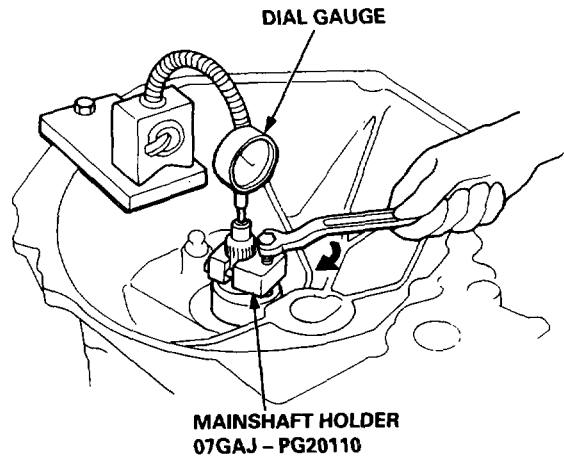
-10. Thread the mainshaft holder bolt in until it just contacts the wide surface of the mainshaft base.

-11. Zero a dial gauge on the end of the mainshaft.

-12. Turn the mainshaft holder bolt clockwise; stop turning when the dial gauge has reached its maximum movement. The reading on the dial gauge is the amount of mainshaft end play.

### CAUTION

Turning the mainshaft holder bolt more than 60 degrees after the needle of the dial gauge stops moving may damage the transmission.



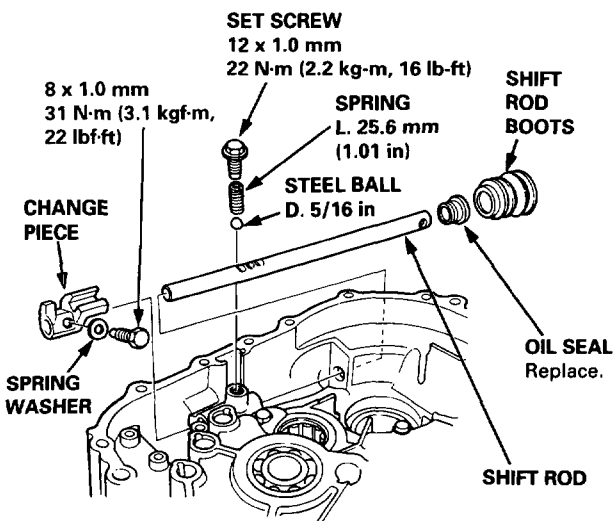
-13. If the reading is within the standard, the clearance is correct. If the reading is not within the standard, recheck the shim thickness.

**Standard: 0.11 - 0.18 mm (0.004 - 0.007 in)**

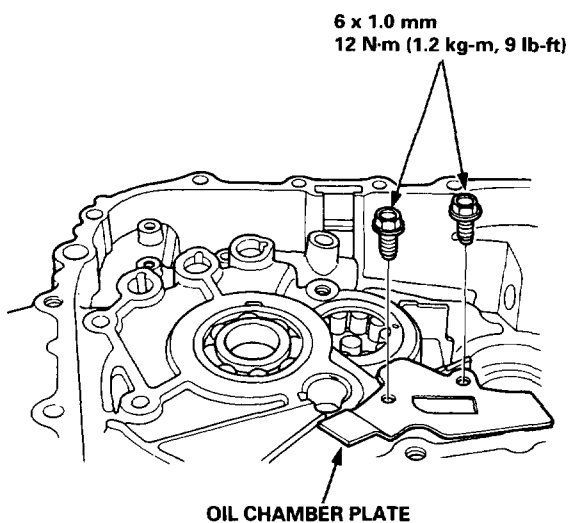


## Reassembly

1. Install the new oil seal.
2. Set the change piece.
3. Install the shift rod.
4. Install the steel ball, the spring, and the set screw.
5. Install the spring washer and change piece attaching bolt.
6. Install the shift rod boots.

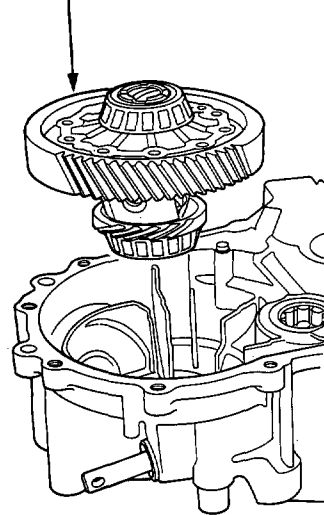


7. Install the oil chamber plate.



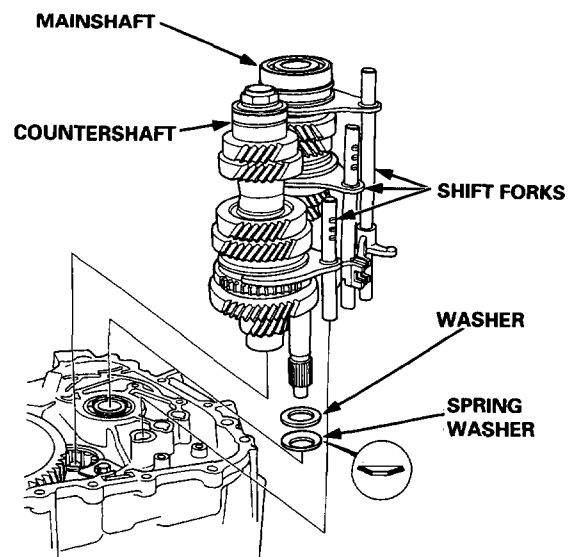
8. Install the differential assembly.

DIFFERENTIAL ASSEMBLY



9. Set the spring washer and the washer.
10. Install the mainshaft, the countershaft, and the shift fork assemblies.

NOTE: Align the finger of the interlock with the groove in the shift fork shaft.



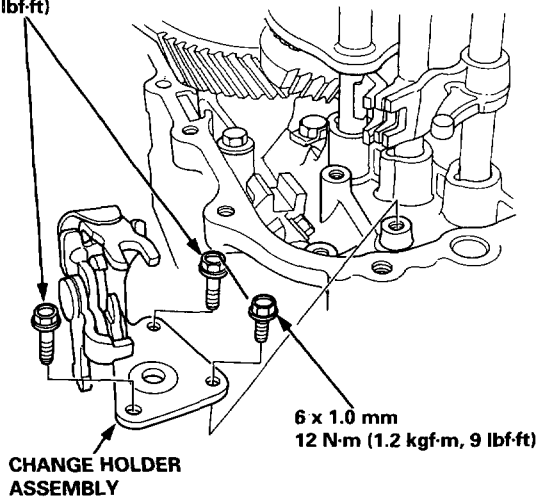
(cont'd)

# Transmission

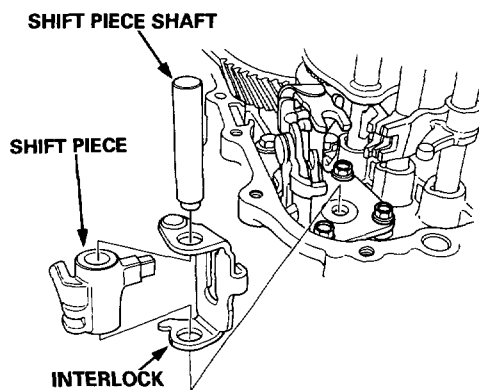
## Reassembly (cont'd)

11. Install the change holder assembly.

6 x 1.0 mm  
15 N·m (1.5 kgf·m,  
11 lbf·ft)

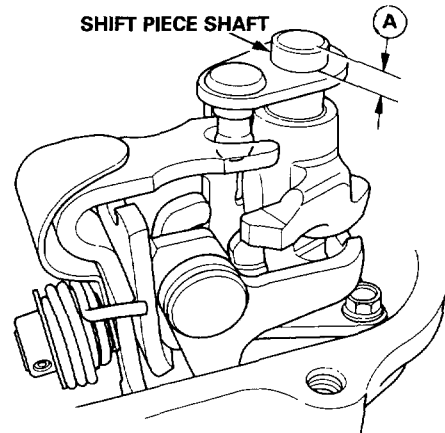


12. Install the shift piece and the interlock, then install the shift piece shaft.

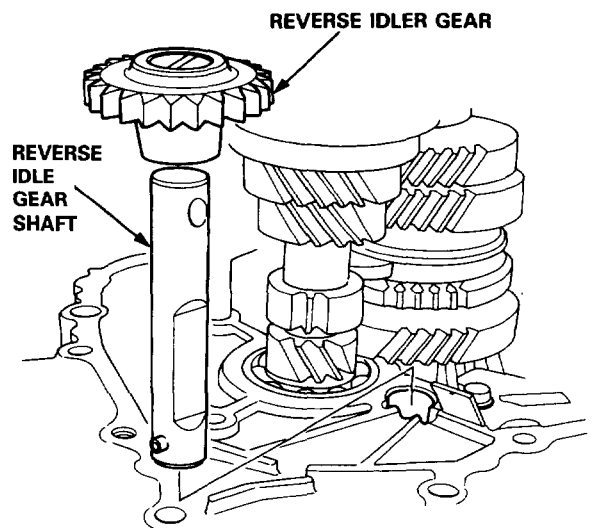


13. Measure the distance (A) after mounting the shift piece shaft. If it's incorrect, check the installation.

Distance (A): 11.9 – 12.3 mm (0.47 – 0.48 in)



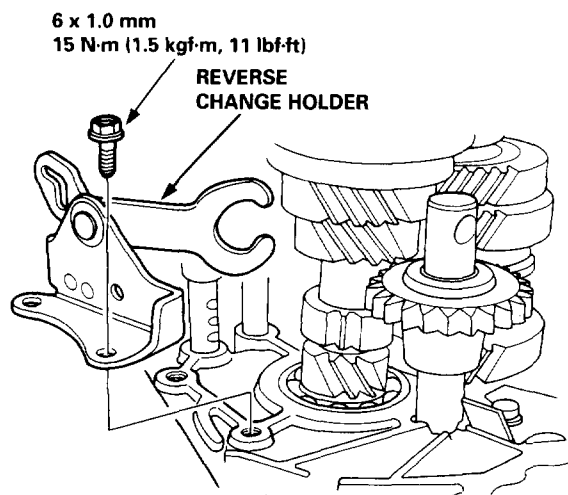
14. Install the reverse idler gear and the reverse idler gear shaft.



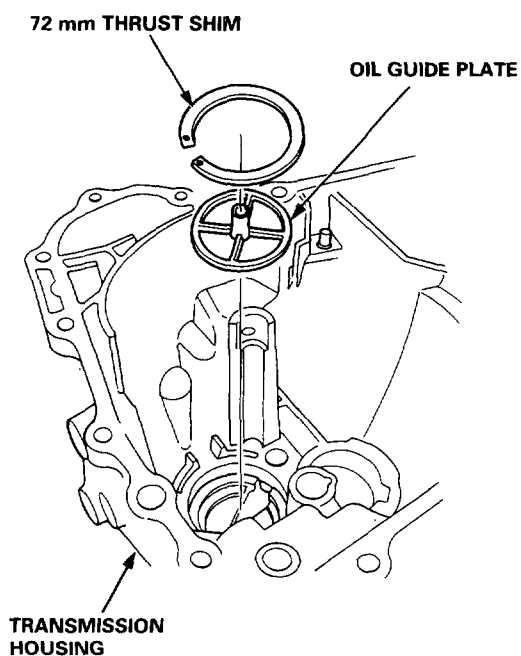




15. Install the reverse change holder.



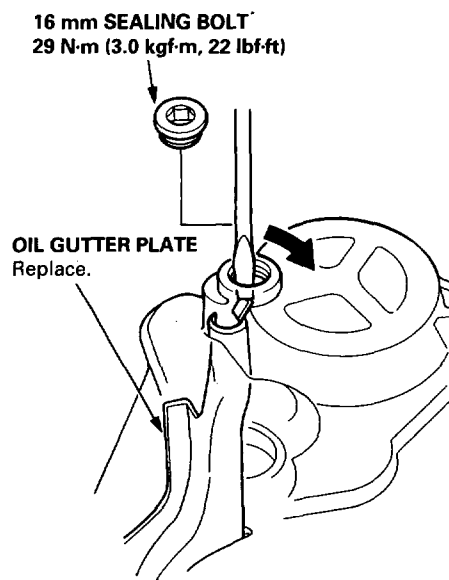
16. Install the oil guide plate and the 72 mm thrust shim into the transmission housing.



17. Install the oil gutter plate.

18. Bend the hook of the oil gutter plate, then install the 16 mm sealing bolt.

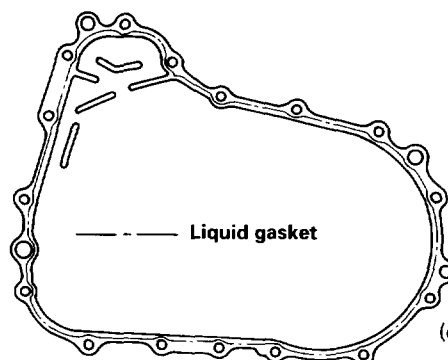
NOTE: Apply liquid gasket (P/N 08C70 - X0134SEB/08C70 - X0231SEB or 08C70 - K0234MEB/08C70 - K0334MEB) to the threads.



19. Apply liquid gasket to the surface of the transmission housing as shown.

NOTE:

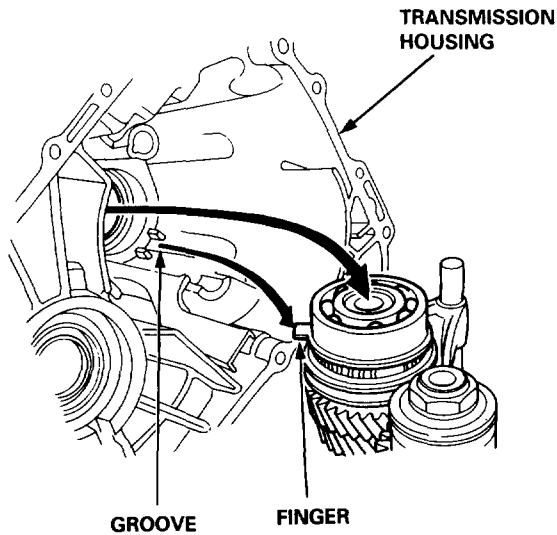
- Use liquid gasket (P/N 08C70 - X0134SEB/08C70 - X0231SEB or 08C70 - K0234MEB/08C70 - K0334MEB).
- Remove the dirty oil from the sealing surface.
- Seal the entire circumference of the bolt holes to prevent oil leakage.
- If 20 minutes have passed after applying liquid gasket, reapply it and assemble the housings, and allow it to cure at least 30 minutes after assembly before filling the transmission with oil.



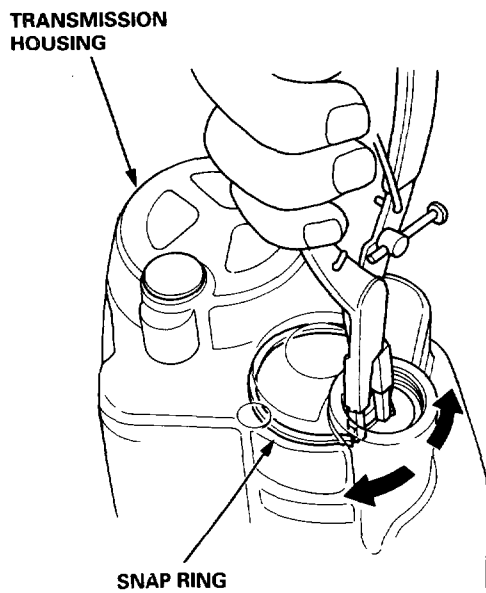
# Transmission

## Reassembly (cont'd)

20. Install the dowel pins.
21. Install the transmission housing by aligning the groove in the housing with the finger on the stopper ring.

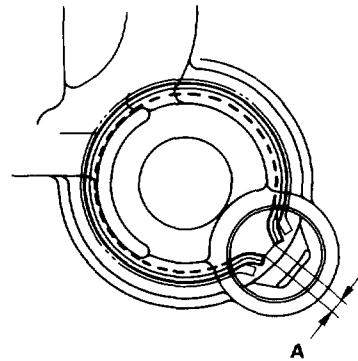


22. Lower the transmission housing with the snap ring pliers, and set the snap ring in the groove of the countershaft bearing.



23. Check that the snap ring is securely seated in the groove of the countershaft bearing.

Dimension **A** as installed: 4.6 – 8.3 mm  
(0.181 – 0.327 in)

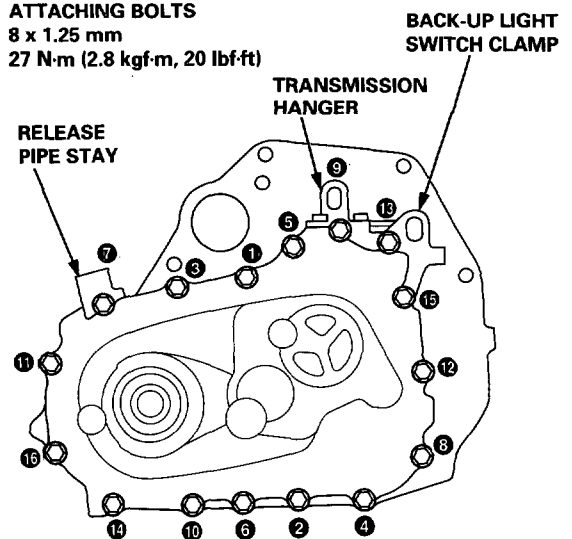


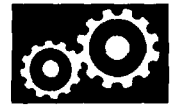
24. Install the transmission hanger A and back-up light switch clamp, then tighten the transmission housing attaching bolts in the numbered sequence shown below.

### ATTACHING BOLTS

8 x 1.25 mm

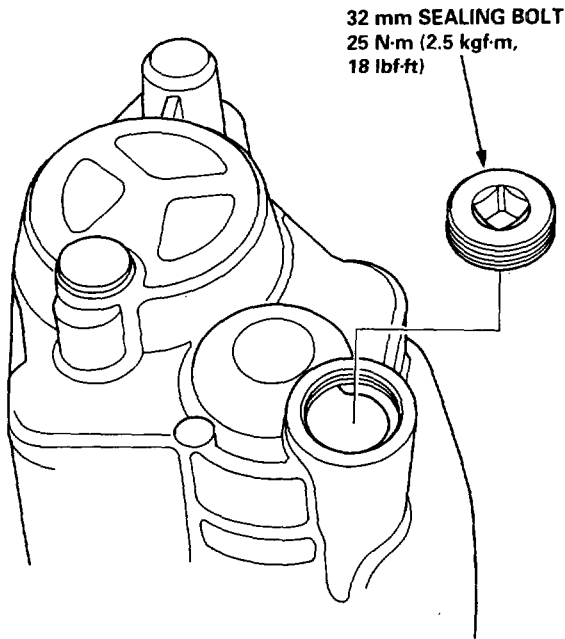
27 N·m (2.8 kgf·m, 20 lbf·ft)



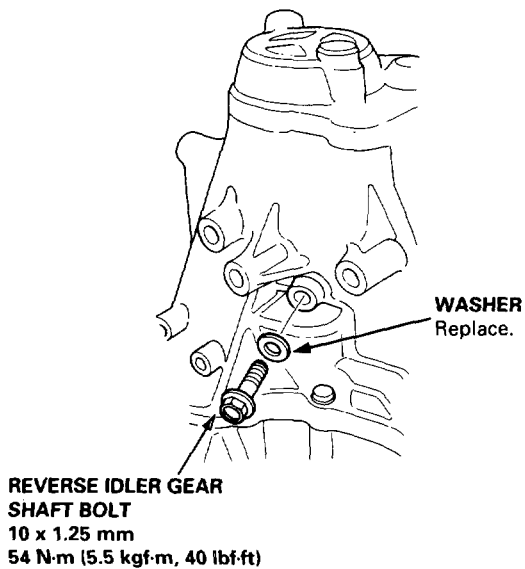


25. Install the 32 mm sealing bolt.

NOTE: Apply liquid gasket (P/N 08C70 - X0134SEB/08C70 - X0231SEB or 08C70 - K0234MEB/08C70 - K0334MEB) to the threads.

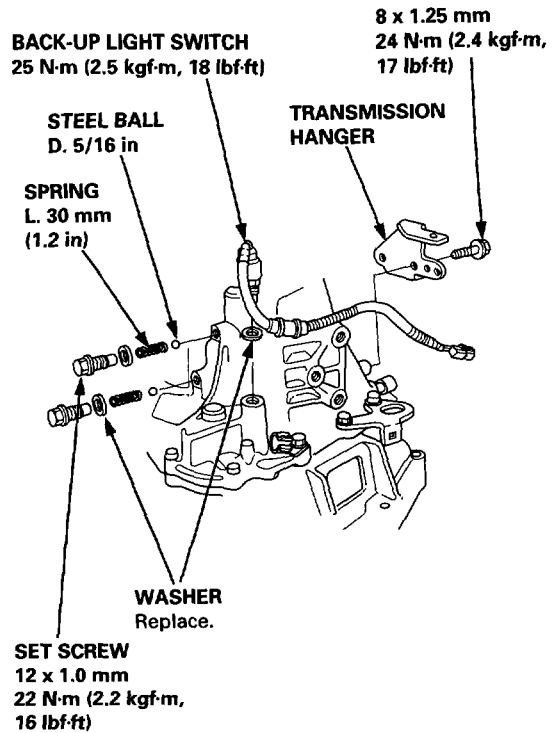


26. Tighten the reverse idler gear shaft bolt.



27. Install the steel balls, the springs, and the set screws.

28. Install the back-up light switch and the transmission hanger B.



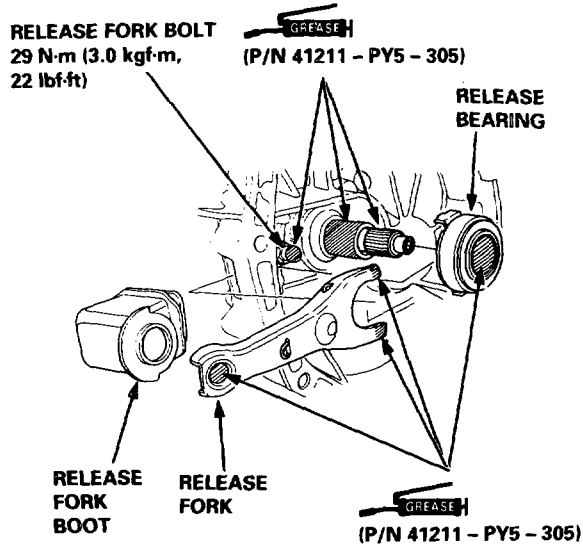
# Transmission Assembly

## Installation

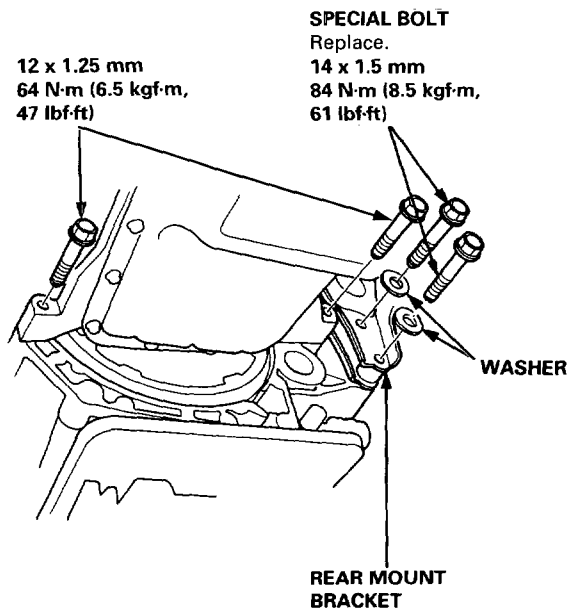
1. Install the two dowel pins.
2. Apply grease to the parts as shown, then install the release fork and release bearing.

NOTE: Use only HONDA Genuine Urea Grease UM264 (P/N 41211 - PY5 - 305).

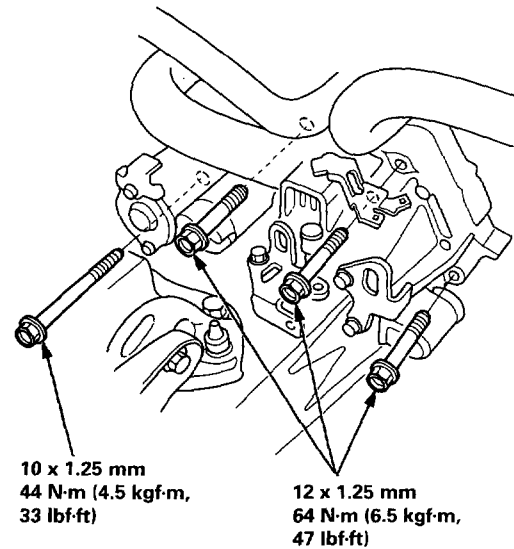
3. Install the release fork boot.



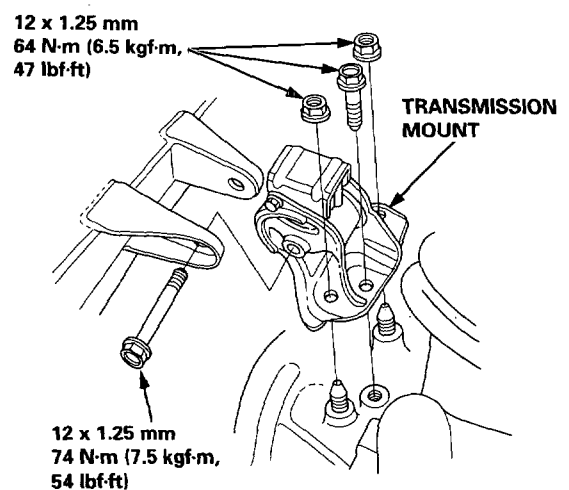
4. Place the transmission on the transmission jack, and raise it to the engine level.
5. Install the transmission mounting bolts and rear mount bracket bolts.



6. Install the three upper transmission mounting bolts and lower starter motor mounting bolt.

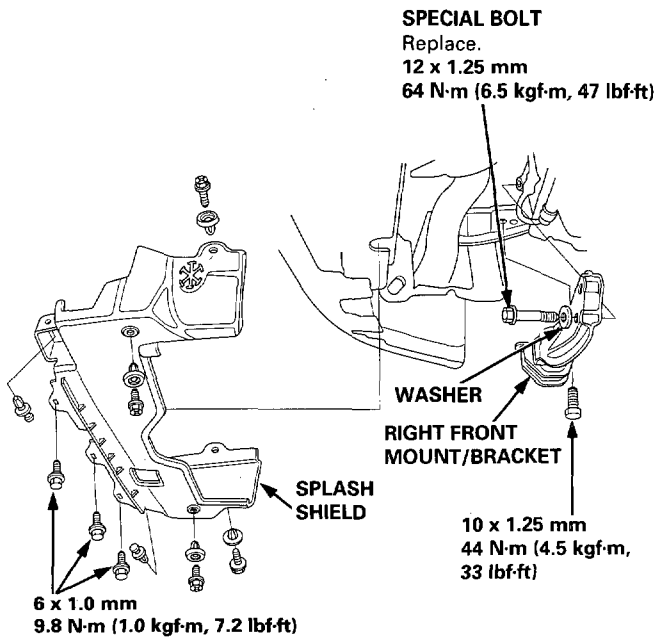


7. Raise the transmission, then install the transmission mount.

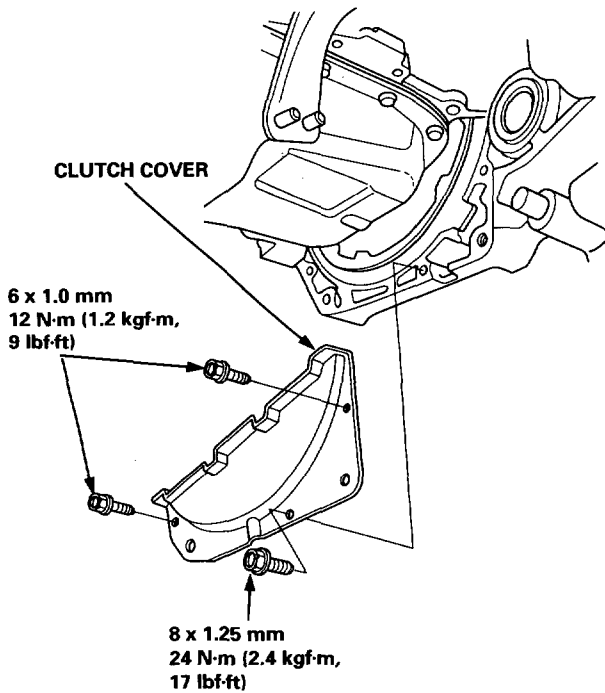




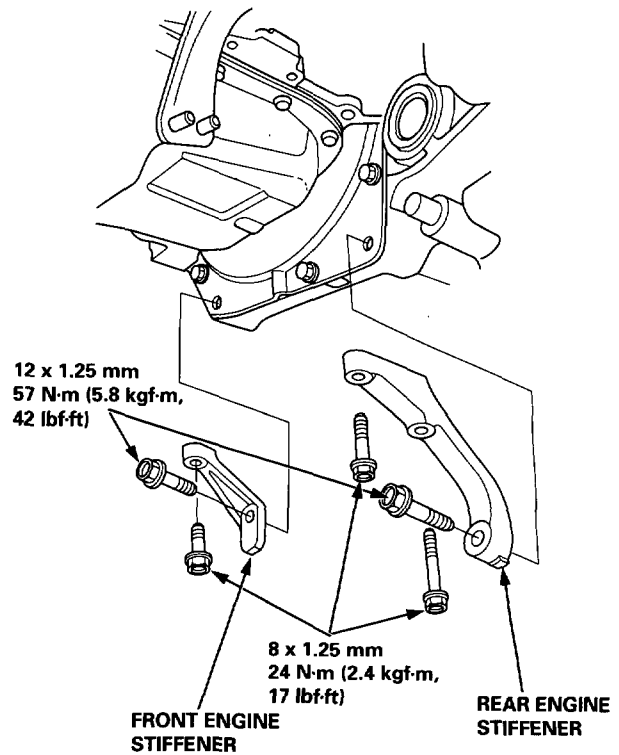
8. Install the right front mount/bracket and splash shield.



9. Install the clutch cover.



10. Install the front and rear engine stiffeners.

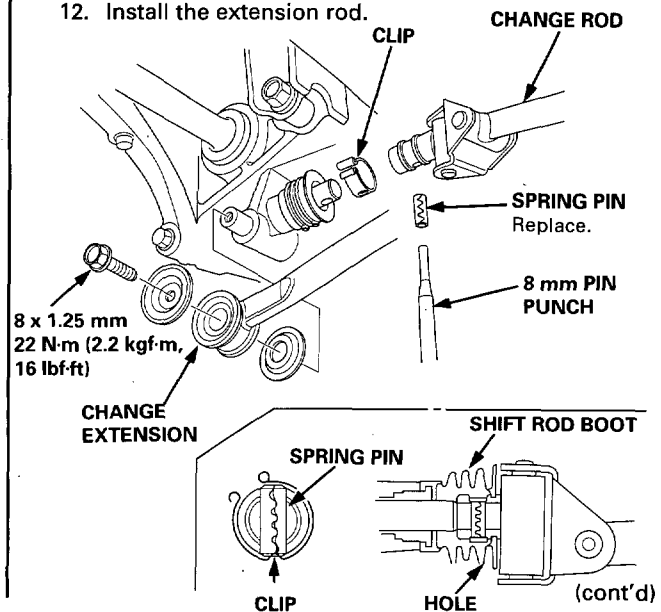


11. Install the shift rod, spring pin, and clip as shown.

NOTE:

- Turn the boot so the hole is facing down.
- Make sure the boot is installed on the shift rod.

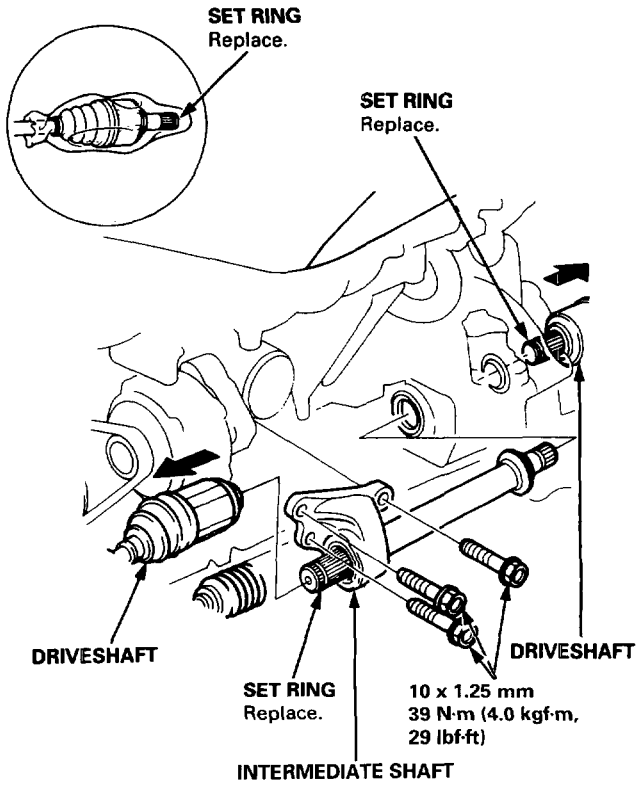
12. Install the extension rod.



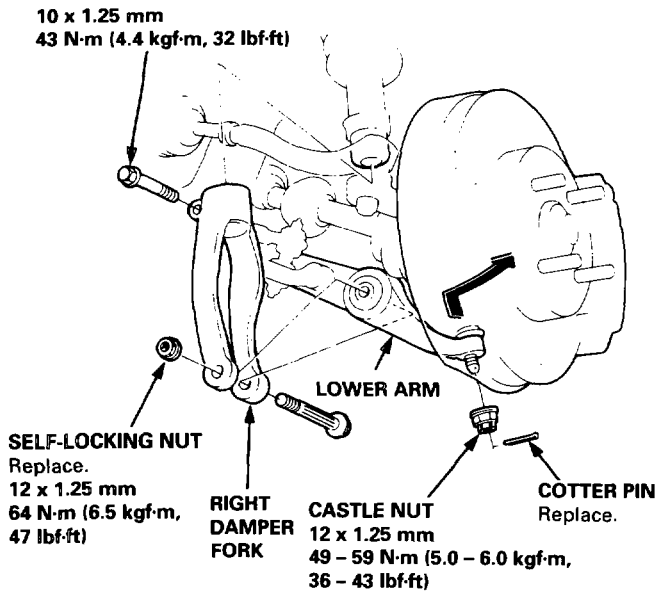
# Transmission Assembly

## Installation (cont'd)

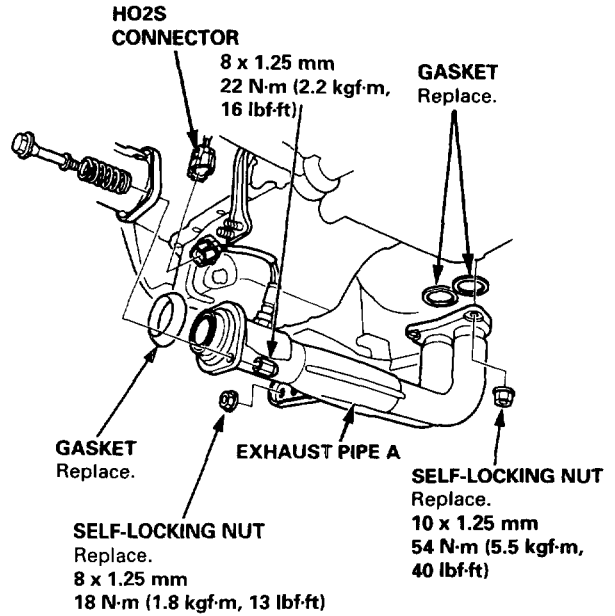
13. Install the intermediate shaft and driveshafts (see section 16).



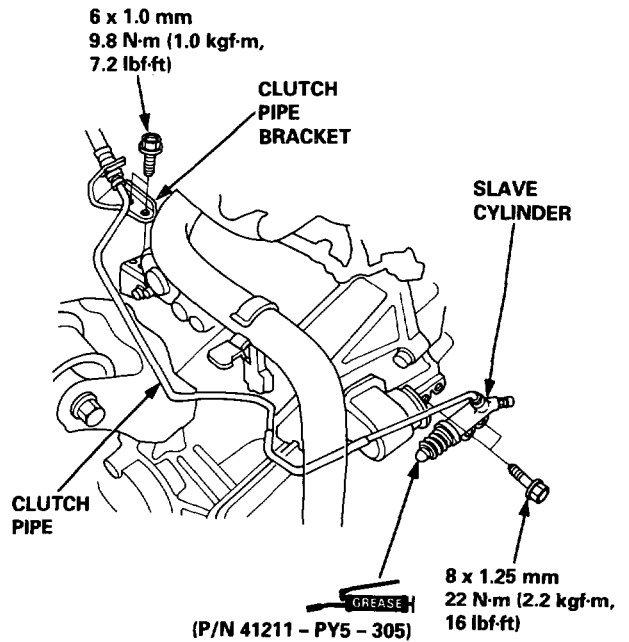
14. Install the damper fork to the lower arm, then install the ball joint to the lower arm with a new cotter pin.

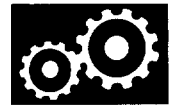


15. Install the exhaust pipe A, then connect the heated oxygen sensor (HO2S) connector.



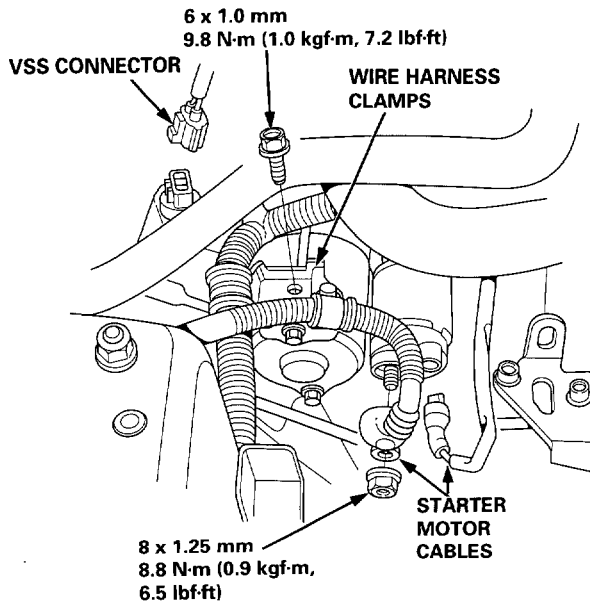
16. Install the slave cylinder and clutch pipe bracket.





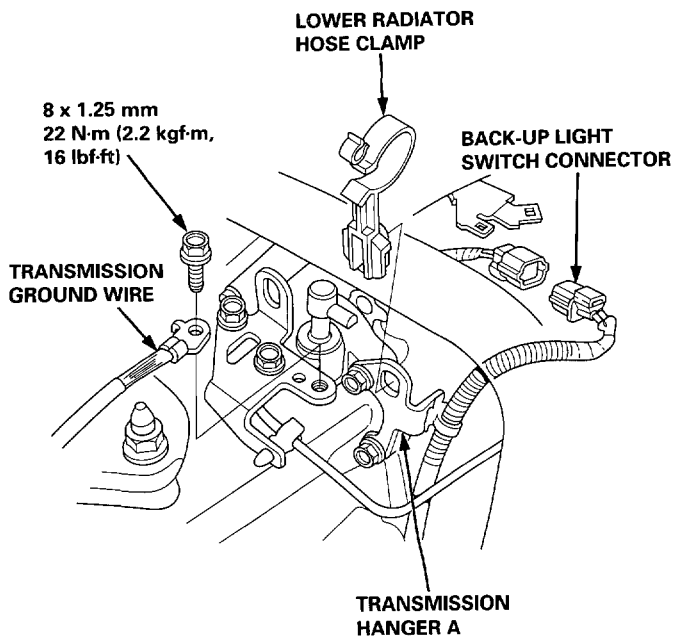
17. Connect the vehicle speed (VSS) connector and starter motor cables.

18. Install the wire harness clamps.

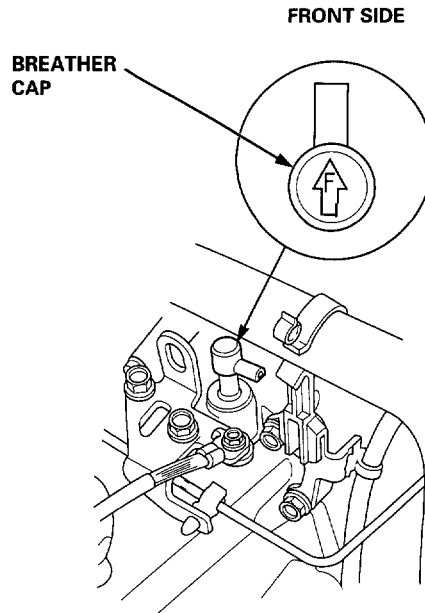


19. Install the lower radiator hose clamp to the transmission hanger A.

20. Connect the back-up light switch connector and the transmission ground wire.



21. Turn the breather cap so that "F" mark points at the front of the vehicle as shown.



22. Install the air cleaner housing assembly and intake air duct (see section 5).

23. Refill the transmission with oil (see page 13-53).

24. Connect the positive (+) cable first, then the negative (-) cable to the battery.

25. Shift the transmission, and check for smooth operation.

26. Check the front wheel alignment (see section 18).

# Automatic Transmission

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# Special Tools

Ref. No.	Tool Number	Description	Qty	Remark
①	07HAC - PK40101	Housing Puller	1	
②	07JAC - PH80000	Adjustable Bearing Remover Set	1	
②-1	07JAC - PH80100	Bearing Remover Attachment	1	
②-2	07JAC - PH80200	Remover Handle Assembly	1	
②-3	07741 - 0010201	Remover Weight	1	
③	07JAD - PH80101	Driver Attachment, 58 mm	1	
④	07JAD - PH80200	Pilot, 26 x 30 mm	1	
⑤	07LAE - PX40000	Clutch Spring Compressor Set	1	
⑤-1	07GAE - PG40200	Clutch Spring Compressor Bolt Assembly	1	
⑤-2	07HAE - PL50100	Clutch Spring Compressor Attachment	1	
⑤-3	07LAE - PX40100	Clutch Spring Compressor Attachment	1	
⑥	07LGC - 0010100	Snap Ring Pliers	1	
⑦	07PAB - 0010000	Mainshaft Holder Set	1	
⑧	07406 - 0020004	A/T Oil Pressure Gauge Set	1	
⑨	07406 - 0070001	A/T Low Pressure Gauge	1	
⑩	07746 - 0010100	Driver Attachment, 32 x 35 mm	1	
⑪	07746 - 0010500	Driver Attachment, 62 x 68 mm	1	
⑫	07746 - 0010600	Driver Attachment, 72 x 75 mm	1	
⑬	07746 - 0030100	Driver 40 mm I.D.	1	
⑭	07749 - 0010000	Handle Driver	1	
⑮	07947 - 6110501	Driver Attachment, 68 mm	1	

The image contains 15 numbered technical drawings of special tools:

- ①: Housing puller with three arms.
- ②: Adjustable bearing remover set, including attachment ②-1, handle assembly ②-2, and weight ②-3.
- ③: Flat circular driver attachment.
- ④: Small cylindrical pilot.
- ⑤-1: Clutch spring compressor bolt assembly.
- ⑤-2: Clutch spring compressor attachment.
- ⑤-3: Clutch spring compressor attachment.
- ⑥: Snap ring pliers.
- ⑦: Mainshaft holder set.
- ⑧: A/T oil pressure gauge set.
- ⑨: A/T low pressure gauge.
- ⑩, ⑪, ⑫: Driver attachments of different sizes.
- ⑬: Driver with 40 mm I.D.
- ⑭: Handle driver.
- ⑮: Driver attachment.



The automatic transmission is a combination of a 3-element torque converter and triple-shaft automatic transmission which provides 4 speeds forward and 1 reverse. The entire unit is positioned in line with the engine.

## **Torque Converter, Gears and Clutches**

The torque converter consists of a pump, turbine and stator assembled in a single unit. The torque converter is connected to the engine crankshaft so they turn together as a unit as the engine turns. Around the outside of the torque converter is a ring gear which meshes with the starter pinion when the engine is being started. The entire torque converter assembly serves as a flywheel while transmitting power to the transmission mainshaft.

The transmission has three parallel shafts: the mainshaft, the countershaft and the sub-shaft. The mainshaft is in line with the engine crankshaft. The mainshaft includes the 1st, and 2nd/4th clutches, and gears for 3rd, 2nd, 4th, reverse and 1st (3rd gear is integral with the mainshaft, while reverse gear is integral with the 4th gear).

The countershaft includes the 3rd clutch and gears for 3rd, 2nd, 4th, reverse, 1st and parking. Reverse and 4th gears can be locked to the countershaft at its center, providing 4th gear or reverse, depending on which way the selector is moved.

The sub-shaft includes the 1st-hold clutch and gears for 1st and 4th.

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 **D<sub>4</sub>**, **D<sub>3</sub>**, **2**, **1** and **R** positions.

## **Hydraulic Control**

The valve body assembly includes the main valve body, the secondary valve body, the regulator valve body, the servo body, the modulator valve body, the lock-up valve body, the modulator valve body, and the governor body, through the respective separator plates.

They are bolted to the torque converter housing.

The main valve body contains the manual valve, the 1-2 shift valve, the 2-3 shift valve, the 3-4 shift valve, the 3-2 timing valve, the 4th exhaust valve, the relief valve, and the ATF pump gears.

The secondary valve body contains the 4-3 kick-down valve, the 2nd ON orifice control valve, the 2-3 orifice control valve, the 2-1 timing valve, the Clutch Pressure Control (CPC) valve, the servo control valve, the reverse control valve, and the governor cut valve.

The regulator valve body contains the pressure regulator valve, the lock-up control valve, the torque converter check valve, and the cooler check valve.

The servo body contains the servo valve which is integrated with the shift fork shaft, the throttle valves A and B, the 2/3-4 orifice control valve, and the accumulators.

The modulator valve body, which is bolted on the servo body, contains the modulator valve.

The lock-up valve body contains the lock-up shift valve and the lock-up timing B valve, and is bolted on the regulator valve body.

The governor body is bolted on the torque converter housing next to the differential assembly.

Fluid from the regulator passes through the manual valve to the various control valves.

## **Lock-up Mechanism**

In **D<sub>4</sub>** position, 2nd, 3rd and 4th, and **D<sub>3</sub>** position in 3rd, pressurized fluid is drained from the back of the torque converter through a fluid passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the engine control module (ECM) optimizes the timing of the lock-up mechanism.

The lock-up shift valve controls the range of lock-up according to the lock-up control solenoid valves A and B, and throttle valve B. The lock-up control solenoid valves A and B are mounted on the torque converter housing, and are controlled by the ECM.

(cont'd)

# Description

(cont'd)

## Gear Selection

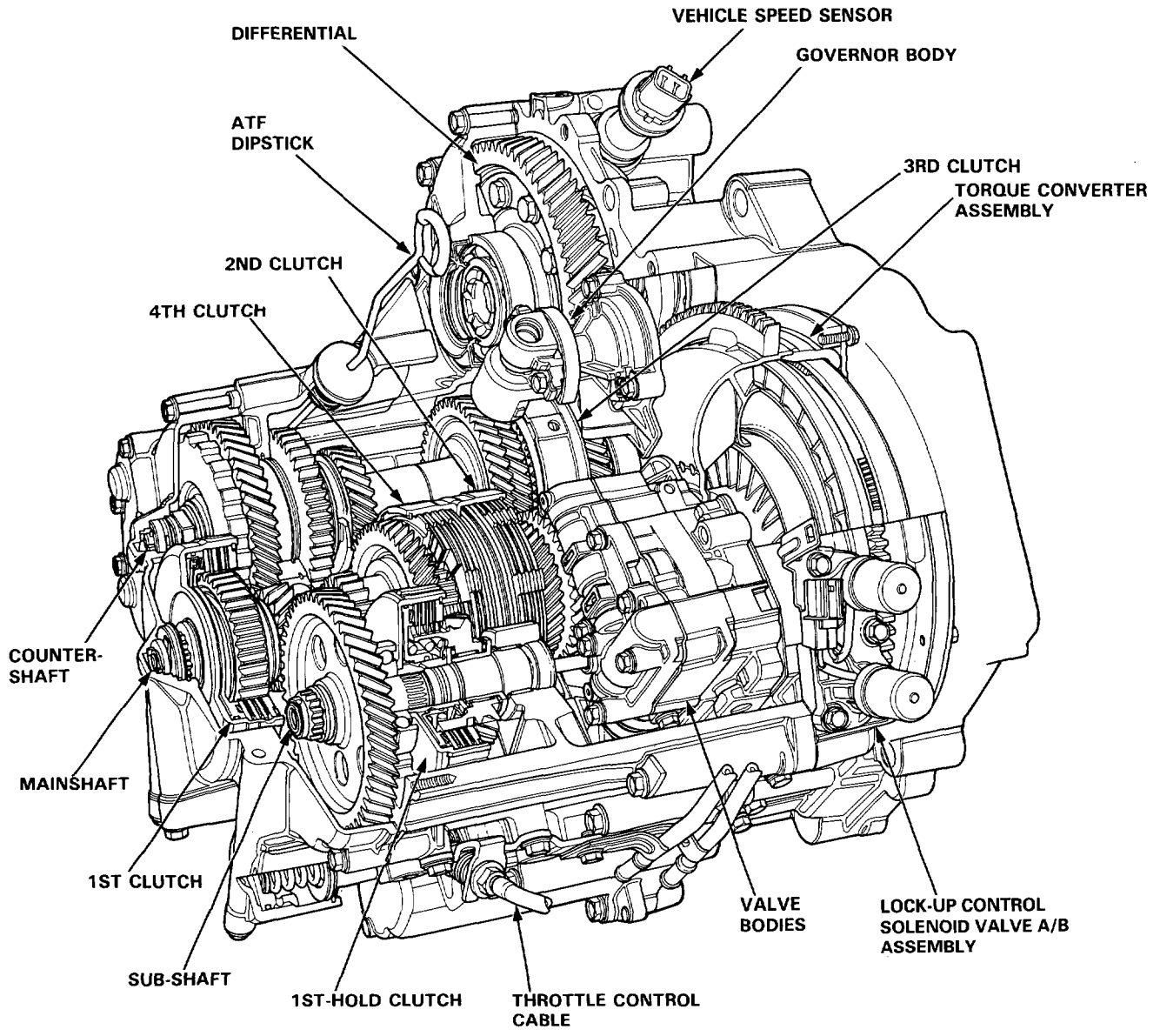
The shift lever has seven positions; **P** PARK, **R** REVERSE, **N** NEUTRAL, **D<sub>4</sub>** 1st through 4th ranges, **D<sub>3</sub>** 1st through 3rd ranges, **2** 2nd gear and **1** 1st gear.

Position	Description
<b>P</b> PARK	Front wheels locked; parking brake pawl engaged with parking gear on countershaft. All clutches released.
<b>R</b> REVERSE	Reverse; reverse selector engaged with countershaft reverse gear and 4th clutch locked.
<b>N</b> NEUTRAL	All clutches released.
<b>D<sub>4</sub></b> DRIVE (1st through 4th)	General driving; starts off in 1st, shifts automatically to 2nd, 3rd, then 4th, depending on vehicle speed and throttle position. Downshifts through 3rd, 2nd and 1st on deceleration to stop. The lock-up mechanism operates in 2nd, 3rd and 4th gear.
<b>D<sub>3</sub></b> DRIVE (1st through 3rd)	For rapid acceleration at highway speeds and general driving; starts off in 1st, shifts automatically to 2nd then 3rd, depending on vehicle speed and throttle position. Downshifts through lower gears on deceleration to stop. The lock-up mechanism operates in 3rd gear.
<b>2</b> SECOND	Driving in 2nd gear; stays in 2nd gear, does not shift up and down. For engine braking or better traction starting off on loose or slippery surface.
<b>1</b> FIRST	Driving in 1st gear; stays in 1st gear, does not shift up. For engine braking.

Starting is possible only in **P** and **N** positions through the use of a slide-type, neutral-safety switch.

## Automatic Transaxle (A/T) Gear Position Indicator

A/T gear position indicator in the instrument panel shows what gear has been selected without having to look down at the console.



# Description

## Clutches

The four-speed automatic transmission uses hydraulically-actuated clutches to engage or disengage the transmission gears. When hydraulic pressure is introduced into the clutch drum, the clutch piston moves. This presses the friction discs and steel plates together, locking them so they don't slip. Power is then transmitted through the engaged clutch pack to its hub-mounted gear.

Likewise, when the hydraulic pressure is bled from the clutch pack, the piston releases the friction discs and steel plates, and they are free to slide past each. This allows the gear to spin independently of its shaft, transmitting no power.

### 1st Clutch

The 1st clutch engages/disengages 1st gear, and is located at the end of the mainshaft, just behind the right side cover. The 1st clutch is supplied hydraulic pressure by its ATF feed pipe within the mainshaft.

### 1st-hold Clutch

The 1st-hold clutch engages/disengages 1st-hold or **1** position, and is located at the middle of the sub-shaft. The 1st-hold clutch is supplied hydraulic pressure by its ATF feed pipe within the sub-shaft.

### 2nd Clutch

The 2nd clutch engages/disengages 2nd gear, and is located at the middle of the mainshaft. The 2nd clutch is joined back-to-back to the 4th clutch. The 2nd clutch is supplied hydraulic pressure through the mainshaft by a circuit connected to the internal hydraulic circuit.

### 3rd Clutch

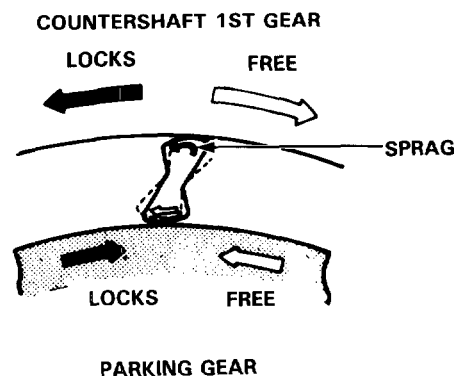
The 3rd clutch engages/disengages 3rd gear, and is located at the end of the countershaft, opposite the right side cover. The 3rd clutch is supplied hydraulic pressure by its ATF feed pipe within the countershaft.

### 4th Clutch

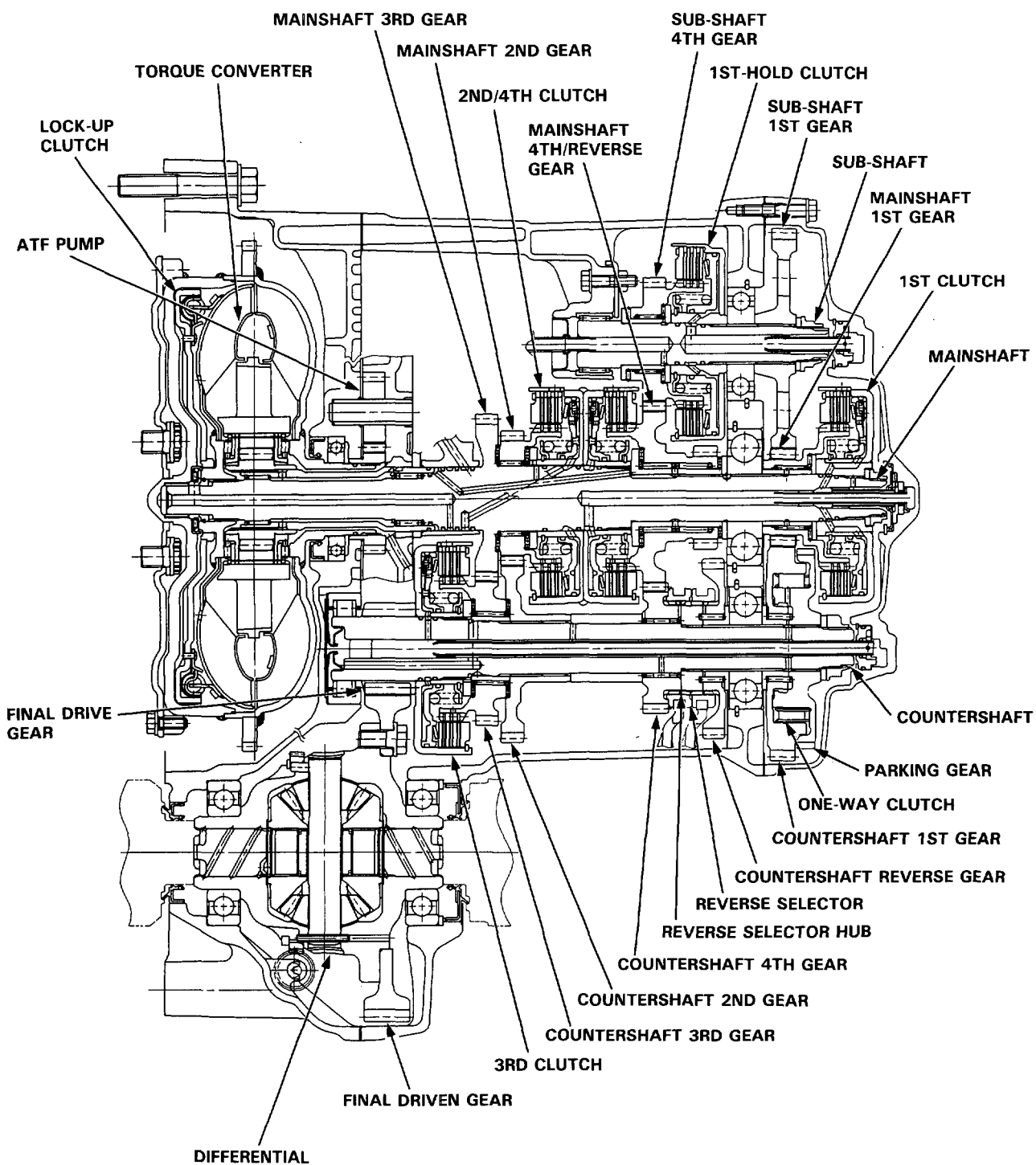
The 4th clutch engages/disengages 4th gear, as well as reverse gear, and the is located at the middle of the mainshaft. The 4th clutch is joined back-to-back to the 2nd clutch. The 4th clutch is supplied hydraulic pressure by its ATF feed pipe within the mainshaft.

### One-way Clutch

The one-way clutch is positioned between the parking gear and the countershaft 1st gear, with the parking gear splined to the countershaft. The countershaft 1st gear provides the outer race surface, and the parking gear provides the inner race surface. The one-way clutch locks up when power is transmitted from the mainshaft 1st gear to the countershaft 1st gear. The 1st clutch and gears remain engaged in the 1st, 2nd, 3rd, and 4th gear ranges in the **D<sub>4</sub>**, **D<sub>3</sub>** or **2** position. However, the one-way clutch disengages when the 2nd, 3rd, or 4th clutches/gears are applied in the **D<sub>2</sub>**, **D<sub>2</sub>** or **2** position. This is because the increased rotational speed of the gears on the countershaft over-ride the locking "speed range" of the one-way clutch. Thereafter, the one-way clutch free-wheels with the 1st clutch still engaged.



NOTE: View from right side cover side.



# Description

## Power Flow

PART POSITION	TORQUE CONVERTER	1ST-HOLD CLUTCH	1ST GEAR 1ST CLUTCH	2ND GEAR 2ND CLUTCH	3RD GEAR 3RD CLUTCH	4TH		REVERSE GEAR	PARKING GEAR
						GEAR	CLUTCH		
<b>P</b>	○	×	×	×	×	×	×	×	○
<b>R</b>	○	×	×	×	×	×	○	○	×
<b>N</b>	○	×	×	×	×	×	×	×	×
<b>D<sub>4</sub></b>	1ST	○	×	○*2	×	×	×	×	×
	2ND	○	×	○*1	○	×	×	×	×
	3RD	○	×	○*1	×	○	×	×	×
	4TH	○	×	○*1	×	×	○	○	×
<b>D<sub>3</sub></b>	1ST	○	×	○*2	×	×	×	×	×
	2ND	○	×	○*1	○	×	×	×	×
	3RD	○	×	○*1	×	○	×	×	×
<b>2</b>	○	×	○*1	○	×	×	×	×	×
<b>1</b>	○	○	○	×	×	×	×	×	×

○: Operates, X: Doesn't operate.

\*1: Although the 1st clutch engages, driving power is not transmitted as the one-way clutch slips.

\*2: The one-way clutch engages when accelerating, and slips when decelerating.

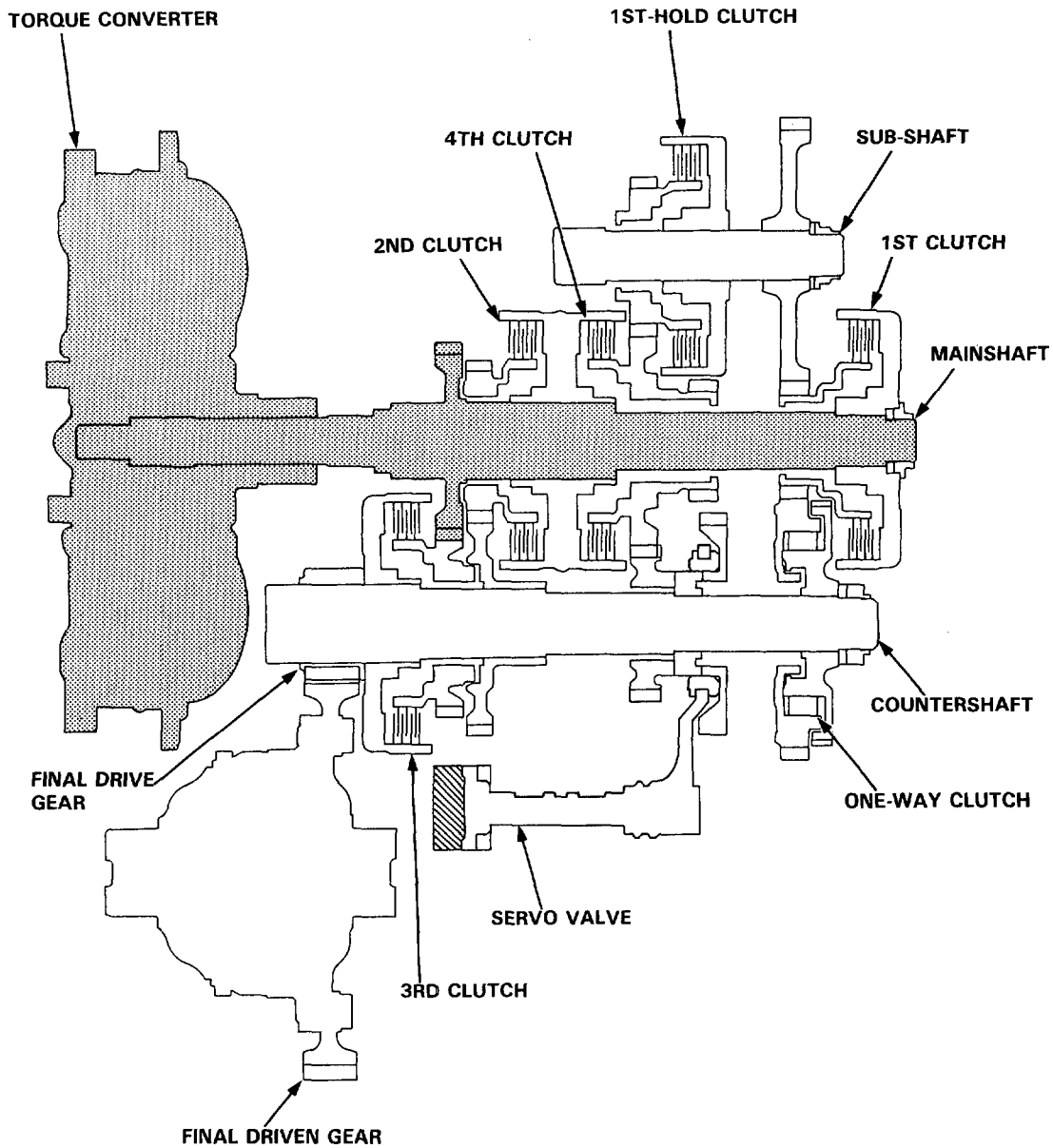


**N Position**

Engine power transmitted from the torque converter drives the mainshaft and the countershaft 3rd gear, but hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft. The countershaft 4th gear is engaged with the reverse selector hub and the countershaft by the reverse selector when the shift lever is shifted in **N** position from **D<sub>4</sub>** position. The countershaft reverse gear is engaged when shifted from **R** position.

**P Position**

Hydraulic pressure is not applied to the clutches. Power is not transmitted to the countershaft. The countershaft is locked by the parking brake pawl interlocking the parking gear.



(cont'd)



# Description

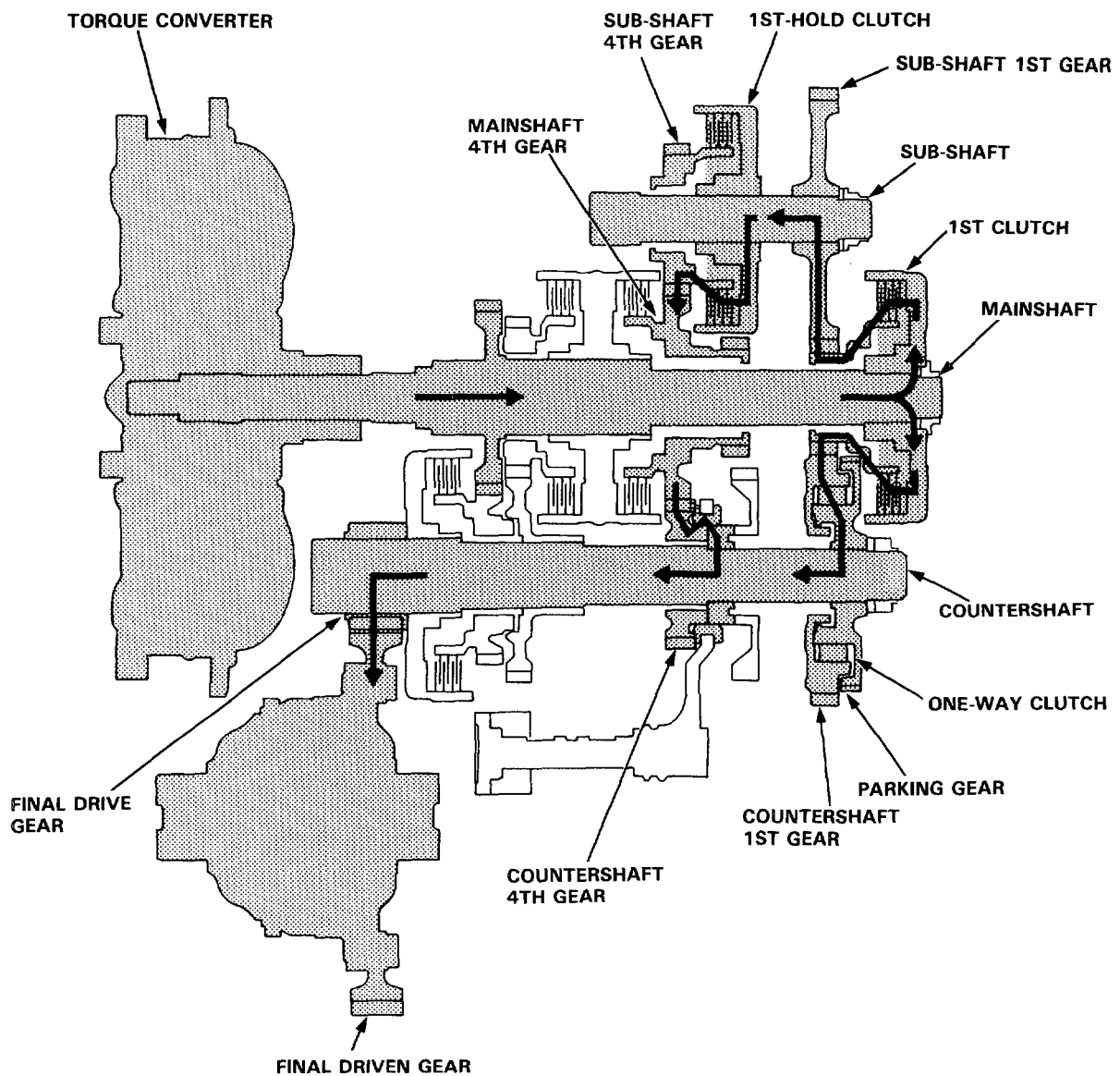
## Power Flow (cont'd)

### 1 Position

In 1 position, hydraulic pressure is applied to the 1st clutch and the 1st-hold clutch.

The power flow when accelerating is as follows:

1. Hydraulic pressure is applied to the 1st clutch on the mainshaft and power is transmitted via the 1st clutch to the mainshaft 1st gear.
2. Hydraulic pressure is also applied to the 1st-hold clutch on the sub-shaft. Power transmitted to the mainshaft 1st gear is conveyed via the countershaft 1st gear to the one-way clutch, and via the sub-shaft 1st gear to the 1st-hold clutch. The one-way clutch is used to drive the countershaft, and the 1st-hold clutch drives the countershaft via the 4th gears.
3. Power is transmitted to the final drive gear, which drives the final driven gear.

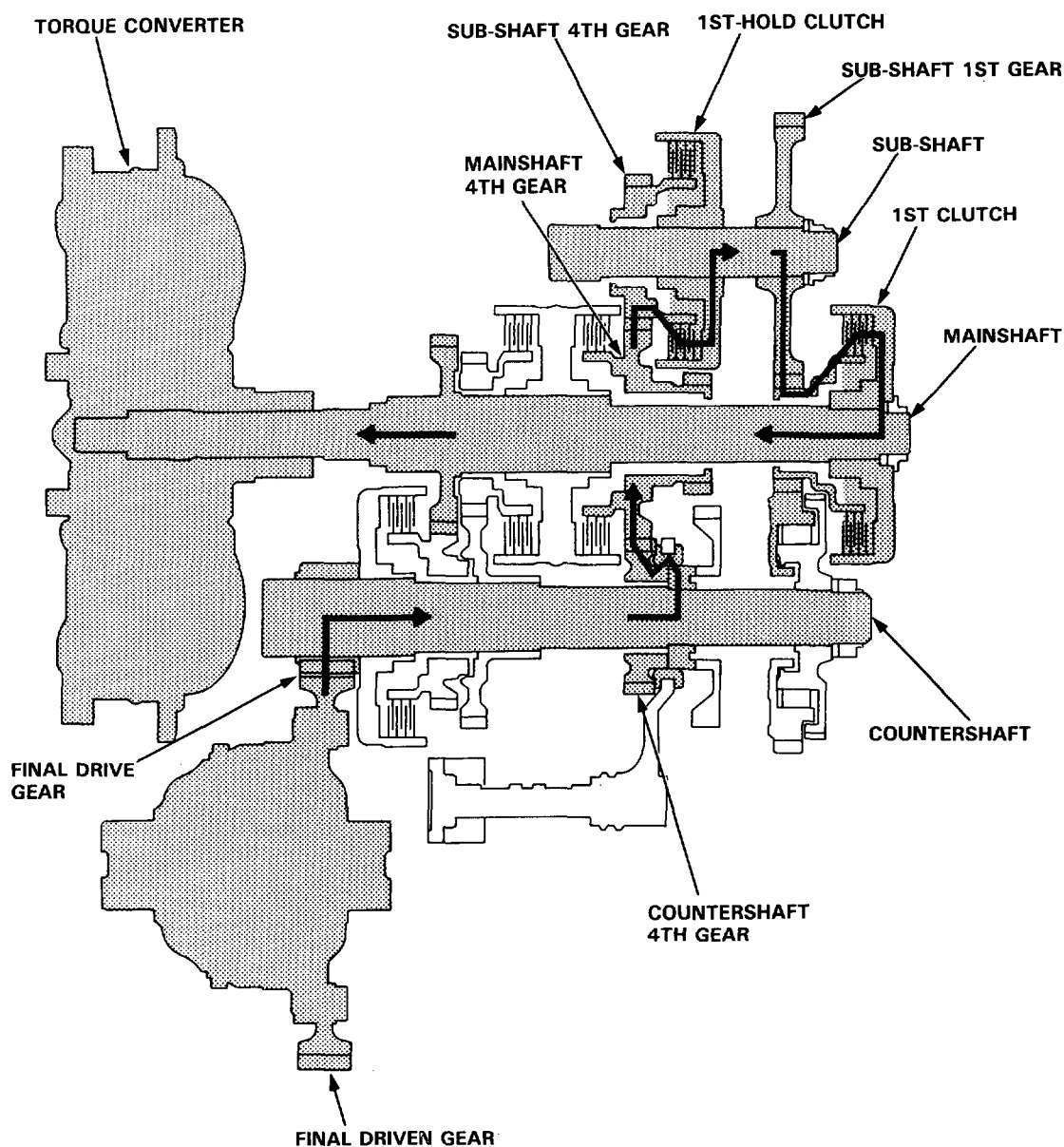




### 1 Position

The power flow when decelerating is as follows;

1. Rolling resistance from the road surface goes through the front wheels to the final drive gear, then to the sub-shaft 1st gear via the 4th gear, and the 1st-hold clutch which is applied during deceleration.
2. The one-way clutch becomes free at this time because the application of torque is reversed.
3. The counterforce conveyed to the countershaft 4th gear turns the sub-shaft 4th gear via the mainshaft 4th gear. At this time, since hydraulic pressure is also applied to the 1st clutch, counterforce is also transmitted to the mainshaft. As a result, engine braking can be obtained with 1st gear.



(cont'd)

# Description

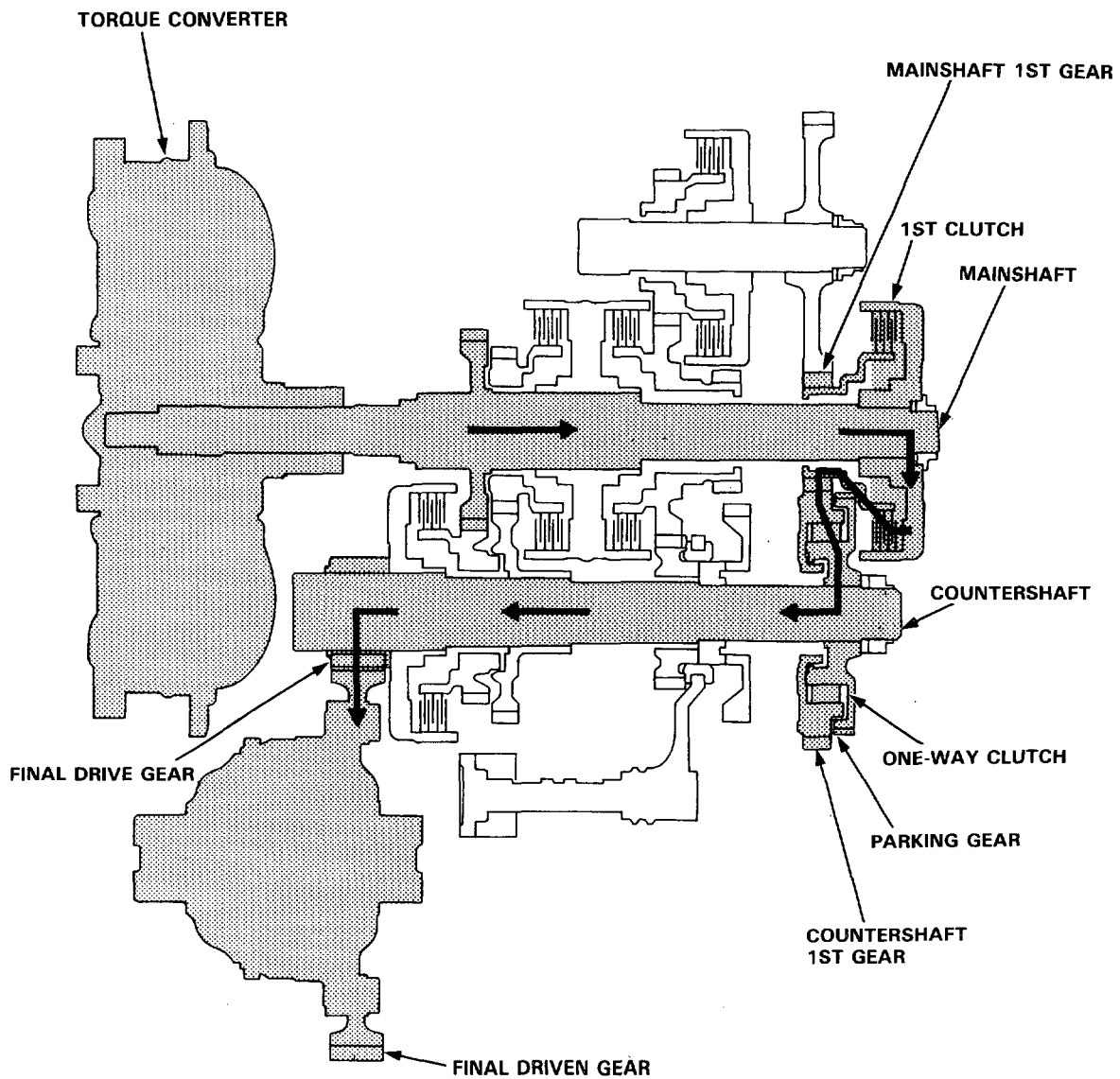
## Power Flow (cont'd)

### 1st Gear (D<sub>4</sub> or D<sub>3</sub> position)

In D<sub>4</sub> or D<sub>3</sub> position, the optimum gear is automatically selected from 1st, 2nd, 3rd and 4th gears, according to conditions such as the balance between throttle opening (engine load) and vehicle speed.

1. Hydraulic pressure is applied to the 1st clutch, which rotates together with the mainshaft, and the mainshaft 1st gear rotates.
2. Power is transmitted to the countershaft 1st gear, which drives the countershaft via the one-way clutch.
3. Power is transmitted to the final drive gear, which drives the final driven gear.

NOTE: In D<sub>4</sub>, D<sub>3</sub> or 2 position, hydraulic pressure is not applied to the 1st-hold clutch.

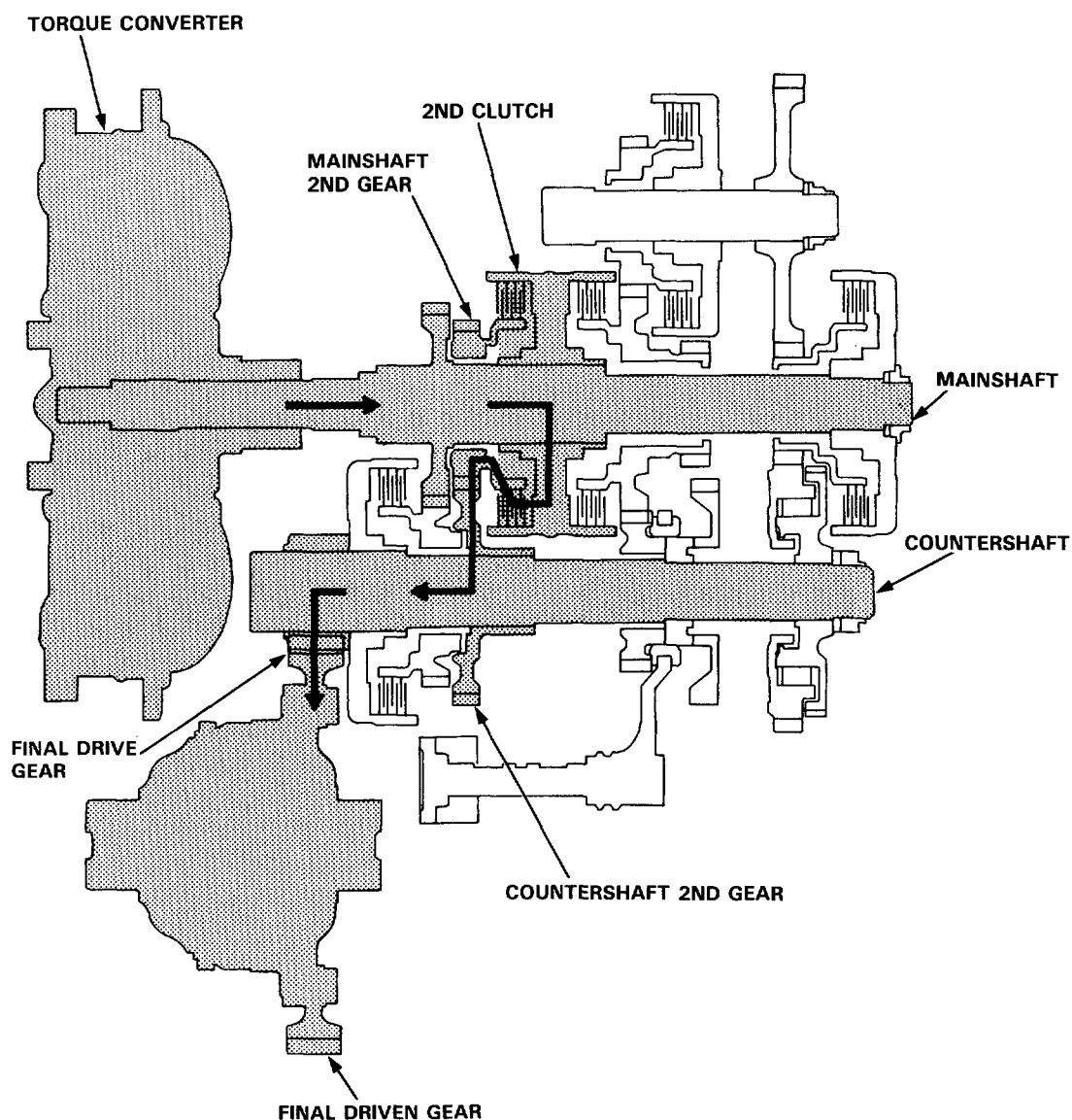




### 2nd Gear (D<sub>1</sub>, D<sub>2</sub> or 2 position)

1. Hydraulic pressure is applied to the 2nd clutch, which rotates together with the mainshaft, and the mainshaft 2nd gear rotates.
2. Power is transmitted to the countershaft 2nd gear, which drives the countershaft.
3. Power is transmitted to the final drive gear, which drives the final driven gear.

NOTE: Hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 2nd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.



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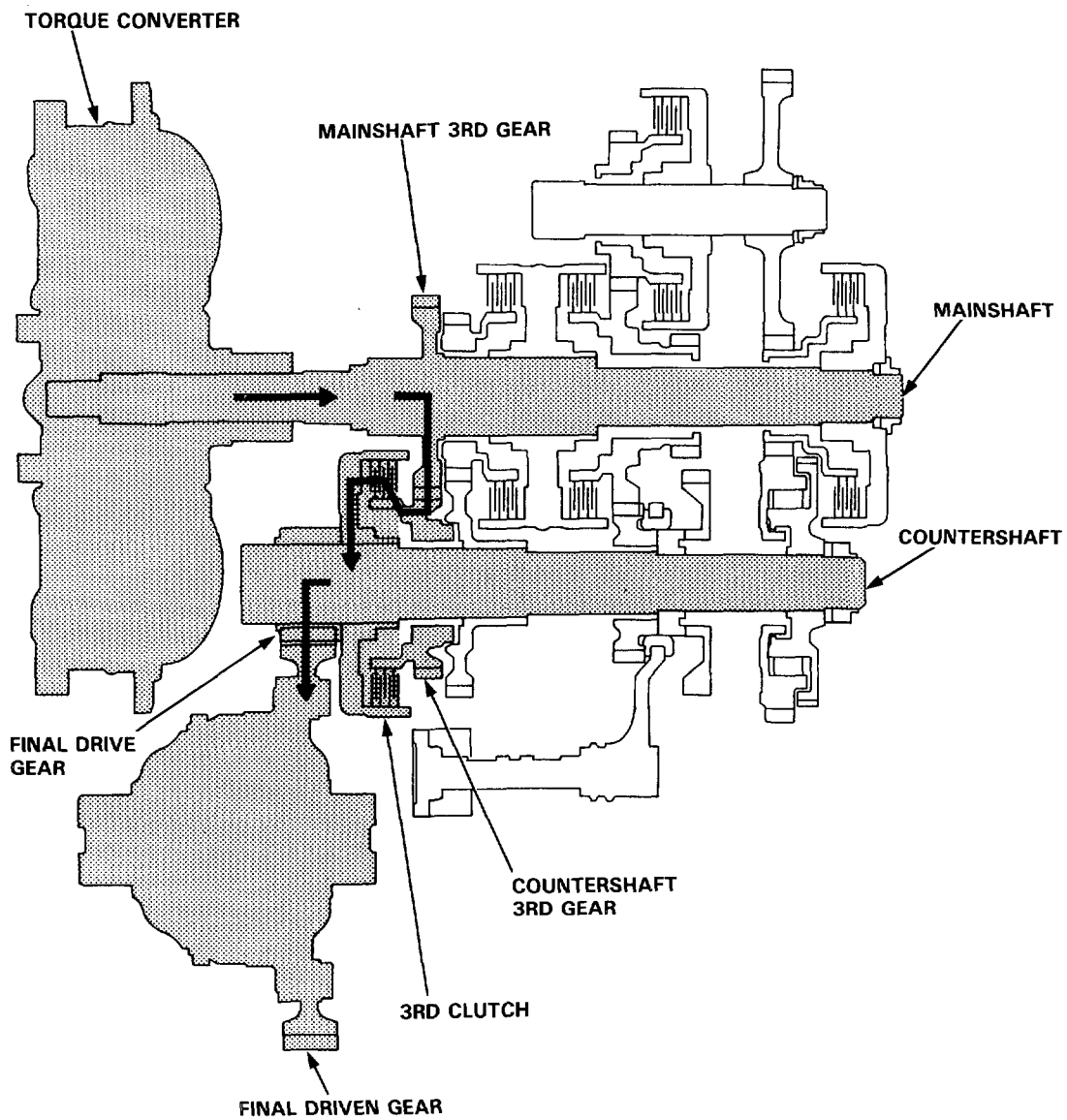
# Description

## Power Flow (cont'd)

### 3rd Gear (D<sub>2</sub> or D<sub>3</sub> position)

1. Hydraulic pressure is applied to the 3rd clutch. Power from the mainshaft 3rd gear is transmitted to the countershaft 3rd gear.
2. Power is transmitted to the final drive gear, which drives the final driven gear.

NOTE: Hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 3rd gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.

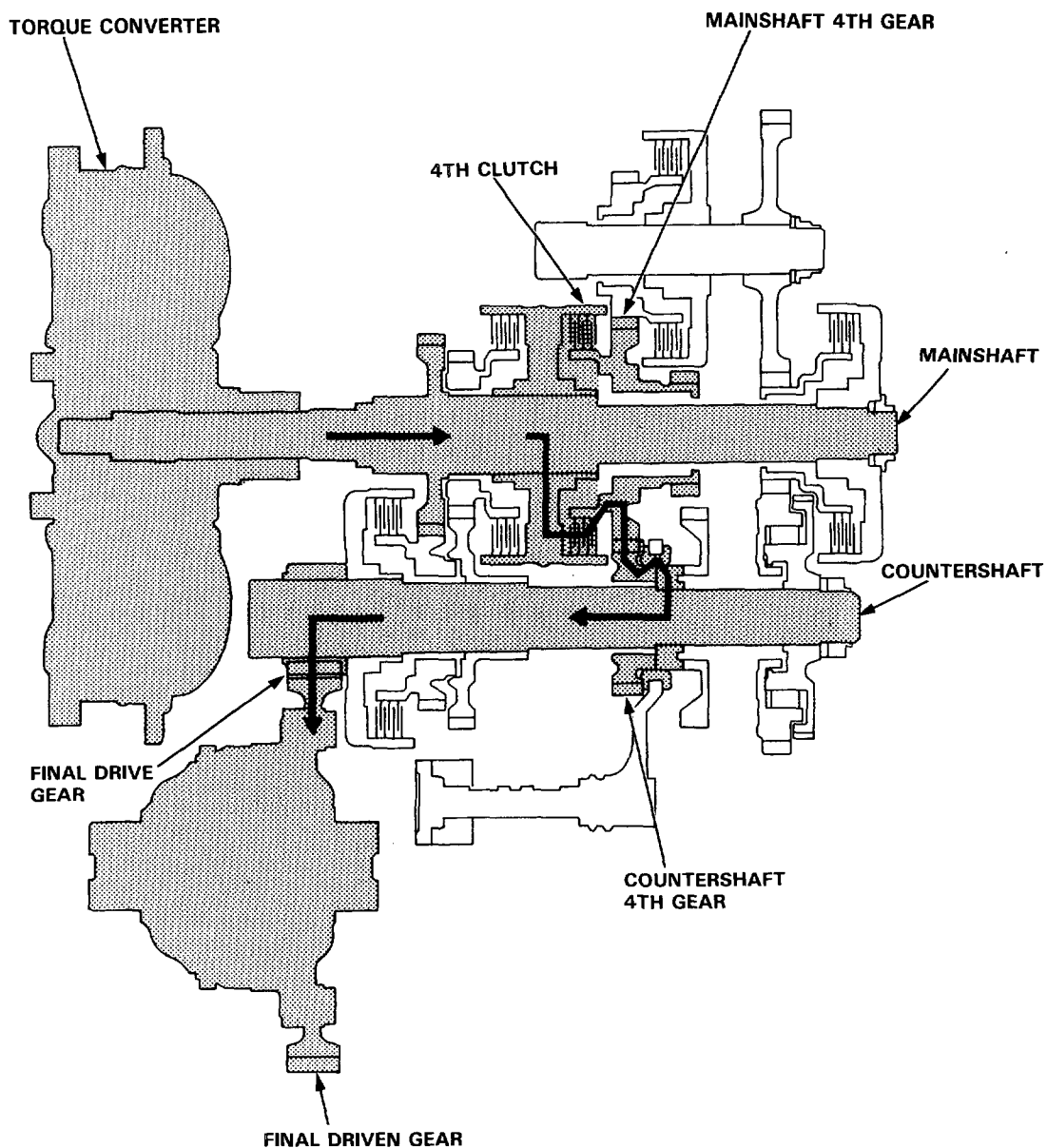




#### 4th Gear (D<sub>4</sub>) position

1. Hydraulic pressure is applied to the 4th clutch, which rotates together with the mainshaft, and the mainshaft 4th gear rotates.
2. Power is transmitted to the countershaft 4th gear, which drives the countershaft.
3. Power is transmitted to the final drive gear, which drives the final driven gear.

NOTE: Hydraulic pressure is also applied to the 1st clutch, but since the rotation speed of 4th gear exceeds that of 1st gear, power from 1st gear is cut off at the one-way clutch.



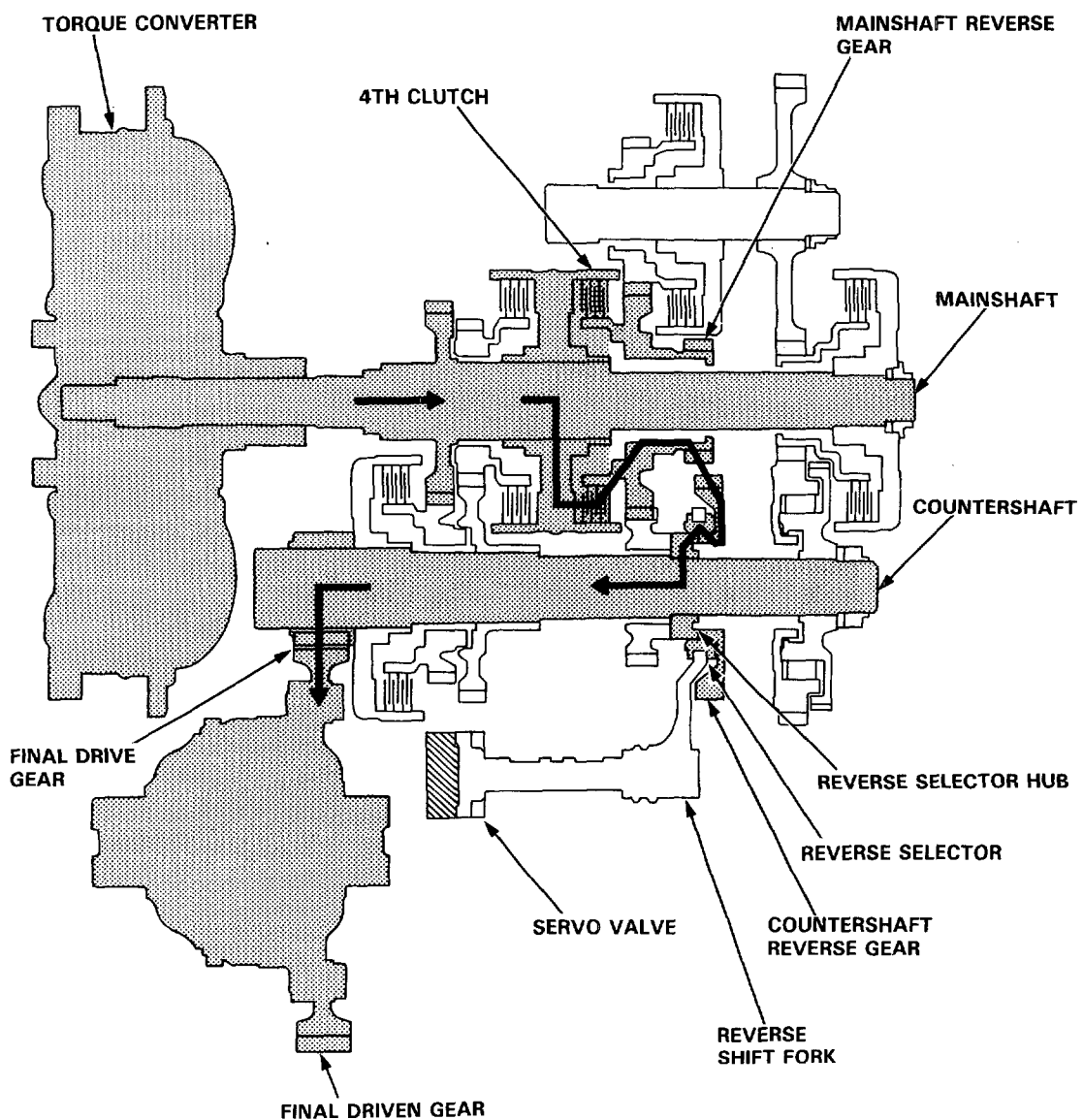
(cont'd)

# Description

## Power Flow (cont'd)

### R position

1. Hydraulic pressure is switched by the manual valve to the servo valve, which moves the reverse shift fork to the reverse position. The reverse shift fork engages with the reverse selector, the reverse selector hub, and the countershaft reverse gear.
2. Hydraulic pressure is also applied to the 4th clutch. Power is transmitted from the mainshaft reverse gear via the reverse idler gear to the countershaft reverse gear.
3. Rotation direction of the countershaft reverse gear is changed via the reverse idler gear.
4. Power is transmitted to the final drive gear, which drives the final driven gear.





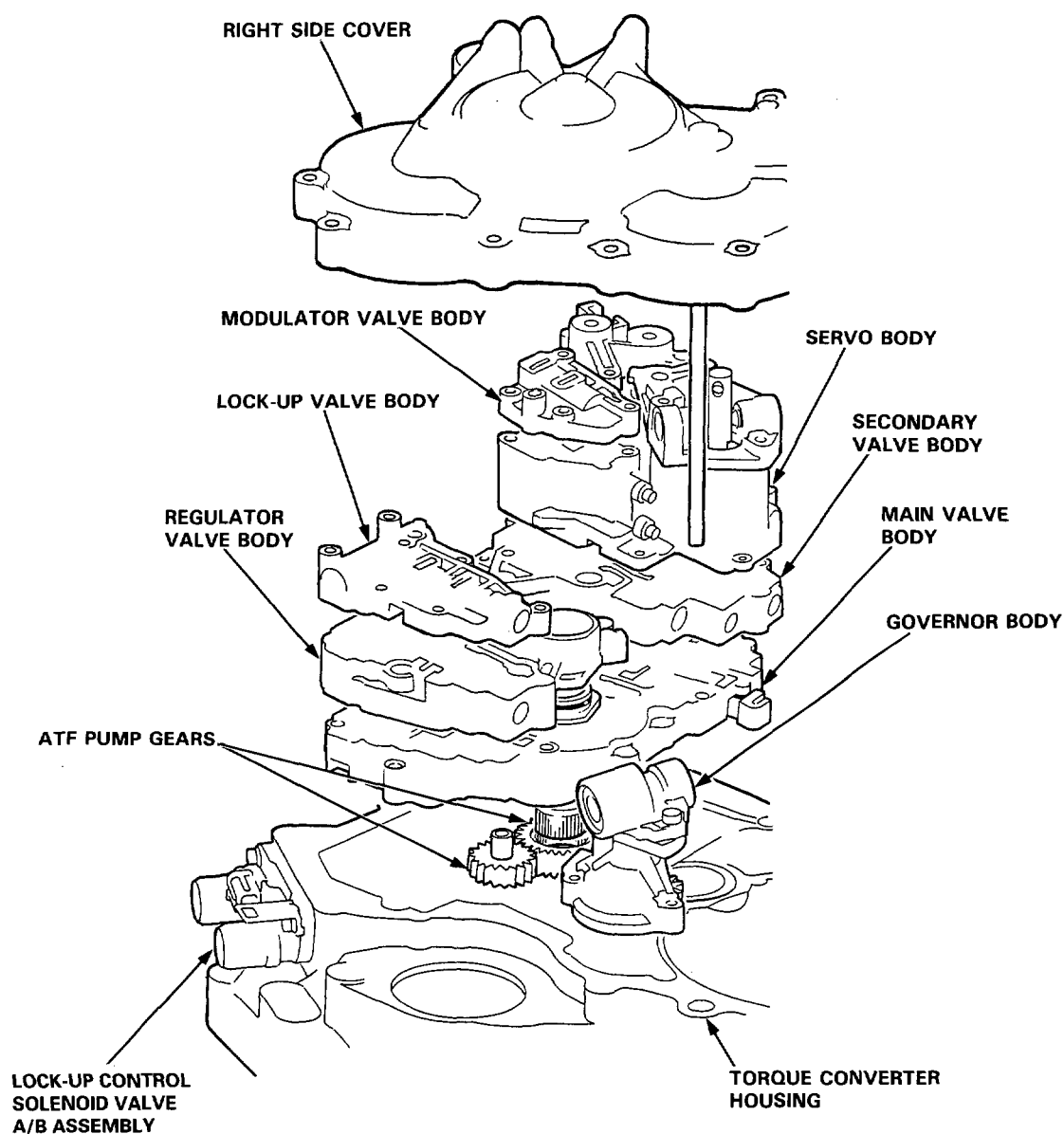
## Hydraulic Control

The hydraulic control system is controlled by the ATF pump, valves and accumulators in the valve bodies. The ATF pump is driven by splines on the end of the torque converter which is attached to the engine.

Fluid from the ATF pump flows through the regulator valve to maintain specified pressure through the main valve body to the manual valve, directing pressure to each of the clutch.

The valve body includes the main valve body, the regulator valve body, the lock-up valve body, the secondary valve body, the servo body, the modulator valve body and the governor body.

The lock-up control solenoid valve A/B assembly is bolted on the outside of the torque converter housing.



(cont'd)



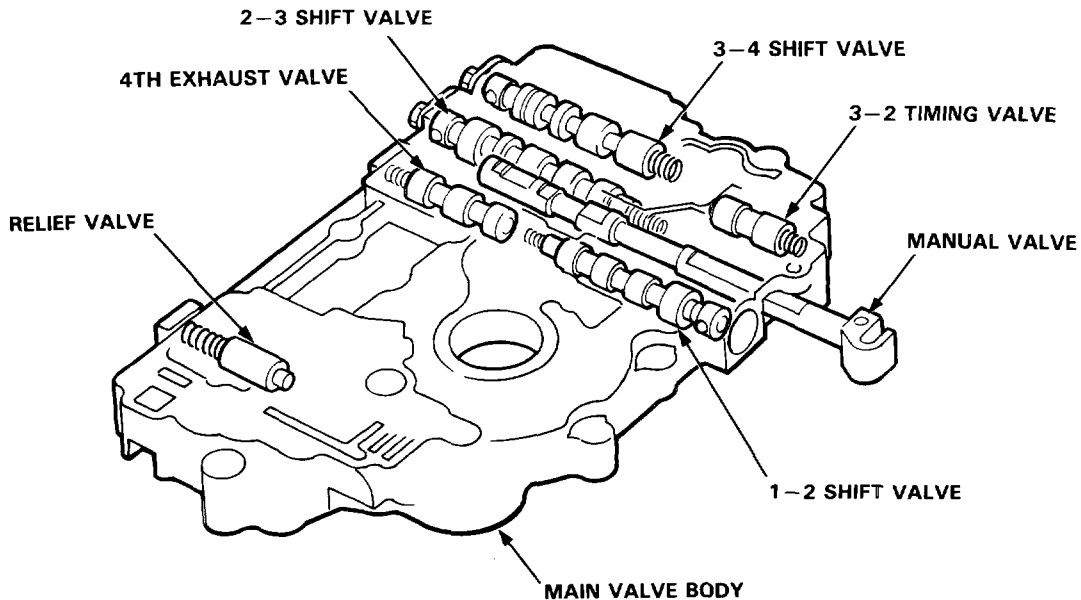
# Description

## Hydraulic Control (cont'd)

### Main Valve Body

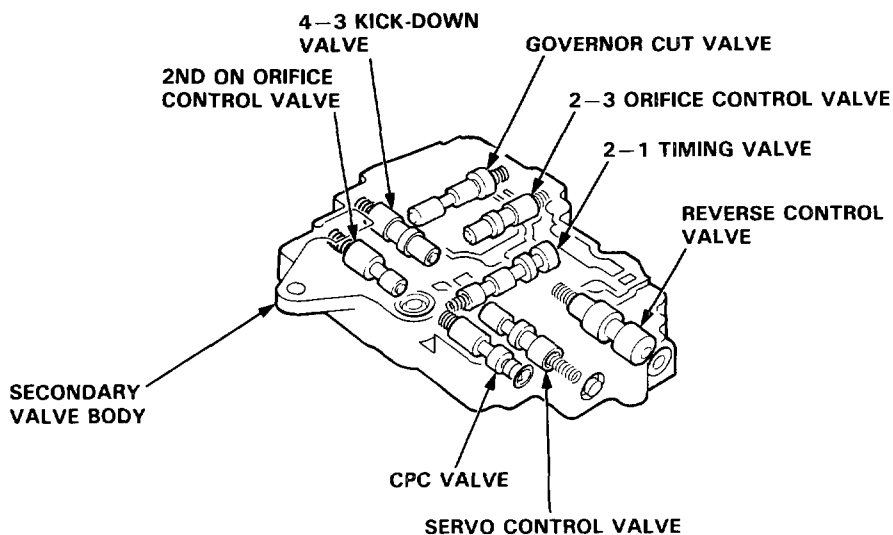
The main valve body houses the manual valve, the 1 - 2 shift valve, the 2 - 3 shift valve, the 3 - 4 shift valve, the 3 - 2 timing valve, the 4th exhaust valve, and the relief valve.

The primary functions of the main valve body are to switch fluid pressure on and off and to control the hydraulic pressure going to the hydraulic control system.



### Secondary Valve Body

The secondary valve body is located on the main valve body. The secondary valve body houses the 2nd ON orifice control valve, the 4 - 3 kick-down valve, the governor cut valve, the 2 - 3 orifice control valve, the 2 - 1 timing valve, the reverse control valve, the servo control valve, and the CPC valve.



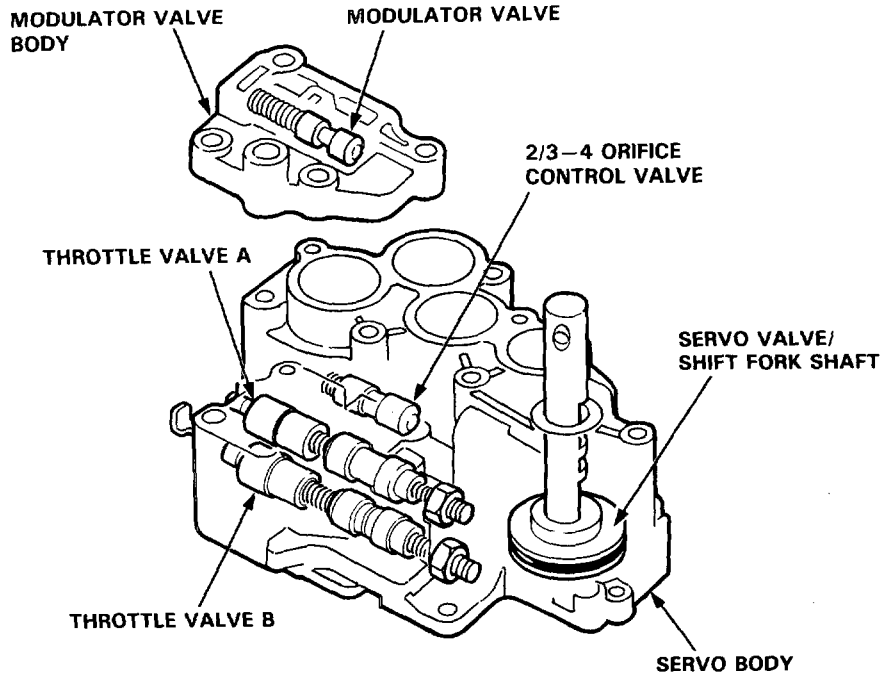


### Servo Body

The servo body is located on the secondary valve body. The servo valve which is integrated with the shift fork shaft, throttle valve A and B, 2/3 – 4 orifice control valve, and accumulator pistons are all assembled in the servo body.

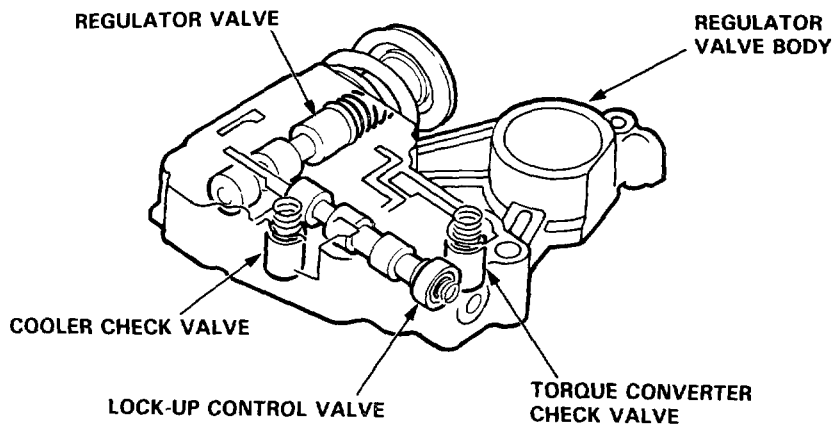
### Modulator Valve Body

The modulator valve body with the modulator valve is located on the servo body.



### Regulator Valve Body

The regulator valve body is located on the main valve body. The regulator valve body consists of the regulator valve, torque converter check valve, cooler check valve, and lock-up control valve.



(cont'd)

# Description

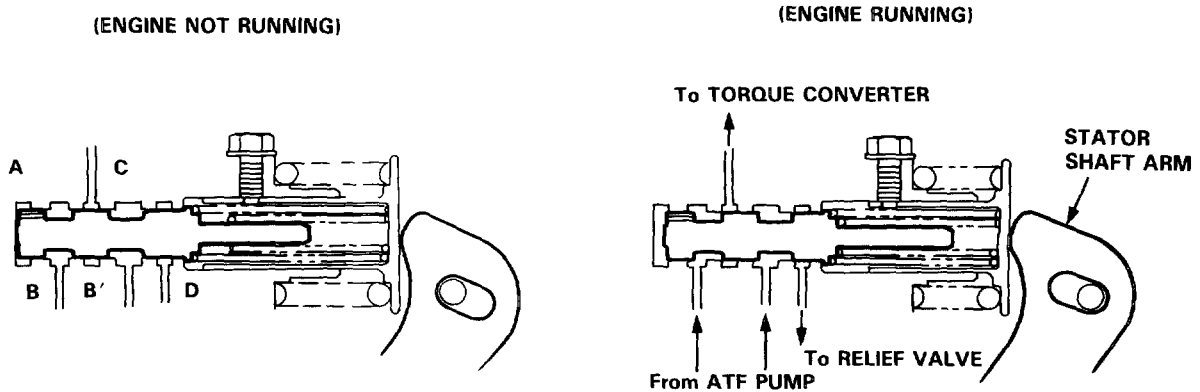
## Hydraulic Control (cont'd)

### Regulator Valve

The regulator valve maintains a constant hydraulic pressure from the ATF pump to the hydraulic control system, while also furnishing fluid to the lubricating system and torque converter.

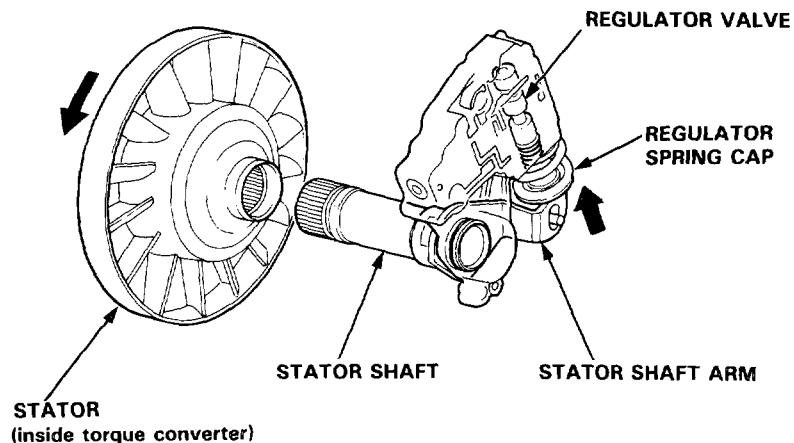
Fluid flows through B and B'. The fluid which enters through B flows through the valve orifice to A, pushing the regulator valve to the right. According to the level of hydraulic pressure through B, the position of the valve changes, and the amount of the fluid through B' from D thus changes. This operation is continued, and maintaining the line pressure.

NOTE: When used, "left" or "right" indicates direction on the illustration below.



### Stator Reaction Hydraulic Pressure Control

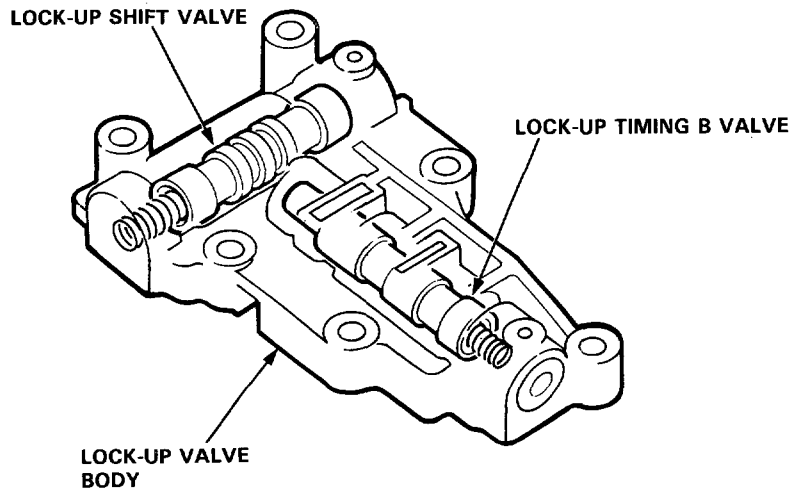
Hydraulic pressure increase, according to torque, is performed by the regulator valve using stator torque reaction. The stator shaft is splined to the stator and its arm end contacts the regulator spring cap. When the vehicle is accelerating or climbing (Torque Converter Range), stator torque reaction acts on the stator shaft and the stator shaft arm pushes the regulator spring cap in the direction of the arrow in proportion to the reaction. The spring compresses and the regulator valve moves to increase the regulated control pressure or line pressure. Line pressure is maximum when the stator reaction is maximum.





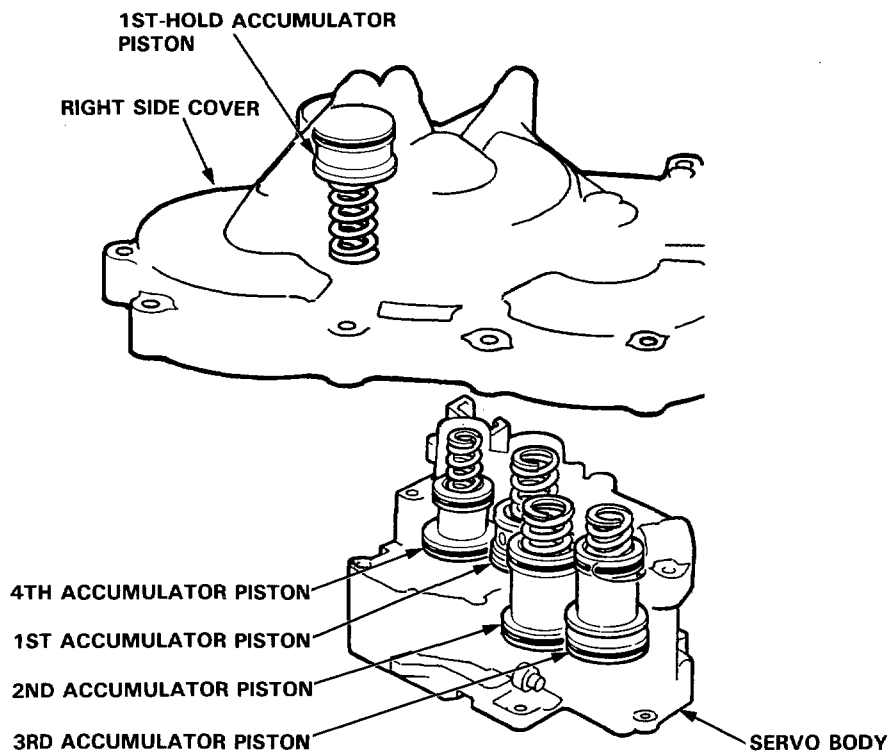
### Lock-up Valve Body

The lock-up valve body with the lock-up shift valve and the lock-up timing B valve is located on the regulator valve body.



### Accumulator Pistons

The accumulator pistons are built into the servo body and right side cover. The 1st-hold accumulator piston is in the right side cover, and the 1st, 2nd, 3rd, and 4th accumulator pistons are built in the servo body.



(cont'd)

# Description

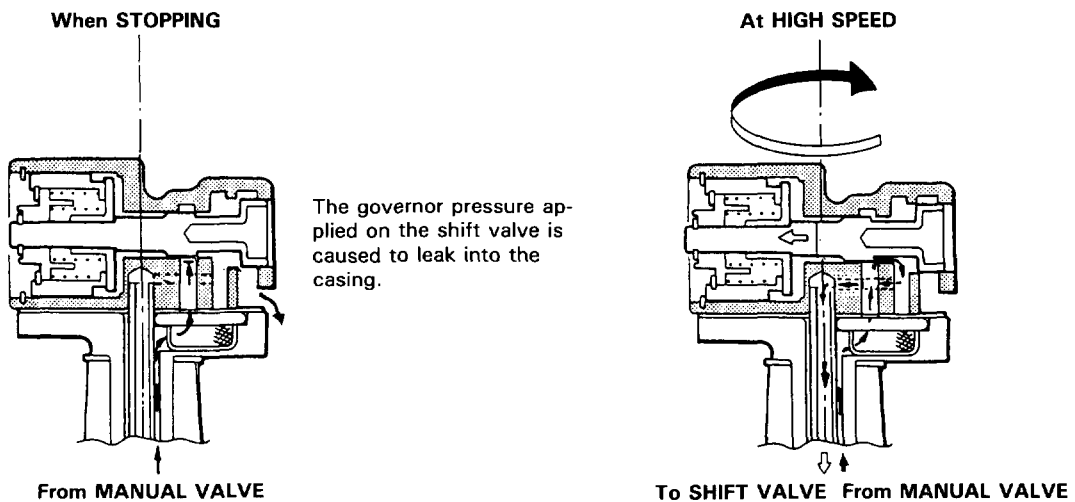
## Hydraulic Control (cont'd)

### Governor Valve

The governor valve generates hydraulic pressure depending on the vehicle speed. The governor valve generates high pressure when the vehicle speed is high, and low pressure when the vehicle speed is low.

The governor valve-generated pressure acts on the shift valve and is one of the two causes of automatic speed change.

The governor gear meshes with the final driven gear, rotates the governor shaft and operates the governor valve using centrifugal force. The governor valve receives the line pressure. Adjusting this line pressure causes governor pressure to be generated. This pressure is thus adjusted to the value that balance with the power generated by the centrifugal force of the primary, secondary and third weights (centering around the rotation axis) depending on the force due to the difference between the governor valve diameters and the number of revolutions. This number of revolutions depends on vehicle speed. Governor pressure increases as vehicle speed increases.





## Hydraulic Flow

### General Chart of Hydraulic Pressure

ATF Pump → Regulator Valve →   
 Line Pressure  
 Torque Converter Pressure  
 Lubrication Pressure

### Distribution of Hydraulic Pressure

- Regulator Valve →   
 Line Pressure  
 Torque Converter Pressure  
 Lubrication Pressure
- Manual Valve → To Select Line Pressure
- Modulator Valve → Modulator Pressure
- 1-2 Shift Valve  
 ● 2-3 Shift Valve → Clutch Pressure  
 ● 3-4 Shift Valve
- Throttle Valve A → Throttle A Pressure
- Throttle Valve B → Throttle B Pressure
- Governor Valve → Governor Pressure

NO.	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE	NO.	DESCRIPTION OF PRESSURE
1	LINE	15	1ST-HOLD CLUTCH	56	THROTTLE B
2	LINE	15'	1ST-HOLD CLUTCH	57	THROTTLE B
3	LINE	16	1ST-HOLD CLUTCH	58	THROTTLE B
3'	LINE	18	LINE	60	GOVERNOR
3"	LINE	20	2ND CLUTCH	61	GOVERNOR
4	LINE	21	2ND CLUTCH	90	TORQUE CONVERTER
4'	LINE	25	LINE	91	TORQUE CONVERTER
5	LINE	30	3RD CLUTCH	92	TORQUE CONVERTER
5'	LINE	31	3RD CLUTCH	93	ATF COOLER
5"	LINE	40	4TH CLUTCH	94	TORQUE CONVERTER
6	MODULATOR	41	4TH CLUTCH	95	LUBRICATION
6C	MODULATOR (LCA)	50	THROTTLE A	96	TORQUE CONVERTER
6D	MODULATOR (LCB)	51	THROTTLE A	97	TORQUE CONVERTER
9	LINE	52	THROTTLE A	99	SUCTION
10	1ST CLUTCH	55	THROTTLE B	X	BLEED

#### NOTE:

- LC A: Lock-up control solenoid valve A
- LC B: Lock-up control solenoid valve B

(cont'd)

# Description

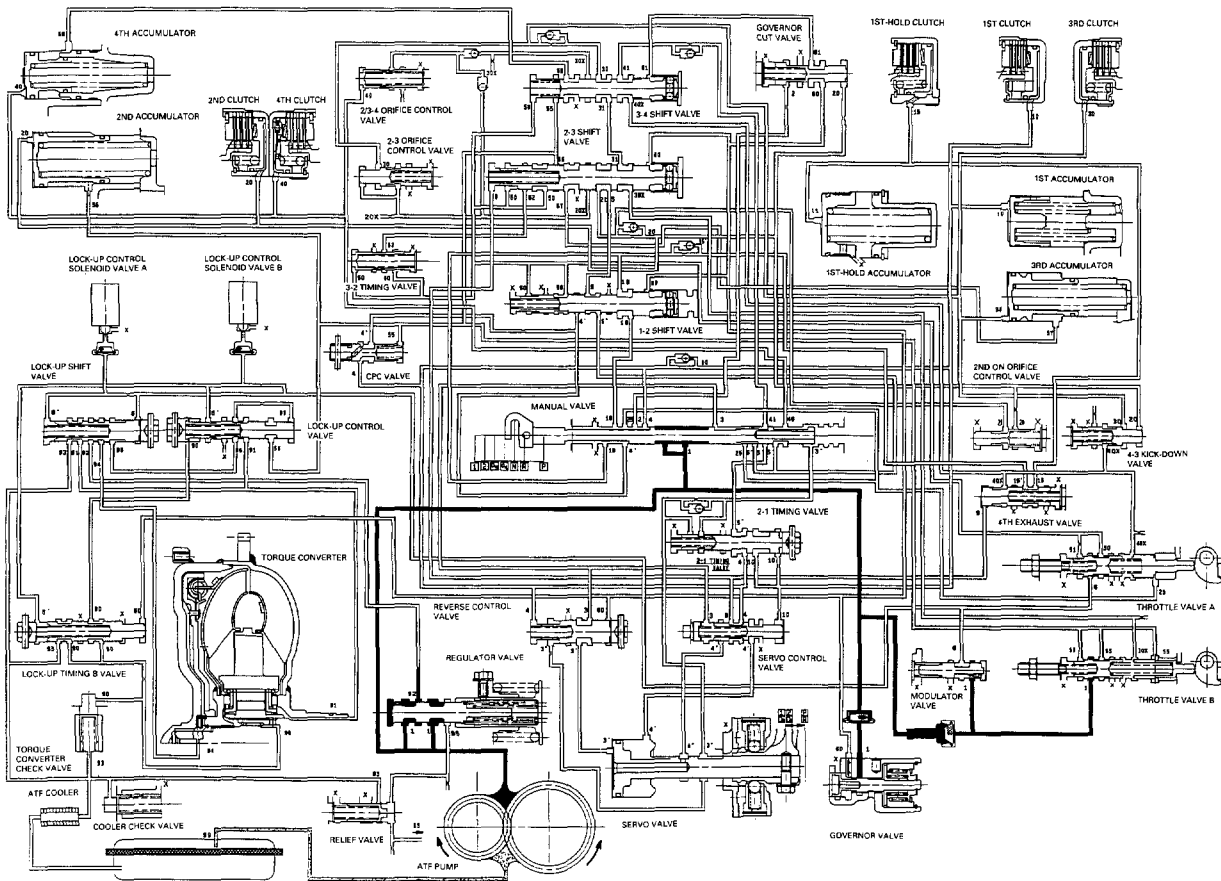
## Hydraulic Flow (cont'd)

### **N** Position

As the engine turns, the ATF pump starts to operate. Automatic transmission fluid (ATF) is drawn from (99) and discharged into (1). Then, ATF pressure is controlled by the regulator valve and becomes line pressure (1). The torque converter inlet pressure (92) enters (94) of torque converter through the orifice and discharges into (90).

The torque converter check valve prevents the torque converter pressure from rising.

Under this condition, the hydraulic pressure is not applied to the clutches.





## 1 Position

The line pressure (1) becomes the line pressure (4) and 1st-hold clutch pressure (16) as it passes through the manual valve. Also, the line pressure (1) goes to the governor valve and becomes the governor pressure (60). The governor pressure (60) is supplied to the 1-2 and 2-3 shift valves. The shift valves remain on the right side because the governor pressure is lower than the valve spring tension.

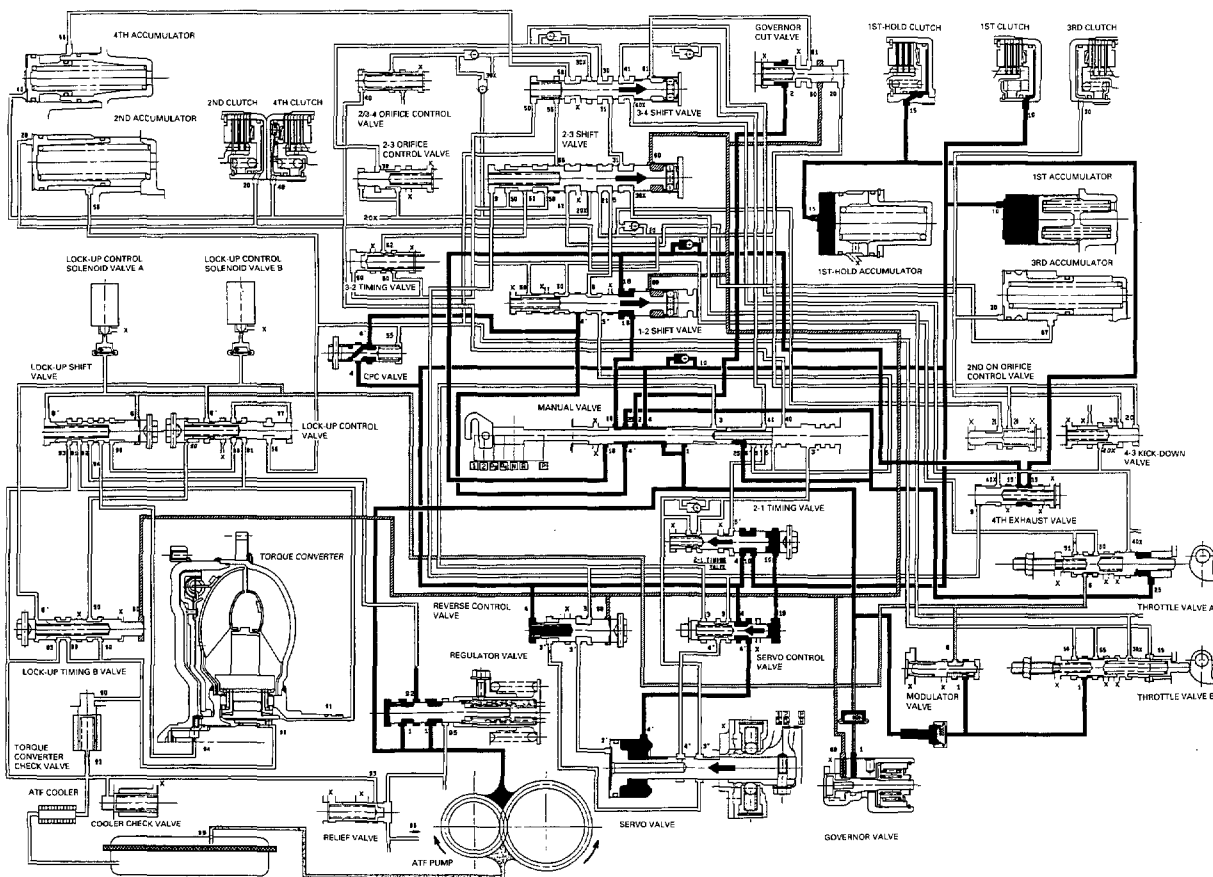
The line pressure (4) becomes the 1st clutch pressure (10) via the orifice, then goes to the 1st clutch. The 1st clutch pressure (10) is also supplied to the servo control valve and 2-1 timing valve to move them to the left side.

The 1st-hold clutch pressure (16) goes to the 1st-hold clutch via the 1-2 shift valve, orifice and 4th exhaust valve.

In the 1 position, the 1st clutch and 1st-hold clutch are engaged.

The line pressure (4) also goes to the servo valve via the servo control valve, and holds on the servo valve in the driving range.

NOTE: When used, "left" and "right" indicates direction on the hydraulic circuit.



(cont'd)



# Description

## Hydraulic Flow (cont'd)

### 2 Position

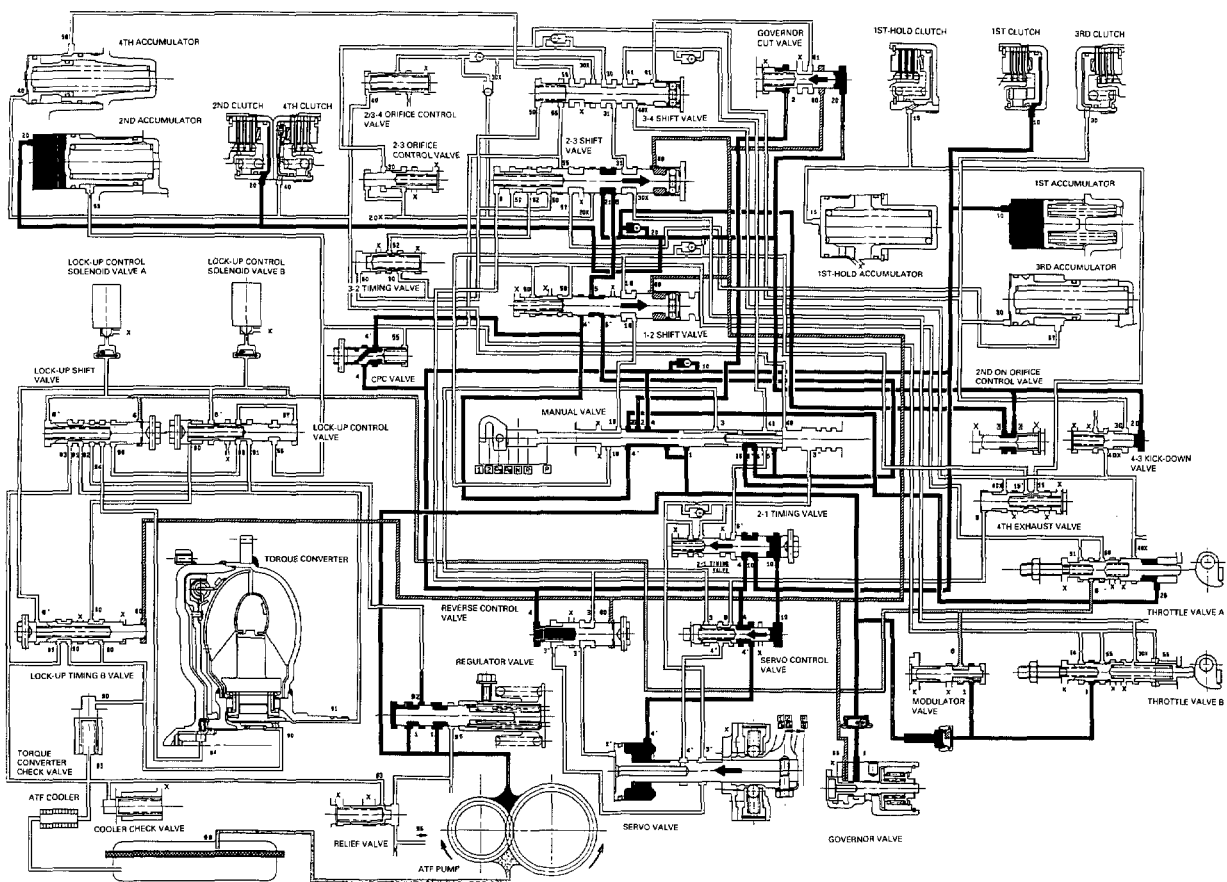
The line pressure (1) becomes the line pressure (2), (4), (4'), (25) as it passes through the manual valve. Also, the line pressure (1) goes to the governor valve and becomes the governor pressure (60). The governor pressure (60) is supplied to the 1-2 and 2-3 shift valves, but the 1-2 and 2-3 shift valves remain on the right side.

The line pressure (25) goes to the 2-3 shift valve via the 1-2 shift valve and becomes the 2nd clutch pressure (21). The 2nd clutch pressure (21) becomes the 2nd clutch pressure (20) as it passes through the orifice, then goes to the 2nd clutch.

The line pressure (4) becomes the 1st clutch pressure (10) and flows to the 1st clutch, servo control valve and 2-1 timing valve. The line pressure (4') also holds on the servo valve in the driving range.

In the 2 position, the 1st clutch and 2nd clutch are engaged. However, no power from the 1st clutch is transmitted by means of the one-way clutch.

NOTE: When used, "left" and "right" indicates direction on the hydraulic circuit.





## D<sub>4</sub> or D<sub>3</sub> Position

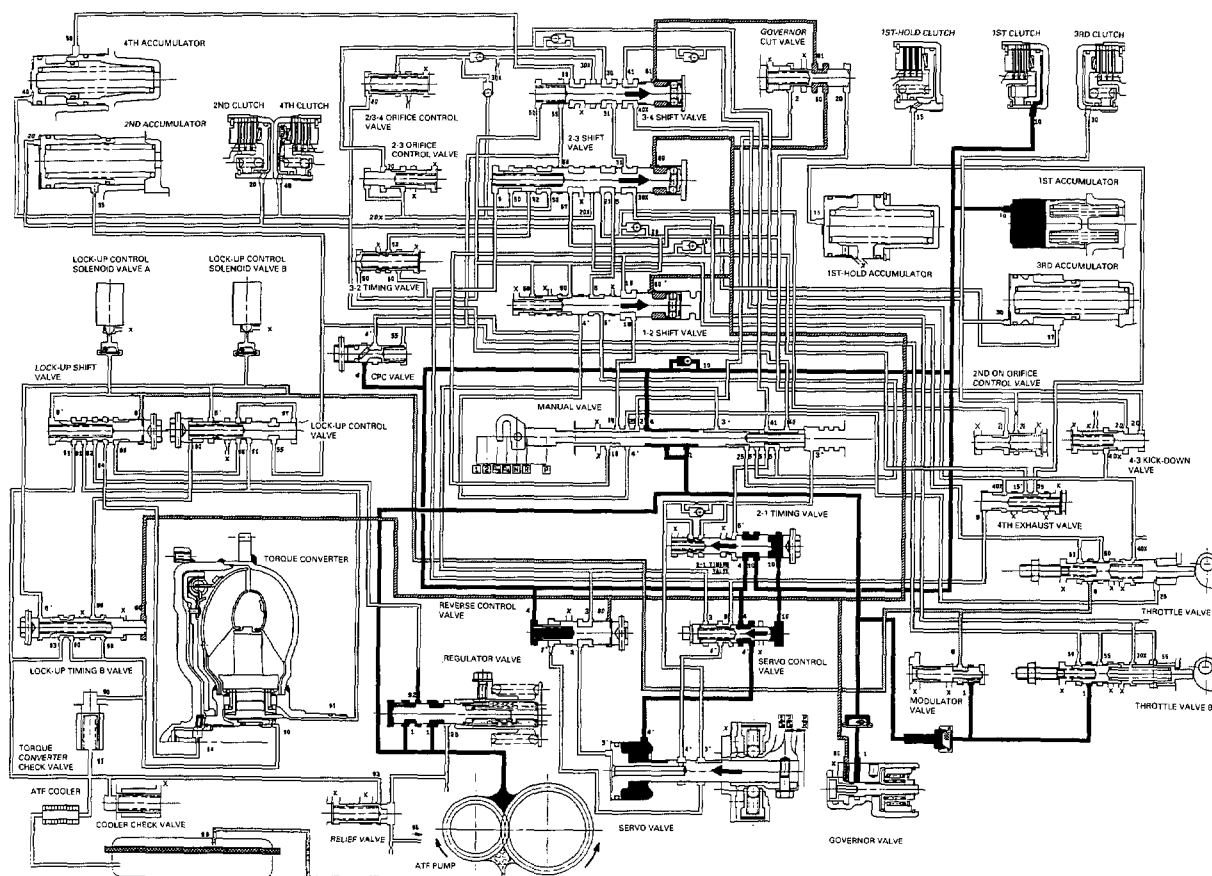
### 1. 1st Gear

The flow of fluid through the torque converter is the same as in the **N** position. The line pressure (1) becomes the line pressure (4). The line pressure (4) becomes the 1st clutch pressure (10) as it passes through the orifice. The 1st clutch pressure (10) is supplied to the 1st clutch and 1st accumulator, consequently the vehicle will move as the engine power is transmitted.

The line pressure (1) becomes the governor pressure (60) by the governor valve and travels to each shift valve. But, all shift valves remain on the right side because the governor pressure (60) is lower than the shift valve spring tension. The line pressure (1) also flows to the modulator valve and throttle valve B.

In the **D<sub>4</sub>** or **D<sub>3</sub>** position, the line pressure (4') flows to the servo valve and holds it on in the driving range as in the **2** position.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

# Description

## Hydraulic Flow (cont'd)

### 2. 2nd Gear

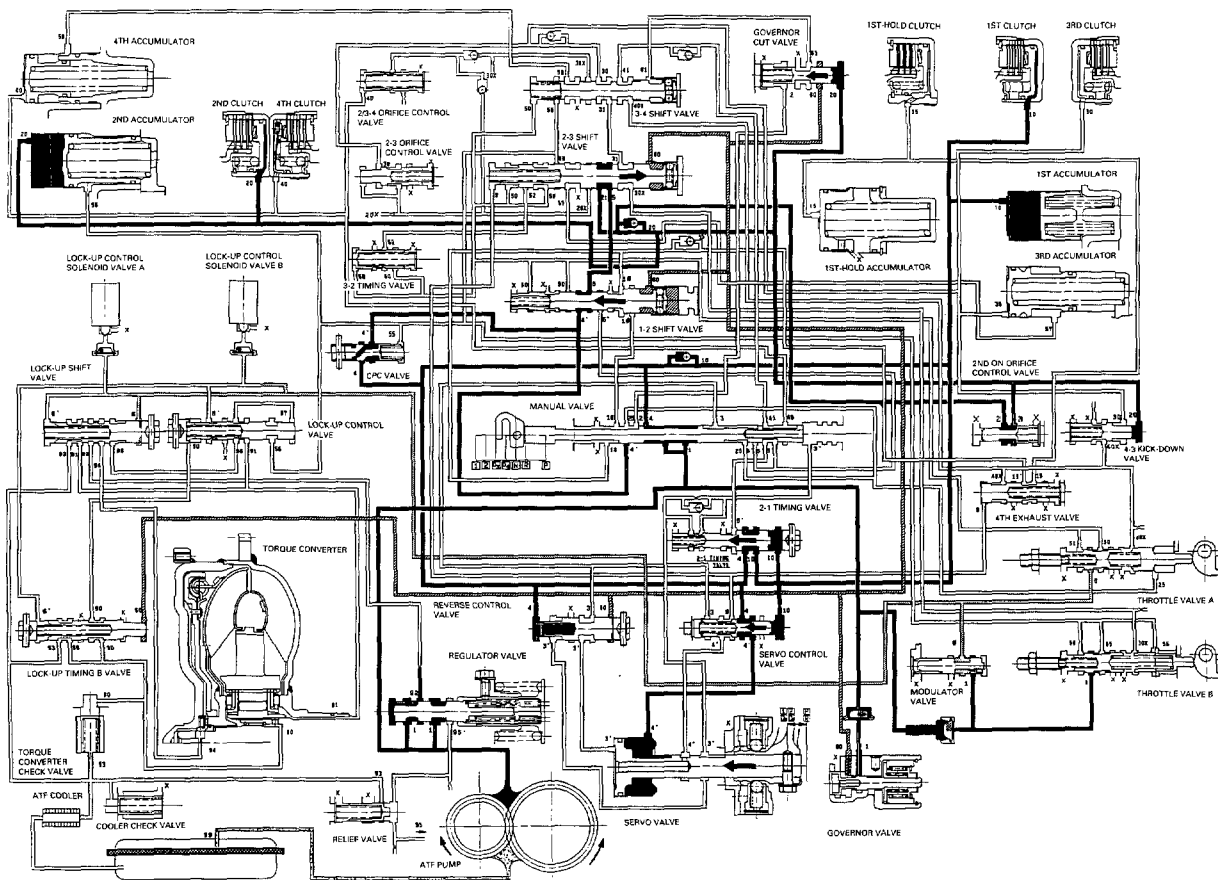
The flow of fluid up to the 1-2 and 2-3 shift valves is the same as the 1st gear. As the speed of the vehicle reaches the prescribed value, the 1-2 shift valve is moved to the left side by the governor pressure (60) and uncovers the port leading to the 2nd clutch; the 2nd clutch is engaged.

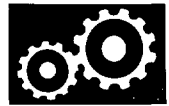
Fluid flows by way of:

Line Pressure (4) → CPC Valve-Line Pressure (4') → 1-2 Shift Valve-Line Pressure (5) → 2-3 Shift Valve-2nd Clutch Pressure (21) → Orifice-2nd Clutch Pressure (20) → 2nd Clutch.

The 2nd clutch pressure (20) is also supplied to the governor cut valve. The governor cut valve is moved to the left side to cover the port of the governor pressure (60) to the 3-4 shift valve. The hydraulic pressure also flows to the 1st clutch, However, no power is transmitted by means of the one-way clutch.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.





### 3. 3rd Gear

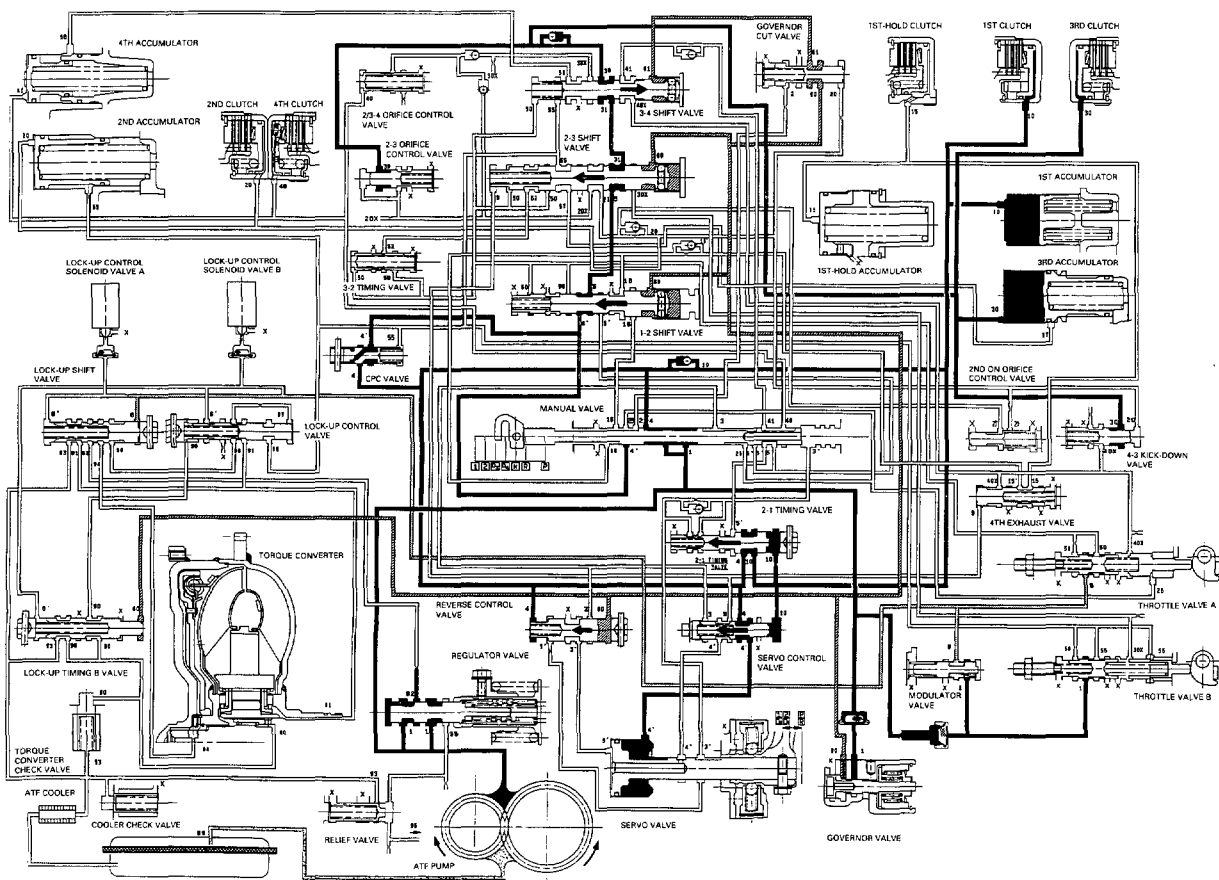
The flow of fluid up to the 1-2, 2-3 and 3-4 shift valves is the same as the 2nd gear. As the speed of the vehicle reaches the prescribed value, the 2-3 shift valve is moved to the left side by the governor pressure (60) and uncovers the port leading to the 3rd clutch. Since the 1-2 shift valve is kept on the left side, and the 3-4 shift valve is on the right side to uncover the port leading to the 3rd clutch, the 3rd clutch is engaged.

Fluid flows by way of:

Line Pressure (4) → CPC Valve-Line Pressure (4') → 1-2 Shift Valve-Line Pressure (5) → 2-3 Shift Valve-3rd Clutch Pressure (31) → 3-4 Shift Valve-3rd Clutch Pressure (30) → Orifice → 3rd Clutch.

The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted by means of the one-way clutch as in the 2nd gear.

NOTE: When used, "left" and "right" indicates direction on the hydraulic circuit.



(cont'd)

# Description

## Hydraulic Flow (cont'd)

### 4. 4th Gear (D<sub>4</sub>) position

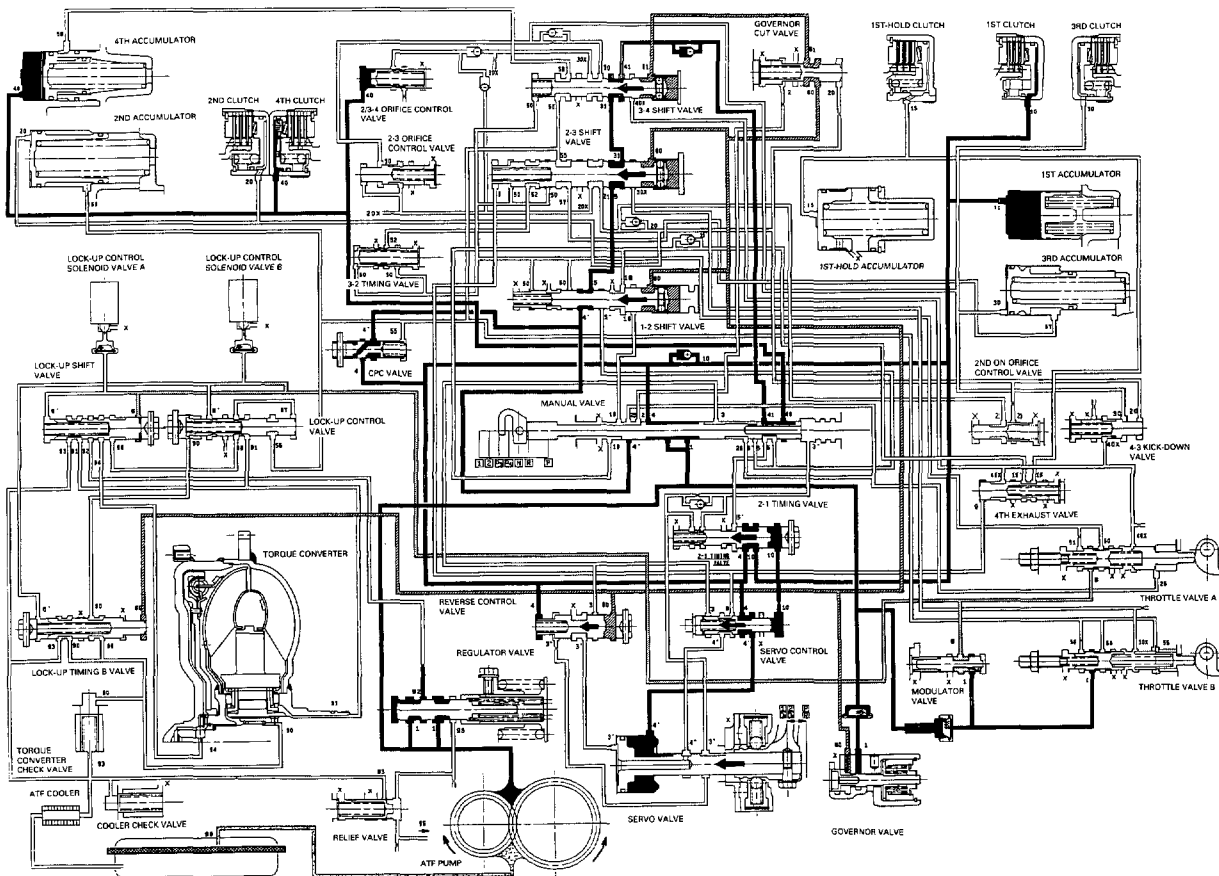
The flow of fluid up to the 1-2, 2-3 and 3-4 shift valves is the same as the 3rd gear. As the speed of the vehicle reaches the prescribed value, the 3-4 shift valve is moved to the left side by the governor pressure (60) and uncovers the port leading to the 4th clutch. Since the 1-2 and 2-3 shift valves are kept on the left side, the fluid flows through to the 4th clutch; the power is transmitted through the 4th clutch.

Fluid flows by way of:

Line Pressure (4) → CPC Valve-Line Pressure (4') → 1-2 Shift Valve-Line Pressure (5) → 2-3 Shift Valve-3rd Clutch Pressure (31) → 3-4 Shift Valve-4th Clutch Pressure (41) → Orifice → Manual Valve-4th Clutch Pressure (40) → 4th Clutch.

The hydraulic pressure also flows to the 1st clutch. However, no power is transmitted by means of the one-way clutch as in the 3rd gear.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.





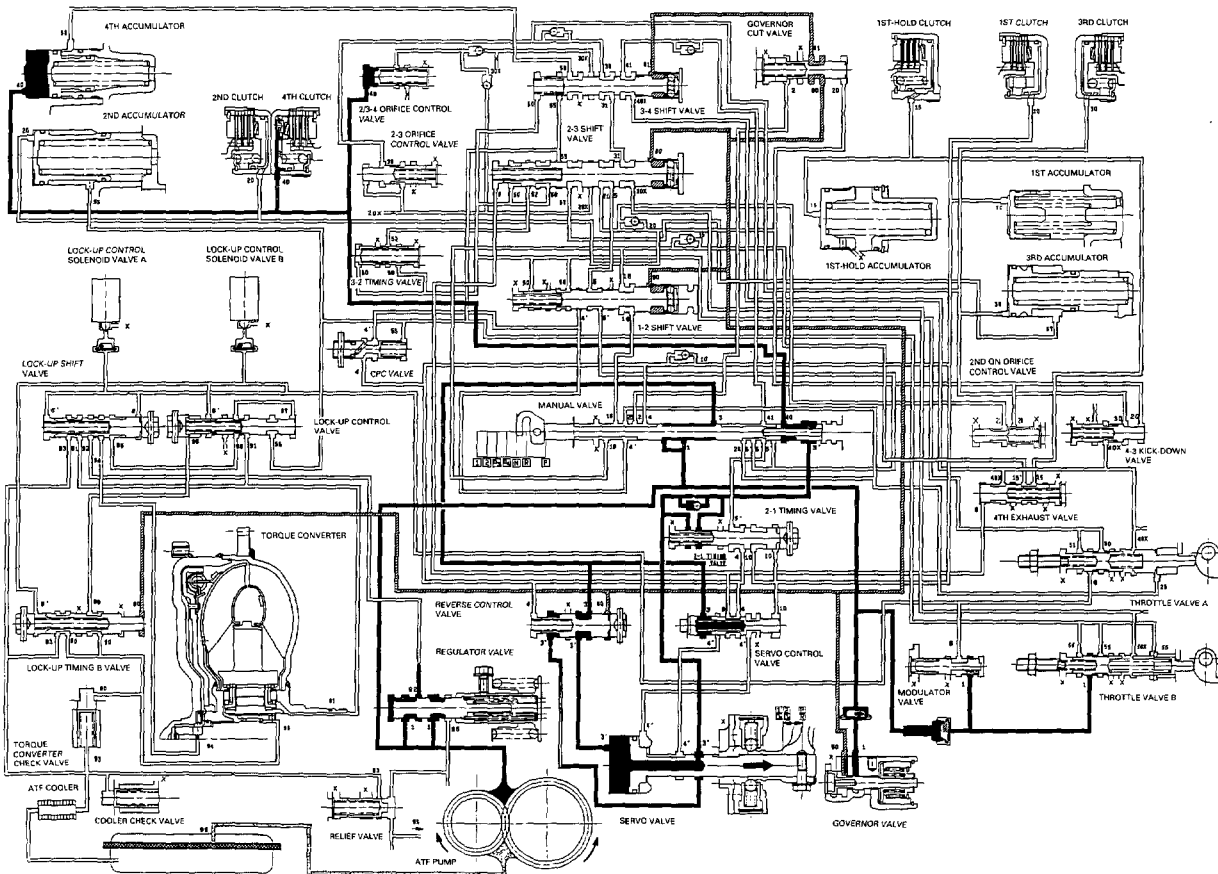
## **R** position

The flow of fluid through the torque converter circuit is the same as in the **N** position. The line pressure (1) becomes the line pressure (3) as it passes the manual valve. It then flows through the reverse control valve to the servo valve, causing the reverse shift fork shaft to be moved to the reverse position. The line pressure (3") from the servo valve goes to the manual valve and becomes the 4th clutch pressure (40). Then it goes to the 4th clutch; the power is transmitted through the 4th clutch.

When the **R** position is selected while the vehicle is moving forward at more than a certain speed, the line pressure (3) is cut by the governor pressure (60) which activates the reverse control valve.

When shifting to **R** from **D<sub>4</sub>**, **D<sub>3</sub>**, **2** or **1** position, the servo control valve is moved to the left side by 1st clutch pressure (10). The servo control valve combines with the reverse shift fork shaft detent system to control movement of the servo valve.

NOTE: When used, "left" and "right" indicates direction on the hydraulic circuit.



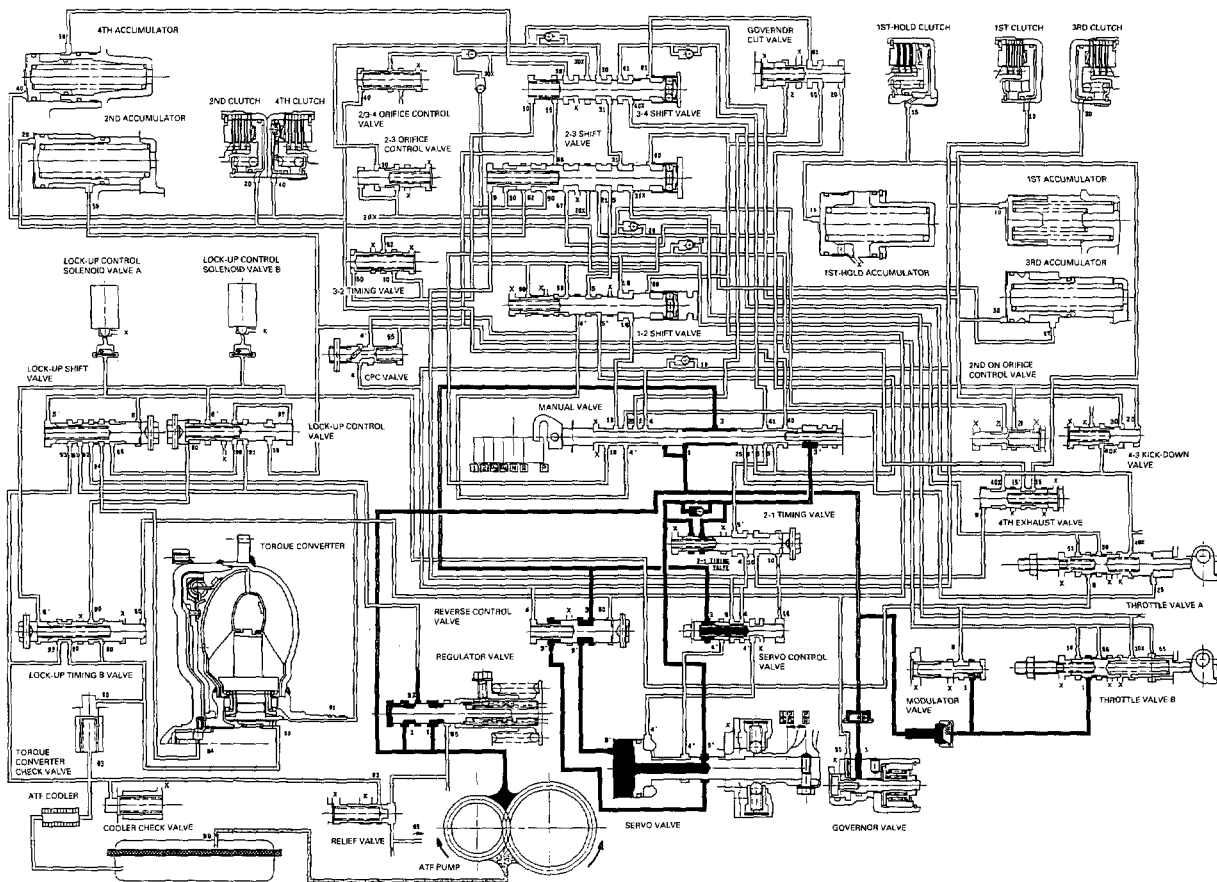
(cont'd)

# Description

## Hydraulic Flow (cont'd)

### **P** Position

The flow of fluid through the torque converter circuit is the same as in the **N** position. The line pressure (1) becomes the line pressure (3) as it passes the manual valve. The line pressure (3) flows through the reverse control valve to the servo valve, causing the reverse shift fork to be moved to the reverse position as in the **R** position. However, the hydraulic pressure is not supplied to the clutches. The power is not transmitted.





## Lock-up System

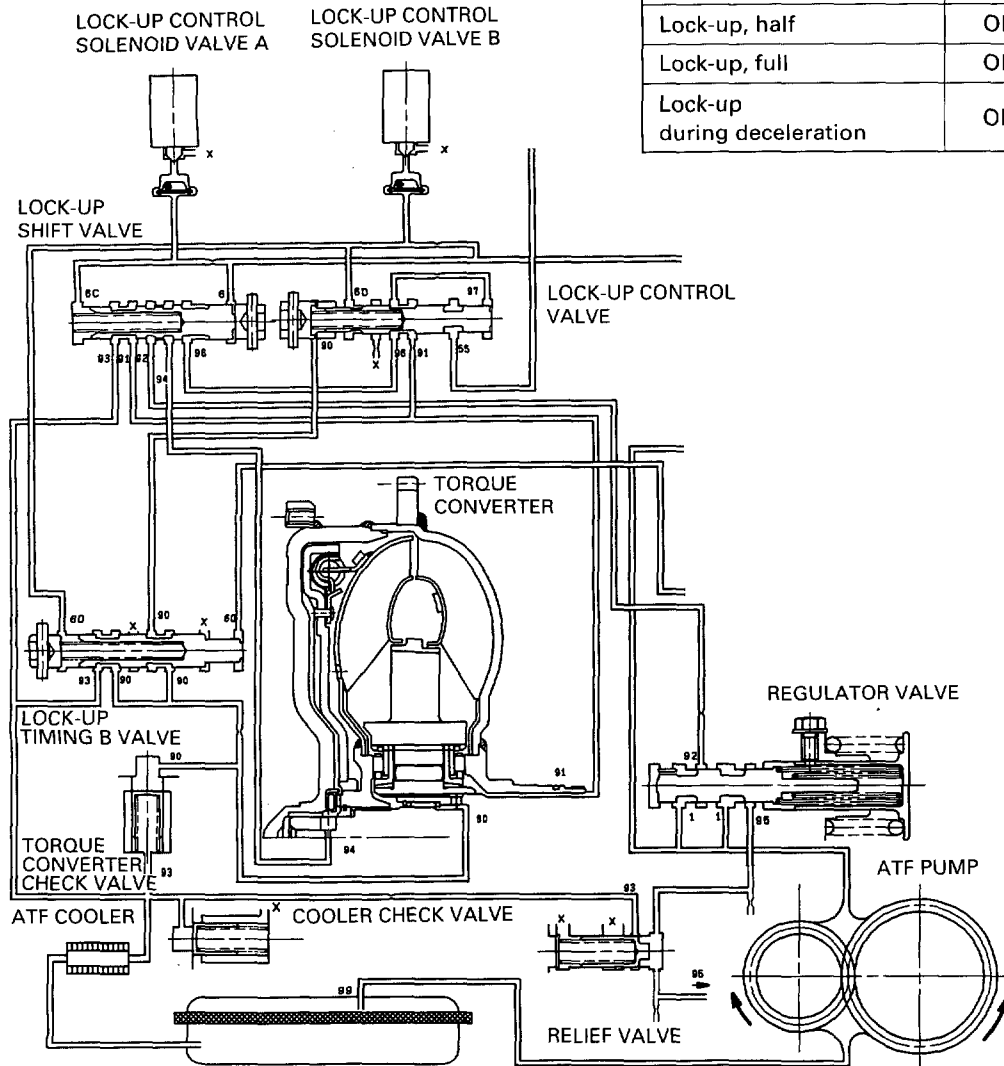
In **D<sub>2</sub>** position, in 2nd, 3rd and 4th, and **D<sub>3</sub>** position in 3rd, pressurized fluid is drained from the back of the torque converter through a fluid passage, causing the lock-up piston to be held against the torque converter cover. As this takes place, the mainshaft rotates at the same speed as the engine crankshaft. Together with hydraulic control, the ECM optimizes the timing of the lock-up system. Under certain conditions, the lock-up operation is applied during deceleration, in 2nd, 3rd and 4th speed.

The lock-up shift valve controls the range of lock-up according to lock-up control solenoid valves A and B, and the throttle valve. 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 ECM.

From sensor input signals, the ECM detects whether to turn the lock-up ON or OFF and activates lock-up control solenoid valve A and/or B accordingly.

The combination of driving signals to lock-up control solenoid valves A and B is shown in the table below.

Solenoid valve	A	B
Lock-up condition		
Lock-up OFF	OFF	OFF
Lock-up, slight	ON	Duty operation OFF ↔ ON
Lock-up, half	ON	ON
Lock-up, full	ON	ON
Lock-up during deceleration	ON	Duty operation OFF ↔ ON



(cont'd)



# Description

## Lock-up System (cont'd)

### Lock-up Clutch

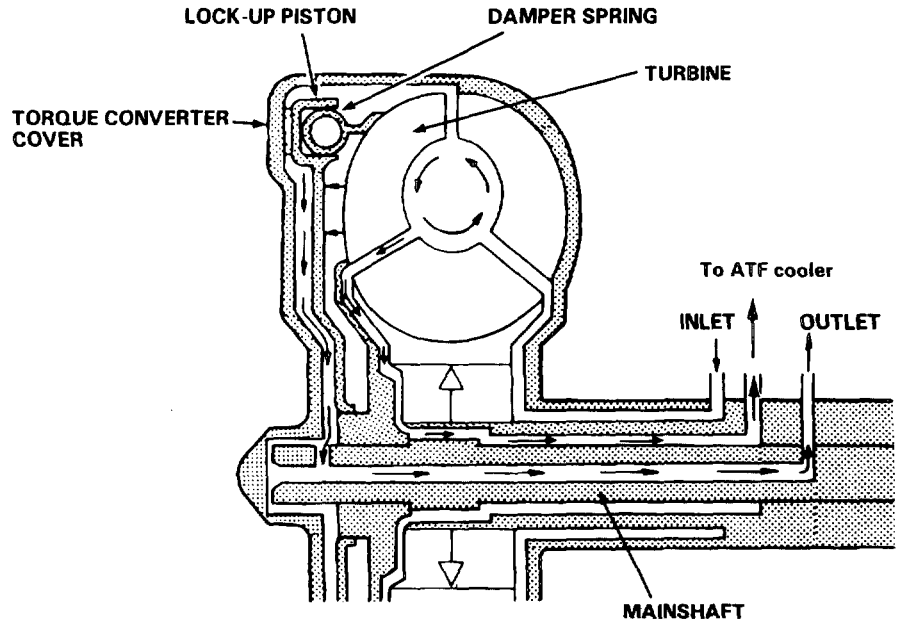
#### 1. Operation (clutch on)

With the lock-up clutch on, the fluid in the chamber between the torque converter cover and lock-up piston is drained off, and the converter fluid exerts pressure through the piston against the torque converter cover. As a result, the converter turbine is locked to the converter cover. The effect is to bypass the converter, thereby placing the vehicle in direct drive.

#### Power flow

The power flows by way of:

Engine  
 ↓  
 Drive plate  
 ↓  
 Torque converter cover  
 ↓  
 Lock-up piston  
 ↓  
 Damper spring  
 ↓  
 Turbine  
 ↓  
 Mainshaft

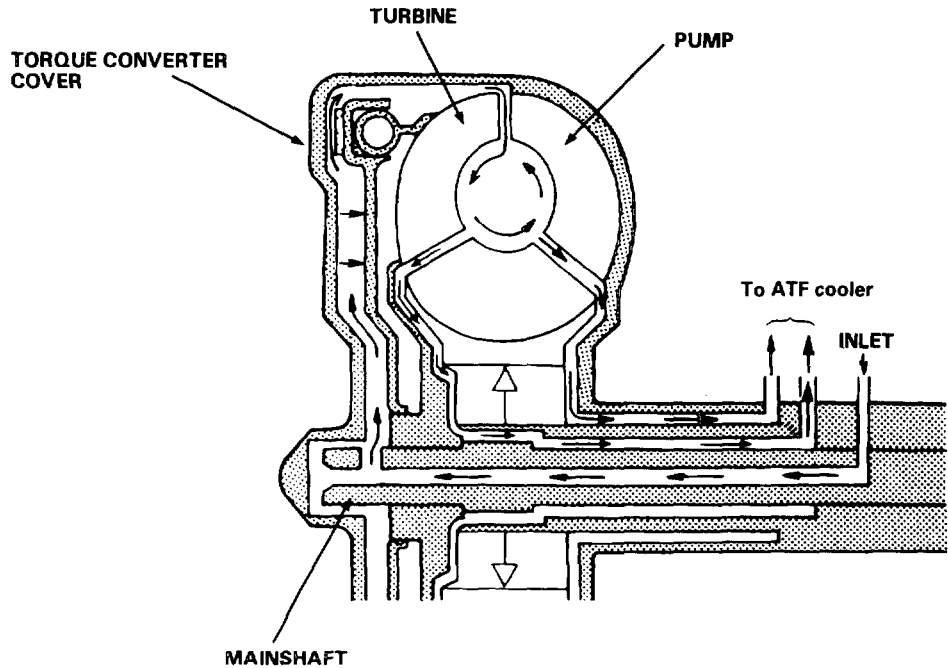


#### 2. Operation (clutch off)

With the lock-up clutch off, the fluid flows in the reverse of CLUTCH ON. As a result, the lock-up piston moves away from the converter cover, and the torque converter lock-up is released.

#### Power flow

Engine  
 ↓  
 Drive plate  
 ↓  
 Torque converter cover  
 ↓  
 Pump  
 ↓  
 Turbine  
 ↓  
 Mainshaft

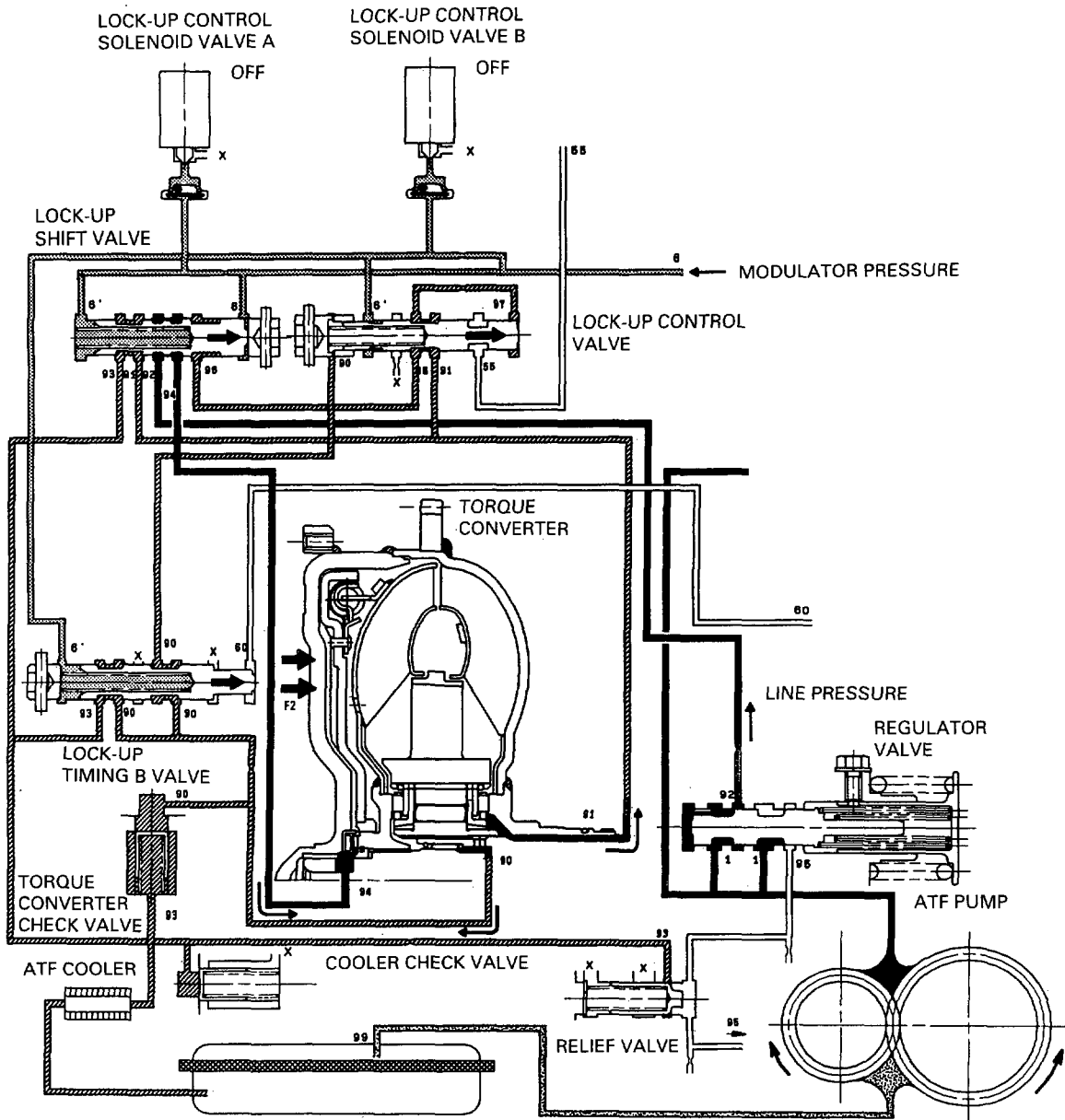




### No Lock-up

Pressurized fluid regulated by the modulator works on both ends of the lock-up shift valve and on the left side of the lock-up control valve. Under this condition, the pressure on both ends of the lock-up shift valve are equal, and the lock-up shift valve is moved to the right side by the tension of the valve spring alone. The fluid from the ATF pump will flow through the left side of the lock-up clutch to the torque converter; that is, the lock-up clutch is OFF condition.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

# Description

## Lock-up System (cont'd)

### Partial Lock-up

Lock-up Control Solenoid Valve A: ON Lock-up Control Solenoid Valve B: Duty operation (ON ↔ OFF)

The ECM switches the solenoid valve A to ON to release the modulator pressure in the left cavity of the lock-up shift valve. The modulator pressure in the right cavity of the lock-up shift valve overcomes the spring force, thus the lock-up shift valve is moved to the left side.

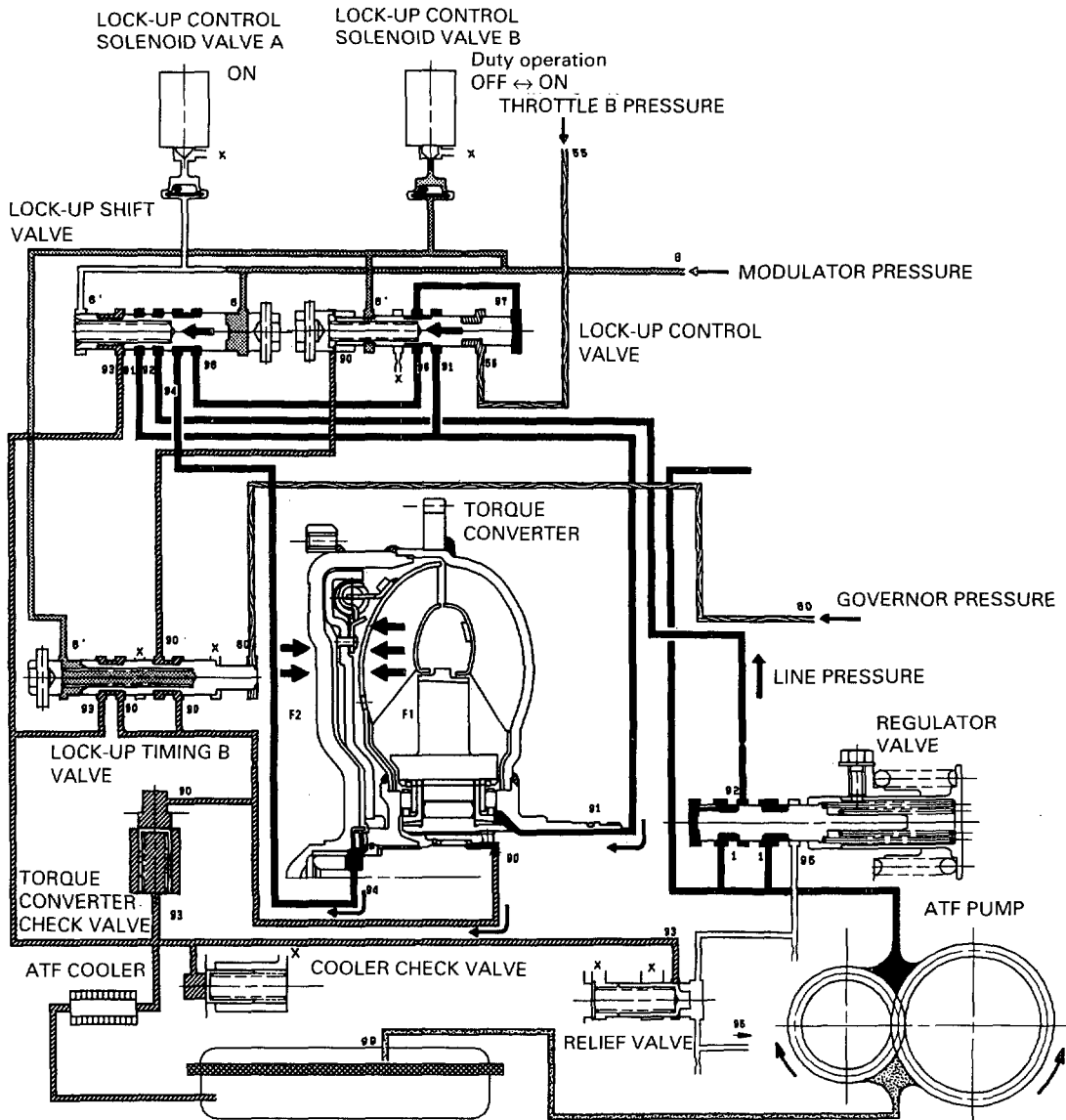
The torque converter pressure is separated into two passages to the torque converter:

Torque Converter Inner Pressure: enters into right side to engage lock-up clutch

Torque Converter Back Pressure: enters into left side to disengage lock-up clutch

The back pressure (F2) is regulated by the lock-up control valve, whereas the position of the lock-up timing B valve is determined by the governor pressure, tension of the valve spring and pressure regulated by the modulator. Also the position of the lock-up control valve is determined by the throttle B pressure, torque converter back pressure and torque converter pressure regulated by the check valve. In low speed range, the throttle B pressure working on the right side of the lock-up control valve is low, causing the valve to be moved to the right side. With the lock-up control solenoid valve B to ON and OFF alternately, the modulator pressure is maintained in the left side of the lock-up control valve; in other words, the lock-up control valve is moved slightly to the left side. This slight movement of the lock-up control valve causes the back pressure (F2) to be lowered slightly, resulting in partial lock-up.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.





### Half Lock-up

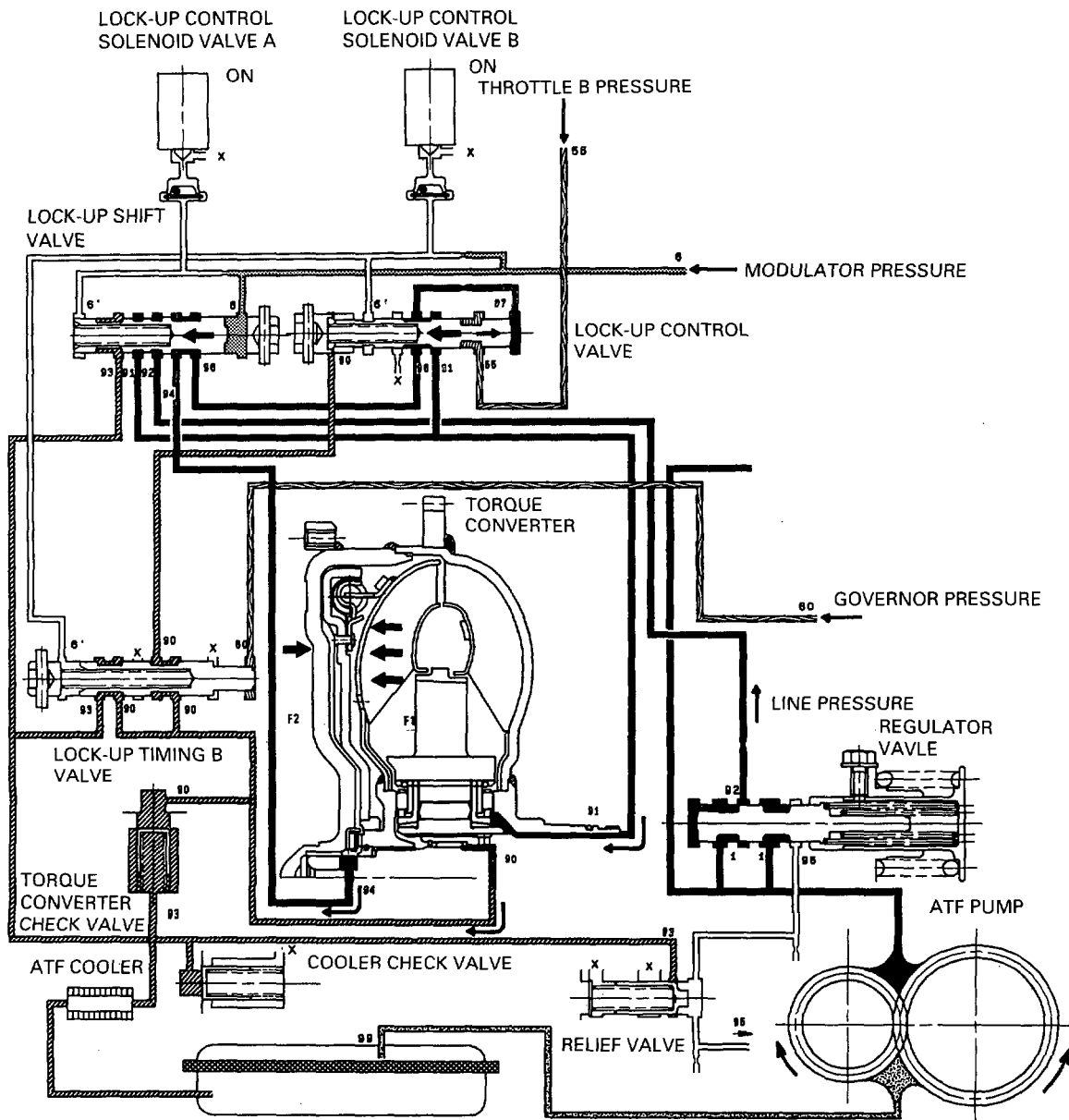
Lock-up Control Solenoid Valve A: ON    Lock-up Control Solenoid Valve B: ON

The modulator pressure is released by the solenoid valve B, causing the modulator pressure in the left cavity of the lock-up control valve to lower.

Also, the modulator pressure in the left cavity of the lock-up timing B valve is low. However, the governor pressure is still low at this time, consequently the lock-up timing B valve is kept on the right side by the spring force.

With the lock-up control solenoid valve B turned ON, the lock-up control valve is moved somewhat to the left side, causing the back pressure (F2) to lower. This allows a greater amount of the fluid (F1) to work on the lock-up clutch so as to engage the clutch. The back pressure (F2) which still exists prevents the clutch from engaging fully.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



(cont'd)

# Description

## Lock-up System (cont'd)

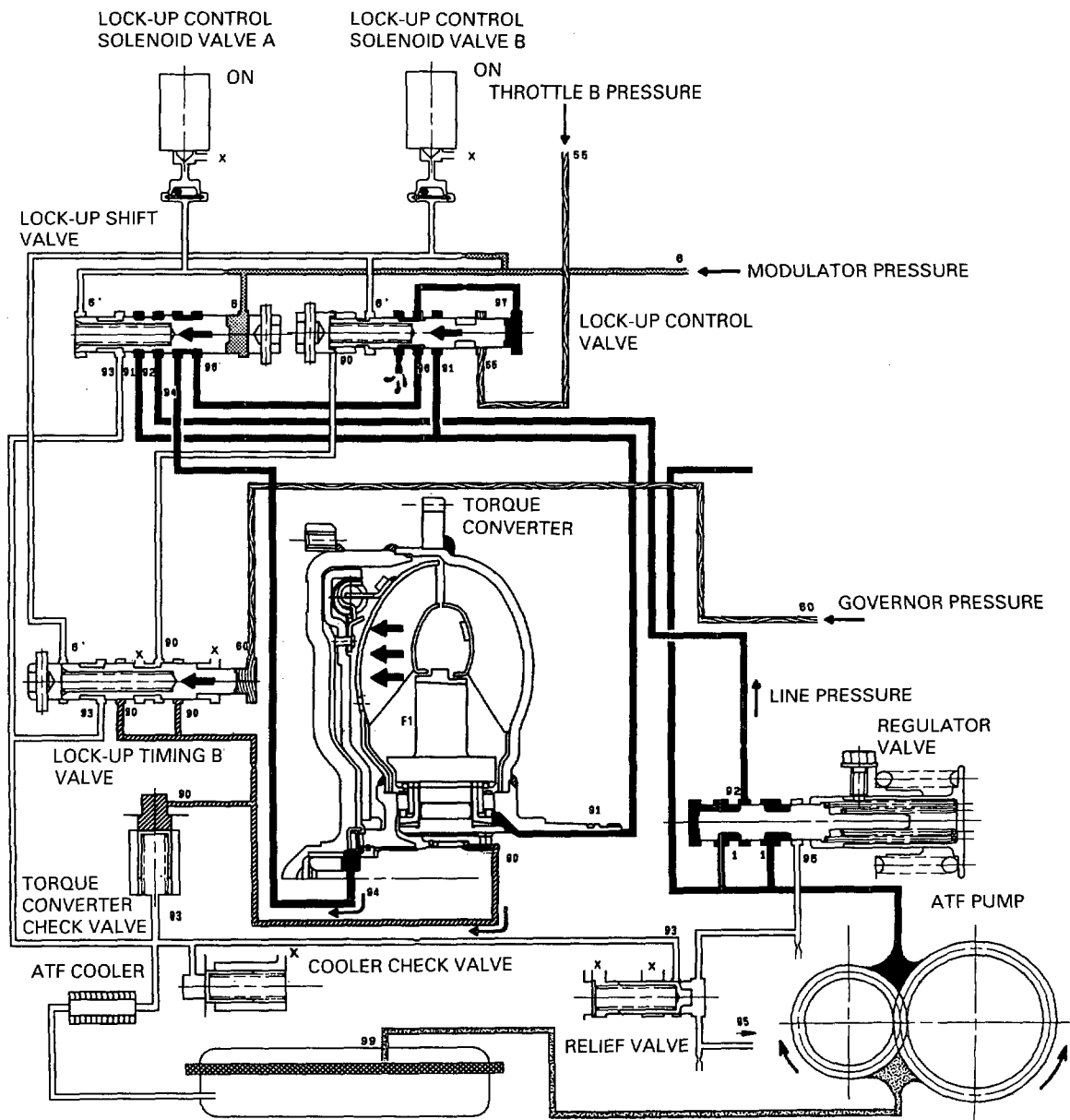
### Full Lock-up

Lock-up Control Solenoid Valve A: ON    Lock-up Control Solenoid Valve B: ON

When the vehicle speed further increases, the governor pressure is increased. The lock-up timing B valve overcomes the spring force and moves to the left side. Also this valve closes the port leading to the torque converter check valve.

Under this condition, the throttle B pressure working on the right side of the lock-up control valve becomes greater than that on the left end (modulator pressure in the left end has already been released by the solenoid valve B); the lock-up control valve is moved to the left side. As this takes place, the torque converter back pressure is released fully, causing the lock-up clutch to be engaged fully.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.



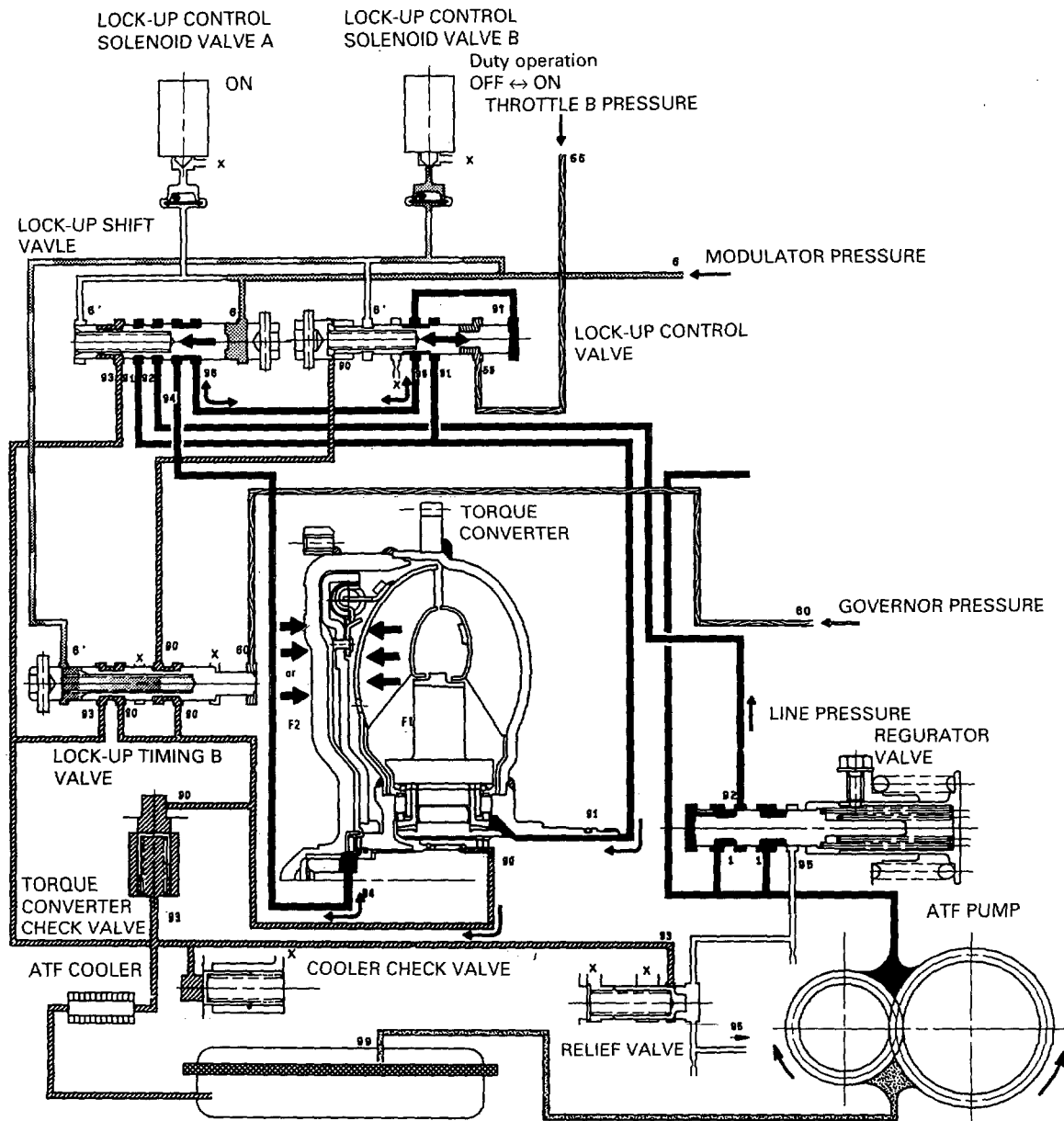


### Deceleration Lock-up

Lock-up Control Solenoid Valve A: ON    Lock-up Control Solenoid Valve B: Duty Operation (ON ↔ OFF)

The ECM switches the solenoid valve B to ON and OFF alternately at high speeds under certain conditions. The slight lock-up and half lock-up regions are maintained so as to lock the torque converter properly.

NOTE: When used, "left" or "right" indicates direction on the hydraulic circuit.

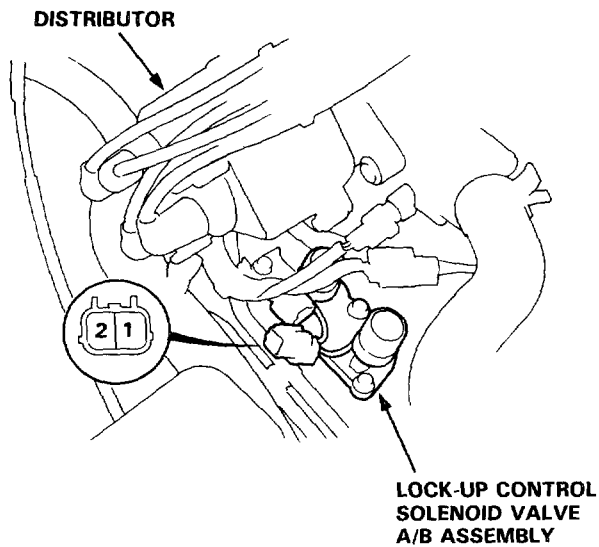


# Lock-up Control Solenoid Valve A/B Assembly

## Test

1. Disconnect the connector from the lock-up control solenoid valve A/B assembly.
2. Measure the resistance between the No. 1 terminal (solenoid valve A) of the lock-up control solenoid valve connector and body ground, and between the No. 2 terminal (solenoid valve B) and body ground.

**STANDARD: 14 – 25  $\Omega$**

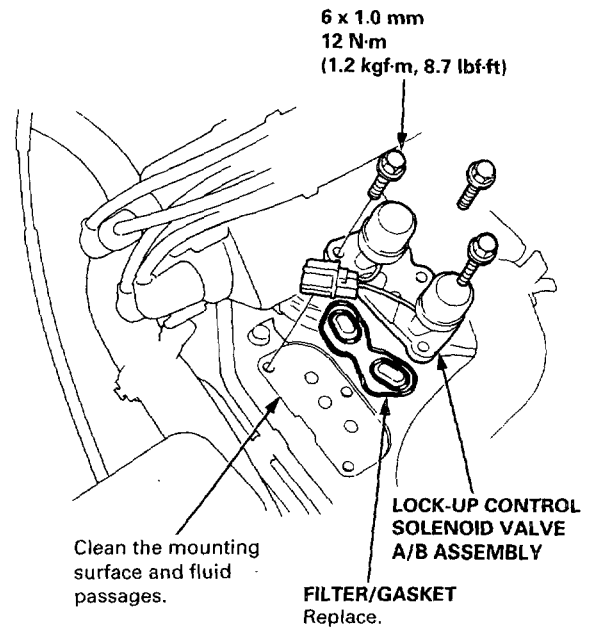


3. Replace the lock-up control solenoid valve assembly if the resistance is out of specification.
4. Connect the No. 1 terminal of the lock-up control solenoid valve connector to the battery positive terminal and connect the battery negative terminal to body ground. A clicking sound should be heard. Connect the No. 2 terminal to the battery positive terminal and connect the battery negative terminal to body ground. A clicking sound should be heard.

## Replacement

**NOTE:** Lock-up control solenoid valves A and B must be removed/replaced as an assembly.

1. Remove the mounting bolts and lock-up control solenoid valve A/B assembly.



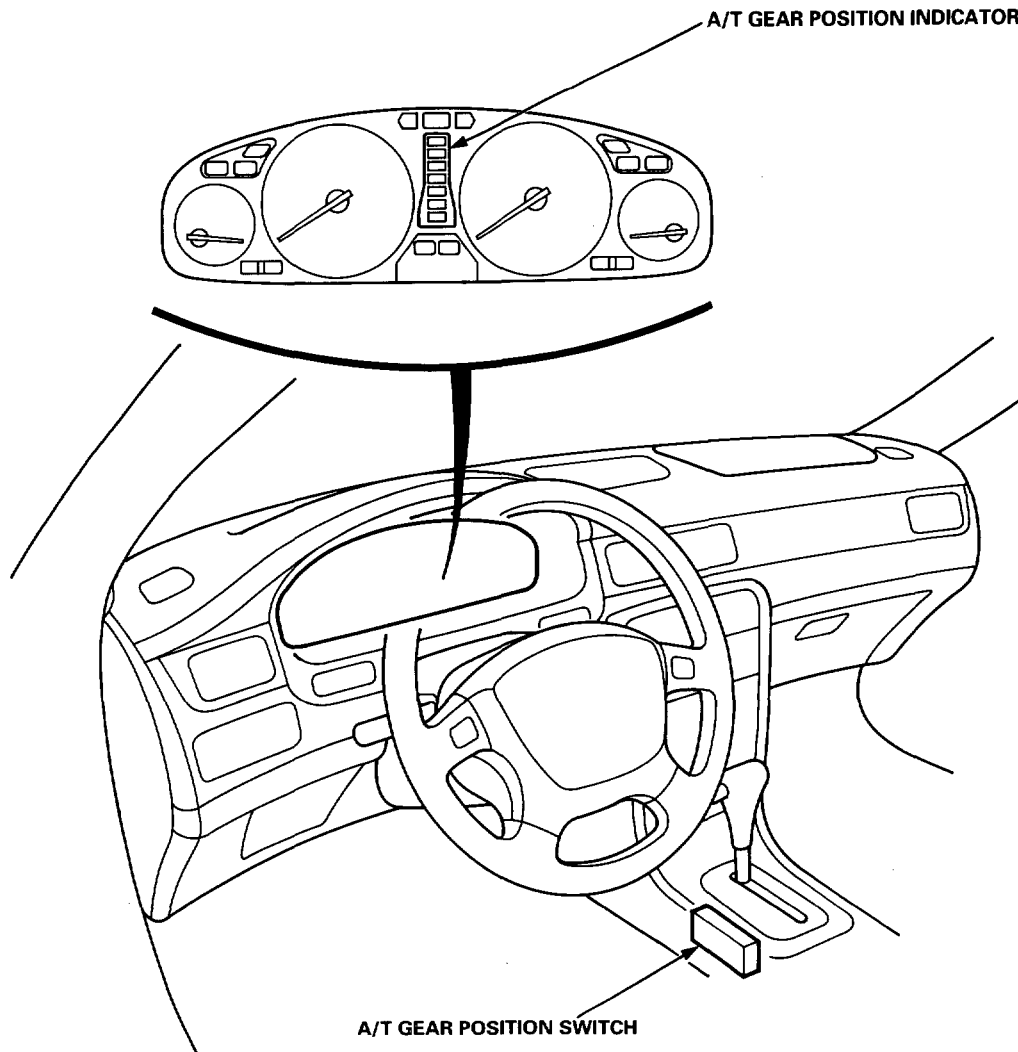
2. Clean the mounting surface and fluid passages of the lock-up control solenoid valve A/B assembly.
3. Install a new lock-up control solenoid valve A/B assembly with a new filter/gasket.
4. Check the connector for rust, dirt or oil, and reconnect it securely.

# A/T Gear Position Indicator



## Component Locations

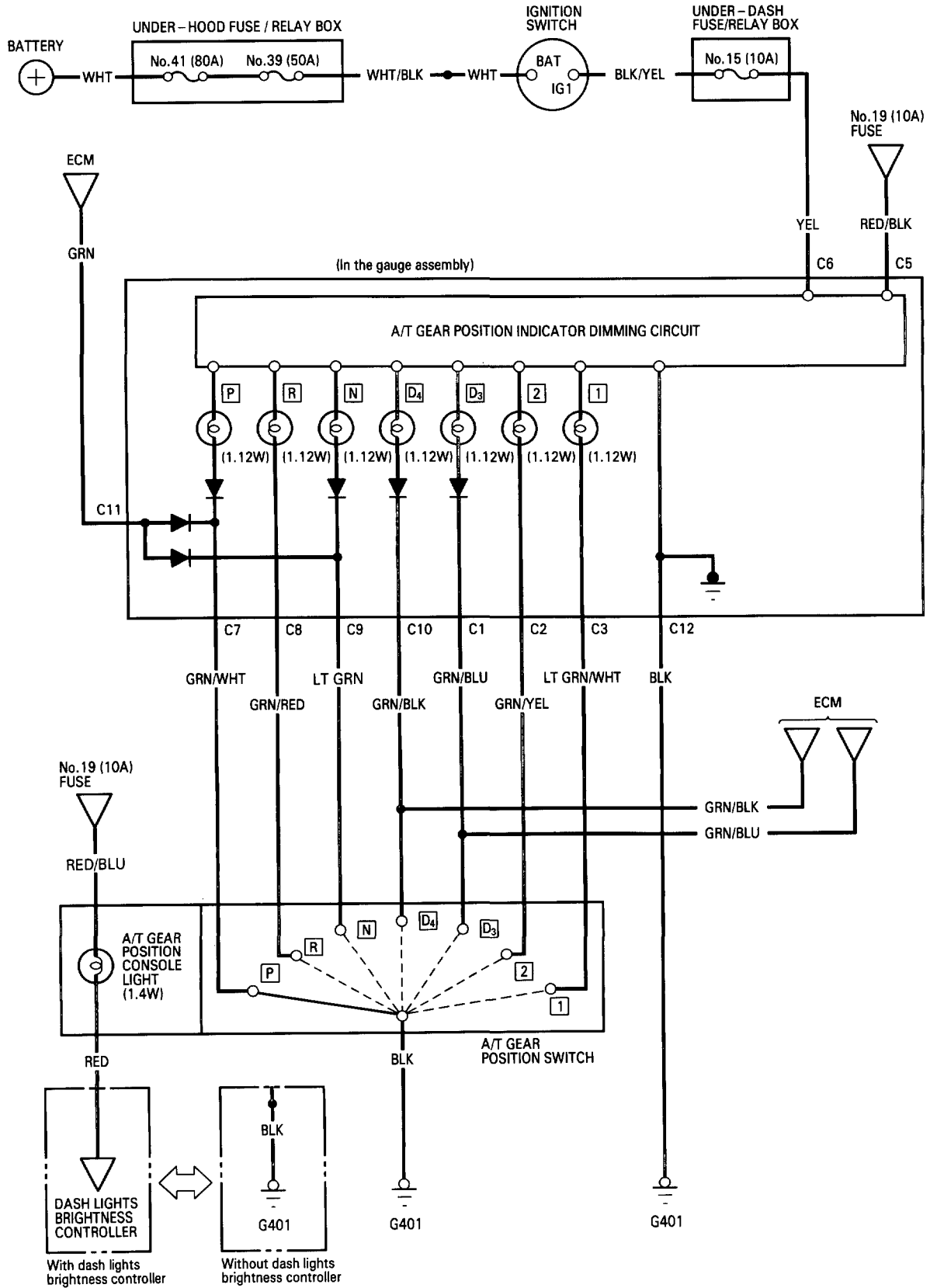
NOTE: LHD type is shown, RHD type is similar.





# A/T Gear Position Indicator

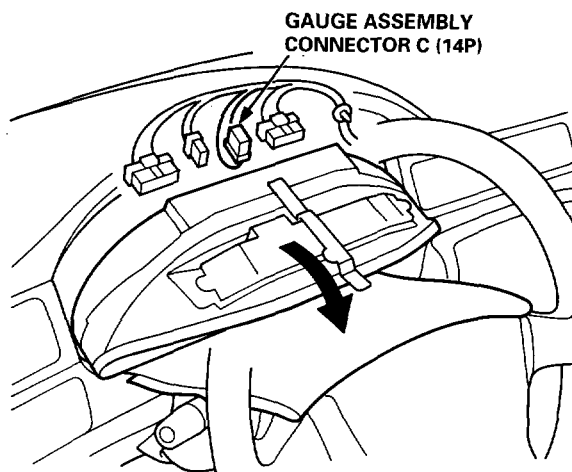
## Circuit Diagram





## Indicator Input Test

1. Remove the gauge assembly (see section 23), and disconnect all connectors from it.
2. Inspect the connector and socket terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, make the following input tests at the 14P connector.
    - If a test indicates a problem, find and correct the cause, then recheck the system.
    - If all the input tests prove OK, but the indicator is faulty, replace the A/T gear position indicator.



GAUGE ASSEMBLY  
CONNECTOR C (14P)

1	2	3			5	6
7	8	9	10	X	11	12

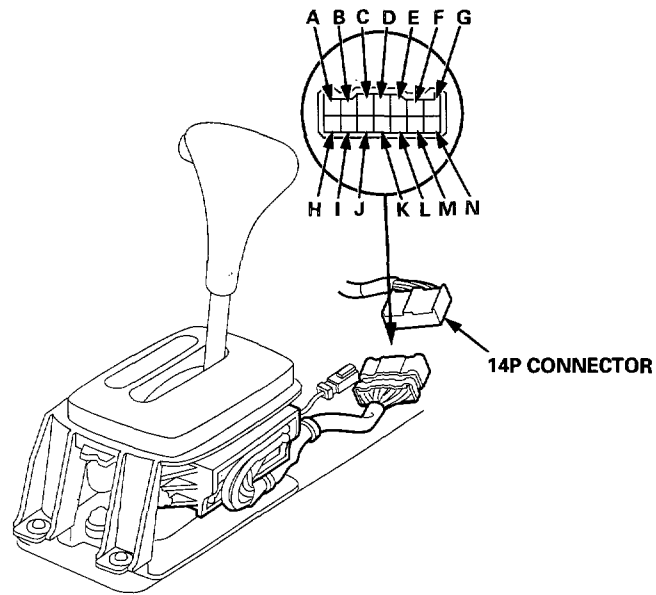
Wire side of female terminals

Terminal No.	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
12	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401)</li> <li>• An open in the wire</li> </ul>
6	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 15 (10 A) fuse in the under-dash fuse/relay box</li> <li>• An open in the wire</li> </ul>
7	GRN/WHT	Shift lever in position <b>P</b>	Check for continuity to ground: There should be continuity. NOTE: There should be no continuity in any other position.	<ul style="list-style-type: none"> <li>• Faulty A/T gear position switch</li> <li>• Poor ground (G401)</li> <li>• An open in the wire</li> </ul>
8	GRN/RED	Shift lever in position <b>R</b>		
9	LT GRN	Shift lever in position <b>N</b>		
10	GRN/BLK	Shift lever in position <b>D<sub>4</sub></b>		
1	GRN/BLU	Shift lever in position <b>D<sub>3</sub></b>		
2	GRN/YEL	Shift lever in position <b>2</b>		
3	LT-GRN/WHT	Shift lever in position <b>1</b>		
5	RED/BLK	Combination light switch ON	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 19 (10 A) fuse in the under-dash fuse/relay box</li> <li>• An open in the wire</li> </ul>
11	GRN	Ignition switch ON (II)	Check for voltage to ground: There should be more than 5 V.	<ul style="list-style-type: none"> <li>• Faulty ECM</li> <li>• An open in the wire</li> </ul>

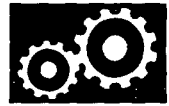
# A/T Gear Position Switch

## Test

1. Remove the front console (see section 20), then disconnect the A/T gear position switch connector (14P).
2. Check for continuity between the terminals in each position according to the following table.
  - Move the shift lever bracket and forth at each position without touching the push button, and check for continuity within the range of free play.
  - If there is no continuity within the range of free play, adjust the installing position of the A/T gear position switch as described on the next page.



Terminal Position	A	B	E	F	G	N	M	L	C	D	J	K
1	○	○										
2	○	○	○									
D <sub>s</sub>	○			○								
D <sub>d</sub>	○				○							
N	○					○					○	○
R	○						○		○	○		
P	○							○			○	○

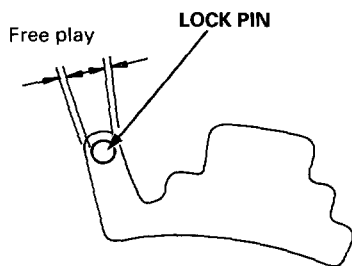
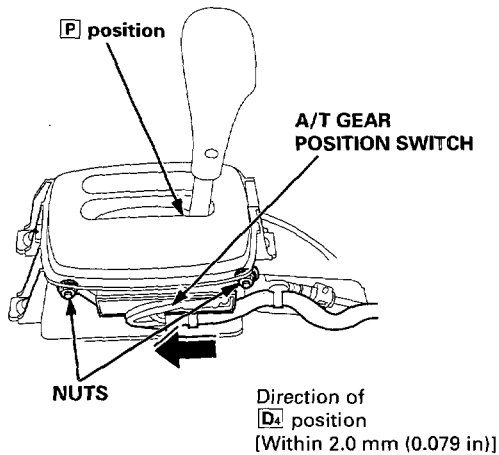


## Adjustment

1. Shift to the **P** position, and loosen the nuts.
2. Slide the switch in the direction of **D<sub>4</sub>** position [within 2.0 mm (0.079 in.)] so that there is continuity between the "A" and "L" terminals in the range of free play of the shift lever.
3. Recheck for continuity between each of the terminals.

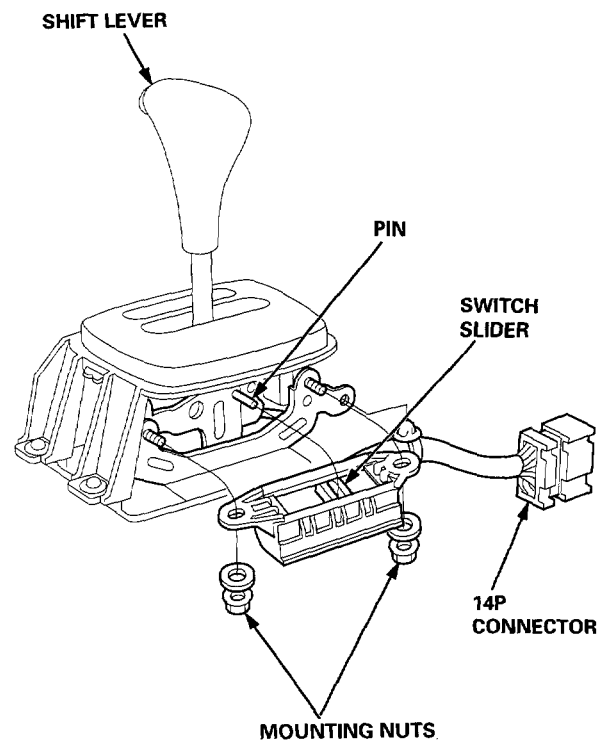
### NOTE:

- If adjustment is not possible, check for damage to the shift lever detent and/or the bracket. If there is no damage, replace the console switch.
- The engine should start when the shift lever is in **N** position in the range of free play.



## Replacement

1. Remove the front console, then disconnect the A/T gear position switch connector (14P).
2. Remove the two mounting nuts.



3. Position the switch slider to "Neutral" as shown above.
4. Move the shift lever to "Neutral", then slip the switch into position.
5. Attach the switch with the two mounting nuts.
6. Test the switch in the **P** and **N** position of the shift lever. The engine should start when the shift lever is in position **P** anywhere in the range of free play.
7. Connect the 14P connector, clamp the harness, and install the front console.

# Symptom-to-Component Chart

## Hydraulic System

SYMPTOM	Check these items on the PROBABLE CAUSE List	Check these items on the NOTES List
Engine runs, but vehicle does not move in any gear.	1, 2, 3, 5, 6, 7, 41, 46	K, L, R, S
Vehicle moves in <b>[2]</b> and <b>[1]</b> , but not in <b>[D<sub>3</sub>]</b> , <b>[D<sub>4</sub>]</b> position.	8, 10	C, M, O
Vehicle moves in <b>[2]</b> , but not in <b>[D<sub>3</sub>]</b> , <b>[D<sub>3</sub>]</b> position.	9, 29	C, M, O
Vehicle moves in <b>[D<sub>3</sub>]</b> , <b>[D<sub>4</sub>]</b> , <b>[1]</b> , <b>[R]</b> , but not in <b>[2]</b> position.	11, 12, 31	C, L
Vehicle moves in <b>[D<sub>3</sub>]</b> , <b>[D<sub>4</sub>]</b> , <b>[2]</b> , <b>[1]</b> , but not in <b>[R]</b> position.	4, 13, 14, 36, 59	C, L, Q
Vehicle moves in <b>[N]</b> position.	10, 12, 15, 35, 36, 38, 39, 40, 58	C, D
Excessive idle vibration.	2, 37, 41, 53, 54	B, K, L
Poor acceleration; flares on starting off in <b>[D<sub>4</sub>]</b> , <b>[D<sub>3</sub>]</b> position.		
Stall rpm high in <b>[D<sub>4</sub>]</b> , <b>[D<sub>3</sub>]</b> , <b>[2]</b> , <b>[1]</b> position.	1, 2, 3, 6, 46, 49	K, L, R
Stall rpm high in <b>[D<sub>4</sub>]</b> , <b>[D<sub>3</sub>]</b> position.	8, 10	C, D
Stall rpm high in <b>[2]</b> position.	12	C, D
Stall rpm is in specification.	15	N
Stall rpm low.	16, 17, 37, 49, 53, 54	R
Upshifting occurs at speed too high or low.	14, 18, 19, 48	
Fails to shift in <b>[D<sub>4</sub>]</b> , <b>[D<sub>3</sub>]</b> position; from 1st to 3rd gear.	22	
Fails to shift in <b>[D<sub>4</sub>]</b> position; from 1st to 4th gear.	22, 23	
Erratic upshifting.		V
1-2 upshift.	14, 21	
2-3 upshift.	14, 22	
3-4 upshift.	14, 23	
Harsh upshift (1-2).	8, 12, 20, 25, 31, 65	C, D, E, V
Harsh upshift (2-3).	12, 20, 26, 28, 33, 35, 65	C, D, E, H, L, V
Harsh upshift (3-4).	20, 27, 32; 34, 35, 36, 65	C, D, E, I, L, V
Harsh downshift (2-1).	20, 25, 42	O
Harsh downshift (3-2).	12, 20, 25, 26, 31, 35, 43, 63	C, D, E, H
Harsh downshift (4-3).	20, 26, 27, 33, 35, 36, 44, 62	C, D, E, I
Late shift from <b>[N]</b> position to <b>[D<sub>4</sub>]</b> or <b>[D<sub>3</sub>]</b> position.	10, 30	M
Late shift from <b>[N]</b> position to <b>[R]</b> position.	36, 59, 71	Q
Noise from transmission in all shift lever position.	2, 45	K, L, Q
Vehicle does not accelerate more than 31 mph (50 km/h).	16	
Shift lever does not operate smoothly.	6, 47, 67, 68	P
Fails to shift in <b>[D<sub>4</sub>]</b> position; stuck in 4th gear.	23, 52	
Transmission will not shift into parking gear in <b>[P]</b> position.	6, 47, 68	P
Lock-up clutch does not engage or disengage.	18, 20, 48, 51, 53, 54, 55, 56	E, L, V
Lock-up clutch slips.	49, 54, 55, 56	L
Excessive shock when lock-up clutch engages.	54, 55, 56	E, L, V
Excessive shock when shifting into <b>[1]</b> position.	10, 24, 58, 64	E, O
No engine braking in <b>[1]</b> position.	57, 58, 69, 70	C, D, L
Vibration in all positions.	41	
Fail to shift in <b>[D<sub>4</sub>]</b> , <b>[D<sub>3</sub>]</b> position; stuck in 1st or 4th gear.	14	
Excessive shock when shifting from <b>[N]</b> position to <b>[D<sub>4</sub>]</b> , <b>[D<sub>3</sub>]</b> position.	10, 12, 24, 25, 30, 31, 61	



PROBABLE CAUSE			
1	Low ATF.	44	4th check ball stuck.
2	ATF pump worn or binding.	45	Torque converter housing or transmission housing ball bearing worn/damaged.
3	Regulator valve stuck or spring worn.	46	ATF strainer clogged.
4	Servo valve stuck.	47	Joint in shift cable and transmission or body worn.
5	Mainshaft worn/damaged.	48	Modulator valve stuck.
6	Shift cable broken/out of adjustment.	49	Torque converter check valve stuck.
7	Final gears worn/damaged (2 gears).	50	Foreign material in separator plate orifice.
8	One-way (sprag) clutch worn/damaged.	51	Lock-up timing valve B stuck.
9	1st gears worn/damaged (2 gears).	52	Governor cut valve stuck.
10	1st clutch defective.	53	Lock-up shift valve stuck.
11	2nd gears worn/damaged (2 gears).	54	Lock-up piston defective.
12	2nd clutch defective.	55	Lock-up control solenoid valve A/B defective.
13	Reverse gears worn/damaged (2 gears).	56	Lock-up control valve stuck.
14	Governor valve defective.	57	Sub-shaft 1st gear worn/damaged.
15	Excessive ATF.	58	1st-hold clutch defective.
16	Torque converter one-way clutch defective.	59	Reverse control valve stuck.
17	Engine throttle cable out of adjustment.	60	Servo control valve stuck.
18	Throttle control cable out of adjustment.	61	2-1 timing valve stuck.
19	Throttle valve A stuck.	62	4-3 kick-down valve stuck.
20	Throttle valve B stuck.	63	3-2 kick-down valve stuck.
21	1-2 shift valve stuck.	64	1st-hold accumulator defective.
22	2-3 shift valve stuck.	65	CPC valve stuck.
23	3-4 shift valve stuck.	66	3rd gear worn/damaged (2 gears).
24	1st accumulator defective.	67	Manual valve defective.
25	2nd accumulator defective.	68	Control shaft and related parts defective.
26	3rd accumulator defective.	69	4th exhaust valve stuck.
27	4th accumulator defective.	70	Foreign material in 1st-hold orifice.
28	2nd orifice control valve stuck.	71	Foreign material in reverse ON orifice.
29	Foreign material in main orifice.		
30	Foreign material in 1st orifice.		
31	Foreign material in 2nd orifice.		
32	3rd orifice control valve stuck.		
33	Foreign material in 3rd orifice.		
34	Foreign material in 4th orifice.		
35	3rd clutch defective.		
36	4th clutch defective.		
37	Engine output low.		
38	Needle bearing worn/damaged.		
39	Thrust washer worn/damaged.		
40	Clutch clearance incorrect.		
41	Drive plate defective or transmission misassembly.		
42	2nd check ball stuck.		
43	3rd check ball stuck.		

(cont'd)

# Symptom-to-Component Chart

## Hydraulic System (cont'd)

The following symptoms can be caused by improper repair or assembly.	Check these items on the PROBABLE CAUSE DUE TO IMPROPER REPAIR	Items on the NOTES CHART
Vehicle creeps in <b>N</b> position.	R1, R2	
Vehicle does not move in <b>D<sub>2</sub></b> or <b>D<sub>1</sub></b> position.	R4	
Transmission locks up in <b>R</b> position.	R3, R12	
Excessive drag in transmission.	R6	K, R
Excessive vibration, rpm related.	R7	
Noise with wheels moving only.	R5	
Main seal pops out.	R8	S
Various shifting problems.	R9, R10	
Harsh upshifts.	R11	

PROBABLE CAUSE DUE TO IMPROPER REPAIR	
R1.	Improper clutch clearance.
R2.	Improper gear clearance.
R3.	Parking brake lever installed upside down.
R4.	One-way (sprag) clutch installed upside down.
R5.	Reverse selector hub installed upside down.
R6.	ATF pump binding.
R7.	Torque converter not fully seated in ATF pump.
R8.	Main seal improperly installed.
R9.	Springs improperly installed.
R10.	Valves improperly installed.
R11.	Check valve balls not installed.
R12.	Shift fork bolt not installed.



NOTES	
B.	Set idle rpm in gear to specified idle speed. If still no good, adjust motor mounts as outlined in engine section of shop manual.
C.	If the large clutch piston O-ring is broken, inspect the piston groove for rough machining.
D.	If the clutch pack is seized or is excessively worn, inspect the other clutches for wear and check the orifice control valves and throttle valves for free movement.
E.	If throttle valve B is stuck, inspect the clutches for wear.
G.	If the 1-2 shift valve is stuck closed, the transmission will not upshift. If stuck open, the transmission has no 1st gear.
H.	If the 2-3 orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I.	If the 2/3-4 orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J.	If the clutch pressure control valve (CPC) is stuck closed, the transmission will not shift out of 1st gear.
K.	Improper alignment of main valve body and torque converter housing may cause ATF pump seizure. The symptoms are mostly an rpm-related ticking noise or a high pitched squeek.
L.	If the ATF strainer is clogged with particles of steel or aluminum, inspect the ATF pump and differential pinion shaft. If both are OK and no cause for the contamination is found, replace the torque converter.
M.	If the 1st clutch feed pipe guide in the right side cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the transmission housing. If OK, replace the right side cover as it is dented. The O-ring under the guide is probably worn.
N.	Replace the mainshaft if the bushings for the 1st and 4th feed pipe are loose or damaged. If the 1st feed pipe is damaged or out of round, replace it. If the 4th feed pipe is damaged or out of round, replace the right side cover.
O.	A worn or damaged one-way (sprag) clutch is mostly a result of shifting the transmission in <b>D<sub>2</sub></b> or <b>D<sub>4</sub></b> position while the wheels rotate in reverse, such as rocking the car in snow.
P.	Inspect the frame for collision damage.
Q.	<p>Inspect for damage or wear:</p> <ol style="list-style-type: none"> <li>1. Reverse selector gear teeth chamfers.</li> <li>2. Engagement teeth chamfers of countershaft 4th and reverse gear.</li> <li>3. Shift fork for scuff marks in center.</li> <li>4. Differential pinion shaft for wear under pinion gears.</li> <li>5. Bottom of 3rd clutch for swirl marks.</li> </ol> <p>Replace items 1, 2, 3, and 4 if worn or damaged. If transmission makes clicking, grinding or whirring noise, also replace mainshaft 4th gear, reverse idler gear, and countershaft 4th gear in addition to 1, 2, 3 or 4. If differential pinion shaft is worn, overhaul differential assembly and replace ATF strainer and thoroughly clean transmission, flush torque converter, cooler and lines.</p> <p>If bottom of 3rd clutch is swirled and transmission makes gear noise, replace the countershaft and final driven gear.</p>
R.	Be very careful not to damage the torque converter housing when replacing the main ball bearing. You may also damage the ATF pump when you torque down the main valve body. This will result in ATF pump seizure if not detected. Use the proper tools.
S.	Install the main seal flush with the torque converter housing. If you push it into the torque converter housing until it bottoms out, it will block the fluid return passage and result in damage.
T.	Harsh downshifts when coasting to a stop with zero throttle may be caused by a bent-in throttle valve retainer/cam stopper. Throttle control cable adjustment may clear this problem.
U.	Check if servo separator plate is installed. If it was not installed, the servo valve may have been pushed out by hydraulic pressure causing a leak (internal) affecting all forward gears.
V.	Throttle control cable adjustment is essential for proper operation of the transmission. Not only does it affect the shift points if misadjusted, but also the shift quality and lock-up clutch operation. A cable adjusted too long will result in throttle pressure being too low for the amount of engine torque input into the transmission and may cause clutch slippage. A cable adjusted too short will result in too high throttle pressures which may cause harsh shifts, erratic shifts and torque converter hunting.



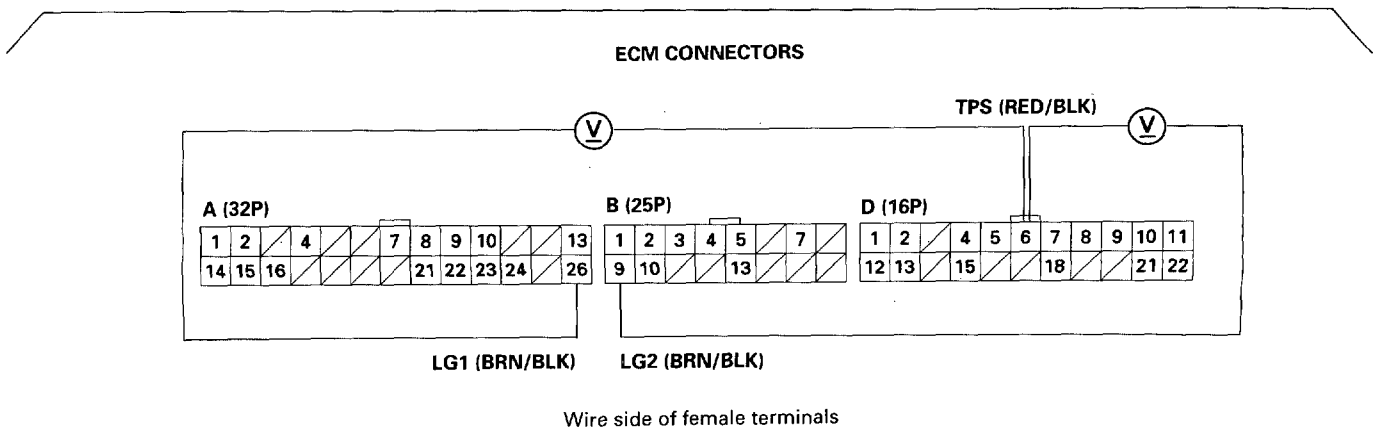
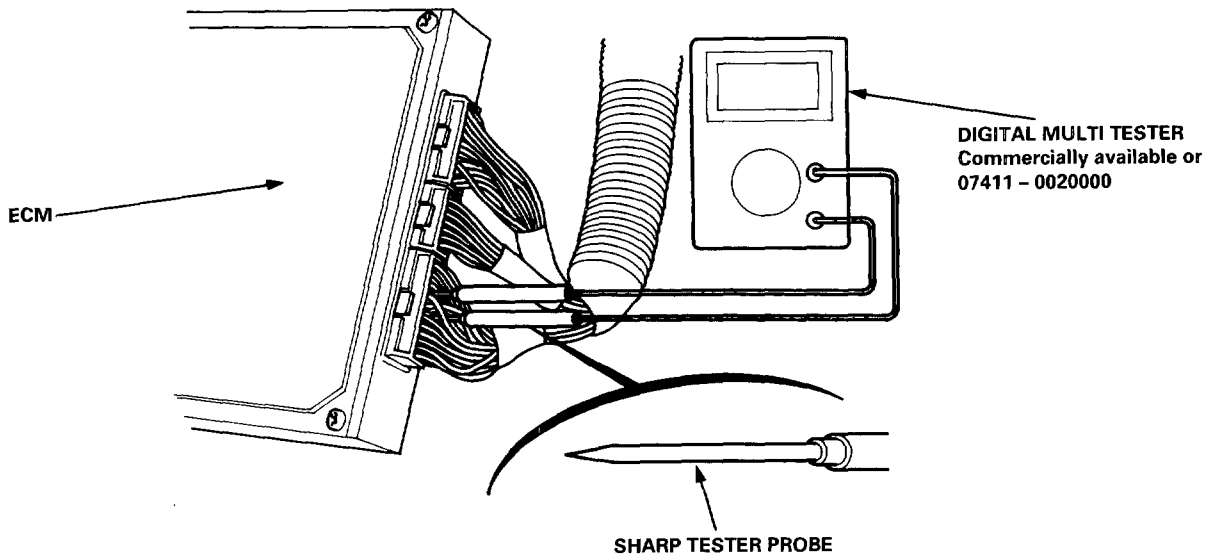
# Road Test

NOTE: Warm up the engine to operating temperature (the radiator fan comes on).

1. Apply parking brake and block the wheels. Start the engine, then shift to **D<sub>3</sub>** position while depressing the brake pedal. Depress the accelerator pedal, and release it suddenly. Engine should not stall.
2. Repeat same test in **D<sub>2</sub>** position.
3. Test drive the vehicle on a flat road in the **D<sub>4</sub>** position. Check that the shift points occur at approximate speeds shown. Also check for abnormal noise and clutch slippage.

NOTE: Throttle position sensor voltage represents the throttle opening.

- 1. Remove the ECM (see section 11).
- 2. Set the digital multimeter to check voltage between D1 (+) terminal and A9 (-) or A22 (-) terminal for the throttle position sensor.





D14A7 and D14A8 engines: **D<sub>2</sub>** Position

• **Upshift**

Throttle Opening	Unit of speed	1st → 2nd	2nd → 3rd	3rd → 4th
Fully-closed throttle	mph	9 – 14	23 – 27	31 – 35
	km/h	15 – 22	37 – 43	50 – 56
Throttle position sensor voltage: 1.27 V	mph	13 – 17	31 – 35	42 – 47
	km/h	21 – 28	50 – 57	67 – 76
Throttle position sensor voltage: 2.03 V	mph	16 – 24	39 – 50	52 – 64
	km/h	26 – 39	62 – 81	84 – 103
Fully-opened throttle	mph	34 – 38	62 – 69	95 – 104
	km/h	54 – 61	99 – 111	153 – 170

• **Downshift**

Throttle Opening	Unit of speed	4th → 3rd	3rd → 2nd	2nd → 1st
Fully-closed throttle	mph	6 – 9	18 – 22	—
	km/h	9 – 15	29 – 35	—
Fully-opened throttle	mph	25 – 30	56 – 63	81 – 92
	km/h	40 – 48	90 – 102	131 – 148

• **Lock-up**

Throttle Opening	Unit of speed	<b>D<sub>2</sub></b> Position		<b>D<sub>3</sub></b> Position	
		Lock-up ON	Lock-up OFF	Lock-up ON	Lock-up OFF
Fully-closed throttle	mph	15 – 17	14 – 16	60 – 64	57 – 61
	km/h	24 – 27	23 – 26	97 – 103	92 – 98
Throttle position sensor voltage: 2.03 V	mph	66 – 70	54 – 58	66 – 70	57 – 61
	km/h	107 – 113	87 – 93	107 – 113	92 – 98
Fully-opened throttle	mph	88 – 91	85 – 88	82 – 86	78 – 82
	km/h	141 – 147	136 – 142	132 – 138	126 – 132

(cont'd)

# Road Test

(cont'd)

D16B2 engine: **D<sub>4</sub>** Position

• **Upshift**

Throttle Opening	Unit of speed	1st → 2nd	2nd → 3rd	3rd → 4th
Fully-closed throttle	mph	9 – 13	22 – 27	30 – 35
	km/h	15 – 21	36 – 43	49 – 56
Throttle position sensor voltage: 1.27 V	mph	13 – 17	31 – 35	42 – 47
	km/h	21 – 27	50 – 56	67 – 76
Throttle position sensor voltage: 2.03 V	mph	16 – 24	38 – 50	51 – 63
	km/h	26 – 39	61 – 80	82 – 101
Fully-opened throttle	mph	33 – 38	61 – 68	94 – 104
	km/h	53 – 61	98 – 109	151 – 167

• **Downshift**

Throttle Opening	Unit of speed	4th → 3rd	3rd → 2nd	2nd → 1st
Fully-closed throttle	mph	6 – 9	17 – 22	—
	km/h	9 – 15	28 – 35	—
Fully-opened throttle	mph	25 – 29	55 – 63	81 – 91
	km/h	40 – 47	89 – 101	130 – 146

• **Lock-up**

Throttle Opening	Unit of speed	<b>D<sub>4</sub></b> Position		<b>D<sub>3</sub></b> Position	
		Lock-up ON	Lock-up OFF	Lock-up ON	Lock-up OFF
Fully-closed throttle	mph	15 – 17	14 – 16	60 – 64	57 – 61
	km/h	24 – 27	23 – 26	97 – 103	92 – 98
Throttle position sensor voltage: 2.03 V	mph	66 – 70	54 – 58	66 – 70	57 – 61
	km/h	107 – 113	87 – 93	107 – 113	92 – 98
Fully-opened throttle	mph	88 – 91	84 – 88	82 – 86	78 – 81
	km/h	141 – 147	135 – 141	132 – 138	125 – 131

4. Accelerate to about 35 mph (57 km/h) so the transmission is in 4th, then shift from **D<sub>4</sub>** position to **2** position. The vehicle should immediately begin slowing down from engine braking.
5. Check for abnormal noise and clutch slippage in the following positions.
  - 1** (1st Gear) Position
    - 1. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
    - 2. Upshifts should not occur with the shift lever in this position.
  - 2** (2nd Gear) Position
    - 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 shift lever in this position.
  - R** (Reverse) Position
    - Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.
6. Test in **P** (Parking) Position
  - Park vehicle on slope (approx. 16°), apply the parking brake, and shift into **P** position. Release the brake; the vehicle should not move.



## Test

### ⚠ CAUTION

- To prevent transmission damage, do not test stall speed for more than 10 seconds at a time.
- Do not shift the lever while raising the engine speed.
- Be sure to remove the pressure gauge before testing stall speed.

1. Engage the parking brake and block all four wheels.
2. Connect the tachometer, and start the engine.
3. Make sure the A/C switch is OFF.
4. After the engine has warmed up to normal operating temperature (the radiator fan comes on), shift into **[2]** position.
5. Fully depress the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
6. Allow 2 minutes for cooling, then repeat the test in **[1]**, **[D4]** and **[R]** positions.

#### NOTE:

- Stall speed tests should be used for diagnostic purposes only.
- Stall speed should be the same in **[D4]**, **[2]**, **[1]** and **[R]** positions.

#### Stall Speed RPM:

- **D14A7 and D14A8 engines**  
**Specification: 2,550 rpm (min<sup>-1</sup>)**  
**Service Limit: 2,400 – 2,700 rpm (min<sup>-1</sup>)**
- **D16B2 engine**  
**Specification: 2,800 rpm (min<sup>-1</sup>)**  
**Service Limit: 2,650 – 2,950 rpm (min<sup>-1</sup>)**

TROUBLE	PROBABLE CAUSE
Stall rpm high in <b>[D4]</b> , <b>[2]</b> , <b>[1]</b> and <b>[R]</b> positions	<ul style="list-style-type: none"> <li>• Low fluid level or ATF pump output</li> <li>• Clogged ATF strainer</li> <li>• Pressure regulator valve stuck closed</li> <li>• Slipping clutch</li> </ul>
Stall rpm high in <b>[1]</b> position	• Slippage of 1st clutch, 1st-hold clutch or 1st gear one-way clutch
Stall rpm high in <b>[2]</b> position	• Slippage of 2nd clutch
Stall rpm high in <b>[D4]</b> position	• Slippage of 1st clutch, 1st gear one-way clutch
Stall rpm high in <b>[R]</b> position	• Slippage of 4th clutch
Stall rpm low in <b>[D4]</b> , <b>[2]</b> , <b>[1]</b> and <b>[R]</b> positions	<ul style="list-style-type: none"> <li>• Engine output low</li> <li>• Torque converter one-way clutch slipping</li> </ul>

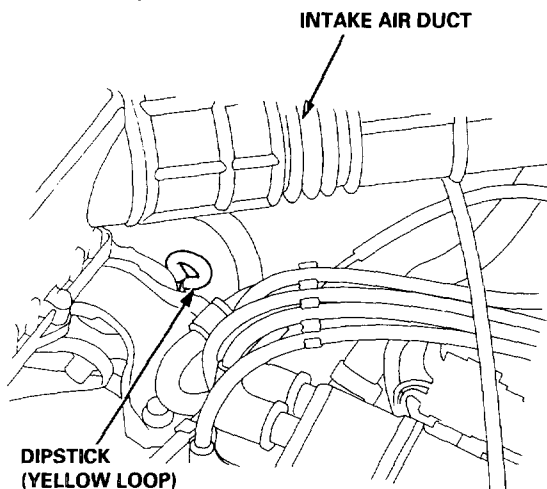
# Fluid Level

## Checking/Changing

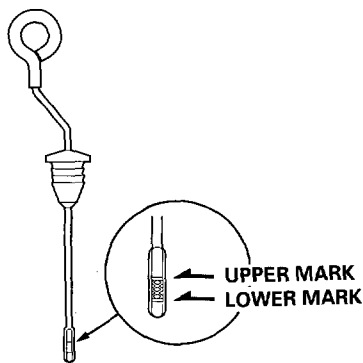
### Checking

NOTE: Keep all of the foreign particles out of the transmission.

1. Warm up the engine to normal operating temperature (the radiator fan comes on).
2. Park the vehicle on level ground. Turn off the engine.
3. Remove the dipstick (yellow loop) from the transmission and wipe it with a clean cloth.
4. Insert the dipstick into the transmission.

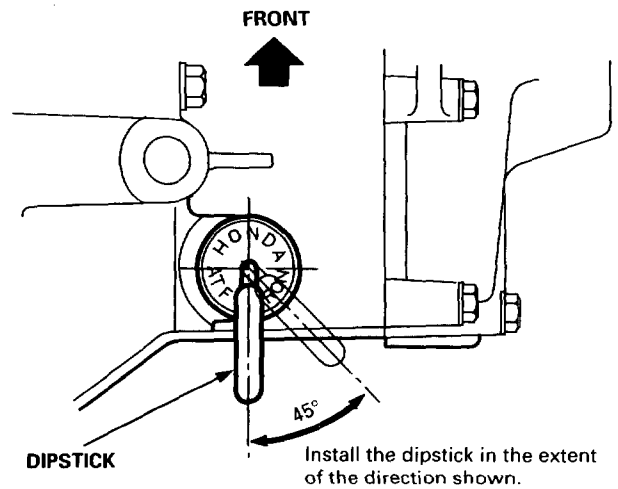


5. Remove the dipstick and check the fluid level. It should be between the upper and lower marks.



6. If the level is below the lower mark, add fluid into the dipstick hole to bring it to the upper mark. Use Genuine Honda ATF PREMIUM (Automatic Transmission Fluid-PREMIUM) or an equivalent quality DEXRON® II or III ATF only.

7. Insert the dipstick back in the transmission in the direction shown.



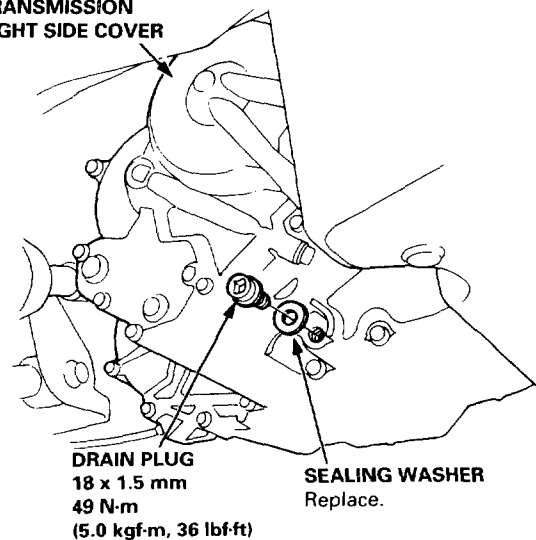
### Changing

NOTE: Keep all of the foreign particles out of the transmission.

1. Bring the transmission up to operating temperature by driving the vehicle. Park the vehicle 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 upper mark on the dipstick.

**Automatic Transmission Fluid Capacity:**  
2.7 ℓ (2.9 US qt, 2.4 Imp qt) at change  
5.9 ℓ (6.2 US qt, 5.2 Imp qt) after overhaul

### TRANSMISSION RIGHT SIDE COVER



# Pressure Testing

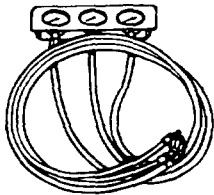


## ⚠ WARNING

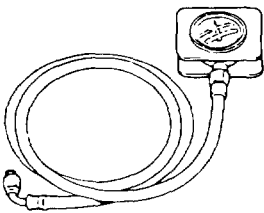
- While testing, be careful of the rotating front wheels.
- Make sure lifts, jacks, and safety stands are placed properly (see section 1).

1. Before testing, be sure the transmission fluid is filled to the proper level.
2. Raise the front of the vehicle, and make sure it is securely supported.
3. Set the parking brake, and block rear wheels securely.
4. Allow the front wheels to rotate freely.
5. Warm up the engine, then stop the engine and connect a tachometer.
6. Connect the oil pressure gauge to each inspection hole securely, and do not allow dust or other foreign particles to enter the holes.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**



**A/T OIL PRESSURE  
GAUGE SET  
07406 - 0020004**



**A/T LOW PRESSURE  
GAUGE  
07406 - 0070001**

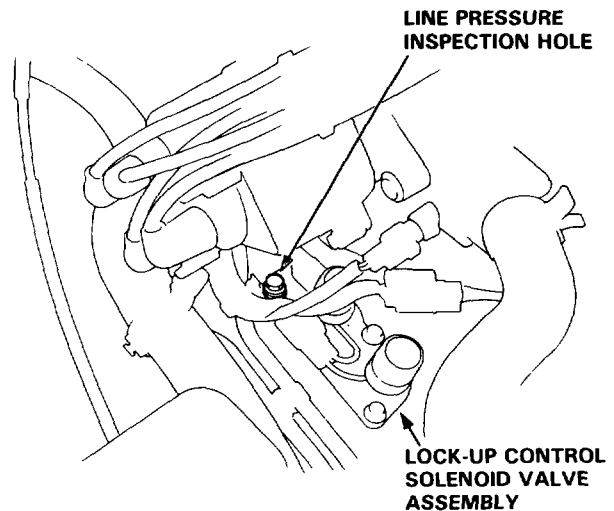
7. Start the engine, and measure the respective pressure as follows.
  - Line Pressure
  - Clutch Pressure
  - Throttle A Pressure, Throttle B Pressure
  - Governor Pressure
8. Install a new washer and the sealing bolt in the inspection hole, and tighten to the specified torque.

**TORQUE: 18 N·m (1.8 kgf·m, 13 lbf·ft)**

NOTE: Do not reuse old aluminum washers.

### • Line Pressure Measurement

1. Start the engine, and run it at 2,000 rpm (min<sup>-1</sup>).
2. Shift to **N** or **P** position.  
NOTE: Higher pressures may be indicated if measurements are made in shift lever positions other than **N** or **P** position.
3. Measure line pressure.



PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE		
					Standard	Service Limit
Line	<b>N</b> or <b>P</b>	No (or low) line pressure	Torque converter, ATF pump, pressure regulator, torque converter check valve	D14A7, D14A8 Engines	780 – 830 kPa (8.0 – 8.5 kgf/cm <sup>2</sup> , 110 – 120 psi)	740 kPa (7.5 kgf/cm <sup>2</sup> , 110 psi)
				D16B2 Engine	830 – 880 kPa (8.5 – 9.0 kgf/cm <sup>2</sup> , 120 – 130 psi)	780 kPa (8.0 kgf/cm <sup>2</sup> , 110 psi)

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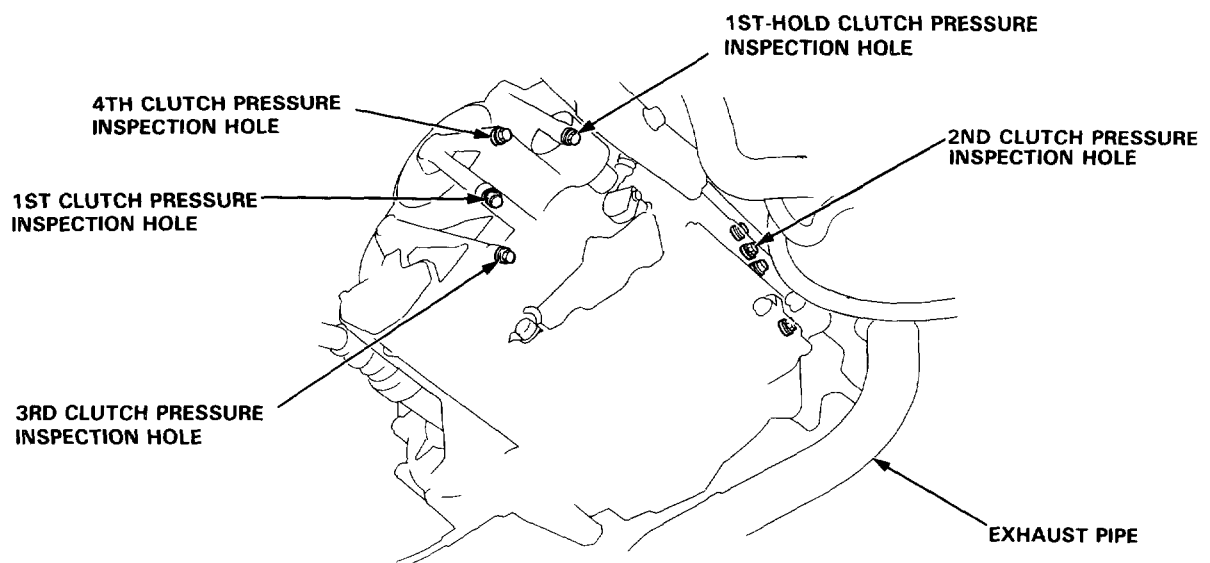
# Pressure Testing

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- **Clutch Pressure Measurement**

1. Start the engine, and run it at 2,000 rpm ( $\text{min}^{-1}$ ).
2. Shift to the respective shift lever position as in the following table.
3. Measure each clutch pressure.





### D14A7 and D14A8 Engines

PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
1st Clutch	<b>1</b> or <b>D<sub>2</sub></b>	No or low 1st pressure	1st Clutch	780 – 830 kPa (8.0 – 8.5 kgf/cm <sup>2</sup> , 110 – 120 psi)	740 kPa (7.5 kgf/cm <sup>2</sup> , 110 psi)
1st-hold Clutch	<b>1</b>	No or low 1st-hold pressure	1st-hold Clutch		
2nd Clutch	<b>2</b>	No or low 2nd pressure	2nd Clutch		
2nd Clutch	<b>D<sub>4</sub></b>	No or low 2nd pressure	2nd Clutch	370 – 420 kPa (3.8 – 4.3 kgf/cm <sup>2</sup> , 54 – 61 psi) throttle control drum fully-closed	360 kPa (3.7 kgf/cm <sup>2</sup> , 53 psi) throttle control drum fully-closed 740 kPa (7.5 kgf/cm <sup>2</sup> , 110 psi) throttle control drum more than 1/8 opened
3rd Clutch		No or low 3rd pressure	3rd Clutch		
4th Clutch		No or low 4th pressure	4th Clutch		
	<b>R</b>		Servo Valve or 4th Clutch	780 – 830 kPa (8.0 – 8.5 kgf/cm <sup>2</sup> , 110 – 120 psi)	740 kPa (7.5 kgf/cm <sup>2</sup> , 110 psi)

### D16B2 Engine

PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
1st Clutch	<b>1</b> or <b>D<sub>2</sub></b>	No or low 1st pressure	1st Clutch	830 – 880 kPa (8.5 – 9.0 kgf/cm <sup>2</sup> , 120 – 130 psi)	780 kPa (8.0 kgf/cm <sup>2</sup> , 110 psi)
1st-hold Clutch	<b>1</b>	No or low 1st-hold pressure	1st-hold Clutch		
2nd Clutch	<b>2</b>	No or low 2nd pressure	2nd Clutch		
2nd Clutch	<b>D<sub>4</sub></b>	No or low 2nd pressure	2nd Clutch	370 – 420 kPa (3.8 – 4.3 kgf/cm <sup>2</sup> , 54 – 61 psi) throttle control drum fully-closed	360 kPa (3.7 kgf/cm <sup>2</sup> , 53 psi) throttle control drum fully-closed 780 kPa (8.0 kgf/cm <sup>2</sup> , 110 psi) throttle control drum more than 1/8 opened
3rd Clutch		No or low 3rd pressure	3rd Clutch		
4th Clutch		No or low 4th pressure	4th Clutch		
	<b>R</b>		Servo Valve or 4th Clutch	830 – 880 kPa (8.5 – 9.0 kgf/cm <sup>2</sup> , 120 – 130 psi)	780 kPa (8.0 kgf/cm <sup>2</sup> , 110 psi)

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# Pressure Testing

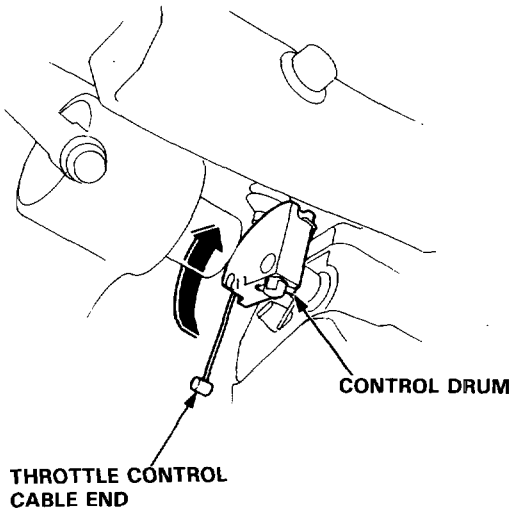
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● **Throttle A Pressure, Throttle B Pressure Measurement**

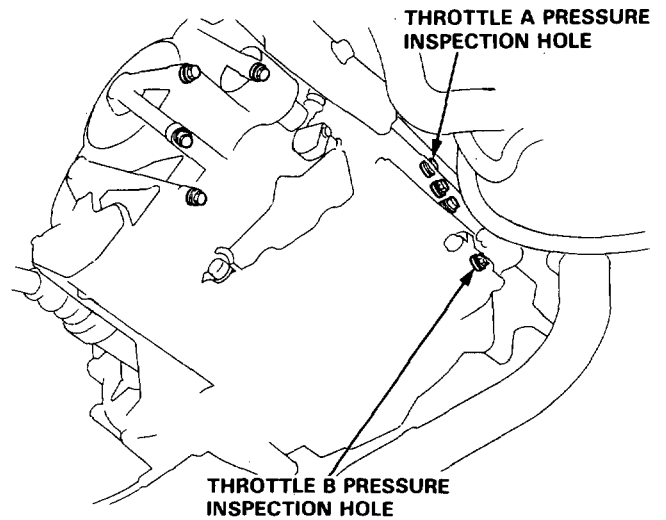
1. Remove the throttle control cable end from the control drum.

NOTE: Do not loosen the locknuts, simply unhook the throttle control cable end.

2. Start the engine, and run it at 1,000 rpm (min<sup>-1</sup>).



3. Shift to **D<sub>4</sub>** or **D<sub>3</sub>** position.
4. Measure fully-closed throttle A pressure and B pressure.
5. Move the throttle control drum to fully-opened throttle position.
6. Measure fully-opened throttle A pressure and B pressure.

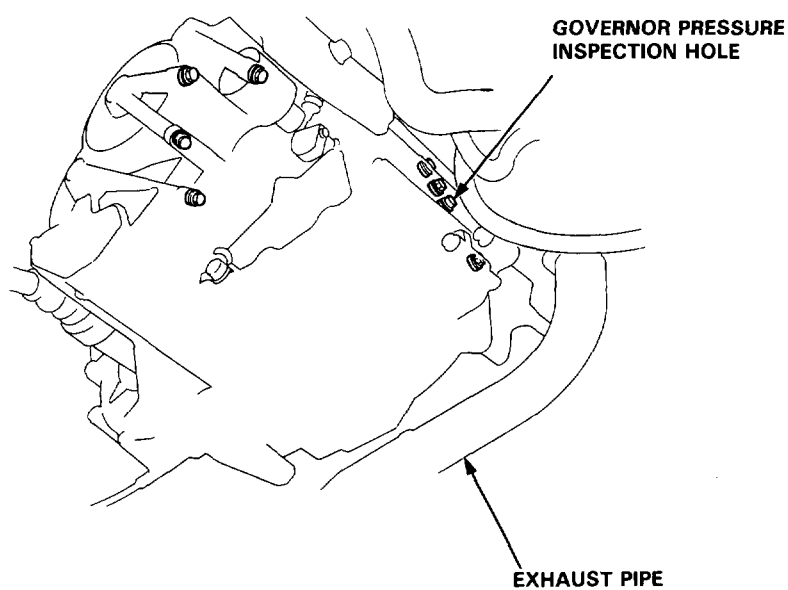


PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE		
				Standard	Service Limit	
Throttle A	<b>D<sub>4</sub></b> or <b>D<sub>3</sub></b>	Pressure too high	Throttle valve A Modulator Valve	0 – 5 kPa (0 – 0.05 kgf/cm <sup>2</sup> , 0 – 2.1 psi) throttle control drum fully-closed		
		No or low Throttle A pressure		525 – 540 kPa (5.35 – 5.50 kgf/cm <sup>2</sup> , 76 – 78 psi) throttle control drum fully-opened	520 kPa (5.3 kgf/cm <sup>2</sup> , 75 psi) throttle control drum fully-opened	
Throttle B	<b>D<sub>4</sub></b> or <b>D<sub>3</sub></b>	Pressure too high	Throttle Valve B	0 – 15 kPa (0 – 0.15 kgf/cm <sup>2</sup> , 0 – 2.1 psi) throttle control drum fully-closed		
		No or low Throttle B pressure		D14A7, D14A8 Engines	780 – 830 kPa (8.0 – 8.5 kgf/cm <sup>2</sup> , 110 – 120 psi) throttle control drum fully-opened	740 kPa (7.5 kgf/cm <sup>2</sup> , 110 psi) throttle control drum fully-opened
				D16B2 Engine	830 – 880 kPa (8.5 – 9.0 kgf/cm <sup>2</sup> , 120 – 130 psi) throttle control drum fully-opened	780 kPa (8.0 kgf/cm <sup>2</sup> , 110 psi) throttle control drum fully-opened



● **Governor Pressure Measurement**

1. Start the engine, and shift to **D<sub>4</sub>** or **D<sub>3</sub>** position.
2. Run the vehicle at 38 mph (60 km/h).
3. Measure the governor pressure.



PRESSURE	SHIFT LEVER POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Governor	<b>D<sub>4</sub></b> or <b>D<sub>3</sub></b>	No or low governor pressure	Governor valve	173 – 192 kPa (1.76 – 1.96 kgf/cm <sup>2</sup> , 25.0 – 27.9 psi)	168 kPa (1.71 kgf/cm <sup>2</sup> , 24 psi)

# Transmission

## Removal

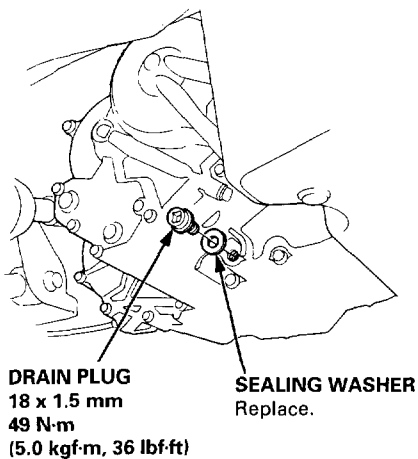
### ⚠ WARNING

- Make sure lifts, jacks and safety stands are placed properly, and hoist brackets are attached to the correct position on the engine (see section 1).
- Apply parking brake and block rear wheels, so car will not roll off stands and fall on you while working under it.

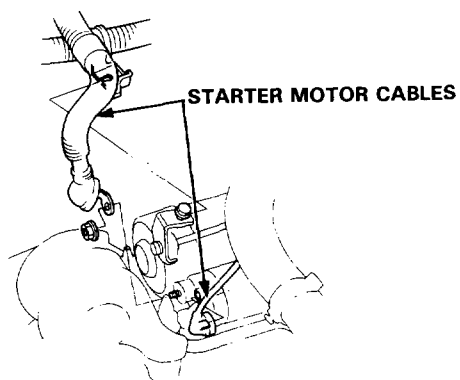
### ⚠ CAUTION

Use fender covers to avoid damaging painted surfaces.

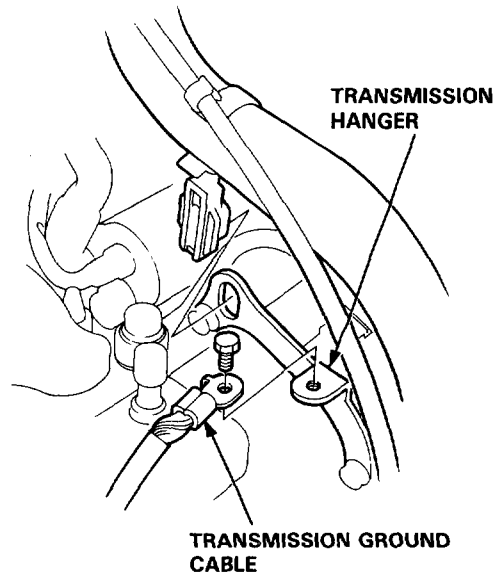
1. Disconnect the battery negative (-) cable first, then the positive (+) cable from the battery.
2. Remove the intake air tube, intake air duct and air cleaner housing assembly.
3. Remove the drain plug and drain the automatic transmission fluid (ATF). Reinstall the drain plug with a new sealing washer.



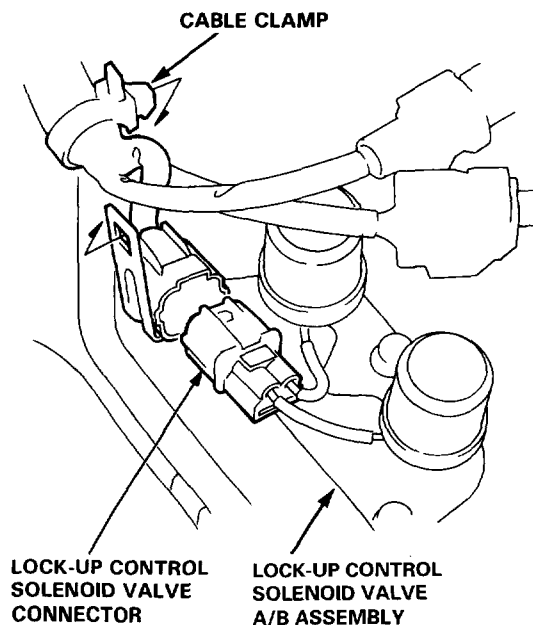
4. Remove the starter cables and cable holder from the starter.



5. Remove the transmission ground cable from the transmission hanger.

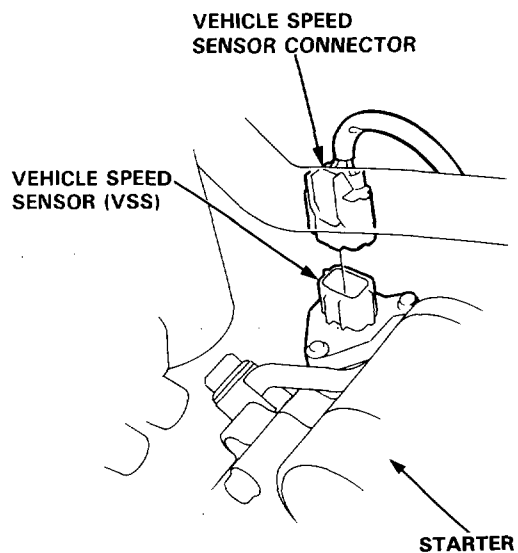


6. Disconnect the lock-up control solenoid valve connector.

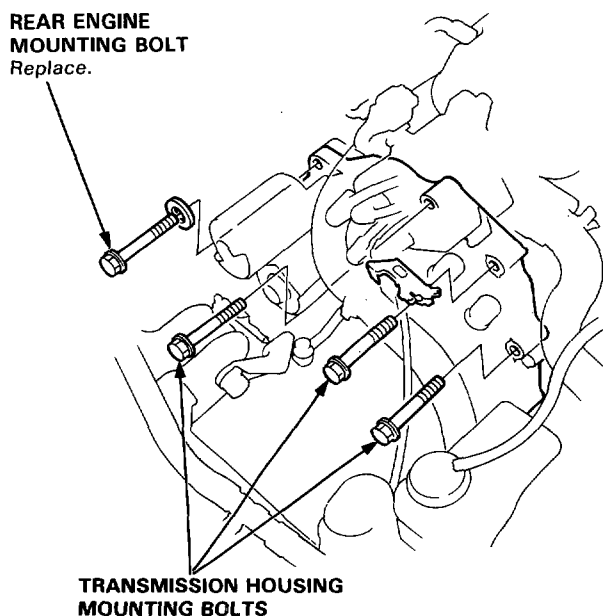




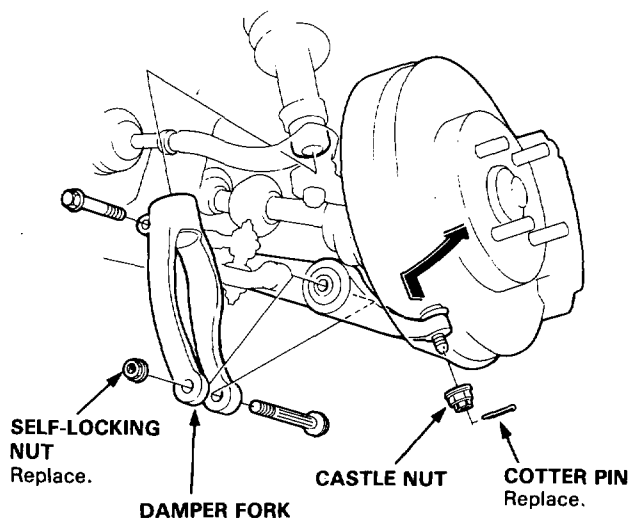
7. Disconnect the vehicle speed sensor (VSS) connector.



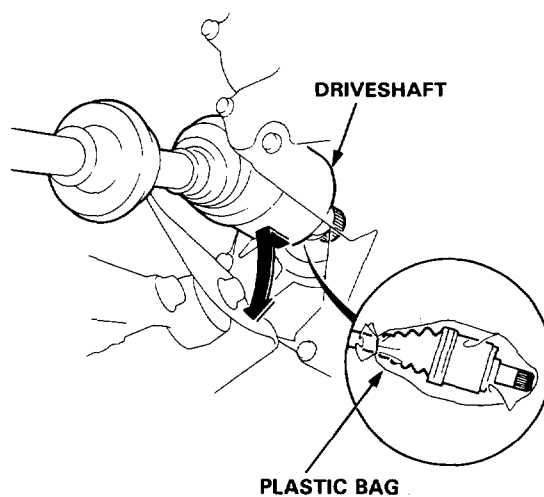
8. Remove the transmission housing mounting bolts and rear engine mounting bolt.



9. Remove the cotter pins and castle nuts, then separate the ball joints from the lower arm (see section 18).



10. Remove the damper fork bolts, then separate the damper forks and lower arms.
11. Remove the right damper pinch bolt, then separate the damper fork and damper.
12. Pry the right and left driveshafts out of the differential (see section 16).



13. Pull on the inboard joint and remove the right and left driveshafts (see section 16).
14. Tie plastic bags over the driveshaft ends.

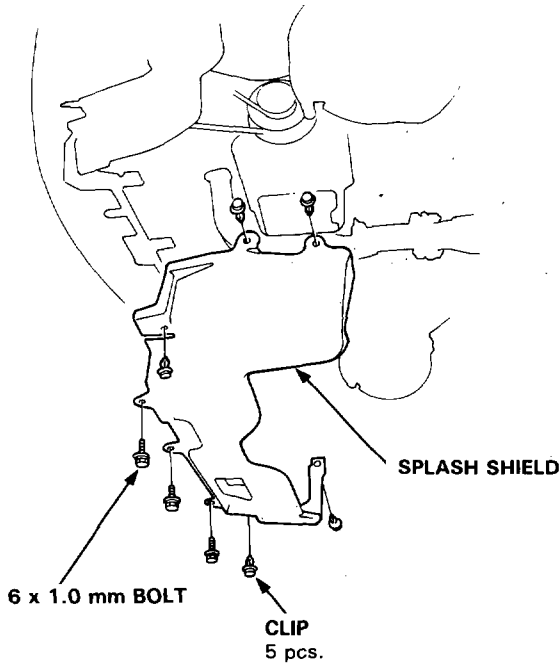
NOTE: Coat all precision finished surfaces with clean engine oil.

(cont'd)

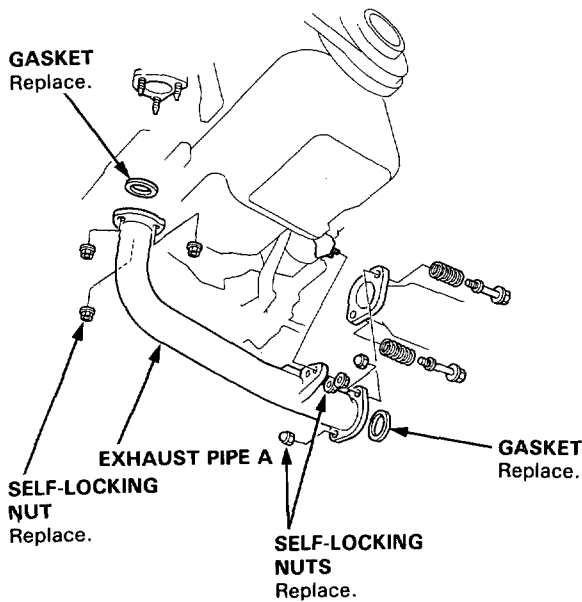
# Transmission

## Removal (cont'd)

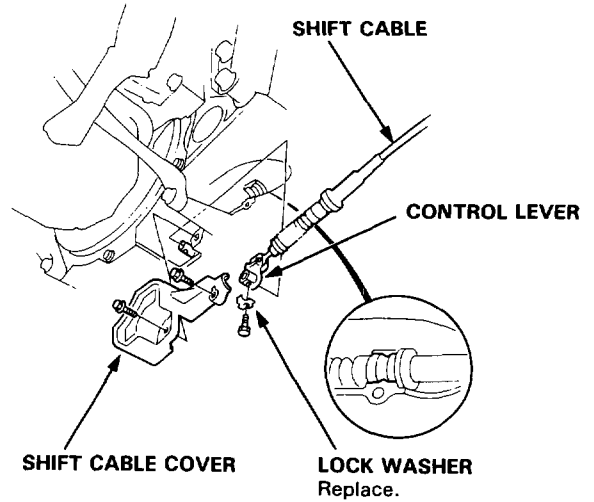
15. Remove the splash shield.



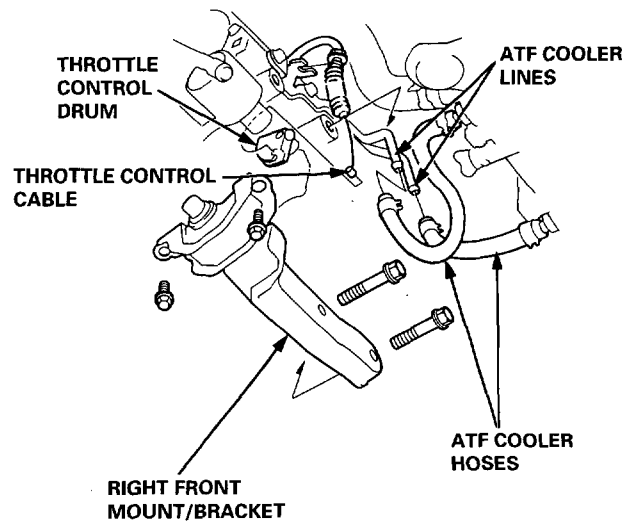
16. Remove the exhaust pipe A.



17. Remove the shift cable cover, then remove the shift cable by removing the control lever. Do not bend the shift cable excessively.



18. Remove the right front mount/bracket, then remove the end of the throttle control cable from the throttle control drum.



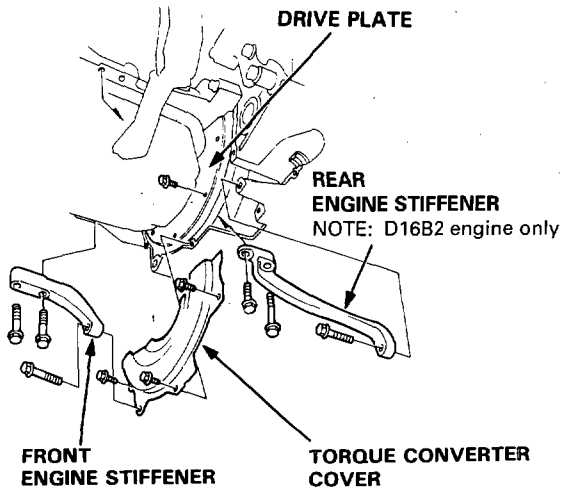
19. Remove the ATF cooler hoses at the joint pipes. Turn the ends of the cooler hoses up to prevent ATF from flowing out, then plug the cooler lines.

NOTE: Check for any signs of leakage at the hose joints.

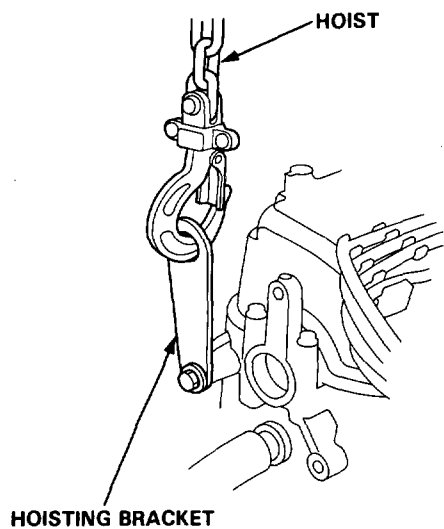


20. Remove the engine stiffeners and torque converter cover.

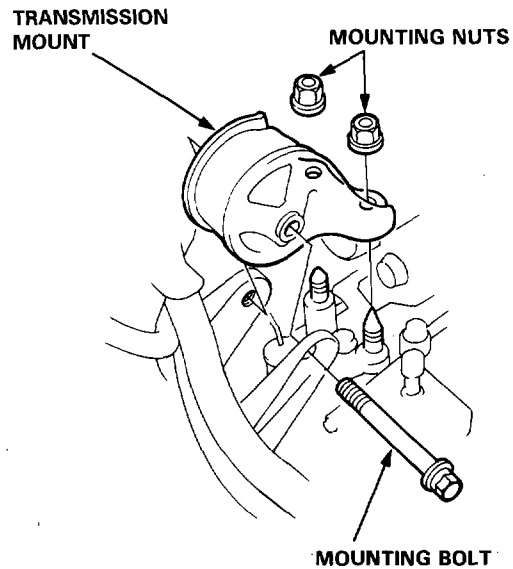
NOTE: Only the D16B2 engine uses a rear engine stiffener.



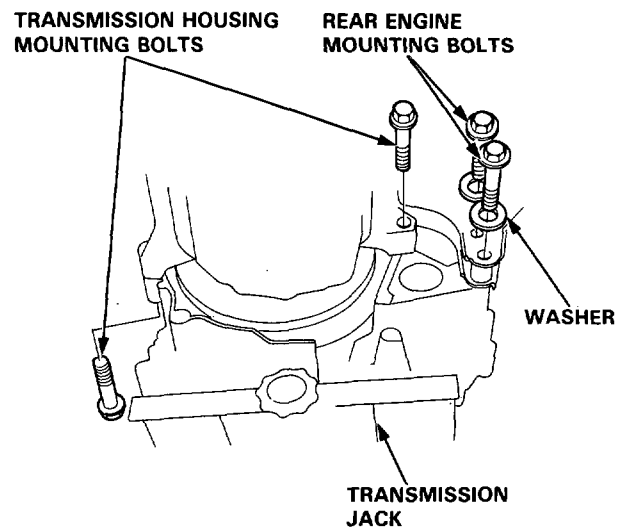
21. Remove the eight drive plate bolts one at a time while rotating the crankshaft pulley.
22. Remove the distributor.
23. Attach a hoisting bracket to the engine, then lift the engine slightly.



24. Place a jack under the transmission and raise the transmission just enough to take weight off of the mounts, then remove the transmission mount.



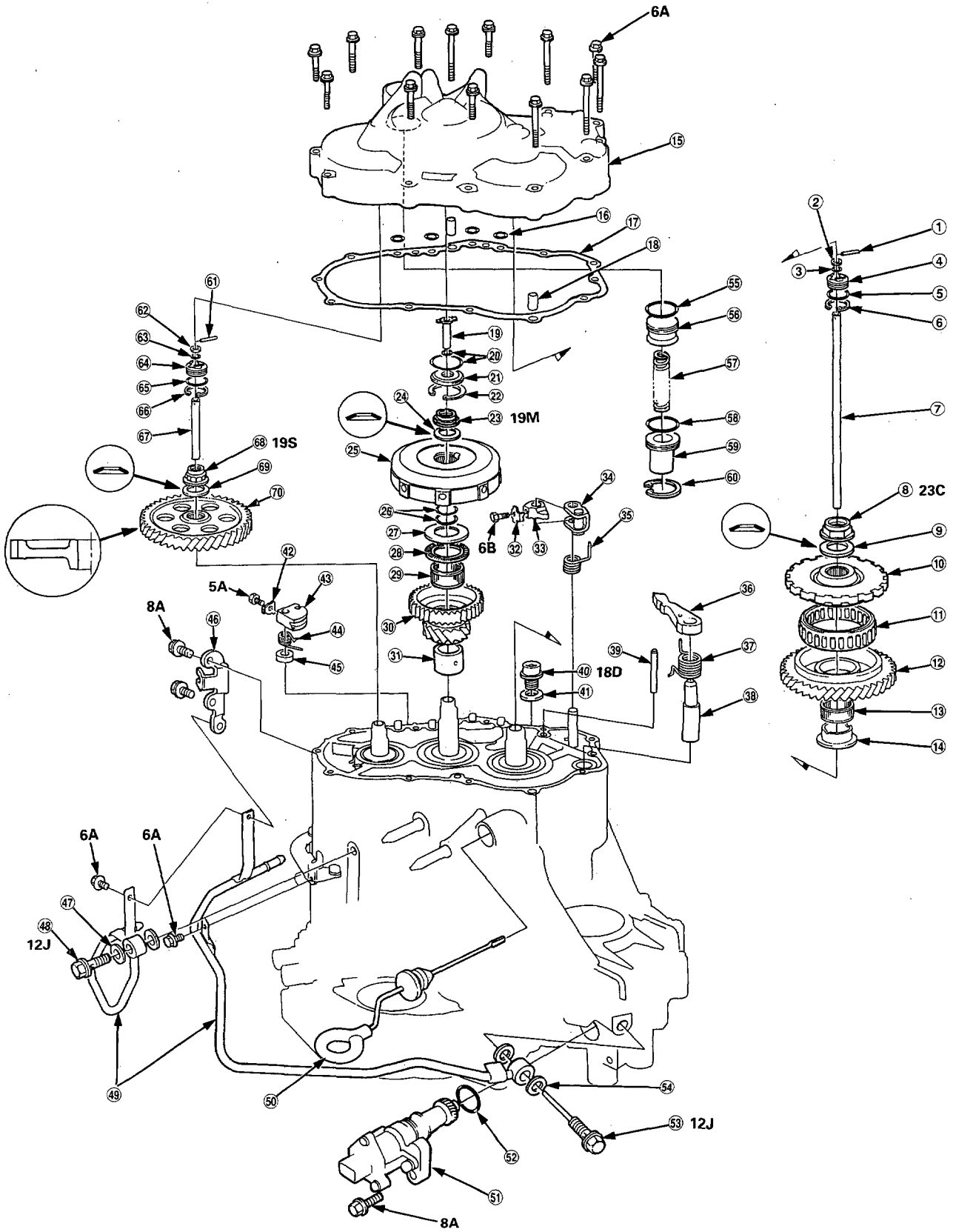
25. Remove the transmission housing mounting bolts and rear engine mounting bolts.



26. Pull the transmission away from the engine until it clears the 14 mm dowel pins, then lower it on the transmission jack.
27. Remove the starter and the torque converter assembly from the transmission.

# Illustrated Index

## Transmission/Right Side Cover





- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>① ROLLER</li> <li>② COLLAR</li> <li>③ O-RING Replace.</li> <li>④ FEED PIPE FLANGE</li> <li>⑤ O-RING Replace.</li> <li>⑥ SNAP RING</li> <li>⑦ 3RD CLUTCH FEED PIPE</li> <li>⑧ COUNTERSHAFT LOCKNUT (FLANGE NUT) 23 x 1.25 mm<br/>Replace.</li> <li>⑨ CONICAL SPRING WASHER Replace.</li> <li>⑩ PARKING GEAR</li> <li>⑪ ONE-WAY CLUTCH</li> <li>⑫ COUNTERSHAFT 1ST GEAR</li> <li>⑬ NEEDLE BEARING</li> <li>⑭ COUNTERSHAFT 1ST GEAR COLLAR</li> <li>⑮ RIGHT SIDE COVER</li> <li>⑯ O-RING Replace.</li> <li>⑰ RIGHT SIDE COVER GASKET Replace.</li> <li>⑱ DOWEL PIN</li> <li>⑲ 1ST CLUTCH FEED PIPE</li> <li>⑳ O-RINGS Replace.</li> <li>㉑ FEED PIPE FLANGE</li> <li>㉒ SNAP RING</li> <li>㉓ MAINSHAFT LOCKNUT (FLANGE NUT) 19 x 1.25 mm<br/>Replace.</li> <li>㉔ CONICAL SPRING WASHER Replace.</li> <li>㉕ 1ST CLUTCH ASSEMBLY</li> <li>㉖ O-RINGS Replace.</li> <li>㉗ THRUST WASHER</li> <li>㉘ THRUST NEEDLE BEARING</li> <li>㉙ NEEDLE BEARING</li> <li>㉚ MAINSHAFT 1ST GEAR</li> <li>㉛ MAINSHAFT 1ST GEAR COLLAR</li> <li>㉜ LOCK WASHER Replace.</li> <li>㉝ PARKING BRAKE STOP Selective part</li> <li>㉞ PARKING BRAKE LEVER</li> <li>㉟ PARKING BRAKE LEVER SPRING</li> <li>㊱ PARKING BRAKE PAWL</li> <li>㊲ PARKING BRAKE PAWL SPRING</li> <li>㊳ PARKING BRAKE PAWL SHAFT</li> <li>㊴ PARKING BRAKE PAWL STOP</li> </ul> | <ul style="list-style-type: none"> <li>④⑩ DRAIN PLUG</li> <li>④⑪ SEALING WASHER Replace.</li> <li>④⑫ LOCK WASHER Replace.</li> <li>④⑬ THROTTLE CONTROL DRUM</li> <li>④⑭ THROTTLE CONTROL DRUM SPRING</li> <li>④⑮ OIL SEAL Replace.</li> <li>④⑯ THROTTLE CONTROL CABLE HOLDER</li> <li>④⑰ SEALING WASHER Replace.</li> <li>④⑱ LINE BOLT</li> <li>④⑲ ATF COOLER LINES</li> <li>④⑳ ATF DIPSTICK</li> <li>⑤① VEHICLE SPEED SENSOR</li> <li>⑤② O-RING Replace.</li> <li>⑤③ LINE BOLT</li> <li>⑤④ SEALING WASHER Replace.</li> <li>⑤⑤ O-RING Replace.</li> <li>⑤⑥ 1ST-HOLD ACCUMULATOR PISTON</li> <li>⑤⑦ 1ST-HOLD ACCUMULATOR SPRING</li> <li>⑤⑧ O-RING Replace.</li> <li>⑤⑨ 1ST-HOLD ACCUMULATOR COVER</li> <li>⑥⑩ SNAP RING</li> <li>⑥⑪ ROLLER</li> <li>⑥⑫ COLLAR</li> <li>⑥⑬ O-RING Replace.</li> <li>⑥⑭ FEED PIPE FLANGE</li> <li>⑥⑮ O-RING Replace.</li> <li>⑥⑯ SNAP RING</li> <li>⑥⑰ 1ST-HOLD CLUTCH FEED PIPE</li> <li>⑥⑱ SUB-SHAFT LOCKNUT (FLANGE NUT) 19 x 1.25 mm<br/>Replace.</li> <li>⑥⑲ CONICAL SPRING WASHER Replace.</li> <li>⑦⑩ SUB-SHAFT 1ST GEAR</li> </ul> |
|--|---|

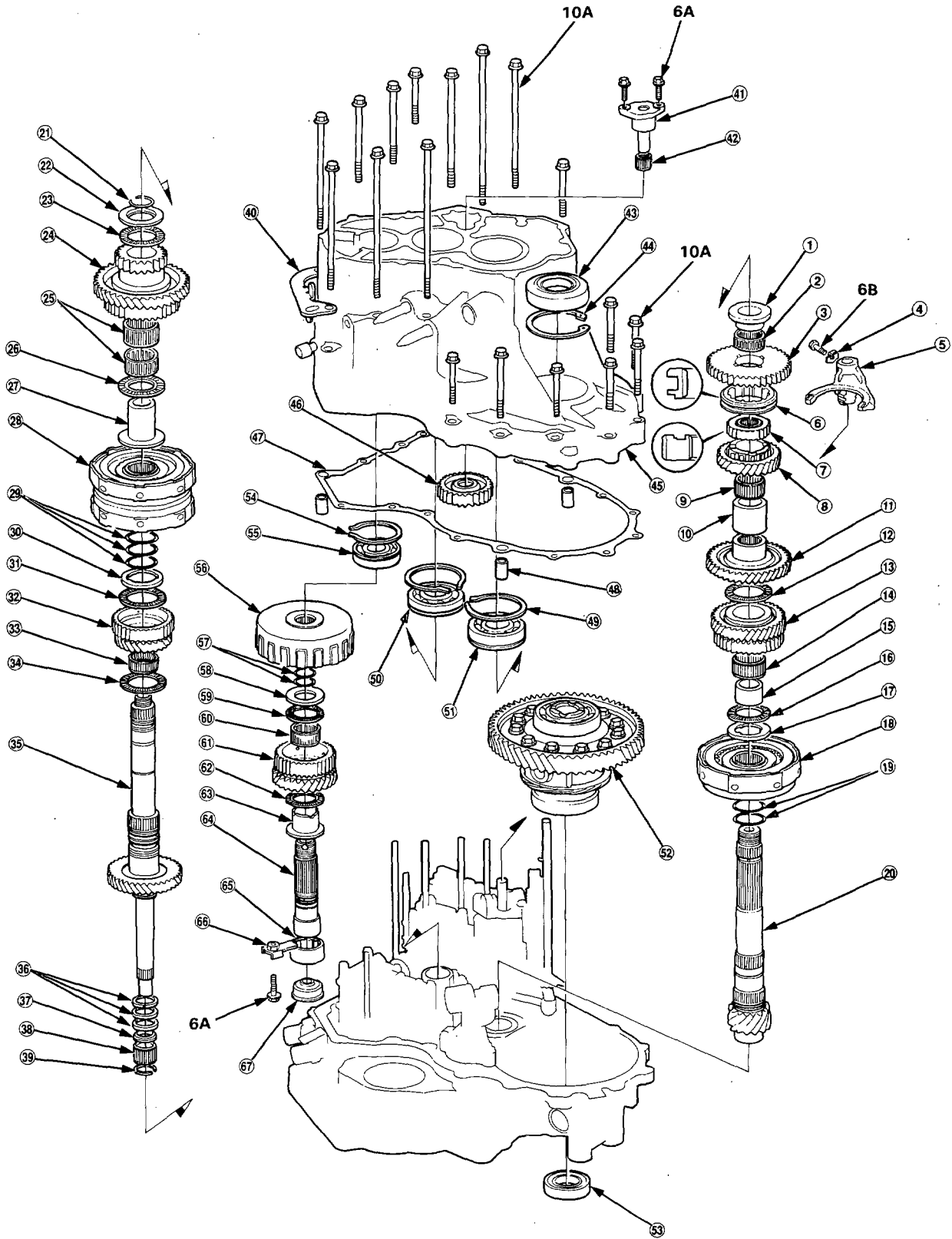
#### TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
5A	8 N·m (0.8 kgf·m, 6 lbf·ft)	8 x 0.8 mm	
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
6B	14 N·m (1.4 kgf·m, 10 lbf·ft)	6 x 1.0 mm	
8A	22 N·m (2.2 kgf·m, 16 lbf·ft)	8 x 1.25 mm	
12J	28 N·m (2.9 kgf·m, 21 lbf·ft)	12 x 1.25 mm	Line bolt
18D	49 N·m (5.0 kgf·m, 36 lbf·ft)	18 x 1.5 mm	Drain plug
19M	78 N·m (8.0 kgf·m, 58 lbf·ft)	19 x 1.25 mm	Mainshaft locknut: Left-hand threads
19S	93 N·m (9.5 kgf·m, 69 lbf·ft)	19 x 1.25 mm	Sub-shaft locknut
23C	103 → 0 → 103 N·m (10.5 → 0 → 10.5 kgf·m, 75.9 → 0 → 75.9 lbf·ft)	23 x 1.25 mm	Countershaft locknut: Left-hand threads



# Illustrated Index

## Transmission Housing





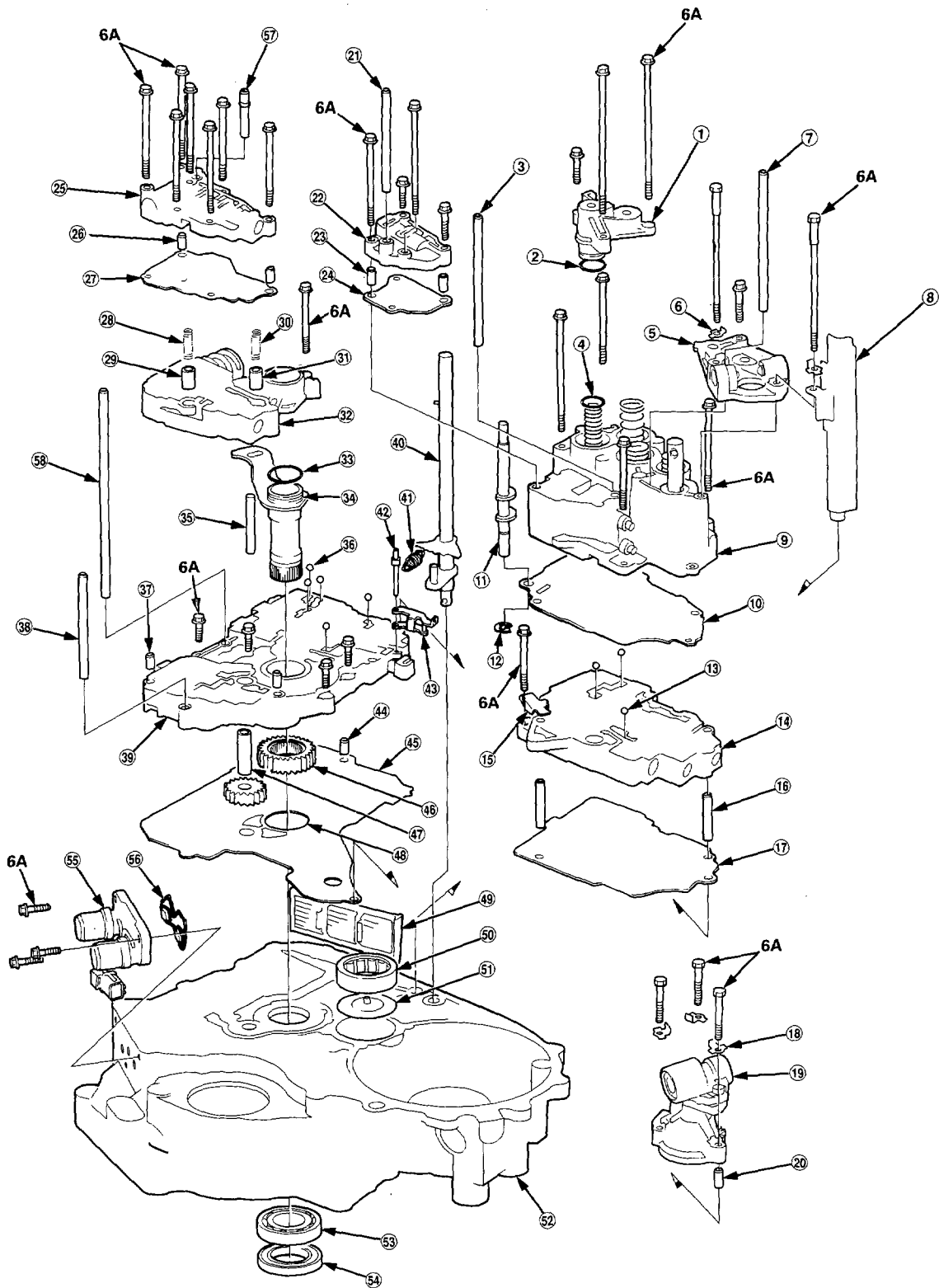
- ① COUNTERSHAFT REVERSE GEAR COLLAR
- ② NEEDLE BEARING
- ③ COUNTERSHAFT REVERSE GEAR
- ④ LOCK WASHER Replace.
- ⑤ REVERSE SHIFT FORK
- ⑥ REVERSE SELECTOR
- ⑦ REVERSE SELECTOR HUB
- ⑧ COUNTERSHAFT 4TH GEAR
- ⑨ NEEDLE BEARING
- ⑩ DISTANCE COLLAR, 28 mm Selective part
- ⑪ COUNTERSHAFT 2ND GEAR
- ⑫ THRUST NEEDLE BEARING
- ⑬ COUNTERSHAFT 3RD GEAR
- ⑭ NEEDLE BEARING
- ⑮ COUNTERSHAFT 3RD GEAR COLLAR
- ⑯ THRUST NEEDLE BEARING
- ⑰ SPLINED WASHER
- ⑱ 3RD CLUTCH ASSEMBLY
- ⑲ O-RINGS Replace.
- ⑳ COUNTERSHAFT
- ㉑ SNAP RING
- ㉒ THRUST WASHER
- ㉓ THRUST NEEDLE BEARING
- ㉔ MAINSHAFT 4TH/REVERSE GEAR
- ㉕ NEEDLE BEARINGS
- ㉖ THRUST NEEDLE BEARING
- ㉗ MAINSHAFT 4TH GEAR COLLAR
- ㉘ 2ND/4TH CLUTCH ASSEMBLY
- ㉙ O-RINGS Replace.
- ㉚ THRUST WASHER, 36.5 x 55 mm Selective part
- ㉛ THRUST NEEDLE BEARING
- ㉜ MAINSHAFT 2ND GEAR
- ㉝ NEEDLE BEARING
- ㉞ THRUST NEEDLE BEARING
- ㉟ MAINSHAFT
- ㊱ SEALING RINGS, 35 mm
- ㊲ SEALING RING, 29 mm
- ㊳ NEEDLE BEARING
- ㊴ SET RING
- ㊵ TRANSMISSION HANGER
- ㊶ REVERSE IDLER GEAR SHAFT/HOLDER ASSEMBLY
- ㊷ NEEDLE BEARING
- ㊸ OIL SEAL Replace.
- ㊹ SET RING, 80 mm Selective part
- ㊺ TRANSMISSION HOUSING
- ㊻ REVERSE IDLER GEAR
- ㊼ TRANSMISSION HOUSING GASKET Replace.
- ㊽ DOWEL PIN
- ㊾ SNAP RING
- ㊿ MAINSHAFT TRANSMISSION HOUSING BEARING
- ① COUNTERSHAFT TRANSMISSION HOUSING BEARING
- ② DIFFERENTIAL ASSEMBLY
- ③ OIL SEAL Replace.
- ④ SNAP RING
- ⑤ SUB-SHAFT TRANSMISSION HOUSING BEARING
- ⑥ 1ST-HOLD CLUTCH ASSEMBLY
- ⑦ O-RINGS Replace.
- ⑧ THRUST WASHER
- ⑨ THRUST NEEDLE BEARING
- ⑩ NEEDLE BEARING
- ⑪ SUB-SHAFT 4TH GEAR
- ⑫ THRUST NEEDLE BEARING
- ⑬ SUB-SHAFT 4TH GEAR COLLAR
- ⑭ SUB-SHAFT
- ⑮ NEEDLE BEARING
- ⑯ NEEDLE BEARING STOP
- ⑰ ATF GUIDE CAP Replace.

#### TORQUE SPECIFICATIONS

Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	
6B	14 N·m (1.4 kgf·m, 10 lbf·ft)	6 x 1.0 mm	
10A	44 N·m (4.5 kgf·m, 33 lbf·ft)	10 x 1.25 mm	

# Illustrated Index

## Torque Converter Housing/Valve Body





- ① ACCUMULATOR COVER
- ② O-RING Replace.
- ③ ATF FEED PIPE
- ④ O-RING Replace.
- ⑤ SERVO DETENT BASE
- ⑥ LOCK WASHER Replace.
- ⑦ ATF FEED PIPE
- ⑧ BAFFLE PLATE/SUCTION PIPE
- ⑨ SERVO BODY
- ⑩ SERVO SEPARATOR PLATE
- ⑪ THROTTLE CONTROL LEVER
- ⑫ E-RING
- ⑬ CHECK BALL
- ⑭ SECONDARY VALVE BODY
- ⑮ SHAFT STOP
- ⑯ DOWEL PIN
- ⑰ SECONDARY SEPARATOR PLATE
- ⑱ LOCK WASHER Replace.
- ⑲ GOVERNOR BODY
- ⑳ DOWEL PIN
- ㉑ ATF FEED PIPE
- ㉒ MODULATOR VALVE BODY
- ㉓ DOWEL PIN
- ㉔ MODULATOR SEPARATOR PLATE
- ㉕ LOCK-UP VALVE BODY
- ㉖ DOWEL PIN
- ㉗ LOCK-UP SEPARATOR PLATE
- ㉘ COOLER CHECK VALVE SPRING
- ㉙ COOLER CHECK VALVE
- ㉚ TORQUE CONVERTER CHECK VALVE SPRING
- ㉛ TORQUE CONVERTER CHECK VALVE
- ㉜ REGULATOR VALVE BODY
- ㉝ O-RING Replace.
- ㉞ STATOR SHAFT
- ㉟ STOP SHAFT
- ㊱ CHECK BALL
- ㊲ DOWEL PIN
- ㊳ ATF FEED PIPE
- ㊴ MAIN VALVE BODY
- ④① CONTROL SHAFT
- ④② DETENT ARM SPRING
- ④③ DETENT ARM SHAFT
- ④④ DETENT ARM
- ④⑤ DOWEL PIN
- ④⑥ MAIN SEPARATOR PLATE
- ④⑦ ATF PUMP DRIVE GEAR
- ④⑧ ATF PUMP DRIVEN GEAR SHAFT
- ④⑨ ATF PUMP DRIVEN GEAR
- ④⑩ ATF STRAINER
- ④⑪ COUNTERSHAFT TORQUE CONVERTER HOUSING BEARING
- ④⑫ ATF GUIDE PLATE
- ④⑬ TORQUE CONVERTER HOUSING
- ④⑭ MAINSHAFT TORQUE CONVERTER HOUSING BEARING
- ④⑮ OIL SEAL Replace.
- ④⑯ LOCK-UP CONTROL SOLENOID VALVE A/B ASSEMBLY
- ④⑰ LOCK-UP CONTROL SOLENOID FILTER/GASKET Replace.
- ④⑱ ATF FEED PIPE
- ④⑲ ATF FEED PIPE

#### TORQUE SPECIFICATIONS

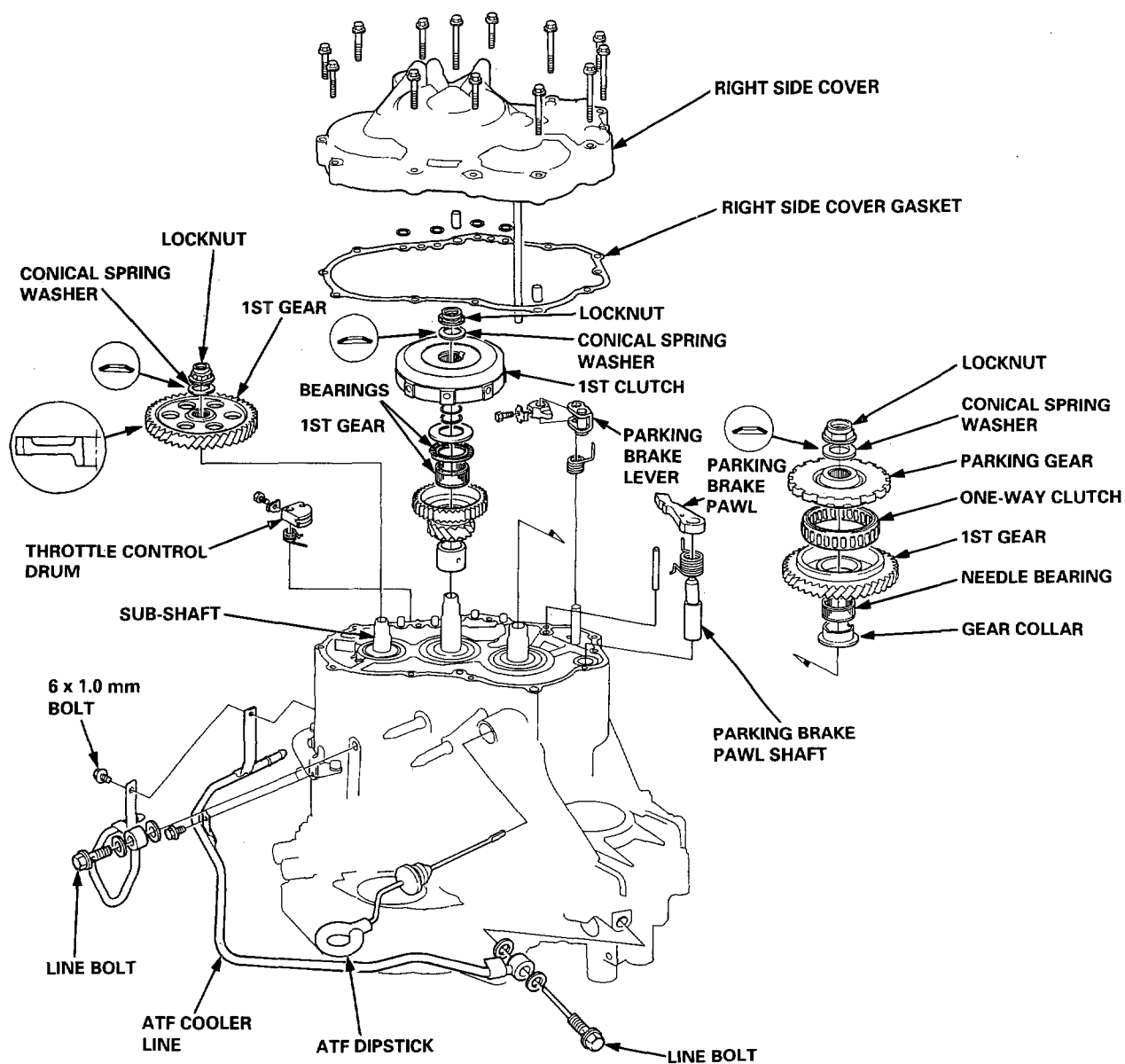
Bolt/Nut No.	Torque Value	Size	Remarks
6A	12 N·m (1.2 kgf·m, 8.7 lbf·ft)	6 x 1.0 mm	

# Right Side Cover

## Removal

### NOTE:

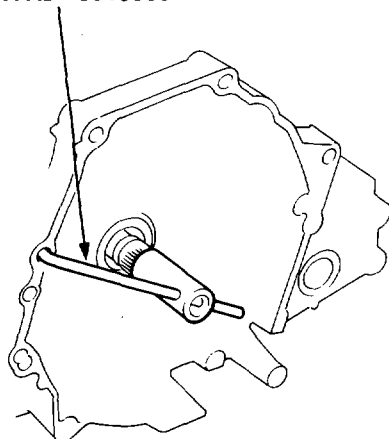
- Clean all parts thoroughly in solvent or carburetor cleaner and dry them with compressed air.
- Blow out all passages.
- When removing the transmission right side cover, replace the following:
  - Right side cover gasket
  - Lock washers
  - O-rings
  - Each shaft locknut
  - Conical spring washer
  - Sealing washers





1. Remove the 13 bolts securing the right side cover, then remove the right side cover.
2. Slip the special tool onto the mainshaft.

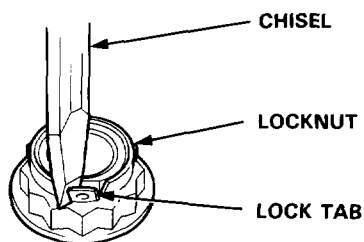
**MAINSHAFT HOLDER SET  
07PAB-0010000**



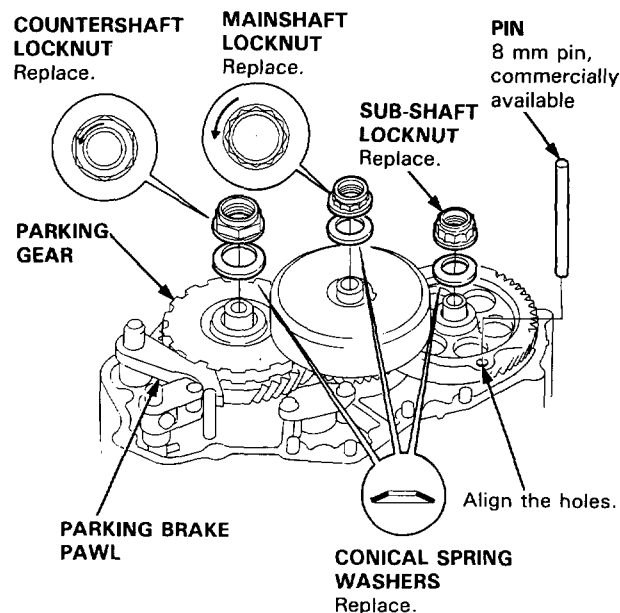
3. Cut the lock tab of each shaft locknut using a chisel as shown. Then remove the locknut from each shaft.

**NOTE:**

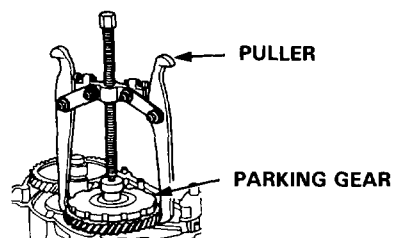
- Mainshaft and countershaft locknuts have left-hand threads.
- Clean the old countershaft locknut. It is used to press the parking gear onto the countershaft.
- Always wear safety glasses.
- Keep all of the chiseled particles out of the transmission.



4. Engage the parking brake pawl with the parking gear.
5. Align the hole of the sub-shaft 1st gear with the hole of the transmission housing, then insert a pin to hold the sub-shaft while removing the sub-shaft locknut.



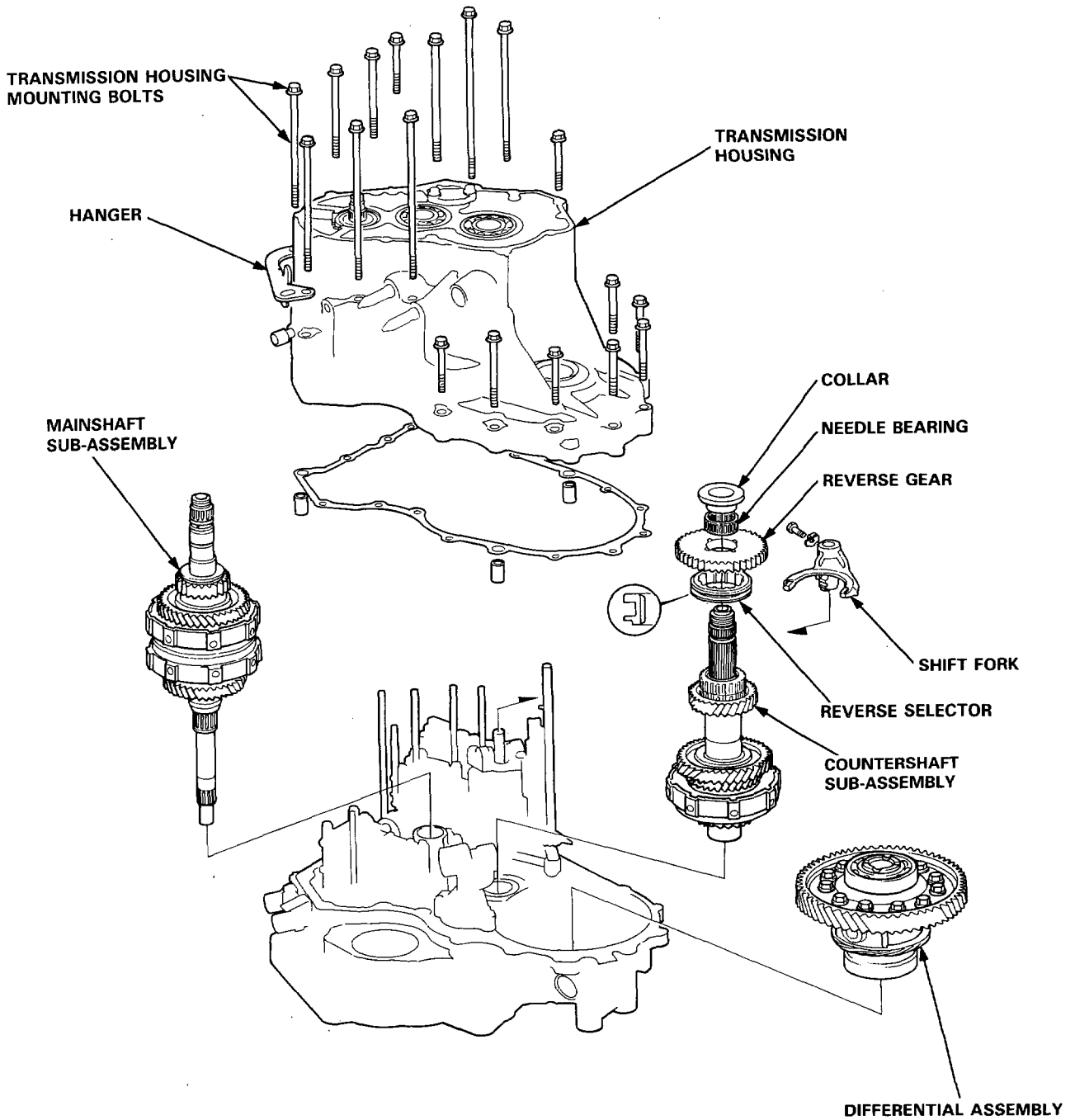
6. Remove the lock pin that was installed to hold the sub-shaft.
7. Remove the special tool from the mainshaft after removing the locknut.
8. Remove the 1st clutch and mainshaft 1st gear assembly from the mainshaft.
9. Remove the sub-shaft 1st gear.
10. Remove the parking brake pawl.
11. Using a puller, remove the parking gear, one-way clutch and countershaft 1st gear assembly.



12. Remove the parking brake lever from the control shaft.
13. Remove the throttle control drum from the throttle control shaft.
14. Remove the ATF cooler lines.
15. Remove the ATF dipstick.

# Transmission Housing

## Removal

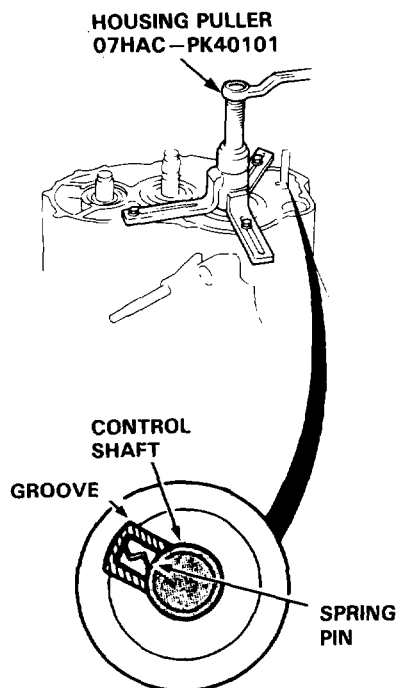




**NOTE:**

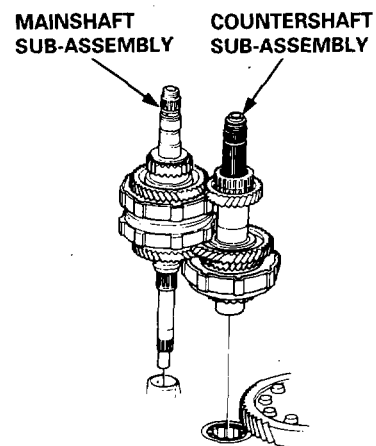
- Clean all parts thoroughly in solvent or carburetor cleaner and dry them with compressed air.
- Blow out all passages.
- When removing the transmission housing, replace the following:
  - Transmission housing gasket
  - Lock washer

1. Remove the transmission housing mounting bolts and hanger.
2. Align the spring pin of the control shaft with the transmission housing groove by turning the control shaft.



3. Install the special tool on the transmission housing, then remove the housing as shown.

4. Remove the countershaft reverse gear with the collar and needle bearing.
5. Remove the lock bolt securing the shift fork, then remove the fork with the reverse selector from the countershaft.
6. Remove the countershaft and mainshaft sub-assembly together.

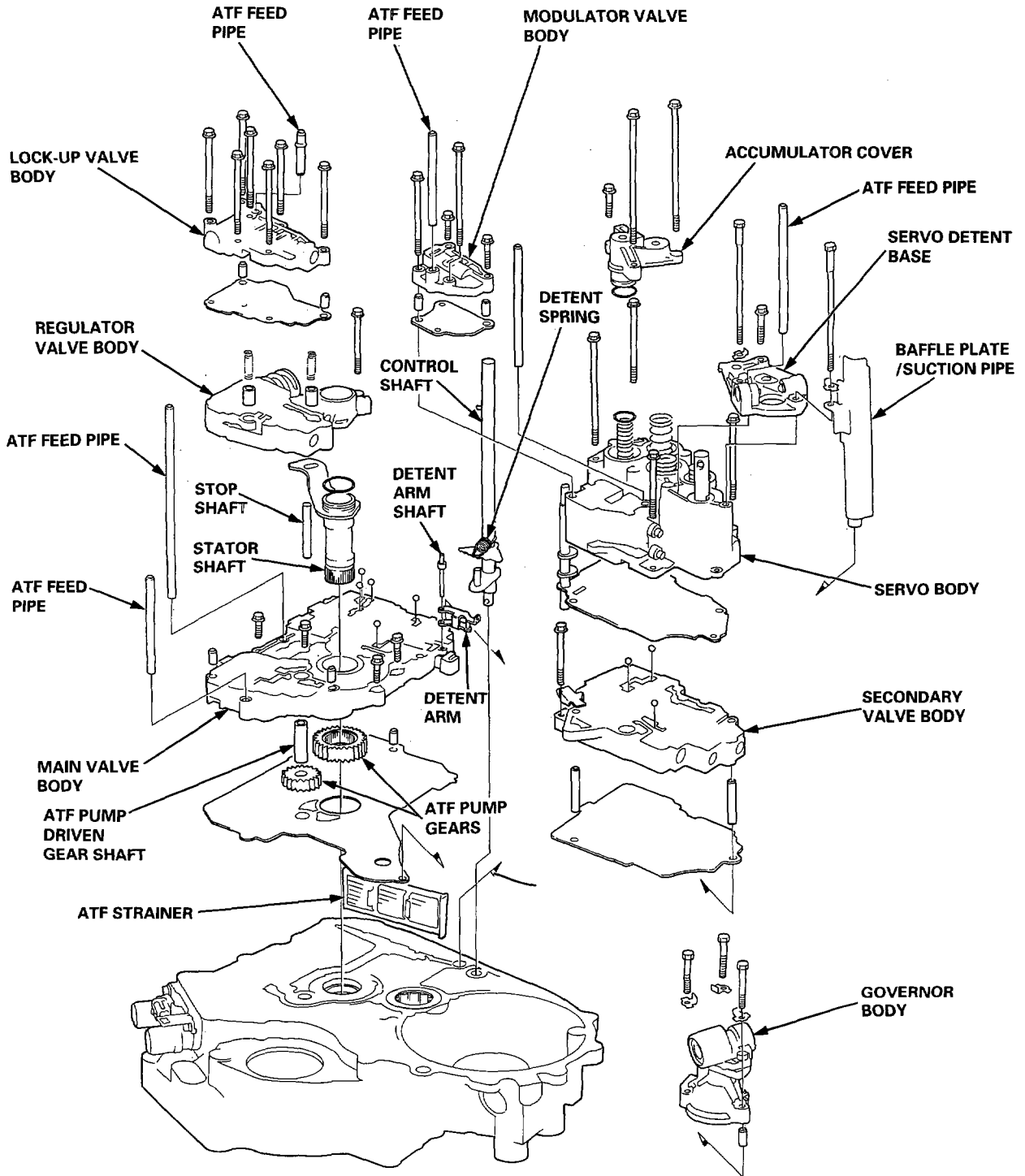


7. Remove the differential assembly.



# Torque Converter Housing/Valve Body

## Removal





NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner and dry them with compressed air.
- Blow out all passages.
- When removing the valve body, replace the following:
  - O-rings
  - Lock washers

1. Remove the ATF feed pipes.
  - Two pipes from the servo body
  - One pipe from the modulator valve body
  - One pipe from the lock-up valve body
  - Two pipes from the main valve body.
2. Remove the three bolts securing the accumulator cover, then remove the accumulator cover.
3. Remove the three bolts securing the servo detent base, then remove the servo detent base and baffle plate/suction pipe.
4. Remove the four bolts securing the modulator valve body, then remove the modulator valve body and separator plate.
5. Remove the four bolts securing the servo body, then remove the servo body and separator plate.
6. Remove the one bolt securing the secondary valve body, then remove the secondary valve body and separator plate.
7. Remove the seven bolts securing the lock-up valve body, then remove the lock-up valve body and separator plate.
8. Remove the one bolt securing the regulator valve body, then remove the regulator valve body.
9. Remove the stator shaft and stop shaft.

10. Remove the detent spring from the detent arm, then remove the control shaft from the torque converter housing.
11. Remove the detent arm and detent arm shaft from the main valve body.
12. Remove the four bolts securing the main valve body, then remove the main valve body.
13. Remove the ATF pump driven gear shaft, then remove the ATF pump gears.
14. Remove the three bolts securing the governor body, then remove the governor body.
15. Remove the main separator plate with two dowel pins.
16. Remove the ATF strainer.

# Valve Caps

## Description

- Caps with one projected tip and one flat end are installed with the flat end toward the inside of the valve body.
- Caps with a projected tip on each end are installed with the smaller tip toward the inside of the valve body. The small tip is a spring guide.

TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with one projected tip and a hollow end are installed with the tip toward the inside of the valve body. The tip is a spring guide.
- Caps with one projected tip and flat end are installed with the tip toward the inside of the valve body. The tip is a spring guide. The groove is a valve cap clip guide.

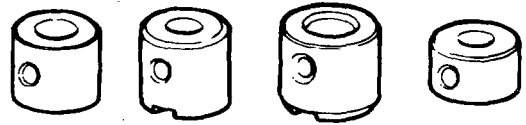
TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with hollow ends are installed with the hollow end away from the inside of the valve body.
- Caps with notched ends are installed with the notch toward the inside of the valve body.
- Caps with flat ends and a hole through the center are installed with the smaller hole toward the inside of the valve body.

TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

- Caps with flat ends and a groove around the cap are installed with the grooved side toward the outside of the valve body.

TOWARD OUTSIDE OF VALVE BODY



TOWARD INSIDE OF VALVE BODY

# Valve Body



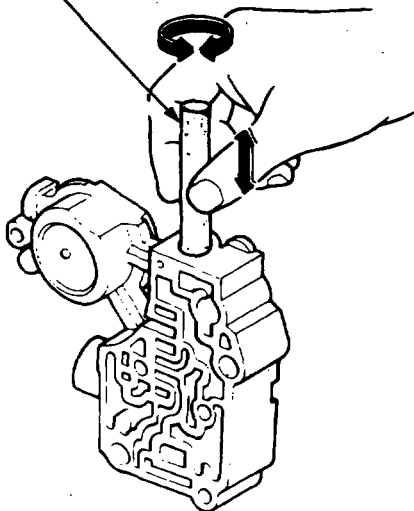
## Repair

NOTE: This repair is only necessary if one or more of the valves in a valve body do not slide smoothly in their bores. Use this procedure to free the valves.

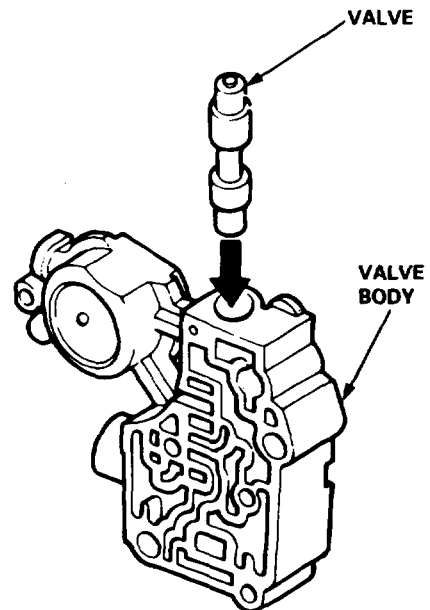
1. Soak a sheet of #600 abrasive paper in ATF for about 30 minutes.
2. Carefully tap the valve body so the sticking valve drops out of its bore. It may be necessary to use a small screwdriver to pry the valve free. Be careful not to scratch the bore with the screwdriver.
3. Inspect the valve for any scuff marks. Use the ATF-soaked #600 paper to polish off any burrs that are on the valve, then wash the valve in solvent and dry it with compressed air.
4. Roll up half a sheet of ATF-soaked #600 paper and insert it in the valve bore of the sticking valve. Twist the paper slightly, so that it unrolls and fits the bore tightly, then polish the bore by twisting the paper as you push it in and out.

NOTE: The valve body is aluminum and doesn't require much polishing to remove any burrs.

ATF-soaked  
#600 abrasive  
paper



5. Remove the #600 paper. Thoroughly wash the entire valve body in solvent, then dry it with compressed air.
6. Coat the valve with ATF, then drop it into its bore. It should drop to the bottom of the bore under its own weight. If not, repeat step 4, then retest. If the valve still sticks, replace the valve body.



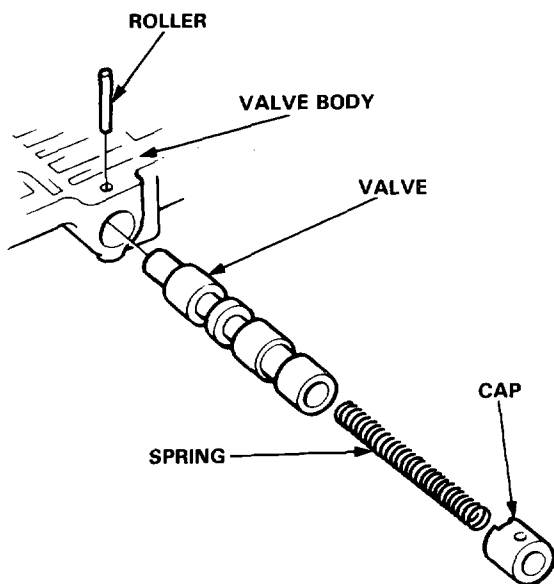
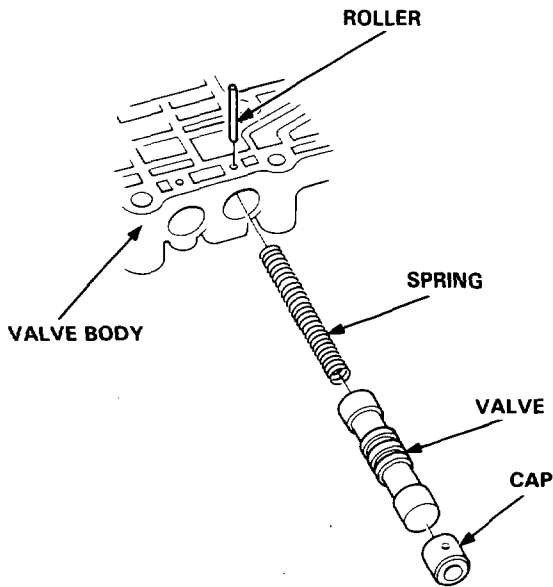
7. Remove the valve, and thoroughly clean it and the valve body with solvent. Dry all parts with compressed air, then reassemble using ATF as a lubricant.

# Valve

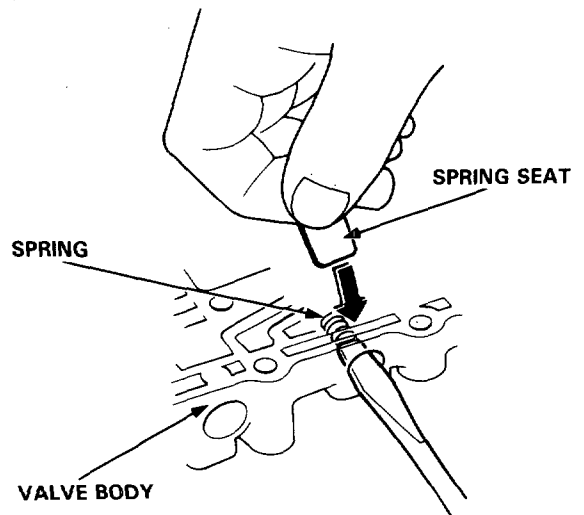
## Assembly

NOTE: Coat all parts with ATF before assembly.

- Install the valve, valve spring and cap in the valve body and secure with the roller.

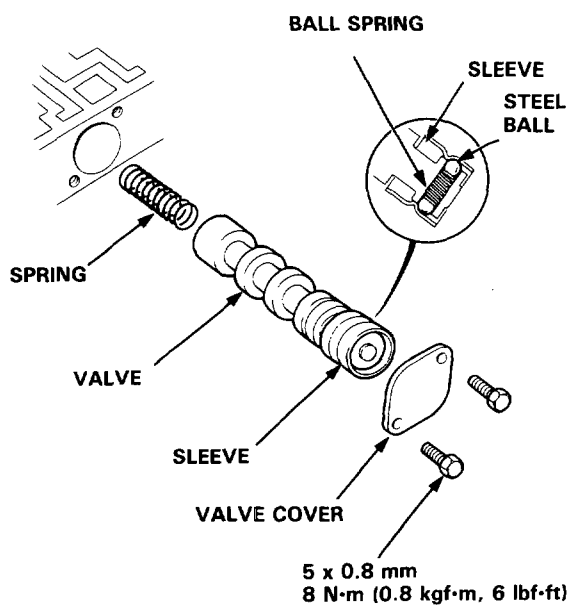


- Set the spring in the valve and install it in the valve body. Push the spring in with a screwdriver, then install the spring seat.

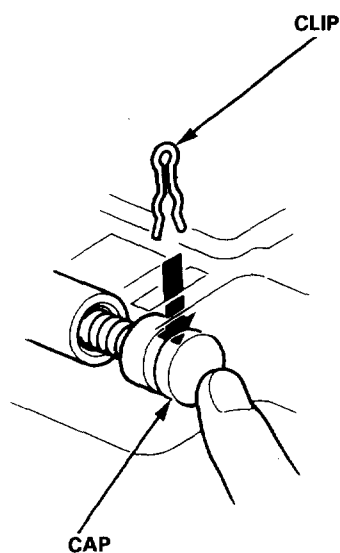




- Slide the spring into the hole in the big end of the shift valve. While holding the steel balls with the tips of your fingers, put the sleeve over the shift valve. Place the shift spring in the shift valve, then slip it into the valve body and install the valve cover.



- Install the valve, spring and cap in the valve body. Push the cap, then install the clip.

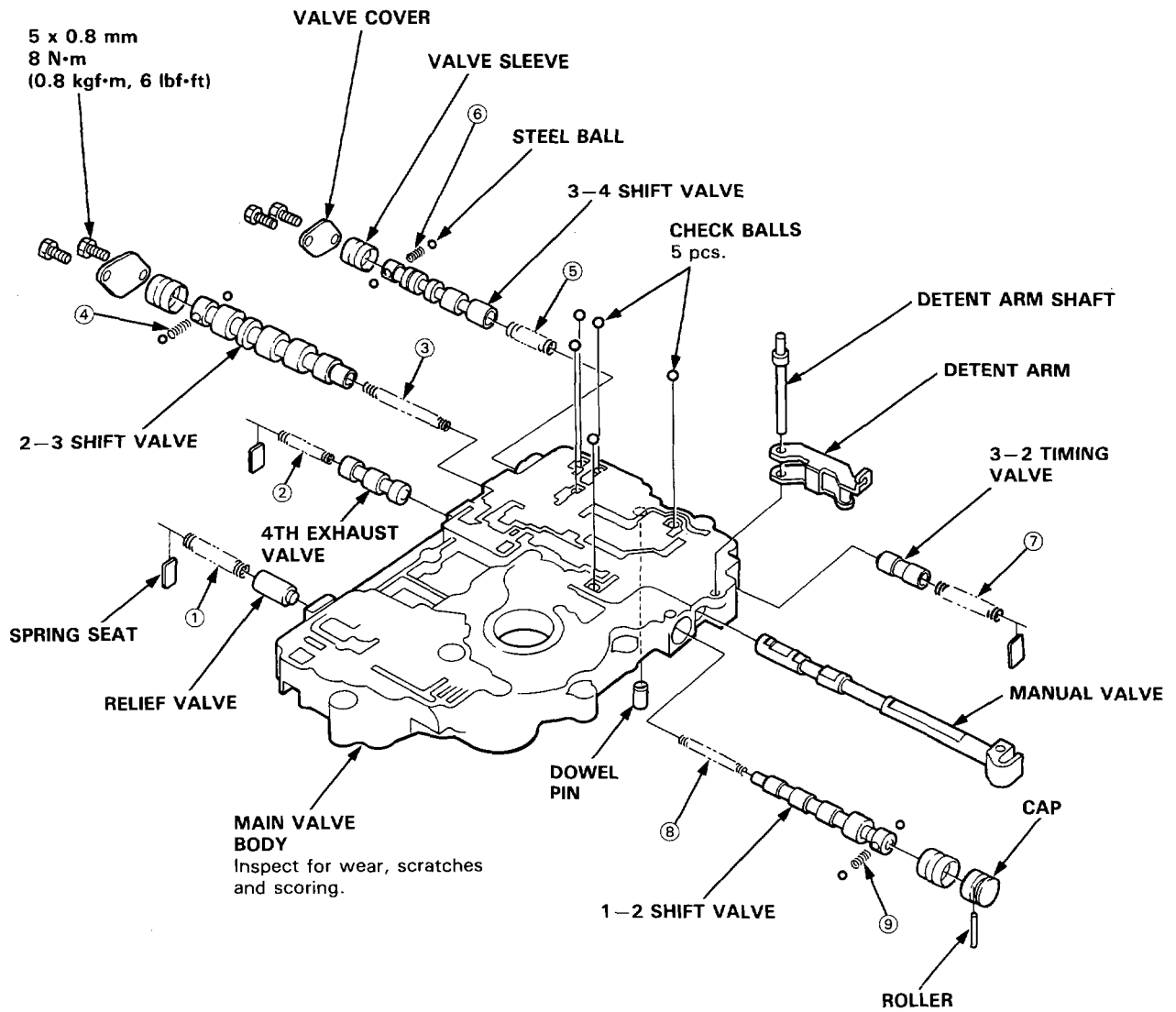


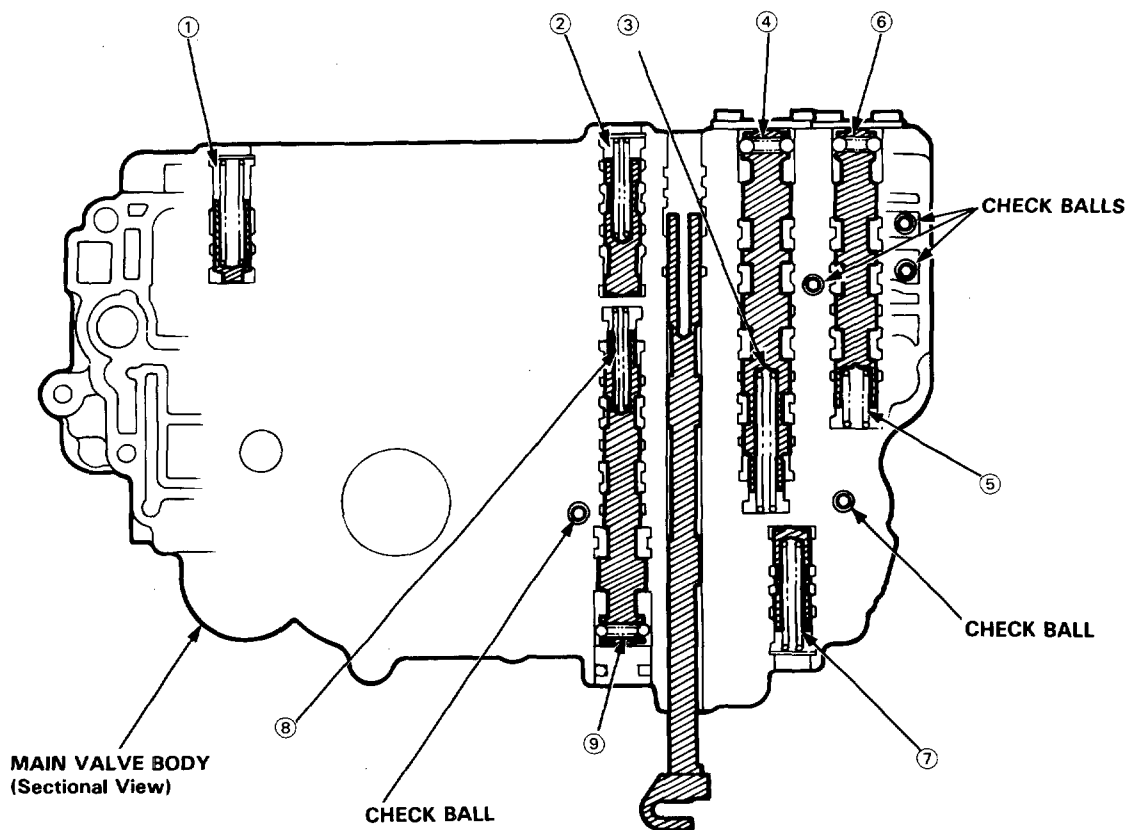
# Main Valve Body

## Disassembly/Inspection/Reassembly

### NOTE:

- Do not use a magnet to remove the check balls; it may magnetize the balls.
- Clean all parts thoroughly in solvent or carburetor cleaner and dry them with compressed air.
- Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-77.
- Coat all parts with ATF before reassembly.





**SPRING SPECIFICATIONS**

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Relief valve spring	1.1 (0.043)	8.6 (0.339)	37.1 (1.461)	13.4
②	4th exhaust valve spring	0.9 (0.035)	6.6 (0.260)	43.3 (1.705)	22.0
③	2-3 shift valve spring	0.9 (0.035)	7.1 (0.280)	65.3 (2.571)	32.1
④	2-3 shift valve ball spring	0.45 (0.018)	4.5 (0.177)	13.3 (0.524)	8.0
⑤	3-4 shift valve spring	0.9 (0.035)	9.6 (0.378)	32.5 (1.280)	10.3
⑥	3-4 shift valve ball spring	0.5 (0.020)	4.5 (0.177)	11.3 (0.445)	7.4
⑦	3-2 timing valve spring	1.2 (0.047)	8.6 (0.339)	45.6 (1.795)	14.7
⑧	1-2 shift valve spring	0.45 (0.018)	5.1 (0.201)	52.8 (2.079)	29.0
⑨	1-2 shift valve ball spring	0.45 (0.018)	4.5 (0.177)	10.7 (0.421)	12.7



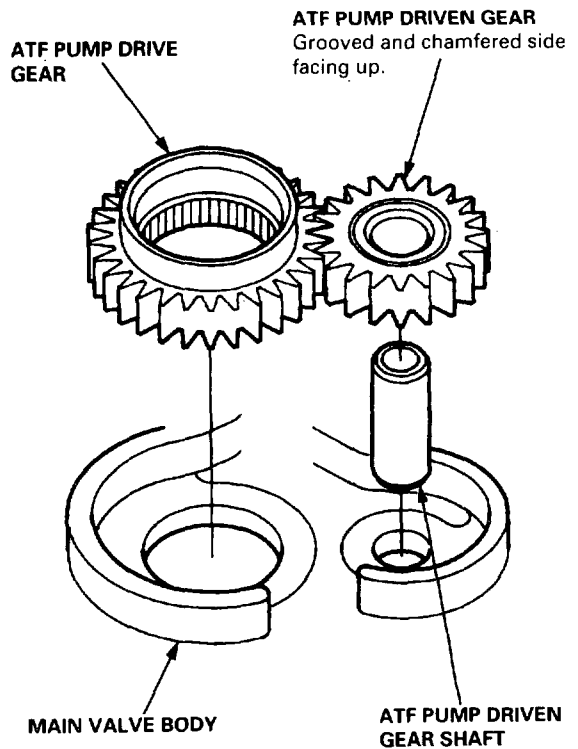
# ATF Pump

## Inspection

1. Install the ATF pump gears and ATF pump driven gear shaft in the main valve body.

**NOTE:**

- Lubricate all parts with ATF during inspecting.
- Install the ATF pump driven gear with its grooved and chamfered side facing up as shown.



2. Measure the side clearance of the ATF pump drive and driven gears.

**ATF Pump Gears Side (Radial) Clearance:**

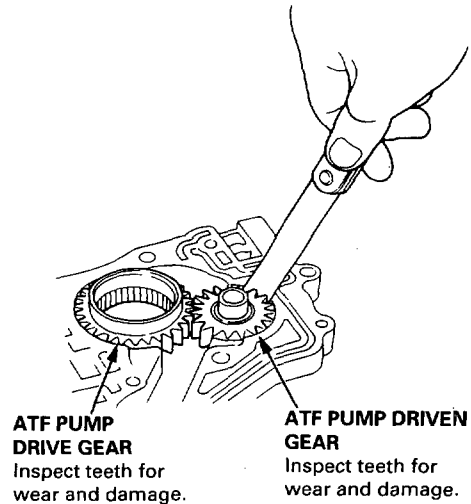
**Standard (New):**

**ATF Pump Drive Gear**

0.210 – 0.265 mm (0.0083 – 0.0104 in)

**ATF Pump Driven Gear**

0.070 – 0.125 mm (0.0028 – 0.0049 in)

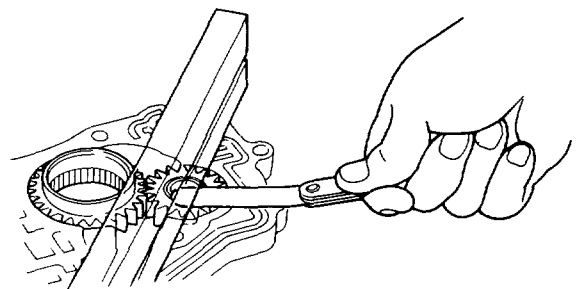


3. Remove the ATF pump driven gear shaft. Measure the thrust clearance of the ATF pump driven gear-to-valve body and the ATF pump drive gear-to-valve body.

**ATF Pump Drive/Driven Gear Thrust (Axial) Clearance:**

**Standard (New):** 0.03 – 0.05 mm (0.001 – 0.002 in)

**Service Limit:** 0.07 mm (0.0028 in)



# Regulator Valve Body



## Disassembly/Inspection/Reassembly

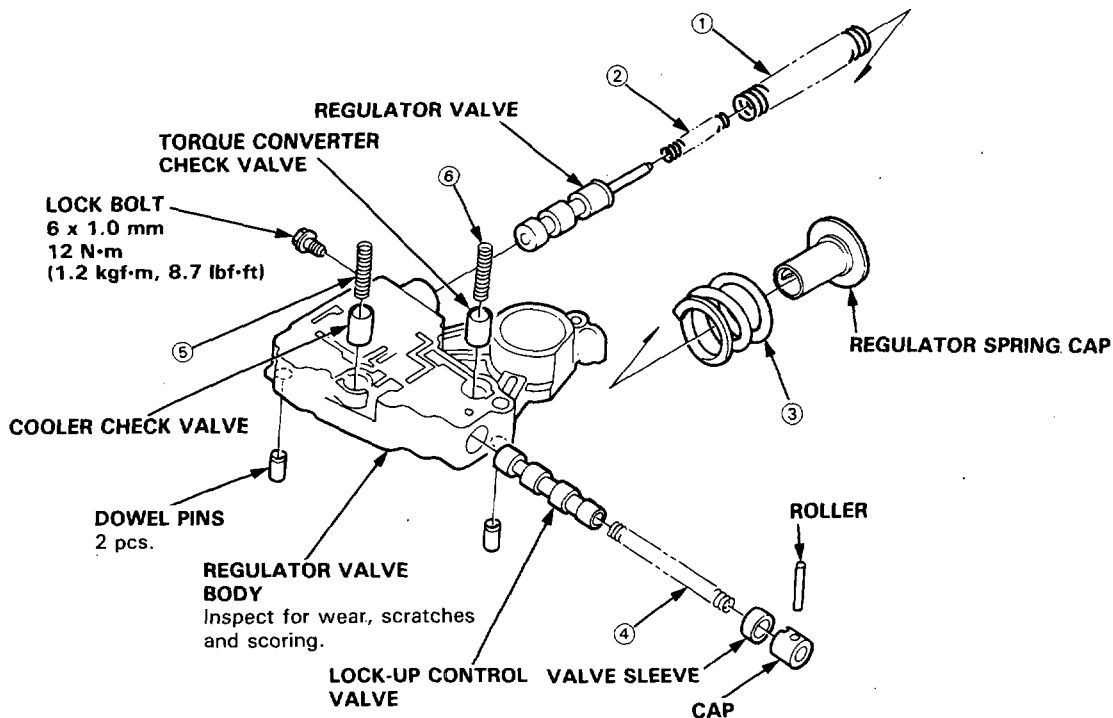
**NOTE:**

- Clean all parts thoroughly in solvent or carburetor cleaner and dry them with compressed air.
- Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-77.

1. Hold the regulator spring cap in place while removing the lock bolt. The regulator spring cap is spring loaded. Once the bolt is removed, release the spring cap slowly so it does not pop out.
2. Reassembly is in the reverse order of the disassembly procedure.

**NOTE:**

- Coat all parts with ATF.
- Align the hole in the regulator cap with the hole in the valve body, press the spring cap into the body and tighten the lock bolt.



**SPRING SPECIFICATIONS**

Unit of length: mm (in)

No.	Spring	Standard (New)				
		Wire Dia.	O.D.	Free Length	No. of Coils	
①	Regulator valve spring A	D16B2 engine D14A7, D14A8 engines	1.8 (0.071)	14.7 (0.579)	87.8 (3.457)	16.5
②	Regulator valve spring B		1.8 (0.071)	14.7 (0.579)	85.4 (3.362)	16.5
③	Stator reaction spring		1.8 (0.071)	9.6 (0.378)	44.0 (1.732)	7.5
④	Lock-up control valve spring		4.5 (0.177)	*26.4 (1.039)	30.3 (1.193)	1.92
⑤	Cooler check valve spring		0.9 (0.035)	6.6 (0.260)	38.4 (1.512)	23.3
⑥	Torque converter check valve spring		1.0 (0.039)	8.4 (0.331)	33.8 (1.331)	8.2
			1.0 (0.039)	8.4 (0.331)	33.8 (1.331)	8.2

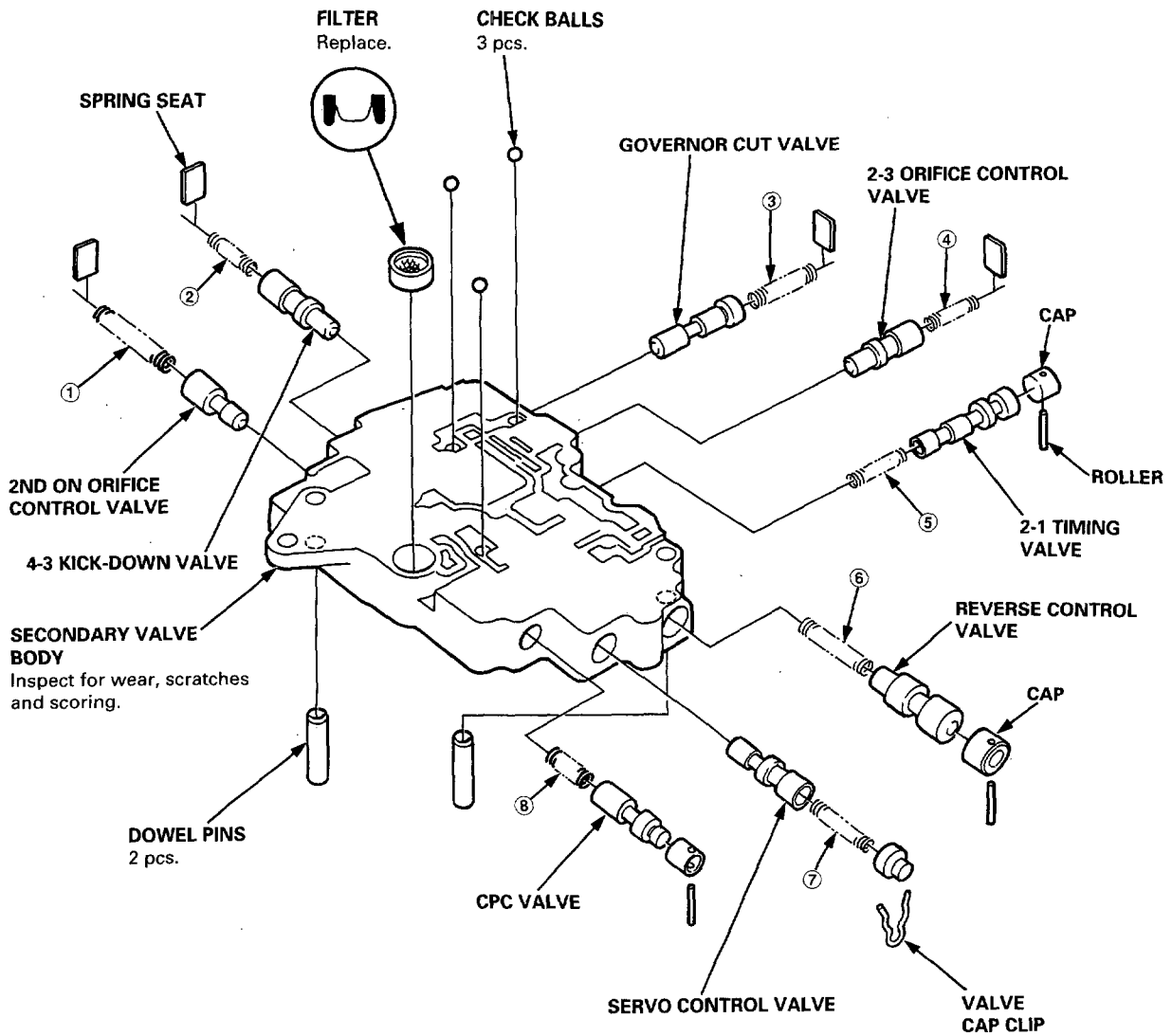
\*: Inside Diameter

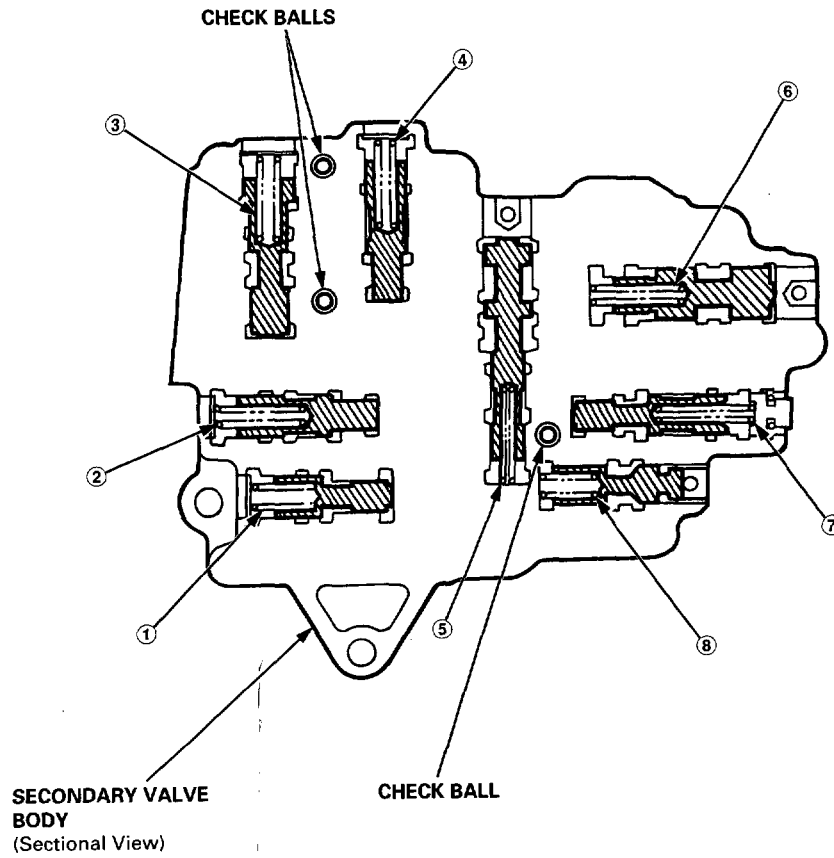
# Secondary Valve Body

## Disassembly/Inspection/Reassembly

### NOTE:

- Do not use a magnet to remove the check balls; it may magnetize the balls.
- Clean all parts thoroughly in solvent or carburetor cleaner and dry them with compressed air.
- Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-77.
- Coat all parts with ATF before reassembly.





**SPRING SPECIFICATIONS**

Unit of length: mm (in)

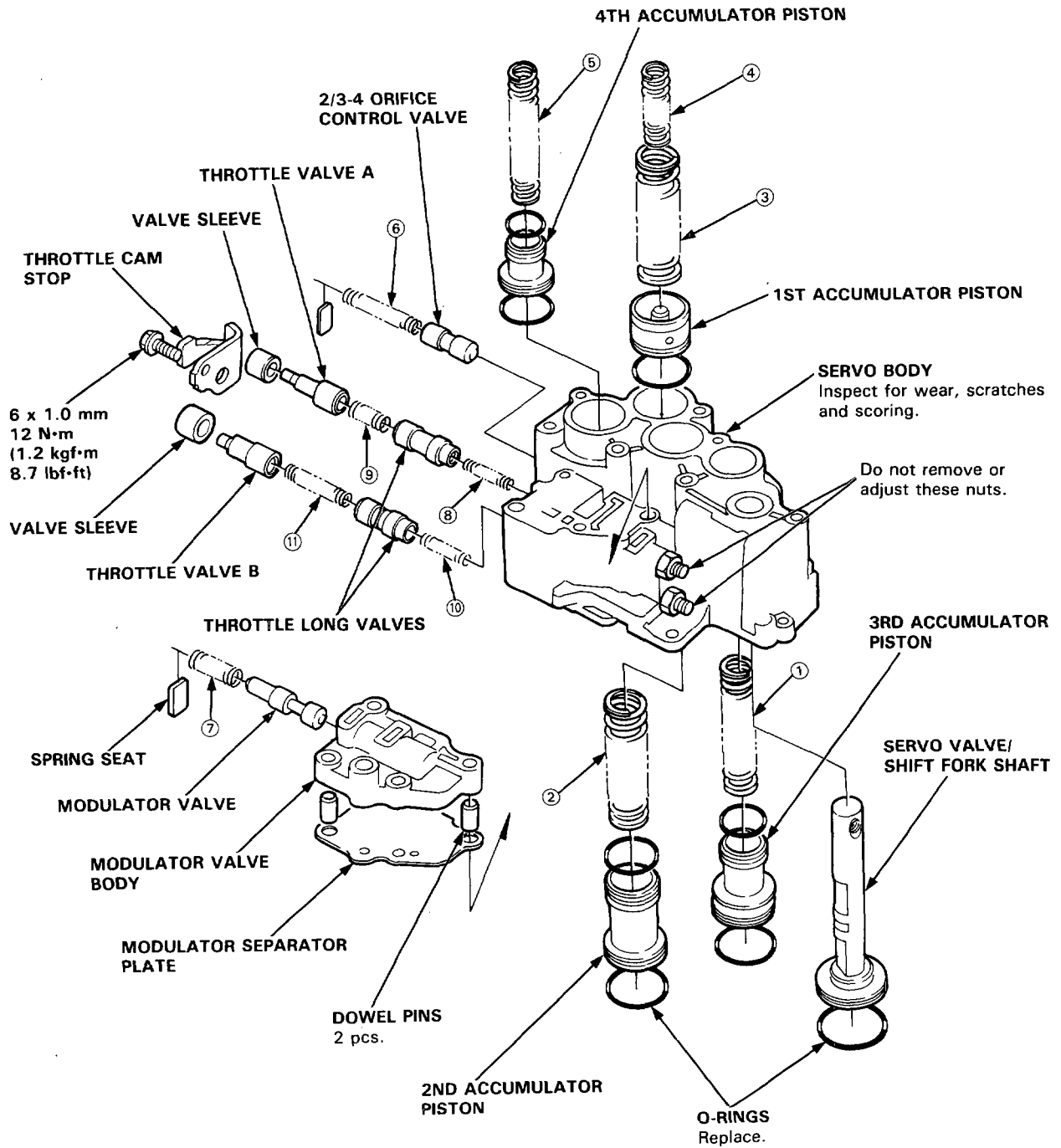
No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	2nd ON orifice control valve spring	0.9 (0.035)	8.0 (0.315)	24.1 (0.949)	9.6
②	4-3 kick-down valve spring	1.0 (0.039)	6.6 (0.260)	29.9 (1.177)	14.7
③	Governor cut valve spring	0.8 (0.031)	7.6 (0.299)	44.5 (1.752)	17.0
④	2-3 orifice control valve spring	0.9 (0.035)	6.6 (0.260)	33.2 (1.307)	14.9
⑤	2-1 timing valve spring	0.7 (0.028)	5.6 (0.220)	33.0 (1.299)	21.7
⑥	Reverse control valve spring	0.7 (0.028)	7.1 (0.280)	40.0 (1.575)	20.8
⑦	Servo control valve spring	0.9 (0.035)	6.4 (0.252)	34.1 (1.343)	17.5
⑧	CPC (Clutch Pressure Control) valve spring	0.9 (0.035)	8.4 (0.331)	24.9 (0.980)	9.8

# Servo Body/Modulator Valve Body

## Disassembly/Inspection/Reassembly

**NOTE:**

- Clean all parts thoroughly in solvent or carburetor cleaner and dry with compressed air.
- Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Coat all parts with ATF before reassembly.
- Replace the O-rings.





**SPRING SPECIFICATIONS**

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	3rd accumulator spring	2.6 (0.102)	17.5 (0.689)	91.8 (3.614)	15.8
②	2nd accumulator spring	3.5 (0.138)	22.0 (0.866)	77.0 (3.031)	9.5
③	1st accumulator spring A	2.6 (0.102)	24.3 (0.957)	101.9 (4.012)	11.6
④	1st accumulator spring B	2.3 (0.091)	*9.9 (0.390)	49.0 (1.929)	4.6
⑤	4th accumulator spring	2.6 (0.102)	16.0 (0.630)	90.1 (3.547)	15.6
⑥	2/3-4 orifice control valve spring	1.0 (0.039)	8.6 (0.339)	51.9 (2.043)	19.8
⑦	Modulator valve spring	1.2 (0.047)	*7.0 (0.276)	27.6 (1.087)	7.7
⑧	Throttle valve A adjusting spring	0.8 (0.031)	6.2 (0.244)	27.0 (1.063)	8.5
⑨	Throttle valve A spring	1.1 (0.043)	8.5 (0.335)	22.3 (0.878)	8.1
		1.0 (0.039)	8.5 (0.335)	22.2 (0.874)	6.0
		1.1 (0.043)	8.5 (0.335)	22.3 (0.878)	7.6
		1.0 (0.039)	8.5 (0.335)	22.1 (0.870)	5.5
⑩	Throttle valve B adjusting spring	0.8 (0.031)	6.2 (0.244)	30.0 (1.181)	8.0
⑪	Throttle valve B spring	1.4 (1.653)	8.5 (0.335)	41.5 (1.634)	10.5
		1.4 (1.653)	8.5 (0.335)	41.5 (1.634)	11.2
		1.4 (1.653)	8.5 (0.335)	41.6 (1.638)	12.4

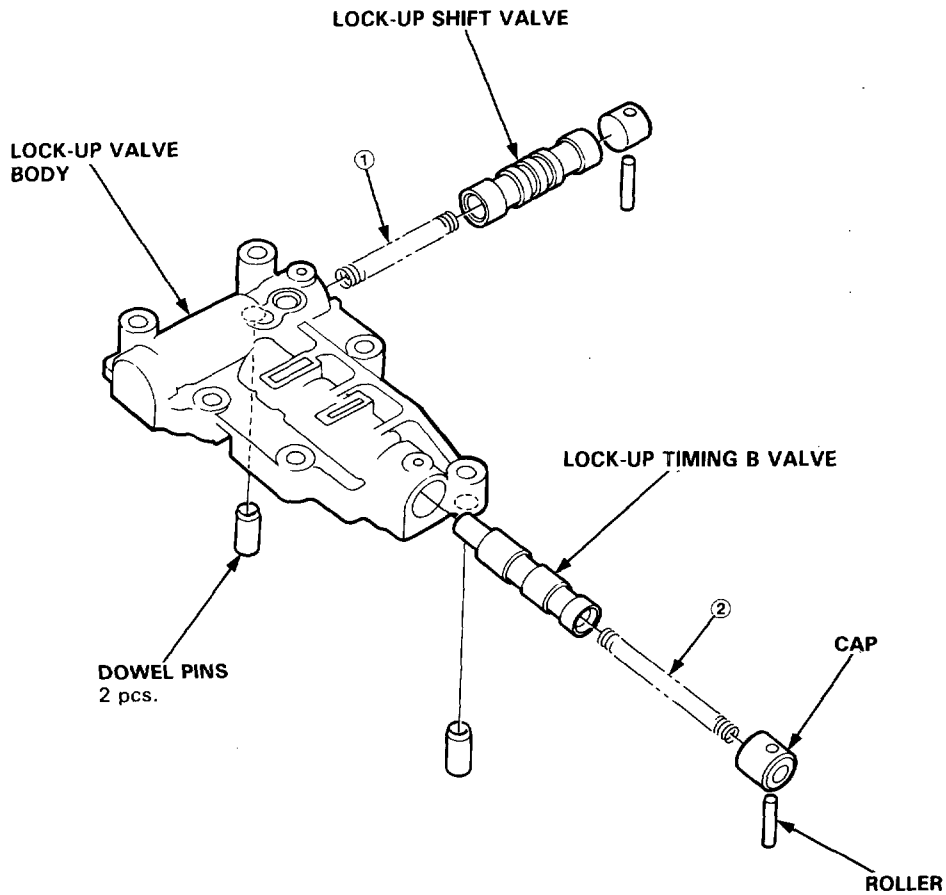
\*: Inside Diameter

# Lock-up Valve Body

## Disassembly/Inspection/Reassembly

**NOTE:**

- Clean all parts thoroughly in solvent or carburetor cleaner and dry them with compressed air.
- Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.
- Check all valves for free movement. If any fail to slide freely, see Valve Body Repair on page 14-77.
- Coat all parts with ATF before reassembly.

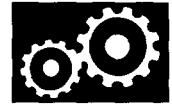


**SPRING SPECIFICATIONS**

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Lock-up shift valve spring	0.9 (0.035)	7.6 (0.299)	73.7 (2.902)	32.0
②	Lock-up timing B valve spring	0.8 (0.031)	6.6 (0.260)	61.5 (2.421)	27.6

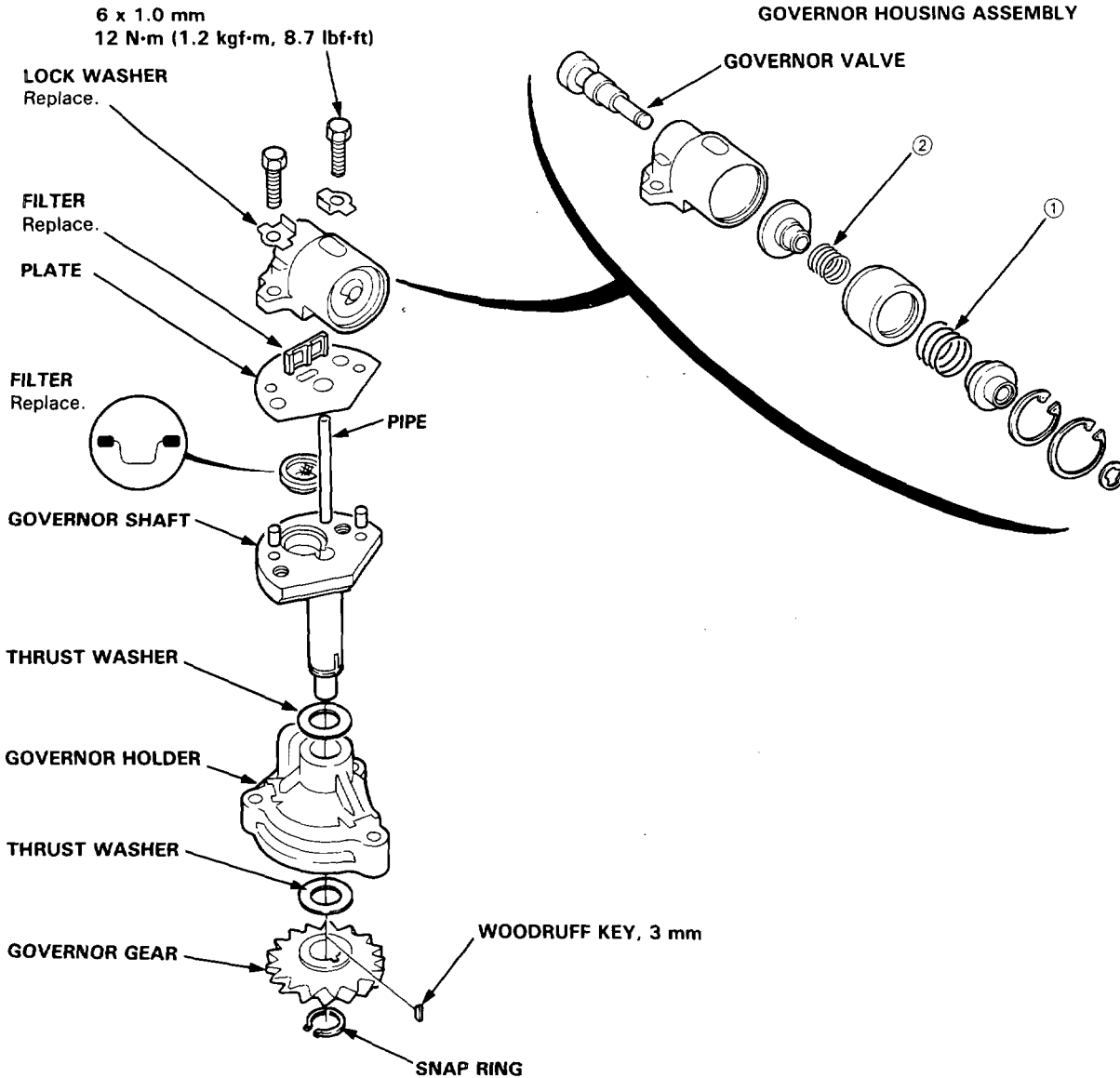
# Governor Body



## Disassembly/Inspection/Reassembly

**NOTE:**

- Clean all parts thoroughly in solvent or carburetor cleaner and dry them with compressed air.
- Blow out all passages.
- Check that the governor works smoothly; replace it if it does not.
- Coat all parts with ATF before reassembly.



**SPRING SPECIFICATIONS**

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	Governor spring A	1.0 (0.039)	18.8 (0.740)	32.9 (1.295)	4.1
②	Governor spring B	0.9 (0.035)	11.8 (0.465)	27.8 (1.094)	6.0
		0.9 (0.035)	11.8 (0.465)	29.1 (1.146)	6.0

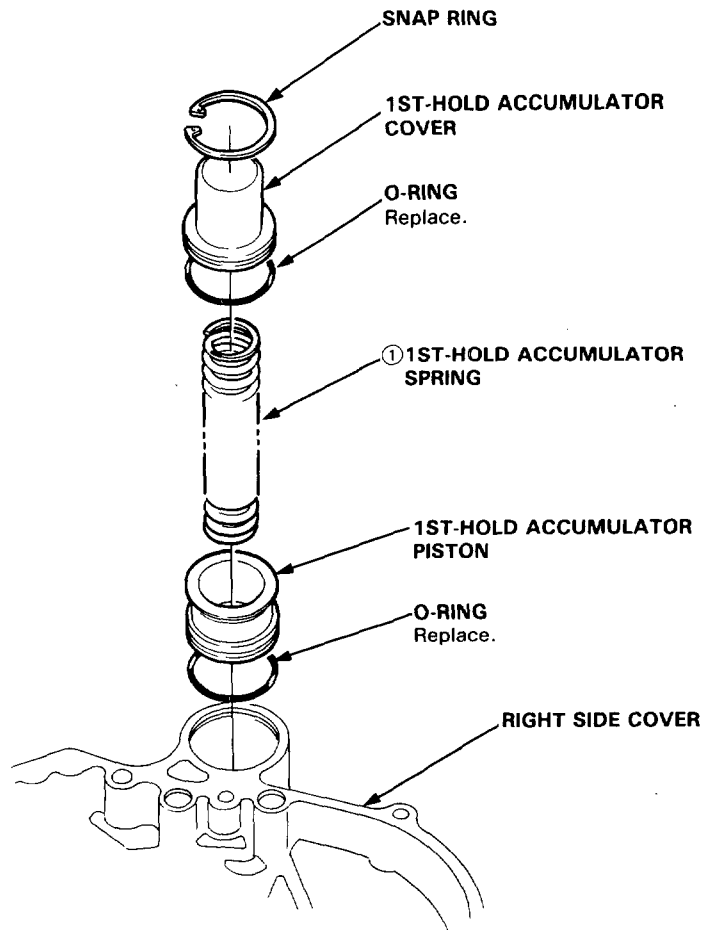


# 1st-hold Accumulator/Right Side Cover

## Disassembly/Inspection/Reassembly

**NOTE:**

- Clean all parts thoroughly in solvent or carburetor cleaner and dry them with compressed air.
- Blow out all passages.
- Coat all parts with ATF before reassembly.



**SPRING SPECIFICATIONS**

Unit of length: mm (in)

No.	Spring	Standard (New)			
		Wire Dia.	O.D.	Free Length	No. of Coils
①	1st-hold accumulator spring	4.0 (0.157)	21.5 (0.846)	71.7 (2.823)	8.3

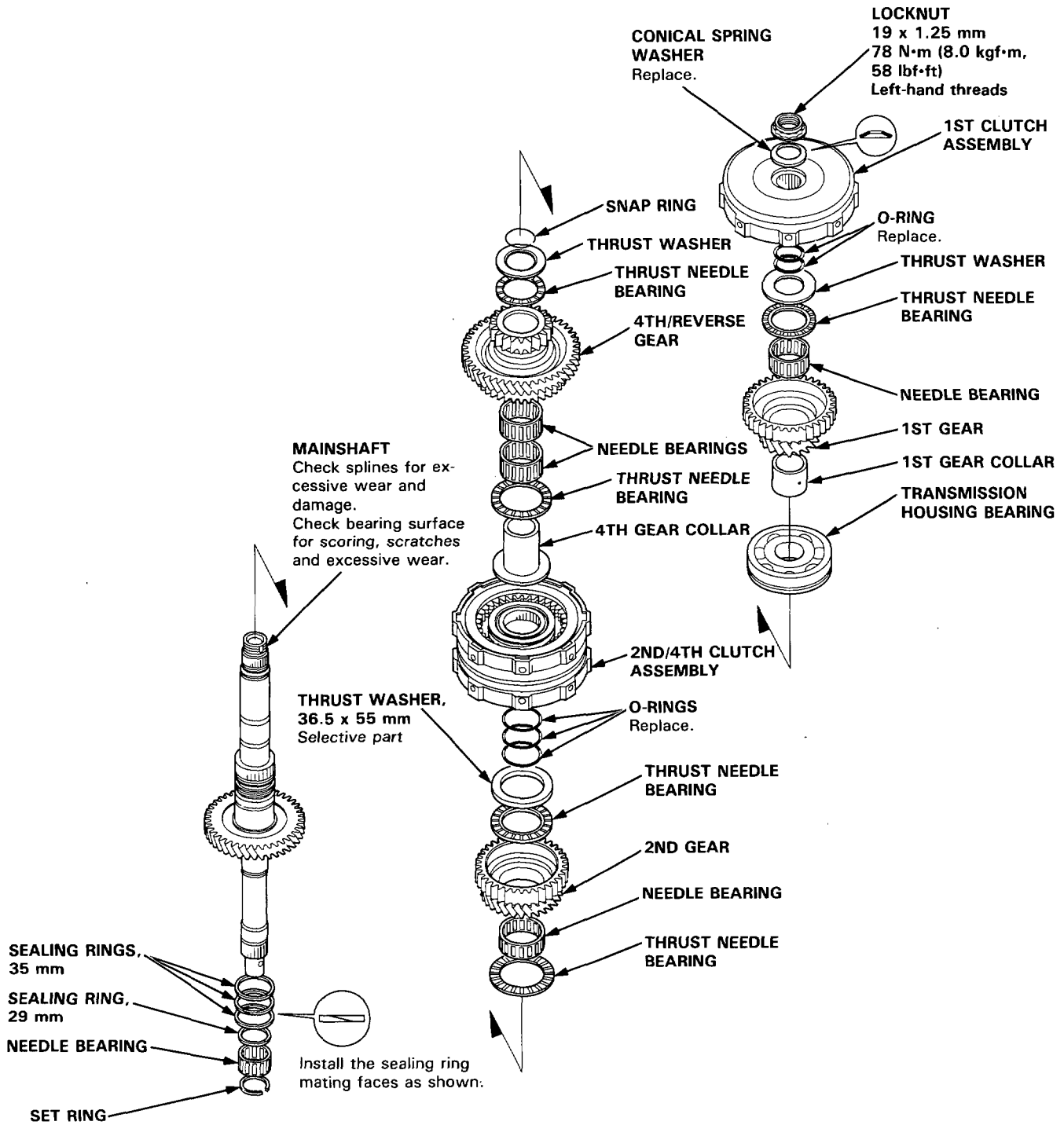
# Mainshaft



## Disassembly/Inspection/Reassembly

**NOTE:**

- Lubricate all parts with ATF during reassembly.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.
- Locknut has left-hand threads.



# Mainshaft

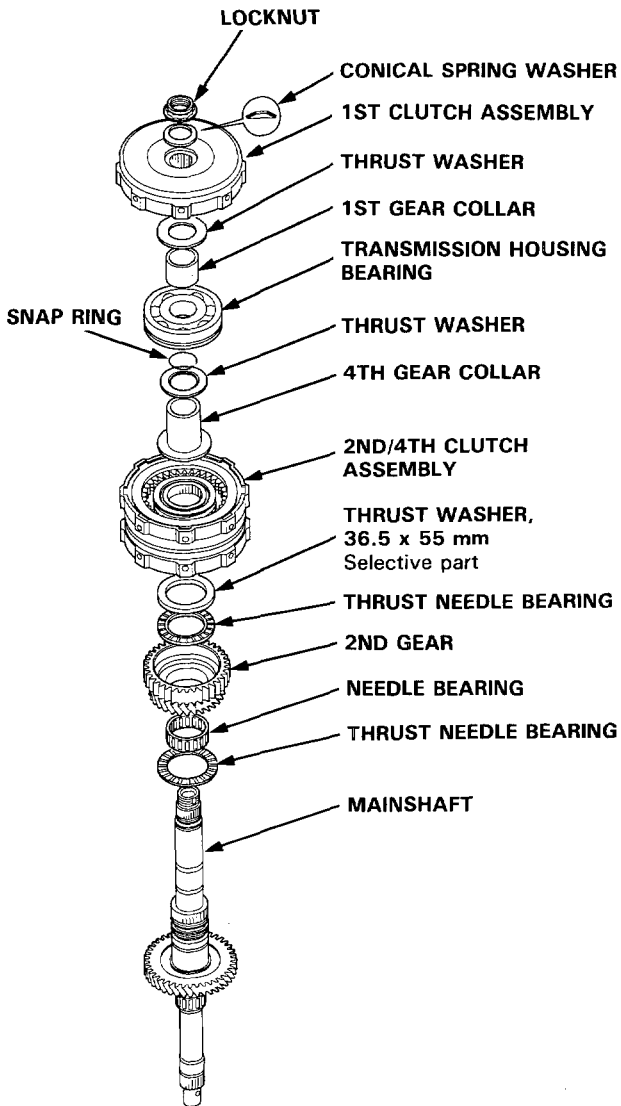
## Inspection

- Clearance Measurement

NOTE: Lubricate all parts with ATF during assembly.

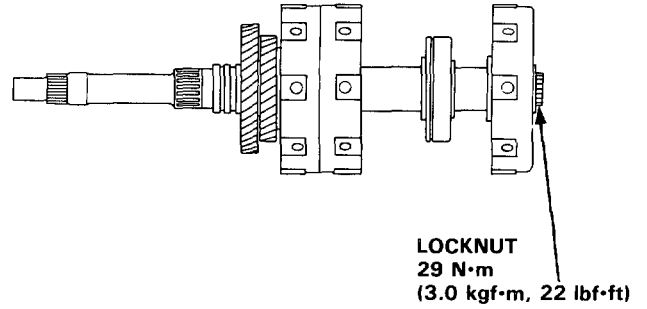
1. Remove the mainshaft bearing from the transmission housing (see page 14-119).
2. Assemble the parts below on the mainshaft.

NOTE: Do not assemble the O-rings during inspection.



3. Tighten the mainshaft locknut to 29 N·m (3.0 kgf·m, 22 lbf·ft).

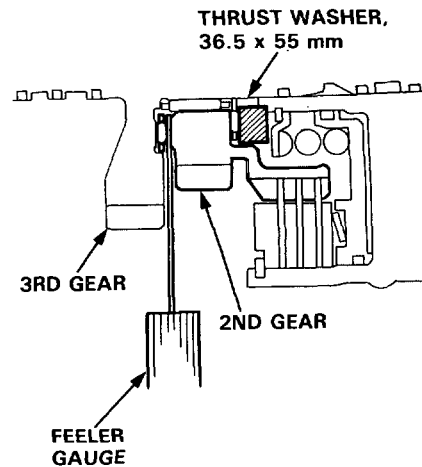
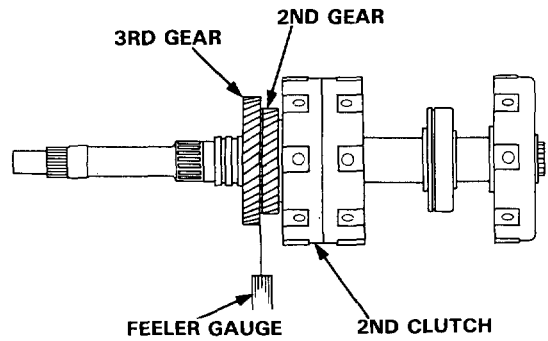
NOTE: Mainshaft locknut has left-hand threads.



4. Hold 2nd gear against the 2nd clutch, then measure the clearance between 2nd gear and 3rd gear with a feeler gauge.

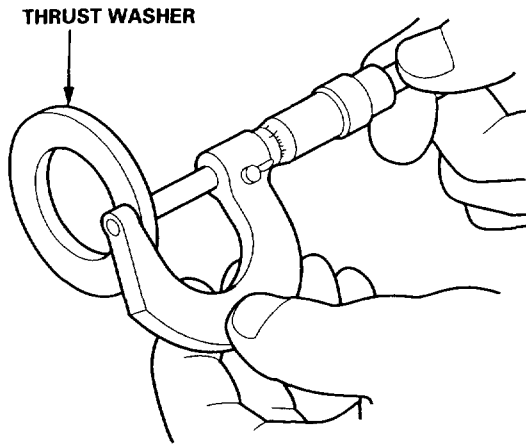
NOTE: Take measurements in at least three places, and use the average as the actual clearance.

STANDARD: 0.05 – 0.13 mm (0.002 – 0.005 in)





- If the clearance is out of standard, remove the thrust washer and measure its thickness.



- Select and install a new washer, then recheck the clearance, and make sure it is within standard.

#### THRUST WASHER 36.5 x 55 mm

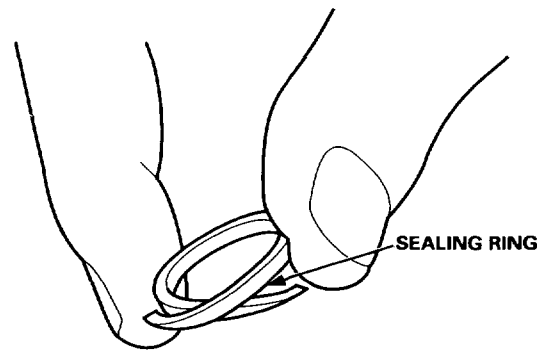
No.	Part Number	Thickness
1	90441 - P4P - 000	4.00 mm (0.157 in)
2	90442 - P4P - 000	4.05 mm (0.159 in)
3	90443 - P4P - 000	4.10 mm (0.161 in)
4	90444 - P4P - 000	4.15 mm (0.163 in)
5	90445 - P4P - 000	4.20 mm (0.165 in)
6	90446 - P4P - 000	4.25 mm (0.167 in)
7	90447 - P4P - 000	4.30 mm (0.169 in)
8	90448 - P4P - 000	4.35 mm (0.171 in)
9	90449 - P4P - 000	4.40 mm (0.173 in)
10	90450 - P4P - 000	4.45 mm (0.175 in)

## Replacement

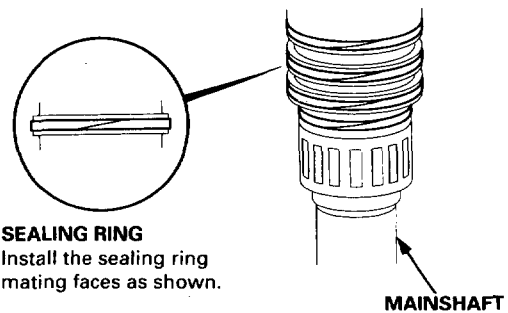
The sealing rings are synthetic resin with chamfered ends. Check conditions of the sealing rings, and replace them only if they are worn, distorted, or damaged.

NOTE: Apply ATF to all parts during assembly.

- For a better fit, squeeze the sealing ring together slightly before installing them.



- Install new sealing rings on the mainshaft.
- After installing the sealing rings verify the following:
  - The sealing rings are fully seated in the groove.
  - The sealing rings are not twisted.
  - The chamfered ends of the sealing rings are properly joined.

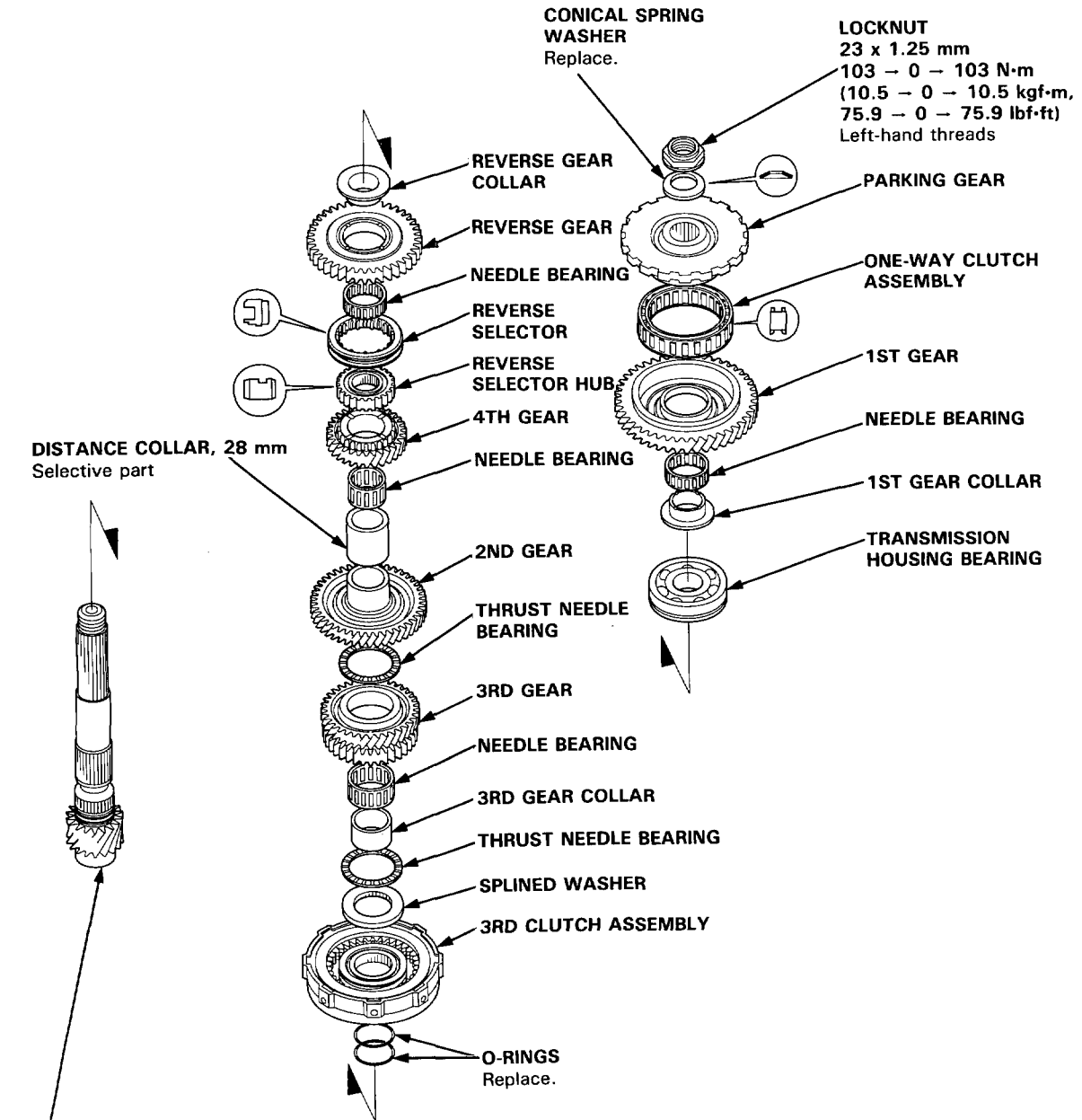


# Countershaft

## Disassembly/Inspection/Reassembly

**NOTE:**

- Lubricate all parts with ATF before reassembly.
- Install thrust needle bearings with unrolled edge of bearing retainer facing washer.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.
- Locknut has left-hand threads.

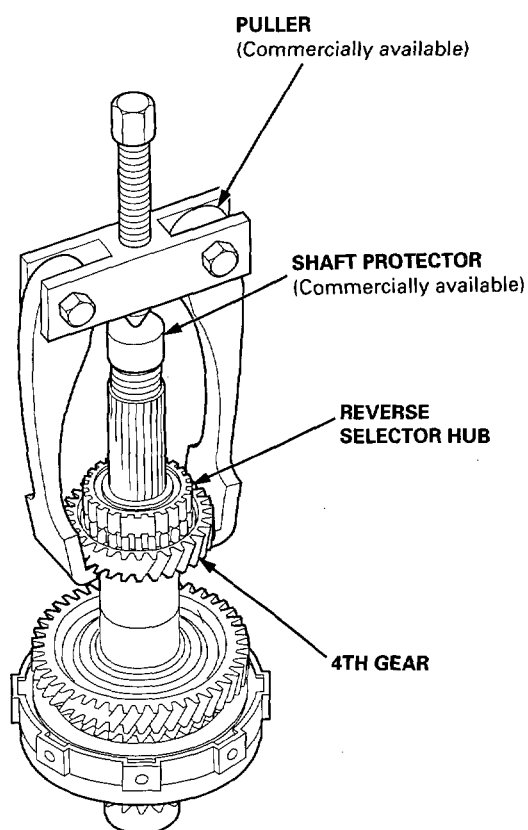


**COUNTERSHAFT**  
 Check splines for excessive wear and damage.  
 Check bearing surface for scoring, scratches and excessive wear.



## Disassembly/Reassembly

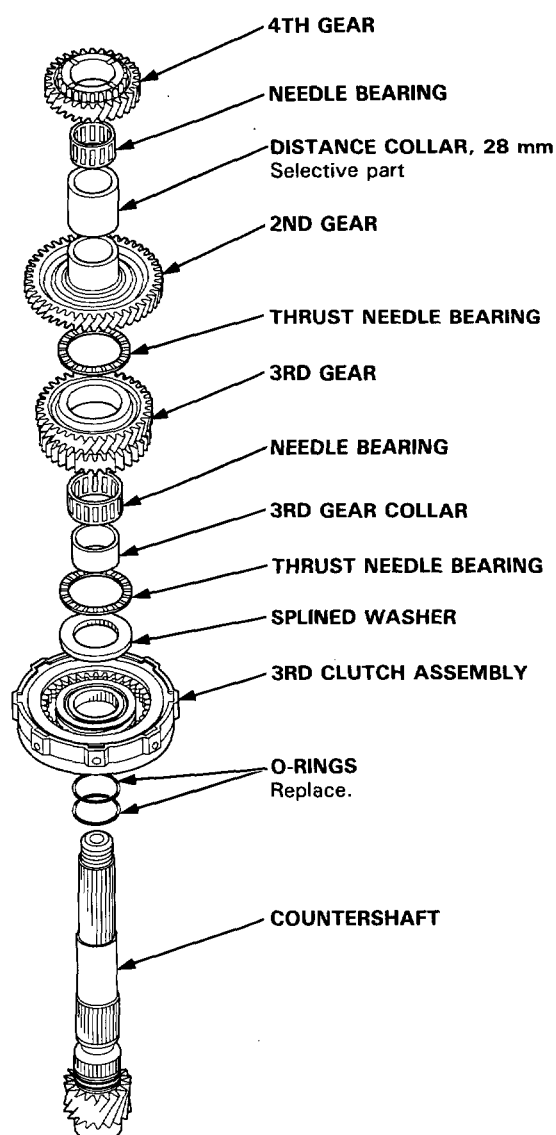
1. Remove the reverse selector hub and countershaft 4th gear using a universal two-jaw (or three-jaw) puller as shown. Place a shaft protector between the puller and countershaft to prevent damaging the countershaft.



2. Assemble the parts below on the countershaft as shown below.

### NOTE:

- Lubricate all parts with ATF during assembly.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.

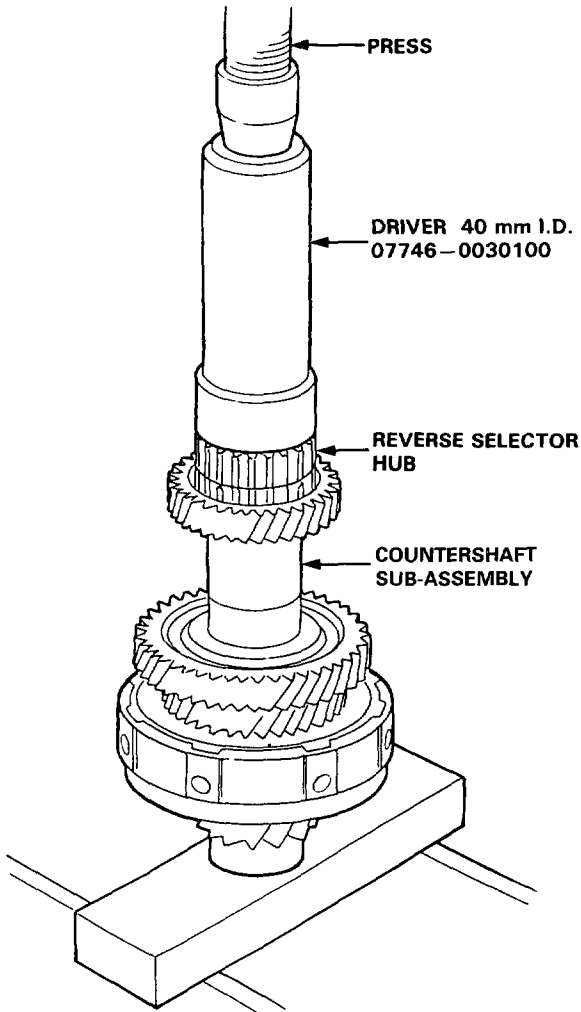


(cont'd)

# Countershaft

## Disassembly/Reassembly (cont'd)

3. Install the reverse selector hub on the countershaft sub assembly, and then press the reverse selector hub using the special tool and a press as shown.



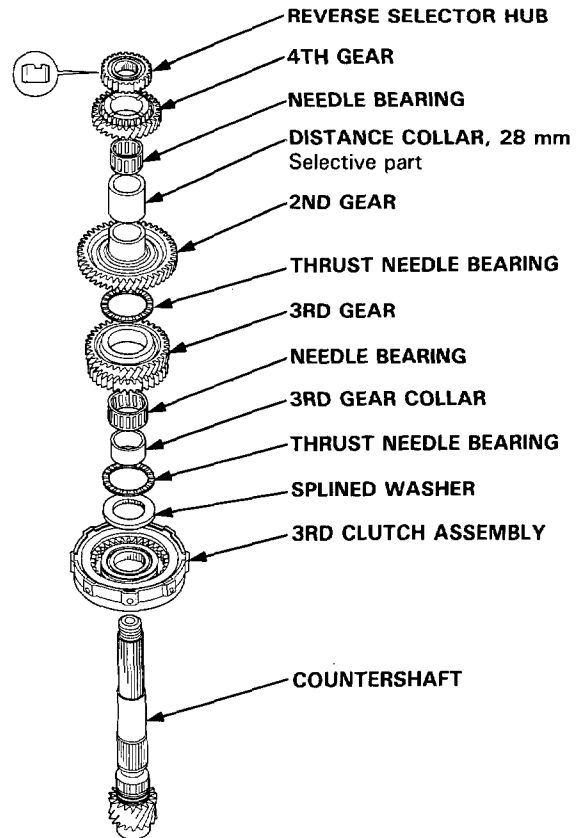
## Inspection

- Clearance Measurement

NOTE: Lubricate all parts with ATF during assembly.

1. Remove the countershaft bearing from the transmission housing (see page 14-119).
2. Install the parts below on the countershaft using the special tool and a press as described on this page.

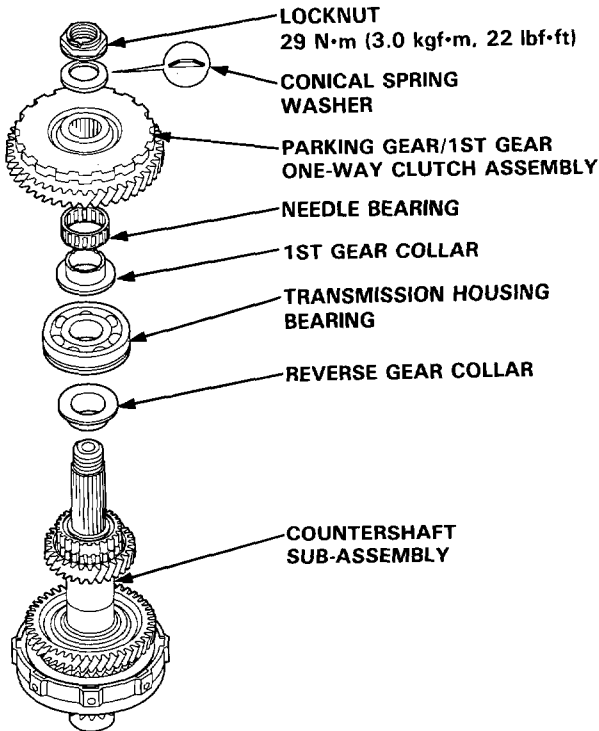
NOTE: Do not assemble the O-rings during inspection.





3. Install the parts below on the countershaft sub-assembly, then tighten the locknut to 29 N·m (3.0 kgf·m, 22 lbf·ft).

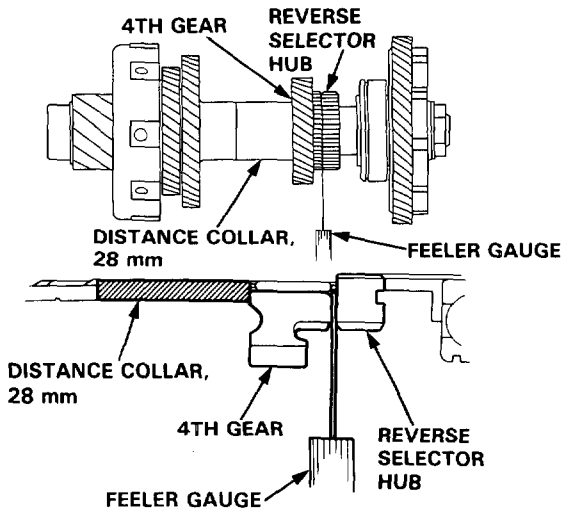
NOTE: Countershaft locknut has left-hand threads.



4. Measure the clearance between 4th gear and the reverse selector hub with a feeler gauge.

NOTE: Take measurements in at least three places, and use the average as the actual clearance.

STANDARD: 0.10 – 0.18 mm (0.004 – 0.007 in)



5. If the clearance is out of standard, remove the 28 mm distance collar, and measure its length.
6. Select and install a new distance collar, then recheck.

**DISTANCE COLLAR 28 mm**

No.	Part Number	Thickness
1	90503 – PC9 – 000	39.00 mm (1.535 in)
2	90504 – PC9 – 000	39.10 mm (1.539 in)
3	90505 – PC9 – 000	39.20 mm (1.543 in)
4	90507 – PC9 – 000	39.30 mm (1.547 in)
5	90508 – PC9 – 000	39.05 mm (1.537 in)
6	90509 – PC9 – 000	39.15 mm (1.541 in)
7	90510 – PC9 – 000	39.25 mm (1.545 in)
8	90511 – PC9 – 000	38.90 mm (1.531 in)
9	90512 – PC9 – 000	38.95 mm (1.533 in)

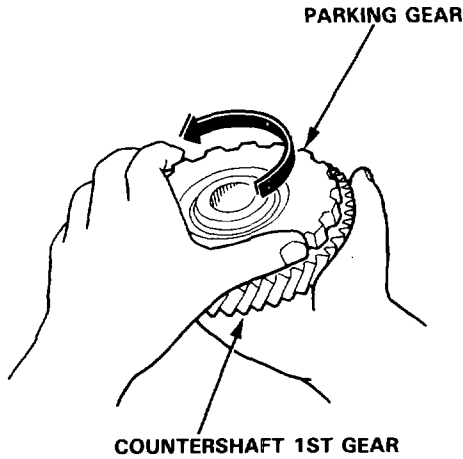
7. After replacing the distance collar, make sure the clearance is within standard.



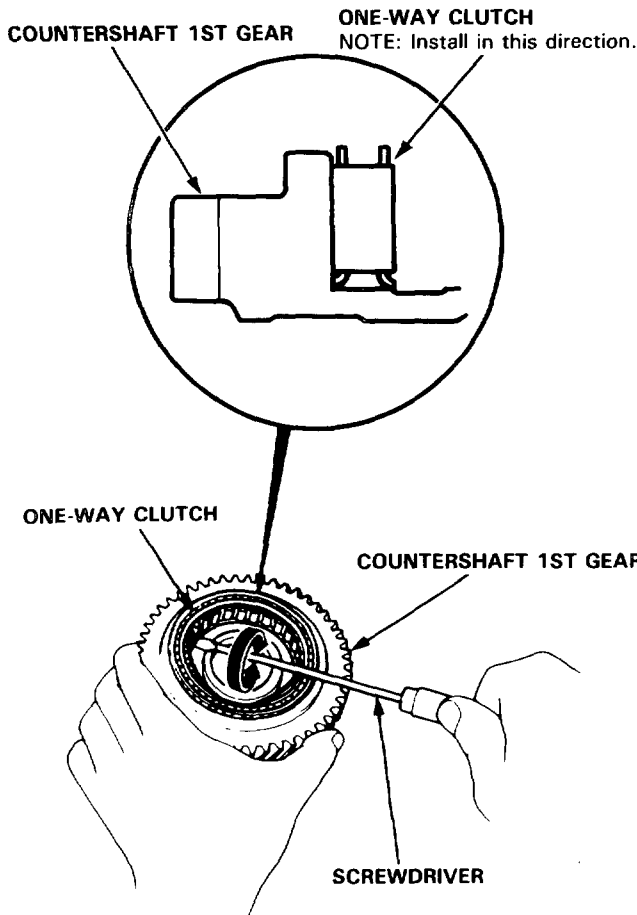
# One-way Clutch

## Disassembly/Inspection/Reassembly

1. Separate countershaft 1st gear from the parking gear by turning the parking gear in the direction shown.



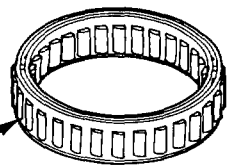
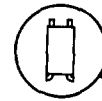
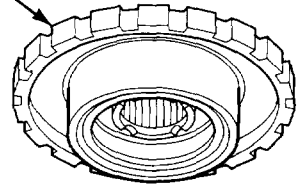
2. Remove the one-way clutch by prying it up with the end of a screwdriver.



3. Inspect the parts as follows:

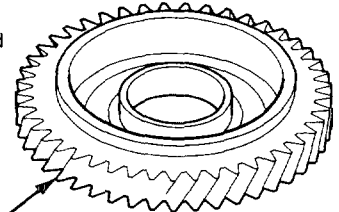
### PARKING GEAR

Inspect the parking gear for wear and scoring.



### ONE-WAY CLUTCH

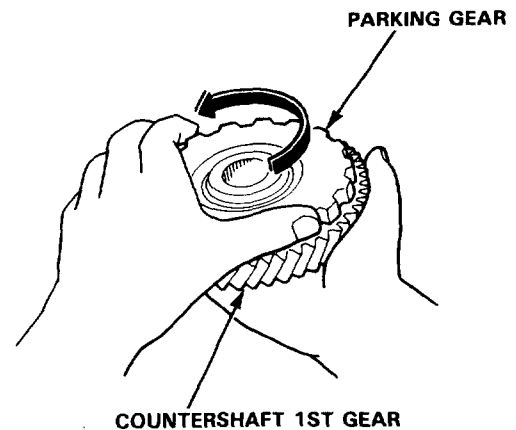
Inspect the one-way clutch for damage and faulty movement.



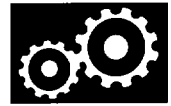
### 1ST GEAR

Inspect countershaft 1st gear for wear and scoring.

4. After the parts are assembled, hold countershaft 1st gear and turn the parking gear in the direction shown to be sure it turns freely. Also make sure the parking gear does not turn in the opposite direction.

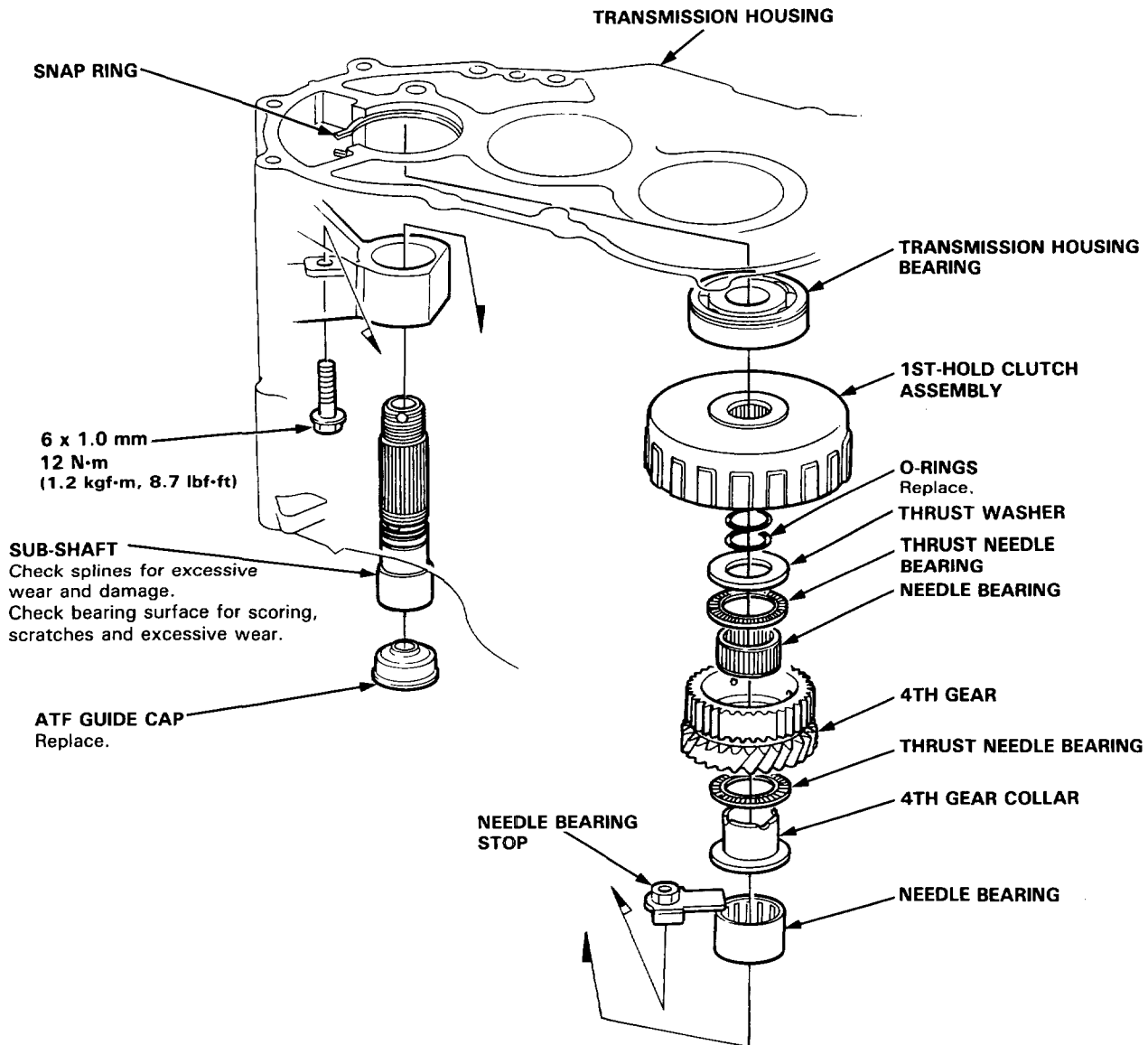


# Sub-shaft



## NOTE:

- Lubricate all parts with ATF before reassembly.
- Inspect the thrust needle bearings and the needle bearings for galling and rough movement.
- Before installing the O-rings, wrap the shaft splines with tape to prevent damaging the O-rings.



# Sub-shaft

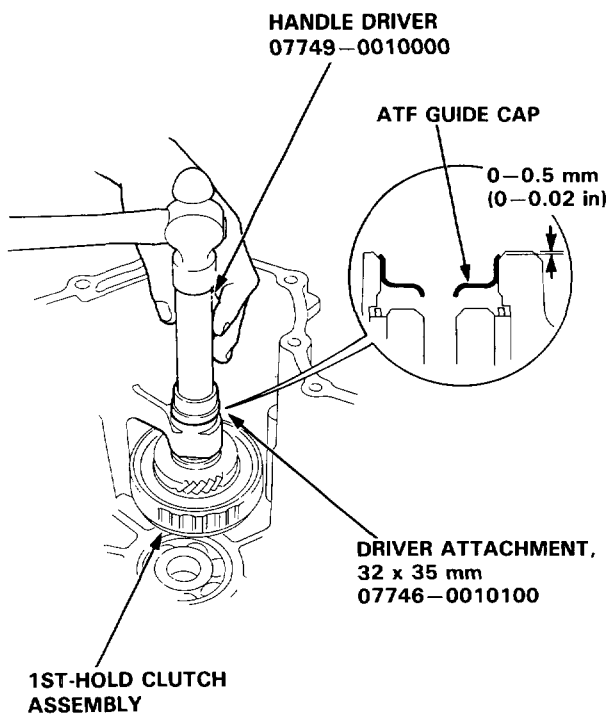
## Disassembly/Reassembly

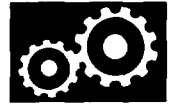
1. Remove the ATF guide cap by pushing the sub-shaft inside the transmission housing.
2. Remove the 1st-hold clutch assembly by pulling the sub-shaft, then remove the sub-shaft.
3. Install new O-rings on the sub-shaft.

NOTE: Wrap the shaft splines with tape to prevent damaging the O-rings.

4. Place the sub-shaft in the transmission housing and install the 1st-hold clutch assembly.
5. Install new ATF guide cap using the special tools as shown.

NOTE: Install the ATF guide cap in the direction shown.

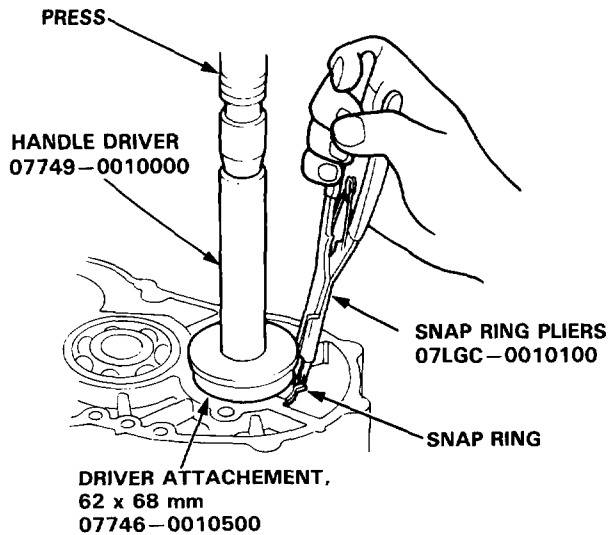




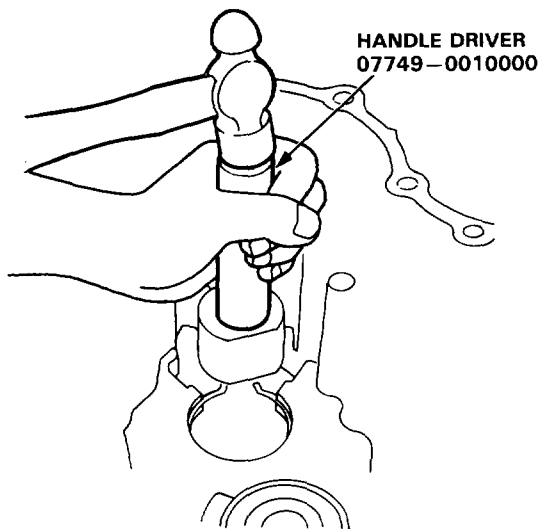
## Replacement

NOTE: Lubricate all parts with ATF before reassembly.

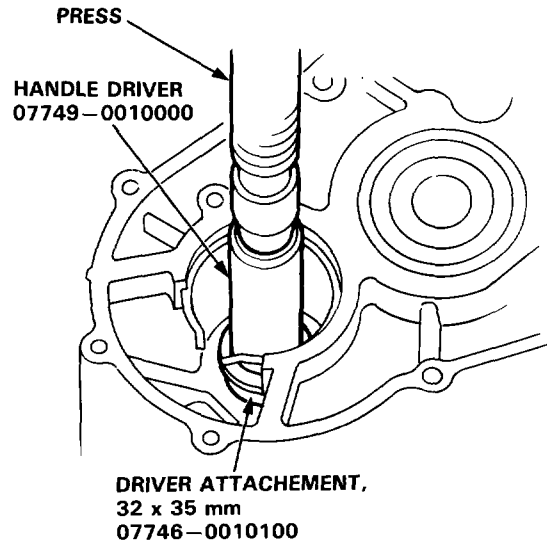
1. To remove the sub-shaft ball bearing from the transmission housing, expand the snap ring with snap ring pliers, then push the bearing out using the special tools and a press as shown.



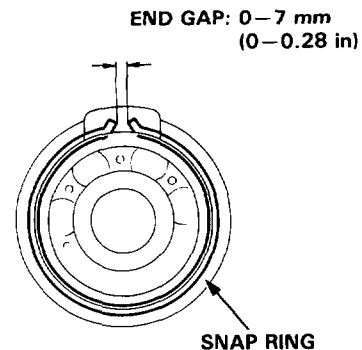
2. Remove the needle bearing stop.
3. Remove the needle bearing from the transmission housing using the special tool.



4. Install the new needle bearing in the transmission housing using the special tools and a press as shown.



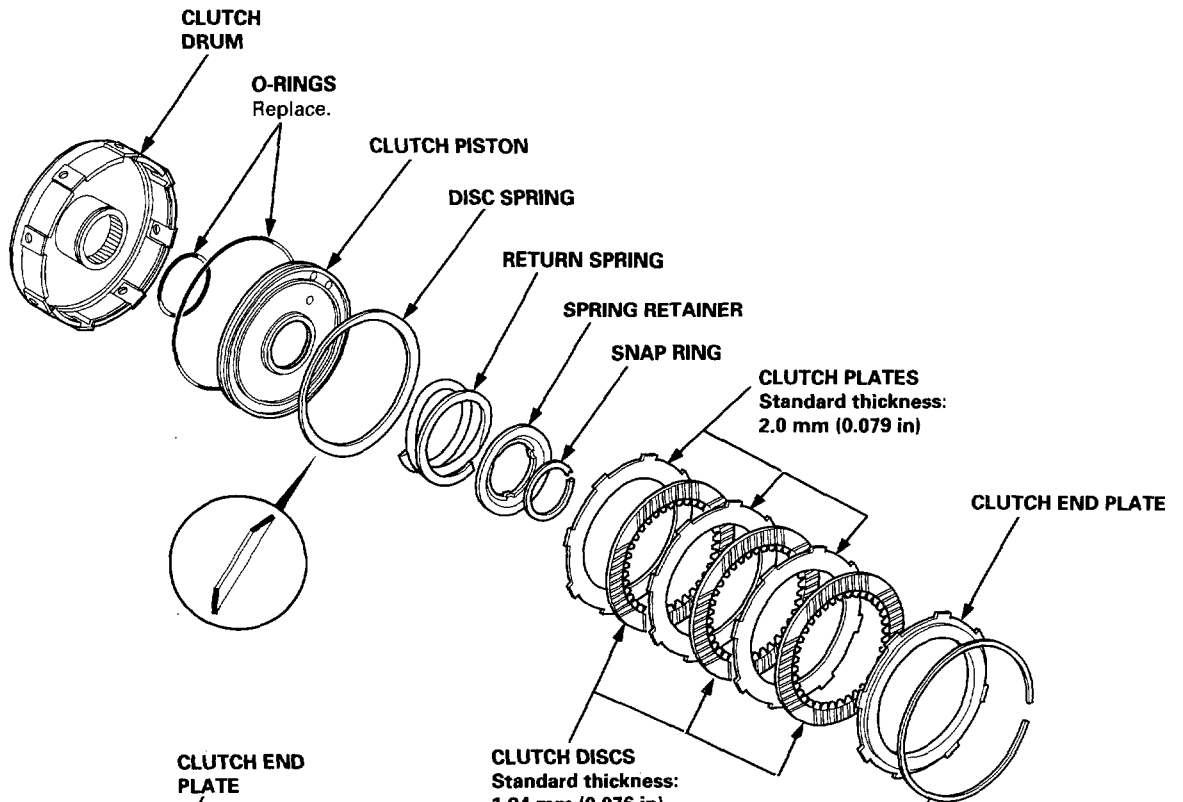
5. Expand the snap ring with snap ring pliers, then insert the ball bearing part-way into the housing using the special tools and a press as described in step 1. Install the bearing with the groove facing outside the housing.
6. Release the pliers, then push the bearing down into the housing until the snap ring snaps in place around it.
7. After installing the ball bearing verify the following:
  - The snap ring is seated in the bearing and housing grooves.
  - The ring end gap is correct.



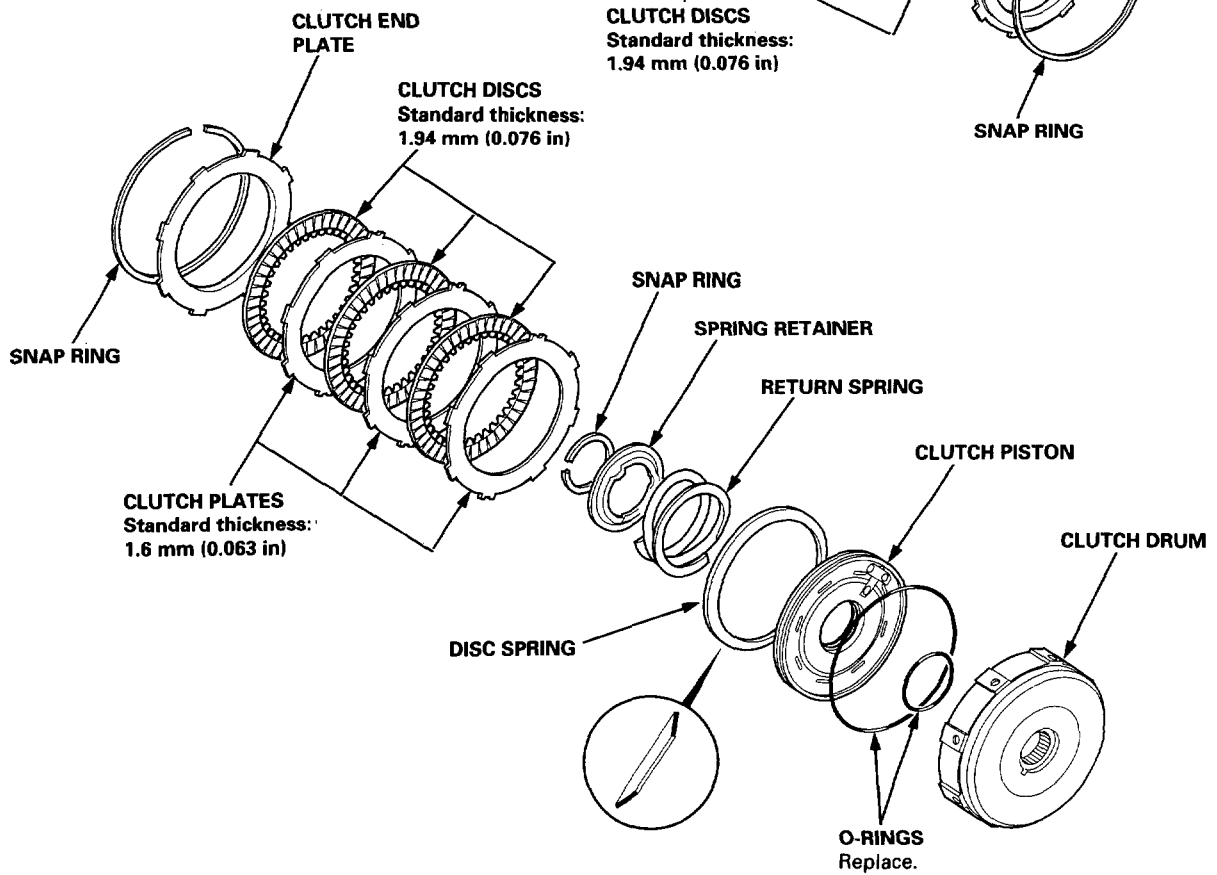
# Clutch

## Illustrated Index

### 3RD CLUTCH

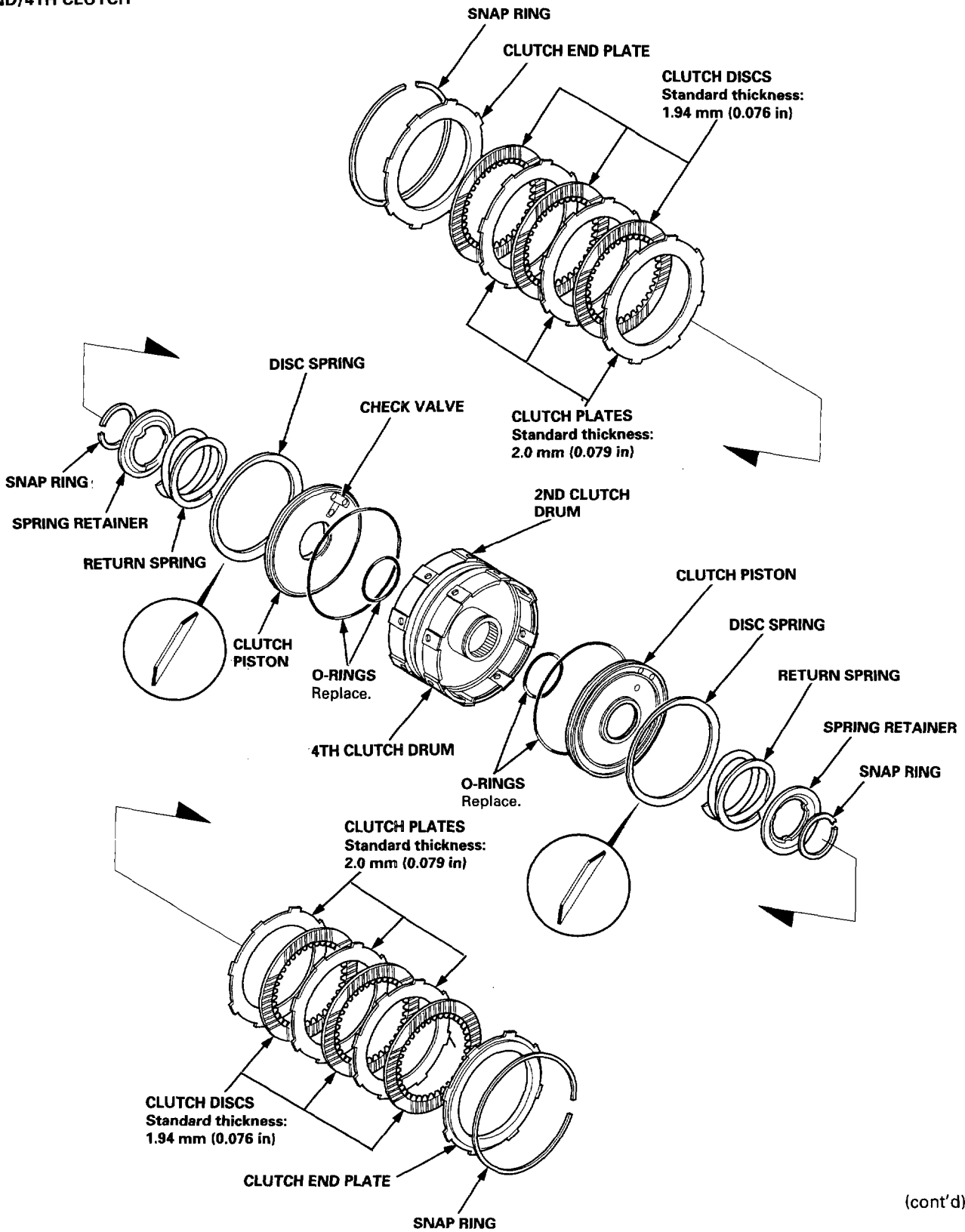


### 1ST CLUTCH





2ND/4TH CLUTCH

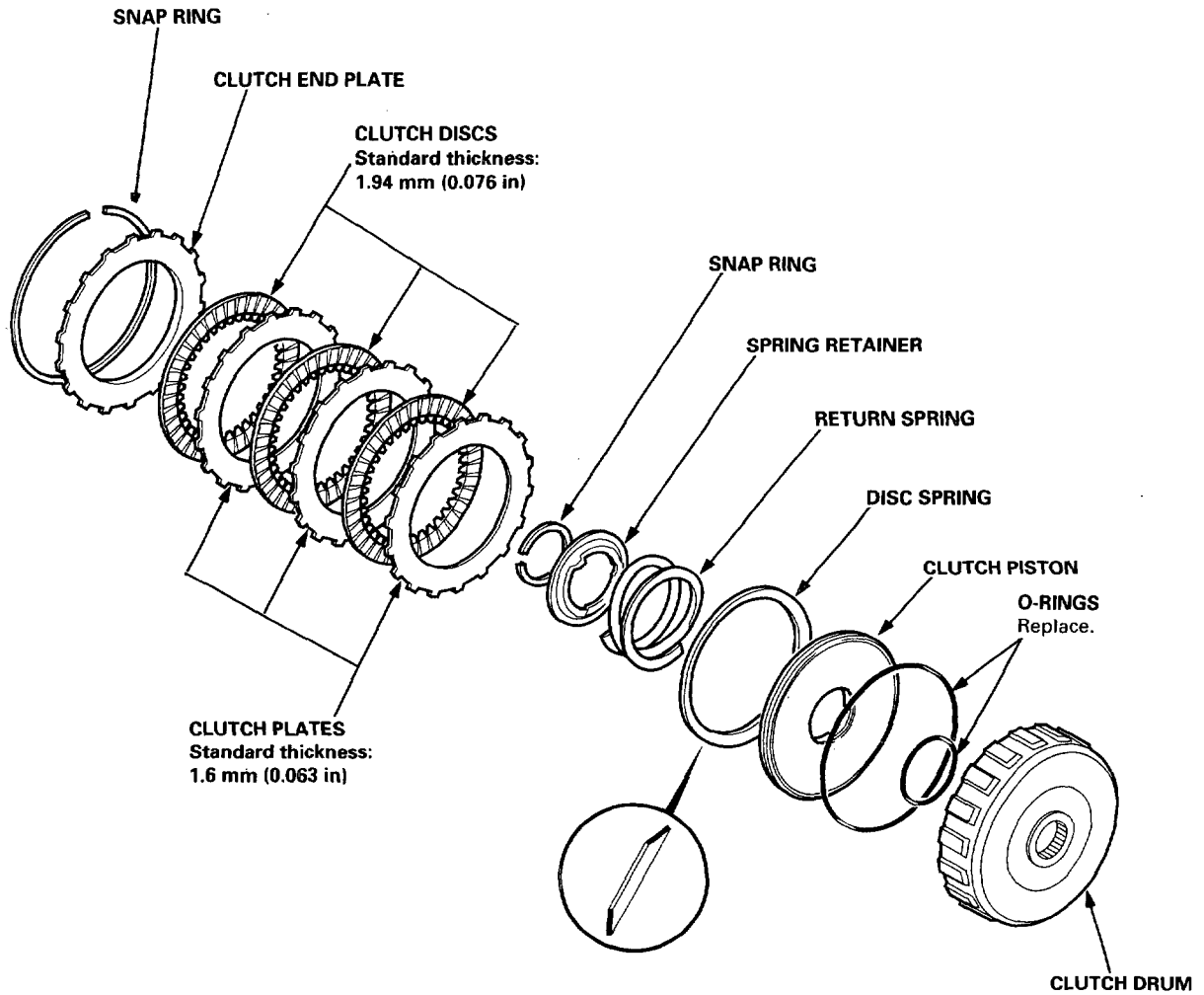


(cont'd)

# Clutch

## Illustrated Index (cont'd)

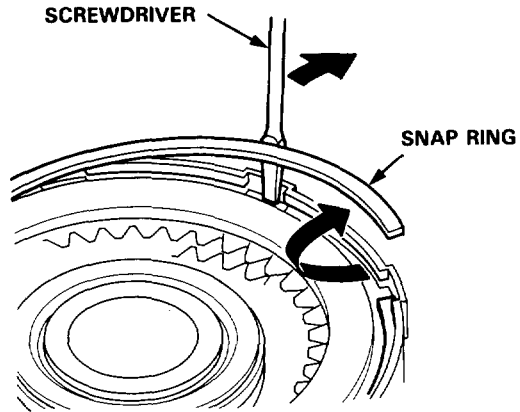
### 1ST-HOLD CLUTCH





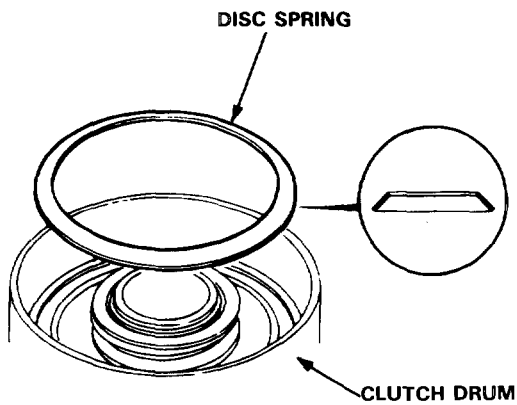
## Disassembly

1. Remove the snap ring, then remove the clutch end plate, clutch discs and plates.

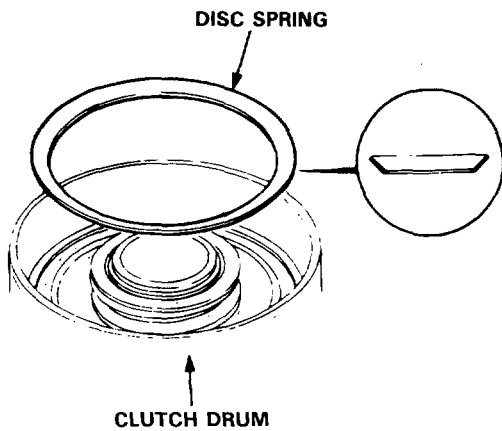


2. Remove the disc spring.

2ND, 1ST-HOLD CLUTCH:



1ST, 3RD, 4TH CLUTCH:



3. Install the special tools as shown.

CLUTCH SPRING  
COMPRESSOR SET  
07LAE-PX40000

CLUTCH SPRING  
COMPRESSOR  
ATTACHMENT  
07LAE-PX40100

CLUTCH SPRING  
COMPRESSOR  
BOLT ASSEMBLY  
07GAE-PG40200

CLUTCH SPRING  
COMPRESSOR  
ATTACHMENT  
07HAE-PL50100

CLUTCH SPRING  
COMPRESSOR SET  
07LAE-PX40000

CLUTCH SPRING  
COMPRESSOR  
ATTACHMENT  
07LAE-PX40100

CLUTCH SPRING  
COMPRESSOR  
BOLT ASSEMBLY  
07GAE-PG40200

CLUTCH SPRING  
COMPRESSOR  
ATTACHMENT  
07HAE-PL50100

(cont'd)

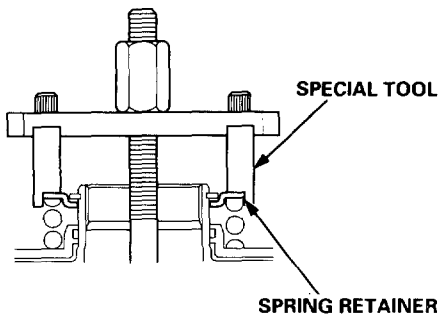
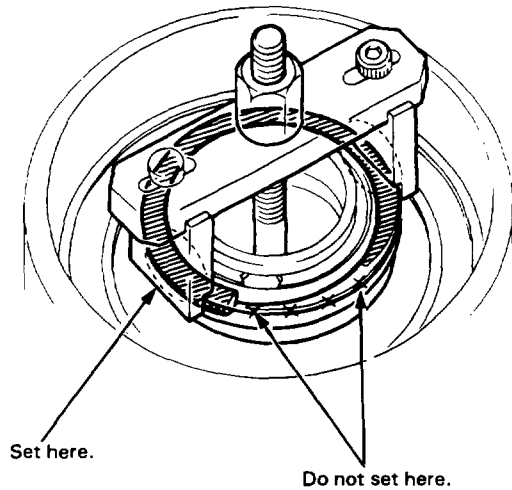


# Clutch

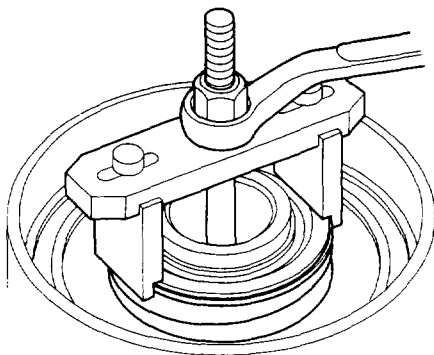
## Disassembly (cont'd)

### ⚠ CAUTION

If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged. Be sure the special tool is adjusted to have full contact with the spring retainer.

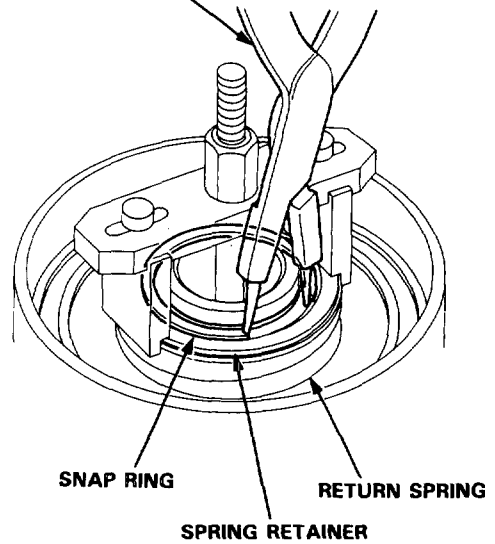


4. Compress the return spring.

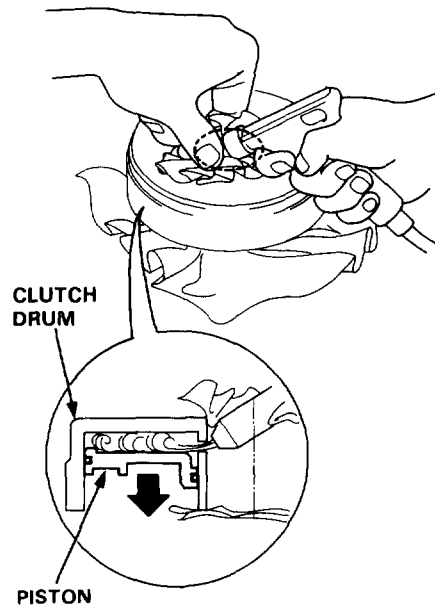


5. Remove the snap ring. Then remove the special tools, spring retainer and return spring.

SNAP RING PLIERS  
07LGC - 0010100



6. Wrap a shop rag around the clutch drum, and apply air pressure to the oil passage to remove the piston. Place a finger tip on the other end while applying air pressure.





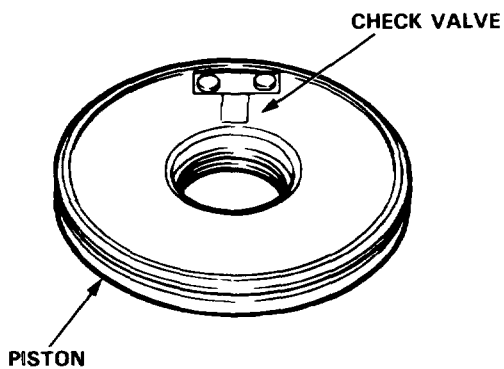
## Reassembly

### NOTE:

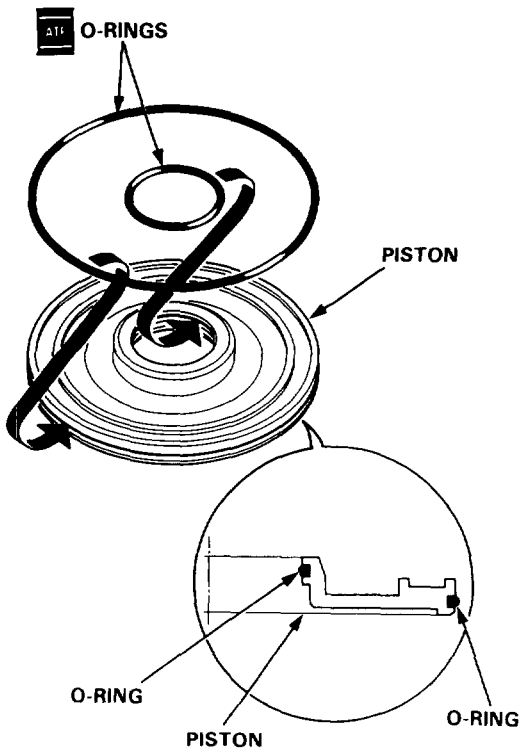
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry them with compressed air.
- Blow out all passages.
- Lubricate all parts with ATF before reassembly.

1. Inspect the check valve; if it's loose, replace the piston.

NOTE: Except 1st-hold clutch.

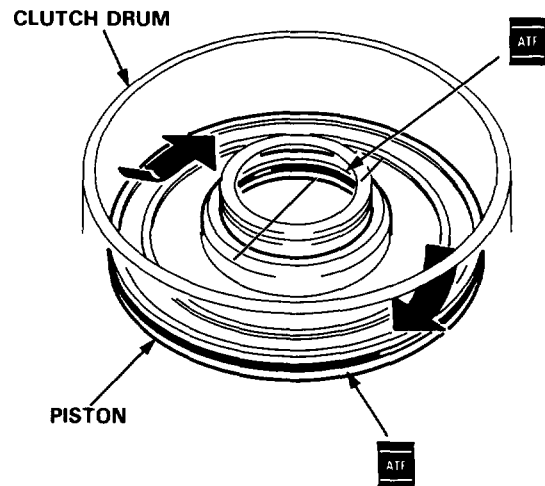


2. Install new O-rings on the clutch piston.

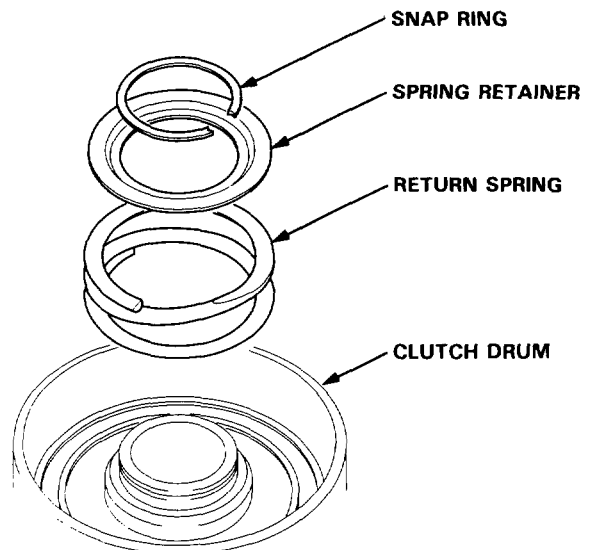


3. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating. Lubricate the piston O-ring with ATF before installing.

NOTE: Do not pinch the O-ring by installing the piston with too much force.



4. Install the return spring and spring retainer, and position the snap ring on the retainer.



(cont'd)

# Clutch

## Reassembly (cont'd)

5. Install the special tools as shown.

CLUTCH SPRING  
COMPRESSOR SET  
07LAE-PX40000

CLUTCH SPRING  
COMPRESSOR  
ATTACHMENT  
07LAE-PX40100

CLUTCH SPRING  
COMPRESSOR  
BOLT ASSEMBLY  
07GAE-PG40200

CLUTCH SPRING  
COMPRESSOR  
ATTACHMENT  
07HAE-PL50100

CLUTCH SPRING  
COMPRESSOR SET  
07LAE-PX40000

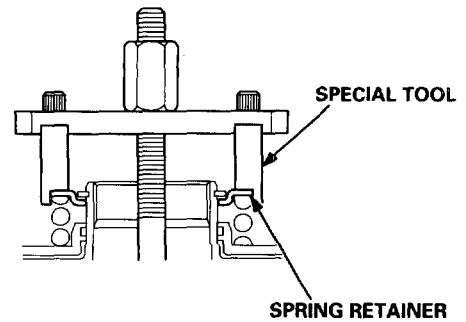
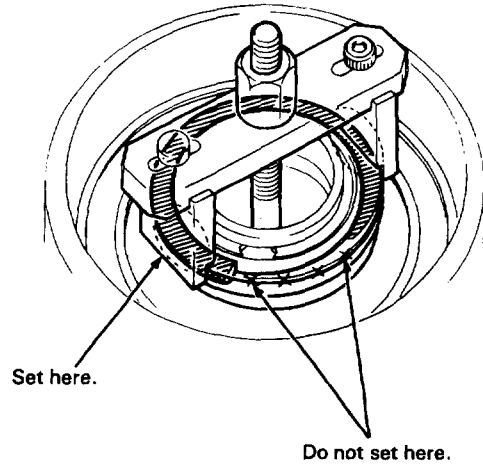
CLUTCH SPRING  
COMPRESSOR  
ATTACHMENT  
07LAE-PX40100

CLUTCH SPRING  
COMPRESSOR  
BOLT ASSEMBLY  
07GAE-PG40200

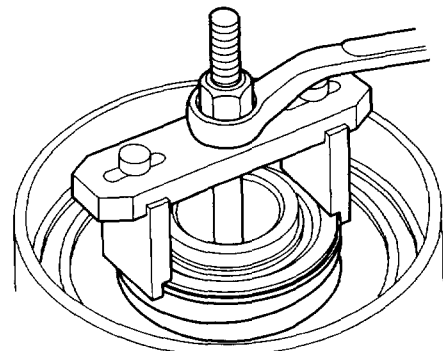
CLUTCH SPRING  
COMPRESSOR  
ATTACHMENT  
07HAE-PL50100

## CAUTION

If either end of the special tool is set over an area of the spring retainer which is unsupported by the return spring, the retainer may be damaged. Be sure the special tool is adjusted to have full contact with the spring retainer.



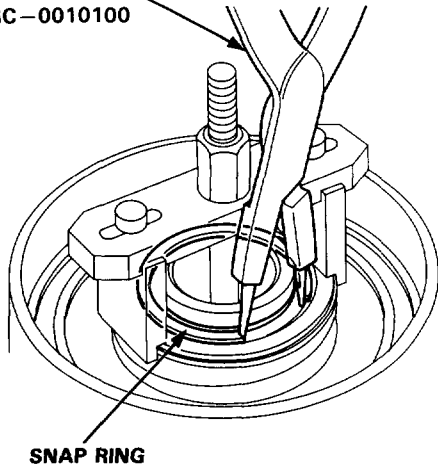
6. Compress the return spring.





7. Install the snap ring.

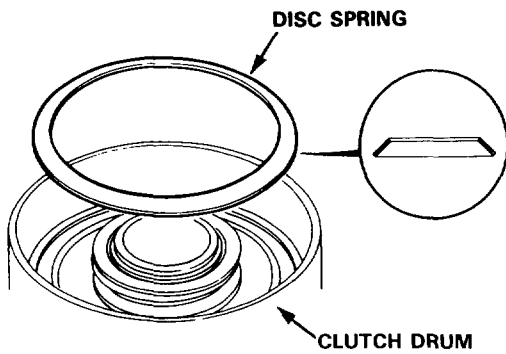
**SNAP RING PLIERS**  
07LGC-0010100



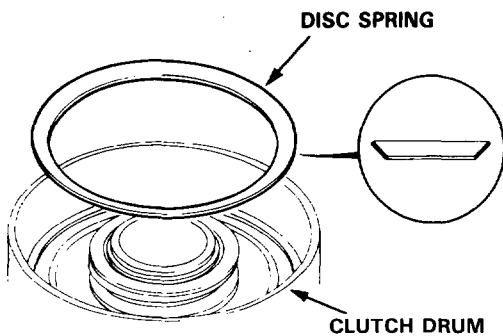
8. Remove the special tools.

9. Install the disc spring in the direction shown.

**2ND, 1ST-HOLD CLUTCH:**

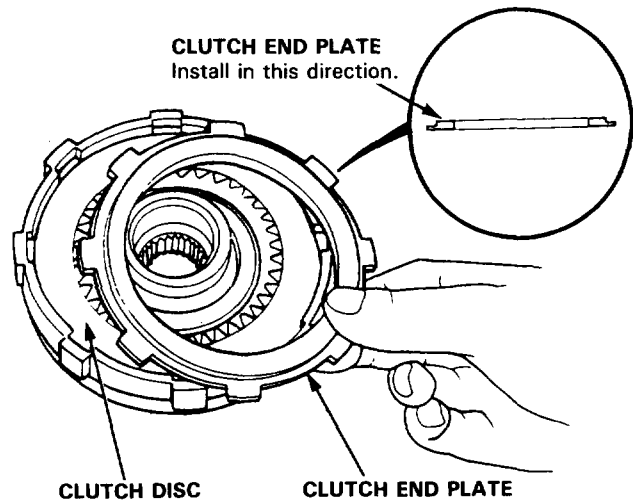


**1ST, 3RD, 4TH CLUTCH:**

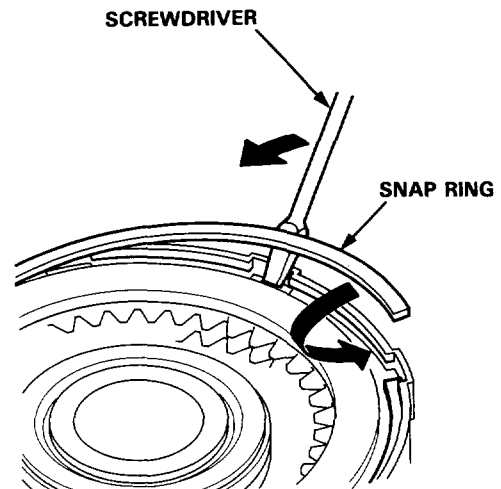


10. Soak the clutch discs thoroughly in ATF for a minimum of 30 minutes. Before installing the plates and discs, make sure the inside of the clutch drum is free of dirt or other foreign matter.

11. Starting with a clutch plate, alternately install the clutch plates and discs. Install the clutch end plate with flat side toward the disc.



12. Install the snap ring.



(cont'd)

# Clutch

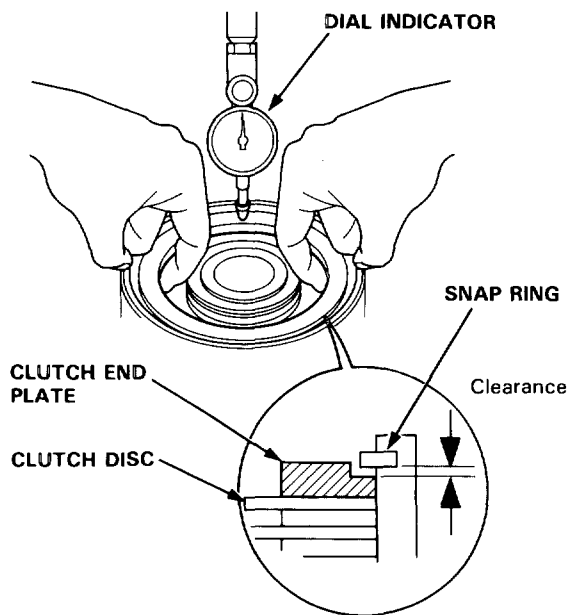
## Reassembly (cont'd)

13. Measure the clearance between the clutch end plate and top disc with a dial indicator. Zero the dial indicator with the clutch end plate lowered and lift it up to the snap ring. The distance that the clutch end plate moves is the clearance between the clutch end plate and top disc.

NOTE: Take measurements in at least three places, and use the average as the actual clearance.

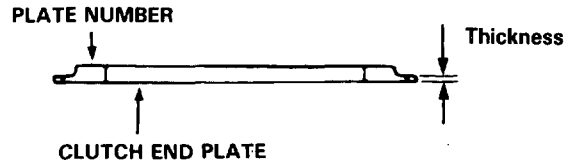
### Clutch End Plate-to-Top Disc Clearance:

Clutch	Service Limit
1st	0.65 – 0.85 mm (0.026 – 0.033 in)
2nd	0.65 – 0.85 mm (0.026 – 0.033 in)
3rd	0.40 – 0.60 mm (0.016 – 0.024 in)
4th	0.40 – 0.60 mm (0.016 – 0.024 in)
1st-hold	0.50 – 0.80 mm (0.020 – 0.031 in)



14. If the clearance is not within the service limits, select a new clutch end plate from the following table.

NOTE: If the thickest clutch end plate is installed, but the clearance is still over the standard, replace the clutch discs and clutch plates.



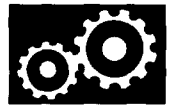
### CLUTCH END PLATE: 1ST, 2ND, 3RD and 4TH CLUTCH

Plate No.	Part Number	Thickness
1	22551 – PC9 – 000	2.4 mm (0.094 in)
2	22552 – PC9 – 000	2.5 mm (0.098 in)
3	22553 – PC9 – 000	2.6 mm (0.102 in)
4	22554 – PC9 – 000	2.7 mm (0.106 in)
5	22555 – PC9 – 000	2.8 mm (0.110 in)
6	22556 – PC9 – 000	2.9 mm (0.114 in)
7	22557 – PC9 – 000	3.0 mm (0.118 in)
8	22558 – PC9 – 000	3.1 mm (0.122 in)
9	22559 – PC9 – 000	3.2 mm (0.126 in)
10	22560 – PC9 – 000	3.3 mm (0.130 in)
11	22561 – PC9 – 000	2.1 mm (0.082 in)
12	22562 – PC9 – 000	2.2 mm (0.086 in)
13	22563 – PC9 – 000	2.3 mm (0.090 in)

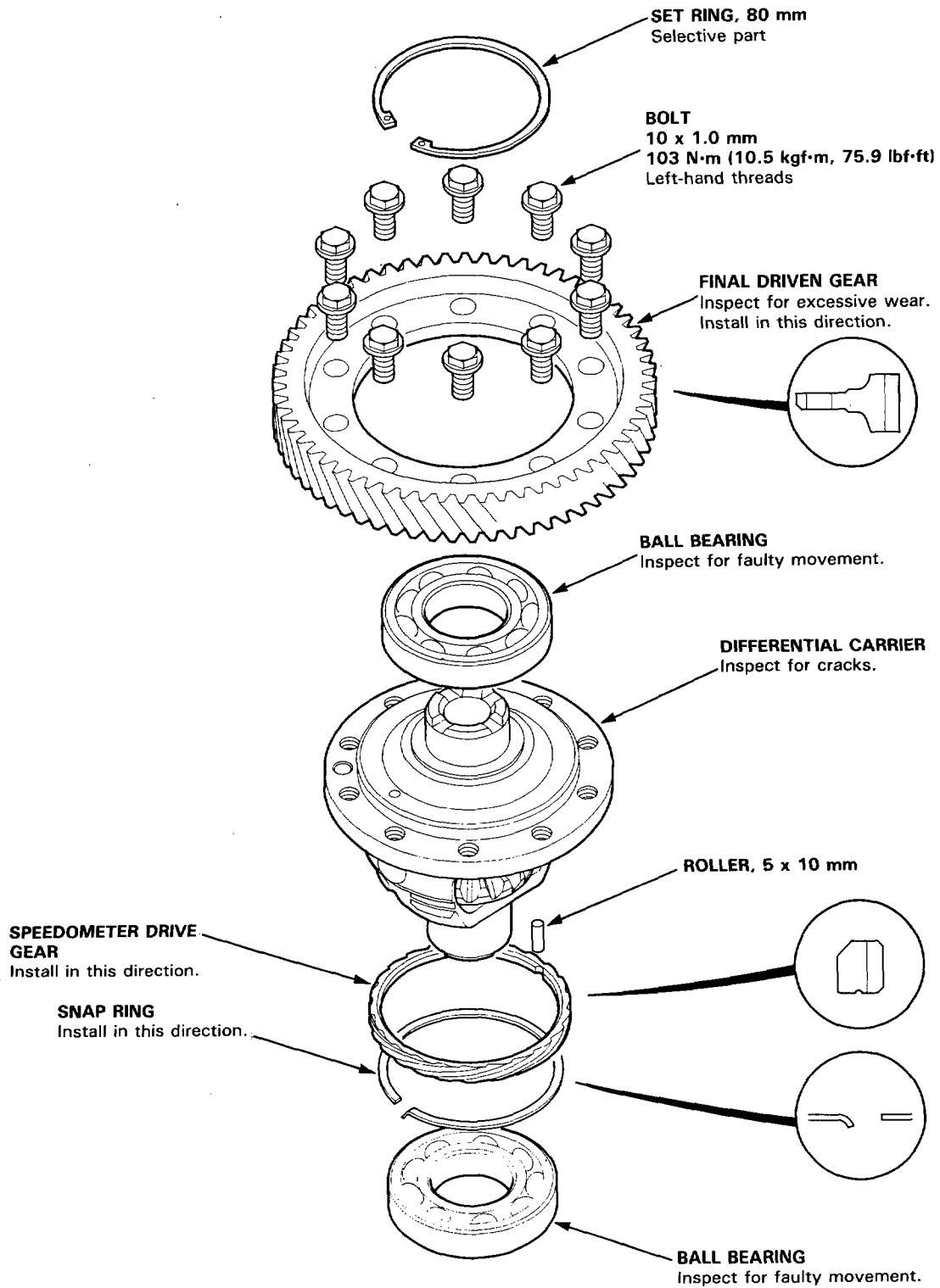
### 1ST-HOLD CLUTCH

Plate No.	Part Number	Thickness
1	22551 – PS5 – 003	2.1 mm (0.082 in)
2	22552 – PS5 – 003	2.2 mm (0.086 in)
3	22553 – PS5 – 003	2.3 mm (0.090 in)
4	22554 – PS5 – 003	2.4 mm (0.094 in)
5 (No mark)	22555 – PS5 – 003	2.5 mm (0.098 in)
6	22556 – PS5 – 003	2.6 mm (0.102 in)
7	22557 – PS5 – 003	2.7 mm (0.106 in)

# Differential



## Illustrated Index

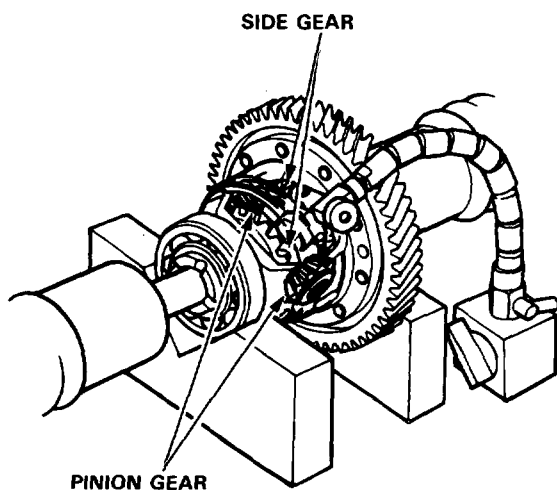


# Differential

## Backlash Inspection

1. Place differential assembly on V-blocks and install both axles.
2. Check backlash of both pinion gears.

**Standard (New): 0.05 – 0.15 mm (0.002 – 0.006 in)**

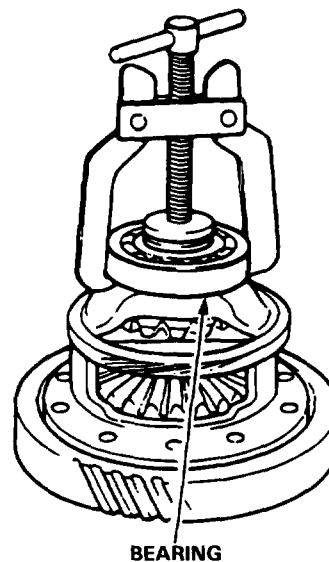


3. If backlash is out of standard, replace the differential carrier.

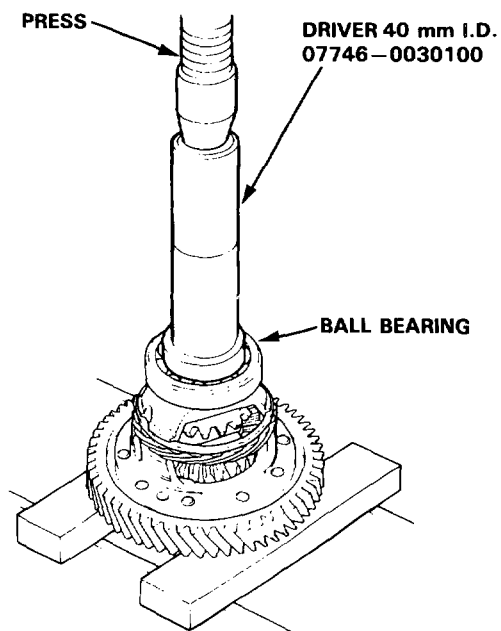
## Bearing Replacement

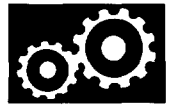
**NOTE:** Check bearings for wear and rough rotation. If bearings are OK, removal is not necessary.

1. Remove bearings using a bearing puller.



2. Install the new ball bearings using the special tool with a press as shown.



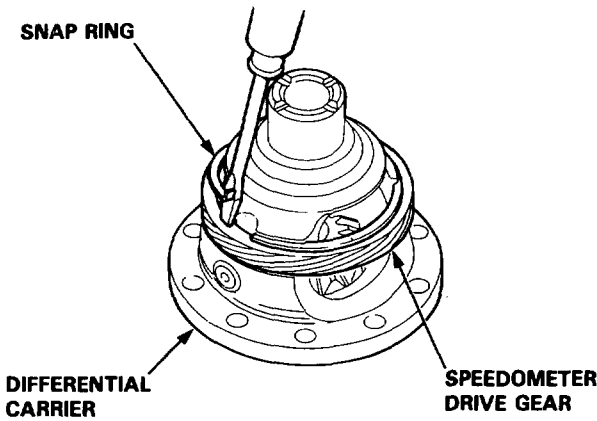


## Differential Carrier Replacement

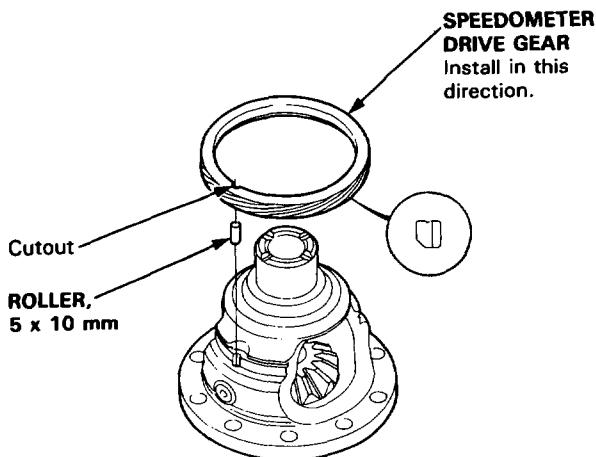
1. Remove the final driven gear from the differential carrier.

NOTE: The final driven gear bolts have left-hand threads.

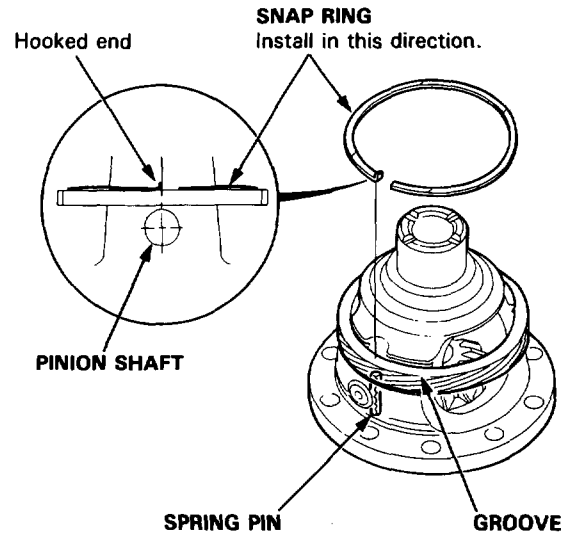
2. Pry the snap ring off differential carrier, then remove the speedometer drive gear and 5 x 10 mm roller.



3. Install the 5 x 10 mm roller in the differential carrier.
4. Install the speedometer drive gear with its chamfered side facing the carrier. Align the cutout on the bore of the speedometer drive gear with the 5 x 10 mm roller.



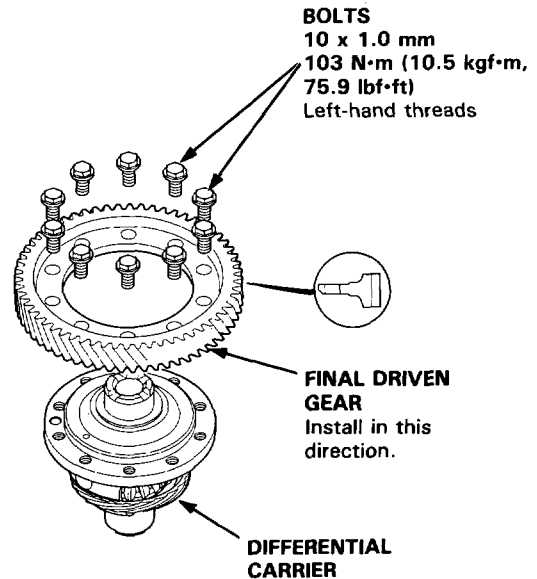
5. Align the hooked end of the snap ring with the pinion shaft as shown, then install the snap ring in the differential carrier groove.



6. Install the final driven gear, then tighten the bolts specified torque.

TORQUE: 101 N·m (10.3 kgf·m, 74.5 lbf·ft)

NOTE: The final driven gear bolts have left-hand threads.



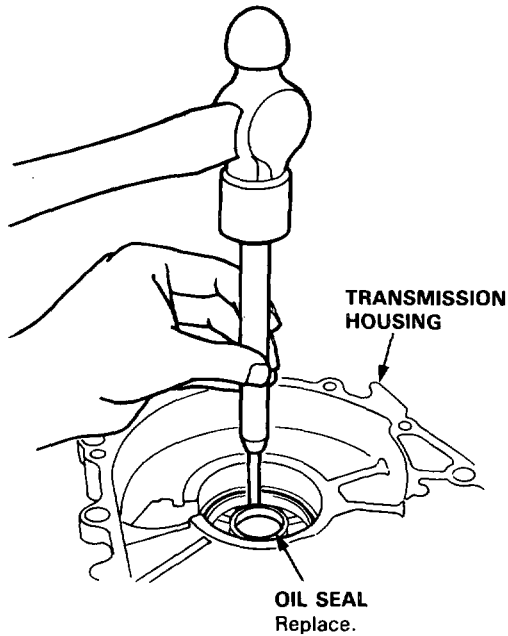
7. Install the ball bearings (see page 14-112).



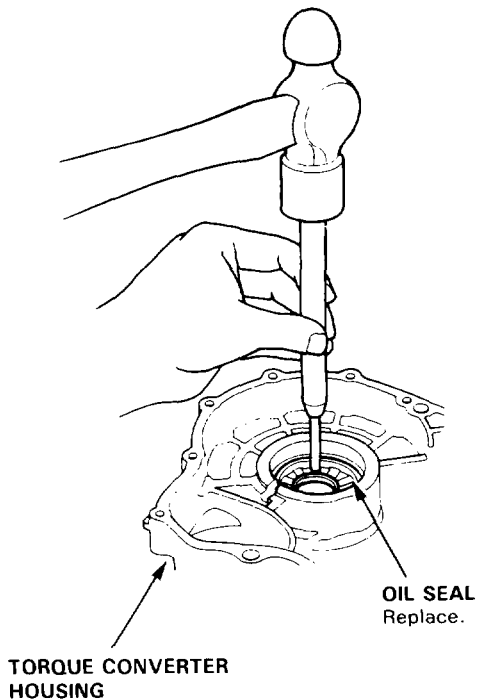
# Differential

## Oil Seal Replacement

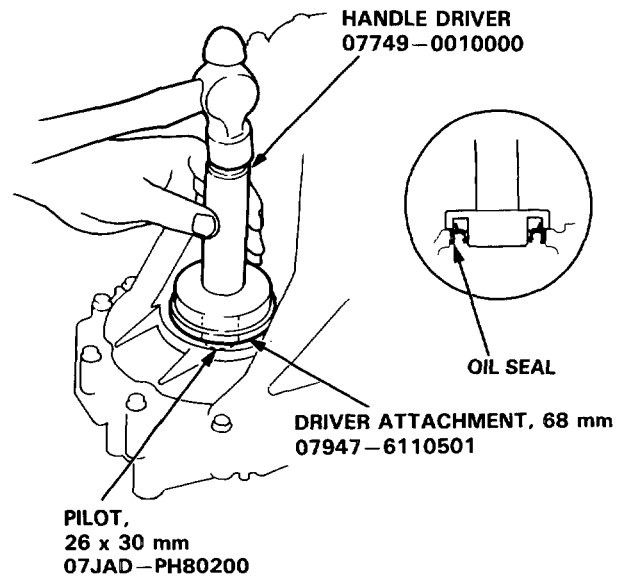
1. Remove the differential assembly.
2. Remove the oil seal from the transmission housing.



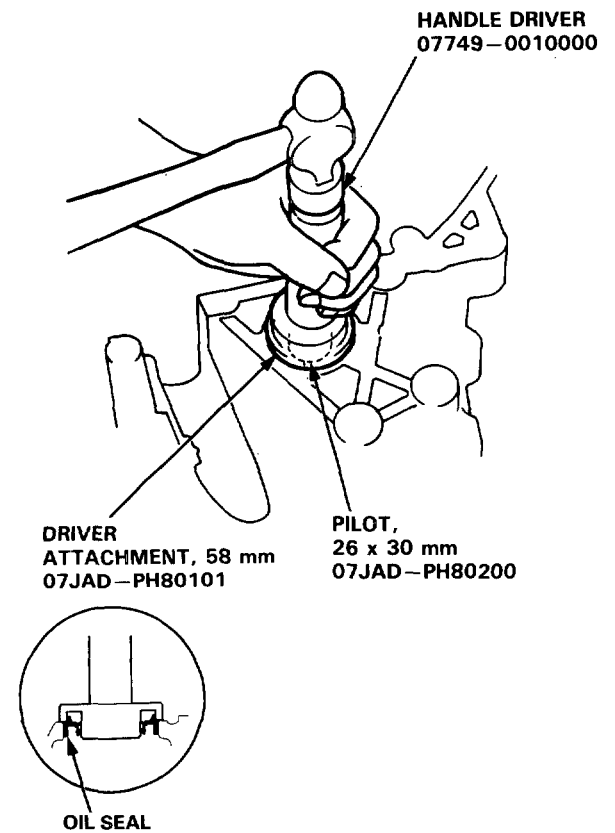
3. Remove the oil seal from the torque converter housing.



4. Install the oil seal in the transmission housing using the special tools as shown.



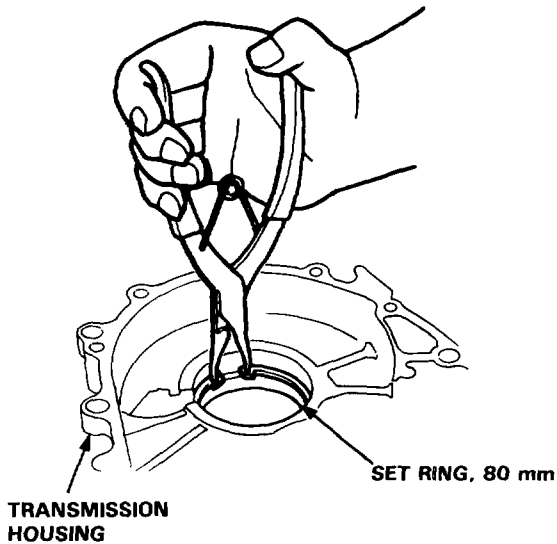
5. Install the oil seal in the torque converter housing using the special tools as shown.



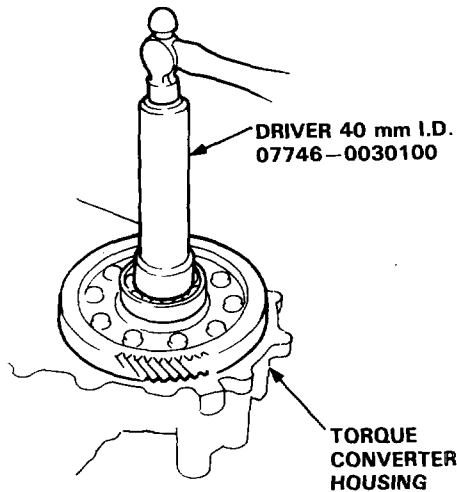


## Side Clearance Inspection

1. Install the 80 mm set ring in transmission housing.

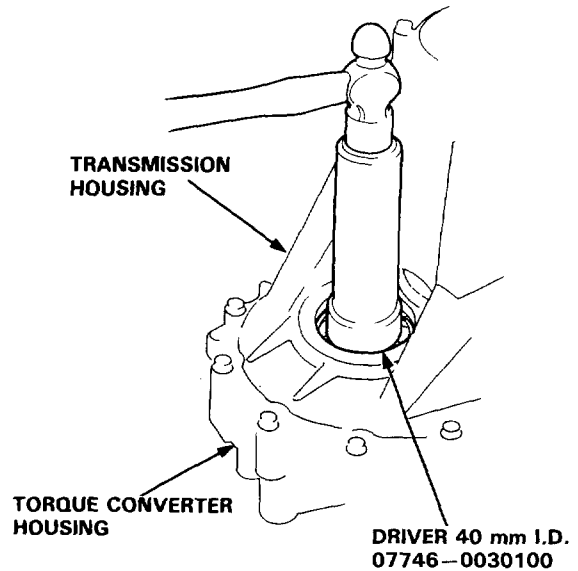


2. Install the differential assembly into the torque converter housing using the special tool as shown.



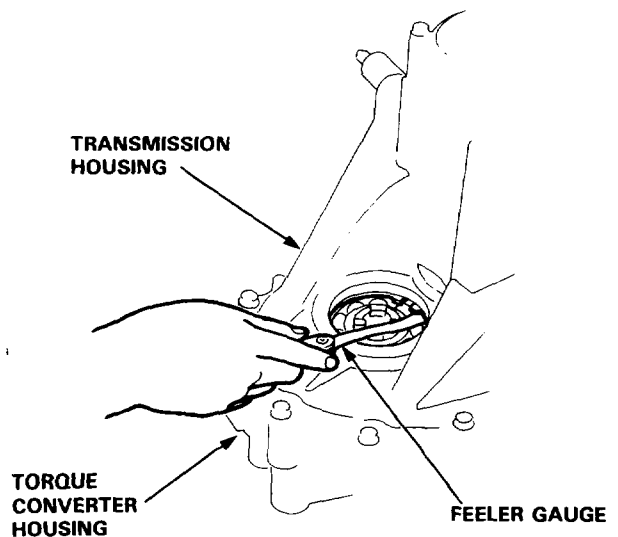
3. Install the transmission housing and tighten the transmission housing mounting bolts (see page 14-124 and 14-125).

4. Tap on the transmission housing side of the differential assembly with the special tool to seat the differential assembly in the torque converter housing.



5. Measure the clearance between the 80 mm set ring and outer race of the ball bearing in the transmission housing.

**STANDARD: 0 - 0.15 mm (0 - 0.006 in)**



(cont'd)

# Differential

---

## Side Clearance Inspection (cont'd)

6. If the clearance is out of standard, remove the set ring and measure its thickness.
7. Select and install a new 80 mm set ring.

### SET RING, 80 mm

Part Number	Thickness
90414 - 689 - 000	2.50 mm (0.098 in)
90415 - 689 - 000	2.60 mm (0.102 in)
90416 - 689 - 000	2.70 mm (0.106 in)
90417 - 689 - 000	2.80 mm (0.110 in)
90418 - 689 - 000	2.90 mm (0.114 in)
90419 - PH8 - 000	3.00 mm (0.118 in)

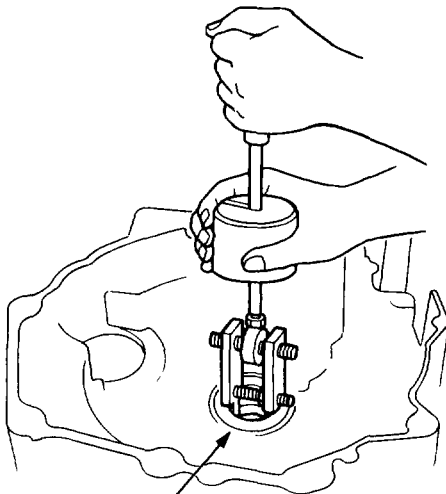
8. Recheck the clearance and make sure it is within standard.

# Torque Converter Housing Bearings



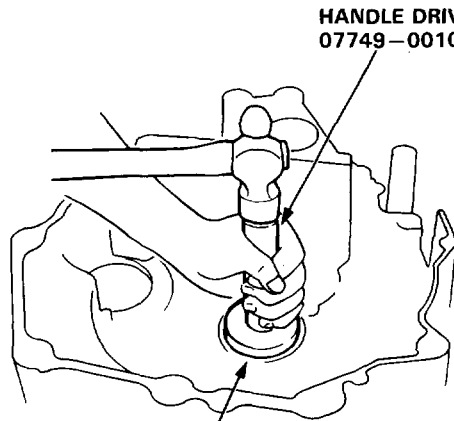
## Mainshaft Bearing/Oil Seal Replacement

1. Remove the mainshaft bearing and oil seal using the special tools as shown.



**ADJUSTABLE BEARING  
REMOVER SET  
07JAC-PH80000**

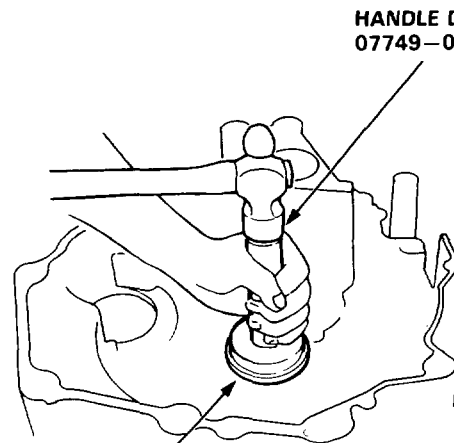
2. Install the new mainshaft bearing until it bottoms in the housing, using the special tools as shown.



**HANDLE DRIVER  
07749-0010000**

**DRIVER ATTACHMENT,  
62 x 68 mm  
07746-0010500**

3. Install the new oil seal flush with the housing using the special tools as shown.



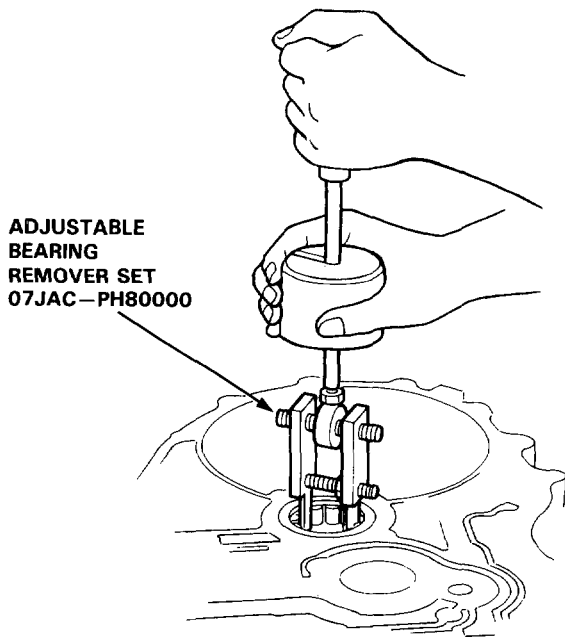
**HANDLE DRIVER  
07749-0010000**

**DRIVER ATTACHMENT,  
72 x 75 mm  
07746-0010600**

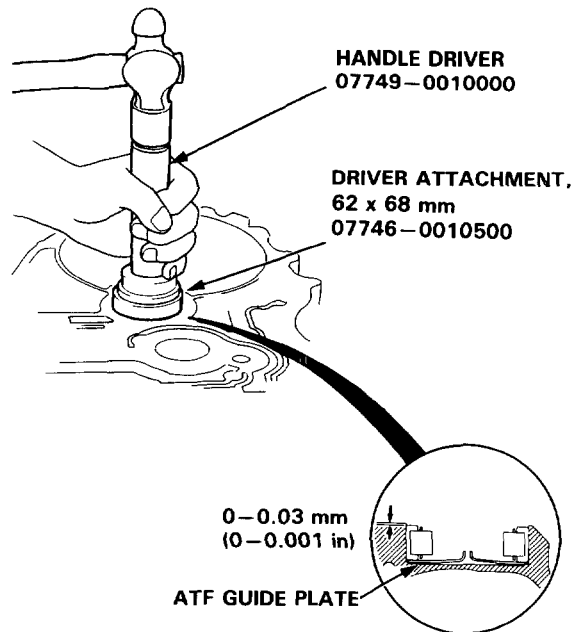
# Torque Converter Housing Bearings

## Countershaft Bearing Replacement

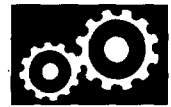
1. Remove the countershaft bearing using the special tools as shown.



2. Install the ATF guide plate.
3. Install the new bearing into the housing using the special tools as shown.



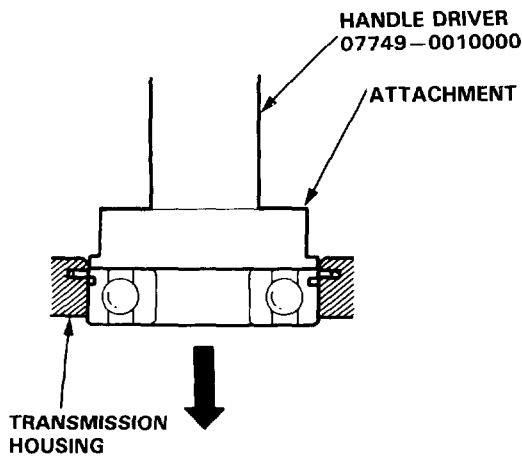
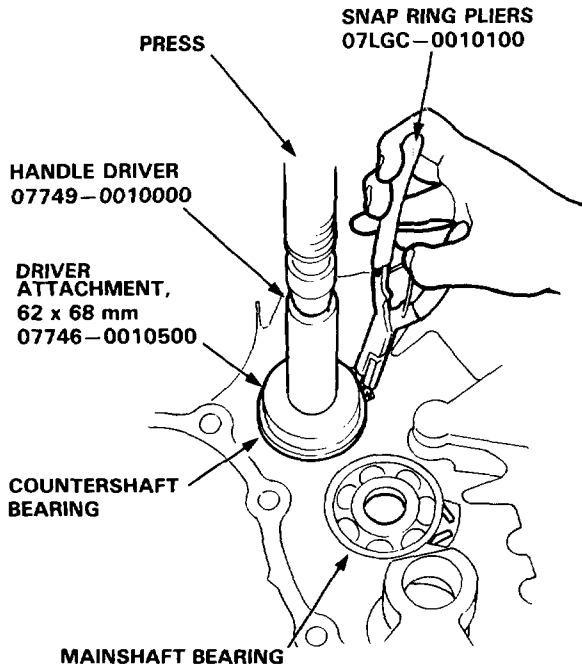
# Transmission Housing Bearings



## Mainshaft/Countershaft Bearings Replacement

1. To remove the mainshaft and countershaft bearings from the transmission housing, expand each snap ring with snap ring pliers, then push the bearing out using the special tools and a press as shown.

NOTE: Do not remove the snap rings unless it's necessary to clean the grooves in the housing.



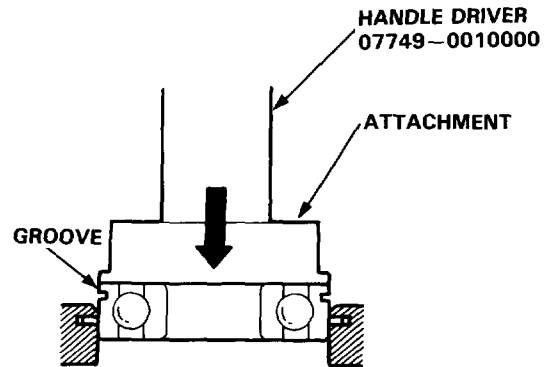
### ATTACHMENT

- Mainshaft Bearing Removal use:  
DRIVER ATTACHMENT, 72 x 75 mm  
07746 - 0010600
- Countershaft Bearing Removal use:  
DRIVER ATTACHMENT, 62 x 68 mm  
07746 - 0010500

2. Expand each snap ring with snap ring pliers, insert the new bearing part-way into the housing using the special tools and a press as shown. Install the bearing with the groove facing outside the housing.

NOTE: Coat all parts with ATF.

3. Release the pliers, then push the bearing down into the housing until the ring snaps in place around it.

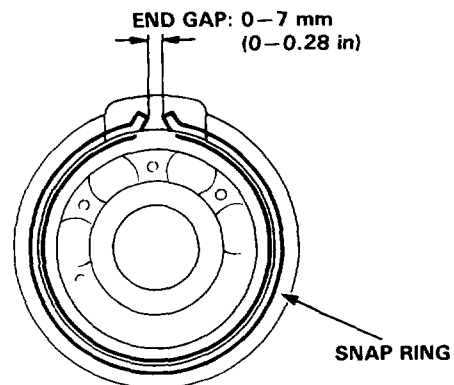


### ATTACHMENT

- Mainshaft Bearing Installation use:  
DRIVER ATTACHMENT, 72 x 75 mm  
07746 - 0010600
- Countershaft Bearing Installation use:  
DRIVER ATTACHMENT, 62 x 68 mm  
07746 - 0010500

4. After installing the bearing verify the following:

- The snap ring is seated in the bearing and housing grooves.
- The ring end gap is correct.

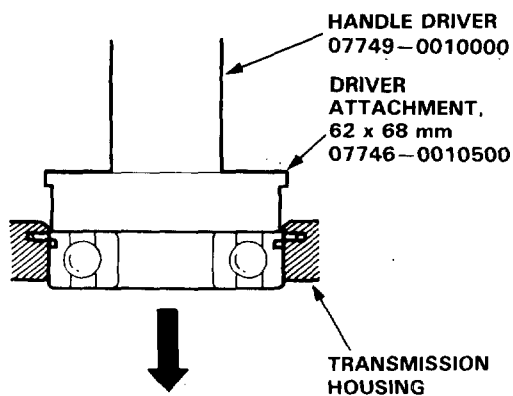
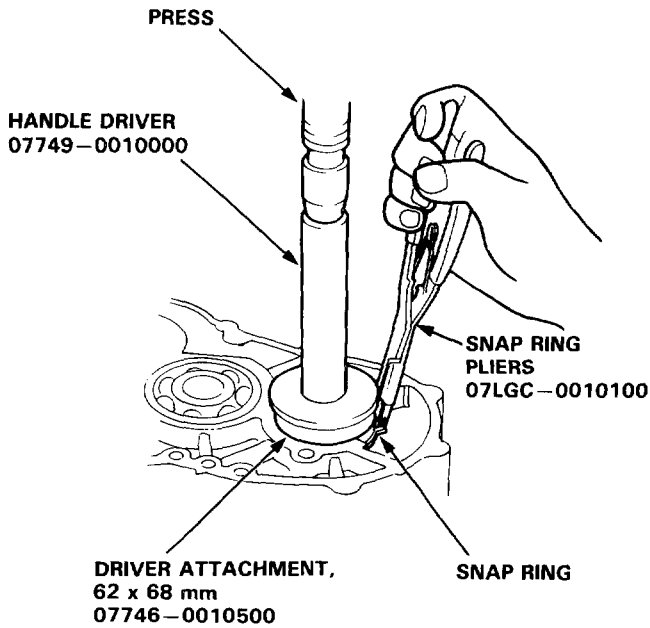


# Transmission Housing Bearings

## Sub-shaft Bearing Replacement

1. To remove the sub-shaft bearing from the transmission housing, expand the snap ring with snap ring pliers, then push the bearing out using the special tools and a press as shown.

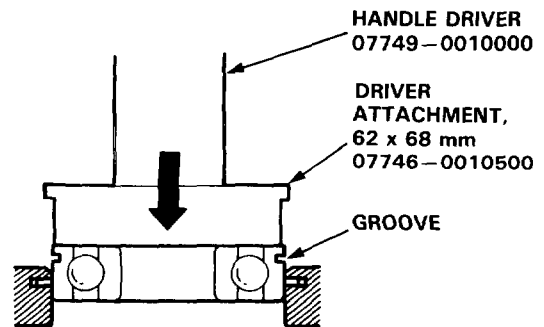
NOTE: Do not remove the snap ring unless it's necessary to clean the groove in the housing.



2. Expand the snap ring with snap ring pliers, insert the new bearing part-way into the housing using the special tools and a press as shown. Install the bearing with the groove facing outside the housing.

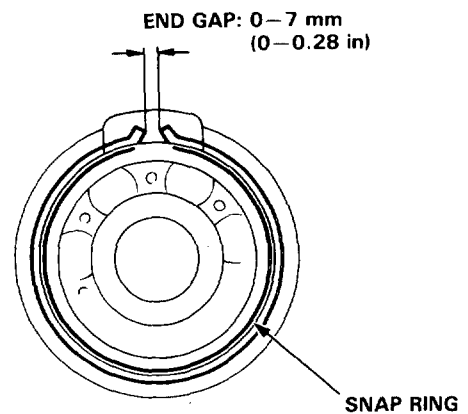
NOTE: Coat all parts with ATF.

3. Release the pliers, then push the bearing down into the housing until the ring snaps in place around it, using the special tools as shown.



4. After installing the bearing verify the following:

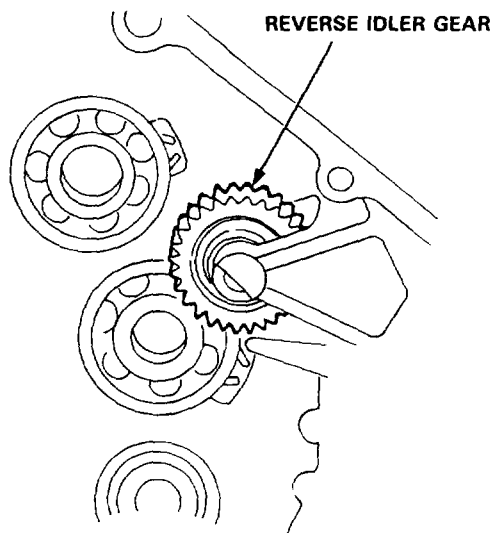
- The snap ring is seated in the bearing and housing grooves.
- The ring end gap is correct.



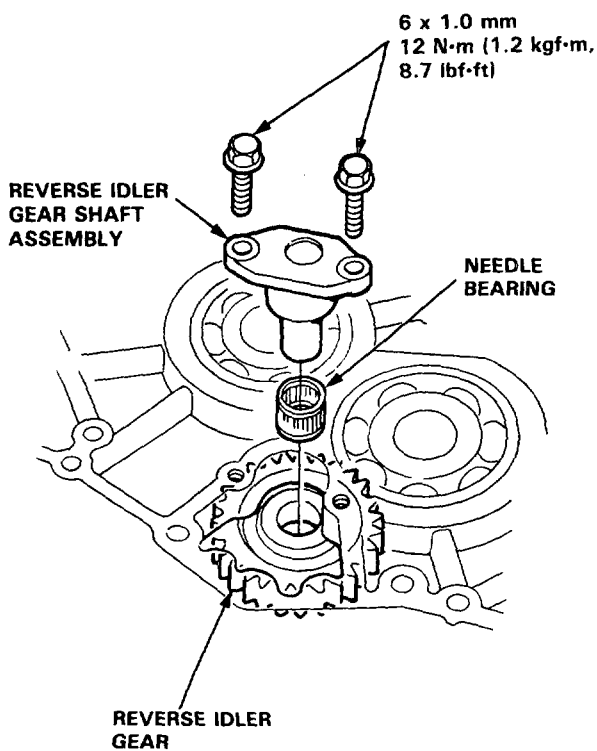


## Installation

1. Install the reverse idler gear.



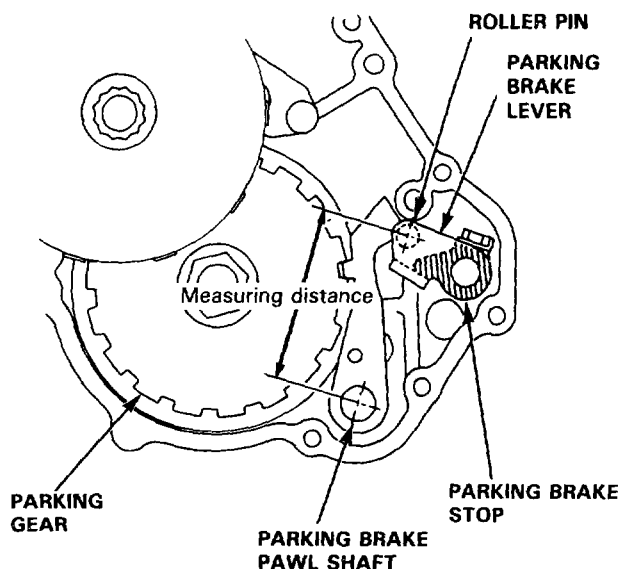
2. Install the reverse idler gear shaft holder and needle bearing into the transmission housing, then tighten the bolts.



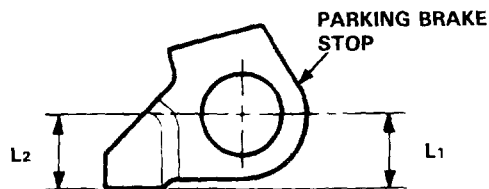
## Inspection/Adjustment

1. Set the parking brake lever in the **P** position.
2. Measure the distance between the parking brake pawl shaft and the parking brake lever roller pin as shown.

**STANDARD: 72.9 – 73.9 mm (2.87 – 2.91 in)**



3. If the measurement is out of tolerance, select and install the appropriate parking brake stop from the table below.



### PARKING BRAKE STOP

Mark	Part Number	L <sub>1</sub>	L <sub>2</sub>
1	24537 - PA9 - 003	11.00 mm (0.433 in)	11.00 mm (0.433 in)
2	24538 - PA9 - 003	10.80 mm (0.425 in)	10.65 mm (0.419 in)
3	24539 - PA9 - 003	10.60 mm (0.417 in)	10.30 mm (0.406 in)

4. After replacing the parking brake stop, make sure the distance is within tolerance.



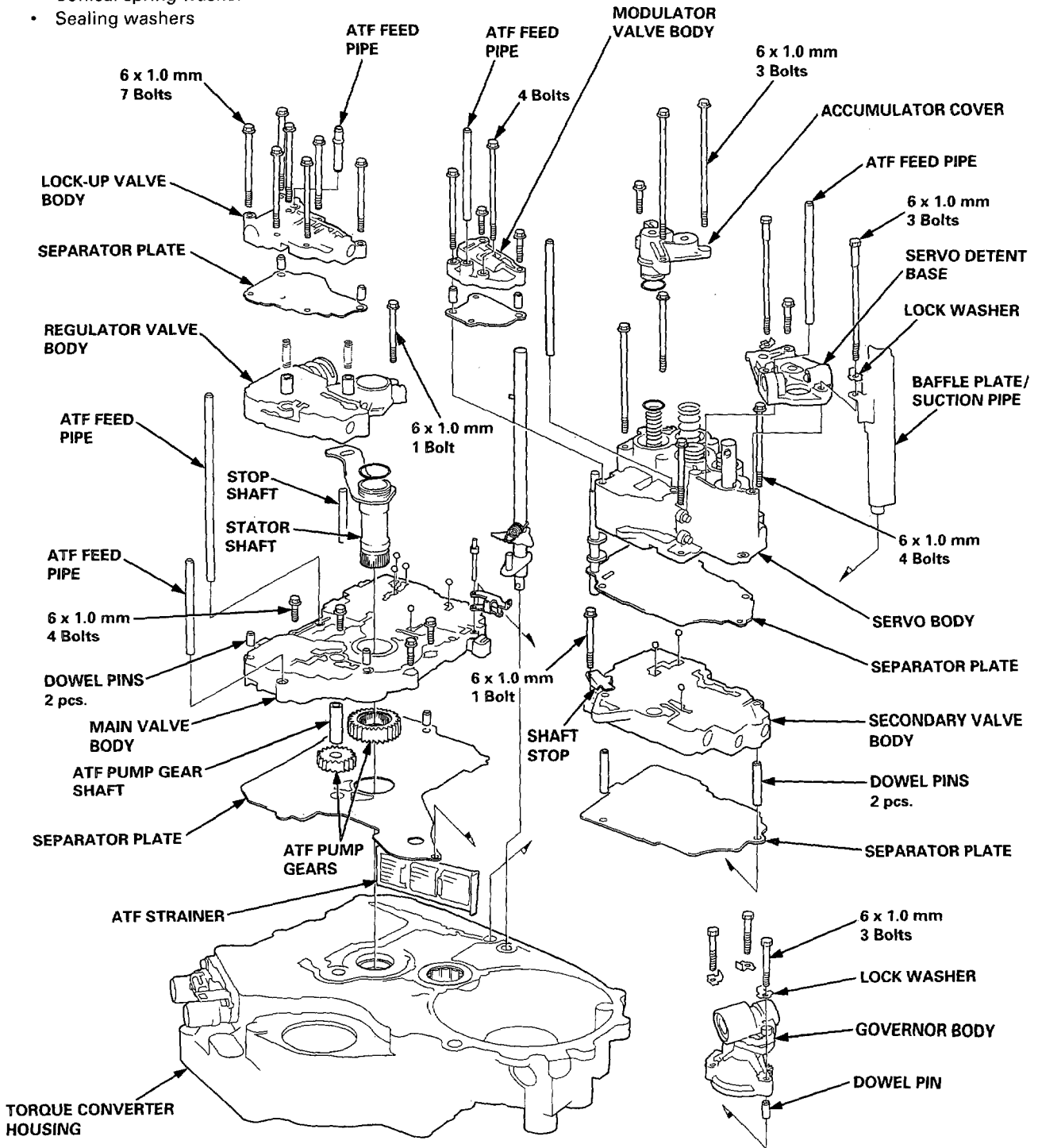
# Transmission

## Reassembly

**NOTE:**

- Coat all parts with ATF.
- Replace the parts below:
  - O-rings
  - Lock washers
  - Gaskets
  - Locknuts
  - Conical spring washer
  - Sealing washers

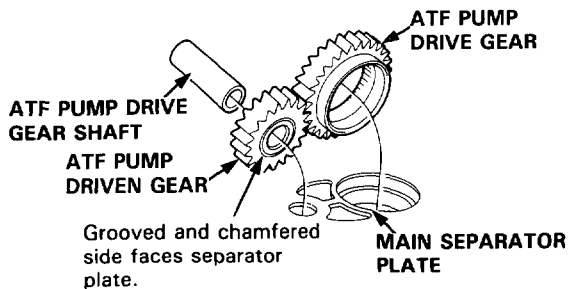
**TORQUE: 6 x 1.0 mm Bolt  
12 N·m (1.2 kgf·m, 8.7 lbf·ft)**



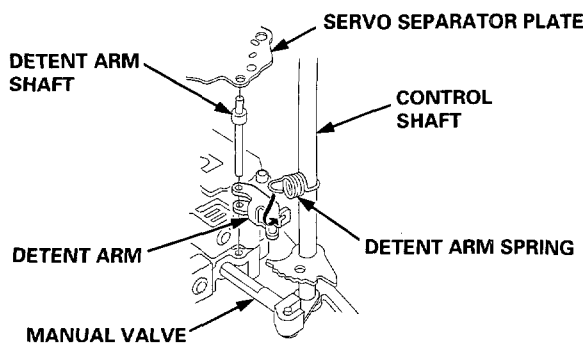


1. Install the ATF strainer in the torque converter housing.
2. Install the main separator plate with two dowel pins on the torque converter housing. Then install the ATF pump drive gear, driven gear and driven gear shaft.

NOTE: Install the ATF pump driven gear with its grooved and chamfered side facing separator plate.



3. Install the main valve body and loosely tighten the bolts. Make sure the ATF pump drive gear rotates smoothly in the normal operating direction and the ATF pump driven gear shaft moves smoothly in the axial and normal operating directions.
4. Install the secondary valve body, separator plate and two dowel pins on the main valve body.
5. Install the control shaft in the housing, with the control shaft and manual valve together.
6. Install the detent arm and shaft in the main valve body, then hook the detent arm spring to the detent arm.

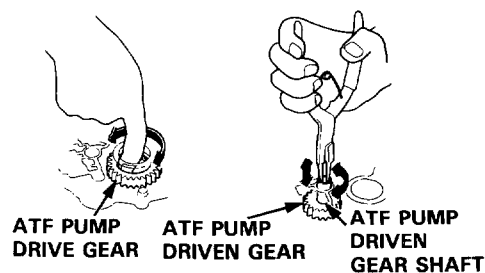


7. Install the servo body and separator plate (four bolts).
8. Install the modulator valve body, separator plate and two dowel pins (four bolts).
9. Install the accumulator cover (three bolts).
10. Install the servo detent base and baffle plate/suction pipe and new lock washers (three bolts).

11. Install the governor body and new lock washers (three bolts).
12. Tighten the four bolts to 12 N·m (1.2 kgf·m, 8.7 lbf·ft) on the main valve body. Make sure the ATF pump drive gear and ATF pump driven gear shaft move smoothly.
13. If the ATF pump drive gear and ATF pump driven gear shaft do not move freely, loosen the four bolts on the main valve body and disassemble the valve bodies. Realign the ATF pump driven gear shaft and reassemble the valve bodies, then retighten the bolts to the specified torque.

### CAUTION

Failure to align the ATF pump driven gear shaft correctly will result in a seized ATF pump drive gear or ATF pump driven gear shaft.

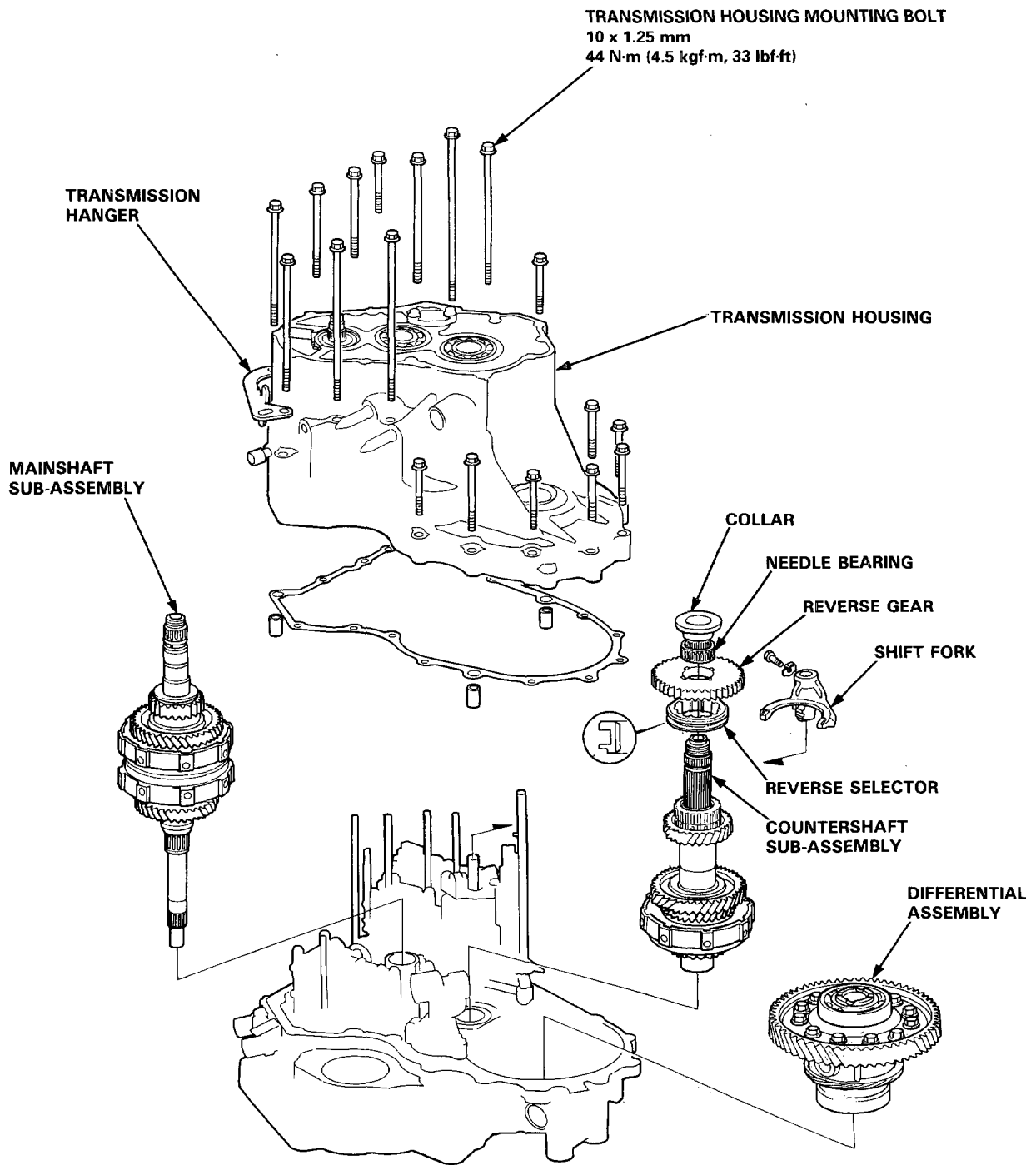


14. Install the stator shaft and stop shaft.
15. Install the shaft stop on the secondary valve body (one bolt).
16. Install the regulator valve body (one bolt).
17. Install the torque converter check valve, cooler check valve and valve springs in the regulator valve body.
18. Install the lock-up valve body, separator plate and two dowel pins (seven bolts).
19. Install the ATF feed pipes.
  - Two pipes on the servo body
  - One pipe on the modulator valve body
  - One pipe on the lock-up valve body
  - Two pipes on the main valve body.

(cont'd)

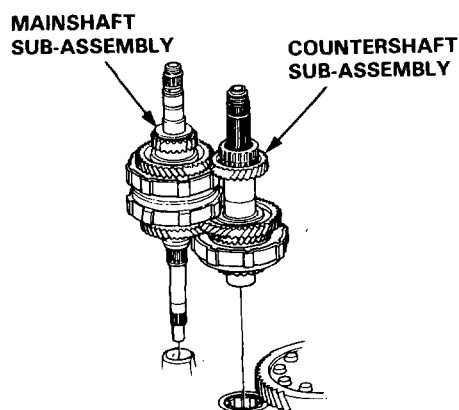
# Transmission

## Reassembly (cont'd)

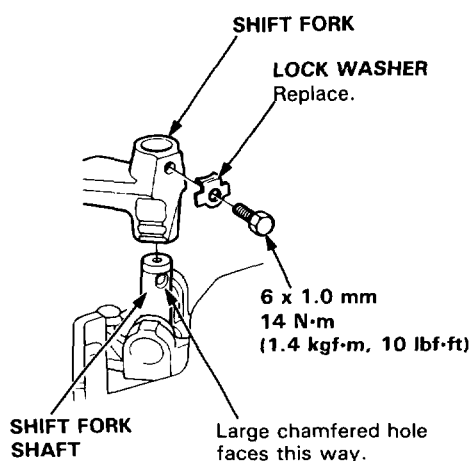




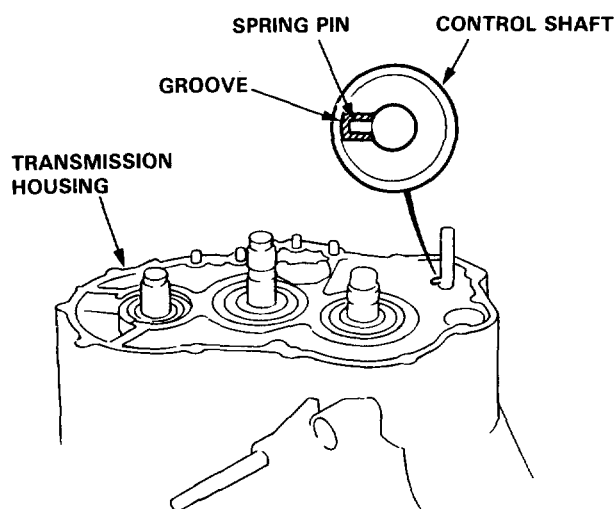
20. Install the sub-shaft assembly in the transmission housing (see pages 14-99 and 14-100).
21. Install the reverse idler gear and gear shaft holder (see page 14-121).
22. Install the differential assembly in the torque converter housing. Take care not to damage the governor body.
23. Assemble the mainshaft and countershaft sub-assembly, then install them together in the torque converter housing.



24. Turn the shift fork shaft so the large chamfered hole is facing the fork bolt hole, then install the shift fork with the reverse selector and tighten the lock bolt. Bend the lock tab against the bolt head.

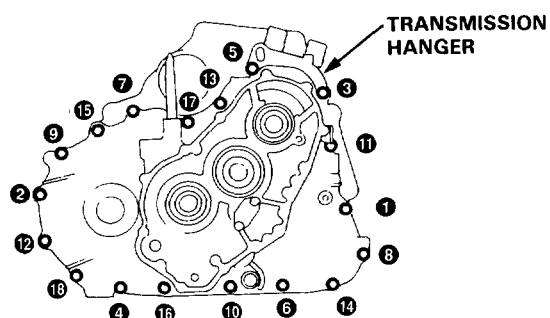


25. Install the reverse gear with the collar and needle bearing on the countershaft.
26. Align the spring pin of the control shaft with the transmission housing groove by turning the control shaft.
27. Place the transmission housing on the torque converter housing with a new gasket and the three dowel pins.



28. Install the transmission housing mounting bolts along with the transmission hanger, then tighten the bolts in two or more steps in the sequence shown.

**TORQUE: 44 N·m (4.5 kgf·m, 33 lbf·ft)**

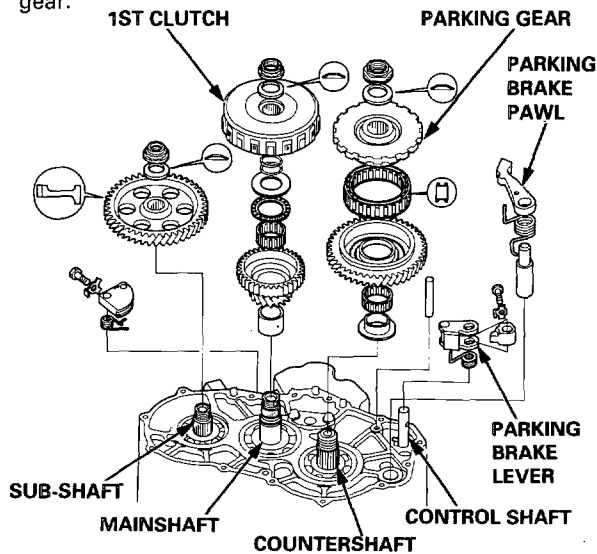


(cont'd)

# Transmission

## Reassembly (cont'd)

29. Install the parking brake lever on the control shaft.
30. Assemble the one-way clutch and the parking gear with the countershaft 1st gear (see page 14-98).
31. Install the countershaft 1st gear collar, needle bearing and the countershaft 1st gear/parking gear assembly on the countershaft.
32. Install the parking brake pawl shaft, spring, pawl and pawl stop on the transmission housing, then engage the parking brake pawl with the parking gear.

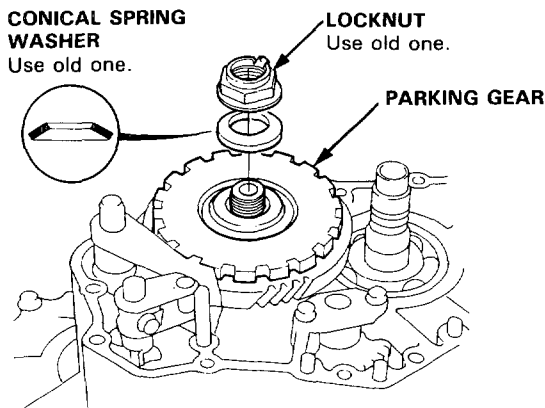


33. Install the old conical spring washer and locknut on the countershaft. Tighten the old locknut to seat the parking gear to the specified torque, then remove them.

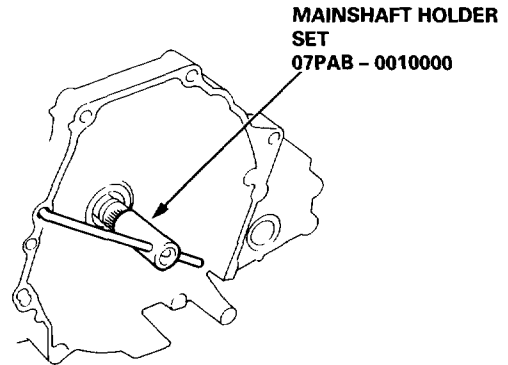
### NOTE:

- Do not use an impact wrench, always use a torque wrench to tighten the locknut.
- Countershaft locknut has left-hand threads.

**TORQUE: 103 N·m (10.5 kgf·m, 75.9 lbf·ft)**



34. Slip the special tool onto the mainshaft as shown.



35. Install the sub-shaft 1st gear on the sub-shaft.
36. Install the mainshaft 1st gear collar, mainshaft 1st gear, needle bearing, thrust needle bearing, and thrust washer on the mainshaft.
37. Wrap the mainshaft splines with tape to prevent damage to the O-rings, then install new O-rings on the mainshaft.
38. Install the 1st clutch assembly on the mainshaft.
39. Install the sub-shaft 1st gear on the sub-shaft, then align the hole of the sub-shaft 1st gear with the hole of the transmission housing. Insert a pin to hold the sub-shaft while tightening the sub-shaft locknut.



40. Install new conical spring washers and new locknuts on each shaft.

**NOTE:** Install the conical spring washers in the direction shown.

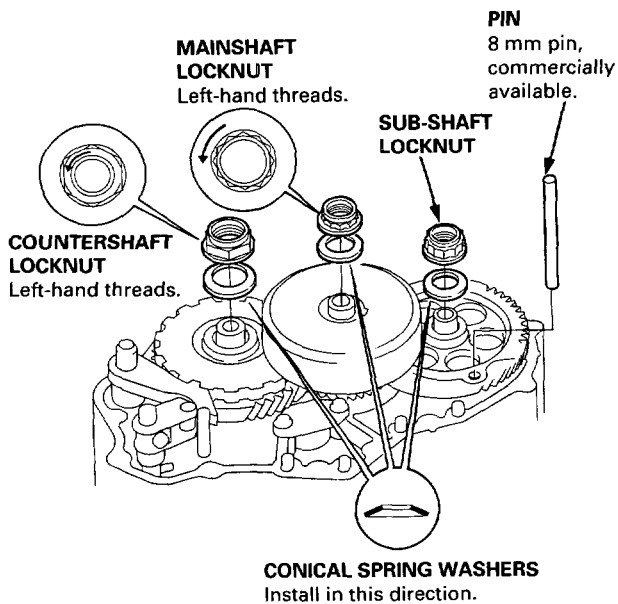
41. Tighten the locknuts to their specified torque.

**TORQUE:**

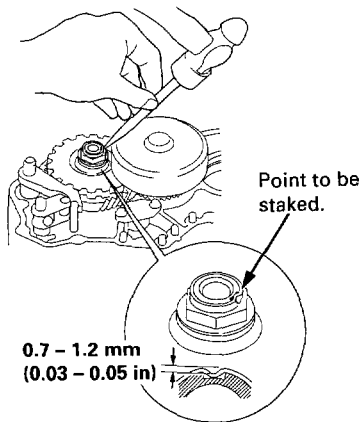
**MAINSHAFT** 78 N·m (8.0 kgf·m, 58 lbf·ft)  
**COUNTERSHAFT** 103 N·m (10.5 kgf·m, 75.9 lbf·ft)  
**SUB-SHAFT** 93 N·m (9.5 kgf·m, 69 lbf·ft)

**NOTE:**

- Mainshaft and countershaft locknuts have left-hand threads.
- Do not use an impact wrench, always use a torque wrench to tighten the locknuts.



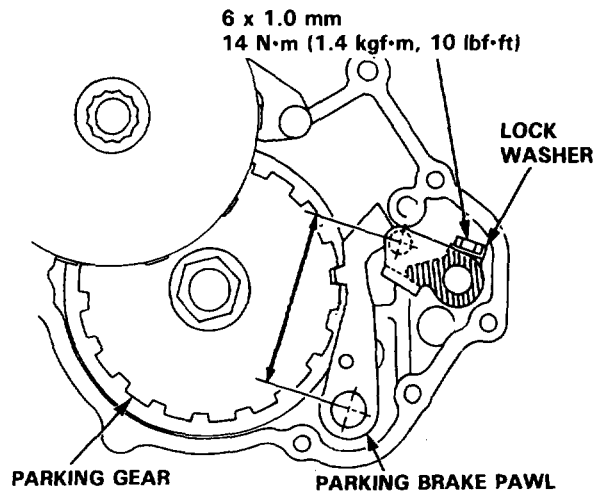
42. Stake each locknut using a 3.5 mm punch.



43. Set the parking brake lever in the **P** position, then verify that the parking brake pawl engages to the parking gear.

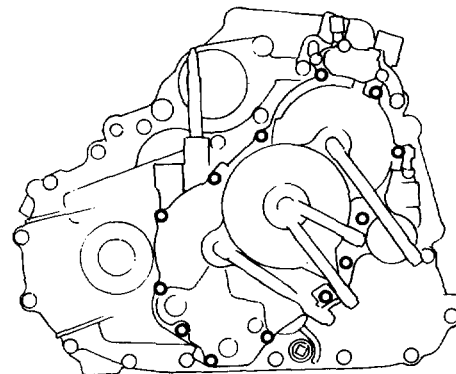
44. If the pawl does not engage fully, check the parking brake pawl stop clearance (see page 14-121).

45. Tighten the lock bolt and bend the lock tab.



46. Install the right side cover with two dowel pins and the new gasket (13 bolts).

**TORQUE: 12 N·m (1.2 kgf·m, 8.7 lbf·ft)**



47. Install the throttle control drum with the drum spring on the throttle control shaft.

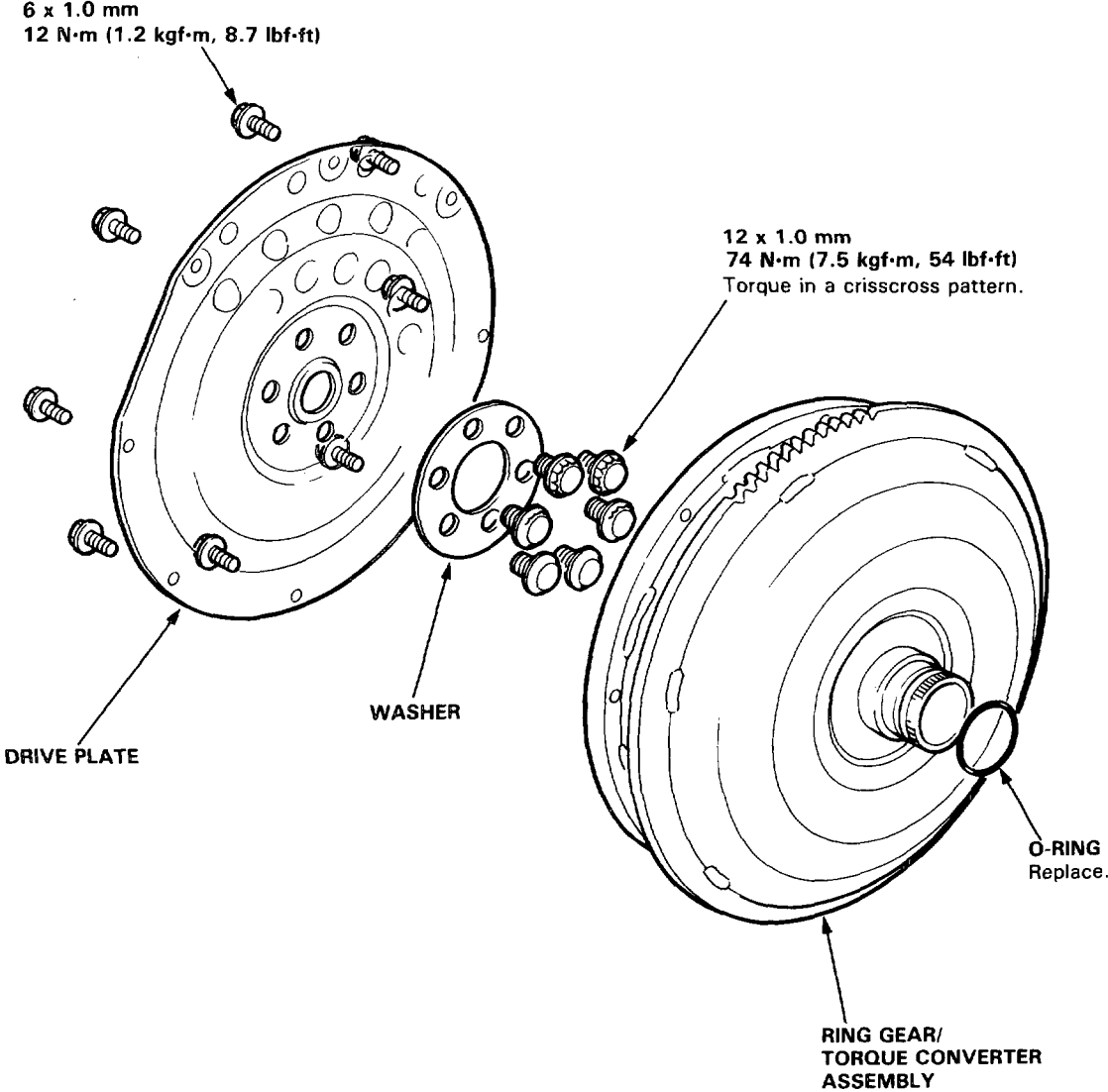
**TORQUE: 8 N·m (0.8 kgf·m, 6 lbf·ft)**

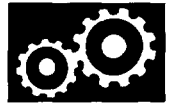
48. Install the ATF cooler lines with the line bolts and new sealing washers.

**TORQUE: 28 N·m (2.9 kgf·m, 21 lbf·ft)**

49. Install the ATF dipstick.

# Torque Converter/Drive Plate

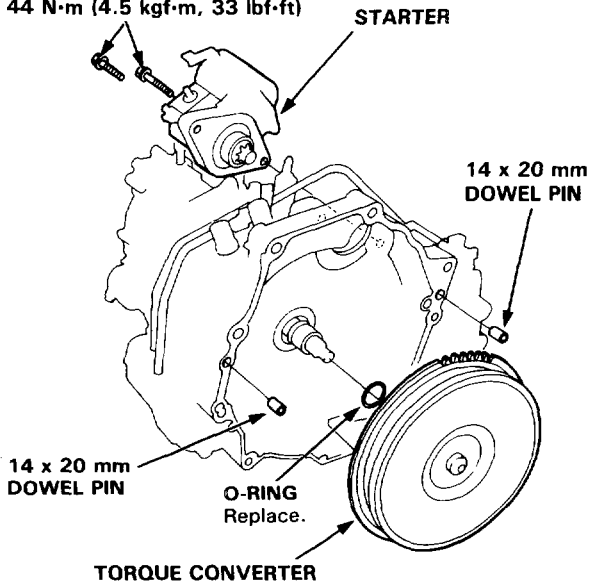




## Installation

1. Install the torque converter assembly securely with a new O-ring on the mainshaft.
2. Install the starter on the torque converter housing, then install the two 14 mm dowel pins in the torque converter housing.

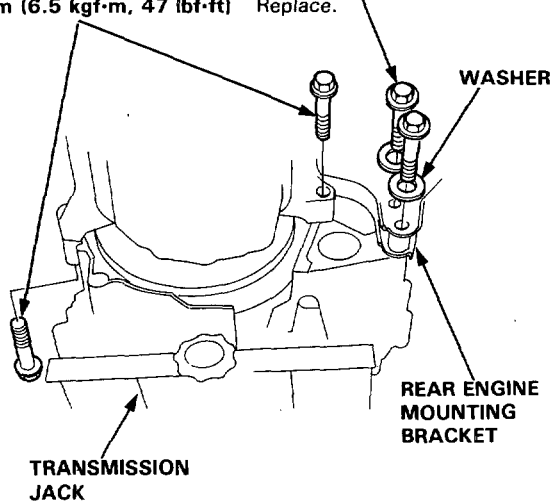
**MOUNTING BOLTS**  
44 N·m (4.5 kgf·m, 33 lbf·ft)



3. Place the transmission on a transmission jack, and raise to the engine level.
4. Attach the transmission to the engine, then install two transmission housing mounting bolts and two rear engine mounting bolts.

**TRANSMISSION HOUSING MOUNTING BOLTS**  
12 x 1.25 mm  
64 N·m (6.5 kgf·m, 47 lbf·ft)

**REAR ENGINE MOUNTING BOLTS**  
14 x 1.25 mm  
83 N·m (8.5 kgf·m, 61 lbf·ft)  
Replace.



5. Install the transmission mount.

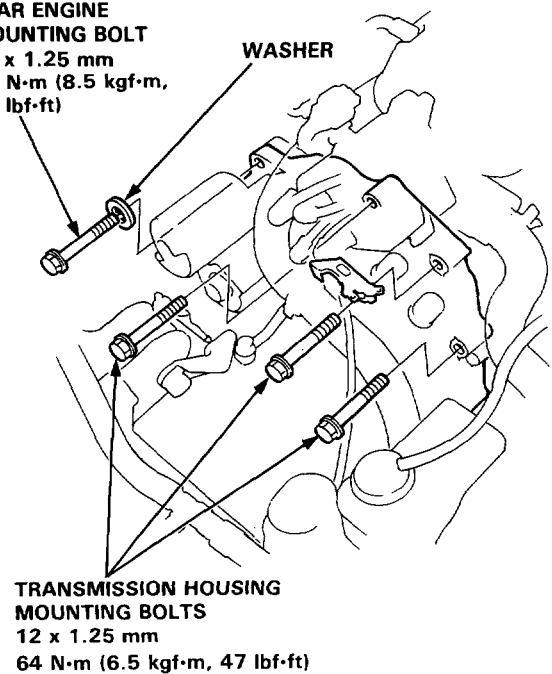
**TRANSMISSION MOUNT**

12 x 1.25 mm  
63 N·m (6.5 kgf·m, 47 lbf·ft)



6. Install the remaining transmission housing mounting bolts and the remaining rear engine mounting bolt.

**REAR ENGINE MOUNTING BOLT**  
14 x 1.25 mm  
83 N·m (8.5 kgf·m, 61 lbf·ft)



**TRANSMISSION HOUSING MOUNTING BOLTS**  
12 x 1.25 mm  
64 N·m (6.5 kgf·m, 47 lbf·ft)

7. Remove the transmission jack and the hoist from the engine.

(cont'd)



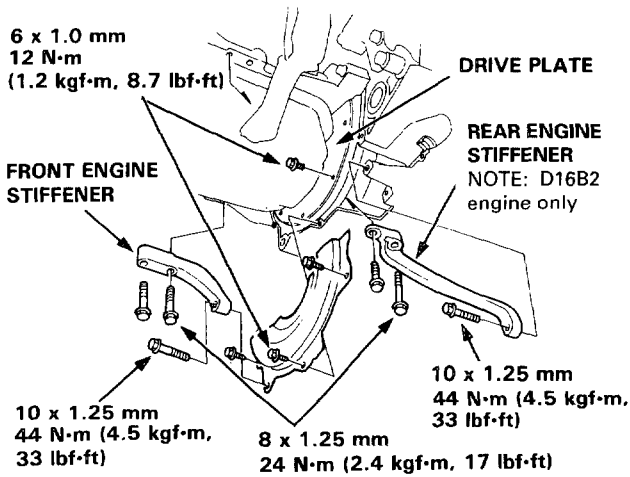
# Transmission

## Installation (cont'd)

8. Attach the torque converter to the drive plate with eight bolts and torque:  
 Rotate the crankshaft as necessary to tighten the bolts to 1/2 of the specified torque, then to the final torque, in a crisscross pattern.  
 After tightening the last bolt, check that the crankshaft rotates freely.

9. Install the torque converter cover and engine stiffeners.

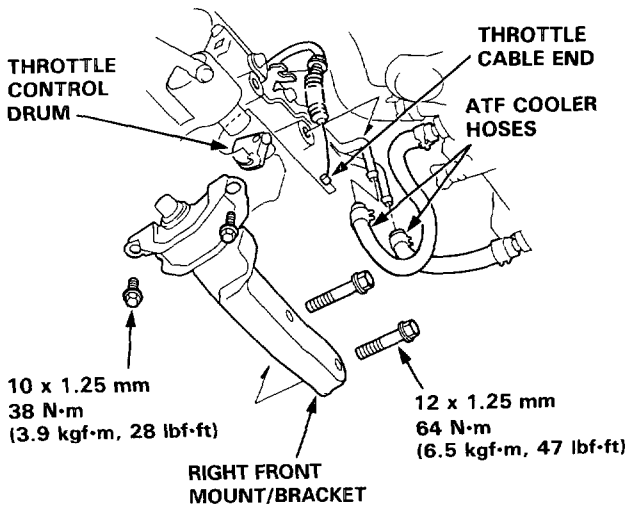
NOTE: Only the D16B2 engine uses a rear engine stiffener.



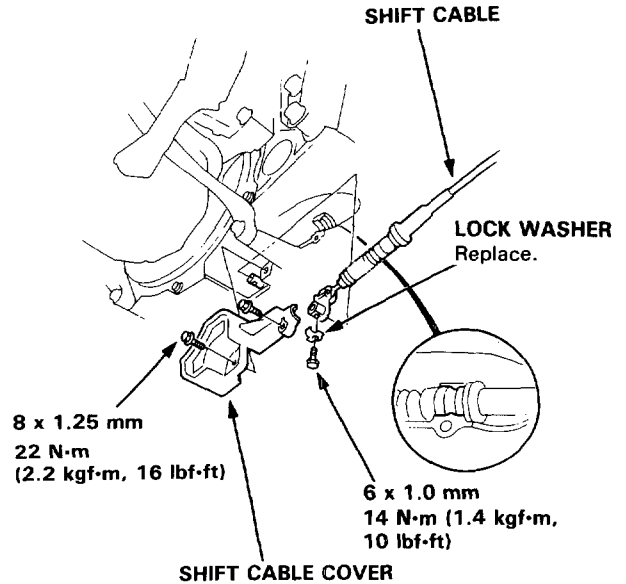
10. Tighten the crankshaft pulley bolt to specified torque (see section 6).

11. Connect the ATF cooler hoses to the cooler lines (see page 14-136).

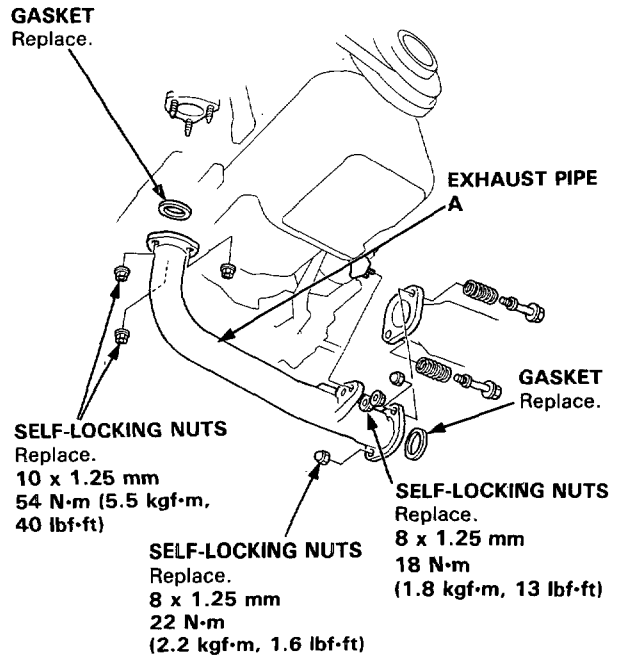
12. Connect the throttle control cable and install the right front mount/bracket.



13. Install the control drum with a new lock washer to the control shaft, then install the shift cable cover. Do not bend the shift cable excessively.



14. Install the exhaust pipe A.





15. Install a new set ring on the end of each driveshaft (see section 16).
16. Install the right and left driveshafts (see section 18). While installing the driveshafts in the differential, be sure not to allow dust and other foreign particles to enter into the transmission.

**NOTE:**

- Clean the areas where the driveshafts contact the transmission (differential) thoroughly with solvent or carburetor cleaner, and dry with compressed air.
  - Turn the right and left steering knuckle fully outward, and slide each driveshaft into the differential until you feel its set ring clip engage the side gear.
17. Install the damper fork, then install the right and left ball joints to the each lower arm with the castle nuts and a new cotter pins.

**DAMPER PINCH BOLT**

10 x 1.25 mm  
43 N·m  
(4.4 kgf·m, 32 lbf·ft)

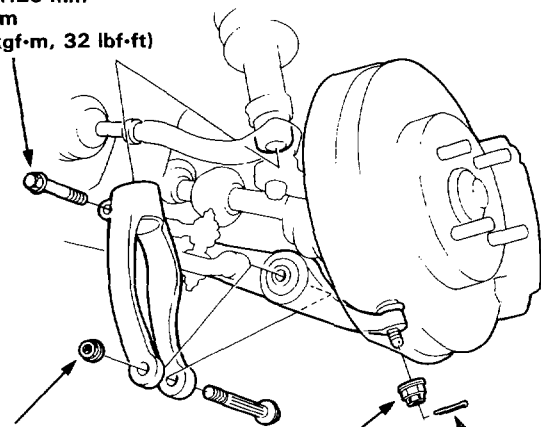
**SELF-LOCKING NUT**

Replace.  
12 x 1.25 mm  
64 N·m  
(6.5 kgf·m, 47 lbf·ft)

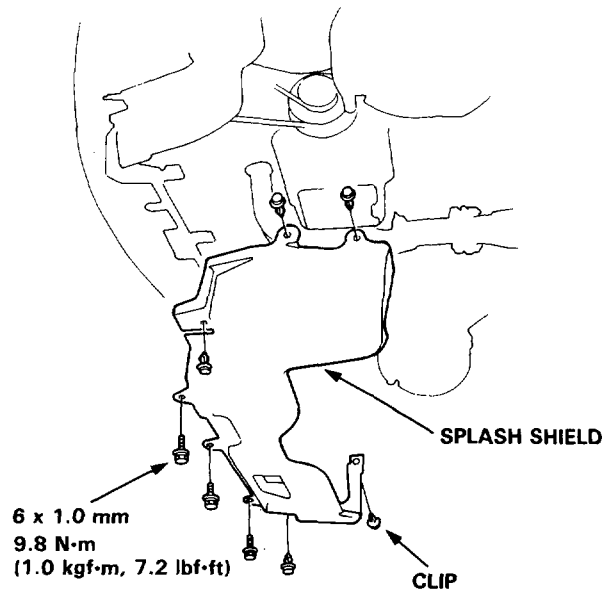
**CASTLE NUT**

49–59 N·m  
(5.6–6.0 kgf·m, 36–43 lbf·ft)

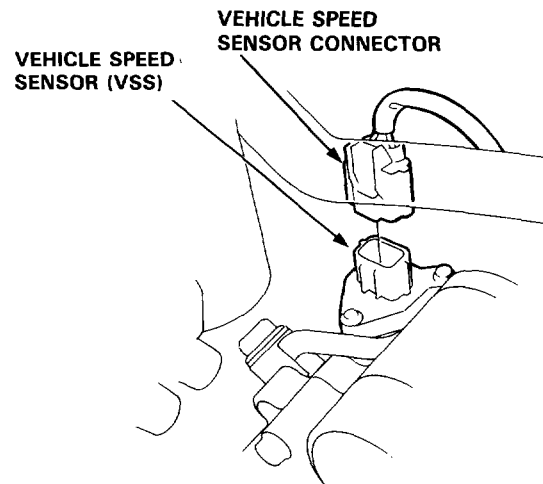
**COTTER PIN**  
Replace.



18. Install the splash shield.



19. Connect the vehicle speed sensor (VSS) connector.

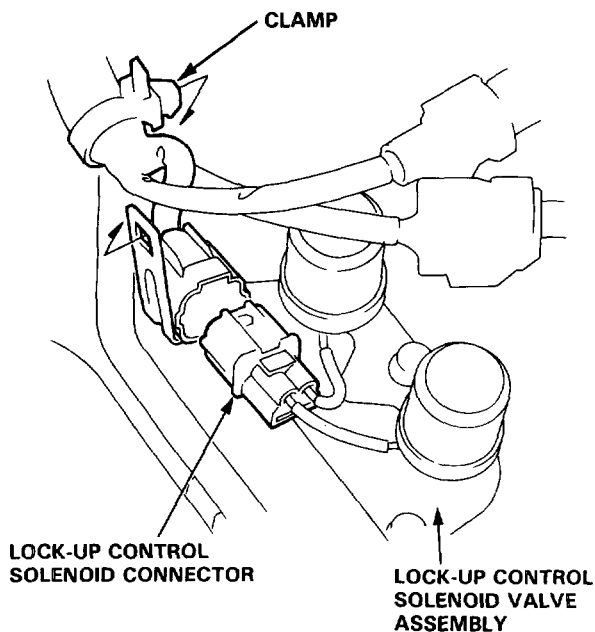


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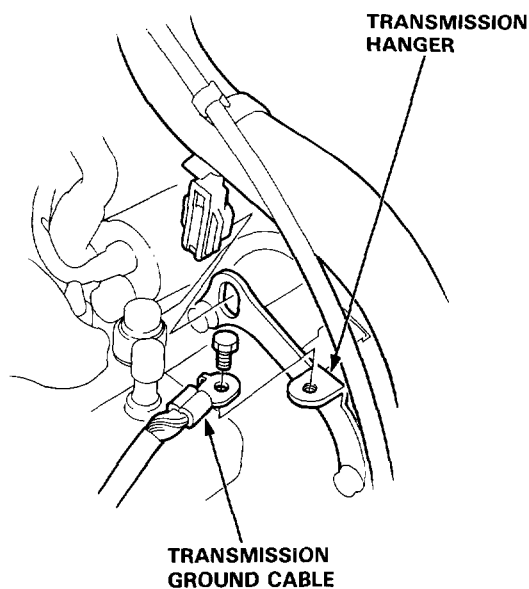
# Transmission

## Installation (cont'd)

20. Connect the lock-up control solenoid connector, and clamp the harness on the lock-up control solenoid connector stay.

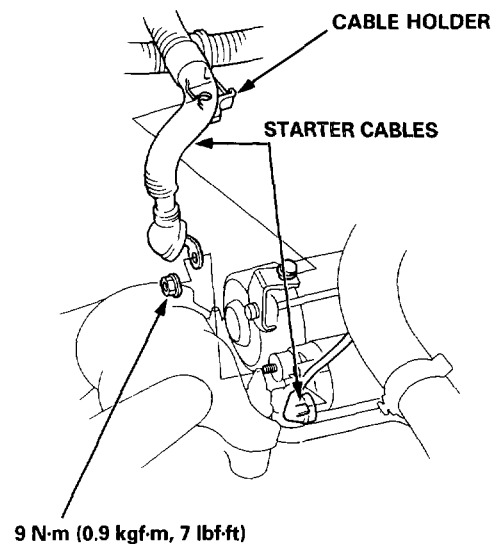


21. Connect the transmission ground cable.

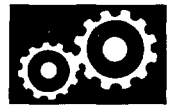


22. Connect the starter cables on the starter, and install the cable holder.

NOTE: When installing the starter cable, make sure that the crimped side of the ring terminal is facing out (see section 4).



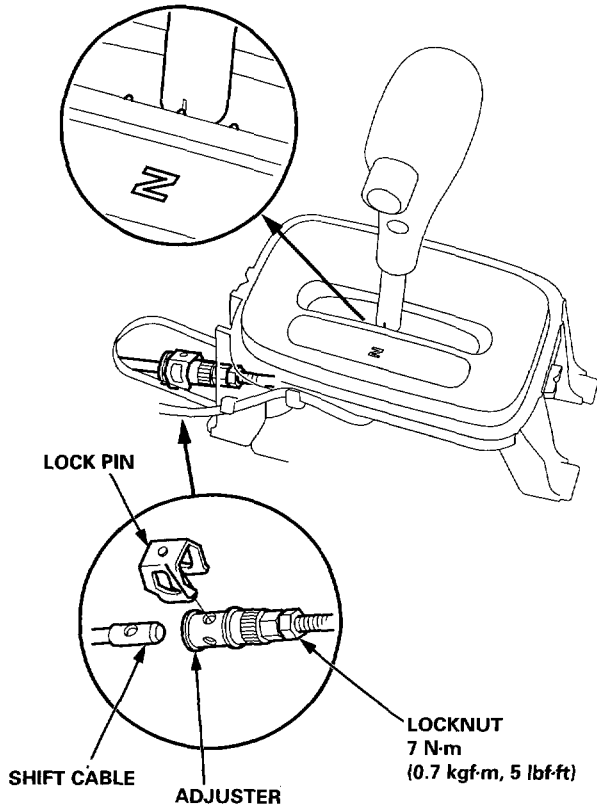
23. Install the air cleaner housing assembly, intake air duct and intake air tube.
24. Refill the transmission with ATF (see page 14-54).
25. Connect the positive (+) cable first, then the negative (-) cable to the battery.
26. Check the ignition timing (see section 4).
27. Start the engine. Set the parking brake, and shift the transmission through all gears, three times. Check shift cable adjustment as described on page 14-134.
28. Check the throttle control cable adjustment as described on page 14-138.
29. Check that front wheel alignment (see section 18).
30. Let the engine reach operating temperature (the cooling fan comes on) with the transmission in **N** or **P** position, then turn it off and check fluid level.
31. Road test as described on pages 14-50 thru 14-52.



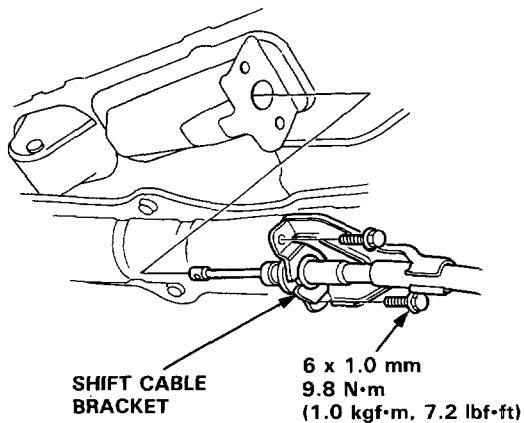
## Removal/Installation

1. Remove the front console (see section 20).
2. Shift to **N** position, then remove the lock pin from the adjuster.

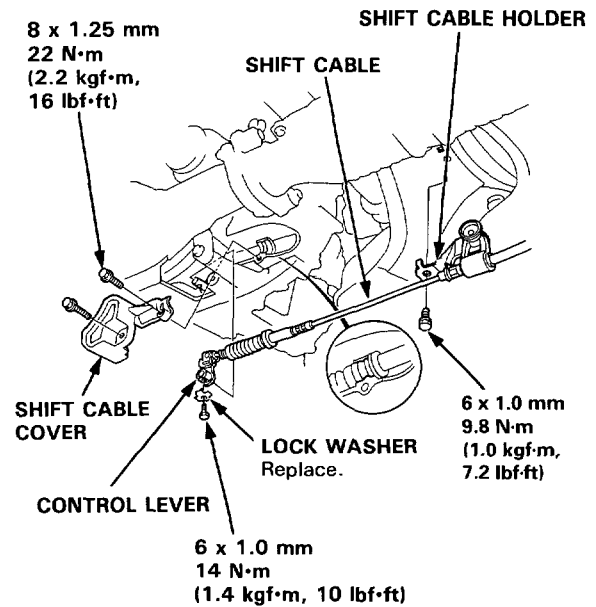
NOTE: LHD is shown; RHD is similar.



3. Remove the shift cable bracket.



4. Remove the shift cable holder.
5. Remove the shift cable cover.
6. Remove the control lever from the control shaft, then remove the shift cable. Do not bend the cable excessively when removing/installing it.



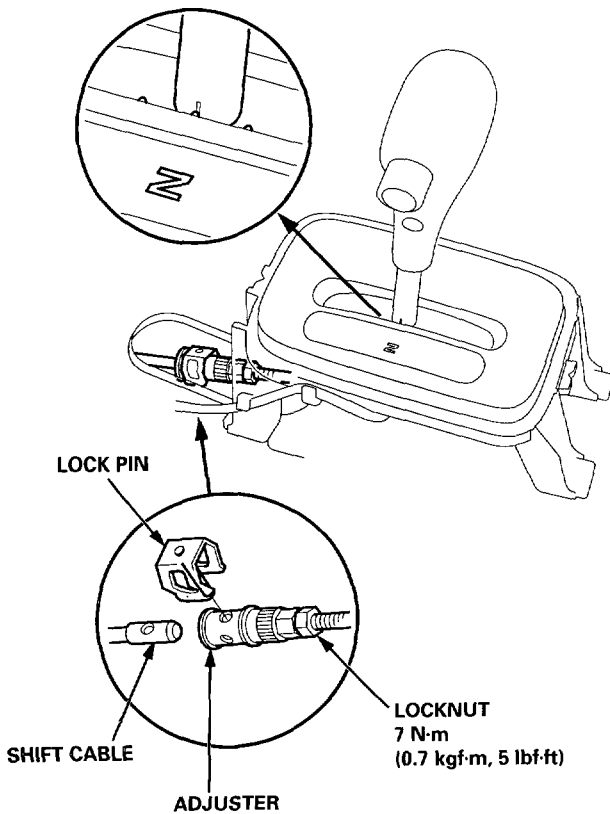
7. Install the shift cable in the reverse order of removal.
8. Check the cable adjustment on reassembly (see page 14-134).

# Shift Cable

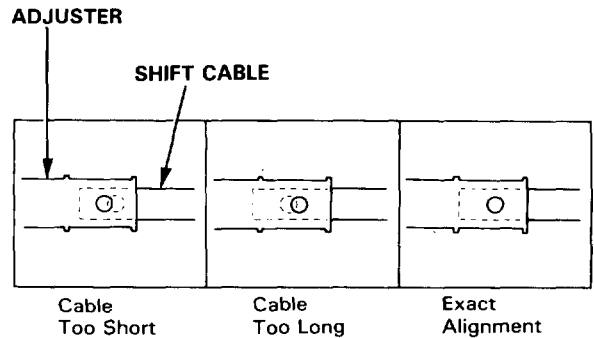
## Adjustment

1. Remove the front console (see section 20).
2. Shift to **N** position, then remove the lock pin from the adjuster.

NOTE: LHD is shown; RHD is similar.



3. Check that the hole in the adjuster is perfectly aligned with the hole in the shift cable. There are two holes in the adjuster. They are positioned 90° apart to allow cable adjustment in 1/4 turn increments.

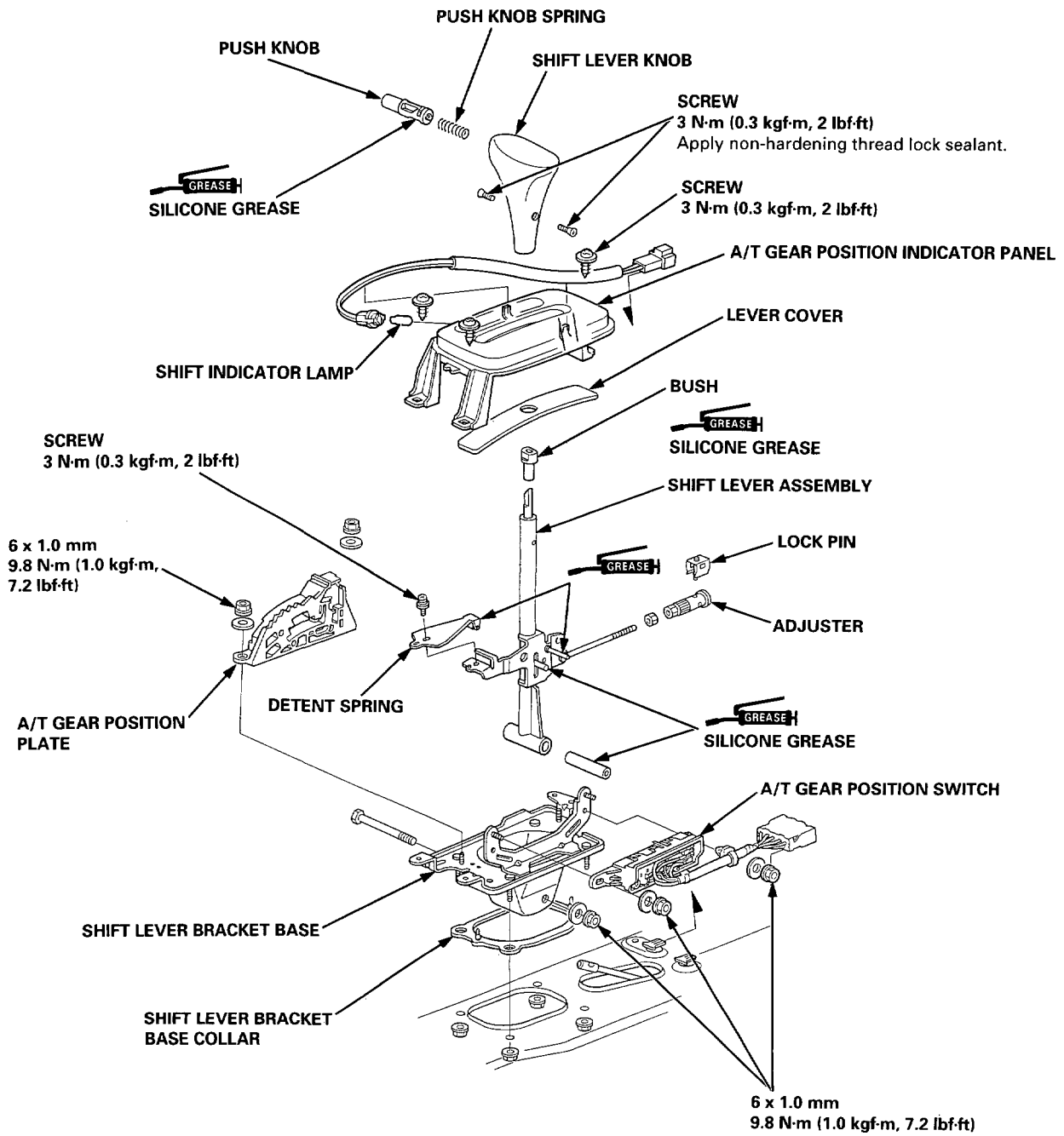


4. If not perfectly aligned, loosen the locknut on the adjuster and adjust as required.
5. Tighten the locknut to 7 N·m (0.7 kgf·m, 5 lbf·ft).
6. Install the lock pin on the adjuster. If you feel the lock pin binding as you reinstall it, the cable is still out of adjustment and must be readjusted.
7. Make sure the lock pin is seated in the adjuster securely.
8. Move the shift lever to each gear and verify that the shift position indicator follows the automatic transaxle gear position switch.
9. Start the engine and check the shift lever in all gears. If any gear does not work properly, refer to troubleshooting (see pages 14-46 thru 14-49).

# Shift Lever



NOTE: LHD is shown; RHD is similar.



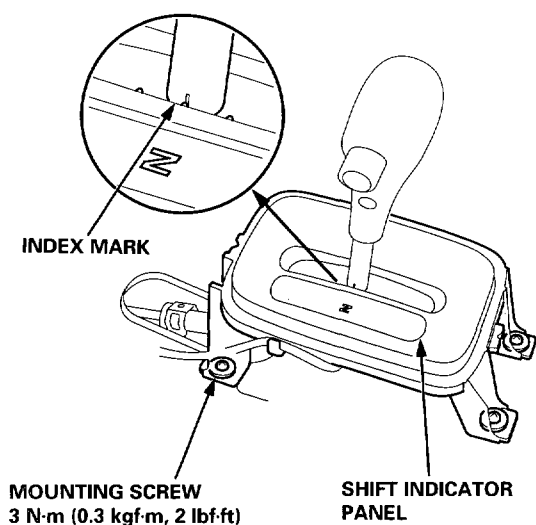
# Shift Indicator Panel

# ATF Cooler Hoses

## Adjustment

1. Check that the index mark on the indicator aligns with the **N** mark on the shift indicator panel when the transmission is in NEUTRAL.
2. If not aligned, remove the front console (see section 20).
3. Remove the shift indicator panel mounting screws and adjust by moving the panel.

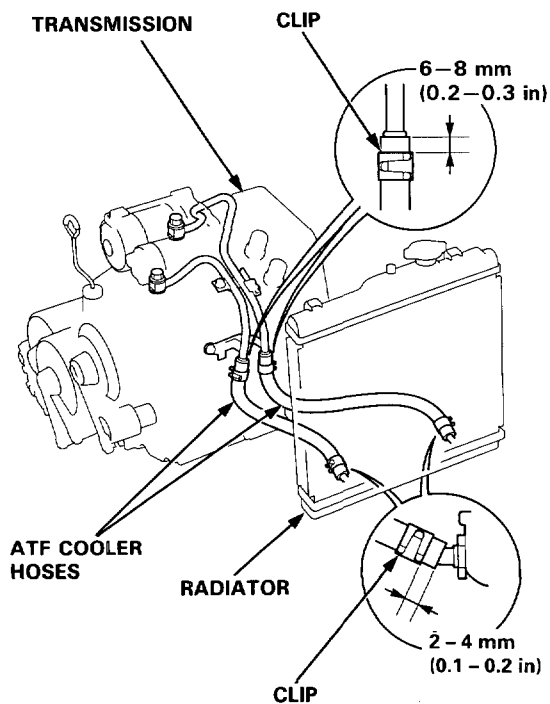
NOTE: Whenever the shift indicator panel is removed, reinstall the panel as described above.



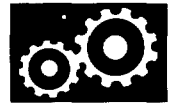
NOTE: LHD is shown; RHD is similar.

## Connection

1. Connect the ATF cooler hoses to the ATF cooler lines and ATF cooler and secure them with the clips as shown.



# Throttle Control Cable

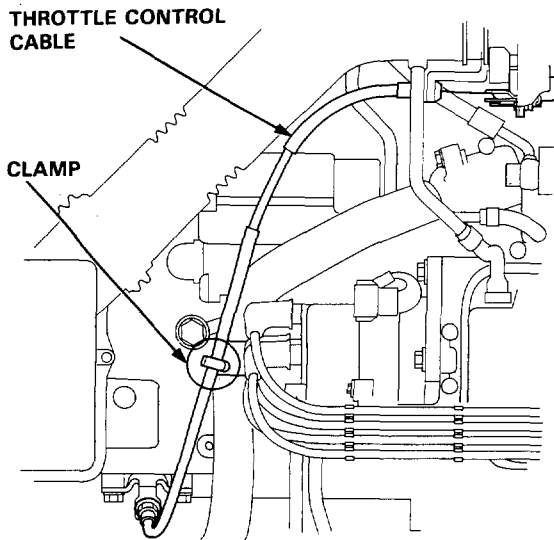


## Inspection

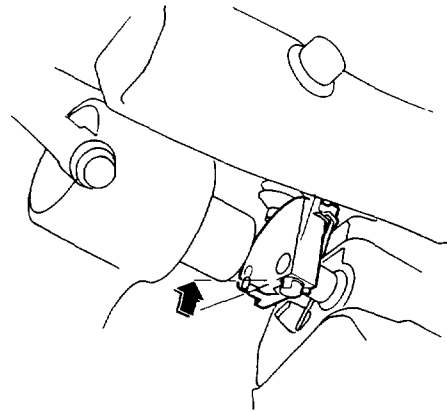
NOTE: Before inspecting the throttle control cable, make sure:

- throttle cable free play is correct (see section 11).
- Idle speed is correct (see section 11).
- To warm up the engine to normal operating temperature (the radiator fan comes on).

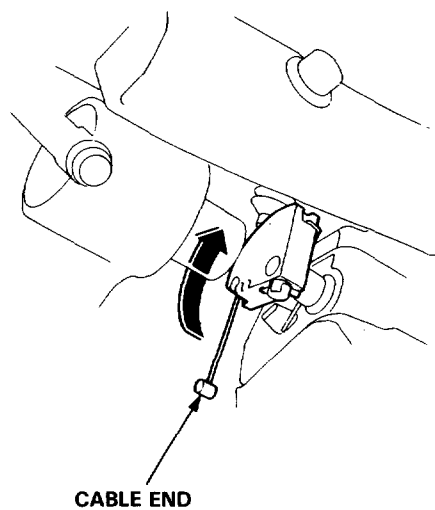
1. Verify that the throttle control cable is clamped correctly.



2. Verify that the throttle control drum is synchronized with the throttle linkage while depressing and releasing the accelerator pedal.
3. If the throttle control drum is not synchronized with the throttle linkage, adjust the throttle control cable.
4. Check that there is play in the throttle control drum while depressing the accelerator pedal to the fully-throttle position.



5. Remove the cable end of the throttle control cable from the throttle control drum.
6. Check that the throttle control drum moves smoothly.





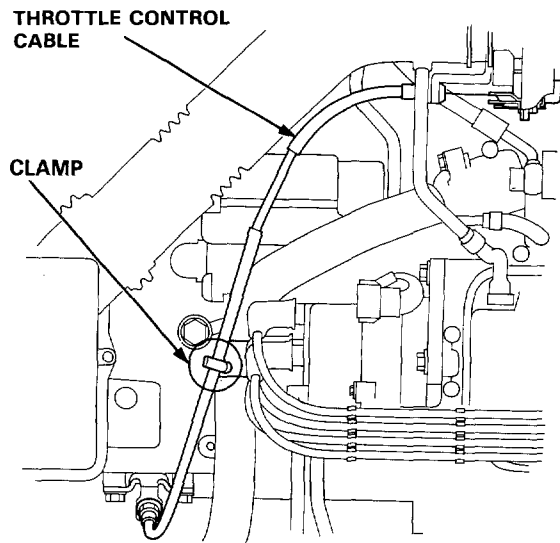
# Throttle Control Cable

## Adjustment

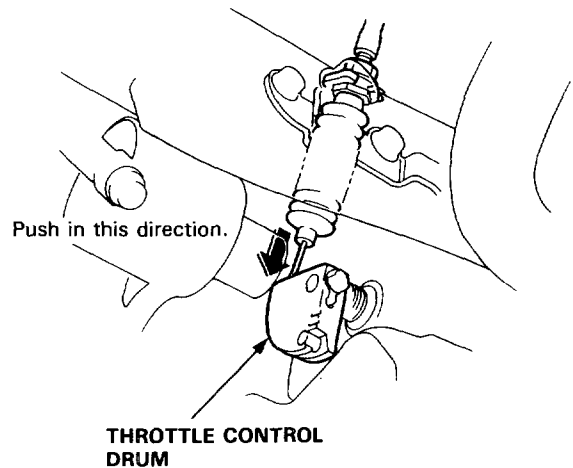
NOTE: Before adjusting the throttle control cable, make sure:

- throttle cable free play is correct (see section 11).
- Idle speed is correct (see section 11).
- To warm up the engine to normal operating temperature (the radiator fan comes on).

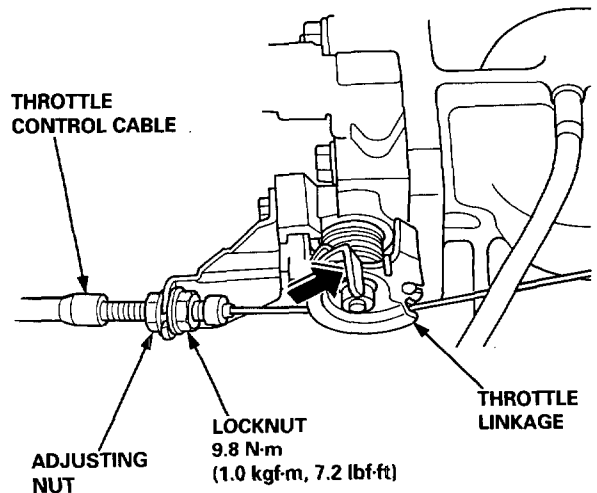
1. Verify that the throttle control cable is clamped correctly.



2. Verify that the throttle linkage is in the fully-closed position.
3. Loosen the locknut on the throttle control cable at the throttle linkage.
4. Remove the free play of the throttle control cable by turning the adjusting nut at the throttle linkage, while pushing the throttle control drum to the fully-closed position as shown.



5. Tighten the locknut with holding the adjusting nut.



6. After tightening the locknut, inspect the synchronization and throttle control drum movement.

## **Differential**

**Manual Transmission ..... section 13**

**Automatic Transmission ..... section 14**



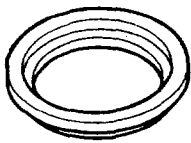
## **Driveshafts**

<b>Special Tools .....</b>	<b>16-2</b>
<b>Driveshafts</b>	
<b>Inspection .....</b>	<b>16-3</b>
<b>Removal .....</b>	<b>16-3</b>
<b>Disassembly .....</b>	<b>16-5</b>
<b>Reassembly .....</b>	<b>16-7</b>
<b>Installation .....</b>	<b>16-10</b>
<b>Intermediate Shaft</b>	
<b>Removal .....</b>	<b>16-12</b>
<b>Disassembly .....</b>	<b>16-12</b>
<b>Reassembly .....</b>	<b>16-13</b>
<b>Installation .....</b>	<b>16-15</b>



# Special Tools

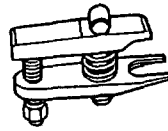
Ref. No.	Tool Number	Description	Qty	Remark
①	07JAF - SH20400	Support Base Attachment	1	
②	07LAD - PW50601	Inner Race Driver	1	
③	07MAC - SL00200	Ball Joint Remover, 28 mm	1	
④	07746 - 0010300	Driver Attachment, 42 x 47 mm	1	
⑤	07746 - 0010400	Driver Attachment, 52 x 55 mm	1	
⑥	07746 - 0030400	Driver Attachment, 35 mm I.D.	1	
⑦	07749 - 0010000	Handle Driver	1	
⑧	07965 - SD90100	Support Base	1	



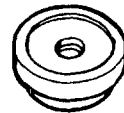
①



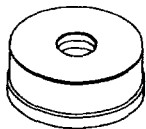
②



③



④



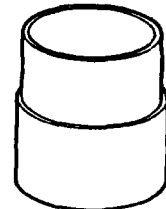
⑤



⑥



⑦



⑧



## Inspection

### Driveshaft Boot

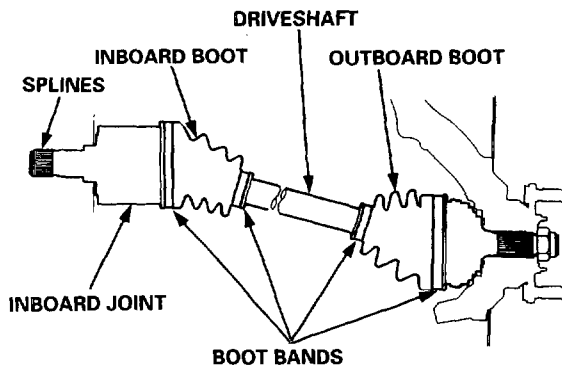
Check the boots on the driveshaft for cracks, damage, leaking grease or loose boot bands. If any damage is found, replace the boot and boot bands.

### Loose Splines

Turn the driveshaft by hand and make sure the splines and joint are not excessively loose. If damage is found, replace the inboard joint.

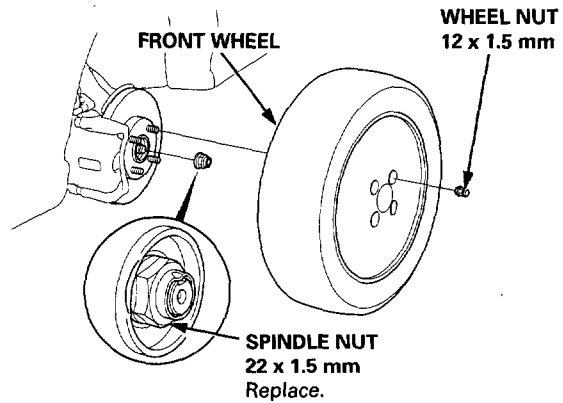
### Twisted or Cracked

Make sure the driveshaft is not twisted or cracked. Replace it if necessary.



## Removal

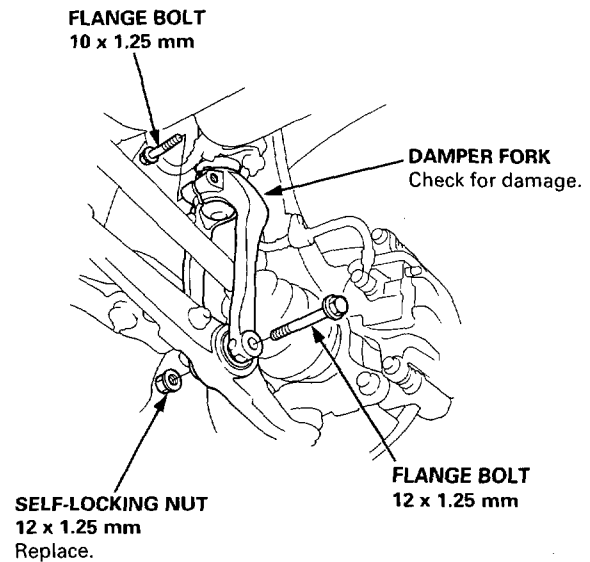
1. Loosen the wheel nuts slightly.
2. Raise the front of vehicle and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and front wheels.



4. Raise the locking tab on the spindle nut, then remove the nut.
5. Drain the transmission oil or fluid (see section 13 or 14).

NOTE: It is not necessary to drain the transmission oil when the left driveshaft for the vehicle with intermediate shaft is removed.

6. Remove the self-locking nut and flange bolts.



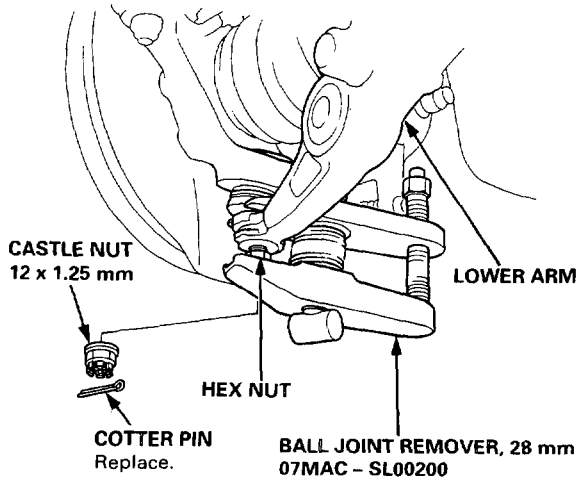
7. Remove the damper fork.

(cont'd)

# Driveshafts

## Removal (cont'd)

8. Remove the cotter pin from the lower arm ball joint castle nut, and remove the nut.

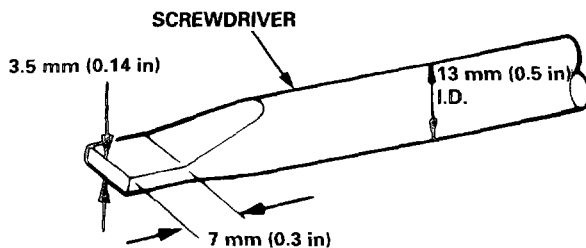


9. Install a 12 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.

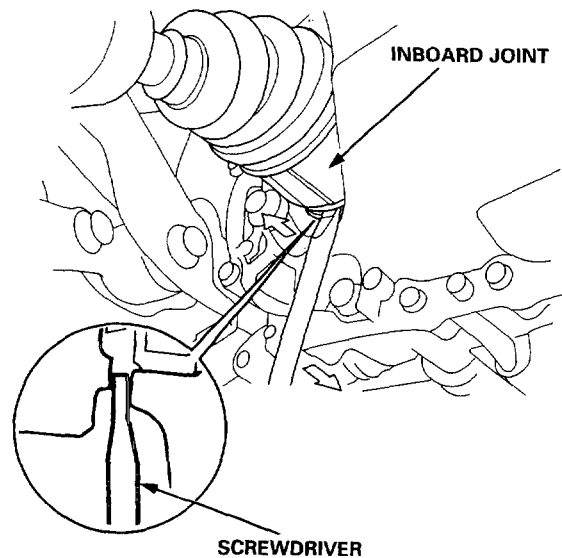
10. Use the ball joint remover, 28 mm, as shown on section 18, to separate the ball joint and lower arm. Be careful not to damage the ball joint boot.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

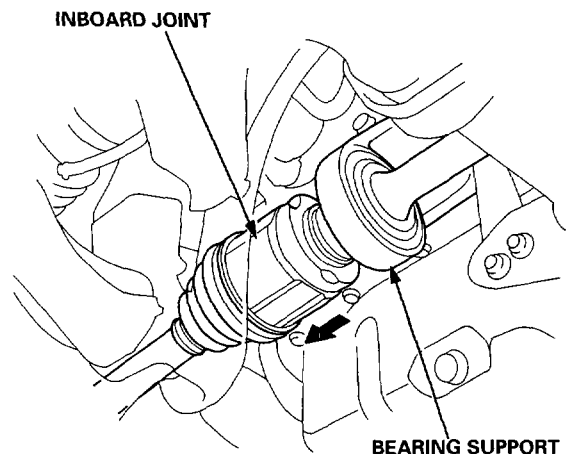
11. Pry the driveshaft assembly with a screwdriver, as shown, to force the set ring at the driveshaft end past the groove.

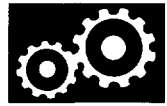


12. Pull the inboard joint, and remove the driveshaft from the differential case as an assembly. Do not pull on the driveshaft, as the inboard joint may come apart. Use care when prying out the assembly, and pull it straight to avoid damaging the differential oil seal or the intermediate shaft outer seal.



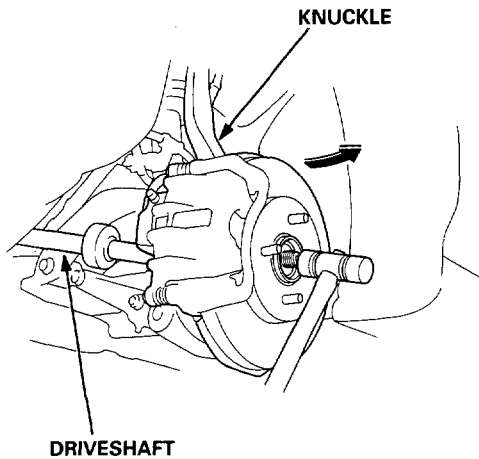
- With Intermediate Shaft:  
Remove the left driveshaft from the bearing support by tapping the inboard joint of the driveshaft with a plastic hammer.



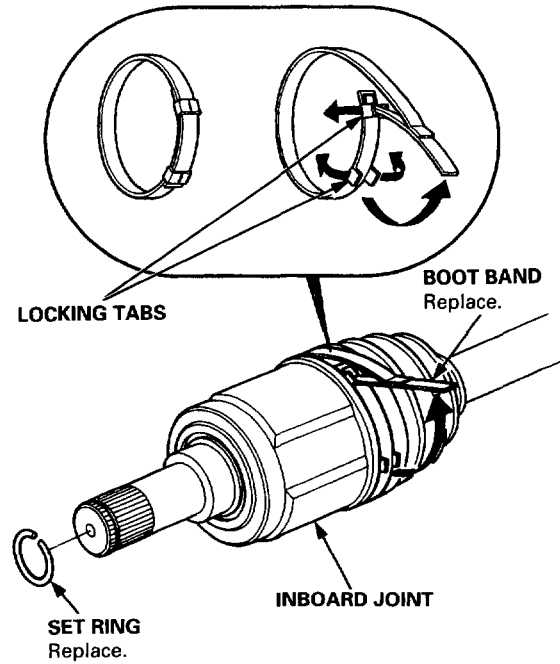


## Disassembly

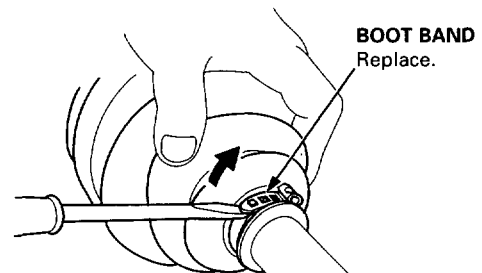
13. Pull the knuckle outward, and remove the driveshaft outboard joint from the front wheel hub using a plastic hammer.



1. Carefully clamp the driveshaft in a vise with soft jaws.
2. Remove the set ring from the inboard joint.
3. To remove the boot band, pry up the locking tabs with a screwdriver and raise the end of the band. Take care not to damage the boot.



- If the boot band is the crimping type, pry up the end of the band with a screwdriver.

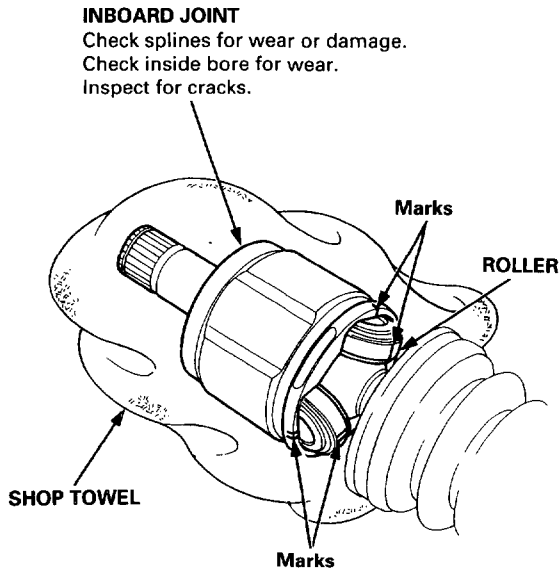


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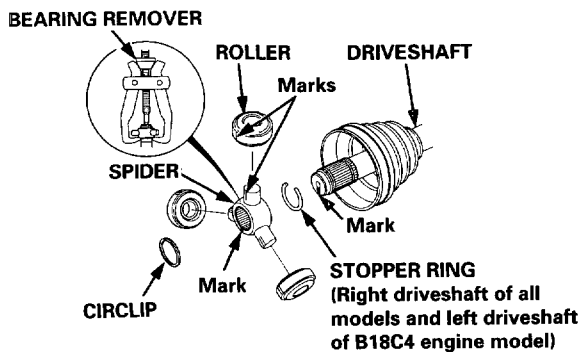
# Driveshafts

## Disassembly (cont'd)

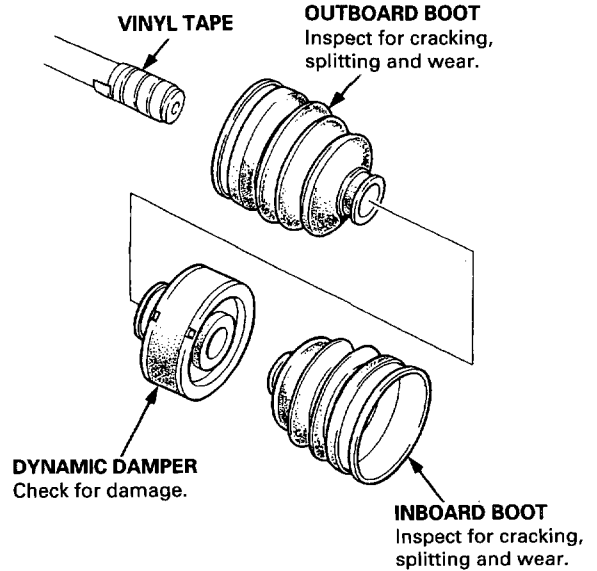
4. Mark each roller and inboard joint to identify the locations of rollers and grooves in the inboard joint. Then remove the inboard joint on the shop towel. Be careful not to drop the rollers when separating them from the inboard joint.



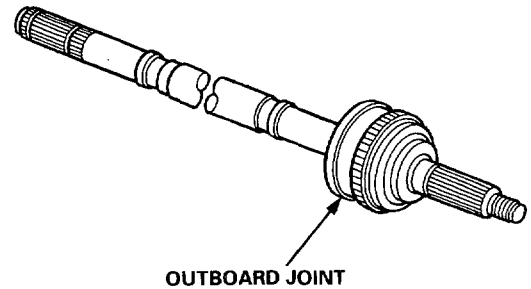
5. Mark the rollers and spider to identify the locations of rollers on the spider, then remove the rollers.
6. Remove the circlip.
7. Mark the spider and driveshaft to identify the position of the spider on the shaft.
8. Remove the spider using a commercially available bearing remover.
9. Remove the stopper ring (right driveshaft of all models and left driveshaft of B18C4 engine model).



10. Wrap the splines on the driveshaft with vinyl tape to prevent damage to the boots and dynamic damper.
11. Remove the inboard boot, dynamic damper and outboard boot, then remove the vinyl tape. Take care not to damage the boots and dynamic damper.



12. Inspect the outboard joint for faulty movement and wear. If any roughness or excess play is felt, replace the outboard joint.








## Reassembly

### NOTE:

- Clean the disassembled parts with solvent, and dry them thoroughly with compressed air. Do not wash the rubber parts with solvent.
-  : Thoroughly pack the inboard joint and both joint boots with the joint grease included in the new driveshaft set.

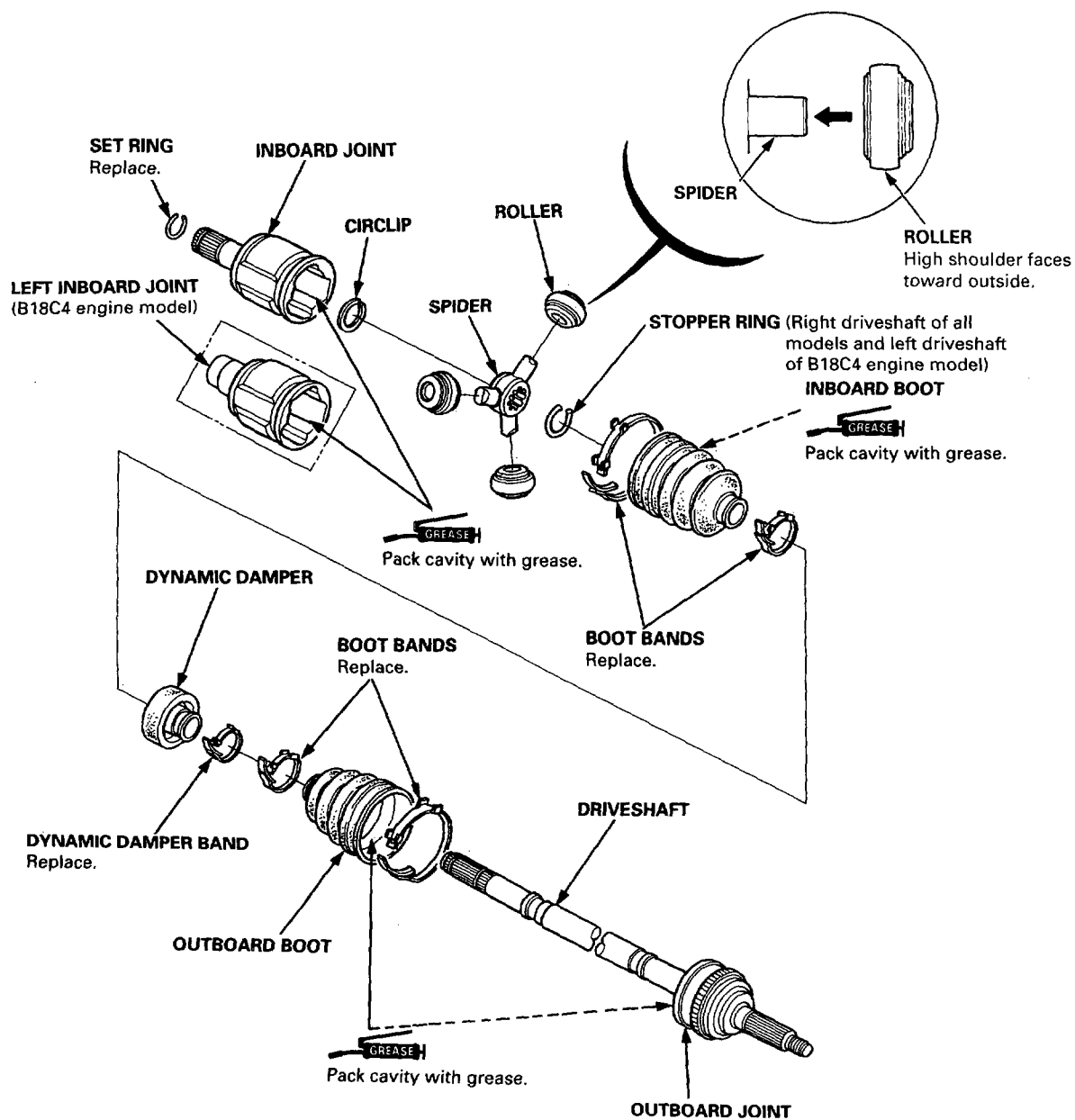
### Grease quantity:

**Inboard Joint:** 120 – 130 g (4.2 – 4.6 oz)

### Outboard Joint:

**B18C4 engine model:** 90 – 100 g (3.2 – 3.5 oz)

**All except B18C4 engine model:** 100 – 118 g (3.5 – 4.2 oz)

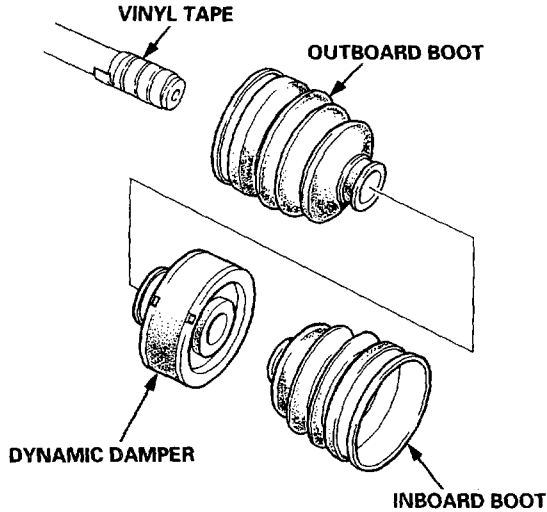


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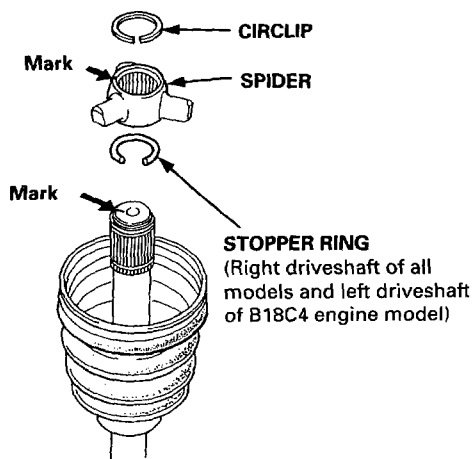
# Driveshafts

## Reassembly (cont'd)

1. Wrap the splines with vinyl tape to prevent damage to the boots and dynamic damper.
2. Install the outboard boot, dynamic damper and inboard boot to the driveshaft, then remove the vinyl tape. Take care not to damage the boots and dynamic damper.



3. Install the stopper ring into the driveshaft groove (right driveshaft of all models and left driveshaft of B18C4 engine model). Always rotate the stopper ring in its groove to be sure it is fully seated.
4. Install the spider on the driveshaft by aligning the marks on the spider and end of the driveshaft.
5. Fit the circlip into the driveshaft groove. Always rotate the circlip in its groove to be sure it is fully seated.



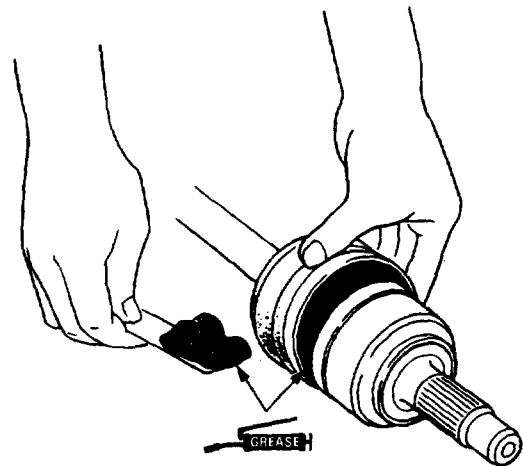
6. Pack the outboard joint with the joint grease included in the new driveshaft set.

### Grease quantity:

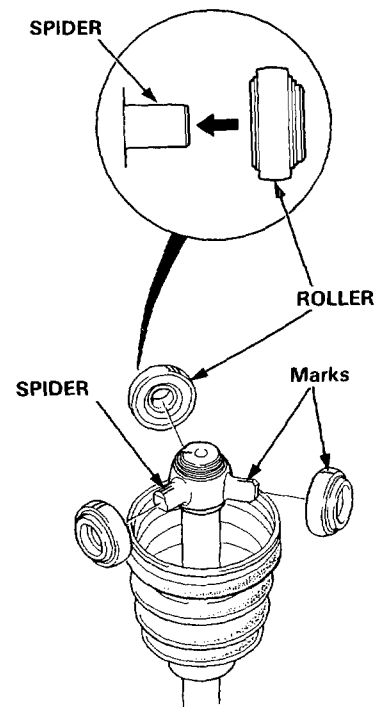
**B18C4 engine model: 90 – 100 g (3.2 – 3.5 oz)**

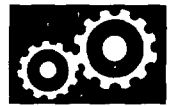
**All except B18C4 engine model:**

**100 – 118 g (3.5 – 4.2 oz)**



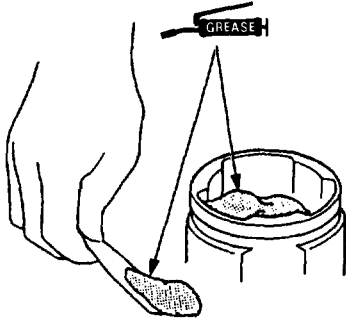
7. Fit the rollers to the spider with their high shoulders facing outward, and note these items:
  - Reinstall the rollers in their original positions on the spider by aligning the marks.
  - Hold the driveshaft pointed up to prevent the rollers from falling off.



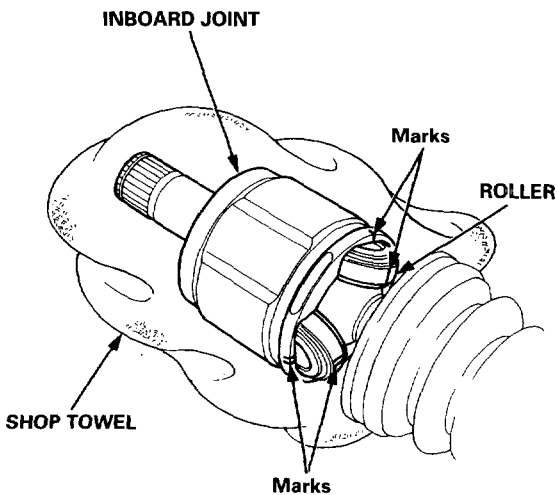


8. Pack the inboard joint with the joint grease included in the new driveshaft set.

**Grease quantity: 120 – 130 g (4.2 – 4.6 oz)**

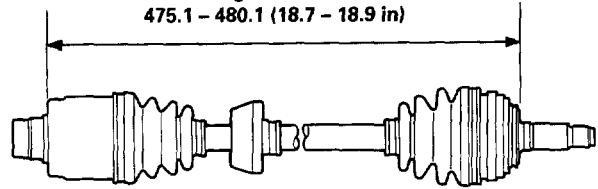


9. Fit the inboard joint onto the driveshaft, and note these items:
- Reinstall the inboard joint onto the driveshaft by aligning the marks on the inboard joint and the rollers.
  - Hold the driveshaft so the inboard joint points up to prevent it from falling off.



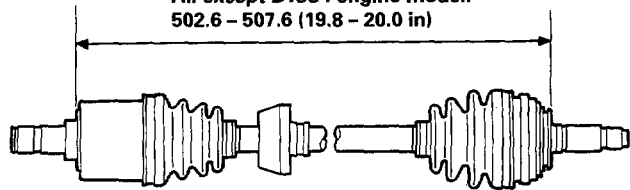
10. Adjust the length of the driveshafts to the figure below, then adjust the boots to halfway between full compression and full extension. The ends of boots seat in the groove of the driveshaft and joint.

**Left driveshaft:  
B18C4 engine model:  
475.1 – 480.1 (18.7 – 18.9 in)**

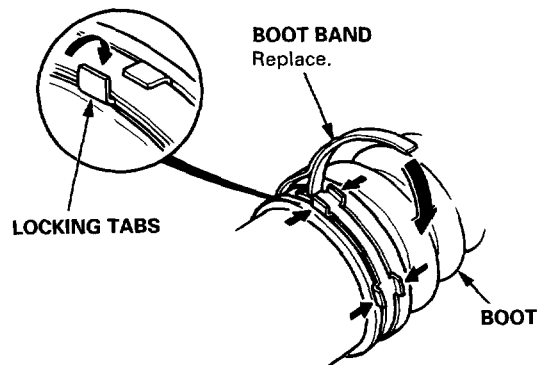


**Left driveshaft:  
All except B18C4 engine model:  
773.1 – 778.1 (30.4 – 30.6 in)**

**Right driveshaft:  
B18C4 engine model:  
475.1 – 480.1 (18.7 – 18.9 in)  
All except B18C4 engine model:  
502.6 – 507.6 (19.8 – 20.0 in)**



11. Install new boot bands on the boots, and bend both sets of locking tabs.
12. Lightly tap on the doubled-over portions to reduce their height.



(cont'd)

# Driveshafts

## Reassembly (cont'd)

13. Position the dynamic damper as shown below.
- Install a new dynamic damper band, and bend down both sets of locking tabs.
  - Lightly tap on the doubled-over portion of the band to reduce its height.

Left:

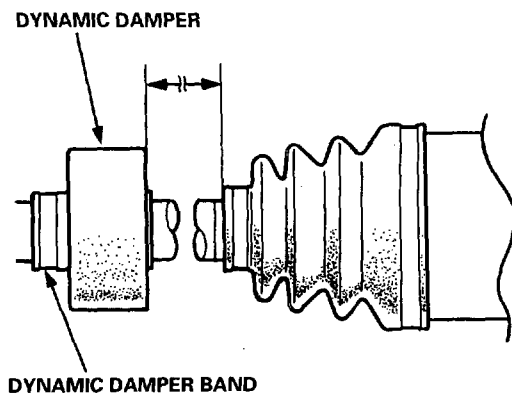
B18C4 engine model:  $29 \pm 2$  mm ( $1.1 \pm 0.1$  in)

All except B18C4 engine model:  $75 \pm 2$  ( $3.0 \pm 0.1$  in)

Right:

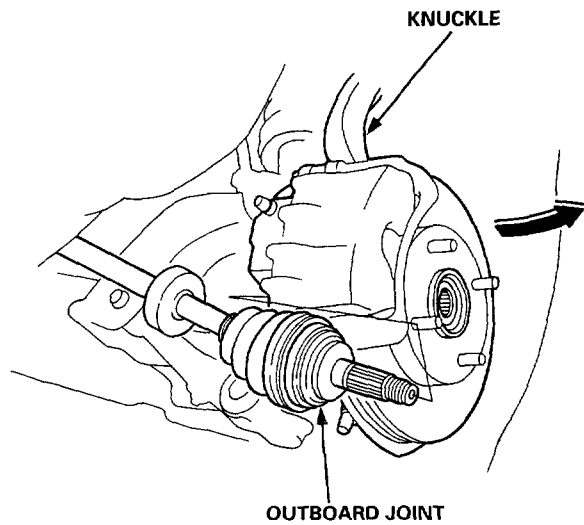
B18C4 engine model:  $29 \pm 2$  mm ( $1.1 \pm 0.1$  in)

B16B2 engine model:  $55 \pm 2$  mm ( $2.2 \pm 0.1$  in)

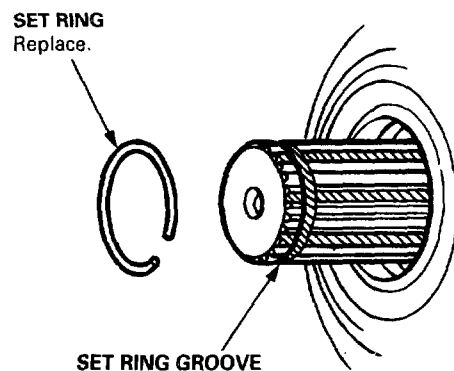


## Installation

1. Install the outboard joint into the knuckle.

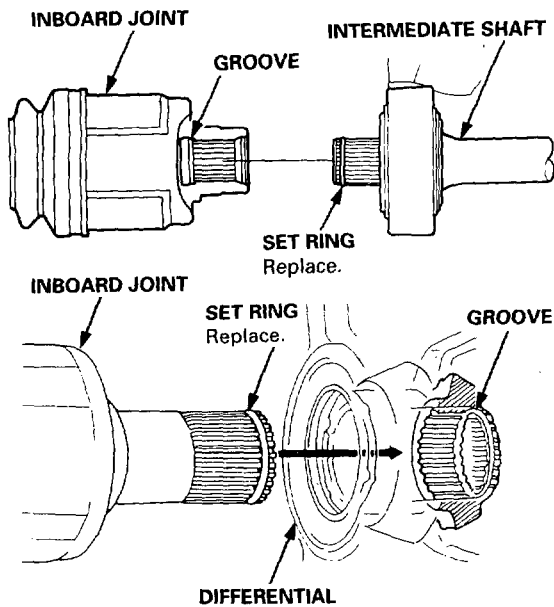


2. Apply 0.5 – 1.0 g (0.02 – 0.04 oz) of specified grease to the whole splined surface of the intermediate shaft (B18C4 engine model). After applying grease, remove the grease from the splined grooves at intervals of 2 – 3 splines and from the set ring groove so air can bleed from the inboard joint.
3. Install the new set ring onto the driveshaft or intermediate shaft groove. Always use a new set ring whenever the driveshaft is being installed.

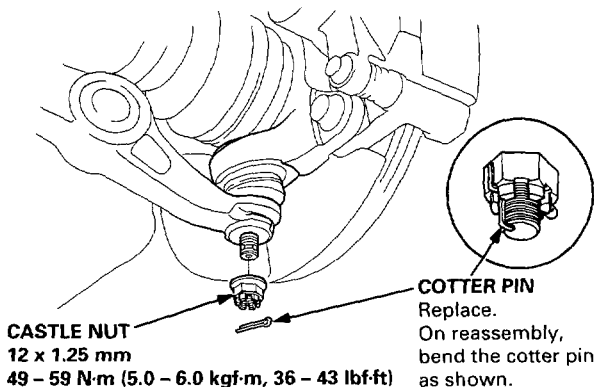




- Clean the areas where the driveshaft contact the transmission (differential) thoroughly with solvent or carburetor cleaner, and dry with compressed air. Insert the inboard end of the driveshaft into the differential or intermediate shaft until the set ring locks in the groove.

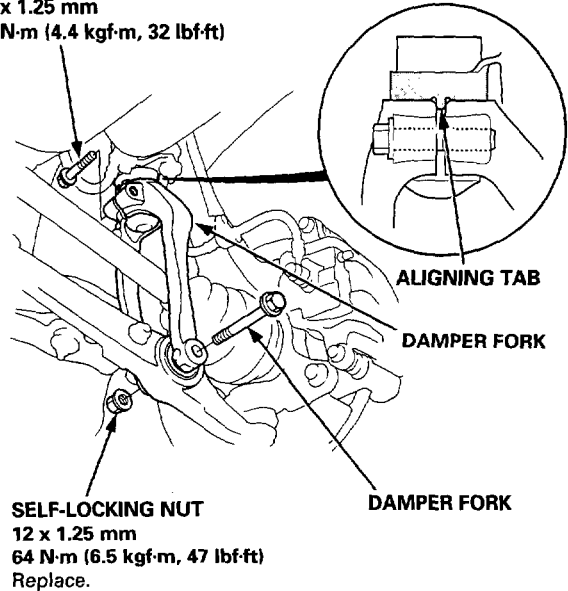


- Install the knuckle on the lower arm. Be careful not to damage the ball joint boot. Wipe off the grease before tightening the nut at the ball joint. Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.

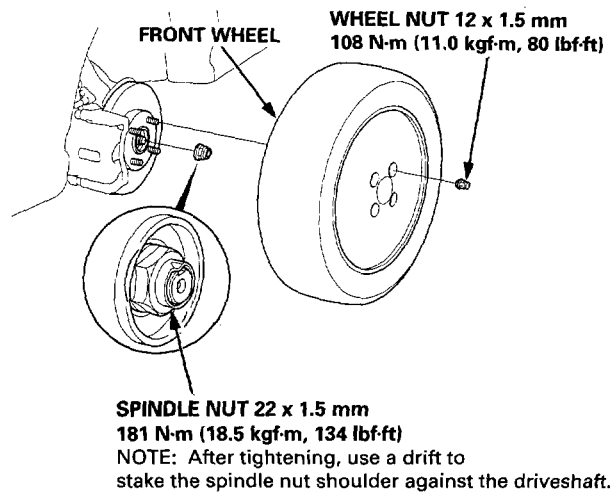


- Install the damper fork over the driveshaft and onto the lower arm. Install the damper in the damper fork so the aligning tab is aligned with the slot in the damper fork.

**FLANGE BOLT**  
10 x 1.25 mm  
43 N-m (4.4 kgf-m, 32 lbf-ft)



- Loosely install the flange bolts and the new self-locking nut.
- Install a new spindle nut, then tighten the nut.

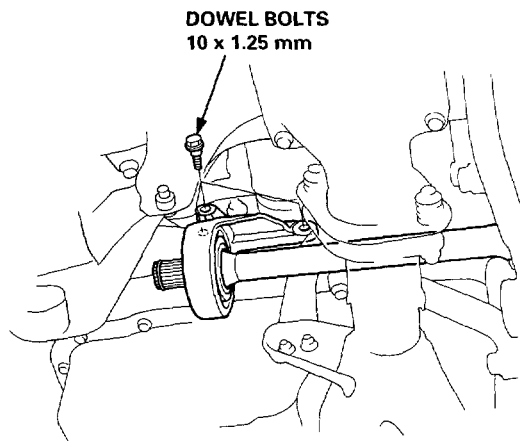


- Installing the wheel, clean the mating surfaces of the brake disc and the wheel, then install the front wheel with the wheel nuts.
- Tighten the flange bolts and the new self-locking nut with the vehicle's weight on the damper.
- Refill the transmission with recommended oil or fluid (see section 13 or 14).
- Check the front wheel alignment and adjust if necessary (see page 18-4).

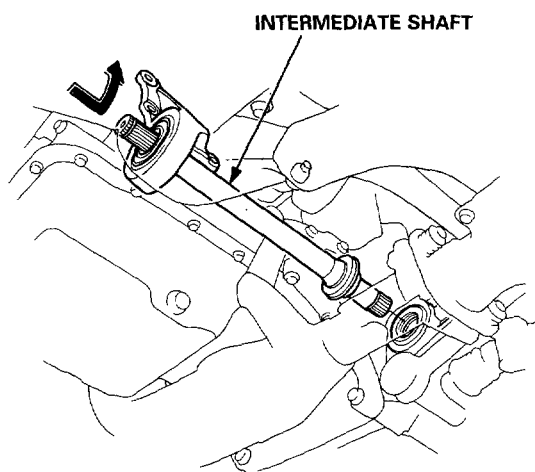
# Intermediate Shaft

## Removal

1. Drain the transmission oil or fluid (see section 13 or 14).
2. Remove the left driveshaft (see page 16-3).
3. Remove the three dowel bolts.



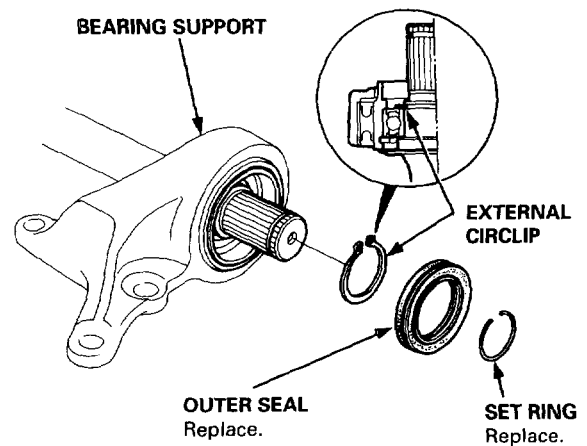
4. Remove the intermediate shaft from the differential. Hold the intermediate shaft horizontal until it is clear of the differential to prevent damage to the differential oil seal.



## Disassembly

NOTE: Be careful not to damage the metal rings on the intermediate shaft during disassembly.

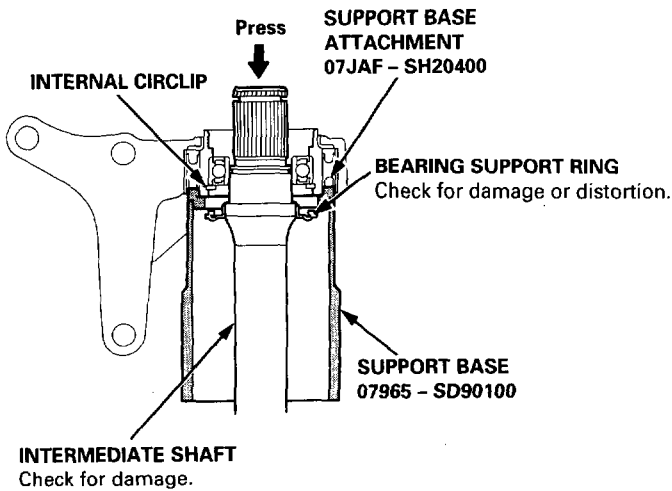
1. Remove the set ring.
2. Remove the intermediate shaft outer seal from the bearing support.
3. Remove the external circlip.





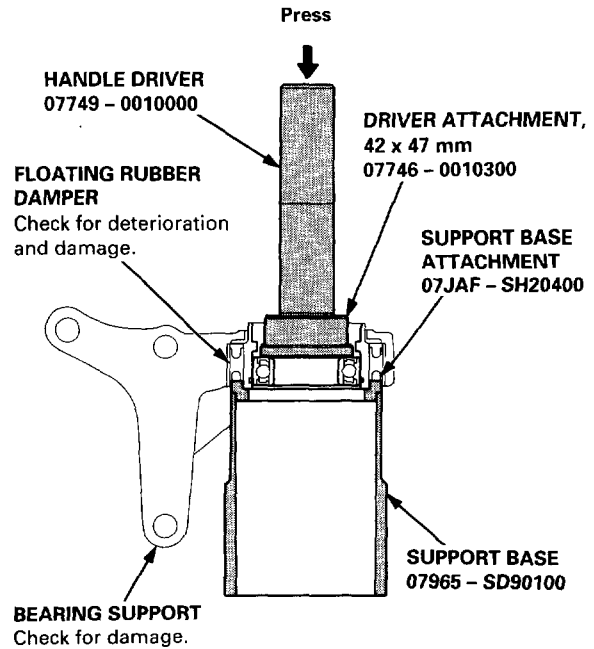
## Disassembly

4. Press the intermediate shaft out of the shaft bearing using the special tools and a press as shown.



5. Remove the internal circlip.

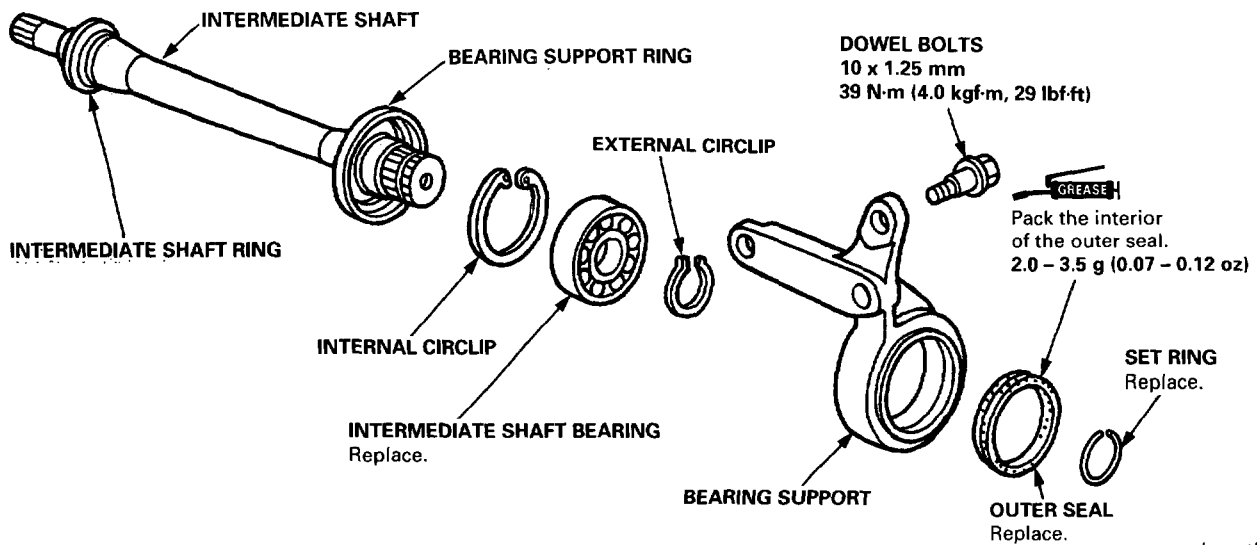
6. Press the intermediate shaft bearing out of the bearing support using the special tools and a press as shown.



## Reassembly

### NOTE:

- Clean the disassembled parts with solvent, and dry them thoroughly with compressed air. Do not wash the rubber parts with solvent.
- Be careful not to damage the metal rings on the intermediate shaft during reassembly.

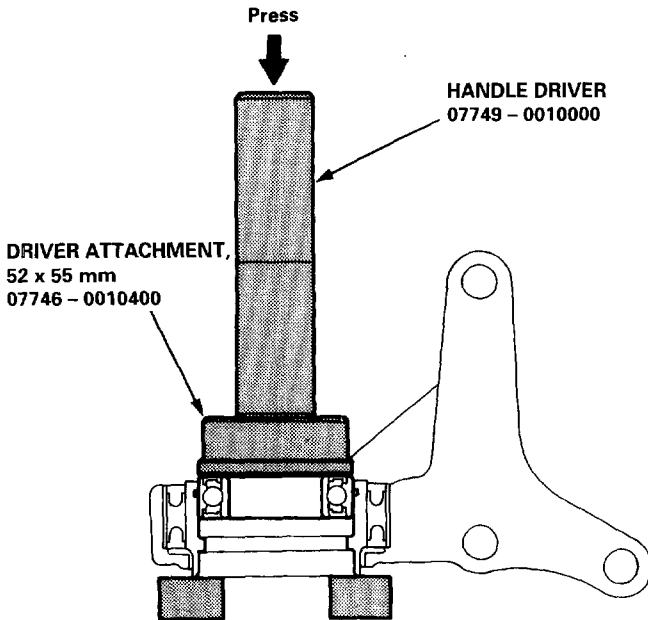


(cont'd)

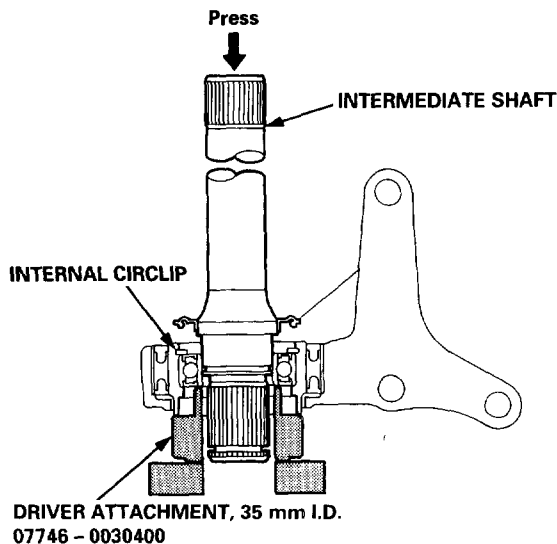
# Intermediate Shaft

## Reassembly (cont'd)

1. Press the intermediate shaft bearing into the bearing support using the special tools and a press as shown.

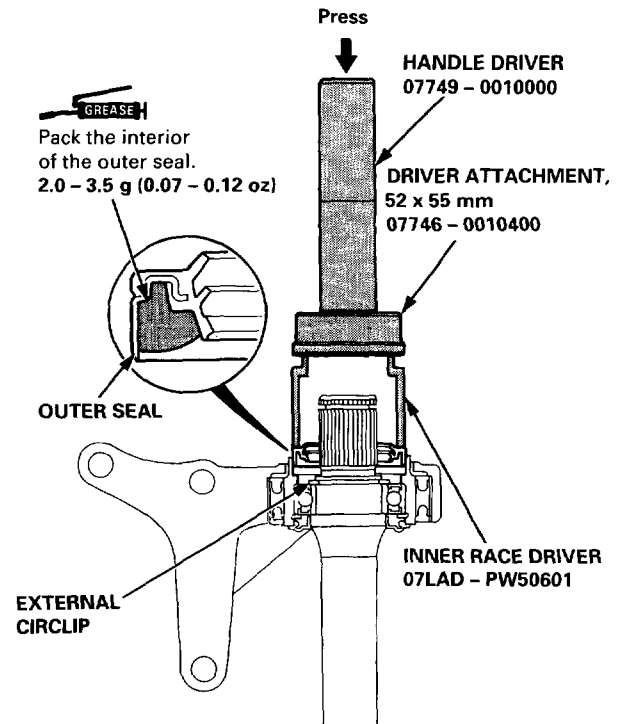


2. Seat the internal circlip in the groove of the bearing support.
3. Press the intermediate shaft into the shaft bearing using the special tools and a press.



4. Seat the external circlip in the groove of the intermediate shaft.
5. Install the outer seal into the bearing support using the special tools as shown.

NOTE: Install the seal flush with the bearing support.



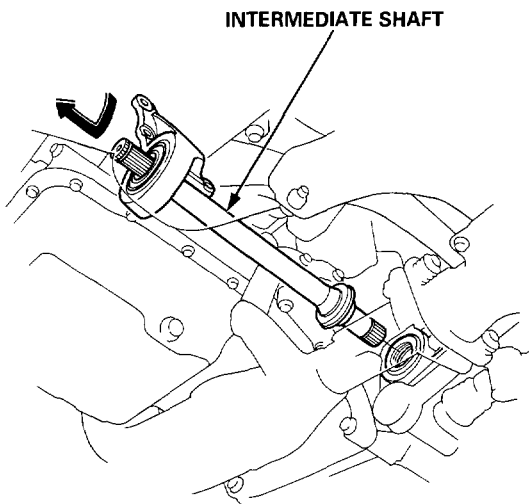
6. Install the new set ring in the intermediate shaft groove.



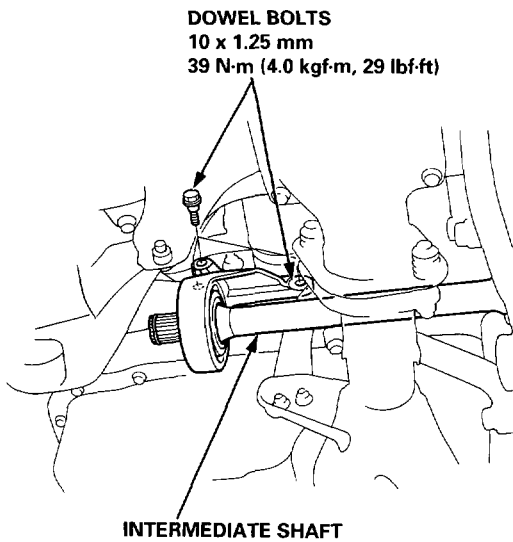


## Installation

1. Clean the areas where the intermediate shaft contact the transmission (differential) thoroughly with solvent or carburetor cleaner, and dry with compressed air. Insert the intermediate shaft assembly into the differential. Hold the intermediate shaft horizontal to prevent damage to the differential oil seal.



2. Install the three dowel bolts, then tighten them.



# Steering

<b>Special Tools</b> .....	17-2	<b>* Steering Column</b>	
<b>Component Locations</b>		<b>Removal/Installation</b> .....	17-20
<b>Index</b> .....	17-3	<b>Inspection</b> .....	17-22
<b>Troubleshooting</b>		<b>Steering Lock Replacement</b> .....	17-23
<b>General Troubleshooting</b> .....	17-4	<b>Power Steering Hoses, Lines</b>	
<b>Noise and Vibration</b> .....	17-8	<b>Fluid Leakage Inspection</b> .....	17-24
<b>Fluid Leaks</b> .....	17-10	<b>Replacement</b> .....	17-25
<b>Inspection and Adjustment</b>		<b>Power Steering Pump</b>	
<b>Steering Operation</b> .....	17-12	<b>Replacement</b> .....	17-26
<b>Power Assist Check</b>		<b>Disassembly</b> .....	17-28
<b>with Vehicle Parked</b> .....	17-12	<b>Inspection</b> .....	17-30
<b>Steering Linkage and Gearbox</b> .....	17-13	<b>Reassembly</b> .....	17-32
<b>Pump Belt</b> .....	17-14	<b>Power Steering Gearbox</b>	
<b>Fluid Replacement</b> .....	17-15	<b>Removal</b> .....	17-35
<b>Pump Pressure Check</b> .....	17-16	<b>Installation</b> .....	17-38
<b>* Steering Wheel</b>			
<b>Removal</b> .....	17-17		
<b>Disassembly/Reassembly</b> .....	17-18		
<b>Installation</b> .....	17-19		

## SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

Some types of this model has an SRS which includes a driver's airbag located in the steering wheel hub and a passenger's airbag located in the dashboard above the glove box and seat belt tensioner located in the seat belt retractors.

Information necessary to safely service the SRS is included in this Shop Manual.

Items marked with an asterisk (\*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

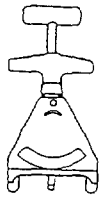


### **⚠ WARNING**

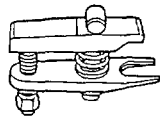
- To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.
- Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional deployment of the airbags.
- All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.
- Before trying to remove the seat belt tensioner, first set the sensor lock pin to LOCK position.

# Special Tools

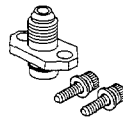
Ref. No.	Tool Number	Description	Qty	Remark
①	07JGG - 0010100	Belt Tension Gauge	1	
②	07MAC - SL00200	Ball Joint Remover, 28 mm	1	
③	07RAK - S040110	P/S Joint Adapter (Pump)	1	
④	07RAK - S040120	P/S Joint Adapter (Hose)	1	
⑤	07406 - 0010200	P/S Pressure Gauge	1	
⑥	07406 - 0010300	Pressure Control Valve	1	
⑦	07406 - 0010400	Pressure Gauge	1	



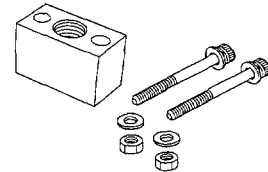
①



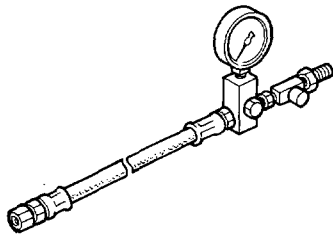
②



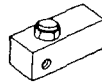
③



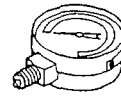
④



⑤



⑥



⑦

# Component Locations

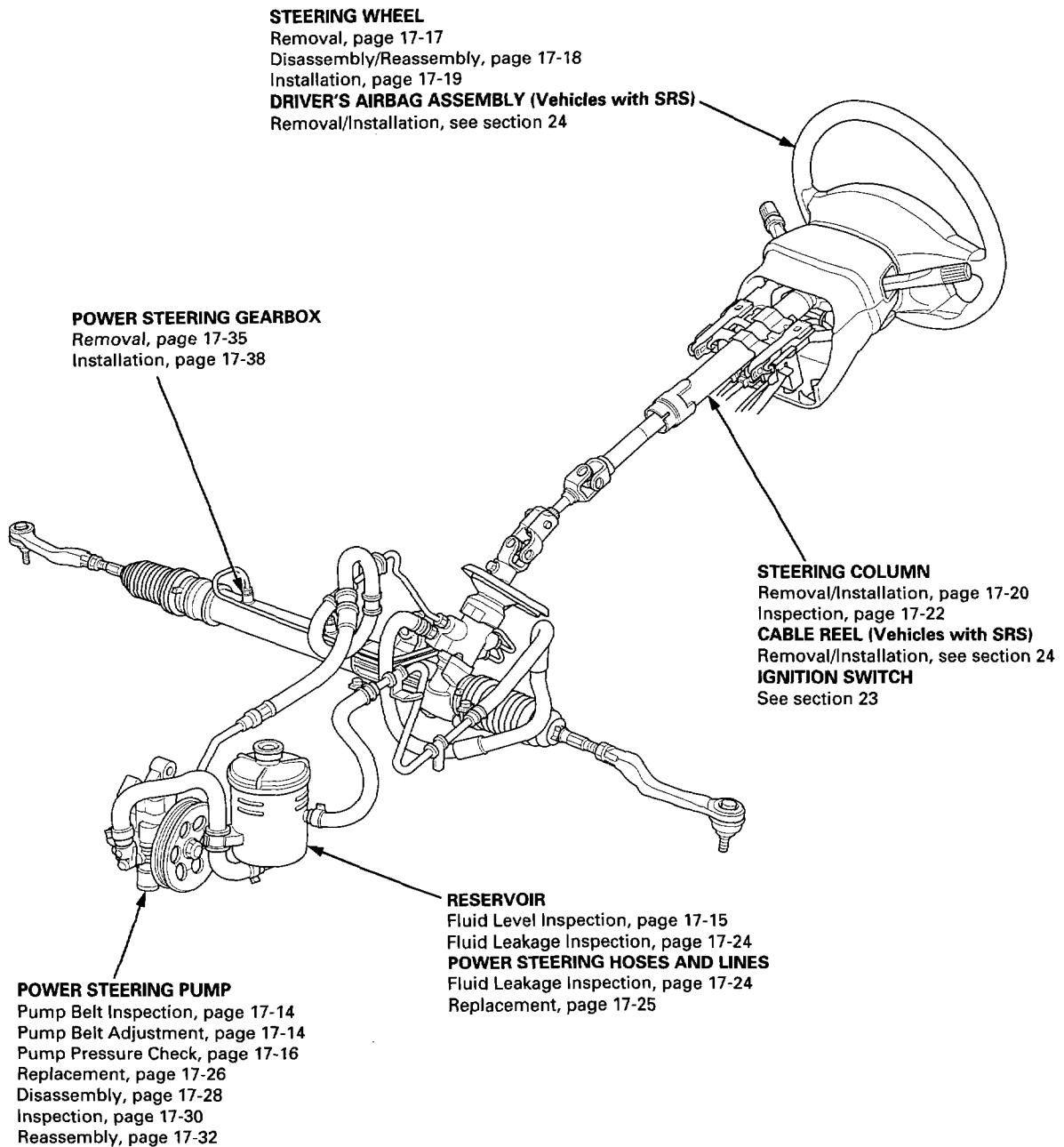


## Index

Note these items during disassembly:

- If an intact airbag assembly has been removed from a scrapped car or has been found defective or damaged during transit, storage or service, it should be deployed (see section 24).
- Before removing the gearbox, remove the driver's airbag assembly and steering wheel.
- After installing the gearbox, check the wheel alignment and adjust if necessary.
- LHD type is shown, RHD type is symmetrical.

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.



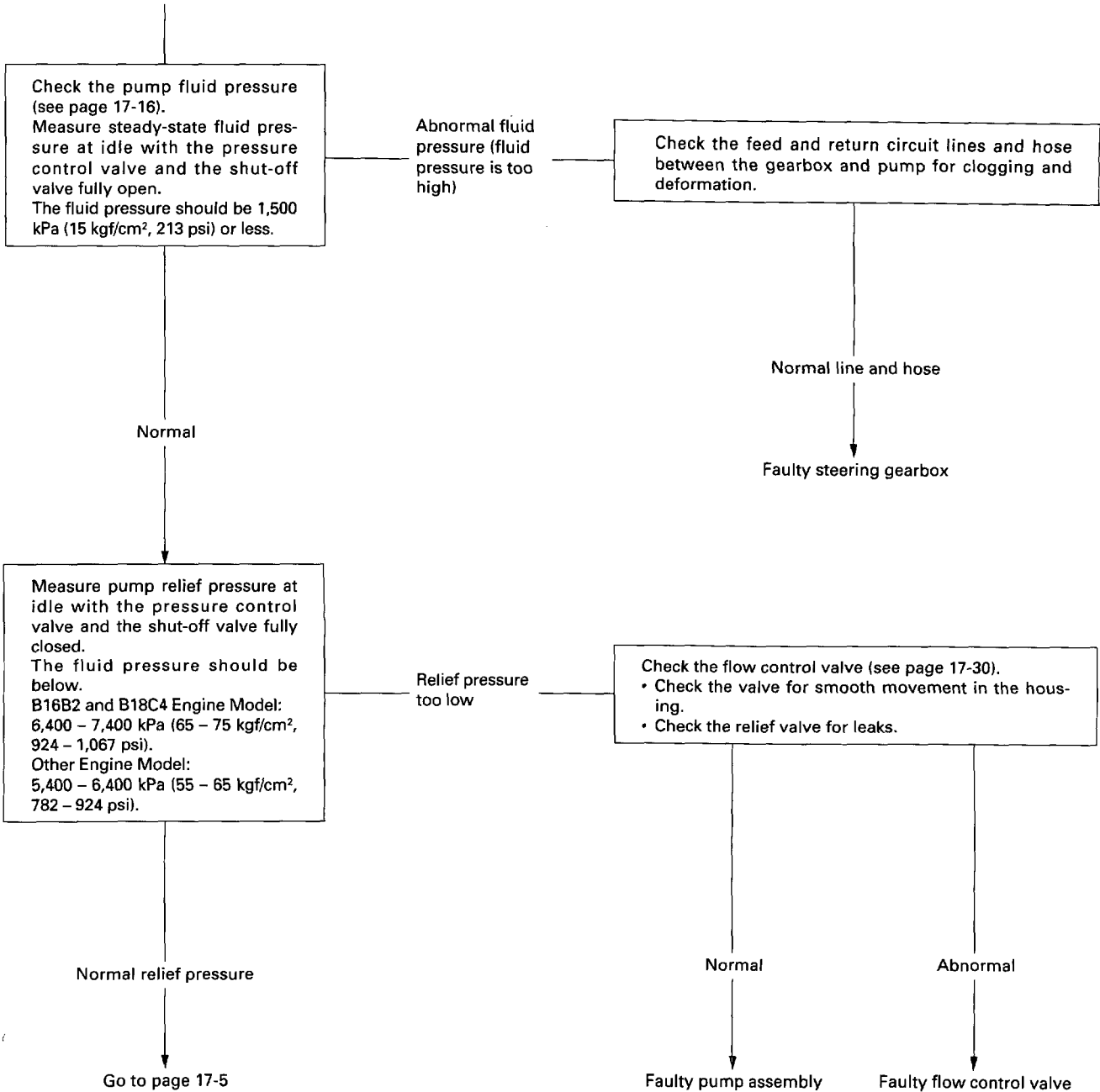
# Troubleshooting

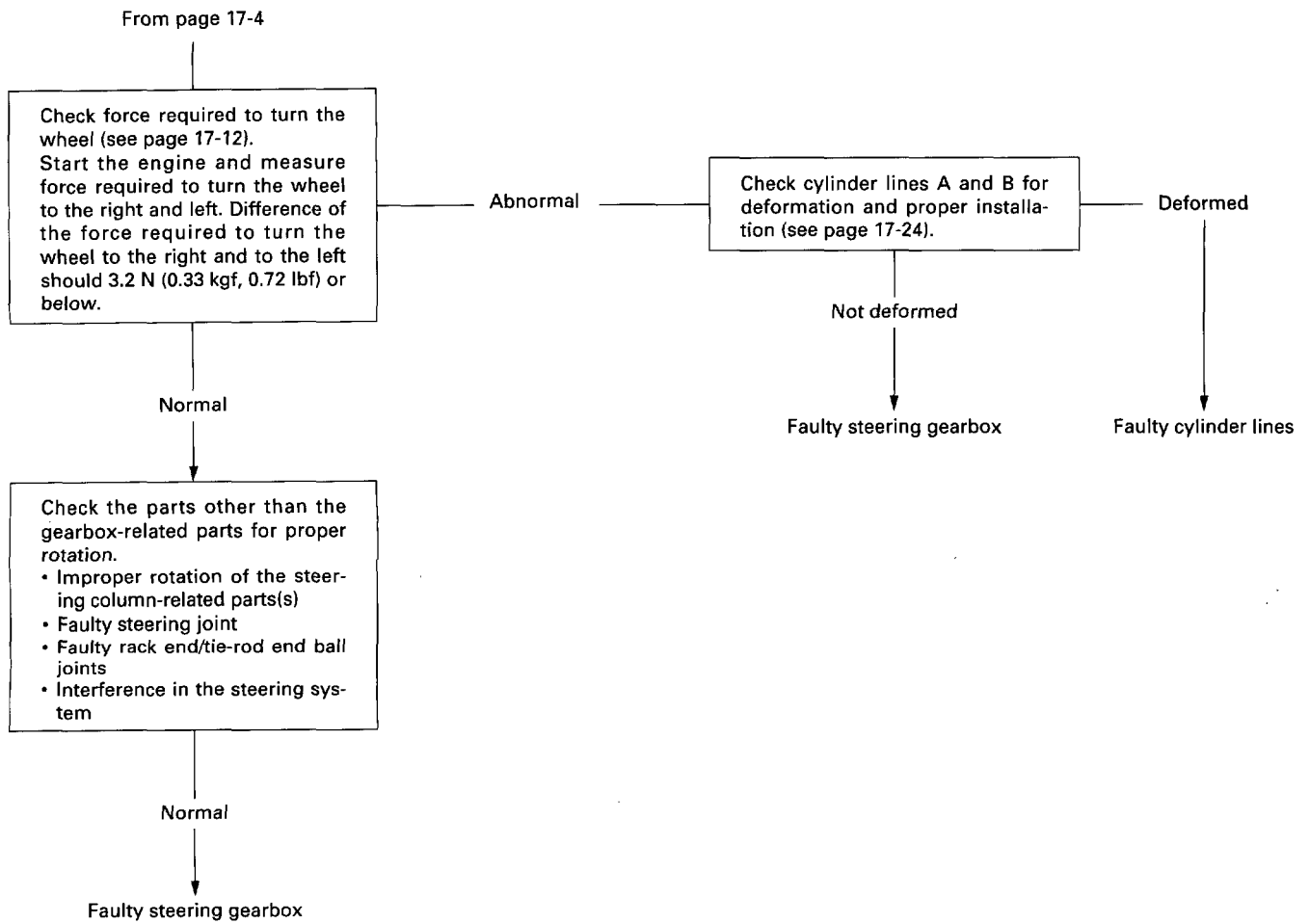
## General Troubleshooting

Check the following before you begin:

- Has the suspension been modified in a way that would affect steering?
- Are tire sizes, tire variety and air pressure correct?
- Is the steering wheel original equipment?
- Is the power steering pump belt properly adjusted?
- Is steering fluid reservoir filled to proper level?
- Is the engine idle speed correct and steady?

Hard Steering (Check the power assist, see page 17-12. If the force is over 30 N (3.1 kgf, 6.8 lbf), Proceed with this troubleshooting.)

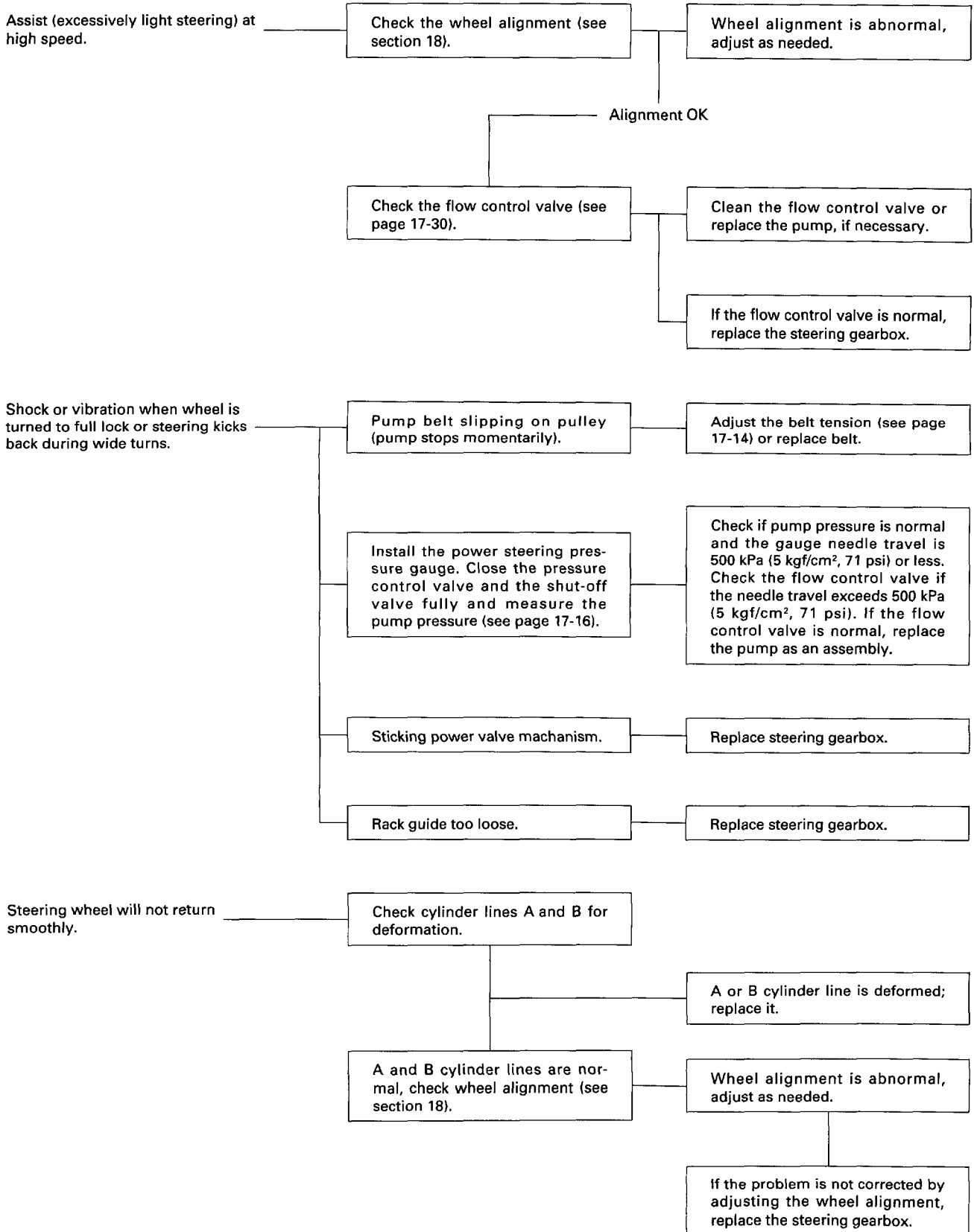




(cont'd)

# Troubleshooting

## General Troubleshooting (cont'd)





Uneven or rough steering.

Improperly rack clearance.

Replace steering gearbox.

Belt slipping on pulley.

Adjust belt tension. Replace belt, if necessary (see page 17-14).

Idle speed low or erratic.

If the engine stalls when wheel is turned while the vehicle is stopped or moving at low speed, adjust idle speed (see section 11).

Air in reservoir, or check power steering fluid level.

Check power steering fluid level. If level is excessively low, check for leaks in the system. Add fluid to the specified level.

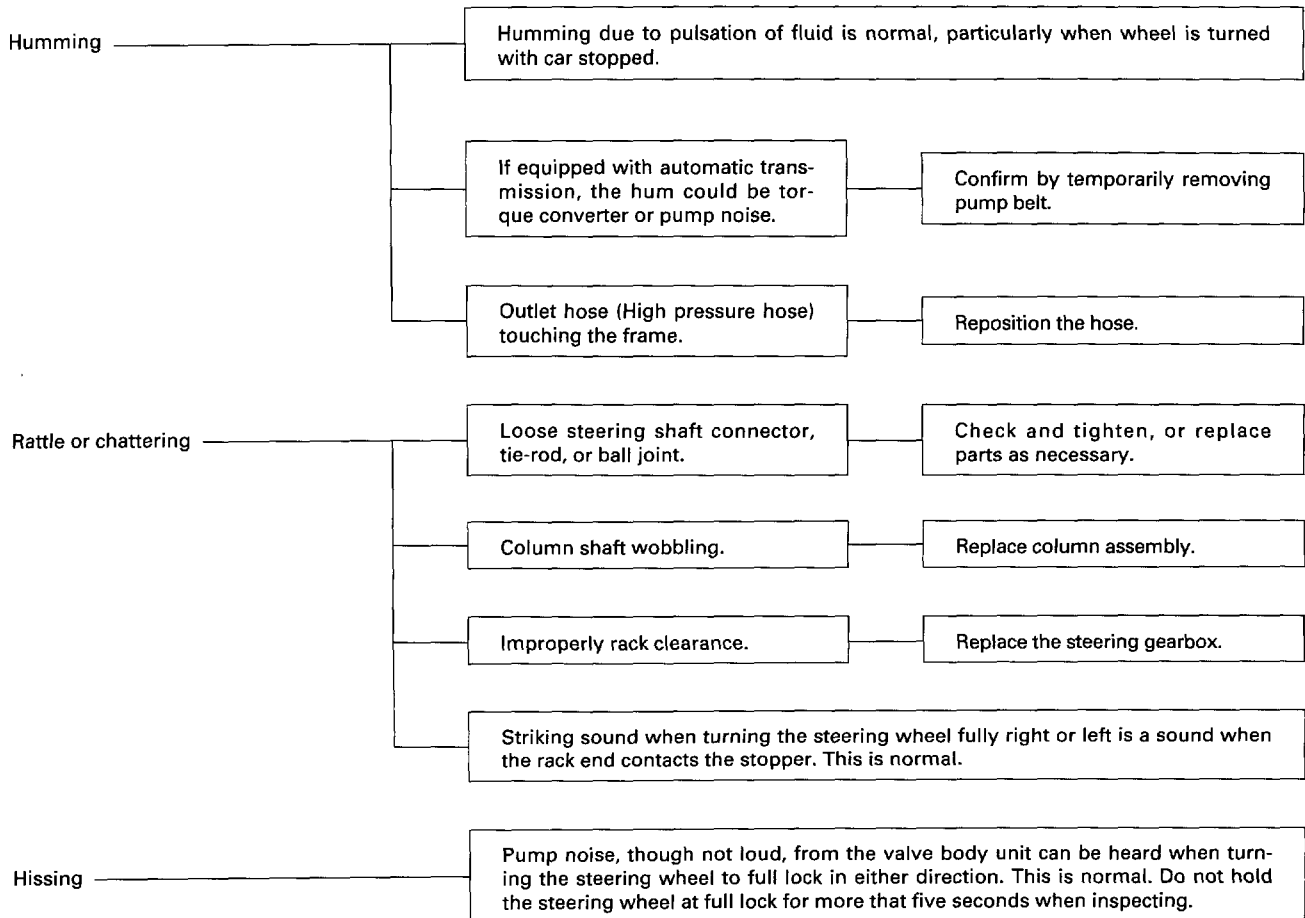
If fluid level is OK, check O-rings and seals on both ends of the pump inlet hose, and the P/S pump housing mating surfaces the pump shaft oil seal for suction leaks. Replace parts as necessary.

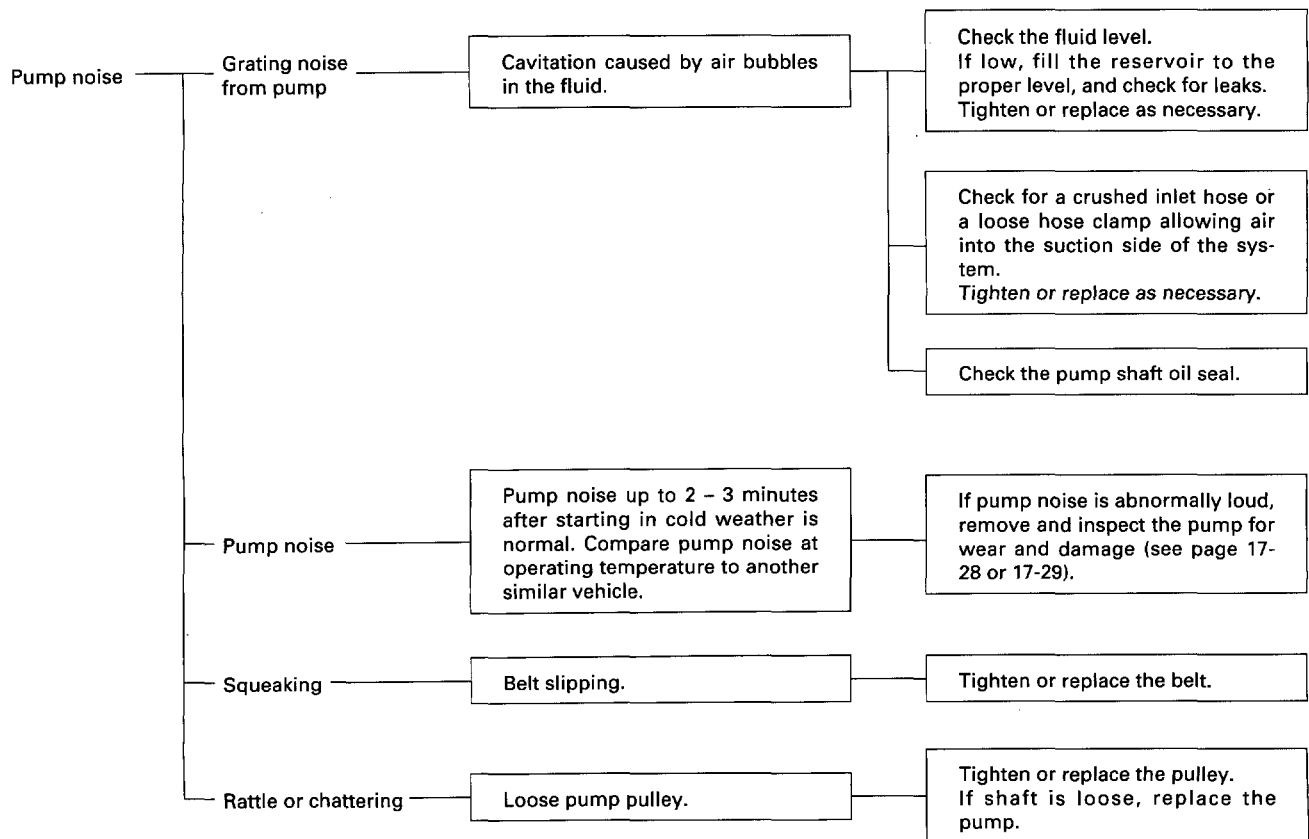


# Troubleshooting

## Noise and Vibration

NOTE: Pump noise in first 2 – 3 minutes after starting in cold weather is normal.





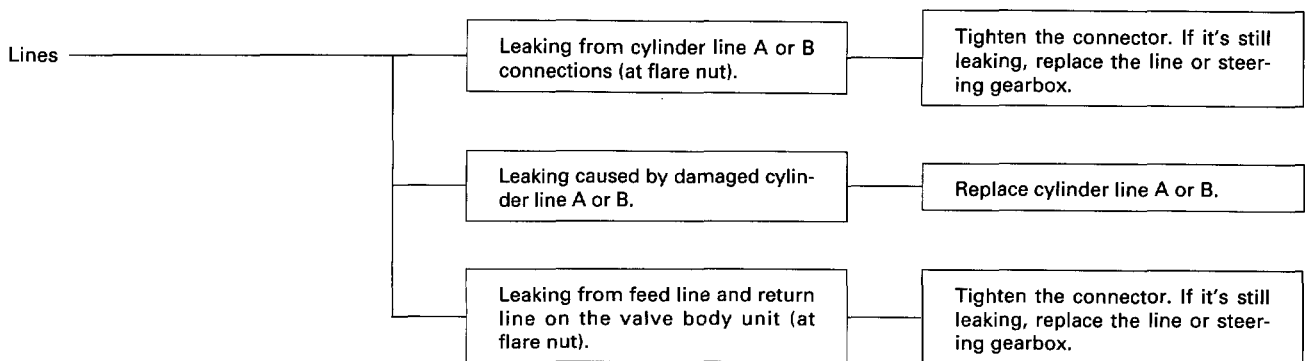
# Troubleshooting

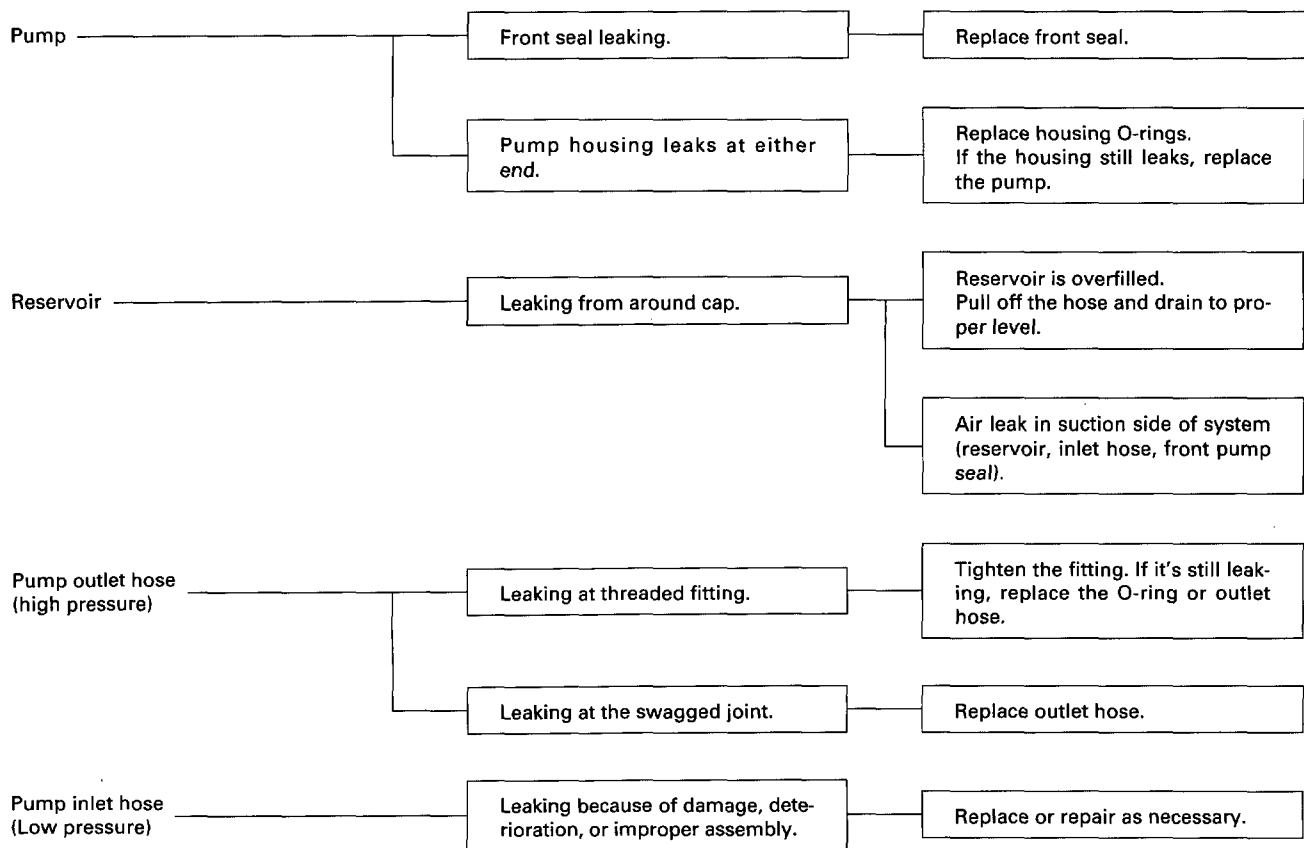
## Fluid Leaks

Steering Gearbox ————— Check the gearbox assembly for fluid leaks carefully. Fluid can leak out of various points, depending on location of the faulty oil seals/seal rings.

If leaking from the following sections on the steering gearbox, replace the whole gearbox as an assembly. Do not try to disassemble to gearbox.

- Leaking from the oil seal on the top of the valve housing.
- Leaking from the cylinder end into left or right tie-rod boots.
- Leaking from the shaft upper end section or pin engagement section of the pinion shaft.
- Leaking from the mating surface of the valve body unit and gearbox.





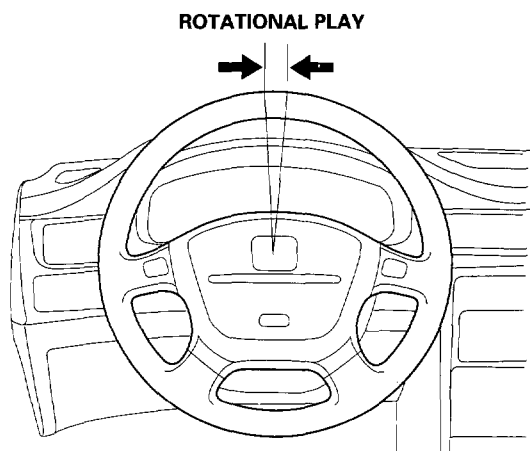
# Inspection and Adjustment

## Steering Operation

Place the front wheels in the straight ahead position and measure the distance the steering wheel can be turned without moving the front wheels.

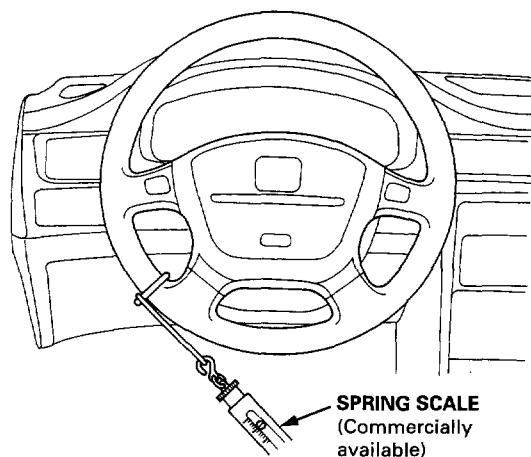
**ROTATIONAL PLAY: 0 – 10 mm (0 – 0.4 in)**

If the play exceeds the service limit, inspect the steering linkage and gearbox as described on the next page.



## Power Assist Check with Vehicle Parked

1. Check the power steering fluid level (see page 17-15) and pump belt tension (see page 17-14).
2. Start the engine, allow it to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid.
3. Attach a spring scale to the steering wheel. With the engine idling and the car on a clean, dry floor, pull the scale as shown and read it as soon as the tires begin to turn.

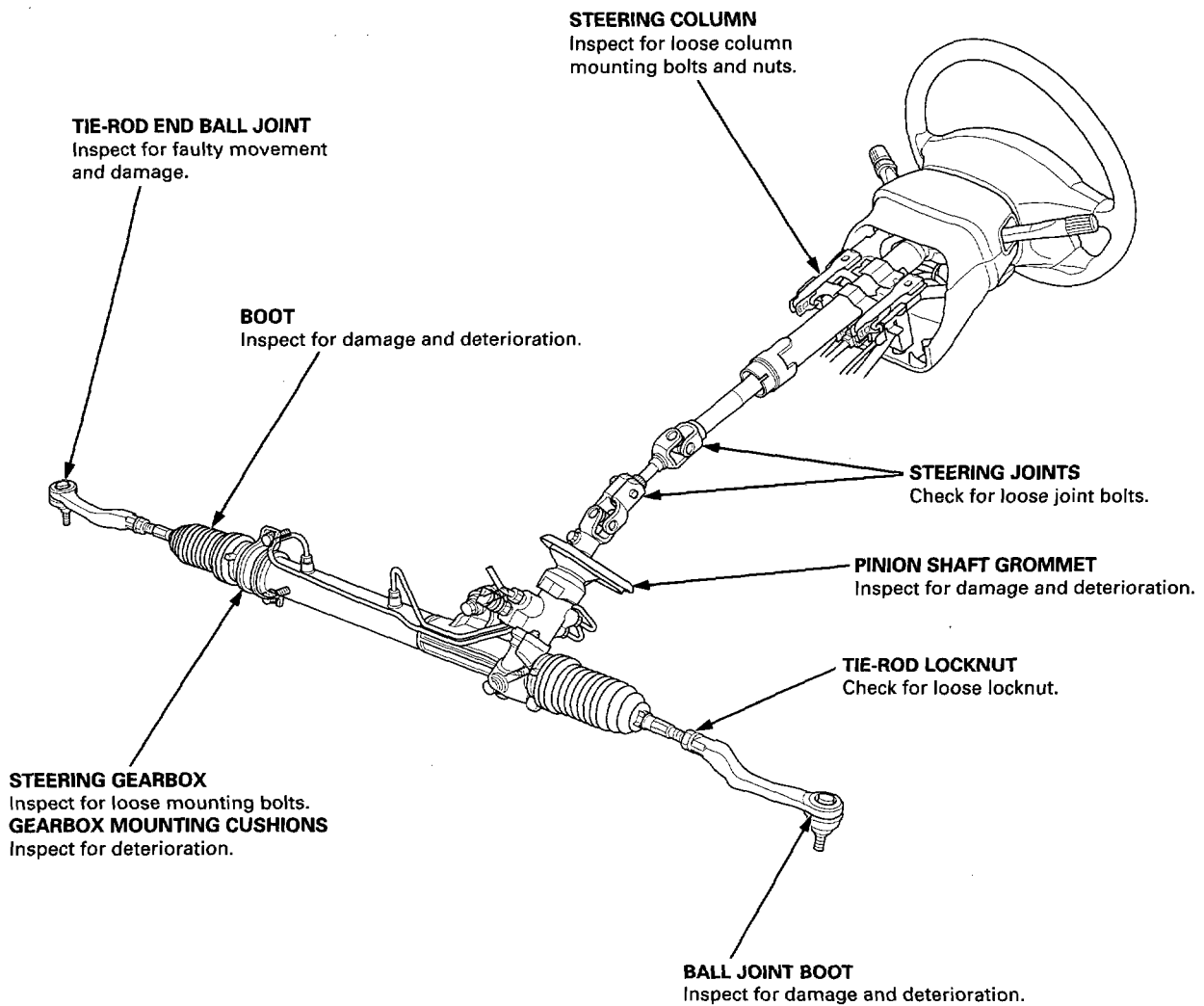


4. The scale should read no more than 30 N (3.1 kgf, 6.8 lbf). If it reads more check the gearbox and pump.



## Steering Linkage and Gearbox

NOTE: LHD type is shown, RHD type is symmetrical.



# Inspection and Adjustment

## Pump Belt

When using a new belt, first adjust the deflection or tension to the values for the new belt, then readjust the deflection or tension to the values for the used belt after running engine for five minutes.

### Inspection

Note these items during inspection:

- If there are cracks or any damage evident on the belt, replace it with a new one.
- Follow the manufacturer's instructions for the tension gauge.

1. Attach the belt tension gauge to the belt and measure the tension of the belt.
2. Remove the belt tension gauge carefully to avoid hitting the gauge reset lever.

### Tension:

#### B18C4 Engine Model:

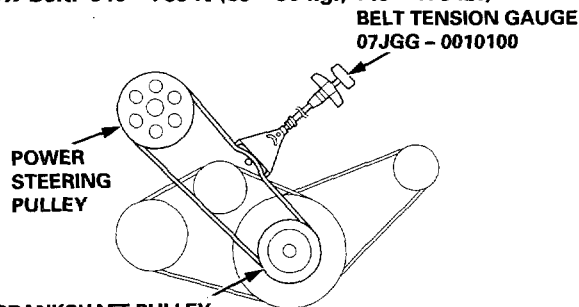
Used Belt: 390 – 540 N (40 – 55 kgf, 88 – 120 lbf)

New Belt: 735 – 880 N (75 – 90 kgf, 170 – 200 lbf)

#### All except B18C4 Engine Models:

Used Belt: 340 – 490 N (35 – 50 kgf, 77 – 110 lbf)

New Belt: 640 – 785 N (65 – 80 kgf, 143 – 176 lbf)



### Measurement without Belt Tension Gauge:

#### Measurement without Belt Tension Gauge:

Apply a force of 98 N (10 kgf, 22 lbf) and measure the deflection between the power steering pump and the crankshaft pulleys.

### Deflection:

#### B18C4 Engine Model:

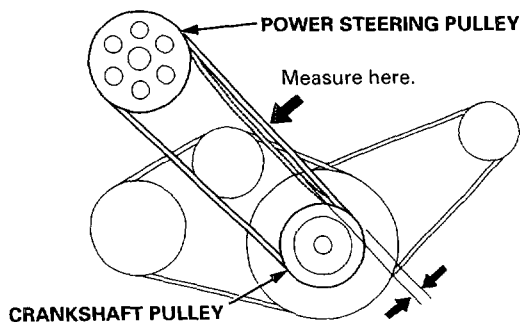
Used Belt: 11.5 – 13.5 mm (0.45 – 0.53 in)

New Belt: 8.0 – 10.0 mm (0.31 – 1.39 in)

#### All except B18C4 Engine Models:

Used Belt: 10.5 – 14.0 mm (0.41 – 0.55 in)

New Belt: 7.5 – 10.0 mm (0.30 – 1.39 in)

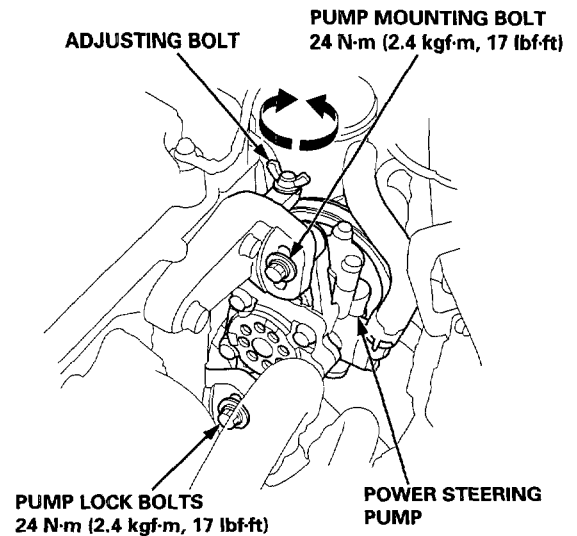


### Adjustment

1. Loosen the power steering pump mounting bolt and pump lock bolt.
2. Adjust the belt tension.

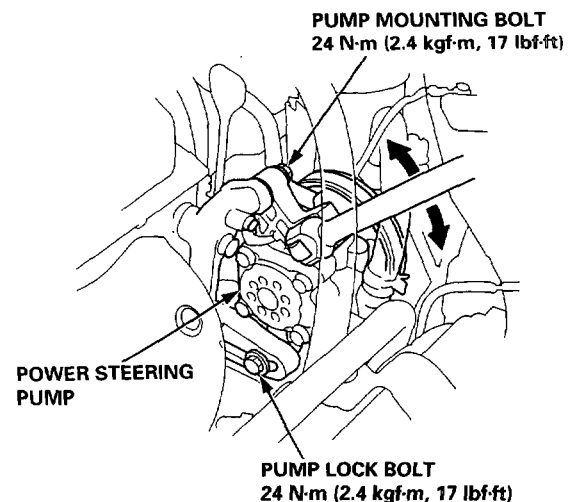
#### B18C4 Engine Model:

- Turn the adjusting bolt to get the proper belt tension, then retighten the mounting bolt and lock bolt.



#### All except B18C4 Engine Models:

- Adjust the belt tension by moving the power steering pump with a 1/2" drive breaker bar to obtain the proper belt tension, then retighten the mounting bolt and lock bolt.



3. Start the engine and turn the steering wheel from lock-to-lock several times, then stop the engine and recheck the deflection of the belt.



## Fluid Replacement

Check the reservoir at regular intervals, and add fluid as necessary.

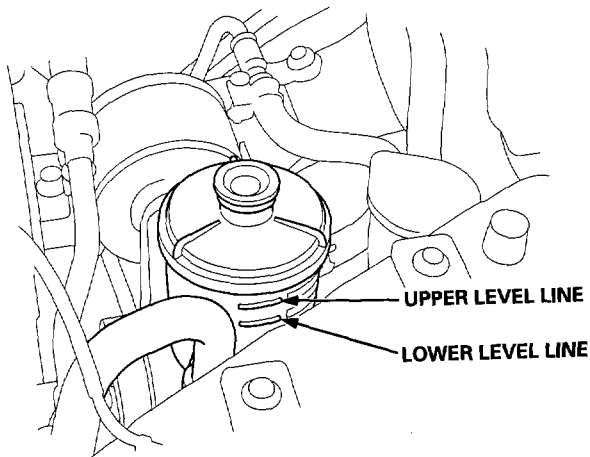
### CAUTION

Use only Genuine Honda Power Steering Fluid (V, II or S). Using other fluids such as ATF or other manufacturer's power steering fluid will damage the system.

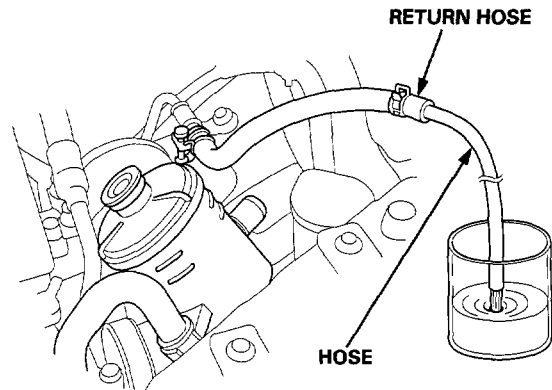
#### SYSTEM CAPACITY:

LHD: 1.0 liter (1.06 US. qt, 0.88 Imp.qt)

RHD: 0.9 liter (0.95 US. qt, 0.79 Imp.qt)  
at disassembly



1. Raise the reservoir and disconnect the return hose to drain the reservoir. Take care not to spill the fluid on the body and parts. Wipe off spilled fluid at once.



2. Connect a hose of suitable diameter to the disconnected return hose, and put the hose end in a suitable container.
3. Start the engine, let it run at idle, and turn the steering wheel from lock-to-lock several times. When fluid stops running out of the hose, shut off the engine. Discard the fluid.
4. Refit the return hose on the reservoir.
5. Fill the reservoir to the upper level line.
6. Start the engine and run it at fast idle, then turn the steering from lock-to-lock several times to bleed air from the system.
7. Recheck the fluid level and add some if necessary. Do not fill the reservoir beyond the upper level line.

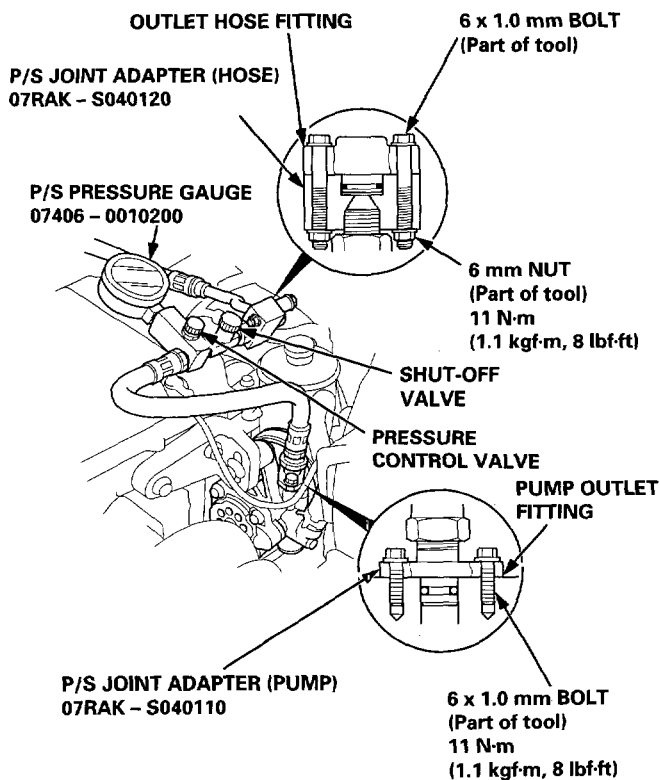


# Inspection and Adjustment

## Pump Pressure Check

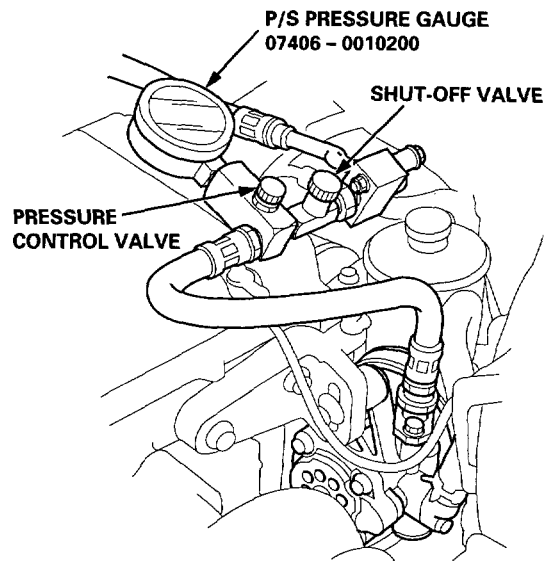
Check the fluid pressure as follows to determine whether the trouble is in the pump or gearbox.

1. Check the power steering fluid level (see page 17-15) and pump belt tension (see page 17-14).
2. Disconnect the pump outlet hose from the pump outlet with care so as not to spill the power steering fluid on the frame and other parts, then install the P/S joint adapter (pump) on the pump outlet.



3. Connect the P/S joint adapter (hose) to the P/S pressure gauge, then connect the pump outlet hose to the P/S joint adapter (hose).
4. Install the P/S pressure gauge to the P/S joint adapter (pump).

5. Fully open the shut - off valve.



6. Fully open the pressure control valve.
7. Start the engine and let it idle.
8. Turn the steering wheel from lock-to-lock several times to warm the fluid to operating temperature.
9. Measure steady-state fluid pressure while the engine is idling. If the pump is in good condition, the gauge should read less than 1,500 kPa (15 kgf/cm<sup>2</sup>, 213 psi). If it reads high, check the outlet hose or valve body unit (see General Troubleshooting).
10. Close the pressure control valve, then close the shut-off valve gradually until the pressure gauge needle is stable. Read the pressure.

### CAUTION

Do not keep the pressure control valve closed more than 5 seconds or the pump could be damaged by over-heating.

11. Immediately open the pressure control valve fully. If the pump is in good condition, the gauge should read at least as follows:  
D16B2 and B18C4 Engine Models:  
6,400 - 7,400 kPa (65 - 75 kgf/cm<sup>2</sup>, 924 - 1,067 psi)  
Other Engine Models:  
5,400 - 6,400 kPa (55 - 65 kgf/cm<sup>2</sup>, 782 - 924 psi)  
A low reading means pump output is too low for full assist. Repair or replace the pump.

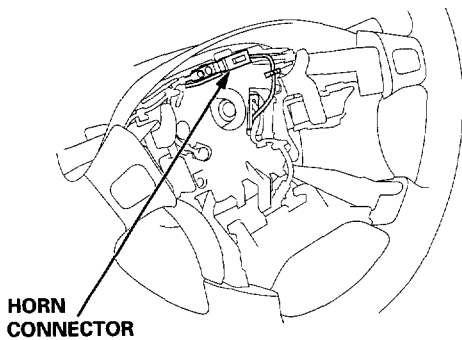


## Removal

### Vehicles With SRS

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

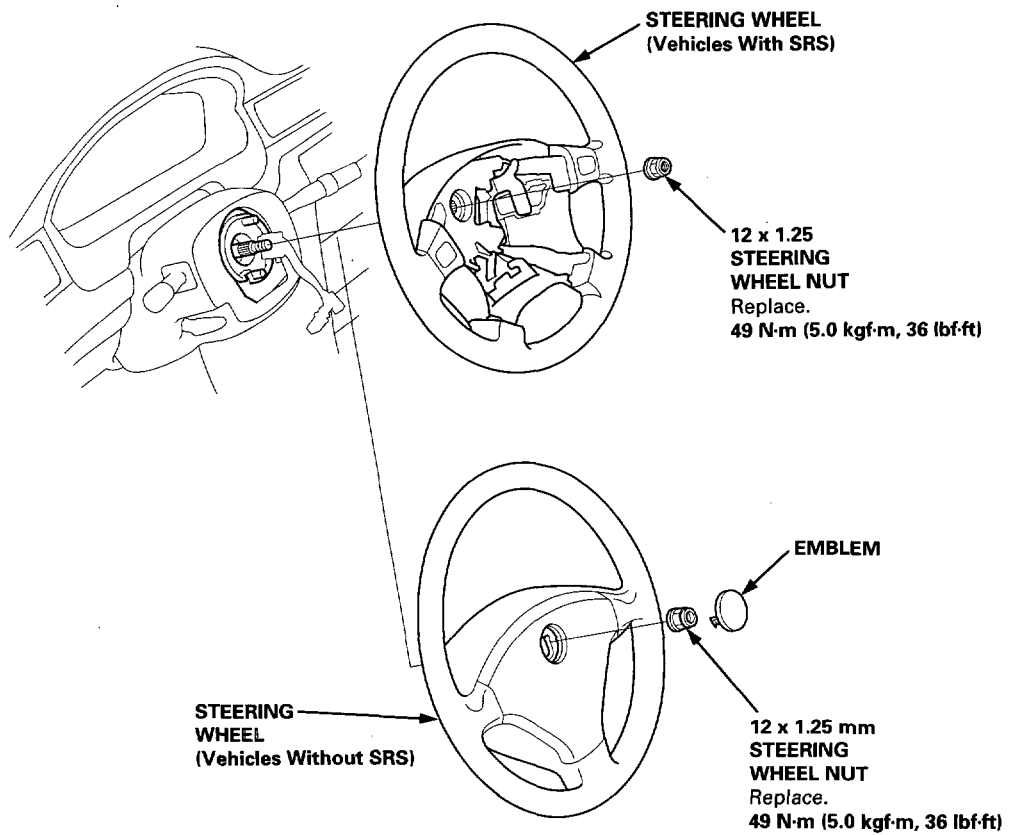
1. Align the front wheels straight ahead, then remove the driver's airbag assembly from the steering wheel (see section 24).
2. Disconnect the horn connector.



3. Remove the steering wheel nut.

### Vehicles Without SRS

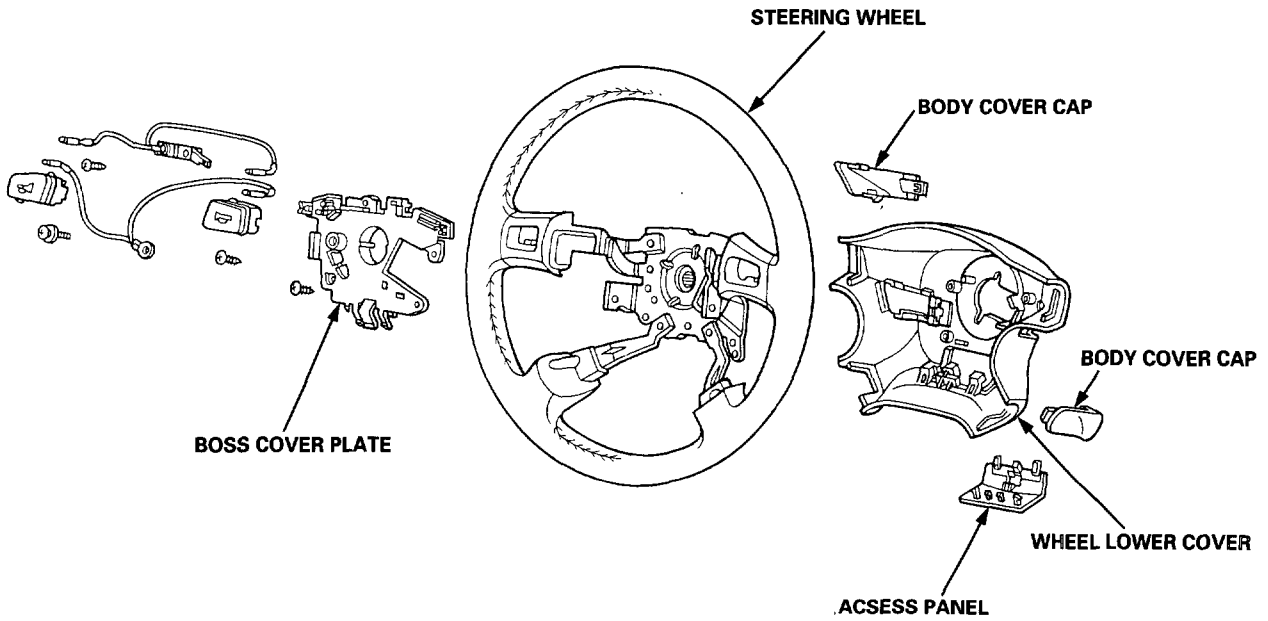
1. Remove the emblem from the steering wheel center pad. Be careful not to damage the center pad.
2. Remove the steering wheel nut.
3. Remove the steering wheel by rocking it slightly from side-to-side as you pull steadily with both hands.



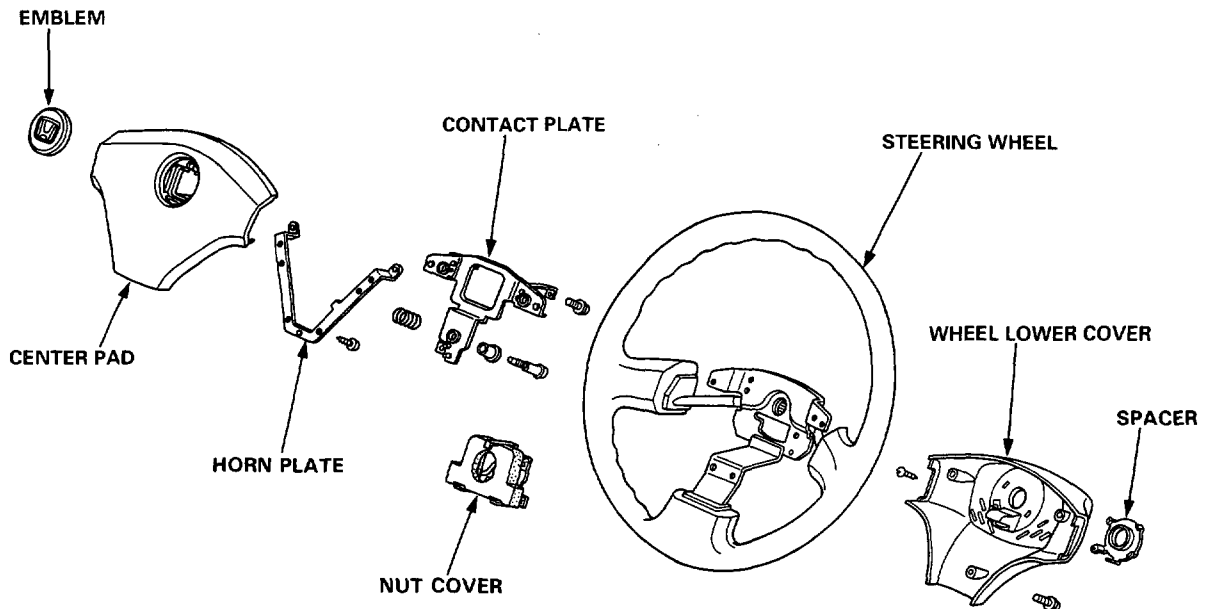
# Steering Wheel

## Disassembly/Reassembly

For Vehicles With SRS



For Vehicles Without SRS

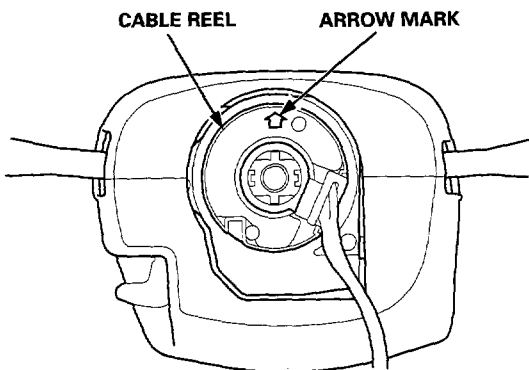




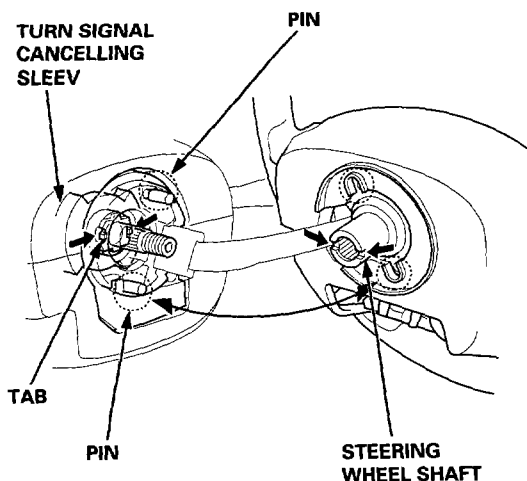
## Installation

### With SRS

1. Before installing the steering wheel, make sure the front wheels are aligned straight ahead, then center the cable reel. Do this by first rotating the cable reel clockwise until it stops. Then rotate it counterclockwise approximately two and half turns. The arrow mark on the cable reel label point should point straight up.



2. Position the two tabs of the turn signal cancelling sleeve as shown, and install the steering wheel on to the steering column shaft, making sure the steering wheel shaft engages the pins of the cable reel and tabs of the canceling sleeve. Do not tap on the steering wheel or steering column shaft when installing the steering wheel.

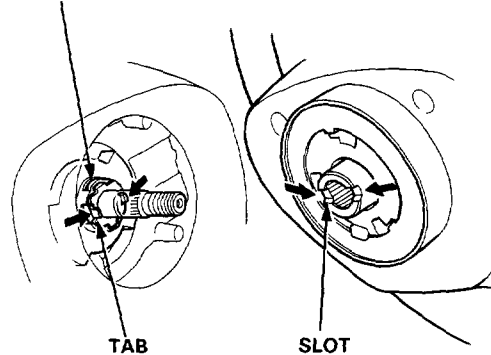


3. Install the steering wheel nut and tighten it to 49 N·m (5.0 kgf·m, 36 lbf·ft).
4. Connect the horn connector.
5. Install the driver's airbag assembly, and confirm that the system is operating properly (see section 24).
6. Check the horn and turn signal cancelling for proper operation.

### Without SRS

1. Before installing the steering wheel, make sure the front wheels are aligned straight ahead.

#### TURN SIGNAL CANCELLING SLEEVE



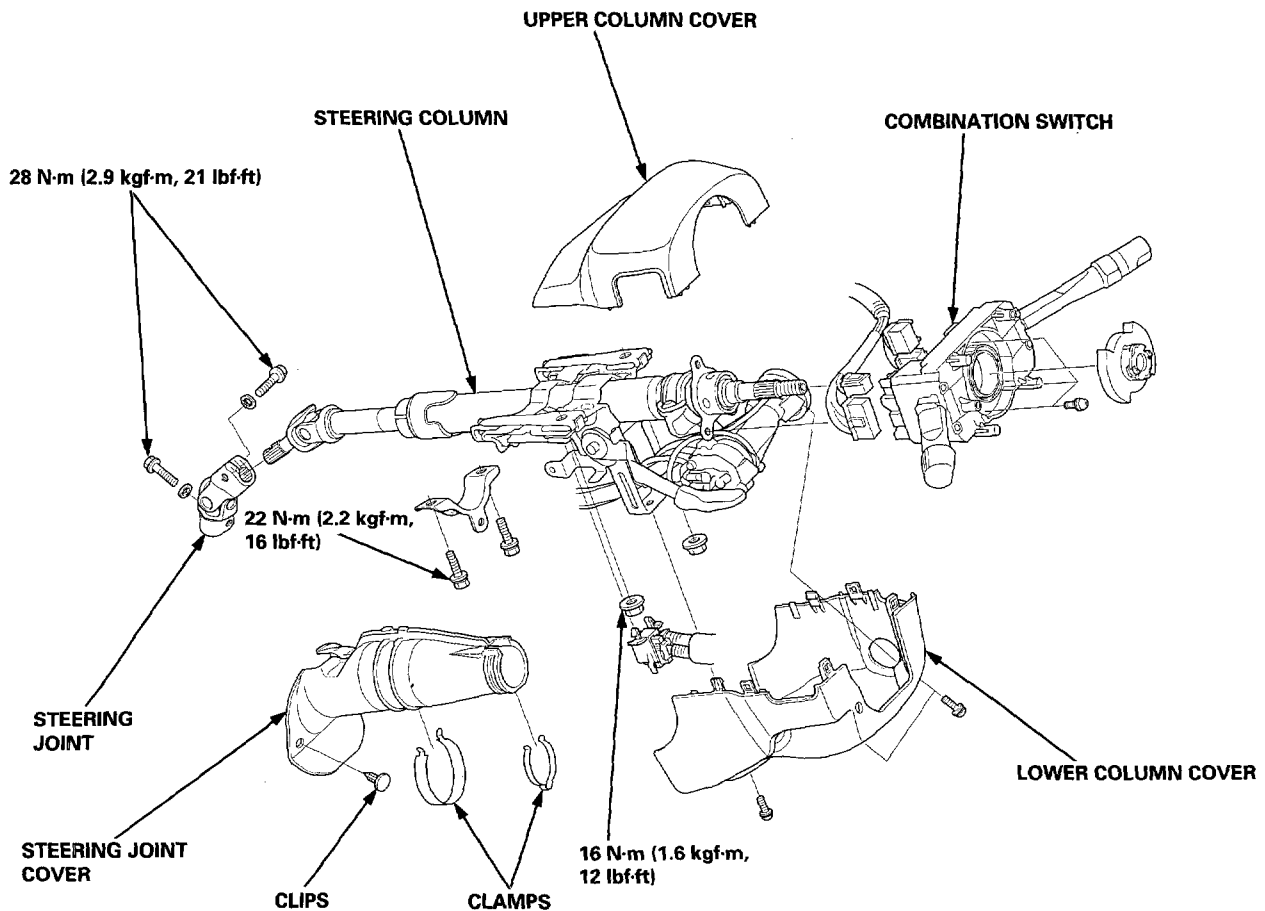
2. Position the two tabs of the turn signal cancelling sleeve as shown, and install the steering wheel on to the steering column shaft, making sure the steering wheel shaft engages the tabs of the canceling sleeve. Do not tap on the steering wheel or steering column shaft when installing the steering wheel.
3. Install the steering wheel nut and tighten it to 49 N·m (5.0 kgf·m, 36 lbf·ft).
4. Connect the horn connector.
5. Check the horn and turn signal cancelling for proper operation.

# Steering Column

## Removal/Installation

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

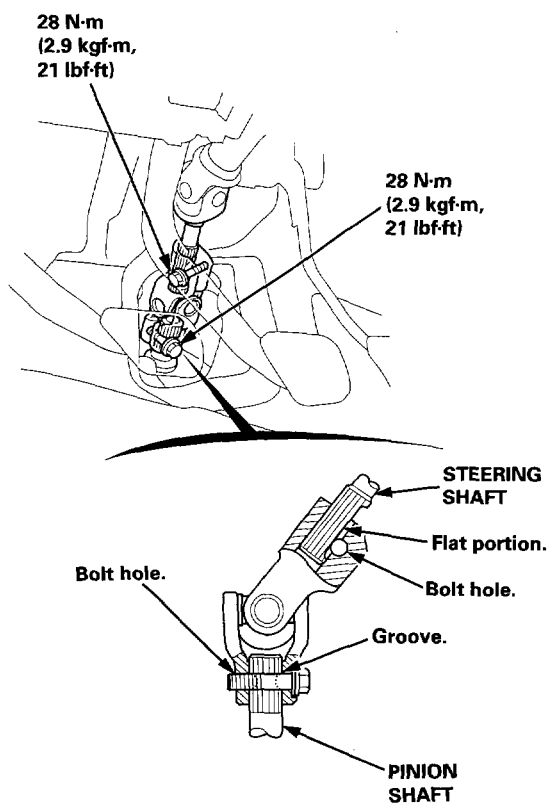
1. Remove the driver's airbag assembly and cable reel (see section 24).
2. Remove the steering wheel (see page 17-17).
3. Remove the driver's dashboard lower cover (see section 20).
4. Remove the column covers.



5. Remove the combination switch assembly from the steering column shaft by disconnecting the connectors.
6. Disconnect the ignition switch connectors.
7. Remove the steering joint cover.
8. Disconnect the steering joint, and remove it from the column shaft.
9. Remove the steering column by removing the attaching nuts and bolts.



10. Install the steering column in the reverse of removal, and note these items:
- Be sure the wires are not caught or pinched by any parts when installing the column.
  - Make sure the wire harness is routed and fastened properly.
  - Make sure the connectors are properly connected.
  - Make sure the steering joint is connected as follows:
    - Insert the upper end of the steering joint onto the steering shaft (line up the bolt hole with the flat portion on the shaft).

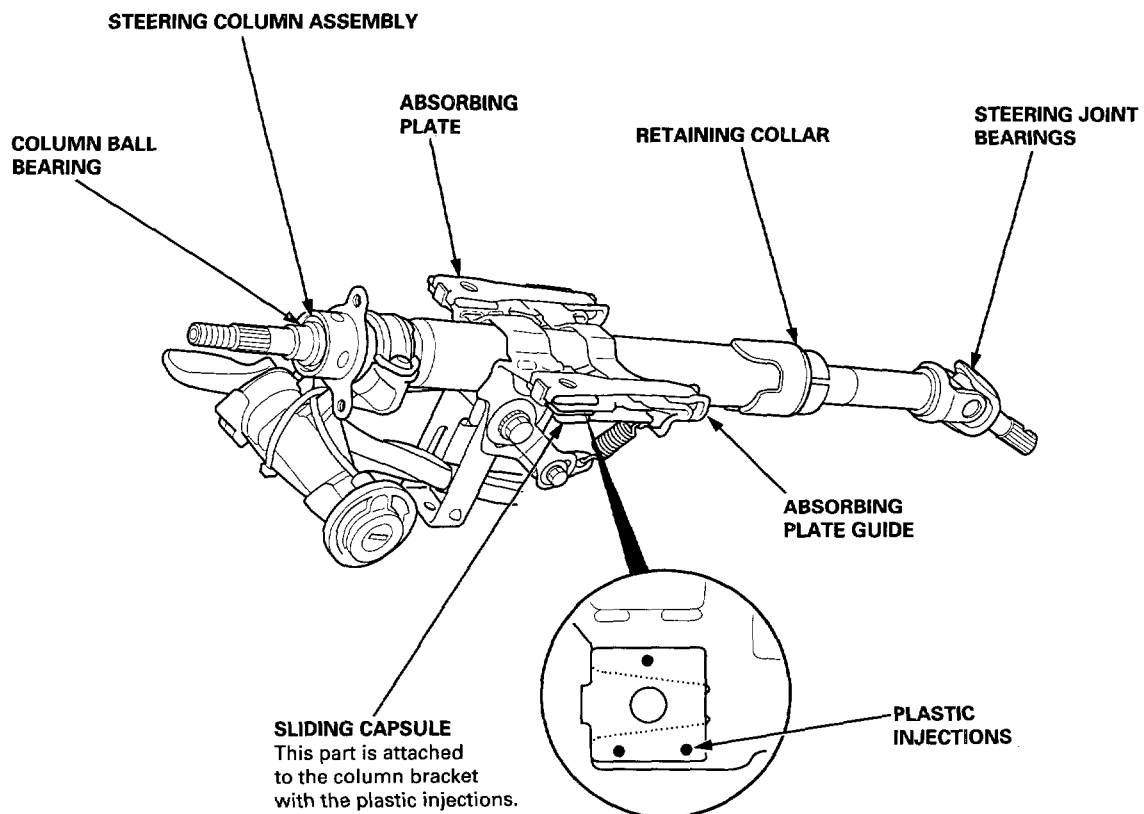


- Slip the lower end of the steering joint onto the pinion shaft (line up the bolt hole with the groove the around the shaft), and loosely install the lower joint bolt. Be sure that the lower joint bolt is securely in the groove in the pinion shaft.
- Pull on the steering joint to make sure that the steering joint is fully seated. Then install the upper joint bolt and tighten it.

# Steering Column

## Inspection

- Check the steering column ball bearing and the steering joint bearings for play and proper movement. If there is noisy or if there is excessive play, replace the steering column as an assembly.
- Check the retaining collar for damage. If it is damage, replace the steering column as an assembly.
- Check the absorbing plates, absorbing plate guides and sliding capsules for distortion breakage. If there is distortion breakage, replace the steering column as an assembly.

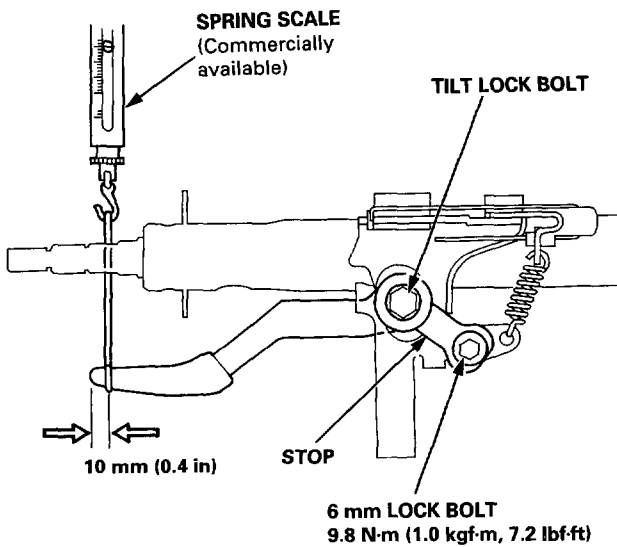




## Steering Lock Replacement

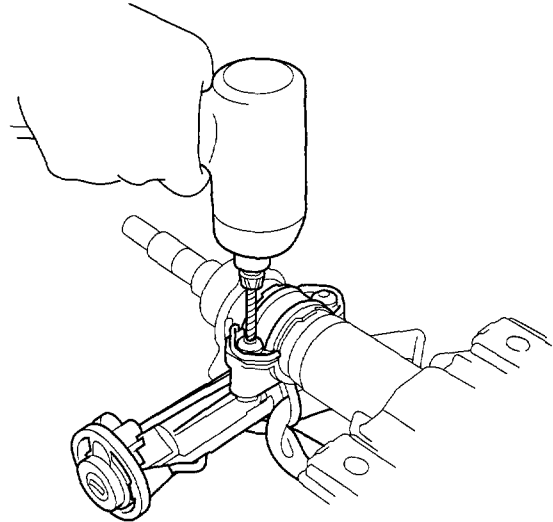
1. Move the tilt lever from the loose position to the lock position 3 to 5 times; then measure the tilt lever preload 10 mm (0.4 in) from the end of the tilt lever.

**Preload: 70 – 90 N (7 – 9 kgf, 15 – 20 lbf)**

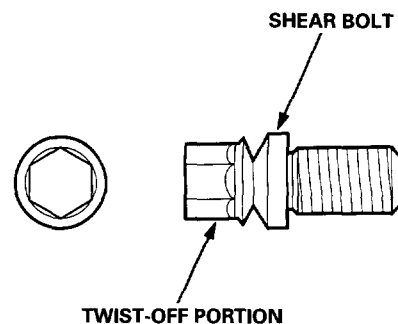


2. If the measurement is out of the specification, adjust the preload using the following procedures.
  - Loosen the tilt lever, and set the steering column in the neutral position.
  - Remove the 6 mm lock bolt, and remove the stop. Be careful not to loosen the tilt lever when installing the stop or tightening the 6 mm lock bolt.
  - Adjust the preload by turning the tilt lock bolt left or right.
  - Pull up the tilt lever to the uppermost position, and install the stop. Check the preload again. If the measurement is still out of specification, repeat the above procedures to adjust.

1. Remove the steering column (see page 17-20).
2. Center punch each of the two shear bolts, and drill their heads off with a 5 mm (3/16 in) drill bit. Be careful not to damage the switch body when removing the shear bolts.



3. Remove the shear bolts from the switch body.
4. Install the switch body without the key inserted.
5. Loosely tighten the new shear bolts.
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.



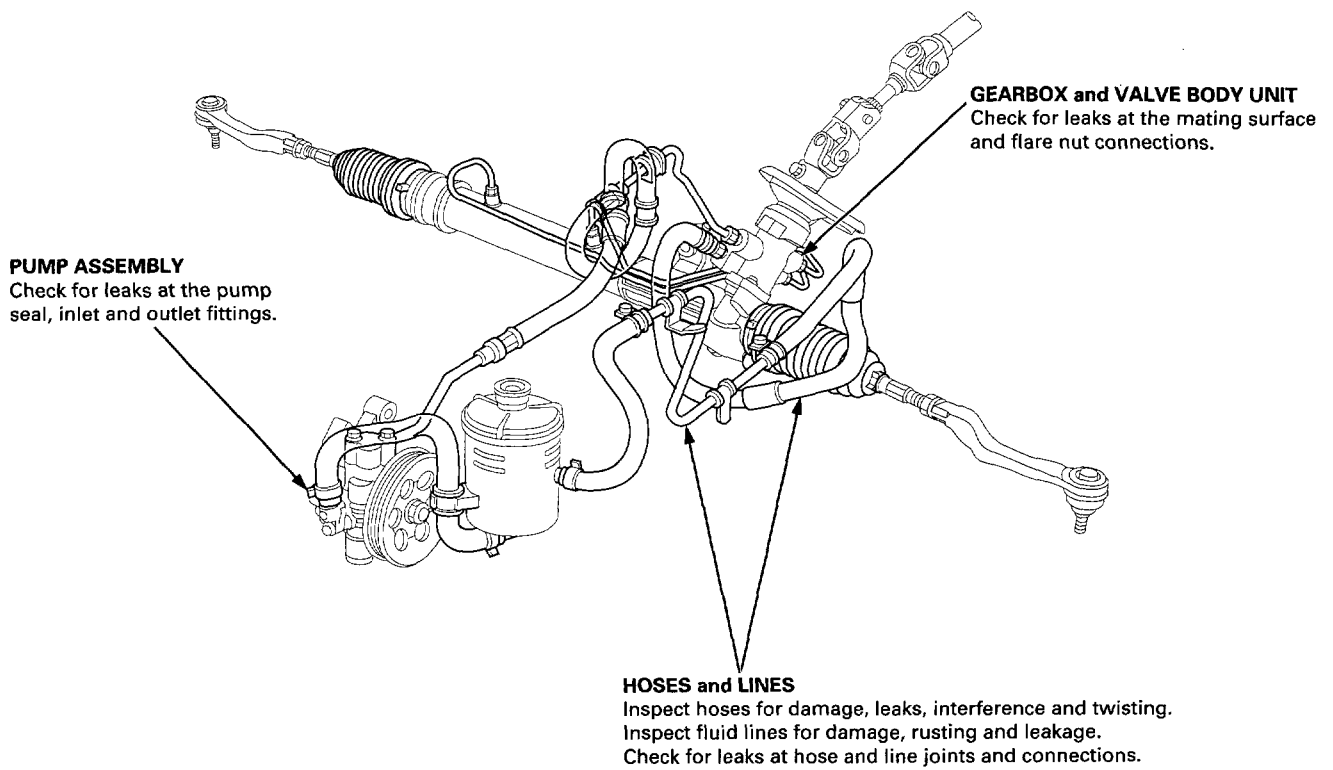


# Power Steering Hoses, Lines

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## Fluid Leakage Inspection

NOTE: LHD type steering gearbox is shown.





## Replacement

Note these items during installation:

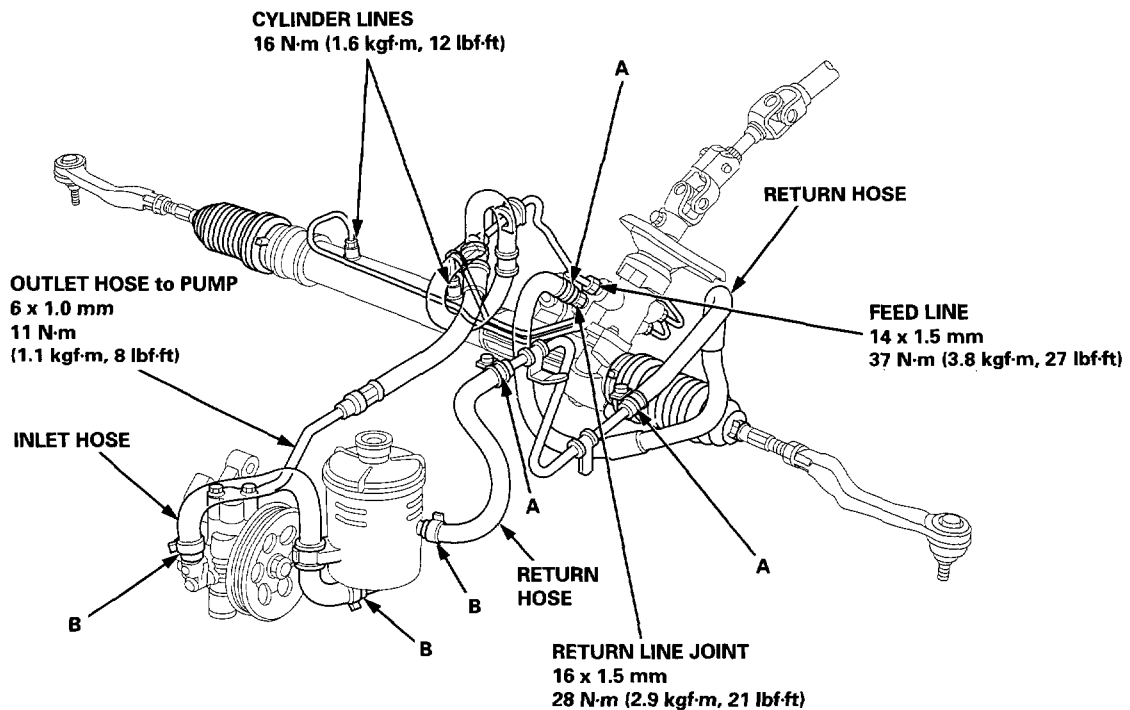
- Connect each hose to the corresponding line securely until it contacts the stop on the line. Install the clamp or adjustable clamp at the specified distance from the hose end as shown.
- Check all clamps for deterioration or deformation; replace with the clamps new ones if necessary.
- Add the recommended power steering fluid to the specified level on the reservoir and check for leaks.

### ADJUSTABLE HOSE CLAMP: (A)

- Position the adjustable hose clamps at the three points indicated.
- Slide the hose over the line until it contacts the stop.

### HOSE CLAMP: (B)

- Position the hose clamps at the four points indicated.
- Slide the hose over the line until it contacts the stop.

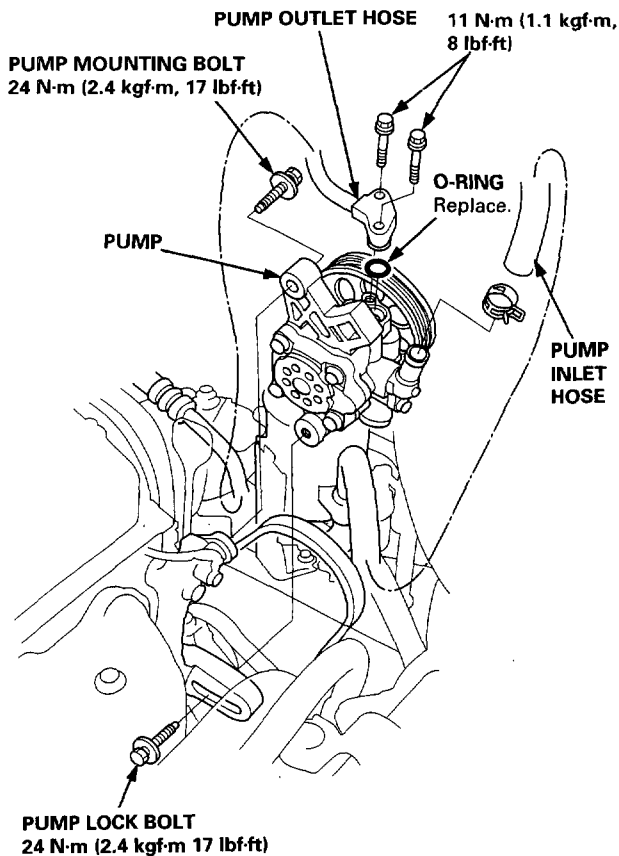


# Power Steering Pump

## Replacement

### Except B18C4 Engine Model

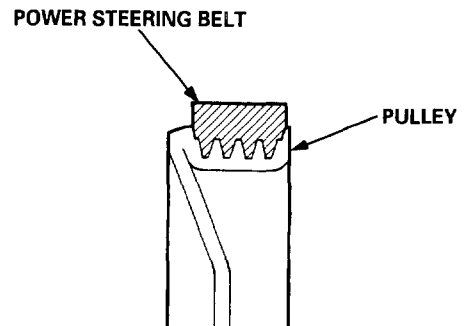
1. Place a suitable container under the vehicle.
2. Drain the power steering fluid from the reservoir.
3. Remove the belt by loosening the pump mounting bolt and lock bolt.
4. Cover the A/C compressor with several shop towels to protect it from spilled power steering fluid. Disconnect the pump inlet hose and outlet hose from the pump, and plug them. Take care not to spill the fluid on the body or parts. Wipe off any spilled fluid at once.



5. Remove the pump mounting bolts and lock bolt, then remove the pump. Do not turn the steering wheel with the pump removed.
6. Cover the opening of the pump with a piece of tape to prevent foreign material from entering the pump.
7. Connect the pump inlet hose and outlet hose. Tighten the pump fittings securely.
8. Loosely install the pump in the pump bracket with mounting bolt and lock bolt.
9. Install the pump belt.

Note these items during belt installation:

- Make sure that the power steering belt is positioned properly on the pulleys.
- Do not get power steering fluid or grease in the power steering belt or pulley faces. Clean off any fluid or grease before installation.

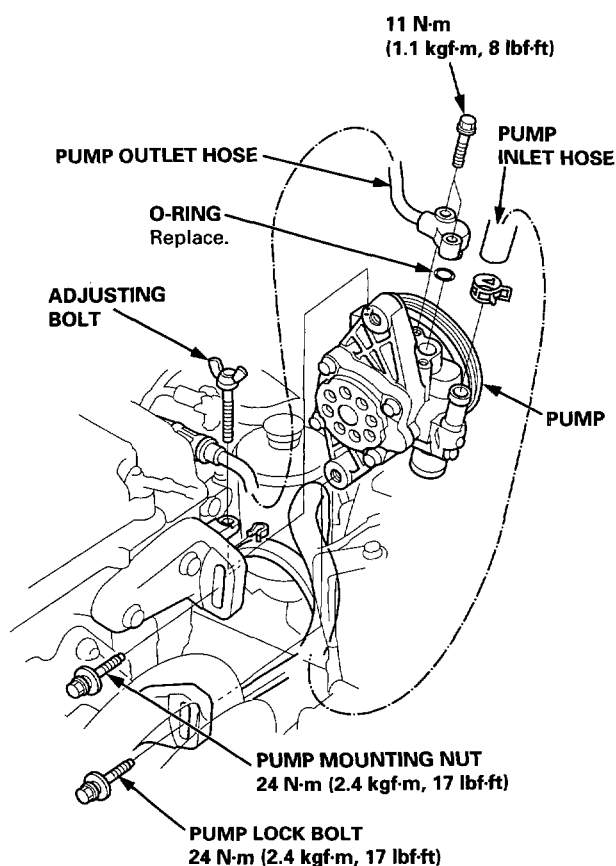


10. Adjust the pump belt (see page 17-14).
11. Fill the reservoir to the upper level line (see page 17-15).



### B18C4 Engine Model

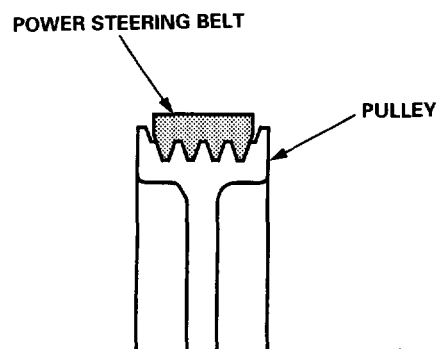
1. Place a suitable container under the vehicle.
2. Remove the belt by loosening the pump adjusting bolt, mounting bolts and nuts.
3. Cover the A/C compressor with several shop towels to protect it from spilled power steering fluid.
4. Disconnect the pump inlet hose and the pump outlet hose from the pump, and plug them. Take care not to spill the fluid on the body or parts. Wipe off any spilled fluid at once.



5. Remove the pump mounting bolt and lock bolt, then remove the pump. Do not turn the steering wheel with the pump removed.
6. Cover the opening of the pump with a piece of tape to prevent foreign material from entering the pump.
7. Connect the pump inlet hose and the pump outlet hose. Tighten the pump fittings securely.
8. Loosely install the pump in the pump bracket with the mounting bolt, lock bolt and adjusting bolt.
9. Install the pump belt.

Note these items during belt installation:

- Make sure that the power steering belt is properly positioned on the pulleys.
- Do not get power steering fluid or grease on the power steering belt or pulley faces. Clean off any fluid or grease before installation.



10. Adjust the pump belt (see page 17-14).
11. Fill the reservoir to the upper level line (see page 17-15).

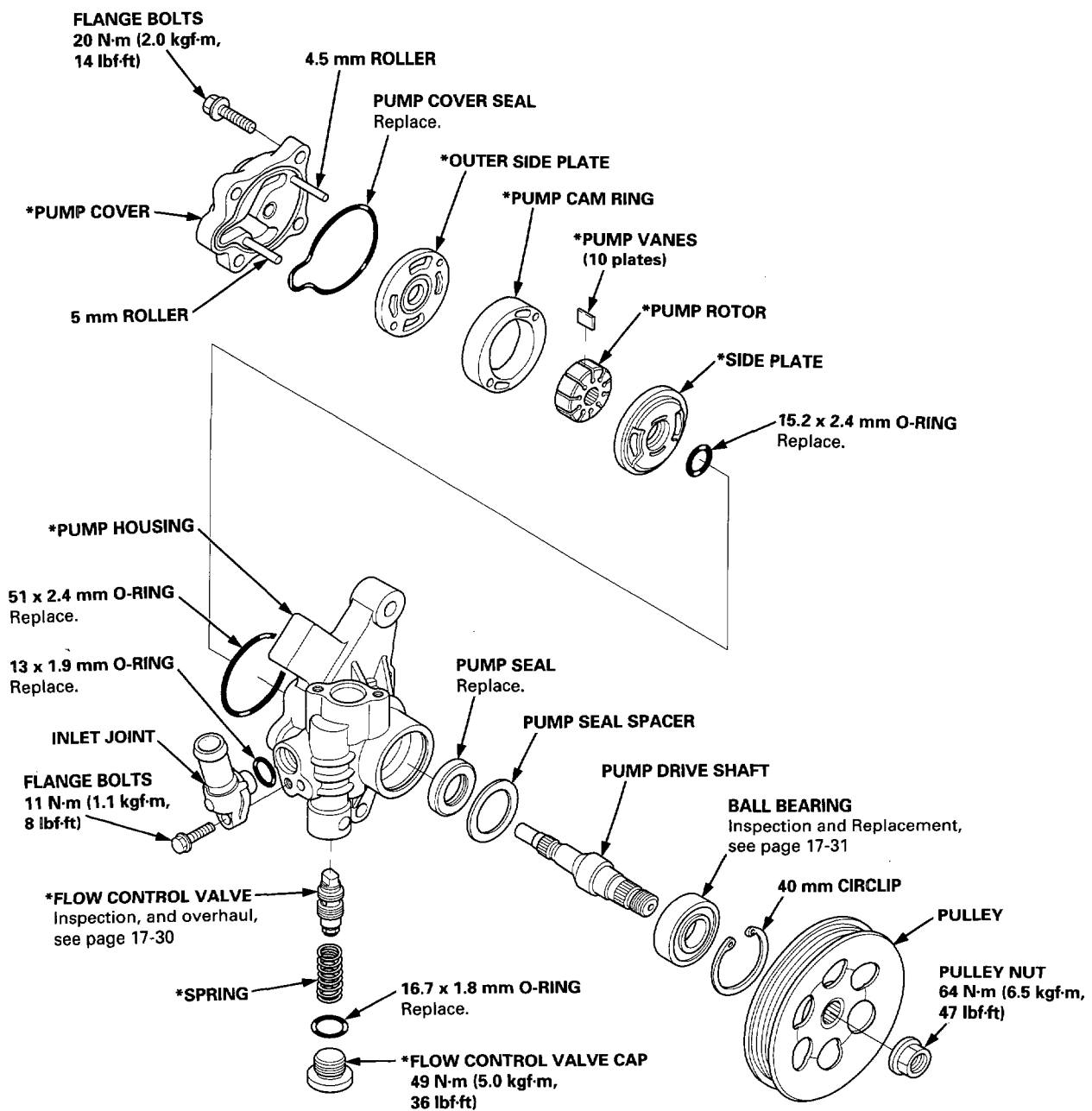
# Power Steering Pump

## Disassembly

All except B18C4 Engine Model

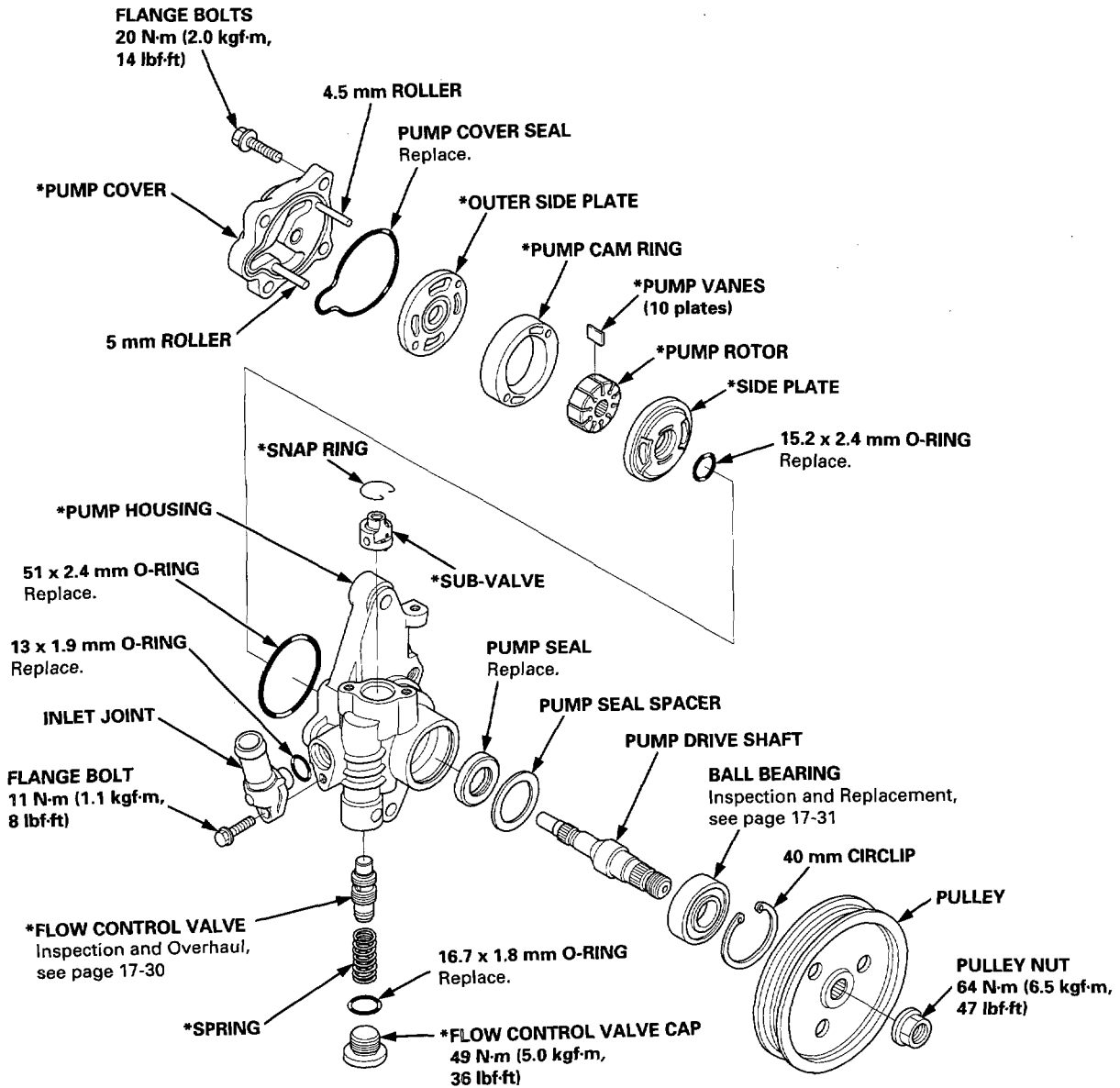
Note these items during disassembly:

- The power steering components are made of aluminum. Avoid damaging the components during assembly.
- Clean the disassembled parts with a solvent, and dry them with compressed air. Do not dip the rubber parts in a solvent.
- Always replace the O-rings and rubber seals with new ones before assembly.
- Apply recommended power steering fluid to the parts indicated in the assembly procedures.
- Do not allow dust, dirt, or other foreign materials to enter the power steering system.
- Replace the pump as an assembly if the parts indicated with asterisk (\*) are worn or damaged.





**B18C4 Engine Model**

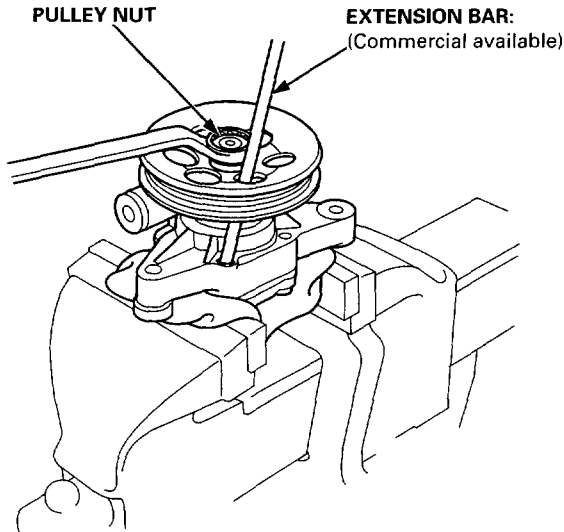


(cont'd)

# Power Steering Pump

## Disassembly (cont'd)

1. Drain the fluid from the pump.
2. Hold the steering pump in a vise with soft jaws, hold the pulley with the extension bar, and remove the pulley nut and pulley. Be careful not to damage the pump housing with the jaws of the vise.

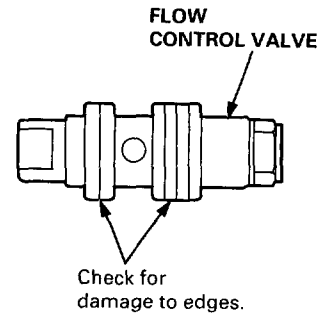


3. Loosen the flow control valve cap with a hex wrench and remove it.
4. Remove the O-ring, flow control valve and spring.
5. Remove the inlet joint and O-ring.
6. Remove the pump cover and pump cover seal.
7. Remove the outer side plate, pump cam ring, pump rotor, pump vanes, side plate and O-rings.
8. For B18C4 engine model only: remove the snap ring, then remove the sub-valve from the pump housing.
9. Remove the circlip, then remove the pump drive shaft by tapping the shaft end with the plastic hammer.
10. Remove the pump seal spacer and pump seal.

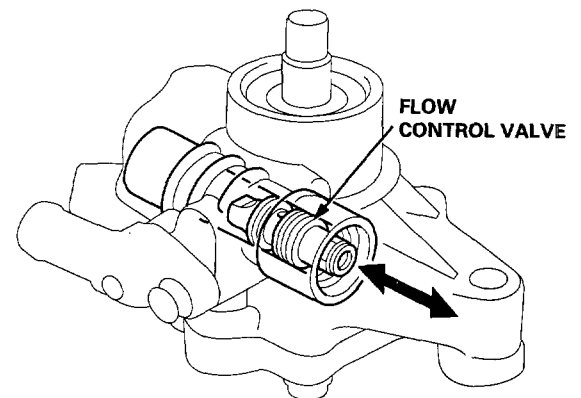
## Inspection

### Flow Control Valve

1. Check the flow control valve for wear, burrs, and other damage to the edges of the grooves in the valve.

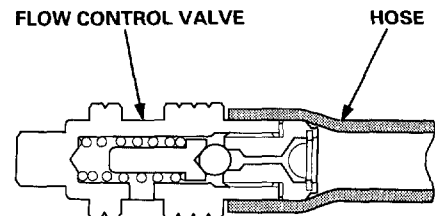


2. Inspect the bore of the flow control valve for scratches or wear.
3. Slip the valve back in the pump, and check that it moves in and out smoothly.



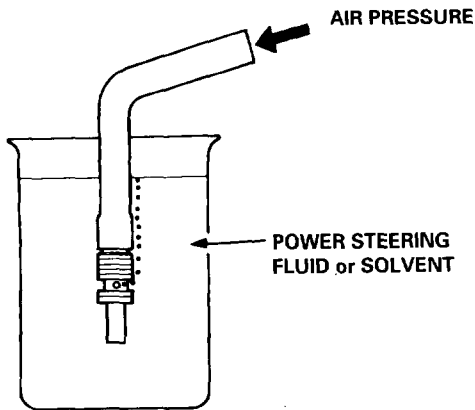
If OK, go to step 4, if not, replace the pump as an assembly. The flow control valve is not available separately.

4. Attach a hose to the end of the valve as shown.

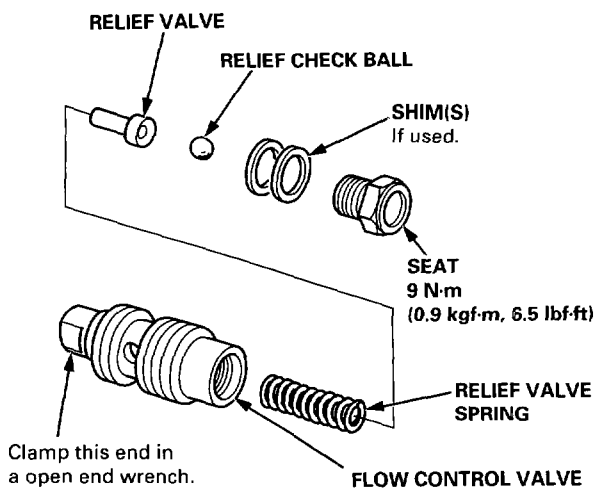




- Submerge the valve in a container of power steering fluid or solvent, and blow in the hose. If air bubbles leak through the valve at less than 98 kPa (1.0 kgf/cm<sup>2</sup>, 14.2 psi), repair it as follows.



- Hold the bottom end of the valve with an open end wrench.
- Unscrew the seat in the top end of the valve, and remove any shims, the relief check ball, relief valve and relief valve spring.

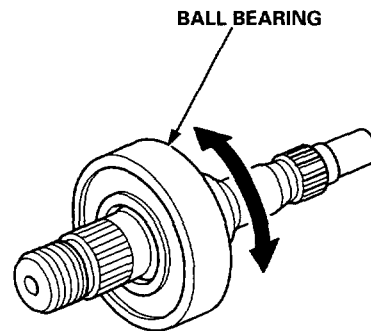


- Clean all the parts in solvent, dry them off, then reassemble and retest the valve. If the flow control valve tests OK, reinstall it in the pump. If the flow control valve still leaks air, replace the pump as an assembly. The flow control valve is not available separately.

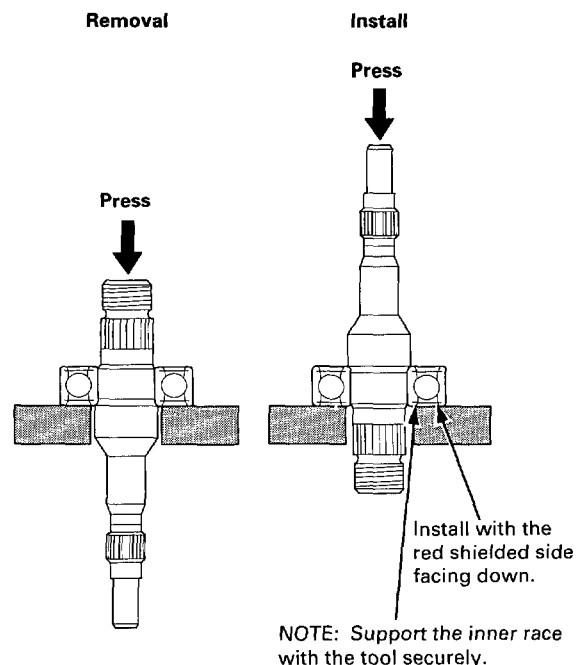
The relief pressure is adjusted at the factory by adding shims under the check ball seat. If you found shims in your valve, be sure you reinstall as many as you took out.

### Ball Bearing

- Inspect the ball bearing by rotating the outer race slowly. If any play or roughness is felt, replace the ball bearing.



- Replace the ball bearing using a press.

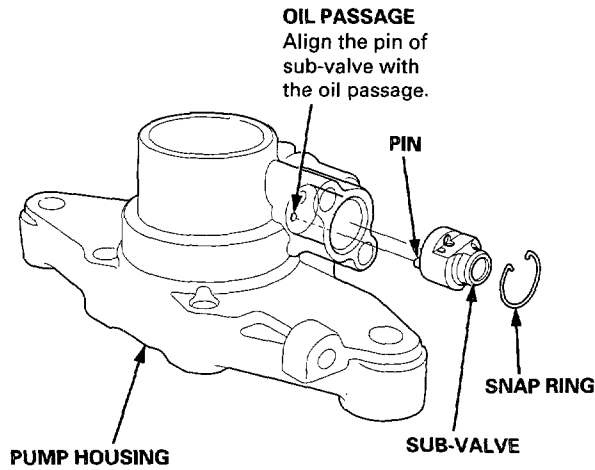




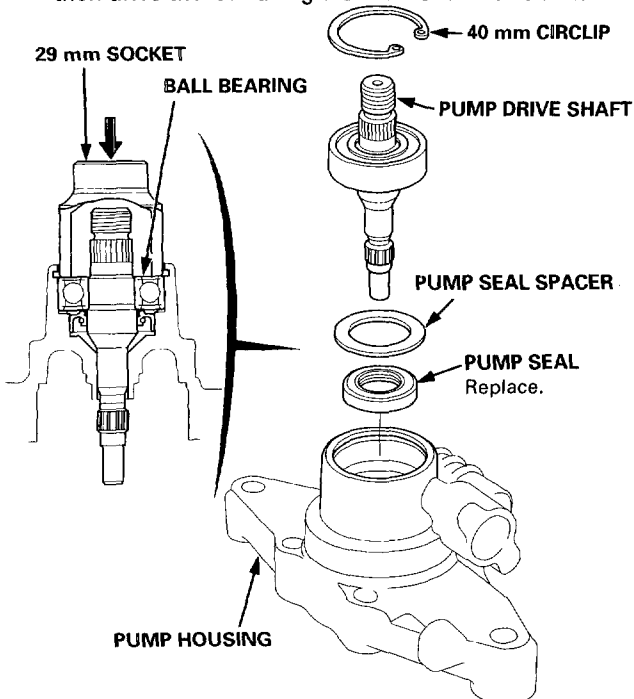
# Power Steering Pump

## Reassembly

1. For B18C4 engine model only: align the pin of the sub-valve with the oil passage in pump housing, and push down the sub-valve. Install the snap ring properly.

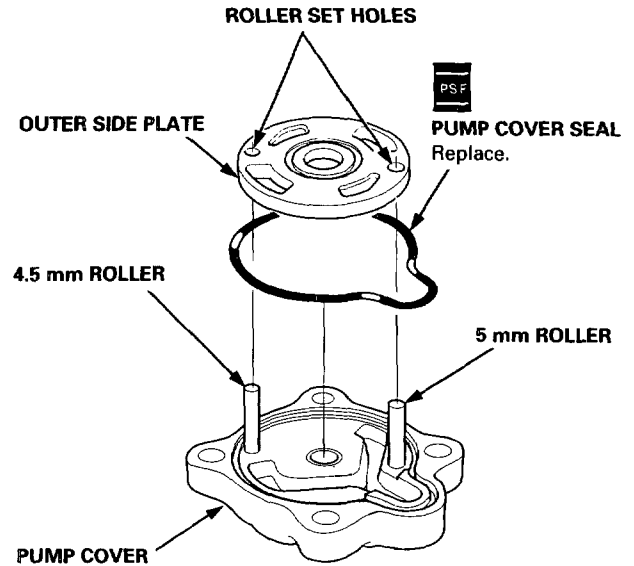


2. Install the new pump seal with its grooved side facing in into the pump housing by hand, then install the pump seal spacer.
3. Position the pump drive shaft in the pump housing, then drive it in using a 29 mm socket as shown.

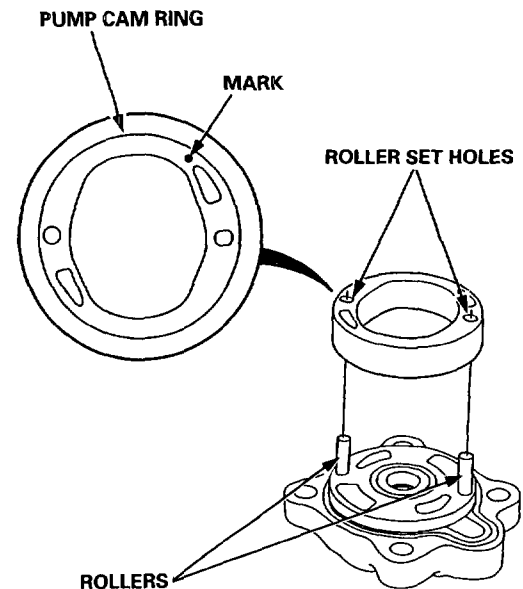


4. Install the 40 mm circlip with its radiused side facing out.

5. Coat the pump cover seal with power steering fluid, and install it into the groove in the pump cover.

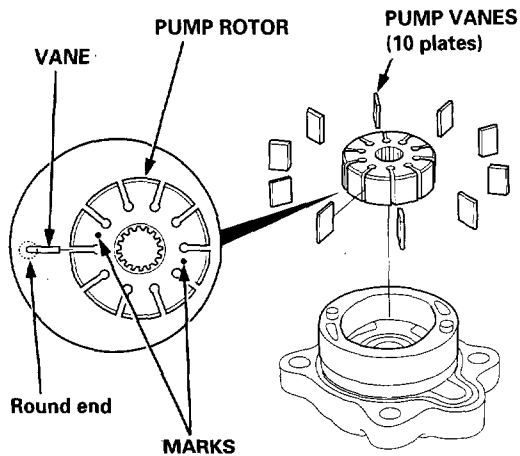


6. Install the outer side plate over the two rollers.
7. Set the pump cam ring over the two rollers with the "o" mark on the cam ring upward.

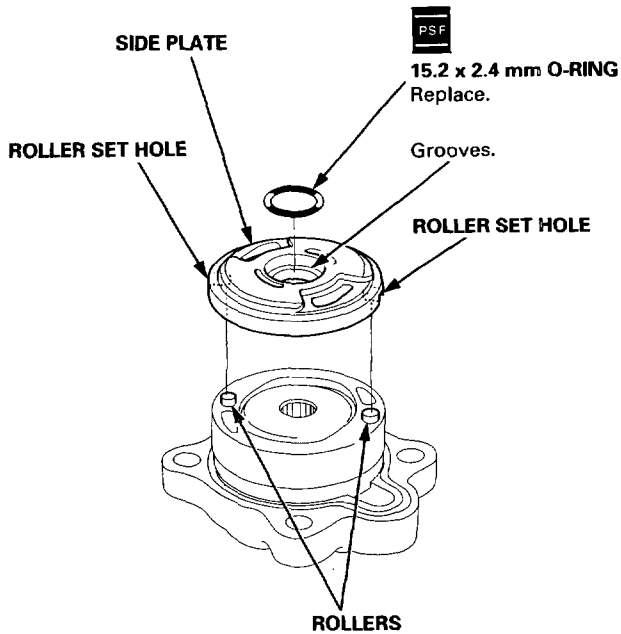




8. Assemble pump rotor to the pump cover with the "o" marks on the rotor facing down.
9. Set the 10 vanes in the grooves in the rotor. Make sure that the round ends of the vanes are in contact with the sliding surface of the cam ring.

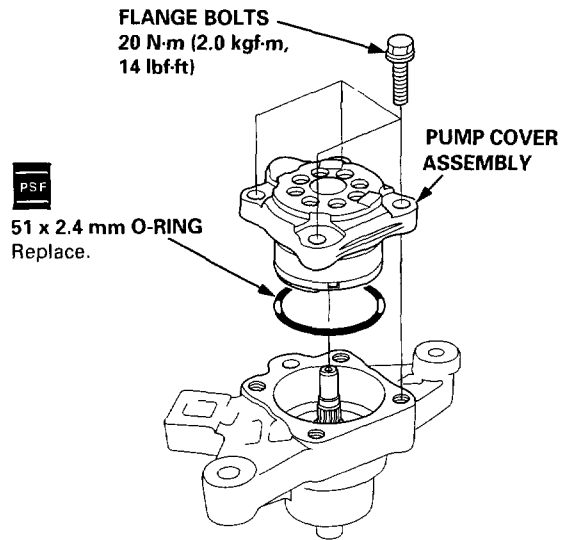


10. Coat the O-ring with power steering fluid, and install it into the grooves in the side plate.

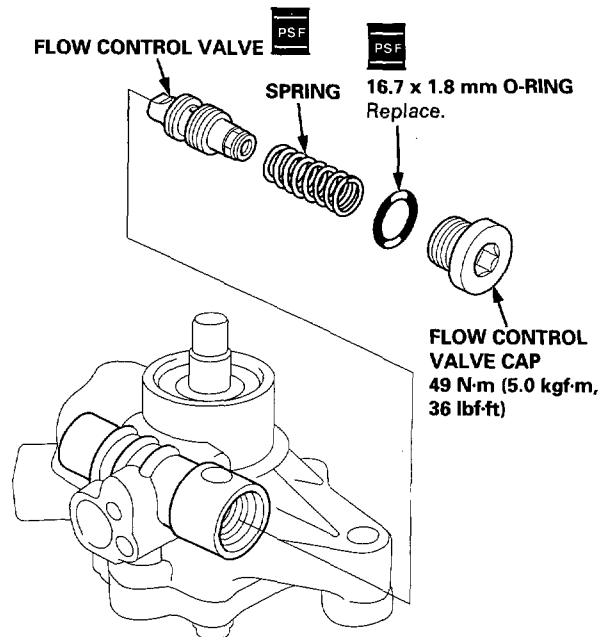


11. Install the side plate on the cam ring by aligning the roller set holes in the side plate with the rollers.

12. Coat the O-ring with power steering fluid, and position it into the pump housing.
13. Install the pump cover assembly in the pump housing.



14. Coat the flow control valve with power steering fluid.
15. Install the flow control valve and spring in the pump housing.



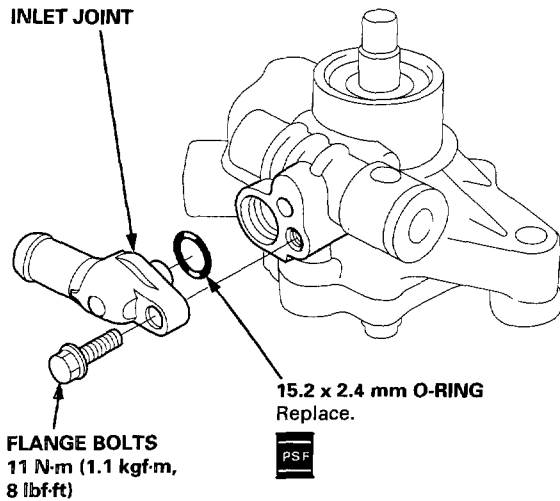
16. Coat the O-ring with power steering fluid, and install it on the flow control valve cap.
17. Install the flow control valve cap on the pump housing, and tighten it.

(cont'd)

# Power Steering Pump

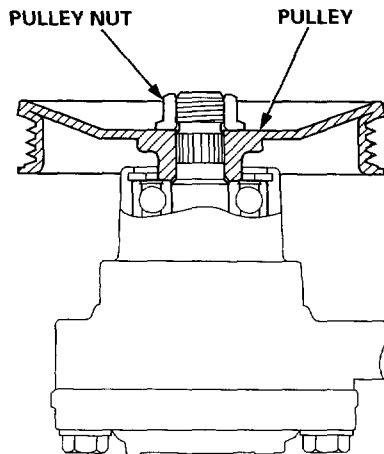
## Reassembly (cont'd)

18. Coat the O-ring with power steering fluid, and install it into the grooves in the inlet joint.

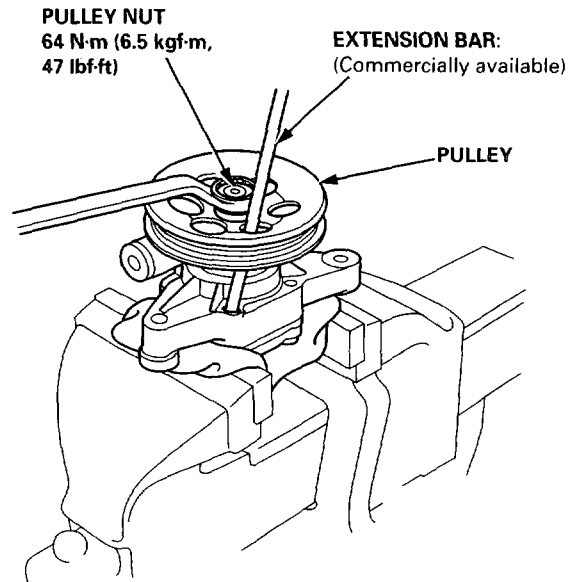


19. Install the inlet joint on the pump housing.

20. Install the pulley as shown below, then loosely install the pulley nut. Hold the steering pump in a vise with soft jaws. Be careful not to damage the pump housing with the jaws of the vise.



21. Hold the pulley with the extension bar, and tighten the pulley nut.

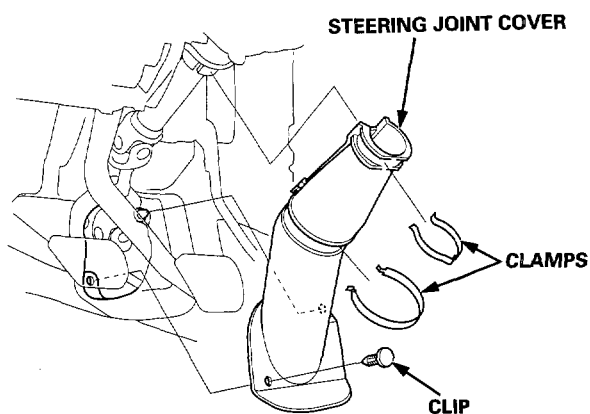


22. Check that the pump turns smoothly by turning the pulley.

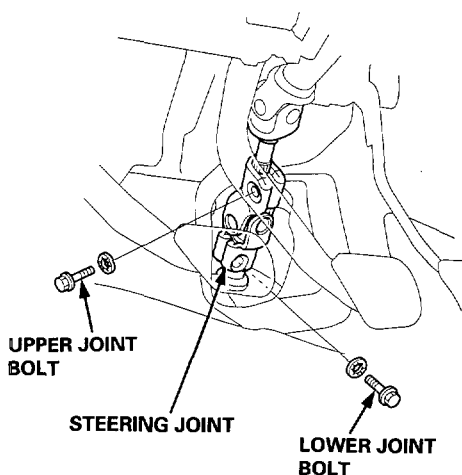


## Removal

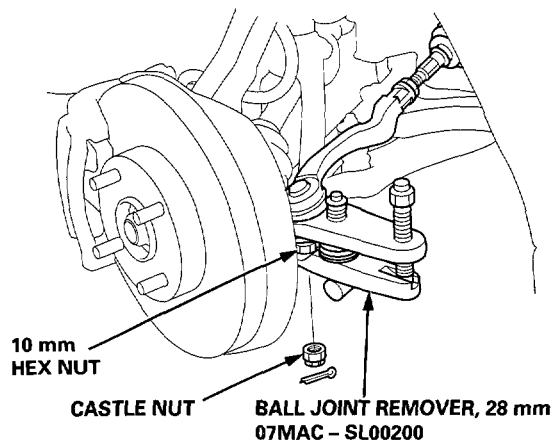
1. Using solvent and a brush, wash any oil and dirt off the valve body unit, its lines, and the end of the gearbox. Blow dry with compressed air.
2. Drain the power steering fluid as described on page 17-15.
3. Raise the front of vehicle, and support on safety stands in the proper locations (see section 1).
4. On vehicles with SRS, do this by first removing the driver's airbag assembly (see section 24), and steering wheel (see page 17-17).
5. Remove the front wheels.
6. Remove the steering joint cover.



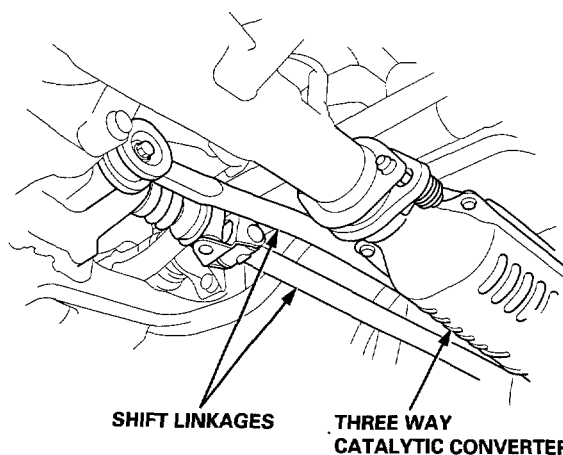
7. Remove the steering joint bolts, then disconnect steering joint by moving the joint toward the column.



8. Remove the cotter pin from the castle nut and remove the nut.



9. Install the 10 mm hex nut on the ball joint. Be sure that the 10 mm hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover. Refer to section 18 for ball joint remover usage instruction.
10. Separate the tie-rod ball joint and knuckle using the special tool. Be careful not to avoid damaging the ball joint boot.
11. Disconnect the shift linkage (M/T model: see section 13, A/T model: see section 14).
12. Separate the three way catalytic converter (see section 9).

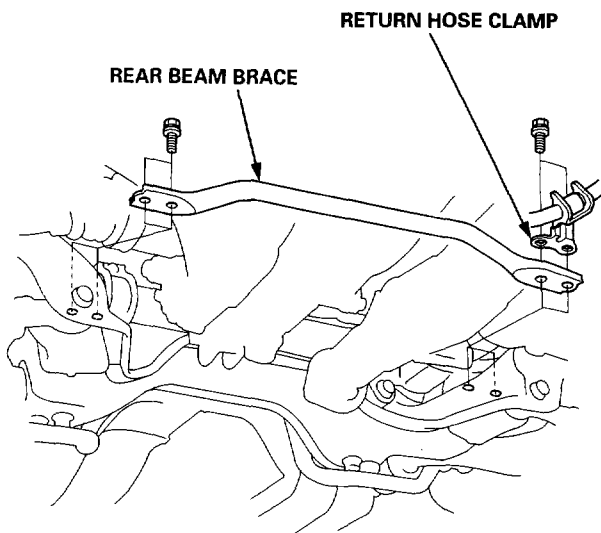


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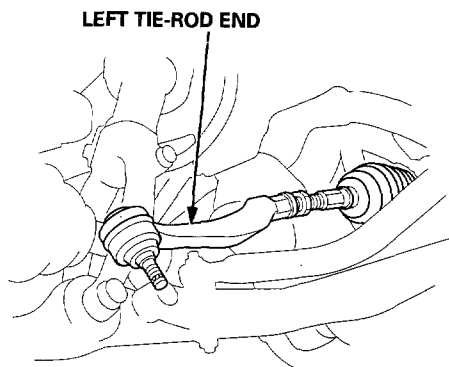
# Power Steering Gearbox

## Removal (cont'd)

13. Remove the rear beam brace on the rear beam.

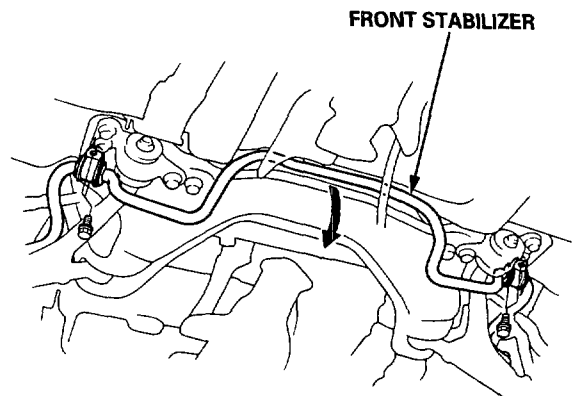


14. Remove the left tie-rod end, then slide the rack all the way to the right.

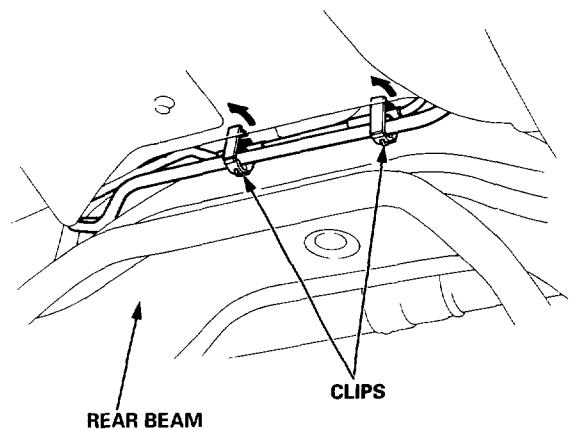


15. RHD only: Remove the clips, from the return line and feed line.

- 1) Remove the fastener from the front stabilizer mounting section and lower the front stabilizer. Do not disconnect the front stabilizer from the joint.



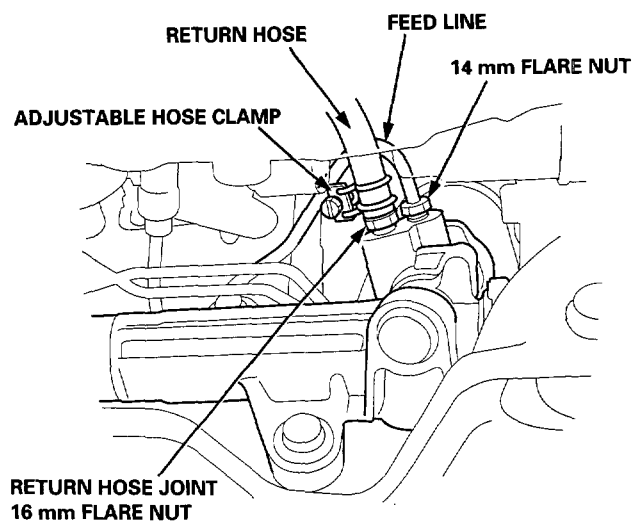
- 2) Remove the return line and feed line from the clips on the top of the rear beam.



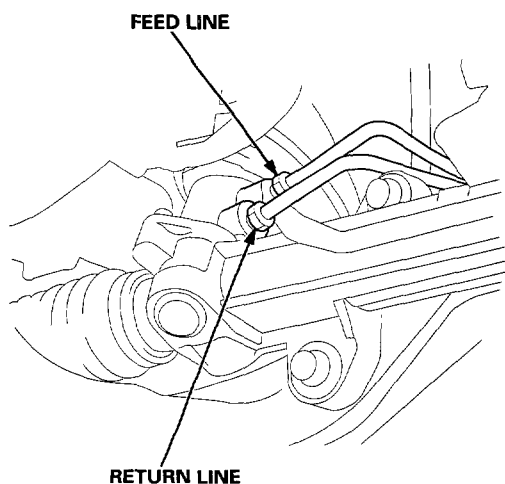


16. Loosen the 14 mm flare nut, and disconnect the feed hose.
17. Loosen the adjustable hose clamp and disconnect the return hose. Do not loosen the cylinder line A and B between the valve body unit and cylinder.
18. After disconnecting the hoses and lines, plug or seal them with a piece of tape or equivalent to prevent foreign materials from entering the valve body unit.

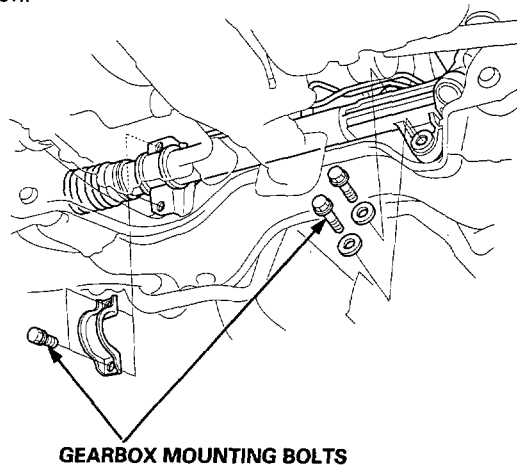
LHD:



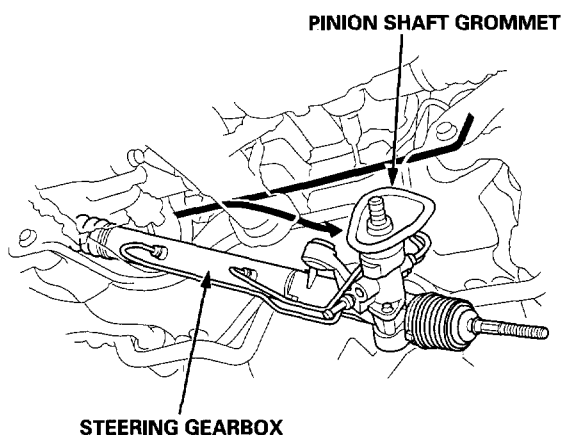
RHD:



19. Remove the steering gearbox mounting bolts.
20. Remove the mounting bracket and mounting cushion.



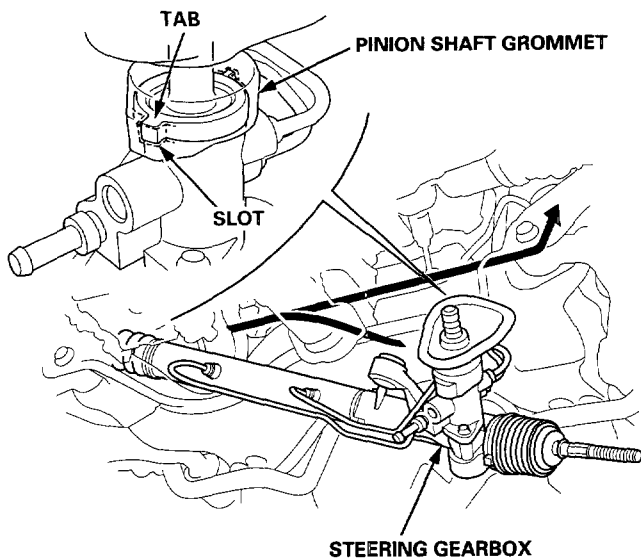
21. Pull the steering gearbox all the way down to clear the pinion shaft from the bulkhead.
22. Move the steering gearbox to the right so the left rack end clears the rear beam.
23. Move the steering gearbox to the left, and tilt the left side down to remove it from the vehicle. Do not try to disassemble the steering gearbox. If the gearbox is faulty, replace the whole gearbox as an assembly.



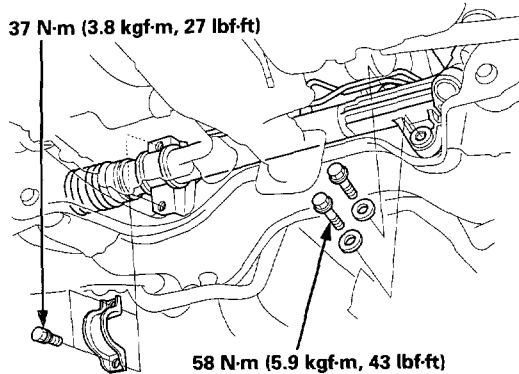
# Power Steering Gearbox

## Installation

1. Install the pinion shaft grommet. Align the slot in the pinion shaft grommet with the lug portion on the valve housing.
2. Before installing the gearbox, slide the rack all the way to right.
3. Pass the right side of the steering gearbox above and through the right side of the rear beam. Be careful not bend or damage the two power steering lines and cylinder lines when installing the gearbox.
4. Raise the left side of the steering gearbox above and through the left side of the rear beam, and insert the pinion shaft up through the bulkhead.

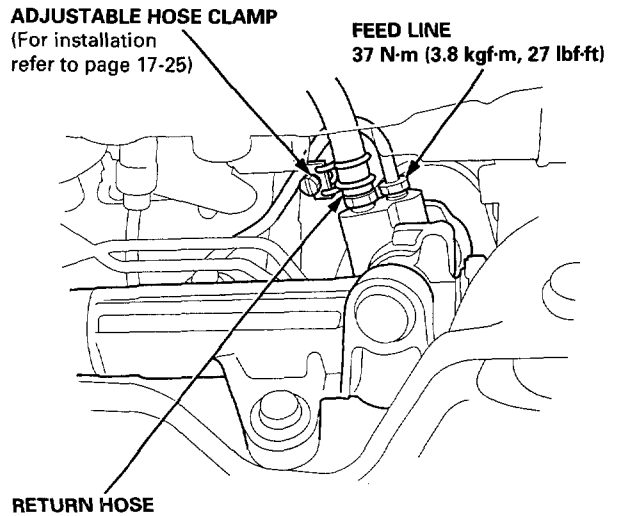


5. Install the mounting cushion on the steering gearbox.
6. Install the mounting bracket over the mounting cushion, then install the two gearbox mounting bolts.
7. Center the steering rack within its stroke.

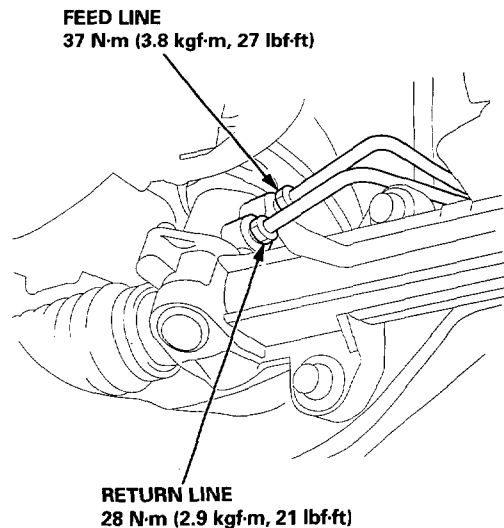


8. Connect the return hose securely, and tighten the adjustable hose clamp.
9. Connect the feed hose and tighten the 14 mm flare nut. Make sure that there is not interference between the fluid lines, the rear beam or any other parts.

### LHD:



### RHD:



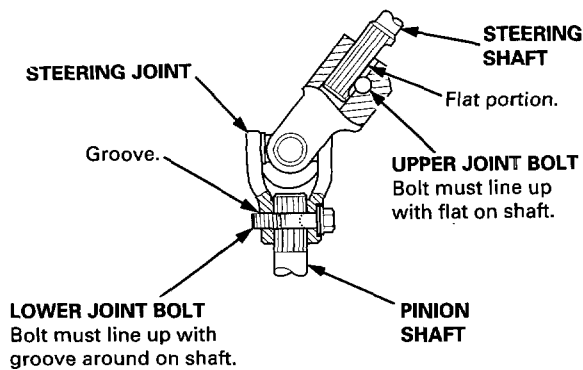
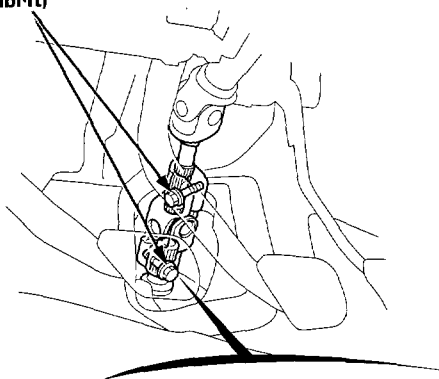


10. Install the steering joint, and reconnect the steering shaft and pinion shaft.

- Make sure the steering joint is connected as follows:

- Insert the upper end of the steering joint onto the steering shaft (line up the bolt hole with the flat portion on the shaft).

**STEERING JOINT BOLTS**  
28 N·m (2.9 kgf·m,  
21 lbf·ft)

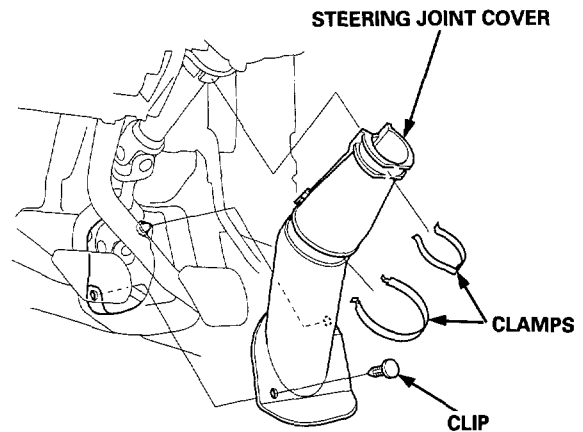


- Slip the lower end of the steering joint onto the pinion shaft (line up the bolt hole with the groove the around the shaft), and loosely install the lower joint bolt. Be sure that the lower joint bolt is securely in the groove in the pinion shaft.

- Pull on the steering joint to make sure that the steering joint is fully seated. Then install the upper joint bolt and tighten it.

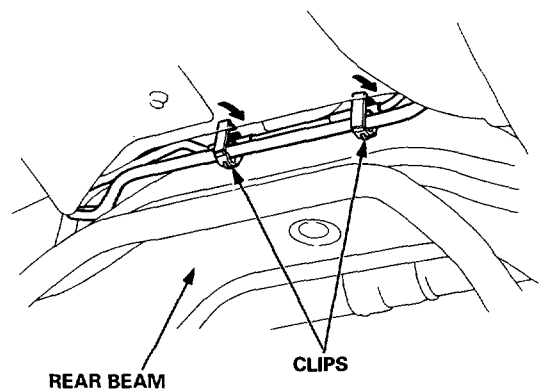
11. For vehicles with SRS; center the cable reel by first rotating it clockwise until it stops. Then rotate it counterclockwise (approximately two turns) until the arrow mark on the label points straight up. Reinstall the steering wheel (see page 17-19).

12. Install the steering joint cover with the clamps and clips.

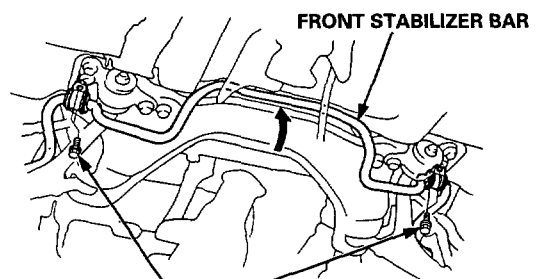


13. RHD only: Install the clips on the return line and feed line.

- 1) Secure the return line and feed line with the clips in the top of the rear beam. After installation of the lines, check them for bend, interference with the adjacent parts, and other abnormalities.



- 2) Install the front stabilizer in its original position.



22 N·m  
(2.2 kgf·m, 16 lbf·ft)

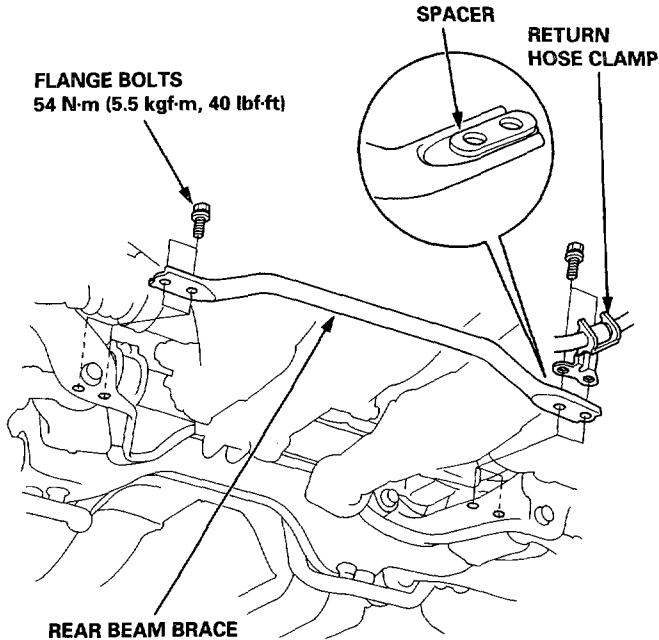
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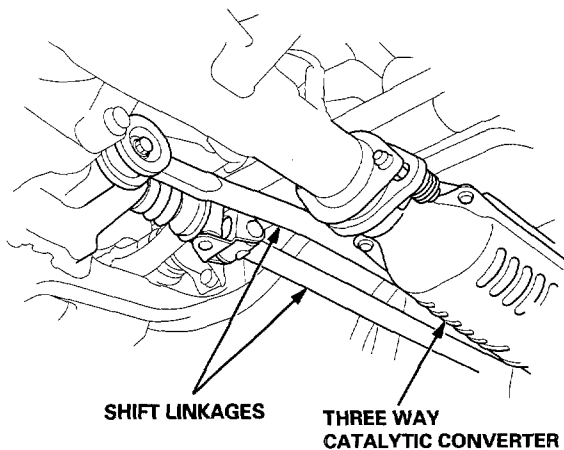
# Power Steering Gearbox

## Installation (cont'd)

14. Install the rear beam brace and return hose clamp on the rear beam. Set the rear beam brace with its spacer side toward the return hose clamp.

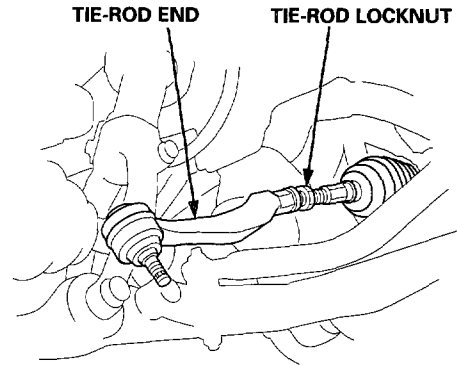


15. Install the three way catalytic converter (see section 9).

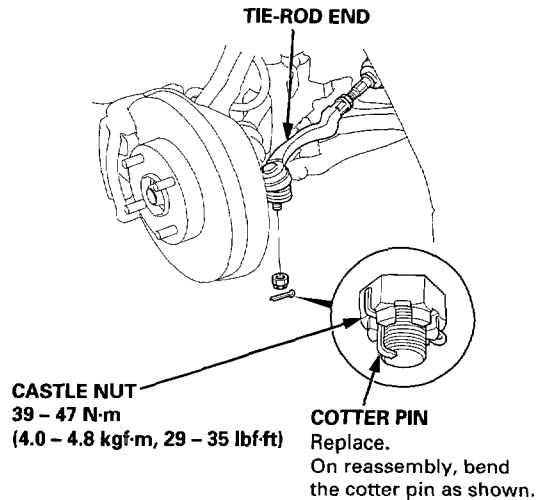


16. Connect the shift linkage (M/T model: see section 13, A/T model: see section 14).

17. Thread the right and left tie-rod ends onto the rack an equal number of turns.



18. Wipe off any grease contamination from the ball joint tapered section and threads, then reconnect the tie-rod ends to the steering knuckles, tighten the castle nut to the specified torque, and install new cotter pins. Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.



19. Install the front wheels.
20. Fill the system with power steering fluid and bleed air from the system (see page 17-15).
21. After installation, perform the following checks.
- Check the gearbox for leaks (see page 17-24).
  - Adjust the front toe (see section 18).
  - Check the steering wheel spoke angle. Adjust by turning the right and left tie-rods equally, if necessary.

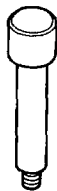
# Suspension

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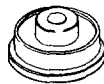


# Special Tools

Ref. No.	Tool Number	Description	Qty	Remark
①	07GAF - SE00100	Hub Dis/Assembly Tool	1	
②	07HAD - SF10100	Driver Attachment	1	
③	07HGK - 0010101	Wheel Alignment Gauge Attachment	1	
④	07MAC - SL00200	Ball Joint Remover, 28 mm	1	
⑤	07NAD - SS00101 or 07NAD - SS00100	Bushing Driver	1	
⑥	07PAF - 0030000	Ball Joint Remover/Installer Set	1	
⑦	07746 - 0010500	Attachment, 62 x 68 mm	1	
⑧	07749 - 0010000	Driver	1	
⑨	07965 - SD90100	Support Base	1	
⑩	07974 - SA50700	Ball Joint Boot Clip Guide	1	



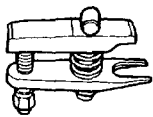
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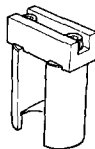
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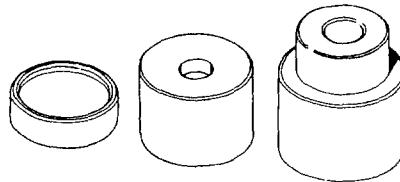
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④



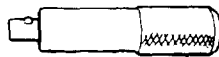
⑤



⑥



⑦



⑧



⑨



⑩



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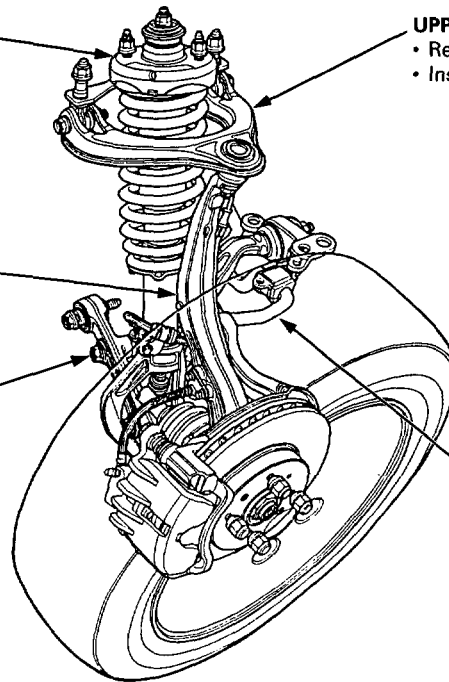
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#### LOWER ARM

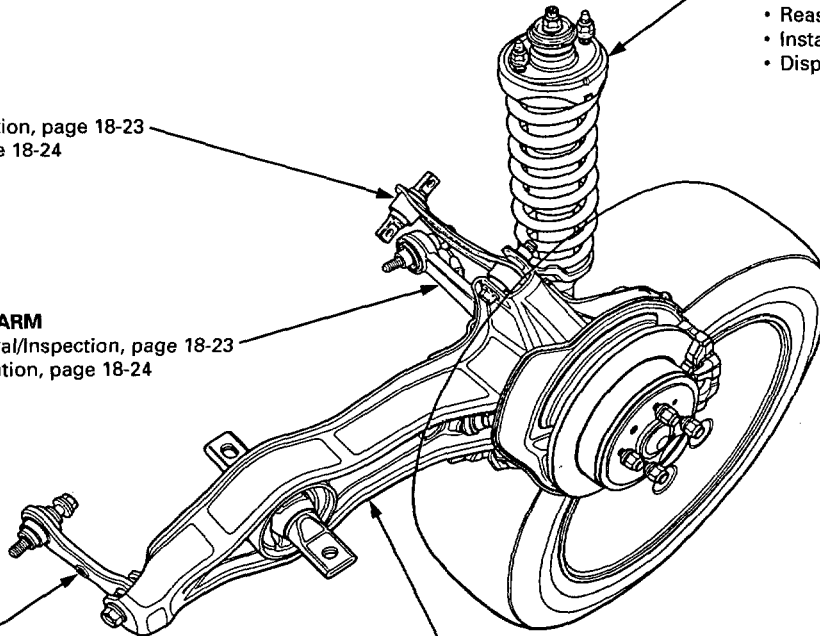
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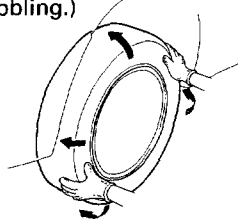


# Wheel Alignment

## Service Information

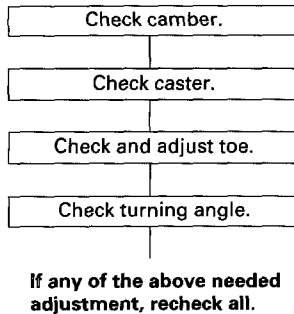
NOTE: For proper inspection/adjustment of the wheel alignment, check and adjust the following before checking the alignment.

- Check that the suspension is not modified.
- Check the tire size and tire pressure.
- Check the runout of the wheels and tires.
- Check the suspension ball joints. (Hold the wheel with your hands, then move it up and down and right and left to check for wobbling.)



## Wheel alignment adjustment procedure

Each of the wheel alignment elements relates to the other. Therefore, the total adjustment of the front/rear wheel alignment is required whenever either one of elements (camber, caster, toe, and/or turning angle) is adjusted.



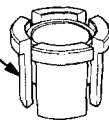
## Special Tool Information

Wheel alignment gauge attachment:

NOTE:

- As the wheel alignment gauge attachment can be installed by magnetic force of camber/caster gauge, make sure the wheel hubs are clean and rust-free before installing the wheel alignment gauge attachment.
- When installing the special tool, align the special tool groove and mating surface groove of the camber/caster gauge, to make the most of the magnetic force of the camber/caster gauge.
- For accurate readings, measure the wheel alignment at the vehicle must be level.

WHEEL ALIGNMENT  
GAUGE ATTACHMENT  
07HGK - 0010101



## Camber

### Inspection

1. Remove the wheel cap.
2. Remove the hub cap from the rear wheel hub (see page 18-26).
3. Install the wheel alignment gauge attachment and camber/caster gauge on the wheel hub.
4. Turn the front wheels to the straight ahead position.
5. Read the camber on the gauge with the bubble at the center of the gauge.

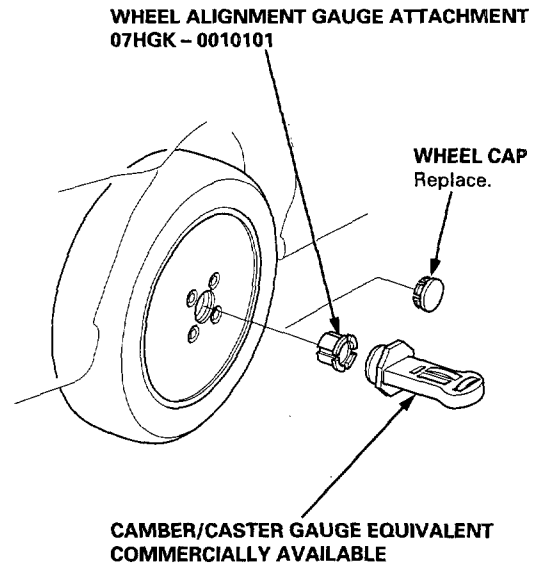
Camber angle:

Front:  $-0^{\circ}07' \pm 1^{\circ}$  (B18C4 engine model)

$0^{\circ} \pm 1^{\circ}$  (All except B18C4 engine model)

Rear:  $-0^{\circ}50' \pm 45'$

6. If out of specification, check for bent or damaged suspension components.





## Caster

### Inspection

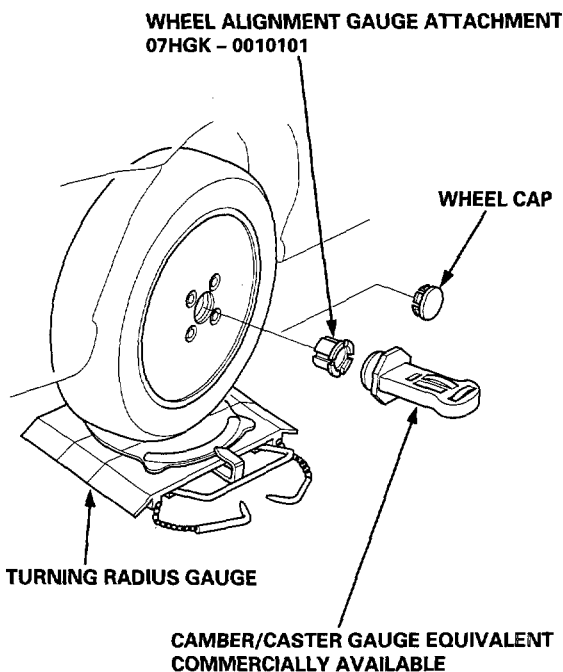
1. Remove the wheel cap.
2. Raise the vehicle and set the turning radius gauges beneath the front wheels, and place boards under the rear wheels the same thickness as one of the turning radius gauges, then lower the vehicle.

**NOTE:** Be sure that the vehicle is parallel to the ground with the wheels on the turning radius gauges and boards.

3. Install the wheel alignment gauge attachment and camber/caster gauge on the wheel hub, and apply the front brake.
4. Turn the front wheel 20° outward, then turn the adjust screw so that the bubble in the camber/caster gauge is at 0°.
5. Turn the wheel 20° inward and read the caster on the gauge with the bubble at the center of the gauge.

**Caster angle:**  $1^{\circ}10' \pm 1^{\circ}$

6. If out of specification, check for bent or damaged suspension components.



## Front Toe Inspection/Adjustment

### Inspection

1. Center steering wheel spokes.

**NOTE:** Measure difference in toe measurements with the wheels pointed straight ahead.

2. Check the front toe.

**Front toe:**  $0 \pm 2 \text{ mm}$  ( $0 \pm 0.08 \text{ in}$ )

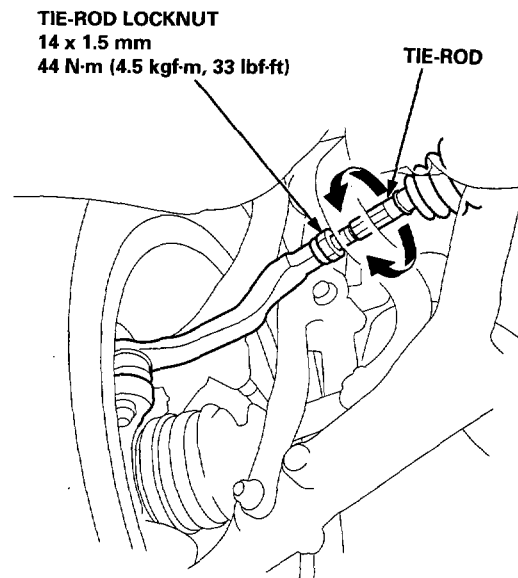
— If adjustment is required, go on to step 3.

— If no adjustment is required, remove alignment equipment.

### Adjustment

3. Loosen the tie-rod locknuts and turn both tie-rods in the same direction until the front wheels are in straight ahead position.
4. Turn both tie-rods equally until the toe reading on the turning radius gauge is correct.
5. After adjusting, tighten the tie-rod locknuts.

**NOTE:** Reposition the tie-rod boot if it is twisted or displaced.



# Wheel Alignment

## Rear Toe Inspection/Adjustment

### Inspection

1. Release parking brake.

NOTE: If the parking brake is engaged, you may get an incorrect reading.

2. Check the rear toe.

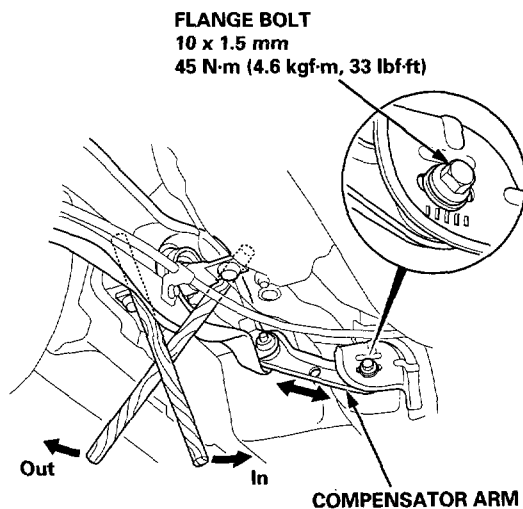
**Rear toe-in:  $2.3 \pm 2$  mm ( $0.09 \pm 0.08$  in)**

— If adjustment is required, go to step 3.

— If no adjustment is required, remove alignment equipment.

### Adjustment

3. Before adjustment, note the locations of flange bolts on the right and left compensator arms.
4. Loosen the flange bolts and slide the compensator arm in or out as shown, to adjust the toe.
5. Tighten the flange bolts.



- Example  
After the rear toe inspection, the wheel is 2 mm (0.08 in) out of the specification.  
— Move the arm so the adjusting bolt moves 2 mm (0.08 in) inward from the position recorded before the adjustment.  
— The distance the adjusting bolt is moved should be equal to the amount out-of-specification.

## Turning Angle Inspection

1. Jack up the front of the vehicle. Set the turning radius gauges beneath the front wheels, then lower the vehicle.
2. Jack up the rear of the vehicle. Place boards that are the same thickness as the turning radius gauges under the rear wheels, then lower the vehicle.

NOTE: For accurate readings, the vehicle must be level.

3. Turn the wheel right and left while applying the brake, and measure the turning angle of both wheels.

### Turning angle:

#### Inward wheel:

**$40^\circ \pm 2^\circ$  (B18C4 engine model)**

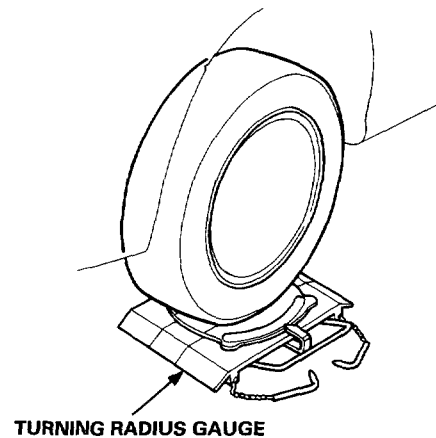
**$36^\circ \pm 2^\circ$  (All except B18C4 engine model)**

#### Outward wheel

**(reference):  $33^\circ$  (B18C4 engine model)**

**$30^\circ$  (All except B18C4 engine model)**

4. If the turning angle is not within the specifications, check for bent or damaged suspension components.



# Wheel/Hub Inspection

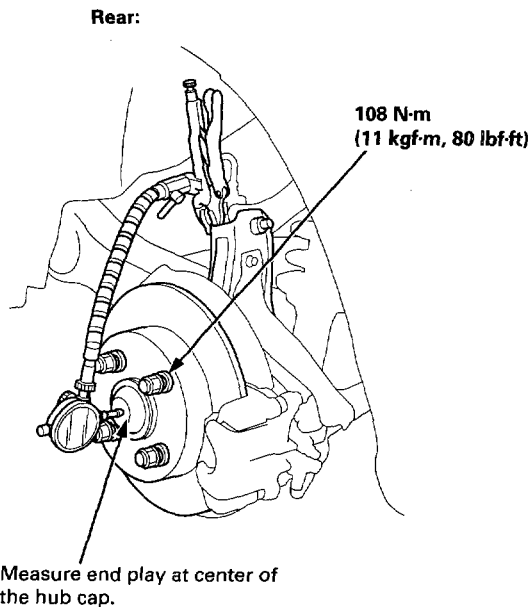
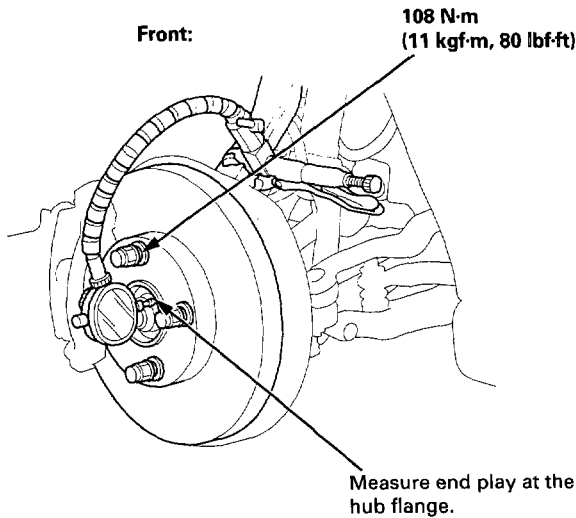


## Bearing End Play

1. Raise the vehicle off the ground, and support it with safety stands in the proper locations (see section 1).
2. Remove the wheels, then reinstall the wheel nuts.
3. Attach the dial gauge as shown.
4. Measure the bearing end play by moving the disc in or outward.

Front/Rear:

Standard: 0 – 0.05 mm (0 – 0.002 in)



5. If the bearing end play measurement is more than the standard, replace the wheel bearing.

## Wheel Runout

1. Raise the vehicle off the ground, and support it with safety stands in the proper locations (see section 1).
2. Check for bent or deformed wheels.
3. Attach the dial gauge as shown.
4. Measure the wheel runout by turning the wheel.

Front and Rear Wheel Axial Runout:

Standard:

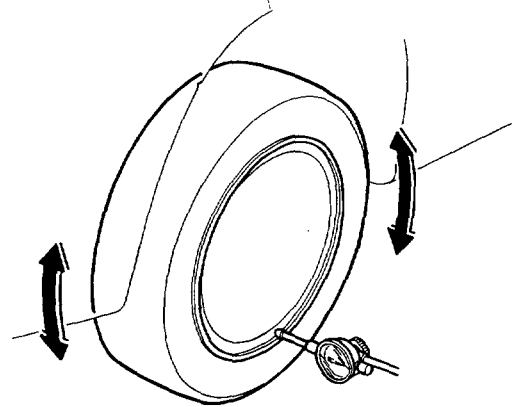
Steel Wheel: 0 – 0.7 mm (0 – 0.03 in)

Aluminum Wheel: 0 – 0.3 mm (0 – 0.01 in)

Service Limit:

Steel Wheel: 1.7 mm (0.07 in)

Aluminum Wheel: 1.6 mm (0.06 in)



Front and Rear Wheel Radial Runout:

Standard:

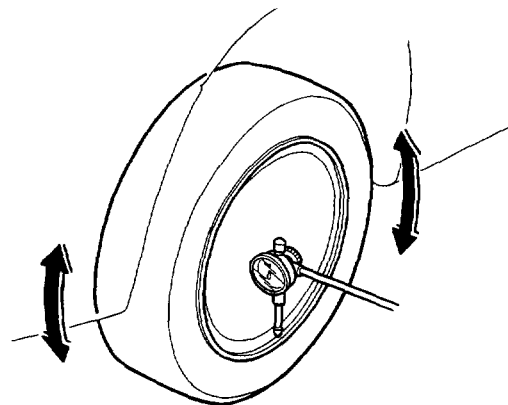
Steel Wheel: 0 – 0.5 mm (0 – 0.02 in)

Aluminum Wheel: 0 – 0.3 mm (0 – 0.01 in)

Service Limit:

Steel Wheel: 1.0 mm (0.04 in)

Aluminum Wheel: 1.0 mm (0.04 in)



5. If the wheel runout is more than the service limit, replace the wheel.



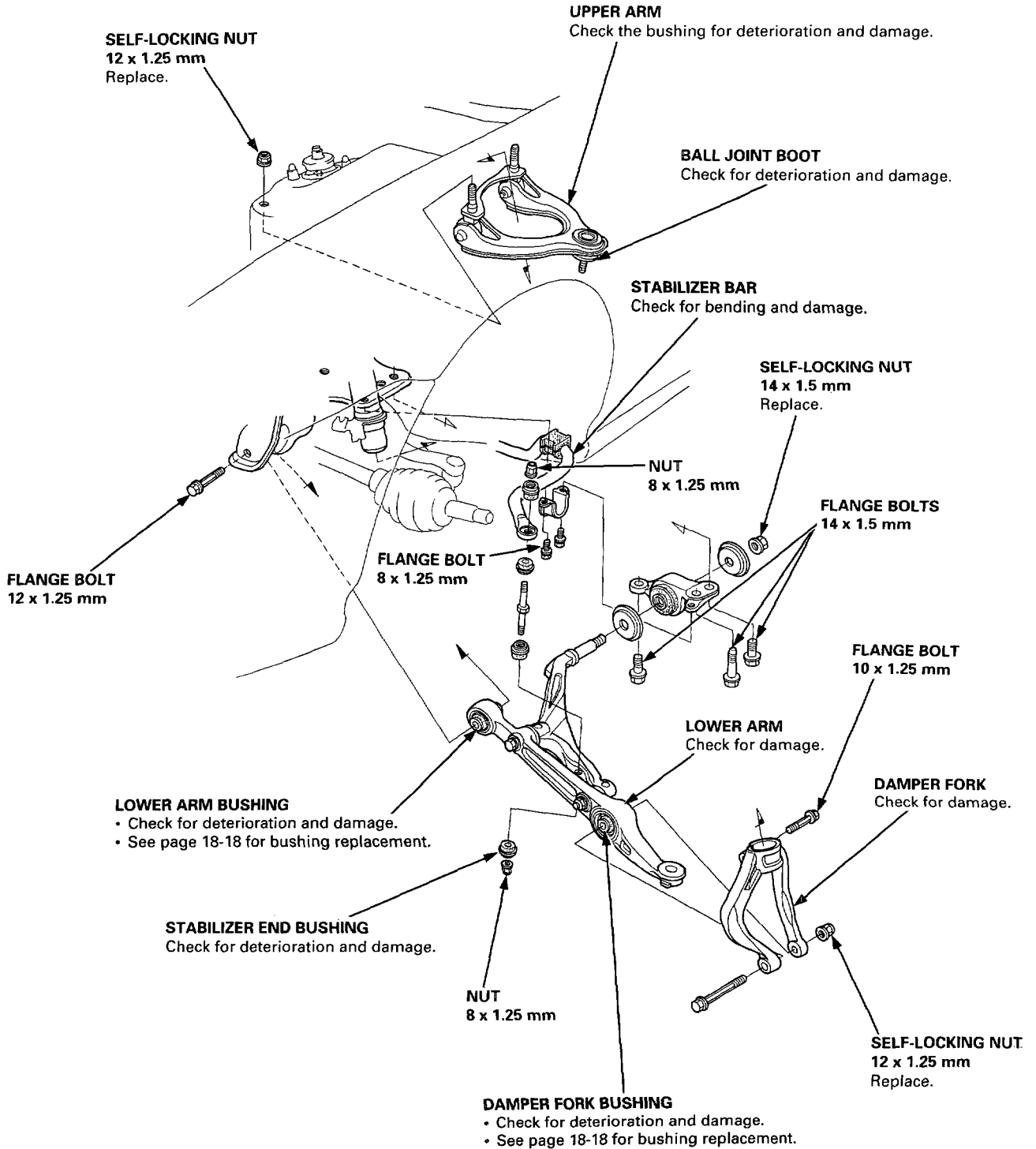
# Front Suspension

## Suspension Arms

### Removal/Inspection

**CAUTION:**

- Replace the self-locking nuts after removal.



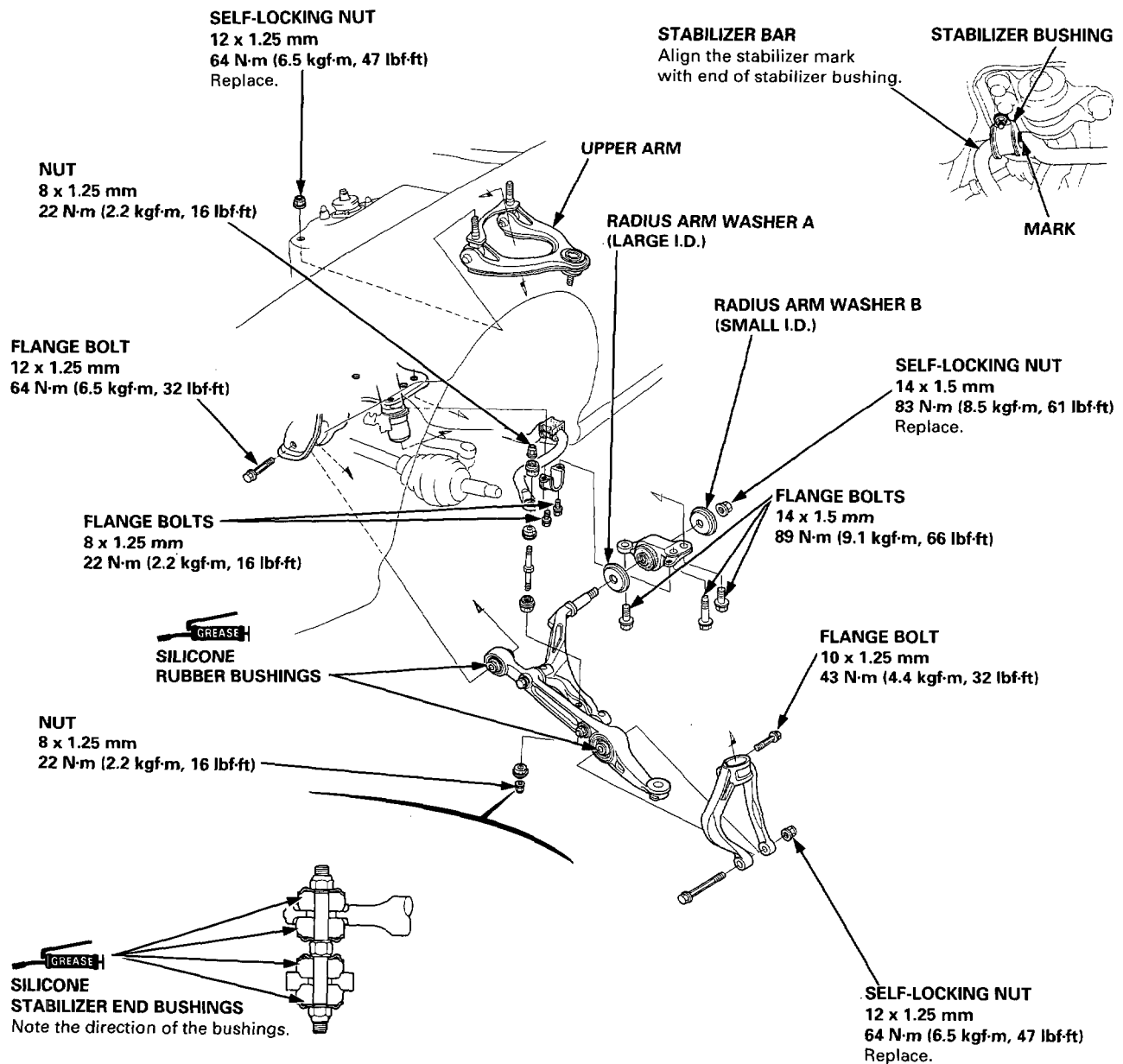


## Installation

**CAUTION:** Any bolts or nuts connected to rubber mounts or bushings should be tightened with the vehicle on the ground.

### NOTE:

- Wipe off the dirt, oil or grease on the threads before tightening the fasteners.
- The right and left damper forks are not interchangeable. The left damper fork is marked with "VL" while the right damper fork is marked with "VR".
- The right and left upper arms are not interchangeable. The left upper arm is marked with "●".
- When installing the radius arm washers, the "FR" mark faces the front of the vehicle.
- After installing the suspension arm, check the front wheel alignment, and adjust if necessary (see page 18-4).



# Front Suspension

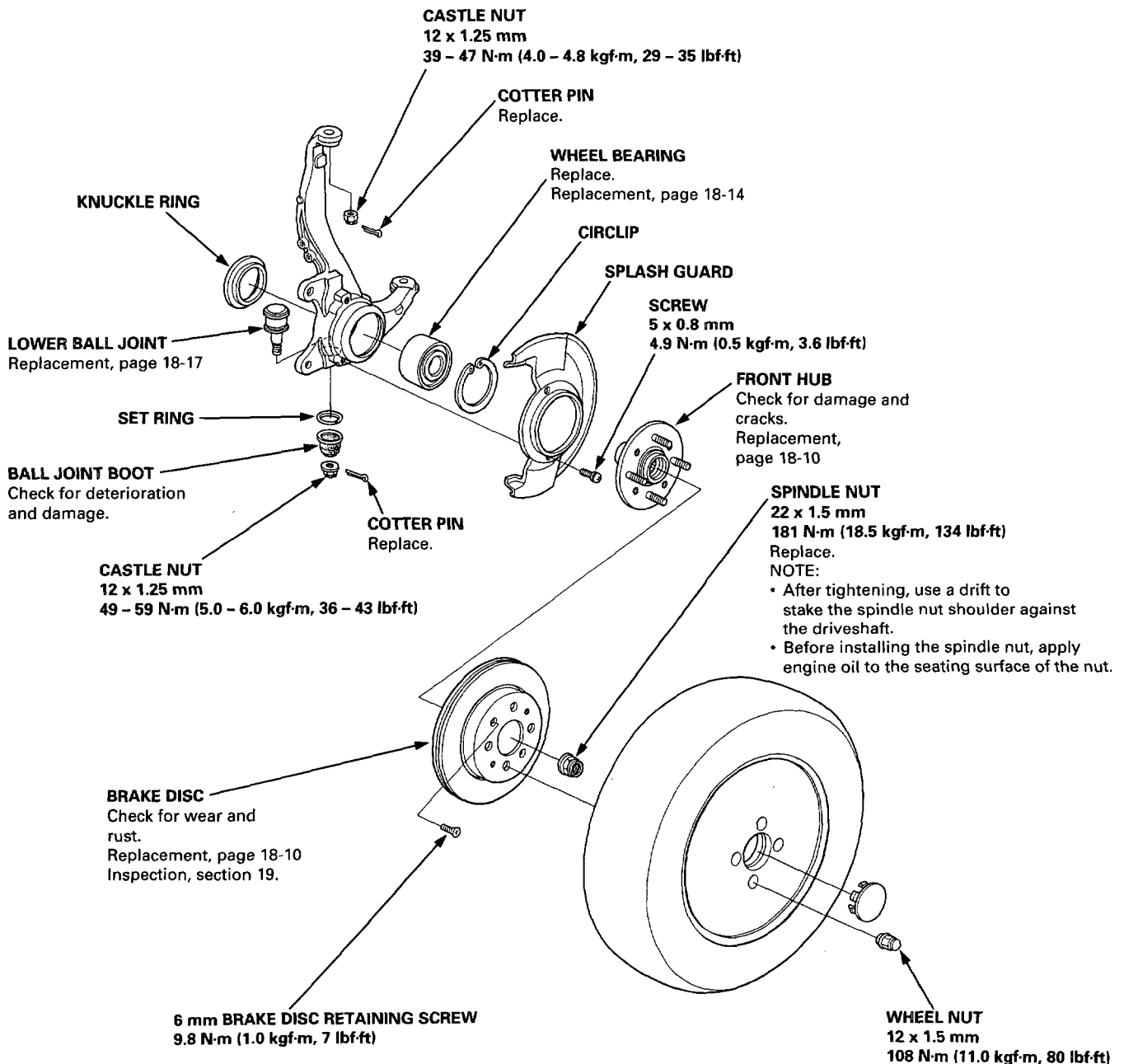
## Knuckle/Hub Replacement

### CAUTION:

- The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.
- Torque the castle nut to the lower torque specification, then tighten it only far enough to align the slot with the pin hole. Do not align the nut by loosening.

### NOTE:

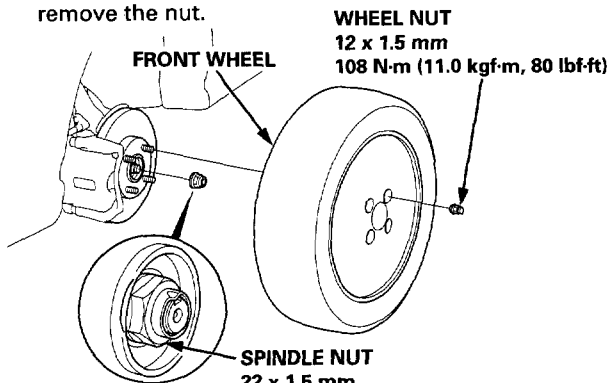
- Use only genuine Honda wheel weights for aluminum wheels. Non-genuine wheel weights may corrode and damage the aluminum wheels.
- On the aluminum wheels, remove the center cap from the inside of the wheel after removing the wheel.
- Before installing the brake disc, clean the mating surfaces of the front hub and brake disc.
- Before installing the wheel, clean the mating surfaces of the brake disc and wheel.





## Knuckle Removal

1. Loosen the wheel nuts slightly.
2. Raise the front of vehicle, and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and front wheel.
4. Raise the locking tab on the spindle nut, then remove the nut.



**WHEEL NUT**  
12 x 1.5 mm  
108 N-m (11.0 kgf-m, 80 lbf-ft)

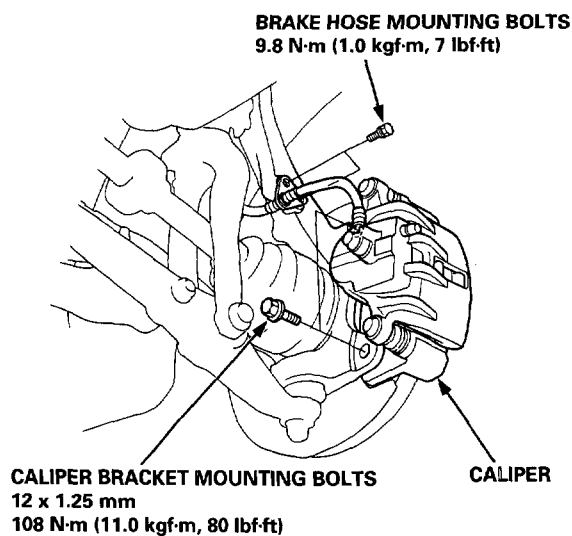
**SPINDLE NUT**  
22 x 1.5 mm  
181 N-m (18.5 kgf-m, 134 lbf-ft)  
Replace.

**NOTE:**

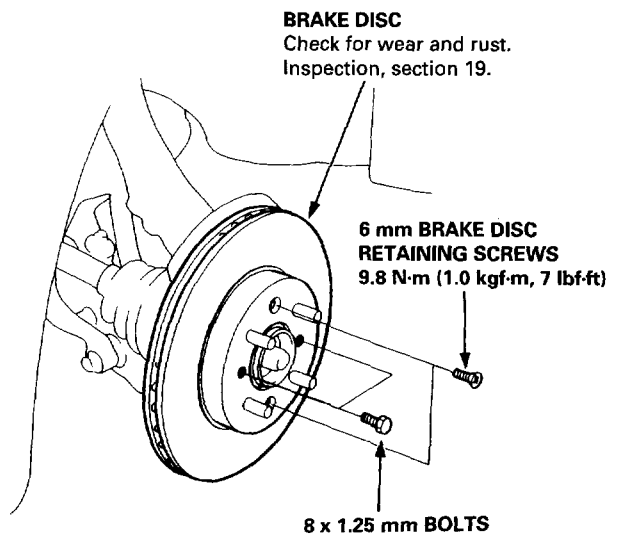
- After tightening, use a drift to stake spindle shoulder against the spindle.
- Before installing the spindle nut, apply engine oil to the seating surface of the nut.

5. Remove the brake hose mounting bolts.
6. Remove the caliper bracket mounting bolts, and hang the caliper to one side.

**CAUTION:** To prevent accidental damage to the caliper or brake hose, use a short piece of wire to hang the caliper from the undercarriage.

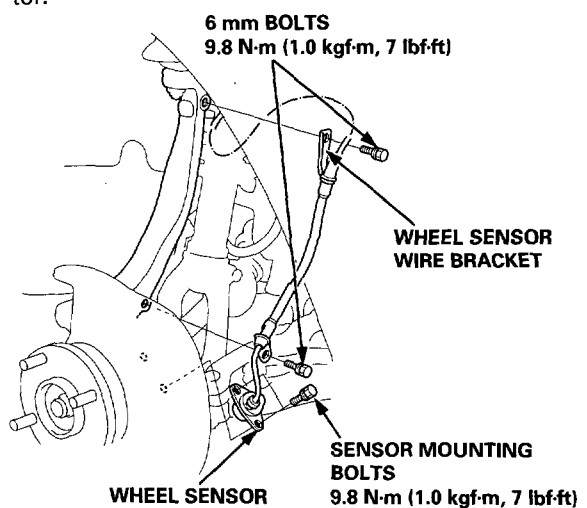


7. Remove the 6 mm brake disc retaining screws.
  8. Screw the two 8 x 1.25 mm bolts into the disc to push it away from the hub.
- NOTE:** Turn each bolt two turns at a time to prevent cocking the disc excessively.
9. Remove the brake disc from the knuckle.
  10. Check the front hub for damage and cracks.



11. Remove the wheel sensor wire bracket, then remove the wheel sensor from the knuckle (for vehicles with ABS).

**NOTE:** Do not disconnect the wheel sensor connector.



(cont'd)

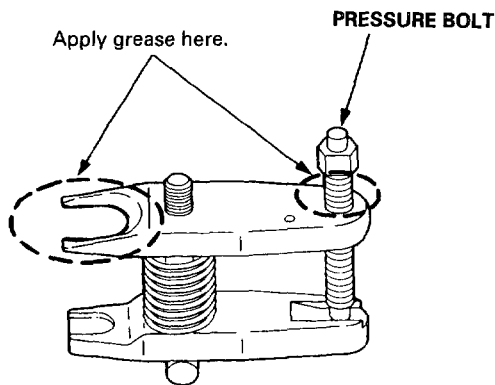
# Front Suspension

## Knuckle/Hub Replacement (cont'd)

NOTE: Use ball joint remover, 28 mm, to separate the ball joints from the suspension or tie-rod end.

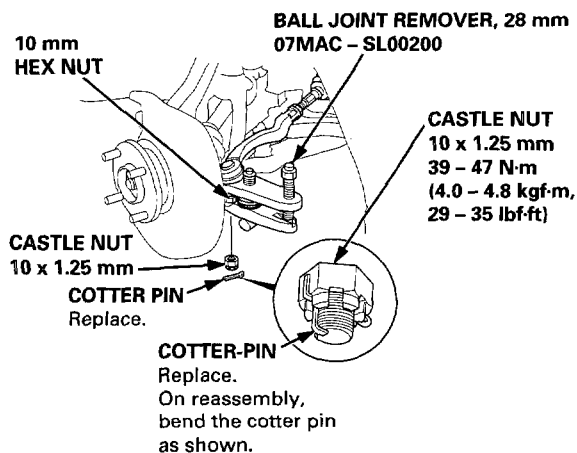
**CAUTION:** Be careful not to damage the ball joint boot.

12. Clean any dirt or grease off the ball joint.
13. Remove the cotter pin from the tie-rod end ball joint castle nut, and remove the nut.
14. Apply grease to the special tool on the areas shown. This will ease installation of the tool and prevent damage to the pressure bolt threads.

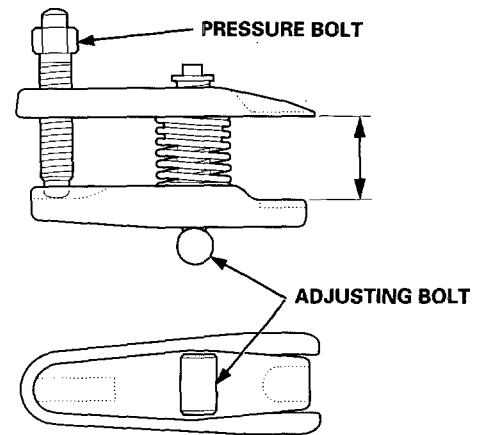


15. Install a 10 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end to prevent damage to the threaded end of the ball joint.
16. Use the ball joint remover, 28 mm, as shown. Insert the jaws carefully, making sure you do not damage the ball joint boot.
17. Adjust the jaw spacing by turning the pressure bolt.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



18. Once the tool is in place, turn the adjusting bolt as necessary to make the jaws parallel. Then hand-tighten the pressure bolt and recheck the jaws to make sure they are still parallel.



NOTE: After making the adjustment to the adjusting bolt, be sure the head of the adjusting bolt is in this position to allow the jaw to pivot.

19. With a wrench, tighten the pressure bolt until the ball joint shaft pops loose from the steering arm.

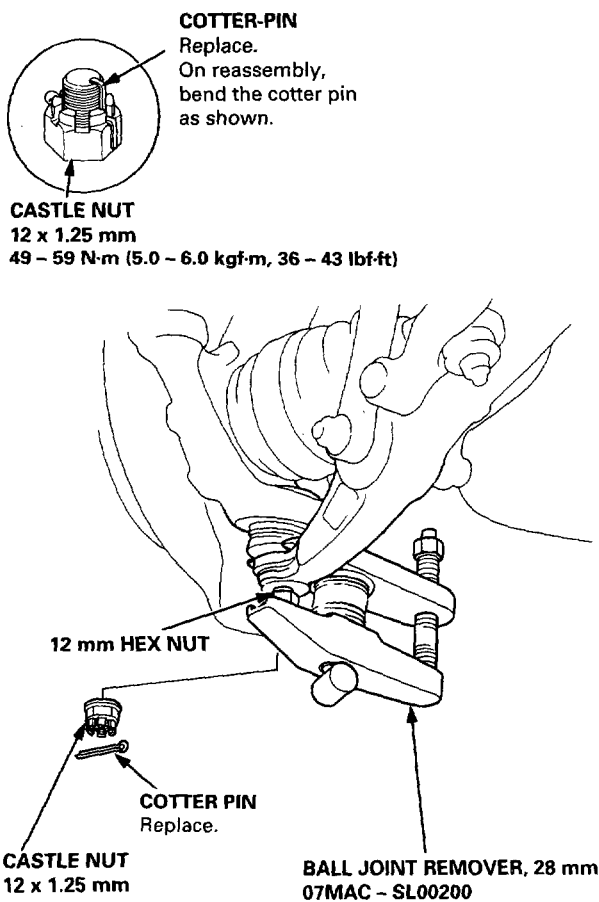
**WARNING** Wear eye protection. The ball joint can break loose suddenly and scatter dirt or other debris in your eyes.

20. Remove the tool, then remove the nut from the end of the ball joint and pull the ball joint out of the steering/suspension arm. Inspect the ball joint boot and replace it if damaged.



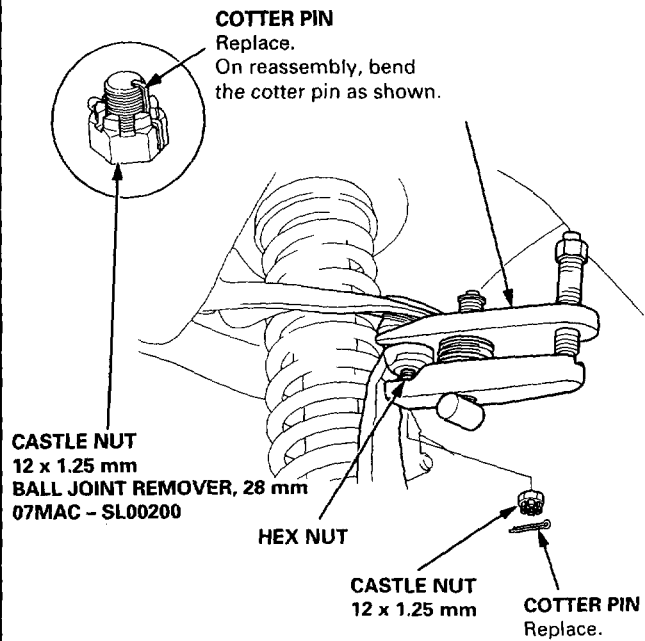
- 21. Remove the cotter pin from the lower arm ball joint castle nut, and remove the nut.
- 22. Install a 12 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.
- 23. Use the special tool as shown on page 18-12 to separate the ball joint and lower arm.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

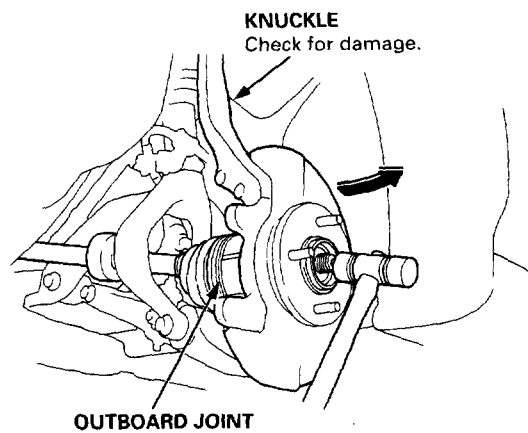


- 24. Remove the cotter pin from the upper ball joint castle nut, and remove the nut.
- 25. Install the 12 mm hex nut on the ball joint. Be sure that the hex nut is flush with the ball joint pin end, or the threaded section of the ball joint pin might be damaged by the ball joint remover.
- 26. Use the special tool as shown on page 18-12 to separate the ball joint and knuckle.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



- 27. Pull the knuckle outward and remove the driveshaft outboard joint from the knuckle using a plastic hammer, then remove the knuckle.



(cont'd)

# Front Suspension

## Knuckle/Hub Replacement (cont'd)

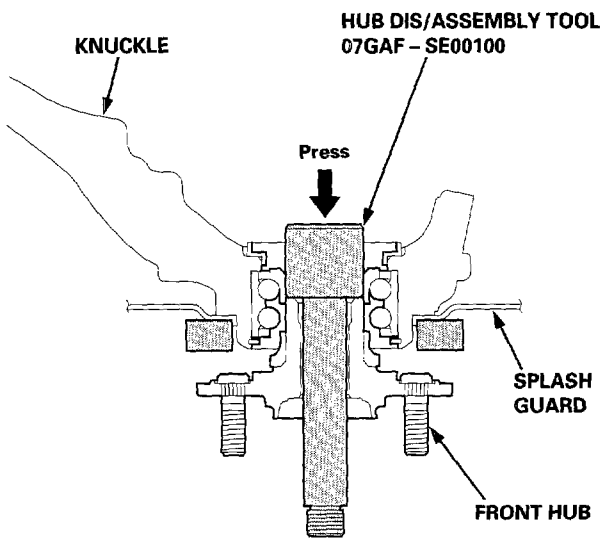
### Wheel Bearing Replacement

NOTE: Replace the bearing with a new one after removal.

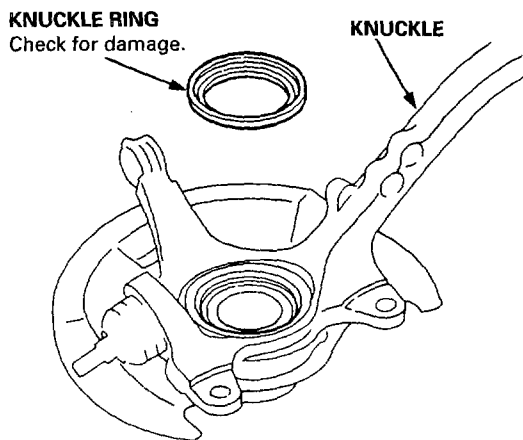
1. Separate the front hub from the knuckle using the special tools and a press as shown.

**CAUTION:**

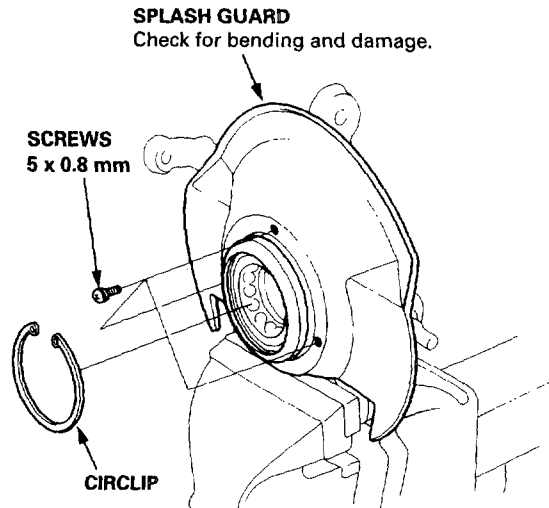
- Take care not to distort the splash guard.
- Hold onto the hub to keep it from falling when pressed clear.
- To prevent damage to the tool, make sure the threads are fully engaged before pressing.



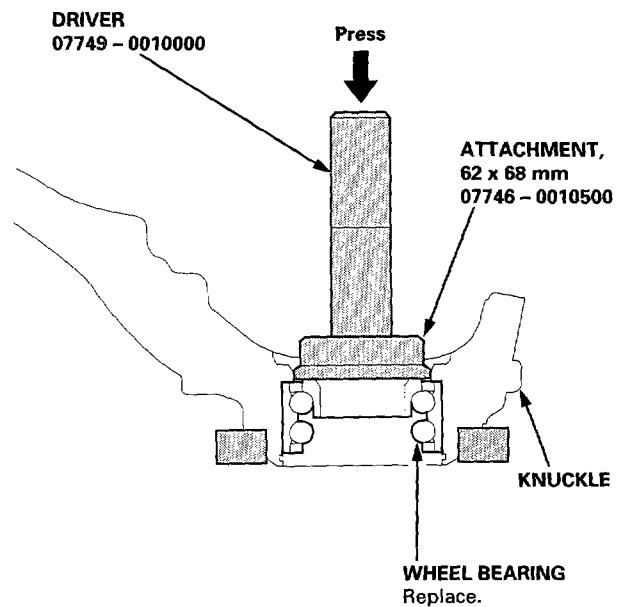
2. Remove the knuckle ring from the knuckle.



3. Remove the circlip and the splash guard from the knuckle.

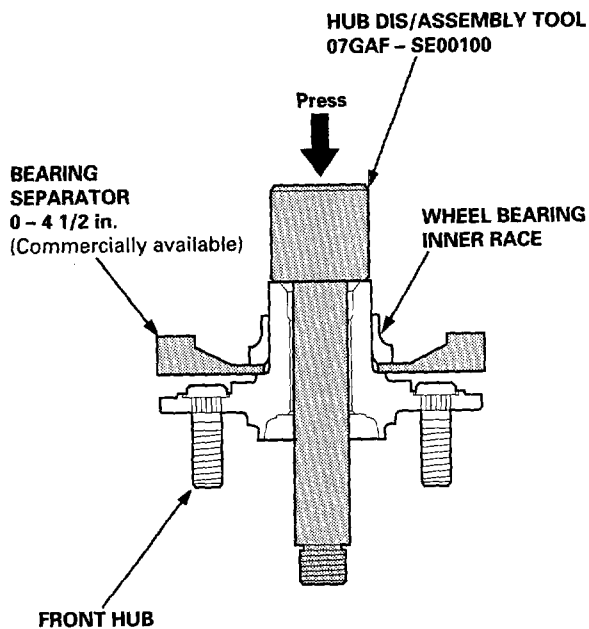


4. Press the wheel bearing out of the knuckle using the special tools and a press as shown.



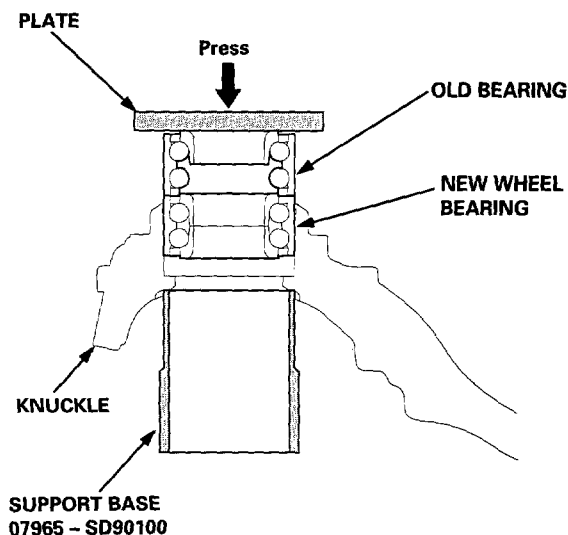


5. Remove the wheel bearing inner race from the front hub using the special tool and a commercially available bearing separator as shown.



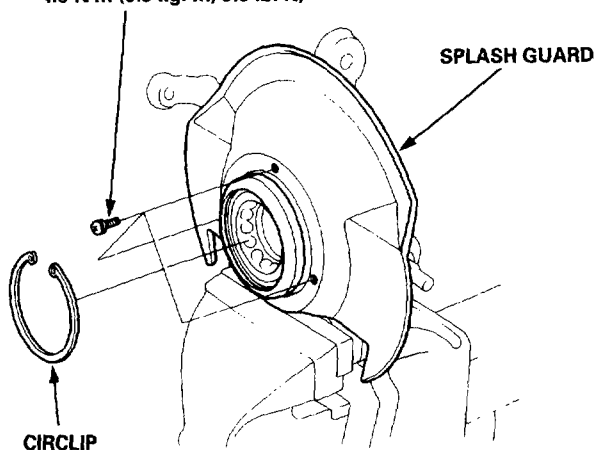
NOTE: Wash the knuckle and hub thoroughly in high flash point solvent before reassembly.

6. Press a new wheel bearing into the knuckle using the special tools and a press as shown.



7. Install the circlip securely in the knuckle groove.
8. Install the splash guard and tighten the screws.

SCREWS  
5 x 0.8 mm  
4.9 N-m (0.5 kgf-m, 3.6 lbf-ft)



(cont'd)

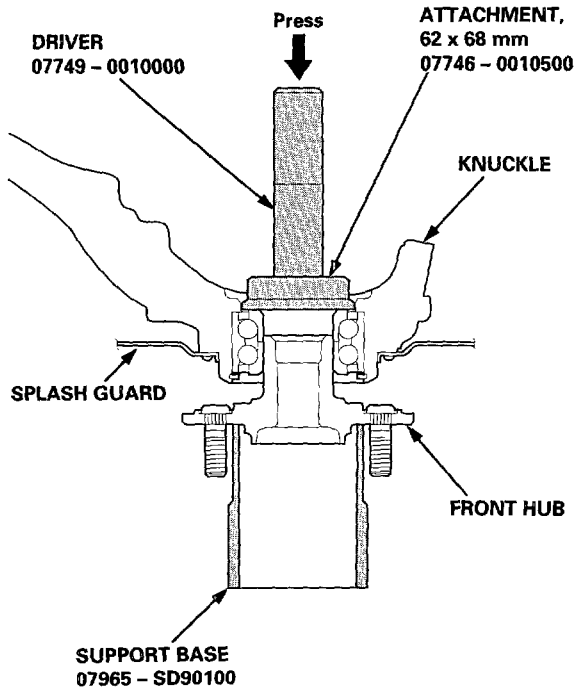


# Front Suspension

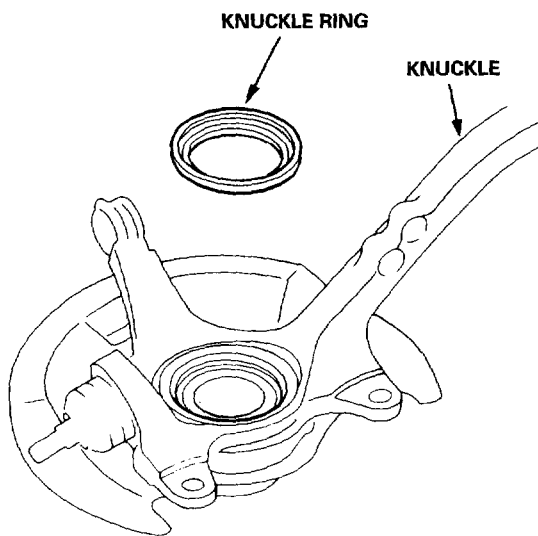
## Knuckle/Hub Replacement (cont'd)

9. Install the front hub on the knuckle using the special tools and a press as shown.

**CAUTION:** Take care not to distort the splash guard.



10. Install the knuckle ring on the knuckle.



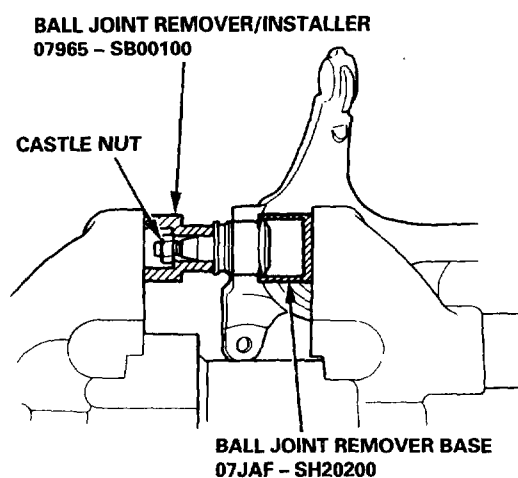
11. Install the knuckle in the reverse order of removal, and pay particular attention to the following items:

- Be careful not to damage the ball joint boots when installing the knuckle.
- Torque all mounting hardware to the specified torque values.
- Torque the castle nuts to the lower torque specifications, then tighten them only far enough to align the slot with the pin hole. Do not align the castle nut by loosening.
- Install new cotter pins on the castle nuts after torquing.
- Avoid twisting the sensor wires when installing the wheel sensor.
- Before installing the brake disc, clean the mating surfaces of the front hub and the inside of the brake disc.
- Before installing the wheel, clean the mating surface of the brake disc and the inside of the wheel.
- Check the front wheel alignment, and adjust it if necessary (see page 18-4).

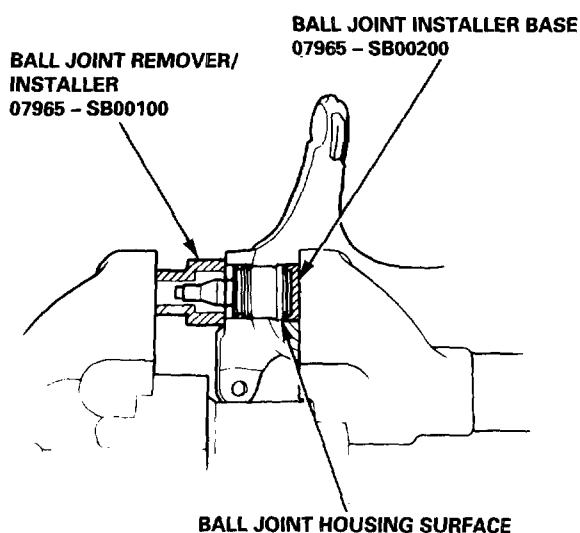


## Lower Ball Joint Replacement

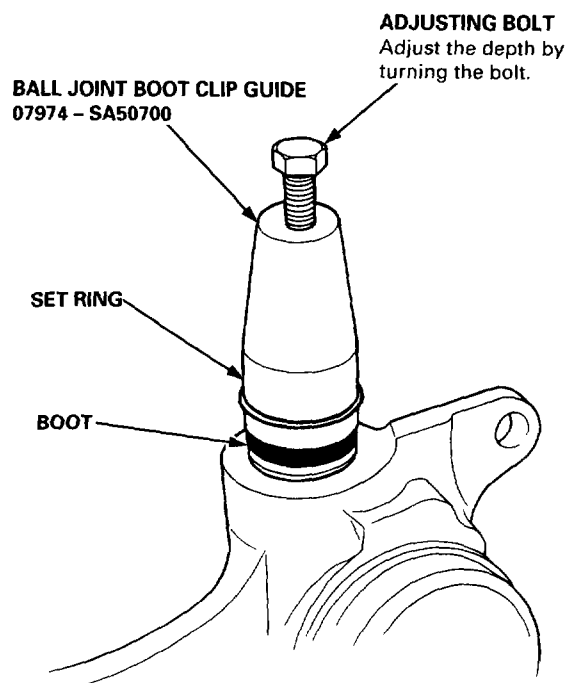
1. Remove the knuckle (see page 18-10).
2. Remove the boot by prying the set ring off.
3. Check the boot for deterioration and damage, replace if necessary.
4. Install the special tools on the ball joint and tighten the castle nut.
5. Position the special tools over the ball joint as shown, then set the assembly in a vise. Press the ball joint out of the knuckle.



6. Place the ball joint in position by hand.
7. Install the special tools over the ball joint as shown, then press the ball joint in.



8. Install the ball joint boot and set ring using the special tool (see page 18-18).



9. Install the knuckle in the reverse order of removal, and pay particular attention to the following items:

- Be careful not to damage the ball joint boots when installing the knuckle.
- Torque all mounting hardware to the specified torque values.
- Torque the castle nuts to the lower torque specifications, then tighten them only far enough to align the slot with the pin hole. Do not align the castle nut by loosening.
- Install new cotter pins on the castle nuts after torquing.
- Avoid twisting the sensor wires when installing the wheel sensor.
- Before installing the brake disc, clean the mating surfaces of the front hub and the inside of the brake disc.
- Before installing the wheel, clean the mating surface of the brake disc and the inside of the wheel.
- Check the front wheel alignment, and adjust it if necessary (see page 18-4).

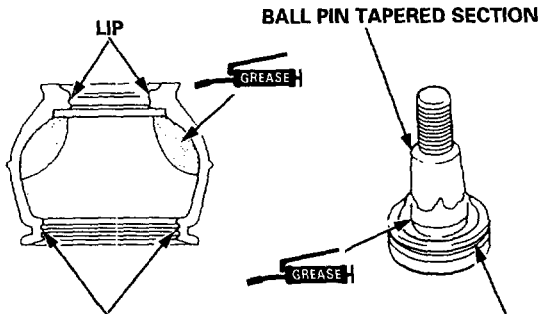
# Front Suspension

## Ball Joint Boot Replacement

1. Remove the set ring and the boot.

**CAUTION:** Do not contaminate the boot installation section with grease.

2. Pack the interior of the boot and lip with grease.



**BOOT INSTALLATION SECTION** Wipe off the grease.  
**BOOT INSTALLATION SECTION** Wipe off the grease.

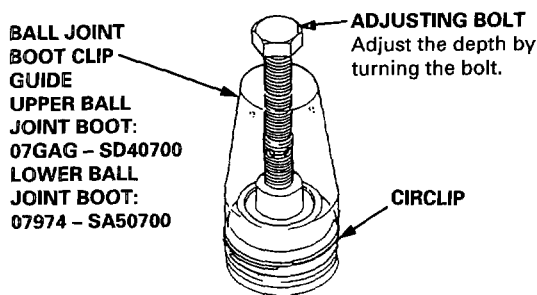
3. Wipe the grease off the sliding surface of the ball pin and pack with fresh grease.

**CAUTION:**

- Keep grease off the boot installation section and the tapered section of the ball pin.
- Do not allow dust, dirt, or other foreign materials to enter the boot.

4. Install the boot in the groove of the boot installation section securely, then bleed air.
5. Install the upper and lower ball joint boot set rings using the special tools as follows:

Lower ball joint: Adjust the special tool with the adjusting bolt until the end of the tool aligns with the groove on the boot. Slide the set ring over the tool and into position.



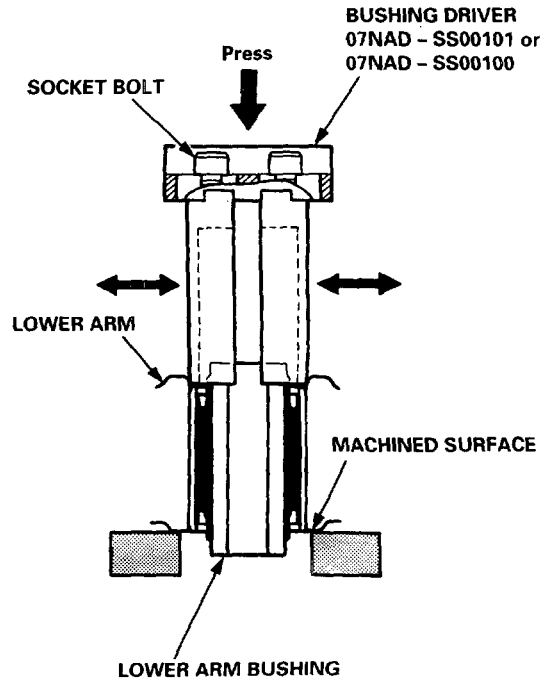
**CAUTION:** After installing the boot, check the ball pin tapered section for grease contamination and wipe it if necessary.

## Lower Arm Bushing Replacement

1. Position the lower arm on the press with the machined surface facing down.
2. Adjust the bushing driver so that it matches the inner diameter of the bushing hole, then tighten the socket bolt securely.
3. Position the bushing driver on the bushing.
4. Remove the bushing by pressing on the bushing driver with a press as shown.

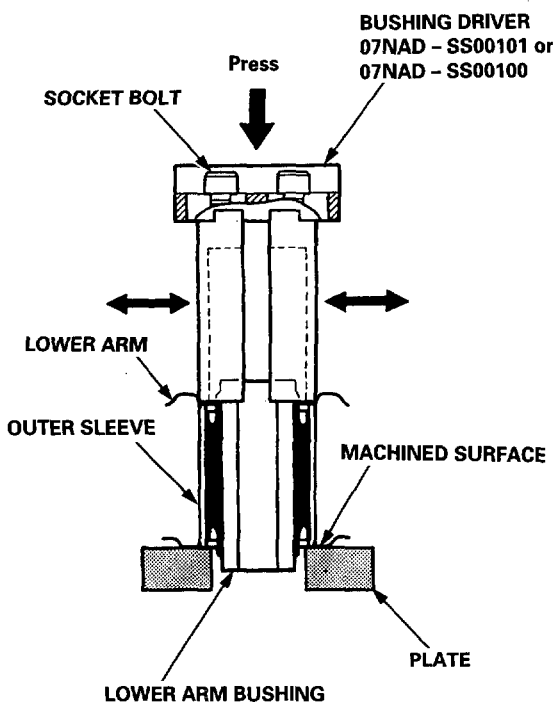
**CAUTION:**

- Support the lower arm at machined surface as shown.
- Be careful not to damage the inside of the bushing hole while pressing on the bushing.



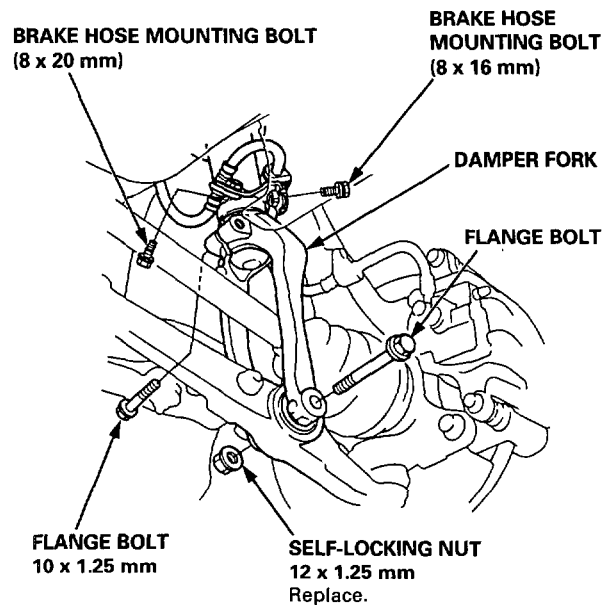


5. Position the lower arm on the press with the machined surface facing down.
6. Adjust the bushing driver so that it matches the inner diameter of the bushing hole, then tighten the socket bolt securely.
7. Position the bushing driver on the outer sleeve of the bushing.
8. Press the bushing into the lower arm using the bushing driver and a press until the edge of the bushing reaches on the plate as shown.

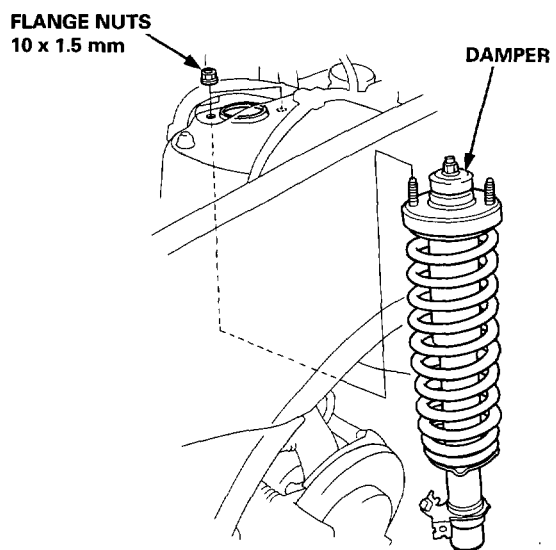


## Removal

1. Remove the front wheels (see page 18-11).
2. Remove the brake hose mounting bolts from the damper.
3. Remove the flange bolt that connects the damper fork to the damper.
4. Remove the flange bolt and self-locking nut, then remove the damper fork.



5. Remove the damper by removing the two flange nuts.



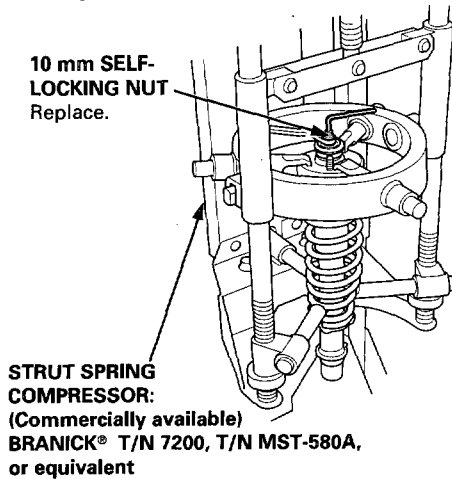
# Front Damper

## Disassembly/Inspection

### Disassembly

1. Compress the damper spring with the spring compressor according to the manufacturer's instructions, then remove the self-locking nut.

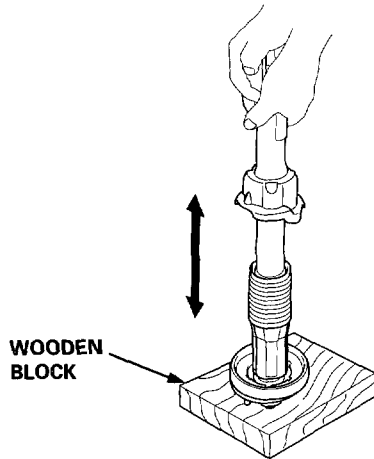
**CAUTION:** Do not compress the spring more than necessary to remove the nut.



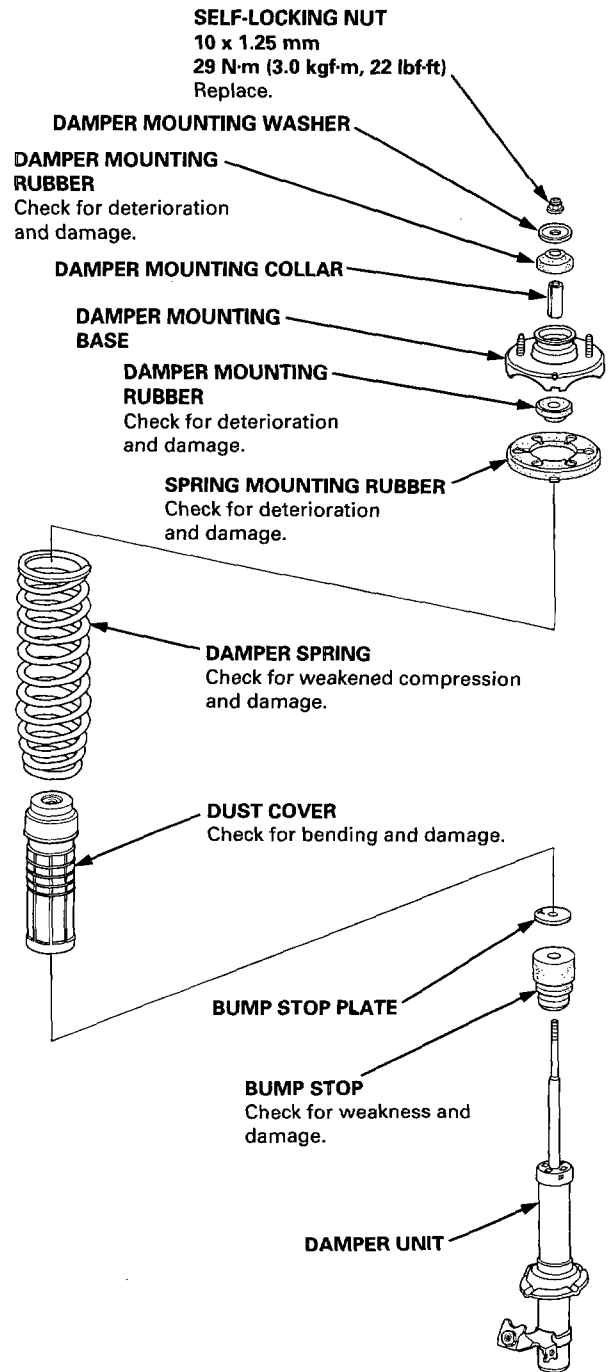
2. Release the pressure from the spring compressor, then disassemble the damper as shown in the next column.

### Inspection

1. Reassemble all parts, except the spring.
2. Push on the damper assembly as shown.



3. Check for smooth operation through a full stroke, both compression and extension.  
**NOTE:** The damper should move smoothly. If it does not (no compression or no extension), the gas is leaking, and the damper should be replaced.
4. Check for oil leaks, abnormal noises or binding during these tests.



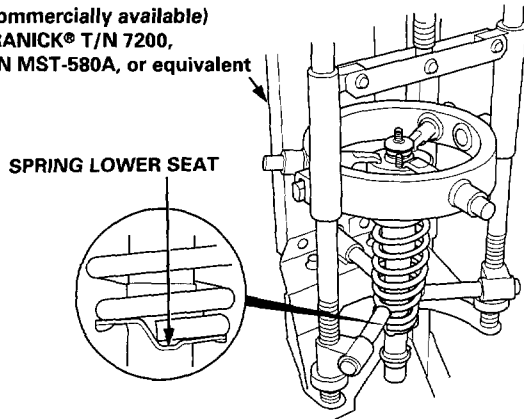


## Reassembly

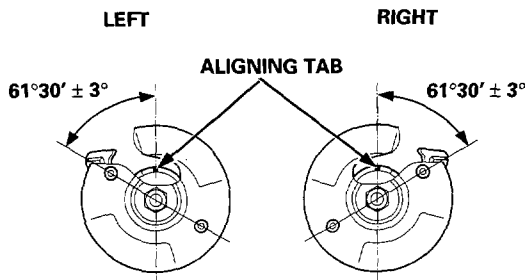
1. Install the damper unit on a spring compressor.
2. Assemble the damper in reverse order of removal except the damper mounting washer and self locking nut.

NOTE: Align the bottom of damper spring and spring lower seat as shown.

**STRUT SPRING COMPRESSOR:**  
(Commercially available)  
BRANICK® T/N 7200,  
T/N MST-580A, or equivalent



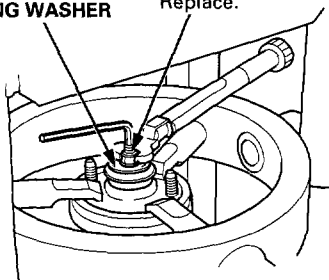
3. Position the damper mounting base on the damper unit as shown.



4. Compress the damper spring.
5. Install the damper mounting rubber, damper mounting washer and a new 10 mm self-locking nut.
6. Hold the damper shaft and tighten the 10 mm self-locking nut.

**DAMPER MOUNTING WASHER**

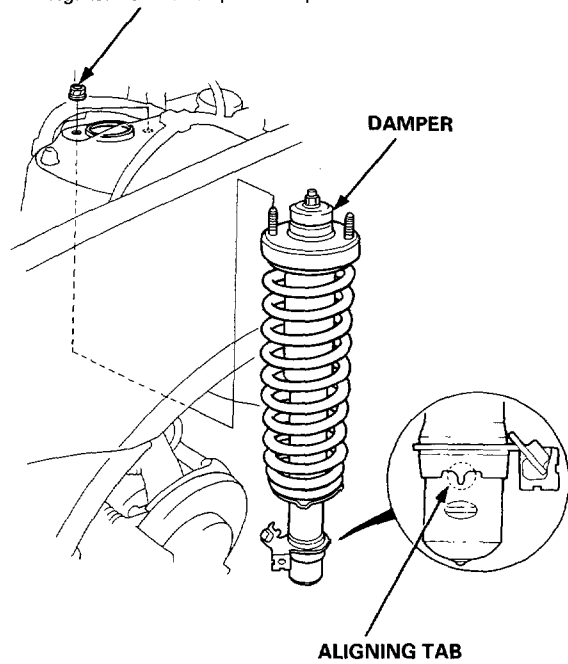
**SELF-LOCKING NUT**  
10 x 1.25 mm  
29 N·m (3.0 kgf·m, 22 lbf·ft)  
Replace.



## Installation

1. Loosely install the damper on the frame with the aligning tab facing inside, then loosely install the two flange nuts.

**FLANGE NUTS**  
10 x 1.5 mm  
38 N·m (3.9 kgf·m, 28 lbf·ft)  
Tighten to this torque in step 8.



(cont'd)

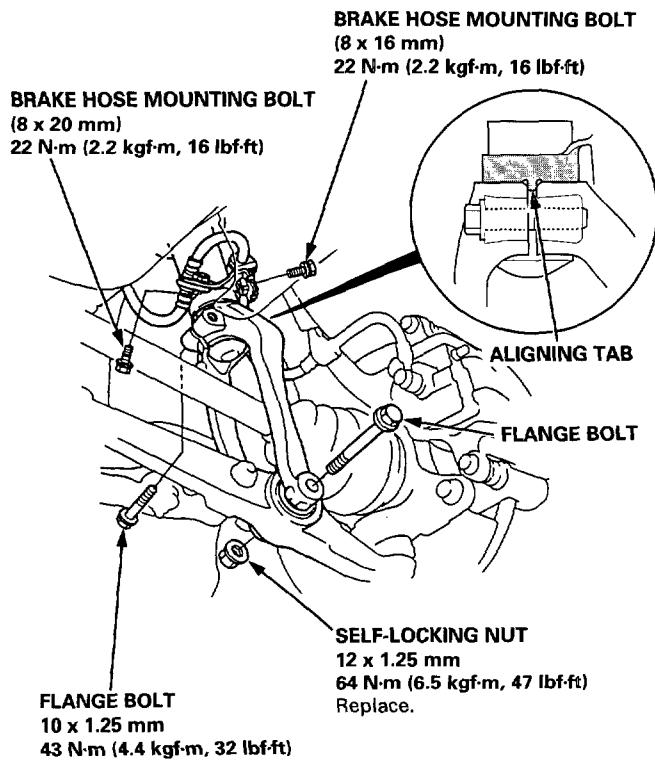
# Front Damper

## Installation (cont'd)

2. Install the damper fork over the driveshaft and onto the lower arm. Install the front damper in the damper fork so the aligning tab is aligned with the slot in the damper fork.
3. Loosely install the flange bolt, and connects the damper fork to the damper.
4. Loosely install a new self-locking nut with the flange bolt.
5. Raise the knuckle with a floor jack until the vehicle just lifts off the safety stand.

**▲ WARNING** The floor jack must be securely positioned or personal injury may result.

6. Tighten the flange bolt.
7. Tighten the self-locking nut.
8. Tighten the flange nuts on the top of the damper to the specified torque.
9. Install the brake hose mounts with the brake hose mounting bolts.



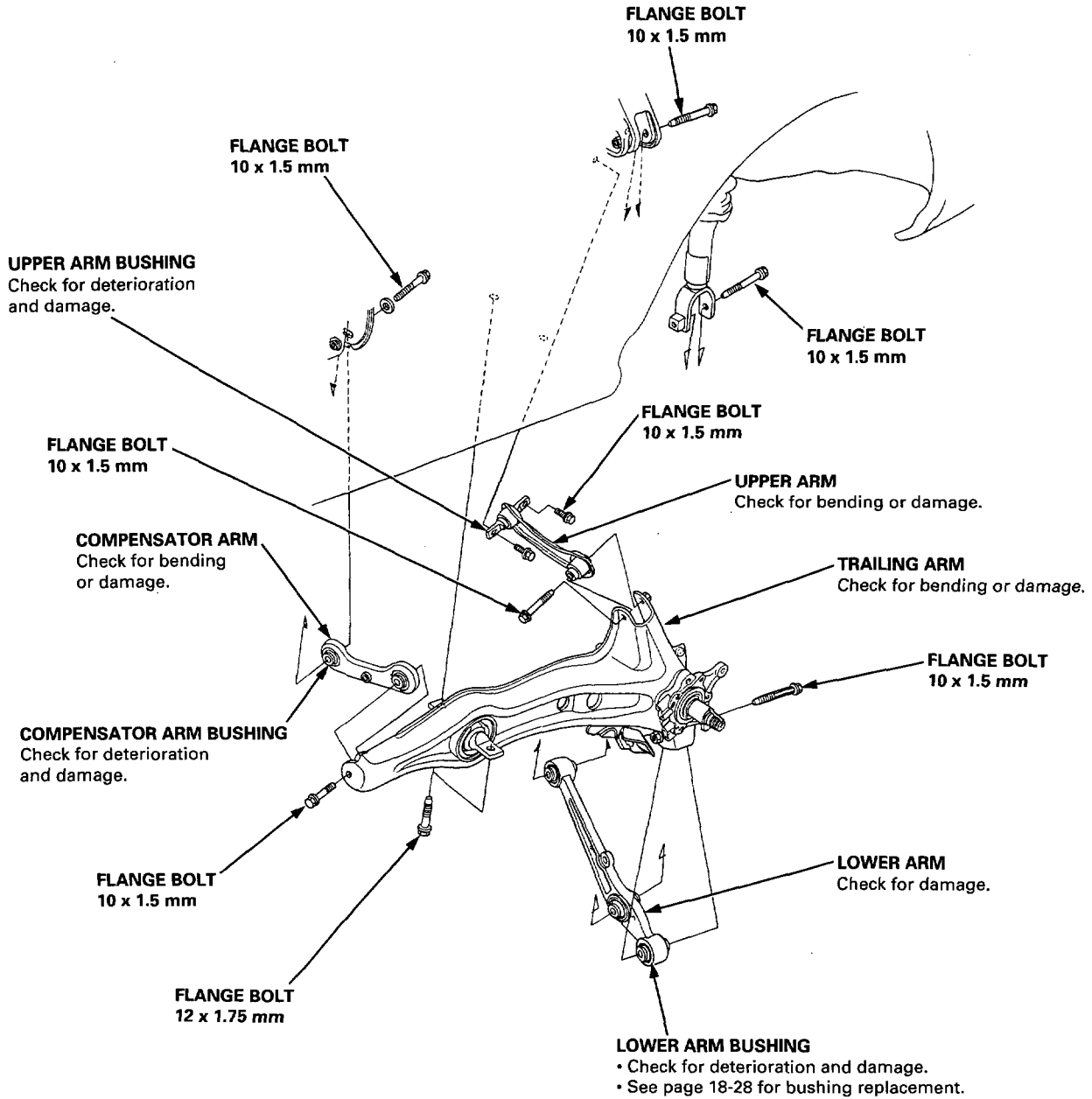
10. Install the front wheel (see page 18-11).

# Rear Suspension



## Suspension Arms

### Removal/Inspection



(cont'd)



# Rear Suspension

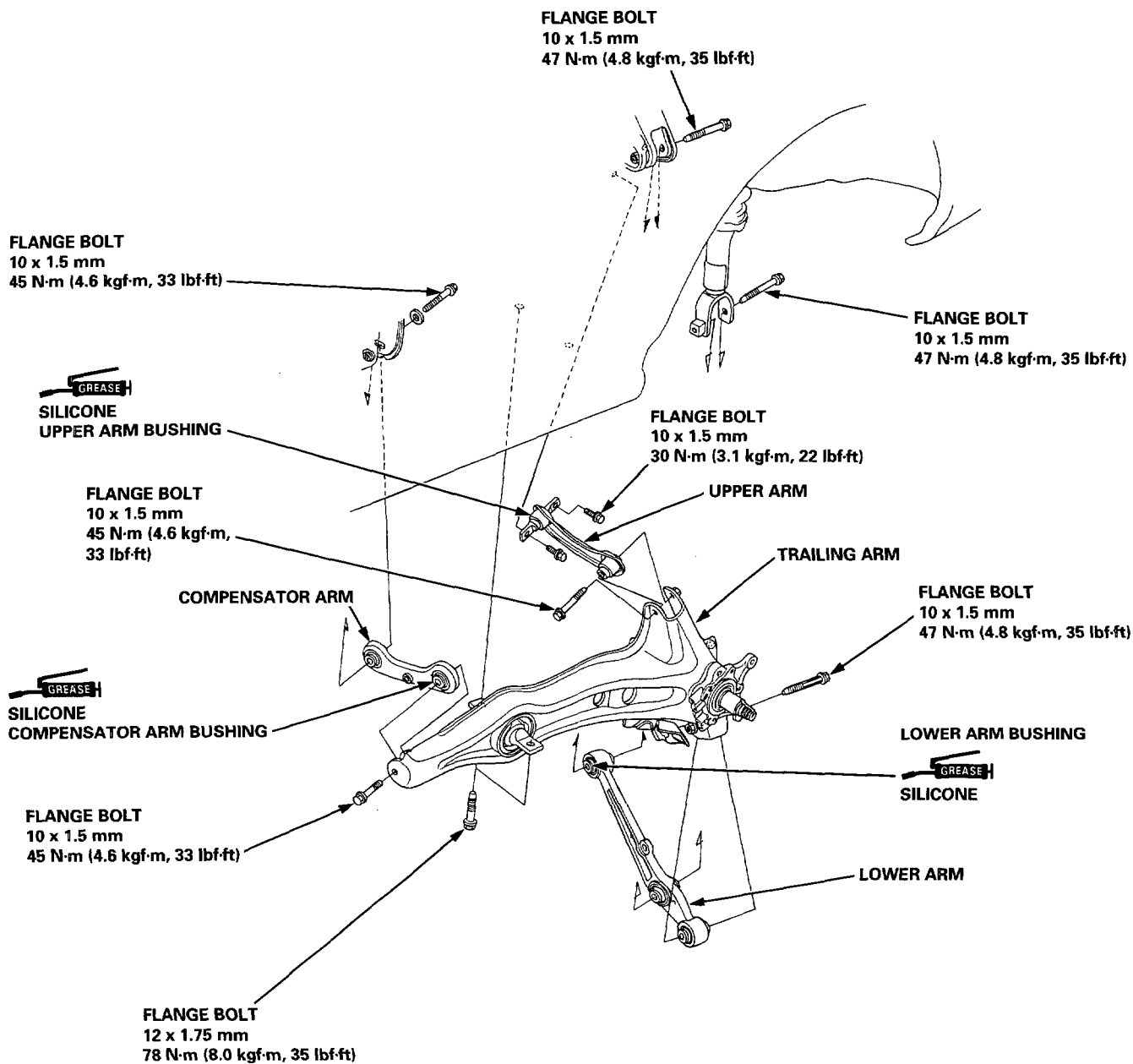
## Suspension Arms (cont'd)

### Installation

**CAUTION:** Any bolts or nuts connected to rubber mounts or bushings should be tightened with the vehicle on the ground.

**NOTE:**

- Make sure the flange bolts on the right and compensator arms are installed in the same direction.
- "L" is stamped on the left lower arm and "R" on the right lower arm.
- "↑ UP L" is stamped on the left upper arm and "↑ UP R" on the right upper arm.
- The right and left compensator arm are symmetrical. Install so the "↑ UP" mark stamped side faces forward.
- After installing the suspension arm, check the rear wheel alignment and adjust if necessary (see page 18-4).





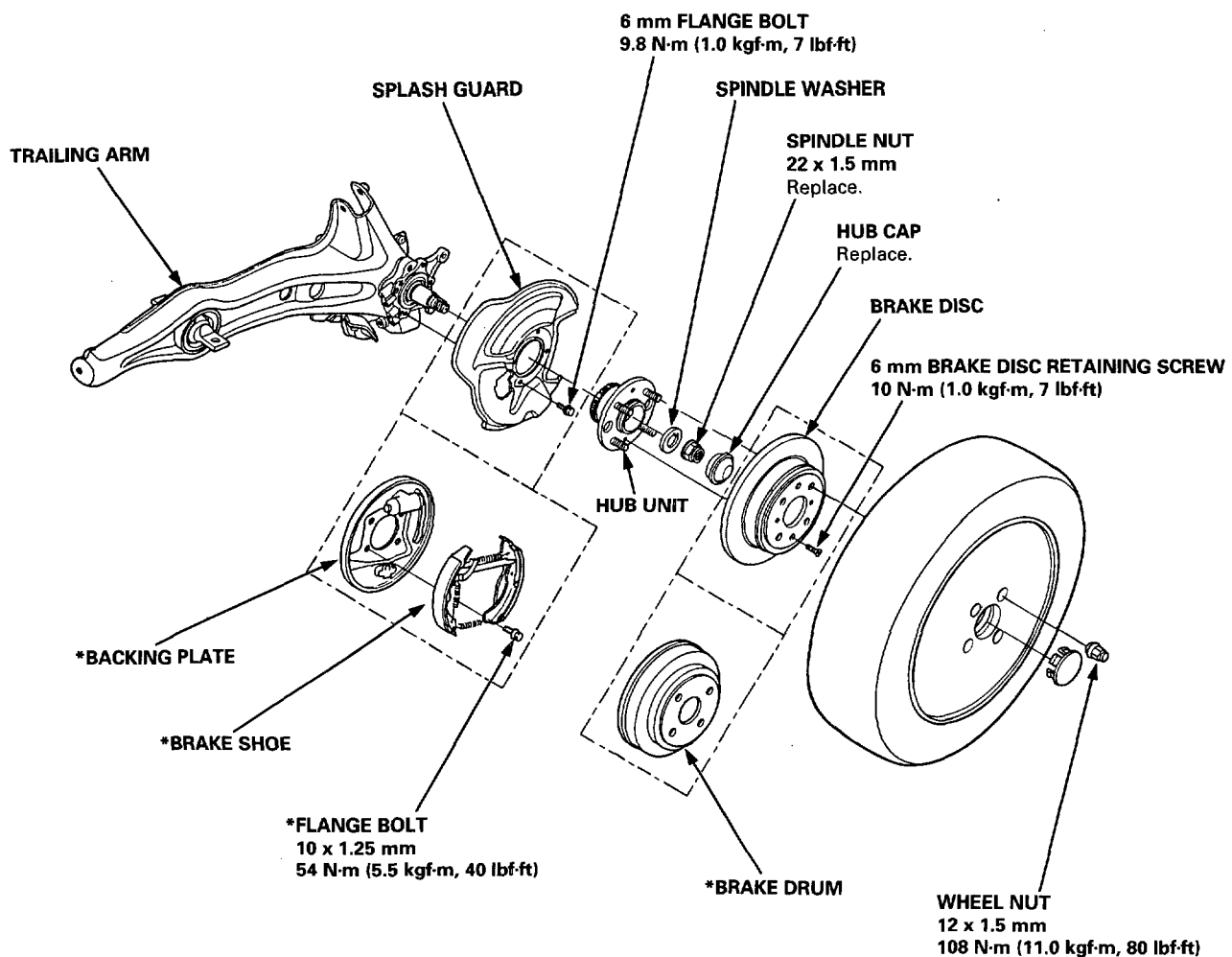
# Hub Bearing Unit Replacement

## Illustrated Index

### NOTE:

- Use only genuine Honda wheel weights for aluminum wheels. Non-genuine wheel weights may corrode and damage the aluminum wheels.
- On the aluminum wheels, remove the center cap from the inside of the wheel after removing the wheel.
- Before installing the brake disc (or brake drum), clean the mating surfaces of the rear hub and the brake disc (or brake drum).
- Before installing the wheel, clean the mating surfaces of the brake disc (or brake drum) and wheel.

\*: For vehicles with drum brake.



(cont'd)

# Rear Suspension

## Hub Bearing Unit Replacement (cont'd)

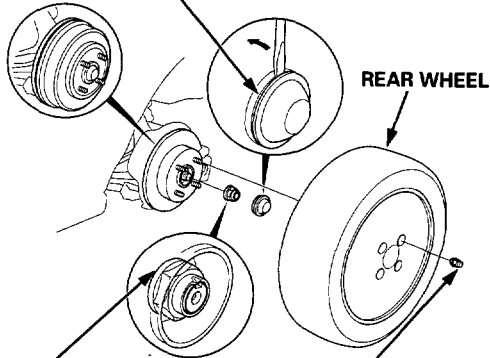
1. Loosen the wheel nuts slightly.
2. Raise the rear of vehicle, and support it with safety stands in the proper locations (see section 1).
3. Remove the wheel nuts and rear wheel.

### HUB CAP

Replace.

NOTE: Take care not to damage the hub bearing unit on disassembly.

For cars with drum brake:



### SPINDLE NUT

22 x 1.5 mm

181 N·m (18.5 kgf·m, 134 lbf·ft)

Replace.

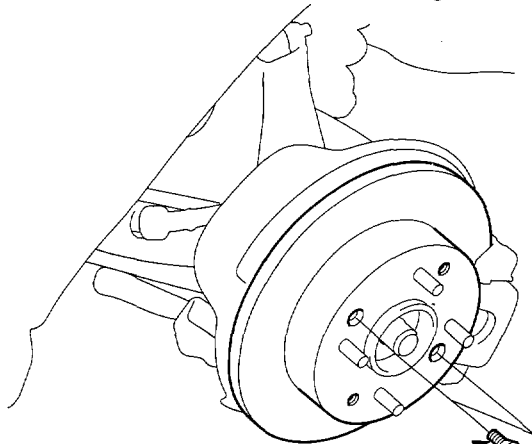
NOTE: After tightening, use a drift to stake the spindle nut shoulder against the spindle.

### WHEEL NUT

12 x 1.5 mm

108 N·m (11.0 kgf·m, 80 lbf·ft)

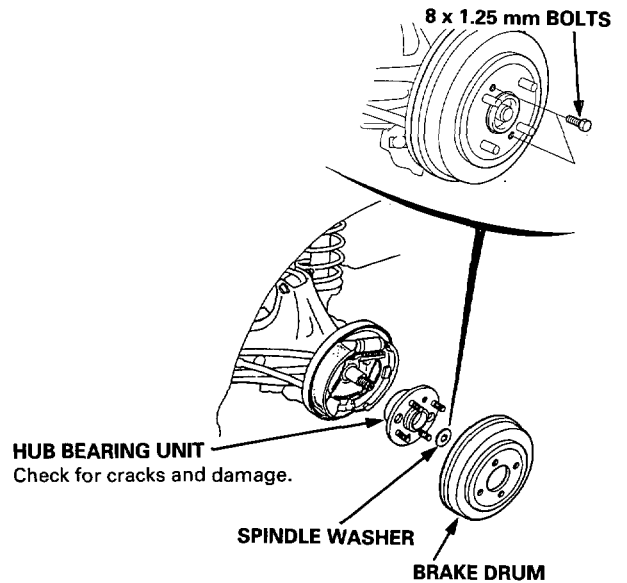
4. Pull the parking brake lever up.
5. Remove the hub cap.
6. Raise the locking tab on the spindle nut, then remove the nut.
7. Remove the 6 mm brake disc retaining screws.



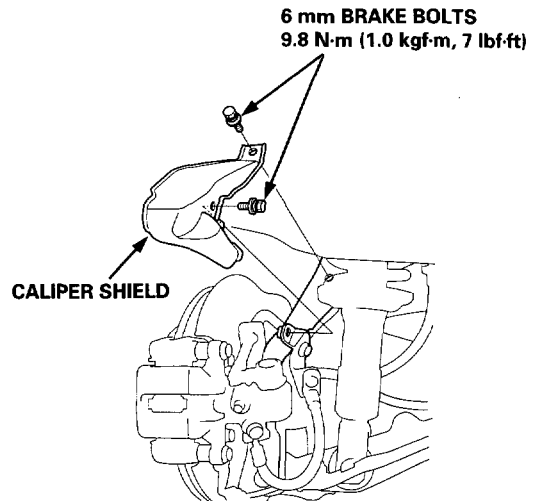
6 mm BRAKE DISC RETAINING SCREWS  
9.8 N·m (1.0 kgf·m, 7 lbf·ft)

8. Release the parking brake lever.
9. Remove the brake drum, hub unit and spindle washer (for cars with drum brake).
10. Screw two 8 x 1.25 mm bolts into the drum to push it away from the hub bearing unit.

NOTE: Turn each bolt two turns at a time to prevent cocking the drum excessively.



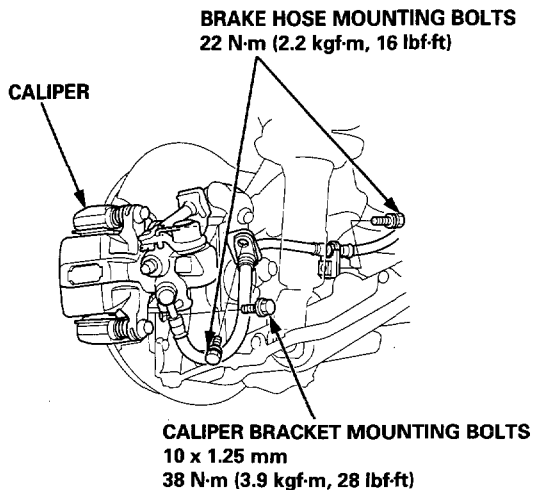
11. Remove the 6 mm flange bolts and caliper shield.





12. Remove the two brake hose mounting bolts.
13. Remove the caliper bracket mounting bolts and hang the caliper to one side.

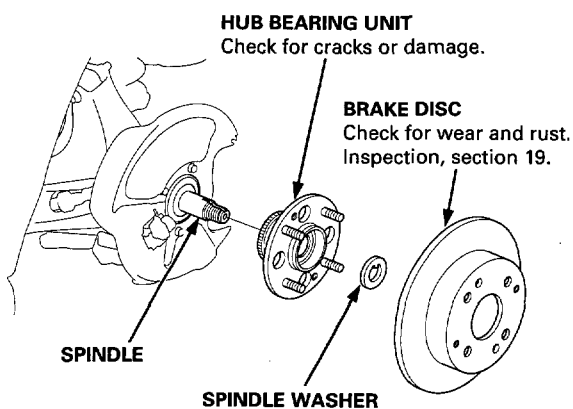
**CAUTION:** To prevent accidental damage to the caliper or brake hose, use a short piece of wire to hang the caliper from the undercarriage.



14. Screw two 8 x 1.25 mm bolts into the disc to push it away from the hub.

**NOTE:** Turn each bolt two turns at a time to prevent cocking the disc excessively.

15. Remove the brake disc.
16. Remove the hub unit from the knuckle.



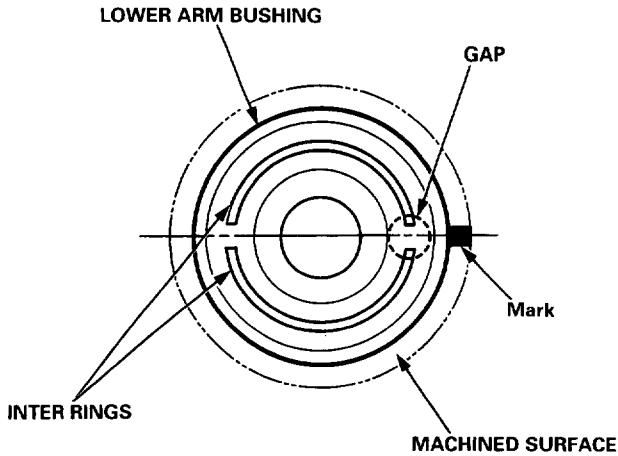
17. Install the reverse order of removal, and pay particular attention to the following items.

- Wash the bearing and spindle thoroughly in high flash point solvent before reassembly.
- Before installing the brake disc (or brake drum), clean the mating surfaces of the rear hub and brake disc (or brake drum).
- Adjust the parking brake (see section 19).
- Check the rear wheel alignment, and adjust it if necessary (see page 18-4).

# Rear Suspension

## Lower Arm Bushing Replacement

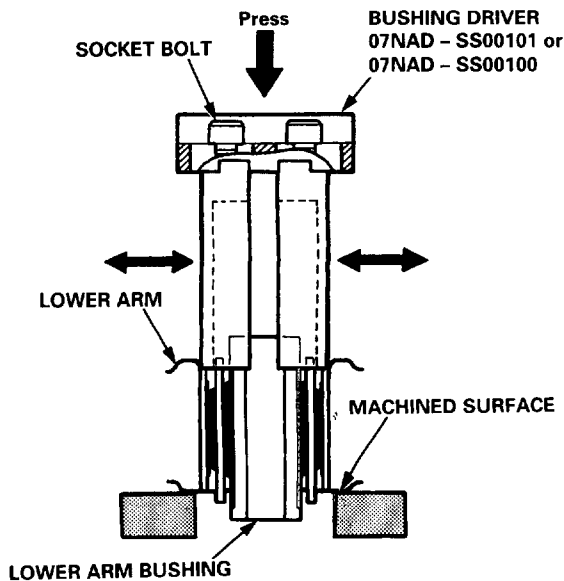
1. Mark on the machined surface of the lower arm so that they are in line with the gaps on the inter rings.



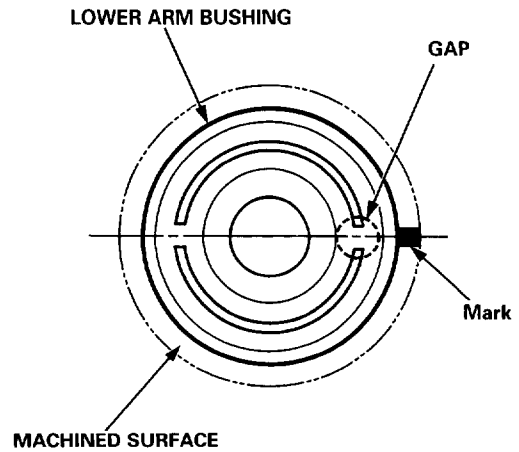
2. Position the lower arm on the press with the machined surface facing down.
3. Adjust the bushing driver so that it matches the inner diameter of the bushing hole, then tighten the socket bolt securely.
4. Position the bushing driver on the bushing.
5. Remove the bushing by pressing on the bushing driver with a press as shown.

**CAUTION:**

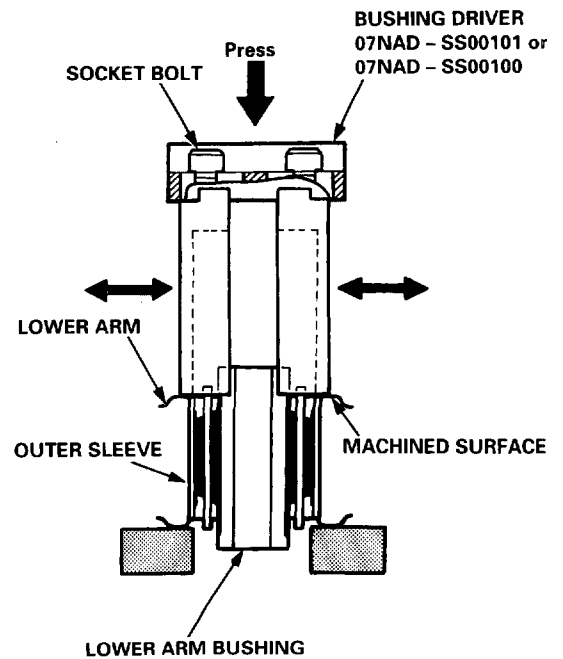
- Support the lower arm at machined surface as shown.
- Be careful not to damage the inside of the bushing hole while pressing on the bushing.



6. Position the lower arm bushing by aligning the gap on the bushing with the mark on the lower arm when viewed from the top.



7. Adjust the bushing driver so that it matches with the outer diameter of the bushing.
8. Position the bushing driver on the outer sleeve of the bushing.
9. Press the bushing into the lower arm using the bushing driver and a press until the edge of the bushing aligns with machined surface on the lower arm as shown.



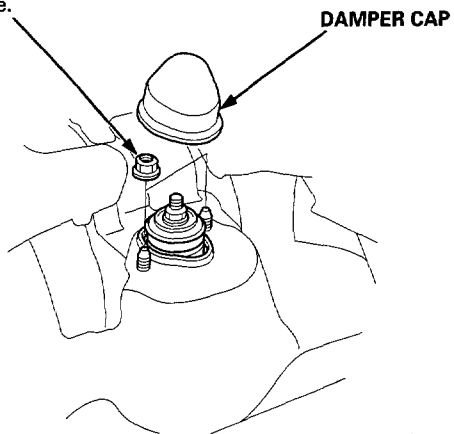
# Rear Damper



## Removal

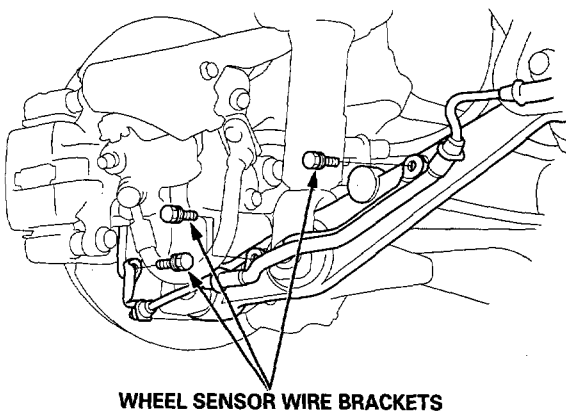
1. Remove the rear wheels (see page 18-26).
2. Remove the trunk side panel (see section 20).
3. Remove the damper cap.
4. Remove the two self-locking nuts.

**SELF-LOCKING NUTS**  
10 x 1.5 mm  
Replace.

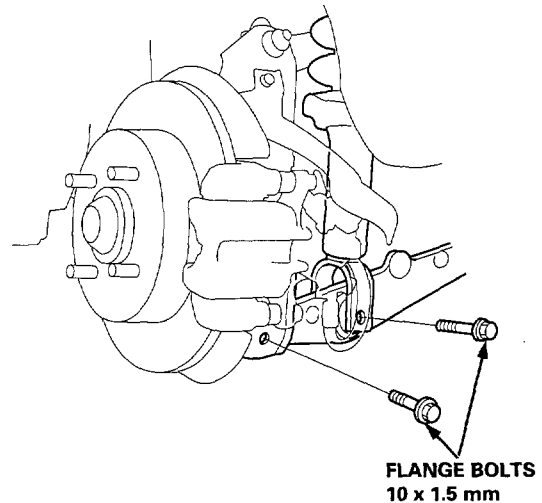


5. Remove the wheel sensor wire brackets (for vehicles with ABS).

**NOTE:** Do not disconnect the wheel sensor connector.



6. Remove the flange bolt on the damper.
7. Remove the flange bolt that connects the lower arm to the trailing arm.



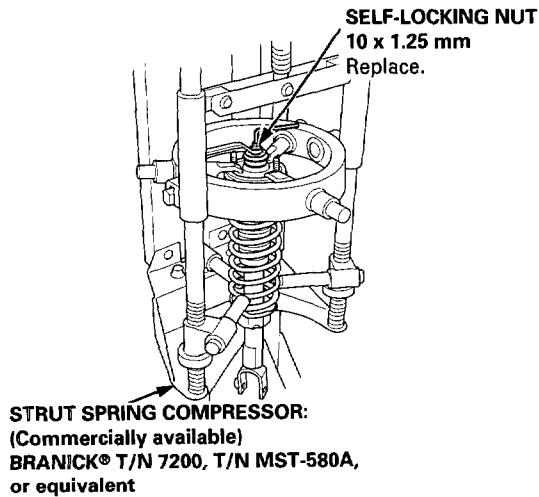
8. Lower the rear suspension and remove the damper.

# Rear Damper

## Disassembly/Inspection

### Disassembly

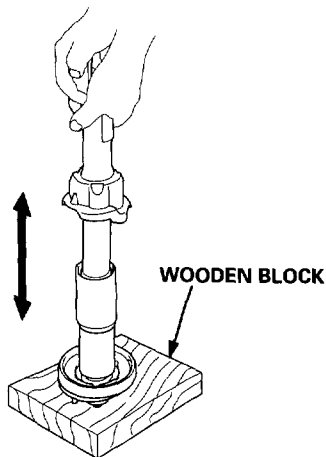
1. Compress the damper spring with the spring compressor according to the manufacturer's instructions, then remove the self-locking nut.  
**CAUTION: Do not compress the spring more than necessary to remove the self-locking nut.**



2. Release the pressure from the spring compressor, then disassemble the damper as shown on page 18-31.

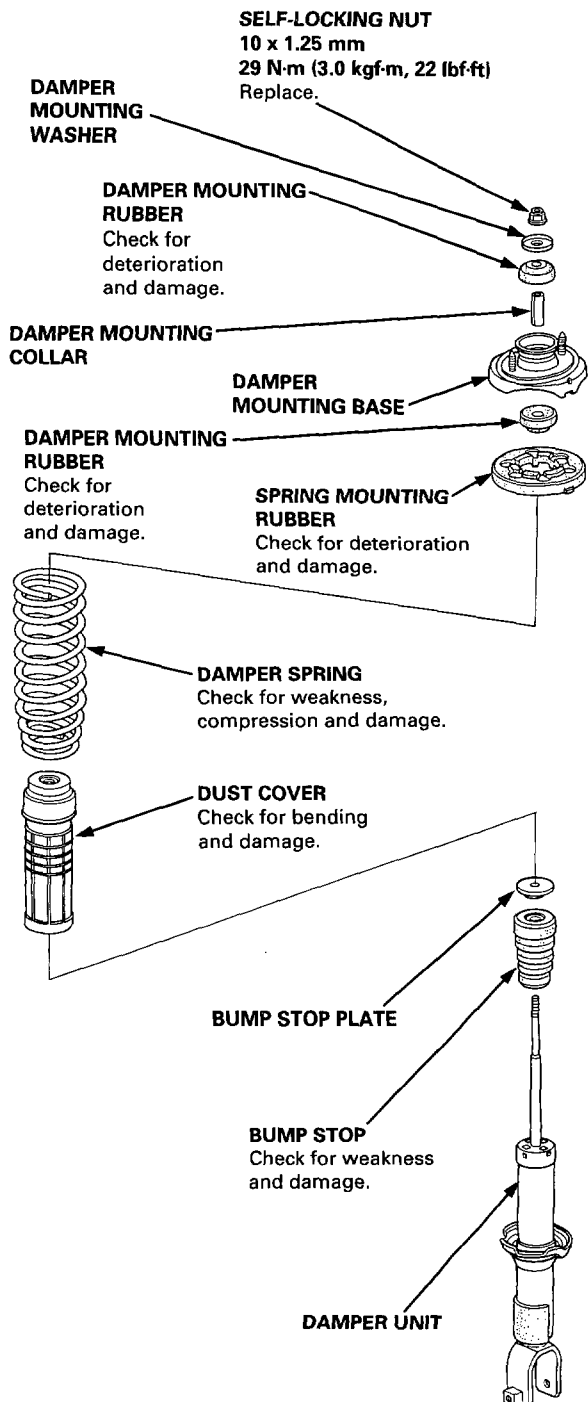
### Inspection

1. Reassemble all parts, except the spring.
2. Push on the damper as shown.



3. Check for smooth operation through a full stroke, both compression and extension.  
**NOTE:** The damper should move smoothly. If it does not (no compression or no extension), the gas is leaking, and the damper should be replaced.
4. Check for oil leaks, abnormal noises and binding during these tests.

### Inspection





## Reassembly

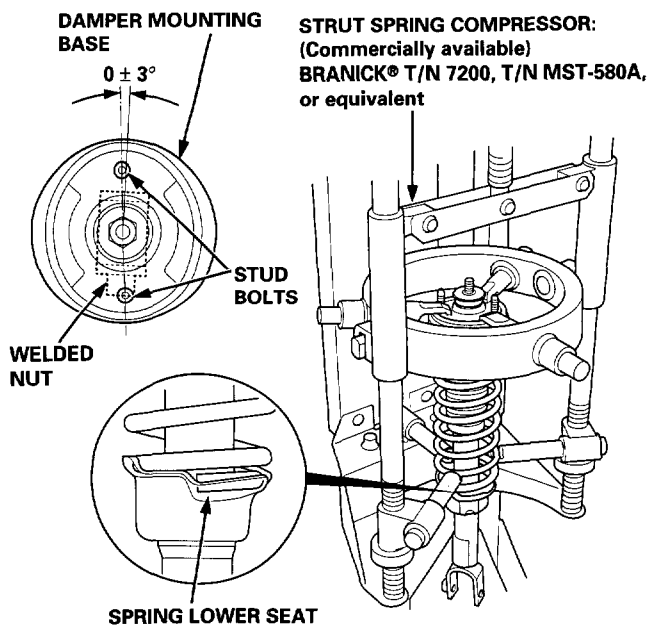
1. Install the damper unit on a spring compressor.

NOTE: Follow the manufacturer's instructions.

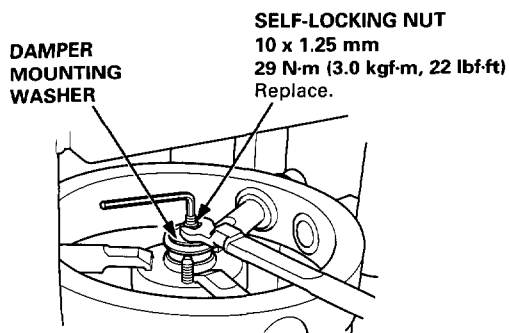
2. Assemble the rear damper in reverse order of disassembly except the damper mounting washer and self-locking nut.

NOTE: Align the bottom of damper spring and spring lower seat as shown.

3. Position the damper mounting base on the damper unit as shown.

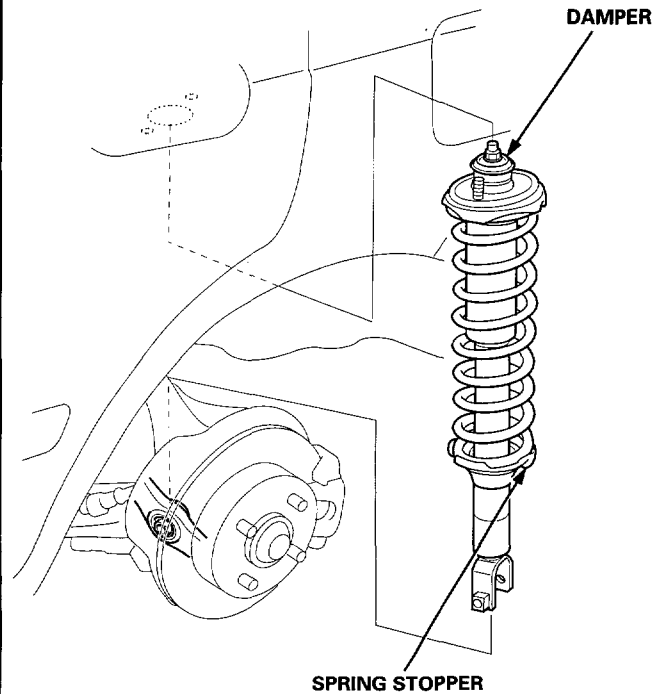


4. Compress the damper spring with the spring compressor.
5. Install the damper mounting washer, and loosely install a new self-locking nut.
6. Hold the damper shaft with a hex wrench and tighten the self-locking nut.



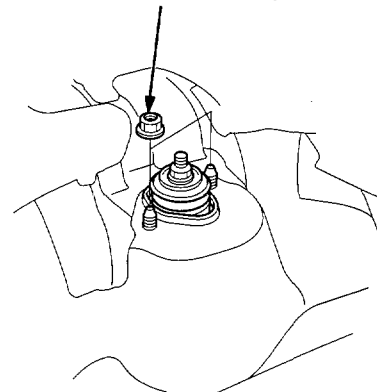
## Installation

1. Lower the rear suspension, and position the damper with the spring stop pointed toward the left side of the vehicle.



2. Loosely install the two flange nuts.

**SELF-LOCKING NUTS**  
10 x 1.5 mm  
Replace.  
Tighten these nuts in step 7 on the next page.



(cont'd)



# Rear Damper

## Installation (cont'd)

3. Install the wheel sensor wire bracket (for vehicles with ABS).

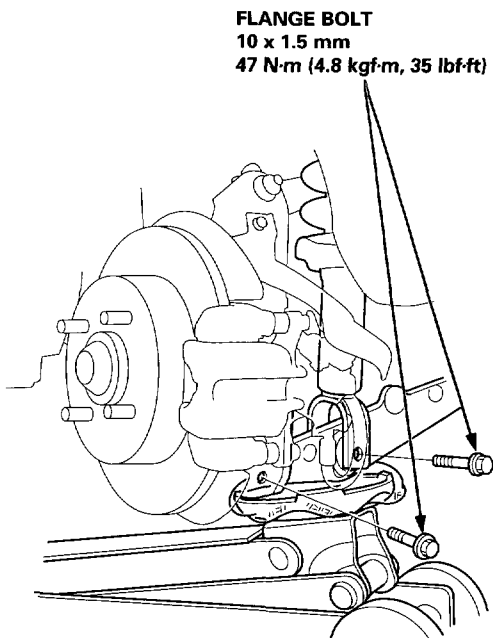
NOTE: Be careful when installing the sensors to avoid twisting wires.

4. Raise the rear suspension with a floor jack until the car just lifts off the safety stand.

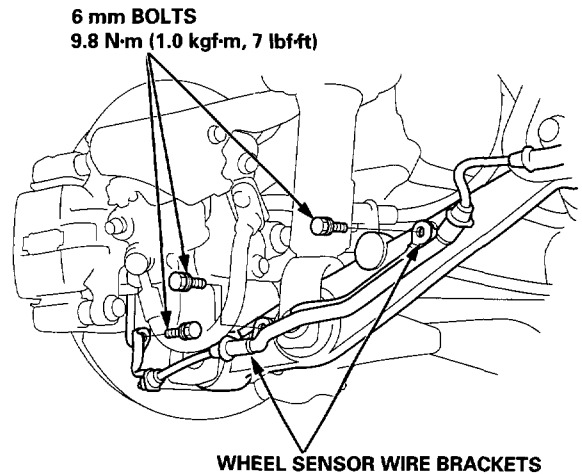
**▲ WARNING** The floor jack must be securely positioned or personal injury may result.

5. Install the flange bolts, then tighten the bolts.

NOTE: The flange bolt should be tightened with the damper under vehicle load.



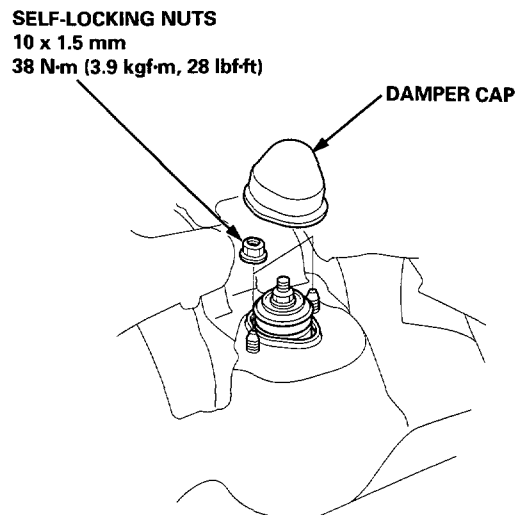
6. Install the wheel sensor wire brackets with the three 6 mm bolts (for vehicles with ABS).



7. Tighten the two self-locking nuts on the top of the damper to the specified torque.

8. Install the damper cap.

9. Install the trunk side panel (see section 20).



10. Install the rear wheels (see page 18-26).

11. Check the rear wheel alignment, and adjust if necessary (see page 18-4).

# Damper Disposal

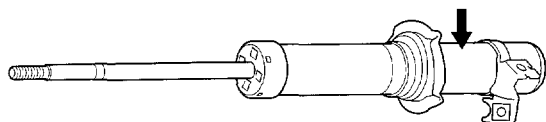


**▲ WARNING** The dampers contain nitrogen gas and oil under pressure.

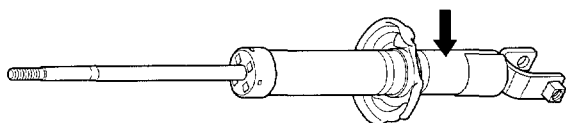
The pressure must be relieved before disposal to prevent explosion and possible injury when scrapping.

Place the damper on a level surface with its rod extended and drill a hole of 2 – 3 mm (0.078 – 0.118 in) diameter in the body release the gas.

## Front Damper



## Rear Damper



**▲ WARNING** Always wear eye protection to avoid getting metal shavings in your eyes when the gas damper pressure is relieved.

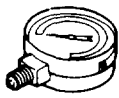
# Conventional Brakes

<b>Special Tools</b> .....	19-A-2	<b>Rear Brake Pads</b>	
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<b>Inspection and Adjustment</b>		<b>Disc Runout Inspection</b> .....	19-A-22
<b>Brake System Rubber Parts</b>		<b>Disc Thickness and Parallelism</b>	
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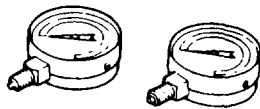


# Special Tools

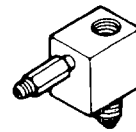
Ref. No.	Tool Number	Description	Qty	Remark
①	07404 - 5790301	Vacuum Gauge	1	
②	07406 - 5790201	Pressure Gauges	2	
③	07410 - 5790101	Pressure Gauge Attachment C	2	
④	07410 - 5790501	Tube Joint Adapter	1	
⑤	07510 - 6340101	Pressure Gauge Joint Pipe	2	



①



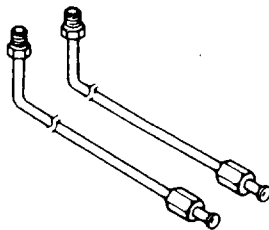
②



③



④



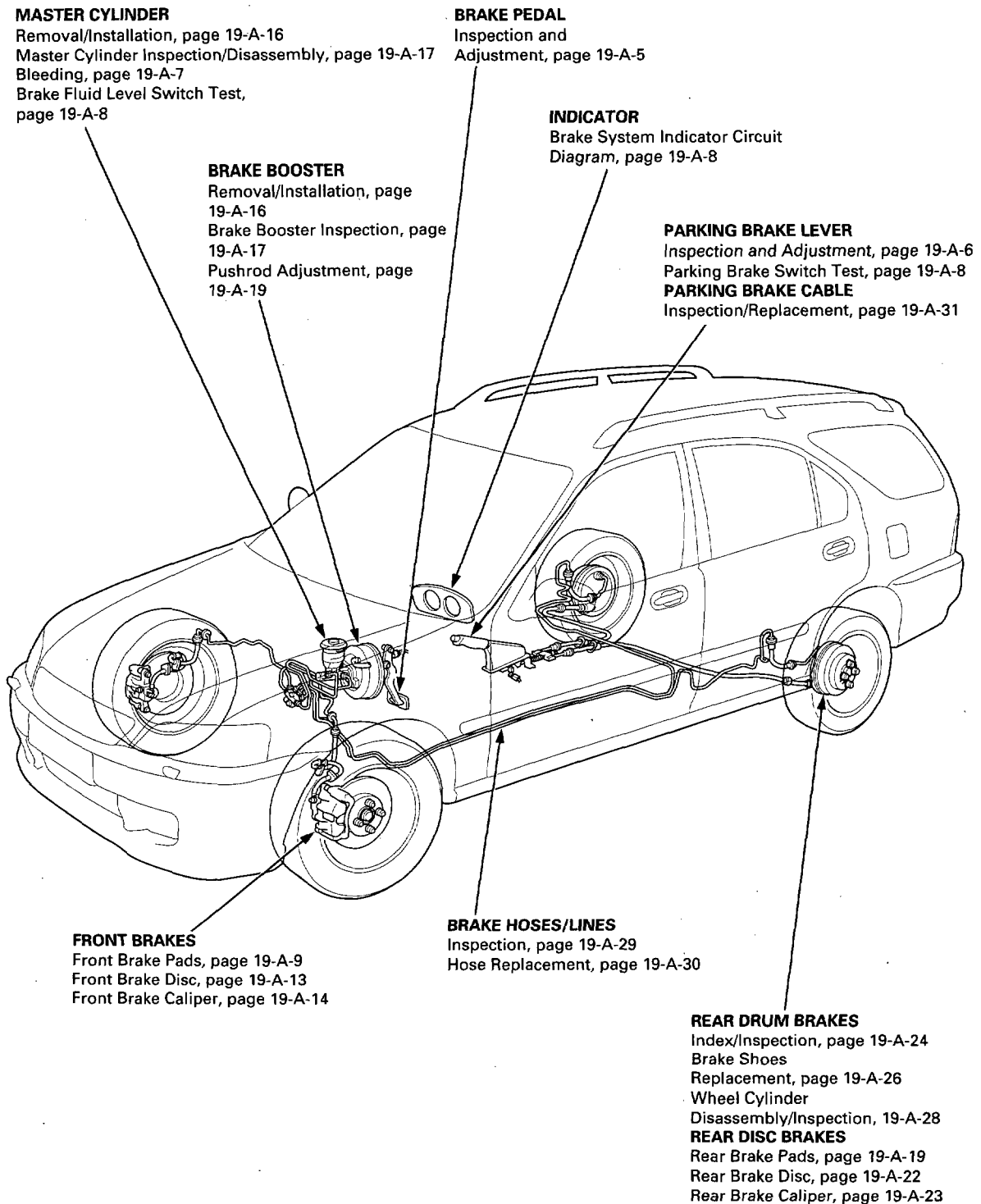
⑤

# Component Locations



## Index

NOTE: LHD type is shown, RHD type is symmetrical.



# Inspection and Adjustment

## Brake System Rubber Parts and Brake Booster

### Brake Booster (A)

Check brake operation by applying the brakes. If the brakes do not work properly, check the brake booster. Replace the brake booster as an assembly if it does not work properly or if there are signs of leakage.

### Piston Cup and Pressure Cup Inspection (B)

- Check brake operation by applying the brakes. Visually check for damage or signs of fluid leakage. Replace the master cylinder as an assembly if the pedal does not work properly or if there is damage or signs of fluid leakage.
- Check for a difference in brake pedal stroke between quick and slow brake applications. Replace the master cylinder if there is a difference in pedal stroke.

### Brake Hoses (C)

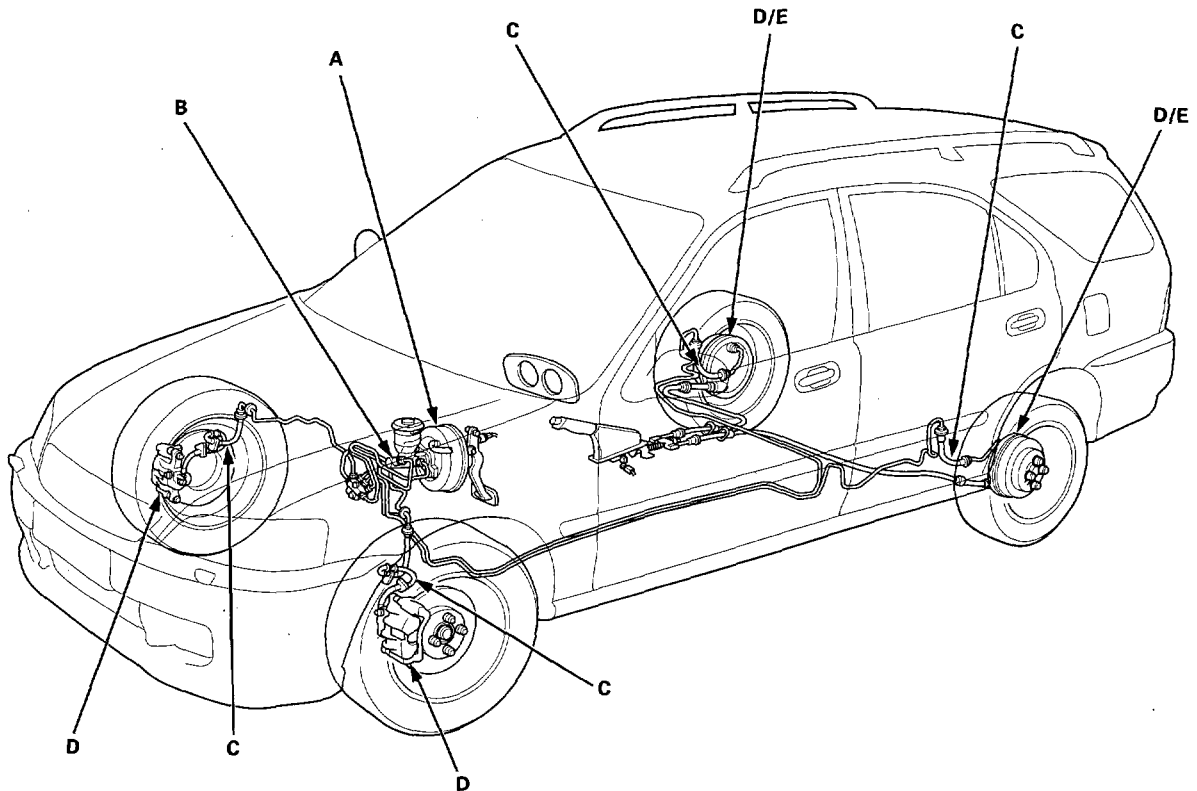
Visually check for damage or signs of fluid leakage. Replace the brake hose with a new one if it is damaged or leaking.

### Caliper Piston Seal and Piston Boots (D)

Check brake operation by applying the brakes. Visually check for damage or signs of fluid leakage. If the pedal does not operate properly, the brakes drag, or there is damage or signs of fluid leakage, disassemble and inspect the brake caliper. Replace the boots and seals with new ones whenever the brake caliper is disassembled.

### Wheel Cylinder Piston Cup and Dust Cover (E)

Check brake operation by applying the brakes. Visually check for damage or signs of fluid leakage. If the pedal does not operate properly, the brakes drag, or there is damage or signs of fluid leakage, disassemble and inspect the wheel cylinder. Replace the piston cups and dust covers with new ones whenever the wheel cylinder is disassembled.

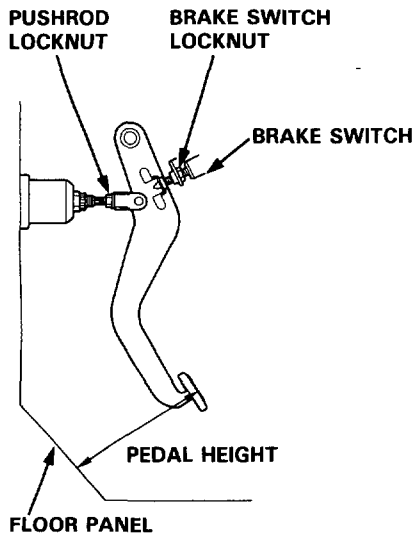




## Brake Pedal

### Pedal Height

1. Disconnect the brake switch connector, loosen the brake switch locknut, and back off the brake switch until it is no longer touching the brake pedal.
2. Turn up the carpet, and measure the pedal height from the left side center of the pedal pad.



### Standard Pedal Height (with floor mat removed):

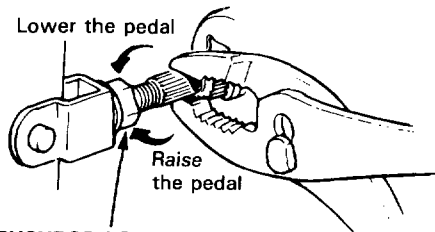
#### RHD:

M/T: 154 mm (6.07 in)  
A/T: 159 mm (6.26 in)

#### LHD:

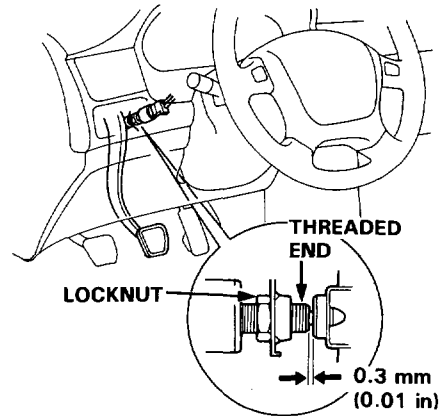
M/T: 157 mm (6.18 in)  
A/T: 162 mm (6.38 in)

3. Loosen the pushrod locknut, and screw the pushrod in or out with pliers until the standard pedal height from the floor is reached. After adjustment, tighten the locknut firmly. Do not adjust the pedal height with the pushrod depressed.



**PUSHROD LOCKNUT**  
15 N·m  
(1.5 kgf·m, 11 lbf·ft)

4. Screw in the brake switch until its plunger is fully depressed (threaded end touching the pad on the pedal arm). Then back off the switch 1/4 turn to make 0.3 mm (0.01 in) of clearance between the threaded end and pad. Tighten the locknut firmly. Connect the brake switch connector. Make sure that the brake lights go off when the pedal is released.



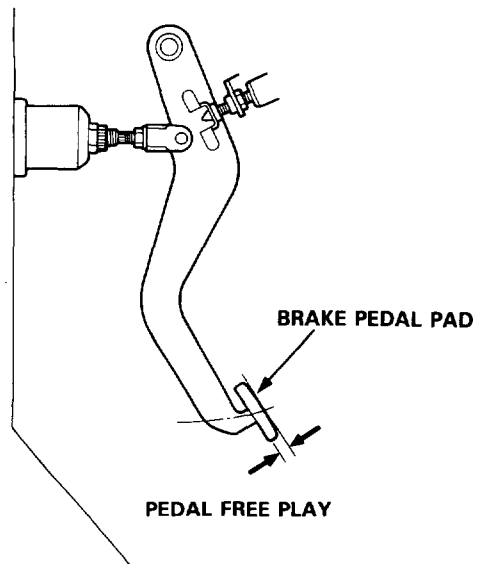
5. Check the brake pedal free play as described below.

### Pedal Free Play

1. Stop the engine, and inspect the play on the pedal pad by pushing the pedal by hand.

**Free Play: 1 – 5 mm (0.04 – 0.20 in)**

2. If the pedal free play is out of specification, adjust the brake switch. If the pedal free play is insufficient, it may result in brake drag.



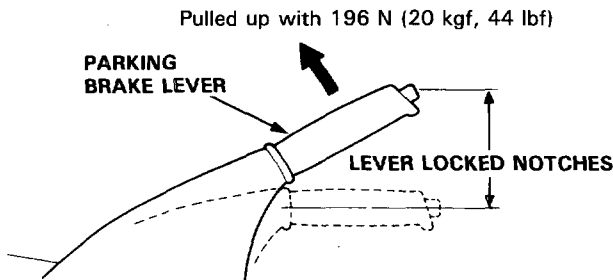
# Inspection and Adjustment

## Parking Brake

### Inspection

1. Pull the parking brake lever with 196 N (20 kgf, 44 lbf) force to fully applied the parking brake. The parking brake lever should be locked within the specified notches.

**Lever Locked Notches: 6 – 10**

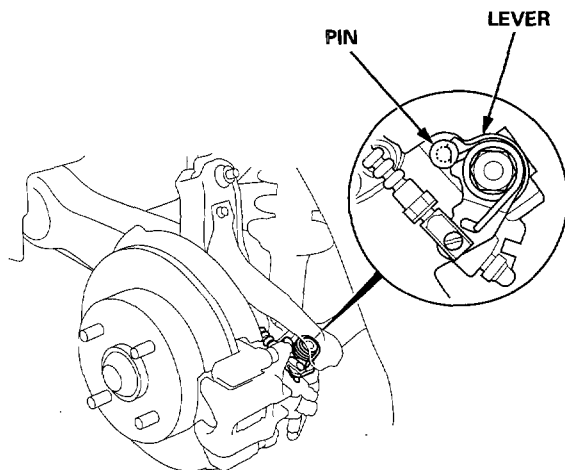


2. Adjust the parking brake if the lever notches are out of specification.

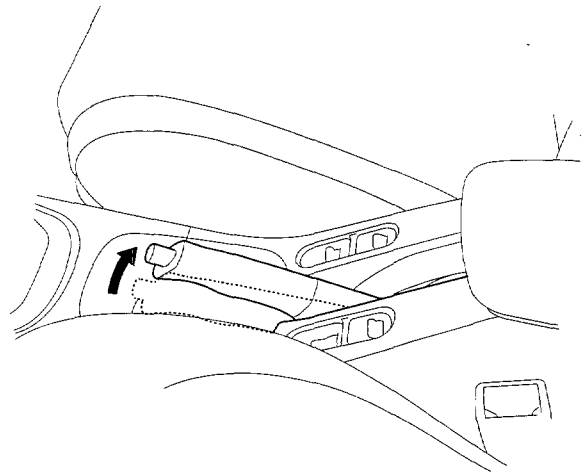
### Adjustment

**NOTE:** After rear brake caliper servicing, loosen the parking brake adjusting nut, start the engine, and depress the brake pedal several times to set the self-adjusting brake before adjusting the parking brake.

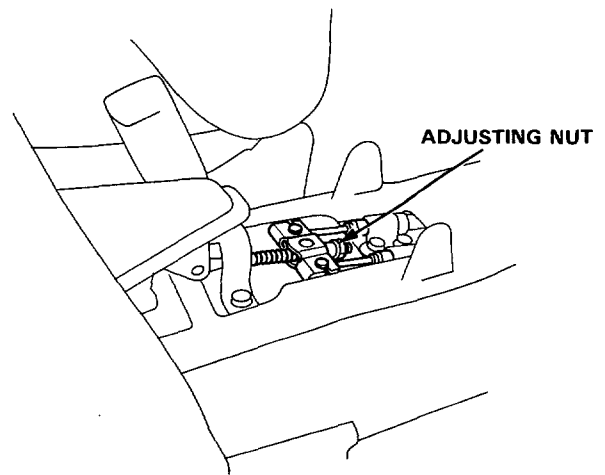
1. Raise the rear wheels off the ground and support on safety stands. Block the front wheels before jacking up the rear of the vehicle.
2. Make sure the parking brake arm on the rear brake caliper contacts the brake caliper pin.



3. Pull the parking brake lever up on notch.



4. Remove the rear console (see section 20).
5. Tighten the adjusting nut until the parking brakes drag slightly when the rear wheels are turned.



6. Release the parking brake lever fully, and check that the parking brakes do not drag when the rear wheels are turned. Readjust if necessary.
7. Make sure that the parking brakes are fully applied with the parking brake lever is pulled up fully.
8. Install the cap onto the parking brake cable end, and reinstall the rear console.



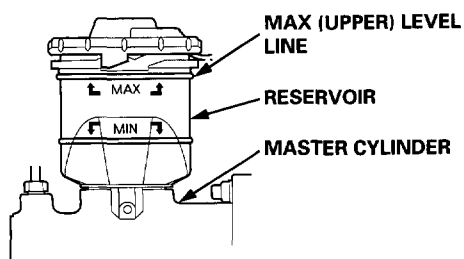


## Bleeding

### NOTE:

- Do not reuse the drained fluid.
- Use only clean Genuine Honda brake fluid or an equivalent DOT3 or DOT4 brake fluid.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not spill brake fluid on the vehicle, it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- The reservoir on the master cylinder must be at the MAX (upper) level mark at the start of bleeding procedure and checked after bleeding each brake caliper. Add fluid as required.

1. Make sure the brake fluid level in the reservoir is at the MAX (upper) level line.

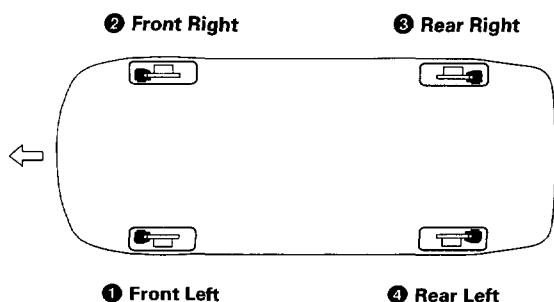


2. Have someone slowly pump the brake pedal several times, then apply steady pressure.
3. Loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.
4. Repeat the procedure for each wheel in the sequence shown below, until air bubbles no longer appear in the fluid.

NOTE: LHD type is shown. RHD type is symmetrical.

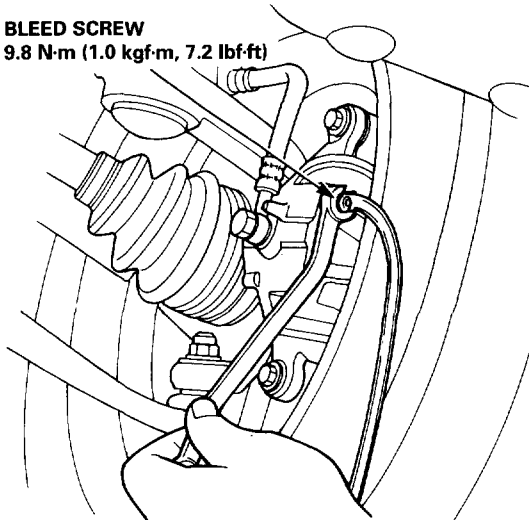
5. Refill the reservoir of master cylinder to the MAX (upper) level line.

### BLEEDING SEQUENCE:



### FRONT

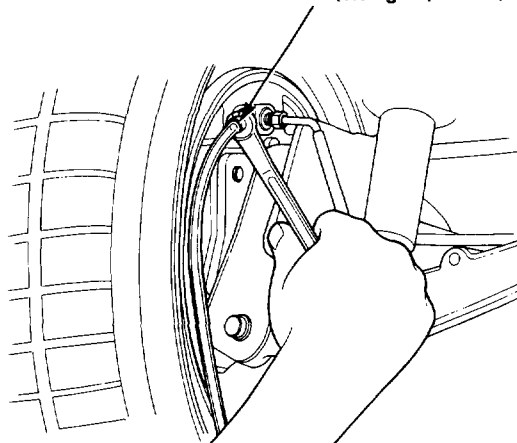
BLEED SCREW  
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



### REAR

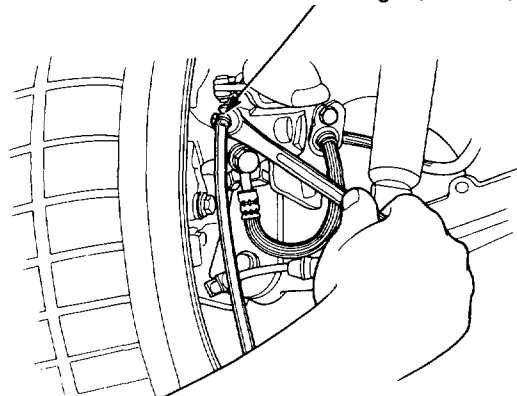
Drum brake

BLEED SCREW  
6 N·m (0.6 kgf·m, 4 lbf·ft)



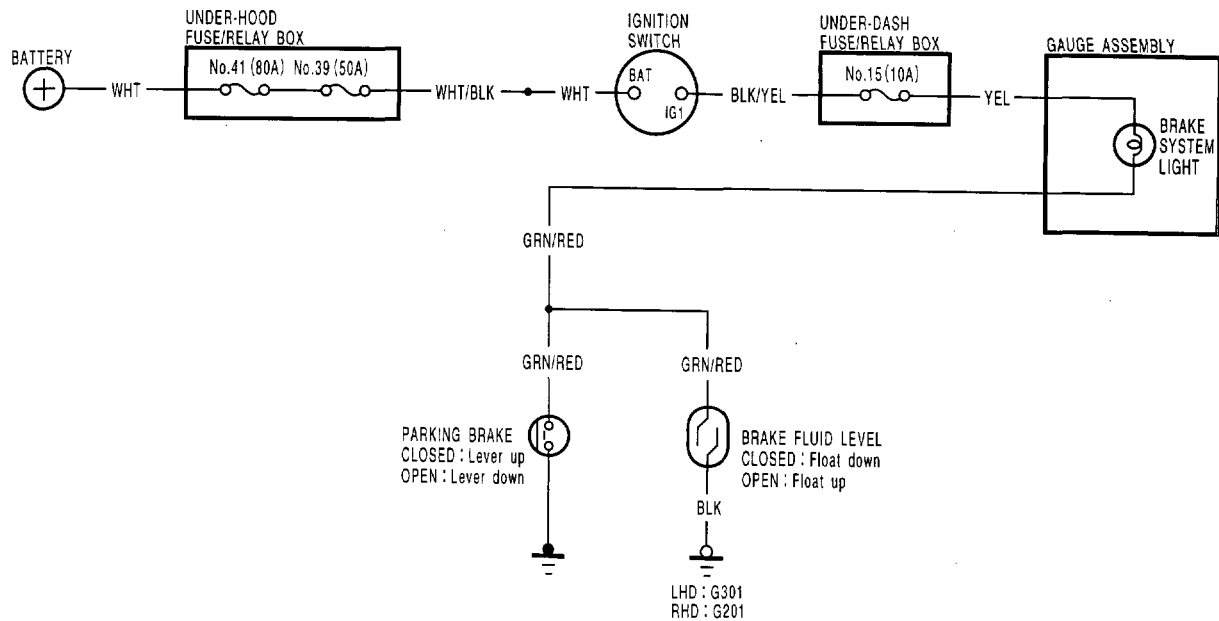
Disc brake

BLEED SCREW  
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)



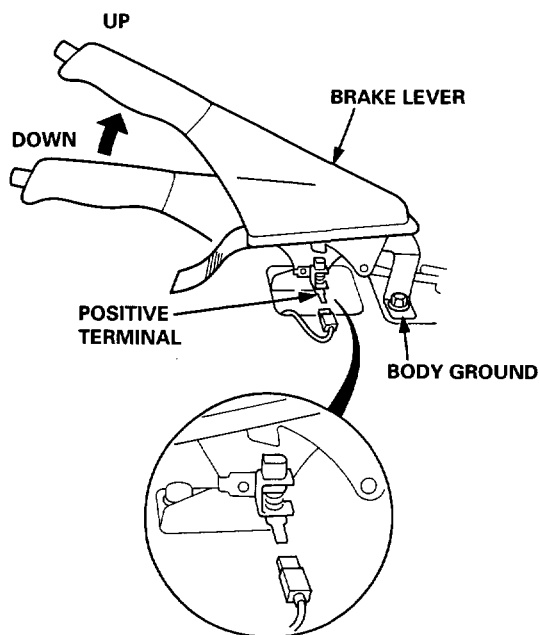
# Inspection and Adjustment

## Brake System Indicator Circuit Diagram



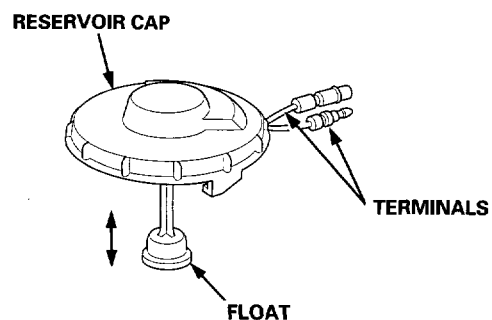
### Parking Brake Switch Test

1. Remove the rear console, and disconnect the connector from the switch.
2. Check for continuity between the positive terminal and body ground:
  - With the brake lever up, there should be continuity.
  - With the brake lever down, there should be no continuity.



### Brake Fluid Level Switch Test

1. Remove the reservoir cap. Check that the float moves up and down freely; if it doesn't, replace the reservoir cap assembly.
2. Check for continuity between the terminals with the float in the down position and the up position:
  - With the float up, there should be no continuity.
  - With the float down, there should be continuity.



# Front Brake Pads



## Inspection and Replacement

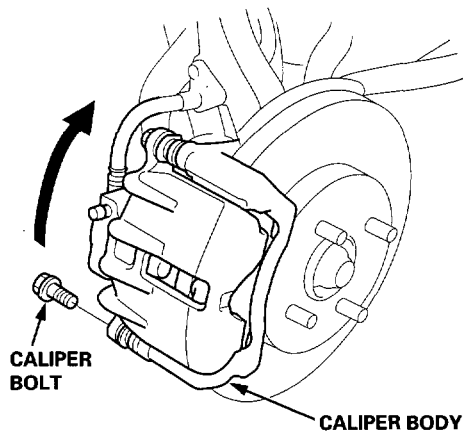
All except B18C4 Engine Model

### CAUTION

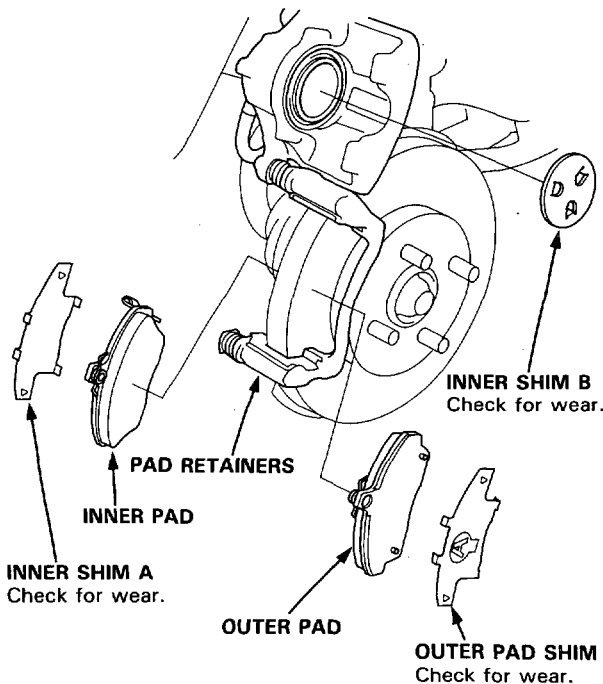
Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use a vacuum cleaner.

1. Loosen the front wheel nuts slightly, then raise the vehicle, and support on safety stands. Remove the front wheels.
2. Remove the caliper bolt, and pivot the caliper up out of the way. Check the hoses and pin boots for damage or deterioration.



3. Remove the pad shims, pad retainers and pads.

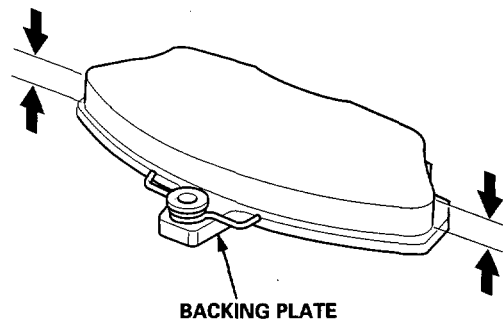


4. Using vernier calipers, measure the thickness of each brake pad lining. The measurement does not include the pad backing plate thickness.

#### Brake Pad Thickness:

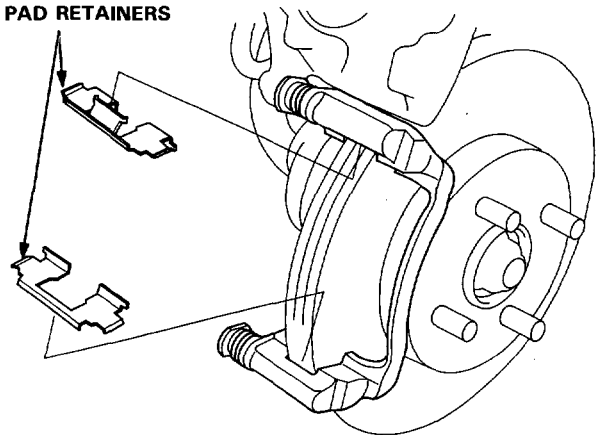
Standard: 11.0 – 11.7 mm (0.43 – 0.46 in)

Service Limit: 1.6 mm (0.06 in)



5. If the brake pad thickness is less than service limit, replace the front pads and shims together as a set.
6. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.
7. Check the brake disc for damage and cracks.
8. Install the pad retainers.

#### PAD RETAINERS

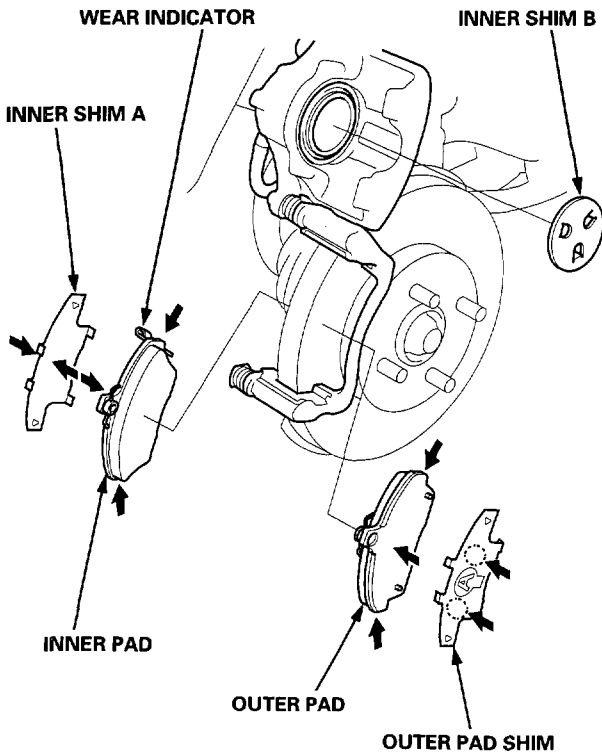


(cont'd)

# Front Brake Pads

## Inspection and Replacement (cont'd)

9. Apply Molykote M77 grease to the both side of the pad shims and the back of the pads. Wipe excess grease off the shims.

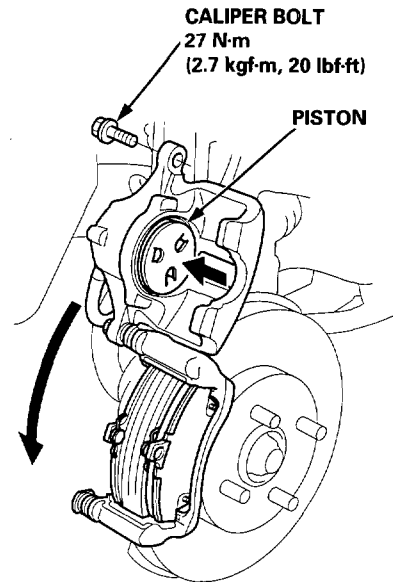


10. Install the brake pads and pad shims correctly. Install the pad with the wear indicator on the inside.

### **WARNING**

- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.
- Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs and pads.

11. Push in the piston so that the caliper will fit over the pads. Make sure that the piston boot is in position to prevent damaging it when pivoting the caliper down.
12. Pivot the caliper down into position, being careful not to damage the pin boot. Install the caliper bolt and tighten it.



13. Depress the brake pedal several times to make sure the brakes work, then road-test.

**NOTE:** Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.

14. After installation, check for leaks at hose and line joints or connections, and retighten if necessary.



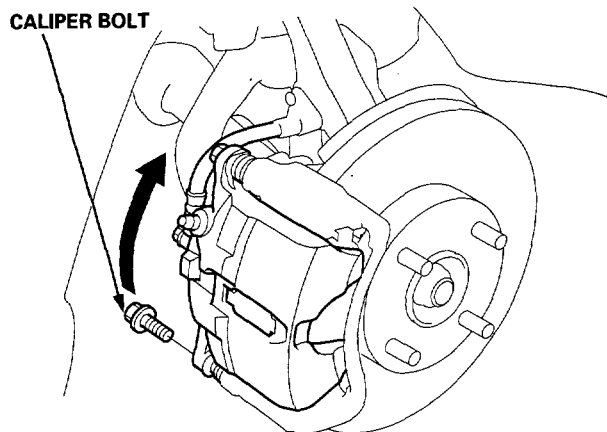
### B18C4 Engine Model

## CAUTION

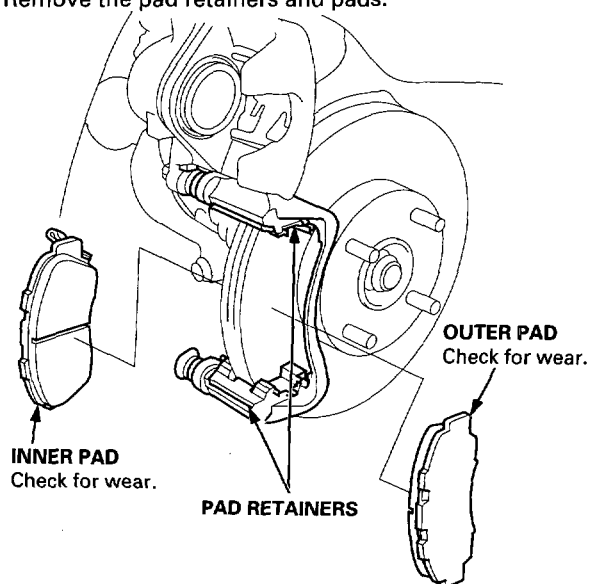
Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use a vacuum cleaner.

1. Loosen the front wheel nuts slightly, then raise the vehicle and support it on safety stands. Remove the front wheels.
2. Remove the caliper bolt, and pivot the caliper out of the way. Check the hoses and pin boots for damage and deterioration.



3. Remove the pad retainers and pads.

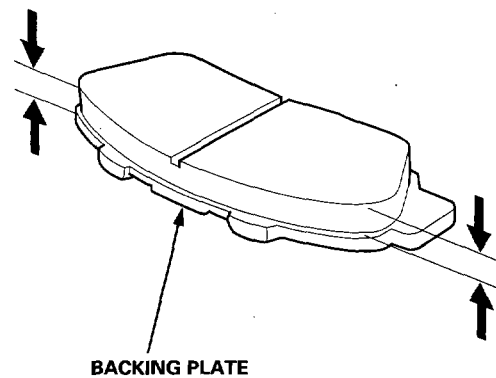


4. Using vernier calipers, measure the thickness of each brake pad lining. The measurement does not include the pad backing plate thickness.

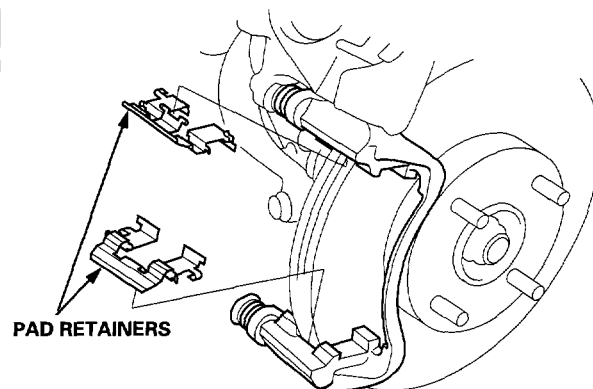
#### Brake Pad Thickness:

**Standard:** 11.0 – 11.7 mm (0.43 – 0.46 in)

**Service Limit:** 1.6 mm (0.06 in)



5. If the brake pad thickness is less than service limit, replace the front pads as a set.
6. Clean the caliper thoroughly; remove any rust, and check for grooves and cracks.
7. Check the brake disc for damage and cracks.
8. Install the pad retainers.

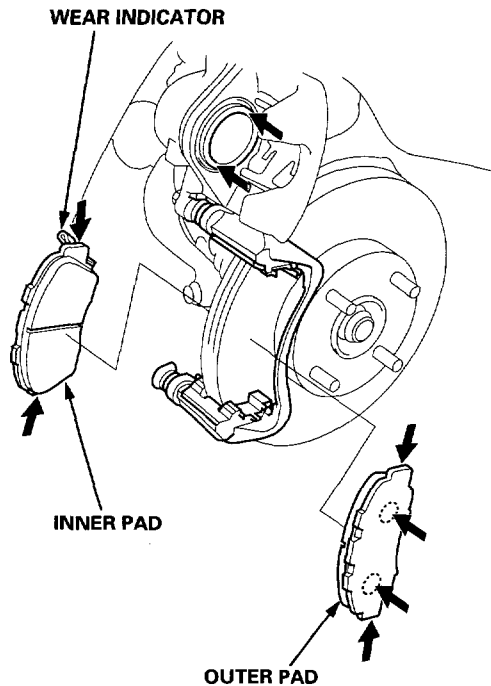


(cont'd)

# Front Brake Pads

## Inspection and Replacement (cont'd)

9. Apply Molykote M77 grease to the back of the pads. Wipe excess grease off the pads.

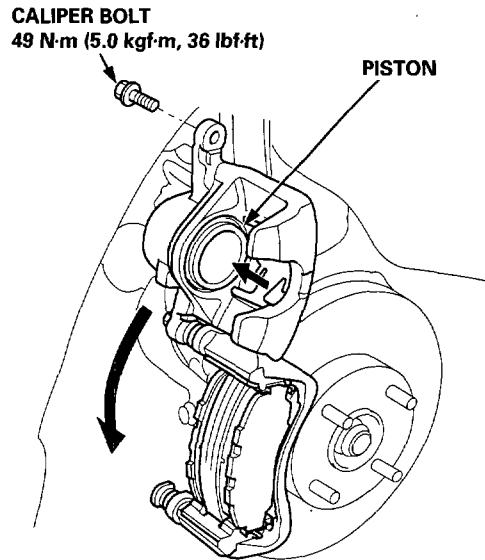


10. Install the brake pads correctly. Install the pad with the wear indicator on the inside.

### **⚠ WARNING**

- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.
- Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs and pads.

11. Push in the piston so that the caliper will fit over the pads. Make sure that the piston boot is in position to prevent damaging it when pivoting the caliper down.



12. Pivot the caliper down into position, being careful not to damage the pin boot. Install the caliper bolt and tighten it.
13. Depress the brake pedal several times to make sure the brakes work, then road-test.

NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.

14. After installation, check for leaks at hose and line joints and connections, and retighten if necessary.



## Disc Runout Inspection

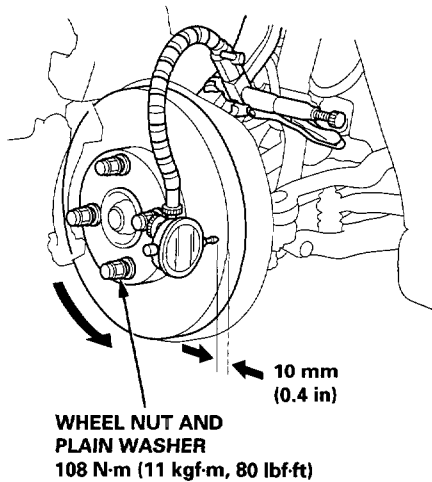
1. Loosen the front wheel nuts slightly, then raise the car and support on safety stands. Remove the front wheels.
2. Remove the brake pads (see page 19-A-9).
3. Inspect the disc surface for damage or cracks. Clean the disc thoroughly and remove all rust.
4. Use wheel nuts and suitable plain washers to hold the disc securely against the hub, then mount a dial indicator as shown, and measure the runout at 10 mm (0.4 in) from the out edge of the disc.

### Brake Disc Runout:

**Service Limit: 0.10 mm (0.004 in)**

5. If the disc is beyond the service limit, refinish the brake disc with an on-car brake lathe. The kwik-Lathe produced by Kwik-way manufacturing Co. and the "Front Brake Disc Lathe" offered by Snap-on Tools Co. are approved for this operation.

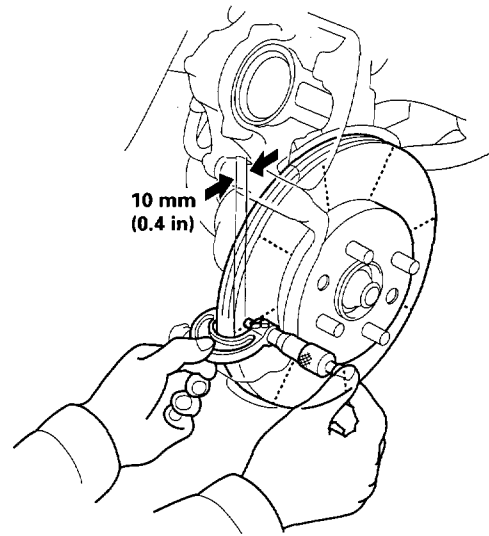
**Max. Refinish Limit: 19.0 mm (0.75 in)**



NOTE: A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in)

## Disc Thickness and Parallelism Inspection

1. Loosen the front wheel nuts slightly, then raise the car and support on safety stands. Remove the front wheels.
2. Remove the brake pads (see page 19-A-9).
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.4 in) in from the outer edge of the disc. Replace the brake disc if the smallest measurement is less than the max. refinishing limit.



### Brake Disc Thickness:

#### Standard:

#### B18C4 Engine Model:

22.9 – 23.1 mm (0.90 – 0.91 in)

#### All except B18C4 Engine Model:

20.9 – 21.1 mm (0.82 – 0.83 in)

**Max. Refinishing Limit: 19.0 mm (0.75 in)**

**Brake Disc Parallelism: 0.015 mm (0.0006 in) max.**

NOTE: This is the maximum allowable difference between the thickness measurements.

4. If the disc is beyond the service limit for parallelism, refinish the brake disc with an on-car brake lathe. The Kwik-Lathe produced by Kwik-Way Manufacturing Co. and the "Front Brake Disc Lathe" offered by Snap-on Tools Co. are approved for this operation.

NOTE: See section 18 for brake disc replacement.

# Front Brake Caliper

## Disassembly/Reassembly


### CAUTION

Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.

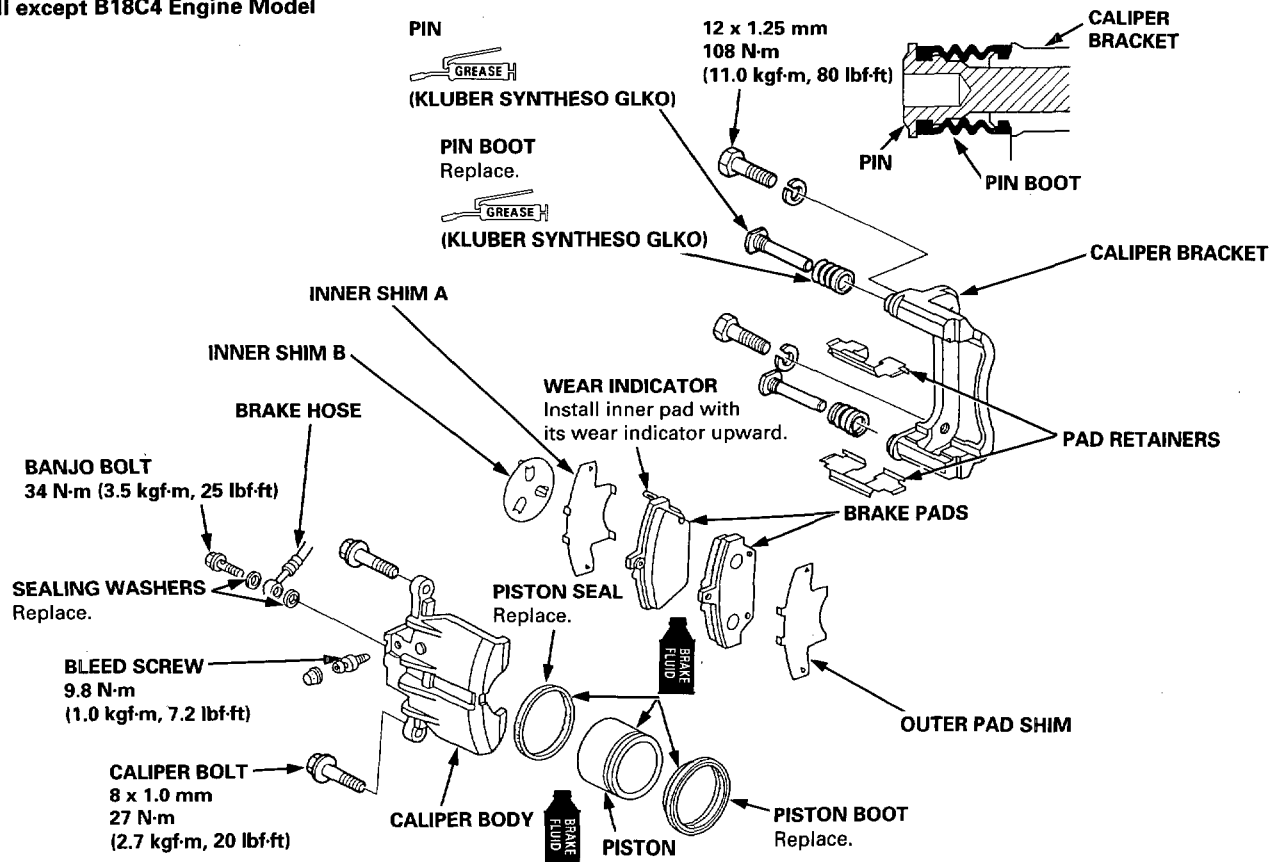
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use a vacuum cleaner.

#### NOTE:

- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- 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.
- Contaminated brake discs or pads reduce stopping ability.
- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.
- Do not reuse the drained fluid.
- Use only clean Genuine Honda brake fluid or an equivalent DOT3 or DOT4 brake fluid.
- Coat the piston and caliper bore with clean brake fluid or non-mineral assembly fluid (BRITISH PETROLEUM BREOX BCF 11S).
- Replace all rubber parts with new ones whenever disassembled.
- After installing the front brake caliper.
  - Check for leaks at hose and line joints and connections, and retighten if necessary.
  - Check the brake hoses for interference and twisting.

: Use recommended pin grease in the caliper set.


All except B18C4 Engine Model



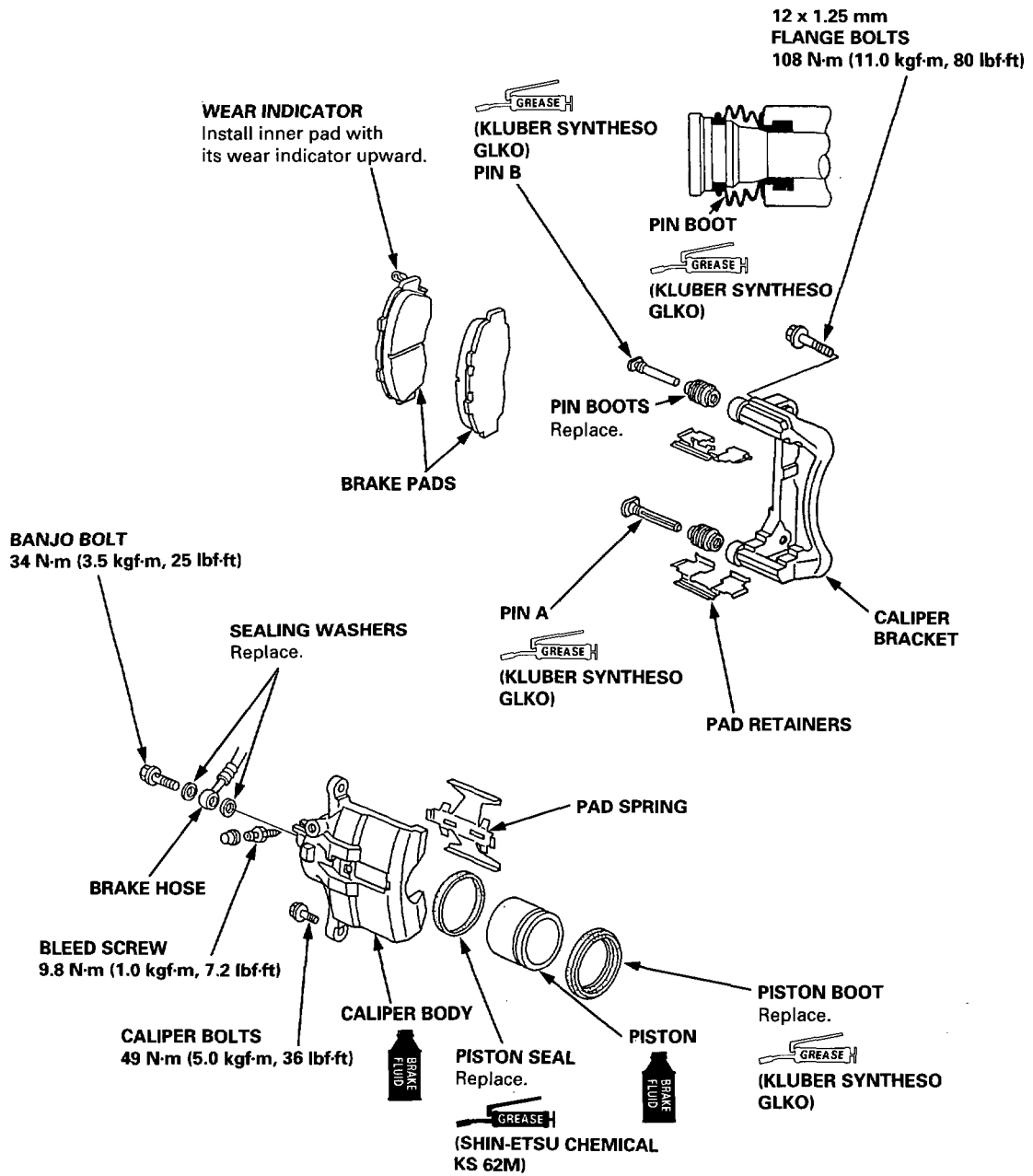




: Use recommended rubber grease in the caliper seal set.

: Use recommended seal grease in the caliper seal set.

### B18C4 Engine Model



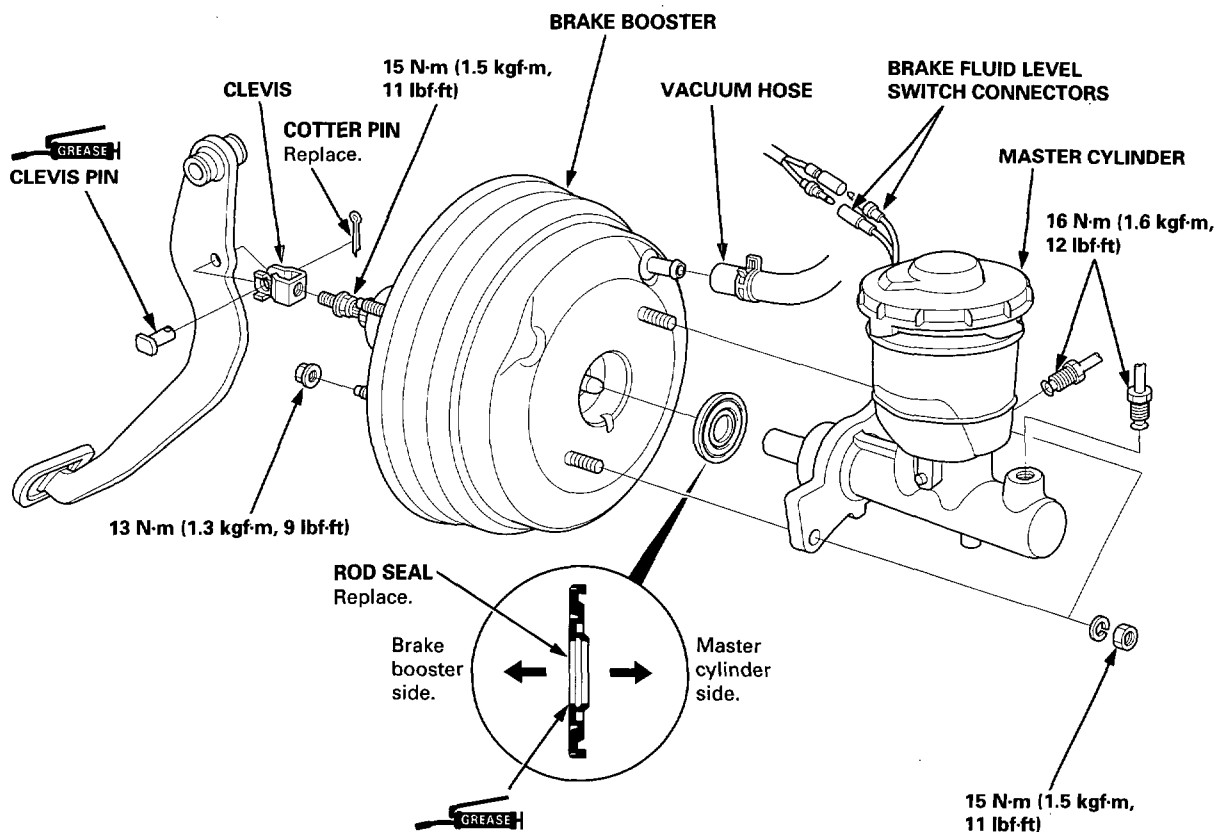
# Master Cylinder/Brake Booster

## Removal/Installation

NOTE: Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.

1. Disconnect the brake fluid level switch connectors.
2. Remove the reservoir cap from the master cylinder.
3. Remove the brake fluid from the master cylinder reservoir with a syringe.
4. Disconnect the brake lines from the master cylinder. To prevent spills, cover the line joints with rags or shop towels.
5. Remove the master cylinder mounting nuts and washers.
6. Remove the master cylinder from the brake booster.
7. Disconnect the vacuum hose from the brake booster.
8. Loosen the pushrod locknut, then remove the cotter pin and clevis pin from clevis.

9. Remove the clevis from the operating rod of the brake booster.
10. Remove the four booster mounting nuts.
11. Pull the brake booster forward until the operating rod is clear of the bulkhead.
12. Remove the brake booster from the engine compartment. Be careful not to bend or damage the brake lines when removing the brake booster.
13. Install the brake booster and master cylinder in the reverse order of removal.
14. Adjust the pushrod length before installing the booster (see page 19-A-19).
15. Fill the master cylinder reservoir, and bleed the brake system (see page 19-A-7).
16. After installation, check the brake pedal height and brake pedal free play (see page 19-A-5) and adjust if necessary.

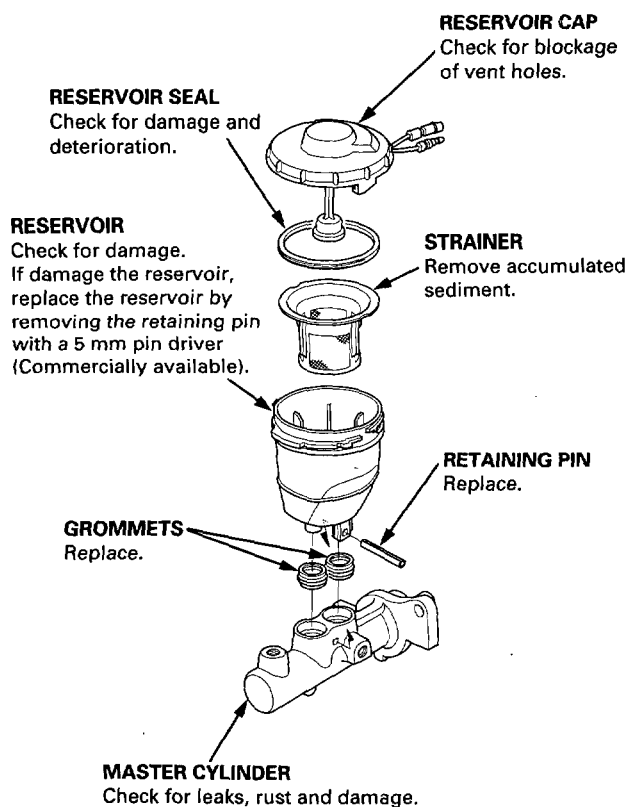




## Master Cylinder Inspection/ Disassembly

### NOTE:

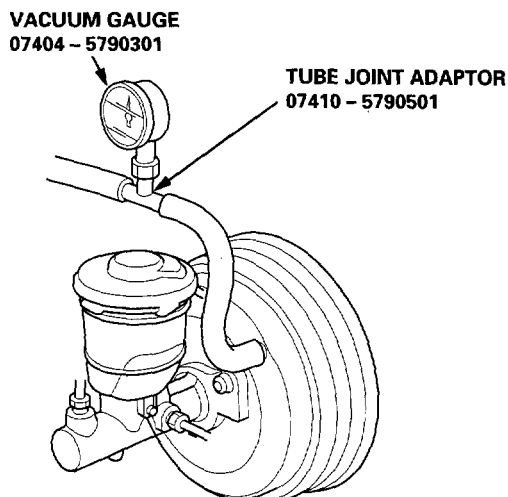
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Do not try to disassemble the master cylinder. Replace the master cylinder assembly with a new part if necessary.
- Do not allow dirt or foreign matter to contaminate the brake fluid.



## Brake Booster Inspection

### Leak Test

1. Install the vacuum gauge between the brake booster and check valve.



2. Start the engine adjust the engine speed with the accelerator pedal so that the vacuum gauge readings show 40.0 - 66.7 kPa (300 - 500 mmHg, 11.8 - 19.7 in-Hg), then stop the engine.
3. Read the vacuum gauge.

If the vacuum reading decreases 2.7 kPa (20 mmHg, 0.8 in-Hg) or more after 30 seconds, check following parts for leaks.

- Check valve
- Vacuum hose, lines
- Seals
- Brake booster
- Master cylinder

**NOTE:** Do not try to disassemble the brake booster. Replace the brake booster as an assembly with new one.

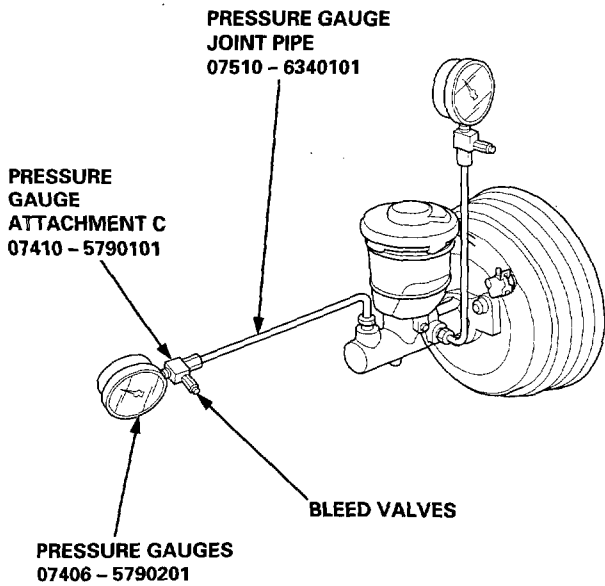
(cont'd)

# Master Cylinder/Brake Booster

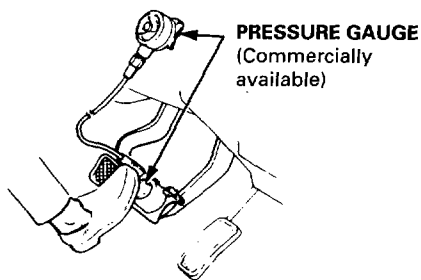
## Brake Booster Inspection (cont'd)

### 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.



4. Start the engine.
5. Depress the brake pedal with a 196 N (20 kgf, 44 lbf) or pressure. The following pressures should be observed at the pressure gauges in each vacuum.



### Vehicles With Rear Drum Brake

Vacuum mm (in) Hg	Min. Line Pressure kPa (kgf/cm <sup>2</sup> , psi)
0 (0)	1,280 (13.1, 186)
300 (11.8)	5,390 (55.0, 782)
500 (19.7)	8,130 (82.9, 1,179)

### Vehicles With Rear Disc Brake

#### All except B18C4 Engine Model:

Vacuum mm (in) Hg	Min. Line Pressure kPa (kgf/cm <sup>2</sup> , psi)
0 (0)	950 (9.7, 138)
300 (11.8)	5,520 (56.3, 801)
500 (19.7)	8,570 (87.4, 1,240)

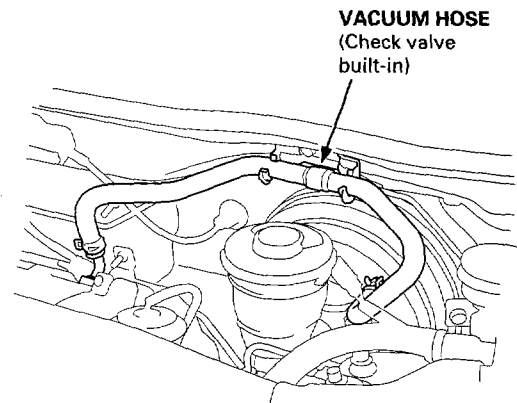
#### B18C4 Engine Model:

Vacuum mm (in) Hg	Min. Line Pressure kPa (kgf/cm <sup>2</sup> , psi)
0 (0)	830 (8.5, 121)
300 (11.8)	4,840 (49.4, 702)
500 (19.7)	7,520 (76.7, 1,090)

6. Inspect the master cylinder for leaks if the readings do not fall within the limits shown above.

### Check Valve Test

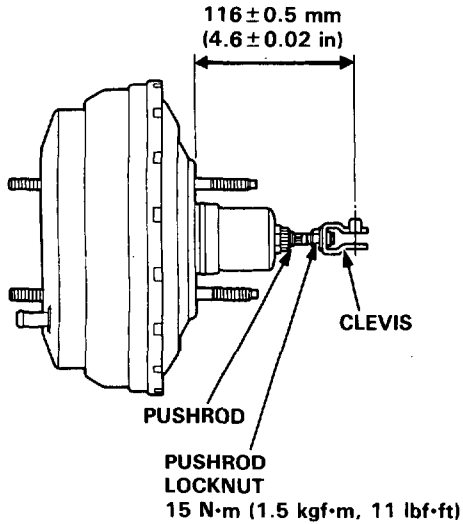
1. Disconnect the brake booster vacuum hose at the booster.
2. Start the engine and let it idle. There should be vacuum available. If no vacuum is available, the check valve is not working properly. Replace the brake booster vacuum hose and check valve and retest.





## Pushrod Adjustment

Adjust the pushrod length as shown if the booster is removed.



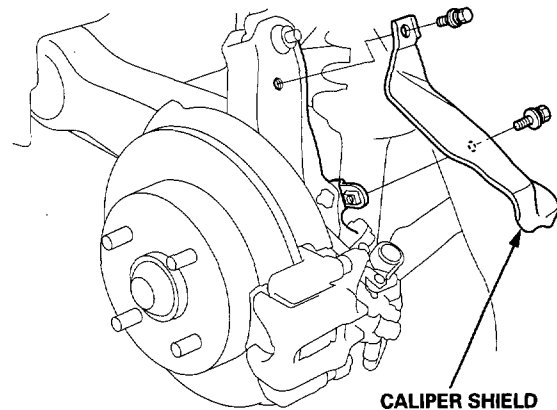
## Inspection and Replacement

### ⚠ CAUTION

Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use a vacuum cleaner.

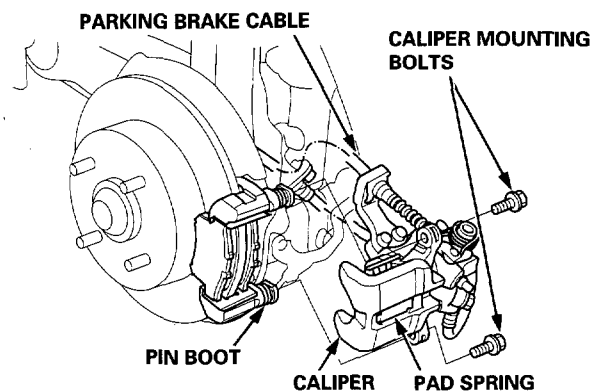
1. Block the front wheels, loosen the rear wheel nuts slightly, support the rear of vehicle on safety stands, then remove the rear wheels. Release the parking brake.
2. Remove the caliper shield.



3. Remove the two caliper mounting bolts and the caliper from the bracket. Check the hoses and pin boots for damage or deterioration.

### ⚠ CAUTION

- Thoroughly clean the outside of the caliper to prevent dust and dirt from entering inside.
- Support the caliper with a piece of wire so that it does not hang from the brake hose.

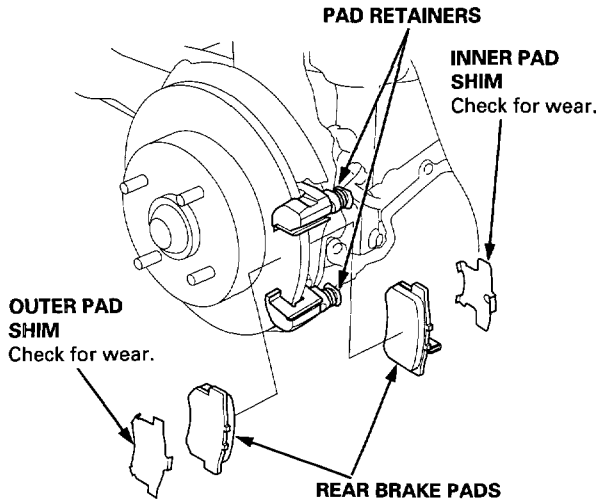


(cont'd)

# Rear Brake Pads

## Inspection and Replacement (cont'd)

4. Remove the pad shims, pads and pad retainer.



5. Using vernier calipers, measure the thickness of each brake pad lining. The measurement does not include the pad backing plate thickness.

**Brake Pad Thickness:**

**Standard:**

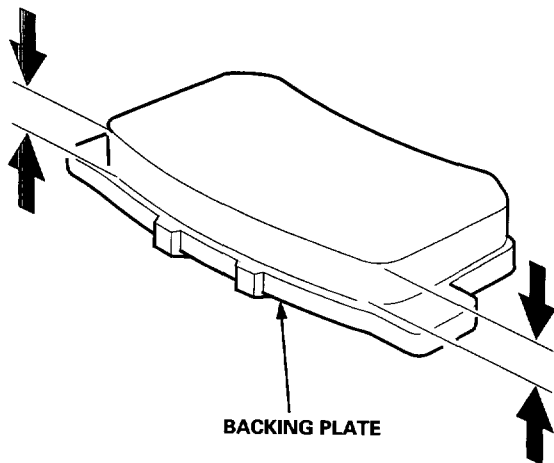
**B18C4 Engine Model:**

8.3 – 9.0 mm (0.33 – 0.35 in)

**All except B18C4 Engine Model:**

7.3 – 8.0 mm (0.29 – 0.32 in)

**Service Limit: 1.6 mm (0.06 in)**

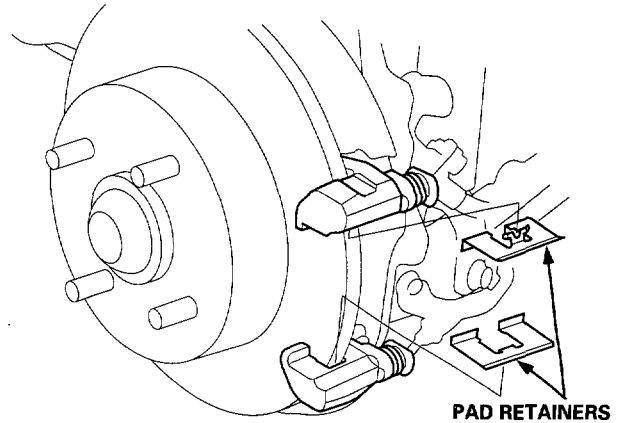


6. If the pad thickness is less than the service limit, replace the pads and shims together as a set.

7. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.

8. Check the brake disc for damage or cracks.

9. Make sure that the pad retainers are installed in the correct positions.

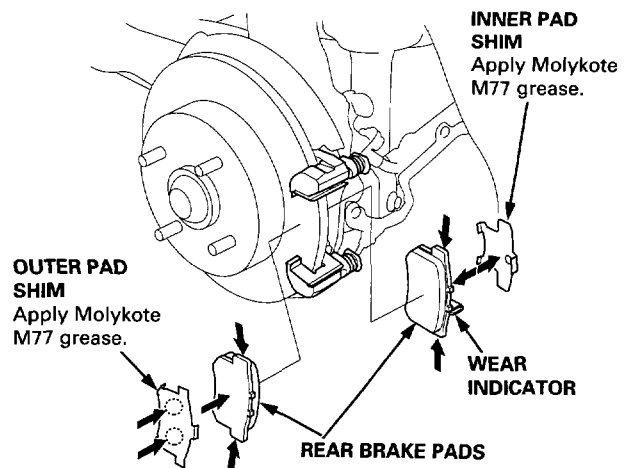


10. Apply Molykote M77 to both sides of the shims. Wipe excess grease off the shims.

11. Install the brake pads and pad shims on caliper bracket. Install the inner pad with its wear indicator facing downward.

**⚠ WARNING**

- When reusing the pads, always reinstall the brake pads in their original positions to prevent loss of braking efficiency.
- Contaminated brake discs or pads reduce stopping ability. Keep grease off the discs and pads.

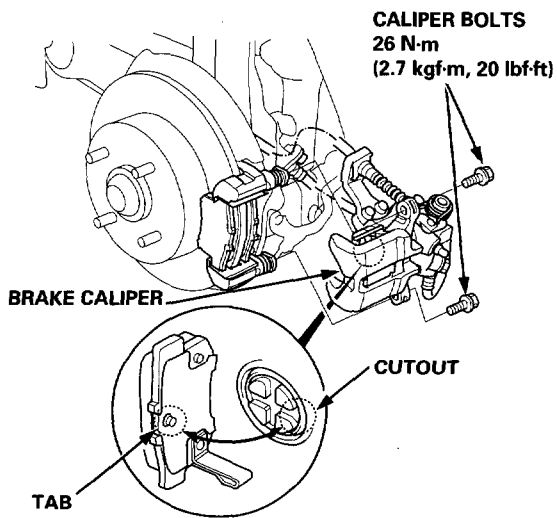




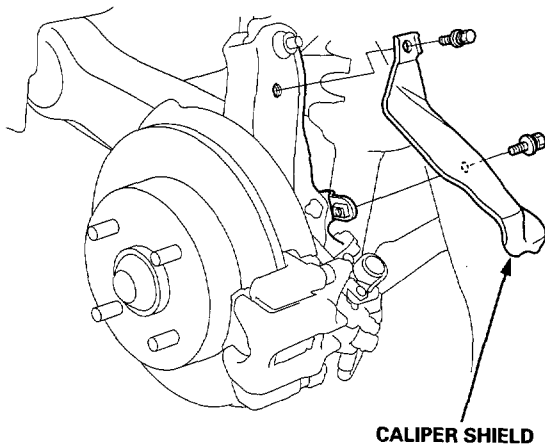
12. Rotate the caliper piston clockwise into place in the cylinder, then align the cutout in the piston with the tab on the inner pad by turning the piston back. Lubricate the boot with rubber grease to avoid twisting the piston boot. If the piston boot is twisted, back it out so it sits properly.

13. Install the brake caliper.

14. Install and tighten the caliper bolts.



15. Install the caliper shield.



16. After installation, check for leaks at hose and line joints or connections, and retighten if necessary.

17. Depress the brake pedal several times to make sure the brakes work, then road-test.

NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.

# Rear Brake Disc

## Disc Runout Inspection

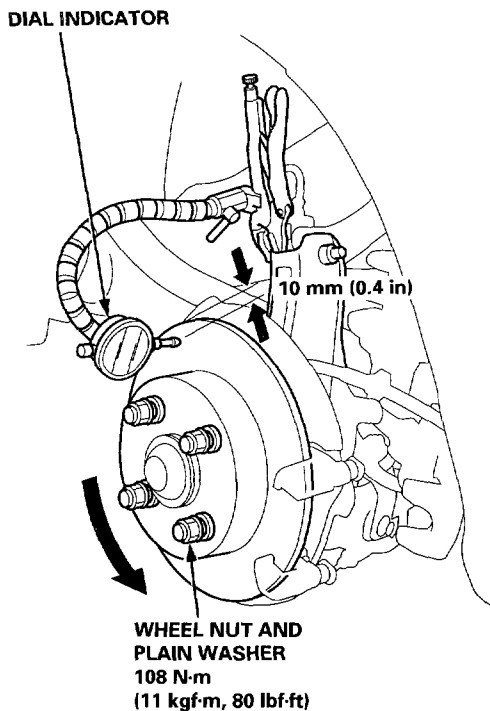
1. Loosen the rear wheel nuts slightly, then raise the vehicle and support on safety stands. Remove the rear wheels.
2. Remove the brake pads (see page 19-A-19).
3. Inspect the disc surface for damage or cracks. Clean the disc thoroughly and remove all rust.
4. Use wheel nuts and suitable plain washers to hold the disc securely against the hub, then mount a dial indicator as shown, and measure the runout at 10 mm (0.4 in) from the outer edge of the disc.

### Brake Disc Runout:

**Service Limit: 0.10 mm (0.004 in)**

5. If the disc is beyond the service limit, refinish the brake disc.

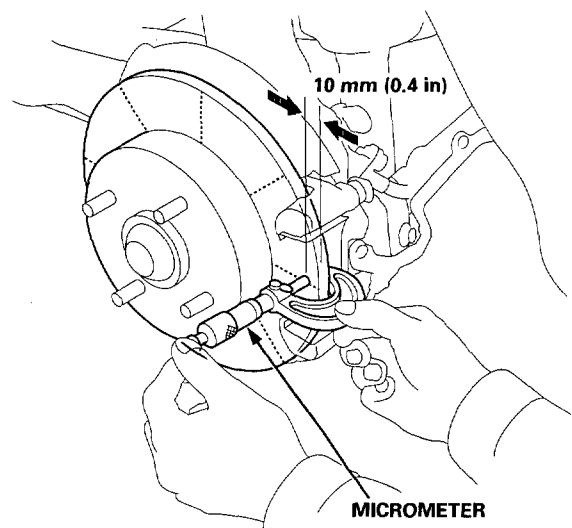
**Max. Refinishing Limit: 8.0 mm (0.32 in)**



NOTE: A new disc should be refinished if its runout is greater than 0.10 mm (0.004 in).

## Thickness and Parallelism Inspection

1. Loosen the rear wheel lug nuts slightly, then raise the vehicle and support it on safety stands. Remove the rear wheels.
2. Remove the brake pads (see page 19-A-19).
3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.4 in) from the outer edge of the disc. Replace the brake disc if the smallest measurement is less than the max. refinishing limit.



### Brake Disc Thickness:

**Standard: 9.9 – 10.1 mm  
(0.39 – 0.40 in)**

**Max. Refinishing Limit: 8.0 mm (0.31 in)**

**Brake Disc Parallelism: 0.015 mm  
(0.0006 in) max.**

NOTE: This is the maximum allowable difference between the thickness measurement.

4. If the disc is beyond the service limit for parallelism, refinish the brake disc.

NOTE: See section 18 for brake disc replacement.



# Rear Brake Caliper



## Disassembly/Reassembly

### CAUTION

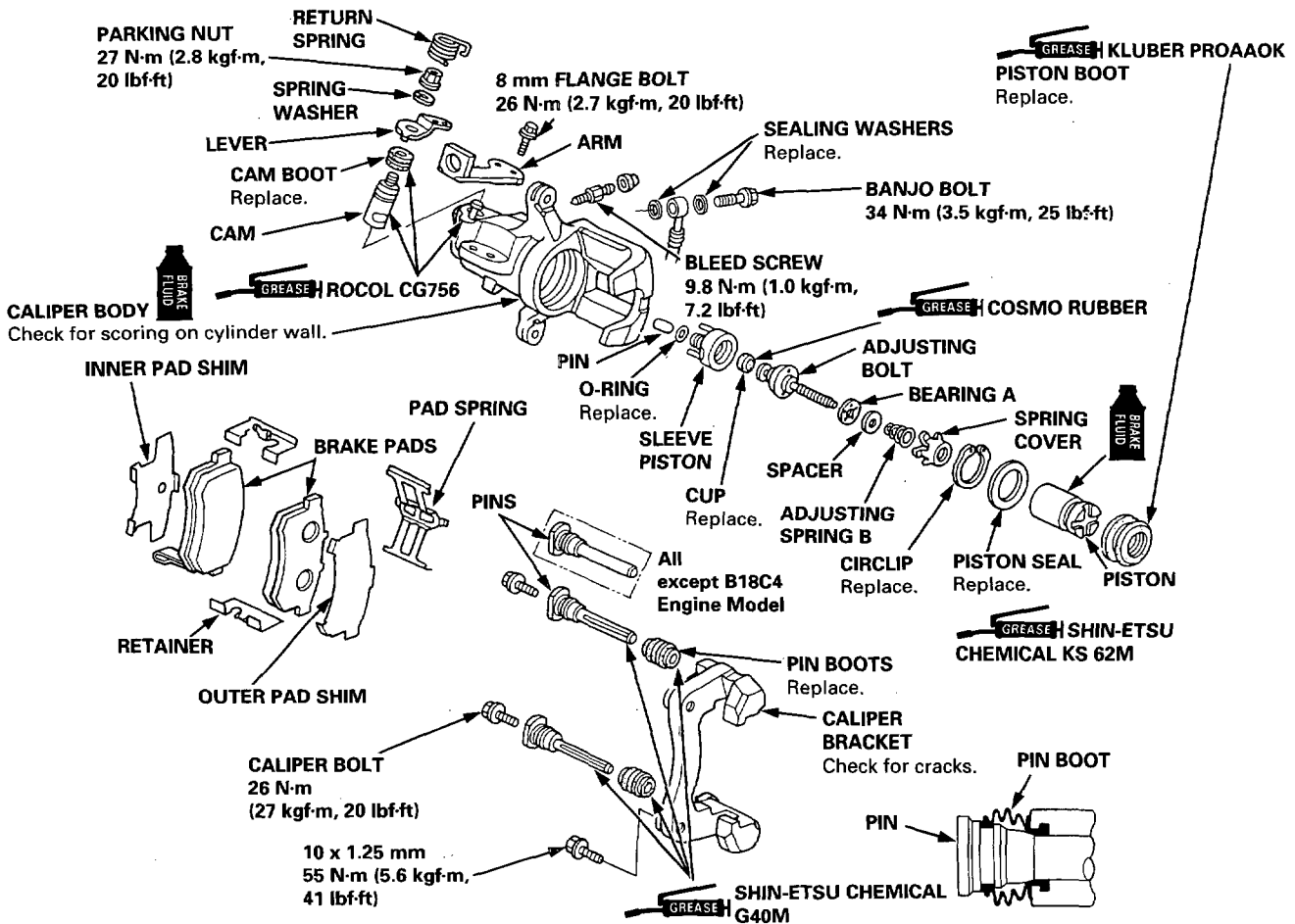
Frequent inhalation of brake pad dust, regardless of material composition, could be hazardous to your health.

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use a vacuum cleaner.

#### NOTE:

- Do not spill brake fluid on the vehicle; It may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Contaminated brake discs or pads reduce stopping ability.
- When reusing the pads, install them in their original positions to prevent loss of braking efficiency.
- Do not reuse the drained fluid.
- Use only clean genuine Honda brake fluid or an equivalent DOT3 or DOT4 brake fluid.
- Coat the piston, piston seal groove, and caliper bore with clean brake fluid or non-mineral assembly fluid (BRITISH PETROLEUM BREOX BCF 11S).
- Replace all rubber parts with new ones whenever disassembled.
- After installing the rear brake caliper.
  - Check for leaks at hose and line joints and connections, and retighten if necessary.
  - Check the brake hoses for interference and twisting.

- GREASE 1: Use recommended grease in the caliper seal set.



# Rear Drum Brakes

## Index/Inspection

### ⚠ CAUTION

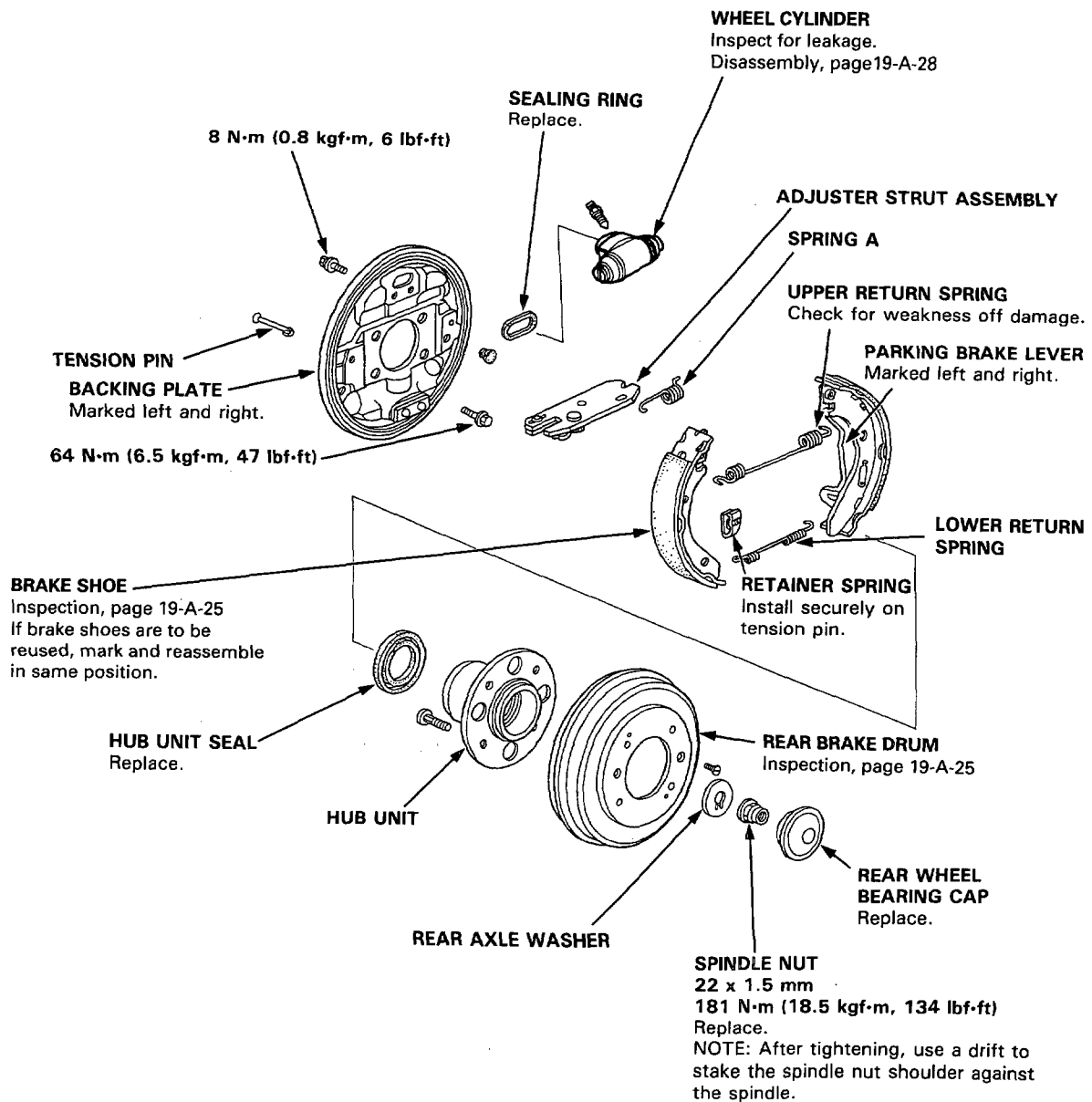
Frequent inhalation of brake shoe dust, regardless of material composition, could be hazardous to your health.

- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use a vacuum cleaner.

#### NOTE:

- Contaminated brake linings or drums reduce stopping ability.
- Block the front wheels before jacking up the rear of the vehicle.

1. Raise the rear of the vehicle, and make sure it is securely supported.
2. Release the parking brake, and remove the rear brake drum (see section 18).



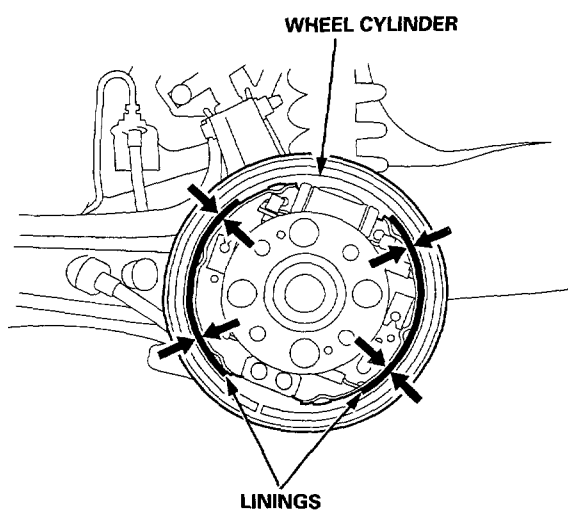


3. Check the wheel cylinders for leakage.
4. Check the brake linings for cracking, glazing, wear or contamination.
5. Measure the brake lining thickness. The measurement does not include brake shoe thickness.

**Brake Lining Thickness:**

**Standard:** 5 mm (0.20 in)

**Service Limit:** 2.0 mm (0.08 in)



6. If the brake lining thickness is less than the service limit, replace the brake shoes as a set.
7. Check the bearings in the hub unit for smooth operation. If defective, refer section 18.

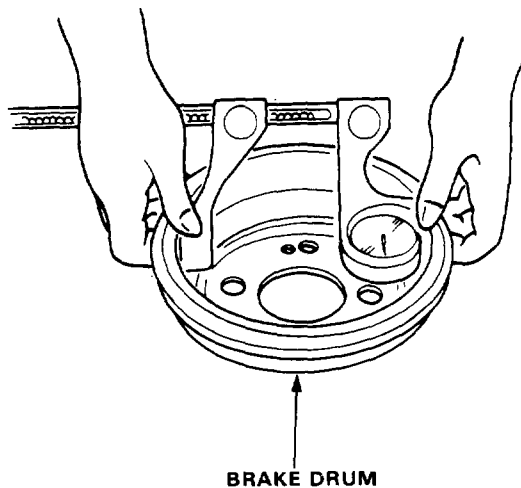
8. Measure inside diameter of the brake drum with inside vernier calipers.

**Drum Inside Diameter:**

**Standard:** 203.20 – 203.33 mm

(8.000 – 8.005 in)

**Service Limit:** 204 mm (8.03 in)



9. If the inside diameter of the brake drum is more than service limit, replace the brake drum.
10. Check the brake drum for scoring, grooving, cracks.

# Rear Drum Brakes

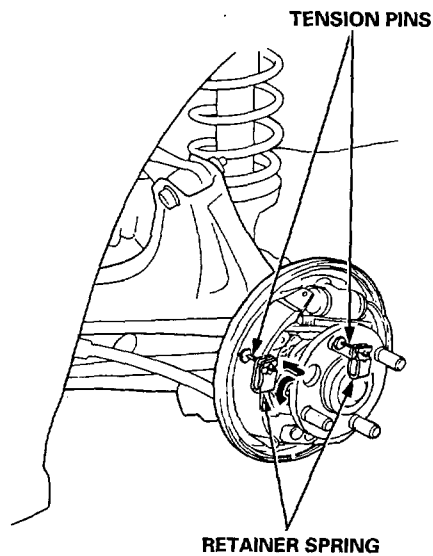
## Brake Shoes Replacement

### ⚠ CAUTION

Frequent inhalation of brake shoe dust, regardless of material composition, could be hazardous to your health.

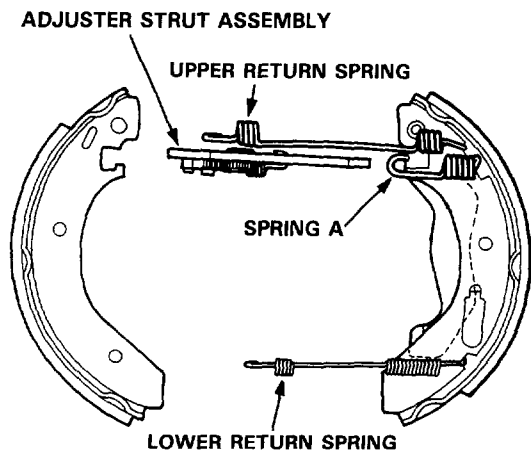
- Avoid breathing dust particles.
- Never use an air hose or brush to clean brake assemblies. Use a vacuum cleaner.

1. Remove the tension pins by pushing the retainer spring and turning them.



2. Lower the brake shoe assembly and remove the lower return spring. Make sure not to damage the dust cover on the wheel cylinder.
3. Remove the brake shoe assembly.

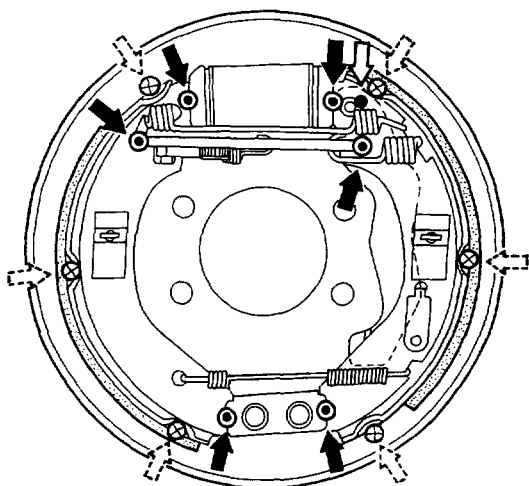
4. Disconnect the parking brake cable from the parking brake lever.
5. Remove the spring A and upper return spring, adjuster strut assembly, and separate the brake shoes.



6. Inspect all parts for worn, rust, and damage.



7. Install the adjuster strut assembly, then upper return spring and spring A in the brake shoes.
8. Connect the parking cable to the parking brake lever.
9. Apply grease on each sliding surface. Keep grease or oil off the brake linings. Wipe any excess grease off the parts.

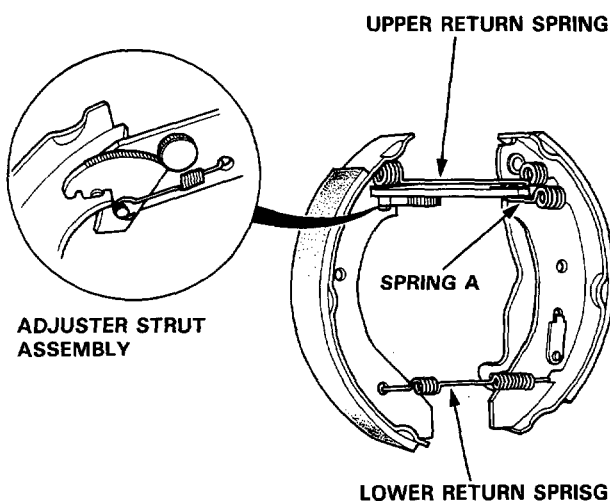


**Greasing Symbols:**

- Brake shoe ends
- Opposite the edge of the shoe
- Sliding surface

10. Install the brake shoe assembly, then hook the lower return spring.

11. Install the tension pins and retaining springs.



12. Install the brake drum.

13. If the wheel cylinder has been removed, bleed the brake system (see page 19-A-7).

14. Depress the brake pedal several times to set the self adjusting brake.

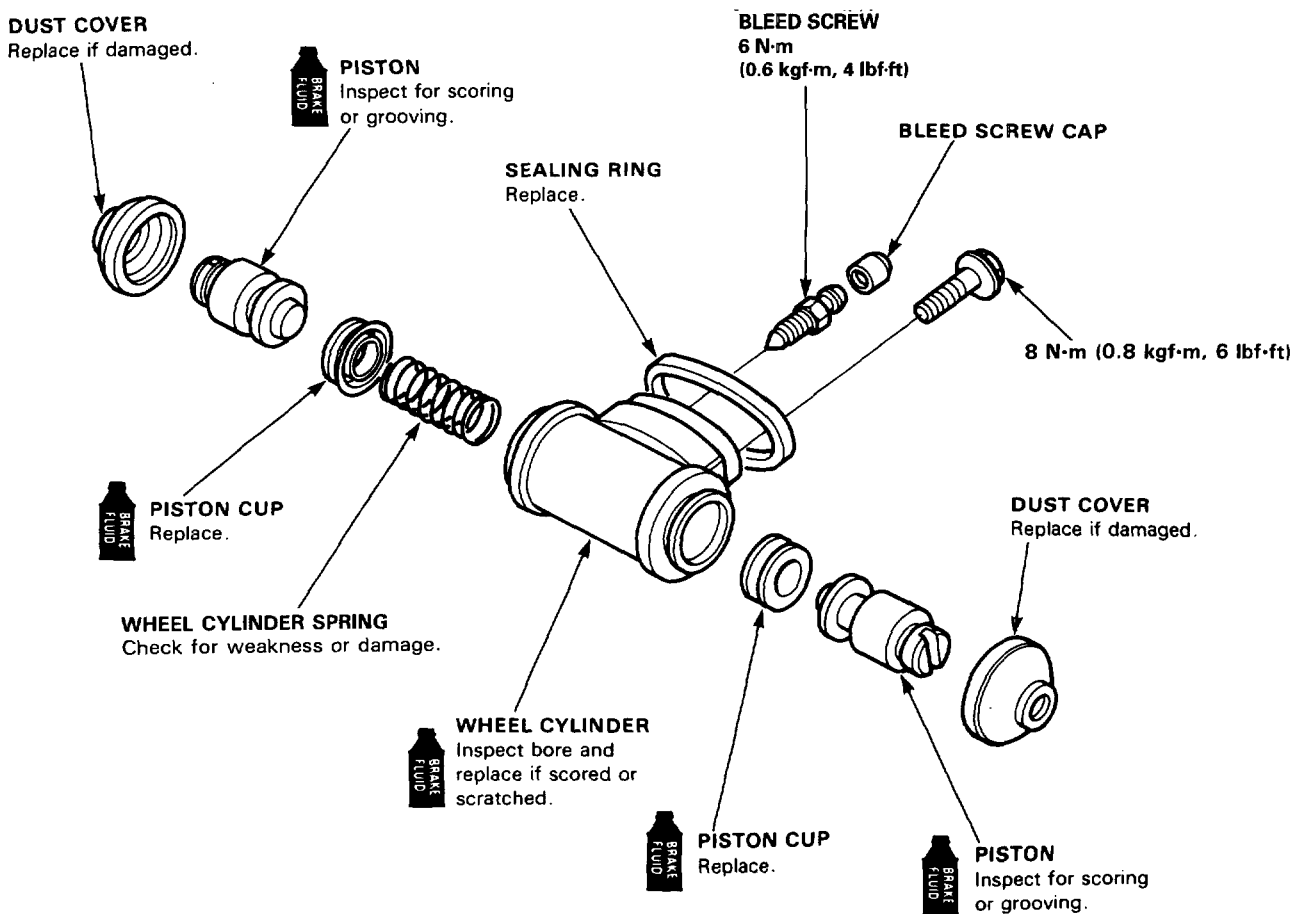
15. Adjust the parking brake (see page 19-A-6).

# Rear Drum Brakes

## Wheel Cylinder Disassembly/Inspection

### NOTE:

- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not reuse the drained fluid.
- Use only clean Genuine Honda brake fluid or an equivalent DOT3 or DOT4 brake fluid.
- Lubricate all parts with clean brake fluid during reassembly.
- Replace all rubber parts with new ones whenever disassembled.



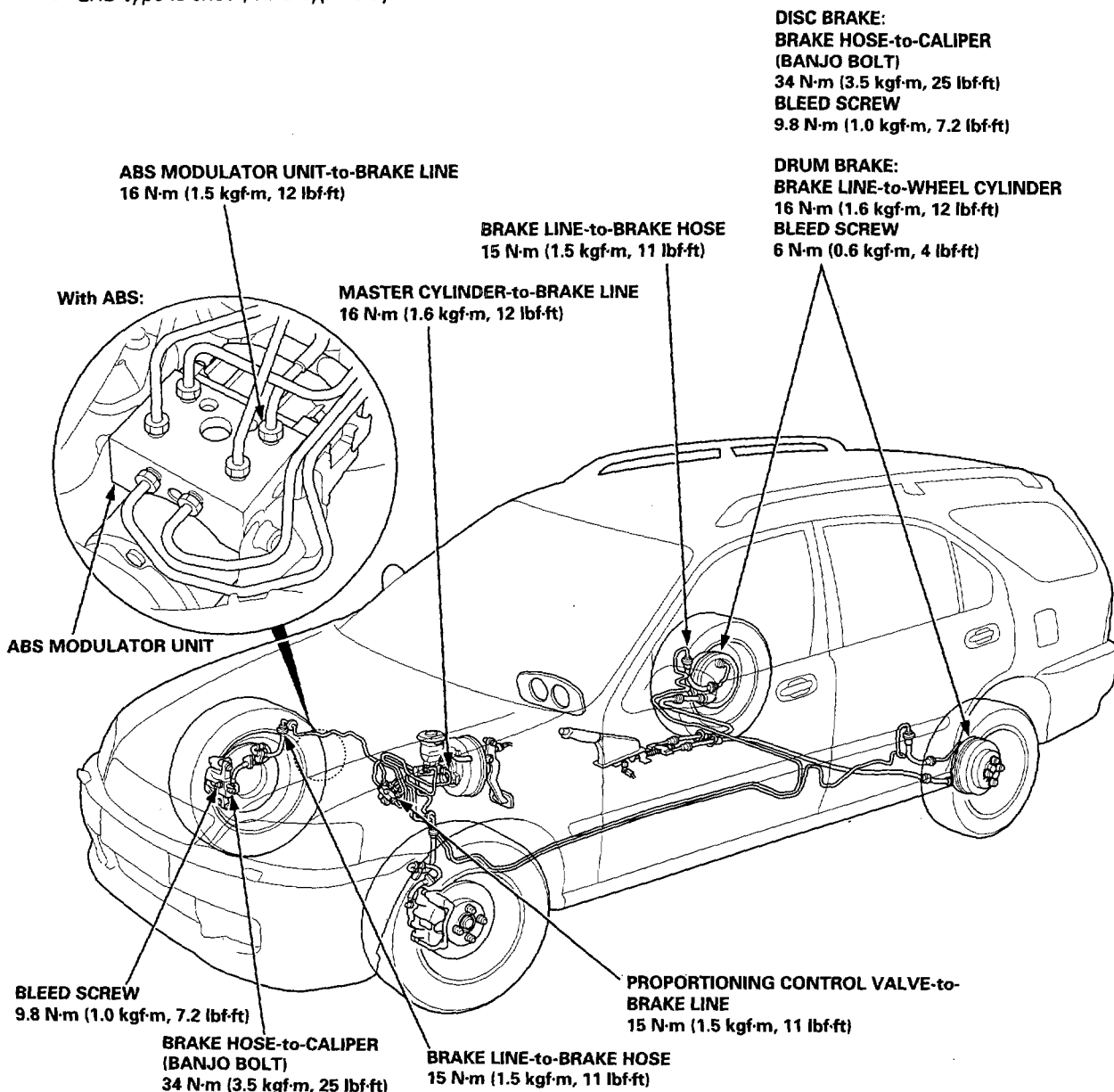


## Inspection

1. Inspect the brake hoses for damage, deterioration, leaks, interference and twisting.
2. Check the brake lines for damage, rusting and leakage. Also check for bent brake lines.
3. Check for leaks at hose and line joints or connections, and retighten if necessary.
4. Check the master cylinder and ABS modulator unit for damage and leakage.

### NOTE:

- Replace the brake hose clip whenever the brake hose is serviced.
- LHD type is show, RHD type is symmetrical.



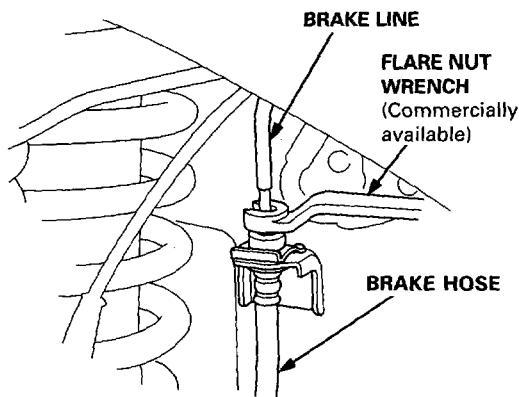
# Brake Hoses/Lines

## Hose Replacement

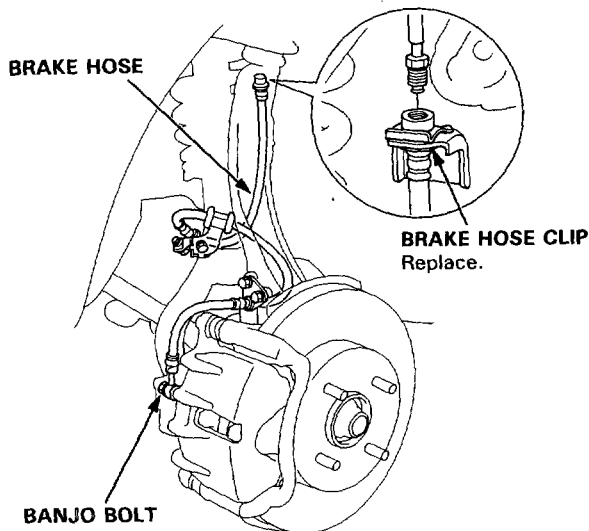
**NOTE:**

- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.

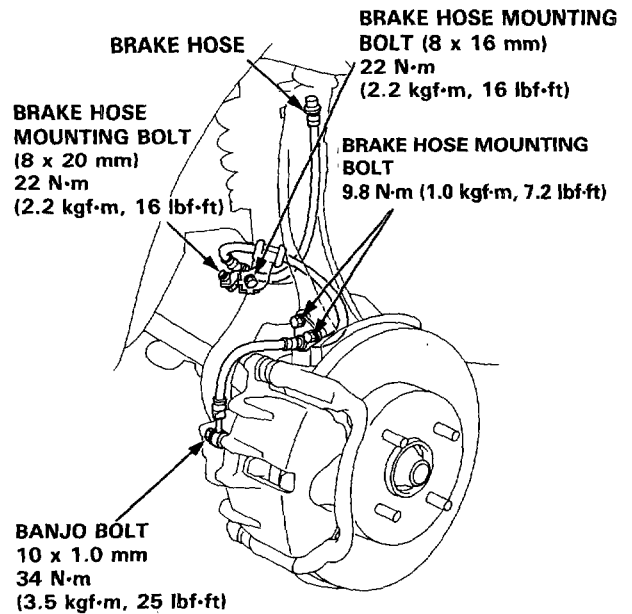
1. Replace the brake hose if the hose is twisted, cracked, or if it leaks.
2. Disconnect the brake hose from the brake line using a 10 mm flare nut wrench.



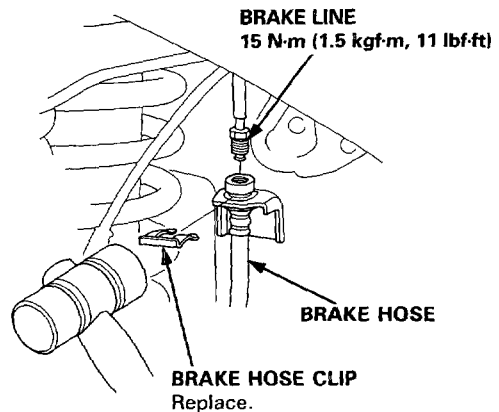
3. Remove and discard the brake hose clip from the brake hose.
4. Remove the banjo bolt, and disconnect the brake hose from the caliper.



5. Install the brake hose on the knuckle and damper first, then connect the brake hose to the caliper with the banjo bolt and new sealing washers. Do not twist the brake hose excessively.



6. Install a new brake hose clip on the brake hose.
7. Connect the brake line to the brake hose.



8. After installing the brake hose, bleed the brake system (see page 19-A-7).
9. Perform the following checks.
  - Check the brake hose and line joint for leaks, and tighten if necessary.
  - Check the brake hoses for interference or twisting.

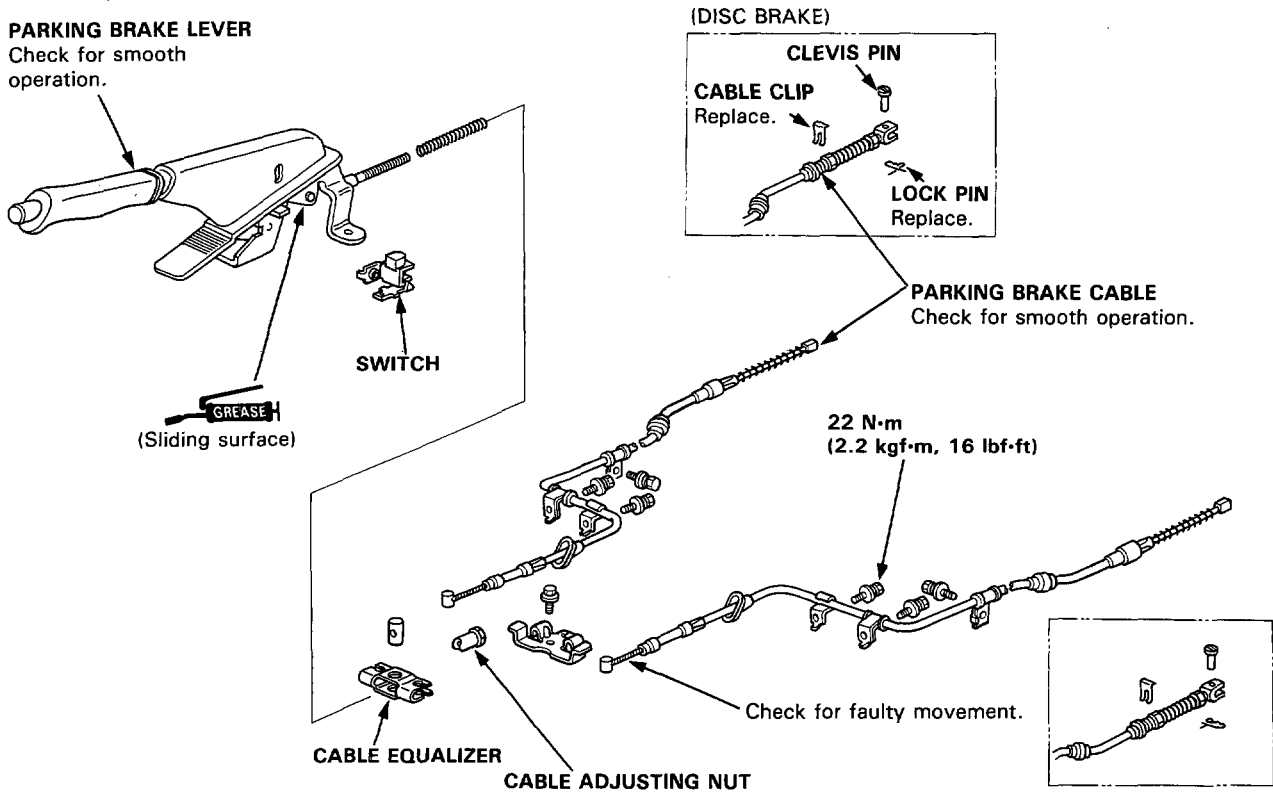


# Parking Brake Cable



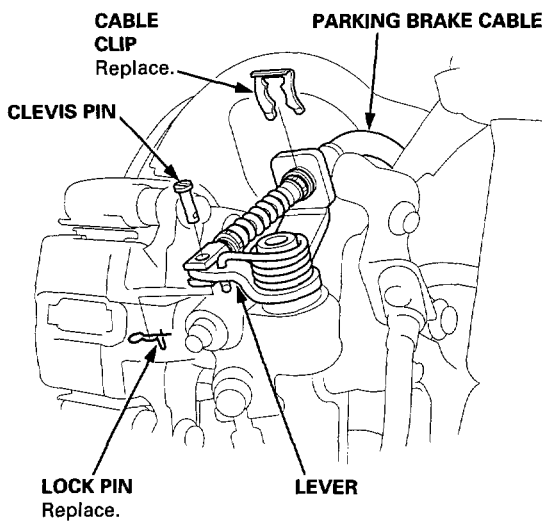
## Inspection/Replacement

NOTE: The parking brake cables must not be bent or distorted. This will lead to stiff operation and premature cable failure.



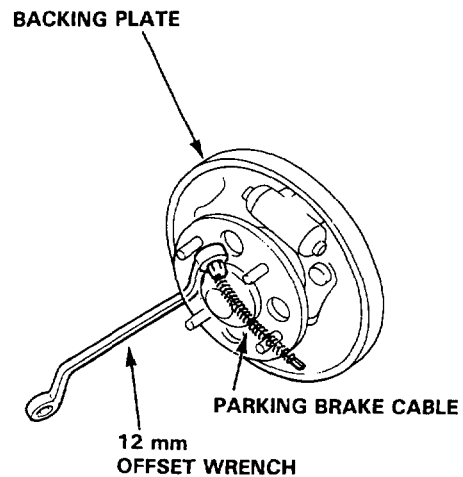
### REAR DISC BRAKE

Disconnect the parking brake cable from the lever on the caliper by removing the lock pin and clevis pin, and remove the cable from the arm by removing the clip.



### REAR DRUM BRAKE

Remove the parking brake cable from the backing plate using a 12 mm offset wrench as shown.

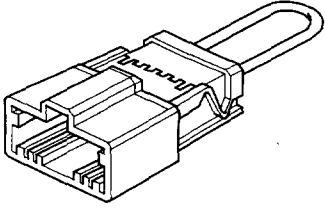


## Anti-lock Brake System (ABS)

Special Tools .....	19-B-2	DTC: 11, 12, 13, 14, 15, 16, 17, 18,	
Component Locations .....	19-B-3	21 .....	19-B-17
Anti-lock Brake System (ABS)		DTC: 31, 32, 33, 34, 35, 36, 37, 38,	
Features/Construction .....	19-B-4	51, 61, 81 .....	19-B-19
Circuit Diagram .....	19-B-6	DTC: 52, 53 .....	19-B-20
Terminal Arrangement .....	19-B-8	DTC: 54 .....	19-B-21
Troubleshooting Precautions .....	19-B-9	Modulator Assembly	
Diagnostic Trouble Code (DTC)		Removal/Installation .....	19-B-22
DTC Indication .....	19-B-11	Pulsers/Wheel Sensors	
Troubleshooting Index .....	19-B-12	Inspection .....	19-B-23
Troubleshooting		Wheel Sensor Replacement .....	19-B-23
ABS Indicator Light Does Not			
Come On .....	19-B-13		
ABS Indicator Light Does Not			
Go Off .....	19-B-15		



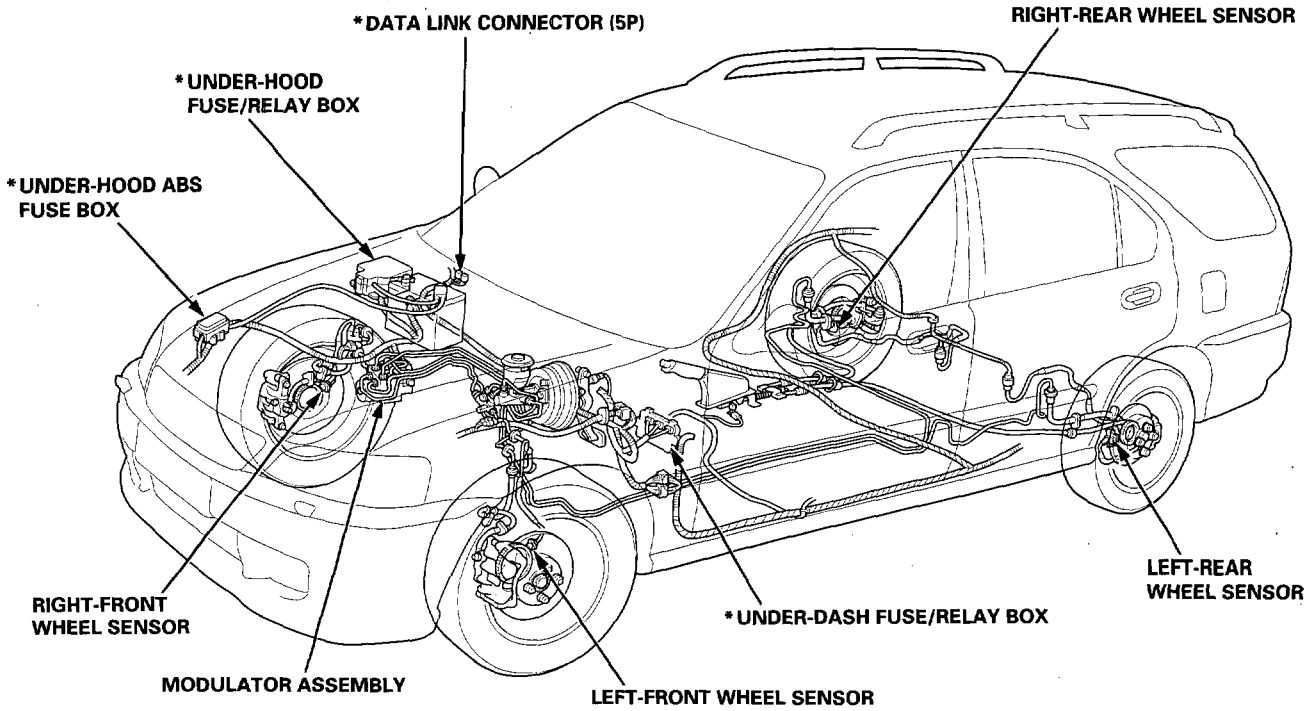
# Special Tools

Ref. No.	Tool Number	Description	Qty	Remark
①	07TAZ - ST30100	ABS Short Connector	1	
 ①				

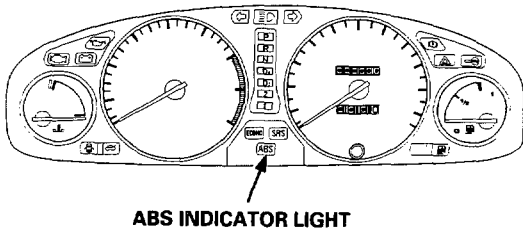
# Component Locations



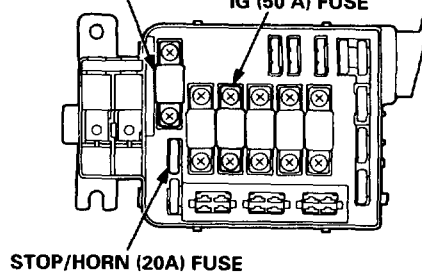
The parts with asterisk (\*): LHD type is shown, RHD type is symmetrical.



**GAUGE ASSEMBLY**



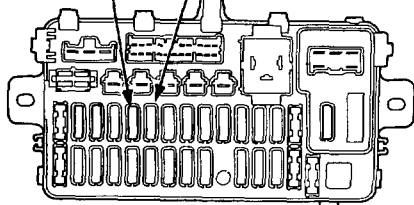
**UNDER HOOD FUSE/RELAY BOX**  
 BATTERY (80 A) FUSE  
 BATTERY (100 A) FUSE (B18C4 engine type)  
 IG (50 A) FUSE



**UNDER-DASH FUSE/RELAY BOX**

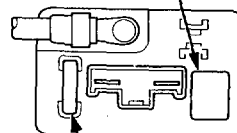
BACK-UP LIGHTS (10 A) FUSE

ABS UNIT (10 A) FUSE  
 (Except KS model)



**UNDER-HOOD ABS FUSE BOX**

ABS MOTOR (40 A) FUSE



# Anti-lock Brake System (ABS)

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## Features/Construction

When the brake pedal is depressed during driving, the wheels can lock before the vehicle comes to a stop. In such an event, the maneuverability of the vehicle is reduced in the front wheels are locked, and the stability of the vehicle is reduced (tail slide) if the rear wheels are locked, creating an extremely unstable condition. The ABS precisely controls the slip rate of the wheels to ensure maximum grip force from the tires, and it thereby ensures maneuverability and stability of the vehicle.

### ABS Control Unit

#### Main Control

The ABS control unit detects the wheel speed based on the wheel sensor signal it received, then it calculates the vehicle speed based on the detected wheel speed. The control unit detects the vehicle speed at deceleration by slowing down from the vehicle speed before deceleration at a certain rate.

The ABS control unit calculates the slip rate of each wheel and it transmits the control signal to the modulator unit solenoid valve when the slip rate is high.

The pressure reduction circuit is the three control channels system of each front wheel and both rear wheels.

The pressure reduction control has three modes: pressure reduction, pressure retaining, and pressure intensifying.

The wheel sensor signal is four channels system from each wheel.

#### Self-diagnosis Function

The ABS control unit equips the watch dog timer.

The ABS control unit equips the main CPU and sub CPU, that check each other for problems.

The CPUs check the circuit of the system.

#### On-board Diagnosis Function

The ABS control unit equips the data link connector (5P).

The ABS system can be diagnosed with HONDA PGM TESTER.

### ABS Modulator

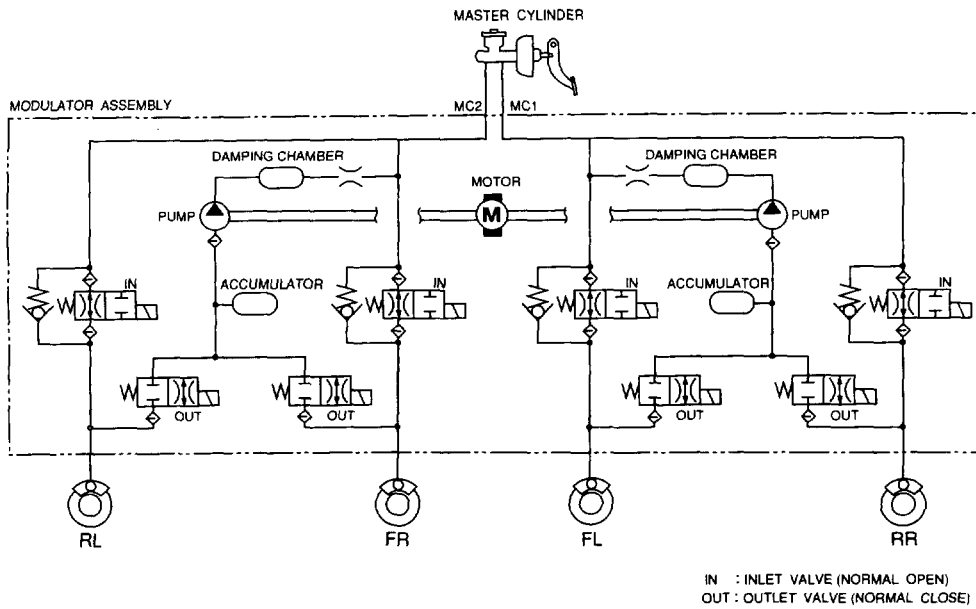
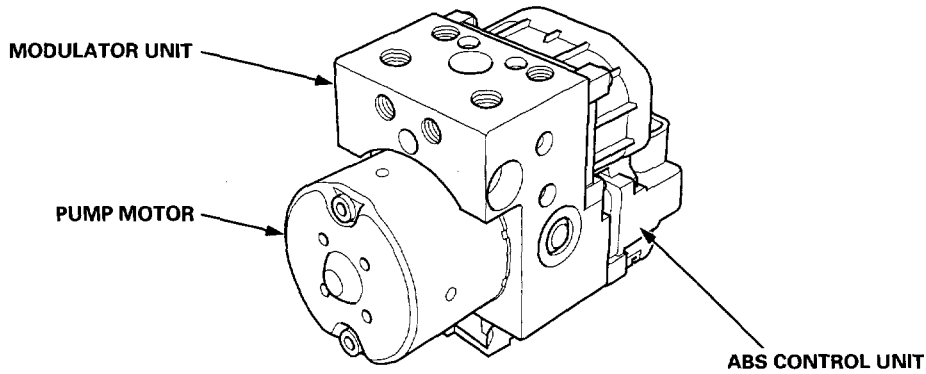
The ABS modulator consists of the inlet solenoid valve, outlet solenoid valve, reservoir, pump, pump motor and the damping chamber.

The direct pressure reducing control type that reduces the caliper fluid pressure directly is adopted for the modulator, which is also referred as the circulating type because the brake fluid circulates through the caliper, reservoir and the master cylinder.

The hydraulic control has the three modes of pressure reduction, pressure retaining and pressure intensifying modes.

The hydraulic circuit is the independent four channel from each wheel.

**MODULATOR ASSEMBLY**

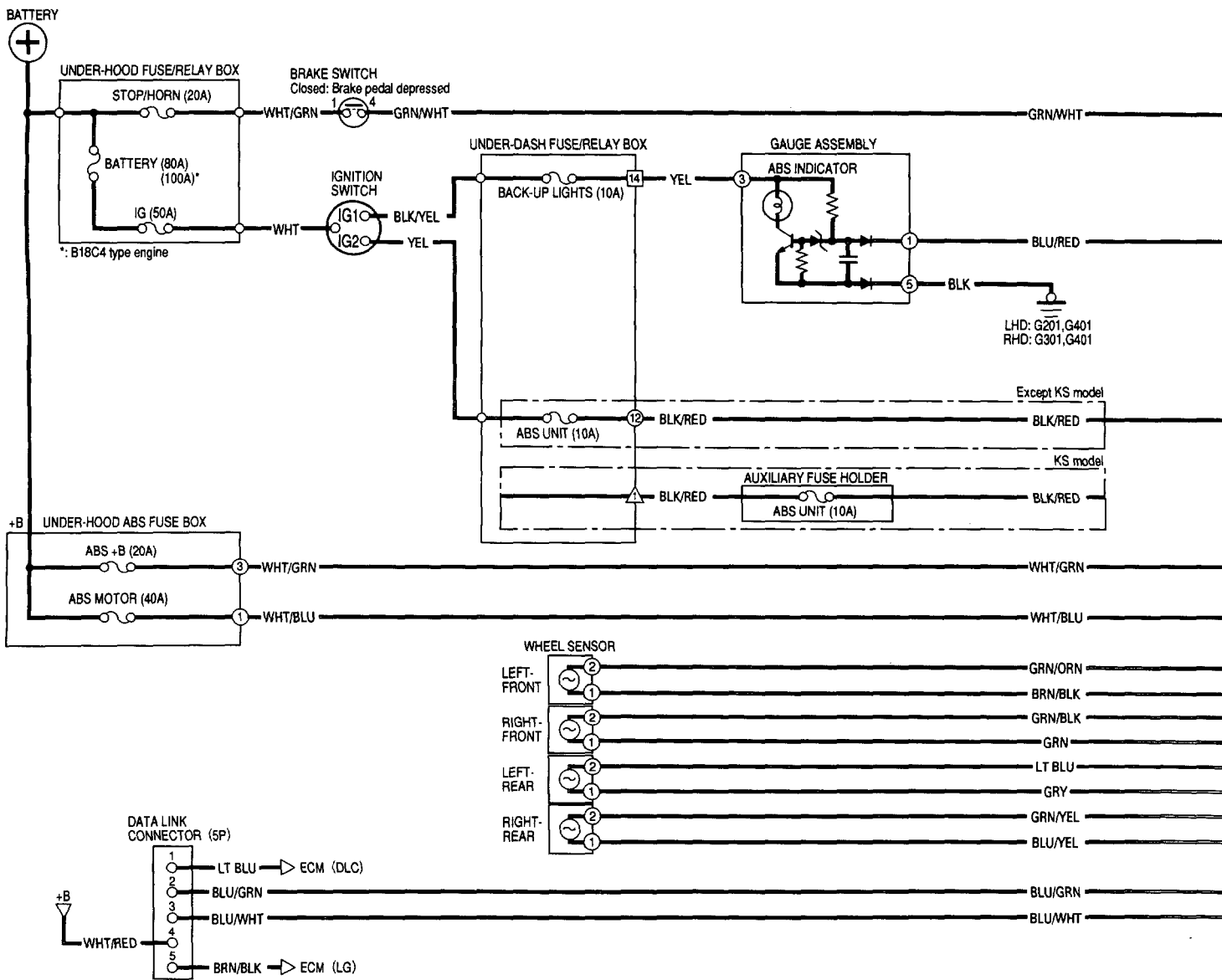


**Wheel Sensor**

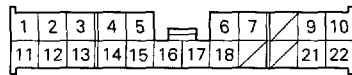
The four wheel sensors are the magnetic contactless type. As the gear pulser teeth rotate past the wheel sensor's magnetic coil, AC current is generated. The AC frequency changes in accordance with the wheel speed. The ABS control unit detects the wheel sensor signal frequency and thereby detects the wheel speed.



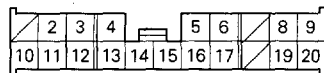
# Circuit Diagram



**UNDER-DASH FUSE/RELAY BOX CONNECTORS**  
22P CONNECTOR (○ number)



20P CONNECTOR (□ number)



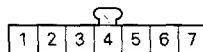
**UNDER-HOOD ABS FUSE BOX CONNECTOR**



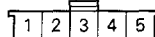
**BRAKE SWITCH CONNECTOR**



**GAUGE ASSEMBLY 7P CONNECTOR**



**DATA LINK CONNECTOR (5P)**



Wire side of female terminals

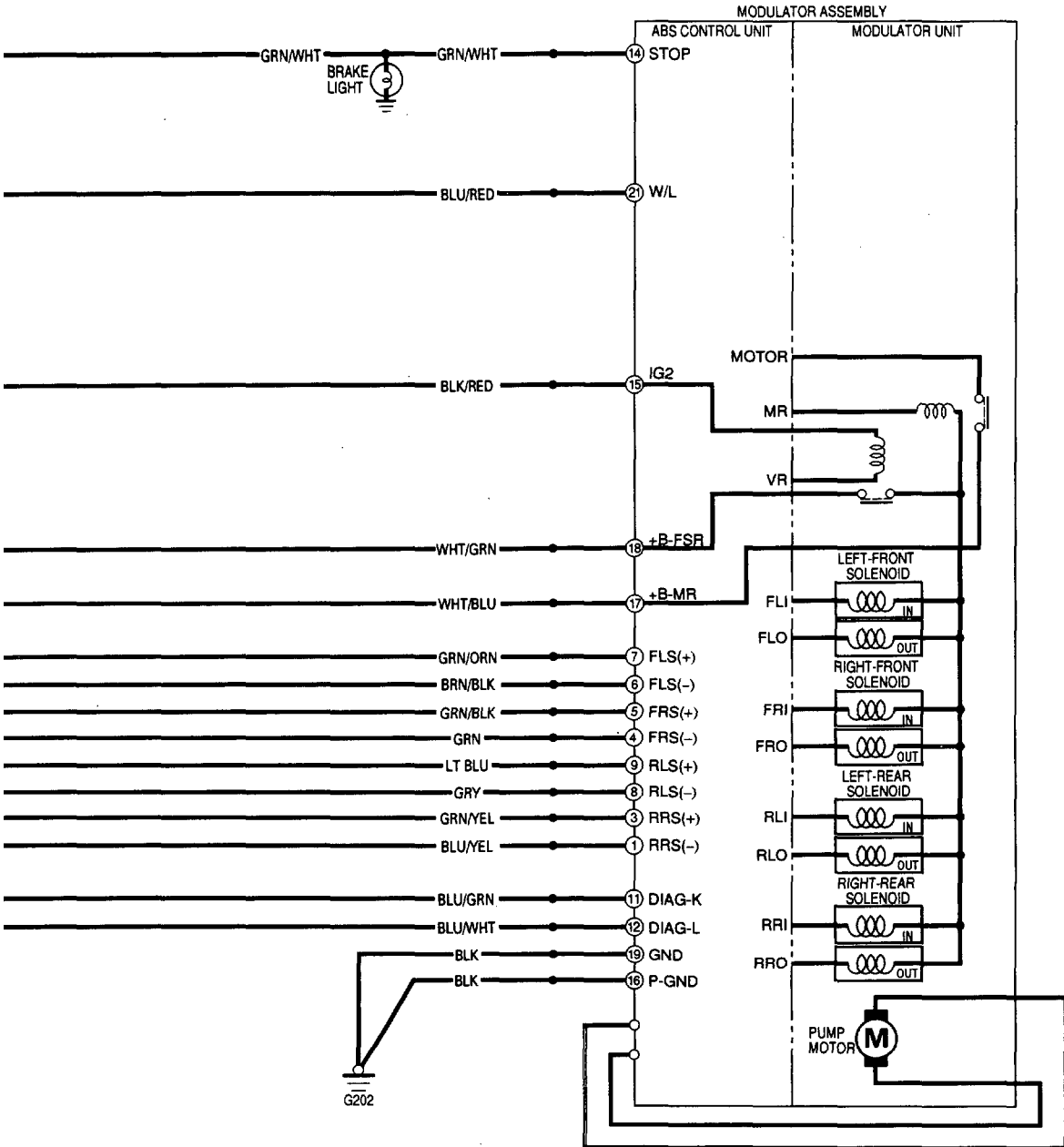
**UNDER-DASH FUSE/RELAY BOX 1P CONNECTOR (△ number)**



**WHEEL SENSOR CONNECTOR**



Terminal side of male terminals



MODULATOR ASSEMBLY CONNECTOR

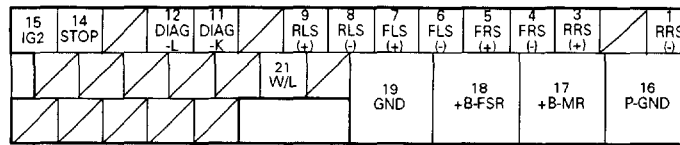
15	14	12	11	9	8	7	6	5	4	3	1
				21			19	18	17		16

Terminal side of female terminals



# Terminal Arrangement

MODULATOR ASSEMBLY CONNECTOR



Terminal side of female terminals

Terminal number	Wire color	Terminal sign (Terminal name)	Description	Measurement			
				Terminal	Conditions (Ignition switch ON (III))	Voltage	
1	BLU/YEL	RRS (-) (Rear-right signal negative)	Detects right-rear wheel sensor signal	1-3	Wheel	Turn wheel at 1 turn/second	AC: 0.053 V or above Oscilloscope: 0.15 Vp-p or above
3	GRN/YEL	RRS (+) (Rear-right signal positive)					
4	GRN	FRS (-) (Front-right signal negative)	4-5				
5	GRN/BLK	FRS (+) (Front-right signal positive)					
6	BRN/BLK	FLS (-) (Front-left signal negative)	6-7				
7	GRN/ORN	FLS (+) (Front-left signal positive)					
8	GRY	RLS (-) (Rear-left signal negative)	Detects left-rear wheel sensor signal	8-9	Stops	Approx. 2.5 V	
9	LT BLU	RLS (+) (Rear-left signal positive)					
11	BLU/GRN	DIAG-K (Diagnosis K terminal)	Communicate with Honda PGM Tester	—	—	—	
12	BLU/WHT	DIAG-L (Diagnosis L terminal)	Diagnostic trouble code indication	12-GND	ABS short connector	Connected	0 V
						Disconnected	Approx. 5 V
14	GRN/WHT	STOP	Detects brake switch signal	14-GND	Brake pedal	Depressed	Battery voltage
						Released	0 V
15	BLK/RED	IG2 (Ignition 2)	Detects ignition switch 2 signal (System activate signal)	15-GND	—	Battery voltage	
16	BLK	P-GND (Pump ground)	Ground for the pump motor	16-GND	—	Below 0.3 V	
17	WHT/BLU	+B-MR (+B motor relay)	Power source for the pump motor	17-GND	Every time	Battery voltage	
18	WHT/GRN	+B-FSR (+B fail-safe relay)	Power source for the solenoid valve and motor relay coil	18-GND	Every time	Battery voltage	
19	BLK	GND (Ground)	Ground for the modulator assembly	19-GND	—	Below 0.3 V	
21	BLU/RED	W/L (Warning lamp)	Drives ABS indicator	21-GND	ABS indicator	ON	Approx. 11 V
						OFF	Below 1 V



## ABS Indicator

1. The ABS indicator comes on when the ABS control unit detects a problem in the system. However, even though the system is operate properly, the ABS indicator will come on, under the following conditions.
  - Disturbance signal
  - Wheel spin
  - Only drive wheels rotate
  - Battery voltage fluctuates
  - Disconnected modulator assembly connector.To determine the actual cause of problem, question the customer about the problem, taking these conditions into consideration.
2. When a problem is detected and the ABS indicator comes on, the indicator can stay on until the ignition switch is turned off and it can automatically goes off depending on the mode.
  - Light stays on until the ignition switch is turned off: When the system is in the system down mode.
  - Light automatically goes off: When the system is in the control inhibition mode.
3. In certain mode, the ABS indicator stays on when the system is reactivated without erasing the DTC after correcting the problem, but it goes off after starting the vehicle.

When the wheel sensor system is faulty and the ABS indicator comes on, the algorithm of the system automatically turns off the ABS indicator after the wheel speed signal returns to the normal speed. While, when the DTC is erased, the CPU is reset and the ABS indicator goes off when the system checked out normal by the initial diagnosis.

Therefore, test-drive the vehicle after servicing the wheel sensor system and be sure that the ABS indicator does not come on.

## Diagnostic Trouble Code (DTC)

1. The diagnostic trouble code (DTC) is memorized when a problem is detected and the ABS indicator does not go off or when the ABS indicator comes on.

Therefore, the DTC can not be memorized when the ABS indicator come on unless the CPU is activated.
2. The DTCs can be memorized until three DTC. However, when the same DTC is detected twice or more, the later one is written over the old one.

Therefore, when the same problem is detected repeatedly, it is recorded as the one DTC.
3. The DTCs are indicated from last memorized DTC.
4. The DTCs are memorized in the EEPROM (non-volatile memory).

Therefore, the memorized DTCs cannot be canceled with the battery. Perform the specified procedures to erase.

## Self-diagnosis

Self-diagnosis can be classified into the four categories as listed below.

- Initial diagnosis: Performed right after the engine starts and until the ABS indicator goes off.
- Except ABS control: Performed when the ABS is not functioning.
- During ABS control: Performed when the ABS is functioning.
- During warning: Performed when the ABS indicator is ON.

# Troubleshooting Precautions

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## **Kickback**

1. The motor operates when the ABS is functioning, and the fluid in the reservoir is forced out to the master cylinder, causing kickback.  
Therefore, the brake pedal must be kept depressed when the kickback occurs as it is performed during the ordinary brake operation.
2. The ABS control unit operates the solenoid valve when the brake pedal is released after the initial diagnosis. You can hear the faint solenoid valve operation sound this time, but it is normal.

## **Pump Motor**

1. The pump motor operates when the ABS is functioning.
2. The ABS control unit checks the pump motor operation when starting the vehicle at first time. You can hear the faint operation sound this time, but it is normal.

## **Brake Fluid Replacement/Air Bleeding**

1. Brake fluid replacement and air bleeding procedure are same as vehicles without ABS. To ease bleeding, start with the front wheels.

## **Troubleshooting**

1. The troubleshooting flowcharts explain the procedures on the assumption that the cause of the problem lasts and the ABS indicator does not go off or it stays on.  
Note that the troubleshooting following the flow chart when the ABS indicator does not come on can result in incorrect judgment.
2. Question the condition when the problem occurred and produce the same conditions as much as possible for troubleshooting.  
Self-diagnosis is made at various times such as the initial diagnosis, except ABS control, during ABS control, during acceleration, during the specified vehicle speed, etc. Therefore, the symptom cannot be checked unless the check conditions match with the problem conditions.
3. When the ABS indicator does not come on during the test-drive but the troubleshooting is performed with the DTC, check for the loose connector, poor contact of the terminal, etc. before troubleshooting.
4. After troubleshooting, erase the DTC and test-drive the vehicle. Be sure that the ABS indicator does not come on.
5. The connector symbol shown in the connector illustration represents the female terminals with the single outline and the male terminals with the double outlines.

# Diagnostic Trouble Code (DTC)



## DTC Indication

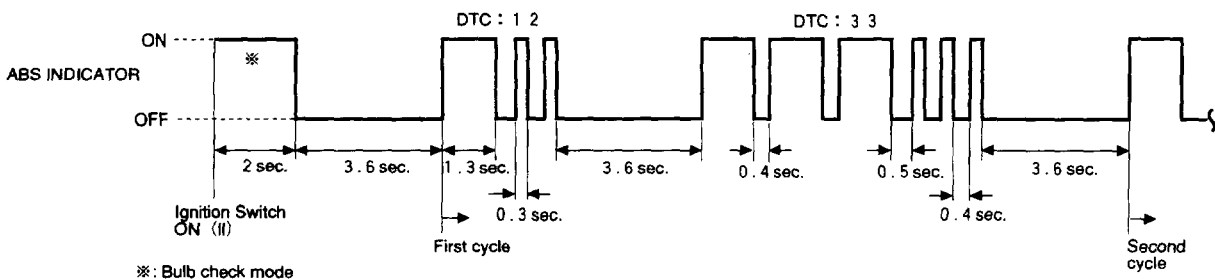
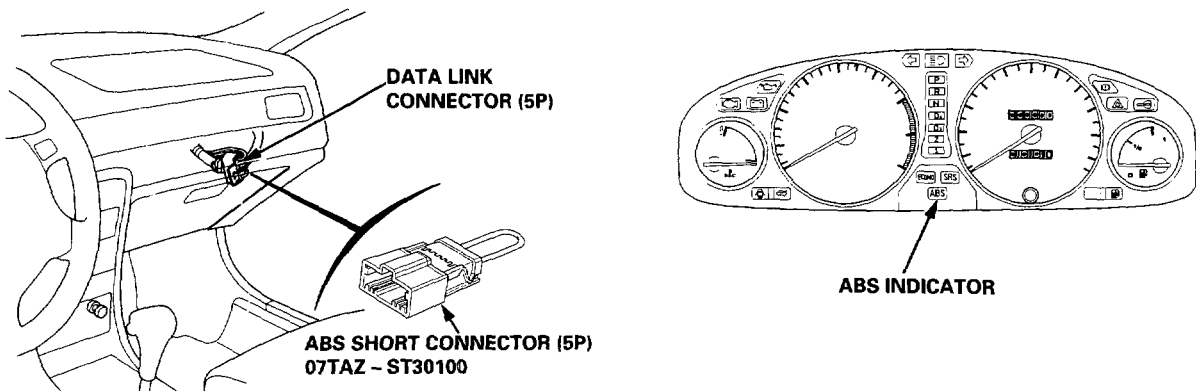
1. Connect the ABS short connector to the data link connector under dash of passenger's side.
2. Turn the ignition switch ON (II), but do not start the engine.  
NOTE: Do not depress the brake pedal when turning the ignition switch.
3. Record the blinking frequency of the ABS indicator. The blinking frequency indicates DTC.
4. Turn the ignition switch OFF, and remove the ABS short connector.
5. Erase the DTC by cycling the ignition switch for 20 times or more.

### Condition for DTC indication

- The vehicle is stopped.
- The ABS short connector is connected before the ignition switch is turned ON (II).
- The brake pedal is not depressed.
- The ABS short connector is not disconnected during this service.

The DTC indication is finished and ABS control unit execute the software function if at least one of the following conditions is satisfied.

- The vehicle is not stopped.
- The ABS short connector is disconnected during this service.

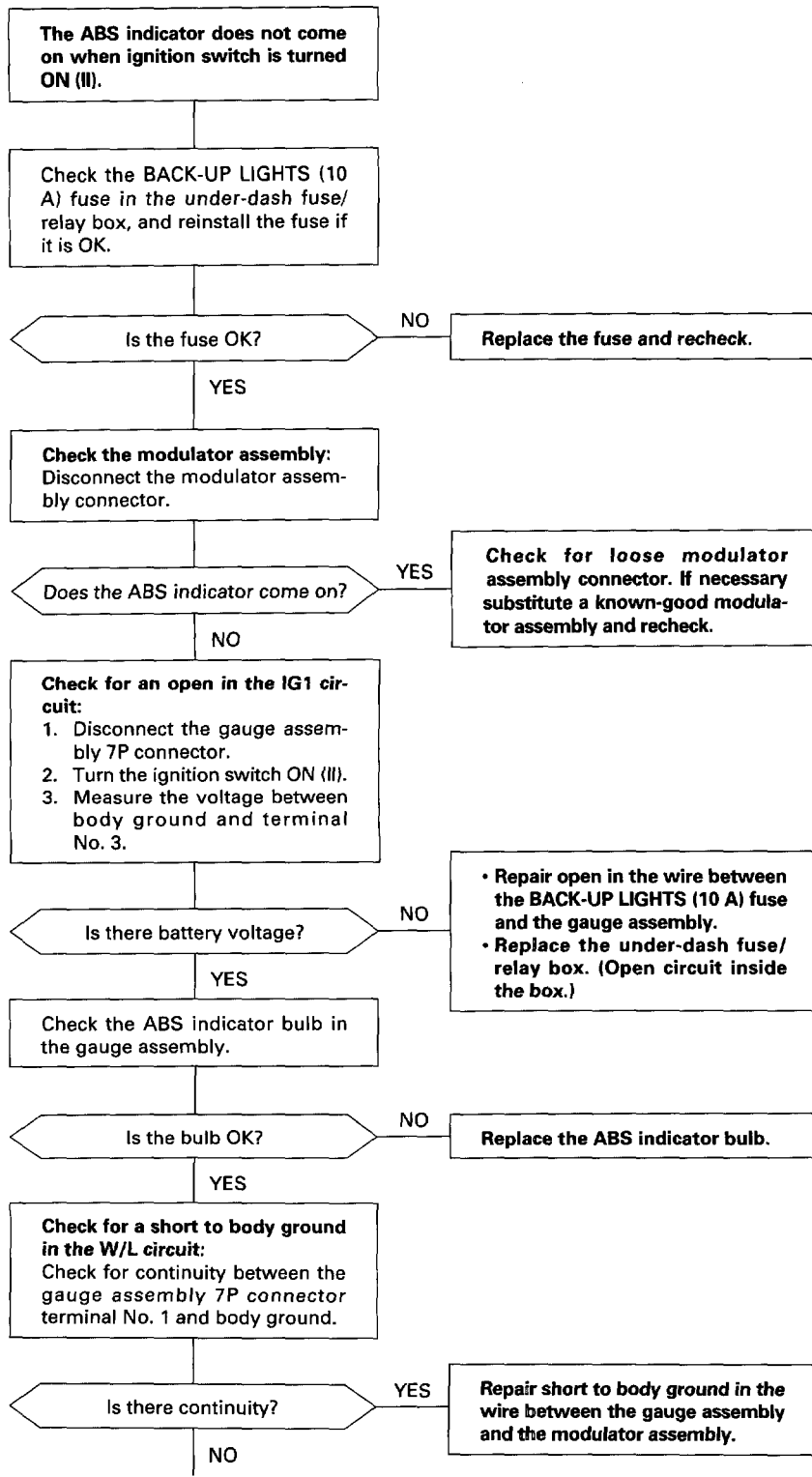


# Diagnostic Trouble Code (DTC)

## Troubleshooting Index

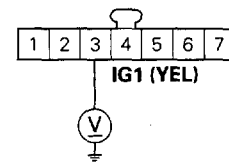
DTC	ABS INDICATOR	DIAGNOSIS/ SYMPTOM	PROBLEM LOCATION	PROBABLE CAUSE	Refer to page
NO DTC	OFF	ABS indicator does not come on		<ul style="list-style-type: none"> <li>• Open in the power source circuit for the ABS indicator</li> <li>• Blown ABS indicator bulb</li> <li>• Open in the W/L circuit</li> <li>• Faulty modulator assembly</li> </ul>	19-B-13
	ON	ABS indicator does not go off		<ul style="list-style-type: none"> <li>• Open in the IG2 circuit</li> <li>• Short to body ground in the W/L circuit</li> <li>• Faulty modulator assembly</li> </ul>	19-B-15
11	ON	Wheel sensor (open/short to power)	FR	<ul style="list-style-type: none"> <li>• Open, short to power in the wheel sensor circuit</li> <li>• Open circuit in the wheel sensor</li> <li>• Faulty modulator assembly</li> </ul>	19-B-17
13			FL		
15			RR		
17			RL		
12	ON	Faulty wheel sensor pulse (noise)	FR	<ul style="list-style-type: none"> <li>• Short to body ground in the wheel sensor circuit</li> <li>• Short to wheel sensor (+) circuit in the wheel sensor (-) circuit</li> <li>• Faulty wheel sensor installation</li> <li>• Detects disturbance signal</li> <li>• Faulty modulator assembly</li> </ul>	19-B-17
14			FL		
16			RR		
18			RL		
21	ON	Continuously operation (chipped pulser)		<ul style="list-style-type: none"> <li>• Chipped pulser gear</li> <li>• Faulty wheel sensor installation</li> </ul>	19-B-17
31	ON	Solenoid (open/short to body ground/ short to power/ stuck)	FRI	<ul style="list-style-type: none"> <li>• Faulty modulator assembly</li> </ul>	19-B-19
32			FRO		
33			FLI		
34			FLO		
35			RRI		
36			RRO		
37			RLI		
38			RLO		
51	ON	Motor lock		<ul style="list-style-type: none"> <li>• Faulty modulator assembly</li> </ul>	19-B-19
52	ON	Motor stuck off		<ul style="list-style-type: none"> <li>• Open and/or blown fuse in the +B MR circuit</li> <li>• Faulty modulator assembly</li> </ul>	19-B-20
53	ON	Motor stuck on		<ul style="list-style-type: none"> <li>• Faulty modulator assembly</li> </ul>	19-B-20
54	ON	Main relay stuck off		<ul style="list-style-type: none"> <li>• Open and/or blown fuse in the +B FSR circuit</li> <li>• Faulty modulator assembly</li> </ul>	19-B-21
61	ON	Ignition voltage (low voltage)		<ul style="list-style-type: none"> <li>• Faulty battery</li> <li>• Faulty charging system</li> <li>• Faulty modulator assembly</li> </ul>	19-B-19
81	ON	CPU		<ul style="list-style-type: none"> <li>• Faulty modulator assembly</li> </ul>	19-B-19

## ABS Indicator Does Not Come On

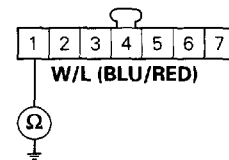


(To page 19-B-14)

GAUGE ASSEMBLY 7P CONNECTOR



Wire side of female terminals



(cont'd)

# Troubleshooting

## ABS Indicator Does Not Come On (cont'd)

(From page 19-B-13)

**Check for an open in the indicator GND circuit:**

1. Turn the ignition switch OFF.
2. Connect the gauge assembly 7P connector.
3. Connect the gauge assembly 7P connector terminal No. 5 to body ground with a jumper wire.

Does the ABS indicator come on?

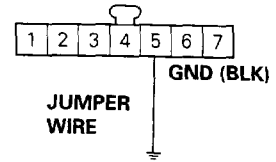
YES

- Repair open in the wire between the gauge assembly and body ground.
- Repair poor ground (LHD: G201, G401, RHD: G301, G401).

NO

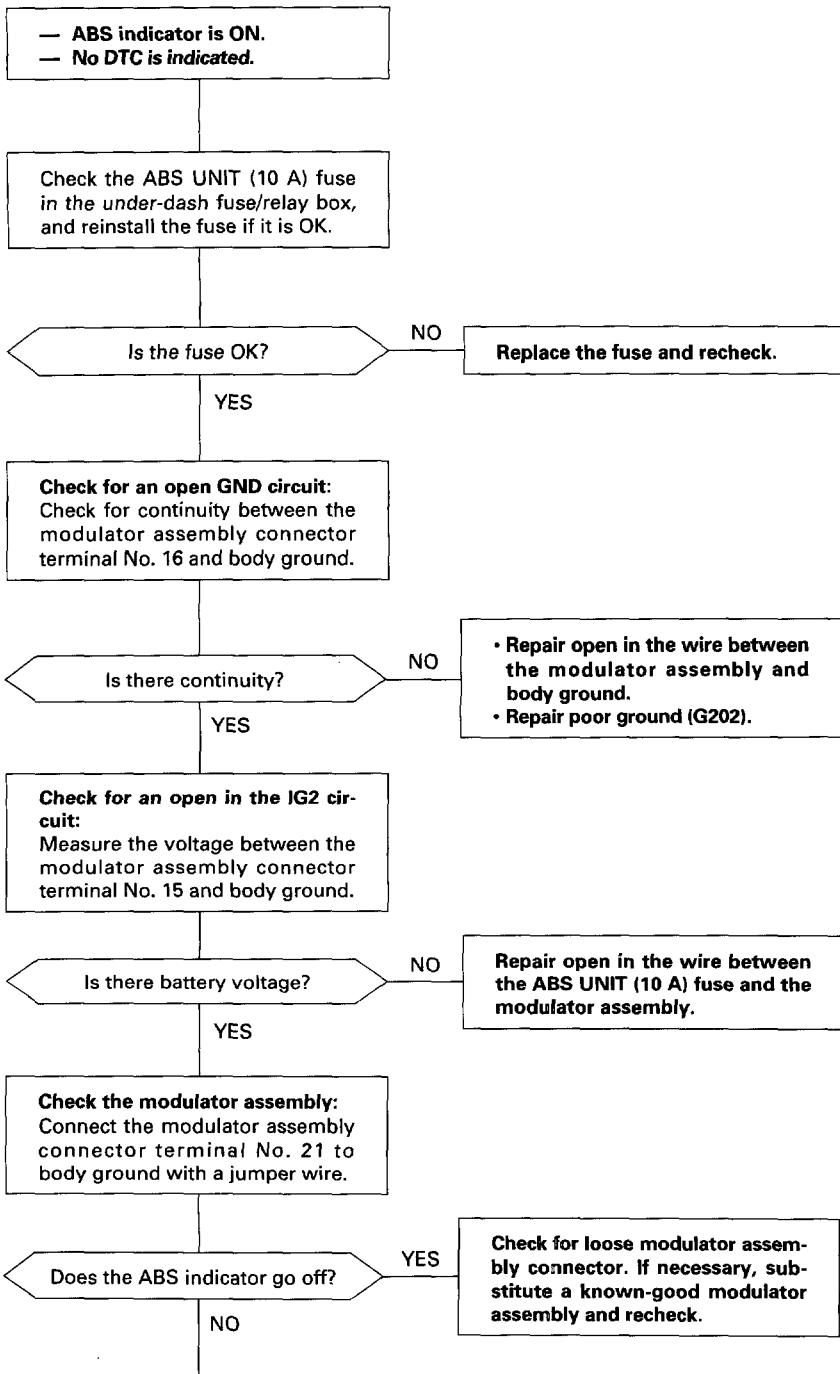
Replace the printed circuit board in the gauge assembly.

GAUGE ASSEMBLY 7P CONNECTOR

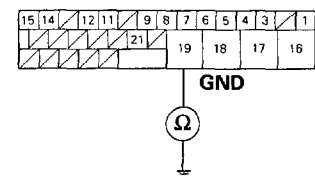


Wire side of female terminals

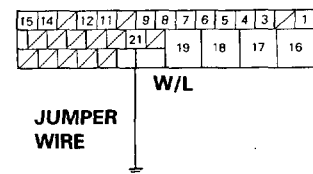
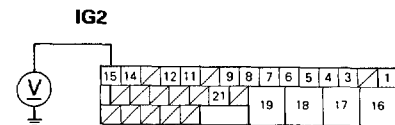
# ABS Indicator Does Not Go Off



**MODULATOR ASSEMBLY CONNECTOR**



Terminal side of female terminals



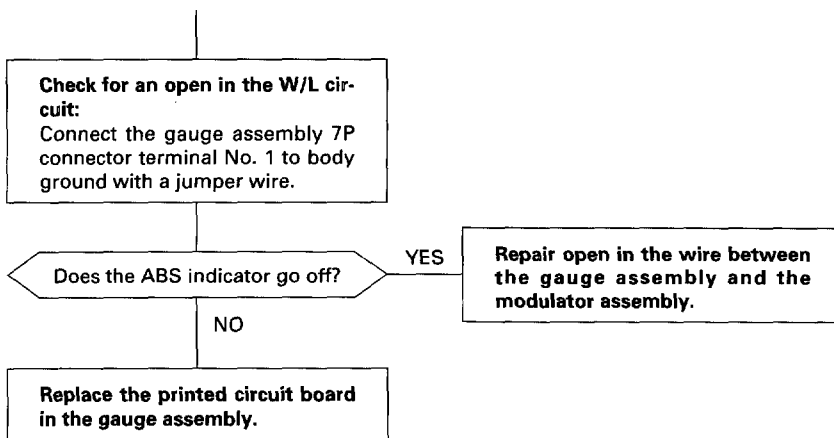
(cont'd)



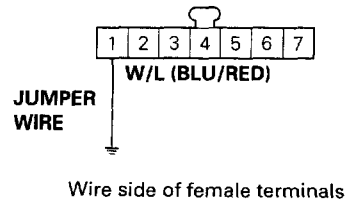
# Troubleshooting

## ABS Indicator Does Not Go Off (cont'd)

(From page 19-B-15)



GAUGE ASSEMBLY 7P CONNECTOR



## DTC: 11, 12, 13, 14, 15, 16, 17, 18, 21

NOTE: The ABS indicator comes on when only drive wheel is turning, and detects disturbance signal, etc. Therefore, test-drive the vehicle at speed of 31 mph (50 km/h) or more after turning the ignition switch OFF to ON (II) and if the ABS indicator does not come on, the system is OK.

— ABS indicator is ON.  
— DTCs 11-21 are indicated.

**Check the wheel sensor circuit:**  
1. Disconnect the modulator assembly connector.  
2. Check for continuity between the appropriate wheel sensor (+) and (-) circuit terminals\*.

DTC	Appropriate Terminal	
	(+) SIDE	(-) SIDE
11, 12: FRS	No. 5	No. 4
13, 14: FLS	No. 7	No. 6
15, 16: RRS	No. 3	No. 1
17, 18: RLS	No. 9	No. 8

\*  
• Repair open in the (+) or (-) circuit wire, or short to the (+) circuit wire in the (-) circuit wire between the modulator assembly and the appropriate wheel sensor.  
• Replace the appropriate wheel sensor.

Is there continuity?  
Front: 600 – 950 Ω/20°C (68°F)  
Rear: 700 – 1100 Ω/20°C (68°F)

NO

YES

**Check for a short to body ground in the wheel sensor circuit:**  
Check for continuity between the modulator assembly connector appropriate wheel sensor (+) circuit terminal\* and body ground.

YES

NO

**Check for a short to power in the wheel sensor circuit:**  
1. Start the engine.  
2. Measure the voltage between the modulator assembly connector appropriate wheel sensor (+) circuit terminal and body ground.

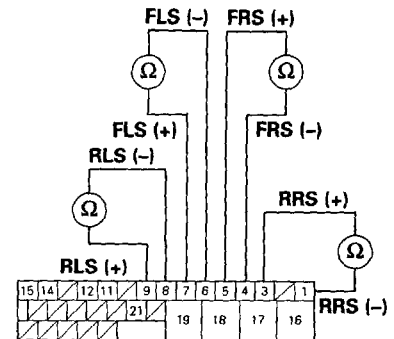
YES

NO

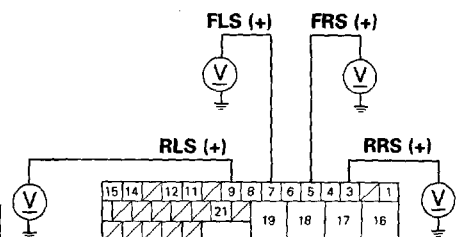
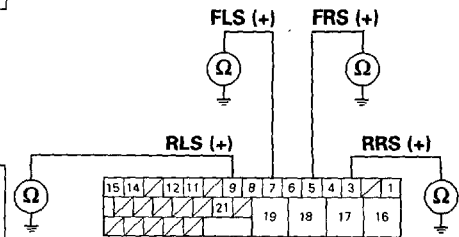
Repair short to power in the (+) or (-) circuit wire between the modulator assembly and the appropriate wheel sensor.

(To page 19-B-18)

### MODULATOR ASSEMBLY CONNECTOR



Terminal side of female terminals

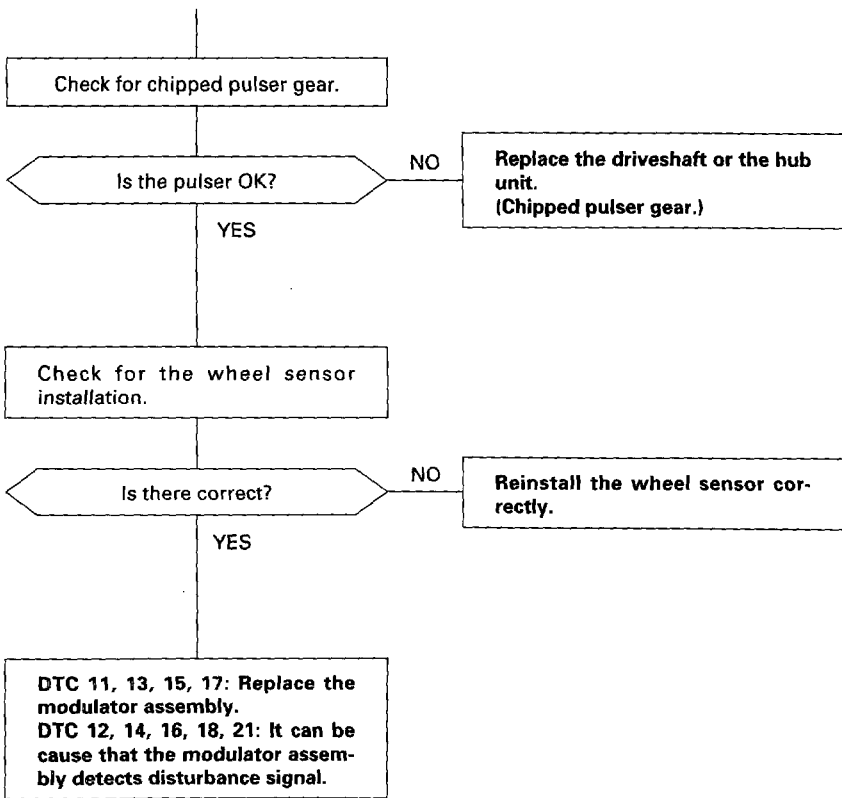


(cont'd)

# Troubleshooting

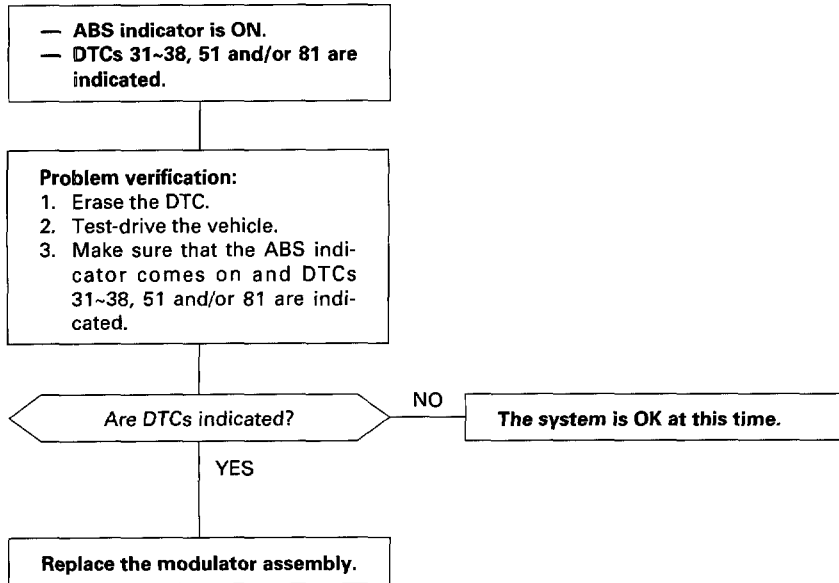
## DTC: 11, 12, 13, 14, 15, 16, 17, 18, 21 (cont'd)

(From page 19-B-17)

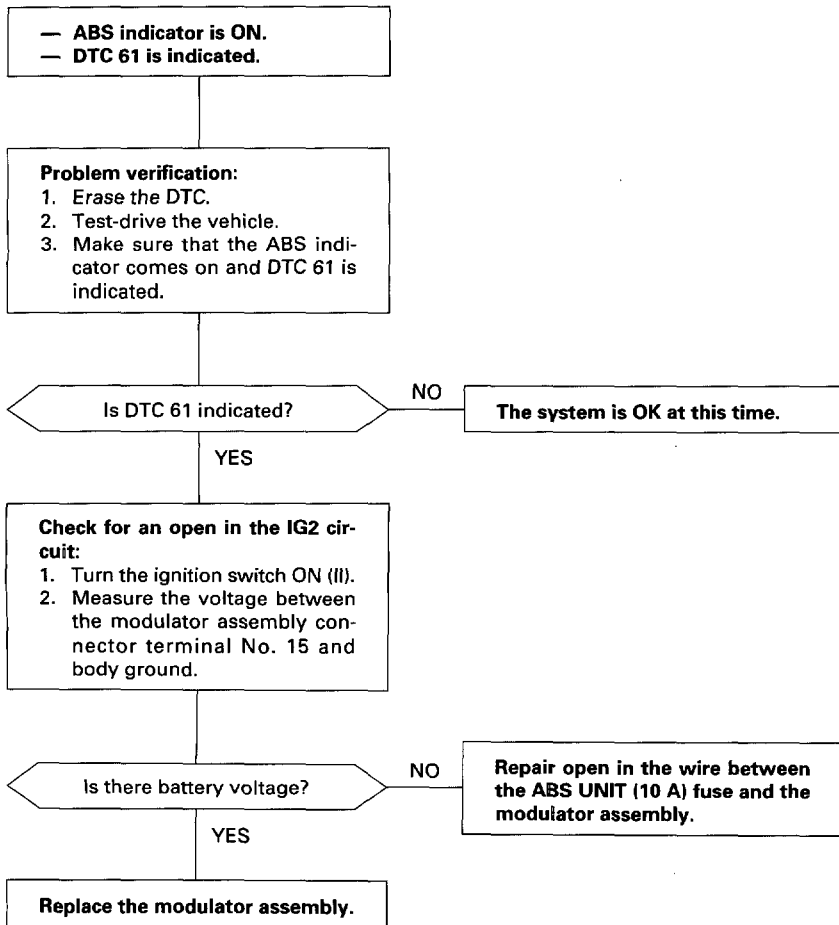


# DTC: 31, 32, 33, 34, 35, 36, 37, 38, 51, 61, 81

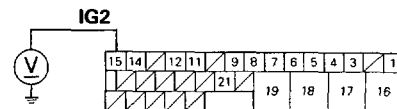
DTC: 31, 32, 33, 34, 35, 36, 37, 38, 51, 81



DTC: 61



MODULATOR ASSEMBLY CONNECTOR



Terminal side of female terminals

# Troubleshooting

## DTC: 52, 53

### DTC: 52

— During driving the vehicle, ABS indicator is ON.  
— DTC 52 is indicated.

Check the ABS MOTOR (40 A) fuse in the under-hood ABS fuse box, and reinstall the fuse if it is OK.

Is the fuse OK? NO **Replace the fuse and recheck.**

YES

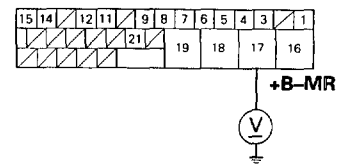
**Check for an open in the +B-MR circuit:**  
Measure the voltage between the modulator assembly connector terminal No. 17 and body ground.

Is there battery voltage? NO **Repair open in the wire between the modulator assembly and the under-hood ABS fuse box.**

YES

**Replace the modulator assembly.**

MODULATOR ASSEMBLY CONNECTOR



Terminal side of female terminals

### DTC: 53

— During driving the vehicle, ABS indicator is ON.  
— DTC 53 is indicated.

**Problem verification:**  
1. Erase the DTC.  
2. Test-drive the vehicle.  
3. Make sure that the ABS indicator comes on and DTC 53 is indicated.

Is DTC 53 indicated? NO **Intermittent motor relay stuck ON, the system is OK at this time.**

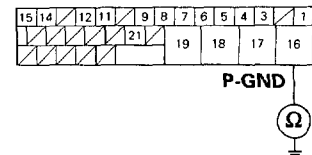
YES

**Check for an open in the P-GND circuit:**  
Check for continuity between the modulator assembly connector terminal No. 16 and body ground.

Is there continuity? NO **• Repair open in the wire between the modulator assembly and body ground.  
• Repair poor ground (G202).**

YES

**Replace the modulator assembly.**



# DTC: 54

— ABS indicator is ON.  
— DTC 54 is indicated.

Check the ABS +B (20 A) fuse in the under-hood ABS fuse box, and reinstall the fuse if it is OK.

Is the fuse OK?

NO

Replace the fuse and recheck.

YES

Check for an open in the +B-FSR circuit:  
Measure the voltage between the modulator assembly connector terminal No. 18 and body ground.

Is there battery voltage?

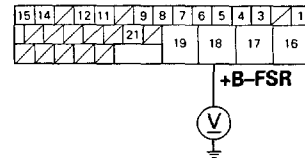
NO

Repair open in the wire between the modulator assembly and the under-hood ABS fuse box.

YES

Replace the modulator assembly.

MODULATOR ASSEMBLY CONNECTOR



Terminal side of female terminals

# Modulator Assembly

## Removal/Installation

### NOTE:

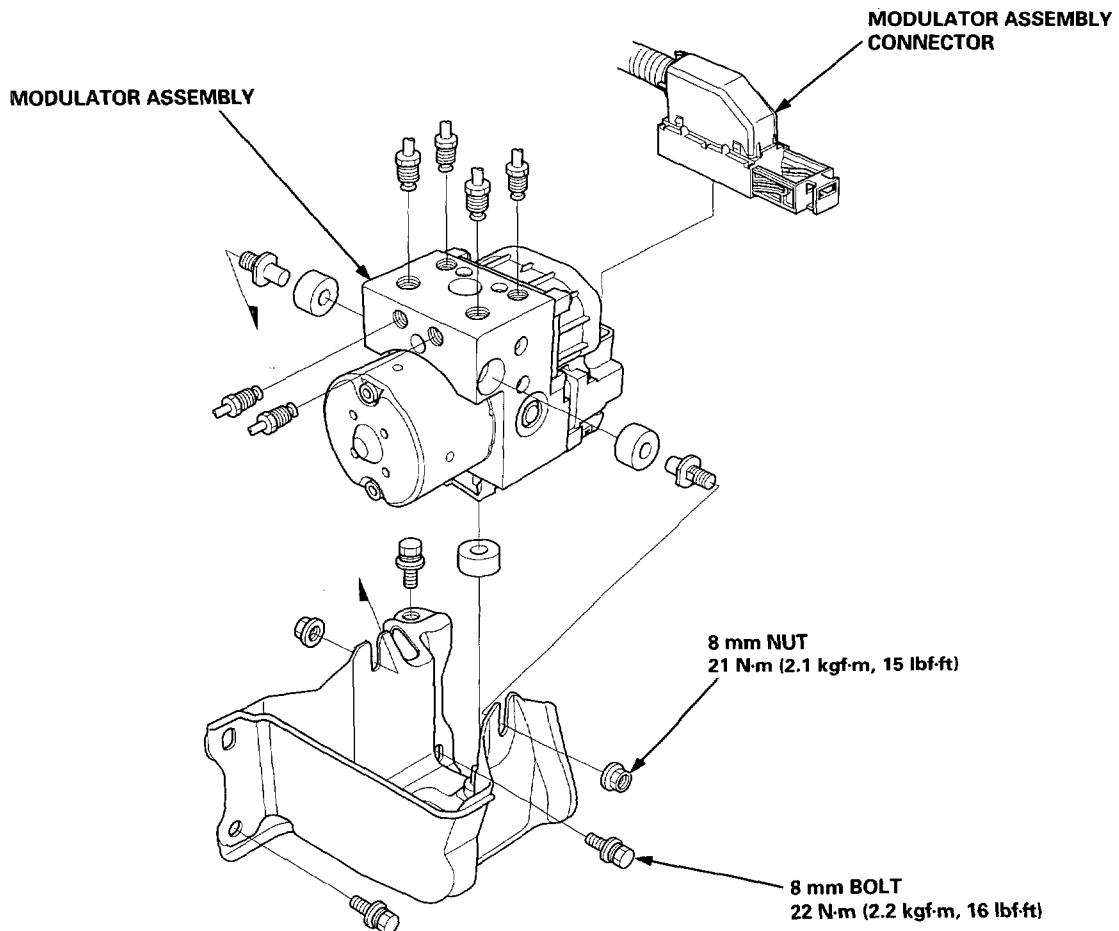
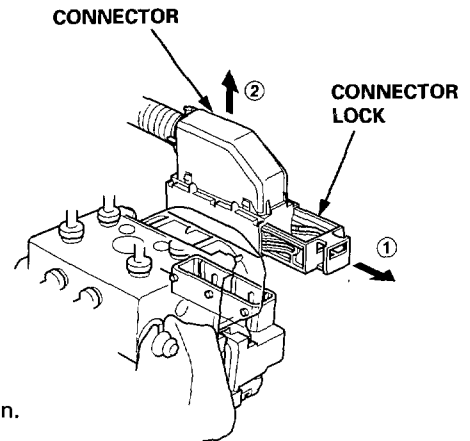
- Do not spill brake fluid on the vehicle; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- Take care not to damage or deform the brake lines during removal and installation.
- To prevent the brake fluid from flowing, plug and cover the hose ends and joints with a shop towel or equivalent material.

### Removal

1. Remove the battery and battery tray (LHD only).
2. Disconnect the modulator assembly connector as described below.
  - ① Pull the connector lock.
  - ② Disconnect the connector.
3. Disconnect the brake pipes, then remove the modulator assembly.

### Installation

1. Install the modulator assembly, then connect the brake pipes. Tighten the flare nuts to 16 N·m (1.6 kgf·m, 12 lbf·ft).
2. Connect the modulator assembly connector in the reverse order of disconnection.
3. Install the battery tray and battery (LHD only).
4. Bleed the brake system, starting with the front wheels.
5. Start the engine, and check that the ABS indicator goes off.
6. Test-drive the vehicle, and check that the ABS indicator does not come on.



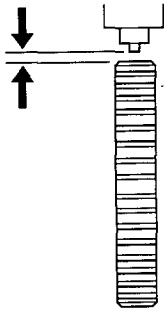
## Inspection

1. Check the front and rear pulser for chipped or damaged teeth.
2. Measure the air gap between the wheel sensor and pulser all the way around while rotating the pulser. If the gap exceeds 1.0 mm (0.04 in), check for a bent suspension arm.

**Standard: 0.4 – 1.0 mm (0.02 – 0.04 in)**

### Front/Rear

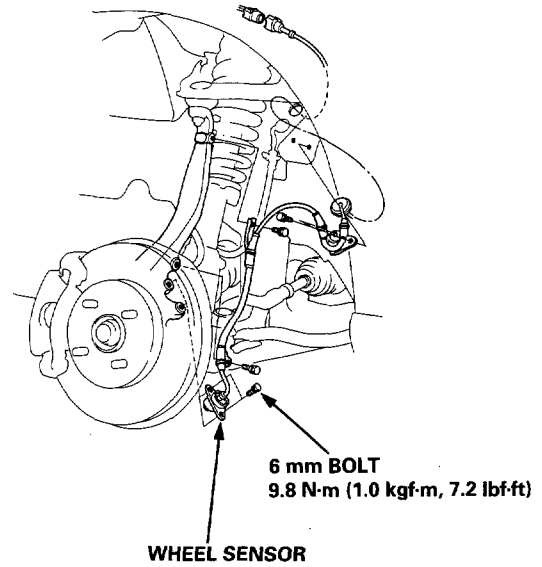
Remove the rear brake disc to inspect the rear wheel sensor air gap.



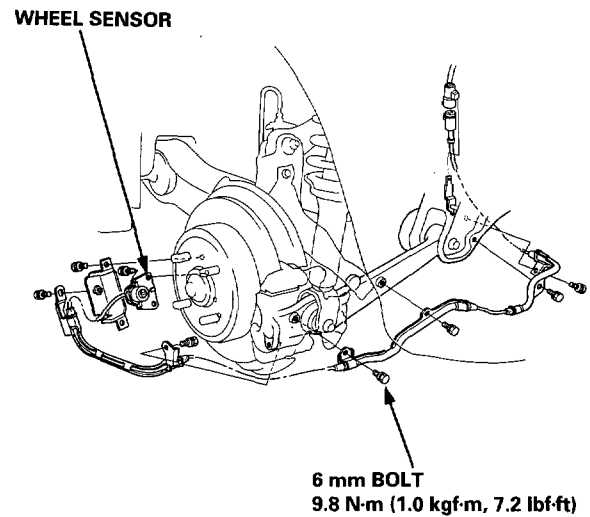
## Wheel Sensor Replacement

Install the sensors carefully to avoid twisting the wires.

### Front



### Rear





## **SUPPLEMENTAL RESTRAINT SYSTEM (SRS) (If body maintenance is required)**

Some types of this model has an SRS which includes a driver's airbag located in the steering wheel hub and a passenger's airbag located in the dashboard above the glove box and seat belt tensioner located in the seat belt retractors.

Information necessary to safely service the SRS is included in this Shop Manual.

Items marked with an asterisk (\*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

### **⚠ WARNING**

- To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.
- Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional deployment of the airbags.
- All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.
- Before trying to remove the seat belt tensioner, first set the sensor lock pin to LOCK position.

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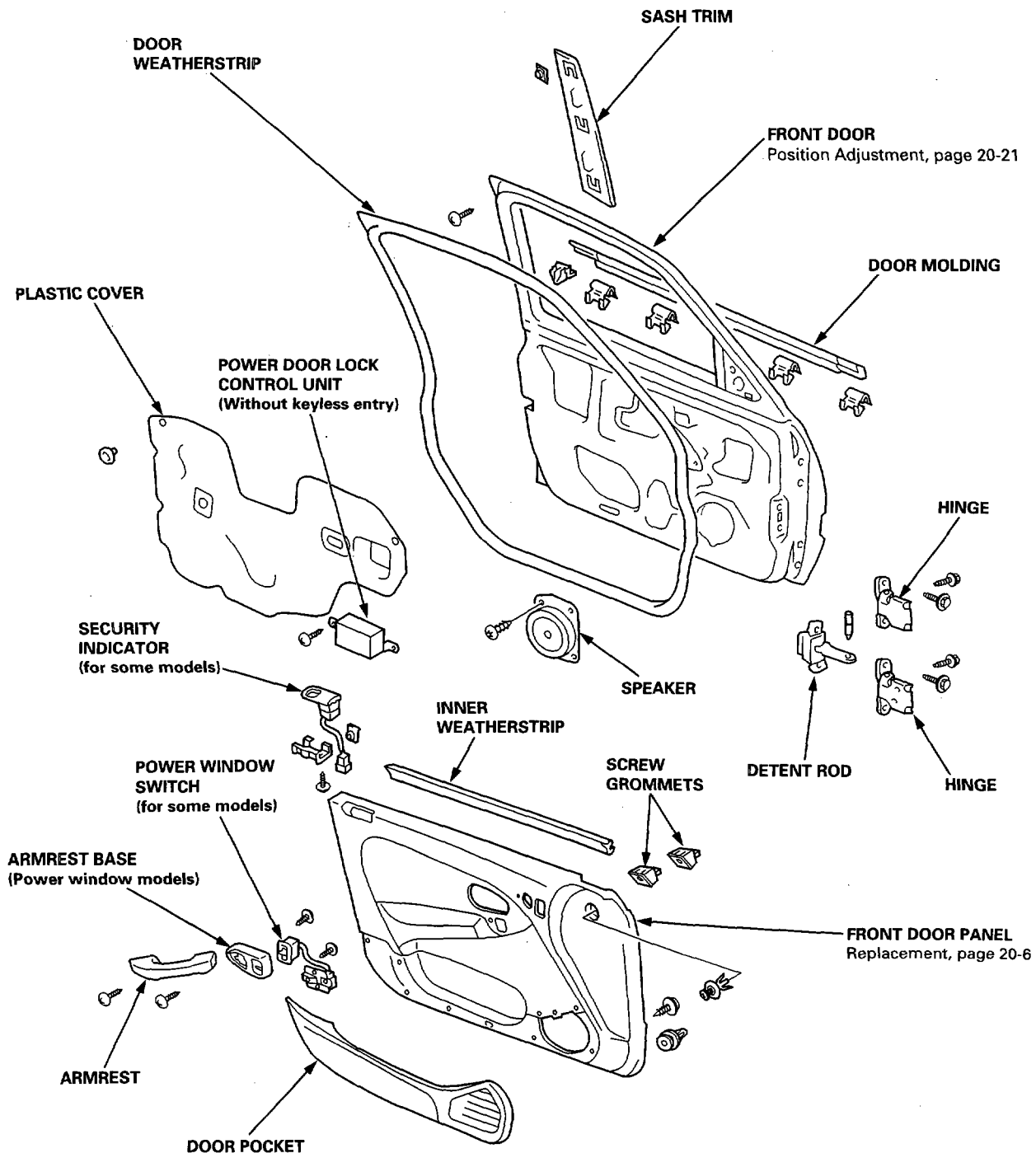
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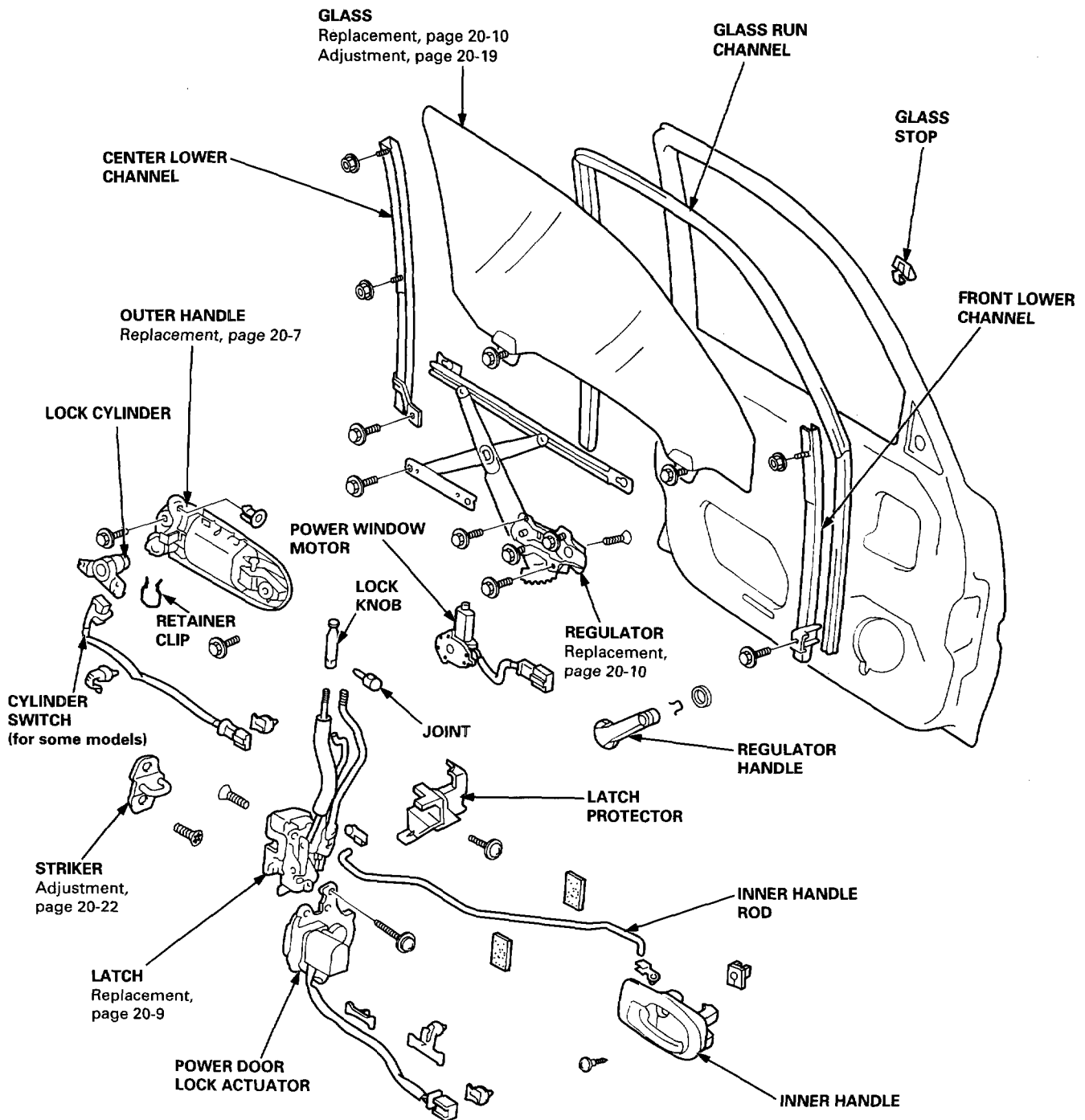


# Doors

## Component Location Index

Front Door:



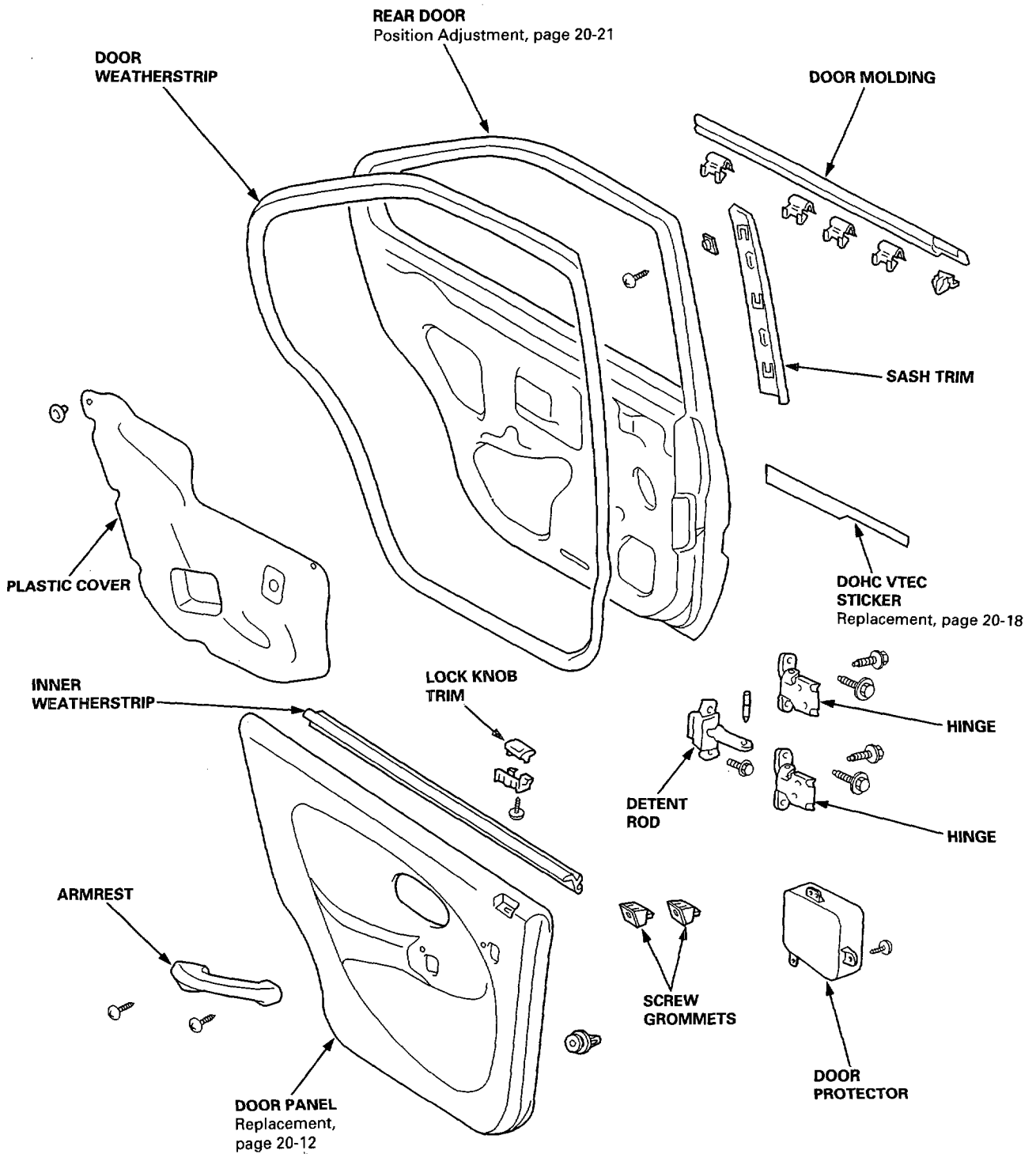


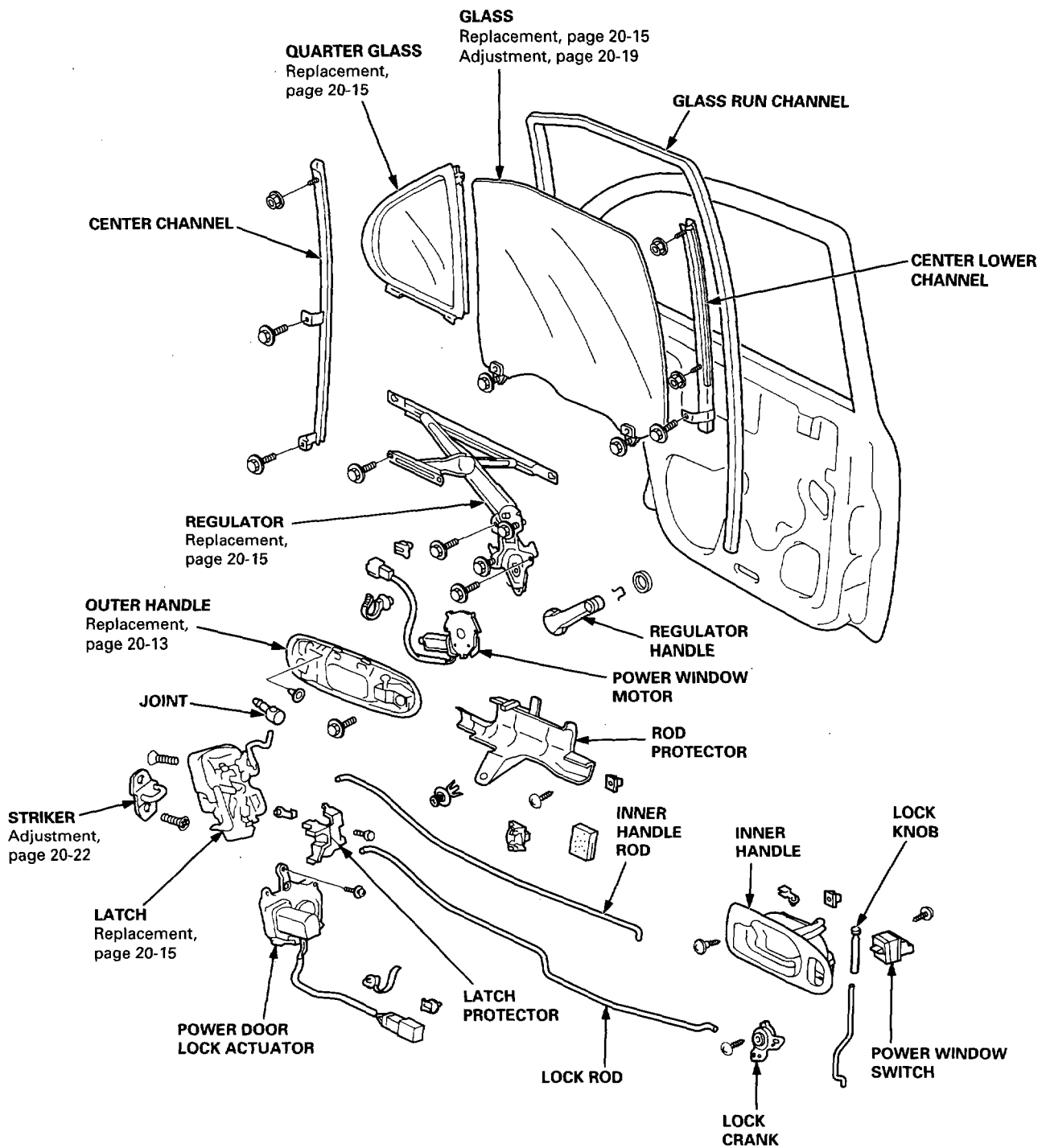
(cont'd)

# Doors

## Component Location Index (cont'd)

Rear Door:

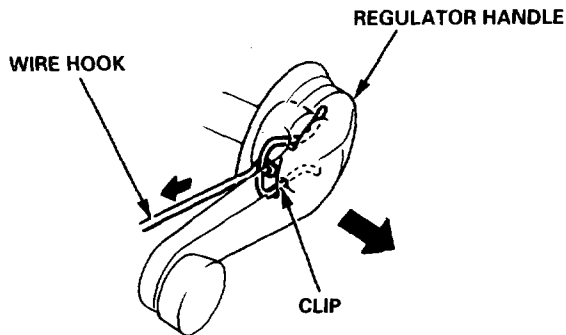




# Doors

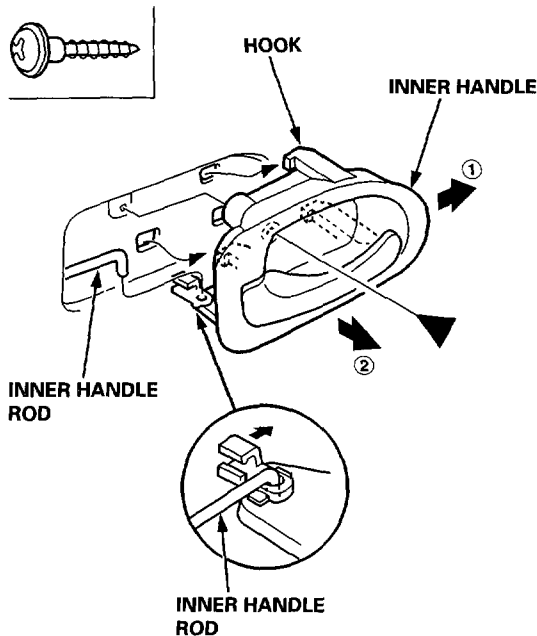
## Front Door Panel Removal and Installation

1. If applicable, remove the regulator handle by pulling the clip out with a wire hook.

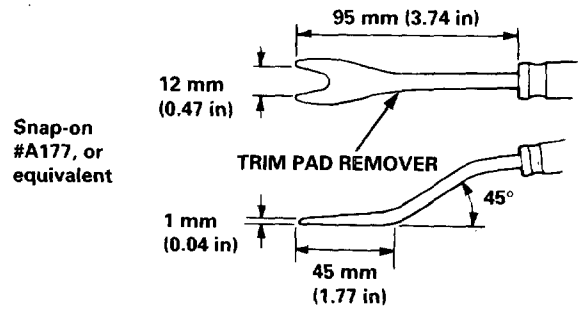


2. Remove the inner handle. Take care not to scratch the door panel.
  - 1. Remove the screw.
  - 2. Pull the inner handle forward and out half-way.
  - 3. Disconnect the inner handle rod.

►: Screw location, 1



3. Remove the screws from the armrest. Release the clips that hold the door panel with a trim pad remover (commercially available), then remove the door panel by pulling it upward. Remove the door panel with as little bending as possible to avoid creasing or breaking it.

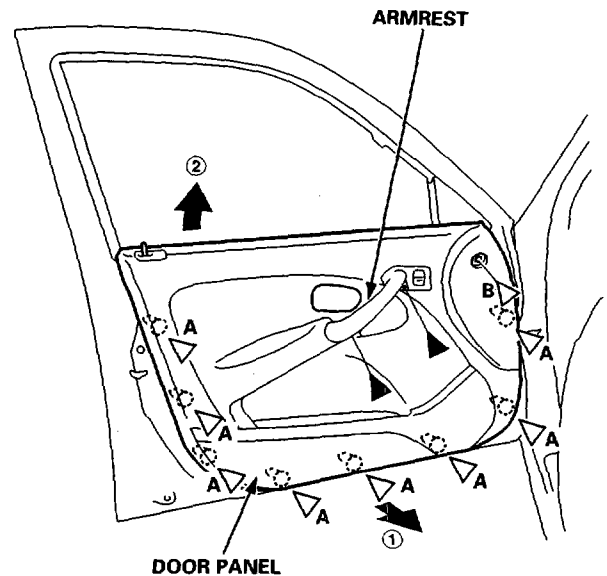
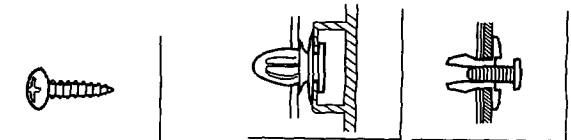


►: Screw locations, 2

▷: Clip locations

A ▷, 8

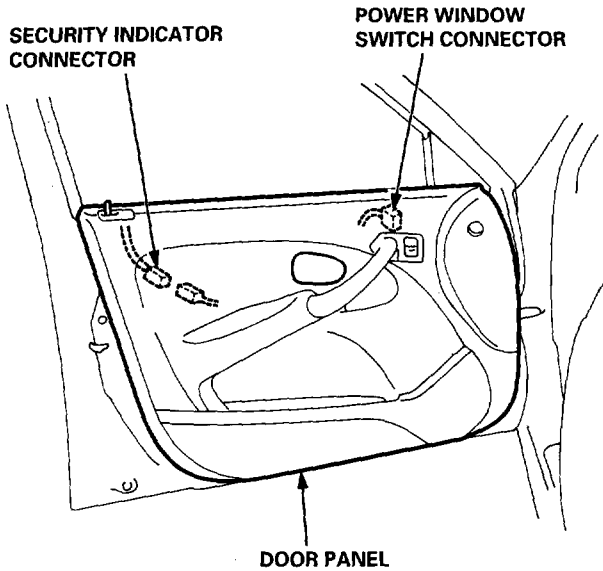
B ▷, 1



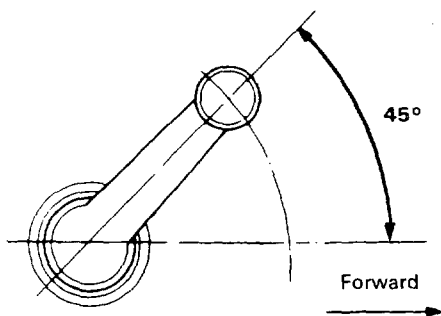


## Front Door Outer Handle Replacement

- If applicable, disconnect the power window switch connector and security indicator connector.



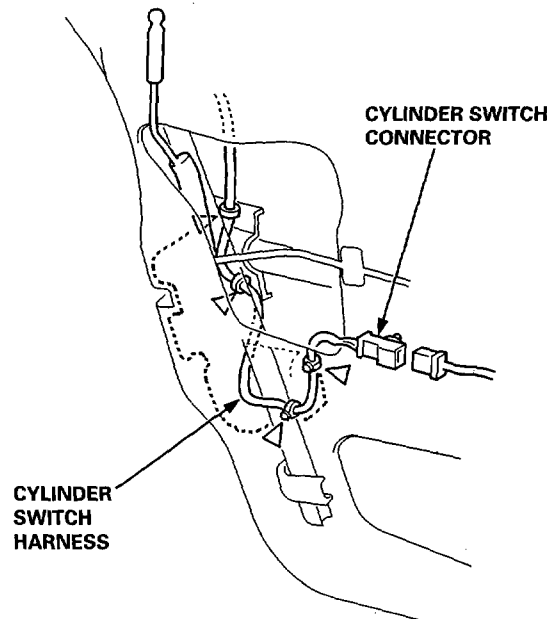
- Install in the reverse order of removal, and note these items:
  - Make sure the connectors are plugged in properly (if equipped), and the rod is connected properly.
  - If applicable, install the regulator handle so it points forward and up at a 45 degree angle with the glass fully closed.



**NOTE:** Wear gloves to protect your hands when removing and installing the outer handle.

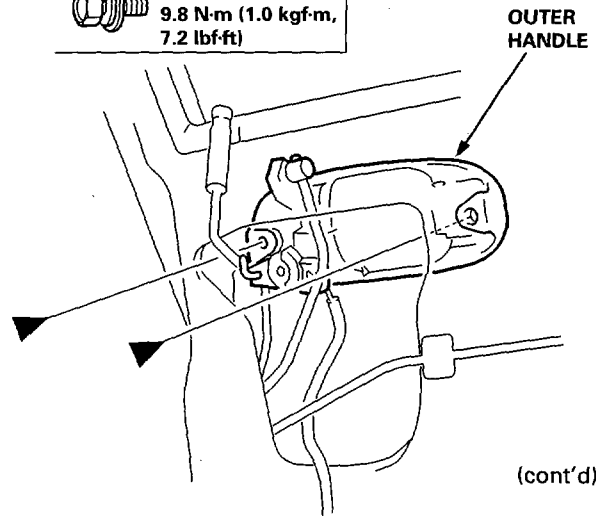
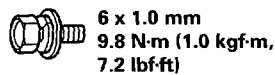
- Raise the glass fully.
- Remove:
  - Door panel
  - Plastic cover (as necessary, see page 20-2)
- If applicable, disconnect the cylinder switch connector, and detach the connector and harness clips.

▷: Harness clip locations



- Remove the bolts securing the outer handle.

▷: Bolt locations, 2



(cont'd)



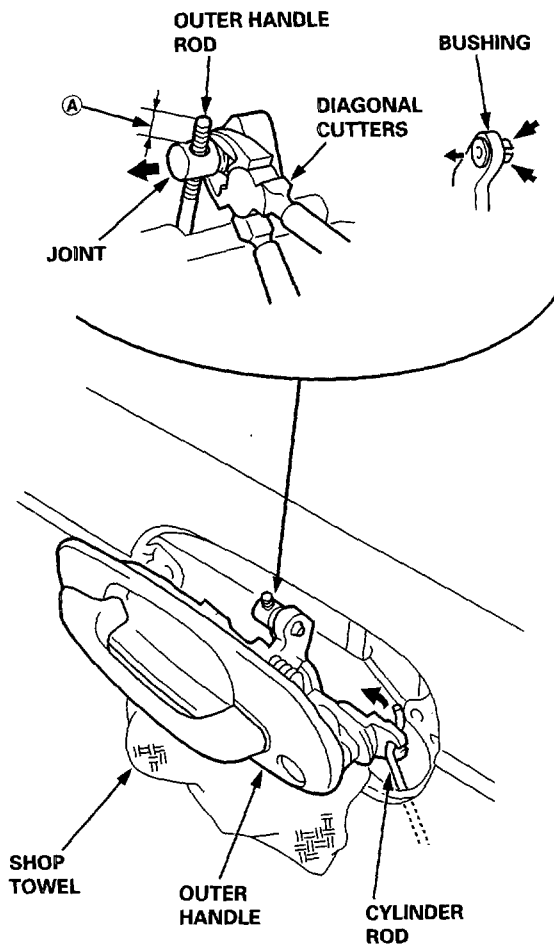
# Doors

## Front Door Outer Handle Replacement (cont'd)

5. Pull out the outer handle. Pry the outer handle rod out of its joint using diagonal cutters.

**NOTE:**

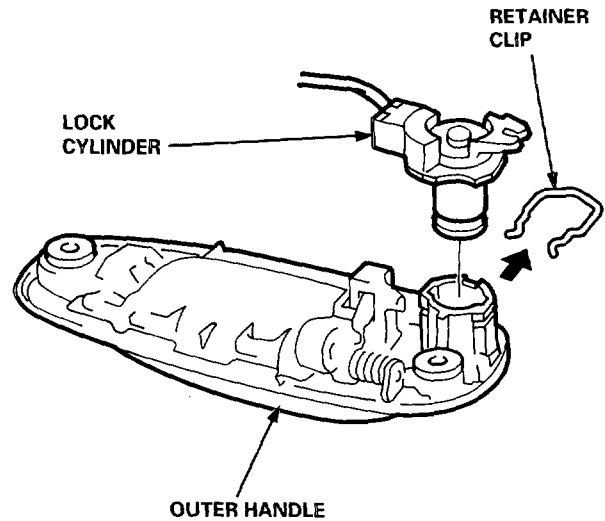
- To ease reassembly, note the distance (A) of the outer handle rod on the joint before disconnecting it.
- Take care not to bend the outer handle rod.
- Use a shop towel to protect the opening in the door.
- Take care not to damage the lock cylinder joint.



6. Disconnect the cylinder rod, then remove the outer handle from the door.

7. Replace the bushing on the outer handle.

8. Pull out the retainer clip, then remove the lock cylinder from the outer handle.



9. Install in the reverse order of removal, and note these items:

- Make sure the cylinder switch harness is routed properly (if equipped).
- Make sure the connector is plugged in properly, and each rod is connected securely.
- Make sure the door locks, and opens properly.

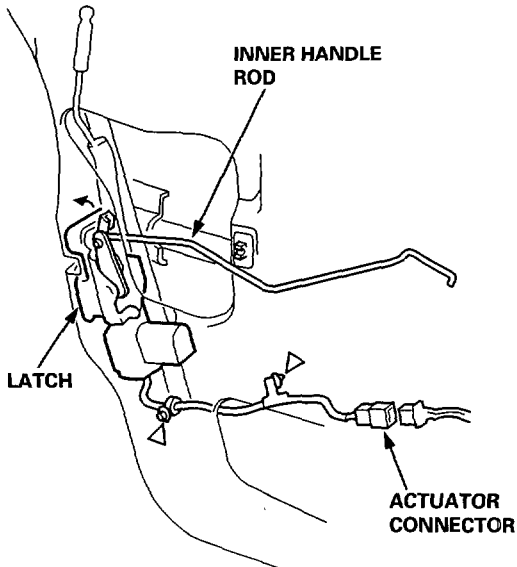


# Front Door Latch Replacement

NOTE: Wear gloves to protect your hands when removing and installing the latch.

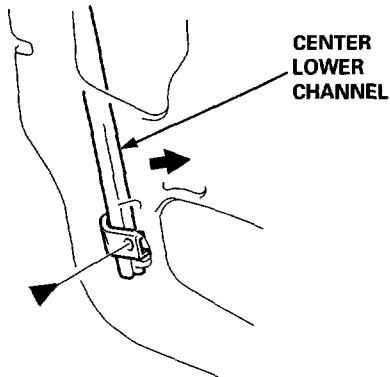
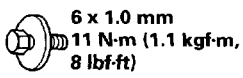
1. Raise the glass fully.
2. Remove:
  - Door panel (see page 20-6)
  - Plastic cover (as necessary, see page 20-2)
  - Outer handle (see page 20-7)
3. Disconnect the inner handle rod from the latch.

▷: Harness clip locations



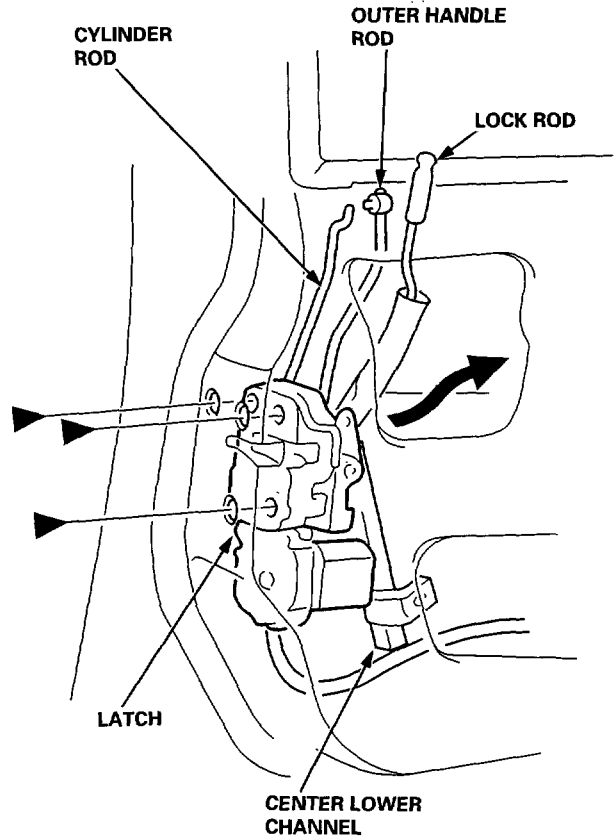
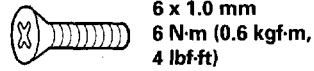
4. Disconnect the actuator connector, and detach the connector and harness clips from the door.
5. Remove the bolt, then move the center lower channel forward. Take care not to bend the center lower channel.

▷: Bolt location, 1



6. Remove the screws, then remove the latch through the hole in the door. Take care not to bend the outer handle rod, cylinder rod and lock rod.

▷: Screw locations, 3



7. Install in the reverse order of removal, and note these items:
  - Make sure the actuator connectors are plugged in properly, and each rod is connected securely.
  - Make sure the door locks and opens properly.

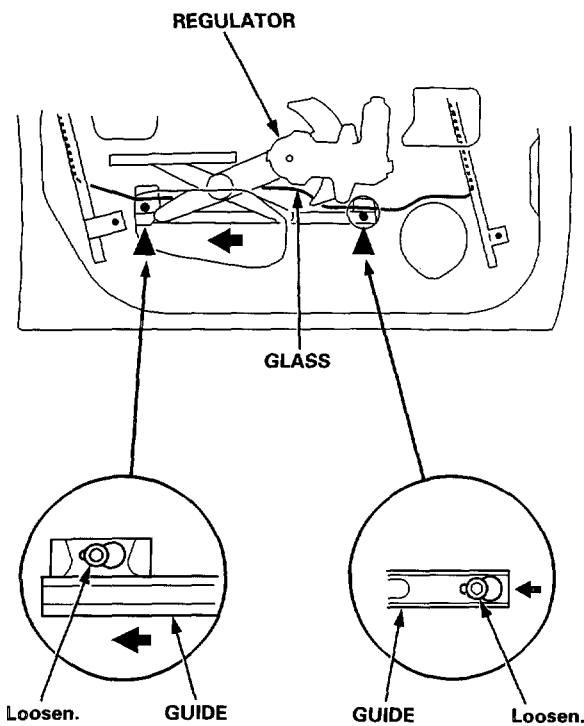
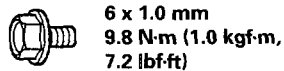
# Doors

## Front Door Glass and Regulator Replacement

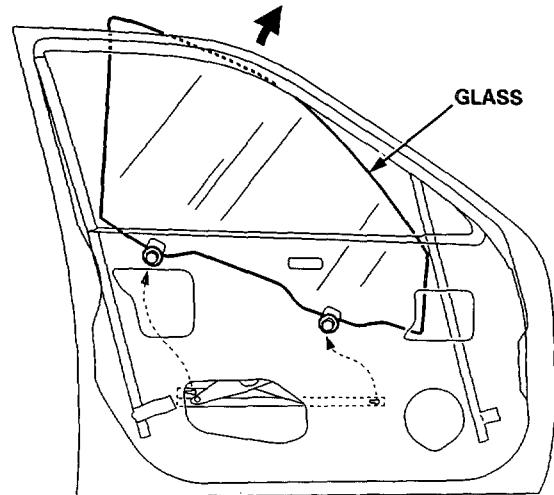
NOTE: Wear gloves to protect your hands when removing and installing the glass and regulator.

1. Remove:
  - Door panel (see page 20-6)
  - Plastic cover (see page 20-2)
2. Carefully move the glass until you can see the bolts, then loosen them. Slide the guide to the rear, then remove the glass from the guide.

►: Bolt locations, 2



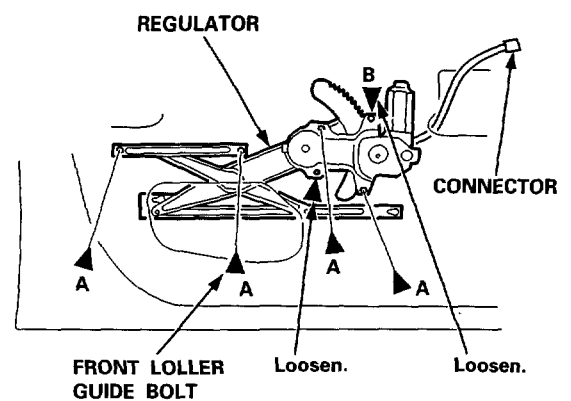
3. Carefully pull the glass out through the window slot. Take care not to drop the glass inside the door.



4. Disconnect the connector. Scribe a line around the front roller guide bolt to show the original adjustment. Remove and loosen the bolts, then remove the regulator through the hole in the door.

►: Bolt locations

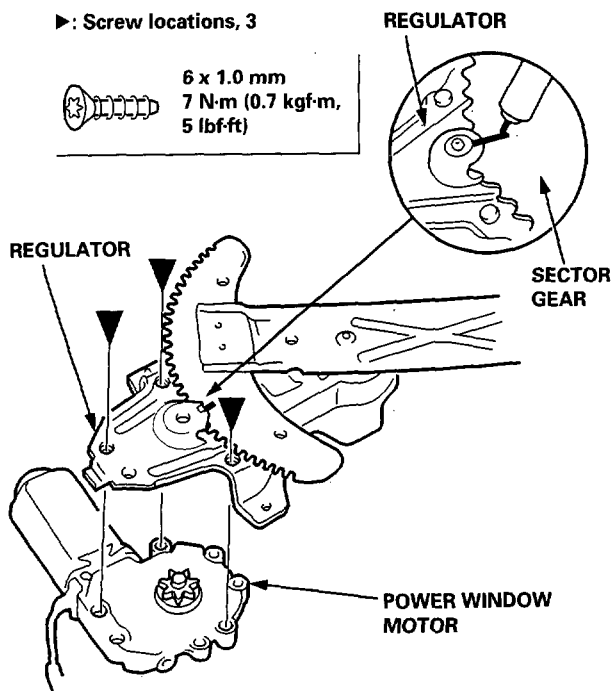
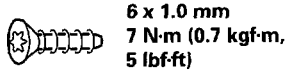
A ►, 4 B ►, 2





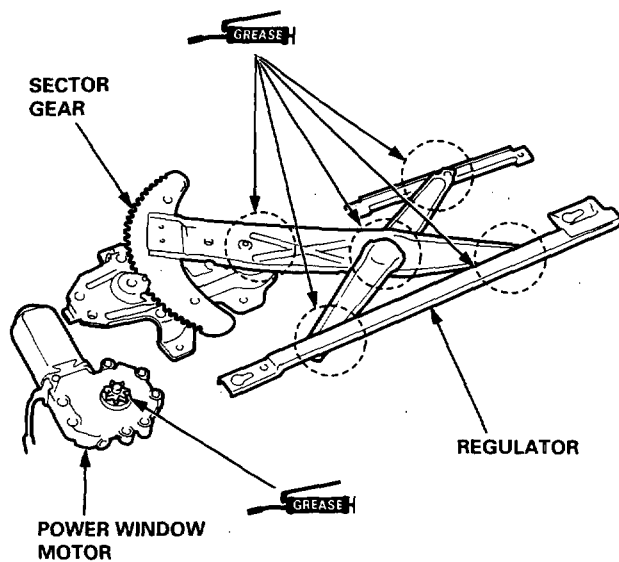
5. Scribe a line across the regulator and sector gear.

►: Screw locations, 3



6. With a Torx T20 bit, remove the screws, then separate the power window motor and regulator.

7. Grease the moving portions of the regulator and power window motor indicated by the arrows.



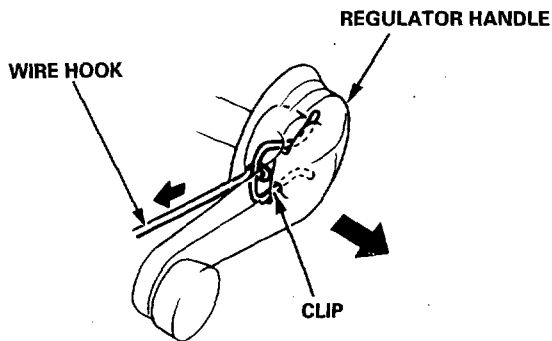
8. Install in the reverse order of removal, and note these items:

- Roll the glass up and down to see if it moves freely without binding.
- Make sure that there is no clearance between the glass and glass run channel when the glass is closed.
- Adjust the position of the glass as necessary (see page 20-19).

# Doors

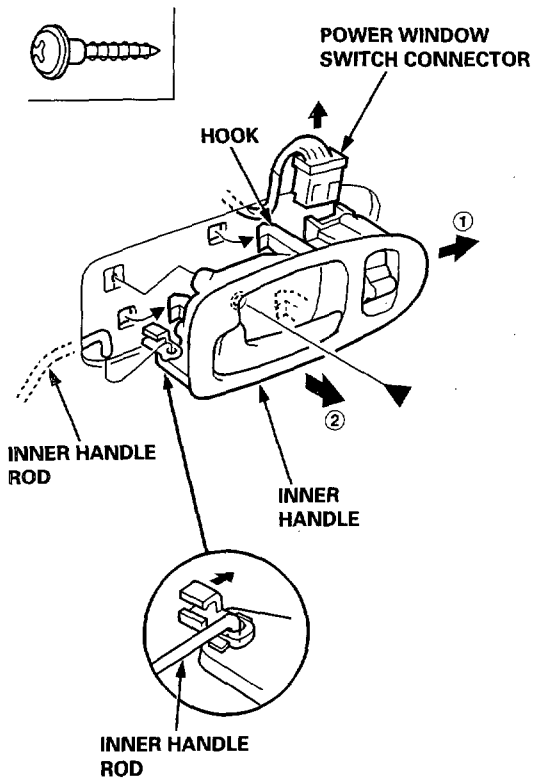
## Rear Door Panel Removal and Installation

1. If applicable, remove the regulator handle by pulling the clip out a wire hook.

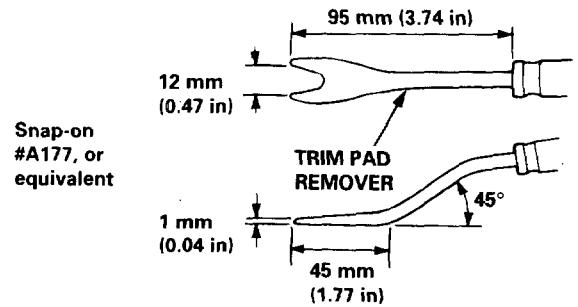


2. Remove the inner handle. Take care not to scratch the door panel.
  - 1. Remove the screw.
  - 2. Move the inner handle forward and out half-way.
  - 3. Disconnect the inner handle rod and power window switch connector (if equipped).

►: Screw location, 1

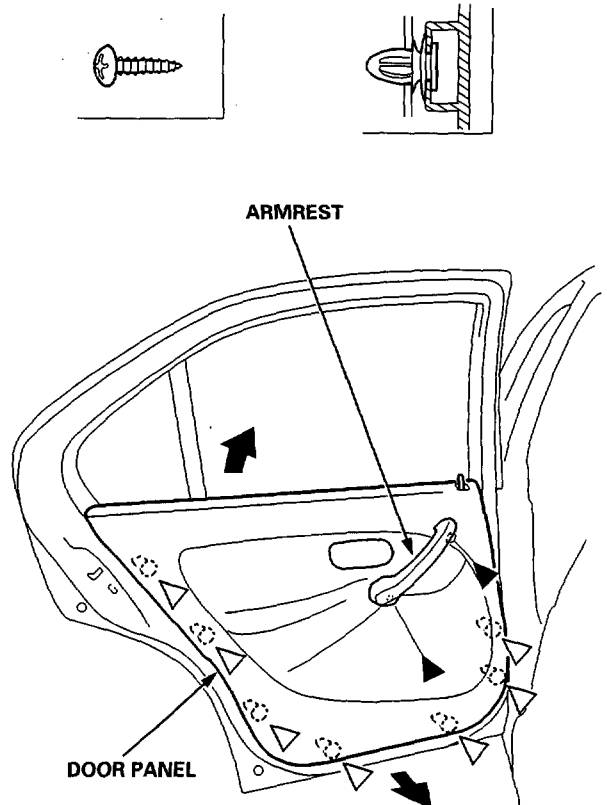


3. Remove the screws from the armrest. Release the clips that hold the door panel with a trim pad remover (commercially available), then remove the door panel by pulling it upward. Remove the door panel with as little bending as possible to avoid creasing or breaking it.



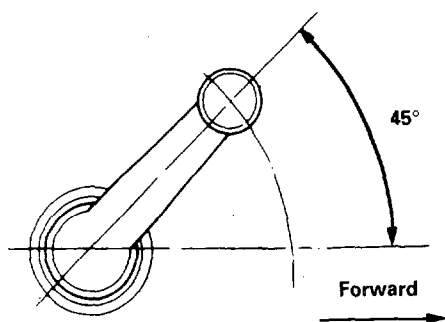
►: Screw locations, 2

▷: Clip locations, 7





4. Install in the reverse order of removal, and note these items:
- Make sure the rod is connected properly.
  - If applicable, install the regulator handle so it points forward and up at a 45 degree angle with the glass fully closed.

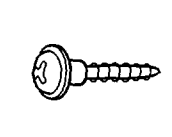


## Rear Door Outer Handle Replacement

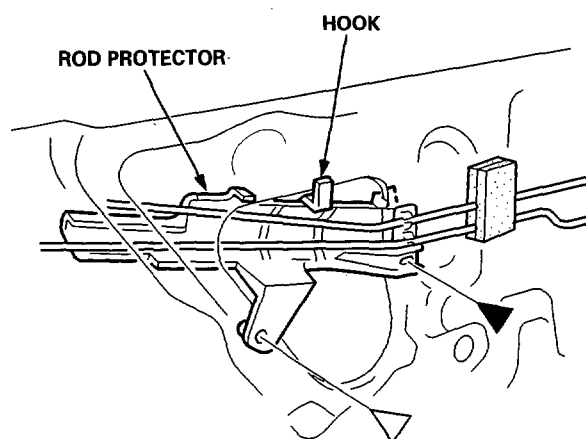
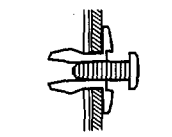
NOTE: Wear gloves to protect your hands when removing and installing the outer handle.

1. Raise the glass fully.
2. Remove:
  - Door panel
  - Plastic cover (as necessary, see page 20-4)
3. Remove the screw, and clip then remove the rod protector.

►: Screw location, 1

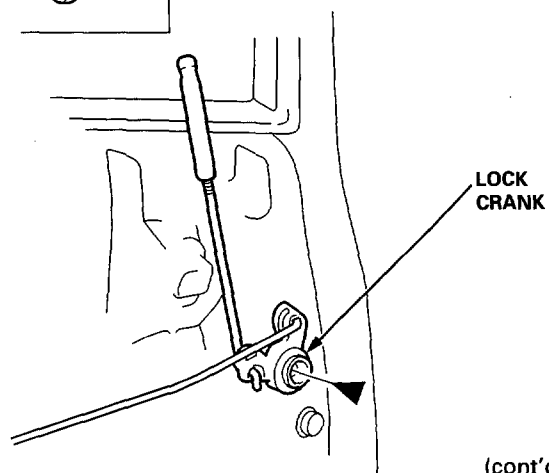
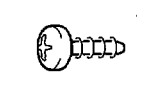


▷: Clip location, 1



4. Remove the screw, and detach the lock crank from the door.

►: Screw location, 1



(cont'd)

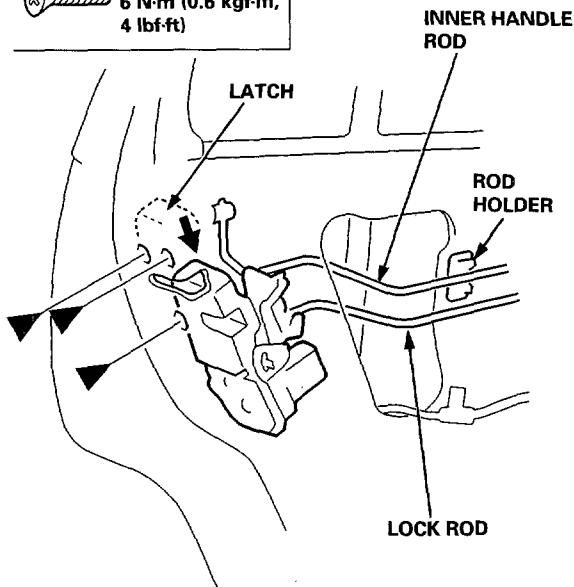
# Doors

## Rear Door Outer Handle Replacement (cont'd)

5. Detach the inner handle rod and lock rod from the rod holder.

►: Screw locations, 3

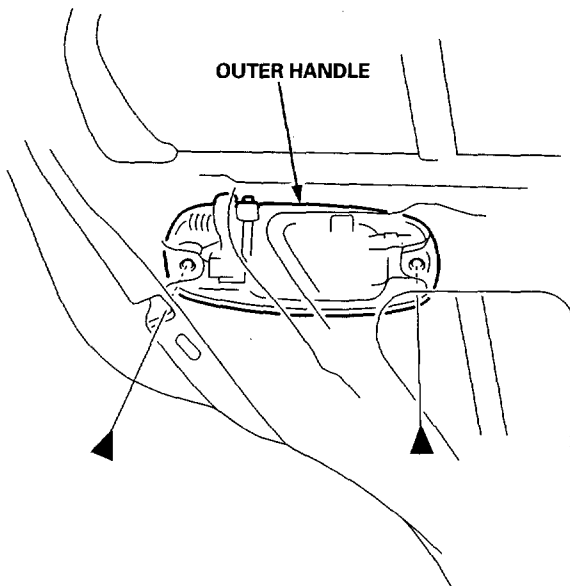
6 x 1.0 mm  
6 N·m (0.6 kgf·m,  
4 lbf·ft)



6. Remove the screws, then move the latch down.  
7. Remove the bolts securing the outer handle.

►: Bolt locations, 2

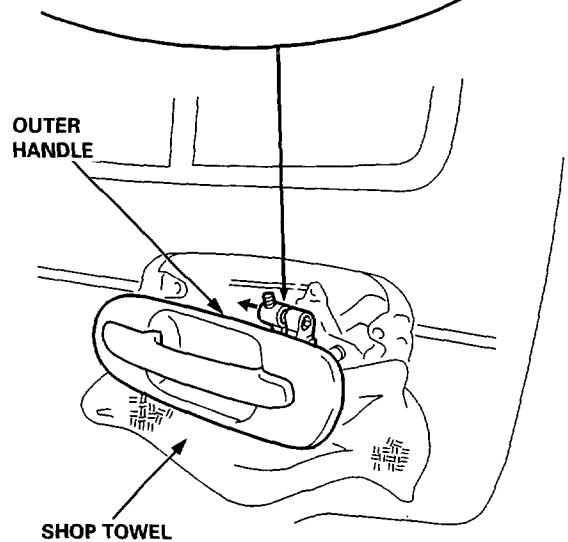
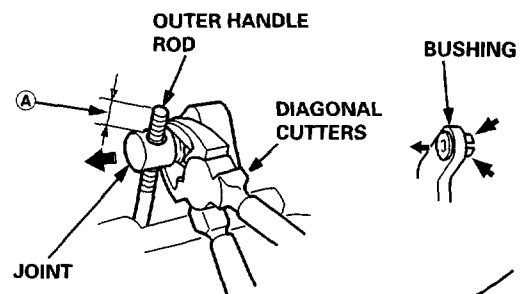
6 x 1.0 mm  
9.8 N·m (1.0 kgf·m,  
7.2 lbf·ft)



8. Pull out the outer handle. Pry the outer handle rod out of its joint using diagonal cutters.

NOTE:

- To ease reassembly, note the distance (A) of the outer handle rod on the joint before disconnecting it.
- Take care not to bend the outer handle rod.
- Use a shop towel to protect the opening in the door.



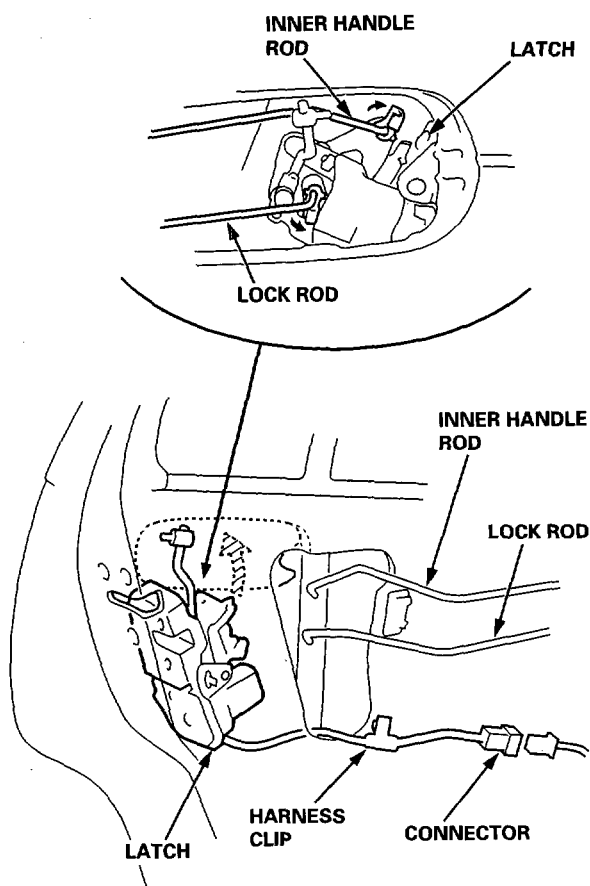
9. Replace the bushing on the outer handle.  
10. Install in the reverse order of removal, and note these items:
- Make sure the outer handle rod is connected securely.
  - Make sure the door locks and opens properly.



## Rear Door Latch Replacement

**NOTE:** Wear gloves to protect your hands when removing and installing the latch.

1. Raise the glass fully.
2. Remove:
  - Door panel (see page 20-12)
  - Plastic cover (as necessary, see page 20-4)
  - Outer handle (see page 20-13)
3. Disconnect the inner handle rod and lock rod from the latch, then remove them.



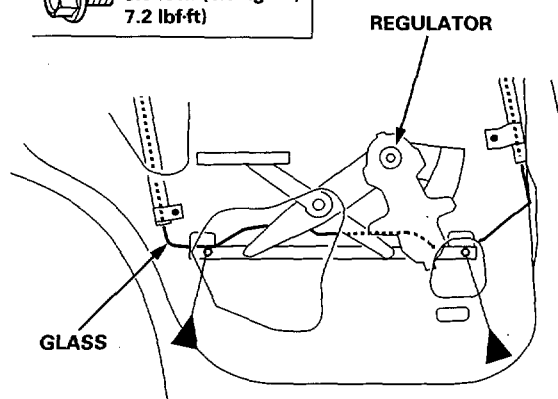
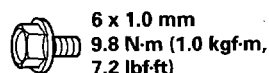
4. Disconnect the connector, and detach the connector and harness clip from the door.
5. With a shop towel to protect the outer handle opening, remove the latch through the outer handle opening.
6. Install in the reverse order of removal, and note these items:
  - Make sure the connectors are plugged in properly, and each rod is connected securely.
  - Make sure the door locks and opens properly.

## Rear Door Glass, Quarter Glass and Regulator Replacement

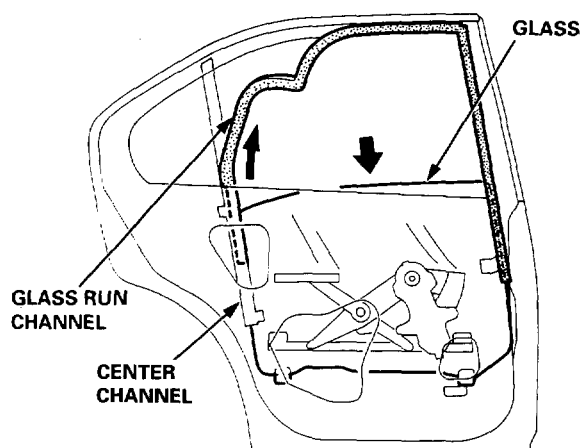
**NOTE:** Wear gloves to protect your hands when removing and installing the glass, quarter glass and regulator.

1. Remove:
  - Door panel (see page 20-12)
  - Plastic cover (see page 20-4)
  - Rod Protector (see page 20-13)
2. Carefully move the glass until you can see the bolts, then remove them. Take care not to drop the glass inside the door.

►: Bolt locations, 2



3. Carefully lower the glass, then pull the glass run channel out of the center channel. Take care not to drop the glass inside the door.



(cont'd)



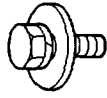
# Doors

## Rear Door Glass, Quarter Glass and Regulator Replacement (cont'd)

4. Remove the bolts, and loosen the nut securing the center channel.

▶: Bolt locations, 2

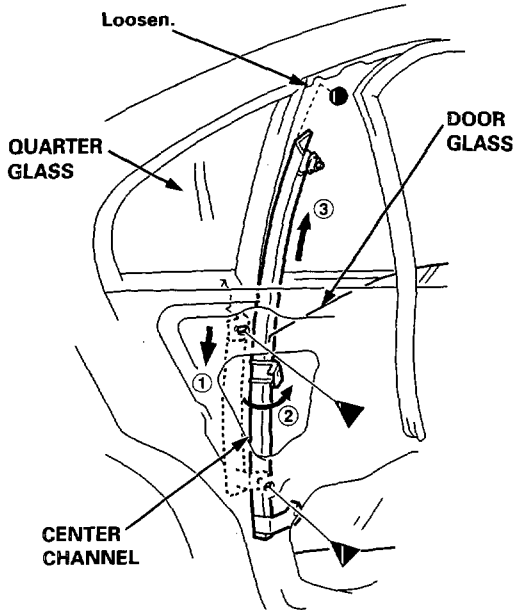
●: Nut location, 1



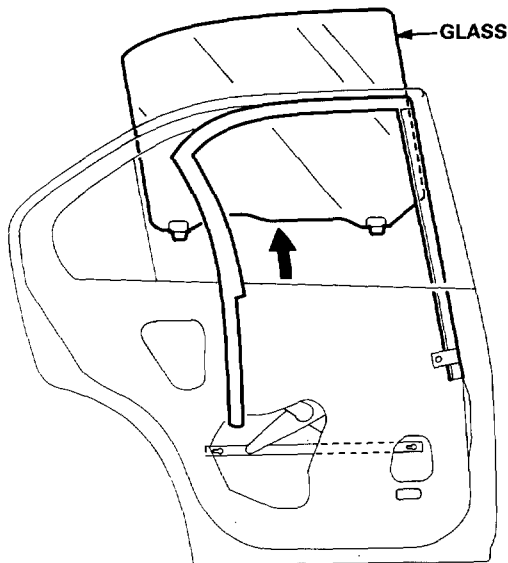
6 x 1.0 mm  
8 N·m (0.8 kgf·m,  
6 lbf·ft)



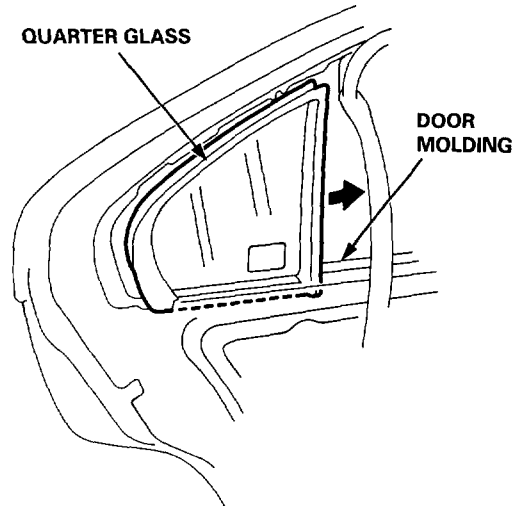
5 x 0.8 mm  
4 N·m (0.4 kgf·m,  
3 lbf·ft)



5. Move the center channel away from the quarter glass and the door glass, then carefully remove the center channel out through the window slot.
6. Carefully remove the glass out through the window slot. Take care not to drop the glass inside the door.



7. Remove the quarter glass. Take care not to damage the door molding.



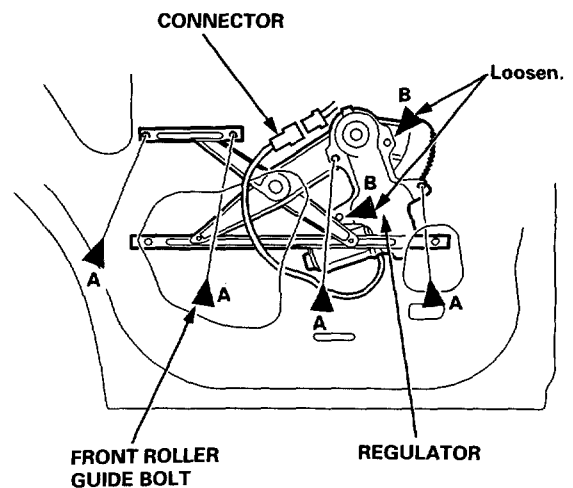
8. Disconnect and detach the connector from the door. Scribe a line around the front roller guide bolt to show the original adjustment. Remove and loosen the bolts, then remove the regulator through the hole in the door.

▶: Bolt locations

A ▶, 4      B ▶, 2



6 x 1.0 mm  
8 N·m (0.8 kgf·m,  
6 lbf·ft)

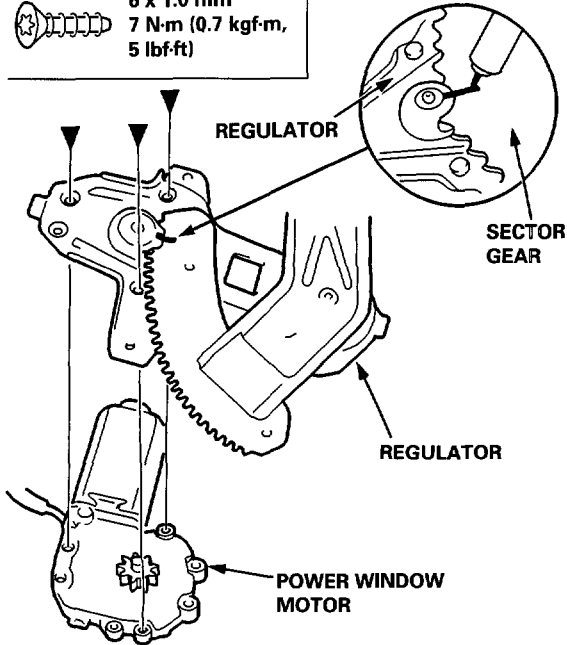




9. Scribe a line across the regulator and sector gear.

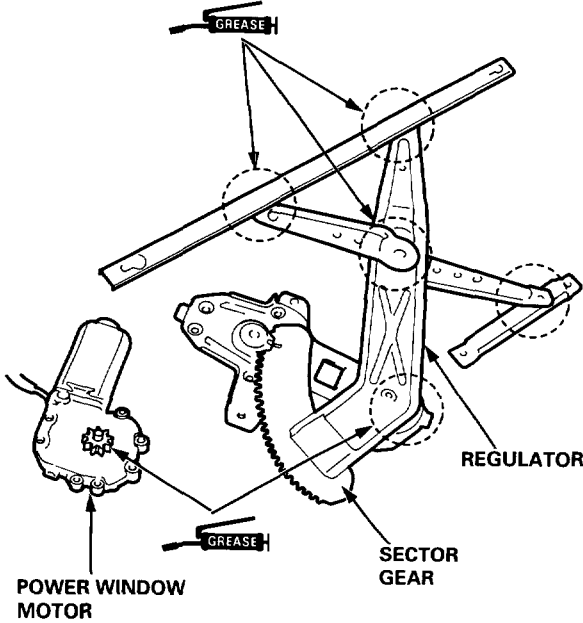
►: Screw locations, 3

6 x 1.0 mm  
7 N·m (0.7 kgf·m,  
5 lbf·ft)



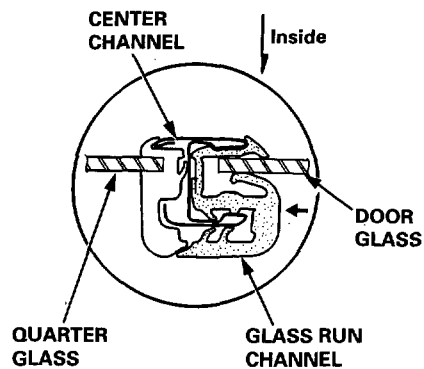
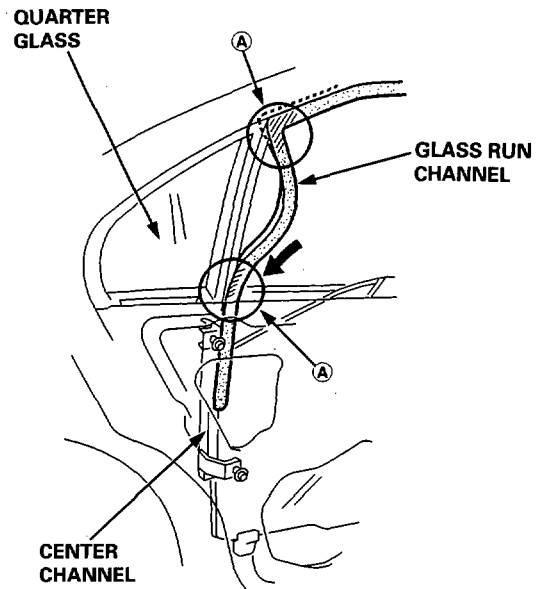
10. With a Torx T20 bit, remove the screws, then separate the power window motor and regulator.

11. Grease the moving portions of the regulator and power window motor indicated by the arrows.



12. Install in the reverse order of removal, and note these items:

- After installing the quarter glass, door glass and center channel, fit the glass run channel into the center channel properly. Apply clear sealant (Cemedine #8500, or equivalent) to (A) portions on the center channel.
- Roll the glass up and down to see if it moves freely without binding.
- Make sure that there is no clearance between the glass and glass run channel when the glass is closed.
- Adjust the position of the glass as necessary (see page 20-19).



# Doors

## Rear Door Sticker Replacement

**For some models:**

Apply the sticker where shown.

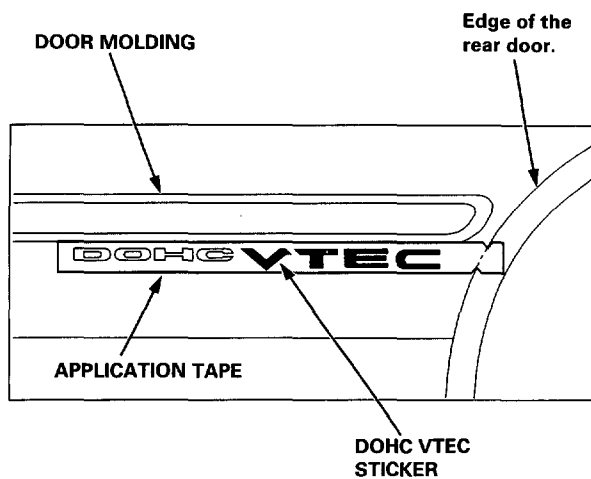
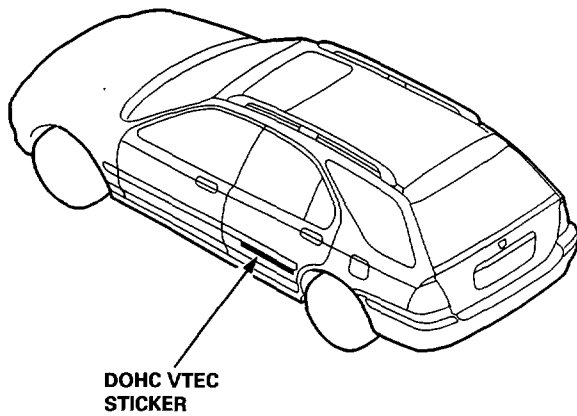
Align the application tape with the edge of the door and door molding, as shown, then press the sticker into place.

Remove the application tape.

**NOTE:**

- Before applying, clean the door surface with a sponge dampened in alcohol.
- After cleaning, keep oil, grease and water from getting on the surface.
- Make sure there are no wrinkles in the sticker.

**Attachment Point (Reference):**



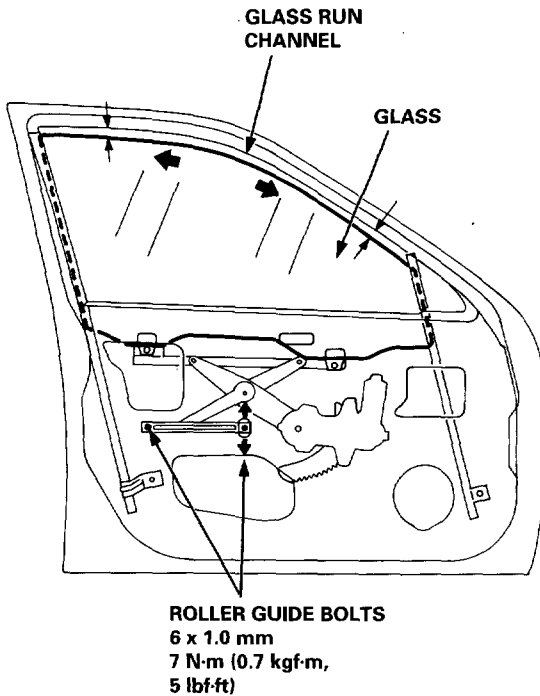


## Front and Rear Door Glass Adjustment

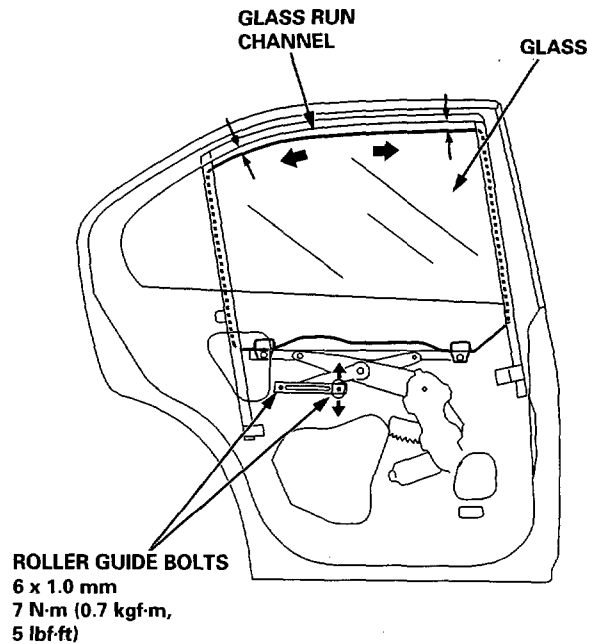
**NOTE:** Check the weatherstrips and glass run channel for damage or deterioration, and replace them if necessary.

- 1 Place the vehicle on a firm, level surface.
- 2 Remove:
  - Door panel (see pages 20-6, 12)
  - Plastic cover (see pages 20-2, 4)
- 3 Raise the glass up as far as possible, and hold it against the glass run channel.

### Front door:

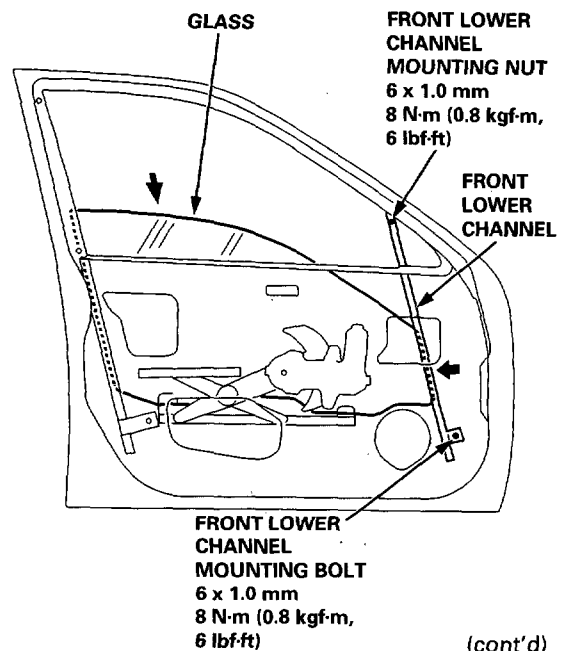


### Rear door:



4. Loosen the roller guide bolts, and adjust the glass so it is parallel with the glass run channel.
5. Tighten the roller guide bolts.
6. Loosen the channel mounting bolt and nut(s), then lower the glass.

### Front door:



(cont'd)

# Doors

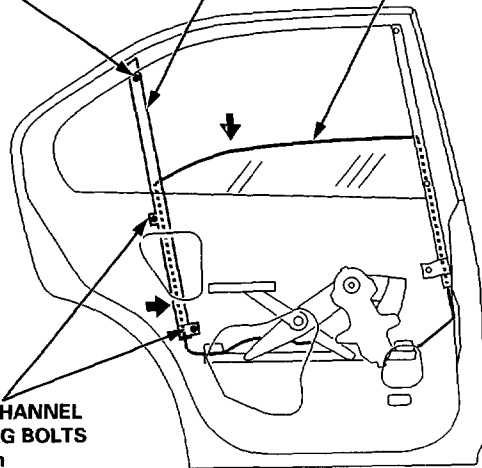
## Front and Rear Door Glass Adjustment (cont'd)

Rear door:

**CENTER CHANNEL MOUNTING NUT**  
5 x 0.8 mm  
4 N·m (0.4 kgf·m,  
3 lbf·ft)

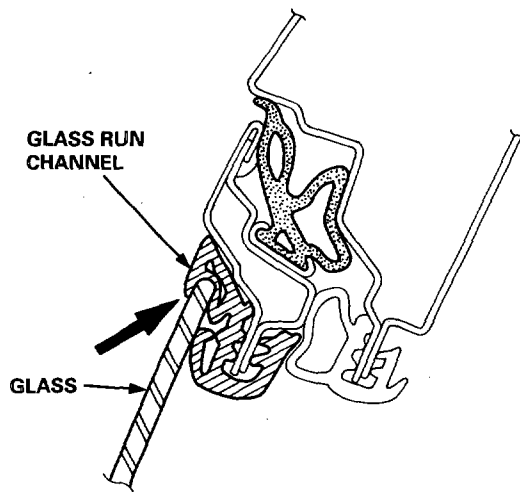
**CENTER CHANNEL**

**GLASS**



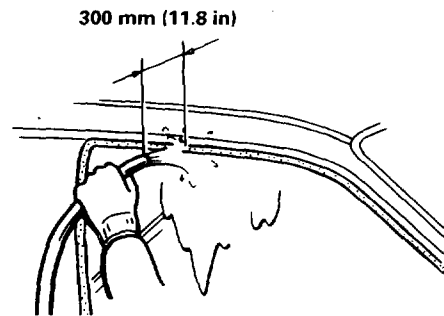
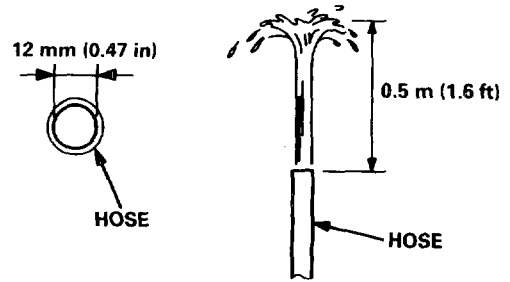
**CENTER CHANNEL MOUNTING BOLTS**  
6 x 1.0 mm  
8 N·m (0.8 kgf·m,  
6 lbf·ft)

7. Push the channel against the glass while you tighten the mounting bolt and nut(s).
8. Check that the glass moves smoothly.
9. Raise the glass fully, and check for gaps. Check that the glass contacts the glass run channel evenly.



10. Check for water leaks. Spray water over the roof and on the sealing area as shown, and note these items:

- Adjust the water pressure as shown.
- Do not squeeze the tip of the hose.



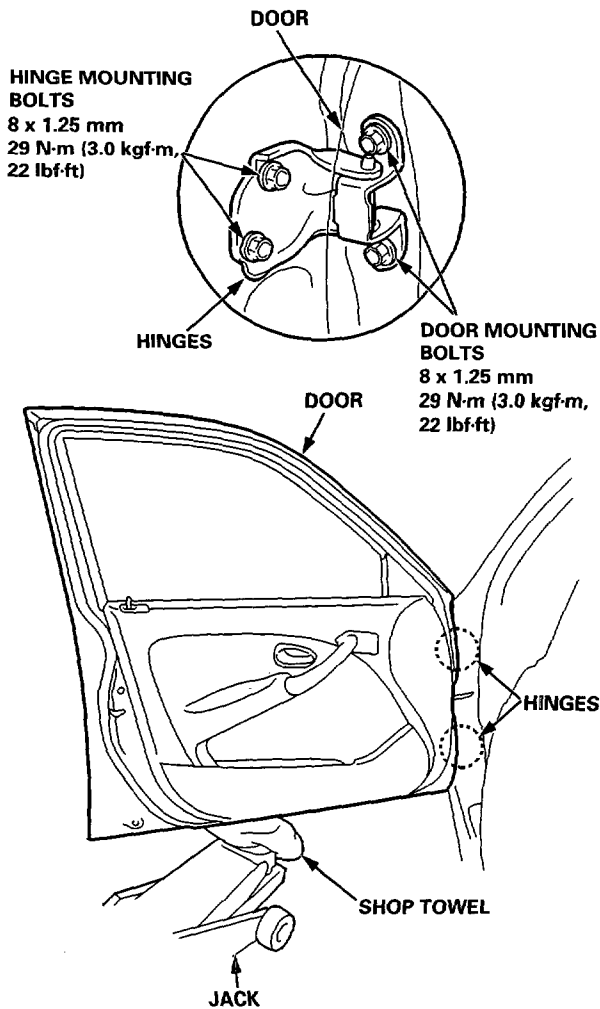
11. Attach the plastic cover, and install the door panel (see pages 20-6, 12).



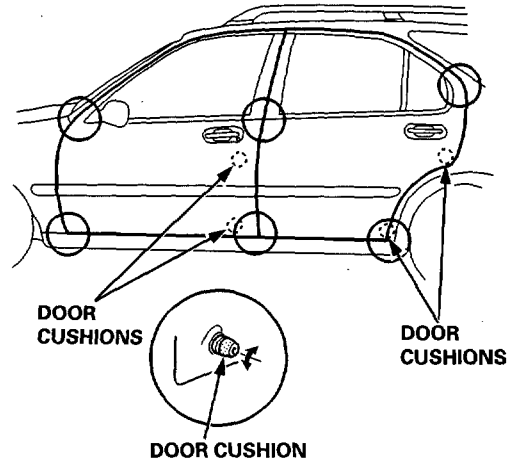
## Front and Rear Door Position Adjustment

**NOTE:** After installing the door, check for a flush fit with the body, then check for equal gaps between the front, rear, and bottom door edges and the body. Check that the door and body edges are parallel. Before adjusting, replace the mounting bolts.

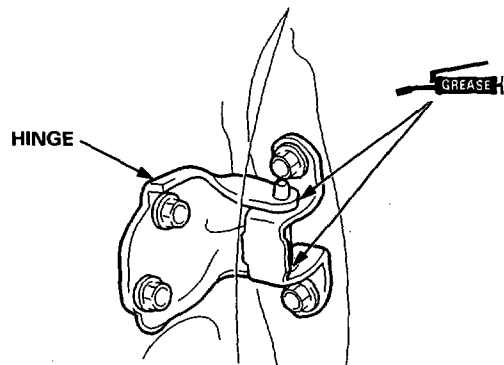
1. Place the vehicle on a firm, level surface when adjusting the doors.
2. Adjust at the hinges:
  - Loosen the door mounting bolts slightly, and move the door IN or OUT until it's flush with the body.
  - Remove the inner fender (see page 20-111), loosen the hinge mounting bolts slightly, and move the door BACKWARD or FORWARD, UP or DOWN as necessary to equalize the gaps.
  - Place a shop towel on the jack to prevent damage to the door when adjusting the door.



3. Check that the door and body edges should be parallel. If necessary, adjust the door cushions.



4. Grease the pivot portions of the hinges indicated by the arrows.



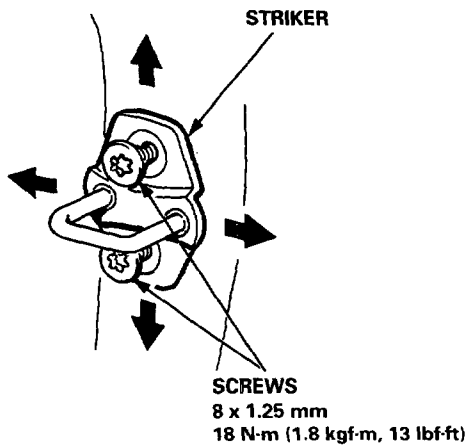
5. Check for water leaks. Do not squeeze the tip of the hose.

# Doors

## Front and Rear Door Striker Adjustment

Make sure the door latches securely without slamming. If it needs adjustment:

1. Draw a line around the striker for reference.
2. With a Torx T40 bit, loosen the screws, and move the striker IN or OUT to make the latch fit tighter or looser. Move the striker UP or DOWN to align it with the latch opening. Then lightly tighten the screws and recheck.

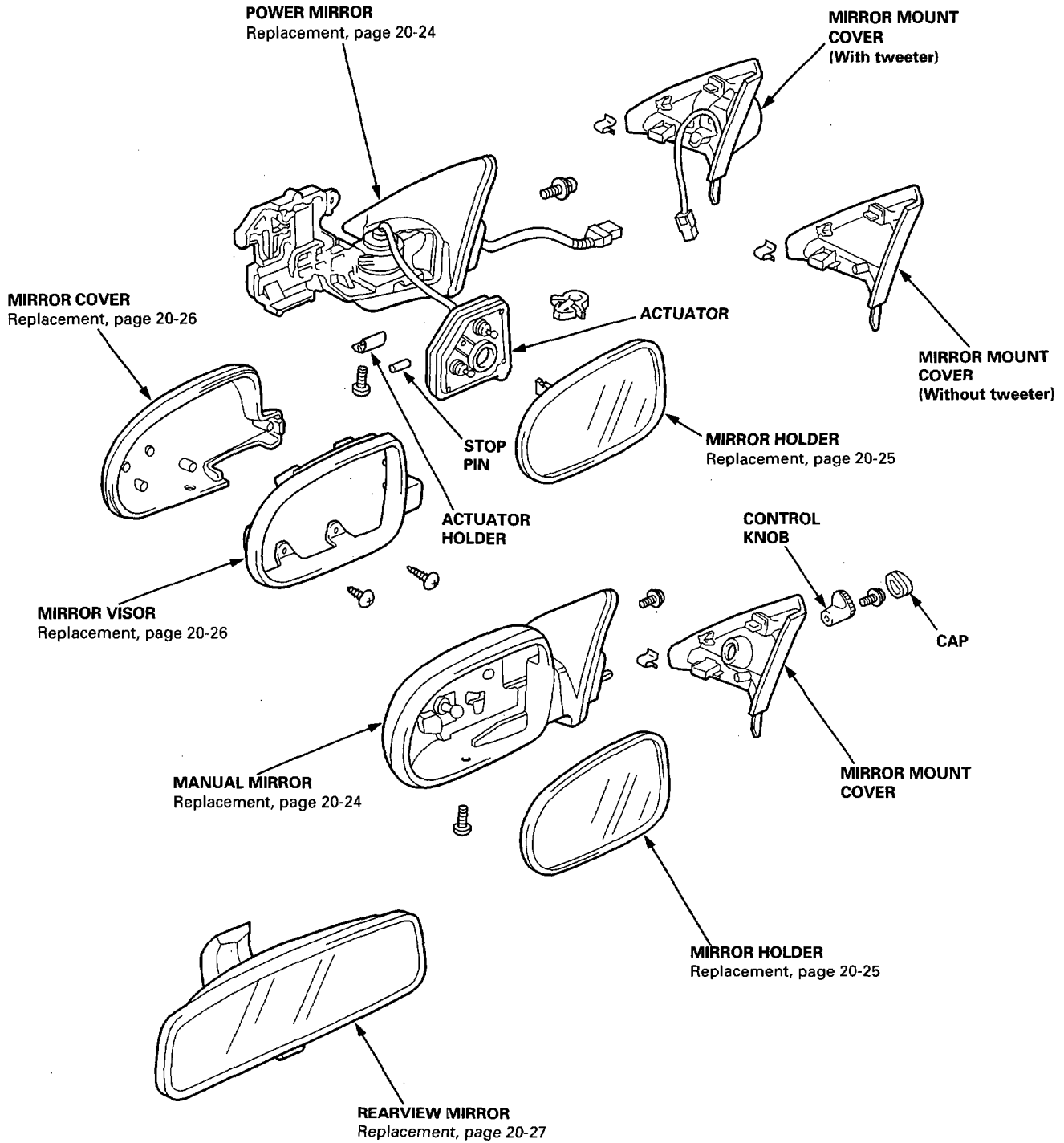


3. Hold the outer handle out, and push the door against the body to be sure the striker allows a flush fit. If the door latches properly, tighten the screws and recheck.



## Component Location Index

Refer to section 23 for the power mirror actuator replacement.



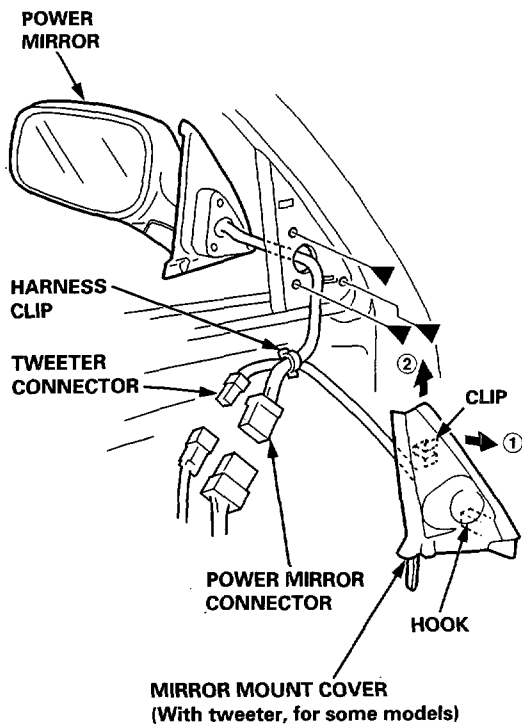
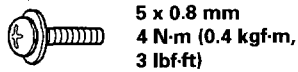


# Mirrors

## Power Mirror Replacement

1. Lower the door glass fully.
2. Remove the front door panel (see page 20-6).
3. Wrap a flat-tip screwdriver with protective tape, and apply protective tape around the related parts, to prevent damage. Carefully pry out the mirror mount cover.

►: Screw locations, 3



4. Detach the harness clip. Disconnect the power mirror connector, and if applicable, disconnect the tweeter connector.
5. Remove the screws, then remove the power mirror while holding it. Take care not to scratch the door.
6. Install in the reverse order of removal, and make sure the connector(s) is plugged in properly.

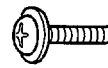
## Manual Mirror Replacement

1. Lower the door glass fully.
2. Remove the front door panel (see page 20-6).
3. Remove the cap and screw, then remove the control knob.

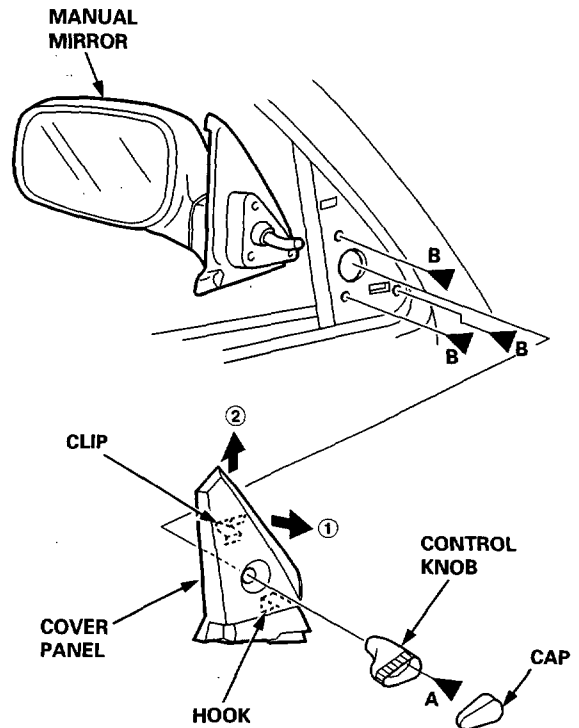
►: Screw locations

A ►, 1

B ►, 3



5 x 0.8 mm  
4 N-m (0.4 kgf-m,  
3 lbf-ft)



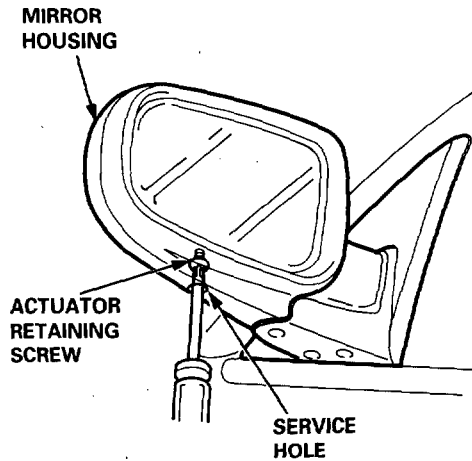
4. Wrap a flat-tip screwdriver with protective tape, and apply protective tape around the related parts, to prevent damage. Carefully pry out the mirror mount cover.
5. Remove the screws, then remove the manual mirror while holding it. Take care not to scratch the door.
6. Install in the reverse order of removal.



# Mirror Holder Replacement

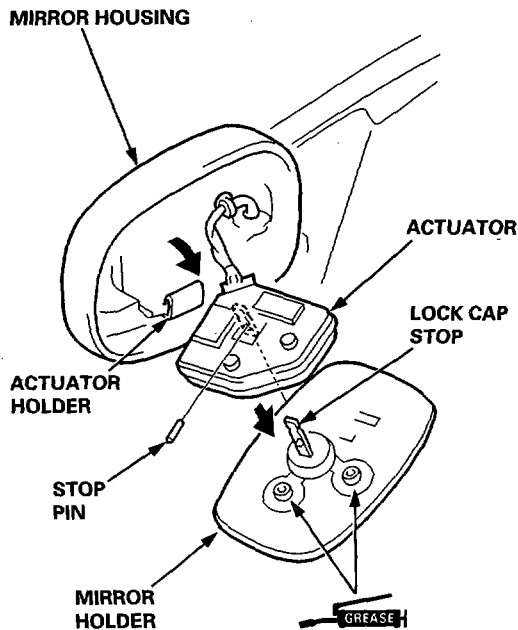
## Power mirror (except heated type):

1. Insert a screwdriver in the mirror housing through the service hole, and loosen the actuator retaining screw.



2. Pull out the mirror holder from the mirror housing.
3. Pull the lock cap stop, and remove the stop pin, then separate the actuator and mirror holder.

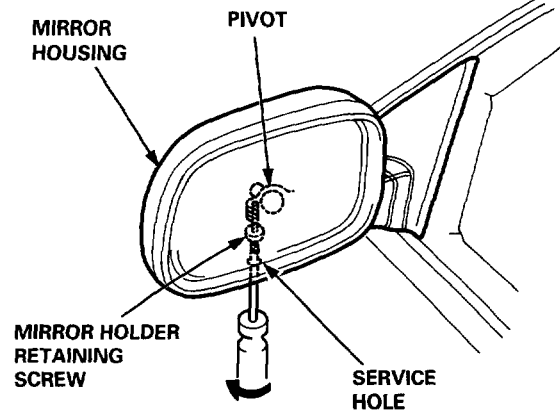
NOTE: If the mirror is equipped with a defogger, you cannot separate the actuator and mirror holder.



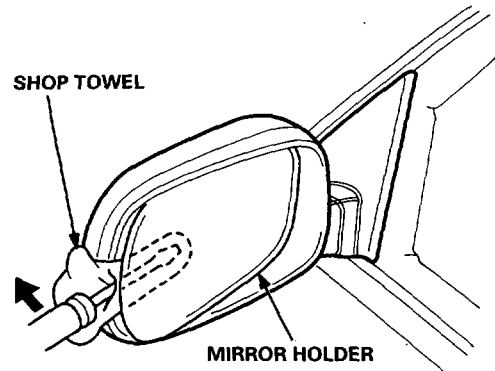
4. Install in the reverse order of removal, and apply grease to the locations indicated by the arrows.

## Manual mirror:

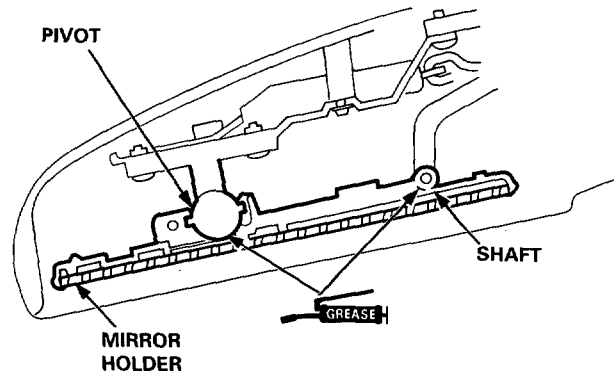
1. Insert a screwdriver in the mirror housing through the service hole, and loosen the mirror holder retaining screw.



2. Wrap a flat-tip screwdriver with shop towel to prevent damage. Carefully pry out the mirror holder with a flat-tip screwdriver as shown.



3. Install in the reverse order of removal, and apply grease to the location indicated by the arrows.



# Mirrors

## Mirror Visor and Mirror Cover Replacement

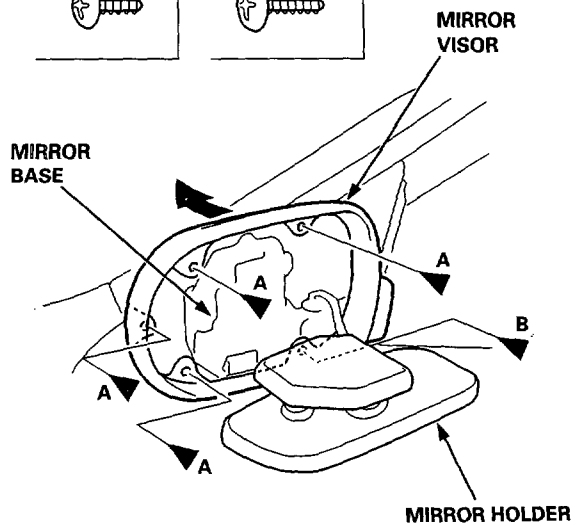
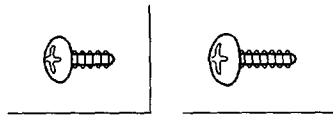
**Power mirror:**

1. Remove the mirror holder (see page 20-25).
2. Turn the mirror base forward, then remove the screws securing the mirror visor.

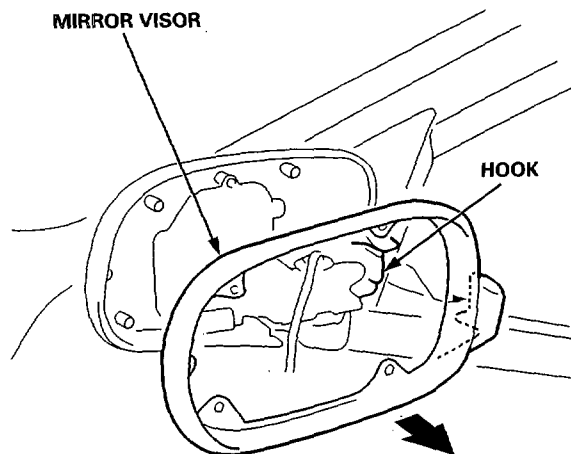
►: Screw locations

A ►, 4

B ►, 1



3. Detach the hook, then remove the mirror visor.

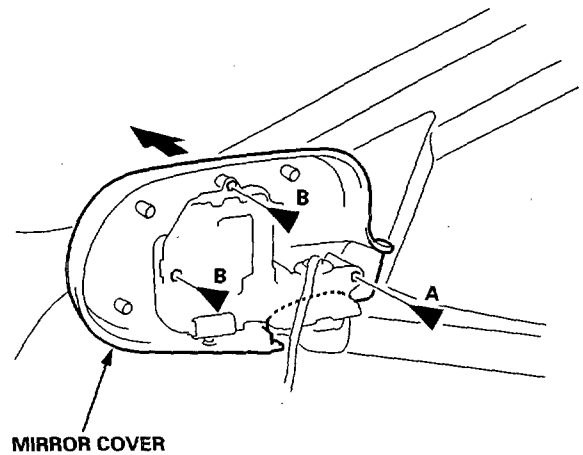
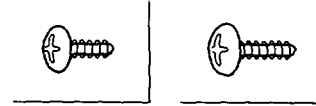


4. Remove the screws, then remove the mirror cover.

►: Screw locations

A ►, 1

B ►, 2

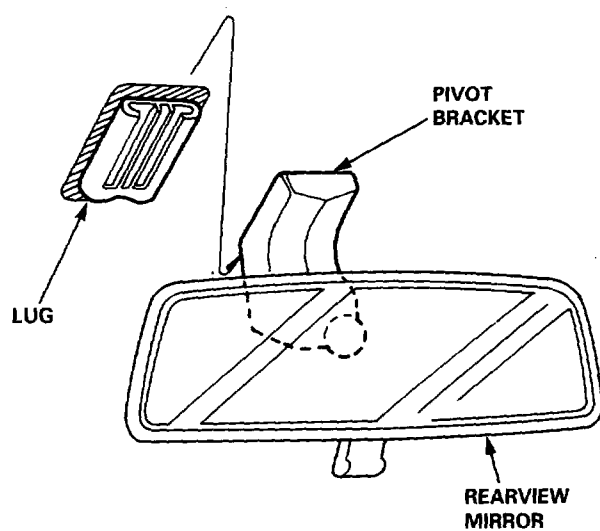


5. Install in the reverse order of removal.



## Rearview Mirror Replacement

1. Slide the pivot bracket up toward the upper of the windshield, then remove the rearview mirror from the lug. Take care not to scratch the pivot bracket.

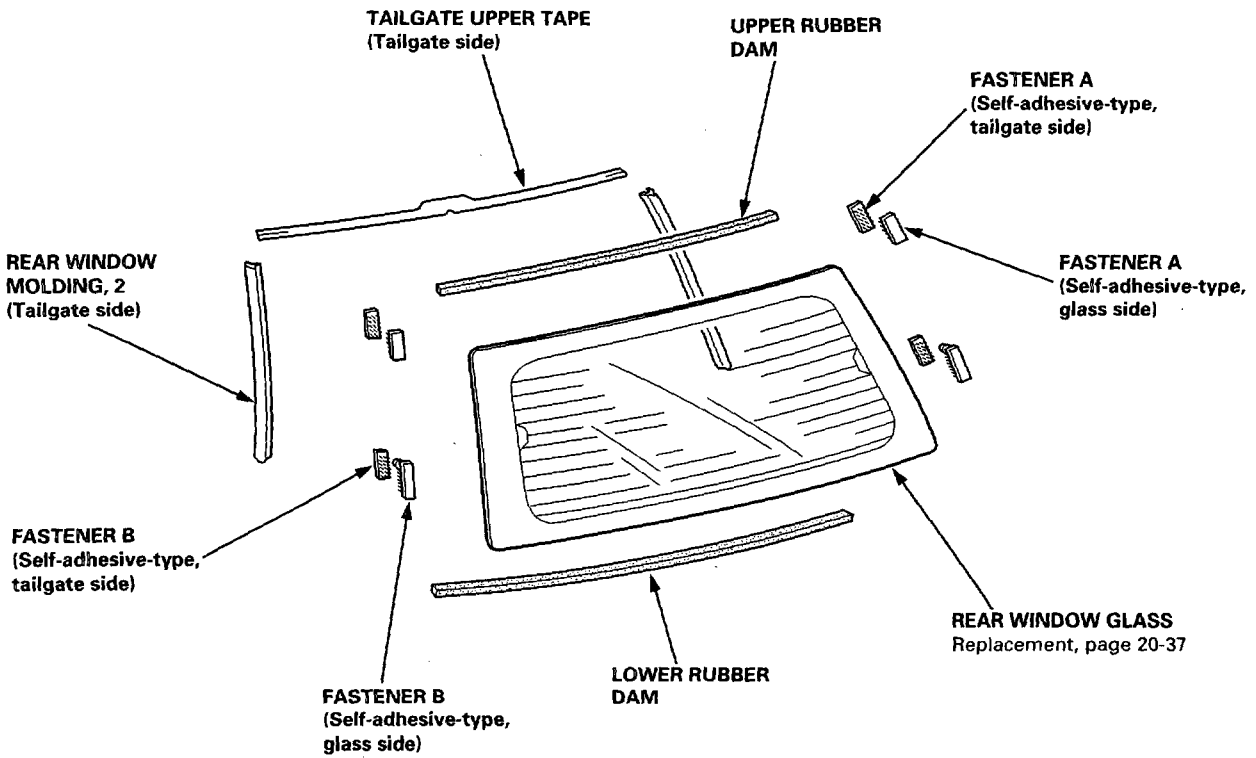
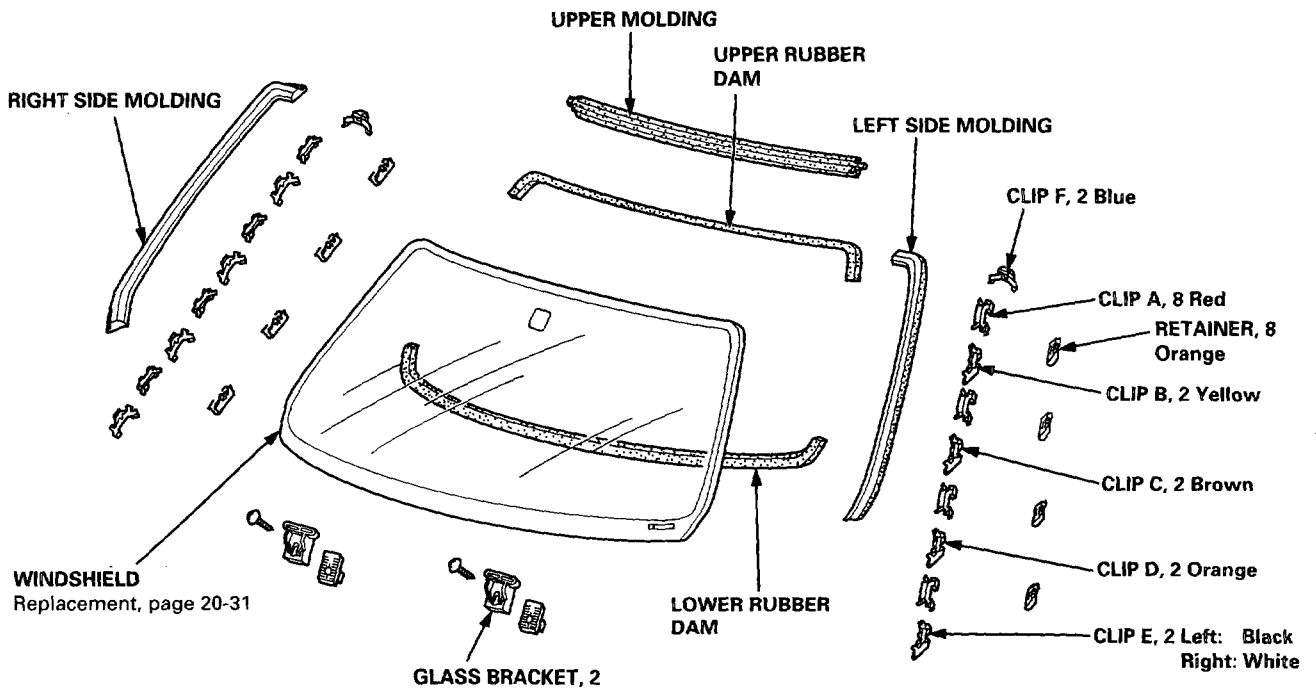


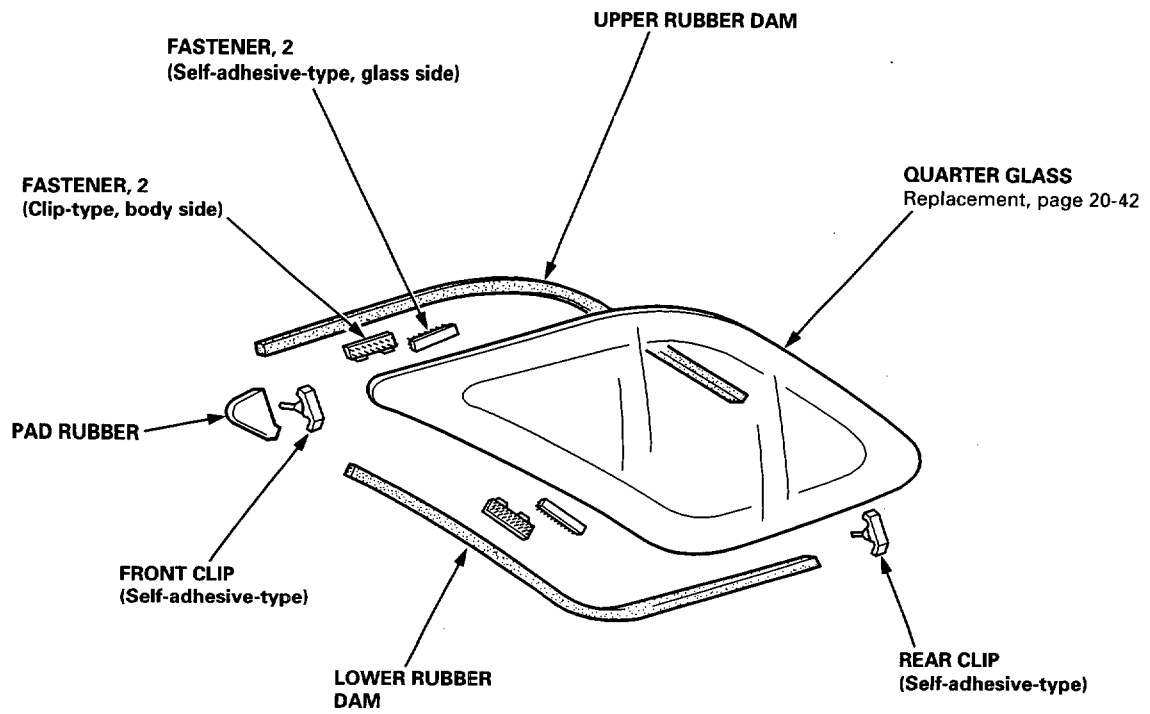
2. Install in the reverse order of removal.

# Glass

## Component Location Index

The numbers after the part names show the quantities of the parts used.





# Glass

## Parts/Tools

### Parts:

Part Number	Contents	Comment
Adhesive kit — Low temperature 08718 – 99960	Adhesive sealant 500 g (17.6 oz)	
	Hardener 75 g (2.6 oz)	
Adhesive kit — High temperature 08718 – 99961	Glass primer 20 g (0.7 oz)	
	Body primer 20 g (0.7 oz)	
	Piano wire Length: 1 m (3 ft), Diameter: 0.6 mm (0.02 in)	
	Gauze	For adhesive
	Cartridge	For applying primers
	Sponge	

### NOTE:

- 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 six months have elapsed since date of manufacture.
- Store adhesive in a cool, dry place.
- Open only immediately before you are going to use it.

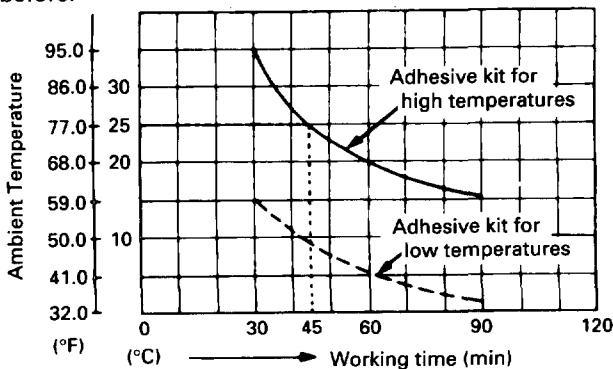
### Tools:

Tool/Material	Remarks
Glass or steel plate	To mix adhesive and hardener on
Putty knife	To mix adhesive and remove excess
Caulking gun	To apply adhesive to windshield
Suction cups	To install windshield
Knife	To scrape bonding surface around window opening
Awl	To make hole through existing adhesive for piano wire
Two wood sticks	To hold piano wire
Toluene or alcohol	To clean bonding surfaces

### 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.

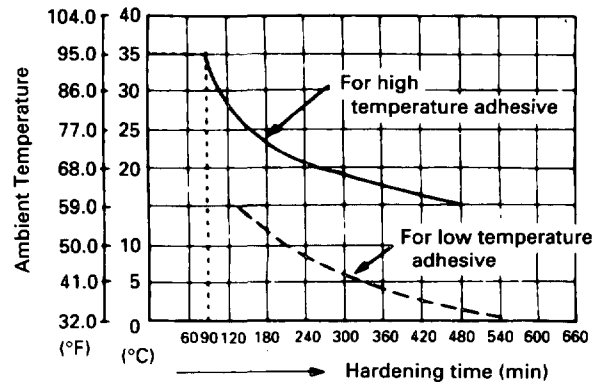
For example, when the ambient temperature is 25°C (77°F), the glass should be installed within 45 minutes using the high temperature type adhesive. Kit part numbers and contents are listed on the page before.



### 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.





## Windshield Replacement

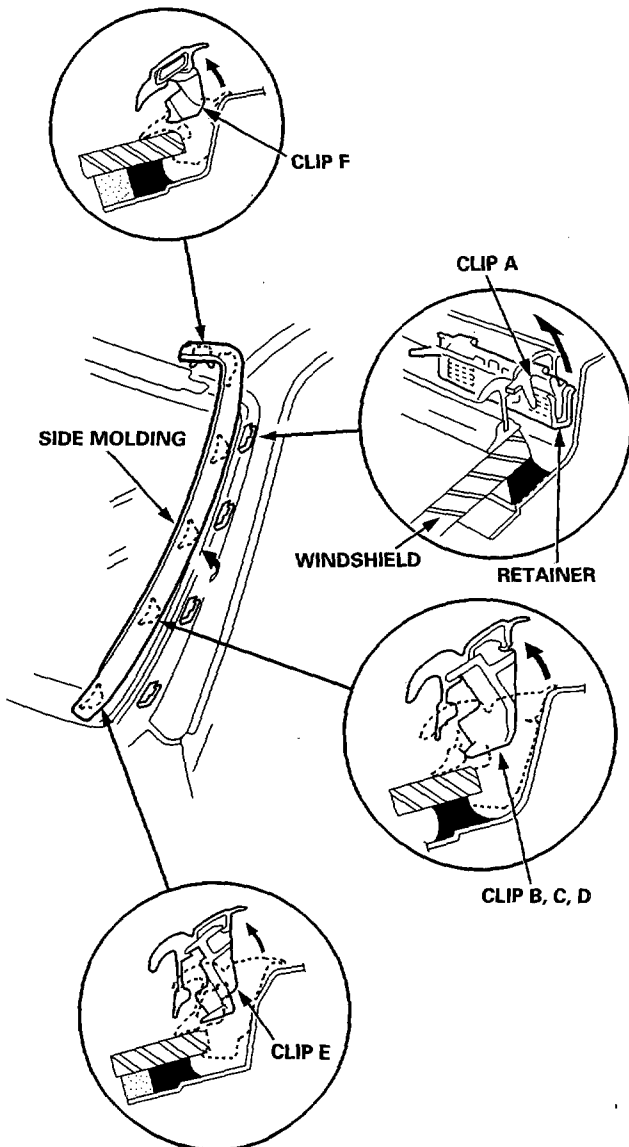
### NOTE:

- Wear gloves to remove and install the windshield.
- Use seat covers to avoid damaging any surfaces.

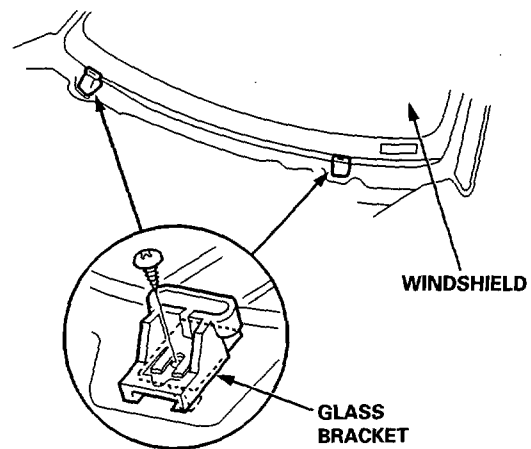
### 1. Remove:

- Front door trim (both sides as necessary, see page 20-61)
- Front pillar trim (see page 20-61)
- Rearview mirror (see page 20-27)
- Sunvisors and holders (both sides, see page 20-65)
- Grab handle (see page 20-65)
- Ceiling light (see section 23)
- Windshield wiper arms and cowl cover (see section 23)

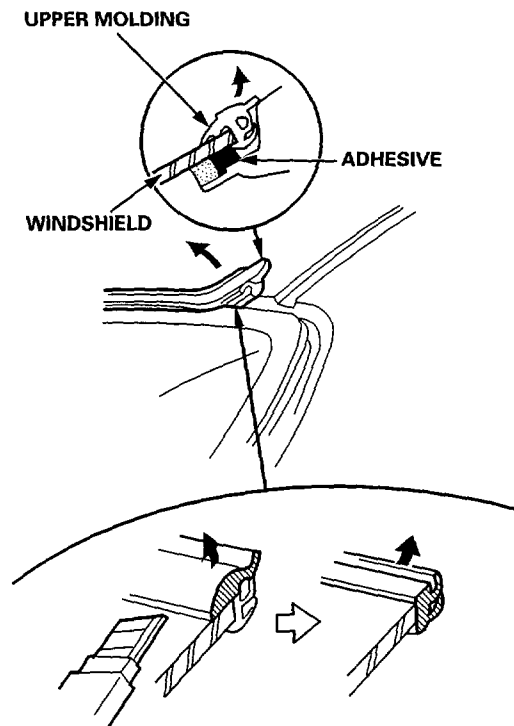
### 2. Detach the clips from the retainers, then remove both side moldings.



### 3. Remove the right and left glass brackets.



### 4. Remove the upper molding from the upper edge of the windshield. If necessary, cut the upper molding with a utility knife.



### 5. Remove the other retainers from the body.

### 6. Pull down the front portion of the headliner (see page 20-65). Take care not to bend the headliner excessively, or you may crease or break it.

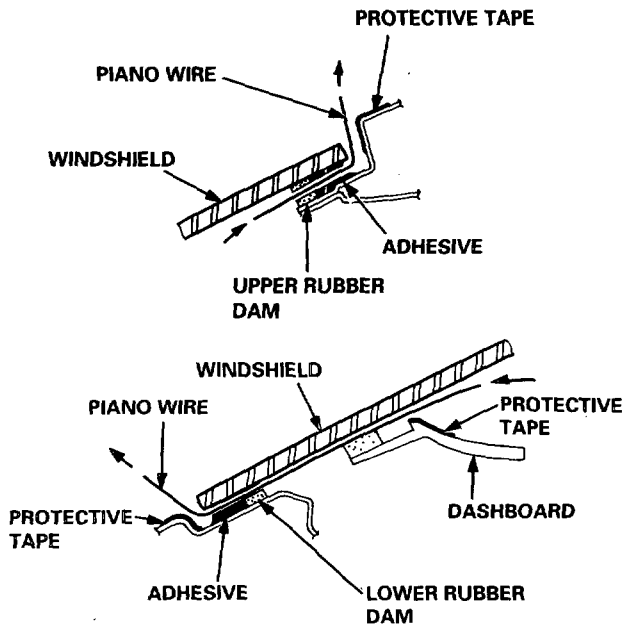
(cont'd)



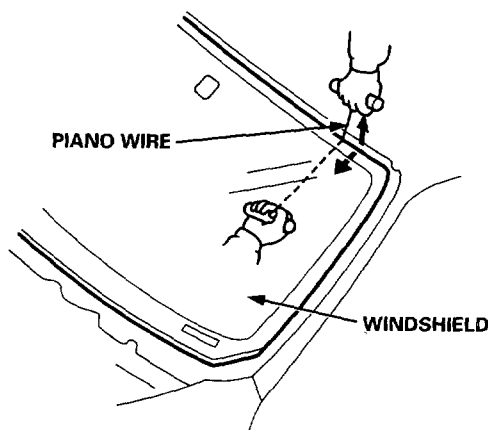
# Glass

## Windshield Replacement (cont'd)

7. Apply protective tape to along the edge of the dashboard and body as shown. Using an awl, make a hole through the rubber dam and adhesive from inside the vehicle. Push the piano wire through the hole, and wrap each end around a piece of wood.



8. With a helper on the outside, pull the piano wire back and forth in a sawing motion. Hold the piano wire as close to the windshield as possible to prevent damage to the body and dashboard. Carefully cut through the rubber dam and adhesive around the entire windshield.

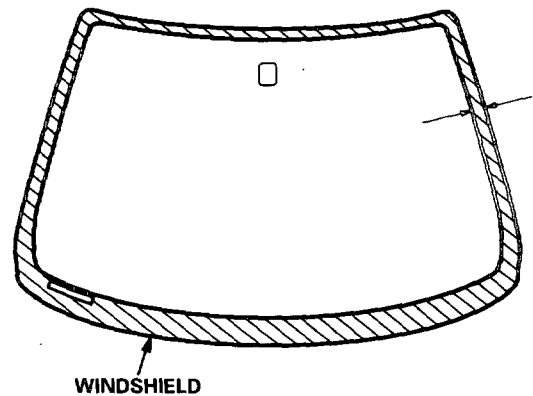


9. Carefully remove the windshield.

10. With a knife, scrape the old adhesive smooth to a thickness of about 2 mm (0.08 in) on the bonding surface around the entire windshield opening flange:
- Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
  - Remove the rubber dam from the body.
  - Mask off surrounding surfaces before painting.

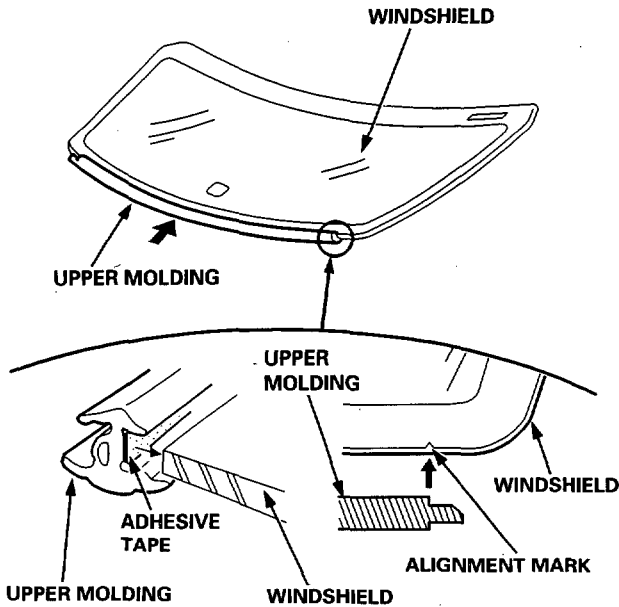
11. Clean the body bonding surface with a sponge dampened in alcohol. After cleaning, keep oil, grease and water from getting on the clean surface.

12. If the old windshield is to be reinstalled, use a putty knife to scrape off all traces of old adhesive and the rubber dams from the windshield, then clean the windshield surface and edge with alcohol where new adhesive is to be applied. Make sure the bonding surface is kept free of water, oil and grease.

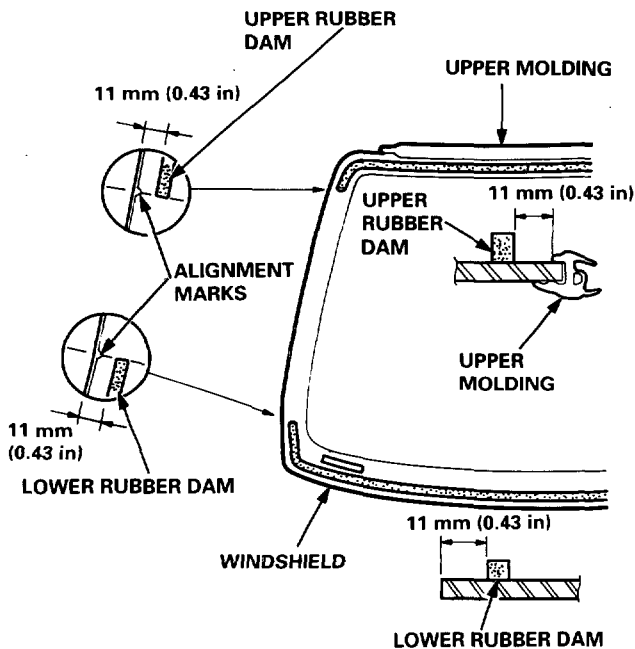




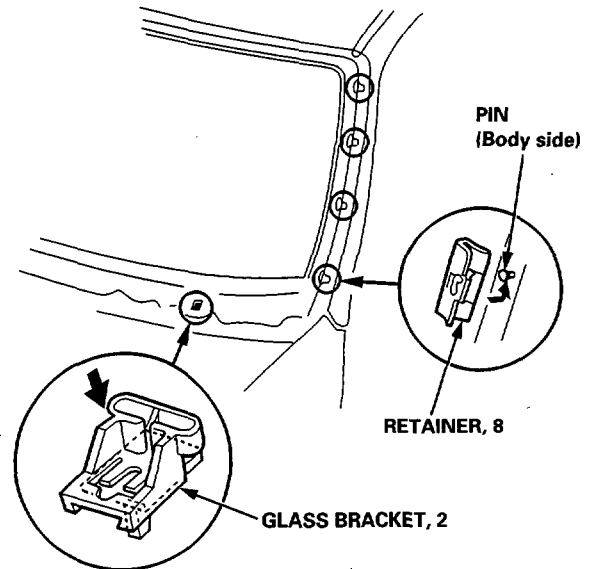
13. Center and glue the upper molding with adhesive tape to the upper edge of the windshield. Be careful not to touch the windshield where adhesive will be applied.



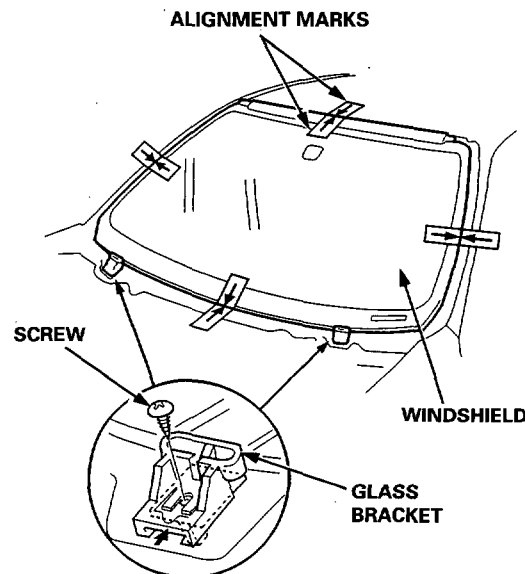
14. Glue the upper and lower rubber dams to the inside face of the windshield, as shown. Be careful not to touch the windshield where adhesive will be applied.



15. Install the glass brackets and retainers to the body. The numbers after the part names show the quantities of the parts used.



16. Set the windshield on the glass brackets, and center it in the opening. Make alignment marks across the windshield and body with a grease pencil at the four points shown. Be careful not to touch the windshield where adhesive will be applied.



17. Adjust the glass brackets to center the windshield in the opening, then tighten the screws.

18. Remove the windshield.

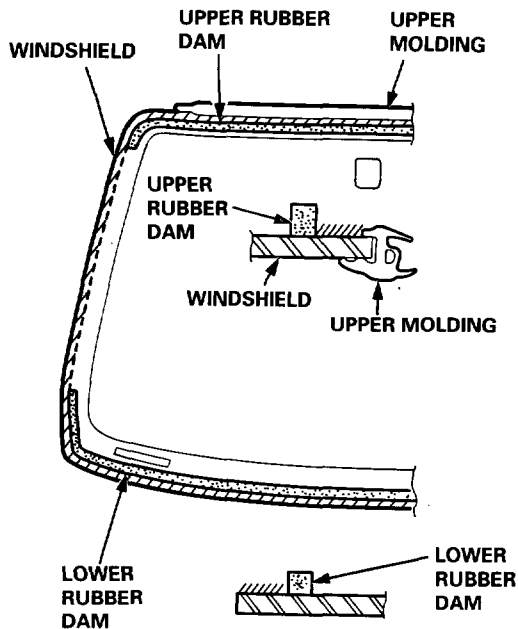
(cont'd)

# Glass

## Windshield Replacement (cont'd)

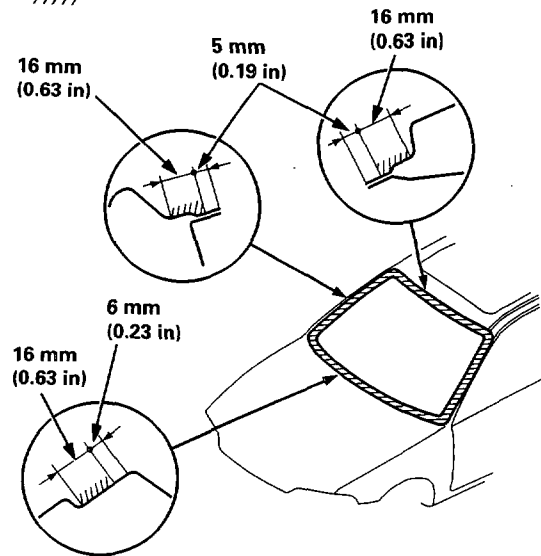
19. With a sponge, apply a light coat of glass primer around the edge of the windshield as shown, then lightly wipe it off with gauze or cheesecloth:
- Do not apply body primer to the windshield, and do not get body and glass primer sponges mixed up.
  - Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the windshield properly, causing a leak after the windshield is installed.
  - Keep water, dust, and abrasive materials away from the primed surface.

////// : Apply glass primer here.

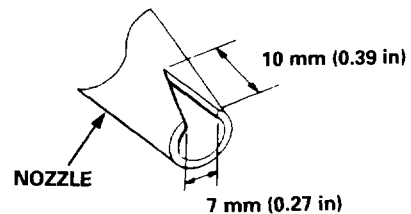


20. With a sponge, apply a light coat of body primer to the original adhesive remaining around the windshield opening flange. Let the body primer dry for at least 10 minutes:
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
  - Never touch the primed surfaces with your hands.
  - Mask off the dashboard before painting the flange.

////// : Apply body primer here.

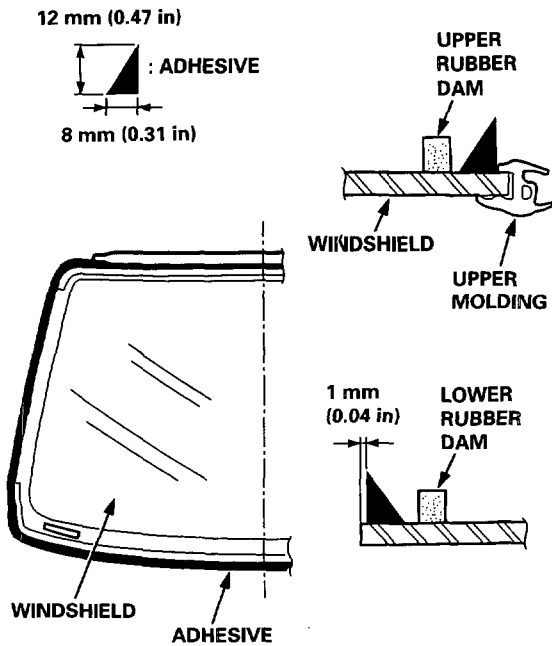


21. Thoroughly mix the adhesive and hardener together on a clean glass or metal plate with a putty knife. Follow the instructions that came with the adhesive.
22. Before filling a cartridge, cut a "V" in the end of the nozzle as shown.

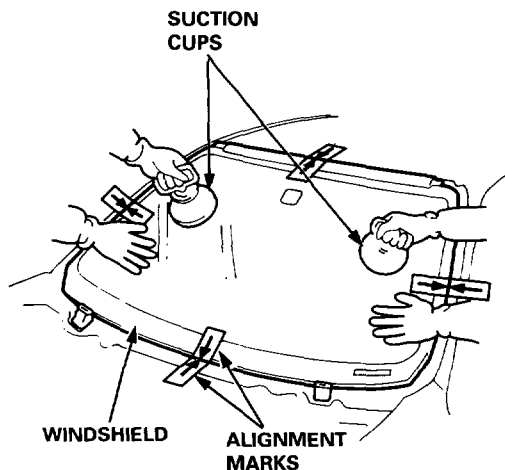




23. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the windshield as shown. Apply the adhesive within 30 minutes after applying the glass primer. Make a slightly thicker bead at each corner.



24. Use suction cups to hold the windshield over the opening, align it with the alignment marks made in step 16, and set it down on the adhesive. Lightly push on the windshield until its edges are fully seated on the adhesive all the way around. Do not open or close the doors until adhesive is dry.



25. Install the clips on both side moldings.

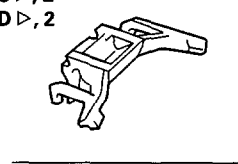
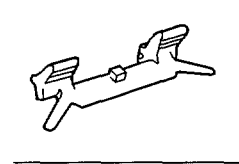
▷: Clip locations

A ▷, 8

B ▷, 2

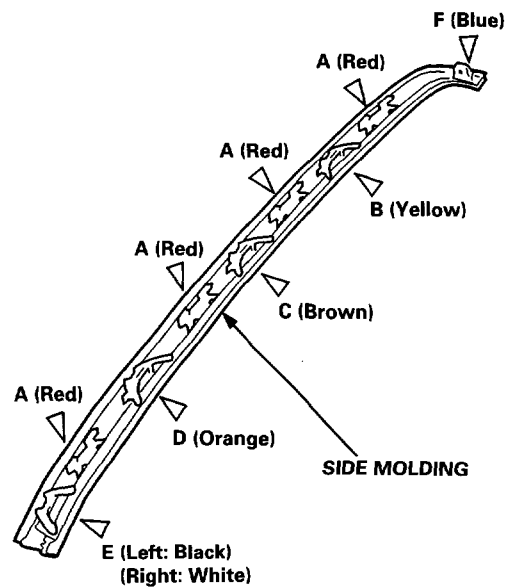
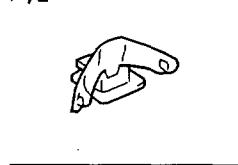
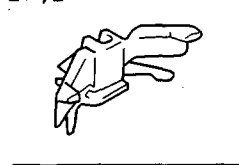
C ▷, 2

D ▷, 2



E ▷, 2

F ▷, 2



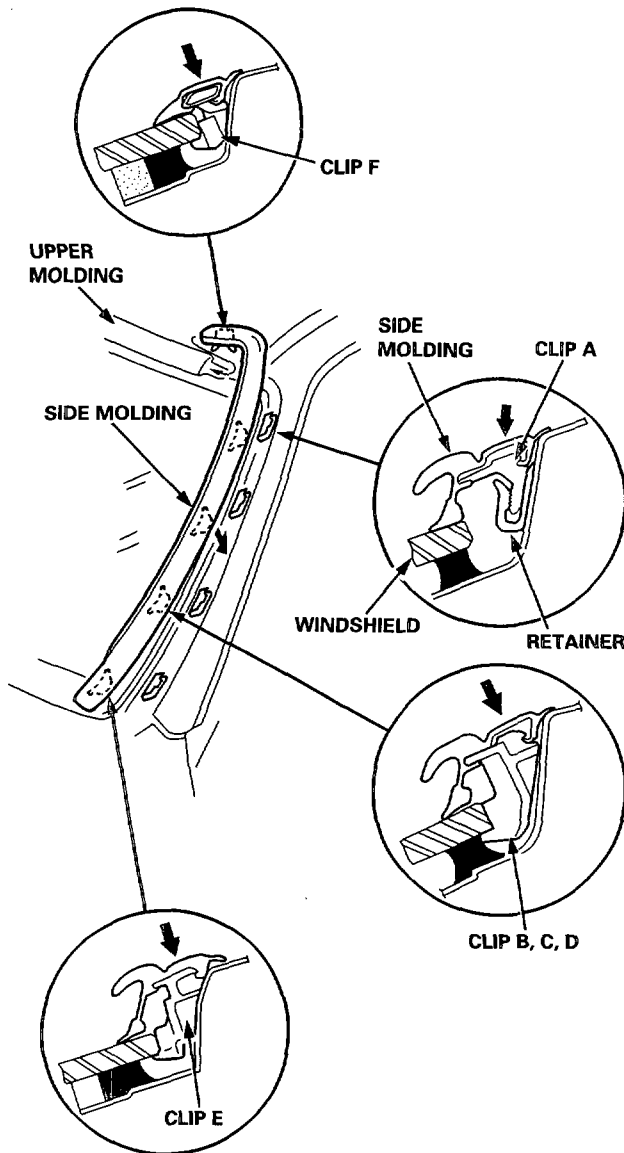
26. Scrape or wipe the excess adhesive off with a putty knife or towel. To remove adhesive from a painted surface or the windshield, wipe with a soft shop towel dampened with alcohol.

(cont'd)

# Glass

## Windshield Replacement (cont'd)

27. Install both side moldings to the body.



28. Let the adhesive dry for at least one hour, then spray water over the windshield and check for leaks. Mark leaking areas, and let the windshield dry, then seal with sealant:

- Let the vehicle stand for at least four hours after windshield installation. If the vehicle has to be used within the first four hours, it must be driven slowly.
- Keep the windshield dry for the first hour after installation.
- Check that the ends of the side molding are set under the cowl cover.

29. Reinstall all remaining removed parts. Install the rearview mirror after the adhesive has dried thoroughly. Advise the customer not to do the following things for two to three days:

- Slam the doors with all the windows rolled up.
- Twist the body excessively (such as when going in and out of driveways at an angle or driving over rough, uneven roads).

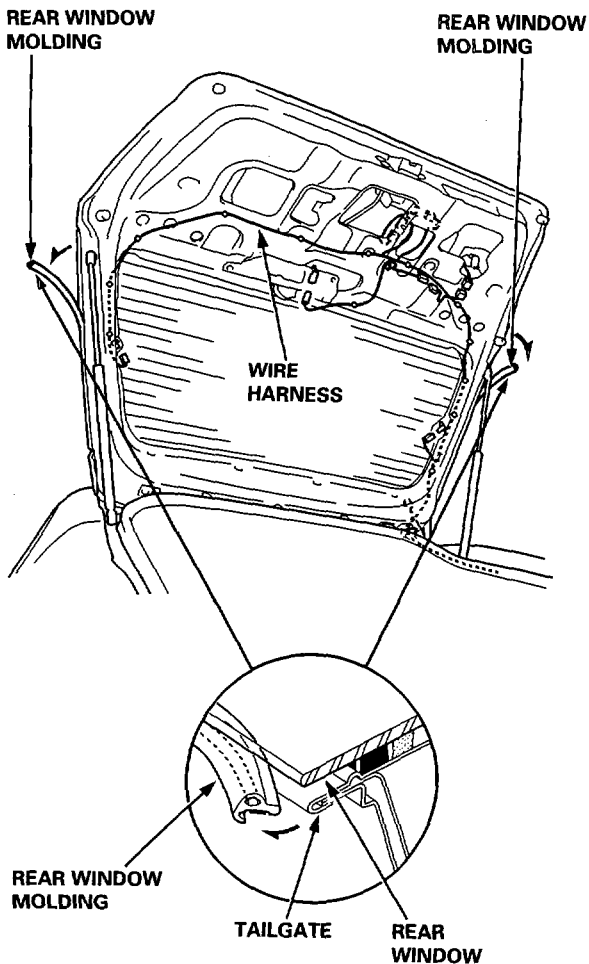


## Rear Window Replacement

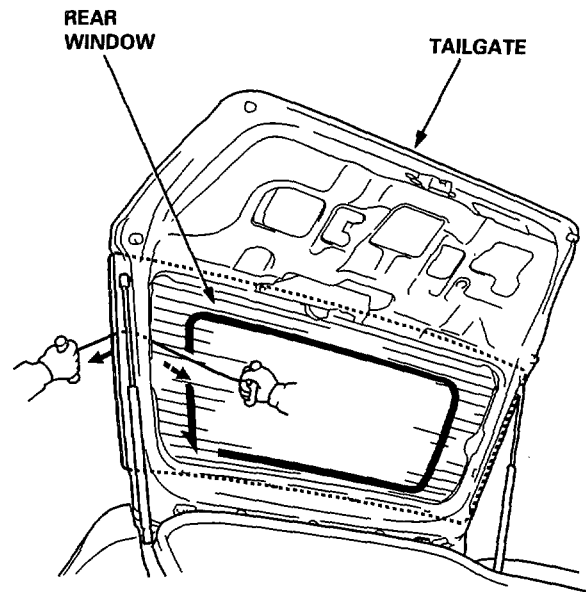
### NOTE:

- Wear gloves to remove and install the rear window.
- Use seat covers to avoid damaging any surfaces.
- Do not damage the rear window defogger grid lines and terminals.

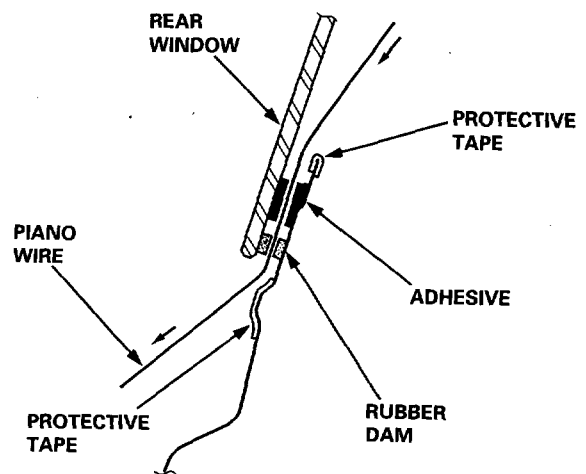
1. Remove:
  - Tailgate upper trim (see page 20-64)
  - Tailgate side trim (see page 20-64)
  - Tailgate trim panel (see page 20-64)
  - Tailgate spoiler (see page 20-104)
  - Rear window wiper arm (see section 23)
2. Disconnect the connectors, detach the harness clips, and remove the grommet, then remove the wire harness from the tailgate (see page 20-100).
3. Remove the rear window moldings from both sides.



4. Apply protective tape to along the edge of the tailgate as shown. Using an awl, make a hole through the adhesive from inside the vehicle. Push piano wire through the hole, and wrap each end around a piece of wood.
5. With a helper on the outside, pull the piano wire back and forth in a sawing motion. Hold the piano wire as close to the rear window as possible to prevent damage to the tailgate. Carefully cut through the rubber dam and adhesive around the entire rear window.



### Upper portion:

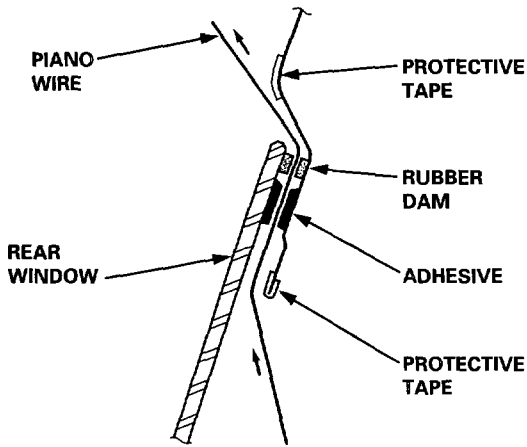


(cont'd)

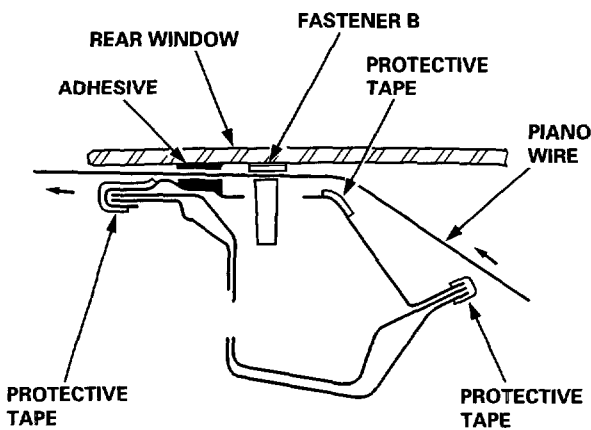
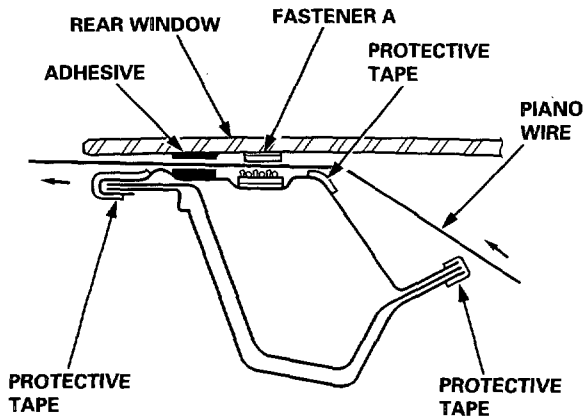
# Glass

## Rear Window Replacement (cont'd)

Lower portion:

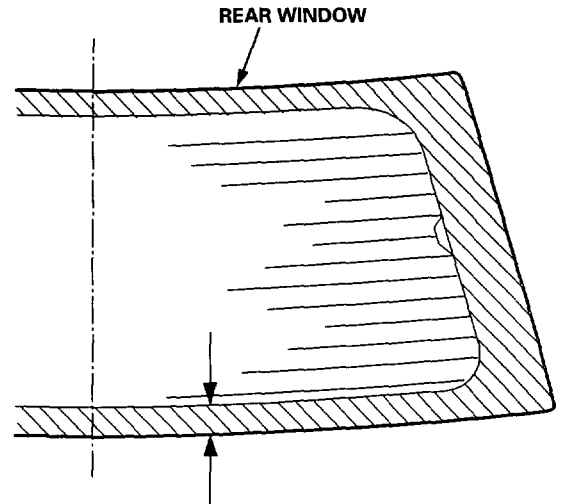


Side portion:



6. Carefully remove the rear window.

7. With a putty knife, scrape the old adhesive smooth to a thickness of about 2 mm (0.08 in) on the bonding surface around the entire rear window opening flange:
  - Do not scrape down to the painted surface of the tailgate; damaged paint will interfere with proper bonding.
  - Mask off surrounding surfaces before painting.
  - Remove the rubber dams and fasteners from the tailgate.
8. Clean the tailgate bonding surface with a sponge dampened in alcohol. After cleaning, keep oil, grease and water from getting on the clean surface.
9. If the old rear window is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, the rubber dams and the fasteners from the rear window, then clean the rear window surface and edge with alcohol where new adhesive is to be applied. Make sure the bonding surface is kept free of water, oil and grease.

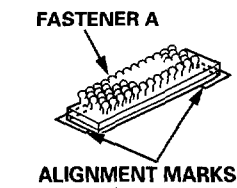




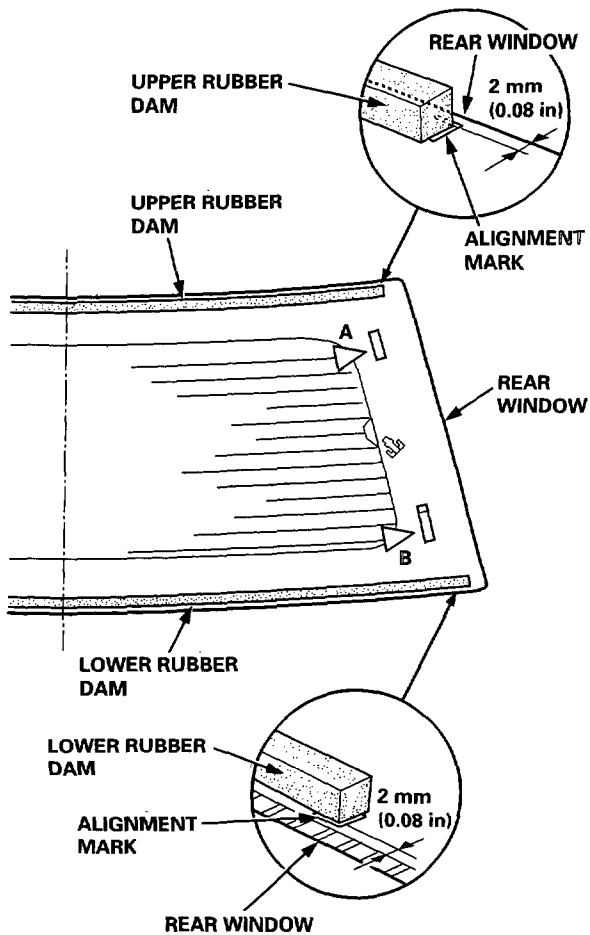
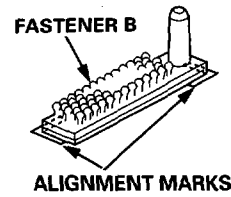
10. Glue the fasteners and rubber dams to the inside face of the rear window as shown:

- Be sure the fasteners and rubber dams line up with the alignment marks.
- Be careful not to touch the rear window where adhesive will be applied.

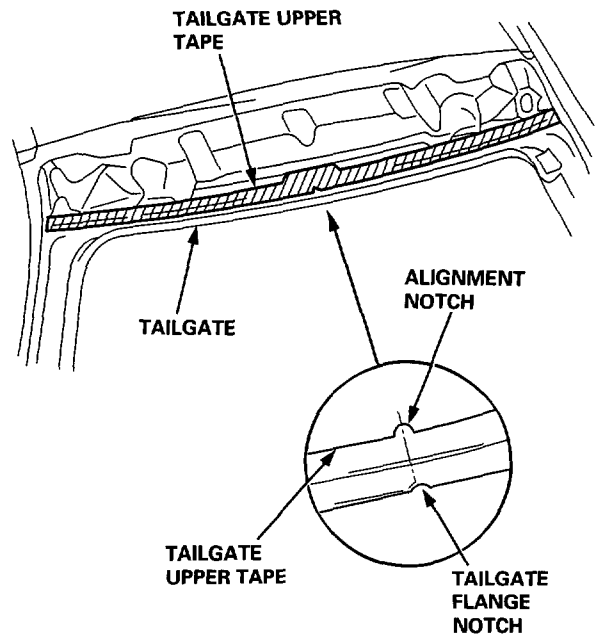
▷: Fastener locations  
A ▷, 2



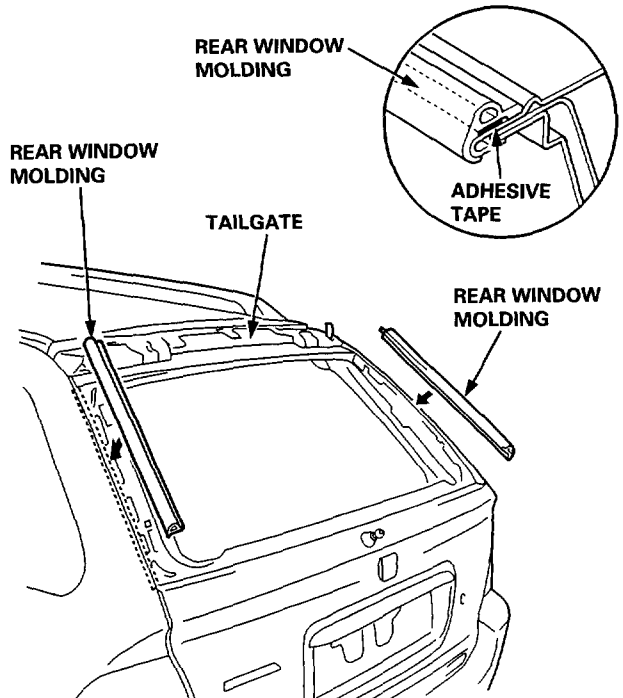
B ▷, 2



11. If necessary, replace the tailgate upper tape. Be sure the tailgate upper tape line up with the alignment mark.



12. Glue the rear window moldings with adhesive tape to along both side edges of the tailgate.



(cont'd)



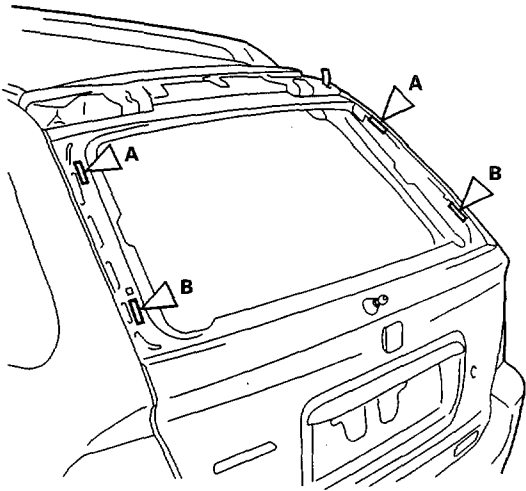
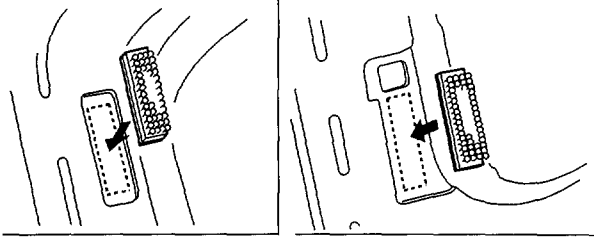
# Glass

## Rear Window Replacement (cont'd)

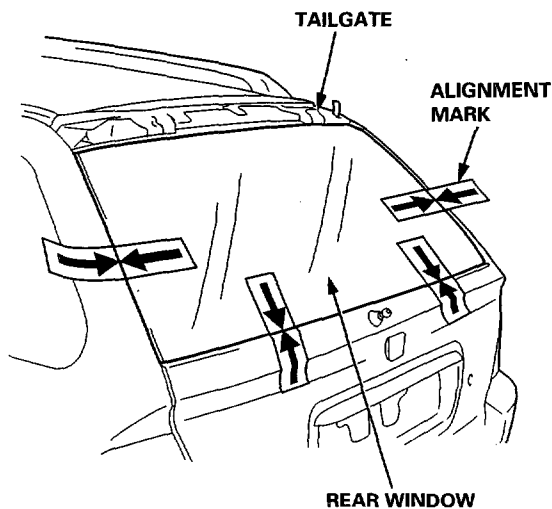
13. Glue the fasteners to the tailgate.

▷: Fastener locations  
A ▷, 2

B ▷, 2



14. Set the rear window in the opening, and center it. Make alignment marks across the rear window, tailgate and body with a grease pencil at the four points shown. Be careful not to touch the rear window where adhesive will be applied.

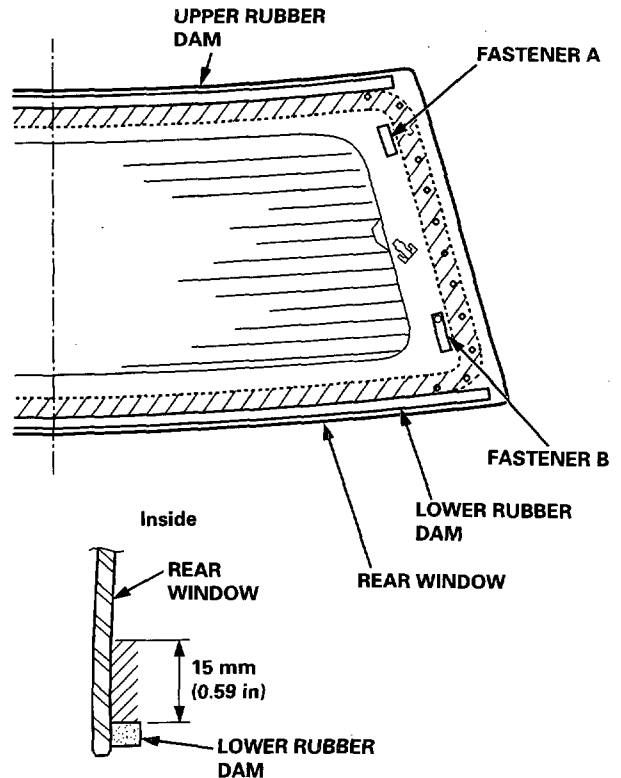
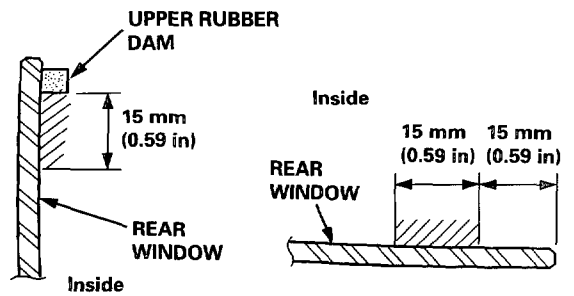


15. Remove the rear window.

16. With a sponge, apply a light coat of glass primer around the edge of the rear window as shown, then lightly wipe it off with gauze or cheesecloth:

- Do not apply body primer to the rear window, and do not get tailgate and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the rear window properly, causing a leak after the rear window is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

▨▨▨▨ : Apply glass primer here.

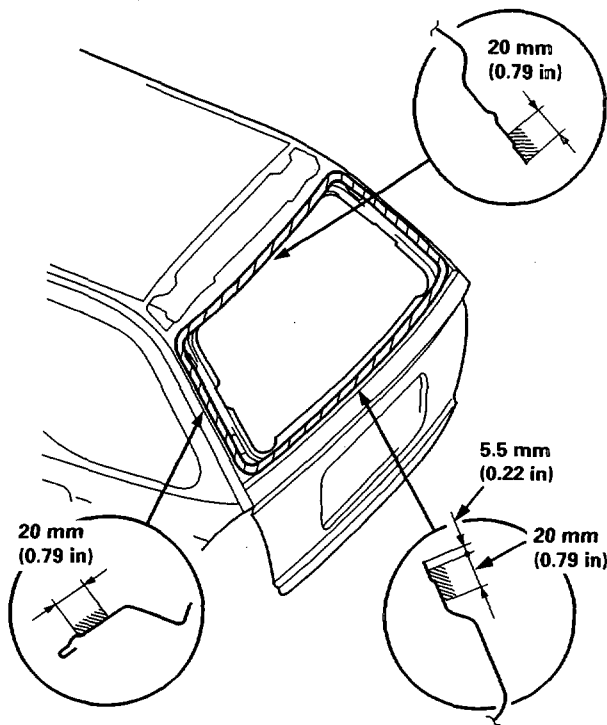




17. With a sponge, apply a light coat of body primer to the original adhesive remaining around the rear window opening flange. Let the body primer dry for at least 10 minutes:

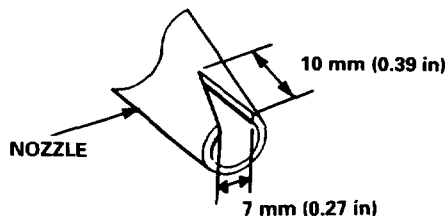
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.

 : Apply body primer here.



18. Thoroughly mix the adhesive and hardener together on a clean glass or metal plate with a putty knife. Follow the instructions that came with the adhesive.

19. Before filling a cartridge, cut a "V" in the end of the nozzle as shown.

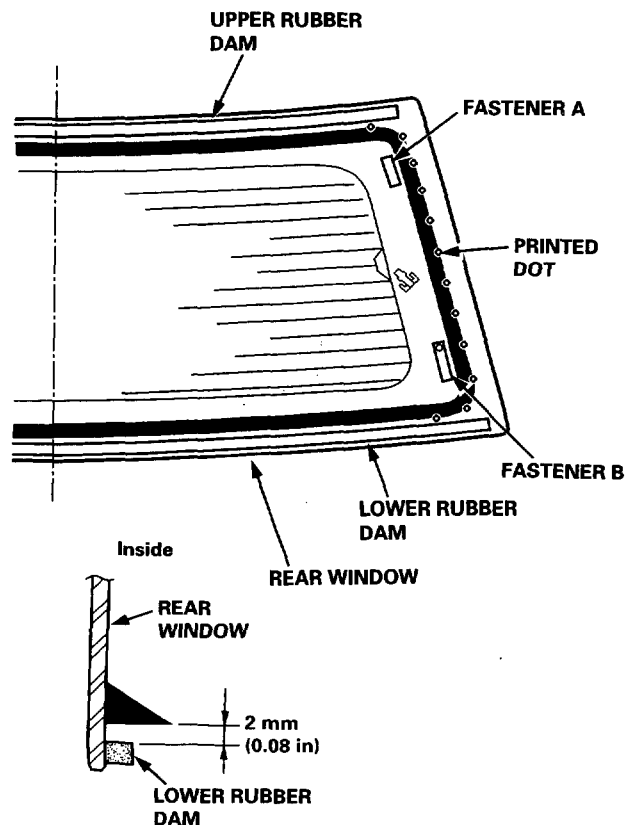
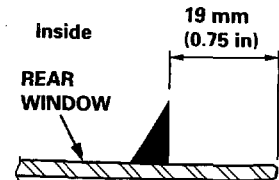
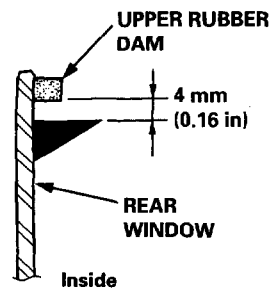


20. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the rear window as shown. With the printed dots on the rear window as guide, apply the adhesive to both side portions of the rear window. Apply the adhesive within 30 minutes after applying the glass primer. Make a slightly thicker bead at each corner.

13 mm (0.51 in)



8 mm (0.31 in)

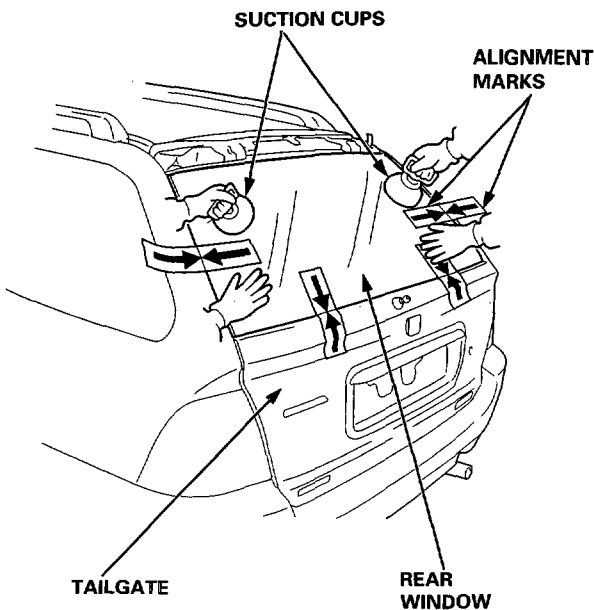


(cont'd)

# Glass

## Rear Window Replacement (cont'd)

21. Use suction cups to hold the rear window over the opening, align it with the alignment marks you made in step 14, and set it down on the adhesive. Lightly push on the rear window until its edges are fully seated on the adhesive all the way around. Do not open or close the doors until the adhesive is dry.

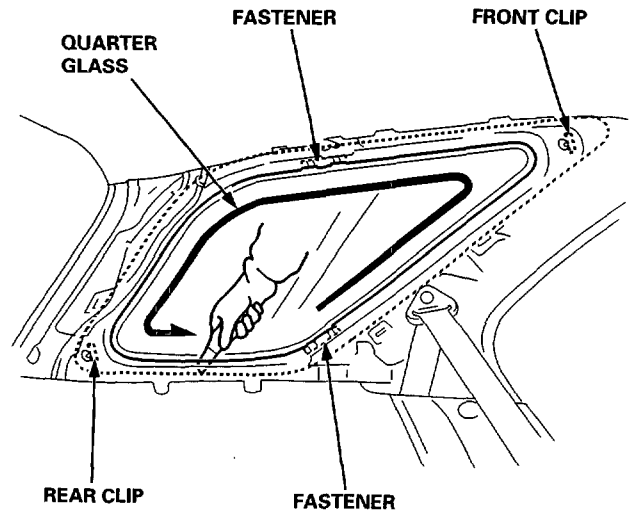


22. Scrape or wipe the excess adhesive off with a putty knife or towel. To remove adhesive from a painted surface or the rear window, use a soft shop towel dampened with alcohol.
23. Let the adhesive dry for at least one hour, then spray water over the rear window and check for leaks. Mark the leaking areas, let the rear window dry, then seal with sealant.
- Let the vehicle stand for at least four hours after rear window installation. If the vehicle has to be used within the first four hours, it must be driven slowly.
  - Keep the rear window dry for the first hour after installation.
24. Reinstall all remaining removed parts. Advise the customer not to do the following things for two to three days:
- Slam the doors with all the windows rolled up.
  - Twist the body excessively (such as when going in and out of driveways at an angle or driving over rough, uneven roads).

## Quarter Glass Replacement

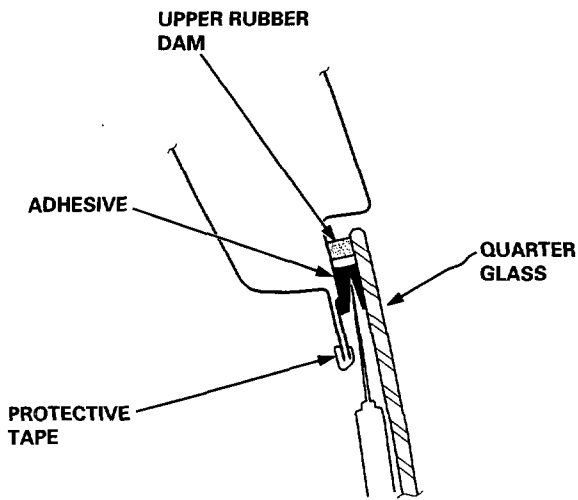
### NOTE:

- Wear gloves to remove and install the quarter glass.
  - Use seat covers to avoid damaging any surfaces.
1. Remove:
- Rear door trim (as necessary, see page 20-61)
  - Tonneau cover (see page 20-62)
  - Rear side upper trim (see page 20-62)
  - Rear quarter trim panel (see page 20-62)
2. From inside the vehicle, use a knife to cut through the quarter glass adhesive all the way around. Apply protective tape along the edge of the entire quarter glass opening flange.

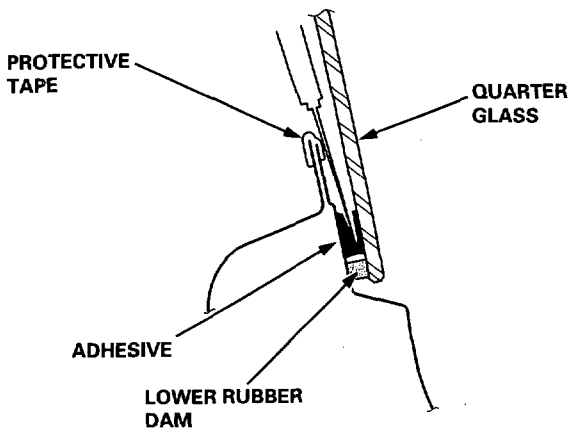




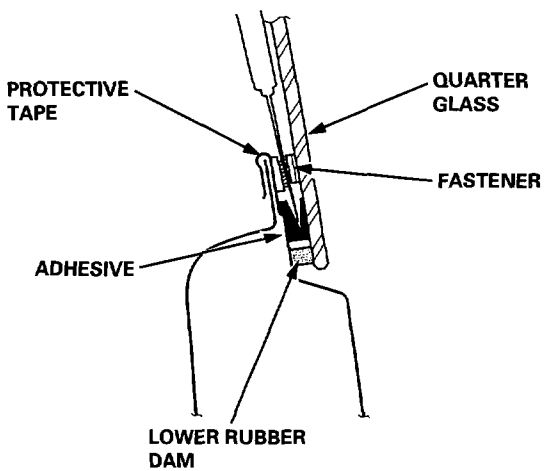
**Upper portion:**



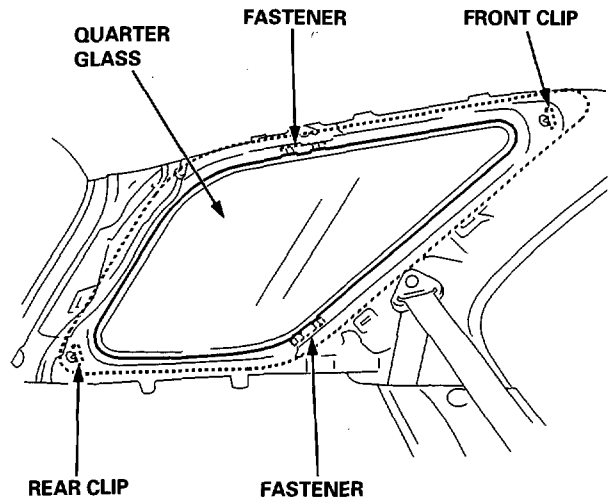
**Lower portion:**



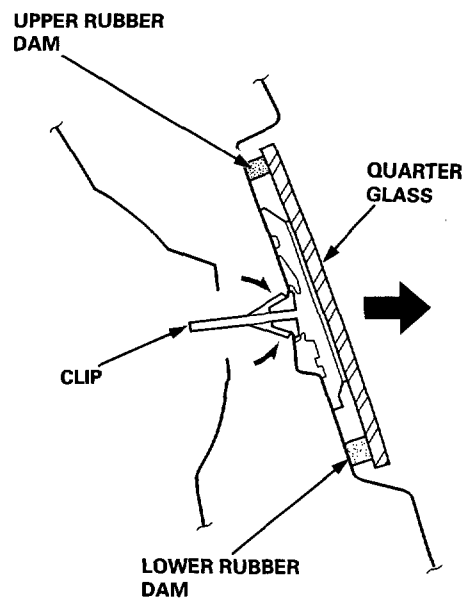
**Fastener portion:**



3. Detach the clips from inside the vehicle, then carefully remove the quarter glass.



**Clip portion:**

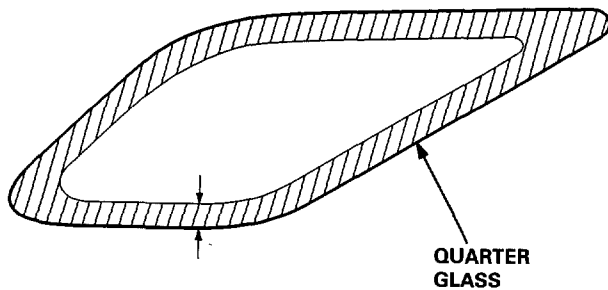


(cont'd)

# Glass

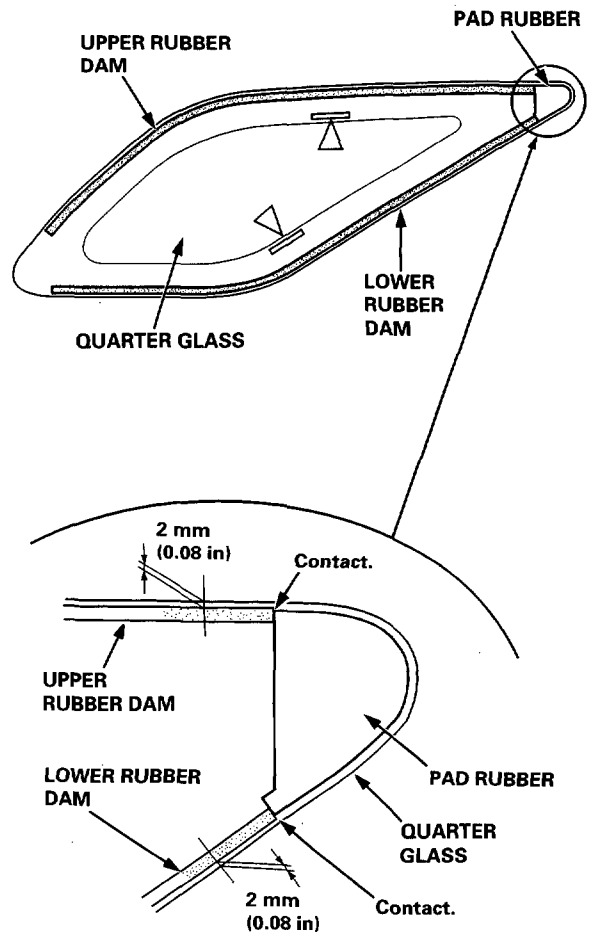
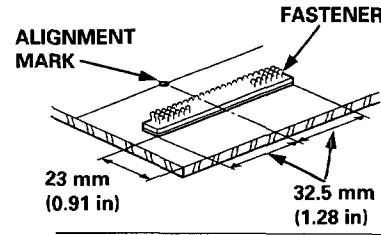
## Quarter Glass Replacement (cont'd)

4. With a knife, scrape the old adhesive smooth to a thickness of about 2 mm (0.08 in) on the bonding surface around the entire quarter glass opening flange:
  - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
  - Remove the rubber dams from the body.
  - If any of the clips are broken, remove them from the body.
  - Mask off surrounding surfaces before applying primer.
5. Clean the body bonding surface with a sponge dampened in alcohol. After cleaning, keep oil, grease and water from getting on the clean surface.
6. If the old quarter glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, rubber dams, pad rubber and fasteners from the quarter glass, then clean the quarter glass surface with alcohol where adhesive is to be applied. Make sure the bonding surface is kept free of water, oil and grease.



7. Center and glue the pad rubber, and glue the rubber dams and fasteners to the inside face of the quarter glass as shown.
  - Be sure the fasteners line up with the alignment marks.
  - Be careful not to touch the quarter glass where adhesive will be applied.

▷: Fastener locations, 2

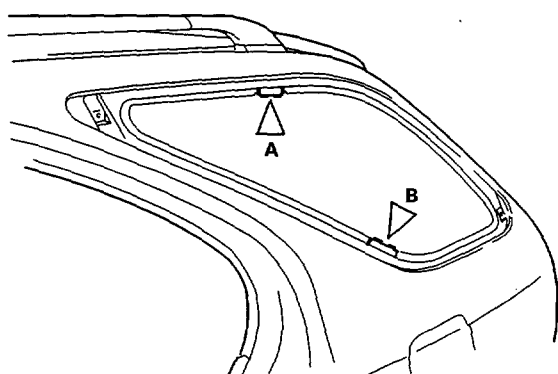
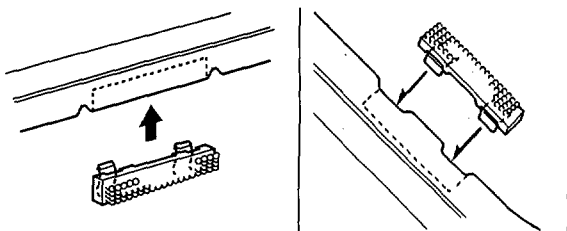




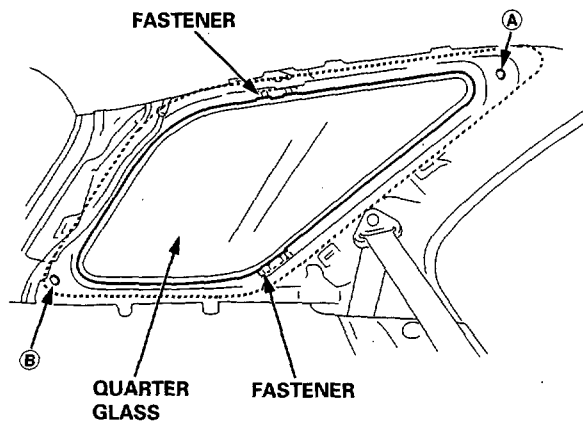
8. Install the fasteners to the body as shown.

▷: Fastener locations  
A ▷, 1

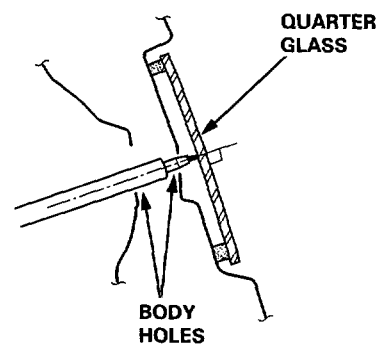
B ▷, 1



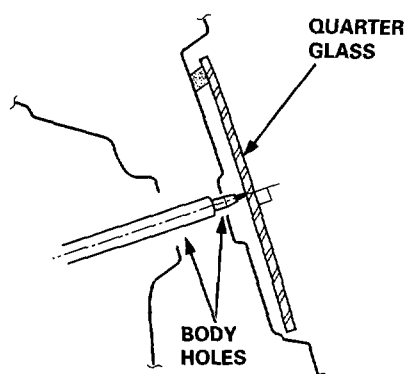
9. Set the quarter glass in the opening, and center it. From inside the vehicle, make alignment marks to the quarter glass through the body holes with a grease pencil. Be careful not to touch the quarter glass where adhesive will be applied.



Ⓐ portion:



Ⓑ portion:



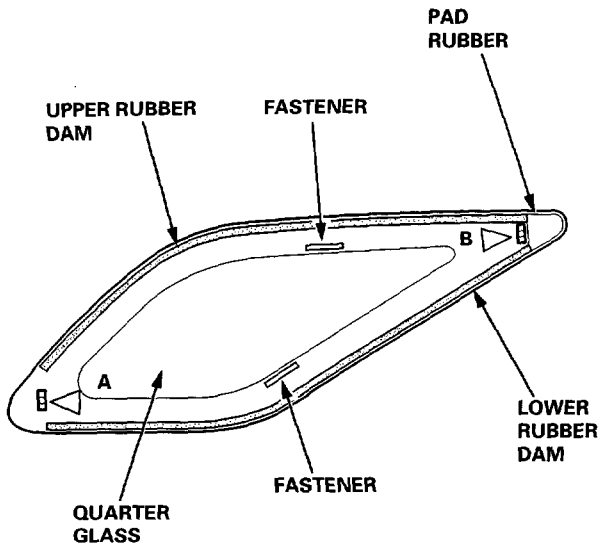
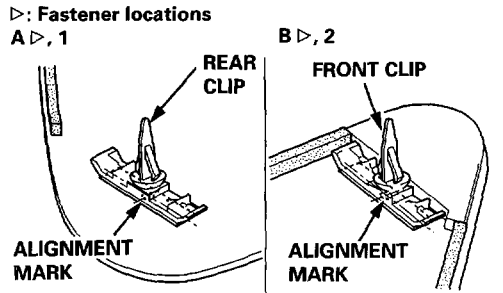
10. Remove the quarter glass.

(cont'd)

# Glass

## Quarter Glass Replacement (cont'd)

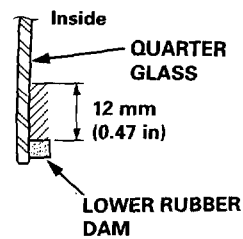
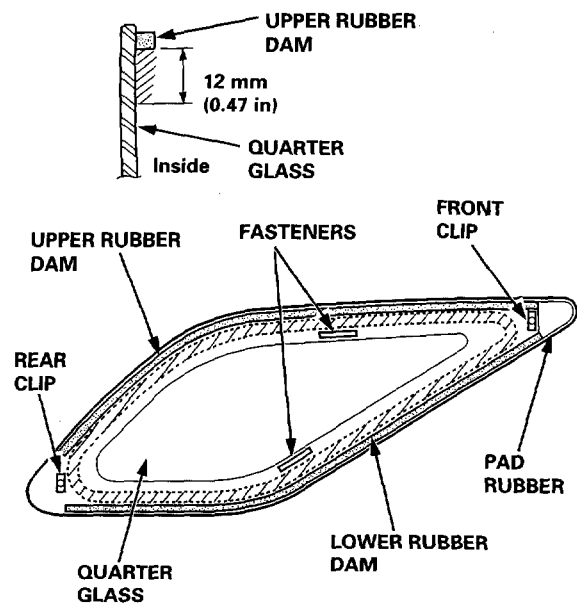
11. Align the clips with the alignment marks made in step 9, and glue them to the inside face of the quarter glass. Be careful not to touch the quarter glass where adhesive will be applied.



12. With a sponge, apply a light coat of glass primer to the inside face of the quarter glass as shown, then lightly wipe it off with gauze or cheesecloth:

- Do not apply body primer to the quarter 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 quarter glass properly, causing a leak after the quarter glass is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

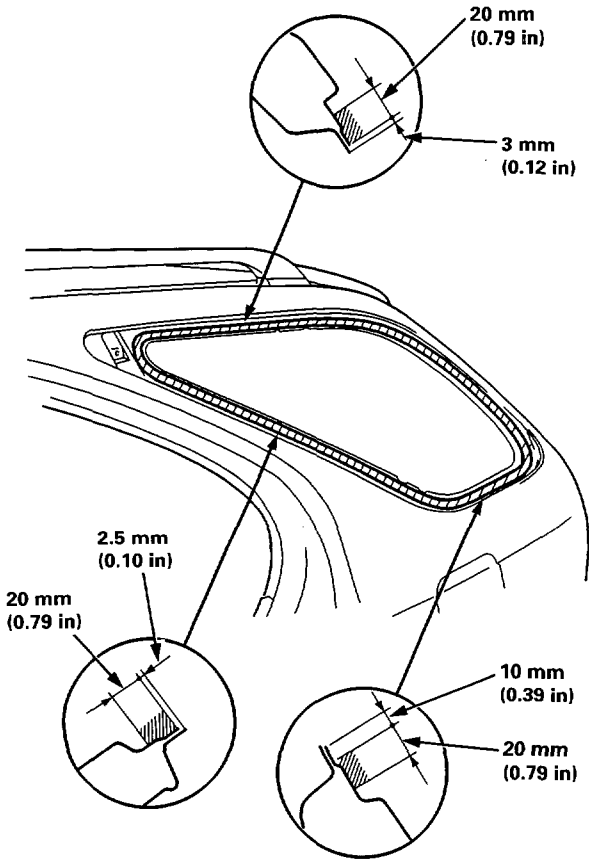
▨▨▨▨ : Apply glass primer here.



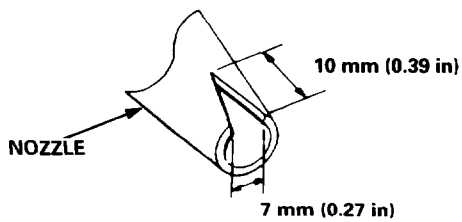


13. With a sponge, apply a light coat of body primer to the original adhesive remaining around the windshield opening flange. Let the body primer dry for at least 10 minutes:
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
  - Never touch the primed surfaces with your hands.
  - Mask off the dashboard before painting the flange.

 : Apply body primer here.

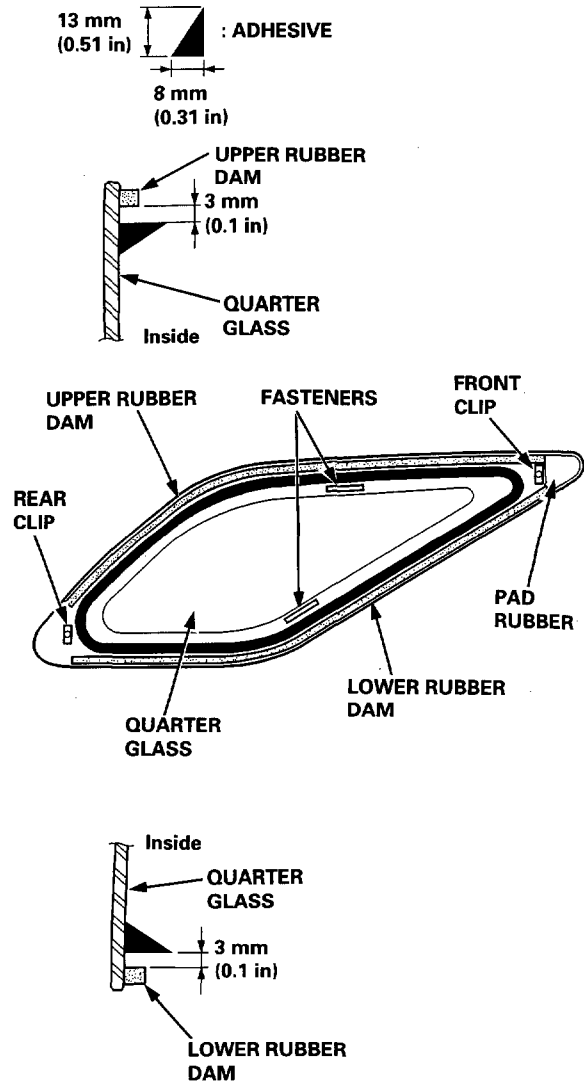


14. Thoroughly mix the adhesive and hardener together on a clean glass or metal plate with a putty knife. Follow the instructions that came with the adhesive.
15. Before filling a cartridge, cut a "V" in the end of the nozzle as shown.



16. 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 quarter glass as shown.

NOTE: Apply the adhesive within 30 minutes after applying the glass primer.



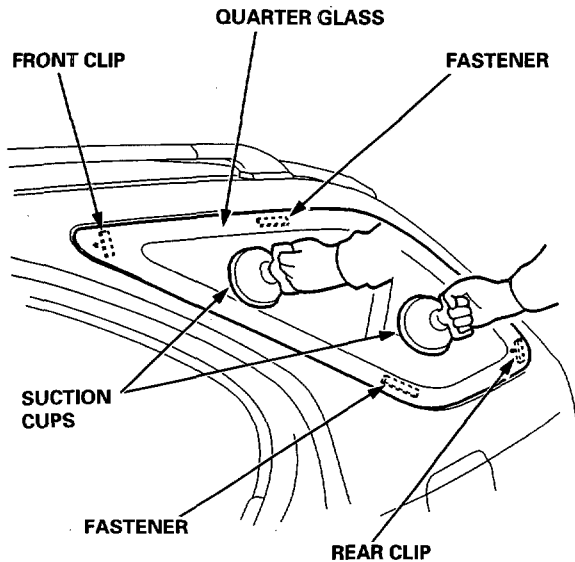
(cont'd)



# Glass

## Quarter Glass Replacement (cont'd)

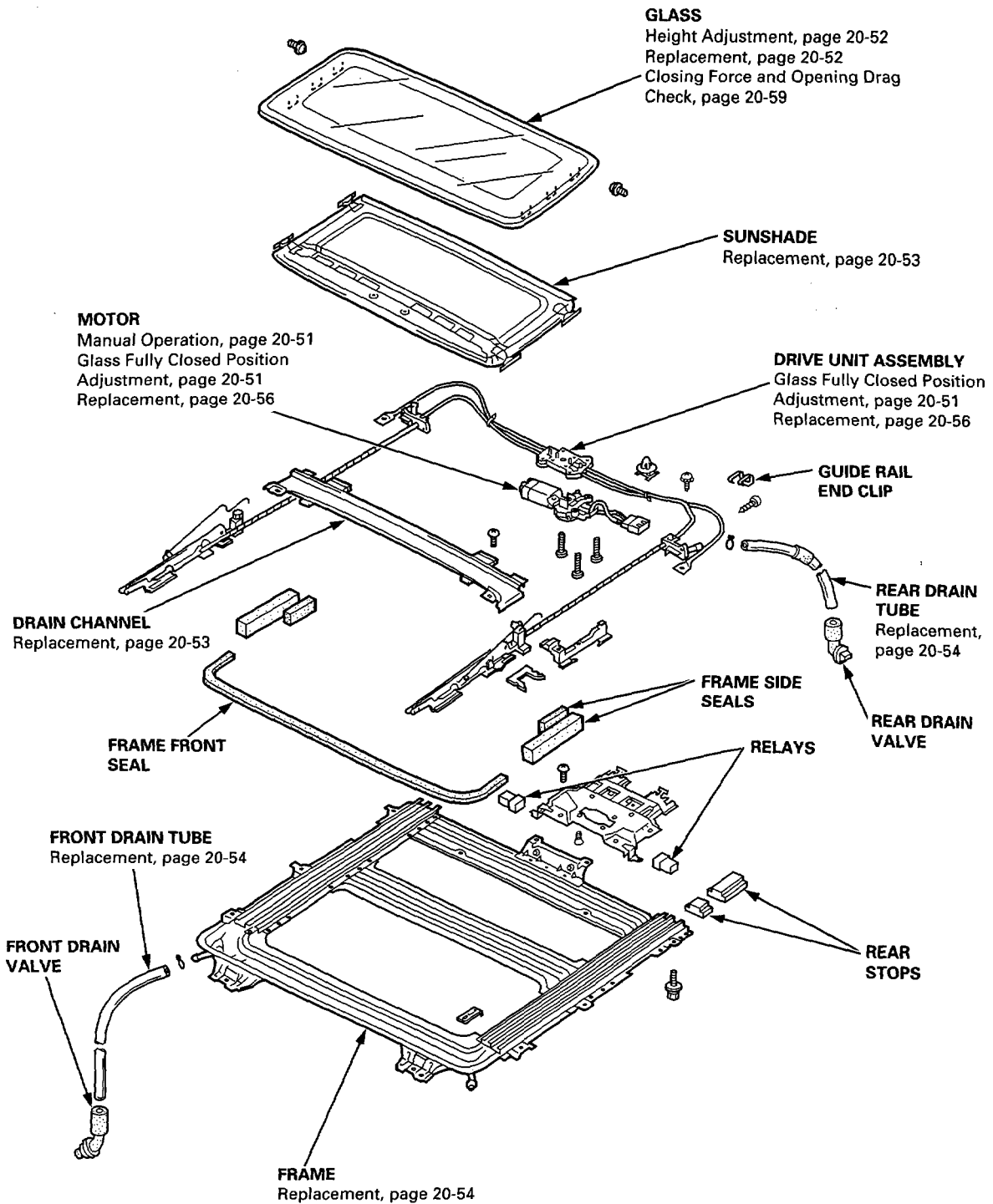
17. Use suction cups to hold the quarter glass over the opening, align the clips, and set it down on the adhesive. Lightly push on the quarter glass until its edges are fully seated on the adhesive all the way around. Do not open or close the doors until the adhesive is dry.



18. Scrape or wipe the excess adhesive off with a putty knife or towel. To remove adhesive from a painted surface or the quarter glass, wipe with a soft shop towel dampened with alcohol.
19. Let the adhesive dry for at least one hour, then spray water over the quarter glass and check for leaks. Mark leaking areas and let the quarter glass dry, then seal with sealant:
  - Let the vehicle stand for at least four hours after quarter glass installation. If the vehicle has to be used within the first four hours, it must be driven slowly.
  - Keep the quarter glass dry for the first hour after installation.
20. Reinstall all remaining removed parts. Advise the customer not to do the following things for two to three days:
  - Slam the doors with all the windows rolled up.
  - Twist the body excessively (such as when going in and out of driveways at an angle or driving over rough, uneven roads).



## Component Location Index



# Sunroof

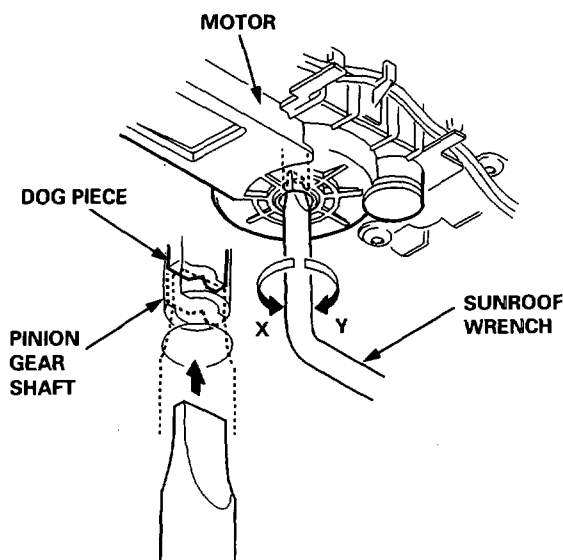
## Symptom Troubleshooting Index

Symptom	Diagnostic procedure	Also check for
Water leaks	<ol style="list-style-type: none"><li>1. Check for a clogged drain tube</li><li>2. Check for a gap between the glass weatherstrip and the roof panel.</li><li>3. Check for a defective or an improperly installed glass weatherstrip.</li><li>4. Check for a gap between the drain seal and the roof panel.</li></ol>	
Wind noise	<ol style="list-style-type: none"><li>1. Check for excessive clearance between the glass weatherstrip and the roof panel.</li></ol>	
Motor noise	<ol style="list-style-type: none"><li>1. Check for a loose motor.</li><li>2. Check for a worn gear or bearing.</li><li>3. Check for a deformed drive unit assembly.</li></ol>	
Glass does not move, but motor turns	<ol style="list-style-type: none"><li>1. Check for a defective gear or inner cable.</li><li>2. Check for foreign matter stuck between the guide rail and the slider.</li><li>3. Check for a loose inner cable.</li><li>4. Make sure the cable assembly is attached properly.</li></ol>	
Glass does not move and motor does not turn (glass can be moved with sunroof wrench)	<ol style="list-style-type: none"><li>1. Check for a blown fuse.</li><li>2. Check for a faulty sunroof switch.</li><li>3. Check for a run down battery.</li><li>4. Check for a defective motor.</li><li>5. Check for a faulty relay.</li></ol>	



## Motor Manual Operation

1. Insert the sunroof wrench into the socket of the motor, and push in the dog piece of the pinion gear shaft fully to unlock it. Operate the sunroof by turning the wrench in the X direction (counterclockwise) or Y direction (clockwise) as shown.

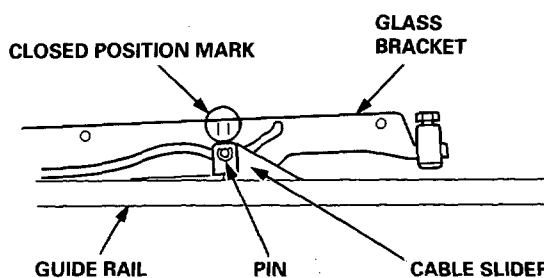


2. When manual operation has been completed, push in the sunroof wrench lightly and turn it slowly in the X direction (counterclockwise) or Y direction (clockwise) until the dog piece returns to the locked position.
3. Remove the sunroof wrench, and make sure the dog piece is in the locked position. The dog piece may be damaged when the sunroof is electrically operated if the dog piece is not in the locked position.

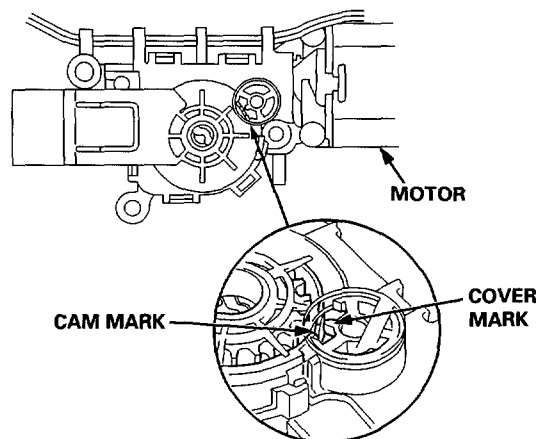
## Glass Fully Closed Position Adjustment

If the motor or drive unit assembly is removed, it is necessary to align the "Glass fully closed position" of the glass bracket and the "Electrically glass fully closed position" of the motor.

1. Remove:
  - Glass (see page 20-52)
  - Motor (see page 20-56)
2. Align the center of the pin on the cable slider to the center of the "Closed Position" mark on the glass bracket.



3. Check the position of both cable sliders. The position should be the same for both cable sliders.
4. Check the electrically glass fully closed position of the motor. If necessary, using the sunroof wrench, align the cover mark on the motor with the inside cam mark by turning the sunroof wrench counterclockwise.

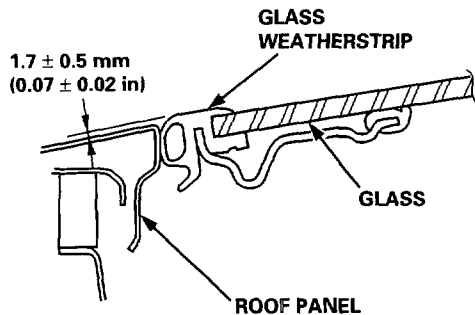


5. Install the glass, and adjust the glass height alignment (see page 20-52).
6. Install the motor, and check the operation of the glass by operating the sunroof switch.
7. Check for water leaks. Do not use high-pressure water.

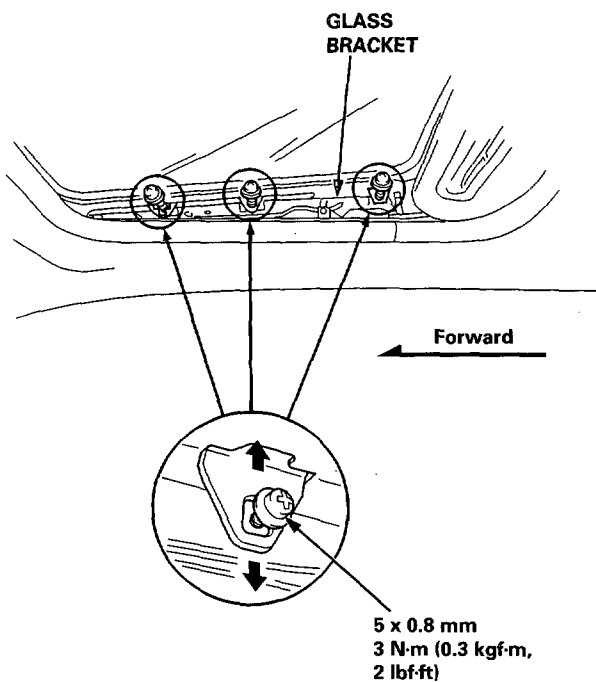
# Sunroof

## Glass Height Adjustment

The roof panel should be even with the glass weatherstrip, to within  $1.7 \pm 0.5$  mm ( $0.07 \pm 0.02$  in) all the way around. If not, close the glass fully, and:



1. Slide the sunshade all the way back.
2. Loosen the screws on each side, and adjust the glass.

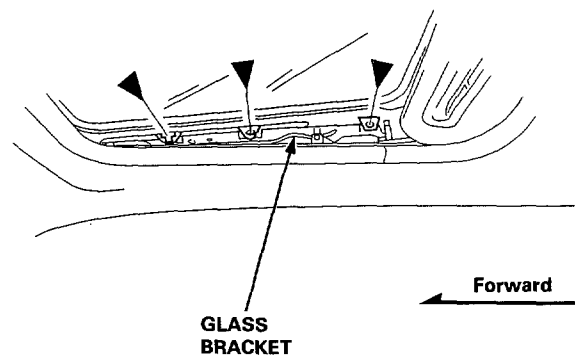
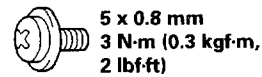


3. Repeat on opposite side if necessary.
4. Apply liquid thread lock to the screws, and tighten them.
5. Side-to-side fit of glass weatherstrip can be adjusted by loosening the frame mounting bolts and moving the frame right or left by hand (see page 20-54).

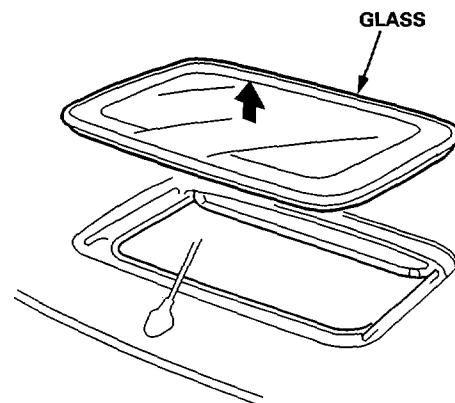
## Glass Replacement

1. Close the glass fully.
2. Slide the sunshade all the way back.
3. Remove the screws from both glass bracket.

►: Screw locations, 6



4. Remove the glass by lifting it up. Do not damage the roof panel.



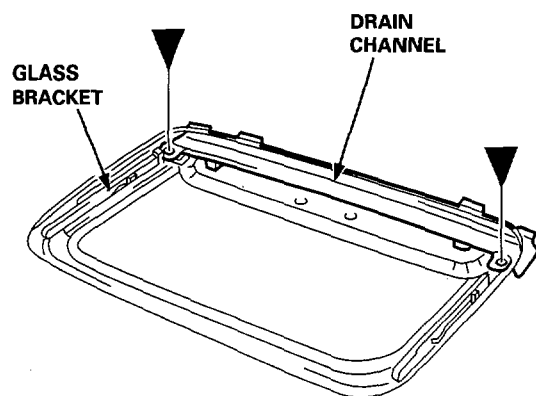
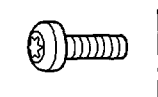
5. Install in the reverse order of removal, and note these items:
  - Adjust the glass height alignment.
  - Before tightening the screws, apply liquid thread lock to the screws.
6. Check for water leaks. Do not use high-pressure water.



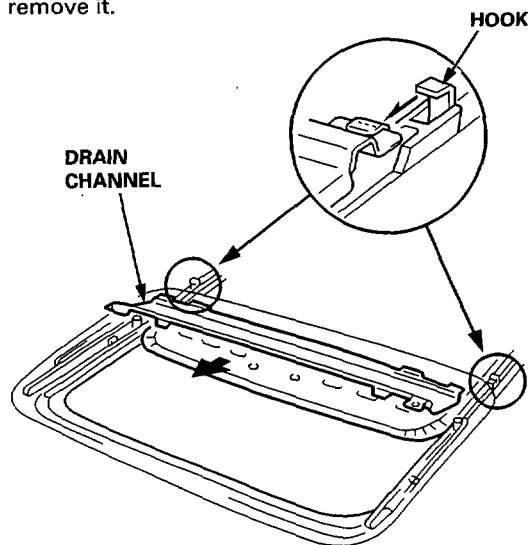
## Drain Channel Replacement

1. Remove the glass.
2. Slide the sunshade forward half-way.
3. With a Torx T25 bit, remove the screws securing the drain channel.

►: Screw locations, 2



4. Release the drain channel from both hooks, then remove it.

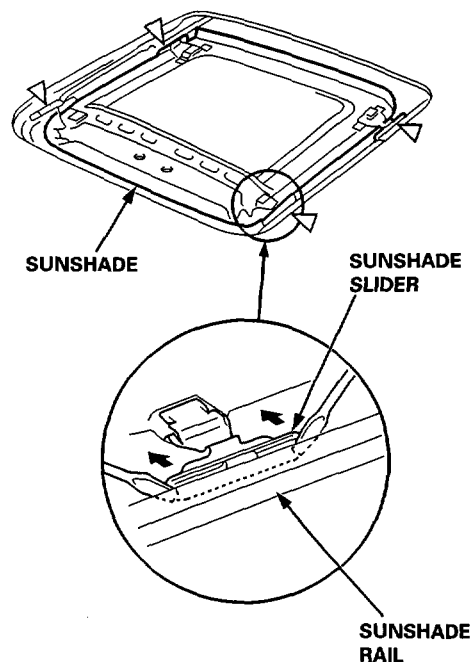


5. Install in the reverse order of removal, and note these items:
  - Install the drain channel to both hooks properly.
  - Check the glass height alignment.
6. Check for water leaks. Do not use high-pressure water.

## Sunshade Replacement

1. Remove:
  - Glass
  - Drain channel
2. Slide the sunshade forward fully.
3. From one side of the sunshade, with a flat-tip screwdriver, release the sunshade sliders from the sunshade rail.

▷: Sunshade slider locations, 4



4. Pull the sunshade out from the sunshade rail of the other side, then remove the sunshade.
5. Install in the reverse order of removal; check the glass height alignment.
6. Check for water leaks. Do not use high-pressure water.

# Sunroof

## Frame and Drain Tube Replacement

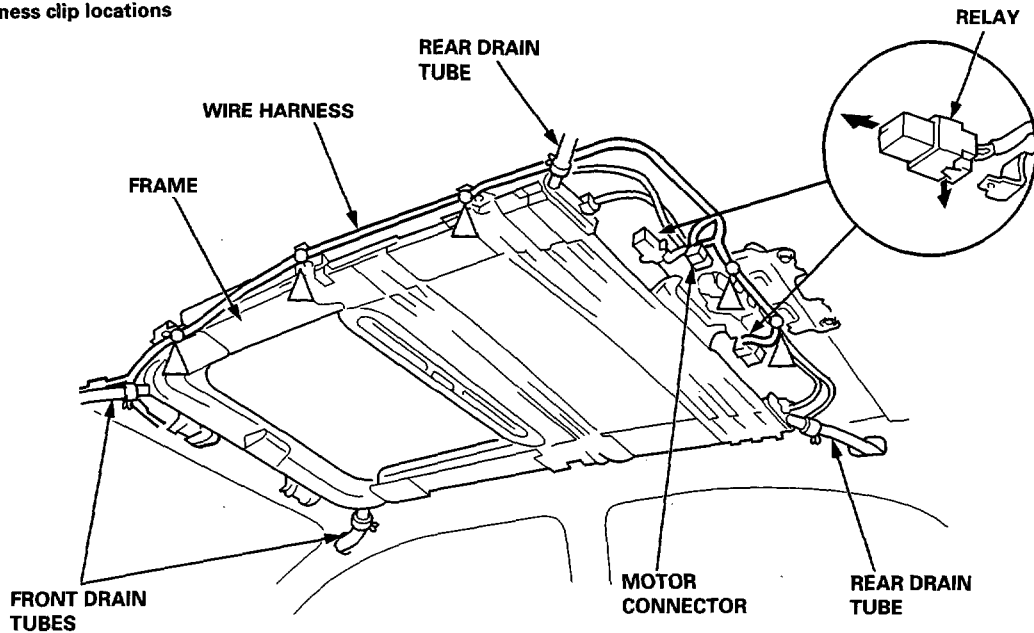
NOTE: Wear gloves to protect your hands.

1. Remove:

- Headliner (see page 20-65)
- Glass (see page 20-52)

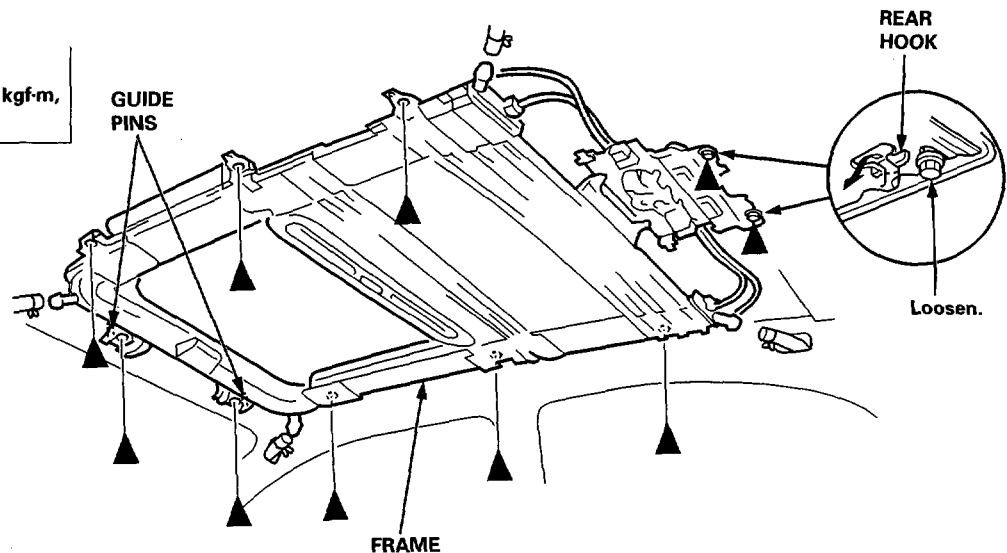
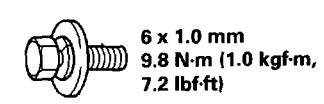
2. Disconnect the motor connector, and remove the relays from the motor bracket. Detach the harness clips from the frame, and disconnect the drain tubes.

▷: **Harness clip locations**



3. Loosen the rear bolts. With an assistant holding the frame, remove the bolts, and release the rear hooks by moving the frame forward, then remove the frame. Take care not to bend the connected portion of the frame and motor bracket.

▷: **Bolt locations, 10**

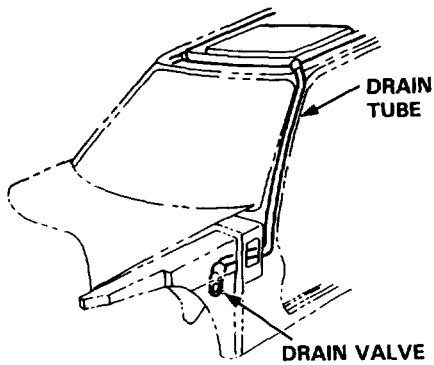


4. With the help of an assistant, carefully remove the frame through the tailgate opening. Take care not to scratch the interior trim and body, or tear the seat covers.



5. Remove each drain valve from the body, and pull the drain tubes out the front and quarter pillars. Before pulling out the drain tube, tie a string to the end of it so it can be reinstalled.

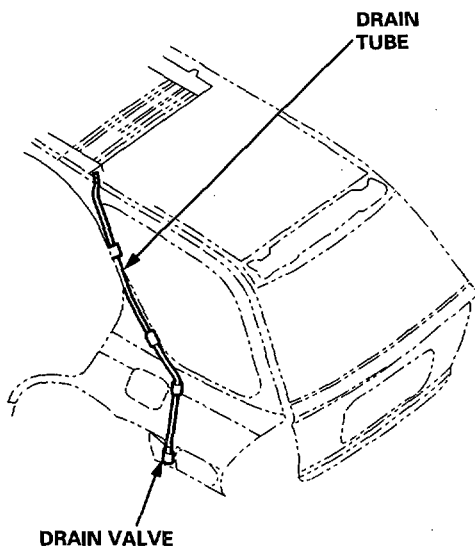
**Front drain tube:**



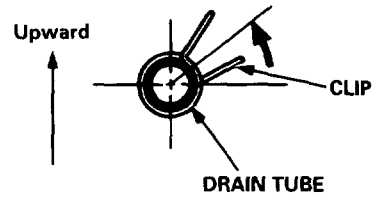
**Rear drain tube:**

Remove the following parts.

- Rear seat-backs (see page 20-85)
- Seat side trim (see page 20-62)
- Cargo floor lid (see page 20-63)
- Rear side upper trim (see page 20-62)
- Rear quarter trim panel (see page 20-62)
- Rear trim panel (see page 20-63)
- Rear side trim panel (see page 20-63)



6. Install in the reverse order of removal, and note these items:
- Before installing the frame, clear the drain tubes and drain valves using compressed air.
  - Check the frame seal.
  - Clean the surface of the frame.
  - When installing the frame, first attach the rear hooks into the body holes.
  - Make sure the connector is plugged in properly.
  - When connecting the drain tube, slide it over the frame nozzle at least 10 mm (0.39 in).
  - Install the tube clip to the drain tube as shown.



7. Check for water leaks. Do not use high-pressure water.



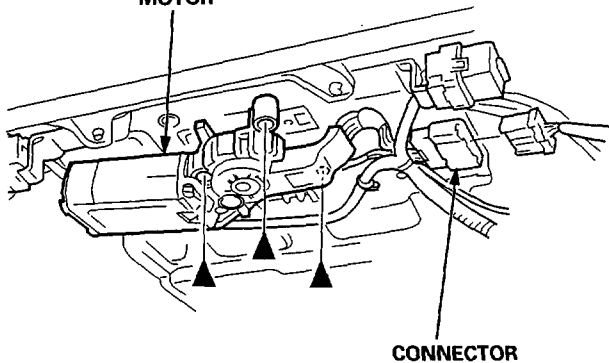
## Motor Replacement

1. Remove the headliner (see page 20-65).
2. Disconnect and detach the connector, and remove the screws with a Torx T20 bit, then remove the motor. Wear gloves to protect your hands.

►: Screw locations, 3



MOTOR



3. Install in the reverse order of removal, and note these items:
  - Make sure the motor is electrically glass fully closed position (see page 20-51).
  - Make sure both cable sliders are parallel, and in the glass fully closed position (see page 20-51).
  - Make sure the connector is plugged in properly.
  - Check the motor operation.

## Drive Unit Assembly Replacement

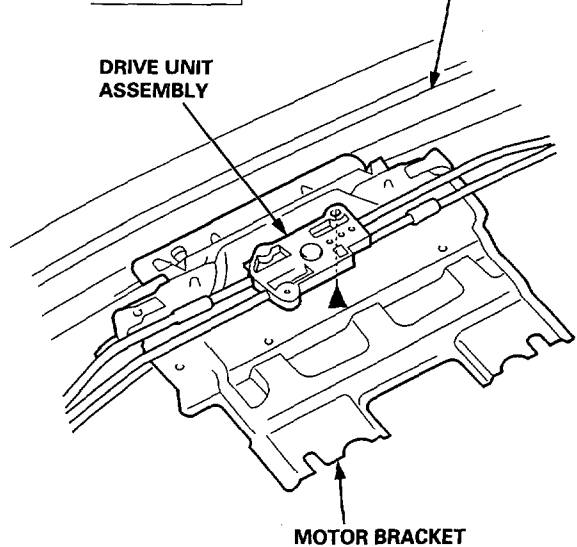
NOTE: Wear gloves to protect your hands.

1. Remove the frame (see page 20-54).
2. Remove the following parts from the frame:
  - Drain channel (see page 20-53)
  - Sunshade (see page 20-53)
  - Motor
3. With a Torx T20 bit, remove the screw from inside of the motor bracket.

►: Screw location, 1

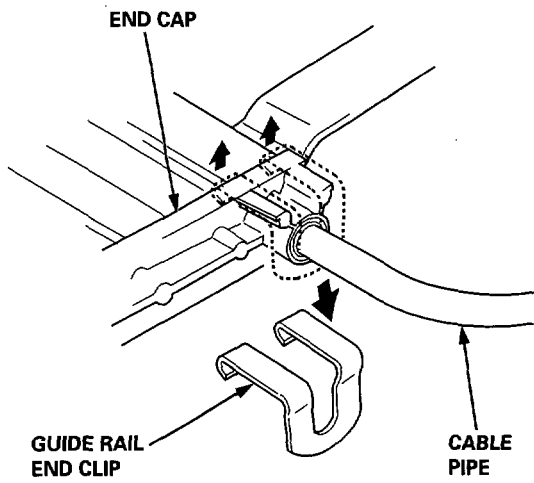


FRAME





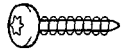
4. Detach the guide rail end clips from both end cap.



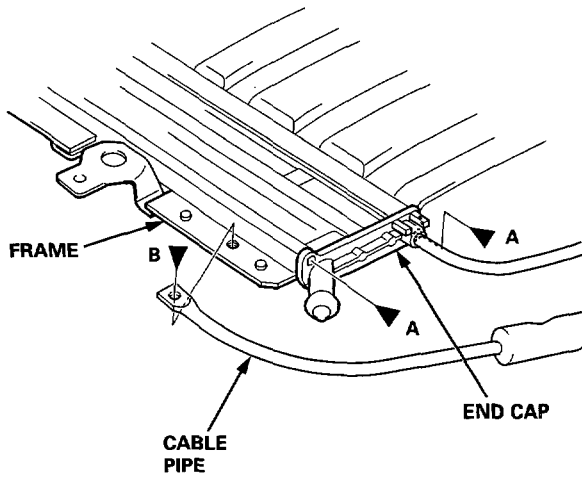
5. With a Torx T20 bit, remove the end cap mounting screws and cable tube mounting screws from both sides of the frame end.

►: Screw locations

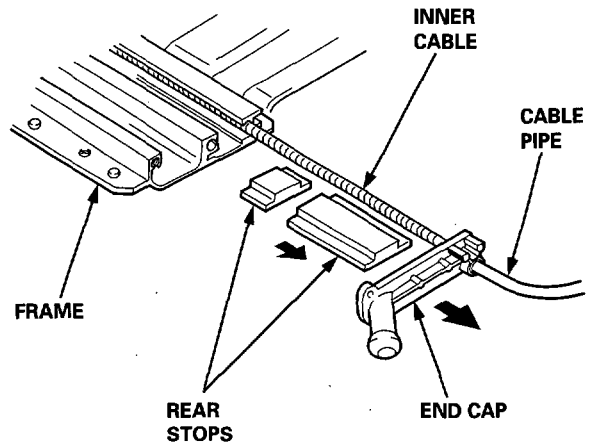
A ►, 4



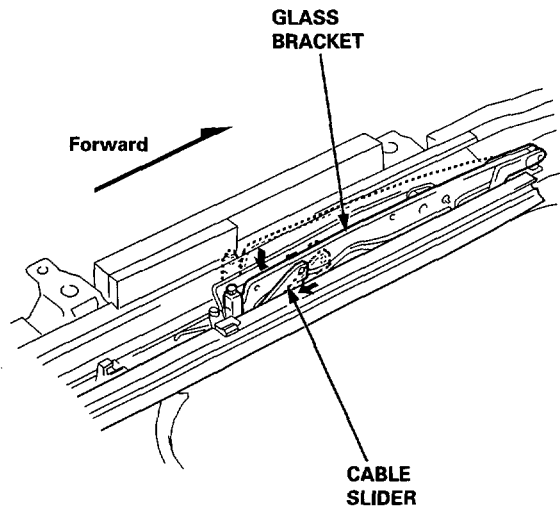
B ►, 2



6. Slide the end caps back, and remove the rear stops from both sides of the frame end.



7. Pivot both glass brackets down by sliding the cable slider back.

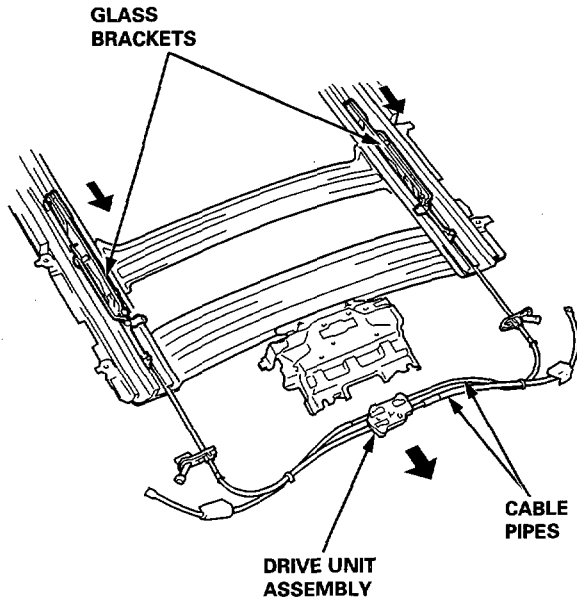


(cont'd)

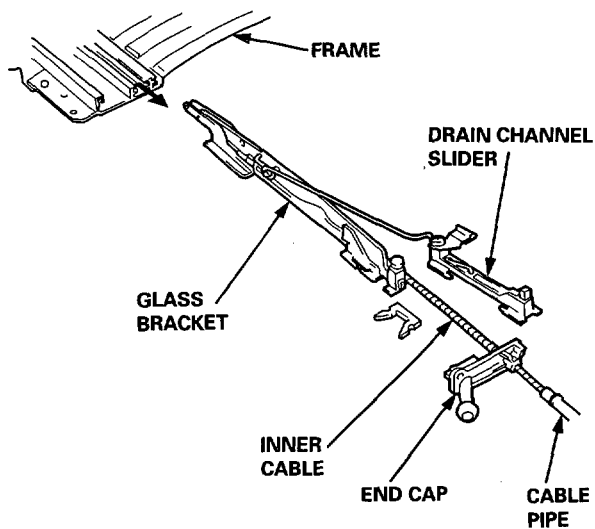
# Sunroof

## Drive Unit Assembly Replacement (cont'd)

8. Slide both glass brackets back. Take care not to bend the cable pipes.

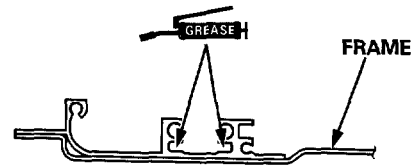


9. Remove the glass brackets and drain channel sliders from both sides of the frame, then remove the drive unit assembly.

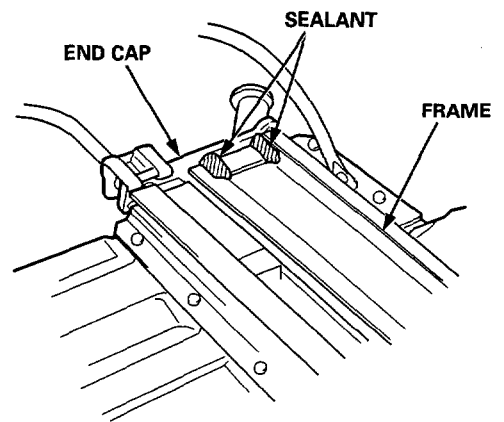


10. Install in the reverse order of removal, and note these items:

- Apply multipurpose grease to the guide rail portion of the frame indicated by the arrows.



- Apply clear sealant to both end caps indicated by the arrows.



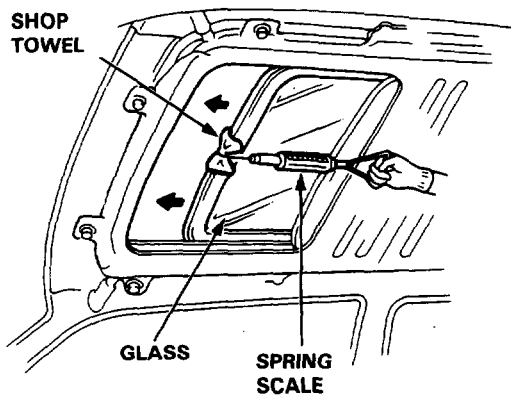
- Make sure the motor is electrically glass fully closed position (see page 20-51).
- Make sure both cable sliders are parallel, and in the glass fully closed position (see page 20-51).
- Before reinstalling the motor, install the frame and glass, then check the opening drag.



## Closing Force and Opening Drag Check

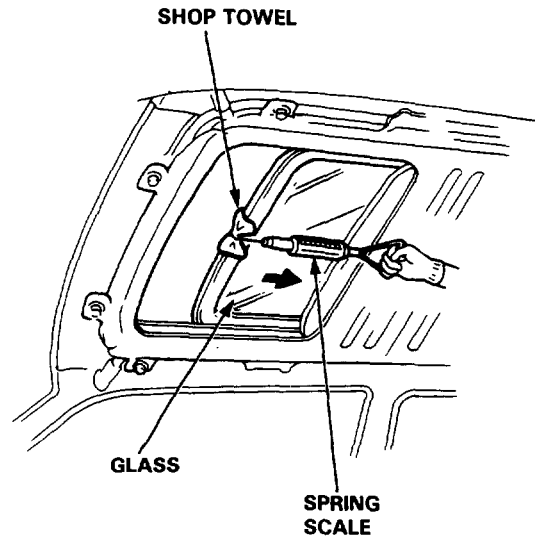
1. Remove the headliner (see page 20-65).
2. Closing force check:
  - With a shop towel on the leading edge of the glass, attach a spring scale as shown.
  - Have an assistant hold the switch to close the glass while you measure the force required to stop it.
  - Read the force as soon as the glass stops moving, then immediately release the switch and spring scale.

**Closing Force: 200 – 290 N**  
(20 – 30 kgf, 44 – 66 lbf)



3. If the force is not within specification, remove the sunroof motor (see page 20-56), then check:
  - The gear portion and the inner cable for breakage and damage. If the gear portion is broken, replace the motor. If the inner cable is damaged, remove the frame (see page 20-54), and replace the drive unit (see page 20-56).
  - The sunroof motor (see section 23). If the motor fails to run or doesn't turn smoothly, replace it.
  - The opening drag.

4. Opening drag check: Protect the leading edge of the glass with a shop towel. Measure the effort required to open the glass using a spring scale as shown.

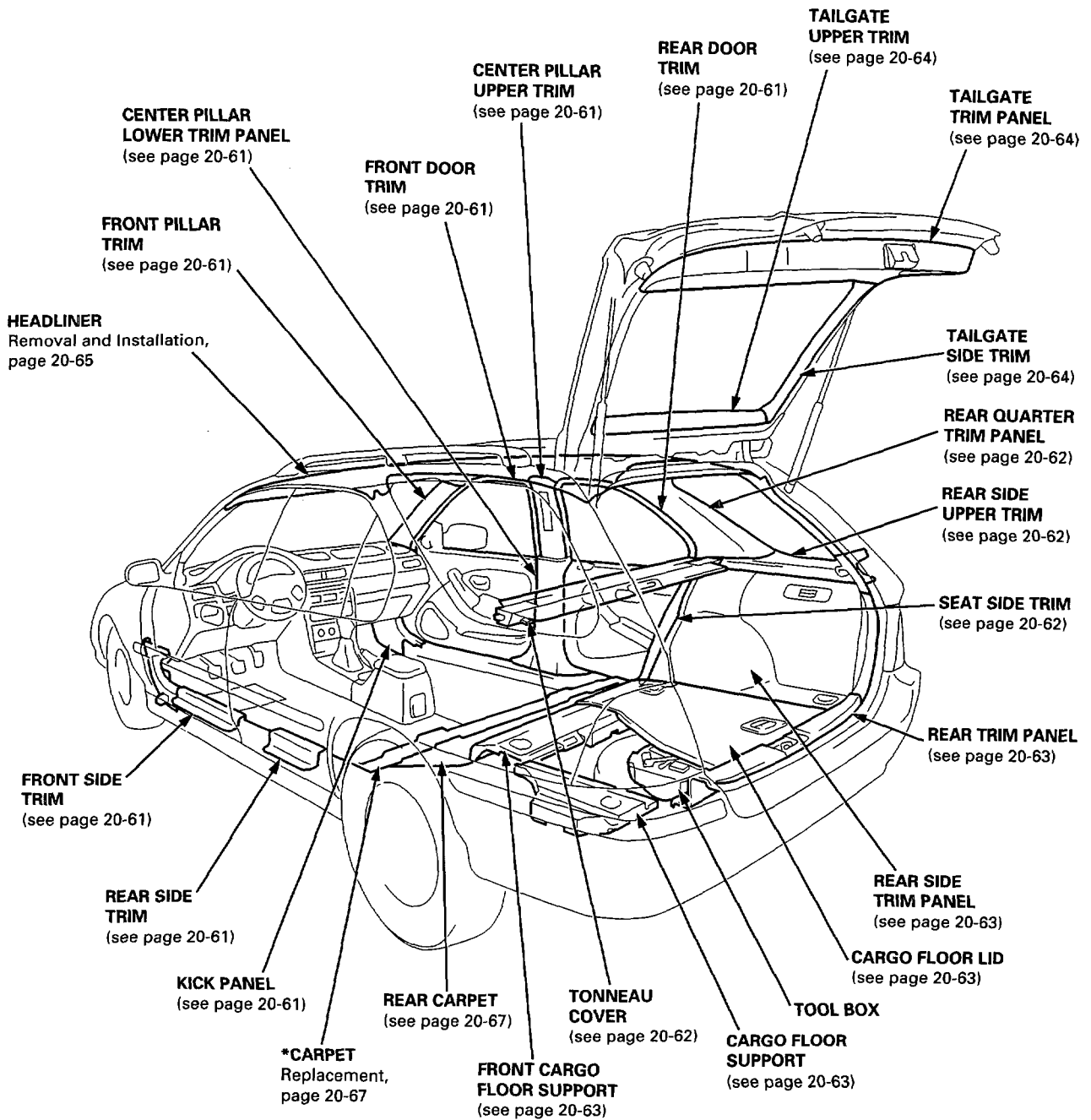


5. If the load is over 40 N (4 kgf, 9 lbf), check:
  - The side clearance and glass height adjustment (see page 20-52).
  - For broken or damaged sliding parts. If any sliding parts are damaged, replace them.

# Interior Trim

## Component Location Index

SRS components are located in the areas marked with an asterisk (\*). Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.



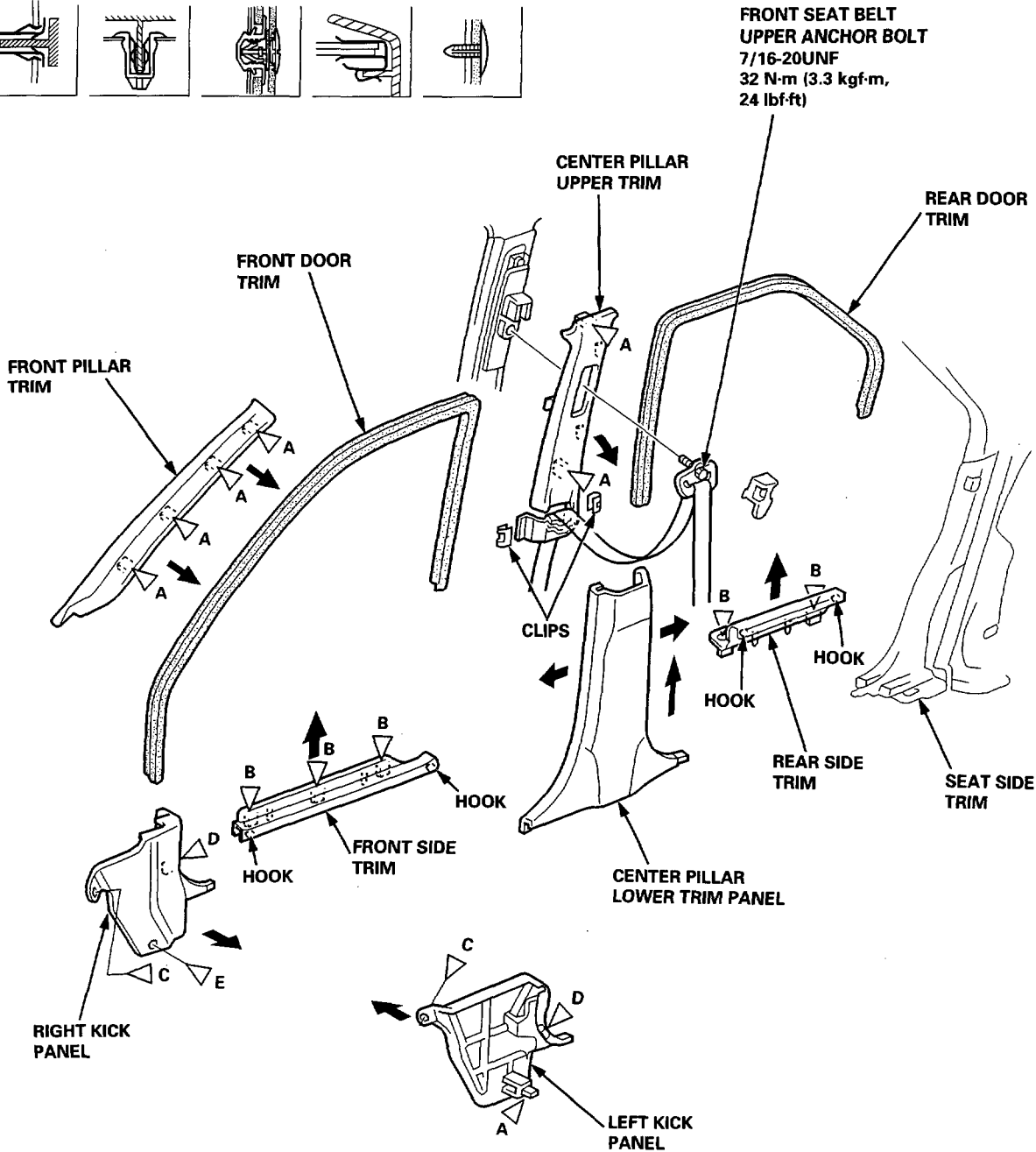
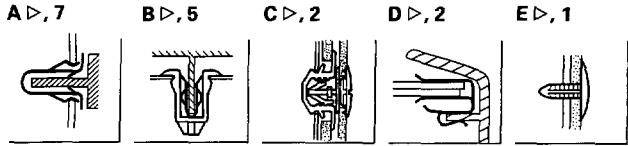


# Trim Removal and Installation

**NOTE:**

- When prying with a flat-tip screwdriver, wrap it with protective tape to prevent damage.
- Take care not to bend or scratch the trim and panels.
- Wear gloves to protect your hands.

▷: Clip locations



(cont'd)

# Interior Trim

## Trim Removal and Installation (cont'd)

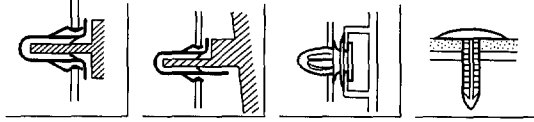
▷: Clip locations

A▷, 7

B▷, 4

C▷, 2

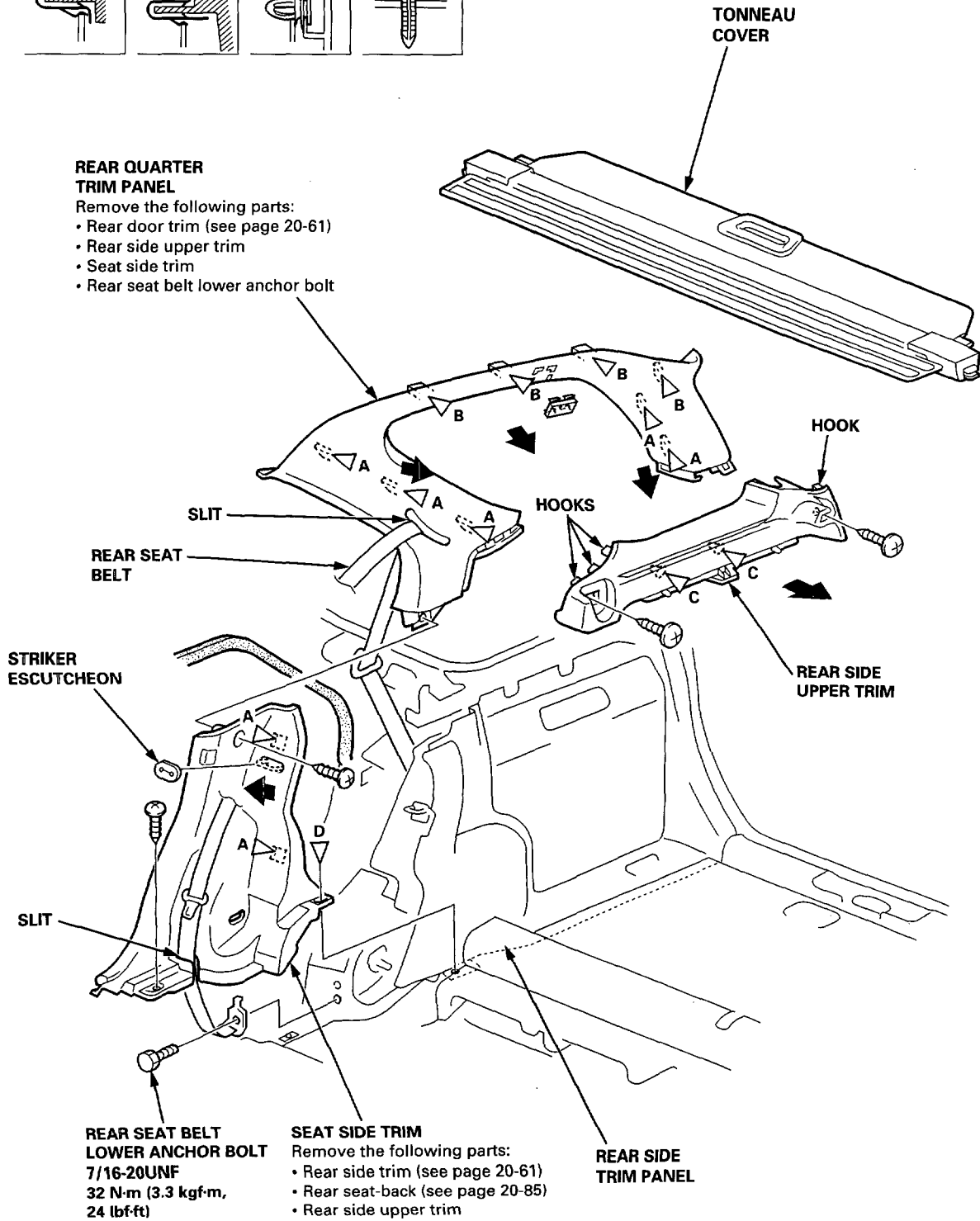
D▷, 1



### REAR QUARTER TRIM PANEL

Remove the following parts:

- Rear door trim (see page 20-61)
- Rear side upper trim
- Seat side trim
- Rear seat belt lower anchor bolt

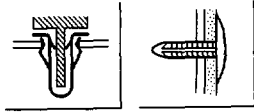




▷: Clip locations

A ▷, 7

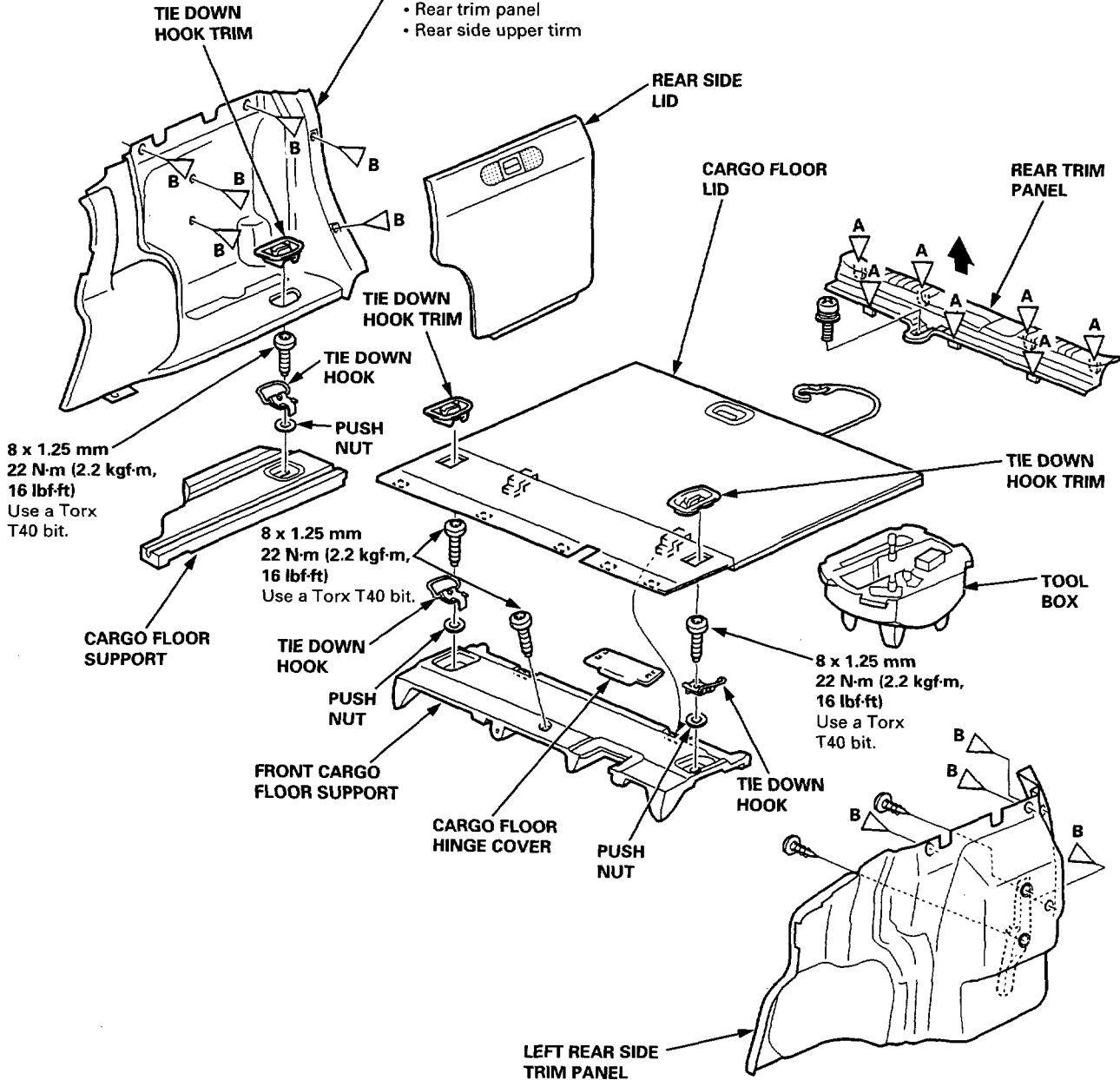
B ▷, 10



**RIGHT REAR SIDE TRIM PANEL**

Remove the following parts:

- Cargo floor lid
- Rear trim panel
- Rear side upper trim



(cont'd)

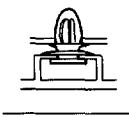


# Interior Trim

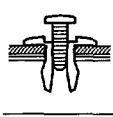
## Trim Removal and Installation (cont'd)

▷: Clip locations

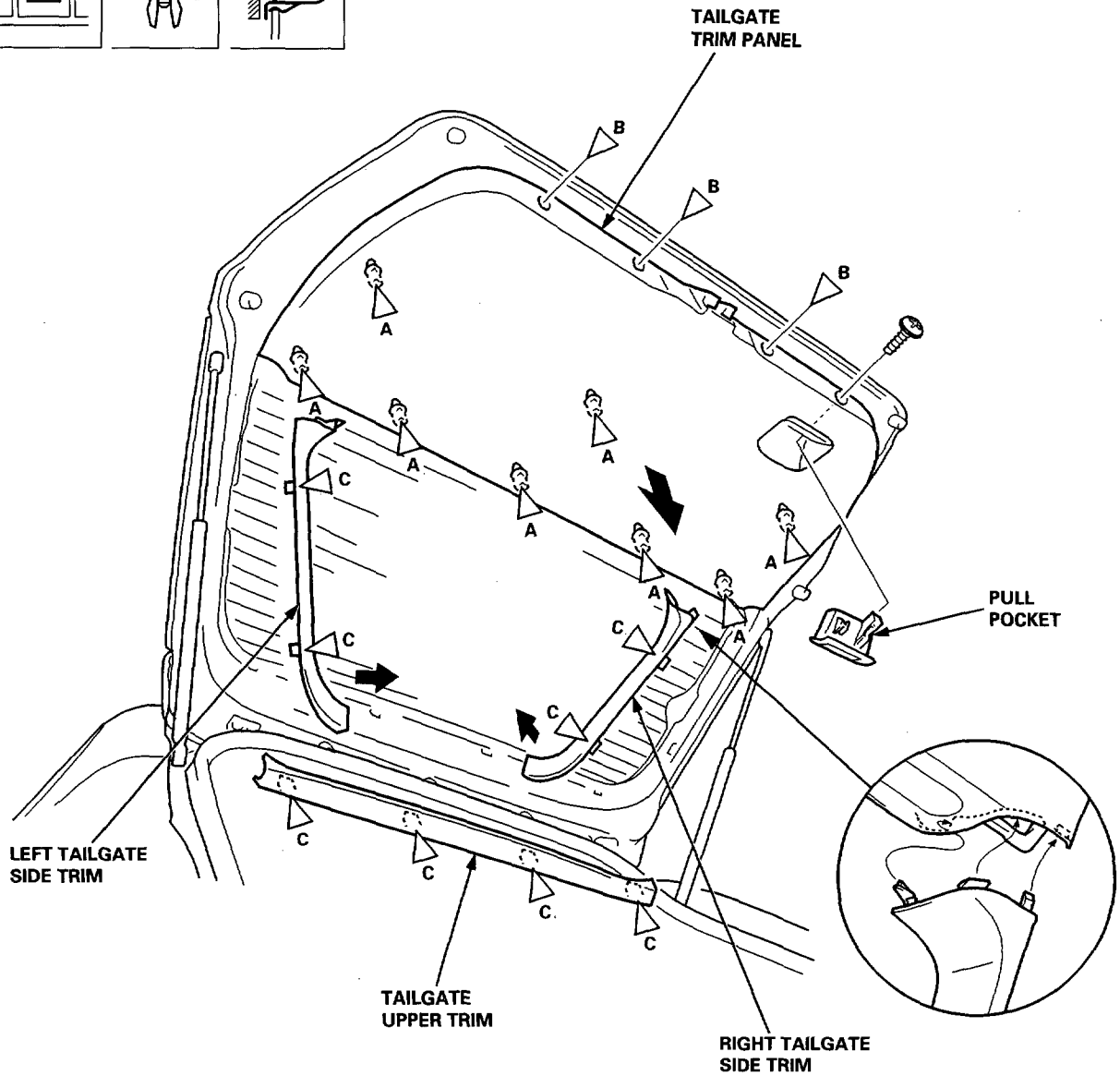
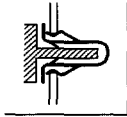
A ▷, 8



B ▷, 3



C ▷, 8



Install in the reverse order of removal, and note these items:

- Replace any damaged clips.
- Apply liquid thread lock to the front seat belt upper anchor bolt and rear seat belt lower anchor bolt before reinstallation.
- Before installing the anchor bolts, make sure there are no twists or kinks in the seat belts.



## Headliner Removal and Installation

### NOTE:

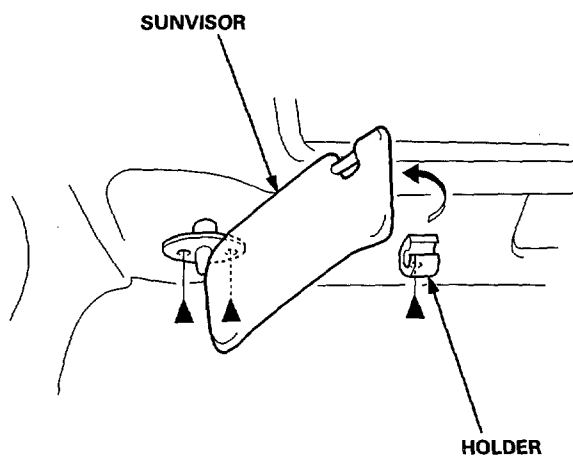
- When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.
- Take care not to bend and scratch the headliner.
- Be careful not to damage the dashboard and other interior trim.

### 1. Remove:

- Front side trim (both sides, see page 20-61)
- Rear side trim (both sides, see page 20-61)
- Center pillar lower trim panel (both sides, see page 20-61)
- Front door trim (both sides, as necessary, see page 20-61)
- Front pillar trim (both sides, see page 20-61)
- Rear door trim (both sides as necessary, see page 20-61)
- Front seat belt upper anchor bolt (both sides, see page 20-61)
- Center pillar upper trim (both sides, see page 20-61)
- Ceiling lights (see section 23)
- Ultra sonic sensor unit (for some model, see section 23)

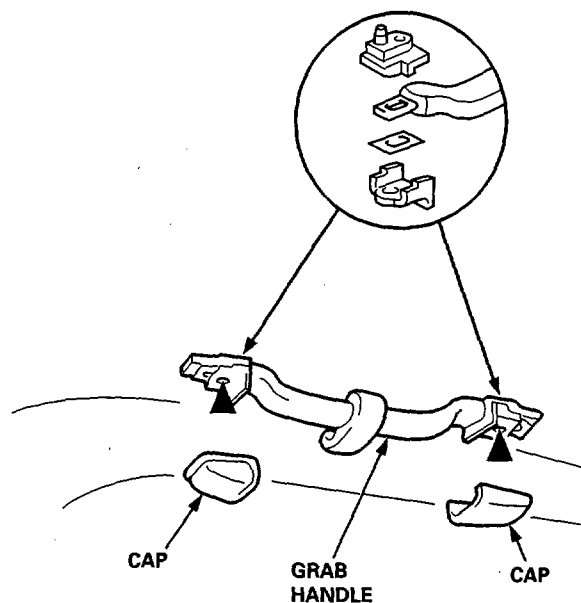
### 2. Remove the sunvisor and holder from each side.

#### ►: Screw locations, 6

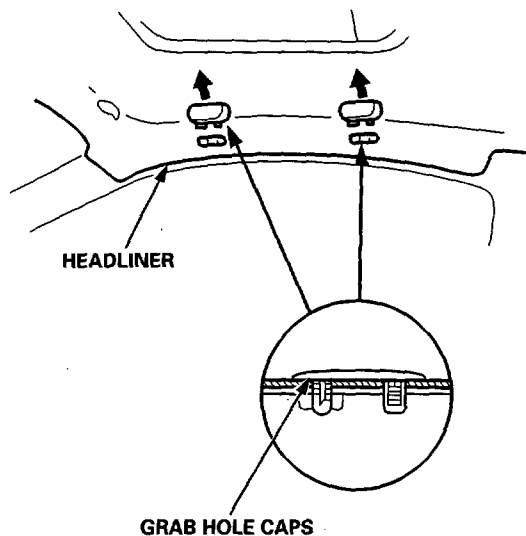


### 3. Remove the grab handles (front and rear passenger's).

#### ►: Bolt locations, 6



### 4. Remove the grab hole caps (driver's).



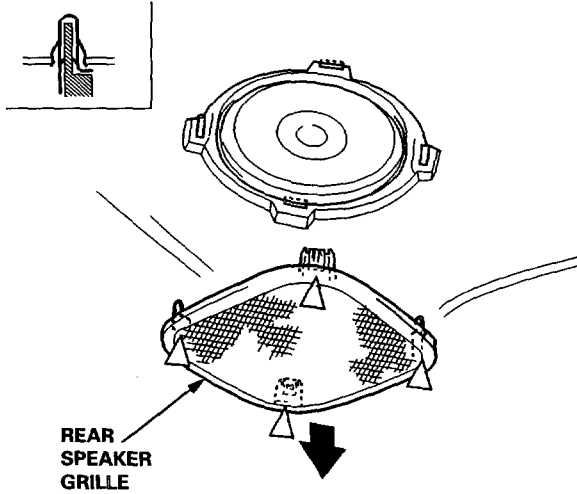
(cont'd)

# Interior Trim

## Headliner Removal and Installation (cont'd)

5. Remove the rear speaker grilles from rear both sides.

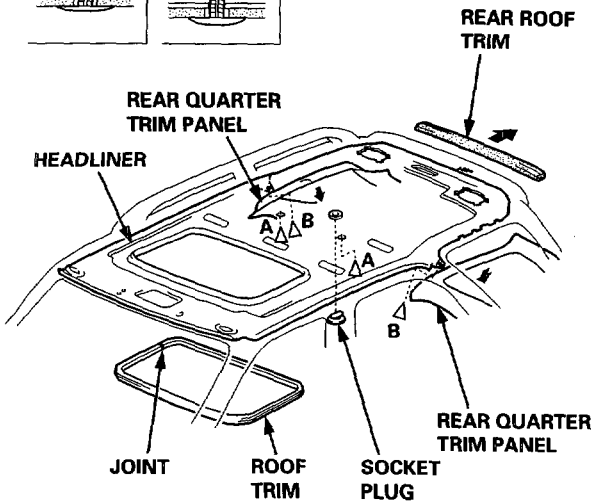
▷: Clip locations, 8



6. Remove the headliner.
- 1 Remove the upper portion of the rear quarter trim panel from each side (see page 20-62).
  - 2 Remove the rear roof trim.
  - 3 For sunroof model: remove the socket plug and roof trim.
  - 4 With help of an assistant, release the clips, and lower the headliner.
  - 5 Remove the headliner through the tailgate opening.

▷: Clip locations

A ▷, 2      B ▷, 2



7. Install in the reverse order of removal, and note these items:

- When reinstalling the headliner through the tailgate opening, be careful not to fold or bend it. Also, be careful not to scratch the body.
- For sunroof model: When reinstalling the roof trim, install the joint toward the right side.
- Check that both sides of the headliner are securely attached to the trim.



## Carpet Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

### NOTE:

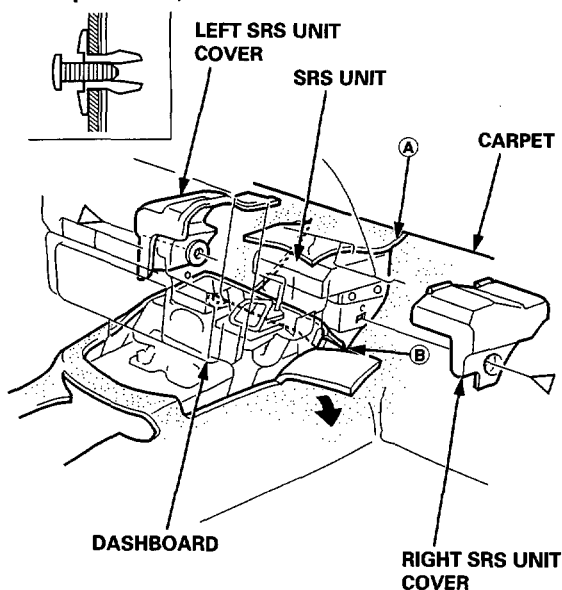
- Wear gloves to protect your hands.
- Take care not to damage, wrinkle or twist the carpet.
- Be careful not to damage the dashbord or other interior trim pieces.
- LHD is shown, RHD is symmetrical.

### 1. Remove:

- Front seats (both sides, see page 20-79)
- Front and rear consoles (see page 20-69)
- Rear seat cushion (see page 20-85)
- Front side trim (both sides, see page 20-61)
- Rear side trim (both sides, see page 20-61)
- Center pillar lower trim panel (both sides, see page 20-61)
- Kick panel (both sides, see page 20-61)
- Front seat belt lower anchor bolt (both sides, see section 24)
- Fuel lid opener cover (see page 20-118)

### 2. Remove the clips, then remove the SRS unit cover from each side.

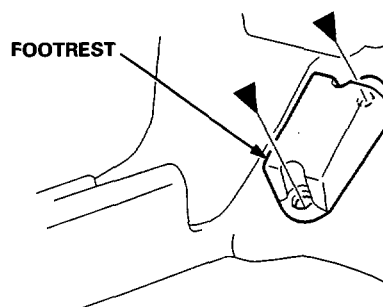
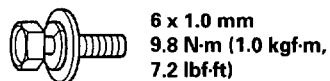
#### ▷: Clip locations, 2



### 3. Cut areas A and B in the carpet at the passenger's side, then pull it back as shown.

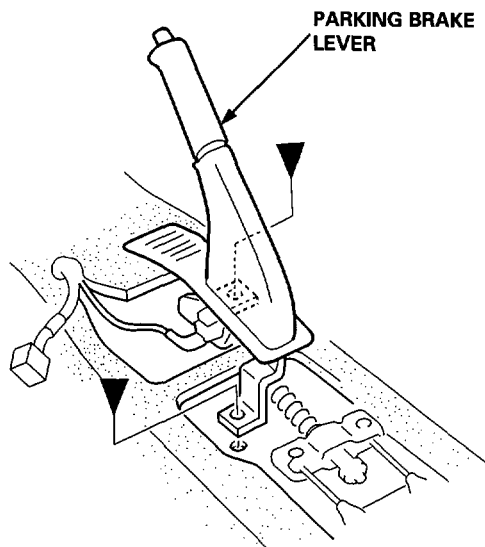
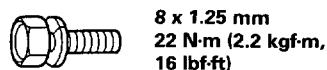
### 4. If so equipped, remove the footrest.

#### ▷: Bolt locations, 2



### 5. Remove the bolts from the parking brake lever.

#### ▷: Bolt locations, 2



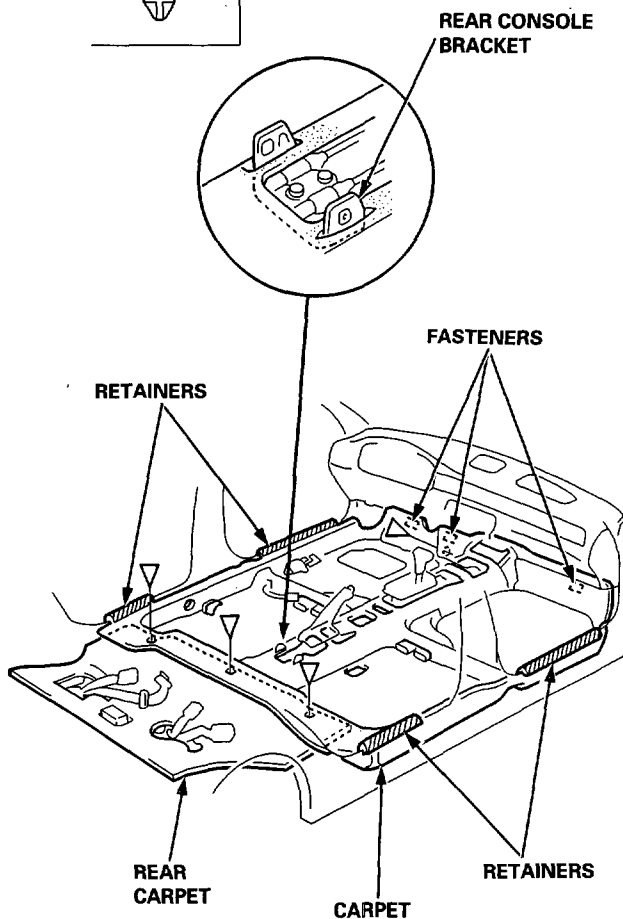
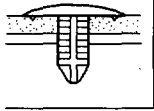
(cont'd)

# Interior Trim

## Carpet Replacement (cont'd)

6. Remove the clips, and release the retainers and fasteners, then remove the carpet and rear carpet. Wear gloves to protect your hands.

▷: Clip locations, 4



7. Remove:
- Rear seat-back (both sides, see page 20-85)
  - Seat side trim (both sides, see page 20-62)
  - Cargo floor lid (see page 20-63)
  - Front cargo floor support (see page 20-63)
8. Remove the rear carpet.

9. Install in the reverse order of removal, and note these items:
- Take care not to damage, wrinkle or twist the carpets.
  - Reattach the cut areas (A) and (B) in the carpet with a wire tie.
  - Make sure the seat harnesses are routed correctly (with seat heater).
  - Slip the slits in the carpet over the rear console bracket.
  - Replace any damaged clips.



## Front and Rear Consoles Removal and Installation

**NOTE:**

- When prying with a flat-tip screwdriver, wrap it with protective tape to prevent damage.
- Take care not to scratch the front seat, dashboard and related parts.
- LHD is shown, RHD is symmetrical.

►: Screw locations

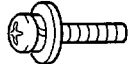
A ►, 4



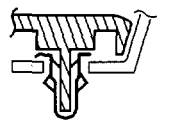
B ►, 3



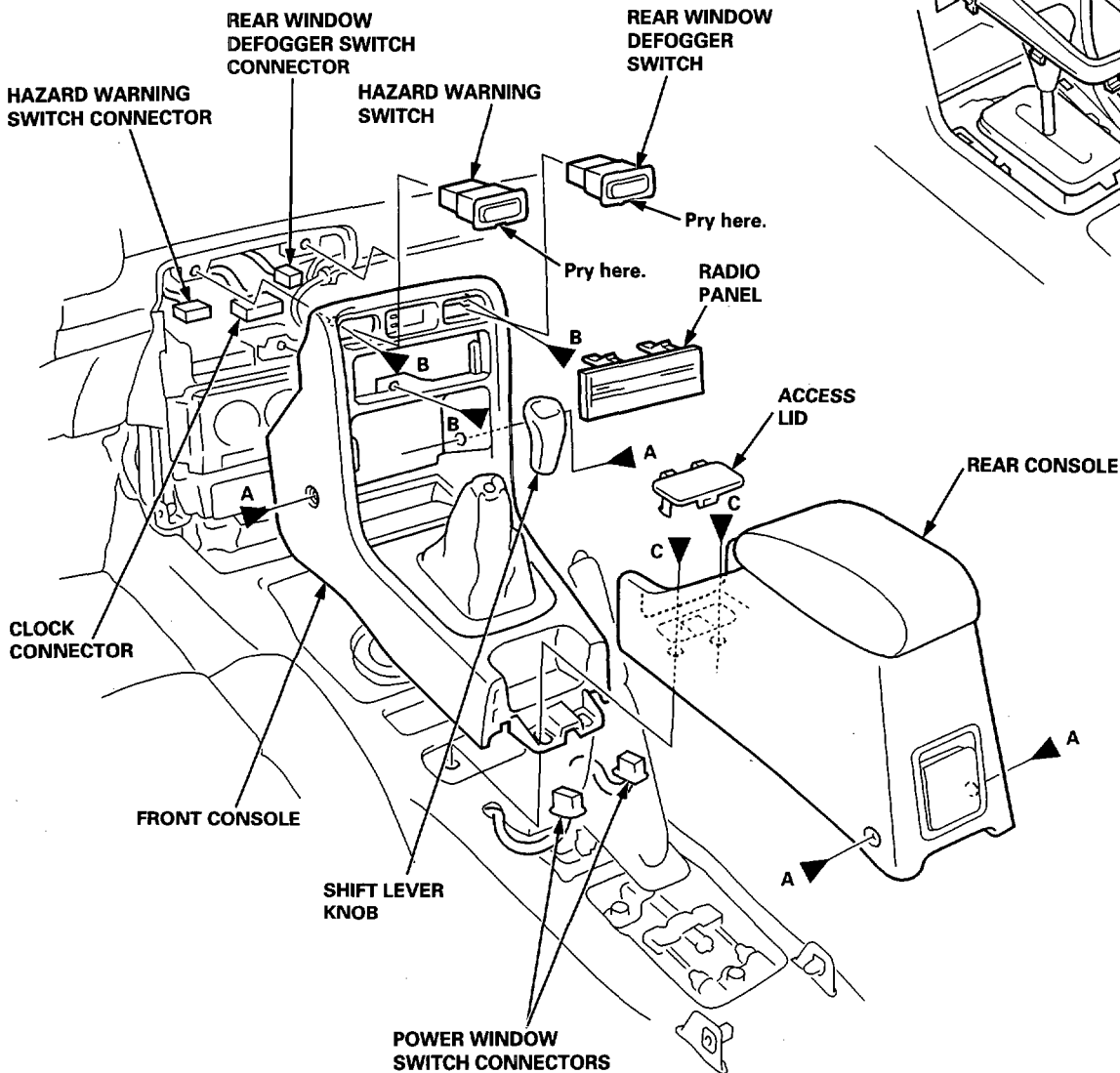
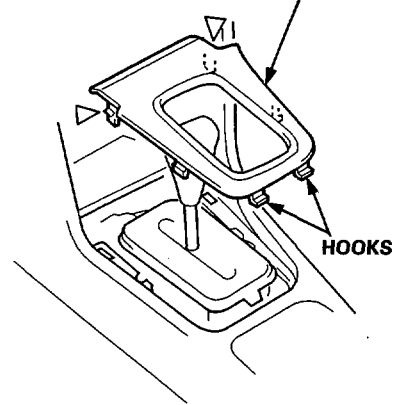
C ►, 2



▷: Clip locations, 2



A/T model:  
FRONT CONSOLE LOWER PANEL



Install in the reverse order of removal, and note these items:

- Replace any damaged clips.
- Make sure the connectors are plugged in properly.

# Dashboard

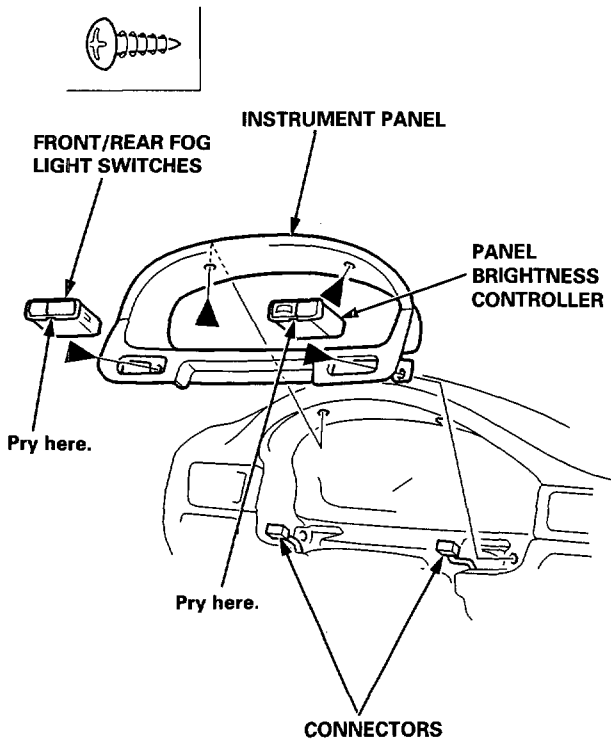
## Instrument Panel Removal and Installation

### NOTE:

- When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts, to prevent damage.
- Take care not to scratch the dashboard and related parts.
- LHD is shown, RHD is symmetrical (except switch locations).

1. Pull the front/rear fog light switches and panel brightness controller out, and disconnect the connectors.

### ►: Screw locations, 4



2. Tilt the steering column down.
3. Remove the screws, then carefully remove the instrument panel.
4. Install in the reverse order of removal; make sure the connectors are plugged in properly.

## Dashboard Lower Cover Removal and Installation

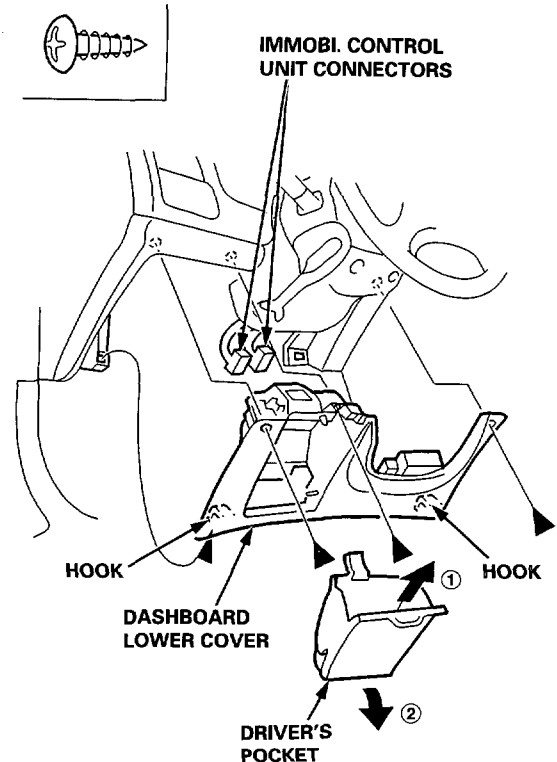
SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

### NOTE:

- Take care not to scratch the dashboard and related parts.
- LHD is shown, RHD is symmetrical.

1. Remove the driver's pocket.

### ►: Screw locations, 3



2. Remove the screws.
3. Release the hooks, then remove the dashboard lower cover by disconnecting the immobi. control unit connectors.
4. Install in the reverse order of removal; make sure the immobi. control unit connectors are plugged in properly.

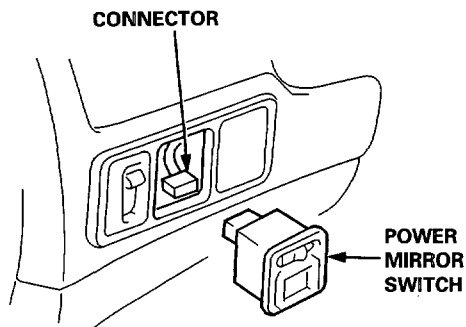


## Power Mirror Trim Removal and Installation

### NOTE:

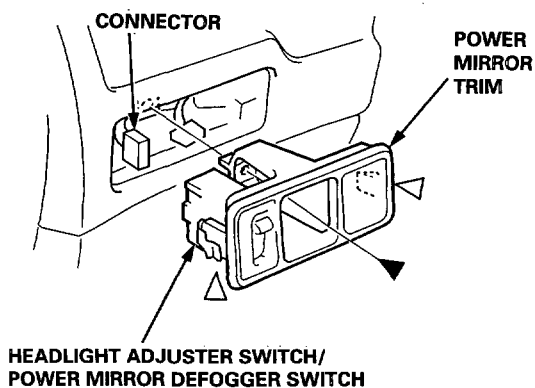
- When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts, to prevent damage.
- Take care not to scratch the dashboard and related parts.
- LHD is shown, RHD is symmetrical.

1. Pull the power mirror switch or hole lid (with manual mirror) out, and disconnect the connector (with power mirror).



2. Remove the screw, and detach the clips, then pull the power mirror trim out. Disconnect the headlight adjuster switch connector or power mirror defogger switch connector (for some models).

►: Screw location, 1    ▷: Clip locations, 2



3. Install in the reverse order of removal; make sure the connectors are plugged in properly.

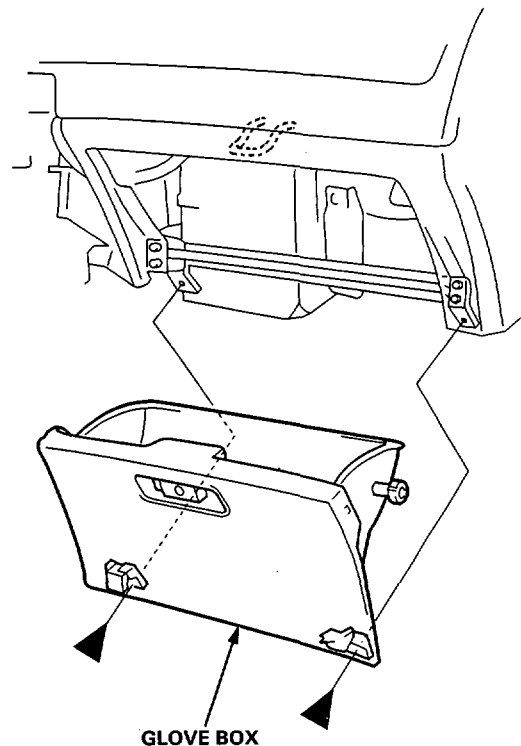
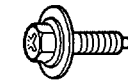
## Glove Box Removal and Installation

### NOTE:

- Take care not to scratch the dashboard and related parts.
- LHD is shown, RHD is symmetrical.

1. Remove the bolts, then remove the glove box.

►: Bolt locations, 2



2. Install in the reverse order of removal.



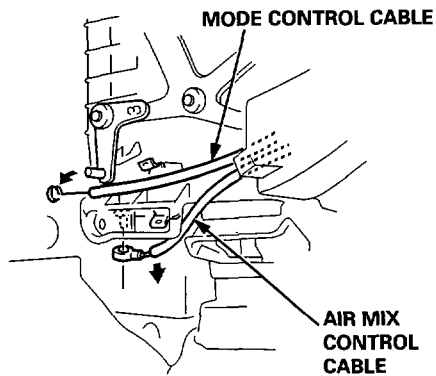
# Dashboard

## Heater Control Panel Removal and Installation

**NOTE:**

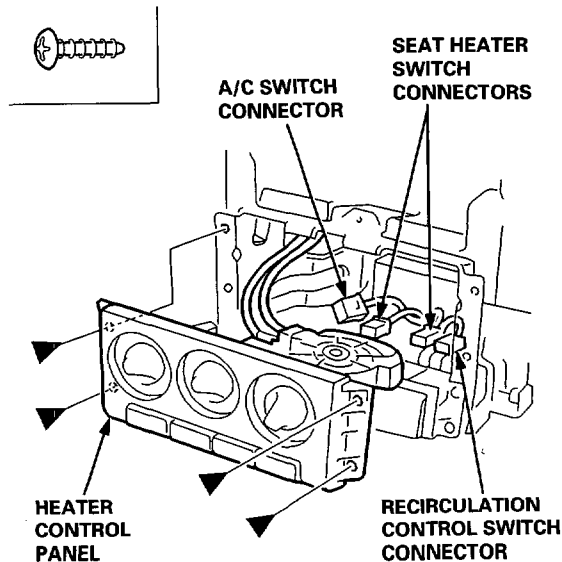
- Take care not to scratch the dashboard and related parts.
- Wear gloves to protect your hands.

1. Remove the rear console and front console (see page 20-69).
2. Disconnect the mode control cable and air mix control cable.



3. Remove the screws, and pull the heater control panel out, then disconnect the recirculation control switch connector, A/C switch connector (for some models) and seat heater switch connectors (for some models).

►: Screw locations, 4



4. Install in the reverse order of removal; adjust the control cables as necessary (see section 21).

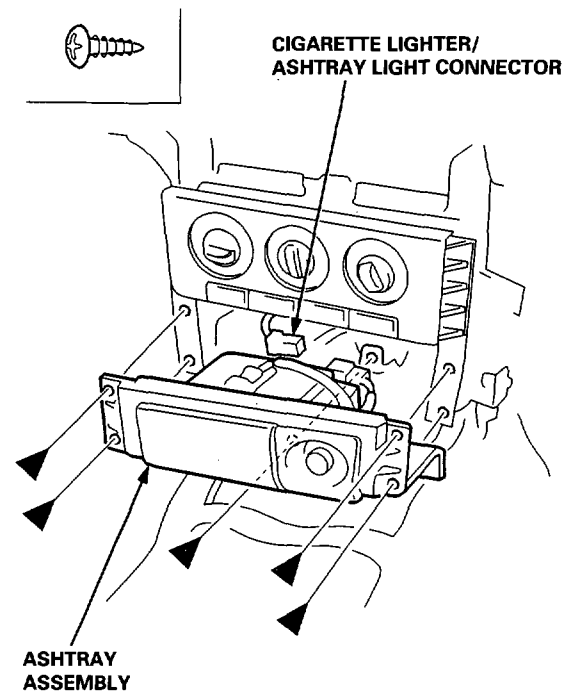
## Ashtray Assembly Removal and Installation

**NOTE:**

- Take care not to scratch the dashboard and related parts.
- Wear gloves to protect your hands.

1. Remove the rear console and front console (see page 20-69).
2. Remove the screws, and pull the ashtray assembly out, then disconnect the cigarette lighter/ashtray light connector.

►: Screw locations, 5



3. Install in the reverse order of removal; make sure the cigarette lighter/ashtray light connector is plugged in properly.



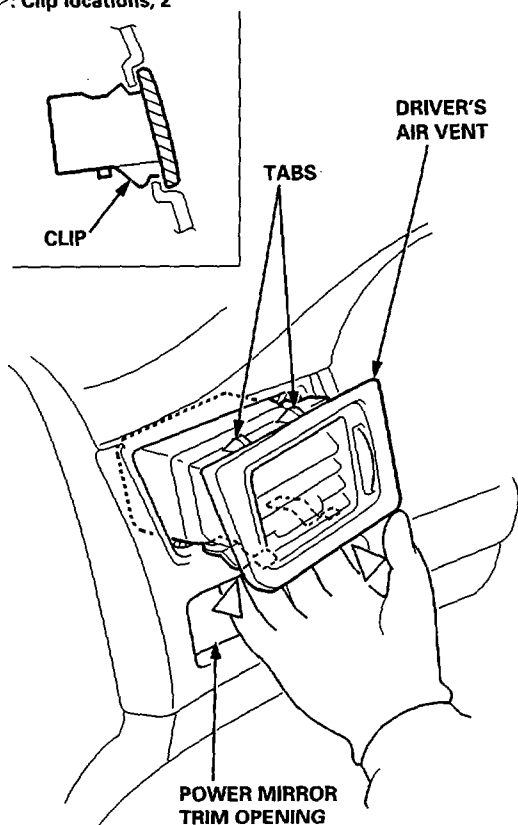
## Driver's Air Vent Removal and Installation

### NOTE:

- Wear gloves to protect your hands.
- LHD is shown, RHD is symmetrical.

1. Remove the power mirror trim (see page 20-71).
2. Push the clips from the power mirror trim opening by hand. Release the retaining tabs, and remove the air vent.

▷: Clip locations, 2



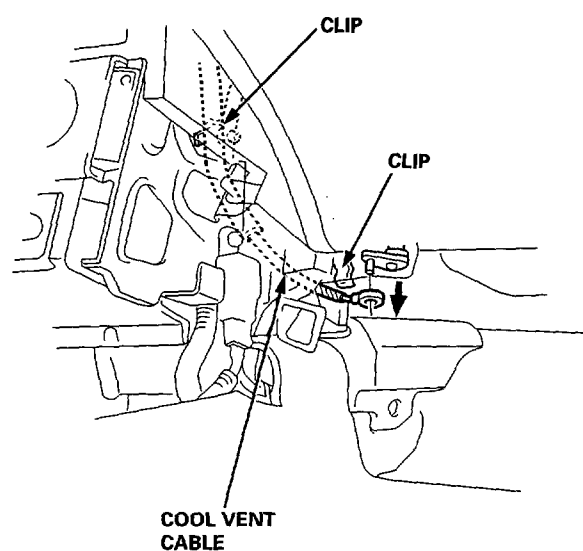
3. Install the retaining tub portions of the air vent, and push the clip portions into place securely.

## Passenger's Air Vent Removal and Installation

### NOTE:

- Wear gloves to protect your hands.
- LHD is shown, RHD is symmetrical.

1. Remove:
  - Rear console (see page 20-69)
  - Front console (see page 20-69)
  - Instrument panel (see page 20-70)
2. Disconnect the cool vent cable, and release it from the clips.



(cont'd)

# Dashboard

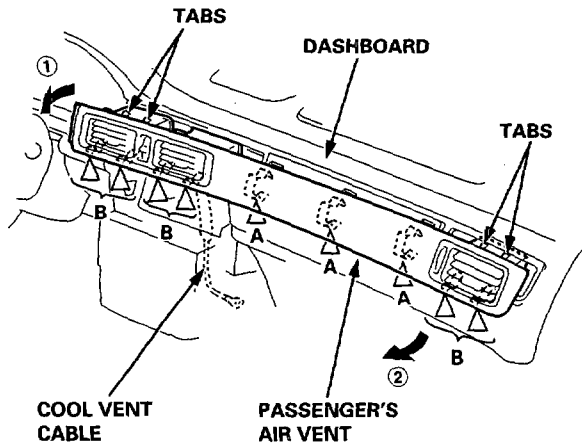
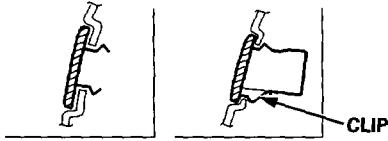
## Passenger's Air Vent Removal and Installation (cont'd)

3. Wrap a flat-tip screwdriver with protective tape, and apply protective tape around the related parts, to prevent damage. Carefully insert a flat-tip screwdriver next to the clip, and detach the clips by prying on the passenger's air vent. Take care not to scratch the dashboard and related parts.

▷: Clip locations

A ▷, 3

B ▷, 6

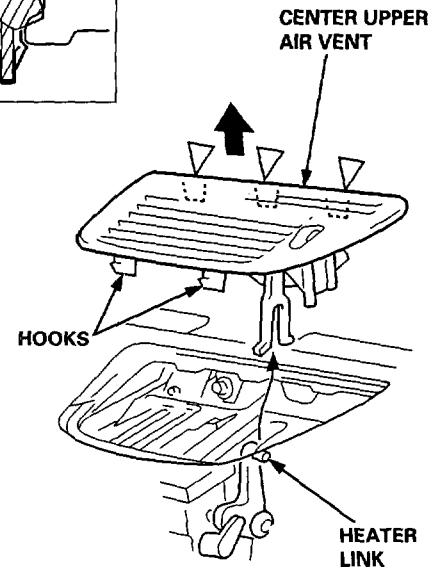
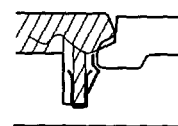


4. Release the retaining tabs, and remove the passenger's air vent.
5. Install in the reverse order of removal, and note these items:
  - Adjust the cool vent cable as necessary (see section 21).
  - Make sure the cool vent cable is connected properly.

## Center Upper Air Vent Removal and Installation

1. Wrap a flat-tip screwdriver with protective tape, and apply protective tape around the related parts, to prevent damage. Carefully insert a flat-tip screwdriver next to the clip, and detach the clips by prying on the center upper air vent. Take care not to scratch the dashboard and related parts.

▷: Clip locations, 3



2. Release the hooks, and remove the center upper air vent.
3. Connect the center upper air vent to the heater link, then install the hook portions of the center upper air vent, and push the clip portions into place securely.

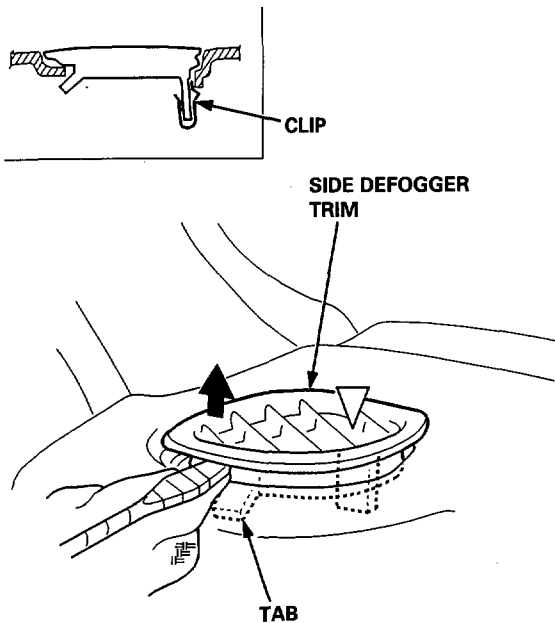


## Side Defogger Trim Removal and Installation

NOTE: LHD is shown, RHD is symmetrical.

1. Wrap a flat-tip screwdriver with protective tape, and apply protective tape around the related parts, to prevent damage. Carefully insert a flat-tip screwdriver next to the retaining tab, and detach the retaining tab by prying on the side defogger trim. Take care not to scratch the dashboard and related parts.

▷: Clip location, 1



2. Pull the side defogger trim out by releasing the clips.
3. Install the retaining tab portion of the side defogger trim, and securely push the clips into place.

## Dashboard Removal and Installation

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

NOTE:

- When prying with a flat-tip screwdriver, wrap it with protective tape, and apply protective tape around the related parts, to prevent damage.
- An assistant is helpful when removing and installing the dashboard.
- Take care not to scratch the dashboard, body and other related parts.
- Wear gloves to protect your hands.
- LHD is shown, RHD is symmetrical.

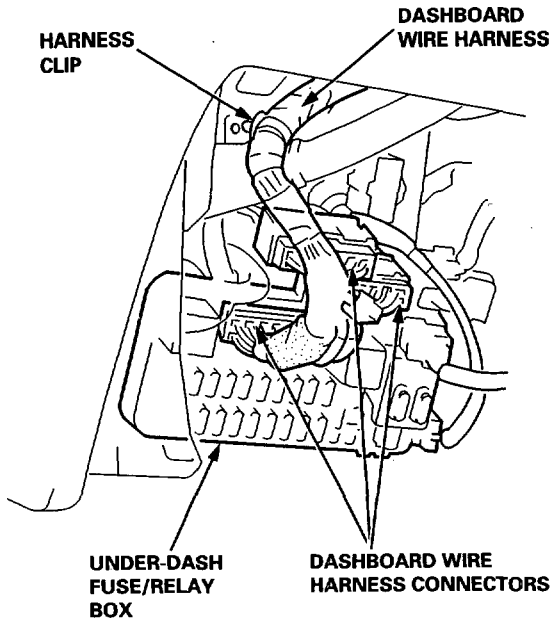
1. Remove:
  - Rear console (see page 20-69)
  - Front console (see page 20-69)
  - Dashboard lower cover (see page 20-70)
  - Glove box (see page 20-71)
  - Heater control panel (see page 20-72)
  - Ashtray assembly (see page 20-72)
  - Center upper air vent
2. Disconnect the cool vent cable (see page 20-73).
3. Disconnect the driver's airbag connector, and lower the steering column (see section 17). To prevent damage to the steering column, wrap it with a shop towel.

(cont'd)

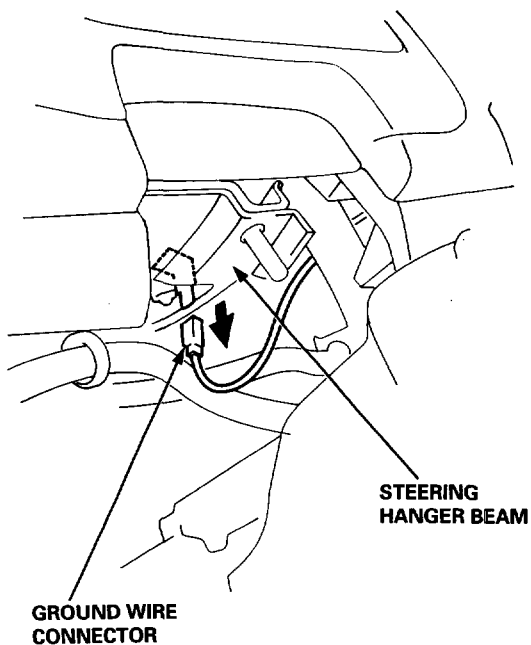
# Dashboard

## Dashboard Removal and Installation (cont'd)

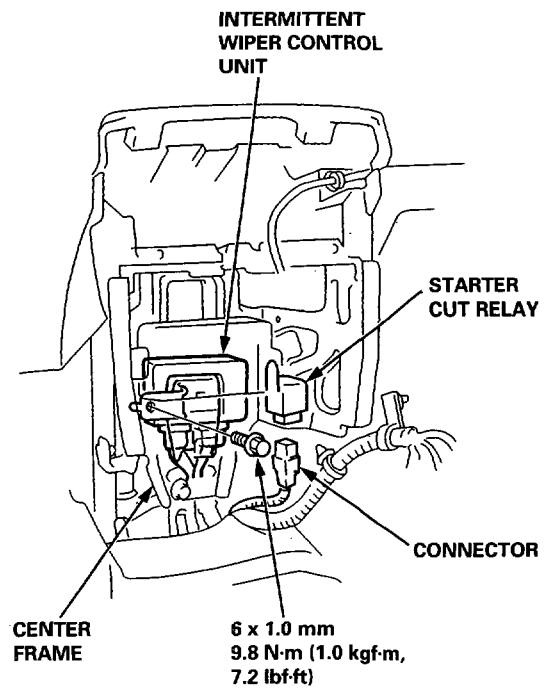
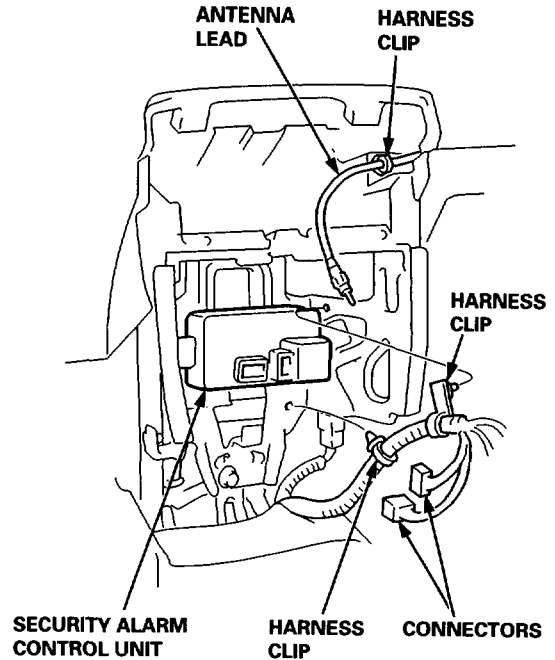
4. From under the dash, disconnect the dashboard wire harness connectors, and detach the harness clip.



5. From the steering hanger beam, disconnect the ground wire connector.



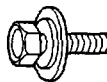
6. From center portion, disconnect the connectors, and detach the harness clips. Remove the bolt, then remove the intermittent wiper control unit from the center frame.





7. Disconnect the front passenger's airbag connector, and remove the front passenger's airbag mounting nuts.

▶: Bolt locations, 6

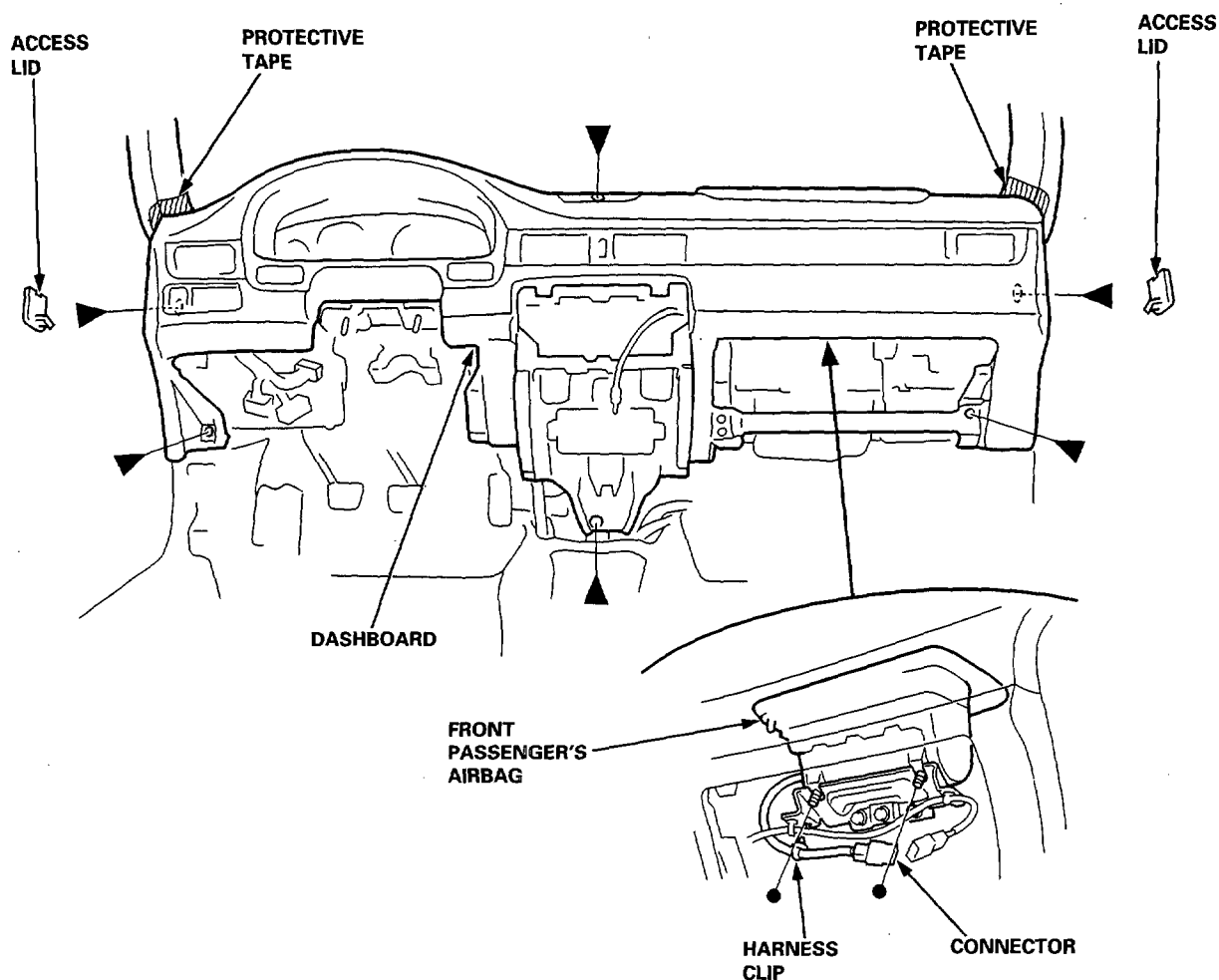


6 x 1.0 mm  
9.8 N·m (1.0 kgf·m,  
7.2 lbf·ft)

●: Nut locations, 2



6 x 1.0 mm  
9.8 N·m (1.0 kgf·m,  
7.2 lbf·ft)



8. Wrap the shift lever and A/T gear position indicator panel with a shop towel, and apply protective tape on the bottom of the front pillar trim, to prevent damage.
9. From outside both doors, remove the access lids. Remove the bolts, and lift up and remove the dashboard.
10. Carefully remove the dashboard through the door opening.
11. Install in the reverse order of removal, and note these items:
  - Make sure the dashboard fits onto the body correctly.
  - Before tightening the bolts, make sure the dashboard wire harness and cool vent cable are not pinched.
  - Make sure the connectors are plugged in properly.

# Seats

## Component Location Index

### REAR SEAT

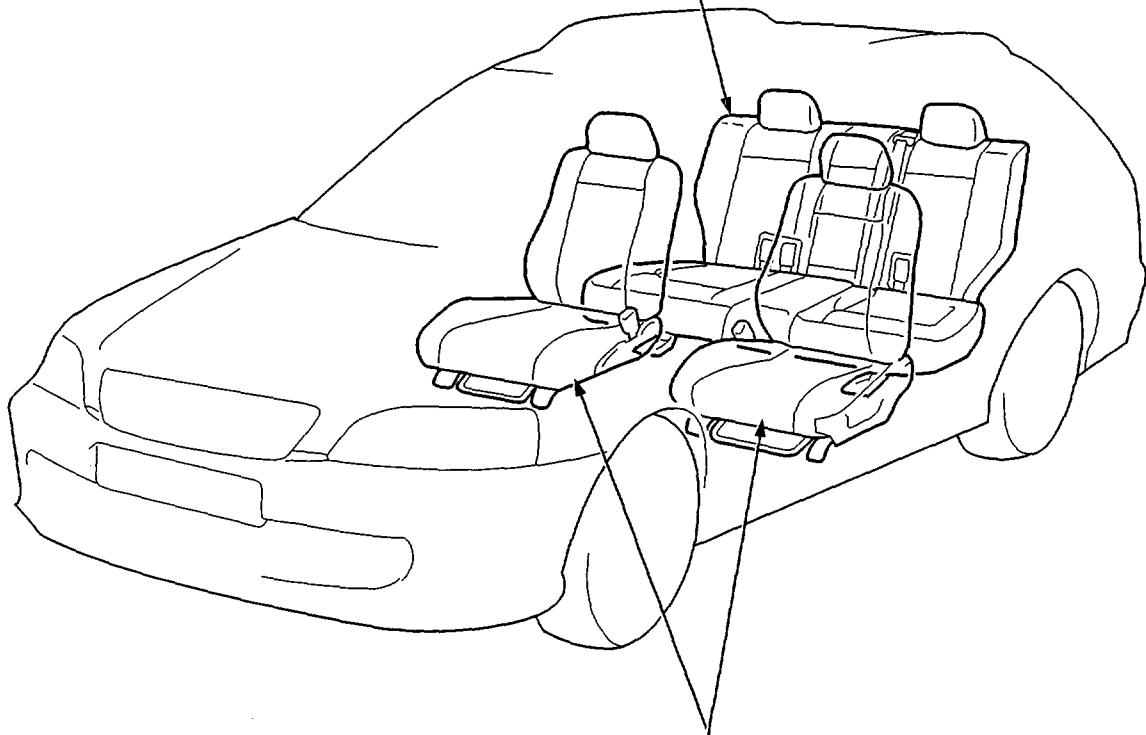
Removal and Installation, page 20-85

Armrest Replacement, page 20-86

Seat-back Latch Replacement, page 20-86

Seat-back Striker Replacement, page 20-87

Seat Cover Replacement, page 20-87



### FRONT SEATS

Removal and Installation, page 20-79

Disassembly and Reassembly, page 20-80

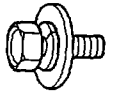
Seat Cover Replacement, page 20-82



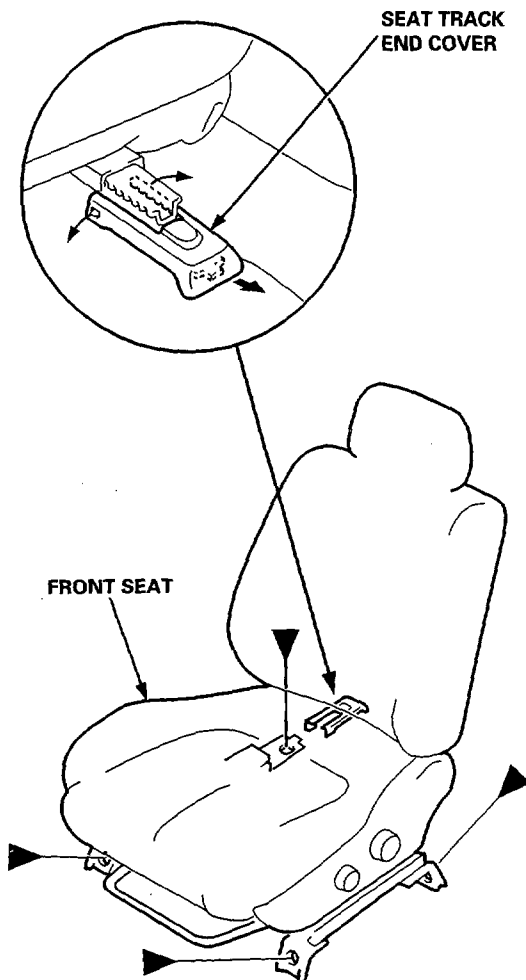
## Front Seat Removal and Installation

1. Wrap a flat-tip screwdriver with protective tape to prevent damage. Carefully remove the seat track end cover, and remove the bolts securing the front seat. Take care not to scratch the body or tear the seat cover.

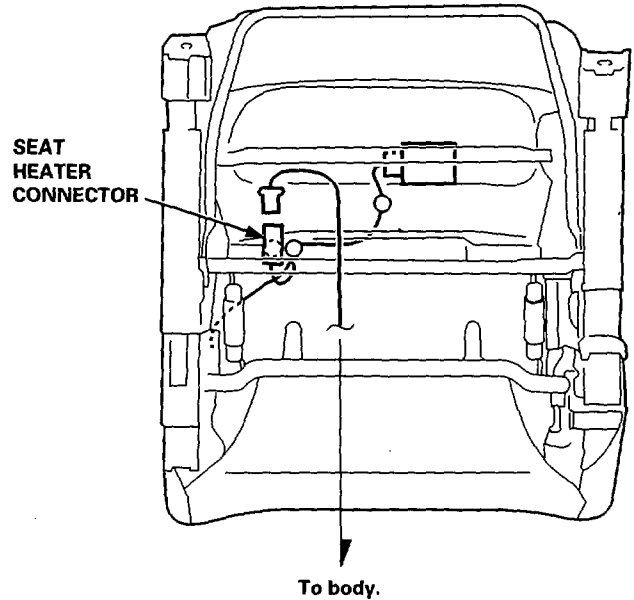
►: Bolt locations, 4



10 x 1.25 mm  
34 N·m (3.5 kgf·m,  
25 lbf·ft)



2. With seat heater: Lift up the front seat, then disconnect the seat heater connector.



3. With the help of an assistant, carefully remove the front seat through the door opening.
4. Install in the reverse order of removal, and make sure the seat harness connector is plugged in properly.



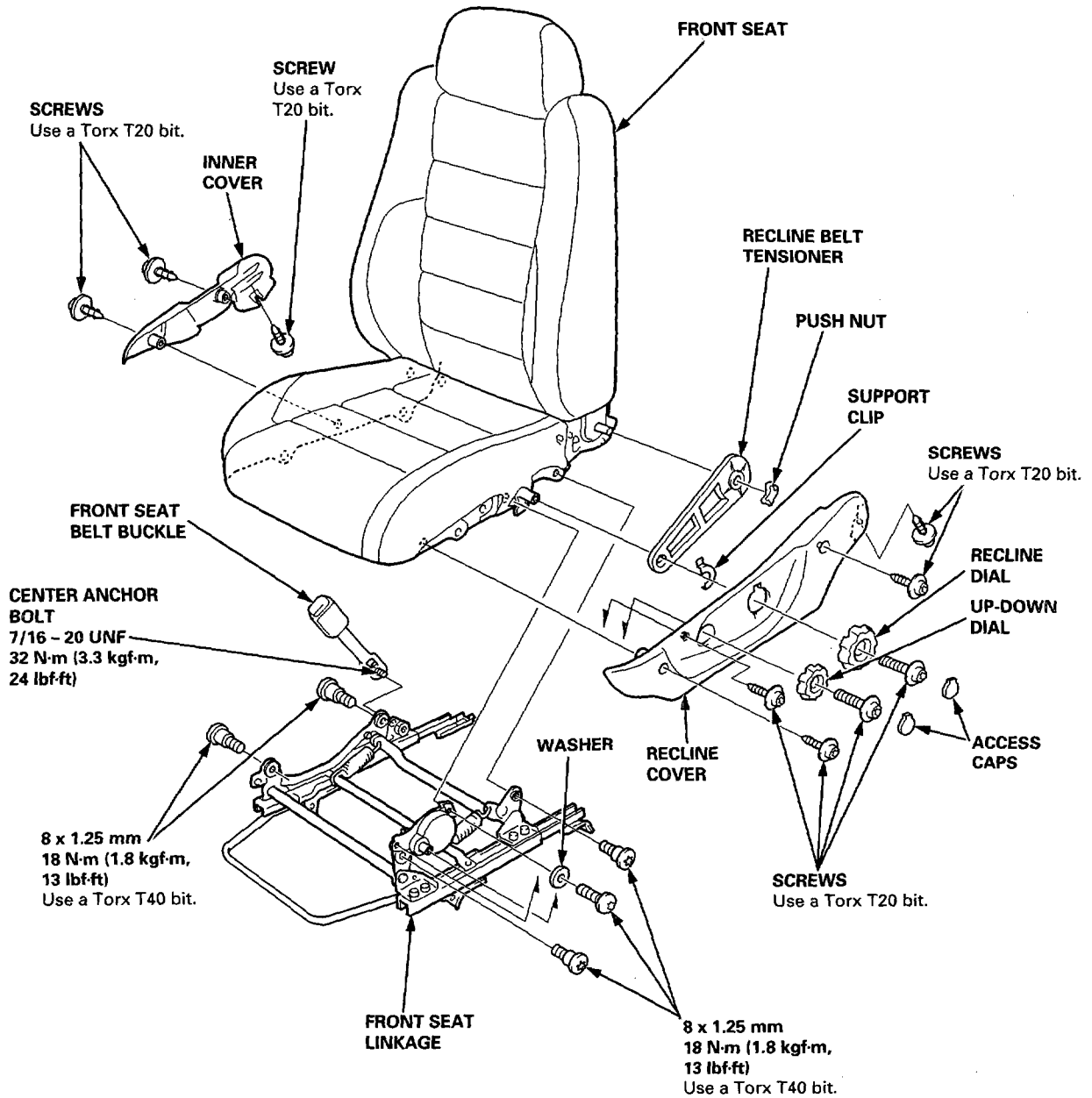
# Seats

## Front Seat Disassembly and Reassembly

**NOTE:**

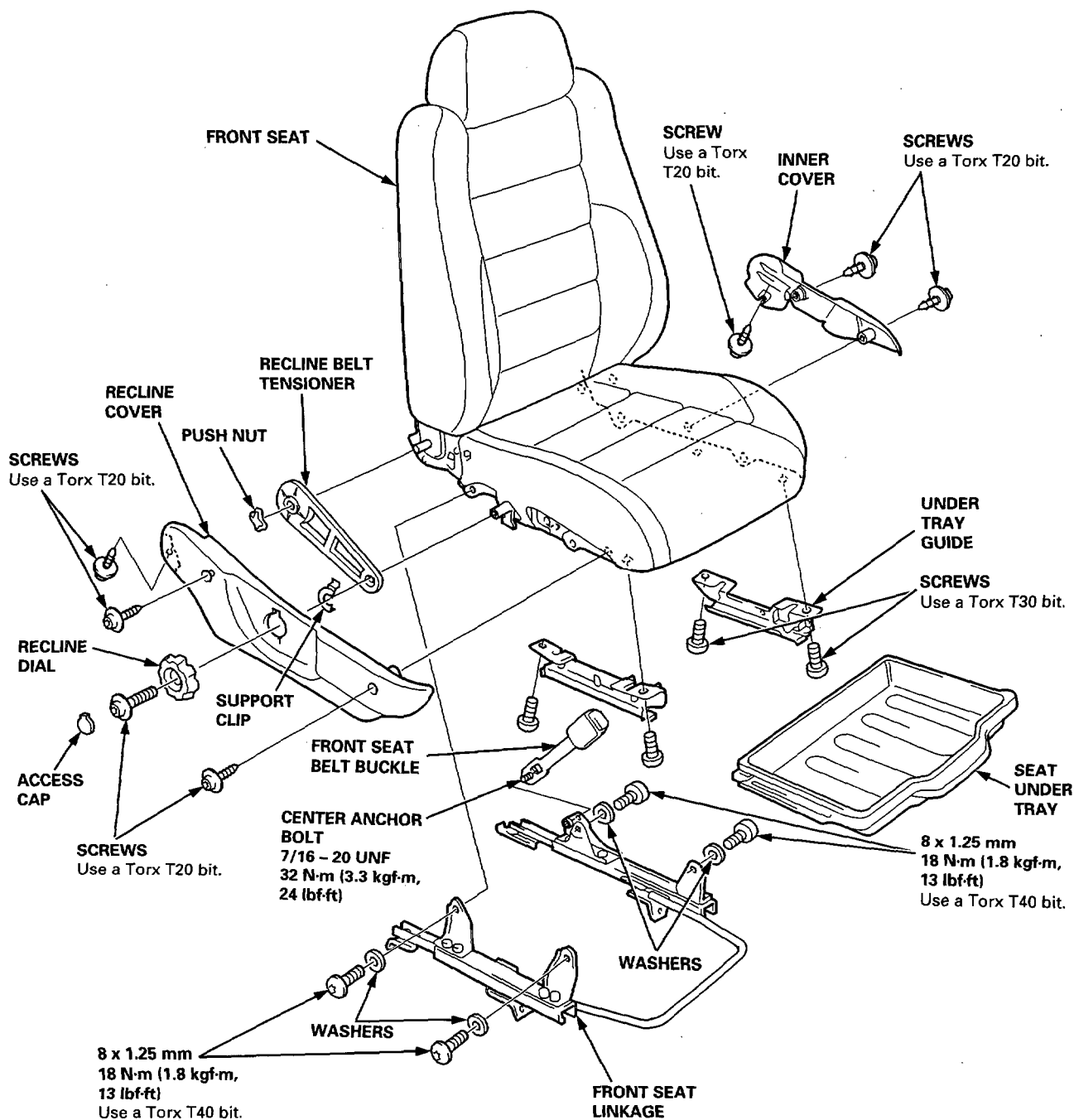
- Take care not to scratch the body or tear the seat covers.
- When prying with a flat-tip screwdriver, wrap it with protective tape to prevent damage.
- LHD is shown, RHD is symmetrical.

**Driver's seat:**





**Passenger's seat:**



Reassemble in the reverse order of disassembly, and note these items:

- Replace the recline belt tensioner push nut with new one (driver's seat).
- Apply liquid thread lock to the center anchor bolt before reinstallation.
- Apply multipurpose grease to the sliding and pivot portions.
- Do not apply grease to the recline belt (driver's seat).

# Seats

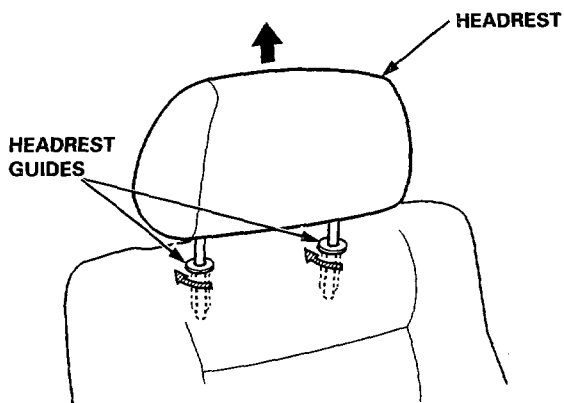
## Front Seat Cover Replacement

### NOTE:

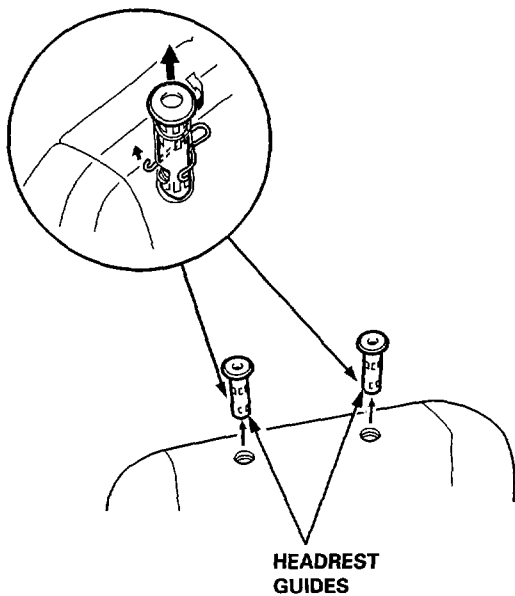
- Take care not to tear the seams or damage the seat covers.
- Wear gloves to protect your hands.

### Seat-back cover:

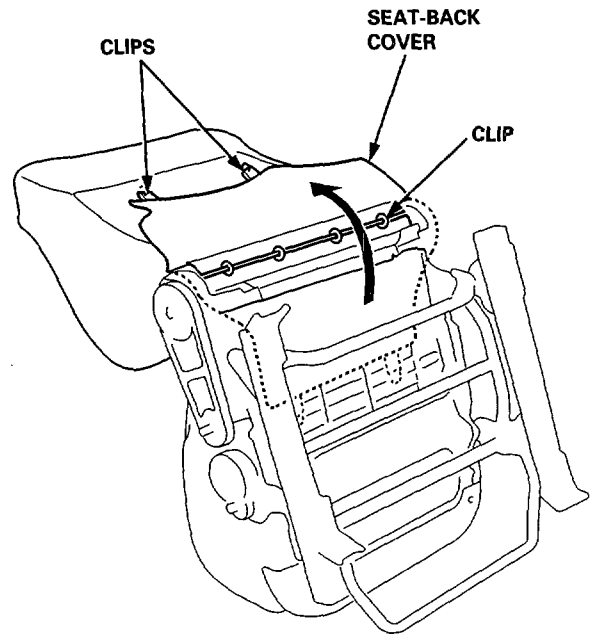
1. Remove the front seat (see page 20-79).
2. Remove (see pages 20-80, 81):
  - Recline outer cover
  - Seat belt buckle
  - Recline inner cover
3. Remove the headrest by turning the headrest guides.



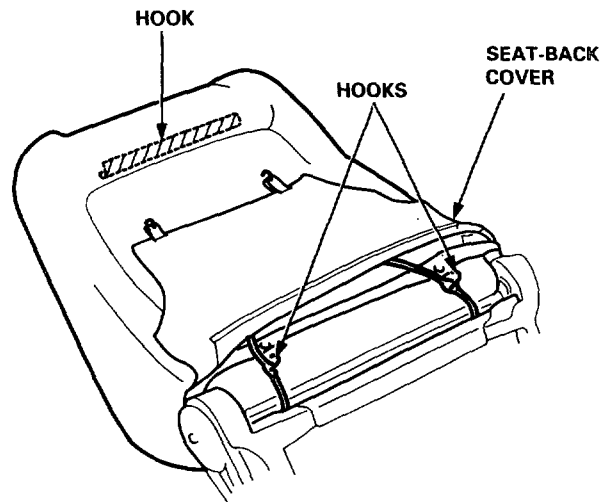
4. Remove the headrest guides by turning it.



5. Release the clips from under the seat cushion.

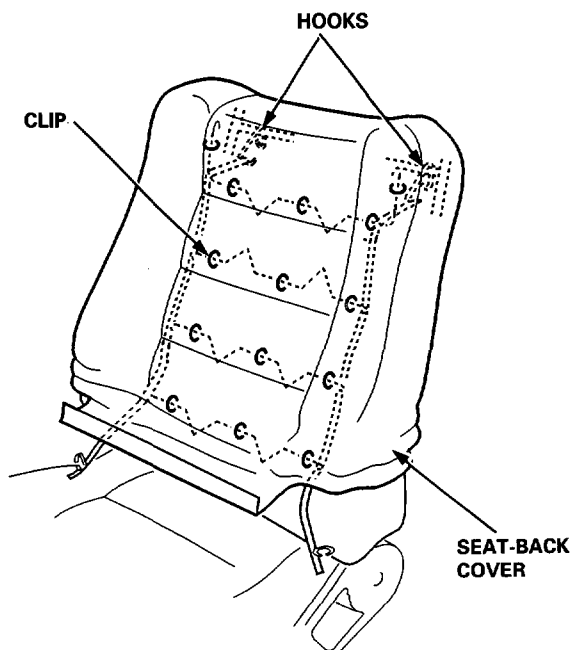


6. Release the hooks, then loosen the seat-back cover.





7. Pull back the edge of the seat-back cover all the way around, and release the clips and hooks, then remove the seat-back cover.

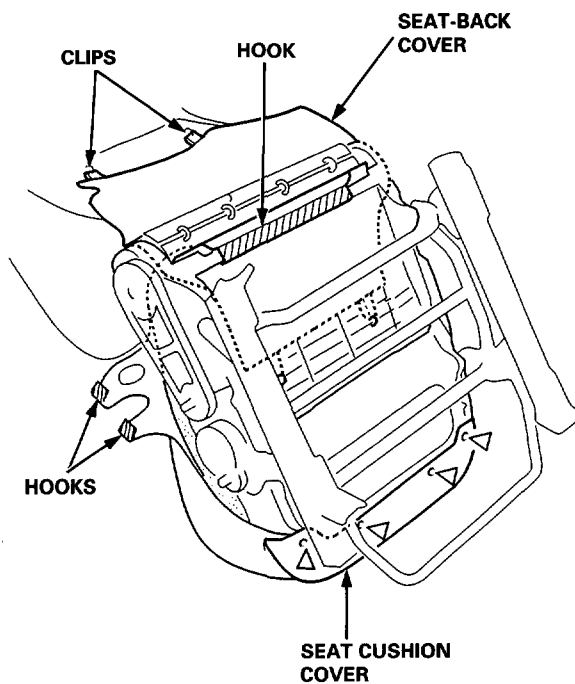
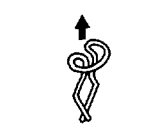


8. Install in the reverse order of removal, and note these items.
- To prevent wrinkles when installing a seat-back cover, make sure the material is stretched evenly over the pad before securing the clips and hooks.
  - Replace the released clips with new ones using commercially available upholstery ring pliers.

**Seat cushion cover:**

1. Remove the front seat (see page 20-79).
2. Remove (see pages 20-80, 81):
  - Recline outer cover
  - Seat belt buckle
  - Recline inner cover
3. Release the clips and hooks from under the seat cushion, then loosen the seat cushion cover.

▷: Clip locations, 4

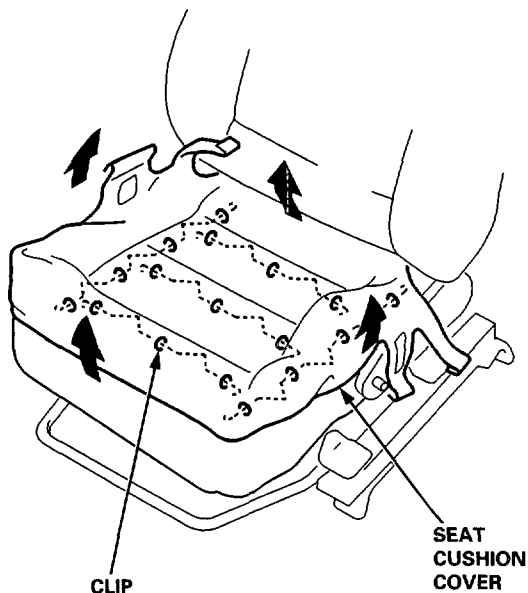


(cont'd)

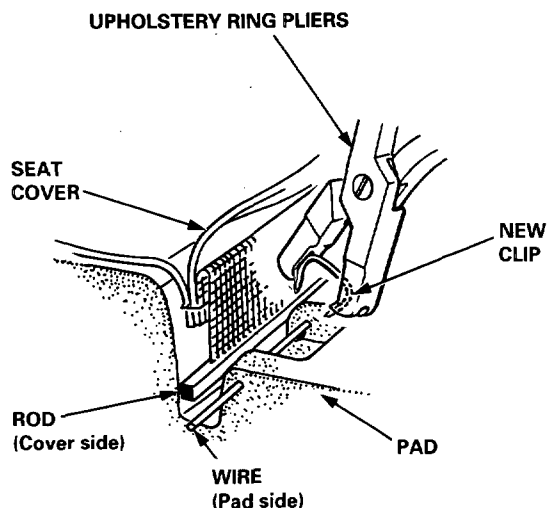
# Seats

## Front Seat Cover Replacement (cont'd)

4. Pull back the edge of the seat cushion cover all the way around, and release the clips, then remove the seat cushion cover.



5. Install in the reverse order of removal, and note these items.
  - To prevent wrinkles when installing a seat cushion cover, make sure the material is stretched evenly over the pad before securing the clips and hooks.
  - Replace the released clips with new ones using commercially available upholstery ring pliers.



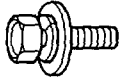


## Rear Seat Removal and Installation

NOTE: Take care not to scratch the body or tear the seat covers.

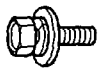
### ►: Bolt locations

A ►, 2

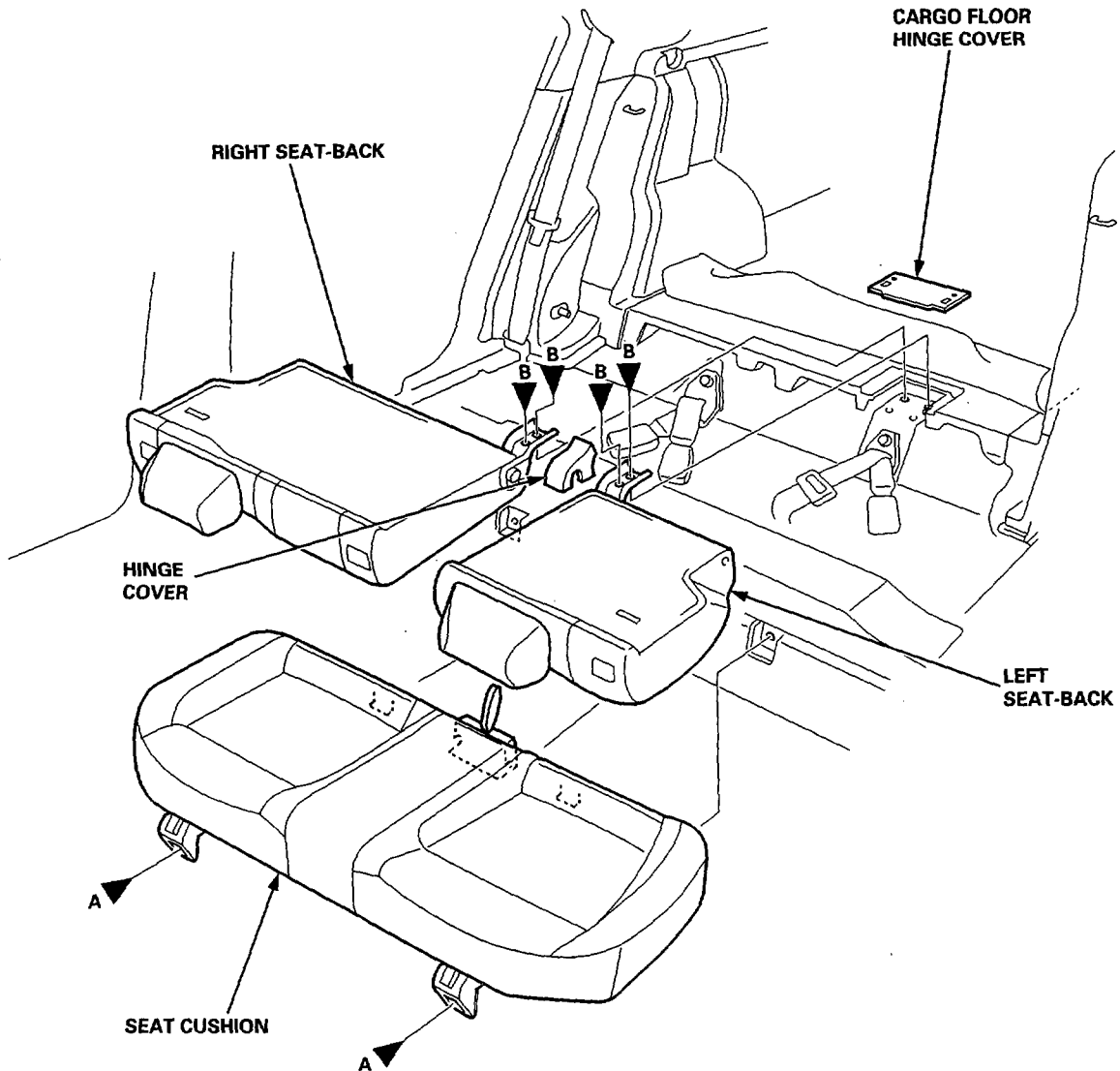


8 x 1.25 mm  
22 N·m (2.2 kgf·m,  
16 lbf·ft)

B ►, 4



6 x 1.0 mm  
9.8 N·m (1.0 kgf·m,  
7.2 lbf·ft)



Install in the reverse order of removal, and note these items:

- Before attaching the rear seat-back and seat cushion, make sure there are no twists or kinks in the rear seat belt buckles and center belt.
- Make sure the seat-backs lock securely.

# Seats

## Rear Seat Armrest Replacement

For some models:

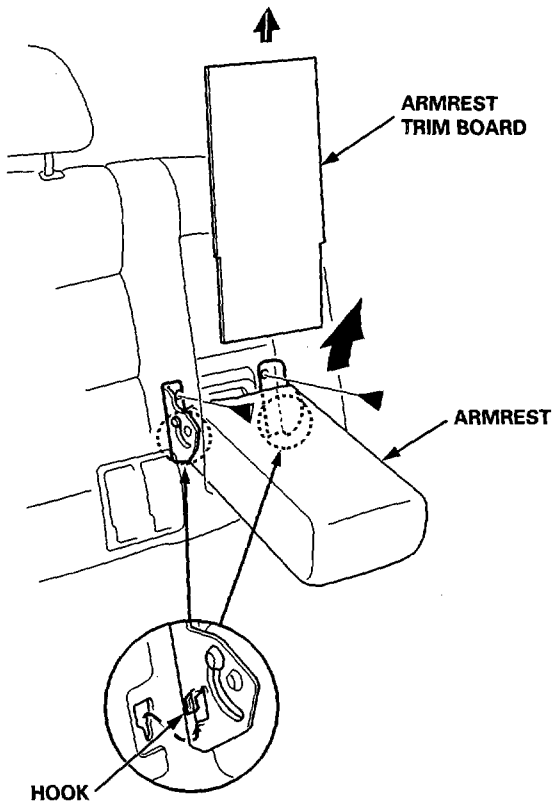
NOTE: Take care not to tear the seams or damage the seat covers.

1. Remove the armrest trim board.

►: Screw locations, 2



6 x 1.0 mm  
9.8 N·m (1.0 kgf·m,  
7.2 lbf·ft)



2. With a Torx T30 bit, remove the screws, and remove the armrest by releasing the hooks.
3. Install in the reverse order of removal.

## Rear Seat-back Latch Replacement

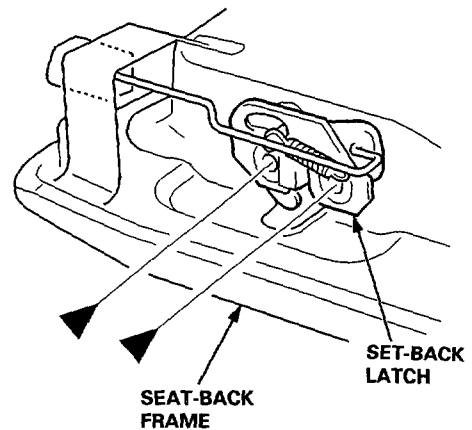
NOTE: Take care not to tear the seams or damage the seat covers.

1. Remove the seat-back (see page 20-85).
2. Remove:
  - Armrest (if so equipped)
  - Pivot bushing
  - Seat belt buckle housing
  - Seat-back center hinge
  - Back cover (see page 20-88)
3. Pull back the seat-back frame (see page 20-88).
4. With a Torx T30 bit, remove the bolts, then remove the seat-back latch from the seat-back frame.

►: Bolt locations, 2



6 x 1.0 mm  
9.8 N·m (1.0 kgf·m,  
7.2 lbf·ft)



5. Install in the reverse order of removal, and make sure the seat-back locks securely and opens properly.

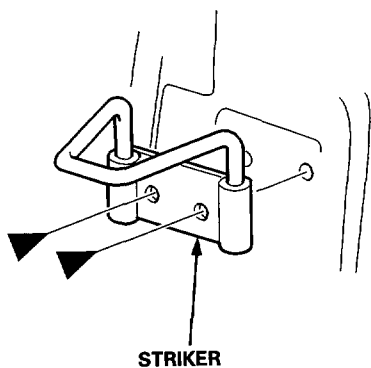
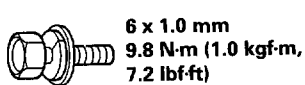


## Rear Seat-back Striker Replacement

NOTE: Take care not to bend or scratch the trim and panels.

1. Remove:
  - Rear seat-back (see page 20-85)
  - Rear side trim (see page 20-61)
  - Rear side upper trim (see page 20-62)
  - Seat side trim (see page 20-62)
2. Remove the bolts, then remove the striker.

►: Bolt locations, 2



3. Install in the reverse order of removal, and make sure the seat-back locks securely.

## Rear Seat Cover Replacement

NOTE:

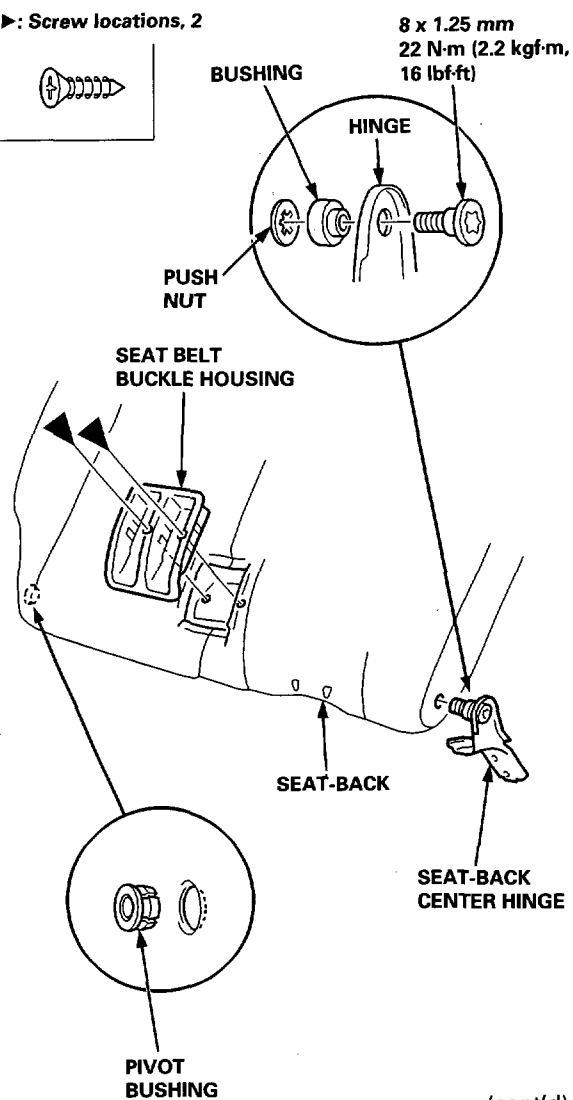
- Take care not to tear the seams or damage the seat covers.
- Wear gloves to protect your hands.

**Seat-back cover:**

NOTE: The right seat-back is shown, the left seat-back is the same manner.

1. Remove the seat-back (see page 20-85).
2. If so equipped, remove the armrest.
3. Remove the pivot bushing, seat belt buckle housing. With a Torx T40 bit, remove the seat-back center hinge.

►: Screw locations, 2



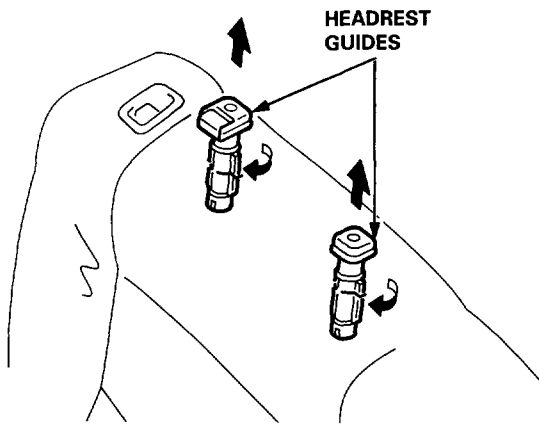
(cont'd)



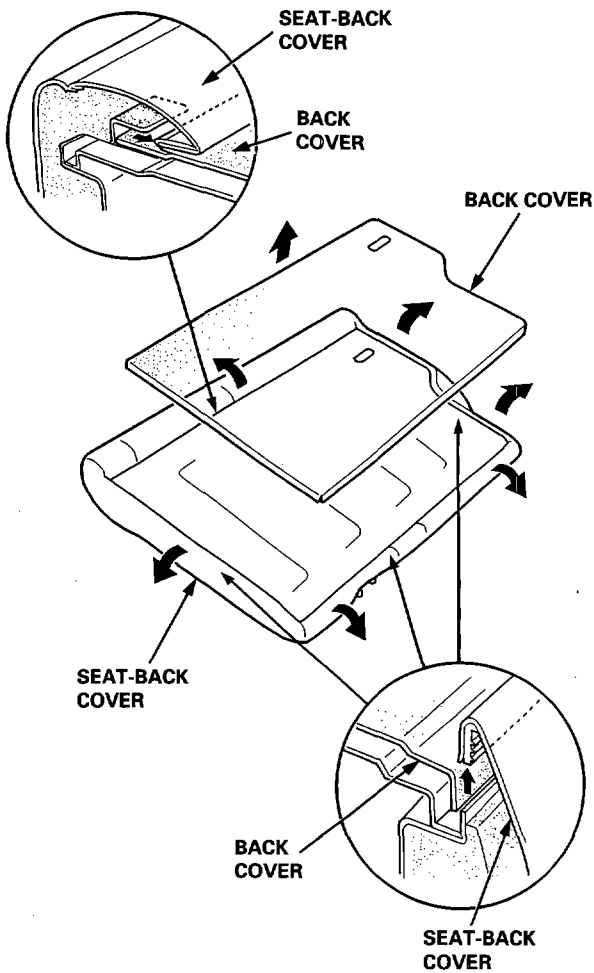
# Seats

## Rear Seat Cover Replacement (cont'd)

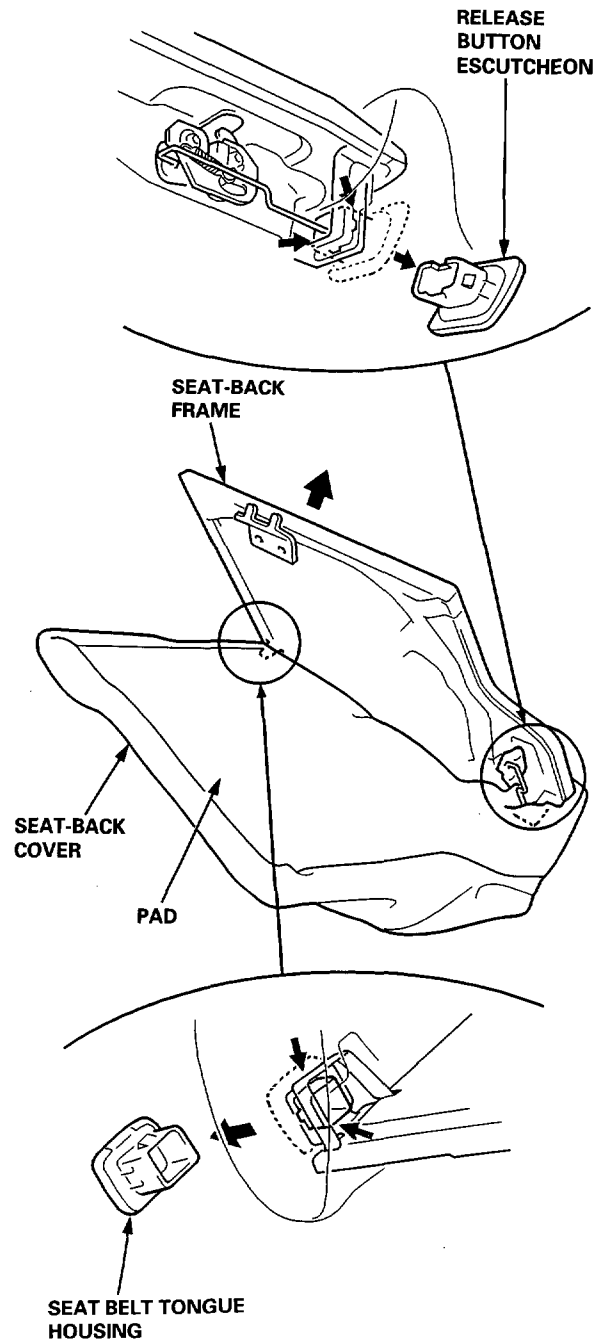
4. If so equipped, remove the headrest, and remove the headrest guides.



5. Pull back the seat-back cover all the way around, then remove the back cover.

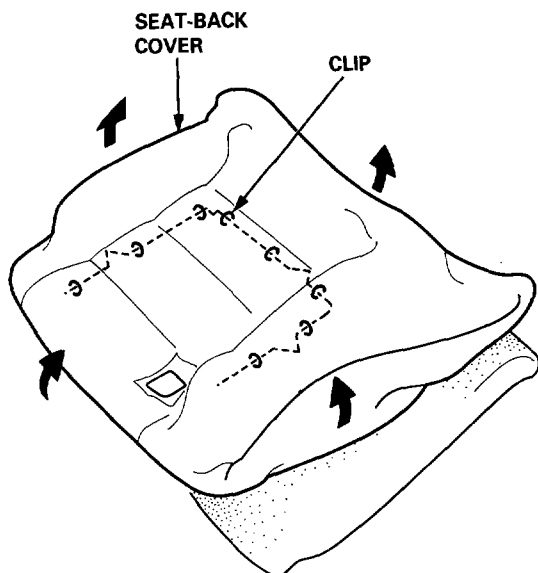


6. Pull back the seat-back frame, and remove the release button escutcheon and the seat belt tongue housing on the right seat-back only, then separate the seat-back cover/pad and seat-back frame.





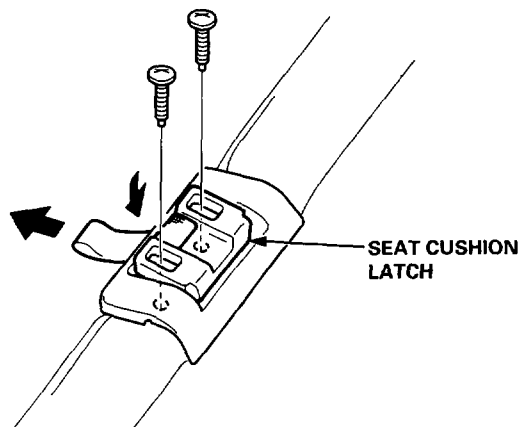
7. Pull back the edge of the seat-back cover all the way around, and release the clips, then remove the seat-back cover.



8. Install in the reverse order of removal, and note these items:
- To prevent wrinkles when installing a seat-back cover, make sure the material is stretched evenly over the pad before securing the hooks and clips.
  - Replace the released clips with new ones.

#### Seat cushion cover:

1. Remove the seat cushion (see page 20-85).
2. Remove the bolts, then remove the seat cushion latch.

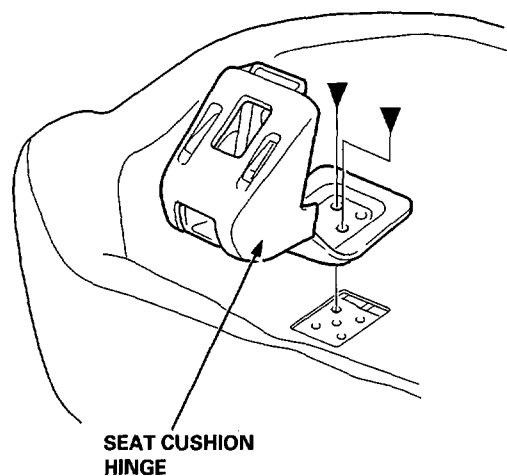


3. With a Torx T30 bit, remove the bolts, then remove the seat cushion hinge from each side.

#### ►: Bolt locations, 4



6 x 1.0 mm  
9.8 N·m (1.0 kgf·m,  
7.2 lbf·ft)

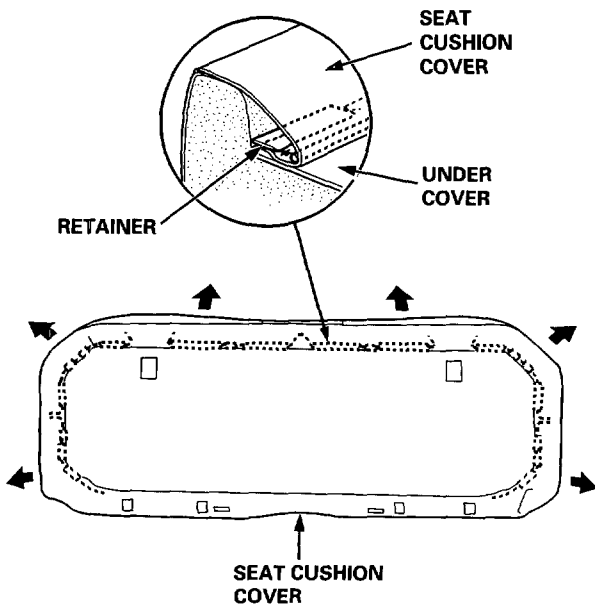


(cont'd)

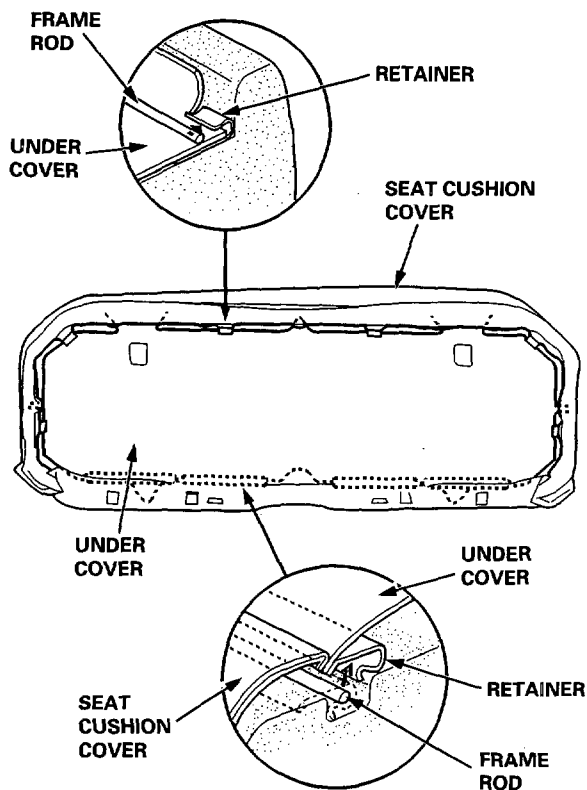
# Seats

## Rear Seat Cover Replacement (cont'd)

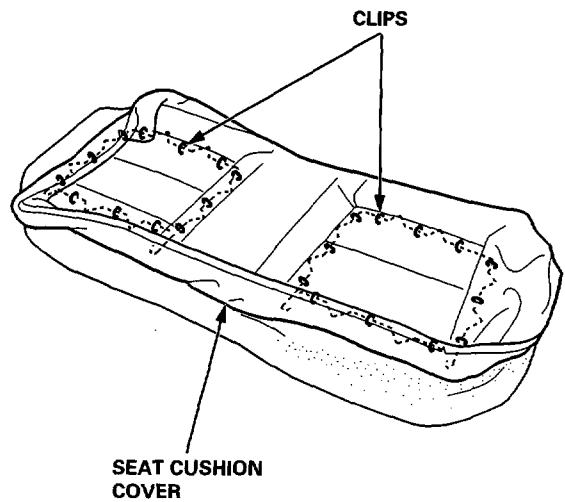
4. Release the retainers of the seat cushion cover.



5. Release the retainers of the under cover, then loosen the seat cushion cover.

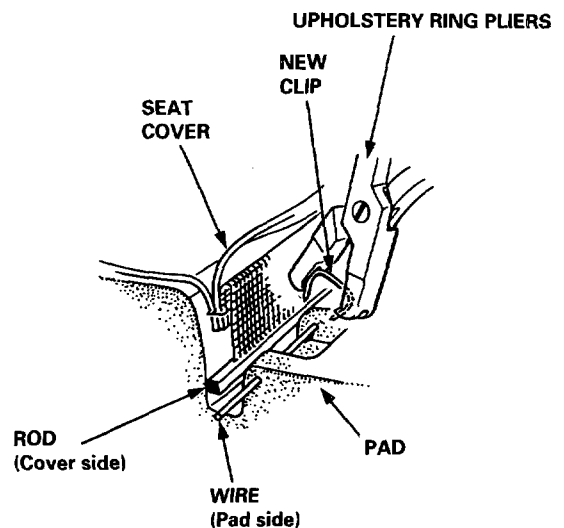


6. Pull back the edge of the seat cushion cover all the way around, and release the clips, then remove the seat cushion cover.



7. Install in the reverse order of removal, and note these items:

- To prevent wrinkles when installing a seat cushion cover, make sure the material is stretched evenly over the pad before securing the clips and retainers.
- Replace the clips with new ones using commercially available upholstery ring pliers.



# Bumpers



## Front Bumper Removal and Installation

### NOTE:

- An assistant is helpful when removing the front bumper.
- Take care not to scratch the front bumper and body.
- Wear gloves to protect your hands.

### ►: Bolt, screw locations

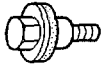
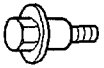
A ►, 2

B ►, 2

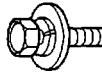
C ►, 4

D ►, 2

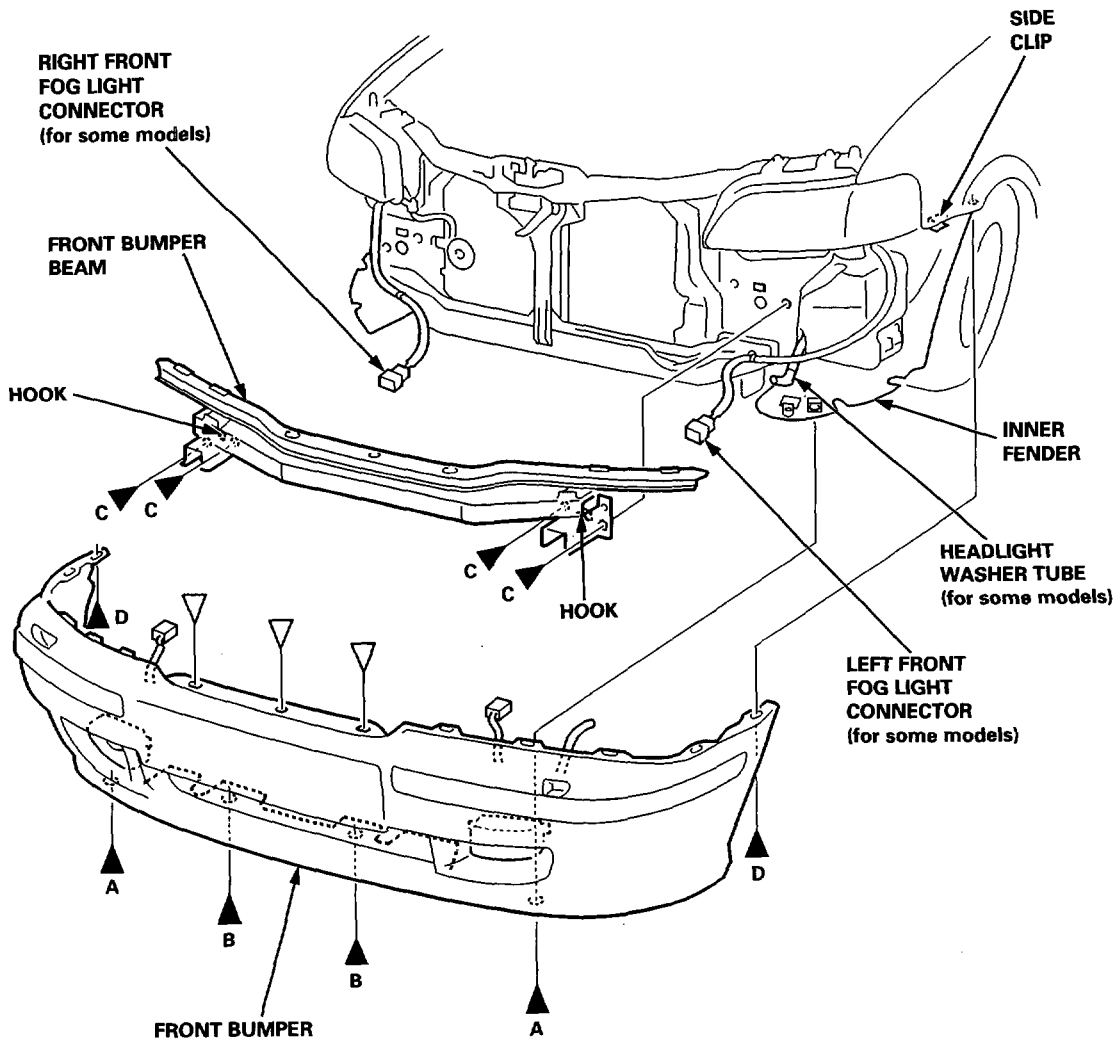
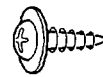
►: Clip locations, 3



6 x 1.0 mm  
9.8 N·m (1.0 kgf·m,  
7.2 lbf·ft)



8 x 1.25 mm  
22 N·m (2.2 kgf·m,  
16 lbf·ft)



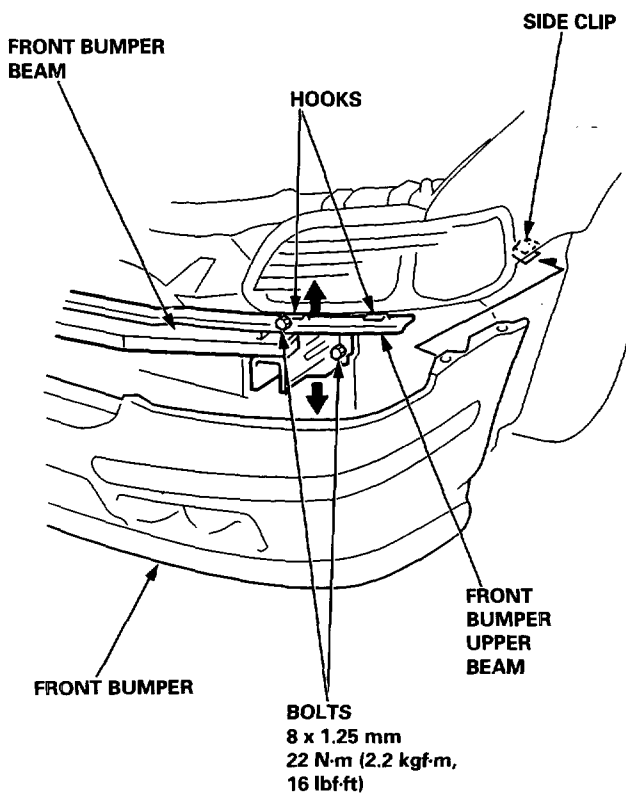
(cont'd)

# Bumpers

## Front Bumper Removal and Installation (cont'd)

Install in the reverse order of removal, and note these items:

- Make sure the front bumper engages the hooks of the front bumper upper beam and side clips securely.
- If necessary, adjust the front bumper beam to obtain the proper gap.
- Replace any damaged clips.



## Front Under Spoiler Replacement

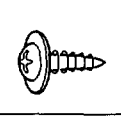
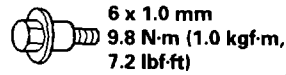
For some models:

NOTE: Take care not to scratch the front bumper and front under spoiler.

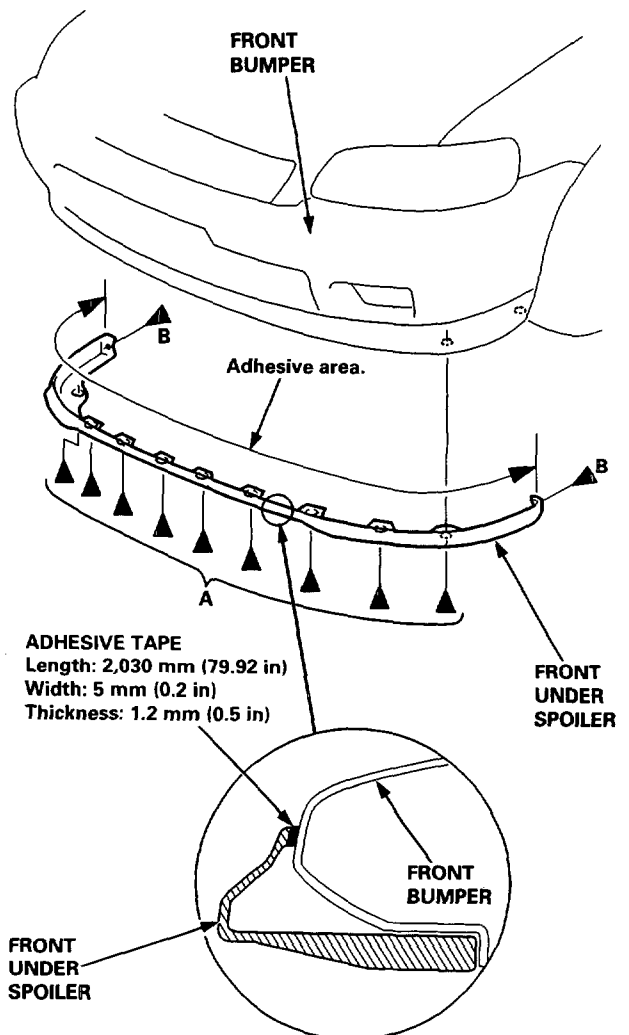
►: Bolt, screw locations

A ►, 9

B ►, 2



Adhesive tape: 3M4211, or equivalent



Install in the reverse order of removal.



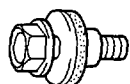
## Rear Bumper Removal and Installation

### NOTE:

- An assistant is helpful when removing the rear bumper.
- Take care not to scratch the rear bumper and body.
- Wear gloves to protect your hands.

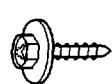
▶: Bolt, screw locations

A ▶, 2

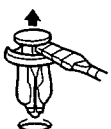


6 x 1.0 mm  
9.8 N·m (1.0 kgf·m,  
7.2 lbf·ft)

B ▶, 4



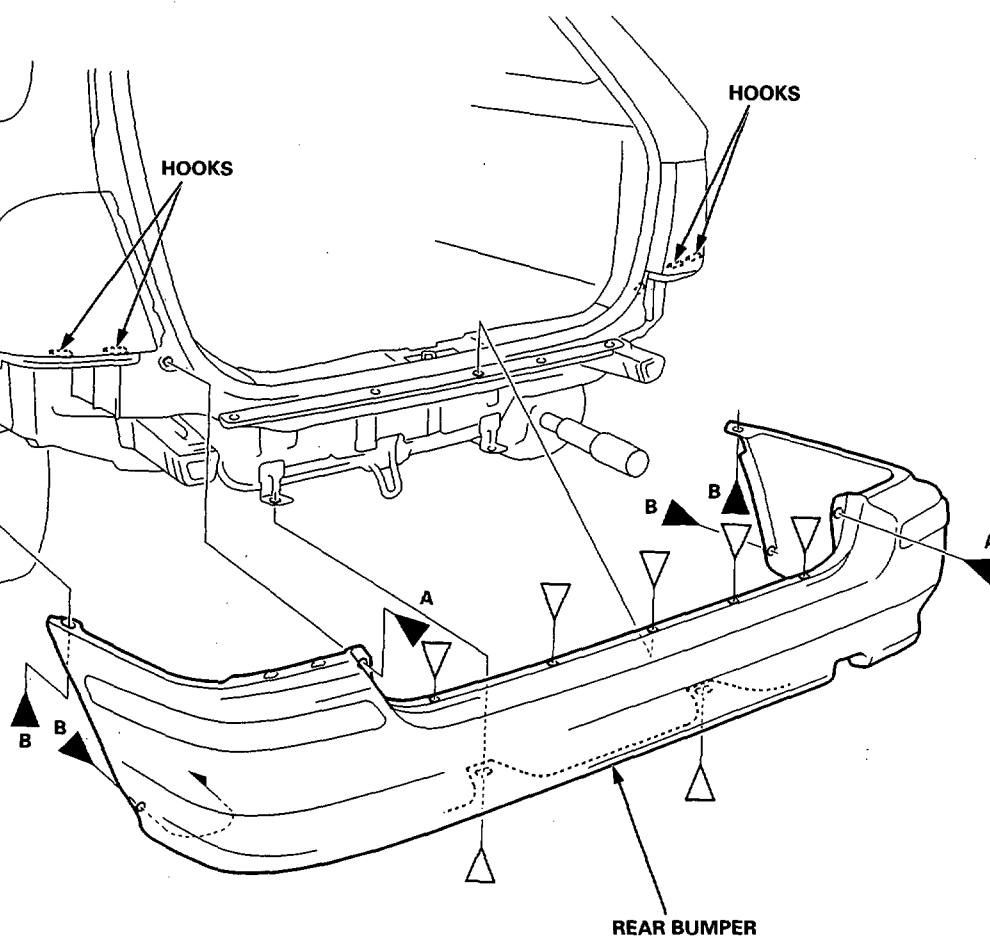
▷: Clip locations, 7



SIDE  
SPACER

HOOKS

HOOKS

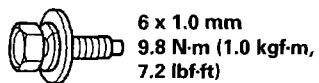


(cont'd)

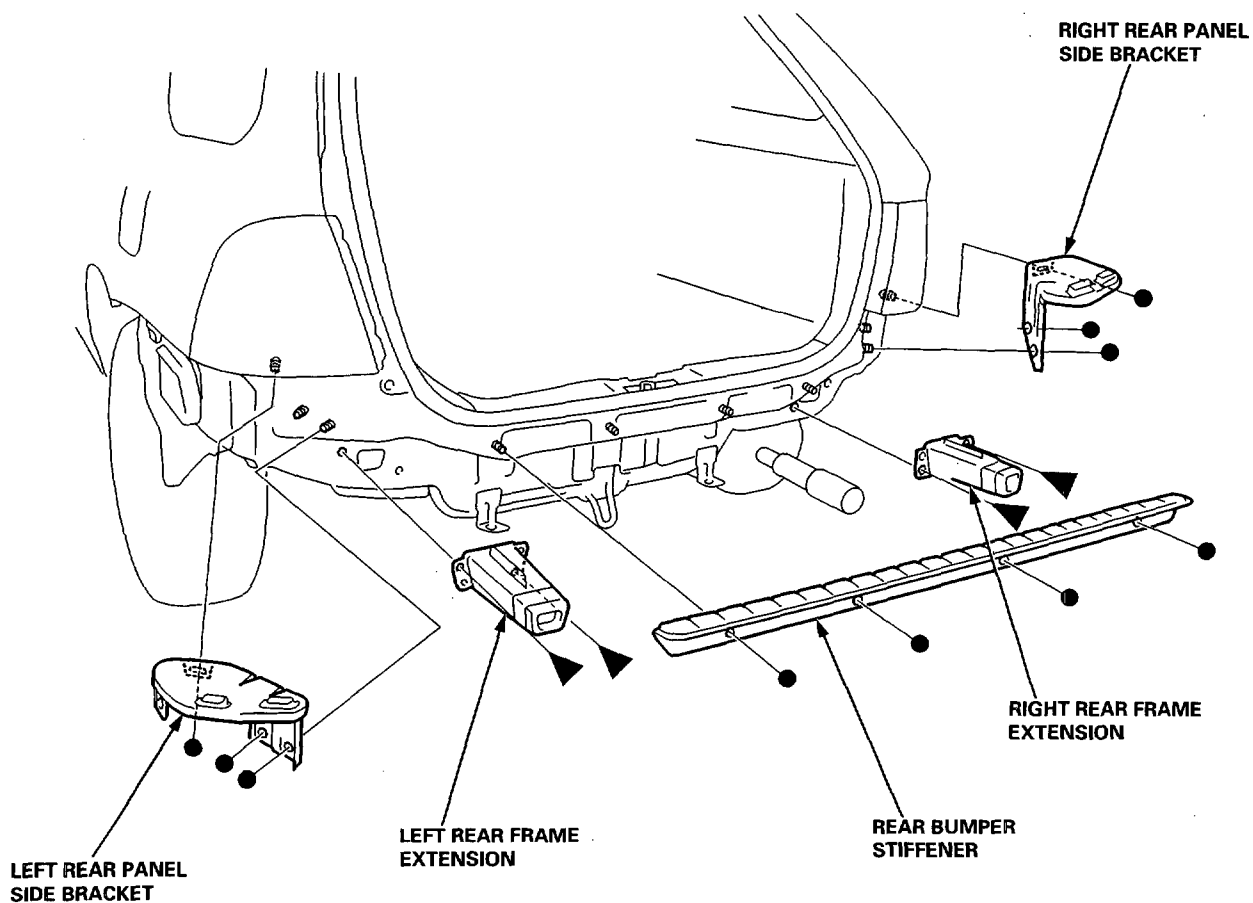
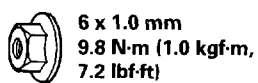
# Bumpers

## Rear Bumper Removal and Installation (cont'd)

►: Bolt locations, 4



●: Nut locations, 10



Install in the reverse order of removal, and note these items:

- Make sure the rear bumper engages the side spacers and the hooks of the rear panel side bracket on each side securely.
- Replace any damaged clips.

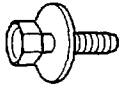


## Replacement

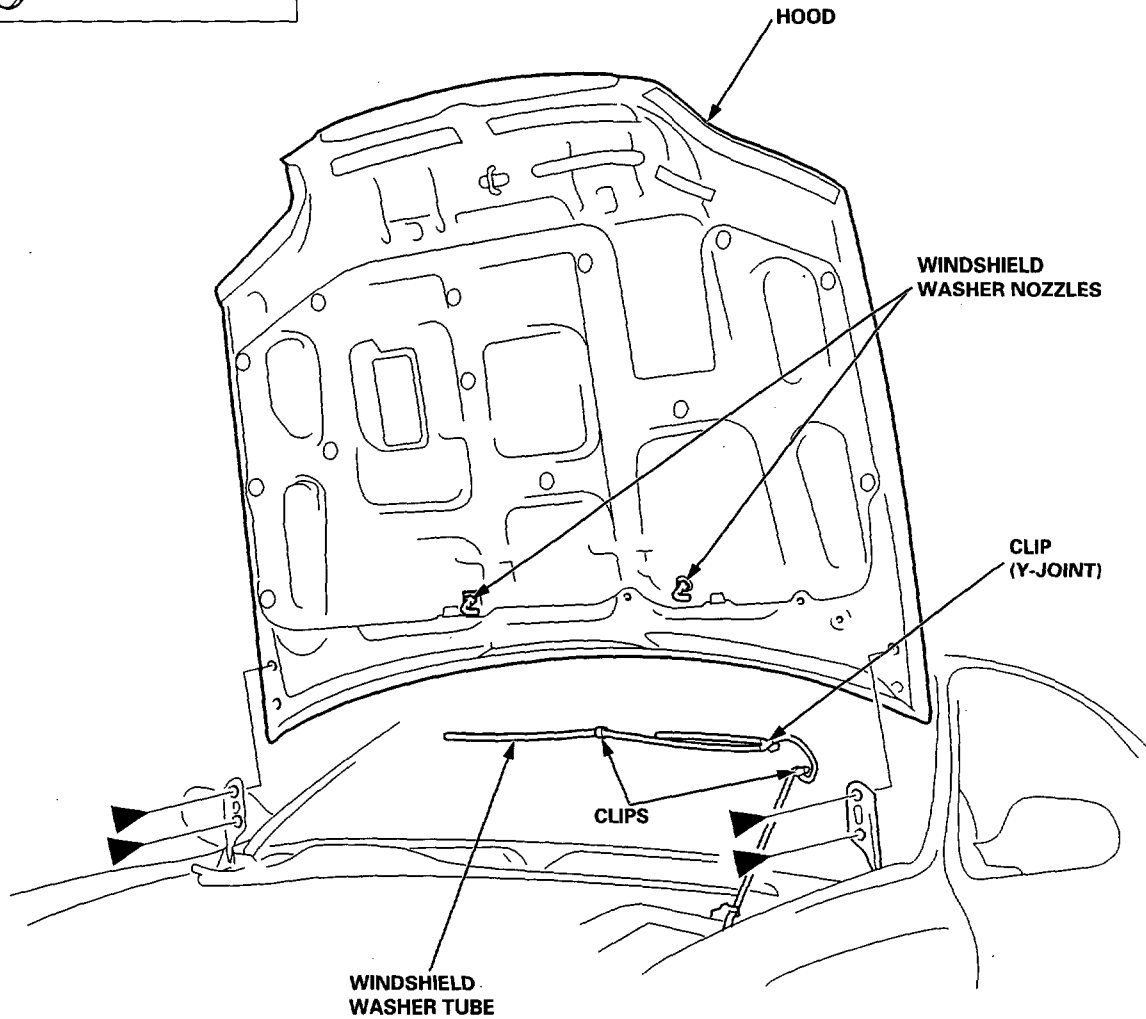
### NOTE:

- An assistant is helpful when removing and installing the hood.
- Take care not to damage the hood and body.

### ►: Bolt locations, 4



6 x 1.0 mm  
9.8 N-m (1.0 kgf-m,  
7.2 lbf-ft)



Install in the reverse order of removal, and note these items:

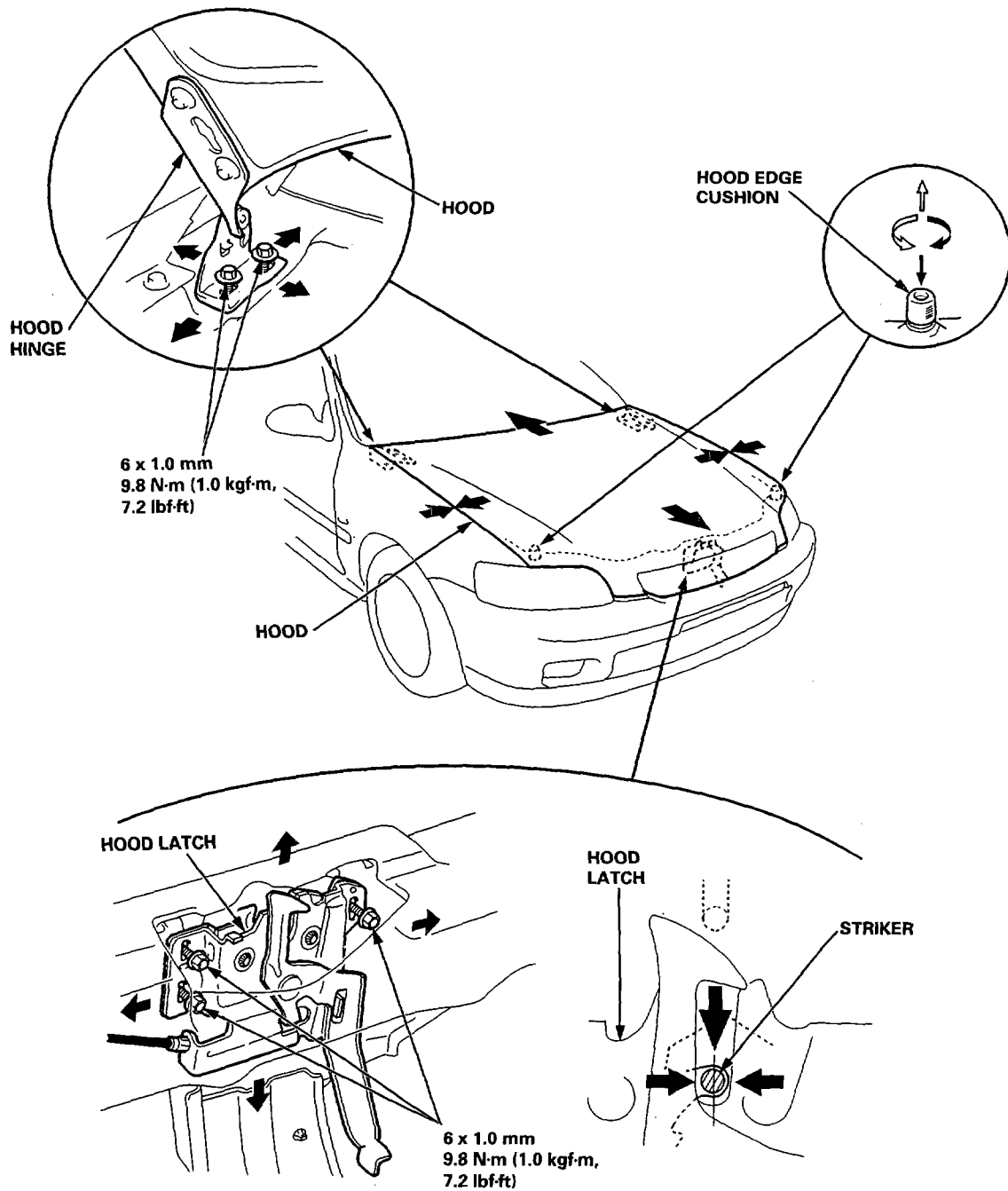
- Make sure the hood opens properly and locks securely.
- Make sure the windshield washer tubes are connected properly.
- Adjust the hood alignment (see page 20-96).



# Hood

## Adjustment

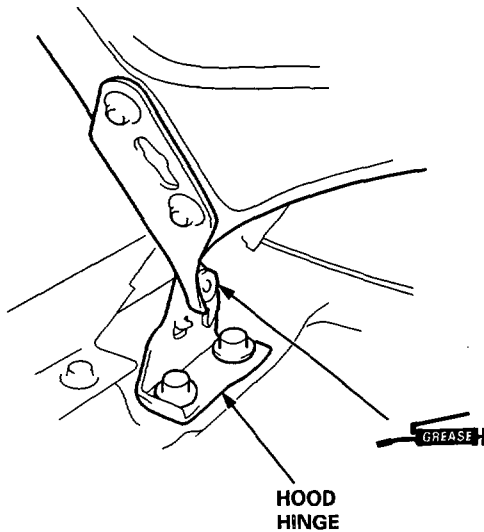
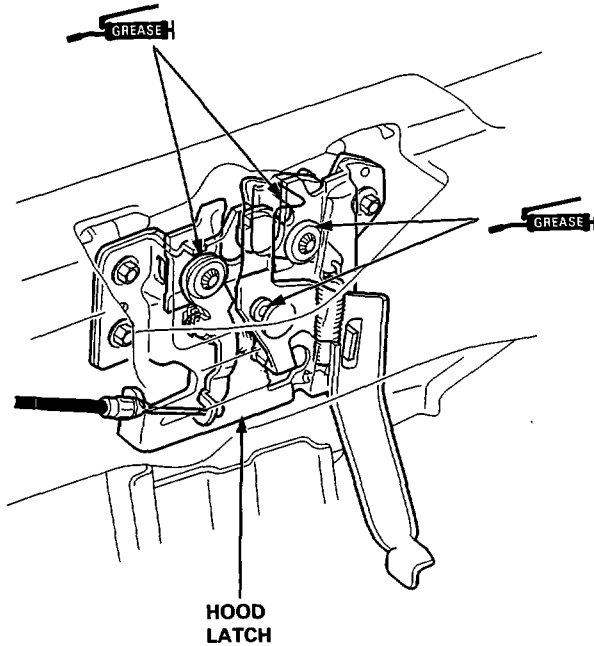
1. Slightly loosen each hood hinge bolt.
2. Adjust the hood alignment in this sequence.
  - Adjust the hood right and left, as well as fore and aft, by using the elongated holes on the hood hinge.
  - Turn the hood edge cushions, as necessary, to make the hood fit flush with the body at front and side edges.
  - Adjust the hood latch to obtain the proper height at the forward edge, and move the hood latch right or left until the striker is centered in the hood latch.





## Hood Insulator Replacement

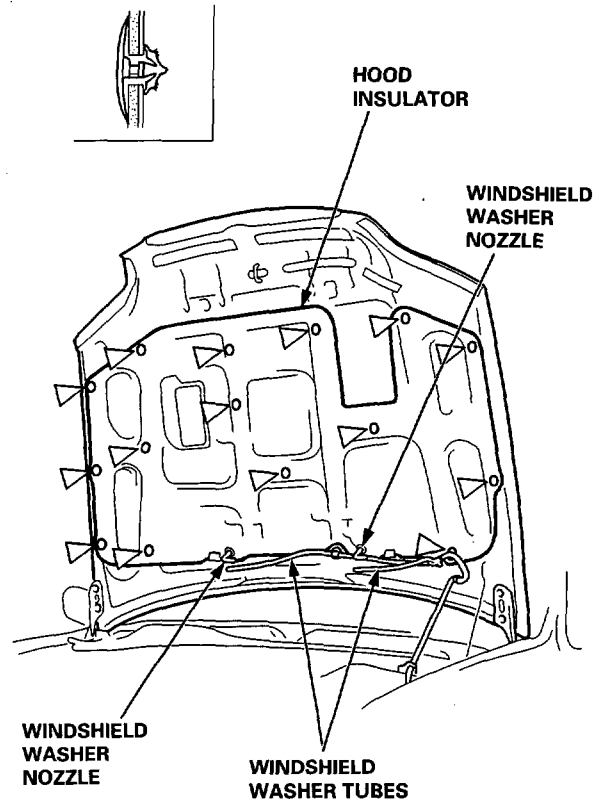
3. Tighten each bolt securely.
4. Check that the hood opens properly and locks securely.
5. Grease each location of the hood latch and hood hinge as indicated by the arrows.



NOTE: Take care not to scratch the hood.

1. Disconnect the windshield washer tubes from the windshield washer nozzles.

▷: Clip locations, 15



2. Using a clip remover, detach the clips, release the hooks, and remove the hood insulator.
3. Install in the reverse order of removal, and note these items:
  - Replace any damaged clips.
  - Make sure the washer tubes are connected properly.

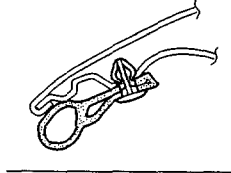
# Hood

## Hood Seal Rubber Replacement

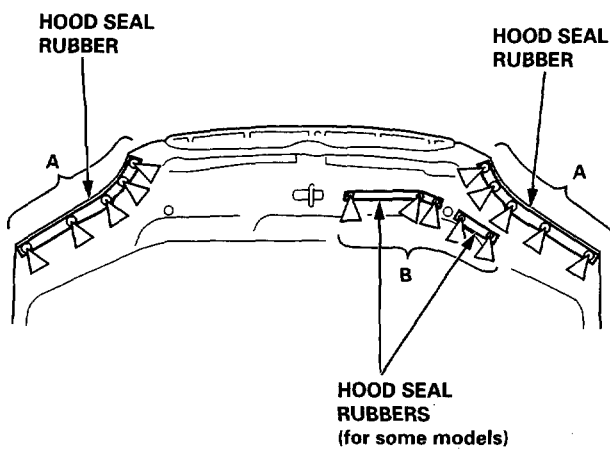
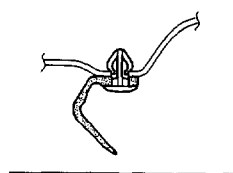
1. Using a clip remover, detach the clips, then remove the hood seal rubbers. Take care not to scratch the hood.

▷: Clip locations

A ▷, 10



B ▷, 5



2. Install in the reverse order of removal; replace any damaged clips.

## Front Grille Replacement

NOTE: Take care not to scratch the hood.

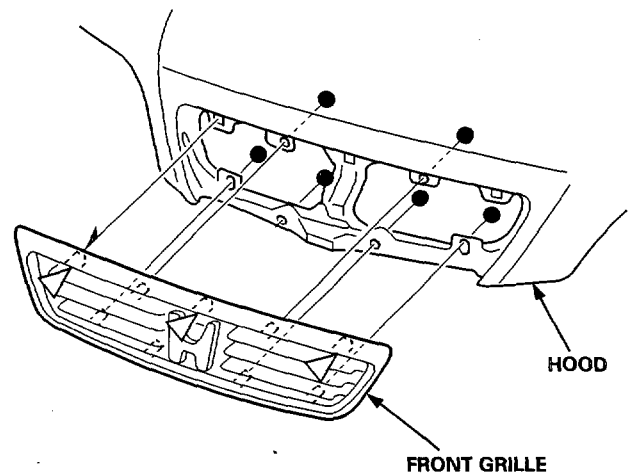
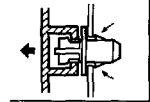
1. Remove the nuts securing the front grille.

●: Nut locations, 6



6 x 1.0 mm  
9.8 N-m (1.0 kgf-m,  
7.2 lbf-ft)

▷: Clip locations, 3



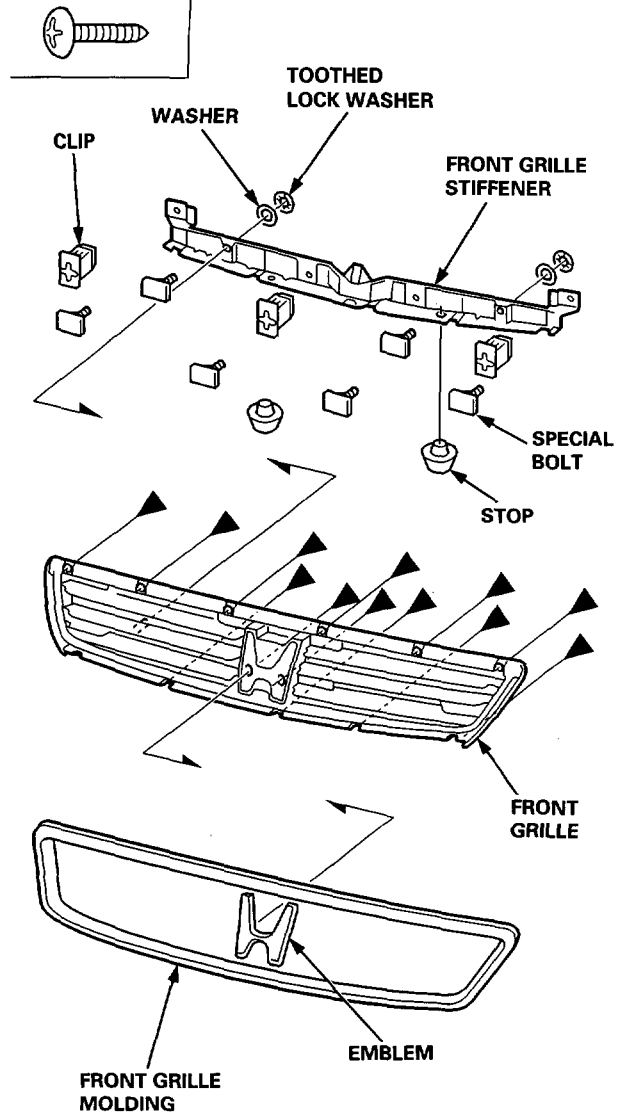
2. Detach the clips, then remove the front grille.
3. Install in the reverse order of removal; replace any damaged clips.



## Front Grille Disassembly and Reassembly

Take care not to scratch the front grille and front grille molding.

►: Screw locations, 13



Reassemble in the reverse order of disassembly.

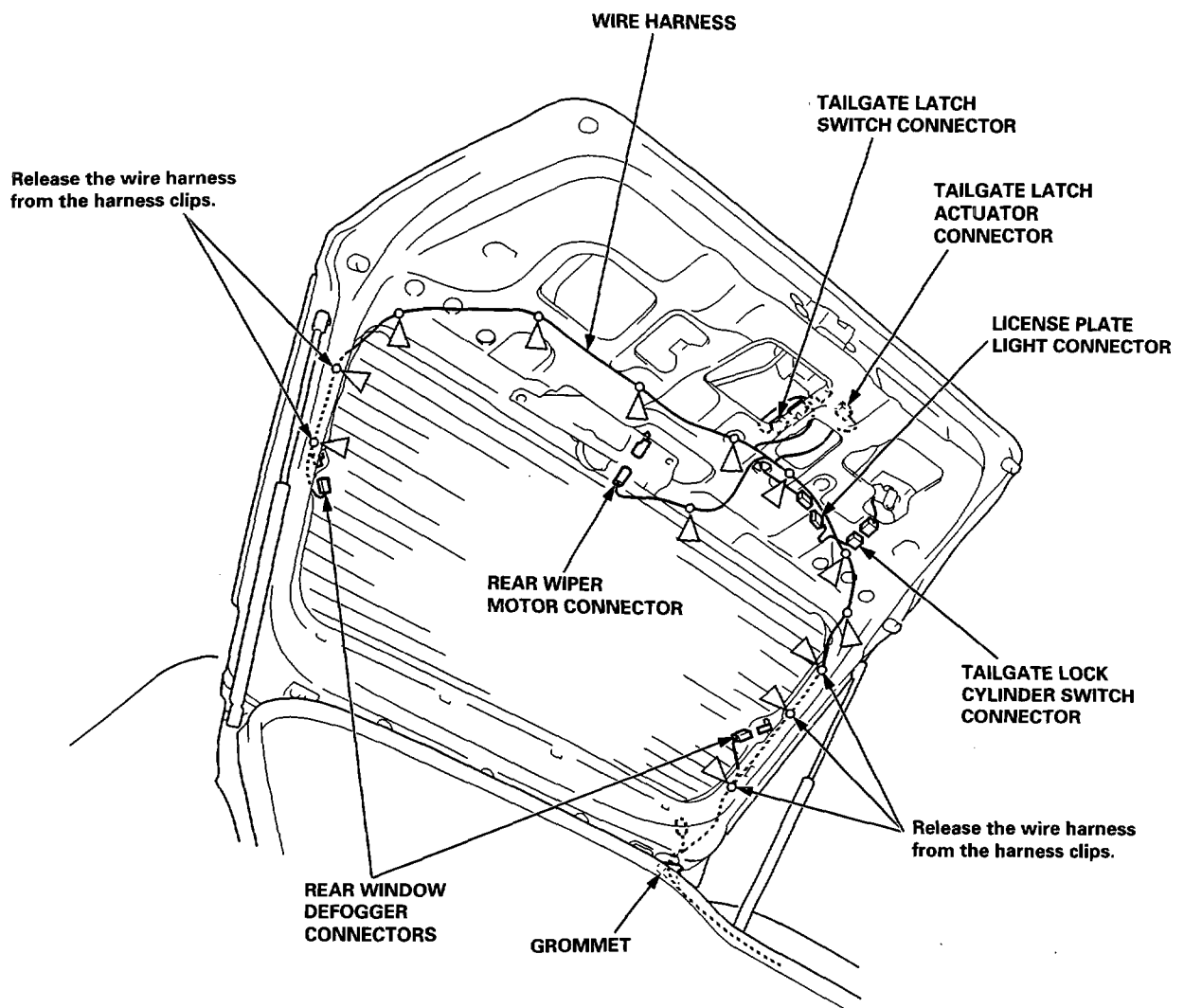
# Tailgate

## Replacement

NOTE: Wear gloves to protect your hands.

1. Remove:
  - Tailgate upper trim (see page 20-64)
  - Tailgate side trim (see page 20-64)
  - Tailgate trim panel (see page 20-64)
  - Tailgate spoiler (see page 20-104)
2. Disconnect the license plate light connector, tailgate latch actuator connector, tailgate latch switch connector, tailgate lock cylinder switch connector, rear wiper motor connector and rear window defogger connectors. Detach the harness clips, and remove the grommet, then remove the wire harness from the tailgate.

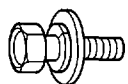
▷: Harness clip locations



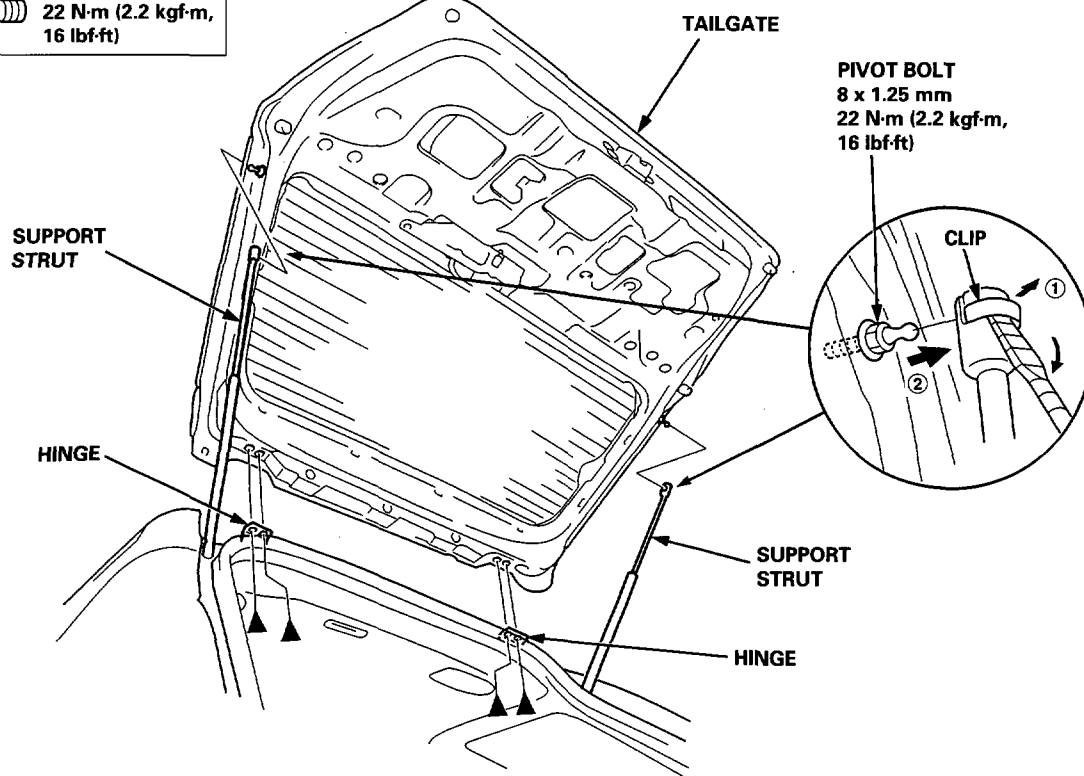


3. With a flat-tip screwdriver, pry the clip of the support strut on each tailgate side, then release both support struts from the pivot bolts with the help of an assistant. Do not remove the clips from the support struts.

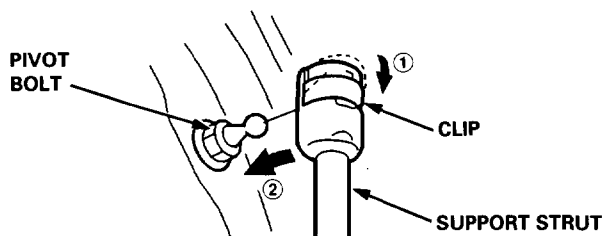
►: Bolt locations, 4



8 x 1.25 mm  
22 N·m (2.2 kgf·m,  
16 lbf·ft)



4. With the help of an assistant, remove the bolts, then remove the tailgate. Take care not to damage the tailgate and body.
5. Install in the reverse order of removal, and note these items:
- Before reattaching the support struts, adjust the tailgate alignment (see page 20-102).
  - Make sure the tailgate opens properly and locks securely.
  - When reattaching the support struts, set the clips to the original position, then attach the support struts on the pivot bolts by pushing the support strut.

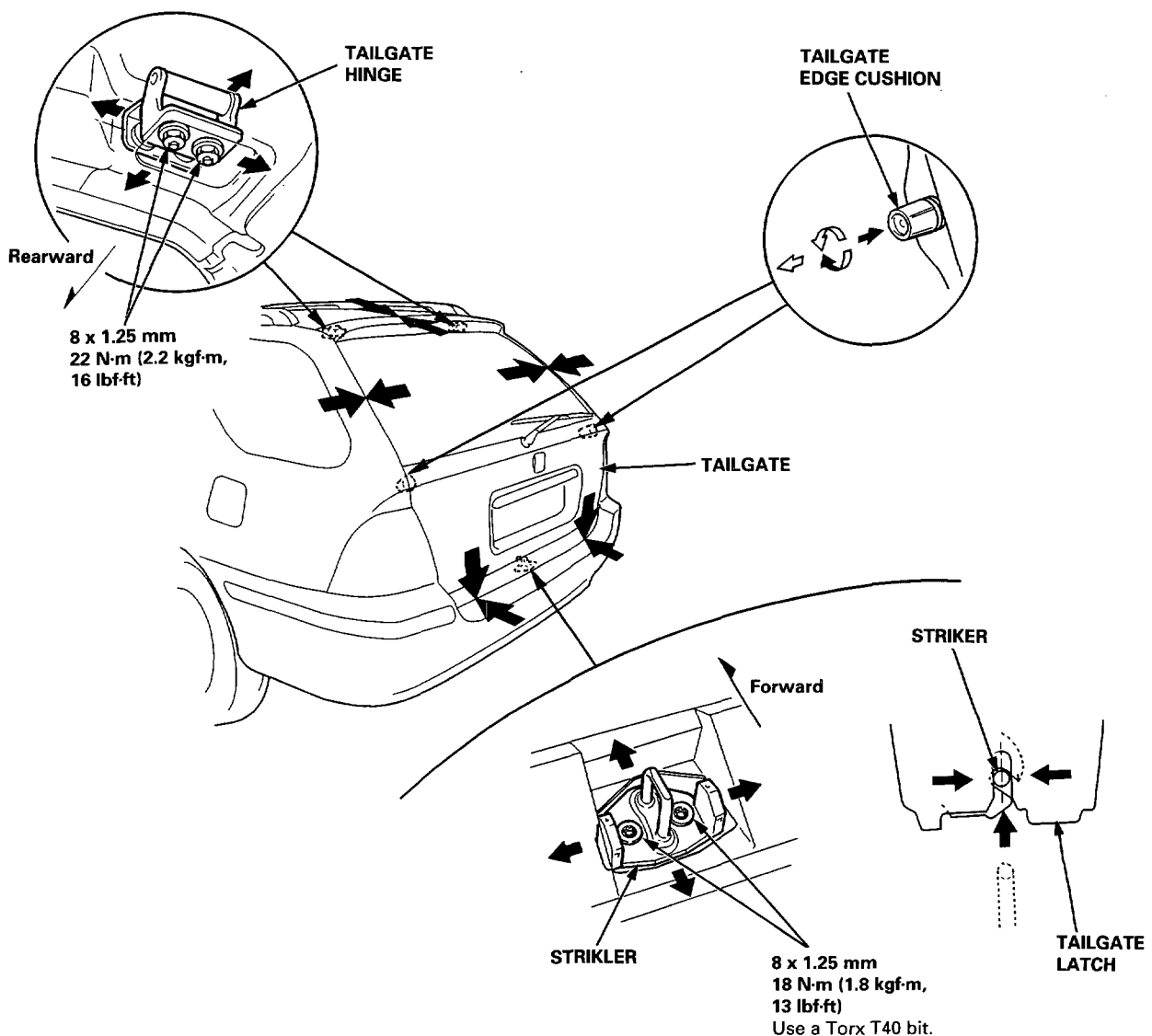


- Make sure the connectors are connected properly, and the wire harness is routed properly.

# Tailgate

## Adjustment

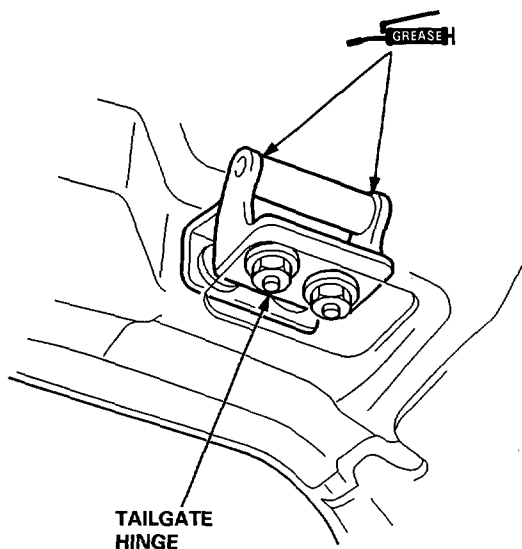
1. Remove the support strut from each side.
2. Slightly loosen each bolt and nut.
3. Adjust the tailgate alignment in the following sequence.
  - Pull down the rear portion of the headliner (see page 20-65). Take care not to bend the headliner excessively. Adjust the tailgate hinges right and left, as well as fore and aft, by using the elongated holes.
  - Turn the tailgate edge cushions, as necessary, to make the tailgate fit flush with the body at the side edges.
  - Adjust the fit between the tailgate and tailgate opening by moving the striker.



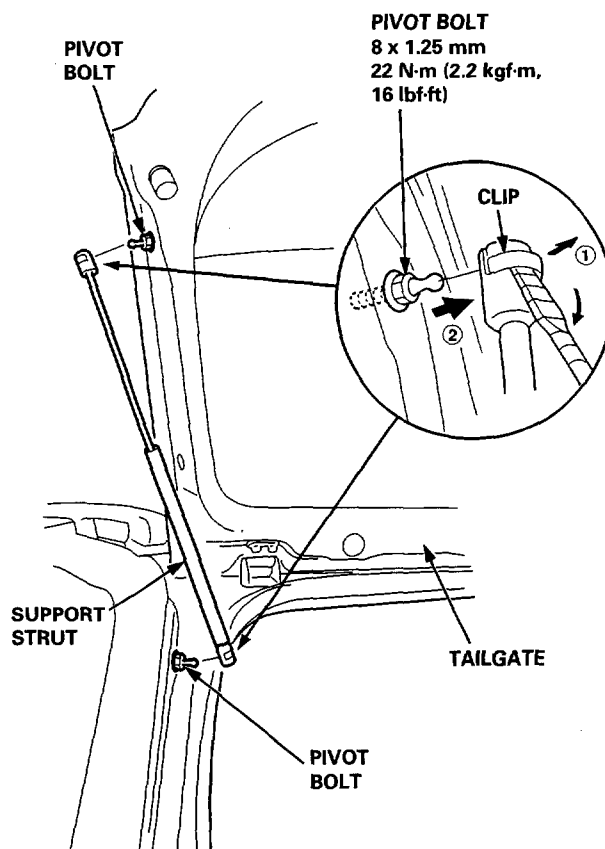


## Tailgate Support Strut Replacement

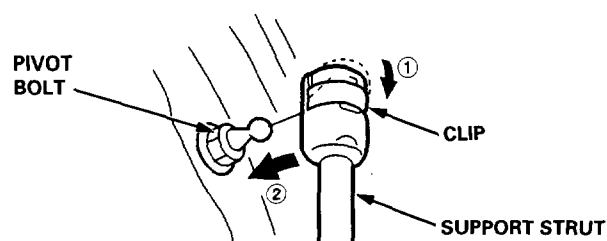
4. Tighten each bolt and nut securely.
5. Check that the tailgate opens properly and locks securely.
6. Reinstall the support struts securely.
7. Grease the pivot portion of the tailgate hinges as indicated by the arrows.



1. With a flat-tip screwdriver, pry the clips of the support strut on the tailgate and body, then release the support strut from the pivot bolts with the help of an assistant. Do not remove the clips from the support strut.



2. Set the clips to the original position, then reattach the support strut on the pivot bolts by pushing the support strut.





# Tailgate

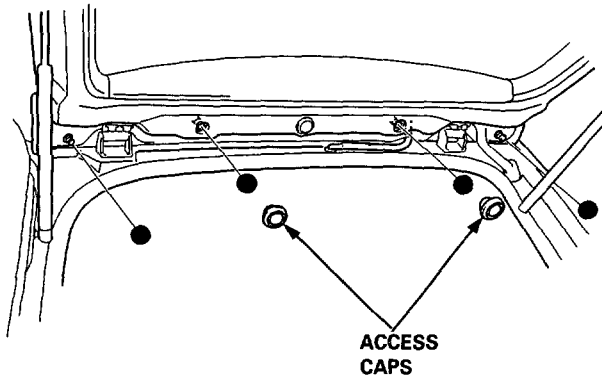
## Tailgate Spoiler Replacement

1. Remove the access caps from the tailgate, and remove the nuts.

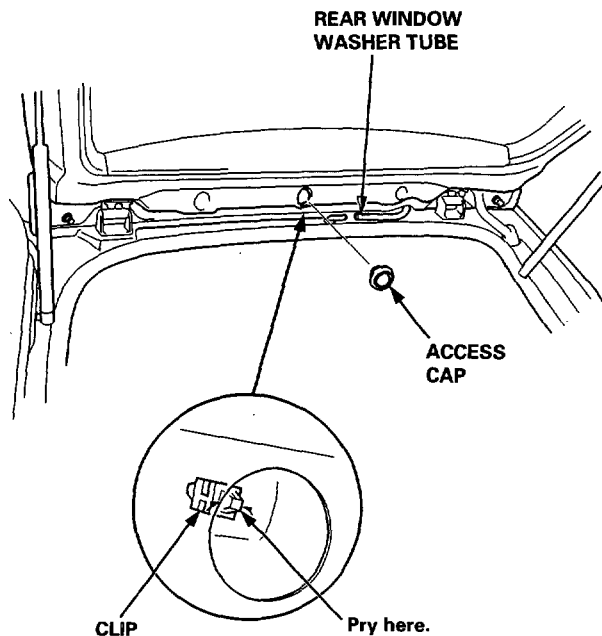
●: Nut locations, 4



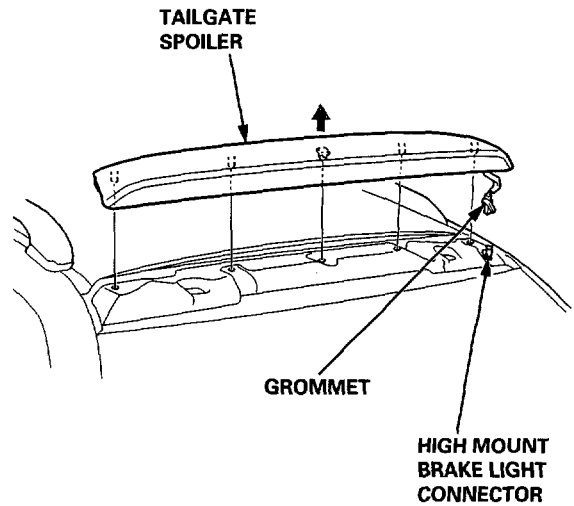
6 x 1.0 mm  
9.8 N·m (1.0 kgf·m,  
7.2 lbf·ft)



2. Disconnect the rear window washer tube. Remove the access cap from the tailgate, and detach the clip.



3. Close the tailgate, and lift the tailgate spoiler up. Remove the high mount brake light connector grommet from the tailgate, and disconnect the high mount brake light connector, then remove the tailgate spoiler. Take care not to scratch the tailgate and body.



4. Install in the reverse order of removal; and make sure the connector is plugged in properly and the washer tube is connected properly.



## License Plate Trim Replacement

### NOTE:

- Take care not to scratch the tailgate.
- Wear gloves to protect your hands.

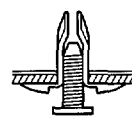
1. Remove (see page 20-64):
  - Tailgate upper trim
  - Tailgate side trim
  - Tailgate trim panel
2. Disconnect the license plate light connector, and detach it from the tailgate, and remove the nuts securing the license plate trim.

●: Nut locations, 4

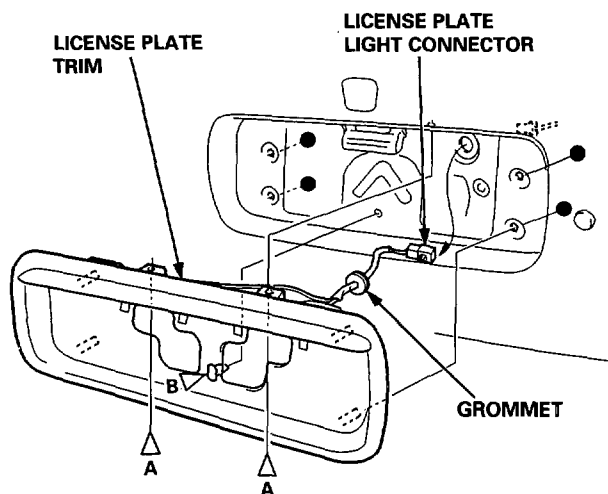
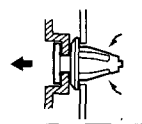


▷: Clip locations

A ▷, 2



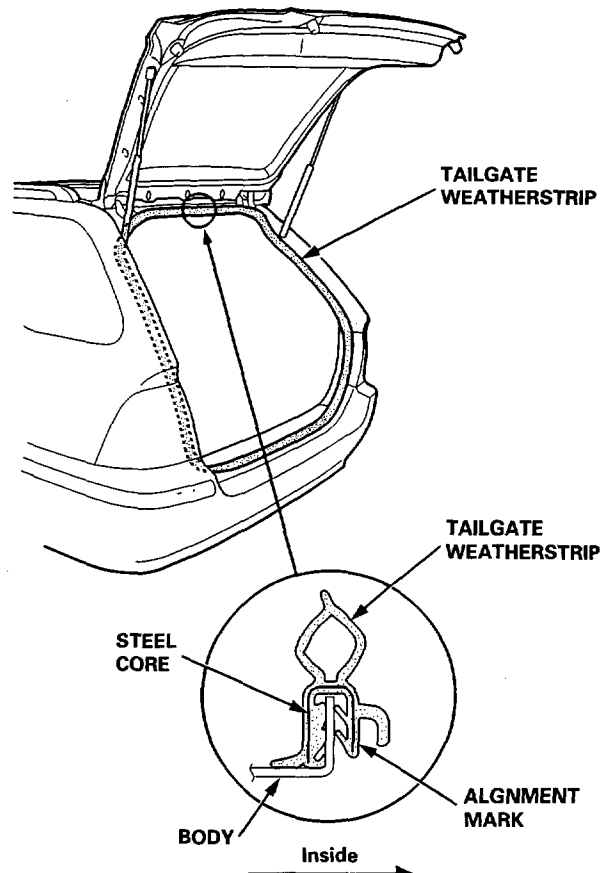
B ▷, 1



3. Remove and detach the clips, then pull the license plate trim out.
4. Remove the grommet, then remove the license plate trim.
5. Install in the reverse order of removal, and note these items:
  - Make sure the connector is plugged in properly.
  - Replace any damaged clips.

## Tailgate Weatherstrip Replacement

1. Remove the tailgate weatherstrip by pulling it out.
2. Locate the painted alignment mark on the tailgate weatherstrip. Align the painted mark with the alignment tab in the center of the tailgate opening, and install the tailgate weatherstrip all the way around in the direction shown. Make sure there are no wrinkles in the weatherstrip.



3. Check for water leaks.

# Tailgate

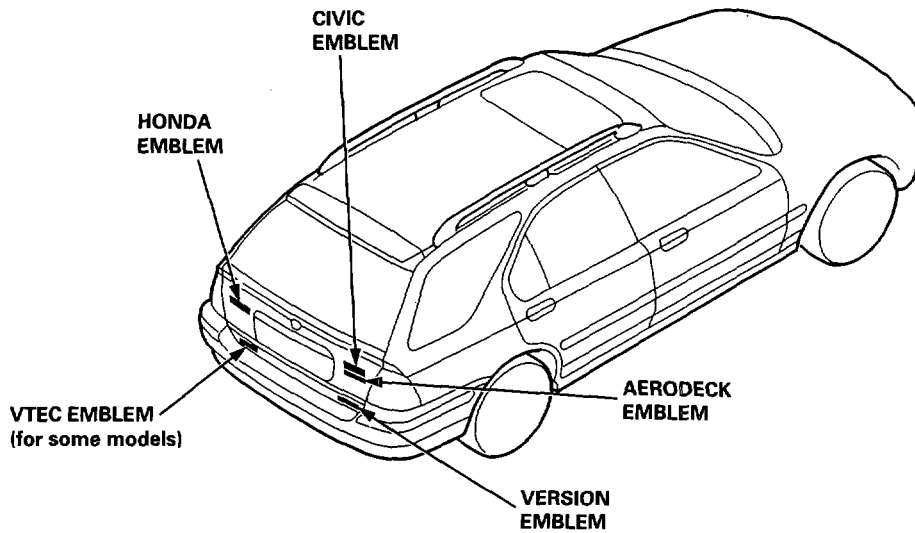
## Emblem Replacement

Apply the emblem where shown.

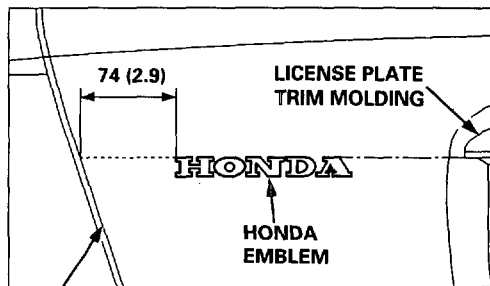
**NOTE:**

- Before applying, clean the tailgate surface with a sponge dampened in alcohol.
- After cleaning, keep oil, grease and water from getting on the surface.

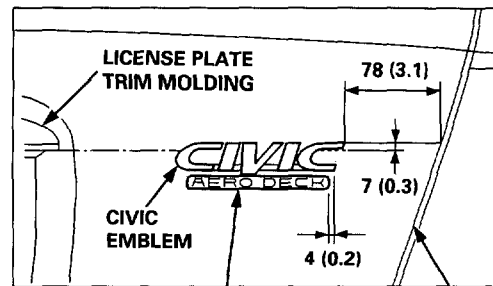
**Attachment Point (Reference):**



Unit: mm (in)

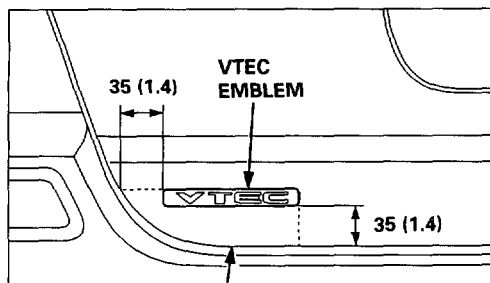


Edge of the tailgate.

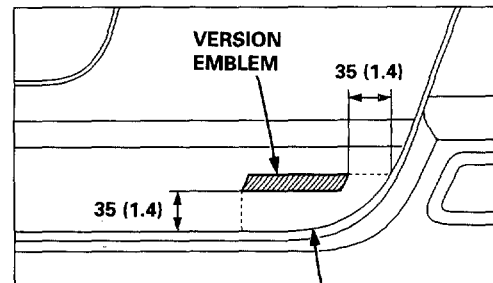


AERODECK EMBLEM

Edge of the tailgate.



Edge of the tailgate.



Edge of the tailgate.

# Roof Rail



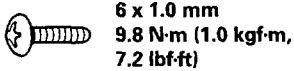
## Replacement

### NOTE:

- When prying with a flat-tip screwdriver, wrap it with protective tape to prevent damage.
- Take care not to scratch each cover, roof rail and body.

1. Slide the front and rear covers while pushing the spring plate through the hole on each stay with a flat-tip screwdriver, then remove them, and remove the center cap. With a Torx T30 bit, remove the nuts from the front and rear stays, and remove the special bolts from the center stay.

### ►: Bolt locations, 2



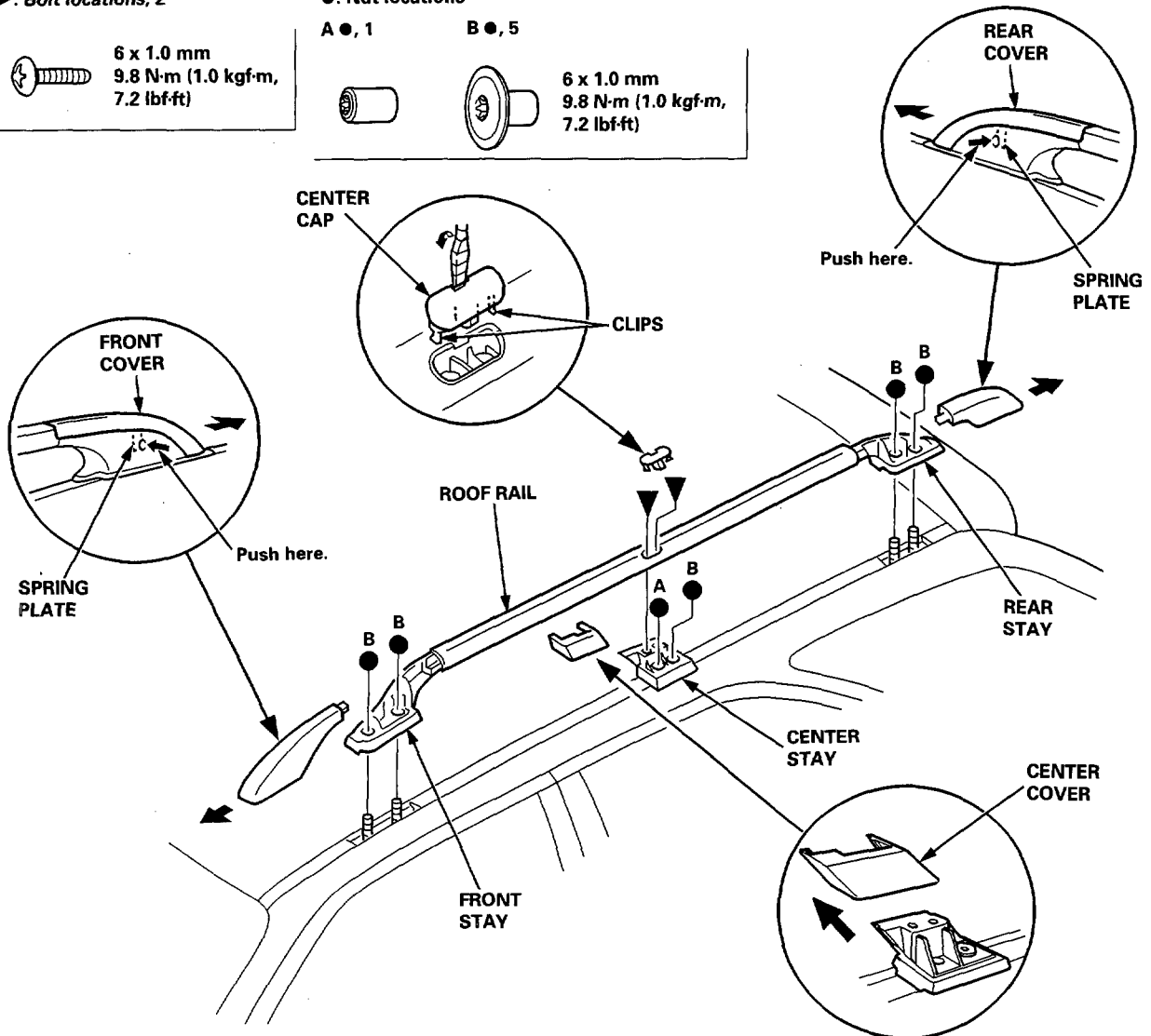
### ●: Nut locations

A ●, 1

B ●, 5



6 x 1.0 mm  
9.8 N-m (1.0 kgf-m,  
7.2 lbf-ft)



2. Remove the roof rail. Do not remove the pad from each stay.
3. Remove the center cover. With a Torx T30 bit, remove the nuts, then remove the center stay. Do not remove the pad from the center stay.
4. Install in the reverse order of removal.

# Moldings

## Roof Moldings Replacement

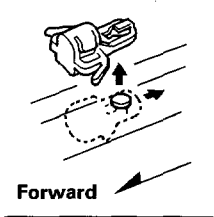
**NOTE:**

- Take care not to scratch the body.
- The steel core in the roof molding cannot be restored to its original shape once it is bent. Replace the roof molding when the steel core is bent.

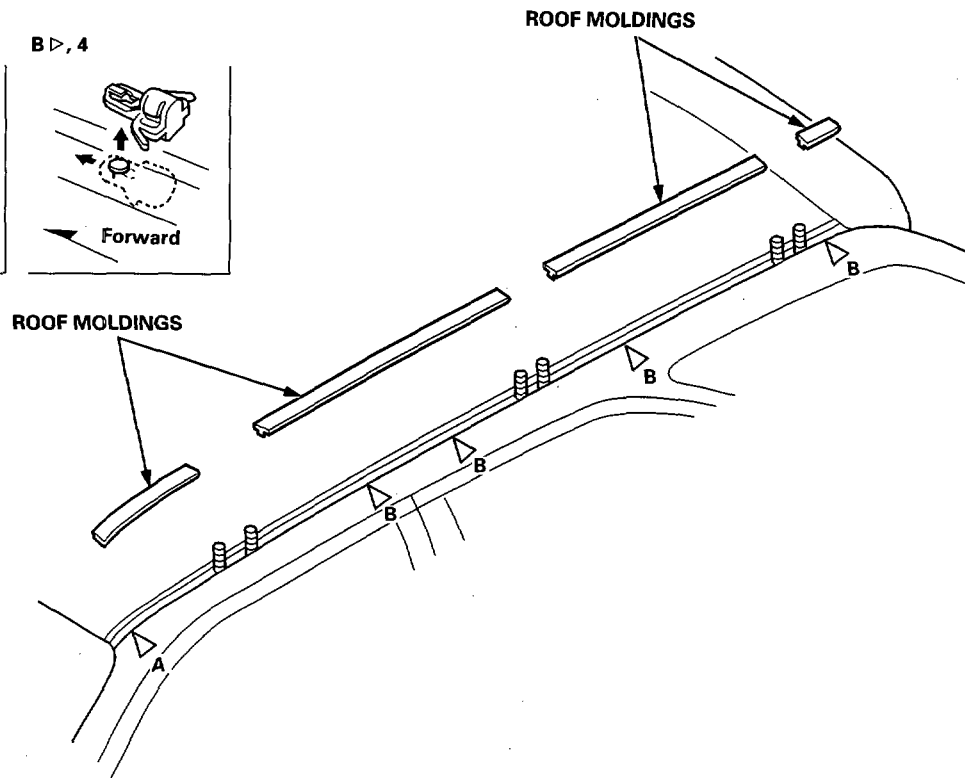
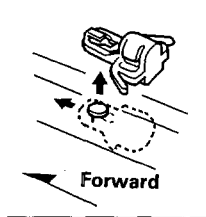
1. Remove the roof rail and center stay (see page 20-107).
2. Using a flat-tip screwdriver wrapped with protective tape, detach the clips by prying up the roof molding. Use a shop towel on the body.

▷: Clip locations

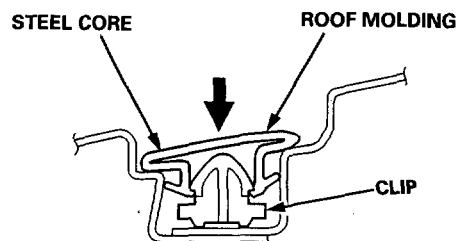
A ▷, 1



B ▷, 4



3. Install in the reverse order of removal, and note these items:
  - Replace any damaged clips.
  - Make sure the roof moldings are installed on the clips securely.



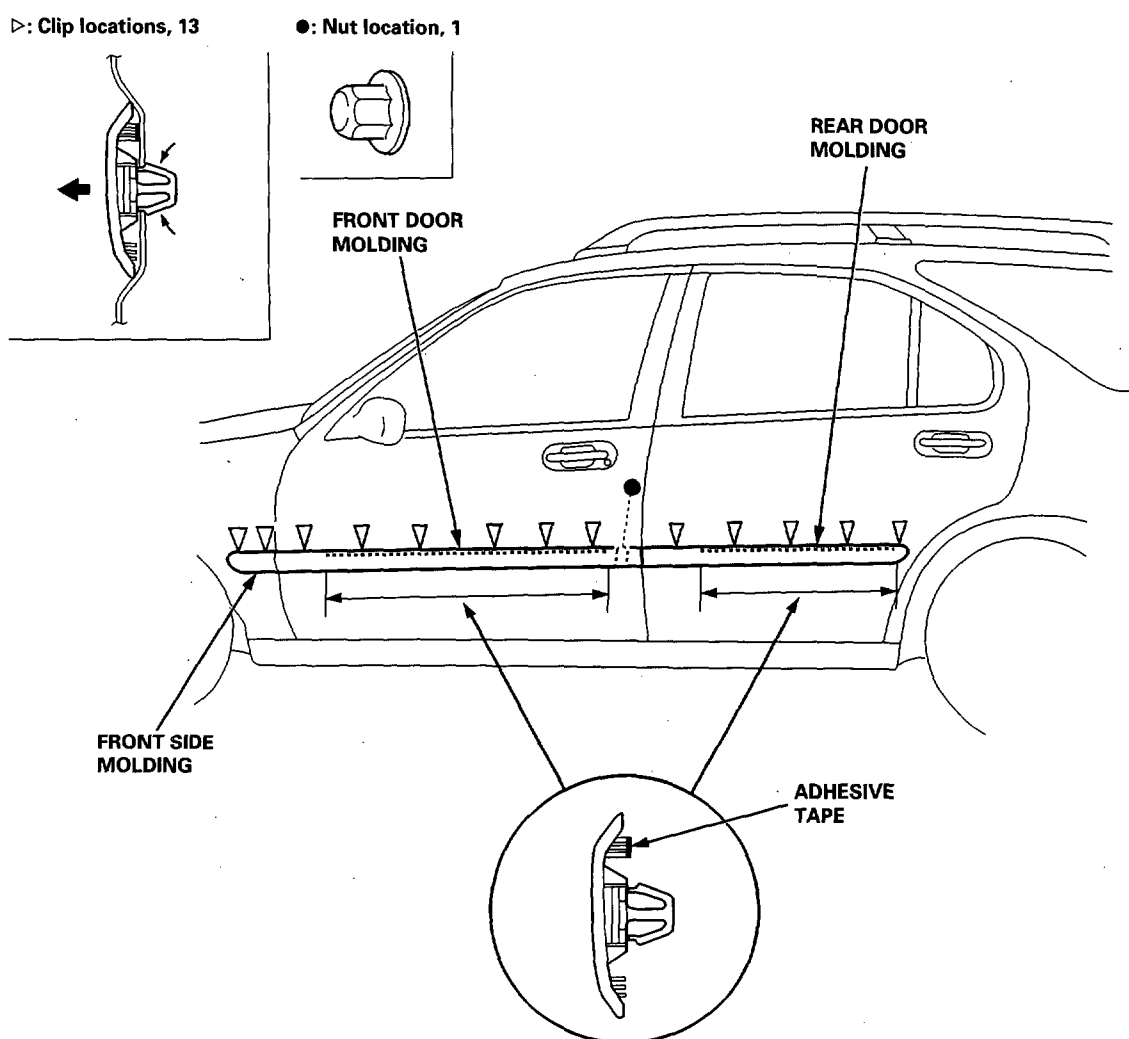


## Door and Side Moldings Replacement

### NOTE:

- Before prying, wrap the blade of your putty knife or flat-tip screwdriver with protective tape to prevent damage to the door.
- Be careful not to pry too far or you may bend the molding.
- Wear gloves to protect your hands.

1. Prepare to release the molding clips from inside the vehicle.
  - To remove the front side molding, remove the inner fender (see page 20-111).
  - To remove the front door molding, remove the front door panel (see page 20-6) and plastic cover.
  - To remove the rear door molding, remove the rear door panel (see page 20-12) and plastic cover.
2. Remove the nut, and release the clips, and gently pry the front door molding or rear door molding away from the door while removing the adhesive tape.



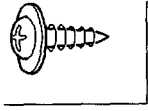
3. Release the clips, then remove the front side molding.
4. Install in the reverse order of removal; replace any damaged clips and adhesive tape.

# Side Sill Panel

## Replacement

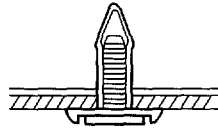
1. Remove the side sill panel.
  - 1 Pull the inner fender back as necessary, and remove the expansion clip.
  - 2 Slide the side sill panel forward and remove it. Side clips will stay in the body.
  - 3 Remove the side clips from the body.

►: Screw locations, 4

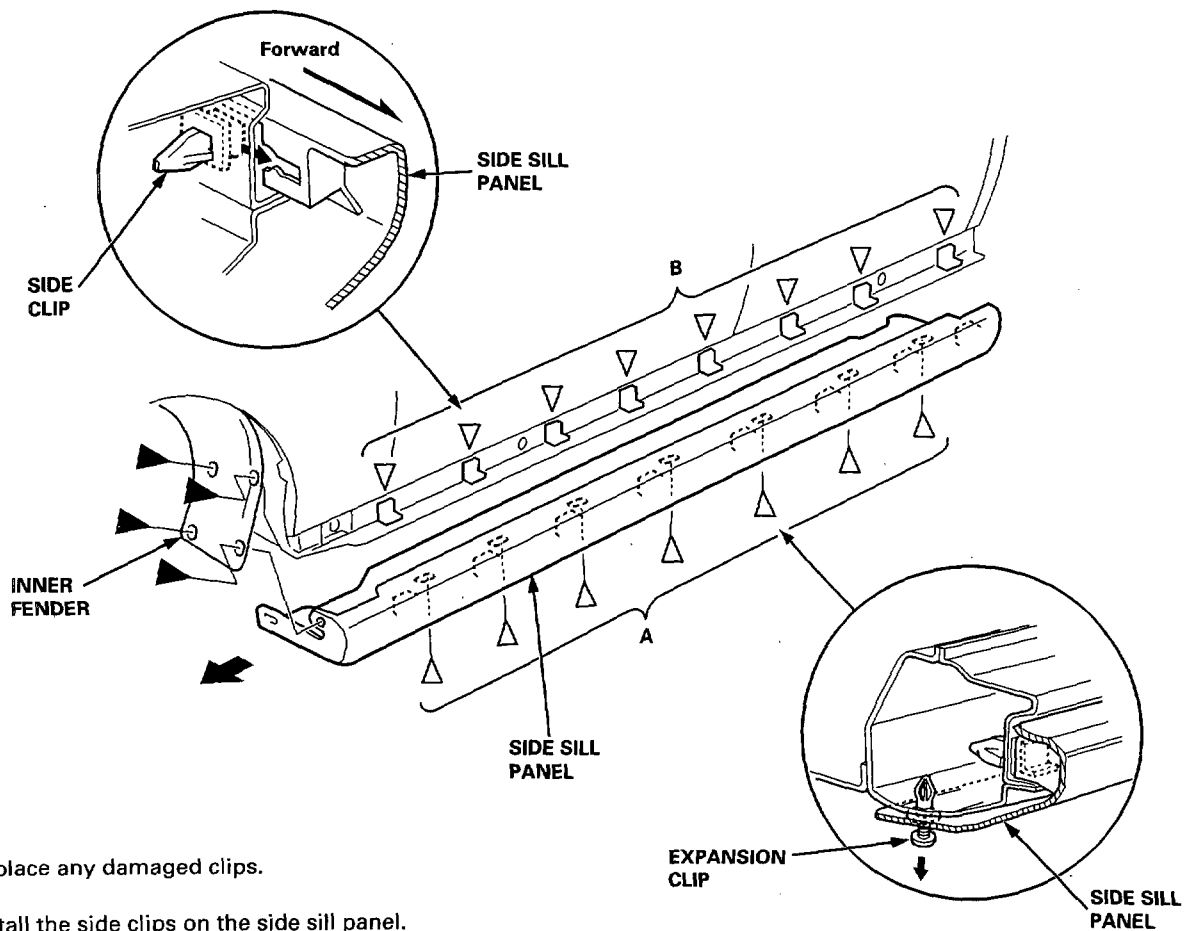
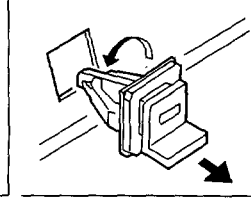


▷: Clip locations

A ▷, 7



B ▷, 8



2. Replace any damaged clips.
3. Install the side clips on the side sill panel.
4. Hold the panel up, and fit all the side clips into the holes in the body, then push on the panel until the clips snap into place.
5. Install all the expansion clips.
6. Install the inner fender.

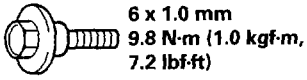


## Inner Fender Replacement

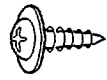
Take care not to scratch the body.

►: Bolt, screw locations

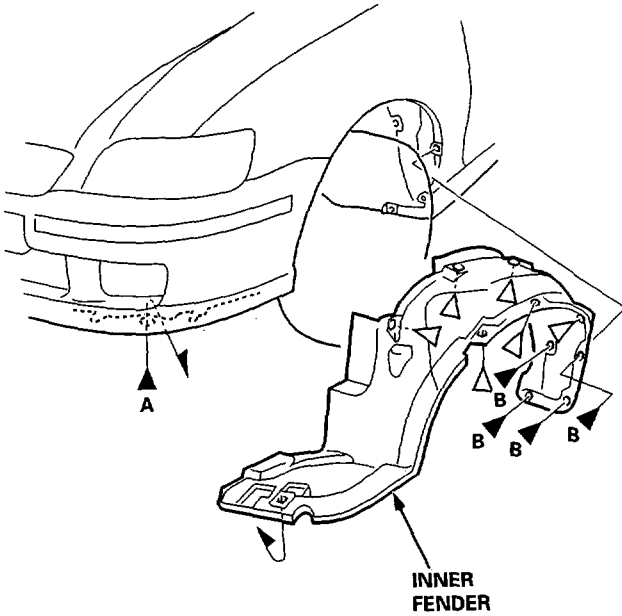
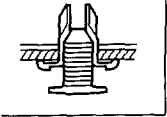
A ►, 1



B ►, 4



▷: Clip locations, 6



Install in the reverse order of removal; replace any damaged clips.

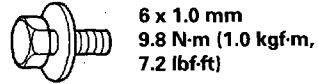
## Fuel Pipe Protector Replacement

NOTE: Take care not to scratch the body.

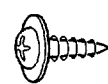
1. Remove the rear wheel (see section 18).
2. Remove the bolt and screws, and release the clips, then remove the fuel pipe protector.

►: Bolt, screw locations

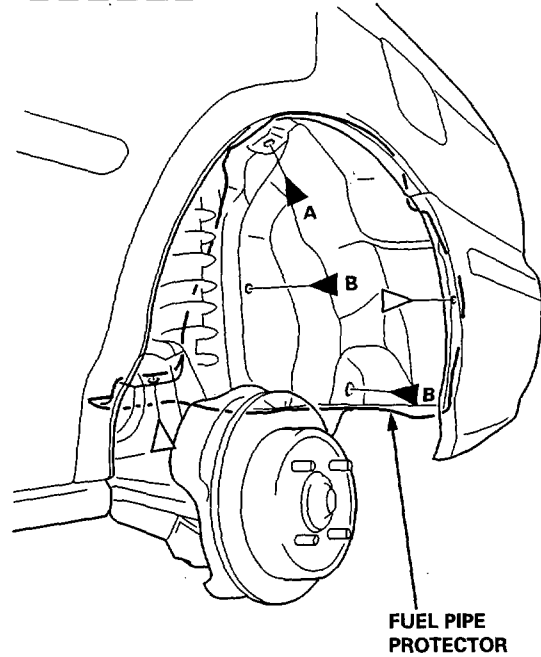
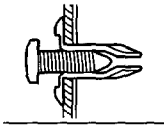
A ►, 1



B ►, 2



▷: Clip locations, 2



3. Install in the reverse order of removal; replace any damaged clips.



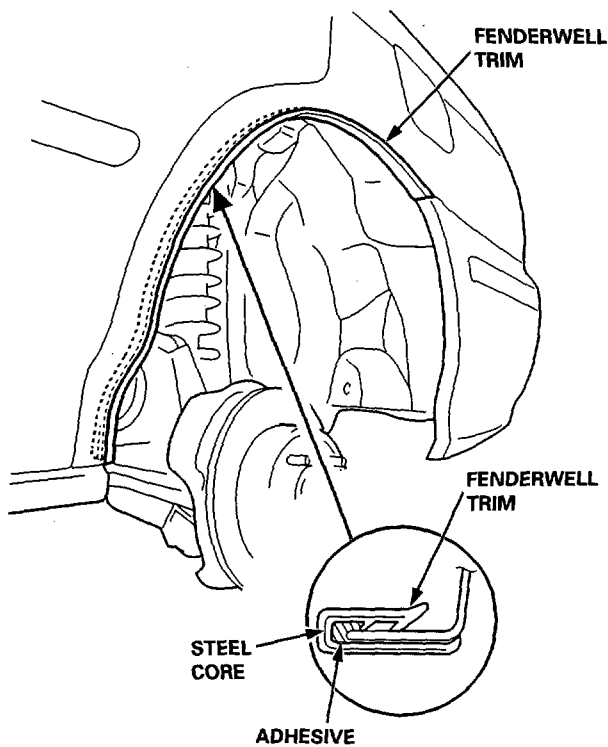
# Fenderwell

## Fenderwell Trim Replacement

NOTE: The steel core in the fenderwell trim cannot be restored to its original shape once it is bent. Replace the fenderwell trim when the steel core is bent.

1. Remove the fenderwell trim by pulling it out.
2. Clean the body bonding surface with a sponge dampened in alcohol. After cleaning, keep oil, grease and water from getting on the clean surface.
3. Apply clear sealant into the channel of the fenderwell trim at area indicated by arrow.
4. Install the fenderwell trim.

Sealant: Cemedine P/N 08712 - 0004, or equivalent

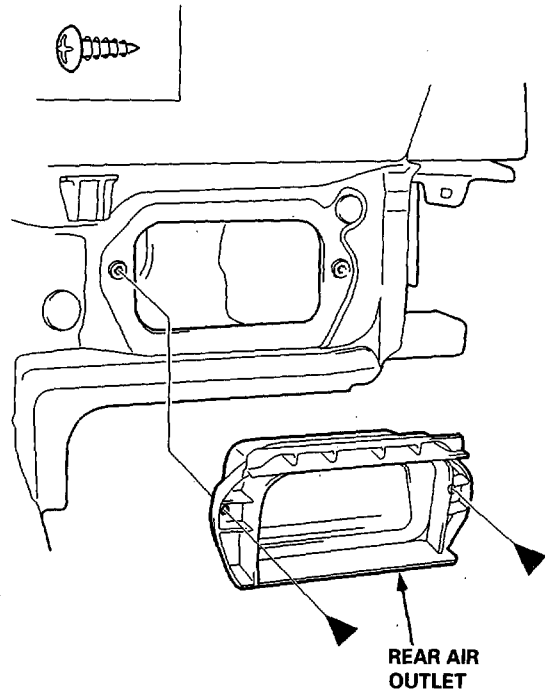


5. Scrape or wipe the excess sealant off with a towel. To remove sealant from a painted surface, wipe with a soft shop towel dampened in alcohol.

## Rear Air Outlet Replacement

1. Remove the rear bumper (see page 20-93).
2. Remove the screws, then remove the rear air outlet. Take care not to scratch the body.

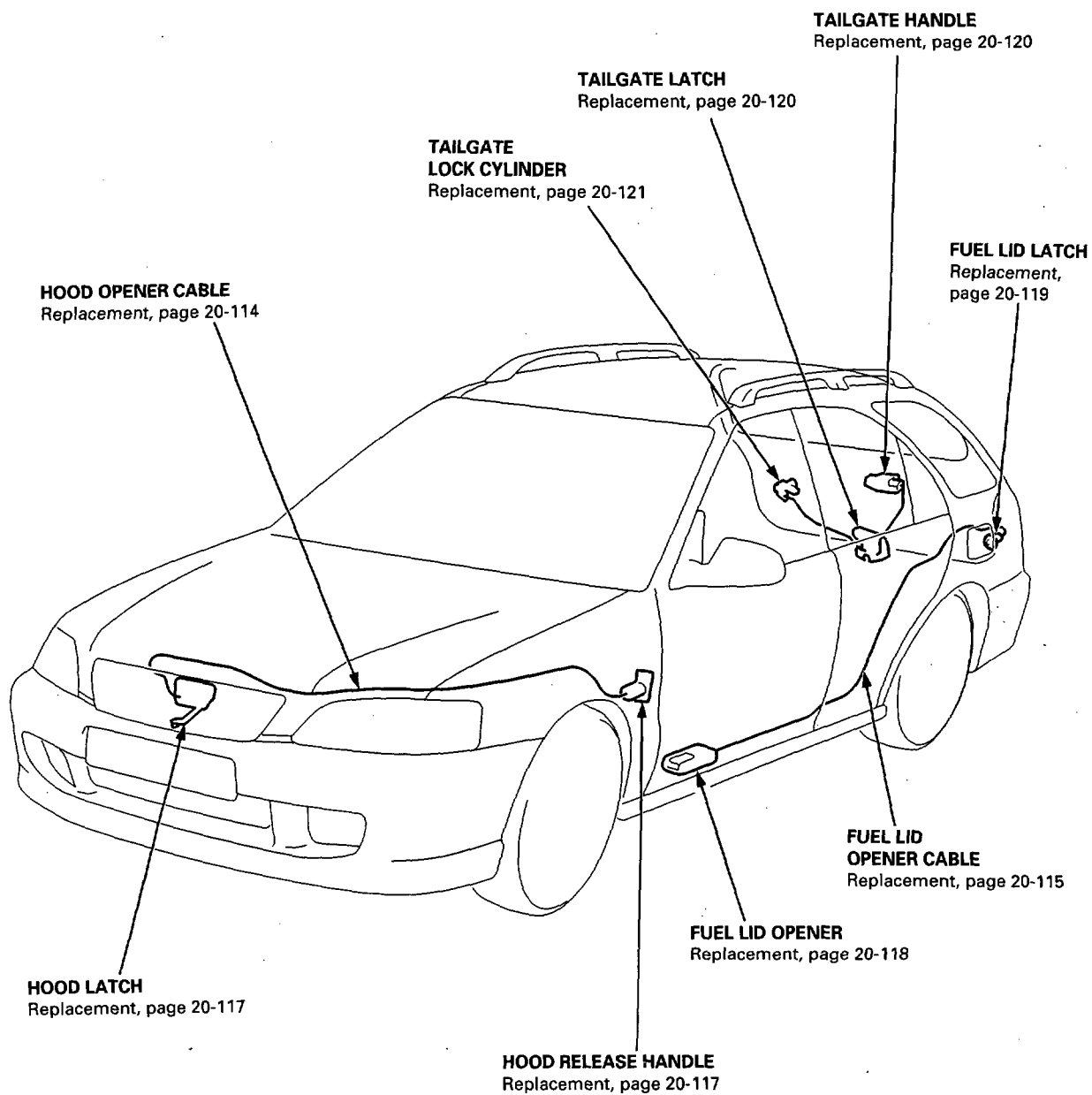
►: Screw locations, 2



3. Install in the reverse order of removal.



## Component Location Index



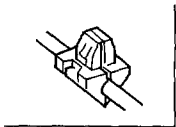
# Openers

## Hood Opener Cable Replacement

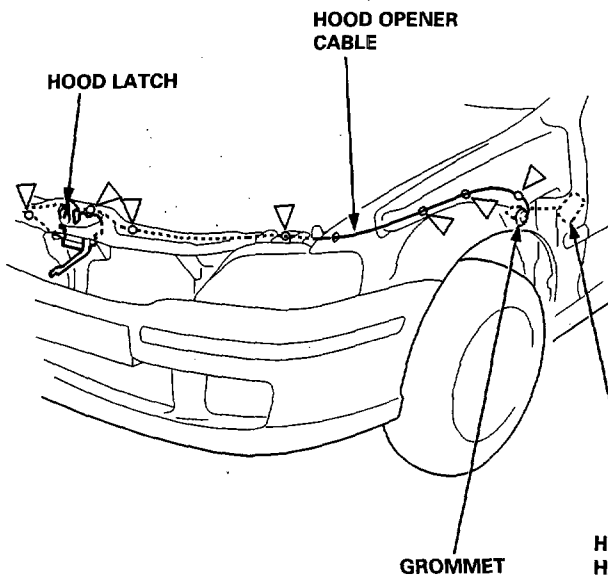
1. Remove the following parts from the left or right side of the vehicle.
  - Inner fender (see page 20-111)
  - Front side trim (see page 20-61)
  - Kick panel (see page 20-61)
2. Disconnect the hood opener cable from the hood latch and hood release handle; see page 20-117.

### ▷: Clip locations

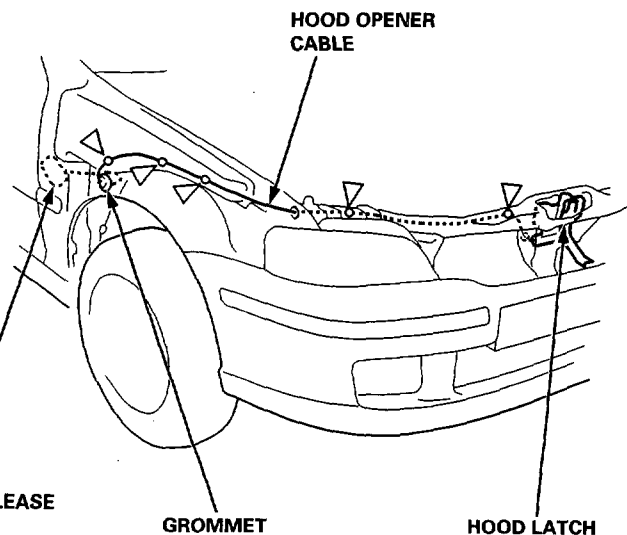
LHD, 7  
RHD, 5



LHD:



RHD:



3. Using a clip remover, detach the clips from the body, then remove the hood opener cable from the vehicle. Take care not to bend the opener cable.
4. Install in the reverse order of removal; replace any damaged clips.

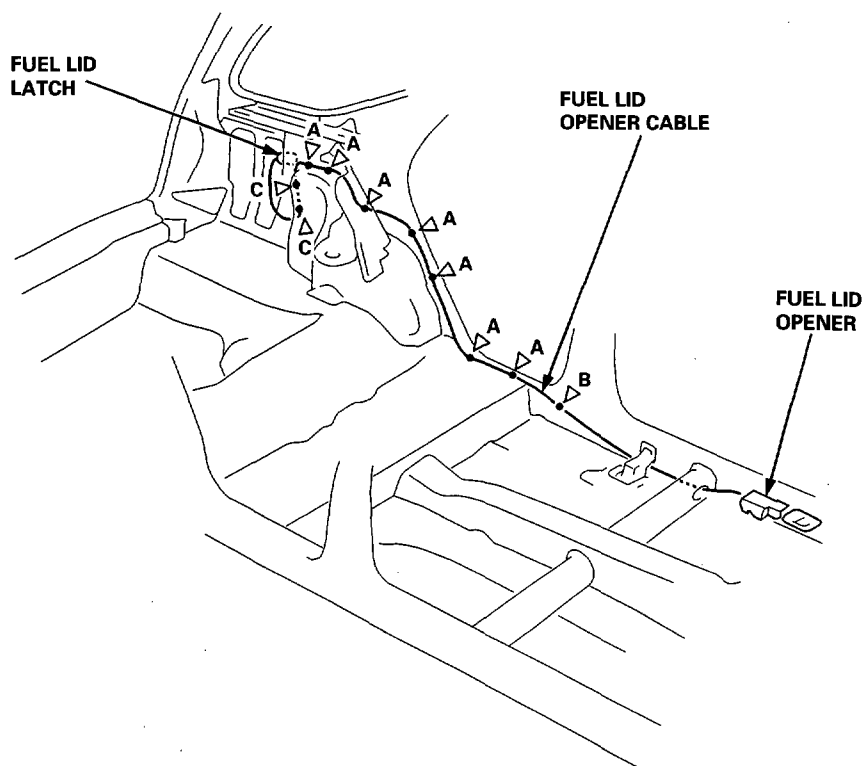
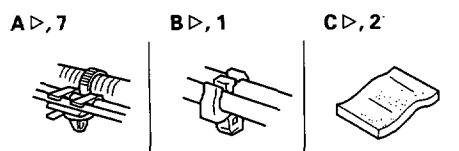


## Fuel Lid Opener Cable Replacement

1. Remove the following parts.
  - Rear seat-back (see page 20-85)
  - Rear seat cushion (see page 20-85)
  - Front side trim (see page 20-61)
  - Rear side trim (see page 20-61)
  - Center pillar lower trim panel (see page 20-61)
  - Front seat belt lower anchor bolt (see section 24)
  - Seat side trim (see page 20-62)
  - Tonneau cover (see page 20-62)
  - Cargo floor lid (see page 20-63)
  - Rear trim panel (see page 20-63)
  - Rear side upper trim (see page 20-62)
  - Rear side trim panel (see page 20-63)
2. Pull the carpet back as necessary (see page 20-67).
3. Disconnect the fuel lid opener cable from the fuel lid opener; see page 20-118.

LHD:

▷: Clip, cable cushion locations



(cont'd)

# Openers

## Fuel Lid Opener Cable Replacement (cont'd)

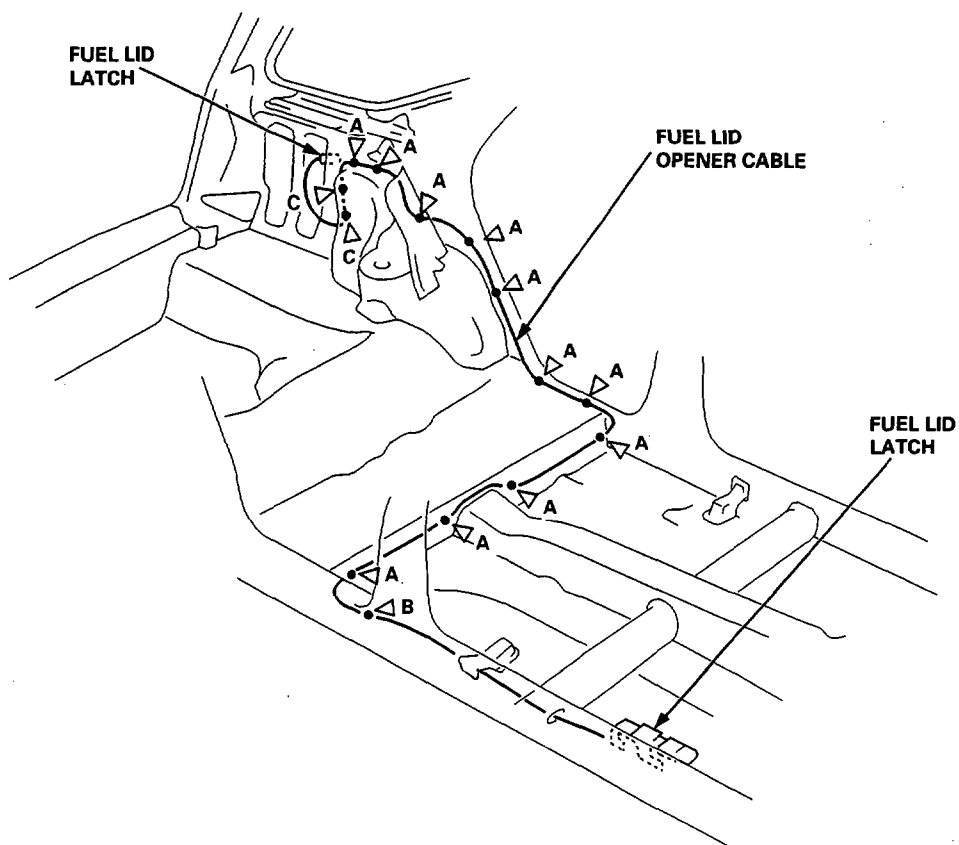
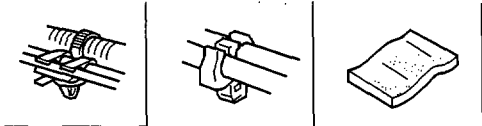
RHD:

▷: Clip, cable cushion locations

A ▷, 11

B ▷, 1

C ▷, 2



4. Release the opener cable from the clips, and remove the cable cushion, then remove the fuel lid latch from the body.
5. Remove the fuel lid opener cable from the vehicle. Take care not to bend the opener cable.
6. Install in the reverse order of removal; replace any damaged clips.

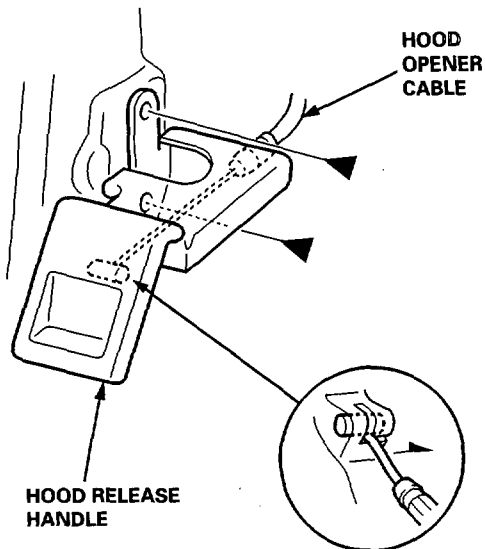
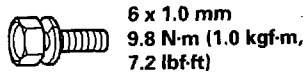


## Hood Release Handle Replacement

NOTE: LHD is shown, RHD is symmetrical.

1. Remove the following parts from the left or right side of the vehicle.
  - Front side trim (see page 20-61)
  - Kick panel (see page 20-61)
2. Disconnect the hood opener cable from the hood release handle. Take care not to bend the hood opener cable.

►: Bolt locations, 2

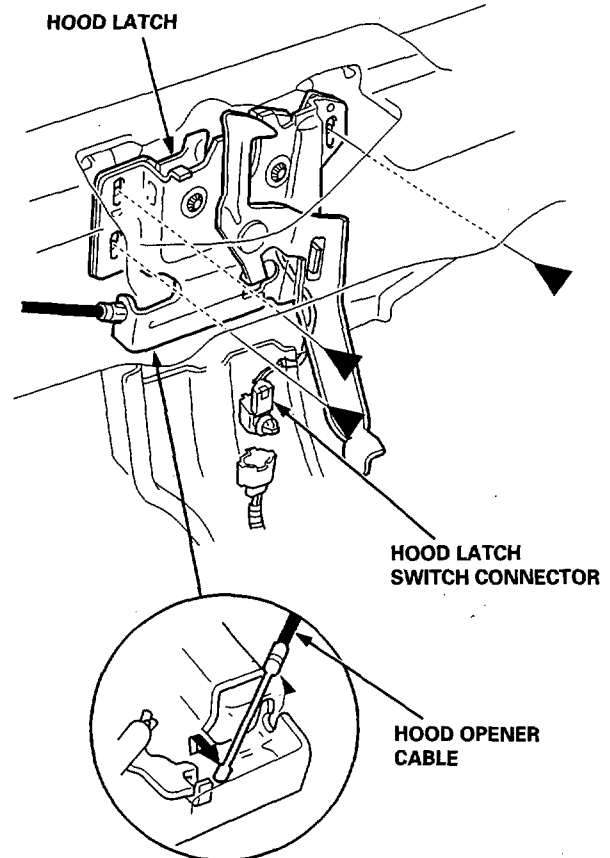
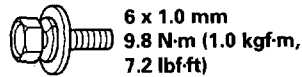


3. Remove the bolts, then remove the hood release handle.
4. Install in the reverse order of removal, and note these items:
  - Make sure the hood opener cable is connected properly.
  - Make sure the hood opens properly.

## Hood Latch Replacement

1. Remove the bolts, then remove the hood latch from the body.

►: Bolt locations, 3



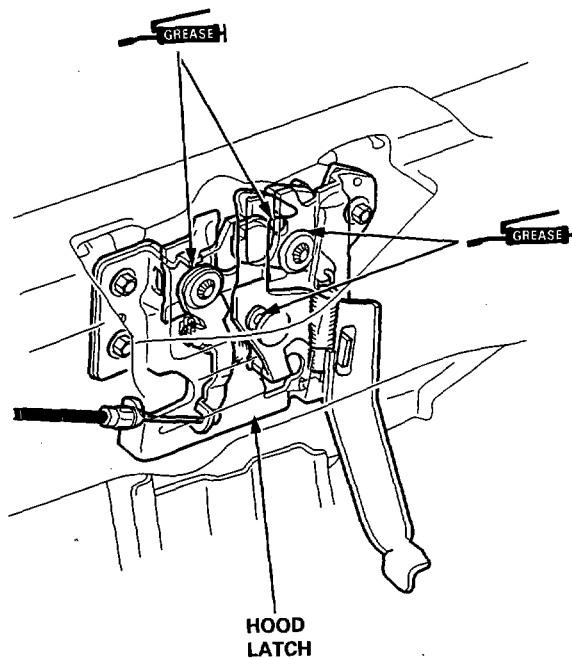
2. Disconnect the hood opener cable and hood latch switch connector, then detach the hood latch switch connector from the body. Take care not to bend the hood opener cable.

(cont'd)

# Openers

## Hood Latch Replacement (cont'd)

3. Install in the reverse order of removal, and note these items:
  - Grease each location of the hood latch indicated by the arrows.
  - Make sure the hood opener cable is connected properly and hood latch switch connector is plugged in properly.
  - Adjust the hood latch alignment (see page 20-117).
  - Make sure the hood locks securely.



## Fuel Lid Opener Replacement

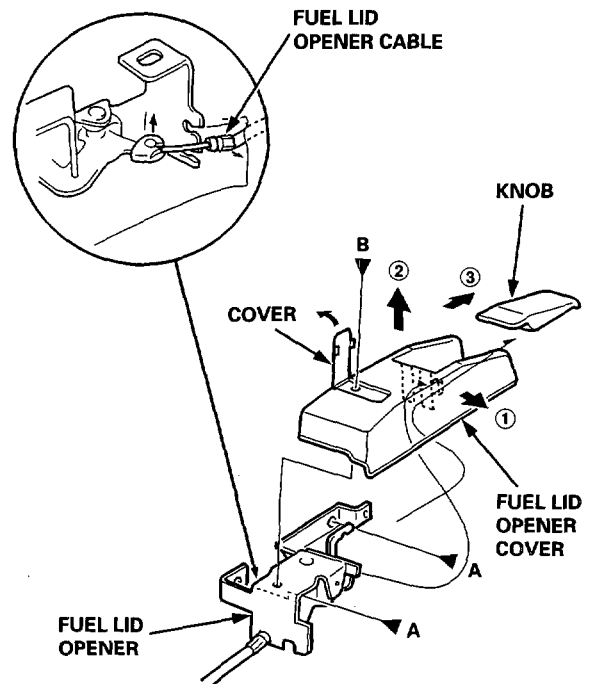
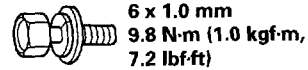
NOTE: LHD is shown, RHD is symmetrical.

1. Using a flat-tip screwdriver wrapped with protective tape, pry up on the cover, and remove the screw. Remove the knob, and remove the fuel lid opener cover.

▶: Bolt, screw locations

A ▶, 2

B ▶, 1

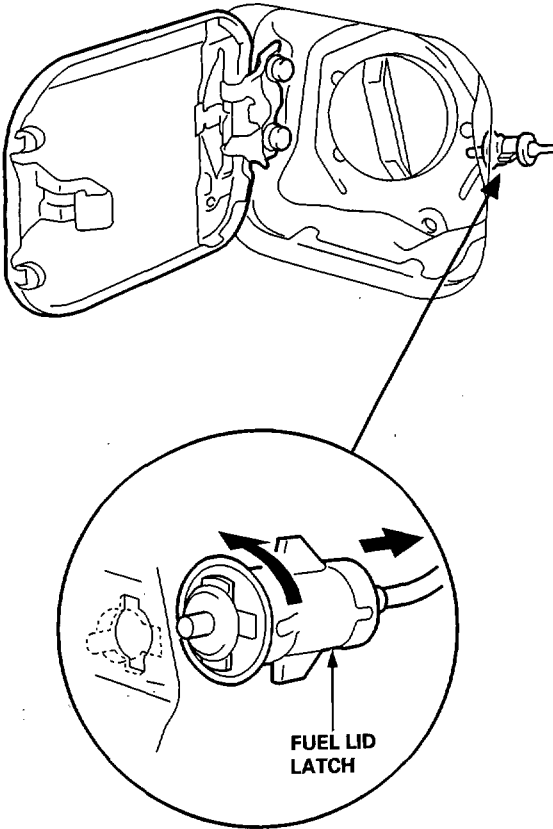


2. Remove the bolts securing the fuel lid opener.
3. Disconnect the fuel lid opener cable, then remove the fuel lid opener.
4. Install in the reverse order of removal, and note these items:
  - Make sure the fuel lid opener cable is connected properly.
  - Make sure the fuel lid opens properly.

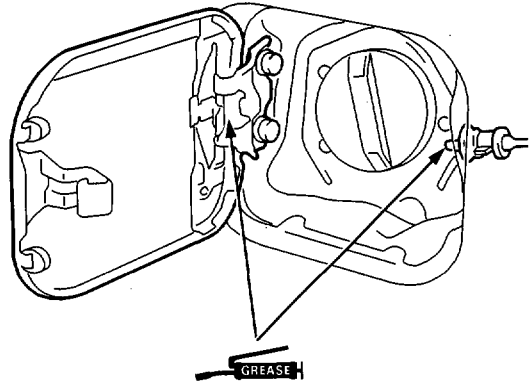


## Fuel Lid Latch Replacement

1. Remove:
  - Tonneau cover (see page 20-62)
  - Rear side upper trim (left side, see page 20-62)
  - Cargo floor lid (see page 20-62)
  - Rear trim pabel (see page 20-63)
2. Remove the tie down hook on the left rear side trim panel (see page 20-63).
3. Pull the rear edge of the left rear side trim panel back (see page 20-63).
4. Turn the fuel lid latch 90°, and remove it.



5. Install in the reverse order of removal, and note these items:
  - Grease each location indicated by the arrows.
  - Make sure the fuel lid opens properly and locks securely.

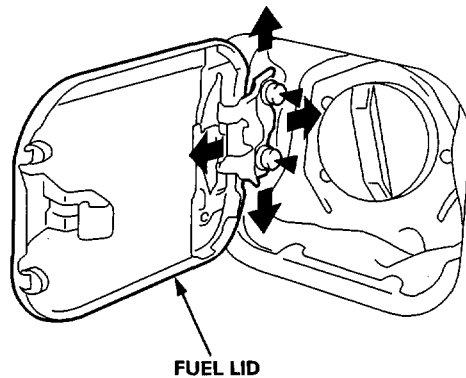


6. Check that the fuel lid fits flush against the body. If necessary, adjust it.

►: Bolt locations, 2



6 x 1.0 mm  
9.8 N·m (1.0 kgf·m,  
7.2 lbf·ft)





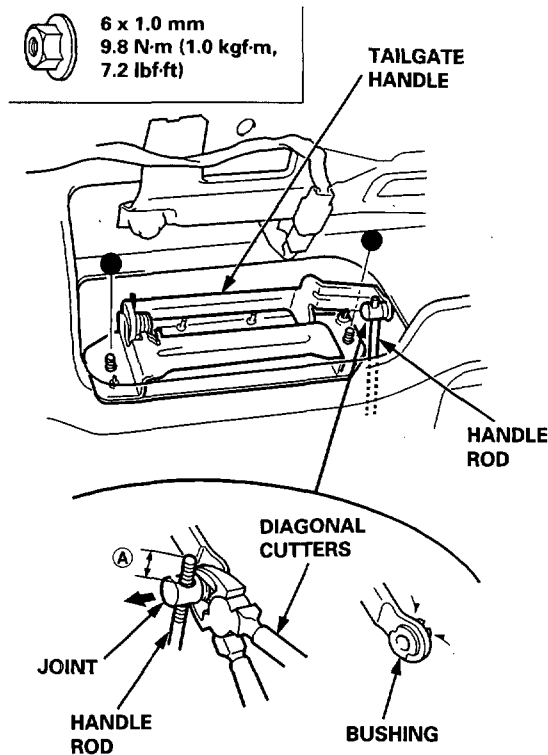
# Openers

## Tailgate Handle Replacement

NOTE: Wear gloves to protect your hands.

1. Remove (see page 20-64):
  - Tailgate upper trim
  - Tailgate side trim
  - Tailgate trim panel
2. Disconnect the handle rod from the tailgate latch.
3. Remove the nuts, then remove the tailgate handle with the handle rod. Take care not to bend the handle rod.

●: Nut locations, 2



4. Pry the handle rod out of its joint using diagonal cutters.

NOTE:

- To ease reassembly, note the distance (A) of the handle rod on the joint before disconnecting it.
- Take care not to bend the handle rod.

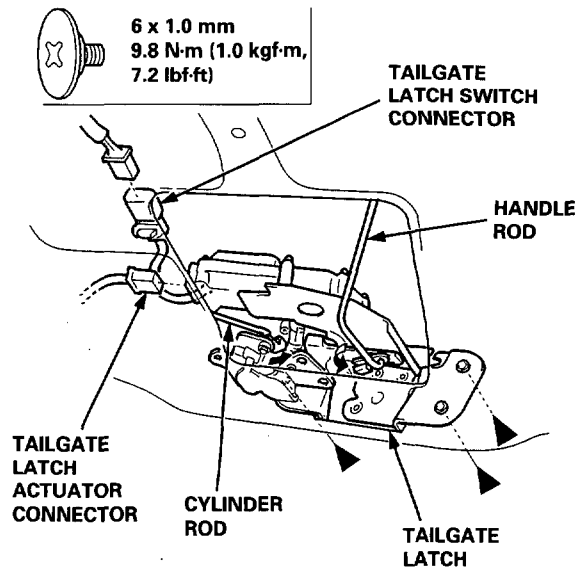
5. Replace the bushing on the tailgate handle.
6. Install in the reverse order of removal, and note these items:
  - Make sure the handle rod is connected securely.
  - Make sure the tailgate opens properly.

## Tailgate Latch Replacement

NOTE: Wear gloves to protect your hands.

1. Remove (see page 20-64):
  - Tailgate upper trim
  - Tailgate side trim
  - Tailgate trim panel
2. Disconnect the handle rod, cylinder rod and tailgate latch switch connector, and detach the connector.

►: Bolt locations, 3



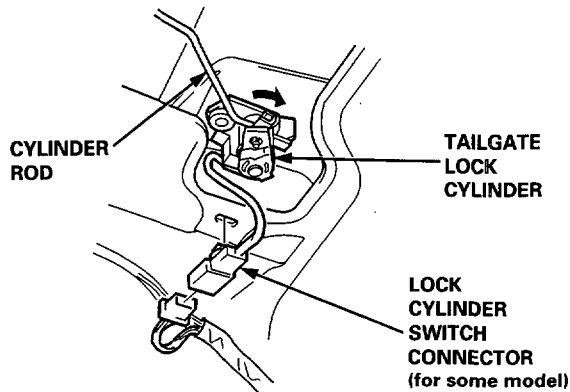
3. Remove the bolts, then pull the tailgate latch out.
4. Disconnect the tailgate latch actuator connector, then remove the tailgate latch.
5. Install in the reverse order of removal, and note these items:
  - Make sure the connectors are plugged in properly and the each rod is connected properly.
  - Make sure the tailgate opens properly and locks securely.



## Tailgate Lock Cylinder Replacement

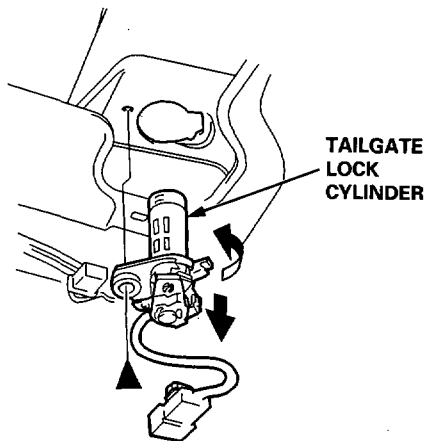
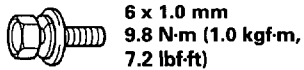
NOTE: Wear gloves to protect your hands.

1. Remove (see page 20-64):
  - Tailgate upper trim
  - Tailgate side trim
  - Tailgate trim panel
2. Disconnect the cylinder rod and lock cylinder switch connector (if applicable), then detach the lock cylinder switch connector from the tailgate.



3. Remove the bolt securing the lock cylinder. Then turn the tailgate lock cylinder 45°, and remove it.

►: Bolt location, 1



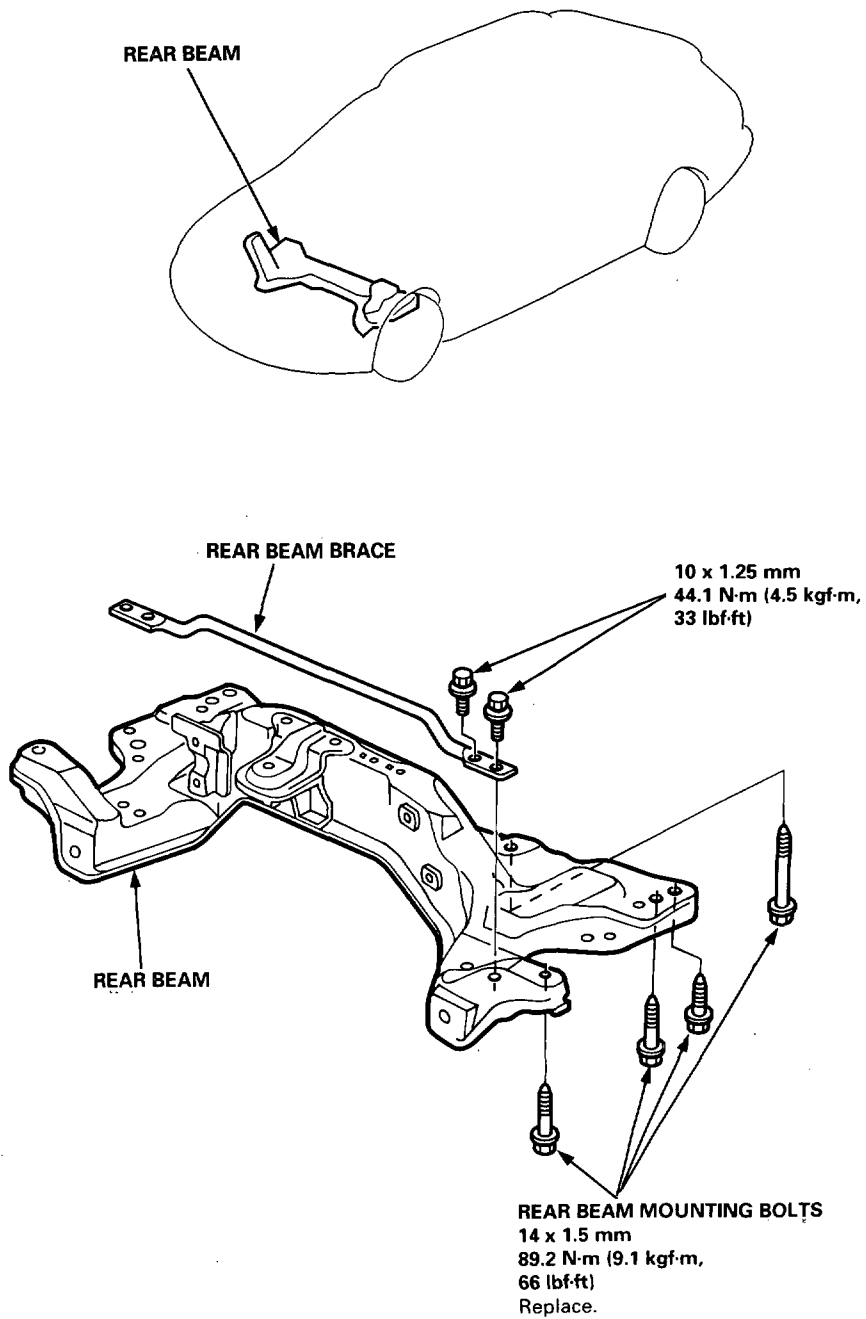
4. Install in the reverse order of removal, and note these items:
  - Make sure the connector is plugged in properly and the cylinder rod is connected properly.
  - Make sure the tailgate opens properly and locks securely.

# Sub-frame

## Replacement

### Sub-frame Torque:

After loosening the sub-frame mounting bolts, be sure to replace them with new ones.

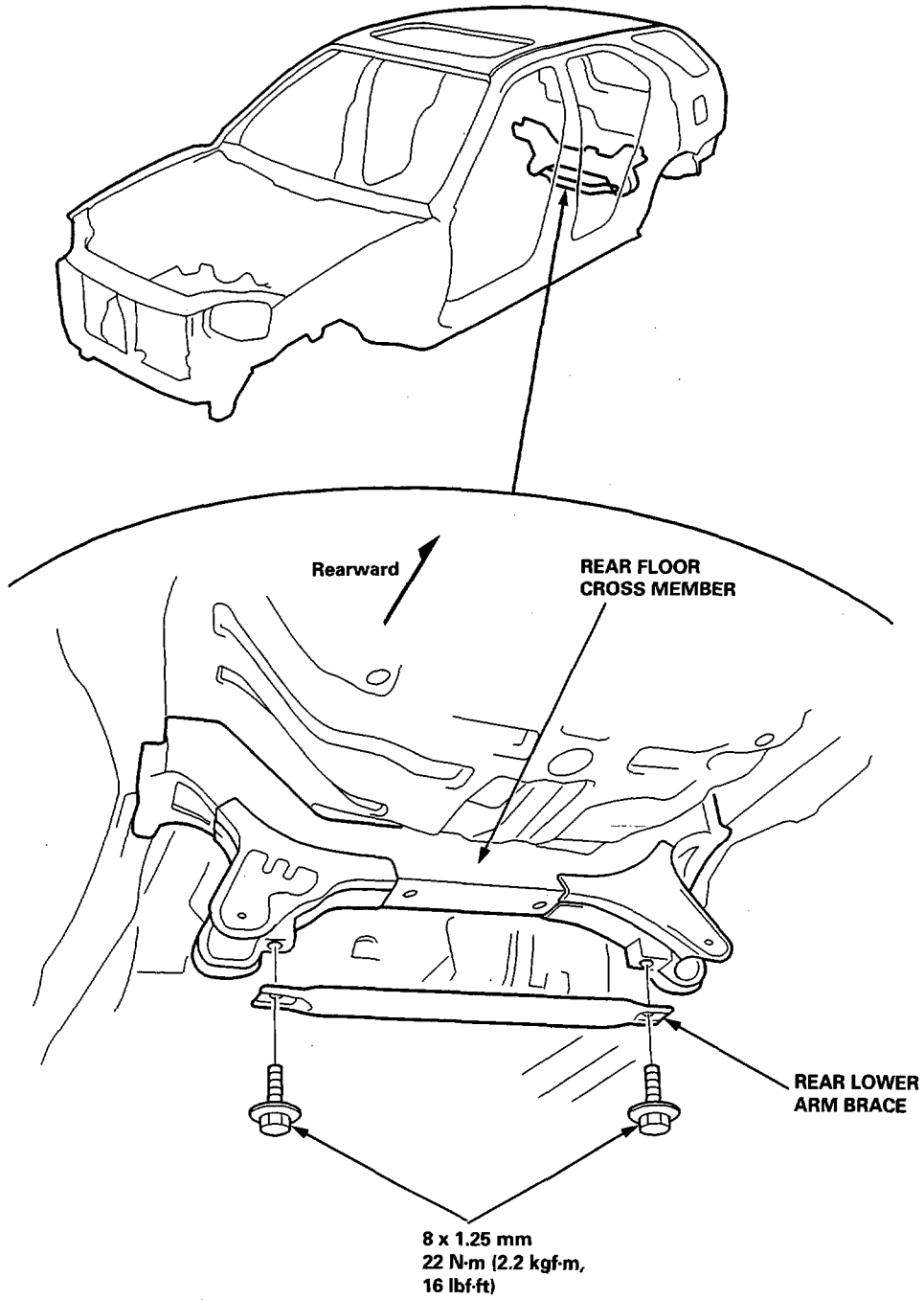


# Rear Lower Arm Brace



## Replacement

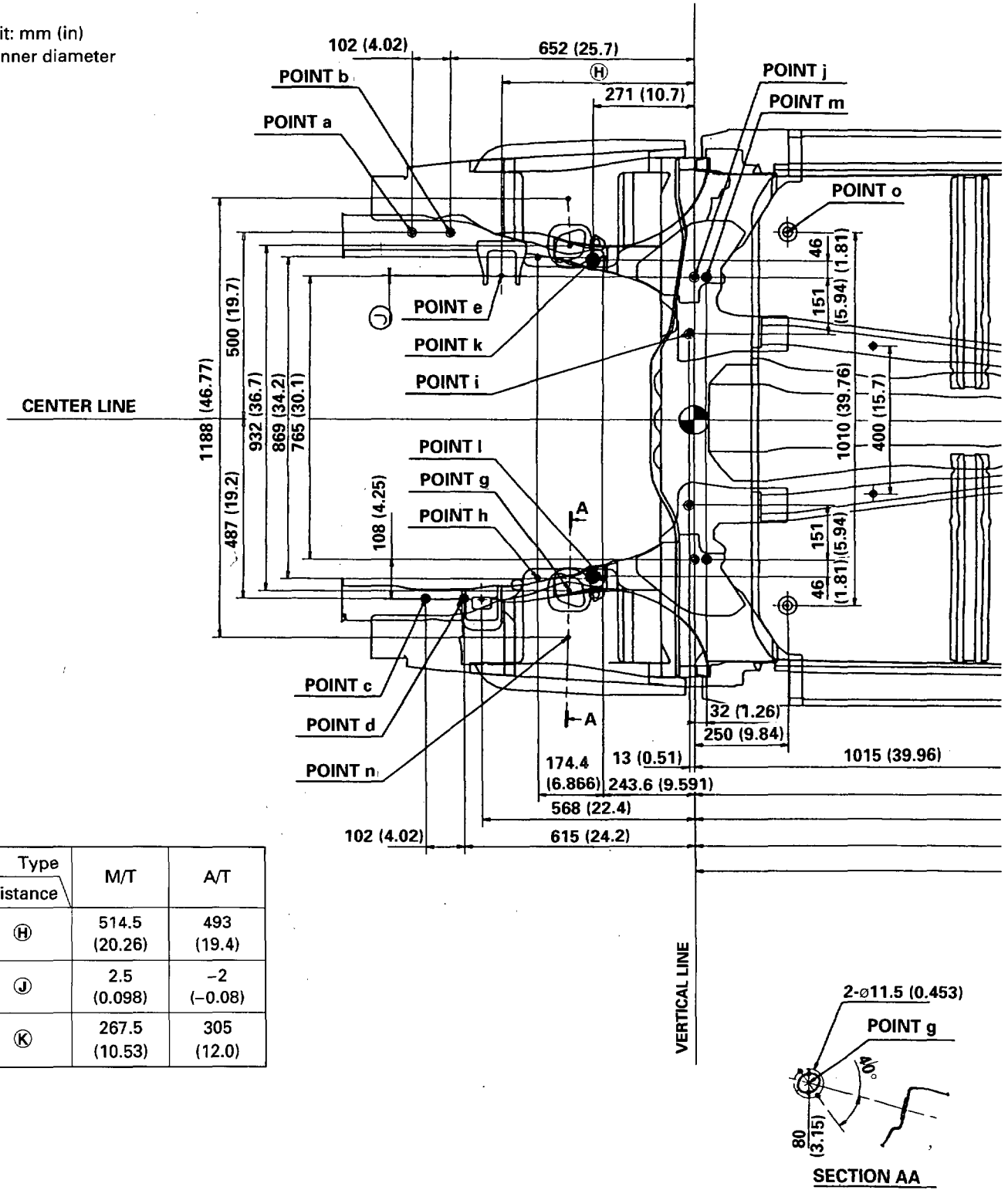
For some models:



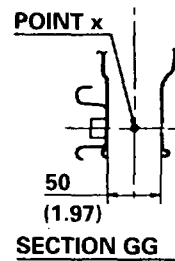
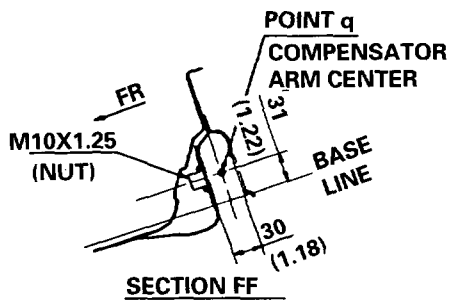
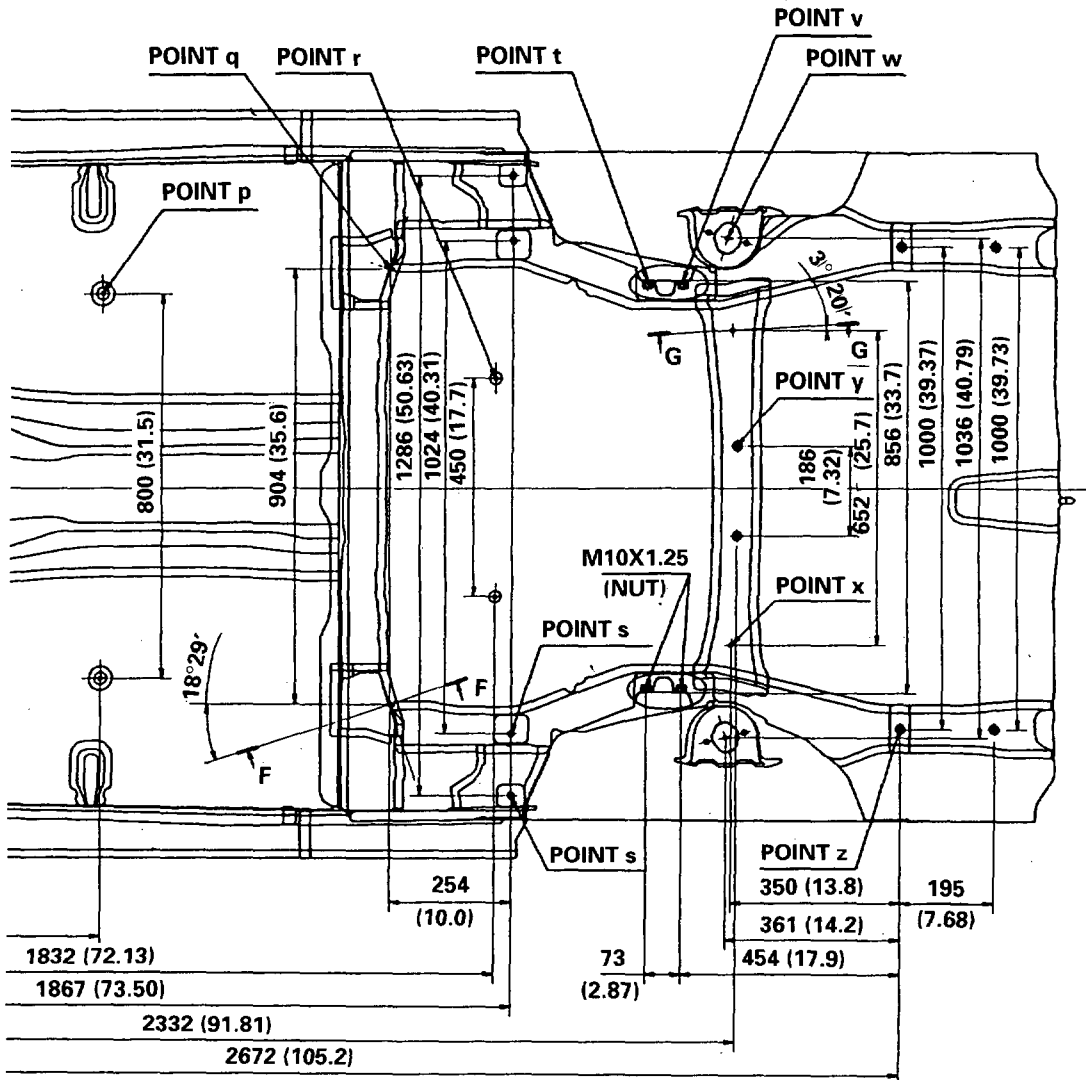
# Frame Repair Chart

Top view:

Unit: mm (in)  
 ø: Inner diameter



Type	M/T	A/T
Distance		
Ⓜ	514.5 (20.26)	493 (19.4)
Ⓝ	2.5 (0.098)	-2 (-0.08)
Ⓚ	267.5 (10.53)	305 (12.0)



(cont'd)

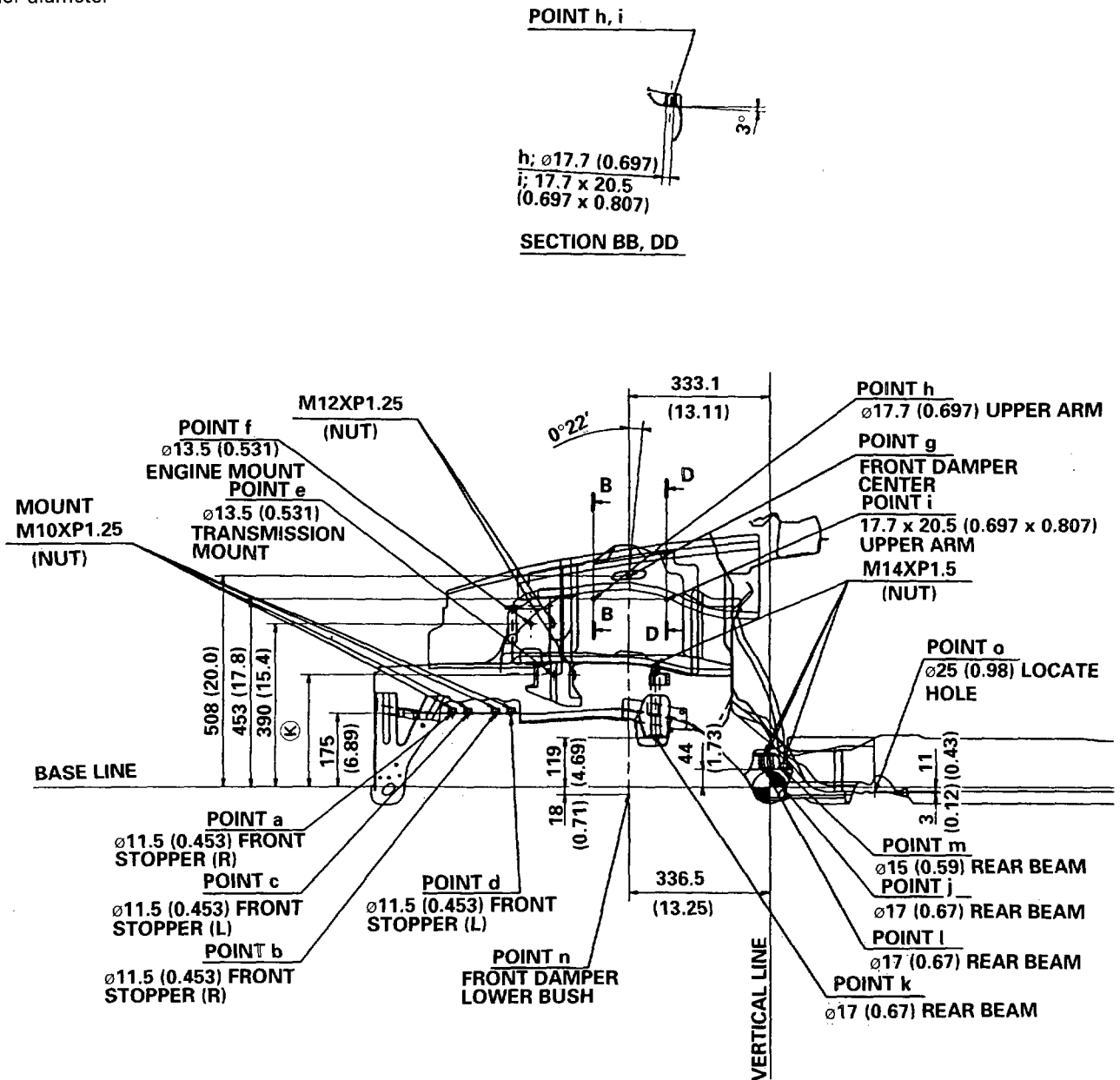
# Frame Repair Chart

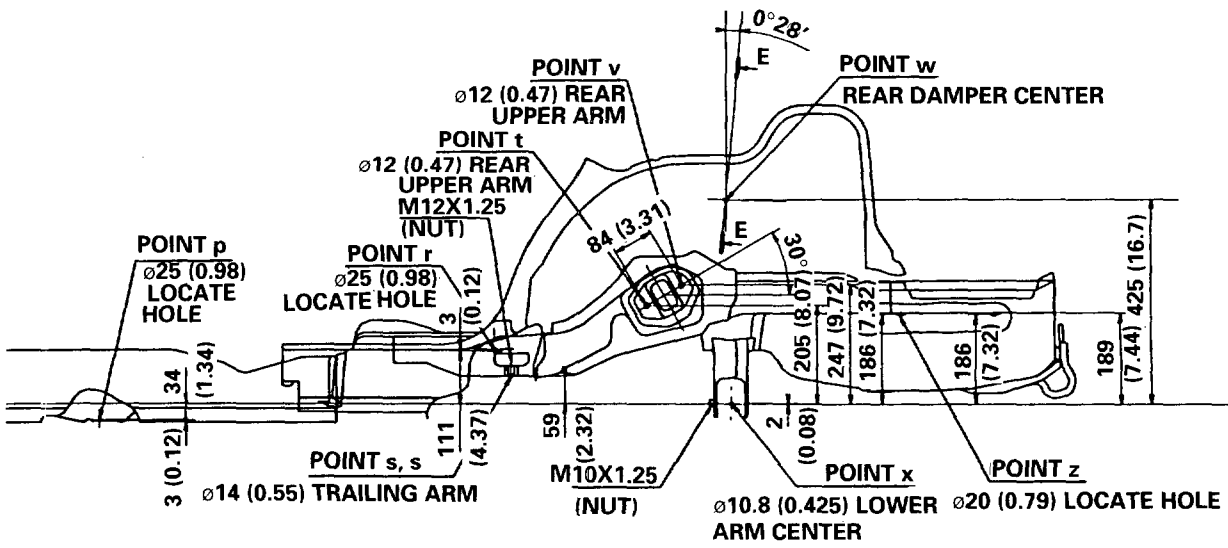
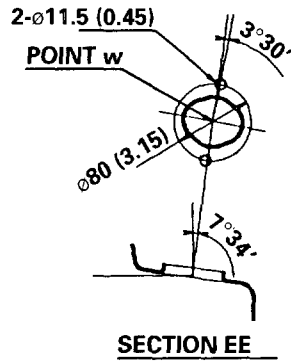
(cont'd)

Side view:

Unit: mm (in)

∅: Inner diameter







## Heater and Air Conditioning

Heater .....	21-1
Air Conditioning .....	22-1

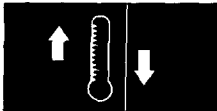
### SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

Some types of this model has an SRS which includes a driver's airbag located in the steering wheel hub and a passenger's airbag located in the dashboard above the glove box and seat belt tensioner located in the seat belt retractors. Information necessary to safely service the SRS is included in this Shop Manual.

Items marked with an asterisk (\*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

#### **! WARNING**

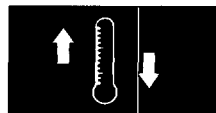
- To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.
- Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional deployment of the airbags.
- All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.
- Before trying to remove the seat belt tensioner, first set the sensor lock pin to LOCK position.



# Heater

<b>Component Location</b>			
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<b>Troubleshooting</b>			
Symptom Chart .....	21-4		
Flowcharts			
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Blower Motor .....	21-7		
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Replacement .....	21-14		
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		Test .....	21-21
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		Test .....	21-22
		<b>A/C Filter</b>	
		Replacement .....	21-22

\*: Read SRS precautions before working in this area.

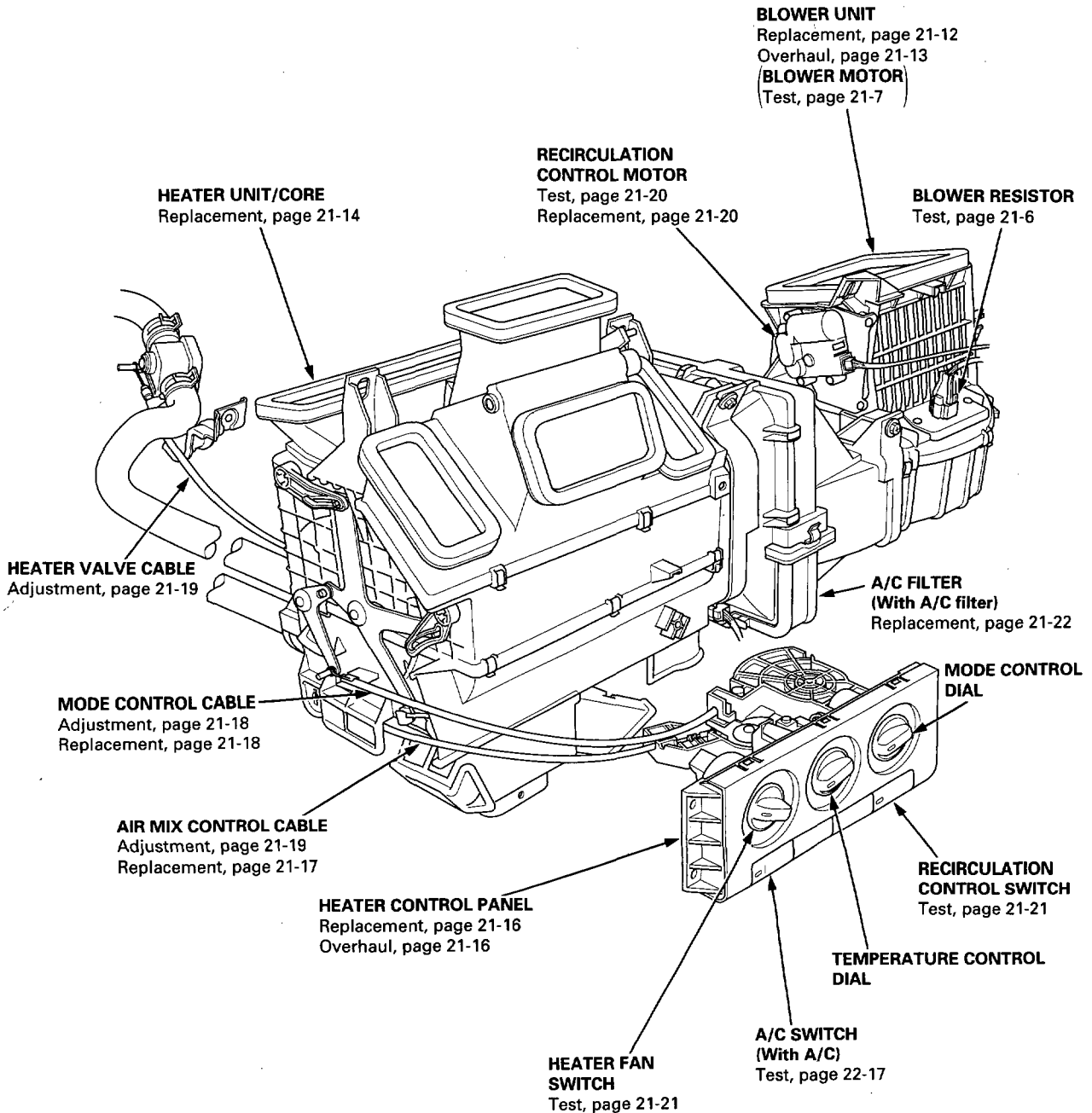


# Component Location

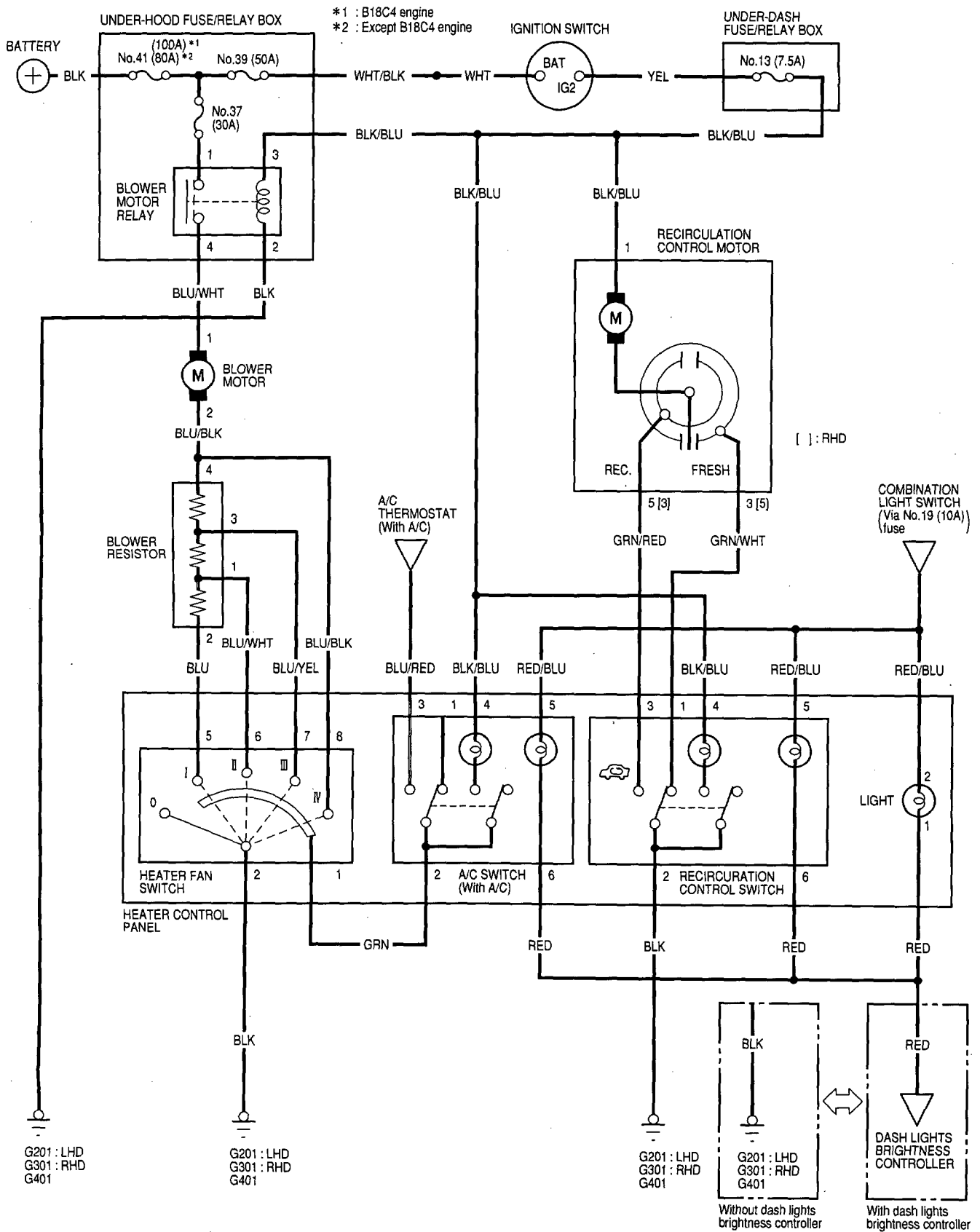
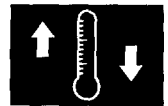
## Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

NOTE: LHD type is shown, RHD type is symmetrical.



# Circuit Diagram



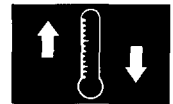
# Troubleshooting

## Symptom Chart

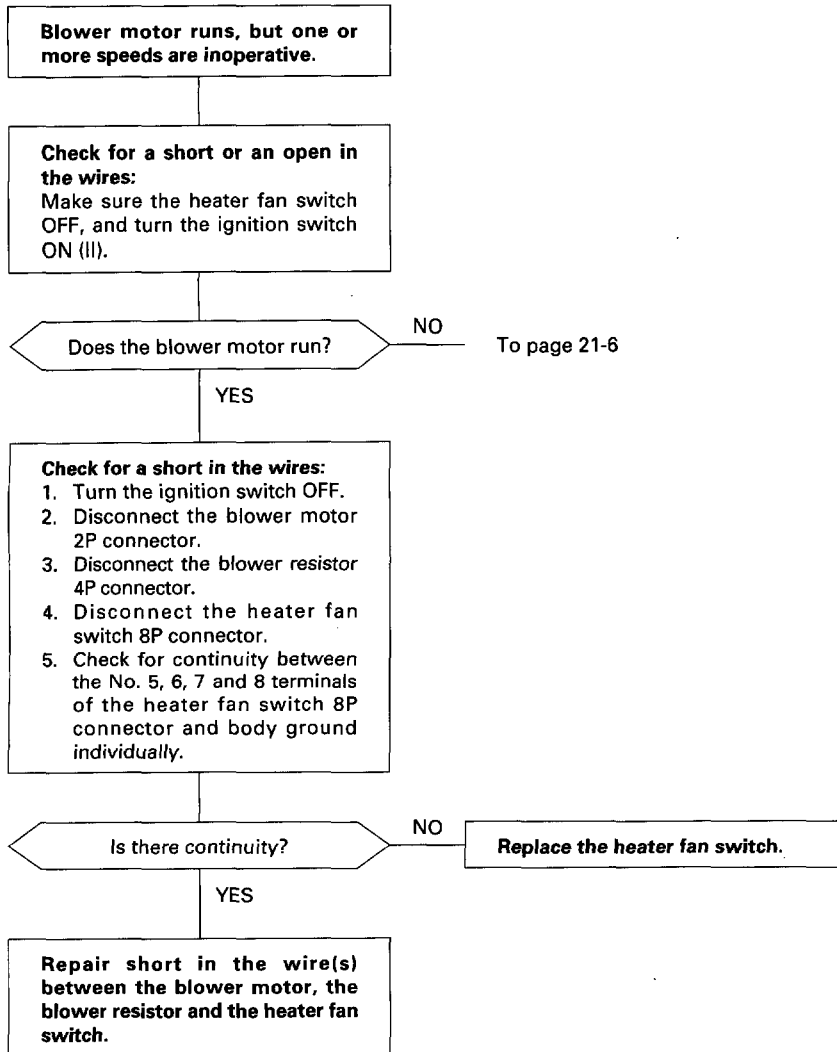
Note these items before troubleshooting a symptom:

- Check the engine coolant level, and allow the engine to warm up before troubleshooting.
- Any abnormality must be corrected before continuing the test.
- Because of the precise measurements needed, use a digital circuit tester when testing.
- Before performing any troubleshooting procedures check:
  - Fuse No. 37 (30 A) in the under-hood fuse/relay box, and No. 13 (7.5 A) in the under-dash fuse/relay box.
  - Grounds No. G201 (LHD), G301 (RHD), G401
  - Cleanliness and tightness of all connectors

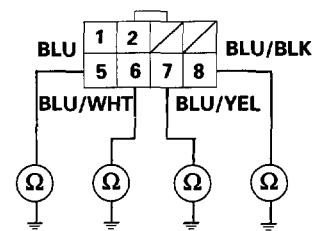
Symptom		Remedy
Hot air flow is low.	Blower motor runs, but one or more speeds are inoperative.	Perform the procedures in the flowchart (see page 21-5).
	Blower runs properly.	Check for the following: <ul style="list-style-type: none"> <li>• Clogged heater duct</li> <li>• Clogged heater outlet</li> <li>• Incorrect door position</li> </ul>
No hot air flow.	Blower motor does not run at all.	Perform the procedures in the flowchart (see page 21-7).
	Blower motor runs.	Check for the following: <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>• Heater valve cable adjustment (see page 21-19)</li> <li>• Air mix control cable adjustment (see page 21-19)</li> <li>• Faulty cooling system thermostat (see section 10)</li> <li>• Clogged evaporator (with air conditioning)</li> <li>• Frozen evaporator (with air conditioning)</li> </ul>
Recirculation control door does not change between Fresh and Recirculate.		Perform the procedures in the flowchart (see page 21-10).



## Blower Motor Speed



HEATER FAN SWITCH 8P CONNECTOR



Wire side of female terminals

(cont'd)

# Troubleshooting

## Blower Motor Speed (cont'd)

From page 21-5

**Check the blower resistor:**

1. Turn the ignition switch OFF.
2. Disconnect the blower resistor 4P connector.
3. Measure the resistance between the No. 2 and No. 4 terminals of the blower resistor.

Is there approx. 2 – 3 ohms?

NO

**Replace the blower resistor.**

YES

**Check for an open in the wires:**

1. Reconnect the blower resistor 4P connector.
2. Disconnect the heater fan switch 8P connector.
3. Turn the ignition switch ON (II).
4. Ground each of the heater fan switch 8P connector terminals individually in the following order: No. 5, 6, 7 and 8.

Does the blower motor run at progressively higher speeds?

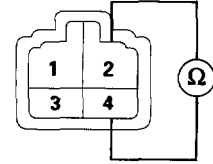
NO

**Repair open or cause of excessive resistance in the appropriate wire(s) between the blower resistor and the heater fan switch.**

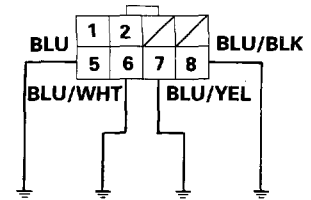
YES

**Replace the heater fan switch.**

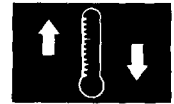
**BLOWER RESISTOR**



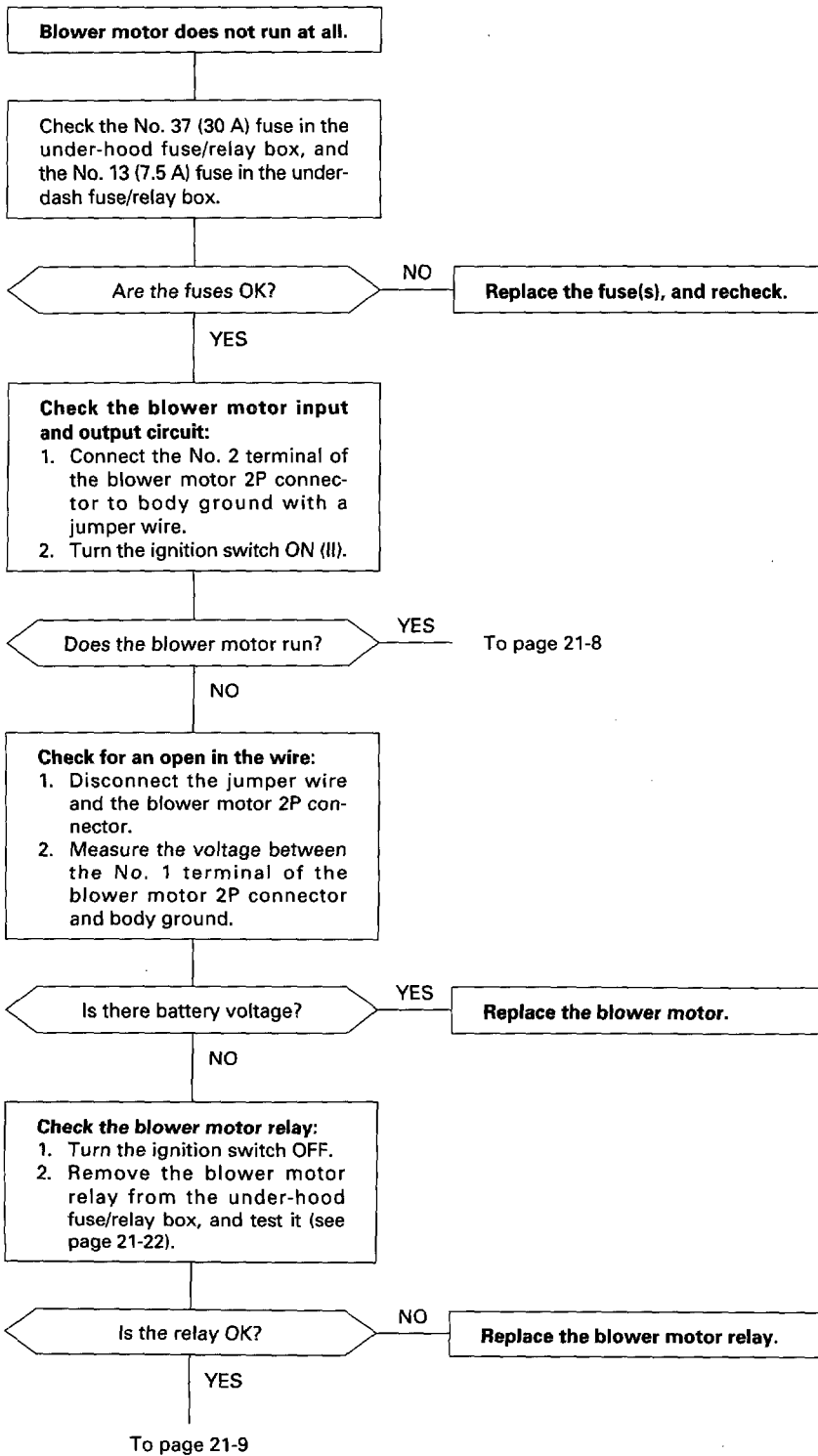
**HEATER FAN SWITCH 8P CONNECTOR**



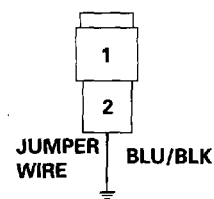
Wire side of female terminals



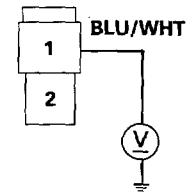
## Blower Motor



**BLOWER MOTOR 2P CONNECTOR**



Wire side of female terminals



(cont'd)



# Troubleshooting

## Blower Motor (cont'd)

From page 21-7

**Check for an open in the wire:**  
 1. Turn the ignition switch OFF, and disconnect the jumper wire.  
 2. Disconnect the heater fan switch 8P connector.  
 3. Turn the ignition switch ON (II).  
 4. Measure the voltage between the No. 8 terminal of the heater fan switch 8P connector and body ground.

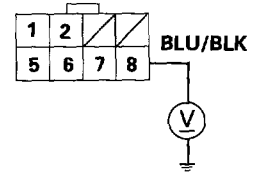
Is there battery voltage? **NO** → **Repair open in the wire between the blower motor and the heater fan switch.**

**Check for an open in the wire:**  
 1. Turn the ignition switch OFF.  
 2. Check for continuity between the No. 2 terminal of the heater fan switch 8P connector and body ground.

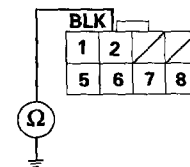
Is there continuity? **NO** → **Check for an open in the wire between the heater fan switch and body ground. If the wire is OK, check for poor ground at G201 (LHD), G301 (RHD) and G401.**

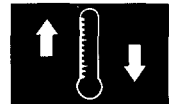
**Replace the heater fan switch.**

HEATER FAN SWITCH 8P CONNECTOR

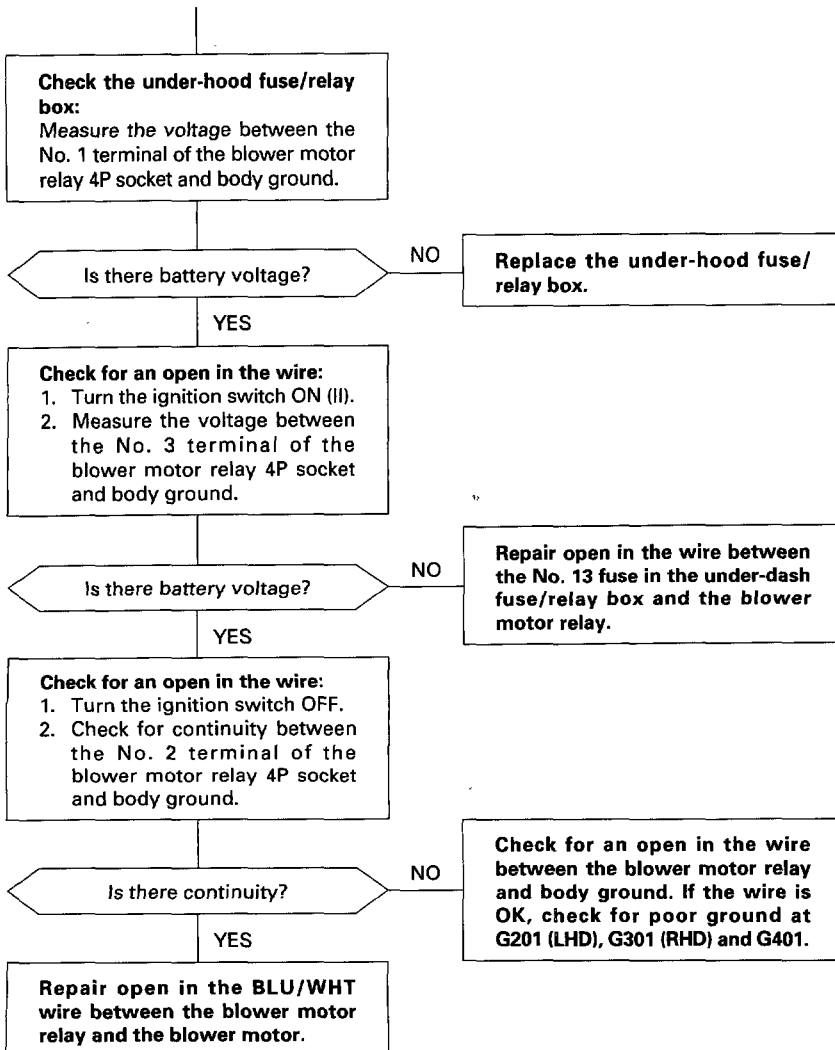


Wire side of female terminals

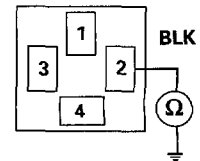
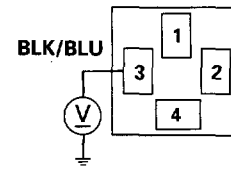
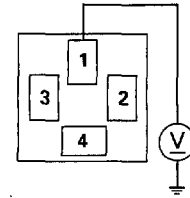




From page 21-7

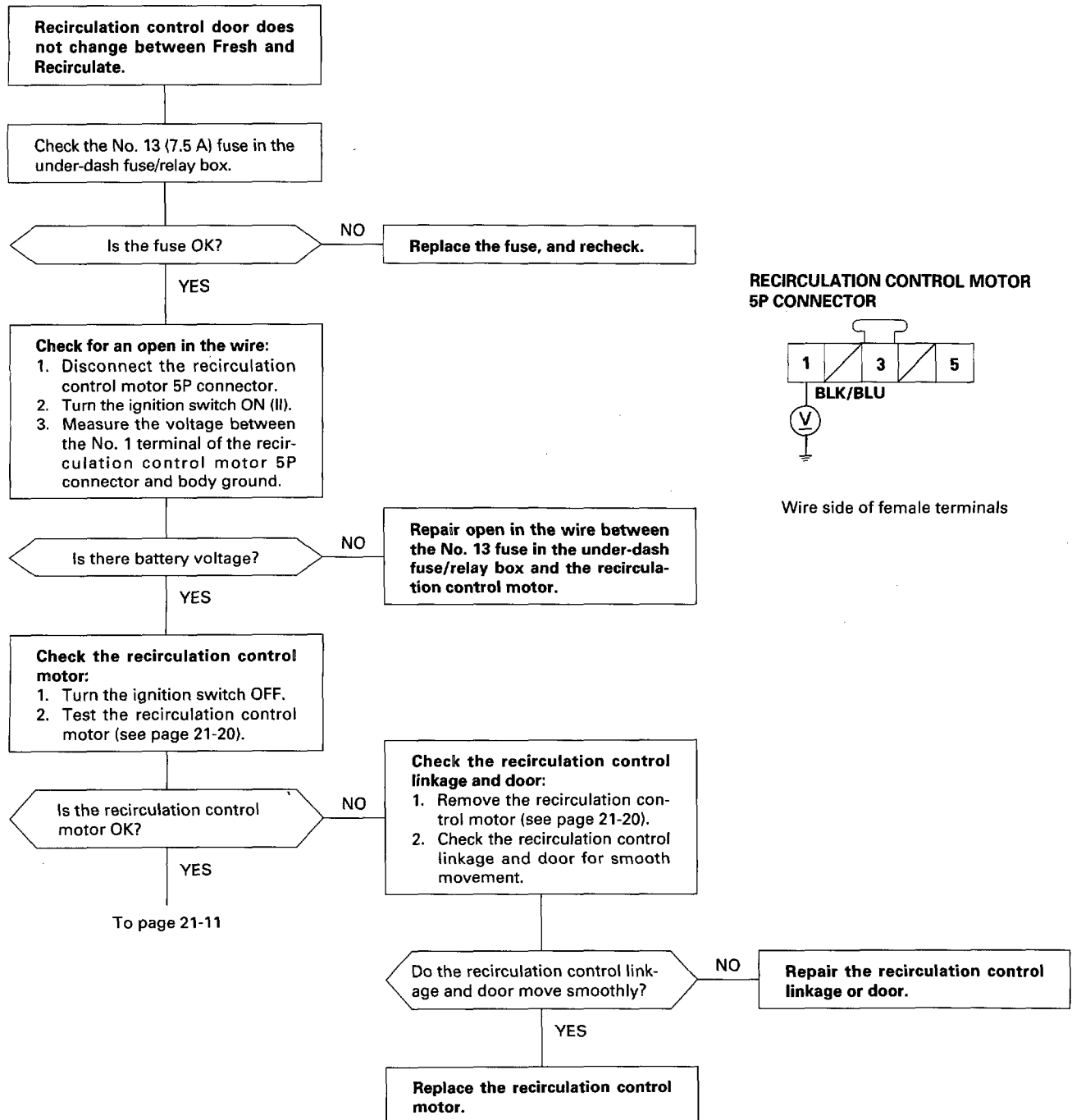


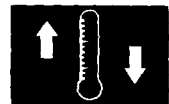
### BLOWER MOTOR RELAY 4P SOCKET



# Troubleshooting

## Recirculation Control Motor





From page 21-10

**Check for a short in the wires:**  
1. Disconnect the recirculation control switch 6P connector.  
2. Check for continuity between the No. 1 and No. 3 terminals of the recirculation control switch 6P connector and body ground individually.

Is there continuity?

YES

**Repair short in the wire(s) between the recirculation control switch and the recirculation control motor.**

NO

**Check for an open in the wires:**  
Check for continuity between the following terminals of the recirculation control switch 6P connector and the recirculation control motor 5P connector.  
6P: 5P:  
No. 1 — No. 3 (5)  
No. 3 — No. 5 (3)  
( ): RHD

Is there continuity?

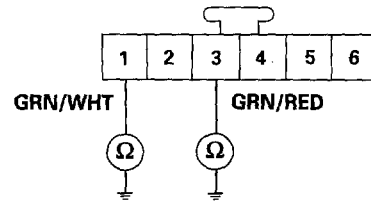
NO

**Repair open in the wire(s) between the recirculation control switch and the recirculation control motor.**

YES

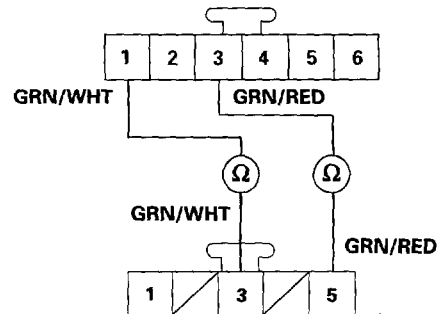
**Replace the recirculation control switch.**

**RECIRCULATION CONTROL SWITCH 6P CONNECTOR**



Wire side of female terminals

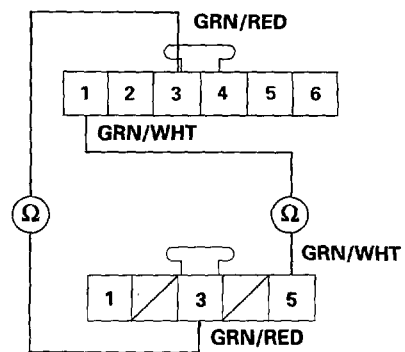
LHD:



**RECIRCULATION CONTROL MOTOR 5P CONNECTOR**

Wire side of female terminals

RHD:

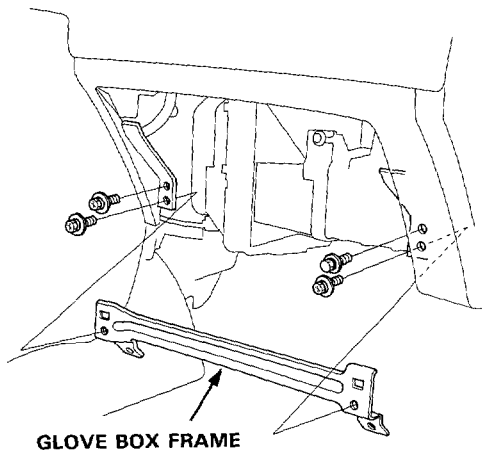


# Blower Unit

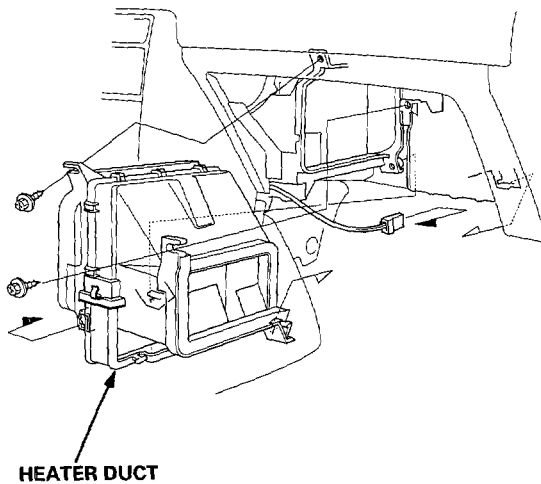
## Replacement

NOTE: LHD type is shown, RHD type is symmetrical.

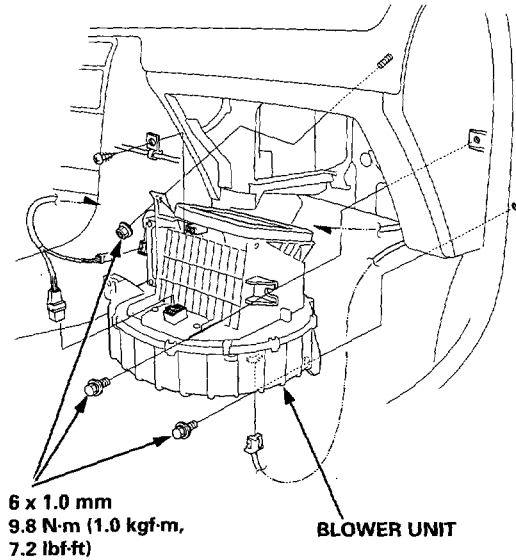
1. Remove the glove box (see section 20).
2. Remove the bolts and the glove box frame.



3. With air conditioning; remove the evaporator (see page 22-24).
4. Without air conditioning; disconnect the connector, then remove the self-tapping screws and the heater duct.



5. Remove the self-tapping screw and the antenna lead. Disconnect the connectors from the blower motor, the blower resistor and the recirculation control motor. Remove the mounting bolts, the mounting nuts and the blower unit.



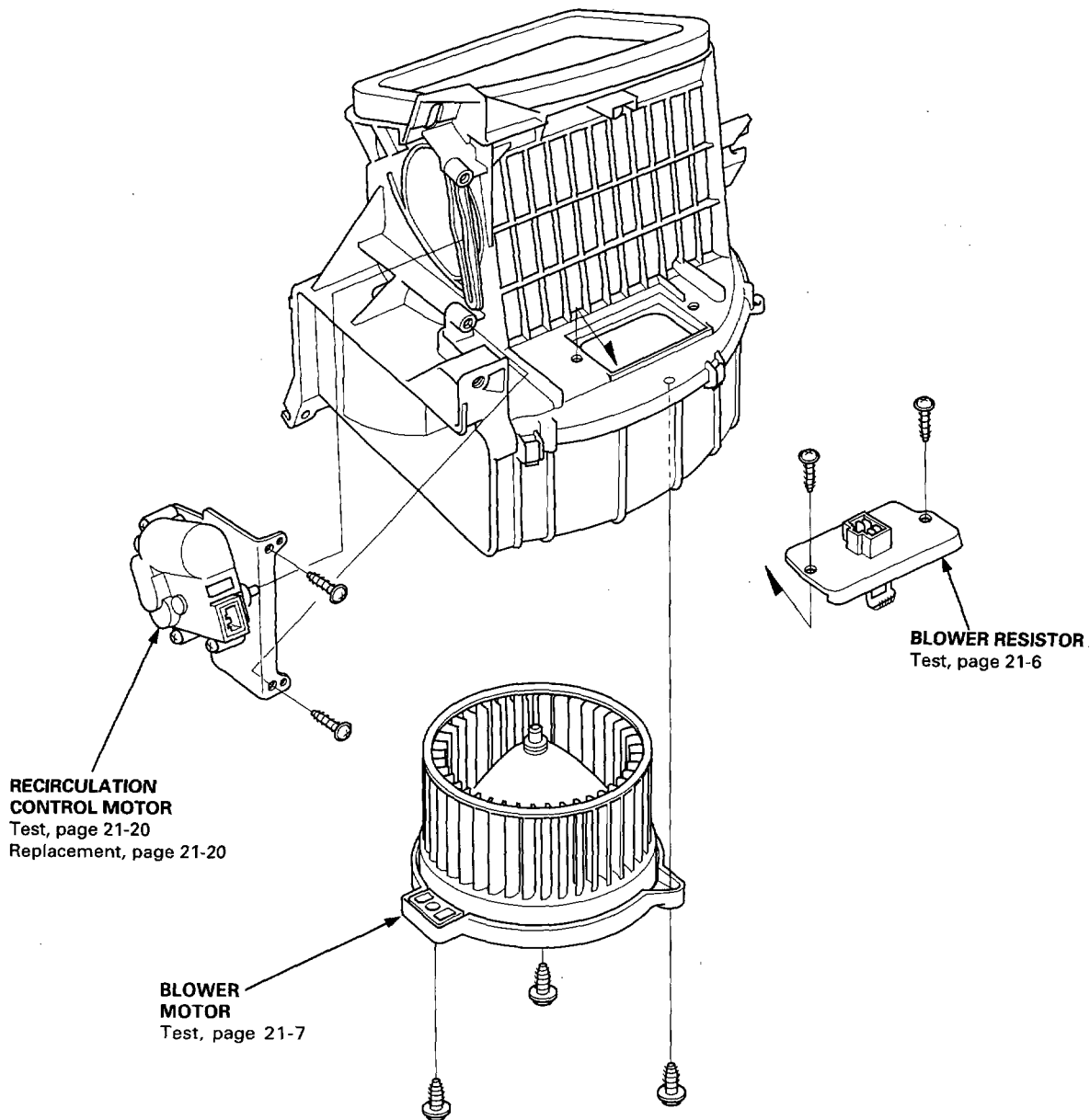
6. Install in the reverse order of removal. Make sure that there is no air leakage.



## Overhaul

Note these items when overhauling the blower unit:

- LHD type is shown, RHD type is symmetrical.
- The recirculation control motor, the blower resistor and the blower motor can be replaced without removing the blower unit.
- Before reassembly, make sure that the recirculation control door and linkage move smoothly without binding.
- After reassembly, make sure the recirculation control motor runs smoothly (see page 21-20).
- Make sure that there is no air leakage.



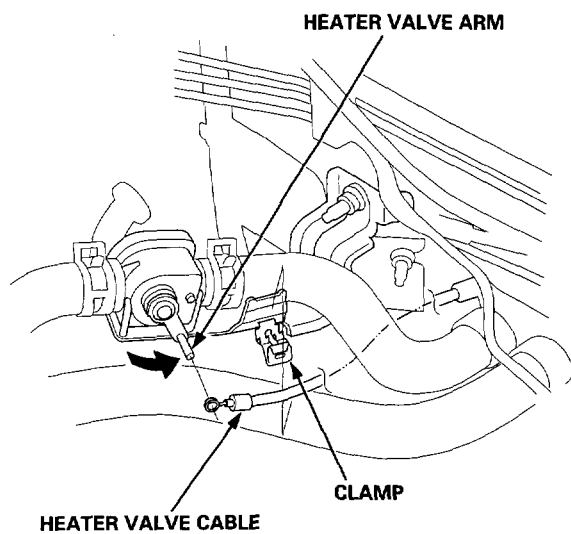
# Heater Unit/Core

## Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

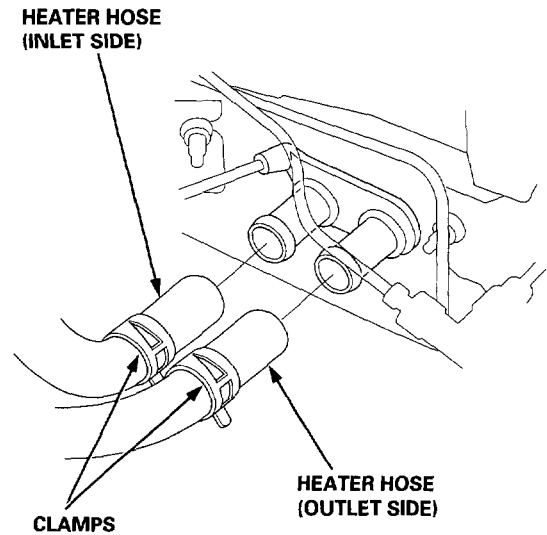
NOTE: LHD type is shown, RHD type is symmetrical.

1. Disconnect the negative cable from the battery.
2. From under the hood, open the cable clamp, then disconnect the heater valve cable from the heater valve arm. Turn the heater valve arm to the fully opened position as shown.

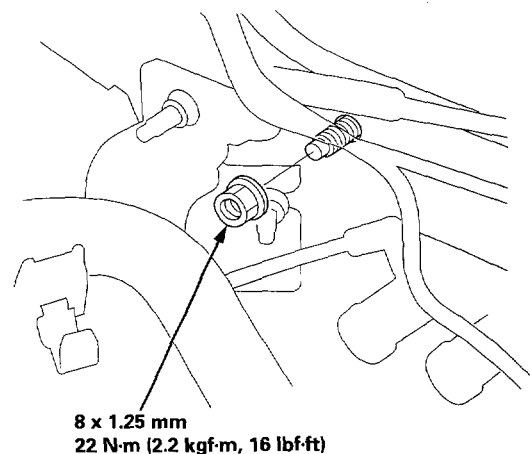


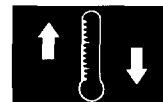
3. When the engine is cool, drain the engine coolant from the radiator (see section 10).

4. Slide the clamps back, then disconnect the inlet and outlet heater hoses from the heater unit. Engine coolant will run out when the hoses are disconnected; drain it into a clean drip pan. Be sure not to let coolant spill on the electrical parts or the painted surfaces. If any coolant spills, rinse it off immediately.

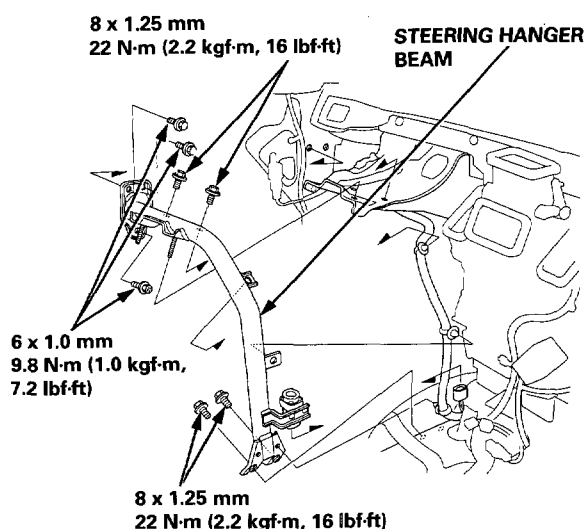


5. Remove the mounting nut from the heater unit. Take care not to damage or bend the fuel and brake lines, etc.

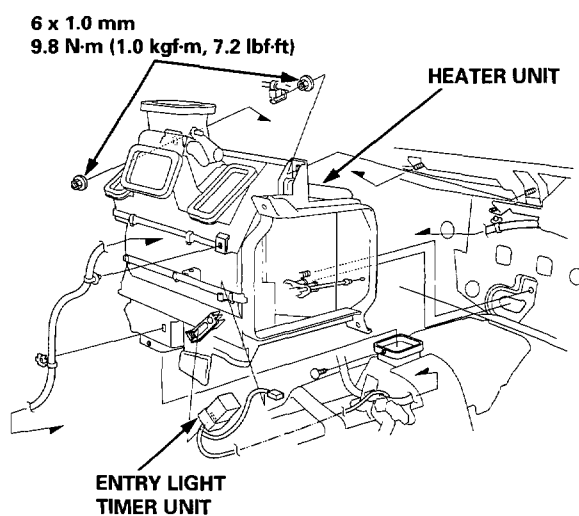




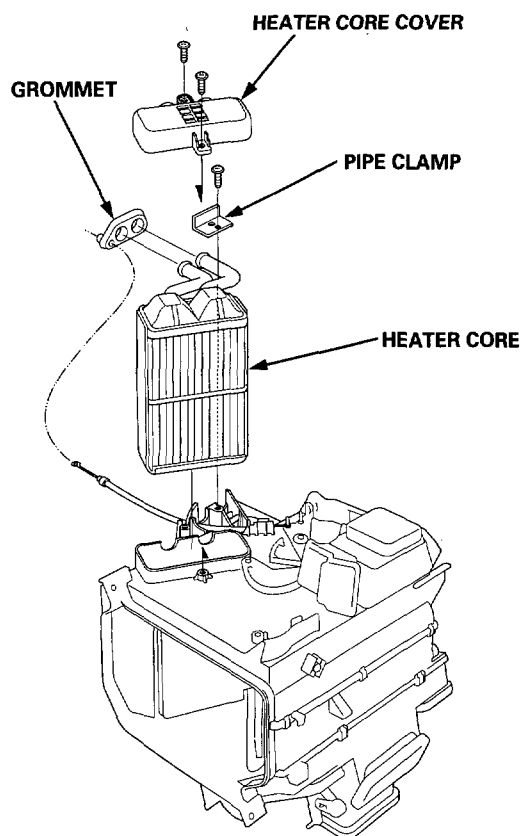
6. Remove the dashboard (see section 20).
7. With air conditioning; remove the evaporator (see page 22-24).
8. Without air conditioning; remove the heater duct (see page 21-12).
9. Disconnect the connector, and remove the wire harness clips. Remove the mounting bolts and the steering hanger beam.



10. Remove the entry light timer unit and the wire harness clips. Remove the clip from the heater duct, then remove the mounting nuts and the heater unit.



11. Remove the grommet. Remove the self-tapping screw and the pipe clamp. Remove the self-tapping screws and the heater core cover. Be careful not to bend the inlet and outlet pipes during heater core removal, and pull out the heater core.



12. Install the heater core in the reverse order of removal.
13. Install the heater unit in the reverse order of removal, and note these items:

- Apply sealant to the grommets.
- Do not interchange the inlet and outlet heater hoses, and install the hose clamps securely.
- Refill the cooling system with engine coolant (see section 10).
- Adjust the mode control cable (see page 21-18), and adjust the heater valve cable and the air mix control cable (see page 21-19).
- Make sure that there is no air leakage.

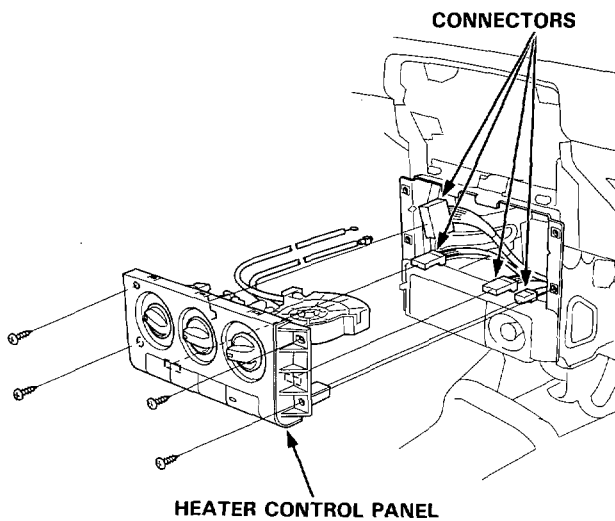


# Heater Control Panel

## Replacement

NOTE: LHD type is shown, RHD type is symmetrical.

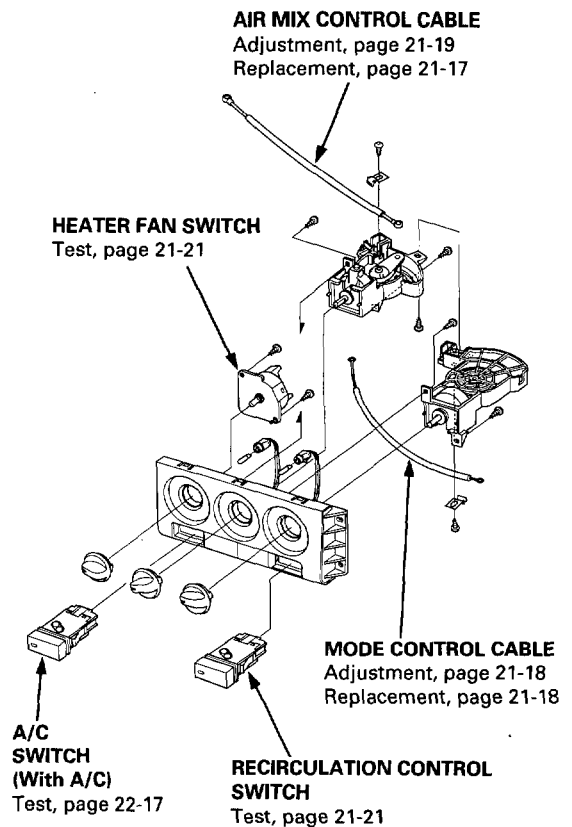
1. Remove the front console (see section 20).
2. Disconnect the air mix control cable and the mode control cable from the heater unit (see page 21-18, 19).
3. Remove the self-tapping screws then pull out the heater control panel. Disconnect the connectors.



4. Install in the reverse order of removal. Adjust the mode control cable (see page 21-18) and air mix control cable (see page 21-19). If necessary, adjust the heater valve cable (see page 21-19).

## Overhaul

NOTE: LHD type is shown, RHD type is symmetrical.

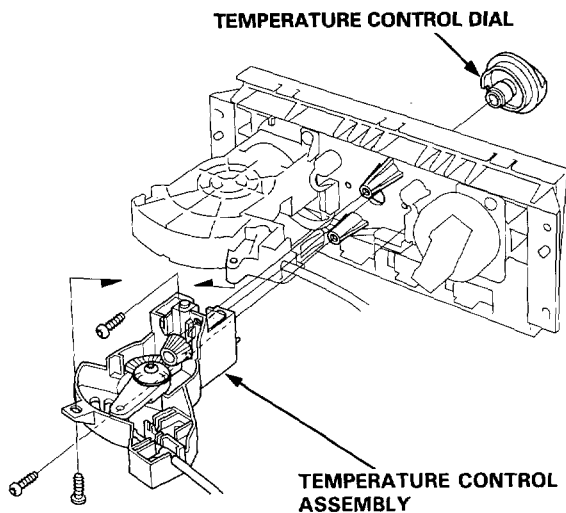




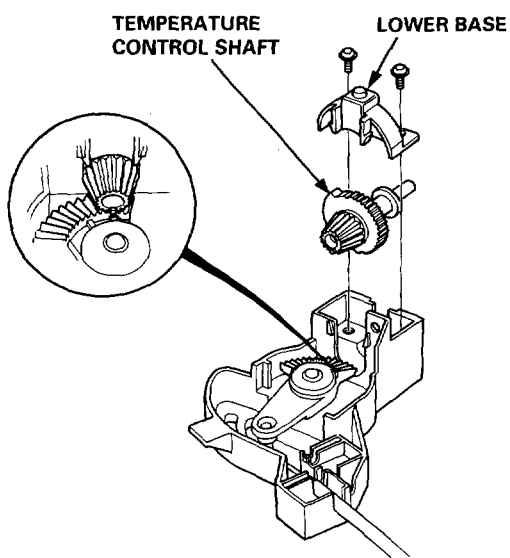
## Air Mix Control Cable Replacement

NOTE: LHD type is shown, RHD type is symmetrical.

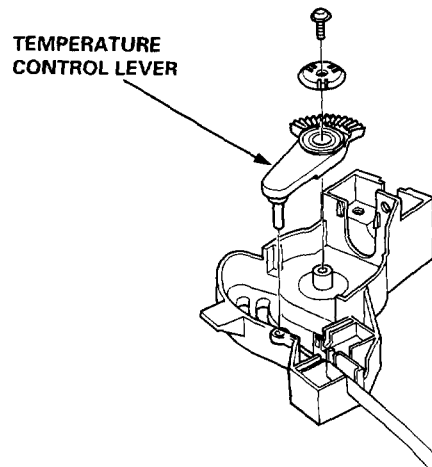
1. Remove the heater control panel (see previous page).
2. Pull out the temperature control dial, then remove the self-tapping (TORX) screws and the temperature control assembly.



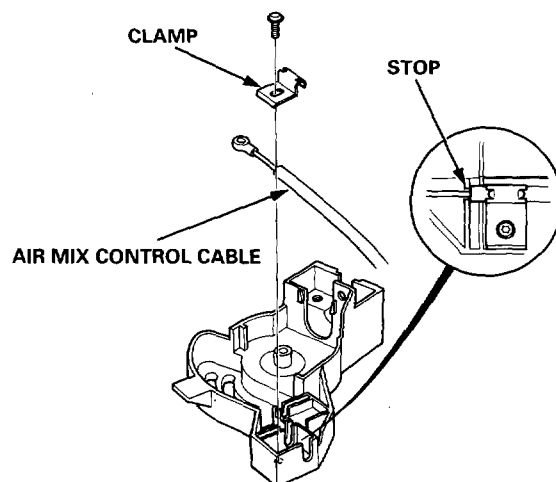
3. Remove the self-tapping (TORX) screws and the lower base, then remove the temperature control shaft.



4. Remove the self-tapping (TORX) screw and the temperature control lever.



5. Remove the self-tapping (TORX) screw, the clamp and the air mix control cable.



6. Install in the reverse order of removal, and note these items:

- Hold the end of the cable against the stop.
- Apply grease to the sliding surfaces.
- When installing the temperature control shaft, make sure that the marks on the temperature control shaft and temperature control lever are aligned.
- After installing, make sure that the temperature control dial moves smoothly without binding.

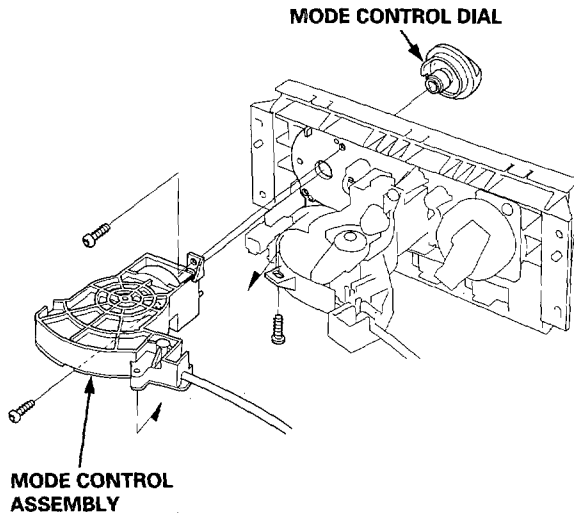
# Heater Control Panel

# Mode Control

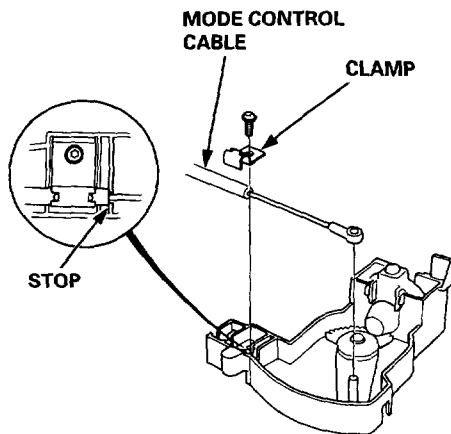
## Mode Control Cable Replacement

NOTE: LHD type is shown, RHD type is symmetrical.

1. Remove the heater control panel (see page 21-16).
2. Pull out the mode control dial, then remove the self-tapping (TORX) screws and the mode control assembly.



3. Remove the self-tapping (TORX) screw, the clamp and the mode control cable.

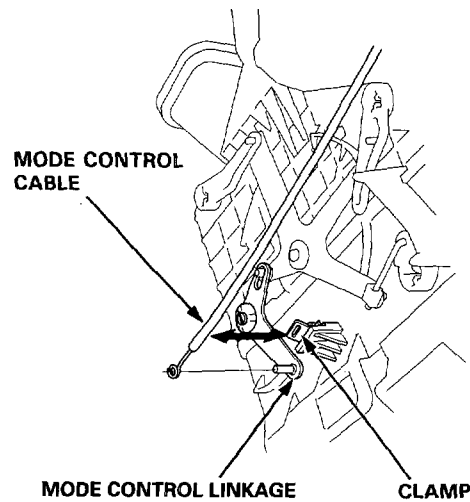


4. Install in the reverse order of removal, and note these items:
  - Hold the end of the cable against the stop.
  - After installing, make sure that the temperature control dial moves smoothly without binding.

## Adjustment

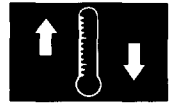
NOTE: LHD type is shown, RHD type is symmetrical.

1. From under the dash, disconnect the mode control cable housing from the clamp, and disconnect the mode control cable from the mode control linkage.



2. Set the mode control dial to VENT.
3. Turn the mode control linkage fully counterclockwise as shown above, and hold it. Attach the mode control cable to the mode control linkage. Hold the end of the mode control cable housing against the stop, then snap the mode control cable housing into the clamp.

# Temperature Control

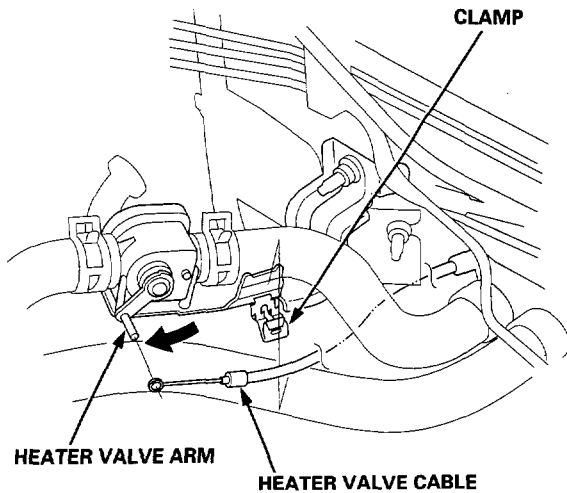


## Adjustment

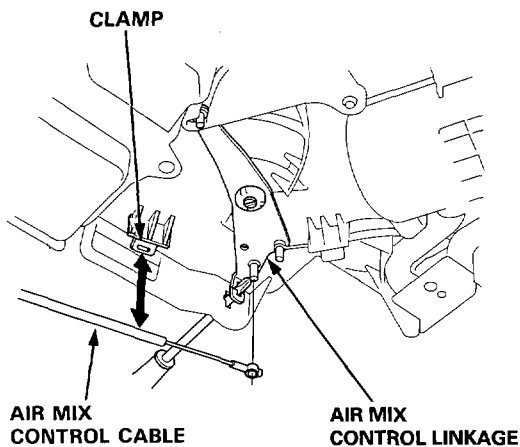
### Air Mix Control Cable

NOTE: LHD type is shown, RHD type is symmetrical.

1. From under the hood, open the clamp, then disconnect the heater valve cable from the heater valve arm.



2. From under the dash, disconnect the air mix control cable housing from the clamp, and disconnect the air mix control cable from the air mix control linkage.

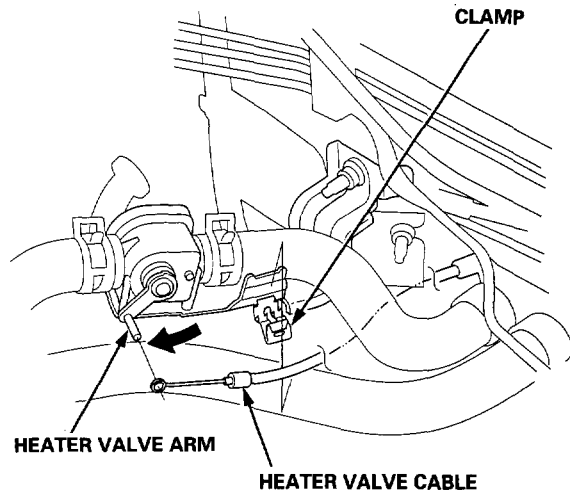


3. Set the temperature control dial to MAX COOL.
4. Attach the air mix control cable to the air mix control linkage as shown above. Hold the end of the air mix control cable housing against the stop, then snap the air mix control cable housing into the clamp.
5. From under the hood, turn the heater valve arm to the fully closed position as shown above, and hold it. Attach the heater valve cable to the heater valve arm, and gently pull on the heater valve cable housing to take up any slack, then install the heater valve cable housing into the clamp.

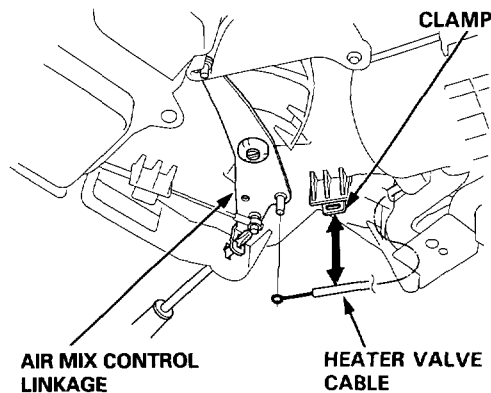
### Heater Valve Cable

NOTE: LHD type is shown, RHD type is symmetrical.

1. From under the hood, open the clamp, then disconnect the heater valve cable from the heater valve arm.



2. From under the dash, disconnect the heater valve cable housing from the clamp, and disconnect the heater valve cable from the air mix control linkage.



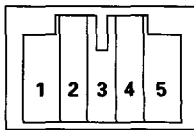
3. Set the temperature control dial to MAX COOL.
4. Attach the heater valve cable to the air mix control linkage as shown above. Hold the end of the heater valve cable housing against the stop, then snap the heater valve cable housing into the clamp.
5. From under the hood, turn the heater valve arm to the fully closed position as shown above, and hold it. Attach the heater valve cable to the heater valve arm, and gently pull on the heater valve cable housing to take up any slack, then install the heater valve cable housing into the clamp.

# Recirculation Control Motor

## Test

1. Disconnect the 5P connector from the recirculation control motor.
2. Connect battery power to the No. 1 terminal, and ground the No. 3 and No. 5 terminals; the recirculation control motor should run smoothly. To avoid damaging the recirculation control motor, do not reverse power and ground.

RECIRCULATION CONTROL MOTOR

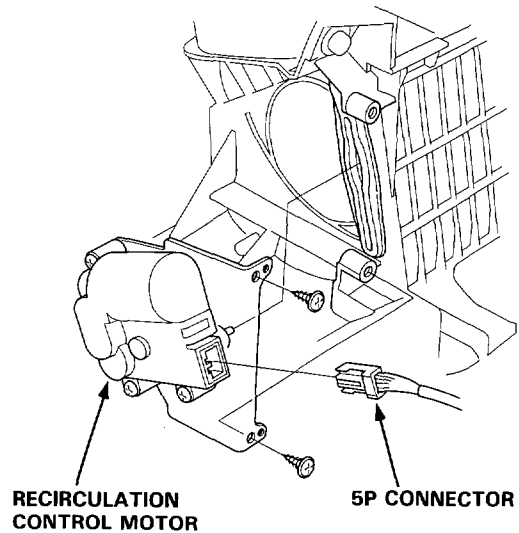


3. Disconnect the No. 3 or No. 5 terminals from ground; the recirculation control motor should stop at Fresh or Recirculate. Don't cycle the recirculation control motor for a long time.
4. If the recirculation control motor does not run in step 2, remove it, then check the recirculation control linkage and door for smooth movement. If they move smoothly, replace the recirculation control motor.

## Replacement

NOTE: LHD type is shown, RHD type is symmetrical.

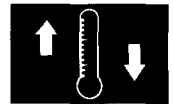
1. Disconnect the 5P connector from the recirculation control motor. Remove the self-tapping screws and the recirculation control motor.



2. Install in the reverse order of removal. After installation, make sure the recirculation control motor runs smoothly.

# Recirculation Control Switch

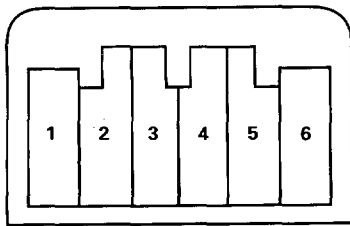
# Heater Fan Switch



## Test

Check for continuity between the terminals in each switch position according to the table.

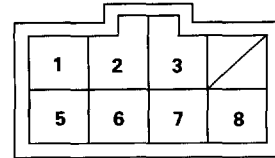
Terminal Position	1	2	3	4	5	6
Fresh	○—○					
Recirculate		○—○	○—○	○—○	○—○	○—○



## Test

Check for continuity between the terminals in each switch position according to the table.

Terminal Position	1	2	3	5	6	7	8
0							
I	○—○			○—○			
II	○—○	○—○			○—○		
III	○—○	○—○				○—○	
IV	○—○	○—○					○—○

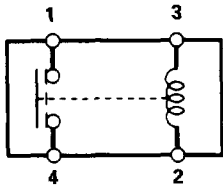


# Relay

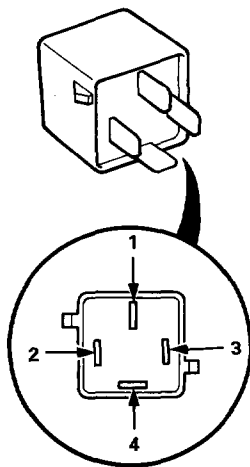
# A/C Filter

## Test

There should be continuity between the No. 1 and No. 4 terminals when power and ground are connected to the No. 2 and No. 3 terminals, and there should be no continuity when power is disconnected.



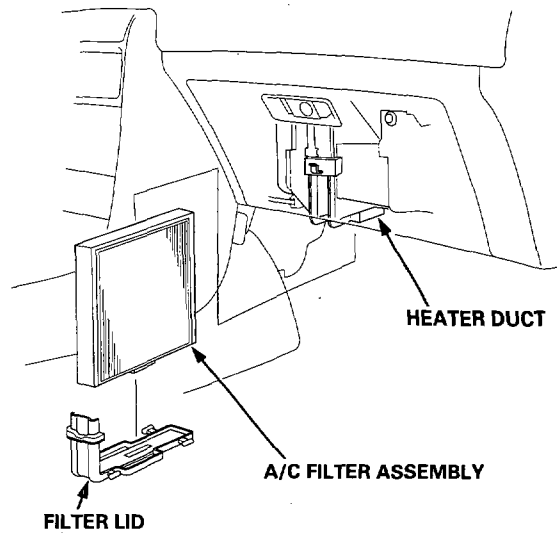
- Blower motor relay



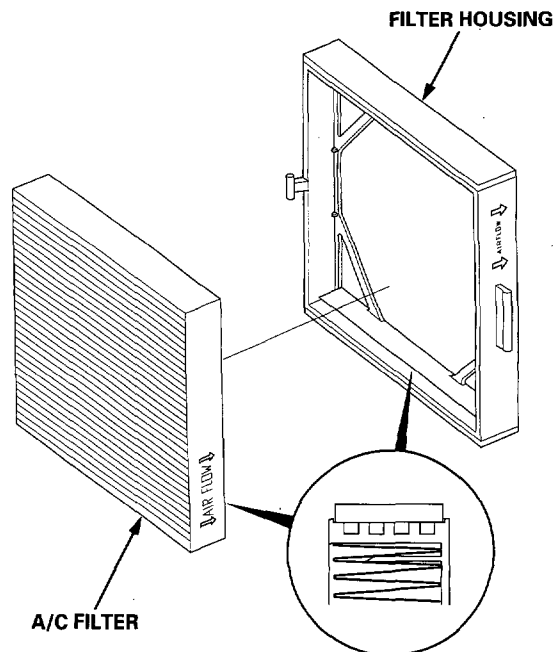
## Replacement

NOTE: LHD type is shown, RHD type is symmetrical.

1. Remove the filter lid from the heater duct, then pull out the A/C filter assembly.



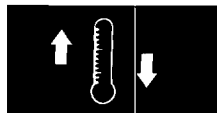
2. Remove the A/C filter from the filter housing. Replace the A/C filter according to the maintenance schedule in the owner's manual.



3. Install in the reverse order of removal. Make sure that there is no air leakage.

# Air Conditioning

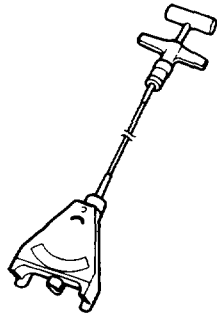
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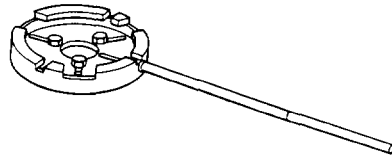


# Special Tools

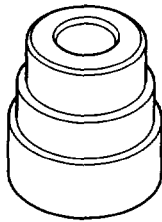
Ref. No.	Tool Number	Description	Qty	Remark
①	07JGG - 0010101	Belt Tension Gauge	1	
②	07NAB - HAC0100	A/C Clutch Holder	1	
③	07947 - 6340300	Driver Attachment	1	
④	07965 - 6920500	Hub Assembly Guide Attachment	1	



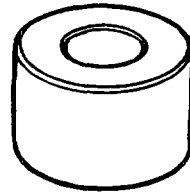
①



②

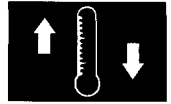


③



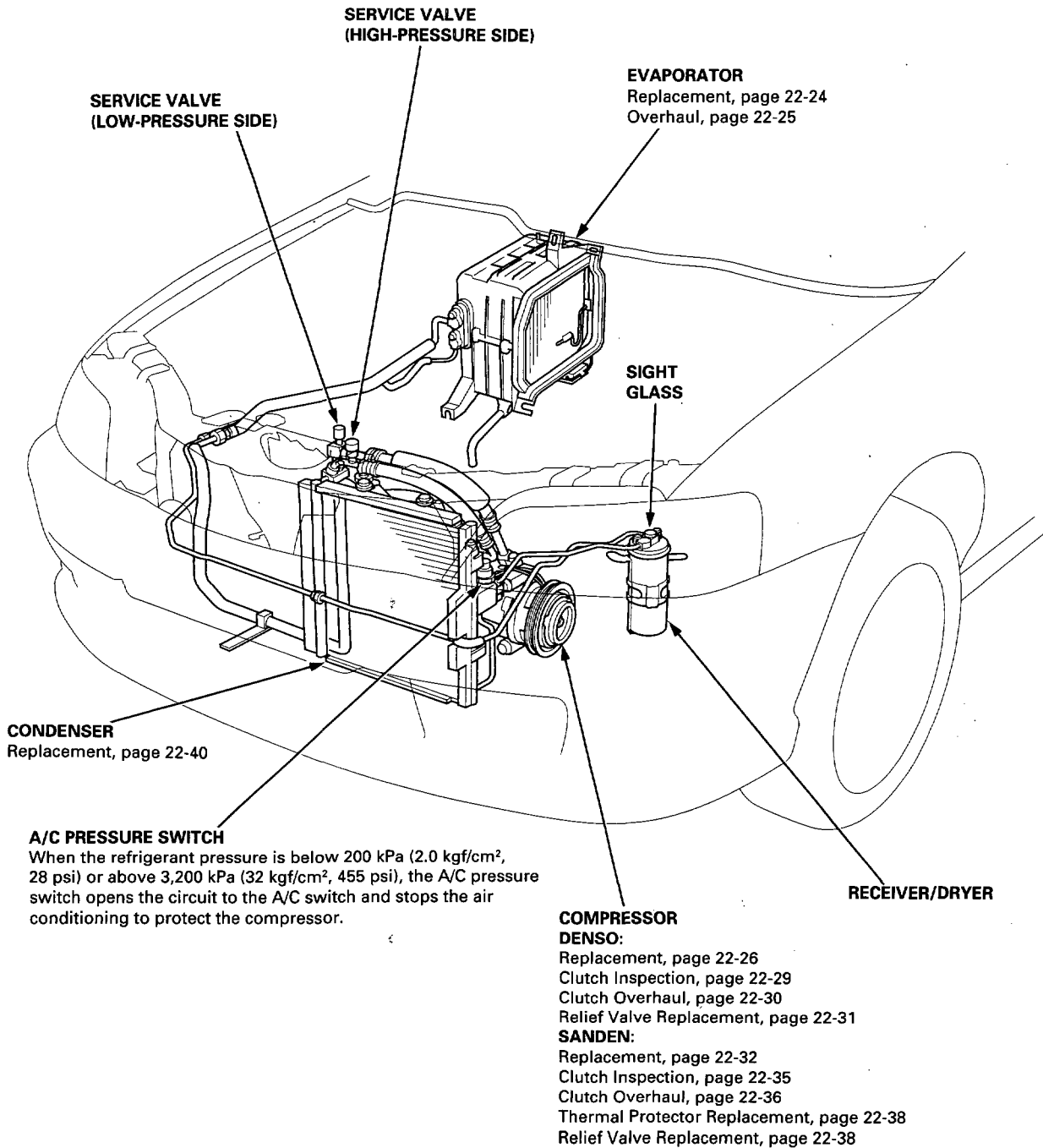
④

# Component Location



## Index

NOTE: LHD type is shown, RHD type is symmetrical.

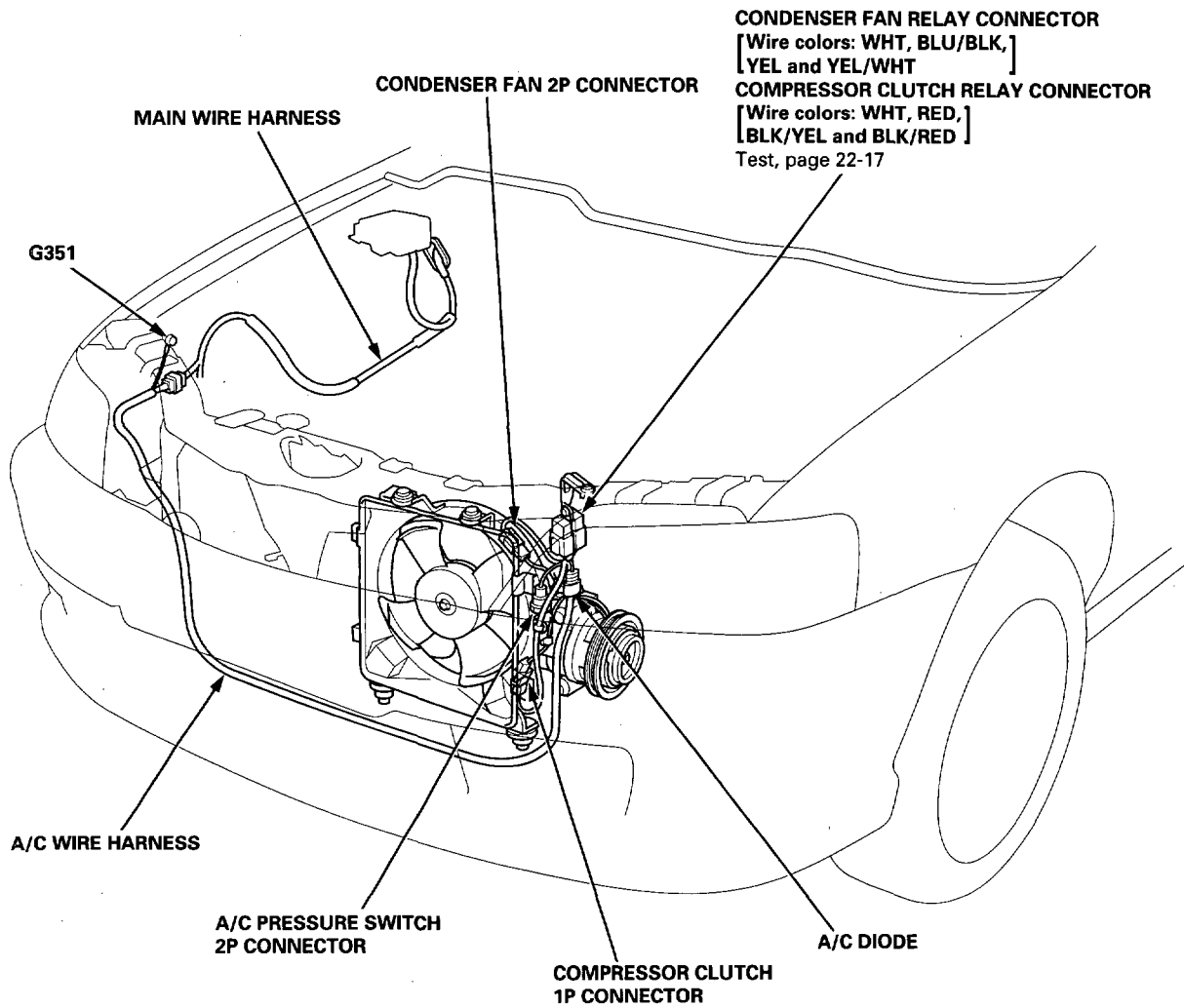


(cont'd)

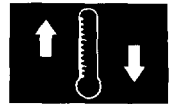
# Component Location

## Index (cont'd)

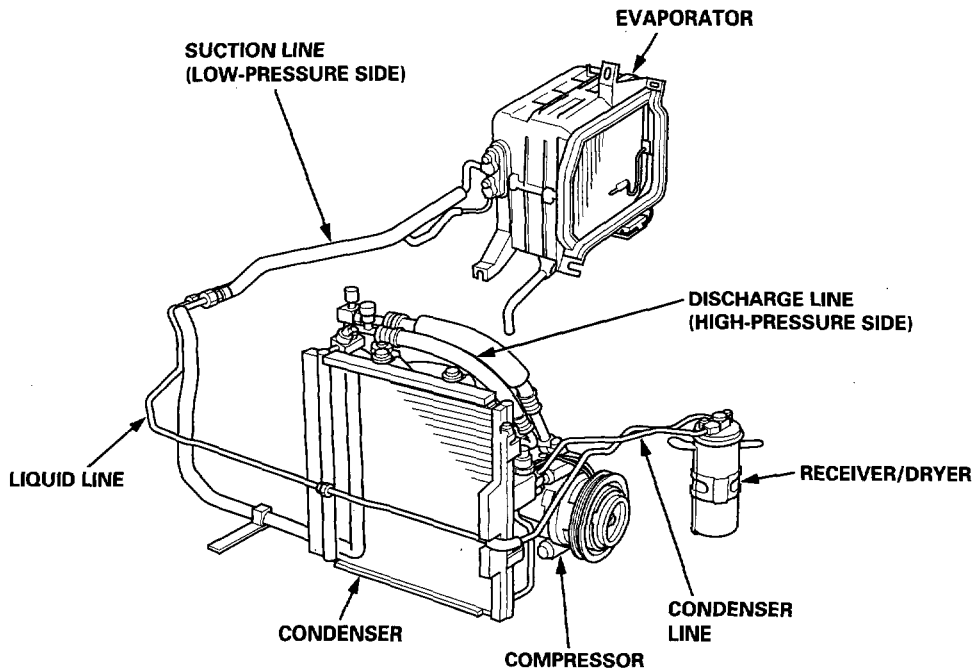
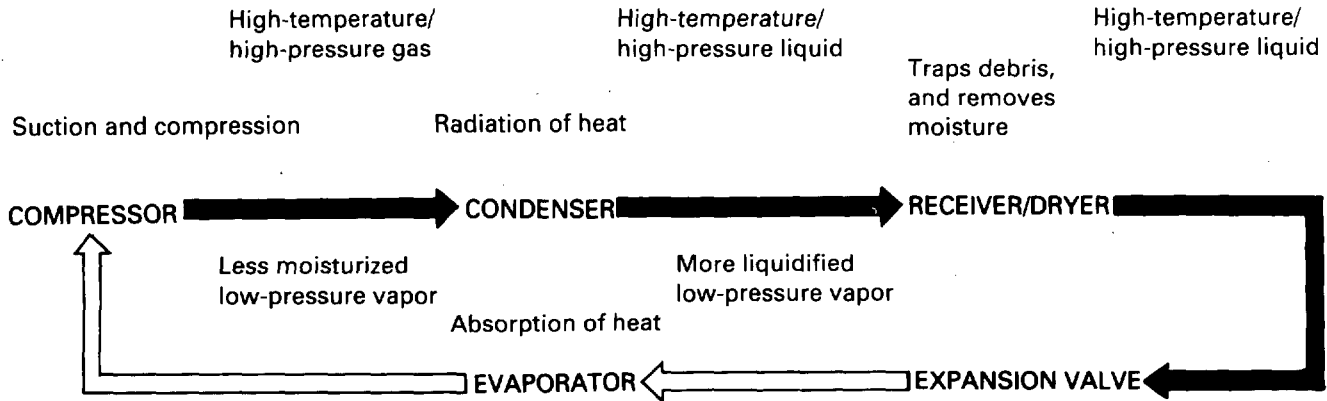
NOTE: LHD type is shown, RHD type is symmetrical.



# Description



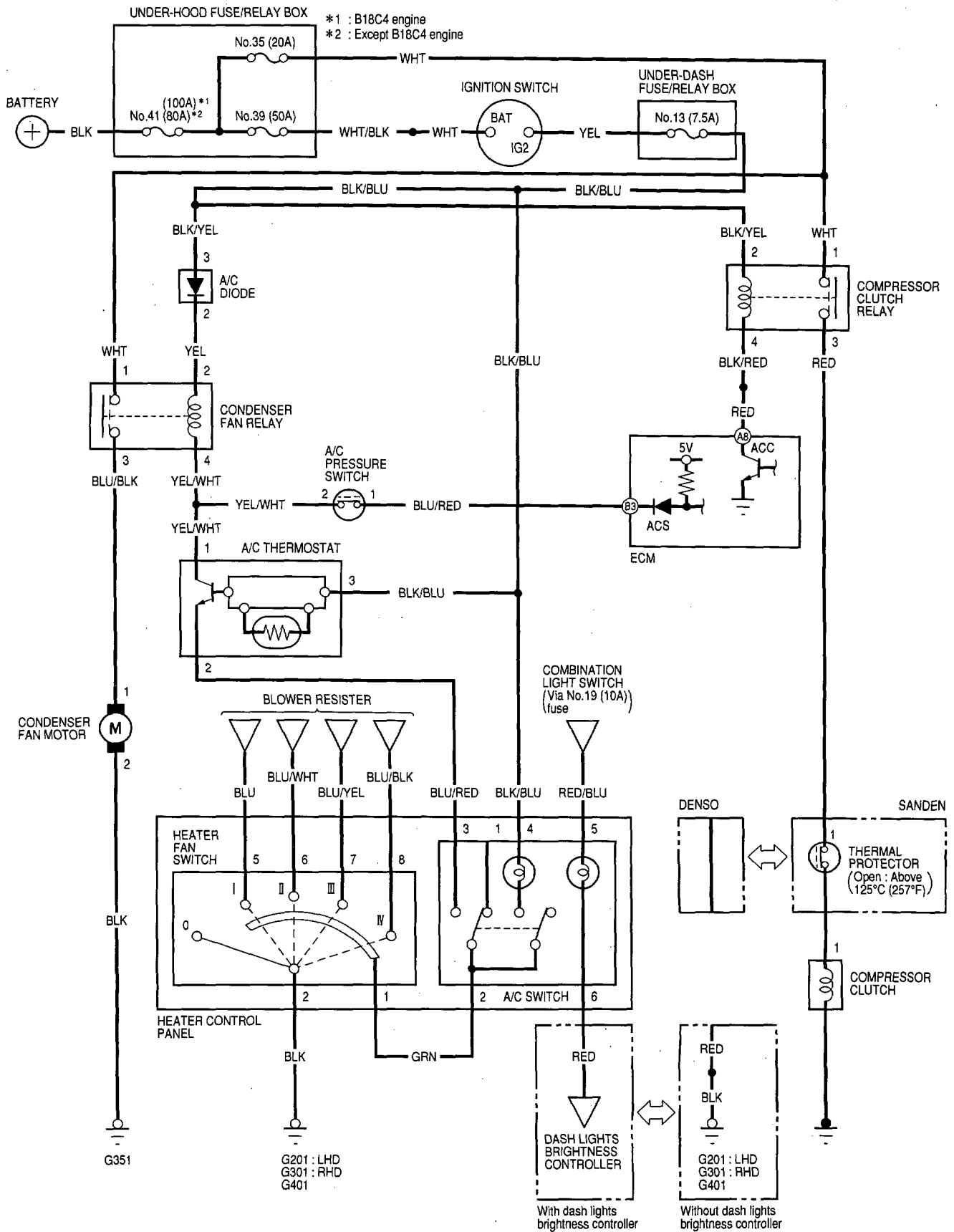
The air conditioner system removes heat from the passenger compartment by circulating refrigerant through the system as shown below.

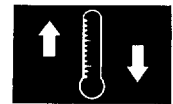


This vehicle uses HFC-134a (R-134a) refrigerant which does not contain chlorofluorocarbons. Pay attention to the following service items:

- Do not mix refrigerants CFC-12 (R-12) and HFC-134a (R-134a). They are not compatible.
- Use only the recommended polyalkyleneglycol (PAG) refrigerant oil (DENSO, ND-OIL 8 or SANDEN, SP-10) designed for the R-134a compressor. Intermixing the recommended (PAG) refrigerant oil with any other refrigerant oil will result in compressor failure.
- All A/C system parts (compressor, discharge line, suction line, evaporator, condenser, receiver/dryer, expansion valve, O-rings for joints) have to be proper for refrigerant R-134a. Do not confuse with R-12 parts.
- Use a halogen gas leak detector designed for refrigerant R-134a.
- Use a vacuum pump adapter which is equipped with a check valve to prevent the backflow of the vacuum pump oil.
- Separate the manifold gauge sets (pressure gauges, hoses, joints) for refrigerants R-12 and R-134a. Do not confuse them.

# Circuit Diagram





## Symptom Chart

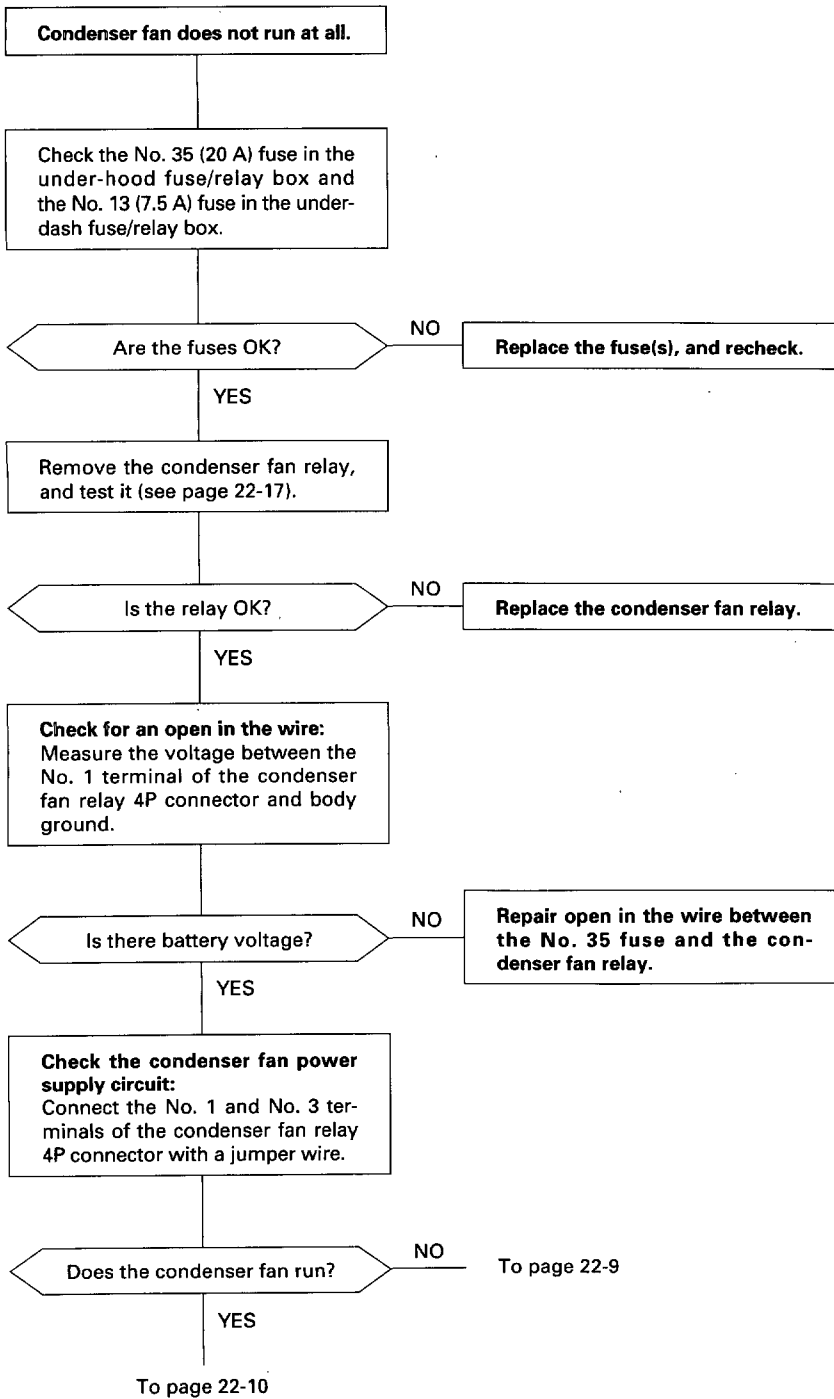
Note these items before troubleshooting a symptom:

- Check the engine coolant level, and allow the engine to warm up before troubleshooting.
- Any abnormality must be corrected before continuing the test.
- Because of the precise measurements needed, use a digital circuit tester when testing.
- Before performing any troubleshooting procedures check:
  - Fuses No. 35 (20 A) in the under-hood fuse/relay box, and No. 13 (7.5 A) in the under-dash fuse/relay box.
  - Grounds No. G201 (LHD), G301 (RHD), G351, G401
  - Cleanliness and tightness of all connectors

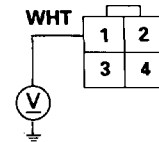
Symptom	See page
Condenser fan does not run at all.	22-8
Compressor clutch does not engage.	22-11
A/C system does not come on (condenser fan and compressor).	22-15

# Troubleshooting

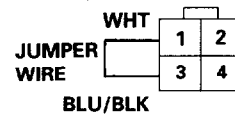
## Condenser Fan

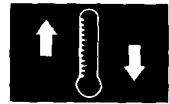


CONDENSER FAN RELAY 4P CONNECTOR



Wire side of female terminals





From page 22-8

**Check for an open in the wire:**  
1. Disconnect the jumper wire.  
2. Disconnect the condenser fan 2P connector.  
3. Check for continuity between the No. 3 terminal of the condenser fan relay 4P connector and the No. 1 terminal of the condenser fan 2P connector.

Is there continuity?

NO

**Repair open in the wire between the condenser fan relay and the condenser fan.**

YES

**Check for an open in the wire:**  
Check for continuity between the No. 2 terminal of the condenser fan 2P connector and body ground.

Is there continuity?

NO

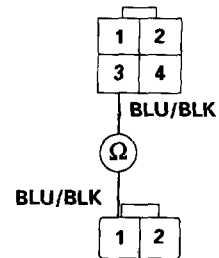
**Check for an open in the wire between the condenser fan and body ground. If the wire is OK, check for poor ground at G351.**

YES

**Replace the condenser fan motor.**

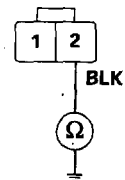
### CONDENSER FAN RELAY 4P CONNECTOR

Wire side of female terminals



### CONDENSER FAN 2P CONNECTOR

Wire side of female terminals



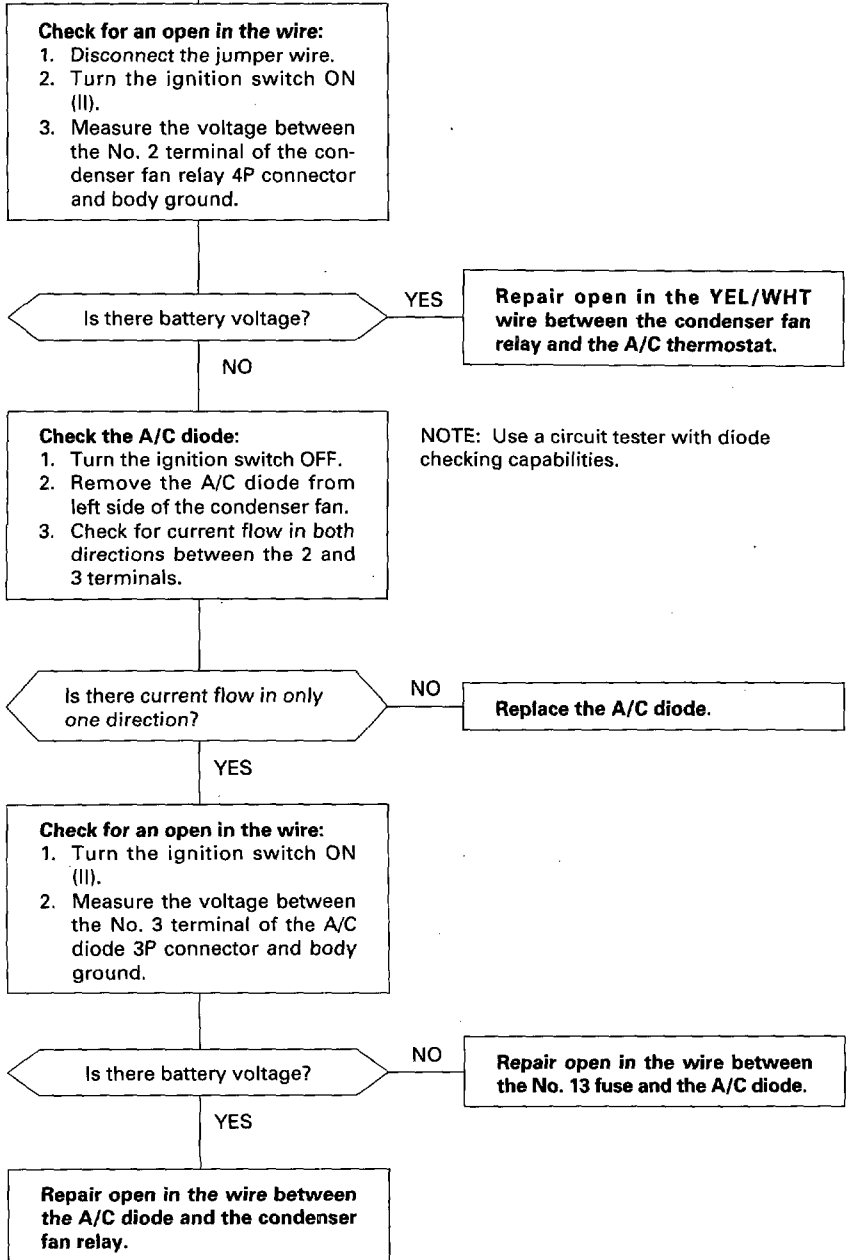
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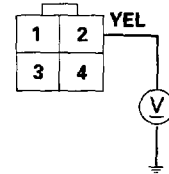
# Troubleshooting

## Condenser Fan (cont'd)

From page 22-8

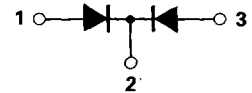
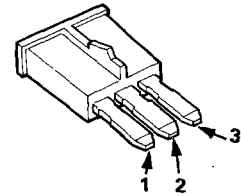


CONDENSER FAN RELAY 4P CONNECTOR

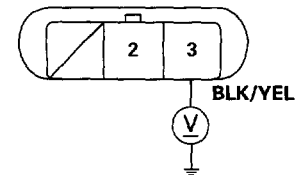


Wire side of female terminals

A/C DIODE



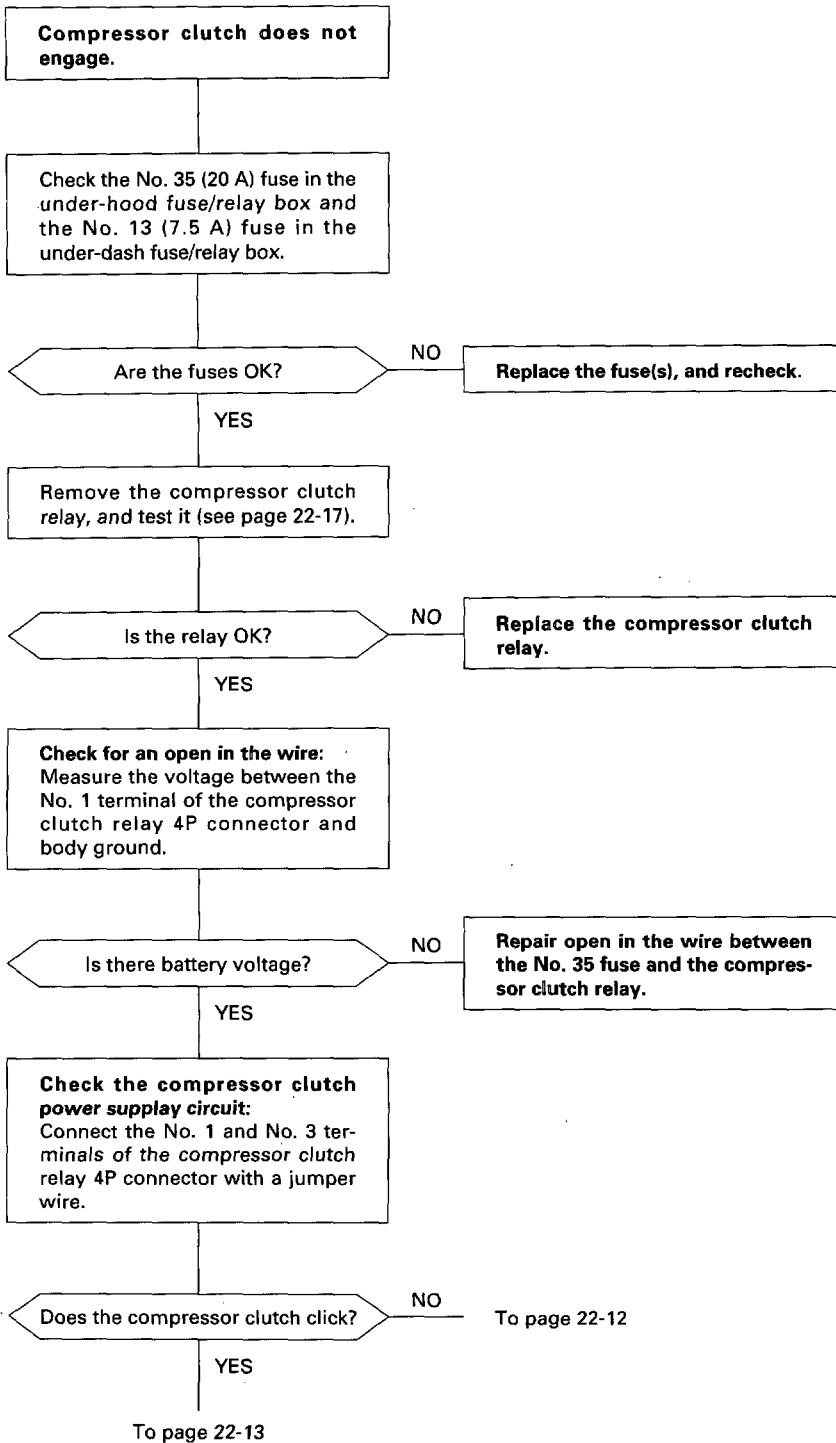
A/C DIODE 3P CONNECTOR



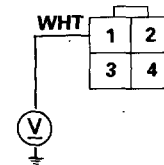
Wire side of female terminals



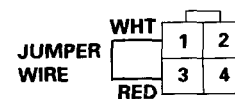
# Compressor



**COMPRESSOR CLUTCH RELAY 4P CONNECTOR**



Wire side of female terminals



(cont'd)

# Troubleshooting

## Compressor (cont'd)

From page 22-11

**Check for an open in the wire:**

1. Disconnect the jumper wire.
2. Disconnect the compressor clutch 1P connector.
3. Check for continuity between the No. 3 terminal of the compressor clutch relay 4P connector and the terminal of the compressor clutch 1P connector (DENSO) or thermal protector 1P connector (SANDEN).

Is there continuity?

NO

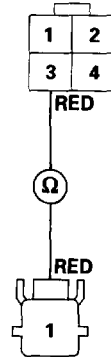
**Repair open in the wire between the compressor clutch relay and the compressor clutch (DENSO) or thermal protector (SANDEN).**

YES

**Inspect the compressor clutch clearance, the thermal protector (SANDEN) and the compressor clutch field coil (see page 22-29 (DENSO) or 22-35 (SANDEN)).**

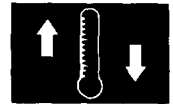
### COMPRESSOR CLUTCH RELAY 4P CONNECTOR

Wire side of female terminals



### COMPRESSOR CLUTCH 1P CONNECTOR (DENSO) or THERMAL PROTECTOR 1P CONNECTOR (SANDEN)

Wire side of female terminals



From page 22-11

**Check for an open in the wire:**  
1. Disconnect the jumper wire.  
2. Turn the ignition switch ON (II).  
3. Measure the voltage between the No. 2 terminal of the compressor clutch relay 4P connector and body ground.

Is there battery voltage?  
NO  
YES

**Repair open in the wire between the No. 13 fuse and the compressor clutch relay.**

**Check for an open in the wire:**  
1. Turn the ignition switch OFF.  
2. Disconnect the A/C pressure switch 2P connector.  
3. Turn the ignition switch ON (II).  
4. Measure the voltage between the No. 2 terminal of the A/C pressure switch 2P connector and body ground.

Is there battery voltage?  
NO  
YES

**Repair open in the wire between the A/C pressure switch and the A/C thermostat.**

**Check the A/C pressure switch:**  
1. Turn the ignition switch OFF.  
2. Check for continuity between the No. 1 and No. 2 terminals of the A/C pressure switch.

Is there continuity?  
YES  
NO

To page 22-14

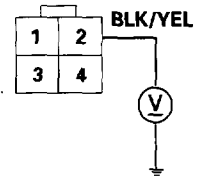
Check for A/C system pressure.

Is the pressure within specifications?  
NO  
YES

**Repair the A/C pressure problem.**

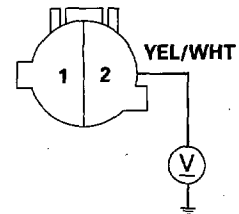
**Replace the A/C pressure switch.**

**COMPRESSOR CLUTCH RELAY 4P CONNECTOR**



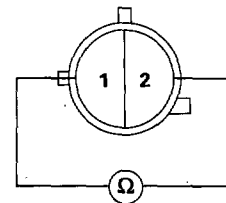
Wire side of female terminals

**A/C PRESSURE SWITCH 2P CONNECTOR**



Wire side of female terminals

**A/C PRESSURE SWITCH**



(cont'd)

# Troubleshooting

## Compressor (cont'd)

From page 22-13

**Check for an open in the wire:**

1. Turn the ignition switch OFF, then reinstall the compressor clutch relay.
2. Make sure the A/C switch is OFF, then turn the ignition switch ON (II).
3. Measure the voltage between the No. 8 terminal of the ECM connector A (26P) and body ground with the ECM connectors connected.

Is there battery voltage?

NO

**Repair open in the wire between the compressor clutch relay and the ECM.**

YES

**Check for an open in the wire:**

1. Turn the A/C and heater fan switches ON.
2. Measure the voltage between the No. 3 terminal of the ECM connector B (16P) and body ground with the ECM connectors connected.

Is there less than 1 volt?

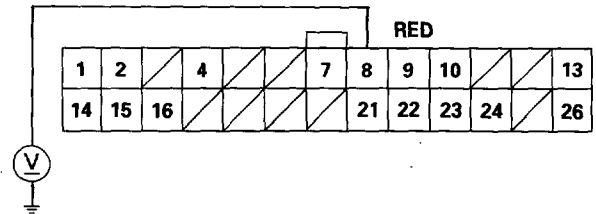
NO

**Repair open in the wire between the ECM and the A/C pressure switch.**

YES

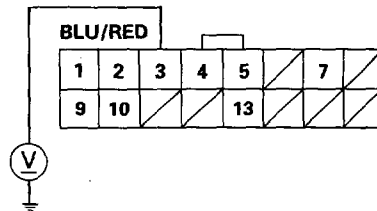
**Check for loose wires or poor connections at the ECM connectors A (26P) and B (16P). If the connections are good, substitute a known-good ECM, and recheck. If the symptom/indication goes away, replace the original ECM.**

ECM CONNECTOR A (26P)

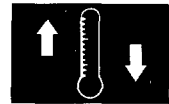


Wire side of female terminals

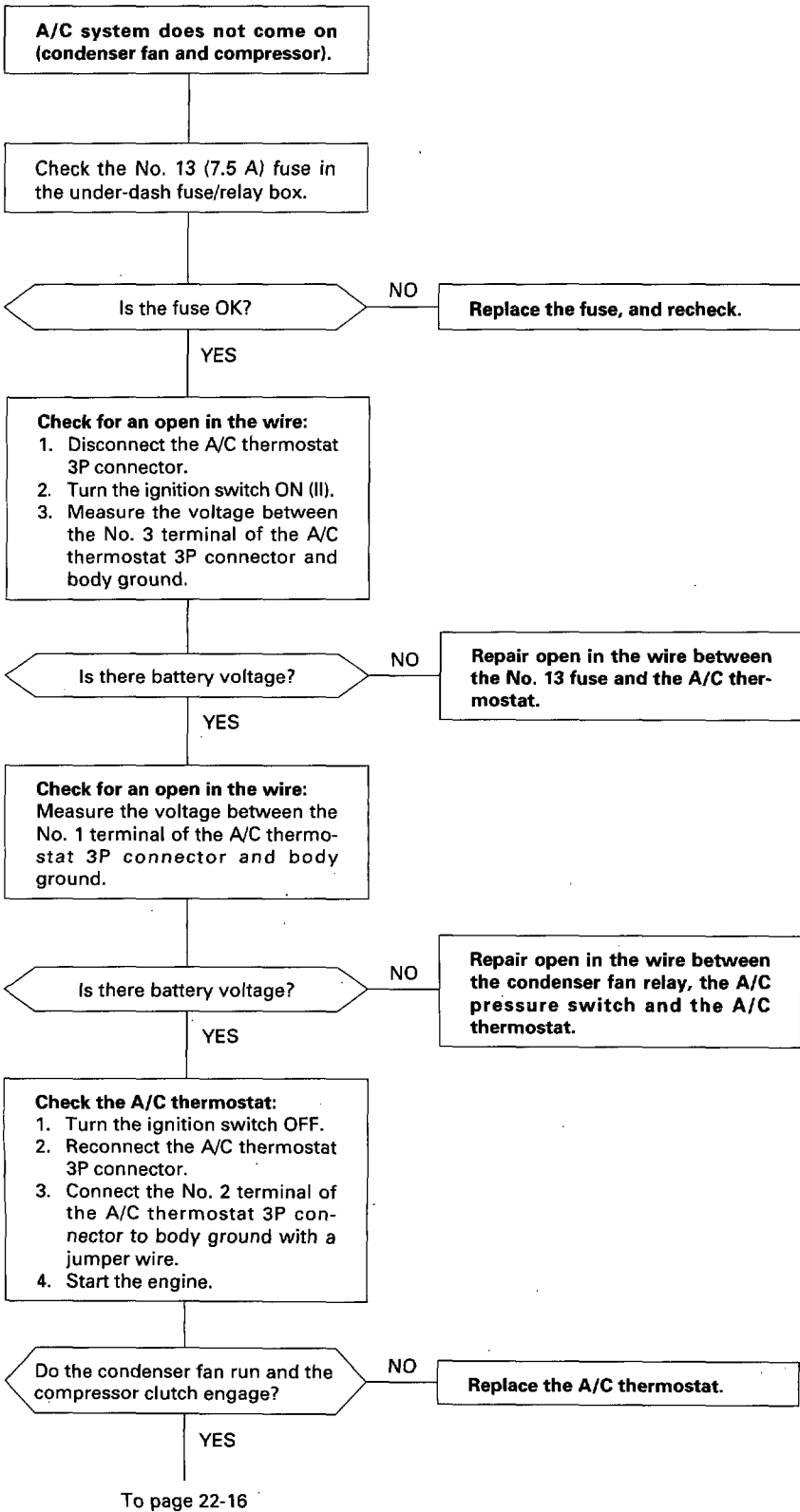
ECM CONNECTOR B (16P)



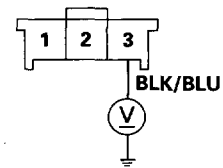
Wire side of female terminals



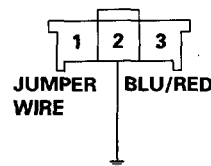
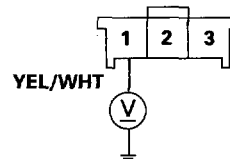
# A/C System



**A/C THERMOSTAT 3P CONNECTOR**



Wire side of female terminals

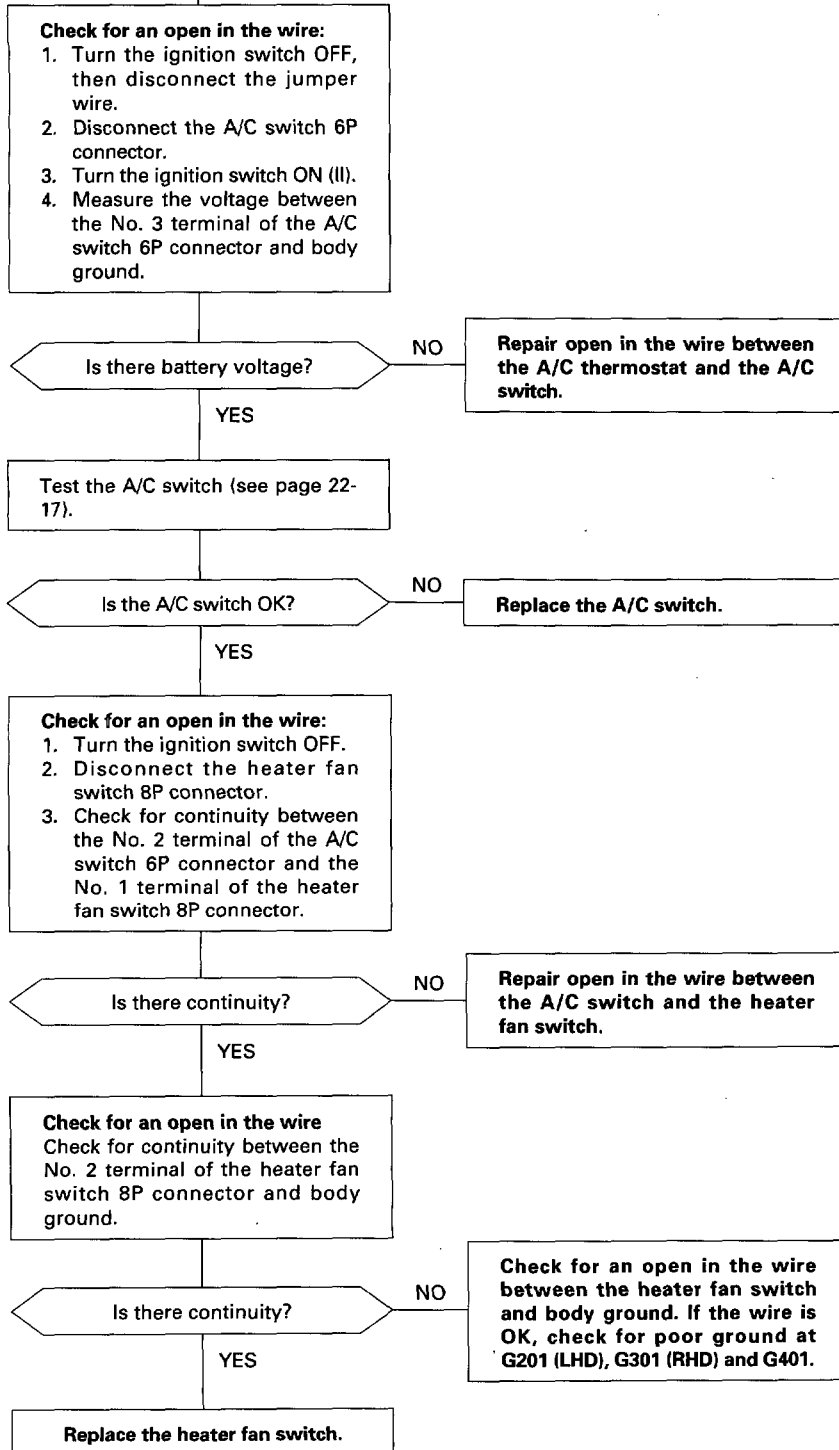


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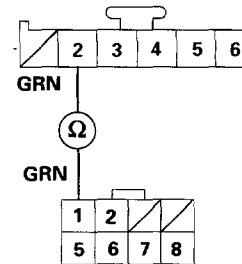
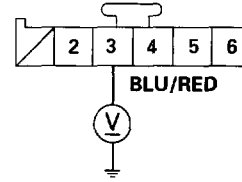
# Troubleshooting

## A/C System (cont'd)

From page 22-15

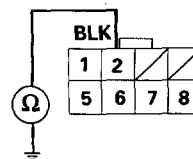


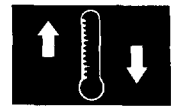
A/C SWITCH 6P CONNECTOR



HEATER FAN SWITCH 8P CONNECTOR

Wire side of female terminals

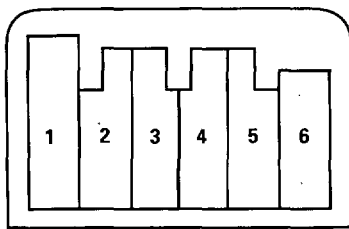




## Test

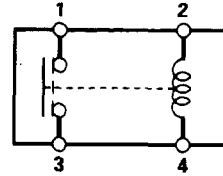
Check for continuity between the terminals in each switch position according to the table.

Terminal Position	1	2	3	4	5	6
OFF	○	○				
ON		○	○		○	○

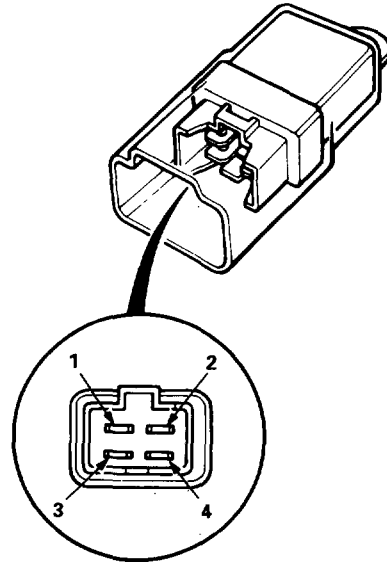


## Test

There should be continuity between the No. 1 and No. 3 terminals when power and ground are connected to the No. 2 and No. 4 terminals, and there should be no continuity when power is disconnected.



- Condenser fan relay
- Compressor clutch relay





# A/C Thermostat

## Test

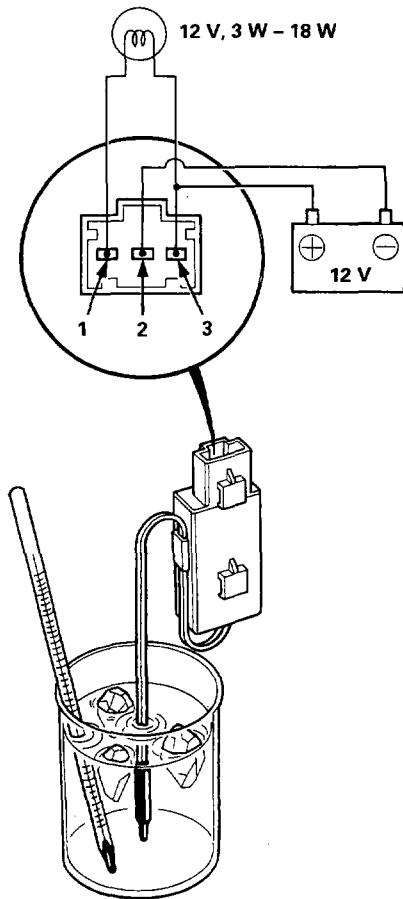
Connect battery power to the No. 3 terminal, ground the No. 2 terminal, and connect a test light between the No. 1 and No. 3 terminals.

NOTE: Use a 12 V, 3 W – 18 W test light.

Dip the A/C thermostat into a cup filled with ice water, and check the test light.

The light should go off at 4 – 6°C (39 – 43°F) or less, and should come on at 5 – 7°C (41 – 45°F) or more.

If the light doesn't come on and go off as specified, replace the A/C thermostat.



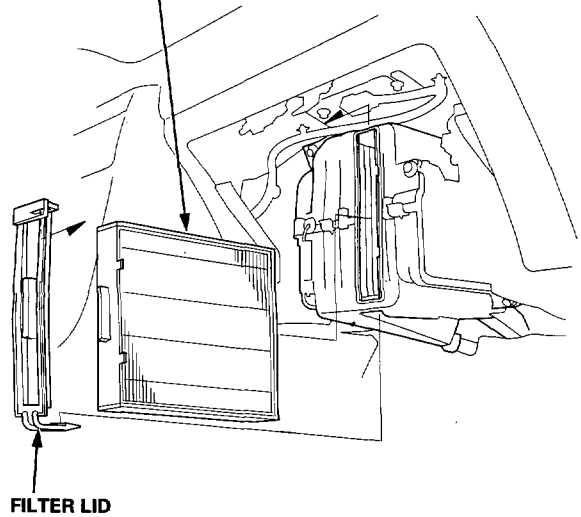
# A/C Filter

## Replacement

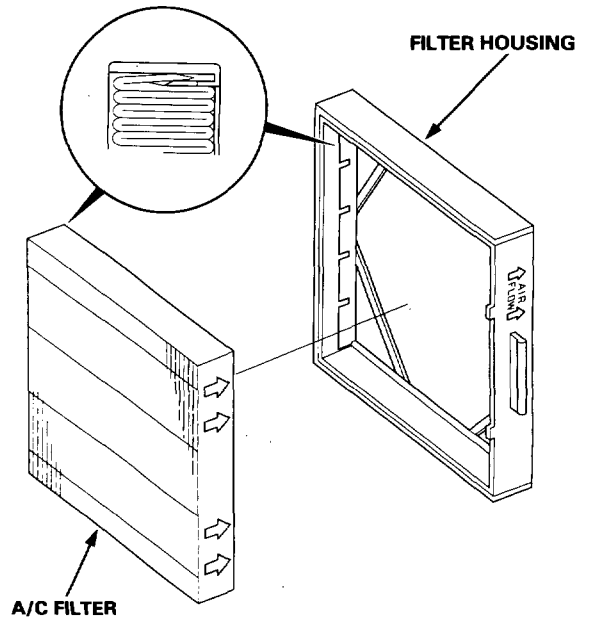
NOTE: LHD type is shown, RHD type is symmetrical.

1. Remove the glove box (see section 20).
2. Remove the glove box frame (see page 22-24).
3. Remove the filter lid from the evaporator, then pull out the A/C filter assembly.

A/C FILTER ASSEMBLY

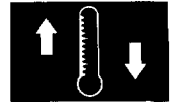


4. Remove the A/C filter from the filter housing. Replace the A/C filter according to the maintenance schedule in the owner's manual.



5. Install in the reverse order of removal. Make sure that there is no air leakage.

# A/C Service Tips and Precautions



The air conditioning system uses HFC-134a (R-134a) refrigerant and polyalkyleneglycol (PAG) refrigerant oil\*, which are not compatible with CFC-12 (R-12) refrigerant and mineral oil. Do not use R-12 refrigerant or mineral oil in this system, and do not attempt to use R-12 servicing equipment; damage to the air conditioning system or your servicing equipment will result.

\*DENSO, ND-OIL 8:

- P/N 38897-PR7-003: 120 ml (4 fl-oz, 4.2 Imp-oz)
- P/N 38898-PR7-003: 250 ml (8 1/3 fl-oz, 8.8 Imp-oz)
- P/N 38899-PR7-A01: 40 ml (1 1/3 fl-oz, 1.4 Imp-oz)

\*SANDEN, SP-10:

- P/N 38897-P13-003: 120 ml (4 fl-oz, 4.2 Imp-oz)
- P/N 38898-P13-003: 250 ml (8 1/3 fl-oz, 8.8 Imp-oz)
- P/N 38899-P13-A01: 40 ml (1 1/3 fl-oz, 1.4 Imp-oz)

Separate the manifold gauge sets (pressure gauges, hoses, joints) for refrigerants R-12 and R-134a. Do not confuse them.

## CAUTION

- Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- Be careful when connecting service equipment.
- Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioning systems should not be pressure tested or leak tested with compressed air.

## WARNING

- Compressed air mixed with R-134a forms a combustible vapor.
- The vapor can burn or explode causing serious injury.
- Never use compressed air to pressure test R-134a service equipment or vehicle air conditioning systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Always disconnect the negative cable from the battery whenever replacing air conditioning parts.
2. Keep moisture and dust out of the system. When disconnecting any lines, plug or cap the fittings immediately; don't remove the caps or plugs until just before you reconnect each line.
3. Before connecting any hose or line, apply a few drops of refrigerant oil to the O-ring.
4. When tightening or loosening a fitting, use a second wrench to support the matching fitting.
5. When discharging the system, 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:

Note these items when handling refrigerant oil:

- To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
- Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
- Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.

Condenser ..... 15 ml (1/2 fl-oz, 0.5 Imp-oz)

Evaporator ..... 25 ml (5/6 fl-oz, 0.9 Imp-oz)

Line or hose ..... 10 ml (1/3 fl-oz, 0.4 Imp-oz)

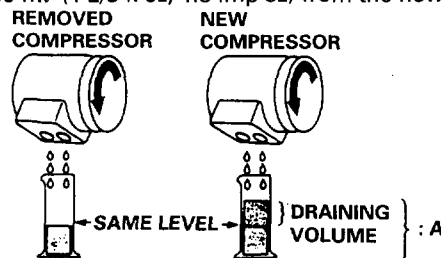
Receiver/Dryer ..... 10 ml (1/3 fl-oz, 0.4 Imp-oz)

Leakage repair ..... 25 ml (5/6 fl-oz, 0.9 Imp-oz)

Compressor..... For compressor replacement, subtract the volume of oil drained from the removed compressor from A, and drain the calculated volume of oil from the new compressor:  $A - \text{Volume of removed compressor} = \text{Volume to drain from new compressor}$ .

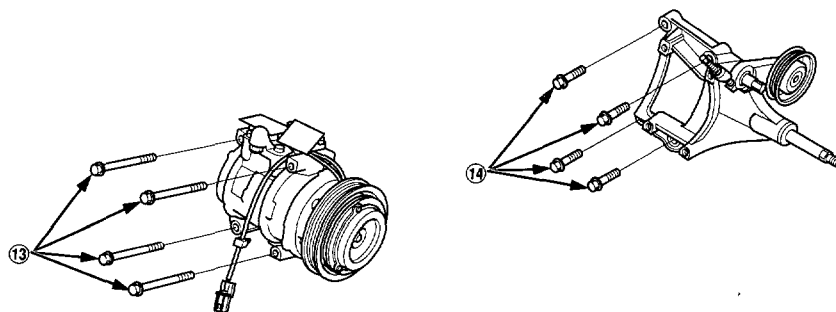
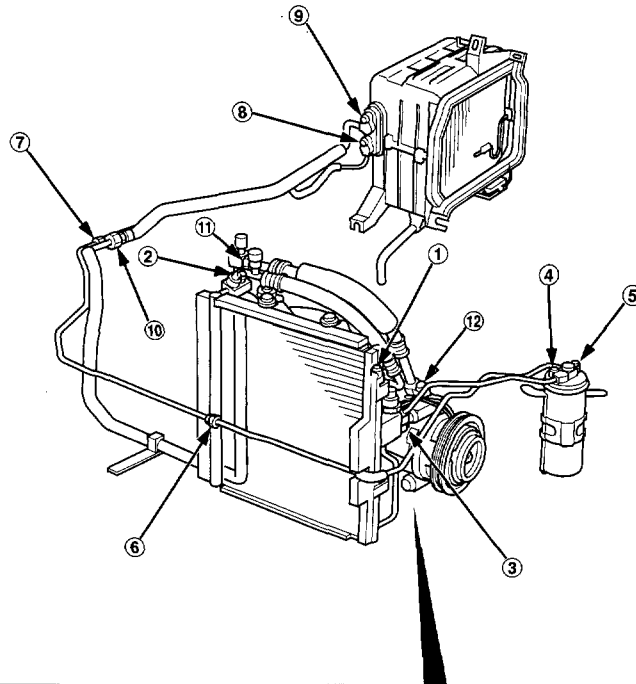
A: SANDEN 130 ml (4 1/3 fl-oz, 4.6 Imp-oz), DENSO 120 ml (4 fl-oz, 4.2 Imp-oz)

NOTE: Even if no oil is drained from the removed compressor, don't drain more than 50 ml (1 2/3 fl-oz, 1.8 Imp-oz) from the new compressor.

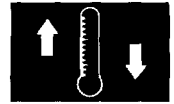


# A/C System Torque Specifications

NOTE: LHD type is shown, RHD type is symmetrical.



① Discharge hose to the compressor (6 x 1.0 mm) .....	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
② Discharge hose to the condenser (6 x 1.0 mm) .....	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
③ Condenser line to the condenser (6 x 1.0 mm) .....	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
④ Condenser line to the receiver/dryer (6 x 1.0 mm) .....	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
⑤ Receiver line A to the receiver/dryer (6 x 1.0 mm) .....	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
⑥ Receiver line B to the receiver pipe A .....	13 N·m (1.3 kgf·m, 9.4 lbf·ft)
⑦ Receiver line C to the receiver pipe B .....	13 N·m (1.3 kgf·m, 9.4 lbf·ft)
⑧ Receiver line C to the evaporator (6 x 1.0 mm) .....	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
⑨ Suction line B to the evaporator (6 x 1.0 mm) .....	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
⑩ Suction line A to the suction pipe B .....	31 N·m (3.2 kgf·m, 23 lbf·ft)
⑪ Suction hose to the suction pipe A .....	31 N·m (3.2 kgf·m, 23 lbf·ft)
⑫ Suction hose to the compressor (6 x 1.0 mm) .....	9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)
⑬ Compressor to the compressor bracket (8 x 1.25 mm) .....	24 N·m (2.4 kgf·m, 17 lbf·ft)
⑭ Compressor bracket to the cylinder block (10 x 1.25 mm) .....	44 N·m (4.5 kgf·m, 33 lbf·ft)



## Pressure Test Chart

NOTE: Performance Test is on page 22-21.

Test results	Related symptoms	Probable cause	Remedy
Discharge (high) pressure abnormally high	After stopping compressor, pressure drops to about 200 kPa (2.0 kgf/cm <sup>2</sup> , 28 psi) quickly, and then falls gradually.	Air in system	Discharge, evacuate, and recharge with specified amount. Evacuation: see page 22-42 Charging: see page 22-43
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge, evacuate, and recharge with specified amount.
	Reduced or no air flow through condenser	<ul style="list-style-type: none"> <li>• Clogged condenser fins</li> <li>• Condenser fan not working properly</li> </ul>	<ul style="list-style-type: none"> <li>• Clean</li> <li>• Check voltage and fan rpm.</li> <li>• Check fan direction.</li> </ul>
	Line to condenser is excessively hot.	Restricted flow of refrigerant in system	Restricted lines
Discharge pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot.	Insufficient refrigerant in system	<ul style="list-style-type: none"> <li>• Check for leak.</li> <li>• Charge system.</li> </ul>
	High and low pressures are balanced soon after stopping compressor. Low side is higher than normal.	<ul style="list-style-type: none"> <li>• Faulty compressor discharge valve</li> <li>• Faulty compressor seal</li> </ul>	Replace the compressor.
	Outlet of expansion valve is not frosted, low-pressure gauge indicates vacuum.	<ul style="list-style-type: none"> <li>• Faulty expansion valve</li> <li>• Moisture in system</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Discharge, evacuate, and recharge with specified amount.</li> </ul>
Suction (low) pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot.	Insufficient refrigerant in system	<ul style="list-style-type: none"> <li>• Repair the leaks.</li> <li>• Discharge, evacuate, and recharge with specified amount.</li> <li>• Charge as required.</li> </ul>
	Expansion valve is not frosted, and low-pressure line is not cold. Low-pressure gauge indicates vacuum.	<ul style="list-style-type: none"> <li>• Frozen expansion valve (Moisture in system)</li> <li>• Faulty expansion valve</li> </ul>	<ul style="list-style-type: none"> <li>• Discharge, evacuate, and recharge with specified amount.</li> <li>• Replace the expansion valve.</li> </ul>
	Discharge temperature is low, and the air flow from vents is restricted.	Frozen evaporator	Run the fan with compressor off, then check A/C thermostat.
	Expansion valve is frosted.	Clogged expansion valve	Clean or replace.
	Receiver/dryer outlet is cool, and inlet is warm (should be warm during operation).	Clogged receiver/dryer	Replace
Suction pressure abnormally high	Low-pressure hose and check joint are cooler than the temperature around evaporator.	<ul style="list-style-type: none"> <li>• Expansion valve open too long</li> <li>• Loose expansion capillary tube</li> </ul>	Repair or replace.
	Suction pressure is lowered when condenser is cooled by water.	Excessive refrigerant in system	Discharge, evacuate, and recharge with specified amount.
	High and low-pressure are equalized as soon as the compressor is stopped, and both gauges fluctuate while running.	<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 the compressor.
Suction and discharge pressures abnormally high	Reduced air flow through condenser.	<ul style="list-style-type: none"> <li>• Clogged condenser fins</li> <li>• Condenser fan not working properly</li> </ul>	<ul style="list-style-type: none"> <li>• Clean</li> <li>• Check voltage and fan rpm.</li> <li>• Check fan direction.</li> </ul>
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge, evacuate, and recharge with specified amount.
Suction and discharge pressure abnormally low	Low-pressure hose and metal end areas are cooler than evaporator.	Clogged or kinked low-pressure hose parts	Repair or replace.
	Temperature around expansion valve is too low compared with that around receiver/dryer.	Clogged high-pressure line	Repair or replace.
Refrigerant leaks	Compressor clutch is dirty.	Compressor shaft seal leaking	Replace the compressor.
	Compressor bolt(s) are dirty.	Leaking around bolt(s)	Tighten bolt(s) or replace compressor.
	Compressor gasket is wet with oil.	Gasket leaking	Replace the compressor.

# A/C System Service

## Performance Test

The performance test will help determine if the air conditioning system is operating within specifications.

**NOTE:**

- Use only a gauge set for refrigerant HFC-134a (R-134a).
- Use a vacuum pump adapter which is equipped with a check valve to prevent the backflow of the vacuum pump oil.

**CAUTION**

- Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- Be careful when connecting service equipment.
- Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioning systems should not be pressure tested or leak tested with compressed air.

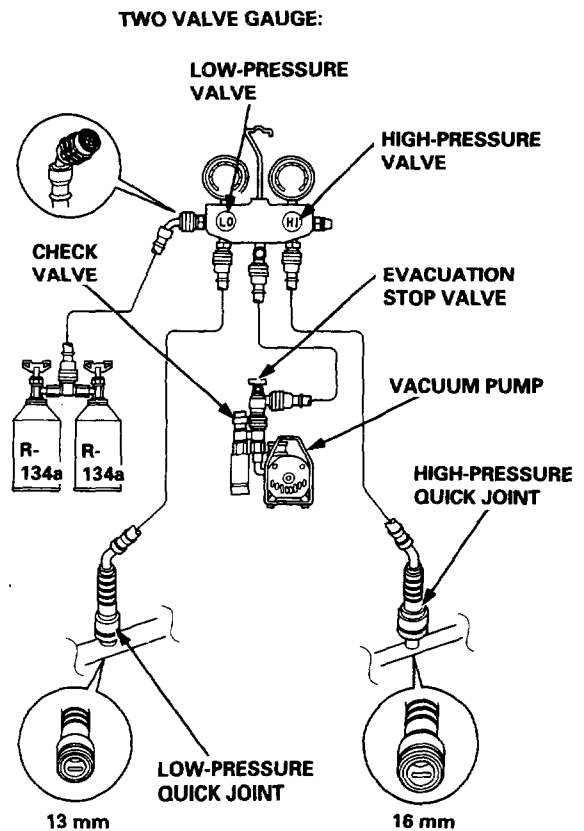
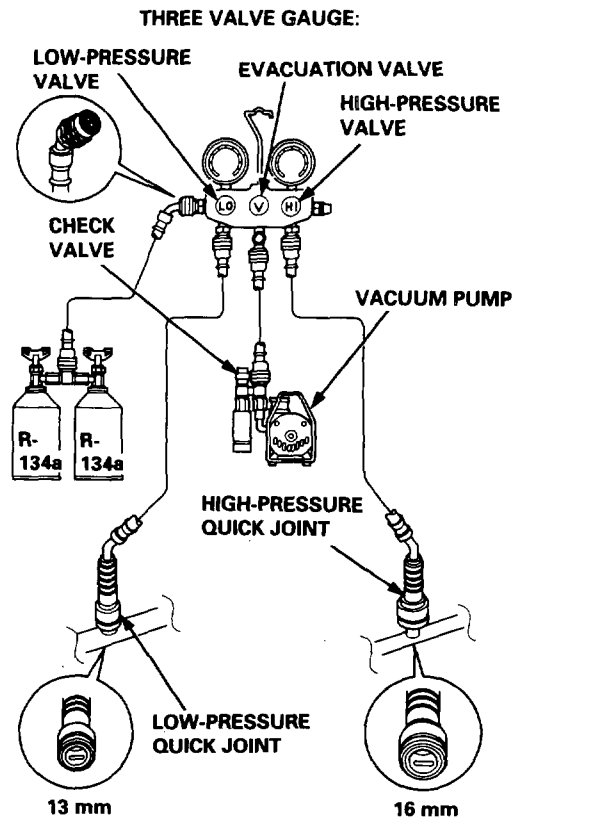
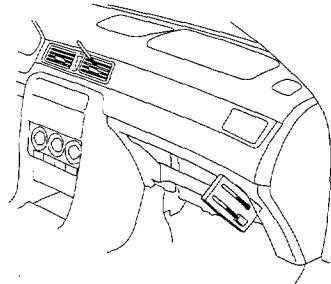
**WARNING**

- Compressed air mixed with R-134a forms a combustible vapor.
- The vapor can burn or explode causing serious injury.
- Never use compressed air to pressure test R-134a service equipment or vehicle air conditioning systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. Connect the R-134a gauge set as shown.
2. Insert a thermometer in the center air vent. Determine the relative humidity and air temperature.
3. Test conditions:
  - Avoid direct sunlight.
  - Open hood.
  - Open front doors.
  - Set the temperature control dial to MAX COOL, the mode control dial to VENT and the recirculation control switch to RECIRCULATE.
  - Turn the A/C switch on and the fan switch to MAX.
  - Run the engine at 1,500 rpm (min<sup>-1</sup>).
  - No driver or passengers in vehicle
4. After running the air conditioning for 10 minutes under the above test conditions, read the delivery temperature from the thermometer in the center air vent, the intake temperature near the blower unit behind the glove box and the high and low system pressure from the A/C gauges.

NOTE: LHD type is shown, RHD type is symmetrical.

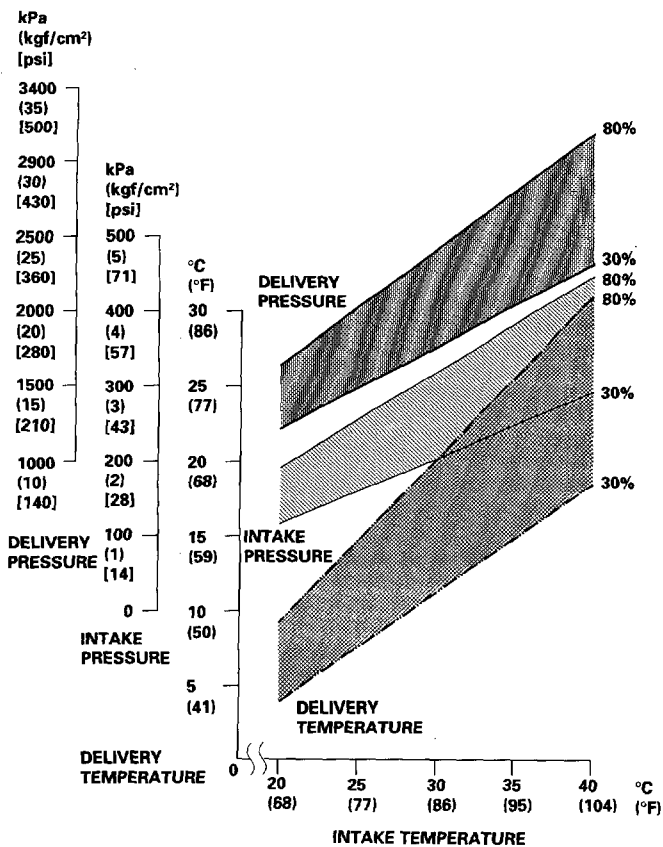




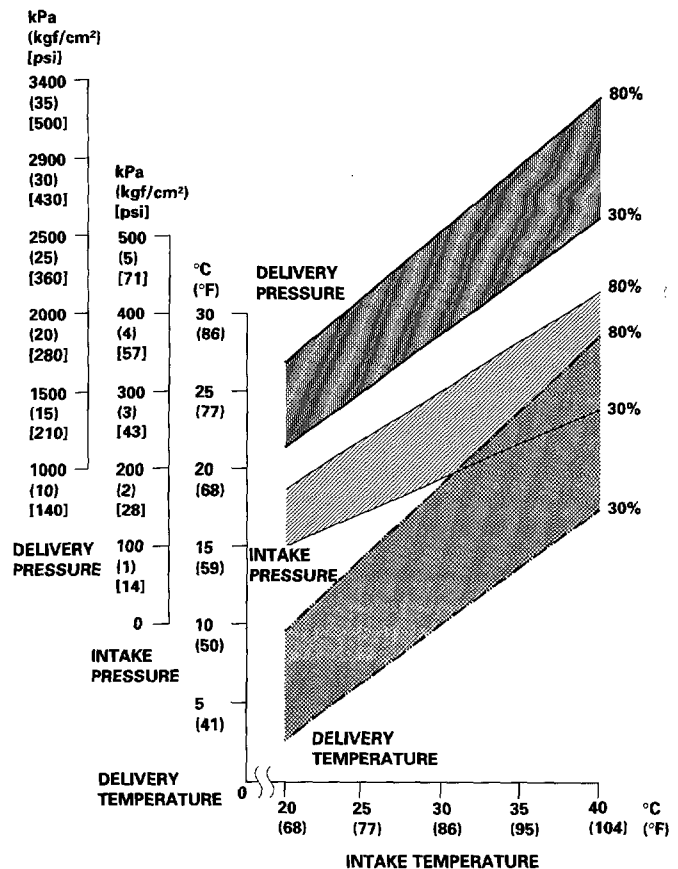
5. To complete the charts:

- Mark the delivery temperature along the vertical line.
- Mark the intake temperature (ambient air temperature) along the bottom line.
- Draw a line straight up from the air temperature to the humidity.
- Mark a point 10% above and 10% below the humidity level.
- From each point, draw a horizontal line across the delivery temperature.
- The delivery temperature should fall between the two lines.
- Complete the low-side pressure test and high-side pressure test in the same way.
- Any measurements outside the line may indicate the need for further inspection.

All except B18C4 engine model:



B18C4 engine model:

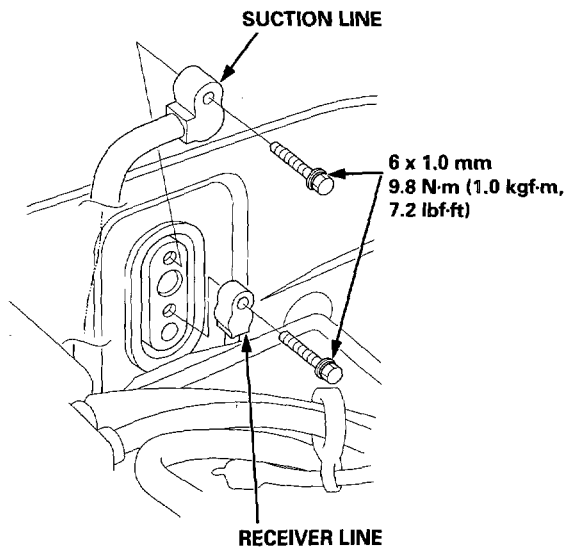


# Evaporator

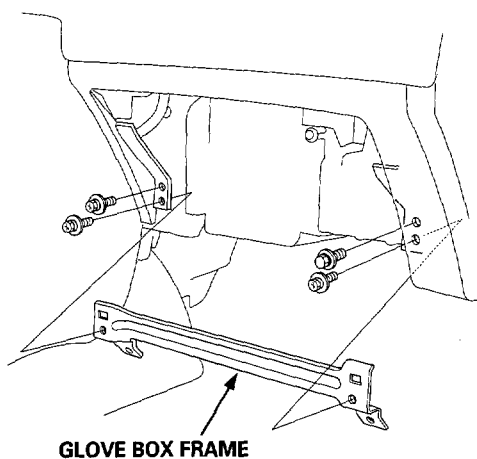
## Replacement

NOTE: LHD type is shown, RHD type is symmetrical.

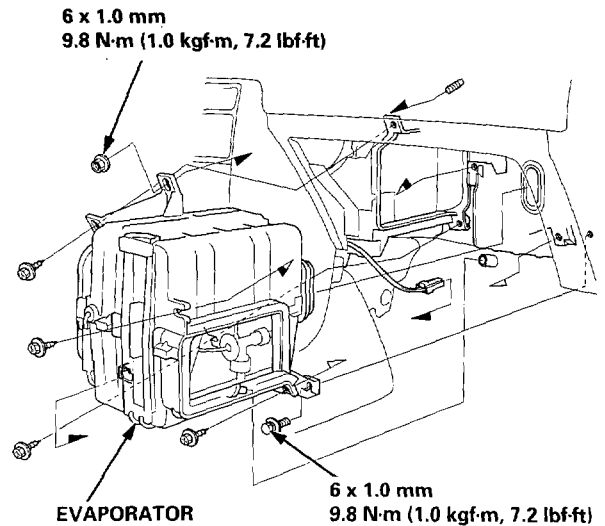
1. Discharge the refrigerant (see page 22-41).
2. Remove the battery.
3. Remove the each bolt, then disconnect the suction and receiver lines from the evaporator. Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



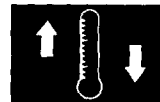
4. Remove the glove box (see section 20).
5. Remove the bolts and the glove box frame.



6. Disconnect the connector from the A/C thermostat, then remove the self-tapping screws, the mounting bolt and the mounting nut. Disconnect the drain hose, then remove the evaporator.



7. Install in the reverse order of removal, and note these items:
  - If you're installing a new evaporator, add refrigerant oil (DENSO, ND-OIL 8 or SANDEN, SP-10) (see page 22-19).
  - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
  - Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
  - Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.
  - Apply sealant to the grommets.
  - Make sure that there is no air leakage.
  - Charge the system (see page 22-43), and test its performance (see page 22-22).



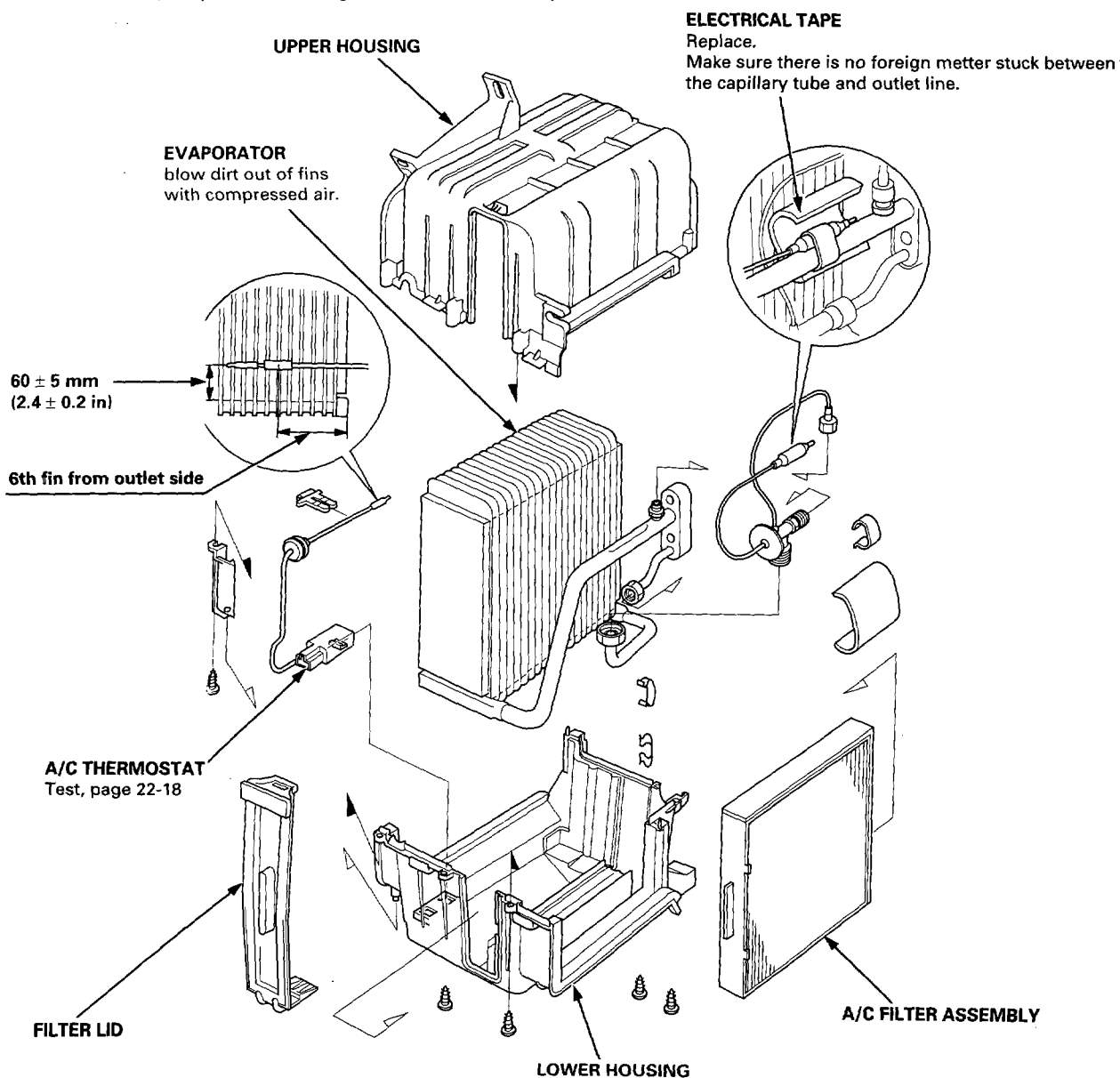
## Overhaul

NOTE: LHD type is shown, RHD type is symmetrical.

1. Remove the filter lid, then pull out the A/C filter assemblies.
2. Pull out the A/C thermostat sensor from the evaporator fins.
3. Remove the self-tapping screws and the clamps. Carefully separate the upper and the lower housings, then remove the evaporator.
4. If necessary, remove the expansion valve. When loosening the nuts of the expansion valve, use a second wrench to hold the expansion valve or the evaporator line. Otherwise, they can be damaged.

5. Reassemble the evaporator in the reverse order of disassembly, and note these items:

- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
- Install the expansion valve capillary tube with the capillary tube in contact with the outlet line directly, and wrap it with electrical tape.
- Reinstall the A/C thermostat sensor to its original location.
- Make sure that there is no air leakage.



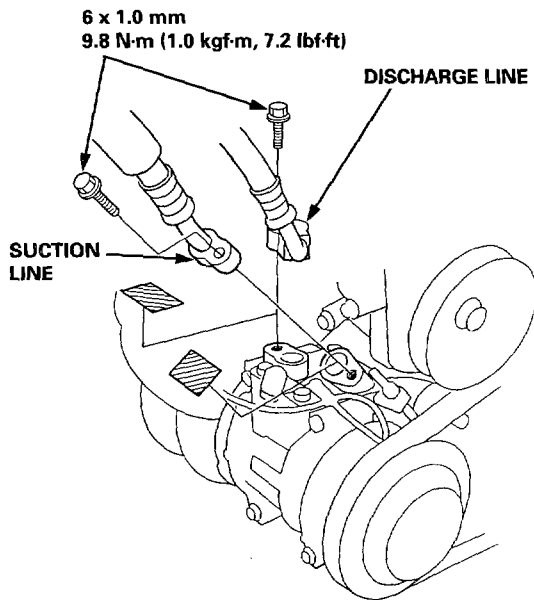


# Compressor (DENSO)

## Replacement

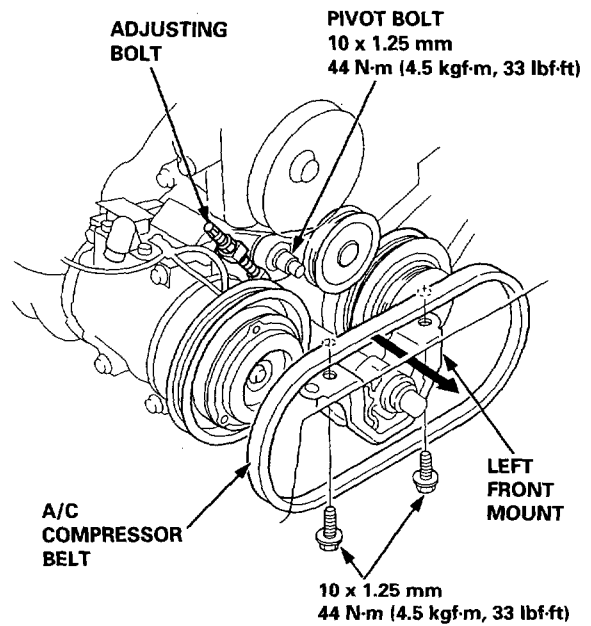
NOTE: LHD type is shown, RHD type is similar.

1. If the compressor is marginally operable, run the engine at idle speed, and let the air conditioning work for a few minutes, then shut the engine off.
2. Disconnect the negative cable from the battery.
3. Discharge the refrigerant (see page 22-41).
4. Remove the each bolt, then disconnect the suction and discharge lines from the compressor. Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.

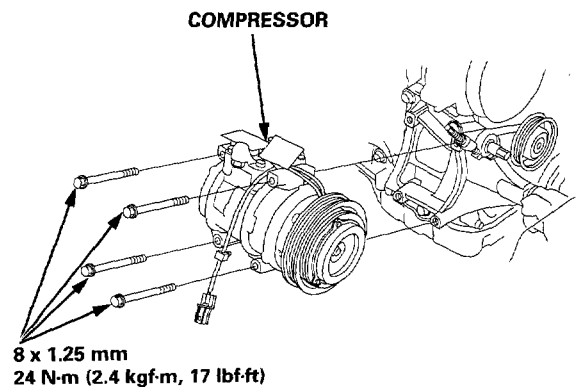


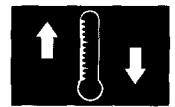
5. Remove the condenser, but do not disconnect the discharge hose from the condenser (see page 22-40).
6. Remove the power steering pump belt (see section 17).

7. Loosen the pivot bolt of the idler pulley bracket and the adjusting bolt, then remove the A/C compressor belt from the pulleys. If necessary, remove the mounting bolts from the left front mount, then remove the A/C compressor belt through the gap between the body and the left front mount.

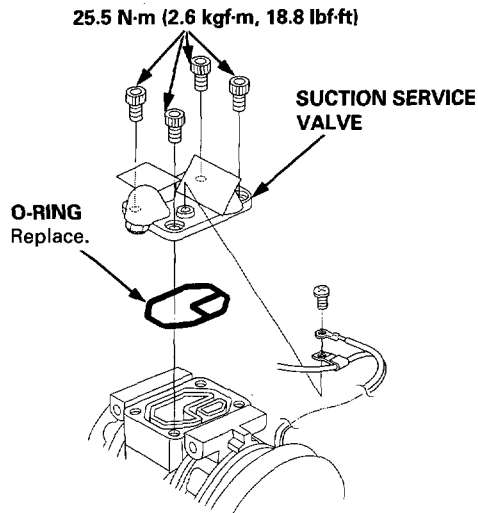


8. Disconnect the compressor clutch connector, then remove the mounting bolts and the compressor.



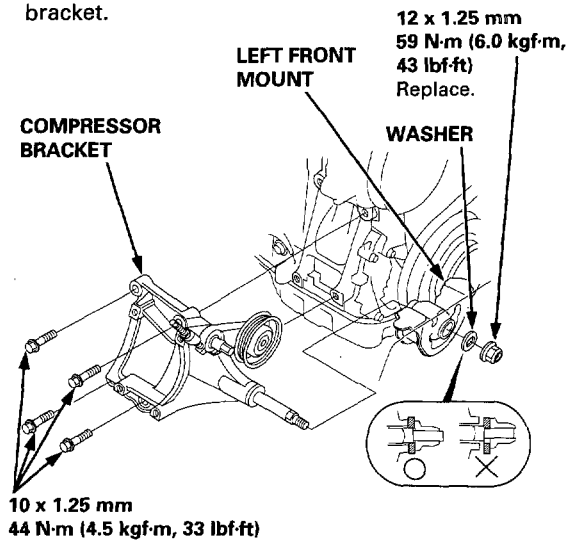


9. Remove the bolts, the suction service valve and the O-ring from the compressor.



10. If necessary, remove the compressor bracket as follows.

- Remove the nut and the washer from the left front mount. When tightening the nut to the left front mount, make sure the washer is set properly on the left front mount as shown.
- Remove the mounting bolts and the compressor bracket.

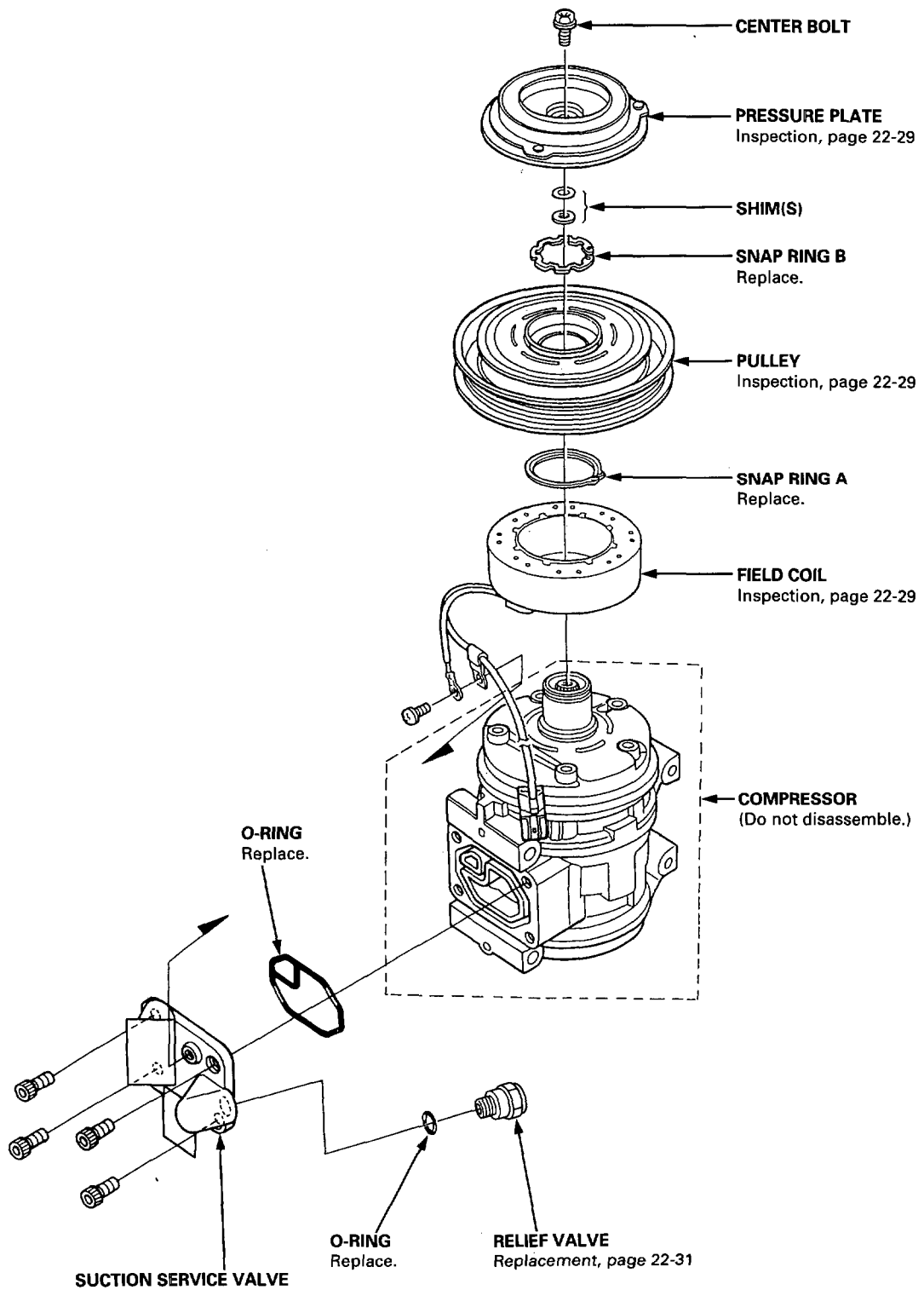


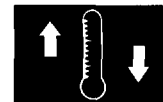
11. Install in the reverse order of removal, and note these items:

- If you're installing a new compressor, drain all the refrigerant oil from the removed compressor, and measure its volume. Subtract the volume of drained oil from 120 ml (4 fl-oz, 4.2 Imp-oz); the result is the amount of oil you should drain from the new compressor (through the suction fitting).
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
- Use refrigerant oil (DENSO, ND-OIL8) for HFC-134a DENSO piston type compressors only.
- To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
- Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
- Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.
- Adjust the A/C compressor belt (see page 22-39) and the power steering pump belt (see section 17).
- Charge the system (see page 22-43), and test its performance (see page 22-22).

# Compressor (DENSO)

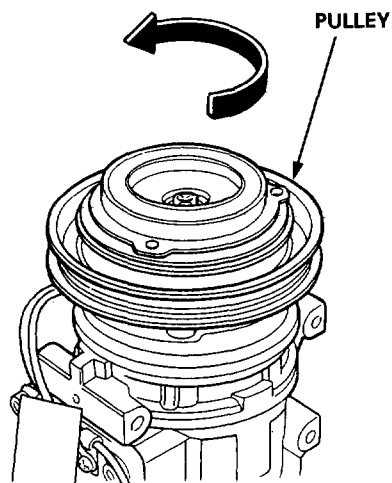
## Illustrated Index





## Clutch Inspection

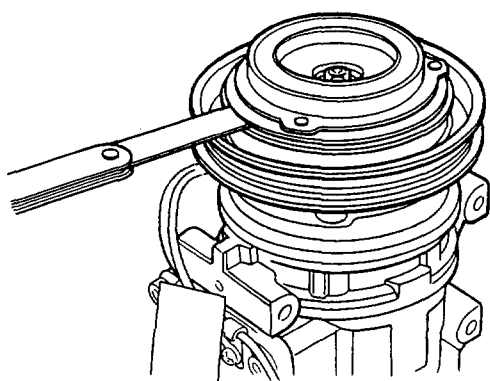
- Check the plated parts of the pressure plate for color changes, peeling or other damage. If there is damage, replace the clutch set.
- Check the pulley bearing play and drag by rotating the pulley by hand. Replace the clutch set with a new one if it is noisy or has excessive play/drag.



- Measure the clearance between the pulley and the pressure plate all the way around. If the clearance is not within specified limits, the pressure plate must be removed and shim(s) added or removed as required, following the procedure on page 22-30.

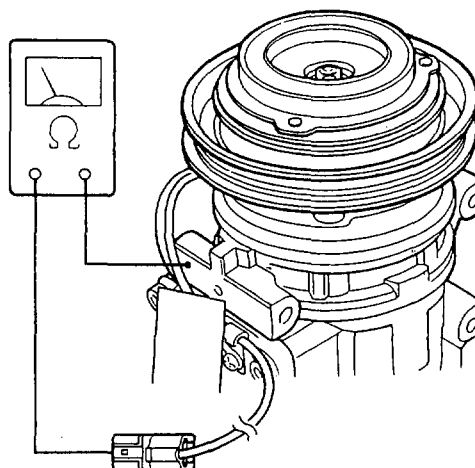
**Clearance:  $0.5 \pm 0.15$  mm ( $0.020 \pm 0.006$  in)**

**NOTE:** The shims are available in three thicknesses: 0.1 mm, 0.3 mm and 0.5 mm.



- Check resistance of the field coil. If resistance is not within specifications, replace the field coil.

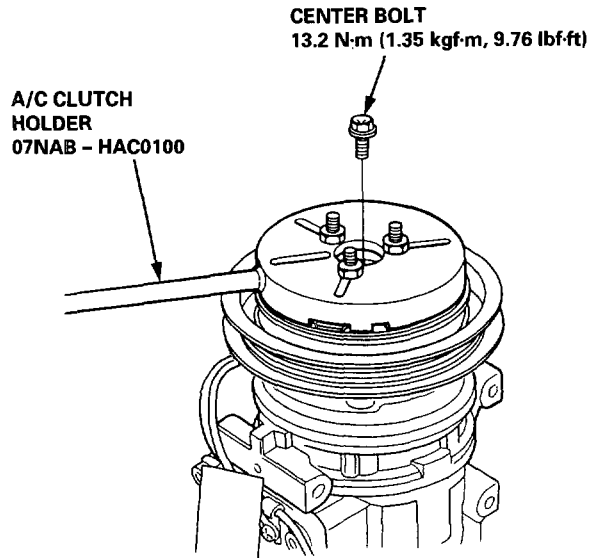
**Field Coil Resistance:  $3.6 \pm 0.2$  ohms at 20°C (68°F)**



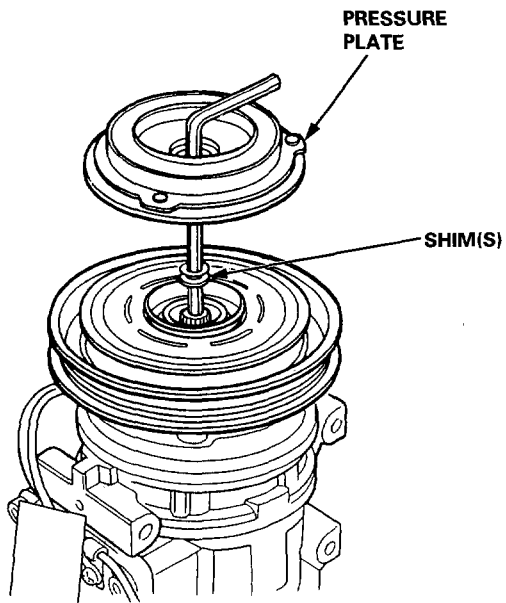
# Compressor (DENSO)

## Clutch Overhaul

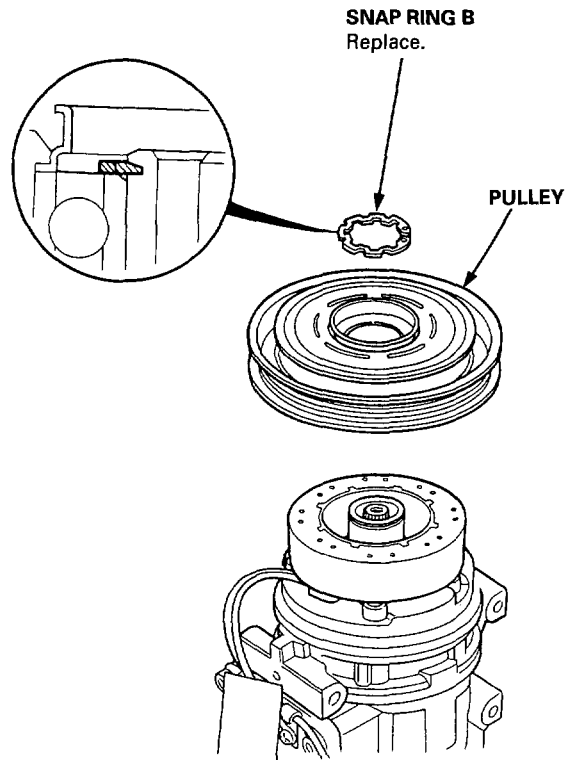
1. Remove the center bolt while holding the pressure plate with the special tool.



2. Remove the pressure plate and shim(s), taking care not to lose the shim(s).



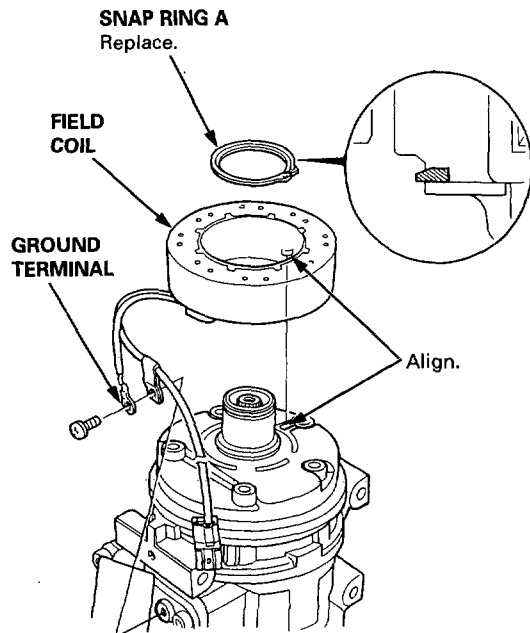
3. Remove the snap ring B with snap ring pliers, then remove the pulley. Be careful not to damage the pulley and compressor.





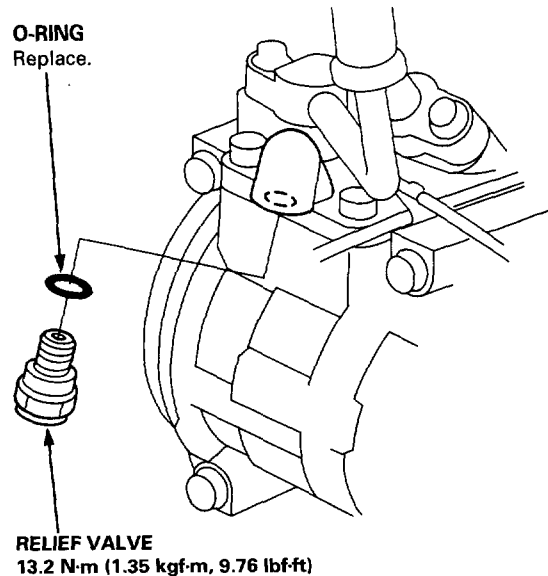
## Relief Valve Replacement

4. Remove the screw from the field coil ground terminal. Remove the snap ring A with snap ring pliers, then remove the field coil. Be careful not to damage the field coil and compressor.



5. Reassemble the compressor clutch in the reverse order of disassembly, and note these items:
  - Install the field coil with the wire side facing down.
  - Clean the pulley and compressor sliding surfaces with non-petroleum solvent.
  - Install new snap rings, and make sure they are fully seated in the groove.
  - Make sure that the pulley turns smoothly after it's reassembled.
  - Route and clamp the wires properly or they can be damaged by pulley.

1. Discharge the refrigerant (see page 22-41).
2. Remove the relief valve and the O-ring. Plug the opening to keep foreign matter from entering the system and the compressor oil from running out.



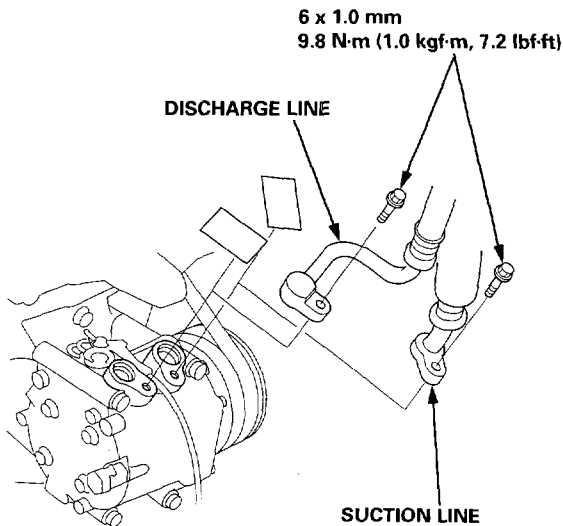
3. Clean the mating surfaces.
4. Replace the O-ring with a new one at the relief valve, and apply a thin coat of refrigerant oil before installing it.
5. Remove the plug, and install and tighten the relief valve.
6. Charge the system (see page 22-43), and test its performance (see page 22-22).

# Compressor (SANDEN)

## Replacement

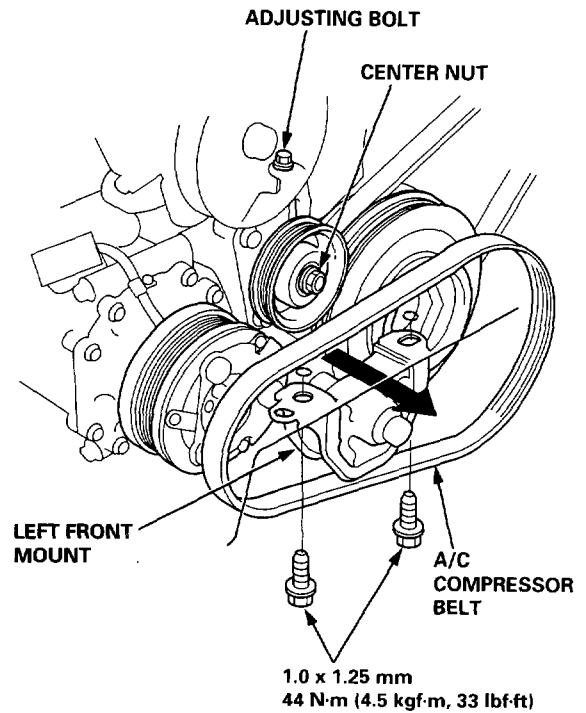
NOTE: LHD type is shown, RHD type is similar.

1. If the compressor is marginally operable, run the engine at idle speed, and let the air conditioning work for a few minutes, then shut the engine off.
2. Disconnect the negative cable from the battery.
3. Discharge the refrigerant (see page 22-41).
4. Remove the each bolt, then disconnect the suction and discharge lines from the compressor. Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.

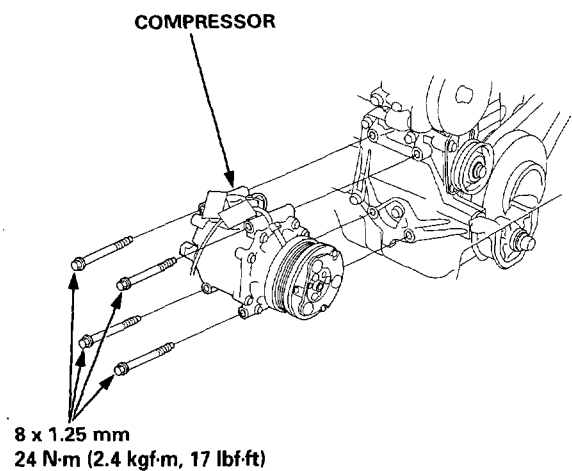


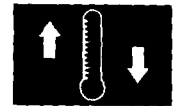
5. Remove the condenser, but do not disconnect the discharge hose from the condenser. (see page 22-40).
6. Remove the power steering pump belt (see section 17).

7. Loosen the center nut of the idler pulley and the adjusting bolt, then remove the A/C compressor belt from the pulleys. If necessary, remove the mounting bolts from the left front mount, then remove the A/C compressor belt through the gap between the body and the left front mount.



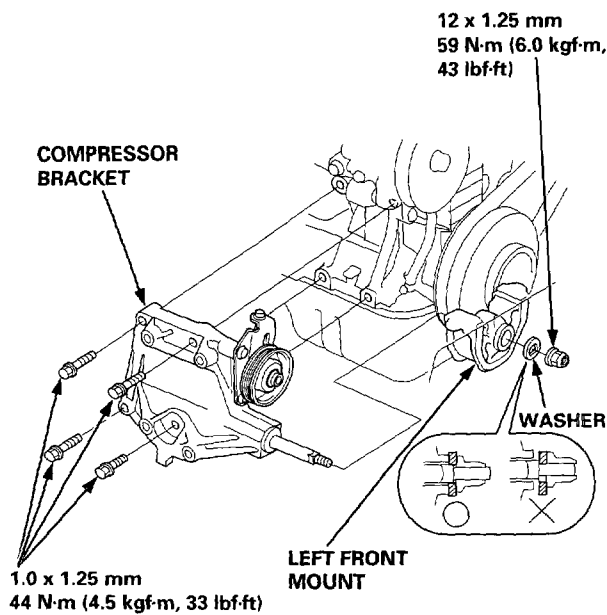
8. Disconnect the thermal protector connector, then remove the mounting bolts and the compressor.





9. If necessary, remove the compressor bracket as follows.

- Remove the nut and the washer from the left front mount. When tightening the nut to the left front mount, make sure the washer is set properly on the left front mount as shown.
- Remove the mounting bolts and the compressor bracket.



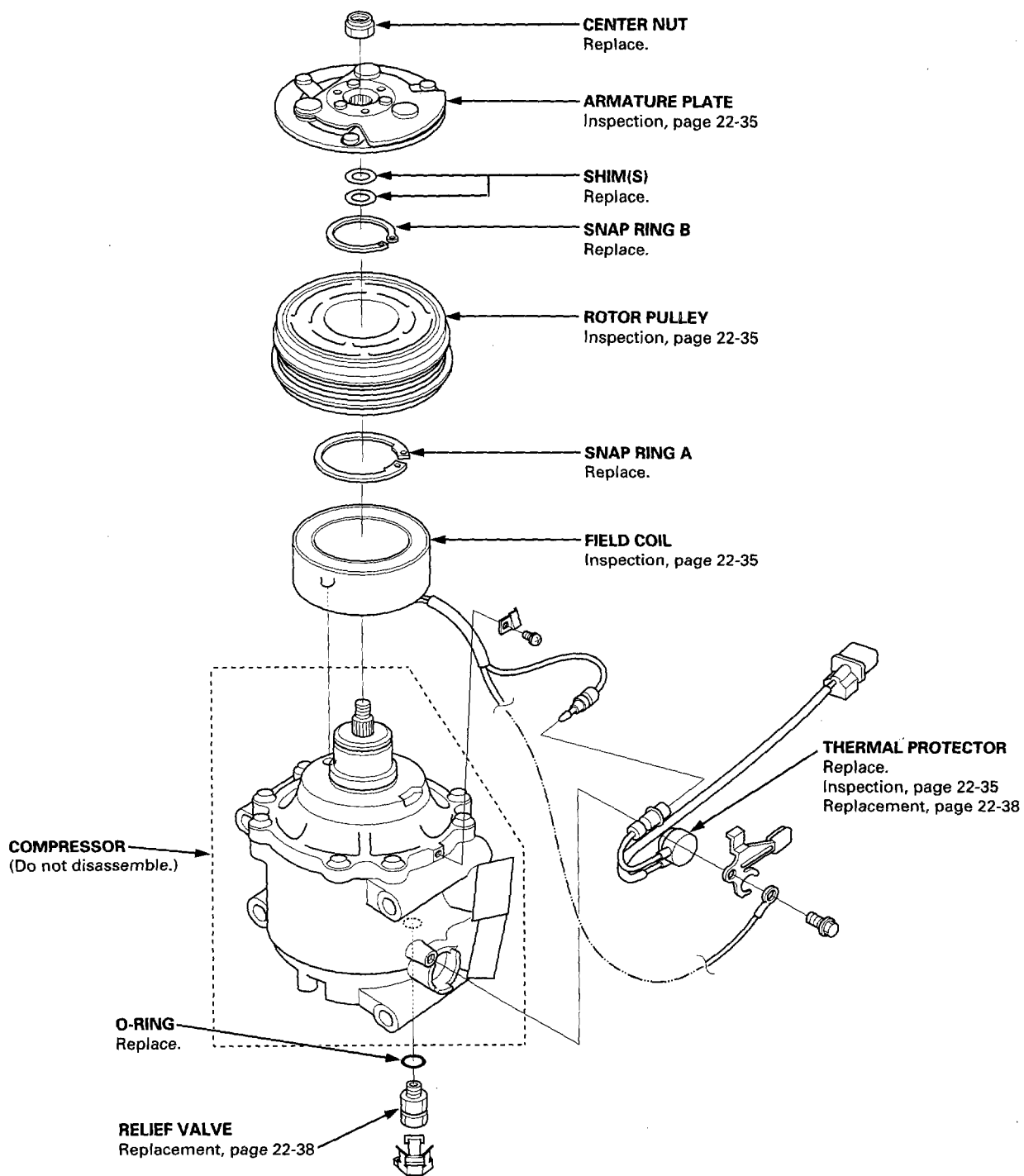
10. Install in the reverse order of removal, and note these items:

- If you're installing a new compressor, drain all the refrigerant oil from the removed compressor, and measure its volume. Subtract the volume of drained oil from 130mℓ (4 1/3 fl-oz, 4.6 imp-oz); the result is the amount of oil you should drain from the new compressor (through the suction fitting).
- Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
- Use refrigerant oil (SANDEN, SP-10) for HFC-134a SANDEN spiral type compressors only.
- To avoid contamination, do not return the oil to the container once dispensed, and never mix it with other refrigerant oils.
- Immediately after using the oil, replace the cap on the container, and seal it to avoid moisture absorption.
- Do not spill the refrigerant oil on the vehicle; it may damage the paint; if the refrigerant oil contacts the paint, wash it off immediately.
- Adjust the A/C compressor belt (see page 22-39) and the power steering pump belt (see section 17).
- Charge the system (see page 22-43), and test its performance (see page 22-22).



# Compressor (SANDEN)

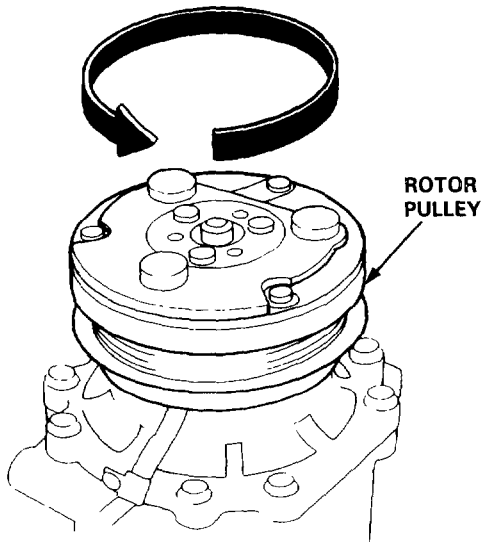
## Illustrated Index





## Clutch Inspection

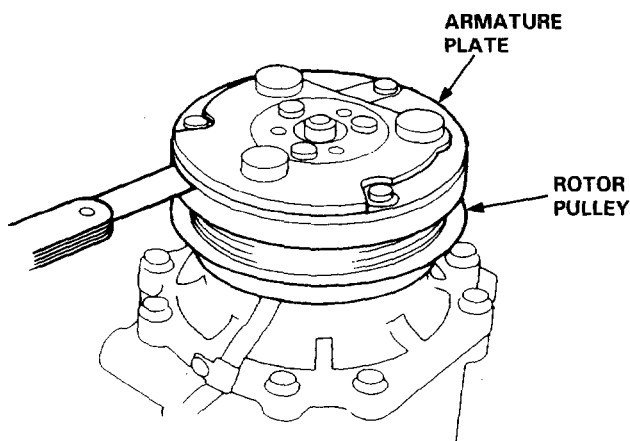
- Check the plated parts of the armature plate for color changes, peeling or other damage. If there is damage, replace the clutch set.
- Check the rotor pulley bearing play and drag by rotating the rotor pulley by hand. Replace the clutch set with a new one if it is noisy or has excessive play/drag.



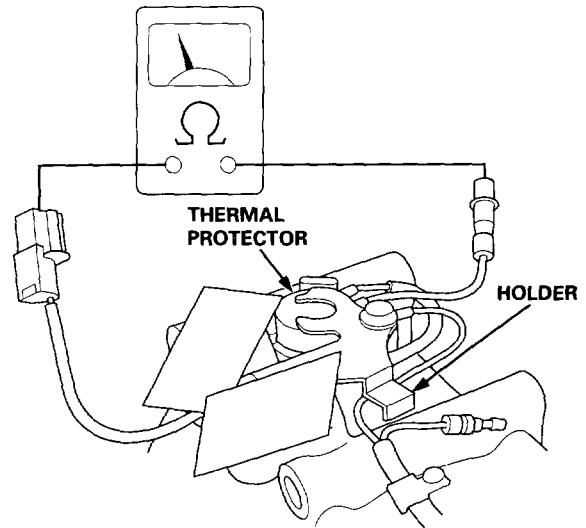
- Measure the clearance between the rotor pulley and the armature plate all the way around. If the clearance is not within specified limits, the armature plate must be removed and shim(s) added or removed as required, following the procedure on page 22-36.

**Clearance:  $0.5 \pm 0.15$  mm ( $0.020 \pm 0.006$  in)**

NOTE: The shims are available in four thicknesses: 0.1 mm, 0.2 mm, 0.4 mm and 0.5 mm

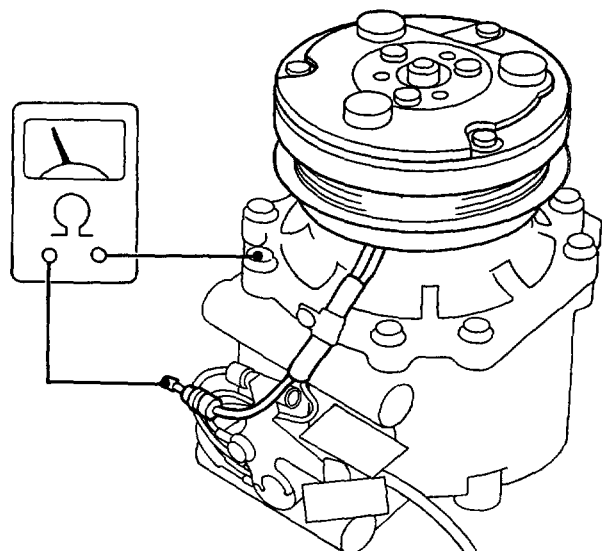


- Release the field coil connector from the holder, then disconnect it. Check the thermal protector for continuity. If there is no continuity, replace the thermal protector.



- Check resistance of the field coil. If resistance is not within specifications, replace the field coil.

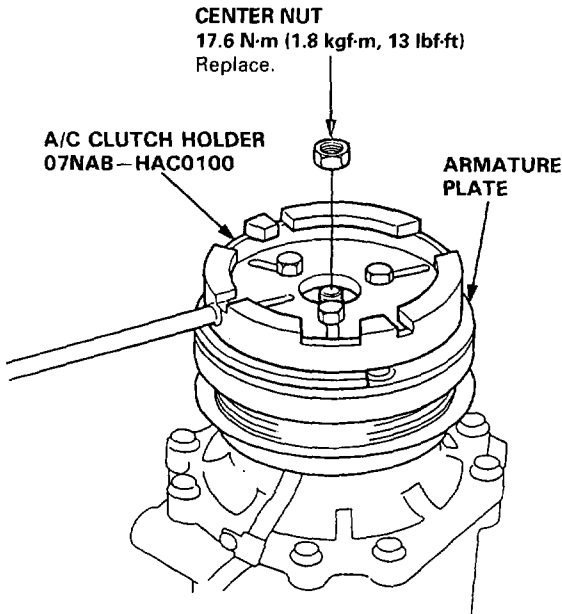
**Field Coil Resistance:  $3.2 \pm 0.15$  ohms at 20°C (68°F)**



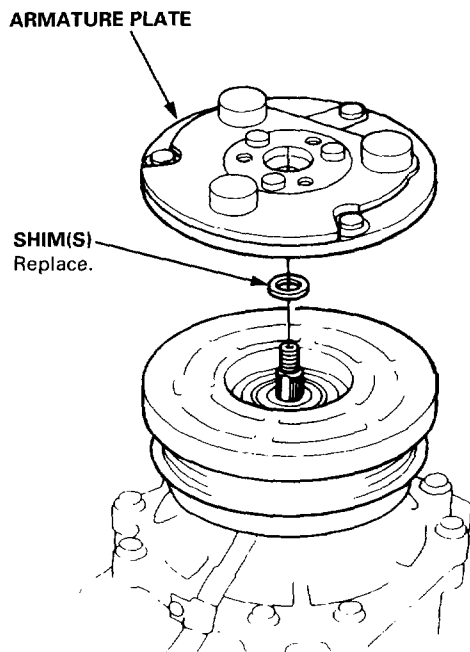
# Compressor (SANDEN)

## Clutch Overhaul

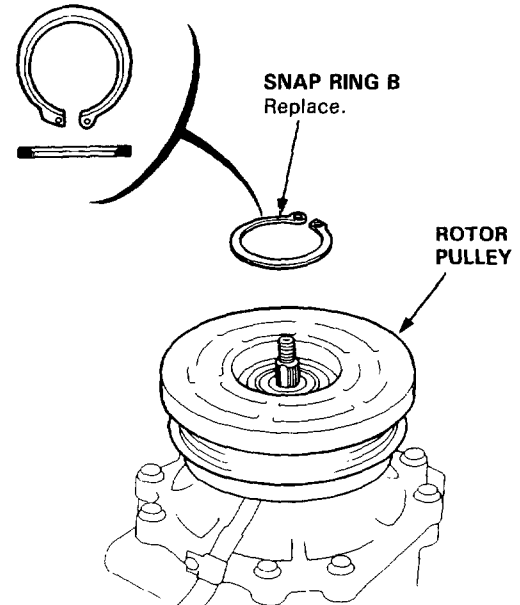
1. Remove the center nut while holding the armature plate with the special tool.



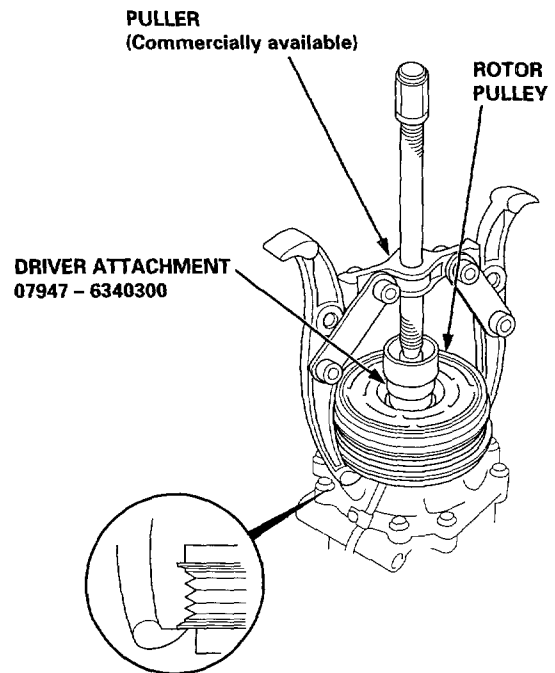
2. Remove the armature plate by pulling it up by hand.

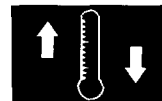


3. Remove the snap ring B with snap ring pliers. Be careful not to damage the rotor pulley and compressor.

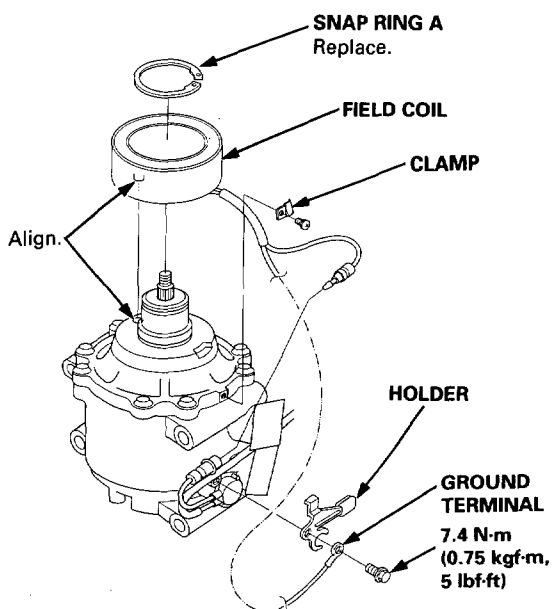


4. Remove the rotor pulley from the shaft with the tools. Be sure the claws of the puller are on the back of the rotor pulley, not on the belt area; otherwise the rotor pulley can be damaged.



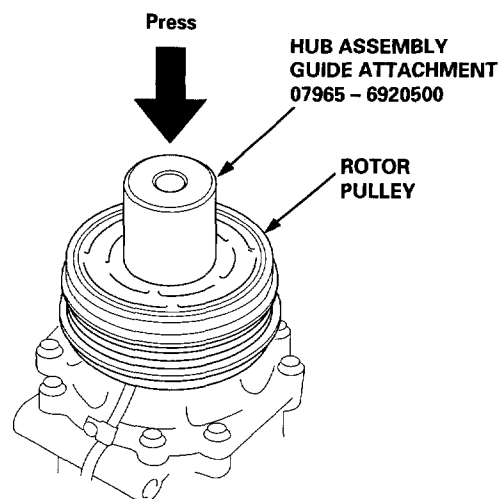


5. Remove the bolt and holder, and screw and clamp, then disconnect the field coil connector. Remove the snap ring A with snap ring pliers, then remove the field coil. Be careful not to damage the field coil and compressor.



6. Position the rotor pulley squarely over the field coil. Press the rotor pulley onto the compressor boss with the special tool. If the rotor pulley does not press on straight, remove it, and check the rotor pulley and compressor boss for burrs or damage.

**Maximum press load: 39,200 kPa (400 kgf/cm<sup>2</sup>, 5,690 psi)**

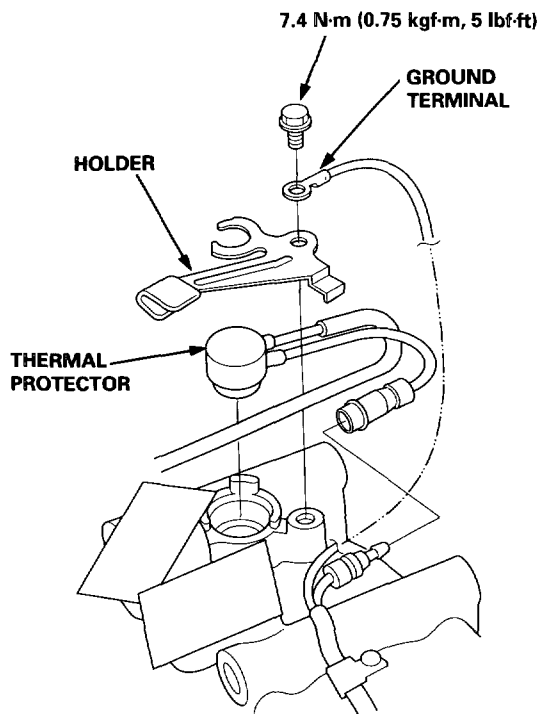


7. Reassemble the compressor clutch in the reverse order of disassembly, and note these items:
  - Install the field coil with the wire side facing down.
  - Clean the rotor pulley and compressor sliding surfaces with non-petroleum solvent.
  - Install new snap rings, and make sure they are fully seated in the groove.
  - Make sure that the rotor pulley turns smoothly after it's reassembled.
  - Route and clamp the wires properly or they can be damaged by the rotor pulley.

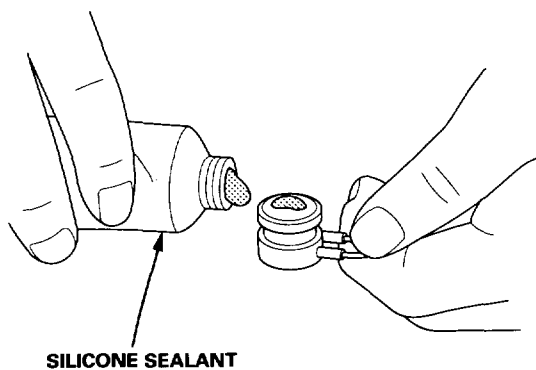
# Compressor (SANDEN)

## Thermal Protector Replacement

1. Remove the bolt, the ground terminal and the holder. Disconnect the field coil connector, then remove the thermal protector.



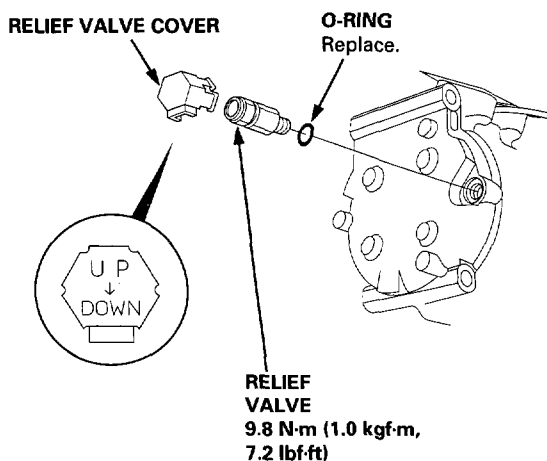
2. Replace the thermal protector with a new one, and apply silicone sealant to the bottom of the thermal protector.



3. Install in the reverse order of removal.

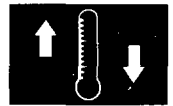
## Relief Valve Replacement

1. Discharge the refrigerant (see page 22-41).
2. Remove the relief valve cover, the relief valve and the O-ring. Plug the opening to keep foreign matter from entering the system and the compressor oil from running out.



3. Clean the mating surfaces.
4. Replace the O-ring with a new one at the relief valve, and apply a thin coat of refrigerant oil before installing it.
5. Remove the plug, and install and tighten the relief valve.
6. Put the cover on the relief valve so that the arrow directs downwards as shown in the illustration above.
7. Charge the system (see page 22-43), and test its performance (see page 22-22).

# A/C Compressor Belt



## Adjustment

### Deflection Method

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

#### A/C Compressor Belt

##### Used Belt: B18C4 engine

7.5 – 9.5 mm (0.30 – 0.37 in)

##### Except B18C4 engine

7.5 – 9.5 mm (0.30 – 0.37 in)

##### New Belt: B18C4 engine

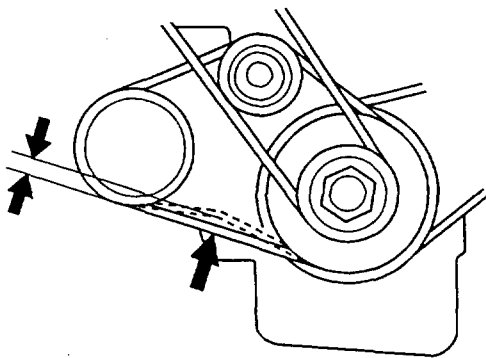
5.0 – 7.0 mm (0.20 – 0.28 in)

##### Except B18C4 engine

5.0 – 6.5 mm (0.20 – 0.26 in)

Note these items when adjusting belt tension:

- If there are cracks or any damage evident on the belt, replace it with a new one.
  - "Used belt" means a belt which has been used for five minutes or more.
  - "New belt" means a belt which has been used for less than five minutes.
2. Loosen the pivot bolt of the idler pulley bracket and the lock nut of the adjusting bolt (DENSO), or the center nut of the idler pulley (SANDEN).
  3. Turn the adjusting bolt to get proper belt tension.
  4. Retighten the pivot bolt of the idler pulley bracket and the lock nut of the adjusting bolt (DENSO), or the center nut of the idler pulley (SANDEN).
  5. Recheck the deflection of the A/C compressor belt.



### Tension Gauge Method

1. Attach the special tool to the A/C compressor belt as shown below, and measure the tension of the belt.

#### A/C Compressor Belt

##### Used Belt: B18C4 engine

390 – 540 N (40 – 55 kgf, 88 – 120 lbf)

##### Except B18C4 engine

340 – 490 N (35 – 50 kgf, 77 – 110 lbf)

##### New Belt: B18C4 engine

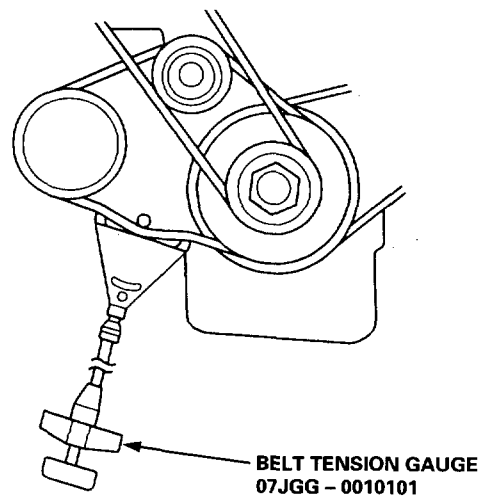
740 – 880 N (75 – 90 kgf, 170 – 200 lbf)

##### Except B18C4 engine

690 – 830 N (70 – 85 kgf, 150 – 190 lbf)

Note these items when adjusting belt tension:

- Follow the manufacturer's instructions for the belt tension gauge.
  - If there are cracks or any damage evident on the belt, replace it with a new one.
  - "Used belt" means a belt which has been used for five minutes or more.
  - "New belt" means a belt which has been used for less than five minutes.
2. Loosen the pivot bolt of the idler pulley bracket and the lock nut of the adjusting bolt (DENSO), or the center nut of the idler pulley (SANDEN).
  3. Turn the adjusting bolt to get proper belt tension.
  4. Retighten the pivot bolt of the idler pulley bracket and the lock nut of the adjusting bolt (DENSO), or the center nut of the idler pulley (SANDEN).
  5. Recheck the tension of the A/C compressor belt.

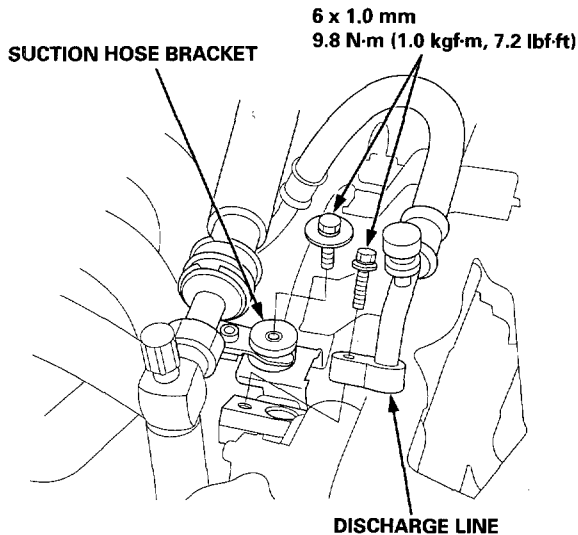


# Condenser

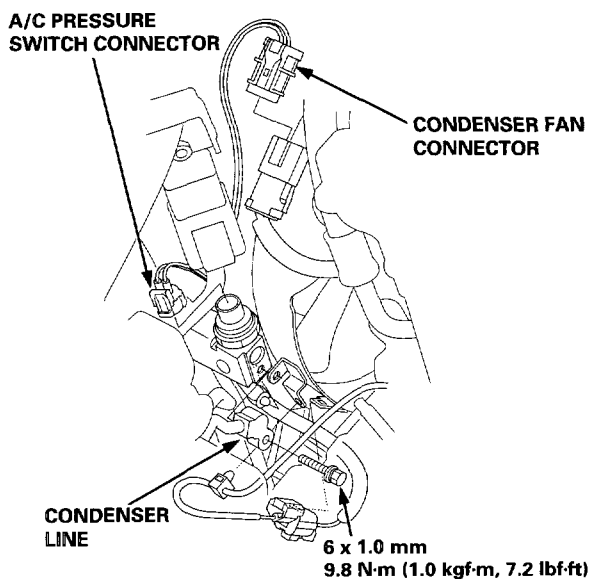
## Replacement

NOTE: LHD type is shown, LHD type is similar.

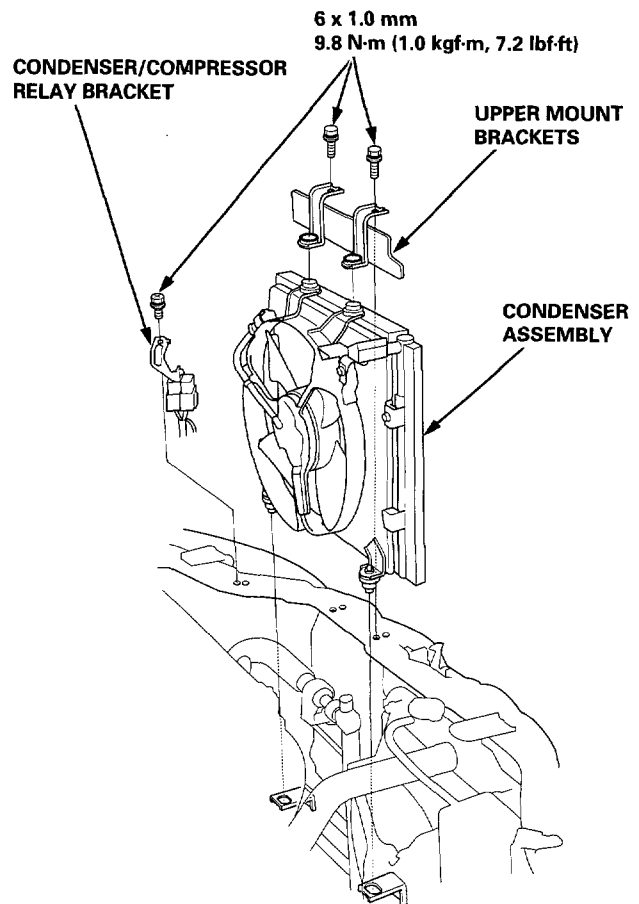
1. Discharge the refrigerant (see page 22-41).
2. Remove the bolt from the suction hose bracket. Remove the bolt, then disconnect the discharge line from the condenser. Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



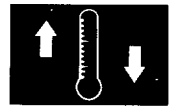
3. Disconnect the condenser fan and A/C pressure switch connectors. Remove the wire harness clips and the compressor clutch connector from the condenser fan shroud. Remove the bolt, then disconnect the condenser line from the condenser. Plug or cap the lines immediately after disconnecting them to avoid moisture and dust contamination.



4. Disconnect the suction and discharge lines from the compressor (see page 22-26 (DENSO) or 22-32 (SANDEN)).
5. Remove the condenser/compressor relay bracket bolt. Remove the bolts and the upper mount brackets, then remove the condenser assembly by lifting it up. Be careful not to damage the condenser fins when removing the condenser assembly.



6. Install in the reverse order of removal, and note these items:
  - If you're installing a new condenser, add refrigerant oil (DENSO ND-OIL 8 or SANDEN SP-10) (see page 22-19).
  - Replace the O-rings with new ones at each fitting, and apply a thin coat of refrigerant oil before installing them. Be sure to use the right O-rings for HFC-134a (R-134a) to avoid leakage.
  - Be careful not to damage the condenser fins when installing the condenser.
  - Charge the system (see page 22-43), and test its performance (see page 22-22).



## Discharge

### ⚠ CAUTION

- Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- Be careful when connecting service equipment.
- Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioning systems should not be pressure tested or leak tested with compressed air.

### ⚠ WARNING

- Compressed air mixed with R-134a forms a combustible vapor.
- The vapor can burn or explode causing serious injury.
- Never use compressed air to pressure test R-134a service equipment or vehicle air conditioning systems.

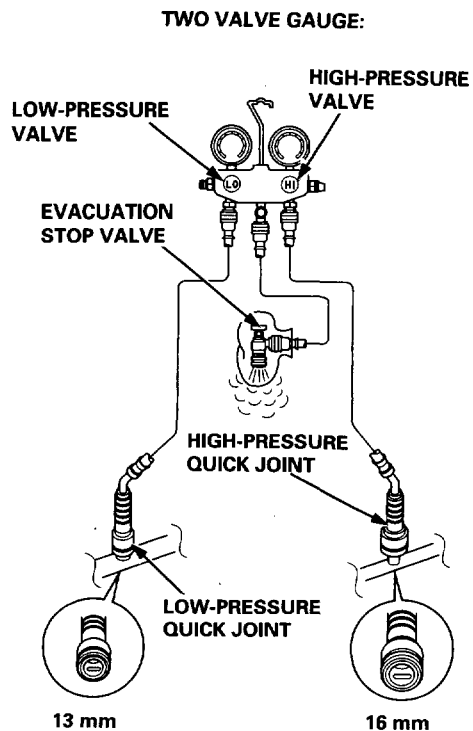
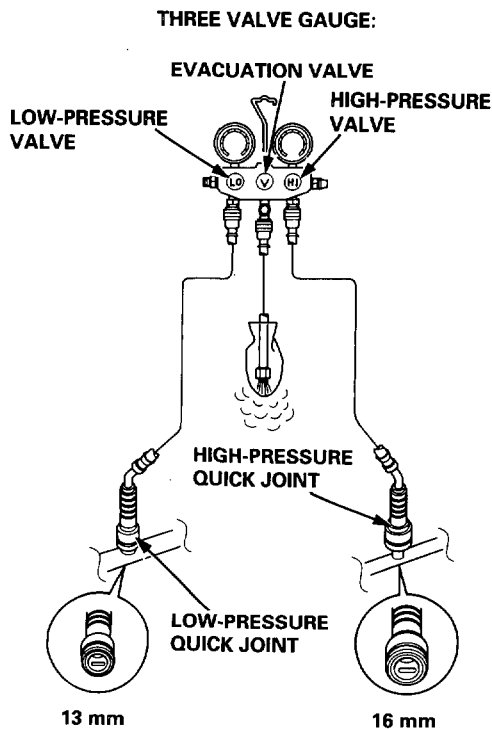
Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

NOTE: Use only a gauge set for refrigerant HFC-134a (R-134a).

1. Connect the R-134a gauge set as shown.
2. Disconnect the center hose of the gauge set, and place the free end in a shop towel.
3. Open the evacuation valve (two valve gauge: evacuation stop valve).
4. Slowly open the high-pressure 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.

**NOTICE** If refrigerant is allowed to escape too fast, compressor oil will be drawn out of the system.

5. After the high-pressure gauge reading has dropped below 980 kPa (10 kgf/cm<sup>2</sup>, 140 psi), open the low side valve to discharge both high and low sides of the system.
6. Note the gauge reading, and as system pressure drops, gradually open both high and low side valves fully until both gauges indicate 0 kPa (0 kgf/cm<sup>2</sup>, 0 psi).





# A/C System Service

## Evacuation

### NOTE:

- Use only a gauge set for refrigerant HFC-134a (R-134a).
- Use a vacuum pump adapter which is equipped with a check valve to prevent the backflow of the vacuum pump oil.

### CAUTION

- Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- Be careful when connecting service equipment.
- Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a R-134a refrigerant vacuum pump. (If the system has been open for several days, the receiver/dryer should be replaced.)

2. Connect the R-134a gauge set, pump and refrigerant containers (cans of R-134a) as shown.

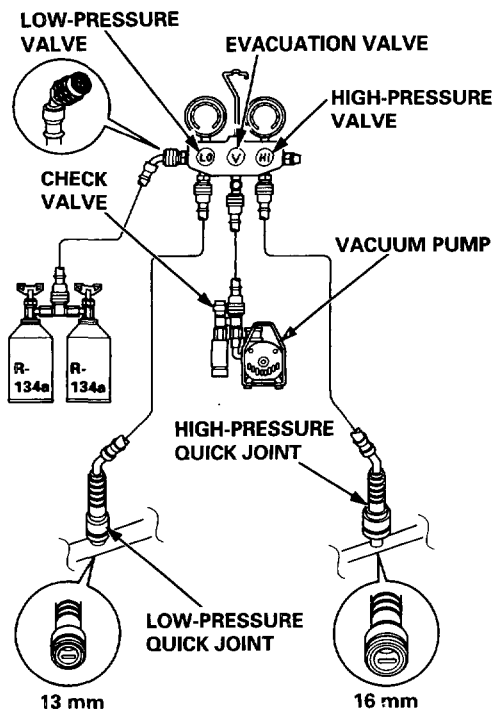
NOTE: Do not open the cans.

3. Start the pump, then open both pressure valves and the evacuation valve (two valve gauge: evacuation stop valve). Run the pump for about 15 minutes.
4. Close both pressure valves and the evacuation valve (two valve gauge: evacuation stop valve), and stop the pump. The low-pressure gauge should indicate above 93.3 kPa (700 mmHg, 27.6 in-Hg), and remain steady with the valves closed.

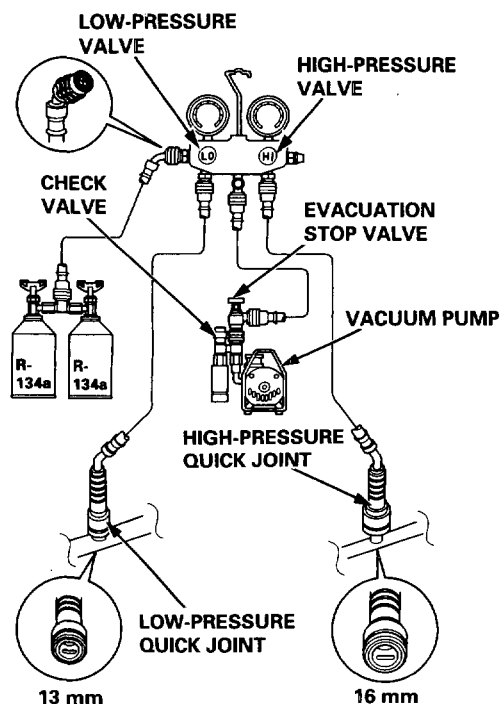
NOTE: If the low pressure does not reach more than 93.3 kPa (700 mmHg, 27.6 in-Hg) in 15 minutes, there is probably a leak in the system. Check for leaks, and repair (see Leak Test).

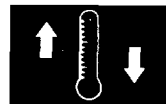
5. If there are no leaks, open the valves and continue pumping for at least another 15 minutes. Then close both valves, and stop the pump.

THREE VALVE GAUGE:



TWO VALVE GAUGE:





## Charging

### NOTE:

- Use only a gauge set for refrigerant HFC-134a (R-134a).
- Use a vacuum pump adapter which is equipped with a check valve to prevent the backflow of the vacuum pump oil.

### CAUTION

- Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- Be careful when connecting service equipment.
- Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioning systems should not be pressure tested or leak tested with compressed air.

### WARNING

- Compressed air mixed with R-134a forms a combustible vapor.
- The vapor can burn or explode causing serious injury.
- Never use compressed air to pressure test R-134a service equipment or vehicle air conditioning systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

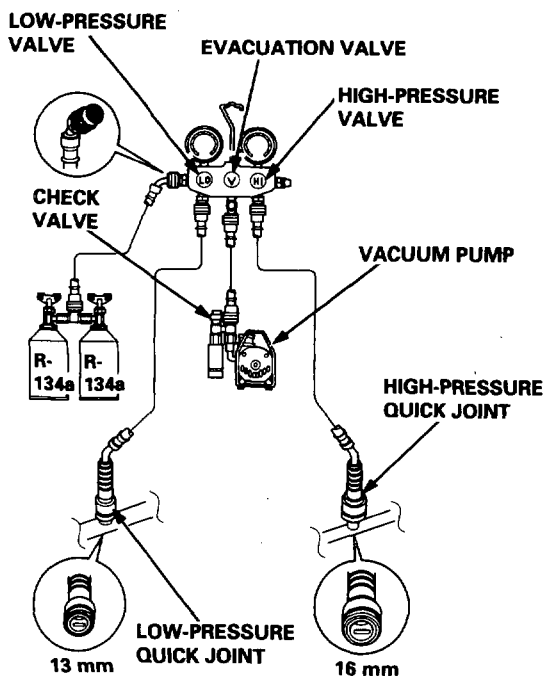
1. After the leak test, check that the high-pressure valve is closed, and start the engine.  
NOTE: Run the engine below 1,500 rpm (min<sup>-1</sup>).
2. Open the front door.  
Turn the A/C switch ON.  
Set the temperature control dial to MAX COOL.  
Set the mode control dial to VENT.  
Turn the fan switch to MAX.
3. Open the low-pressure valve, and charge with R-134a refrigerant.

### WARNING

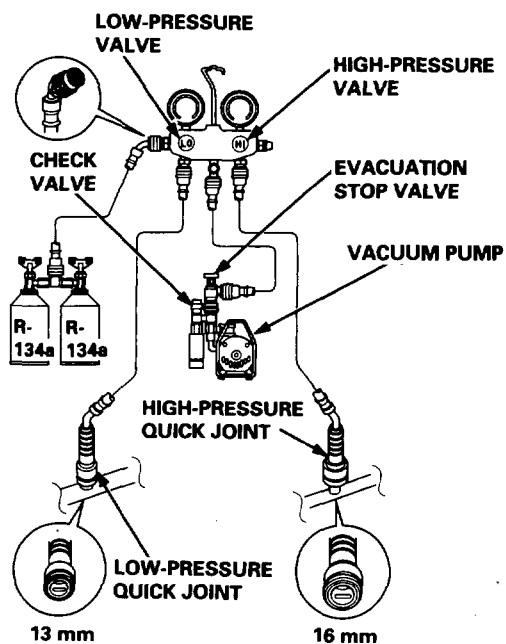
- Do not open the high-pressure valve.
- Do not turn the cans upside down.

4. Charge the system with refrigerant capacity. Do not overcharge the system; the compressor will be damaged.  
**Refrigerant capacity: 550 ±<sub>50</sub> g (19.4 ±<sub>1.8</sub> oz)**
5. When fully charged, close the low-pressure valve and the refrigerant cans. Check the system.
6. Stop the engine, and disconnect the charge hose quickly.
7. Check the system for leaks using a leak detector proper to refrigerant R-134a.  
NOTE: Particularly check for leaks around the compressor, condenser and receiver/dryer.

THREE VALVE GAUGE:



TWO VALVE GAUGE:



# A/C System Service

## Leak Test

### CAUTION

- Air conditioning refrigerant or lubricant vapor can irritate your eyes, nose, or throat.
- Be careful when connecting service equipment.
- Do not breathe refrigerant or vapor.

If accidental system discharge occurs, ventilate work area before resuming service.

R-134a service equipment or vehicle air conditioning systems should not be pressure tested or leak tested with compressed air.

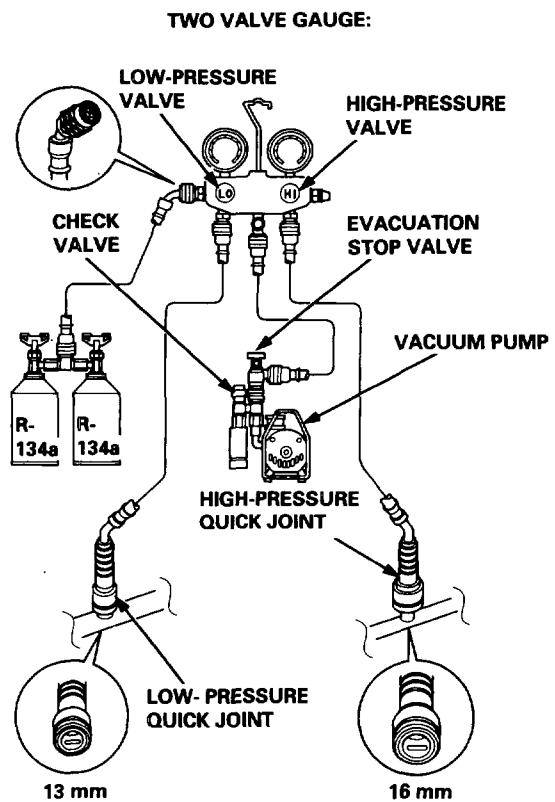
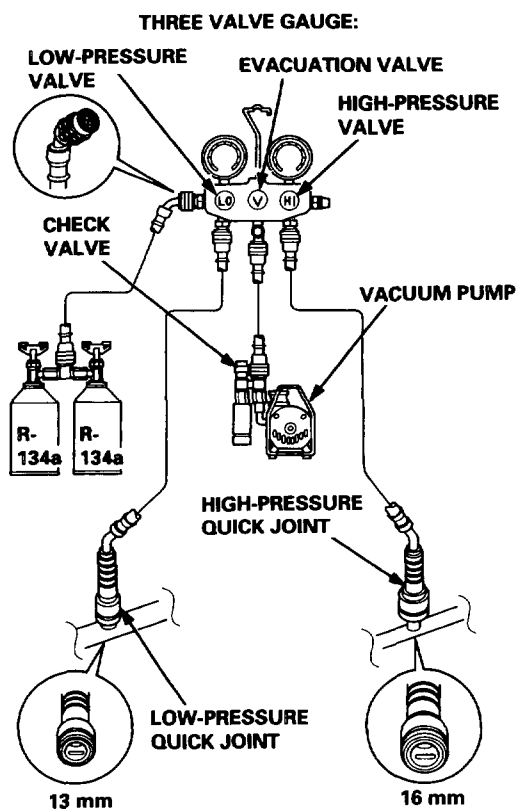
### WARNING

- Compressed air mixed with R-134a forms a combustible vapor.
- The vapor can burn or explode causing serious injury.
- Never use compressed air to pressure test R-134a service equipment or vehicle air conditioning systems.

Additional health and safety information may be obtained from the refrigerant and lubricant manufacturers.

### NOTE:

- Use only a gauge set for refrigerant HFC-134a (R-134a).
  - Use a vacuum pump adapter which is equipped with a check valve to prevent the backflow of the vacuum pump oil.
1. Close the evacuation valve (two valve gauge: evacuation stop valve).
  2. Open the cans.
  3. Open the high-pressure valve to charge the system to about 98 kPa (1.0 kgf/cm<sup>2</sup>, 14 psi), then close it.  
NOTE: Close the low-pressure valve.
  4. Check the system for leaks using a leak detector proper to refrigerant R-134a.  
NOTE: Particularly check for leaks around the compressor, condenser and receiver/dryer.
  5. If you find any leaks, tighten the joint nuts and bolts to the specified torque.
  6. Recheck the system for leaks using a leak detector.
  7. If you find leaks that require the system to be opened (to repair or replace hoses, fittings, etc.), release any charge in the system.
  8. After checking and repairing leaks, the system must be evacuated (see System Evacuation on page 22-42).



## **SUPPLEMENTAL RESTRAINT SYSTEM (SRS) (If electrical maintenance is required)**

Some types of this model has an SRS which includes a driver's airbag located in the steering wheel hub and a passenger's airbag located in the dashboard above the glove box and seat belt tensioner located in the seat belt retractors. Information necessary to safely service the SRS is included in this Shop Manual.

Items marked with an asterisk (\*) on the contents page include, or are located near, SRS components. Servicing, disassembling or replacing these items will require special precautions and tools, and should therefore be done by an authorized Honda dealer.

### **⚠ WARNING**

- To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all SRS service work must be performed by an authorized Honda dealer.
- Improper service procedures, including incorrect removal and installation of the SRS, could lead to personal injury caused by unintentional deployment of the airbags.
- All SRS electrical wiring harnesses are covered with yellow insulation. Related components are located in the steering column, front console, dashboard, dashboard lower panel, and in the dashboard above the glove box. Do not use electrical test equipment on these circuits.
- Before trying to remove the seat belt tensioner, first set the sensor lock pin to LOCK position.









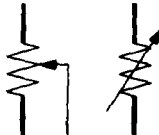

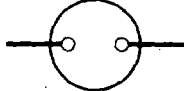










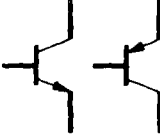


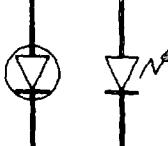
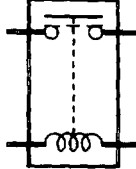
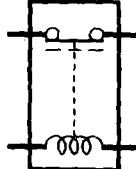



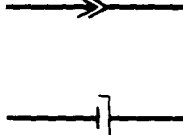

## **Electrical**

<b>Locations .....</b>	<b>23-A-1</b>
<b>Power and Ground Distributions .....</b>	<b>23-B-1</b>
<b>Gauges .....</b>	<b>23-C-1</b>
<b>Lighting System .....</b>	<b>23-D-1</b>
<b>Controls .....</b>	<b>23-E-1</b>
<b>Instruments .....</b>	<b>23-F-1</b>
<b>Security .....</b>	<b>23-G-1</b>



# Troubleshooting

## Schematic Symbols

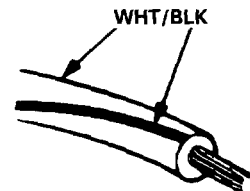
<b>BATTERY</b>  	<b>GROUND</b> Ground terminal  Component ground 		<b>FUSE</b> 	<b>COIL, SOLENOID</b> 	<b>CIGARETTE LIGHTER</b> 
<b>RESISTOR</b> 	<b>VARIABLE RESISTOR</b> 	<b>THERMISTOR</b> 	<b>IGNITION SWITCH</b> 	<b>BULB</b> 	<b>HEATER</b> 
<b>MOTOR</b> 	<b>PUMP</b> 	<b>CIRCUIT BREAKER</b> 	<b>HORN</b> 	<b>DIODE</b> 	<b>SPEAKER, BUZZER</b> 
<b>ANTENNA</b> Mast  Window 		<b>TRANSISTOR (Tr)</b> 	<b>SWITCH (In normal position)</b> Normally open switch  Normally closed switch 		<b>LIGHT EMITTING DIODE (LED)</b> 
<b>RELAY (In normal position)</b> Normally open relay  Normally closed relay 		<b>CONDENSER</b> 	<b>CONNECTION</b> Input  Output 	<b>CONNECTOR</b> 	<b>REED SWITCH</b> 

## Wire Color Codes

The following abbreviations are used to identify wire colors in the circuit schematics:

WHT .....	White	PNK .....	Pink
YEL .....	Yellow	BRN .....	Brown
BLK .....	Black	GRY .....	Gray
BLU .....	Blue	PUR .....	Purple
GRN .....	Green	LT BLU .....	Light Blue
RED .....	Red	LT GRN .....	Light Green
ORN .....	Orange		

The wire insulation has one color or one color with another color stripe. The second color is the stripe.



NOTE: Different wires with the same color in the same system have been given number suffixes to distinguish them (for example, YEL<sup>1</sup> and YEL<sup>2</sup> are not the same).

## Locations

### Relay and Control Unit Locations

Engine Compartment .....	23-A-2
Dashboard .....	23-A-3
Rear/Roof .....	23-A-6
Door .....	23-A-7

### Wire Harness and Ground Locations

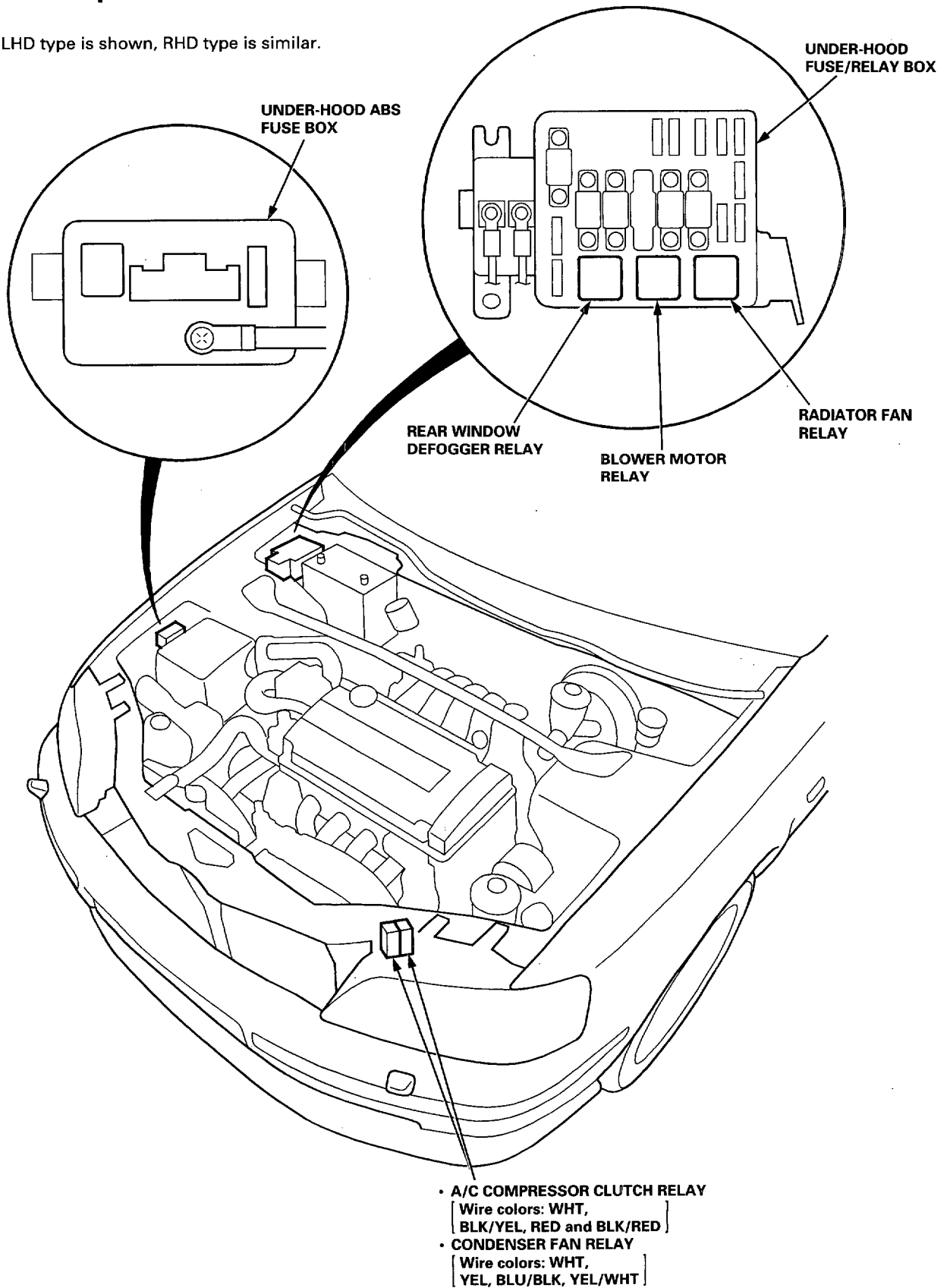
Engine Compartment .....	23-A-8
Dashboard .....	23-A-12
Floor/Rear .....	23-A-16
Floor/Roof .....	23-A-17
Tailgate .....	23-A-18
Door .....	23-A-19



# Relay and Control Unit Locations

## Engine Compartment

NOTE: LHD type is shown, RHD type is similar.

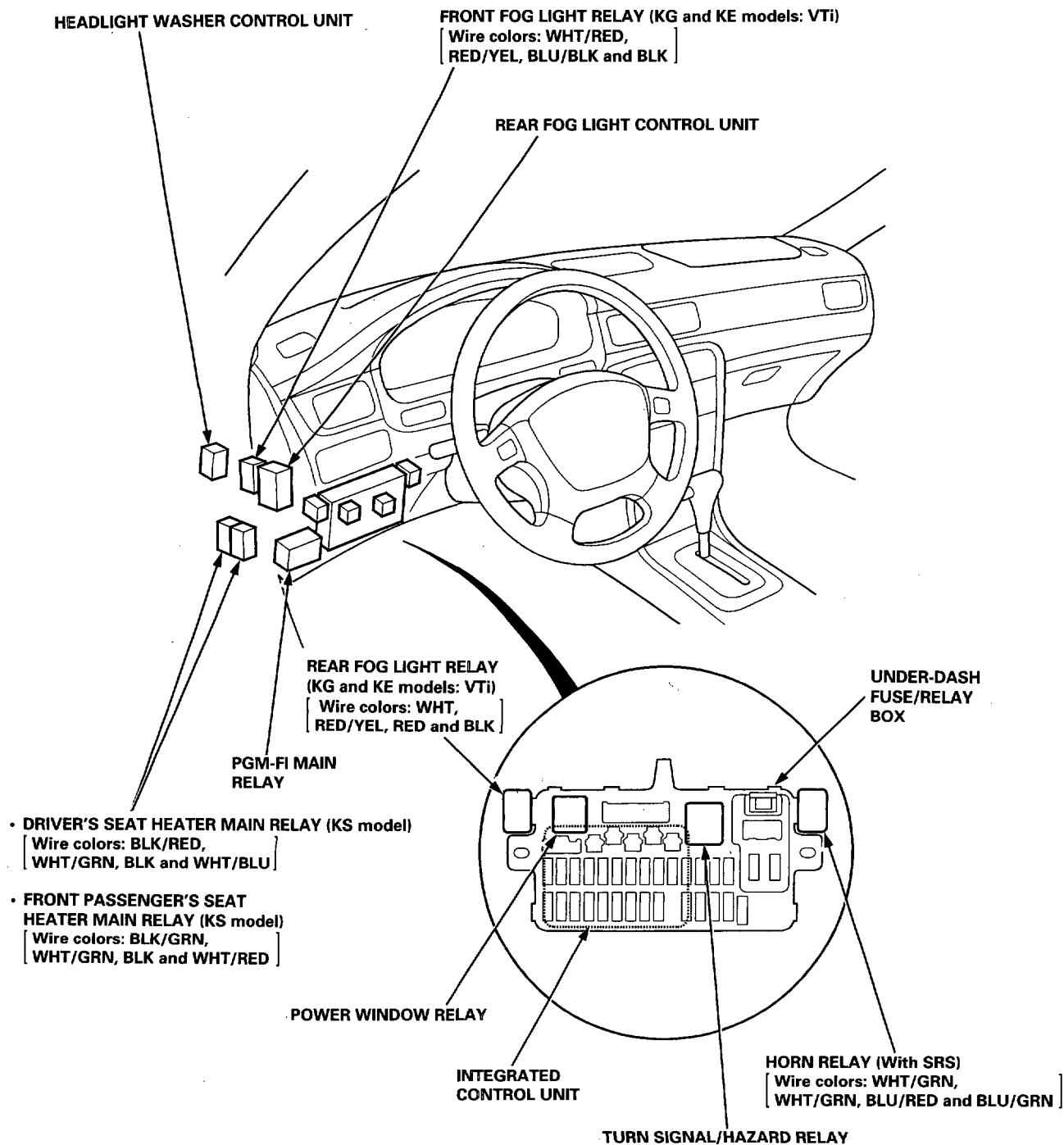






## Dashboard

NOTE: LHD type is shown, RHD type is similar.

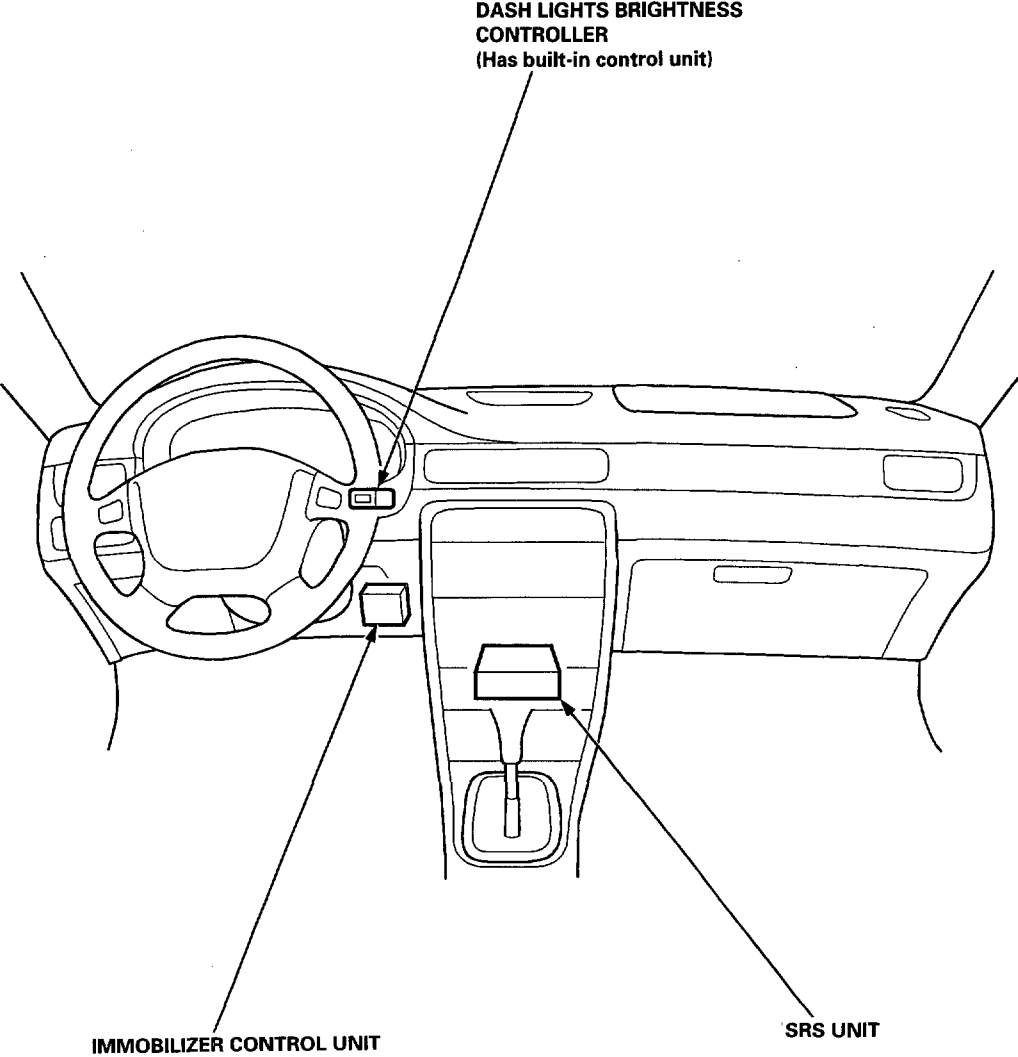


(cont'd)

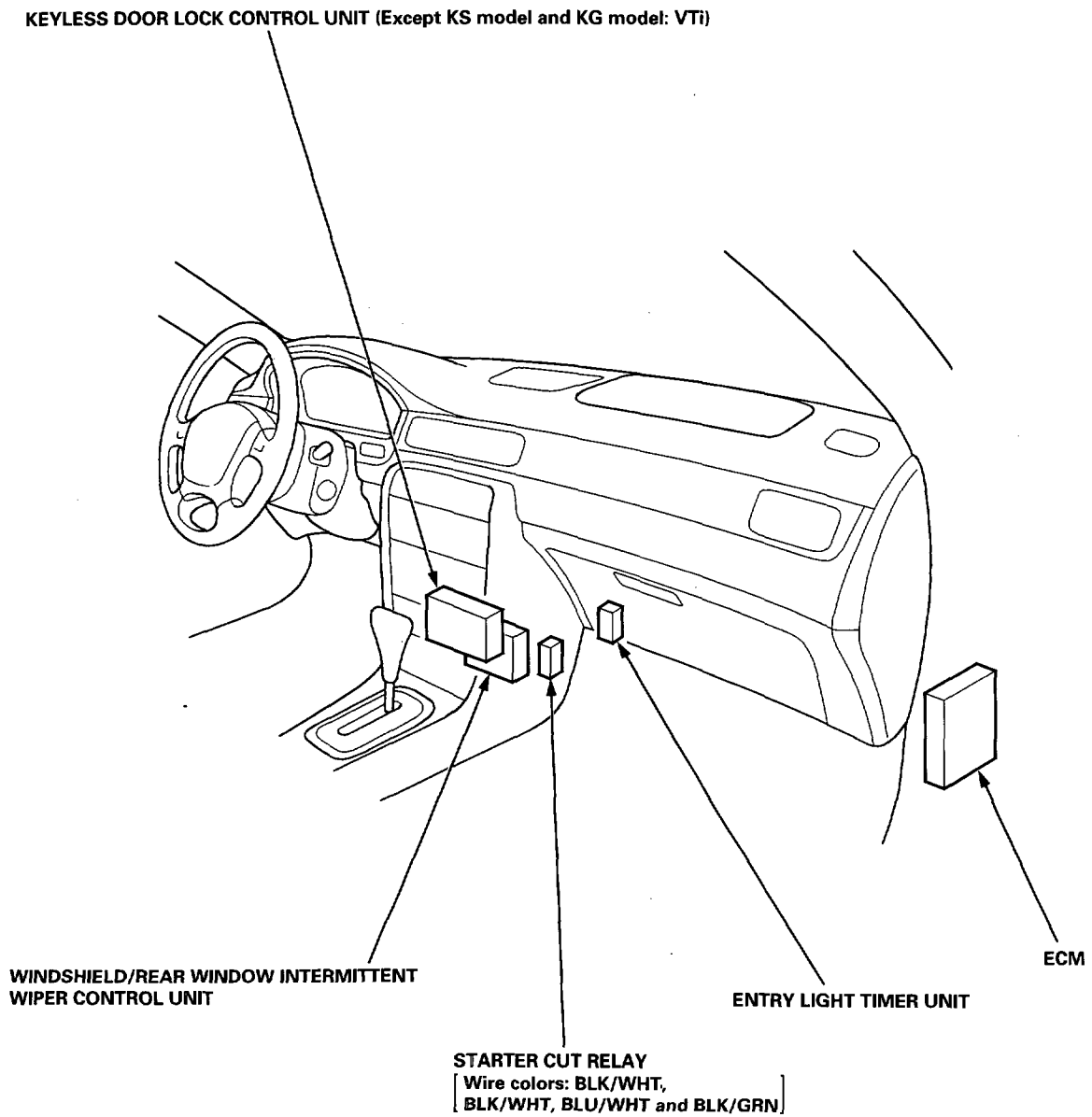
# Relay and Control Unit Locations

## Dashboard (cont'd)

NOTE: LHD type is shown, RHD type is similar.



NOTE: LHD type is shown, RHD type is similar.

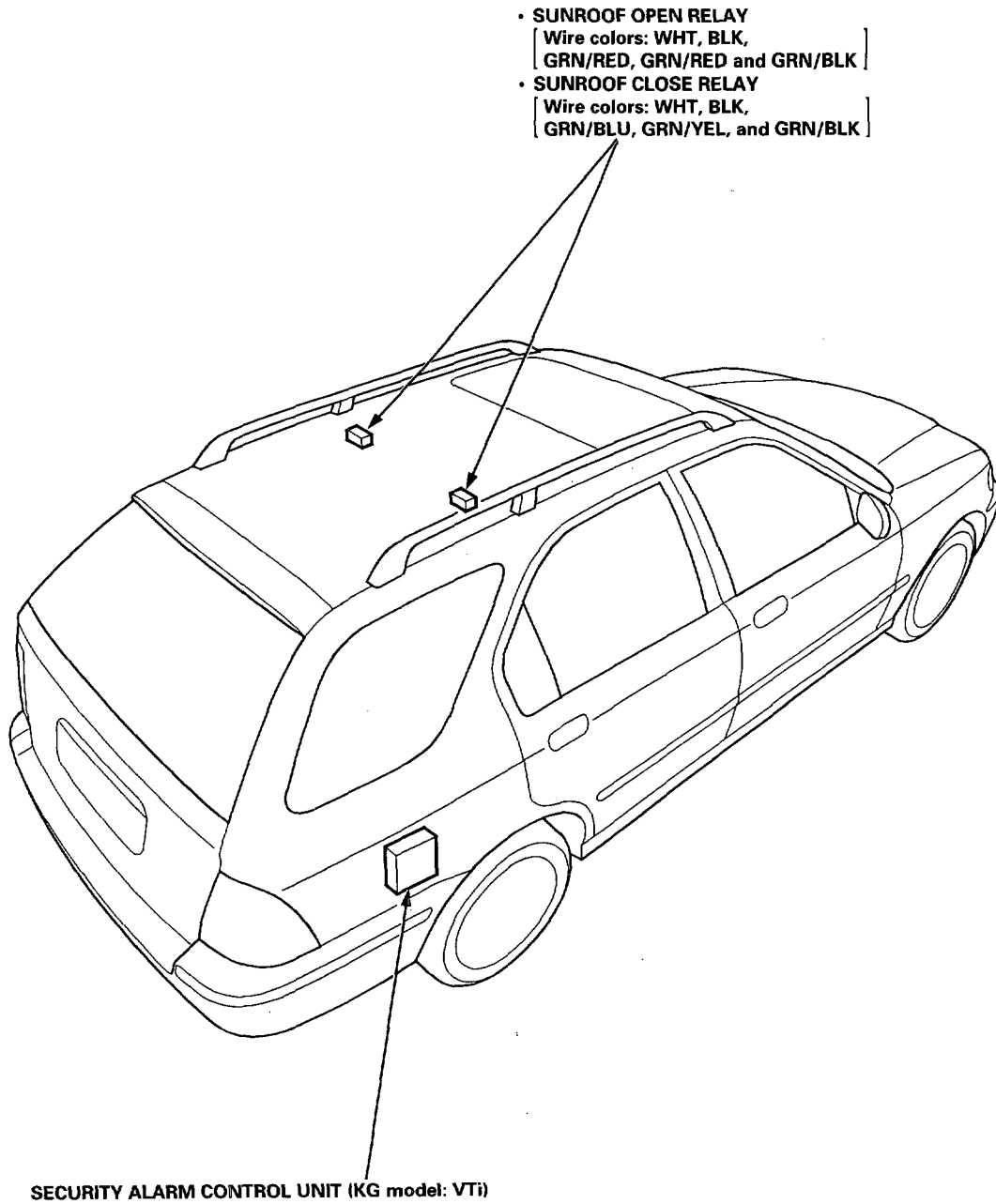


# Relay and Control Unit Locations

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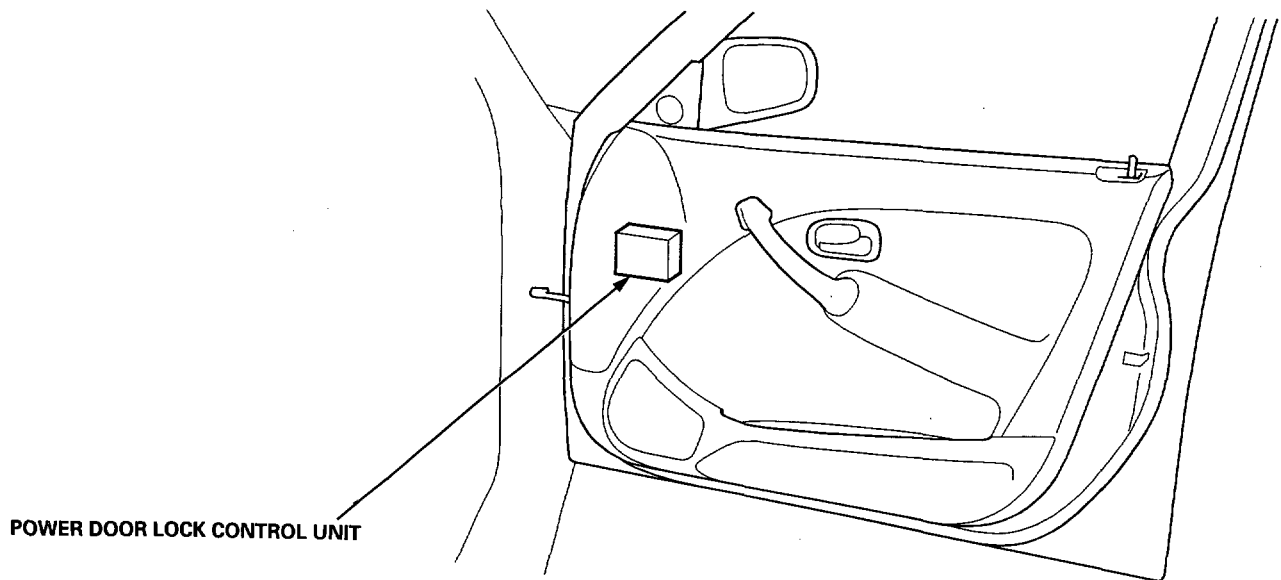
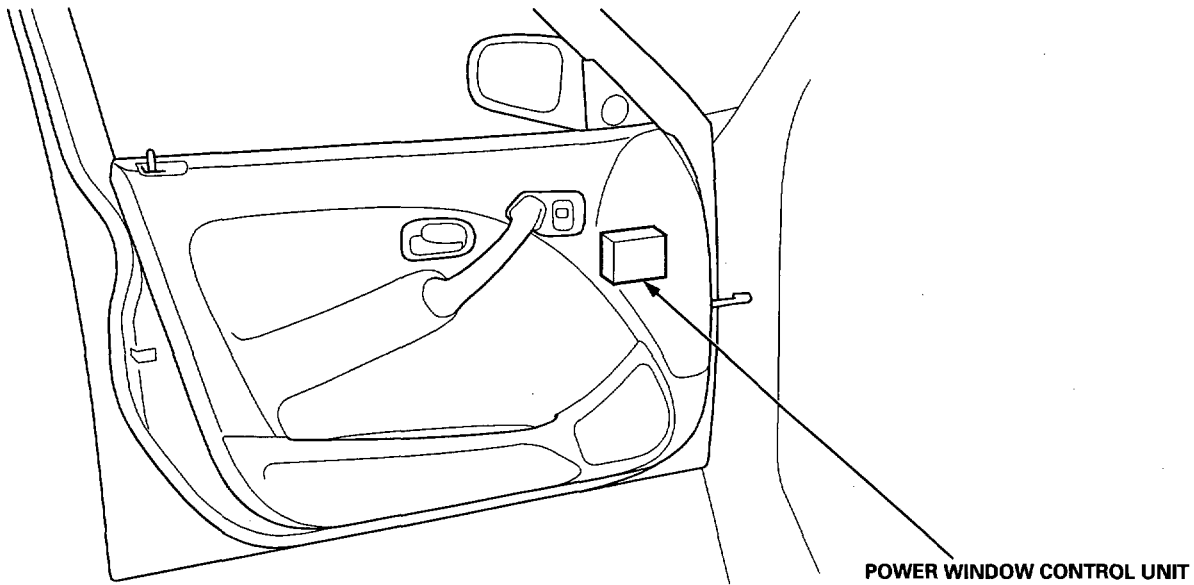
## Rear/Roof

NOTE: LHD type is shown, RHD type is similar.



## Door

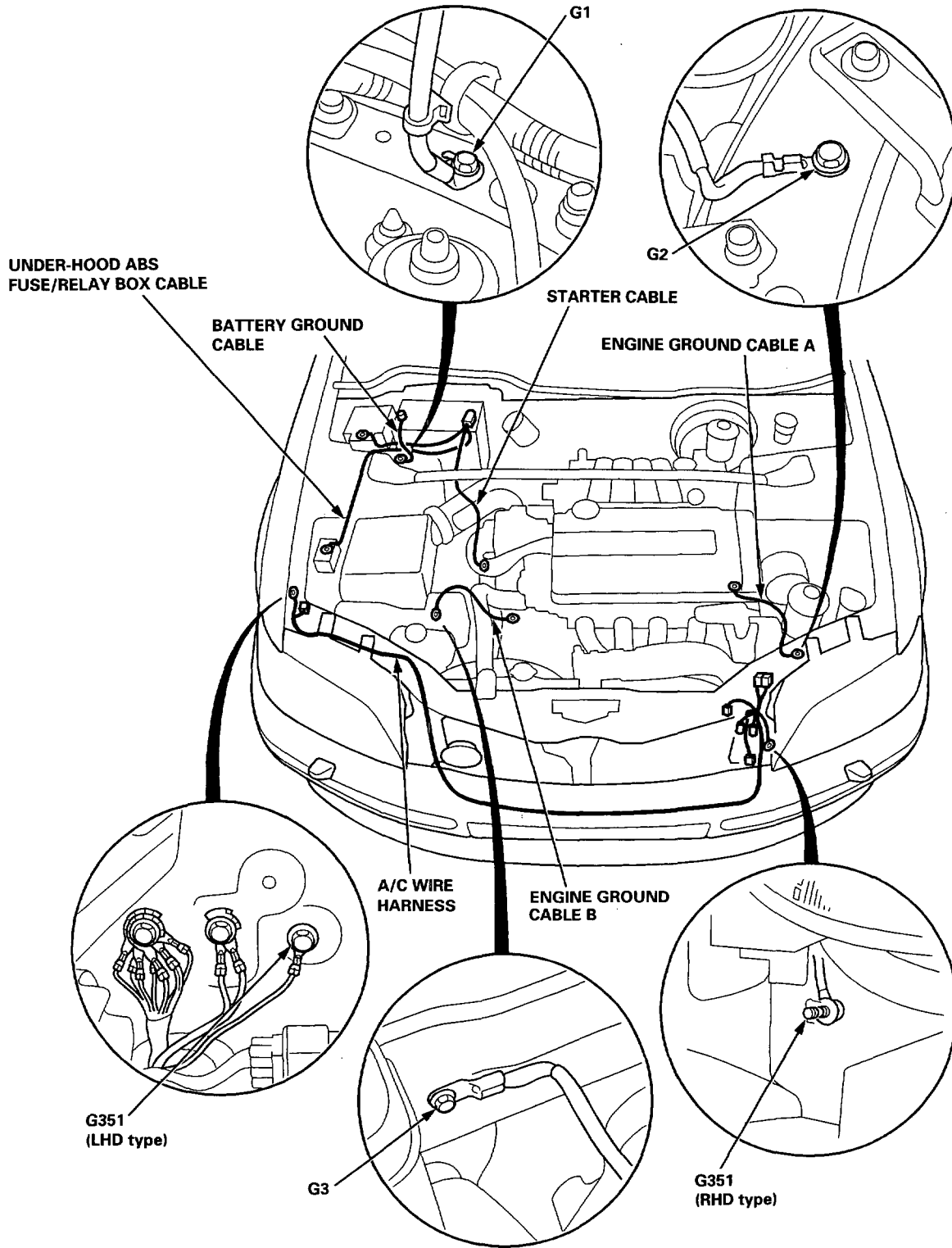
NOTE: LHD type is shown, RHD type is symmetrical.



# Wire Harness and Ground Locations

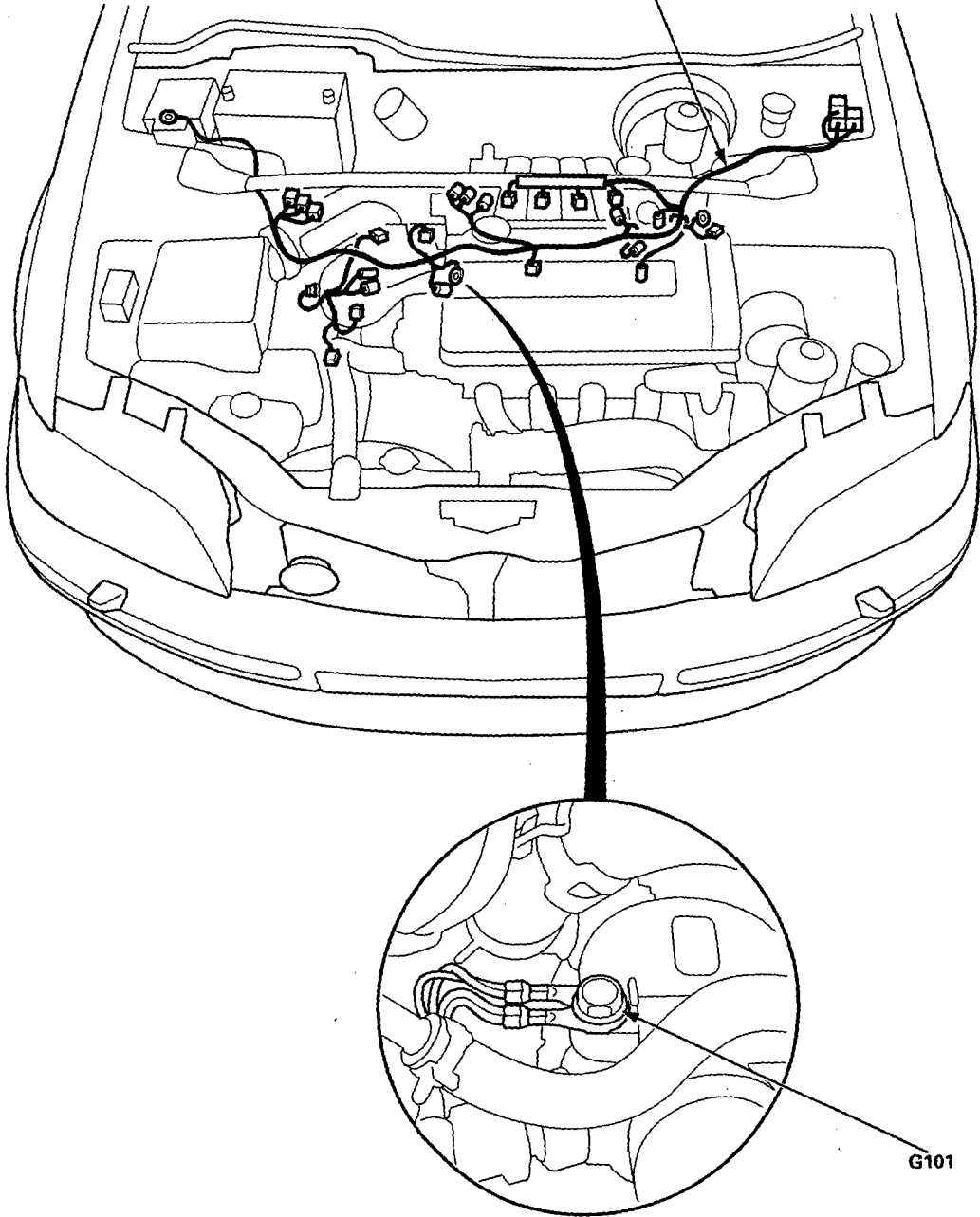
## Engine Compartment

NOTE: LHD type is shown, RHD type is similar.



NOTE: LHD type is shown, RHD type is similar.

ENGINE WIRE HARNESS

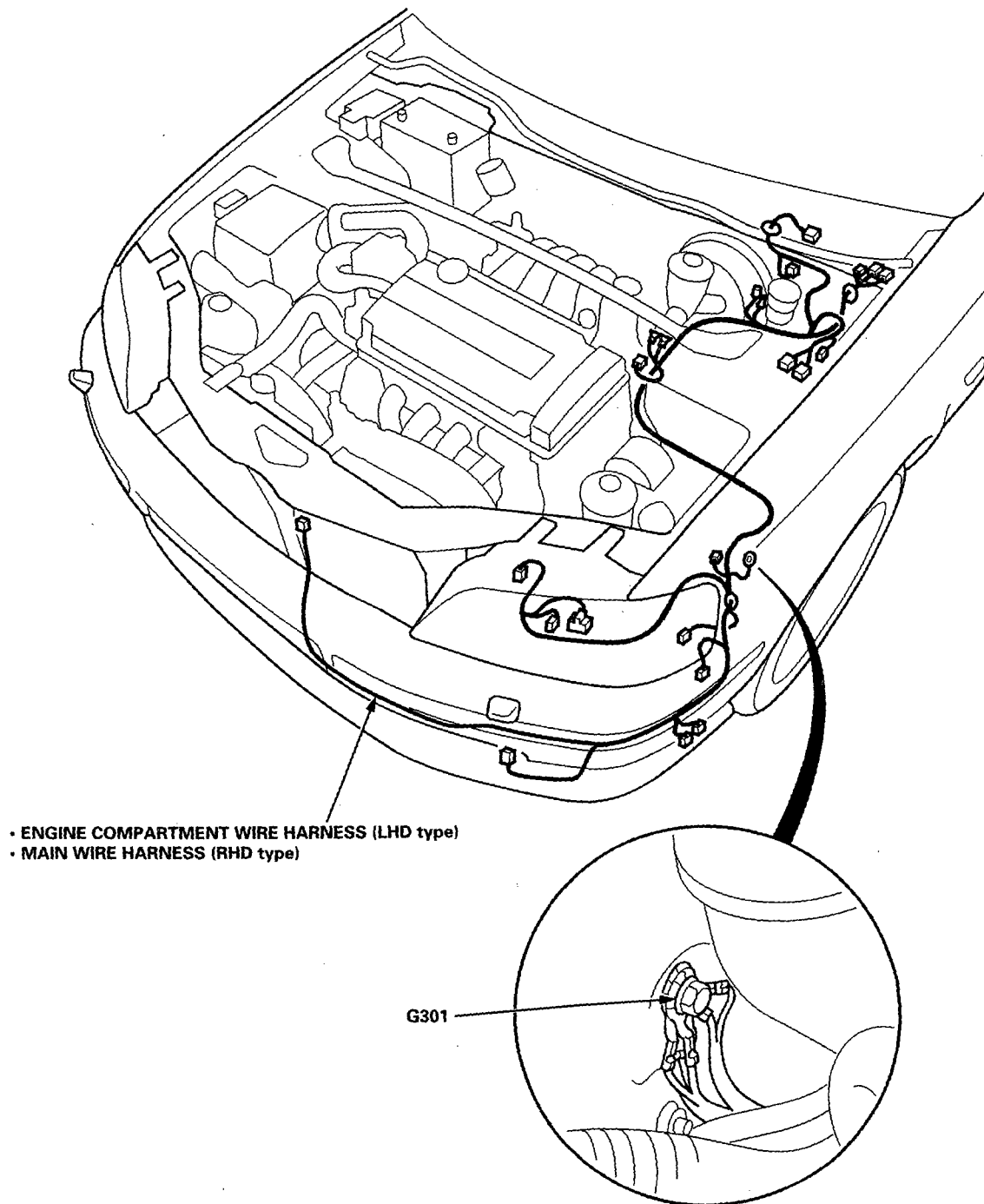


(cont'd)

# Wire Harness and Ground Locations

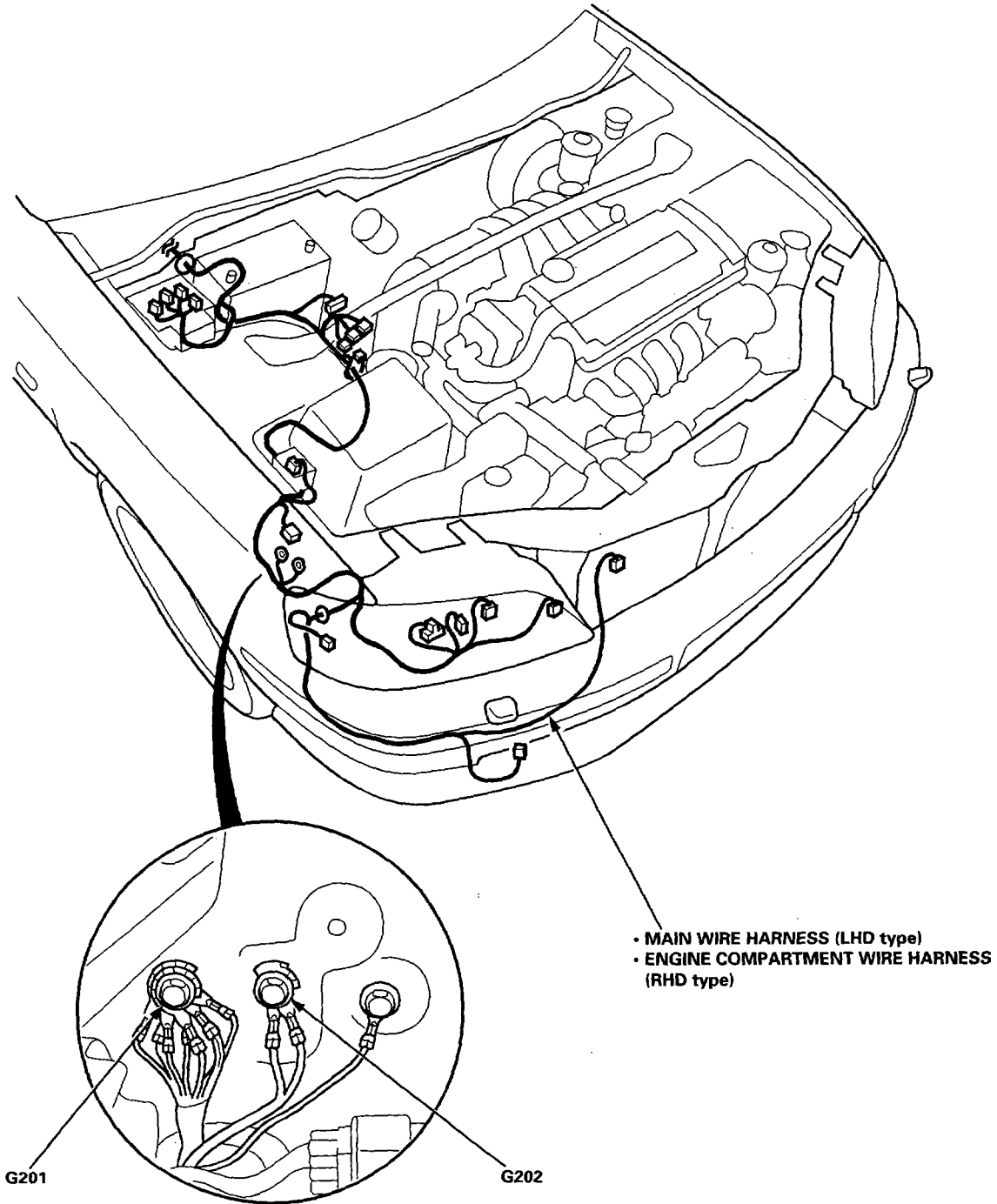
## Engine Compartment (cont'd)

NOTE: LHD type is shown, RHD type is similar.





NOTE: LHD type is shown, RHD type is similar.

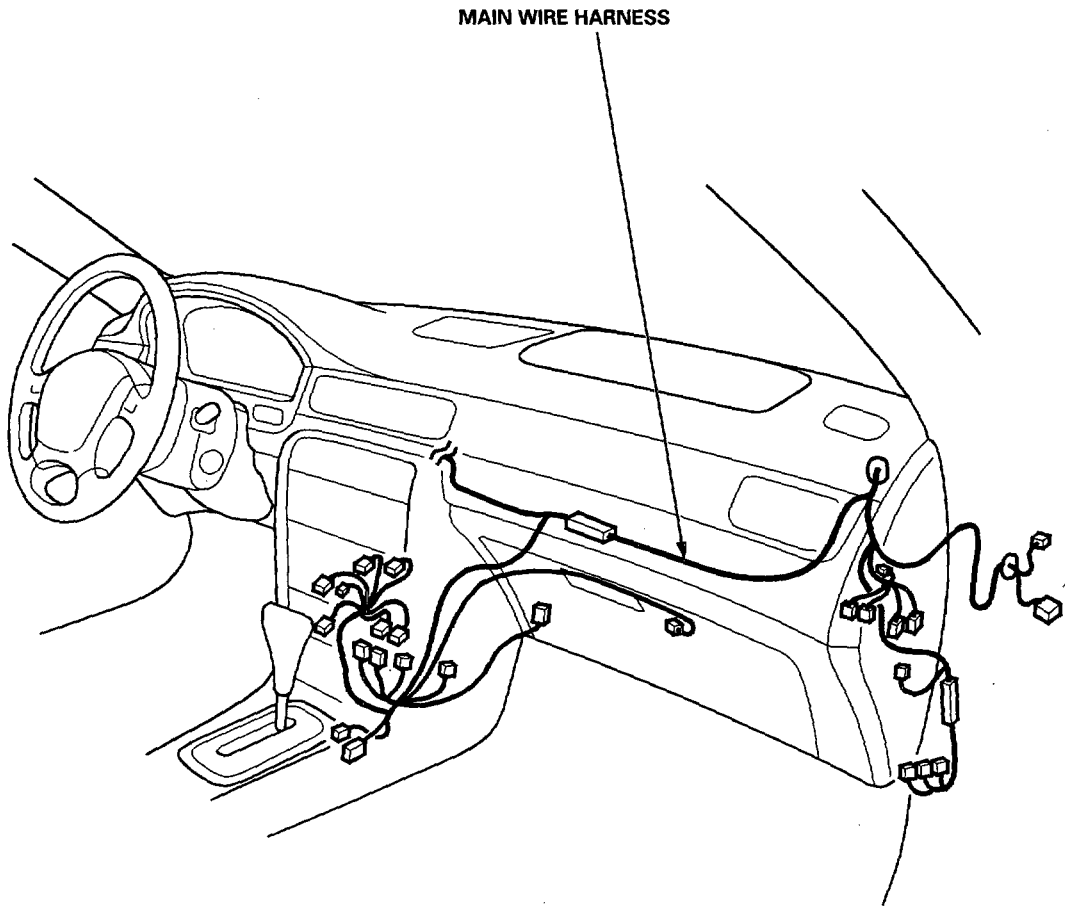


# Wire Harness and Ground Locations

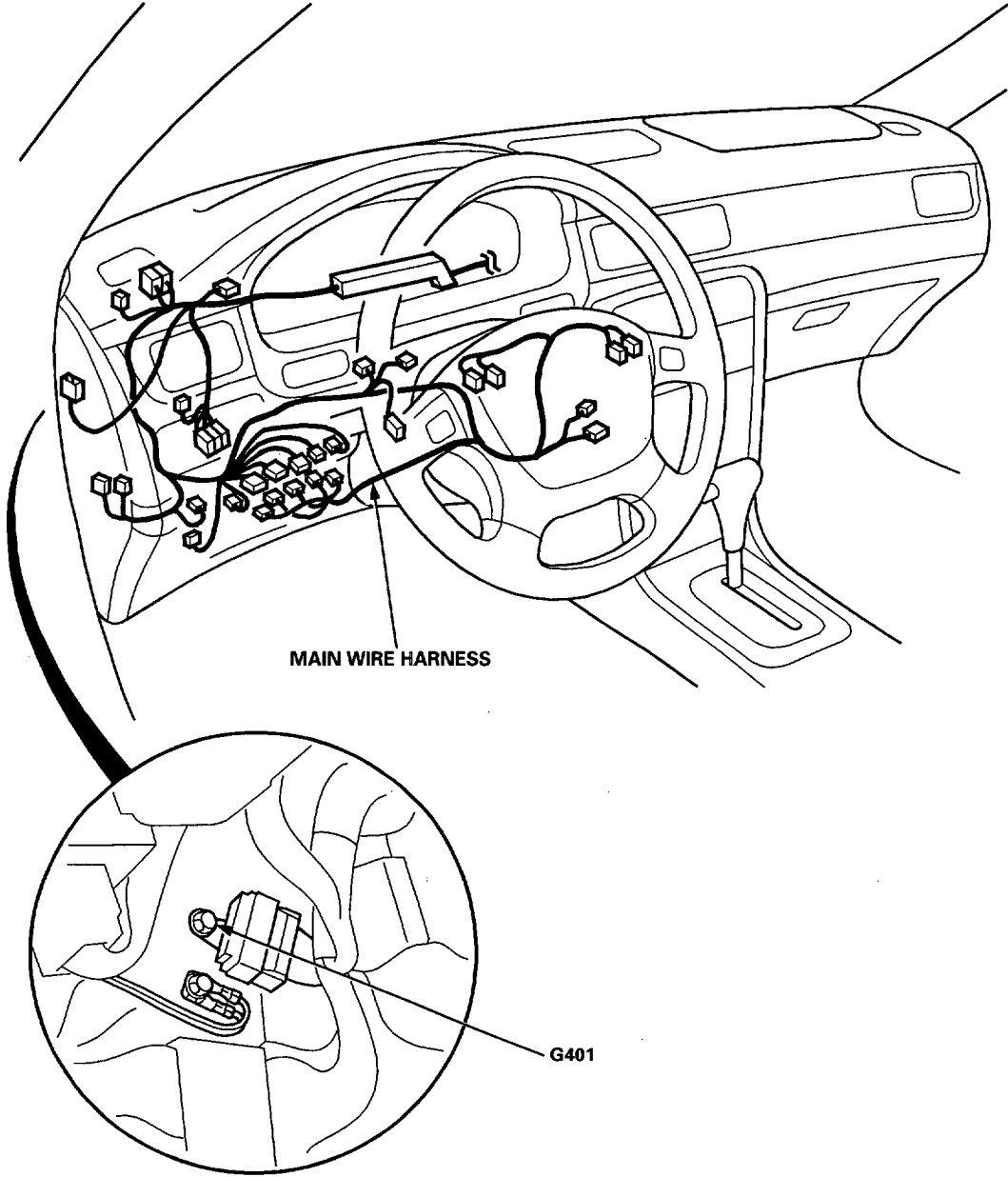
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## Dashboard

NOTE: LHD type is shown, RHD type is similar.



NOTE: LHD type is shown, RHD type is similar.

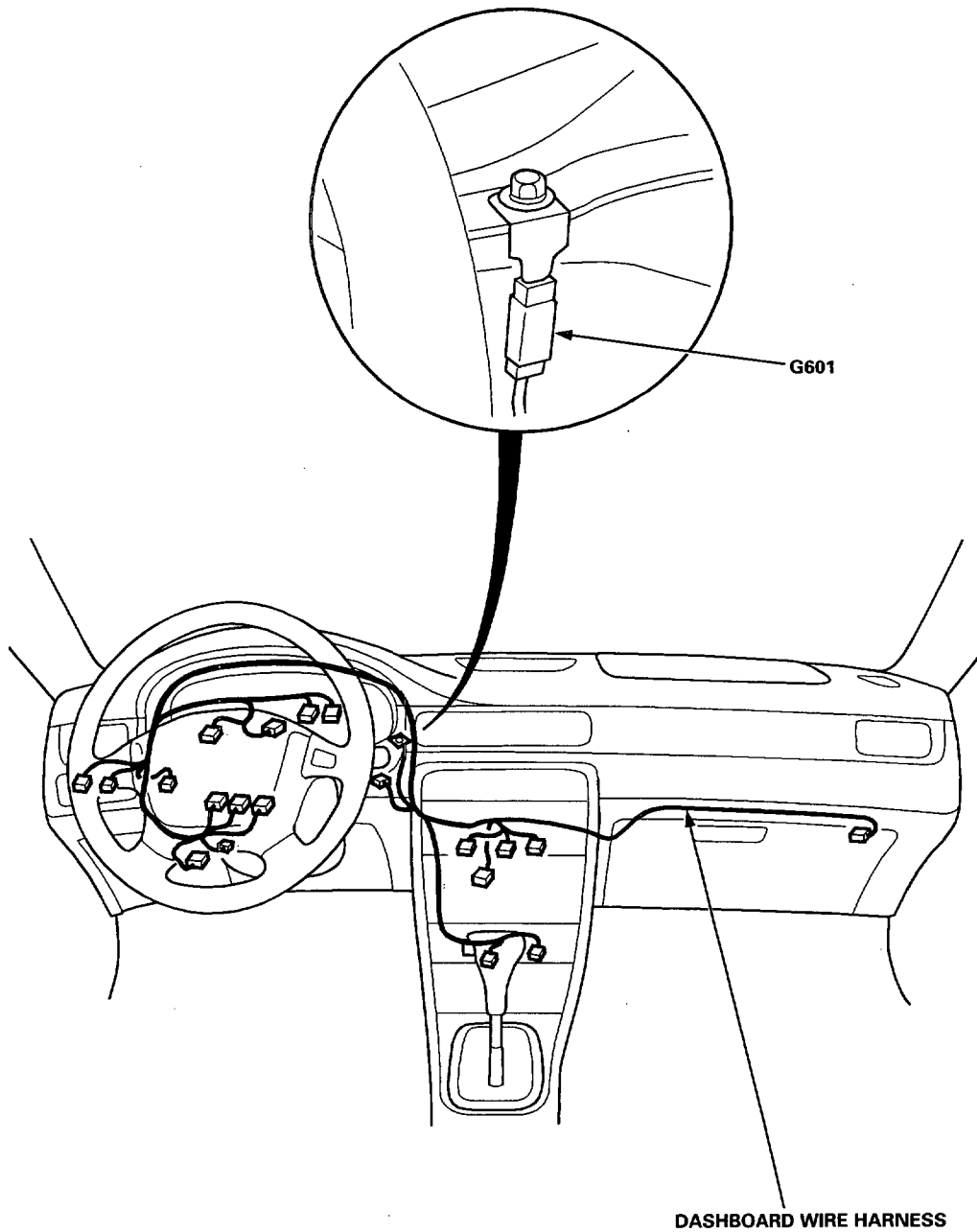


(cont'd)

# Wire Harness and Ground Locations

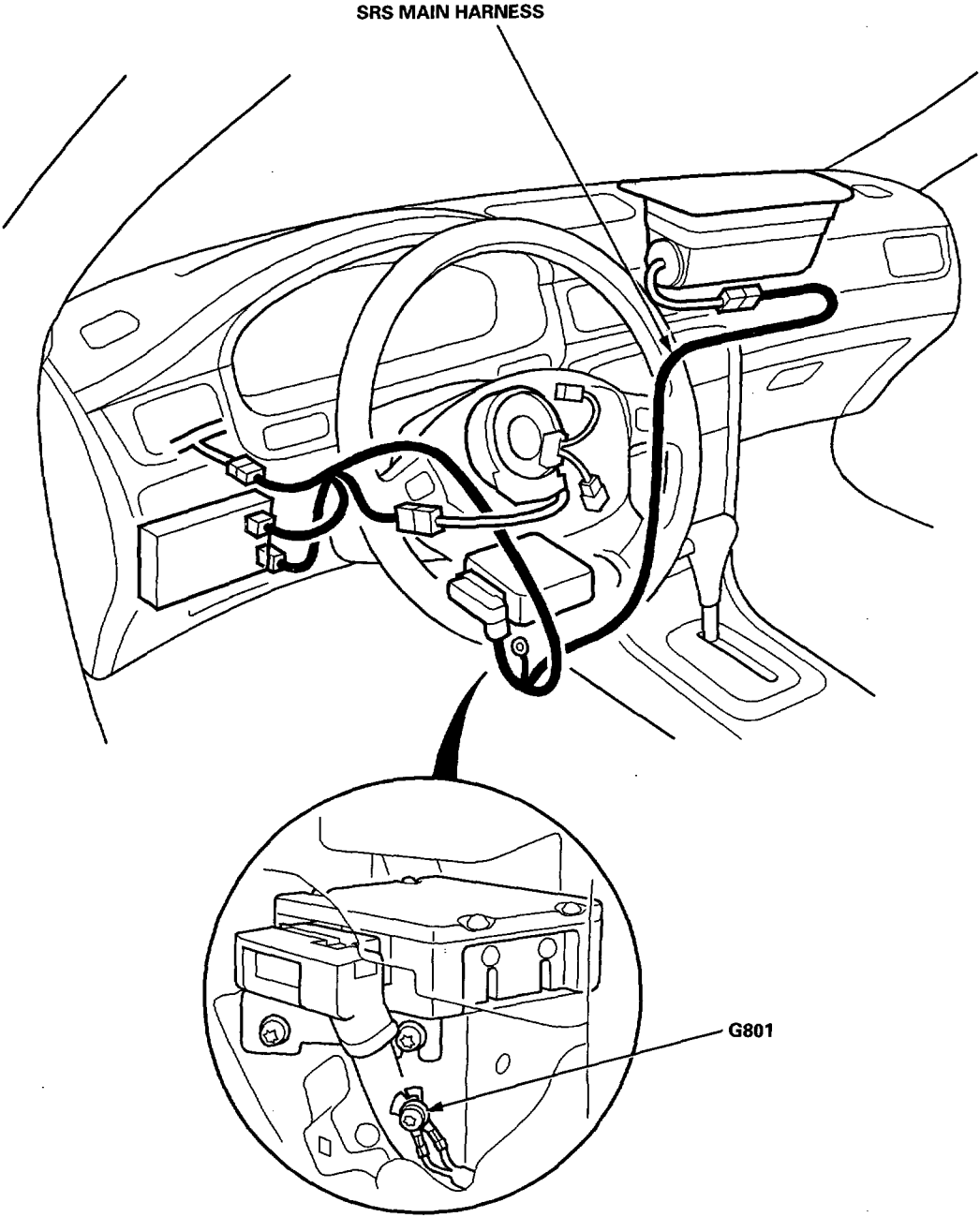
## Dashboard (cont'd)

NOTE: LHD type is shown, RHD type is similar.





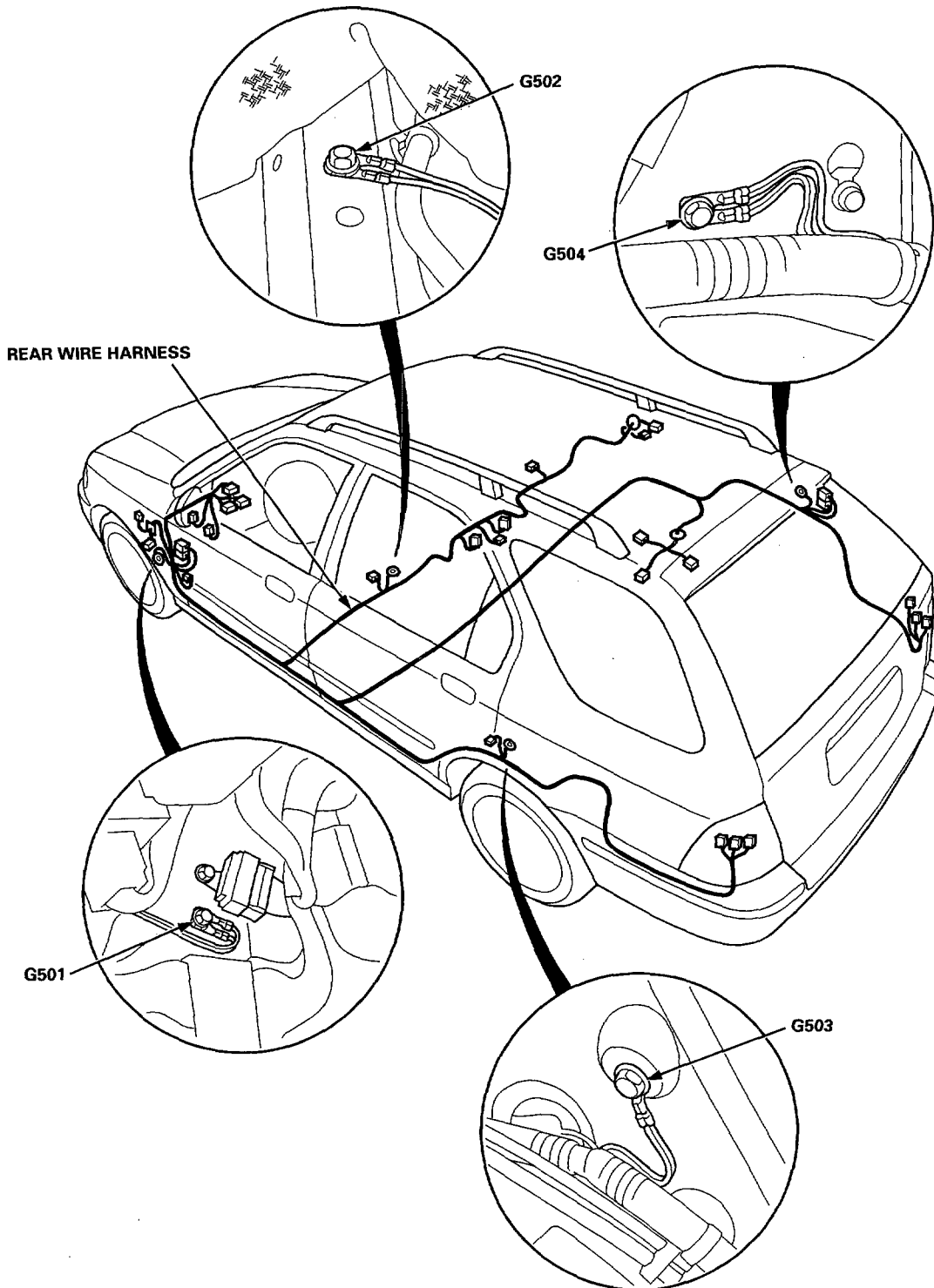
NOTE: LHD type is shown, RHD type is similar.



# Wire Harness and Ground Locations

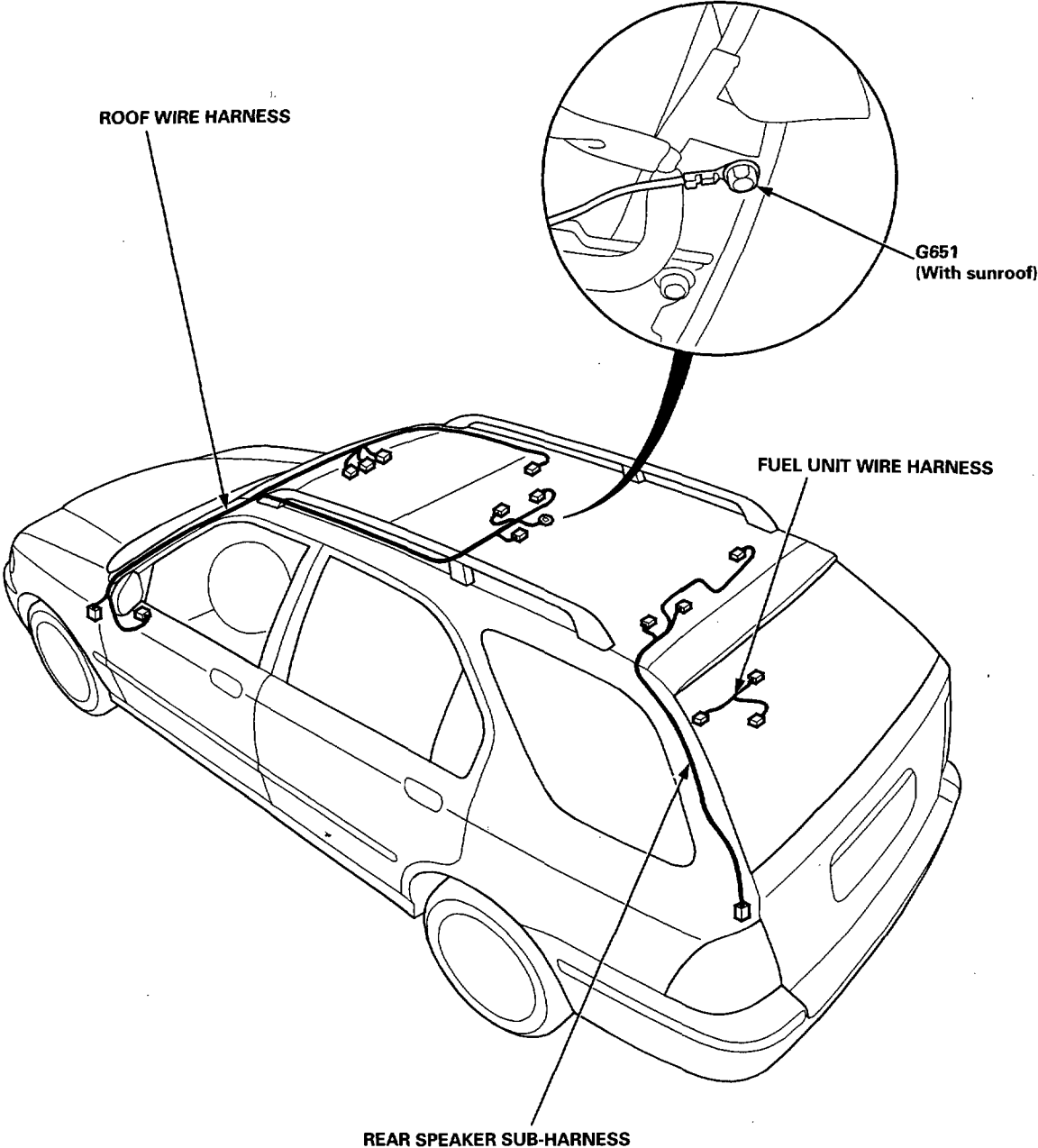
## Floor/Rear

NOTE: LHD type is shown, RHD type is similar.



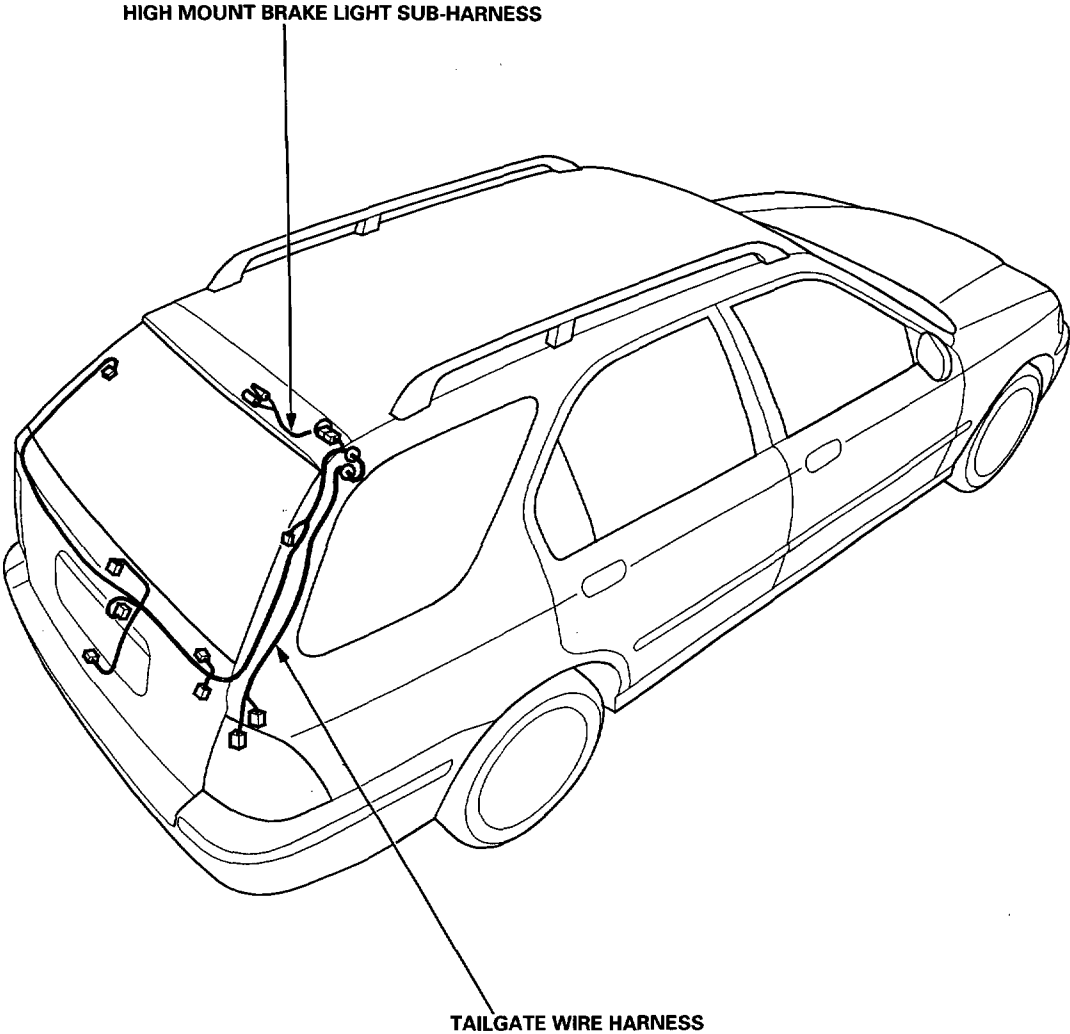
# Floor/Roof

NOTE: LHD type is shown, RHD type is similar.



# Wire Harness and Ground Locations

## Tailgate

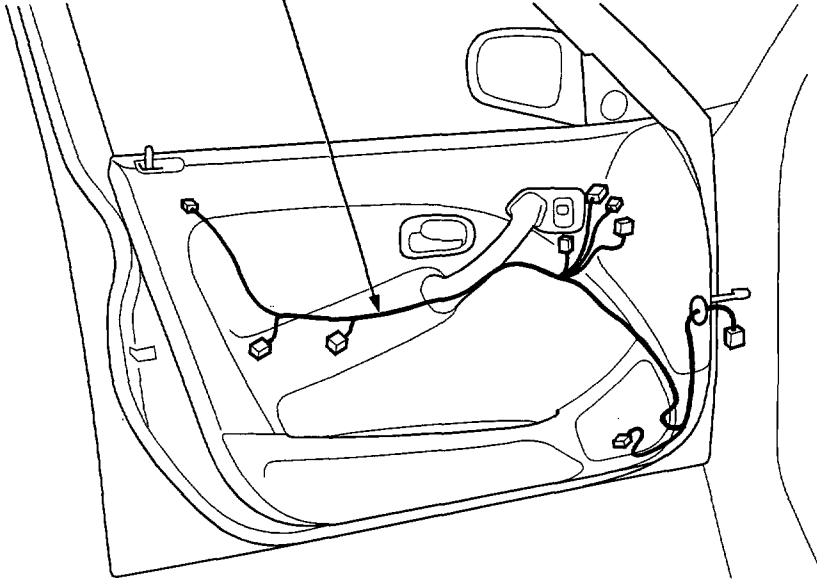




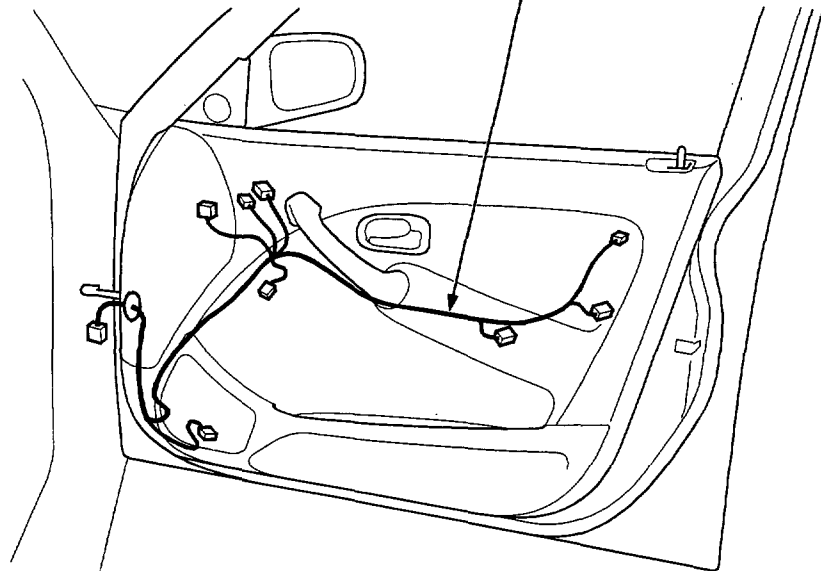
## Door

NOTE: LHD type is shown, RHD type is symmetrical.

DRIVER'S DOOR WIRE HARNESS



FRONT PASSENGER'S DOOR WIRE HARNESS

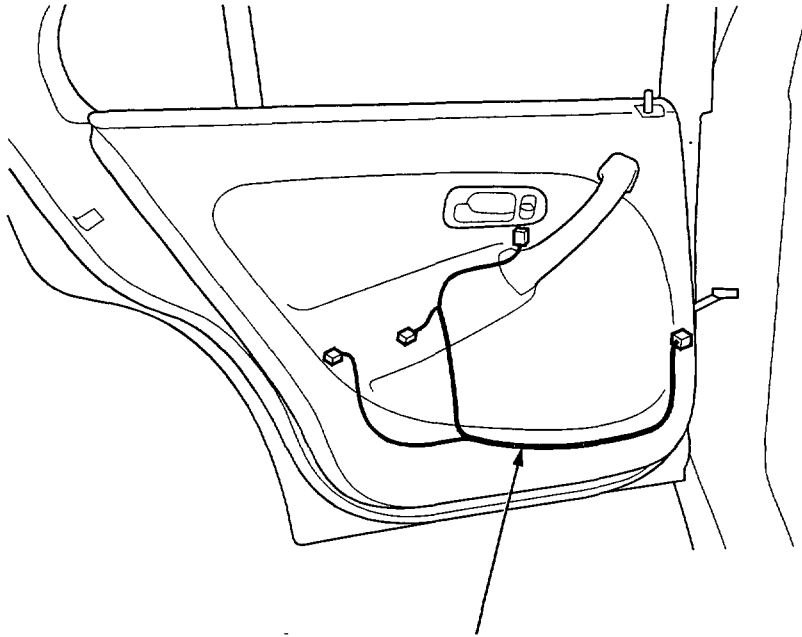


(cont'd)

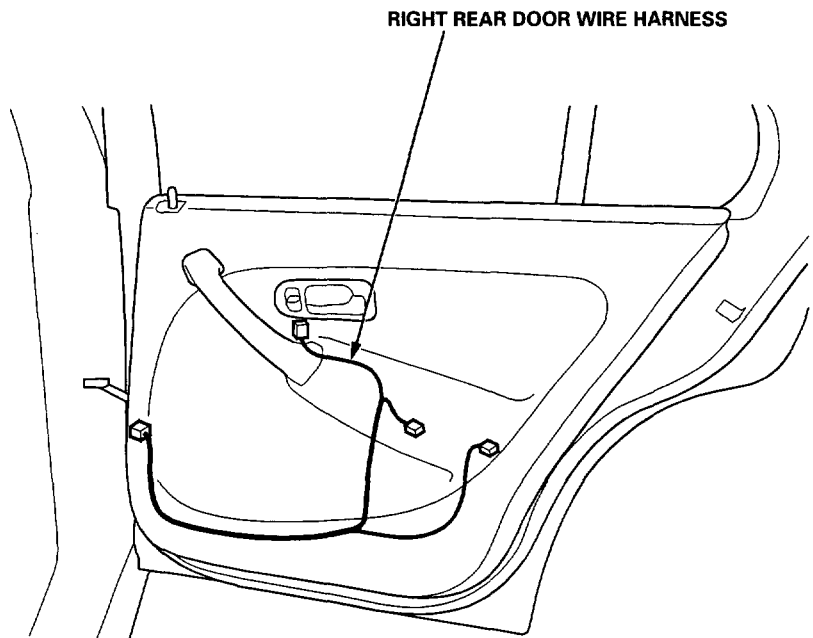
# Wire Harness and Ground Locations

---

## Door (cont'd)



LEFT REAR DOOR WIRE HARNESS



RIGHT REAR DOOR WIRE HARNESS

## **Power and Ground Distributions**

### **Battery**

**Test ..... 23-B-2**

### **Power Relays**

**Relay Test ..... 23-B-3**

### **\*Ignition Switch**

**Test ..... 23-B-5**

**Electrical Switch Replacement ..... 23-B-5**

### **\*Under-dash Fuse/Relay Box**

**Removal/Installation ..... 23-B-6**

### **Fuses**

**Under-hood ABS Fuse Box ..... 23-B-7**

**Under-hood Fuse/Relay Box ..... 23-B-8**

**Under-dash Fuse/Relay Box ..... 23-B-10**

### **Power Distribution**

**Circuit Identification ..... 23-B-14**

### **Ground Distributions**

**Circuit Identification ..... 23-B-28**



# Battery

## Test

### ⚠ WARNING

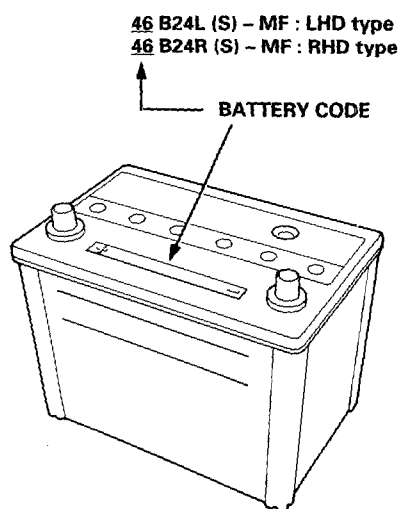
- Battery fluid (electrolyte) contains sulfuric acid. It may cause severe burns if it gets on your skin or in your eyes.  
Wear protective clothing and a face shield.
  - If electrolyte gets on your skin or clothes, rinse it off with water immediately.
  - If electrolyte gets in your eyes, flush it out by splashing water in your eyes for at least 15 minutes; call a physician immediately.
- A battery gives off hydrogen gas. If ignited, the hydrogen will explode and could crack the battery case and splatter acid on you. Keep sparks, flames, and cigarettes away from the battery.
- Overcharging will raise the temperature of the electrolyte. This may force electrolyte to spray out of the battery vents. Follow the charger manufacturer's instructions, and charge the battery at a proper rate.

#### NOTE:

- To get accurate results, the temperature of the electrolyte must be between 21 and 38°C (70 and 100°F) before testing.
- The ECM memory must be reset after reconnecting the battery (see section 11).

#### 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:

1. Check for damage: If the case is cracked or the terminals 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 three times the battery ampere hour rating.  
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, connect a battery charger and charge the battery for three 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 three 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 three minutes of fast charge, the battery is not good; replace it.
- If the reading drops below 6.5 V, slow-charge the battery by connecting a battery, and charge at five amps for no more than 24 hours (or until the indicator shows full charge, or the specific gravity of the electrolyte is at least 1.270). 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 not good; replace it.



# Power Relays

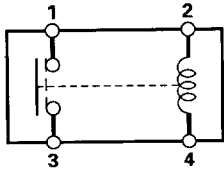
## Relay Test

NOTE: See page 23-D-24 for turn signal/hazard relay input test.

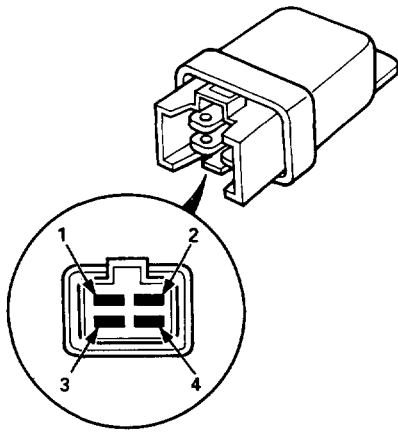
### Normally-open type:

1. Check for continuity between the terminals.
  - There should be continuity between the No. 1 and No. 3 terminals when power and ground are connected to the No. 2 and No. 4 terminals.
  - There should be no continuity between the No. 1 and No. 3 terminals when power is disconnected.

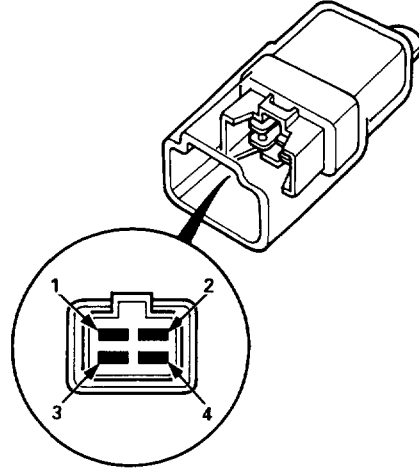
Terminal	1	3
Power (No. 2 – No. 4)		
Disconnected		
Connected		



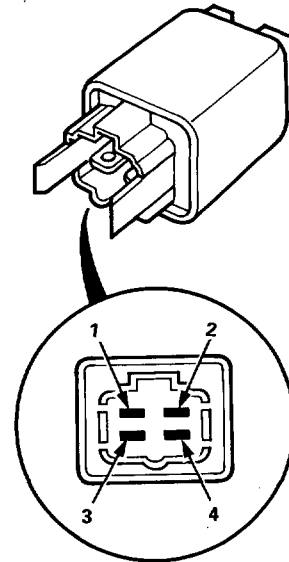
- Horn relay (With SRS)
- Front fog light relay (KG and KE models: VTi)
- Rear fog light relay (KG and KE models: VTi)



- Condenser fan relay
- A/C compressor clutch relay



- Starter cut relay

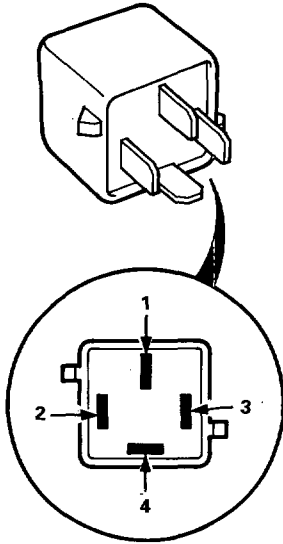


(cont'd)

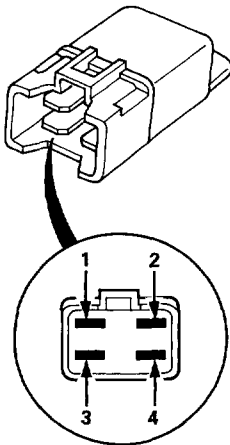
# Power Relays

## Relay Test (cont'd)

- Blower motor relay
- Power window relay
- Radiator fan relay
- Rear window defogger relay



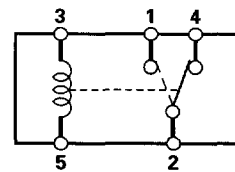
- Driver's seat heater main relay (KS model)
- Front passenger's seat heater main relay (KS model)



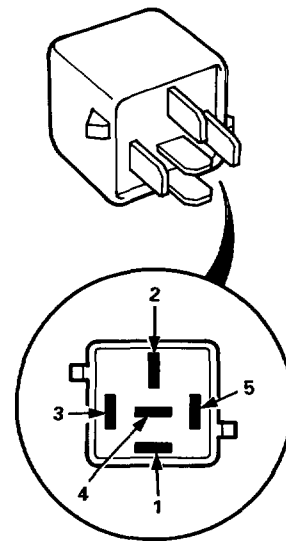
### Five-terminal type:

1. Check for continuity between the terminals.
  - There should be continuity between the No. 1 and No. 2 terminals when power and ground are connected to the No. 3 and No. 5 terminals.
  - There should be continuity between the No. 2 and No. 4 terminals when power is disconnected.

Terminal	1	2	4
Power (No. 3 – No. 5)			
Disconnected		○	○
Connected	○	○	



- Sunroof open relay
- Sunroof close relay



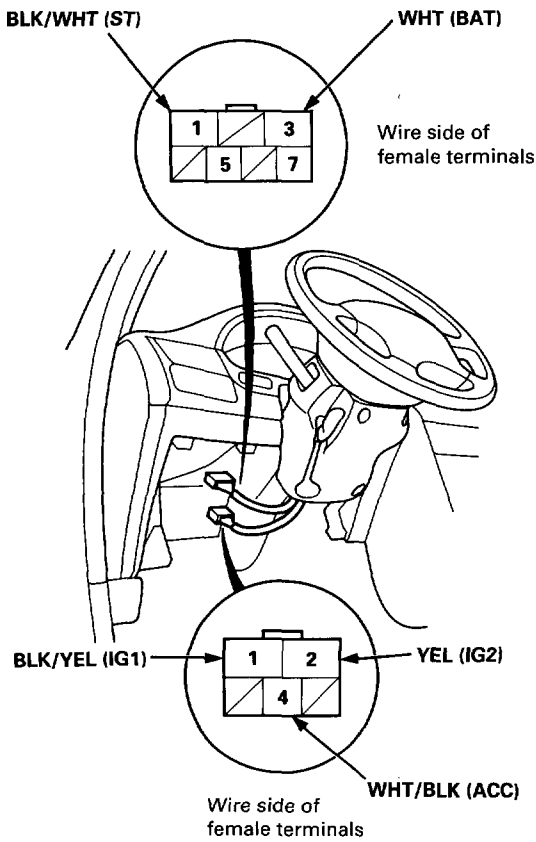


# Ignition Switch

## Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Disconnect both the negative cable and positive cable from the battery.
2. Remove the dashboard lower cover (see section 20).
3. Disconnect the 5P connector from the under-dash fuse/relay box, and disconnect the 7P connector from the main wire harness.



4. Check for continuity between the terminals in each switch position according to the table.

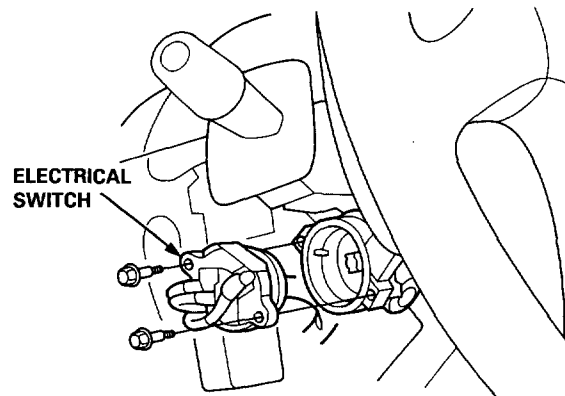
Terminal Position	WHT/BLK (ACC)	WHT (BAT)	BLK/YEL (IG1)	YEL (IG2)	BLK/WHT (ST)
O (LOCK)					
I (ACC)	○—○				
II (ON)	○—○	○—○	○—○	○—○	
III (START)		○—○	○—○		○—○

5. If continuity checks do not agree with the table, replace the electrical switch.

## Electrical Switch Replacement

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Disconnect both the negative cable and positive cable from the battery.
2. Remove the dashboard lower cover (see section 20).
3. Disconnect the 5P connector from the under-dash fuse/relay box, and disconnect the 7P connector from the main wire harness.
4. Remove the steering column covers (see section 17).
5. Insert the ignition key, and turn it to "0" position.
6. Remove the two screws, and replace the electrical switch.



# Under-dash Fuse/Relay Box

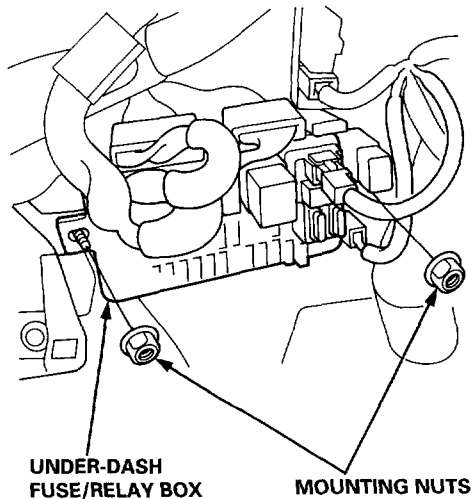
## Removal/Installation

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

### Removal:

1. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
2. Disconnect the airbag connectors (see section 24).
3. Remove the dashboard lower cover (see section 20).
4. Remove the two mounting nuts, and pull the under-dash fuse/relay box out from under the dash.

NOTE: LHD type is shown, RHD type is similar.



5. Disconnect the connectors from the under-dash fuse/relay box (see section 24 for the SRS main harness connector), and take out the under-dash fuse/relay box.

### Installation:

1. Connect the connectors to the under-dash fuse/relay box (see section 24 for the SRS main harness connector), then install the under-dash fuse/relay box in the reverse order of removal.
2. Install the dashboard lower cover (see section 20).
3. Connect the airbag connectors (see section 24).
4. Connect the battery positive cable, then connect the negative cable.
5. Confirm that all systems work properly.

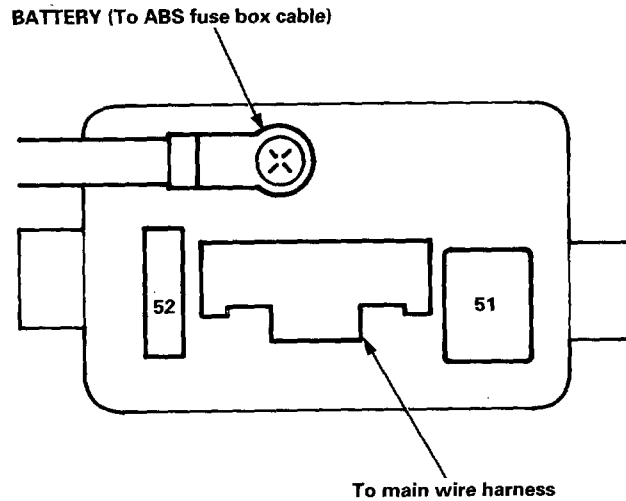


# Fuses



## Under-hood ABS Fuse Box

NOTE: LHD type is shown, RHD type is similar.

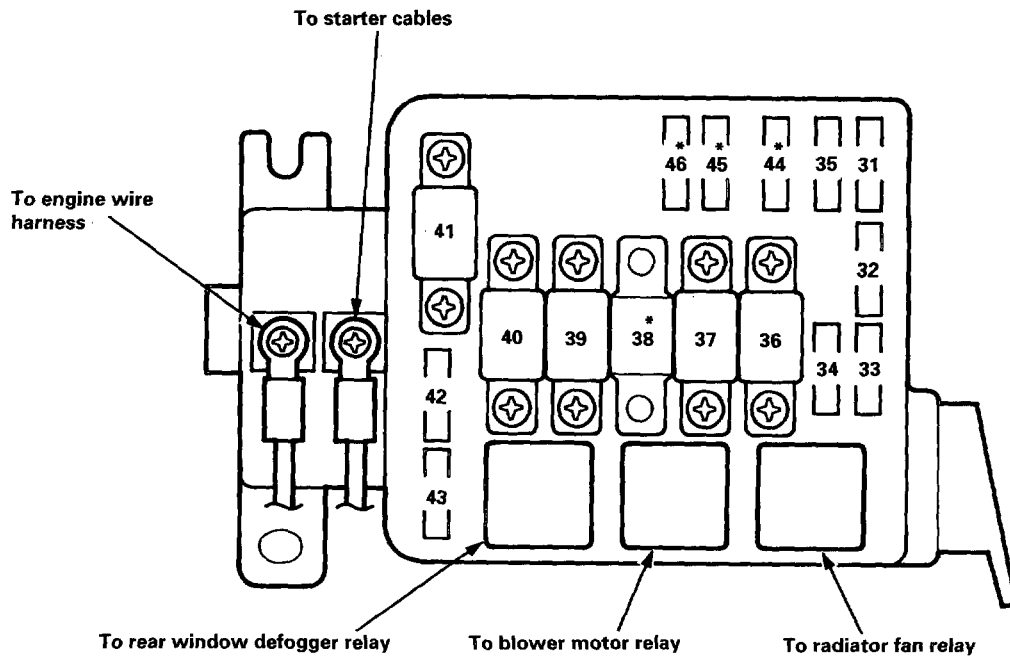


Fuse Number	Amps	Wire color	Component(s) or Circuit(s) Protected
51	40 A	WHT/BLU	ABS modulator assembly (+B MR)
52	20 A	WHT/GRN	ABS modulator assembly (+B FSR)

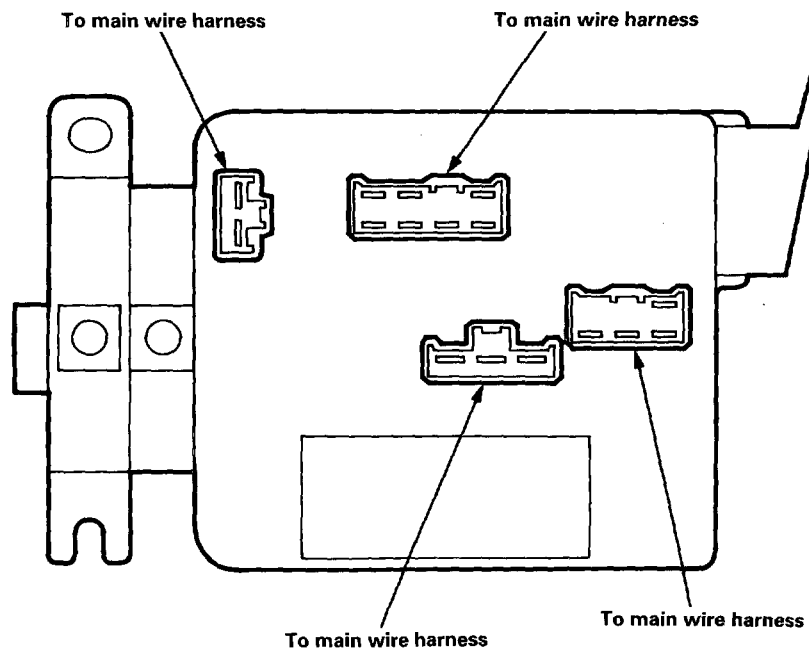
# Fuses

## Under-hood Fuse/Relay Box

\*: Not used



NOTE: View from back side of the under-hood fuse/relay box.





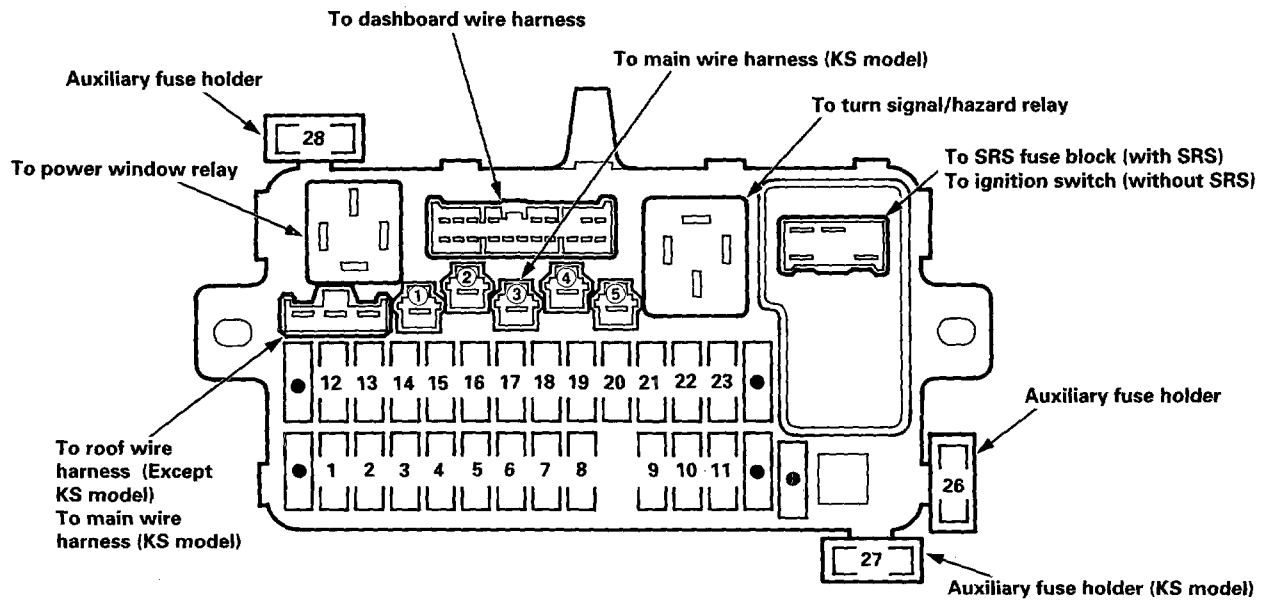
Fuse Number	Amps	Wire color	Component(s) or Circuit(s) Protected
31	15 A	YEL/WHT	PGM-FI main relay (+B), immobilizer control unit
32	7.5 A	WHT/BLU	ECM, clock, audio unit connector
		[WHT/BLK]	
33	30 A	BLK/GRN	Rear window defogger (Via rear window defogger relay)
34	15 A	BLK/RED	Radiator fan motor (Via radiator fan relay)
35	20 A	WHT	Condenser fan motor (Via condenser fan relay), A/C compressor clutch (Via A/C compressor clutch relay)
36	50 A	WHT/RED	(To under-dash fuse/relay box)
37	30 A	BLU/WHT	Blower motor (Via blower motor relay)
38	—	—	Not used
39	50 A	WHT/BLK	Ignition switch (BAT)
40	40 A	WHT	Integrated control unit (KS model), rear fog light (Via rear fog light relay) (KG and KE models: VTi), combination light switch
41	*	—	Battery, power distribution
42	20 A	WHT/GRN	Horn relay (With SRS), security alarm horn (KG model: VTi), horn, brake lights (Via brake switch)
43	10 A	WHT/BLK	Hazard warning lights, turn signal/hazard relay, security alarm control unit (KG model: VTi), immobilizer indicator light
44	—	—	Not used
45	—	—	Not used
46	—	—	Not used

\* 100 A: B18C4 engine  
 80A: Except B18C4 engine  
 [ ]: RHD type

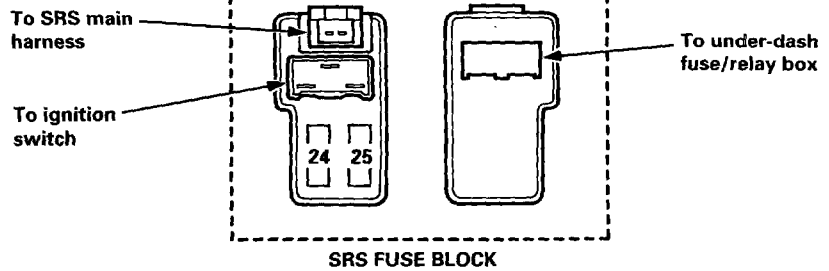
# Fuses

## Under-dash Fuse/Relay Box

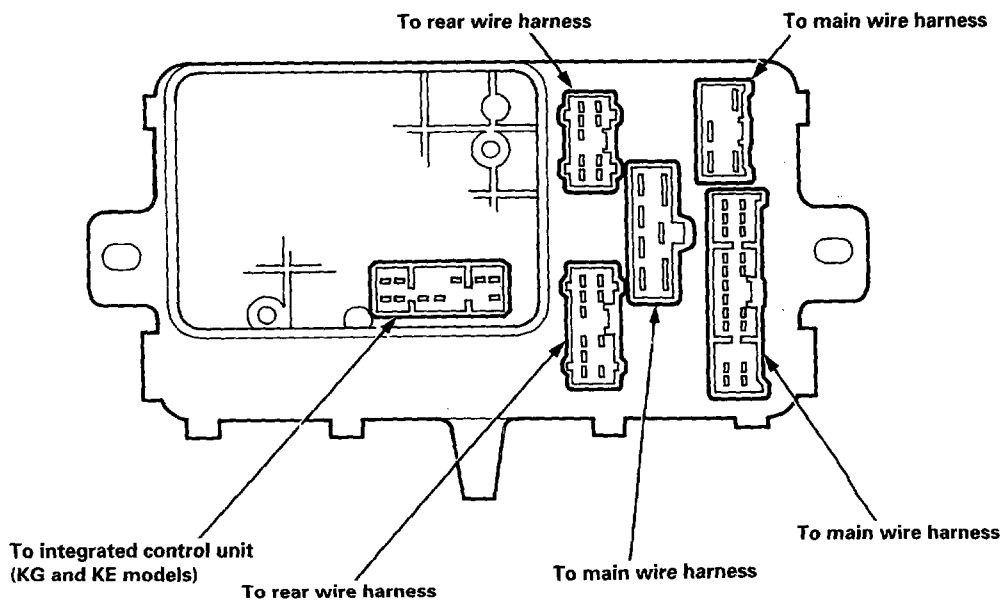
NOTE: LHD type is shown, RHD type is similar.



- : Spare fuse
- ①: Optional connector
- ②: Optional connector
- ③: Optional connector (KG and KE models)
- ④: Optional connector
- ⑤: Optional connector



NOTE: View from back side of the under-dash fuse/relay box.





Fuse Number	Amps	Wire color	Component(s) or Circuit(s) Protected
1	*1 30 A	WHT	Sunroof motor (Via, sunroof open/close relay)
	*2 20 A	WHT/BLK	Headlight washer control unit (KS model)
2	20 A	WHT/BLK	Headlight washer control unit (KG and KE models)
		WHT/GRN	Driver's seat heater (Via driver's seat heater, main relay) (KS model), Front passenger's seat heater (Via front passenger's seat heater main relay) (KS model)
3	7.5 A	WHT/RED	Front ceiling light, data link connector, ignition key light, entry light timer unit, keyless receiver unit, rear ceiling light
4	20 A	YEL/BLK	Right rear power window motor
5	20 A	WHT/BLK	Front passenger's power window motor (LHD type), driver's power window motor (RHD type), power window control unit (RHD type)
6	20 A	WHT/YEL	Power door lock control unit, keyless door lock control unit, security alarm control unit (KG model: VTi), driver's door security indicator (KG model: VTi), front passenger's door security indicator (KG model: VTi)
7	20 A	GRN/BLK	Left rear power window motor
8	20 A	BLU/BLK	Driver's power window motor (LHD type), power window control unit (LHD type), front passenger's power window motor (RHD type)
9	10 A	RED/BLU	Right headlight (High beam), integrated control unit (KS model)
10	10 A	RED/GRN	Left headlight (High beam), high beam indicator light
11	15 A	WHT/RED	Front fog lights (Via front fog light relay) (KG and KE models: VTi)
12	15 A	BLK/YEL	Inertia switch (without SRS)
13	7.5 A	BLK/BLU	Power mirror actuators, rear window defogger indicator light, driver's seat heater switch (KS model), front passenger's seat heater switch (KS model), A/C switch indicator light, power mirror defogger (KS and KE models), recirculation control motor, recirculation control switch indicator light, A/C thermostat, A/C compressor clutch relay, condenser fan relay (Via A/C diode), radiator fan relay, blower motor relay
14	20 A	GRN/BLK	Sunroof open relay, sunroof close relay, rear window wiper motor, windshield wiper motor, windshield/rear window intermittent wiper control unit, windshield wiper/washer switch, rear window wiper/washer switch, headlight washer switch
		Fuse/relay box socket	Power window relay

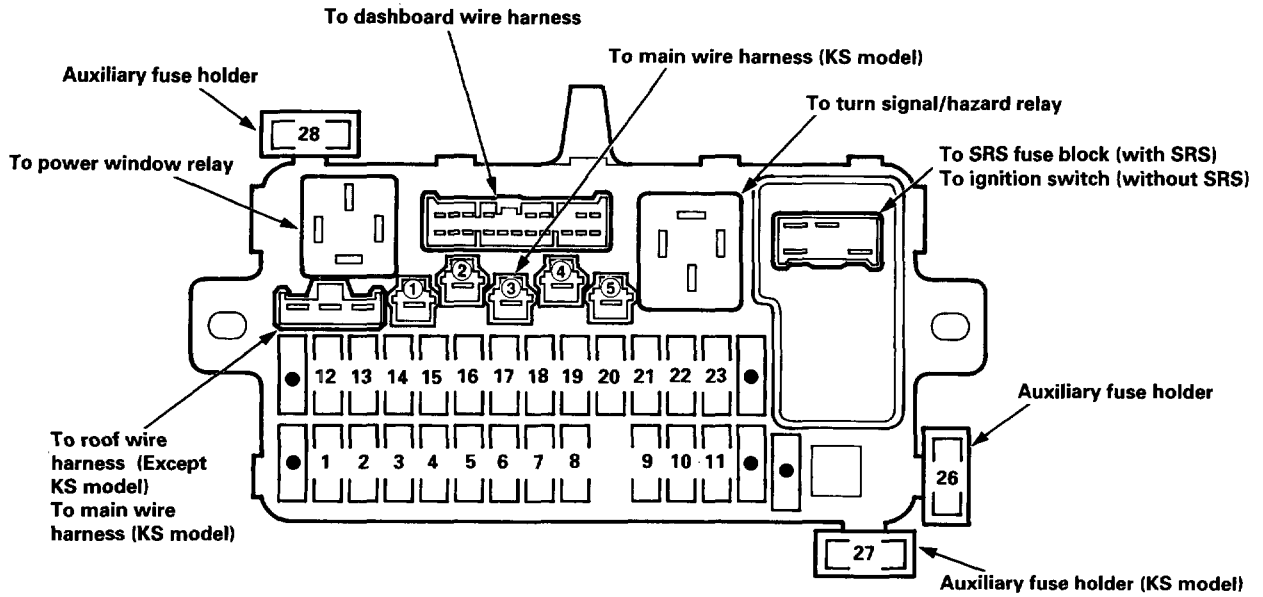
\*1 30 A: KG and KE models

\*2 20 A: KS model

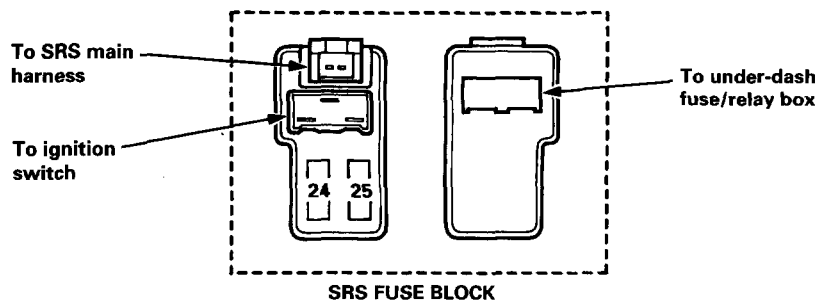
(cont'd)

# Fuses

## Under-dash Fuse/Relay Box (cont'd)



- : Spare fuse
- ①: Optional connector
- ②: Optional connector
- ③: Optional connector (KG and KE models)
- ④: Optional connector
- ⑤: Optional connector





Fuse Number	Amps	Wire color	Component(s) or Circuit(s) Protected
15	10 A	YEL	Clock, turn signal/hazard relay, gauge assembly, A/T gear position indicator dimming circuit, headlight adjuster switch, security alarm control unit (KG model: VTi), headlight adjuster units, back-up lights, gauge assembly, SRS indicator light
		Fuse/relay box socket	Integrated control unit (KG and KE models)
16	10 A	BLK/RED	ABS modulator assembly (KG and KE models)
		—	Optional connector
	7.5 A	YEL/BLK	Integrated control unit (KS model)
*1 17	10 A	RED/BLK	Front parking lights, taillights, trailer lighting connector, license plate lights
18	7.5 A	BLK/WHT	ECM, PGM-FI main relay
19	10 A	RED/BLK	Hazard warning switch light, gauge lights, audio unit connector, rear window defogger switch light, ECONO indicator light (D15Z8 engine), front fog light switch light (KG and KE models: VTi), rear fog light switch light, glove box light, driver's/front passenger's seat heater switch light (KS model), dash lights brightness controller, clock, A/T gear position indicator dimming circuit
		RED/BLU	A/C switch light, heater control panel light, A/T gear position console light, recirculation control switch light, cigarette lighter
		*2 RED/BLK	Front parking lights, taillights, trailer lighting connector, license plate lights
		Fuse/relay box socket	Integrated control unit (KG and KE models)
		—	Optional connector
20	7.5 A	WHT/RED	Rear fog light control unit, headlight washer control unit
21	10 A	RED/WHT	Right headlight (Low beam)
22	10 A	RED/YEL	Left headlight (Low beam)
23	15 A	YEL/RED	Audio unit connector, cigarette lighter
		—	Optional connector
24	15 A	GRY (or RED)	SRS unit (VA)
		BLK/YEL	Inertia switch (With SRS)
25	10 A	GRY (or PNK)	SRS unit (VB)
26 (Auxiliary fuse holder)	15 A	BLK/YEL	Alternator, vehicle speed sensor (VSS), charging system light, ECONO indicator light (D15Z8 engine), immobilizer control unit
*2 27 (Auxiliary fuse holder)	10 A	BLK/RED	ABS modulator assembly
28 (Auxiliary fuse holder)	15 A	BLK/YEL	ICM (D14A7, D14A8 and D16B2 engine)

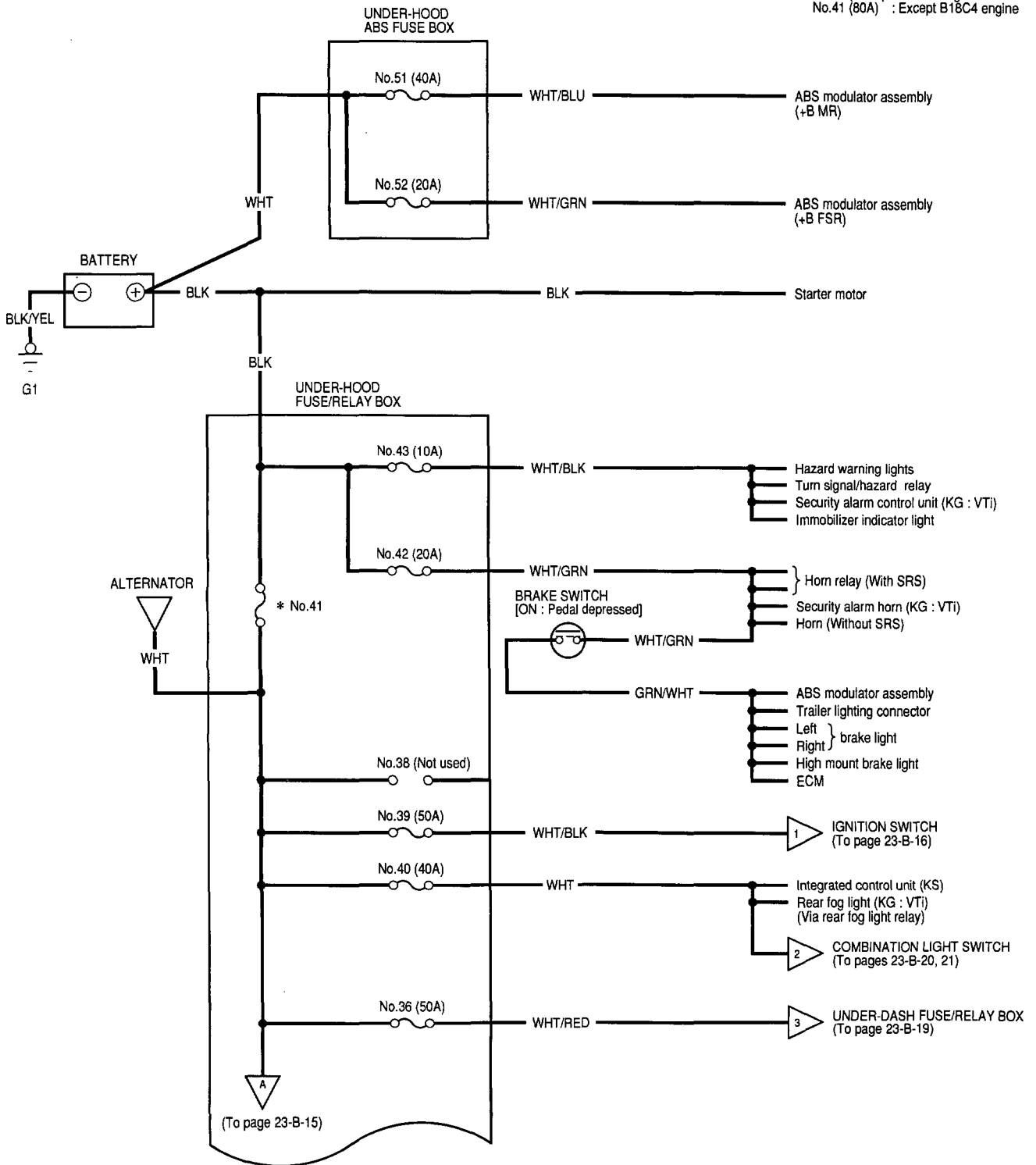
\*1: KS model

\*2: KG and KE models

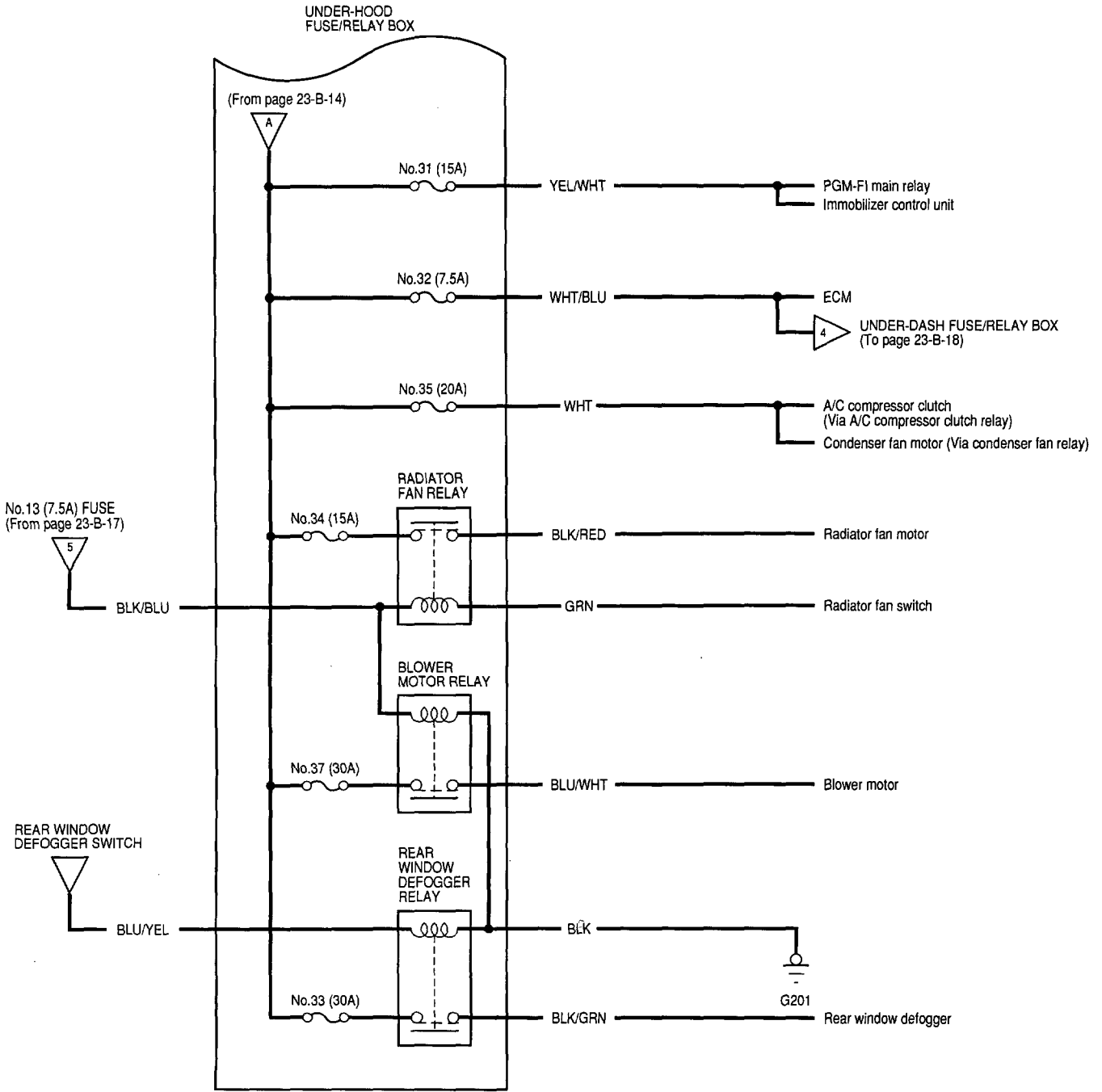
# Power Distribution

## Circuit Identification (LHD type)

\* No.41 (100A) : B18C4 engine  
 No.41 (80A) : Except B18C4 engine



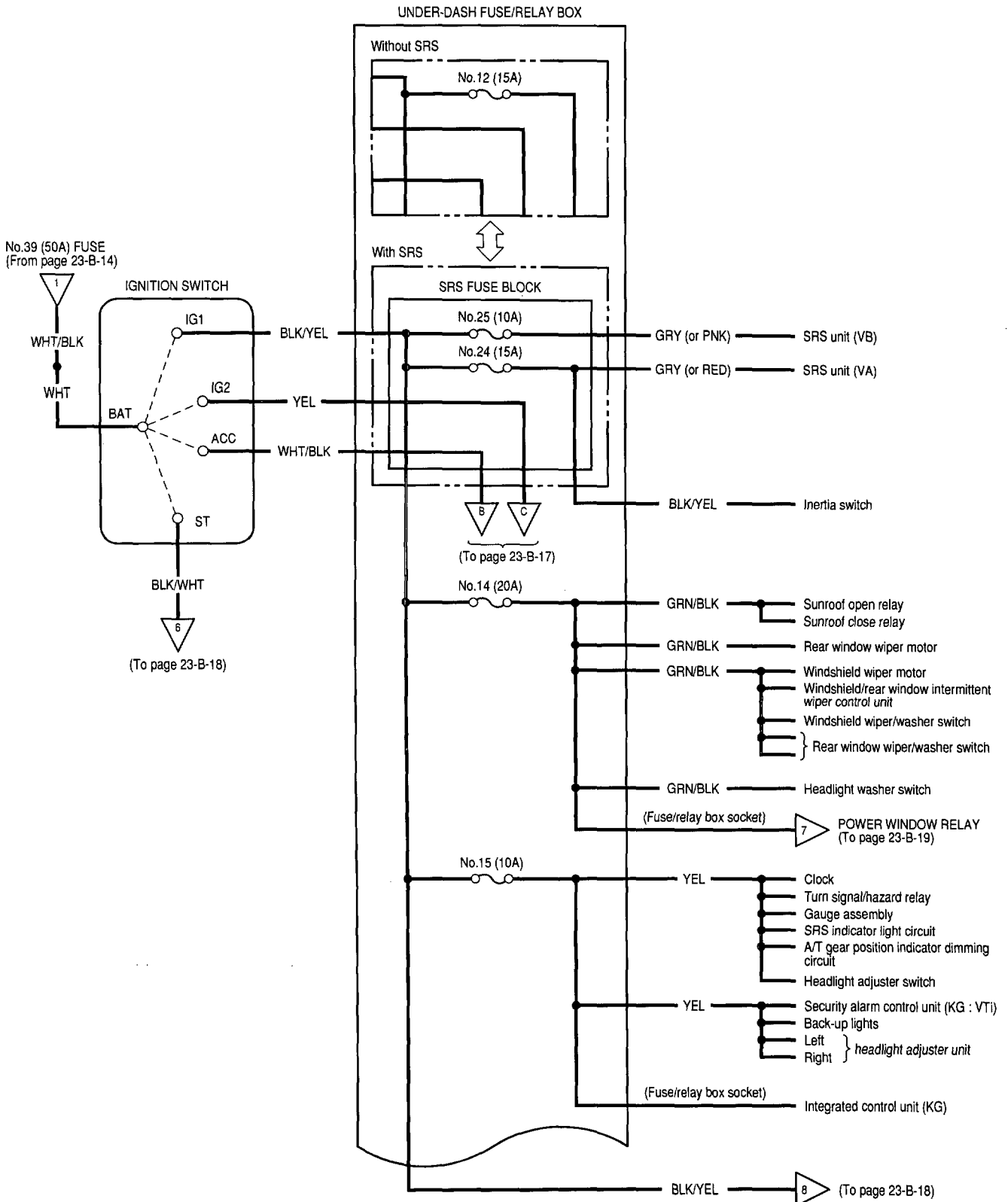


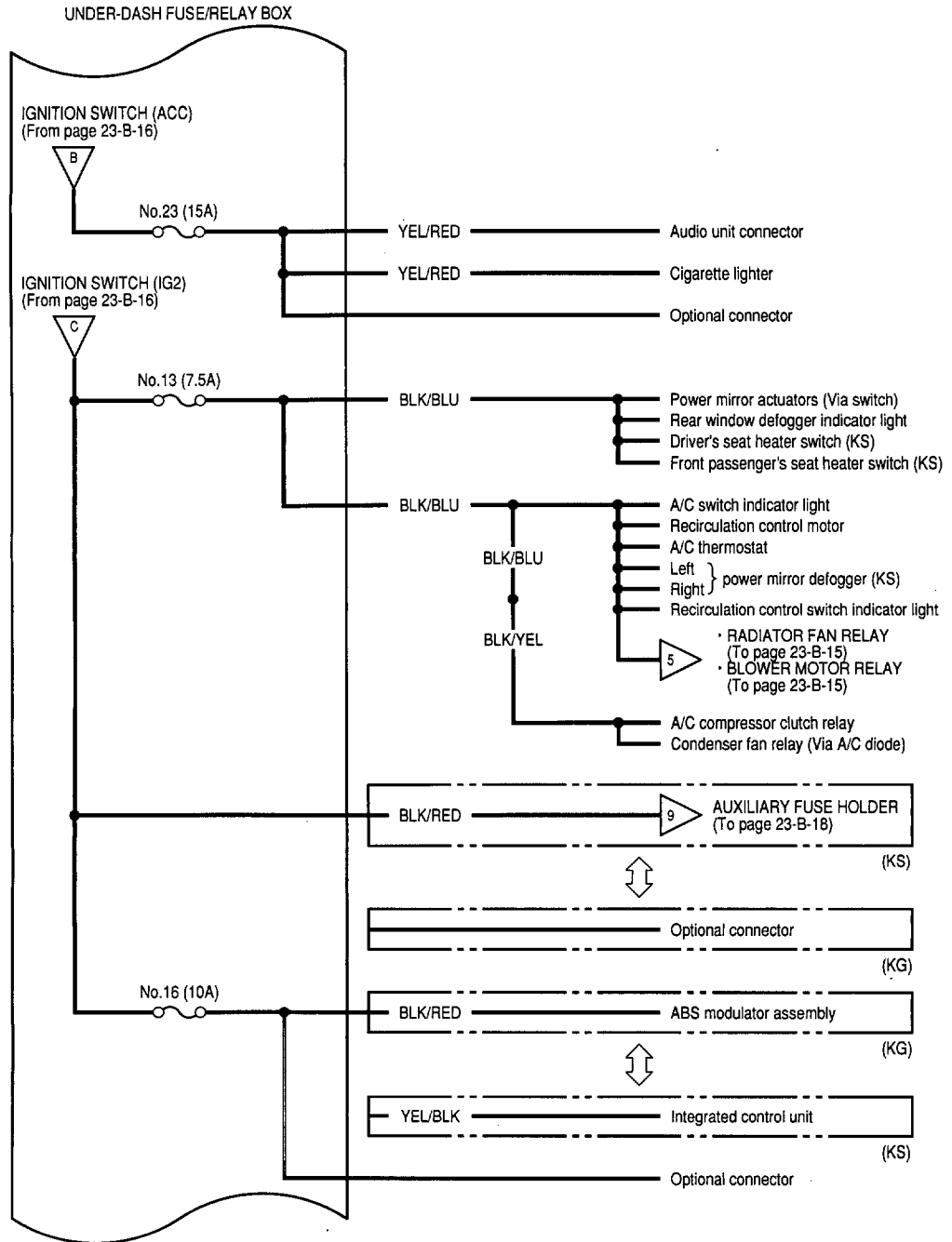


(cont'd)

# Power Distribution

## Circuit Identification (LHD type) (cont'd)

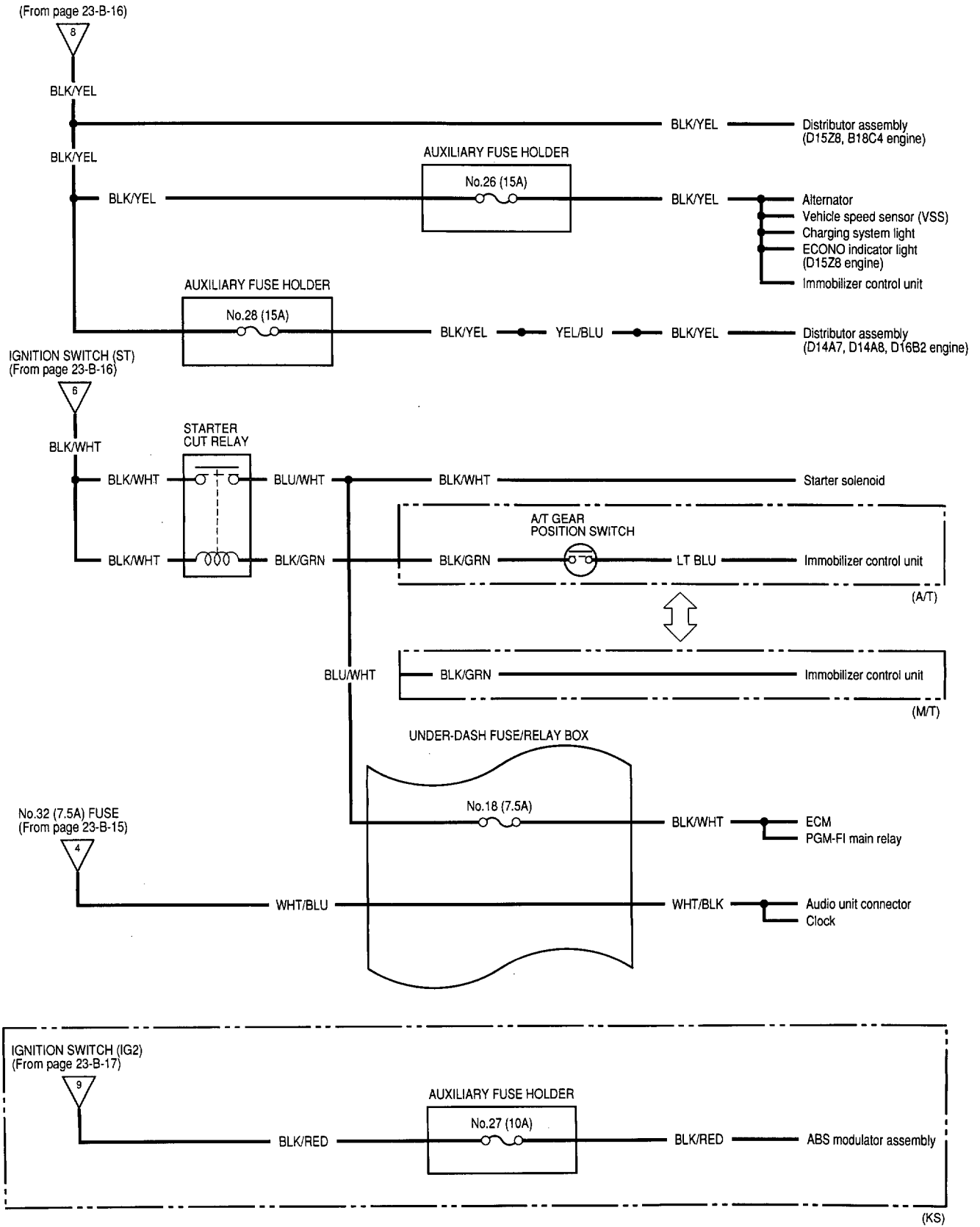


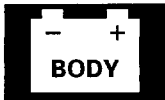


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# Power Distribution

## Circuit Identification (LHD type) (cont'd)

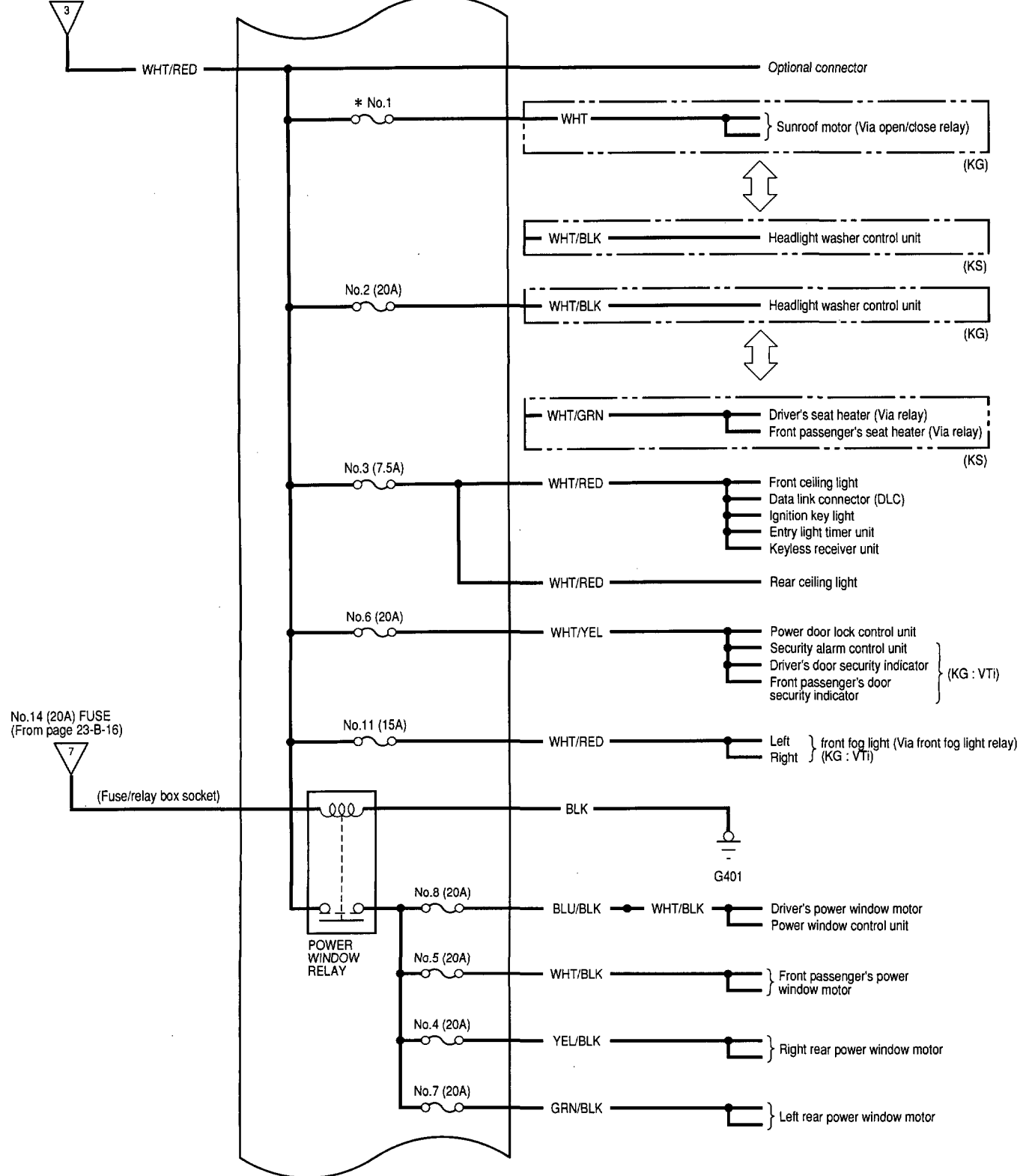




No.36 (50A) FUSE  
(From page 23-B-14)

UNDER-DASH FUSE/RELAY BOX

\* No.1 (30A) : KG  
No.1 (20A) : KS

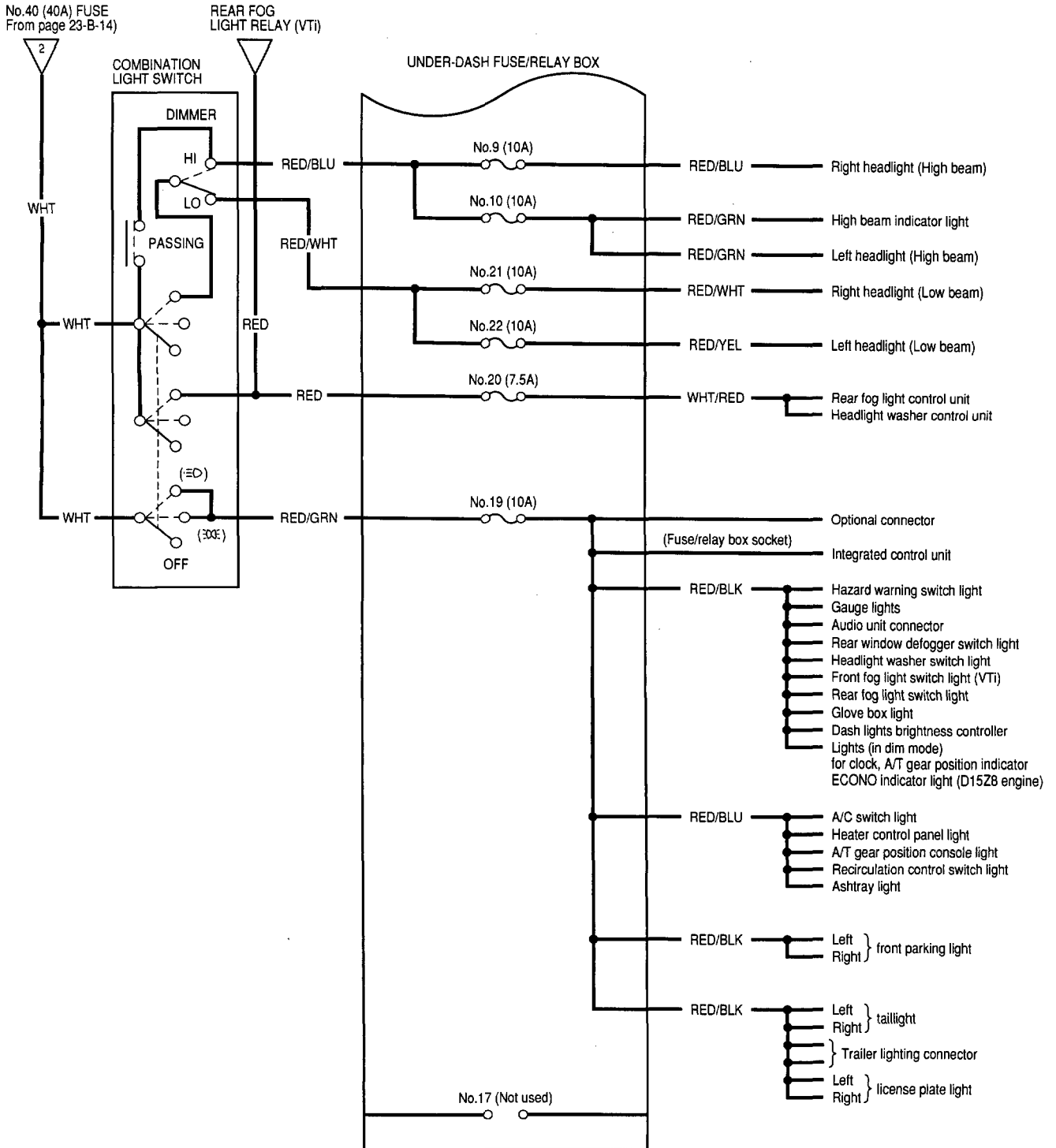


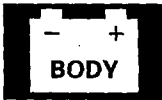
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# Power Distribution

## Circuit Identification (LHD type) (cont'd)

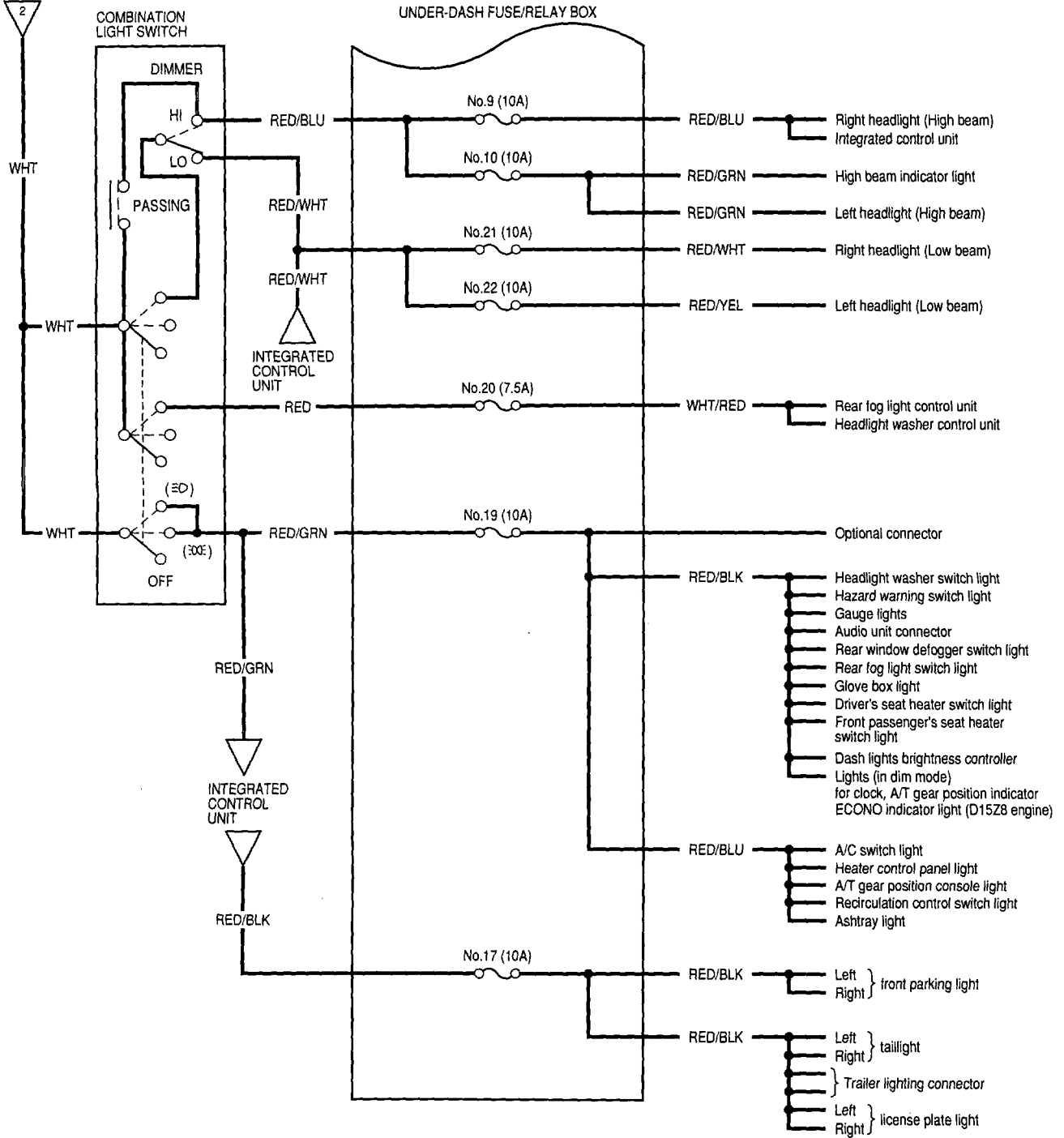
KG model:





**KS model:**

No.40 (40A) FUSE  
(From page 23-B-14)

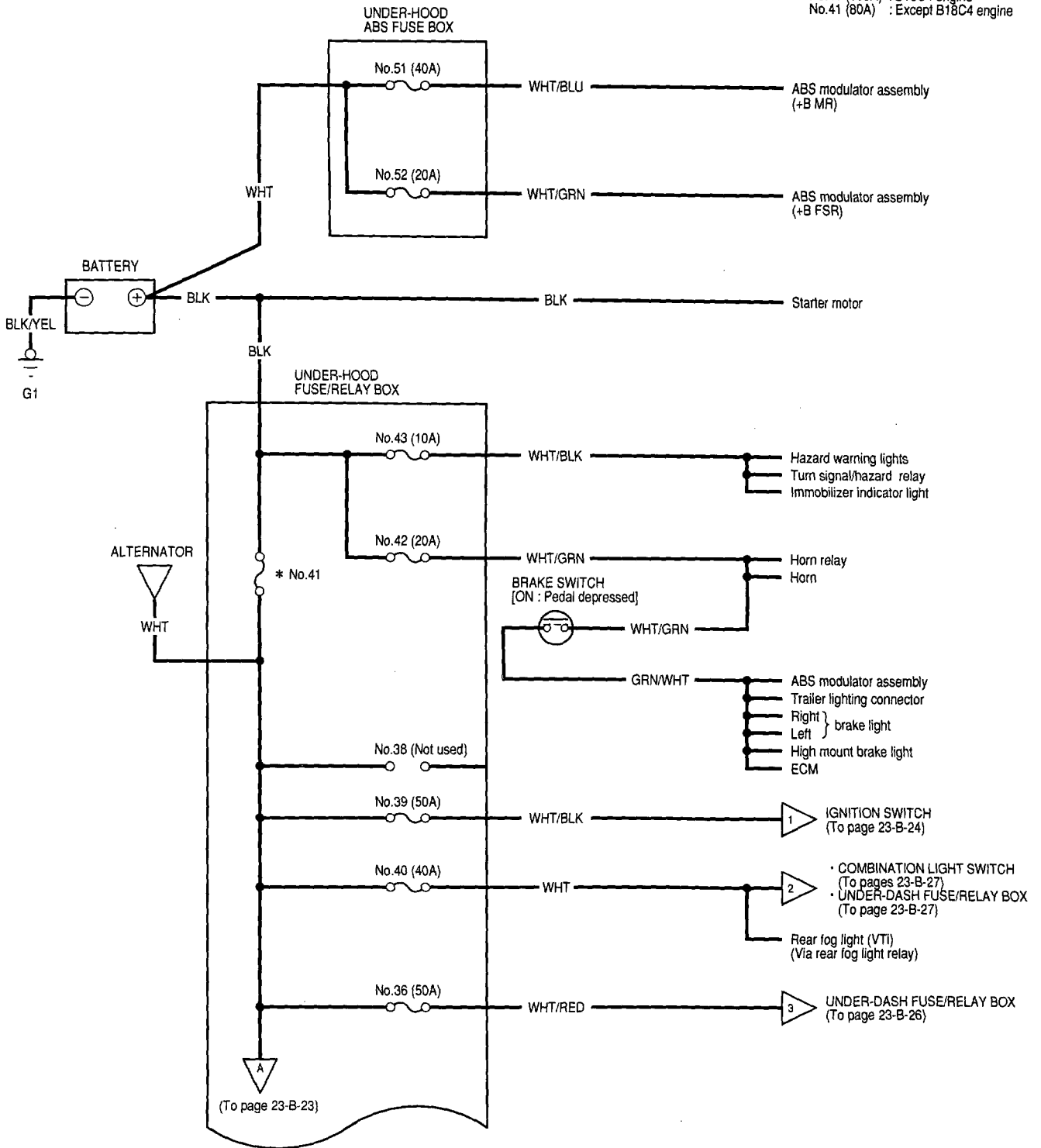


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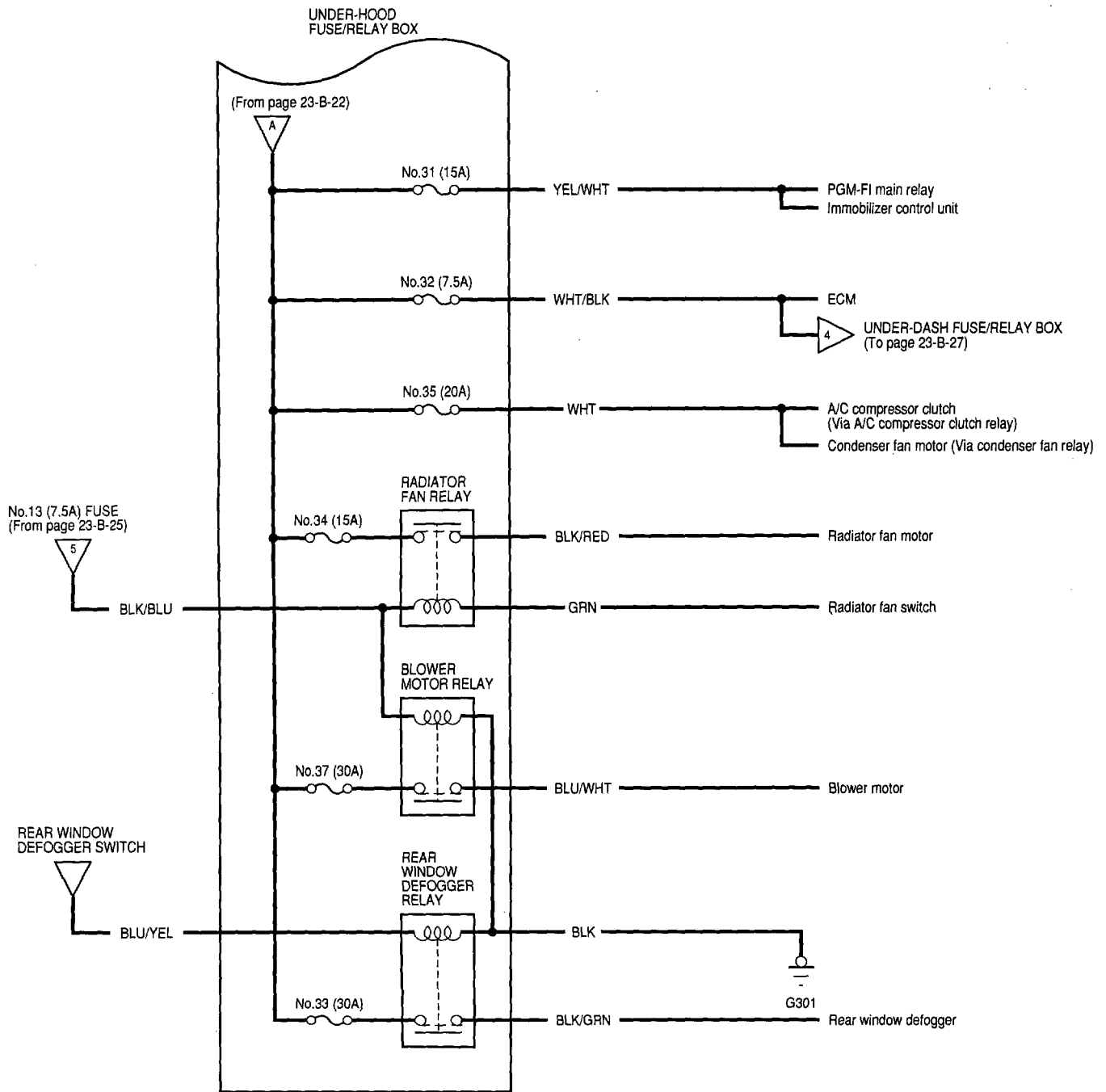
# Power Distribution

## Circuit Identification (RHD type)

\* No.41 (100A) : B18C4 engine  
 No.41 (80A) : Except B18C4 engine



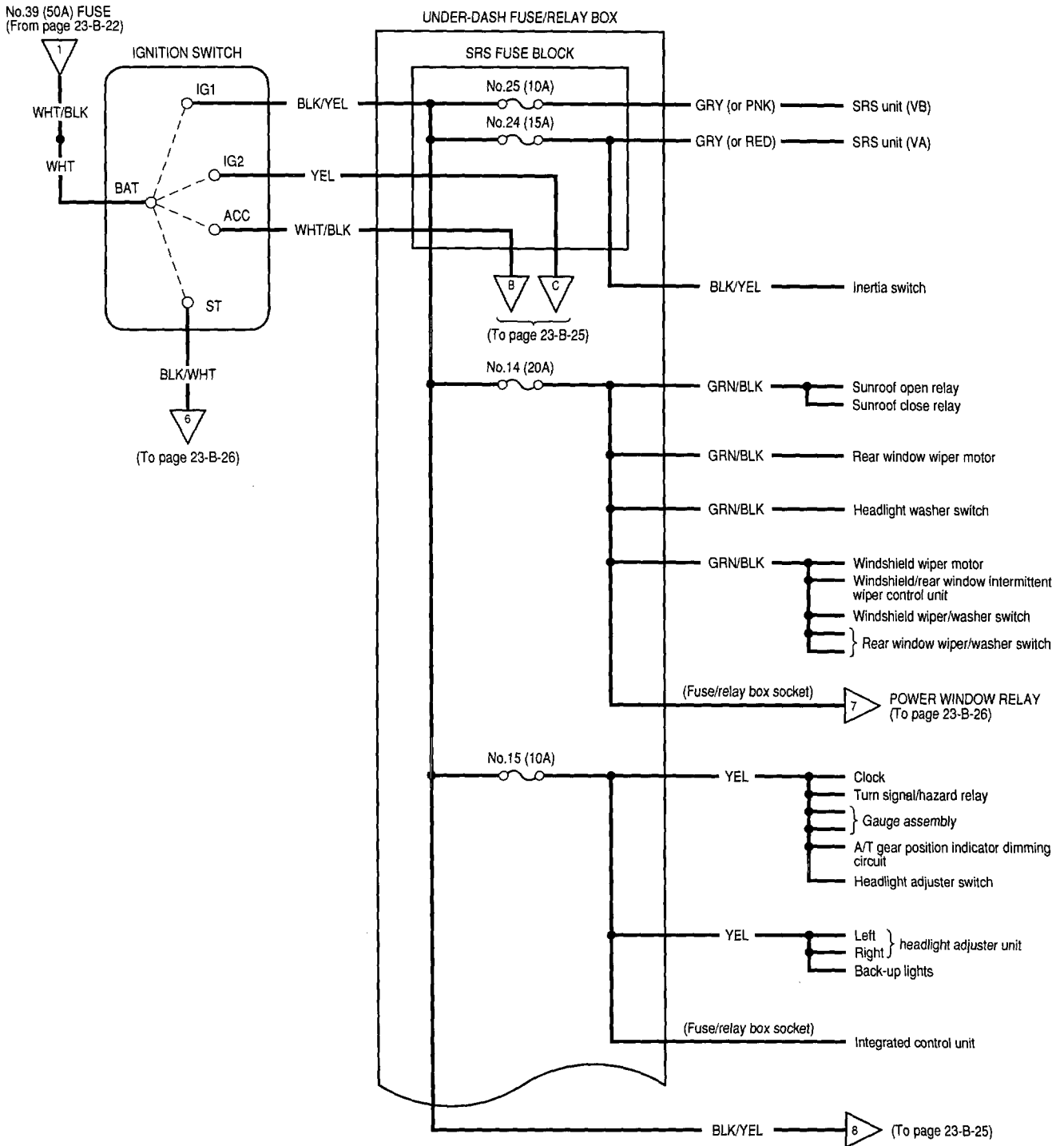


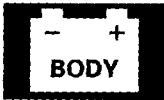


(cont'd)

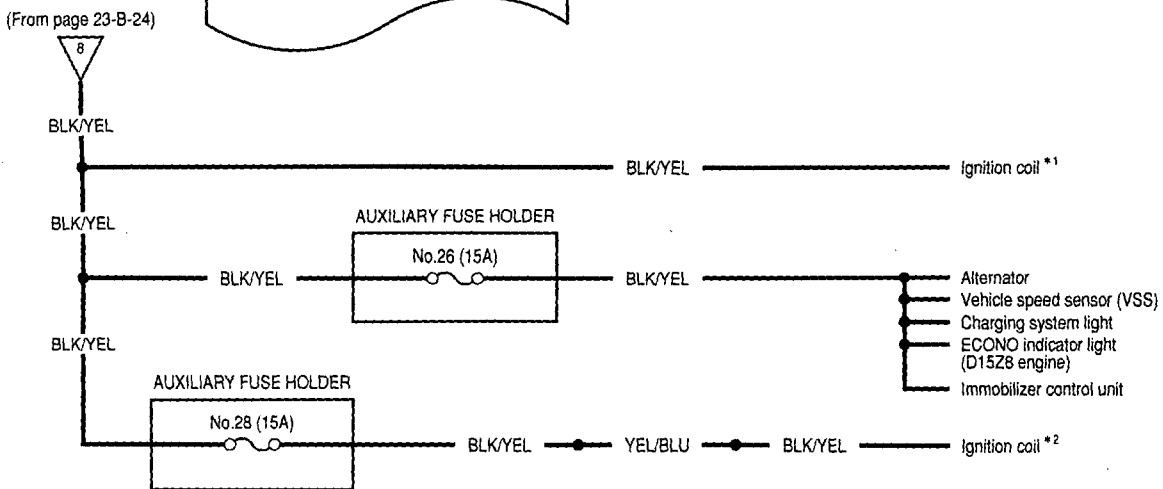
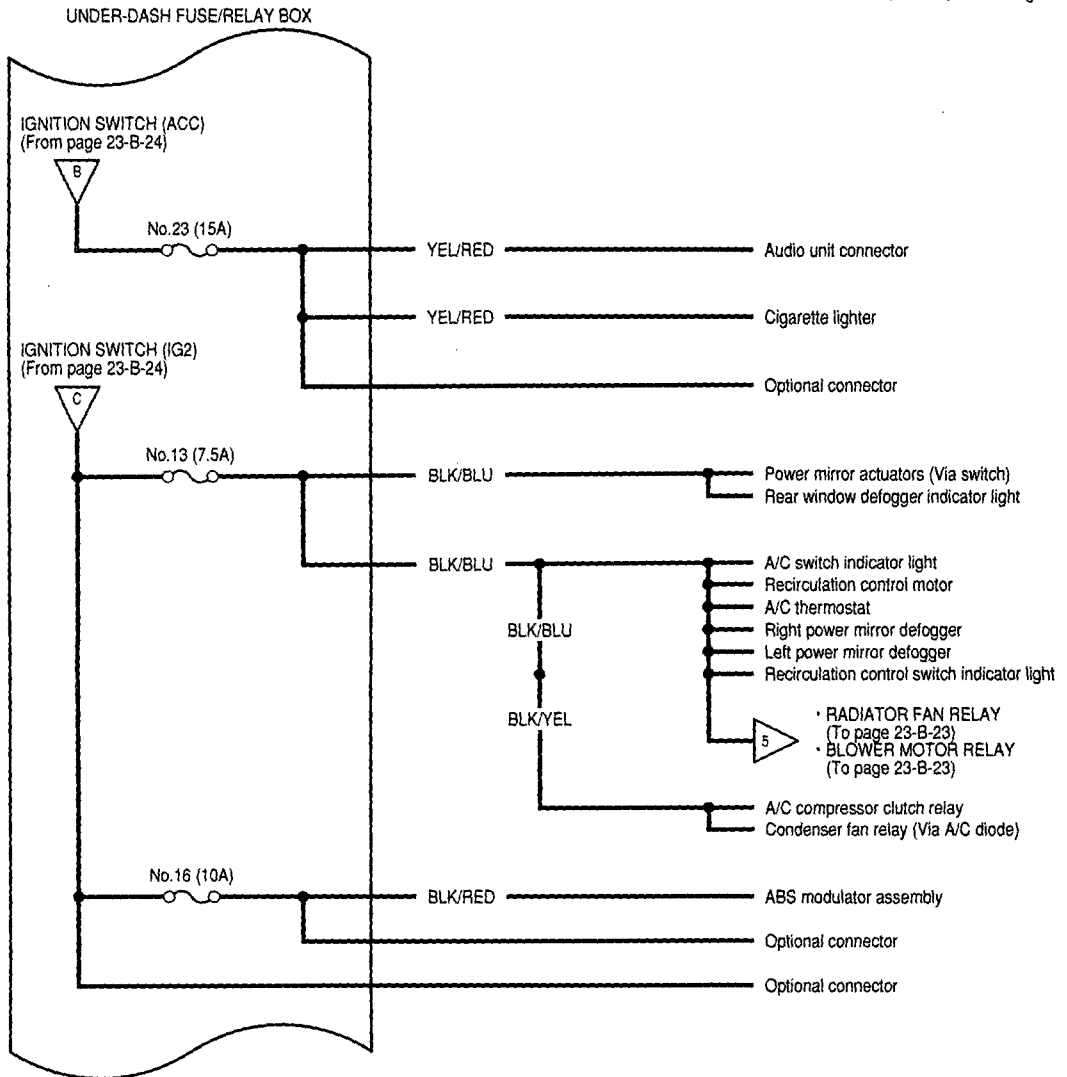
# Power Distribution

## Circuit Identification (RHD type) (cont'd)





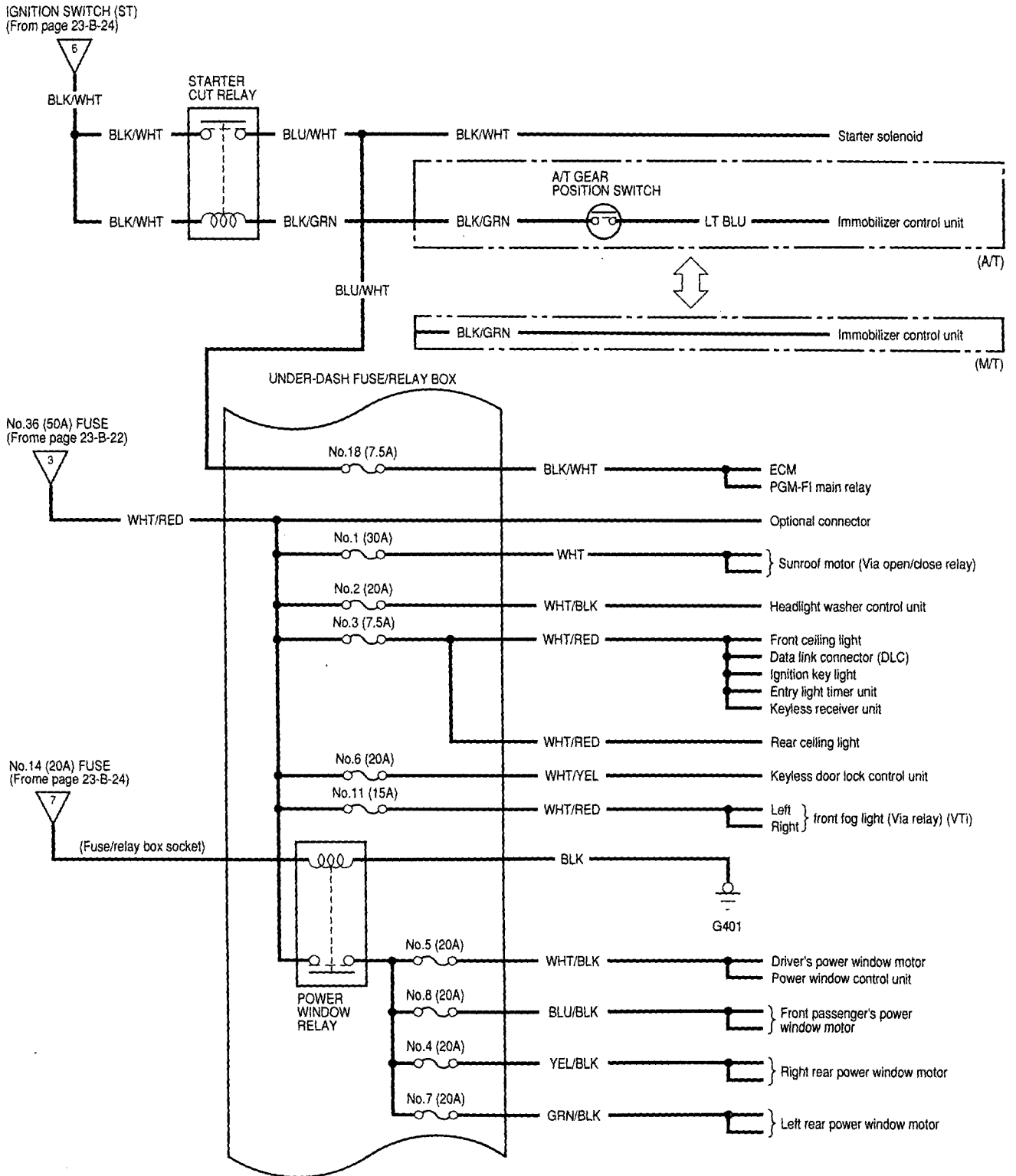
\*1 : D1528, B18C4 engine  
 \*2 : D14A7, D14A8, D16B2 engine



(cont'd)

# Power Distribution

## Circuit Identification (RHD type) (cont'd)

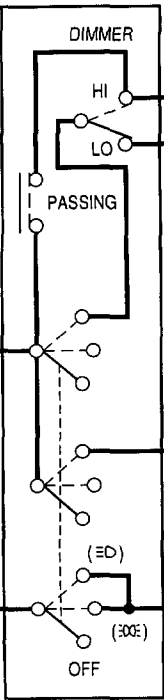




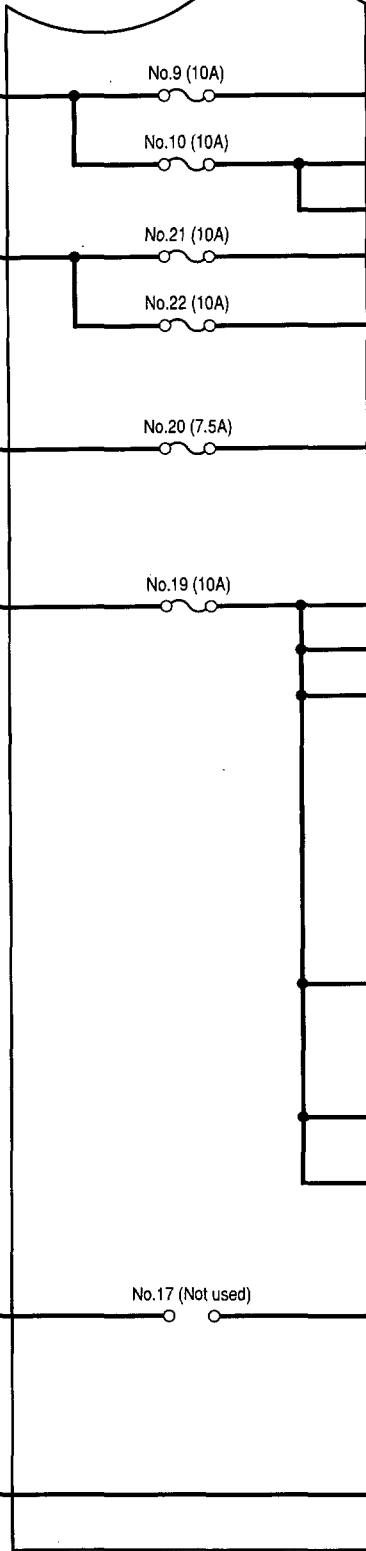
No.40 (40A) FUSE  
(From page 23-B-22)

2

COMBINATION LIGHT SWITCH



UNDER-DASH FUSE/RELAY BOX



No.40 (40A) FUSE  
(From page 23-B-22)

2

No.32 (7.5A) FUSE  
(From page 23-B-23)

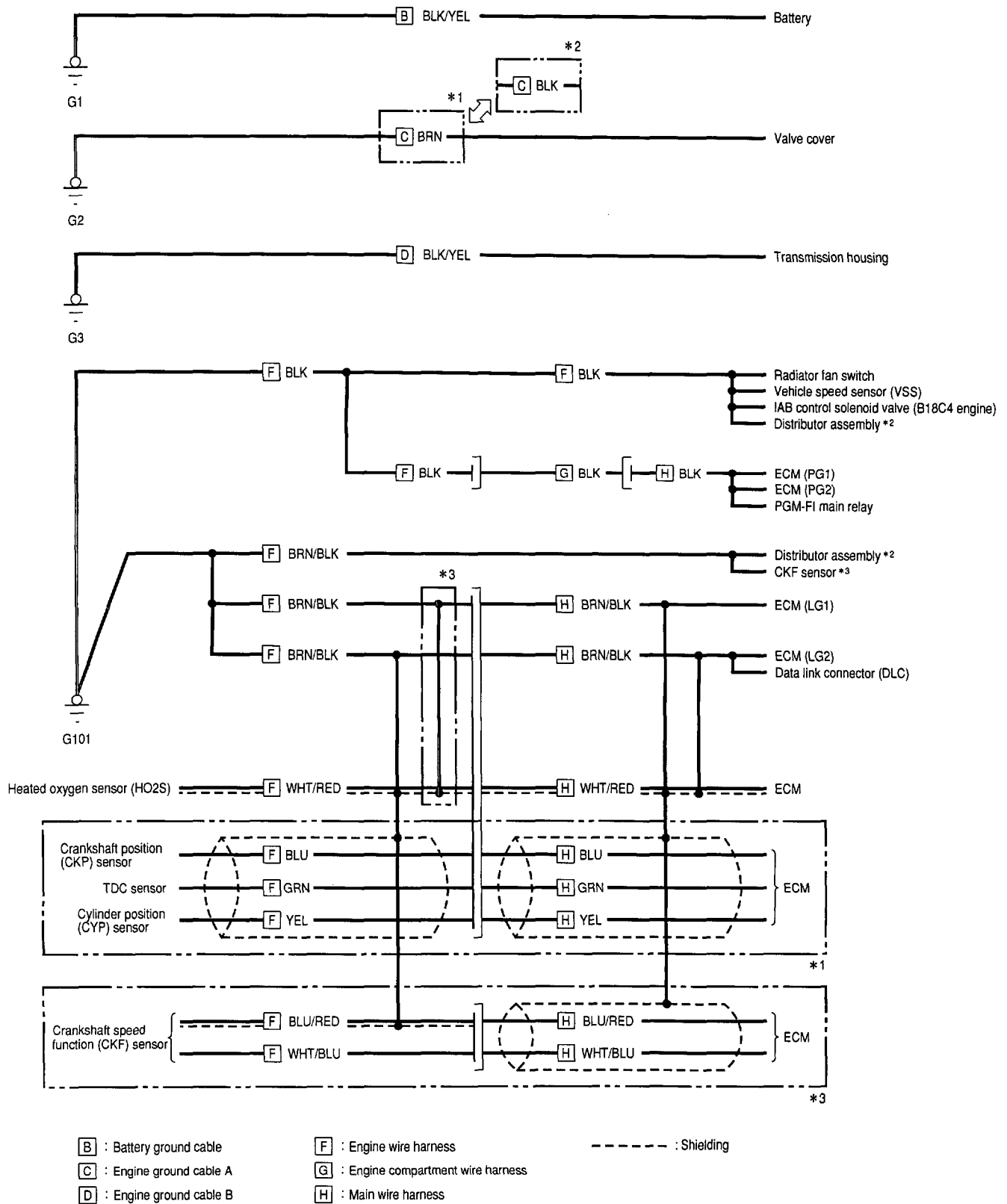
4

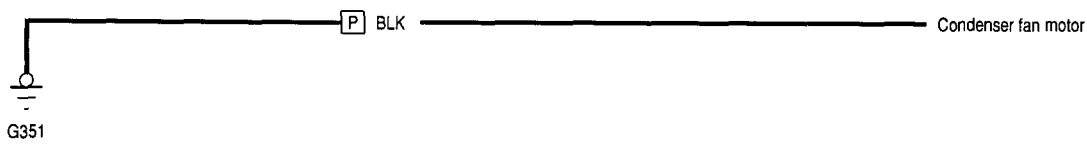
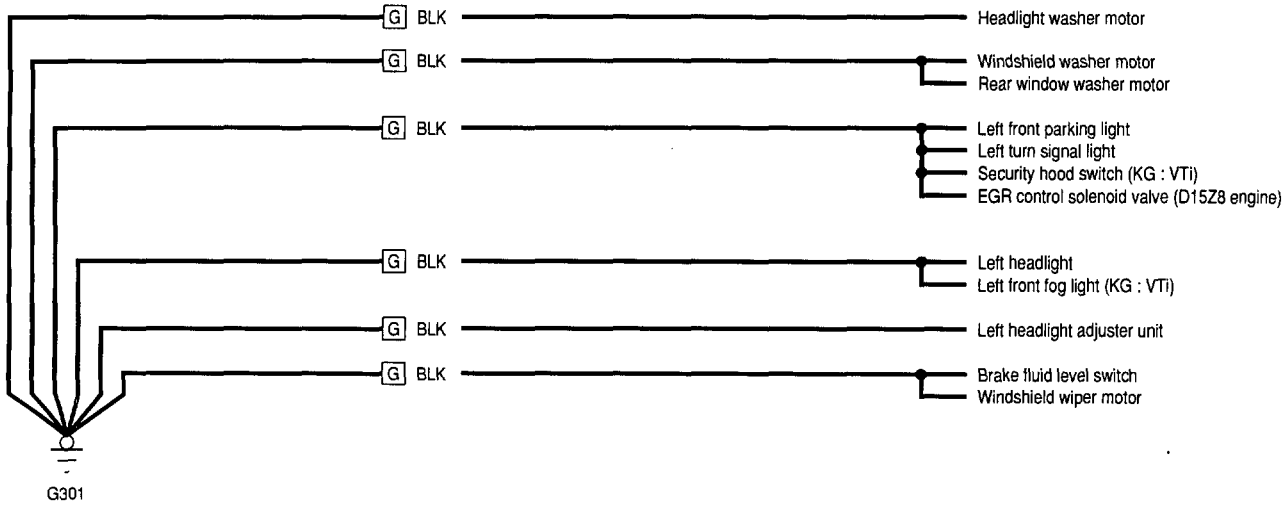
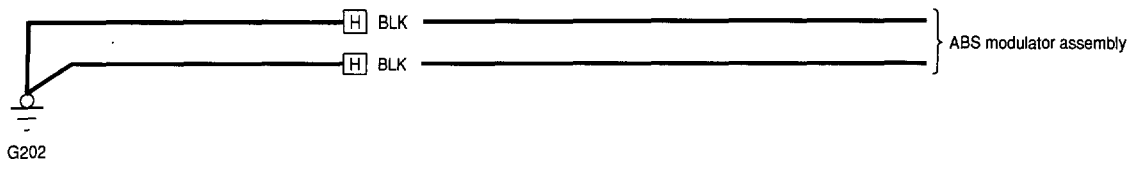
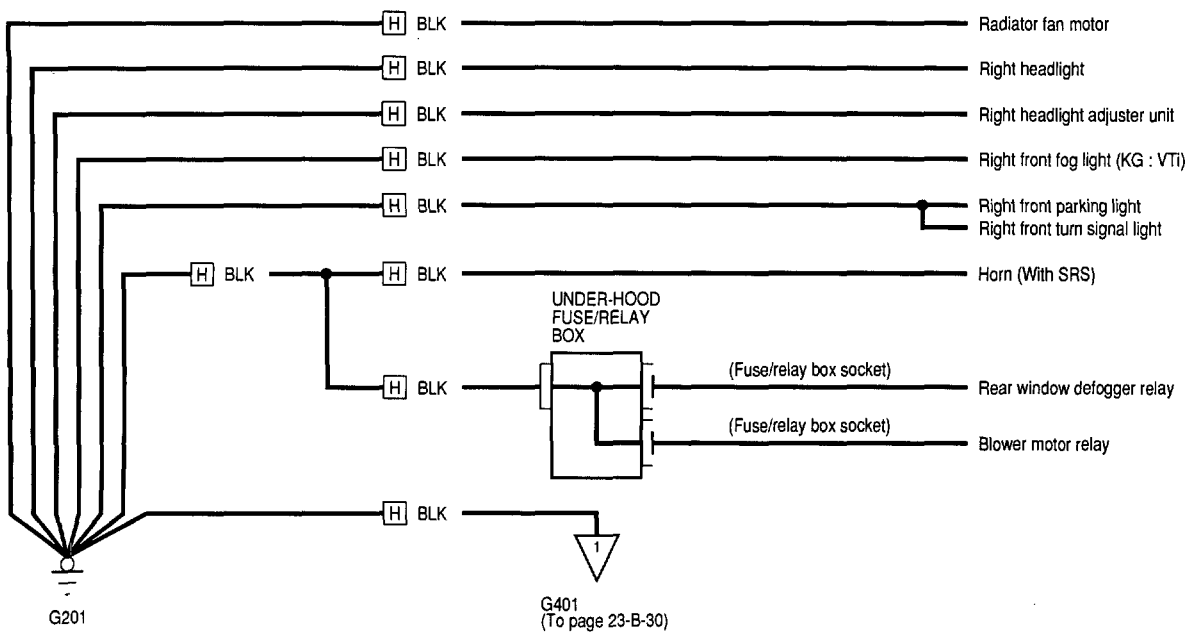
- RED/BLU — Right headlight (High beam)
- RED/GRN — High beam indicator light
- RED/GRN — Left headlight (High beam)
- RED/WHT — Right headlight (Low beam)
- RED/YEL — Left headlight (Low beam)
- WHT/RED — Rear fog light control unit
- Headlight washer control unit
- Optional connector
- (Fuse/relay box socket)
- Integrated control unit
- RED/BLK — Hazard warning switch light
- Gauge lights
- Audio unit connector
- Rear window defogger switch light
- Front fog light switch light (VTI)
- Rear fog light switch light
- Glove box light
- Dash lights brightness controller
- Lights (in dim mode)
- for clock, A/T gear position indicator
- ECONO indicator light (D1528 engine)
- Headlight washer switch light
- RED/BLU — A/C switch light
- Heater control panel light
- A/T gear position console light
- Recirculation control switch light
- Ashtray light
- RED/BLK — Left } front parking light
- Right }
- RED/BLK — Left } taillight
- Right }
- Trailer lighting connector
- Left } license plate light
- Right }
- WHT/BLK — Audio unit connector
- Clock

# Ground Distribution

## Circuit Identification (LHD type)

\*1 : D15Z8, B18C4 engine  
 \*2 : D14A7, D14A8, D16B2 engine  
 \*3 : D15Z8 engine





**G** : Engine compartment wire harness      **P** : A/C wire harness  
**H** : Main wire harness

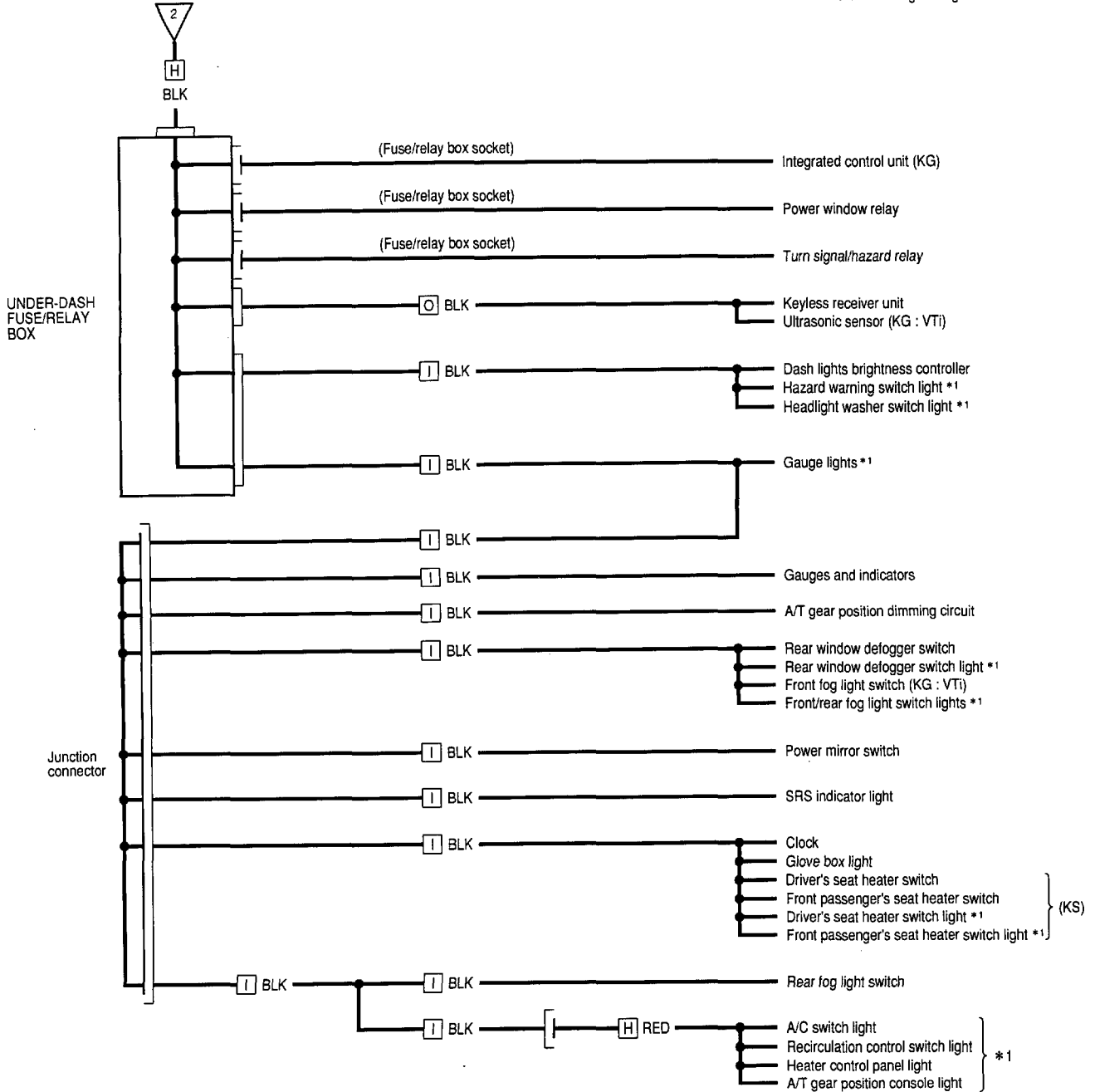
(cont'd)





G401  
(From page 23-B-30)

\* 1 : Without dash lights brightness controller



[H] : Main wire harness

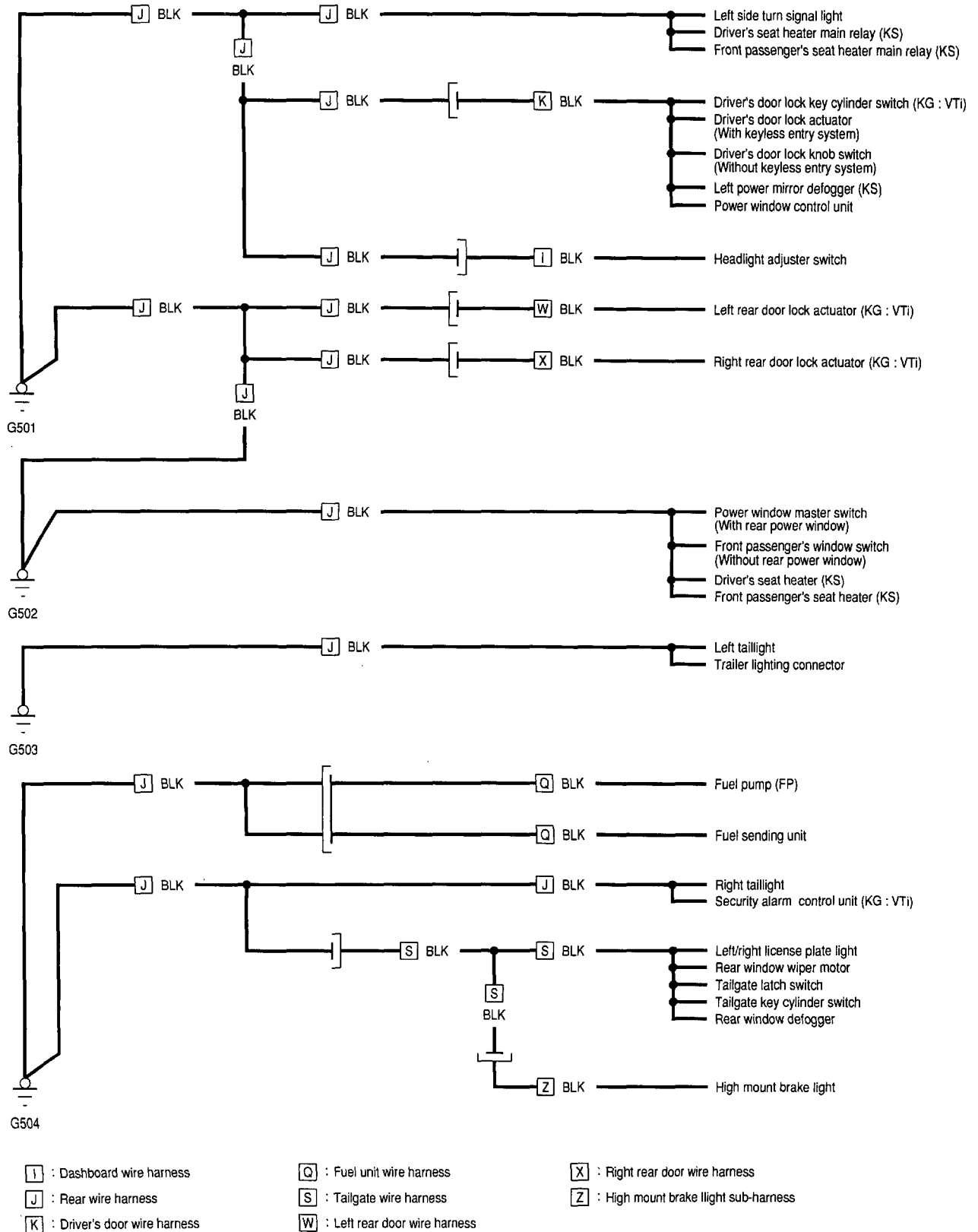
[O] : Roof wire harness

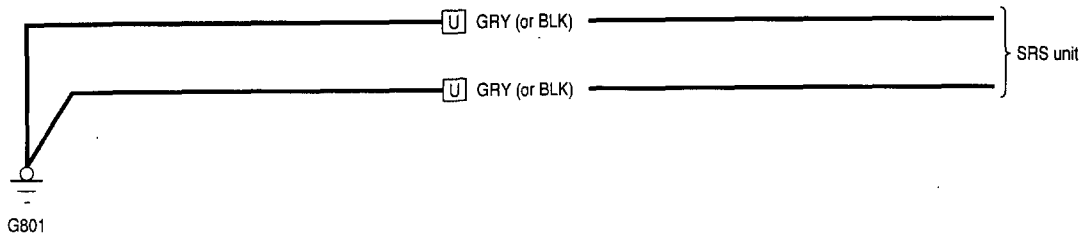
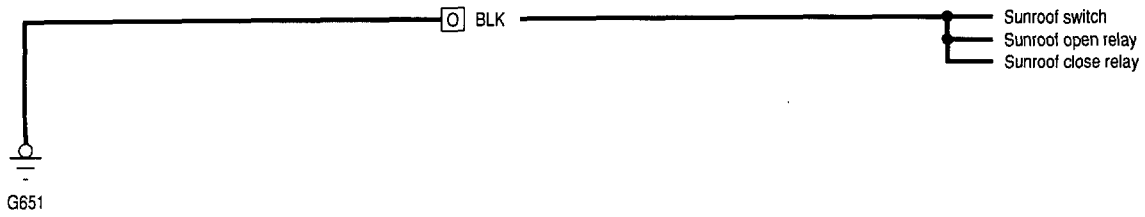
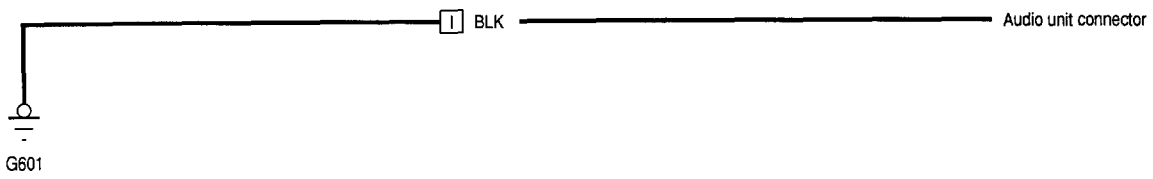
[I] : Dashboard wire harness

(cont'd)

# Ground Distribution

## Circuit Identification (LHD type) (cont'd)





I : Dashboard wire harness

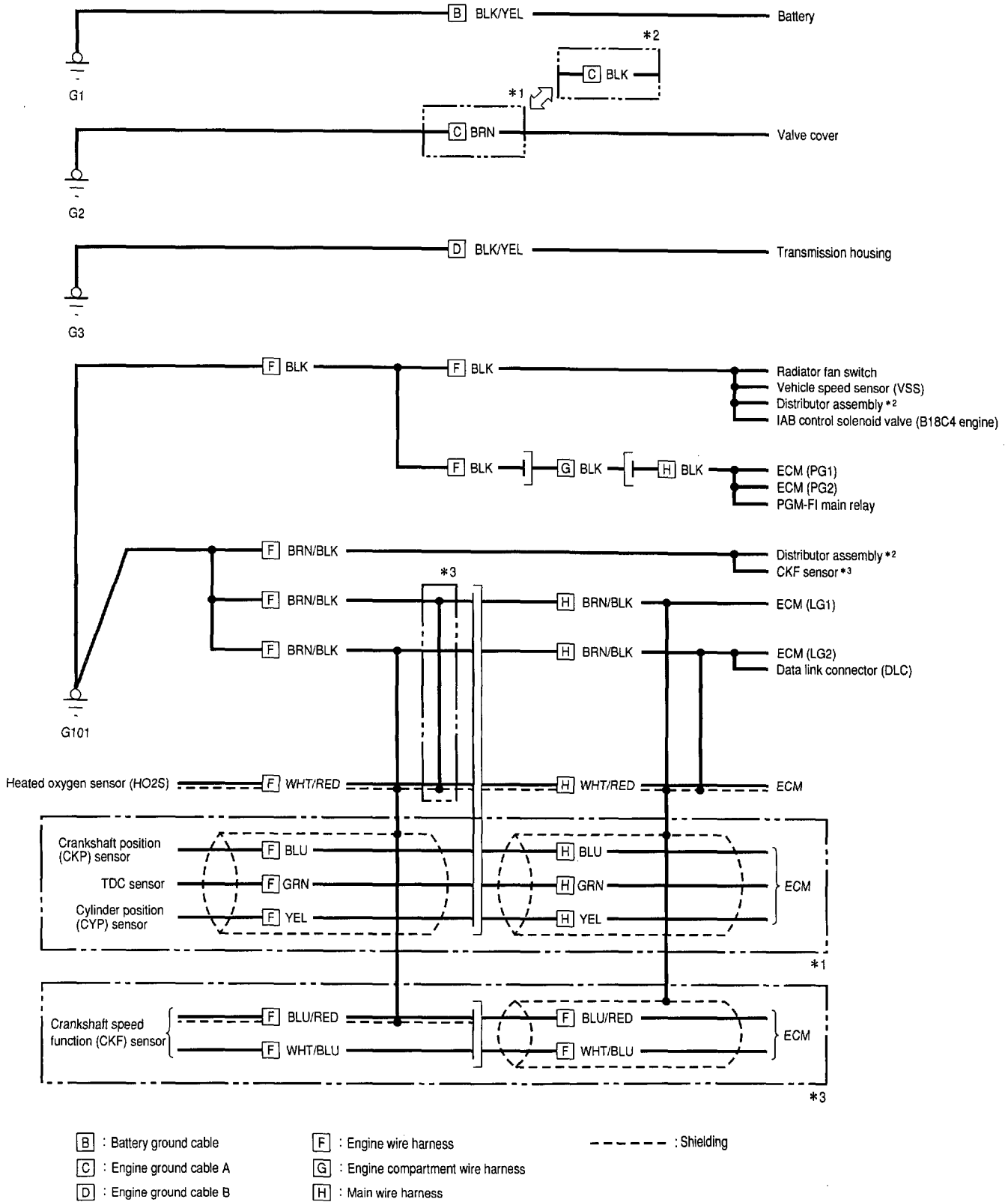
O : Roof wire harness

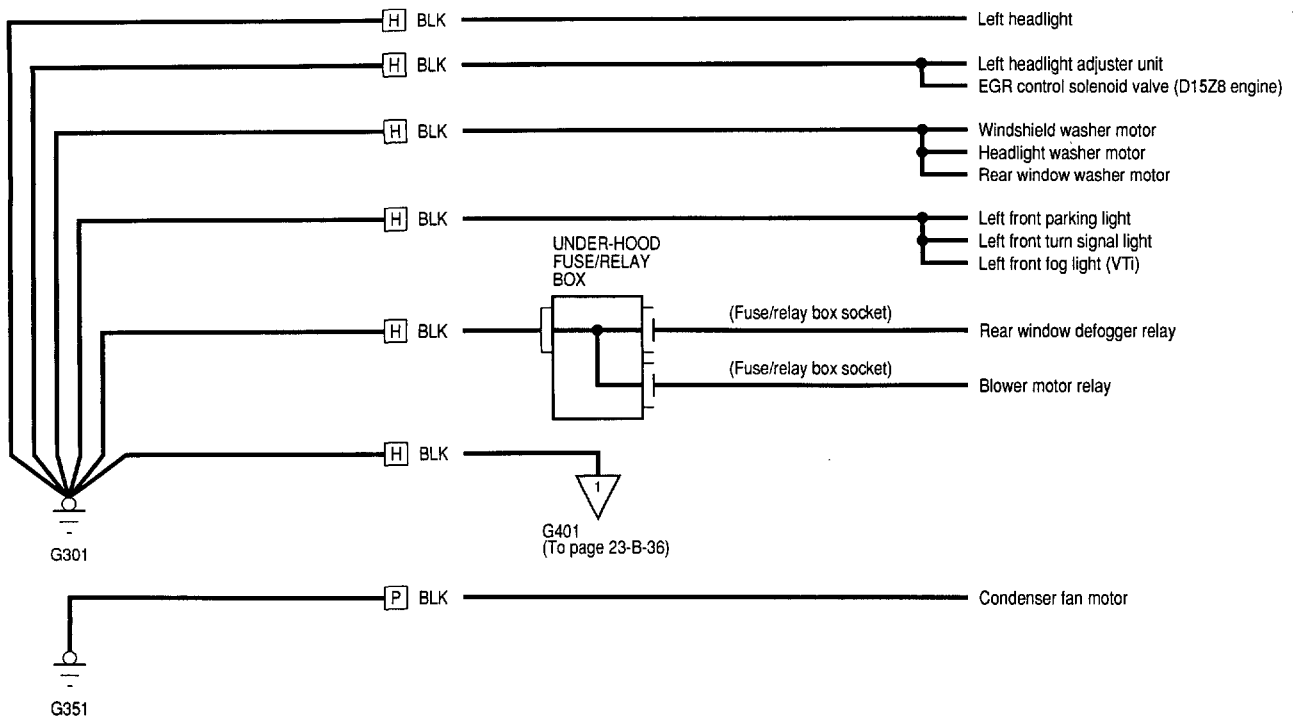
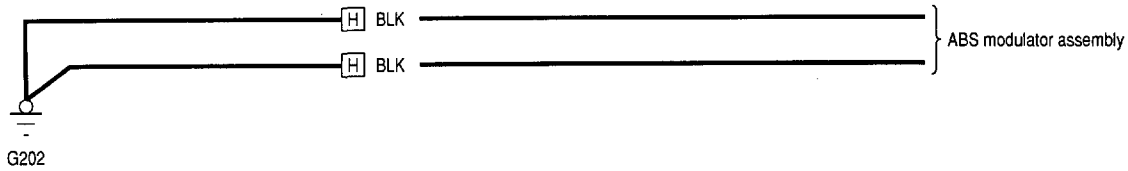
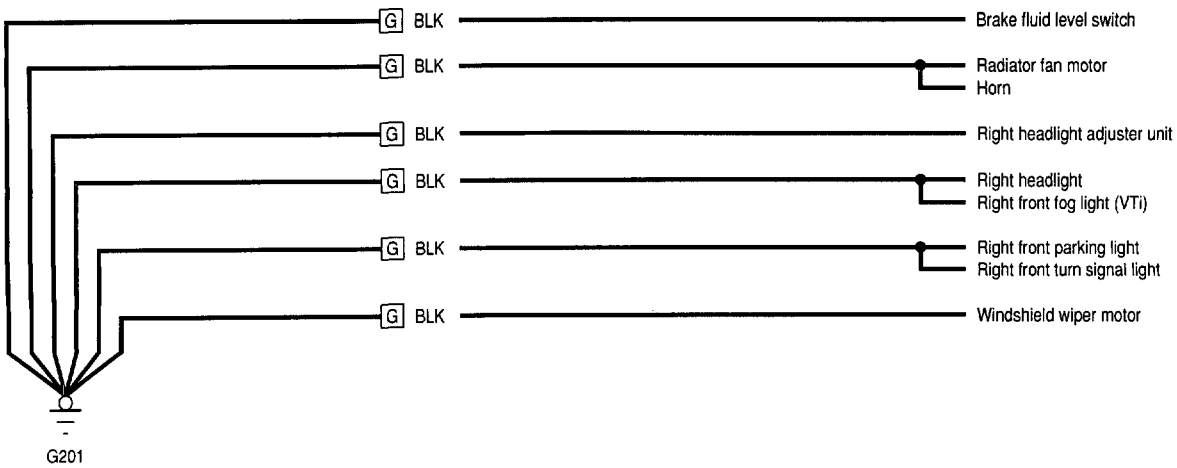
U : SRS main harness

# Ground Distribution

## Circuit Identification (RHD type)

\*1 : D15Z8, B18C4 engine  
 \*2 : D14A7, D14A8, D16B2 engine  
 \*3 : D15Z8 engine





[G] : Engine compartment wire harness

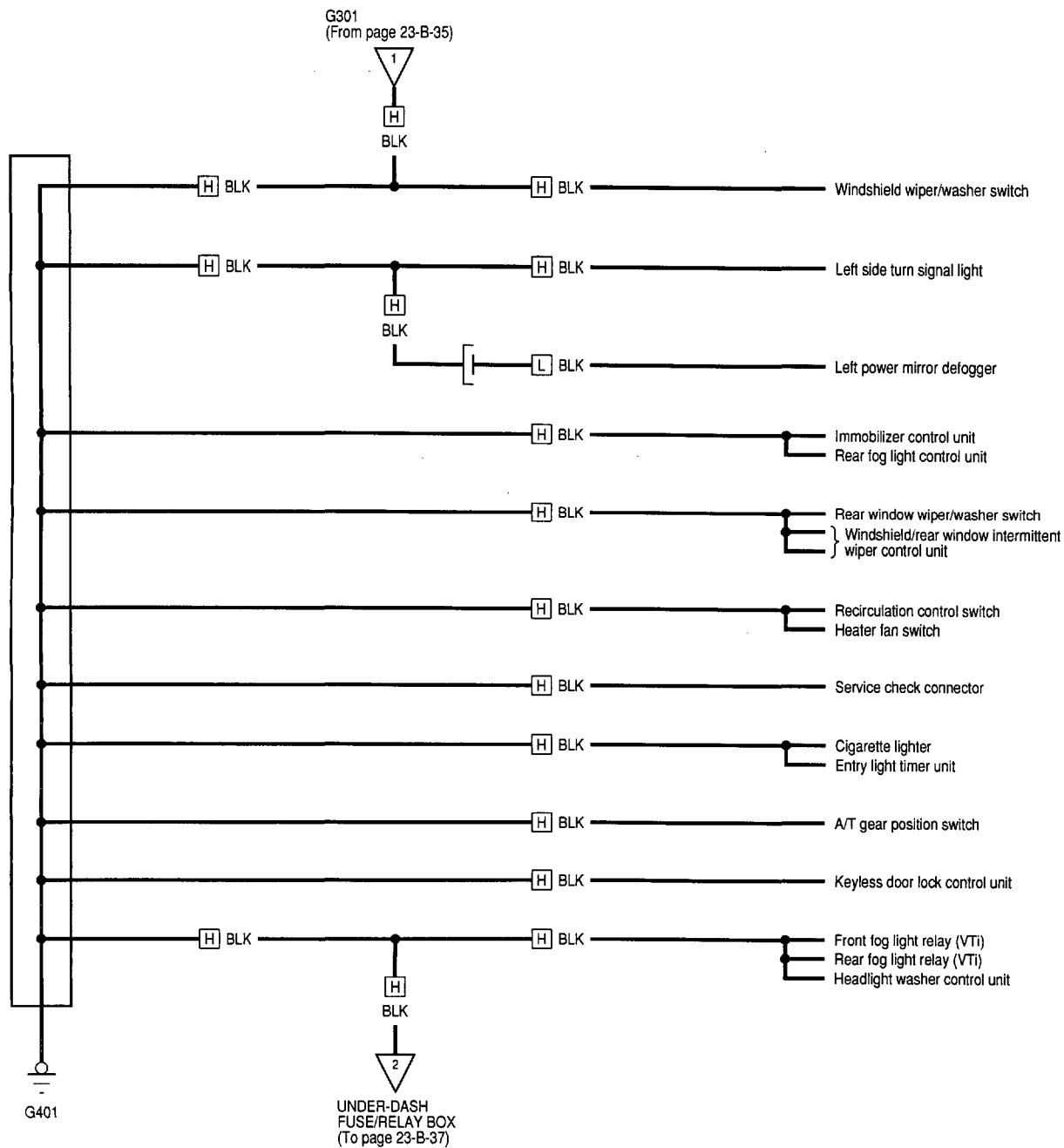
[P] : A/C wire harness

[H] : Main wire harness

(cont'd)

# Ground Distribution

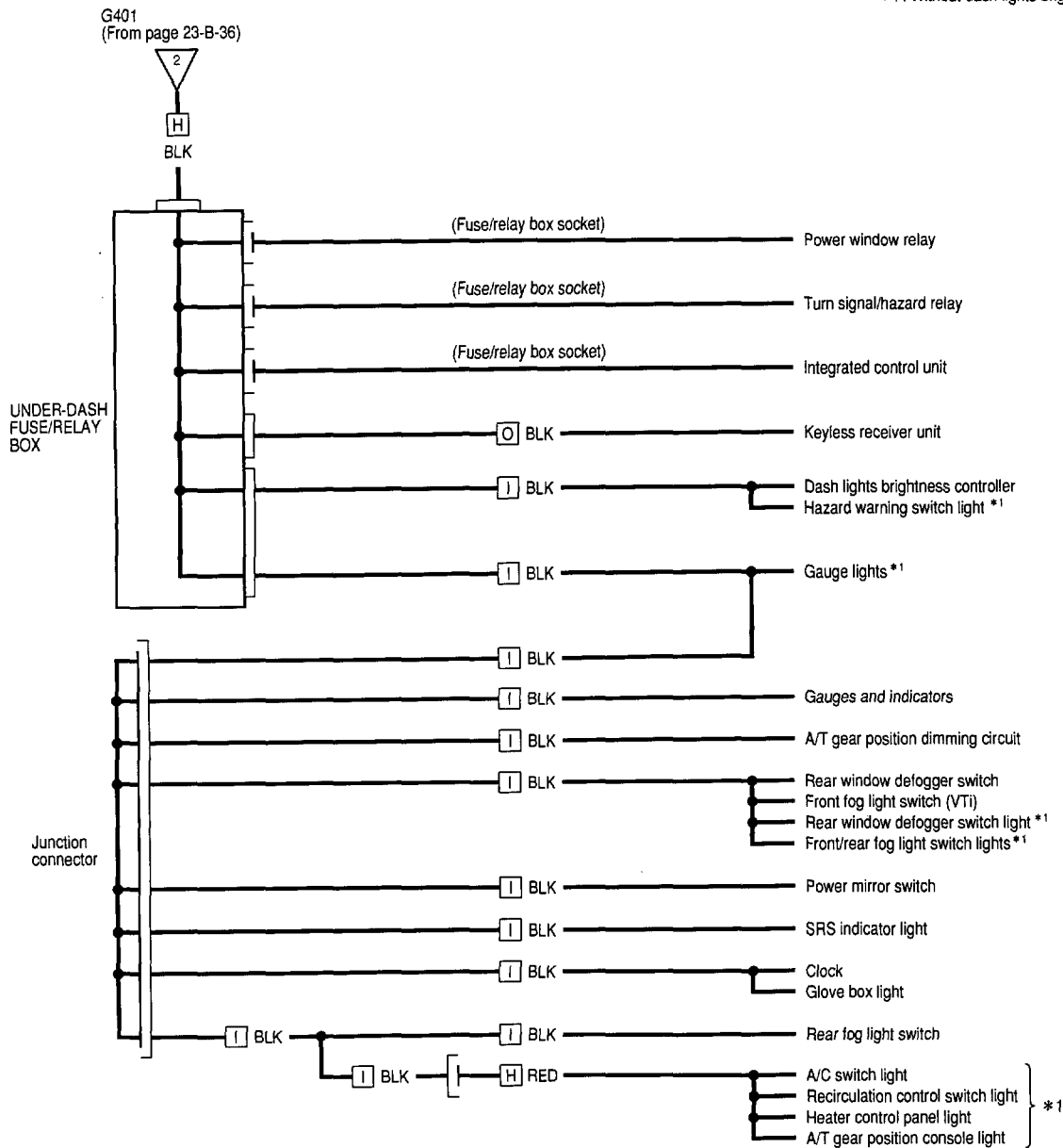
## Circuit Identification (RHD type) (cont'd)



H : Main wire harness

L : Front passenger's door wire harness

\*1 : Without dash lights brightness controller



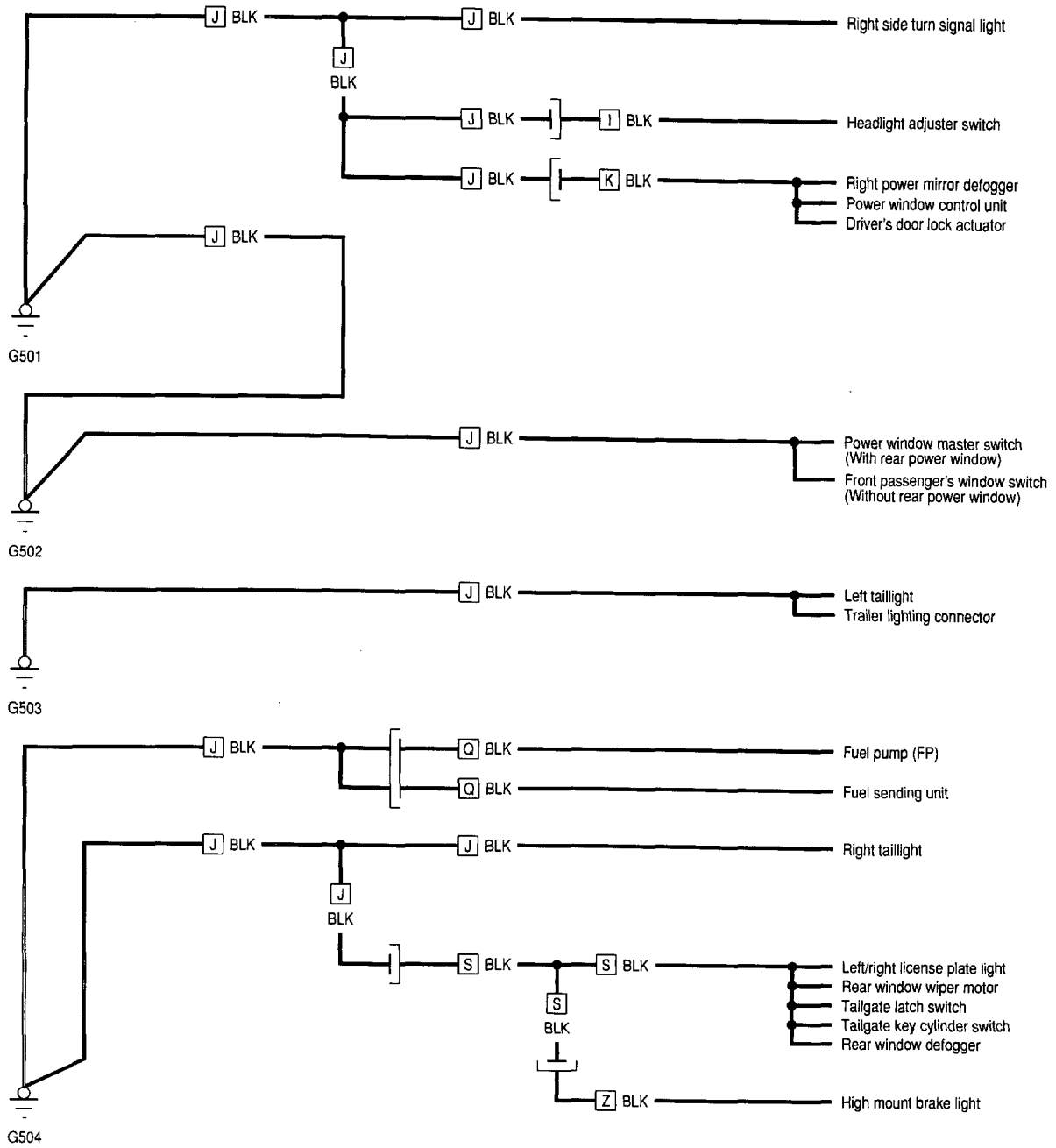
(H) : Main wire harness  
(I) : Dashboard wire harness

(O) : Roof wire harness

(cont'd)

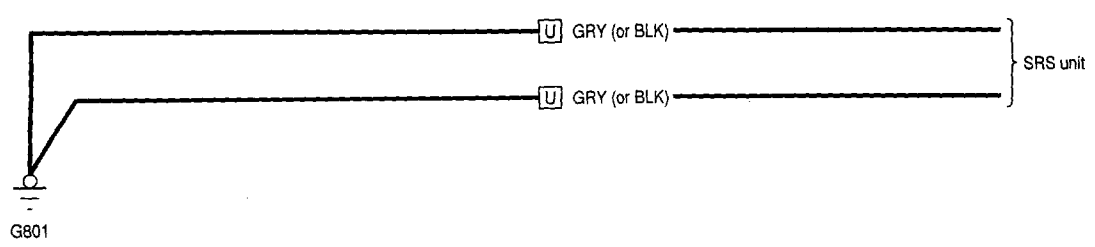
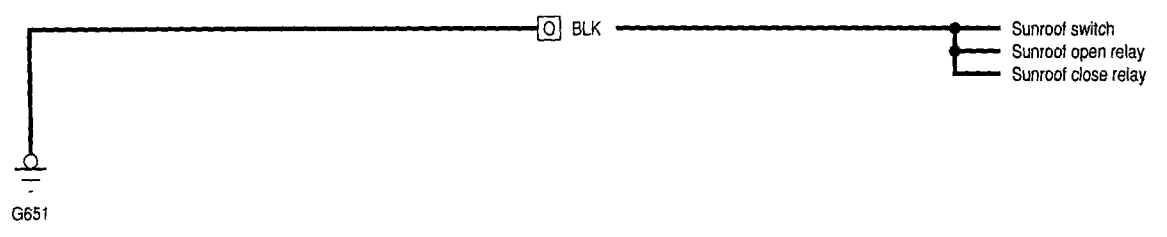
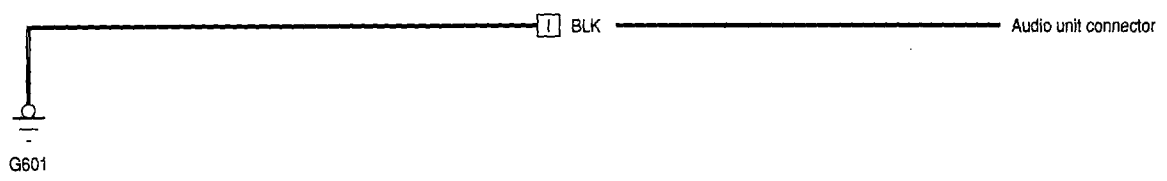
# Ground Distribution

## Circuit Identification (RHD type) (cont'd)



- |                                       |   |
|---------------------------------------|---|
| <b>I</b> : Dashboard wire harness     | <b>Q</b> : Fuel unit wire harness             |
| <b>J</b> : Rear wire harness          | <b>S</b> : Tailgate wire harness              |
| <b>K</b> : Driver's door wire harness | <b>Z</b> : High mount brake light sub-harness |





**I** : Dashboard wire harness

**O** : Roof wire harness

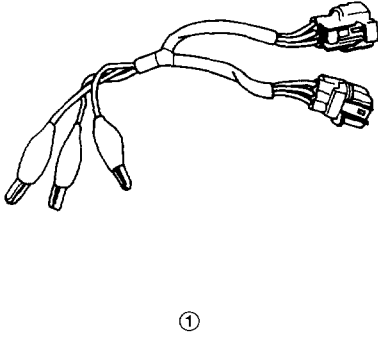
**U** : SRS main harness

## Gauges

<b>Special Tools .....</b>	<b>23-C-2</b>
<b>Gauge Assembly</b>	
<b>Component Location Index .....</b>	<b>23-C-3</b>
<b>Gauge/Terminal Location Index .....</b>	<b>23-C-4</b>
<b>Bulb Locations .....</b>	<b>23-C-5</b>
<b>Circuit Diagram .....</b>	<b>23-C-6</b>
<b>Replacement .....</b>	<b>23-C-9</b>
<b>Vehicle Speed Sensor (VSS)</b>	
<b>Troubleshooting .....</b>	<b>23-C-10</b>
<b>Replacement .....</b>	<b>23-C-12</b>



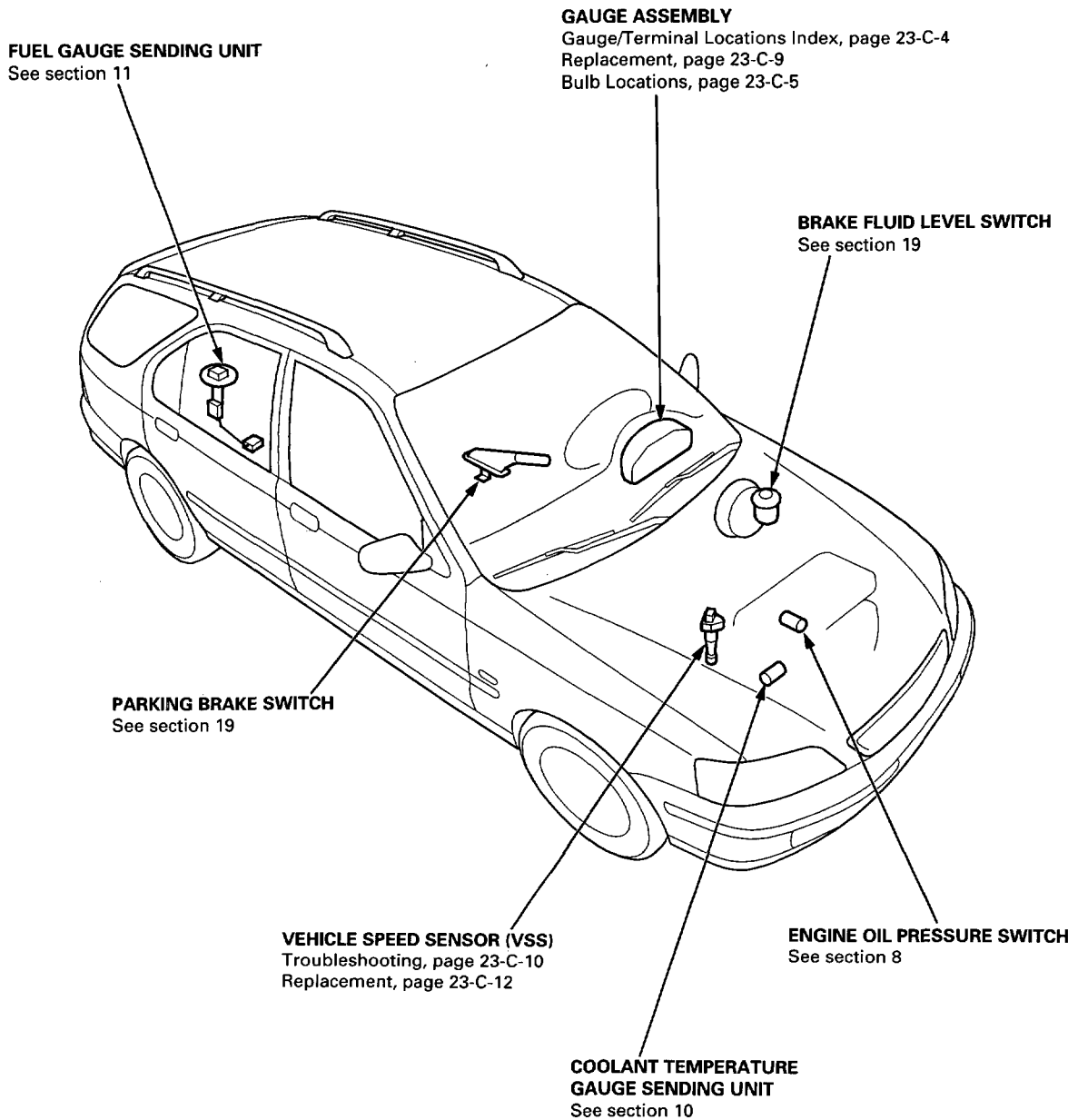
# Special Tools

Ref. No.	Tool Number	Description	Qty	Remark
①	07LAJ - PT30200	Test Harness	1	
				



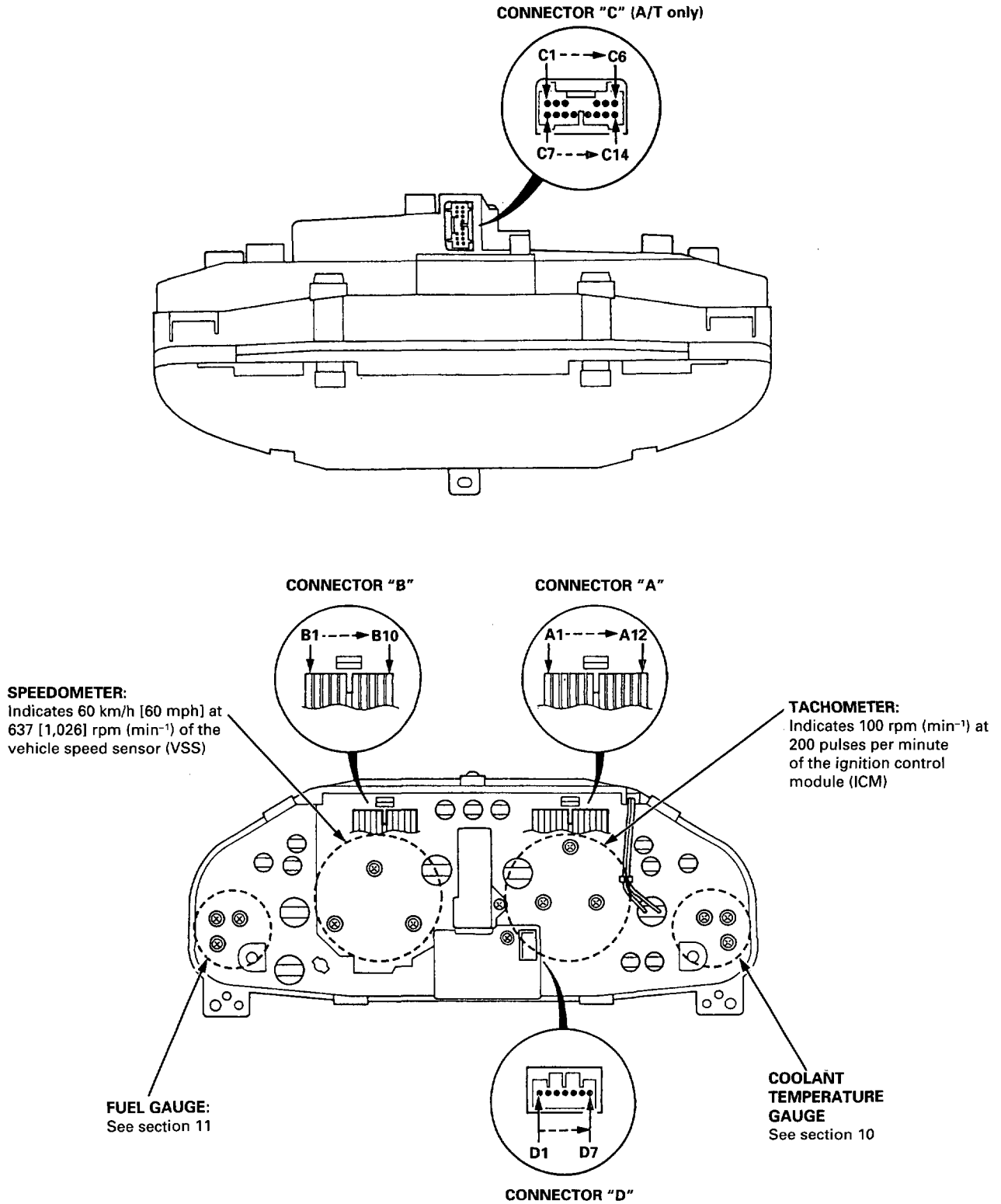
## Component Location Index

NOTE: LHD type is shown, RHD type is similar.



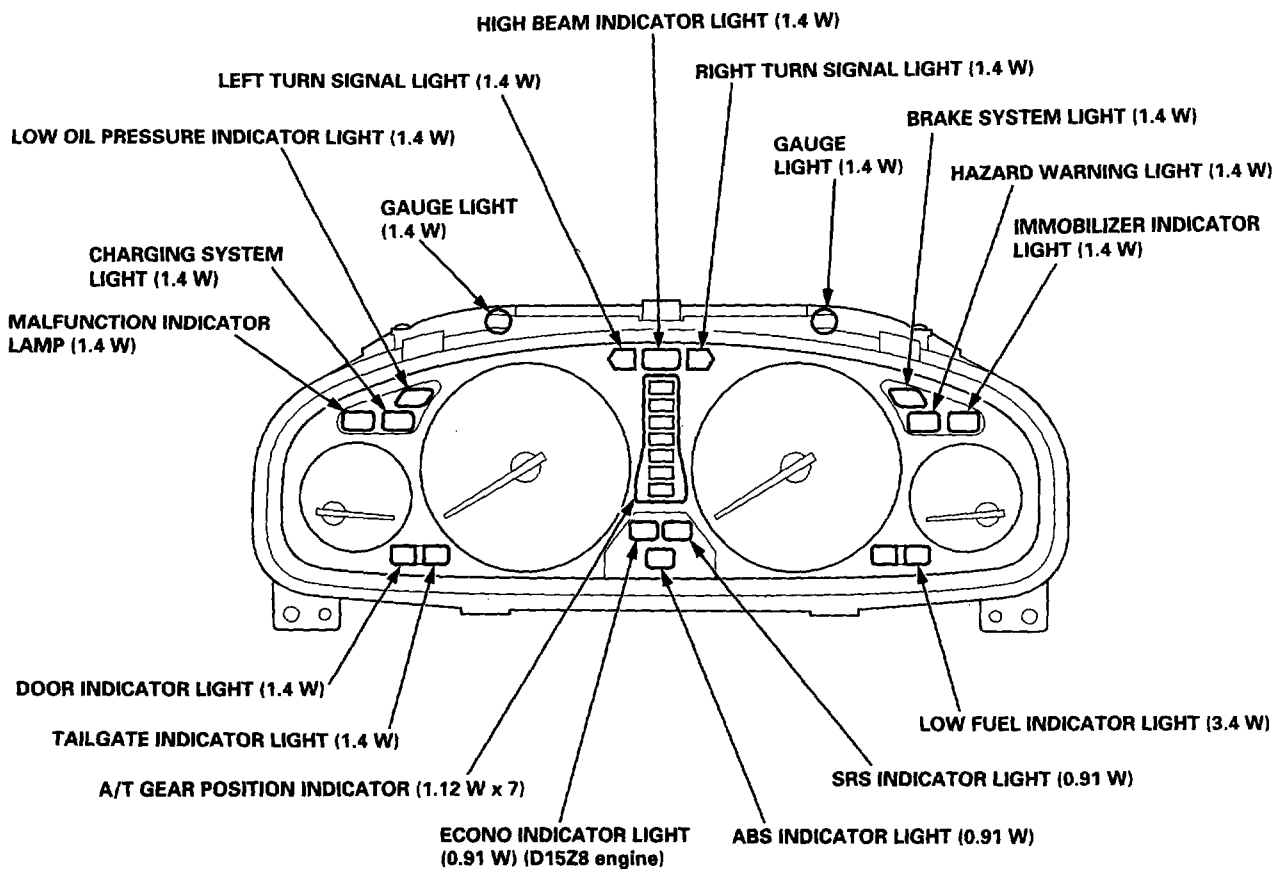
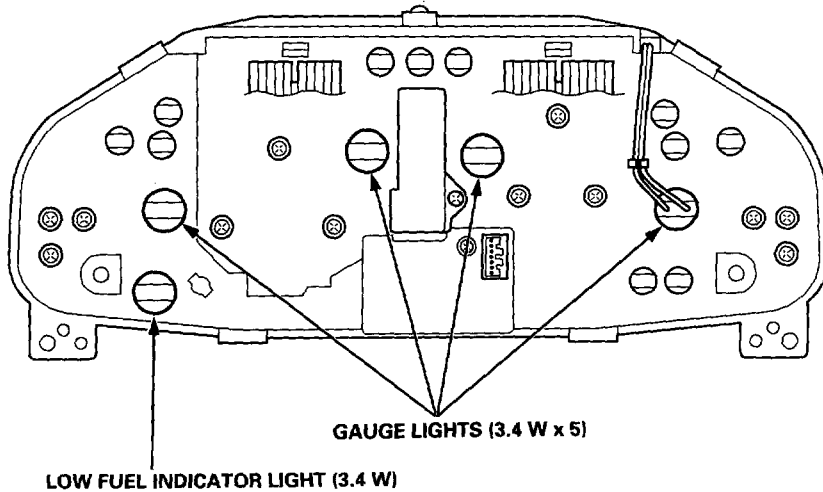
# Gauge Assembly

## Gauge/Terminal Location Index



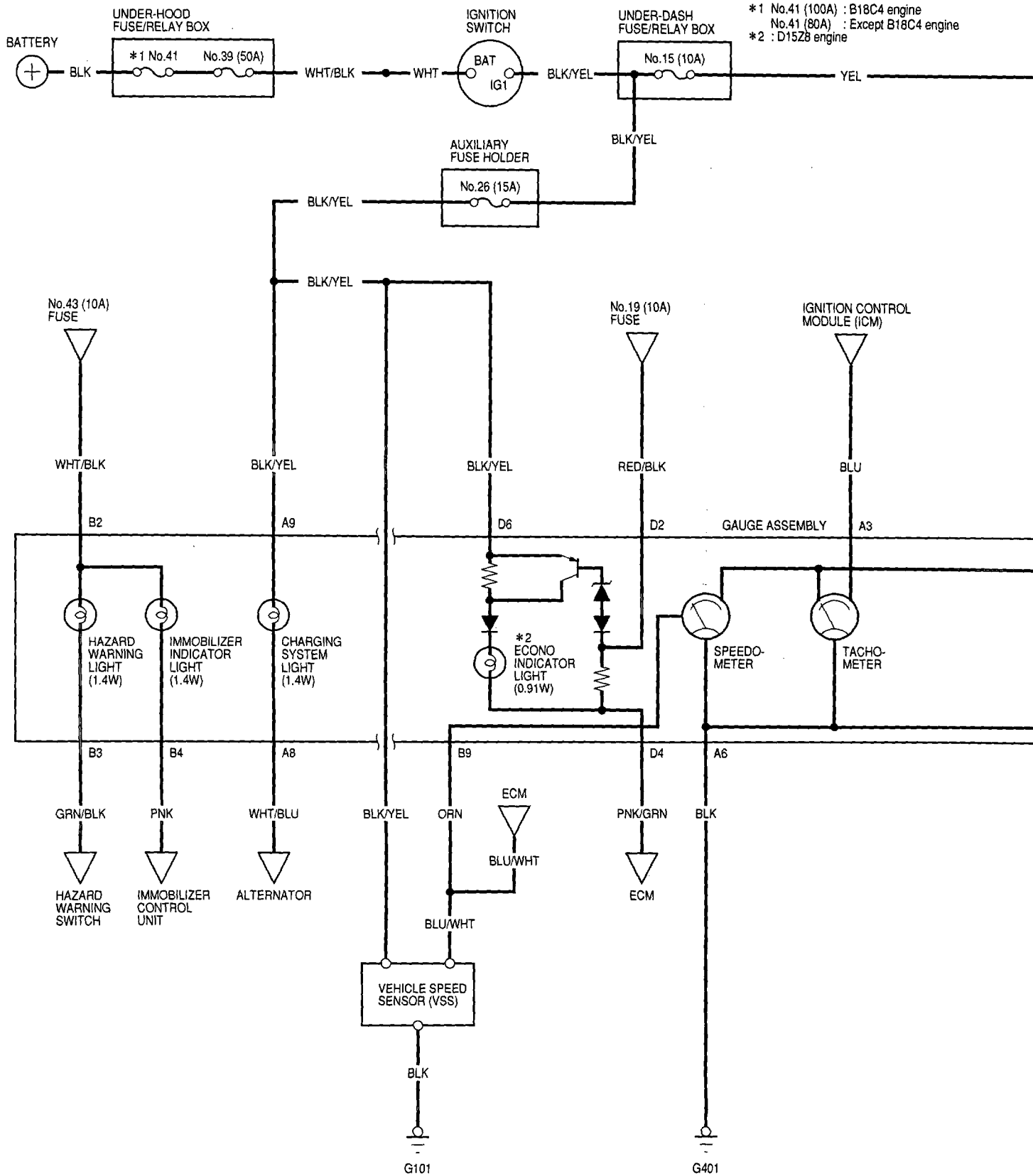


## Bulb Locations



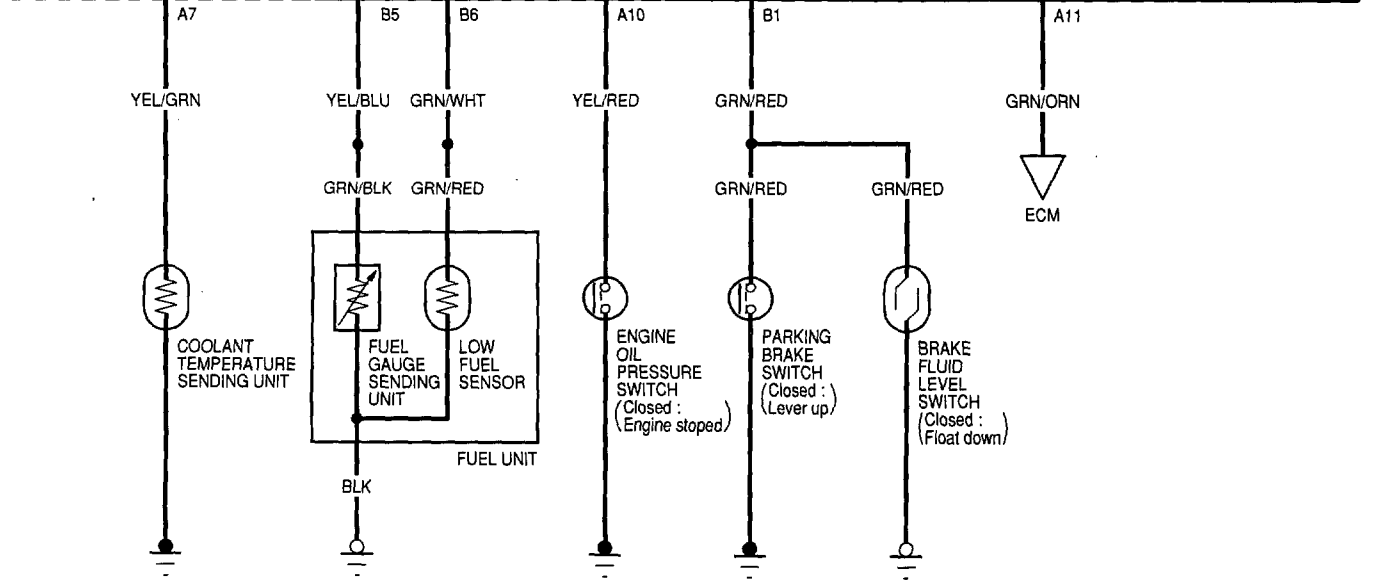
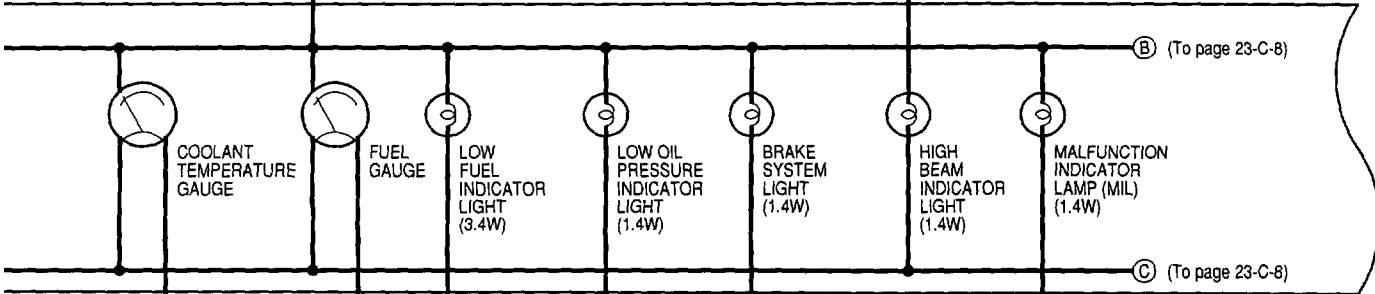
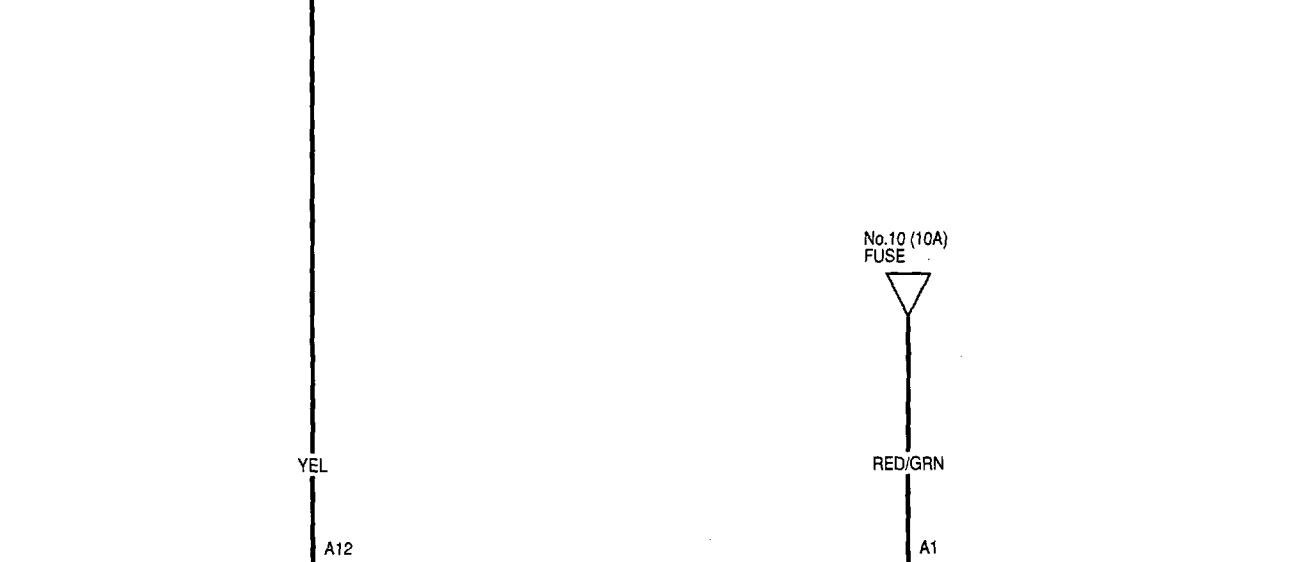
# Gauge Assembly

## Circuit Diagram





YEL ——— YEL ——— (A) (To page 23-C-8)



G504

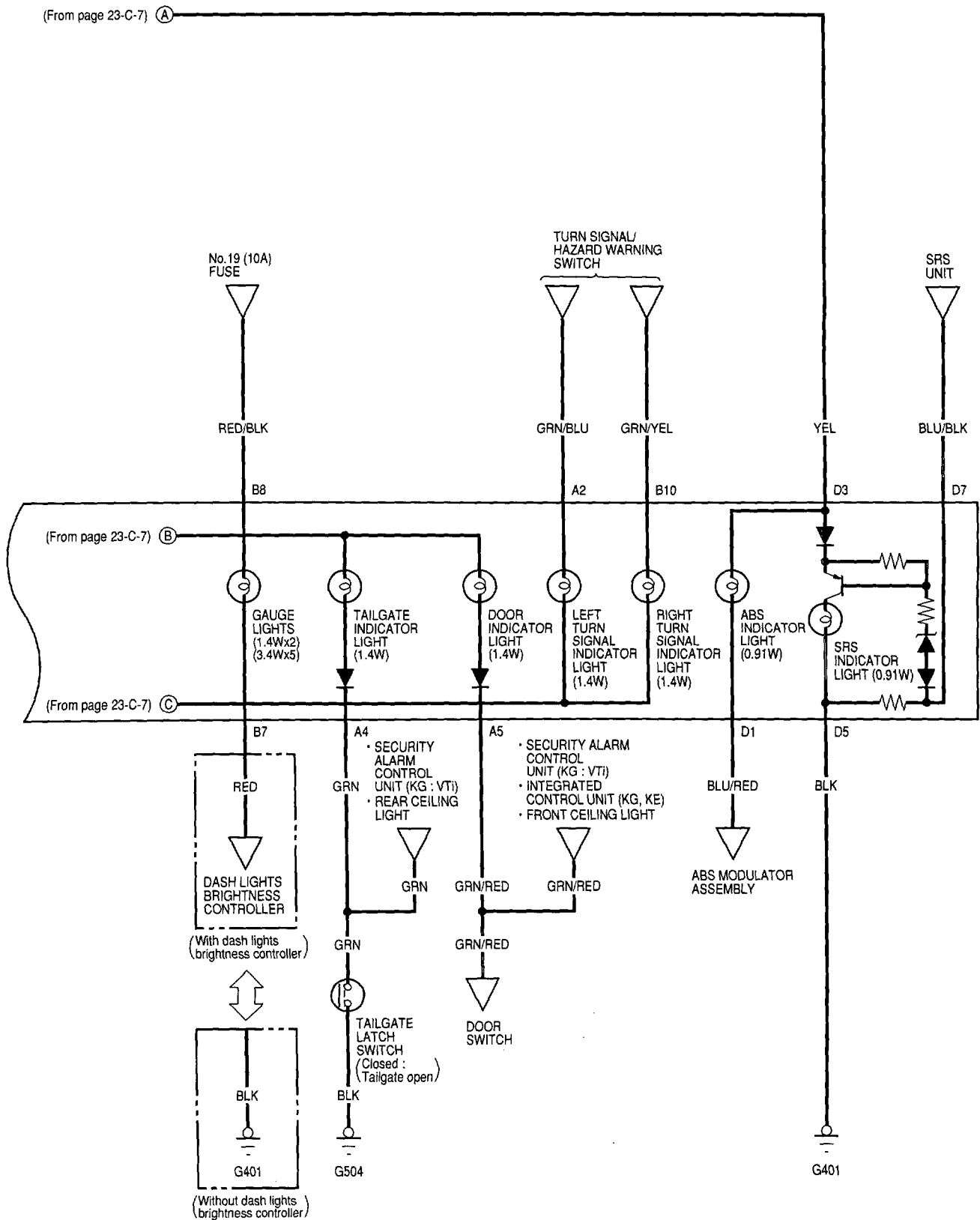
LHD : G301  
RHD : G201

(cont'd)



# Gauge Assembly

## Circuit Diagram (cont'd)



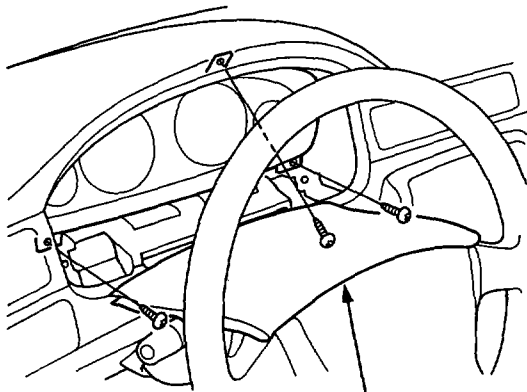
# Gauge Assembly



## Replacement

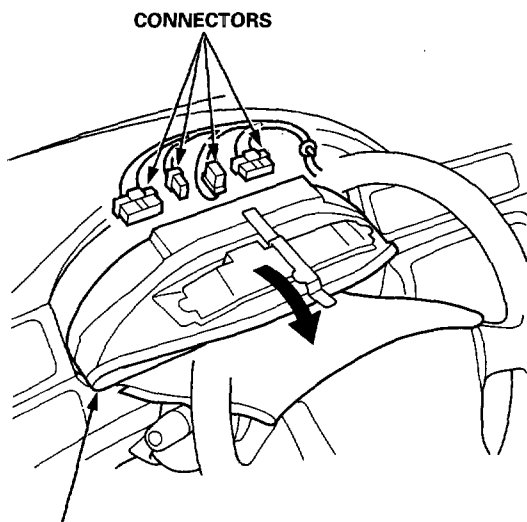
1. Remove the instrument panel (see section 20).
2. Remove the screws from the gauge assembly, and spread a protective cloth on the upper column cover.
3. Tilt the steering wheel down with the tilt adjustment lever.

NOTE: LHD type is shown, RHD type is symmetrical.



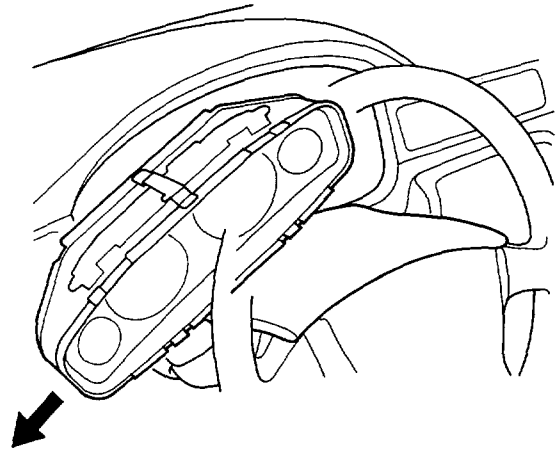
PROTECTIVE CLOTH

4. Pry the gauge assembly out, and disconnect the connectors.



GAUGE ASSEMBLY

5. Carefully remove the gauge assembly.



6. Install in the reverse order of removal.

# Vehicle Speed Sensor (VSS)

## Troubleshooting

Before testing, inspect the No. 26 (15 A) fuse in the auxiliary fuse holder.

**Test the BLK wire:**

1. Disconnect the 3P connector from the vehicle speed sensor (VSS).
2. Connect the test harness only to the engine wire harness.
3. Connect the RED or WHT test harness clip to the positive probe of an ohmmeter.
4. Check for continuity between the RED or WHT test harness clip and body ground.

Is there continuity? **NO** → Repair open in the BLK wire between the VSS and G101.

YES

**Test the BLK/YEL wire:**

1. Connect the WHT or RED test harness clip to the positive probe of a voltmeter and connect the RED or WHT test harness clip to the negative probe.
2. Turn the ignition switch ON (II).

Is there battery voltage? **NO** → Repair open in the BLK/YEL wire between the VSS and auxiliary fuse holder.

YES

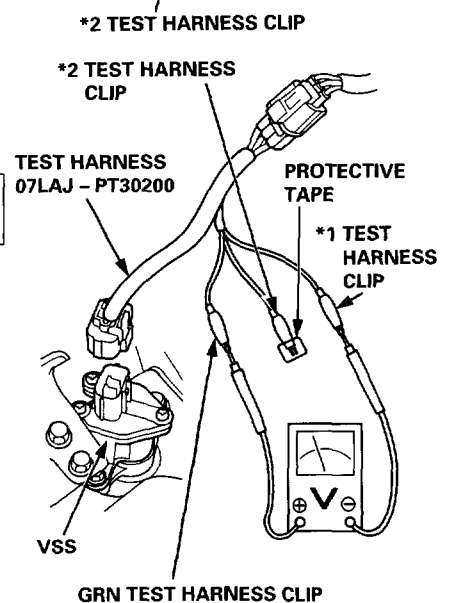
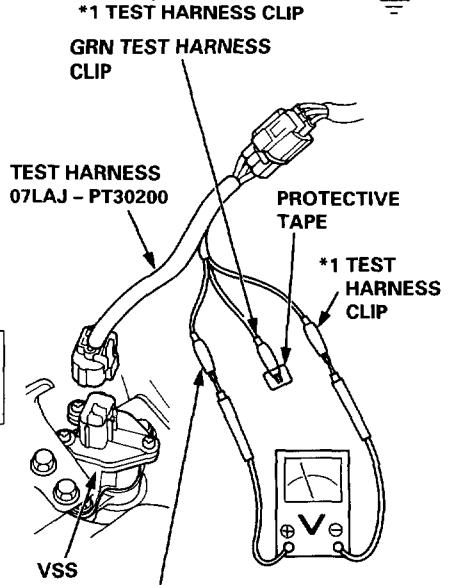
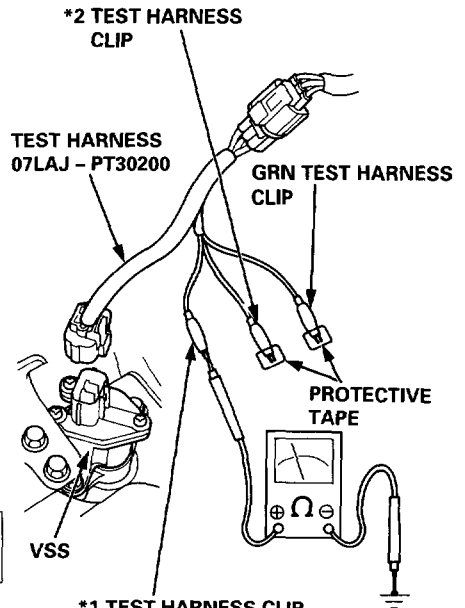
**Test the BLU/WHT wire:**

1. Disconnect the WHT or RED test harness clip.
2. Connect the GRN test harness clip to the positive probe of a voltmeter.

Is there 5 V or more? **NO** → Repair short in the BLU/WHT wire between the VSS and ECM.

YES

▲  
To next page



From previous page



**Test the VSS:**

1. Turn the ignition switch OFF.
2. Connect the other test harness connector to the VSS.
3. Raise the front of the vehicle and support it with safety stands.
4. Put the vehicle in neutral with the ignition switch ON (II).
5. Slowly rotate one wheel with the other wheel blocked.

Does voltage pulse from 0 to approx. 5 V or more?

NO

Replace the VSS.

YES

**Test the Speedometer:**

1. Disconnect the 10P connector "B" from the gauge assembly.
2. Touch a probe to the ORN wire, and connect it to body ground through a voltmeter.
3. Slowly rotate one wheel with the other wheel blocked.

Does the meter indicate pulsing voltage?

NO

Repair open in the ORN wire between the VSS and the speedometer.

YES

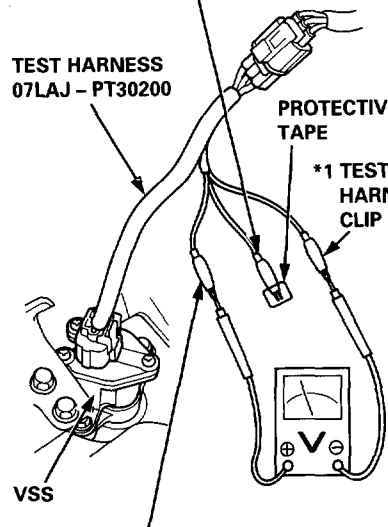
Replace the speedometer.

\*2 TEST HARNESS CLIP

TEST HARNESS 07LAJ - PT30200

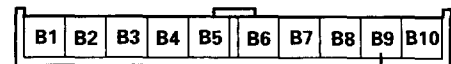
PROTECTIVE TAPE

\*1 TEST HARNESS CLIP



GRN TEST HARNESS CLIP

DASHBOARD WIRE HARNESS 10P CONNECTOR "B"



Wire side of female terminals



\*1 RED: D14A7, D14A8, D16B2 engine A/T and B18C4 engine  
WHT: Except D14A7, D14A8, D16B2 engine A/T and B18C4 engine

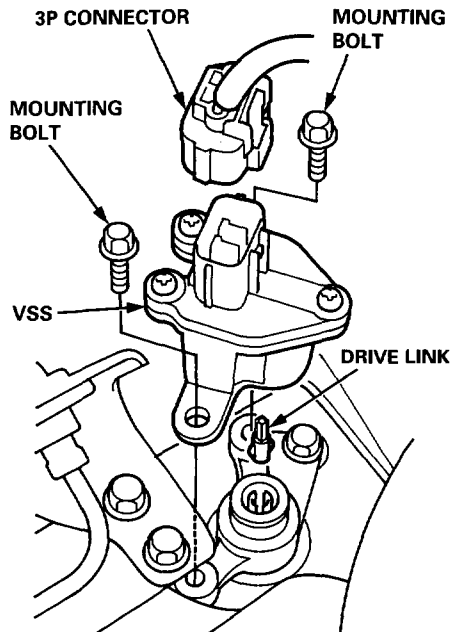
\*2 WHT: D14A7, D14A8, D16B2 engine A/T and B18C4 engine  
RED: Except D14A7, D14A8, D16B2 engine A/T and B18C4 engine

# Vehicle Speed Sensor (VSS)

## Replacement

1. Disconnect the 3P connector from the vehicle speed sensor (VSS).

NOTE: The VSS drive link is a very small part; be careful not to lose it.



2. Remove the two mounting bolts, then remove the VSS.
3. Install in the reverse order of removal.

# Lighting System

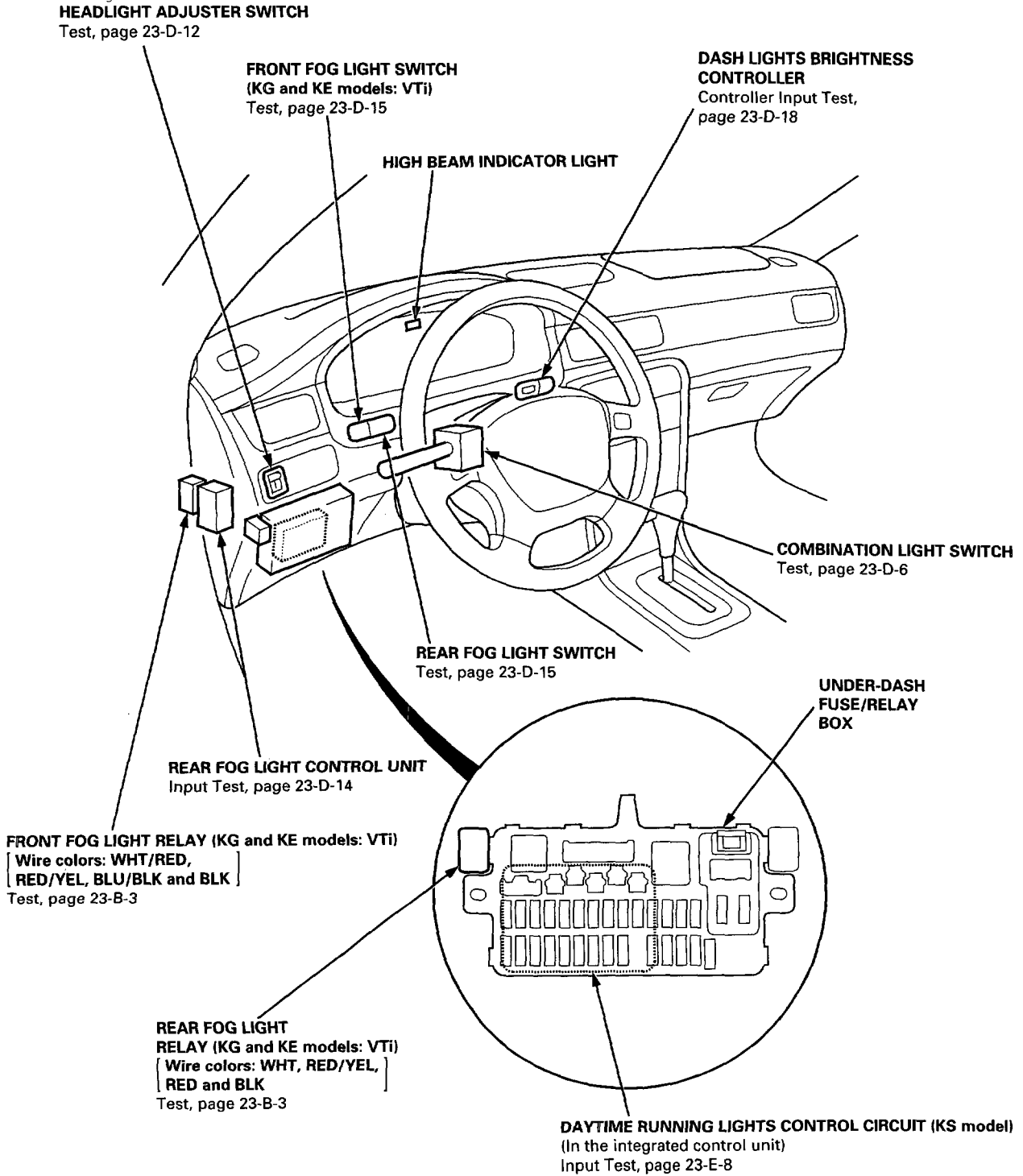
<b>Lighting System</b>	
Component Location Index .....	23-D-2
Circuit Diagram .....	23-D-4
*Combination Light Switch Test ....	23-D-6
<b>Headlights</b>	
Adjustment .....	23-D-8
Replacement .....	23-D-8
<b>Front Turn Signal Lights</b>	
Replacement .....	23-D-9
<b>Side Turn Signal Lights</b>	
Replacement .....	23-D-9
<b>Taillights</b>	
Replacement .....	23-D-10
<b>License Plate Lights</b>	
Replacement .....	23-D-10
<b>Headlights Adjuster</b>	
Circuit Diagram .....	23-D-11
Headlight Adjuster Switch	
Test .....	23-D-12
Headlights Adjuster Unit Input	
Test .....	23-D-13
<b>Fog Lights</b>	
Rear Fog Light Control Unit	
Input Test .....	23-D-14
Front Fog and Rear Fog Light	
Switch Test .....	23-D-15
Front Fog Light Replacement	
(KG and KE models: VTi) .....	23-D-16
<b>Dash Lights Brightness Control</b>	
Circuit Diagram .....	23-D-17
Controller Input Test .....	23-D-18
<b>Back-up Lights</b>	
Circuit Diagram .....	23-D-19
<b>Brake Lights</b>	
Circuit Diagram .....	23-D-20
High Mount Brake Light	
Replacement .....	23-D-21
<b>*Turn Signal/Hazard Flasher System</b>	
Component Location Index .....	23-D-22
Circuit Diagram .....	23-D-23
Turn Signal/Hazard Relay Input	
Test .....	23-D-24
Hazard Warning Switch Test .....	23-D-25
<b>Interior Lights</b>	
Component Location Index .....	23-D-26
Circuit Diagram .....	23-D-27
Front Ceiling Light Test .....	23-D-28
Rear Ceiling Light Test .....	23-D-29
Glove Box Light Test .....	23-D-30
Tailgate Latch Switch	
Test .....	23-D-30



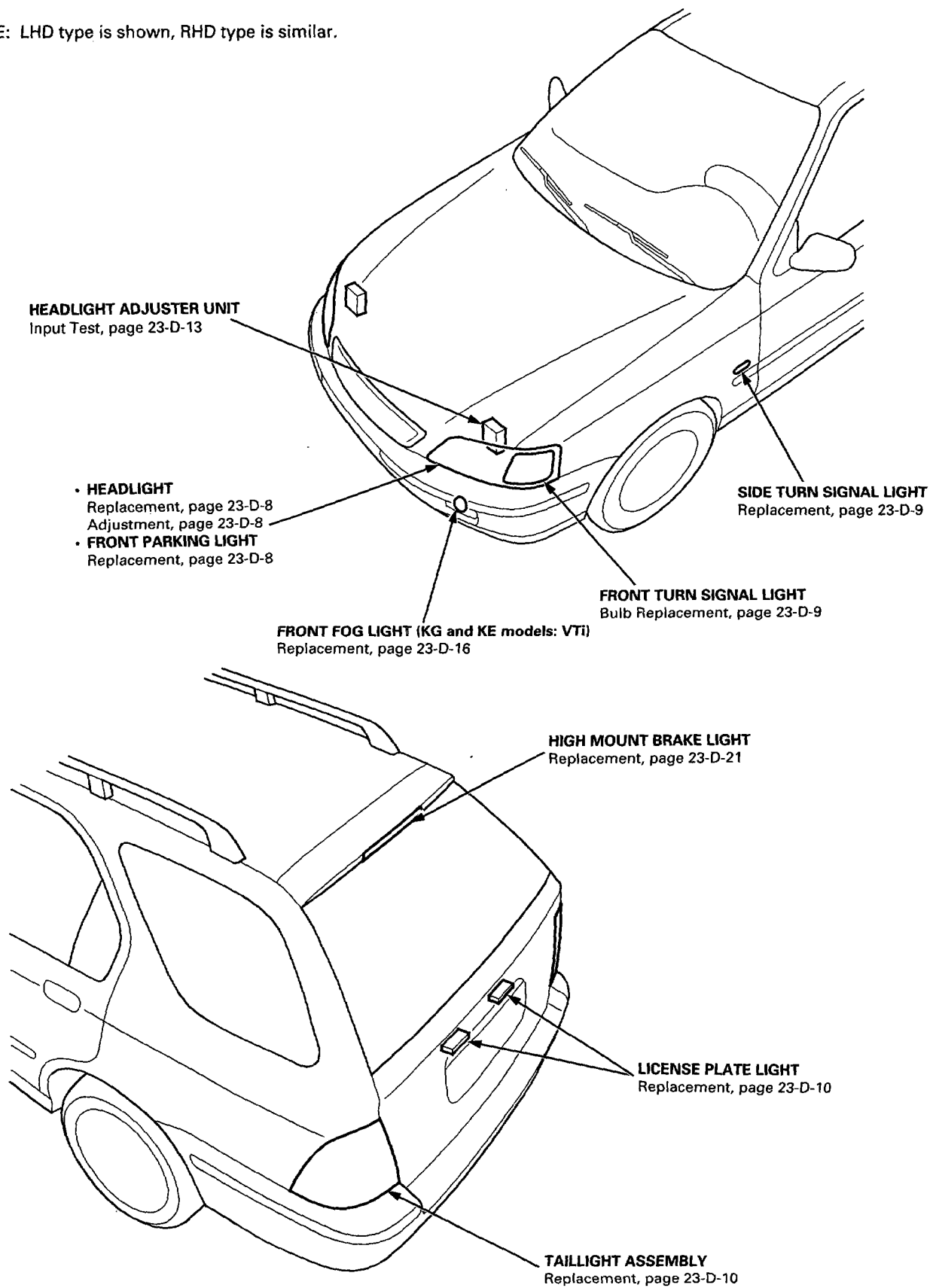
# Lighting System

## Component Location Index

NOTE: LHD type is shown, RHD type is similar.



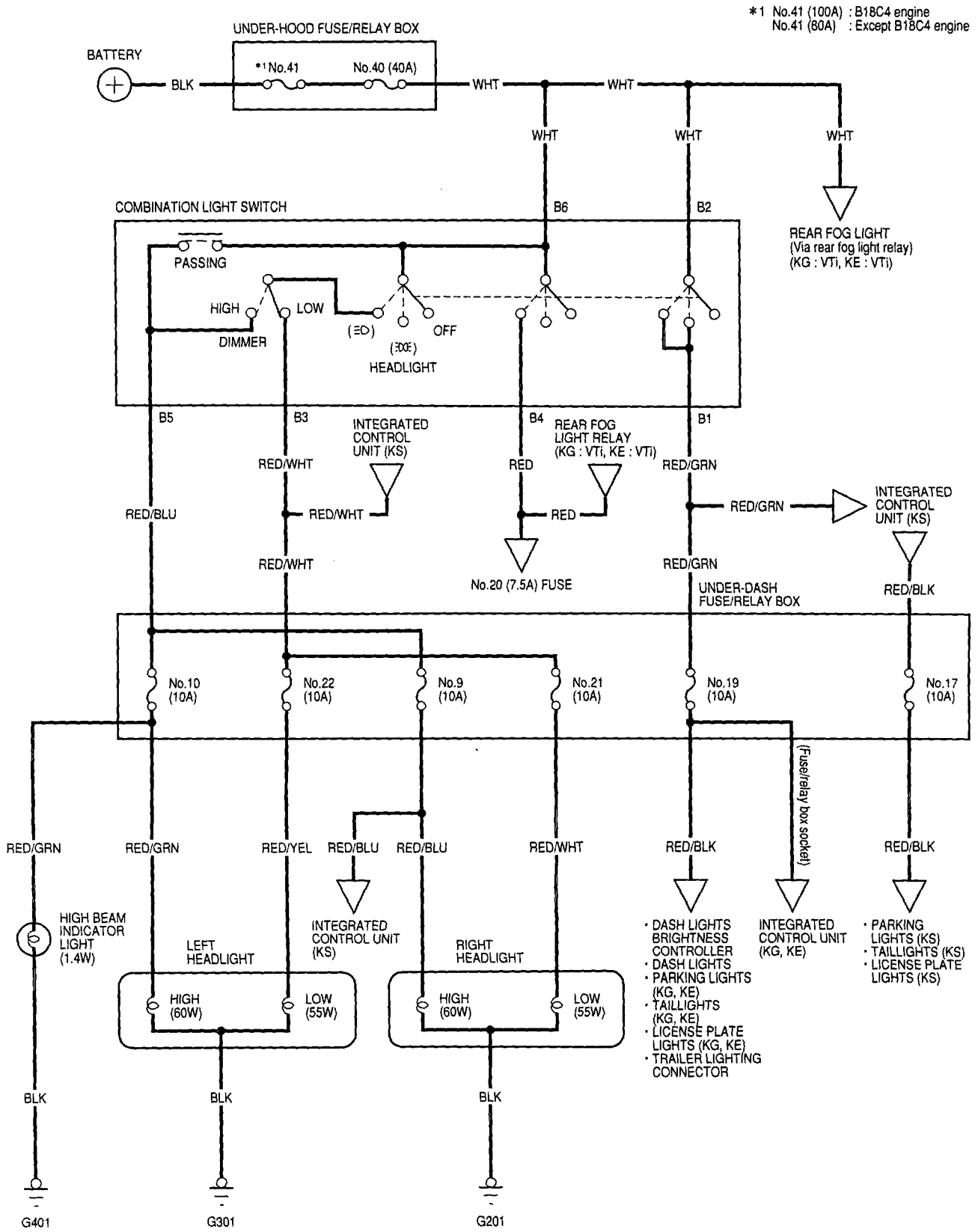
NOTE: LHD type is shown, RHD type is similar.





# Lighting System

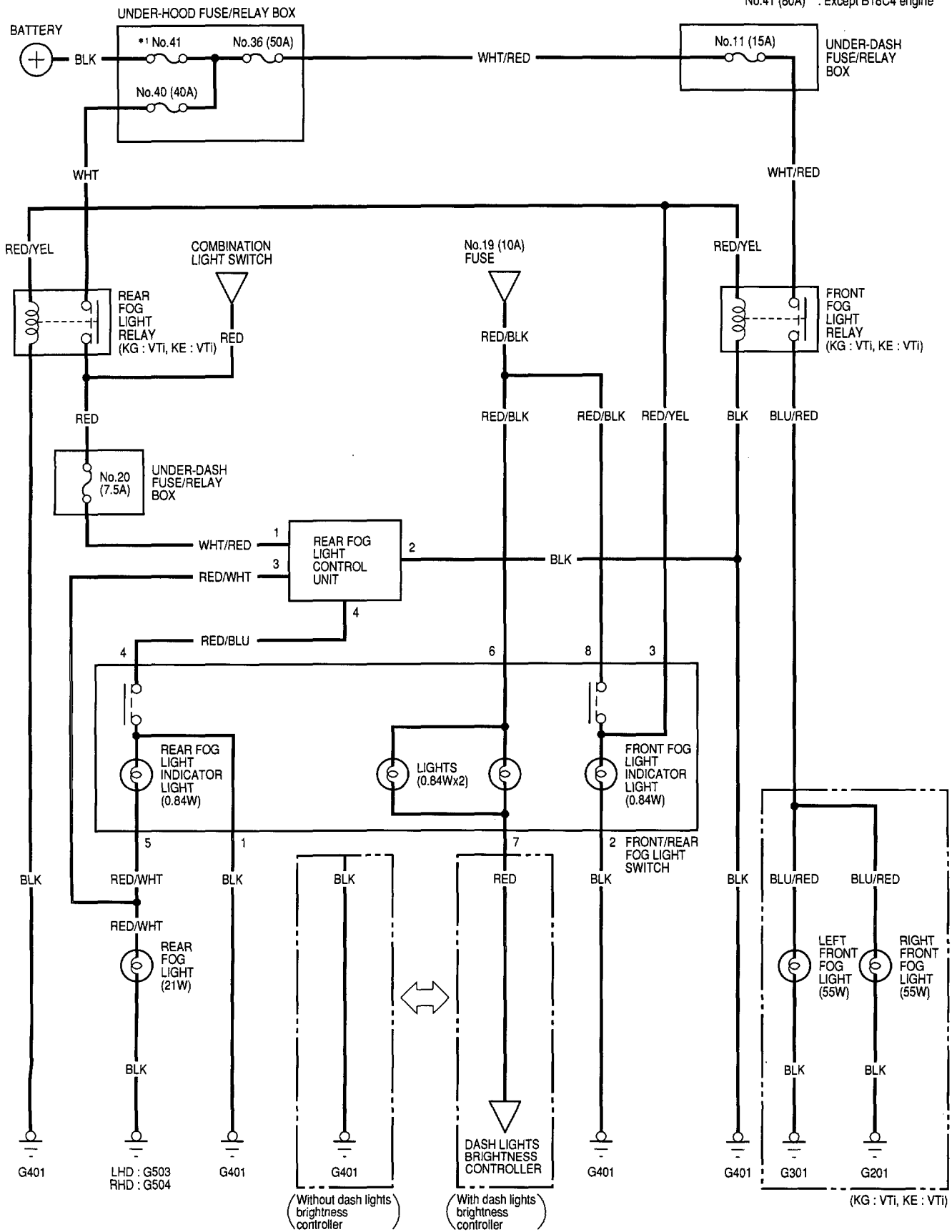
## Circuit Diagram





# Circuit Diagram

\*1 No.41 (100A) : B18C4 engine  
No.41 (80A) : Except B18C4 engine



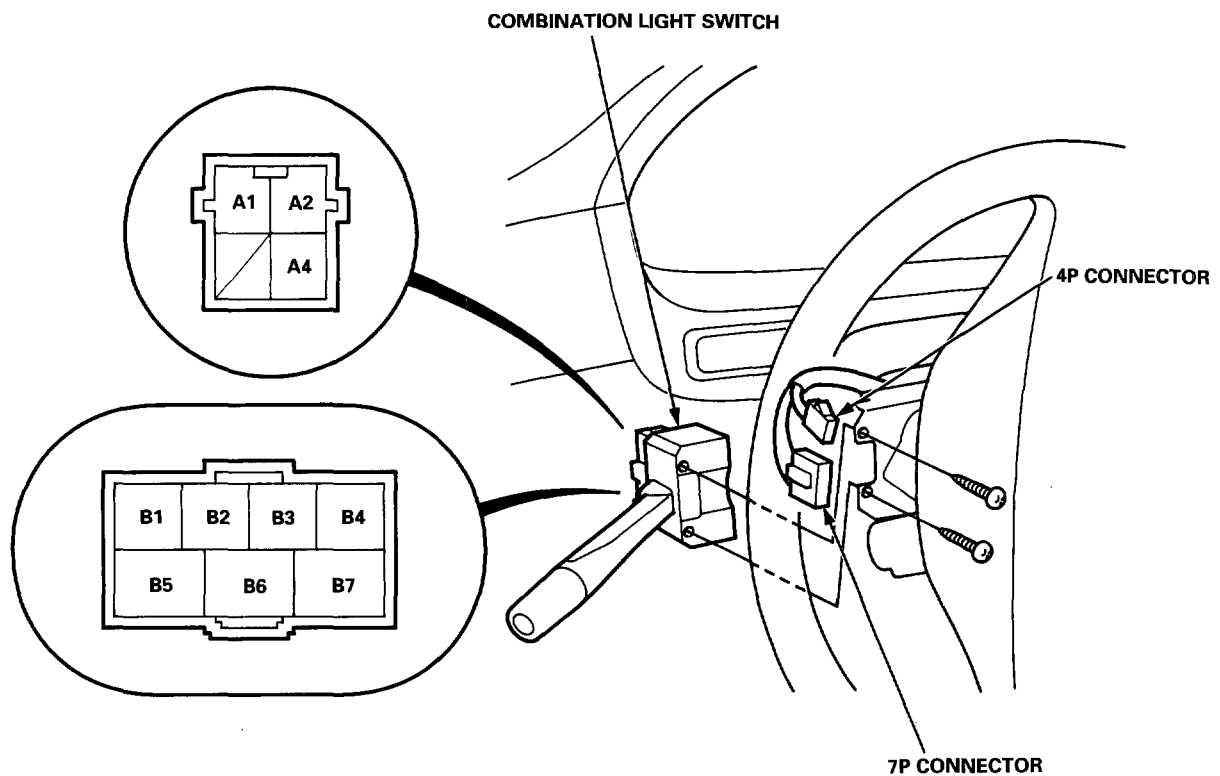
# Lighting System

## Combination Light Switch Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the steering column covers (see section 17).
2. Disconnect the 4P and 7P connectors from the combination light switch.
3. Inspect the connector terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, check for continuity between them in each switch position according to the table. If there is no continuity between any of them, check for continuity in the switch harness.
    - If there is continuity in the switch harness, replace the combination light switch.
    - If there is no continuity in the switch harness, replace it.

NOTE: LHD type is shown, RHD type is similar.





**Lighting switch:**

Terminal		B1	B2	B3	B4	B5	B6
Position	OFF						
Headlight switch	☺	○	○				
	☹	○	○	○	○	○	○
		○	○		○	○	○
Passing switch	OFF						
	ON					○	○

**Turn signal switch:**

Terminal	A1	A2	A4
Position			
LEFT	○	○	
NEUTRAL			
RIGHT	○		○

# Headlights

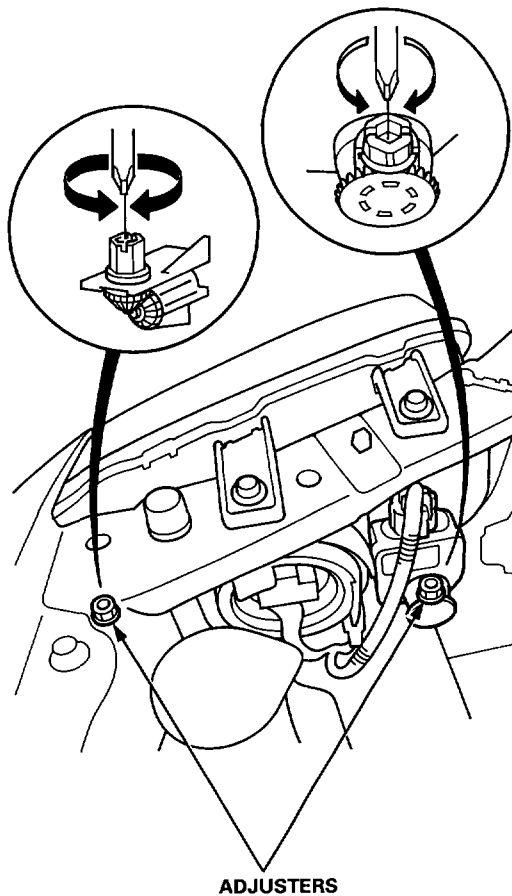
## Adjustment

### ⚠ CAUTION

- Halogen headlights can become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.
- Do not try to replace or clean the headlights with the lights on.

1. Adjust the headlights to local requirements by turning the adjusters.

NOTE: As the outer lenses are made of a resin material, don't cover the headlights when they are turned on.

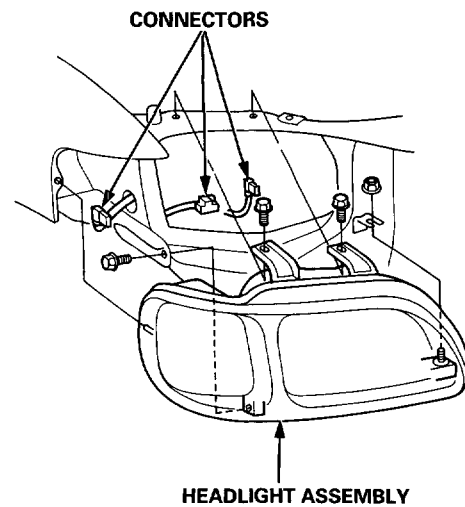


## Replacement

### ⚠ CAUTION

- Halogen headlights can become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.
- Do not try to replace or clean the headlights with the lights on.

1. Remove the front bumper (see section 20).
2. Disconnect the connectors from the headlight.
3. Remove the mounting bolts and nut, then pull out the headlight.



HEADLIGHT: 60/55 W  
FRONT PARKING LIGHT: 5 W  
FRONT TURN SIGNAL LIGHT: 21 W

4. After replacement, adjust the headlight to local requirements.

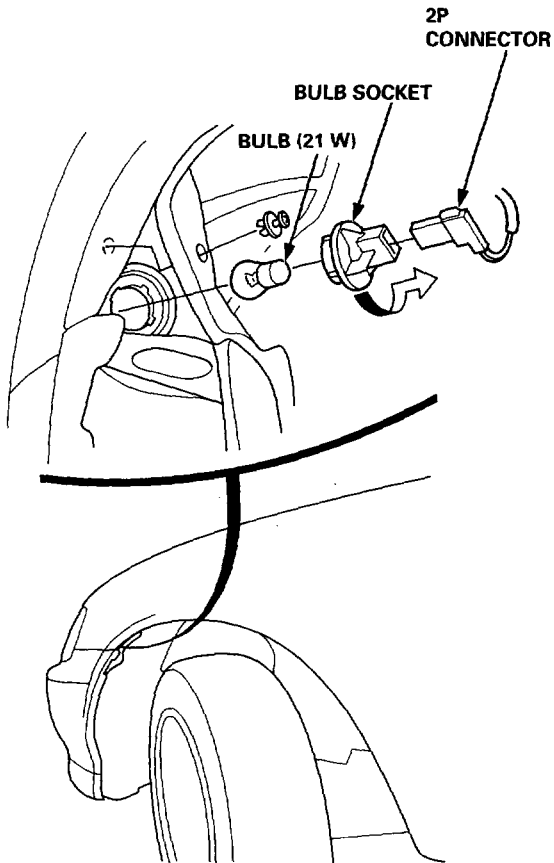
# Front Turn Signal Lights

# Side Turn Signal Lights



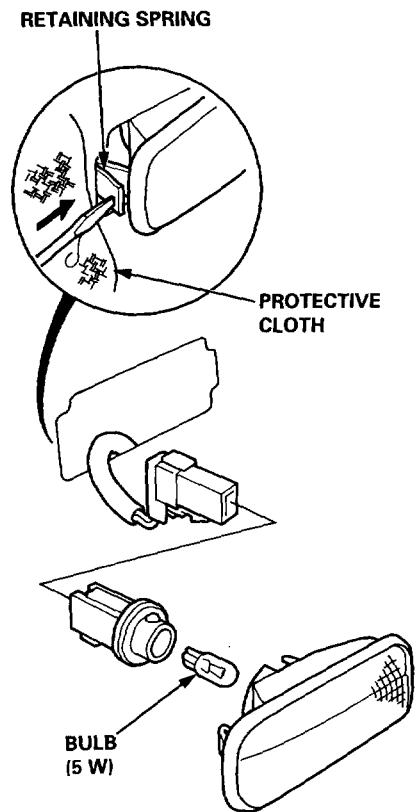
## Bulb Replacement

1. Remove the inner fender.
2. To replace the bulb, turn the bulb socket 45° counter-clockwise, and remove it from the front turn signal light.



## Replacement

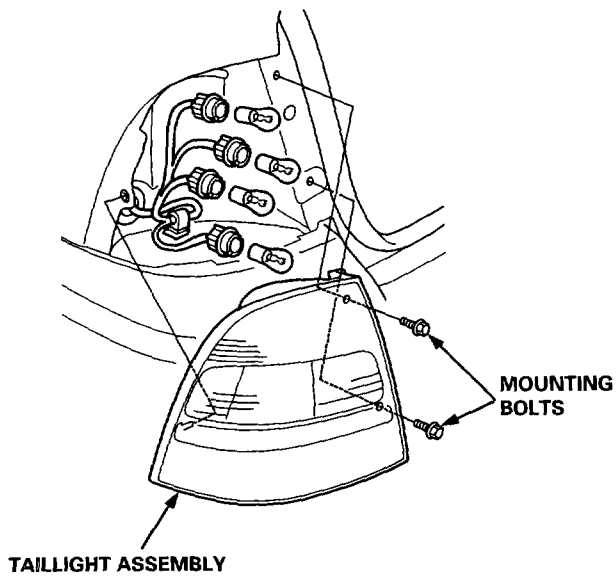
1. Push the retaining spring, and remove the side turn signal light.
2. Remove the bulb socket from the light housing, then replace the bulb.



# Taillights

## Replacement

1. Open the tailgate.
2. Remove the two mounting bolts from the taillight assembly.
3. Carefully remove the taillight assembly from the body.



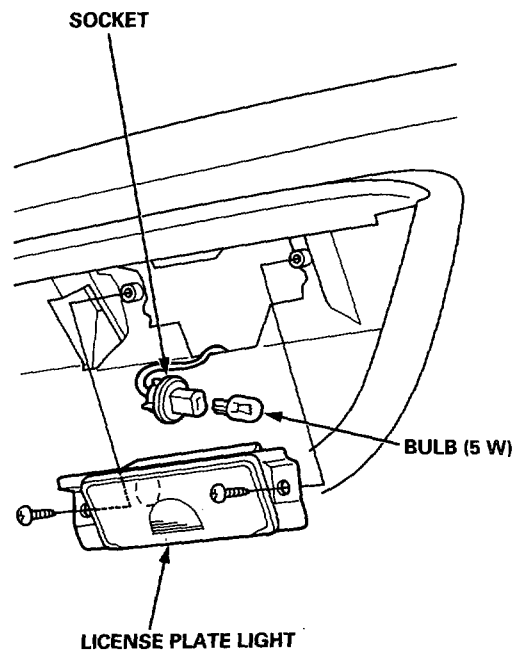
**REAR FOG LIGHT: 21 W**  
**TURN SIGNAL LIGHT: 21 W**  
**BACK-UP LIGHT: 21 W**  
**BRAKE LIGHT/TAILLIGHT: 21/5 W**

NOTE: After installing them, run water over the lights to make sure they do not leak.

# License Plate Lights

## Replacement

1. Remove the two screws from the license plate light.
2. Turn the bulb socket 45° counterclockwise, remove it from the light housing, then replace the bulb.

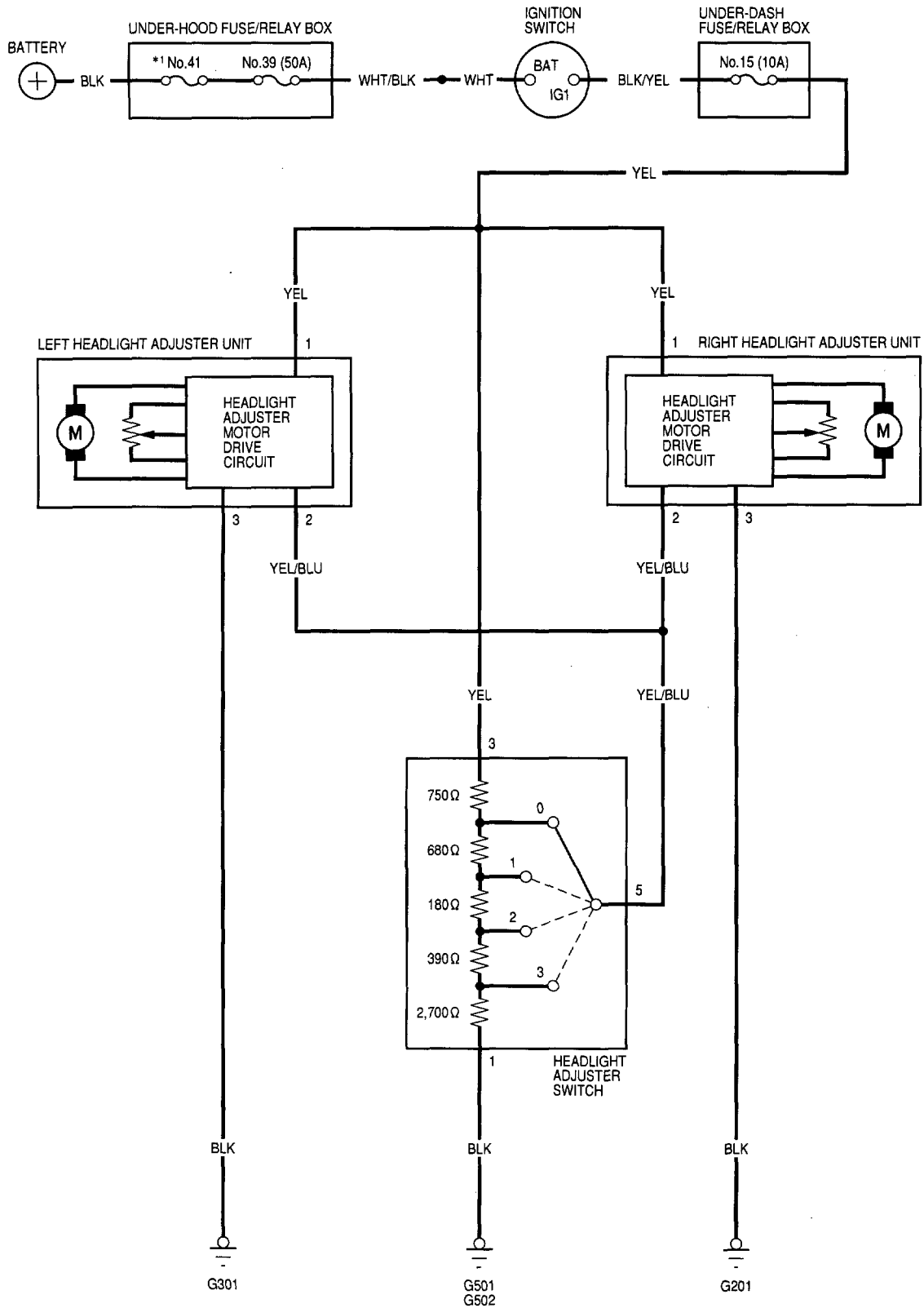


# Headlight Adjuster



## Circuit Diagram

\*1 No.41(100A) : B18C4 engine  
No.41(80A) : Except B18C4 engine



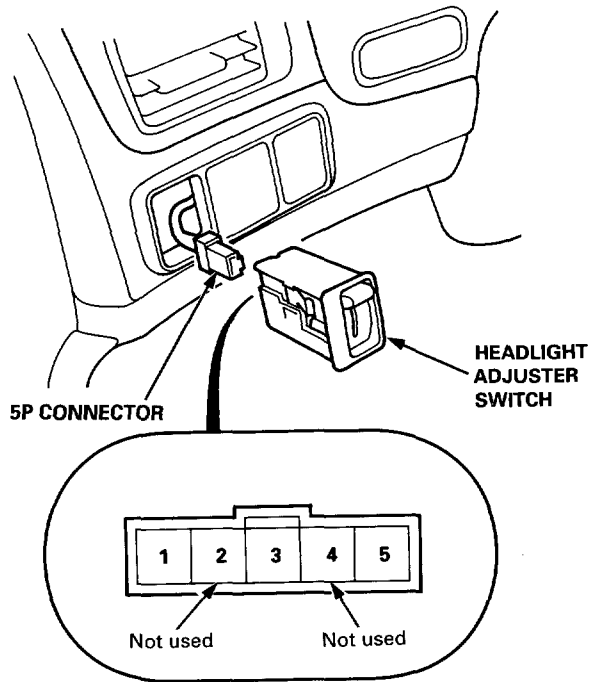


# Headlight Adjuster

## Headlight Adjuster Switch Test

1. Remove the dashboard lower cover (see section 20).
2. Disconnect the 5P connector from the switch.
3. Push the switch out from behind the dashboard.

NOTE: LHD type is shown, RHD type is similar.



4. Measure the resistance between the No. 1 and No. 3 terminals, and then measure the resistance between the No. 3 and No. 5 terminals at positions 0, 1, 2 and 3 by moving the knob.

**Between No. 1 and No. 3 terminals: Approx. 4.7 k $\Omega$**

**Between No. 3 and No. 5 terminals:**

Knob position	0	1	2	3
Resistance [Approx. (k $\Omega$ )]	0.7	1.4	1.6	2.0

5. Replace the switch if the resistance is not within specifications.

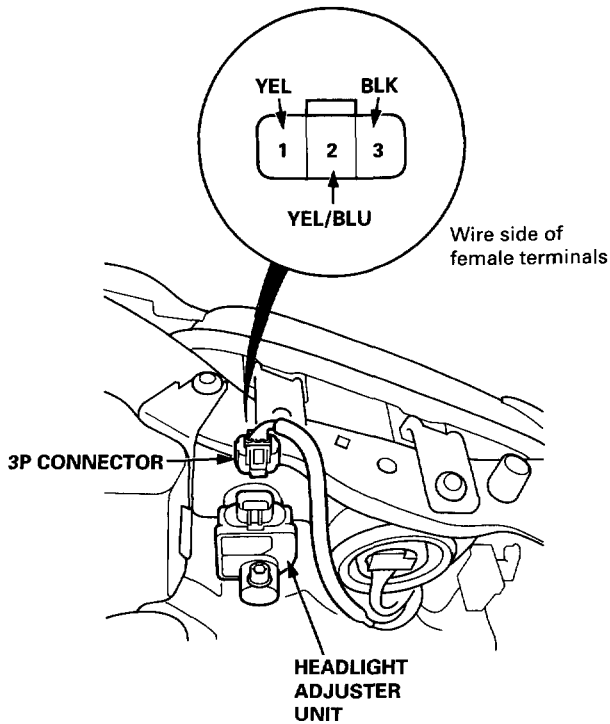


## Headlight Adjuster Unit Input Test

NOTE: Before testing, check for:

- blown No. 15 (10 A) fuse in the under-dash fuse/relay box.
- bent, loose or corroded terminals.

1. Disconnect the 3P connectors from each headlight adjuster unit.



2. Check for continuity between the No. 3 (BLK) terminal and body ground. There should be continuity.
  - If there is no continuity, check for:
    - an open in the BLK wire.
    - poor ground (G201, G301).
  - If there is continuity, go to step 3.

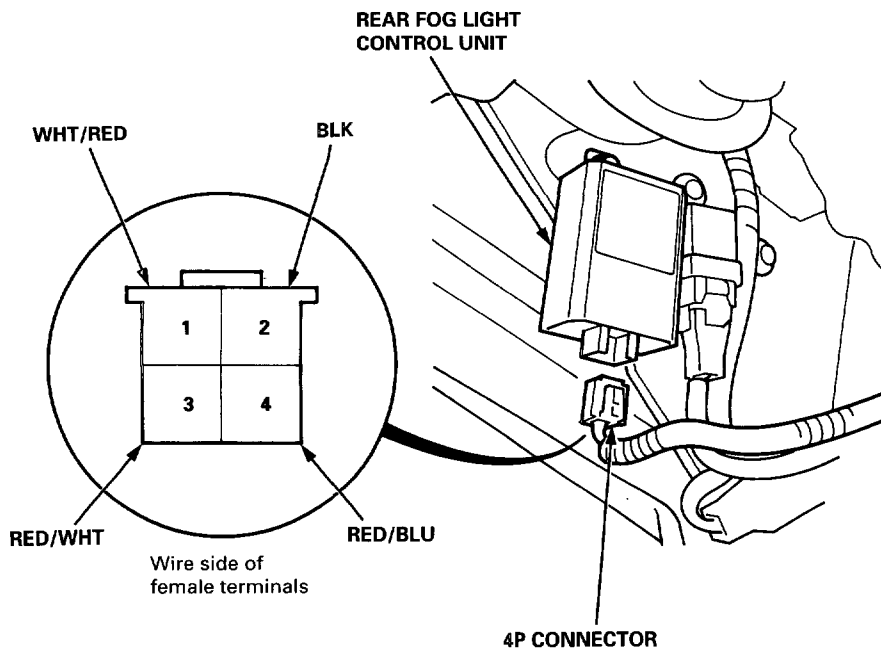
3. Check for voltage between the No. 1 (YEL) terminal and body ground with the ignition switch ON (II). There should be battery voltage.
  - If there is no battery voltage, check for an open in the YEL wire.
  - If there is battery voltage, go to step 4.
4. Check for continuity between the No. 2 (YEL/BLU) terminal and body ground in any switch position. There should be continuity.
  - If there is no continuity, check for:
    - an open in the YEL/BLU wire.
    - faulty headlight adjuster switch.
  - If there is continuity, go to step 5.
5. If all input tests prove OK, but the headlight adjuster does not work, check for frozen stuck or improperly installed headlight adjuster unit. If the mechanical check is OK, replace the headlight adjuster unit.
6. After installing, recheck the system.

# Fog Lights

## Rear Fog Light Control Unit Input Test

1. Remove the dashboard lower cover (see section 20).
2. Disconnect the 4P connector from the rear fog light control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
  - If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, make the following input tests at the connector.
    - If any test indicates a problem, find and correct the cause, then recheck the system.
    - If all the input tests prove OK, the control unit must be faulty; replace it.

NOTE: LHD type is shown, RHD type is similar.



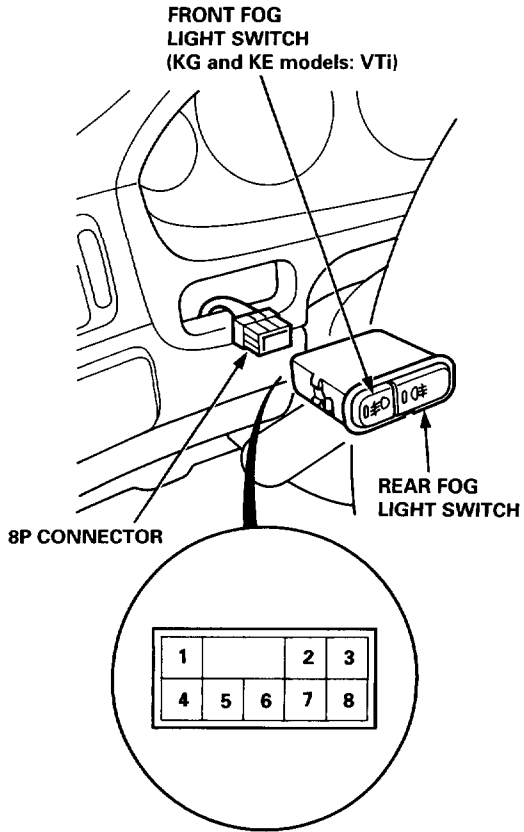
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
1	WHT/RED	Combination light switch ON ( $\Xi$ )	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 20 (7.5 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty combination light switch</li> <li>• An open in the wire</li> </ul>
2	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401)</li> <li>• An open in the wire</li> </ul>
3	RED/WHT	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401, G503, G504)</li> <li>• Faulty rear fog light</li> <li>• Faulty rear fog light switch indicator light</li> <li>• An open in the wire</li> </ul>
4	RED/BLU	Rear fog light switch ON	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401)</li> <li>• Faulty rear fog light switch</li> <li>• An open in the wire</li> </ul>

# Front Fog and Rear Fog Light Switch Test

NOTE: Be careful not to damage the instrument panel.

- Carefully pry the switch out of the instrument panel.
- Disconnect the 8P connector from the switch.

NOTE: LHD type is shown, RHD type is similar.



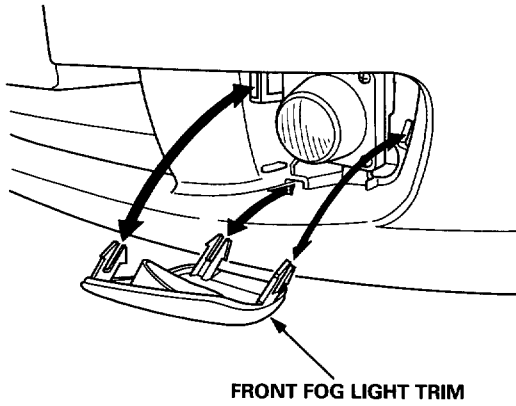
- Check for continuity between the terminals according to the table.

Terminal Position	1	4	3	8	2	5	6		7
OFF									
FRONT FOG LIGHT SWITCH "ON"									
REAR FOG LIGHT SWITCH "ON"									

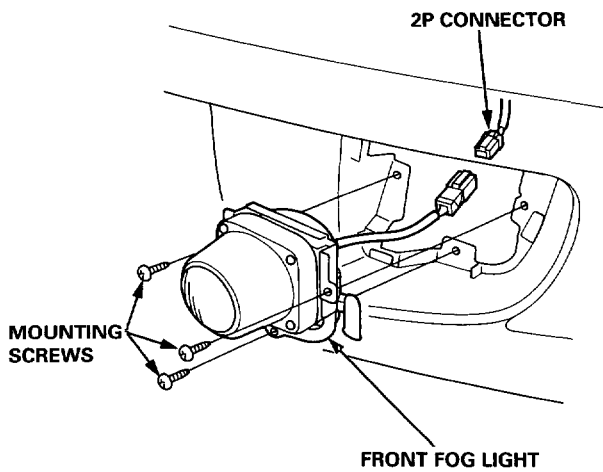
# Fog Lights

## Front Fog Light Replacement (KG and KE models: VTi)

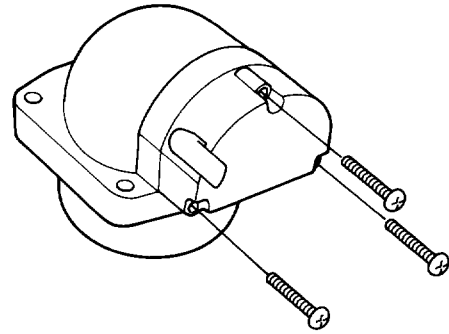
1. Remove the front fog light trim.



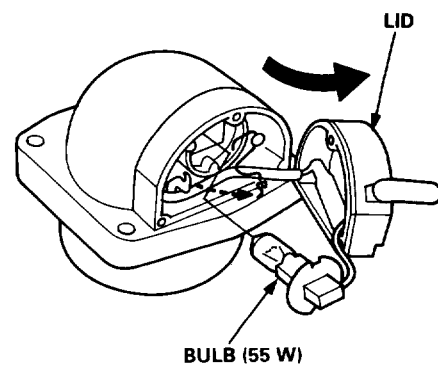
2. Remove the three mounting screws.
3. Pull out the front fog light.
4. Disconnect the 2P connector.



5. Remove the screws.



6. Open the lid.
7. Turn the retaining spring out, and remove the bulb.



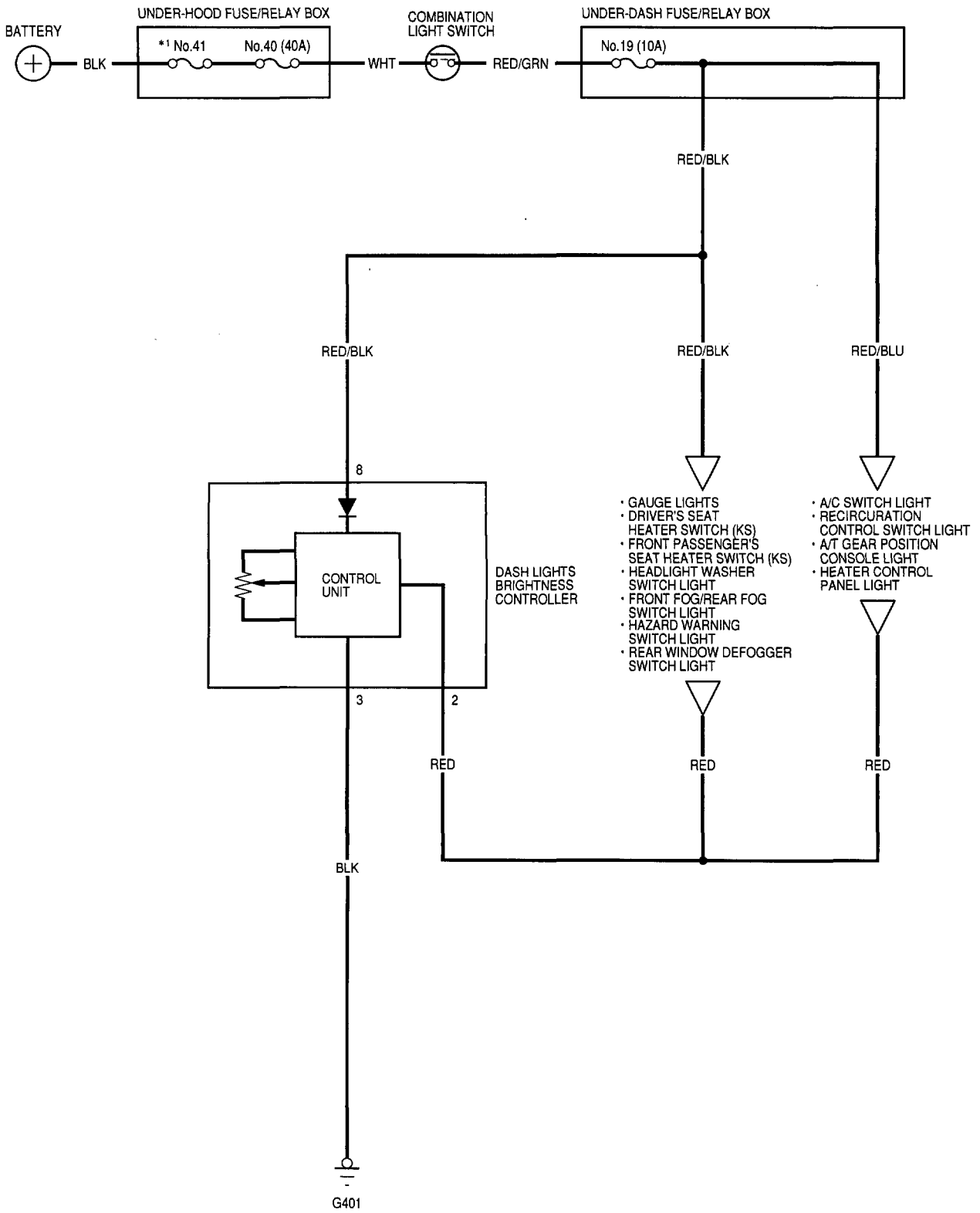
8. Install in the reverse order of removal.

# Dash Lights Brightness Controller



## Circuit Diagram

\*1 No.41 (100A) : B18C4 engine  
 No.41 (80A) : Except B18C4 engine



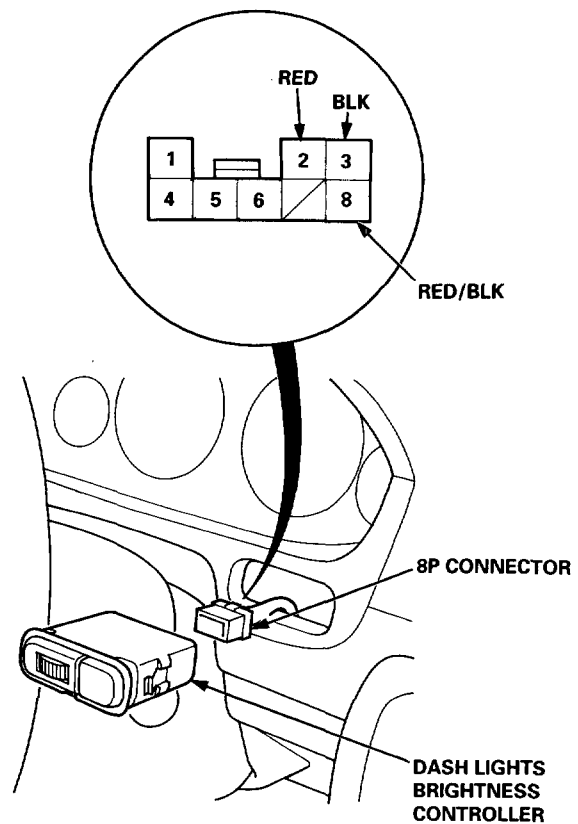
# Dash Lights Brightness Controller

## Controller Input Test

NOTE: The control unit is built into the dash lights brightness controller.

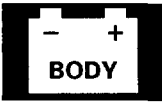
1. Carefully pry the controller out of the dashboard, then disconnect the 8P connector from the controller.
2. Inspect the connector and socket terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, make the following input tests at the connector.
    - If any test indicates a problem, find and correct the cause, then recheck the system.
    - If all the input tests prove OK, the controller must be faulty; replace it.

NOTE: LHD type is shown, RHD type is similar.



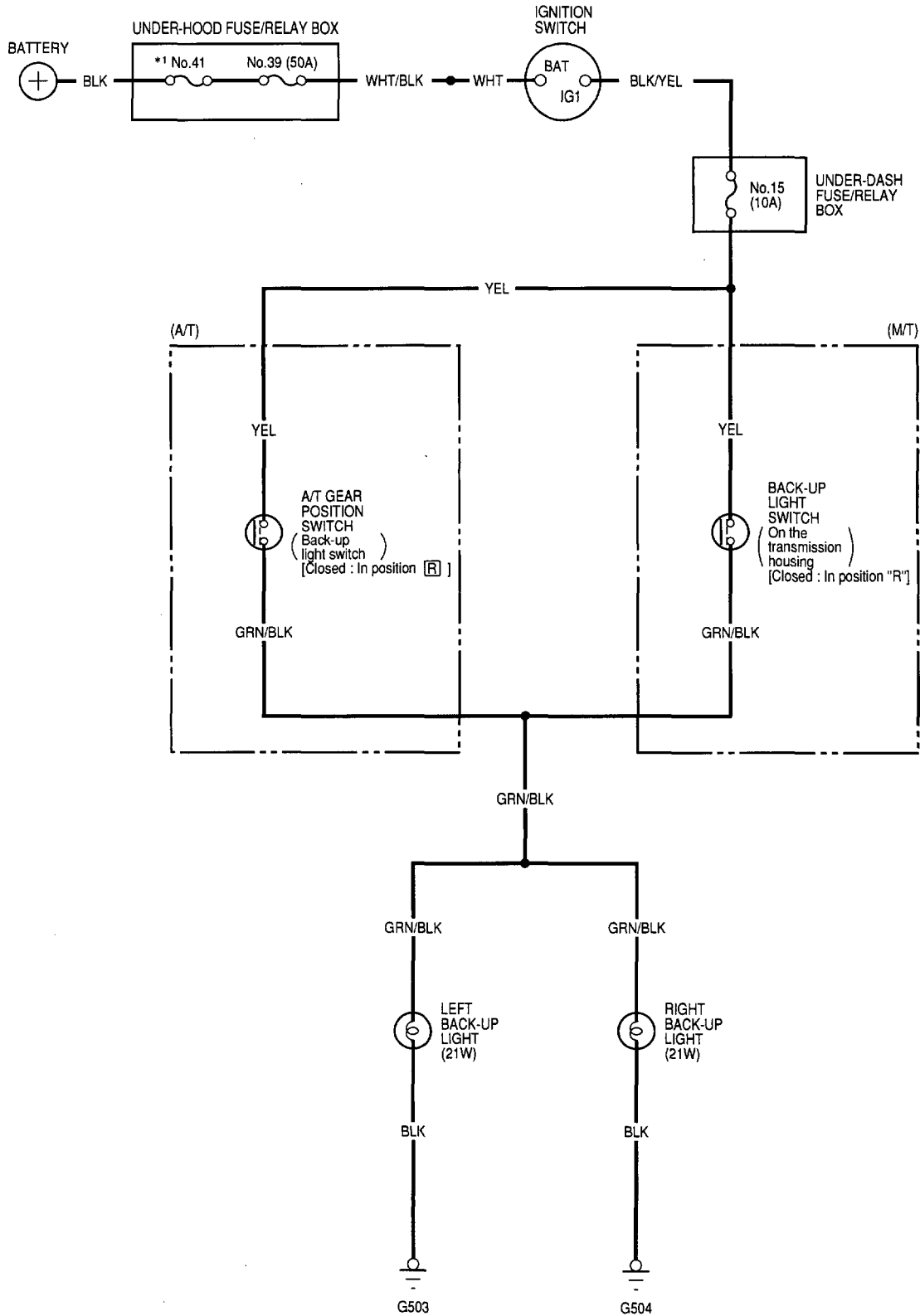
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
3	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401)</li> <li>• An open in the wire</li> </ul>
8	RED/BLK	Headlight switch ON	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 19 (10 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty combination light switch</li> <li>• An open in the wire</li> </ul>
2	RED	Headlight switch ON	Connect to ground: Dash lights should come on full bright.	<ul style="list-style-type: none"> <li>• An open in the wire</li> </ul>

# Back-up Lights



## Circuit Diagram

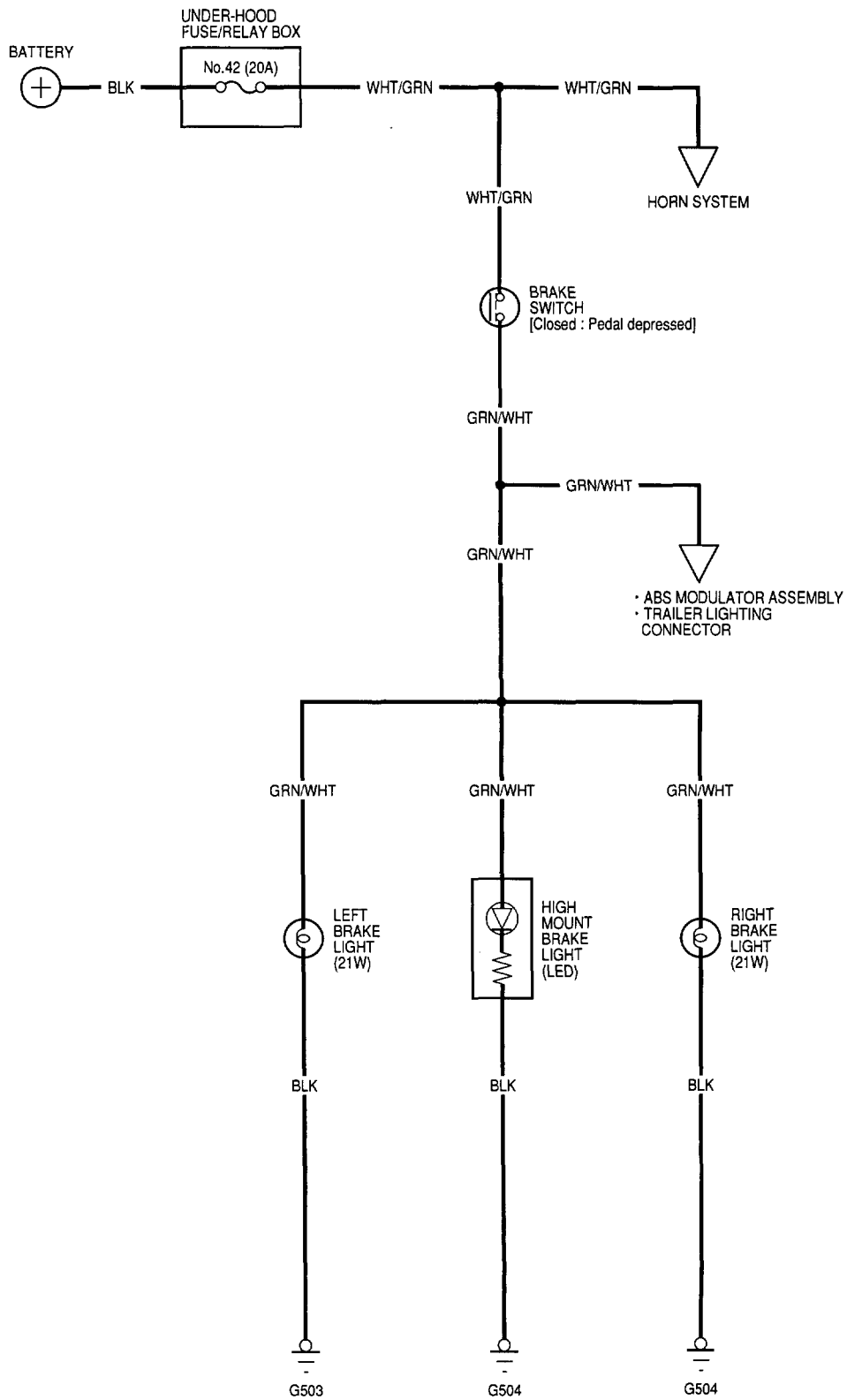
\*1 No.41 (100A) : B18C4 engine  
 No.41 (80A) : Except B18C4 engine





# Brake Lights

## Circuit Diagram

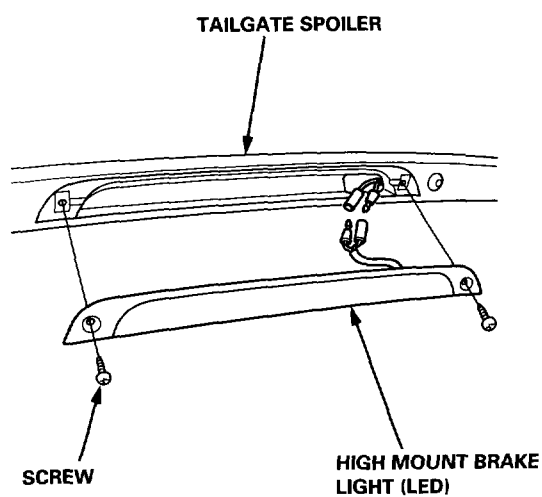


## High Mount Brake Light Replacement

1. Remove the two screws from the high mount brake light.

NOTE: Be careful not to damage the tailgate spoiler.

2. Pry the light out of the tailgate spoiler.
3. Disconnect the each connector from the light.
4. Remove the screw from the clamp on from the high mount brake light harness, then remove the high mount brake light (LED) form the tailgate spoiler.



5. Install in the reverse order of removal.

# Turn Signal/Hazard Flasher System

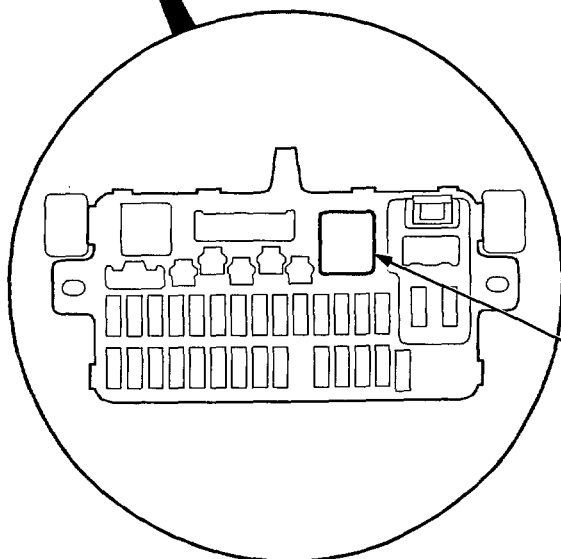
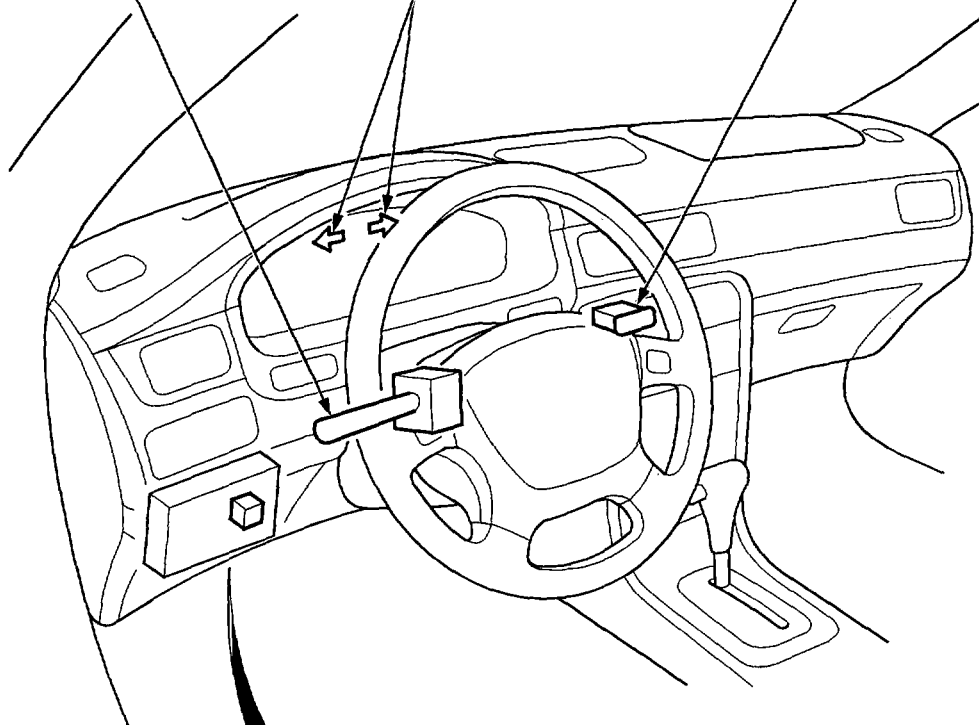
## Component Location Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

**COMBINATION LIGHT/TURN SIGNAL SWITCH**  
Test, page 23-D-6

**TURN SIGNAL INDICATOR LIGHTS**  
(In the gauge assembly)  
Bulb Locations, page 23-C-5

**HAZARD WARNING SWITCH**  
Test, page 23-D-25

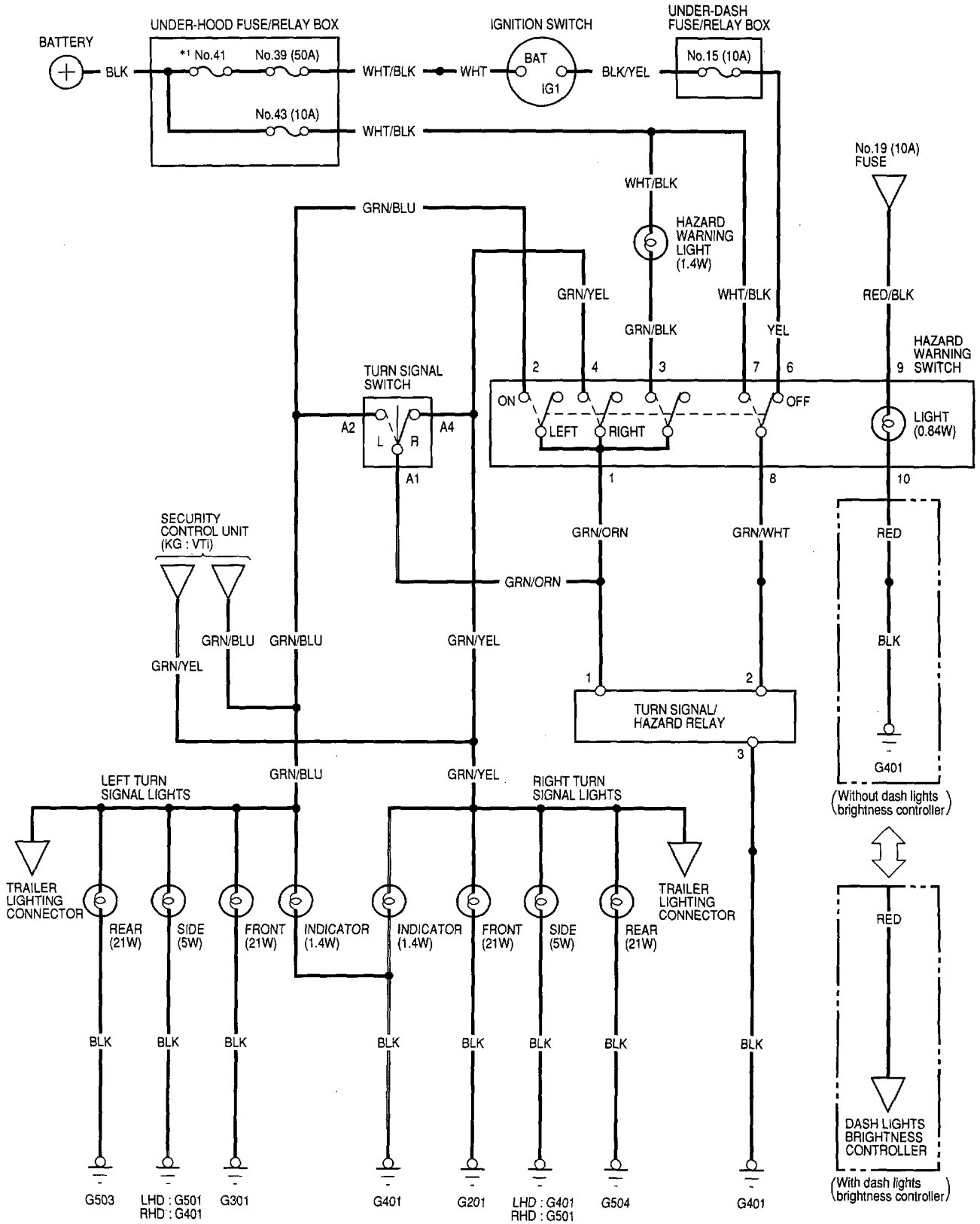


**TURN SIGNAL/HAZARD RELAY**  
Input Test, page 23-D-24



# Circuit Diagram

\* 1 No.41 (100A) : B18C4 engine  
No.41 (80A) : Except B18C4 engine

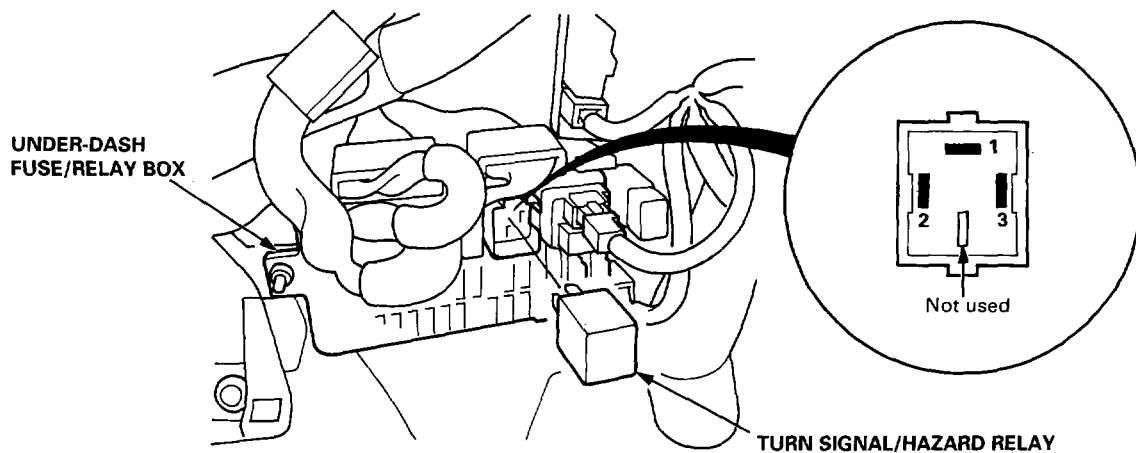


# Turn Signal/Hazard Flasher System

## Turn Signal/Hazard Relay Input Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the turn signal/hazard relay from the under-dash fuse/relay box.
2. Inspect the relay and fuse/relay box socket terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, make the following input tests at the fuse/relay box socket.
    - If any test indicates a problem, find and correct the cause, then recheck the system.
    - If all the input tests prove OK, the turn signal/hazard relay must be faulty; replace it.

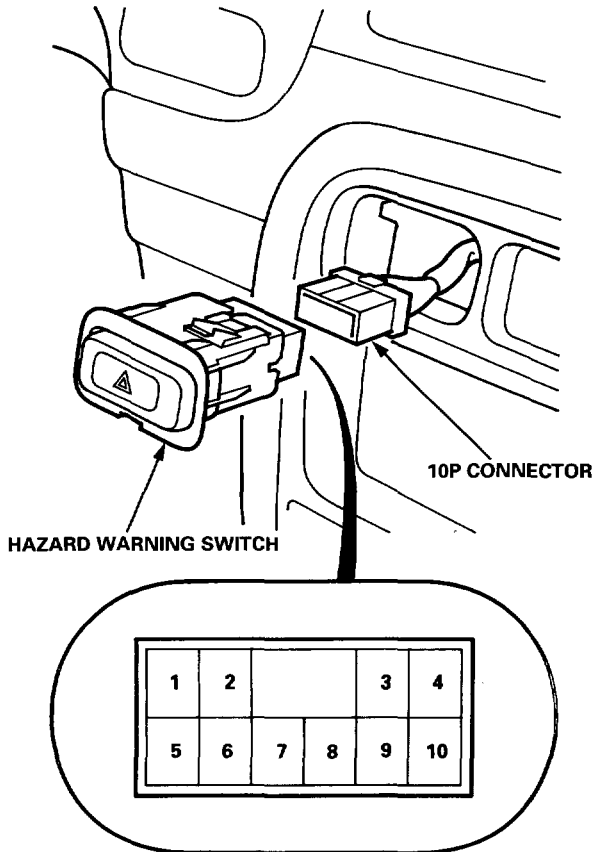


Cavity	Test condition	Test: Desired result	Possible cause if result is not obtained
3	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401)</li> <li>• An open in the wire</li> </ul>
2	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 15 (10 A) fuse in the under-dash fuse/relay box</li> <li>• An open in the wire</li> <li>• Faulty hazard warning switch</li> </ul>
	Hazard warning switch ON	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 43 (10 A) fuse in the under-hood fuse/relay box</li> <li>• An open in the wire</li> <li>• Faulty hazard warning switch</li> </ul>
1	Hazard warning switch ON; connect the B terminal to the L terminal.	Hazard lights should come on.	<ul style="list-style-type: none"> <li>• Poor ground (G201, G301, G401, G501, G503, G504)</li> <li>• Faulty hazard warning switch</li> <li>• An open in the wire</li> </ul>
	Ignition switch ON (II) and turn signal switch in right or left; connect the B terminal to the L terminal.	Right or left turn signal lights should come on.	<ul style="list-style-type: none"> <li>• Faulty turn signal switch</li> </ul>

## Hazard Warning Switch Test

1. Carefully pry the hazard warning switch out of the front console panel.
2. Disconnect the 10P connector from the hazard warning switch.

NOTE: LHD type is shown, RHD type is similar.



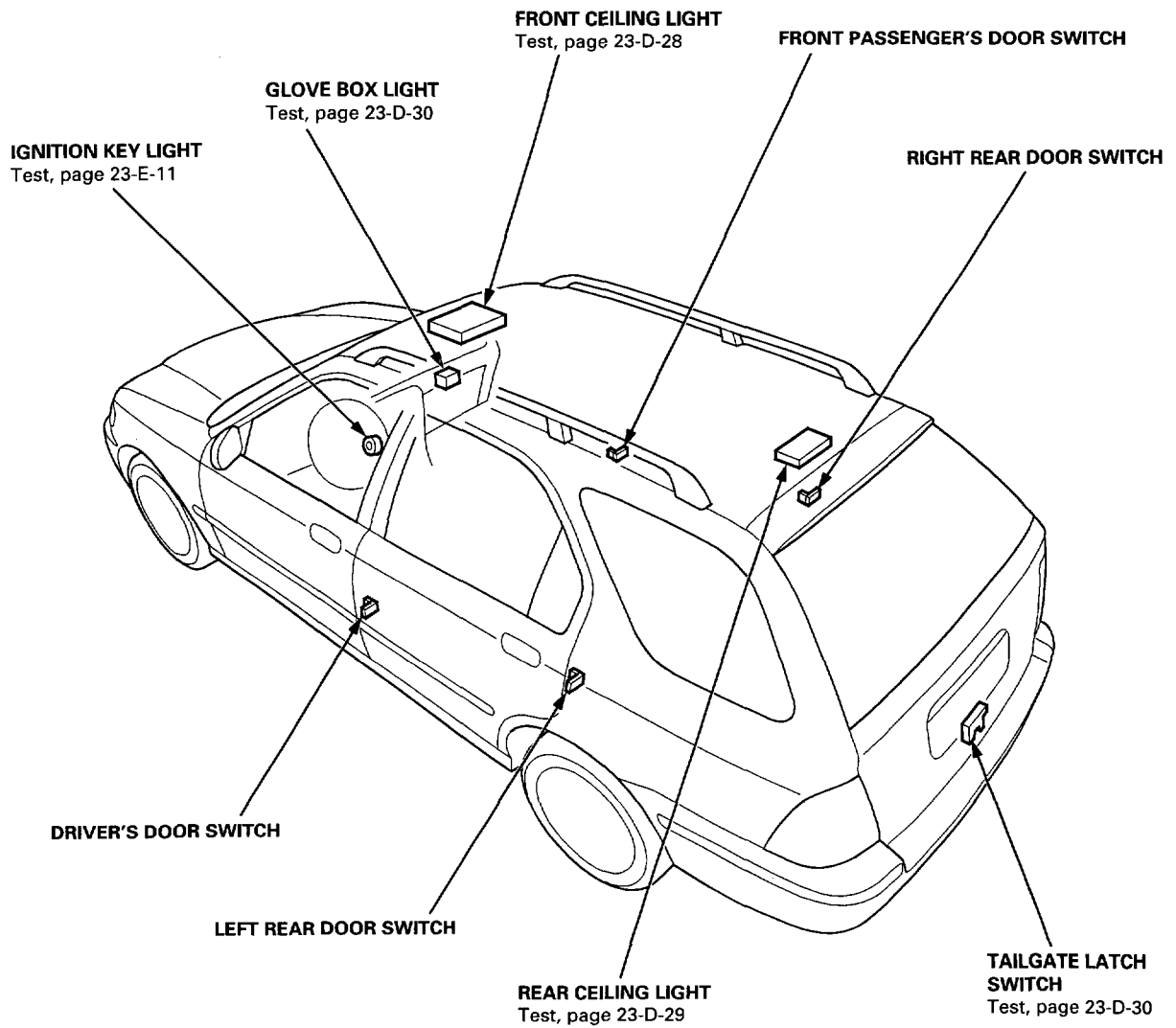
3. Check for continuity between the terminals in each switch position according to the table.

Terminal	1	2	3	4	6	7	8	9	10
Position									
OFF					○	○	○	○	○
ON	○	○	○	○		○	○	○	○

# Interior Lights

## Component Location Index

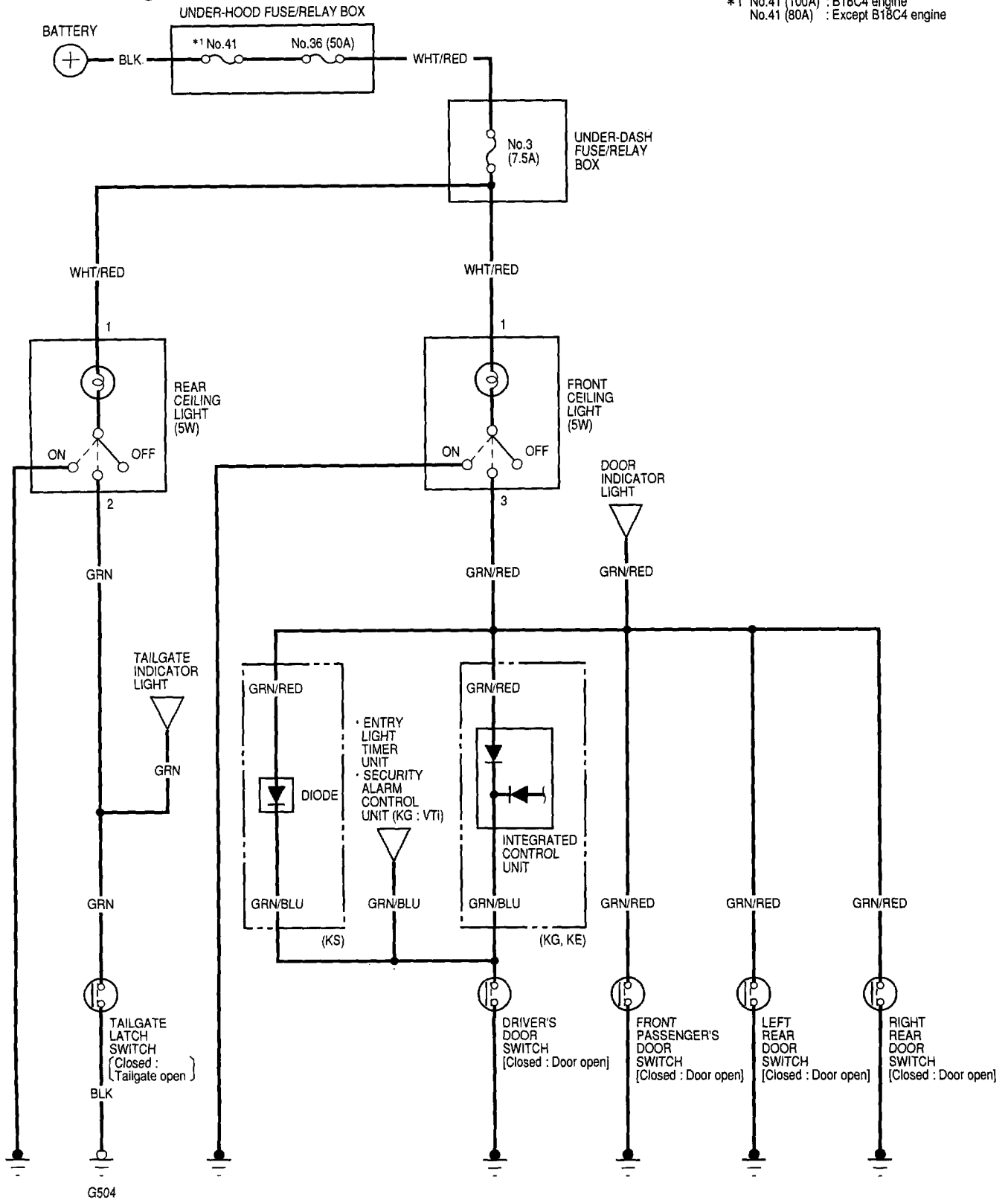
NOTE: LHD type is shown, RHD type is similar.





# Circuit Diagram

\*1 No.41 (100A) : B18C4 engine  
No.41 (80A) : Except B18C4 engine

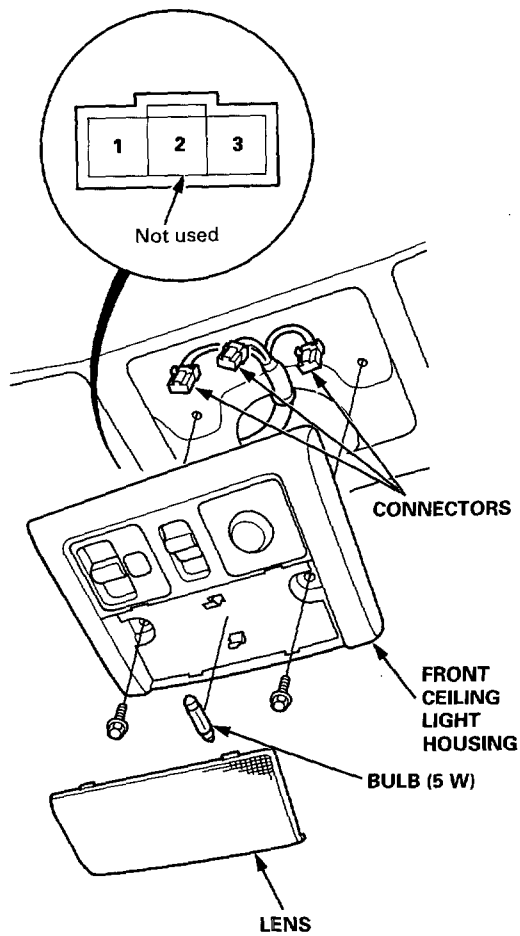




# Interior Lights

## Front Ceiling Light Test

1. Turn the ceiling light switch OFF.
2. Pry off the lens.
3. Remove the two mounting bolts and the ceiling light housing.
4. Disconnect the connectors.



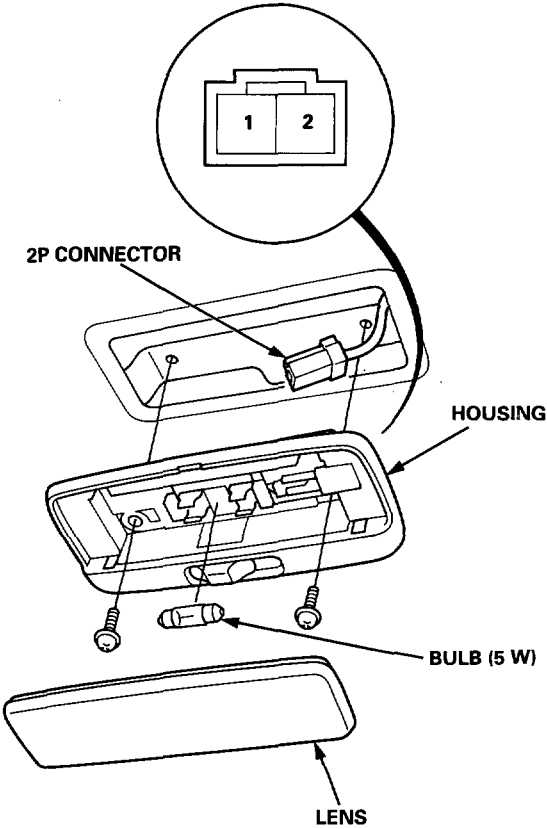
5. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	1		3	BODY GROUND
OFF				
MIDDLE	○	⊕	○	
ON	○	⊕	—	○



# Rear Ceiling Light Test

- 1. Turn the light switch OFF.
- 2. Pry off the lens.
- 3. Remove the two screws and the housing.
- 4. Disconnect the 2P connector from the housing.



- 5. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	1		2	BODY GROUND
OFF				
MIDDLE	○	⊖	○	
ON	○	⊖	—	○

# Interior Lights

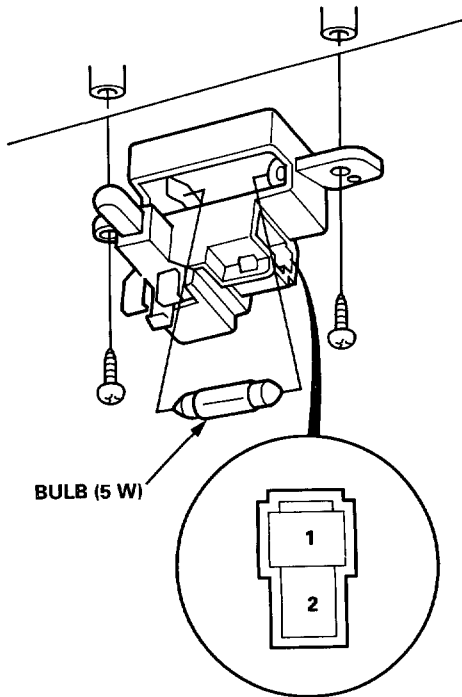
## Glove Box Light Test

1. Open the glove box, and disconnect the 2P connector.

NOTE: If necessary, remove the glove box.

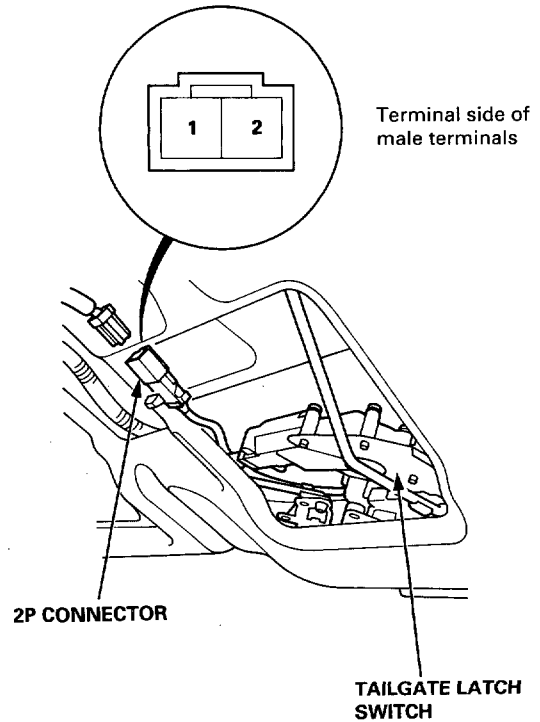
2. Check for continuity between the terminals in each switch position according to the table.

Terminal	1	2
Position		
CLOSE (OFF)		
OPEN (ON)	○	○



## Tailgate Latch Switch Test

1. Open the tailgate.
2. Remove the tailgate trim panel (see section 20).
3. Disconnect the 2P connector from the tailgate latch switch.



4. Check for continuity between the terminals in each switch position according to the table.

Terminals	1	2
Position		
CLOSE (OFF)		
OPEN (ON)	○	○

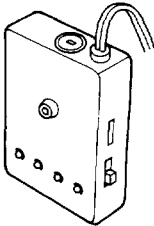
## Controls

<b>Special Tools .....</b>	<b>23-E-2</b>
<b>*Integrated Control Unit</b>	
<b>Circuit Diagram</b>	
<b>(KG and KE models) .....</b>	<b>23-E-3</b>
<b>Circuit Diagram (KS model) .....</b>	<b>23-E-4</b>
<b>Input Test (KG and KE models) .....</b>	<b>23-E-5</b>
<b>Input Test (KS model) .....</b>	<b>23-E-7</b>
<b>Entry Light Timer System</b>	
<b>Circuit Diagram .....</b>	<b>23-E-10</b>
<b>Ignition Key Light Test .....</b>	<b>23-E-11</b>
<b>Entry Light Timer Unit Input Test ...</b>	<b>23-E-12</b>
<b>Power Windows</b>	
<b>Component Location Index .....</b>	<b>23-E-13</b>
<b>Circuit Diagram (With Rear Power</b>	
<b>Window) .....</b>	<b>23-E-14</b>
<b>Circuit Diagram (Without Rear Power</b>	
<b>Window) .....</b>	<b>23-E-15</b>
<b>*Power Door Locks</b>	
<b>Component Location Index .....</b>	<b>23-E-23</b>
<b>Circuit Diagram (With Keyless</b>	
<b>Entry) .....</b>	<b>23-E-24</b>
<b>Circuit Diagram (Without Keyless</b>	
<b>Entry) .....</b>	<b>23-E-25</b>

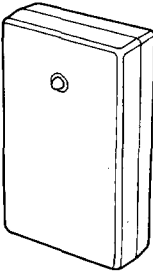


# Special Tools

Ref. No.	Tool Number	Description	Qty	Remark
①	07MAJ - SP00200	Keyless Entry Checker	1	
②	07MAJ - SP00300	Keyless Entry Checker	1	

①



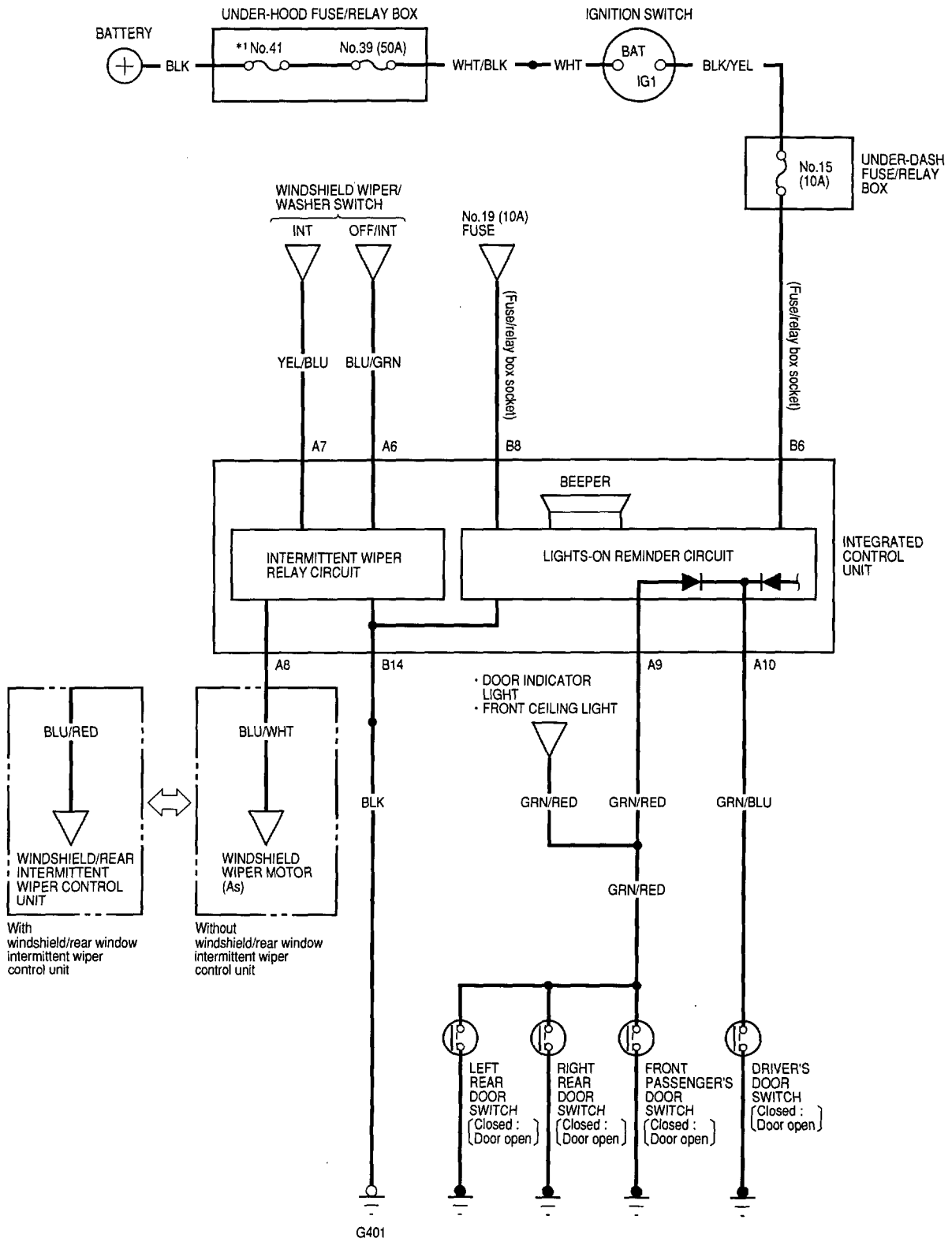
②

# Integrated Control Unit



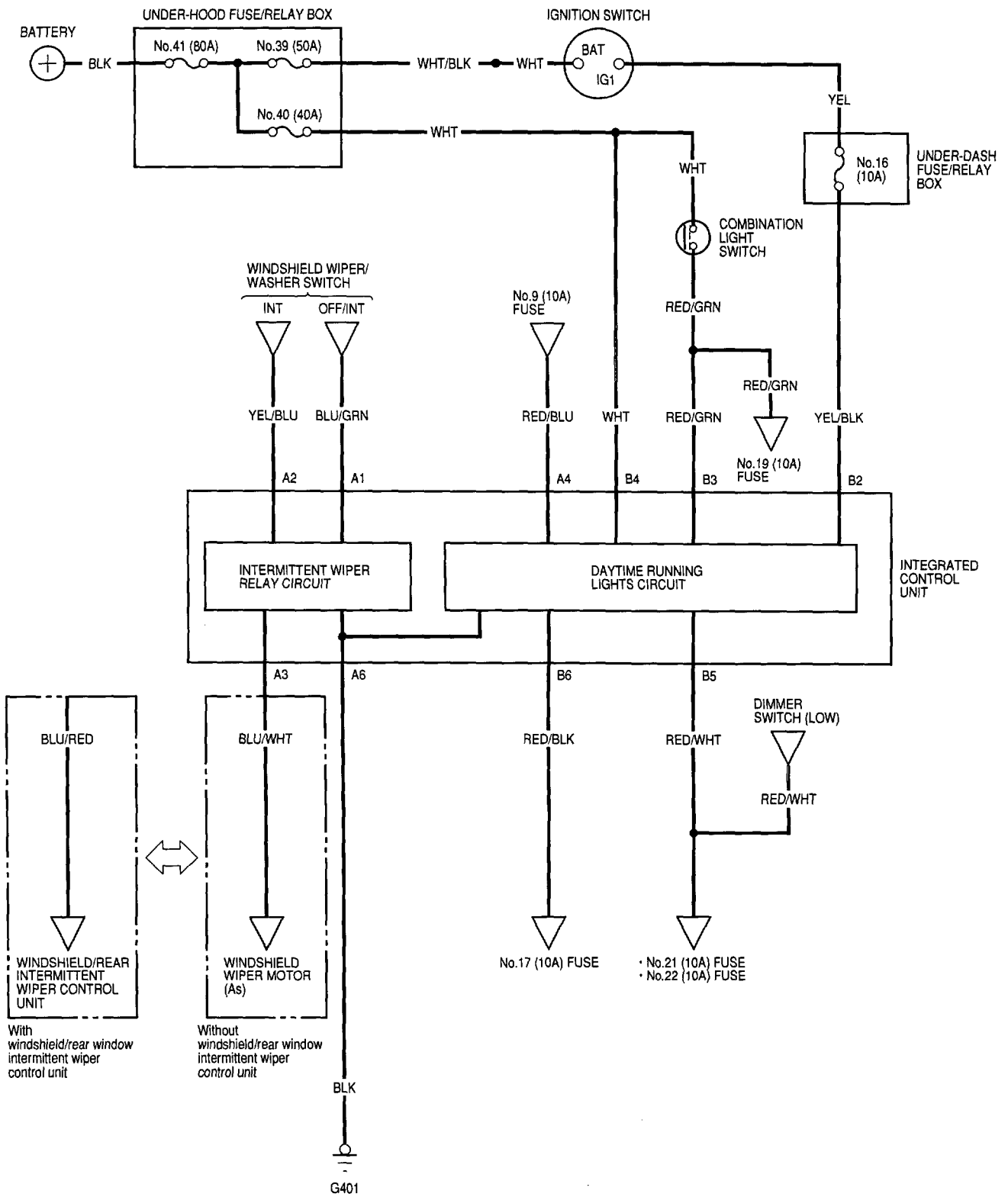
## Circuit Diagram (KG and KE models)

\*1 No.41,(100A) : B18C4 engine  
 No.41 (80A) : Except B18C4 engine



# Integrated Control Unit

## Circuit Diagram (KS model)



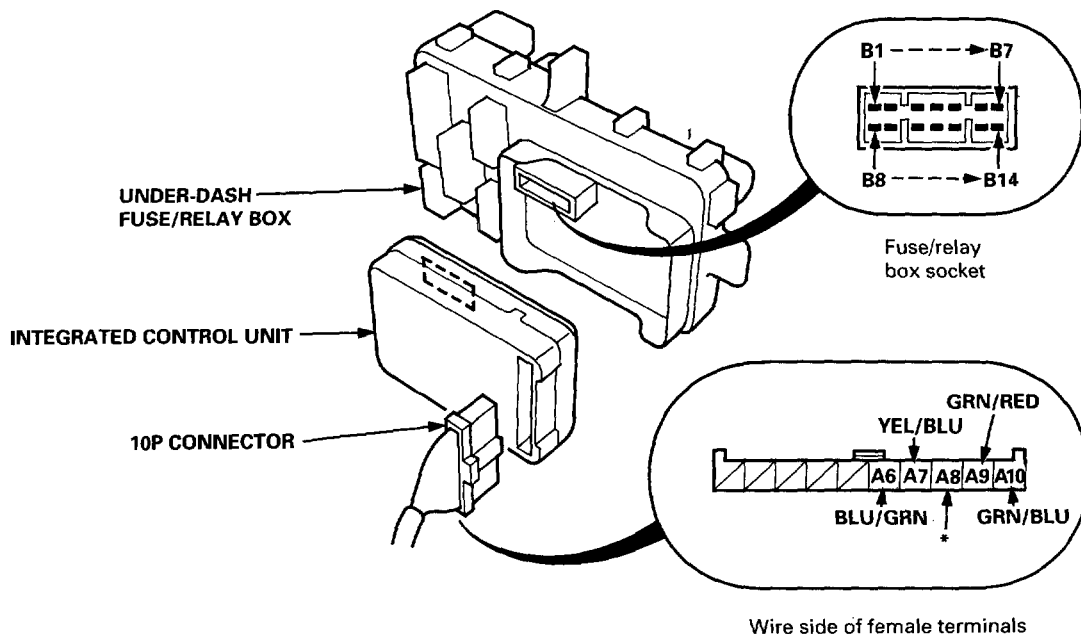
# Integrated Control Unit



## Input Test (KG and KE models)

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the driver's dashboard lower cover (see section 20).
2. Disconnect the 10P connector from the integrated control unit.
3. Remove the integrated control unit from the under-dash fuse/relay box.
4. Inspect the connector and socket terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, make the following input tests at the connector and the fuse/relay box socket.
    - If any test indicates a problem, find and correct the cause, then recheck the system.
    - If all the input tests prove OK, the control unit must be faulty; replace it.



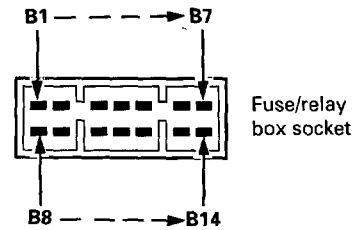
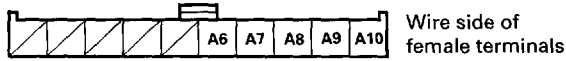
- \* BLU/WHT: Without windshield/rear window intermittent wiper control unit.
- BLU/RED: With windshield/rear window intermittent wiper control unit.

(cont'd)



# Integrated Control Unit

## Input Test (KG and KE models) (cont'd)



### Intermittent Wiper Relay System:

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B14	—	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>Poor ground (G401)</li> <li>An open in the wire</li> </ul>
A7	YEL/BLU	Ignition switch ON (II), and windshield wiper switch at INT	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>Faulty windshield wiper switch</li> <li>An open in the wire</li> </ul>
A6	BLU/GRN	Ignition switch ON (II), and windshield wiper switch at OFF or INT	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>Faulty windshield wiper switch</li> <li>An open in the wire</li> <li>Faulty windshield wiper motor</li> </ul>
A8	*1 BLU/WHT	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>Faulty windshield wiper motor</li> <li>An open in the wire</li> </ul>
	*2 BLU/RED	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>Faulty windshield wiper motor</li> <li>Faulty windshield/rear window intermittent wiper control unit</li> <li>An open in the wire</li> </ul>

\*1: Without windshield/rear window intermittent wiper control unit

\*2: With windshield/rear window intermittent wiper control unit

### Lights-on Reminder System:

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B14	—	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>Poor ground (G401)</li> <li>An open in the wire</li> </ul>
B8	—	Combination light switch ON	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>Blown No. 19 (20 A) fuse in the under-dash fuse/relay box</li> <li>Faulty combination light switch</li> <li>An open in the wire</li> </ul>
B6	—	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>Blown No. 15 (10 A) fuse in the under-dash fuse/relay box</li> <li>An open in the wire</li> </ul>
A10	GRN/BLU	Driver's door open	Check for voltage to ground: There should be 1 V or less.	<ul style="list-style-type: none"> <li>Faulty driver's door switch</li> <li>An open in the wire</li> <li>Poor ground</li> </ul>
A9	GRN/RED	Passenger's door open	Check for voltage to ground: There should be 1 V or less.	<ul style="list-style-type: none"> <li>Faulty passenger's door switch</li> <li>An open in the wire</li> <li>Poor ground</li> </ul>

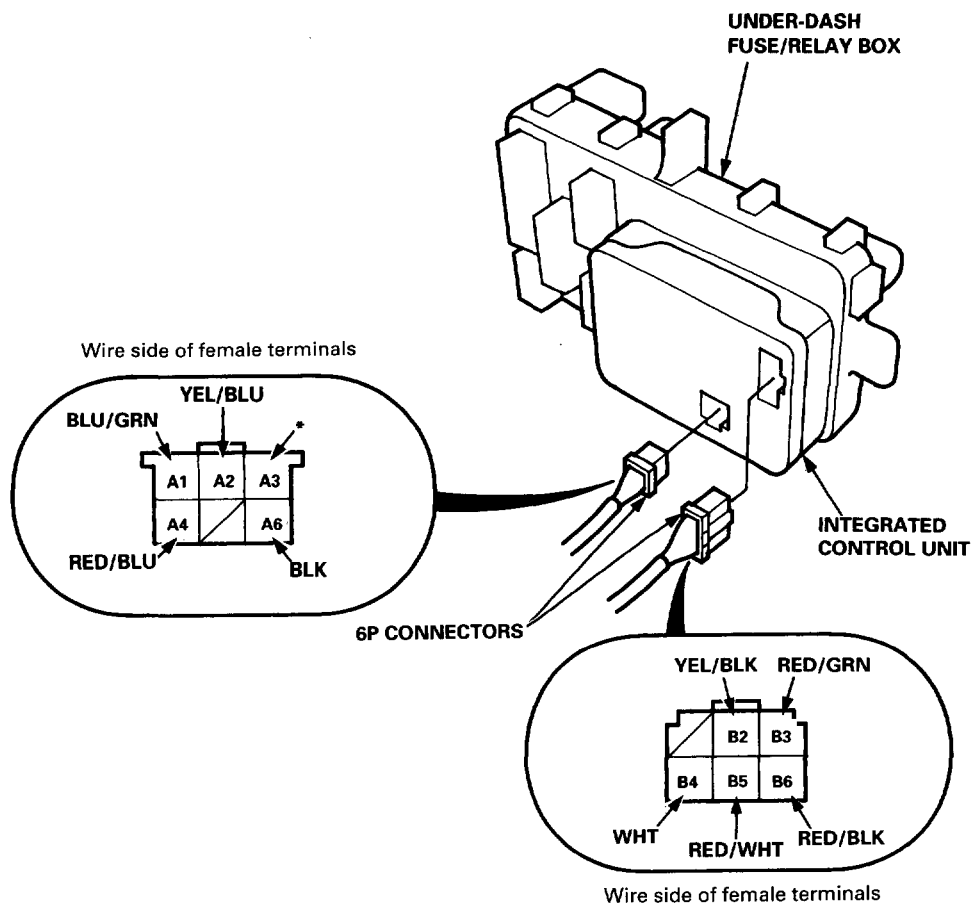
# Integrated Control Unit



## Input Test (KS model)

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the dashboard lower cover.
2. Disconnect the 6P connectors from the integrated control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, make the following input tests at the connector and under-dash fuse/relay box.
    - If any test indicates a problem, find and correct the cause, then recheck the system.
    - If all the input tests prove OK, the control unit must be faulty; replace it.



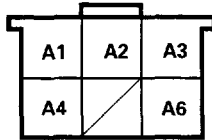
\* BLU/RED: With windshield/rear window intermittent wiper control unit.

BLU/WHT: Without windshield/rear window intermittent wiper control unit.

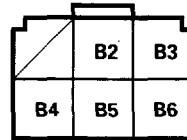
(cont'd)

# Integrated Control Unit

## Input Test (KS model) (cont'd)



Wire side of female terminals



Wire side of female terminals

### Daytime Running Lights System:

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A6	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401)</li> <li>• An open in the wire</li> </ul>
B4	WHT	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 40 (40 A) fuse in the under-hood fuse/relay box</li> <li>• An open in the wire</li> </ul>
B2	YEL/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 16 (10 A) fuse in the under-dash fuse/relay box</li> <li>• An open in the wire</li> </ul>
B3	RED/GRN	Combination light switch ON	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 40 (40 A) fuse in the under-hood fuse/relay box</li> <li>• Faulty combination light switch</li> <li>• An open in the wire</li> </ul>
A4	RED/BLU	Combination light switch ON (≡▷) and dimmer switch "HI"	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 9 (10 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty combination light switch</li> <li>• An open in the wire</li> </ul>
B5	RED/WHT	Connect a jumper wire between the WHT and RED/WHT terminals.	Left and right headlights (LOW) should come on.	<ul style="list-style-type: none"> <li>• Blown No. 21 (10 A) or No. 22 (10 A) fuse in the under-dash fuse/relay box</li> <li>• Blown bulbs</li> <li>• An open in the wire</li> </ul>
B6	RED/BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Blown No. 17 (10 A) fuse in the under-dash fuse/relay box</li> <li>• An open in the wire</li> </ul>



**Intermittent Wiper Relay System:**

<b>Cavity</b>	<b>Wire</b>	<b>Test condition</b>	<b>Test: Desired result</b>	<b>Possible cause if result is not obtained</b>
A6	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401)</li> <li>• An open in the wire</li> </ul>
A7	YEL/BLU	Ignition switch ON (II), and windshield wiper switch at INT	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty windshield wiper switch</li> <li>• An open in the wire</li> </ul>
A6	BLU/GRN	Ignition switch ON (II), and windshield wiper switch at OFF or INT	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty windshield wiper switch</li> <li>• An open in the wire</li> <li>• Faulty windshield wiper motor</li> </ul>
A8	*2 BLU/WHT	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty windshield wiper motor</li> <li>• An open in the wire</li> </ul>
	*1 BLU/RED	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty windshield wiper motor</li> <li>• Faulty windshield/rear window intermittent wiper control unit</li> <li>• An open in the wire</li> </ul>

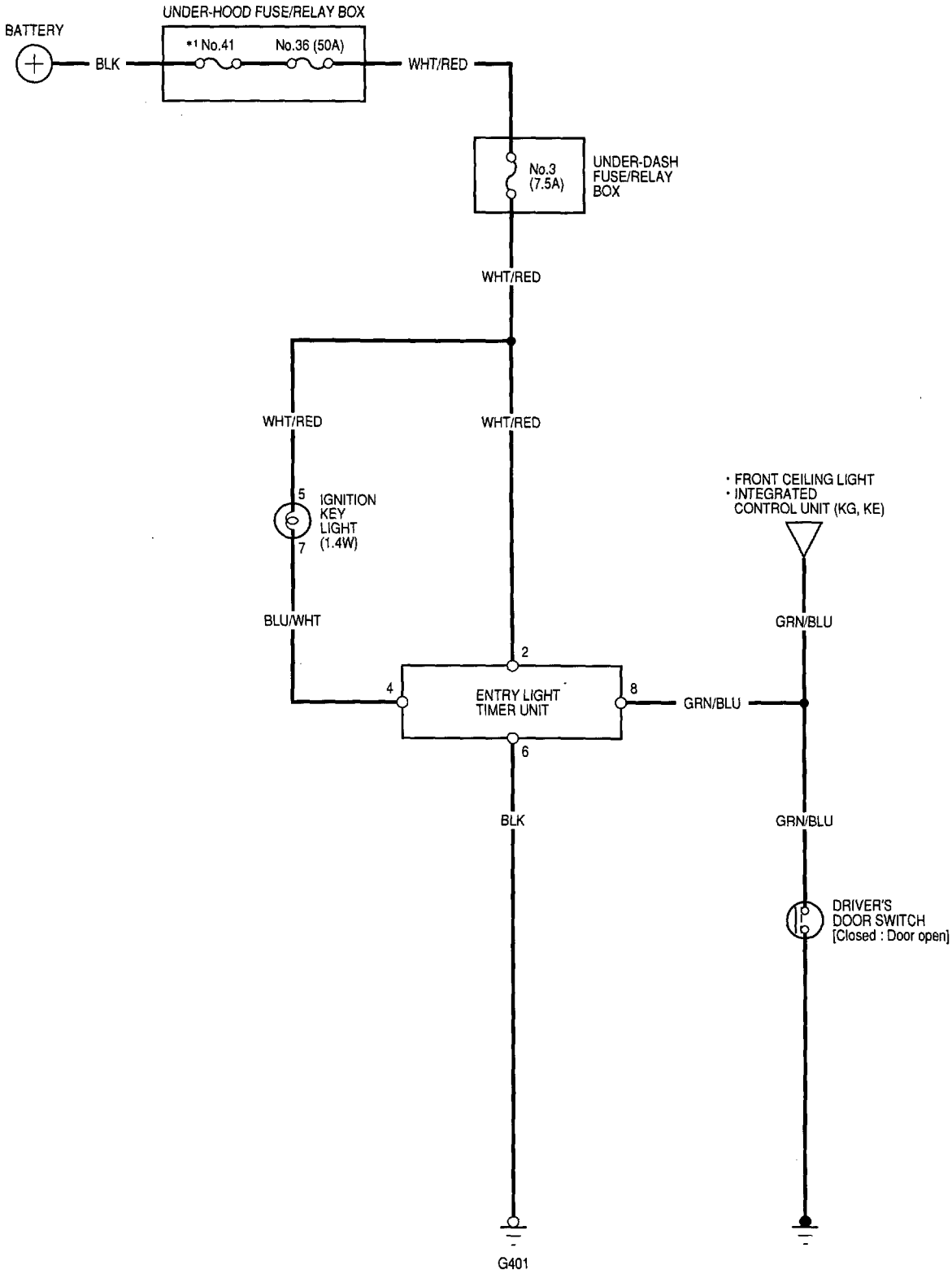
\*1: With windshield/rear window intermittent wiper control unit

\*2: Without windshield/rear window intermittent wiper control unit

# Entry Light Timer System

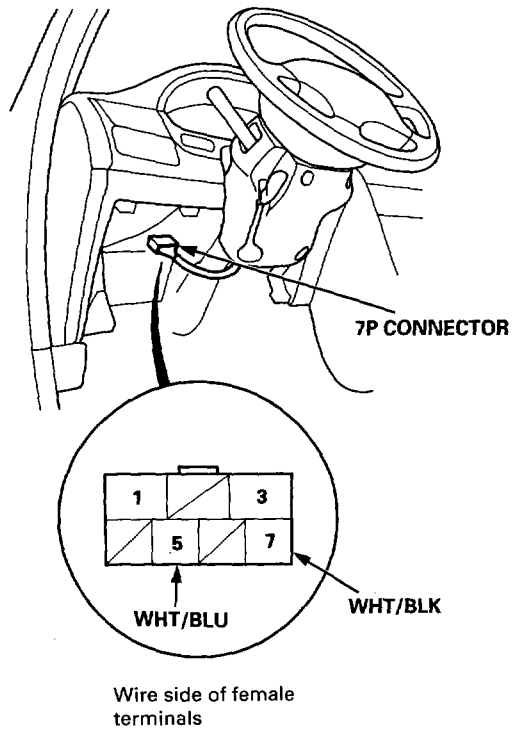
## Circuit Diagram

\*1 No.41 (100A) : B18C4 engine  
 No.41 (80A) : Except B18C4 engine



## Ignition Key Light Test

1. Remove the dashboard lower cover.
2. Disconnect the 7P connector from the main wire harness.

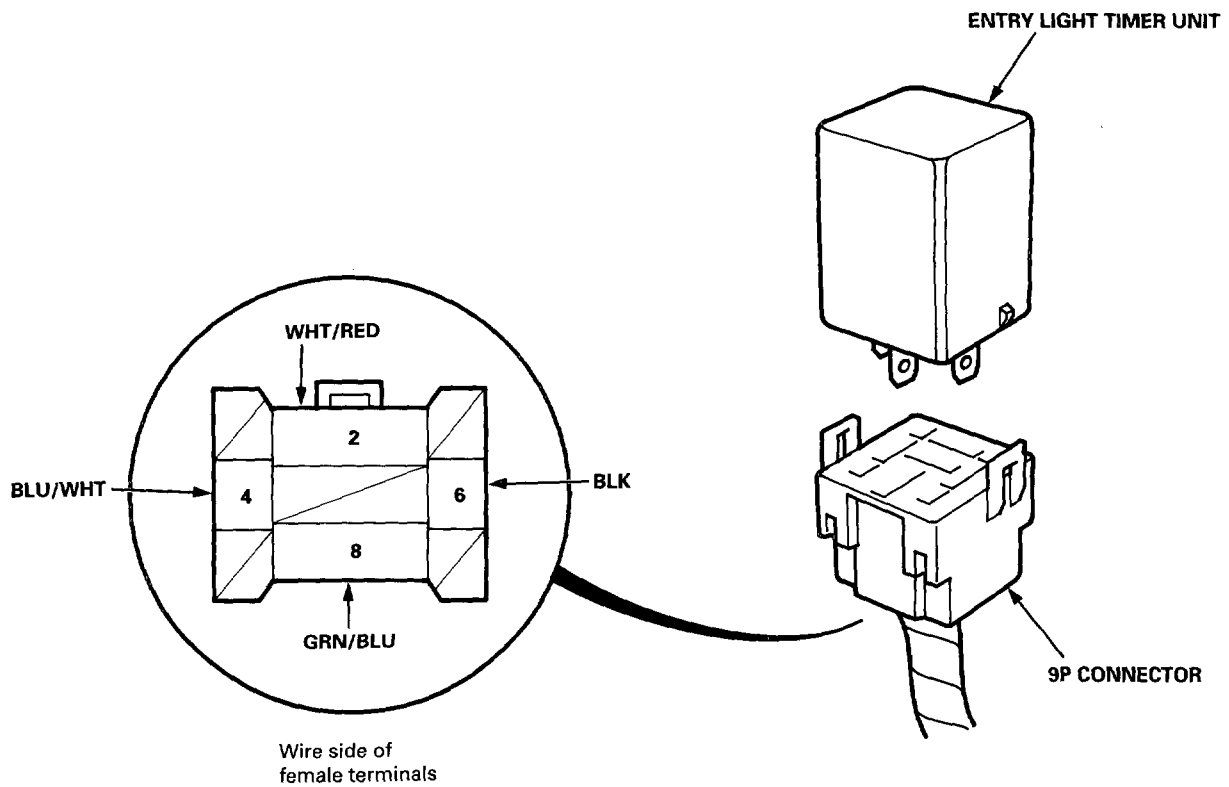


3. The ignition key light should come on when power is connected to terminal No. 5 (WHT/BLU) and ground is connected to terminal No. 7 (WHT/BLK).
- If the ignition key light does not come on, replace the bulb.

# Entry Light Timer System

## Entry Light Timer Unit Input Test

1. Disconnect the 9P connector from the entry light timer unit.
2. Inspect the connector and socket terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, make the following input tests at the connector.
    - If any test indicates a problem, find and correct the cause, then recheck the system.
    - If all the input tests prove OK, the control unit must be faulty; replace it.



Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
2	WHT/RED	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 3 (7.5 A) fuse in the under-dash fuse/relay box</li> <li>• An open in the wire</li> </ul>
4	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401)</li> <li>• An open in the wire</li> </ul>
6	BLU/WHT	Under all conditions	Attach to ground: Ignition key light should come on.	<ul style="list-style-type: none"> <li>• Blown bulb</li> <li>• An open in the wire</li> </ul>
8	GRN/BLU	Driver's door open	Check for voltage to ground: There should be 1 V or less.	<ul style="list-style-type: none"> <li>• Faulty driver's door switch</li> <li>• An open in the wire</li> </ul>



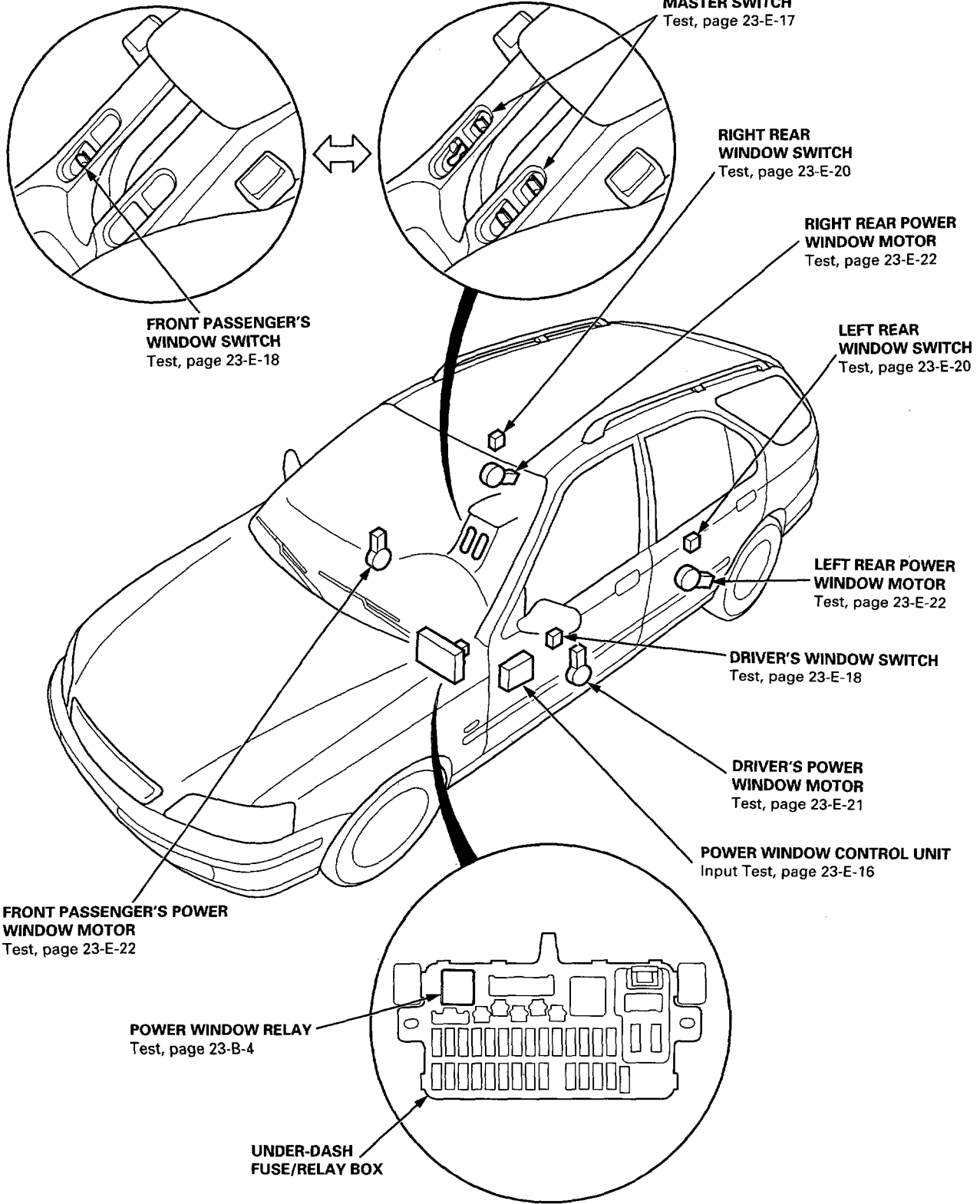
# Power Windows

## Component Location Index

NOTE: LHD type is shown; RHD type is similar.

Without Rear Power Window:

With Rear Power Window:

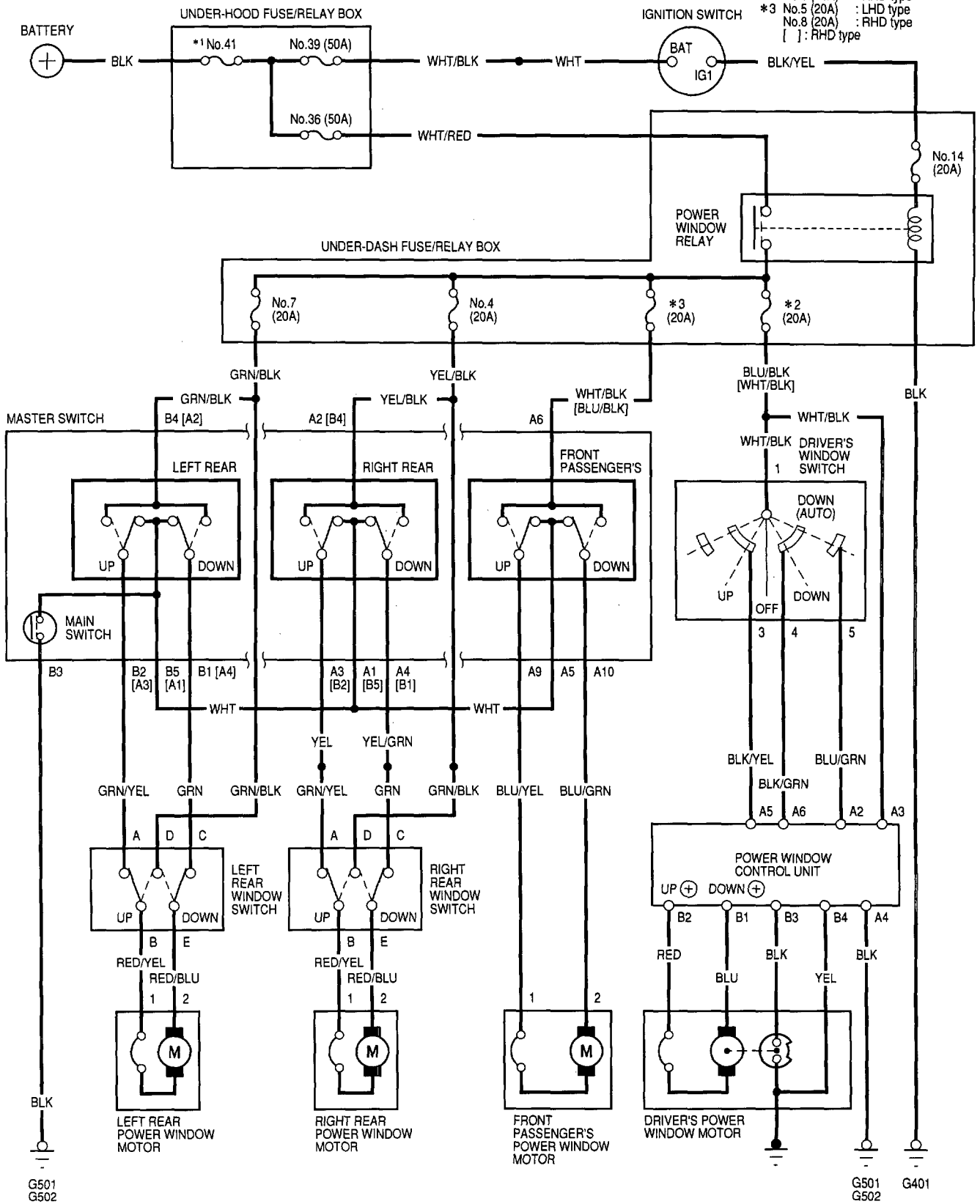


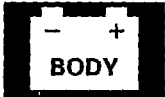


# Power Windows

## Circuit Diagram (With Rear Power Windows)

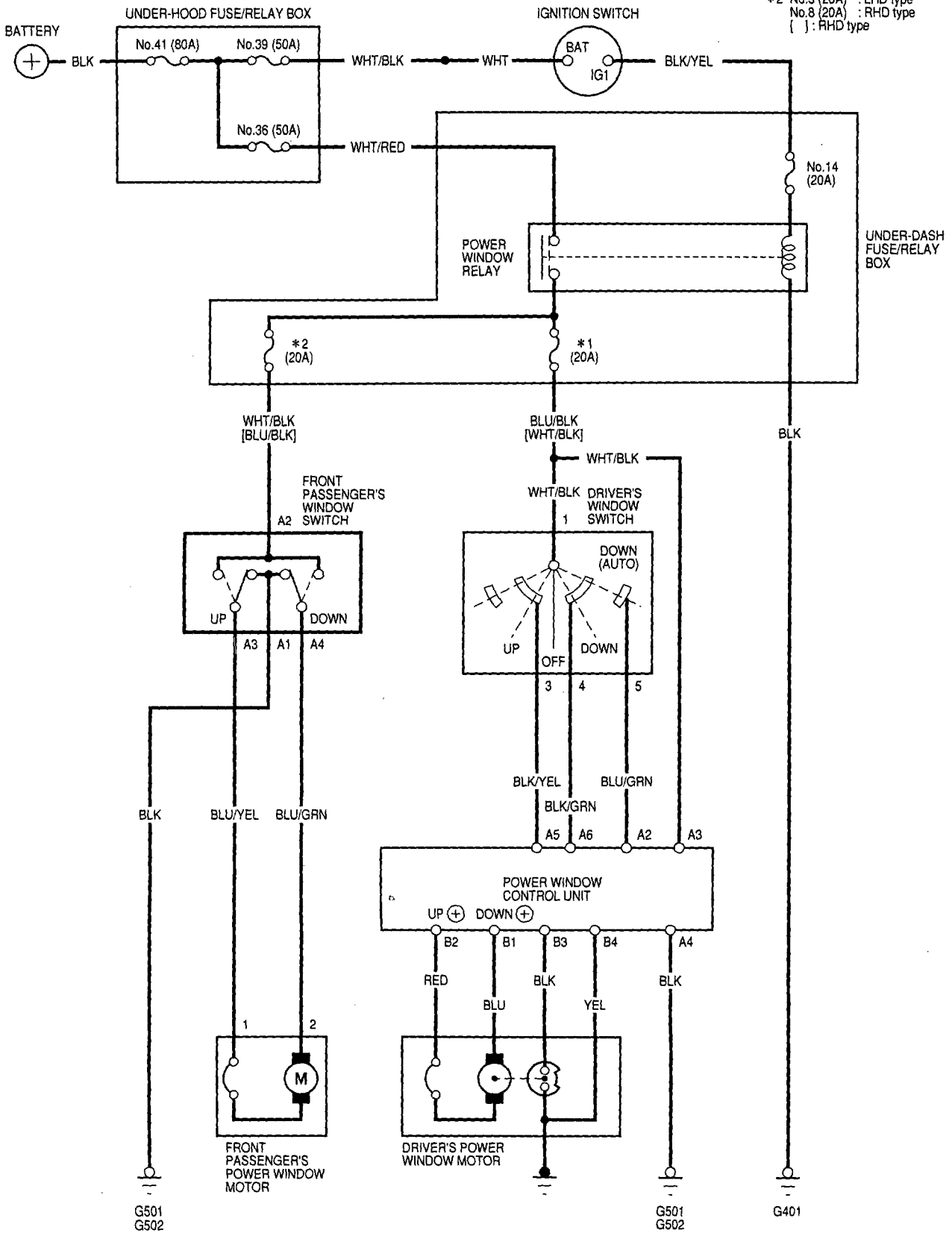
- \*1 No.41 (100A) : B18C4 engine  
No.41 (80A) : Except B18C4 engine
- \*2 No.8 (20A) : LHD type  
No.5 (20A) : RHD type
- \*3 No.5 (20A) : LHD type  
No.8 (20A) : RHD type  
[ ] : RHD type





# Circuit Diagram (Without Rear Rower Windows)

- \*1 No.8 (20A) : LHD type  
No.5 (20A) : RHD type
- \*2 No.5 (20A) : LHD type  
No.8 (20A) : RHD type  
{ } : RHD type

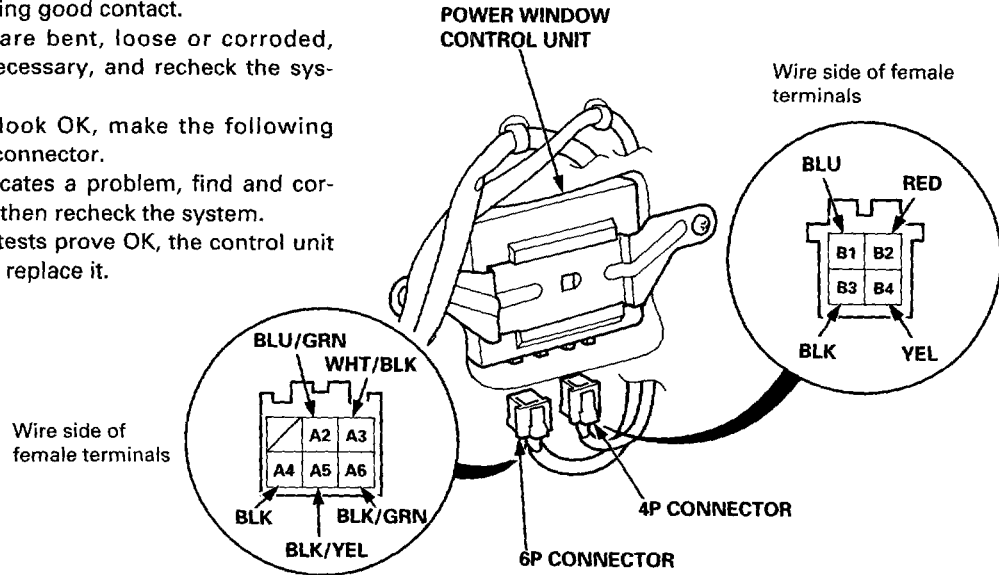


# Power Windows

## Power Window Control Unit Input Test

1. Remove the driver's door panel (see section 20).
2. Disconnect the 6P and 4P connectors from the control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, make the following input tests at the connector.
    - If any test indicates a problem, find and correct the cause, then recheck the system.
    - If all the input tests prove OK, the control unit must be faulty; replace it.

\*1 No. 8 (20 A): LHD type  
No. 5 (20 A): RHD type



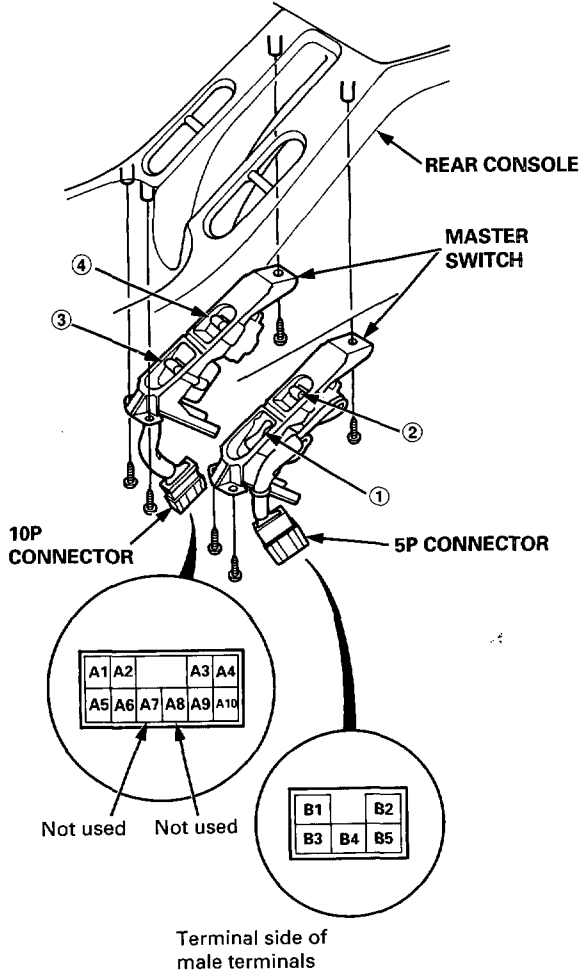
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A4	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G501, G502)</li> <li>• An open in the wire</li> </ul>
A3	WHT/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>• Blown*1 (20 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty power window relay</li> </ul>
A5	BLK/YEL	Ignition switch ON (II), driver's window switch UP	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Faulty driver's window switch</li> <li>• An open in the wire</li> </ul>
A6	BLK/GRN	Ignition switch ON (II), driver's window switch DOWN		
A2	BLU/GRN	Ignition switch ON (II), driver's window switch DOWN (AUTO)		
B1	BLU	Connect the A3 terminal to the B1 terminal, and the A4 terminal to the B2 terminal, then turn the ignition switch ON (II).	Check the driver's power window motor: It should run (the window moves down).	<ul style="list-style-type: none"> <li>• Faulty driver's power window motor</li> <li>• An open in the wire</li> </ul>
B2	RED			
B3	BLK	Connect the A3 terminal to the B2 terminal, and the A4 terminal to the B1 terminal, then turn the ignition switch ON (II).	Check for resistance between the B3 and B4 terminals: Between 20 – 50 ohms should be indicated as the driver's motor runs.	<ul style="list-style-type: none"> <li>• Faulty pulser</li> <li>• Faulty driver's power window motor</li> <li>• An open in the wire</li> </ul>
B4	YEL			



## Master Switch Test/Replacement (With Rear Power Window)

1. Remove the rear console (see section 20).
2. Disconnect the 10P and 5P connectors from the master switch.
3. Remove the master switch from the rear console.

NOTE: LHD type is shown, RHD type is symmetrical.



4. Check for continuity between the terminals in each switch position according to the tables.

### FRONT PASSENGER'S SWITCH

Terminal Position	A5	A6	A9	A10
OFF	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
UP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOWN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### LEFT (\*RIGHT) REAR SWITCH

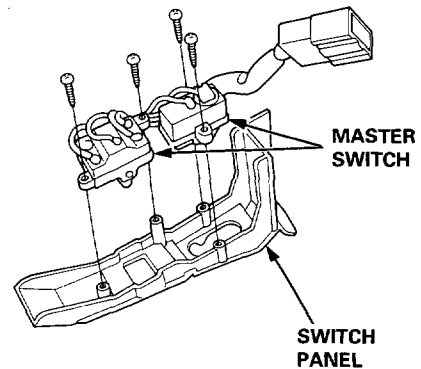
Position	Terminal					
	Main switch	B1	B2	B3	B4	B5
OFF	ON	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	OFF	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UP	ON	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	OFF	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOWN	ON	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	OFF	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### RIGHT (\*LEFT) REAR SWITCH

Terminal Position	A1	A2	A3	A4
OFF	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
UP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
DOWN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

\*: KE model

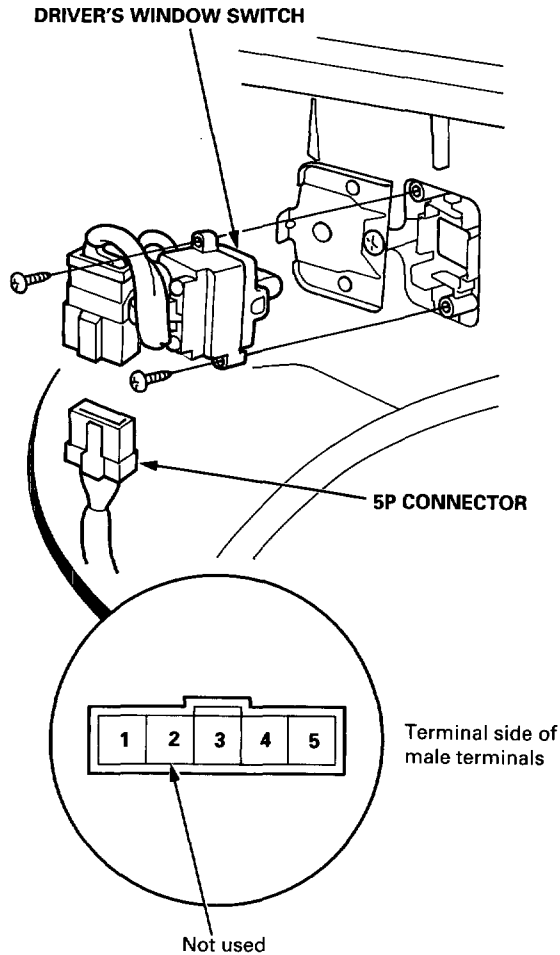
5. Remove the screws, then remove the master switch from the switch panel.



# Power Windows

## Driver's Window Switch Test

1. Remove the driver's door panel (see section 20).
2. Disconnect the 5P connector from the switch.



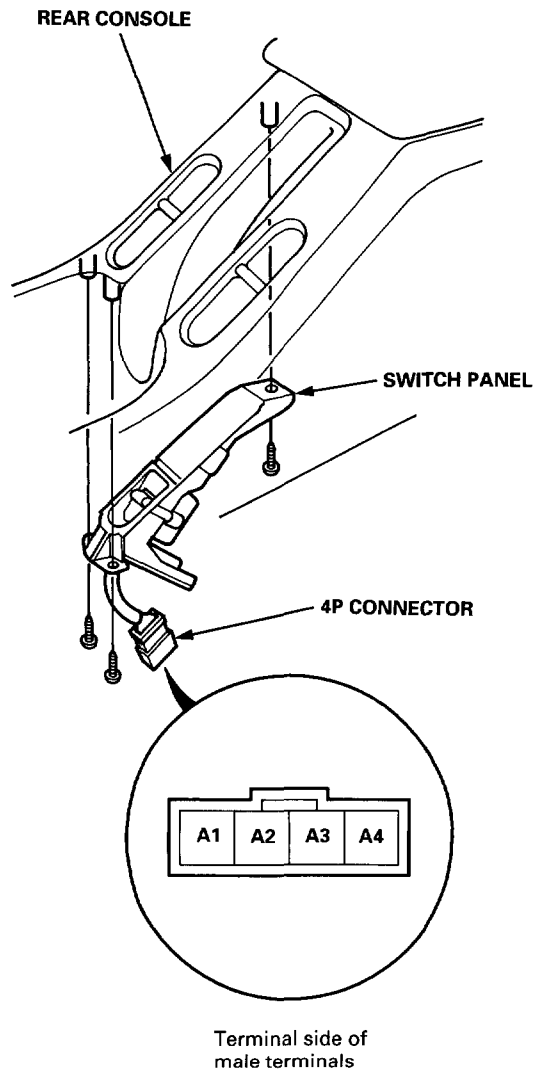
3. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	1	3	4	5
UP	○	○		
OFF				
DOWN	○		○	
DOWN (AUTO)	○			○

## Front Passenger's Window Switch Test (Without Rear Power Window)

1. Remove the rear console (see section 20).
2. Disconnect the 4P connector from the switch.
3. Remove the switch from the rear console.

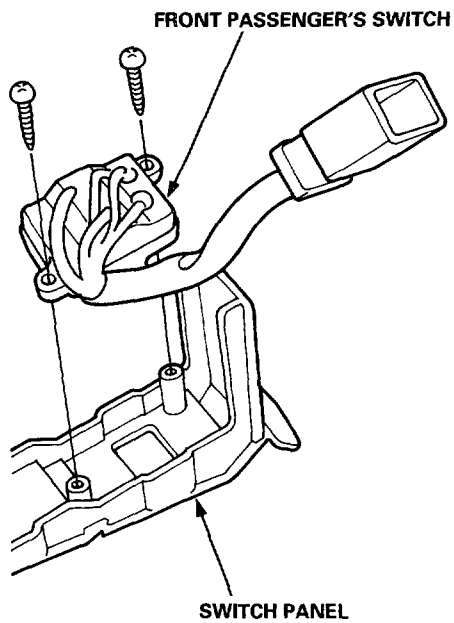
NOTE: LHD type is shown, RHD type is symmetrical.



4. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	A1	A2	A3	A4
UP	○	○ — ○		○
OFF	○	○ — ○	○	○
DOWN	○	○ — ○	○	○

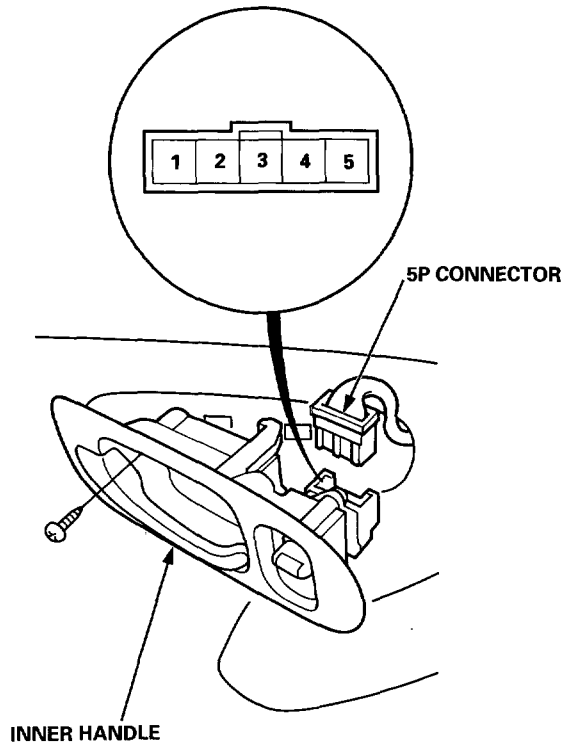
5. Remove the two screws, then remove the switch from the switch panel.



# Power Windows

## Rear Window Switch Test

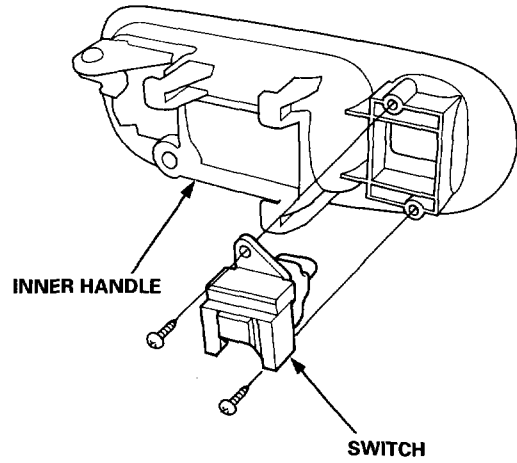
1. Remove the door inner handle.
2. Disconnect the 5P connector.



3. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	1	2	3	4	5
UP		○	○	○	○
OFF	○	○	○	○	○
DOWN	○	○		○	○

4. Remove the two screws from the switch, then remove the switch from the inner handle.

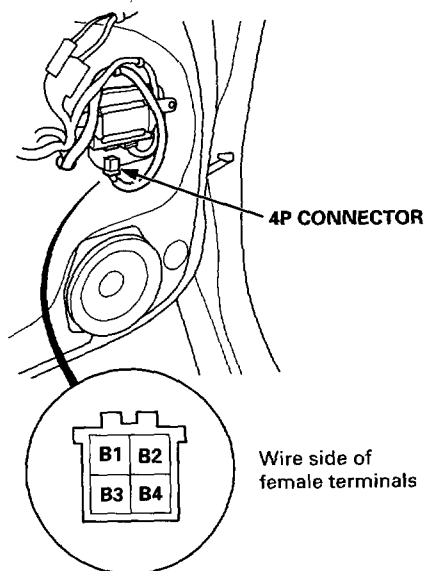


## Driver's Power Window Motor Test

### Motor Test:

1. Remove the driver's door panel (see section 20).
2. Disconnect the 4P connector from the motor.

NOTE: LHD type is shown, RHD type is similar.



### CAUTION

When the motor stops running, disconnect one lead immediately.

3. Test the motor in each direction by connecting battery power and ground according to the table.

Terminal	B1	B2
Direction		
UP	⊖	⊕
DOWN	⊕	⊖

4. If the motor does not run or fails to run smoothly, replace it.

### Pulser Test:

5. Connect the test leads of an analog ohmmeter to the B3 and B4 terminals.
6. Run the motor by connecting power and ground to the B1 and B2 terminals. The ohmmeter needle should move back and forth alternately.



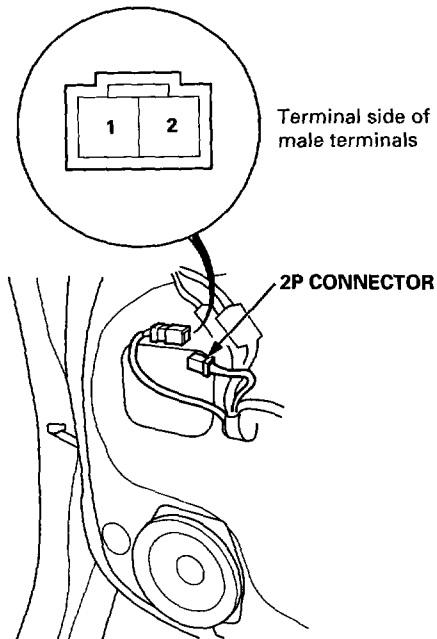
# Power Windows

## Passenger's Power Window Motor Test

### Front:

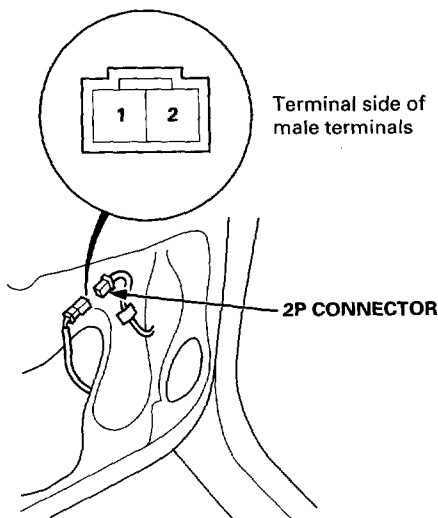
1. Remove the passenger's door panel (see section 20).
2. Disconnect the 2P connector from the motor.

NOTE: LHD type is shown, RHD type is similar.



### Rear:

1. Remove the passenger's door panel (see section 20).
2. Disconnect the 2P connector from the motor.



## CAUTION

When the motor stops running, disconnect one lead immediately.

3. Check window motor operation by connecting power and ground according to the table.

Terminal	1	2
Direction		
UP	⊕	⊖
DOWN	⊖	⊕

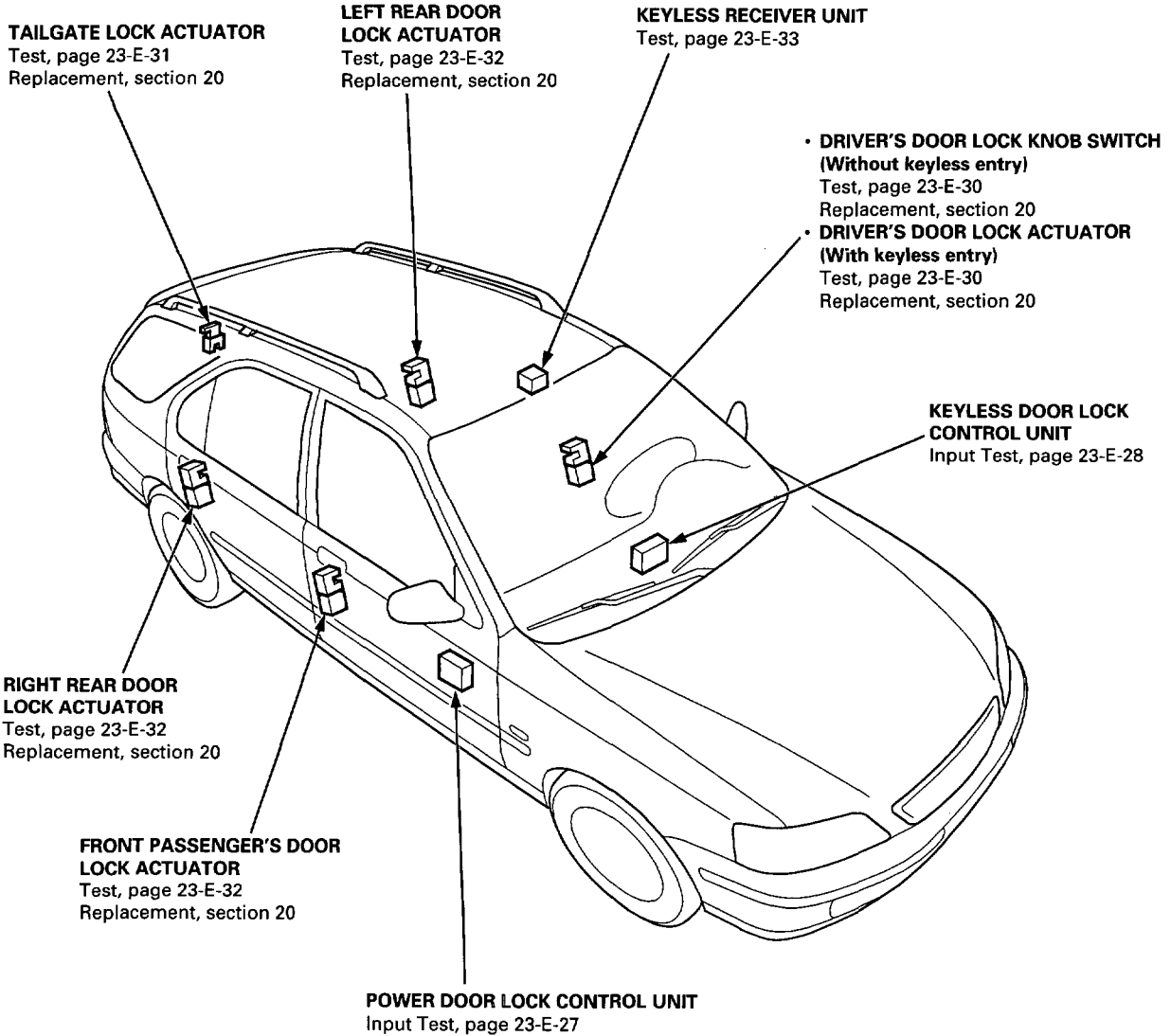
4. If the motor does not run or fails to run smoothly, replace it.

# Power Door Locks



## Component Location Index

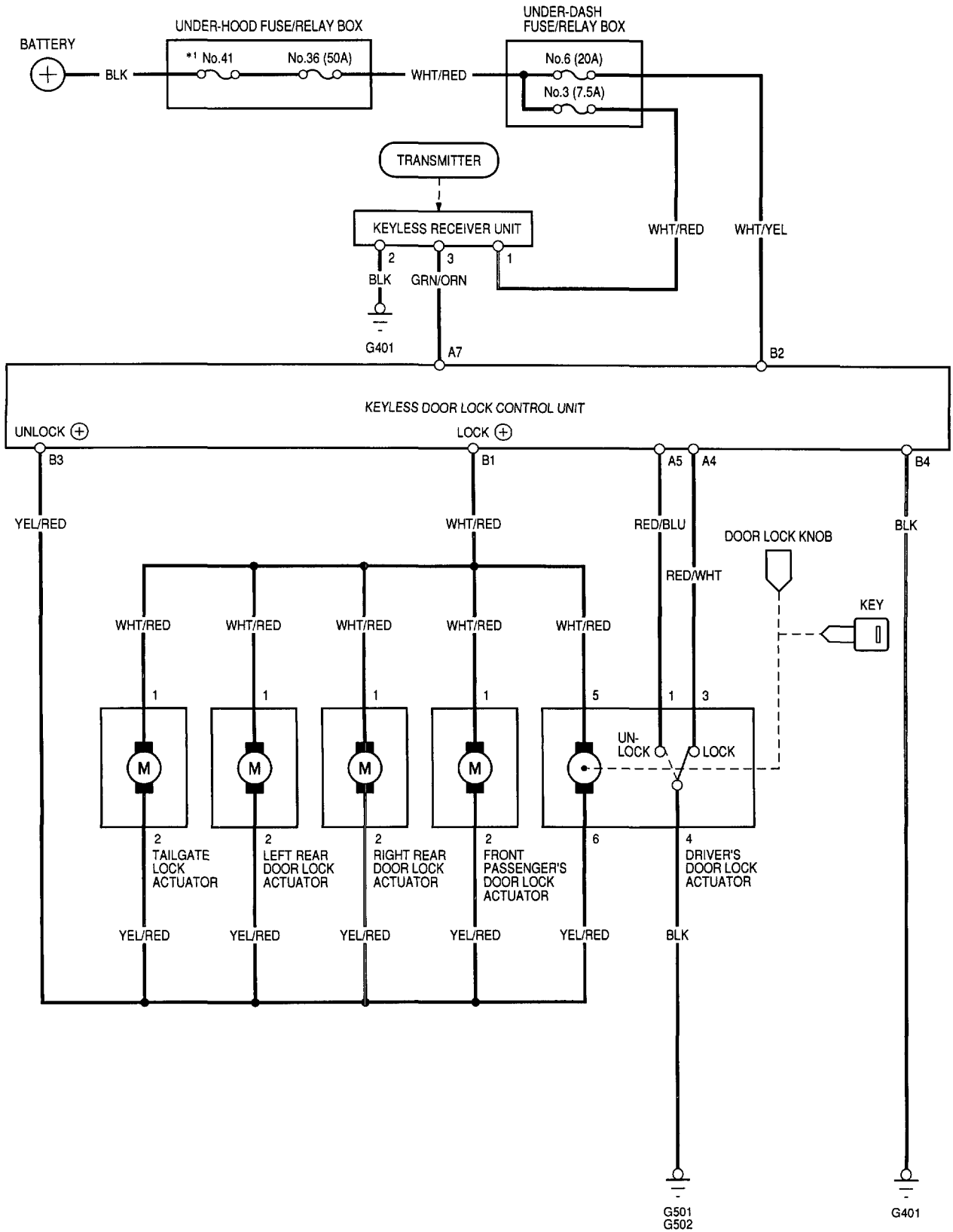
NOTE: LHD type is shown, RHD type is similar.



# Power Door Locks

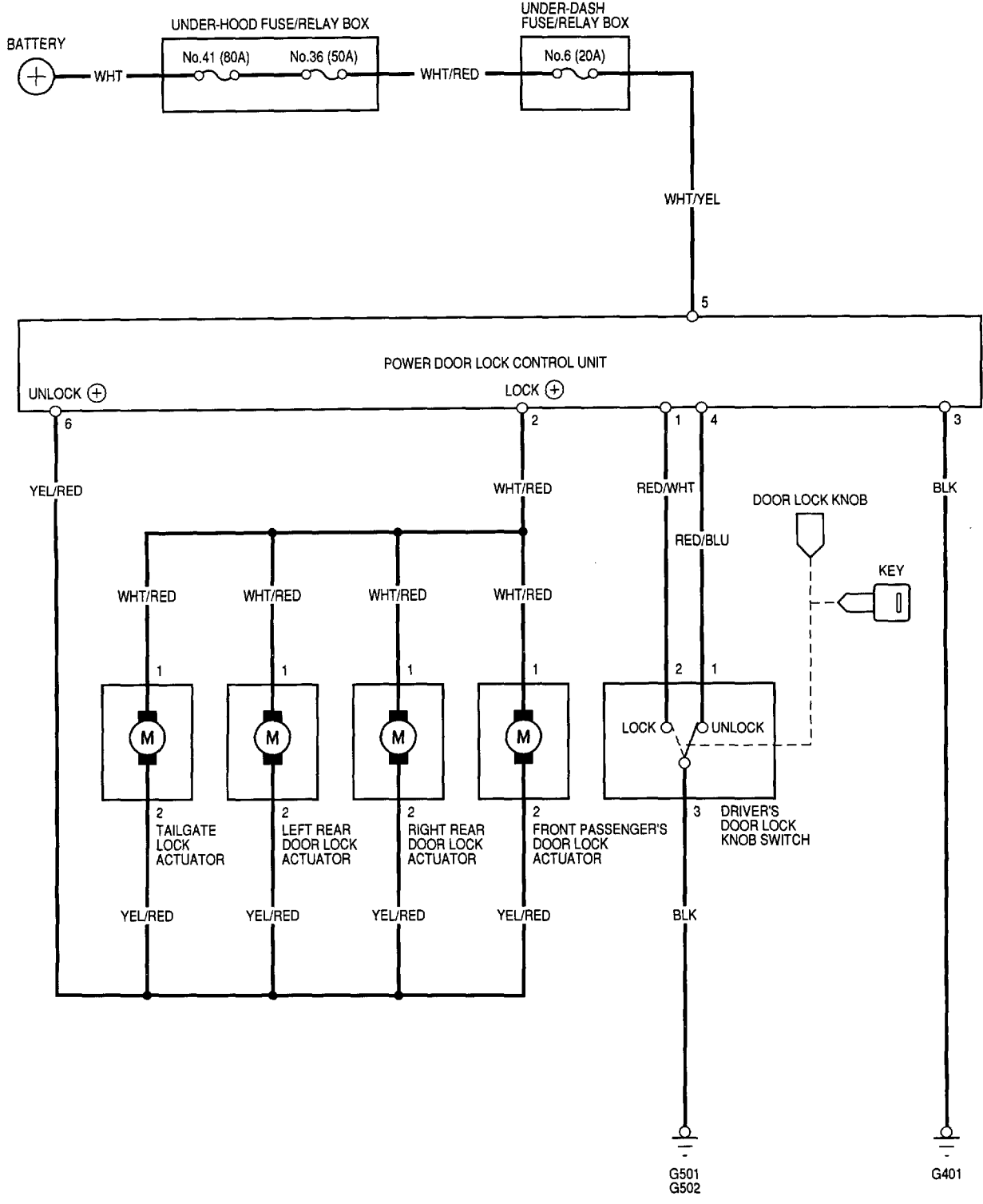
## Circuit Diagram (With Keyless Entry)

\*1 No.41 (100A) : B18C4 engine  
No.41 (80A) : Except B18C4 engine





# Circuit Diagram (Without Keyless Entry)



# Power Door Locks

## Troubleshooting

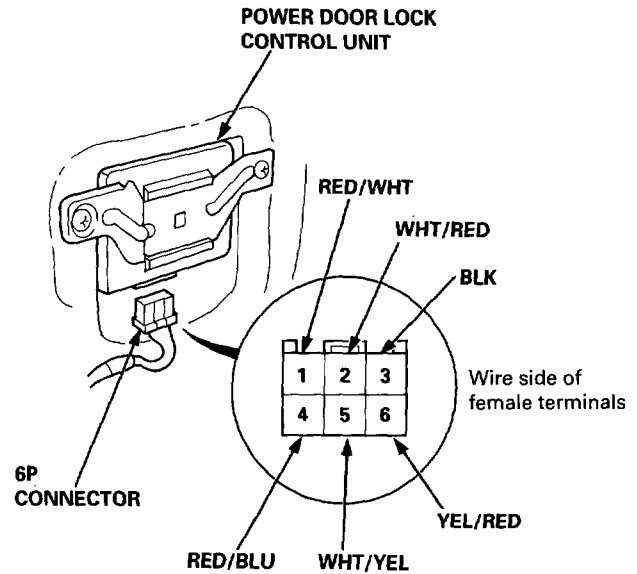
NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected		Blown No. 6 (20 A) fuse (In the under-dash fuse/relay box)	Blown No. 3 (7.5 A) fuse (In the under-dash fuse/relay box)	Driver's door lock knob switch	Driver's door lock actuator	Passenger's door lock actuator	Keyless receiver unit	Disconnected or obstructed door lock rod/linkage	Power door lock control unit input test	Poor ground	Open circuit, loose or disconnected terminals
Symptom											
Power door lock system does not operate at all.		1							2	G401	WHT/YEL
Doors do not lock or unlock with driver's door lock knob switch	All doors			1					2	G501 G502	BLU/RED, BLU/WHT
	One or more doors				1	2		3			WHT/RED, YEL/RED
The power door lock system works properly but the keyless entry system does not work.			1				2		3	G401	GRN/ORN, WHT/RED



## Control Unit Input Test (Without Keyless Entry)

1. Remove the front passenger's door panel (see section 20).
2. Disconnect the 6P connector from the control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, make the following input tests at the connector.
    - If any test indicates a problem, find and correct the cause, then recheck the system.
    - If all the input tests prove OK, the control unit must be faulty; replace it.



### CAUTION

To prevent damage to the motor, apply battery voltage only momentarily.

Disconnect the 6P connector from the power door lock control unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
3	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401)</li> <li>• An open in the wire</li> </ul>
2 and 6	WHT/RED and YEL/RED	Connect the YEL/RED terminal to the WHT/YEL terminal, and the WHT/RED terminal to the BLK terminal momentarily.	Check door and tailgate lock operation: All doors and tailgate should unlock.	<ul style="list-style-type: none"> <li>• Faulty actuator</li> <li>• An open in the wire</li> <li>• Blown No. 6 (20 A) fuse in the under-dash fuse/relay box</li> </ul>
		Connect the WHT/RED terminal to the WHT/YEL terminal, and the YEL/RED terminal to the BLK terminal momentarily.	Check door and tailgate lock operation: All doors and tailgate should lock.	

Reconnect the 6P connector to the power door lock control unit.

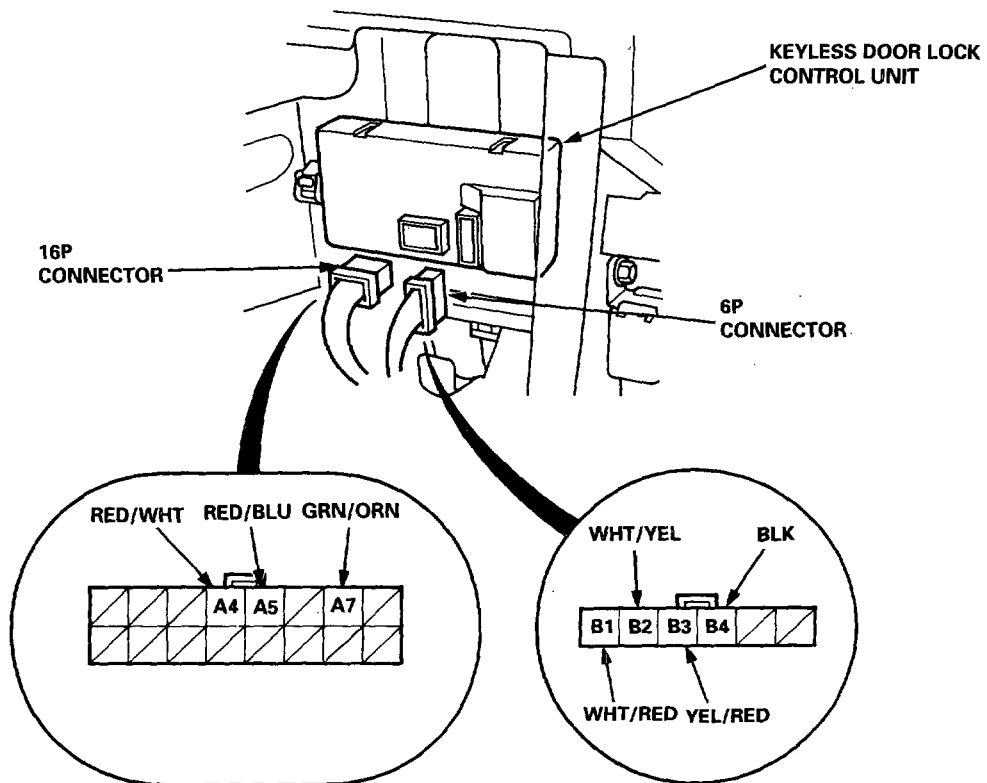
Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
5	WHT/YEL	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 6 (20 A) fuse in the under-dash fuse/relay box</li> <li>• An open in the wire</li> </ul>
1	RED/WHT	Driver's door lock knob in LOCK	Check for voltage to ground: There should be 1 V or less.	<ul style="list-style-type: none"> <li>• Faulty driver's door lock knob switch</li> <li>• Poor ground (G501, G502)</li> <li>• An open in the wire</li> </ul>
4	RED/BLU	Driver's door lock knob in UNLOCK		

# Power Door Locks

## Control Unit Input Test (With Keyless Entry)

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Disconnect the 6P and 16P connector from the control unit.
2. Inspect the connector and socket terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, make the following input tests at the connector.
    - If any test indicates a problem, find and correct the cause, then recheck the system.
    - If all the input tests prove OK, the control unit must be faulty; replace it.





## ⚠ CAUTION

To prevent damage to the motor, apply battery voltage only momentarily.

Disconnect the 6P and 16P connectors from the power door lock control unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B4	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401)</li> <li>• An open in the wire</li> </ul>
B1 and B3	WHT/RED and YEL/RED	Connect the YEL/RED terminal to the WHT/YEL terminal, and the WHT/RED terminal to the BLK terminal momentarily.	Check door and tailgate lock operation: All doors and tailgate should unlock.	<ul style="list-style-type: none"> <li>• Faulty actuator</li> <li>• An open in the wire</li> <li>• Blown No. 6 (20 A) fuse in the under-dash fuse/relay box</li> </ul>
		Connect the WHT/RED terminal to the WHT/YEL terminal, and the YEL/RED terminal to the BLK terminal momentarily.	Check door and tailgate lock operation: All doors and tailgate should lock.	

Reconnect the 6P and 16P connectors to the power door lock control unit.

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B2	WHT/YEL	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 6 (20 A) fuse in the under-dash fuse/relay box</li> <li>• An open in the wire</li> </ul>
A4	RED/WHT	Driver's door lock knob in LOCK	Check for voltage to ground: There should be 1 V or less.	<ul style="list-style-type: none"> <li>• Faulty driver's door lock actuator</li> <li>• Poor ground (G501, G502)</li> <li>• An open in the wire</li> </ul>
A5	RED/BLU	Driver's door lock knob in UNLOCK		

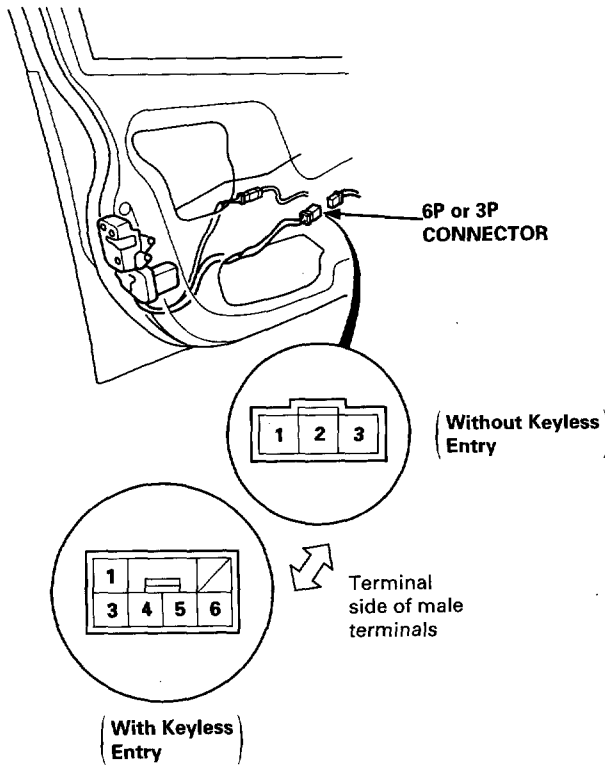


# Power Door Locks

## Driver's Door Lock Actuator and Knob Switch Test

1. Remove the driver's door panel (see section 20).
2. Disconnect the 6P or 3P connector from the actuator.

NOTE: LHD type is shown, RHD type is similar.



4. Check for continuity between the terminals in each switch position according to the table.

### With Keyless Entry:

Terminal	3	4	1
Position			
* LOCK	○	○	
UNLOCK		○	○

\*: Driver's only

### Without Keyless Entry:

Terminal	1	3	2
Position			
LOCK		○	○
UNLOCK	○	○	

5. If the actuator or knob switch fails to work properly, replace it.

## CAUTION

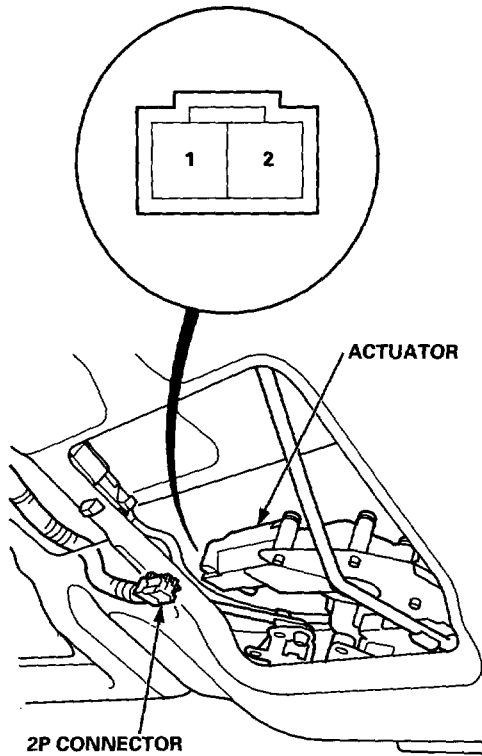
To prevent damage to the actuator, apply battery voltage only momentarily.

3. Check actuator operation by connecting power and ground according to the table (with keyless entry).

Terminal	5	6
Position		
LOCK	⊕	⊖
UNLOCK	⊖	⊕

## Tailgate Lock Actuator Test

1. Open the tailgate.
2. Remove the tailgate trim panel (see section 20).
3. Disconnect the 2P connector from the tailgate lock actuator.



### ⚠ CAUTION

To prevent damage to the actuator, apply battery voltage only momentarily.

4. Check actuator operation by connecting power and ground according to the table.

Terminal	2	1
Position		
LOCK	⊖	⊕
UNLOCK	⊕	⊖

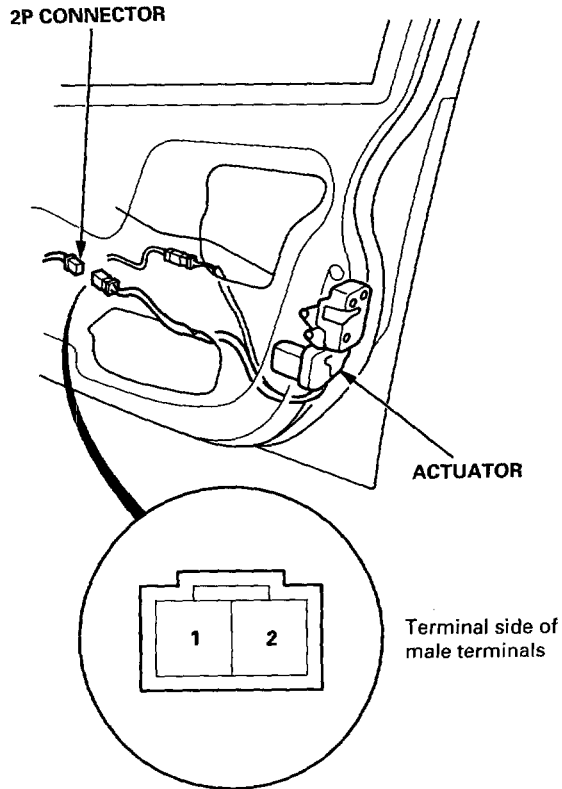
5. If the actuator fails to work properly, replace it.

# Power Door Locks

## Passenger's Door Lock Actuator Test

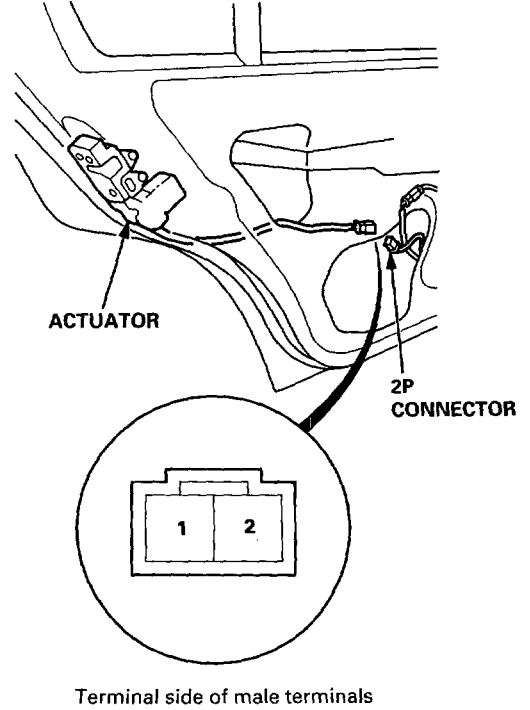
1. Remove the door panel (see section 20).
2. Disconnect the 2P connector from the actuator.

### Front Passenger's Door:



### Rear Passenger's Door:

NOTE: Left rear actuator is shown, right rear actuator is similar.



### CAUTION

To prevent damage to the actuator, apply battery voltage only momentarily.

3. Check actuator operation by connecting power and ground according to the table.

Terminal	2	1
Position		
LOCK	⊖	⊕
UNLOCK	⊕	⊖

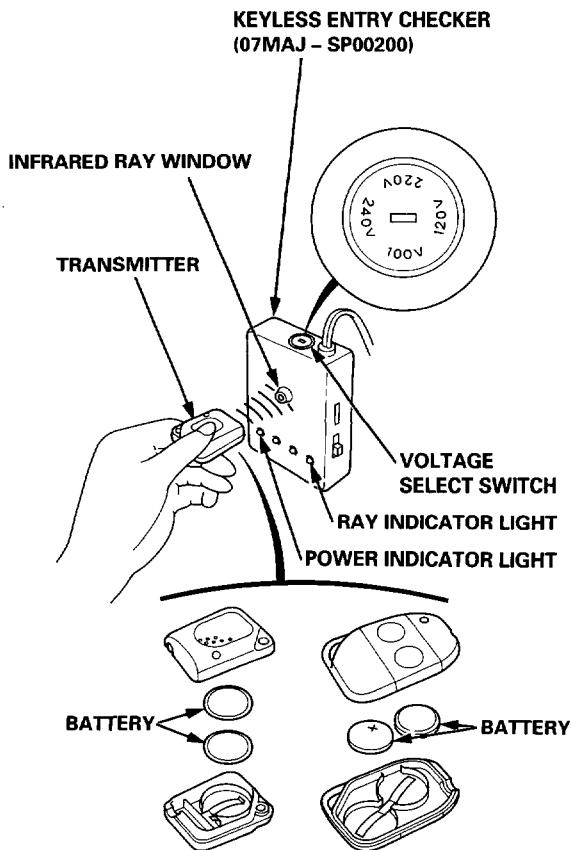
4. If the actuator fails to work properly, replace it.



## Keyless Entry System Test

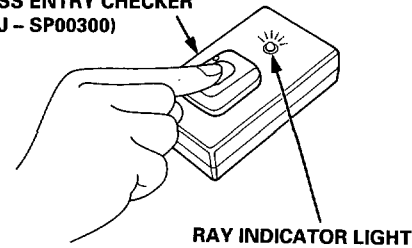
NOTE: Before testing, make sure that the power door lock system works properly.

1. Using a keyless entry checker (07MAJ – SP00200):
  - 1. Turn the voltage select switch to the proper voltage, and connect the Keyless Entry Checker to an AC power outlet. The power indicator light should come on.
  - 2. Hold the transmitter within 500 mm (19.7 in) from the front of the infrared ray window, and press the button.
    - If the ray indicator light does not come on:
      - Dead or low battery
      - Faulty transmitter
    - If the ray indicator light comes on, go to step 3.



2. Using a keyless entry checker (07MAJ – SP00300):
  - 1. Put the transmitter on the keyless entry checker, and press the button.
    - If the ray indicator light does not come on:
      - Dead or low battery
      - Faulty transmitter
    - If the ray indicator light comes on, go to step 3.

**KEYLESS ENTRY CHECKER (07MAJ – SP00300)**

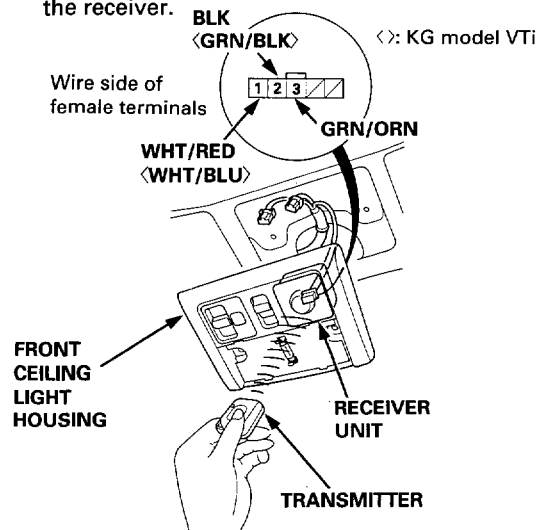


NOTE: When the transmitter battery was replaced, aim the transmitter at the receiver, and press the transmitter button six times. Confirm you can hear the sound of the door lock actuators when you press the sixth time.

3. Pry out the receiver unit and cover from the rearview mirror.
4. Check if there is receiver output when the transmitter button is pressed.

### Test method:

- Use a digital multimeter.
- Do not disconnect the 5P connector.
- Connect the positive (+) probe to the No. 3 (GRN/ORN) and the negative (-) probe to the No. 1 (BLK <GRN/BLK>) wires.
- If there is a momentary output voltage of about 3.5 mV – 1 V, the receiver is OK.
- If there is no voltage, check for an open in the No. 2 (GRN/ORN) wire. If the wire is OK, replace the receiver.



# Instruments

## Rear Window Defogger

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Circuit Diagram ..... 23-F-3

## Sunroof

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## Power Mirrors

Component Location Index ..... 23-F-10

Circuit Diagram ..... 23-F-11

## \* Horn

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## Clock

Circuit Diagram ..... 23-F-22

Removal ..... 23-F-23

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## Stereo Sound System

Component Location Index ..... 23-F-24

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## Cigarette Lighter

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## Seat Heaters (KS model)

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## \* Wipers/Washers

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Circuit Diagram (Windshield  
Wiper/Washer) ..... 23-F-36

Circuit Diagram (Rear Window  
Wiper/Washer) ..... 23-F-37

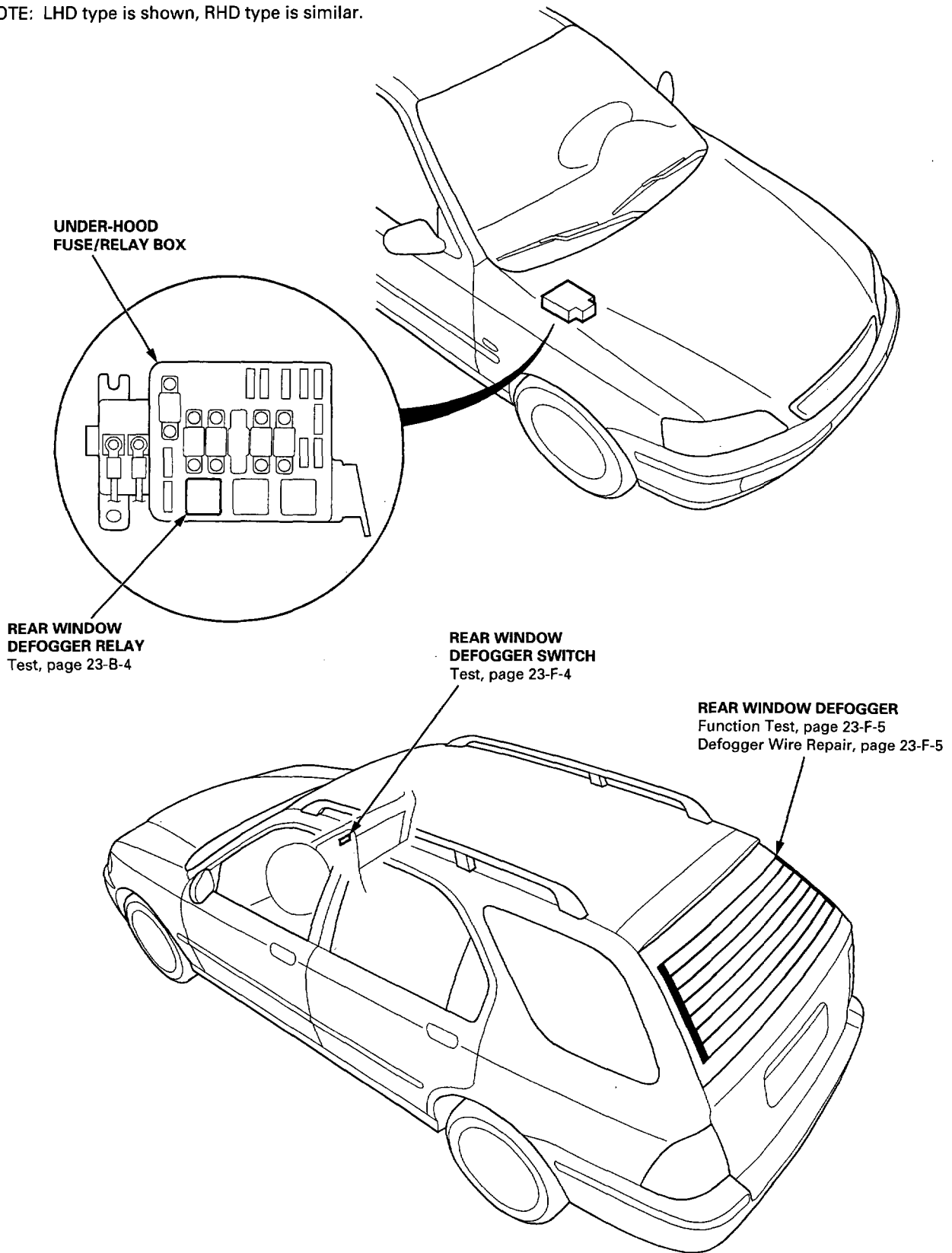
Circuit Diagram (With Head-  
light Washer) ..... 23-F-38



# Rear Window Defogger

## Component Location Index

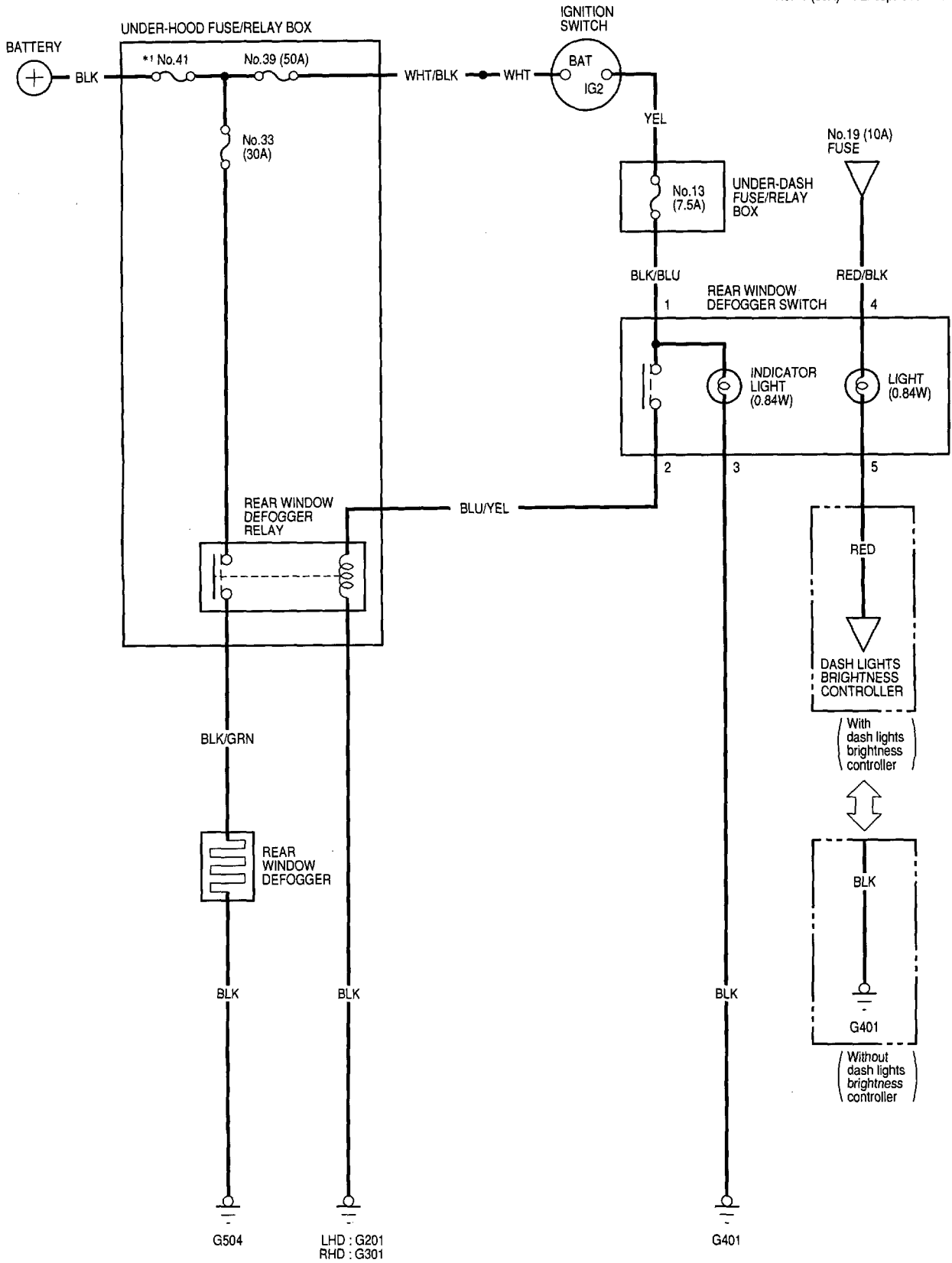
NOTE: LHD type is shown, RHD type is similar.





# Circuit Diagram

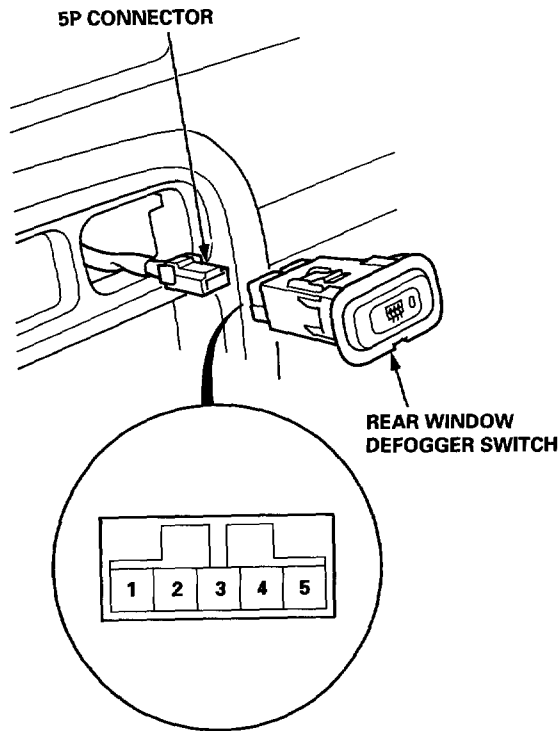
\*1 No.41 (100A) : B18C4 engine  
No.41 (80A) : Except B18C4 engine



# Rear Window Defogger

## Rear Window Defogger Switch Test

1. Carefully pry the switch out of the front console panel.
2. Disconnect the 5P connector from the switch.



3. Check for continuity between the terminals in each switch position according to the table.

Terminal	1	2	3	4	5
Position					
OFF	○	—	⊖	○	○
ON	○	○	⊖	○	○



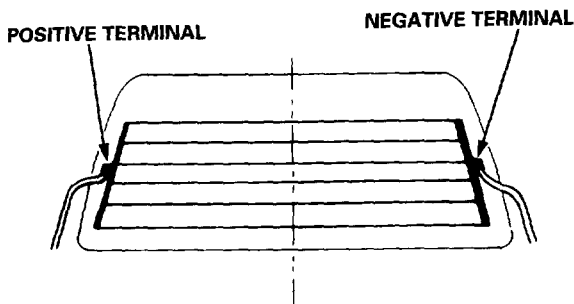


## Function Test

### ⚠ CAUTION

Be careful not to scratch or damage the defogger wires with the tester probe.

1. Check for voltage between the positive terminal and body ground with the ignition switch and defogger switch ON.  
There should be battery voltage.
  - If there is no voltage, check for:
    - faulty defogger relay.
    - faulty defogger switch.
    - an open in the BLK/GRN wire.
  - If there is battery voltage, go to step 2.

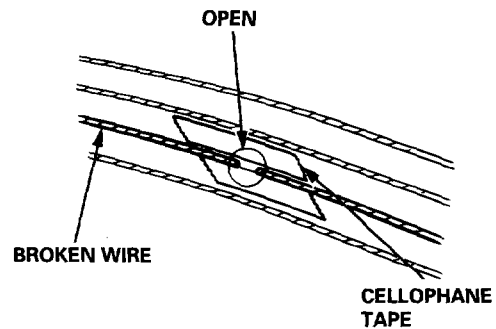


2. Check for continuity between the negative terminal and body ground.  
If there is no continuity, check for an open in the defogger ground wire.
3. Touch the voltmeter positive probe to the halfway point of each defogger wire, and the negative probe to the negative terminal.  
There should be approximately 6 V with the ignition switch and the defogger switch ON.
  - If the voltage is as specified, the defogger wire is OK.
  - If the voltage is not as specified, repair the defogger wire.
    - If it is more than 6 V, there is a break in the negative half of the wire.
    - If it is less than 6 V, there is a break in the positive half of the wire.

## Defogger Wire Repair

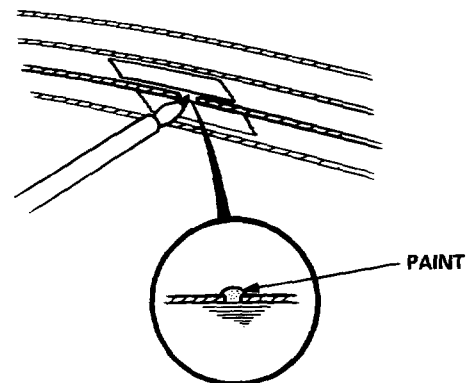
NOTE: To make an effective repair, the broken section must be no longer than one inch.

1. Lightly rub the area around the broken section with fine steel wool, then clean it with alcohol.
2. Carefully mask above and below the broken portion of the defogger wire with cellophane tape.



3. Using a small brush, apply a heavy coat of silver conductive paint extending about 1/8" on both sides of the break. Allow 30 minutes to dry.

NOTE: Thoroughly mix the paint before use.

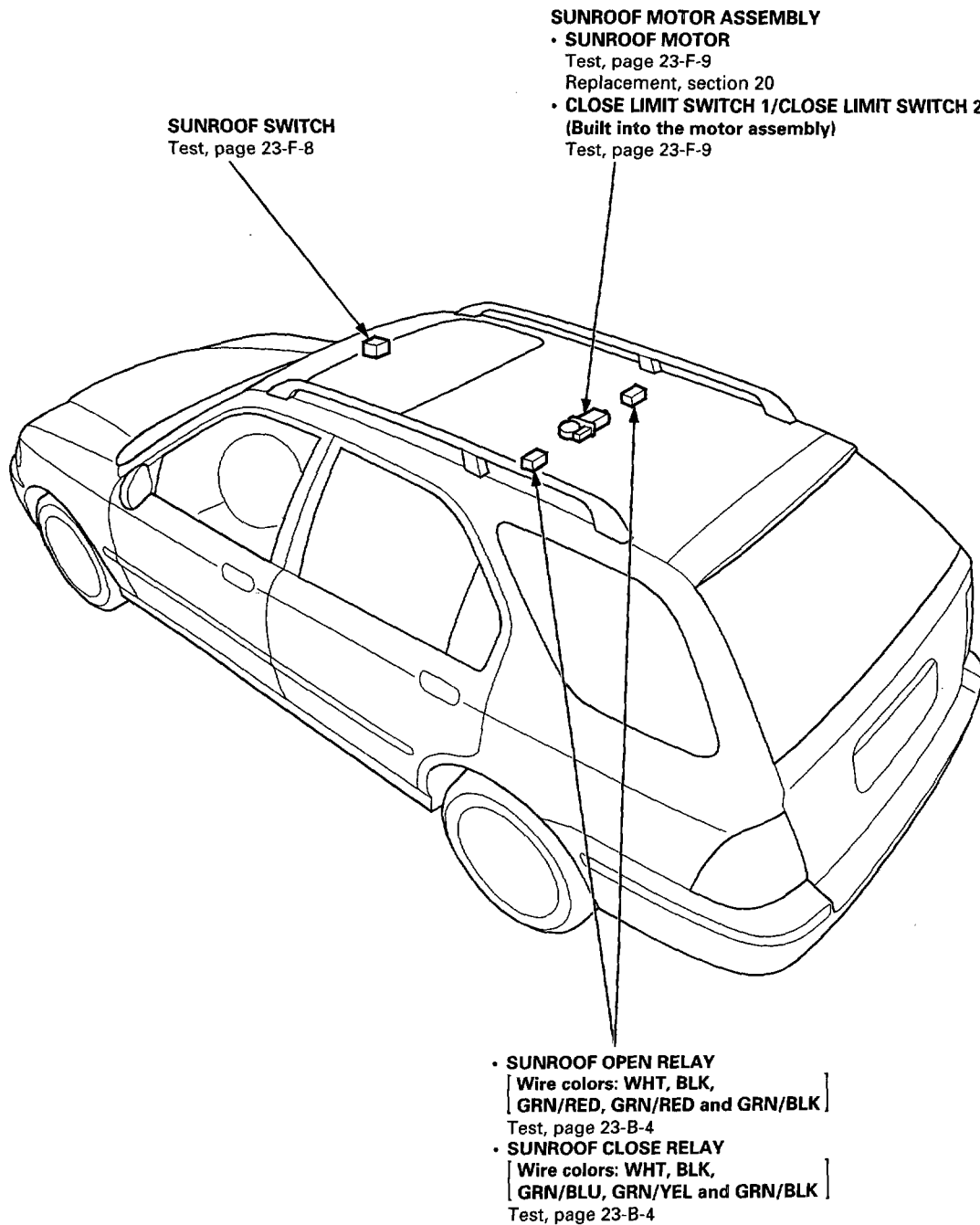


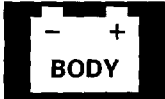
4. Check for continuity in the repaired wire.
5. Apply a second coat of paint in the same way. Let it dry three hours before removing the tape.

# Sunroof

## Component Location Index

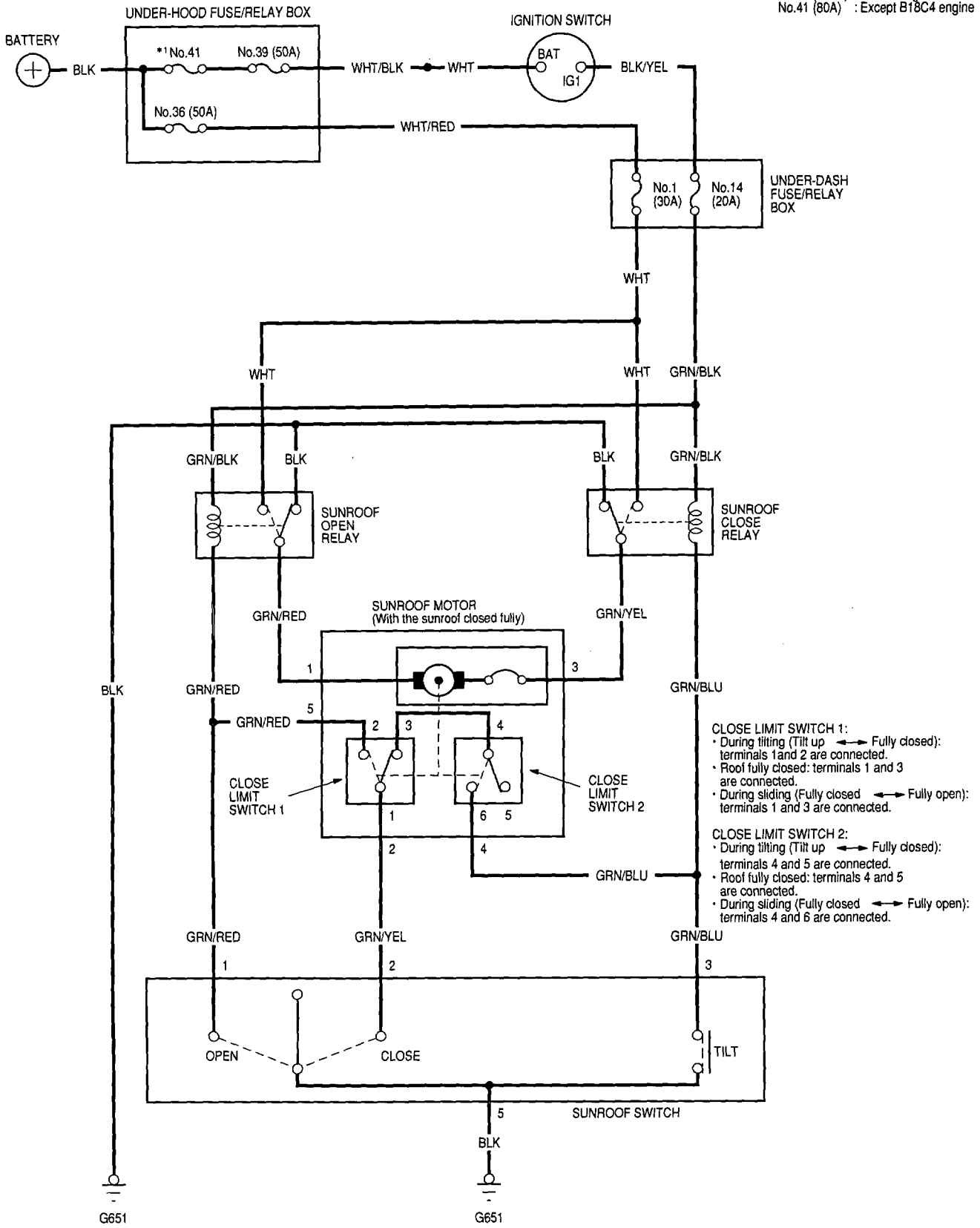
NOTE: LHD type is shown, RHD type is similar.





# Circuit Diagram

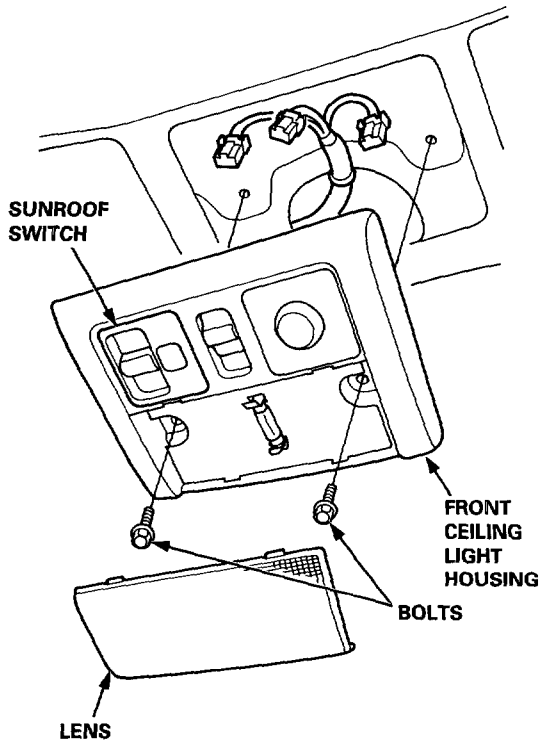
\*1 No.41 (100A) : B18C4 engine  
 No.41 (80A) : Except B18C4 engine



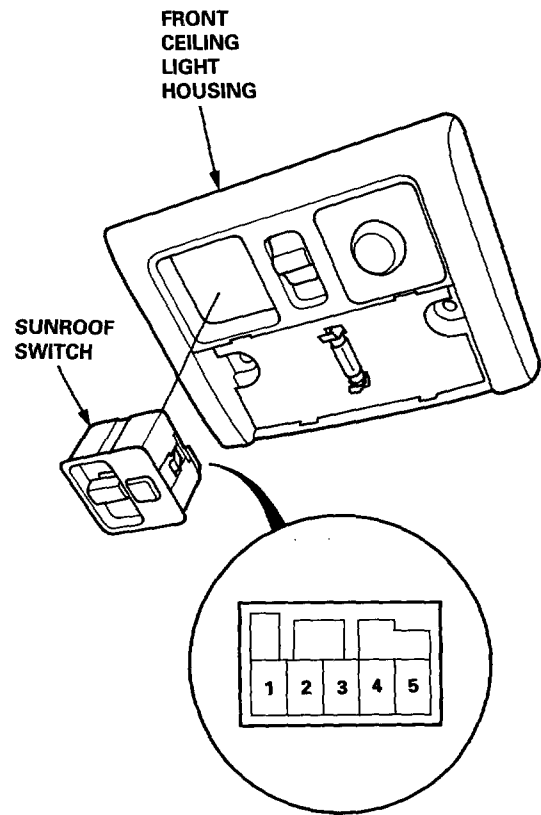
# Sunroof

## Sunroof Switch Test

1. Turn the front ceiling light switch OFF.
2. Pry the ceiling light lens off from the light housing.
3. Remove the two bolts and the light housing.
4. Disconnect the connectors from the light housing.



5. Separate the sunroof switch from the light housing.



6. Check for continuity between the terminals in each switch position according to the table.

Terminal	1	2	3	5
Position				
TILT			○—○	
CLOSE		○—○		
OPEN	○—○			

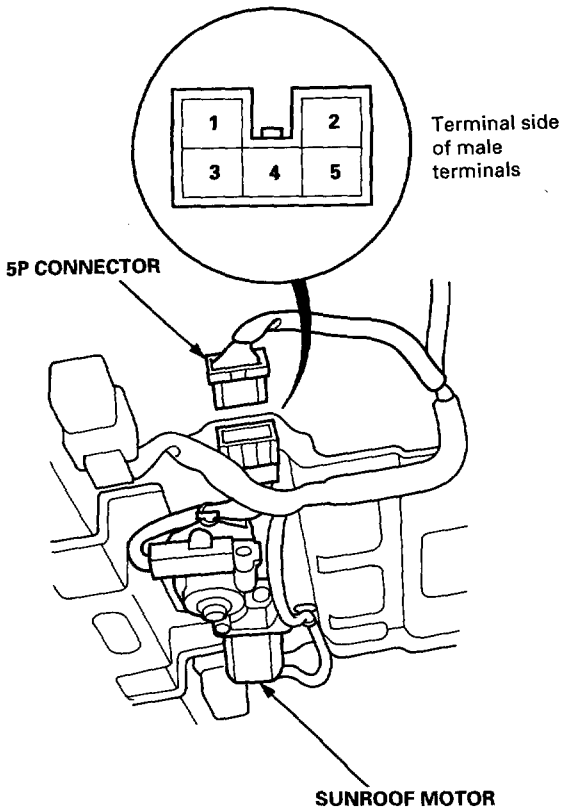


## Sunroof Motor Test

1. Remove the roof lining (see section 20).
2. Disconnect the 5P connector from the sunroof motor.
3. Test the motor:

Terminal	1	3
Position		
OPEN	⊕	⊖
CLOSE	⊖	⊕

NOTE: The motor clutch test is in section 20.



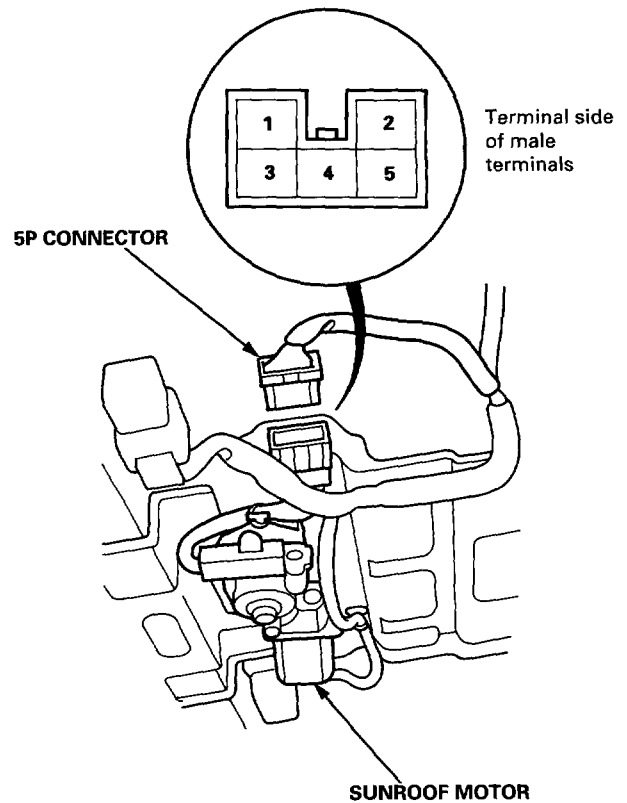
4. If the motor does not run or fails to run smoothly, replace it.

## Sunroof Motor Limit Switch Test

1. Remove the roof lining (see section 20).
2. Disconnect the 5P connector from the motor.
3. Check for continuity between the terminals in each switch position according to the table.

NOTE: Turn the motor by hand with the wrench.

Terminal	2	5	4
Sunroof Position			
Tilted up ←→ Fully closed	○	○	
Fully closed			
Fully open ←→ Fully closed	○	○	○



4. If there is no continuity, replace the sunroof motor assembly.

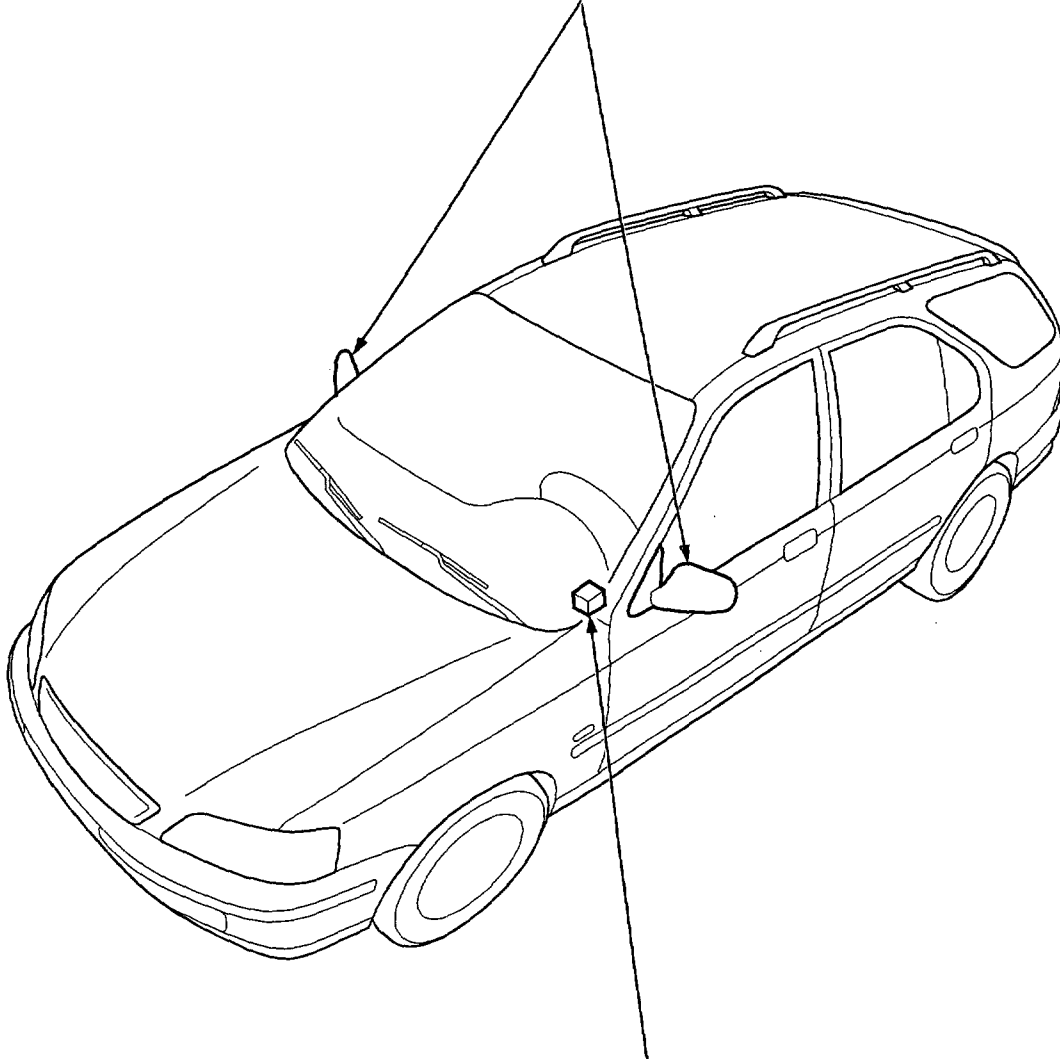
# Power Mirrors

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## Component Location Index

NOTE: LHD type is shown, RHD type is symmetrical.

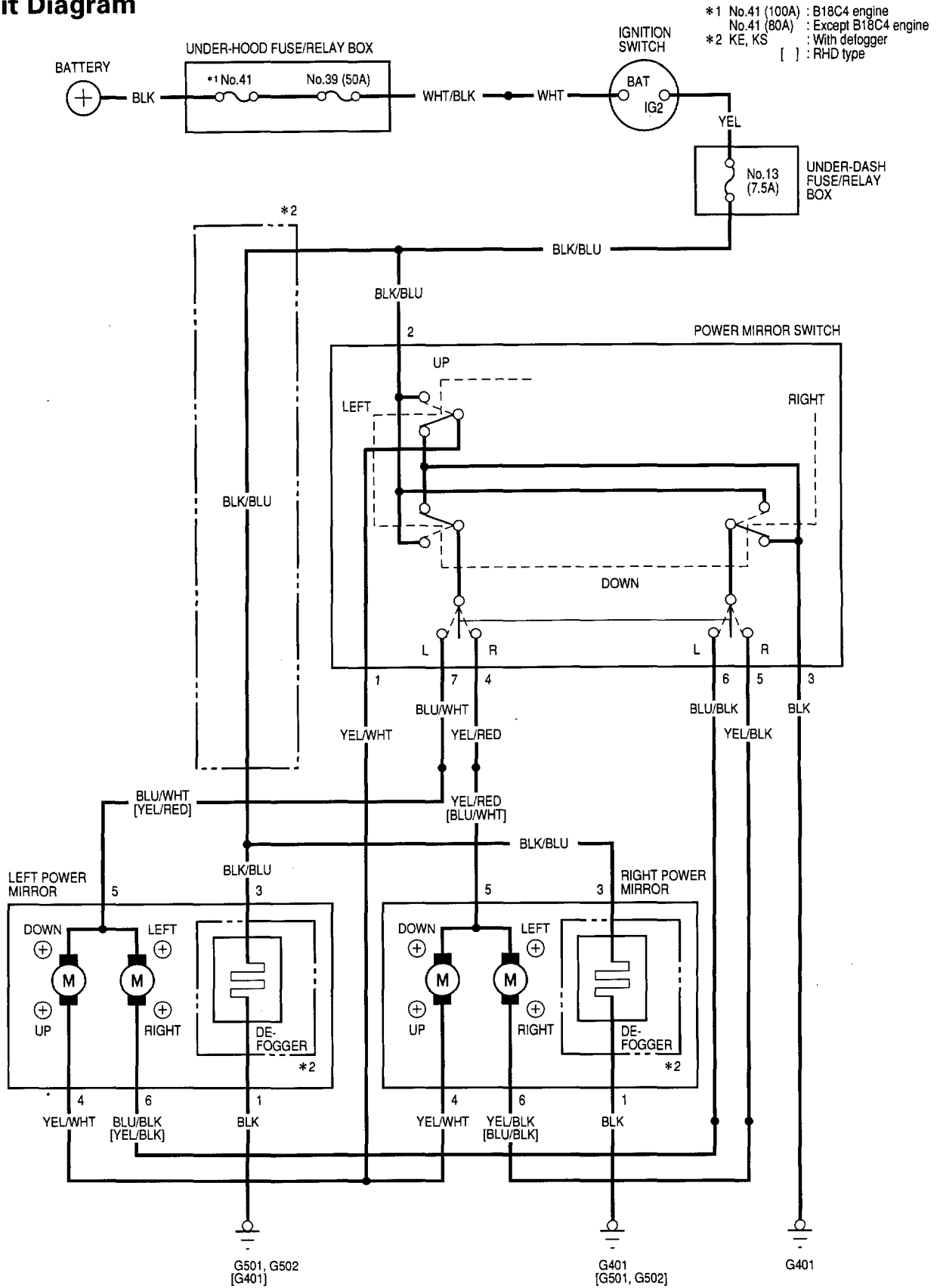
**POWER MIRROR**  
Function Test, page 23-F-12  
Power Mirror Test, page 23-F-16  
Replacement, section 20  
Actuator Replacement, page 23-F-13



**POWER MIRROR SWITCH**  
Test, page 23-F-16



# Circuit Diagram

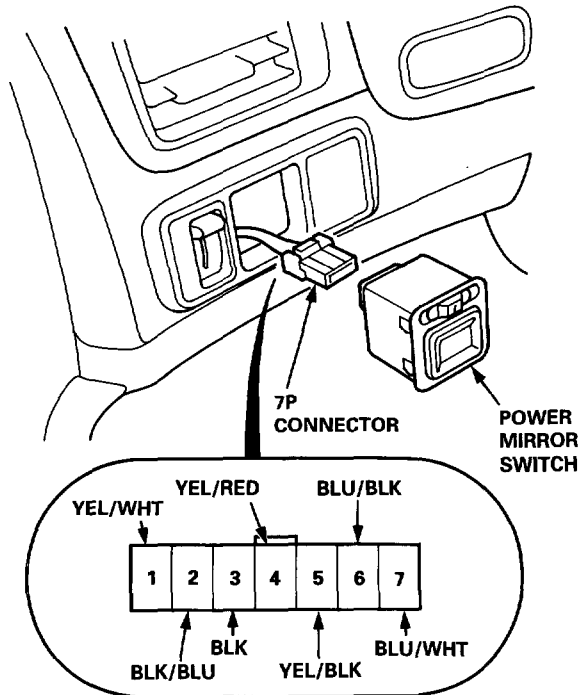


# Power Mirrors

## Function Test

### NOTE:

- Before testing, check the No. 13 (7.5 A) fuse in the under-dash fuse/relay box.
- To test, remove the dashboard lower cover, and push out the switches from behind the dashboard.
- LHD type is shown, RHD type is similar.



### Mirror Actuator Test

#### One or both inoperative:

1. Check for voltage between the No. 2 (BLK/BLU) terminal of the 7P connector and body ground with the ignition switch ON (II). There should be battery voltage.
  - If there is no voltage, check for an open in the No. 2 (BLK/BLU) wire.
  - If there is battery voltage, go to step 2.
2. Check for continuity between the No. 3 (BLK) terminal and body ground. There should be continuity.
  - If there is no continuity, check for
    - an open in the BLK wire.
    - poor ground (G401).

#### Left mirror inoperative:

Connect the No. 2 (BLK/BLU) terminal of the 7P connector to the No. 7 (BLU/WHT) terminal, and the No. 1 (YEL/WHT) (or No. 6 BLU/BLK) terminal to body ground with jumper wires.

The left mirror should tilt down (or swing left) with the ignition switch ON (II).

- If the mirror does not tilt down (or does not swing left), check for an open in the No. 1 (YEL/WHT) (or No. 6 BLU/BLK) wire between the left mirror and the 7P connector.

If the wire is OK, check the left mirror actuator.

- If the mirror neither tilts down nor swings left, repair the No. 7 (BLU/WHT) wire.
- If the mirror operates properly, check the mirror switch.

#### Right mirror inoperative:

Connect the No. 2 (BLK/BLU) terminal of the 7P connector to the No. 4 (YEL/RED) terminal, and the No. 1 (YEL/WHT) (or No. 5 YEL/BLK) terminal to body ground with jumper wires.

The right mirror should tilt down (or swing left) with the ignition switch ON (II).

- If the mirror does not tilt down (or does not swing left), check for an open in the No. 1 (YEL/WHT) (or No. 5 YEL/BLK) wire between the right mirror and the 7P connector.

If the wire is OK, check the right mirror actuator.

- If the mirror neither tilts down nor swings left, repair the No. 4 (YEL/RED) wire.
- If the mirror works properly, check the mirror switch.

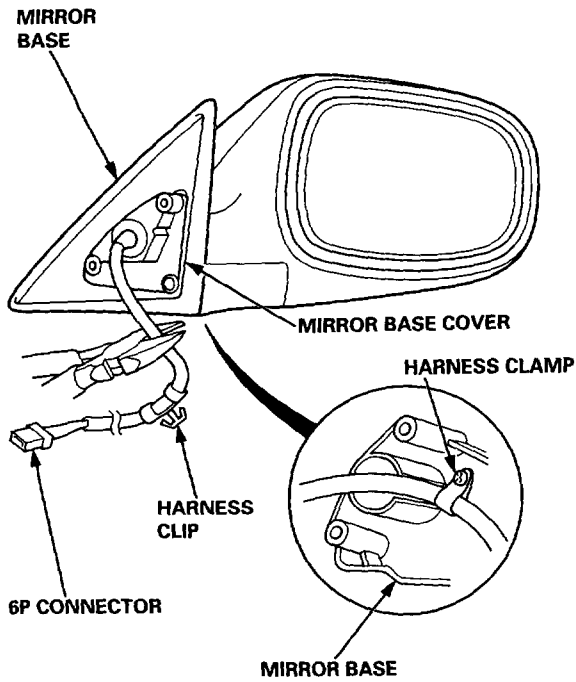
#### Defogger Test (With defogger)

1. Check for voltage between the BLK/BLU terminal of the power mirror 6P connector and body ground with the ignition switch ON (II). There should be battery voltage.
  - If there is no voltage, check for an open in the BLK/BLU wire between the under-dash fuse/relay box and the power mirror 6P connector.

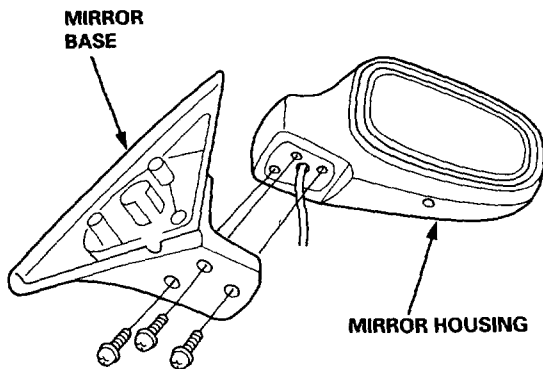


## Mirror Actuator Replacement

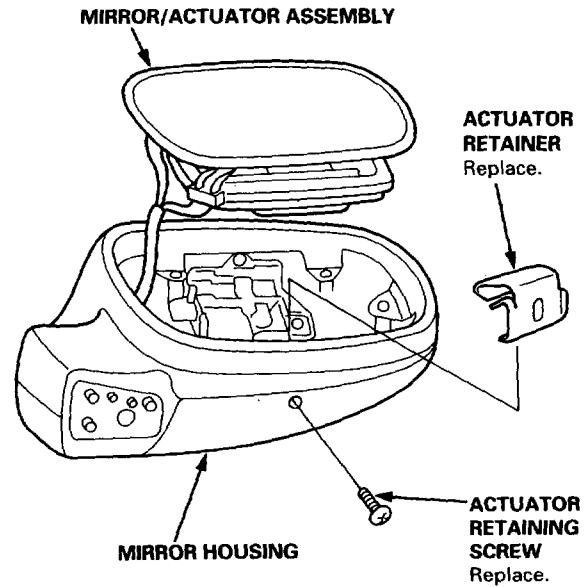
1. Remove the door mirror from the car, and disconnect the 6P connector.
2. Cut the wire harness with wire cutters, remove the mirror base cover, and remove the harness clamp from the mirror base.



3. Remove the three mounting screws, and separate the mirror base from the mirror housing.

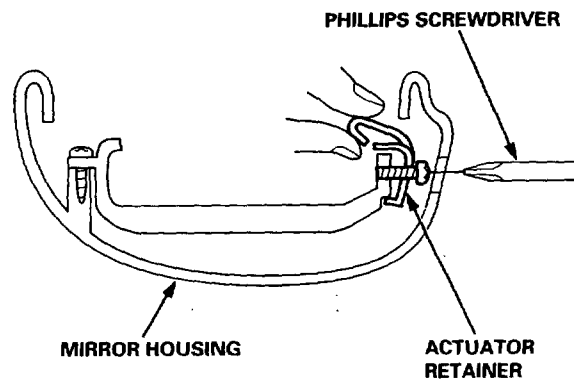


4. Insert a screwdriver into the hole on the bottom of the mirror housing, and remove the actuator retaining screw. Then carefully press on the mirror to create a gap between mirror and mirror housing, insert a finger into the gap, and take out the mirror/actuator assembly.



5. Loosely install a new actuator retainer on the frame in the mirror housing with a new retainer screw.

NOTE: If the retainer is not loose enough, it will impede the installation of the new mirror/actuator assembly.

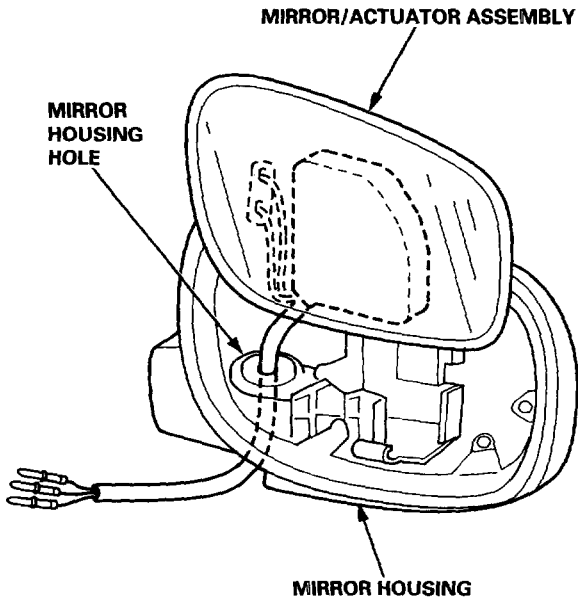


(cont'd)

# Power Mirrors

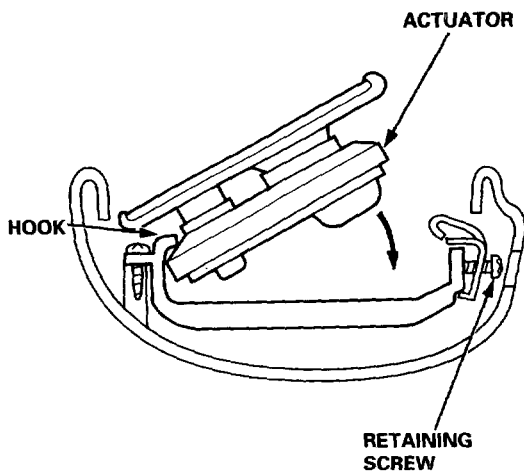
## Mirror Actuator Replacement (cont'd)

6. Route the wire harness of the new mirror/actuator assembly through the hole in the mirror housing.

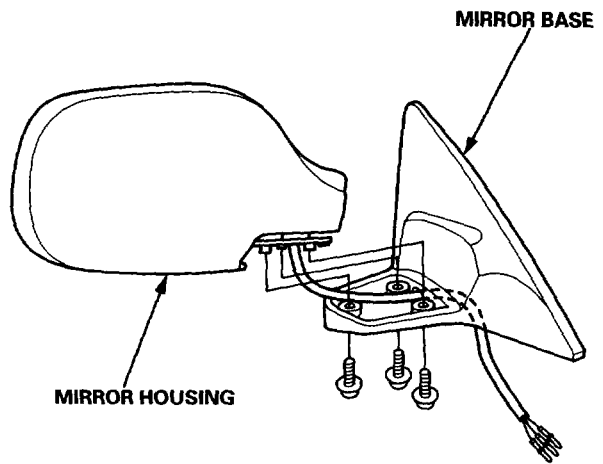


7. Position the upper edge of the actuator under the hooks of the frame, then insert the new mirror/actuator assembly into the housing, and tighten the retaining screw.

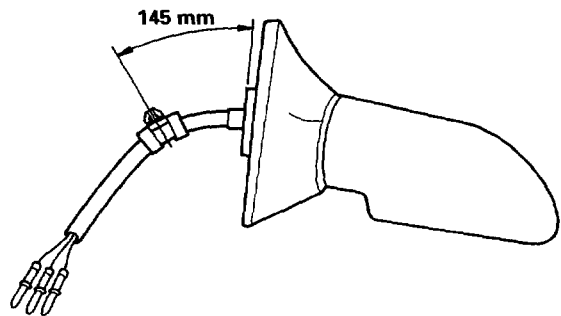
NOTE: Make sure the actuator is held securely by the hooks and the retainer.



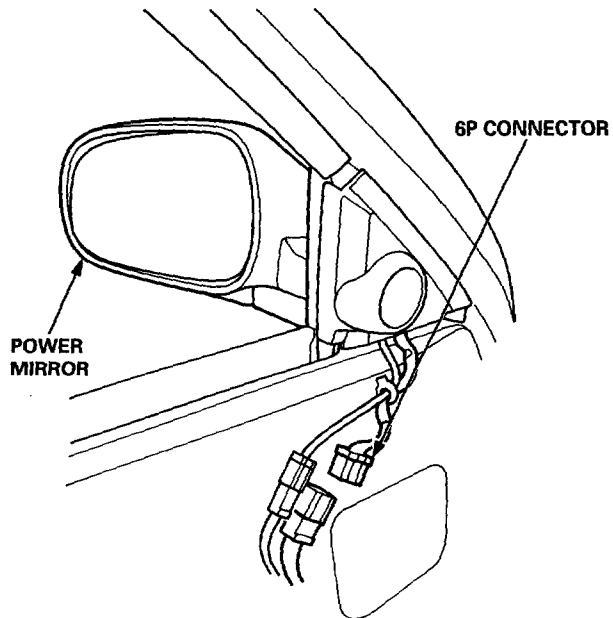
8. Route the harness through the hole in the mirror base, and reinstall the mirror housing on the mirror base.



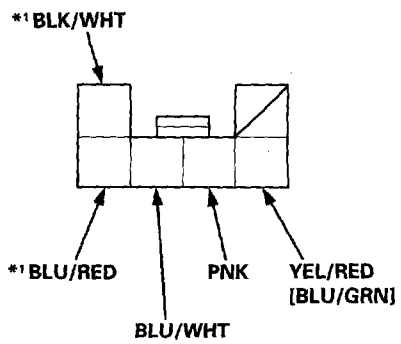
9. Reinstall the harness clamp and the mirror base cover removed in step 3, and tape the harness clip to the wire harness 145 mm (5.7 in) from the mirror base cover.



10. Insert the terminals into the 6P connector as shown below, then reconnect the connector, and reinstall the mirror to the car.



**6P CONNECTOR:** Wire side of female terminals



[BLU/GRN]: Right side  
\*1: KE and KS models with defogger

11. Test the mirror for smooth movement in all directions.

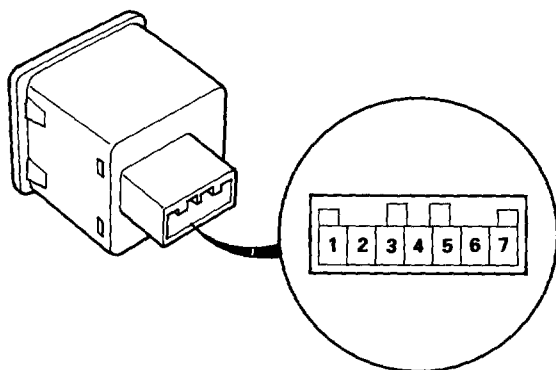
# Power Mirrors

## Power Mirror Switch Test

1. Remove the dashboard lower cover (see section 20).
2. Push out the switches from behind the dashboard.
3. Disconnect the connectors, and check for continuity between the terminals in each switch position according to the table.

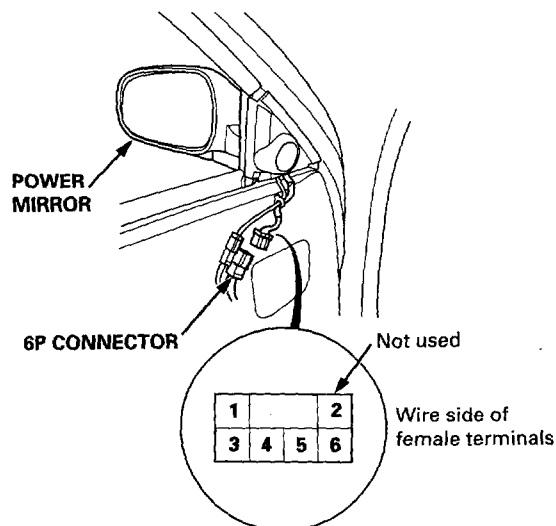
### Mirror Switch:

Terminal Position	2	3	1	6	7	5	4
R	ON		○—○			○—○	
	UP	○—○				○—○	
	DOWN	○—○				○—○	
	LEFT	○—○	○—○			○—○	
	RIGHT	○—○	○—○			○—○	
L	OFF	○—○	○—○	○—○	○—○		
	UP	○—○	○—○	○—○	○—○		
	DOWN	○—○	○—○	○—○	○—○		
	LEFT	○—○	○—○	○—○	○—○		
	RIGHT	○—○	○—○	○—○	○—○		



## Power Mirror Test

1. Remove the door panel (see section 20).
2. Disconnect the 6P connector from the power mirror actuator.



3. Check mirror actuator operation by connecting power and ground according to the table.

Terminal Position	4	5	6
TILT UP	⊕	⊖	
TILT DOWN	⊖	⊕	
SWING LEFT		⊕	⊖
SWING RIGHT		⊖	⊕

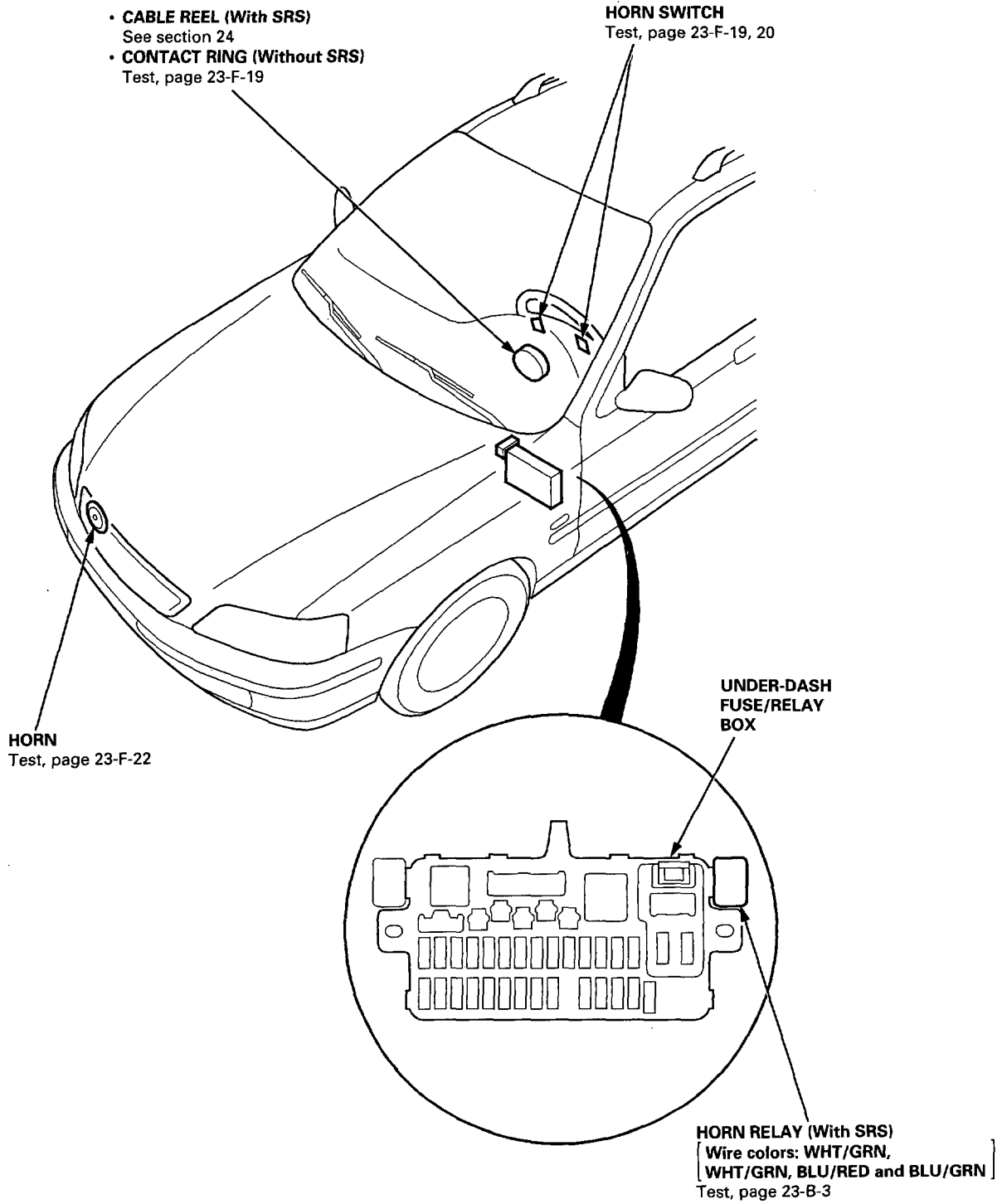
### With defogger

4. Check for continuity between the No. 1 and No. 3 terminals (R x 10<sup>3</sup> scale). There should be continuity.
5. If the power mirror fails to operate properly, replace it.



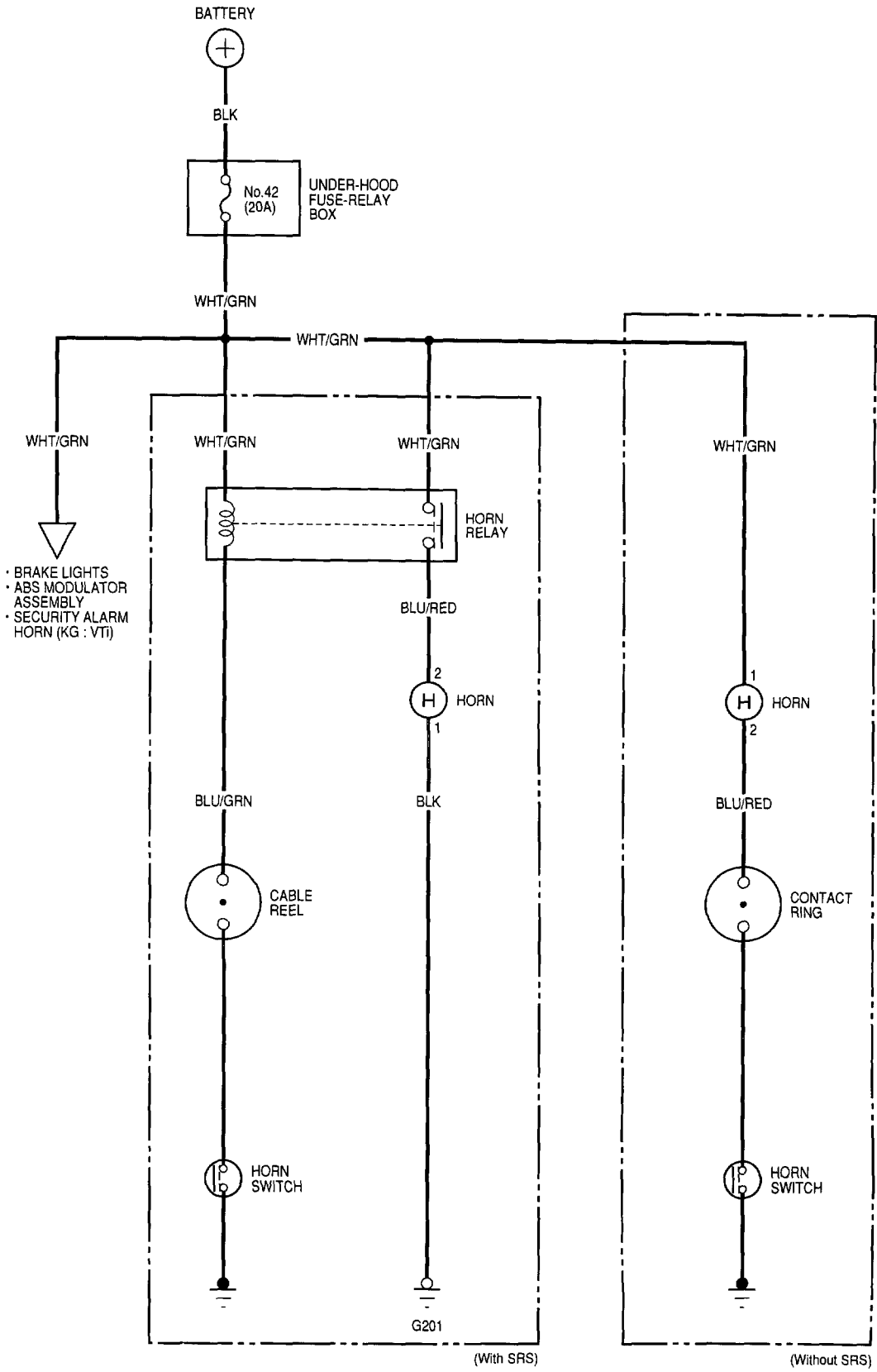
## Component Location Index

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.



# Horn

## Circuit Diagram

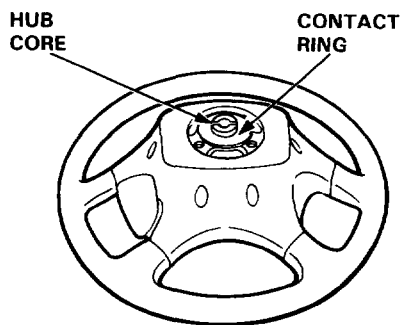




## Switch Test (Without SRS)

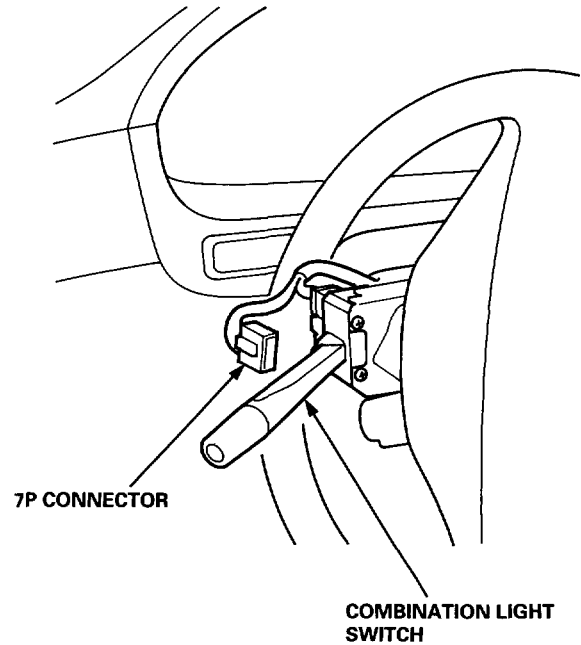
1. Remove the steering wheel, then turn it over.
2. Check for continuity between the hub core and the contact ring with the horn switch pressed.

Terminal Position	HUB CORE	CONTACT RING
PRESSED		
RELEASED		

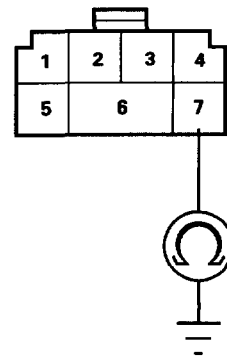


3. If there is continuity, reinstall the steering wheel, then go to step 4.

4. Disconnect the main wire harness 7P connector from the combination light switch.



5. Check for continuity between the No. 7 terminal and body ground.



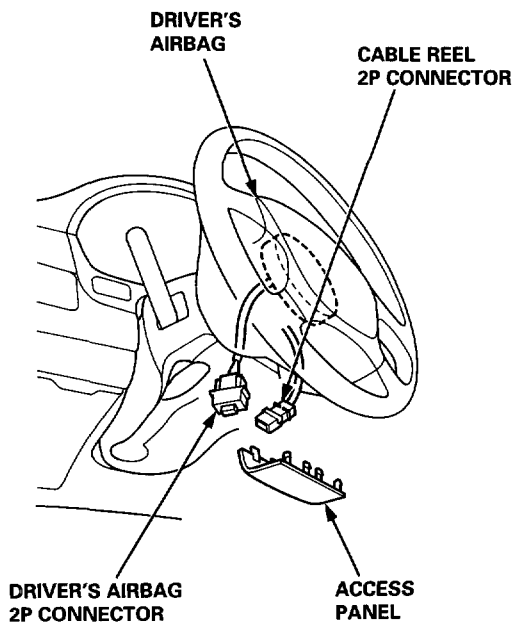
- If there is no continuity, check for an open in the BLU/RED wire.
- If there is continuity replace the combination light switch (see page 23-D-6).

# Horn

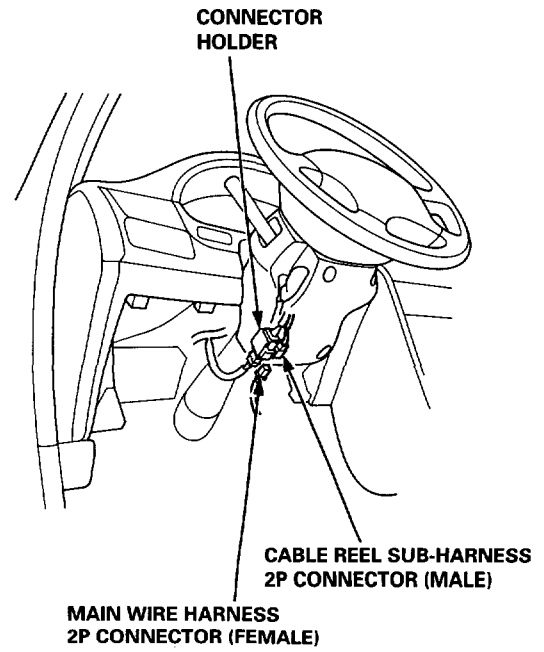
## Switch Test (With SRS)

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

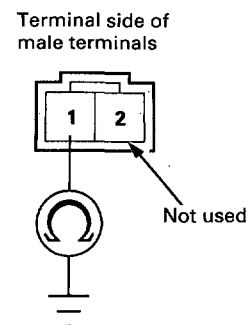
1. Disconnect the battery negative cable, then disconnect the positive cable, and wait at least three minutes.
2. Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel.



3. Remove the dashboard lower cover (see section 20).
4. Disconnect the cable reel sub-harness 2P connector from the main wire harness.



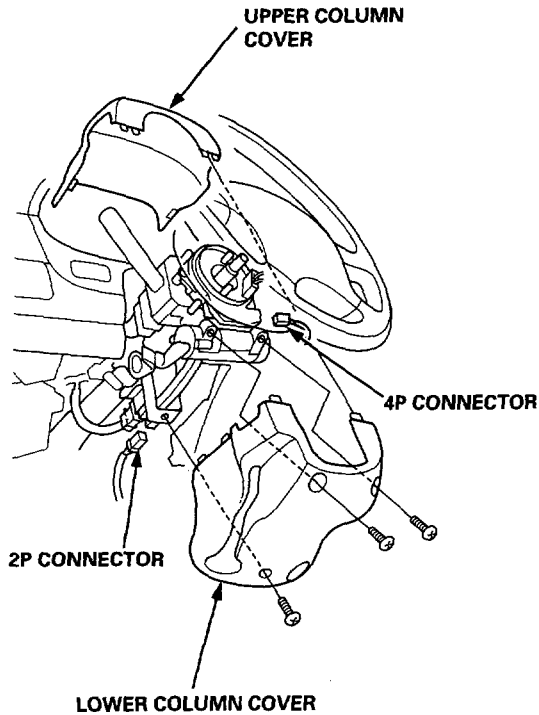
5. Check for continuity between the No. 1 terminal of the 2P connector of the cable reel sub-harness and body ground with the horn switch pressed.



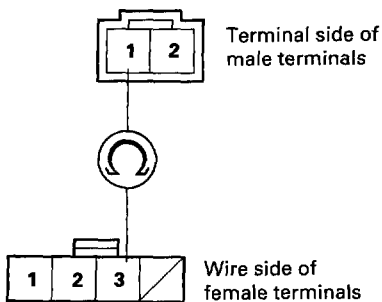
- If there is continuity, the horn switch is OK.
- If there is no continuity, go to step 6.



- Remove the steering column covers, then disconnect the 4P connector from the cable reel.

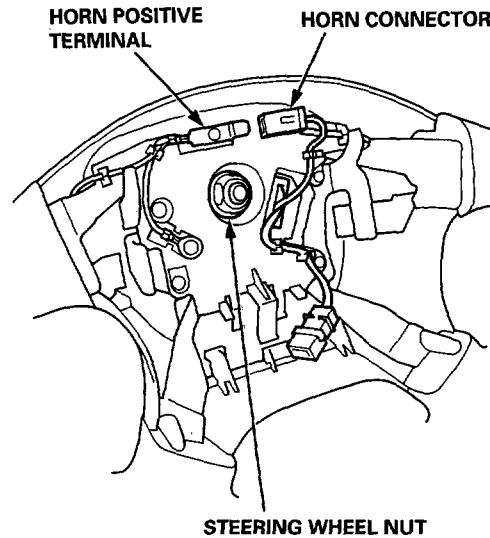


- Check for continuity between the No. 1 terminal of the (main wire harness side:) 2P connector and the No. 3 terminal of the (cable reel side:) 4P connector.



- If there is no continuity, replace the cable reel sub-harness.
- If there is continuity, go to step 8.

- Remove the driver's airbag assembly (see section 24).
- Check for continuity between the horn positive terminal and the steering wheel bolt with the horn switch pressed.



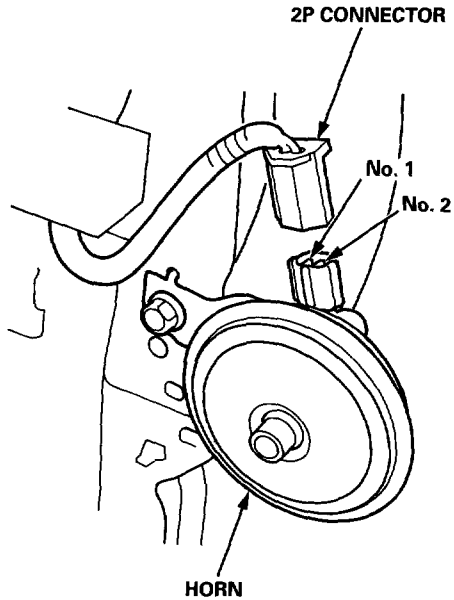
- If there is continuity, check the cable reel.
  - If there is no continuity, replace the horn switch.
- If all the tests prove OK, install the driver's airbag and reinstall the access panel on the steering wheel.
  - Reconnect the battery positive cable, then the negative cable.
  - After installing the airbag assembly, confirm proper system operation:
    - Turn the ignition switch ON (II); the instrument panel SRS indicator light should come on for about six seconds and then go off.
    - Make sure both horn buttons work.

# Horn

# Clock

## Horn Test

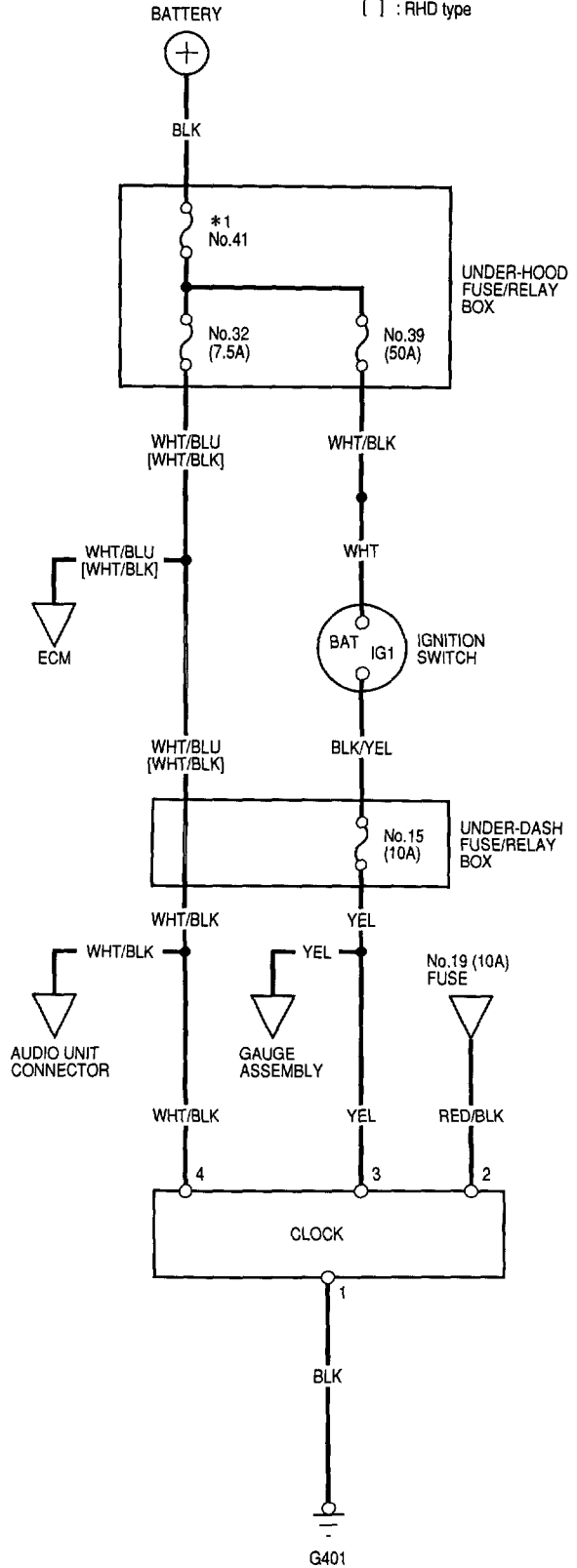
1. Disconnect the 2P connector from the horn.



2. Test the horn by connecting battery power to one terminal and grounding the other. The horn should sound.
3. Replace the horn if it fails to sound.

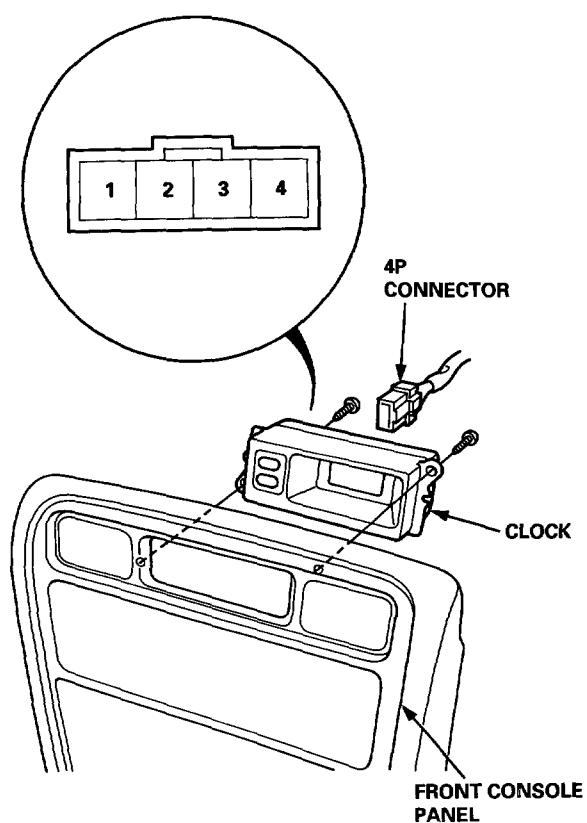
## Circuit Diagram

\*1 No. 41 (100A) : B18C4 engine  
 No. 41 (80A) : Except B18C4 engine  
 [ ] : RHD type



## Removal

1. Remove the rear console (see section 20).
2. Remove the front console (see section 20).
3. Disconnect the 4P connector from the clock.
4. Remove the two screws.

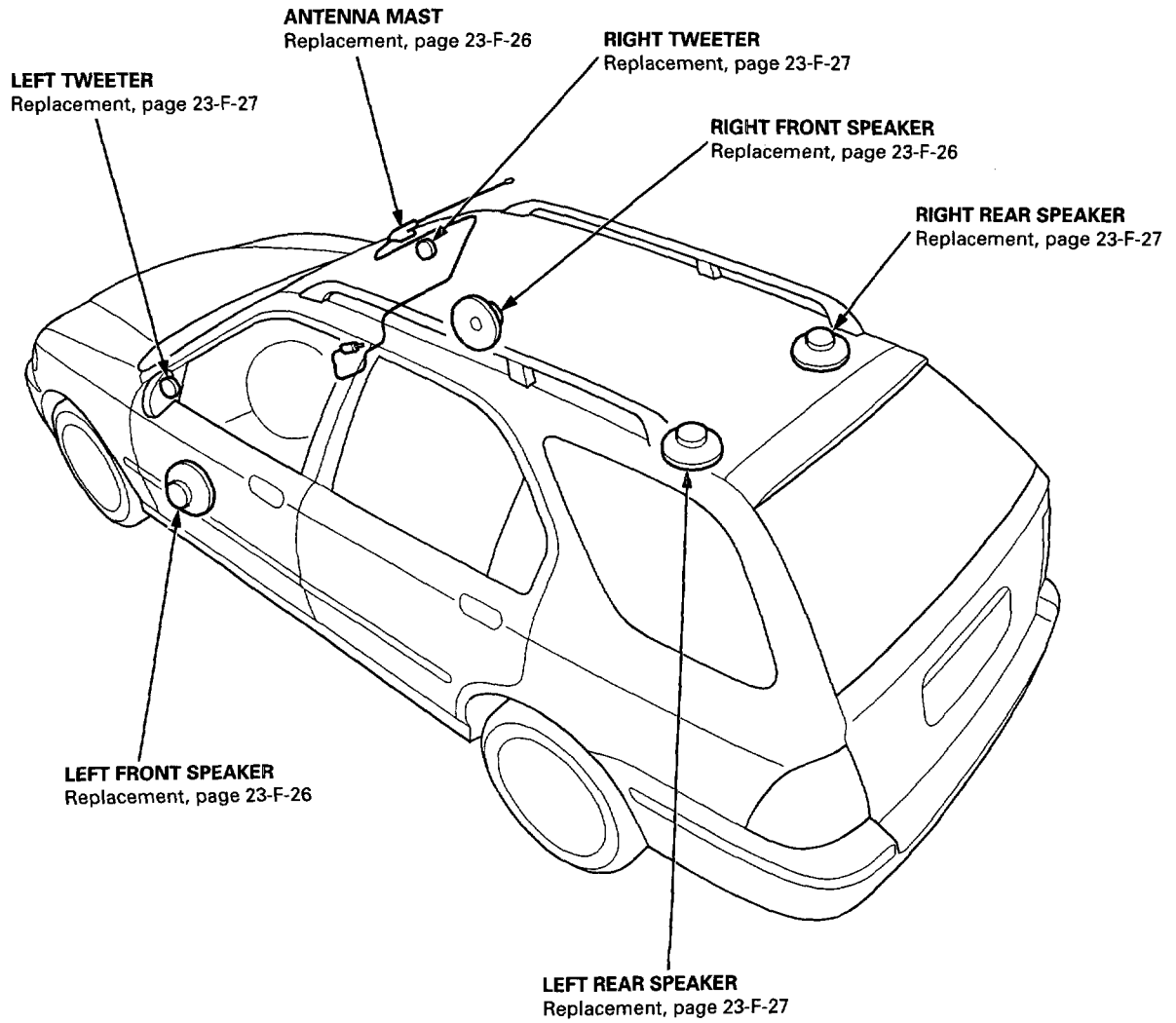


## Terminal

Cavity	Wire	Connects to
1	BLK	Ground (G401)
2	RED/BLK	Lights-on signal
3	YEL	IG1 (Main clock power supply)
4	WHT/BLK	Constant power (Time memory)

# Stereo Sound System

## Component Location Index

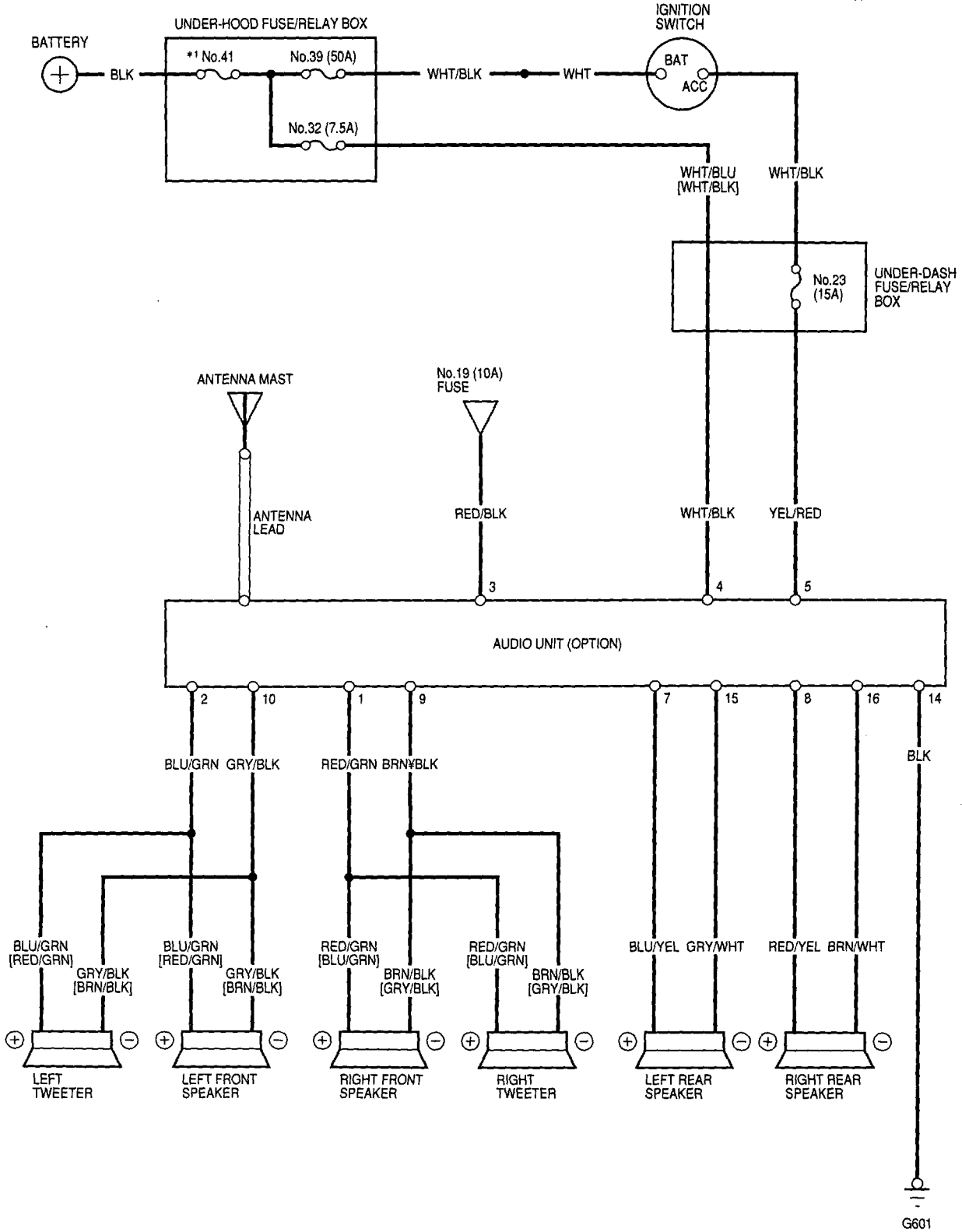




# Circuit Diagram

NOTE: In case of the audio unit is option

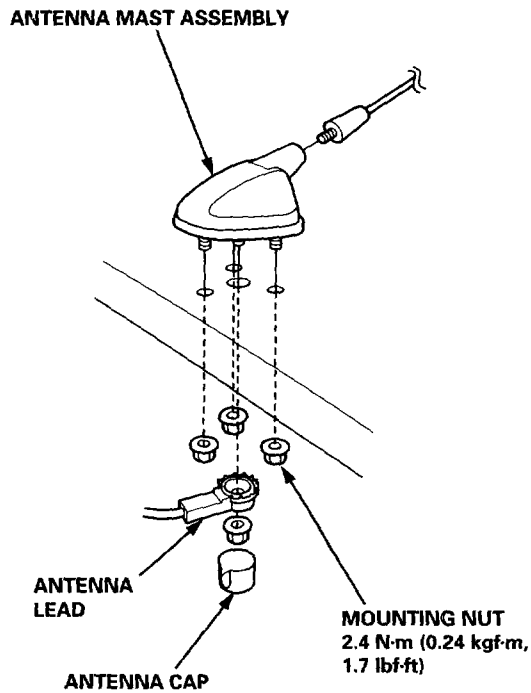
\*1 No.41(100A) : B18C4 engine  
No.41(80A) : Except B18C4 engine  
[ ] : RHD type



# Stereo Sound System

## Antenna Mast Replacement

1. Remove the front ceiling light (see page 23-D-28).
2. Remove the antenna cap.
3. Remove the four mounting nuts.
4. Remove the antenna mast assembly.



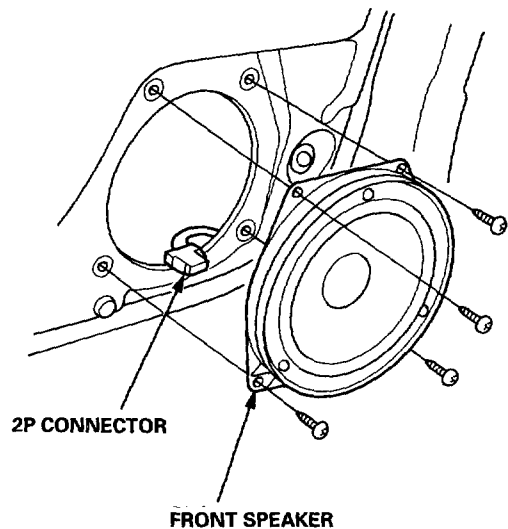
5. Install in the reverse order of removal.

### NOTE:

- Inspect the gasket; replace it if it is distorted or stays compressed.
- After installing it, run water over the antenna mast to make sure there is no leak.

## Front Speaker Replacement

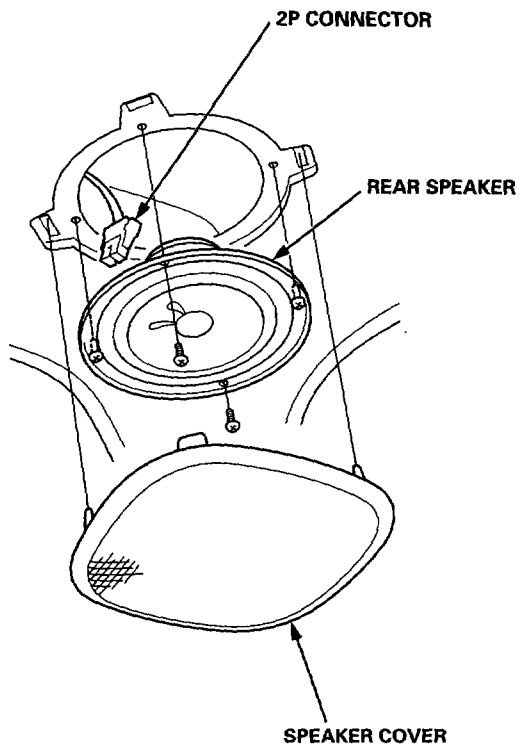
1. Remove the door panel (see section 20).
2. Remove the four screws, then disconnect the 2P connector from the front speaker.



3. Install in the reverse order of removal.

## Rear Speaker Replacement

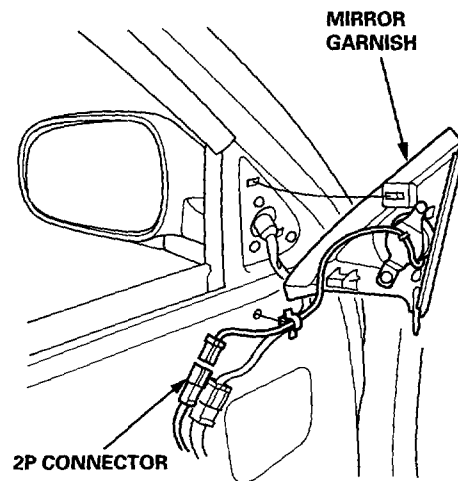
1. Remove the speaker cover from the headliner.
2. Remove the four screws from the speaker.
3. Disconnect the 2P connector from the speaker.



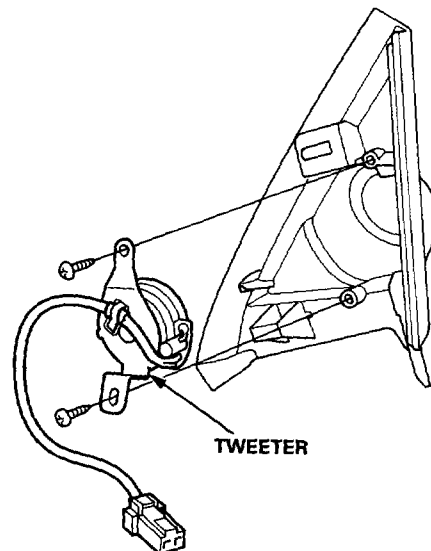
4. Install in the reverse order of removal.

## Tweeter Replacement

1. Remove the door panel (see section 20).
2. Disconnect the 2P connector from the tweeter.
3. Remove the mirror garnish.



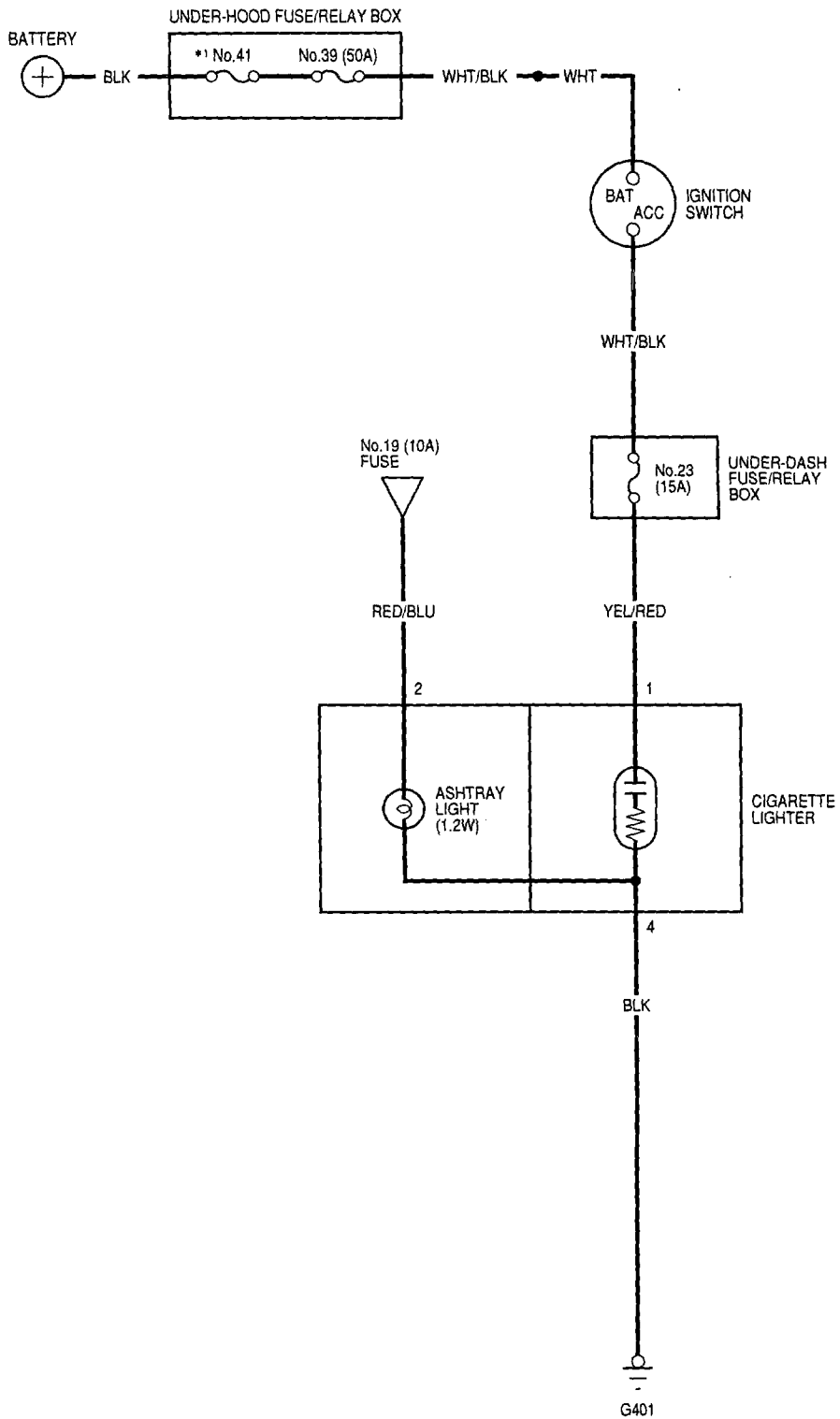
4. Remove the two screws, then remove the tweeter.



# Cigarette Lightre

## Circuit Diagram

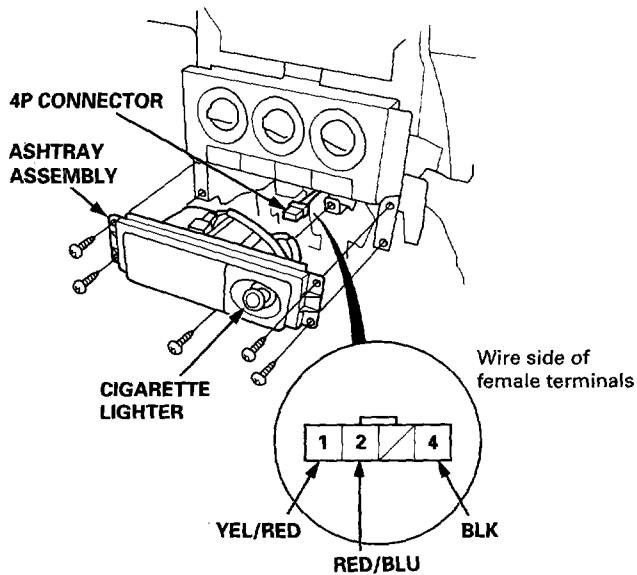
\*1 No.41 (100A) : B18C4 engine  
No.41 (80A) : Except B18C4 engine





## Cigarette Lighter Test/Replacement

1. Remove the rear console (see section 20).
2. Remove the front console (see section 20).
3. Remove the five screws, then pull out the ashtray assembly.
4. Disconnect the 4P connector from the cigarette lighter.

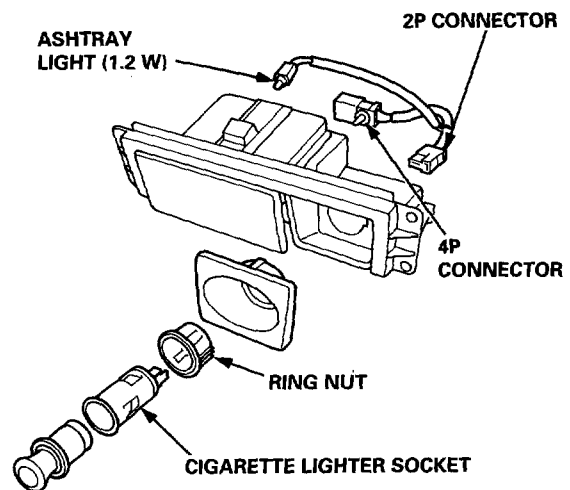


5. Inspect the connector terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, go to step 6.
6. Turn the ignition switch ON (II).
7. Check for voltage between the No. 1 (YEL/RED) and the No. 4 (BLK) terminals. There should be battery voltage.
  - If there is battery voltage, go to step 8.
  - If there is no battery voltage, check for
    - blown No. 23 (15 A) fuse in the under-dash fuse/relay box.
    - poor ground (G401).
    - an open in the wire.

8. Turn the headlight switch ON, and check for voltage between the No. 2 (RED/BLU) and the No. 4 (BLK) terminals. There should be battery voltage.

- If there is battery voltage, go to step 9.
- If there is no battery voltage, check for
  - blown No. 19 (10 A) fuse in the under-dash fuse/relay box.
  - faulty combination light switch.
  - an open in the wire.

9. If all tests prove OK, replace the cigarette lighter.
10. Disconnect the 2P connector and ashtray light.

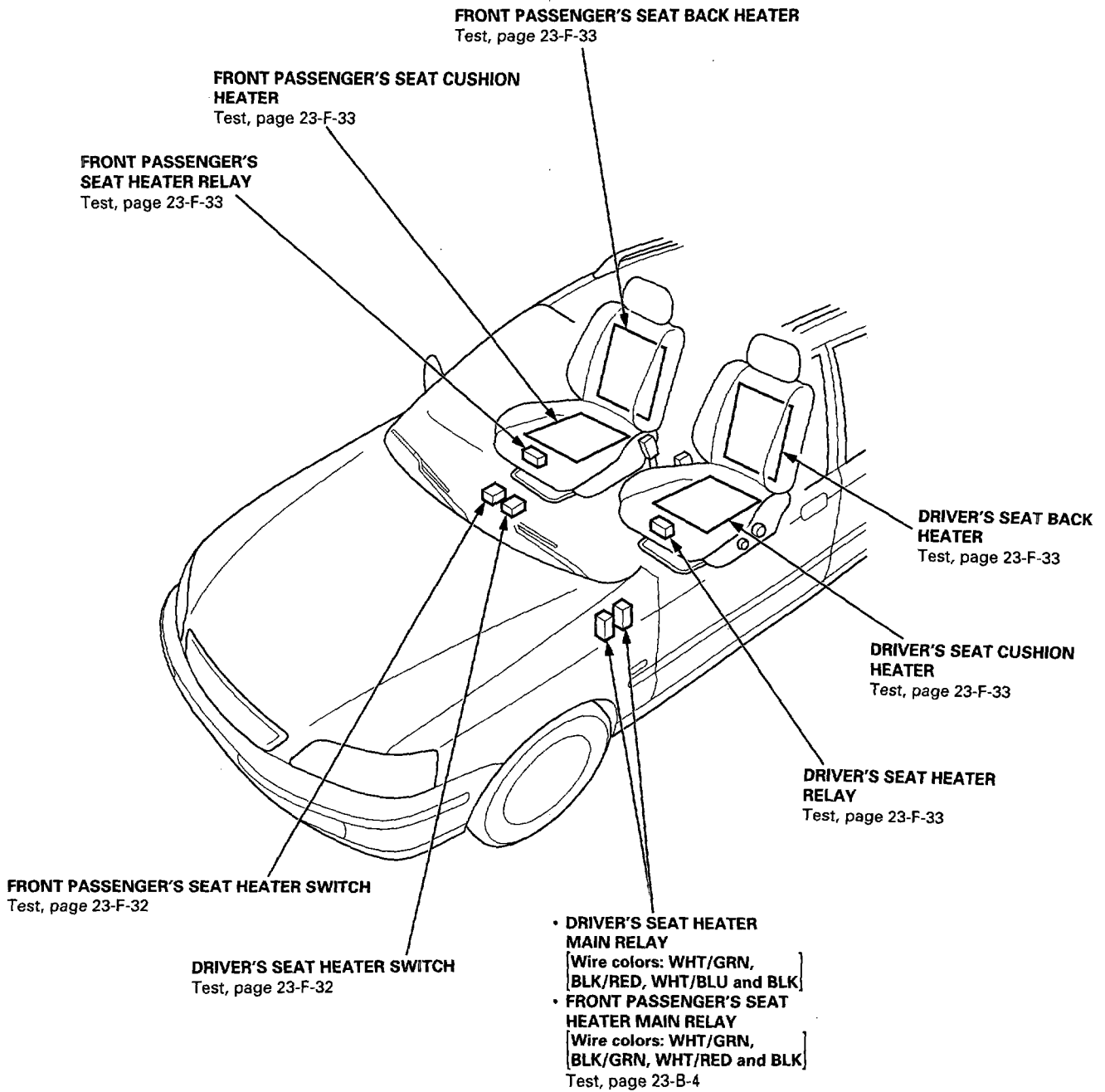


11. Remove the ring nut and separate the cigarette lighter socket.

**NOTE:** When installing the cigarette lighter, align the lug on the cigarette lighter socket with the slot in the panel.

# Seat Heaters (KS model)

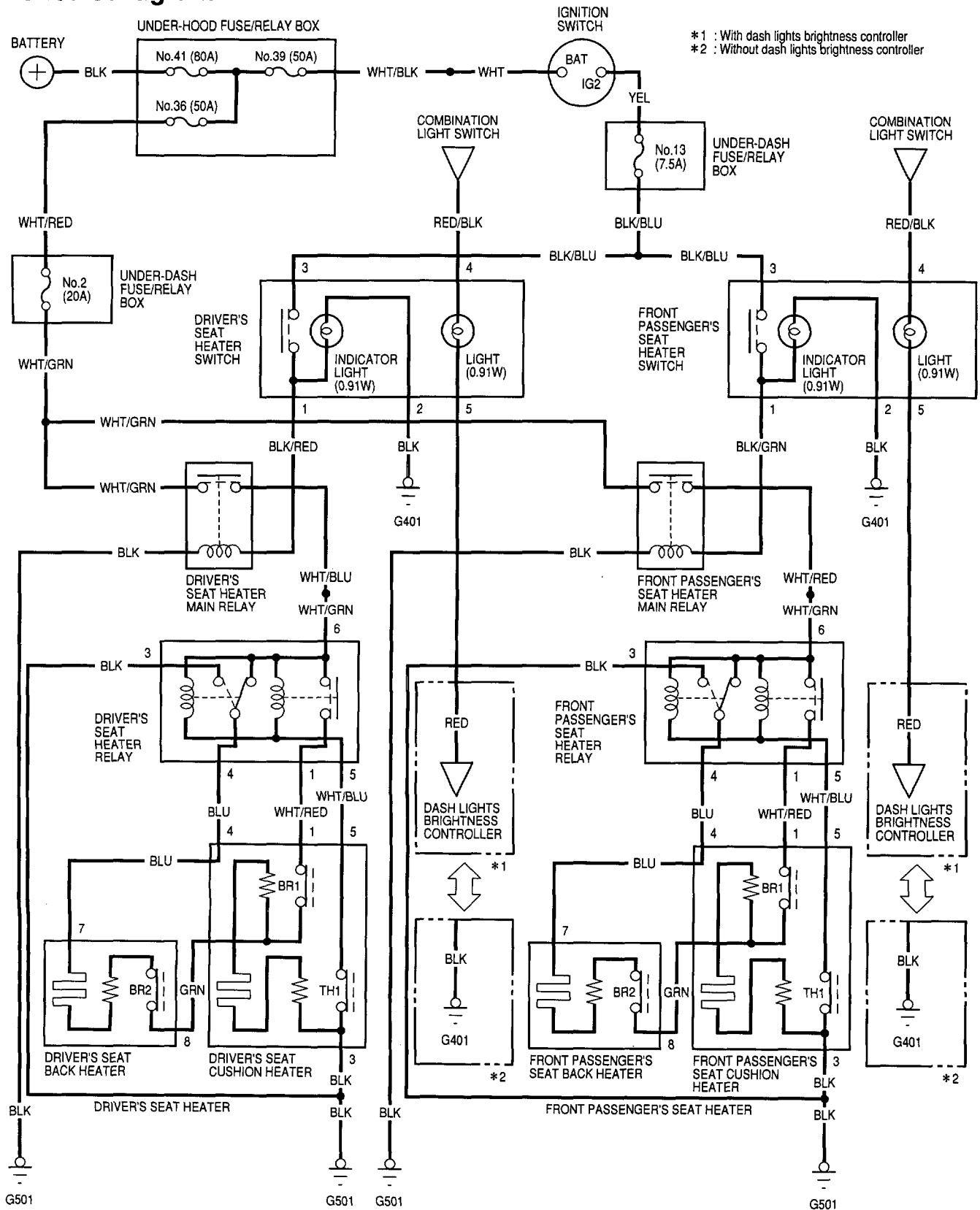
## Component Location Index



## Description

Two heaters are provided in each front seat, one in the seat cushion and another in the seat back. In normal use, temperature is automatically controlled by the thermostat [OFF above 40°C (104°F)] built into each seat cushion heater. Breaker 1 [OFF above 50°C (122°F)] and breaker 2 [OFF above 70°C (158°F)] cut off the circuit to prevent abnormal temperature rise.

## Circuit Diagram



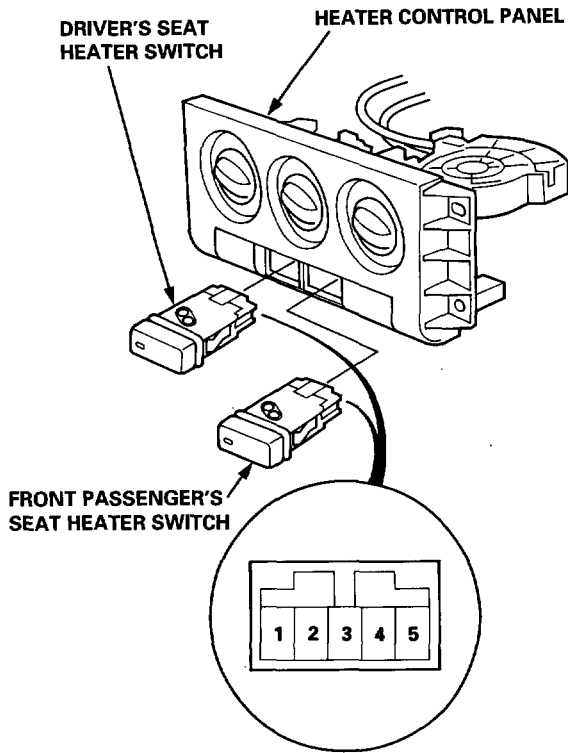
\*1 : With dash lights brightness controller  
\*2 : Without dash lights brightness controller

BR1 : BREAKER [OFF above 50°C (122°F)]  
TH1 : THERMOSTAT [OFF above 40°C (104°F)]  
BR2 : BREAKER [OFF above 70°C (158°F)]

# Seat Heaters (KS model)

## Heater Switch Test

1. Remove the front console (see section 20).
2. Remove the heater control panel (see section 20).
3. Disconnect the connectors.
4. Remove the driver's or front passenger's seat heater switch from the heater control panel.



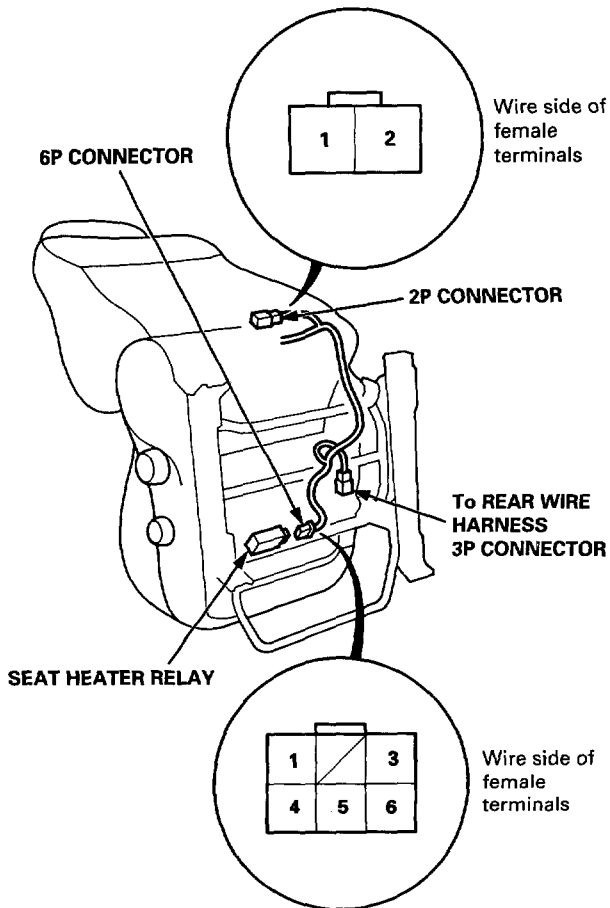
5. Check for continuity between the terminals according to the table.

Terminal Position	1	2	3	4	5
ON	○	⊕	○	○	
OFF	○	⊕	○	○	○

## Heater Test

1. Disconnect the 6P connector and 2P connector as shown below.

NOTE: Driver's seat is shown, front passenger's seat is similar.

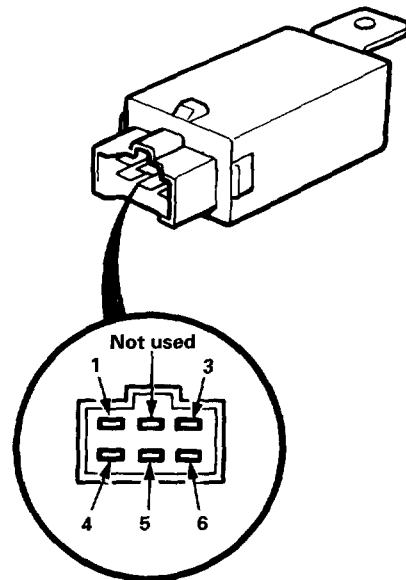


2. **Seat Cushion Heater:**  
Check for continuity between the No. 1 and No. 5 terminals ( $R \times 10^3$  scale).  
There should be continuity.
3. **Seat Back Heater:**  
Check for continuity between the No. 7 and No. 8 terminals ( $R \times 10^3$  scale).  
There should be continuity.

## Relay Test

### Seat Heater Relay:

1. Remove the seat, then remove the seat heater relay from the bottom of the seat.
2. Check for continuity between terminals No. 6 and No. 1.  
There should be no continuity.
3. When power and ground are connected to terminals No. 6 and No. 5, there should be continuity between terminals No. 3 and No. 4, and there should be battery voltage on the No. 1 terminal.
4. When power is disconnected, there should be continuity between terminals No. 6 and No. 4.

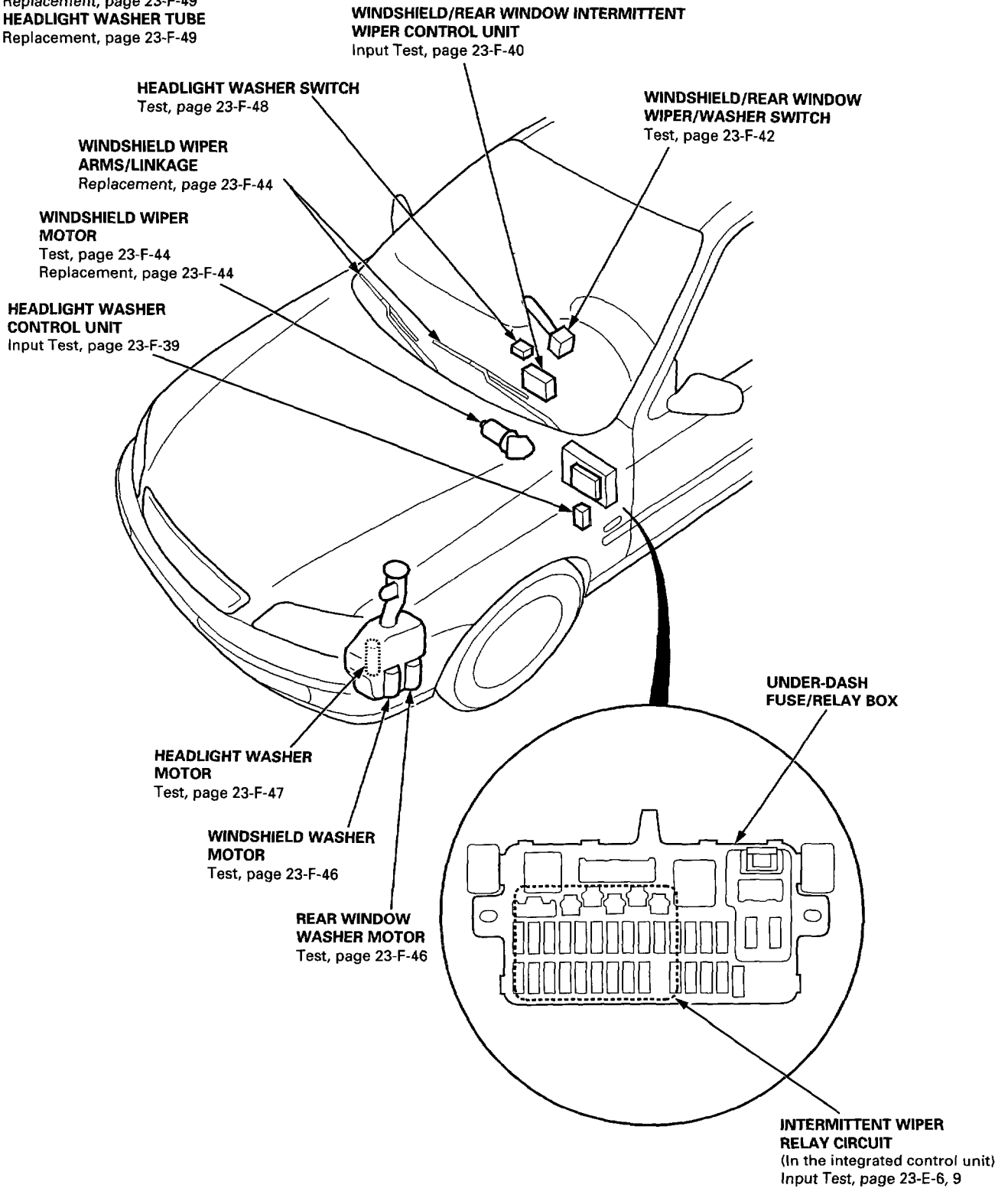


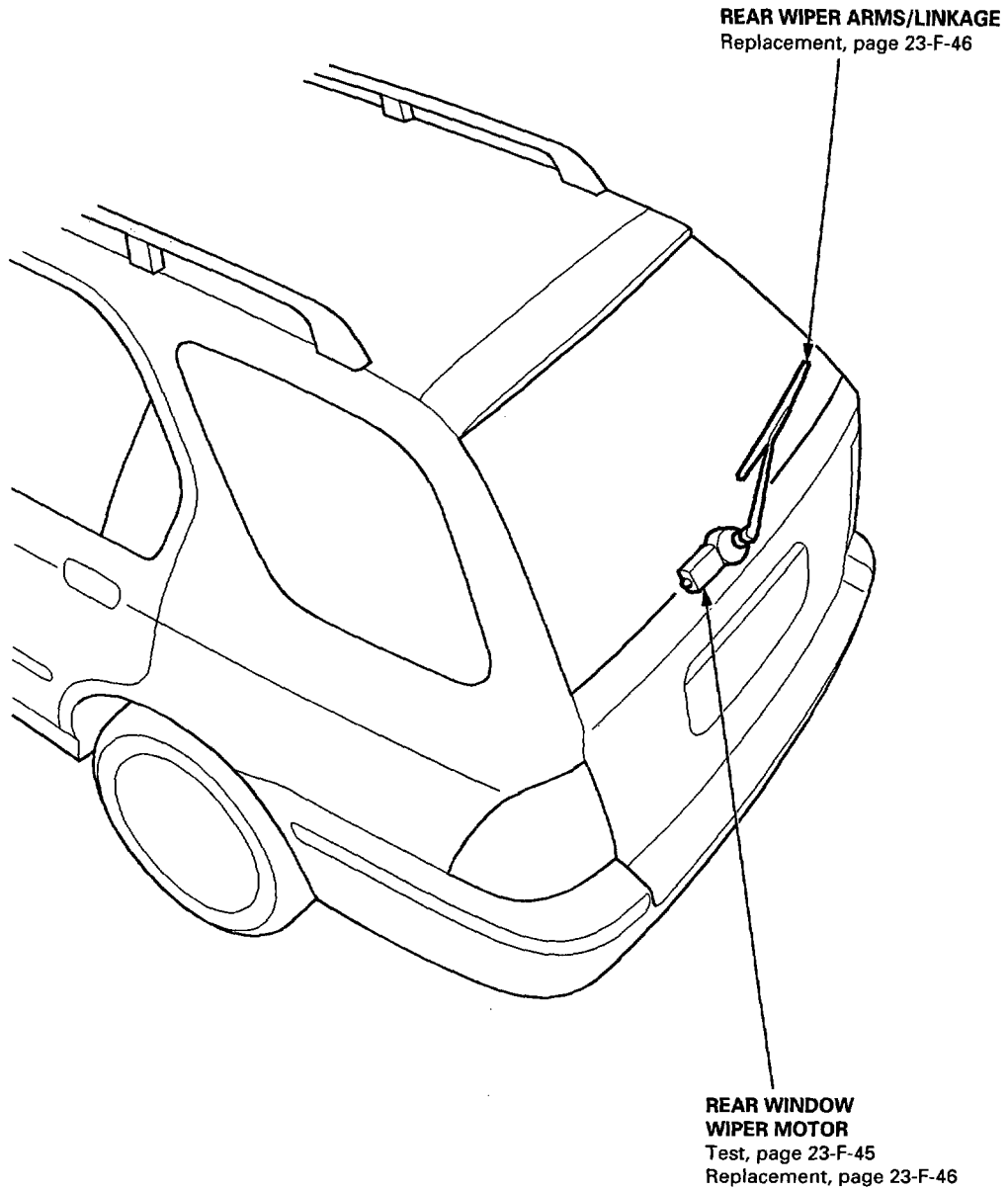
# Wipers/Washers

## Component Location Index

NOTE: LHD type is shown, RHD type is similar.

- **WINDSHIELD WASHER TUBE**  
Replacement, page 23-F-49
- **HEADLIGHT WASHER TUBE**  
Replacement, page 23-F-49



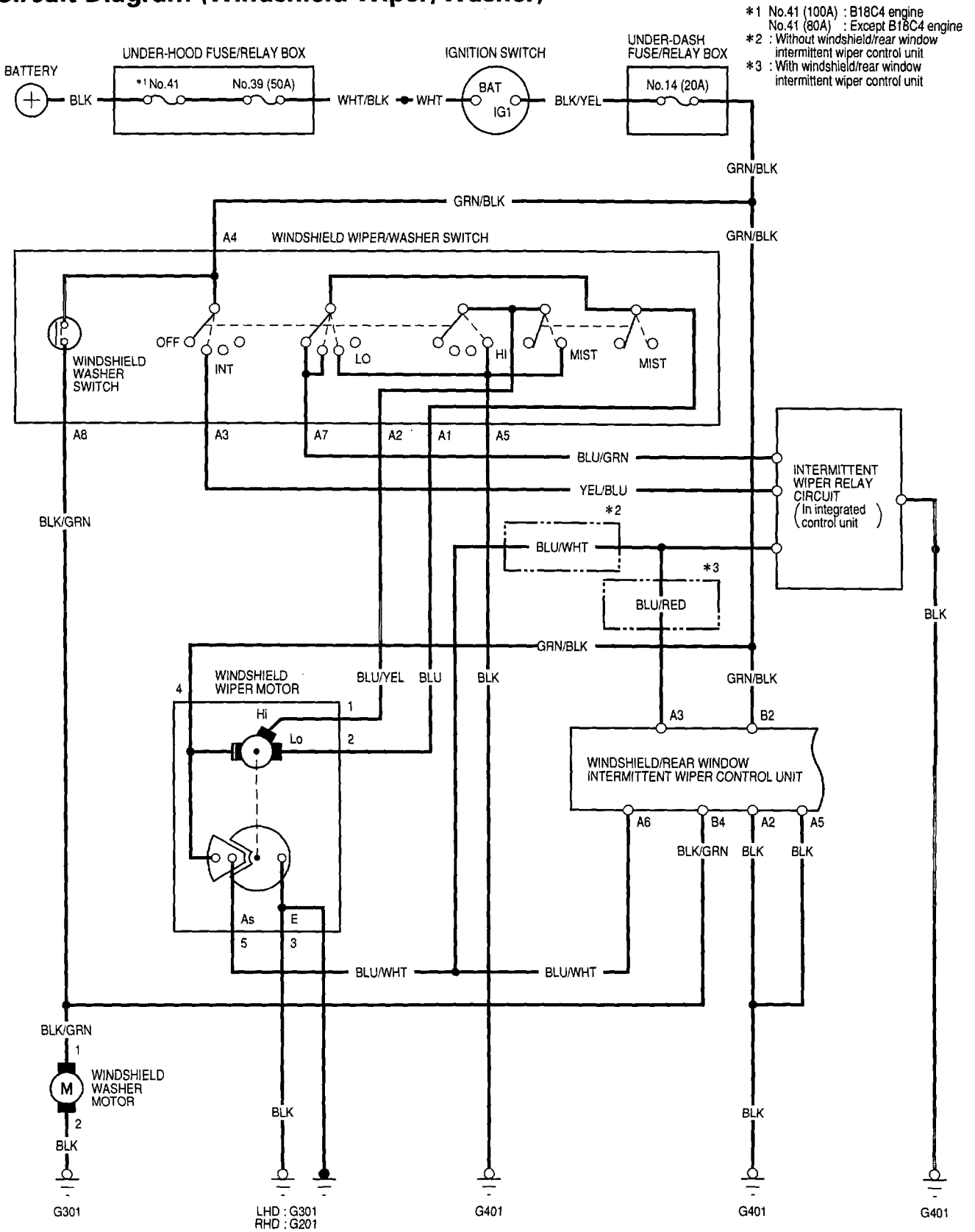


## Description

- **Rear Window Wiper Intermittent Operation:**  
After the rear window wiper switch has been turned ON, the rear wiper will work continuously for about three to five times, then it will work intermittently.
- **Combined Washer/Wiper Operation:**  
When the washer switch is turned ON, the wipers too will work.

# Wipers/Washers

## Circuit Diagram (Windshield Wiper/Washer)

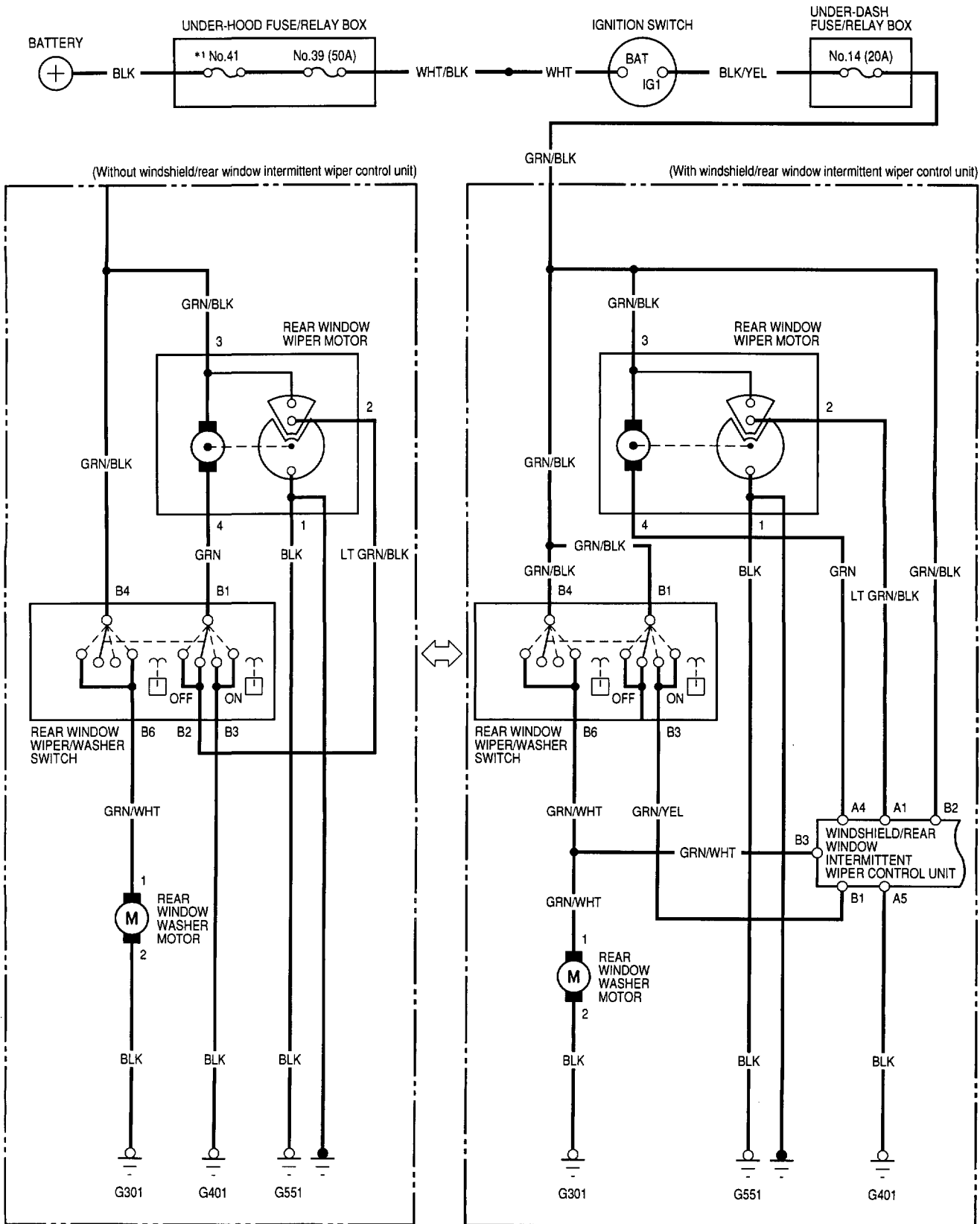






# Circuit Diagram (Rear Window Wiper/Washer)

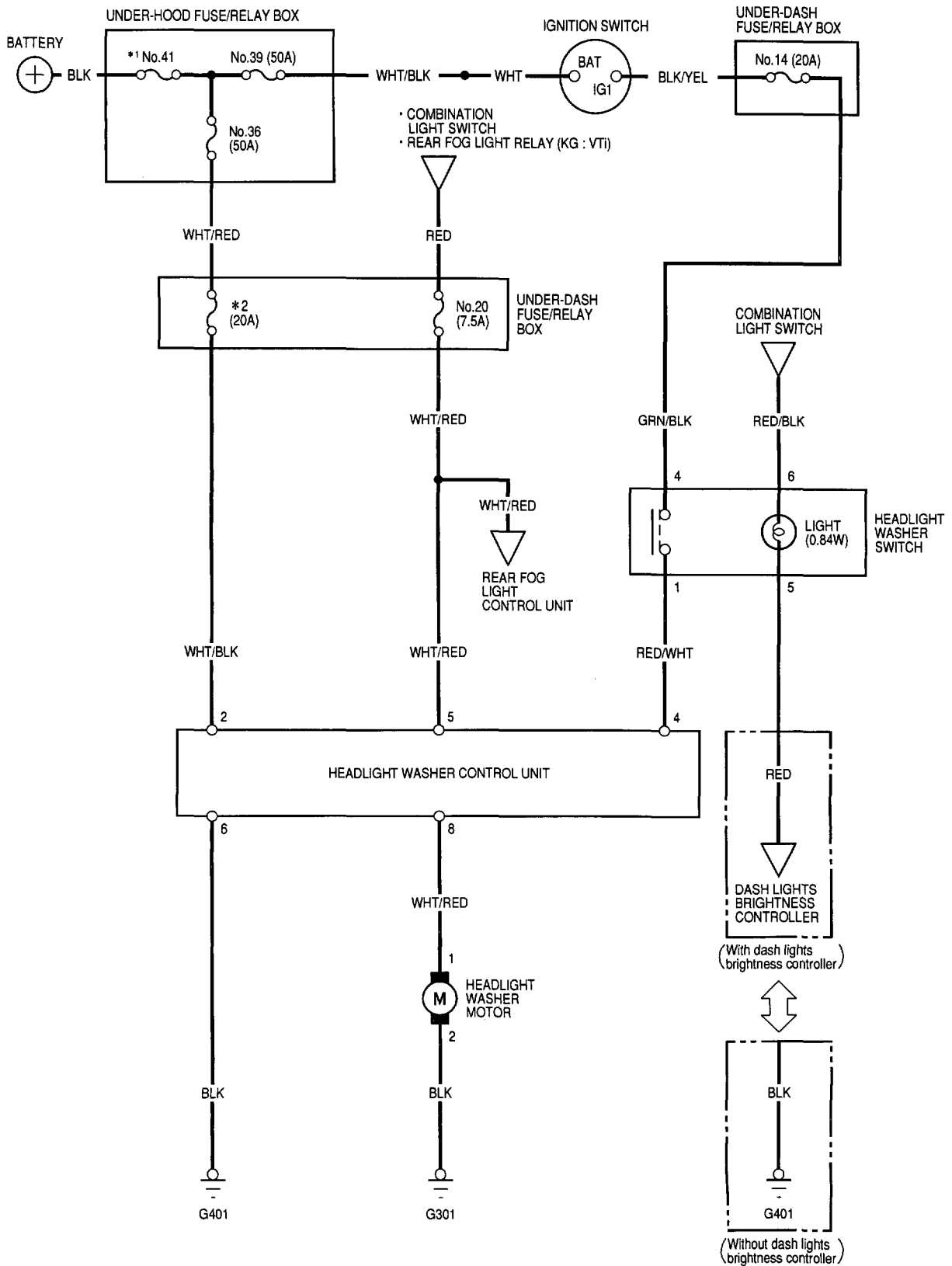
\*1 No.41 (100A) : B18C4 engine  
No.41 (80A) : Except B18C4 engine



# Wipers/Washers

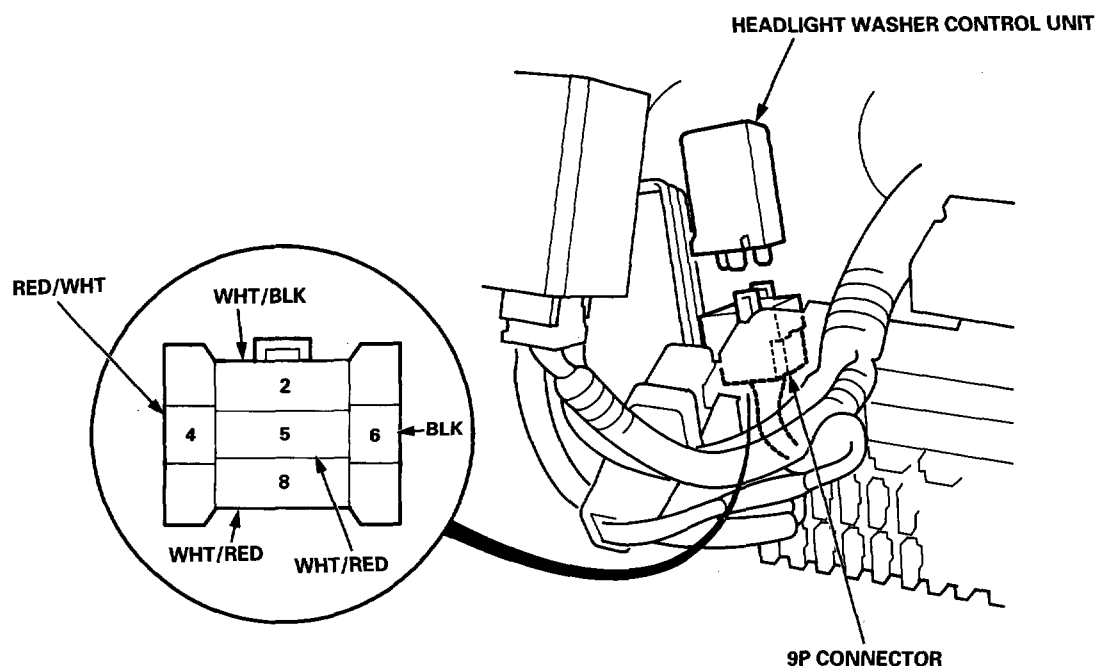
## Circuit Diagram (With Headlight Washer)

- \*1 No.41 (100A) : B18C4 engine  
No.41 (80A) : Except B18C4 engine
- \*2 No.1 : KS  
No.2 : KG, KE



## Headlight Washer Control Unit Input Test

1. Disconnect the 9P connector from the headlight washer control unit.
2. Inspect the connector and socket terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, make the following input tests at the connector.
    - If any test indicates a problem, find and correct the cause, then recheck the system.
    - If all the input tests prove OK, the control unit must be faulty; replace it.



Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
2	WHT/BLK	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown *1 (20 A) fuse in the under-dash fuse/relay box</li> <li>• An open in the wire</li> </ul>
6	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401)</li> <li>• An open in the wire</li> </ul>
5	WHT/RED	Combination light switch ON ( $\Xi$ D )	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 20 (7.5 A) fuse in the under-dash fuse/relay box</li> <li>• An open in the wire</li> </ul>
4	RED/WHT	Ignition switch ON (II) and headlight washer switch ON	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty headlight washer switch</li> <li>• An open in the wire</li> </ul>
8	WHT/RED	Connect the WHT/BLK terminal to the WHT/RED terminal with a jumper wire	Check the washer motor: It should run.	<ul style="list-style-type: none"> <li>• Faulty headlight washer motor</li> <li>• Poor ground (G301)</li> <li>• An open in the wire</li> </ul>

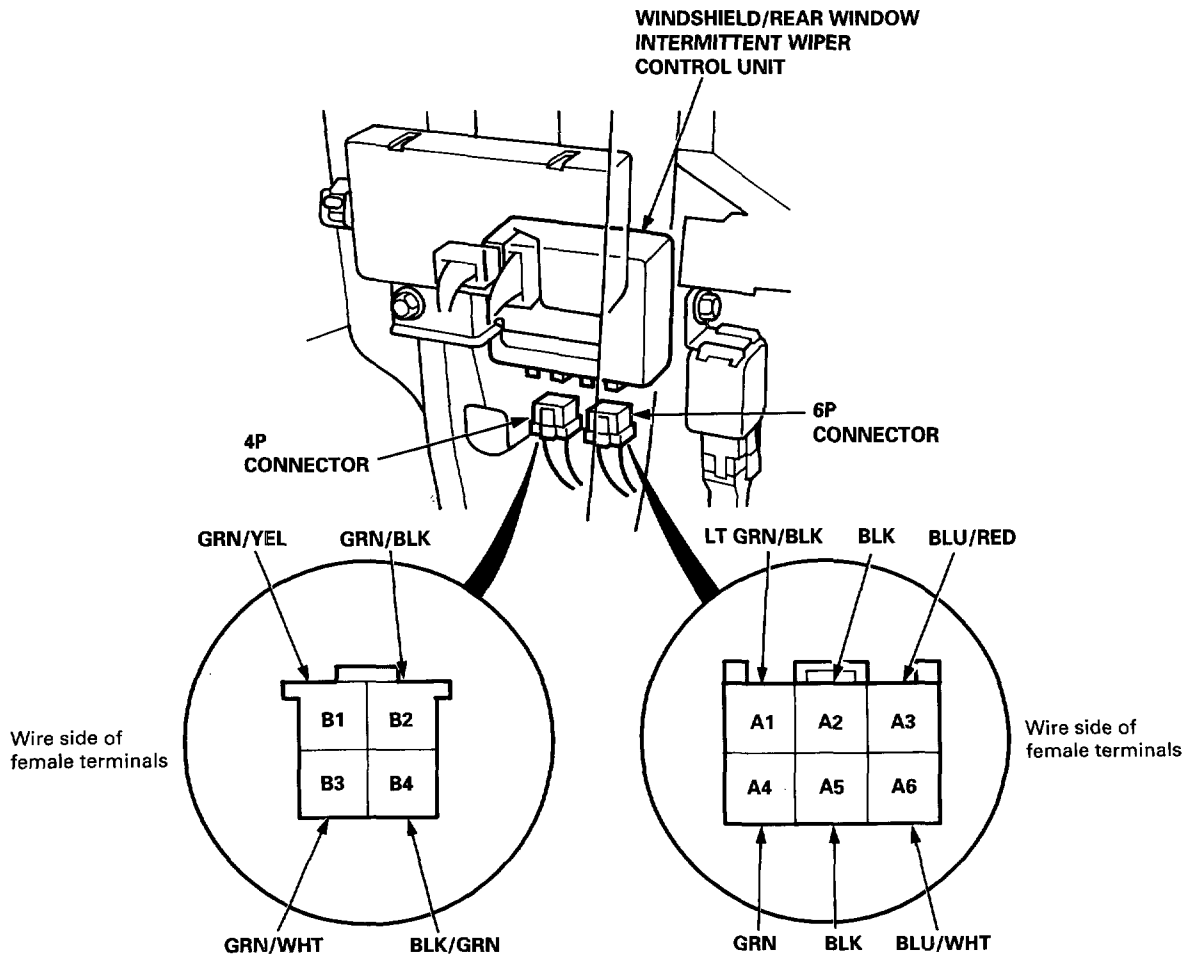
\*1 No. 1: KS model  
No. 2: KG and KE models

# Wipers/Washers

## Windshield/Rear Window Intermittent Wiper Control Unit Input Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Disconnect the 6P and 4P connectors from the control unit.
2. Inspect the connector and socket terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, make the following input tests at the connector.
    - If any test indicates a problem, find and correct the cause, then recheck the system.
    - If all the input tests prove OK, the control unit must be faulty; replace it.





### Windshield Wiper:

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B2	GRN/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>• An open in the wire</li> </ul>
A5	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401)</li> <li>• An open in the wire</li> </ul>
A2	BLK			
B4	BLK/GRN	Ignition switch ON (II), windshield washer switch ON	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty windshield wiper/washer switch</li> <li>• An open in the wire</li> </ul>
A3	BLU/RED	Under all conditions	Check for continuity in the wire between the windshield/rear window intermittent wiper control unit and integrated control unit.	<ul style="list-style-type: none"> <li>• An open in the wire</li> </ul>
A6	BLU/WHT	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty windshield wiper motor</li> <li>• An open in the wire</li> </ul>

### Rear Window Wiper:

Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B2	GRN/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>• An open in the wire</li> </ul>
A5	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401)</li> <li>• An open in the wire</li> </ul>
A4	GRN	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty rear wiper motor</li> <li>• An open in the wire</li> </ul>
B3	GRN/WHT	Ignition switch ON (II), rear window washer switch ON	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty rear window washer switch</li> <li>• An open in the wire</li> </ul>
A1	LT GRN/BLK	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty rear window wiper</li> <li>• An open in the wire</li> </ul>
B1	GRN/YEL	Ignition switch ON (II), rear window wiper switch ON	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 14 (20 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty rear window wiper switch</li> <li>• An open in the wire</li> </ul>

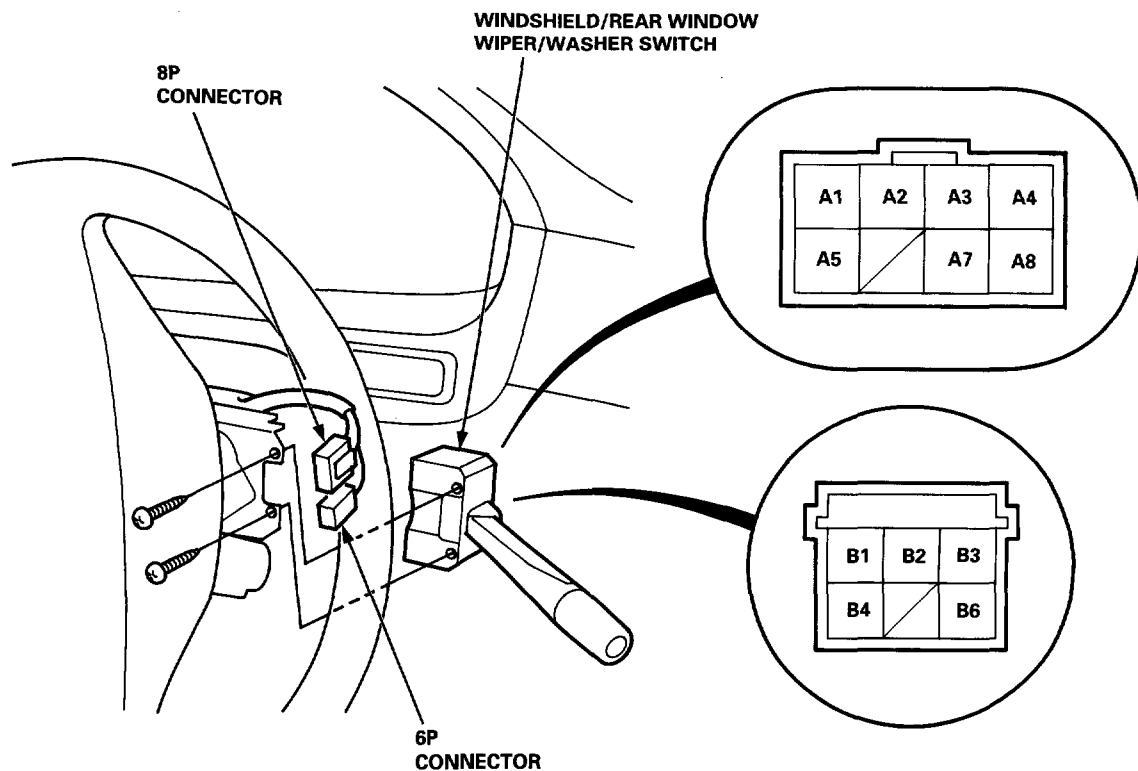
# Wipers/Washers

## Wipers/Washers Switch Test

SRS components are located in this area. Review the SRS component locations, precautions, and procedures in the SRS section (24) before performing repairs or service.

1. Remove the steering column covers (see section 17).
2. Disconnect the 8P and 6P connectors from the windshield/rear window wiper/washer switch.
3. Inspect the connector terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, check for continuity between them in each switch position according to the table. If there is no continuity between any of them, check for continuity in the switch harness.
    - If there is continuity in the switch harness, replace the windshield/rear window wiper/washer switch.
    - If there is no continuity in the switch harness, replace it.

NOTE: LHD type is shown, RHD type is similar.





**Windshield Wiper/Washer Switch:**

Terminal Position	A1	A2	A3	A4	A8	A7	A5
OFF	○					○	
INT	○		○	○		○	
LO	○						○
HI		○					○
Mist switch "ON"		○					○
Washer switch "ON"				○	○		

**Rear Window Wiper/Washer Switch:**

Terminal Position	B6	B4	B1	B2	B3
OFF			○	○	
Washer switch "ON"	○	○	○	○	
ON			○		○
Washer switch "ON"	○	○	○		○

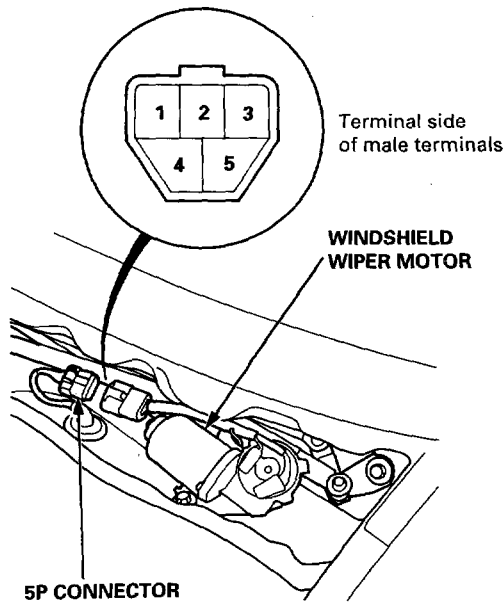
# Wipers/Washers

## Windshield Wiper Motor Test

1. Open the hood, and remove the cap nuts and the wiper arms.

NOTE: Remove the wiper arms carefully without damaging the hood.

2. Remove the hood seal and air scoop by prying out their trim clips.
3. Disconnect the 5P connector from the windshield wiper motor.



4. Test the motor by connecting battery power and ground according to the table.

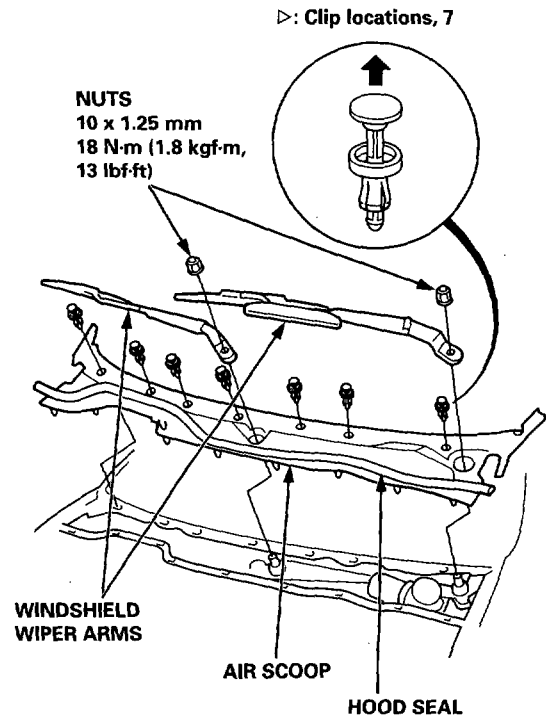
Terminal Position	1	2	4
LOW SPEED		⊖	⊕
HIGH SPEED	⊖		⊕

If the motor does not run or fails to run smoothly, replace it.

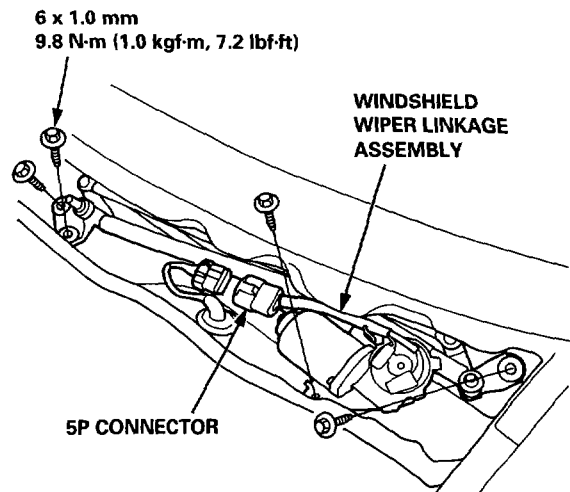
5. Connect an analog voltmeter between the No. 5 (+) and No. 3 (-) terminals, and run the motor at low or high speed. The voltmeter should indicate 0 V and 4 V or less alternately.

## Windshield Wiper Motor Replacement

1. Remove the windshield wiper arms, then remove the hood seal and air scoop.

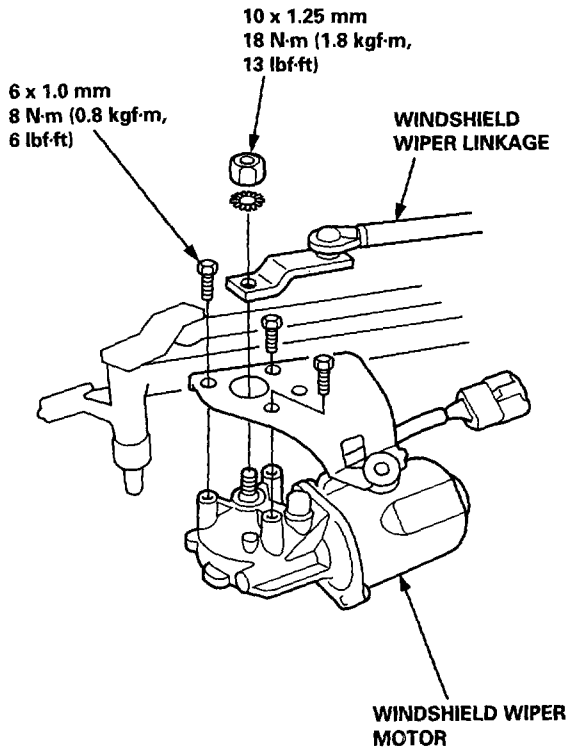


2. Disconnect the 5P connector, then remove the windshield wiper linkage assembly.





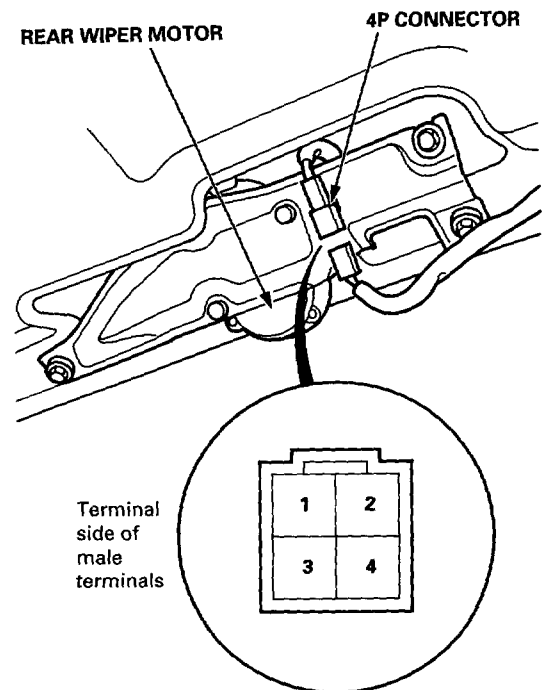
3. Separate the windshield wiper linkage and windshield wiper motor.



4. Installation is the reverse of the removal procedure.

## Rear Window Wiper Motor Test

1. Open the tailgate.
2. Remove the tailgate trim panel (see section 20).
3. Disconnect the 4P connector from the motor.

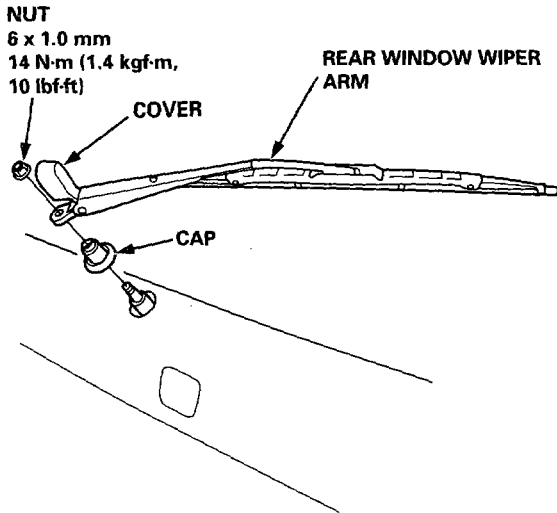


4. Test the motor by connecting battery power to the No. 3 terminal and ground to the No. 1 terminals.
5. Connect an analog voltmeter between the No. 2 and No. 4 terminals, then run the motor. The voltmeter should indicate 0 V and more than 4 V alternately.

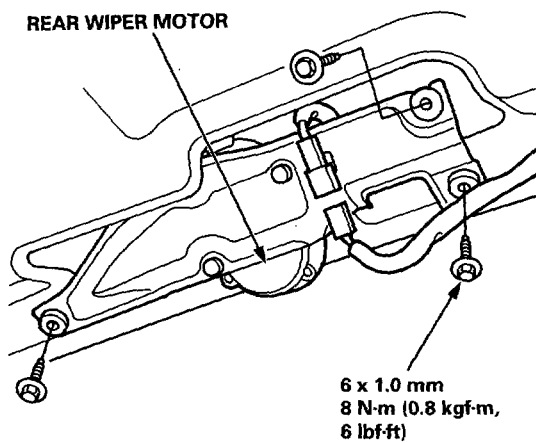
# Wipers/Washers

## Rear Window Wiper Motor Replacement

1. Remove the tailgate trim panel (see section 20).
2. Remove the rear window wiper arm.



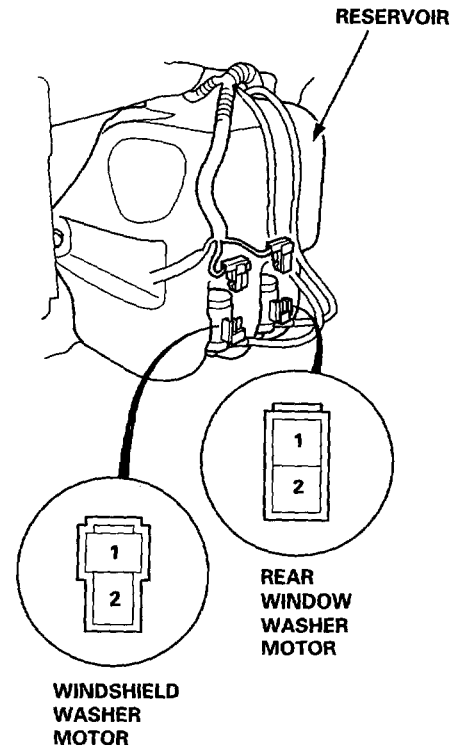
3. Disconnect the 4P connector from the motor.
4. Remove the three mounting bolts from the tailgate.



5. Install in the reverse order of removal.

## Windshield/Rear Window Washer Motor Test

1. Remove the front bumper (see section 20).
2. Disconnect the 2P connector from the washer motor.



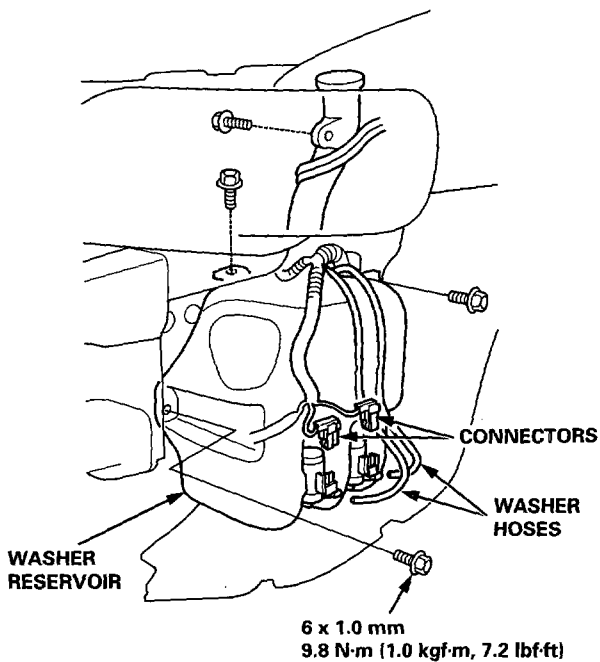
3. Test the washer motor operation by connecting battery power and ground according to the table.

	Terminal	1	2
Battery			
Disconnected			
Connected		⊕	⊖

- If the motor does not run or fails to run smoothly, replace it.
- If the motor runs smoothly, but little or no washer fluid is pumped, check for a disconnected or blocked washer hose, or a clogged pump outlet in the motor.

## Washer Reservoir Replacement

1. Remove the front bumper (see section 20).
2. Remove the P/S fluid reservoir from the bracket (see section 17).
3. Disconnect the connectors and washer hoses from the washer motors.
4. Remove the bolts, then remove the washer reservoir.



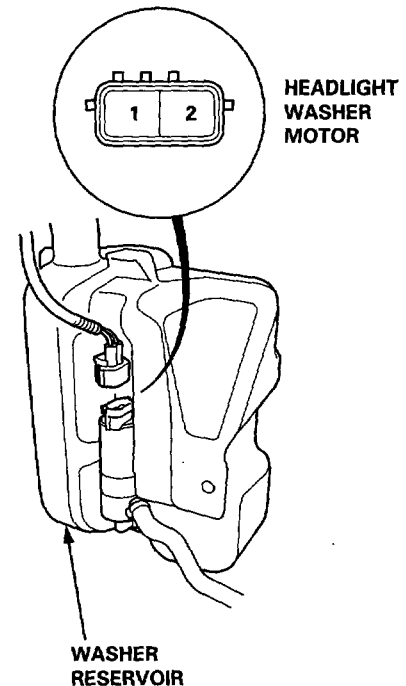
5. Installation is the reverse of the removal procedure.

### NOTE:

- Make sure the connectors and washer hoses are connected properly.
- Check the washer motor operation.

## Headlight Washer Motor Test

1. Remove the front bumper.
2. Remove the washer reservoir.
3. Disconnect the 2P connectors from the washer motor.



4. Test the washer motor operation by connecting battery power and ground according to the table.

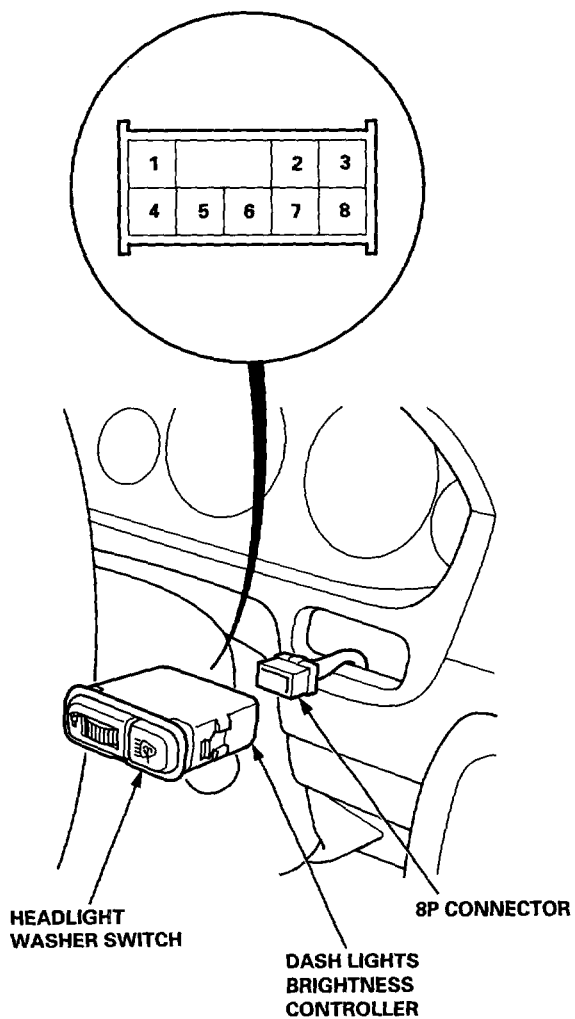
Battery	Terminal 1	Terminal 2
Disconnected		
Connected	⊕	⊖

- If the motor does not run or fails to run smoothly, replace it.
- If the motor runs smoothly, but little or no washer fluid is pumped, check for a disconnected or blocked washer hose, or a clogged pump outlet in the motor.

# Wipers/Washers

## Headlight Washer Switch Test

1. Carefully pry the dash lights brightness controller/headlight washer switch out of the dashboard.
2. Disconnect the 8P connector from the dash lights brightness controller/headlight washer switch.



3. Check for continuity between the terminals in each switch position according to the table.

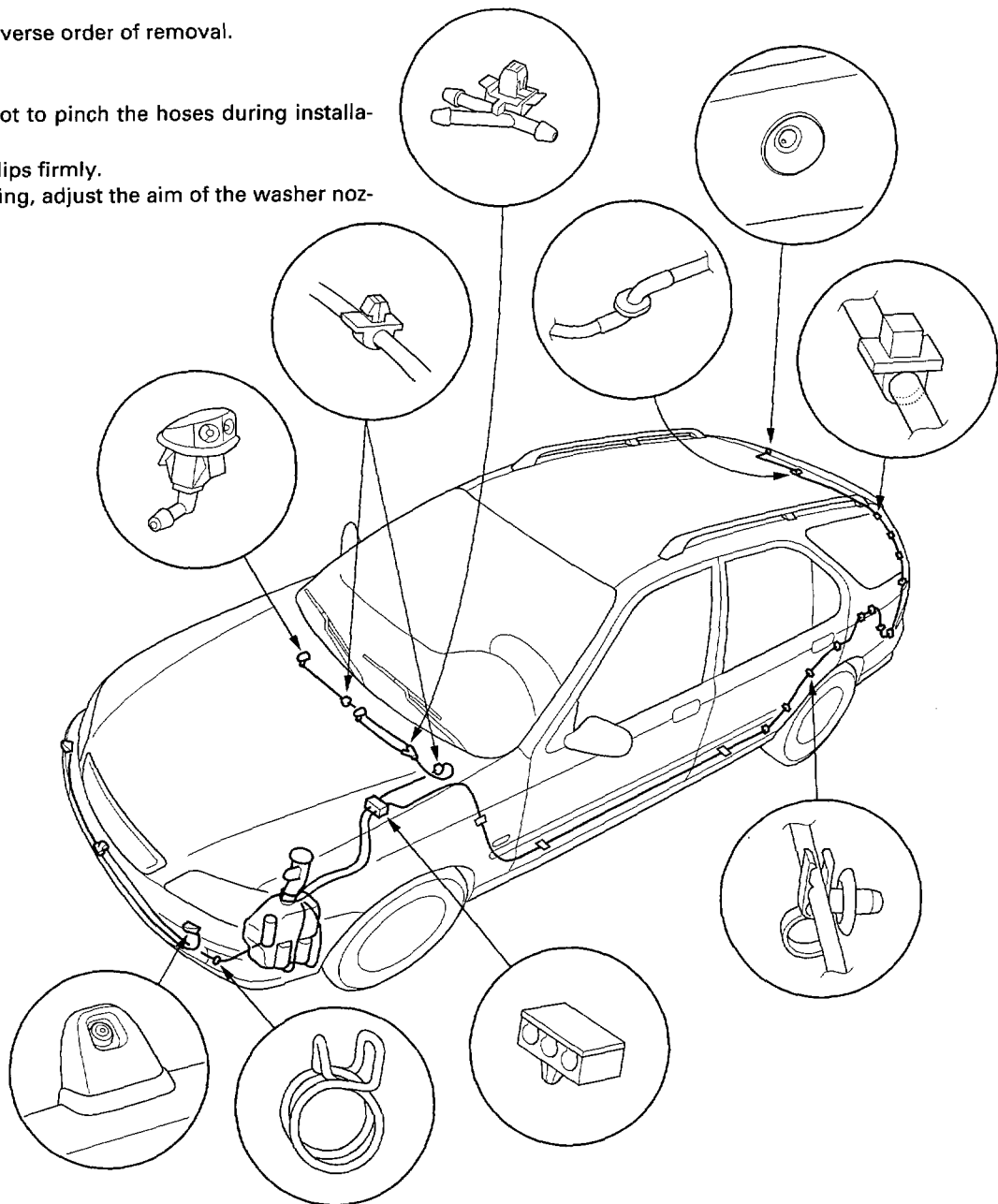
Terminal Position	1	4	5		6
OFF			○	○	○
ON	○	○			

## Washers Tube Replacement

1. Remove the front bumper (see section 20).
2. Remove the left front inner fender.
3. Disconnect the 2P connectors and washer hose from the washer motors.
4. Remove the three mounting bolts and the washer reservoir.
5. Remove the washer nozzles and washer hoses.
6. Install in the reverse order of removal.

**NOTE:**

- Take care not to pinch the hoses during installation.
- Install the clips firmly.
- After installing, adjust the aim of the washer nozzles.

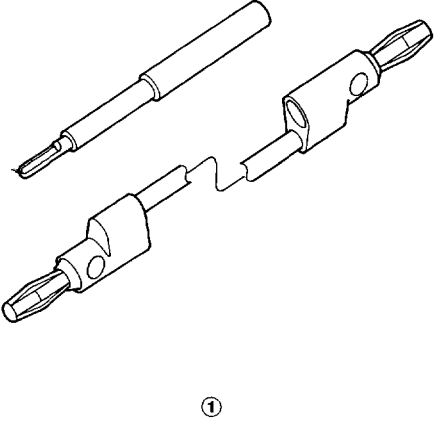


## **Security**

<b>Special Tools .....</b>	<b>23-G-2</b>
<b>Immobilizer System</b>	
<b>Component Location Index .....</b>	<b>23-G-3</b>
<b>Description .....</b>	<b>23-G-4</b>
<b>Circuit Diagram .....</b>	<b>23-G-7</b>
<b>Security Alarm System</b>	
<b>(KG model: VTi)</b>	
<b>Component Location Index .....</b>	<b>23-G-12</b>
<b>Circuit Diagram .....</b>	<b>23-G-14</b>



# Special Tools

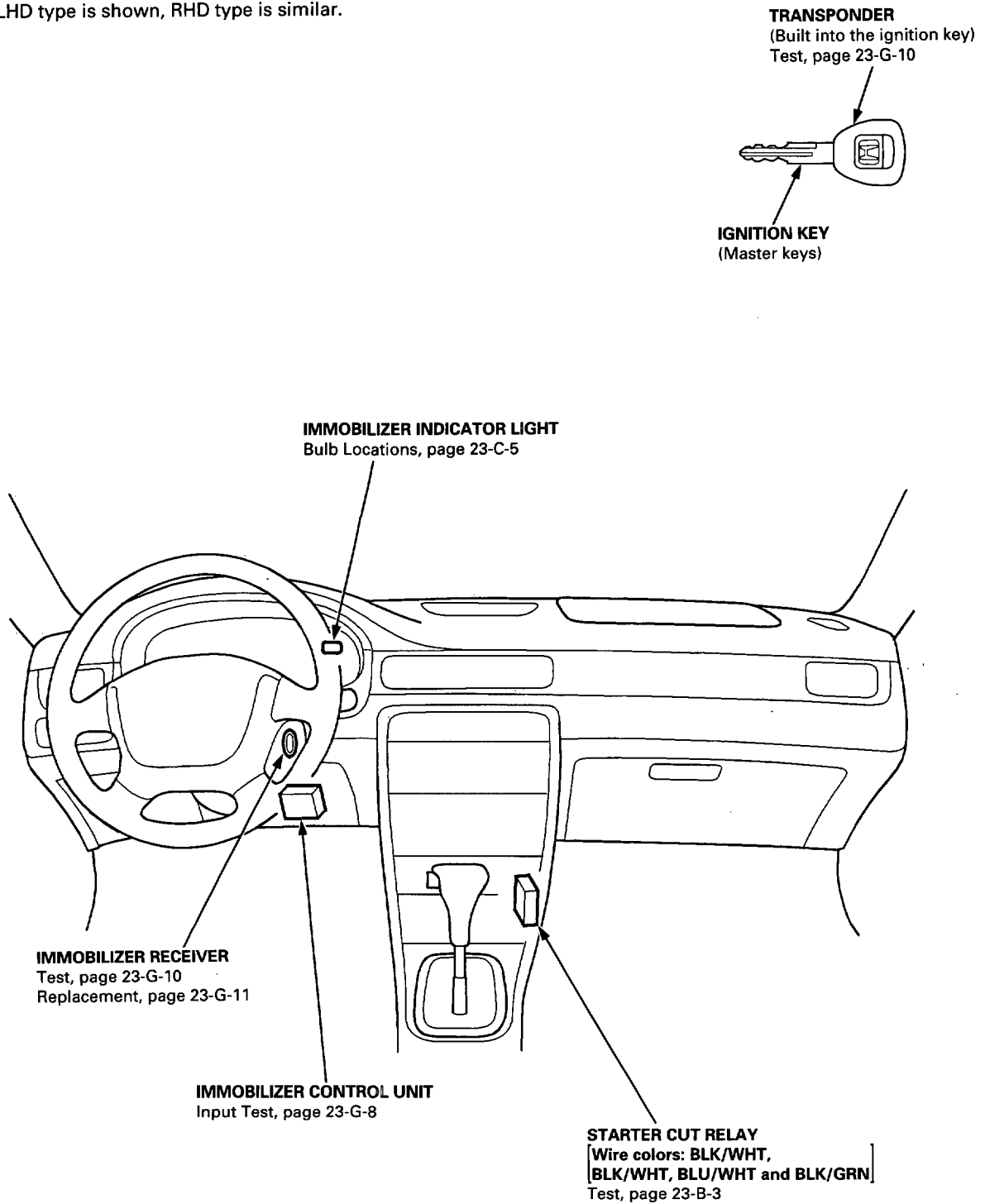
Ref. No.	Tool Number	Description	Qty	Remark
①	07SAZ - 001000A	Backprobe Set	1	
				

# Immobilizer System



## Component Location Index

NOTE: LHD type is shown, RHD type is similar.





# Immobilizer System

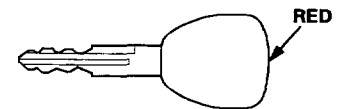
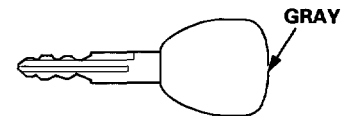
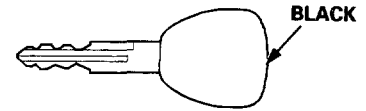
## Description

The vehicle is equipped with an immobilizer system that will disable the vehicle unless the proper ignition key is used. This system consists of a transponder located in the ignition key, a receiver, a control unit, an indicator light, and the ECM.

The vehicle has three kinds of keys.

- The master key is for:
  - ignition switch.
  - door locks.
  - trunk lock.
- The valet key is for:
  - ignition switch.
  - door locks.
- The learning key is for rewriting the immobilizer system.

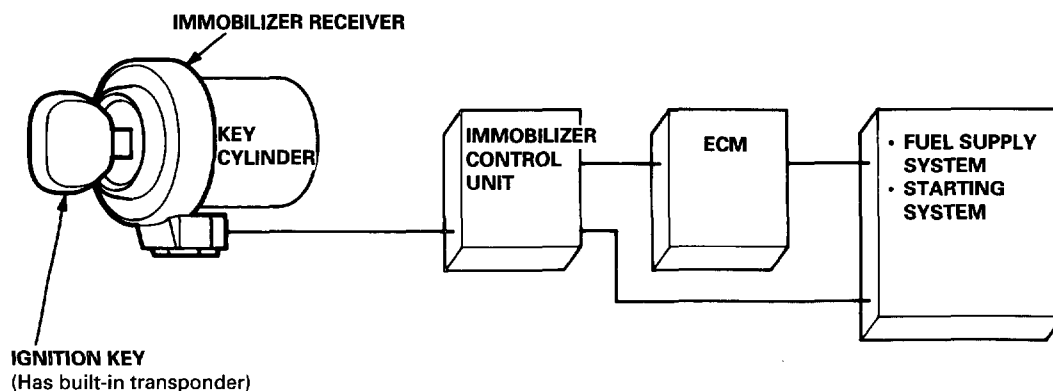
NOTE: This key cannot start the engine; do not use it except for rewriting the system. If someone tries to start the engine with the learning key, all master and valet keys must be relearned.



When the key is inserted in the ignition and turned to the (II) position, the immobilizer control unit sends power to the transponder through the receiver.

The transponder then sends a coded signal back through the receiver to the control unit.

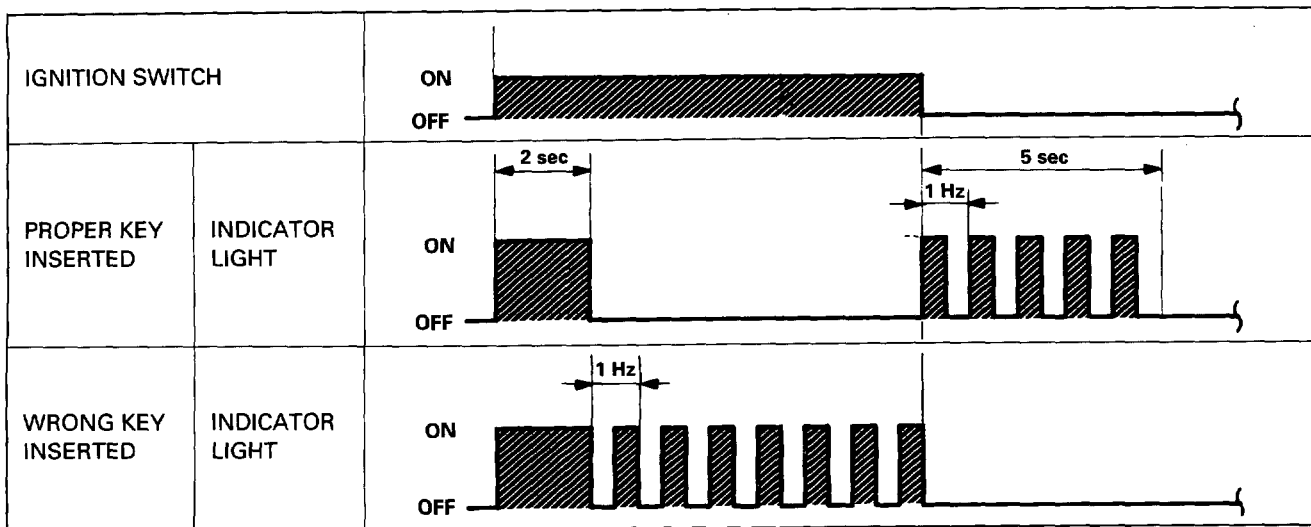
The control unit in turn signals the ECM, as well as the starter cut relay.





- If the proper key has been used, the starter cut relay will be energized, and the ECM will energize the fuel supply system. The immobilizer indicator light in the gauge assembly will simultaneously come on for about two seconds, then go off, thereby signaling that the immobilizer unit has recognized the code sent by the transponder.
- If the wrong key has been used whose code was not received or recognized by the unit, or which was not approved by Honda, the indicator light will come on for about two seconds, then it will go on blinking until ignition switch turn OFF.
- If the ignition switch is turned OFF, the indicator will blink for about five seconds to signal that the unit has been set correctly, then the indicator will go off.

**IMMOBILIZER INDICATOR LIGHT BLINKING PATTERN:**



(cont'd)

# Immobilizer System

## Description (cont'd)

### Problems and Replacement Parts:

Problem	Parts set	PGM-Tester required?
① Master or valet key has been lost or additional master or valet key is required.	A	YES
② All master and valet keys have been lost.	A x 2, and B	YES
③ Learning key has been lost.	B	YES
④ Immobilizer receiver does not work.	C	NO
⑤ Immobilizer control unit does not work.	B	YES
⑥ ECM does not work.	E	YES
⑦ Ignition switch does not work.	D	YES
⑧ Door key cylinder has been broken.	F (G)	NO (YES)

### Parts Set:

A: Blank key

E: ECM

B: Immobilizer control unit  
Master key  
Learning key

F: Door key cylinder  
Master keys for doors open or locked

C: Immobilizer receiver

G: Ignition switch with immobilizer receiver  
Immobilizer control unit  
Master key  
Learning key  
Door key cylinders  
Trunk key cylinder

D: Ignition switch with immobilizer receiver  
Immobilizer control unit  
Master key  
Learning key

### NOTE:

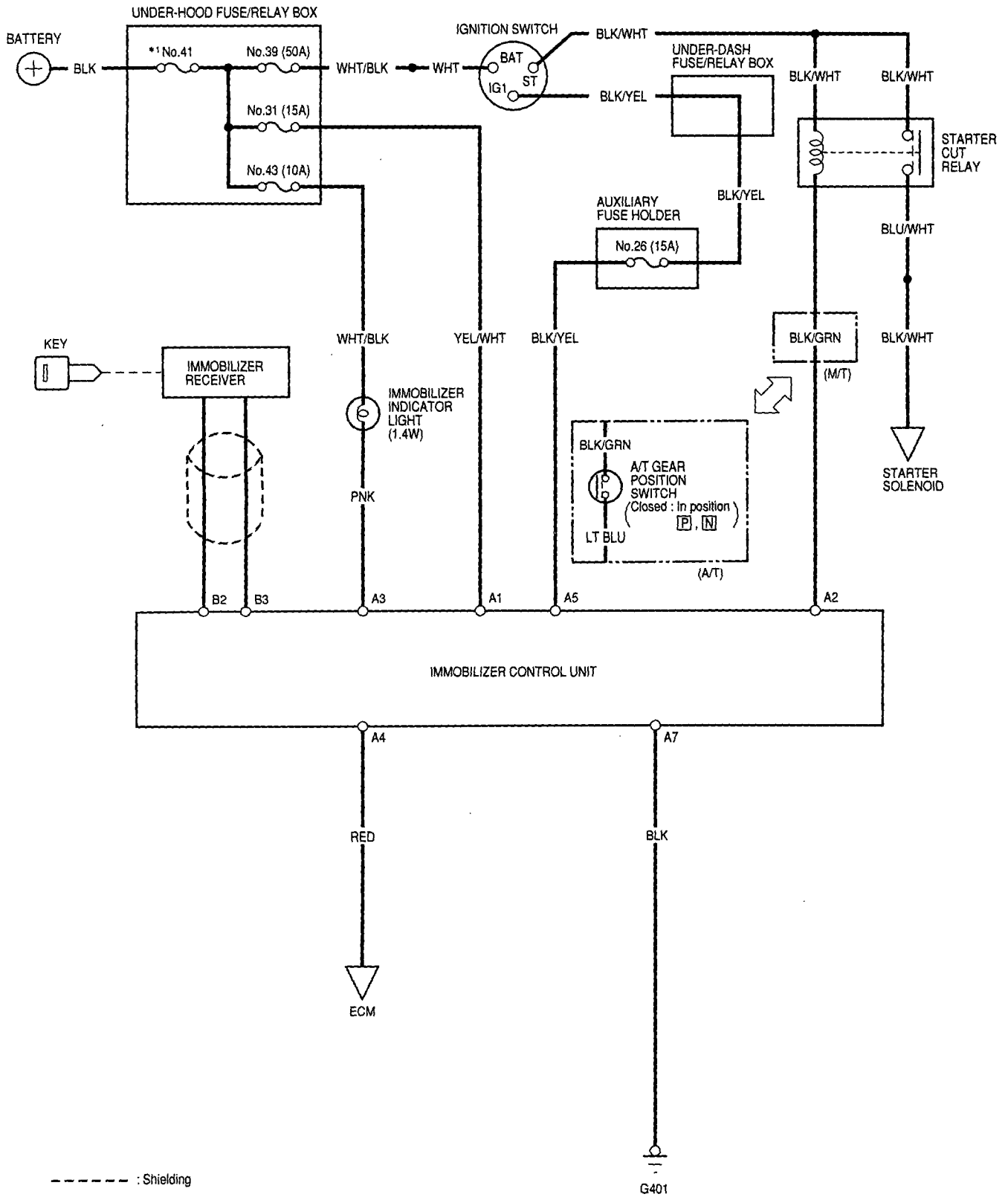
- The immobilizer system can store up to five key codes.
- If it is necessary to rewrite the immobilizer control unit to learn a new key, the dealer needs the customer's vehicle, all its master keys and valet keys, its learning key, and the Honda PGM Tester equipped with an immobilizer program card. Any key that is not learned during rewriting will no longer start the engine.
- If the customer has lost his key, and cannot start the engine, contact Honda Customer Relations or Roadside Assistance.

### Before Testing:

- Due to the action of the immobilizer system, the engine takes slightly more time to start than engines of vehicle without an immobilizer system.
- When the system is normal, and the proper key is inserted, the indicator light comes on for two seconds, then it will go off.
- If the indicator starts to blink after two seconds, or if the engine does not start, repeat the starting procedure.
  - If the engine still does not start, perform the immobilizer control unit input test and transponder and immobilizer receiver test.
- If all the input tests and transponder and immobilizer receiver test prove OK, check the ECM (see section 11).
  - If the ECM is OK, the immobilizer control unit must be faulty; replace the immobilizer control unit, master key and learning key together, and then rewrite the ECM with the Honda PGM Tester.
  - If the ECM is faulty, substitute a known-good ECM, and recheck. However, since the known-good ECM has a different code stored into it, it must be rewritten with the Honda PGM Tester. Otherwise, the engine will not start.



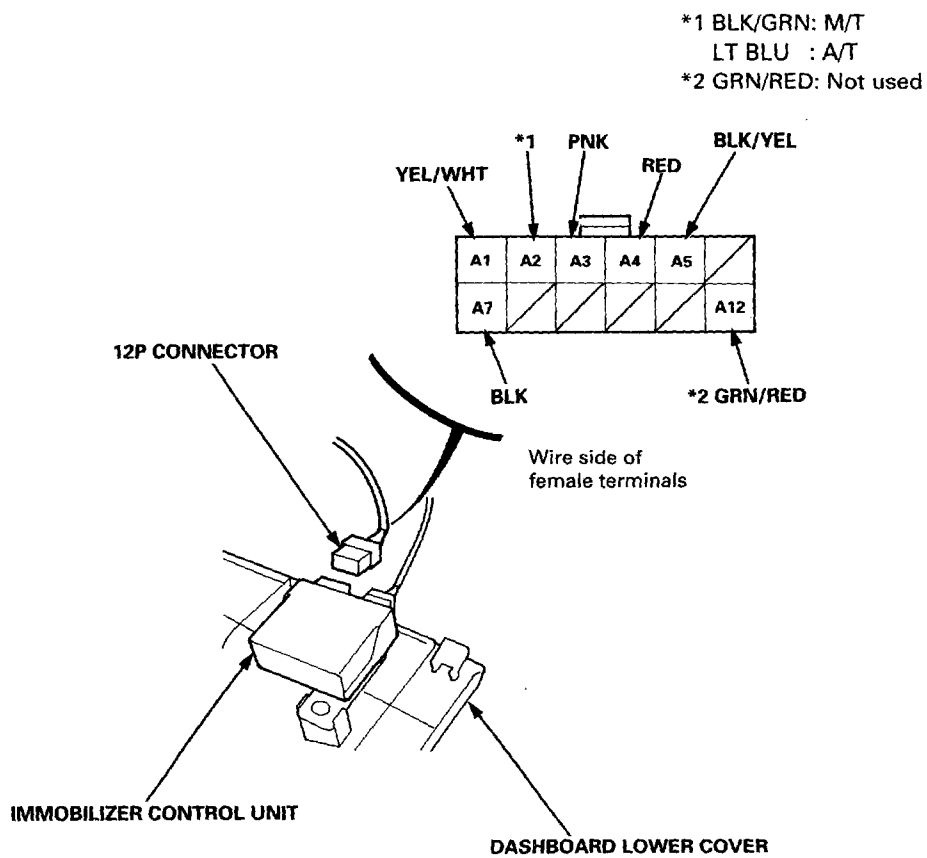
\*1 No.41 (100A) : B18C4 engine  
No.41 (80A) : Except B18C4 engine



# Immobilizer System

## Control Unit Input Test

1. Remove the dashboard lower cover.
2. Disconnect the 12P connector "A" from the immobilizer control unit.
3. Inspect the connector and socket terminals to be sure they are all making good contact.
  - If the terminals are bent, loose, or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, make the following input tests at the connector.
    - If any test indicates a problem, find and correct the cause, then recheck the system.
    - If all the input tests prove OK, check the immobilizer receiver and transponder (see page 23-G-10).



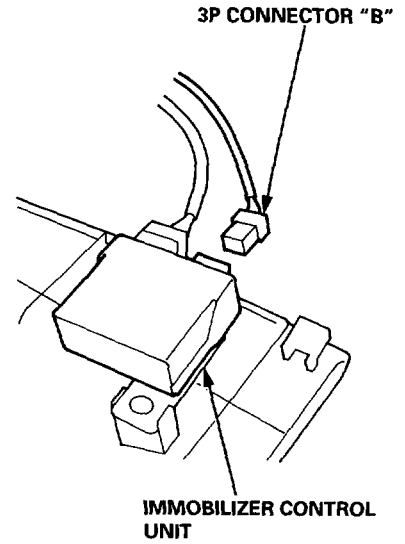
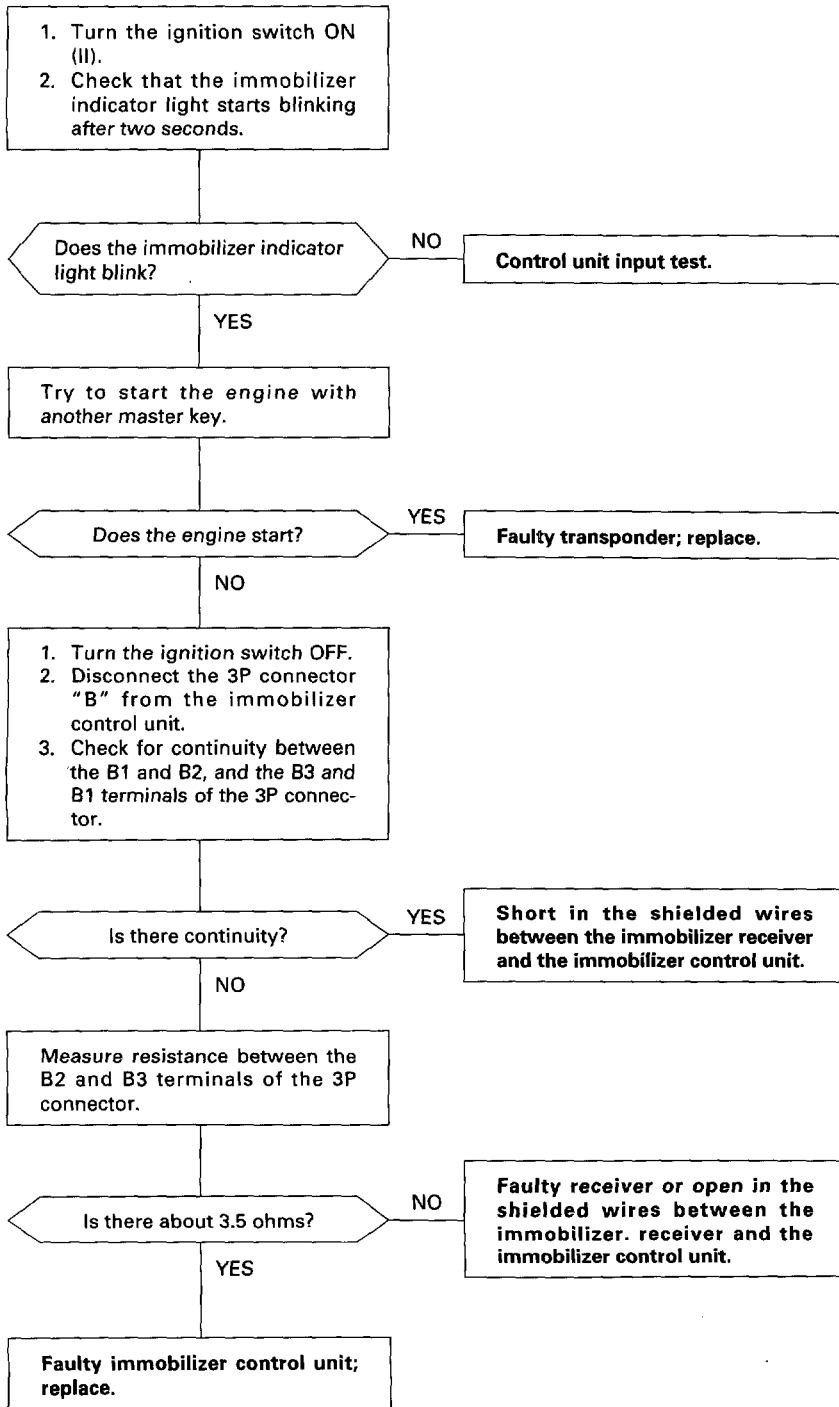


Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A7	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G401)</li> <li>• An open in the wire</li> </ul>
A1	YEL/WHT	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 31 (15 A) fuse in the under-hood fuse/relay box</li> <li>• An open in the wire</li> </ul>
A5	BLK/YEL	Ignition switch to ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 26 (15 A) fuse in the auxiliary fuse holder</li> <li>• An open in the wire</li> </ul>
A2	*1BLK/GRN	M/T: Ignition switch to START (III)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Faulty starter cut relay</li> <li>• Faulty A/T gear position switch</li> <li>• An open in the wire</li> </ul>
	*2LT BLU	A/T: Ignition switch to START (III) with shift lever in <b>P</b> or <b>N</b>		
A3	PNK	Under all conditions	Attach to ground: The immobilizer indicator light should come on.	<ul style="list-style-type: none"> <li>• Blown No. 43 (10 A) fuse in the under-hood fuse/relay box</li> <li>• Faulty gauge assembly</li> <li>• Blown bulb</li> <li>• An open in the wire</li> </ul>
A4	RED	Under all conditions	Check the continuity between the A4 terminal and No. 2 terminal of the ECM 22P connector. There should be continuity.	<ul style="list-style-type: none"> <li>• An open in the wire</li> </ul>

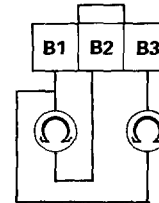
\*1: M/T \*2: A/T

# Immobilizer System

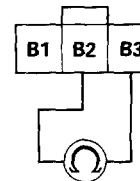
## Immobilizer Receiver and Transponder Test



Wire side of female terminals



Wire side of female terminals



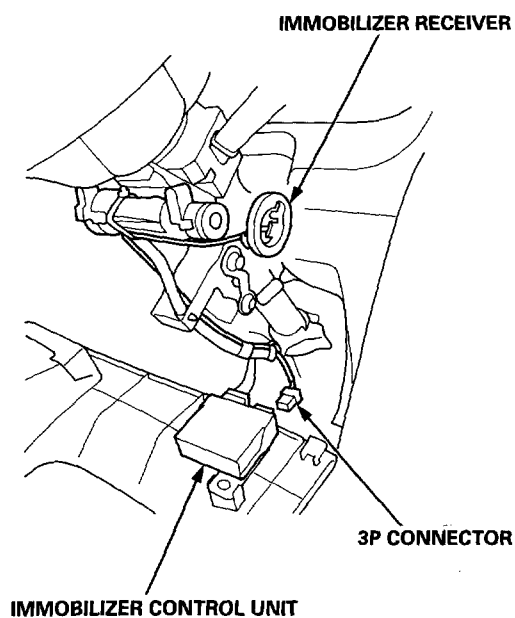
## Immobilizer Receiver Replacement

1. Remove the dashboard lower cover (see section 20).
2. Remove the steering column covers (see section 17).
3. Disconnect the 3P connector from the immobilizer control unit.

### **CAUTION**

Be careful not to damage the receiver and key cylinder.

4. Remove the receiver from the ignition key cylinder.



5. Install in the reverse order of removal.

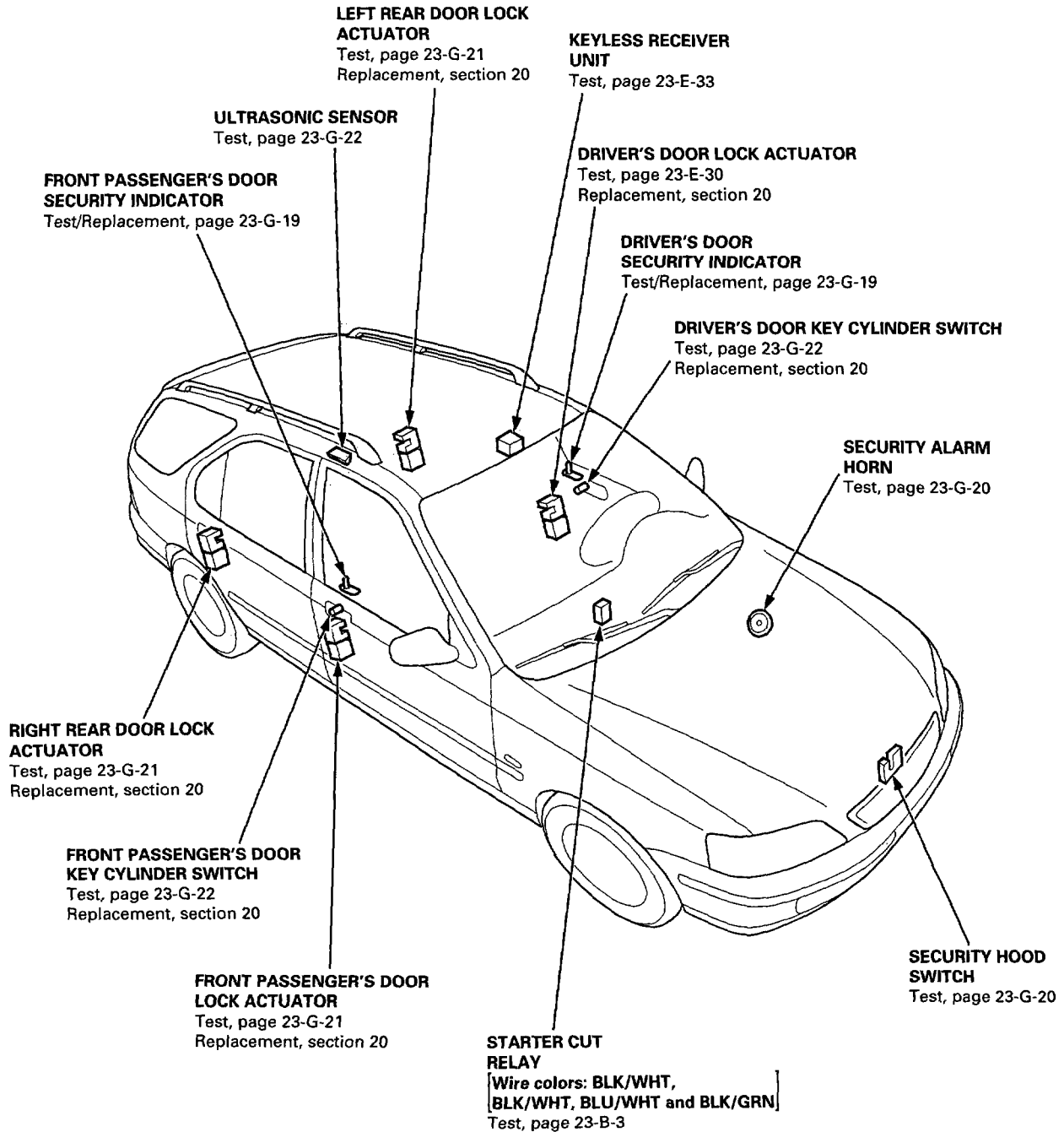
**NOTE:** As this harness serves as communication link, install it carefully.

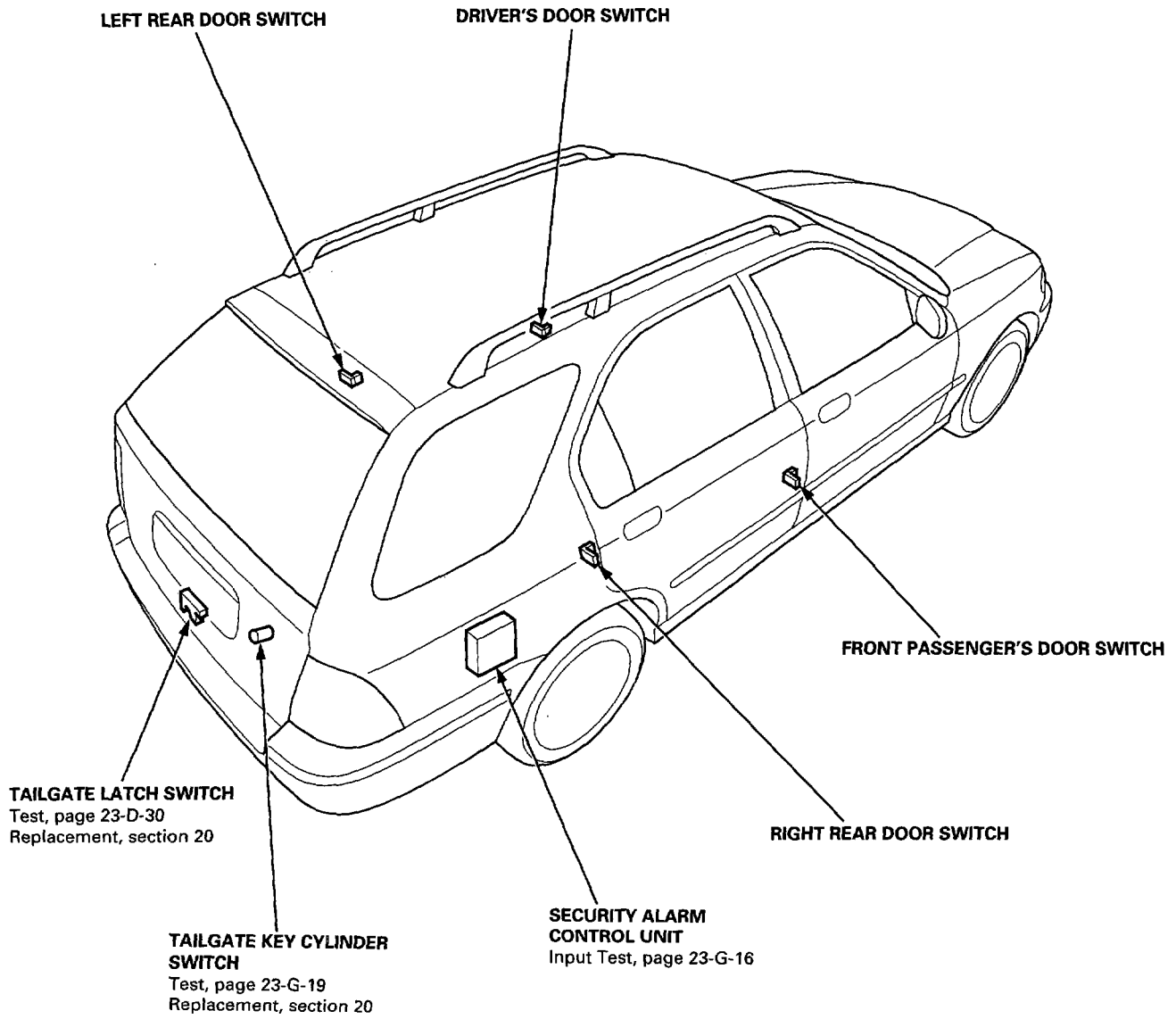
6. After replacement, check the immobilizer system.



# Security Alarm System (KG model: VTi)

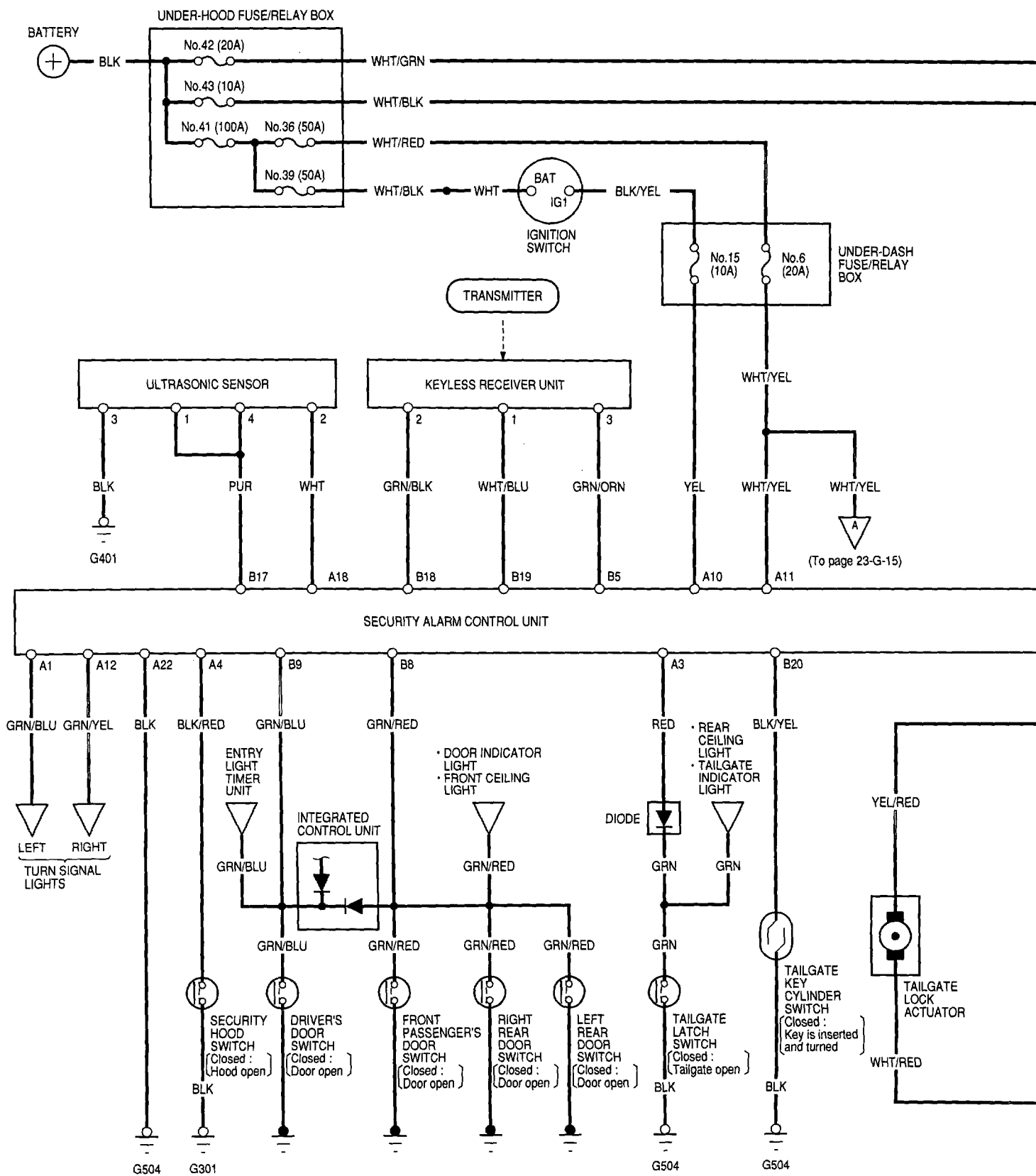
## Component Location Index

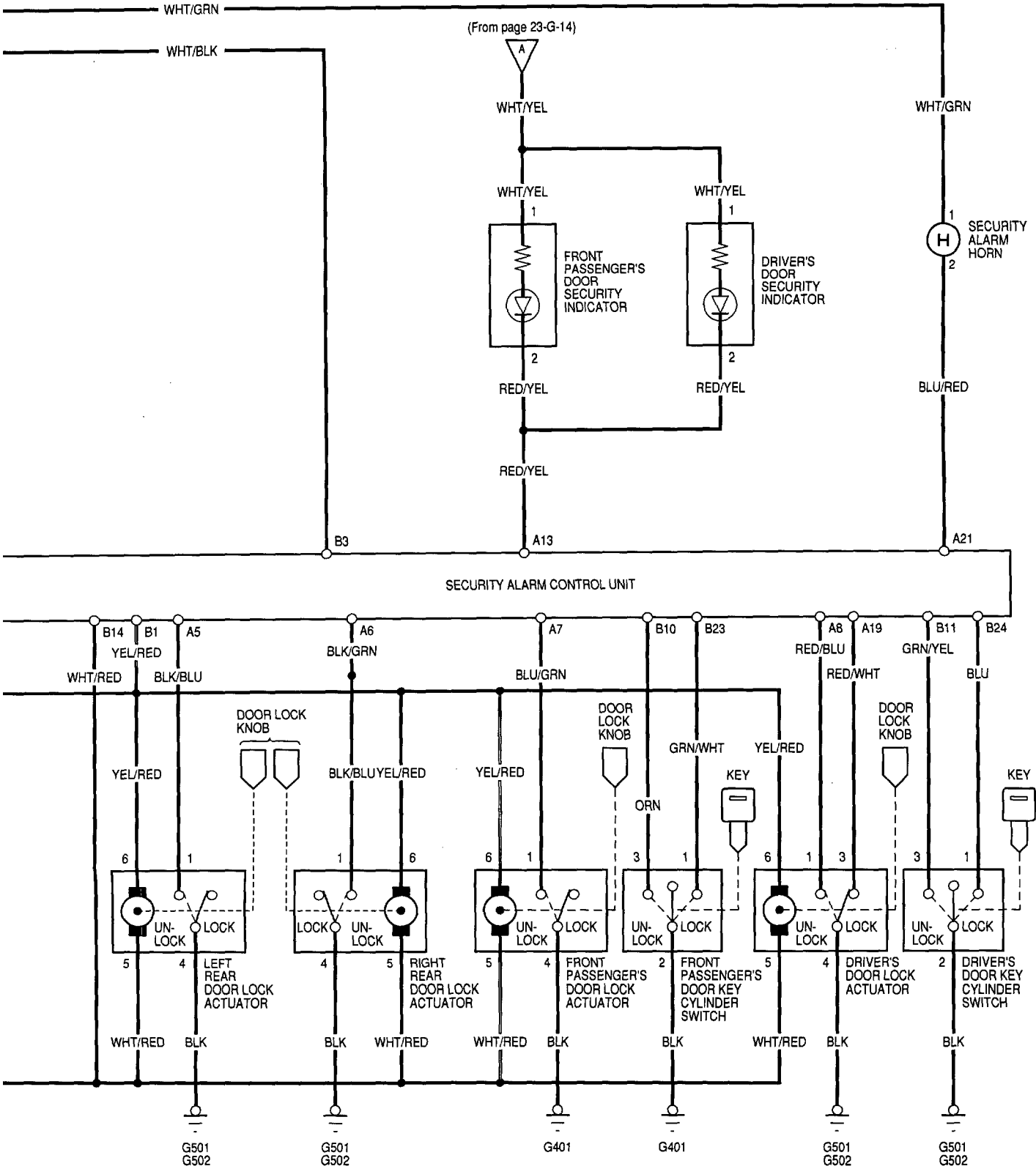




# Security Alarm System (KG model : VTi)

## Circuit Diagram

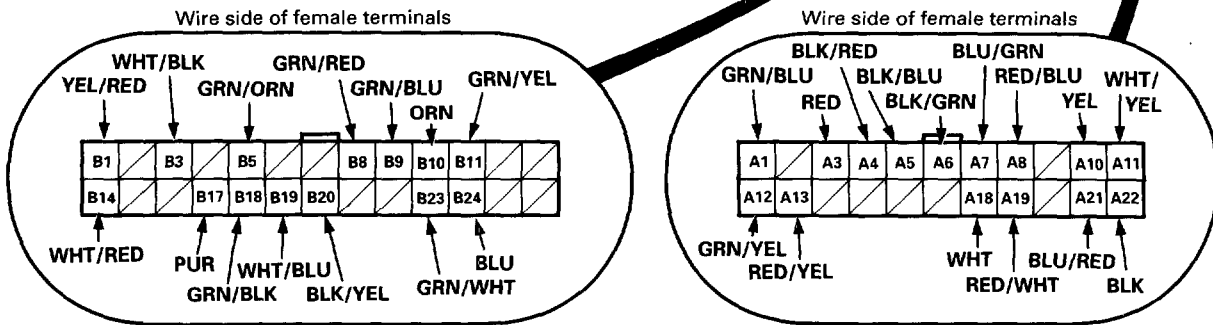
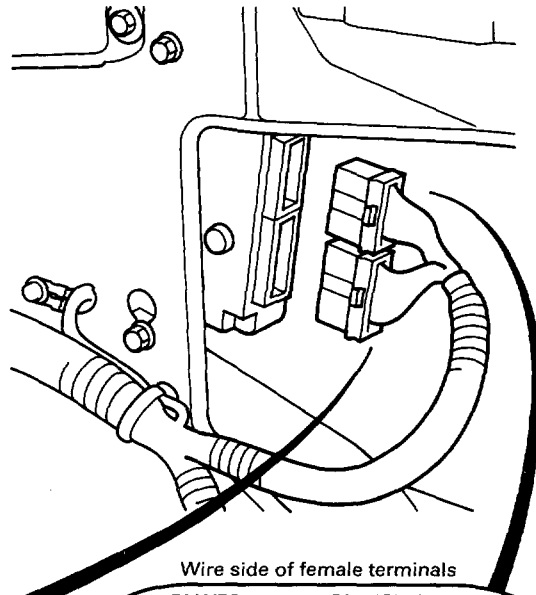




# Security Alarm System (KG model: VTi)

## Security Alarm Control Unit Input Test

1. Disconnect the 22P and 26P connectors from the control unit.
2. Inspect the connector and socket terminals to be sure they are all making good contact.
  - If the terminals are bent, loose or corroded, repair them as necessary, and recheck the system.
  - If the terminals look OK, make the following input tests at the connector.
    - If any test indicates a problem, find and correct the cause, then recheck the system.
    - If all the input tests prove OK, the control unit must be faulty; replace it.



Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A22	BLK	Under all conditions	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Poor ground (G504)</li> <li>• An open in the wire</li> </ul>
A11	WHT/YEL	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 6 (20 A) fuse in the under-dash fuse/relay box</li> <li>• An open in the wire</li> </ul>
A10	YEL	Ignition switch ON (II)	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 15 (10 A) fuse in the under-dash fuse/relay box</li> <li>• An open in the wire</li> </ul>
B3	WHT/BLK	Under all conditions	Check for voltage to ground: There should be battery voltage.	<ul style="list-style-type: none"> <li>• Blown No. 43 (10 A) fuse in the under-hood fuse/relay box</li> <li>• An open in the wire</li> </ul>
A13	RED/YEL	Under all conditions	Connect to ground: Security indicators should come on.	<ul style="list-style-type: none"> <li>• Blown No. 6 (20 A) fuse in the under-dash fuse/relay box</li> <li>• Faulty security indicator</li> <li>• An open in the wire</li> </ul>
A21	BLU/RED	Under all conditions	Connect to ground: Security alarm horn should sound.	<ul style="list-style-type: none"> <li>• Blown No. 42 (20 A) fuse in the under-hood fuse/relay box</li> <li>• Faulty security alarm horn</li> <li>• An open in the wire</li> </ul>

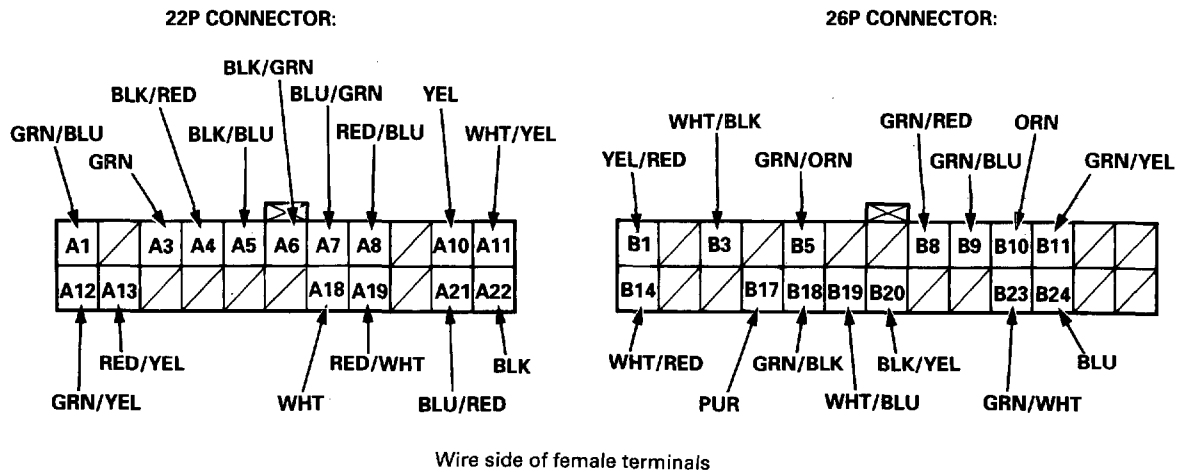


Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
A12	GRN/YEL	Connect battery power to the A12 terminal.	Right turn signal lights should come on as the battery is connected.	<ul style="list-style-type: none"> <li>• Poor ground (G201, G401, G501, G504)</li> <li>• An open in the wire</li> </ul>
A1	GRN/BLU	Connect battery power to the A1 terminal.	Left turn signal lights should come on as the battery is connected.	<ul style="list-style-type: none"> <li>• Poor ground (G301, G401, G501, G503)</li> <li>• An open in the wire</li> </ul>
B18	GRN/BLK	Under all conditions	Check for continuity in the wire between the keyless receiver unit and security alarm control unit.	• An open in the wire
B19	WHT/BLU	Under all conditions		
B5	GRN/ORN	Under all conditions		
A4	BLK/RED	Hood open	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Faulty security hood switch</li> <li>• Poor ground (G301)</li> <li>• An open in the wire</li> </ul>
B9	GRN/BLU	Driver's door open	Check for voltage to ground: There should be 1 V or less.	<ul style="list-style-type: none"> <li>• Faulty driver's door switch</li> <li>• An open in the wire</li> </ul>
B8	GRN/RED	Passenger's door open	Check for voltage to ground: There should be 1 V or less.	<ul style="list-style-type: none"> <li>• Faulty passenger's door switch</li> <li>• An open in the wire</li> </ul>
A3	RED	Tailgate open	Check for voltage to ground: There should be 1 V or less.	<ul style="list-style-type: none"> <li>• Faulty tailgate latch switch</li> <li>• Faulty diode</li> <li>• Poor ground (G504)</li> <li>• An open in the wire</li> </ul>
B20	BLK/YEL	Tailgate key cylinder switch in UNLOCK	Check for continuity to ground: There should be 1 V or less.	<ul style="list-style-type: none"> <li>• Faulty tailgate key cylinder switch</li> <li>• An open in the wire</li> </ul>
B24	BLU	Driver's door key cylinder switch in LOCK	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>• Faulty driver's door key cylinder switch</li> <li>• Poor ground (G501, G502)</li> <li>• An open in the wire</li> </ul>
B11	GRN/YEL	Driver's door key cylinder switch in UNLOCK		

(cont'd)

# Security Alarm System (KG model: VTi)

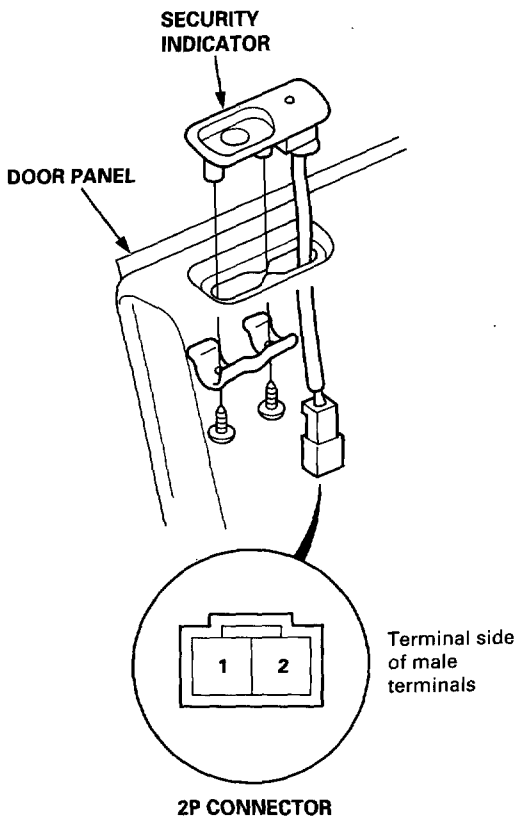
## Security Alarm Control Unit Input Test (cont'd)



Cavity	Wire	Test condition	Test: Desired result	Possible cause if result is not obtained
B23	GRN/WHT	Front passenger's door key cylinder switch in LOCK	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>Faulty front passenger's door key cylinder switch</li> <li>Poor ground (G401)</li> <li>An open in the wire</li> </ul>
B10	ORN	Front passenger's door key cylinder switch in UNLOCK		
A19	RED/WHT	Driver's door lock knob in LOCK	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>Faulty driver's door lock knob switch (built into the actuator)</li> <li>Poor ground (G501, G502)</li> <li>An open in the wire</li> </ul>
A8	RED/BLU	Driver's door lock knob in UNLOCK		
A7	BLU/GRN	Front passenger's door lock knob in UNLOCK	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>Faulty front passenger's door lock knob switch (built into the actuator)</li> <li>Poor ground (G401)</li> <li>An open in the wire</li> </ul>
A6	BLK/GRN	Right rear door lock knob in UNLOCK	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>Faulty right rear door lock knob switch (built into the actuator)</li> <li>Poor ground (G501, G502)</li> <li>An open in the wire</li> </ul>
A5	BLK/BLU	Left rear door lock knob in UNLOCK	Check for continuity to ground: There should be continuity.	<ul style="list-style-type: none"> <li>Faulty left rear door lock knob switch (built into the actuator)</li> <li>Poor ground (G501, G502)</li> <li>An open in the wire</li> </ul>
B14 and B1	WHT/RED and YEL/RED	Connect the B14 and A11 terminals and the B1 and A22 terminals momentarily	Check the door and tailgate lock operation: All doors and tailgate should lock.	<ul style="list-style-type: none"> <li>Faulty actuator</li> <li>An open in the wire</li> <li>Disconnected or obstructed door or tailgate lock rod/linkage</li> </ul>
		Connect the B1 and A11 terminals and the B14 and A22 terminals momentarily	Check the door and tailgate lock operation: All doors and tailgate should unlock.	

## Security Indicator Test/ Replacement

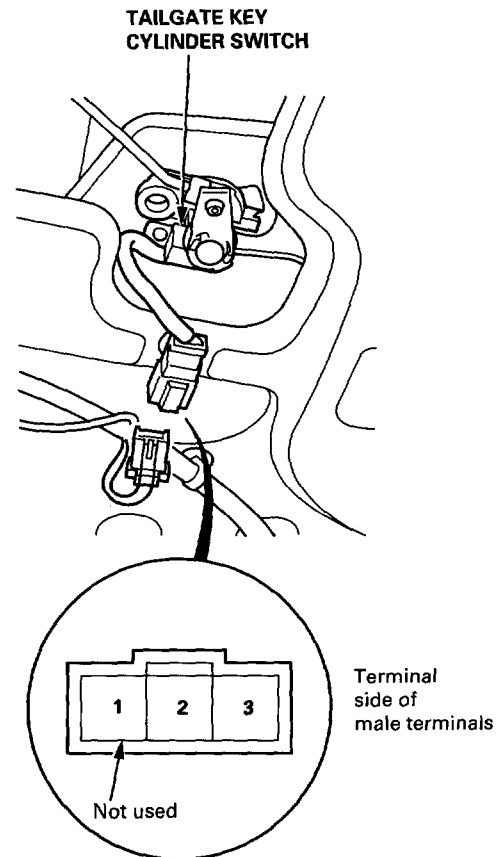
1. Remove the front door panel (see section 20).
2. Remove the two screws, and disconnect the 2P connector from the security indicator.
3. Remove the security indicator from the door panel.



4. The LED should come on when power is connected to terminal No. 1 and ground is connected to terminal No. 2.  
If the LED does not come on, replace it.

## Tailgate Key Cylinder Switch Test

1. Open the tailgate.
2. Remove the tailgate trim panel (see section 20).
3. Disconnect the 3P connector from the key cylinder switch.



4. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	2	3
LOCK (Closed)		
UNLOCK (Open)	○	○

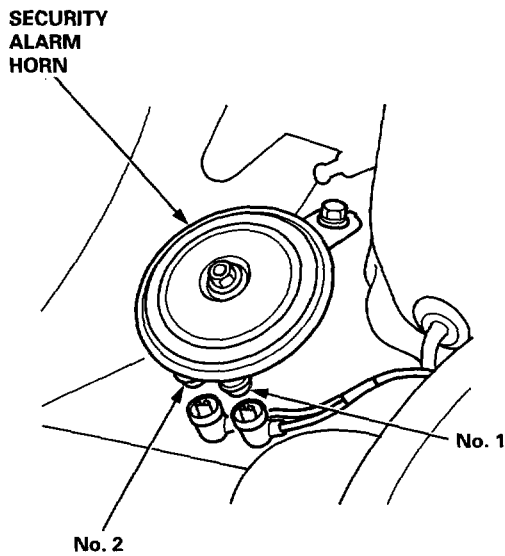
5. If it fails to work, replace the trunk key cylinder switch (see section 20).



# Security Alarm System (KG model: VTi)

## Security Alarm Horn Test

1. Open the hood and disconnect the terminals from the security alarm horn.
2. Test the horn by connecting battery power to one terminal and grounding the other. The horn should sound.



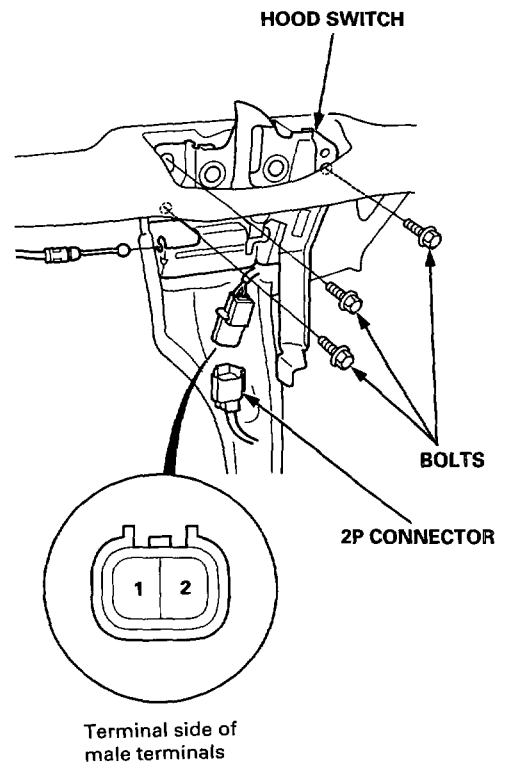
3. Replace the horn if it fails to sound.

## Hood Switch Test/Replacement

1. Open the hood.
2. Disconnect the 2P connector from the hood switch.
3. Check for continuity between the terminals No. 1 and No. 2 in each switch position according to the table.

Terminal	1	2
Position		
Hood open	○—○	○—○
Hood closed		

4. If the hood switch does not work properly remove the two bolts and replace the switch.

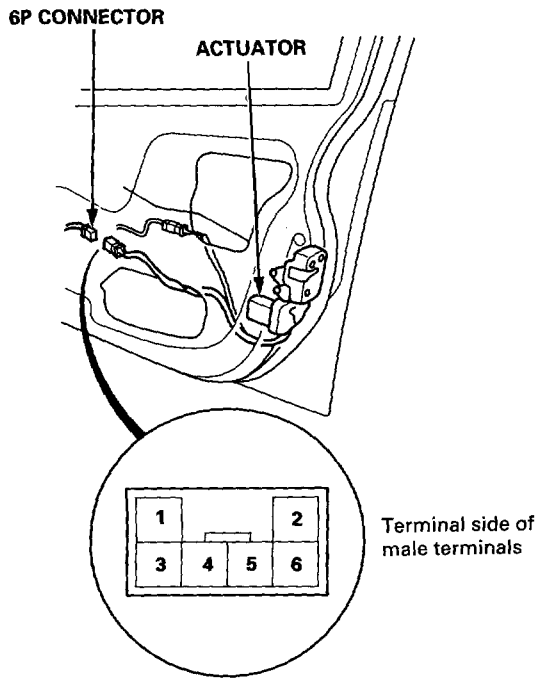




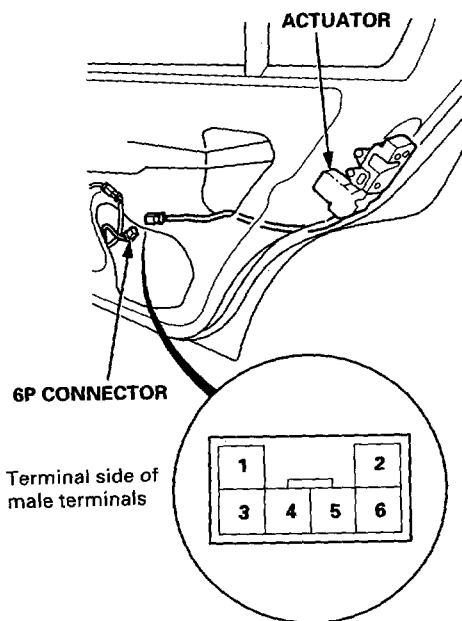
## Passenger's Door Lock Actuator Test

1. Remove the passenger's door panel (see section 20).
2. Disconnect the 6P connector from the door lock actuator.

### Front Passenger's Door:



### Rear Passenger's Door:



3. Check for continuity between the terminals in each switch position according to the table.

Terminal	1	4
Position		
LOCK		
UNLOCK	○—○	○—○

### CAUTION

To prevent damage to the actuator, apply battery voltage only momentarily.

4. Check actuator operation by connecting power and ground according to the table.

Terminal	6	5
Position		
LOCK	⊖	⊕
UNLOCK	⊕	⊖

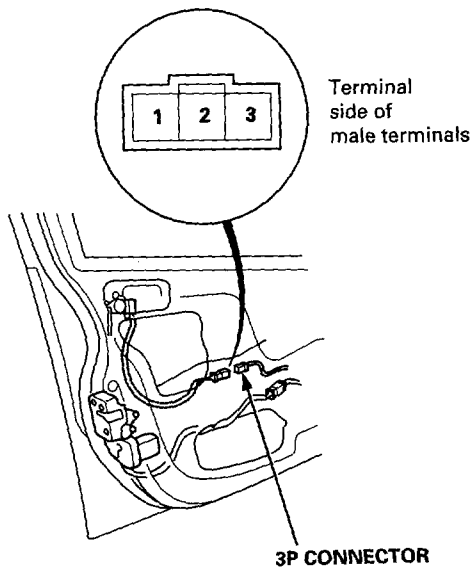
5. If the actuator does not work properly, replace it.

# Security Alarm System (KG model: VTi)

## Door Key Cylinder Switch Test

1. Remove the door panel (see section 20).
2. Disconnect the 3P connector from the key cylinder switch.

NOTE: Driver's side is shown, front passenger's side is similar.

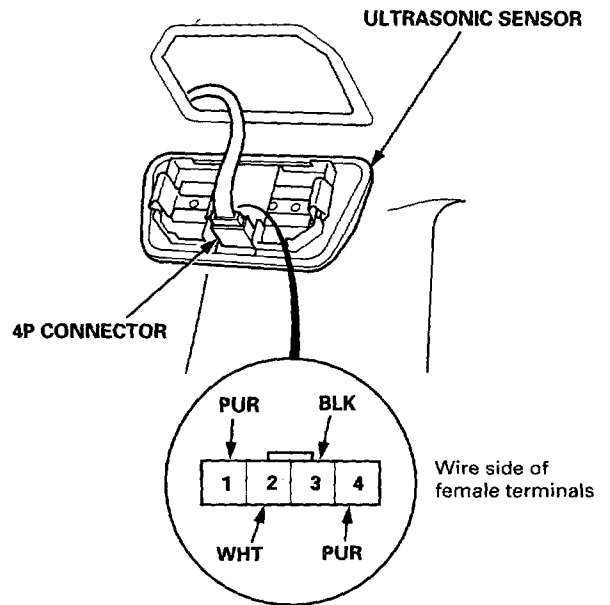


3. Check for continuity between the terminals in each switch position according to the table.

Terminal Position	1	2	3
LOCK	○	○	
UNLOCK		○	○

## Ultrasonic Sensor Test

1. Remove the ultrasonic sensor from the headliner.



2. Check for continuity between the No. 3 (BLK) terminal and body ground. There should be continuity.
  - If there is no continuity, check for:
    - an open in the BLK wire.
    - poor ground (G401).
3. Connect the positive (+) probe to the No. 1 (PUR) or No. 4 (PUR) and the negative (-) probe to the No. 3 (BLK) terminals.
  - If there is momentary output voltage of about 1 V.
  - If there is no voltage, check for an open in the No. 1 (PUR) or No. 4 (PUR) wire.
4. Check for voltage between the No. 2 (WHT) terminal of the ultrasonic sensor and the No. 18 terminal of the 22 P connector of the security alarm control unit while making the flow of air with your hands within the reach of the ultrasonic sensor: There should be approx. 5 V.
  - If there is no voltage check for:
    - an open in the WHT wire.
    - security alarm control unit.

## Restraints

<b>Seat Belts</b> .....	24-1
<b>Supplemental Restraint System</b> .....	24-11

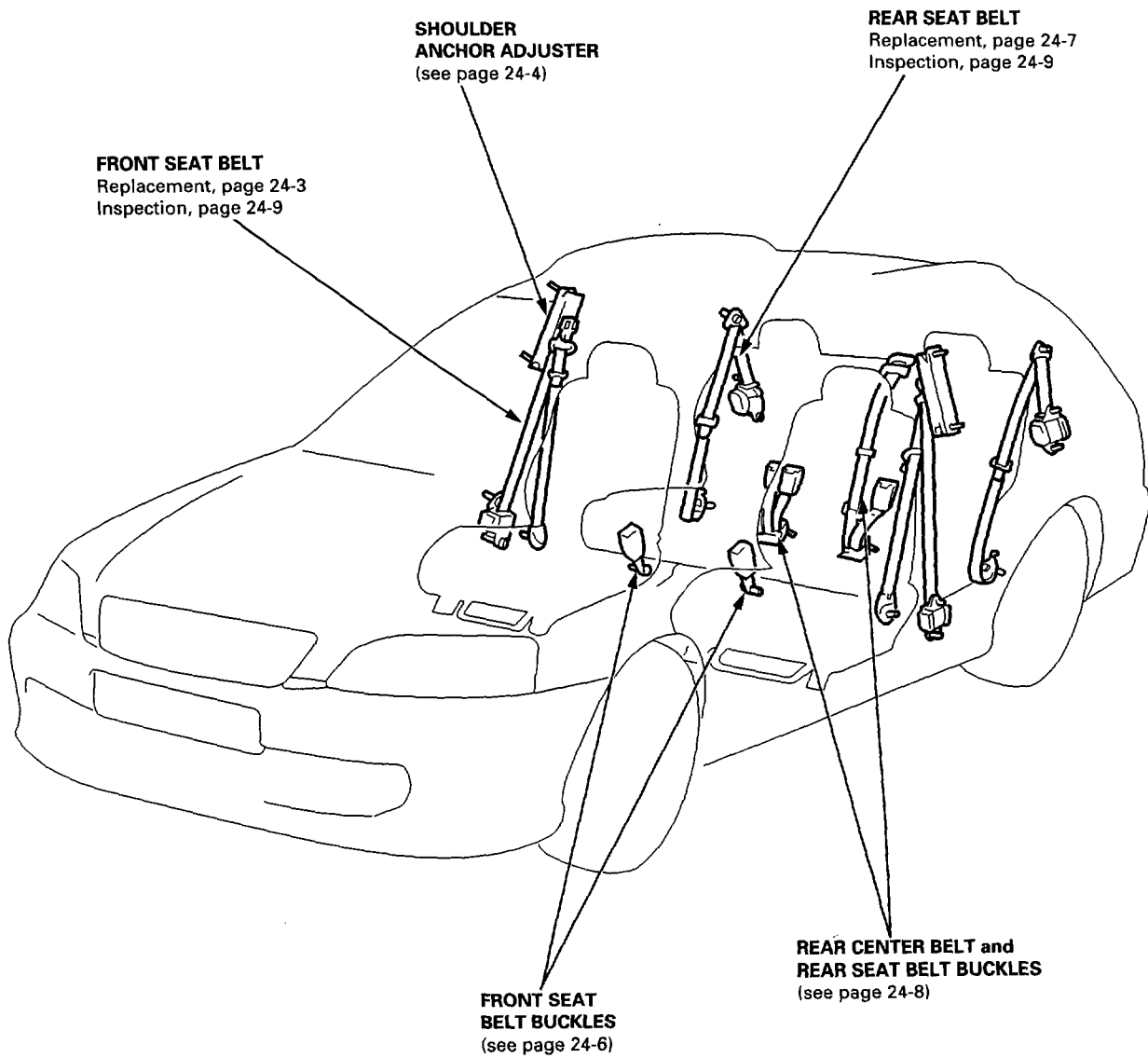
### Seat Belts

Component Location Index .....	24-2
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# Seat Belts

## Component Location Index





# Front Seat Belt Replacement

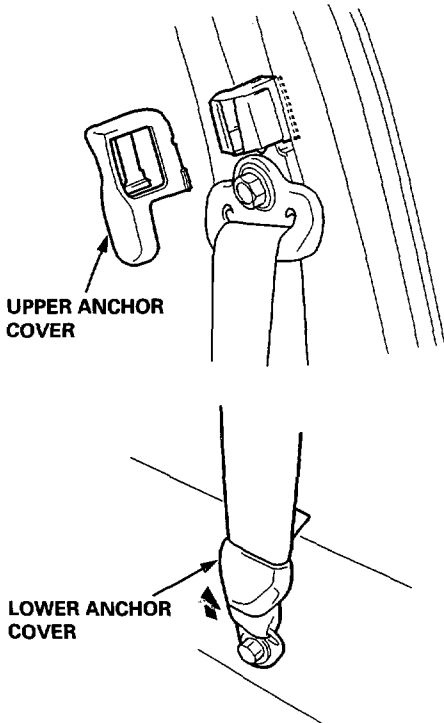
**CAUTION**

- Before trying to remove the retractor with tensioner, first set the sensor lock pin to LOCK position.
- Be careful not to bump the area around the retractor with tensioner. The tensioner could accidentally trigger and cause damage or injuries.
- Carefully inspect the retractor with tensioner before installing it. Do not install the retractor with tensioner that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.
- The upper anchor bolt must be removed before you remove the retractor with tensioner.

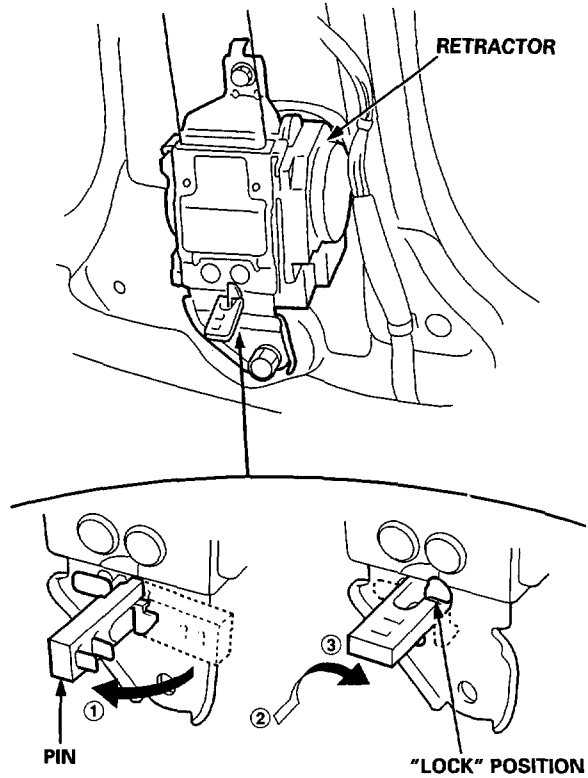
**NOTE:** Check the front seat belts for damage, and replace them if necessary. Be careful not to damage them during removal and installation.

### Front seat belt:

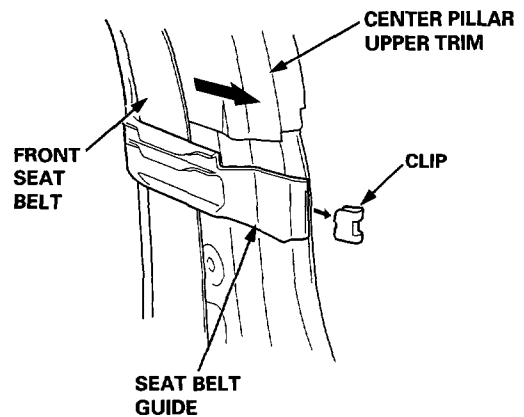
1. Slide the front seat forward fully.
2. Remove (see section 20):
  - Front side trim
  - Rear side trim
  - Center pillar lower trim panel
3. Remove the upper anchor cover, and pull the lower anchor cover back.



4. Set the sensor lock pin of the retractor to LOCK position.
  - 1 Pull up (①) the pin.
  - 2 Press down (②) and turn (③) the pin.



5. Remove the clip, and release the front seat belt from the seat belt guide portion of the center pillar upper trim.

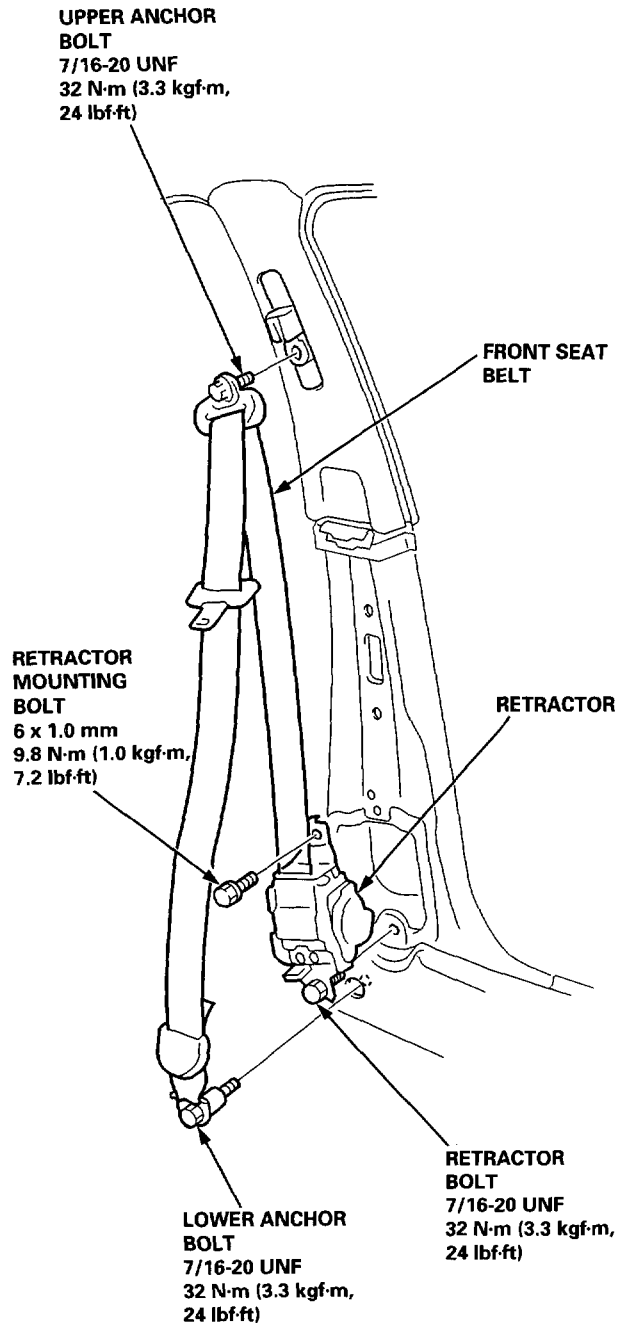


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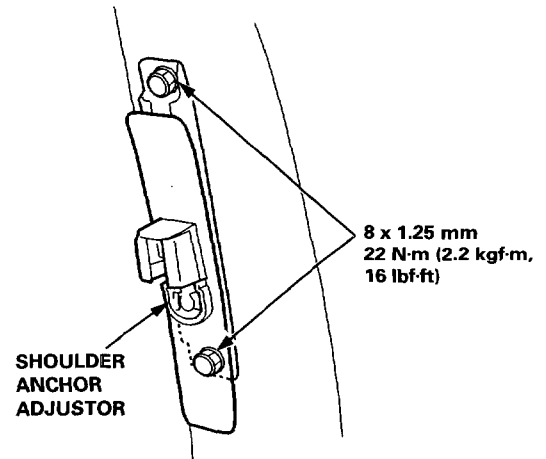
# Seat Belts

## Front Seat Belt Replacement (cont'd)

6. Remove the upper anchor bolt and lower anchor bolt, the retractor mounting bolt, the retractor bolt, and remove the front seat belt and retractor.

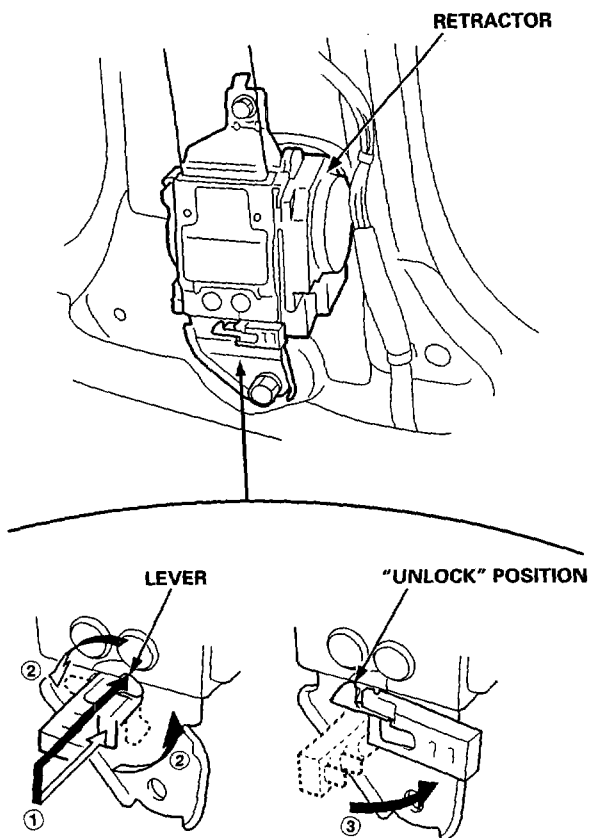


7. Remove the front and rear door trim as necessary (see section 20).
8. Remove the center pillar upper trim (see section 20).
9. Remove the shoulder anchor adjuster.

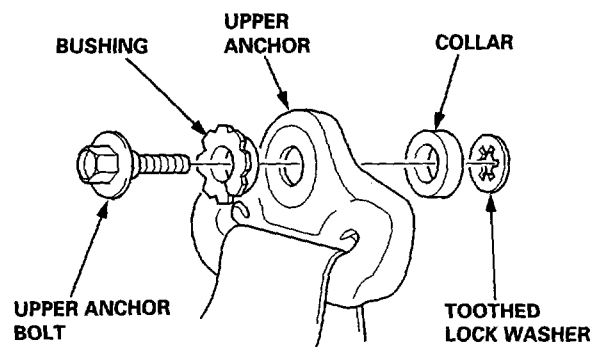




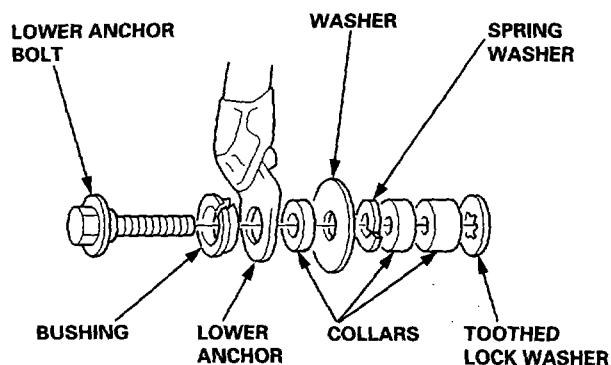
10. Install in the reverse order of removal, and note these items:
- Apply liquid thread lock to the upper anchor bolt before reinstallation.
  - Check that the retractor locking mechanism functions as described on page 24-9.
  - Assemble the washers, collar and bushing on the upper and lower anchor bolts as shown.
  - Before installing the anchor bolts, make sure there are no twists or kinks in the front seat belt.
  - After reinstalling the retractor, disengage its sensor lock.
    - 1 Press down (①) and turn (②) the lever.
    - 2 Place (③) the pin down.



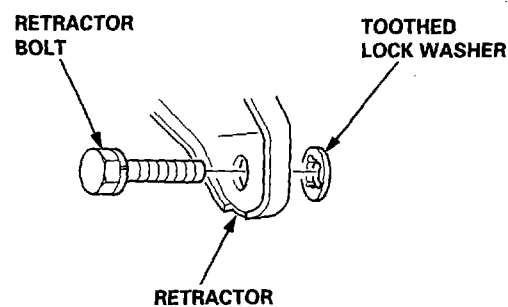
#### Upper anchor bolt construction:



#### Lower anchor bolt construction:



#### Retractor bolt construction:



(cont'd)

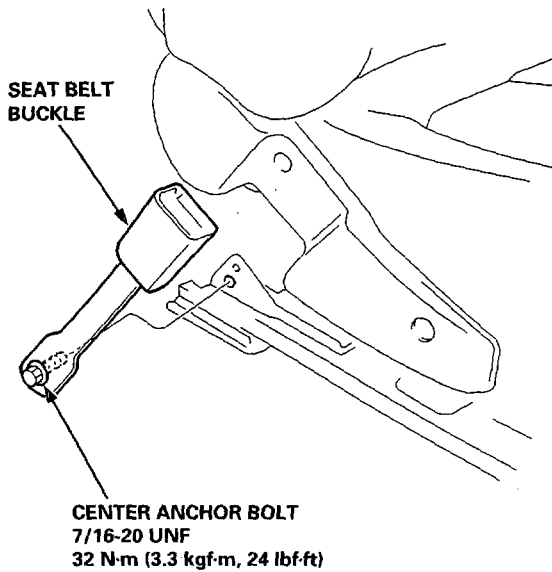


# Seat Belts

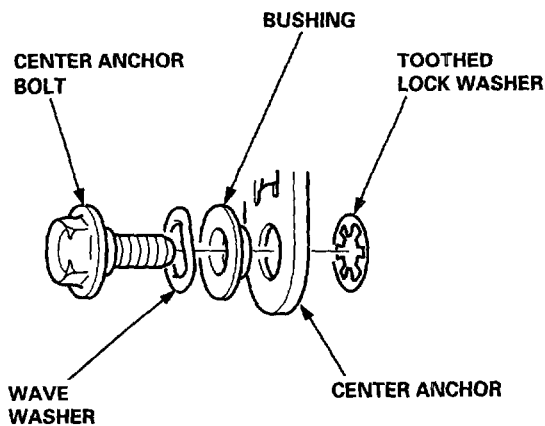
## Front Seat Belt Replacement (cont'd)

### Seat belt buckles:

1. Remove the rear console (see section 20).
2. Slide the front seat until you can remove the center anchor bolt.
3. Remove the center anchor bolt, and remove the seat belt buckle.



### Center anchor bolt construction:



4. Install in the reverse order of removal, and note these items:
  - Apply liquid thread lock to the center anchor bolt before reinstallation.
  - Assemble the washers and bushing on the center anchor bolt as shown.



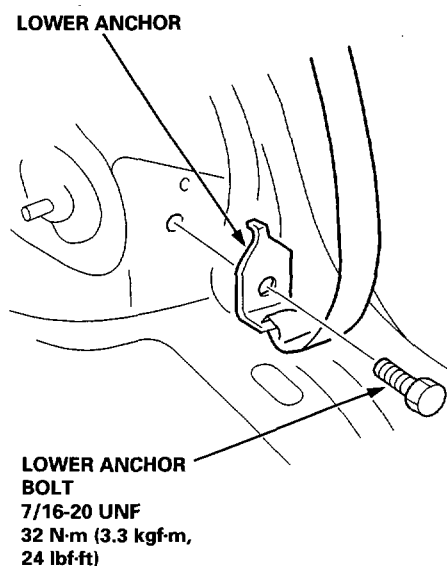
## Rear Seat Belt Replacement

**NOTE:** Check the rear seat belts for damage, and replace them if necessary. Be careful not to damage them during removal and installation.

### Rear seat belt:

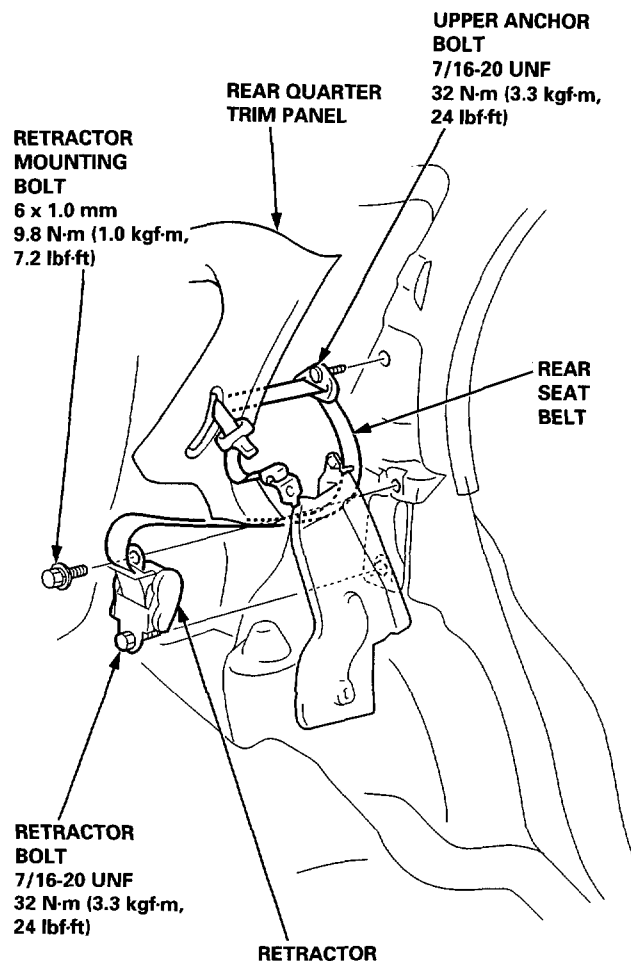
1. Remove (see section 20):
  - Rear seat-back
  - Rear side trim
  - Seat side trim
  - Tonneau cover
  - Cargo floor lid
  - Rear trim panel
  - Rear side upper trim
  - Rear side trim panel

2. Remove the lower anchor bolt.



3. Remove the rear door trim as necessary, and remove the rear quarter trim panel (see section 20).

4. Remove the upper anchor bolt, the retractor mounting bolt, the retractor bolt, and remove the rear seat belt and retractor.



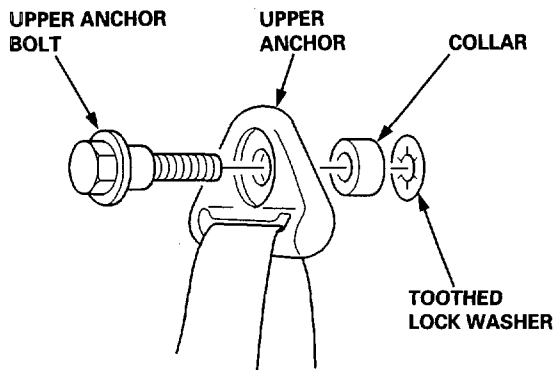
(cont'd)

# Seat Belts

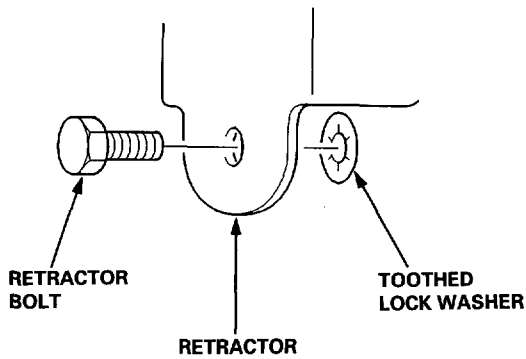
## Rear Seat Belt Replacement (cont'd)

5. Install in the reverse order of removal, and note these items:
  - Apply liquid thread lock to the upper and lower anchor bolts, and the retractor bolt before reinstallation.
  - Check that the retractor locking mechanism functions as described on page 24-9.
  - Assemble the collar on the upper anchor bolt as shown.
  - Before installing the anchor bolts, make sure there are no twists or kinks in the rear seat belt.

### Upper anchor bolt construction:

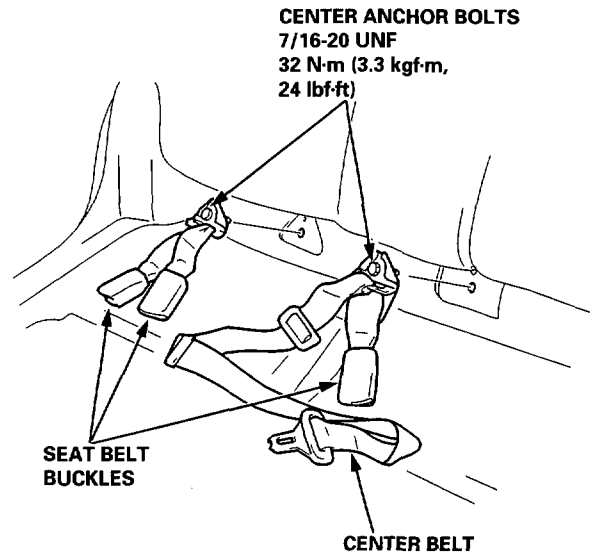


### Retractor bolt construction:

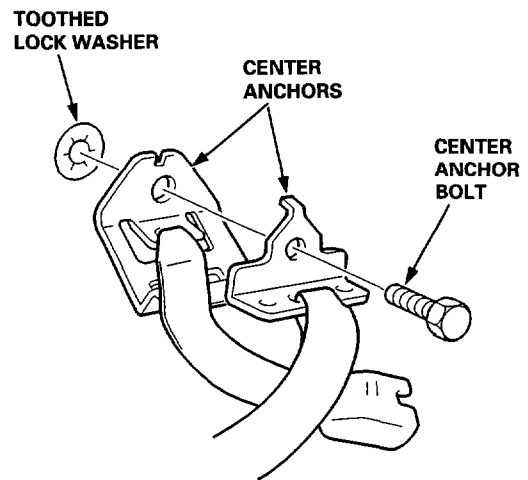


### Center belt and seat belt buckles:

1. Fold the rear seat cushion forward.
2. Remove the center anchor bolts, and remove the center belt and seat belt buckles.



### Center anchor bolt construction:



3. Install in the reverse order of removal, and note these items:
  - Apply liquid thread lock to the center anchor bolts before reinstallation.
  - Make sure there are no twists or kinks in the center belt.



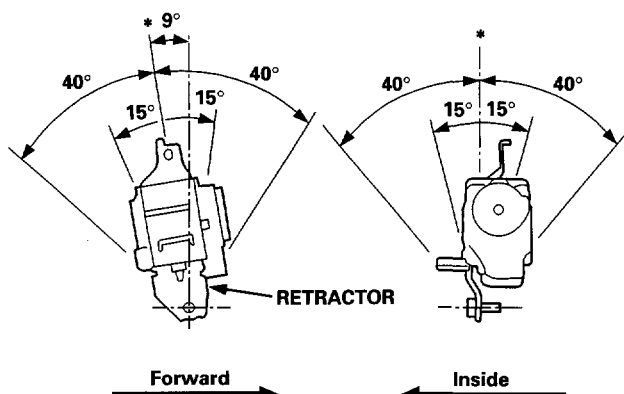
## Inspection

### Retractor:

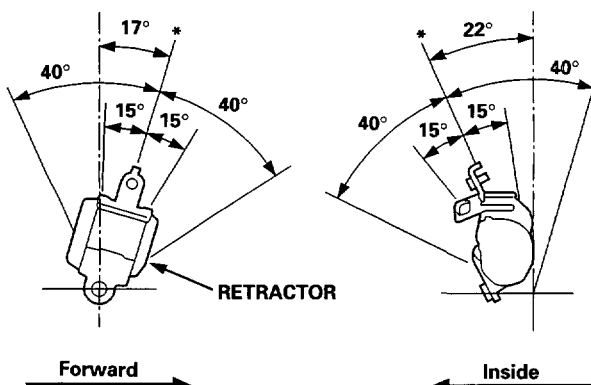
1. Before installing the retractor, check that the seat belt can be pulled out freely.
2. Make sure that the seat belt does not lock when the retractor is leaned slowly up to  $15^\circ$  from the mounted position. The seat belt should lock when the retractor is leaned over  $40^\circ$ . Do not attempt to disassemble the retractor.

### Front:

\*: Mounted Position



### Rear:



3. Replace the seat belt with a new one if there is any abnormality.

### In-vehicle:

1. Check that the seat belt is not twisted or caught on anything.
2. After installing the anchors, check for free movement on the anchor bolts. If necessary, remove the anchor bolts and check that the washers and other parts are not damaged or improperly installed.
3. Check the seat belts for damage or discoloration. Clean with a shop towel if necessary. Use only soap and water to clean.

NOTE: Dirt build-up in the metal loops of the upper anchors can cause the seat belts to retract slowly. Wipe the inside of the loops with a clean cloth dampened in isopropyl alcohol.

4. Check that the seat belt does not lock when pulled out slowly. The seat belt is designed to lock only during a sudden stop or impact.
5. Make sure that the seat belt will retract automatically when released.
6. Replace the seat belt with a new one if there is any abnormality.

## Supplemental Restraint System (SRS)

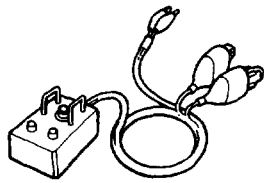
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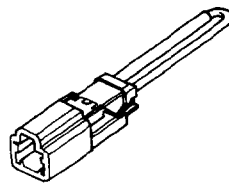
# Special Tools

Ref. No.	Tool Number	Description	Qty	Remark
①	07HAZ - SG00500	Deployment Tool	1	
②	07PAZ - 0010100	SCS Short Connector	1	
③	07SAZ - TB4011A	SRS Inflator Simulator	1	
④	07TAZ - SZ5011A	SRS Simulator Lead C	1	
⑤	07TAZ - SZ50200	SRS Service Connector (2 Ω)	1	
⑥*	07TAZ - 001020A	Backprobe Adapter, 17 mm	2	

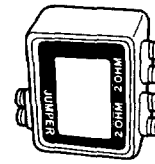
\*: Use with the staking patch cords from T/N 07SAZ - 001000A, Backprobe Set.



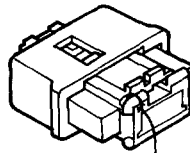
①



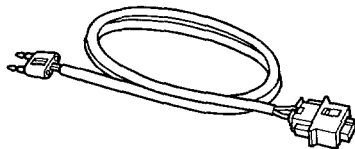
②



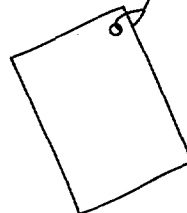
③



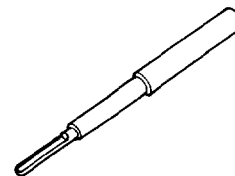
⑤



④



⑥

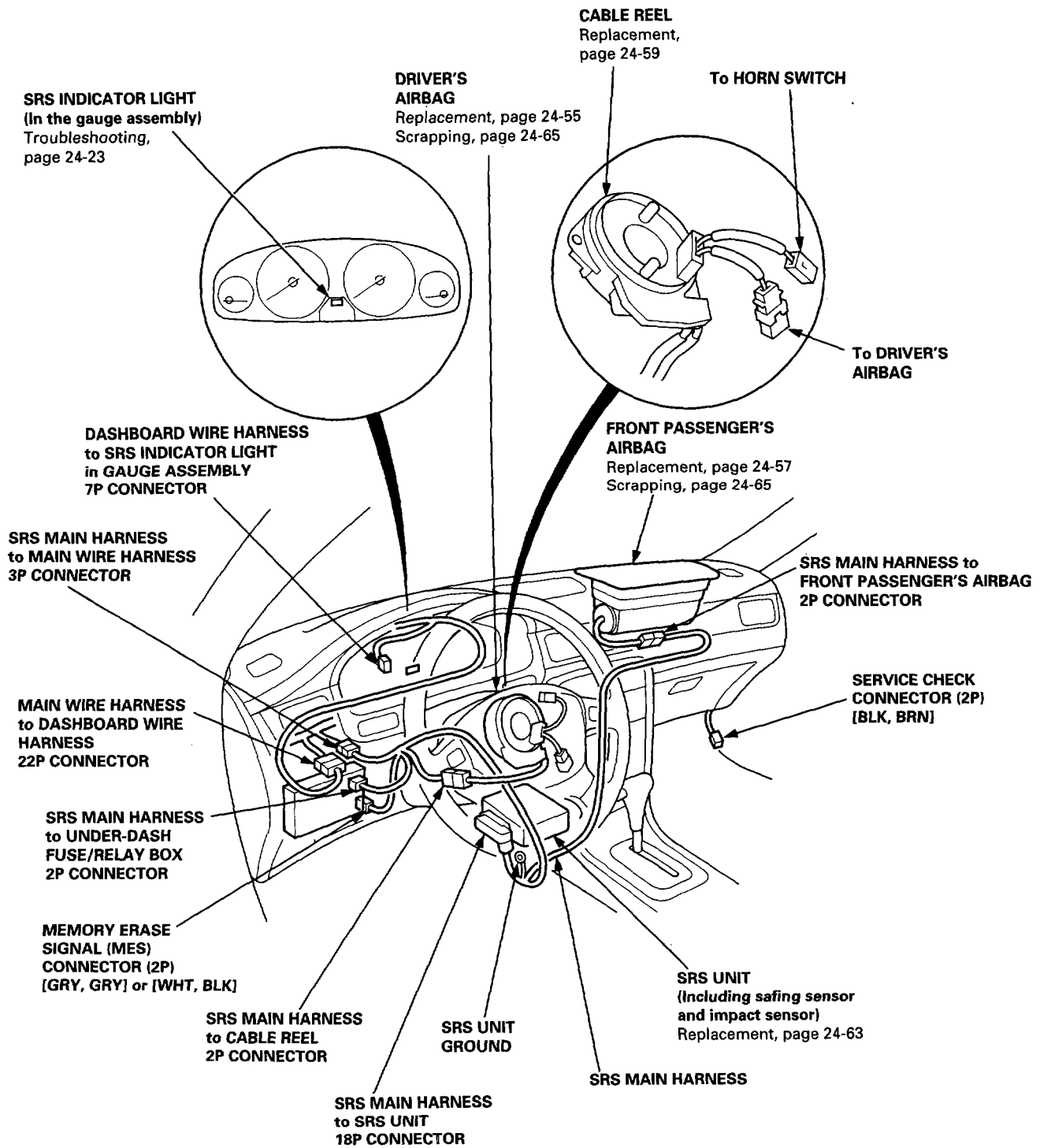


NOTE: The thing used can be done by connecting SRS Inflator Simulator, T/N 07SAZ - TB4011A, and SRS Simulator Lead C, T/N 07TAZ - SZ5011A, as substitution of SRS Service Connector, 2 Ω, T/N 07TAZ-SZ50200. When the SRS Service Connector (2 Ω), T/N 07TAZ - SZ50200, is called for, connect the lead to one of the simulator's "2 Ω" jacks.



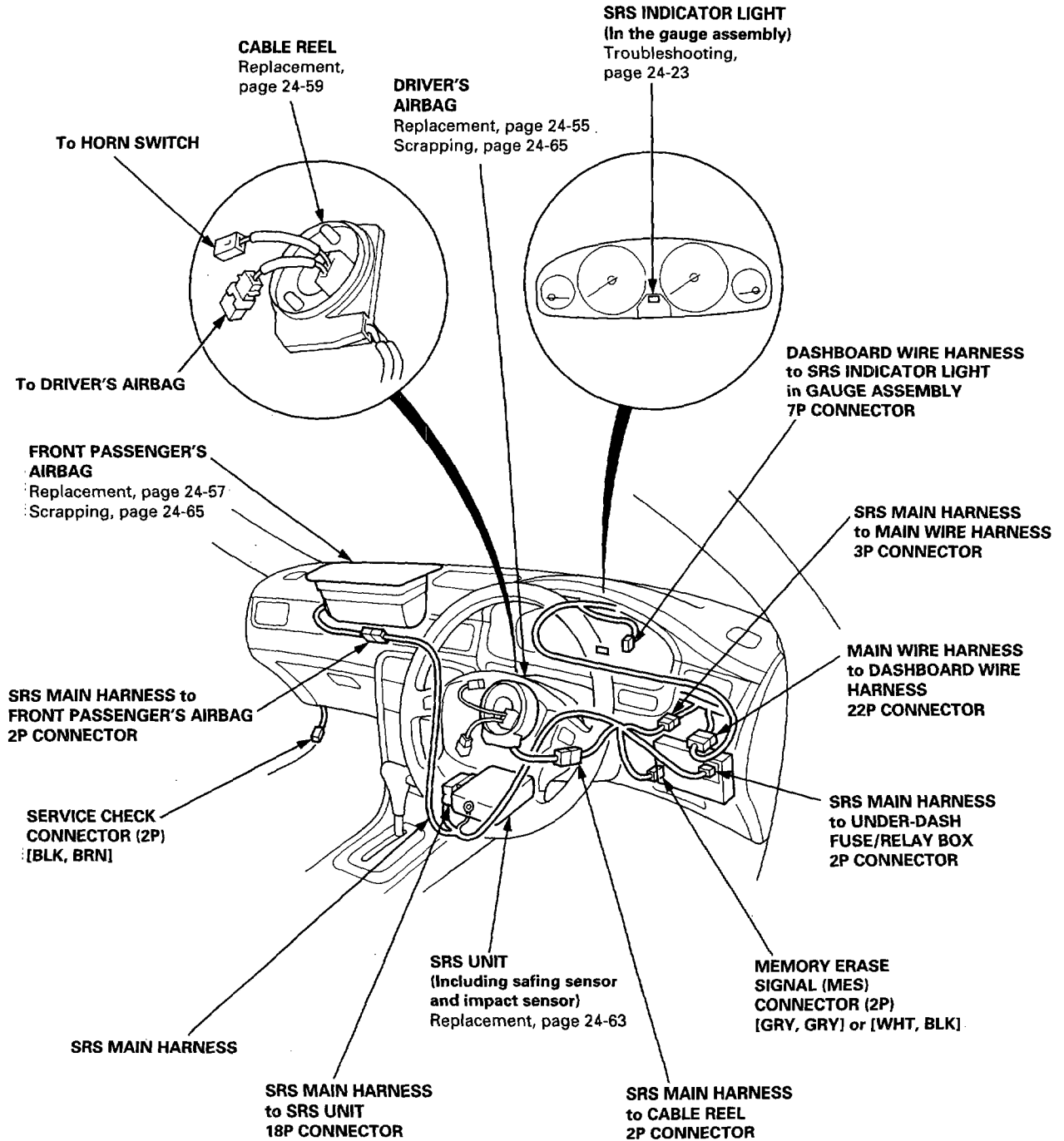
# Component/Wiring Locations Index

Index: LHD



# Component/Wiring Locations Index

## Index: RHD

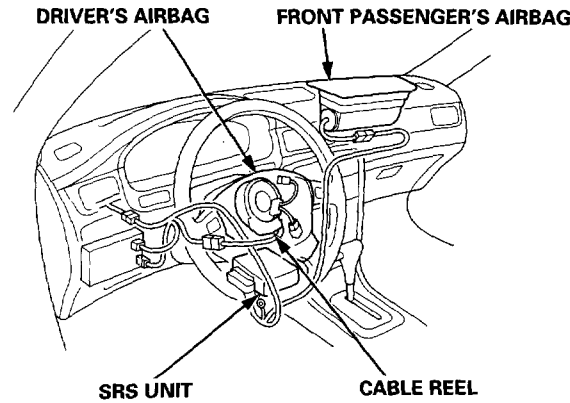




# Description



The SRS is a safety device which, when used in conjunction with the seat belt, is designed to help protect the driver and front passenger in a frontal impact exceeding a certain set limit. The system consists of the SRS unit (including safing sensor and impact sensor), the cable reel, the driver's airbag, and front passenger's airbag.

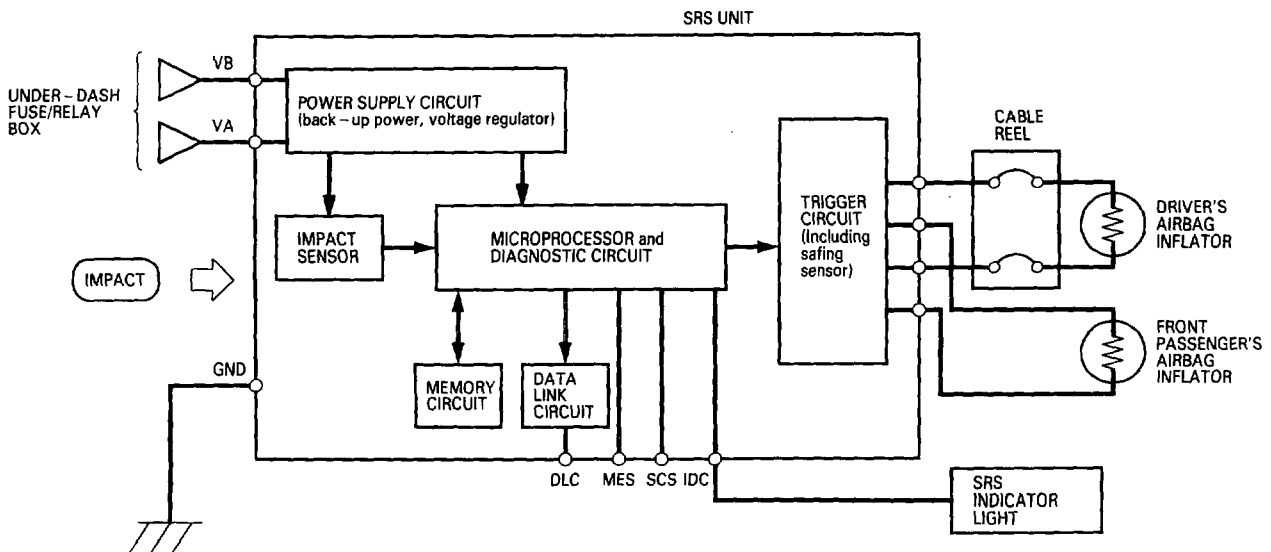


## Operation

The main circuit in the SRS unit senses and judges the force of impact and, if necessary, ignites the inflator charges. If battery voltage is too low or power is disconnected due to the impact, the back-up power circuit will keep voltage at a constant level.

## For the SRS to operate:

- (1) The impact sensor and safing sensor must activate and send electric signals to the microprocessor.
- (2) The microprocessor must compute the signals and send signals to the airbag inflators.
- (3) The inflators must ignite and deploy the airbags.



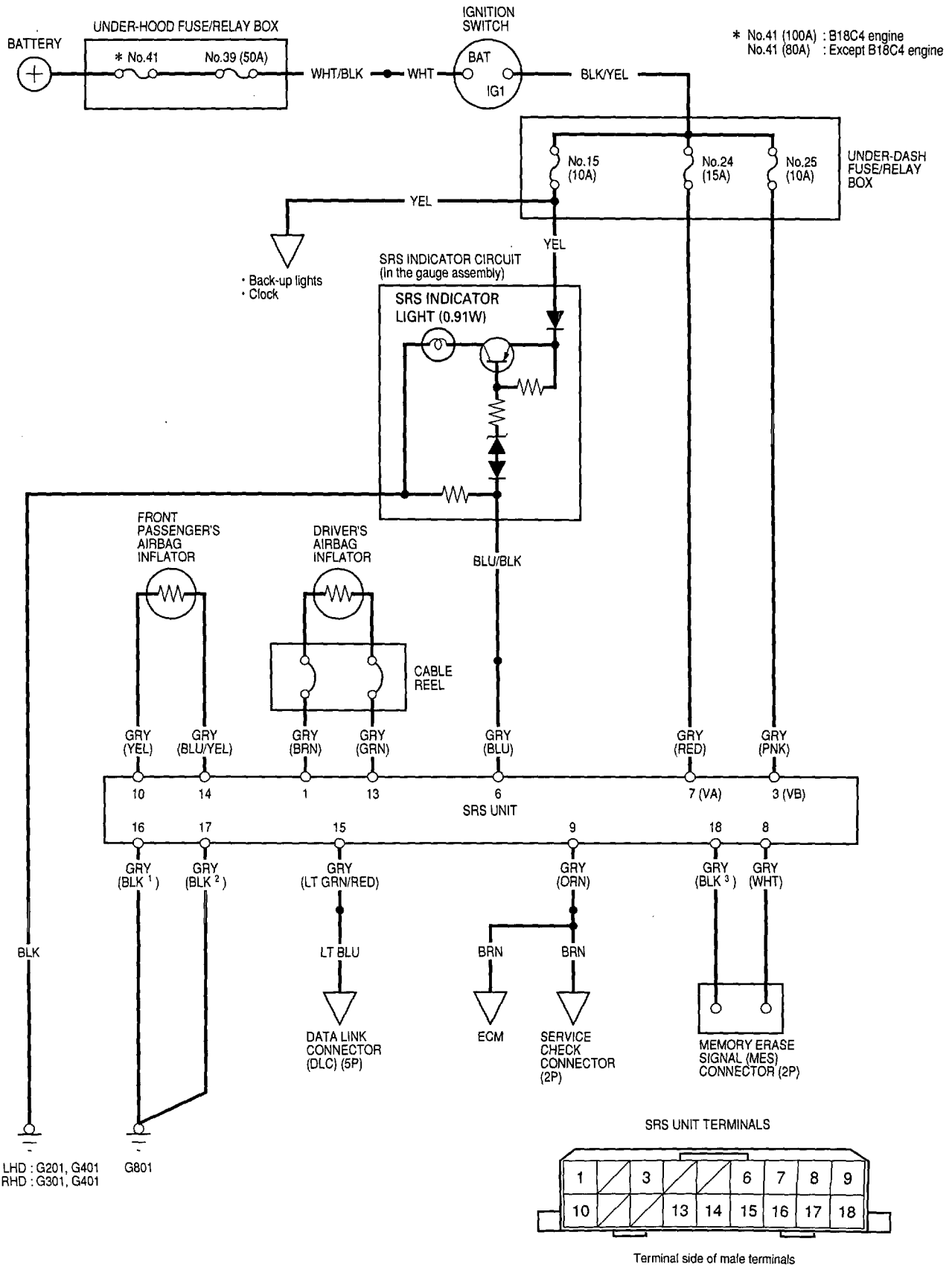
## Self-diagnosis System

A self-diagnosis circuit is built into the SRS unit; when the ignition switch is turned ON (II), the SRS indicator light comes on and goes off after about six seconds if the system is operating normally.

If the light does not come on, or does not go off after six seconds, or if it comes on while driving, it indicates an abnormality in the system. The system must be inspected and repaired as soon as possible.

For better serviceability, the memory will store the cause of the malfunction, and the data link circuit passes on the information from the memory to the data link connector (DLC). This information can be read with the Honda PGM Tester connected to the DLC (5P).

# Circuit Diagram

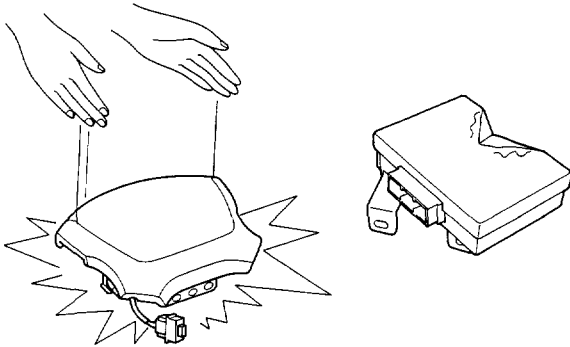




## General Precautions

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

- Airbags
- Cable reel
- SRS unit



- Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental deployment and possible injury.
- Do not install used SRS parts from another vehicle. When making SRS repairs, use only new parts.
- Except when performing electrical inspections, always disconnect both the negative cable and positive cable from the battery, and wait at least three minutes before beginning work.
- Replacement of the combination light and wiper/washer switches can be done without removing the steering wheel:
  - Combination light and wiper/washer switch replacement, see section 23.
- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injury.
- Whenever the airbags have been activated, replace the SRS unit.

## Airbag Handling and Storage

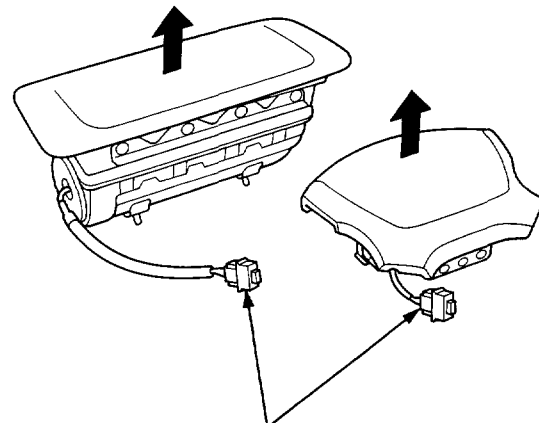
Do not try to disassemble the airbag. It has no serviceable parts. Once an airbag has been operated (deployed), it cannot be repaired or reused.

For temporary storage of the airbag during service, please observe the following precautions:

- Store the removed airbag with the pad surface up. The driver's and front passenger's airbag connectors have a built-in short contact (see page 24-20).

### ⚠ WARNING

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

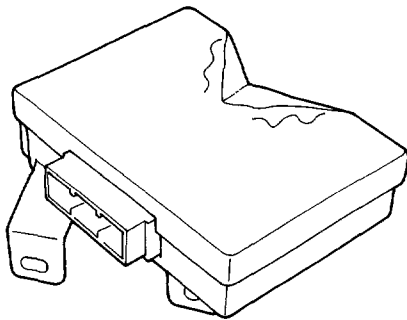


- Store the removed airbag assembly on a secure flat surface away from any high heat source (exceeding 100°C/212°F) and free of any oil, grease, detergent or water.
- Improper handling or storage can internally damage the airbag making it inoperative. If you suspect the airbag has been damaged, install a new unit, and refer to the Deployment/Scrapping procedures for disposing of the damaged airbag.

# Precautions/Procedures

## SRS Unit Precautions

- Take extra care when painting or doing body work in the area below the dashboard. Avoid direct exposure of the SRS unit or wiring to heat guns, welding, or spraying equipment.
- Disconnect the airbag connector(s) before disconnecting SRS harness connectors (see page 24-21).
- After any degree of frontal body damage, or after a collision without airbag deployment, inspect the SRS unit for physical damage. If it is dented, cracked, or deformed, replace it.



- Be sure the SRS unit is installed securely.
- Do not disassemble the SRS unit.
- Store the SRS unit in a cool (less than about 40°C/ 104°F) and dry (less than 80% humidity, no moisture) place. Do not spill water or oil on the SRS unit, and keep it away from dust.
- During installation or replacement, be careful not to bump (impact wrench, hammer, etc.) the area around the SRS unit. The airbag(s) could accidentally deploy and cause damage or injury.

## Inspection After Deployment

After a collision in which the airbags were deployed, replace the SRS unit, and inspect the following:

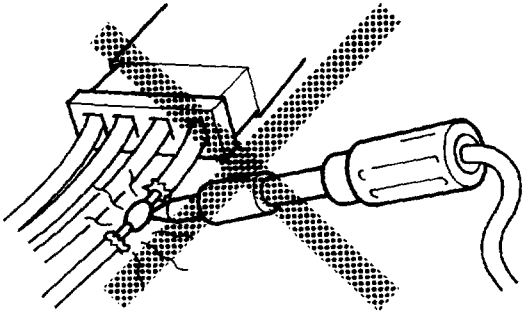
1. Inspect all the SRS wire harnesses. Replace, don't repair, any damaged harnesses.
2. Inspect the cable reel for heat damage. If there is any damage, replace the cable reel.
3. After the vehicle is completely repaired, turn the ignition switch on. If the SRS indicator light comes on for about six seconds and then goes off, the SRS system is OK. If the indicator light does not function properly, go to SRS Troubleshooting.



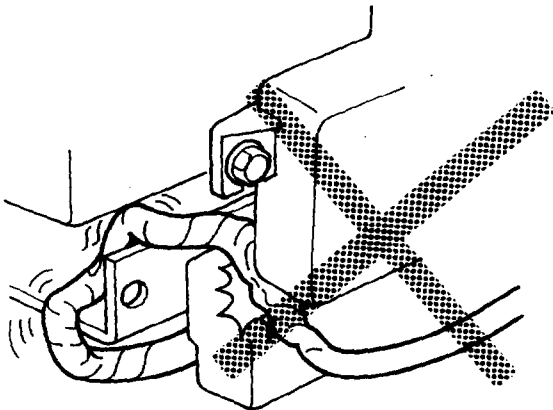
## Wiring Precautions

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

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



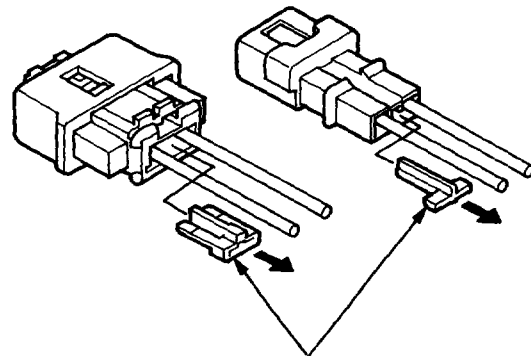
- Be sure to install the harness wires so that they are not pinched or interfering with other parts.



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

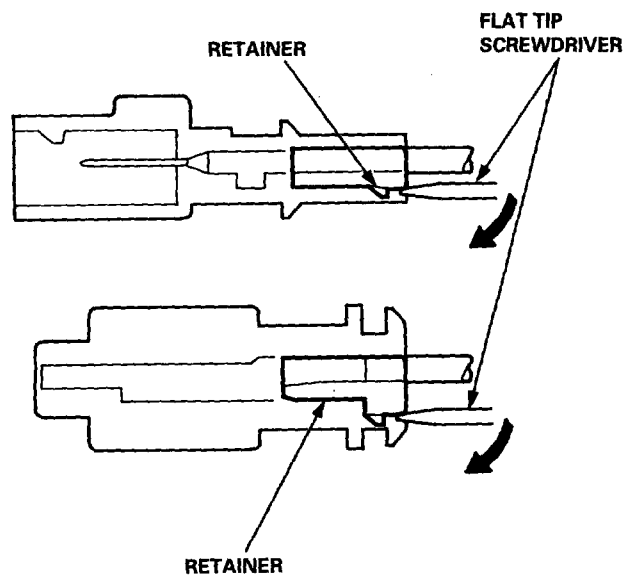
## Backprobing Spring-loaded Lock Connectors

- When checking voltage or resistance on this type of connector the first time, it is necessary to remove the retainer to insert tester probes from the wire side. It is not necessary to reinstall the removed retainer; the terminals will stay locked in the connector housing.



RETAINER  
\* Discard after removal.

- To remove the retainer, insert a flat tip screwdriver between connector body and retainer, and carefully pry out the retainer. Take care not to break the connector.



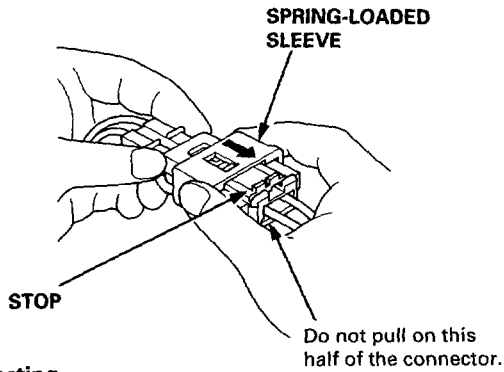
# Precautions/Procedures

## Spring-loaded Lock Connector

Some SRS system connectors have a spring-loaded lock.

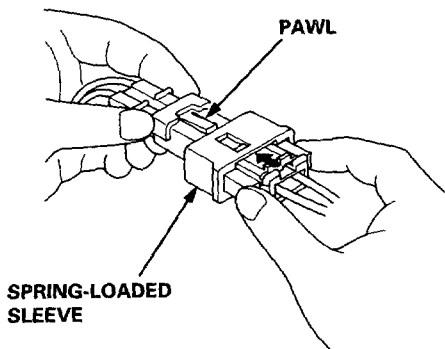
### Disconnecting

To release the lock, pull the spring-loaded sleeve toward the stop while holding the opposite half of the connector. Then pull the connector halves apart. Be sure to pull on the sleeve and not on the connector half.

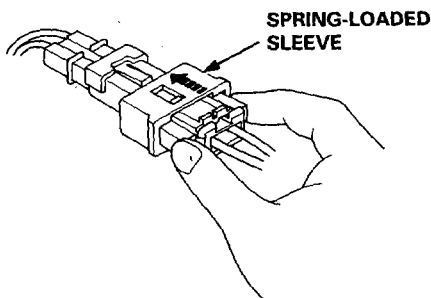


### Connecting

1. Hold the pawl-side connector half, and press on the back of the sleeve-side connector half in the direction shown. Do not touch the sleeve. As the two connector halves are pressed together, the sleeve is pushed back by the pawl.



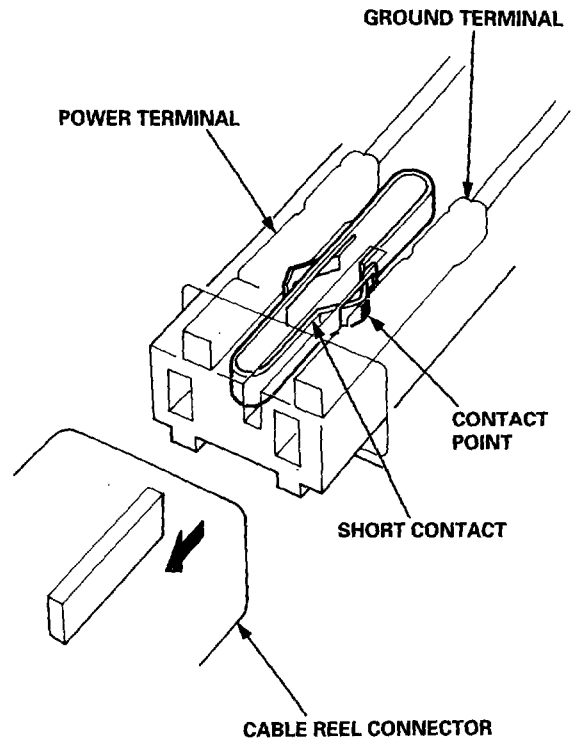
2. When the connector halves are completely connected, the pawl is released, and the spring-loaded sleeve locks the connector.



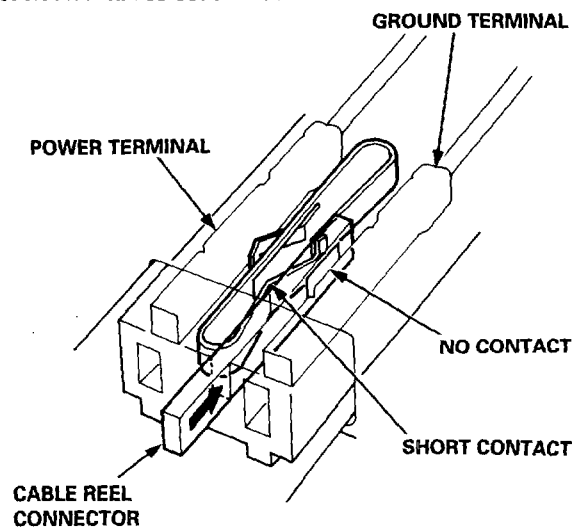
## Spring-loaded Lock Connector with Built-in Short Contact

The driver's airbag and front passenger's airbag have a spring-loaded lock connector with a built-in short contact. When this connector is disconnected, the power terminal and the ground terminal in the airbag connector are automatically shorted.

### Connector halves disconnected:



### Connector halves connected:

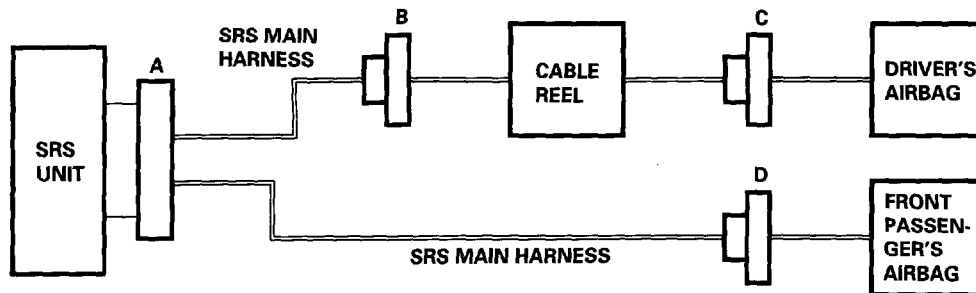




## Disconnecting the Airbag Connector(s)

**⚠ WARNING** To prevent accidental airbag deployment, turn the ignition switch OFF, disconnect the negative battery cable, and wait three minutes before disconnecting any SRS connectors.

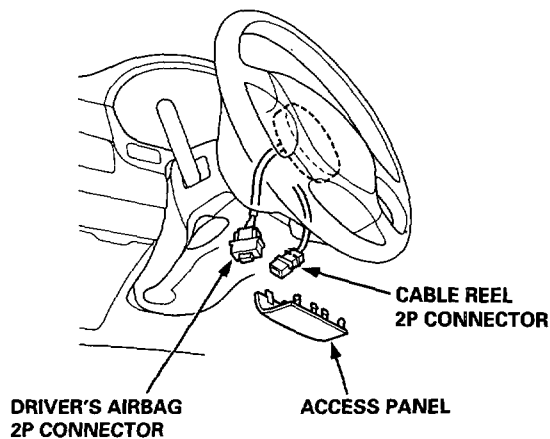
- Before disconnecting the SRS main harness (A) from the SRS unit, disconnect both airbags (C, D).
- Before disconnecting the cable reel 2P connector (B), disconnect the driver's airbag 2P connector (C).



1. Disconnect the negative battery cable, and wait at least three minutes.
2. Disconnect the airbag connector(s).

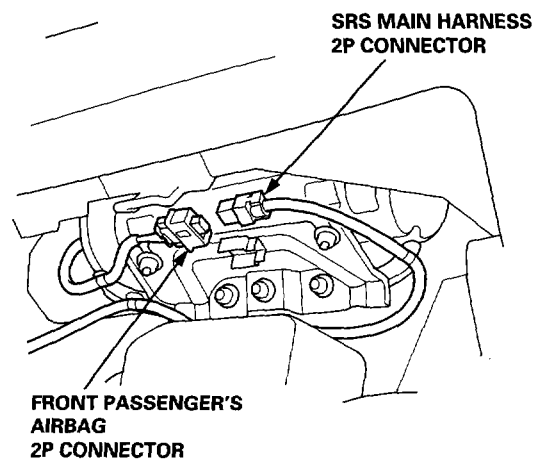
### Driver's Side:

- Remove the access panel from the steering wheel, then disconnect the driver's airbag 2P connector and cable reel 2P connector.



### Front Passenger's Side:

- Remove the glove box, then disconnect the front passenger's airbag 2P connector and SRS main harness 2P connector.

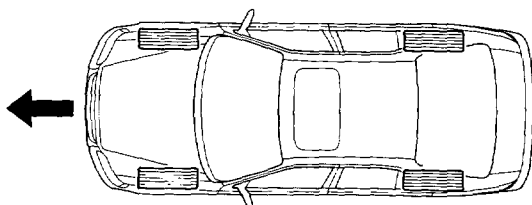


# Precautions/Procedures

## Steering-related Precautions

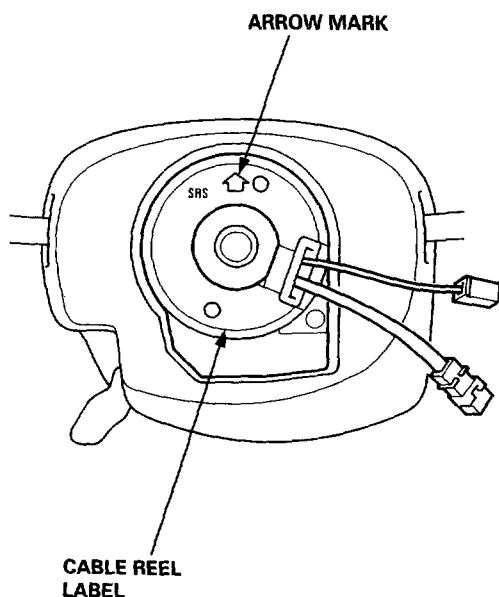
### Steering Wheel and Cable Reel Alignment

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



To center the cable reel, rotate the cable reel clockwise until it stops.

Then rotate it counterclockwise (approximately two and a half turns) until the arrow mark on the cable reel label points straight up.



### Steering Column Removal

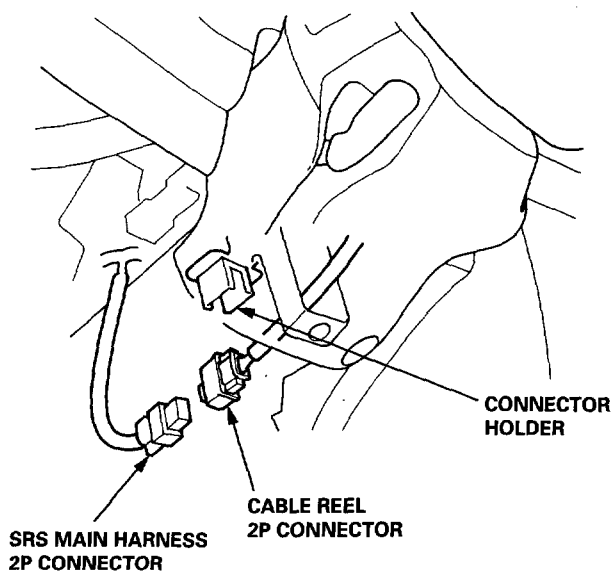
#### CAUTION

Before removing the steering column, first disconnect the connector between the cable reel and the SRS main harness.

If the steering column is going to be removed without dismantling the steering wheel, lock the steering by turning the ignition key to 0-LOCK position, or remove the key from the ignition so that the steering wheel will not turn.

#### NOTE:

- When the airbag assembly and cable reel are disconnected, and the battery is reconnected and the ignition switch is turned ON (II), the SRS unit will store this as an open in the driver's airbag inflator, and the SRS indicator light will come on. In such a case, make sure to confirm the DTC, then clear the SRS unit memory.
- For disconnecting the spring-loaded lock type connector, refer to page 24-20.



Do not replace the original steering wheel with any other design, since it will make it impossible to properly install the airbag (only use genuine Honda replacement parts).

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





# Troubleshooting

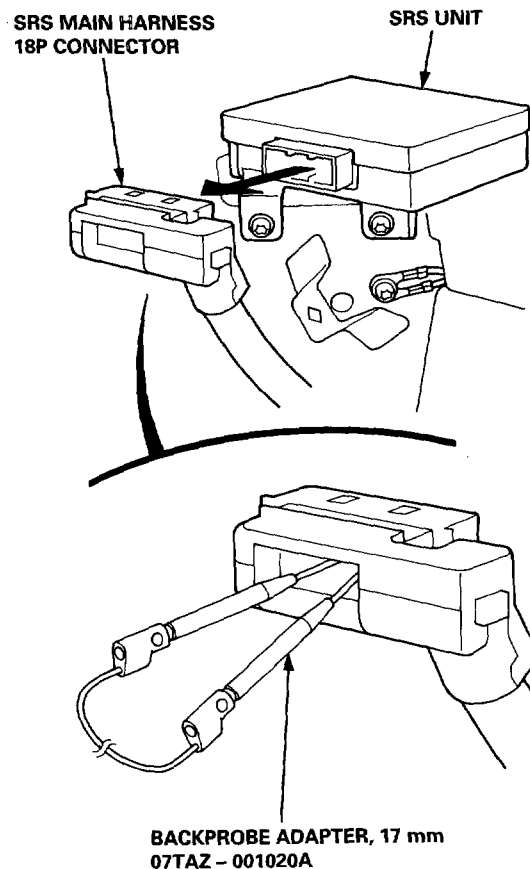
## Self-diagnostic Procedures

The self-diagnostic function of the SRS system allows it to locate the causes of system problems and to store this information in memory. For easier troubleshooting, this data can be retrieved via a data link circuit.

- When you turn the ignition switch ON (II), the SRS indicator will come on. If it goes off after six seconds, the system is normal.
- If there is an abnormality, the system locates and defines the problem, stores this information in memory, and turns the SRS indicator light on. The data will remain in the memory even when the ignition switch is turned off or if the battery is disconnected.
- When you connect the SCS short connector to the service check connector (2P), and turn the ignition switch ON (II), the SRS indicator light will indicate the diagnostic trouble code (DTC) by the number of blinks.
- After reading and recording the DTC, proceed with the troubleshooting for this code.

### Precautions

- Use only a digital multimeter to check the system. If it's not a Honda multimeter, make sure its output is 10 mA (0.01 A) or less when switched to the smallest value in the ohmmeter range. A tester with a higher output could damage the airbag circuit or cause accidental airbag deployment and possible injury.
- Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.
- Before you remove the SRS main harness, disconnect the driver's airbag connector and front passenger's airbag connector.
- Make sure the battery is sufficiently charged. If the battery is dead or low, or the back-up power circuit in the SRS unit is faulty, measuring values won't be correct.
- Do not touch a tester probe to the terminals in the SRS unit or harness connectors, and do not connect the terminals with a jumper wire. Use only the backprobe set and the SCS short connectors. For backprobing spring-loaded lock type connectors, refer to page 24-19.

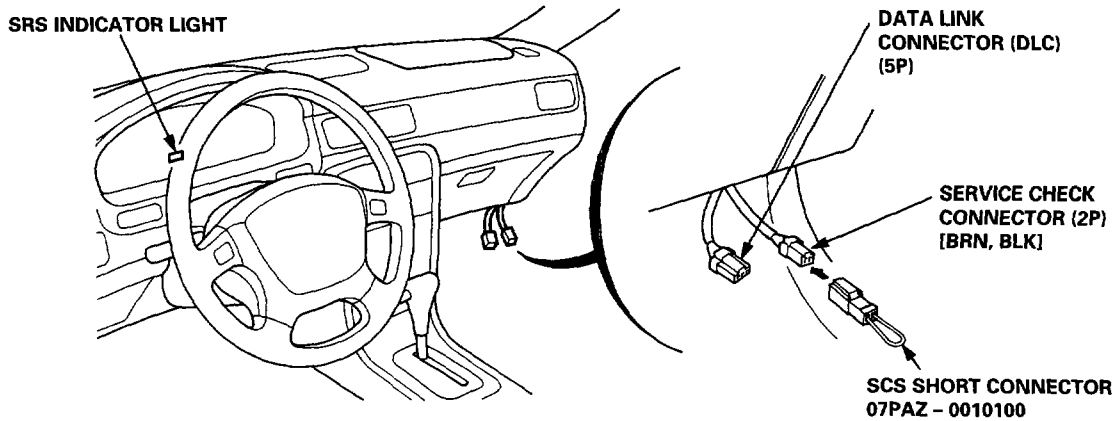


# Troubleshooting

## Reading the DTC

The SRS indicator light indicate the DTC by the number of blinks when the SCS short connector is connected to the service check connector (2P).

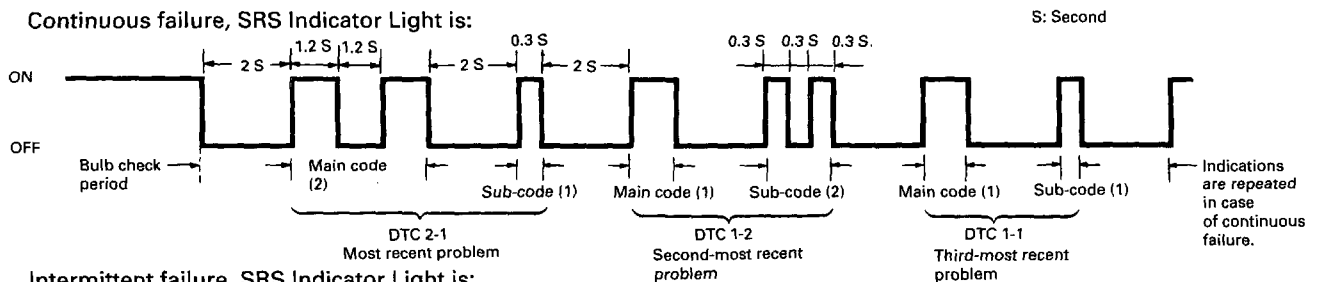
1. Turn the ignition switch OFF, and wait for ten seconds. Then connect the SCS short connector to the service check connector (2P). If you do not wait ten seconds, the SRS unit will not be completely reset and will not output DTCs.



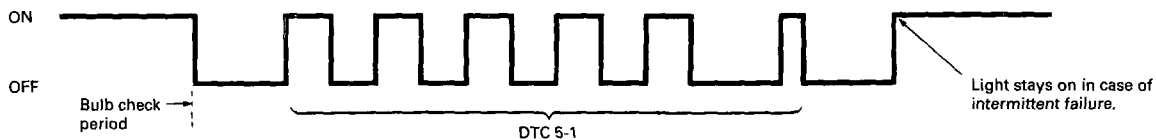
2. Turn the ignition switch ON (II). The SRS indicator light comes on for about six seconds and then goes off. Then it will indicate the DTC:
  - The DTC consists of a main code and a sub-code.
  - Including the most recent problem, up to three different malfunctions can be indicated.
  - In case of a continuous failure, the DTC will be indicated repeatedly (see example 1 below).
  - In case of an intermittent failure, the SRS indicator light will indicate the DTC one time, then it will stay on (see example 2 below).
  - If both a continuous and an intermittent failure occur, both DTCs will be indicated as continuous failures.
  - In case the system is normal (no DTC), the SRS indicator light will stay on (see example 3).
3. Read the DTC.
4. Turn the ignition switch OFF, and wait for ten seconds. Then disconnect the SCS short connector from the service check connector (2P).

### Examples of DTC Indications:

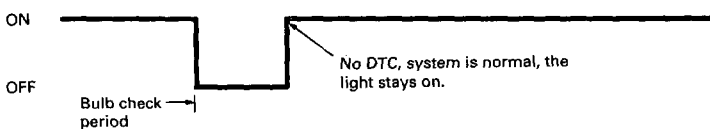
1. Continuous failure, SRS Indicator Light is:



2. Intermittent failure, SRS Indicator Light is:



3. Normal (no failure), SRS Indicator Light is:

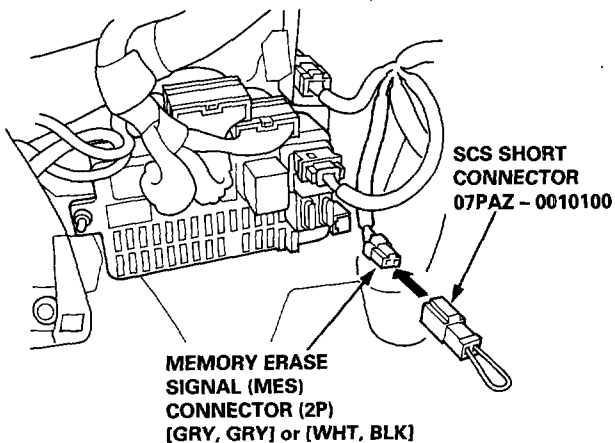




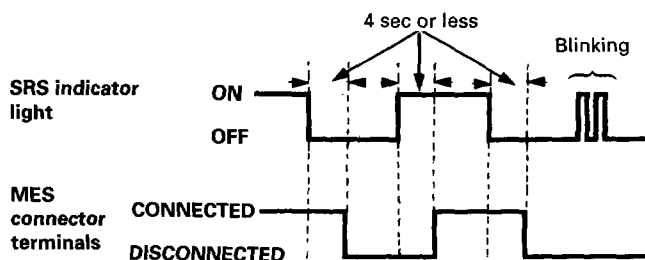
## Erasing the DTC Memory

To erase the DTC(s) from the SRS unit, use a Honda PGM Tester (see the Honda PGM Tester SRS vehicle System Supplement) or the following procedure.

1. Make sure the ignition switch is OFF.
2. Connect the SCS short connector to the MES connector (2P). Do not use a jumper wire.



3. Turn the ignition switch ON (II).
4. The SRS indicator light comes on for about six seconds and goes off. Remove the SCS short connector from the MES connector (2P) within four seconds after the SRS indicator light went off.
5. The SRS indicator light comes on again. Reconnect the SCS short connector to the MES connector (2P) within the four seconds after the SRS indicator light comes on.
6. The SRS indicator light goes off. Remove the SCS short connector from the MES connector (2P) within four seconds.
7. The SRS indicator light indicates that the memory is erased by blinking two times.
8. Turn the ignition switch OFF, and wait for ten seconds.

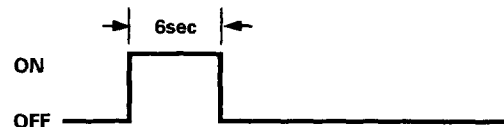


## Troubleshooting Intermittent Failures

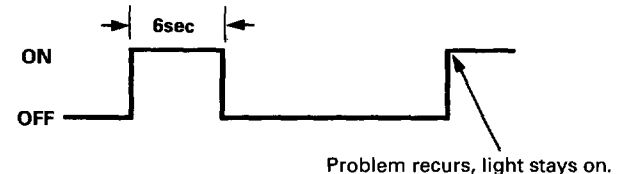
If there was a malfunction, but it doesn't recur, it will be stored in the memory as an intermittent failure, and the SRS indicator light comes on.

After checking the DTC, troubleshoot as follows:

1. Read the DTC (see "Reading the DTC").
2. Erase the DTC memory (see "Erasing the DTC Memory").
3. With the shift lever in neutral, turn the ignition switch ON (II), and let the engine idle.
4. The SRS indicator light comes on for about six seconds and goes off.



5. Shake the wire harness and the connector, take a test drive (quick acceleration, quick braking, cornering), and turn the steering wheel fully left and right, and hold it there for five to ten seconds to find the cause of the intermittent failure. If the problem recurs, the SRS indicator light will stay on.



6. If you can't duplicate the intermittent failure, the system is OK at this time.

# Troubleshooting

## Diagnostic Trouble Code (DTC) Chart

SRS indicator light	DTC	Possible cause	Corrective action	See page
doesn't come on	none (doesn't come on)	Faulty SRS indicator light circuit	Troubleshooting	24-28
comes on	none (doesn't go off)	Faulty SRS indicator light circuit, internal failure of SRS unit, faulty SRS power supply.	Troubleshooting	24-31
	1-1	Open or increased resistance in the driver's airbag inflator	Troubleshooting	24-36
	1-3	Short to another wire in the driver's airbag inflator or decreased resistance		24-38
	1-4	Short to power in the driver's airbag inflator		24-40
	1-5	Short to ground in the driver's airbag inflator		24-42
	2-1	Open or increased resistance in the passenger's airbag inflator		Troubleshooting
	2-3	Short to another wire in the passenger's airbag inflator or decreased resistance	24-46	
	2-4	Short to power in the passenger's airbag inflator	24-48	
	2-5	Short to ground in the passenger's airbag inflator	24-50	
	5-1	Internal failure of the SRS unit	SRS unit replacement	24-63
	5-3			
	5-4			
	6-3	Internal failure of the SRS unit	SRS unit replacement	24-63
	6-4			
	7-1	Internal failure of the SRS unit	SRS unit replacement	24-63
	7-2			
	7-3			
	8-1	Internal failure of the SRS unit	SRS unit replacement	24-63
	8-2			
	8-6			
	9-1*1	Faulty SRS indicator circuit	SRS unit replacement	24-63
	9-2	Faulty SRS power supply (VB line)	Troubleshooting	24-52
	10-1	SRS unit replacement code (SRS unit must not be used any longer)	SRS unit replacement	24-63

**NOTE:**

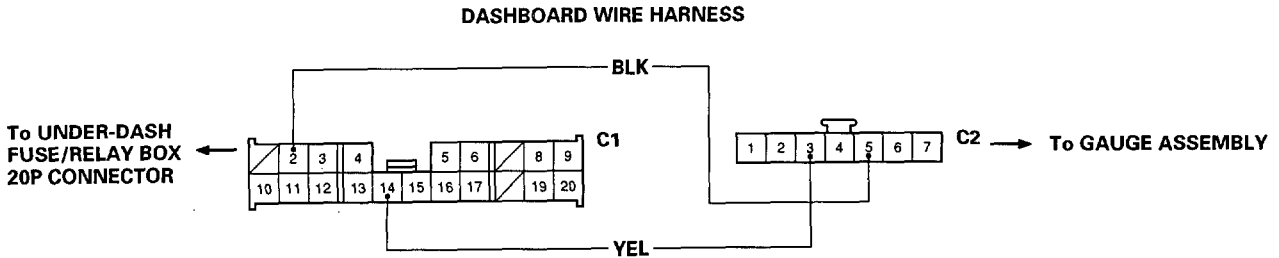
\*1: In case of an intermittent failure DTC 9-1, it means there was an internal failure of the SRS unit or a faulty SRS indicator light circuit. Do the troubleshooting for intermittent failures (see page 24-25).



# SRS Indicator Light Wire Connections

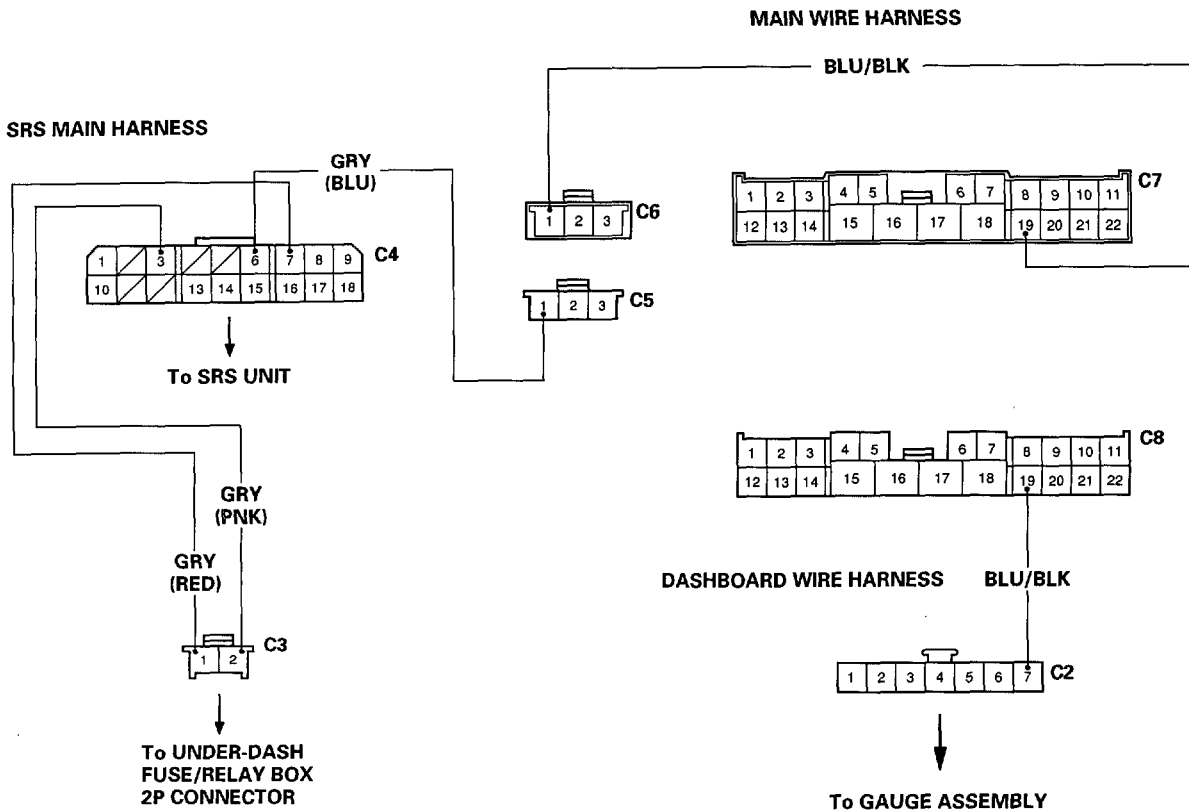
## SRS Indicator Light Power Circuit

C1, C2 : Wire side of female terminals



## SRS Indicator Light Control Circuit

C3, C4, C5, C8 : Wire side of female terminals  
C6, C7 : Terminal side of male terminals



C1 : DASHBOARD WIRE HARNESS 20P CONNECTOR  
C2 : DASHBOARD WIRE HARNESS 7P CONNECTOR  
C3 : SRS MAIN HARNESS 2P CONNECTOR  
C4 : SRS MAIN HARNESS 18P CONNECTOR

C5 : SRS MAIN HARNESS 3P CONNECTOR  
C6 : MAIN WIRE HARNESS 3P CONNECTOR  
C7 : MAIN WIRE HARNESS 22P CONNECTOR  
C8 : DASHBOARD WIRE HARNESS 22P CONNECTOR

# Troubleshooting

## The SRS Indicator Light Doesn't Come On

### ⚠ CAUTION

Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

#### Check the power supply (fuse):

Turn the ignition switch ON (II), and check whether the other indicator lights come on or not (brake system, etc.).

Do the other indicator lights come on?

YES

NO

#### Check the fuse:

Check the No. 15 (10 A) fuse in the under-dash fuse/relay box.

Is the fuse OK?

YES

NO

#### Check the bulb:

Replace the No. 15 (10 A) fuse, and check that the SRS indicator light comes on.

Does the SRS indicator light come on?

YES

NO

END

#### Check the wire harness between fuse and gauge assembly:

Check for an open in the wire harness between fuse No. 15 (10 A) and the gauge assembly, and repair. Check that the SRS indicator light comes on.

Does the SRS indicator light come on?

YES

NO

END

#### Check the SRS indicator light bulb:

1. Turn the ignition switch OFF.
2. Remove the gauge assembly.
3. Check for blown SRS indicator light bulb.

Is the SRS indicator light bulb OK?

YES

NO

#### Check the SRS indicator light circuit:

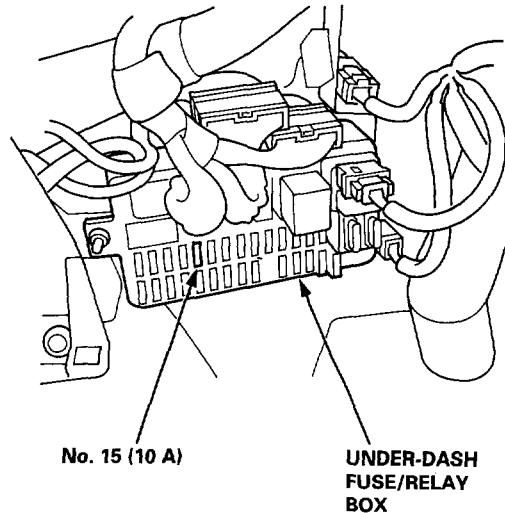
Replace the bulb, and reconnect the gauge assembly connectors. Then turn the ignition switch ON (II).

Does the SRS indicator light come on?

YES

NO

END



(A) To page 24-29

(B)  
To page 24-29



From page 24-28  
(A)

From page 24-28  
(B)

**Check the SRS indicator light circuit:**

1. Disconnect the dashboard wire harness 7P connector from the gauge assembly.
2. Connect a voltmeter between the No. 7 terminal (+) of the 7P connector and ground.
3. Turn the ignition switch ON (II), and measure voltage.

**Is there 8.5 V or less for six seconds after the ignition switch has been turned ON (II)?**

YES

NO

**Faulty SRS indicator light circuit in the gauge assembly; replace the SRS printed circuit board in the gauge assembly.**

**Check the wire harness of the SRS indicator light circuit (1):**

1. Turn the ignition switch OFF.
2. Disconnect the main wire harness 22P connector from the dashboard wire harness.
3. Connect a voltmeter between the No. 19 terminal (+) of the main wire harness 22P connector and ground.
4. Turn the ignition ON (II), and measure voltage.

**Is there 8.5 V or less for six seconds after the ignition switch has been turned ON (II)?**

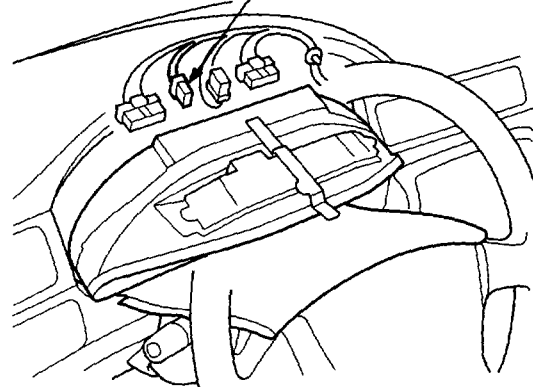
YES

NO

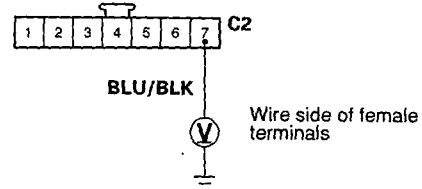
**Short to power in the BLU/BLK wire of the dashboard wire harness; repair the harness.**

To page 24-30

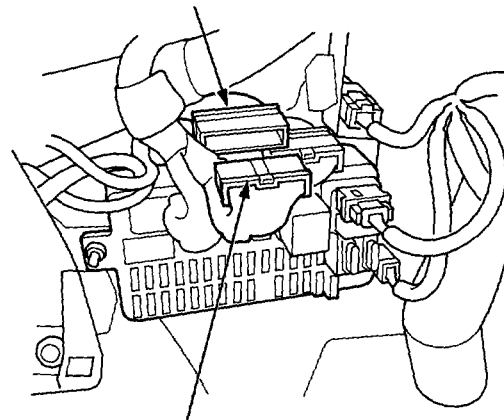
**DASHBOARD WIRE HARNESS  
7P CONNECTOR**



**DASHBOARD WIRE HARNESS  
7P CONNECTOR**

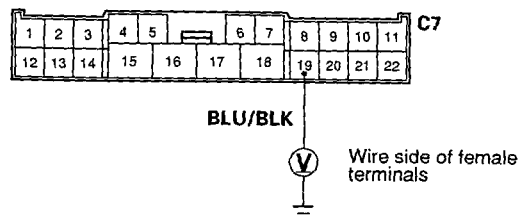


**MAIN WIRE HARNESS  
22P CONNECTOR**



**DASHBOARD WIRE HARNESS  
22P CONNECTOR**

**MAIN WIRE HARNESS  
22P CONNECTOR**



(cont'd)

# Troubleshooting

## The SRS Indicator Light Doesn't Come On (cont'd)

From page 24-29

**Check the wire harness of the SRS indicator light circuit (2):**

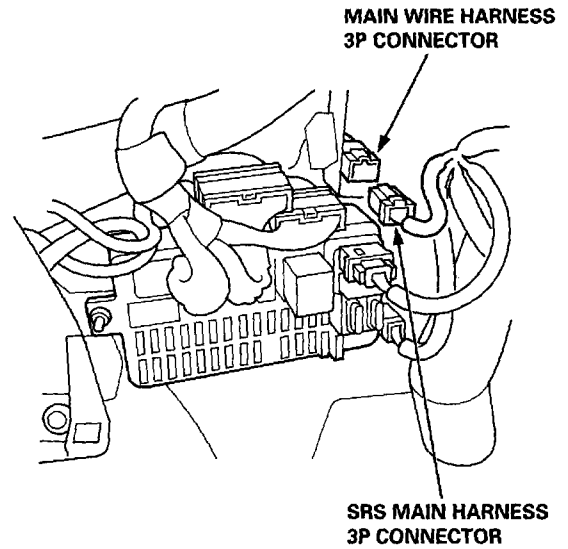
1. Turn the ignition switch OFF.
2. Disconnect the SRS main harness 3P connector from the main wire harness.
3. Connect a voltmeter between the No. 1 terminal (+) of the SRS main harness 3P connector and ground.
4. Turn the ignition switch ON (II), and measure voltage.

**Is there 8.5 V or less for six seconds after the ignition switch has been turned ON (II)?**

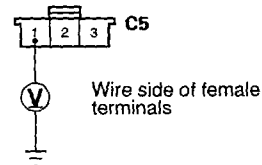
YES

NO

**Short to power in the BLU/BLK wire of the main wire harness; repair the harness.**



**SRS MAIN HARNESS 3P CONNECTOR**



**Check the wire harness of the SRS indicator circuit (3):**

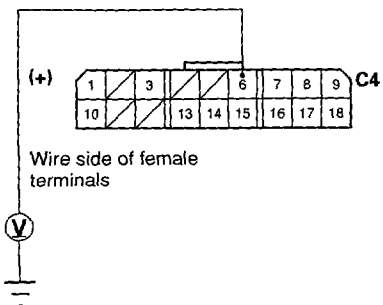
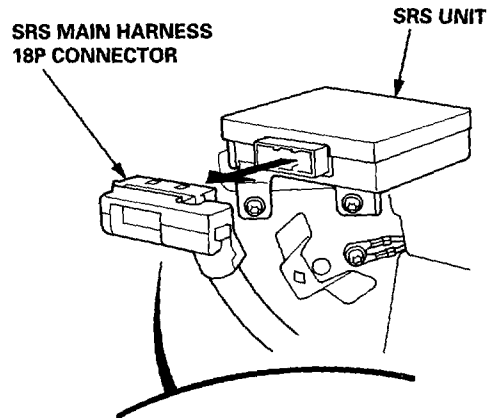
1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable, and wait three minutes.
3. Disconnect the driver's and front passenger's airbag connectors (see page 24-21).
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Reconnect the negative battery cable.
6. Connect a voltmeter between the No. 6 terminal (+) of the SRS main harness 18P connector and ground.
7. Turn the ignition switch ON (II), and measure voltage. There should be 0-8.5 V.

**Is voltage as specified?**

YES

NO

**Faulty SRS unit; replace the unit (see page 24-63).**







# The SRS Indicator Light Doesn't Go Off

## CAUTION

Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

### Try to reproduce the SRS indicator light:

1. Erase the DTC memory (see page 24-15).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

### Does the SRS indicator light stay on?

YES NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-25.

### Check the No. 24 (15 A) fuse:

1. Turn the ignition switch OFF.
2. Check for blown No. 24 (15 A) fuse in the under-dash fuse/relay box.

### Is the fuse OK?

YES NO

### Replace the fuse, and erase the memory

1. Replace the No. 24 (15 A) fuse.
2. Erase the DTC memory (see page 24-25).
3. Turn the ignition switch ON (II).

### Does the SRS indicator light go off after six seconds?

YES NO

END

### Confirm the DTC, and continue troubleshooting.

### Check for an open in the SRS main harness (VA line):

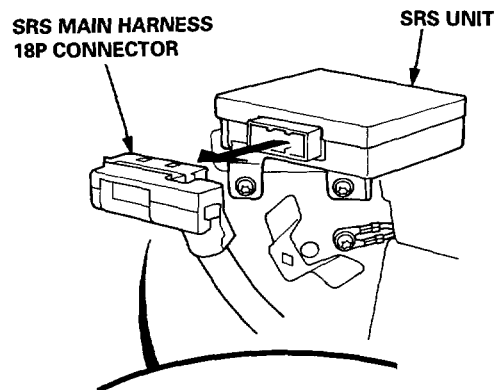
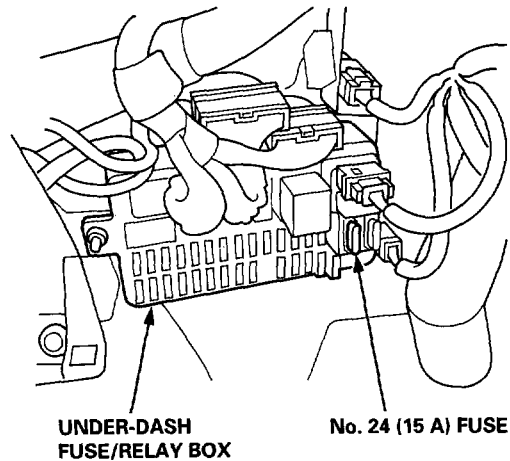
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's and front passenger's airbag connectors (see page 24-21).
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Reconnect the negative battery cable.
5. Connect a voltmeter between the No. 7 terminal (+) of the SRS main harness 18P connector and ground.
6. Turn the ignition switch on.

### Is there battery voltage?

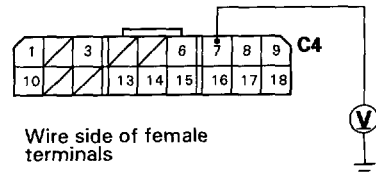
YES NO

(A)  
To page 24-32

Open in the SRS main harness (VA line); replace the SRS main harness.



### SRS MAIN HARNESS 18P CONNECTOR



(cont'd)

# Troubleshooting

## The SRS Indicator Light Doesn't Go Off (cont'd)

From page 24-31  
(A)

**Check the SRS unit:**

Connect the SRS main harness 18P connector terminals No. 6 and No. 7 with a jumper wire and backprobe adapters.

**Does the SRS indicator light go off?**

**YES**

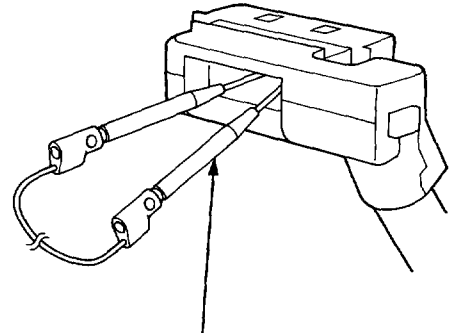
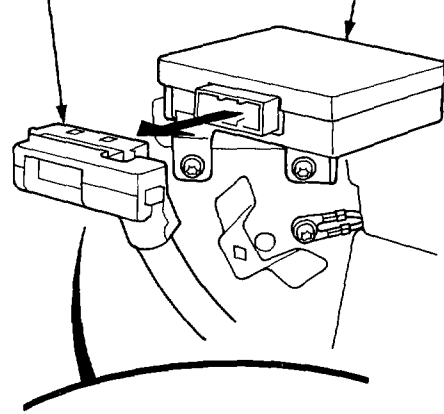
**NO**

**Faulty SRS unit or poor contact at the SRS main harness 18P connector; check the connector. If the connector is OK, replace the SRS unit.**

(B)  
To page 24-33

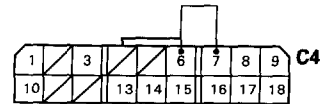
SRS MAIN HARNESS  
18P CONNECTOR

SRS UNIT



BACKPROBE ADAPTER, 17 mm  
07TAZ - 001020A

JUMPER WIRE



Wire side of female terminals



From page 24-32  
(B)

**Check the SRS indicator circuit:**

1. Turn the ignition switch OFF.
2. Remove the gauge assembly. Do not disconnect the dashboard wire harness 7P connector from the gauge assembly.
3. Turn the ignition switch ON (II).
4. Connect the dashboard wire harness 7P connector terminals No. 3 and No. 7 with a jumper wire.

**Does the SRS indicator light go off?**

YES

NO

**Faulty SRS indicator light circuit in the gauge assembly; replace the SRS printed circuit board in the gauge assembly.**

**Check for a short to ground in the SRS indicator light circuit:**

1. Turn the ignition switch OFF.
2. Disconnect the dashboard wire harness 7P connector from the gauge assembly.
3. Check resistance between the No. 7 terminal of the dashboard wire harness 7P connector and ground. There should be 1 M $\Omega$  or more.

**Is the resistance as specified?**

YES

NO

(C)  
To page 24-34

**Check for an open in the SRS indicator light circuit:**

1. Check resistance between the No. 6 terminal of the SRS main harness 18P connector and No. 7 terminal of the dashboard wire harness 7P connector; there should be 0 - 1.0  $\Omega$ .

**Is the resistance as specified?**

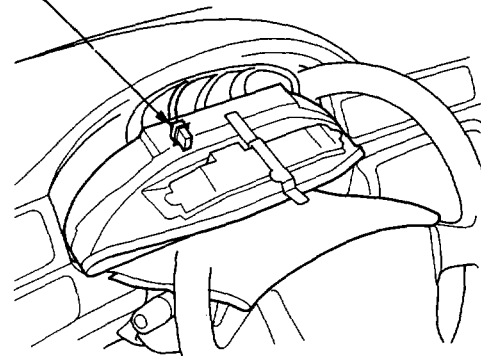
YES

NO

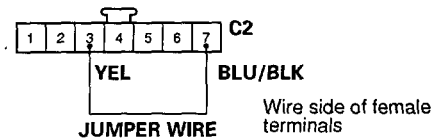
(D)  
To page 24-35

(E)  
To page 24-35

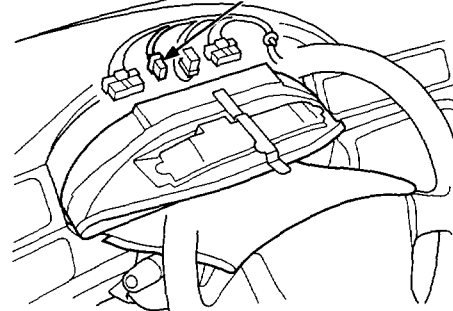
**DASHBOARD WIRE HARNESS  
7P CONNECTOR**



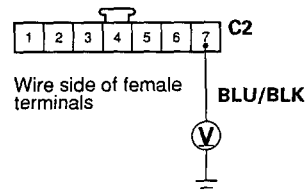
**DASHBOARD WIRE HARNESS 7P CONNECTOR**



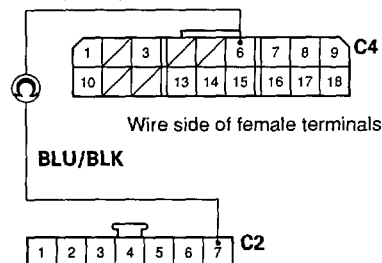
**DASHBOARD WIRE HARNESS  
7P CONNECTOR**



**DASHBOARD WIRE HARNESS  
7P CONNECTOR**



**SRS MAIN HARNESS  
18P CONNECTOR**



**DASHBOARD WIRE HARNESS  
7P CONNECTOR**

(cont'd)

# Troubleshooting

## The SRS Indicator Light Doesn't Go Off (cont'd)

From page 24-33  
(C)

**Check for a short to ground in the main wire harness:**

1. Disconnect the dashboard wire harness 22P connector from the main wire harness.
2. Check resistance between the No. 19 terminal of the main wire harness 22P connector and ground. There should be 1 MΩ or more.

**Is the resistance as specified?**

YES

NO

Short to ground in the dashboard wire harness; repair the dashboard wire harness.

**Check for a short to ground in the SRS main harness:**

1. Disconnect the SRS main harness 3P connector from the main wire harness.
2. Check resistance between the No. 1 terminal of the SRS main harness 3P connector and ground. There should be 1 MΩ or more.

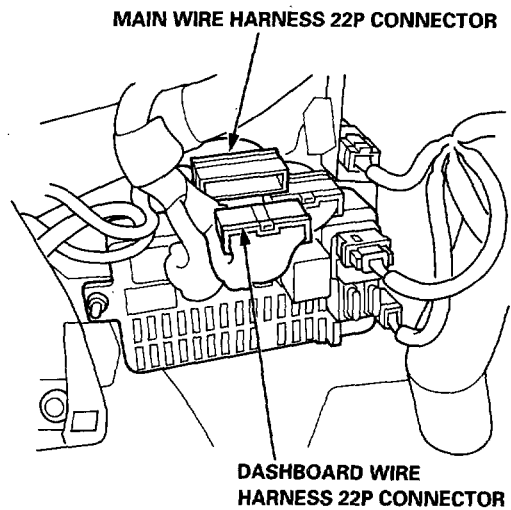
**Is the resistance as specified?**

YES

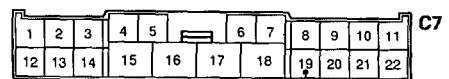
NO

Short to ground in the main wire harness; repair the main wire harness.

Short to ground in the SRS main harness; replace the SRS main harness.

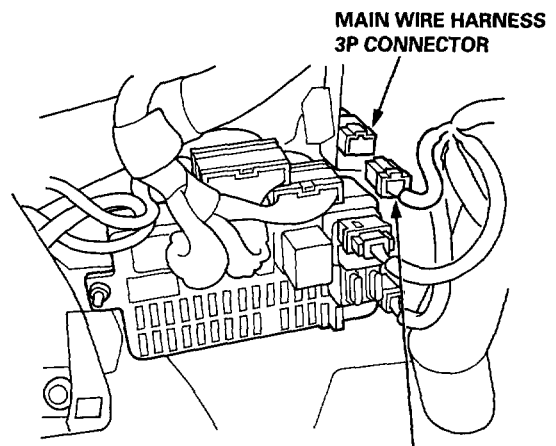


**MAIN WIRE HARNESS 22P CONNECTOR**

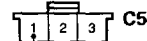


Terminal side of male terminals

BLU/BLK



**SRS MAIN HARNESS 3P CONNECTOR**



Wire side of female terminals



**SRS MAIN HARNESS 3P CONNECTOR**



From page 24-33  
(D)

**Check the SRS indicator circuit input voltage:**

1. Reconnect the SRS main harness 18P connector to the SRS unit.
2. Connect a voltmeter between the No. 7 terminal (+) of the dashboard 7P connector and ground.
3. Turn the ignition switch ON (II), and measure voltage.

**Is there 8.5 V or more six seconds after the ignition switch has been turned ON (III)?**

YES

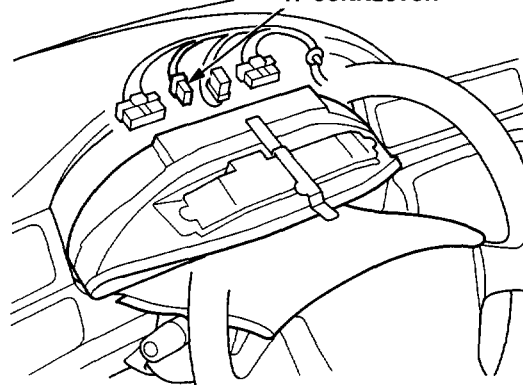
NO

The problem has disappeared due to disconnecting and connecting the connectors. Be sure all terminals make good contact, and recheck the system (see Troubleshooting Intermittent Failures on page 24-25).

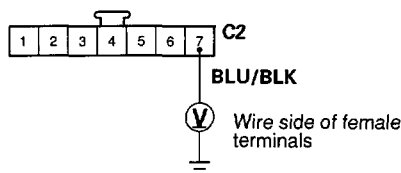
**Poor contact at the SRS main harness 18P connector; check the connector.**

- If the connector is OK, substitute a known-good SRS unit, and recheck.
- If the problem is still present, replace the SRS main harness.

**DASHBOARD WIRE HARNESS  
7P CONNECTOR**



**DASHBOARD WIRE HARNESS  
7P CONNECTOR**



From page 24-33  
(E)

**Check for an open in the dashboard wire harness:**

1. Disconnect the dashboard wire harness 22P connector from the main wire harness.
2. Check resistance between the No. 6 terminal of the SRS main harness 18P connector and No. 19 terminal of the main wire harness 22P connector; there should be 0 – 1.0 Ω.

**Is the resistance as specified?**

YES

NO

Open in the BLU/BLK wire of the dashboard wire harness; repair the dashboard wire harness.

**Check for an open in the main wire harness:**

1. Disconnect the SRS main harness 3P connector from the main wire harness.
2. Check resistance between the No. 6 terminal of the SRS main harness 18P connector and No. 1 terminal of the SRS main harness 3P connector; there should be 0 – 1.0 Ω.

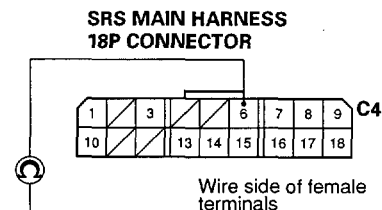
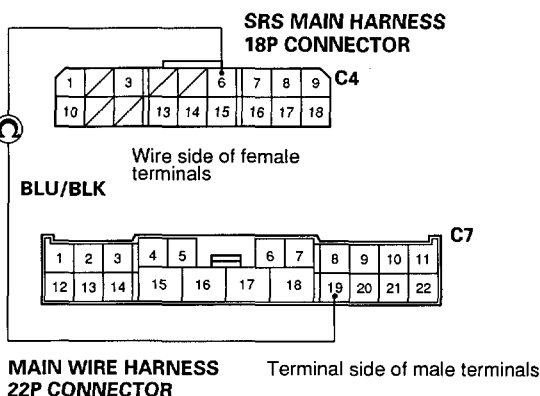
**Is the resistance as specified?**

YES

NO

Open in the BLU/BLK wire of the main wire harness; repair the main wire harness.

Open in the SRS main harness; replace the SRS main harness.



**SRS MAIN HARNESS  
3P CONNECTOR**

# Troubleshooting

## DTC 1-1

### ⚠ CAUTION

Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

#### Try to reproduce the SRS indicator light:

1. Erase the DTC memory (see page 24-25).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

#### Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-25.

#### Check for an open in the driver's airbag inflator:

1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable, and wait for three minutes.
3. Disconnect the driver's airbag 2P connector from the cable reel 2P connector.
4. Connect the special tool (2 Ω) to the cable reel 2P connector.
5. Reconnect the negative battery cable.
6. Erase the DTC memory (see page 24-25).
7. Read the DTC (see page 24-24).

#### Is DTC 1-1 indicated?

YES

NO

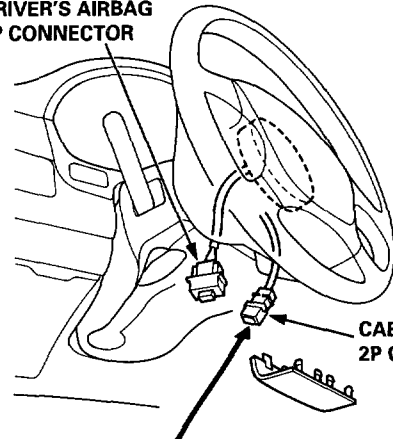
Open or increased resistance in the driver's airbag inflator; replace the driver's airbag assembly (see page 24-55).

#### Check for an open in the cable reel:

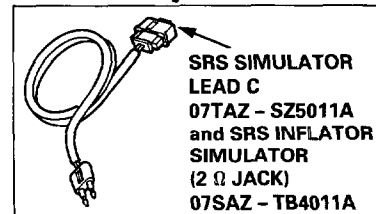
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the special tool (2 Ω) from the cable reel 2P connector.
3. Remove the dashboard lower cover, and disconnect the cable reel 2P connector from the SRS main harness.
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. (cont'd)

To page 24-37

DRIVER'S AIRBAG  
2P CONNECTOR

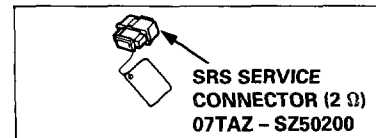


CABLE REEL  
2P CONNECTOR



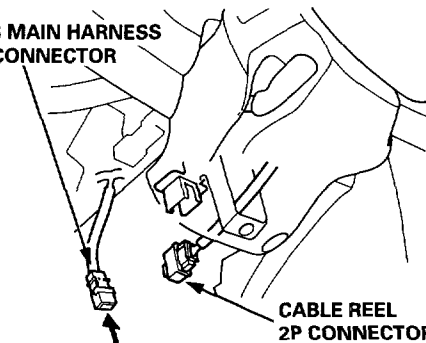
SRS SIMULATOR  
LEAD C  
07TAZ - SZ5011A  
and SRS INFLATOR  
SIMULATOR  
(2 Ω JACK)  
07SAZ - TB4011A

or

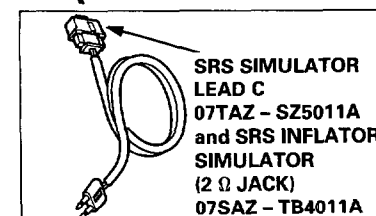


SRS SERVICE  
CONNECTOR (2 Ω)  
07TAZ - SZ50200

SRS MAIN HARNESS  
2P CONNECTOR

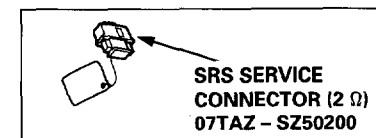


CABLE REEL  
2P CONNECTOR



SRS SIMULATOR  
LEAD C  
07TAZ - SZ5011A  
and SRS INFLATOR  
SIMULATOR  
(2 Ω JACK)  
07SAZ - TB4011A

or



SRS SERVICE  
CONNECTOR (2 Ω)  
07TAZ - SZ50200



From page 24-36

**Check for an open in the cable reel (cont'd)**

5. Reconnect the negative battery cable.
6. Erase the DTC memory (see page 24-25).
7. Read the DTC (see page 24-24).

**Is DTC 1-1 indicated?**

**YES**

**NO**

**Open or increased resistance in the cable reel; replace the cable reel (see page 24-59).**

**Check for an open in the SRS main harness:**

1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the front passenger's airbag connector from the SRS main harness.
3. Disconnect the SRS main harness 18P connector from the SRS unit. Do not disconnect the special tool (2  $\Omega$ ) from the SRS main harness 2P connector.
4. Check resistance between terminals No. 1 and No. 13 of the SRS main harness 18P connector. There should be approx. 2.0 – 3.0  $\Omega$ .

**Is the resistance as specified?**

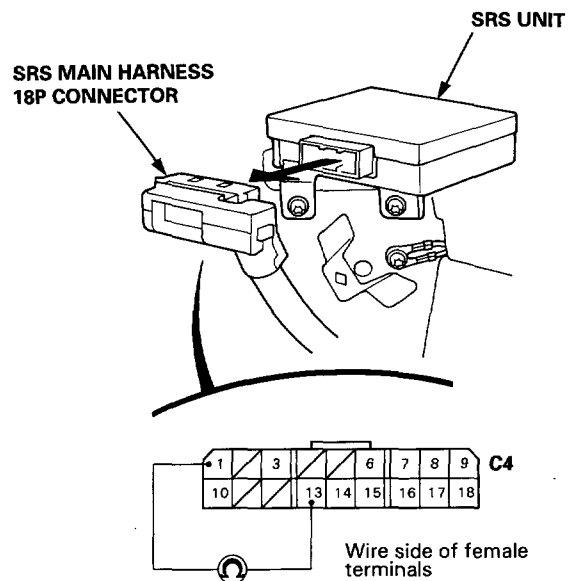
**YES**

**NO**

**Poor contact at the SRS main harness 18P connector; check the connector.**

- If the connector is OK, substitute a known-good SRS unit, and recheck.
- If the problem is still present, replace the SRS main harness.

**Open or increased resistance in the SRS main harness; replace the harness.**



# Troubleshooting

## DTC 1-3

### CAUTION

Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

#### Try to reproduce the SRS indicator light:

1. Erase the DTC memory (see page 24-25).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

#### Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-25.

#### Check for a short to another wire in the driver's airbag inflator:

1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable, and wait for three minutes.
3. Disconnect the driver's airbag 2P connector from the cable reel 2P connector.
4. Connect the special tool (2 Ω) to the cable reel 2P connector.
5. Reconnect the negative battery cable.
6. Erase the DTC memory (see page 24-25).
7. Read the DTC (see page 24-24).

#### Is DTC 1-3 indicated?

YES

NO

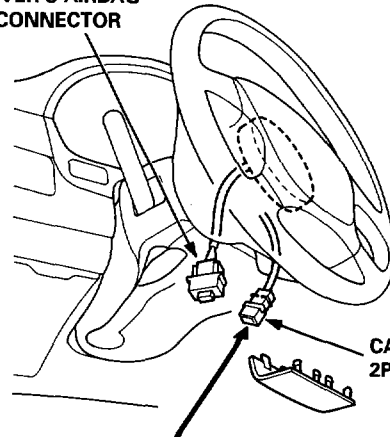
Short in the driver's airbag inflator; replace the driver's airbag assembly (see page 24-55).

#### Check for a short in the cable reel:

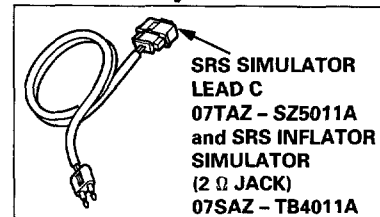
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the special tool (2 Ω) from the cable reel 2P connector.
3. Remove the dashboard lower cover, and disconnect the cable reel 2P connector from the SRS main harness.
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. (cont'd)

To page 24-39

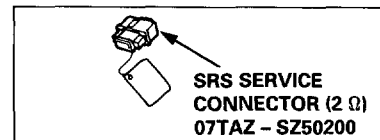
DRIVER'S AIRBAG  
2P CONNECTOR



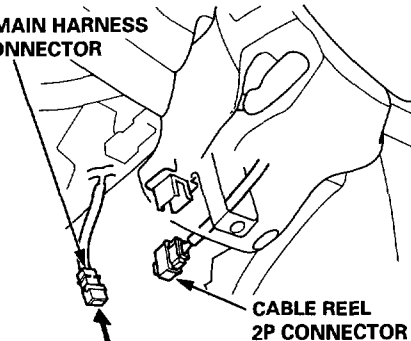
CABLE REEL  
2P CONNECTOR



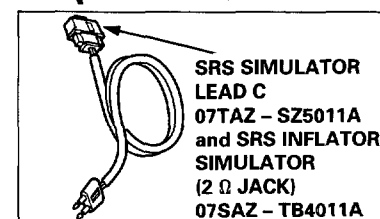
or



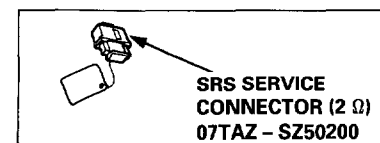
SRS MAIN HARNESS  
2P CONNECTOR



CABLE REEL  
2P CONNECTOR



or







From page 24-38

**Check for a short in the cable reel (cont'd):**

5. Reconnect the negative battery cable.
6. Erase the DTC memory (see page 24-25).
7. Read the DTC (see page 24-24).

**Is DTC 1-3 indicated?**

YES

NO

Short in the cable reel; replace the cable reel (see page 24-59).

**Check for a short in the SRS main harness:**

1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the front passenger's airbag connector from the SRS main harness.
3. Disconnect the SRS main harness 18P connector from the SRS unit. Do not disconnect the special tool (2  $\Omega$ ) from the SRS main harness 2P connector.
4. Check resistance between terminals No. 1 and No. 13 of the SRS main harness 18P connector. There should be approx. 2.0 – 3.0  $\Omega$ .

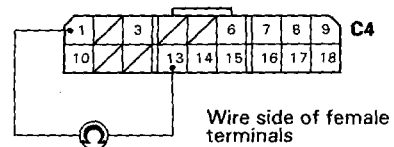
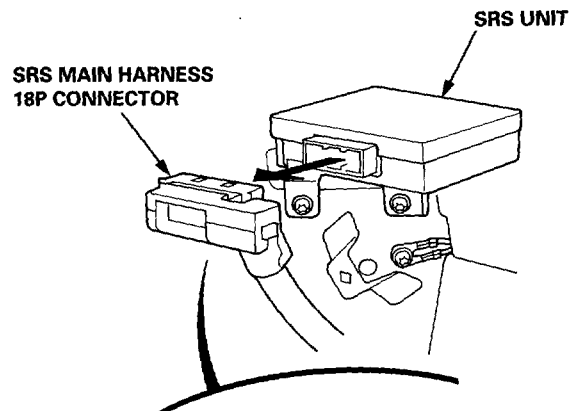
**Is the resistance as specified?**

YES

NO

Faulty SRS unit; replace the SRS unit (see page 24-64).

Short in the SRS main harness; replace the SRS main harness.



# Troubleshooting

## DTC 1-4

### CAUTION

Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

#### Try to reproduce the SRS indicator light:

1. Erase the DTC memory (see page 24-25).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

#### Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-25.

#### Check for a short to power in the driver's airbag inflator:

1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable, and wait for three minutes.
3. Disconnect the driver's airbag 2P connector from the cable reel 2P connector.
4. Connect the special tool (2 Ω) to the cable reel 2P connector.
5. Reconnect the negative battery cable.
6. Erase the DTC memory (see page 24-25).
7. Read the DTC (see page 24-24).

#### Is DTC 1-4 indicated?

YES

NO

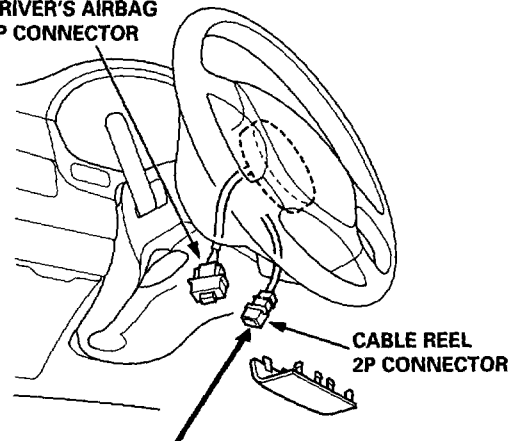
Short to power in the driver's airbag inflator; replace the driver's airbag assembly (see page 24-55).

#### Check for a short to power in the cable reel:

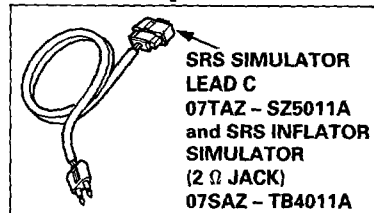
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the special tool (2 Ω) from the cable reel 2P connector.
3. Remove the dashboard lower cover, and disconnect the cable reel 2P connector from the SRS main harness.
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector. (cont'd)

To page 24-41

DRIVER'S AIRBAG  
2P CONNECTOR

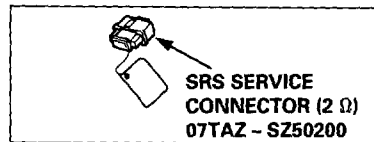


CABLE REEL  
2P CONNECTOR



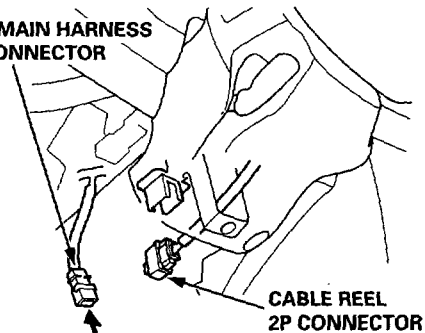
SRS SIMULATOR  
LEAD C  
07TAZ - SZ5011A  
and SRS INFLATOR  
SIMULATOR  
(2 Ω JACK)  
07SAZ - TB4011A

or

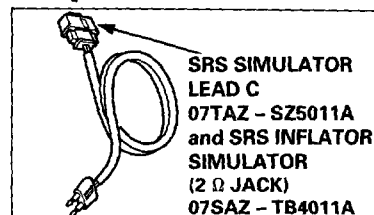


SRS SERVICE  
CONNECTOR (2 Ω)  
07TAZ - SZ50200

SRS MAIN HARNESS  
2P CONNECTOR

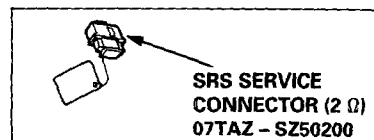


CABLE REEL  
2P CONNECTOR



SRS SIMULATOR  
LEAD C  
07TAZ - SZ5011A  
and SRS INFLATOR  
SIMULATOR  
(2 Ω JACK)  
07SAZ - TB4011A

or



SRS SERVICE  
CONNECTOR (2 Ω)  
07TAZ - SZ50200



From page 24-40

**Check for a short to power in the cable reel (cont'd):**

5. Reconnect the negative battery cable.
6. Erase the DTC memory (see page 24-25).
7. Read the DTC (see page 24-24).

**Is DTC 1-4 indicated?**

YES

NO

**Short to power in the cable reel; replace the cable reel (see page 24-59).**

**Check for a short to power in the SRS main harness:**

1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the front passenger's airbag connector from the SRS main harness.
3. Remove the special tool (2  $\Omega$ ) from the SRS main harness 2P connector.
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Reconnect the negative battery cable.
6. Connect a voltmeter between the No. 1 (+) terminal of the SRS main harness 18P connector and body ground.
7. Turn the ignition switch ON (II), and measure voltage. There should be 0.5 V or less.
8. Turn the ignition switch OFF.
9. Connect a voltmeter between the No. 13 (+) terminal of the SRS main harness 18P connector and body ground.
10. Turn the ignition switch ON (II), and measure voltage. There should be 0.5 V or less.

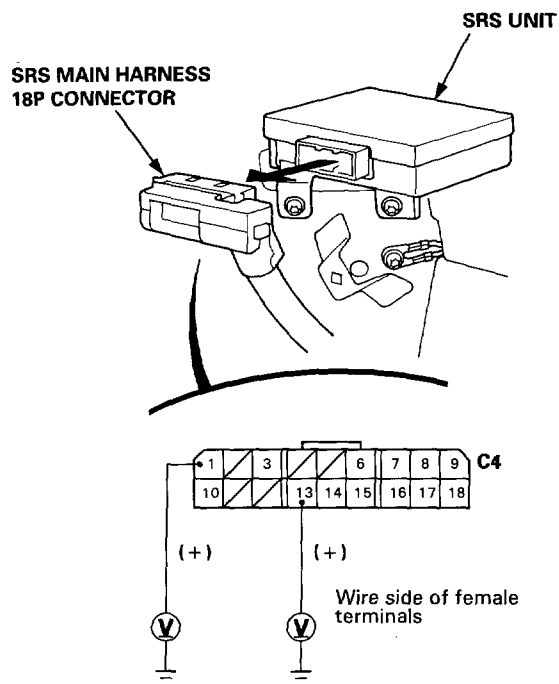
**Are voltages as specified?**

YES

NO

**Faulty SRS unit; replace the SRS unit (see page 24-63).**

**Short to power in the SRS main harness; replace the SRS main harness.**



# Troubleshooting

## DTC 1-5

### CAUTION

Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

#### Try to reproduce the SRS indicator light:

1. Erase the DTC memory (See page 24-25).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

#### Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-25.

#### Check for a short to ground in the driver's airbag inflator:

1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable, and wait for three minutes.
3. Disconnect the driver's airbag 2P connector from the cable reel 2P connector.
4. Connect the special tool (2 Ω) to the cable reel 2P connector.
5. Reconnect the negative battery cable.
6. Erase the DTC memory (see page 24-25).
7. Read the DTC (see page 24-24).

#### Is DTC 1-5 indicated?

YES

NO

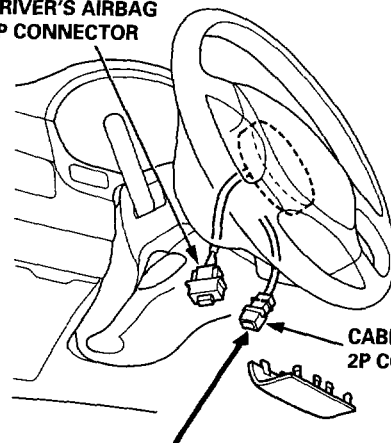
Short to ground in the driver's airbag inflator; replace the driver's airbag assembly (see page 24-55).

#### Check for a short to ground in the cable reel:

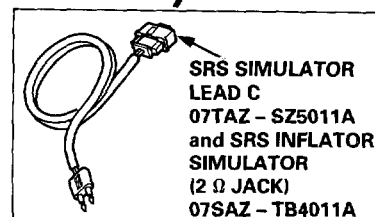
1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the special tool (2 Ω) from the cable reel 2P connector.
3. Remove the dashboard lower cover, and disconnect the cable reel 2P connector from the SRS main harness.
4. Connect the Special tool (2 Ω) to the SRS main harness 2P connector (cont'd).

To page 24-43

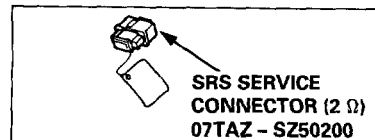
DRIVER'S AIRBAG  
2P CONNECTOR



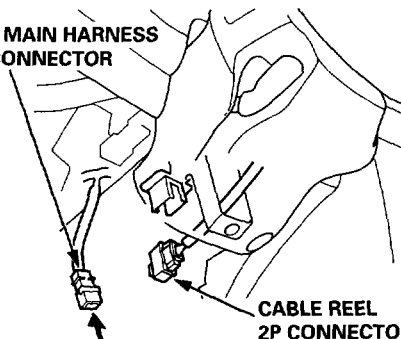
CABLE REEL  
2P CONNECTOR



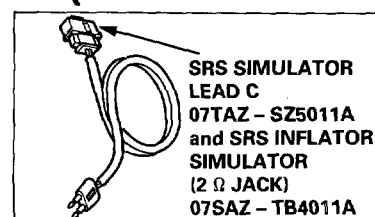
or



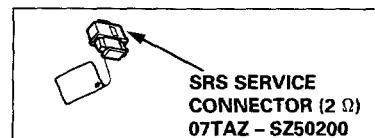
SRS MAIN HARNESS  
2P CONNECTOR



CABLE REEL  
2P CONNECTOR



or





From page 24-42

**Check for a short to ground in the cable reel (cont'd):**

5. Reconnect the negative battery cable.
6. Erase the DTC memory (see page 24-25).
7. Read the DTC (see page 24-24).

**Is DTC 1-5 indicated?**

YES

NO

**Short to ground in the cable reel; replace the cable reel (see page 24-59).**

**Check for a short to ground in the SRS main harness:**

1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the front passenger's airbag 2P connector from the SRS main harness.
3. Remove the special tool ( $2\ \Omega$ ) from the SRS main harness 2P connector.
4. Check resistance between the No. 1 terminal of the SRS main harness 18P connector and ground, and between the No. 13 terminal of the SRS main harness 18P connector and ground. There should be  $1\ M\Omega$  or more.

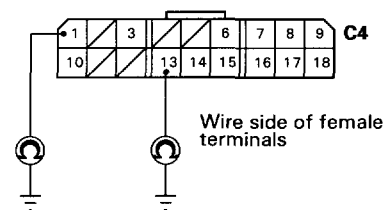
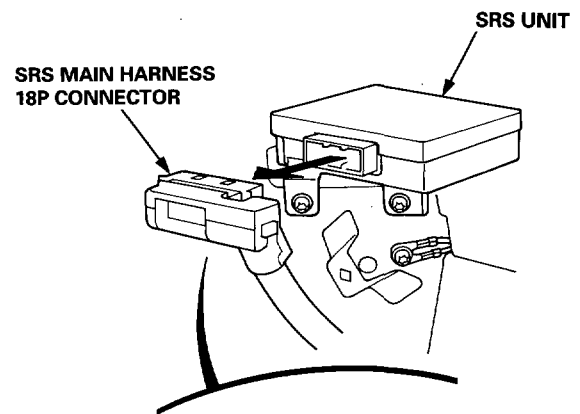
**Is the resistance as specified?**

YES

NO

**Faulty SRS unit; replace the SRS unit (see page 24-63).**

**Short to ground in the SRS main harness; replace the SRS main harness.**



# Troubleshooting

## DTC 2-1

### ⚠ CAUTION

Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

#### Try to reproduce the SRS indicator light:

1. Erase the DTC memory (see page 24-25).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

#### Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-25.

#### Check for an open in the passenger's airbag inflator:

1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable, and wait for three minutes.
3. Disconnect the front passenger's airbag connector from the SRS main harness (see page 24-21).
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector.
5. Reconnect the negative battery cable.
6. Erase the DTC memory (see page 24-25).
7. Read the DTC (see page 24-24).

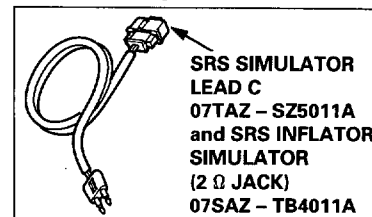
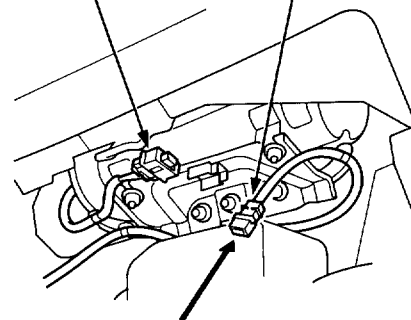
#### Is DTC 2-1 indicated?

YES

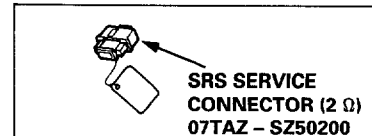
NO

Open or increased resistance in the passenger's airbag inflator; replace the passenger's airbag assembly (see page 24-57).

FRONT PASSENGER'S AIRBAG 2P CONNECTOR  
SRS MAIN HARNESS 2P CONNECTOR



or



To page 24-45



From page 24-44

**Check for an open in the SRS main harness:**

1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's airbag 2P connector from the cable reel 2P connector (see page 24-21).
3. Disconnect the SRS main harness 18P connector from the SRS unit. Do not disconnect the special tool (2  $\Omega$ ) from the SRS main harness 2P connector.
4. Check resistance between the No. 10 terminal and No. 14 terminal of the SRS main harness 18P connector. There should be approx. 2.0 – 3.0  $\Omega$ .

**Is the resistance as specified?**

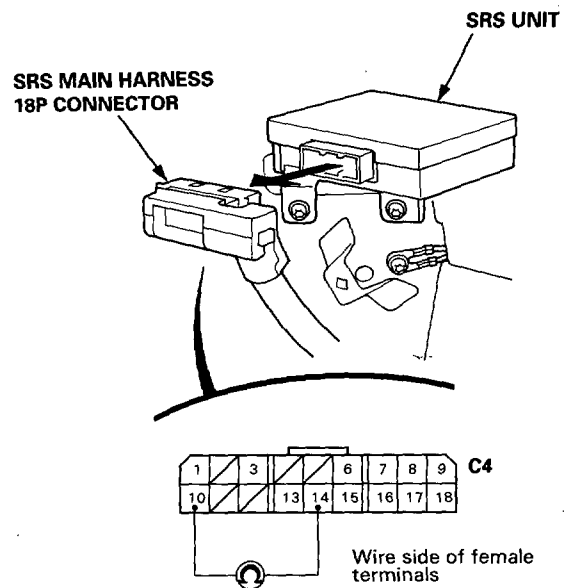
YES

NO

**Poor contact at the SRS main harness 18P connector; check the connector.**

- If the connector is OK, substitute a known-good SRS unit, and recheck.
- If the problem is still present, replace the SRS main harness.

**Open or increased resistance in the SRS main harness; replace the harness.**



# Troubleshooting

## DTC 2-3

### ⚠ CAUTION

Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

#### Try to reproduce the SRS indicator light:

1. Erase the DTC memory (see page 24-25).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

#### Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-25.

#### Check for a short to another wire or decreased resistance in the passenger's airbag inflator:

1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable, and wait for three minutes.
3. Disconnect the front passenger's airbag 2P connector from the SRS main harness (see page 24-21).
4. Connect the special tool ( $2\ \Omega$ ) to the SRS main harness 2P connector.
5. Reconnect the negative battery cable.
6. Erase the DTC memory (see page 24-25).
7. Read the DTC (see page 24-24).

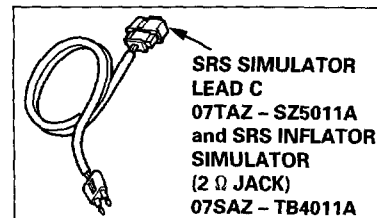
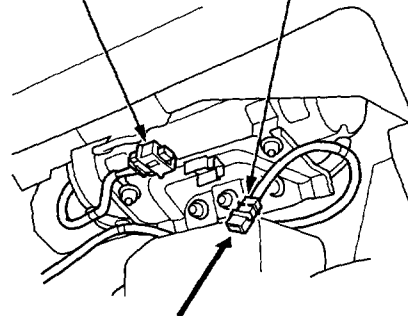
#### Is DTC 2-3 indicated?

YES

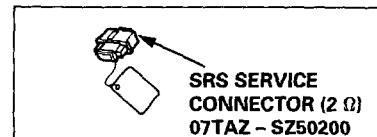
NO

Short to another wire or decreased resistance in the passenger's airbag inflator; replace the passenger's airbag assembly (see page 24-57).

FRONT PASSENGER'S AIRBAG 2P CONNECTOR  
SRS MAIN HARNESS 2P CONNECTOR



or



To page 24-47





From page 24-37

**Check for a short to another wire or decreased resistance in the SRS main harness:**

1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's airbag 2P connector from the cable reel 2P connector.
3. Disconnect the SRS main harness 18P connector from the SRS unit. Do not disconnect the special tool ( $2\ \Omega$ ) from the SRS main harness 2P connector.
4. Check resistance between the No. 10 terminal and No. 14 terminal of the SRS main harness 18P connector. There should be approx.  $2.0 - 3.0\ \Omega$ .

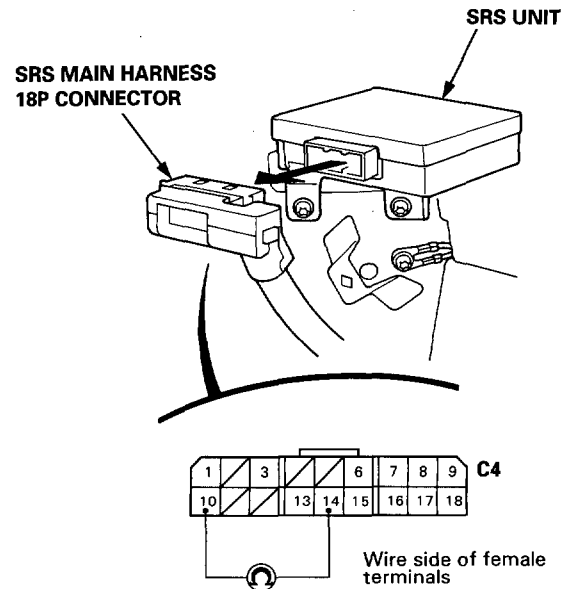
**Is the resistance as specified?**

YES

NO

**Faulty SRS unit; replace the SRS unit (see page 24-63).**

**Short to another wire or decreased resistance in the SRS main harness; replace the SRS main harness.**



# Troubleshooting

## DTC 2-4

### ⚠ CAUTION

Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

#### Try to reproduce the SRS indicator light:

1. Erase the DTC memory (see page 24-25).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

#### Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-25.

#### Check for a short to power in the passenger's airbag inflator:

1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable, and wait for three minutes.
3. Disconnect the front passenger's airbag 2P connector from the SRS main harness (see page 24-21).
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector.
5. Reconnect the negative battery cable.
6. Erase the DTC memory (see page 24-25).
7. Read the DTC (see page 24-24).

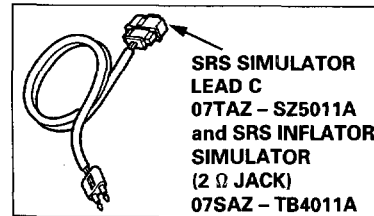
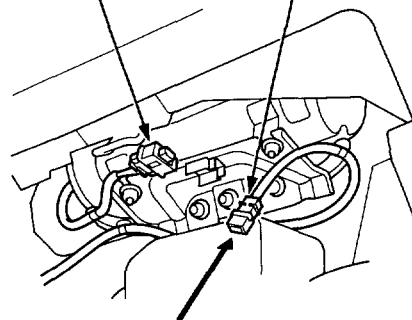
#### Is DTC 2-4 indicated?

YES

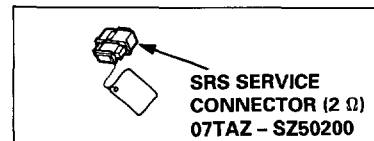
NO

Short to power in the passenger's airbag inflator; replace the passenger's airbag assembly (see page 24-57).

FRONT PASSENGER'S AIRBAG 2P CONNECTOR  
SRS MAIN HARNESS 2P CONNECTOR



or



To page 24-49



From page 24-48

**Check for a short to power in the SRS main harness:**

1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's airbag 2P connector from the cable reel 2P connector.
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Remove the special tool ( $2\ \Omega$ ) from the SRS main harness 2P connector.
5. Reconnect the negative battery cable.
6. Connect a voltmeter between the No. 10 (+) terminal of SRS main harness 18P connector and ground.
7. Turn the ignition switch ON (II), and measure voltage. There should be 0.5 V or less.
8. Connect a voltmeter between the No. 14 (+) terminal of the SRS main harness 18P connector and ground, and measure voltage. There should be 0.5 V or less.

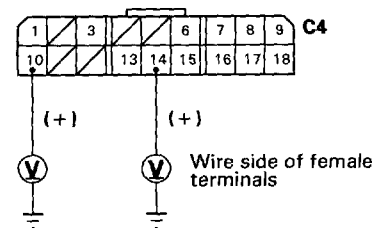
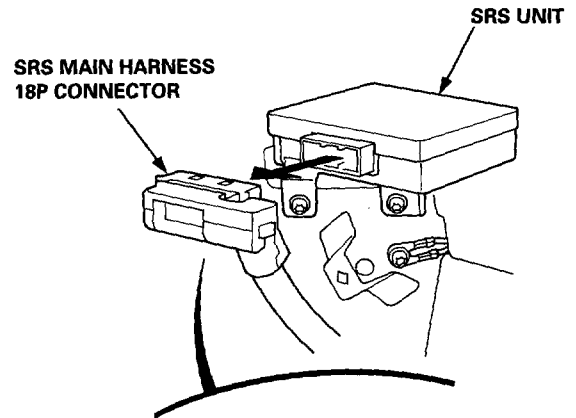
Are voltages as specified?

YES

NO

Faulty SRS unit; replace the SRS unit (see page 24-63).

Short to power in the SRS main harness; replace the SRS main harness.



# Troubleshooting

## DTC 2-5

### ⚠ CAUTION

Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

#### Try to reproduce the SRS indicator light:

1. Erase the DTC memory (see page 24-25).
2. Turn the ignition switch ON (II), and check that the SRS indicator light comes on for about six seconds and then goes off.

#### Does the SRS indicator light stay on?

YES

NO

Intermittent failure, system is OK at this time. See Troubleshooting Intermittent Failures on page 24-25.

#### Check for a short to ground in the passenger's airbag inflator:

1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable, and wait for three minutes.
3. Disconnect the front passenger's airbag 2P connector from the SRS main harness (see page 24-21).
4. Connect the special tool (2 Ω) to the SRS main harness 2P connector.
5. Reconnect the negative battery cable.
6. Erase the DTC memory (see page 24-25).
7. Read the DTC (see page 24-24).

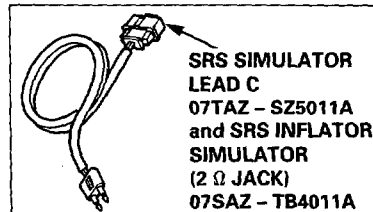
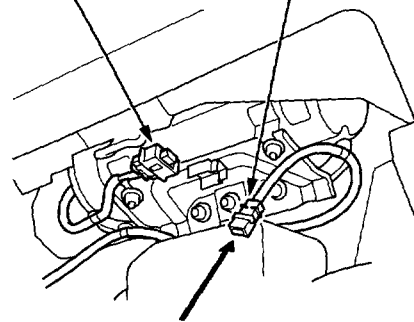
#### Is DTC 2-5 indicated?

YES

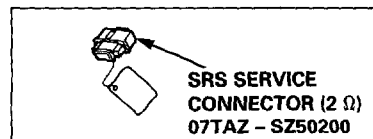
NO

Short to ground in the passenger's airbag inflator; replace the passenger's airbag assembly (see page 24-57).

FRONT PASSENGER'S AIRBAG 2P CONNECTOR  
SRS MAIN HARNESS 2P CONNECTOR



or



To page 24-51



From page 24-50

**Check for a short to ground in the SRS main harness:**

1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's airbag 2P connector from the cable reel 2P connector.
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Remove the special tool ( $2\ \Omega$ ) from the SRS main harness 2P connector.
5. Check resistance between the No. 10 terminal of the SRS main harness 18P connector and ground, and between the No. 14 terminal of the SRS main harness 18P connector and ground. There should be  $1\ M\Omega$  or more.

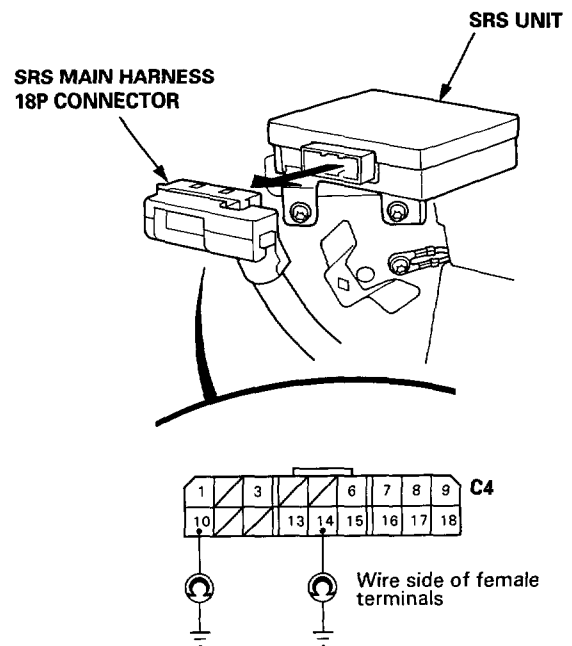
**Is the resistance as specified?**

**YES**

**NO**

**Faulty SRS unit; replace the SRS unit (see page 24-63).**

**Short to ground in the SRS main harness; replace the SRS main harness.**



# Troubleshooting

## DTC 9-2

### ⚠ CAUTION

Whenever the ignition switch is ON (II), or has been turned OFF for less than three minutes, be careful not to bump the SRS unit; the airbags could accidentally deploy and cause damage or injuries.

**Check the fuse:**  
Check for blown No. 25 (10 A) fuse in the under-dash fuse/relay box.

**Is the fuse OK?**

YES

NO

(F) To page 24-53

Replace the fuse. Turn the ignition switch ON (II), and check that the fuse doesn't blow.

**Is the fuse OK?**

YES

NO

The problem has disappeared. Test-drive the vehicle and see Troubleshooting Intermittent Failures on page 24-25.

**Check for short to ground between the under-dash fuse/relay box and the SRS unit.**

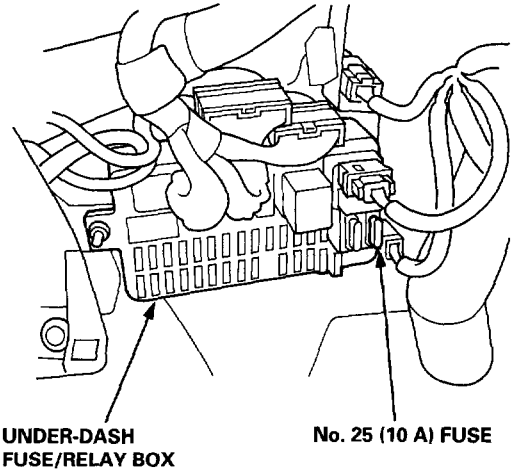
1. Turn the ignition switch OFF.
2. Disconnect the negative battery cable, and wait for three minutes.
3. Disconnect the driver's and front passenger's airbag connectors (see page 24-21).
4. Disconnect the SRS main harness 18P connector from the SRS unit.
5. Check resistance between the No. 3 terminal of the SRS main harness 18P connector and ground. There should be  $1 \frac{1}{2} M\Omega$ .

**Is the resistance as specified?**

YES

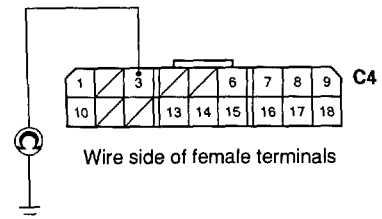
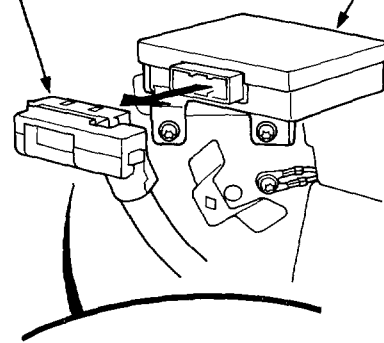
NO

Faulty SRS unit; replace the SRS unit (see page 24-63).



SRS MAIN HARNESS 18P CONNECTOR

SRS UNIT



(G)

To page 24-53



From page 24-52  
(G)

**Check for short to ground in the SRS main harness:**

1. Disconnect the SRS main harness 2P connector from the under-dash fuse/relay box.
2. Check resistance between the No. 3 terminal of the SRS main harness 18P connector and ground. There should be 1 MΩ.

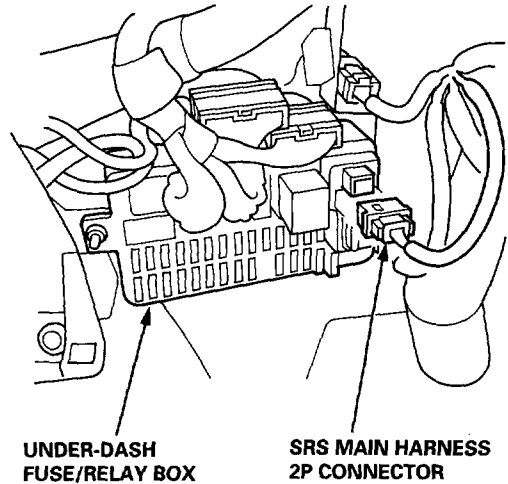
Is the resistance as specified?

YES

NO

Short to ground in the under-dash fuse/relay box; replace the under-dash fuse/relay box.

Short to ground in the SRS main harness; replace the SRS main harness.



(F) From page 24-52

**Check for an open in the SRS main harness:**

1. Disconnect the negative battery cable, and wait for three minutes.
2. Disconnect the driver's and front passenger's airbag connectors (see page 24-21).
3. Disconnect the SRS main harness 18P connector from the SRS unit.
4. Reconnect the negative battery cable.
5. Connect a voltmeter between the No. 3 terminal of the SRS main harness 18P connector and ground.
6. Turn the ignition switch ON (II), and measure voltage.

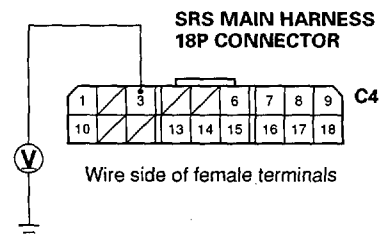
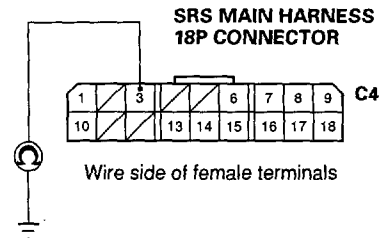
Is there battery voltage?

YES

NO

Poor contact at the SRS main harness 18P connector; check the connector.

- If the connector is OK, substitute a known-good SRS unit, and recheck.
- If the problem is still present, replace the SRS main harness



To page 24-54

(cont'd)

# Troubleshooting

## DTC 9-2 (cont'd)

From page 24-53

### Check for an open in the SRS main harness:

1. Turn the ignition switch OFF.
2. Disconnect the SRS main harness 2P connector from the under-dash fuse/relay box.
3. Check resistance between the No. 2 terminal of the SRS main harness 2P connector and No. 3 terminal of the SRS main harness 18P connector.  
There should be  $0^{+1.0}_{-0} \Omega$ .

### Is the resistance as specified?

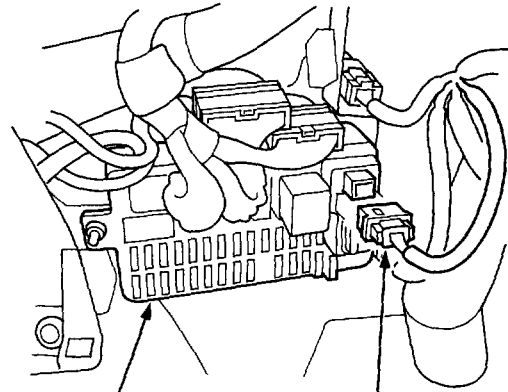
YES

NO

### Poor contact at the SRS main harness 2P connector; check the connector.

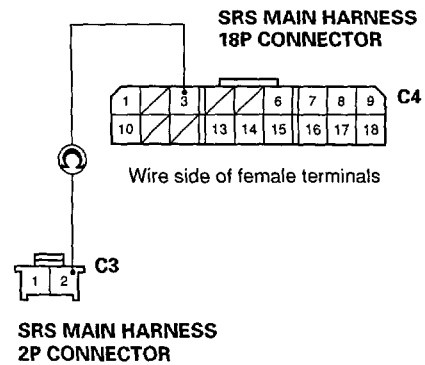
- If the connector is OK, substitute a known-good under-dash fuse/relay box, and recheck.
- If the problem is still present, replace the SRS main harness.

Open in the SRS main harness; replace the SRS main harness.



UNDER-DASH FUSE/RELAY BOX

SRS MAIN HARNESS 2P CONNECTOR



SRS MAIN HARNESS 18P CONNECTOR

Wire side of female terminals

SRS MAIN HARNESS 2P CONNECTOR



# Driver's Airbag

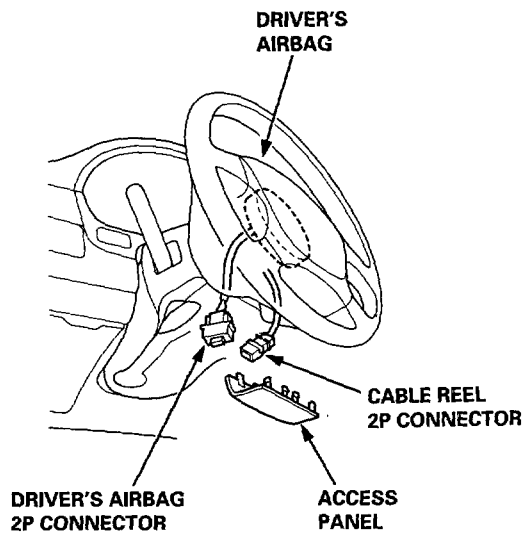


## Replacement

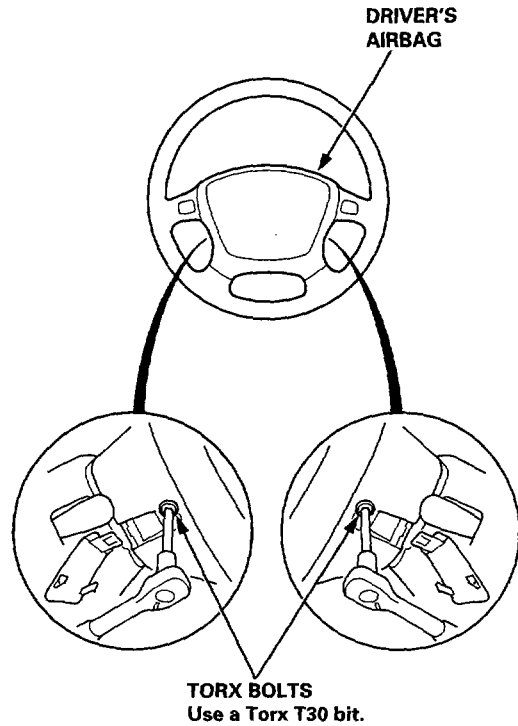
### ⚠ CAUTION

- Removal of the airbag must be performed according to the precautions/procedures described before.
- Disconnect the negative battery cable and wait at least three minutes beginning work.

1. Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel. When disconnected, the airbag connector is automatically shorted.



2. Remove the two Torx bolts from the steering wheel, and disconnect the horn connector. Remove the driver's airbag.

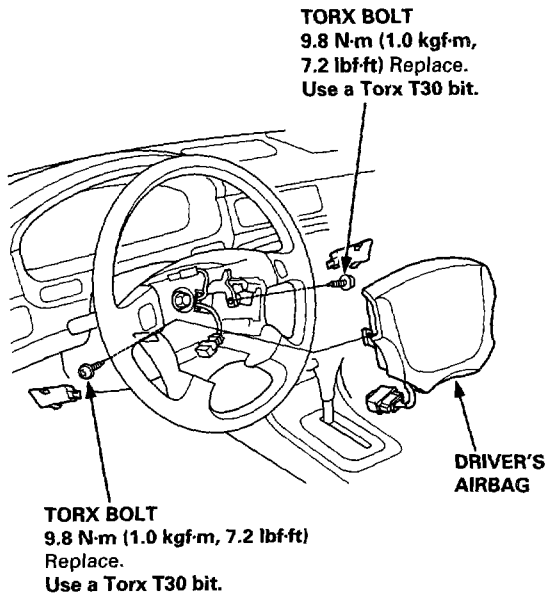


(cont'd)

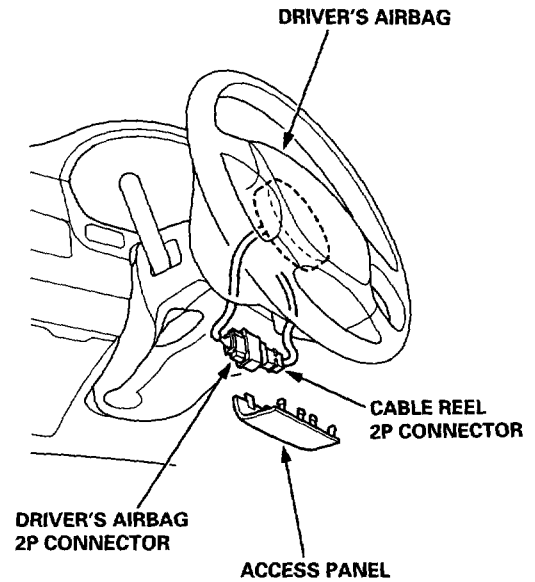
# Driver's Airbag

## Replacement (cont'd)

3. Place the new driver's airbag into the steering wheel, and secure it with new Torx bolts.



4. Connect the driver's airbag 2P connector to the cable reel 2P connector, then install the access panel on the steering wheel.



5. Connect the negative battery cable.
6. After installing the airbag assembly, confirm proper system operation:
  - Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.
  - Make sure both horn buttons work.

# Front Passenger's Airbag

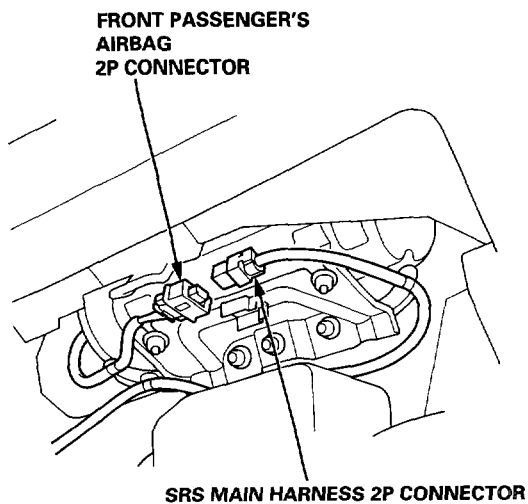


## Replacement

### ⚠ CAUTION

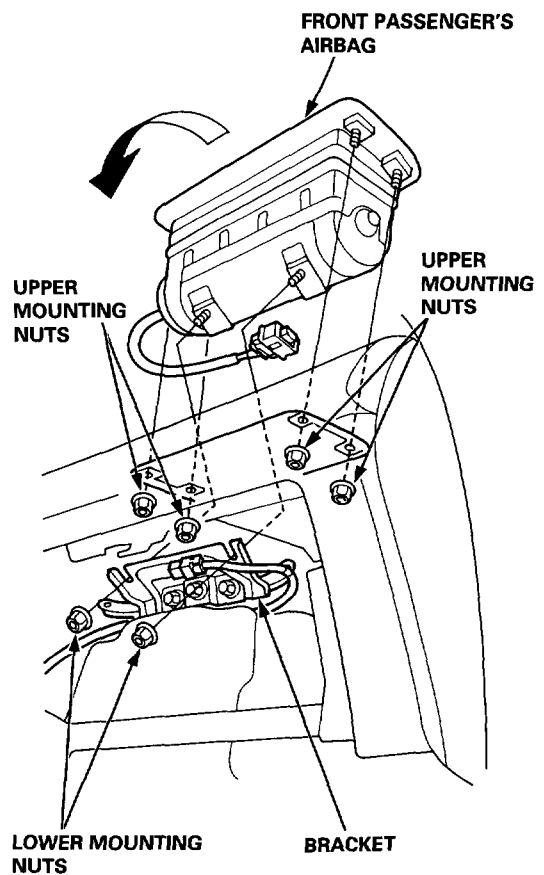
- Removal of the airbag must be performed according to the precautions/procedures described before.
- Disconnect the negative battery cable and wait at least three minutes beginning work.

1. Remove the glove box (see section 20).
2. Disconnect the 2P connector between the front passenger's airbag and SRS main harness. When disconnected, the airbag connector is automatically shorted.



3. Remove the six mounting nuts.
4. Lift the front passenger's airbag out of the dashboard by covering the lid and dashboard with a cloth, and prying carefully with a flat-tip screwdriver.

NOTE: Do not confuse the lower mounting nuts with the upper mounting nuts. The upper mounting nuts are not self-locking.



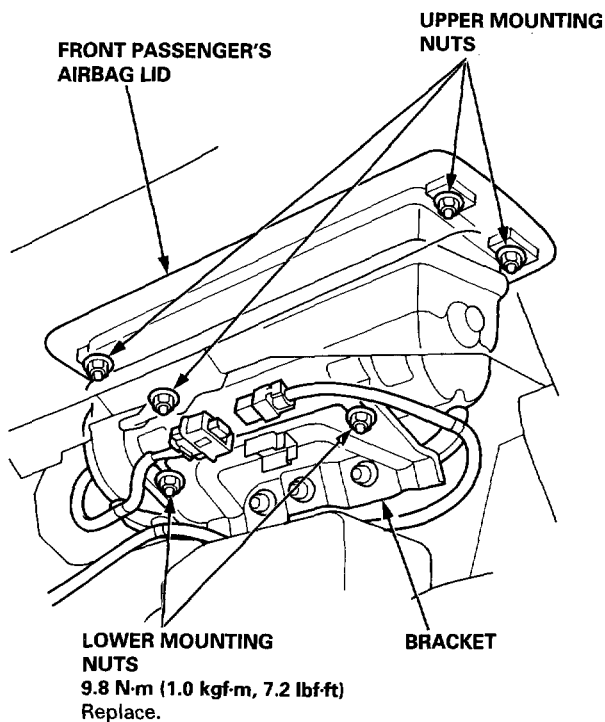
(cont'd)

# Front Passenger's Airbag

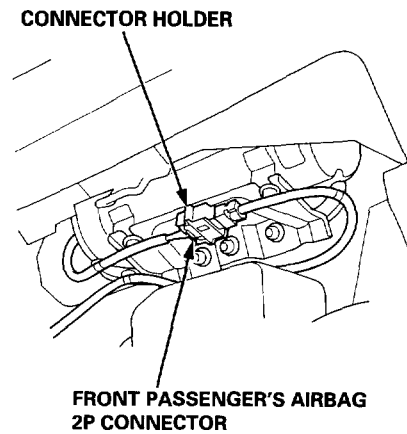
## Replacement (cont'd)

5. Place the front passenger's airbag into the dashboard. Loosely install all six mounting nuts. Tighten the upper four nuts first, then tighten the lower two nuts. The lower mounting brackets can be adjusted if necessary.

**NOTE:** If there is some space between the airbag lid and the dashboard after tightening the nuts, loosen the lower mounting nuts, and lightly press down the airbag. Then retighten the lower mounting nuts.



6. Attach the airbag connector to the connector holder, then reinstall the glove box.



7. Connect the negative battery cable.
8. After installing the airbag, confirm proper system operation:  
Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.

# Cable Reel

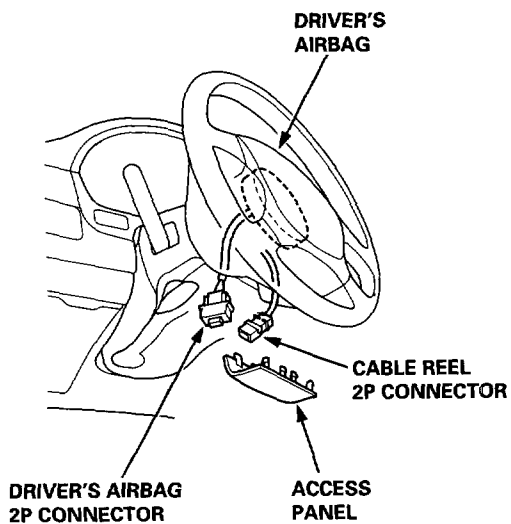


## Replacement

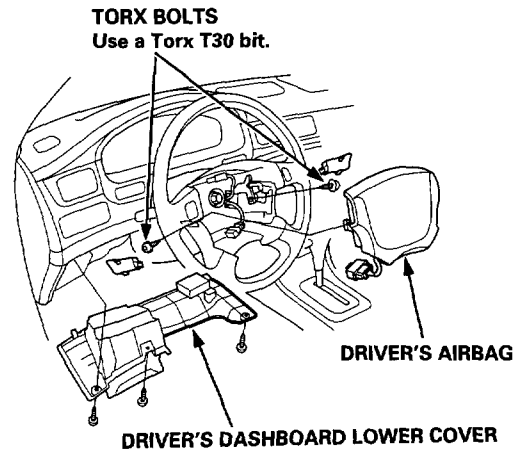
### ⚠ CAUTION

- Removal of the cable reel must be performed according to the precautions/procedures described before.
- Disconnect the negative battery cable and wait at least three minutes beginning work.

1. Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel.



2. Make sure the wheels are aligned straight ahead.
3. Remove the driver's dashboard lower cover.



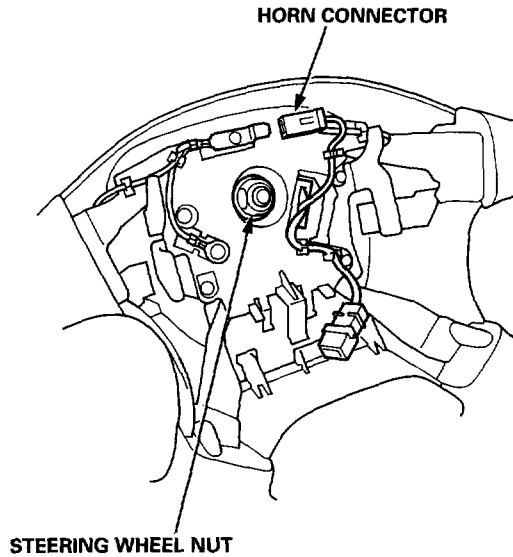
4. Remove the two Torx bolts from the steering wheel, then remove the driver's airbag.

(cont'd)

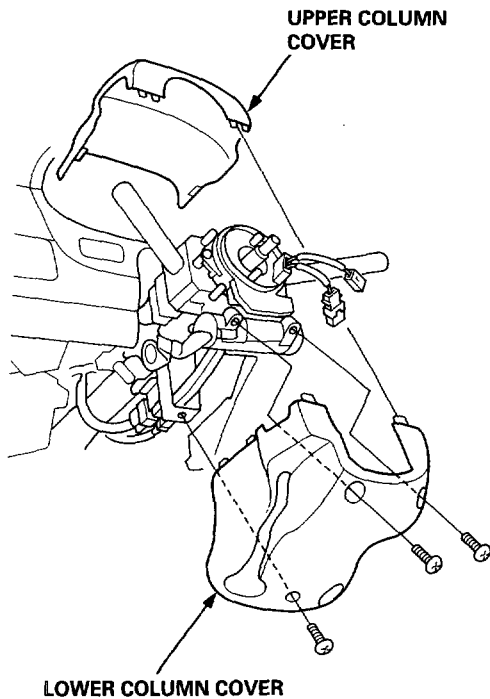
# Cable Reel

## Replacement (cont'd)

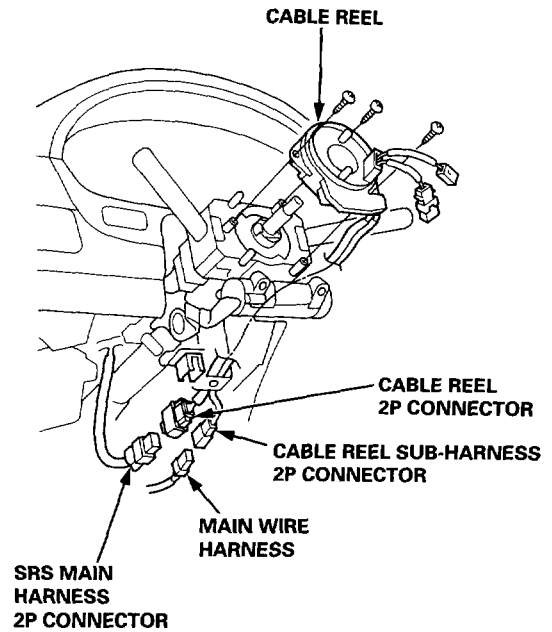
5. Disconnect the connectors from the horn switch, then remove the steering wheel nut.



6. Remove the steering wheel from the column.
7. Remove the steering column covers.



8. Disconnect the 2P connector between the cable reel and main wire harness, and remove the 2P connector between the cable reel and SRS main harness.



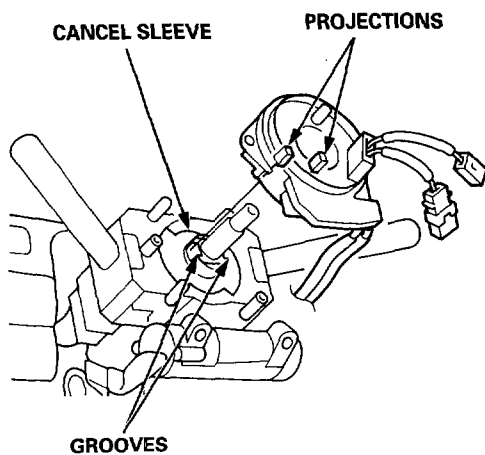
9. Remove the cable reel from the column.



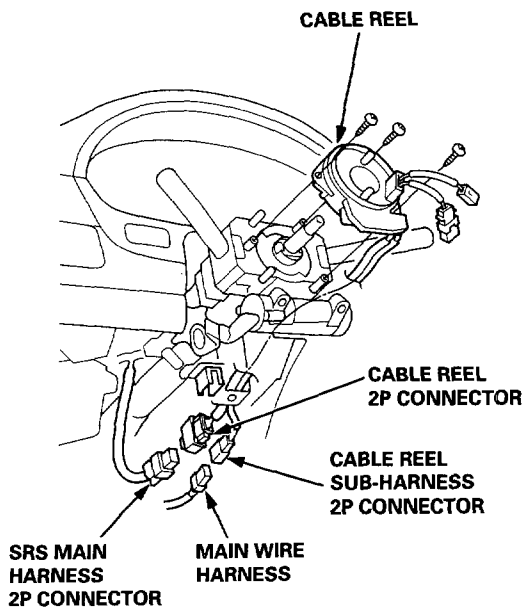
## CAUTION

- Installation of the cable reel must be performed according to the precautions/procedures described before.
- Be sure to check the negative cable from the battery is disconnected before beginning work.

10. Align the cancel sleeve grooves with the cable reel projections.

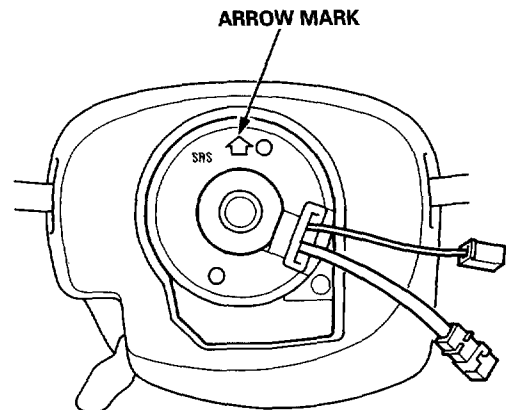


11. Carefully install the cable reel on the steering column shaft. Then connect the 2P connector to the SRS main harness, and connect the 2P connector to the main wire harness.

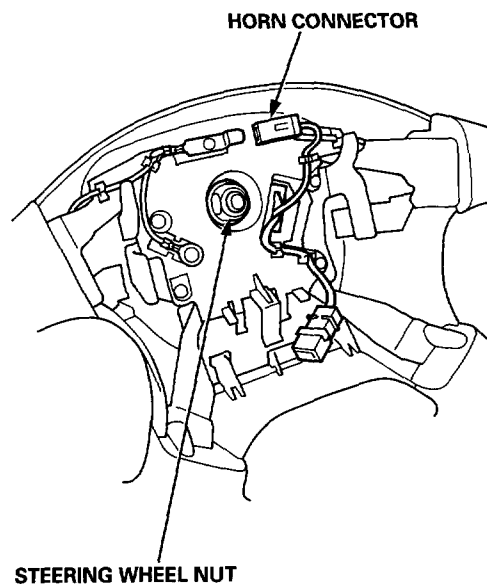


12. Install the steering column covers.

13. If necessary, center the cable reel. (New replacement cable reels come centered.) Do this by first rotating the cable reel clockwise until it stops. Then rotate it counterclockwise (approximately two and a half turns) until the arrow mark on the cable reel label points straight up.



14. Install the steering wheel, then connect the horn connector.



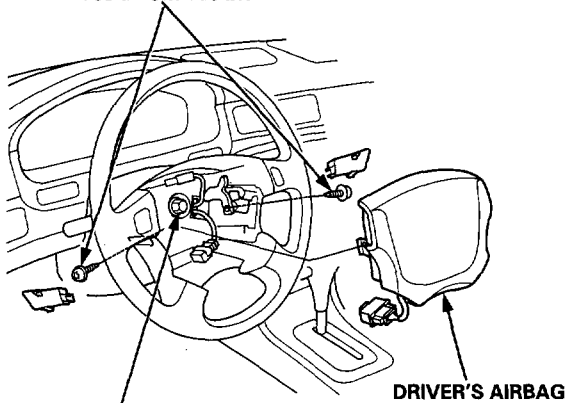
(cont'd)

# Cable Reel

## Replacement (cont'd)

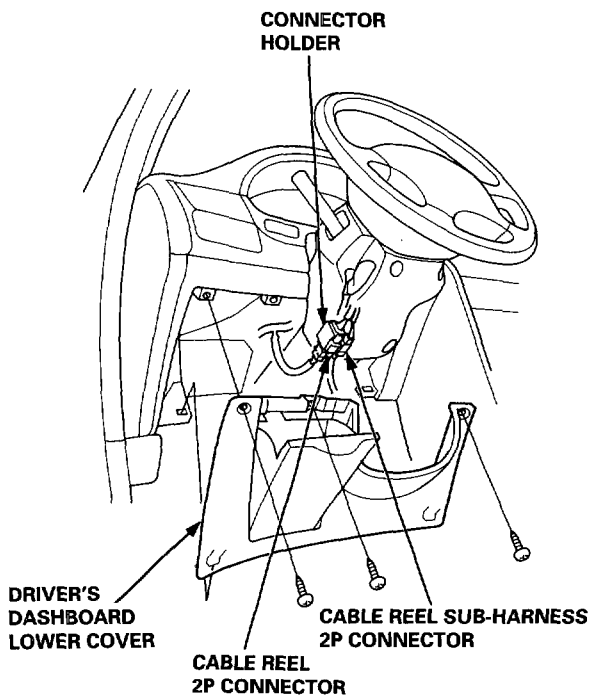
15. Install the steering wheel nut, then install the driver's airbag.

**TORX BOLTS**  
9.8 N·m (1.0 kgf·m, 7.2 lbf·ft)  
Replace.  
Use a Torx T30 bit.



**STEERING WHEEL NUT**  
50 N·m (5.0 kgf·m, 36 lbf·ft)

16. Attach the cable reel both 2P connectors to the connector holder. Then install the driver's dashboard lower cover.



17. Reconnect the driver's airbag 2P connector to the cable reel 2P connector, and reinstall the access panel on the steering wheel.

18. Reconnect the negative battery cable.

19. After installing the cable reel, confirm proper system operation:

- Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.
- Make sure both horn buttons work.
- Make sure the headlight and wiper switches work.





## Replacement

### ⚠ CAUTION

- Removal of the SRS unit must be performed according to the precautions/procedures described before.
- Disconnect the negative battery cable and wait at least three minutes beginning work.

1. Disconnect the airbag connectors. (When disconnected, the airbag connectors are automatically shorted.)

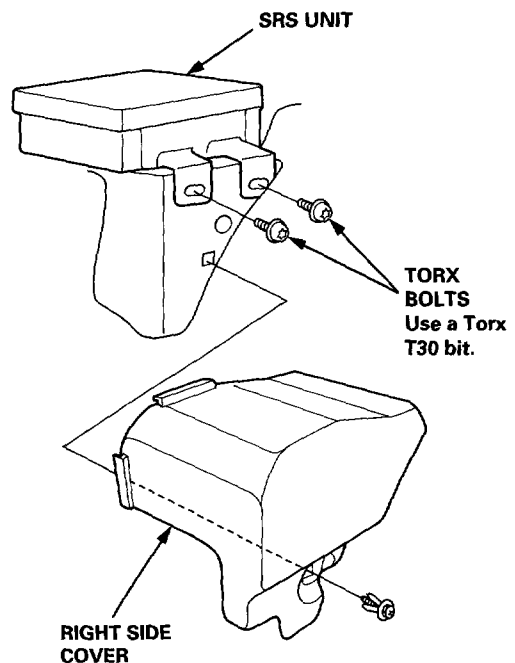
#### Driver's Side:

- Remove the access panel from the steering wheel, then disconnect the 2P connector between the driver's airbag and cable reel (see page 24-21).

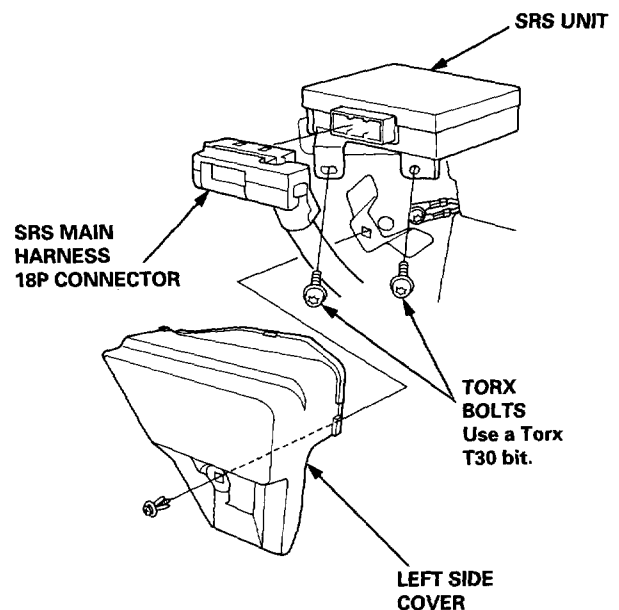
#### Front Passenger's Side:

- Disconnect the 2P connector between the front passenger's airbag and SRS main harness (see page 24-21).

2. Remove the right side cover from the SRS unit.



3. Remove the left side cover from the SRS unit, then disconnect the SRS main harness 18P connector from the SRS unit.



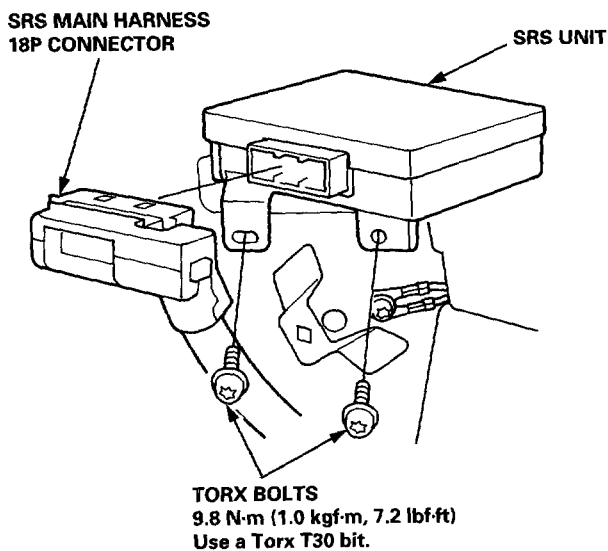
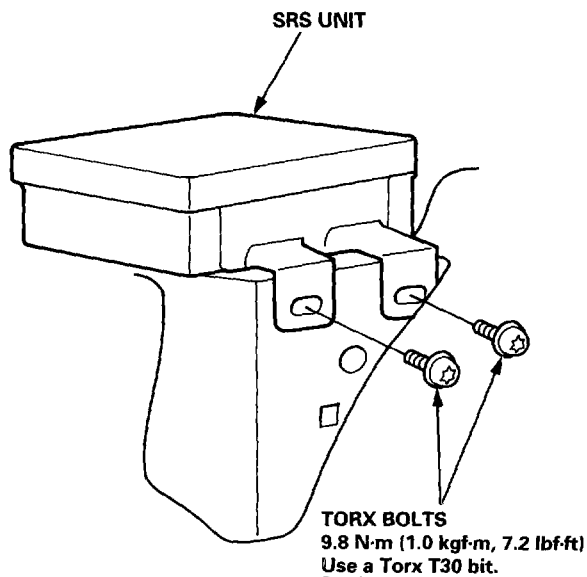
4. Remove the four Torx bolts from the SRS unit, then pull out the SRS unit from the driver's side.

(cont'd)

# SRS Unit

## Replacement (cont'd)

5. Install the new SRS unit.



6. Connect the SRS main harness 18P connector to the SRS unit; push it into position until it clicks.
7. Install the SRS unit covers (right and left). Make sure the covers snap together in the middle.

8. Reconnect the driver's airbag 2P connector to the cable reel 2P connector, then reinstall the access panel on the steering wheel.
9. Reconnect the front passenger's airbag connector to the SRS main harness.
10. Reconnect the negative battery cable.
11. After installing the SRS unit, confirm proper system operation: Turn the ignition switch ON (II); the SRS indicator light should come on for about six seconds and then go off.

# Airbag Scrapping



## Procedure

Before scrapping any airbags (including those in a whole vehicle to be scrapped), the airbags must be deployed. If the vehicle is still within the warranty period, before you deploy the airbags, the local Honda Service Manager must give approval and/or special instructions. Only after the airbags have been deployed (as the result of vehicle collision, for example), can they be scrapped. If the airbags appear intact (not deployed) treat them with extreme caution.

Follow this procedure:

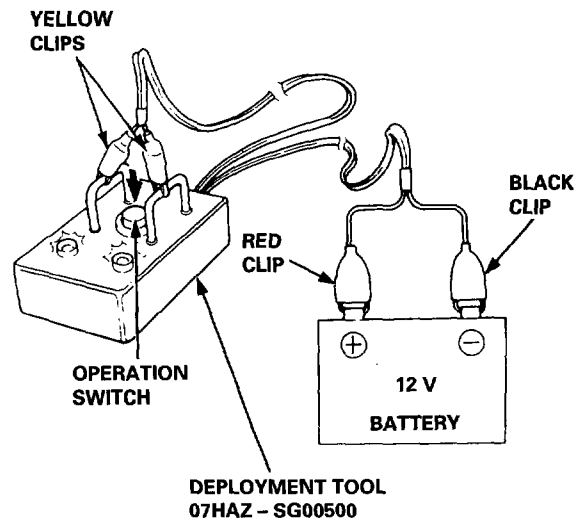
1. Deployment Preparations (see pages 24-66 through 71).
2. Deployment (see pages 24-72 and 73).
3. Disposal (see page 24-73).

### CAUTION

If you scrap more than one airbag, first complete the deployment procedure for one airbag, and only then start with step 1 of Deployment Preparations for the next airbag. Otherwise, severe personal injury could result from deployment.

## Deployment Tool Check

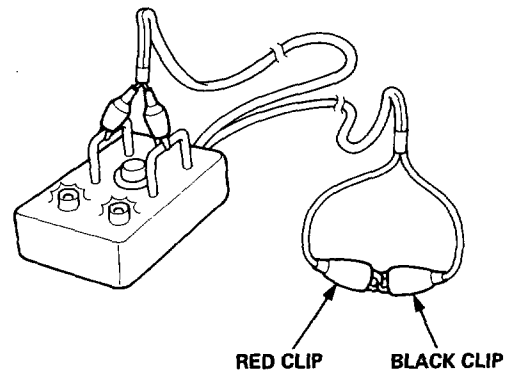
1. Connect the yellow clips to both switch protector handles on the tool, and connect the red (+) and black (-) clips to a 12 V battery.



2. Push the operation switch: green means the tool is OK; red means the tool is faulty.
3. After the check, disconnect the red and black clips from the battery, and connect them to each other.

### CAUTION

Do not reconnect the red and black clips to the battery until all preparations for deployment are finished. Otherwise, severe personal injury could result from accidental deployment.



# Airbag Scrapping

## In-vehicle Deployment Preparations (With Deployment Tool)

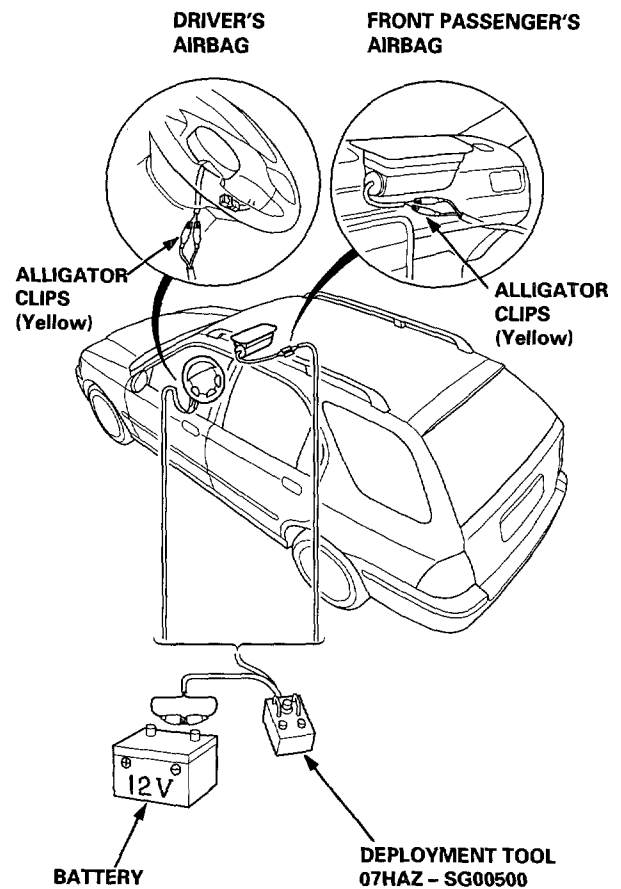
NOTE: If an SRS vehicle is to be entirely scrapped, its airbags should be deployed while still in the vehicle. The airbags should not be considered as salvageable parts and should never be installed in another vehicle.

1. Disconnect the negative battery cable, and wait at least three minutes.
2. Confirm that the deployment tool is functioning properly by following the check procedure on the tool box label, or on page 24-65.
3. Remove the access panel, then disconnect the 2P connector between the driver's airbag and the cable reel (see page 24-21).
4. Disconnect the front passenger's airbag 2P connector from the SRS main harness (see page 24-21).

5. Cut off the airbag connector, strip the ends of the airbag wires, and connect the deployment tool alligator clips to the airbag. Place the deployment tool at least 10 meters (thirty feet) away from the airbag.

### CAUTION

Do not position yourself in front of the airbag during off the airbag connector.



6. Go to Deployment (With Deployment Tool) on page 24-72.



## Out-of-vehicle Deployment Preparations (With Deployment Tool)

NOTE: If an intact airbag assembly has been removed from a scrapped vehicle or has been found defective or damaged during transit, storage or service, it should be deployed as follows.

### CAUTION

Position a removed airbag always with the pad surface up. If the airbag is improperly positioned face down, accidental deployment could propel the unit with enough force to cause serious injury.

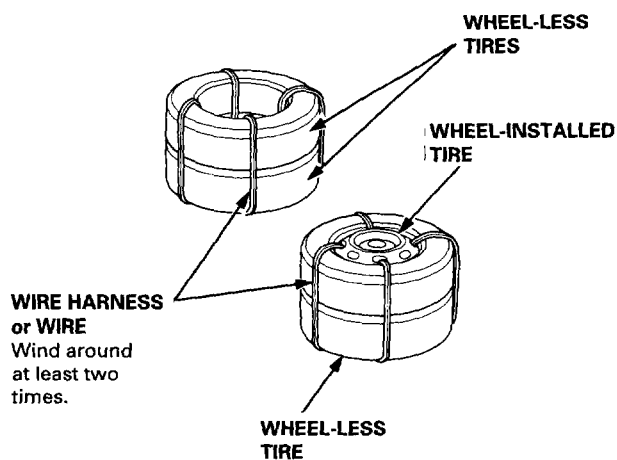
#### Necessary Equipment:

- Four tires for 15 inch wheels or bigger without wheel, and one tire of the same size with wheel

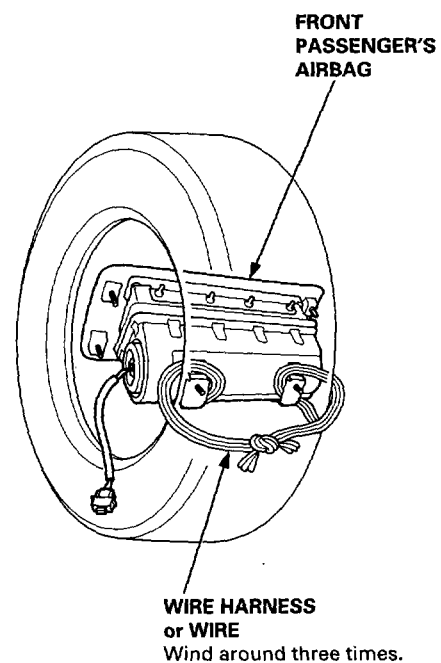
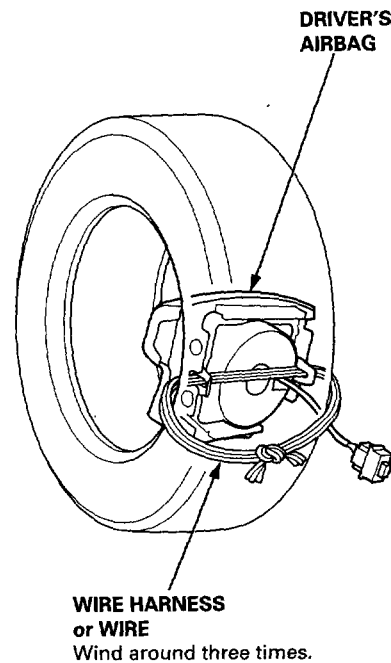
#### NOTE:

- Preferably take used tires.
  - Tires which were used for airbag deployment can be reused on vehicles after carefully cleaning their inner side with water.
- Vehicle wire harness with a core wire cross sectional area of at least 1.25 mm<sup>2</sup> (0.002 in<sup>2</sup>) or iron wire with a diameter of more than 1.2 mm (0.05 in)
  - Deployment tool

1. Disconnect the negative battery cable, and wait at least three minutes.
2. Confirm that the deployment tool is functioning properly by following the check procedure on the tool box label, or on page 24-65.
3. Remove the driver's airbag (see page 24-55).
4. Remove the front passenger's airbag (see page 24-57).
5. With vehicle wire harness or wire, tie two of the wheel-less tires together, then tie one wheel-less tire and the wheel-installed tire together. (Wind around at least two times.)



6. Tie the airbag assembly with vehicle wire harness or wire to the remaining wheel-less tire as shown. (Wind around three times.)



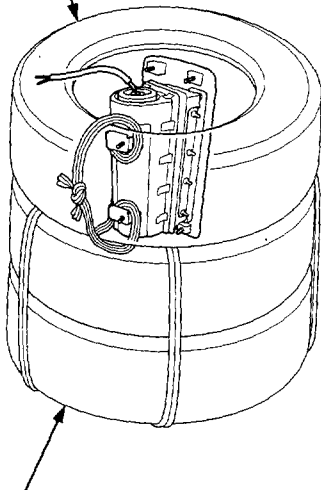
(cont'd)

# Airbag Scrapping

## Out-of-vehicle Deployment Preparations (With Deployment Tool) (cont'd)

7. Place the set of two wheel-less tires on flat ground, and place the tire with the airbag on them.
8. Cut off the airbag connector, and strip the ends of the airbag wires. Go immediately to step 9.

TIRE with installed AIRBAG



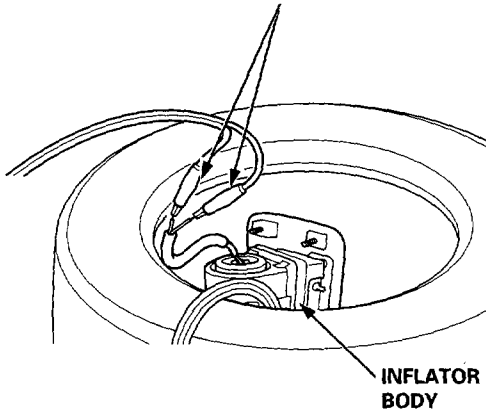
WHEEL-LESS TIRE SET

9. Connect the deployment tool alligator clips to the airbag wires.

### CAUTION

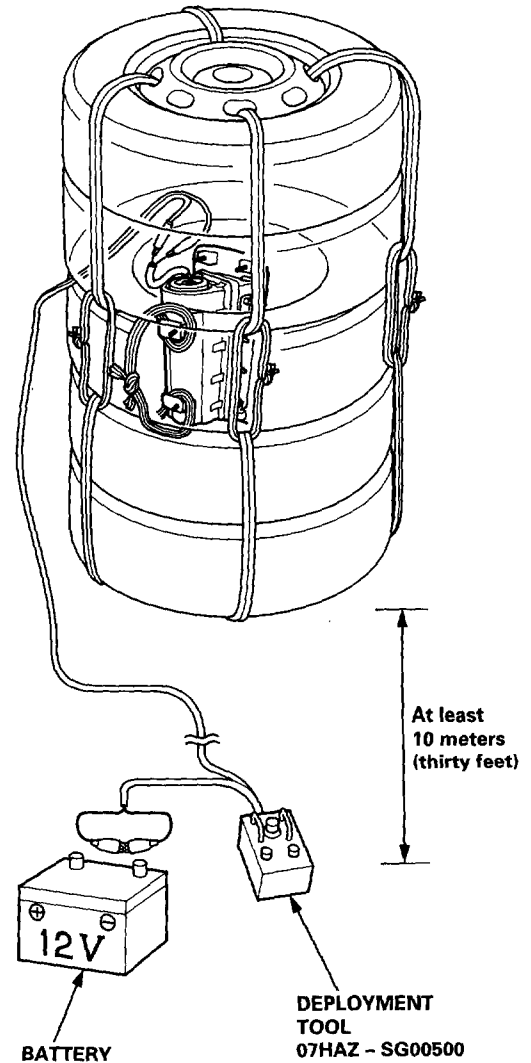
- Do not route the deployment tool wires nearby the pad surface of the airbag or the inflator body.
- Make sure the pad surface is turned to the center of the tire.

ALLIGATOR CLIPS (Yellow)



INFLATOR BODY

10. With the wheel-installed tire up, put the second pair of tires on top of the other three tires, and tie the upper and lower tire sets together. Place the deployment tool at least 10 meters (thirty feet) away from the tires.



11. Go to Deployment (With Deployment Tool) on page 24-72.



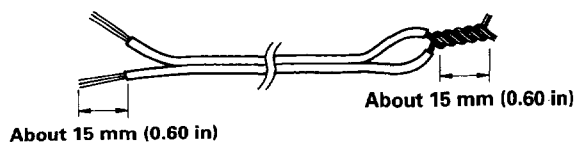
## In-vehicle Deployment Preparations (Without Deployment Tool)

**NOTE:** If an SRS vehicle is to be entirely scrapped, its airbags should be deployed while still in the vehicle. The airbags should not be considered as salvageable parts and should never be installed in another vehicle.

### Necessary Equipment:

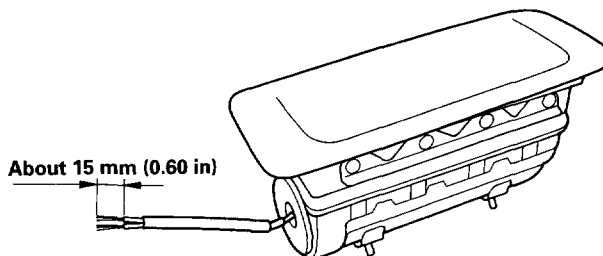
- 12 to 15 m (40 to 50 ft) of vinyl double cable
- Fully charged 12 volt battery
- Insulation tape

1. Disconnect the negative battery cable, and wait at least three minutes.
2. Strip both ends of the vinyl double cable about 15 mm (0.60 in), and intertwine the wires on one end.

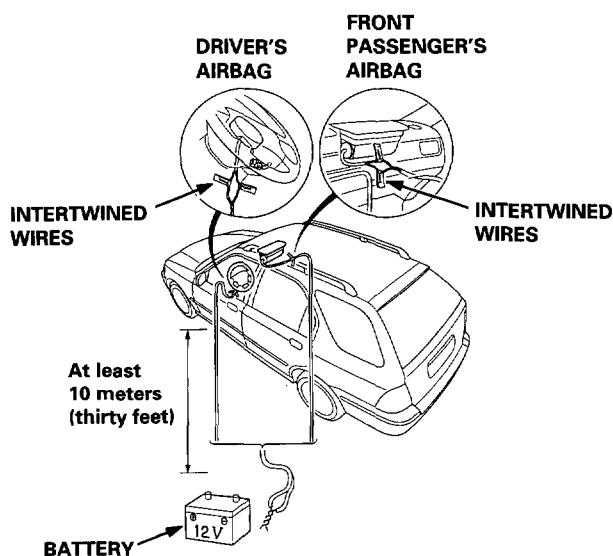


3. Remove the driver's airbag (see page 24-55).
4. Remove the front passenger's airbag (see page 24-57).

5. Cut off the driver's or front passenger's airbag connector, and strip the ends of the airbag wires about 15 mm (0.60 in). Go immediately to step 6.



6. Connect the wires of the vinyl double cable which were not intertwined in step 2 to the airbag wires as shown, and put insulation tape over the connections. Place the battery at least 10 meters (thirty feet) away from the vehicle.



7. Go to In-vehicle Deployment (Without Deployment Tool) on page 24-72.

# Airbag Scrapping

## Out-of-vehicle Deployment Preparations (Without Deployment Tool)

NOTE: If an intact airbag has been removed from a scrapped vehicle or has been found defective or damaged during transit, storage or service, it should be deployed as follows.

### CAUTION

Position a removed airbag always with the pad surface up. If the airbag is improperly positioned face down, accidental deployment could propel the unit with enough force to cause serious injury.

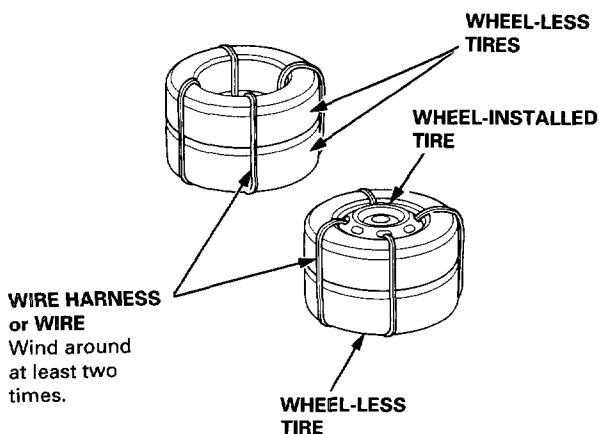
#### Necessary Equipment:

- 12 to 15 m (40 to 50 ft) of vinyl double cable
- Fully charged 12 volt battery
- Insulation tape
- Four tires for 15 inch wheels or bigger without wheel, and one tire of the same size with wheel

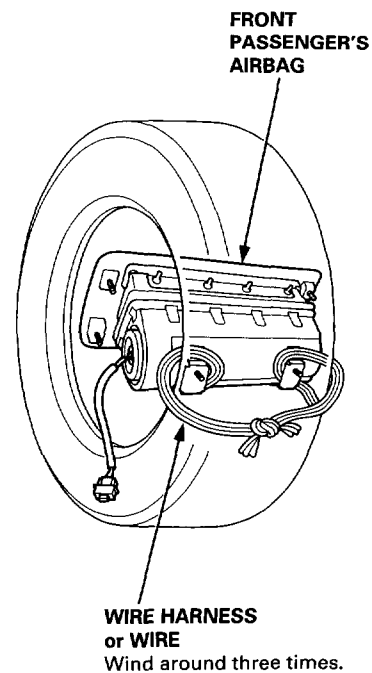
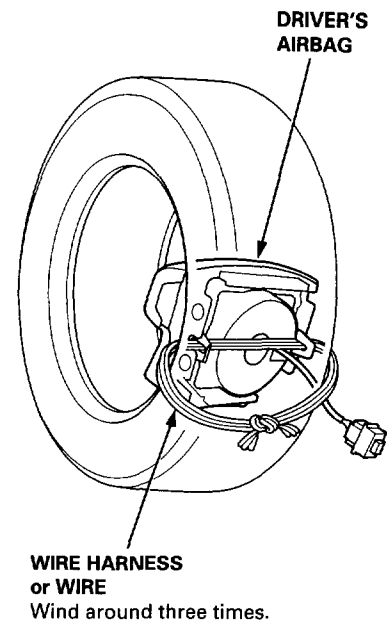
#### NOTE:

- Preferably take used tires.
  - Tires which were used for airbag deployment can be reused on vehicles after carefully cleaning their inner side with water.
- Vehicle wire harness with a core wire cross sectional area of at least 1.25 mm<sup>2</sup> (0.002 in<sup>2</sup>) or iron wire with a diameter of more than 1.2 mm (0.05 in).

1. Turn the ignition switch OFF, and disconnect the negative battery cable. Then disconnect the positive cable, and wait at least three minutes.
2. Remove the driver's airbag (see page 24-55).
3. Remove the front passenger's airbag (see page 24-57).
4. With vehicle wire harness or wire, tie two of the wheel-less tires together, then tie one wheel-less tire and the wheel-installed tire together. (Wind around at least two times.)



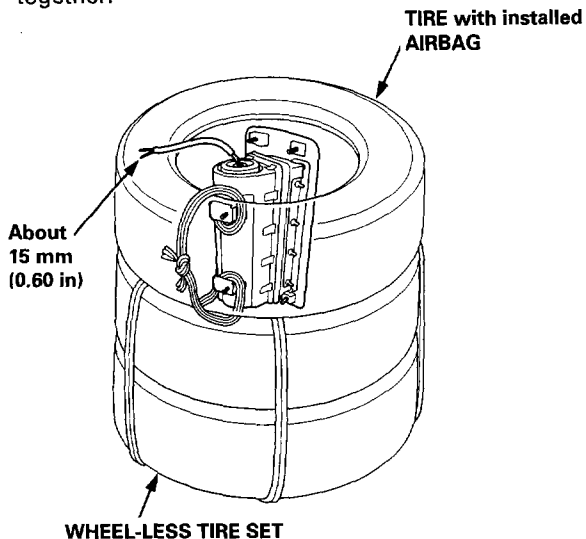
5. Tie the airbag with vehicle wire harness or wire to the remaining wheel-less tire as shown. (Wind around three times.)



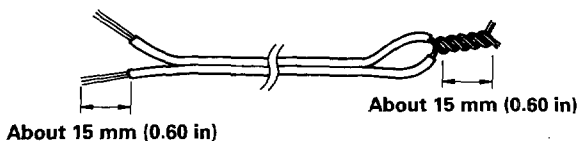




- Place the set of two wheel-less tires on flat ground, and place the tire with the airbag assembly on them.
- Cut off the airbag connector, strip the ends of the airbag wires about 15 mm (0.60 in), and twist them together.



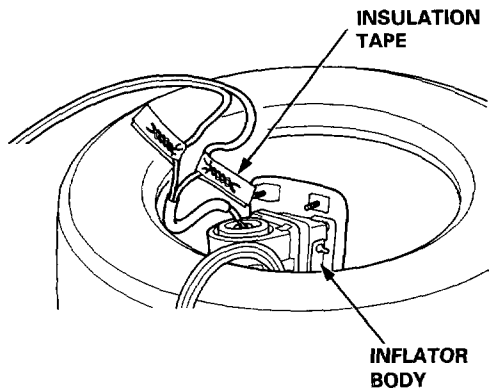
- Strip both ends of the vinyl double cable about 15 mm (0.60 in), and intertwine the wires on one end.



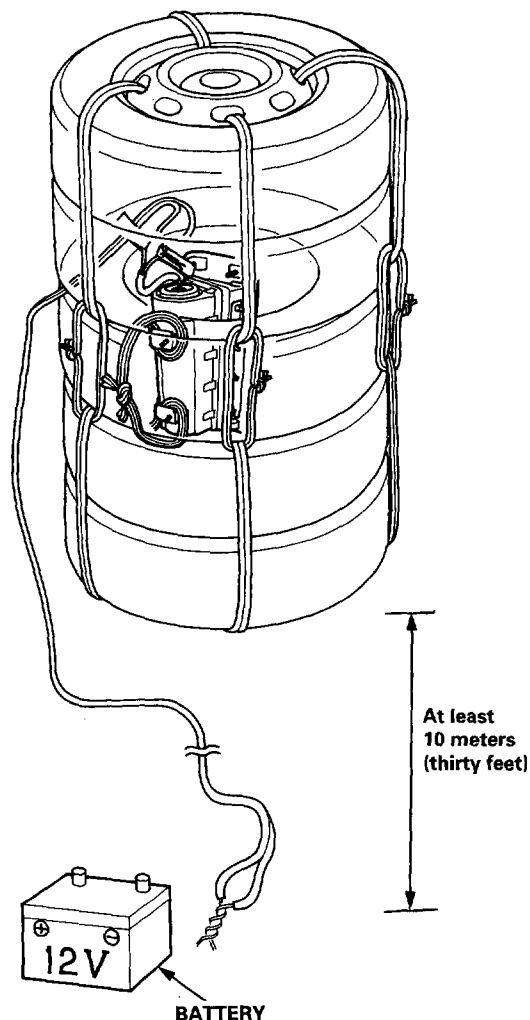
- Connect the wires of the vinyl double cable which were not intertwined in step 8 to the airbag wires as shown, and put insulation tape over the connections.

### CAUTION

- Do not route the vinyl double cable nearby the pad surface of the airbag or the inflator body.
- Make sure the pad surface is turned to the center of the tire.



- With the wheel-installed tire up, put the second pair of tires on top of the other three tires, and tie the upper and lower tire sets together. Place the battery at least 10 meters (thirty feet) away from the tires.

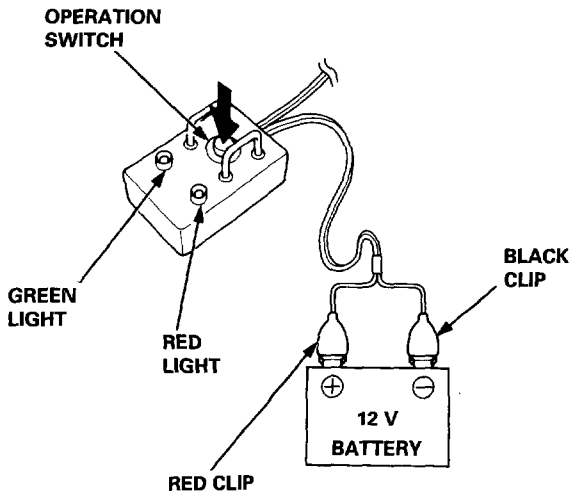


- Go to Out-of-vehicle Deployment (Without Deployment Tool) on page 24-73.

# Airbag Scrapping

## Deployment (With Deployment Tool)

1. Connect the red (+) and black (-) clips of the deployment tool to the 12 volt battery:
  - If the green light on the tool comes on, the airbag igniter circuit is defective and cannot deploy the airbag. In this case, refer to Damaged Airbag Special Procedure under Disposal on page 24-73.
  - If the red light on the tool comes on, the airbag is ready to be deployed.
2. Push the tool's operation switch. The airbag should deploy (deployment is both highly audible and visible; a loud noise and rapid inflation of the bag, followed by slow deflation).
  - If audible/visible deployment happens and the green light on the tool comes on, go to Disposal on page 24-73.
  - If the airbag does not deploy, yet the green light comes on, the igniter is defective. Go to Damaged Airbag Special Procedure under Disposal on page 24-73.



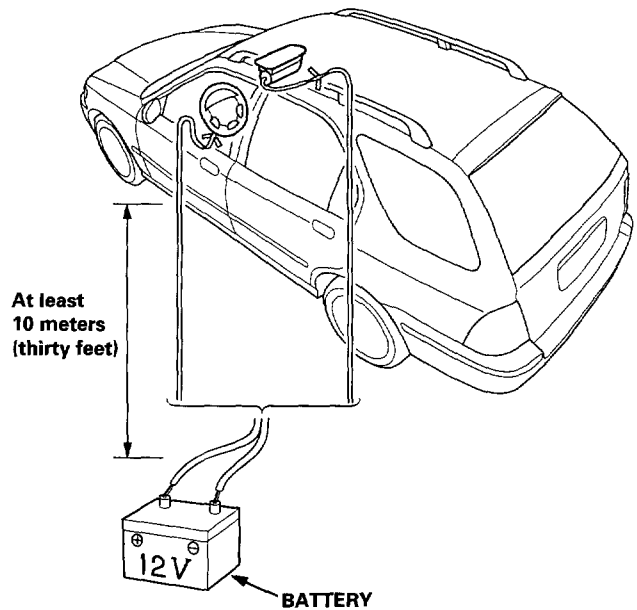
### ⚠ CAUTION

During deployment, the airbag can become hot enough to burn you. Wait thirty minutes after deployment before touching the airbag.

## In-vehicle Deployment (Without Deployment Tool)

Untwist the stripped ends of the vinyl double cable and connect them to the 12 volt battery. The airbag should deploy (deployment is both highly audible and visible; a loud noise and rapid inflation of the bag, followed by slow deflation).

- If audible/visible deployment happens, go to Disposal on page 24-73.
- If the airbag does not deploy, go to Damaged Airbag Special Procedure under Disposal on page 24-73.



### ⚠ CAUTION

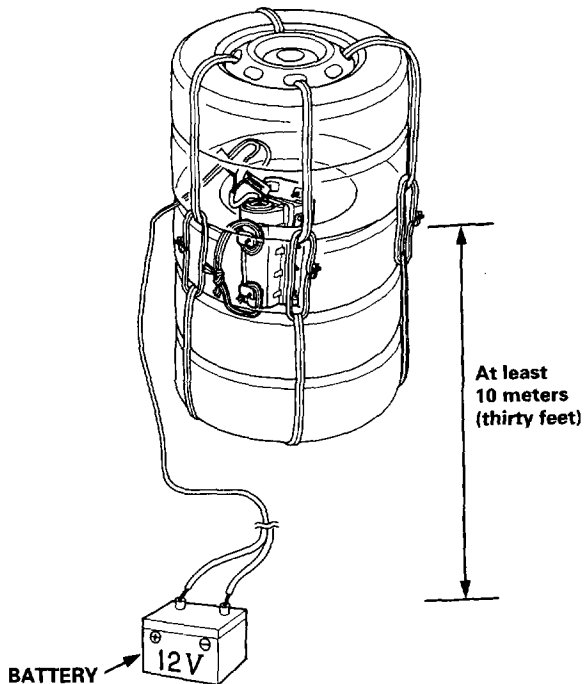
During deployment, the airbag can become hot enough to burn you. Wait thirty minutes after deployment before touching the airbag.



## Out-of-vehicle Deployment (Without Deployment Tool)

Untwist the stripped ends of the vinyl double cable and connect them to the 12 volt battery. The airbag should deploy (deployment is both highly audible and visible; a loud noise and rapid inflation of the bag, followed by slow deflation).

- If audible/visible deployment happens, go to Disposal.
- If the airbag does not deploy, go to Damaged Airbag Special Procedure.



### ⚠ CAUTION

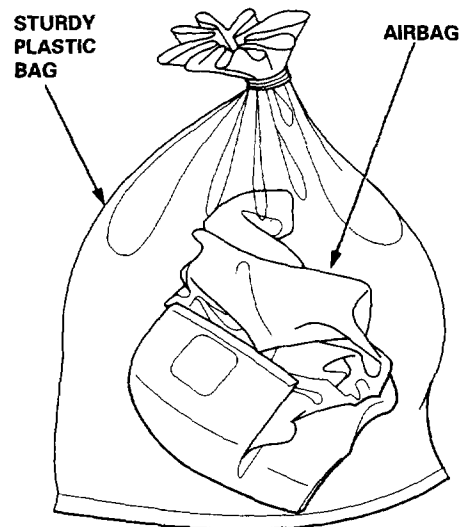
During deployment, the airbag can become hot enough to burn you. Wait thirty minutes after deployment before touching the airbag.

## Disposal

In accordance with local regulations, dispose of the complete airbag assembly. No part of it can be reused. Place it in a sturdy plastic bag, and seal it securely.

### ⚠ CAUTION

- Wear a face shield and gloves when handling a deployed airbag.
- Wash your hands and rinse them well with water after handling a deployed airbag.



### Damaged Airbag Special Procedure

### ⚠ CAUTION

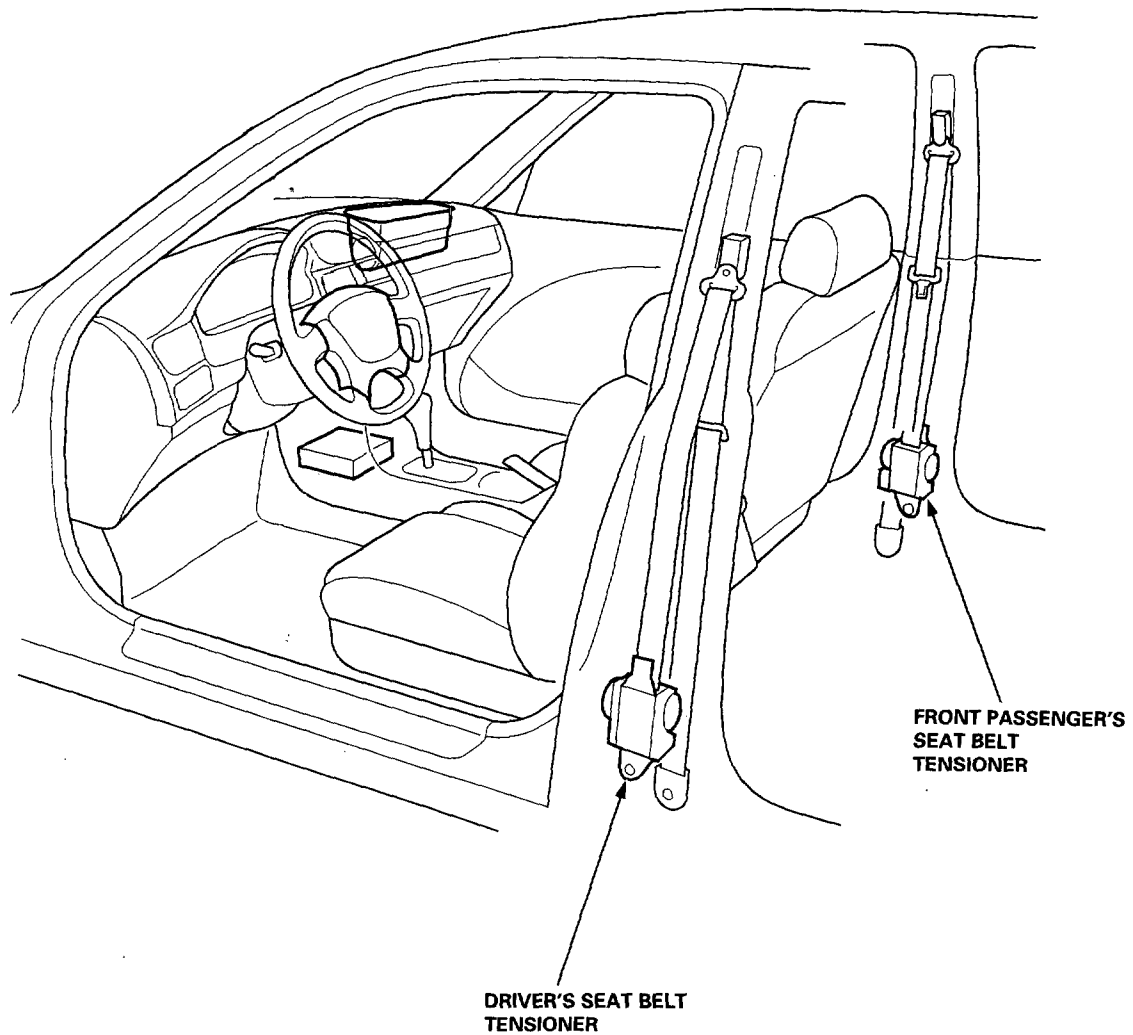
If an airbag cannot be deployed, it should not be treated as normal scrap; it should still be considered a potentially explosive device that can cause serious injury.

1. If installed in a vehicle, follow the removal procedure on page 24-55 and 24-57.
2. Intertwine the stripped ends of the two airbag wires to make a short circuit.
3. Package the airbag in exactly the same packaging that the new replacement part came in.
4. Mark the outside of the box "DAMAGED AIRBAG NOT DEPLOYED" so it does not get confused with your parts stock.
5. Contact your local Honda Service Manager for how and where to return it for disposal.

# Seat Belt Tensioner

## Locations Index/Description

NOTE: LHD type is shown, RHD type is symmetrical.



### Description:

Some types of this model has seat belt tensioners located in the seat belt retractors.

A mechanical seat belt tensioners have been added to the current SRS airbag system-type III.

In addition to the airbag, it serves to further reduce impacts on driver and front passenger from front end collisions.



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## Precautions

- Take extra care when painting or doing body work in the area below the center pillar. Avoid direct exposure of the seat belt retractor to heat guns, welding, or spraying equipment.
- After any degree of frontal body damage, or after a collision without tensioner triggered, inspect the seat belt assembly for physical damage. If it is dented, cracked, or deformed, replace it.
- Do not let fluids such as grease, detergent, oil or water adhere to the seat belt tensioner. If found on the seat belt tensioner, quickly wipe these fluids away using a dry cloth.
- Be careful not to bump the area around the seat belt tensioner. The tensioner could accidentally trigger and cause damage or injuries.
- Do not try to disassemble the seat belt tensioner assembly. It has no serviceable parts. Once an seat belt tensioner has been operated (triggered), it cannot be repaired or reused.
- Before scrapping any seat belt tensioners (including those in a whole vehicle to be scrapped), the seat belt tensioners must be triggered.
- Before trying to remove the seat belt tensioner, first set the sensor lock pin to LOCK position.

# Seat Belt Tensioner

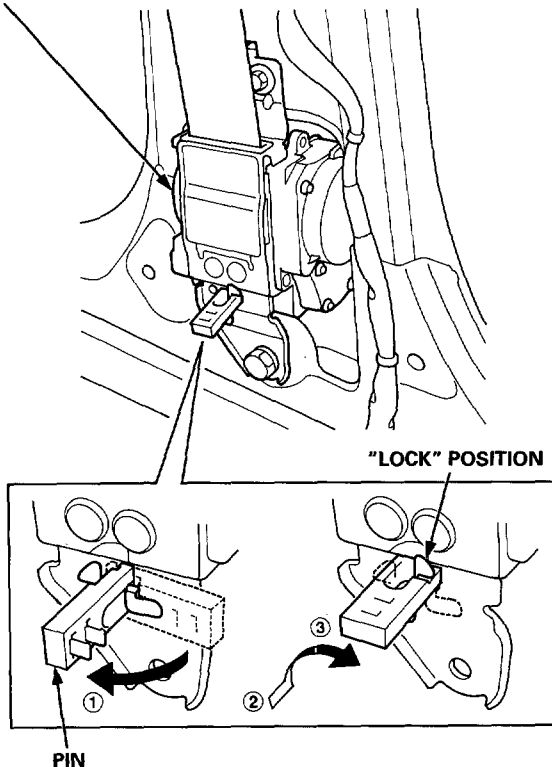
## Replacement

### ⚠ CAUTION

- Before trying to remove the seat belt tensioner, first set the sensor lock pin to LOCK position.
- Be careful not to bump the area around the seat belt tensioner. The tensioner could accidentally trigger and cause damage or injuries.
- Carefully inspect the seat belt tensioner before installing it. Do not install a tensioner that shows signs of being dropped or improperly handled, such as dents, cracks or deformation.
- The shoulder harness anchor bolt must be removed before you remove the tensioner.

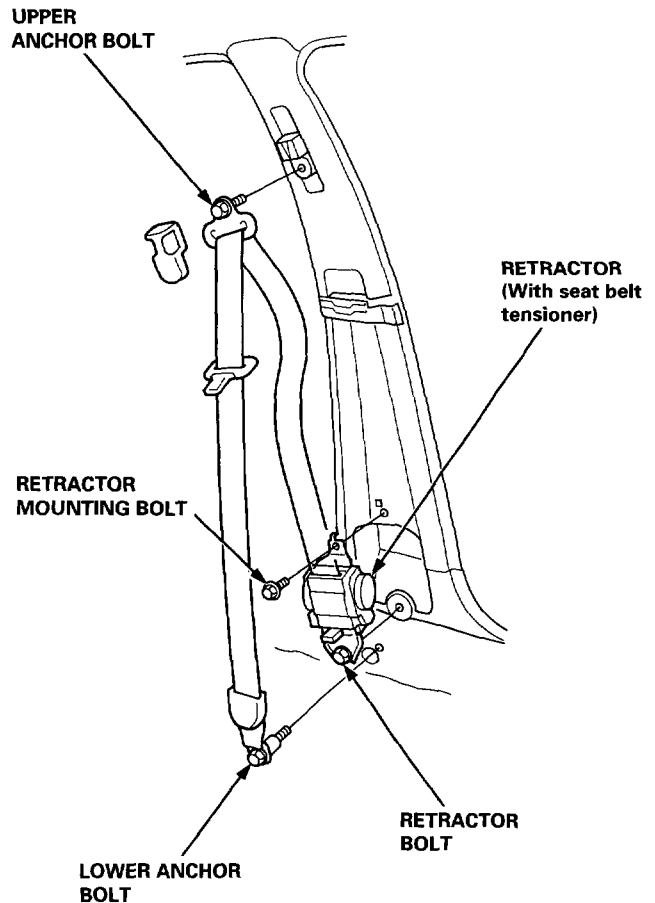
1. Remove the front and rear door sill molding, then remove the center pillar lower trim.
2. Set the seat belt tensioner sensor lock pin to LOCK position.

RETRACTOR  
(With seat belt  
tensioner)



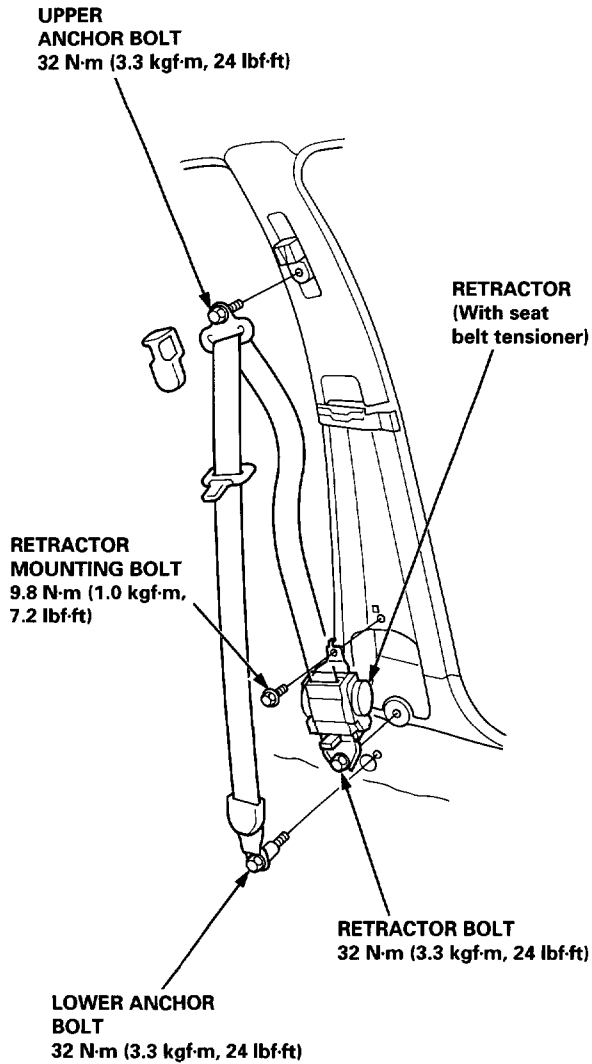
Pull up (1) the pin.  
Press down (2) and turn (3) the pin.

3. Remove the upper anchor bolt, then remove the lower anchor bolt.
4. Remove the retractor mounting bolt and the retractor bolt, then remove the retractor.



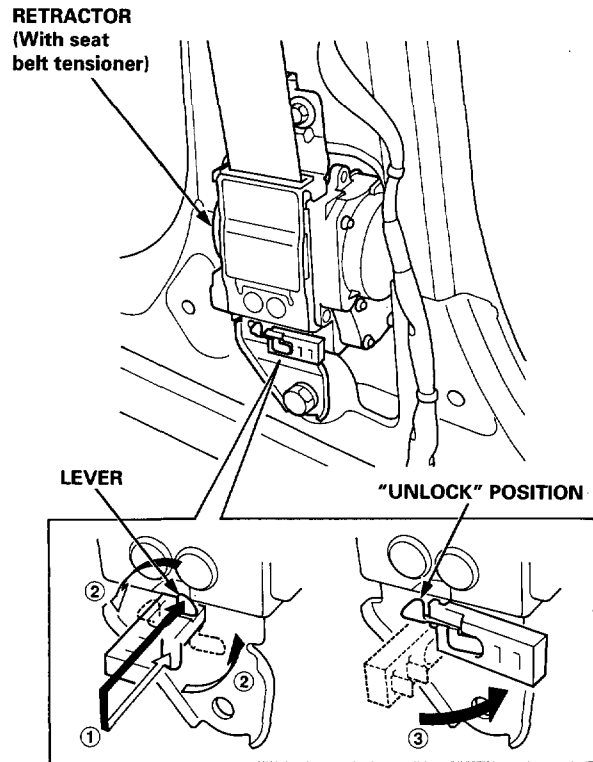


5. Install the new retractor.
6. Reinstall the lower anchor bolt, then reinstall the upper anchor bolt.



7. Disengage the seat belt tensioner sensor lock.

NOTE: Take care not to apply any impacts to the seat belt tensioner, once the sensor lock has been disengaged.



Press down (①) and turn (②) the lever.  
Place (③) the pin down.

8. Reinstall the center pillar lower trim, then reinstall the front and rear door sill molding.

# Seat Belt Tensioner

## Scrapping

When disposing of the retractor (with seat belt tensioner), trigger it by always using the following procedure.

### ⚠ CAUTION

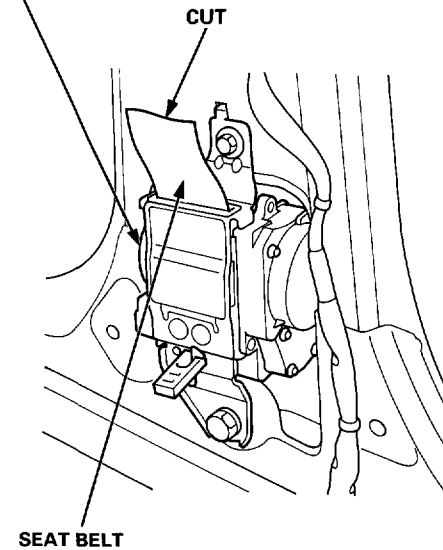
- Do the work at an outdoor location on a secure flat surface.
- Be careful not to bump or drop impacts the seat belt tensioner, once the sensor lock has been disengaged.
- Wear a face shield and gloves when triggering the seat belt tensioner.
- Stay at least 5 meters (16 feet) away when triggering the seat belt tensioner.
- During trigger the seat belt tensioner can become hot enough to burn you. Wait thirty minutes after triggering before dispose the assembly. Never allow water to get it.
- Place the triggered seat belt tensioner in a sturdy plastic bag, and seal it securely.
- Never attempt to dispose of an untriggered seat belt tensioner.

### Necessary Equipment:

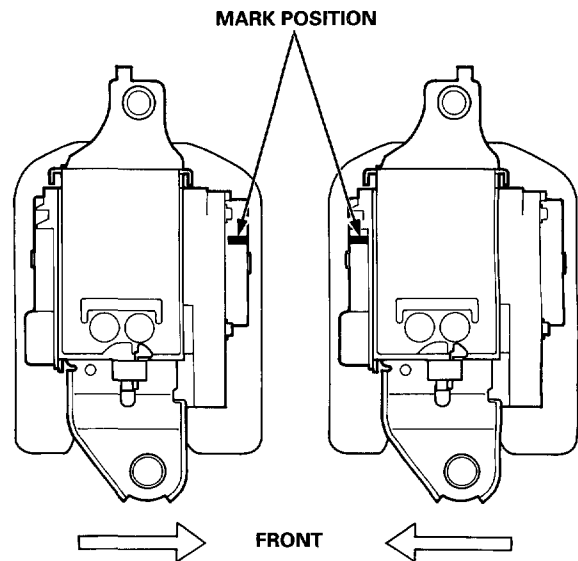
- Three tires for 15 inch wheels or bigger without wheel, and one tire of the same size with wheel
- NOTE:
- Preferably take used tires.
  - Tires which were used for seat belt tensioner triggered can be reused on cars after carefully cleaning their inner side with water.
- Vehicle wire harness 7 meters (23 feet) (for suspending)
  - Vehicle wire harness 6 meters (20 feet) (for fastening tire)
  - Vehicle wire harness with a core wire cross sectional area of at least 1.25 mm (0.002 in) or iron wire with a diameter of more than 1.2 mm (0.05 in).

1. Remove the front and rear door sill molding, then remove the center pillar lower trim.
2. Set the sensor lock pin to LOCK position (see page 24-76).
3. Pull the seat belt out all the way and cut it.

RETRACTOR (With seat belt tensioner)



4. Make front chassis side marks on the retractor as shown.

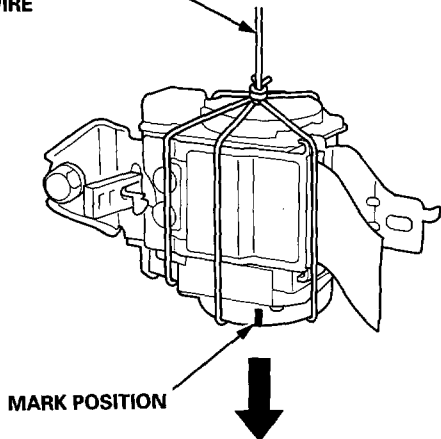






- Remove the retractor (see page 24-76).
- Next attach a vehicle wire harness or wire as shown in the figure so that the seat belt tensioner front (chassis) side faces down or so that the seat belt tensioner is level.

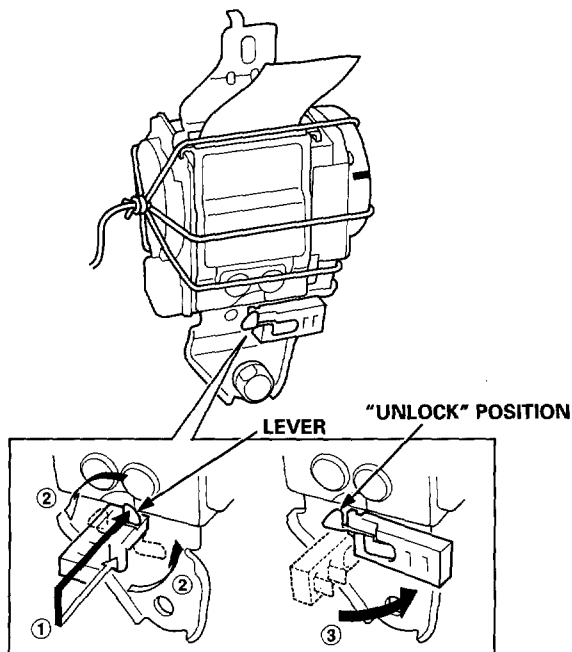
CAR WIRE HARNESS  
or WIRE



- Disengage the seat belt tensioner sensor lock.

### CAUTION

Be careful not to bump or drop impacts the seat belt tensioner, once the sensor lock has been disengaged.

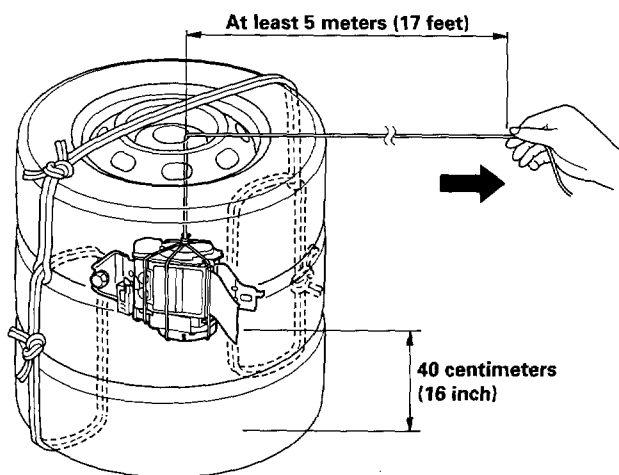


Press down (1) and turn (2) the lever.  
Place (3) the pin down.

- Run the vehicle wire harness or wire through the two tires (wheel-less tire) and one tire (wheel-installed tire) as shown in the figure.

### CAUTION

Never apply any shocks to the retractor (with seat belt tensioner).



- After moving about 5 meters (17 feet) away for safety, pull up about 40 centimeters (16 inch) on the seat belt tensioner.

#### NOTE:

- Check the surrounding area for safety before pulling on the seat belt tensioner.
- Shout to get everyone's attention before attempting to trigger the seat belt tensioner.

(cont'd)

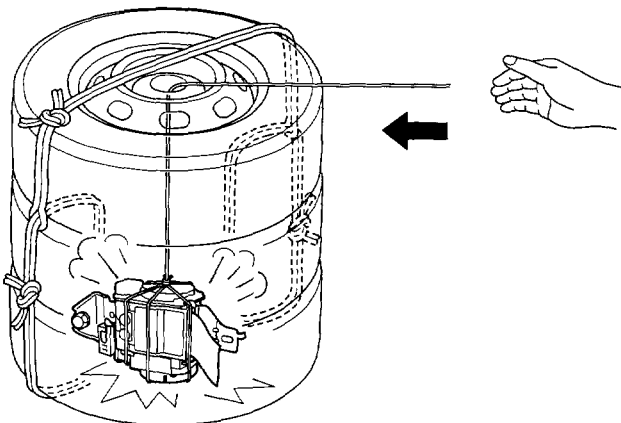
# Seat Belt Tensioner

## Scrapping (cont'd)

10. Release the vehicle wire harness or wire and trigger the seat belt tensioner by applying a downward impact as shown. The seat belt tensioner should be triggered (triggering is highly audible and visible; a loud noise and smoke).

### ⚠ CAUTION

- The seat belt tensioner will get hot once triggered, so wait 30 minutes after triggering, for the unit to cool in the air. Never allow water to get on it.
- The seat belt tensioner might not trigger if the sensor lock was not fully disengaged or the seat belt tensioner was not suspended horizontally. In such case, avoid applying impacts to the seat belt tensioner and redo the triggering procedure from the very beginning.

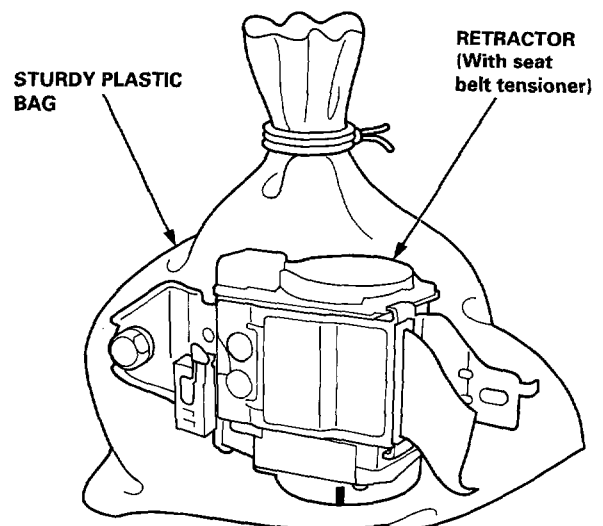


## Disposal

### ⚠ CAUTION

- During trigger, the retractor (with seat belt tensioner) can become hot enough to burn you. Wait thirty minutes after triggering before touching the assembly.
- Wear a face shield and gloves when handling a triggered seat belt tensioner.
  - Wash your hands and rinse them well with water after handling a triggered seat belt tensioner.

In accordance with local regulations, dispose of the complete retractor (with seat belt tensioner). No part of it can be reused. Place it in a sturdy plastic bag, and seal it securely.



### Damaged Seat belt Tensioner Special Procedure

### ⚠ CAUTION

If a seat belt tensioner cannot be triggered, it should not be treated as normal scrap; it should still be considered a potentially explosive device that can cause serious injury.

1. If installed in a vehicle, follow the removal procedure on page 24-76.
2. Package the retractor (with seat belt tensioner) in exactly the same packaging that the new replacement part came in.
3. Mark the outside of the box "DAMAGED SEAT BELT TENSIONER NOT TRIGGERED" so it does not get confused with your parts stock.
4. Contact your local Honda Service Manager for how and where to return it for disposal.