INTRODUCTION

How to Use This Manual

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

Each section includes:

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

Special Information

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

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

NOTE: Gives helpful information.

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

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

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HONDA MOTOR CO., LTD.
Service Publication Office

General Info
Special Tools
Specifications
Maintenance
Engine
Cooling
Fuel and Carburetor
Transaxle
Steering
Suspension
Brakes
Body
Heating and Air Conditioning
Electrical

General Information

Chassis and Engine Codes 1-2
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Label Locations 1-4
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Chassis and Engine Codes

Vehicle Identification Number
(Canadian Model)

JHMAB522*DC000001

- **Model Name**
  - AB: PRELUDE
- **Transmission Type**
  - 5: 5-speed
  - 7: Automatic
- **Number of Doors**
  - 2: 2 Door
- **Vehicle Version**
  - 2: Standard Model
- **Check Digit**
- **Model Year**
  - D: 1983
- **Plant**
  - C: Sayama Plant
- **Serial Number**

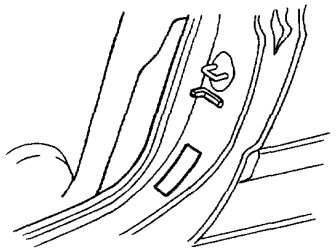
Vehicle Identification Number
(Except Canadian Model)

JHMAAB5220C000001

- **Model Name**
  - AB: PRELUDE
- **Transmission Type**
  - 5: 5-speed
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- **Vehicle Version**
  - 2: Standard Model
  - 3: EX (Higher Cost Versions)
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  - C: Sayama Plant
- **Serial Number**

Chassis Number
(Canadian Model)

and Federal Motor Vehicle Safety Standard Certification.



Engine Serial Number

ET – 1300001

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

Transmission Number (Manual)

GM – 3600001

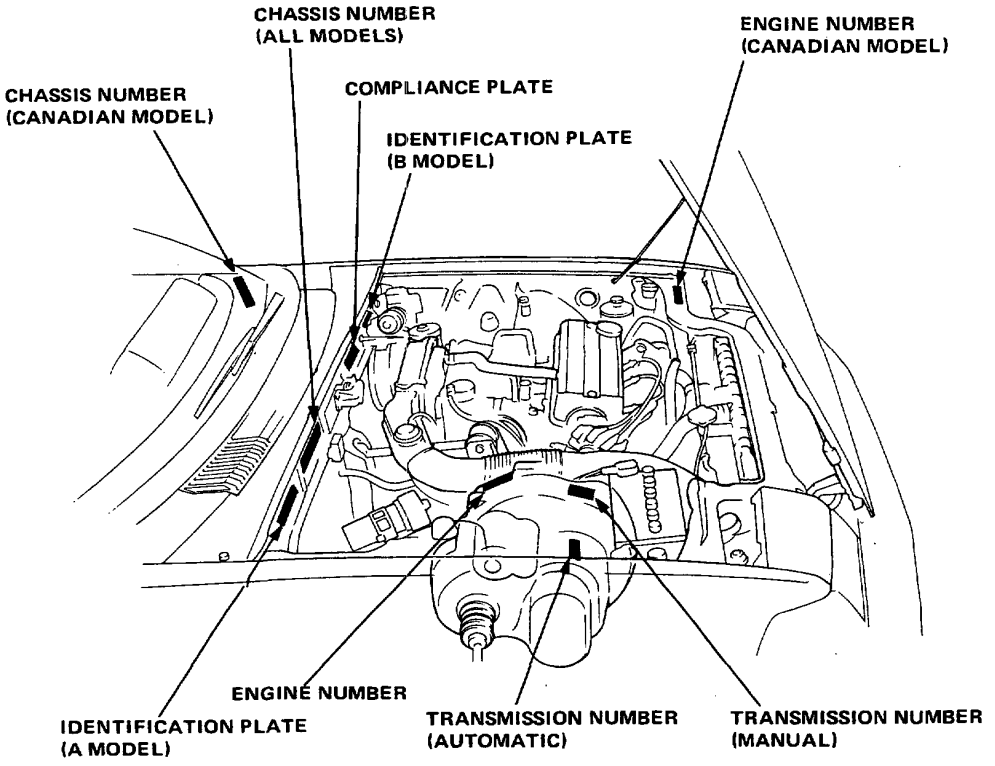
- **Transmission Type**
- **Serial Number**

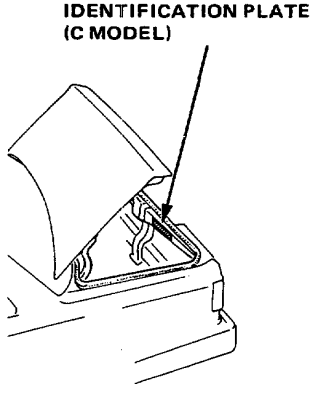
Transmission Number (Automatic)

AK – 4000001

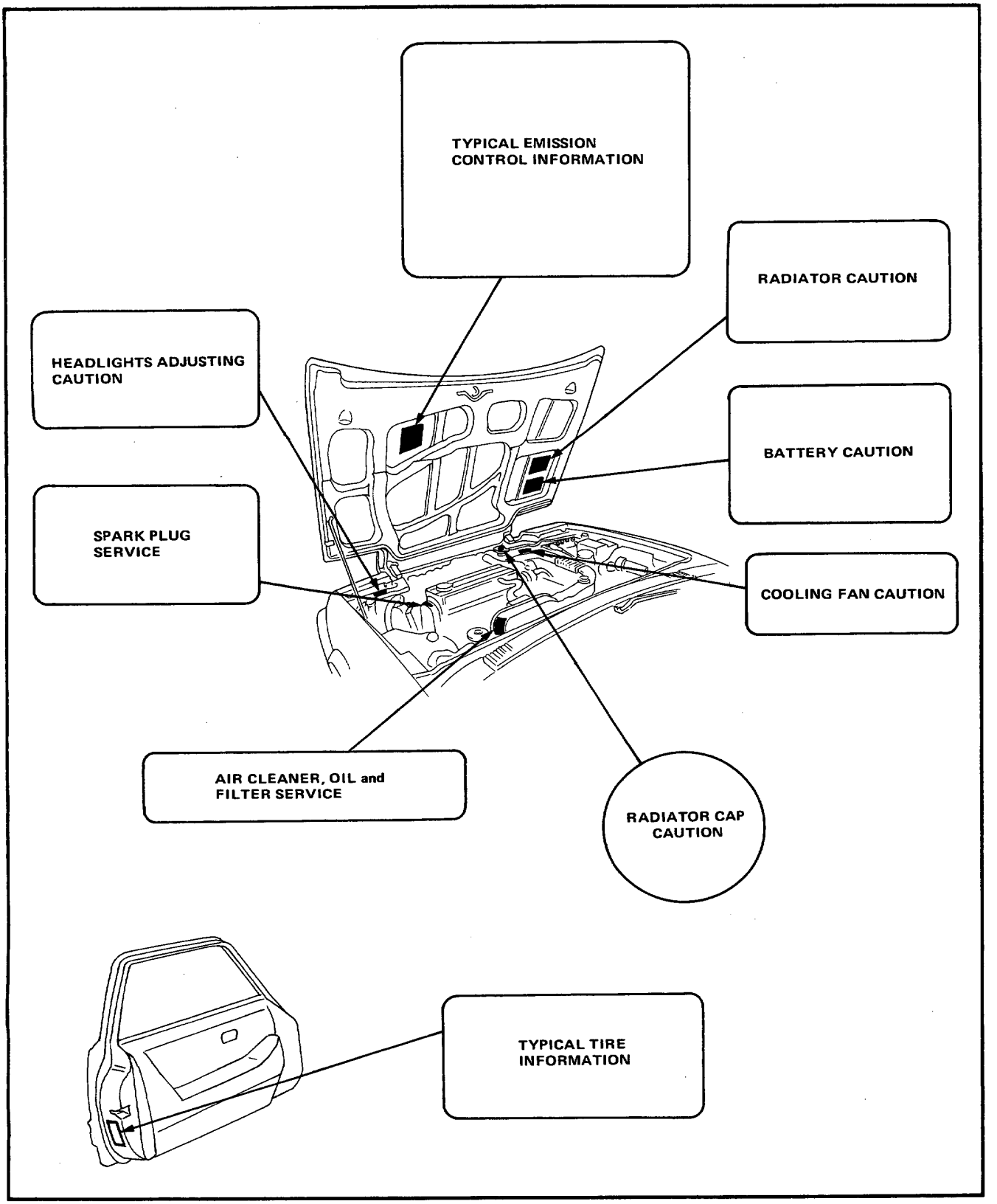
- **Transmission Type**
- **Serial Number**

Identification Number Locations





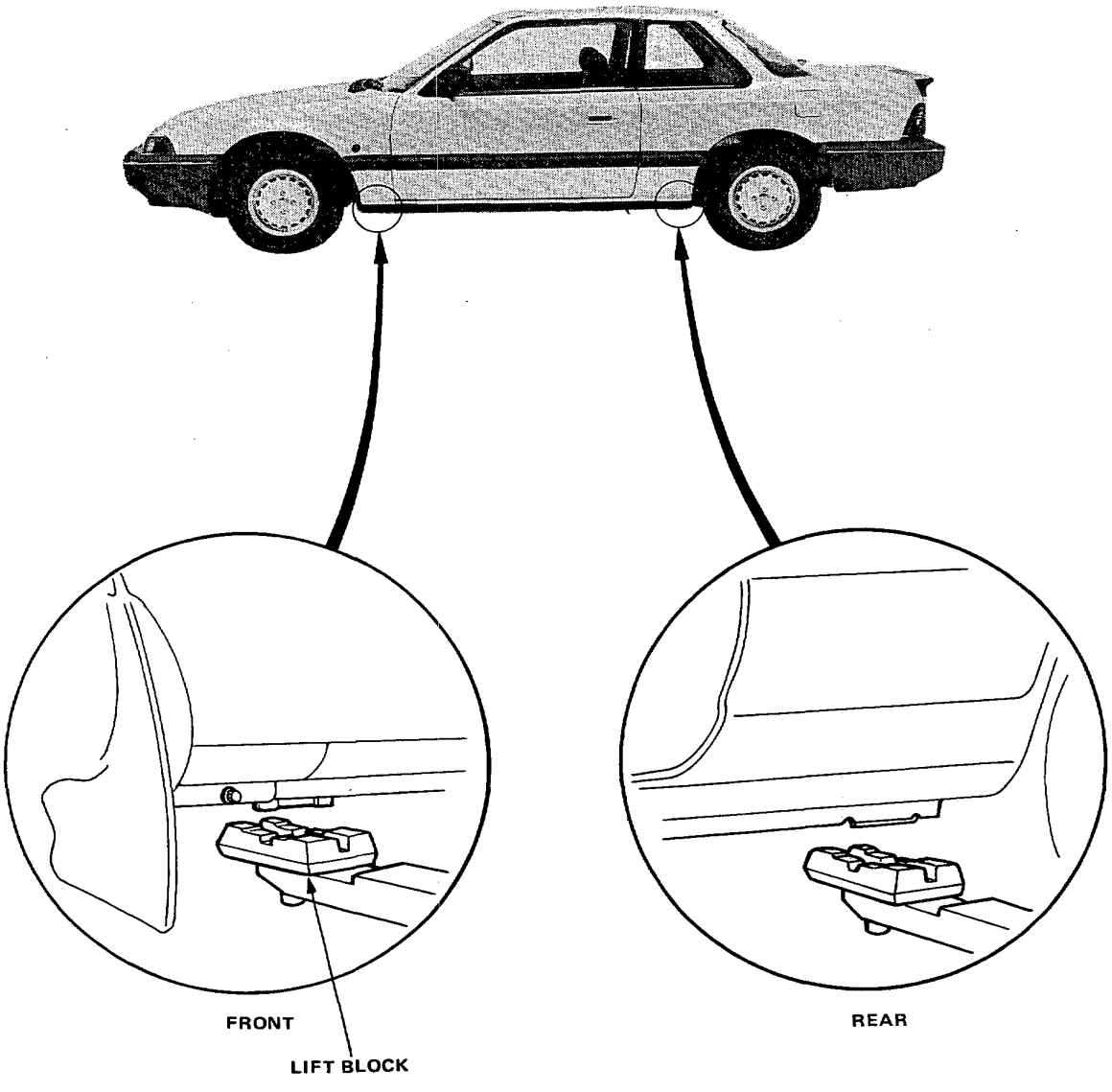
Label Locations



Lift and Support Points

Hoist

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



(cont'd)

Lift and Support Points (cont'd)

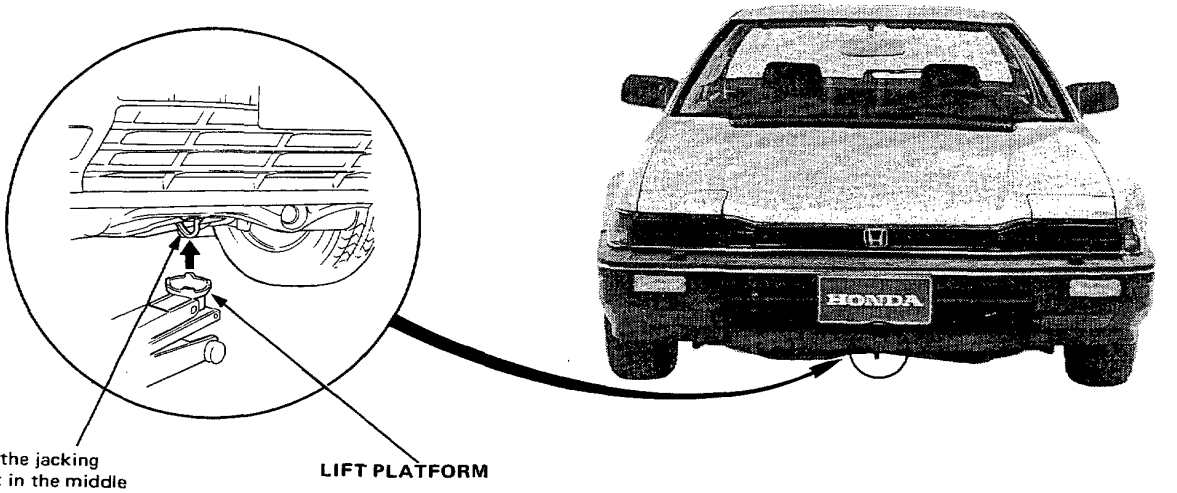
Floor Jack

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

WARNING

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

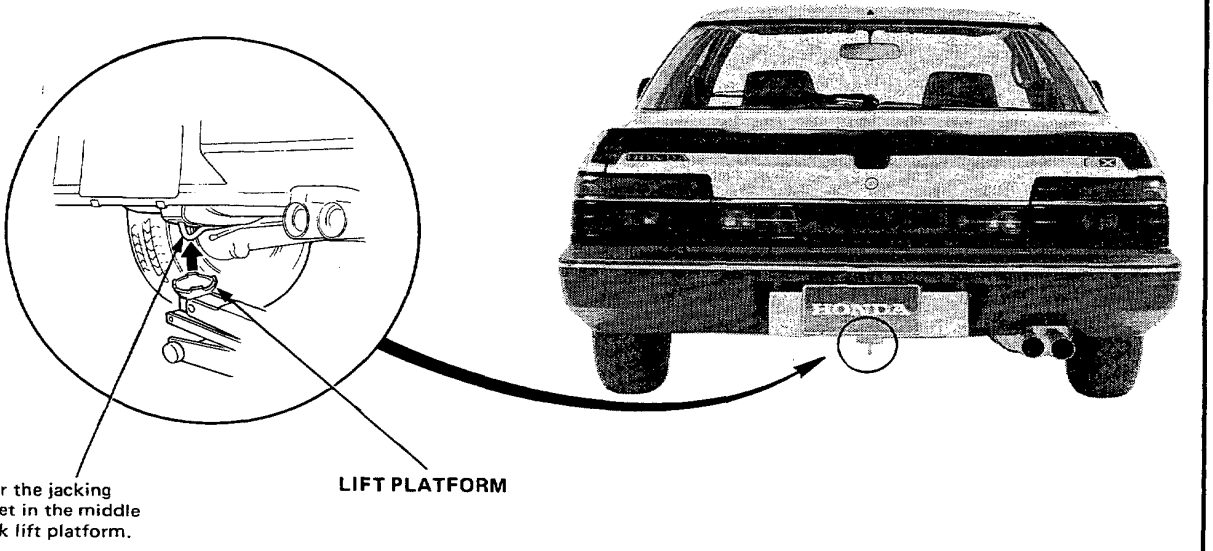
Front



Center the jacking bracket in the middle of jack lift platform.

LIFT PLATFORM

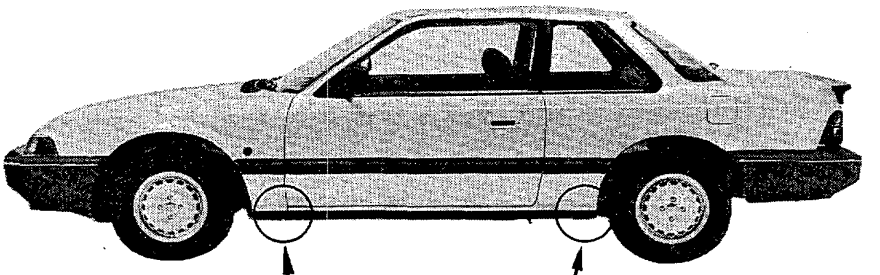
Rear

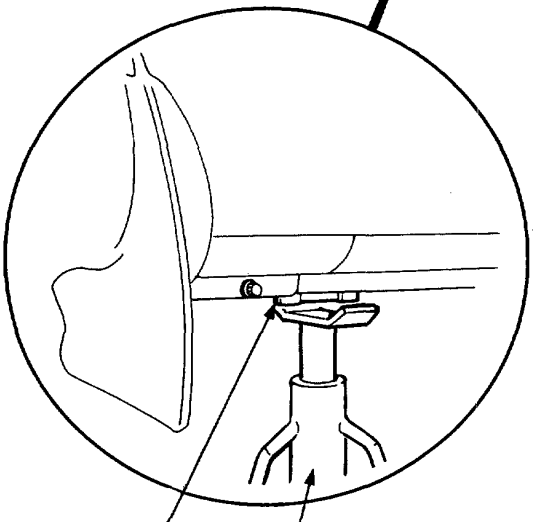


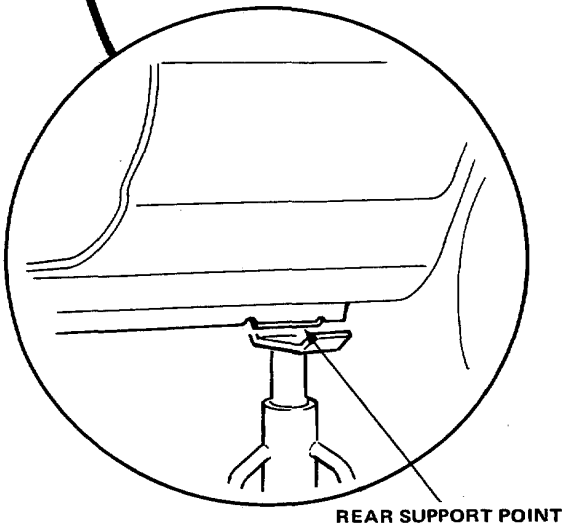
Center the jacking bracket in the middle of jack lift platform.

LIFT PLATFORM

Safety Stands







FRONT SUPPORT POINT

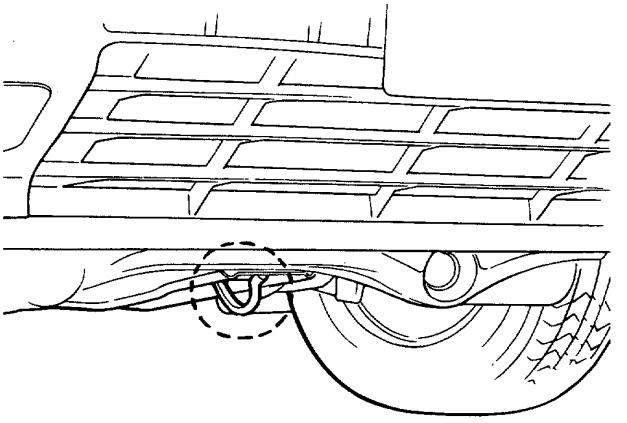
SAFETY STAND

REAR SUPPORT POINT

Towing

Towing

If possible, always tow the car with the front wheels off the ground. Do not use the bumpers to lift the car or to support the car's weight while towing. Check local regulations for towing with a rope or frame-mounted tow bar. A rope may be attached as shown in the illustration. Do to attach a tow bar to either bumper.



If the car is to be towed with four wheels on the ground, observe the following precautions:

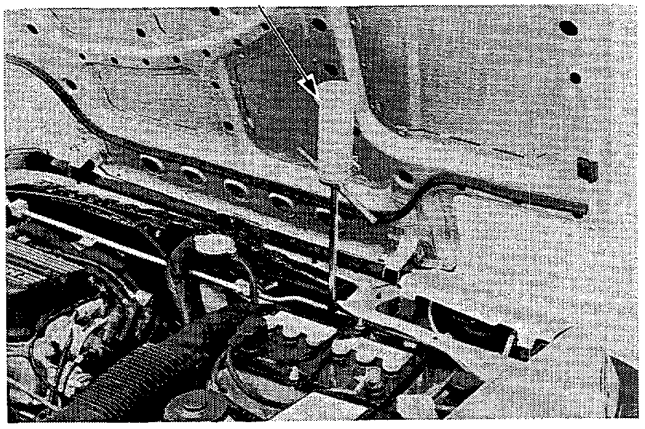
1. Wheels and axle must not be touching body or frame.
2. Turn the ignition key to the "I" position and make sure the steering wheel turns freely.
3. Place the transmission in NEUTRAL.
4. Release the parking brake.
5. DO NOT exceed 55 KPH (35 MPH) for distances of more than 80 km (50 miles).

WARNING **DO NOT tow a car to start it. The forward surge when the engine starts could cause a collision. A car equipped with Automatic transmission cannot be started by pushing or towing.**

Special Caution Items For This Car

1. For cars equipped with A.L.B., the high-pressure brake fluid must be drained before disassembly of the A.L.B. piping system. When this is not done, danger may be caused by brake fluid squirting out under high pressure. For draining of the high-pressure brake fluid, refer to page 21-57.

A.L.B T-WRENCH
07907—SB00000

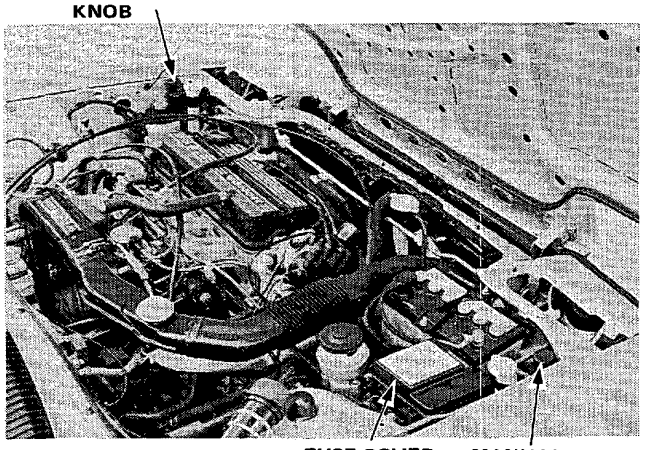


2. Installation of an amateur radio for cars equipped with A.L.B.
   Care has been taken for the A.L.B. control unit (computer) and its wiring to prevent erroneous operation from external interference, but erroneous operation of the computer may be caused by entry of extremely strong radio waves. Attention must be paid to the following items to prevent erroneous operation of the computer.

   - The antenna and the body of the radio must be at least 200 mm (7.9 in.) away from the computer. (The computer installation position is inside the lining on the right side of the rear seat.)
   - Do not lead the antenna feeder and the coaxial cable over a long distance parallel to the wiring, and when crossing with the wiring is required, execute crossing at a right angle.
   - Do not install a radio with a large output (max. 10 W).

3. Retractable headlights are installed. For manual raising and lowering, the fuse must be pulled. When raising and lowering is executed without pulling the fuse, danger may be caused by rapid turning of the manual retracting knob.

MANUAL RETRACTING
KNOB



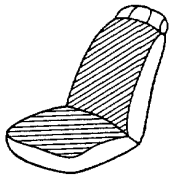
FUSE COVER

MANUAL
RETRACTING
KNOB

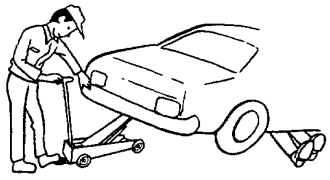
Preparation of Work

CAUTION: Observe all safety precautions and notes while working.

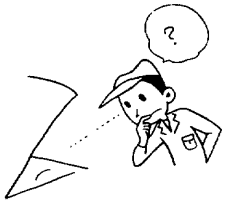
1. Protect all painted surfaces and seats against dirt and scratches with a clean cloth or vinyl cover.



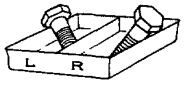
2. Work safely and give your work your undivided attention. When either the front or rear wheels are to be raised, block the remaining wheels securely. Exchange signals as frequently as possible when a work involves two or more workers. Do not run the engine unless the shop or working area is well ventilated.



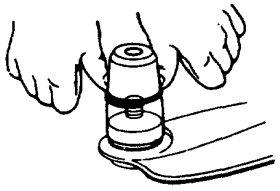
3. Prior to removing or disassembling parts, they must be inspected carefully to isolate the cause for which the service is called for. Observe all safety notes and precautions and follow the proper procedures as described in this manual.



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

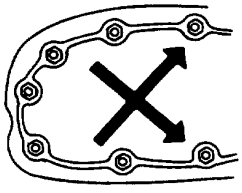


4. Use special tool when use of such a tool is specified.

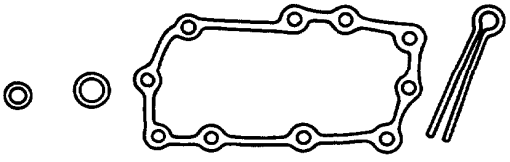


5. Parts must be assembled with the proper looseness or tightness according to the maintenance standards established.

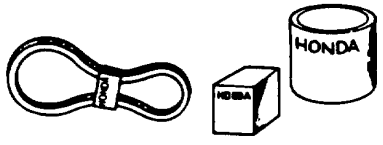
6. When tightening bolts or nuts, begin on center or larger diameter bolts and tighten them in criss-cross pattern in two or more steps if necessary.



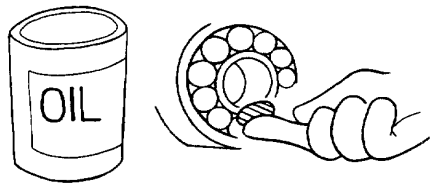
7. Use new packings, gaskets, O-rings and cotter pins whenever reassembling.



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



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

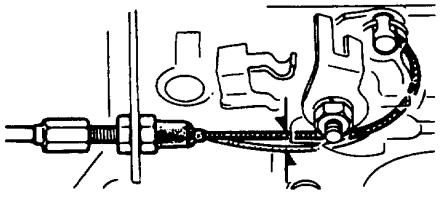


10. Do not spill brake fluid onto painted surfaces. Wipe up spilled fluid at once.



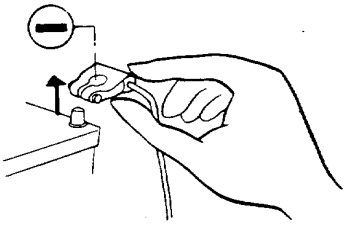
11. Avoid oil or grease getting on rubber parts and tubes.

12. Upon assembling, check every possible part for proper installation and movement or operation.

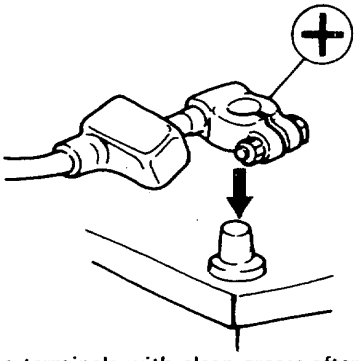


Electrical

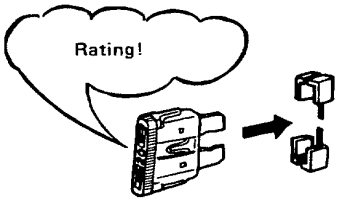
- Before making any repairs on electric wires or parts, disconnect the battery cables from the battery staring with the negative (—) terminal.



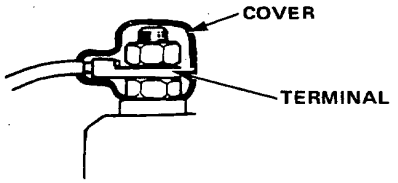
- After making repairs, check each wire or part for proper routing and installation. Also check to see that they are connected properly.
- Always connect the battery positive (+) cable first, then connect the negative (-) cable.



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



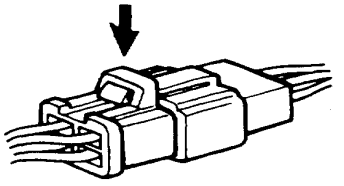
- Be sure to install the terminal cover over the connections after a wire or wire harness has been connected.



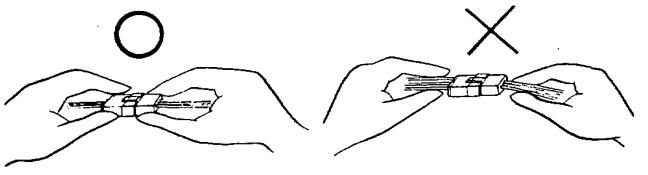
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Electrical (cont'd)

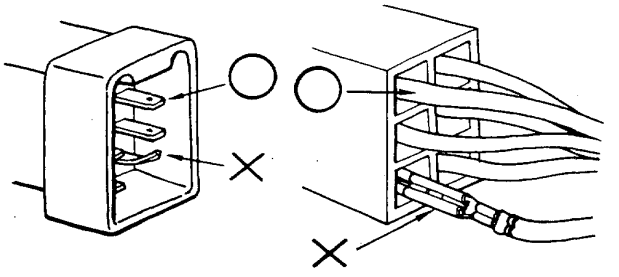
- All plastic plugs have locking tabs that must be released before disconnecting, and must be aligned when re-connecting.



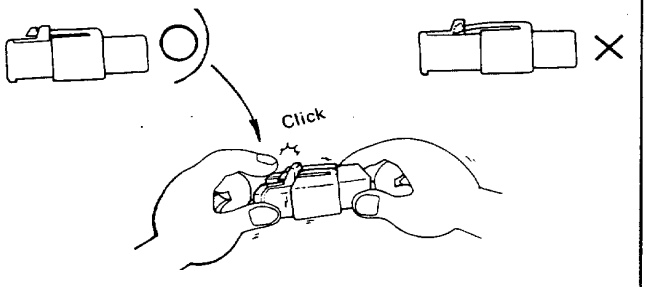
- When disconnecting a coupler, pull it off from the mating coupler by holding on both couplers.
- Never try to disconnect couplers by pulling on their wires.



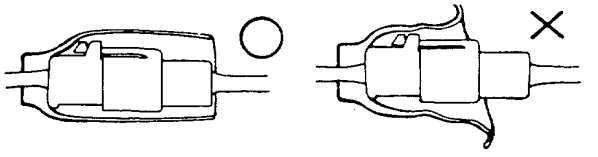
- Before connecting couplers, check to see that the terminals are in place and are not bent or distorted.



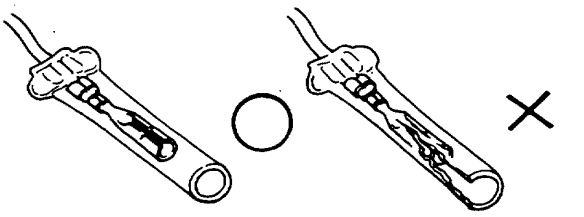
- Insert couplers fully until they will no longer go.
- Some couplers have locking tabs that must be aligned and engaged securely.
- Don't use wire harnesses with a loose wire or coupler.



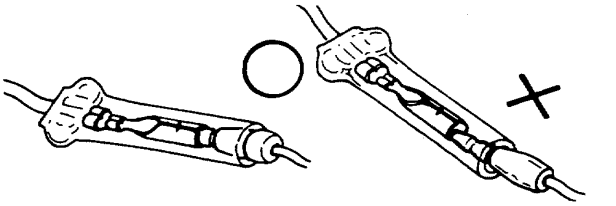
- Place the plastic cover over the mating coupler after reconnecting. Also check that the end is not inverted.



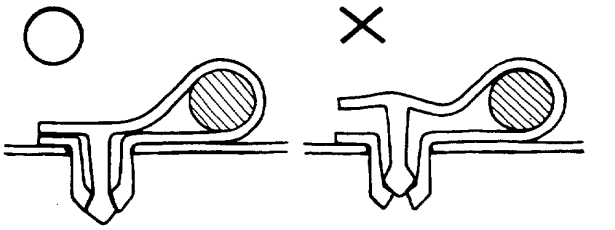
- Before connecting, check each connector cover for breakage. Also make sure that the female connector is tight and not pried open from the previous use.



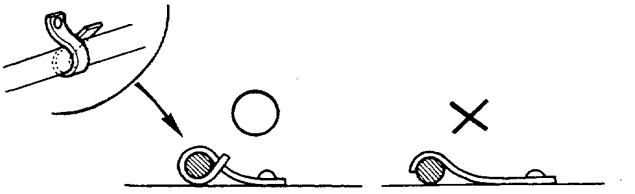
- Insert male connectors into the female connectors fully until they will no longer go.
- Be sure that plastic cover is placed over the connection.
- Don't place the opening of each plastic cover facing up.



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



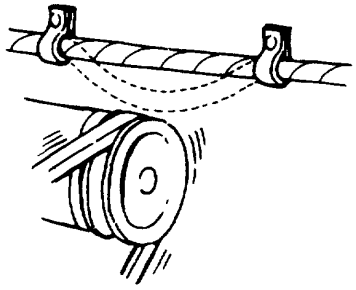
- A loose wire harness or cable can be a hazard to safety. After clamping, check each wire for security in its clamp.



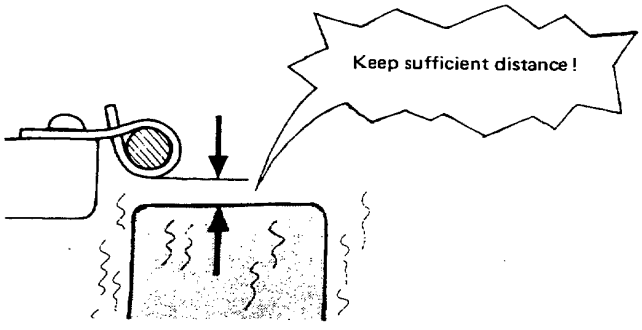
- Do not squeeze wires against the weld or nugget of its clamp when a weld-on clamp is used.



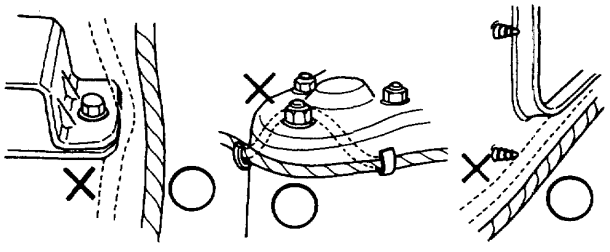
- After clamping, check each harness to be certain that it is not interferring with any moving or sliding parts of the vehicle.
- Keep wire harnesses away from the exhaust pipes and other hot parts.



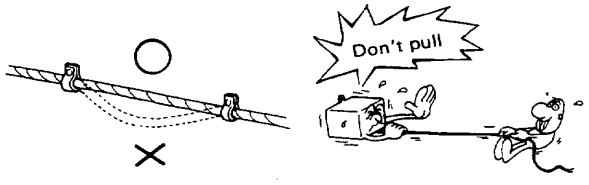
- Always keep a safe distance between wire harnesses and any heated parts.



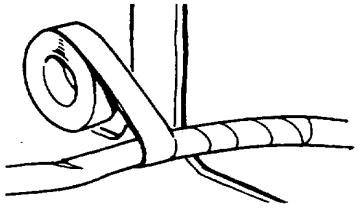
- Do not bring wire harnesses in direct contact with sharp edges or corners.
- Also avoid contact with the projected ends of bolts, screws and other fasteners.



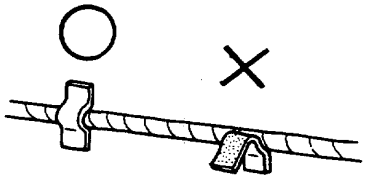
- Route harnesses so they are not pulled taut or slackened excessively.



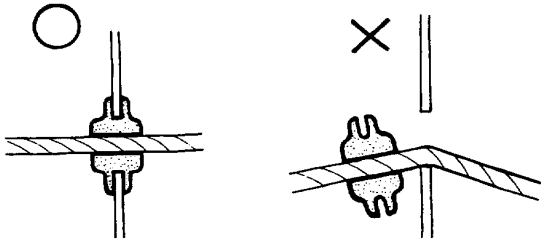
- Protect wires and harnesses with a tape or tube if they are in contact with a sharp edge or corner.



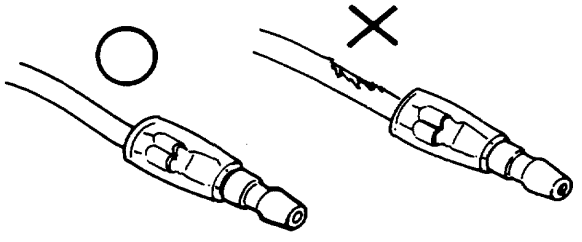
- Clean the attaching surface thoroughly if a plaster is used. Use a spirit wipe if necessary.



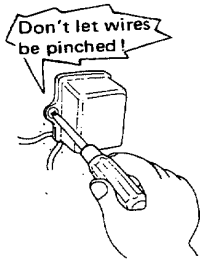
- Seat grommets in their grooves properly.



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



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

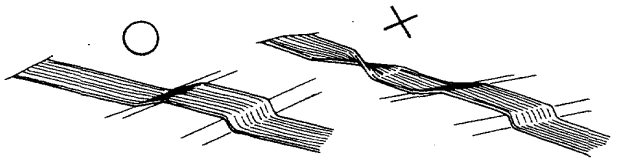


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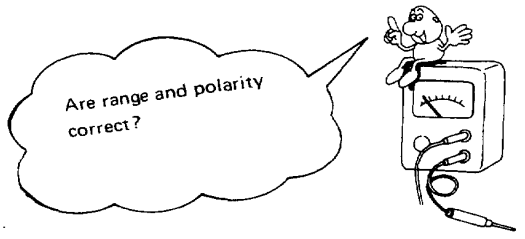
Preparation of Work

Electrical (cont'd)

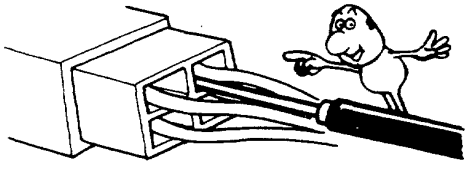
- After routing, check that the wire harnesses are not twisted or kinked.



- Wire harnesses should be routed so that they are not pulled taut, slackened excessively, pinched, or interferred with adjacent or surrounding parts in all stering positions.



- When using the Service Tester, follow the manufacturer's instructions and those described in the Shop Manual.



- Do not throw or let parts fall.



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



Symbol Marks

The following symbols stand for:



: Apply engine oil.



: Apply brake fluid.



: Apply grease.



: Apply Automatic Transmission Fluid.

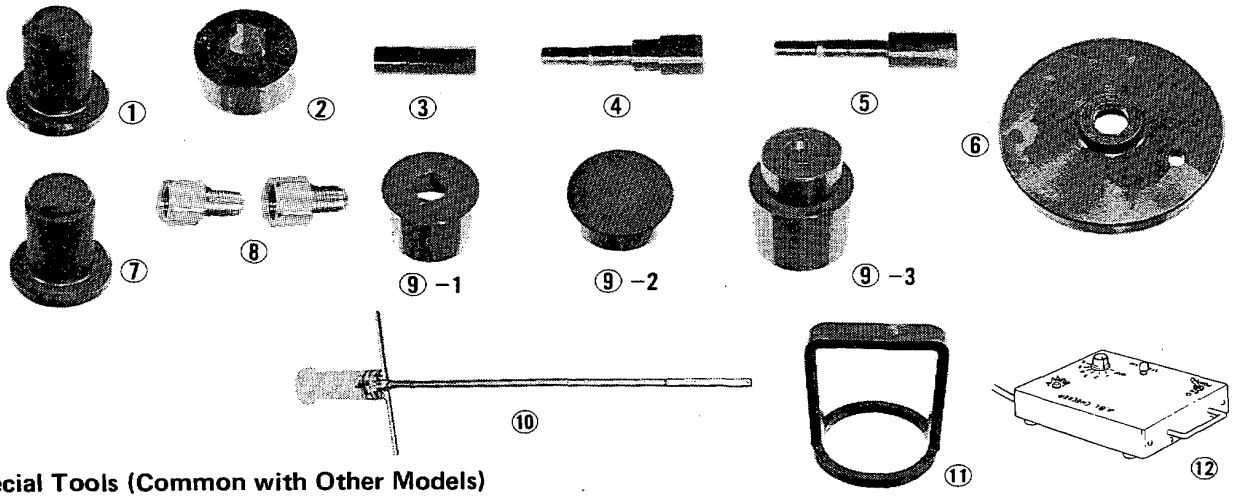
Special Tools

Newly Provided Tools 2-2
SPecial Tools (Common with Other Models) 2-2
Optional Tools 2-11

Special Tools

Newly Provided Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks	Section
①	07947–SB00100	Oil Seal Driver	1	Camshaft Oil Seal	6
②	07973–SB00100	Piston Pilot	1		7
③	07973–SB00200	Piston Pin Pilot Collar	1	Use Changed to 07973–6570002 Attachment	7
④	07973–SB00300	Piston Pin Insert Attachment A	1		7
⑤	07973–SB00400	Piston Pin Insert Attachment B	1		7
⑥	07948–SB00100	Driver Attachment	1	Crankshaft Oil Seal (Clutch Side)	7
⑦	07947–SB00200	Oil Seal Driver	1	Crankshaft Oil Seal	7
⑧	07406–0010500	Joint Adapter Kit	2		19
⑨	07965–SB00000	Ball Joint Dis/Assembly Tool Kit	1		20
⑨-1	07965–SB00100	Dis/Assembly Tool A	(1)		20
⑨-2	07965–SB00200	Dis/Assembly Tool B	(1)		20
⑨-3	07965–SB00300	Assembly base	(1)		20
⑩	07907–SB00000	A.L.B. T-Wrench	1		21
⑪	07967–SB00000	Pulser Driver	1		21
⑫	07508–SB00000	A.L.B. Checker	1		21



Special Tools (Common with Other Models)

5. Engine Removal/Installation

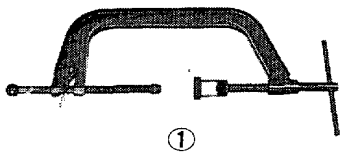
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07941–6920001	Ball Joint Remover	1	
②	07966–6340011	Engine Block Hanger	1	

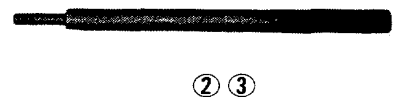


Special Tools (Common with Other Models)

6. Cylinder Head/Valve Train

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07757–0010000	Valve Spring Compressor	1	07957–3290001 may also be used
②	07942–6110000	Valve Guide Driver/Remover	1	07742–0010200 may also be used
③	07942–SA50000	Valve Guide Driver/Remover	1	
④	07943–SA50000	Valve Guide Driver Attachment	1	
⑤	07984–6110000	Valve Guide Reamer	1	
⑥	07984–SA50000	Valve Guide Reamer	1	
⑦	07947–SB00100	Oil Seal Driver	1	Camshaft











7. Engine Block

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07973–6570002	Piston Pin Insert Base Set	1	
②	07973–SB00100	Piston Pilot	1	Not included in base set. Use each with the base set.
③	07973–SB00200	Piston Pin Insert Attachment A	1	
④	07973–SB00300	Piston Pin Pilot Collar	1	
⑤	07973–SB00400	Piston Pin Insert Attachment B	1	
⑥	07948–SB00100	Driver Attachment	1	Crankshaft Oil Seal (Clutch side)
⑦	07947–SB00200	Oil Seal Driver	1	Crankshaft Oil Seal
⑧	07749–0010000	Driver	1	07949–6110000 may also be used

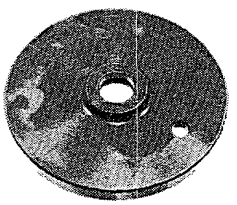
















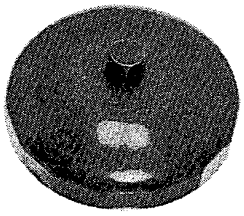
(cont'd)

Special Tools

Special Tools (Common with Other Models)

8. Engine Lubrication

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07912–6110001	Oil Filter Socket Wrench	1	
②	07746–0010100	Driver Attachment 32 x 35	1	
③	07749–0010000	Driver	1	07949–6110000 may also be used

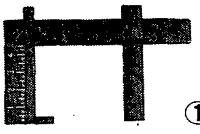

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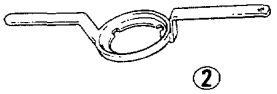

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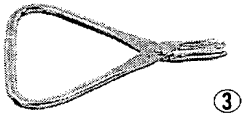

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11. Fuel and Carburetor

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07401–0010000	Float Level Gauge	1	
②	07920–SA50000	Fuel Sender Wrench	1	
③	07614–0050100	Fuel Line Clip	1	

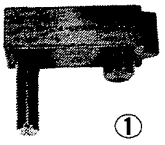

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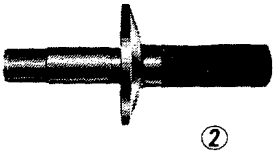

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13. Clutch

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07924–6890101	Ring Gear Holder	1	
②	07974–6890100	Clutch Disc Alignment Tool	1	

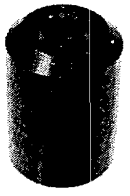

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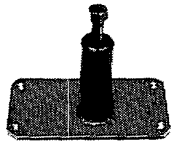
14. Manual Transmission

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07923–6890100	Mainshaft Holder	1	07923–6890101 may also be used
②	07907–PD10000	Socket Wrench 30 mm	1	07907–6890100 may also be used
③	07944–6110100	5 mm Pin Punch	1	
④	07933–6890100	Transmission Housing Puller	1	
⑤	07749–0010000	Driver	1	07949–6110000 may also be used
⑥	07947–6340500	Driver Attachment E	1	
⑦	07936–6340001	Bearing Remover Set	1	
⑧	07936–6890101	Bearing Remover Attachment	1	Use changed to 07936–6340001 attachment
⑨	07947–SB00200	Oil Seal Driver	1	07947–6340000 may also be used
⑩	07746–0010400	Driver Attachment 52 x 55	1	
⑪	07744–0010200	3 mm Pin Punch	1	
⑫	07947–6110400	Oil Seal Driver Attachment	1	Differential Oil Seal
⑬	07947–6110500	Driver Attachment E	1	Differential Oil Seal


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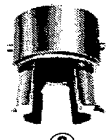

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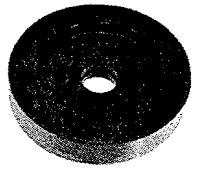

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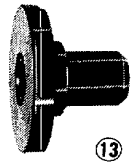

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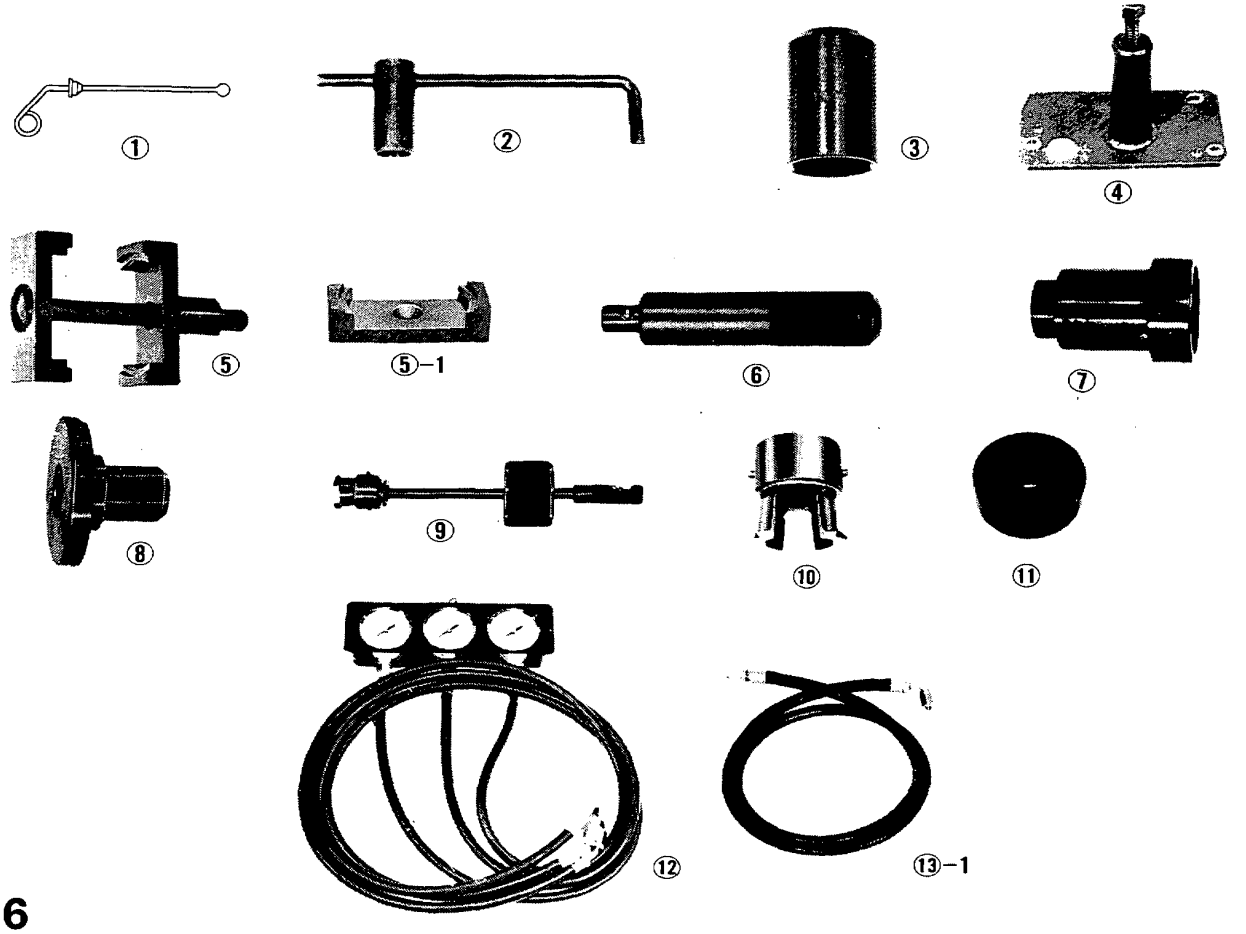
(cont'd)

Special Tools

Special Tools (Common with Other Models)

15. Automatic Transmission

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07974–6890300	Throttle Cable Adjustment Gauge	1	
②	07923–6890100	Mainshaft Holder	1	07923–6890201 may also be used
③	07907–PD10000	Socket Wrench 30 mm	1	07907–6890100 may also be used
④	07933–6890201	Transmission Housing Puller	1	Use corrected to 07936–6890200 is possible. For the correction method, refer to page 15-4.
⑤	07960–6890000	Clutch Spring Compressor	1	
⑤-1	07960–6890100	Clutch Spring Compressor Attachment	1	Use changed to 07960–6120000 attachment
⑥	07749–0010000	Driver	1	07949–6110000 may also be used
⑦	07947–6340500	Driver Attachment	1	
⑧	07947–6110500	Oil Seal Driver Attachment	1	
⑨	07936–6340001	Bearing Remover Set	1	
⑩	07936–6890101	Bearing Remover Attachment	1	Use changed to 07936–6340001 attachment
⑪	07746–0010400	Driver Attachment 52 x 55	1	
⑫	07406–0020003	Oil Pressure Gauge Set	1	
⑬-1	07406–0020201	Oil Pressure Gauge Hose	(3)	Component Tool



16. Differential

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07746–0030100	Driver C	1	
②	07944–SA00000	4 mm Pin Punch	1	
③	07947–6110500	Oil Seal Driver	1	
④	07749–0010000	Driver	1	07949–6110000 may also be used
⑤	07947–6340500	Driver Attachment E	1	



①



②



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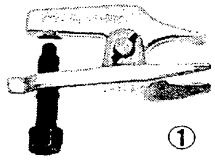
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17. Drive shaft

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07941–6920001	Ball Joint Remover	1	



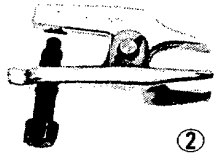
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18. Stearing

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07916–6920000	Steering Gearbox Lock Nut Wrench	1	07916–SA50001 may also be used
②	07941–6920001	Ball Joint Remover	1	
③	07974–SA50800	Clipe Guide (B)	1	Clipe Type
④	07974–6790000	Tie-Rod Boots Driver	1	Press-in Type



①



②



③



④

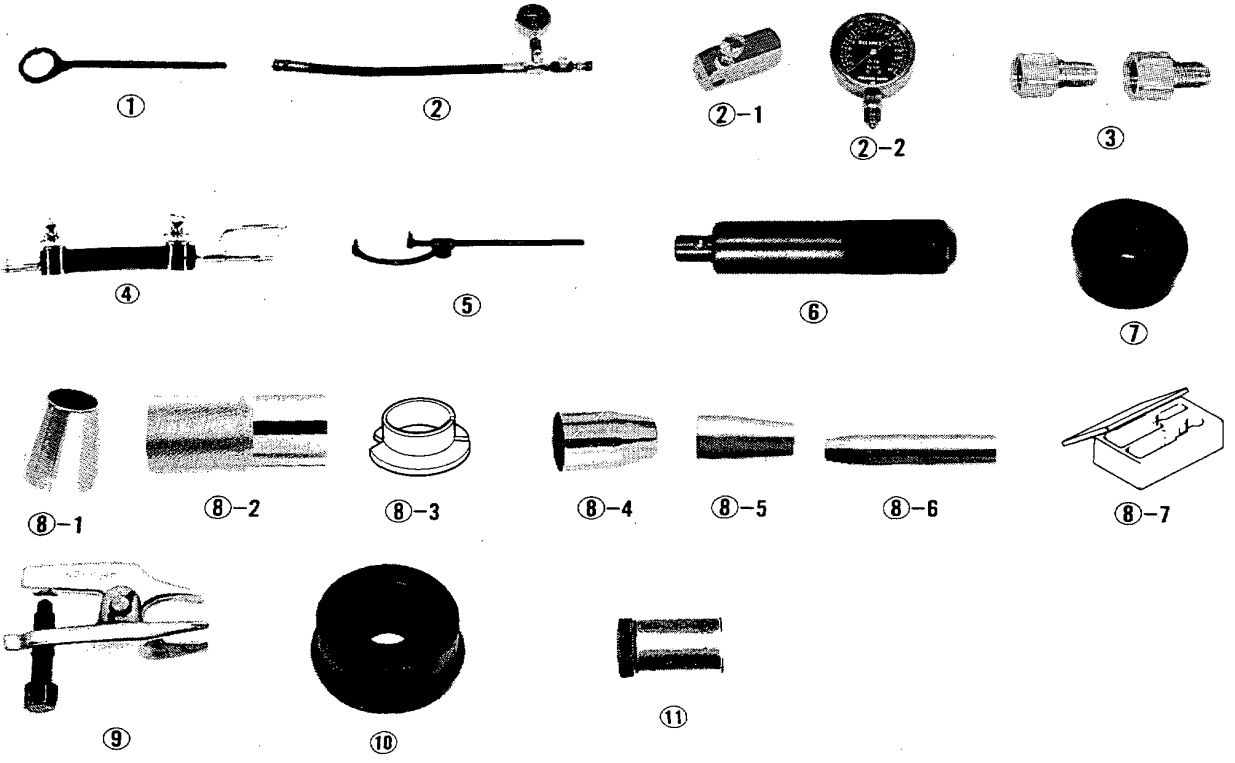
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Special Tools

Special Tools (Common with Other Models)

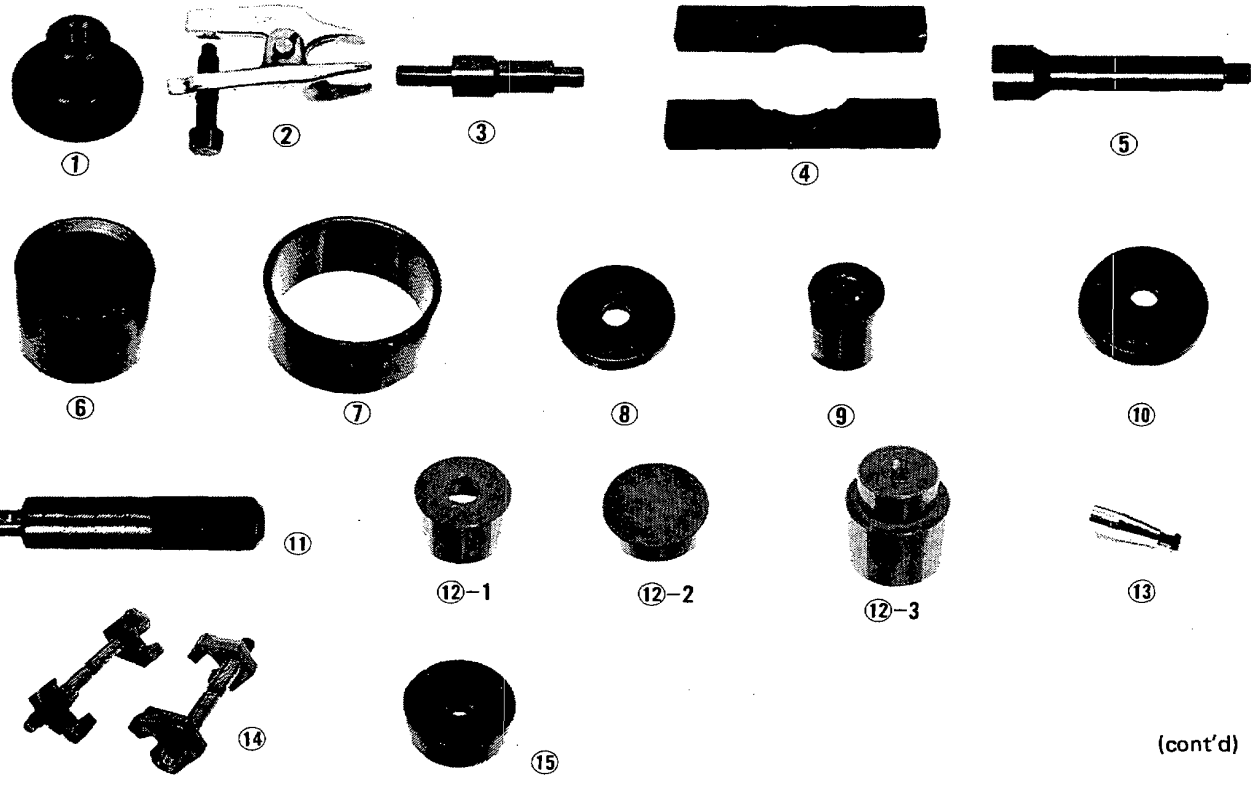
19. Power Steering

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07916–SA50001	Steering Gearbox Lock Nut Wrench	1	
②	07406–0010200	PS. Pressure Gauge Assy.	1	
②-1	07406–0010300	Oil Pressure Control Valve	(1)	Component tools
②-2	07406–0010400	PS. Pressure Meter	(1)	
③	07406–0010500	Joint Adapter Kit	1	
④	07406–0010101	Bypass Tube	1	
⑤	07725–0030000	Universal Holder	1	07725–0010101 may also be used
⑥	07749–0010000	Driver	1	07949–6110000 may also be used
⑦	07946–1870100	Driver Attachment 28 x 30 mm	1	
⑧	07900–SA50000	Power Steering Tool Kit	1	PS. Gearbox Overhaul Kit
⑧-1	07974–SA50100	Piston Seal-Ring Guide	(1)	Component tools
⑧-2	07974–SA50200	Piston Seal-Ring Sizing Tool	(1)	
⑧-3	07974–SA50300	Cylinder End Packing Slider	(1)	
⑧-4	07974–SA50400	End Seal Guide	(1)	
⑧-5	07974–SA50500	End Cover Seal Guide	(1)	
⑧-6	07974–SA50600	Dust Seal Slider	(1)	
⑧-7	07974–SA50900	PS. Tools Kit Case	(1)	
⑨	07941–6920001	Ball Joint Remover	1	
⑩	07746–0010300	Driver Attachment 42 x 47	1	
⑪	07973–6920001	PS. Column Setting Guide	1	



20. Suspension

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07410–0010200	Front Wheel Alignment Attachment B	1	
②	07941–6920001	Ball Joint Remover	1	
③	07965–6340100	Front Hub Dis/Assembly Tool Pin A	1	
④	07965–6340301	Front Hub Dis/Assembly Tool Base A	2	
⑤	07965–SA50100	Front Hub Dis/Assembly Tool A	1	
⑥	07965–6920200	Front Hub Dis/Assembly Tool B	1	
⑦	07965–6920300	Front Hub Dis/Assembly Tool C	1	
⑧	07965–6920400	Front Hub Dis/Assembly Tool D	1	
⑨	07965–SA50500	Front Hub Dis/Assembly Tool E	1	
⑩	07965–SA00600	Front Hub Dis/Assembly Tool F	1	
⑪	07749–0010000	Driver	1	07949–6110000 may also be used
⑫	07965–SB00000	Ball Joint Dis/Assembly Tool Kit	1	
⑫-1	07965–SB00100	Dis/Assembly Tool A	(1)	
⑫-2	07965–SB00200	Dis/Assembly Tool B	(1)	
⑫-3	07965–SB00300	Assembly base	(1)	
⑬	07974–SA50700	Clipe Guide (A)	1	
⑭	07959–SA50000	Absorber Spring Compressor	2	
⑮	07946–6920100	Driver Attachment	1	



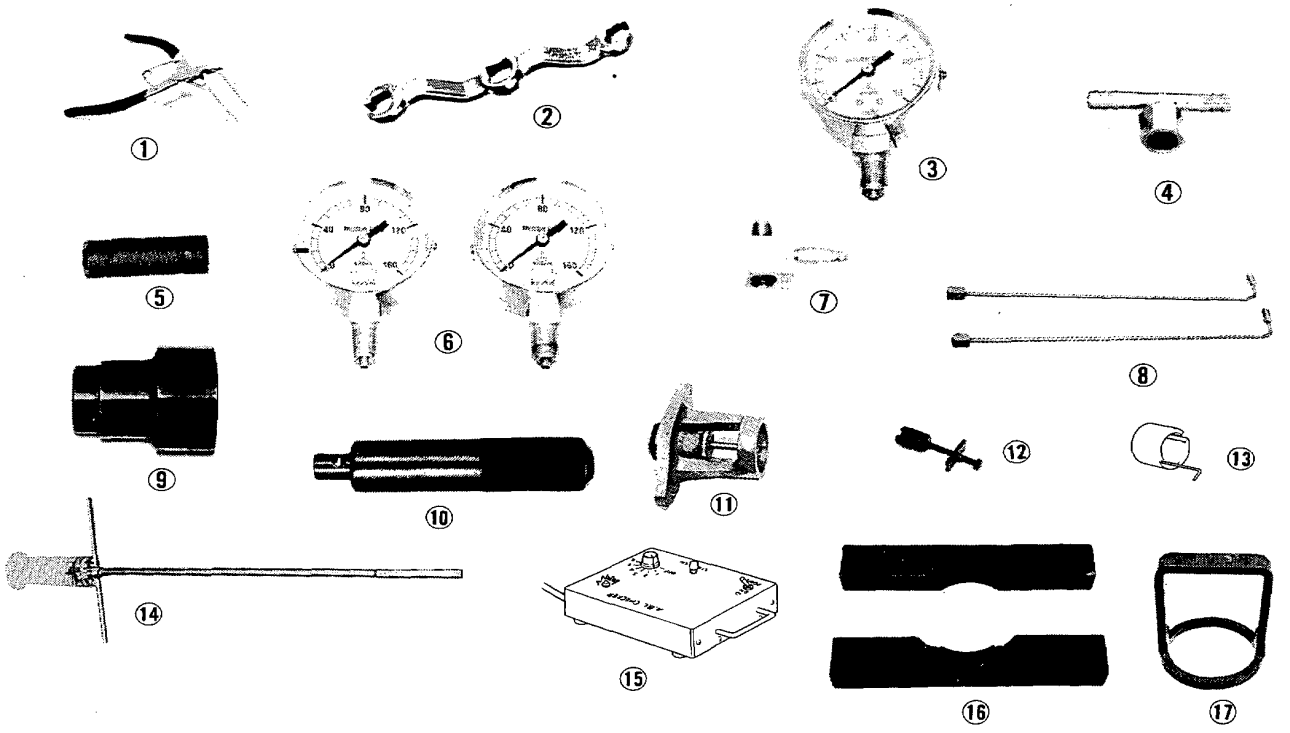
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Special Tools

Special Tools (Common with Other Models)

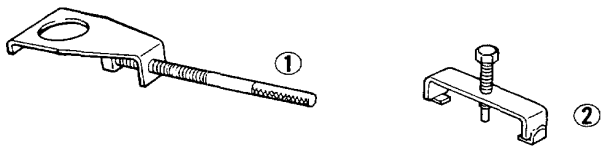
21. Brake

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07914–SA50000	Snap Ring Pliers	1	Rear Caliper
②	07921–0010100	Flare Nut Wrench	1	
③	07404–5790300	Vacuum Gauge	1	
④	07410–5790500	Tube Joint Attachment I	1	
⑤	07510–6340300	Vacuum Joint Tube A	1	Short parts of the brake power kit 07504–6340100
⑥	07406–5790200	Oil Pressure Gauge	2	
⑦	07410–5790100	Pressure Gauge Attachment C	1	
⑧	07510–6340100	Pressure Gauge Attachment	2	
⑨	07947–6890300	Driver Attachment C	1	
⑩	07749–0010000	Driver	1	07949–6110000 may also be used
⑪	07975–SA50001	Brake Booster Adjusting Gauge	1	
⑫	07960–SA50001	Brake Spring Compressor	1	
⑬	07973–SA50000	Rear Caliper Guide	1	
⑭	07907–SB00000	A.L.B. T-Wrench	1	
⑮	07508–SB00000	A.L.B. Checker	1	
⑯	07965–6340301	Front Hub Dis/Assembly Tool Base A	2	
⑰	07967–SB00000	Pulser Driver	1	



24. Air Conditioning

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07923–PB80000	Pulley Holder	1	
②	07934–PB80000	Clutch Remover	1	



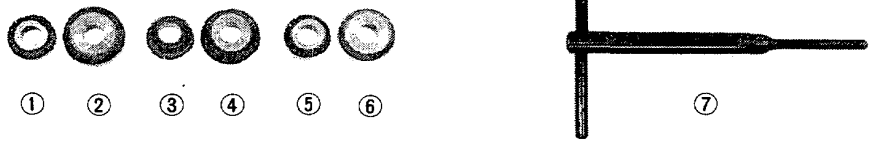
26. Ignition

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07744–0010200	3 mm Pin Punch	1	Distributor



Optional Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07780–0012300	Valve Seat Cutter 32°	1	
②	07780–0012900	Valve Seat Cutter 32°	1	
③	07780–0014000	Valve Seat Cutter 60°	1	
④	07780–0014100	Valve Seat Cutter 60°	1	
⑤	07780–0010400	Valve Seat Cutter 45°	1	
⑥	07780–0010800	Valve Seat Cutter 45°	1	
⑦	07781–0010201	Valve Seat Cutter Holder	1	
⑧	07781–0010301	Valve Seat Cutter Holder	1	



MEMO

Specifications

Standards and Service Limits 3-2
Design Specifications 3-11
Body Specifications 3-18
Frame Specifications 3-19

Standards and Service Limits

Engine

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Compression	300 min^{-1} (rpm) and wide-open throttle	Nominal Minimum Maximum variation	1,323 kPa (13.5 kg/cm^2, 192 psi) 1,127 kPa (11.5 kg/cm^2, 164 psi) 196 kPa (2 kg/cm^2, 28 psi)
Ignition Timing	At idling KC-MT KT, KS, KQ, KX-MT/AT KC-AT EC, KY-MT/AT	22 ± 2° BTDC 12 ± 2° BTDC 18 ± 2° BTDC	
Valve Timing		MT / AT	
	IN open	10° ATDC / 10° ATDC	
	IN close	35° ABDC / 30° ABDC	
	EX open	40° BBDC / 35° BBDC	
	EX close	10° BTDC / 10° BTDC	

6. Cylinder Head/Valve Train

	MEASUREMENT			STANDARD (NEW)	SERVICE LIMIT
Cylinder head	Warpage			—	0.05 (0.002)
	Height			90 (3.54)	89.8 (3.54)
Camshaft	End play			0.05–0.15 (0.002–0.006)	0.5 (0.02)
	Oil clearance	No. 1, 3 and 5 Journal		0.050–0.089 (0.002–0.004)	0.15 (0.006)
		No. 2 and 4 Journal		0.130–0.169 (0.005–0.007)	0.23 (0.009)
	Runout			0.03 (0.001) max.	0.06 (0.002)
	Cam lobe height	Manual	IN	38.353 (1.5100)	—
			EX	38.796 (1.5274)	—
		Automatic	IN	38.668 (1.5224)	—
			EX	38.480 (1.5150)	—
Valve	Valve clearance		IN	0.12–0.17 (0.005–0.007)	—
			EX	0.25–0.30 (0.010–0.012)	—
	Valve stem O.D.		IN	6.58–6.59 (0.2591–0.2594)	6.55 (0.258)
			EX	6.94–6.95 (0.2732–0.2736)	6.91 (0.272)
	Steam-to-guide clearance		IN	0.02–0.05 (0.001–0.002)	0.08 (0.003)
			EX	0.06–0.09 (0.002–0.004)	0.12 (0.005)
	Stem installed hight		IN	48.59 (1.913)	49.34 (1.943)
			EX	47.66 (1.876)	48.41 (1.906)
Valve seat	Width		IN	1.25–1.55 (0.049–0.061)	2.0 (0.08)
Valve spring				Nippon spring / Chuo spring	Nippon spring / Chuo spring
	Free length	Inner	EX	46.59 (1.834) / 46.6 (1.835)	—
		Outer	IN	48.34 (1.903) / 48.3 (1.902)	—
			EX	55.9 (2.20)	—
	Squareness Inner and Outer			—	1.75 (0.067)
Valve guide	I.D.		IN	6.61–6.63 (0.260–0.261)	6.65 (0.0262)
			EX	7.01–7.03 (0.276–0.277)	7.05 (0.278)
Rocker arm	Arm-to-shaft clearance			0.08 (0.003)	—

Unit: mm (in.)

7. Engine Block

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface		0.08 (0.003) max.	0.10 (0.004)
	Bore diameter	A	80.01–80.02 (3.1500–3.1504)	80.05 (3.1516)
		B	80.00–80.01 (3.1496–3.1500)	80.04 (3.1512)
	Bore taper		0.007–0.012 (0.0003–0.0005)	0.05 (0.002)
	Reboring limit		–	0.5 (0.02)
Piston	Skirt O.D. (At 21 mm (0.83 in) from bottom of skirt)	A	79.98–79.99 (3.1488–3.1492)	79.97 (3.1484)
		B	79.97–79.98 (3.1484–3.1488)	79.96 (3.1480)
	Clearance in cylinder		0.020–0.040 (0.0008–0.0016)	0.08 (0.003)
	Piston-to-ring clearance (top and second)		0.020–0.045 (0.0008–0.0018)	0.13 (0.005)
Piston ring	Ring end gap (top and second)		0.20–0.35 (0.008–0.014)	0.6 (0.024)
	Ring end gap (oil)		0.20–0.70 (0.008–0.030)	1.1 (0.043)
Connecting rod	Pin-to-rod interference		0.016–0.032 (0.0006–0.0013)	0.013 (0.0005)
	Large end bore diameter		Nominal 45 (1.77)	–
	End play installed on crankshaft		0.15–0.30 (0.006–0.012)	0.40 (0.016)
Crankshaft	Main journal diameter		50.006–50.030 (1.9687–1.9697)	–
	Taper/out-of-round, main journal		0.005 (0.0002) max.	0.010 (0.0004)
	Rod journal diameter		44.976–45.000 (1.7707–1.7717)	–
	Taper/out-of-round, rod journal		0.005 (0.0002) max.	0.010 (0.0004)
	End play		0.10–0.35 (0.004–0.014)	0.45 (0.018)
	Runout		0.03 (0.0012) max.	0.06 (0.0024)
Bearings	Main bearing-to-journal oil clearance		0.020–0.049 (0.0008–0.0019)	0.07 (0.003)
	Rod bearing-to-journal oil clearance		0.020–0.038 (0.0008–0.0015)	0.07 (0.003)

8. Engine Lubrication

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US. qt. Imp. qt.)	3.9 (4.1, 3.4) Means designed value 3.5 (3.7, 3.1) Adding replace oil filter 3.0 (3.2, 2.6) Exclude oil filter	
Oil pump	Displacement	31ℓ (8.2 US gal., 6.8 Imp gal.) 5,500 min^{-1} (rpm)	
	Inner-to-outer rotor radial clearance	0.14 (0.006) max.	0.2 (0.008)
	Pump body-to-rotor radial clearance	0.12–0.18 (0.005–0.007)	0.2 (0.008)
	Pump body-to-rotor side clearance	0.03–0.108 (0.001–0.004)	0.15 (0.006)
Relief valve	Pressure setting	373–451 kPa (3.8–4.6 kg/cm^2 54–65 psi)	

10. Cooling

	MEASUREMENT	STANDARD (NEW)	
Cooling fan belt	Deflection midway between pulleys/load	7–10 (0.3–0.4)/98N (10 kg, 22 lb) 5–7 (0.2–0.3)/98N (10 kg, 22 lb) for replacement of belt	
Radiator	Capacity (incld. heater) ℓ (US. Gal., Imp. Gal.)	Except KY: 6.8 (1.8, 1.5) (Include reservoir tank 0.8 (0.21, 0.18) KY: 7.5 (2.0, 1.7) (Include reservoir tank 0.8 (0.21, 0.18)	
	Pressure cap opening pressure	74–103 kPa (0.75–1.05 kg/cm^2, 11–15 psi)	
Thermostat	Starts to open	80–84°C (176–183°F)	86–90°C (187–194°F)
	Full open	90°C (203°F)	100°C (212°F) OPTIONAL
	Valve lift at full open	8 (0.31) max.	8 (0.31) max.
Water pump	Gear ratio (crankshaft)	1.29	
	Capacity (ℓ min/min^{-1})	124/5,000 (32.7 US. gal/5,000 rpm)	
Cooling fan	Fan-to-core clearance	23.0 (0.90)	
	Thermoswitch "ON" temperature	87°–93°C (188°–199°F)	
	Thermoswitch "OFF" temperature	83°C (181°F) or more (hysteresis 2°C (35°F) or more)	

(cont'd)

Standards and Service Limits (cont'd)

11. Fuel

	MEASUREMENT	STANDARD (NEW)
Fuel pump	Delivery pressure Displacement	14.7–19.6 kPa (0.15–0.20 kg/cm^2, 2.1–2.8 psi) 620 cm^3/min. at 10V (38 cu. in./10V) 680 cm^3/min. at 12V (41 cu. in./12V)
Fuel Tank	Capacity	60 ℓ (15.8 US. Gal., 13.2 Imp. Gal.)

12. Carburetor

	MEASUREMENT	STANDARD (NEW)
Carburetor	Choke fast idle KC Except KC	1,700–2,700 min^{-1} (rpm) 2,200–3,200 min^{-1} (rpm)
	Idle Speed with headlights and cooling fan off	750 ± 50 min^{-1} (rpm)
	Idle Co KC, KS, KX Other types Float level (from gasket)	0.5–2.0 3.0 15–17 (0.59–0.67)

13. Clutch

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height Stroke Pedal play Disengagement height	181 (7.1) to floor 114 (4.5) to carpet 120–130 (4.7–5.1) 10–30 (0.39–1.18) 65 (2.6) min. to floor 30 (1.2) min. to carpet	– – – – – –
Clutch arm	Release arm adjustment	5.2–6.4 (0.20–0.25)	–
Flywheel	Clutch surface runout	0.05 (0.002) max.	0.15 (0.006)
Clutch plate	Rivet head depth Surface runout Radial play in splines Thickness	1.3 (0.05) min. 0.8 (0.03) max. 0.7–2.1 (0.028–0.083) 8.1–8.8 (0.32–0.35)	0.2 (0.008) 1.0 (0.04) 4.0 (0.16) 5.7 (0.22)
Clutch release bearing holder	I.D. Holder-to-guide sleeve clearance	31.00–31.059 (1.220–1.223) 0.05–0.15 (0.0020–0.0059)	31.09 (1.224) 0.22 (0.0087)
Clutch cover	Uneveness of diaphragm spring	0.8 (0.03) max.	1.0 (0.04)

Unit: mm (in.)

14. Manual Transmissions

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US. qt., Imp. qt)	2.5 (2.6, 2.2) 2.4 (2.5, 2.1) adding	
Mainshaft	End play Diameter of needle bearing contact area Diameter of third gear contact area Diameter of ball bearing contact area Runout	0.10–0.35 (0.004–0.014) 28.002–28.015 (1.1024–1.1035) 31.984–32.000 (1.2592–1.2598) 24.980–24.993 (0.9835–0.9840) 0.04 (0.0016) max.	0.5 (0.02) 27.95 (1.100) 31.93 (1.2571) 24.93 (0.981) 0.10 (0.04)
Mainshaft third and fourth gears	I.D. End play Thickness	37.009–37.025 (1.4570–1.4577) 0.03–0.18 (0.0012–0.0071) 30.42–30.47 (1.1780–1.1799)	37.07 (1.459) 0.3 (0.012) 30.3 (1.193)
Mainshaft fifth gear	I.D. End play Thickness	37.009–37.025 (1.4570–1.4577) 0.03–0.13 (0.0012–0.0051) 29.92–29.97 (1.1776–1.1799)	37.07 (1.459) 0.3 (0.012) 29.8 (1.173)
Countershaft	End play Diameter of needle bearing contact area Diameter of ball bearing contact area Diameter of low gear contact area Runout	0.10–0.35 (0.004–0.014) 33.000–33.015 (1.2992–1.2998) 24.980–24.993 (0.9835–0.9840) 33.984–34.000 (1.3380–1.3386) 0.04 (0.0016)	0.5 (0.02) 32.95 (1.297) 24.93 (0.981) 33.93 (1.336) 0.10 (0.004)
Countershaft low gear	I.D. End play	39.008–39.025 (1.5357–1.5364) 0.03–0.08 (0.0012–0.0031)	39.07 (1.538) 0.18 (0.007)
Countershaft second gear	I.D. End play Thickness	43.008–43.025 (1.6932–1.6939) 0.03–0.10 (0.0012–0.0039) 30.42–30.47 (1.1976–1.1996)	43.07 (1.696) 0.18 (0.007) 30.3 (1.193)
Spacer collar (Countershaft second gear)	I.D. O.D. Length	30.98–30.99 (1.2197–1.2201) 37.989–38.00 (1.4956–1.4961) 30.53–30.55 (1.2020–1.2028)	31.4 (1.236) 37.93 (1.493) 30.51 (1.201)
Spacer collar (Mainshaft fourth and fifth gears)	I.D. O.D. Length	25.002–25.012 (0.9843–0.9847) 31.989–32.00 (1.2594–1.2598) 27.03–27.08 (1.0642–1.0661)	25.06 (0.987) 31.93 (1.257) 27.01 (1.063)
Reverse idler gear	I.D. Gear-to-reverse gear shaft clearance	17.016–17.043 (0.6699–0.6710) 0.032–0.077 (0.0013–0.0030)	17.09 (0.673) 0.15 (0.006)
Synchronizer ring	Ring-to-gear clearance (ring pushed against gear)	0.85–1.10 (0.033–0.043)	0.4 (0.016)
Shift fork	Synchronizer sleeve gear Fork-to-synchronizer sleeve clearance	6.75–6.85 (0.266–0.270) 0.35–0.65 (0.014–0.026)	– 1.0 (0.039)
Reverse shift fork	End gap Fork-to-reverse idler gear clearance Groove width Fork-to-fifth/reverse shift shaft clearance	11.8–12.0 (0.46–0.47) 0.2–1.0 (0.008–0.04) 7.05–7.25 (0.278–0.285) 0.05–0.35 (0.002–0.014)	– 1.7 (0.07) – 0.5 (0.020)
Shift arm	Width of groove in shift rod guide Shift arm-to-shift rod guide clearance Width in shift guide Shift arm-to-shift guide clearance	11.8–12.0 (0.46–0.47) 0.05–0.35 (0.0020–0.014) 7.9–8.0 (0.311–0.315) 0.1–0.3 (0.004–0.012)	– 0.8 (0.031) – 0.6 (0.024)
Shift rod guide	I.D. Guide-to-shaft clearance O.D. Guide-to-fifth/reverse shift shaft clearance	14.000–14.068 (0.5512–0.5539) 0.011–0.092 (0.0004–0.0036) 11.9–12.0 (0.469–0.472) 0.2–0.5 (0.008–0.020)	– 0.15 (0.006) – 0.8 (0.03)
Selector arm	Width Arm-to-shift rod guide clearance End gap Arm-to-interlock clearance Arm-to-holder clearance	11.9–12.0 (0.469–0.472) 0.05–0.25 (0.002–0.010) 10.05–10.15 (0.396–0.400) 0.05–0.25 (0.002–0.010) 0.01–0.20 (0.0004–0.0079)	– 0.5 (0.020) – 0.7 (0.028) Selection with 5 types of shims

(cont'd)

Standards and Service Limits (cont'd)

15. Automatic Transmission

	MEAUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US. qt., Imp. qt)	2.8 (3.0, 2.5) at change 5.8 (6.1, 5.1) at assembly	
Hydraulic pressure	Line pressure at 2,000 min^{-1} (rpm)	735–784 kPa (7.5–8.0 kg/cm^2, 107–121 psi)	686 kPa (7.0 kg/cm^2, 100 psi)
	4th clutch pressure at 2,000 min^{-1} (rpm)	686–784 kPa (7.0–8.0 kg/cm^2, 100–114 psi)	637 kPa (6.5 kg/cm^2, 92 psi)
	3rd clutch pressure at 2,000 min^{-1} (rpm)	686–784 kPa (7.0–8.0 kg/cm^2, 100–114 psi)	637 kPa (6.5 kg/cm^2, 92 psi)
	2nd clutch pressure at 2,000 min^{-1} (rpm)	686–784 kPa (7.0–8.0 kg/cm^2, 100–114 psi)	637 kPa (6.5 kg/cm^2, 92 psi)
	1st clutch pressure at 2,000 min^{-1} (rpm)	686–784 kPa (7.0–8.0 kg/cm^2, 100–114 psi)	637 kPa (6.5 kg/cm^2, 92 psi)
	Governor pressure at 60 km/h	216–225 kPa (2.2–2.3 kg/cm^2, 31–33 psi)	201 kPa (2.05 kg/cm^2, 29 psi)
	Throttle pressure A	593–608 kPa (6.05–6.20 kg/cm^2, 86–88 psi)	578 kPa (5.9 kg/cm^2, 83.2 psi)
	Throttle pressure B	735–784 kPa (7.5–8.0 kg/cm^2, 107–114 psi)	686 kPa (7.0 kg/cm^2, 100 psi)
Stall rpm	Check with car on level ground	KY TYPE: 2,650 min^{-1} (rpm) Others: 2,600 min^{-1} (rpm)	2,300–2,900 min^{-1} (rpm)
Clutch	Clutch initial clearance	0.4–0.7 (0.016–0.028)	–
	Clutch return spring free length	29 (1.14)	27 (1.06)
	Clutch disc thickness	1.88–2.0 (0.074–0.079)	Until grooves worn out
	Clutch plate thickness	1.95–2.05 (0.077–0.079)	Discoloration
	Clutch end plate thickness Mark 1	2.4–2.5 (0.094–0.098)	Discoloration
	Mark 2	2.5–2.6 (0.098–0.102)	Discoloration
	Mark 3	2.6–2.7 (0.102–0.106)	Discoloration
	Mark 4	2.7–2.8 (0.106–0.110)	Discoloration
	Mark 5	2.8–2.9 (0.110–0.114)	Discoloration
	Mark 6	2.9–3.0 (0.114–0.118)	Discoloration
	Mark 7	3.0–3.1 (0.118–0.122)	Discoloration
	Mark 8	3.1–3.2 (0.122–0.126)	Discoloration
	Mark 9	3.2–3.3 (0.126–0.130)	Discoloration
	Mark 10	3.3–3.4 (0.130–0.134)	Discoloration
Transmission	Diameter of needle bearing contact area on main and stator shaft	19.980–19.983 (0.7866–0.7867)	Damage or dent
	Diameter of needle bearing contact area on mainshaft 2nd gear	35.975–35.991 (1.4163–1.4169)	Damage or dent
	Diameter of needle bearing contact area on main 4th gear collar	31.975–31.991 (1.2588–1.2594)	Damage or dent
	Diameter of needle bearing contact area on mainshaft 1st gear collar	29.980–29.993 (1.1803–1.1808)	Damage or dent
	Diameter of needle bearing contact area on countershaft (L side)	32.984–33.000 (1.2986–1.2993)	Damage or dent
	Diameter of needle bearing contact area on countershaft 3rd gear	31.975–31.991 (1.2589–1.2595)	Damage or dent
	Diameter of needle bearing contact area on countershaft 4th gear	27.980–27.993 (1.1016–1.1021)	Damage or dent
	Diameter of needle bearing contact area on countershaft reverse gear collar	29.980–29.993 (1.1803–1.1808)	Damage or dent
	Diameter of needle bearing contact area on countershaft L gear collar	29.980–29.993 (1.1803–1.1808)	Damage or dent
	Diameter of needle bearing contact area on reverse idle gear	13.994–14.000 (0.5509–0.5512)	Damage or dent
	Reverse idler shaft holder diameter	14.016–14.034 (0.5518–0.5525)	Damage or dent
	Mainshaft 2nd gear I.D.	41.000–41.016 (1.6141–1.6148)	Damage or dent
	Mainshaft 1st gear I.D.	36.000–36.016 (1.4173–1.4179)	Damage or dent
	Countershaft 4th gear I.D.	33.000–33.016 (1.2992–1.2998)	Damage or dent
	Countershaft 3rd gear I.D.	38.000–38.016 (1.4966–1.4966)	Damage or dent
	Countershaft 2nd gear I.D.	31.000–31.016 (1.2204–1.2210)	Damage or dent
	Countershaft 1st gear I.D.	35.000–35.016 (1.3779–1.3785)	Damage or dent
	Countershaft reverse gear I.D.	36.000–36.016 (1.4173–1.4179)	Damage or dent
	Reverse idler gear I.D.	18.007–18.020 (0.7086–0.7094)	Damage or dent

Unit: mm (in.)

15. Automatic Transmission (cont'd)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission	Mainshaft 4th gear end play		0.07–0.15 (0.0027–0.0059)	–
	Mainshaft 2nd gear end play		0.07–0.15 (0.0027–0.0059)	–
	Mainshaft 1st gear end play		0.08–0.24 (0.0031–0.0094)	–
	Countershaft 3rd gear end play		0.07–0.15 (0.003–0.006)	–
	Countershaft 2nd gear end play		0.07–0.15 (0.003–0.006)	–
	Reverse idler gear end play		0.05–0.18 (0.002–0.007)	–
	Countershaft reverse gear end play		0.10–0.20 (0.004–0.008)	–
	Reverse gear hub O.D.		51.87–51.90 (2.0421–2.0433)	Damage or dent
	Thrust washer thickness			
	Mainshaft 2nd gear	A	2.97–3.00 (0.1169–0.1181)	–
		B	3.02–3.05 (0.1189–0.1201)	–
		C	3.07–3.10 (0.1209–0.1220)	–
		D	3.12–3.15 (0.1228–0.1240)	–
		E	3.17–3.20 (0.1248–0.1260)	–
		F	3.22–3.25 (0.1268–0.1280)	–
		G	3.27–3.30 (0.1287–0.1299)	–
	Mainshaft R side bearing		2.95–3.05 (0.1161–0.1200)	Damage or dent
	Mainshaft 1st gear		2.43–2.50 (0.0957–0.0984)	Damage or dent
	Countershaft 3rd gear	A	2.97–3.00 (0.1169–0.1181)	–
		B	3.02–3.05 (0.1189–0.1201)	–
		C	3.07–3.10 (0.1209–0.1220)	–
		D	3.12–3.15 (0.1228–0.1240)	–
		E	3.17–3.20 (0.1248–0.1260)	–
		F	3.22–3.25 (0.1268–0.1280)	–
		G	3.27–3.30 (0.1287–0.1299)	–
		H	3.32–3.35 (0.1307–0.1319)	–
		I	3.37–3.40 (0.1327–0.1339)	–
	Countershaft 4th gear thickness	A	38.95–39.00 (1.5334–1.5354)	–
		B	39.05–39.10 (1.5373–1.5393)	–
		C	39.15–39.20 (1.5413–1.5433)	–
		D	39.25–39.30 (1.5452–1.5472)	–
	Thrust washer thickness (mainshaft 1st gear L side)		1.45–1.50 (0.057–0.059)	1.4 (0.055)
	Mainshaft 1st gear collar length		22.50–22.55 (0.8858–0.8878)	–
	Mainshaft 1st gear collar flange thickness		2.5–2.6 (0.098–0.102)	damage or dent
	Countershaft reverse gear collar length		14.0–14.1 (0.551–0.555)	–
	Countershaft reverse gear collar flange thickness		2.45–2.50 (0.096–0.098)	Damage or dent
	Countershaft 1st gear collar length		11.0–11.1 (0.433–0.437)	–
	Countershaft 1st gear collar flange thickness		2.4–2.6 (0.095–0.102)	Damage or dent
	Diameter of countershaft one-way clutch contact area		74.414–74.440 (2.9297–2.9307)	Damage or dent
	Diameter of parking gear one-way clutch contact area		57.755–57.768 (2.2738–2.2743)	Damage or dent
	Mainshaft and countershaft feed pipe O.D. (at 20 mm from end)		7.97–7.98 (0.3138–0.3142)	7.95 (0.31)
	Mainshaft sealing ring 32 mm Thickness		1.9980–1.9995 (0.780–0.785)	1.8 (0.071)
	Mainshaft bushing I.D.		9.000–9.015 (0.3543–0.3549)	9.03 (0.356)
	Countershaft bushing I.D.		8.000–8.015 (0.3150–0.3156)	8.03 (0.316)
	Mainshaft sealing ring groove width		2.025–2.060 (0.0797–0.0811)	2.08 (0.082)
Regulator valve body	Sealing ring contact area diameter		32.000–32.025 (1.2598–1.2608)	32.05 (1.26)
Shifting device and parking brake control	*Reverse shift fork thickness*		5.9–6.0 (0.232–0.236)	5.4 (0.21)
	Parking brake ratchet pawl		–	Wear or other defect
	Parking gear		–	Wear or other defect

(cont'd)

Standard and Service Limit (cont'd)

15. Automatic Transmission (Cont'd)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Servo body	Shift fork shaft bore I.D.	A	14.000–14.005 (0.5512–0.5514)	–
		B	14.006–14.010 (0.5514–0.5516)	–
		C	14.011–14.015 (0.5516–0.5518)	–
	Shift fork shaft valve bore I.D.		37.000–37.039 (1.4567–1.4582)	37.045 (1.4585)
Valve body	Oil pump gear side clearance		0.03–0.05 (0.0012–0.0020)	0.08 (0.003)
	Oil pump gear-to-body clearance		Drive: 0.21–0.27 (0.0083–0.0106)	–
			Driven: 0.05–0.09 (0.0020–0.0035)	–
	Stator camshaft needle bearing bore I.D.		24.000–24.021 (0.9449–0.9457)	Damage or dent
	Stator camshaft needle bearing contact and O.D.		26.000–26.013 (1.0236–1.0241)	Damage or dent
	Oil pump driven gear I.D.		14.016–14.034 (0.5518–0.5525)	Damage or dent
	Oil pump shaft O.D.		13.980–13.990 (0.5504–0.5508)	Damage or dent

16. Differential

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Ring gear	Backlash		0.14–0.20 (0.006–0.008)	0.25 (0.010)
Differential carrier	Pinion shaft bore diameter		18.000–18.018 (0.7087–0.7094)	18.1 (0.71)
	Carrier-to-pinion shaft clearance		0.016–0.052 (0.0006–0.0020)	0.1 (0.004)
	Driveshaft bore diameter	MT	26.000–26.021 (1.0236–1.0244)	–
		AT	28.000–28.021 (1.1024–1.1032)	–
	Carrier-to-driveshaft clearance		0.025–0.066 (0.0010–0.0026)	0.12 (0.005)
	Side clearance		0.10–0.20 (0.004–0.008)	0.15 (0.006)
Differential pinion gear	Backlash		0.05–0.15 (0.002–0.006)	0.2 (0.008)
	Pinion gear bore diameter		18.041–18.061 (0.7103–0.7111)	–
	Pinion gear-to-pinion shaft clearance		0.057–0.095 (0.0022–0.0037)	0.15 (0.006)

17. Drive shaft

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Driveshaft	Right boot	As installed	514.0–518.5 (20.2–20.4)	–
	Left boot	As installed	809.0–813.5 (31.9–32.0)	–

18. Steering

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Steering wheel	Play	10.0 (0.39) Max.	–
	Rack-to-pinion backlash	0	–
	Pinion-starting torque N-m (kg-m, lb-ft)	0.5–1.7 (0.05–0.17, 0.36–1.20)	–

Unit: mm (in.)

19. Power Steering

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Steering wheel	Play *Pinion starting torque N·m (kg-m, lb-ft)*	10 (0.39) Max. 1.2 (0.12, 0.87)	–
Power steering	Pump pressure with valve closed (Oil temp./ speed: 40°C (104°F) min/idle. Do not run for more than 5 seconds) KPa (kg/cm², psi) Fluid capacity Reservoir At change	7845–8826 (80–90, 1138–1280) 0.5ℓ (0.13 US gal., 0.11 Imp gal.) approx. 1.5ℓ (0.40 US gal., 0.33 Imp gal.)	
Rack	*Torque at rack end N·m (kg-m, lb-ft)*	1.0–4.0 (0.1–0.4, 0.72–2.89)	–

20. Suspention

	MEASUREMENT			STANDARD (NEW)		SERVICE LIMIT
Wheel alignment	Camber Caster Toe-in Kingpin inclination			Front 0° 0° 0 mm (0 in.) 6°51′	Rear 0° – in 2 mm (0.008 in.) –	
	Steering angle	R/L	Inside Outside	38°30′ ± 2° 30°00′ ± 2°		
	Side slip		Front Rear	0 ± 3 2 ± 2		
Wheel	Rim runout	Steel	Axial Radial	0–1.3 (0–0.051) 0–1.0 (0–0.039)		– –
		Aluminum	Axial Radial	0–1.0 (0–0.039) 0–0.7 (0–0.028)		– –

21. Brake

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Parking brake lever	Play in stroke 200N (20 kg, 44 lbs)		To be locked when pulled 4–8 notches	
Foot brake pedal	Pedal height Free play		176 (6.93) to floor 1–5 (0.04–0.20)	– 5 (0.20)
Master cylinder	Piston-to-push rod clearance		0–0.4 (0–0.016) 0.2–0.6 (0.008–0.024)	– –
Brake drum	I.D.		200.0 (7.87)	201.0 (7.91)
Lining	Thickness		4.5 (0.18)	2.0 (0.08)
Disc brake	Disc thickness	Front Rear	19.0 (0.75) 10.0 (0.39)	17.0 (0.67) 8.0 (0.31)
	Disc runout		–	0.15 (0.006)
	Disc parallelism		–	0.015 (0.0006)
	Pad thickness	Front Rear	9.5 (0.37) 8.0 (0.31)	3 (0.1) 1.6 (0.06)

		Vacuum (mmHg)	Pedal Pressure kg (lbs)	Line Pressure kg/cm² (psi)	
				Rear: drum	Rear: disc.
Brake Booster	Characteristics	0 300 500	20 (44) 20 (44) 20 (44)	15 (213) min 50 (711) min 65 (924) min	13 (185) min 53 (754) min 65 (924) min

Standard and Service Limit

Unit: mm (in.)

26. Ignition

	MEASUREMENT		STANDARD (NEW)		
Ignition coil	Rated voltage Insulation resistance		12 Volts 10,000 ohms min.		
	Performance: Make sure strong sparks jump across electrodes (3-point tester)				
	Voltage	Camshaft	Secondary Voltage	3-point gap	Condition
	6V 12V	75 min^{-1} (rpm) 3,000 min^{-1} (rpm)	26 ± 4 kV 17 ± 4 kV	11–17 mm(0.43–0.67) 9–13 mm(0.35–0.51)	At 80°C(176°F)
Ignition wire	Resistance		25,000 ohms max.		
Spark plug	Type Standard	KC KF, KG, KB, KE, KW KY KS, KX KQ, KT	NGK: BPR6EY-U, ND: W20EXR-U11, NGK: BPR6ES, BPR6EY ND: W20EXR-U, W20EPR-U NGK: BP6ES, BP6EY ND: W20EX-U, W20EP-U NGK: BPR6EY, BPR6ES ND: W20EXR-U, W20EPR-U NGK: BP6EY, BP6ES ND: W20EX-U, W20EP-U		
	Gap		KC: 1.0–1.1 (0.039–0.043) BPR6EY, BP6EY: 0.8–0.9 (0.031–0.035) Other types : 0.7–0.8 (0.028–0.031)		
Ignition timing	At Idling	KQ, KS, KX, KT, KC(AT) EC, KY KC(MT)	12/750 BTDC°/min^{-1} (rpm) 18/750 BTDC°/min^{-1} (rpm) 22/750 BTDC°/min^{-1} (rpm)		

27. Charging

	MEASUREMENT	STANDARD (NEW)	
Battery	Lighting capacity (20-hour ratio) Starting capacity (5-second ratio)	40, 45, 47 or 50 Ampere Hours 8V minimum at 150 Ampere draw	
Alternator	Output at no-load Output	14V at 850 min^{-1} (rpm) max. 14V/60A at 3,500 min^{-1} (rpm) max.	
	Coil resistance (rotor) Slip ring O.D. Brush length Brush spring tension	2.8–3.0 ohms 32.5 (1.28) 15.5 (0.61) 300–500 g (10.6–17.6 oz)	±0.1 ohms 32.1 (1.26) 5.3 (0.21) –
Voltage relay	Rated voltage Relay point gap Contact spring deflection (pulled in)	4.5–5.8V 0.4–1.2 (0.02–0.05) 0.2–0.6 (0.01–0.02)	– – –
Voltage regulator	Regulated voltage Armature gap Point gap Contact spring deflection Angle gap	13.5–14.5V 0.5 (0.02) max. 0.4–1.2 (0.02–0.05) 0.2–0.6 (0.01–0.02) 0.5 (0.02) max.	– – – – –

28. Starting

Starting motor		1.0 KW		1.4 KW	
	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	STANDARD (NEW)	SERVICE LIMIT
	Mica depth	0.5–0.8 (0.020–0.031)	0.2 (0.008)	0.5–0.8 (0.020–0.031)	0.2 (0.008)
	Commutator runout	0–0.02 (0.0008)	0.05 (0.020)	0–0.02 (0.0008)	0.05 (0.020)
	Commutator O.D.	30.0 (1.18)	29.0 (1.14)	30.0 (1.18)	29.0 (1.14)
	Brush length	13.0 (0.51)	8.5 (0.33)	15.0 (0.59)	10.0 (0.39)
	Spring pressure (new)	(1.7 kg, 3.7 lb)	–	(21 kg, 46 lb)	–

Design Specifications

Canadian Model

	ITEMS		METRIC	ENGLISH	NOTE
DIMENSIONS	Overall Length		4,295 mm	169.1 in.	
	Overall Width		1,690 mm	66.5 in.	
	Overall Height		1,295 mm	51.0 in.	
	Wheelbase		2,450 mm	96.5 in.	
	Tread F/R		1,470/1,470 mm	57.9/57.9 in.	
	Ground Clearance		153 mm	6.0 in.	
	Seating Capacity		5		
	Overhang F/R		885/955 mm	34.8/37.6 in.	Include bumper
WEIGHTS	Cub Weight	4–AT	1,016 kg	2,240 lb.	4–AT: 4 speed Automatic transmission with Torque converter
		5–MT	991 kg	2,185 lb.	5–MT: 5 speed manual transmission
	Weight Distribution (F/R)	4–AT	632/384 kg	1,393/847 lb.	Curb weight
		5–MT	607/384 kg	1,338/847 lb.	+ A/C–23 kg (51 lb.)
	Gross Vehicle Weight Rating (MVSS)		1,465 kg	3,230 lb.	+ Cargo–45 kg (100 lb.)
					+ Passengers–68 kg x 5 (150 lb. x 5)
					+ Tolerance
					= G.V.W.R.
	Carrying (loading) Weight Capacity		450kg	1000lb.	
ENGINE	Type		Water cooled, 4-cycle O.H.C.		
	Cylinder Arrangement		4-cylinder in line, transverse		
	Bore and Stroke		80.0 x 91.0 mm	3.15 x 3.58 in.	
	Displacement		1,829 cm³	112 cu. in.	
	Compression Ratio		9.1 : 1		MA X 9.3 : 1 MIN 8.9 : 1
	Carburetor Type		Side draft		
	Carburetor, Throttle Bore Dia.		34 mm	1.34 in.	
	Valve Train		Timing belt driven, single overhead camshaft		
	Lubrication System		Trochoid pump		
	Fuel Required		Low-lead or regular grade gasoline with 91 research octane number or higher.		
	Engine Weight		108 kg	238 lb.	Includes oil and coolant.
TRANSMISSION	Clutch	4–AT	Torque Converter		
		5–MT	Single plate dry, diaphragm spring		
	Transmission	4–AT	4 forward speed, 1 speed reverse, constant mesh.		
		5–MT	5 speed forward, 1 speed reverse, constant mesh.		
			5–MT	4–AT	
	Primary Reduction		1.000	1.000	
	Gear Ratio	I	3.181	2.380	
		II	1.944	1.560	
		III	1.250	1.032	
		IV	0.933	0.777	
		V	0.757	—	
		Reverse	3.000	1.954	
	Final Reduction	4–AT	Single helical gear, 3.875		
		5–MT	Single helical gear, 4.071		
	Clutch Facing Area		160 cm²	24.8 sq. in.	

(cont'd)

Design Specifications (cont'd)

Canadian Model

	ITEMS		METRIC	ENGLISH	NOTE
STEERING SYSTEM	Type		Rack and Pinion		
		Power Steering	Integral		
	Overall Ratio		17.1 : 1		
		Power Steering	14.9 : 1		
	Turns, lock-to-lock		3.25		
		Power Steering	2.84		
	Steering Wheel Dia.		370 mm	14.6 in.	
	Power Steering Oil Capacity		1.5 lit.	1.6 US. qt., 1.3 Imp. qt.	
	Power Steering Oil		HONDA Genuine Power Steering Fluid		
SUSPENSION SYSTEM	Type, Front		Independent by double wishbones, coil spring		
	Type, Rear		Independent, Mac'Pherson strut, coil spring		
	Shock Absorber	Front/Rear	Telescopic, hydraulic		
WHEEL ALIGNMENT	Wheel Alignment				
	camber	Front	0°		
		Rear	0°		
	caster	Front	0°		
	Toe	Front	0 mm	0 in.	
		Rear	IN 2 mm	0.080 in.	
	Kingpin Inclination		6°51'		
BRAKE SYSTEM	Type, Front		Self-adjusting power assisted ventilated disc brake type		
	Type, Rear		Power assisted leading-trailing shoe and drum type		
	Lining Surface Area:	Front/Rear	35.8/67.2 cm^2	5.5/10.4 sq. in.	(Pad and Shoe)
	Effective Disc Dia.		190 mm	7.5 in.	Q'ty 4
	Effective Brake Drum I.D.		200 mm	7.9 in.	Q'ty 4
	Parking Brake Kind and Type		Mechanical expanding, rear two wheel brakes		
TIRES	Front/Rear		185/70 SR13		
	Spare		T105/80D13		
ELECTRICAL SYSTEM	Battery		12 V–50 AH		
	Starting Motor		12 V–1.4 KW		
	Generator		12 V–60 A		
	Main Fuse		65Ax1, 35 Ax1		
	Fuses		20Ax4, 15Ax7, 10A x 7		
	Headlights		12 V–65/35 W (2B1)		
	Turn Signal Lights	Front	12 V–32 CP (SAE1156)		
		Rear	12 V–32 CP (SAE1156)		
	License Plate Lights		12 V–4 CP (SAE67)		
	Side Marker Lights	Front/Rear	12 V–3 CP (SAE194)		
	Back-up-Lights		12 V–32 CP (SAE1156)		
	Stop/Tailights		12 V–32/3 CP (SAE1157)		
	Interior Light		12 V – 8 W		
	Trunk Light		12 V–3.4 W		
	Other Dash Lights (heater, radio, cigarette lighter, ashtray)		12 V–3.4/1.4/1.2 W		
	Gauge Lights		12 V–3.4/1.4 W		
	Indicator and Warning Lights		12 V–1.4 W, 1.2 W		

European Model

	ITEMS		METRIC	ENGLISH	NOTE
DIMENSIONS	Overall Length		4,295 mm	169.1 in.	
			4,320 mm	170.1 in.	KW
	Overall Width		1,690 mm	66.5 in.	
	Overall Height		1,295 mm	51.0 in.	
	Wheelbase		2,450 mm	96.5 in	
	Tread Front/Rear		1,470/1,470 mm	57.9/57.9 in.	
	Ground Clearance		153 mm	6.0 in.	
	Seating Capacity		Total 4		
			2		KS
	Overhang Front/Rear		890/955 mm	35.0/37.6 in.	Include bumper
			915/955 mm	36.0/37.6 in.	KW
WEIGHTS	Curb Weight				
	4–AT	STD	980 kg	2,161 lb.	KE
			990 kg	2,183 lb.	KS & FINLAND
			985 kg	2,172 lb.	Other types
		EX	995 kg	2,194 lb.	KE & KX
			1,000 kg	2,205 lb.	KS
			1,010 kg	2,227 lb.	FINLAND
			1,005 kg	2,216 lb.	Other types
	5–MT	STD	970 kg	2,139 lb.	KE
			980 kg	2,161 lb.	KS & FINLAND
			975 kg	2,150 lb.	Other types
		EX	985 kg	2,172 lb.	KE & KX
			990 kg	2,183 lb.	KS
			1,000 kg	2,205 lb.	FINLAND
			995 kg	2,194 lb.	Other types
	Weight Distribution Front/Rear				
	4–AT	STD	595/385 kg	1,312/849 lb.	KE
			605/385 kg	1,334/849 lb.	KS & FINLAND
			595/390 kg	1,312/860 lb.	Other types
		EX	600/395 kg	1,323/871 lb.	KE & KX
			605/395 kg	1,334/871 lb.	KS
			610/400 kg	1,345/882 lb.	FINLAND
			605/400 kg	1,334/882 lb.	Other types
	5–MT	STD	585/385 kg	1,290/849 lb.	KE
			595/385 kg	1,312/849 lb.	KS & FINLAND
			585/390 kg	1,290/860 lb.	Other types
		EX	590/395 kg	1,301/871 lb.	KE & KX
			595/395 kg	1,312/871 lb.	KS
			600/400 kg	1,323/882 lb.	FINLAND
			595/400 kg	1,312/882 lb.	Other types
			For power steering types 12.4 kg (27 lb.) anti-lock braking device 11.5 kg (25 lb.) has to be added if installed		

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Design Specifications

European Model (cont'd)

	ITEMS		METRIC	ENGLISH	NOTE
WEIGHTS	Gross Weight				
	4–AT	STD	1,280 kg	2,822 lb.	KE
			1,140 kg	2,514 lb.	KS
			1,290 kg	2,844 lb.	FINLAND
			1,285 kg	2,833 lb.	Other types
		EX	1,295 kg	2,855 lb.	KE & KX
			1,150 kg	2,536 lb.	KS
			1,310 kg	2,889 lb.	FINLAND
			1,305 kg	2,878 lb.	Other types
	5–MT	STD	1,270 kg	2,800 lb.	KE
			1,130 kg	2,492 lb.	KS
			1,280 kg	2,822 lb.	FINLAND
			1,275 kg	2,811 lb.	Other types
		EX	1,285 kg	2,833 lb.	KE & KX
			1,140 kg	2,514 lb.	KS
			1,300 kg	2,867 lb.	FINLAND
			1,295 kg	2,855 lb.	Other types
	Max. Permissible Weight (EC)		1,490 kg	3,285 lb.	
	Carrying (loading) Weight Capacity		45 kg	100 lb.	
ENGINE	Type		Water cooled, 4-cycle O.H.C.		
	Cylinder Arrangement		4-cylinder in line, transverse		
	Bore and Stroke		80x91 mm	3.15x3.58 in.	
	Displacement		1,829 cm³	112 cu. in.	
	Compression Ratio		9.5 : 1		
			9.1 : 1		KS, KX
	Carburetor Type		Side draft		
	Carburetor, Throttle Bore Dia.		34 mm	1.34 in.	
	Valve Train		Timing belt driven, single overhead camshaft		
	Lubrication System		Trochoid pump		
	Fuel Required		Super or premium grade gasoline with 97 research octane number or higher.		
			Low-lead or regular grade gasoline with 91 research octane number or higher.		KS, KX
	Engine Weight		108 kg	238 lb.	Include oil and coolant
TRANSMISSION	Clutch	4–AT	Torque Converter		
		5–MT	Single plate dry, diaphragm spring		
	Transmission	4–AT	4 forward speed, 1 speed reverse, constant mesh.		
		5–MT	5 speed forward, 1 speed reverse, constant mesh.		
			5–MT	4–AT	
	Primary Reduction		1.000	1.000	
	Gear Ratio	I	3.181	2.380	
		II	1.944	1.560	
		III	1.250	1.032	
		IV	0.933	0.777	
		V	0.757	–	
		Reverse	3.000	1.954	
	Final Reduction	4–AT	Single helical gear, 3.875		
		5–MT	Single helical gear, 4.071		
	Clutch Facing Area		160 cm²	24.8 sq. in.	
STEERING SYSTEM	Type		Rack and Pinion		
		Power Steering	Integral		
	Overall Ratio		17.1 : 1		
		Power Steering	14.9 : 1		
	Turns, lock-to-lock		3.25		
		Power Steering	2.84		
	Steering Wheel Dia.		370 mm	14.6 in.	
	Power Steering	Tank Capacity	1.5 lit.	1.6 US.qt. 1.3 Imp.qt.	
	Power Steering	Fluid	HONDA Genuine Power Steering Fluid		

European Model (cont'd)

	ITEMS		METRIC	ENGLISH	NOTE
SUSPENSION SYSTEM	Type, Front		Independent by double wishbones, coil spring.		
	Type, Rear		Independent, Mac'Pherson strut, coil spring.		
	Shock Absorber Front/Rear		Telescopic hydraulic		
WHEEL ALIGNMENT	Wheel Alignment				
	Camber	Front	0°		
		Rear	0°		
	Caster	Front	0°		
	Toe	Front	0 mm	0 in.	
		Rear	in 2 mm	0.008 in.	
	Kingpin Inclination		6°51'		
BRAKE SYSTEM	Type		Front ventilated and rear non-ventilated disc brake with or without anti-lock braking device, hydraulic, four-wheel brake, servo assisted		
	Lining Surface Area	Front/Rear	35.8/20.9 cm²	5.5/3.2 sq. in.	
	Effective Disc Dia.	Front/Rear	190/208 mm	7.5/8.2 in.	
	Parking Brake Kind and Type		Mechanically pressing the disk with pads, rear two wheel brakes.		
TIRES	Tire Size	Front/Rear	185/70 HR13		
ELECTRICAL SYSTEM	Battery		12 V–47 AH		
			12 V–45 AH		KE
	Starting Motor		12 V–1.0 KW		
	Generator		12 V–60 A		
	Main Fuse		65 A x 1, 35 A x 2		
	Fuses		20 A x 4.15 A x 12, 10 A x 8		
	Headlights		12 V–60/55 W		
	Day Time Running Lamp		12 V–21 W		NORWAY, FINLAND
	Passing Lights		12 V–55 W		Austrian model
	Turn Signal Lights	Front	12 V–21 W		
		Rear	12 V–21 W		
		Side	12 V–5 W		
	Licence Plate Lights		12 V–5 W		
	Position Light		12 V–5 W		
	Back-up Lights		12 V–21 W		
	Stop/Tail Lights		12 V–21/5 W		
	Rear Fog Light		12 V–21 W		
	Interior Light		12 V–8 W		
	Trunk Light		12 V–3.4 W		
	Other dash Lights (heater, radio, cigarette lighter, ashtray)		12 V–3.4/1.4 W		
	Gauge Lights		12 V–3.4/1.2 W		
	Indicator and Warning Lights		12 V–1.4 W, 14 V–1.4 W, 14 V–1.2W, 8 V–1.2 V		

(cont'd)

Design Specifications

KQ Model

NOTE: Only the design specifications for next three models different from those of the European model are listed. For the other items not given here, refer to the European model design specifications.

	ITEMS		METRIC	ENGLISH	NOTE
WEIGHTS	Curb Weight 4–AT	STD	970 kg	2,139 lb.	
		EX	985 kg	2,172 lb.	
	5–MT	STD	960 kg	2,117 lb.	
		EX	975 kg	2,150 lb.	
	Weight Distribution Front/Rear				
	4–AT	STD	600/370 kg	1,323/816 lb.	
		EX	605/380 kg	1,334/838 lb.	
	5–MT	STD	590/370 kg	1,301/816 lb.	
		EX	595/380 kg	1,312/838 lb.	
	Maximum Loaded Vehicle Weight				
	4–AT	STD	1,320 kg	2,911 lb.	
		EX	1,360 kg	2,999 lb.	
	5–MT	STD	1,310 kg	2,889 lb.	
		EX	1,350 kg	2,977 lb.	
ENGINE	Compression Ratio		9.1 : 1		
	Fuel Required		Low-lead or regular grade gasoline with 91 research octane number or higher.		
ELECTRICAL SYSTEM	Battery		12 V–40 A 12 V–55 W		

General Export

NOTE: Only the design specifications for next three models different from those of the European model are listed. For the other items not given here, refer to the European model design specification.

	ITEMS		METRIC	ENGLISH	NOTE
DIMENSION	Curb Weight 4–AT	STD	980 kg	2,161 lb.	
		EX	1,005 kg	2,216 lb.	
	5–MT	STD	970 kg	2,139 lb.	
		EX	995 kg	2,194 lb.	
	Weight Distribution				
	4–AT	STD	590/390 kg	1,301/860 lb.	
		EX	605/400 kg	1,334/882 lb.	
	5–MT	STD	580/390 kg	1,279/860 lb.	
		EX	595/400 kg	1,312/882 lb.	
	Gross Weight 4–AT	STD	1,280 kg	2,822 lb.	
		EX	1,305 kg	2,878 lb.	
	5–MT	STD	1,270 kg	2,800 lb.	
		EX	1,295 kg	2,855 lb.	
ENGINE	Compression Ratio		9.1 : 1		
	Fuel Required		Low-lead or regular grade gasoline with 91 research octane number or higher.		
ELECTRICAL SYSTEM	Battery		12 V–40 A		

KY Model

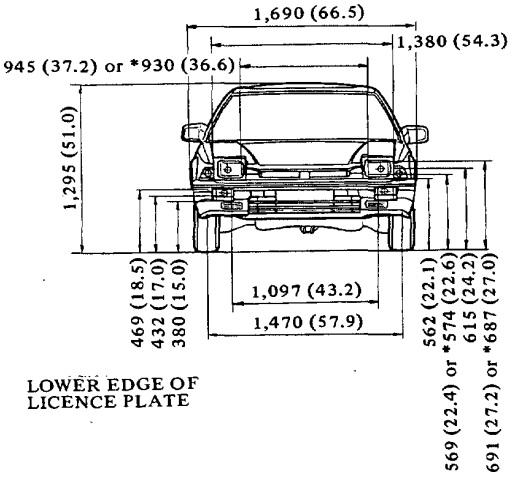
NOTE: Only the design specifications for models below different from those of the European model are listed. For the other items not given here, refer to the European Model design specification.

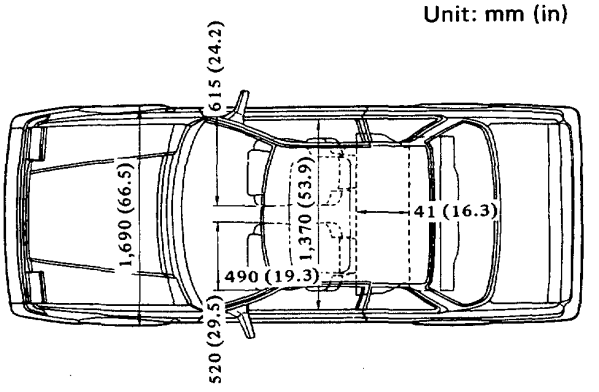
	ITEMS	METRIC	ENGLISH	NOTE
WEIGHTS	Curb Weight 4–AT	1,040 kg	2,293 lb.	
	5–MT	1,030 kg	2,271 lb.	
	Weight Distribution Front/Rear			
	4–AT	635/405 kg	1,400/893 lb.	
	5–MT	625/405 kg	1,378/893 lb.	
	Gross Weight 4–AT	1,340 kg	2,955 lb.	
	5–MT	1,330 kg	2,933 lb.	
	Carrying (loading) Weight Capacity	45 kg	100 lb.	
ENGINE	Compression Ratio	9.5 : 1		
	Fuel Required	Super or premium grade gasoline with 97 research octane number or higher.		
STEERING SYSTEM	Overall Ratio	14.9 : 1		
	Turns, lock-to-lock	2.84		
BRAKE SYSTEM	Type	Front ventilated and rear non-ventilated disc brake, hydraulic, four-wheel brake, servo assisted.		
TIRES	Tire Size Front/Rear	185/70 SR13		
ELECTRICAL SYSTEM	Battery	12 V–40 A		
	Main Fuse	65 A x 1, 35 A x 1		
	Fuses	20 A x 4, 15 A x 11, 10 A x 8		

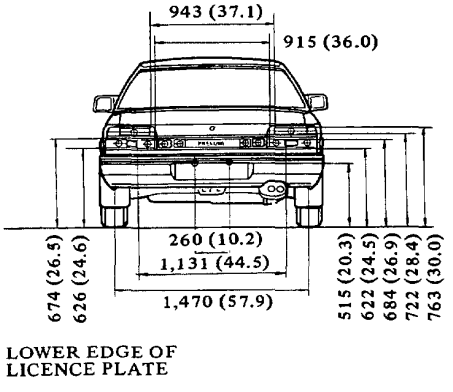
Body Specifications

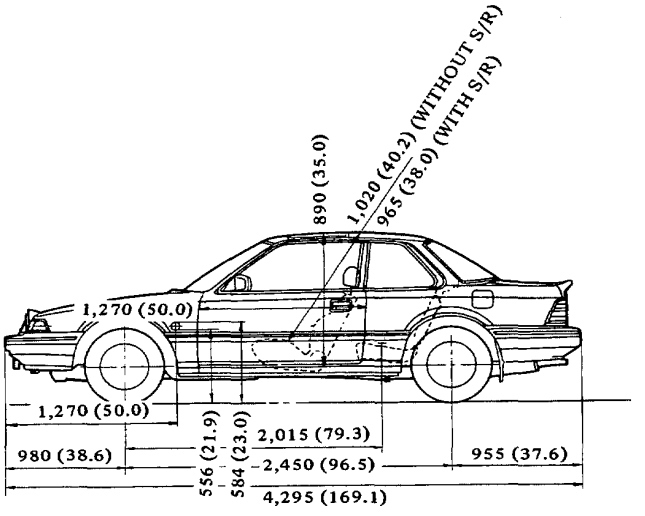
European Model

Unit: mm (in)







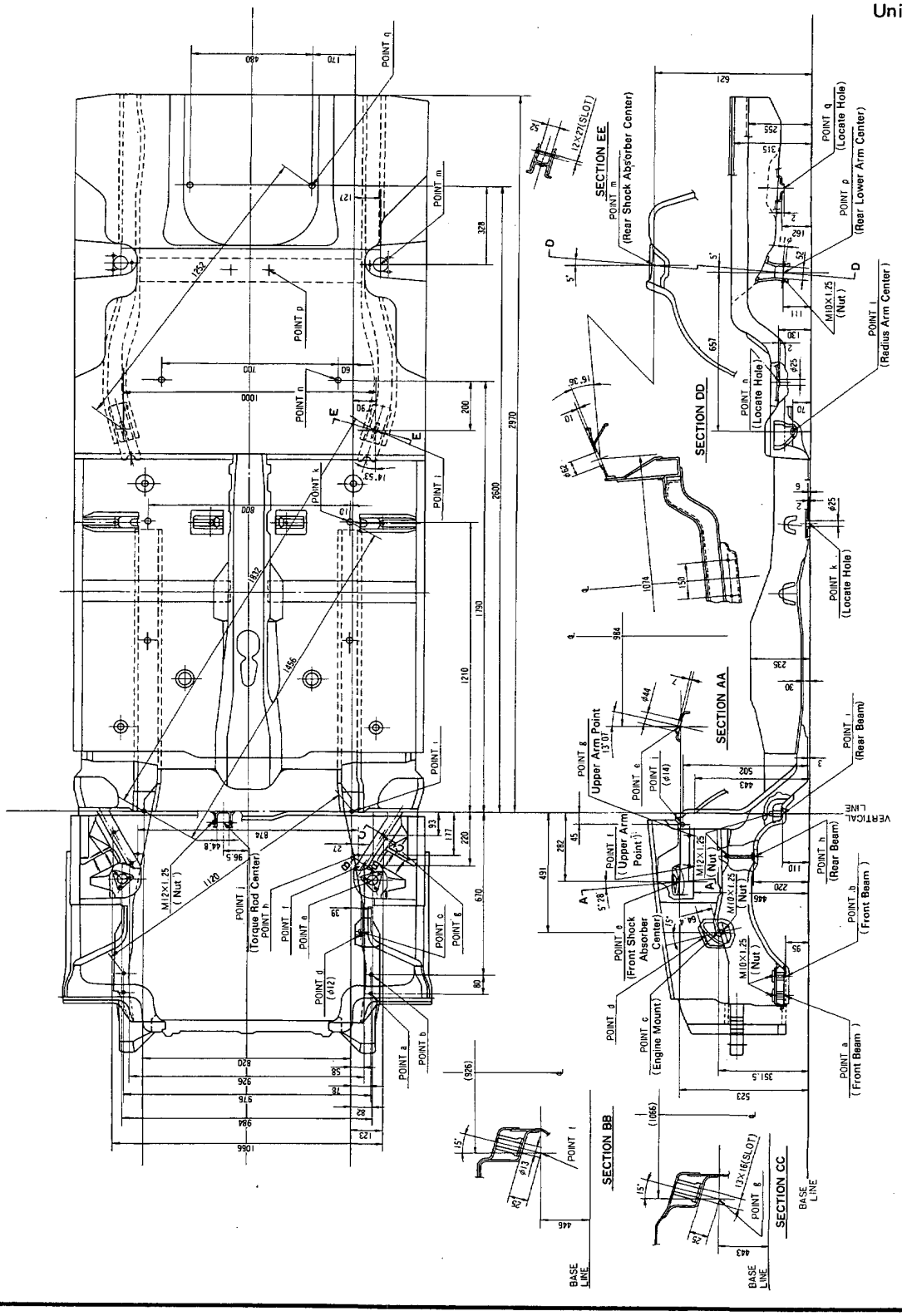


NO.	NAME
1	HEADLAMP (MAIN BEAM & DIPPED BEAM)
2	REVERSING LAMP
3	FRONT DIRECTION INDICATOR LAMP FRONT HAZARD WARNING DEVICE
4	SIDE DIRECTION INDICATOR LAMP SIDE HAZARD WARNING DEVICE
5	REAR DIRECTION INDICATOR LAMP REAR HAZARD WARNING DEVICE
6	FRONT POSITION LAMP
7	REAR POSITION LAMP STOP LAMP
8	REAR REGISTRATION PLATE LAMP
9	REAR FOG LAMP
10	REAR REFLEX REFLECTOR

Location of head lamp: without * STANLEY
with * BOSCH

Frame Specifications

Unit: mm



MEMO

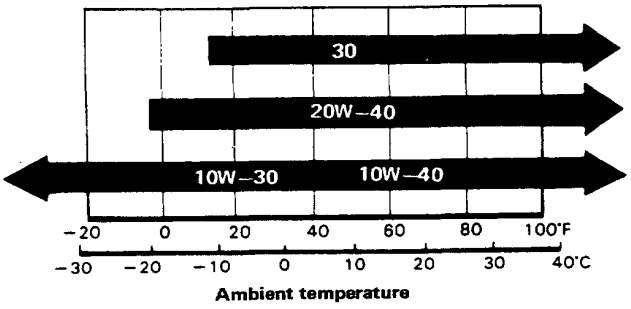
Maintenance

Lubrication 4-2
Required Maintenance Schedule ... 4-5
Maintenance Specifications..... 4-7

Lubrication

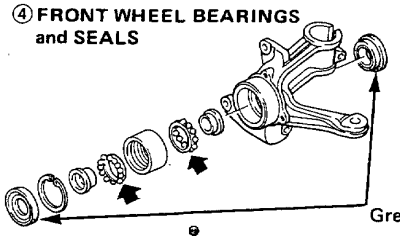
No.	LUBRICATION POINTS		LUBRICANT
1	Engine		API Service Grade: SE or SF SAE Viscosity: See Page 4-4 chart
2	Transmission	Manual Automatic	API Service Grade: SE or SF SAE30, 10W–30, 10W–40 or 20W–40 grade oil DEXRON® Automatic transmission fluid
3	Brake reservoir		Brake fluid DOT 3 or DOT 4
4 5 6 7 8	Front wheel bearings and seals Rear wheel bearings and seals Front stabilizer bar end bushings Tie rod ball joints Steering gearbox (Manual)		Multipurpose Grease
8	Steering gearbox (Power)		Honda steering grease P/N 08740–99969
9 10 11 12 13 14	Shift lever pivot (Manual) Select lever (Automatic) Lower arm ball joints upper and lower Pedal linkage Rear brake shoe linkage Steering column bushings Except tilt steering		Multipurpose Grease
15	Power steering reservoir		Honda power steering fluid P/N 08208–99961
16	Caliper	Piston seal Dust seal Caliper pin Piston	Silicone Grease
17 18 19 20 21 22 23 24	Shift rod cleivs bushings Door hinges upper and lower Door opening detents Engine hood latch Hood hinges Fuel filler lid Trunk hinges Front upper arm		Multipurpose Grease

Recommended Manual Transmission Oil
(SE or SF grade Only)



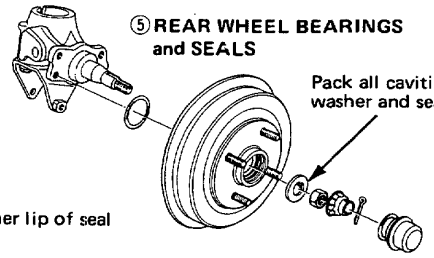
Manual transmission oil viscosity for ambient temperature ranges.

④ FRONT WHEEL BEARINGS and SEALS



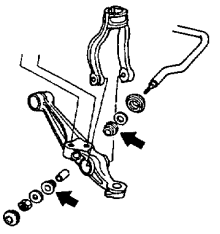
Grease inner lip of seal

⑤ REAR WHEEL BEARINGS and SEALS



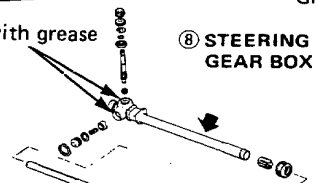
Pack all cavities between washer and seal

⑥ FRONT STABILIZER BAR BUSHINGS

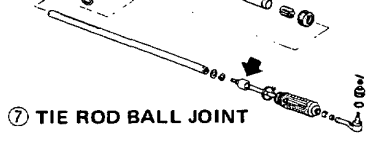


Pack with grease

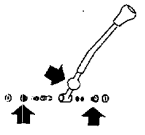
⑧ STEERING GEAR BOX



⑦ TIE ROD BALL JOINT



⑨ SHIFT LEVER PIVOT

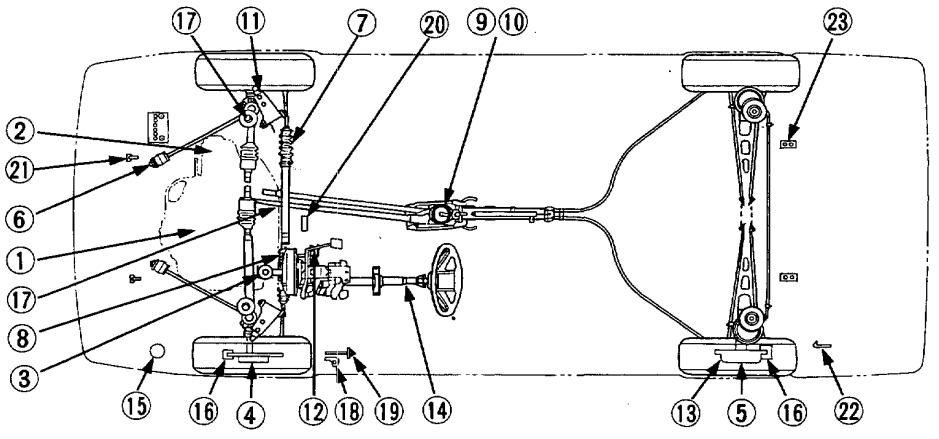


⑩ SELECT LEVER

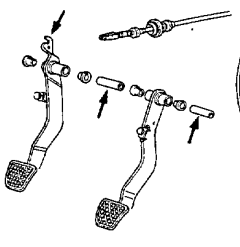




⑪ LOWER ARM BALL JOINT

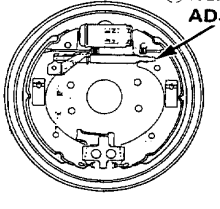


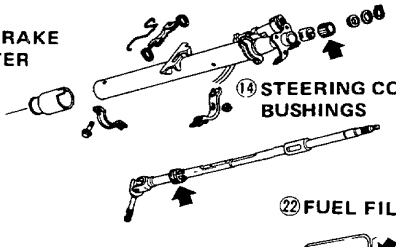
⑫ PEDAL LINKAGE



⑬ REAR BRAKE SHOE LINKAGE

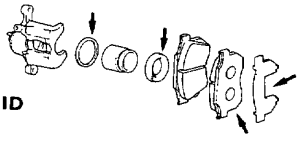
⑲ REAR BRAKE ADJUSTER



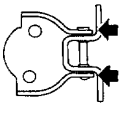


⑭ STEERING COLUMN BUSHINGS

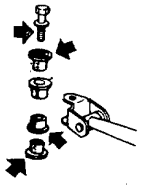
⑯ CALIPERS
Silicone grease



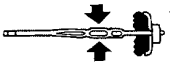
⑱ DOOR HINGE



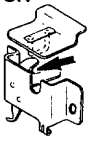
⑰ SHIFT ROD CLEVIS BUSHING



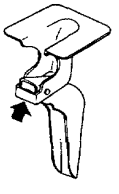
⑲ DOOR OPENING DETENTS



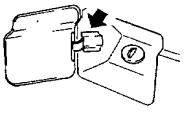
⑳ ENGINE HOOD LATCH



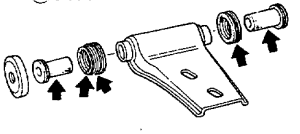
㉑ ENGINE HOOD HINGE



㉒ FUEL FILLER LID



㉔ FRONT UPPER ARM



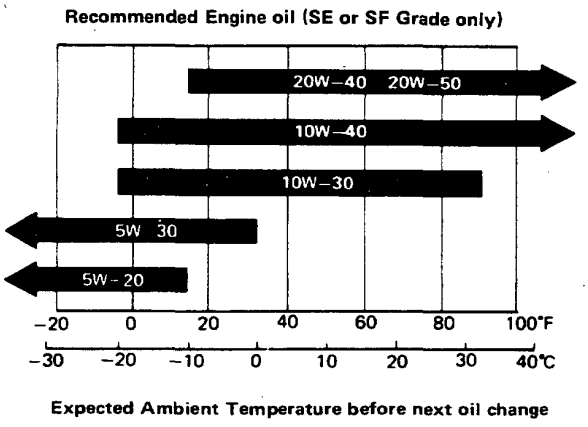
(cont'd)

Lubrication (cont'd)

Recommended Engine Oil

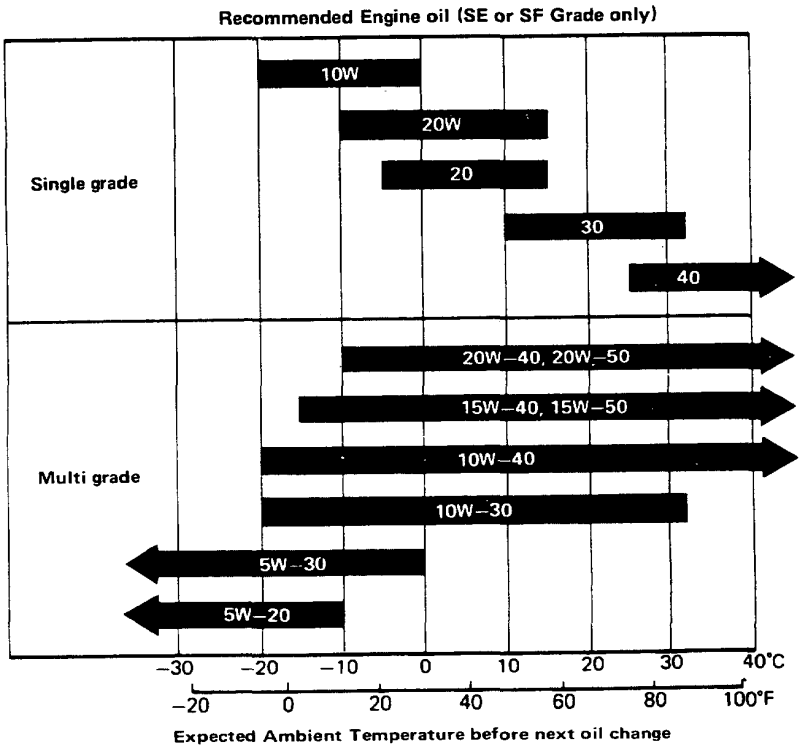
Canadian Model

Engine oil viscosity for ambient temperature ranges.



Except Canadian Models

Engine oil viscosity for ambient temperature ranges.



Required Maintenance Schedule

Canadian Model

R – REPLACE
I – INSPECTION, CLEAN, ADJUST OR REPLACE IF NECESSARY

SERVICE AT THE INTERVAL LISTED x 1,000 KM (OR MILES) OR AFTER THAT NUMBER OF MONTHS, WHICHEVER OCCURS FIRST.		*1 Inspect idle CO every 60 months or 96,000 km (60,000 miles), whichever comes first. *2 Thereafter, replace every 2 years 48,000 km (30,000 miles) whichever comes first.							
ITEMS		miles/months	7.5	15	22.5	30	37.5	45	52.5	60
		km	12	24	36	48	60	72	84	96
ENGINE	IDLE SPEED			I		I		I		I*1
	VALVE CLEARANCE			I		I		I		I
	ALTERNATOR DRIVE BELT					I				I
	■ ENGINE OIL		R	R	R	R	R	R	R	R
	ENGINE OIL FILTER		R	R	R	R	R	R	R	R
	■ TRANSMISSION OIL	MANUAL				R				R
		AUTOMATIC		R				R		
	■ RADIATOR COOLANT							R*2		
	COOLING SYSTEM, HOSES AND CONNECTIONS					I				I
	EGR SYSTEM									I
FUEL SYSTEM	AIR CLEANER ELEMENT					R				R
	FUEL FILTER (Inc. Sub Filter)									R
	INTAKE AIR TEMP. CONTROL SYSTEM									I
	TANK, FUEL LINES AND CONNECTIONS					I				I
	THROTTLE CONTROL SYSTEM					I				I
	CHOKE MECHANISM					I				I
EVAPORATIVE CONTROL SYSTEM	CHARCOAL CANISTER									R
	TWO-WAY VALVE									I
IGNITION COMPONENTS	IGNITION TIMING AND CONTROL SYSTEM					I				I
	SPARK PLUGS					R				R
	DISTRIBUTOR CAP AND ROTOR					I				I
	IGNITION WIRING					I				I
CRANKCASE EMISSION CONTROL SYSTEM	PCV VALVE					R				R
	BLOW-BY FILTER					R				R
FRAME	BRAKE HOSES, LINES		I	I		I		I		I
	BRAKE FLUID					R				R
	REAR BRAKES					I				I
	FRONT BRAKE PADS, DISCS AND CALIPERS		I	I	I	I	I	I	I	I
	PARKING BRAKE		I			I				I
	CLUTCH RELEASE ARM TRAVEL		I	I	I	I	I	I	I	I
	ENGINE EXHAUST SILENCER, SUSPENSION MOUNTING BOLTS		I	I		I		I		I
	WHEEL ALIGNMENT (FRONT)			I		I		I		I
	STEERING OPERATION, TIE ROD ENDS, STEERING GEAR BOX AND BOOTS		I			I				I
	WHEEL BEARING GREASE (REAR)									R
	POWER STEERING SYSTEM		I	I	I	I	I	I	I	I
	POWER STEERING PUMP BELT					I				I

CAUTION:

- **If vehicle is operated under severe conditions; driving in severe cold condition, short distance driving or driving in dusty condition, change engine oil and engine oil filter every 5,000 km (3,000 miles) or 3 months, whichever occurs first.**
- **Disc brakes should be serviced every 7-1/2 months or 12,000 km (7,500 miles) however, in area using a high concentration of road salt or other corrosive materials more frequent servicing may be required.**

■ **REMAKR: DAY TO DAY CARE (such as oil, coolant level check replenishment etc,) should be done practically according to the Owner's Manual.**

(cont'd)

Required Maintenance Schedule (cont'd)

Except Canadian Model

R – REPLACE
I – INSPECTION, CLEAN, ADJUST OR REPLACE IF NECESSARY

SERVICE AT THE INTERVAL LISTED x 1,000 KM (OR MILES) OR AFTER THAT NUMBER OF MONTHS, WHICHEVER OCCURS FIRST.		*4 Thereafter, replace every 2 years 48,000 km (30,000 miles) whichever comes first.							
ITEMS		Miles (x 1,000)/Months	7.5	15	22.5	30	37.5	45	52.5	60
		km (x 1,000)	12	24	36	48	60	72	84	96
ENGINE	IDLE SPEED AND IDLE CO			I		I		I		I
	VALVE CLEARANCE			I		I		I		I
	ALTERNATOR DRIVE BELT					I				I
	ENGINE OIL*1		R	R	R	R	R	R	R	R
	ENGINE OIL FILTER		R	R	R	R	R	R	R	R
	TRANSMISSION OIL	MANUAL				R				R
		AUTOMATIC		R				R		
	RADIATOR COOLANT							R*4		
	COOLING SYSTEM, HOSES AND CONNECTIONS					I				I
FUEL SYSTEM	AIR CLEANER ELEMENT			R		R		R		R
	FUEL FILTER (Inc. Sub Filter)					R				R
	INTAKE AIR TEMP. CONTROL SYSTEM									I
	TANK, FUEL LINES AND CONNECTIONS					I				I
	THROTTLE CONTROL SYSTEM*2					I				I
	CHOKE MECHANISM					I				I
EVAPORATIVE CONTROL SYSTEM*3	CHARCOAL CANISTER									R
	TWO-WAY VALVE									I
IGNITION COMPONENTS	IGNITION TIMING AND CONTROL SYSTEM					I				I
	SPARK PLUGS			R		R		R		R
	DISTRIBUTOR CAP AND ROTOR					I				I
	IGNITION WIRING					I				I
CRANCASE EMISSION CONTROL SYSTEM	PCV VALVE					R				R
	BLOW-BY FILTER					R				R
FRAME	BRAKE HOSES, LINES (Includes ALB hoses and pipes for ALB models)		I	I		I		I		I
	BRAKE FLUID*5 (Includes ALB fluid for ALB models)					R				R
	REAR BRAKES					I				I
	FRONT BRAKE PADS, DISCS AND CALIPERS		I	I	I	I	I	I	I	I
	PARKING BRAKE		I			I				I
	CLUTCH RELEASE ARM TRAVEL		I	I	I	I	I	I	I	I
	ENGINE EXHAUST SILENCER, SUSPENSION MOUNTING BOLTS		I	I		I		I		I
	WHEEL ALIGNMENT (FRONT)			I		I		I		I
	STEERING OPERATION, TIE ROD ENDS, STEERING GEAR BOX AND BOOTS		I			I				I
	WHEEL BEARING GREASE (REAR)									R
	ALB HIGH PRESSURE HOSES					R				R
	ALB PUMP, ACCUMULATOR AND PRESSURE SWITCH		I			I				I
	ALB MODULATOR PISTONS		I			I				I
	ALB OPERATION		I			I				I
	POWER STEERING SYSTEM		I	I	I	I	I	I	I	I
	POWER STEERING PUMP BELT					I				I

CAUTION:

- **If vehicle is operated under severe conditions; driving in severe cold condition, short distance driving or driving in dusty condition, change engine oil and engine oil filter every 5,000 km (3,000 miles) or 3 months, whichever occurs first.**
- **Disc brakes should be serviced every 7-1/2 months or 12,000 km (7,500 miles) however, in area using a high concentration of road salt or other corrosive materials more frequent servicing may be required.**

REMAKR: DAY TO DAY CARE (such as oil, coolant level check replenishment etc,) should be done practically according to the Owner's Manual.

*1 Engine oil should be changed every 12,000 km (7,500 miles) or 7.5 months, whichever comes first.
*2 Only for Manual transmission on Swedish, Swiss and Australian types.
*3 Only the cars sold in Australia.
*5 Every 48,000 km (30,000 miles) or 30 months whichever comes first.
ALB: Anti-Lock Brake

Maintenance Specifications/Settings

TUNE UP CONDITION: Engine at normal operating temperature

Canadian Model

TUNE UP CONDITION: Engine at normal operating temperature.

SUBJECT		ITEMS OR CONDITIONS	REQUIREMENTS
ENGINE	Ignition timing (At idle)	Manual transmission	22 ± 2° BTDC
		Automatic (in gear)	12 ± 2° BTDC
	Valve clearance	Below 38°C (100°F) Intake	0.12–0.17 mm (0.005–007 in.)
		Below 38°C (100°F) Exhaust	0.25–0.30 mm (0.010–0.012 in.)
	Idle speed (With headlights off and cooling fan off)	Manual transmission (At neutral)	750 ± 50 min^{-1} (rpm)
		Automatic (in gear)	750 ± 50 min^{-1} (rpm)
	Idle CO	Manual and Automatic	0.5–2.0 %
	Choke fast idle	Manual transmission	1,700–2,700 min^{-1} (rpm)
		Automatic	1,700–2,700 min^{-1} (rpm)
	Spark plug	Type: NGK: BPR6EY–11 Denso : W20EXR–U11 or equivalent	Gap: 1.0–1.1 mm (0.039–0.043 in.)
	Compression	300 min^{-1} (rpm) and wide-open throttle	1275 kPa (13 kg/cm^2, 185 psi)
	Alternator belt	Belt deflection with 98N(10 kg, 22 lb.) tension	7–10 mm (0.28–0.39 in.)
	Ignition wire	Resistance	25,000 ohms maximum
	Radiator cooling fan	Fan operating temperature	Above 90 ± 1.5°C (194 ± 3°F)
EVAPORATIVE EMISSION CONTROLS	Two-way valve	Pressurize	25–50 mmHg (1.0–2.2 in. Hg)
		Draw	5–15 mmHg (0.2–0.6 in. Hg)
	Charcoal canister	Draws	Partial open throttle
EXHAUST EMISSION CONTROLS	Air intake control	COLD (cranking) (air cleaner below 37°C (99°F))	Valve stays up
		HOT (air cleaner 25°C (77°F) nominal))	Valve door down
	Throttle control	Throttle Opener Throttle return time	1 – 4 seconds
		Throttle Opener Engine speed control	1,800 min^{-1} (rpm) Automatic 1,900 min^{-1} (rpm) Manual
CLUTCH	Manual transmission	Pedal free play	10–30 mm (0.39–1.18 in.)
		Pedal height	181 mm (7.1 in.)
SUSPENSION	Tires	Pressure (front) (cold)	190 kPa (1.9 kg/cm^2, 29 psi)
		Pressure (rear) (cold)	180 kPa (1.8 kg/cm^2, 26 psi)
		Pressure (spare)	415 kPa (4.2 kg/cm^2, 60 psi)
	Wheel alignment	Front Camber	0°
		Caster	0°
		Toe	Out 0
		Kingpin inclination	6°51′
		Rear Toe	In 2 mm (0.008 in.)

(cont'd)

Maintenance Specifications/Settings (cont'd)

Canadian Model (cont'd)

SUBJECT		ITEMS OR CONDITIONS	REQUIREMENTS
BRAKES	Pedal	Free play	1–5 mm (0.04–0.20 in.)
		Pedal-to-floor clearance	176 mm (6.93 in.)
	Pad and shoe	Pad wear limit	3 mm (0.1 in.) min. thickness
		Shoe lining wear limit	2.0 mm (0.08 in.) min. thickness
	Drum	Absolute refinishing limit	201 mm (7.91 in.) max. diameter
	Rotor disc	Absolute refinishing limit	17 mm (0.67 in.) min. thickness

European Model

SUBJECT		ITEMS OR CONDITIONS	REQUIREMENTS
ENGINE	Ignition timing (At idle)	Except KS. KX	18 ± 2° BTDC
		KS, KX	12 ± 2° BTDC
	Valve clearance	Below 38°C (100°F) Intake	0.12–0.17 mm (0.004–0.005 in.)
		Below 38°C (100°F) Exhaust	0.25–0.30 mm (0.010–0.012 in.)
	Idle speed *1 (With headlight off and cooling fan off)	Manual transmission (At neutral)	750 ± 50 min^{-1} (rpm)
		Automatic (in gear)	750 ± 50 min^{-1} (rpm)
	Idle CO	Manual and Automatic	KS, KX 0.5–2.0% Other types below 3%
	Choke fast idle	Manual transmission	2,200–3,200 min^{-1} (rpm)
		Automatic	2,200–3,200 min^{-1} (rpm)
	Spark plug	Type: NGK: BPR6ES, BPR6EY	Gap: BPR6EY: 0.8–0.9 mm (0.032–0.035 in.) Other types: 0.7–0.8 mm (0.028–0.032 in.)
		Denso: W20EXR–U, W20EPR–U	
	Compression	300 min^{-1} (rpm) and wide-open throttle	1275 kPa (13 kg/cm^2, 185 psi)
	Alternator belt	Belt deflection with 98N (10 kg, 22 lb) tension	7–10 mm (0.28–0.39 in.)
	Ignition wire	Resistance	25,000 ohms maximum
	Radiator cooling fan	Fan operating temperature	Above 90 ± 1.5°C (194 ± 3°F)
EXHAUST EMISSION CONTROLS	Air intake control	COLD (cranking) (air cleaner below 37°C (99°F))	Valve stays up
		HOT (air cleaner 25°C (77°F) nominal)	Valve door down
	Throttle control	Throttle Opener Throttle return time	2–4 seconds
		Throttle Opener Engine speed control KS, KX	1,800 min^{-1} (rpm)
		Throttle Opener Engine speed control Except KS, KX	2,000 min^{-1} (rpm)
CLUTCH	Manual transmission	Pedal free play	10–30 mm (0.39–1.18 in.)
		Pedal height	181 mm (7.1 in.)

*1 Only for KS Model (With headlights on and cooling fan off)

*2 For extended high speed driving

European Model (cont'd)

SUBJECT		ITEMS OR CONDITIONS	REQUIREMENTS
SUSPENSION	Tires	Pressure (front/rear) (cold)	Front: 190 kPa (1.9 kg/cm², 28 psi) Real : 180 kPa (1.8 kg/cm², 26 psi)
	Wheel alignment	Front Camber Caster Toe Kingpin inclination	 0° 0° Out 0 mm (0 in.) 6°51′
		Rear Toe	 In 2 mm (0.008 in.)
BRAKES	Pedal	Free play	1–5 mm (0.04–0.20 in.)
		Pedal-to-floor clearance	176 mm (6.93 in.)
	Front Pad	Pad wear limit	3 mm (0.1 in.) min. thickness
	Rear Pad	pad wear limit	1.6 mm (0.06 in.) min. thickness
	Front Rotor disc	Absolute refinishing limit	17 mm (0.67 in.) max. thickness
	Rear Rotor disc	Absolute refinishing limit	8 mm (0.32 in.) min. thickness

KQ Model

Only the maintenance specifications and settings for above two models different from those of the European model (Except KS, KX model) are listed.
For the other items not given here, refer to the European model maintenance specifications and settings.

SUBJECT		ITEMS OR CONDITIONS	REQUIREMENTS
ENGINE	Ignition timing (At idle)	Manual and Automatic	12 ± 2° BTDC
	Idle: CO	Manual and Automatic	0.5–2.0 %
	Spark plug	Type: NGK BP6EY, BP6ES	Gap: BP6EY 0.8–0.9 mm (0.032–0.035 in.) Other type: 0.7–0.8 mm (0.028–0.032 in.)
		Denso W20EX–U, W20EP–U	
EVAPORATIVE EMISSION CONTROLS	Two-way valve	Pressurize	25–50 mmHg (1.0–2.2 in. Hg)
		Draw	5–15 mmHg (0.2–0.6 in. Hg)
	Chacoal canister	Draws	Partical open throttle
EXHAUST EMISSION CONTROLS	Throttle control (Only for Australian Model with Manual Transmission)	Throttle Opener Throttle return time	2–4 seconds
		Throttle Opener Engine speed control	1,800 min^{-1} (rpm)

*2 for extended high speed driving

(cont'd)

Maintenance Specifications/Setting (cont'd)

KY Model

Only the maintenance specifications and settings for above two models different from those of the European model (Except KS, KX model) are listed.
For the other items not given here, refer to the European model maintenance specifications and settings.

SUBJECT		ITEMS OR CONDITIONS	REQUIREMENTS
ENGINE	Ignition timing (At idel)	Manual and Automatic	18 ± 2° BTDC
	Spark plug	Type: NGK BP6ES, BP6EY	Gap: BP6EY 0.8–0.9 mm (0.032–0.035 in.) Other type:
		Denso W20EX–U, W20EP–U	0.7–0.8 mm (0.028–0.032 in.)

General Export Model

Only the maintenance specifications and settings for above two models different from those of the European model (Except KS, KX model) are listed.
For the other items not given here, refer to the European model maintenance specifications and settings.

SUBJECT		ITEMS OR CONDITIONS	REQUIREMENTS
ENGINE	Ignition timing (At idle)	Manual and Automatic	12 ± 2° BTDC
	Spark plug	Type: NGK BP6EY, BP6ES	Gap: BP6EY 0.8–0.9 mm (0.032–0.035 in.) Other type:
		Denso W20EX–U, W20EP–U	0.7–0.8 mm (0.028–0.032 in.)

Engine

Engine Removal/Installation 5-2

Cylinder Head/Valve Train

Illustrated Index 6-2
Removal 6-5
Camshaft 6-6
Rocker Arms 6-8
Valves 6-9
Timing Belt 6-18
Valve Adjustment 6-21

Engine Block

Illustrated Index 7-2
Rod and Main Bearings 7-5
Crankshaft 7-8
Block 7-9
Piston Rings 7-11
Pistons 7-12
Connecting Rods 7-13

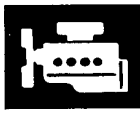
Engine Lubrication

Illustrated Index 8-2
Oil Level Inspection 8-3
Oil Replacement 8-3
Oil Filter Replacement 8-4
Oil Pressure Test 8-4
Oil Pressure Warning Troubleshooting 8-5
Oil Pump Illustrated Index 8-7
Oil Pump Inspection 8-8
Oil Filter Base Overhaul 8-9

Intake Manifold/Exhaust System

Manifold Replacement 9-2
Exhaust Pipe and Muffler 9-3

Engine Removal/Installation



Engine Removal/Installation

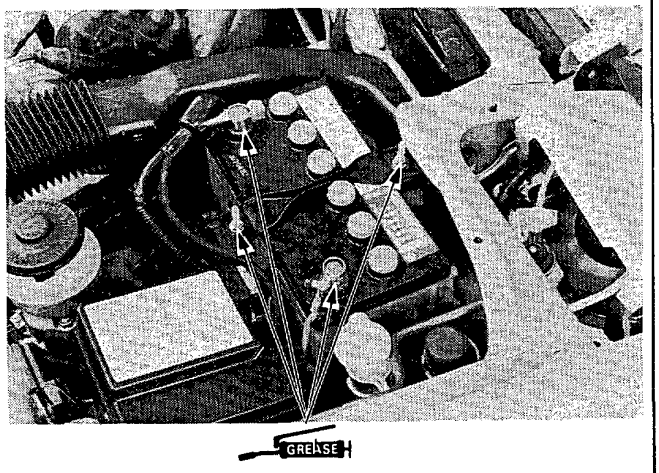
WARNING Make sure jacks and safety stands are placed properly (pages 1-5 thru 7), and hoist brackets are attached to correct positions on the engine (page 5-13).

CAUTION: Use fender covers to avoid damaging painted surfaces.

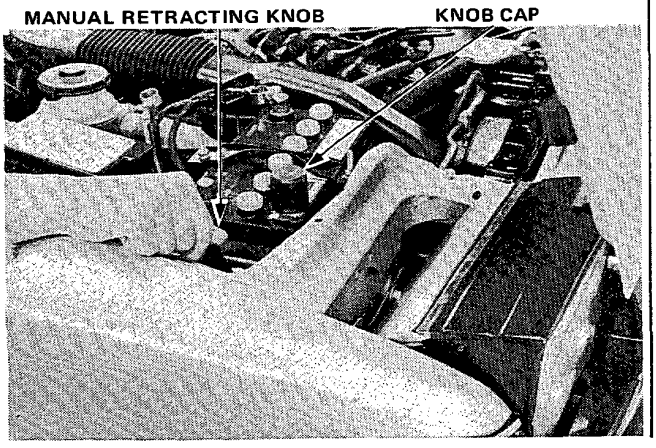
WARNING Apply parking brake and block rear wheels, so car will not roll off stands and fall on you while working under it.

1. Disconnect battery negative terminal first, then positive terminal.

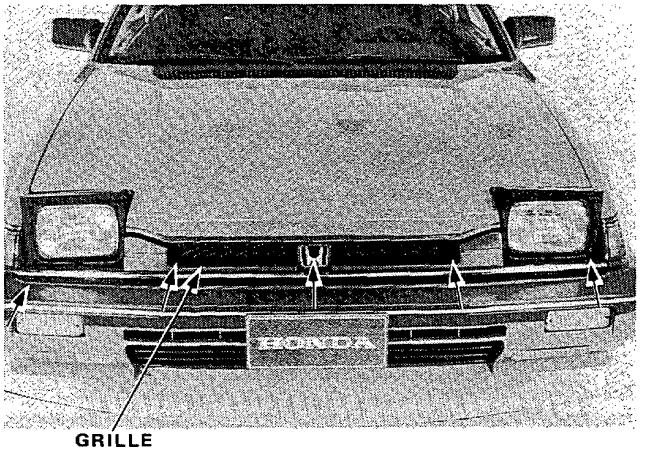
   NOTE: On reassembly, clean battery posts and cable terminals with sandpaper, assemble, then apply grease to prevent corrosion.



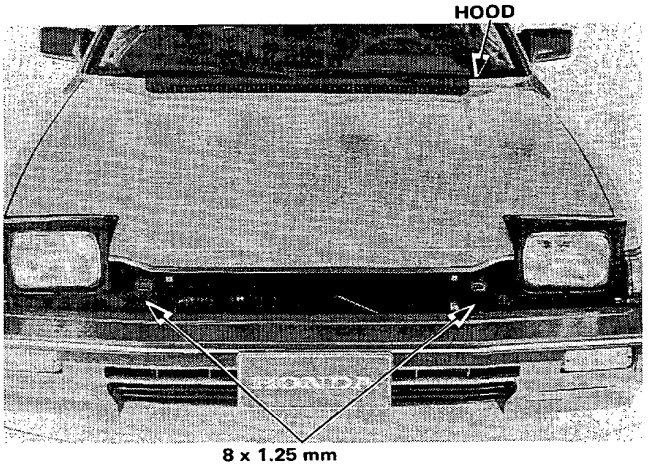
2. Open the hood, remove the manual retracting knob caps on the left and the right, and turn the knobs to bring the lamps to the lit condition.



3. Remove the 5-screws then the grille.



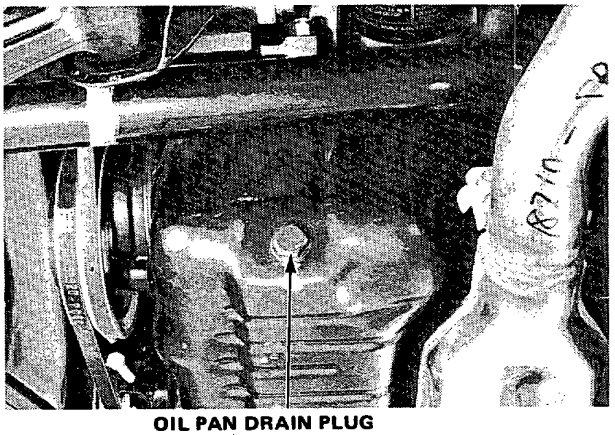
4. Unbolt the hood bracket and remove the hood.



CAUTION: Use care when storing hood to avoid damaging painted surface of hood.

5. Drain engine oil. Remove oil filler cap to speed draining. Reinstall drain plug with new washer.

NOTE: Do not re-use old washer.

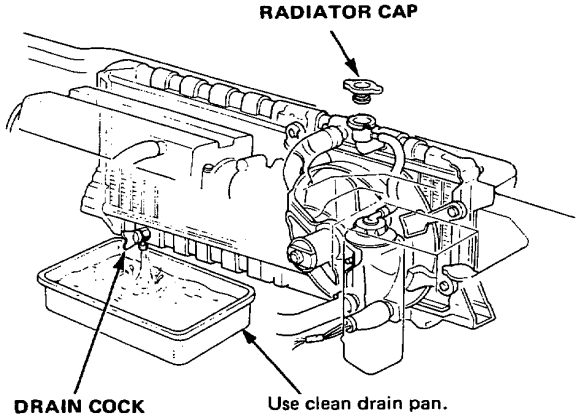


OIL PAN DRAIN PLUG
45 N·m (4.5 kg-m, 33 lb-ft)

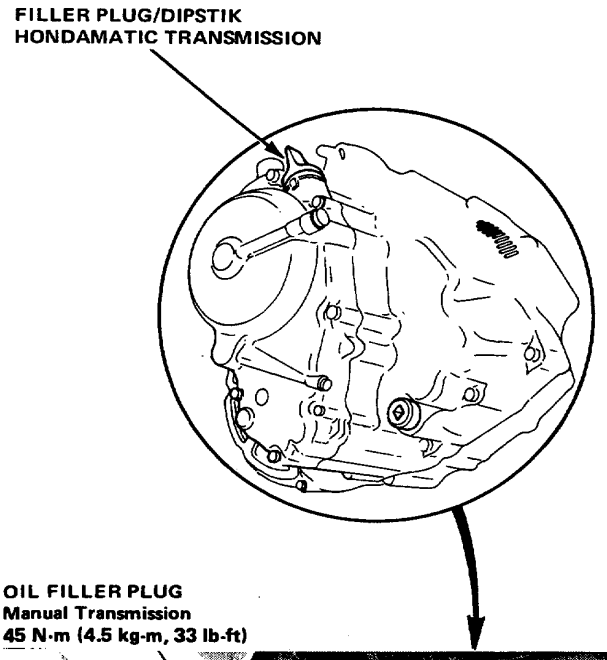
6. Drain coolant from radiator into a clean pan so it may be re-used.

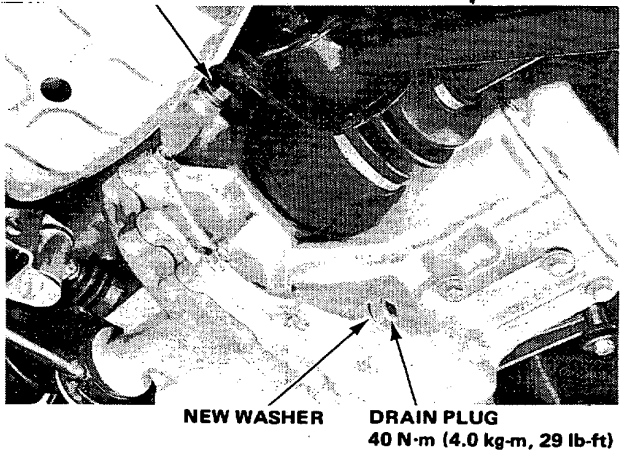
- Remove radiator cap to speed draining.

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



7. Drain transmission oil/fluid. Use a 3/8" drive socket wrench to remove drain plug. Remove oil filler plug to speed draining. Reinstall drain plug with new washer.



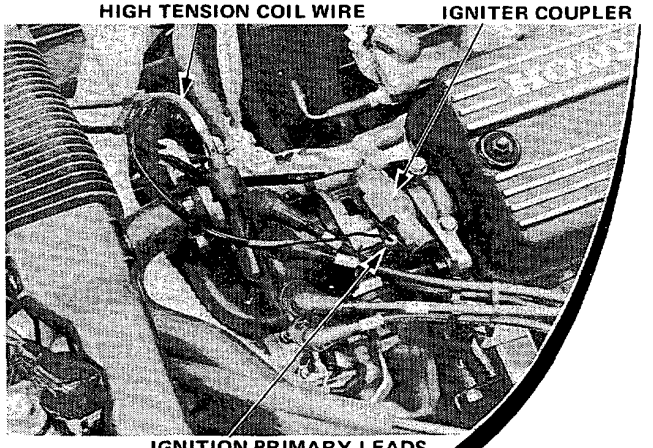


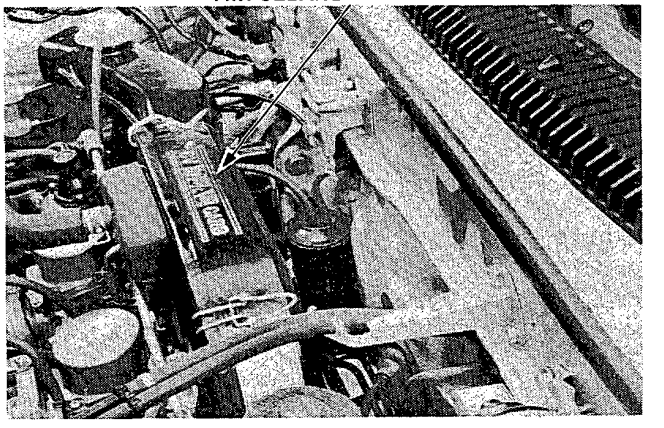
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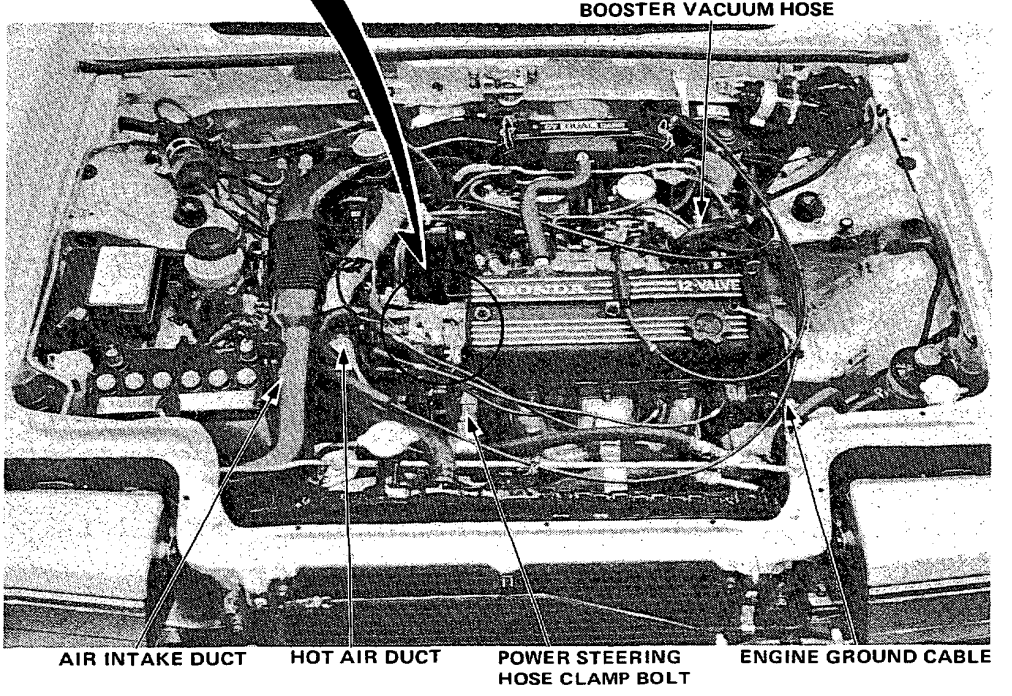
Engine Removal/Installation (cont'd)

8. Disconnect the following wires and remove the air cleaner case cover.

   NOTE: On reassembly, connect all wires properly; checking that they are not pinched or interfering with adjacent parts.

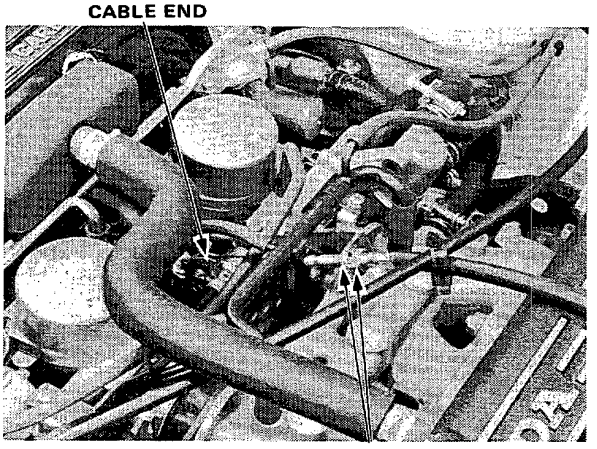






9. Remove throttle cable by loosening locknut and throttle cable adjusting nut, then slip cable end out of throttle bracket and carburetor linkage.

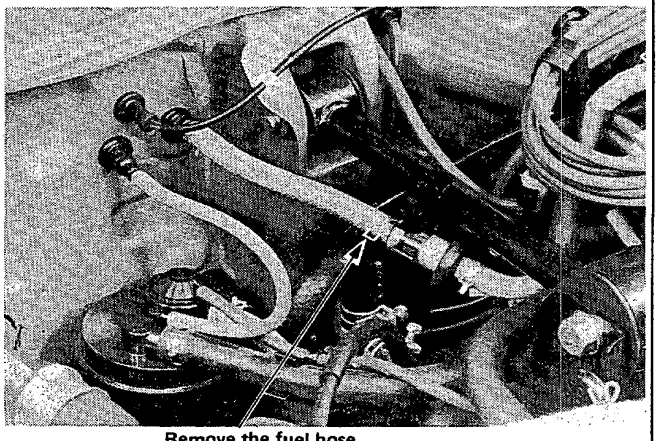
NOTE: Take care not to bend cables when removing them. Do not use pliers to remove cables from linkage. Replace kinked cable with new one.



THROTTLE CABLE LOCKNUT and ADJUSTING NUT

10. Disconnect fuel hose at the fuel filter.

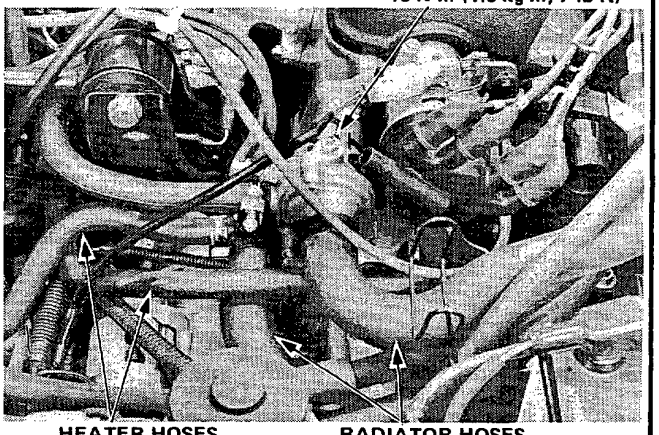
WARNING Do not smoke while working on fuel system. Keep open flame away from work area.



Remove the fuel hose

11. Disconnect radiator hoses and heater hoses at engine.

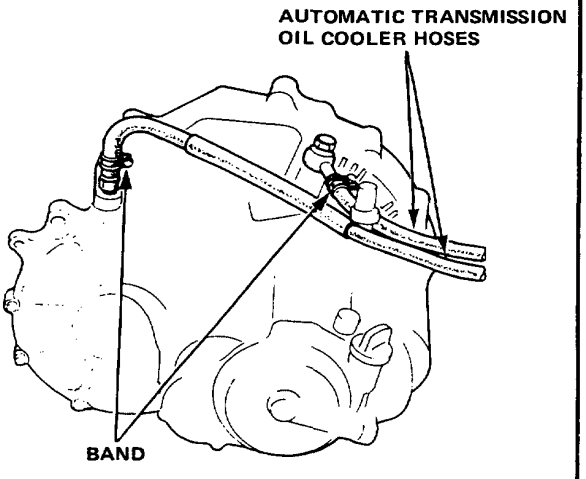
CAUTION:
- **Disconnect heater hose with water valve cable attached.**
- **On reassembly, do not interchange inlet and outlet hoses.**



NOTE: When refilling cooling system, open heater valve and unscrew air bleed bolt to bleed air out of system.

12. **On Automatic Cars:**

- Disconnect transmission oil cooler hoses at the transmission, let ATF drain from hoses, then hang hoses up out of the way near the radiator.



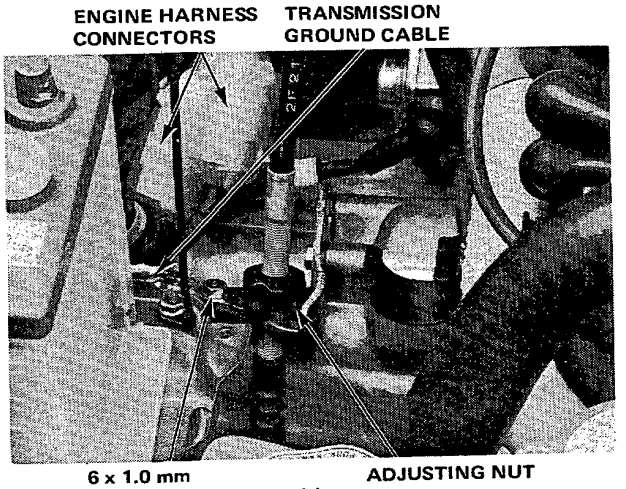
(cont'd)

Engine Removal/Installation (cont'd)

13. **On Manual Cars:**

- Loosen clutch cable adjusting nut and disconnect clutch cable from release arm.

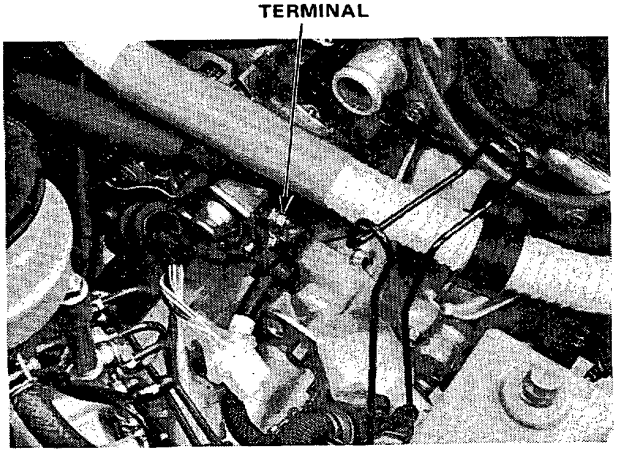
NOTE: After installing engine, readjust clutch pedal free play (page 13-3).



14. Remove the transmission ground cable frame the clutch cable stay (Manual) or the ground stay (Automatic).

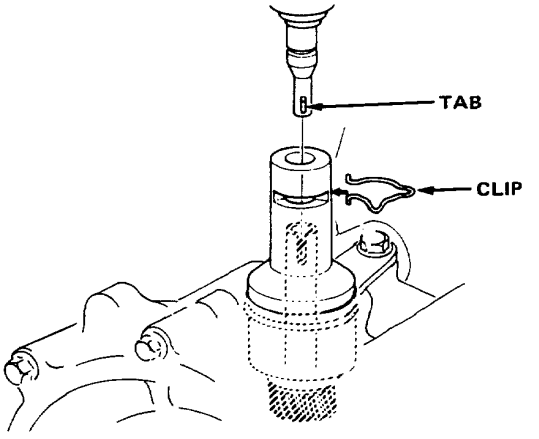
15. Disconnect both engine harness connectors.

16. Disconnect the starter cable at terminal on starter motor.



17. Remove cable clip, then pull the speedometer cable out of holder.

CAUTION: Do not remove holder because speedometer gear may fall into transmission housing.



During Installation:

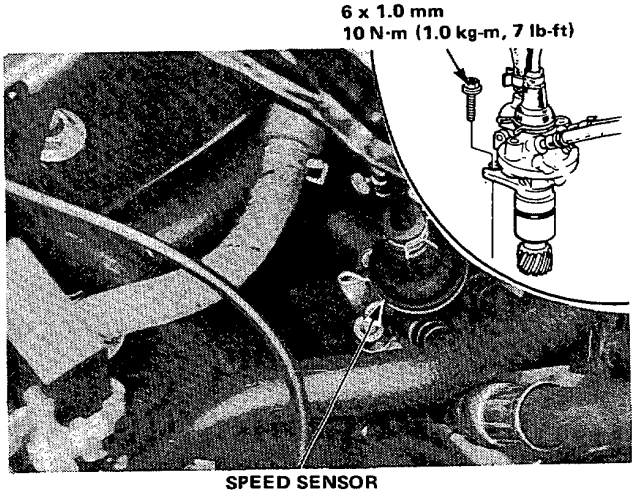
- Align tab on cable end with slot in holder.
- Install clip so bent leg is on groove side.

After installing, pull speedometer cable to make sure it is secure.

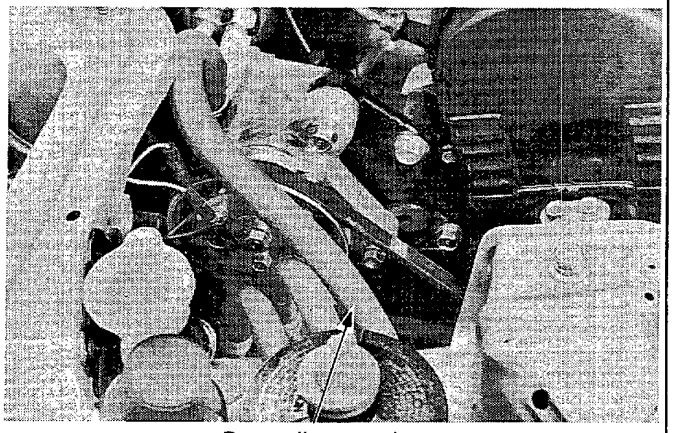
18. **On Cars with Power Steering:**

- Remove speed sensor complete with hoses.

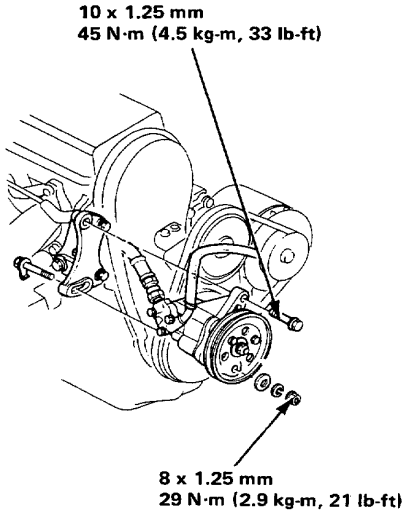
CAUTION: If you disconnect the hoses from the speed sensor, power steering fluid will flow out.



- Remove adjusting bolt and V-belt.
- Without disconnecting hoses, remove the pump from its mounting bracket.



Do not disconnect hoses;
fluid will flow out.

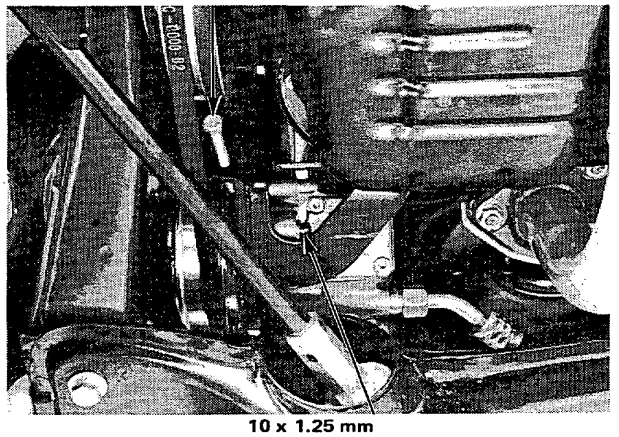


19. **On Cars with A/C:**

- Remove the compressor clutch lead wire.
- Loosen the belt adjustment bolt.

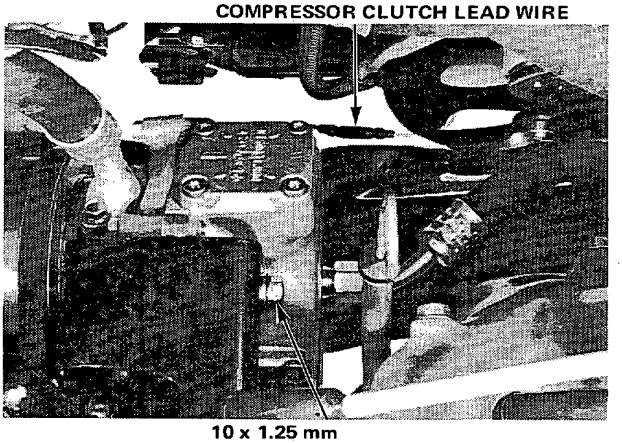
NOTE: Compressor can be moved without discharging air conditioner system.

BELT ADJUSTING BOLT



10 x 1.25 mm
45 N·m (4.5 kg-m, 33 lb-ft)

COMPRESSOR CLUTCH LEAD WIRE



10 x 1.25 mm
48 N·m (4.8 kg-m, 35 lb-ft)

- Remove compressor mounting bolts, then lift compressor out of bracket, with hoses attached, and wire it up to front center beem.

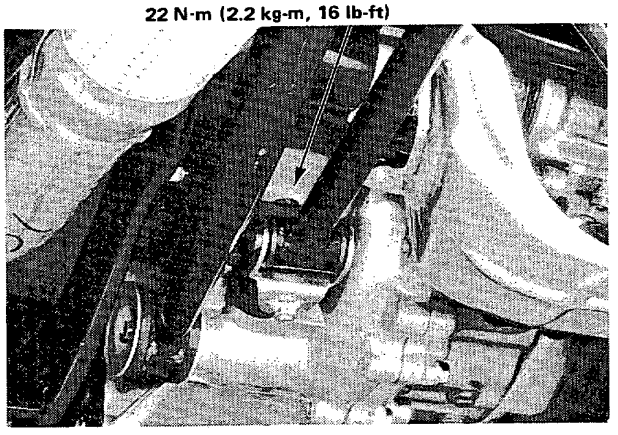
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20. **Manual Transmission Only:**

- Remove shift rod yoke attaching bolt.

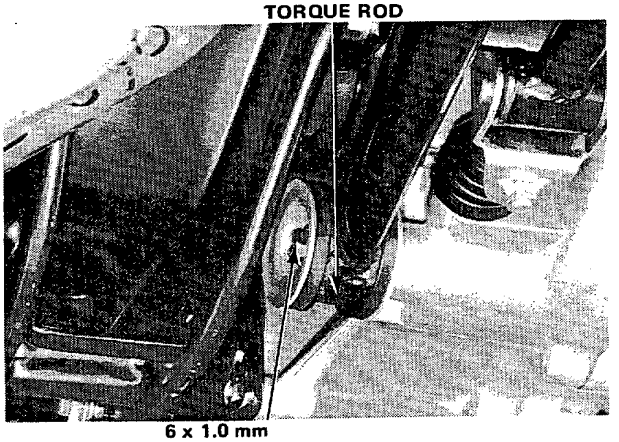
NOTE: Shift to 1st to ease bolt removal.

SHIFT ROD YOKE ATTACHING BOLT
8 x 1.25 mm
22 N·m (2.2 kg-m, 16 lb-ft)



- Disconnect shift lever torque rod from clutch housing.

SHIFT LEVER TORQUE ROD



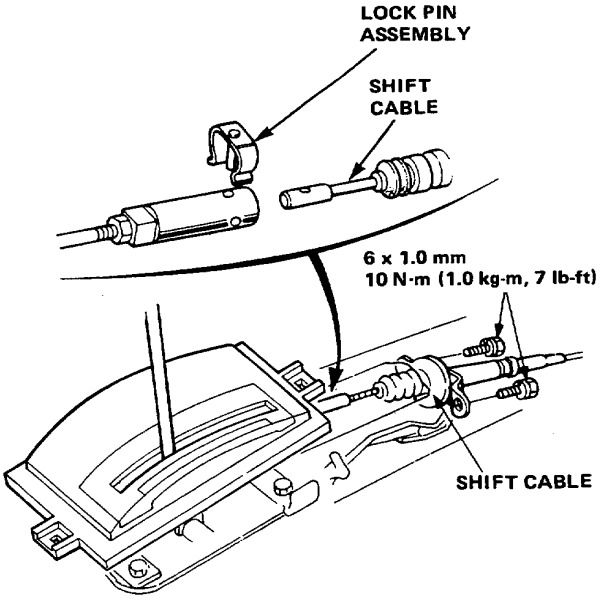
6 x 1.0 mm
10 N·m (1.0 kg-m, 7 lb-ft)

(Manual Transmission: go to step 22.)

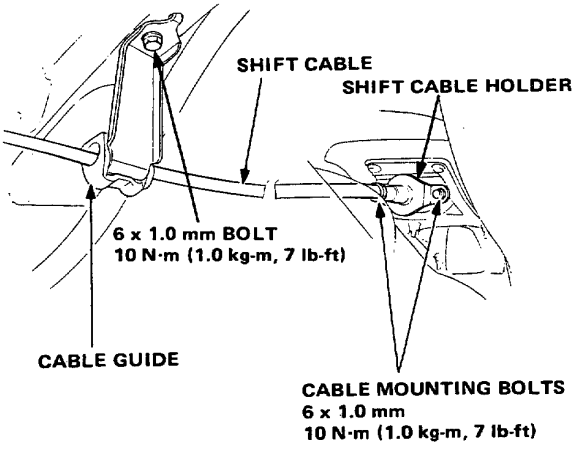
21. **Automatic Transmission Only:**

- Remove center console.
- Place shift lever in reverse, then remove lock pin from end of shift cable.

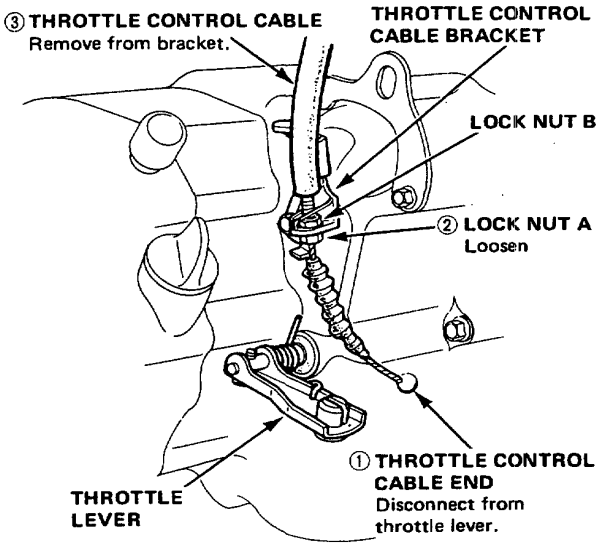
NOTE: On reassembly, check cable adjustment.



- Unscrew cable mounting bolts and remove shift cable holder.

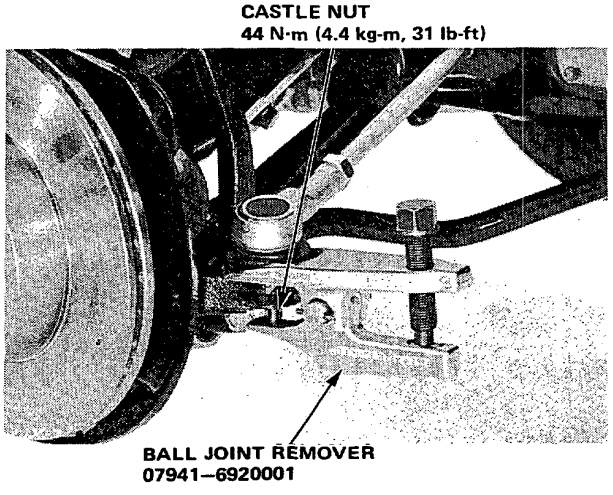


- Remove throttle control cable in numbered sequence.



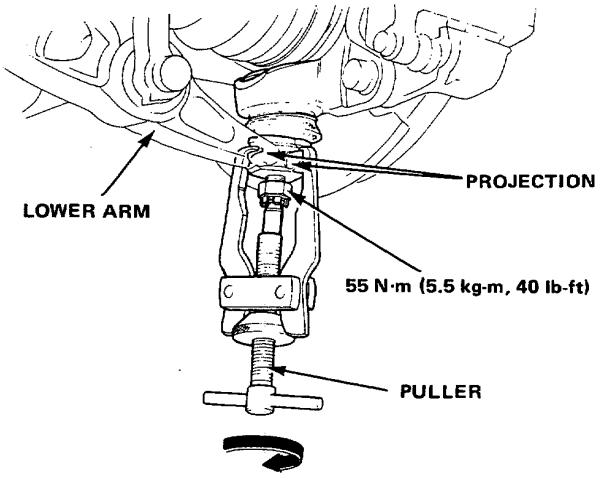
CAUTION: Do not loosen lock nut B as it will change the transmission shift points.

22. Remove cotter pin from tie-rod end and remove cassle nut.
    Disconnect right and left lower arm bolt and tie-rod end ball joints using Ball Joint Removal Tool.



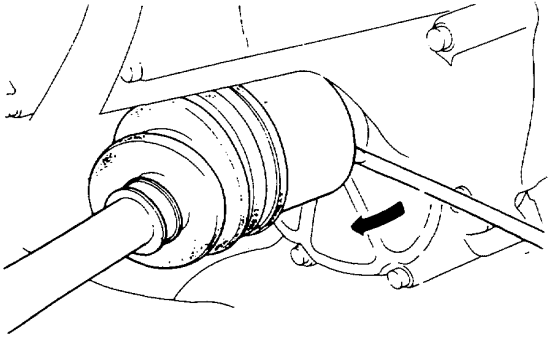
23. Separate the lower arm ball joint on the left and the right side.

- Remove the cotterpin, loosen the nut, and leave the nut about one half engaged.
- Apply a puller (commercial product).



24. Turn right steering knuckle outward as fas as it will go. With screwdriver against inboard CV joint, pry right axle out of transmission housing approximately 1/2 inch (to force its spring clip out of groove inside differential gear splines), then pull it out the rest of the way. Repeat on opposite side.

CAUTION: Do not damage differential seals.

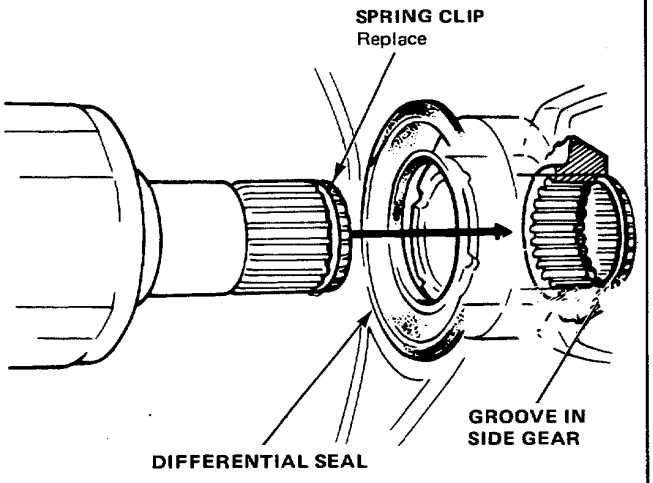


(cont'd)

Engine Removal/Installation (cont'd)

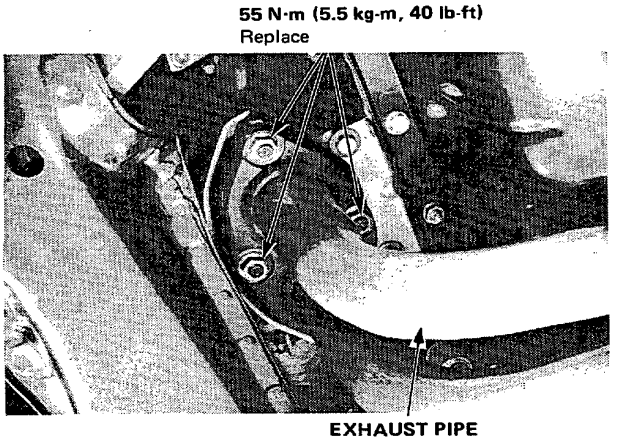
NOTE: When installing drive shaft, insert shaft until spring clip "clicks" into groove in differential side gear.

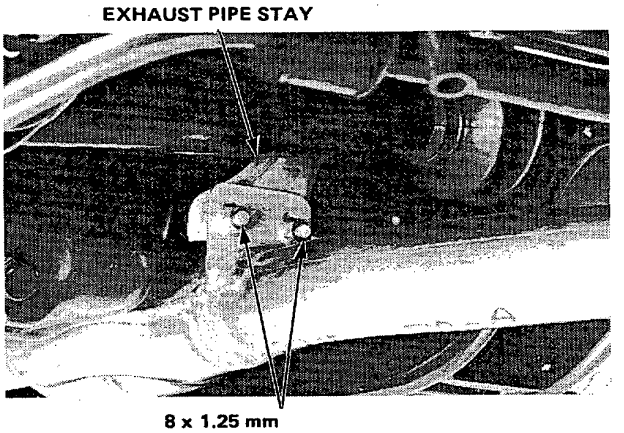
CAUTION: Always use new spring clips when installing drivershafts.



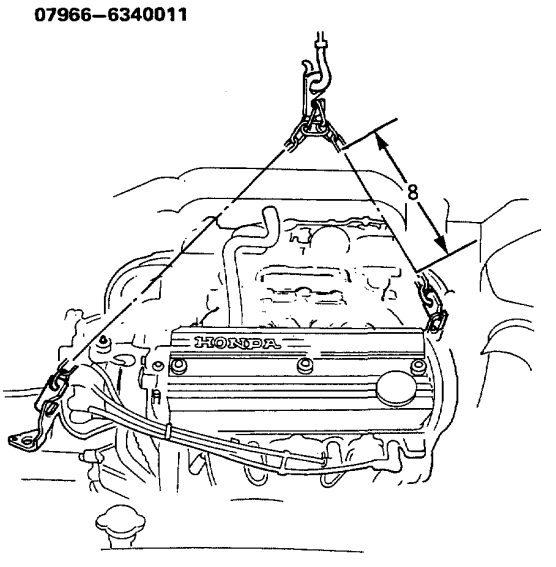
25. Remove the exhaust pipe by removing the 6 nuts (4 nuts on the manifold side and 2 nuts on the exhaust pipe stay side).

CAUTION:
- **To ease disassembly, squirt penetrating oil on exhaust manifold studs before removing nuts.**
- **Replace exhaust gasket and self-locking nuts, on reassembly.**



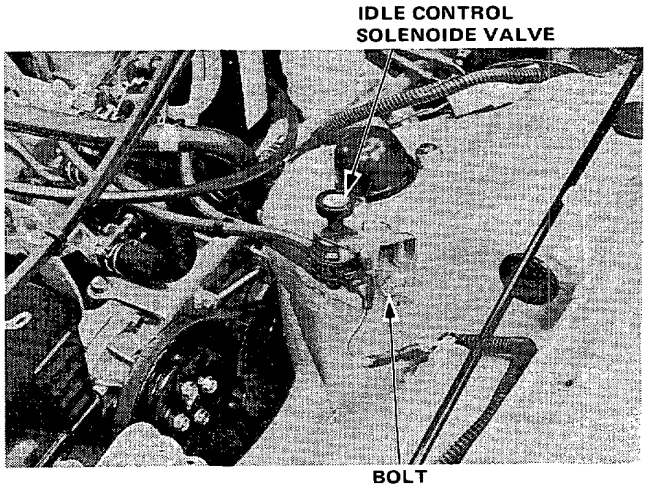


26. Attach hoise chain to engine block and raise hoist just enough to remove slack from chain with slight tension.

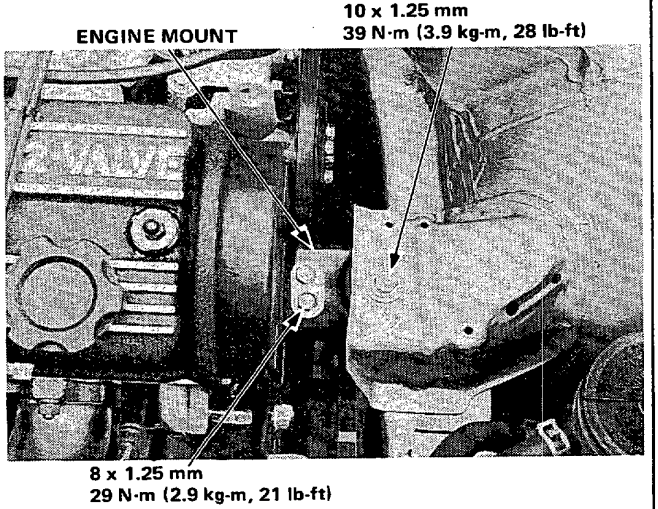


27. On cars with A/C. remove the idle control solenoid valve.

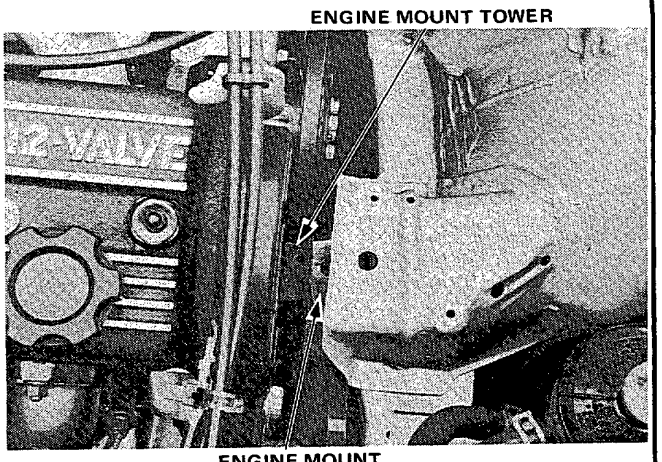
- Remove the harness coupler and the bolt, and remove with attached tube.



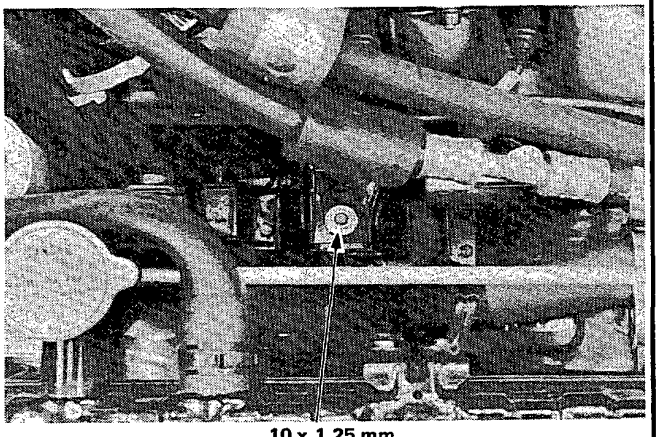
28. Remove three engine mount bolts.



29. Then push engine mount into the engine mount tower.



30. Remove front engine mount nut.



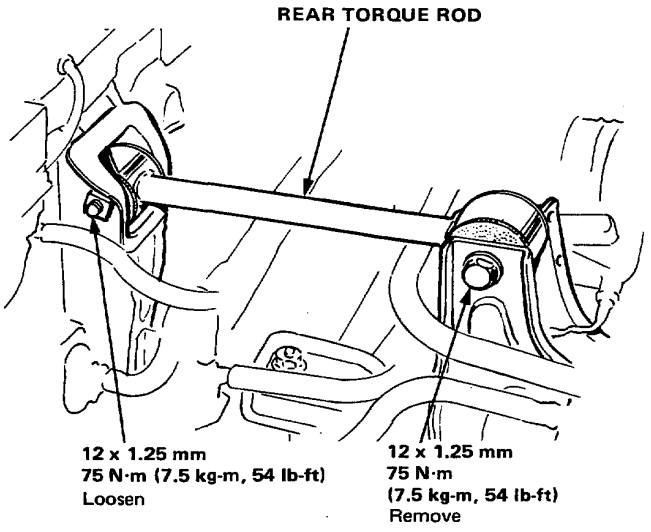
31. Remove rear engine mount nut.



(cont'd)

Engine Removal/Installation (cont'd)

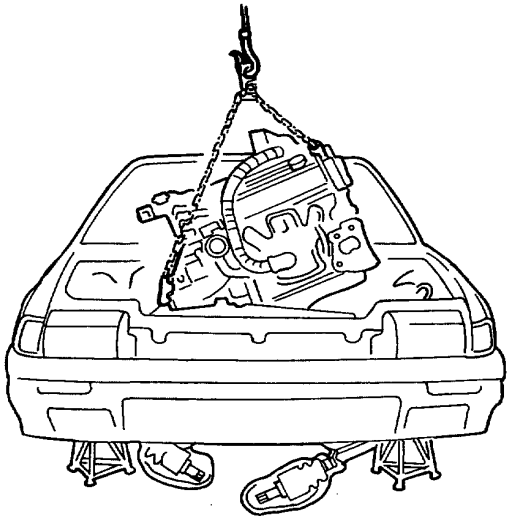
32. Remove bolt from rear torque rod at engine, then loosen bolt in frame mount and swing rod up out of the way.



33. Check that engine/transaxle is completely free of vacuum, fuel, and coolant hoses; and electrical wires.

34. Slowly raise engine. Check once again that all wires and hoses have been disconnected from engine/transaxle.

35. Raise engine all the way and remove from car.



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

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

- Torque engine mount bolts in sequence shown on next page.

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

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

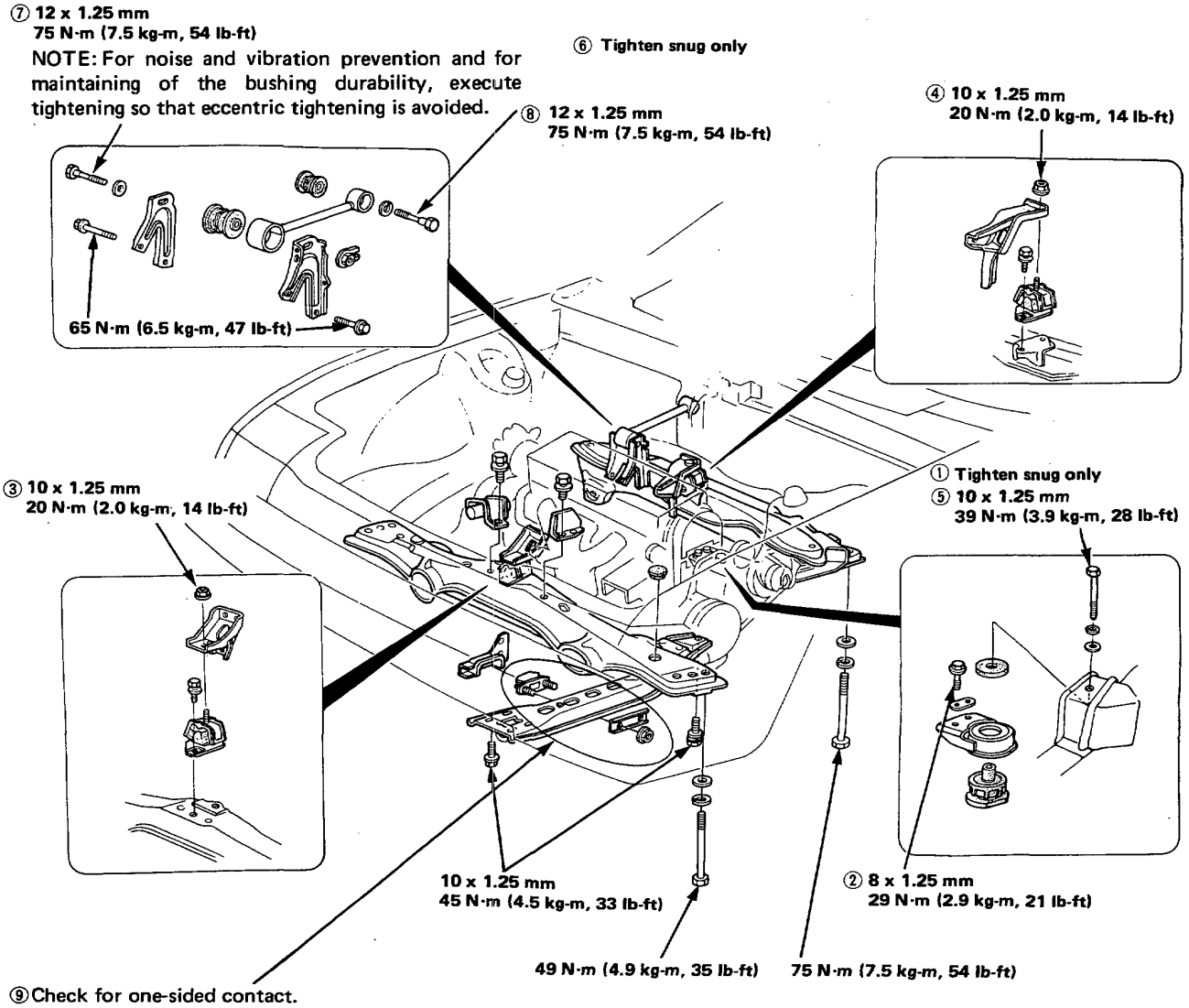
  CAUTION: Use new spring clips on installation.

- Bleed air from cooling system at bleed bolt with heater valve open.
- Adjust throttle cable tension.
- Check clutch pedal free play.
- Check that transmission shifts into gear smoothly.
- Connect air conditioning hoses and wiring.

Tightening sequence for the bolts for engine mounting.

NOTE:

- Execute tightening of the bolts for engine mounting in the following sequence because of noise and vibration prevention and maintaining of bushing durability.
- Execute the work from item (5) on with the car body in level condition.



⑨ Check for one-sided contact.

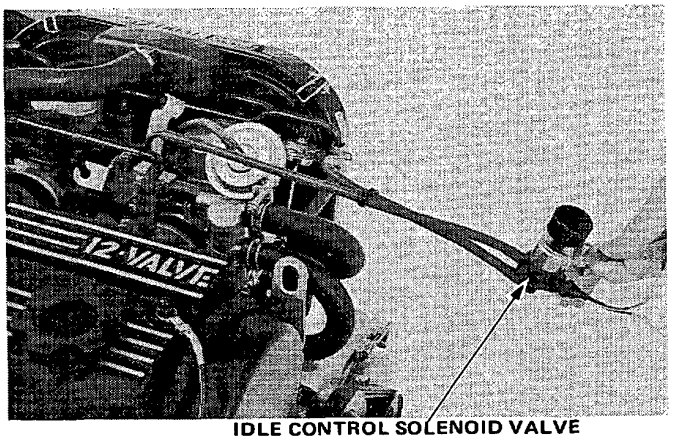
In case of one-sided contact, loosen the center beam clamp bolt and the wind stopper clamp nut, and adjust to the center position.

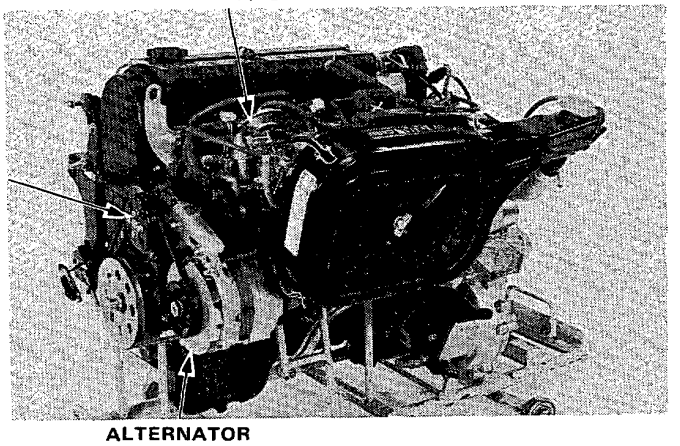
10 x 1.25 mm
20 N·m (2.0 kg-m, 14 lb-ft)

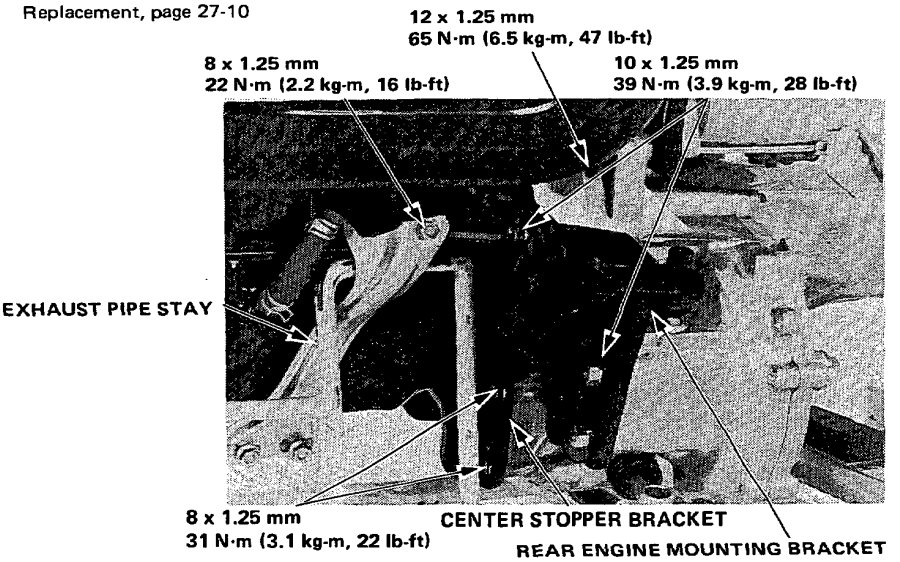
(cont'd)

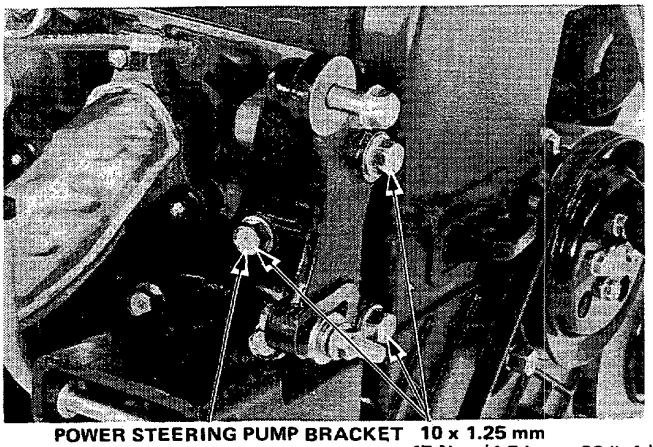
Engine Removal/Installation (cont'd)

Engine

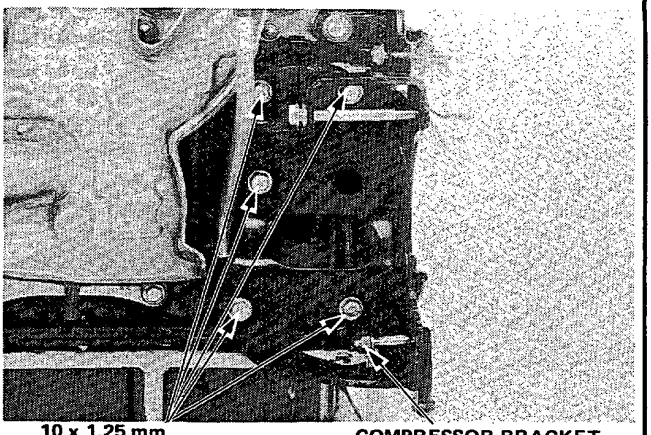




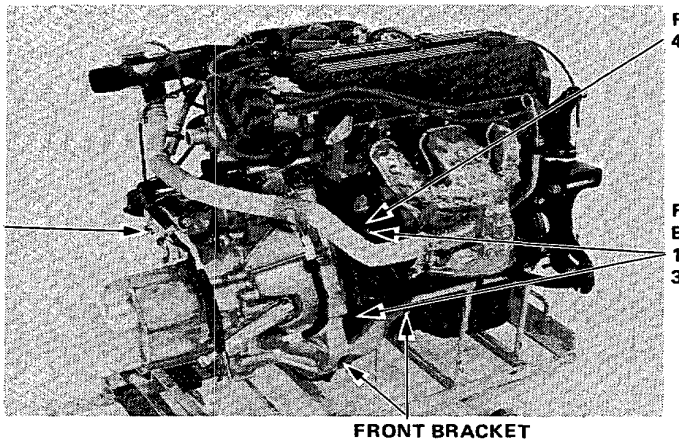




POWER STEERING PUMP BRACKET
10 x 1.25 mm
45 N·m (4.5 kg-m, 33 lb-ft)



10 x 1.25 mm
45 N·m (4.5 kg-m, 33 lb-ft)
COMPRESSOR BRACKET



RADIATOR DRAIN BOLT
40 N·m (4.0 kg-m, 29 lb-ft)

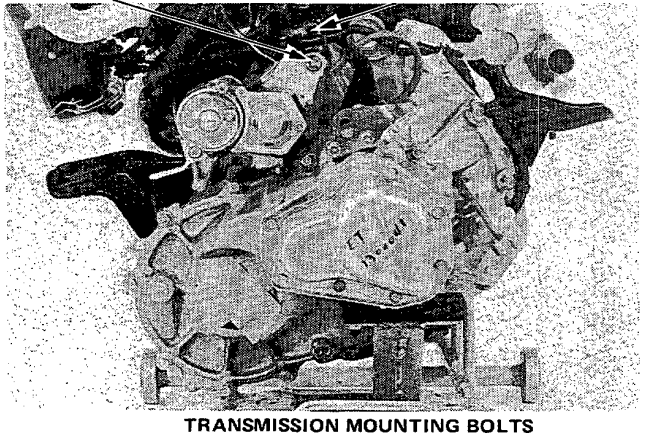
STATER

FRONT ENGINE MOUNTING BRACKET
10 x 1.25 mm
39 N·m (3.9 kg-m, 28 lb-ft)

FRONT BRACKET
10 x 1.25 mm
39 N·m (3.9 kg-m, 28 lb-ft)

STATER
10 x 1.25 mm
45 N·m (4.5 kg-m, 33 lb-ft)

10 x 1.25 mm
65 N·m (6.5 kg-m, 47 lb-ft)



TRANSMISSION MOUNTING BOLTS
10 x 1.25 mm
45 N·m (4.5 kg-m, 33 lb-ft)

MEMO

Cylinder Head/Valve Train

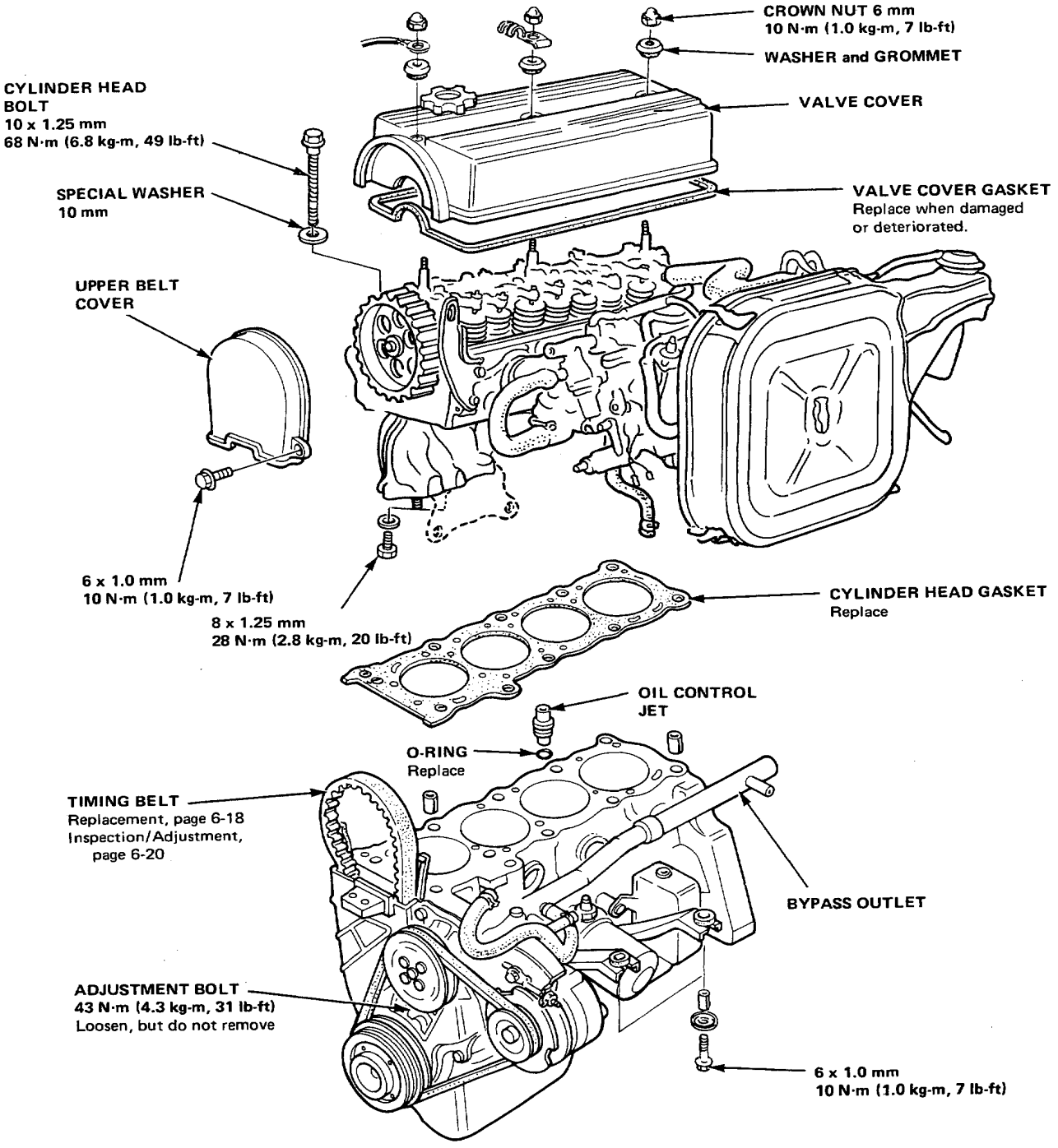


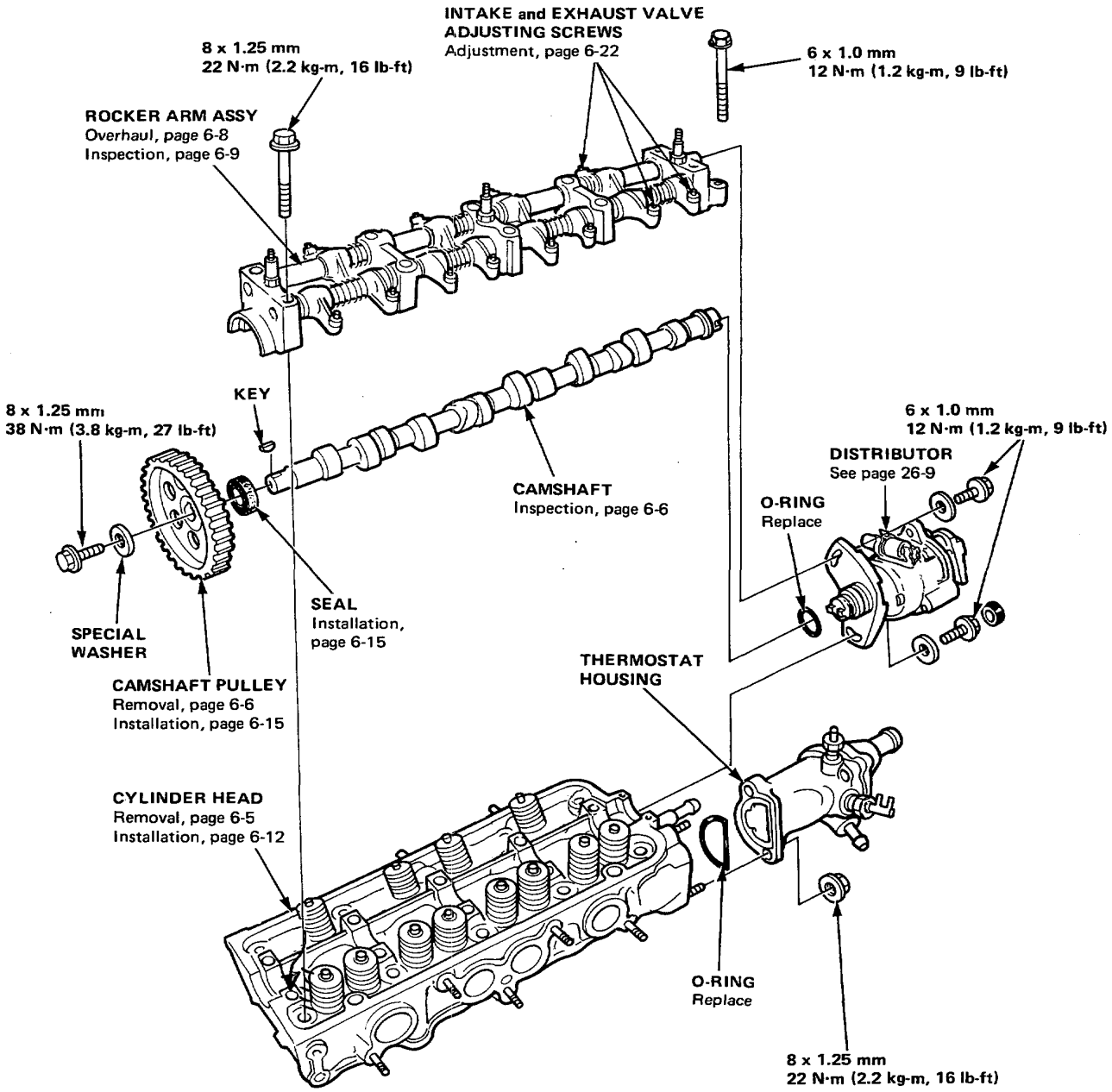
Illustrated Index 6-2
Removal 6-5
Camshaft 6-6
Rocker Arms 6-8
Valves 6-9
Timing Belt 6-18
Valve Adjustment 6-21

Cylinder Head/Valve Train

Illustrated Index

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



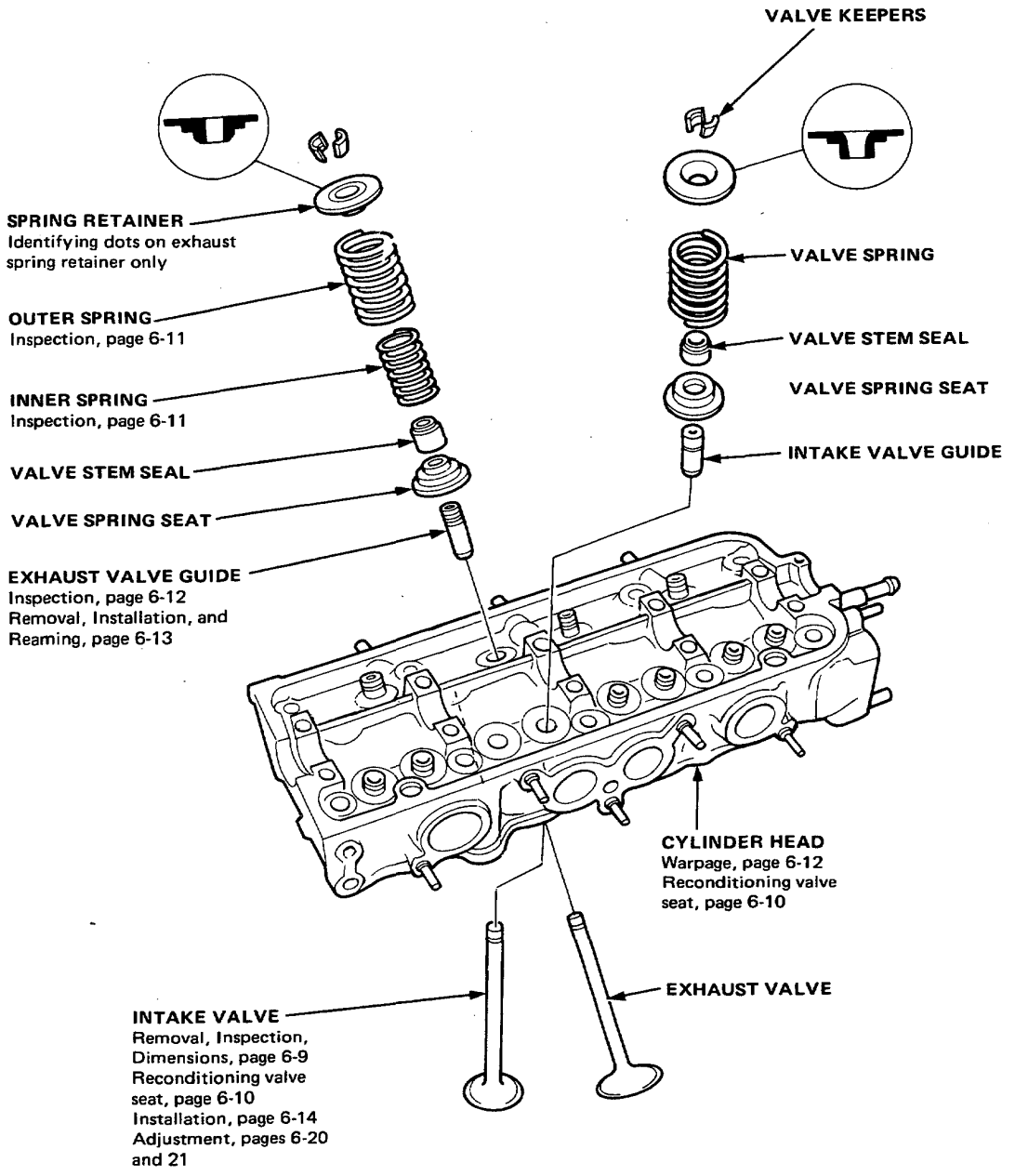

INTAKE and EXHAUST VALVE
ADJUSTING SCREWS
Adjustment, page 6-22
8 x 1.25 mm
22 N·m (2.2 kg-m, 16 lb-ft)
6 x 1.0 mm
12 N·m (1.2 kg-m, 9 lb-ft)
ROCKER ARM ASSY
Overhaul, page 6-8
Inspection, page 6-9
KEY
8 x 1.25 mm
38 N·m (3.8 kg-m, 27 lb-ft)
6 x 1.0 mm
12 N·m (1.2 kg-m, 9 lb-ft)
DISTRIBUTOR
See page 26-9
CAMSHAFT
Inspection, page 6-6
O-RING
Replace
SEAL
Installation,
page 6-15
SPECIAL
WASHER
CAMSHAFT PULLEY
Removal, page 6-6
Installation, page 6-15
THERMOSTAT
HOUSING
CYLINDER HEAD
Removal, page 6-5
Installation, page 6-12
O-RING
Replace
8 x 1.25 mm
22 N·m (2.2 kg-m, 16 lb-ft)

(cont'd)

Cylinder Head/Valve Train

Illustrated Index (cont'd)

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



Cylinder Head Removal (engine removal not required)

CAUTION: Do not remove cylinder head until coolant temperature drops below 38°C (100°F).

NOTE:
- Inspect the timing belt before removing the cylinder head.
- Before removal of the cylinder head, match the flywheel to the upper dead-center mark (T mark).
- At the time of sensor tube removal, marking should be executed to assure correct reassembly.

1. Remove the battery (–) terminal (page 5-2).
2. Drain the radiator coolant (page 5-3).
3. Remove the vacuum tube from the brake booster (page 5-4).
4. Remove air cleaner and identify all its emission hoses.
5. Disconnect electrical wires from temperature gauge sending unit, fuel cut-off solenoid valve, automatic choke.
6. Disconnect fuel lines and throttle cable from carburetor (page 5-5).

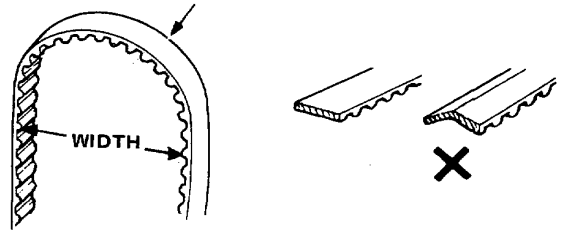
WARNING Do not smoke while working on fuel system. Keep open flame or spark away from work area.

7. Disconnect connector from distributor and remove vacuum hoses.
8. Disconnect upper radiator hose, heater inlet hose, and bypass inlet hose from cylinder head (page 5-5).
9. Remove the hose between the thermocase and the intake manifold.
10. Remove the connector of the thermounit on the intake manifold.
11. Remove the power steering oil pump. The pump hose must not be removed, as otherwise fluid will flow out (page 5-7) (cars equipped with power steering).
12. Remove the hose clamp bolt on the cylinder head (cars equipped with power steering).
13. Remove the power steering pump bracket from the cylinder head (cars equipped with power steering).
14. Remove the tube of the air conditioner solenoid valve from the installation pipe (cars equipped with an air conditioner).

From below the engine

15. Remove the manifold mount nut from the exhaust pipe.
16. Remove the mount nut for exhaust manifold and stay.
17. Remove the mount bolt for air cleaner case and stay.
18. Remove the tube of intake manifold and breather chamber.
19. Remove the valve cover and the timing belt upper cover.
20. Loosen the tensioner tension with the adjustment bolt for the timing belt, and remove the timing belt from the driven pulley of the timing belt.

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



21. Remove the cylinder head by removing the cylinder head bolts.

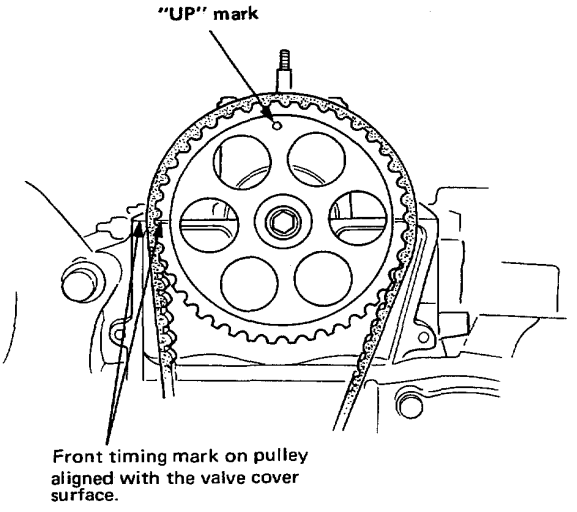
CAUTION: To prevent warpage, unscrew bolts 1/3 turn each time and repeat sequence until loose.

22. Remove the exhaust manifold from the cylinder head.
23. Remove the air cleaner case and the air cleaner base.
24. Remove the intake manifold from the cylinder head.

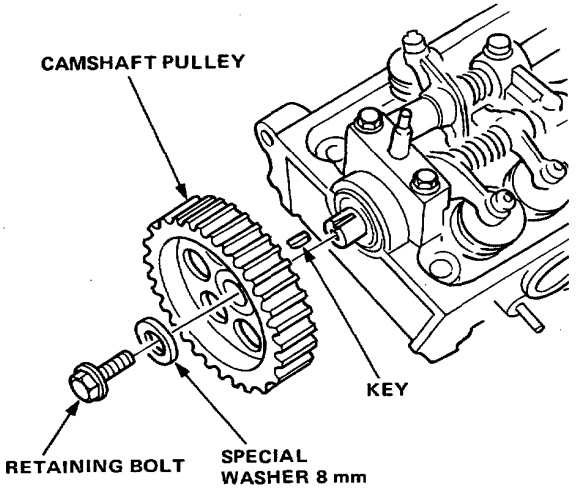
Cylinder Head/Valve Train

Camshaft Pulley Removal

1. To ease reassembly, turn the pulley until the "UP" mark faces up, and the front timing mark is aligned with the valve cover surface.



2. Remove pulley retaining bolt and washer, then pull off pulley.



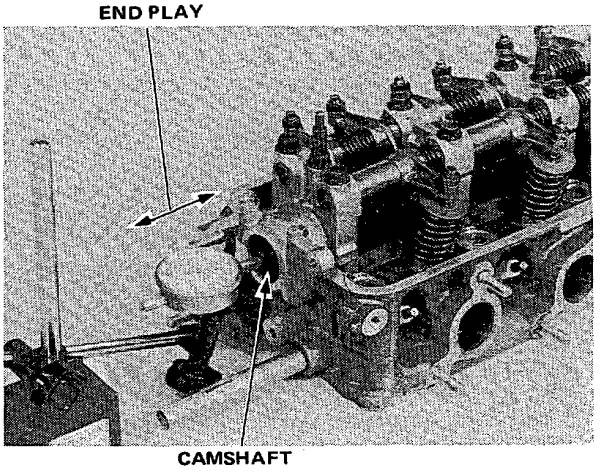
NOTE: Before removing rocker arm assembly, check camshaft end play.

Camshaft Inspection

1. Seat camshaft by prying it toward left end of head with screwdriver.

2. Zero dial indicator against end of distributor drive gear, then pry camshaft back toward it, and read 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.)



3. Remove rocker arm bolts, then remove rocker assembly from cylinder head.

   NOTE: Unscrew rocker arm bolts, two turns at a time, in a criss-cross pattern, to prevent damaging valves or rocker assembly.

4. Lift camshaft out of cylinder head, wipe clean, then inspect lift ramps. Replace camshaft if lobes are pitted, scored, or excessively worn.

5. Clean the camshaft bearing surfaces in the cylinder head, then set camshaft back in place.

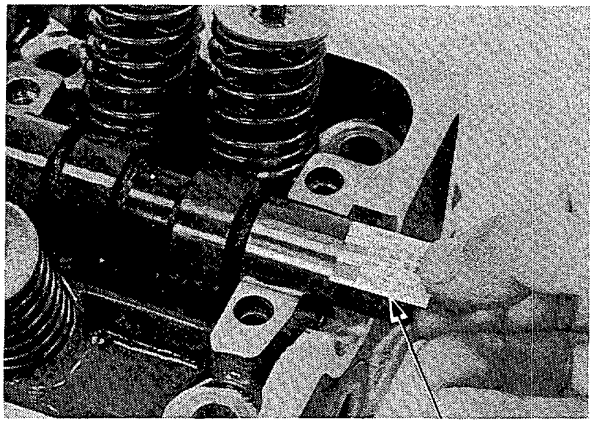
6. Insert plastigage strip across each journal.

   NOTE: Do not rotate camshaft during inspection.

7. Install rocker arm assembly and torque bolts to values and in sequence shown on page 6-16, then remove bolts and rocker arm assembly.

8. Measure widest portion of plastigage on each journal.

Camshaft Bearing Radial Clearance:
No. 1, No. 3 and No. 5 JOURNAL
Standard (New): 0.050–0.089 mm (0.002–0.004 in.)
Service Limit: 0.15 mm (0.006 in.)
No. 2 and No. 4 JOURNAL
Standard (New): 0.130–0.169 mm (0.005–0.007 in.)
Service Limit: 0.23 mm (0.009 in.)

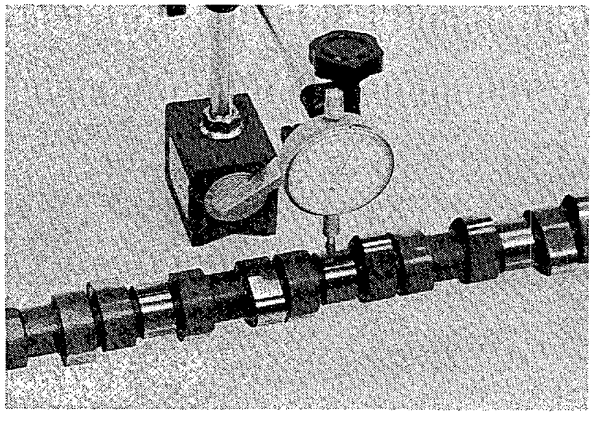


PLASTIGAGE

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

   Camshaft Total Runout:
   Standard (New): 0.03 mm (0.001 in.)
   Service Limit: 0.06 mm (0.002 in.)

Rotate camshaft while measuring

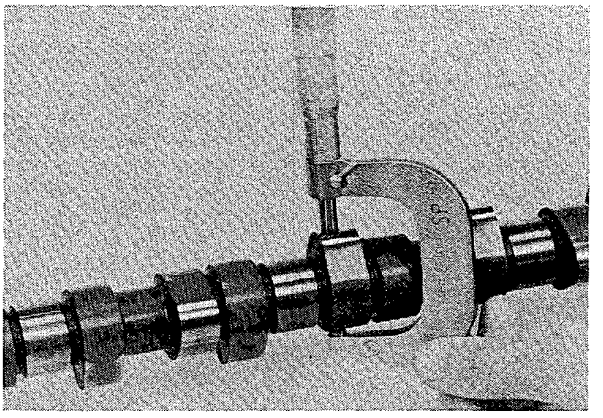


10. If total runout is out of tolerance, replace camshaft and recheck clearance in cylinder head.

11. If still out of tolerance, replace cylinder head.

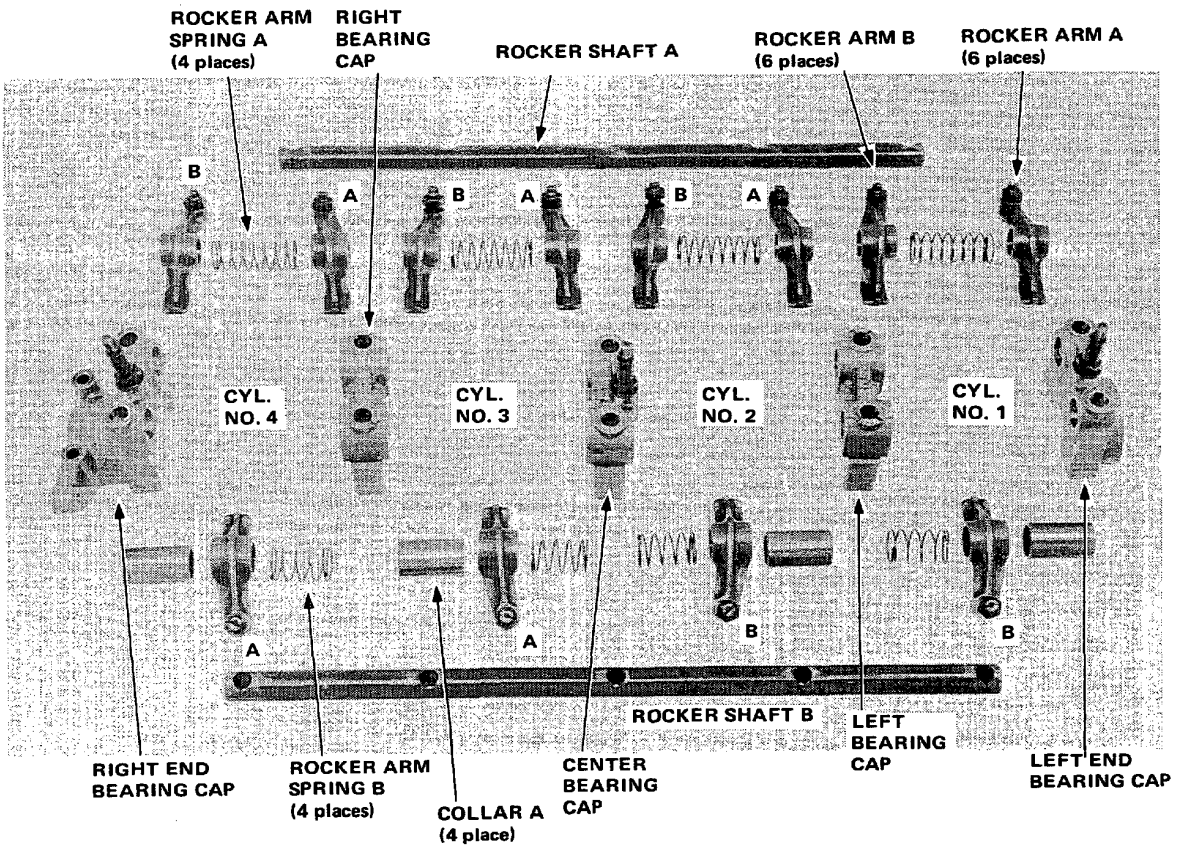
12. Measure camshaft height.

[MT]
Intake Standard: 38.853 mm (1.5296 in.)
Exhaust Standard: 38.796 mm (1.5274 in.)
[HM]
Intake Standard: 38.668 mm (1.5224 in.)
Exhaust Standard: 38.480 mm (1.5150 in.)



Rocker Arm Overhaul

NOTE: Rocker arms must be installed in the same position if reused.



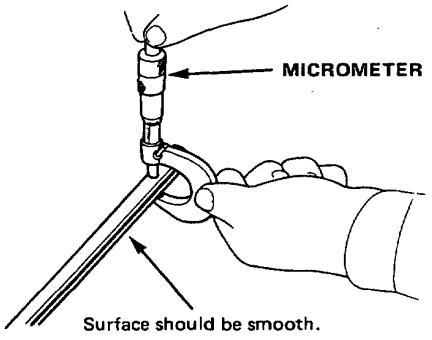
NOTE:

- Identify parts as they are removed to ensure reinstallation in original locations.
- Inspect rocker shaft and rocker arms (page 6-9).

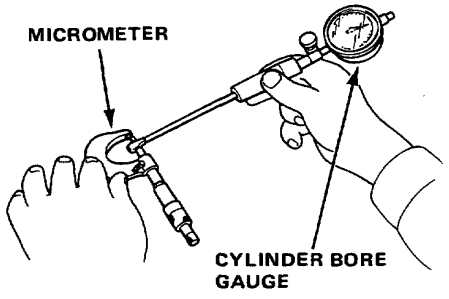
Rocker Arm Clearance

Measure the rocker shaft.

1. Measure diameter of shaft at first rocker location.

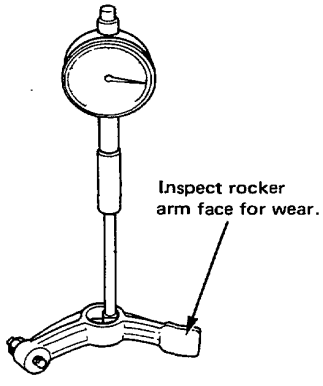


2. Zero gauge to shaft diameter.



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

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



Repeat for all rockers. If over limit, replace rocker shaft and all over-tolerance rocker arms.

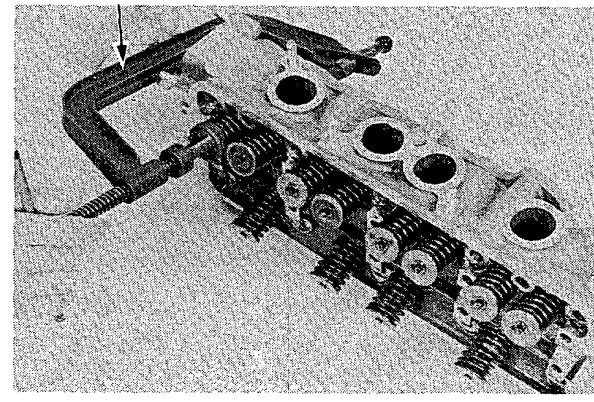
Intake and Exhaust Valve Replacement

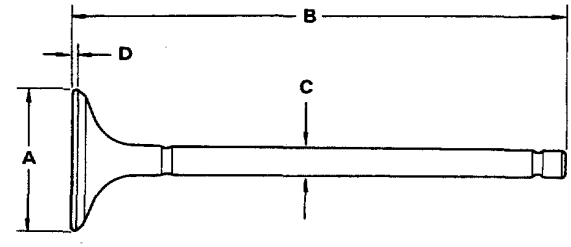
NOTE: Identify valves and valve springs as they are removed so that each item can be reinstalled in its original position.

1. Tap each valve stem with a plastic mallet to loosen valve keepers before installing spring compressor.

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

VALVE SPRING COMPRESSOR 07757–0010000





Intake Valve Dimensions

A Standard (New):	29.9–30.1 mm (1.177–1.185 in.)
B Standard (New):	120.29–120.59 mm (4.736–4.748 in.)
C Standard (New):	6.58–6.59 mm (0.2591–0.2594 in.)
C Service Limit:	6.55 mm (0.258 in.)
D Standard (New):	1.35–1.65 mm (0.053–0.065 in.)

Exhaust Valve Dimensions

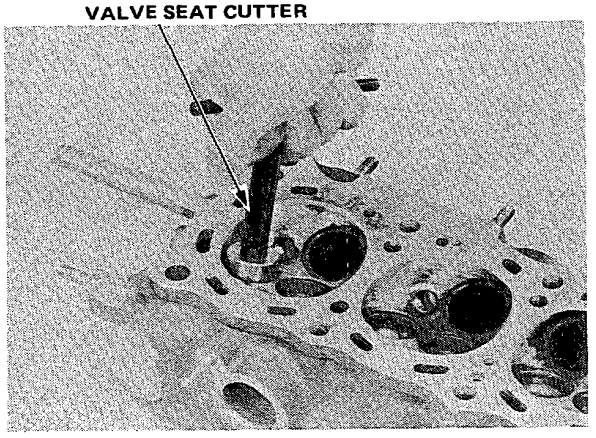
A Standard (New):	34.9–35.1 mm (1.374–1.382 in.)
B Standard (New):	121.36–121.66 mm (4.778–4.790 in.)
C Standard (New):	6.94–6.95 mm (0.2732–0.2736 in.)
C Service Limit:	6.91 mm (0.272 in.)
D Standard (New):	2.35–2.65 mm (0.093–0.104 in.)

Valve Seat Reconditioning

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

   NOTE: If guides are worn (page 6-12), replace them (page 6-13) before cutting valve seats.

VALVE SEAT CUTTER



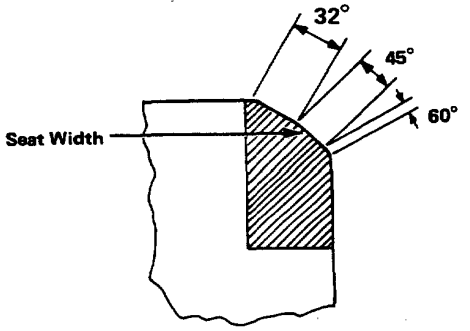
CUTTER	INTAKE	EXHAUST
32°	07780–0012900	07780–0012300
60°	07780–0014000	07780–0014100
45°	07780–0010800	07780–0010400
HOLDER	07781–0010201 and 07781–0010301	

2. Bevel the upper edge of seat with the 32° cutter until required seat width is obtained.

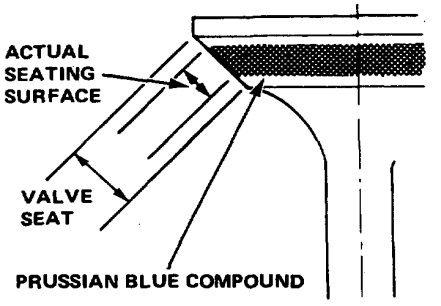
3. Bevel the inner edge of seat slightly with the 60° cutter.

4. Carefully center 45° cutter.
   Remove as little material as possible. (See measurement after reconditioning shown below.)

   Valve Seat Width:
   Standard: 1.25–1.55 mm (0.049–0.061 in.)
   Service Limit: 2.0 mm (0.08 in.)



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

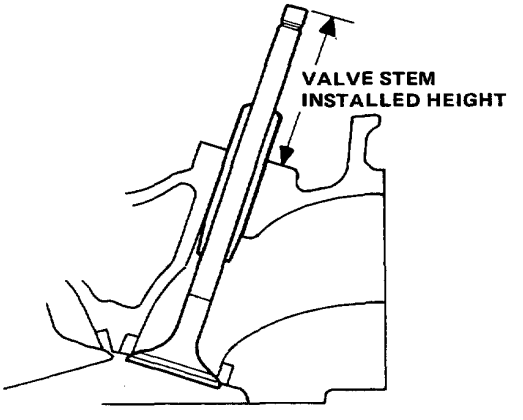


6. The actual valve seating surface, as shown by the blue compound, should be centered on the seat.
   - If it is too high (closer to the valve stem), you must make a second cut with the 60° cutter to move it down, then one more cut with the 45° cutter to restore seat width.
   - If it is too low (closer to valve edge), you must make a second cut with the 32° 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 head and measure valve stem installed height.

   Intake Valve Stem Installed Height:
   Standard (New): 48.59 mm (1.913 in.)
   Service Limit: 49.34 mm (1.943 in.)
   Exhaust Valve Stem Installed Height:
   Standard (New): 47.66 mm (1.876 in.)
   Service Limit: 48.41 mm (1.906 in.)

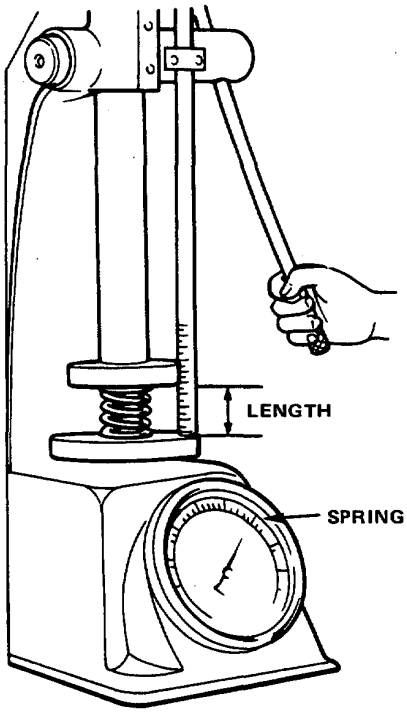


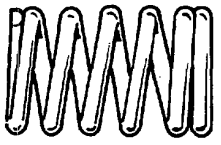
8. If valve stem installed height is over service limit, replace valve and recheck. If still over service limit, replace cylinder head; the valve seat in the head is too deep.

Spring Length and Force Check

1. Compress spring to specified length.
2. Note reading of spring force.

NOTE: Inspect springs for obvious distortion.





INTAKE SPRING

Free Length:	
Nippon Hatsujo	48.34 mm (1.903 in.)
Chuo Hatsujo	48.3 mm (1.902 in.)
Installed Length:	42.2 mm (1.66 in.)
Spring Force:	21.9–25.9 kg (48.3–57.1 lb)
Compressed Length:	32.4 mm (1.28 in.)
Spring Force:	66.85–76.85 kg (147.4–169.5 lb)



EXHAUST INNER SPRING

Free Length:	
Nippon Hatsujo	46.59 mm (1.834 in.)
Chuo Hatsujo	46.6 mm (1.835 in.)
Installed Length:	37.0 mm (1.46 in.)
Spring Force:	12.4–14.8 kg (27.3–32.6 lb)
Compressed Length:	27.4 mm (1.08 in.)
Spring Force:	24.91–27.51 kg (54.9–60.7 lb)



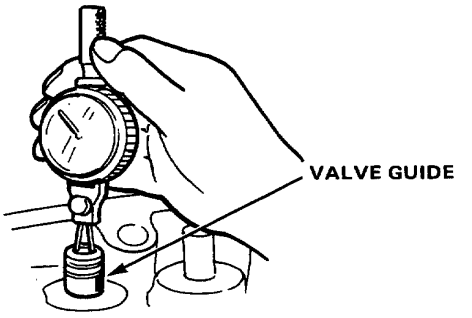
EXHAUST OUTER SPRING

Free Length:	55.9 mm (2.20 in.)
Installed Length:	42.3 mm (1.67 in.)
Spring Force:	28.8–31.8 kg (63.5–70.1 lb)
Compressed Length:	32.7 mm (1.29 in.)
Spring Force:	49.09–54.29 kg (108.2–119.7 lb)

Cylinder Head/Valve Train

Valve Guide-to-Valve Stem Clearance

1. Measure the I.D. of the intake and exhaust valve guides with an inside micrometer or ball gauge.
2. Using a micrometer, measure the diameter of valve stem.
3. Now subtract each stem diameter from its guide I.D.
4. The difference between the largest measurement in the guide and the smallest measurement on the valve stem should not exceed the service limit.

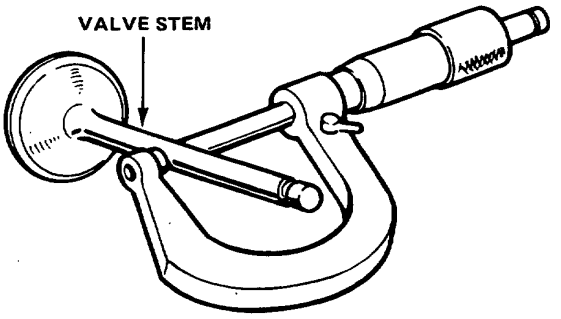


Intake Valve Guide I.D.
Standard (New): 6.61–6.63 mm (0.260–0.261 in.)
Service Limit: 6.65 mm (0.262 in.)

Exhaust Valve Guide I.D.
Standard (New): 7.01–7.03 mm (0.276–0.277 in.)
Service Limit: 7.05 mm (0.278 in.)

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): 0.06–0.09 mm (0.002–0.004 in.)
Service Limit: 0.12 mm (0.005 in.)



Cylinder Head Warpage

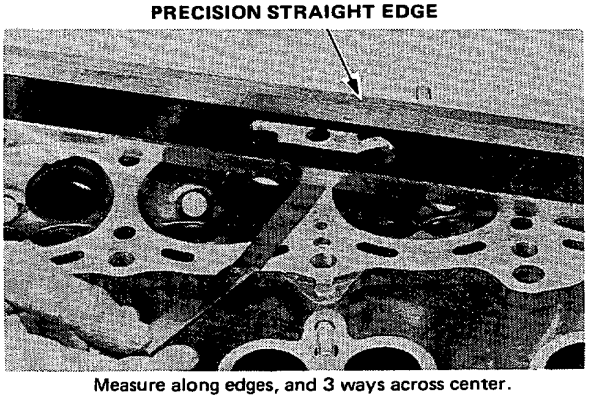
NOTE: If camshaft bearing clearances are not of specification, head cannot be resurfaced (page 6-7).

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

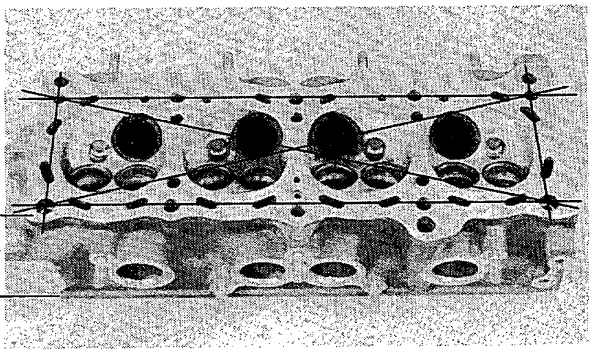
- If warpage is below 0.05 mm (0.002 in.) cylinder head resurfacing is not required.
- If warpage is between 0.05 mm (0.002 in.) and 0.2 mm (0.008 in.), resurface cylinder head.
- Maximum resurface limit is 0.2 mm (0.008 in.) based on height of 90.0 mm (3.54 in.)

Cylinder Head Height:

New: 90.0 mm (3.54 in.)
Service Limit: 89.8 mm (3.53 in.)



Measure along edges, and 3 ways across center.

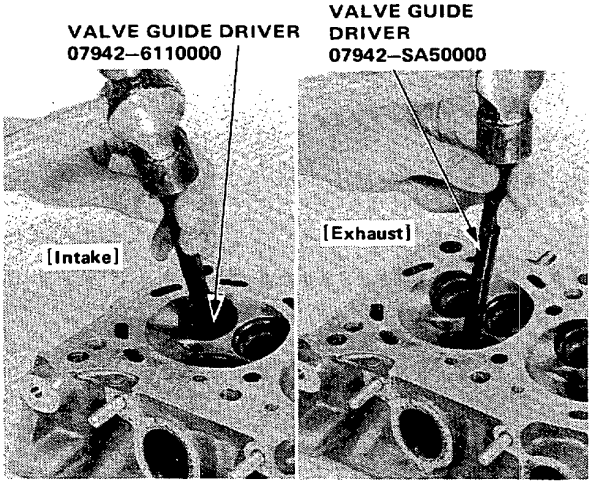


Valve Guide Replacement

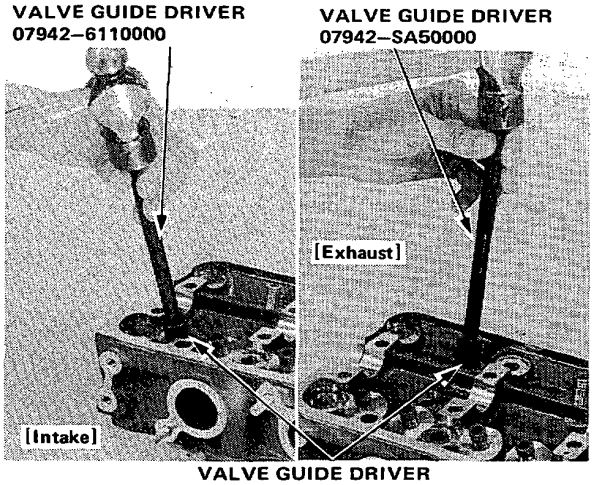
NOTE:
- For best results, heat cylinder head to 150°C (300°F) before removing or installing guides.
- It may be necessary to use an air hammer to remove some valve guides.

CAUTION: To avoid burns, use heavy gloves when handling heated cylinder head.

1. Drive valve guide out from button of cylinder head.



2. Drive new valve guide in until driver bottoms.

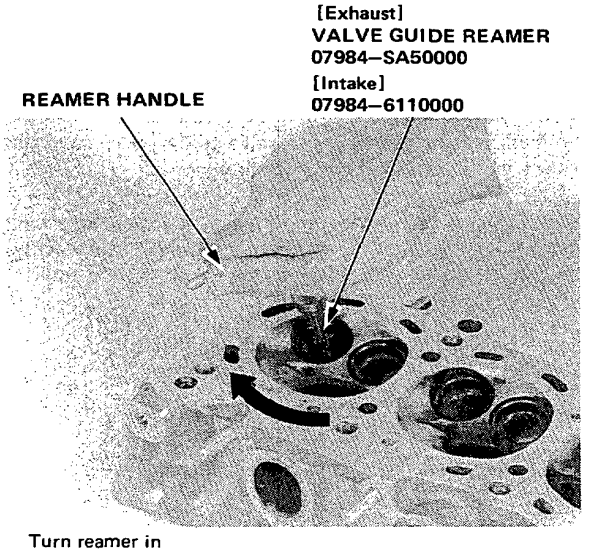


VALVE GUIDE DRIVER ATTACHMENT 07943–SA50000
Used for installing intake and exhaust valve guides

Valve Guide Reaming

NOTE: For new valve guides only.

1. Coat reamer and valve guide with cutting oil.
2. Rotate reamer clockwise the full length of the valve guide bore.
3. Continue to rotate reamer clockwise while removing.
4. Thoroughly wash the guide in detergent and water to remove any cutting residue.
5. Check clearance with valve (page 6-12).

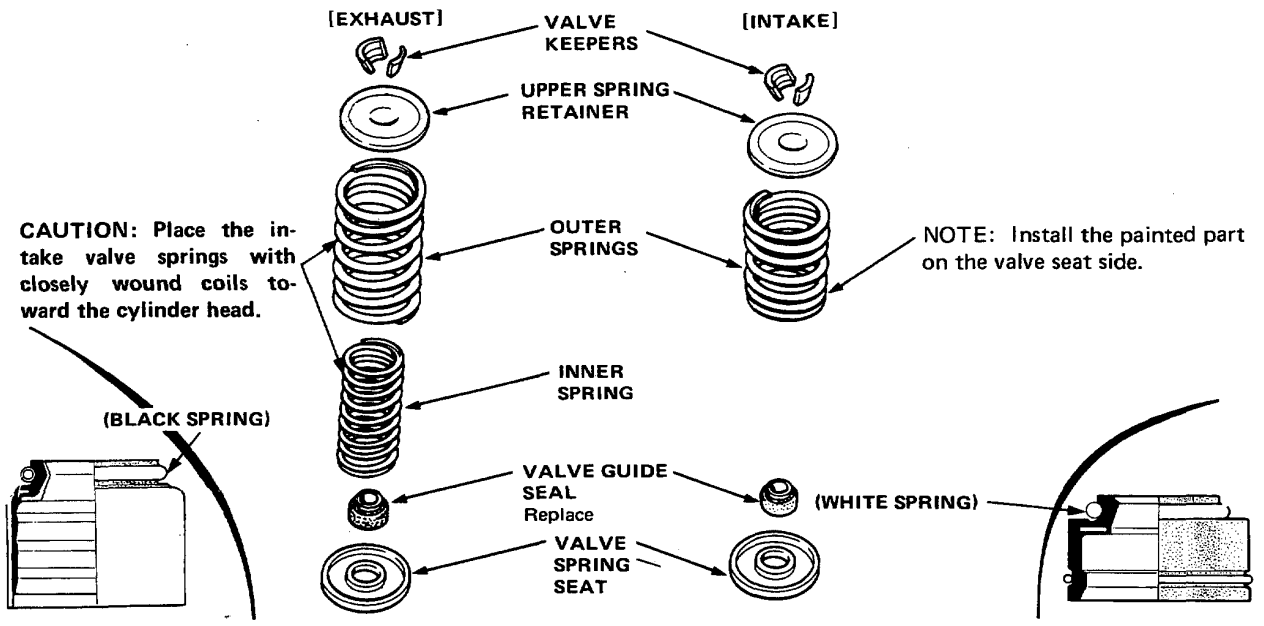


Turn reamer in clockwise direction only.

Cylinder Head/Valve Train

Valve Spring Installation Sequence

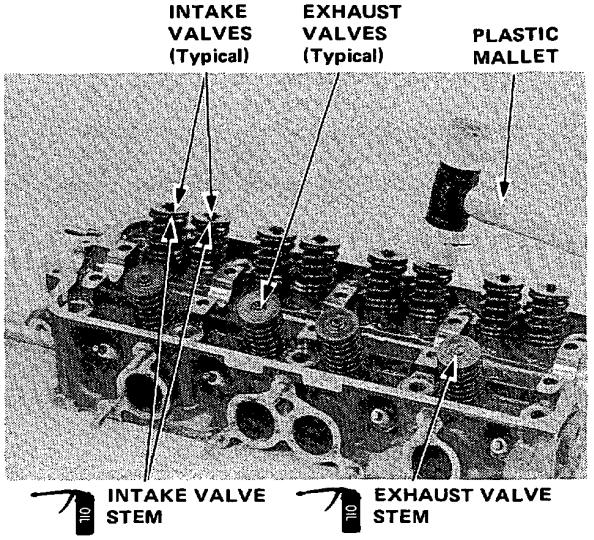
NOTE: Exhaust and intake valve guide seals are NOT interchangeable.



Intake and Exhaust Valve Installation

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

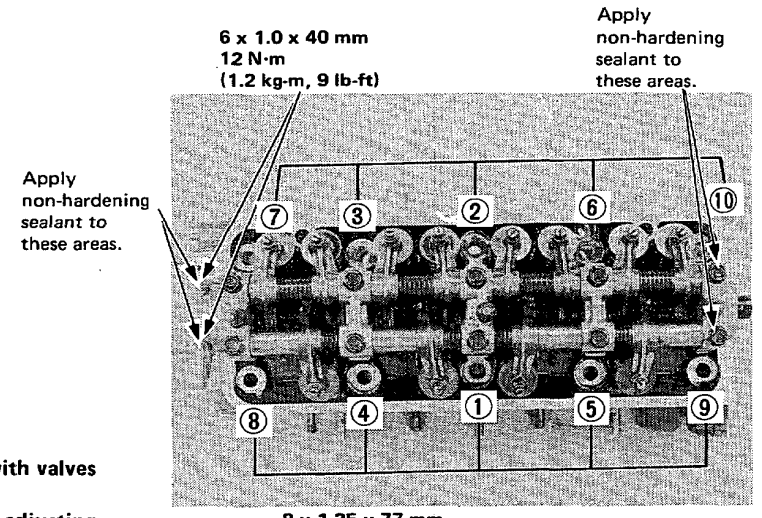
When valves and springs are in place, tap the end of each valve stem lightly two or three times to ensure proper seating of valve and valve keepers (use plastic mallet).



Cam/Rocker Arm Installation

1. After wiping down cam, and journals in cylinder head, lubricate both surfaces and install camshaft.
2. Turn camshaft until its keyway is facing up. (No. 1 cylinder TDC).
3. *Install the camshaft seal.*
4. Set rocker arm assembly in place and temporarily fix the assembly with the bolts.
5. Tighten each bolt two turns at a time in the sequence shown below to insure that the rockers do not bind on the valves.

OIL Lubricate cam lobes after reassembly.



CAUTION:
- **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.**

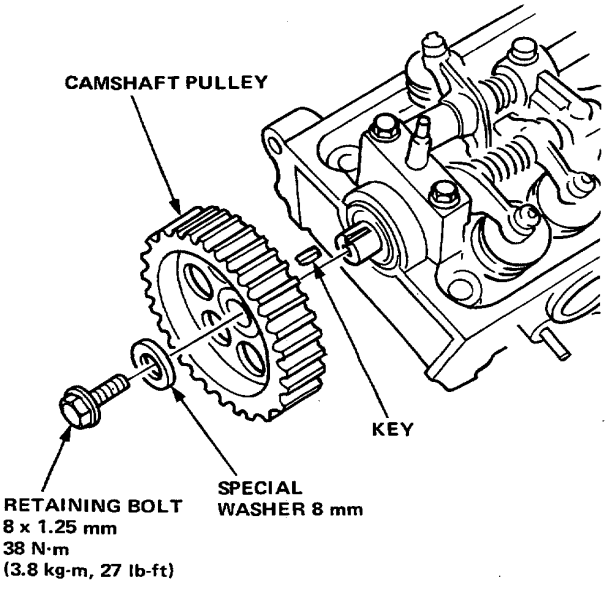
Camshaft Seal/Pulley Installation

NOTE: Press in after temporary fixing of the rocker arm assembly.

1. Install seal with spring side facing in.
2. Drive in seal until driver bottoms.



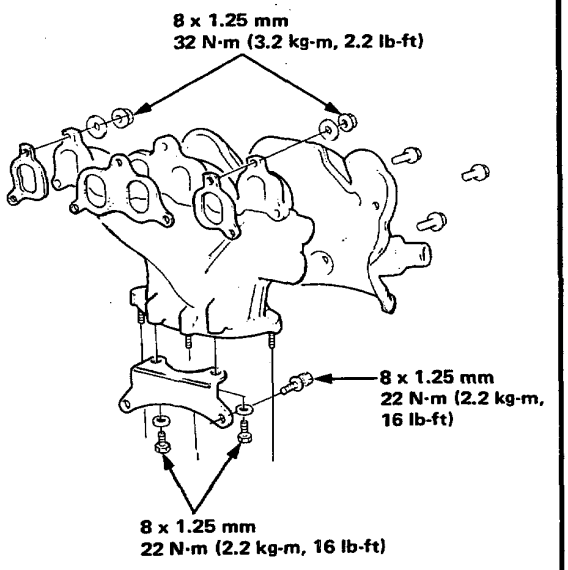
3. Push camshaft pulley onto cam, then tighten retaining bolt to torque shown.

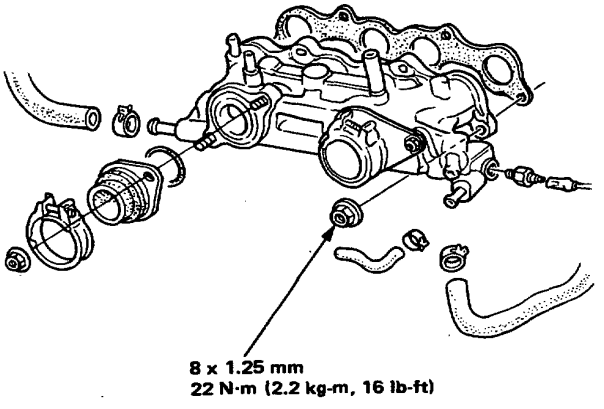


Cylinder Head/Valve Train

Manifold Assembly/Installation

- Always use new head gasket.

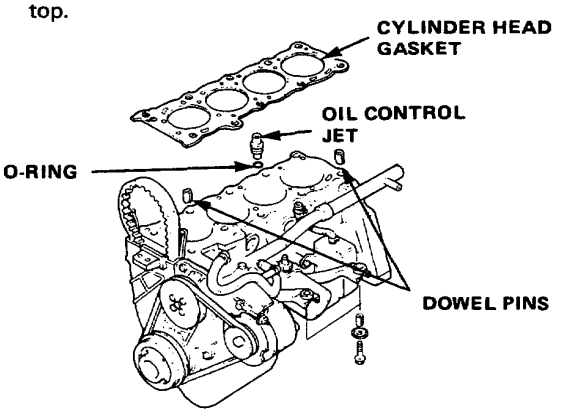




Cylinder Head Installation

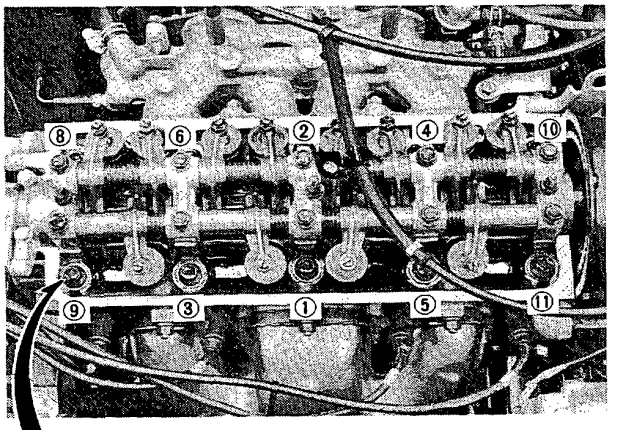
1. Install cylinder head in reverse order of removal:

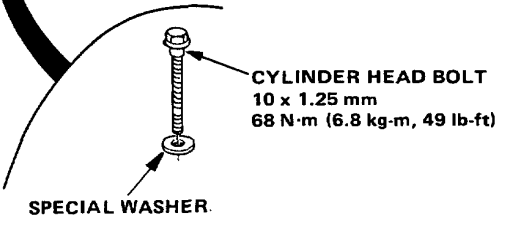
- Always used a new head gasket.
- Cylinder head and engine block surface must be clean.
- "UP" mark on timing belt pulley should be at the top.



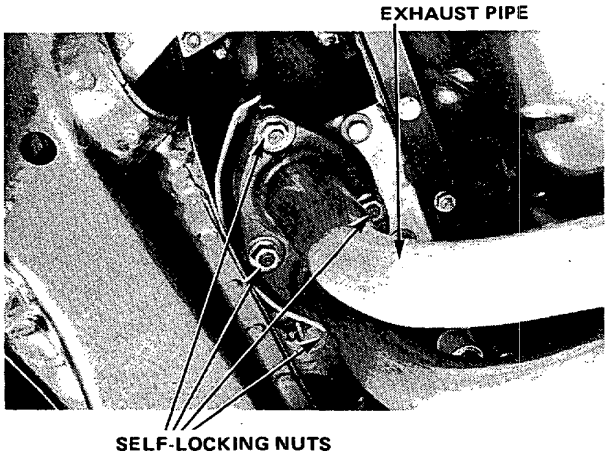
2. Adjust the valve timing (page 6-22).
3. Tighten cylinder head bolts in two steps. In the first step tighten all bolts, in sequence, to about 30 N·m (3.0 kg-m, 22 lb-ft); in the final step tighten, in same sequence, to 68 N·m (6.8 kg-m, 49 lb-ft).

CYLINDER HEAD TORQUE SEQUENCE



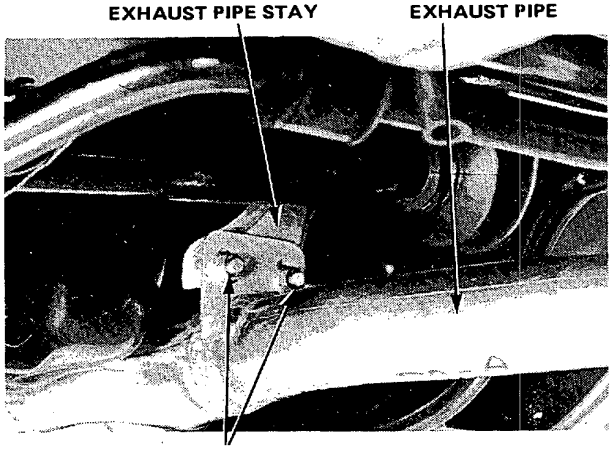


4. Install the exhaust pipe on the exhaust manifold.



SELF-LOCKING NUTS
10 x 1.25 mm
55 N·m
(5.5 kg-m, 40 lb-ft)

5. Install the exhaust pipe on the exhaust pipe.



8 x 1.25 mm
22 N·m (2.2 kg-m, 16 lb-ft)

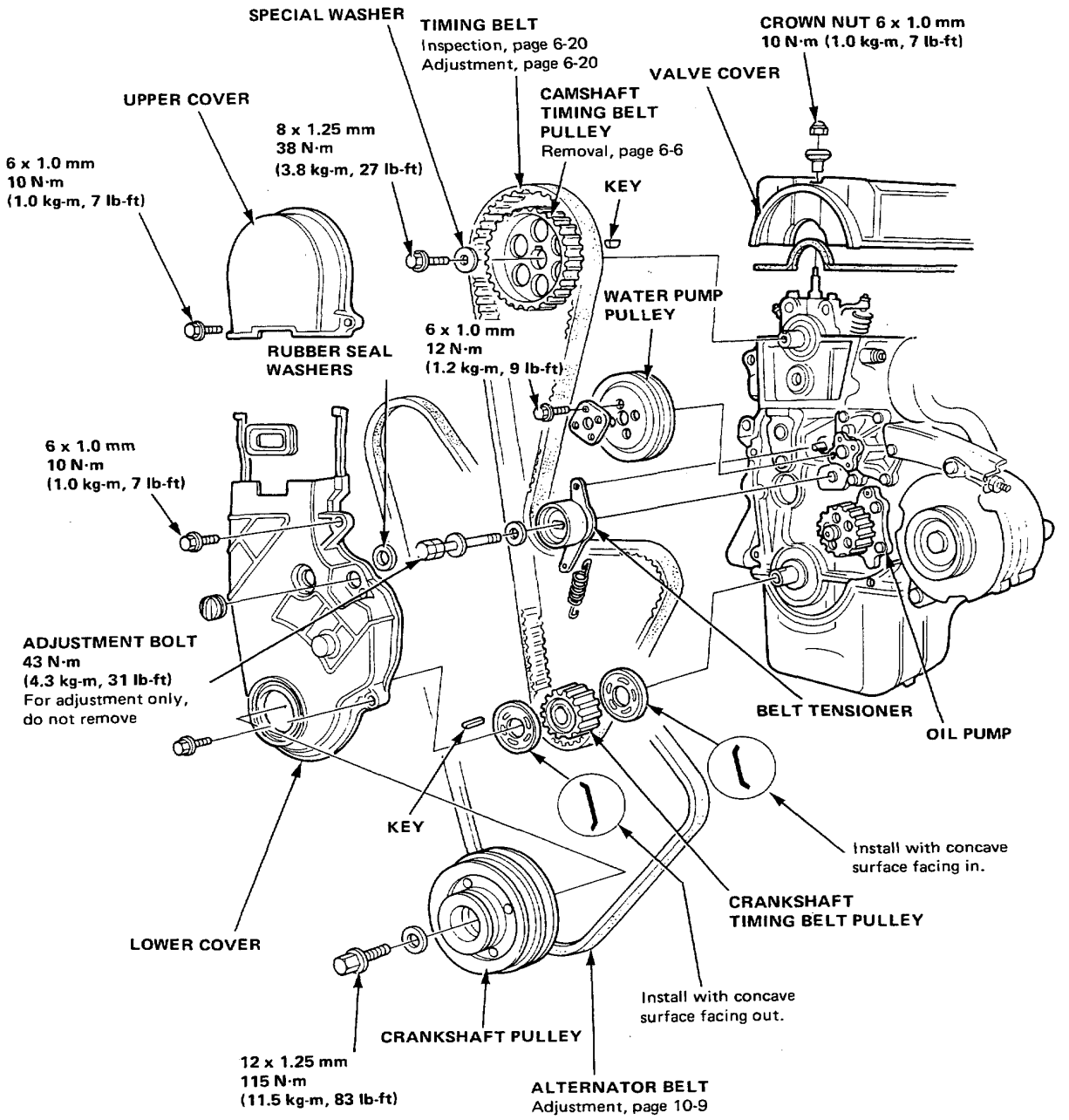
6. Install the mount bolt for air cleaner case and stay.
7. After the installation, confirm positive connection of tubes, hoses, connectors, etc.

Cylinder Head/Valve Train

Timing Belt Replacement

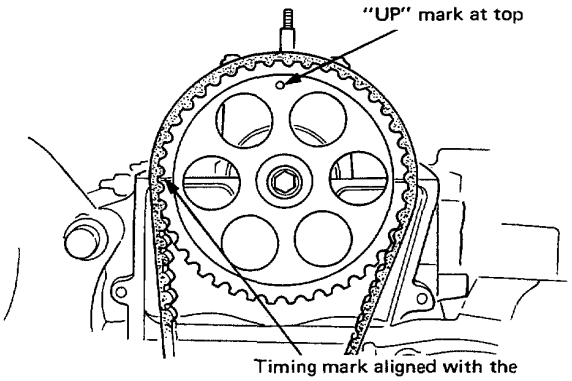
NOTE:

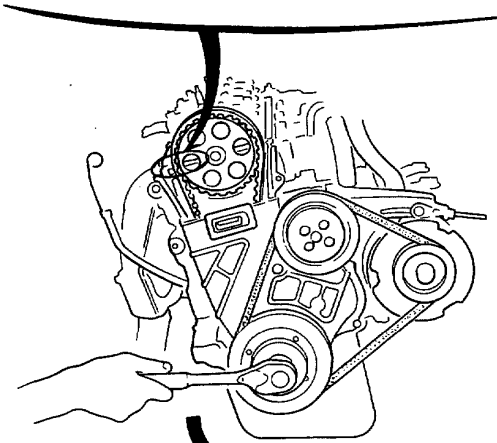
- Refer to next page for positioning crank and pulley before installing belt.
- Refer to cooling system, page 10-9, for alternator belt adjustment.
- Mark direction of rotation before removing.



Positioning Crankshaft Before Installing Timing Belt

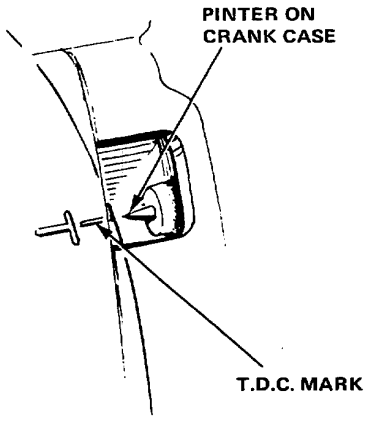
NOTE: Install the timing belt with the No. 1 piston at TDC (Top Dead Center) of the compression stroke.



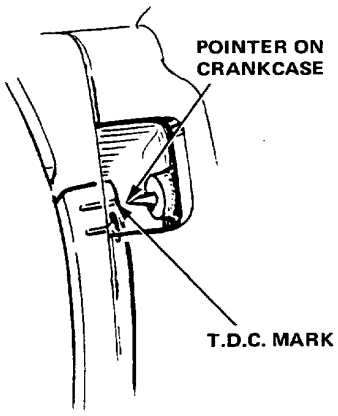


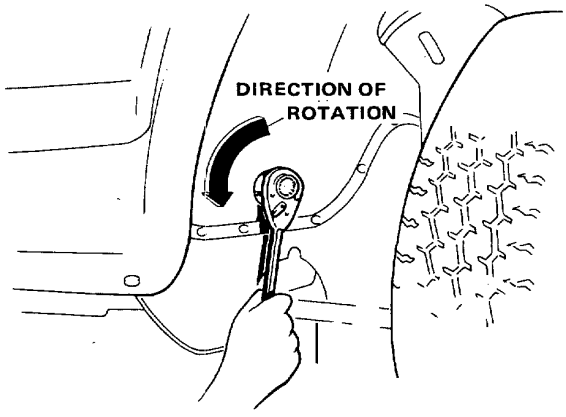
With engine installed, turn crank with socket wrench and extension as shown.

MANUAL



AUTOMATIC

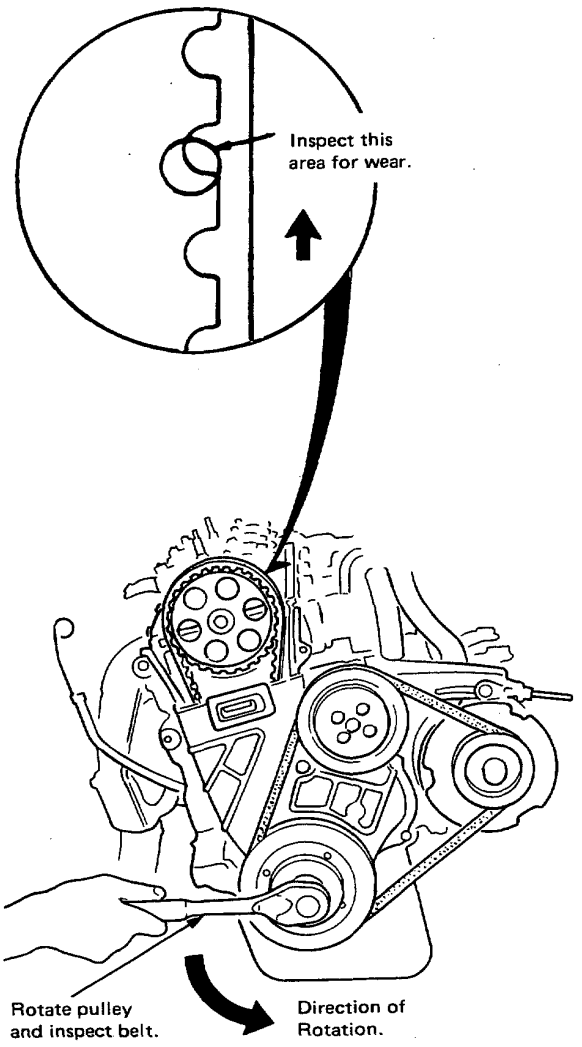




Cylinder Head/Valve Train

Timing Belt Inspection

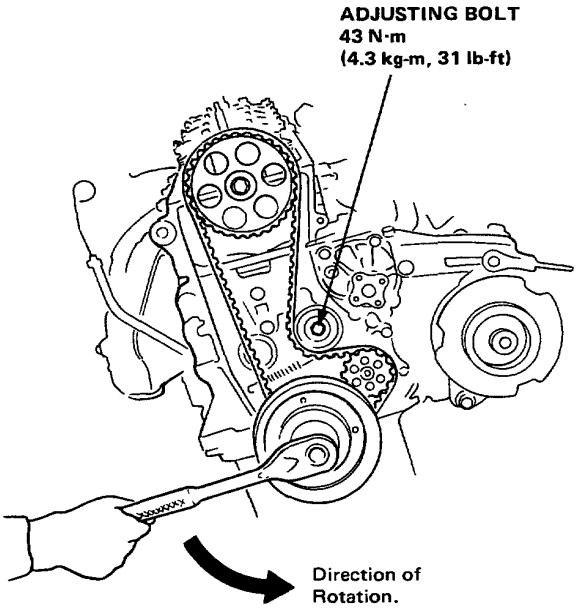
NOTES:
- Replace belt if oil soaked.
- Remove any oil or solvent that gets on the belt.



Timing Belt Tension Adjustment

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

1. Set No. 1 piston at TDC.
2. Loosen adjusting bolt.



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

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

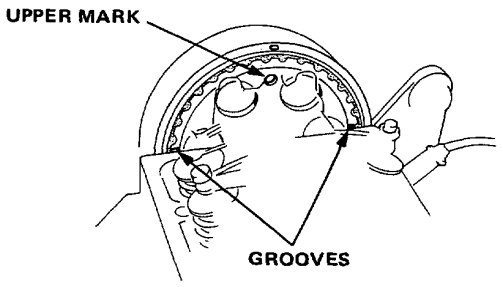
Valve Adjusting Sequence

NOTE: Valves should be adjusted cold. Cylinder head temperature less than 38°C (100°F).

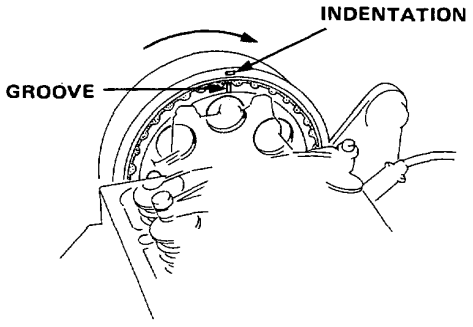
1. Remove valve cover.
2. Set No. 1 piston TDC. "UP" mark in pulley should be at top, and TDC grooves on back side of pulley should align with cylinder head surface. The distributor rotor must be pointing towards No. 1 spark plug wire.
3. Adjust valve clearance on No. 1 cylinder.

   Valve Clearance:
   Intake: 0.12–0.17 mm (0.005–0.007 in.)
   Exhaust: 0.25–0.30 mm (0.010–0.012 in.)
4. Rotate crankshaft 180° counterclockwise (cam pulley turns 90°). TDC groove should be aligned with the indentation in the belt cover. "UP" mark should not be visible and distributor rotor pointed to No. 3 spark plug wire. Adjust valves on No. 3 cylinder.
5. Rotate crankshaft 180° counterclockwise to bring No. 4 piston to TDC. Both TDC grooves are once again visible and distributor rotor points toward No. 4 spark plug wire. Adjust valves on No. 4 cylinder.
6. Rotate crankshaft 180° counterclockwise to bring No. 2 piston to TDC. Mark on pulley should align with indentation on the belt cover. "UP" mark should be visible and the distributor rotor should point to No. 2 spark plug wire. Adjust valves on No. 2 cylinder.

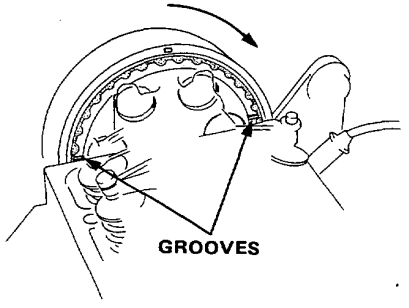
Number 1 Piston at TDC



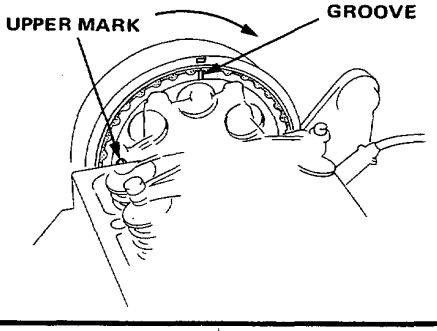
Number 3 piston at TDC



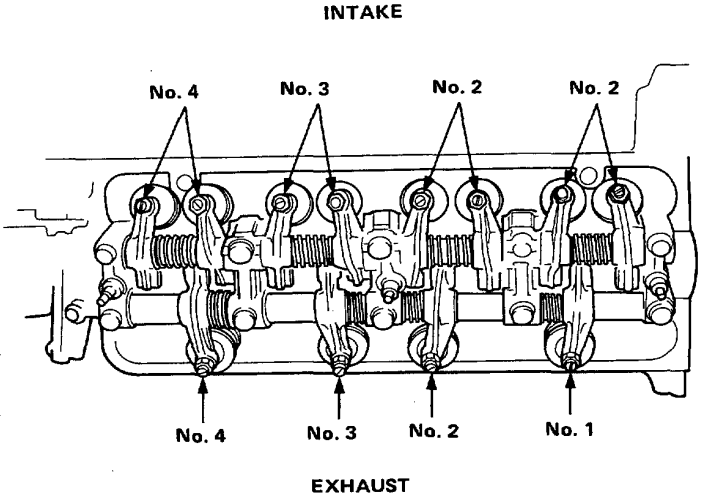
Number 4 piston at TDC



Number 2 piston at TDC



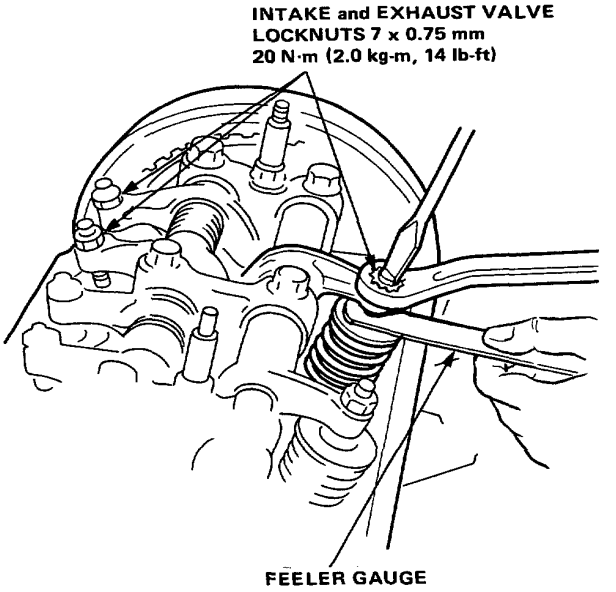
Valve Adjustment



NOTE: Adjustment procedures are the same for intake and exhaust valves.

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

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



Engine Block

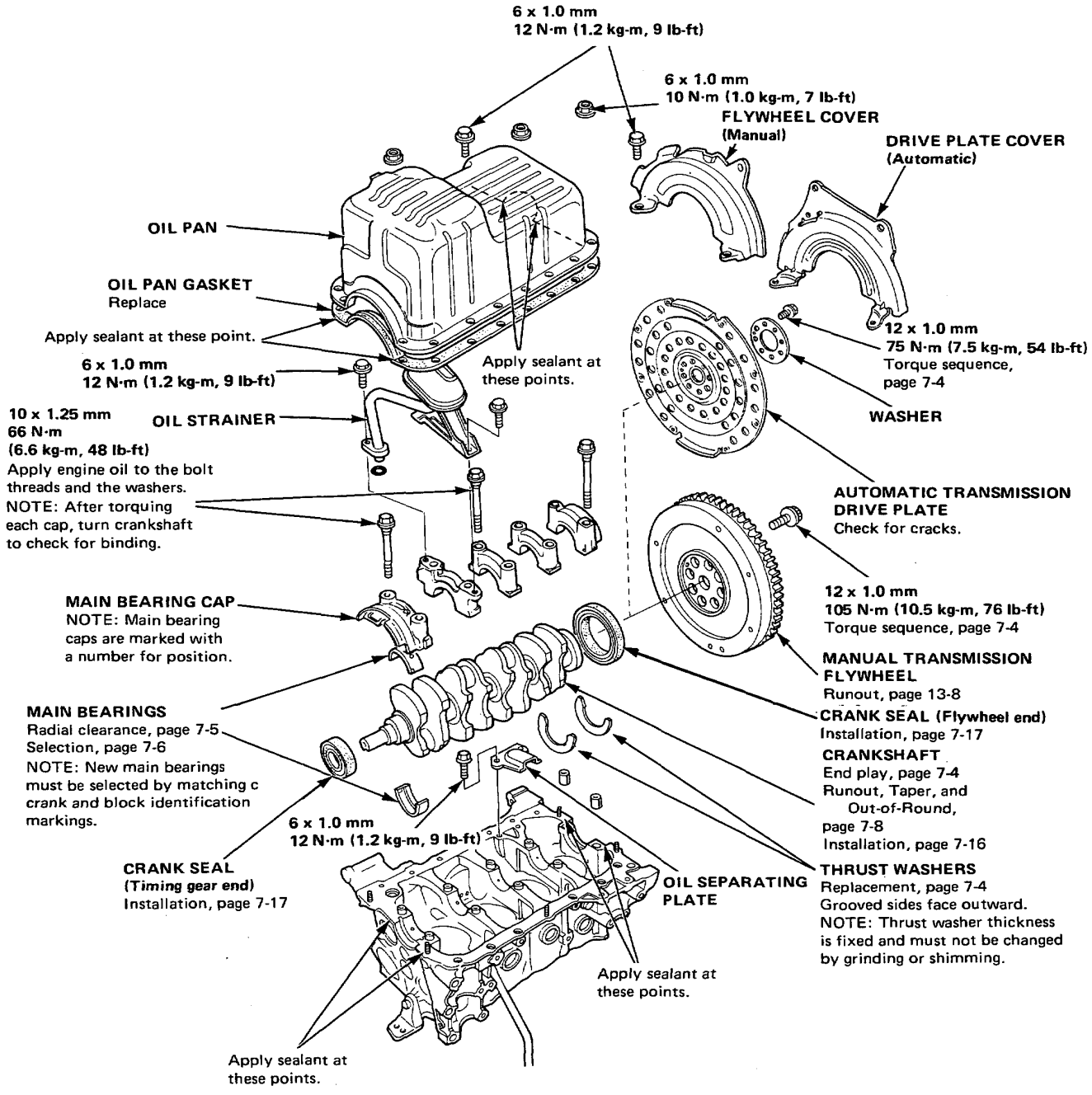


Illustrated Index 7-2
Rod and Main Bearings 7-5
Crankshaft 7-8
Block 7-9
Piston Rings 7-11
Pistons 7-12
Connecting Rods 7-13

Engine Block

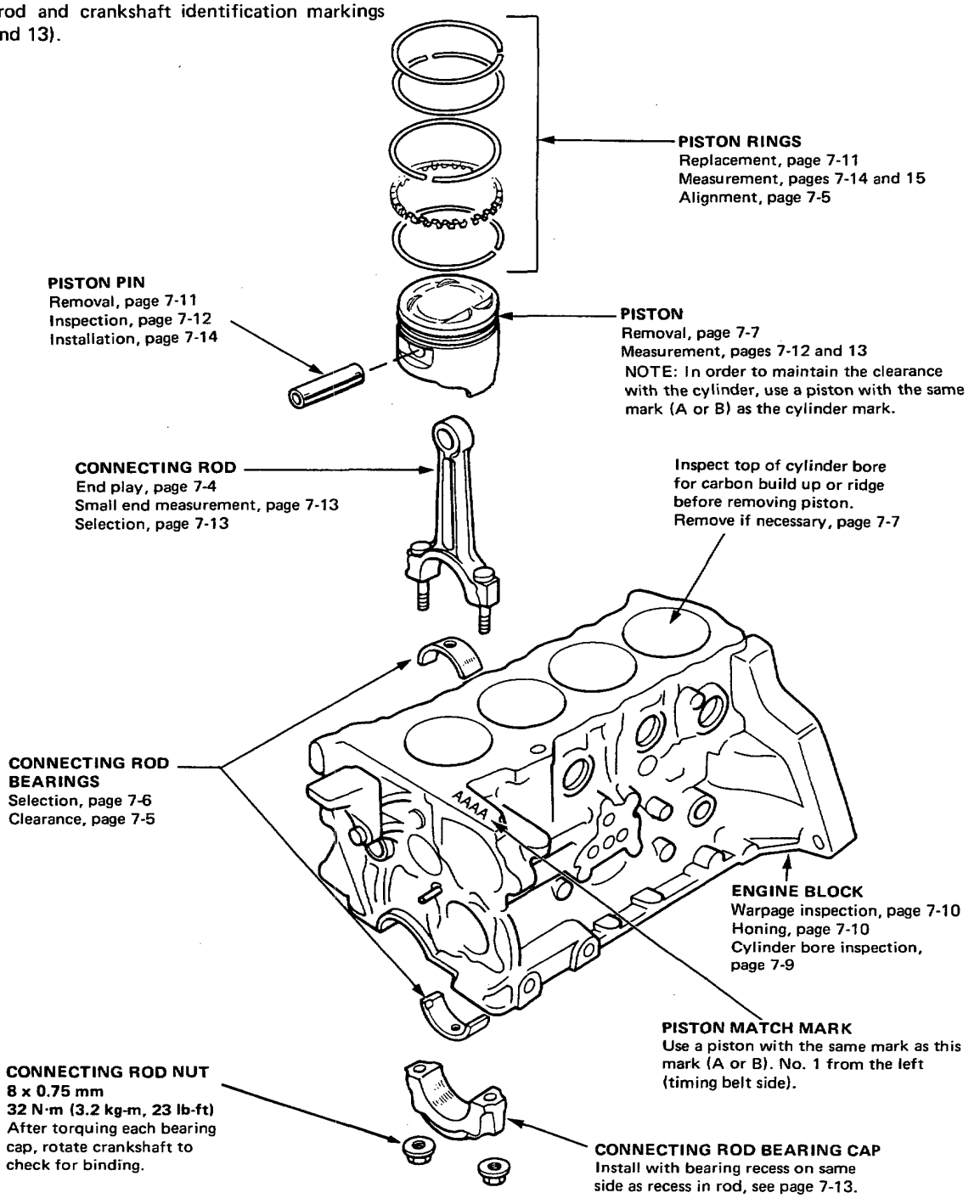
Illustrated Index

Lubricate all internal parts with engine oil during reassembly.



Lubricate all internal parts with engine oil during reassembly.

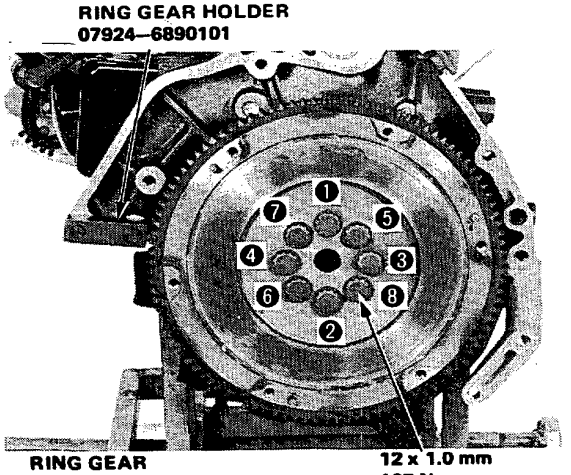
NOTE: New rod bearings must be selected by matching connecting rod and crankshaft identification markings (pages 7-6, and 13).



Engine Block

Flywheel Replacement (Manual Transmission)

Remove the 8th flywheel bolts, then separate the flywheel from the crankshaft flange. After installation, tighten bolts in sequence shown.

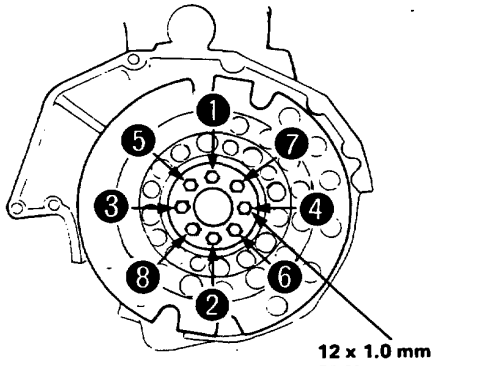


RING GEAR
Inspect ring gear teeth for wear or damage.

12 x 1.0 mm
105 N·m
(10.5 kg-m, 76 lb-ft)

Drive Plate Replacement (Automatic Transmission)

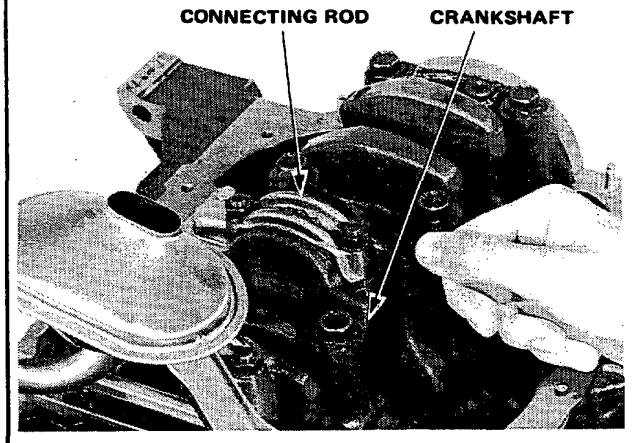
Remove the 8th drive plate bolts, then separate drive plate from the crankshaft flange. After installation, tighten bolts in sequence shown.



12 x 1.0 mm
75 N·m
(7.5 kg-m, 54 lb-ft)

Connecting Rod End Play

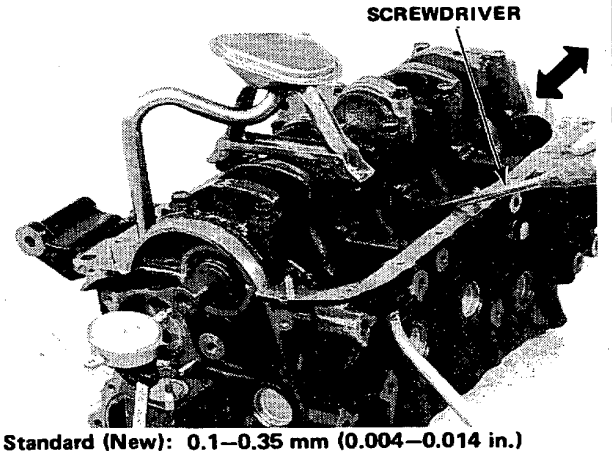
Standard (New): 0.15–0.30 mm (0.006–0.012 in.)
Service Limit: 0.40 mm (0.016 in.)



- If out-of-tolerance, install new connecting rod.
- If still out-of-tolerance, replace crankshaft (pages 7-7 and 7-16).

Crankshaft End Play

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



Standard (New): 0.1–0.35 mm (0.004–0.014 in.)
Service Limit: 0.45 mm (0.018 in.)

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

NOTE: Thrust washer thickness is fixed and must not be *changed either by grinding or shimming.*

Main Bearing Clearance

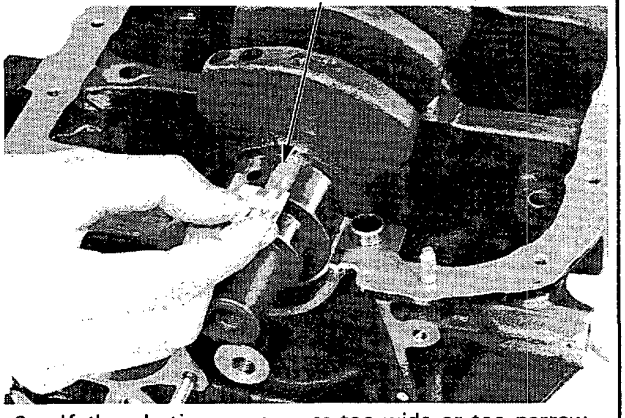
1. To check main bearing clearance, remove the main caps and bearing halves. Each cap is numbered to indicate its position on the block.
2. Clean each main journal and bearing half with a clean shop rag.
3. Place one strip of plastigage across each main journal.

   NOTE: If the engine is still in the car, when you bolt the main caps down to check clearance, the weight of the crank and flywheel will flatten the plastigage further than just the torque on the cap bolts, and give you an incorrect reading. For an accurate reading, support the crank with a jack under the counterweights. Check only one bearing at a time.
4. Reinstall the bearings and caps, then torque the bolts to 66 N·m (6.6 kg-m, 48 lb-ft).

   NOTE: Do not rotate the crank during inspection.
5. Remove the caps and bearings again, and read the widest part of the plastigage.

   Main Bearing Clearance:
   Standard (New): 0.020—0.049 mm (0.0008—0.0019 in.)
   Service Limit: 0.07 mm (0.003 in.)

PLASTIGAGE STRIP



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

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

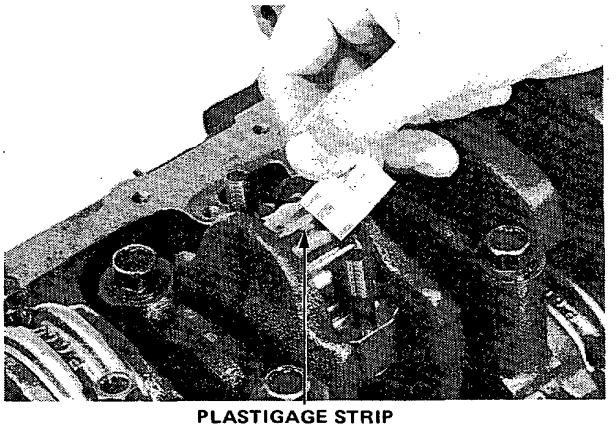
   NOTE: If the smallest (thickest) bearing available (blue) will not provide proper clearance, replace the crank and start over.

Rod Bearing Clearance

1. Remove the connecting rod cap and bearing half.
2. Clean the crankshaft rod journal and bearing half with a clean shop rag.
3. Place plastigage across the rod journal.
4. Reinstall the bearing half and cap, and torque the nuts to 32 N·m (3.2 kg-m, 23 lb-ft).

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

   Connecting Rod Bearing Clearance:
   Standard (New): 0.020—0.038 mm (0.0008—0.0015 in.)
   Service Limit: 0.07 mm (0.003 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 color as shown on next page), and recheck the clearance.

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

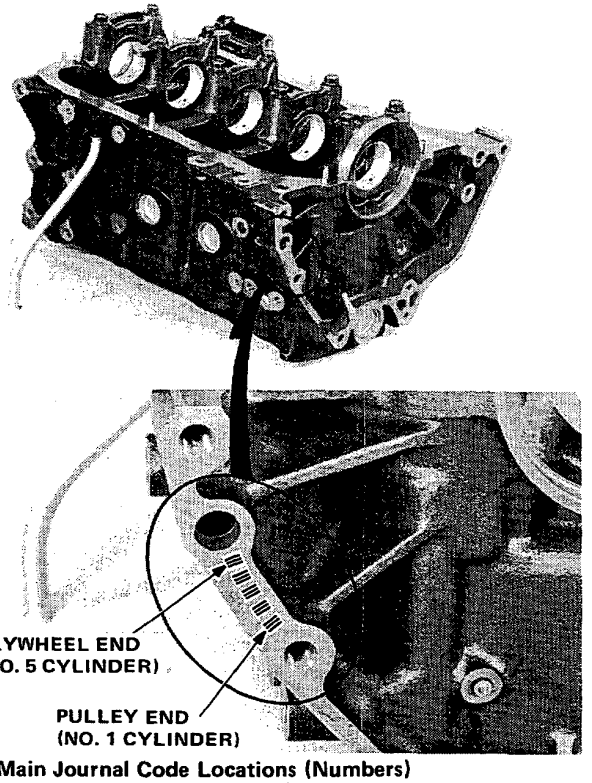
   NOTE: If the smallest (thickest) bearing available (blue) will not provide proper clearance, replace the crankshaft, and start over.

Engine Block

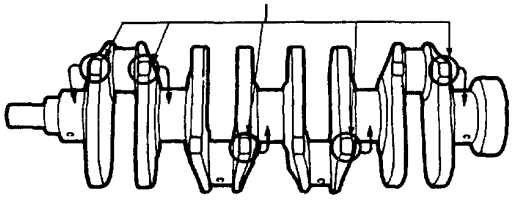
Main Bearing Selection

Crank Bore Code Locations (Marks)

Marks 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 crank (codes for main journal size), to choose the correct bearings.



Main Journal Code Locations (Numbers)



Bearing Identification

Color code is on the edge of the bearing

→ Larger crank bore

I	II	III	IIII

→ Smaller bearing (thicker)

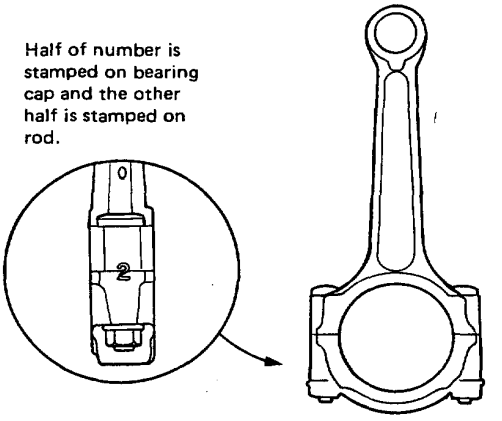
1	Red	Pink	Yellow	Green
2	Pink	Yellow	Green	Brown
3	Yellow	Green	Brown	Black
4	Green	Brown	Black	Blue

Smaller main journal ↓ Smaller bearing (thicker) ↓

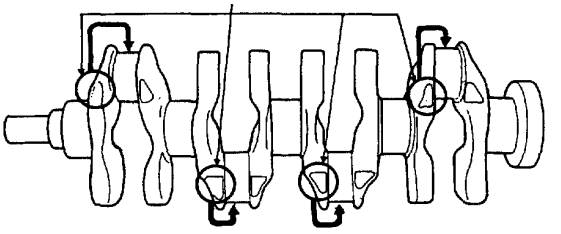
Rod Bearing Selection

Rod Code Location (Numbers)

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



Rod Journal Code Locations (Letters)



Bearing Identification

Color code is on the edge of the bearing

→ Larger rod big end

1	2	3	4

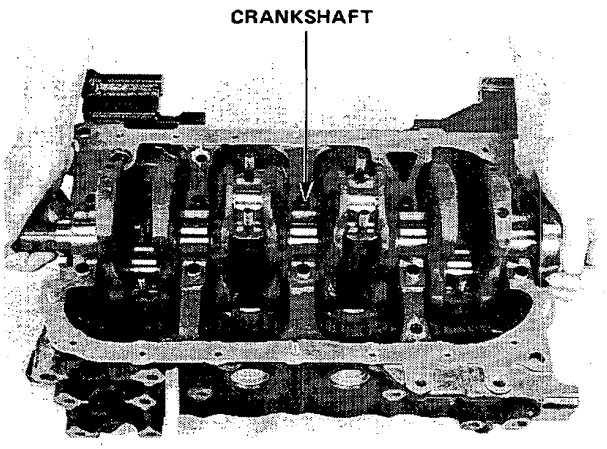
→ Smaller bearing (thicker)

A	Red	Pin	Yellow	Green
B	Pink	Yellow	Green	Brown
C	Yellow	Green	Brown	Black
D	Green	Brown	Black	Blue

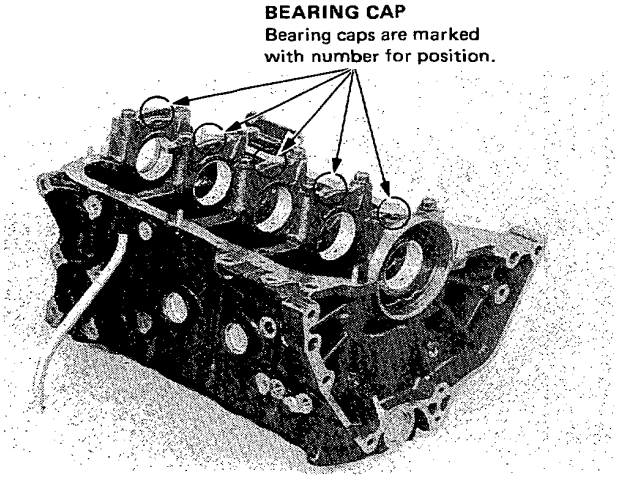
Smaller rod journal ↓ Smaller bearing (thicker) ↓

Crankshaft/Piston Removal

1. Turn crankshaft so No. 2 and 3 positions are at bottom.
2. Remove rod caps/bearings and main caps/bearings. Keep all caps/bearings in order.
3. Lift crankshaft out of engine, being careful not to damage journals.

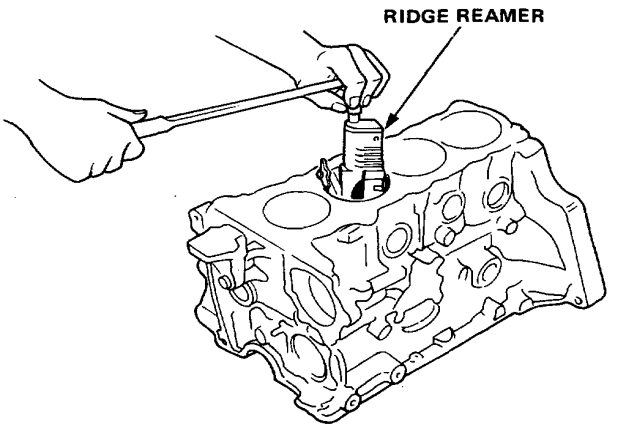


4. Remove upper bearing halves from connecting rods and set aside with their respective caps.
5. Reinstall main caps and bearings on engine in proper order.

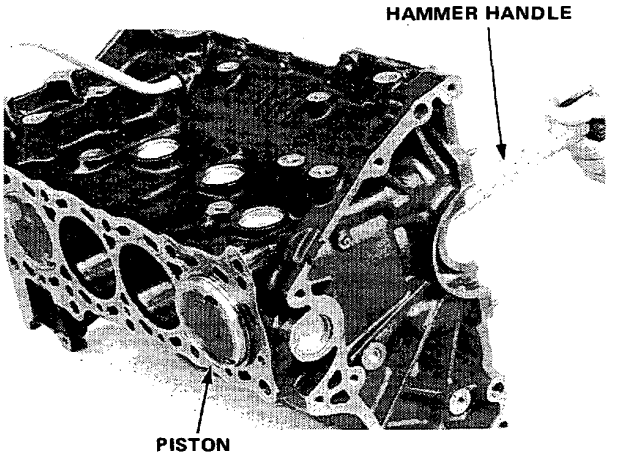


6. If you can feel a ridge of metal or hard carbon around the top of each cylinder, remove it with a ridge reamer. Follow reamer manufacturer's instructions.

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



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



8. Reassemble rods, caps and bearings after removal.
9. Mark piston/connecting rod assemblies with cylinder numbers to avoid mixup on reassembly.

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

Engine Block

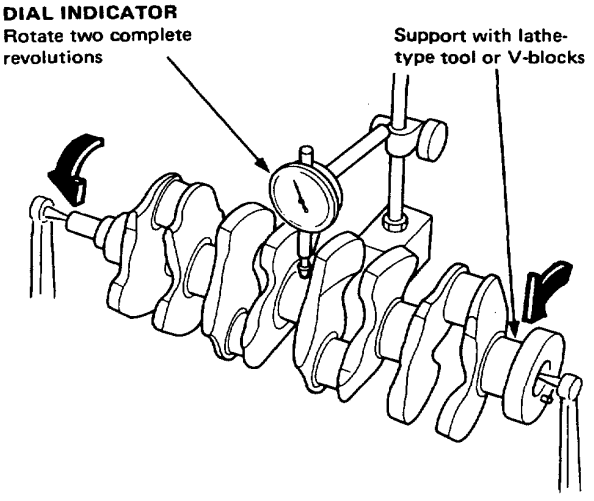
Crankshaft Inspection

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

Alignment

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

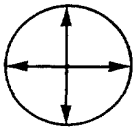
Crankshaft Total Indicated Runout:
Standard (New): 0.03 mm (0.0012 in.)
Service Limit: 0.06 mm (0.0024 in.)

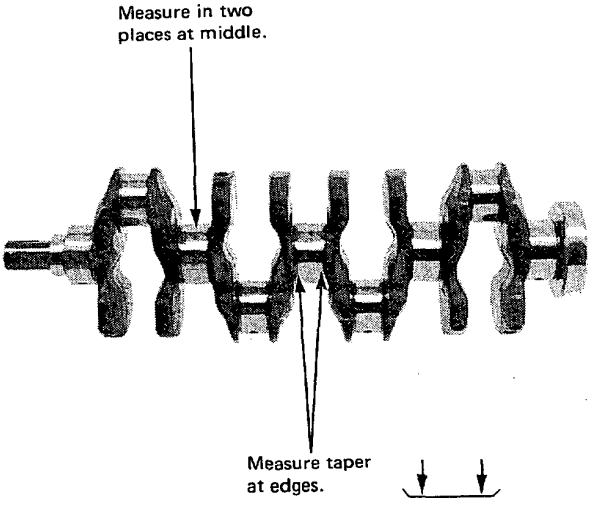


Out-of-Round and Taper

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

Journal Out-of-Round:
Standard (New): 0.005 mm (0.0002 in.)
Service Limit: 0.010 mm (0.0004 in.)



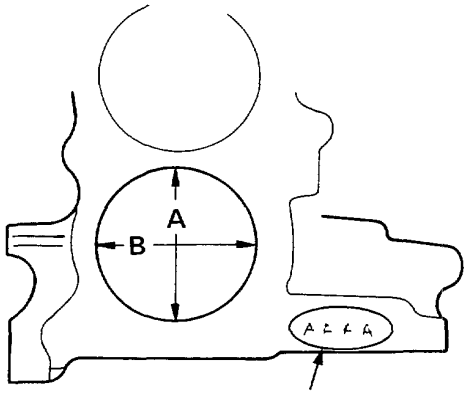


- Measure taper at edges of each rod and main journal.
- The Difference between measurement on each journal must not be more than the service limit.

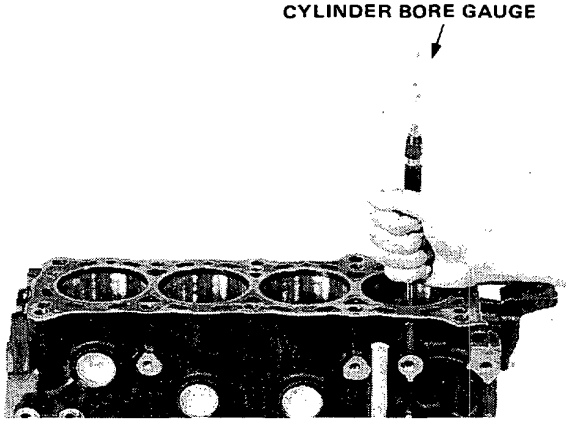
Journal Taper:
Standard (New): 0.005 mm (0.0002 in.)
Service Limit: 0.010 mm (0.0004 in.)

Block Inspection

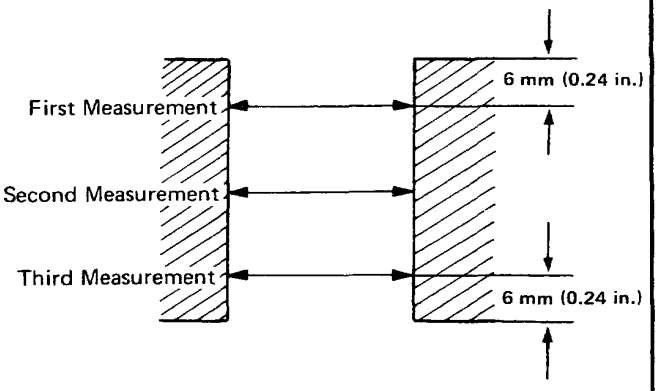
1. Measure wear and taper in directions A and B at three levels in each cylinder as shown.



PISTON MATCH MARK
Use a piston with the same mark as this mark (A or B). No. 1 from the left (timing belt side).



2. Take both measurements at three levels in each cylinder.



Block A Bore Size
Standard (New): **80.01–80.02 mm (3.1500–3.1504 in.)**
Service Limit: **80.05 mm (3.1516 in.)**

Block B Bore Size
Standard (New): **80.00–80.01 mm (3.1496–3.1500 in.)**
Service Limit: **80.04 mm (3.1512 in.)**

Block Oversize Bore
Standard 0.25 (New): **80.25–80.26 mm (3.1594–3.1598 in.)**
Standard 0.5 (New): **80.50–80.51 mm (3.1693–3.1697 in.)**

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

- If measurements are beyond Oversize Bore Service Limit in any cylinder, replace the block.
- If block is to be rebored, refer to Bore Clearance Inspection (page 7-12) after reboring.

NOTE: Scored or scratched cylinder bores must be honed (see next page).

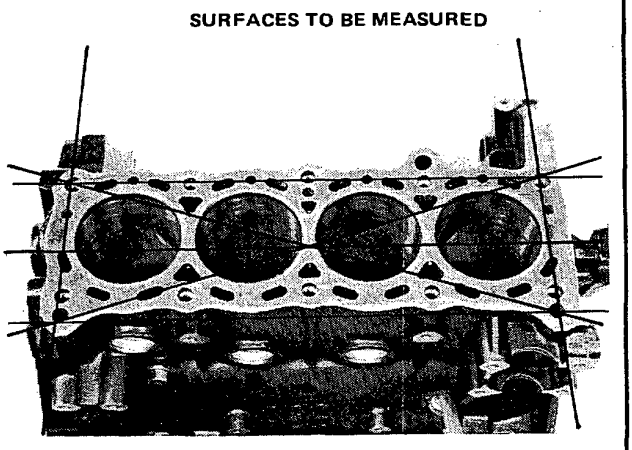
Out-of-Round
Service Limit: **0.05 mm (0.002 in.)**

(cont'd)

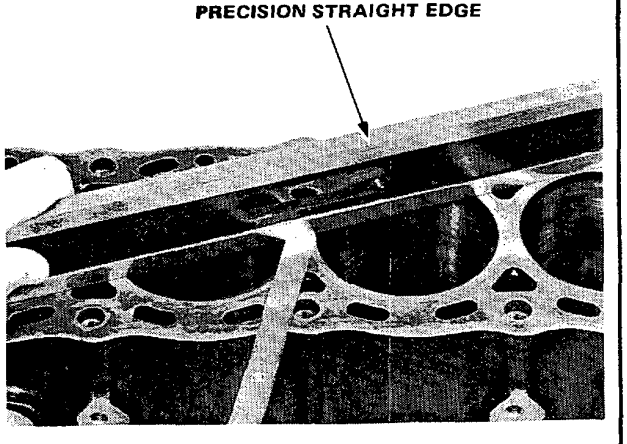
Engine Block

Block Inspection (cont'd)

3. Check the top of the block for warpage. Measure along the edges and three ways across the center as shown.



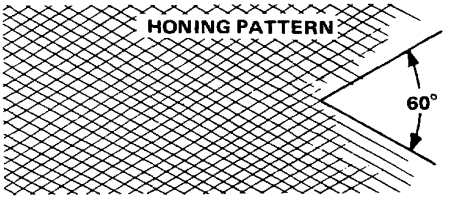
Engine Block Warpage:
Standard (New): 0.08 mm (0.003 in.)
Service Limit: 0.10 mm (0.004 in.)



Cylinder Bore Honing

1. Measure cylinder bores as shown on page 7-9. If the block can be re-used, hone the cylinders, and remeasure the bores.

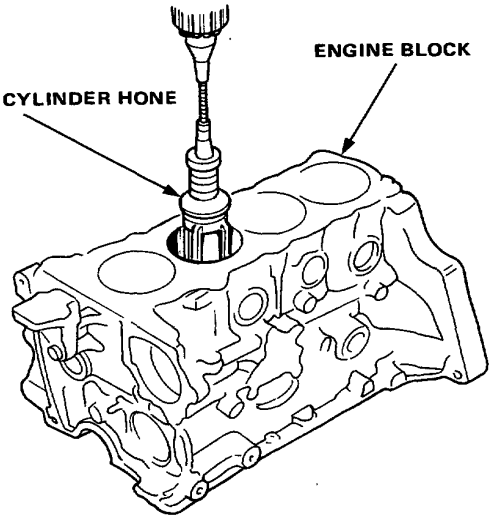
2. Hone cylinder bores with honing oil and medium (220 grit) stone in a 60 degree cross-hatch pattern.



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.

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



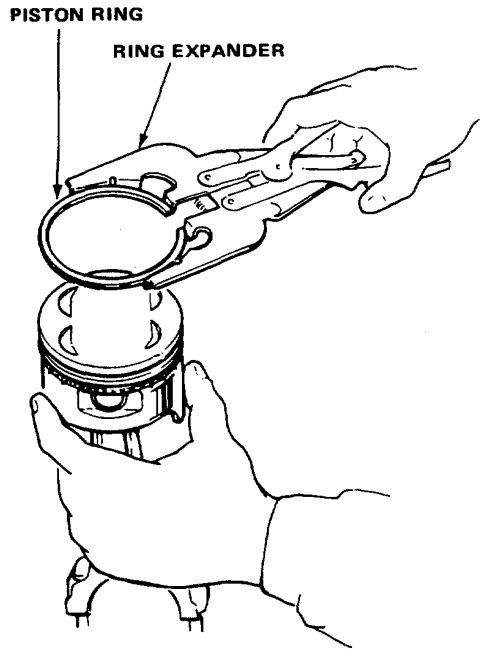
Piston Ring Replacement

1. Using ring expander, remove old piston rings.
2. Clean all ring grooves thoroughly.
   - Use squared-off broken ring, or file down blade on ring groove cleaner to fit (compression rings are 1.5 mm wide; oil ring is 4.0 mm wide).

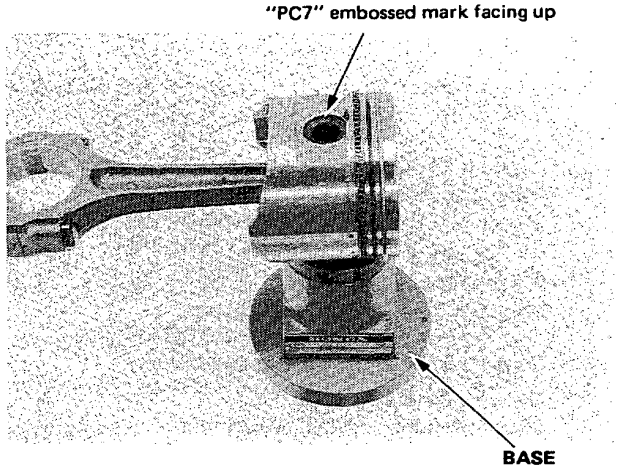
   CAUTION: Do not use a wire brush to clean ring lands, or cut ring lands deeper with cleaning tool.

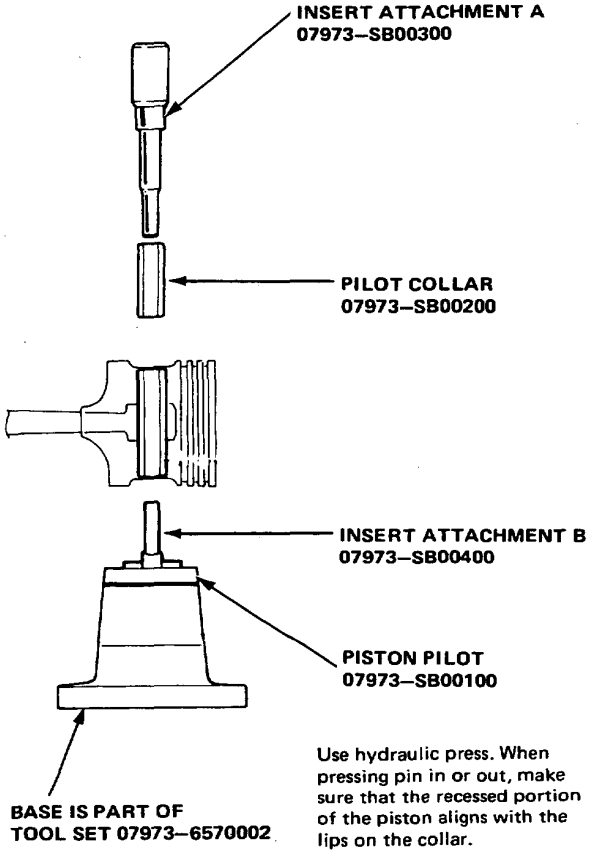
   NOTE: Do not re-use old piston rings.
3. Install new rings in proper sequence and position (page 7-15).

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



Piston Pin Removal





Use hydraulic press. When pressing pin in or out, make sure that the recessed portion of the piston aligns with the lips on the collar.

(cont'd)

Engine Block

Bore Clearance Inspection

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

1. Measure piston diameter at a point 2 mm (0.08 in.) from bottom of skirt.

   Piston A Diameter
   Standard (New): 79.98–79.99 mm (3.1488–3.1492 in.)
   Service Limit: 79.97 mm (3.1484 in.)

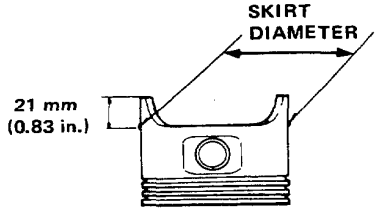
   Piston B Diameter
   Standard (New): 79.97–79.98 mm (3.1484–3.1488 in.)
   Service Limit: 79.96 mm (3.1480 in.)

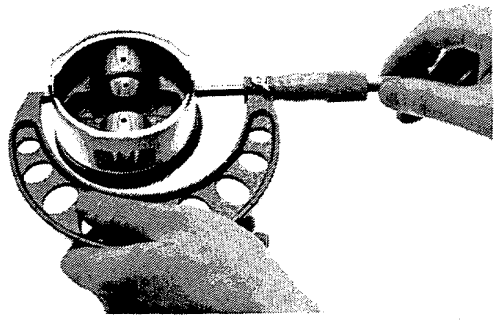
   Oversize Piston Diameter
   Standard 0.25: 80.22–80.23 mm (3.1583–3.1587 in.)
   Standard 0.5: 80.47–80.48 mm (3.1681–3.1685 in.)

2. Calculate difference between cylinder bore diameter on page 7-9 and piston diameter.

   Piston-to-Cylinder Clearance:

   Standard (New): 0.02–0.04 mm (0.0008–0.0016 in.)
   Service Limit: 0.08 mm (0.003 in.)



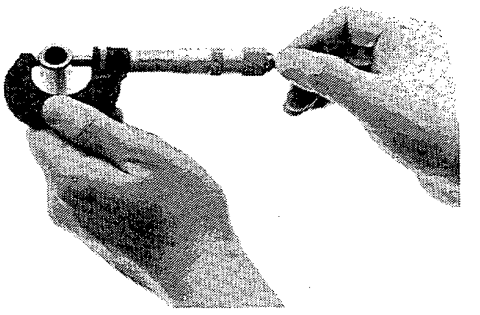


Piston Pin Inspection

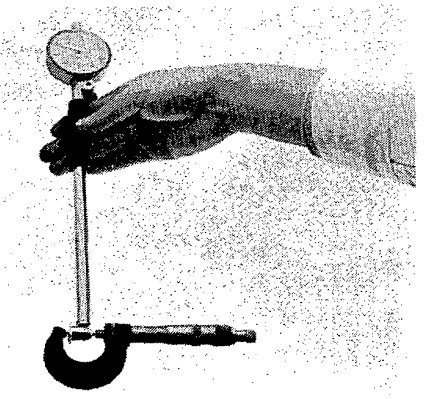
1. Measure diameter of piston pin.

   Piston Pin Diameter:
   Standard (New): 19.994–20.000 mm (0.7872–0.7874 in.)
   Oversize: 19.997–20.003 mm (0.7873–0.7875 in.)

   NOTE: All replacement piston pins are oversize.



2. Zero dial indicator to piston pin diameter.

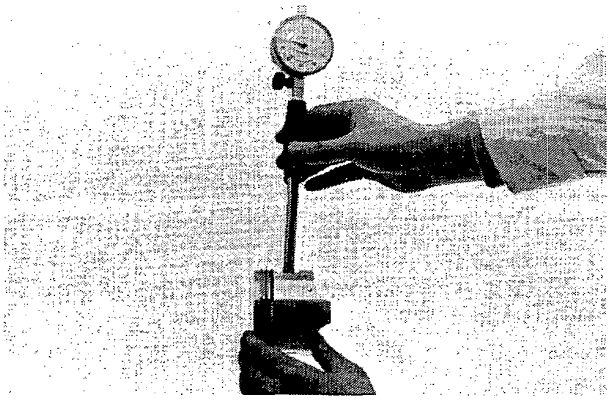


3. Measure piston pin-to-piston clearance.

NOTE: Check piston for distortion or cracks.

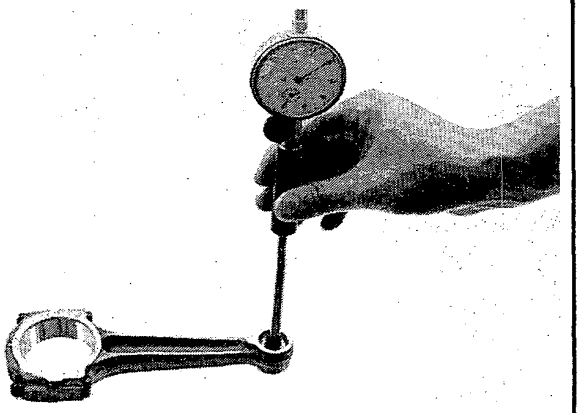
If piston pin clearance is greater than 0.024 mm (0.0009 in.) re-measure using an oversize piston pin.

Piston Pin-to-Piston Clearance:
Service Limit: 0.012–0.024 mm (0.0005–0.0009 in.)



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

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



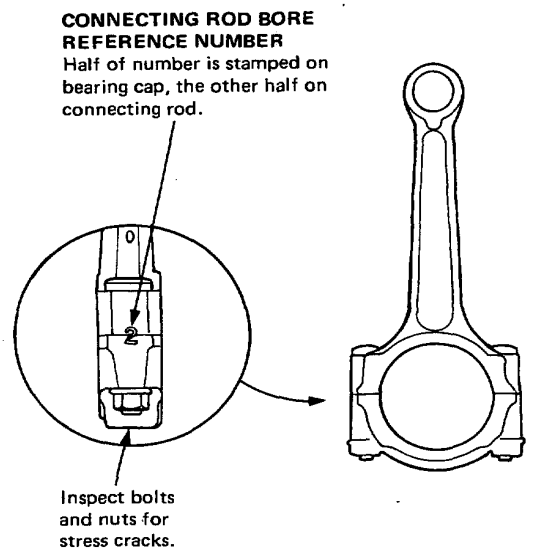
Connecting Rod Selection

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

Normal Bore Size: 45 mm (1.77 in.)

NOTE:

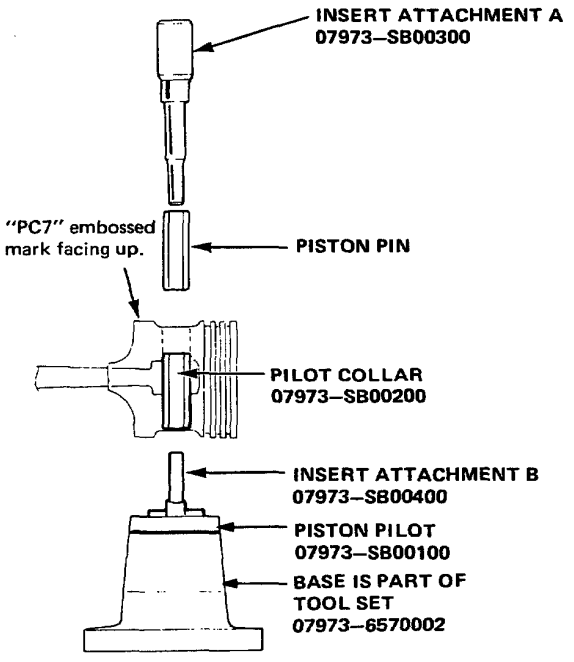
- Reference numbers are for big end bore size and do NOT indicate the position of rod in engine.
- Inspect connecting rod for cracks and heat damage.

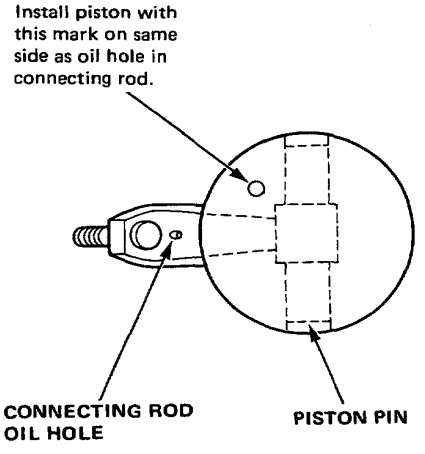


Engine Block

Piston Pin Installation

Use hydraulic press for installation. When pressing pin in or out, be sure you position the recessed flat on the piston against the lugs on the base attachment.





NOTE: Install the assembled piston and rod with the oil hole facing the intake manifold.

Piston Ring End Gap

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

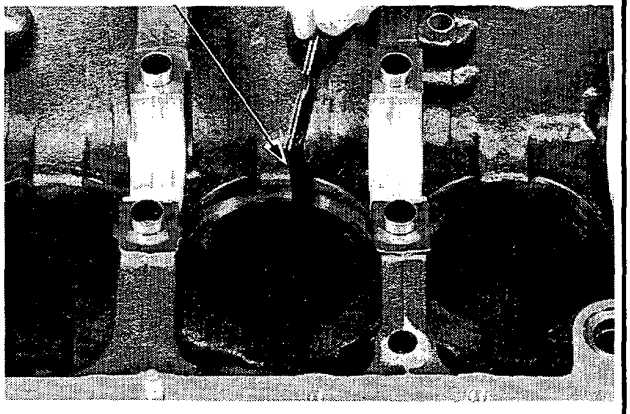
2. Measure piston ring end-gap with a feeler gauge:

   - If gap is too small, check to see if you have the proper rings for your engine.
   - If gap is too large, re-check cylinder bore diameter against the wear limits on page 7-9. If bore is over limit, engine block must be re-bored.

Piston Ring End-Gap:
Top and Second Ring
Standard (New): 0.20–0.35 mm (0.008–0.014 in.)
Service Limit: 0.60 mm (0.024 in.)

Oil Ring
Standard (New): 0.2–0.7 mm (0.008–0.030 in.)
Service Limit: 1.1 mm (0.043 in.)

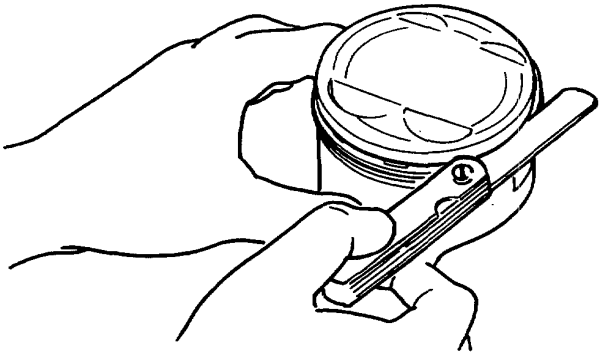
FEELER GAUGE



Ring Land Clearances

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

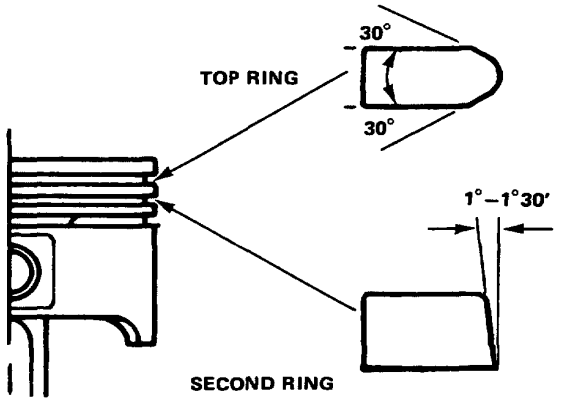
Top/Second Ring Clearance:
Standard (New): 0.020–0.045 mm (0.0008–0.0018 in.)
Service Limit: 0.13 mm (0.005 in.)



Piston Ring Alignment

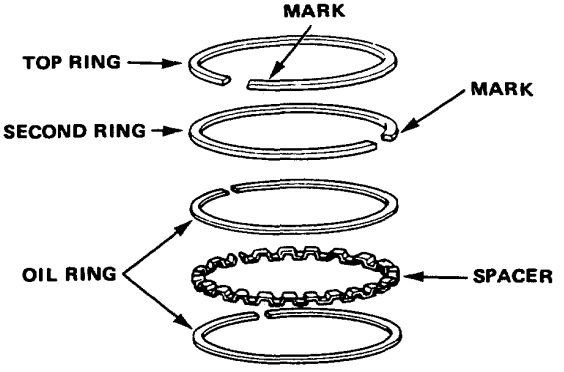
1. Install the rings as shown on page 7-11.

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

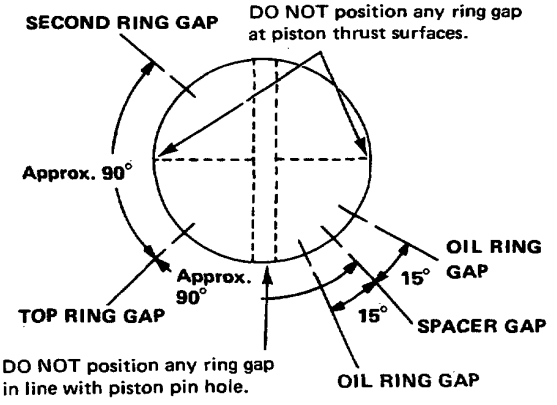


2. Rotate rings in grooves to make sure they do not bind.

3. Manufacturing marks must be facing upward.



4. Position ring end gaps as shown:

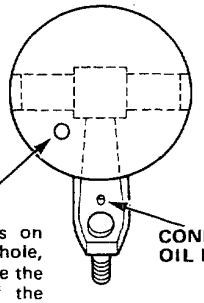


Engine Block

Piston Installation

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

1. If crankshaft is already installed:
   - Remove connecting rod caps, then slip short sections of rubber hose over the threaded ends of connecting rod bolts.
   - Install ring compressor, check that bearing is securely in place, then position piston in cylinder and drive in using the wooden handle of a hammer.
     Stop after ring compressor pops free and check connecting rod-to-crank journal alignment before driving rod into place.
   - Install rod caps with bearings, and torque nuts to 32 N·m (3.2 kg-m, 23 lb-ft).
2. If crankshaft is not installed:
   - Remove rod caps and bearings, install ring compressor, then position piston in cylinder and drive in using the wooden handle of a hammer.
   - *Position all pistons at top dead center.*

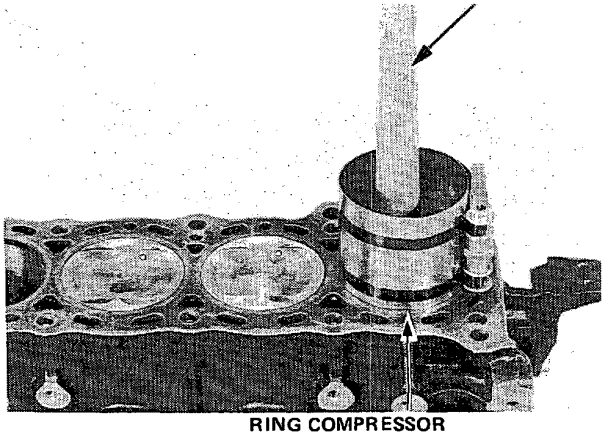


Check that the mark is on the same side as the oil hole, and that both of them face the intake mainfold side of the engine block.

CONNECTING ROD OIL HOLE

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

Use the wooden handle of a hammer to push, or tap the piston into the cylinder bore.

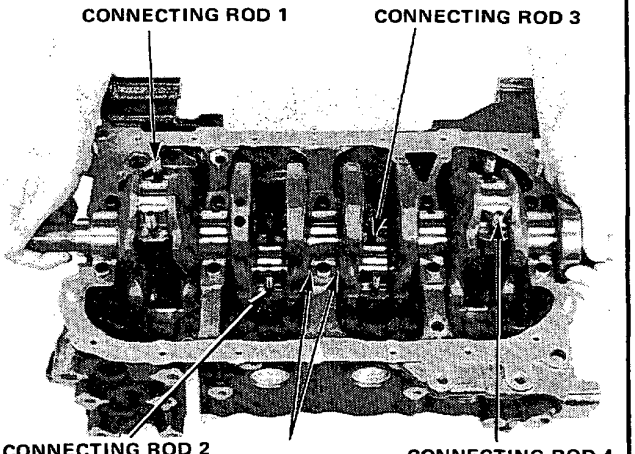


RING COMPRESSOR

Crankshaft Installation

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

1. Insert bearing halves in engine block and connecting rods.
2. Hold crankshaft so rod journals for cylinder No. 2 and No. 3 are straight down.
3. Lower crankshaft into block, seating rod journals into connecting rods No. 2 and No. 3 and install rod caps and nuts finger tight.



4. *Rotate crankshaft clockwise, seat journals into connecting rods No. 1 and No. 4, and install rod caps and nuts finger tight.*
5. *Install thrust washers, main bearing halves and caps,* check clearance with plastigage (page 7-5), then torque nuts to 66 N·m (6.6 kg-m, 48 lb-ft). Oil thrust washer surfaces.
6. Check rod bearing clearance with plastigage (page 7-5), then torque nuts to 32 N·m (3.2 kg-m, 23 lb-ft).

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

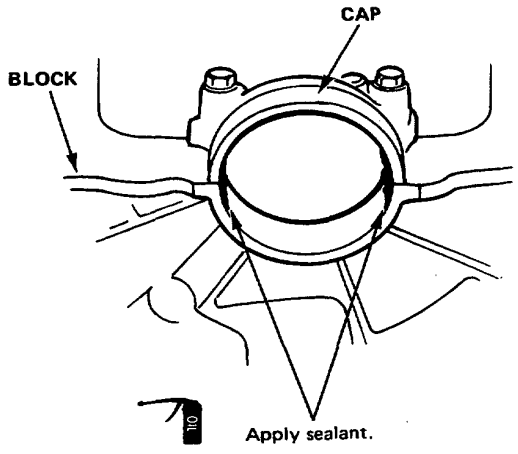
   CAUTION: Whenever any crankshaft or connecting rod bearing is replaced after reassembly, run the engine at idling speed until it reaches normal operating temperature, then continue to run for approximately 15 minutes.

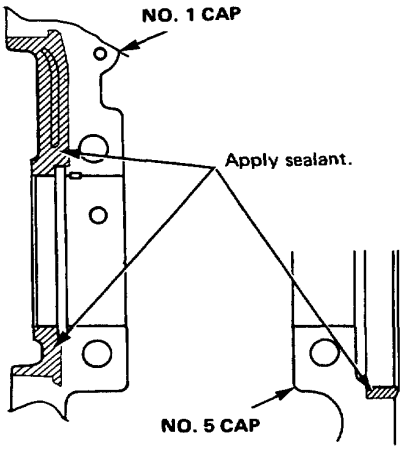
Oil Seal Installation

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

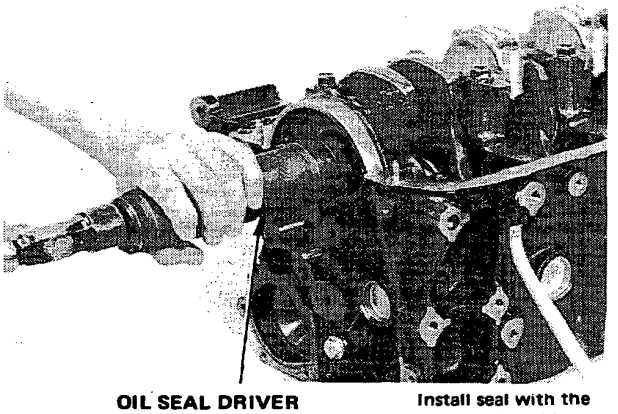
NOTE: Install before bearing holder tightening.

1. Apply non-hardening sealant along the seams where the cap joins the block before installing the seals.





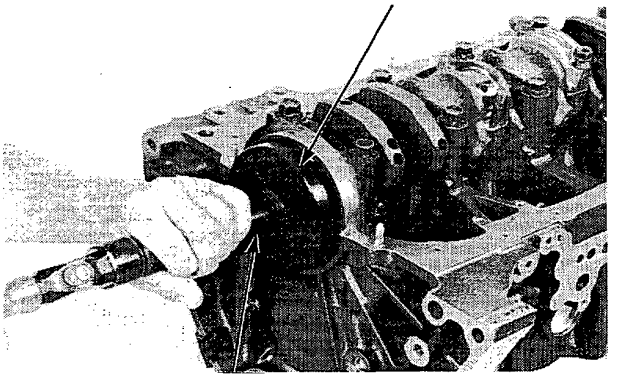
2. Drive in timing gear-end seal until it bottoms against block.



OIL SEAL DRIVER
07947–SB00200

Install seal with the part number side facing out.

3. Drive in flywheel-end seal until to bottoms against block.



DRIVER
07749–0010000

Install seal with the part number side facing out.

MEMO

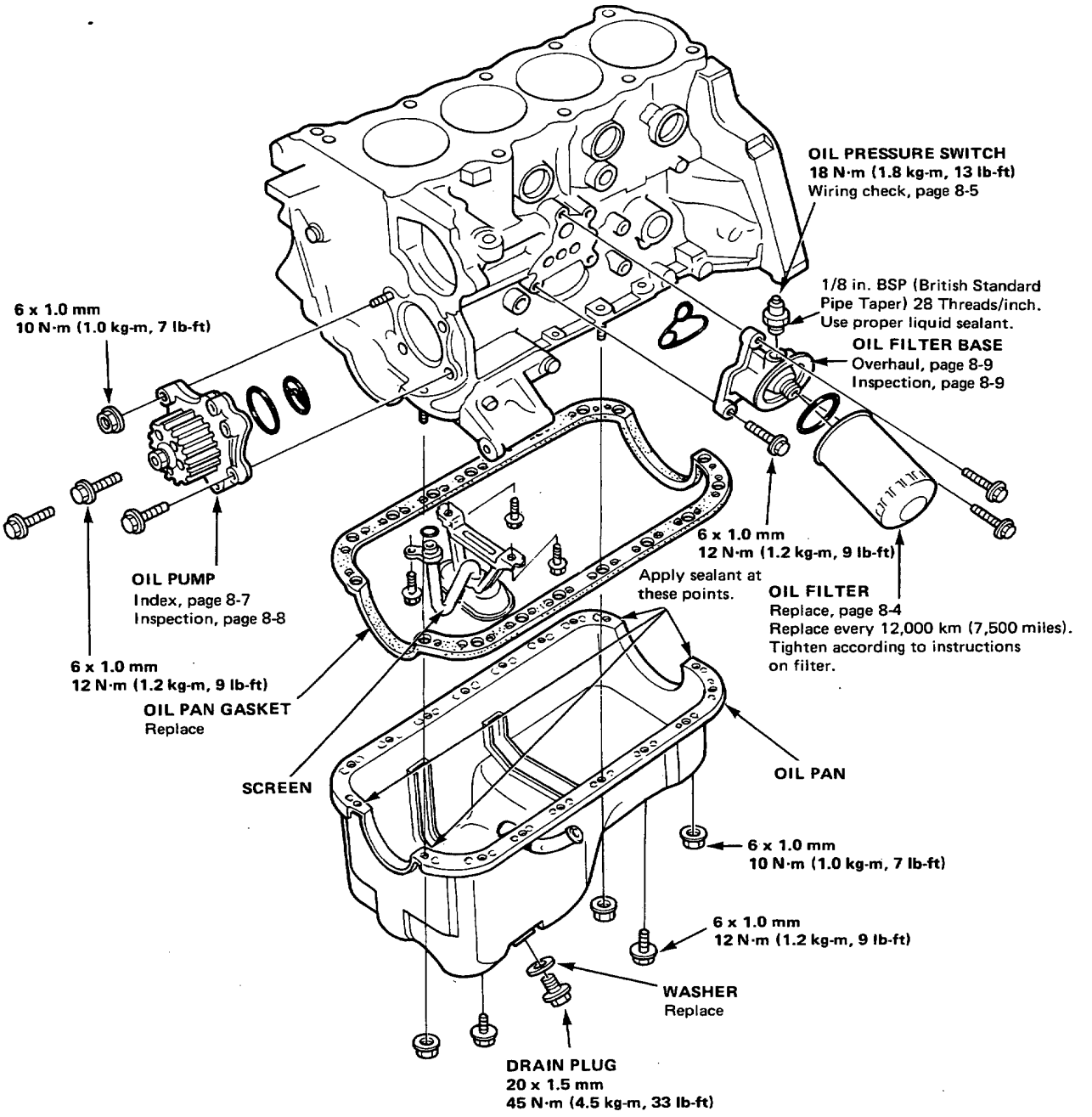
Engine Lubrication



Illustrated Index 8-2
Oil Level Inspection 8-3
Oil Replacement 8-3
Oil Filter Replacement 8-4
Oil Pressure Test 8-4
Oil Pressure Warning Troubleshooting 8-5
Oil Pump Illustrated Index 8-7
Oil Pump Inspection 8-8
Oil Filter Base Overhaul 8-9

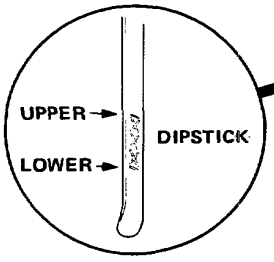
Engine Lubrication

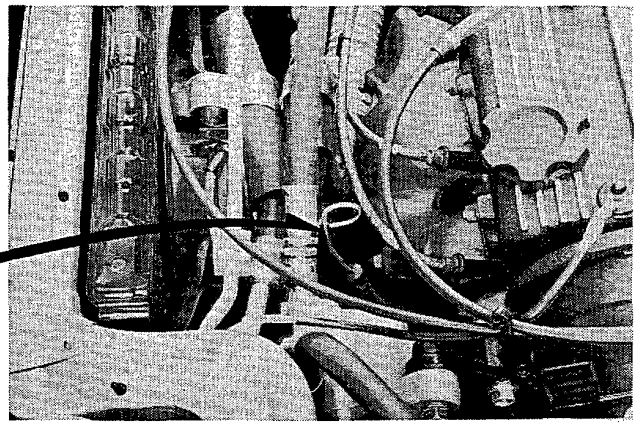
Illustrated Index



Oil Level Inspection

1. Check engine oil with the engine off and the car parked on level ground.
2. Make certain that the oil level indicated on the dipstick is between the upper and lower marks.
3. If the level has dropped close to the lower mark, add oil until it registers on the upper mark.

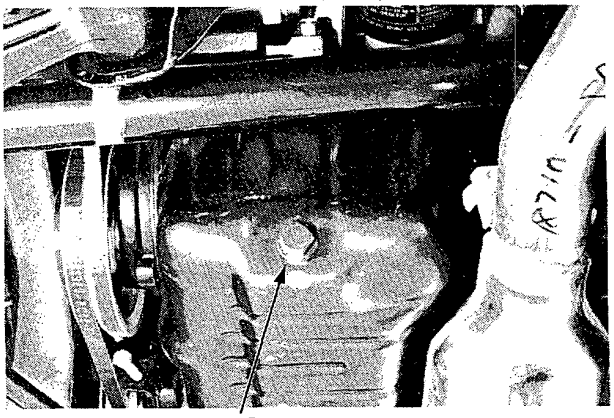




Oil Replacement

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

NOTE: Remove filler cap to speed draining.



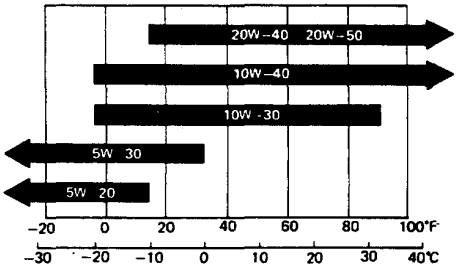
OIL PAN DRAIN PLUG
45 N·m (4.5 kg-m, 33 lb-ft)

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

Requirement	API Service SE or SF Grade
Capacity	3.0 lit (3.2 US qt, 2.6 Imp. qt) Exclude oil filter 3.5 lit (3.7 US qt, 3.1 Imp. qt) Adding replace oil filter 3.9 lit (4.1 US qt, 3.4 Imp. qt) Means designed value
Change	Every 12,000 km (7,500 mi.)

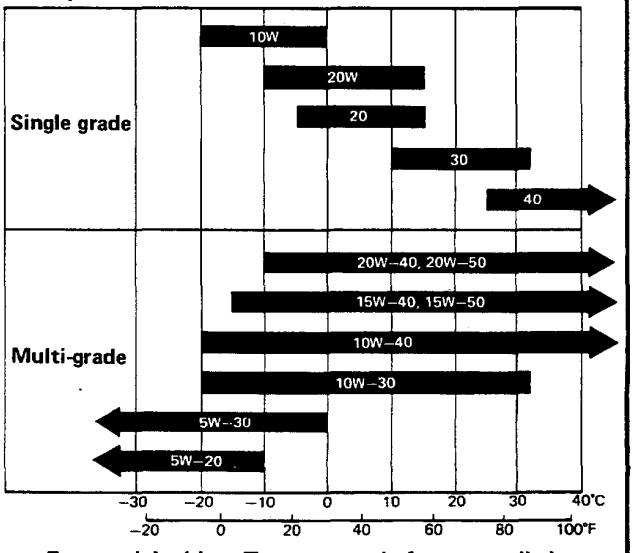
Canadian Model

Recommended Engine oil (SE or SF Grade only)



Expected Ambient Temperature before next oil change

Except Canadian Model



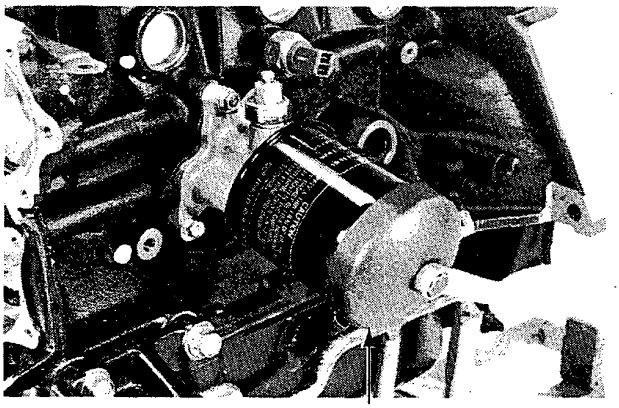
Expected Ambient Temperature before next oil change

Engine Lubrication

Oil Filter Replacement

WARNING **Burns may be caused when this work is executed while the muffler is hot.**

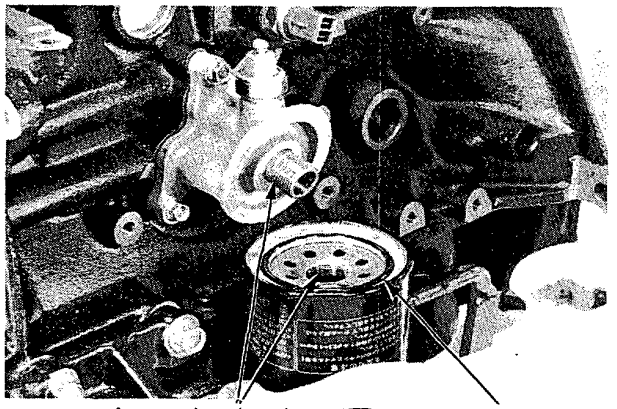
1. Remove the oil filter using proper removal tools.



OIL FILTER SOCKET
07912–6110001
28 N·m (2.8 kg-m, 20 lb-ft)

2. Inspect threads and gasket on new filter. Wipe off seat on engine block, then apply light coat of oil to gasket, and install filter. Tighten according to instructions on the filter.

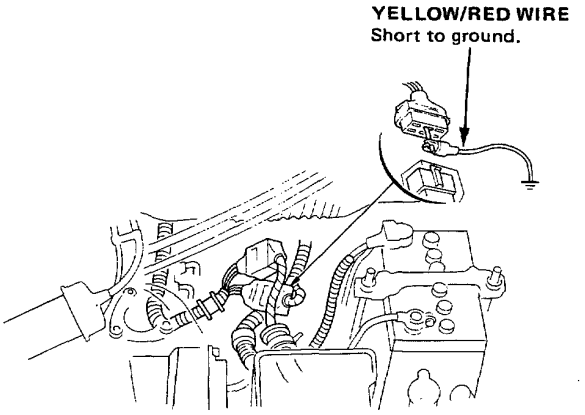
   NOTE: Use only filters with a built-in bypass system.



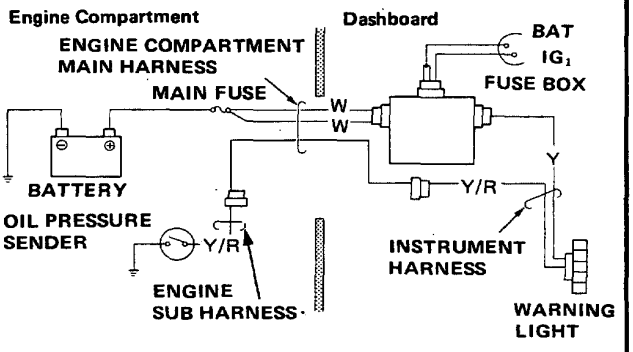
Oil Pressure Test (Except Canadian Model)

If oil pressure warning light does not go on:

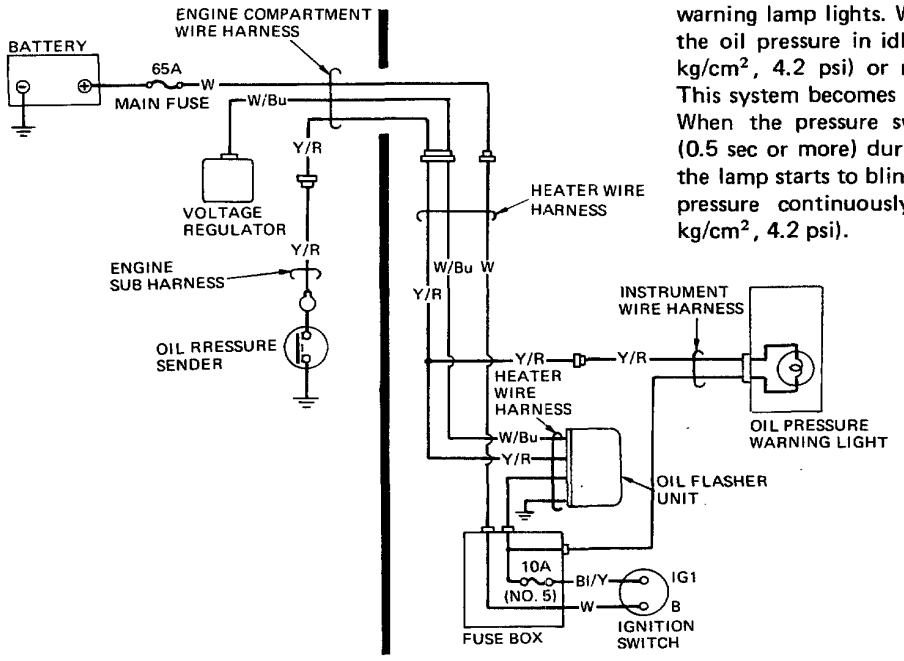
1. Disconnect yellow/red wire lead to oil pressure sender at engine compartment coupler and short it to ground.



2. Turn ignition switch to on. The oil pressure light should go on.
3. If light goes on, replace oil pressure sender.
4. If light DOES NOT go on, check fuse, bulb, wire and connections.



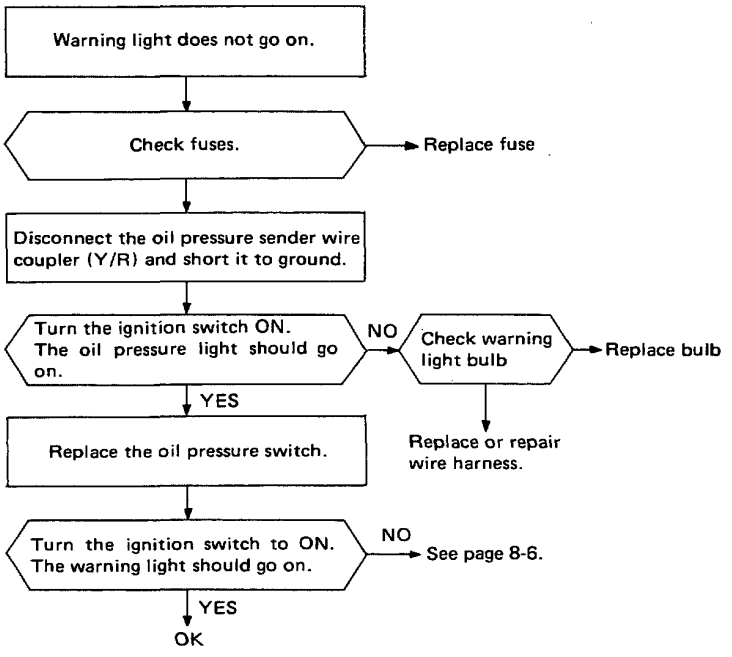
Oil Pressure Warning Diagram (Canadian Model)



FEATURE

When the ignition switch is switched on, the oil pressure warning lamp lights. When next the engine is started and the oil pressure in idling condition reaches 29 kPa (0.3 kg/cm^2, 4.2 psi) or more, the warning light goes out. This system becomes operative 30 sec after engine start. When the pressure switch operates even momentarily (0.5 sec or more) during driving (running of the engine), the lamp starts to blink, and the lamp lights when the oil pressure continuously drops to below 29 kPa (0.3 kg/cm^2, 4.2 psi).

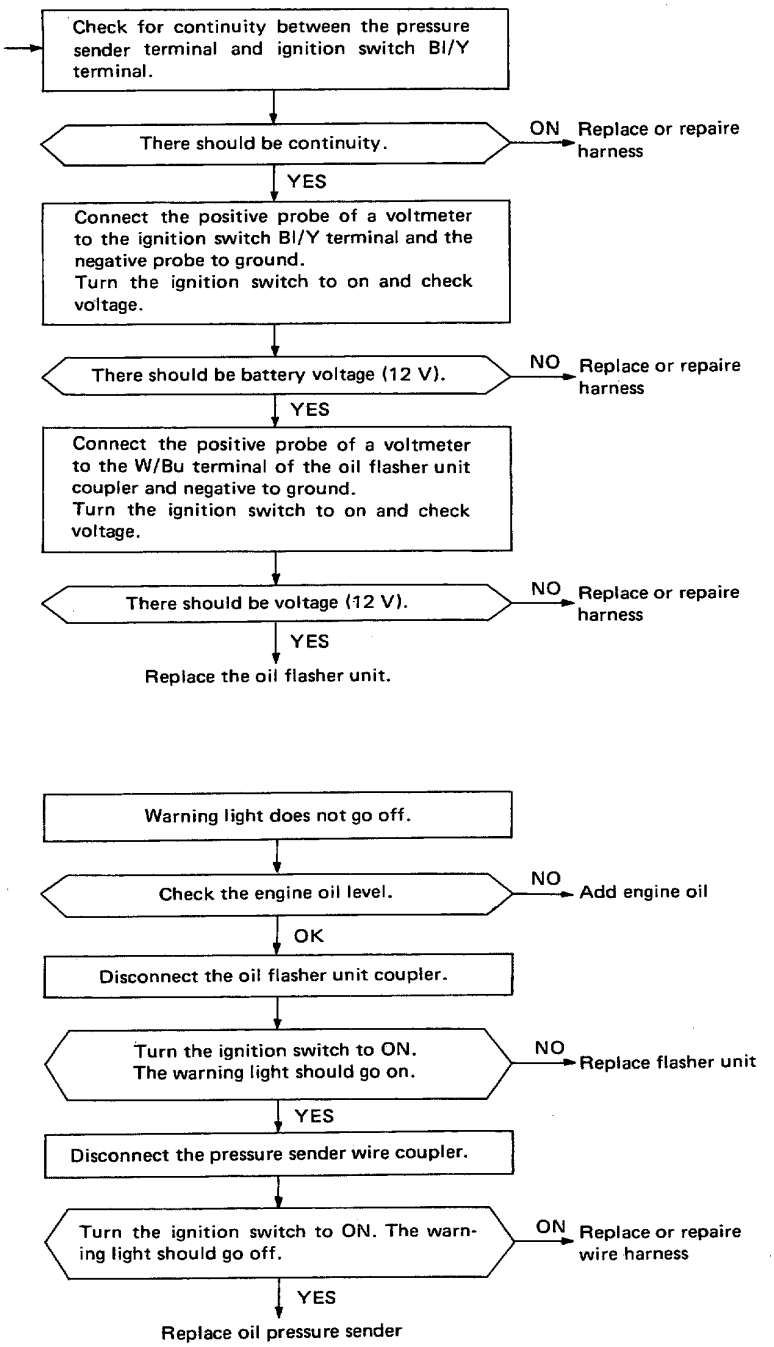
Oil Pressure Warning Troubleshooting (Canadian Model)



(cont'd)

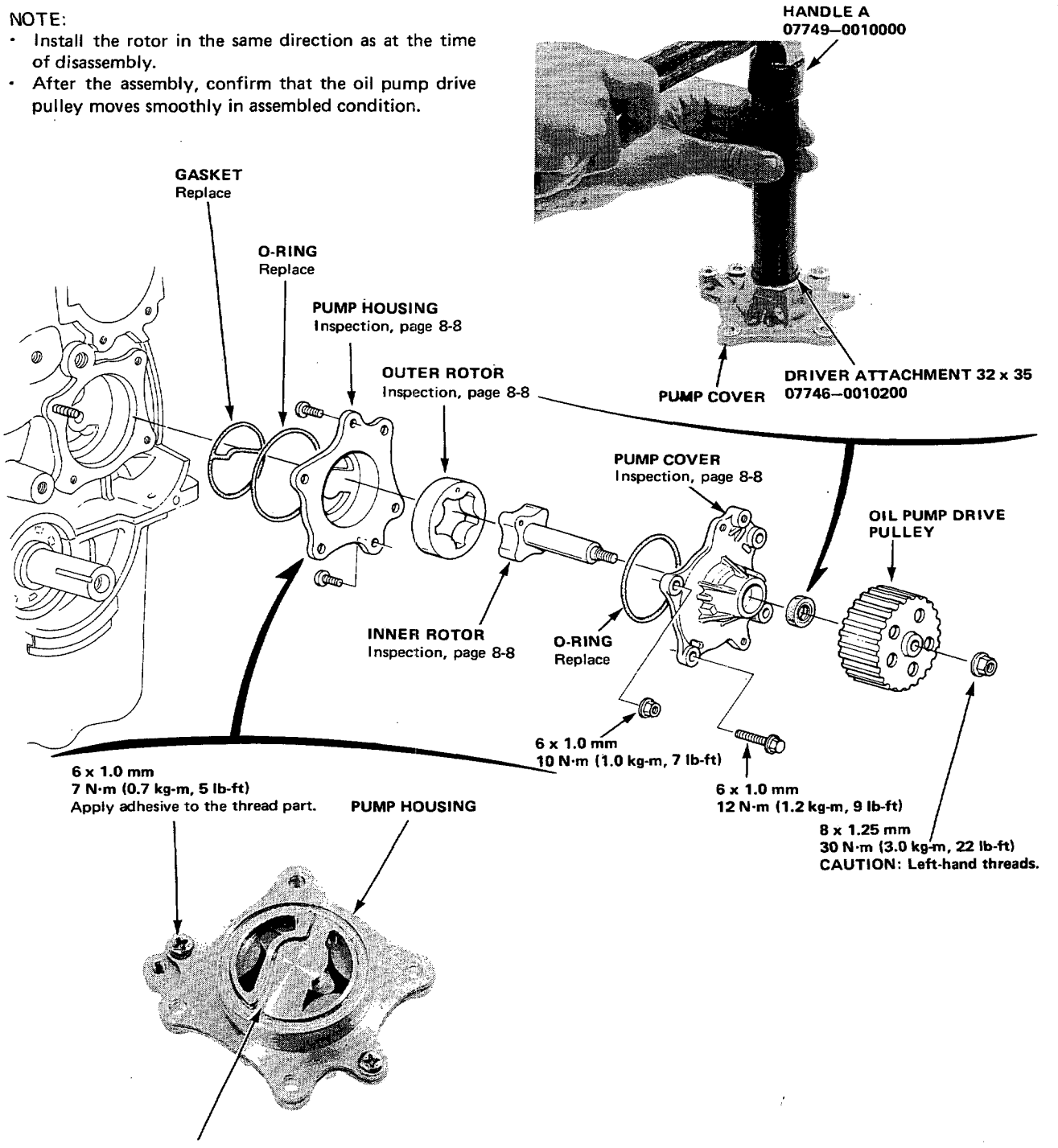
Engine Lubrication

Oil Pressure Warning Troubleshooting (cont'd)



Oil Pump Illustrated Index

NOTE:
- Install the rotor in the same direction as at the time of disassembly.
- After the assembly, confirm that the oil pump drive pulley moves smoothly in assembled condition.



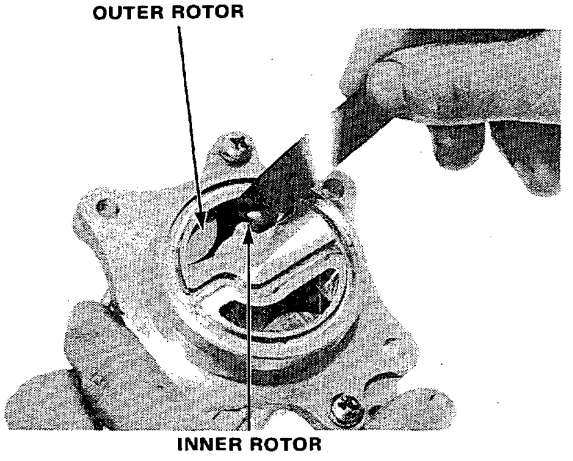
Apply sealant to the entire circumference of the O-ring groove and install the O-ring.

Engine Lubrication

Oil Pump Inspection

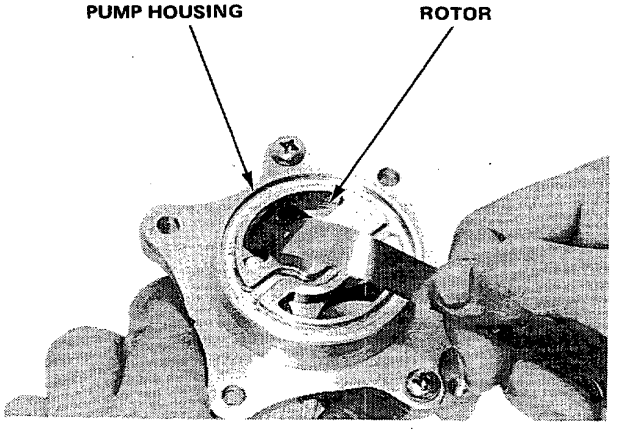
1. Check rotor radial clearance on pump rotor.

Rotor Radial Clearance
Standard (New): 0.15 mm (0.006 in.)
Service Limit: 0.2 mm (0.008 in.)



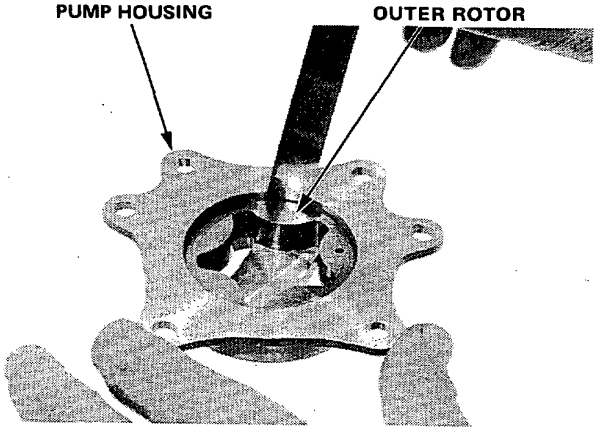
2. Check axial clearance. Check for scoring and replace parts as necessary.

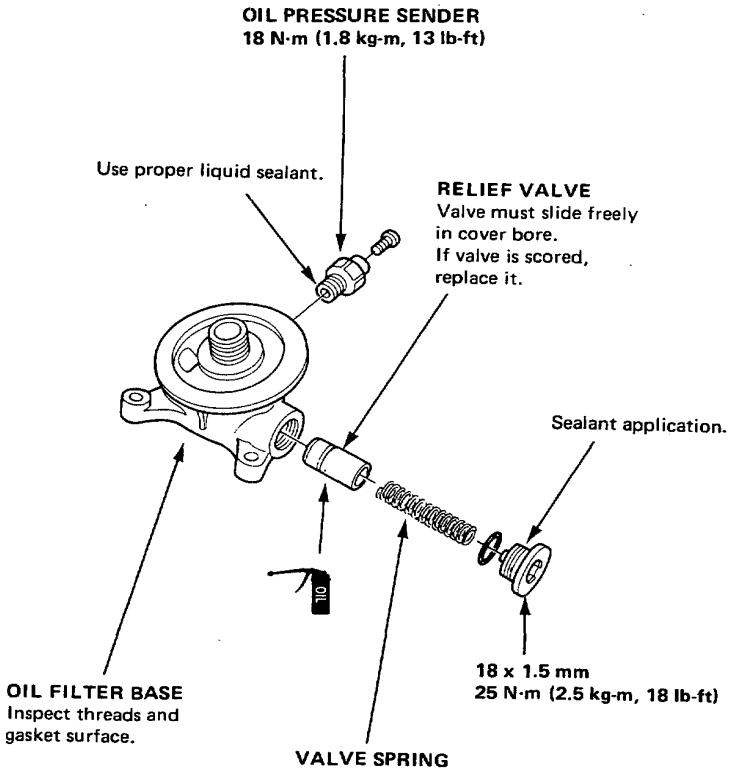
Housing-to-Rotor Axial Clearance
Standard (New): 0.03–0.108 mm (0.001–0.004 in.)
Service Limit: 0.15 mm (0.006 in.)



3. Check housing-to-Rotor radial clearances.

Housing-to-Rotor Radial Clearance
Standard (New): 0.1–0.18 mm (0.004–0.007 in.)
Service Limit: 0.2 mm (0.008 in.)




OIL PRESSURE SENDER
18 N·m (1.8 kg-m, 13 lb-ft)
Use proper liquid sealant.
RELIEF VALVE
Valve must slide freely
in cover bore.
If valve is scored,
replace it.
Sealant application.
OIL
OIL FILTER BASE
Inspect threads and
gasket surface.
VALVE SPRING
18 x 1.5 mm
25 N·m (2.5 kg-m, 18 lb-ft)

MEMO

Intake Manifold/Exhaust System

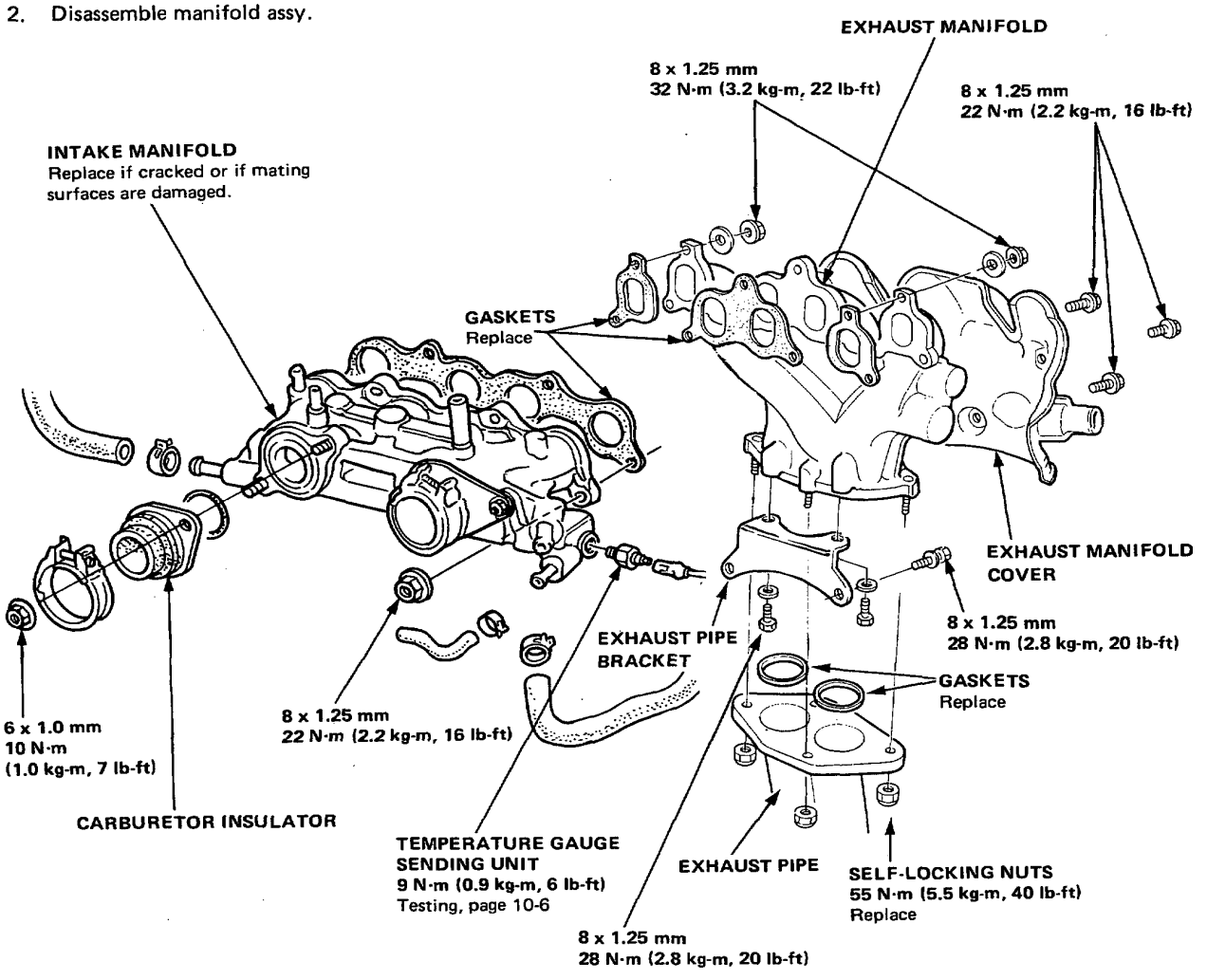


Manifold Replacement 9-2
Exhaust Pipe and Muffler. 9-3

Intake Manifold/Exhaust System

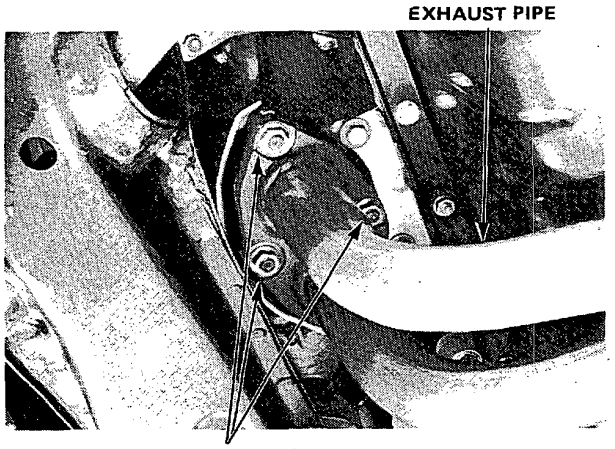
Manifold Replacement

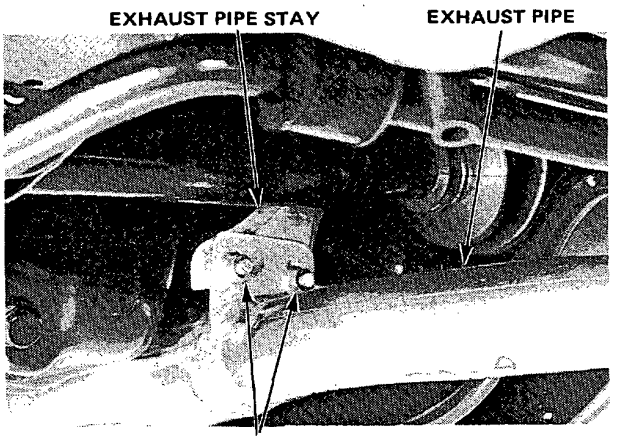
1. Remove manifold assy. (Page 6-5)
2. Disassemble manifold assy.

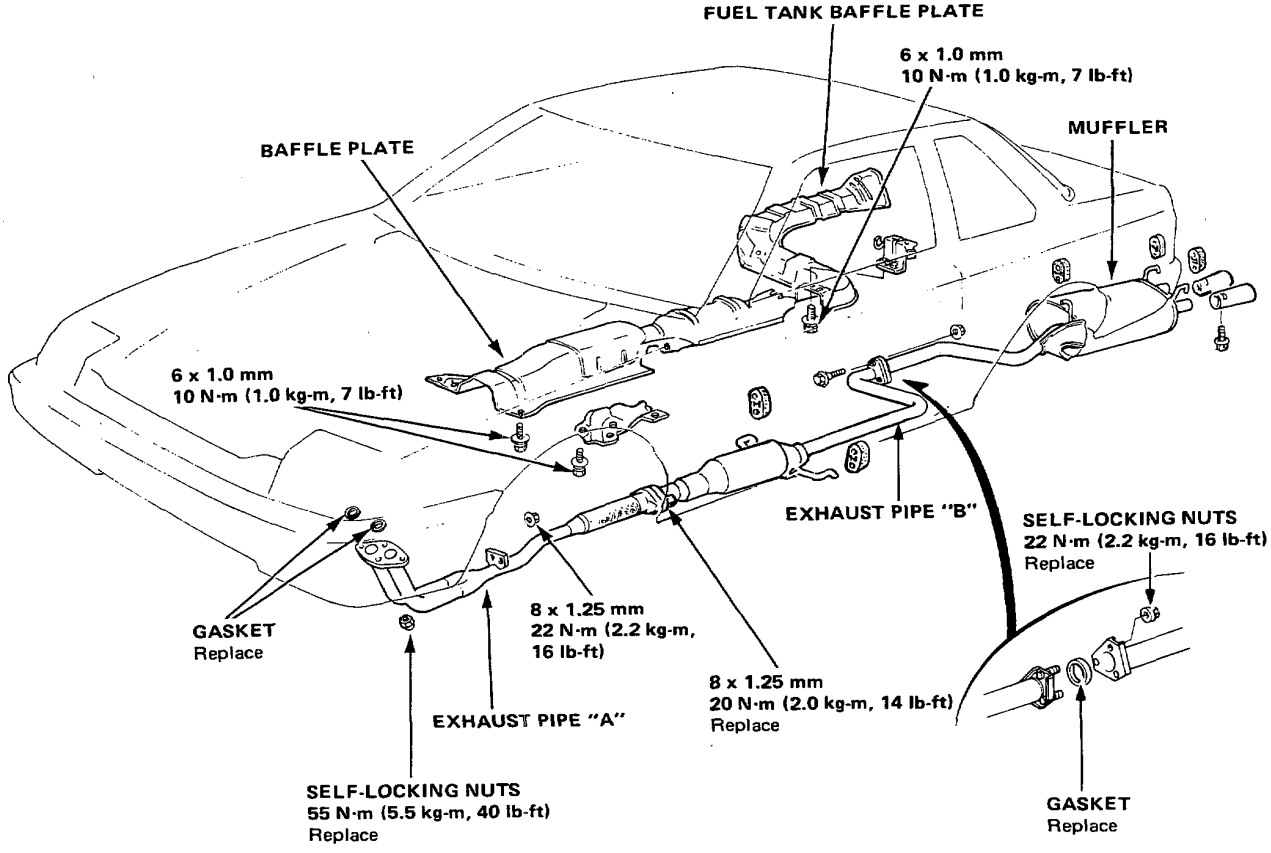


3. Reassemble manifold assy.
4. Install manifold assy. (page 6-16).

Exhaust Pipe and Muffler Replacement







MEMO

Cooling

Radiator 10-2
Thermostat 10-3
Water Pump 10-3
Belt Adjustment 10-9



Radiator

Replacement

WARNING

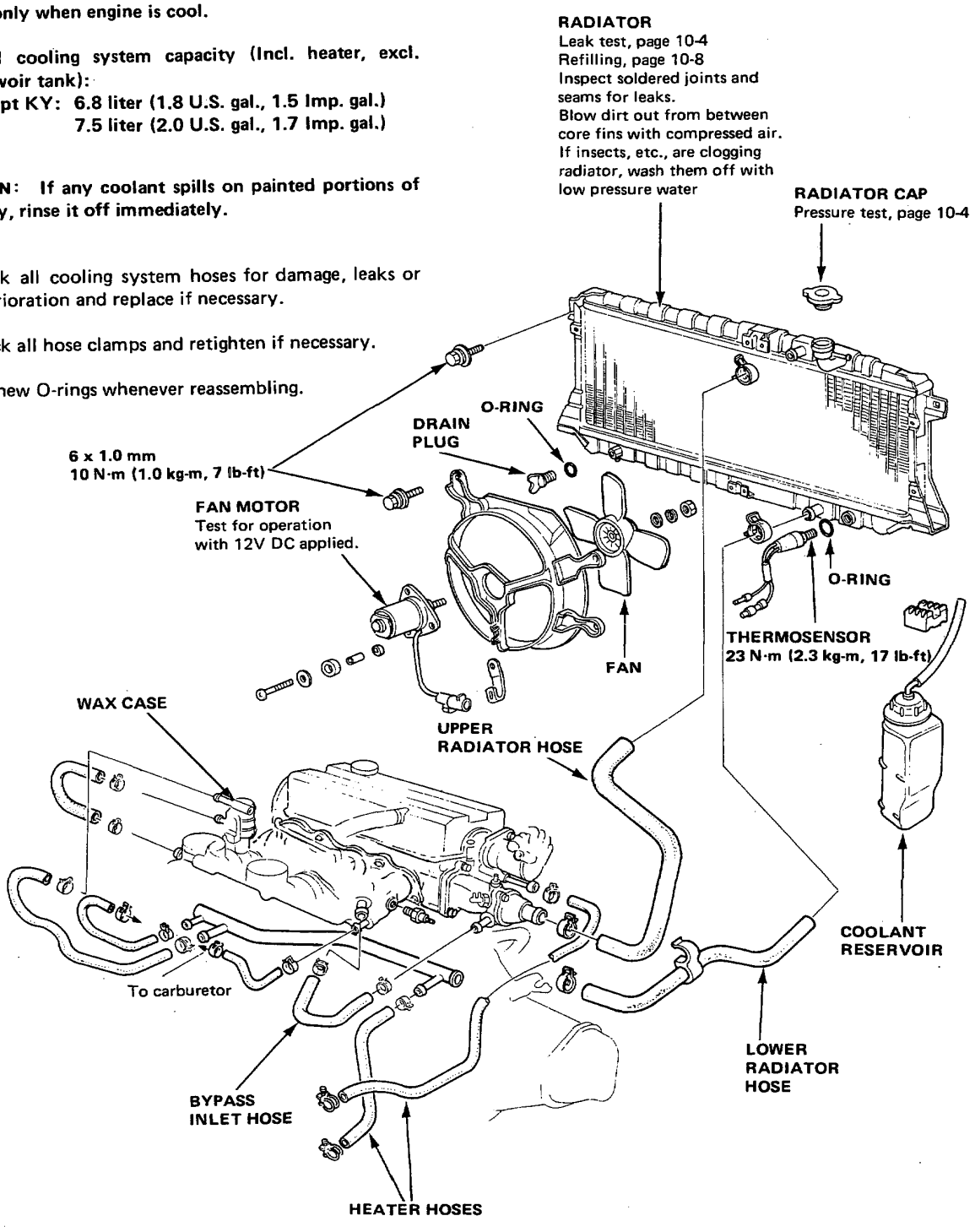
- **System is under high pressure when engine is hot. To avoid danger of releasing scalding coolant, remove cap only when engine is cool.**

- **Total cooling system capacity (Incl. heater, excl. reservoir tank):**
  Except KY: 6.8 liter (1.8 U.S. gal., 1.5 Imp. gal.)
  KY: 7.5 liter (2.0 U.S. gal., 1.7 Imp. gal.)

CAUTION: If any coolant spills on painted portions of the body, rinse it off immediately.

NOTE:

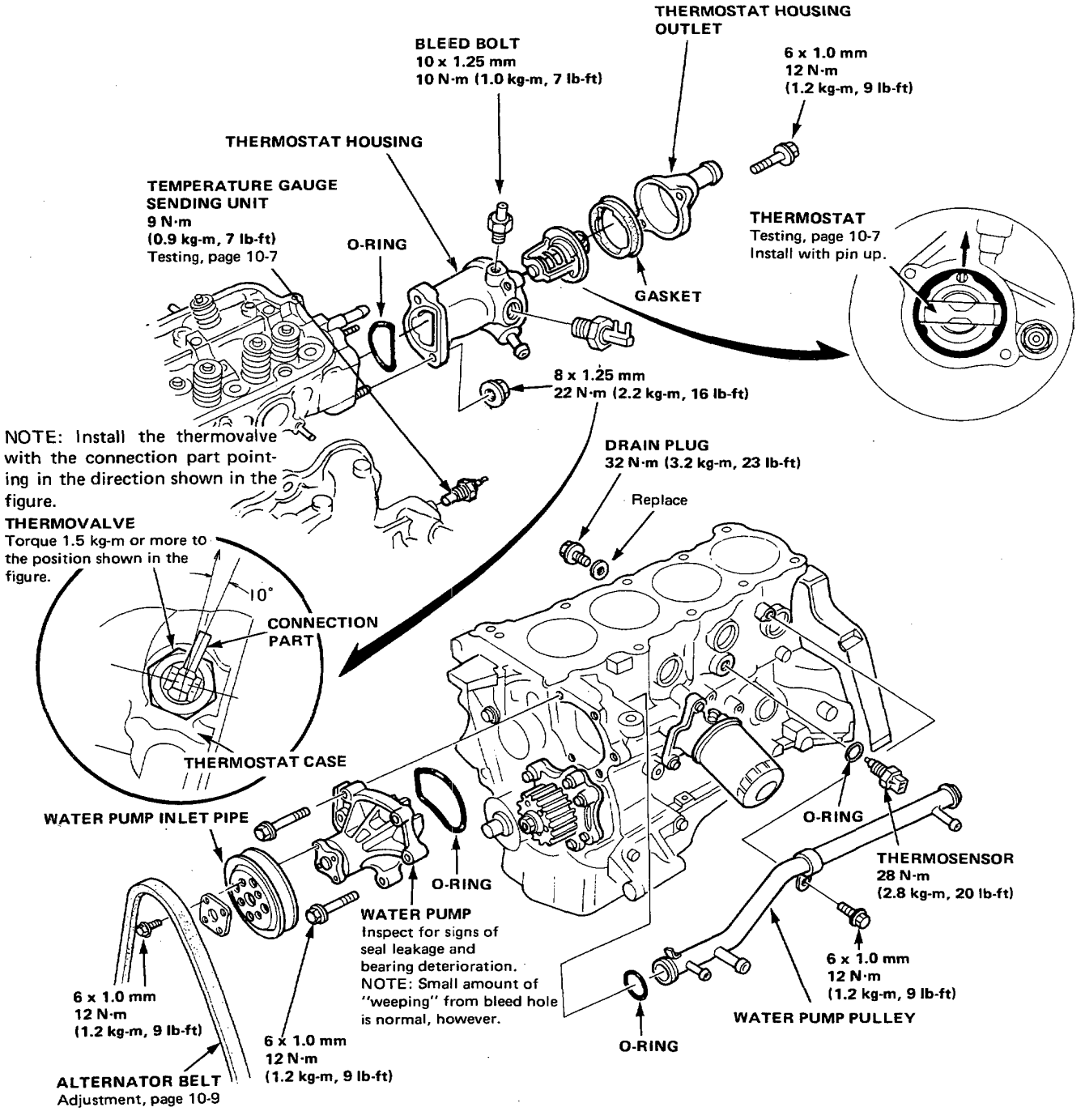
- Check all cooling system hoses for damage, leaks or deterioration and replace if necessary.
- Check all hose clamps and retighten if necessary.
- Use new O-rings whenever reassembling.



Thermostat and Water Pump

Replacement

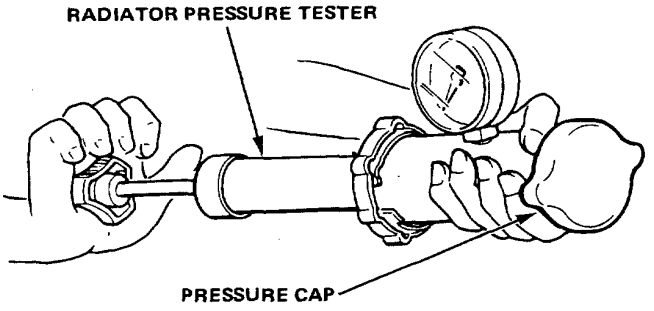
NOTE: Use new gaskets and O-rings whenever reassembling.



Radiator Cap and Radiator

Cap Testing

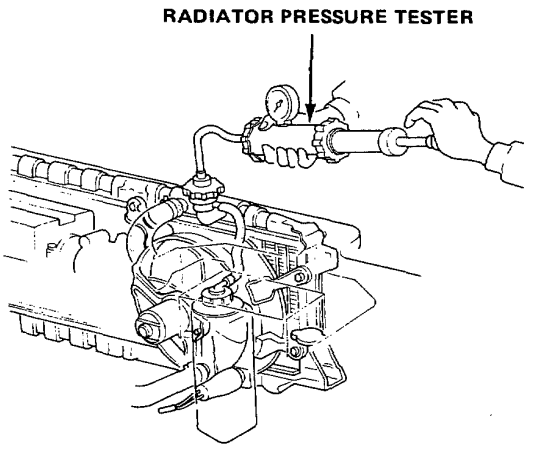
1. Remove radiator cap, wet its seal with coolant, then install it on pressure tester.
2. Apply pressure of 0.75—1.05 kg/cm^2 (78—98 kPa, 11—14 psi).
3. Check for drop in pressure.



Radiator Testing

1. Wait until engine is cool, then carefully remove pressure cap and fill radiator with coolant to top of filler neck.
2. Attach pressure tester to radiator and apply pressure of 0.75—1.05 kg/cm^2 (78—98 kPa, 11—14 psi).
3. Inspect for coolant leaks and drop in pressure.
4. Remove tester and reinstall pressure cap.

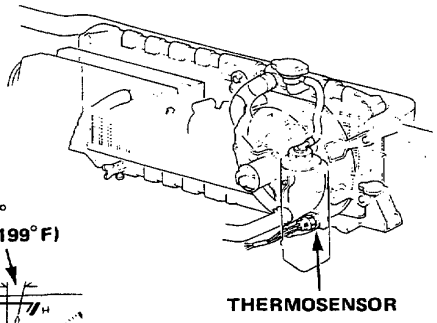
   NOTE: Check for engine oil in coolant and/or coolant in engine oil.

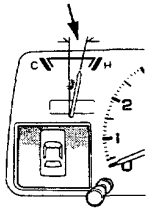


Fan Thermosensor

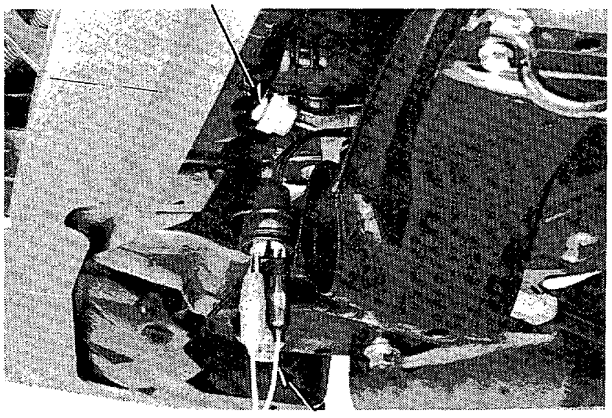
Testing

The cooling fan motor is actuated by a thermosensor located in right tank of radiator. Run the engine until coolant temperature reaches 87–93° (189–199°F). The fan motor should start running.
The fan motor should stop when the coolant temperature drops to 82–87°C (180–189°F).





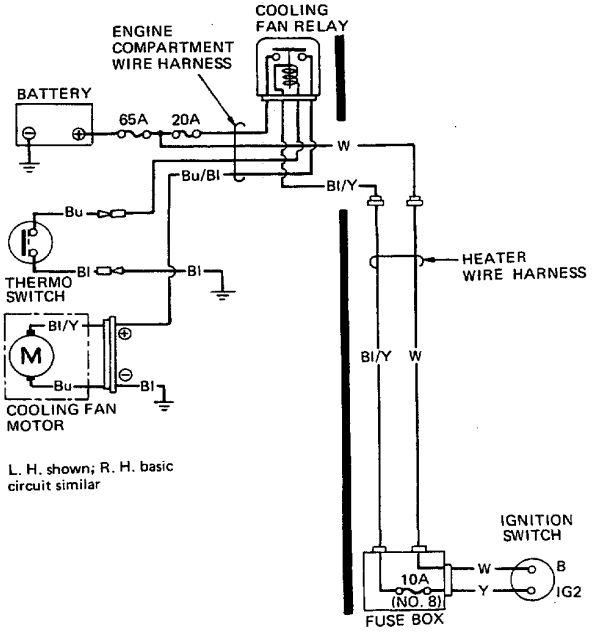
THERMOSENSOR



JUMPER WIRE

If the fan motor does not start:

1. Disconnect the black and the blue wire leads from the cooling fan thermosensor and short the wire together.
2. Turn ignition switch on.
3. The cooling fan motor should start running.
   - If the motor runs, replace the cooling fan thermosensor and re-test.
   - If the motor does not run, check for battery voltage from the blue lead wire (positive) to the black wire lead (negative) of the cooling fan and check cooling fan motor.
     - If voltage is not available, check for blown or faulty fuse, loose terminals and connectors, and open circuit.
     - If voltage is available, check for faulty fan motor.

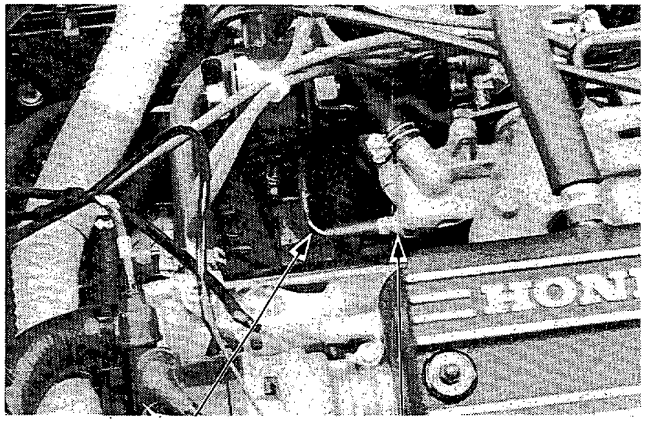


L. H. shown; R. H. basic circuit similar

Temperature Gauge Sending Unit

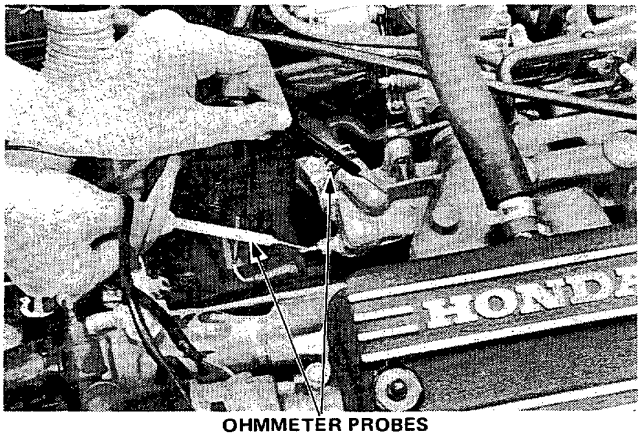
Testing

1. Disconnect yellow/green wire from sending unit.



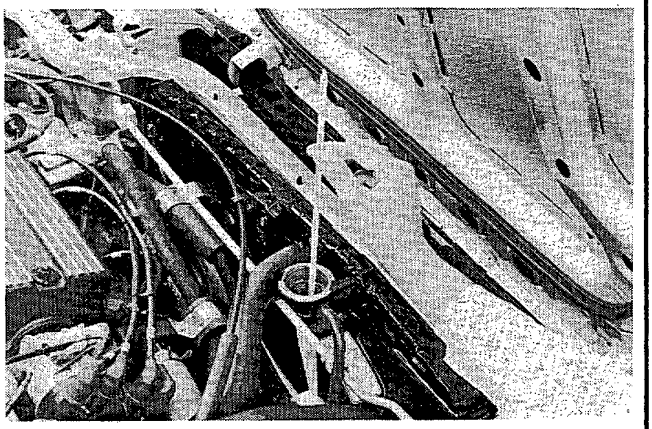
YELLOW/GREEN WIRE TEMPERATURE GAUGE SENDING UNIT

2. With engine cold, use ohmmeter to measure resistance between sending unit terminal and engine as shown.



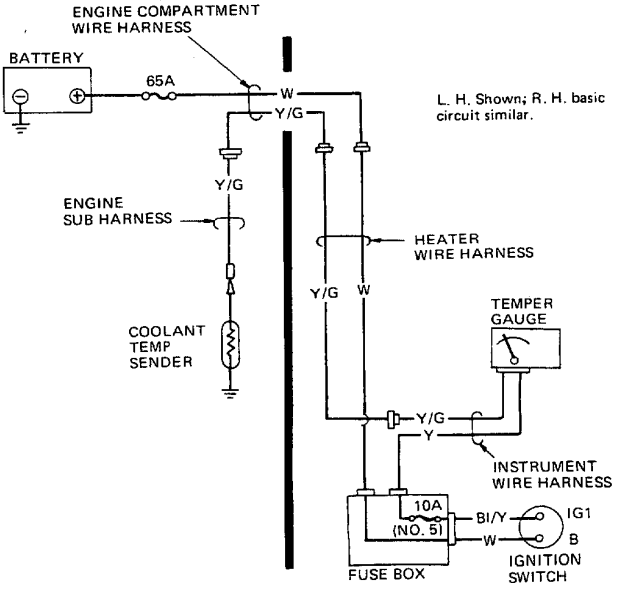
OHMMETER PROBES

3. Check temperature of coolant as shown.



4. Run the engine and measure the change in resistance with engine at operating temperature.

Temperature	50°C (122°F)	80°C (176°F)	100°C (212°F)
Resistance (ohms)	154 +22 −20	52 +4.9 −4.4	27 +1.9 −1.2



Temperature Gauge and Thermostat

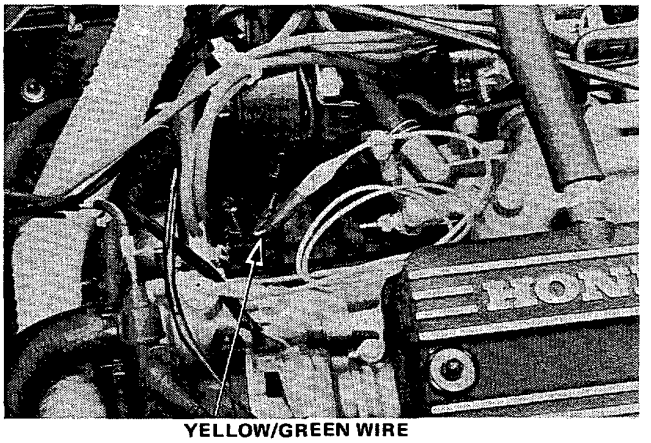
Temperature Gauge Testing

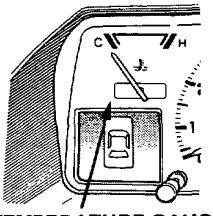
NOTE: If both the temperature gauge and fuel gauge malfunction simultaneously (and show H and F respectively), replace the fuel/temp gauge assembly.

1. Disconnect yellow/green wire from the temperature gauge sending unit and short it to ground.
2. Turn ignition switch to on.
3. Temperature gauge needle should move all the way to H.

   If not, check fuse, wiring and connections; if all are OK, replace gauge.

   CAUTION: Do not leave sending unit wire grounded for longer than a few seconds or temperature gauge will be damaged.
4. Turn ignition switch off.


YELLOW/GREEN WIRE



TEMPERATURE GAUGE

Thermostat Testing

Replace thermostat if it is open at room temperature.

To test a closed thermostat:

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

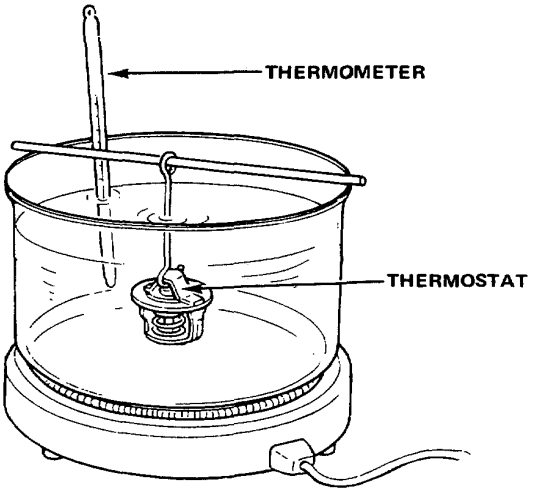
   CAUTION: Do not let thermometer touch bottom of hot container.
3. Measure lift height of thermostat when fully open.

STANDARD THERMOSTAT

Lift height:	**8 mm (0.32 in)**
Starts opening:	**80–84°C (176–183°F)**
Fully open:	**95°C (203°F)**

OPTIONAL THERMOSTAT

Lift height:	**8 mm (0.32 in)**
Starts opening:	**86–90°C (187–194°F)**
Fully open:	**100°C (212°F)**



Radiator

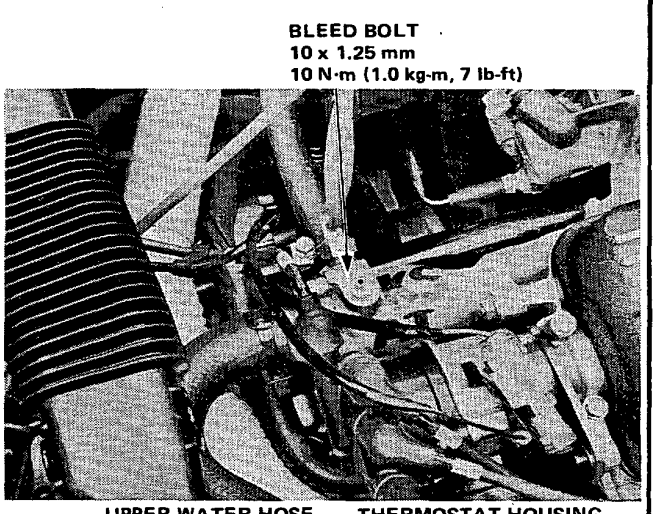
Refilling and Bleeding

1. Set the heater temperature lever to maximum heat.
2. When the radiator is cool, remove the radiator cap and drain plug, and drain the radiator.
3. Reinstall the radiator drain plug and tighten it securely.
4. Remove, drain and reinstall the reserve tank. Fill the tank halfway to the MAX mark with water, then up to the MAX mark with coolant.

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

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

   Radiator Coolant Refill Capacity (Incl. reserve tank): 6.4 liter (1.7 US gal., 1.4 Imp. qt)
   7.1 liter (1.9 US gal., 1.6 Imp. qt): KY only
5. Mix the recommended anti-freeze with an equal amount of water, in a clean container.
6. Loosen the air bleed bolt in the thermostat housing, then fill the radiator to the bottom of the filler neck with the coolant mixture. Tighten the bleed bolt as soon as coolant starts to run out in a steady stream without bubbles.



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

Alternator/Water Pump Belt

Adjustment

1. Apply force of 10 kg (22 lb) and measure deflection between alternator and water pump pulley.

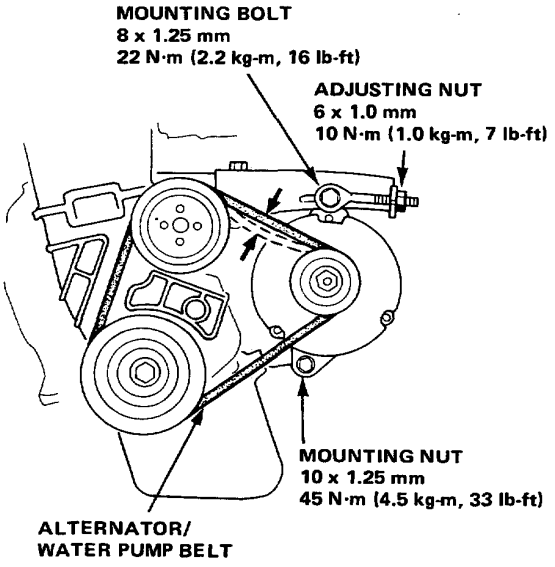
   Deflection: 7–10 mm (0.3–0.4 in.)
   5–7 mm (0.2–0.3 in.)
   for replacement of belt

2. Loosen alternator adjusting nut and mounting bolt and nut.

3. Move the alternator to obtain the proper belt tension and retighten the bolt and nut.

4. Recheck deflection of belt.

5. Tighten the adjusting nut.



MEMO

Fuel and Carburetor

Fuel

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Fuel Filter 11-4
Two-way Valve 11-4
Fuel Pump Cut-off Relay 11-5
Fuel Cut-off Solenoid Valve 11-7
Fuel Pump 11-8
Fuel Tank 11-10
Fuel Gauge 11-11
Fuel Gauge Sending Unit 11-12
Lower Fuel Warning Light 11-13
Evaporative Emission Control System 11-14



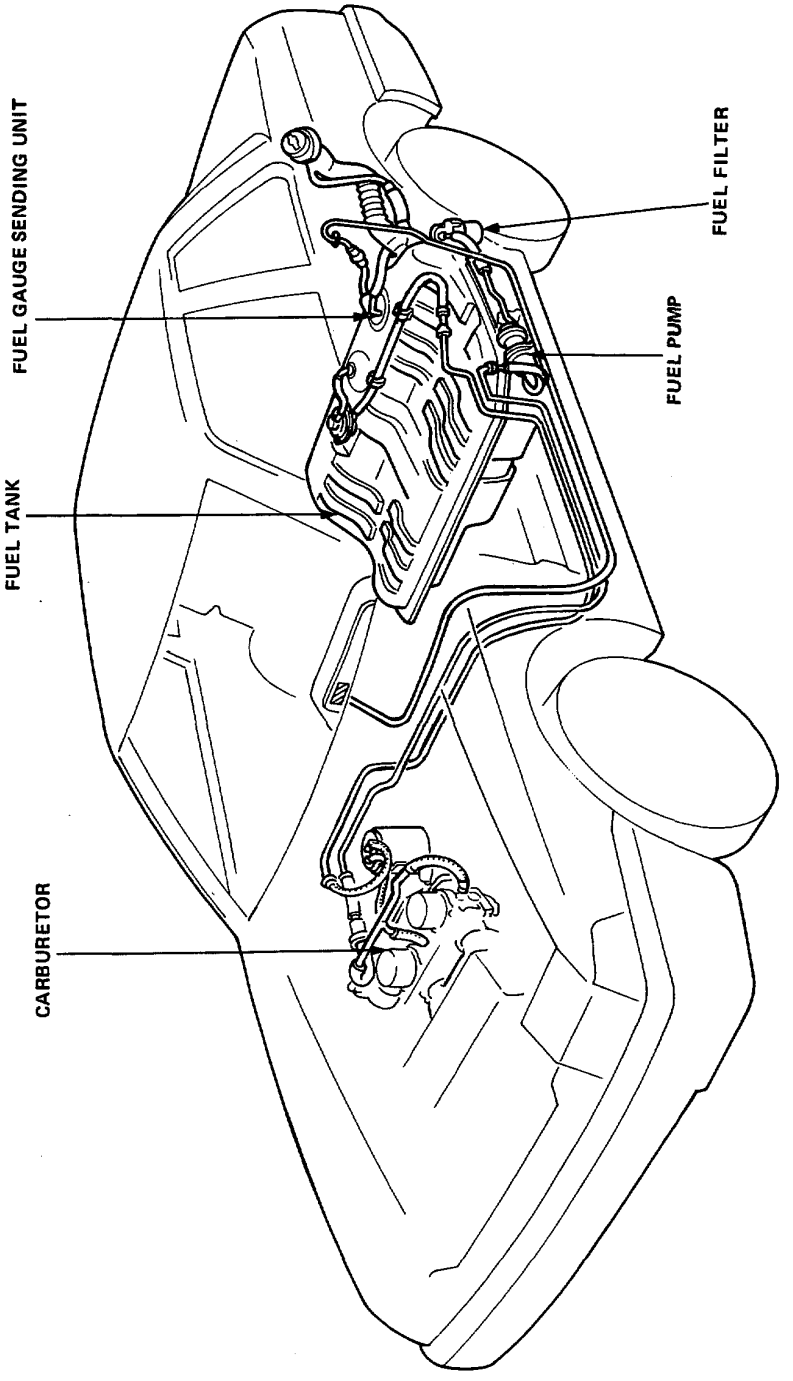
Carburetor

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Fuel

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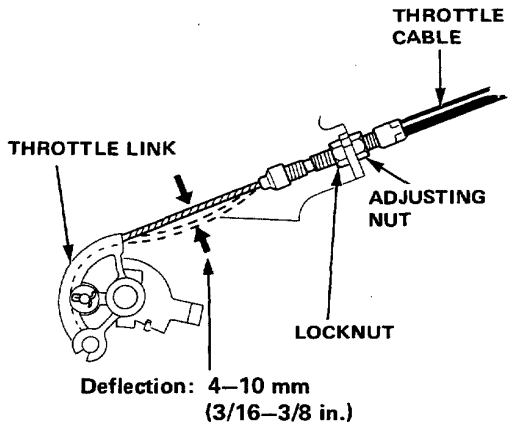



FUEL GAUGE SENDING UNIT
FUEL FILTER
FUEL PUMP
FUEL TANK
CARBURETOR

Throttle Cable

Inspection/Adjustment

1. Check that throttle cable operates smoothly with no binding or sticking. Repair as necessary.
2. Check cable free-play at throttle linkage. Cable deflection should be 4–10 mm (3/16–3/8 in.)



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

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

Adjustment (accelerator pedal)

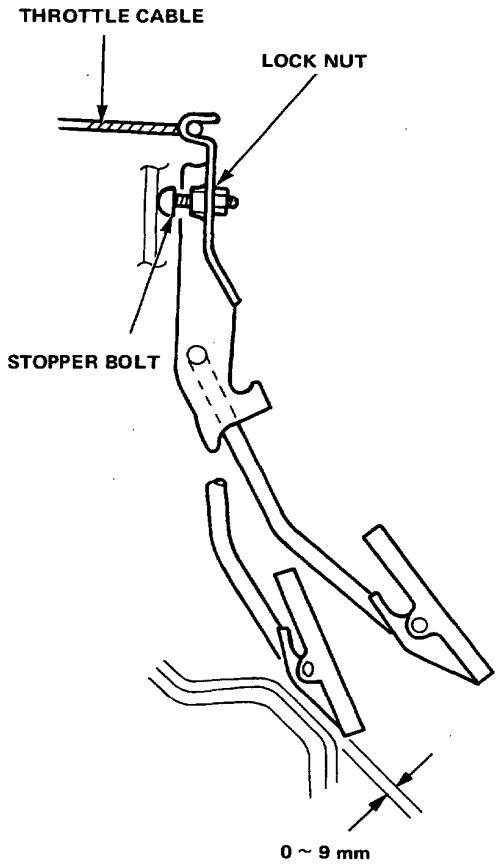
1. With the accelerator pedal held to floor and throttle valve opened fully, measure the clearance between the pedal and floor.

   STANDARD: 0–9 mm (0–3.5 in.)

   If adjustment is necessary, loosen the throttle cable lock nut and turn the adjusting nut until the correct clearance is obtained.

2. Check pedal free-play at the pedal. To adjust free-play, loosen the lock nut and turn the stopper bolt until you have free-play as specified.

   STANDARD: 6 ± 3 mm (2.4 ± 1.2 in.)



Fuel Filter

Replacement

Replace both front and rear filters every 48,000 km (30,000 mils)

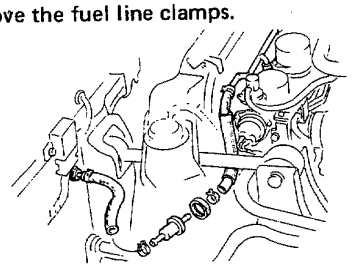
WARNING

- **Do not smoke while working on fuel system. Keep open flame away from work area.**
- **Block front wheels before jacking up rear of car.**

Front

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

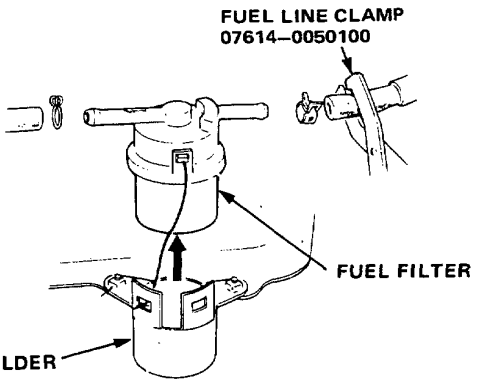
   CAUTION: When disconnecting the fuel lines, slide back the clamps then twist the lines as you pull, to avoid damaging them.
3. Remove the filter cover from the old filter and install it on the new filter.
4. Install the new fuel filter.
5. Remove the fuel line clamps.



Rear

1. Raise the rear of the car and place the jackstands in proper locations.
2. Push in the tab of the fuel filter to release the holder, then remove the filter from its bracket.
3. Attach fuel line clips to the fuel lines and disconnect the lines from the filter.

   CAUTION: To avoid damaging the fuel lines when disconnecting, slide back the clamps then twist the lines as you pull.
4. Install in the reverse order of removal.



Two-way Valve

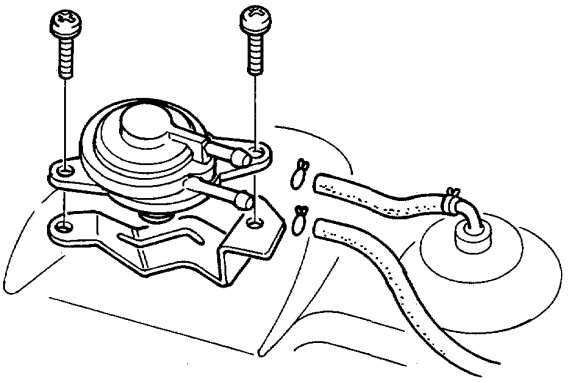
Replacement

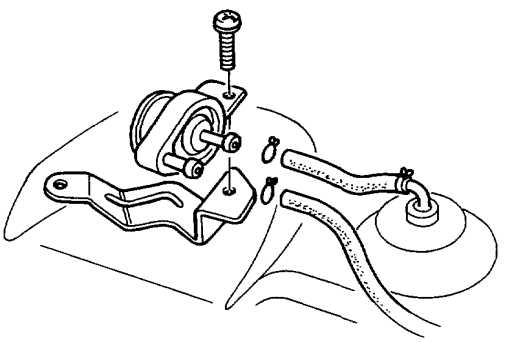
WARNING

- **Do not smoke while working on fuel system. Keep open flame away from work area.**
- **Block front wheels before jacking up rear of car.**

1. Raise rear of car and place jackstands in the proper locations.
2. Place jack under fuel tank.

   CAUTION: Place a flat piece of wood on the jack lifting pad to prevent damage to the fuel tank.
3. Remove the tank mounting nuts and bolts.
4. Lower fuel tank only enough to gain access to two-way valve.
5. Remove screws holding two-way valve to fuel tank and remove valve.



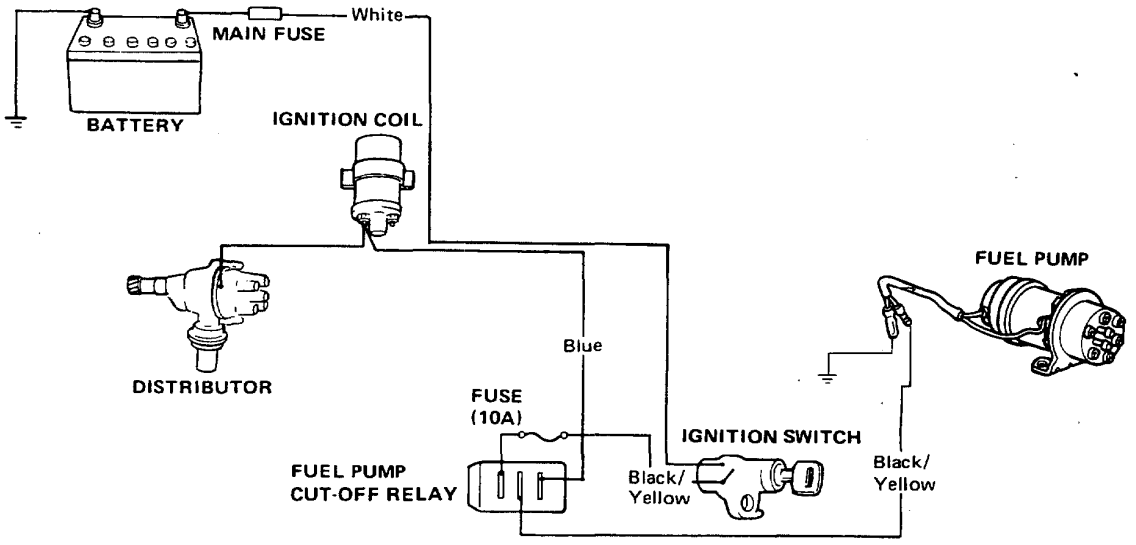


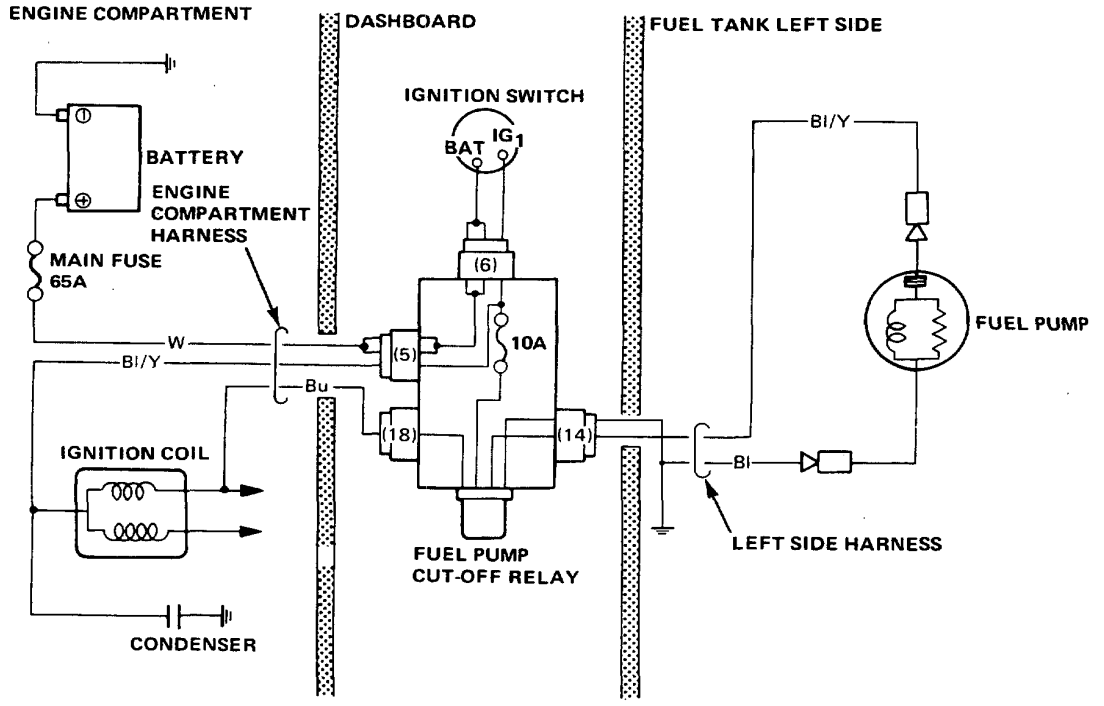
6. Install in reverse order of removal.

Fuel Pump Cut-Off Relay

Wiring

The fuel pump cut-off relay allows fuel flow only when the ignition switch is in START position or the engine is RUNNING. It is a solid-state, pointless relay which switches the fuel pump on whenever ignition pulsations are present at the negative terminal of the ignition coil, and cuts off electrical current to the fuel pump whenever the engine stops running.

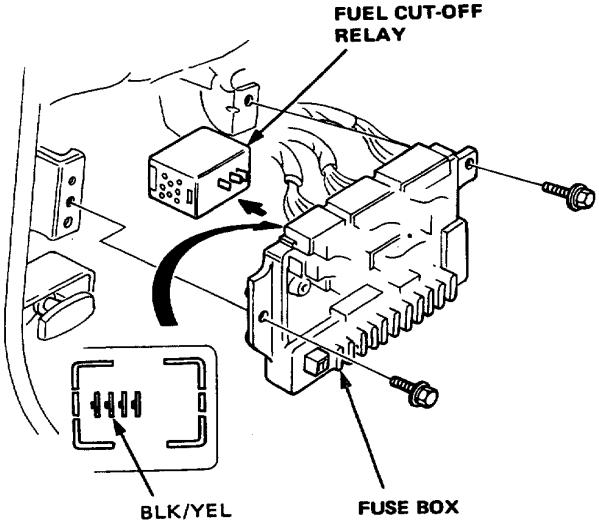




Fuel Pump Cut-Off Relay

Testing

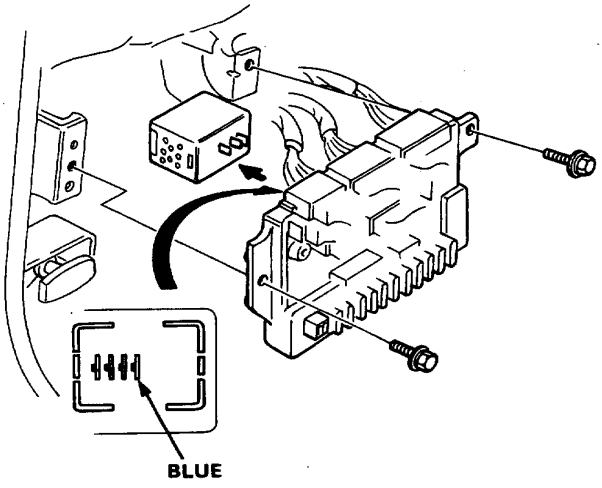
1. With the ignition switch off, remove the fuse box cover, fuse box/relay panel mounting bolt and nut, and pull down the fuse box/relay panel.
2. Remove the fuel cut-off relay.
3. Connect positive probe of voltmeter to black/yellow terminal in the fuse panel (from ignition switch) and negative probe to ground. Then turn ignition switch ON.
   Voltmeter should indicate battery voltage.



- If no voltage, check fuse and continuity of black/yellow wire from ignition switch to relay. Make sure probe is on proper black/yellow wire.
- If voltage is present proceed to step 4.

4. Connect positive probe of voltmeter to the blue wire at fuel pump cut-off relay connector, and the negative probe to ground. Turn ignition switch ON.

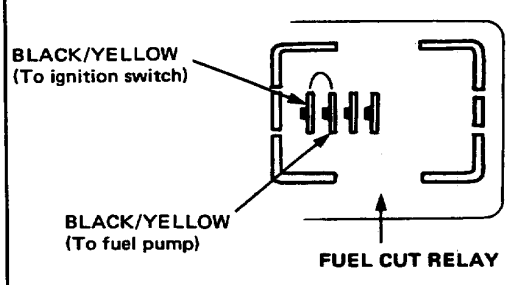
   Voltmeter should indicate battery voltage.



- If no voltage, check blue wire circuit between connector and ignition coil negative terminal. Repair or replace as necessary.
- If voltage is present, go on to step 5.

5. With ignition switch OFF, Connect the two black/yellow wires together using a jumper wire, then turn ignition switch ON.

   Fuel pressure should now be available (fuel pump should go on).

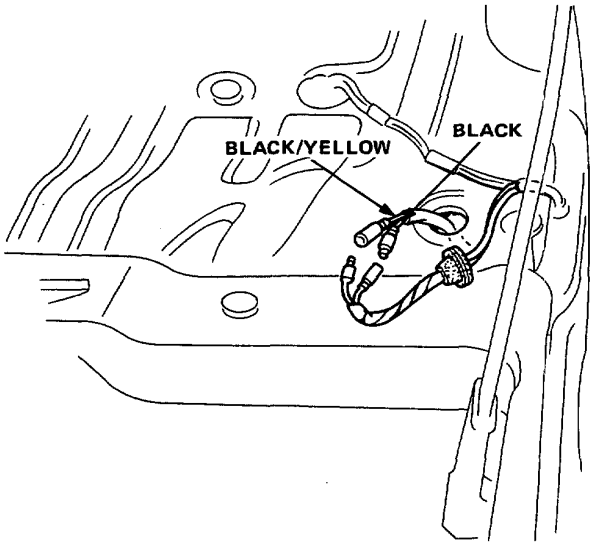


- If fuel pressure is available; and battery voltage was available in step 4, replace the fuel cut-off relay and re-test.
- If fuel pressure is not available, go on to step 6.

Fuel Cut-off Solenoid Valve

6. If battery voltage is available in steps 2 and 3, with the jumper wire connected as in step 4, disconnect the fuel pump leads at the pump and check the voltage between their leads, positive probe to black/yellow and negative probe to black.

   Battery voltage should be present with the ignition switch ON.



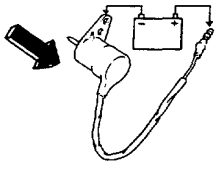
- If no voltage, check the black/yellow wire from the relay and black wire to ground and repeat step 4.
- If voltage is present, replace the relay and go on to Fuel Pump test in next page.

Inspection

1. Disconnect the wire leads at the fuel cut-off solenoid valve. With the ignition switch turned on, check if battery voltage is available. Battery voltage should be present with the ignition switch ON.



2. Remove the fuel cut-off solenoid valve. Connect the positive probe of a battery to the valve lead and negative probe to the body ground. The valve is normal if the rod is retracted and remains steady.
   See page 12-5 for carburetor disassembly.

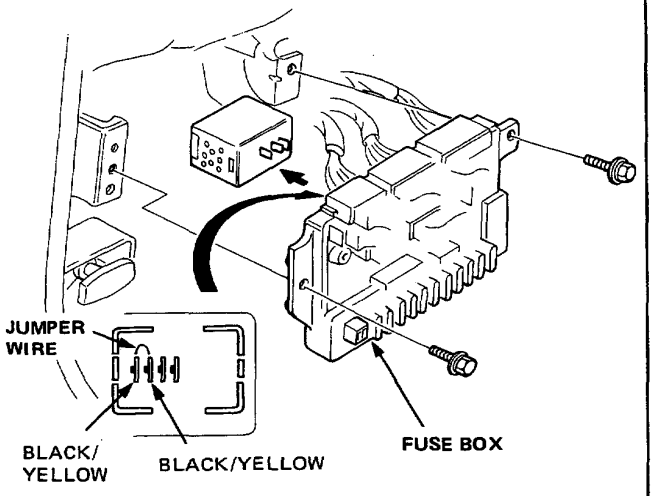


Fuel Pump

Testing

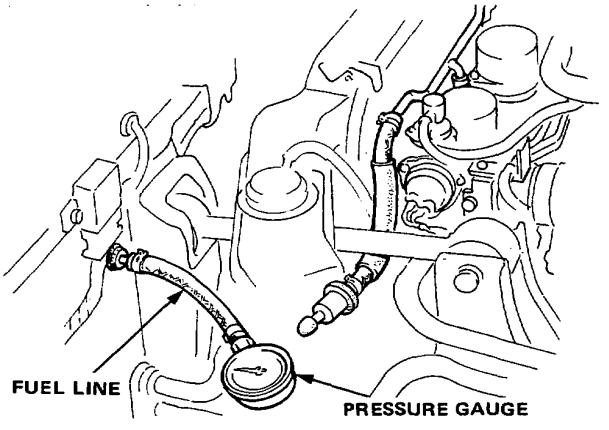
NOTE: Check for a clogged fuel filter and/or fuel line before checking fuel pump pressure.

1. Connect a jumper wire between the two black/yellow wires at the fuel pump cut-off relay connector.



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

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



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

   Pressure should be 13.8–20.6 kPa (2–3 psi).

   - If gauge shows at least 13.8 kPa (2 psi) go on to step 4.
   - If gauge shows less than 13.8 kPa (2 psi), replace pump and re-test.

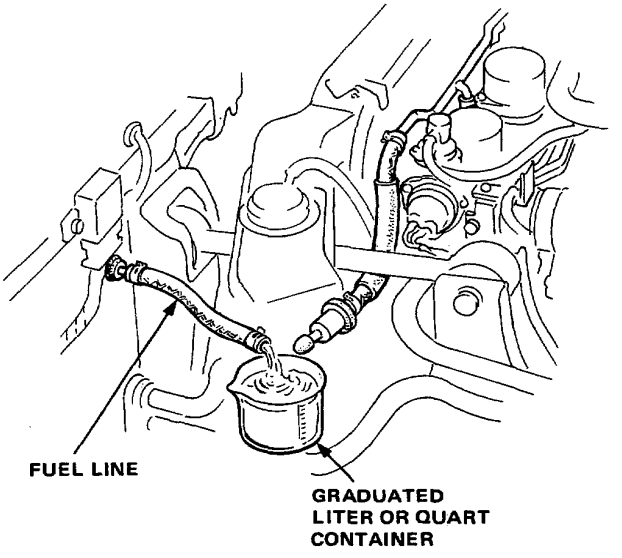
4. Remove pressure gauge and hold a graduated container under the hose.

5. Turn ignition ON, measure amount of full flow for 60 seconds, then turn ignition OFF.

   Fuel flow should be more than 680cc (23 oz.) in 60 seconds with battery voltage at 10 volts minimum.

   - If fuel flow is 680cc (23 oz.) or more in 60 seconds, reconnect cut-off relay and fuel hose.
   - If fuel flow is less than 680cc (23 oz.) replace the fuel pump and re-test.

   NOTE: Check for a clogged fuel filter and/or fuel line before replacing pump.



Fuel Pump

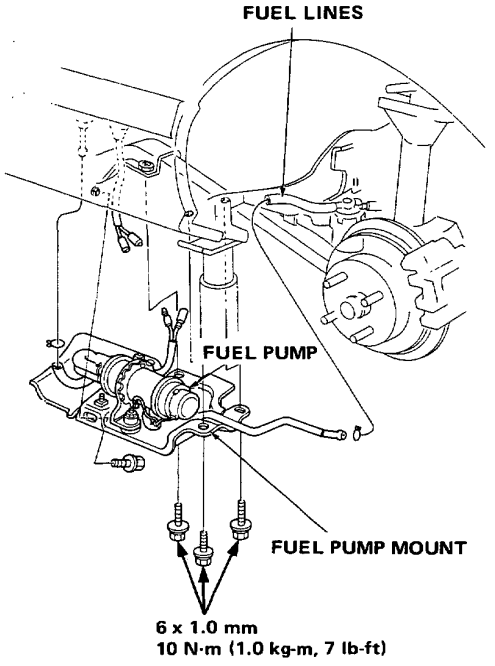
Replacement

WARNING

- **Do not smoke while working on fuel system. Keep open flame away from work area.**
- **Block front wheels before jacking up rear of car.**

1. Jack up rear of car and place jack stands in proper locations.
2. Remove left rear wheel.
3. Attach fuel line clamps to fuel pump lines.
4. Disconnect fuel lines and electrical leads at fuel pump.

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



5. Remove fuel pump with mount.
6. Remove fuel pump from its mount.

Fuel Tank

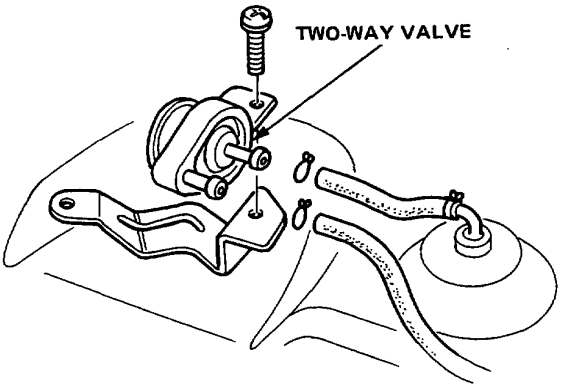
Replacement

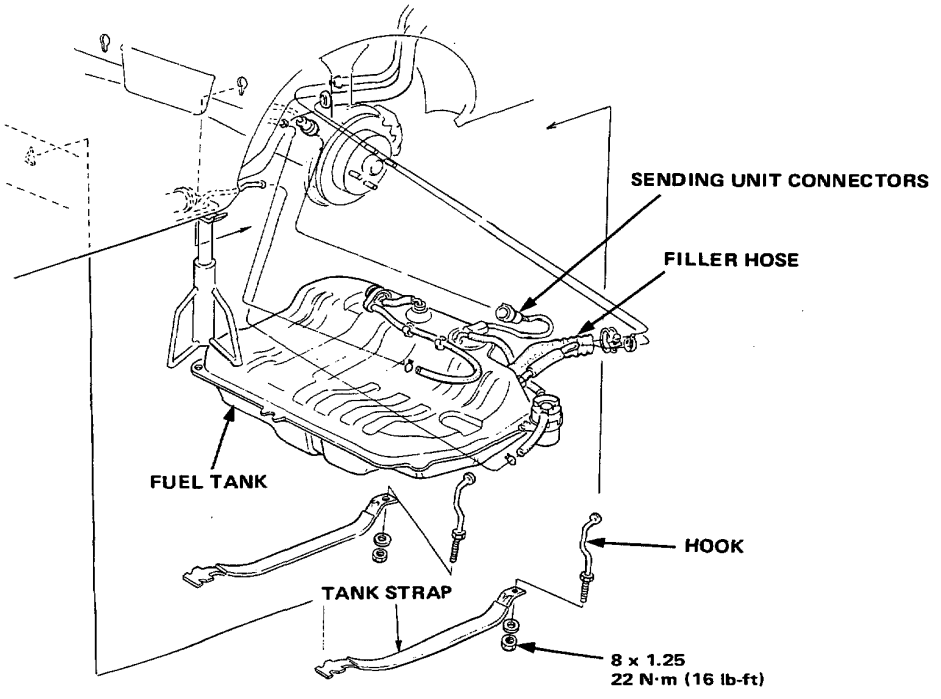
WARNING

- **Do not smoke while working on fuel system. Keep open flame away from work area.**
- **Block front wheels before jack up rear of car.**

1. Raise rear of the car and place jackstands in the proper locations.
2. Remove the drain bolt and drain the fuel into an approved container.
3. Disconnect the sending unit connectors.
4. Disconnect the hoses.

   CAUTION: When disconnecting the hoses, slide back the clamps, then twist hoses as you pull, to avoid damaging them.
5. Place a jack, or other support, under the tank.
6. Remove the strap nuts and let the straps fall free.
7. Remove the fuel tank.
8. Install in the reverse order of removal.





Fuel Gauge

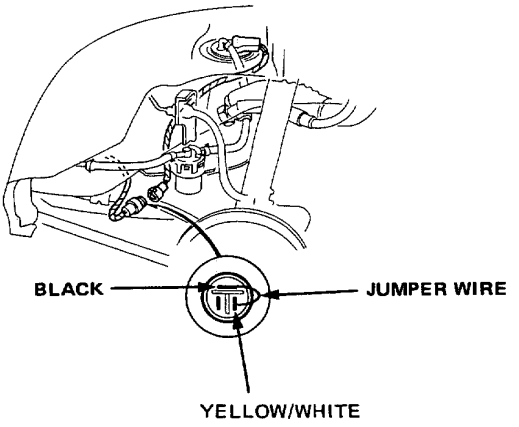
Testing

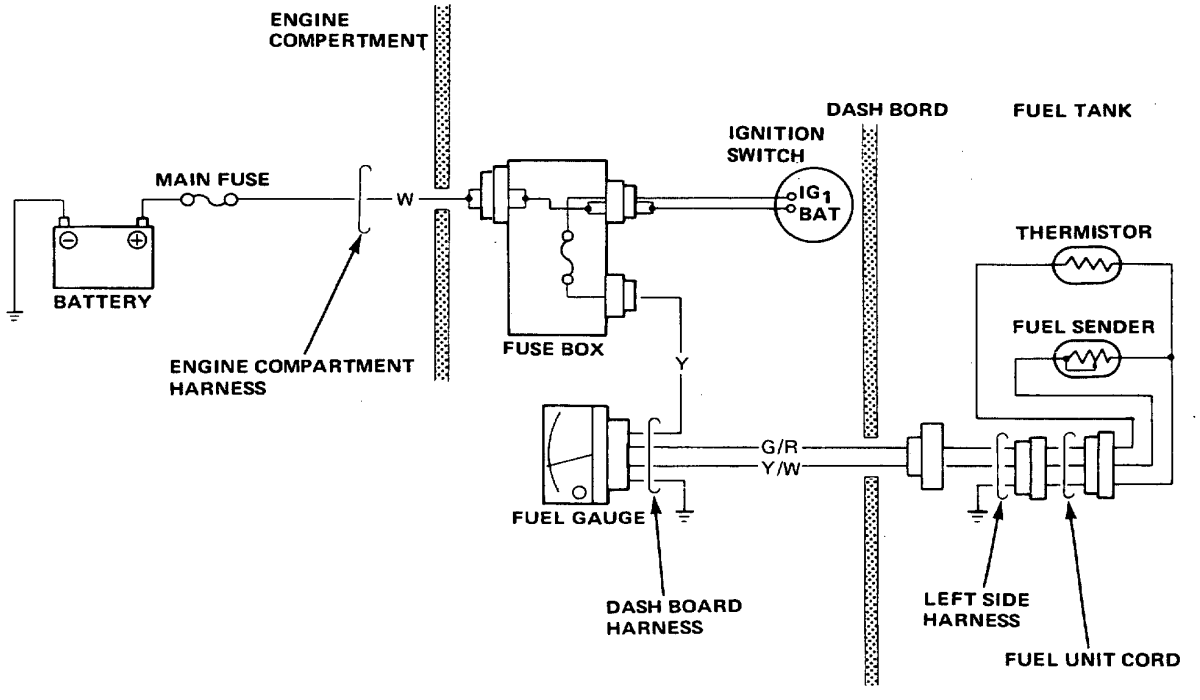
NOTE: If both the fuel gauge and temperature gauge malfunction simultaneously (and show F and H respectively) first check for a faulty voltage stabilizer attached to the fuel gauge; there may be nothing wrong with the gauges or sensors them selves.

1. Pull out the fuel gauge connector under the car.
2. Check that ignition switch is OFF.
3. Disconnect fuel sending unit connector to check fuel gauge continuity and movement.
4. Connect the yellow/white wire to the black wire using a jumper wire as shown.
5. Turn ignition switch ON and watch the fuel gauge; turn the ignition OFF as soon as gauge needle stops moving. Needle should have moved to FULL mark.

   CAUTION: Do not leave ignition ON for longer than 5 seconds or fuel gauge will be damaged.

   - If gauge needle went to FULL, re-connect sending unit wires and go on to sending unit test on next page.
   - If needle did not go to FULL, check fuse, wiring and connectors. If OK, replace gauge and re-test.





Fuel Gauge Sending Unit

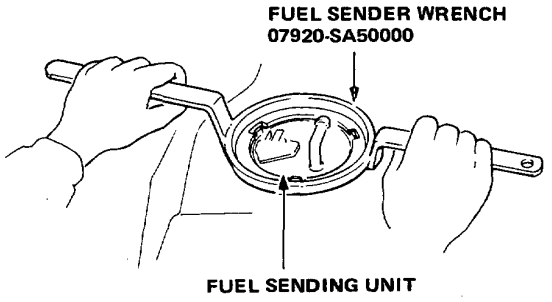
Testing

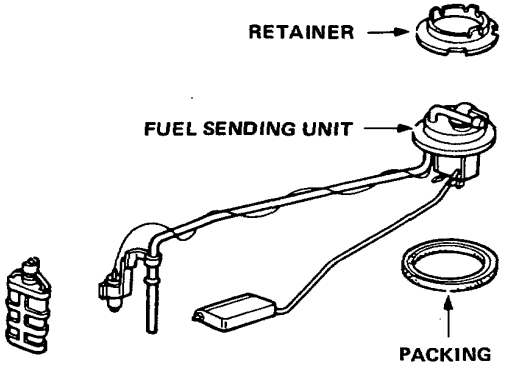
1. Check that ignition switch is OFF, then disconnect fuel sending unit connector at tank.

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

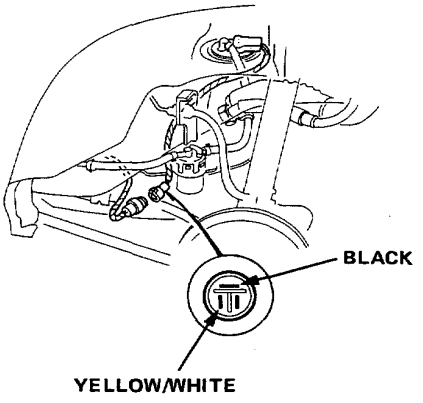
2. Drain and remove fuel tank as shown on page 11-10.

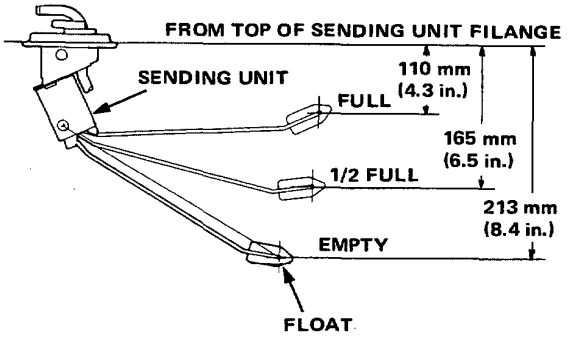
3. Remove fuel sending unit from tank.





4. Measure resistance between the yellow/white wire and black wire at the 3 float positions shown below.





FLOAT POSITION	RESISTANCE (OHMS)	FUEL VOLUME
EMPTY	105–110	4ℓ (15.1 US gal.)
1/2 FULL	15.5–39.5	30ℓ (113.6 US gal.)
FULL	2–5	57ℓ (215.8 US gal.)

- If the resistance is correct, check the float of the sending unit. If OK, replace the fuel gauge and re-test.
- If resistance is incorrect, replace sending unit. Test new unit as described above before installing it.

Low Fuel Warning Light

Testing

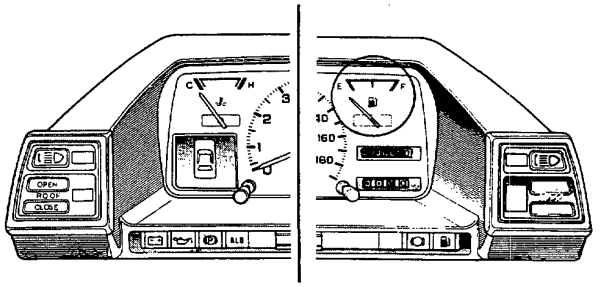
1. Park car on level ground.

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

2. Drain fuel tank into an approved container.

3. Add less than 10ℓ (2.64 U.S. Gal.) of fuel and turn the ignition switch on.

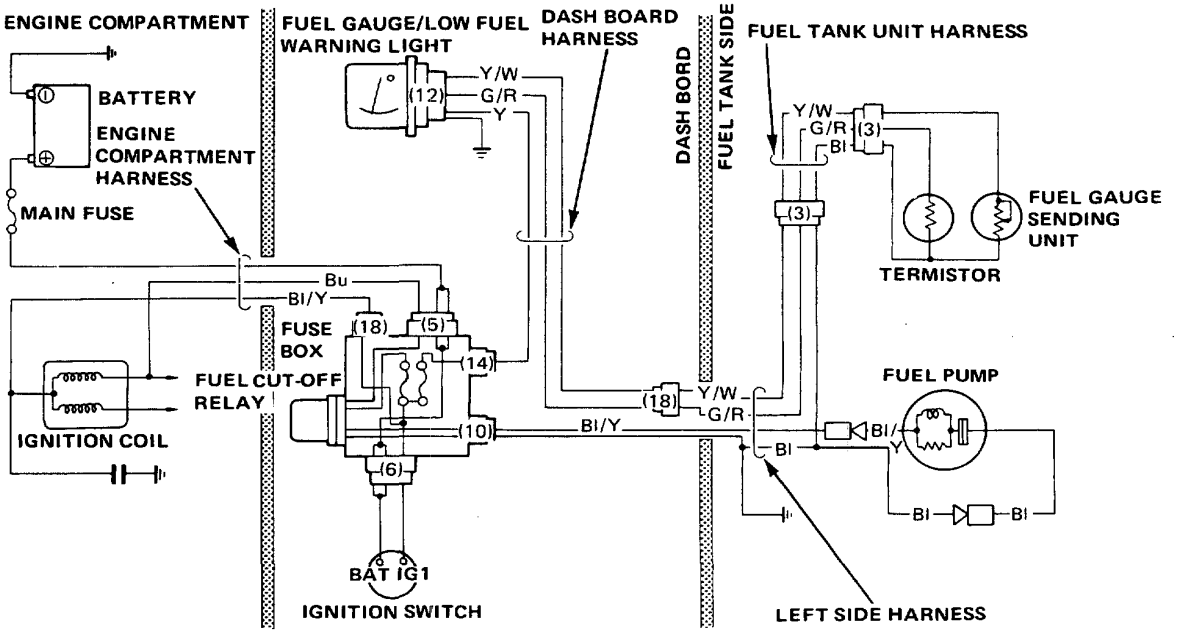
   The low fuel warning light should come on within 3 minutes.



- If light comes on within 3 minutes, go on to step 4.
- If light does not come on, remove the gauge assembly from the instrument panel and check bulb. Replace if necessary and re-test.
  - If the bulb is OK, but does not come on, or only comes on dimly, check the circuit between the gauge and tank.

4. Add fuel so the total fuel will be more than 11.5ℓ (3.04 U.S. Gal.) and check that the light goes off.

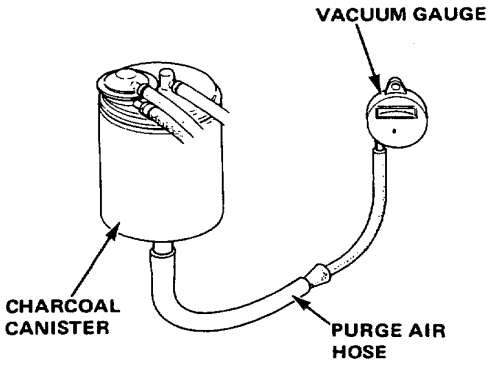
   - If light does not go off, check for short circuit in the wire harness or in the printed circuit. If no short circuit, replace fuel sending unit.
   - If light goes off, turn off key; test is complete.



Charcoal Canister

Inspection

1. Remove fuel filler cap.
2. Remove canister purge air hose from frame and connect hose to vacuum gauge as shown.



3. Start engine and raise speed to 3500 min^{-1} (rpm).

   Vaccum should appear on gauge within 1 minute.

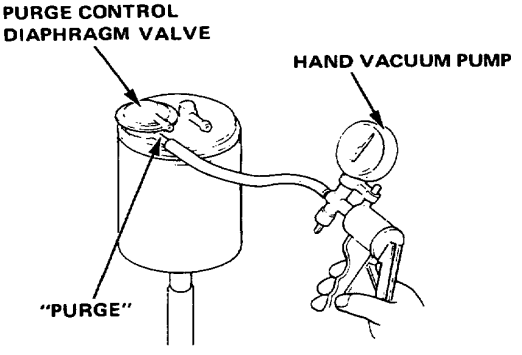
   - If vacuum appears on gauge in 1 minute, remove gauge and go on to step 8.
   - If no vacuum, disconnect vacuum gauge and reinstall fuel filler cap, go on to step 4.

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

   - If defective, replace canister.
   - If OK, go on to step 5.

5. Connect hand vacuum pump to canister "purge" fitting as shown, and draw vacuum.

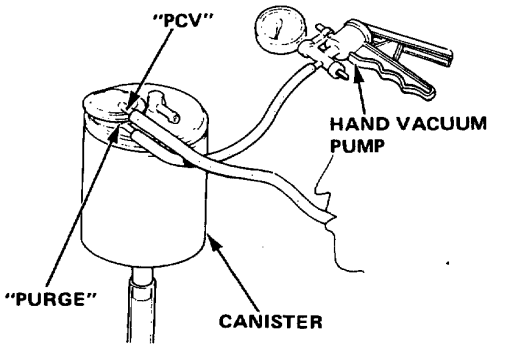
   Vacuum should remain steady.



   - If vacuum remains steady, go on to step 6.
   - If vacuum drops, replace canister and re-test.

6. Draw air from canister "PCV" fitting as shown.

   "PURGE" side vacuum should drop to zero.



   - If "PURGE" side vacuum does not drop to zero, replace canister and re-test.
   - If "PURGE" side vacuum drops to zero disconnect vacuum pump, and go on to step 7.

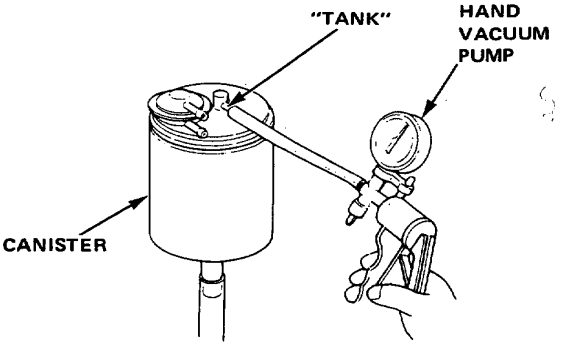
7. Connect hand vacuum pump to canister "PCV" fitting and draw vacuum.

   Vacuum should remain steady.

   - If vacuum remains steady, go on to step 8.
   - If vacuum drops, replace canister and re-test.

8. Connect vacuum pump to "TANK" fitting as shown, and draw vacuum.

   There should not be any vacuum.



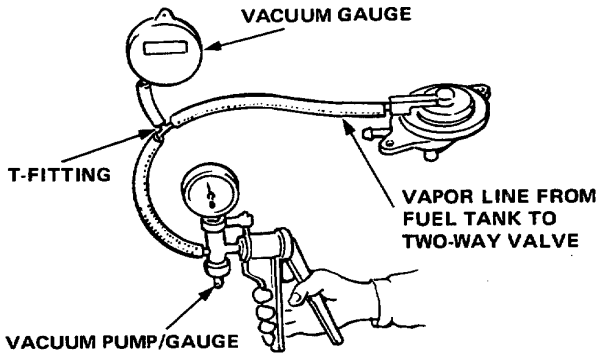
   - If no vacuum, reinstall fuel filler cap and canister, test complete.
   - If there is vacuum, replace canister and re-test.

Two-way Valve

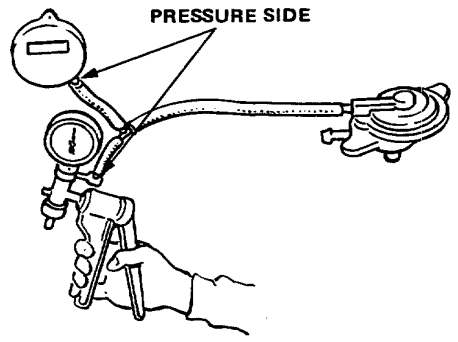
Inspection

[KQ and KC types]

1. Remove fuel filler cap.
2. Remove vapor line from liquid/vapor separator pipe and connect to T-fitting from vacuum gauge and vacuum pump as shown.



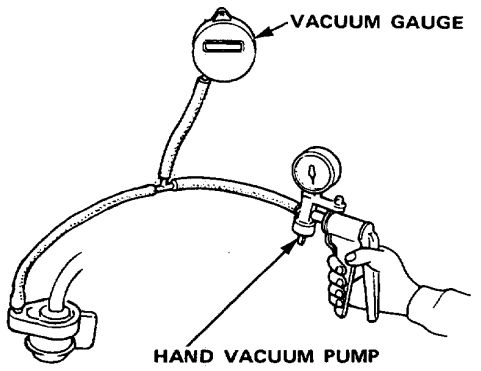
3. Slowly draw a vacuum while watching the gauge.
   Vacuum should stabilize at 5 to 15 mmHg (0.2 to 0.6 in. Hg).
   - If vacuum stabilizes momentarily (two-way valve opens) between 5 and 15 mmHg (0.2 and 0.6 in. Hg), go on to Step 4.
   - If vacuum stabilizes (valve opens) below 5 mmHg (0.2 in. Hg) or above 15 mmHg (0.6 in. Hg), install new valve and re-test.
4. Move hand pump hose from vacuum to pressure fitting, and move vacuum gauge hose from vacuum to pressure side as shown.



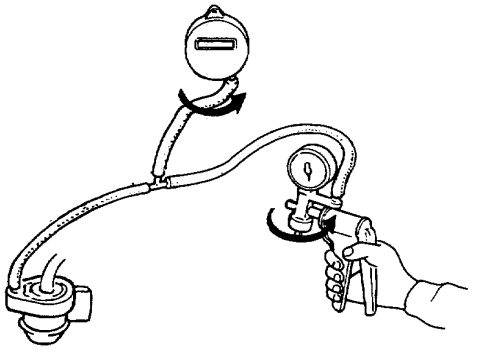
5. Slowly pressurize the vapor line while watching the gauge.
   Pressure should stabilize at 25 to 55 mmHg (1.0 to 2.2 in. Hg).
   - If pressure momentarily stabilizes (valve opens) at 25 to 55 mm Hg (1.0 to 2.2 in. Hg), the valve is OK.
   - If pressure stabilized below 25 mmHg (1.0 in. Hg) or above 55 mmHg (2.2 in. Hg), install a new valve and re-test.

[except for KQ and KC types]

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



3. Slowly draw a vacuum while watching the gauge. Vacuum should stabilize at 15 to 30 mmHg (0.6 to 1.2 in. Hg).
   - If vacuum stabilizes momentarily (Two-way Valve opens) between 15 and 30 mmHg (0.6 and 1.2 in. Hg), go on step 4.
   - If vacuum stabilizes (valve opens) below 15 mmHg or above 30 mmHg (1.2 in. Hg), install new valve and retest.
4. Move hand pump hose from vacuum to pressure fitting, and move vacuum gauge hose from vacuum to pressure side as shown.



5. Slowly pressurize the vapor line while watching the gauge.
   Pressure should stabilize at 5 to 15 mmHg (0.2 to 0.6 in. Hg).
   - If pressure momentarily stabilizes (Valve opens) at 5 to 15 mmHg (0.2 to 0.6 in. Hg), the valve is OK.
   - If pressure stabilizes below 5 mmHg (0.2 in. Hg) or above 15 mmHg (0.6 in. Hg), install a new valve and re-test.

MEMO

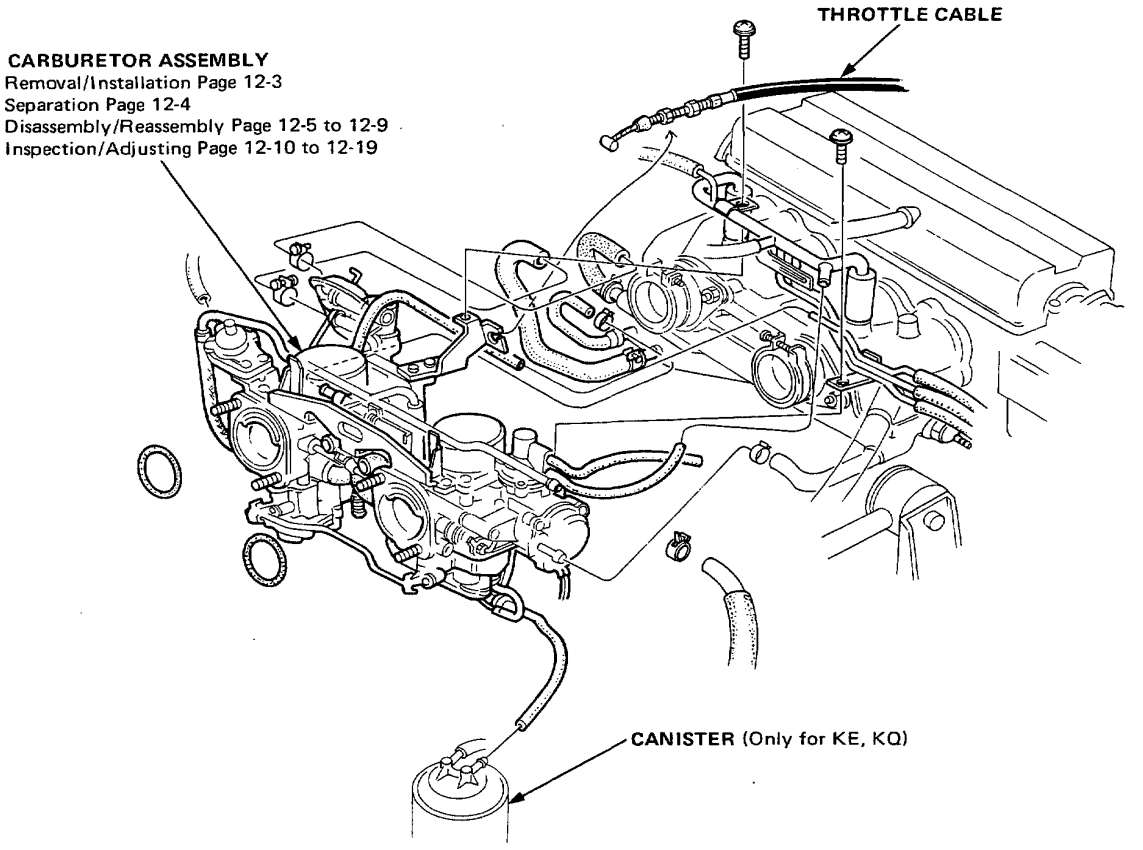
Carburetor

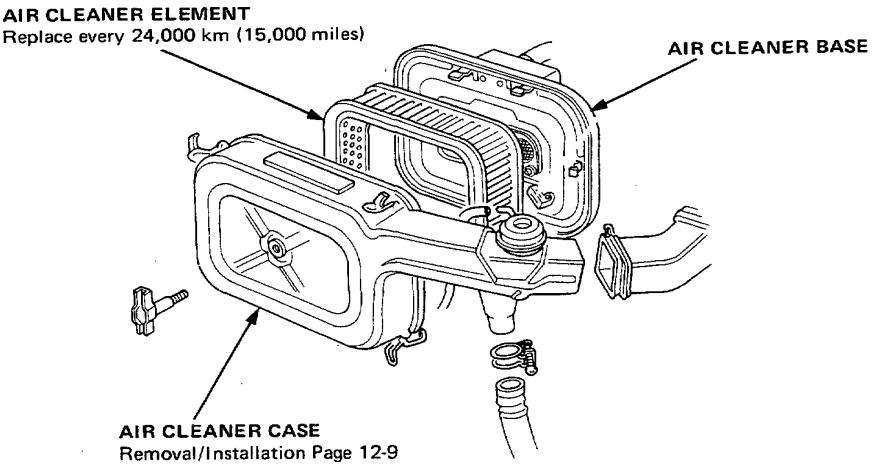
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Carburetor

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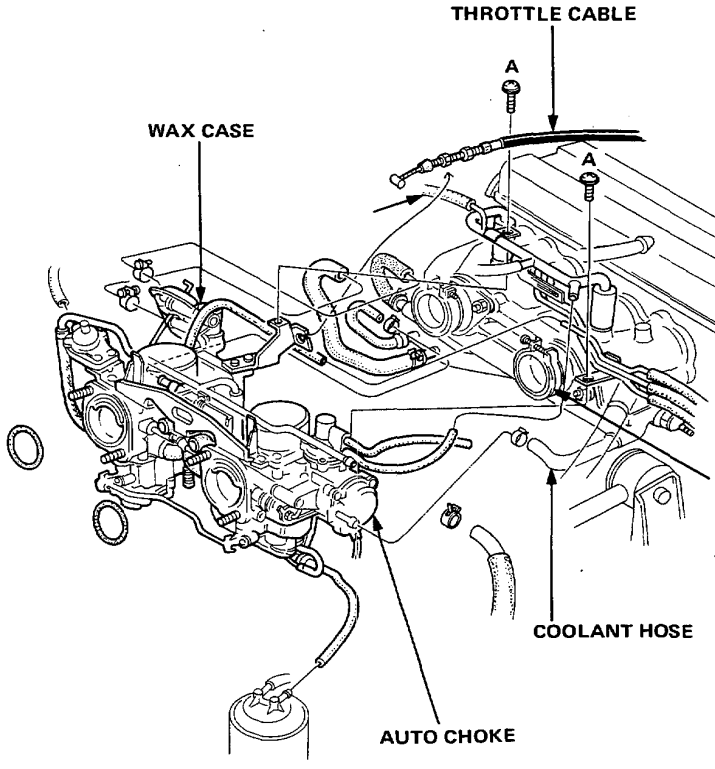
Removal/Installation

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

1. Remove the air cleaner case.
2. Disconnect the install pipes.

   NOTE: Disconnect all tubes at the carburetors.
3. Disconnect the throttle cable.
4. Disconnect the vacuum tube from the throttle opener diaphragm.
5. Disconnect auto choke lead.
6. Disconnect the coolant hose from the wax case.

   NOTE: Receive coolant drained with a shop towel when disconnecting the hose.
7. Disconnect the coolant hose at the right side of the front bracket.
8. Loosen the insulator band and remove the carburetors.



NOTE: The install pipes can be removed by removing the two screws (A).

NOTE: When installing the carburetors, make sure that the distance between the carburetor and insulator band is 0–2 mm (0–0.8 in.).

Installation:

Install the carburetors in the reverse order of removal.

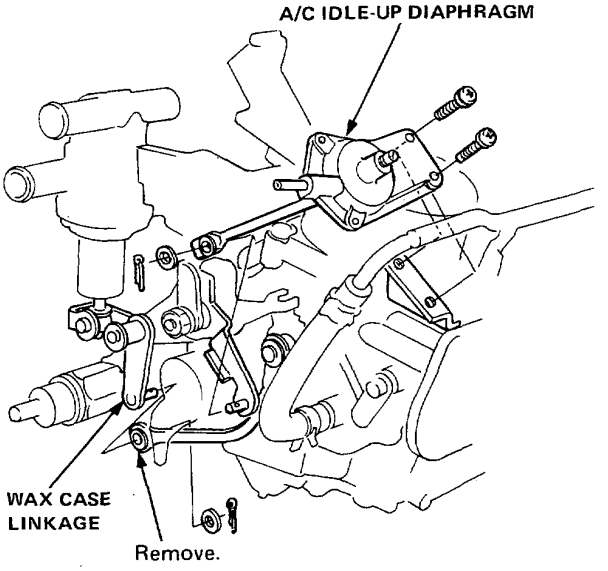
1. After installing, bleed air from the system. Check the level of coolant and add up to the proper level if necessary.
2. Check idle speed, exhaust pollutants and carburetor synchronization, and adjust as necessary.
3. Make sure that the carburetor air horns are inserted into the insulators properly.

Carburetor

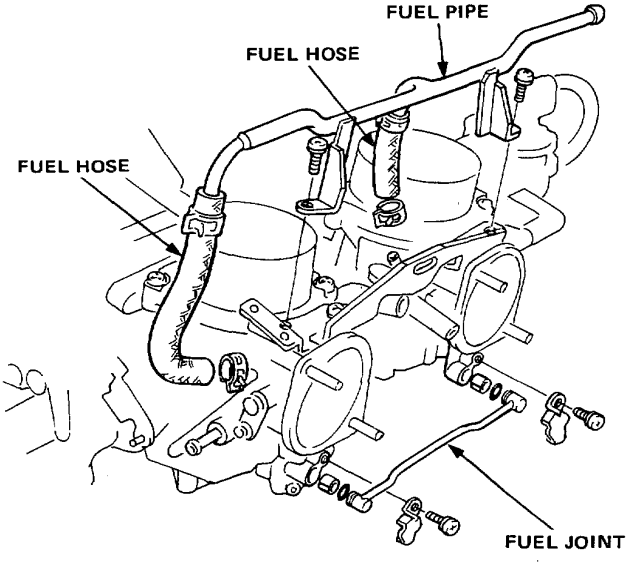
Separation

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

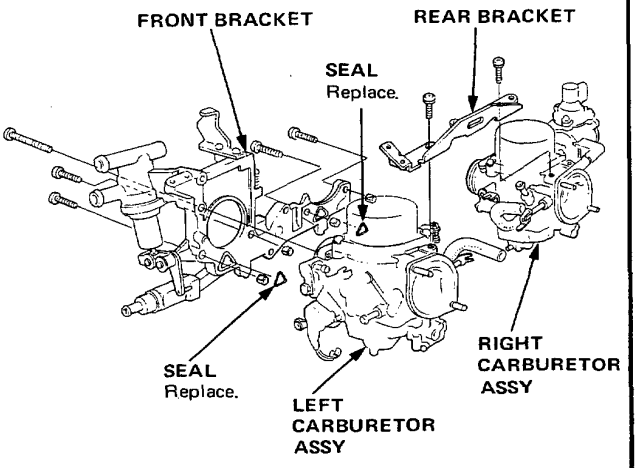
1. Remove the carburetor (see page 12-3).
2. Disconnect the wax assembly linkage at the position shown.
3. On cars equipped with an air conditioner, remove the idle-up diaphragm.



4. Remove the fuel hose, fuel pipe and fuel joint.



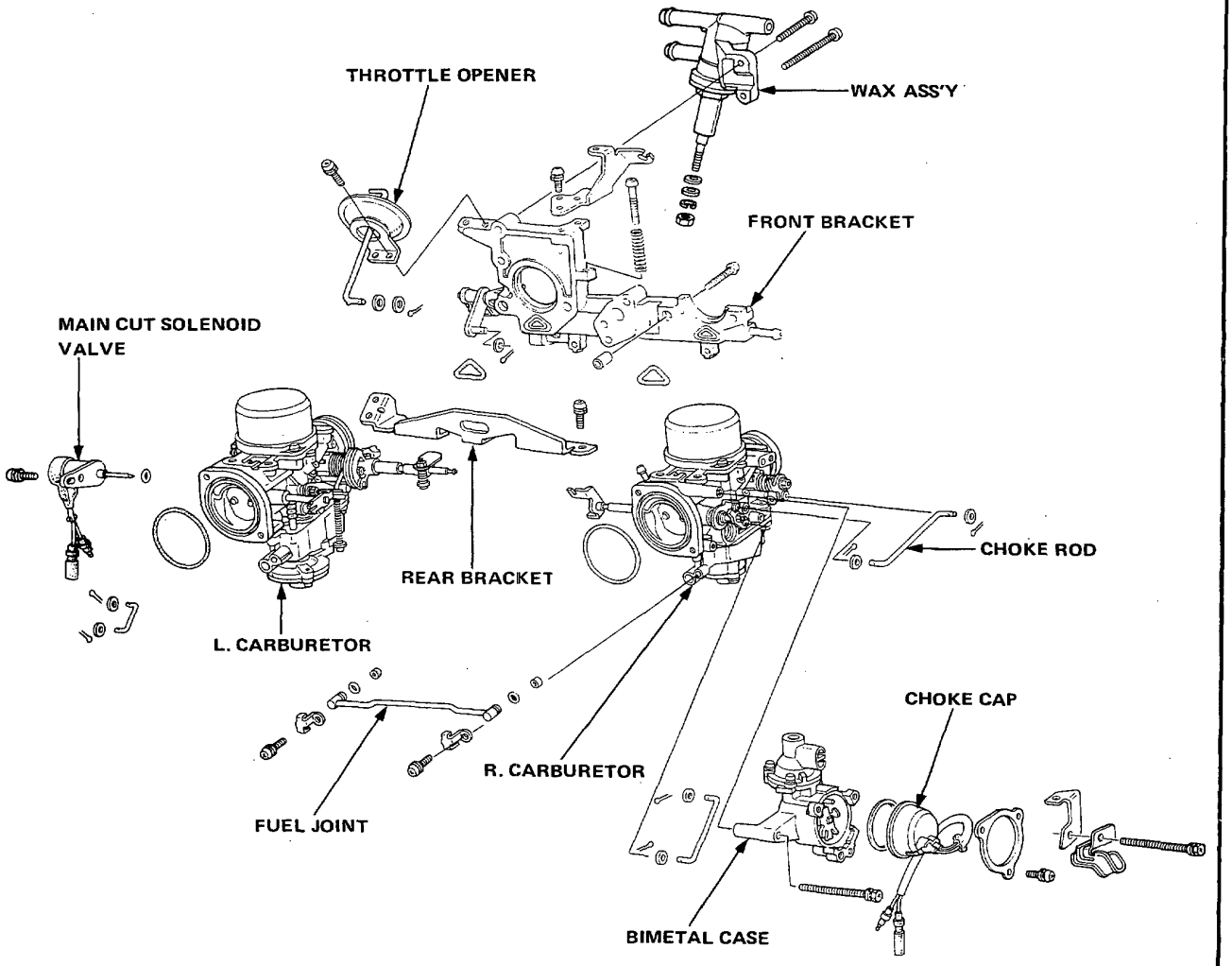
5. Remove the rear and front brackets; separate the right and left carburetors.



Disasscmbly/Reassembly

CAUTION:

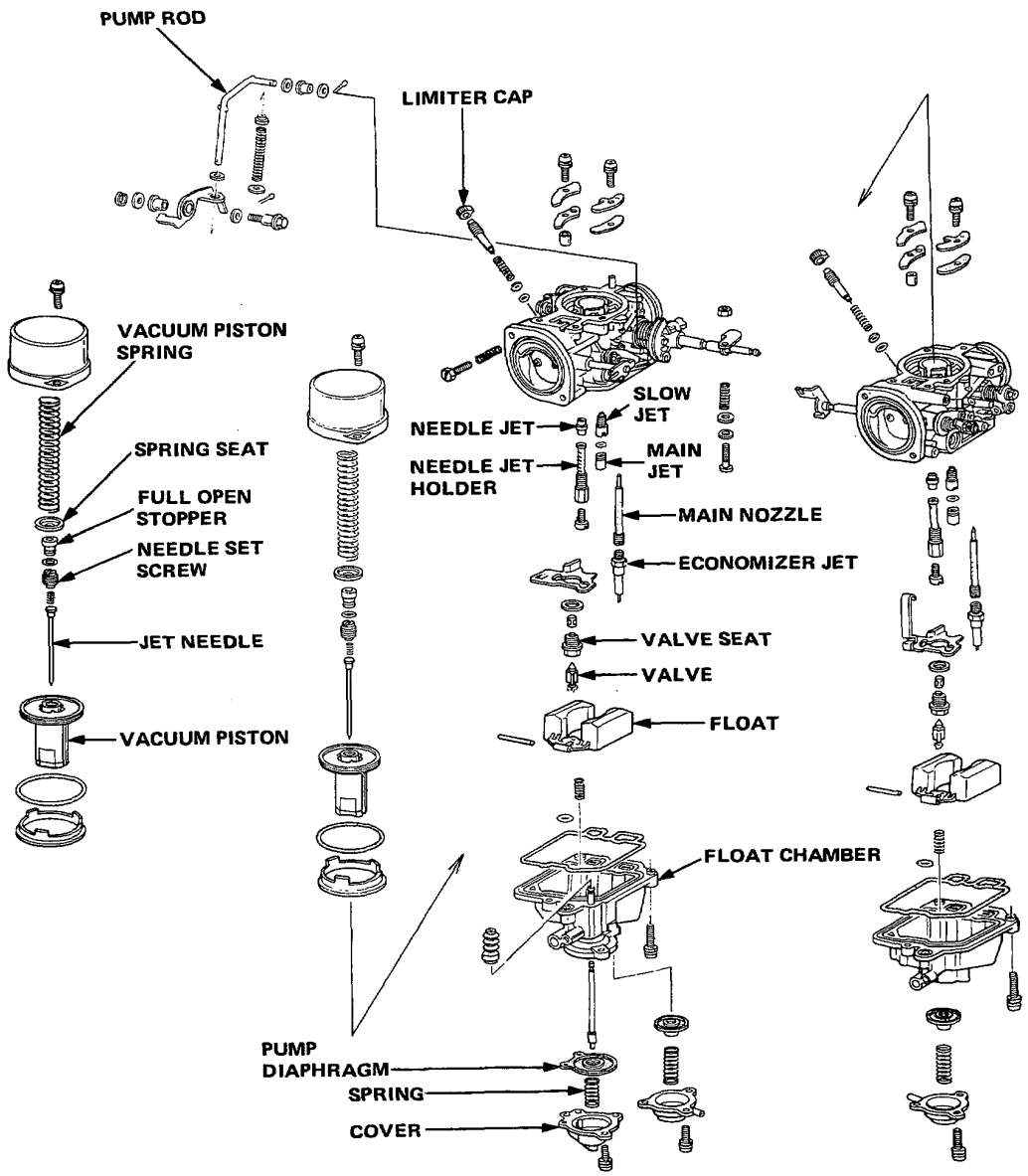
- As the carburetor parts are small always use hand tools that specifically correspond to the sizes of the fastners to be removed.
- The carburetor must be disassembled in a clean area and washed in gasoline.
- Use compressed air to clean jet orifices and fuel passages. Do not use a wire.
- Do not disassemble the throttle and choke valves and their shafts.
- Replace with new parts as a set if so required in the parts list.
- After cleaning the carburetor, apply coat of silicon oil.



(cont'd)

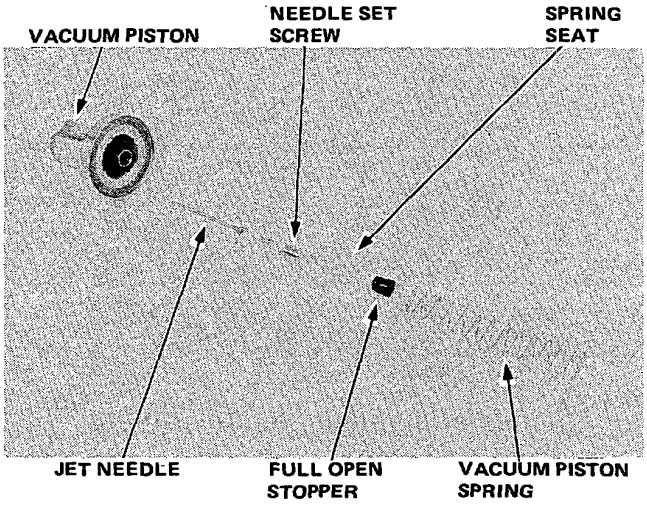
Carburetor

Disassembly/Reassembly (cont'd)



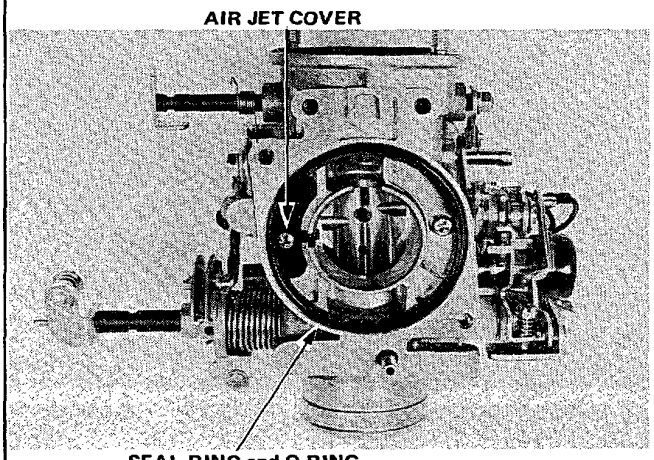
1. Remove the vacuum cylinders from the carburetor bodies. Carefully lift the vacuum piston out with its needle and compression spring.
   Inspect the vacuum piston and cylinder for wear, nicks, scratches or other damage. Make sure that the piston moves up and down freely in the cylinder.

2. Remove the full open stopper.



   Remove the needle set screw.
   Separate the jet needle from the piston.
   Inspect the needle and seat for deposits, grooves, or other damage.

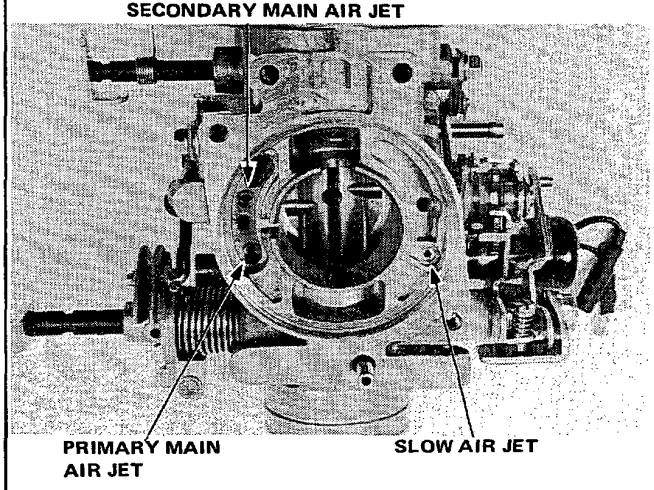
3. Lift the seal ring and O-ring off the carburetor body.



   Remove air jet cover.

4. Blow open the primary main air jet, secondary main air jet and slow air jet with compressed air.

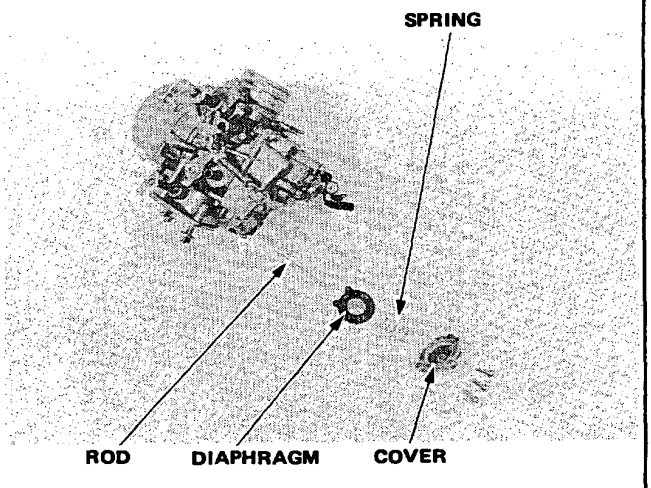
   CAUTION: Never clean carburetor jets with wire or drills. This will enlarge the openings and result in excessive fuel consumption.



Carburetor

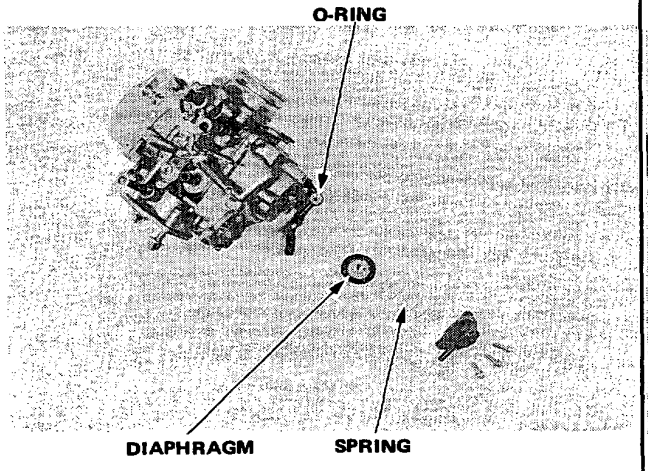
Disassembly/Reassembly (cont'd)

5. Remove the accelerator pump cover and spring.



Remove the diaphragm. Inspect the diaphragm for cracks and brittleness.
Be sure the accelerator pump rod is not bent.

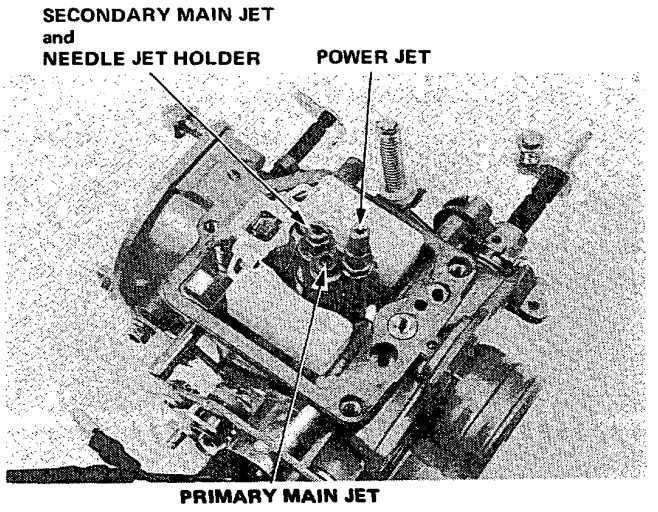
6. Remove the power valve cover and spring.



Remove the diaphragm.
Take out the O-ring.

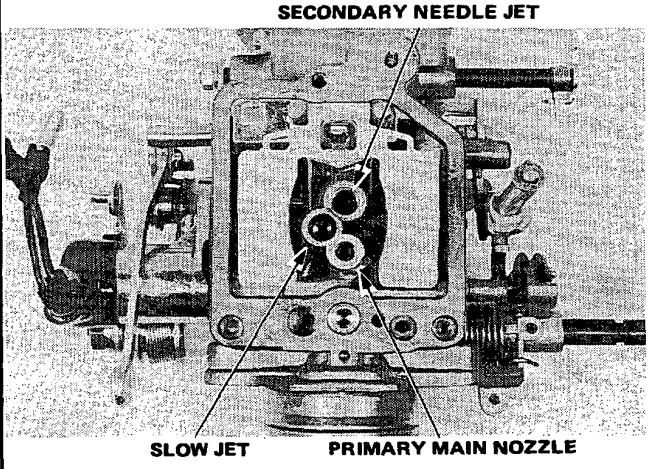
Inspect the diaphragm for cracks and brittleness.

7. Remove the float chamber body.
Remove the power jet.
Inspect the power jet for bent.



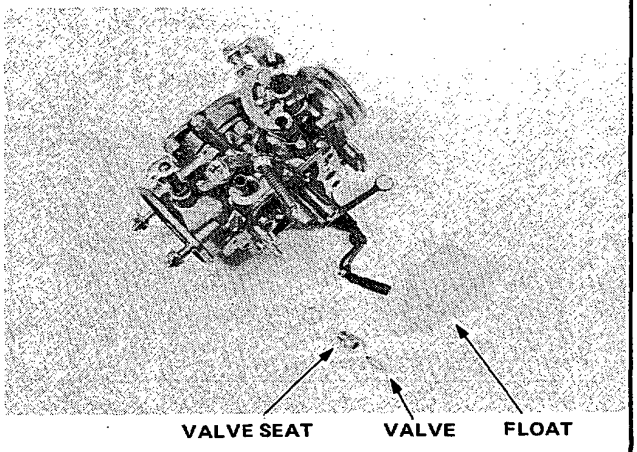
Remove the secondary main jet and needle jet holder.
Remove the primary main jet.

8. Take out the secondary main nozzle.



Remove the primary main nozzle and slow jet.
Blow open all jets and body openings with compressed air.

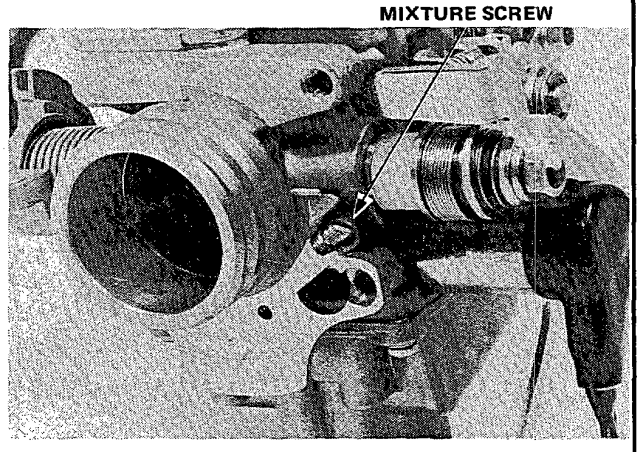
9. Remove the float arm pin.
Remove the float, float valve, seat and O-ring.



Inspect the float valve and seat for grooves, nicks, deposits or other defects.
Clean the valve seat filter.

10. Turn the mixture screw in and carefully count the number of turns before it seats lightly. Make a note of this to use as a reference when reinstalling the mixture screw.

CAUTION: Damage to the mixture screw seat will occur if the mixture screw is tightened against the seat.



Inspect the mixture screw for wear and replace if necessary.

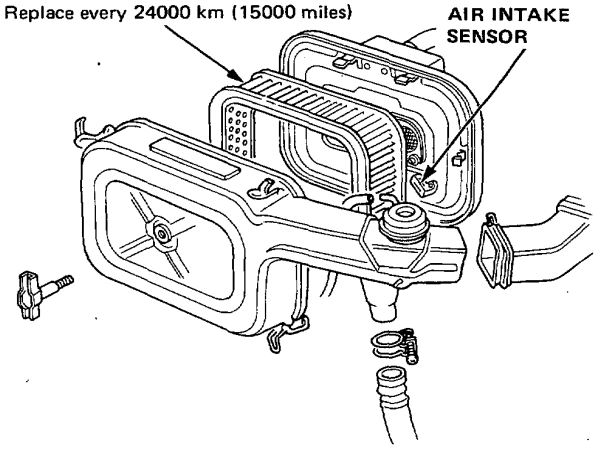
Install new hole cap.

Air Cleaner

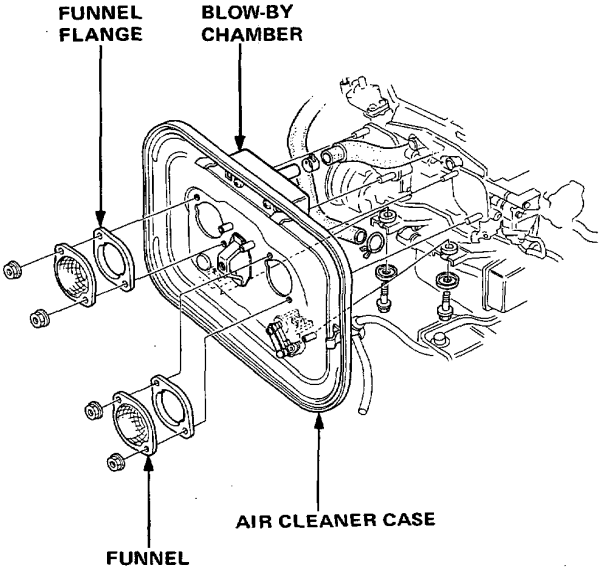
Removal/Installation

1. Disconnect the air intake and hot air pipes.
2. Disconnect the vacuum tube from the control valve diaphragm.
3. Remove the air cleaner cover with the air cleaner element.

NOTE: Avoid damaging the element with the air intake sensor when removing it.



4. Disconnect the tube from the blow-by chamber at the back of the air cleaner case.
5. Remove the funnels and flanges, then remove the air cleaner case.



Idle Speed and Mixture

Adjustment

[Except Canada model]

NOTE: Ignition timing and valve clearance must be correct, and engine must be at normal operating temperature.

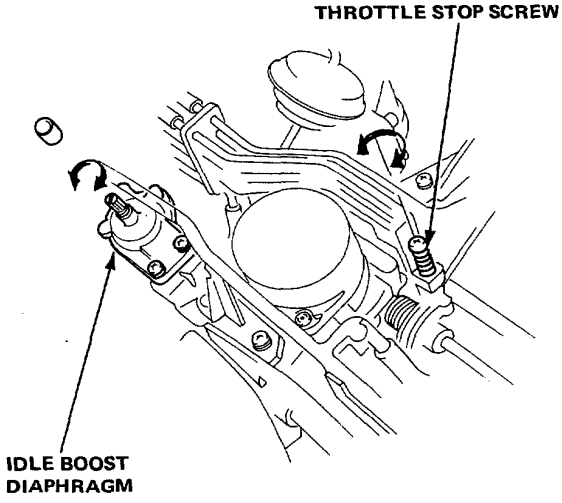
WARNING **Do not smoke during this procedure. Keep any open flame away from your work area.**

CO Meter Method

1. Warm-up and calibrate the NDIR CO Meter in accordance with the manufacturer's recommended procedures.
2. Insert exhaust gas sampling probe into the tail pipe at least 40 cm (16-inches).
3. Check specification for idle speed and CO with the headlights OFF (on swedish model: on) and cooling fan OFF.

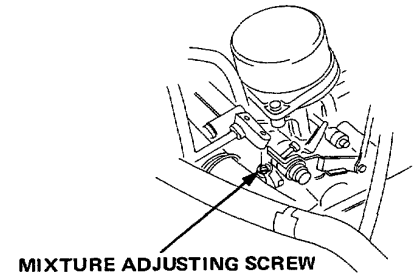
Transmission	Idle Speed
Manual Transmission	750 ± 50 min^{-1} (rpm)
Hondamatic (in gear)	750 ± 50 min^{-1} (rpm)

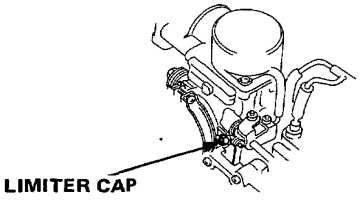
Specified CO%	below 3.0% (Except Australia, Sweden and Switzerland) 0.5–2.0% (Australia, Sweden and Switzerland



4. If unable to obtain this reading with the limiter cap in place, remove the cap. Adjust the mixture adjusting screw to obtain specified CO%, recheck the engine idle speed and reset if necessary. Finally recheck the CO reading and replace the limiter cap.

   NOTE: Turn each mixture adjusting screw equally.





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

5. If car is equipped with air conditioning, recheck idle speed with A/C on: Speed should still be within specification.
   If the speed is outside the spec, remove the rubber cap on the idle boost diaphragm and adjust by turning adjusting screw.

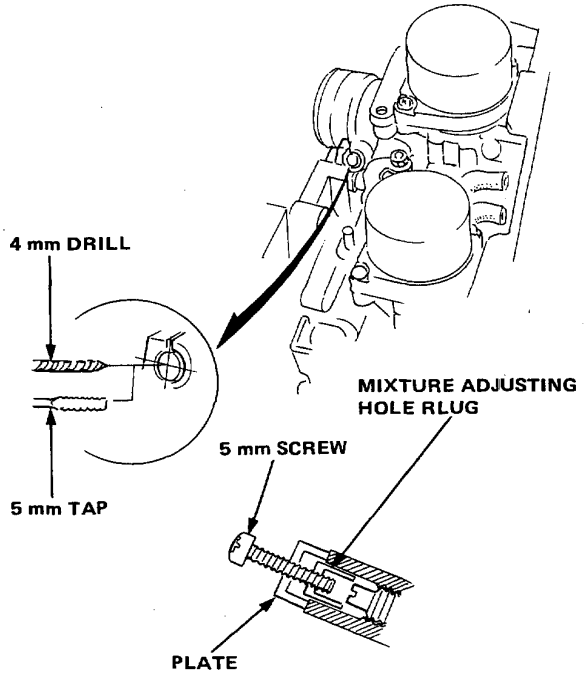
Adjustment

[For Canada model]

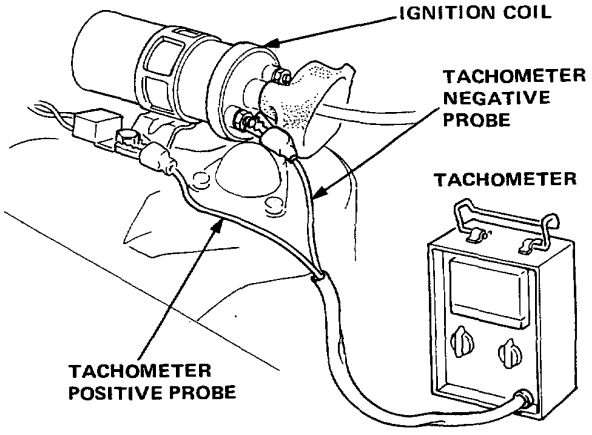
WARNING **Do not smoke during this procedure. Keep any open flame away from your work area.**

CO Meter Method

1. Remove air cleaner.
2. Disconnect vacuum tubes, fuel line, install pipe throttle cable, choke cable and water hose from carburetor.
3. Remove carburetor.
4. To remove the mixture adjusting screw hole plug.



5. Replace the carburetor, vacuum tubes, fuel line, install pipe, throttle cable, choke cable and water hose.
6. Install air cleaner.
7. Start engine and warm up to normal operating temperature; the cooling fan will come on.
8. Connect tachometer.



9. Warm-up and calibrate the NDIR CO Meter in accordance with the manufacturer's recommended procedures.
10. Insert exhaust gas sampling probe into the tail pipe at least 40 cm.
11. Check specification for idle speed and CO with the headlights OFF and cooling fan OFF.

Transmission	Idle Speed
Manual Transmission	750 ± 50 min^{-1} (rpm)
Hondamatic (in gear)	750 ± 50 min^{-1} (rpm)

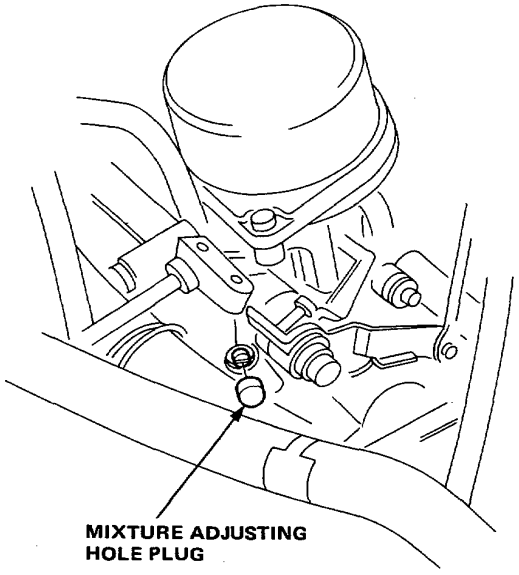
Specified CO%	below 2.0%

Idle Speed and Mixture

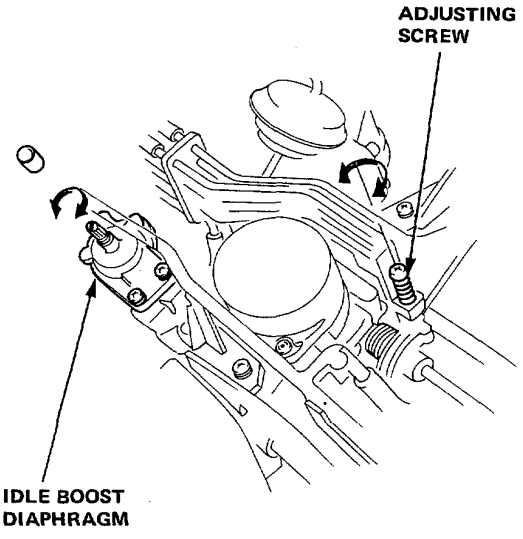
Adjustment (cont'd)

12. Adjust the mixture adjusting screws to obtain specified CO%, recheck the engine idle speed and reset if necessary. Finally recheck the CO reading and replace the mixture adjusting hole plugs. If unable to obtain a CO reading of specified % by this procedure, check the engine tune-up condition.

    NOTE: Turn each mixture adjusting screw equally.



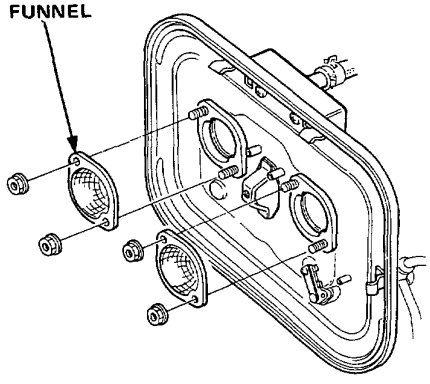
13. If car is equipped with air conditioning, recheck idle speed with A/C on: Speed should still be within specification.
    If the speed is outside the spec, remove the rubber cap on the idle boost diaphragm and adjust by turning adjusting screw.



Syncronization

Inspection/Adjustment

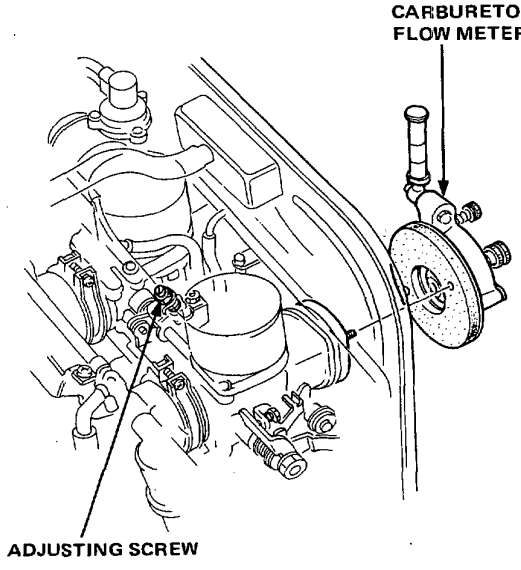
1. Connect tachometer, start engine and allow to reach normal operating temperature (cooling fan comes on).
2. Remove air cleaner and funnel.



3. Measure air flow using flow meter.

   NOTE: Follow flow meter manufacturer's instructions.

4. If air flow at each intake is different, loosen the lock nut and adjust with adjusting screw.



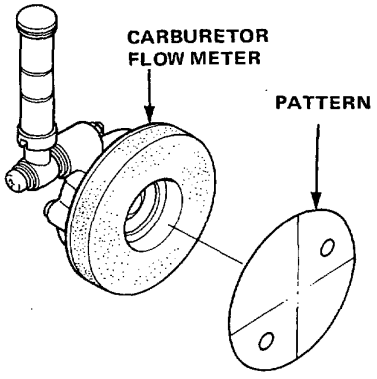
   Turning adjusting screw to right.
   Air flow on right carburetor decreases.
   Turning adjusting screw to left:
   Air flow on right carburetor increases.

5. If air flow can not be satisfactorily balanced, check following possible causes.

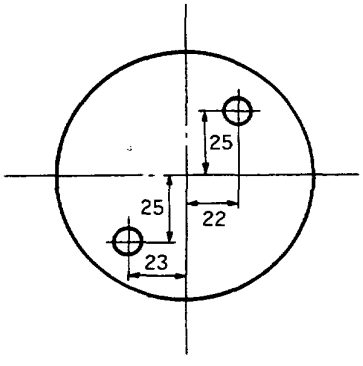
   - Vernturi or throttle valve carbonized
   - Air leaking into manifold

6. Retighten the lock nut securely.
7. Recheck synchronization and idel speed.
8. Disconnect tachometer and reinstall air cleaner.

   NOTE: Use commercially available flow meter and drill two holes as illustrated,



To facilitate operation, prepare a pattern as shown and drill two 6.2 mm holes at the locations designated.

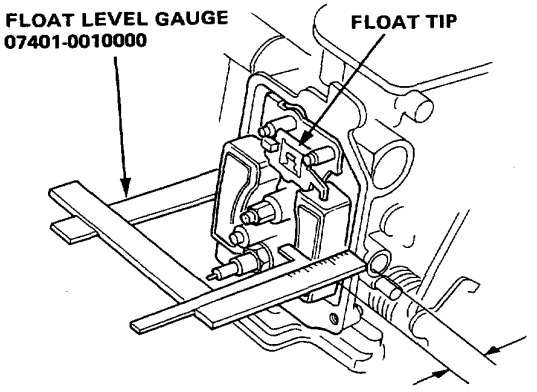


Float Level Inspection

Disassembly/Reassembly refer to page 12-8.

1. Remove the float chamber.
2. Using the float level gauge, measure the float level with the float tip lightly contacting the float valve and the carburetor inclined 0°–30° from vertical.

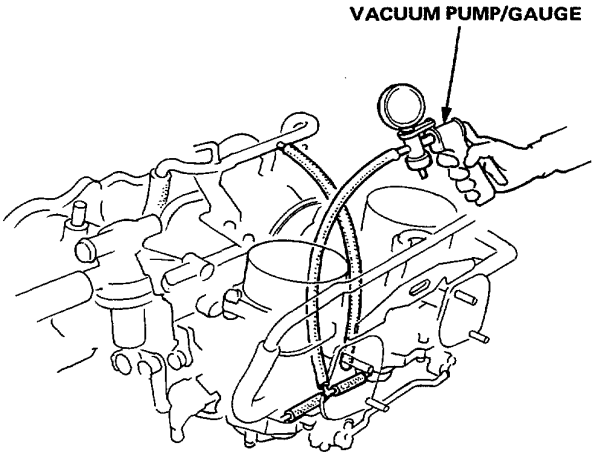
   Float Level: 16±1 mm (0.6 ± 0.04 in.)



3. Adjust if necessary.

Power Valve Inspection

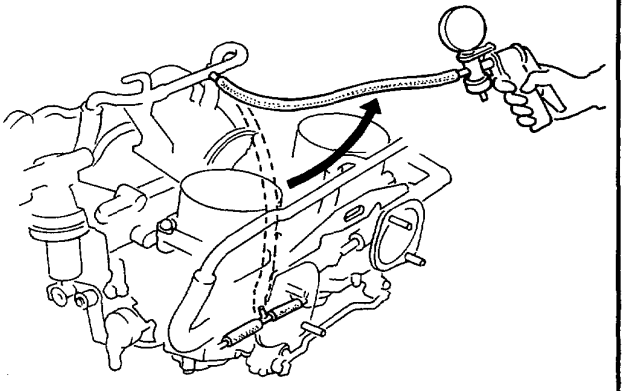
1. Disconnect the hose from the power valve and connect a hand vacuum pump to the valve. Draw vacuum.



Vacuum should remain steady.

- If vacuum remains steady, go on to step 2.
- If vacuum decreases, replace the diaphragm and re-test.

2. Start the engine and disconnect the hose from the power valve and connect a vacuum gauge to the hose.
   Vacuum should be available.
   - If vacuum is available, the system is OK.



Automatic Choke

Choke Linkege Inspection

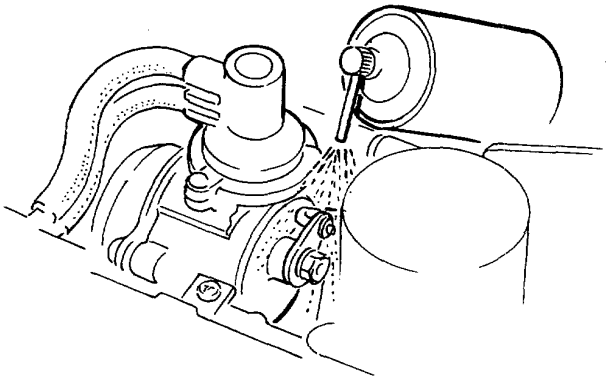
COLD ENGINE

1. Remove the air cleaner.
2. Open and close the throttle fully to let the choke close.

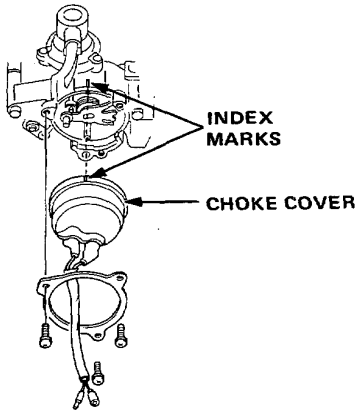
   The choke blade should close completely.

   NOTE: Above about 28°C (82°F), the choke will not close completely, but should still close to less than 1 mm (3/64 in.).

   - If the choke closes properly, go on to the fast idle unloader test in the next column.
   - If the choke does not close properly, spray its linkage with carburetor cleaner: use a spray can with an extension on the nozzle. Now, check the choke again.



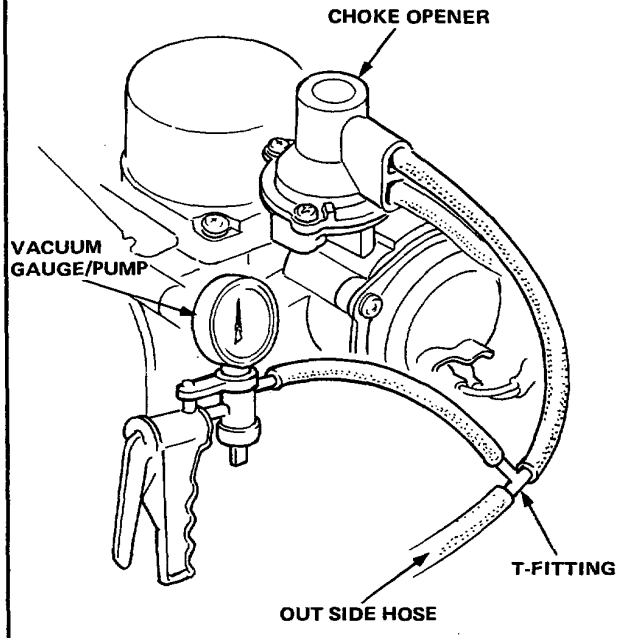
   - If the choke still does not close properly, remove the choke cover (page 12-16) and inspect the linkage for free movement. Repair or replace parts as necessary. Then reinstall the cover and adjust it so the index marks line up, and re-test.



   - If the choke still does not close properly, replace the cover. (page 12-16)

Choke Coil Tension and Linkage

1. Disconnect the out side hose.
2. Connect a hand vacuum pump/gauge to the disconnected hose as shown.
3. Start the engine and check for vacuum.



Above 15°C (43°F) Vacuum should remain steady.
Below 15°C (43°F) Vacuum should drop.

Check the thermovalve if necessary.

Automatic Choke

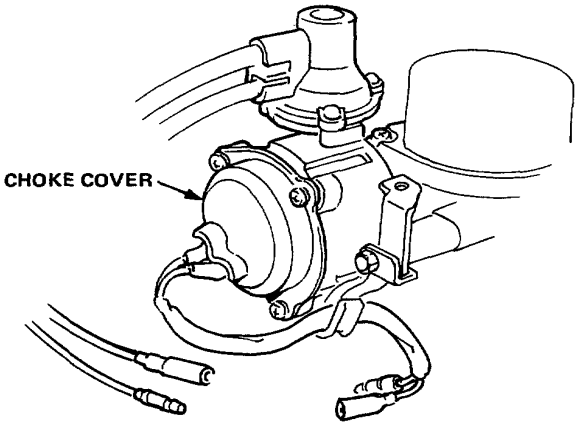
Choke Coil Heater Inspection

Start the engine and let it run. As the engine reaches normal operating temperature, the choke blade should fully open:

- If it does, go on to the fast idle test on page 12-18.
- If it doesn't, inspect the linkage, and clean or repair it as necessary.

If the choke still does not open all the way, disconnect the choke cover wire from the engine compartment wire harness and measure the voltage between the wire and ground.

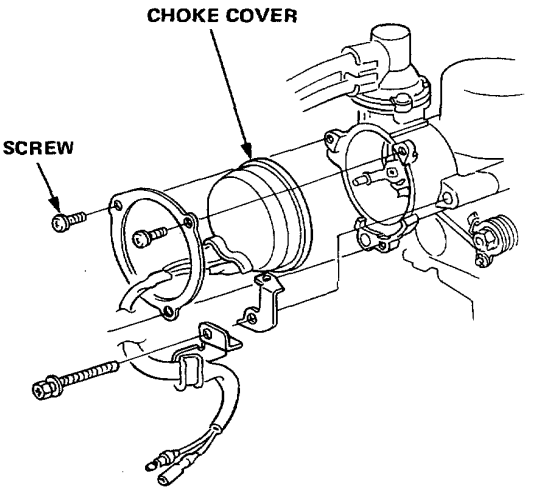
There should be battery voltage with the engine running.



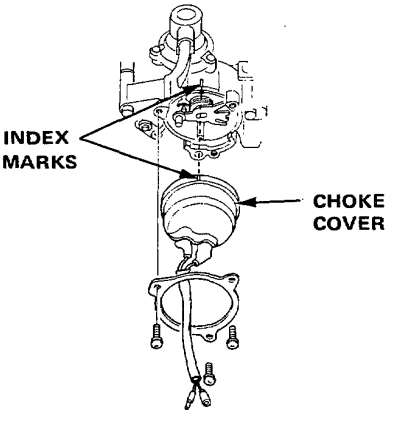
– If the voltmeter reads 0 volts, check for an open circuit in the wire between the choke cover connector and voltage regulator connector, then check the charge warning light circuit.

Choke Cover Replacement

1. Remove the air cleaner.
2. Disconnect the choke heater wire.
3. Remove the three screws and set plates.
4. Remove the choke cover.



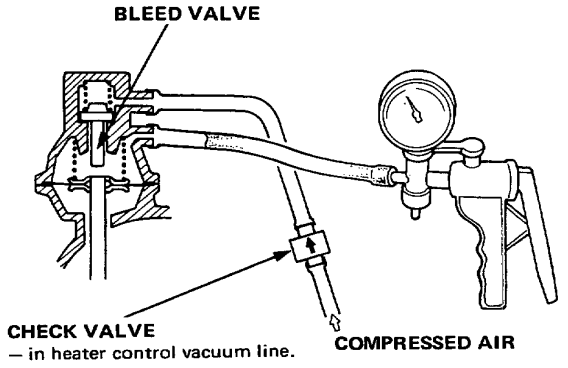
5. Install a new choke cover by fitting the choke drive lever boss to choke bimetal end hook.
6. Align the index marks by turning it clockwise and tighten the screws.



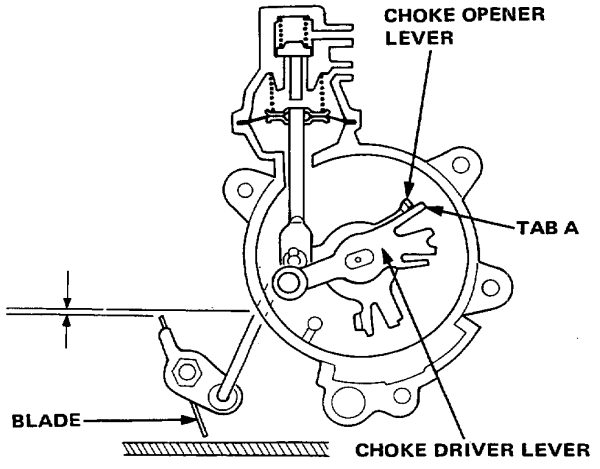
7. Connect the choke heater wire and install the air cleaner.

Choke Linkage Adjustment

1. Remove the air cleaner.
2. Remove the choke cover (page 12-16).
3. Disconnect the choke opener hose from the thermovalve, and attach a check valve and hand vacuum pump to it as shown. Then pressurize the choke opener with compressed air to hold the bleed valve in it closed. and vacuumize (100–200 mm Hg) the choke opener with vacuum pump to hold the choke opener rod in it half stroked.



4. Turn the choke drive lever counter clockwise until it taches to the choke opener lever and measure the clearance between the choke blade and casting.

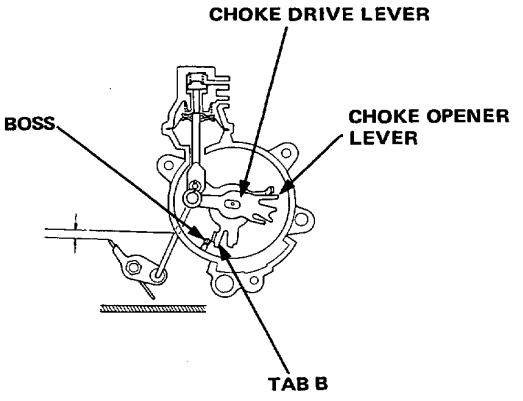


1st Stage Clearance:

	Except KC	
MT	2.05 ± 0.1 mm (0.081 ± 0.004 in)	1.43 ± 0.1 mm (0.056 ± 0.004 in)
AT	1.73 ± 0.1 mm (0.068 ± 0.004 in)	

Adjust clerance by bending Tab A.

5. Vacuumize the choke opener with hand vacuum pump (–150–180 mm Hg) to hold the choke opener rod in it full stroked.
6. The choke drive lever counterclockwise until the Tab A seat against choke opener lever, and measure clearance between the blade and casting:

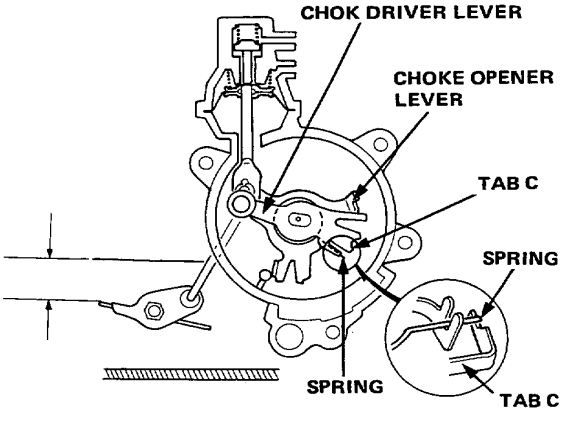


2nd Stage Clearance:

	Except KC	KC
MT	3.90 ± 1.2 mm (0.154 ± 0.005 in)	3.11 ± 0.12 mm (0.122 ± 0.005 in)
AT		2.74 ± 0.12 mm (0.108 ± 0.005 in)

Adjust clearance by bending Tab B.

7. While still holding the opener lever against the tab seated, then turn the choke drive lever until the Tab C tatch the spring and measure clearance at the choke blade:

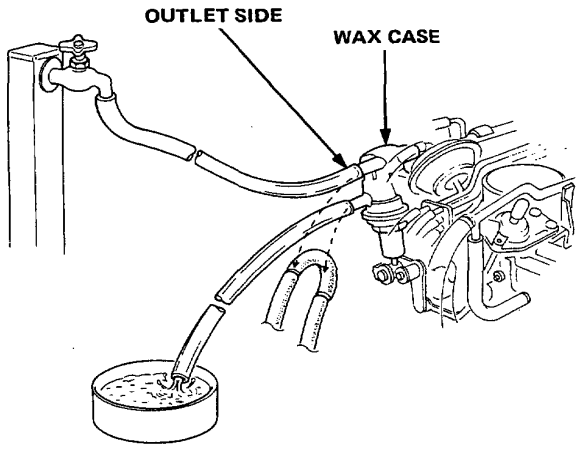


3rd Stage Clearance:
3rd Stage Clearance (All models):
8.63 ± 0.26 mm (0.34 ± 0.010 in)
Adjust clearance by bending Tab C.

Fast Idle

Inspection/Adjustment

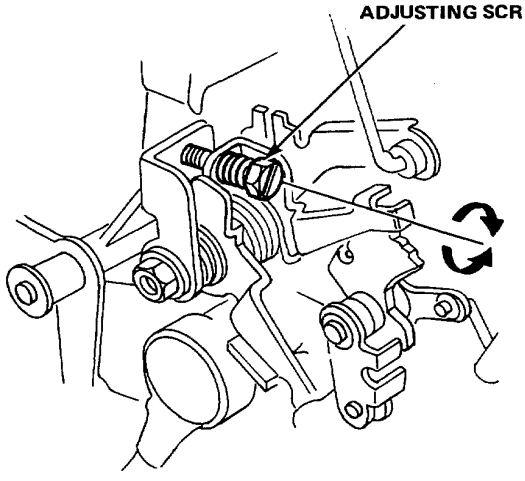
1. Disconnect the water hoses at the carburetor wax case, and connect the by-pass hose.
2. Connect hoses to the wax case, and pure cool water to the inlet side and catch the draining water from outlet hose with a jar.



3. Start the engine and allow to reaches normal operating temperature check the fast idle speed and fast idle cam position.
   Fast idle speed should be

KC	1,700–2,700 min^{-1} (rpm)
Except KC	2,200–3,200 min^{-1} (rpm)

   and fast idle cam should be on 2nd cam.

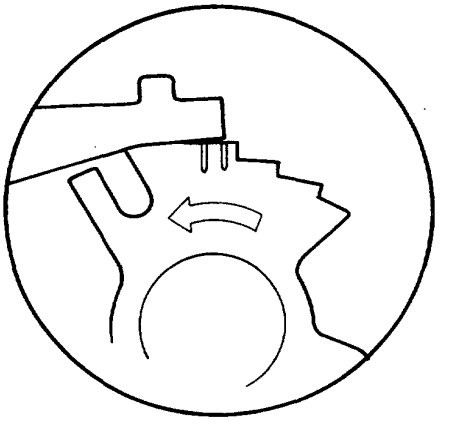


   Adjust fast idle speed by turning the adjusting screw.

4. Stop the engine and reconnect the water hose.
5. Run the engine, check the engine speed drops gradually by engine temperature.

   The engine speed (idle) should drop.

   - If the engine speed does not drop, spray its linkage with carburetor cleaner, and re-check.
   - If the fast idle still does not drop, check the linkage for free movement. Repair or replace parts as necessary, and adjust the wax case (next column).

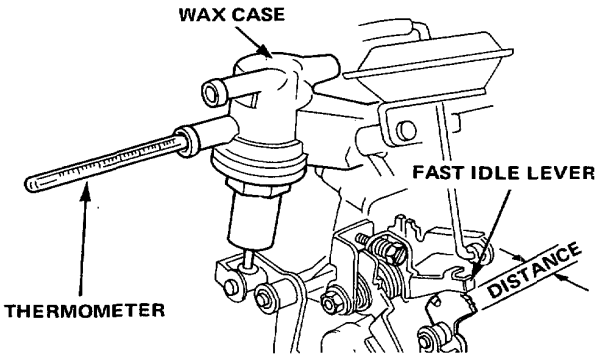


Wax Case

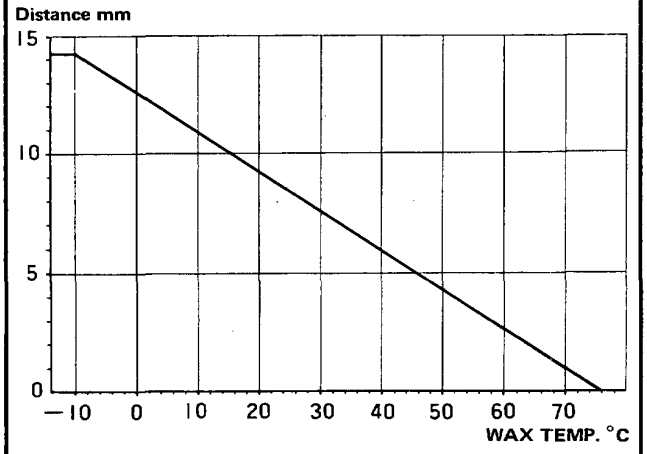
Adjustment

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

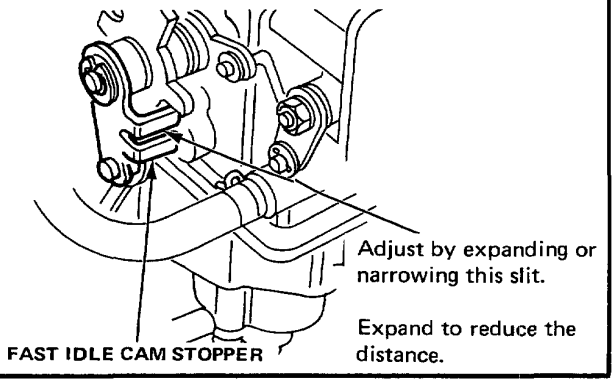
1. Remove the air cleaner cover and air cleaner case (Page 12-9).
2. Disconnect the hoses from the wax case. Using an extension, connect the hoses so as to bypass the wax case.
3. Test the wax case in relation to the fast idle lever with a thermometer as shown.



NOTE: Adjust the fast idle if the readings do not fall within the limits shown below.

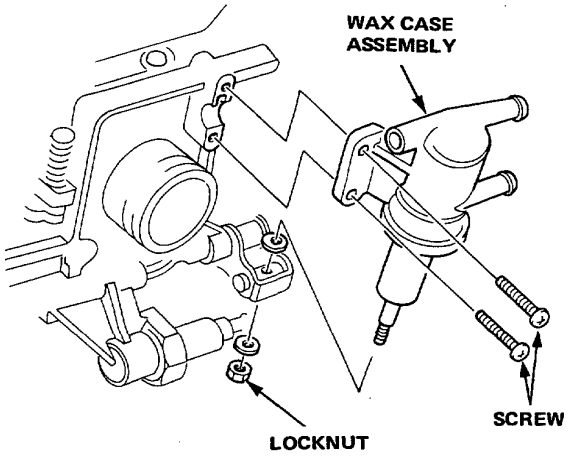


If adjustment is necessary, expand or narrow the slit in the fast idle cam stopper.



Replacement

1. Remove the air cleaner case and carburetor.
2. Remove the locknut and adjusting nut.
3. Remove the two screws and wax case assembly.



4. Install a new wax case assembly.
5. Install the locknut, and adjust the fast idle lever position.

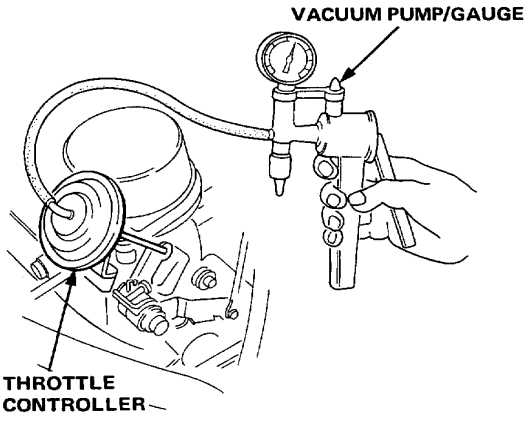
Inspection

Throttle Controller

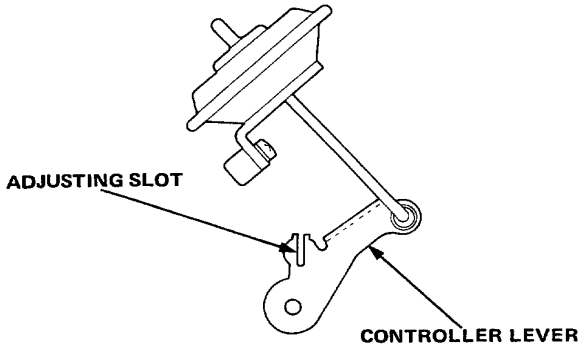
1. Connect tachometer, start engine and allow to reach normal operating temperature (cooling fan comes on).

2. Disconnect the vacuum hose from the throttle controller, connect a hand vacuum pump to the controller and apply 200 mmHg (8 in. Hg) vacuum.

With 1 minute, engine should rise to:
1800 ± 500 min^{-1} (rpm) — KX, KQ, KS manual
KC automatic
1900 ± 500 min^{-1} (rpm) — KC manual
2000 ± 500 min^{-1} (rpm) — KF, KG, KB, KW, KE,
KY manual
KY automatic



- If rpm is too Low: Widen the adjusting slot in the controller lever with a screwdriver.



- If the rpm is too HIGH: Narrow the adjusting slot in the lever with a long nose pliers.

- If the rpm cannot be adjusted; or the diaphragm will not hold a vacuum, replace the throttle controller and re-test.

Throttle Control Valve with Dashpot System

[On KC manual car only]

1. Raise engine speed to 3500 min^{-1} (rpm) and maintain for 2 to 3 seconds. Release the throttle suddenly, and watch how long the throttle controller arm takes to fully extend.

   Return time should be 1-4 seconds.

   - If engine returns to idle in 1 to 4 seconds with arm fully extended, go on to step 4.

   - If return to idle takes less than 1 second, go on to step 2.

   - If the throttle takes longer than 4 seconds to return, go on to step 3.

2. Disconnect the vacuum hose from the throttle controller, connect a hand vacuum pump to the hose.

   Vacuum should be at least 30 mmHg (1.2 in. Hg) at 4000 min^{-1} (rpm).

   - If vacuum is at least 30 mmHg (1.2 in. Hg) at 4000 rpm, replace the control valve and repeat step 1.

   - If there is less than 30 mmHg (1.2 in. Hg) vacuum, check for vacuum at the carburetor vacuum port.

     — If there is vacuum available at the carburetor, check the hoses for leaks of blockage. Repeat check in step 2, then repeat step 1.

     — If there is no vacuum at carburetor, clean the port and repeat step 1.

3. Pinch the hose between throttle positioner solenoid valve and control valve and repeat step 1.

- If there is no change, replace the control valve and repeat step 1.
- If the throttle return is within limits when pinching off the hose, check the throttle positioner solenoid valve for voltage.
  - If battery voltage is present at the throttle positioner solenoid valve, replace the speed sensor. Repeat step 1.
  - If no voltage is present, replace the throttle positioner solenoid valve. Repeat step 1.

4. Bypass the speed sensor by jumping battery (+) voltage to yellow/black wire at the control box connector.

5; Raise engine speed to 3500 rpm and release throttle. Return to idle must be longer than dashpot check time but not longer than 6 seconds.

- If return to idle takes longer than the time you recorded for dashpot system, but not longer than 6 seconds, throttle opener is OK. Go to step 7.
- If return time is more than 6 seconds, replace throttle control valve and re-test.
- If return time is less than you recorded for the dashpot system, go on to step 6.

6. Remove vacuum line connecting throttle positioner solenoid valve to throttle control valve. Check for vacuum at throttle positioner solenoid.

- If vacuum is present, replace throttle control valve and re-test.
- If no vacuum, replace throttle positioner solenoid valve and re-test.

7 Disconnect battery jumper and stop engine.

8. Go on to Speed Sensor Check on page 12-22.

Throttle Control Vavle

[On KQ, KS, KX, KF, KG, KB, KE, KW manual and KC automatic cars]

1. On KX and KC cars, bypass the speed sensor by jumping battery (+) voltage to yellow black wire at the control box connector.

2. Raise engine speed to 3500 min^{-1} (rpm) and release throttle.

   Return time to idle should be 2-4 seconds.

   - If engine returns to idle in 2 to 4 seconds, go on to step 4.
   - If return to idle takes less than 2 seconds, go on to step 3.
   - If return to idle takes longer than 4 seconds, replace throttle control valve.

3. On KX and KC cars:

   Disconnect the hose #20 at the control box and check for vacuum.

   There should be vacuum.

   - If there is no vacuum, check hose connections between the control box and intake manifold for leaks or blockage.
   - If there is vacuum, remove vacuum line connecting throttle positioner solenoid valve to throttle control valve. Check for vacuum at solenoid valve.
     - If vacuum is present, replace throttle control valve and re-test.
     - If no vacuum, replace throttle positioner solenoid valve and re-test.

(cont'd)

Inspection (cont'd)

On cars except KX and KC:
Disconnect the hose #20 from the control valve and check for vacuum.

There should be vacuum.

- If there is vacuum, replace throttle control valve and re-test.
- If there is no vacuum, check hose connections between the throttle control valve and intake manifold for leaks or blockage.

4. Disconnect battery jumper (on KX and KC cars) and stop engine.

Speed Sensor

[On KX manual and KC cars only]

1. Jack up front of car, support with safety stands, block rear wheels, and set hand brake.

2. Push the voltmeter positive probe into the yellow/black wire terminal at the control box connector. Connect the negative probe to a suitable ground.

3. Start engine. Select second gear or (2) position and accelerate slowly, while observing voltmeter.

   Voltmeter should show battery voltage above 25 km/h (16 mph) and no voltage below 15 km/h (9 mph).

   - If there is no voltage below approximately 15 km/h (9 mph), and there is battery voltage above 25 km/h (16 mph), speed sensor is OK. Go on to Step 5.

   - If voltmeter readings do not correspond to above km/h (mph) ranges, install a new speed sensor and re-test.

   - If there is no voltage to throttle positioner solenoid valve during speed sensor test, go to Step 4.

4. Check for bad electrical connection, fuse or failed speed sensor. Replace or repair as necessary and re-test per Step 3.

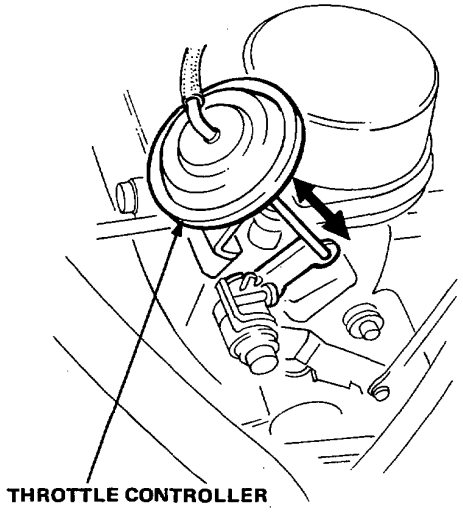
5. Stop engine, lower car to ground, and disconnect voltmeter.

Cranking Solenoid Valve

[On KC and KY cars only]

1. Ground the coil secondary wire to prevent the engine from starting. Turn the ignition key to III (START).

   The throttle controller arm should retract when you crank the engine.



   - If the controller operates, the cranking solenoid valve is functional; test is complete.
   - If the controller does not operate, check for voltage at the cranking solenoid valve.

     There should be voltage.

     – If voltage is present, go on to step 2.

     – If no voltage, check wiring and fuse.

2. Disconnect the hose between the cranking solenoid valve and check valve at the solenoid valve, and check for vacuum when cranking the engine.

   There should be vacuum with the ignition switch turned to III (START).

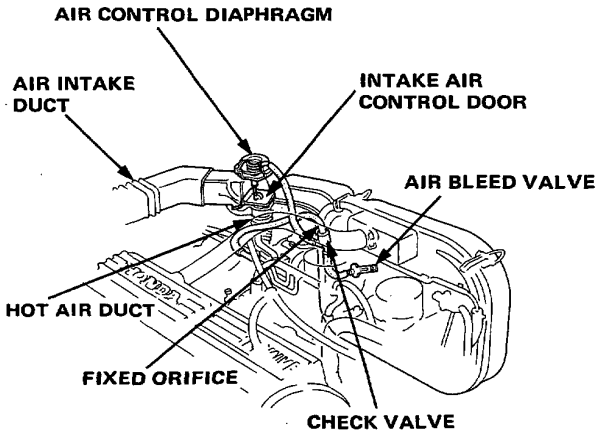
   - If there is vacuum, replace the cranking solenoid valve and re-test.
   - If no vacuum, check the vacuum line for leaks or blockage. If there is not defect, replace the check valve and re-test.

Inspection

COLD ENGINE

1. Remove air cleaner cover and filter element. Disconnect air intake and hot air ducts.

2. With the engine cold, start the engine for about 5 seconds and stop. Air control door should rise on start up and remain fully open for at least 3 seconds after stopping engine.



   - If door rises, intake air control is OK; reinstall filter element and air cleaner cover. Connect air intake and hot air ducts. Go on to step 1 for hot engine inspection.
   - If door DOES NOT rise: Check to see if door is binding. It door still fails to rise, or fails to stay up for 3 seconds after cold cranking test, go to step 3.

Intake Air Controls

Inspection (cont'd)

3. Disconnect and plug hose leading to air bleed valve.

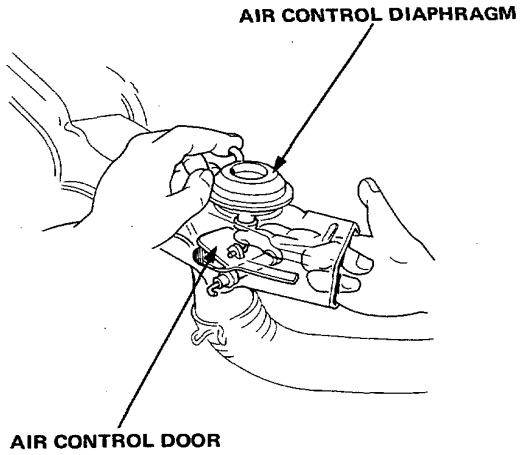
4. Crank starter for approximately 5 seconds:

   - If the air control door does not rise or stay open for at least 3 seconds, proceed to Step 5.

   - If door rises and stays up for at least 3 seconds replace the air bleed valve, and re-test (steps 2 thru 4).

5. Disconnect vacuum hose from air control diaphragm.

6. Raise air control door manually and while blocking the inlet pipe, release the door.



   - If the door stays up, replace check valve and re-test.

   - If the door drops to the closed position, replace the air control diaphragm and re-test.

7. Reinstall filter element and air cleaner cover.

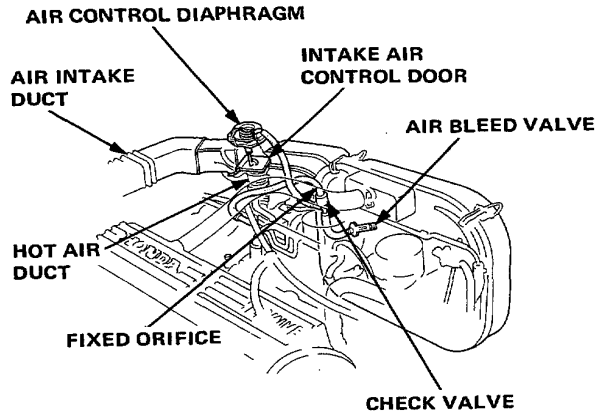
   Connect air intake and hot air ducts.

HOT ENGINE

NOTE: As the outside air temperature drops, the bi metal spring in the bleed valve closes, causing the air control door to rise and allowing pre-heated air into the air cleaner; consistant intake air temperature (approximately 100°F) is maintained this way.

1. With engine running and cooling fan on, disconnect air intake duct and immediately check control door position.

   The air control door should be down.



   - If the control door has dropped down to fully close the hot air intake duct: stop engine, connect air intake duct. Test is complete.

   - If control door HAS NOT dropped to the fully closed position, go to Step 2.

2. Disconnect the vacuum hose to the air control diaphragm.

   - If the control door now closes, replace the air bleed valve and re-test.

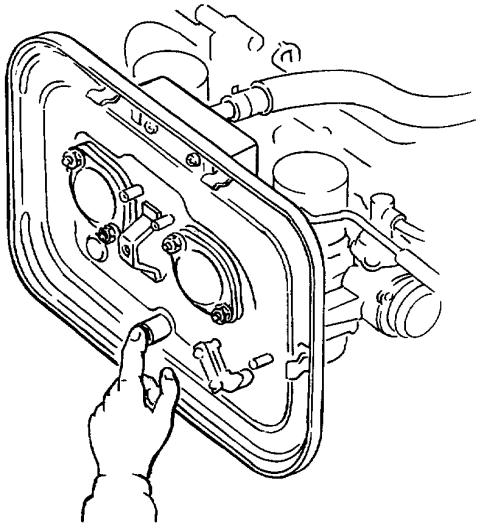
   - If the control door does not close, correct whatever is causing the door to bind, and/or replace air control diaphragm. Re-test.

3. Stop engine, connect air intake duct. Test is complete.

Anti-Afterburn Valve

Inspection

1. Remove the air cleaner cover and filter.
2. Start the engine and allow to idle.
3. Place finger over the air inlet hose.
   There should be no vacuum.



- If there is no vacuum, go on to Step 4.
- If you feel vacuum, replace the anti-afterburn valve and re-test.

4. Quickly raise engine speed to 3500 rpm and close the throttle suddenly.

   There should be vacuum.

   - If you feel vacuum, valve is OK, test is complete.
   - If you do not feel vacuum, locate and remove blockage, and re-test.
   - If you still do not feel vacuum, replace the anti-afterburn valve, and re-test.

   NOTE: This completes inspection of the Exhaust Emission Controls.

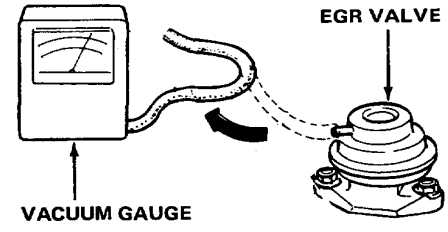
EGR

Inspection

COLD ENGINE

NOTE: Engine coolant temperature must be below thermovalve set temperature; Thermovalve must be open.

1. Disconnect vacuum hose from EGR valve and connect vacuum gauge to hose.



2. Start engine and raise engine speed to 4500–5000 min^{-1} (rpm).

   Vacuum should not be available.

   - If vacuum is not available, go on to hot engine inspection.
   - If the gauge shows vacuum is available, go on to page 12-26 for thermovalve inspection.

HOT ENGINE

3. Warm up the engine to normal operating temperature.
4. Start engine and raise engine speed to 4500–5000 min^{-1} (rpm).

   Vacuum should be available.

   - If vacuum is not available, check vacuum line routing and carburetor port. If OK, check thermovalve operation on page 12-26.

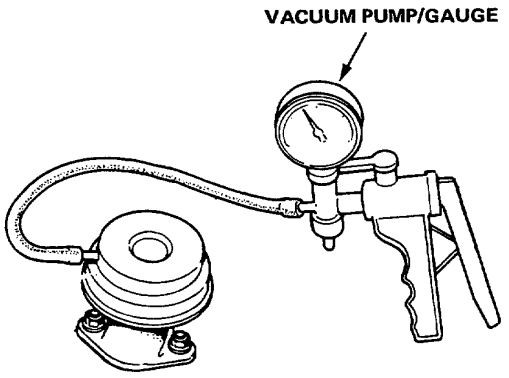
(cont'd)

EGR

Inspection (cont'd)

EGR Valve

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

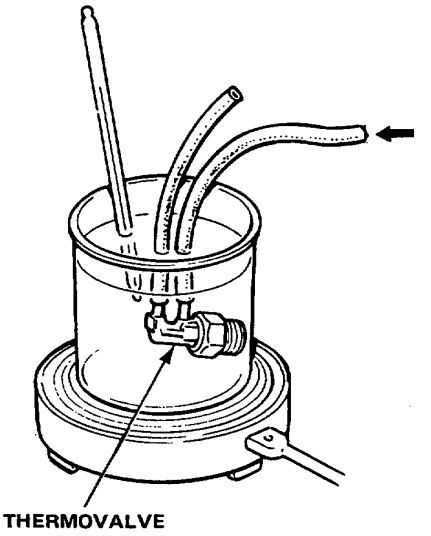


3. Apply 150 mmHg (6 in. Hg) vacuum to EGR Valve. Vacuum should remain steady and engine should die.
   - If vacuum remains steady and engine dies, EGR valve is working properly. Remove hand vacuum pump and reconnect EGR vacuum hose, test complete.
   - If vacuum does not remain steady and engine does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

Thermovalve

Inspection

1. Drain the coolant until its level is lower than the thermocase.
2. Remove the thermocase from the cylinder head, then remove the thermovalve.
3. To test the thermovalve, suspend it in cold water, with vacuum hoses attached.



4. Check thermovalve operation by blowing air in to hose, then heat the water slowly as you watch the thermometer and re-test.

   NOTE: Don't let the thermometer touch the bottom of the container.

   CAUTION: Do not allow water to enter the thermovalve vacuum ports.

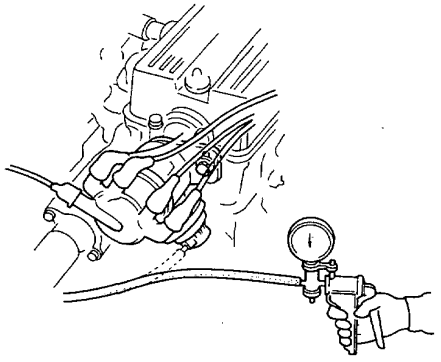
   - Thermovalve (for choke opener) should open below 15 ± 4°C (59 ± 7°F) and close above 25°C (77°F)
   - Thermovalve (for EGR) should open below 55°C (131°F) and close 65 ± 4°C (149 ± 7°F).

Vacuum Advance

Inspection

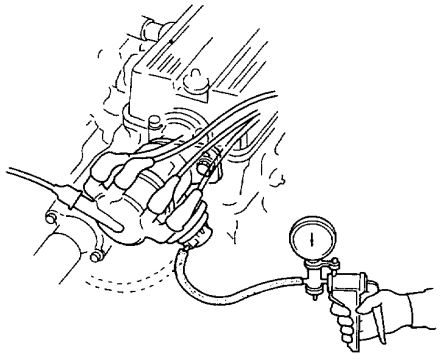
1. Connect tachometer, connect vacuum gauge to *vacuum advance hose, then start engine and check* vacuum.

   There should be vacuum at idle.



   - If there is vacuum, go on the Step 2.
   - If vacuum does not appear on gauge, check hose connections between distributor and carburetor port for leaks or blockage.

2. Attach hand vacuum pump to vacuum advance diaphragm, pinch end of disconnected advance hose and start the engine.
   Pull 400 mmHg (16 in. Hg) vacuum.
   Timing should advance.



   - If timing advances, disconnect tachometer and reconnect advance hose to distributor. Test is complete.
   - If timing will not stay advanced (diaphragm leaks), replace advance diaphragm and re-test.
   - If timing does not advance, stop the engine and remove distributor cap. Turn breaker plate right and left to check for freedom of movement. If there is no evidence of binding, replace advance diaphragm and re-test.

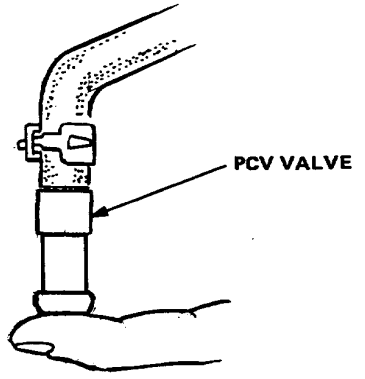
Crankcase Emission Control

Inspection

PCV valve

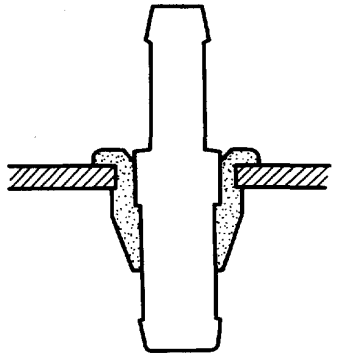
NOTE: Replace the PCV valve every 48,000 km (30,000 miles).

1. Check the ventilation hoses and connections for leaks and clogging.
2. Disconnect the PCV valve from the PCV chamber.
3; Start the engine and allow it to idle.
4. Place finger over the PCV valve and check for a operating noise from the PCV valve.



   - If operating noise is heard, go on to step 5.
   - If operating noise is not heard, replace the PCV valve and re-test.

5. Install the PCV valve with large end down.



(cont'd)

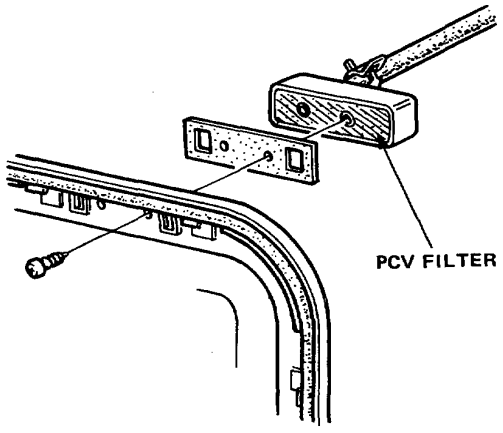
Crankcase Emission Control

Inspection (cont'd)

Blow-by Filter

NOTE: Replace the blow-by filter every 48,000 km (30,000 miles).

1. Inspect the state of the blow-by filter.
   - Replace the filter in the following instances:
   - When the entire filter is stuck fast and oil is dripping or seeping through.
   - When the entire filter is covered with dust and dirt so that clogging is evident.



Transaxle

Clutch

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Clutch Plate 13-7
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Clutch

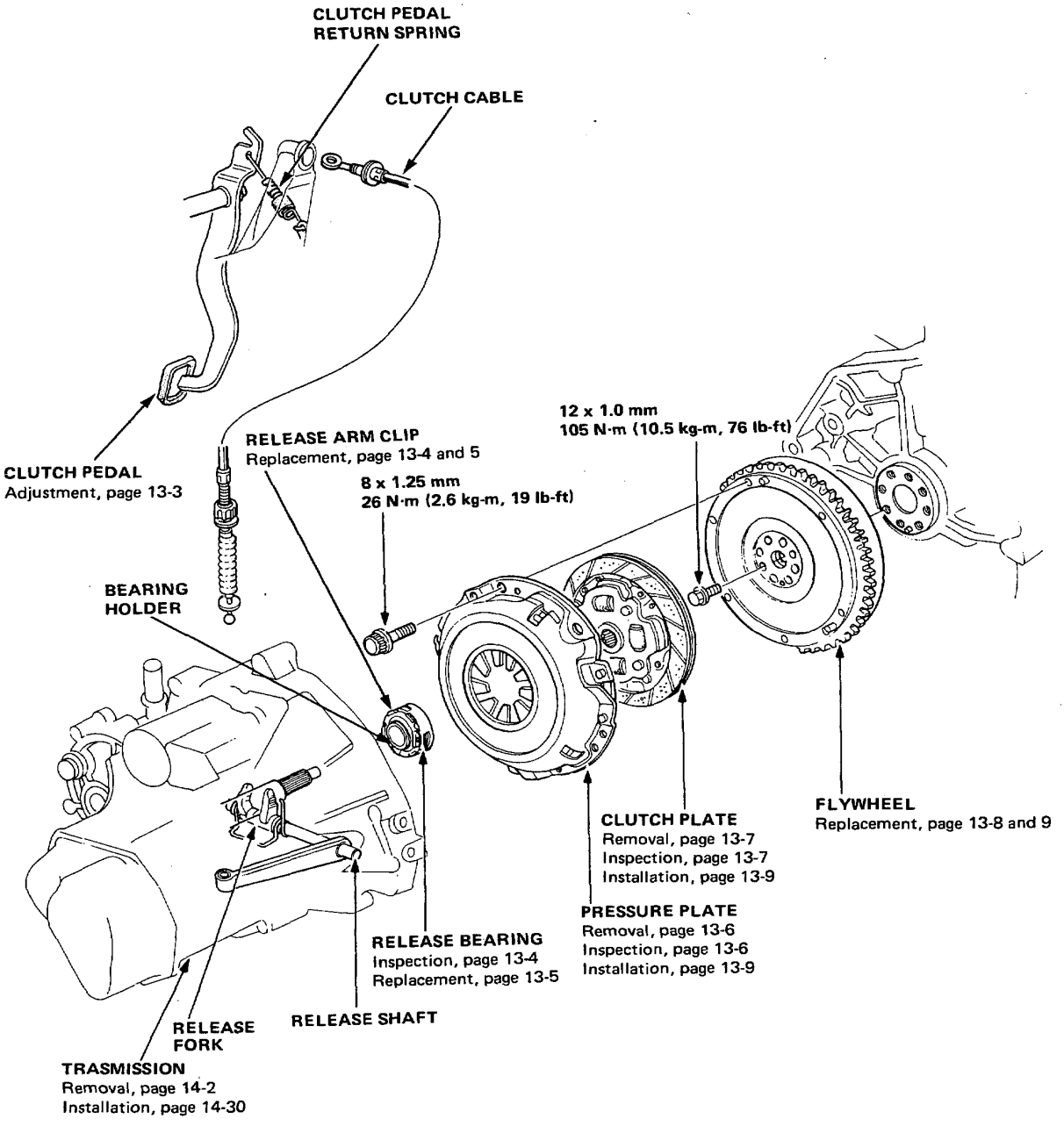
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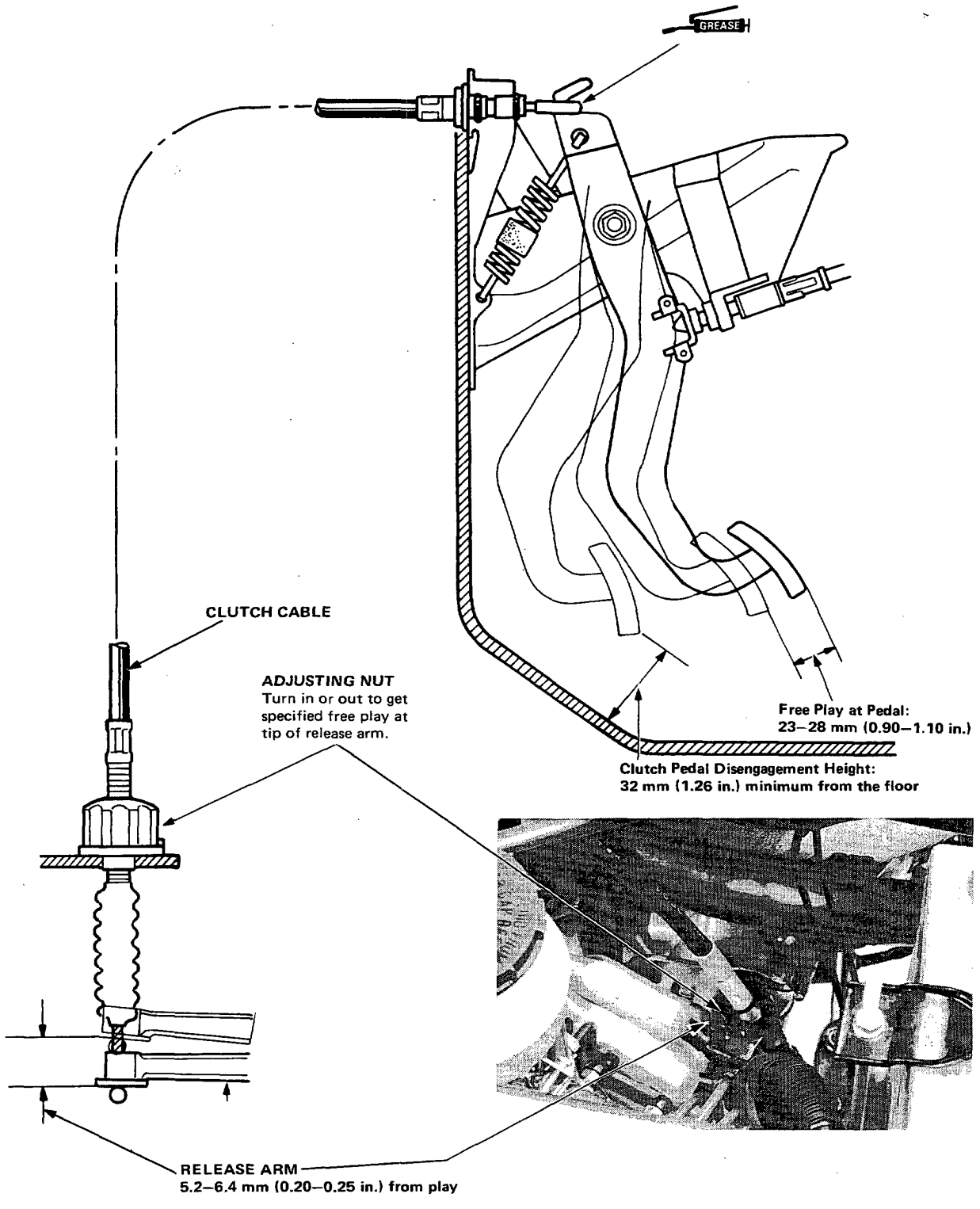
Clutch

Illustrated Index

NOTE: Whenever the transmission is removed, the release bearing sliding surface should be cleaned and greased.



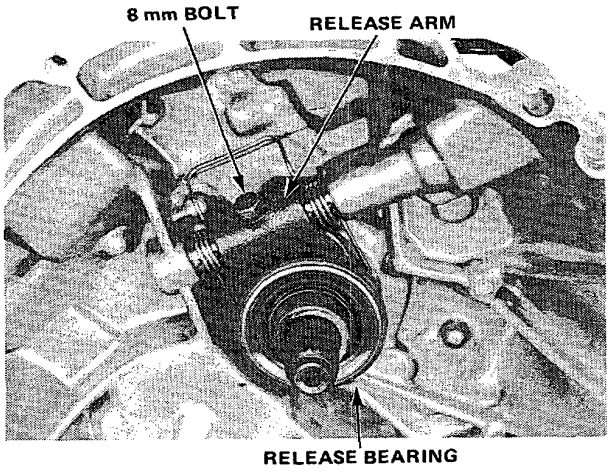
Clutch Adjustment



Clutch

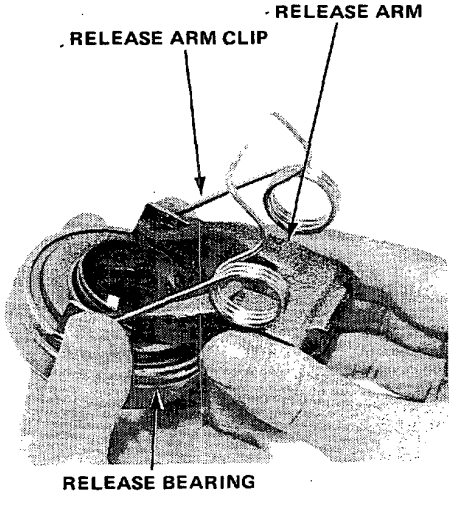
Release Bearing Removal/Inspection

1. Remove the 8 mm bolt.

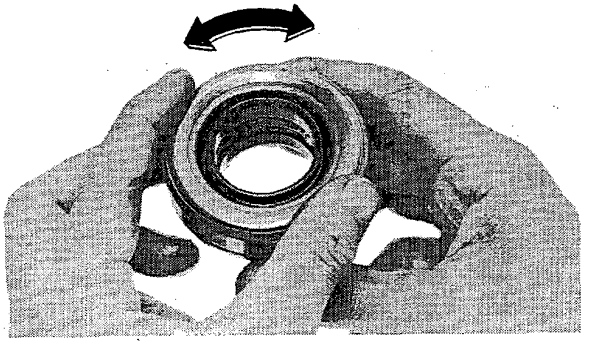


2. Remove release shaft and release bearing assembly.

3. Separate release arm from bearing by removing clip from hole in release bearing.



4. Check release bearing for excessive play by spinning it by hand.

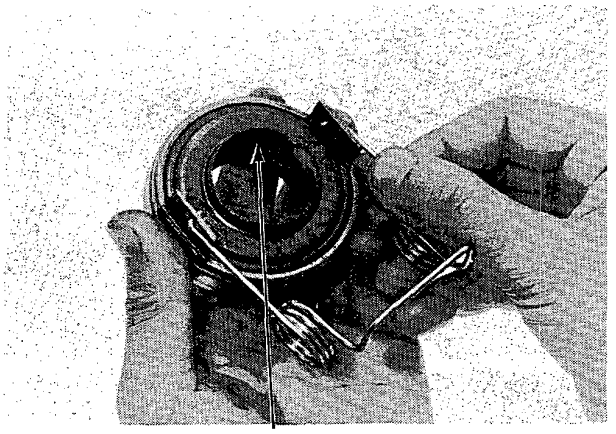


5. Replace bearing with new one if there is excessive play.

CAUTION: **Bearing is packed with grease. Do not wash in solvent.**

Release Bearing Installation

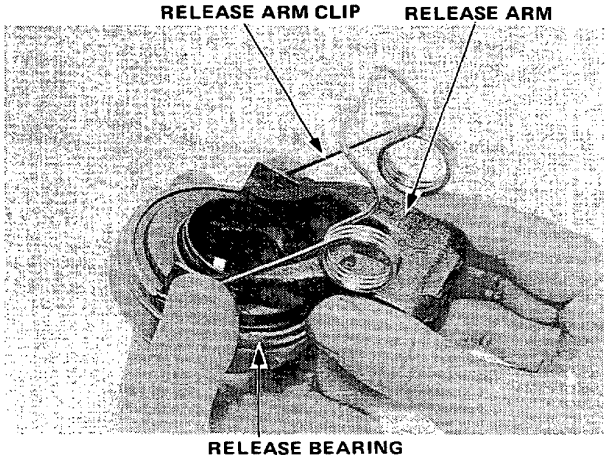
1. Align release arm with locating holes of release bearing.



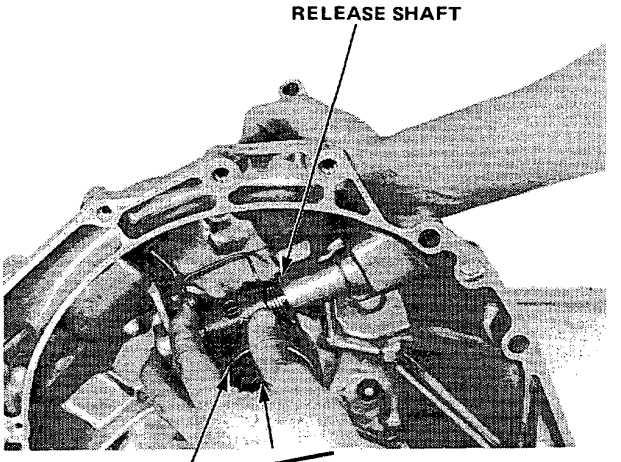
GREASE

(Molybdenum Disulfide)

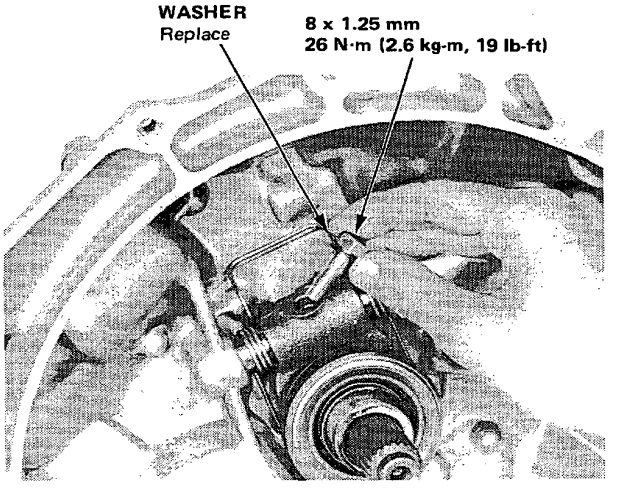
2. Install release arm clip in locating holes as shown.



3. Install release shaft and release bearing.



4. Install new lock plate and bolt with release shaft hole aligned with hole in release arm.

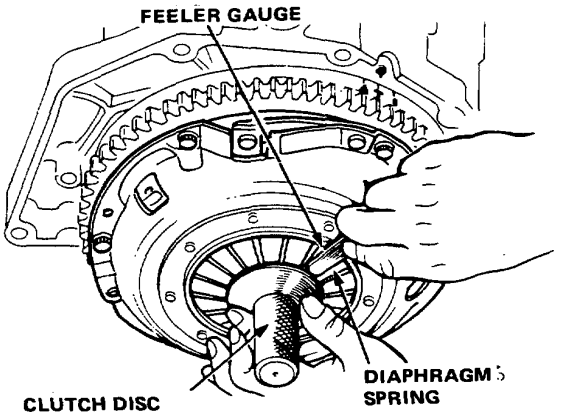


5. After installation, pull release arm up, then let it down, to be sure fork fits against bearing properly, and bearing slides freely on sleeve.

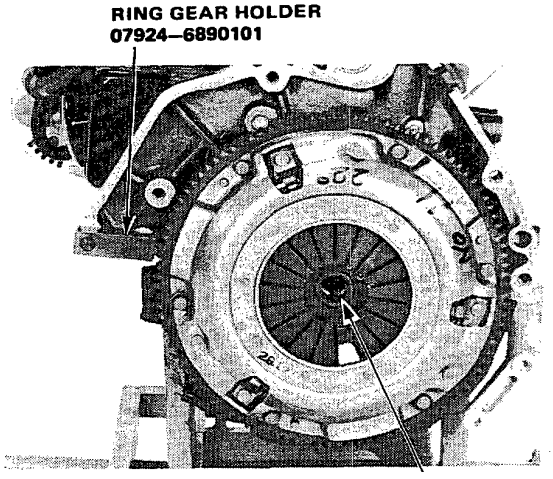
Pressure Plate Removal/Inspection

1. Inspect fingers of diaphragm spring for wear at release bearing contact area.
2. Check diaphram spring leaves for height using Clutch Disc Alignment Tool and feeler gauge.

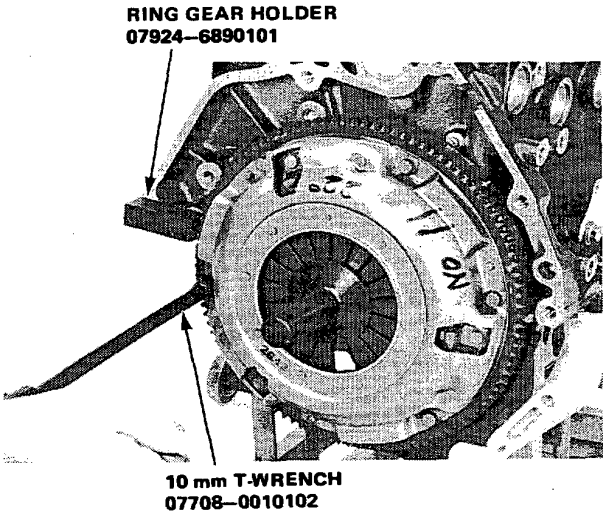
   Service Limit: 1.0 mm (0.04 in.) Max.



3. Install Ring Gear Holder.

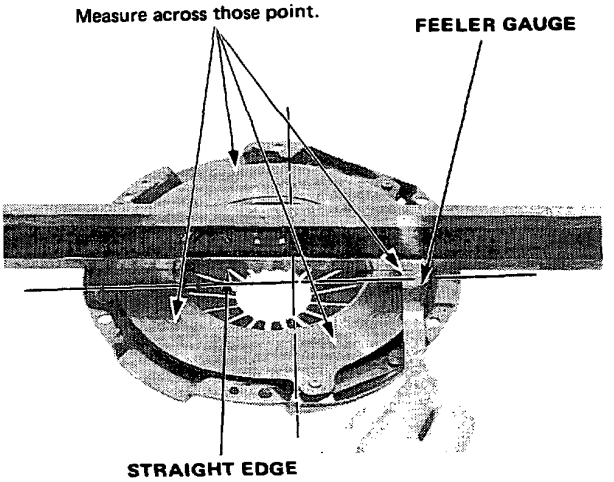


4. To prevent warping, unscrew pressure plate mounting bolts two turns at a time in a criss-cross pattern using a 10 mm T-wrench, then remove pressure plate and clutch plate.



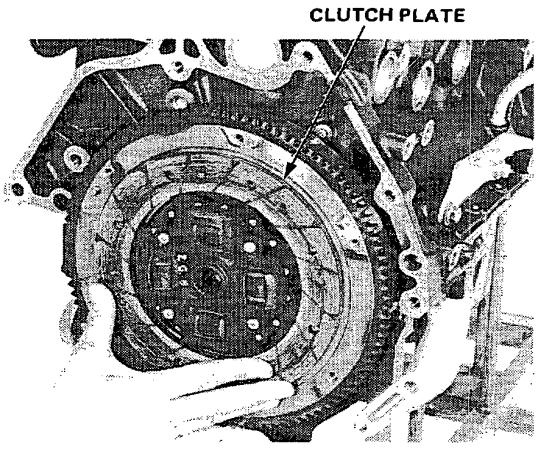
5. Inspect pressure plate surface for wear, cracks, or burning.
6. Inspect for warpage using a straight edge and feeler gauge.

   Service Limit: 0.15 mm (0.006 in.) Max.



Clutch Plate Removal/Inspection

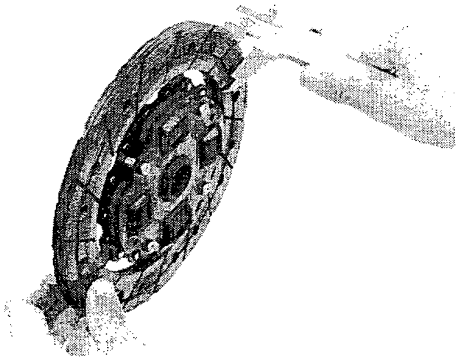
1. Remove clutch plate.



2. Inspect lining for signs of slipping or oil. Replace if burned black or oil soaked.

3. Measure clutch plate thickness.

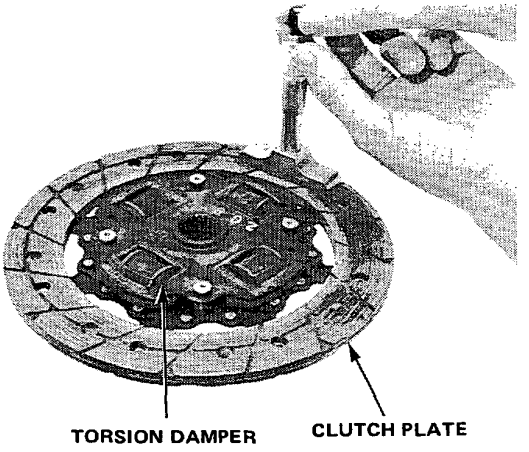
   Clutch Plate Thickness:
   Standard: 8.1–8.8 mm (0.32–0.35 in.)
   Service Limit: 5.7 mm (0.22 in.)



4. Check for loose rubber torsion dampers. Replace clutch plate if any are loose.

5. Measure depth from lining surface to rivets, on both sides.

   Rivet Depth:
   Standard (New): 1.3 mm (0.051 in.) min.
   Service Limit: 0.2 mm (0.008 in.)



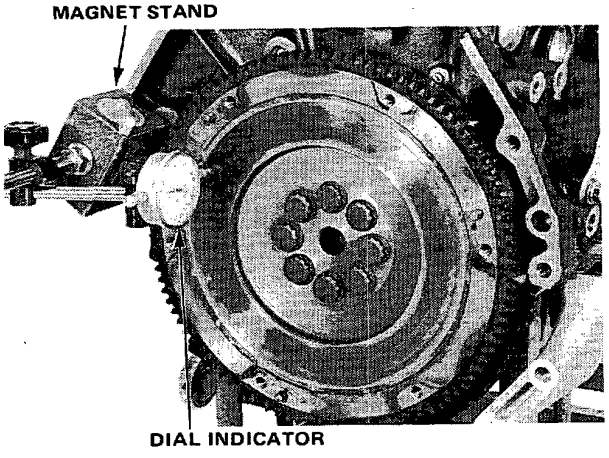
Clutch

Flywheel Inspection/Removal

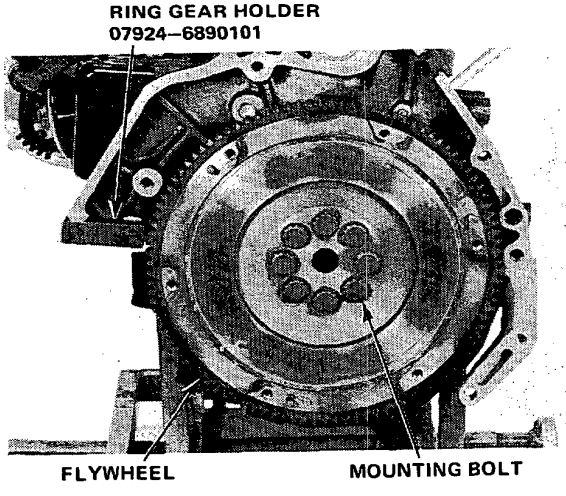
1. Inspect ring gear teeth for wear or damage.
2. Inspect clutch plate mating surface on flywheel for wear, cracks or burning.
3. Measure flywheel runout using dial indicator through at least two full turns. Push against flywheel each time you turn it to take up crankshaft thrust washer clearance.

NOTE: Runout can be measured with engine installed.

Flywheel Runout:
Standard (New): 0.05 mm (0.002 in.) max.
Service Limit: 0.15 mm (0.006 in.)

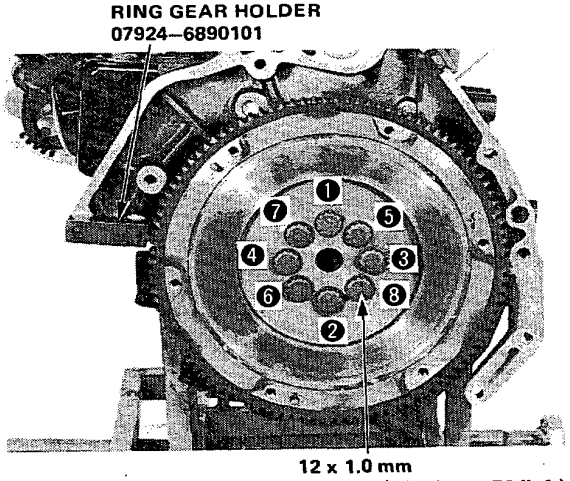


4. Remove eight flywheel mounting bolts and flywheel.

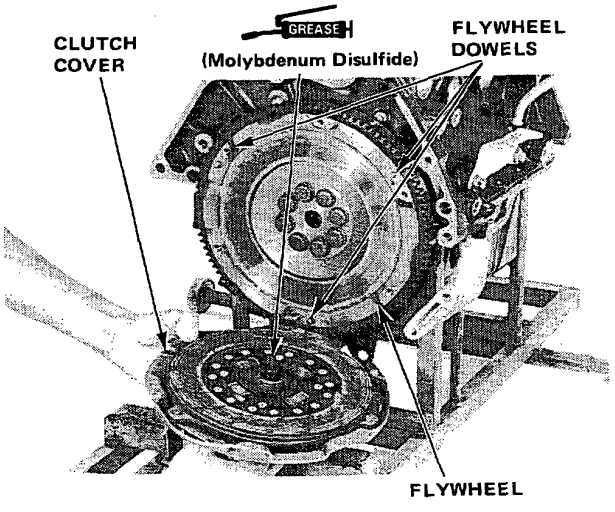


Flywheel and Clutch Installation

1. Align hole in flywheel with crankshaft dowel pin and assemble. Install bolts only finger tight.
2. Install Ring Gear Holder, then torque flywheel bolts in a criss-cross pattern.

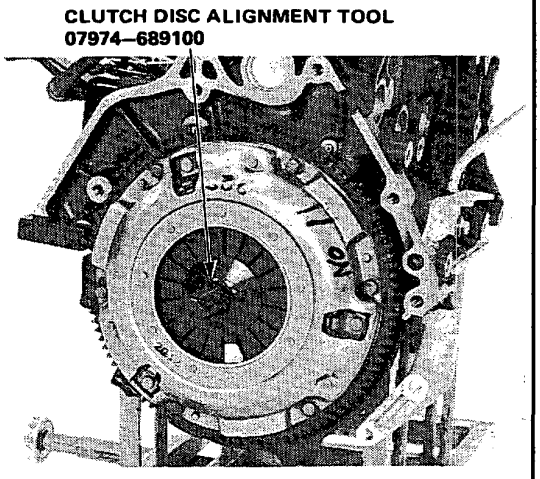


3. Install friction disc and clutch cover by aligning flywheel dowels with dowel holes in clutch cover.

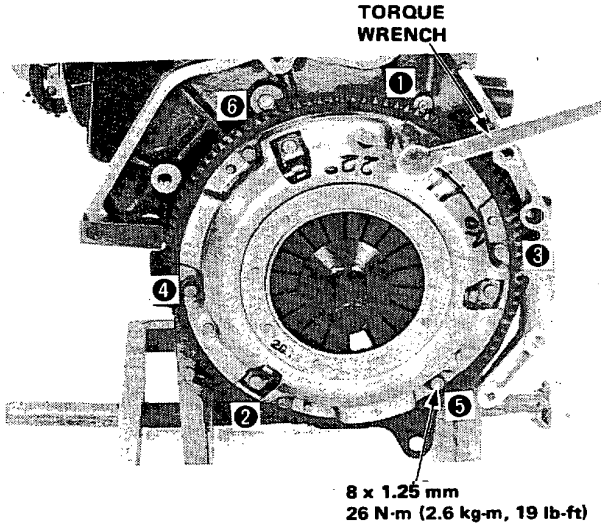


4. Install attaching bolts but do not tighten the bolts at this time.

5. Insert Clutch Alignment Tool in spline hole in friction disc.



6. Torque the bolts in a criss-cross pattern. Tighten them two turns at a time to prevent warping the diaphragm spring.

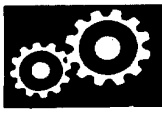


7. Remove Alignment Tool and Ring Gear Holder.

MEMO

Manual Transmission

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Manual Transmission

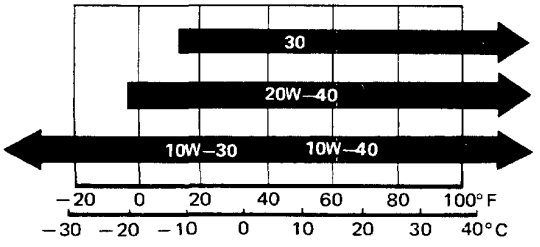
Maintenance

Oil Level Inspection

1. Check with oil at operating temperature, engine OFF, and car on level ground.
2. Remove oil filler plug and check level with finger.
3. Oil level must be up to fill hole. If it is below hole, add oil until it runs out, then reinstall plug.

Oil Change

Change oil every 48,000 km (30,000 miles).
Use only SAE30, 10W-30, 10W-40, or 20W-40 weight oil rated SE or SF grade.

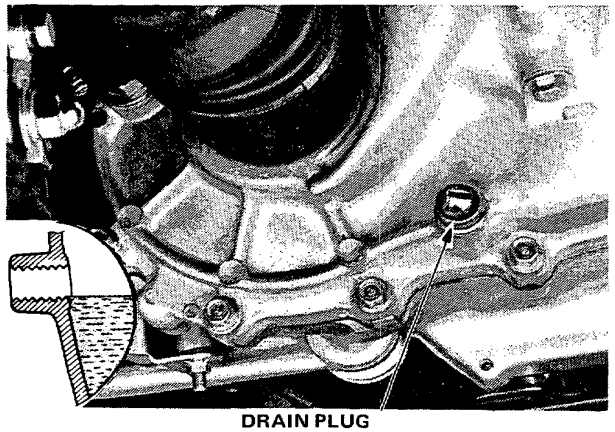


1. With transmission oil at operating temperature, engine OFF, and car on level ground, remove drain plug and drain transmission.
2. Reinstall drain plug with new washer, and refill to proper level.

   NOTE: Drain plug washer should be replaced at every oil change.

Oil Capacity

2.4ℓ (2.5 U.S. qt.) after drain.
2.5ℓ (2.6 U.S. qt.) after overhaul.



DRAIN PLUG
40 N·m (4.0 kg-m, 29 lb-ft)

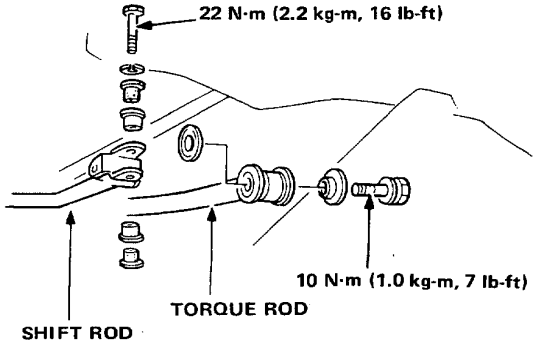
Removal

Car on Ground

1. Disconnect ground cable at battery and at transmission.
2. Release steering lock and place gear selector in neutral position.
3. Disconnect engine compartment wiring as follows:
   - Battery positive cable from starter motor.
   - Black/white wire from starter solenoid.
   - Green/black and yellow wires from back-up light switch.
4. Release engine sub wire harness from clamp at clutch housing.
5. Disconnect clutch cable at the release arm.
6. Remove transmission-side starter mounting bolt and two upper transmission mounting bolts.

Car Raised on Hoist

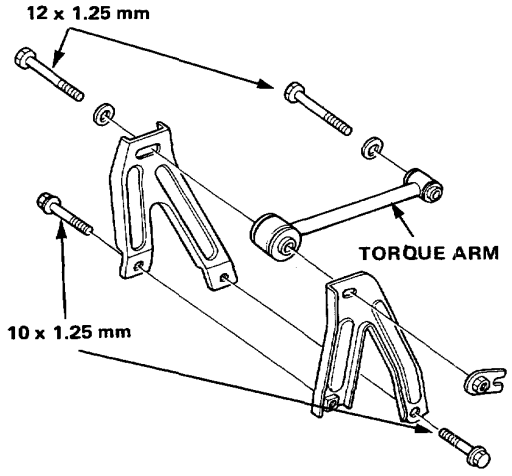
7. Drain transmission oil. Reinstall drain plug and washer.
8. Remove front wheels.
9. Place transmission jack securely beneath transmission.
10. Remove bolt securing speedometer drive holder and pull assembly out of transmission.
11. Disconnect shift lever torque rod from clutch housing.
12. Remove bolt from shift rod clevis.



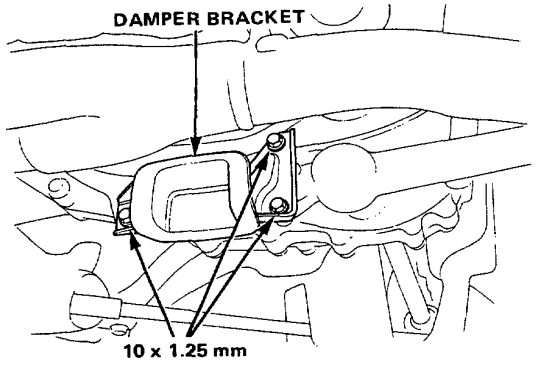
13. Disconnect the tie-rod ball joints and remove using the Ball Joint Remover (page 20-8).
14. Remove the lower arm ball joint pinch bolts and free the arms by tapping downward with a soft metal hammer (page 20-9).

15. Turn each steering knuckle to its most outboard position. With screwdriver, pry CV joint out approximately 1/2", then pull sub-axle out of transmission housing. Repeat on opposite side.
Remove the right-side radius rod.

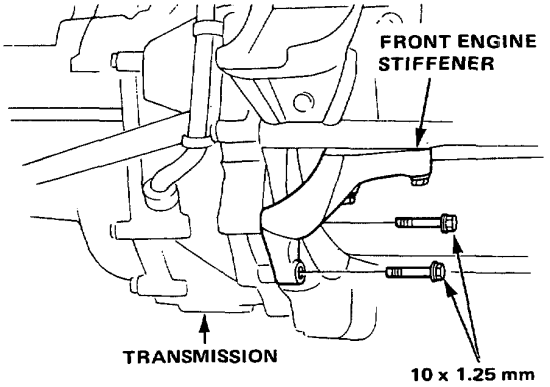
16. Remove the torque arm bracket bolts from the clutch housing.



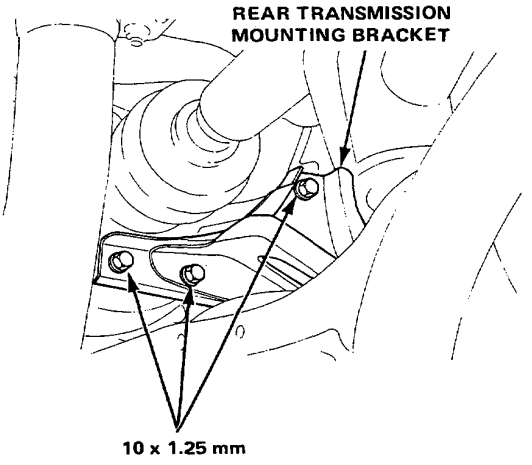
17. Remove damper bracket from transmission.



18. Remove the clutch housing bolts from front engine stiffener.



19. Remove the clutch housing bolts from rear transmission mounting bracket.

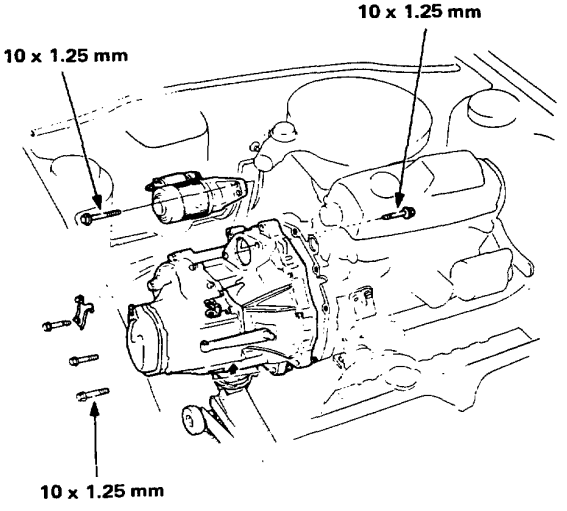


20. Remove clutch cover.

21. Remove engine-side starter mounting bolt. Detach starter motor and lower through chassis.

22. Remove the front transmission mounting bolt.

23. Pull transmission away from engine block to clear the two 14 mm dowel pins and lower on transmission jack.

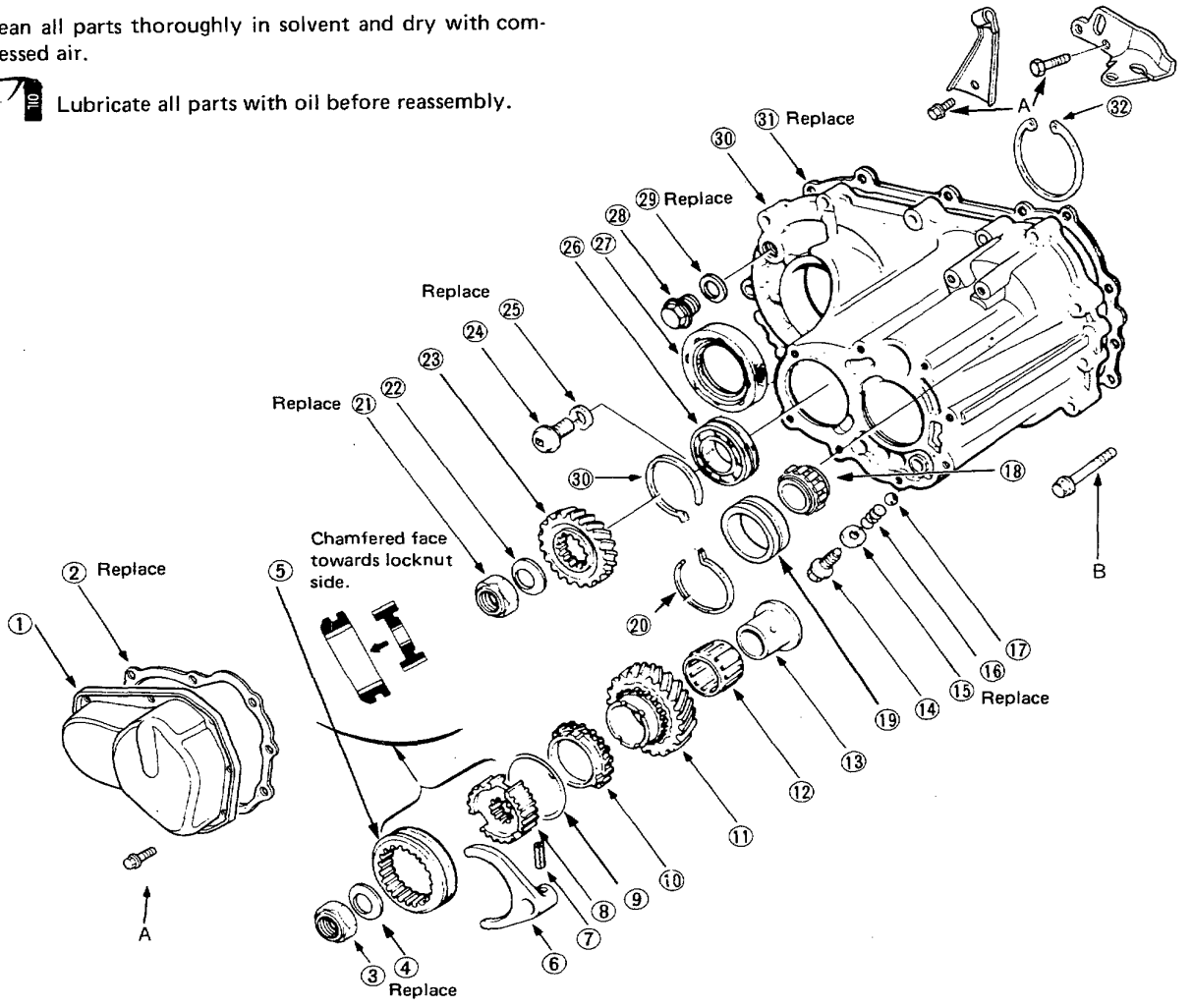


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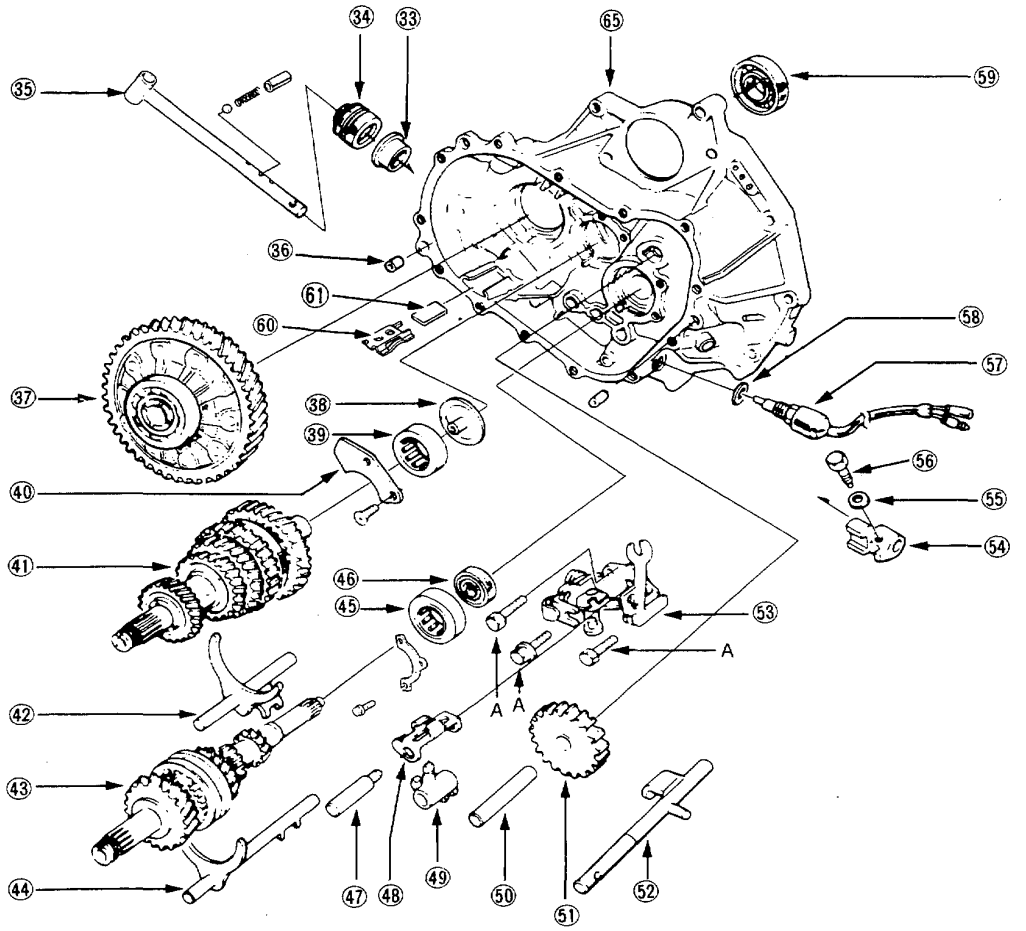
Clean all parts thoroughly in solvent and dry with compressed air.

Lubricate all parts with oil before reassembly.



CAUTION: Left-hand threads.

① **END COVER**
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② **GASKET**
③ **LOCKNUT**
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Installation, Page 14-28
④ **SPRING WASHER**
⑤ **FIFTH GEAR SYNCHRO SLEEVE**
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⑥ **FIFTH GEAR SHIFT FORK**
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⑦ **SPRING PIN**
⑧ **FIFTH GEAR SYNCRO HUB**
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⑨ **SYNCHRO SPRING**
⑩ **FIFTH GEAR SYNCHRO RING**
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⑪ **MAINSHAFT FIFTH GEAR**
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⑫ **NEEDLE BEARING**
⑬ **SPACER COLLAR**
⑭ **RETAINING SCREW**
22 N·m (2.2 kg-m, 16 lb-ft)
⑮ **WASHER 12 mm**
⑯ **SPRING**
⑰ **DETENT BALL**
⑱ **ROLLAR BEARING**
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⑲ **BEARING OUTER RACE**
⑳ **SNAP RING 60 mm**
㉑ **LOCKNUT**
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㉒ **SPRING WASHER**
㉓ **COUNTERSHAFT FIFTH GEAR**
㉔ **DRAIN PLUG**
㉕ **WASHER 14 mm**
㉖ **BALL BEARING**
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㉗ **OIL SEAL**
Removal, Page 14-10
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㉘ **OIL FILLER BOLT**
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㉙ **WASHER 20 mm**
㉚ **TRANSMISSION HOUSING**
Disassembly, Page 14-6
Installation, Page 14-27
㉛ **GASKET**
㉜ **SNAP RING 80 mm**



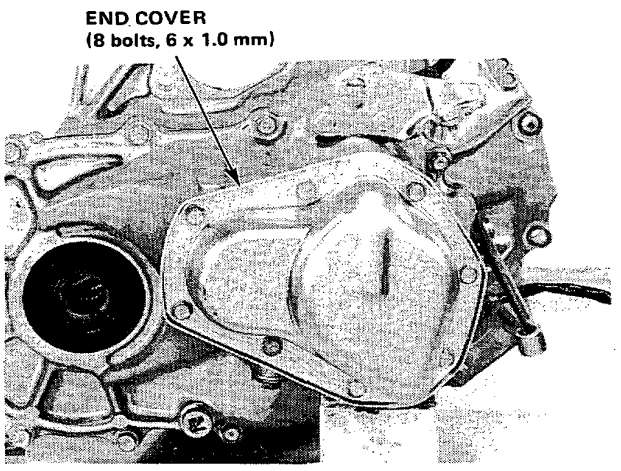
㉝ **OIL SEAL**
㉞ **BOOT**
㉟ **SHIFT ROD**
㊱ **DOWEL PIN 14 x 20 mm**
㊲ **DIFFERENTIAL ASSY**
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㊴ **COUNTERSHAFT BEARING**
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㊷ **FIRST & SECOND GEAR SHIFT SHAFT**

㊸ **MAINSHAFT**
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㊹ **THIRD & FOURTH GEAR SHIFT SHAFT**
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㊼ **SHIFT GUIDE SHAFT**
㊽ **INTERLOCK**
㊾ **SHIFT GUIDE**
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(51) **REVERSE IDLER GEAR**
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(52) **FIFTH & REVERSE GEAR SHIFT SHAFT**

(53) **SHIFT ARM HOLDER**
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(54) **SHIFT ROD GUIDE**
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(55) **WASHER 8 mm**
(56) **BOLT, 8 x 1.25 mm**
30 N·m (22 lb-ft)
(57) **BACK-UP LIGHT SWITCH**
(58) **WASHER 14 mm**
(59) **OIL SEAL**
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(60) **SET PLATE**
(61) **MAGNET**
(62) **DETENT BALL**
(63) **SPRING**
(64) **SPRING COLLAR**
(65) **CLUTCH HOUSING**

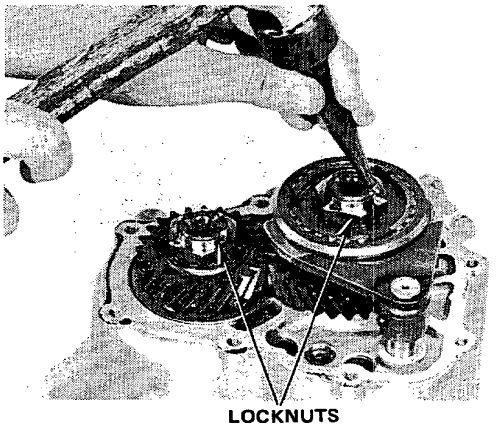
Housing Disassembly

1. Remove transmission end cover.

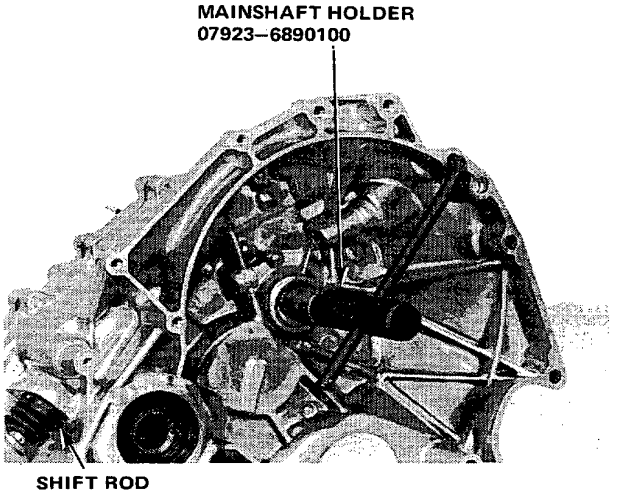


NOTE: Before removing locknuts, measure clearance between spacer collar and shoulder on fifth gear.

2. Bend locking tab on locknuts out of slots in mainshaft and countershaft.



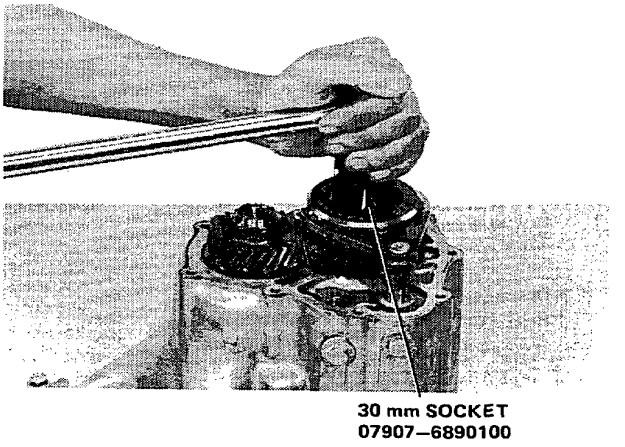
3. Install mainshaft holder.



4. Shift transmission into reverse gear.

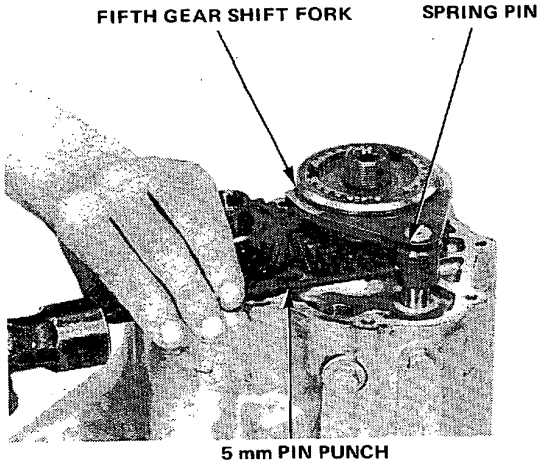
5. Remove locknuts.

CAUTION: The mainshaft locknut has left-hand thread.



6. Remove mainshaft holder.

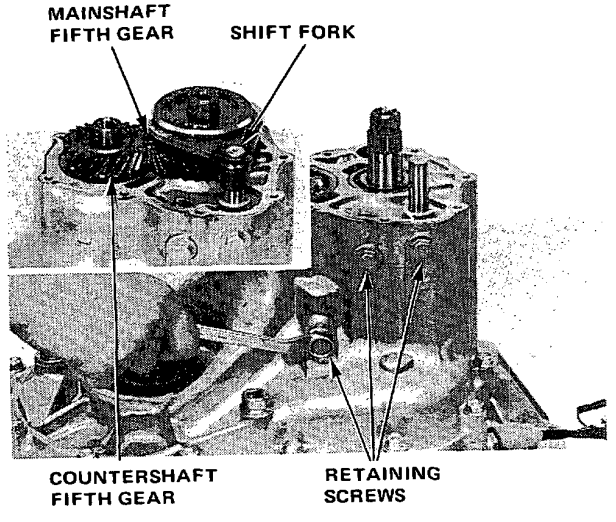
7. Drive out spring pin securing fifth gear shift fork to shaft.



8. Remove mainshaft fifth gear, shift fork, synchronizer sleeve, hub, ring and spring as a unit.

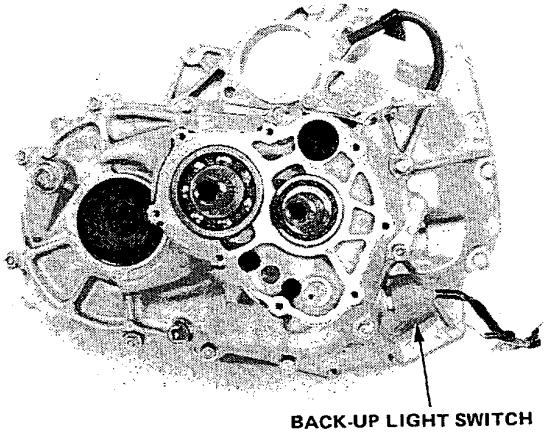
9. Remove countershaft fifth gear.

10. Remove three retaining screws and detent balls.

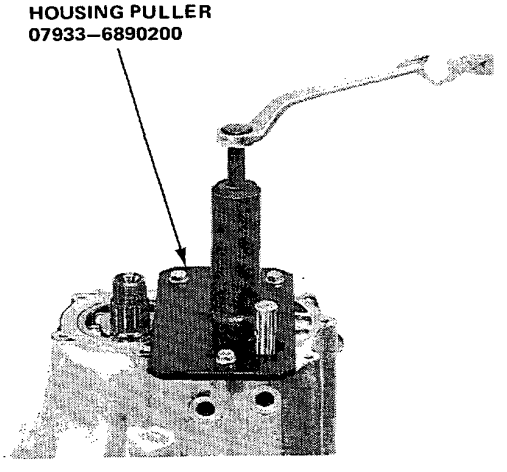


11. Remove back-up light switch.

12. Remove thirteen housing bolts.



13. Install transmission housing puller with four bolts and tighten securely. Then screw in puller bolt against end of countershaft until transmission housing comes loose.



Reverse Fork to Shift Shaft Clearance

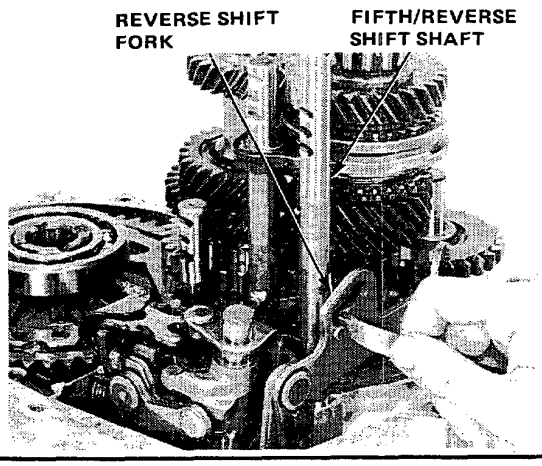
1. Check clearance between fifth/reverse shift shaft pin and reverse shift fork.

   PIN-TO-FORK CLEARANCE

   Standard (New): 0.05–0.35 mm (0.002–0.014 in.)
   Service Limit: 0.5 mm (0.02 in.)

2. If clearance is out of limit, measure width of slot in reverse shift fork.

   Standard (New): 7.05–7.25 mm (0.278–0.285 in.)



Reverse Fork to Gear Clearance

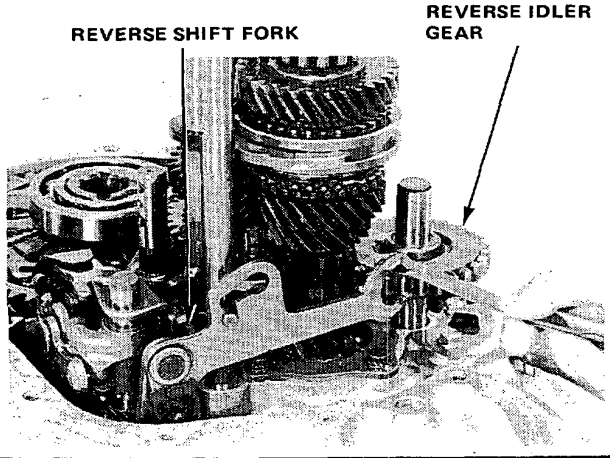
1. Check reverse idler gear-to-shift fork clearance.

   GEAR-TO-FORK CLEARANCE

   Standard (New): 0.2–1.0 mm (0.008–0.04 in.)
   Service Limit: 1.7 mm (0.07 in.)

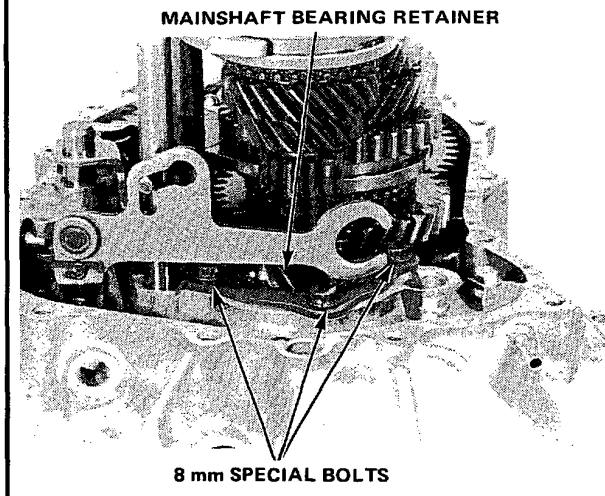
2. Pull out the reverse idler shaft and remove gear. If gear-to fork clearance is beyond limit, measure gap between ends of shift fork fingers.

   Standard (New): 11.8–12.1 mm (0.46–0.48 in.)

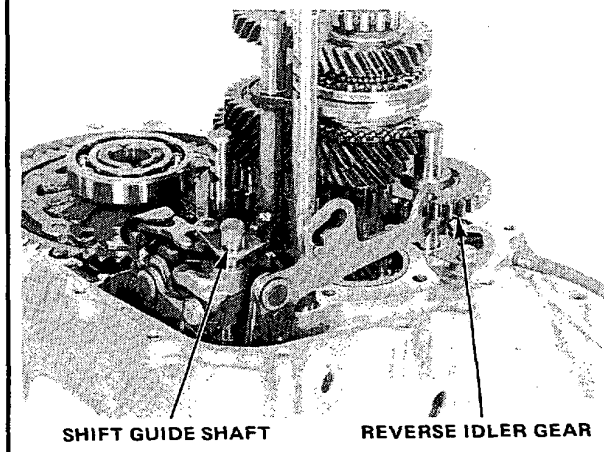


Shaft Removal

1. Shift transmission into neutral.
2. Remove the mainshaft bearing retainer plate.

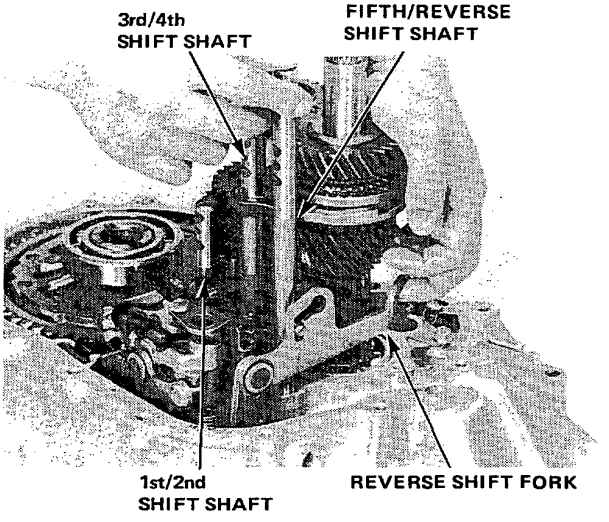


3. Pull out the shift guide shaft.
4. Pull out reverse idler shaft and remove gear.

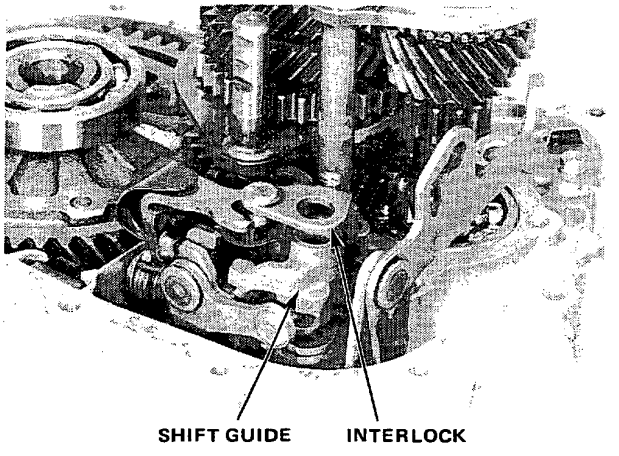


5. Pull the 3rd/4th and 1st/2nd shift shafts up, to shift into fourth and second.

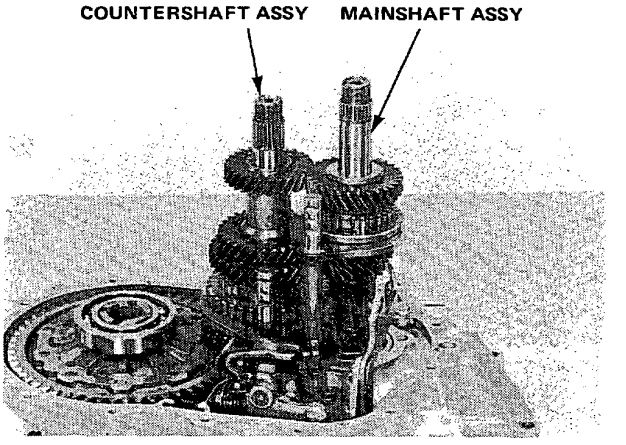
6. Remove the 5th/reverse shift shaft by pulling it up while lifting the reverse shift fork.



7. Tilt interlock and shift guide to the side, then lift them out.

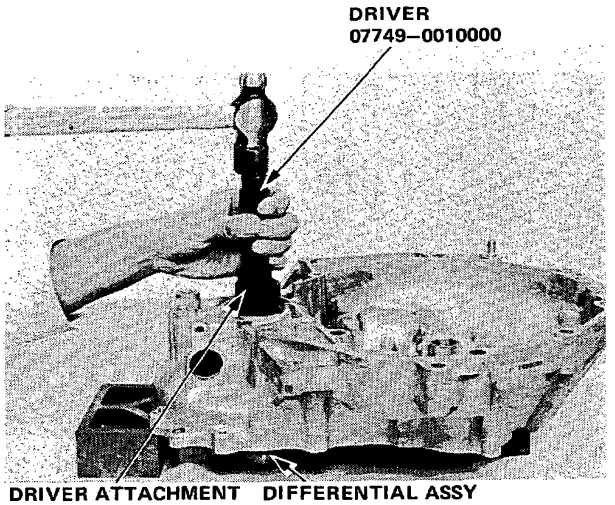


8. Remove countershaft and mainshaft as an assembly, with 1st/2nd & 3rd/4th shift shafts.

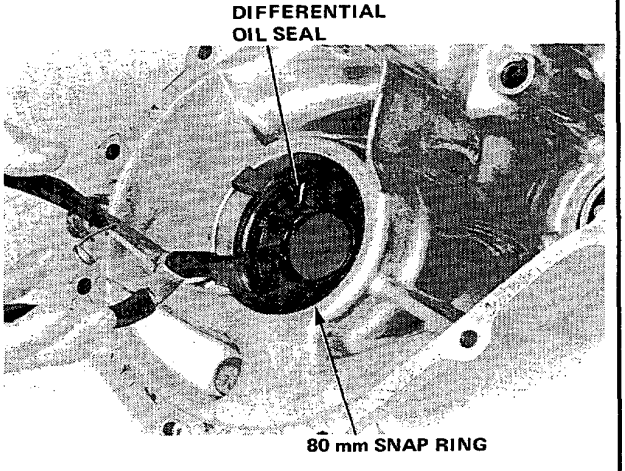


Differential Oil Seal Removal

1. If seals are to be replaced, or if differential needs repair, remove differential assembly.



2. Remove 80 mm snap ring in transmission housing.

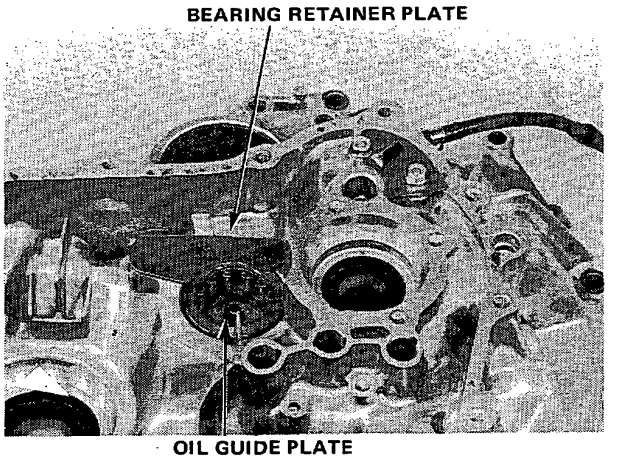


3. Pry the differential oil seal off the differential case.

   NOTE: Replace the oil seal on the transmission case whenever disassembled.

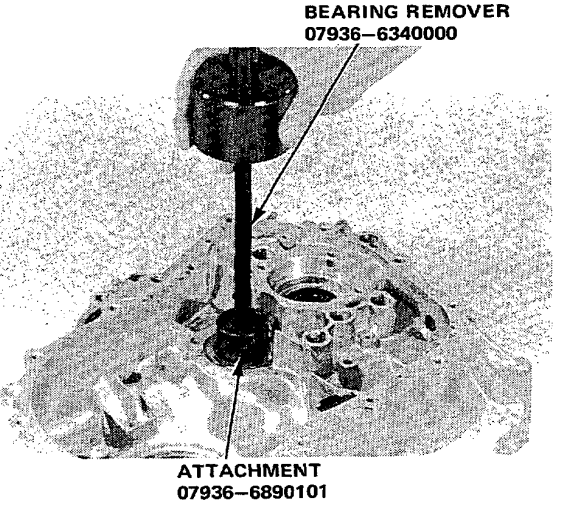
Main & Countershaft Bearing/ Seal Replacement (Clutch housing)

1. Remove mainshaft bearing retainer plates.



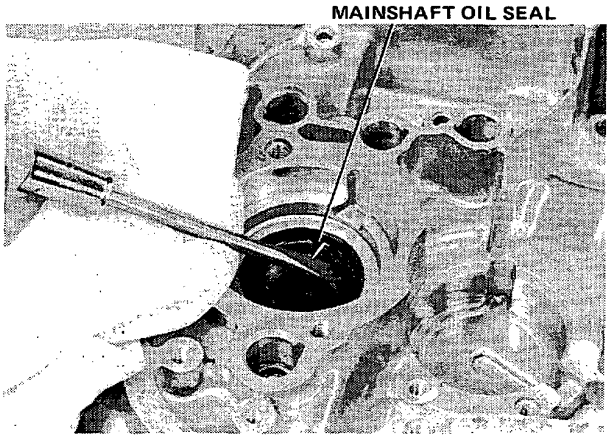
2. Insert Bearing Remover with attachment into countershaft bearing.

3. Raise slide hammer rapidly and strike against handle.
   Repeat several times to remove bearing.



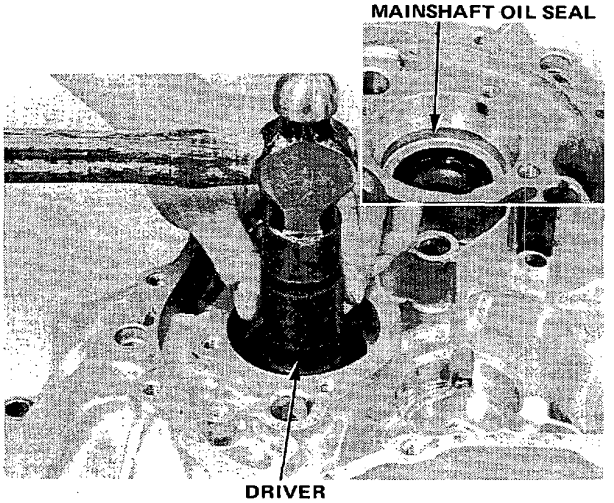
4. Remove mainshaft bearing and seal from clutch housing by driving out with a drift.

NOTE: Always install new bearing and seal. Do not reinstall old ones.

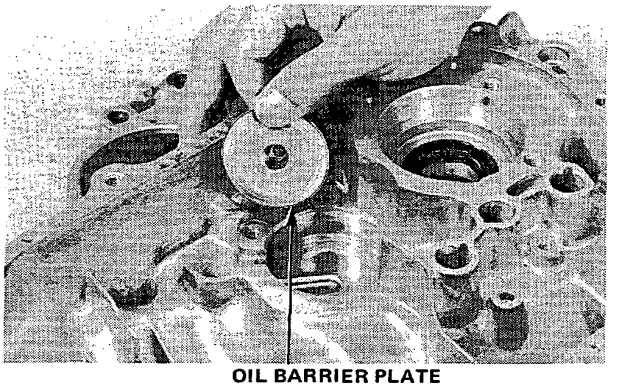


5. Install the mainshaft oil seal.

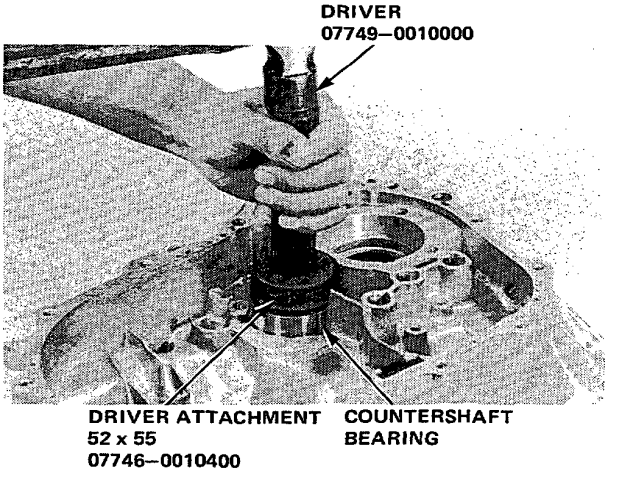
NOTE: Install the oil seal with the sealing lips facing the mainshaft bearing.



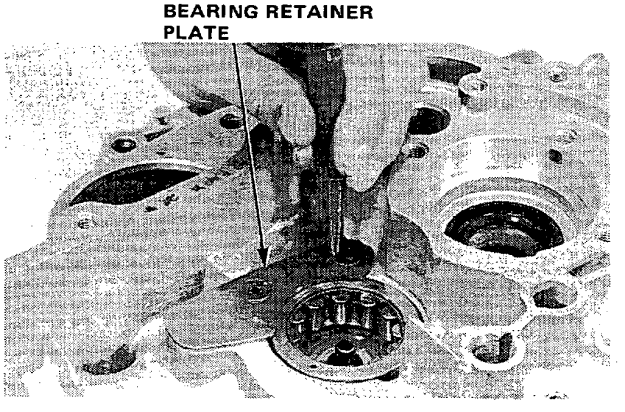
6. Install the countershaft oil barrier plate.



7. Drive in mainshaft bearing with support block placed under case to support bearing boss.

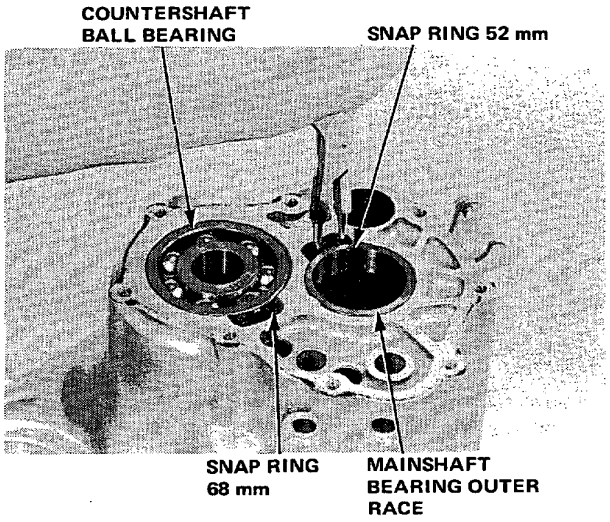


8. Reinstall-bearing retainer plates. Install screws using impact driver. Stake all four screws.



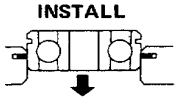
Main & Countershaft Bearing Replacement (Trans housing)

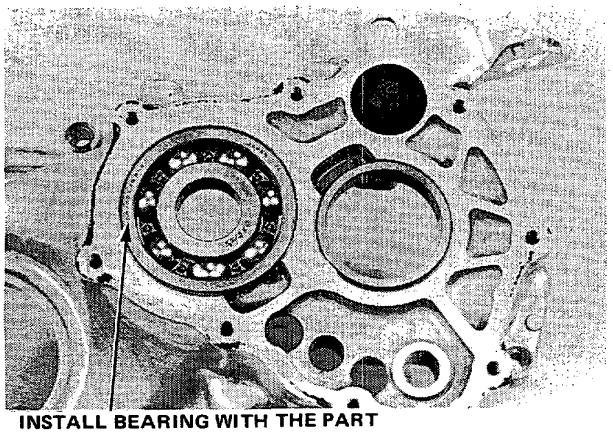
1. Using the Snap Ring Pliers, expand the snap ring and press the bearing out into the case.



2. Using the Snap Ring Pliers, expand the snap ring, press the bearing into the case, and then seat the snap ring in the bearing groove.

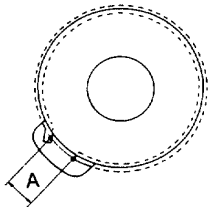
3. After the bearing has entered the snap ring, remove the pliers, and press the bearing into place by hand.





INSTALL BEARING WITH THE PART NUMBER SIDE FACING OUT.

4. Check that the snap ring is seated in the grooves of the bearing and case securely.



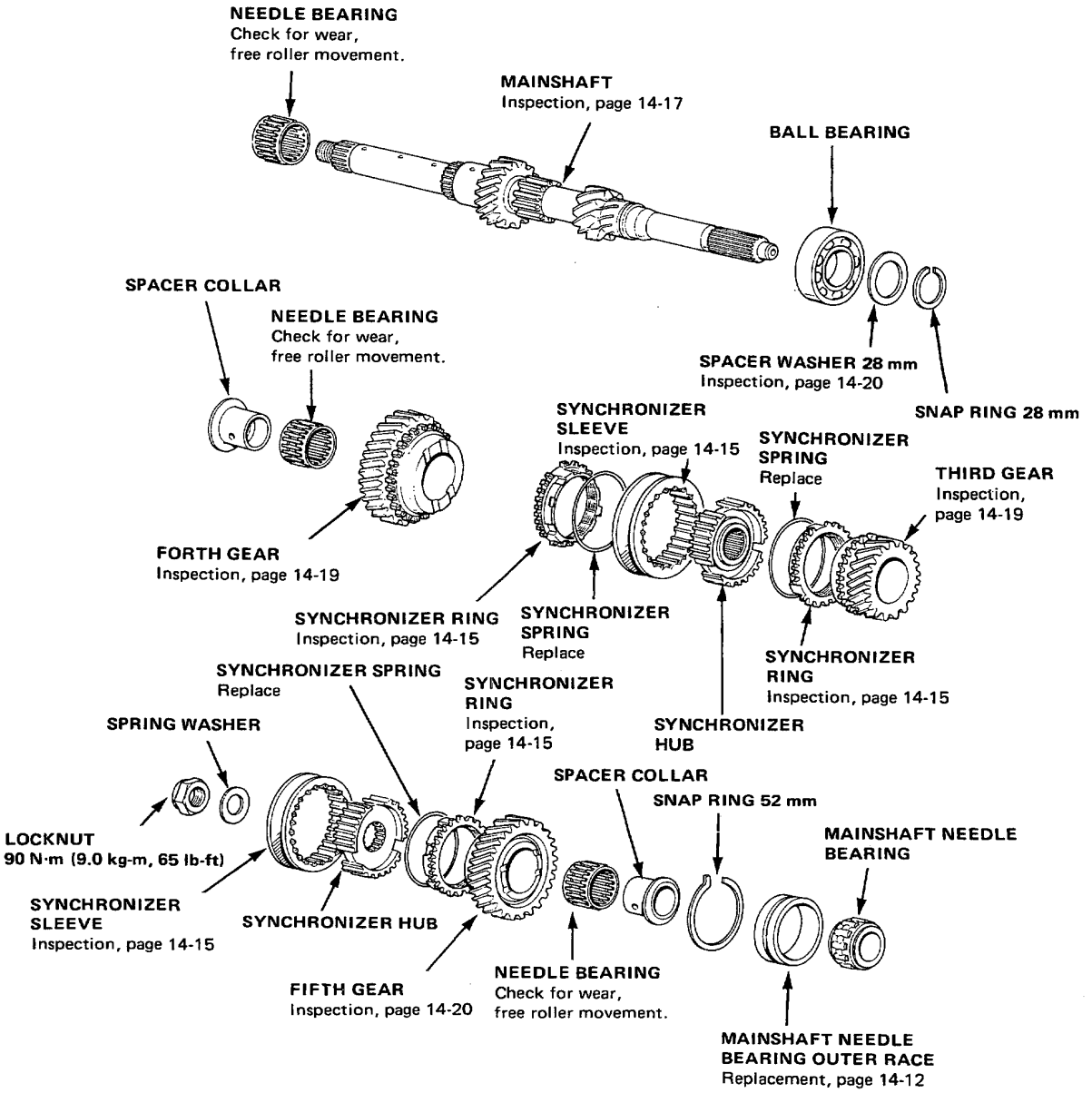
Snap Ring Dimensions as Installed

Bearing	Dimension A as installed	Difference in dimension A between as installed and compressed
Mainshaft	3.0–8.0 mm (0.118–0.314 in)	6.8–7.3 mm (0.267–0.287 in)
Countershaft	7.0–7.1 mm (0.270–0.279 in)	10.3–11.2 mm (0.405–0.440 in)

Mainshaft Index

NOTE:
- Clean all parts thoroughly in solvent and dry with compressed air.
- Third, fourth and fifth gear needle bearings are identical.

OIL Lubricate all parts with oil before reassembly.

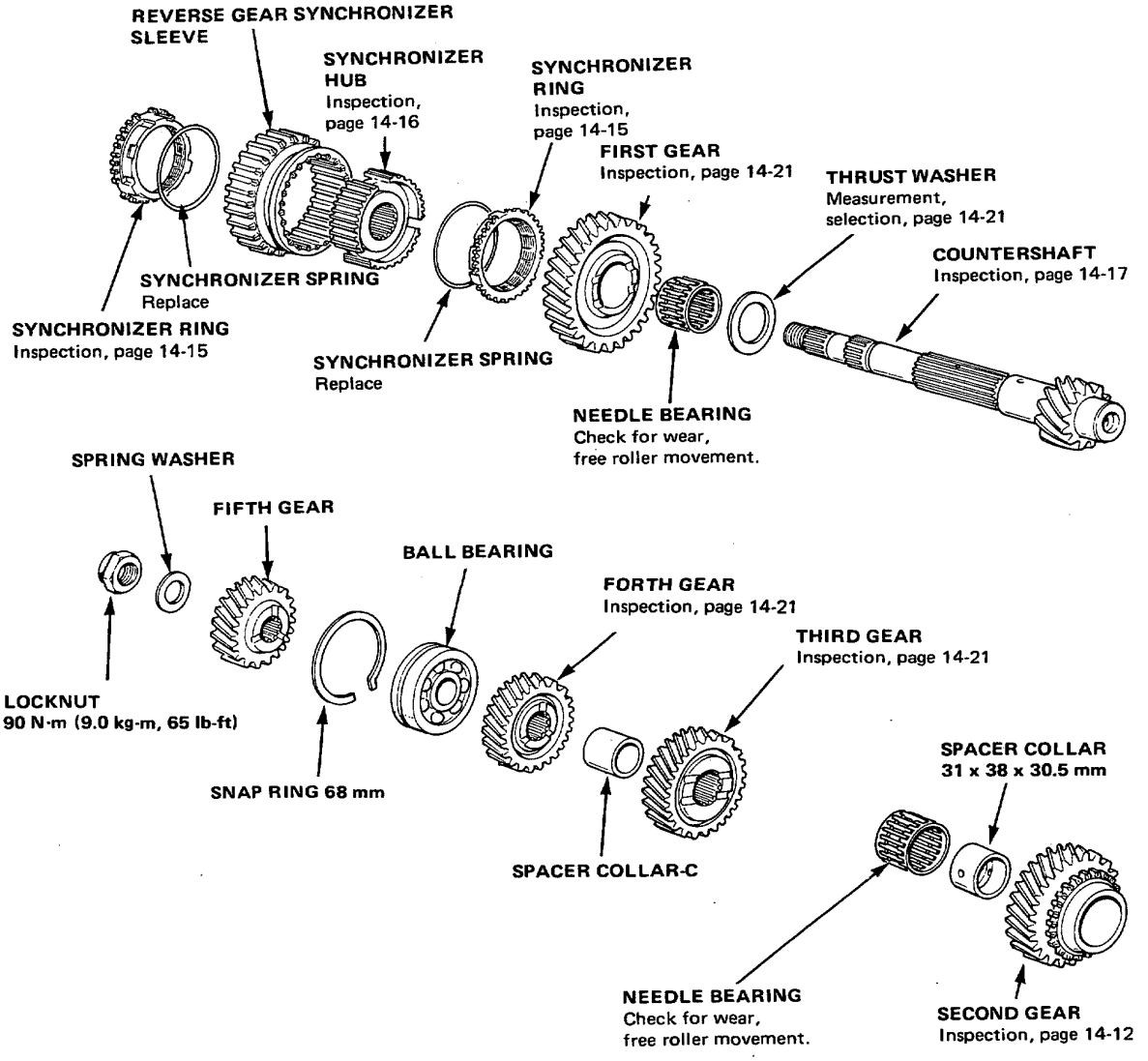


Manual Transmission

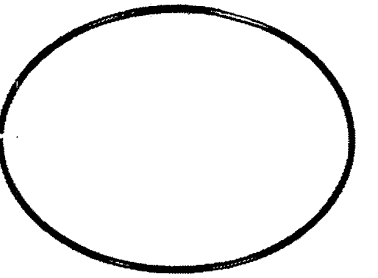
Countershaft Index

NOTE:
- Clean all parts thoroughly in solvent and dry with compressed air.
- First and second gear needle bearings are not identical.

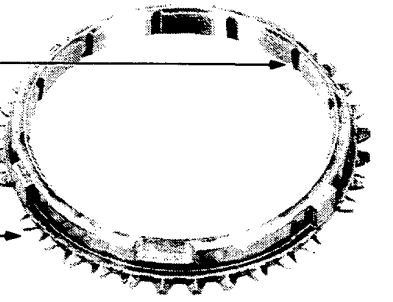
Lubricate all parts with oil before reassembly.



Gear and Synchronizer Ring Inspections



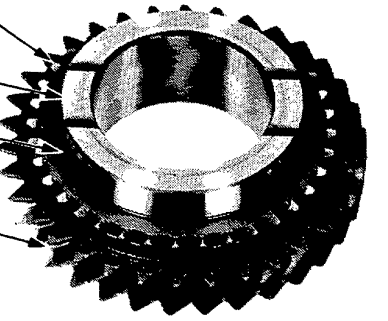
1. Inspect inside of synchronizer ring for wear.



2. Inspect synchro ring teeth and matching teeth on gear for wear (rounded off).



3. Inspect gear hub thrust surface for wear.
4. Inspect cone surface for wear on 1st and 2nd countershaft gears; 3rd, 4th and 5th mainshaft gears.
5. Inspect teeth on all gears for uneven wear, scoring, galling, cracks.

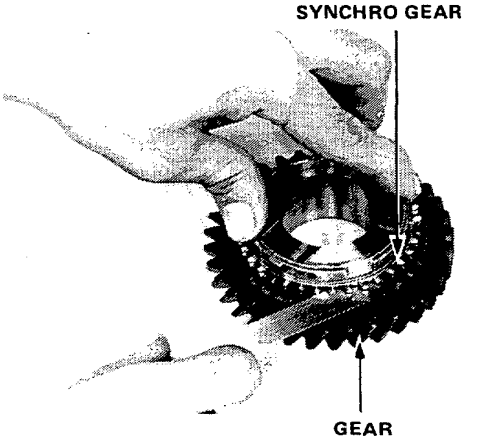


6. Place synchronizer ring on matching gear cone and rotate until it stops (approx. 10 to 20 degrees), then measure clearance between ring and gear teeth.

RING–TO–GEAR CLEARANCE

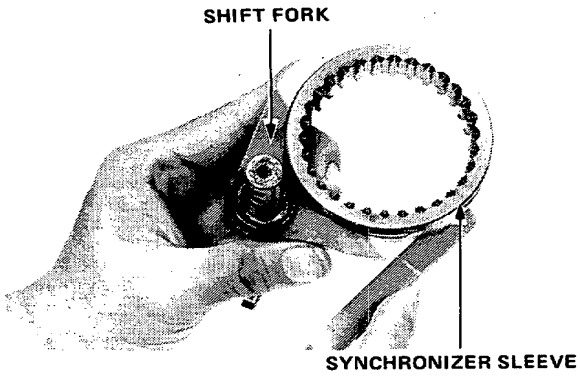
Standard (New): 0.85–1.10 mm (0.033–0.043 in.)
Service Limit: 0.4 mm (0.016 in.)

7. Separate the synchronizer ring and gear, and coat them with oil.
8. Install synchronizer spring on synchronizer ring.
9. Put synchronizer ring on gear cone again, rotate until it stops, then set it aside for later reassembly.



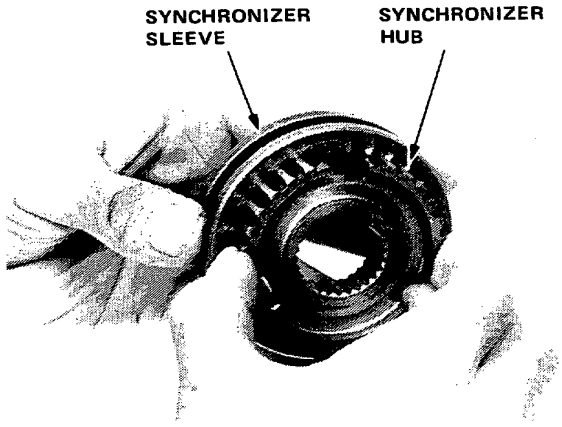
Shift Fork to Synchronizer Sleeve Clearance

1. Check clearance between each shift fork and its matching synchronizer sleeve.
   FORK-TO-SLEEVE CLEARANCE (ALL THREE FORKS & SLEEVES)
   Standard (New): 0.35–0.65 mm (0.014–0.026 in.)
   Service Limit: 1.0 mm (0.039 in.)
2. If fork-to-sleeve clearance is too great, measure width of groove in synchronizer sleeve.
   Standard (New): 6.75–6.85 mm (0.266–0.270 in.)



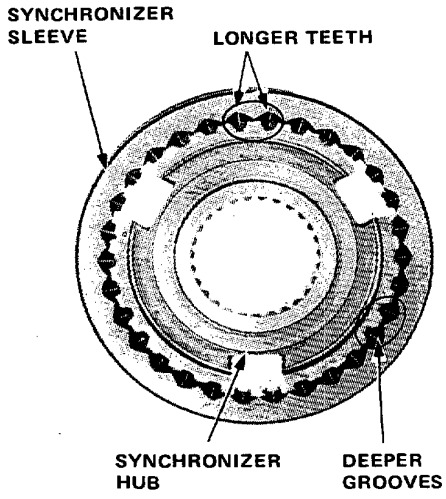
Synchronizer Sleeve and Hub Inspections

1. Inspect gear teeth on all synchro hubs and sleeves for rounded off corners, indicating wear.
2. Install each hub in its mating sleeve and check for freedom of movement.



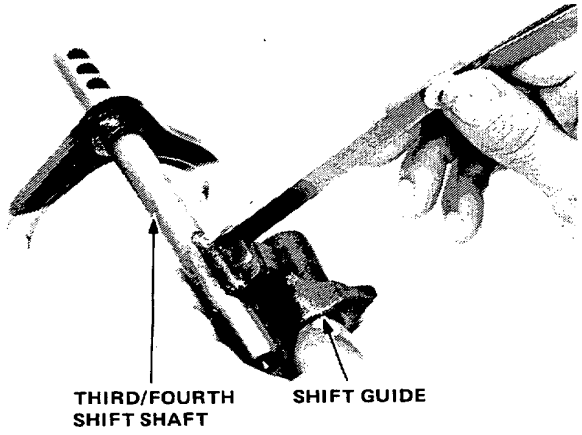
Installing Synchronizer Hubs in Sleeves

Each synchronizer sleeve has three sets of longer teeth (120 degrees apart) that must be matched with the three sets of deeper grooves in the hub when assembled.



Third/Fourth Shift Shaft to Shift Guide Clearance

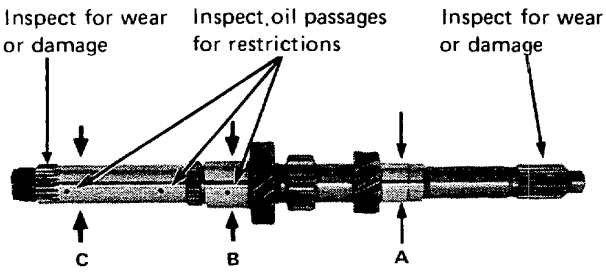
1. Check third/fourth shift shaft-to-shift guide clearance as shown.
   SHAFT-TO-GUIDE CLEARANCE
   Standard (New): 0.2–0.5 mm (0.008–0.02 in.)
   Service Limit: 0.8 mm (0.03 in.)
2. If clearance is too great, measure width of shift guide tab.
   Standard (New): 11.9–12.0 mm (0.469–0.472 in.)



Mainshaft Inspection

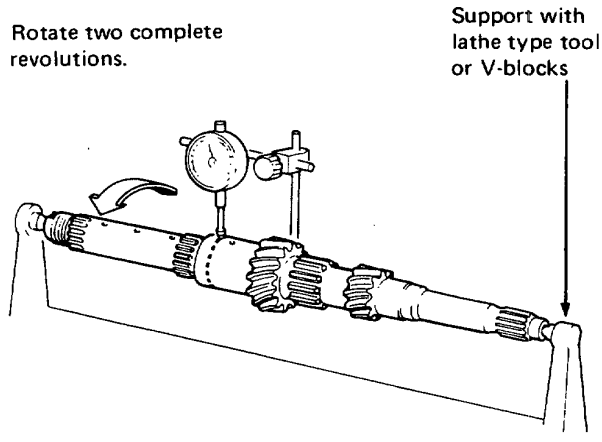
Wear

Outside Diameter:
Standard (New): A: 26.004–26.017 mm (1.0238–1.0243 in.)
B: 31.984–32.000 mm (1.2592–1.2598 in.)
C: 24.980–24.993 mm (0.9835–0.9840 in.)
Service Limit: A: 25.95 mm (1.022 in.)
B: 31.93 mm (1.257 in.)
C: 24.93 mm (0.98 in.)



Runout

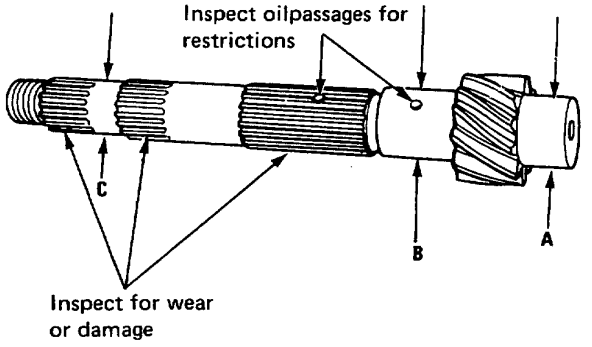
Standard (New): 0.04 mm (0.0016 in.)
Service Limit: 0.10 mm (0.004 in.)



Countershaft Inspection

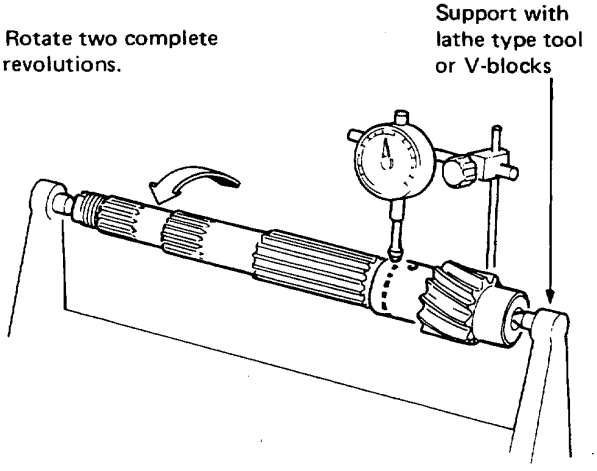
Wear

Outside Diameter:
Standard (New): A: 33.000–33.015 mm (1.2992–1.2998 in.)
B: 33.984–34.000 mm (1.3380–1.3386 in.)
C: 24.980–24.993 mm (0.9835–0.9840 in.)
Service Limit: A: 32.95 mm (1.297 in.)
B: 33.93 mm (1.336 in.)
C: 24.93 mm (0.981 in.)



Runout

Standard (New): 0.04 mm (0.0016 in.)
Service Limit: 0.10 mm (0.004 in.)



Manual Transmission

Mainshaft/Countershaft Reassembly and Measurement

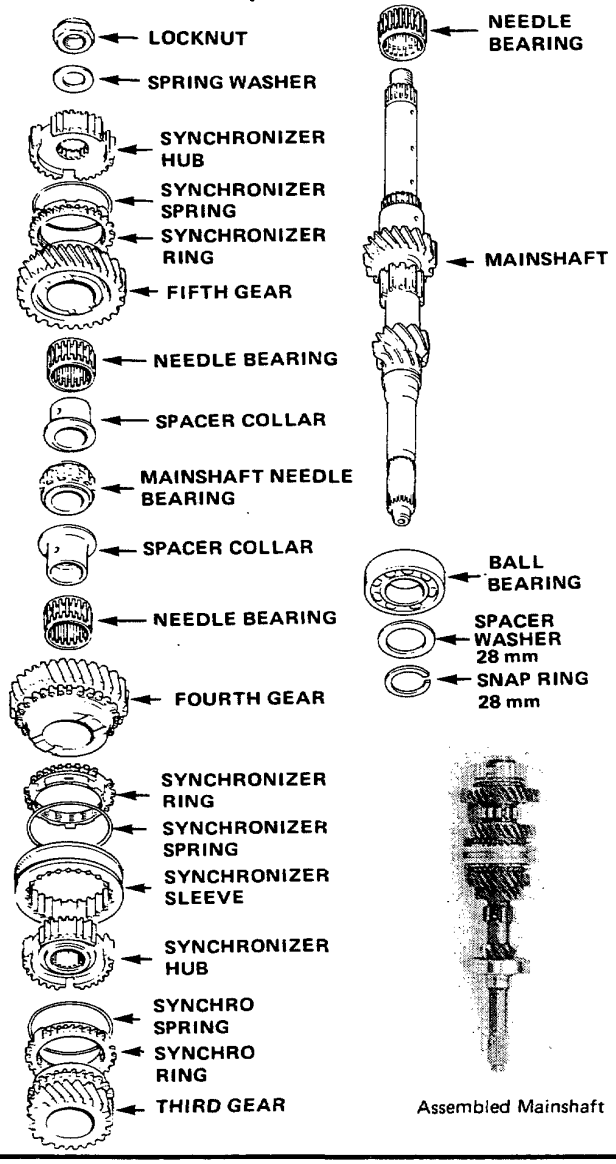
1. Remove both mainshaft and countershaft bearings from transmission housing.
2. Assemble mainshaft and countershaft including bearings and fifth gear components, as shown below.
3. Install mainshaft/countershaft assembly into clutch housing.
4. Install the mainshaft holder to prevent shafts from turning, and shift transmission into gear.
5. Torque the countershaft and mainshaft locknuts to 90 N·m (9.0 kg-m, 65 lb-ft) before checking clearances.

CAUTION: Incorrect gear clearances can be caused by overtorquing the countershaft or mainshaft locknuts. Whenever locknuts are installed, use an accurately calibrated torque wrench.

6. Remove transmission shafts from clutch housing and measure clearances described on next two pages.

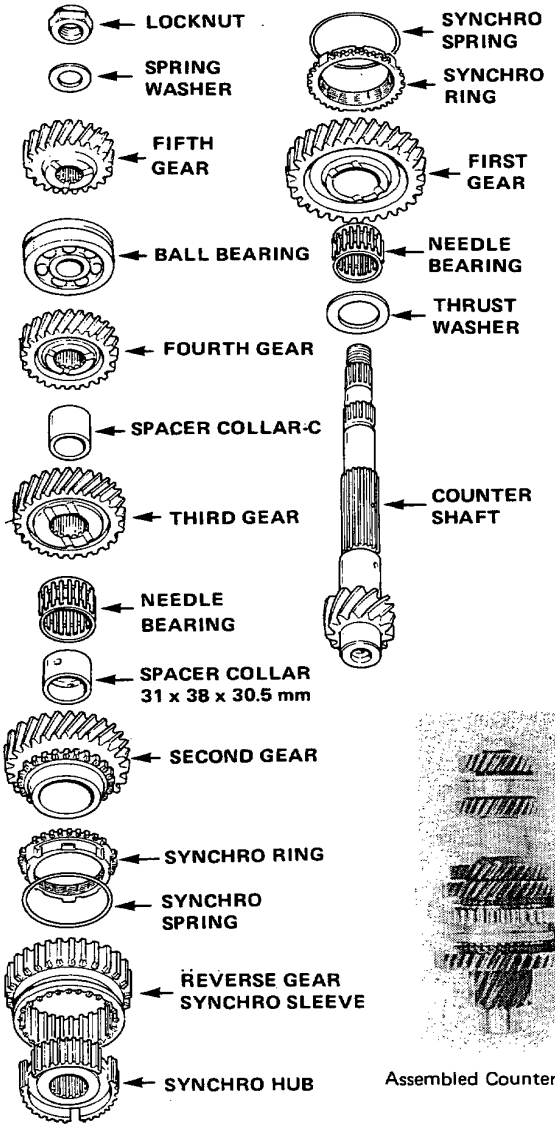
Lubricate all parts with oil before final reassembly.

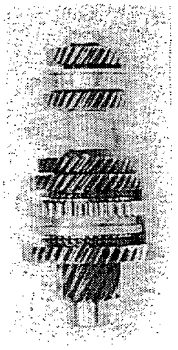
Mainshaft Assembly



Assembled Mainshaft

Countershaft Assembly



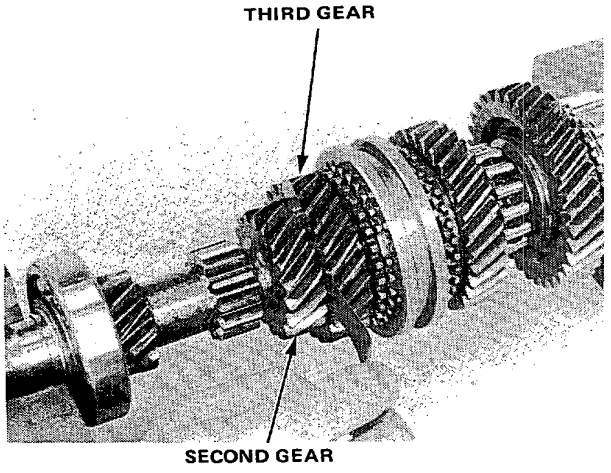


Assembled Countershaft

Mainshaft Measurements

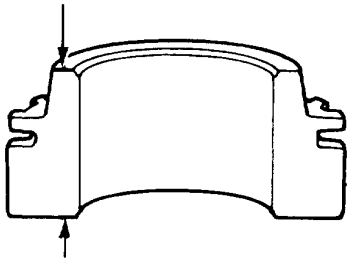
7. Measure clearance between shoulder on third gear and shoulder on second gear.

THIRD GEAR CLEARANCE
Standard (New): 0.03–0.18 mm (0.0012–0.0071 in.)
Service Limit: 0.3 mm (0.012 in.)



8. If out of tolerance, measure thickness of third gear.

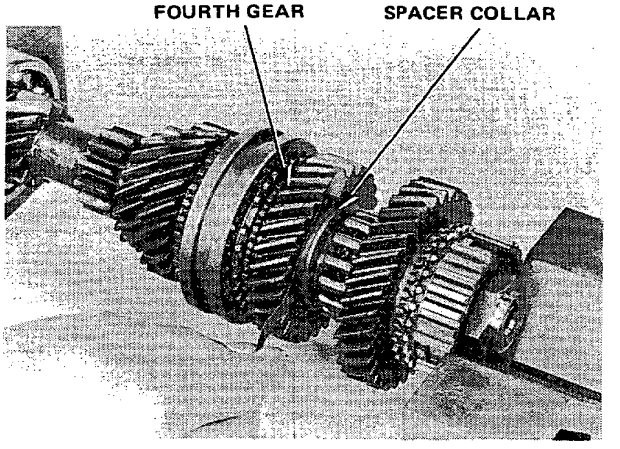
THIRD GEAR THICKNESS
Standard (New): 29.42–29.47 mm (1.158–1.160 in.)
Service Limit: 29.3 mm (1.15 in.)



If third gear is OK, replace synchronizer hub if necessary after all other measurements are complete.

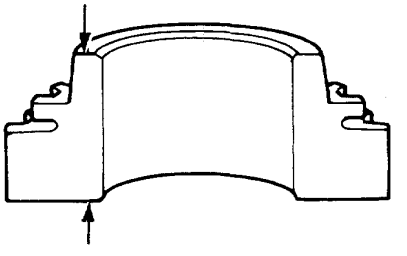
9. Measure clearance between spacer collar and shoulder on fourth gear.

FOURTH GEAR CLEARANCE
Standard (New): 0.03–0.18 mm (0.0012–0.0071 in.)
Service Limit: 0.3 mm (0.012 in.)



10. If out of tolerance, measure thickness of fourth gear.

FOURTH GEAR THICKNESS
Standard (New): 29.42–29.47 mm (1.158–1.160 in.)
Service Limit: 29.3 mm (1.15 in.)



If fourth gear is OK, replace synchronizer hub if necessary after all other measurements are complete.

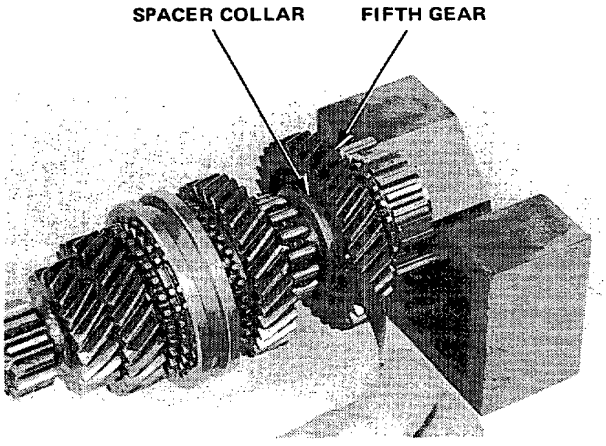
(cont'd)

Mainshaft/Countershaft Clearance Meaurements (cont'd)

Mainshaft Measurements

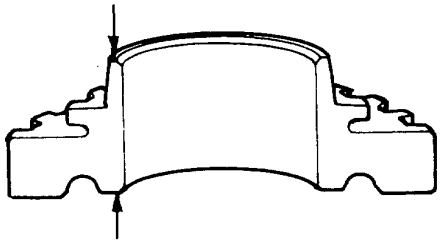
11. Measure clearance between spacer collar and shoulder on fifth gear.

FIFTH GEAR CLEARANCE
Standard (New): 0.03–0.13 mm (0.001–0.005 in.)
Service Limit: 0.25 mm (0.01 in.)



12. If out of tolerance, measure thickness of fifth gear.

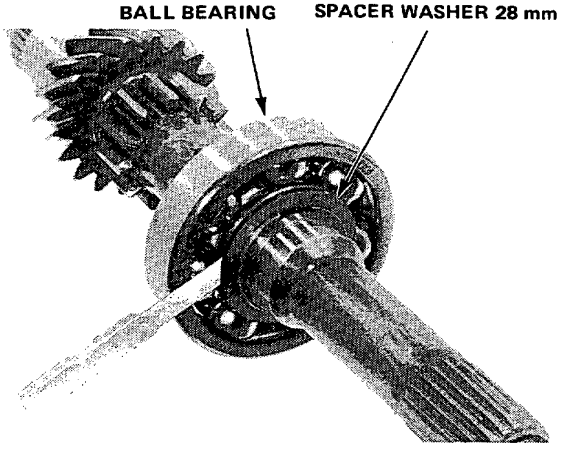
FIFTH GEAR THICKNESS
Standard (New): 26.92–26.97 mm (1.06–1.062 in.)
Service Limit: 26.8 mm (1.055 in.)



If out of limit, replace fifth gear.

13. Measure clearance between spacer washer 28 mm and ball bearing.

BALL BEARING CLEARANCE
Standard (New): 0–0.1 mm (0–0.004 in.)



If out of tolerance, change thickness of spacer washer 28 mm after measuring all other clearances.

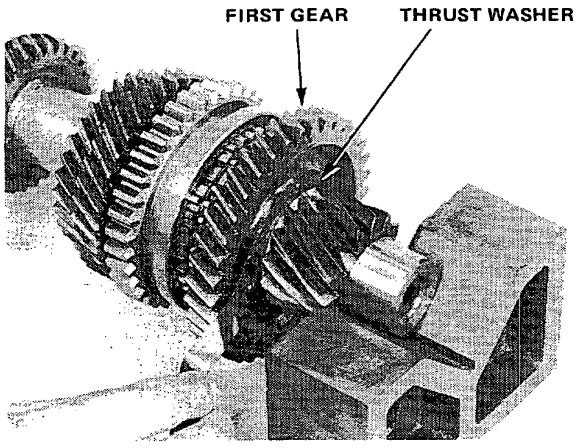
REPLACEMENT SPACER WASHERS

CLASS	THICKNESS
A	1.88–1.92 mm (0.074–0.075 in.)
B	1.94–1.98 mm (0.076–0.078 in.)
C	2.00–2.04 mm (0.079–0.080 in.)
D	2.06–2.10 mm (0.081–0.082 in.)
E	2.12–2.16 mm (0.083–0.085 in.)

Countershaft Measurements

14. Measure clearance between first gear thrust washer and shoulder on first gear.

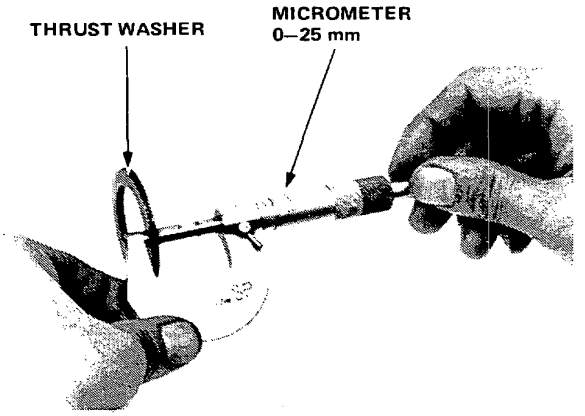
FIRST GEAR CLEARANCE
Standard (New): 0.03–0.08 mm (0.001–0.003 in.)



If out of tolerance, change thickness of first gear thrust washer after measuring all other clearances.

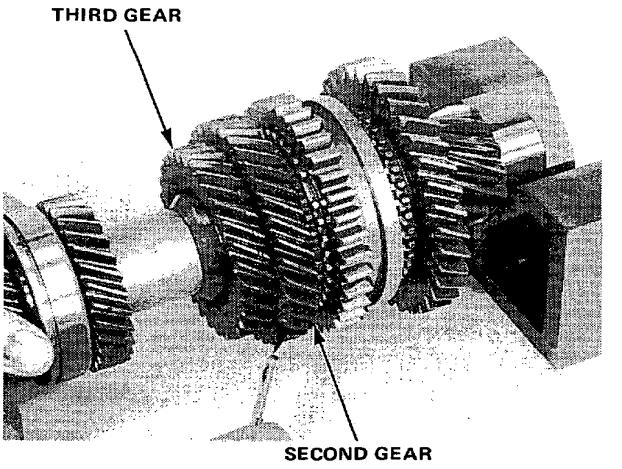
REPLACEMENT THRUST WASHERS

CLASS	THICKNESS
A	2.02–2.04 mm (0.119–0.120 in.)
B	2.00–2.02 mm (0.118–0.119 in.)
C	2.98–3.00 mm (0.117–0.118 in.)
D	2.96–2.98 mm (0.116–0.117 in.)



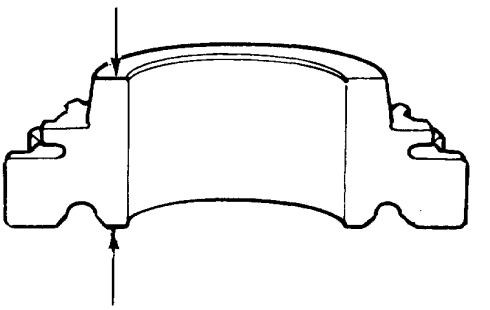
15. Measure clearance between shoulder on third gear and shoulder on second gear.

SECOND GEAR CLEARANCE
Standard (New): 0.03–0.1 mm (0.0012–0.004 in.)
Service Limit: 0.18 mm (0.007 in.)



16. If out of tolerance, measure thickness of second gear.

SECOND GEAR THICKNESS
Standard (New): 30.42–30.47 mm (1.198–1.200 in.)
Service Limit: 30.3 mm (1.192 in.)

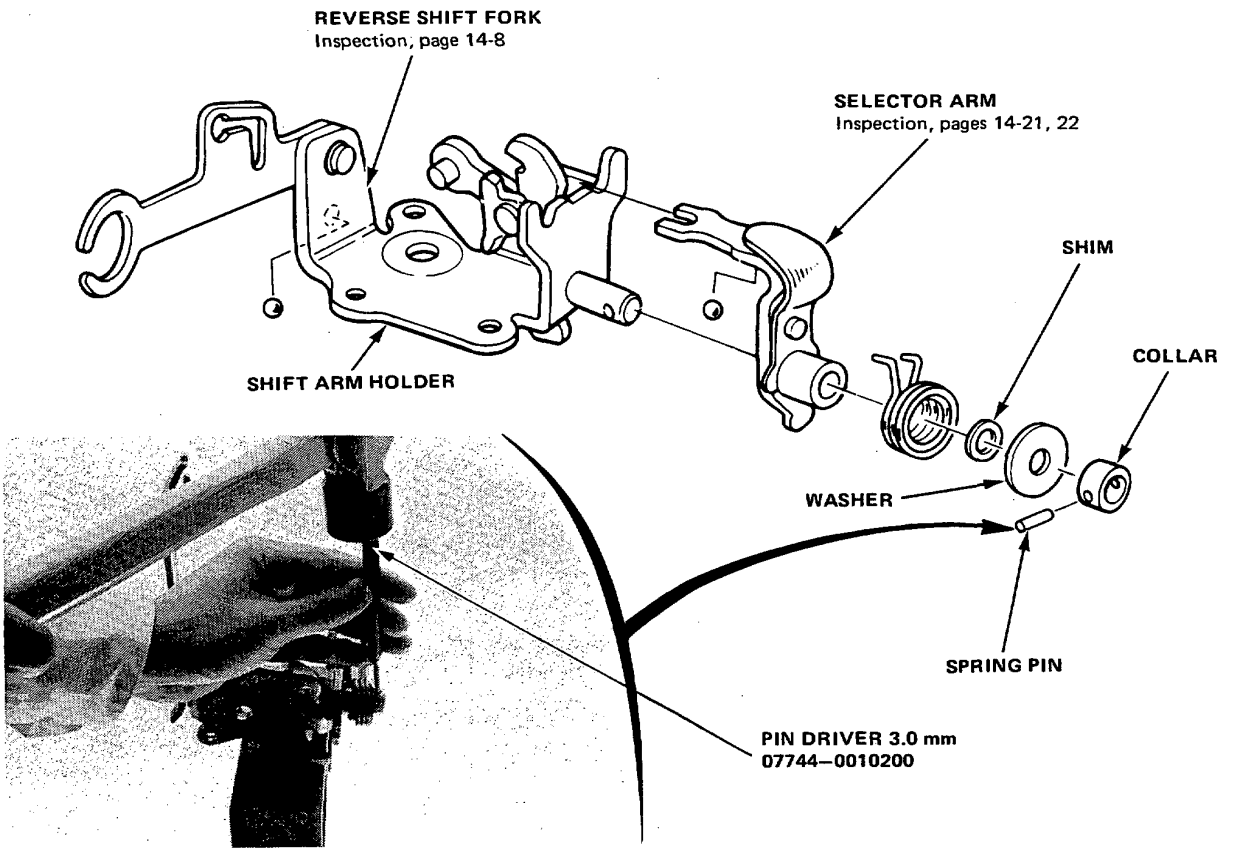


If out of limit, replace second gear.

17. After all clearances have all been checked, and those out of limits corrected, reassemble transmission mainshaft and countershaft and recheck all clearances. If they are correct, disassemble fifth gear components and reinstall bearings in transmission housing.

Shift Arm Holder Index

To remove selector arm from holder for shimming or replacement, drive out spring pin with driver.



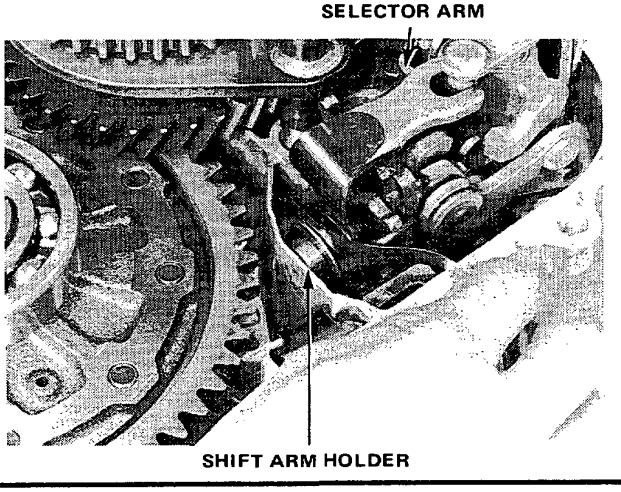
Shift Arm Holder Clearances

1. Measure clearance between collar and shim on shaft of selector arm as shown.

   CLEARANCE
   Standard (New): 0.01–0.2 mm (0.0004–0.008 in.)

2. If out of tolerance, select a new shim from following table.

CLASS	THICKNESS
A	0.8 mm (0.031 in.)
B	1.0 mm (0.039 in.)
C	1.2 mm (0.047 in.)
D	1.4 mm (0.055 in.)
E	1.6 mm (0.063 in.)



Shift Arm to Shift Guide Clearance

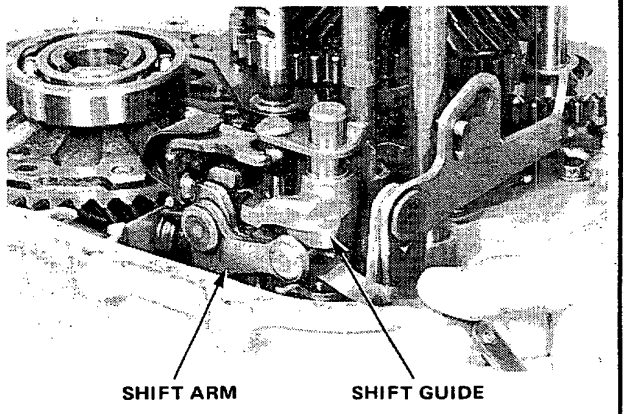
1. Check shift arm-to-shift guide clearance.

   Standard (New): 0.1–0.3 mm (0.004–0.012 in.)
   Service Limit: 0.6 mm (0.024 in.)

2. If not within service limit, measure width of slot in shift guide.

   Standard (New): 7.9–8.0 mm (0.311–0.315 in.)

3. If slot is wider than standard, replace shift guide.



Selector Arm to Interlock Clearance

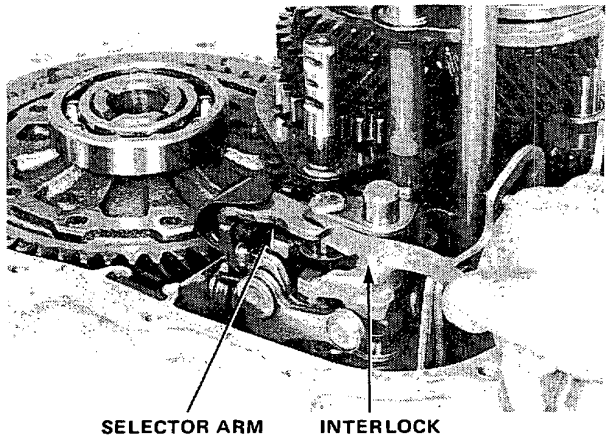
1. Check selector arm-to-interlock clearance.

   Standard (New): 0.05–0.25 mm (0.002–0.01 in.)
   Service Limit: 0.7 mm (0.03 in.)

2. If not within service limit, measure gap between selector arm fingers.

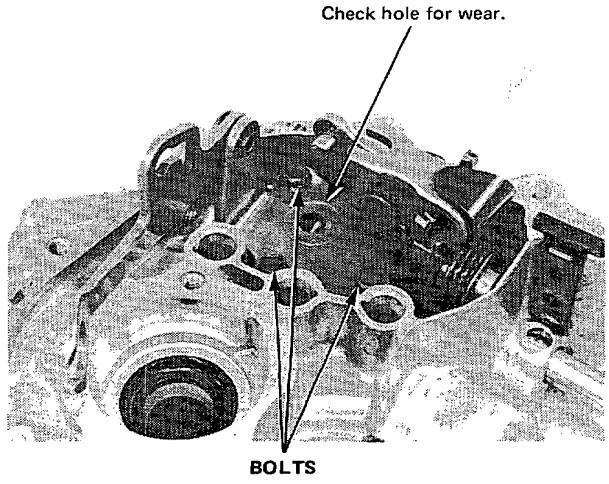
   Standard (New): 10.05–10.15 mm (0.396–0.4 in.)

3. If gap is wider than standard, replace arm.

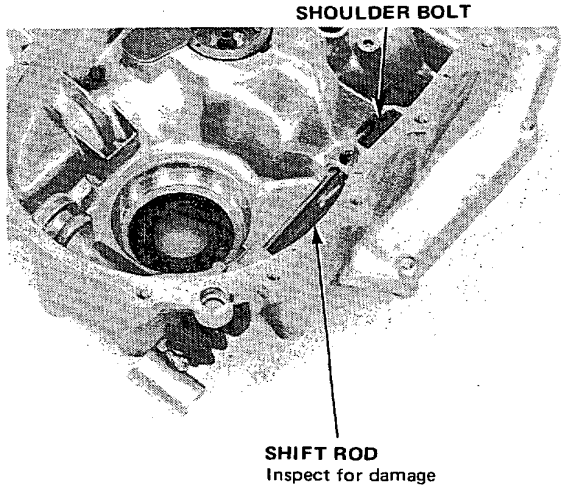


Shift Rod and Shift Arm Holder Removal

1. Remove shift arm holder (3 bolts).

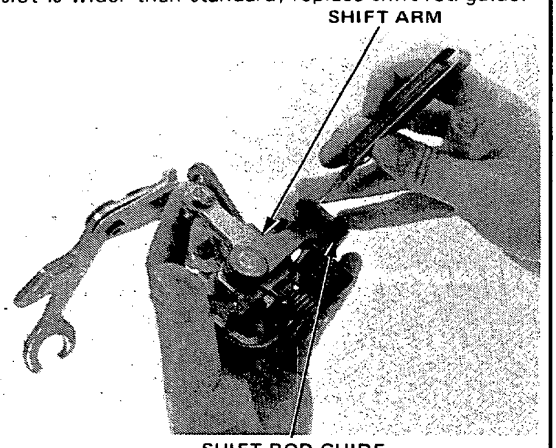


2. Remove shift rod by removing shoulder bolt.



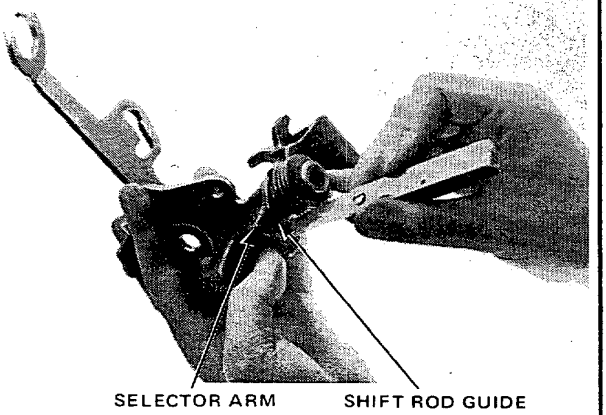
Shift Arm to Shift Rod Guide Clearance

1. Check shift arm-to-shift rod guide clearance.
   Standard (New): 0.05–0.35 mm (0.002–0.01 in.)
   Service Limit: 0.8 mm (0.03 in.)
2. If not within service limit, measure width of slot in shift rod guide.
   Standard (New): 11.8–12.0 mm (0.46–0.47 in.)
3. If slot is wider than standard, replace shift rod guide.



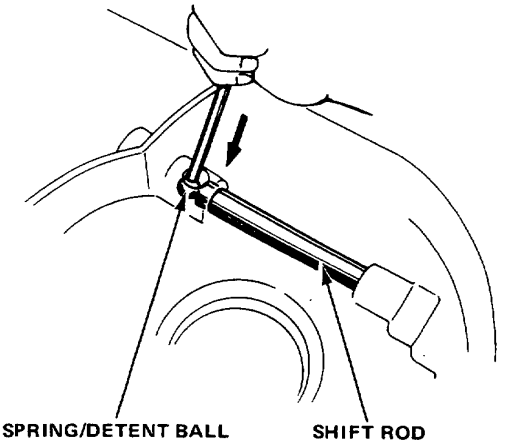
Gear Selector Arm to Shift Rod Guide Clearance

1. Check selector arm-to-shift rod guide clearance.
   Standard (New): 0.05–0.25 mm (0.002–0.01 in.)
   Service Limit: 0.5 mm (0.02 in.)
2. If not within service limit, measure width of tab on selector arm.
   Standard (New): 11.9–12.0 mm (0.469–0.472 in.)
3. If tab is narrower than standard, replace the arm.

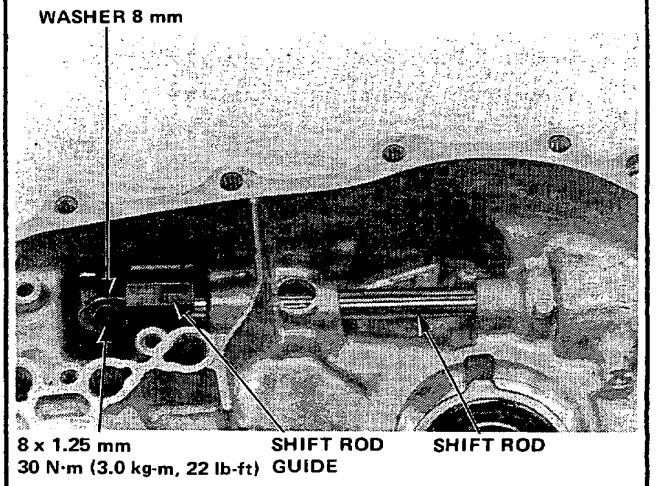


Shift Rod Installation

1. Install shift rod with detent notches facing downward.
2. Install spring and detent ball. Lubricate spring with molylube.
3. Install shift rod while pushing detent ball in.

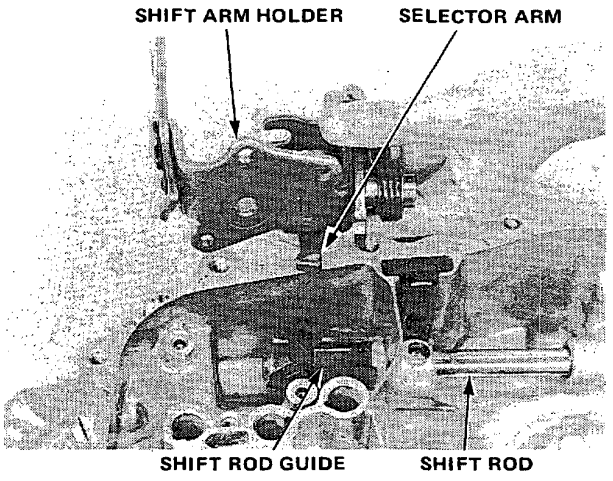


4. Install shift rod guide on shift rod.

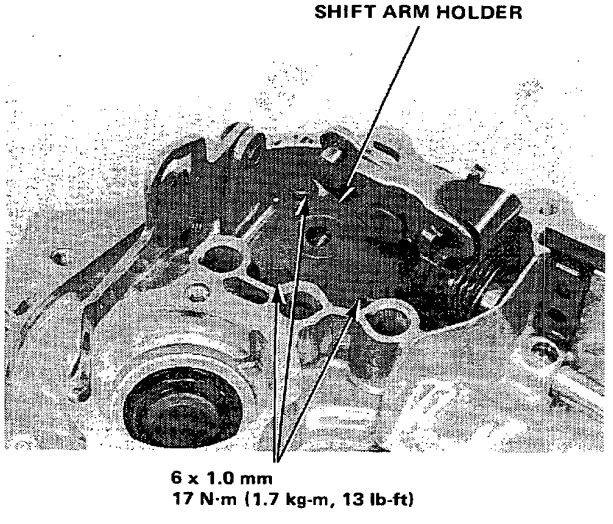


Shift Arm Holder Assembly Installation

1. Hook selector arm and shift arm into shift rod guide.

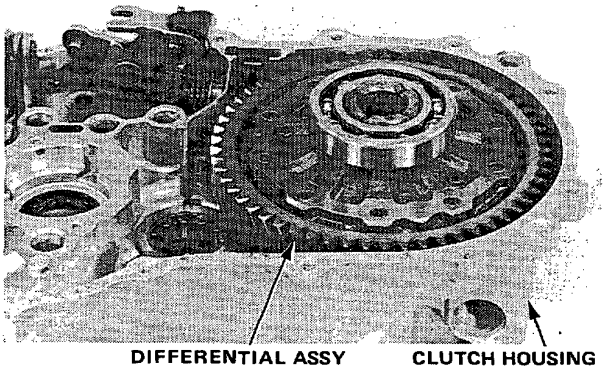


2. Install bolts in shift arm holder.

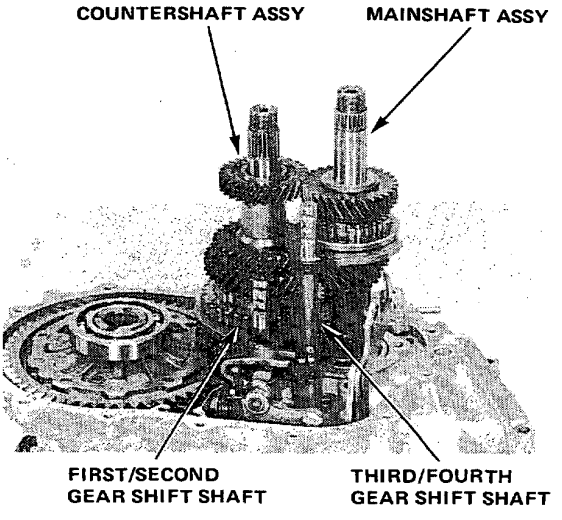


Transmission Reassembly

1. Install differential assembly in clutch housing.



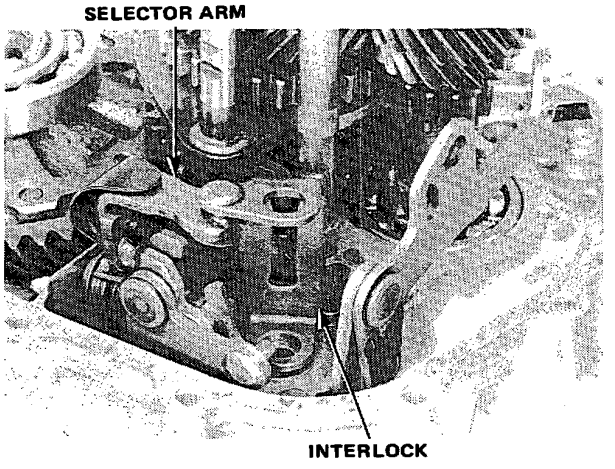
2. Install mainshaft, countershaft, first/second gear shift shaft and third/fourth gear shift shaft together as an assembly. Make sure forks are in fourth and second gear positions to make installation easier.



(cont'd)

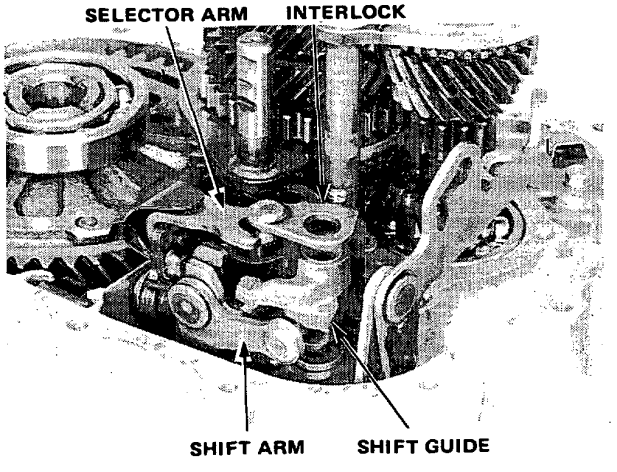
Transmission Reassembly (cont'd)

3. Lift mainshaft as shown and install interlock into the selector arm.

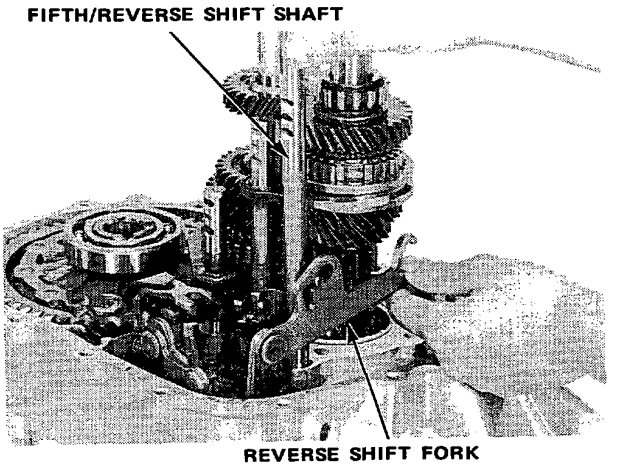


4. Place shift rod in neutral.

5. Hook interlock into selector arm, first/second gear shift shaft and third/fourth gear shift shaft. Hook shift guide into shift arm.

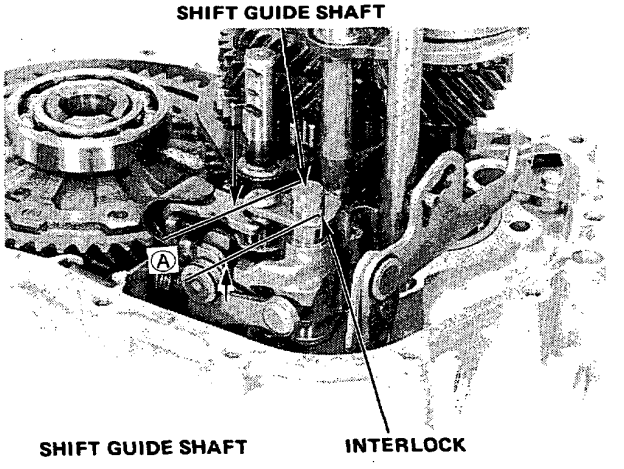


6. Install fifth/reverse shift shaft and hook its pin into reverse shift fork slot.

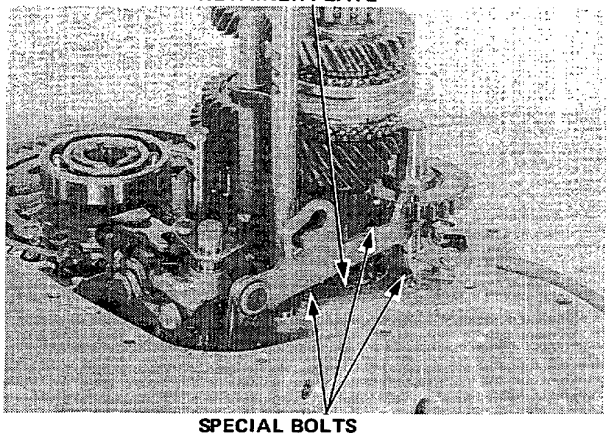


7. Install shift guide shaft so it bottoms securely in clutch housing hole. End of shaft should extend no more than 12 mm (0.5 in.) above interlock as shown.

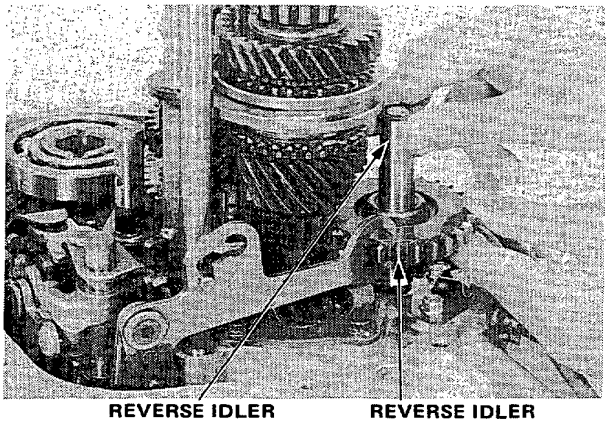
   If not, check installation.



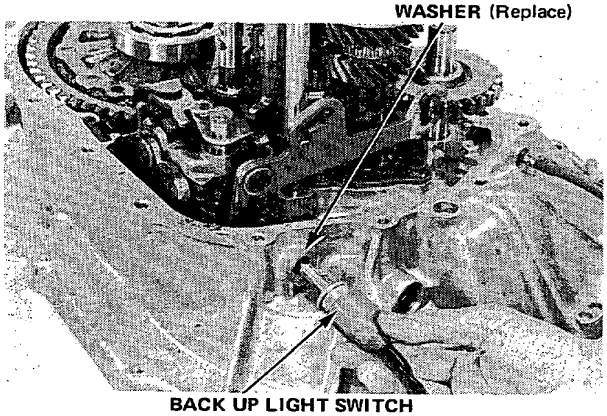
8. Install mainshaft bearing retainer plate.



9. Install reverse idler gear and shaft.



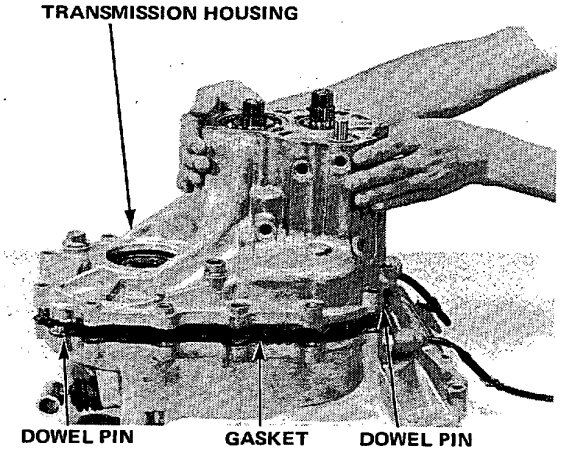
10. Install back-up light switch with new washer.



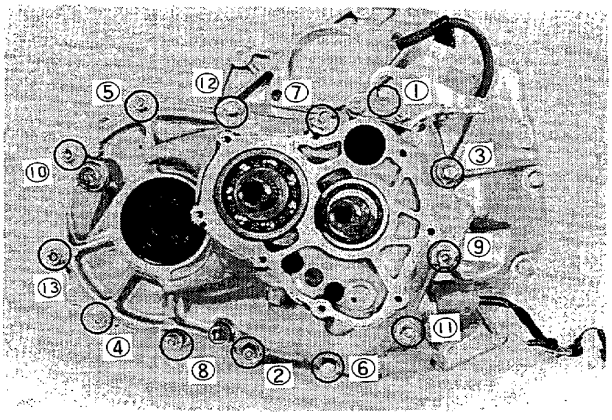
11. Place new gasket on clutch housing.

12. Install dowel pins.

13. Shift transmission into third gear to position shift guide shaft for reassembly. Install transmission housing being careful to line up shafts. Shift guide shaft must seat in blind hole in transmission housing. Do not force installation of housing.

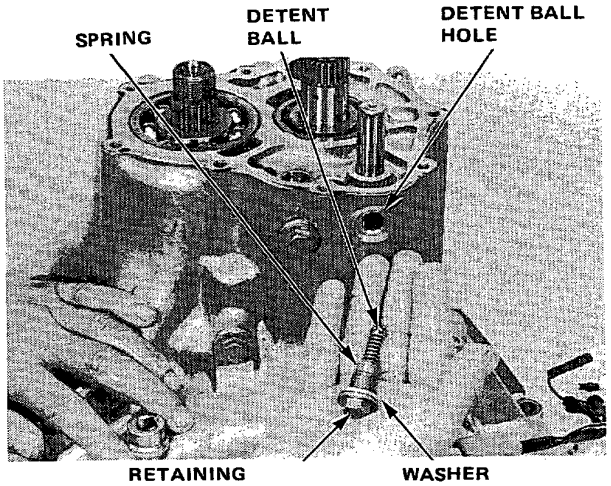


14. Torque bolts (8 x 1.25 mm) in sequence shown, to 28 N·m (2.8 kg-m, 21 lb-ft)

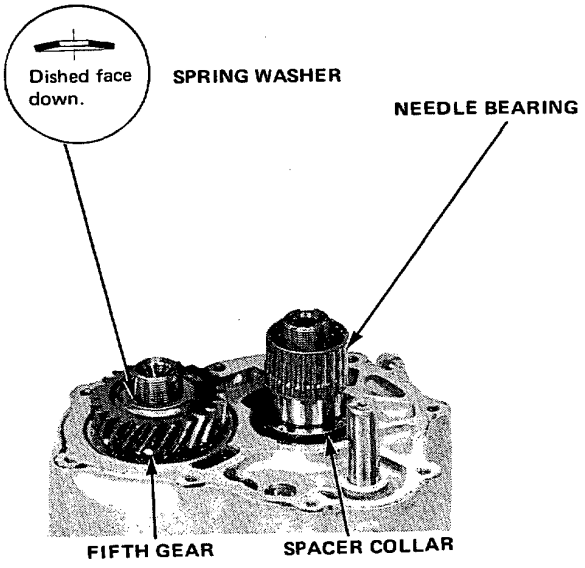


Transmission Reassembly (cont'd)

15. Install three detent balls, washers, and retaining screws.

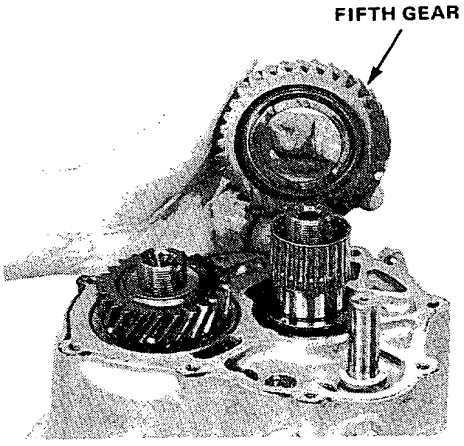


16. Install fifth gear with high side facing down. Then install spring washer with dished surface facing fifth gear.

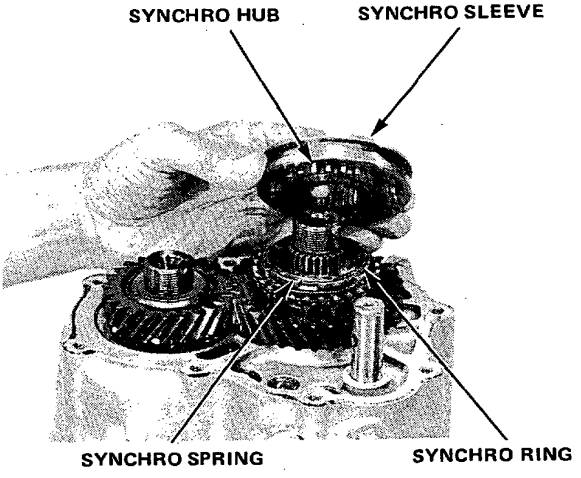


17. Install spacer collar and needle bearing on the mainshaft.

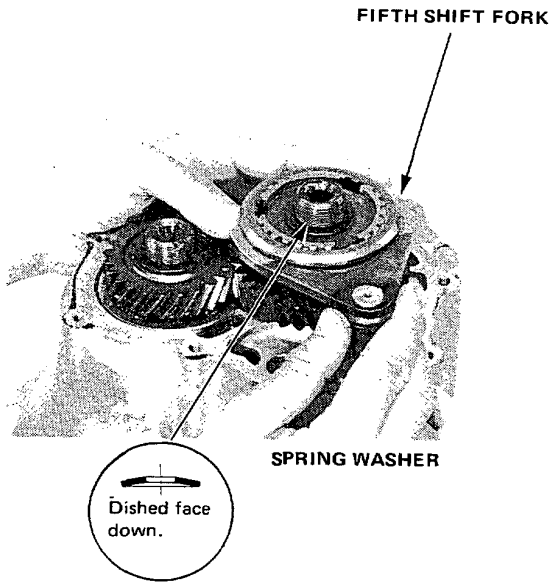
18. Install mainshaft fifth gear.



19. Install synchro ring, synchro spring, synchro hub and synchro sleeve on the mainshaft.

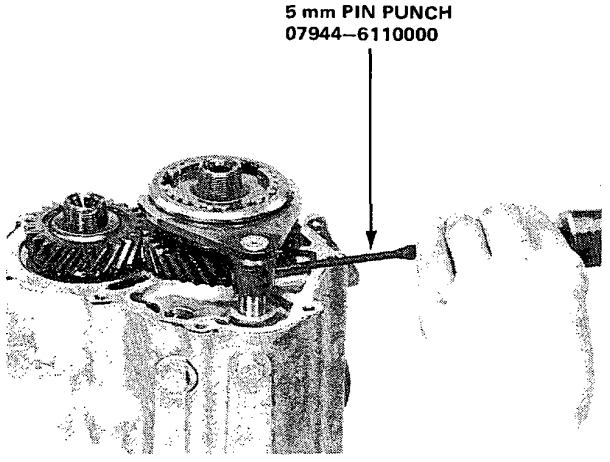


20. Install fifth shift fork into synchro sleeve.



21. Install spring washer with dished (concave) surface facing synchro hub.

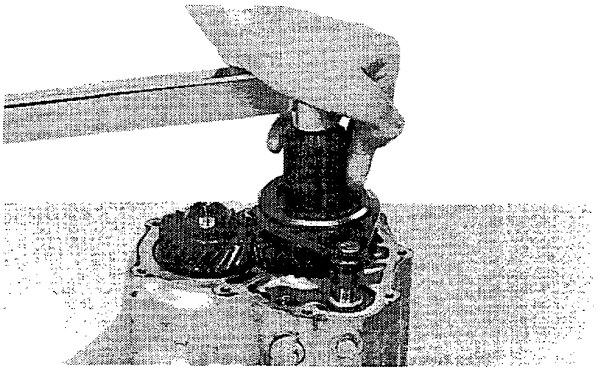
22. Drive spring pin into fifth gear shift fork.



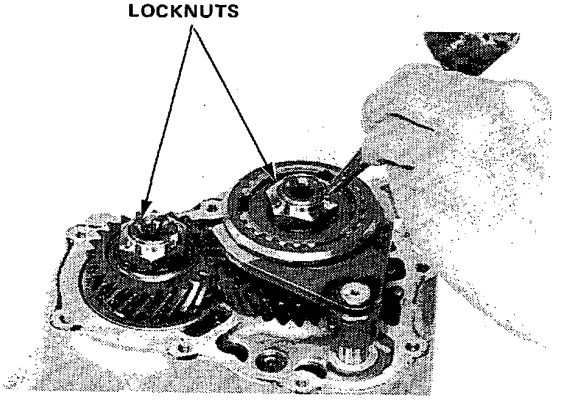
23. Install mainshaft holder 07923–6890100 to prevent shaft from rotating, then shift transmission into reverse gear.

24. Torque mainshaft and countershaft locknuts. Tighten to specified torque, then loosen and re-tighten to same torque.

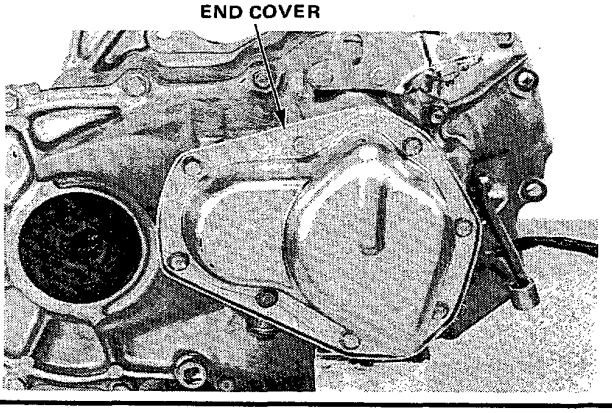
    90 N·m (9.0 kg-m, 65 lb-ft) → 0 → 90 N·m (9.0 kg-m, 65 lb-ft)



25. Stake shoulders on locknuts into slots in mainshaft and countershaft.

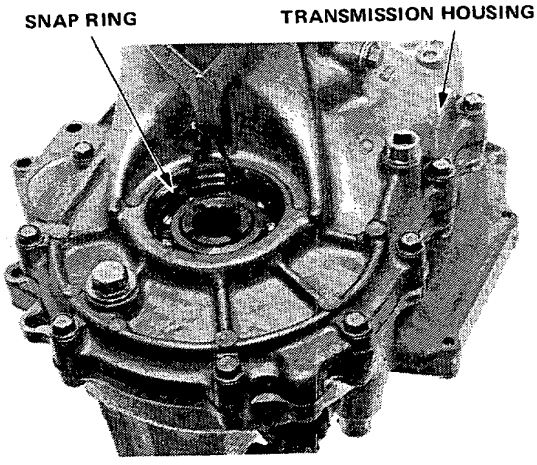


26. Install end cover on transmission housing with new gasket.
27. Torque bolts (6 x 1.0 mm) in sequence shown to 12 N·m (1.2 kg-m, 9 lb-ft).

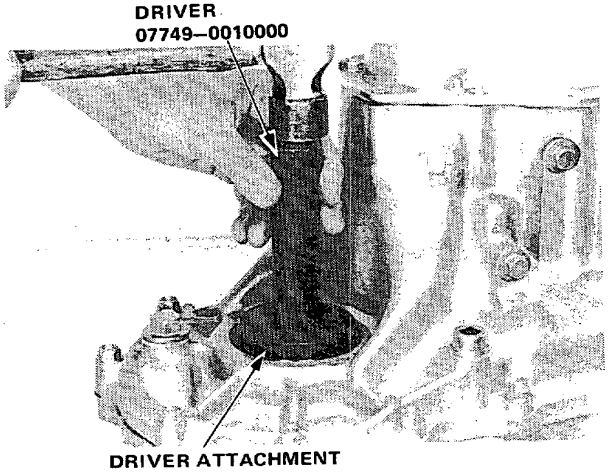


Differential Oil Seal Installation

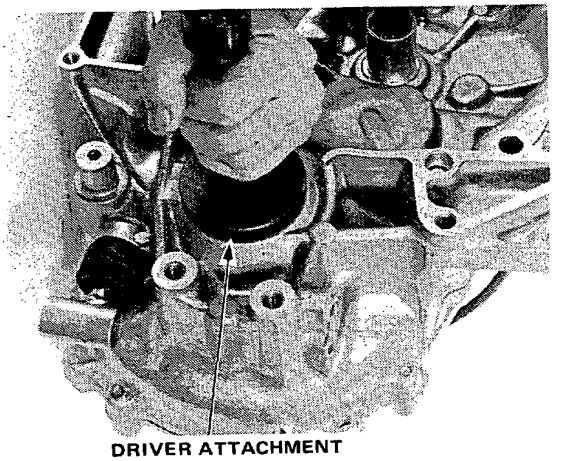
1. Install 80 mm snap ring in transmission housing. If differential bearings or carrier were replaced, select snap ring of correct thickness as shown on page 16-10.



2. Drive oil seal into transmission housing with part number side facing away from snap ring.



3. Drive differential oil seal into clutch housing with part number side facing away from bearing.



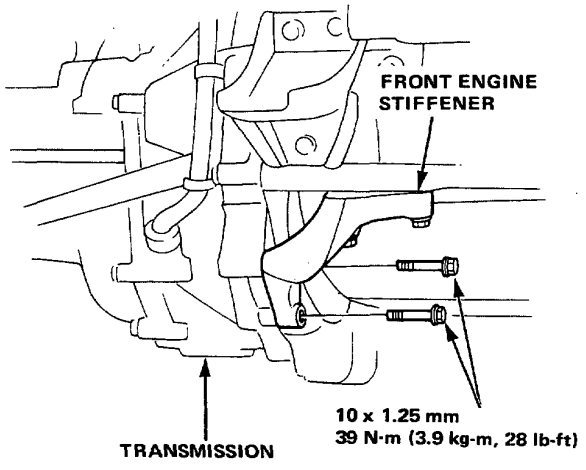
Installation

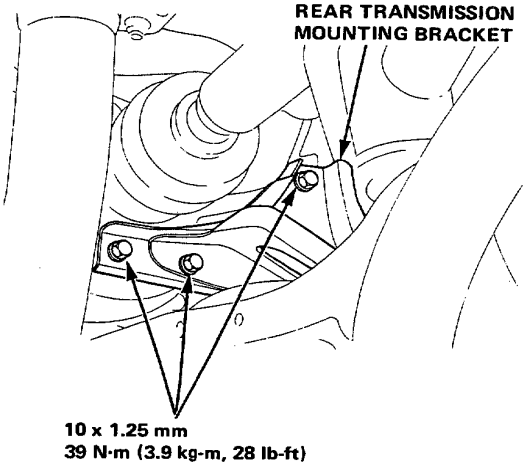
Car Raised on Hoist

1. Place transmission on transmission jack.

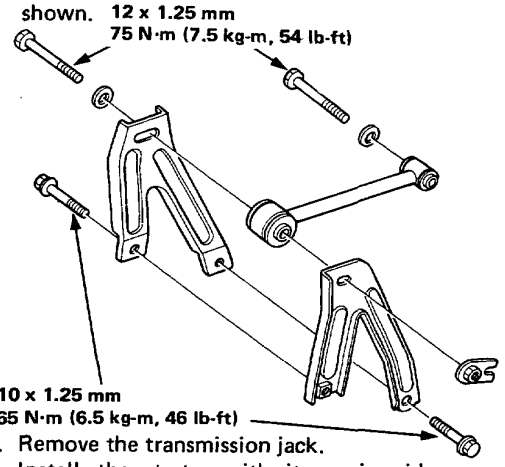
   NOTE: Clean and grease the release bearing sliding surface.

2. Check that two 14 mm dowel pins are installed in clutch housing.
3. Raise transmission far enough to align dowel pins with matching holes in block.
4. Roll transmission toward engine and fit mainshaft into clutch disc splines. If driver's side suspension was left in place, install new spring clips on both axles, then carefully insert left axle into differential as you install transmission.
5. Push and wiggle transmission until it fits flush with engine flange.
6. Tighten bolts until clutch housing is seated against block.
7. Install the front and rear transmission brackets as shown.





8. Install the upper torque arm and its brackets as shown.



9. Remove the transmission jack.
10. Install the starter with its engine-side mounting bolt, 10 x 1.25 mm and torque to 45 N·m (4.5 kg-m, 33 lb-ft).
11. Turn right steering knuckle/axle assembly outward enough to insert free end of axle into transmission. Repeat on opposite side.

    NOTE: New 26 mm spring clips must be used on both axles.

    CAUTION: Make sure that axles fully bottom. Slide axle in until you feel spring clips engage differential.

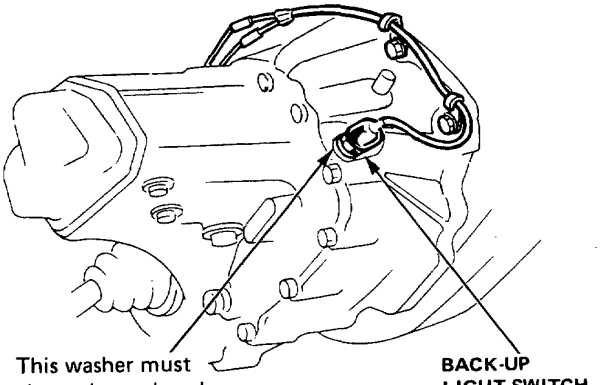
12. Install lower arm ball joint pinch bolts and tie-rod ball joint nuts (page 20-8).
13. Connect shift linkage.
14. Connect shift lever torque rod to clutch housing and torque 8 x 1.25 mm bolt to 25 N·m (2.5 kg-m, 18 lb-ft).
15. Install front wheels.
16. Torque 14 mm transmission drain plug to 40 N·m (4.0 kg-m, 29 lb-ft).

Car on Ground

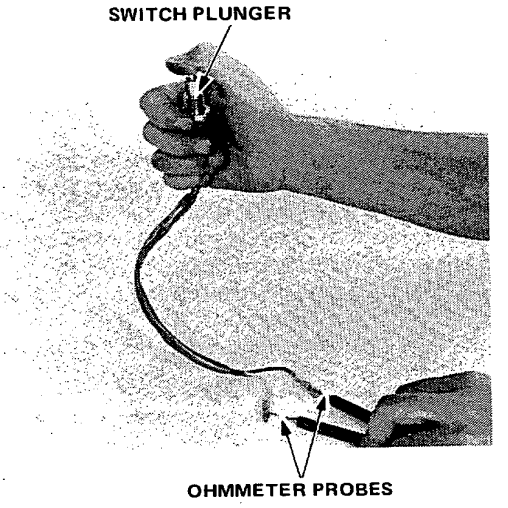
17. Install transmission-side starter mounting bolt (10 x 1.25 mm) and remaining transmission mounting bolt, and torque both to 45 N·m (4.5 kg-m, 33 lb-ft).
18. Install clutch cable at the release arm.
19. Coat new O-ring with oil, put it on speed gear holder, then install holder in transmission housing and secure with hold-down tab and bolt.
20. Install engine sub wire harness in clamp at clutch housing.
21. Connect engine compartment wiring:
    - Battery positive cable to starter.
    - Black/white wire to starter solenoid.
    - Green/black and yellow wires to back-up light switch.
22. With ignition key OFF connect ground cable to battery and transmission.
23. Refill transmission with recommend oil (page 14-2).
24. Check transmission for smooth operation.

Back-up Light Switch Testing

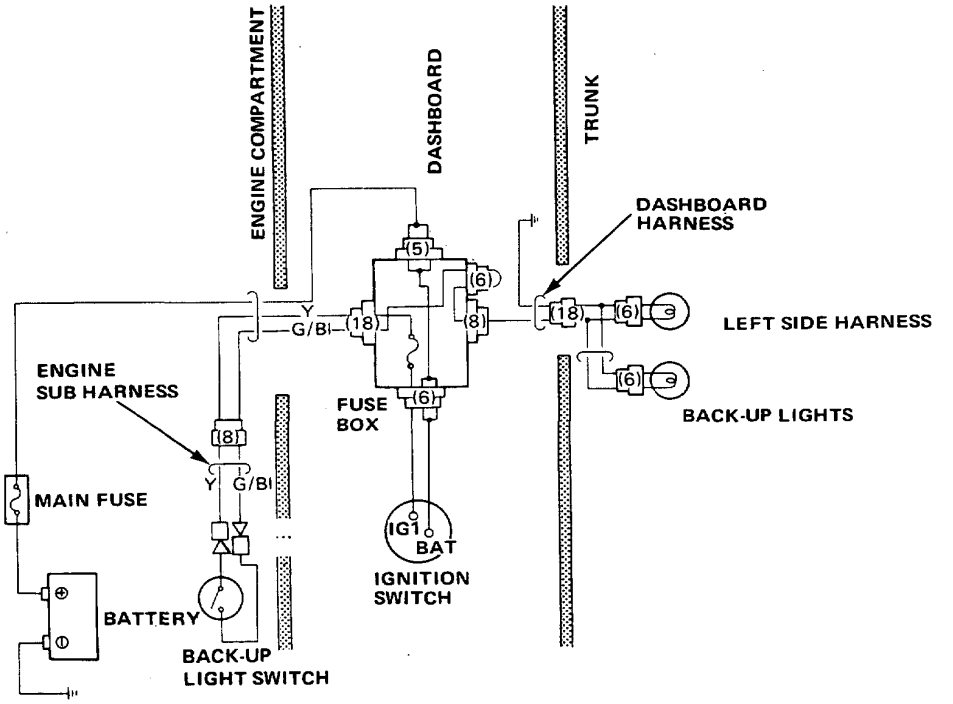
1. Test back-up light switch by placing gear shift lever in reverse and turning ignition switch to ON.
2. If back-up lights do not go on, remove back-up light switch.



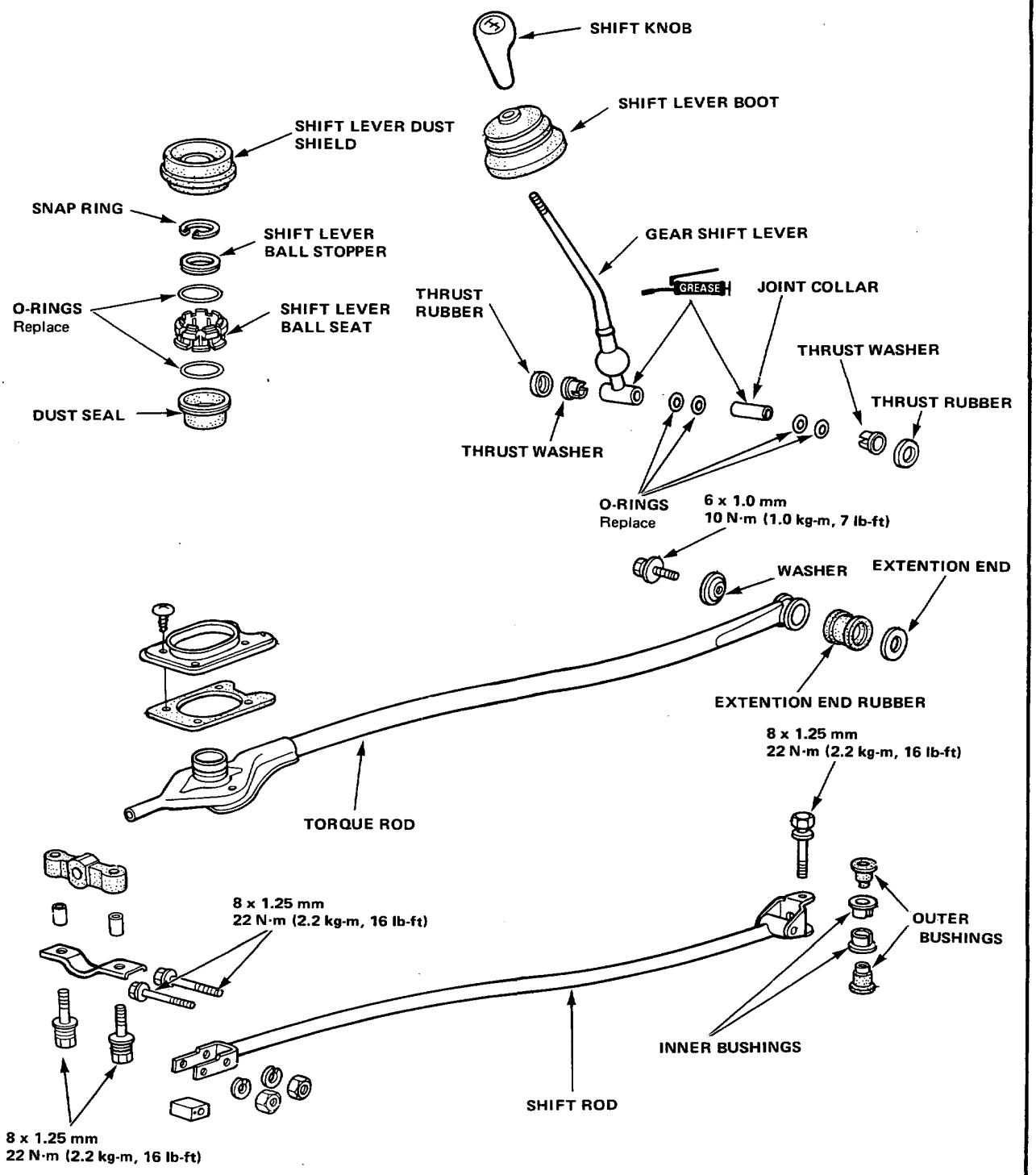
3. Using an ohmmeter, check for switch continuity by pressing in on switch plunger.



Back-up Light Switch Circuit



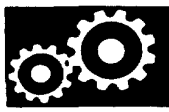
Gearshift Mechanism Overhaul



MEMO

Automatic Transmission

Description 15-2
Troubleshooting 15-4
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Removal 15-7
Illustrated Index 15-8
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Automatic Transmission

Description

The Honda Automatic Transmission is a combination of a 3-element torque converter and dual-shaft automatic transmission which provides 4 speeds forward and 1 speed reverse. The entire unit is positioned in line with engine.

TORQUE CONVERTER, GEARS, AND CLUTCHES.

The torque converter consists of a pump, turbine and stator, assembled in a single unit.

They are connected to the engine crankshaft so they turn together as a unit as the engine turns. Around the outside of the torque converter is a ring gear which meshes with the starter pinion when the engine is being started. The entire torque converter assembly serves as a flywheel while transmitting power to the transmission mainshaft.

The transmission has two parallel shafts, the mainshaft and countershaft. The mainshaft is in line with the engine crankshaft.

The mainshaft includes the clutches for 1st, and 2nd/4th, and gears for 3rd, 2nd, 4th, Reverse and 1st (3rd gear is integral with the mainshaft, while reverse gear is integral with 4th gear).

The countershaft includes 3rd clutch and gears for 3rd, and 4th, Reverse and 1st.

4th and reverse gears can be locked to the countershaft at its center, providing 4th gear or Reverse, depending on which way the selector is moved.

The gears on the mainshaft are in constant mesh with those on the countershaft. When certain combinations of gears in the transmission are engaged by the clutches, power is transmitted from the mainshaft to the countershaft to provide [D3], [D4], [2] or REVERSE.

HYDRAULIC CONTROL

The valve assembly includes a main valve body and regulator valve bolted to the torque converter case through a separator plate. The servo valve body is bolted on top of the main valve body through another separator plate.

The main valve body contains a manual valve, 1-2 shift valve, 2-3 shift valve, 3-4 shift valve, pressure relief valve, orifice control valve, torque convertor check valve and the oil pump gear.

The servo valve body includes the shift fork shaft, throttle control valves, throttle modulator valve, and accumulator pistons.

The regulator valve regulates the fluid pressure within the system. Fluid from the regulator passes through the manual valve to the various control valves.

1st, 3rd and 4th clutches receive oil from the valves through their respective feed pipes.

GEAR SELECTION

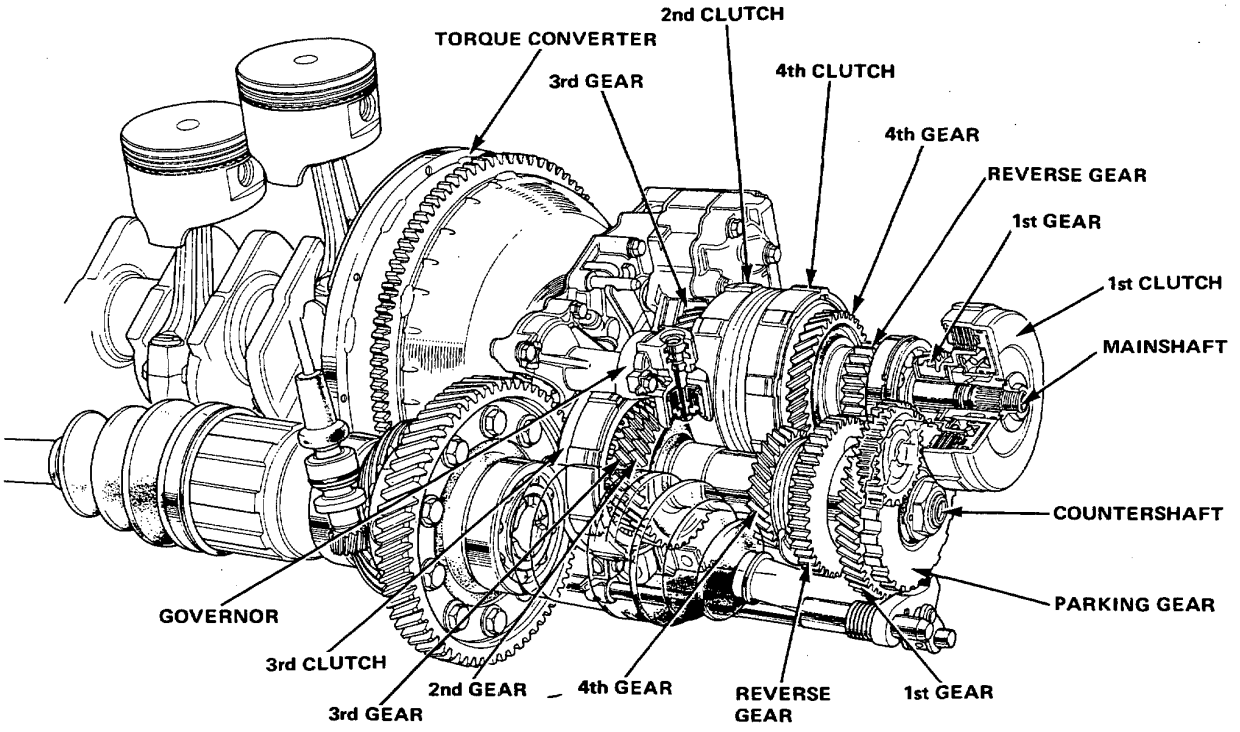
The selector lever has six positions: [P] PARK, [R] REVERSE, [N] NEUTRAL, [D4] 1st through 4th gear ranges, [D3] 1st through 3rd gear ranges, and [2] 2nd gear.

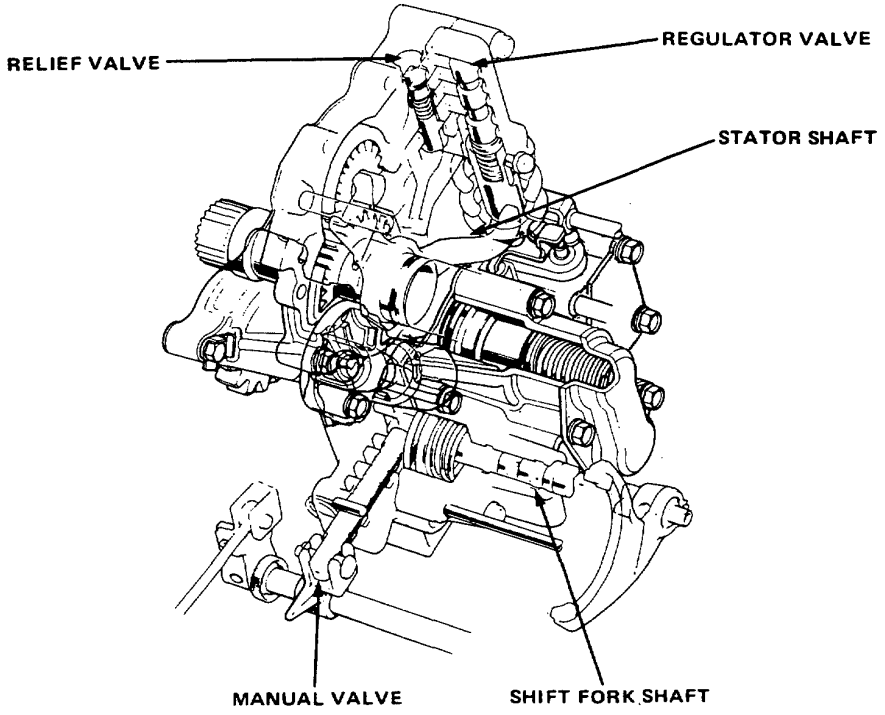
Position	Discription
[P] PARK	Front wheels locked; parking pawl engaged with parking gear on countershaft. All clutches released.
[R] REVERSE	Reverse; reverse selector engaged with countershaft reverse gear and 4th gear clutch locked.
[N] NEUTRAL	All clutches released.
[D4] DRIVER (1 through 4)	General driving; starts off in 1st, shifts automatically to 2nd, 3rd, then 4th, depending on vehicle speed and trottle position. Downshifts through 3rd, 2nd and 1st on deceleration to stop.
[D3] DRIVE (1 through 3)	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 2nd to 1st on deceleration to stop.
[2] SECOND	For engine braking or better traction starting off on loose or slippery surfaces; stays in 2nd gear, does not shift up or down.

Starting is possible only in [P] and [N] through use of a slide-type, neutral-safety switch.

POSITION INDICATOR

A position indicator in the instrument panel shows what gear has been selected without having to look down at the console.


2nd CLUTCH
TORQUE CONVERTER
3rd GEAR
4th CLUTCH
4th GEAR
REVERSE GEAR
1st GEAR
1st CLUTCH
MAINSHAFT
COUNTERSHAFT
PARKING GEAR
GOVERNOR
3rd CLUTCH
2nd GEAR
4th GEAR
REVERSE GEAR
1st GEAR
3rd GEAR


RELIEF VALVE
REGULATOR VALVE
STATOR SHAFT
MANUAL VALVE
SHIFT FORK SHAFT

Automatic Transmission

Troubleshooting

PROBLEM	REFER TO:
Engine runs but car does not move:	1, 2, 3, 6, 7, 8, 41
Car does not move in [D3] or [D4] but does move in [2] (No low gear)	7, 9, 10, 11
Car does not move in [2] (OK in [D3] and [D4])	7, 12, 13
Car does not move in [R] (OK in [D3], [D4] and [2])	4, 7, 14, 23, 36
Poor acceleration, Engine races when starting off in [D3] and [D4]:	
— Stall rpm high in [D3], [D4] and [2]	1, 2, 3, 7, 46, 49
— Stall rpm high in [D3] and [D4]	7, 9, 11
— Stall rpm high in [2]	7, 13
— Stall rpm OK	16
— Stall rpm low	17, 18, 37
Engine vibrates at idle	2, 37, 41
Up-shift speed too high	15, 19, 20, 48
Jumps from first to third in [D3]	23
Jumps from first to fourth in [D4]	23, 24
Up shift point too early:	
— 1st to 2nd, 2nd to 3rd, and 3rd to 4th	15, 19, 20, 48
— 1st to 2nd only	15, 22
— 2nd to 3rd only	15, 23
— 3rd to 4th only	15, 24
Harsh shift from 1st to 2nd	13, 21, 25
Harsh shift from 2nd to 3rd	21, 26, 28, 35
Harsh shift from 3rd to 4th	21, 27, 32, 36
Harsh shift from 2nd to 1st	21, 25, 28, 42
Harsh shift from 3rd to 2nd	21, 26, 32, 43
Harsh shift from 4th to 3rd	21, 27, 44
Engine races when shifting up from 2nd to 3rd	21, 26, 28, 29, 33, 35
Engine races when shifting up from 3rd to 4th (Shift timing OK)	21, 27, 32, 36
Engine Vibrates when shifting up from 2nd to 3rd	13, 21, 26, 31, 43, 50
Engine Vibrates when shifting up from 3rd to 4th (Shift timing OK)	21, 32, 44, 50
Car creeps foward in [N] (Shift cable adjusted correctly)	11, 13, 16, 35, 36, 38, 39, 40
Excessive time lag from [N] to [D3], [D4] (Shift cable adjusted correctly)	11, 30
Excessive time lag from [N] to [R] (Shift cable adjusted correctly)	4, 23, 36
Malfunctions after reassembly:	
— Loud noise in all gears, neutral and park	2, 5, 45
— Car will only accelerate to 30 mph. (48 km/h)	17
— Vibration in all gears	41
— Shift lever requires excessive force	7, 47
— Car has only 4th gear	15
— Transmission has no park	7, 47
— Stall rpm is high, but clutch pressure is OK in all positions	49

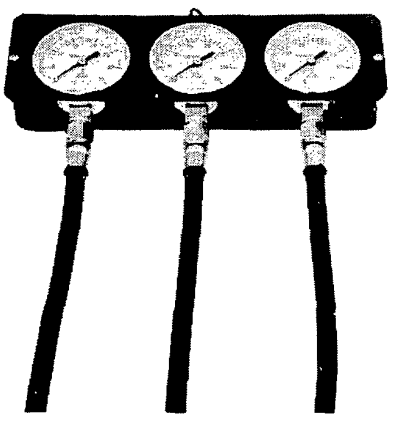
CHECK OR CAUSE
1. ATF level too low
2. Faulty ATF pump
3. Stuck regulator valve or damaged spring
4. Stuck servo shaft
5. Damaged 3rd gear
6. Damaged mainshaft
7. Manual shift out of adjustment (broken cable, loose end pin)
8. Damaged final gear
9. Worn or damaged one-way clutch
10. Damaged low gear
11. Faulty first clutch
a. Stuck clutch piston
b. Damaged clutch O-ring
c. Damaged clutch feed pipe or O-ring
d. Foreign matter stuck in check valve
e. Worn or burnt clutch disc
12. Damaged 2nd gear
13. Faulty 2nd clutch
a. Stuck clutch piston
b. Damaged clutch O-ring
c. Foreign matter stuck in clutch check valve
d. Worn or damaged sealing rings.
e. Worn or burnt clutch disc.
14. Damaged reverse gear
15. Faulty governor valve
16. ATF level too high
17. Burnt or seized torque convertor one-way clutch
18. Improperly adjusted throttle cable at carburetor
19. Improperly adjusted throttle control cable at automatic transmission
20. Defective throttle valve A
21. Defective throttle valve B
22. Defective 1—2 shift valve
23. Defective 2—3 shift valve
24. Defective 3—4 shift valve
25. Defective 2nd accumulator
26. Defective third accumulator
27. Defective fourth accumulator
28. Defective 2nd orifice control valve
29. Foreign matter stuck in main orifice
30. Foreign matter stuck in 1st orifice
31. Foreign matter stuck in second orifice
32. Defective third orifice control valve
33. Foreign matter stuck in third orifice
34. Foreign matter stuck in fourth orifice
35. Defective third clutch
a. Stuck clutch piston
b. Damaged clutch O-ring
c. Foreign matter stuck in clutch check valve
d. Damaged clutch feed pipe or O-ring
e. Worn or burnt clutch disc.
36. Defective fourth clutch
a. Stuck clutch piston
b. Damaged clutch O-ring
c. Foreign matter stuck in clutch check valve
d. Worn or damaged sealing rings
e. Worn or burnt clutch disc.
37. Lack of engine power
38. Burnt needle bearing
39. Burnt thrust washer
40. Improper clutch clearance
41. Torque convertor not fully seated, causing flex plate to deform
42. No 2nd ball check valve
43. No 3rd ball check valve
44. No 4th ball check valve
45. Damaged mainshaft ball bearing and/or countershaft ball bearing.
46. Oil filter clogged
47. Cable housing damaged
48. Defective modulator valve
49. Faulty torque convertor check valve
50. Foreign matter stuck in separator port orifice

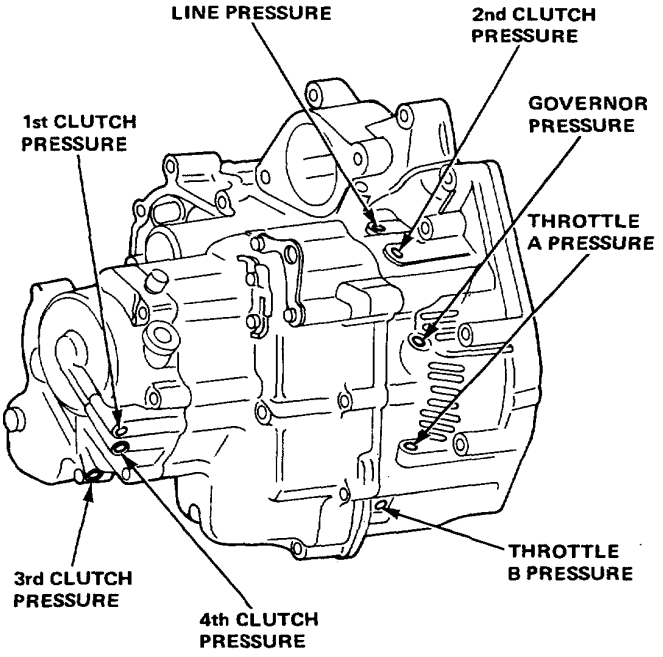
Pressure Test

NOTE:

- *Stop engine when attaching hoses for pressure tests. Torque hose fitting to 18 N·m (1.8 kg-m, 12 lb-ft).*
- Do not reuse aluminum washers.

GAUGE SET 07406-0020002
(includes pressure hose set 07406-0020201)





CAUTION: Before checking, be sure transmission is filled to proper level.

PRESSURE	SELECTOR POSITION	MEASUREMENT	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
					SPECIFICATION	SERVICE LIMIT
LINE	N or P	• With parking brake applied. • Run engine at 2,000 min^{-1} (rpm).	No (or low) LINE pressure	Torque converter, oil pump pressure regulator, torque converter check valve.	735–784 kPa (7.5–8.0 kg/cm^2, 107–114 psi)	686 kPa (7.0 kg/cm^2, 100 psi)
1st	D3 or D4	• With parking brake applied, raise front wheels off ground and support with safety stands. • Run engine at 2,000 min^{-1} (rpm).	No (or low) First pressure	1st clutch	686–784 kPa (7.0–8.0 kg/cm^2, 100–114 psi)	637 kPa (6.5 kg/cm^2, 92 psi)
2nd	2		No (or low) SECOND pressure	2nd clutch		
3rd	D3		No (or low) THIRD pressure	3rd clutch		
4th	D4		No (or low) FORTH pressure	4th clutch		
	R			Servo valve		
THROTTLE	D3 or D4	• With parking brake applied, raise front wheels off ground and support with safety stands. • Run engine at 1,000 min^{-1} (rpm) • Disconnect throttle control cable at throttle lever. • Read pressure with lever released. • Manually push lever up simulating full throttle. • Read pressure with lever in full throttle position.	No (or low) THROTTLE pressure	Throttle valve A Throttle modulator valve.	0 kPa (0 kg/cm^2, 0 psi) with lever released. 593–608 kPa (6.05–6.20 kg/cm^2, 86–88 psi) lever in full throttle position.	578 kPa (5.9 kg/cm^2, 83.2 psi)
				Throttle valve B.	0 kPa (0 kg/cm^2, 0 psi) with lever released. 735–784 kPa (7.5–8.0 kg/cm^2, 106.7–113.8 psi) with lever in full throttle position.	686 kPa (7.0 kg/cm^2, 100 psi)
GOVERNOR	D3 or D4	• Place vehicle on chassis dynamometer, or jack up front of car, support with safety stands, block rear wheels, and set hand brake. • Run vehicle at 60 km/h (38 mph).	No (or low) Governor pressure.	Governor valve	216–225 kPa (2.0–2.3 kg/cm^2, 31–33 psi)	201 kPa (2.05 kg/cm^2, 29 psi)

Automatic Transmission

Stall Speed Test

1. Engage parking brake and block front wheels.
2. Connect tachometer, and start engine.
3. After engine has warmed up to normal operating temperature, shift into [D3]
4. Fully depress brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
5. Allow 2 minutes for cooling, then repeat same test in [D4] , [2] and Reverse.

Stall speed in [D3] , [D4] , [2], and [R] must be the same, and must also be within limits:

Stall Speed RPM:
Specification: 2600 min^{-1} (rpm)
Service Limit: 2300–2900 min^{-1} (rpm)

KY type only:
Specification: 2650 min^{-1} (rpm)
Service Limit: 2350–2950 min^{-1} (rpm)

CAUTION: Do not test stall speed for more than 10 seconds at a time.

TROUBLE	PROBABLE CAUSE
Stall rpm high in [2] , [D3] , [D4] & R.	Low fluid level or oil pump output, clogged oil strainer, pressure regulator, slipping one-way clutch in torque convertor. Slipping clutch.
Stall rpm high in [D3] , [D4] only.	Slippage of 1st clutch
Stall rpm low in [2] , [D3] , [D4] & [R] .	· Engine output low, throttle cable mis-adjusted at carburetor. · Oil pump seized, torque convertor thrust washer seized.

Maintenance

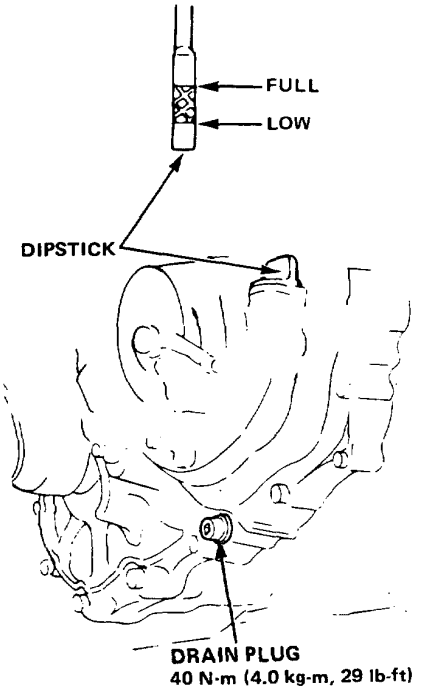
Checking

With the car on level ground, unscrew the transmission dipstick and check the level of fluid immediately after the engine is shut off (within one minute). The fluid level should be between full and low marks. If the level is at, or below, the low mark, add DEXRON-type automatic transmission fluid. Do not screw dipstick in to check the fluid level.

Changing

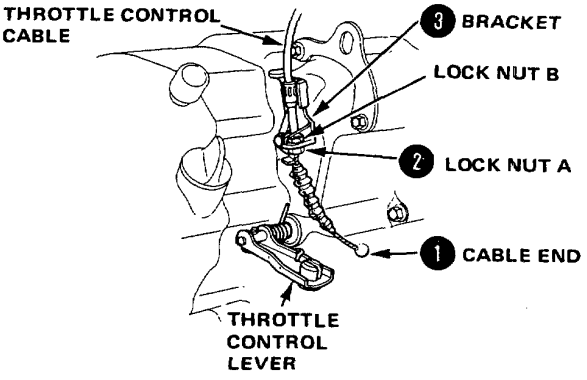
1. Bring the transmission up to operating temperature by driving the car. Park the car on level ground, turn the engine off, then remove drain plug.
2. Reinstall the drain plug with a new washer, then refill the transmission to the full mark on the dipstick.

Automatic transmission Capacity:
2.8 ℓ (3.0 U.S. qts., 2.5 Imp. qt) at change
5.8 ℓ (6.1 U.S. qts., 5.1 Imp. qt) at assembly



Removal

1. Disconnect ground cable at battery and transmission.
2. Release steering lock, and shift gear selector to N.
3. Disconnect wiring:
   - Battery positive cable from starter.
   - Black/white wire from starter solenoid.
4. Disconnect cooler hoses, and wire them up next to radiator so ATF won't drain out.
5. Remove starter mounting bolt on transmission side, and top transmission mounting bolt.
6. Loosen front wheel nuts.
7. Apply parking brake, block rear wheels, then raise front end on jack stands and remove front wheels.
8. Drain transmission. Reinstall drain plug and washer.
9. Remove throttle control cable:
   - Remove cable end from throttle lever.
   - Loosen lock nut A only.
   - Remove cable from bracket.

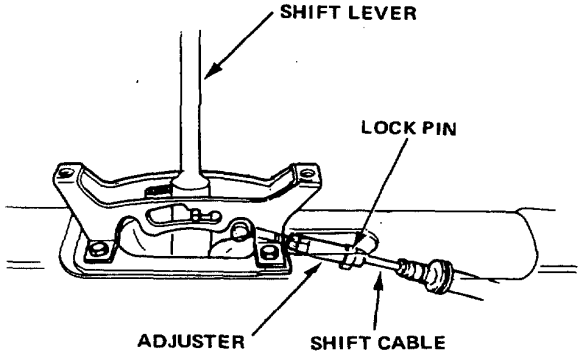


NOTE: For cable adjustment see page 15-62 and 63.

10. For models without power steering:
    Remove cable clip, then pull the speedometer cable out of holder.

    CAUTION: Do not remove holder because speedometer gear may fall into transmission housing.
11. For models with power steering:
    Remove speed sensor complete with speedometer cable and hoses.
12. Remove transmission-side starter motor mounting bolt and two upper transmission mounting bolts.
13. Place transmission jack securely beneath transmission, and hook hanger plate with hoist; make sure hoist chain is tight.
14. *Remove subframe center beam.*
15. Remove the ball joint pinch bolt from the right-side lower control arm, then use a lead or brass hammer to tap the control arm free of the knuckle.
16. Turn right side steering knuckle to its most outboard position. With screwdriver, pry CV joint out approximately 1/2", then pull CV joint out of transmission housing.

    CAUTION: Do not pull on the driveshaft or knuckle since this may cause the inboard CV joint to separate; pull on the inboard CV joint.
17. Remove engine-side starter motor bolt. Detach starter motor and lower through chassis.
18. Remove transmission damper bracket located in front of torque converter cover plate.
19. Remove torque converter cover plate.
20. Remove center console and shift indicator.

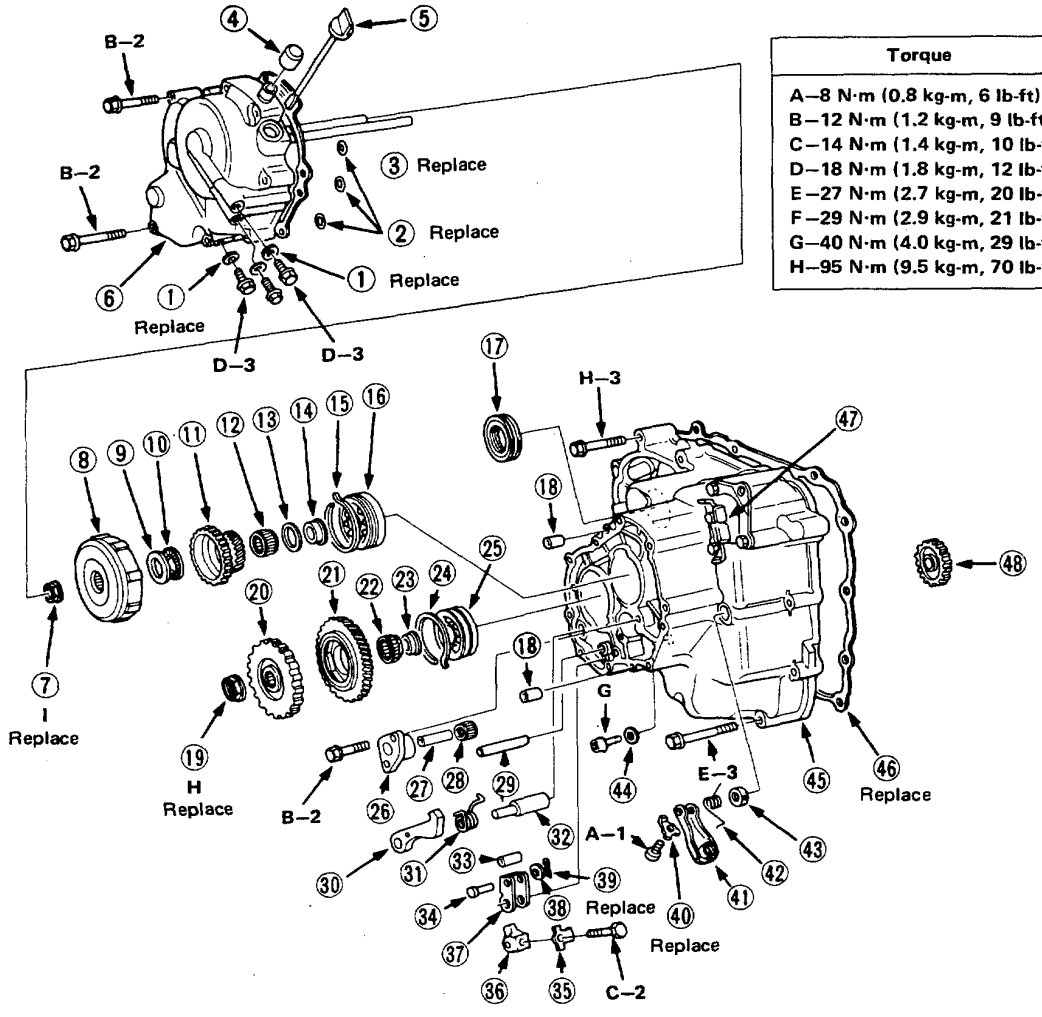


21. Remove lock pin from adjuster and shift cable.

    NOTE: On reassembly, check cable adjustment page 15-62 and 63.
22. Remove both bolts and pull shift cable out of housing.
23. Unbolt torque converter assy from drive plate by removing eight bolts.
24. *Remove the three rear engine mounting bolts from* transmission housing.
    Remove the rear engine mount.
25. Remove the front engine stiffner mounting two bolts.
26. Remove the lower transmission mounting bolt.
27. Pull transmission away from engine to clear the two 14 mm dowel pins.
    - Pry left-side CV joint out approximately 1/2".
    - Pull transmission out and lower on transmission jack.
    - Remove torque convertor from transmission.

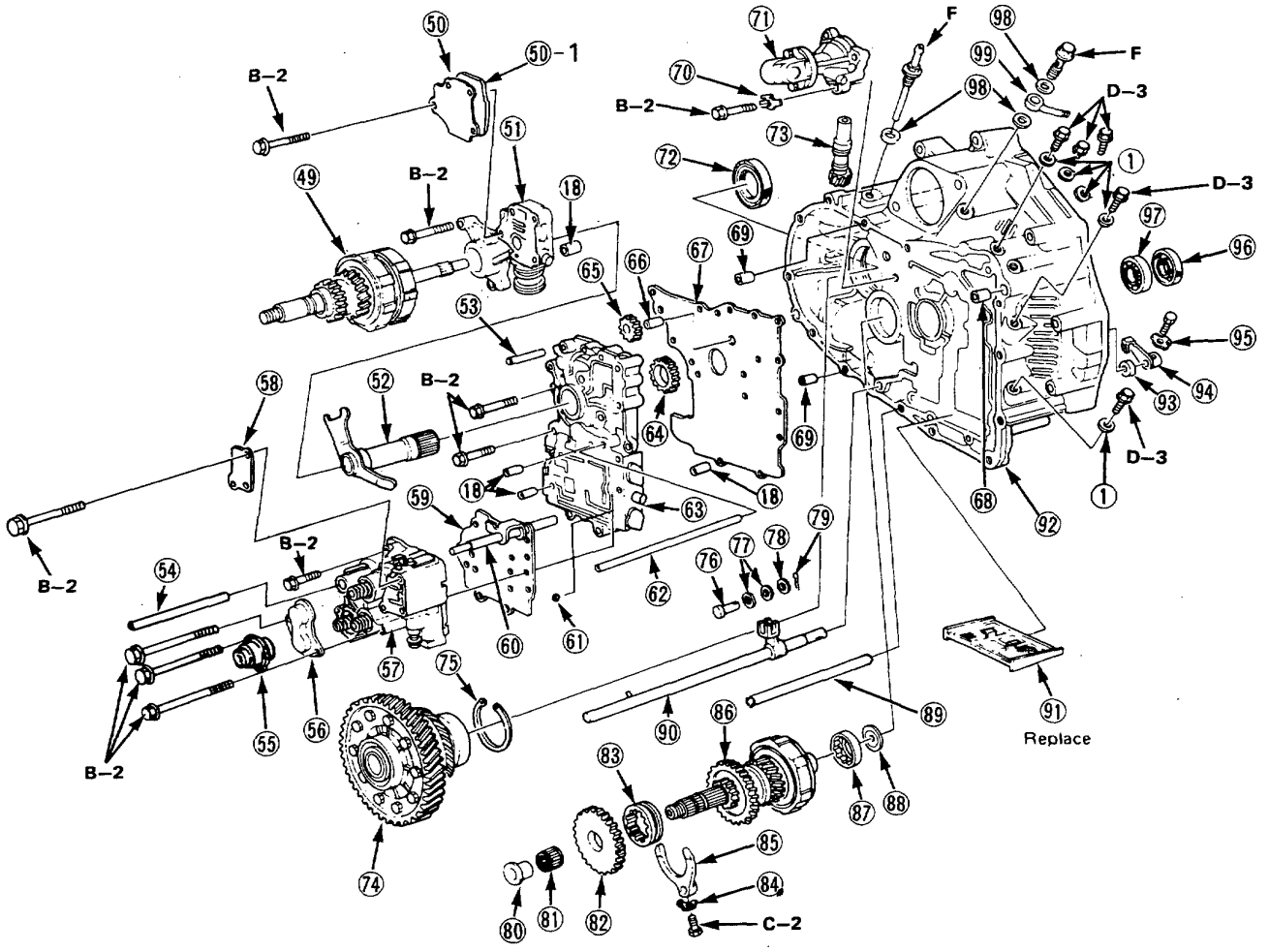
Automatic Transmission

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Torque	Bolt size
A–8 N·m (0.8 kg-m, 6 lb-ft)	1–5 x 0.8 mm
B–12 N·m (1.2 kg-m, 9 lb-ft)	2–6 x 1.0 mm
C–14 N·m (1.4 kg-m, 10 lb-ft)	3–8 x 1.25 mm
D–18 N·m (1.8 kg-m, 12 lb-ft)	
E–27 N·m (2.7 kg-m, 20 lb-ft)	
F–29 N·m (2.9 kg-m, 21 lb-ft)	
G–40 N·m (4.0 kg-m, 29 lb-ft)	
H–95 N·m (9.5 kg-m, 70 lb-ft)	

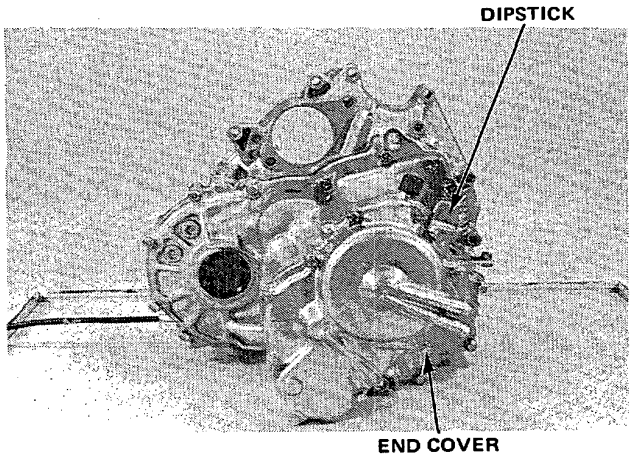
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② O-RING 6 x 2.3 mm
③ GASKET
④ BREATHER CAP
⑤ DIPSTICK
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⑩ THRUST NEEDLE
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⑫ NEEDLE BEARING
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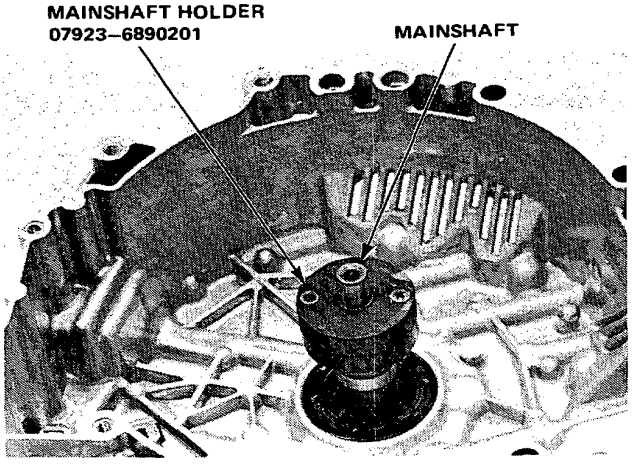
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Transmission Housing Removal

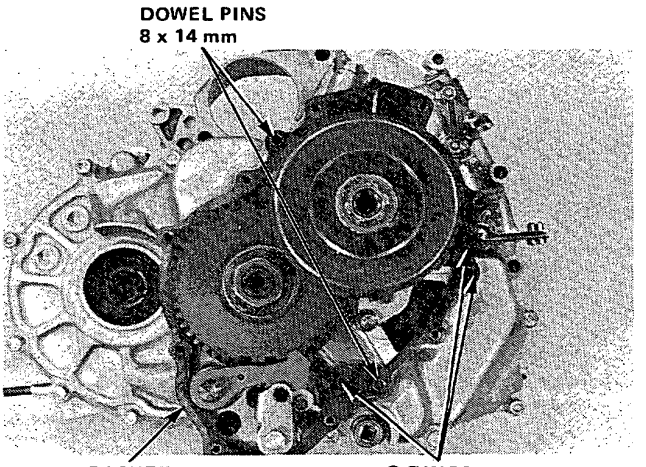
1. Remove the dipstick.
2. Remove the nine bolts from the end cover, then remove the cover.



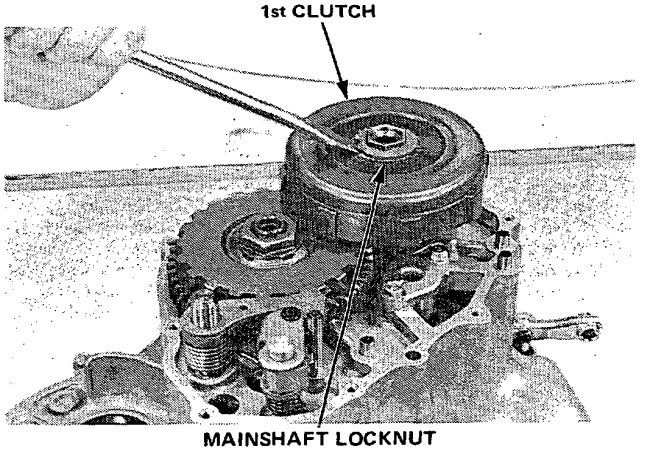
3. Shift the transmission to PARK.
4. Lock the mainshaft using the mainshaft holder.



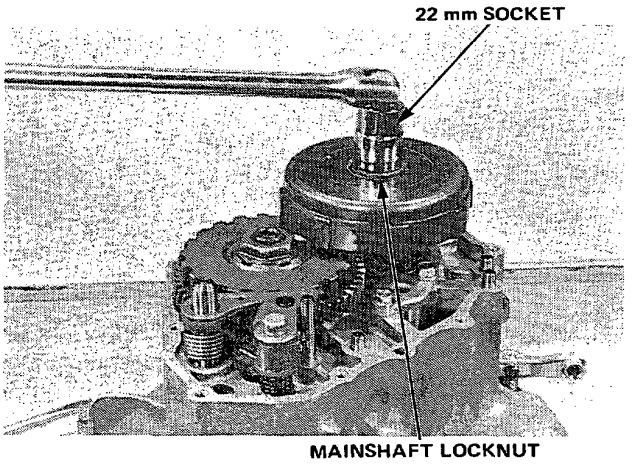
5. Remove the end cover gasket, dowel pins, and O-rings.



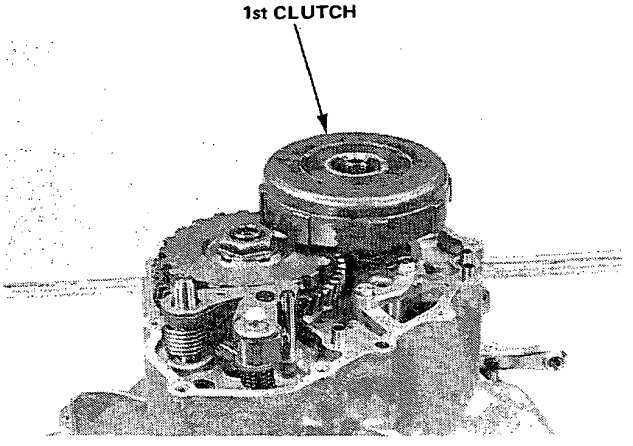
6. Pry the staked edge of the locknut flange out of the notch in the 1st clutch.



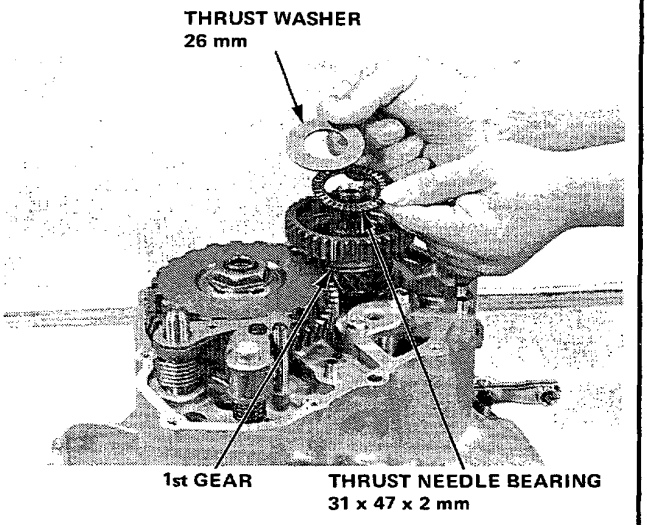
7. Remove the mainshaft locknut.
CAUTION: Mainshaft locknut has left-hand threads.



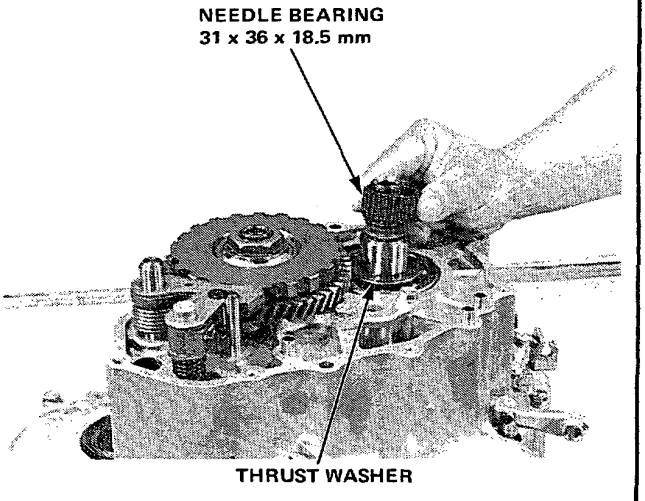
8. Remove the 1st clutch.



9. Remove the thrust washer, needle bearing and 1st gear.



10. Remove the needle bearing and thrust washer from the mainshaft.

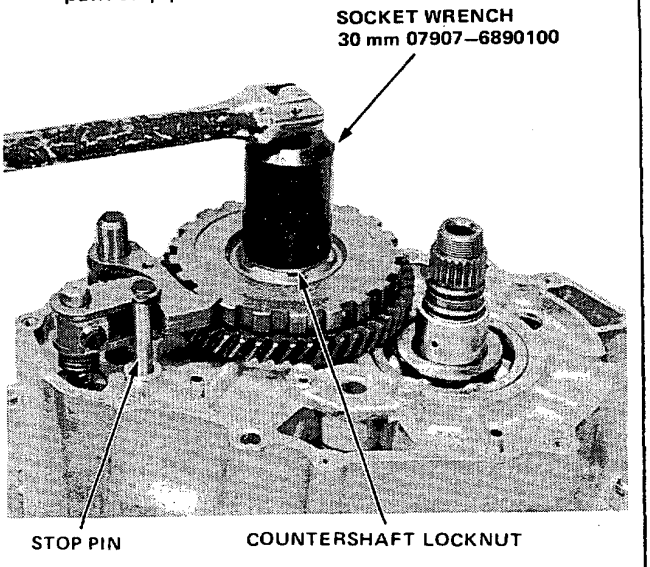


(cont'd)

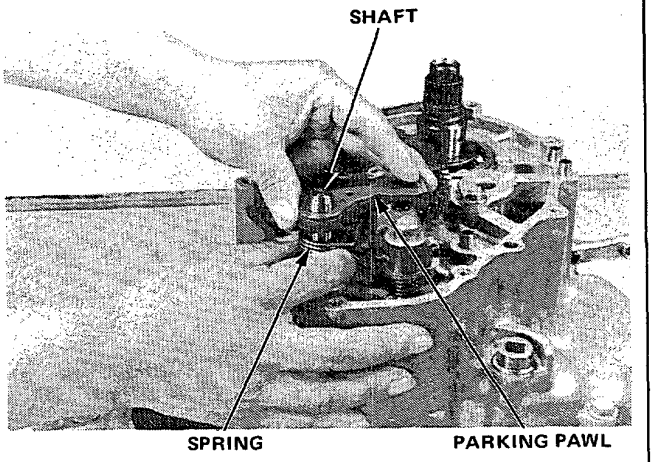
Transmission Removal (cont'd)

11. Pry the staked edge of the locknut out of the notch in the parking gear.

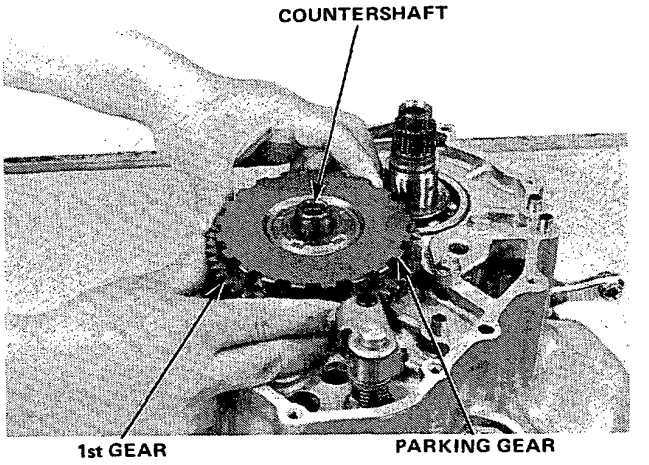
12. Remove the countershaft locknut and the parking pawl stop pin.



13. Remove the parking pawl, shaft, and spring.

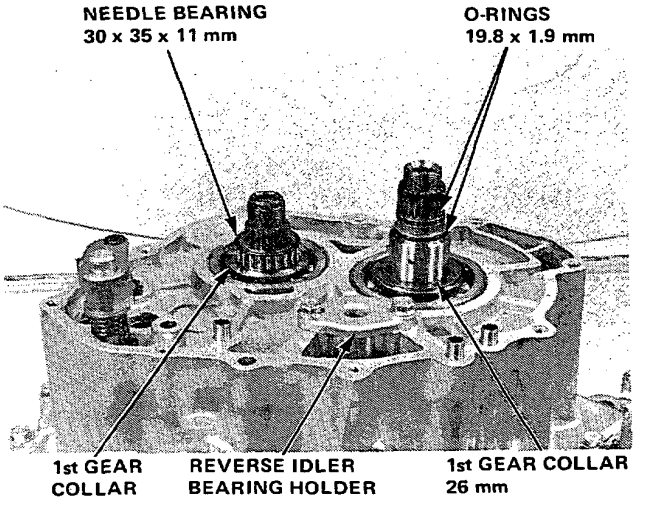


14. Remove the parking gear and countershaft 1st gear as a unit.



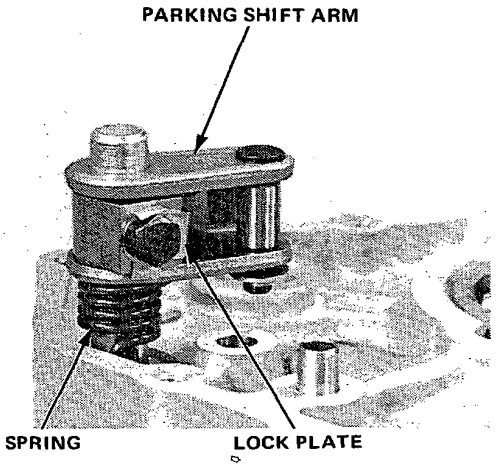
15. From the countershaft, remove the needle bearing and 1st gear collar. From the mainshaft, remove the O-ring and 1st gear collar.

16. Remove the reverse idle bearing holder.

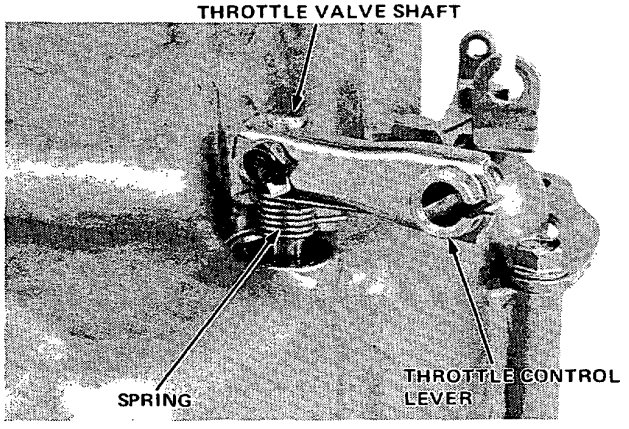


17. Bend down the tab on the lock plate under the parking shift arm bolt.

18. Remove the bolt, then remove the parking shift arm.

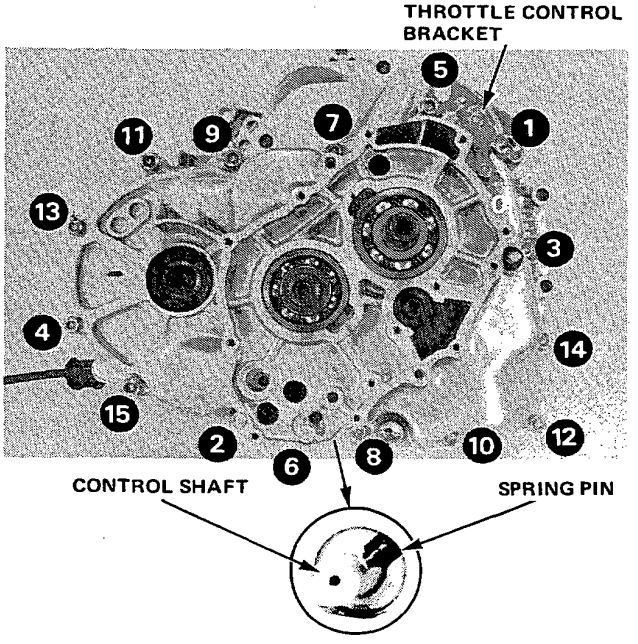


19. Bend down the tab on the throttle control lever bolt lock plate, then remove the bolt. Now, remove the throttle control lever and spring from throttle valve shaft.



20. Remove the 8 x 1.25 mm bolts, (1) thru (15), in sequence shown.

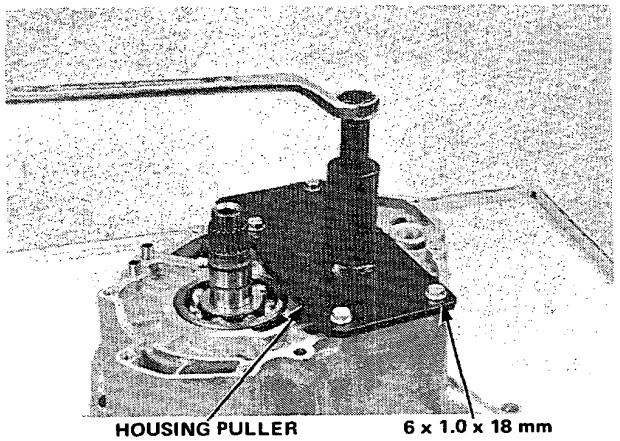
NOTE: Bolt 1 will not come all the way out of the transmission housing because the throttle control cable bracket is in the way; just unscrew it free of the threads in the torque convertor housing and leave in place — If you remove the bracket, it must be adjusted, when reinstalled (page 15-63).



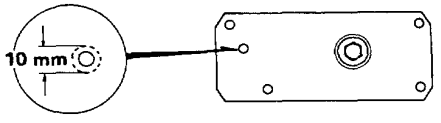
21. Align the control shaft spring pin with the cutout in the transmission housing.

Transmission Removal (cont'd)

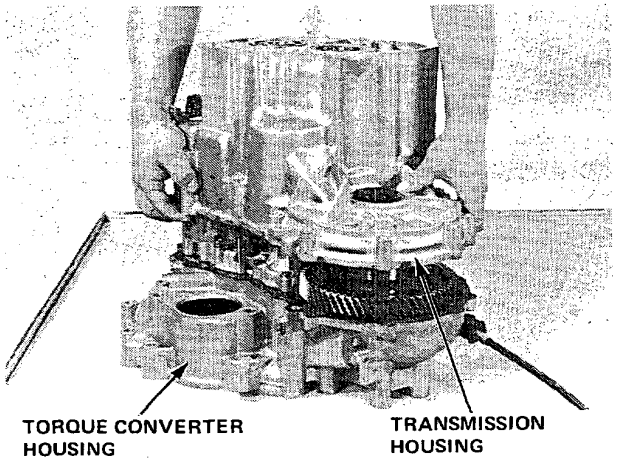
22. Install the transmission housing puller with four bolts and tighten securely. Then screw in the puller bolt against the end of the countershaft until the transmission housing comes loose.



NOTE: The special tool (No. 07933–6890200) Can be used with the feed pipe guide hole in it drilled as shown.

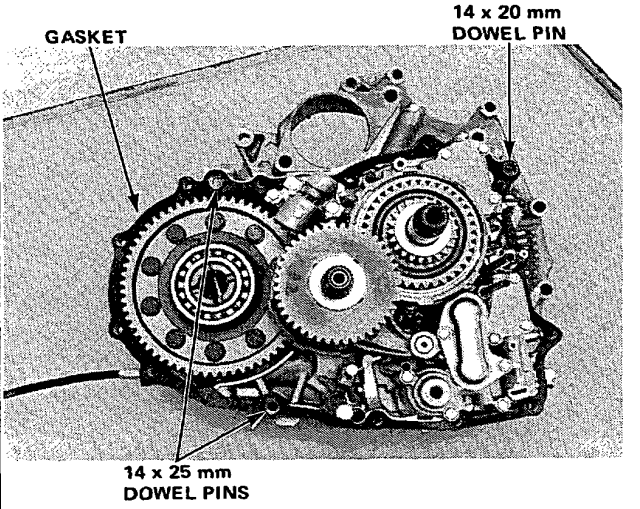


23. Remove the puller and separate the housings.

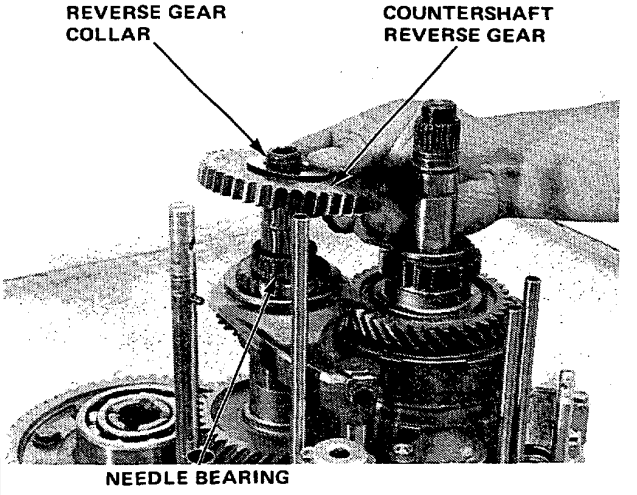


Mainshaft/Countershaft Removal

1. Remove the gasket and dowel pins.

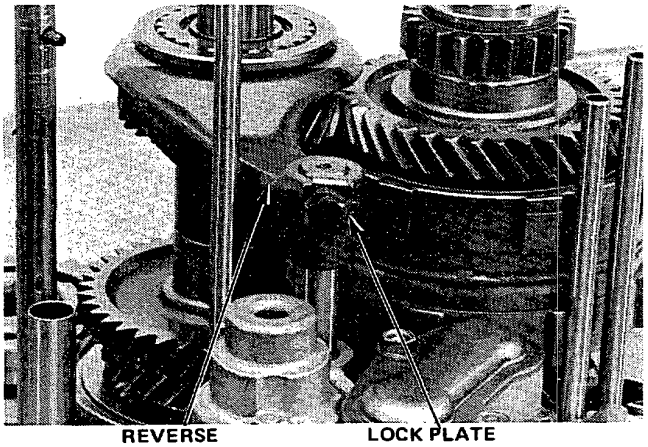


2. Remove the reverse gear collar and needle bearing.

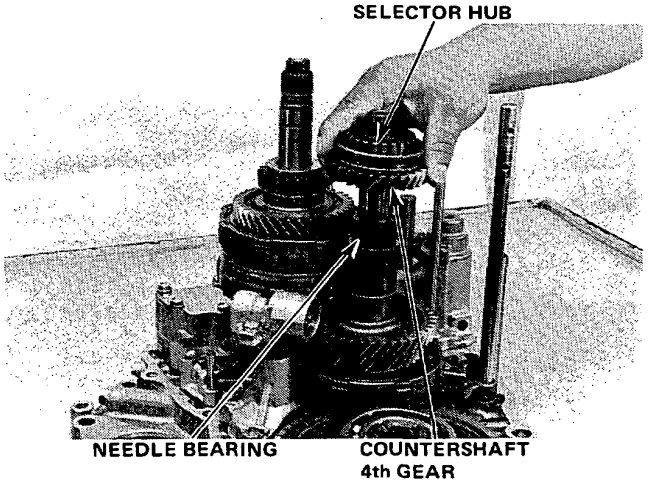


3. Bend down the tab on the lock plate and remove the bolt from the reverse shift fork.

4. Remove the reverse shift fork.

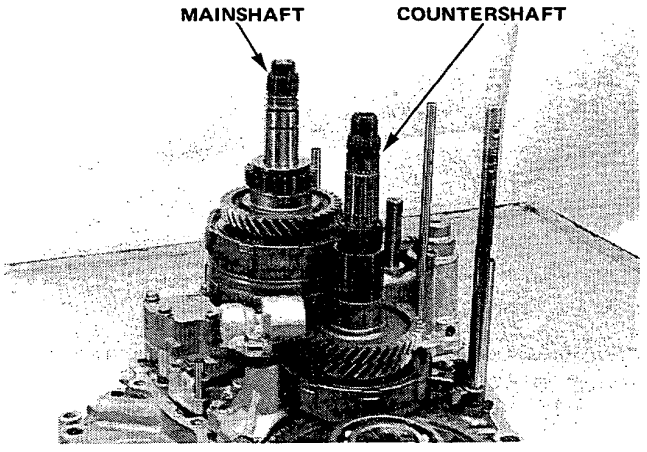


5. Remove the selector hub, countershaft 4th gear and needle bearing.



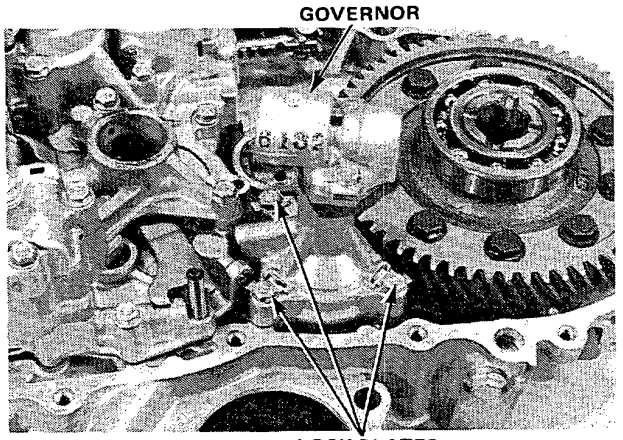
6. Remove the mainshaft and countershaft together.

NOTE: It will be necessary to pull up at a slight angle to clear the governor.



Governor Removal

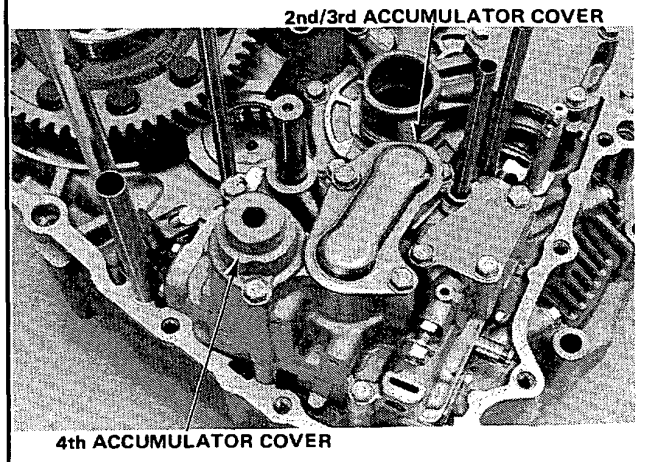
Bend down the tabs on the lock plates, remove the bolts holding the governor to the torque convertor housing, and remove governor.



Main Valve body Removal

1. Remove the accumulator covers.

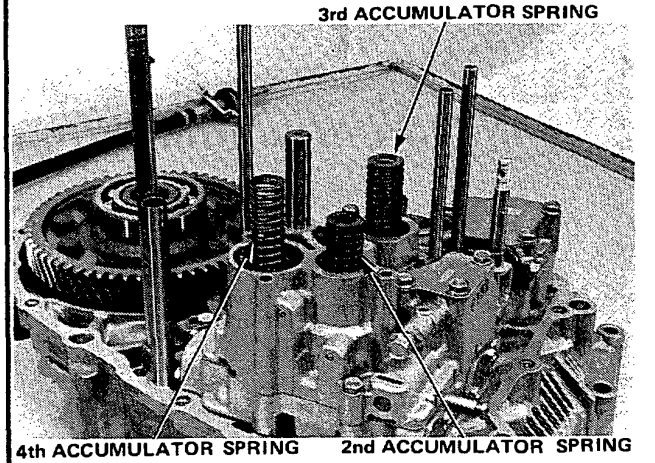
   CAUTION: Accumulator covers are spring loaded; to prevent stripping the threads in the torque convertor housing, press down on the accumulator covers while unscrewing the bolts in a criss-cross pattern.



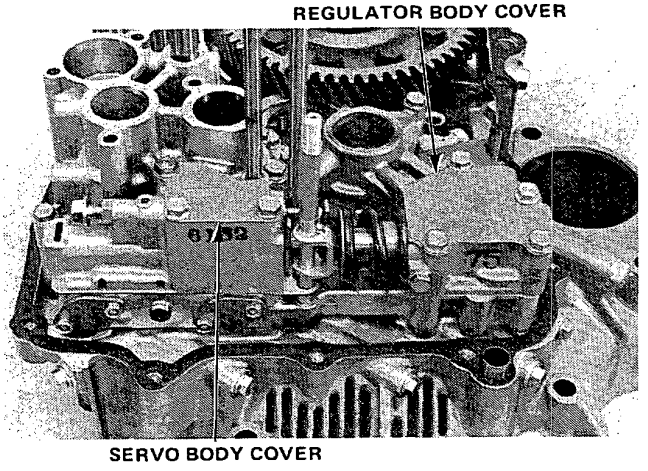
2. Remove the accumulator springs.

Accumulator springs, outside diameter:
- **2nd Accumulator spring: 20.0 mm (0.787 in.)**
- **3rd Accumulator spring: 20.6 mm (0.811 in.)**
- **4th Accumulator spring: 17.9 mm (0.704 in.)**

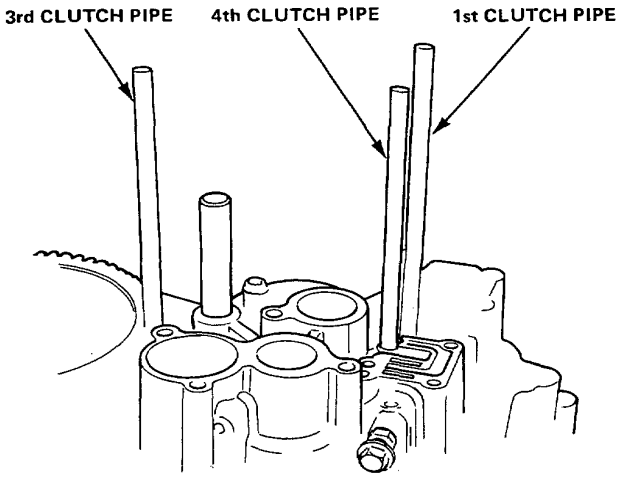
Accumulator springs, free length:
- **2nd Accumulator spring**
  - **Standard: 91.4 mm (3.598 in.)**
  - **Service Limit: 90.0 mm (3.543 in.)**
- **3rd Accumulator spring**
  - **Standard: 109.4 mm (4.306 in.)**
  - **Service Limit: 107.4 mm (4.228 in.)**
- **4th Accumulator spring**
  - **Standard: 94.1 mm (3.704 in.)**
  - **Service Limit: 92.6 mm (3.645 in.)**



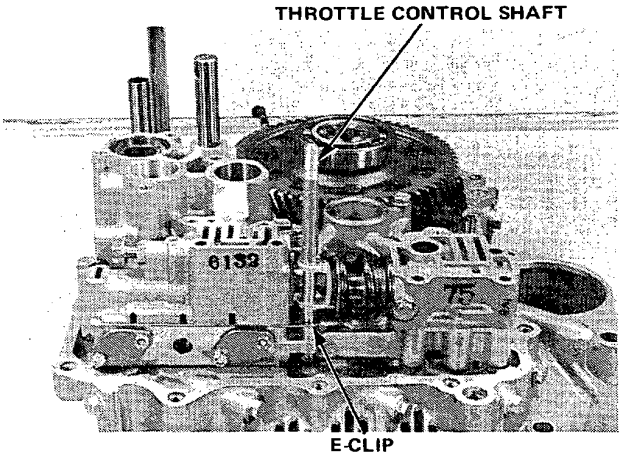
3. Remove the servo body cover and regulator body cover.



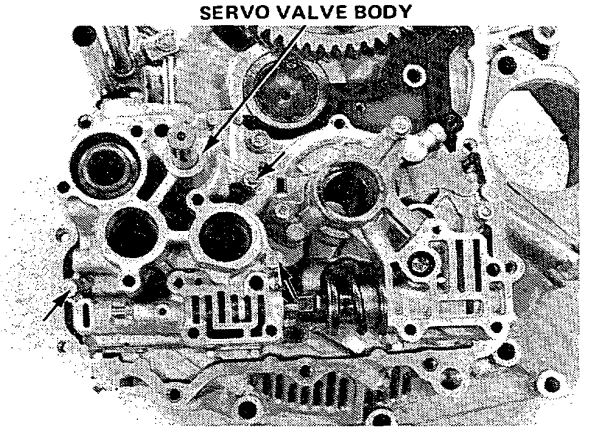
4. Remove the 1st, 3rd and 4th clutch pipes.



5. Remove the E-clip from the throttle control shaft, then remove the shaft.

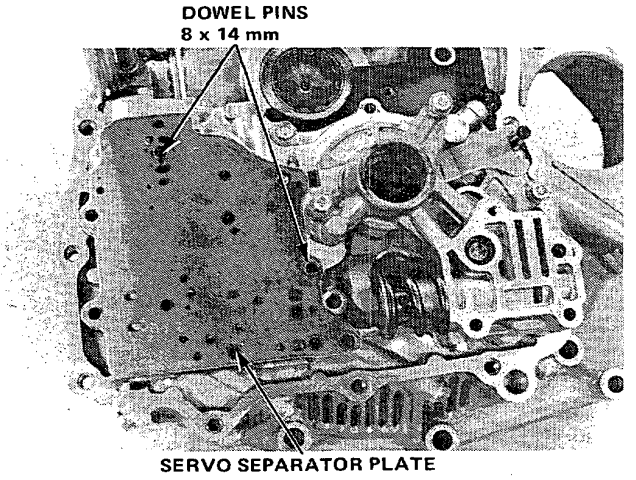


6. Remove the servo valve body (3 bolts).



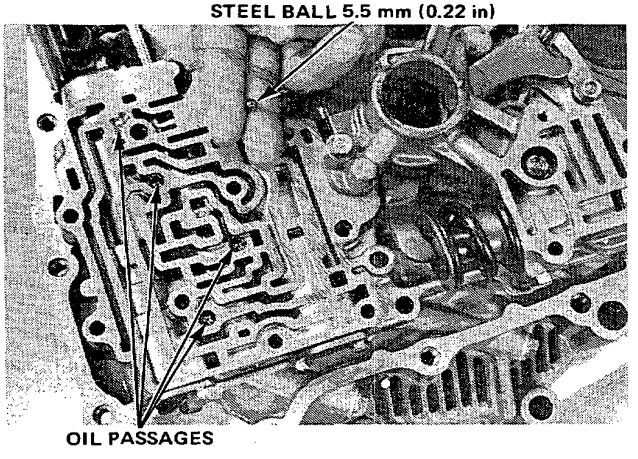
Main Valve body Removal (cont'd)

7. Remove the separator plate and dowel pins.

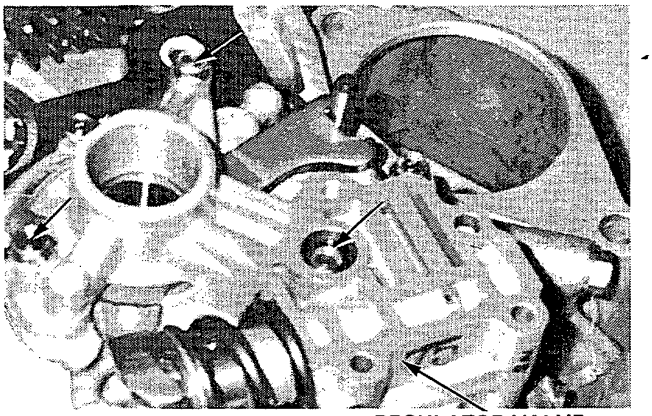


8. Remove the 4 steel balls from valve body oil passages.

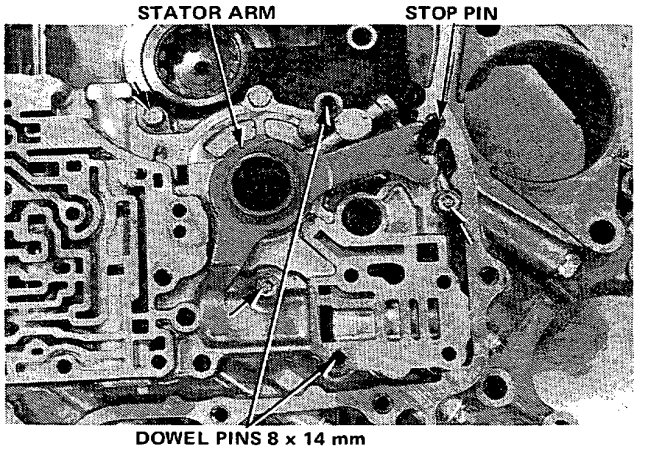
CAUTION: Do not use a magnet to remove the steel balls; it may magnetize the balls.



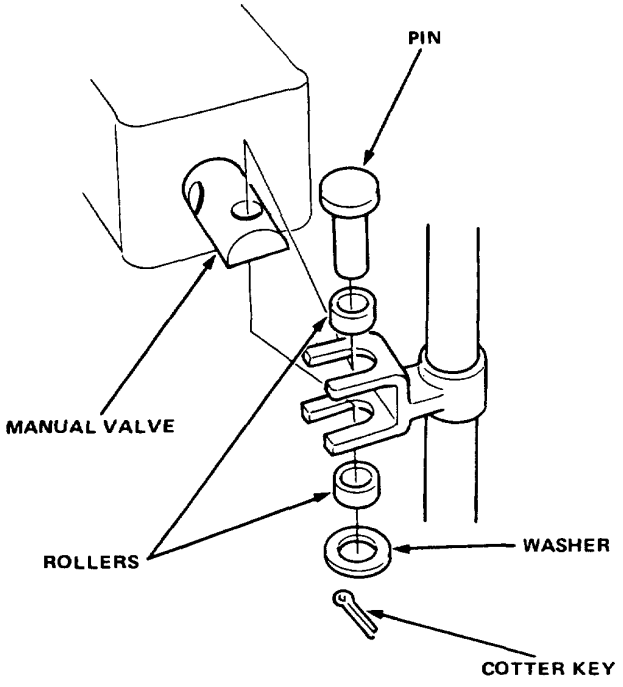
9. Remove the regulator valve (3 bolts).



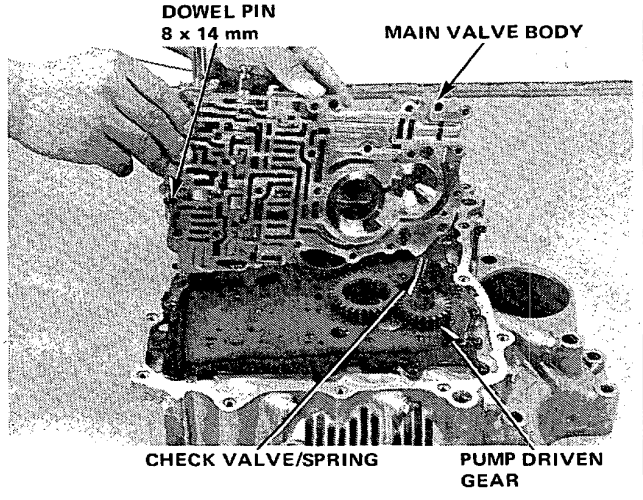
10. Remove the stator shaft arm, dowel pins, stop pin, and four bolts holding the valve body to the torque convertor housing.



11. Remove the cotter key, washer, rollers, and pin from manual valve.



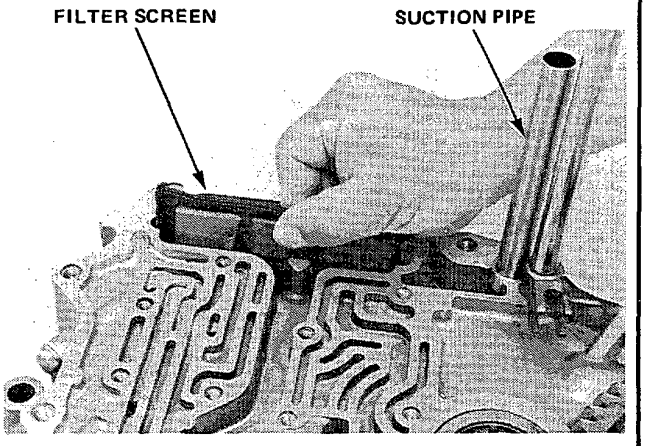
12. Remove the main valve body, being careful not to lose the torque convertor check valve and spring.



13. Remove the pump gears and shaft.
14. Remove the separator plate, dowel pins, check valve, and spring.

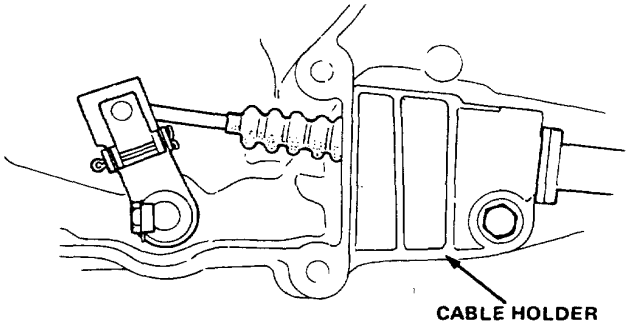
15. Remove the filter screen and suction pipe.

NOTE: Do not reuse filter screen; install a new one on reassembly.

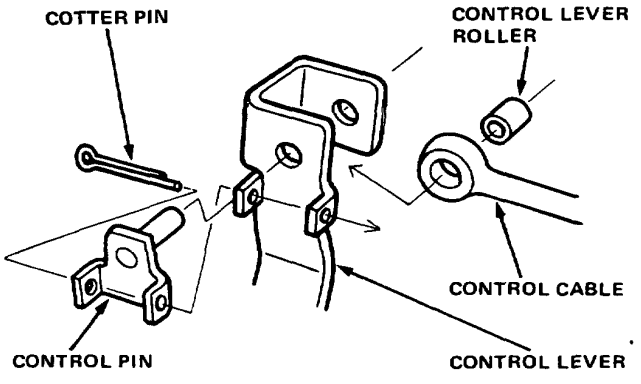


Control Shaft Removal

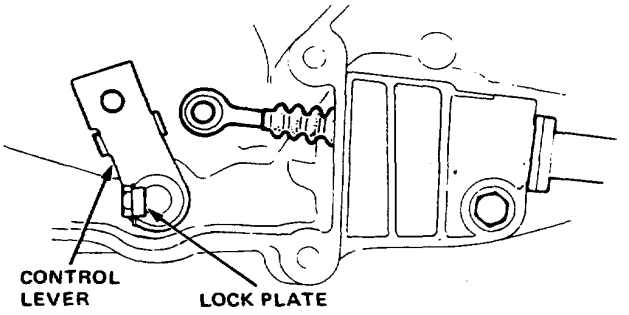
1. Remove the cable holder.



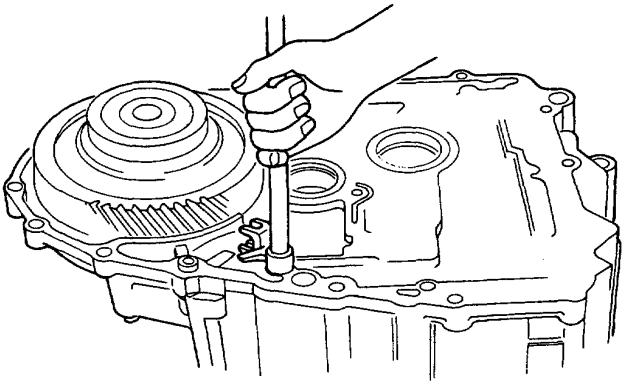
2. Remove the cotter key, control pin, and control lever roller from the control lever.



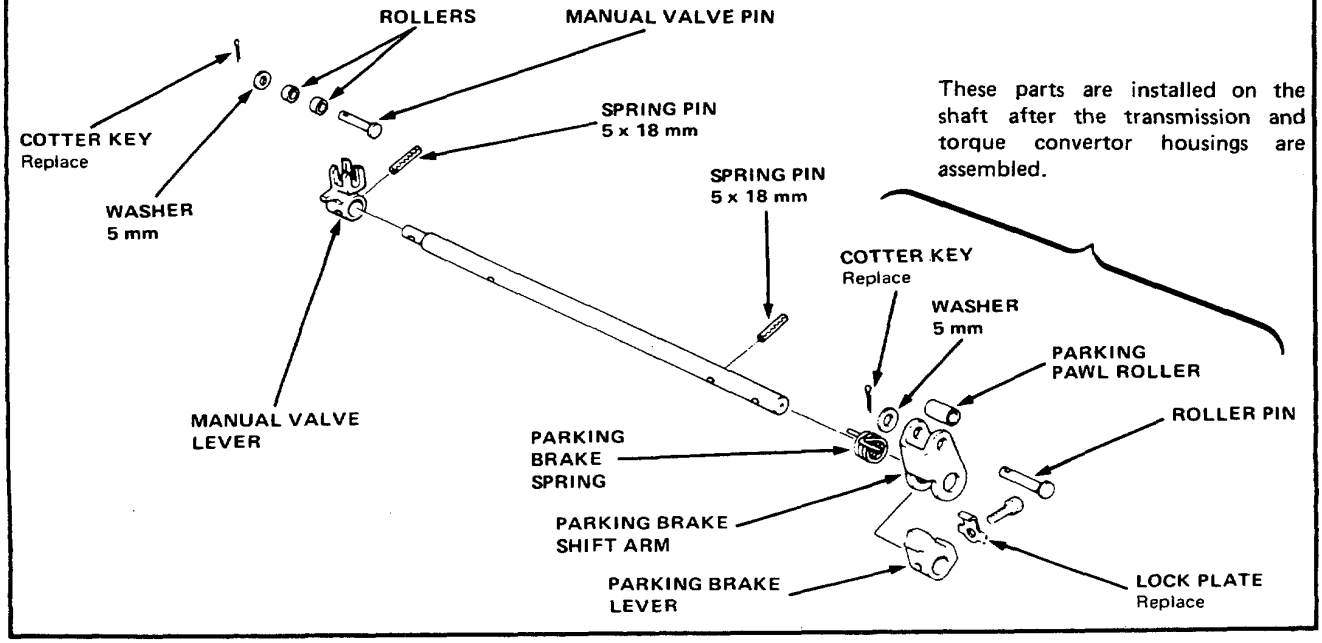
3. Bend down the tab on the lock plate under the bolt in the control lever. Then remove the bolt and lever.



4. Turn the torque convertor housing over and remove the control shaft.

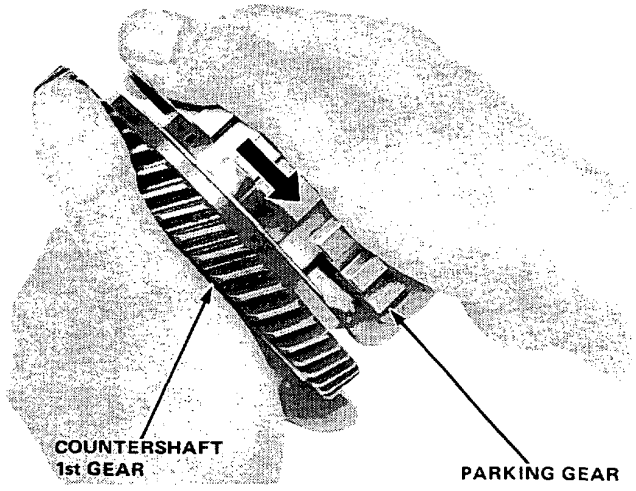


Control Shaft Disassembly/Reassembly

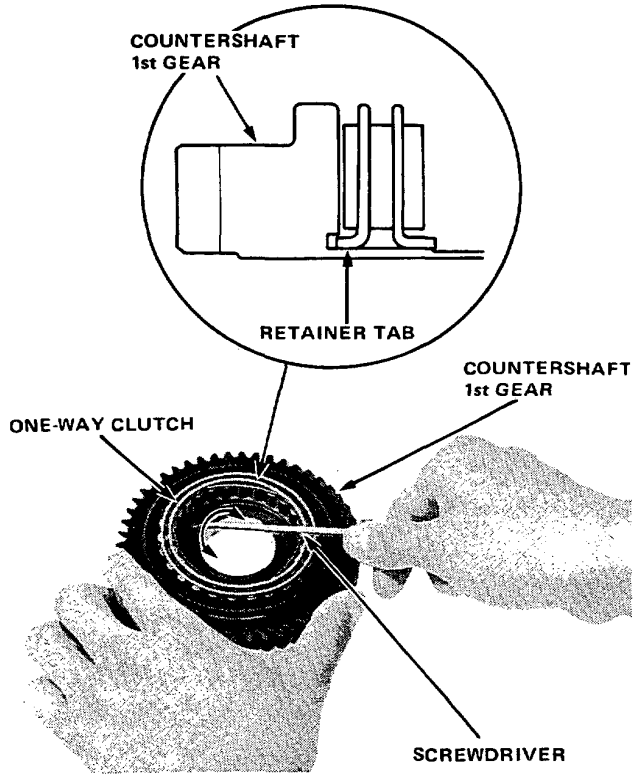


One-Way Clutch/Parking Gear Disassembly and Inspection

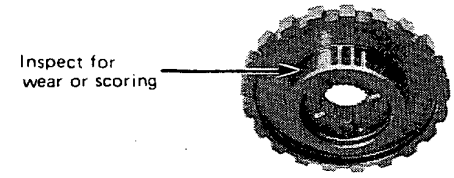
1. Separate the countershaft 1st gear from the parking gear by turning the parking gear in the direction shown.



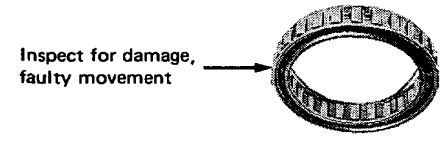
2. Remove the one-way clutch by prying it up with the end of a screwdriver.



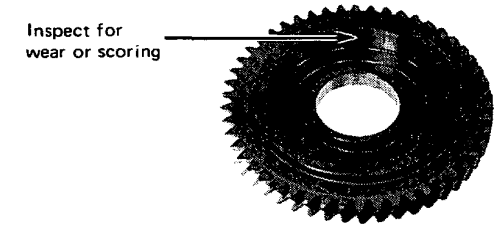
- Parking gear:



- One-way clutch:

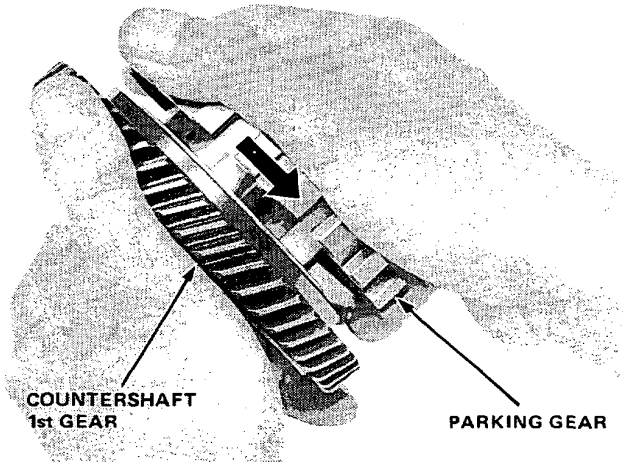


- Countershaft 1st gear:



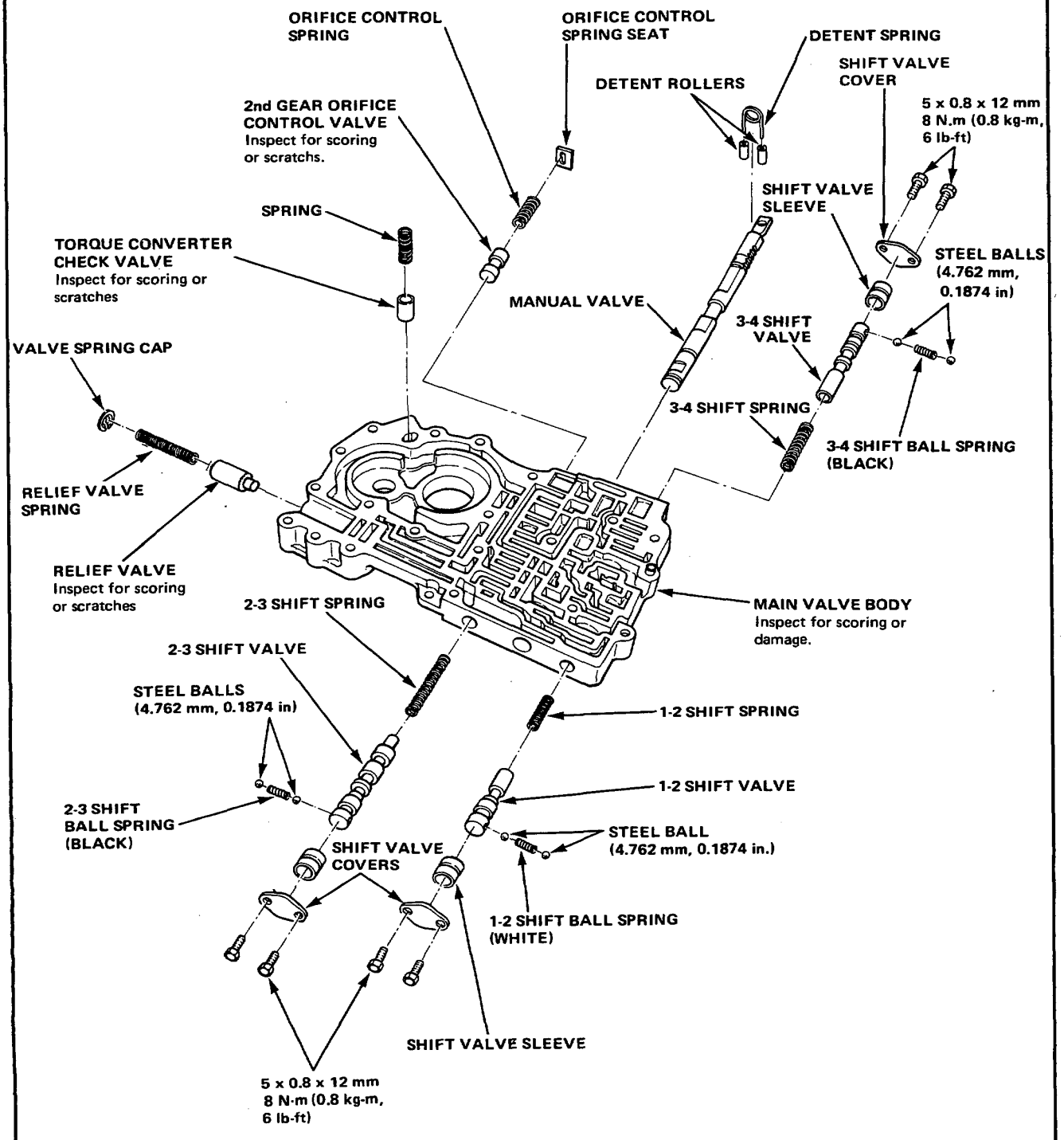
- Assembled:

Hold the countershaft 1st gear and turn the parking gear in direction of the arrow to be sure they turn freely.



Main Valve Body Disassembly

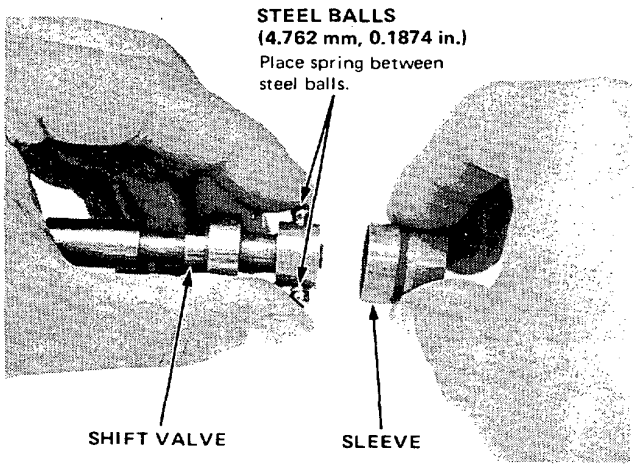
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Replace valve body as an assembly if any parts are worn or damaged.



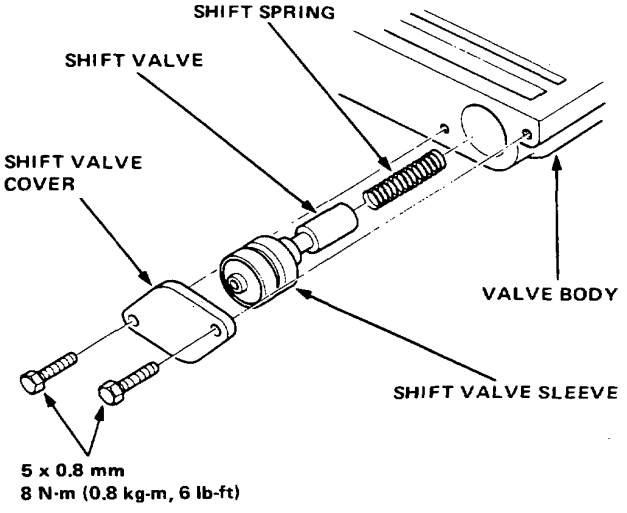
Main Valve Body Reassembly

NOTE: Coat all parts with ATF before assembling.

1. 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 valve.

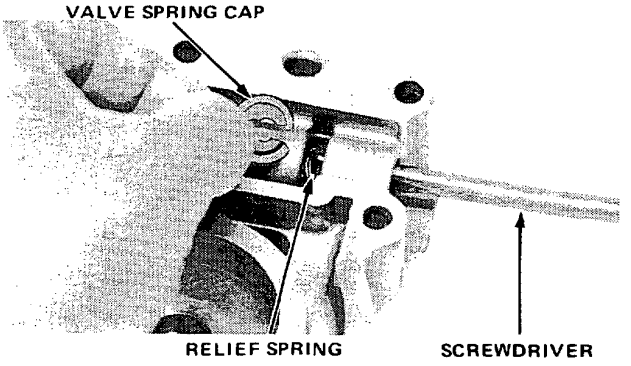


2. Place the shift spring in the valve, then slip it into the valve body and install the valve cover.

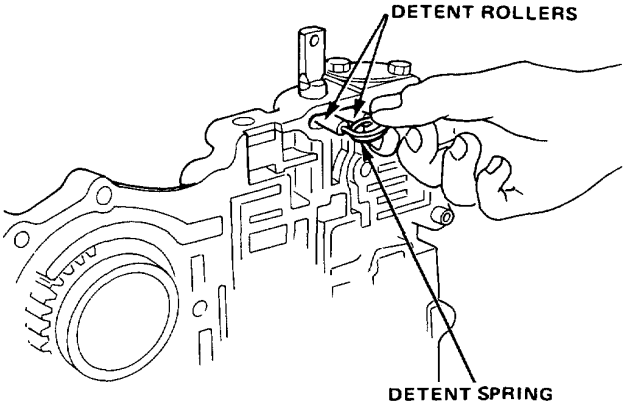


3. Set the relief spring in the relief valve and install it in the main valve body.

4. Install the spring with a screwdriver, then install the check valve cap with the cutout aligned with the screwdriver.



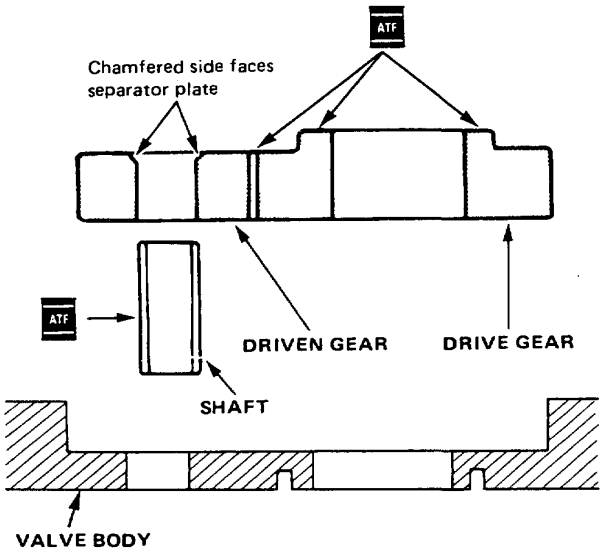
5. Install the manual valve, detent rollers and spring.



(cont'd)

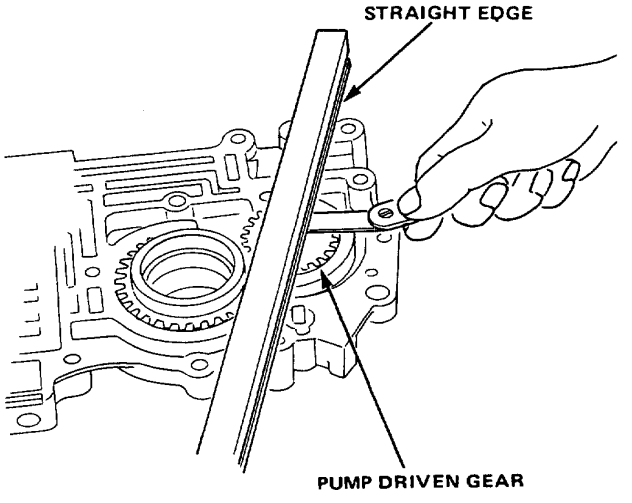
Main Valve Body Reassembly (cont'd)

6. Install the pump gears and shaft in the main valve body.



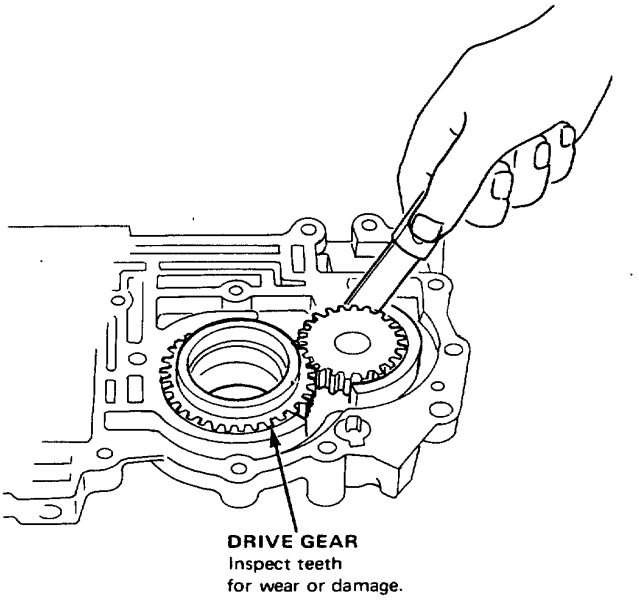
7. Measure the thrust clearance of the driven gear-to-valve body.

Drive/Driven Gear thrust (Axial) Clearance:
Standard (New): 0.03–0.05 mm (0.001–0.002 in.)
Service Limit: 0.08 mm (0.003 in.)



8. Measure the side cleaarnce of the drive and driven gears.

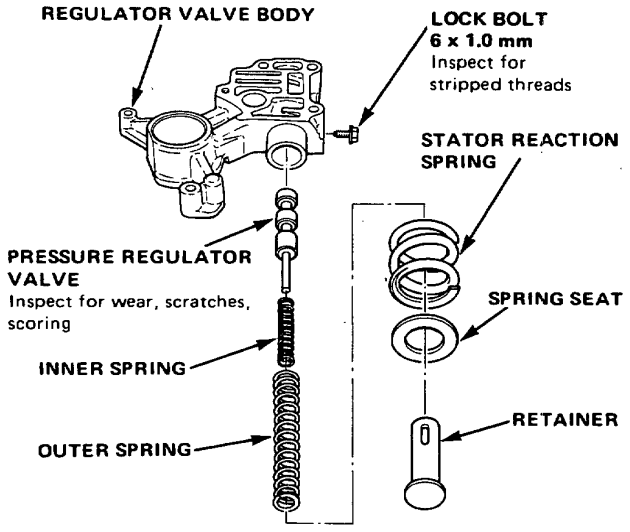
Pump Gears Side (Radial) Clearance:
Standard (New): Drive gear 0.21–0.27 mm (0.008–0.010 in.)
Driven gear 0.05–0.09 mm (0.002–0.004 in.)



Regulator Valve Body Disassembly Reassembly

1. Hold the retainer in place while removing the lock bolt. Once the bolt is removed, release the retainer slowly.

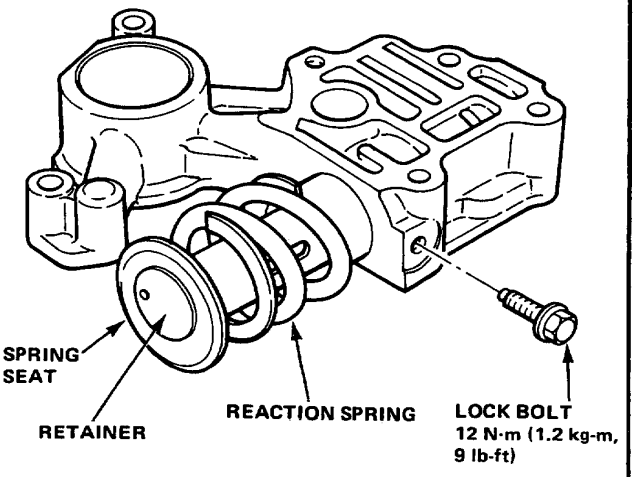
2. Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.



3. Install the pressure regulator valve, and the inner and outer springs.

4. Install the reaction spring, spring seat, and retainer. Align the hole in the retainer with the hole in the valve body, then press the retainer into the valve body and tighten the lock bolt.

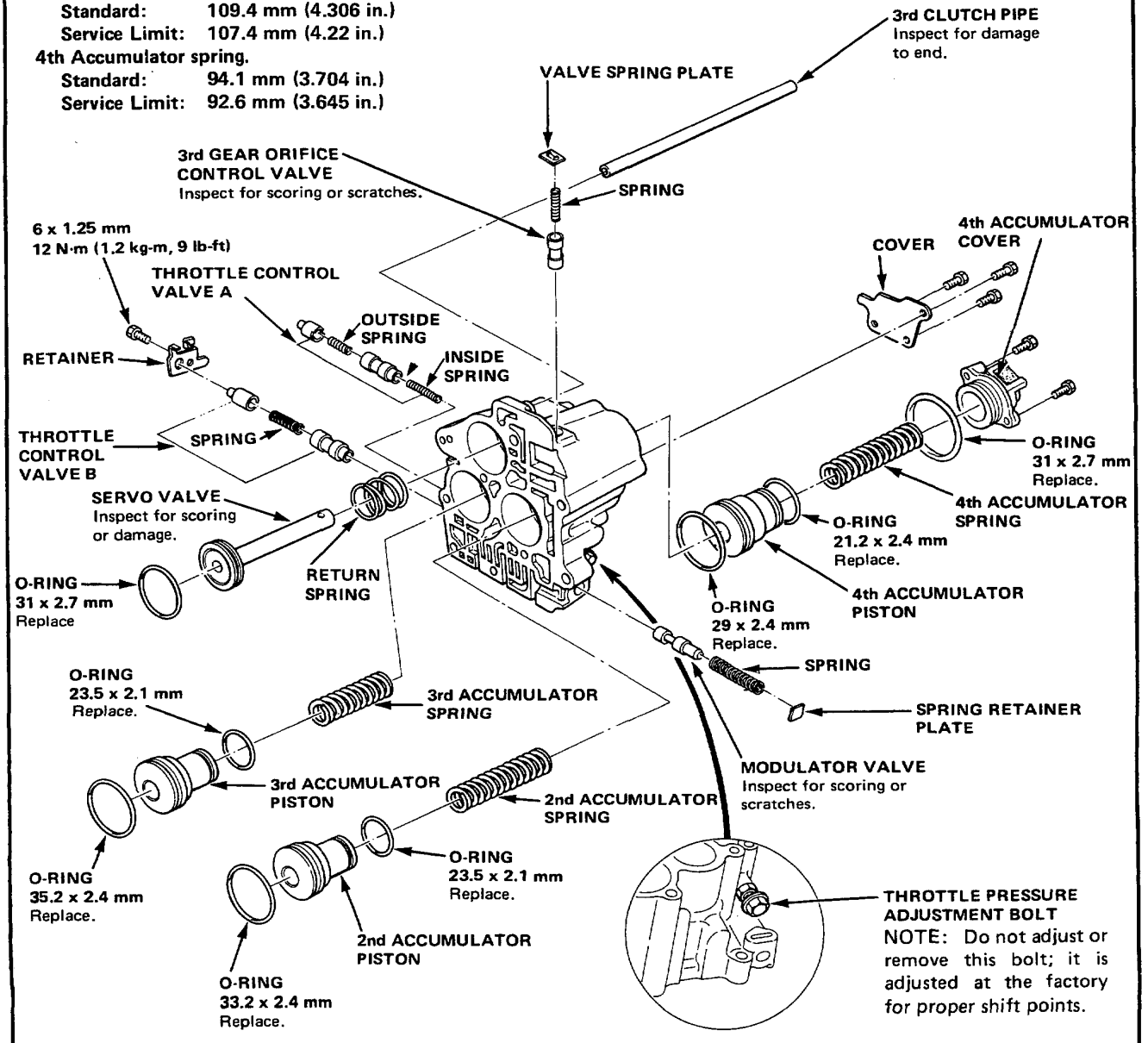
   NOTE: Coat all parts with ATF before assembling.



Servo Disassembly/Reassembly

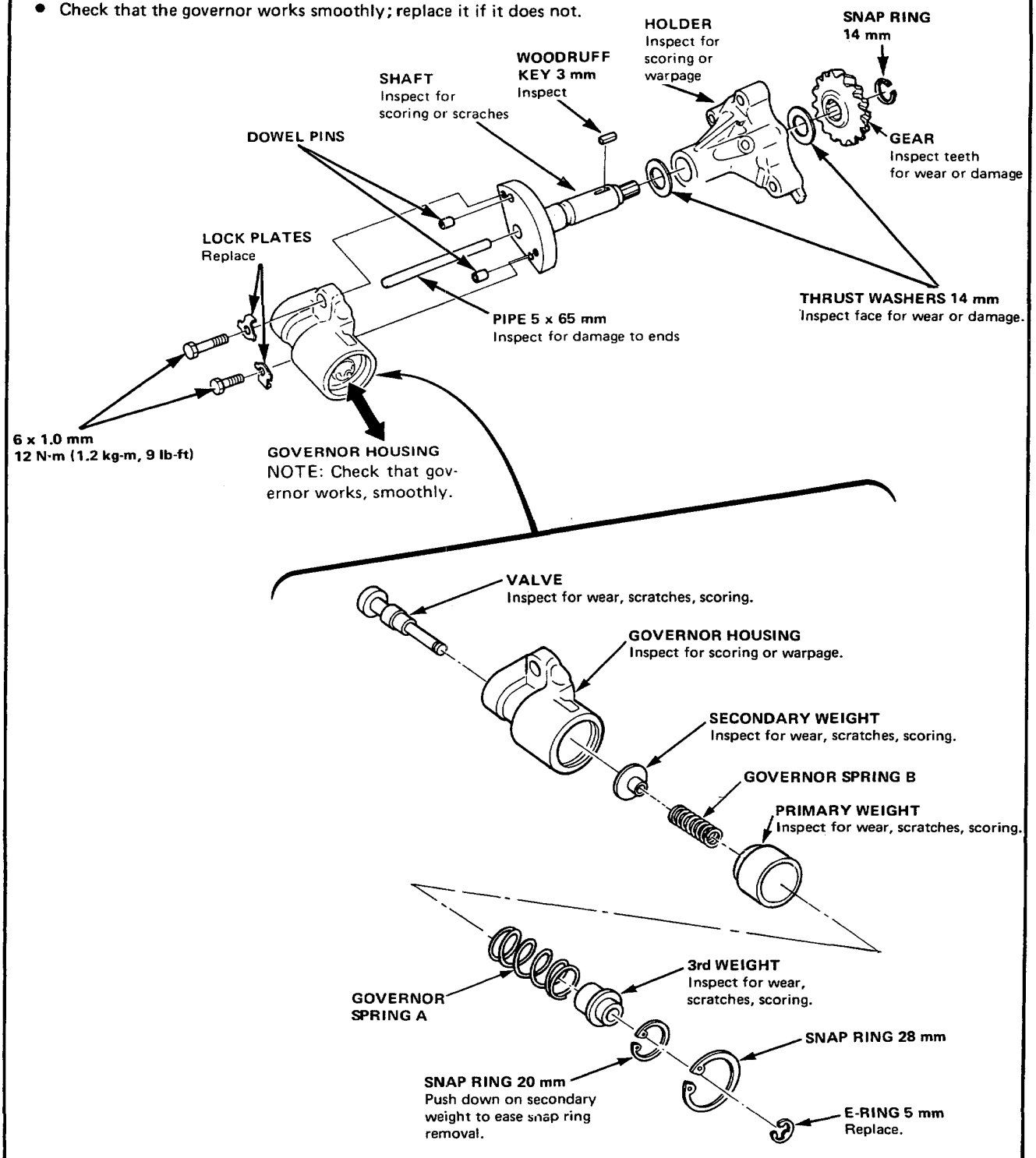
- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.

Servo valve return spring.
Standard: 40.3 mm (1.586 in.)
Service Limit: 38.0 mm (1.496 in.)
2nd Accumulator spring.
Standard: 91.4 mm (3.598 in.)
Service Limit: 90.0 mm (3.543 in.)
3rd Accumulator spring.
Standard: 109.4 mm (4.306 in.)
Service Limit: 107.4 mm (4.22 in.)
4th Accumulator spring.
Standard: 94.1 mm (3.704 in.)
Service Limit: 92.6 mm (3.645 in.)



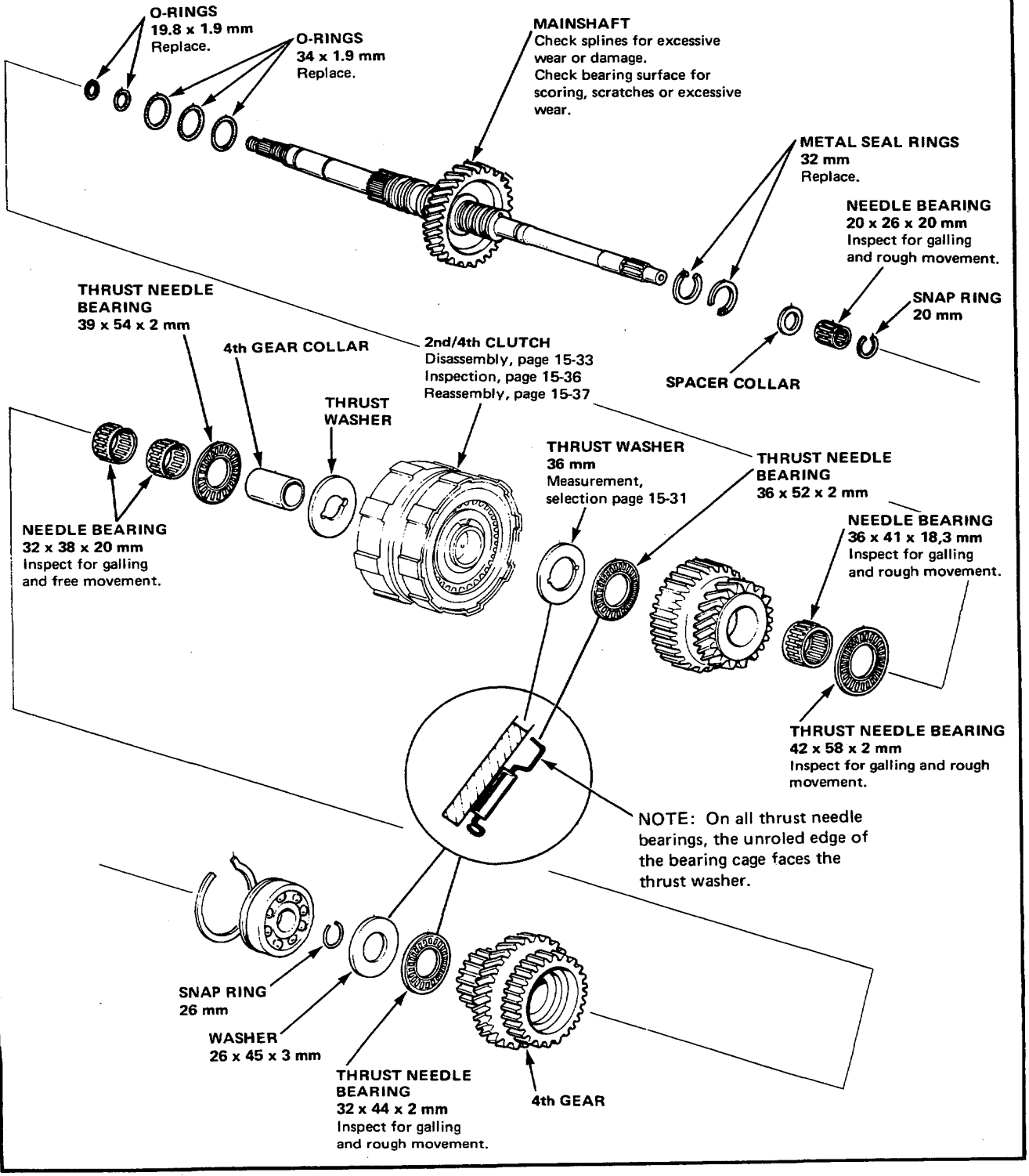
Governor Disassembly/Inspection

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Check that the governor works smoothly; replace it if it does not.



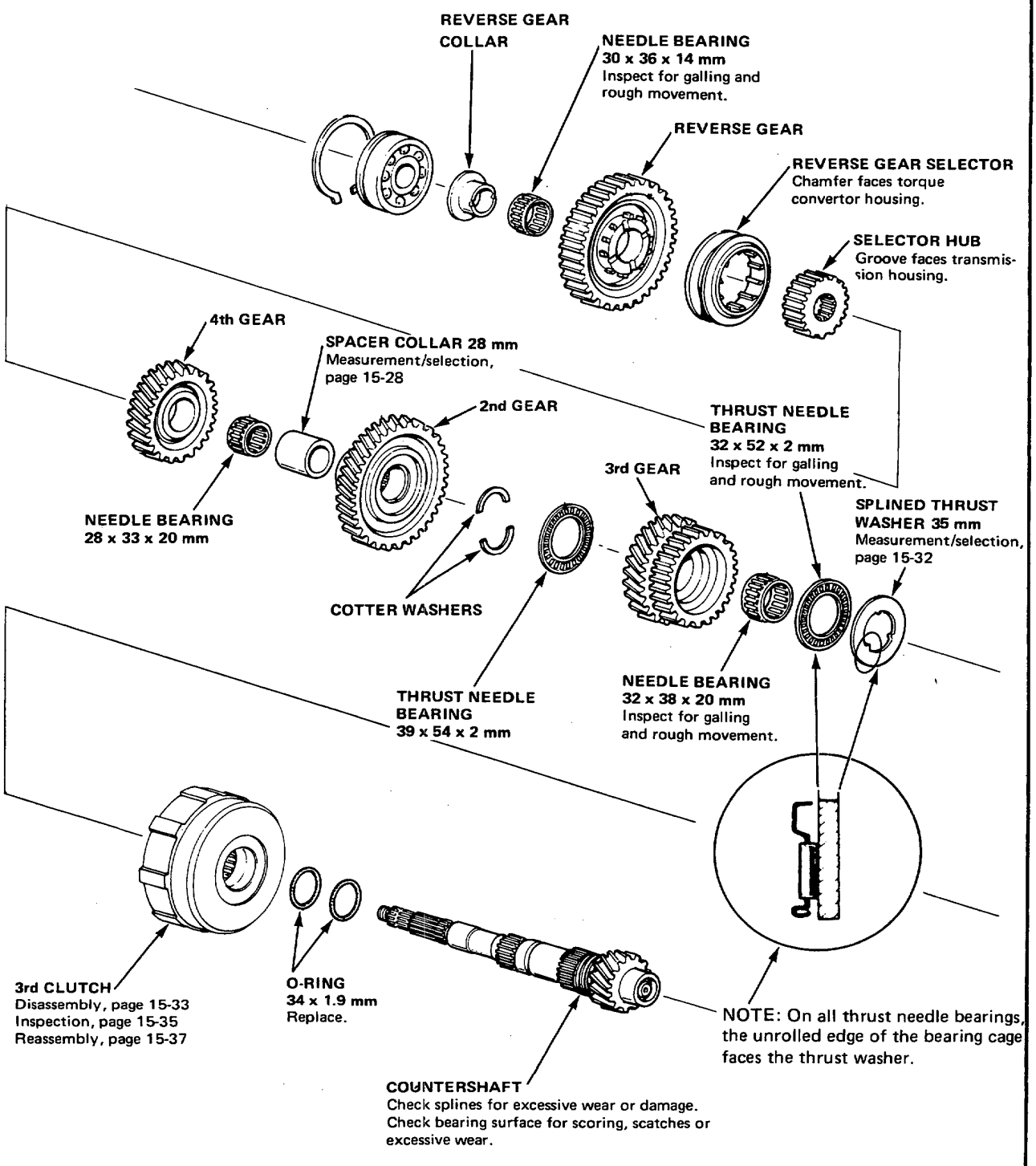
Mainshaft Disassembly/Inspection/Reassembly

- Lubricate all parts with ATF during reassembly.
- Install thrust needle bearings with curved side of bearing retainer facing washer.



Countershaft Disassembly/Inspection/Reassembly

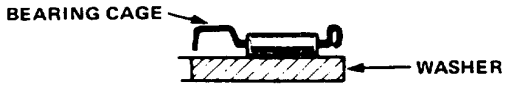
- Lubricate all parts with ATF during reassembly.
- Install thrust needle bearing with curved side of bearing retainer facing washer.



Countershaft/Mainshaft Clearance Measurements

1. Remove the both mainshaft countershaft bearings from the transmission housing.
2. Assemble the mainshaft and the countershaft including bearings and all parts shown below.

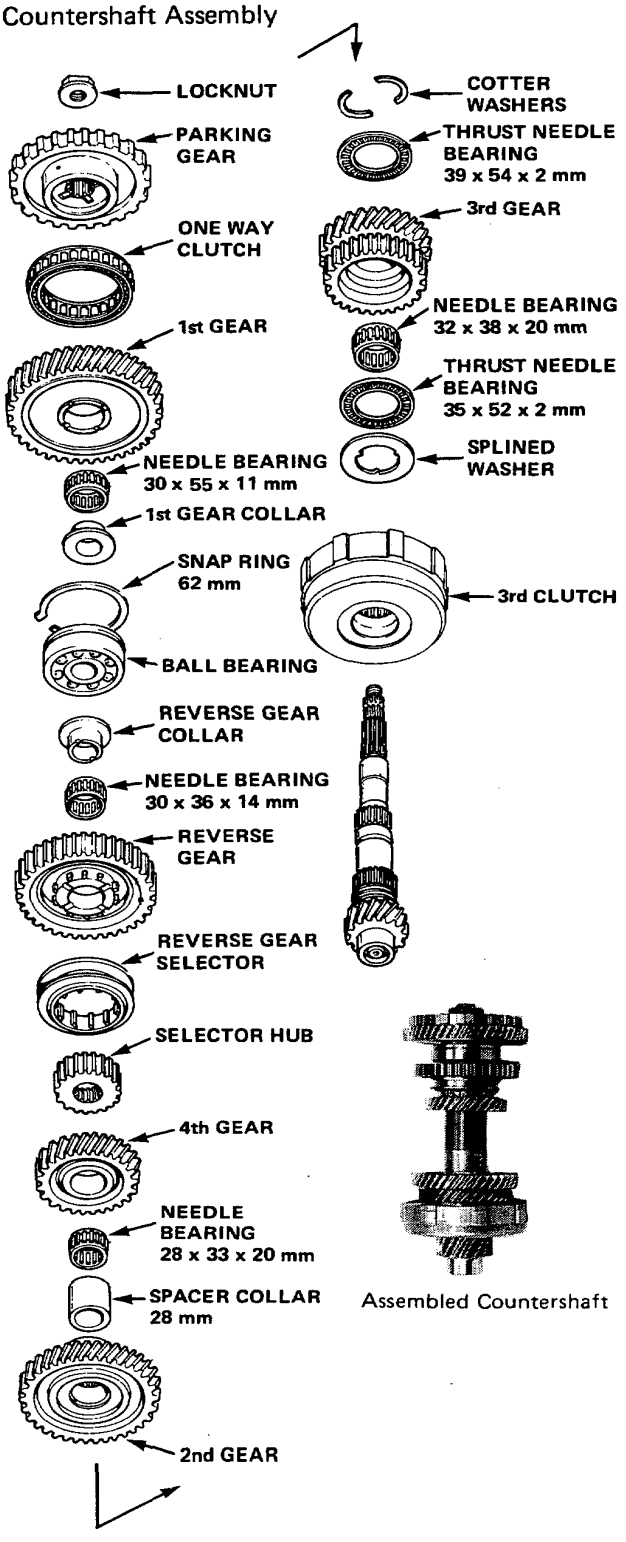
   NOTE: On all thrust needle bearings, the unrolled edge of the bearing cage faces the thrust washer.



3. Install the mainshaft countershaft assemblies into the torque converter housing.
4. Install the mainshaft holder to prevent the shafts from turning.
5. Torque the mainshaft locknut to 35 N·m (3.5 kg-m, 25 lb-ft).
6. Hold the parking gear on the countershaft with your hand and torque the countershaft locknut to 35 N·m (3.5 kg-m, 25 lb-ft).
7. Measure clearances as described on the next page.

   ATF Lubricate all parts with ATF before final re-assembly.

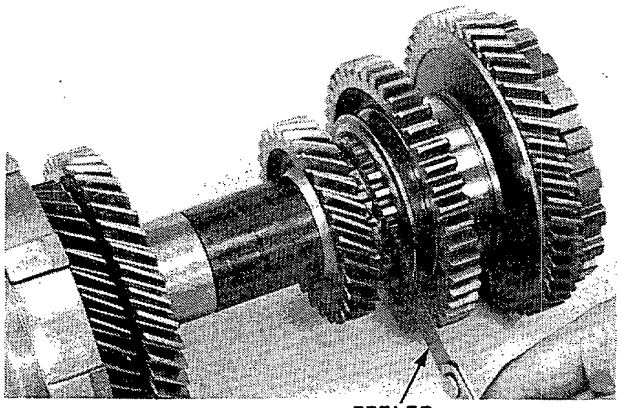
Countershaft Assembly



Assembled Countershaft

8 On the countershaft, measure the clearance between the shoulder on the selector hub and the shoulder on 4th gear.

Countershaft 4th Gear Clearance:
Standard: 0.07–0.15 (0.003–0.006 in.)



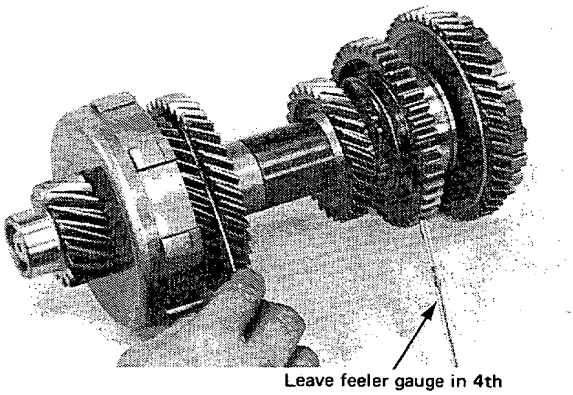
If clearance exceeds the service limit, measure the thickness of the spacer collar and select one which gives correct clearance.
Replacement spacer collars:

CLASS	P/N	THICKNESS
A	90503–PC9–000	38.97–39.00 mm (1.534–1.535 in.)
B	90508–PC9–000	39.02–39.05 mm (1.536–1.537 in.)
C	90504–PC9–000	39.07–39.10 mm (1.538–1.539 in.)
D	90509–PC9–000	39.12–39.15 mm (1.540–1.541 in.)
E	90505–PC9–000	39.17–39.20 mm (1.542–1.543 in.)
F	90510–PC9–000	39.22–39.25 mm (1.544–1.545 in.)
G	90507–PC9–000	39.27–39.30 mm (1.546–1.547 in.)

NOTE: Leave feeler gauge in place (4th gear) while measuring 2nd gear clearance.

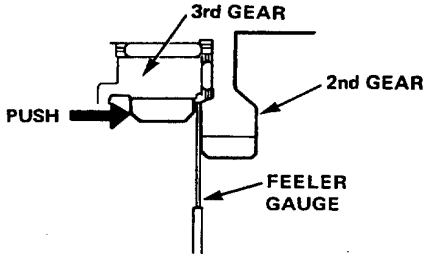
Countershaft 2nd Gear Clearance:
Standard 0.07–0.15 (0.003–0.006 in.)

9. Slide the 3rd gear out fully. Measure and record the clearance between the 2nd and 3rd gears with a feeler gauge.



Leave feeler gauge in 4th gear slot while measuring 2nd gear clearance.

- Slide the 3rd gear in fully and again measure the clearance between the 2nd and 3rd gears with another feeler gauge.
- Calculate the difference between the two readings to determine the actual clearance between the two gears.



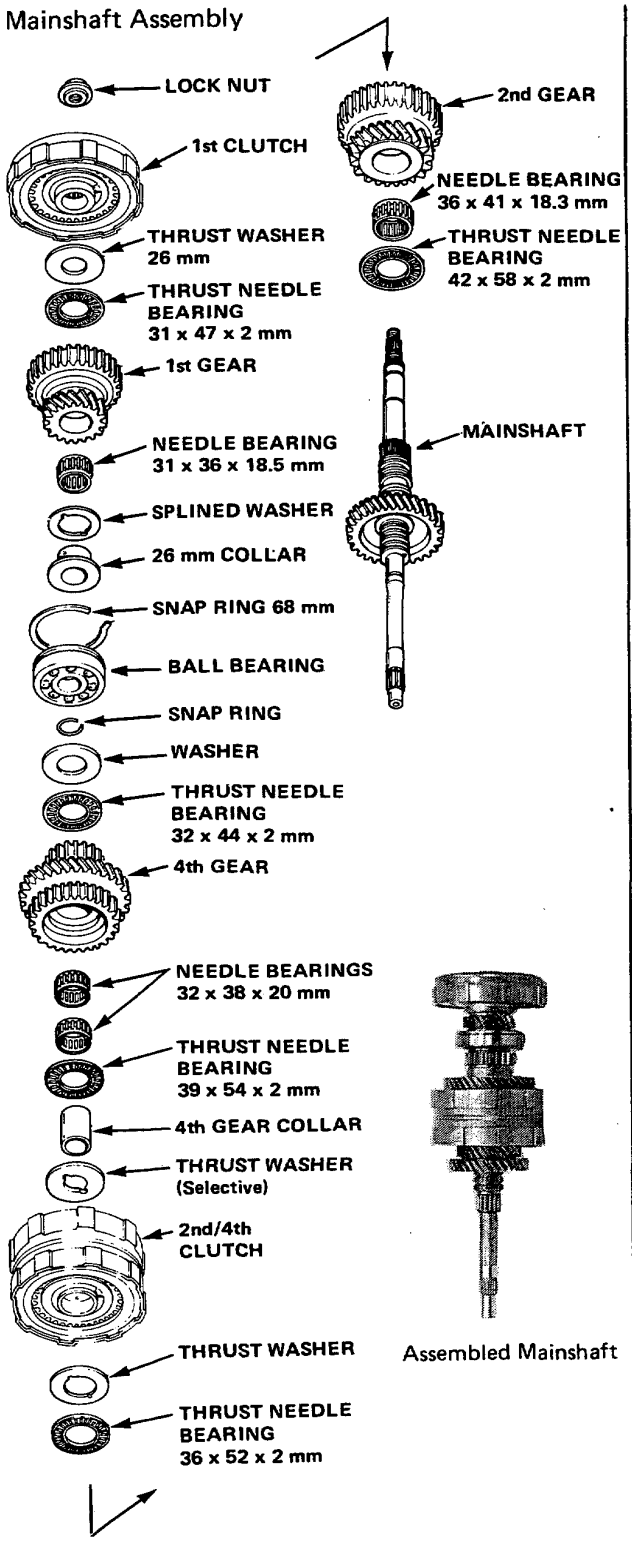
If clearance exceeds service limit, measure the thickness of the splined thrust washer (35 mm i.d.) and select one which gives the proper clearance.
Replacement splined thrust washers:

CLASS	P/N	THICKNESS
A	90411–PA9–0100	2.97–3.00 mm (0.117–0.118 in.)
B	90412–PA9–0100	3.02–3.05 mm (0.119–0.120 in.)
C	90413–PA9–0100	3.07–3.10 mm (0.121–0.122 in.)
D	90414–PA9–0100	(3.12–3.15 mm (0.123–0.124 in.)
E	90415–PA9–0100	3.17–3.20 mm (0.125–0.126 in.)
F	90418–PA9–0100	3.22–3.25 mm (0.127–0.128 in.)
G	90419–PA9–0100	3.27–3.30 mm (0.129–0.130 in.)
H	90420–PA9–0100	3.32–3.35 mm (0.131–0.132 in.)
I	90421–PA9–0100	3.37–3.40 mm (0.133–0.134 in.)

(cont'd)

Countershaft/Mainshaft Clearance Measurments (cont'd)

Mainshaft Assembly

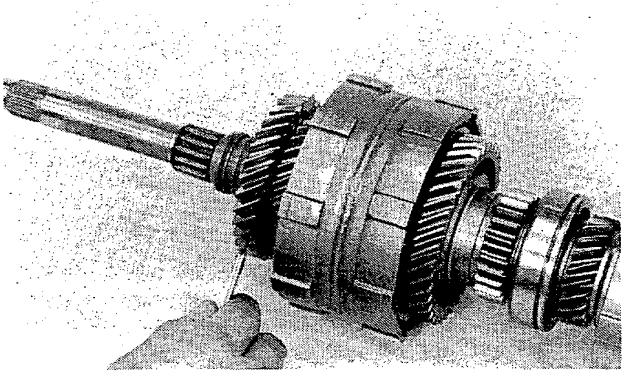


Assembled Mainshaft

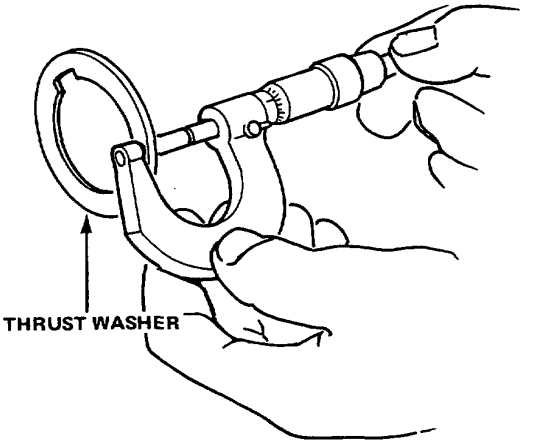
NOTE: Make all measurements before changing the thrust washers. Recheck after making the adjustments.

10. On the mainshaft measure the clearance between the shoulder of 2nd gear and main 3rd gear.

Mainshaft 2nd Gear Clearance:
Standard (New): 0.07–0.15 mm (0.003–0.006 in.)



If the clearance exceeds the service limit, measure the thickness of the 2nd clutch thrust washer (36 mm I.d.) and select one which gives the correct clearance.



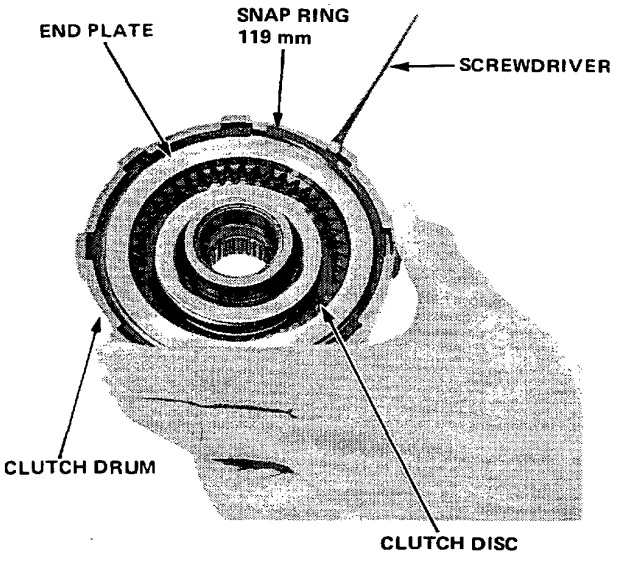
Replacement washer (36 mm i.d.)

P/N	THICKNESS
90410–PC9–000	2.97–3.00 mm (0.117–0.118 in.)
90411–PC9–000	3.02–3.05 mm (0.119–0.120 in.)
90412–PC9–000	3.07–3.10 mm (0.121–0.122 in.)
90413–PC9–000	3.12–3.15 mm (0.123–0.124 in.)
90414–PC9–000	3.17–3.20 mm (0.125–0.126 in.)
90415–PC9–000	3.22–3.25 mm (0.127–0.128 in.)
90416–PC9–000	3.27–3.30 mm (0.129–0.130 in.)

Clutch Disassembly

NOTE:
- The 1st and 3rd clutches are identical.
- To disassemble the 2nd/4th clutch, use the special tool in Step 3 in the same manner as for the 1st and 3rd clutches.

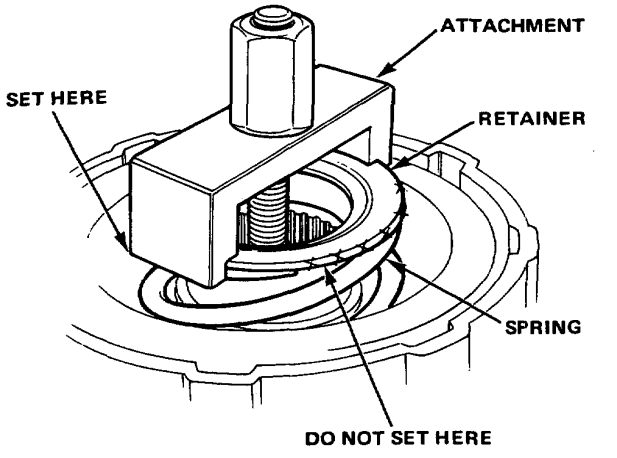
1. Remove the snap ring.



2. Remove the end plate, clutch discs and plates.

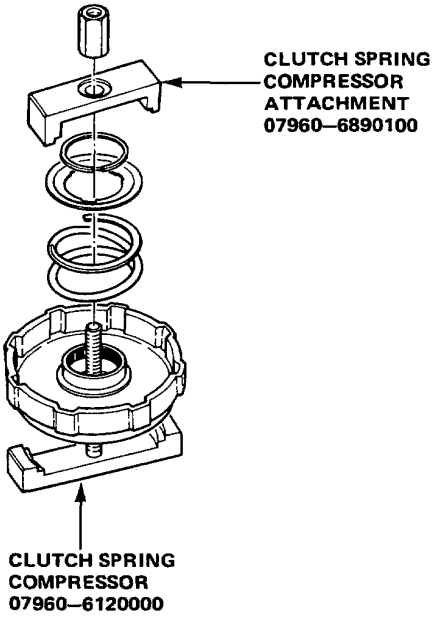
3. Install the clutch spring compressor and compress the clutch return spring.

CAUTION: Do not mount either end of the attachment directly over the open area where the spring coil ends. To do so may damage the spring retainer.

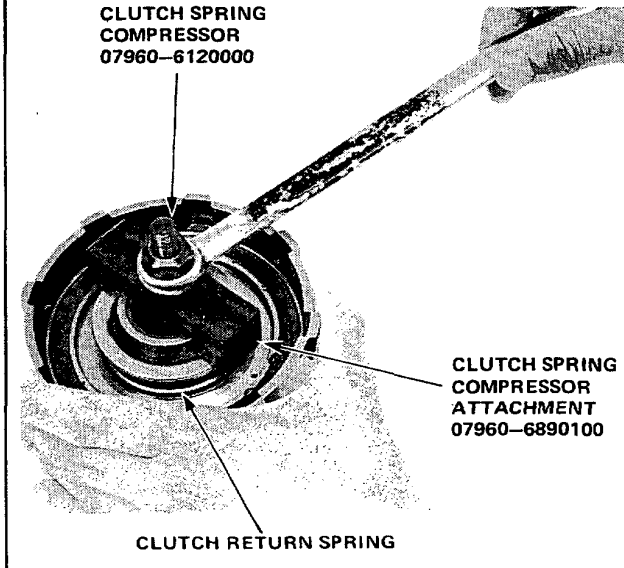


1st and 3rd Clutches

- Assemble the spring compressor on the clutch drum.



- Compress the clutch return spring.

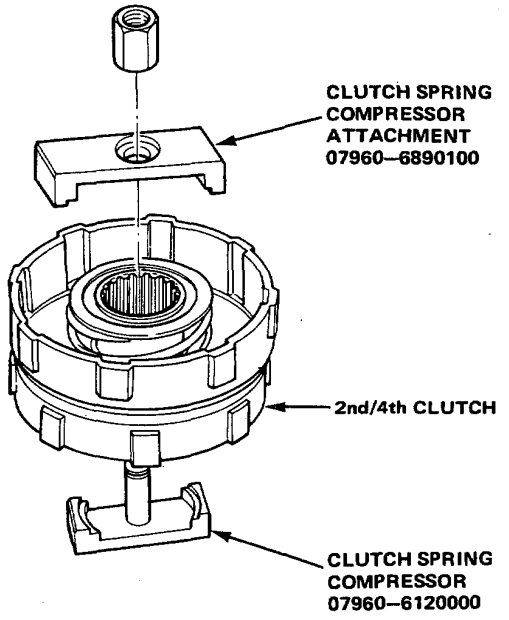


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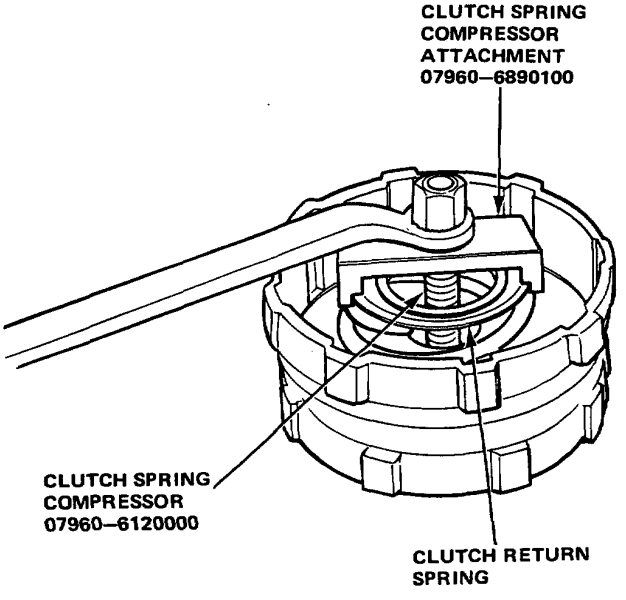
Clutch Disassembly (cont'd)

2nd/4th Clutch

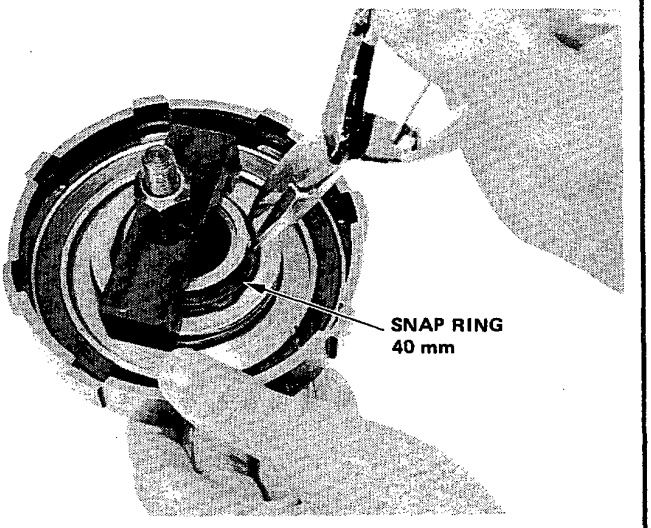
- Assemble the spring compressor on clutch drum.



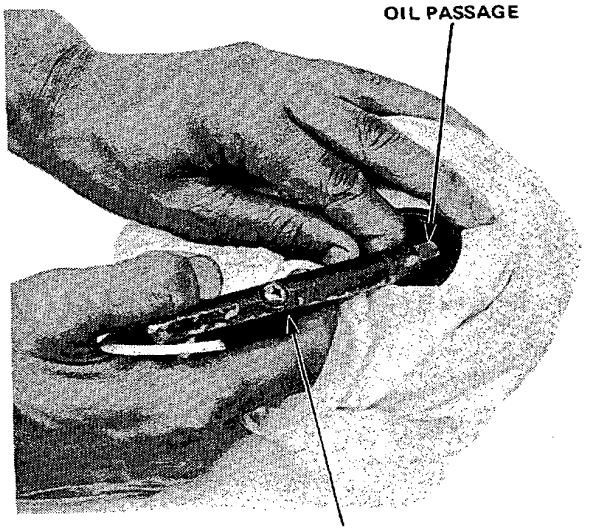
- Compress the clutch return spring.



4. Remove the snap ring. Then remove the clutch spring compressor, spring retainer and spring.

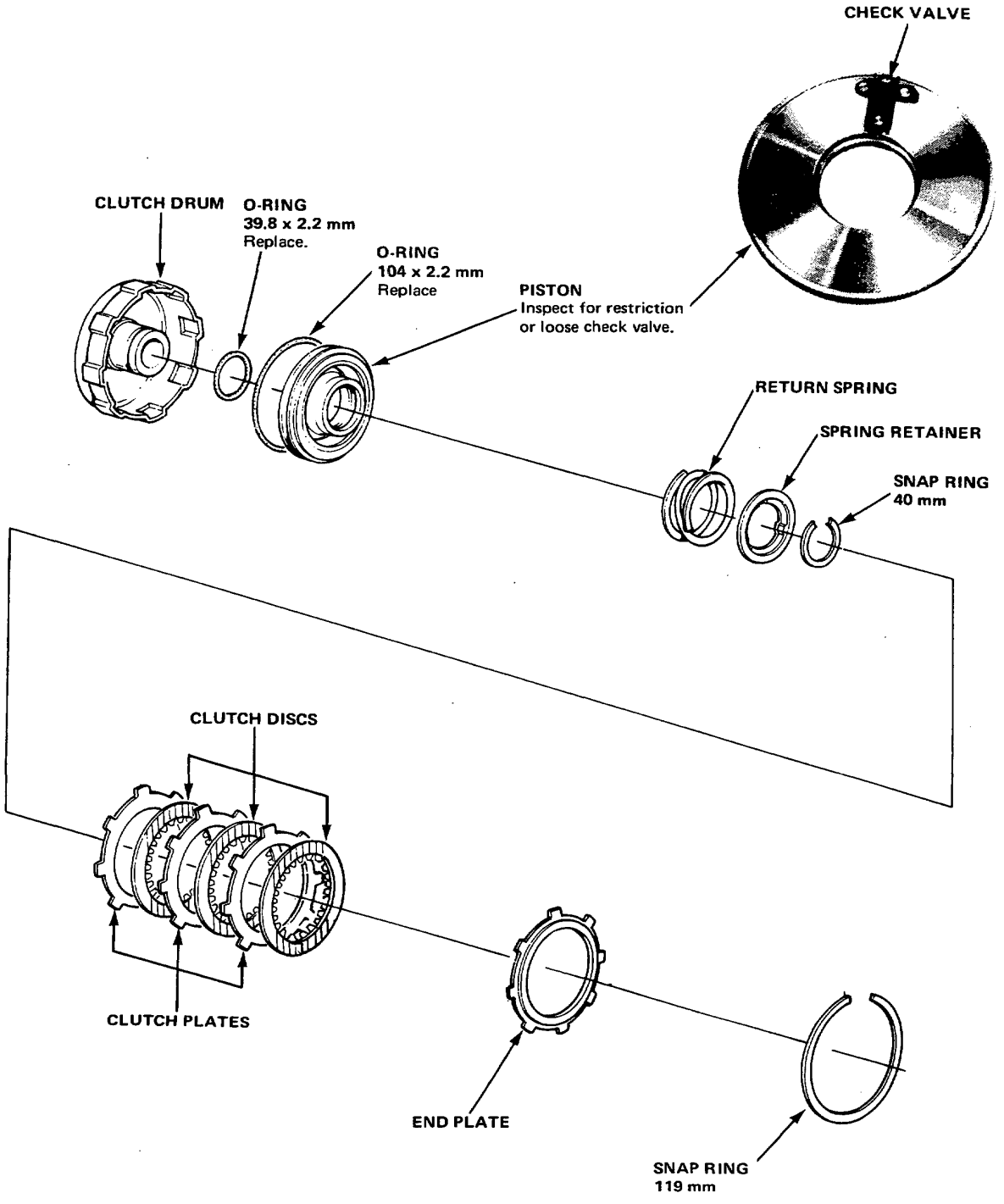


5. Wrap a shop rag around the clutch drum and apply air pressure to the oil passage to remove the piston. Place a finger tip on other end while applying air pressure.



Clutch Disassembly/Inspection

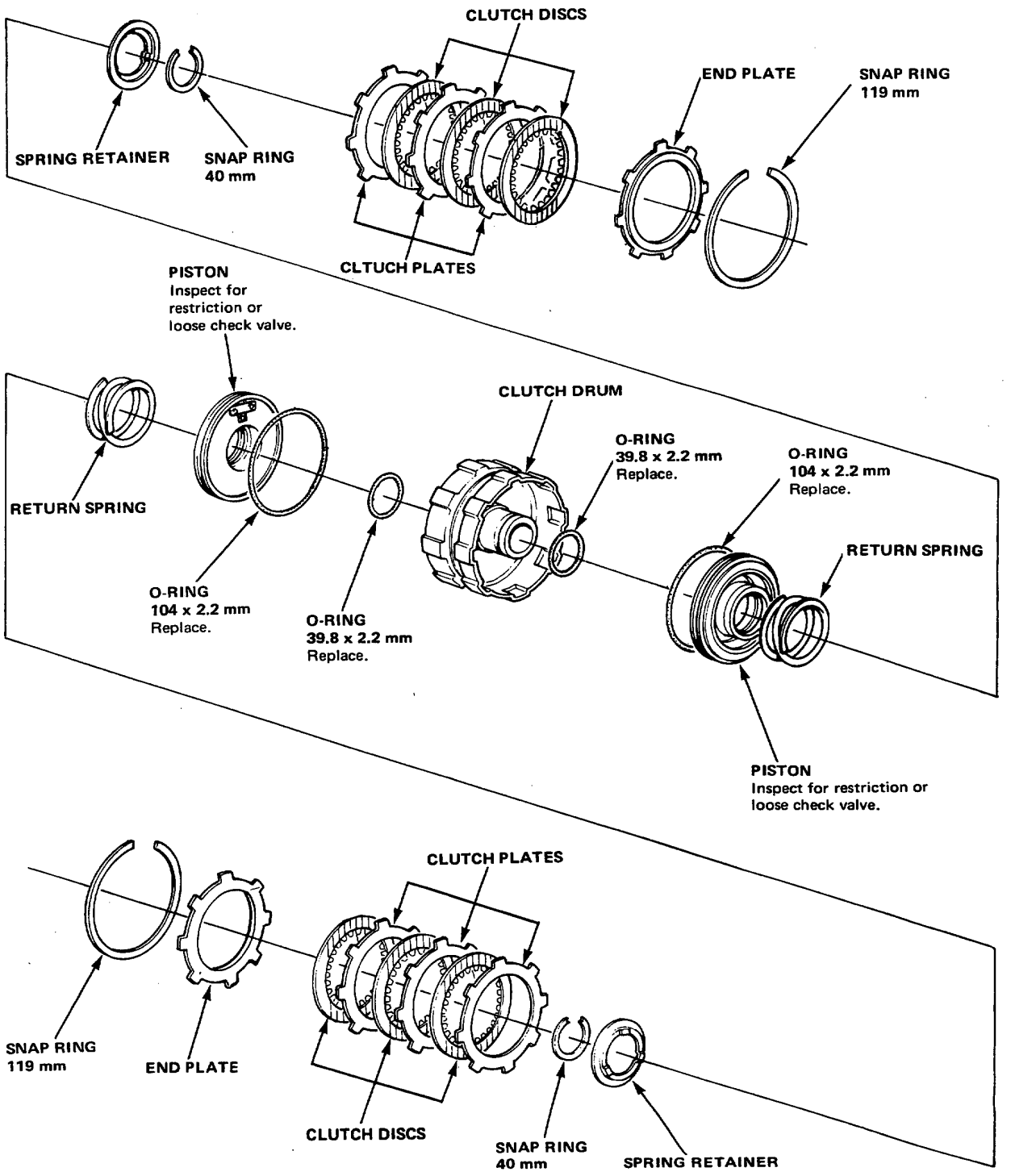
1st and 3rd Clutches



(cont'd)

Clutch Disassembly/Inspection (cont'd)

2nd/4th Clutch

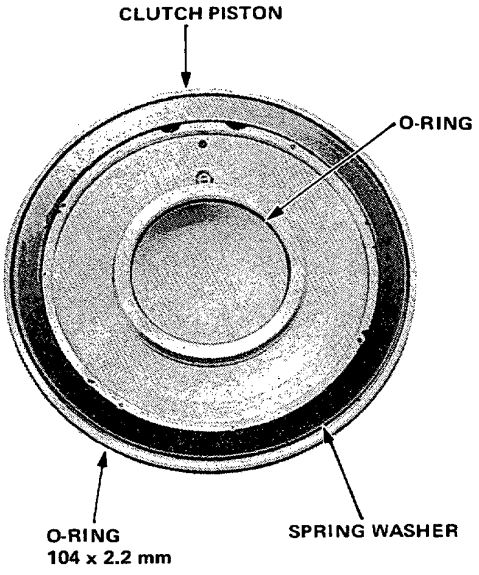


Clutch Reassembly

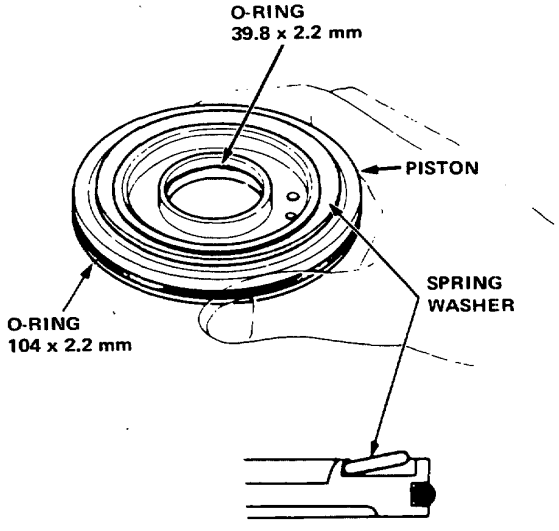
NOTE:
- The 1st and 3rd clutches are indentical.
- To reassemble the 2nd/4th clutch, use the special tool in Step 7 in the same manner as for the 1st and 3rd clutches.

1. Clean all parts thoroughly in solvent, and dry with compressed air. Blow out all passages.

2. Lubricate all parts with ATF before reassembly.



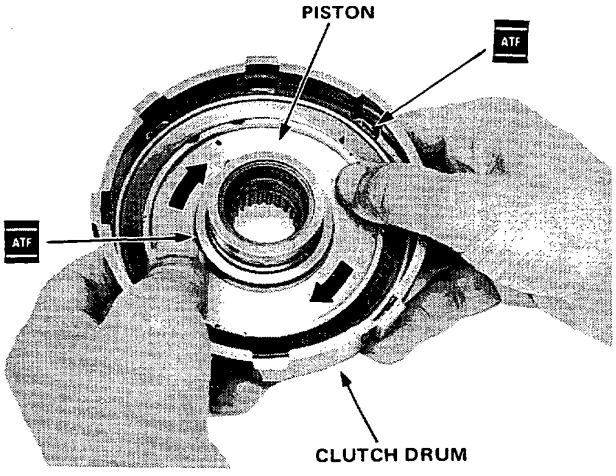
3. Install new O-ring on clutch piston.
Make sure the spring washer is properly positioned as shown.



4. Install the piston in the clutch drum. Apply pressure and rotate to ensure proper seating.

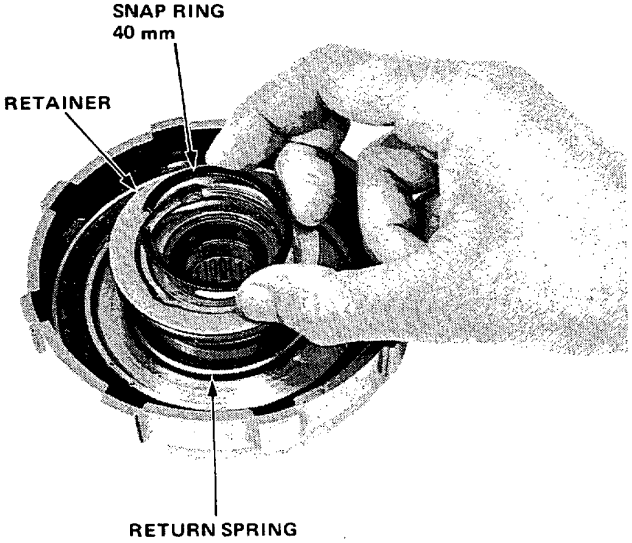
NOTE: Lubricate piston O-ring before installing.

CAUTION: Do not pinch O-ring by forcing piston installation.



5. Install return spring and retainer.

6. Position the 40 mm snap ring on the spring retainer.

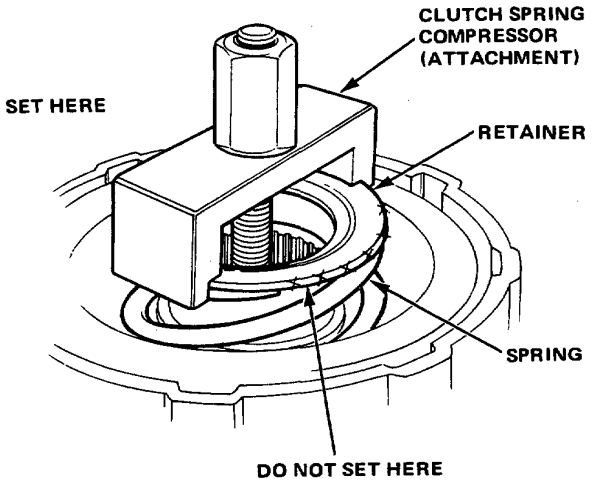


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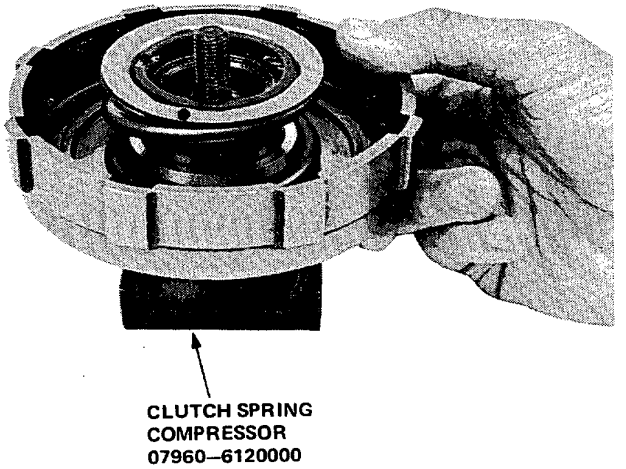
Clutch Reassembly (cont'd)

7. Assemble the spring compressor on the clutch drum.

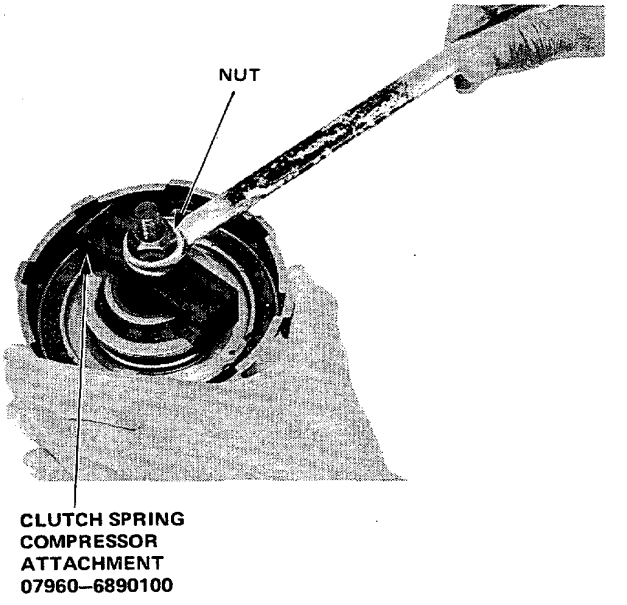
CAUTION: Don't mount either end of the attachment directly over the open area where the spring coil ends. To do so may damage the spring retainer.



1st and 3rd clutches

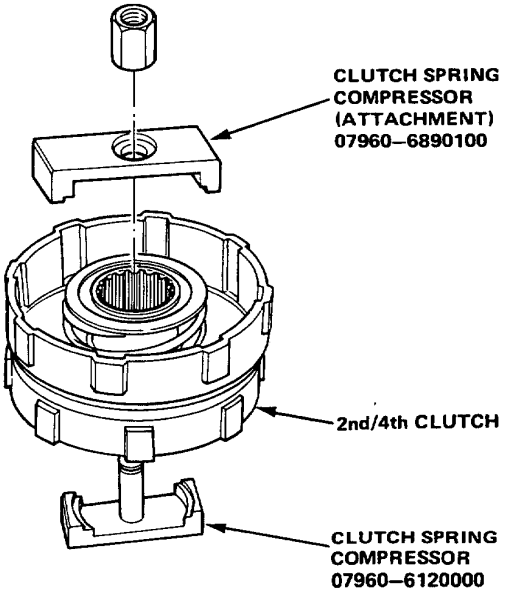


8. Compress the spring until the retainer is below the snap ring groove in the hub.

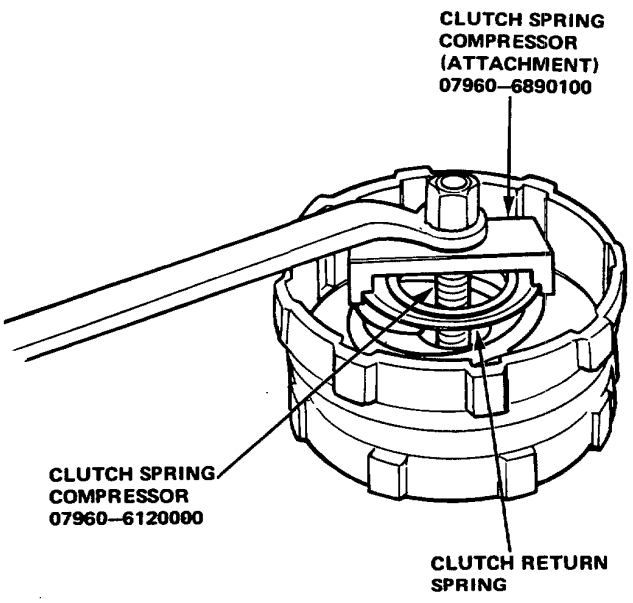


2nd/4th clutch

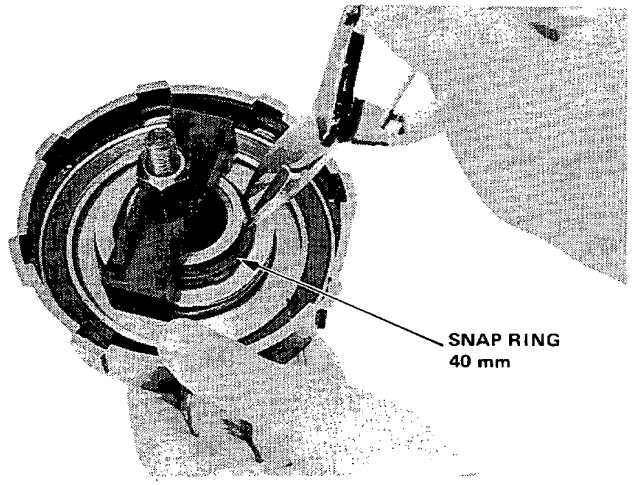
- Assemble the spring compressor on the clutch drum.



- Compress the clutch return spring.



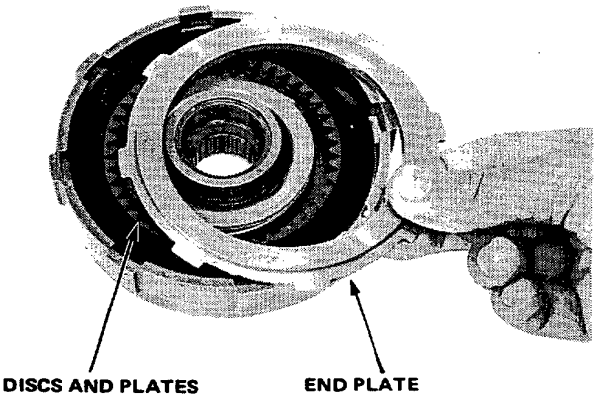
9. Then install the snap ring in the hub groove and remove the spring compressor.



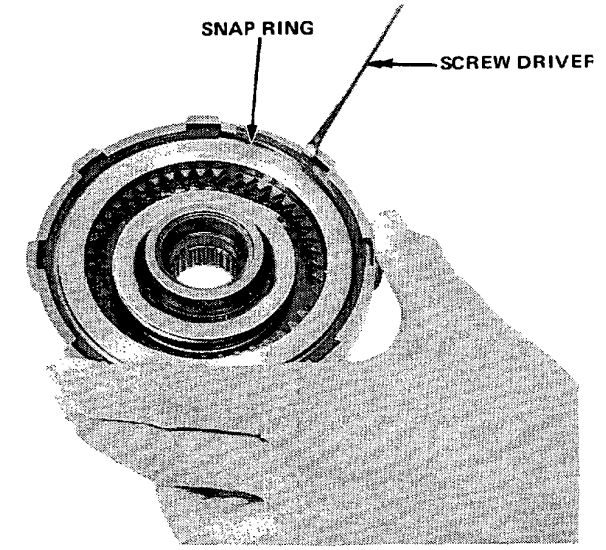
10. Soak the clutch discs thoroughly in automatic transmission fluid for a minimum of 30 minutes.

11. Starting with a clutch plate, alternately install the clutch plates and discs. Install the clutch end plate with flat side toward the disc.

    NOTE: Before installing the plates and discs, make sure the inside of the clutch drum is free of grit or other foreign matter.



12. Install the 119 mm snap ring.

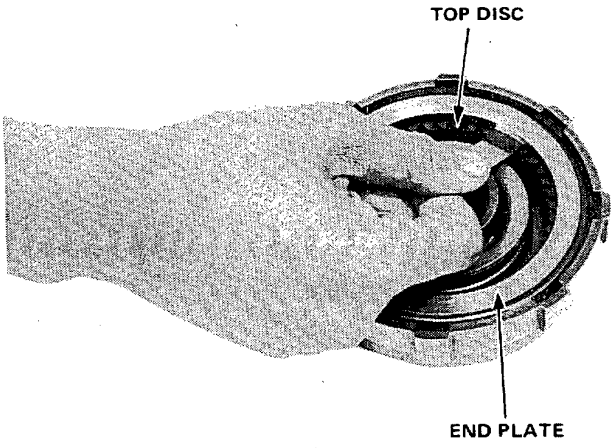


(cont'd)

Clutch Reassembly (cont'd)

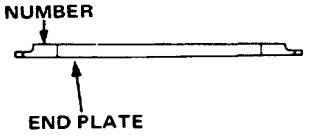
13. Using bent feeler gauges, carefully measure the clearance between the clutch end plate and the top disc. Do not damage the disc.

End Plate-to-Top Disc Clearance:
Service Limit: 0.4–0.7 mm (0.016–0.028 in.)

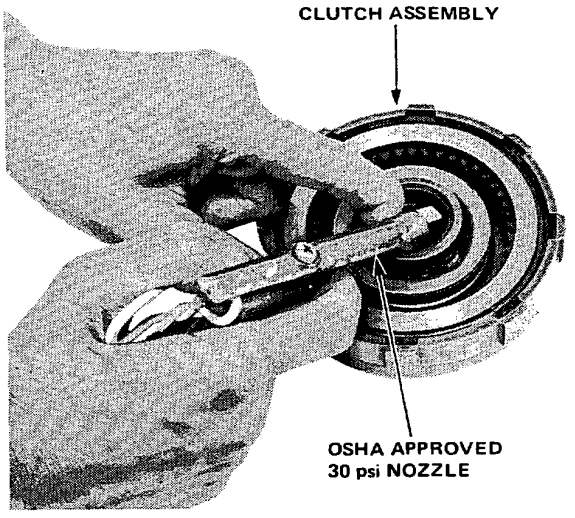


14. If not within service limit, select a new clutch end plate from following table.

P/N	PLATE NO.	THICKNESS
22551–PC9–000	1	2.4 mm (0.094 in.)
22552–PC9–000	2	2.5 mm (0.098 in.)
22553–PC9–000	3	2.6 mm (0.102 in.)
22554–PC9–000	4	2.7 mm (0.106 in.)
22555–PC9–000	5	2.8 mm (0.110 in.)
22556–PC9–000	6	2.9 mm (0.114 in.)
22557–PC9–000	7	3.0 mm (0.118 in.)
22558–PC9–000	8	3.1 mm (0.122 in.)
22559–PC9–000	9	3.2 mm (0.126 in.)
22560–PC9–000	10	3.3 mm (0.130 in.)

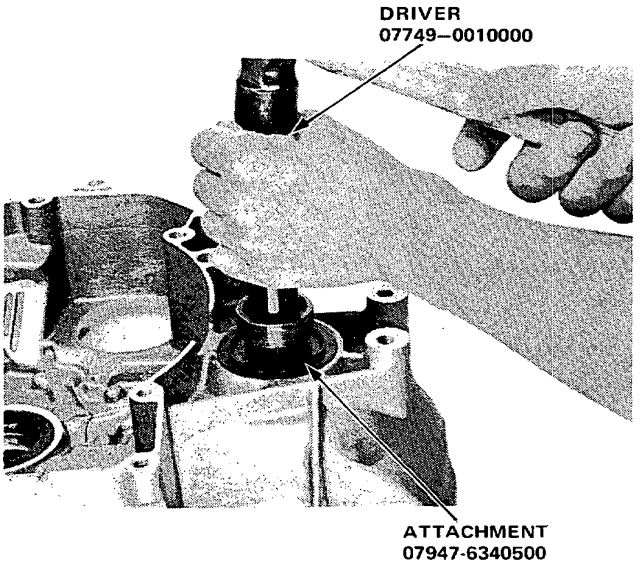


15. Check the clutch engagement by blowing air into the oil passage in the clutch drum hub. Remove the air pressure and check that the clutch releases.

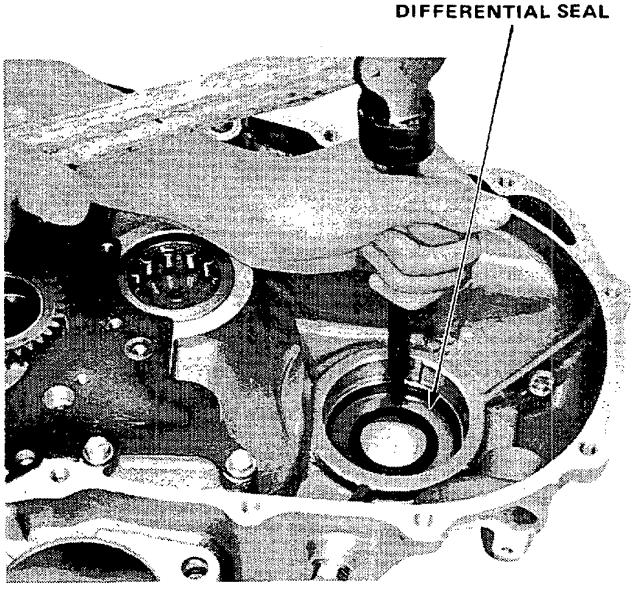


Differential and Seal Replacement

1. If seals are to be replaced, or if the differential needs repair, remove the differential.

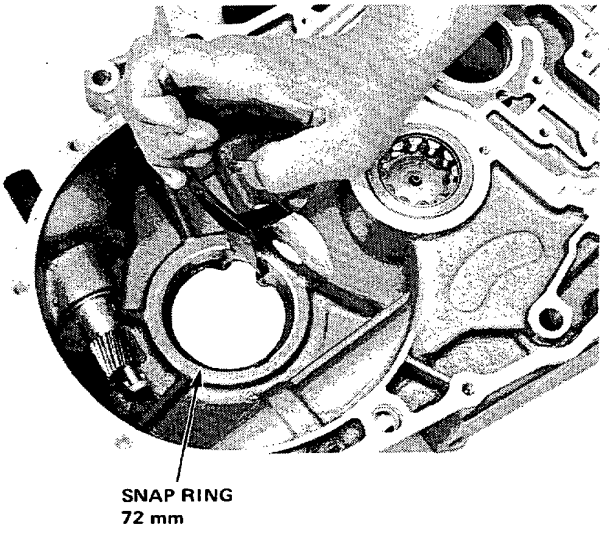


2. On the torque converter housing, remove the 72 mm snap ring, then drive out the seal as shown.

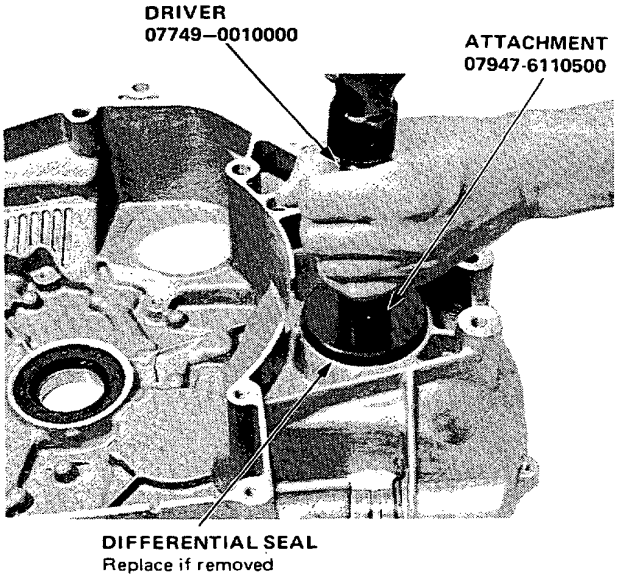


3. Remove the differential seal from the transmission housing the same way.

4. On the torque converter housing, install the differential 72 mm snap ring if removed.

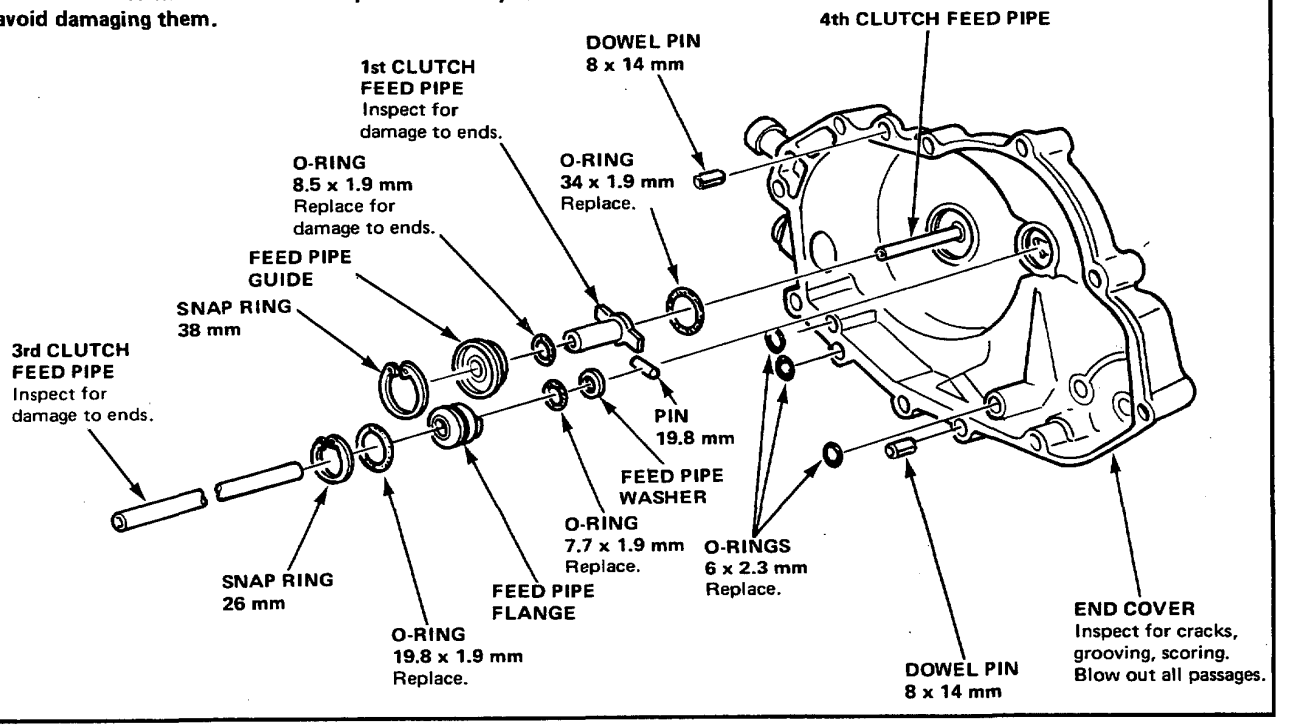


5. Install the differential seals int the torque converter housing and transmission housing.



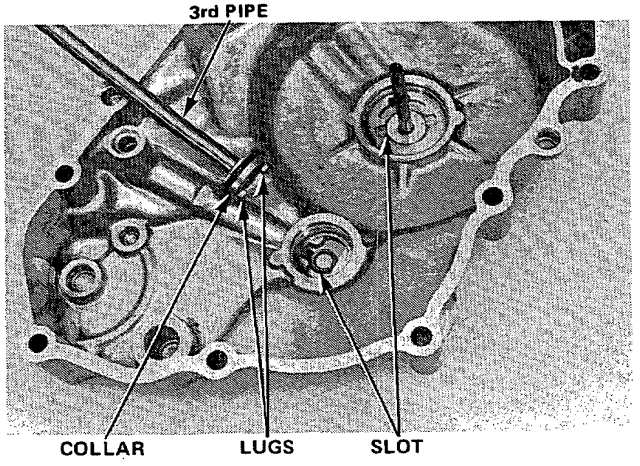
End Cover Disassembly/Inspection

CAUTION: **Remove and install parts carefully to avoid damaging them.**

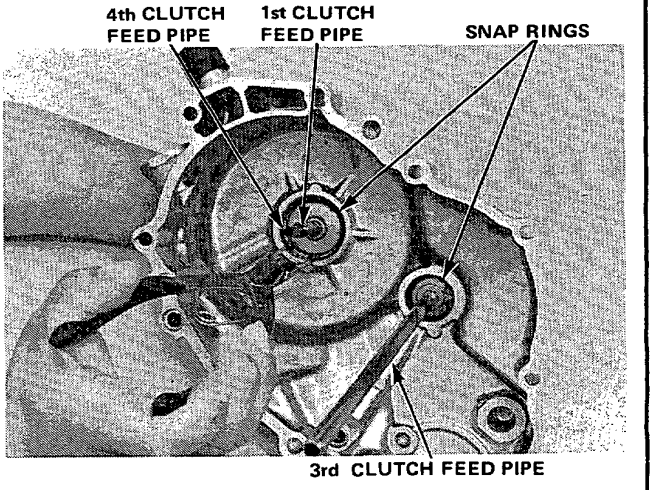


End Cover Reassembly

1. With feed pipes assembled, align lugs on the collars with slots in end cover.

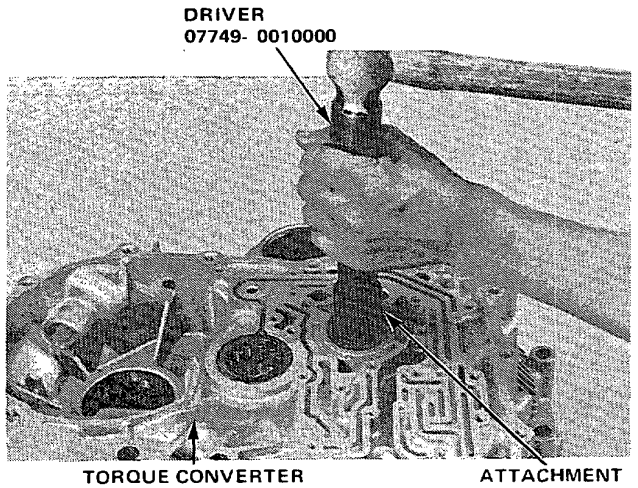


2. Install the feed pipes in the end cover with snap rings.

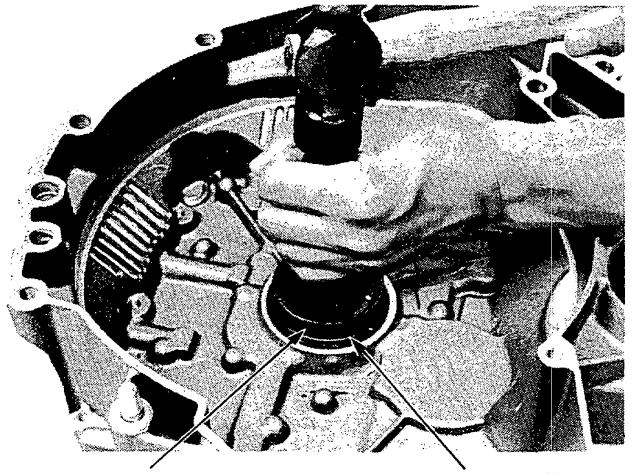


Mainshaft Bearings and Seal, and Countershaft Bearings Replacement

1. Remove the mainshaft bearing and seal from the torque converter housing.

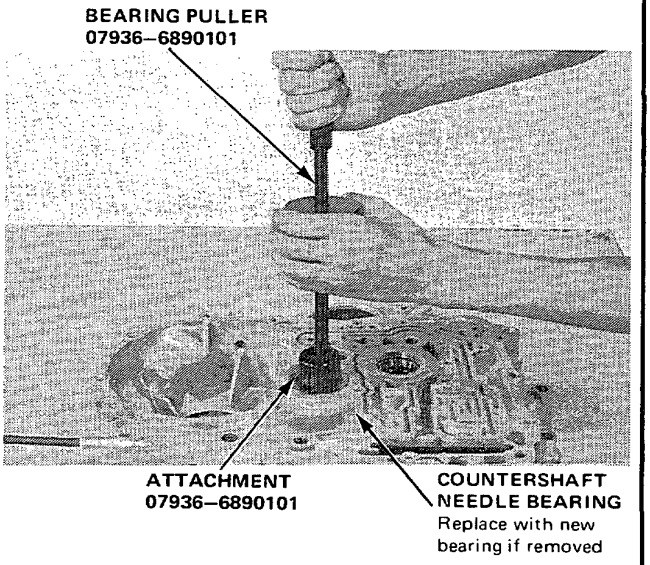


2. Drive in the new mainshaft bearing until it bottoms in housing.

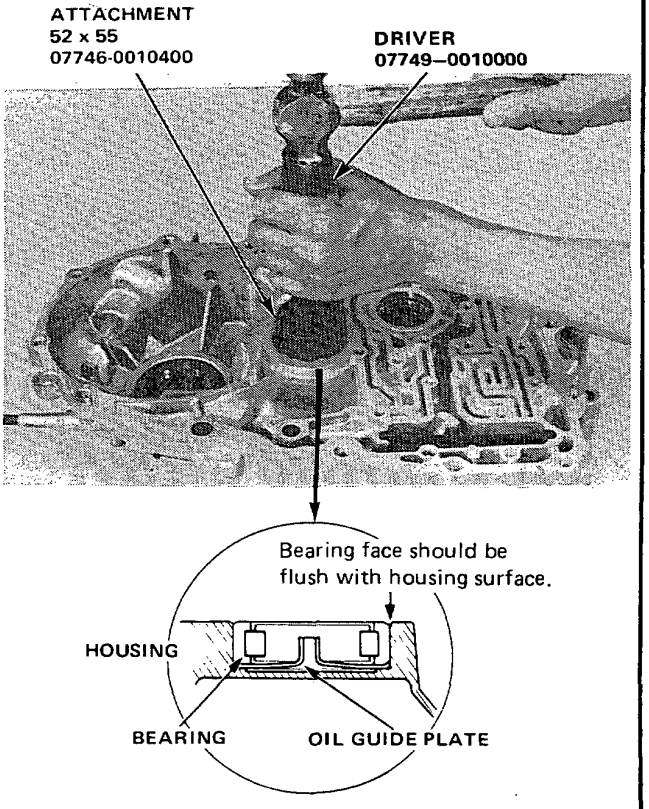


3. Then install the new mainshaft seal flush with the housing, using attachment 07947–6340201.

4. Turn the torque coverter housing over and remove the countershaft bearing.

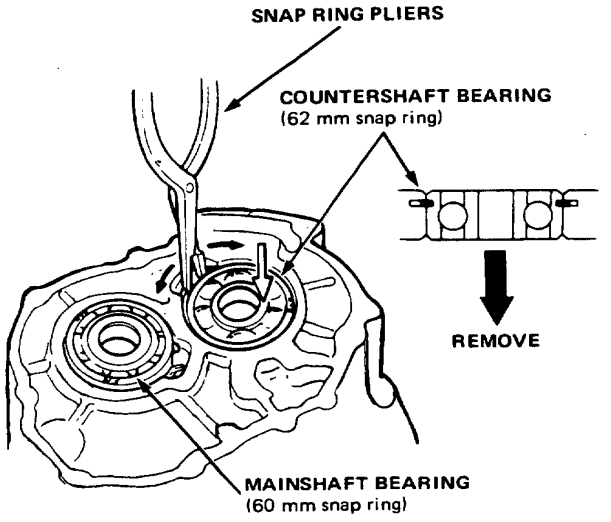


5. Make sure the oil guide plate is installed in the bearing hole, then install a new countershft bearing flush with the housing.

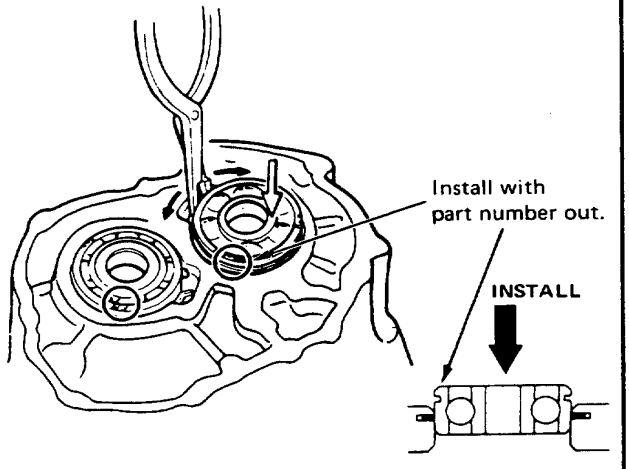


Countershaft Bearing Replacement

1. To remove the mainshaft and countershaft bearings from transmission housing, expand each snap ring with snap ring pliers, then push the bearing out by hand.
   NOTE: Do not remove the snap rings unless it's necessary to clean the grooves in the housing.



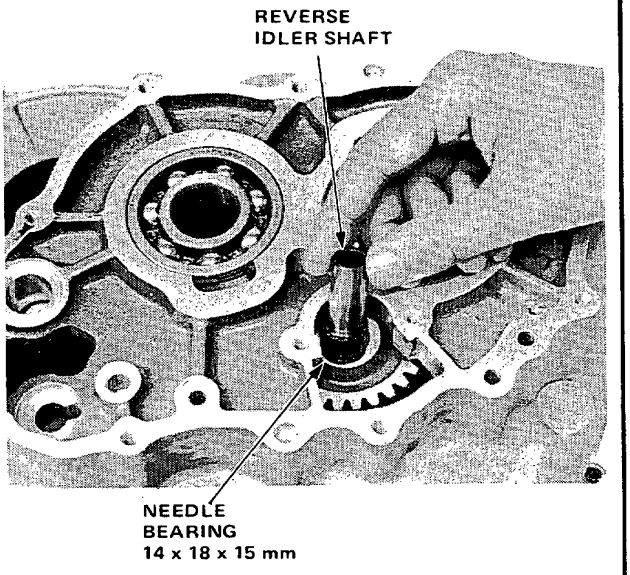
2. Expand each snap ring with snap ring pliers, insert the new bearing part-way into it, then release the pliers. Push the bearing down into the transmission until the ring snaps in place around it.



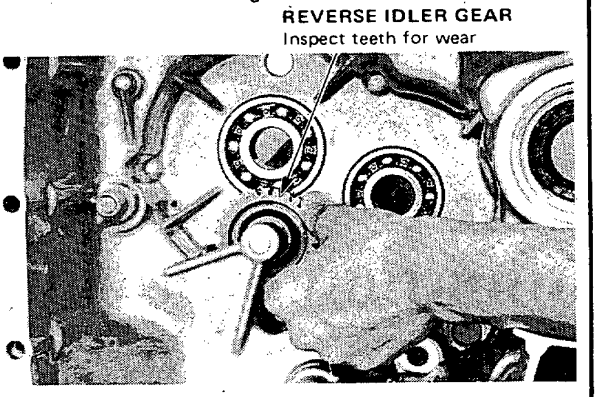
3. Make sure the snap rings are seated in the bearing and housing grooves.

Reverse Idler Gear Replacement

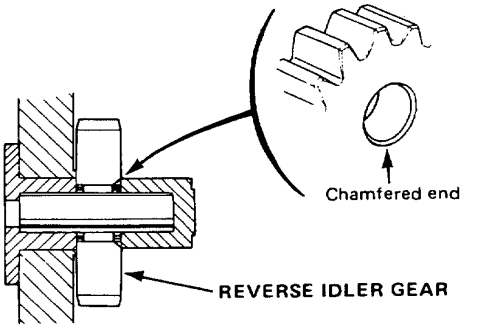
1. Push out the idler gear shaft and bearing from inside the transmission housing.



2. Then remove the idler gear.



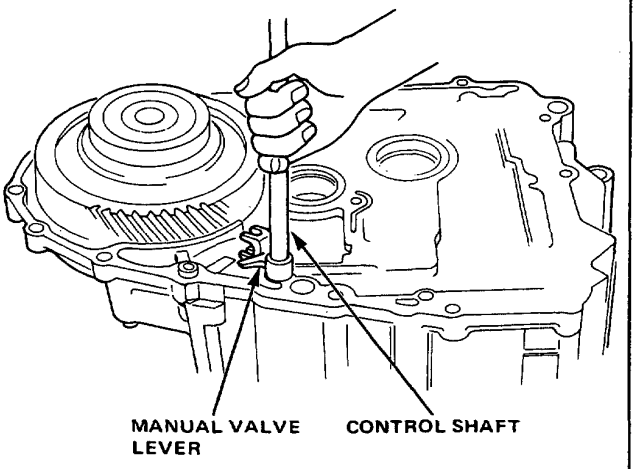
3. Install in the reverse order.
   NOTE: Install the reverse idler gear with the chamfered end facing the torque converter housing.



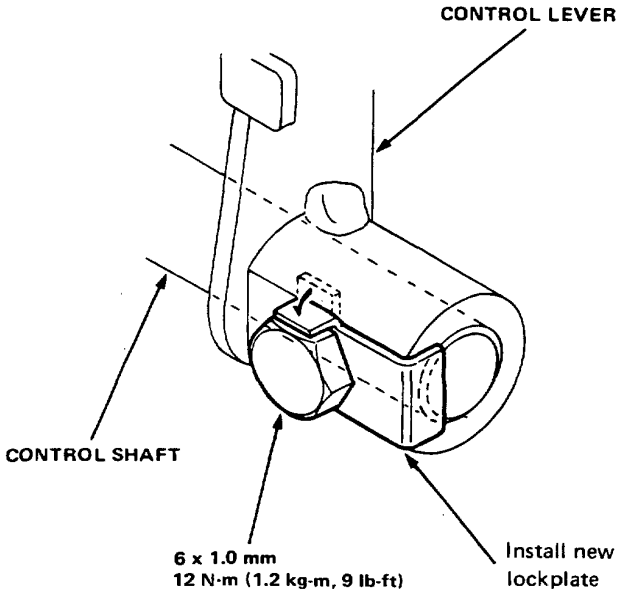
Reassembly

NOTE: Lubricate all parts with ATF during reassembly.

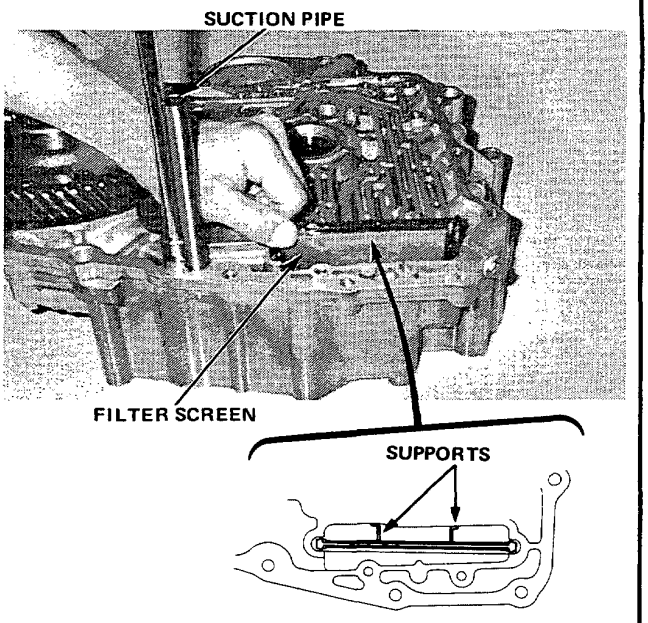
1. Install the differential assembly. If the torque converter housing, transmission housing and/or differential side bearings were replaced, the differential side clearance must be checked as shown 16 section.
2. Assemble the manual valve lever on the control shaft, then install in the torque converter housing as shown.



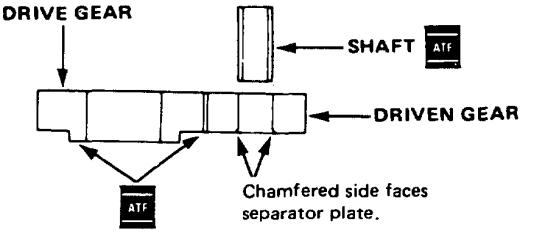
3. Install the control lever and new lock plate on the other end of the shaft. Tighten the bolt to the torque shown, then bend the tab over against the bolt head.

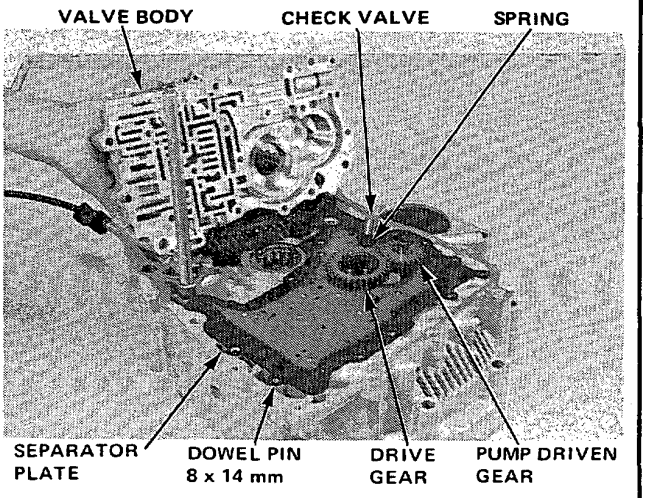


4. Install the new filter screen and suction pipe.



5. Install the separator plate, dowel pin, pump gears, and shaft.



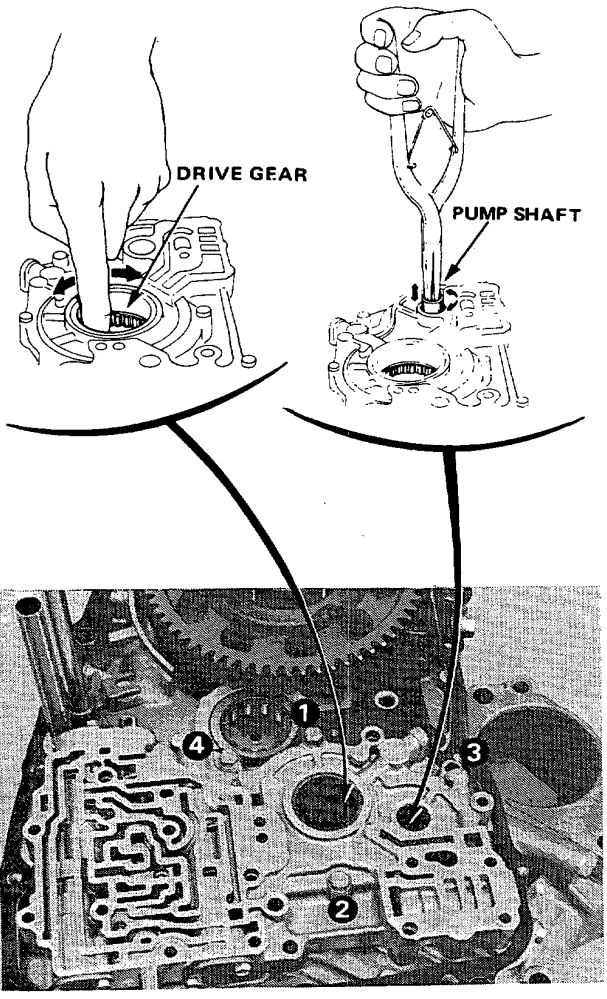


6. Install the check valve and spring, then install the main valve body on the torque converter housing.

(cont'd)

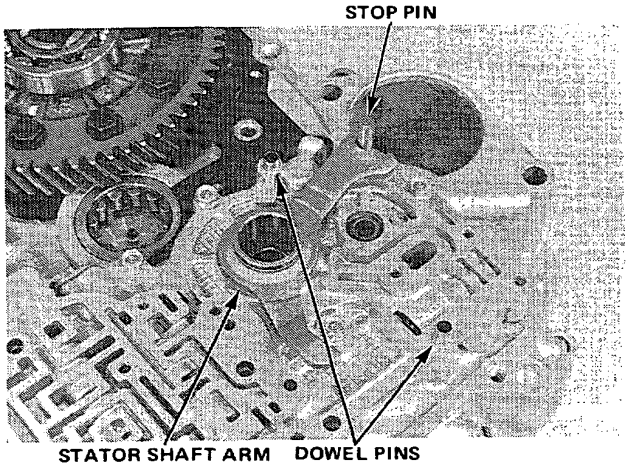
Reassembly (cont'd)

7. Tighten the 4 valve body bolts in the sequence shown. Make sure the pump drive gear rotates smoothly in the normal operating direction and the pump shaft moves smoothly in both the axial and normal operating directions.

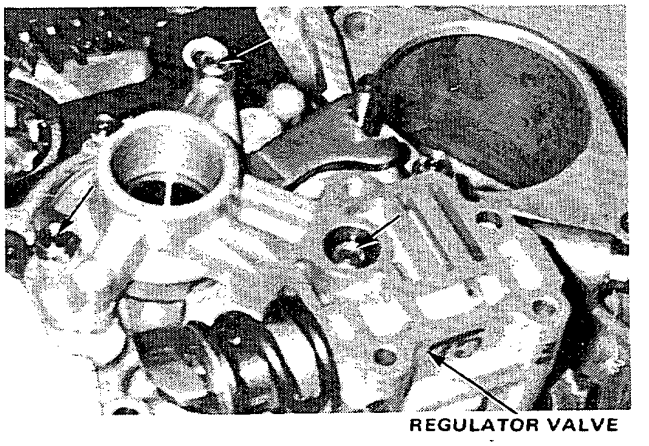


8. Torque the valve body bolts to 12 N·m (1.2 kg-m, 9 lb-ft), and again check that the pump gear and pump shaft move freely.

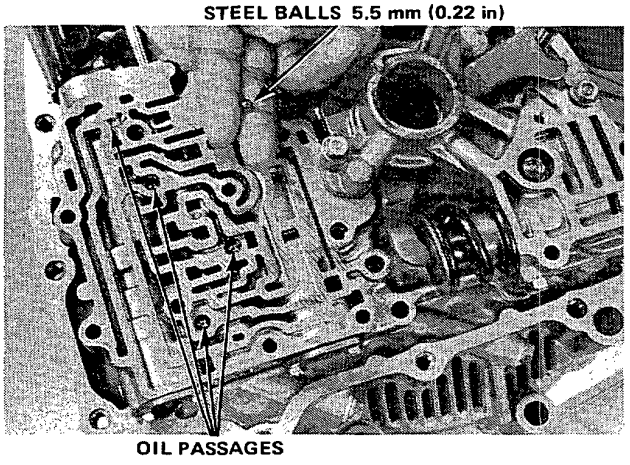
9. Install the stator shaft arm, stop pin and dowel pins.



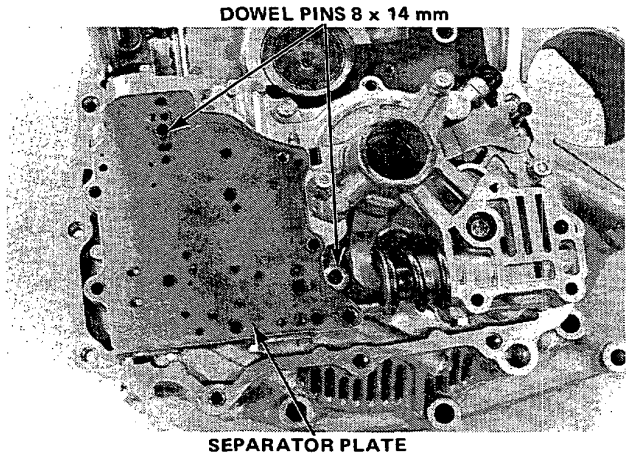
10. Install the regulator valve and torque its 3 bolts to 12 N·m (1.2 kg-m, 9 lb-ft).



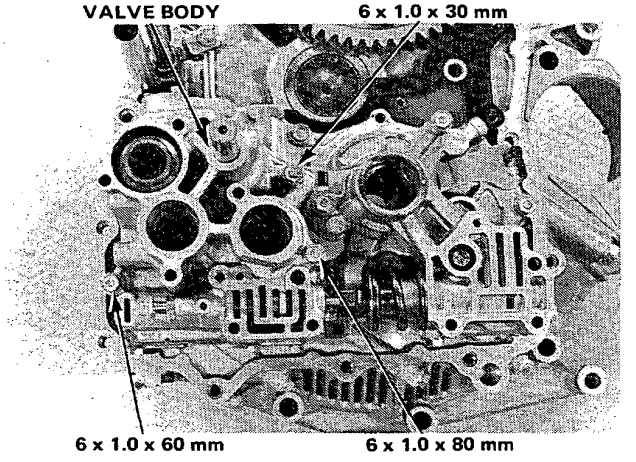
11. Install the 4 steel balls in main valve body oil passages.



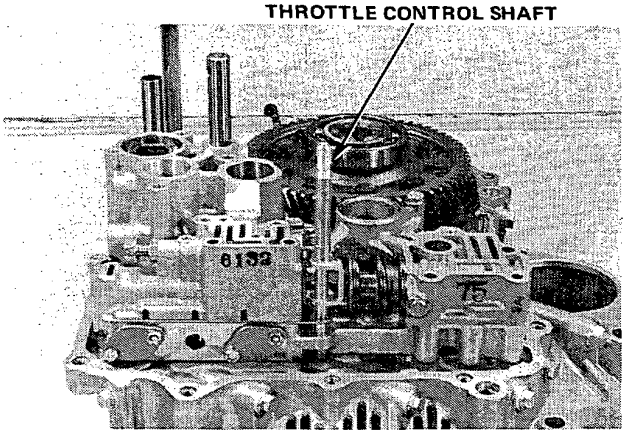
12. Install the separator plate and dowel pins.



13. Install the servo valve body. Use correct length bolt in each hole as shown, and torque to 12 N·m (1.2 kg-m, 9 lb-ft).

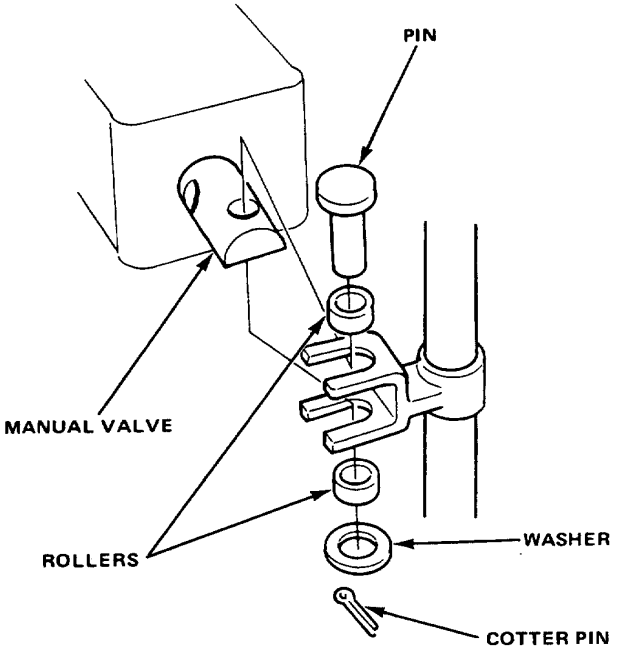


14. Install the throttle control shaft.

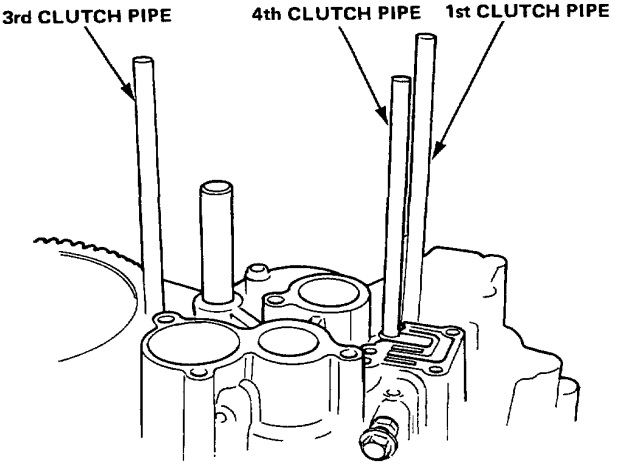


Reassembly (cont'd)

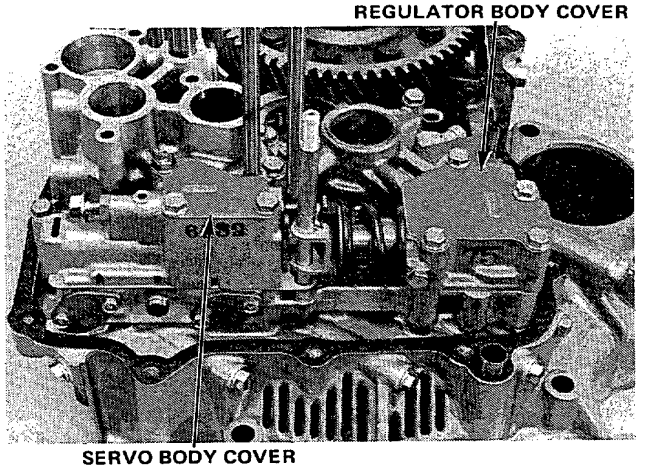
15. Put the rollers on each side of the manual valve stem, then attach the valve to the lever with the pin. Secure with the lock pin.



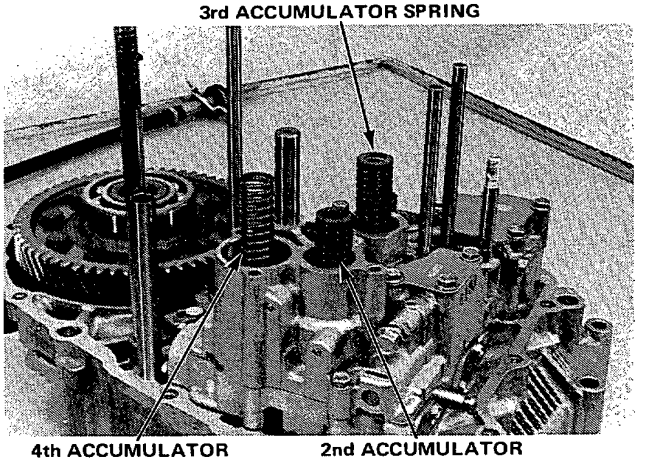
16. Install the 1st, 3rd and 4th clutch pipes.



17. Install the Servo body cover and Regulator body cover.

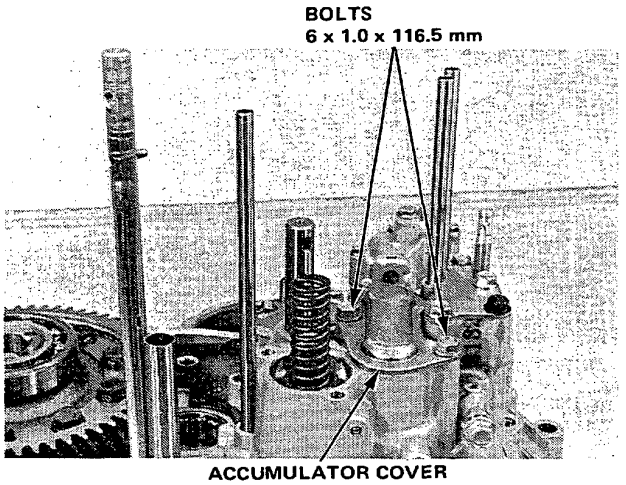


18. Install the Accumulator springs.
    2nd Accumulator spring:
    20.0 mm (0.787 in)/91.4 mm (3.598 in)
    3rd Accumulator spring:
    20.6 mm (0.811 in)/109.4 mm (4.306 in.)
    4th Accumulator spring:
    17.9 mm (0.704 in)/94.1 mm (3.704 in.)



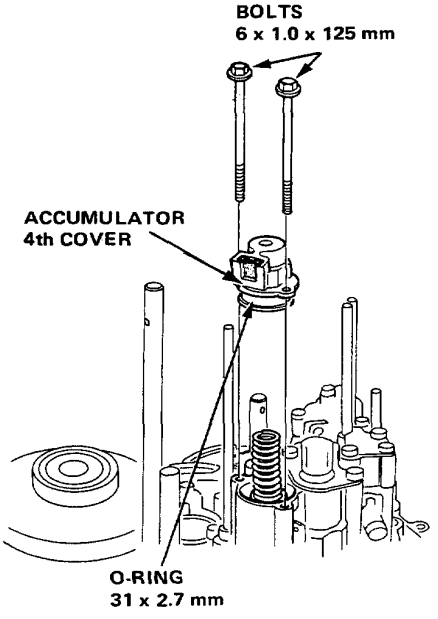
19. Install the 2nd/3rd accumulator cover, and torque the bolts to 12 N·m (1.2 kg-m, 9 lb-ft) in a criss-cross pattern.

CAUTION: To prevent stripping the threads, press down on the accumulator cover, then install bolts.

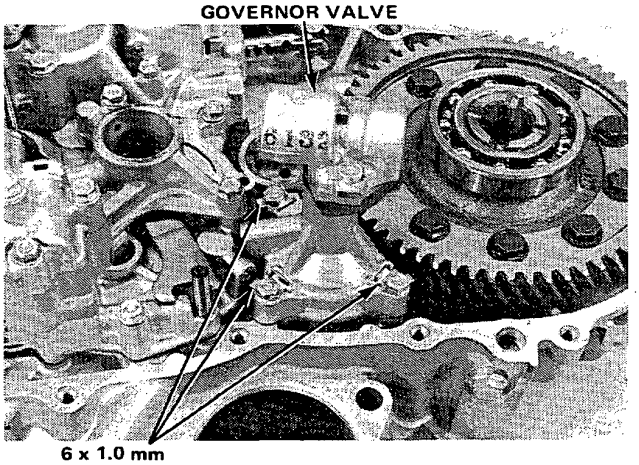


20. Install the 4th accumulator cover, and torque the bolts to 12 N·m (1.2 kg-m, 9 lb-ft) in a criss-cross pattern.

CAUTION: To prevent stripping the threads, press down on accumulator cover, then install the bolts.

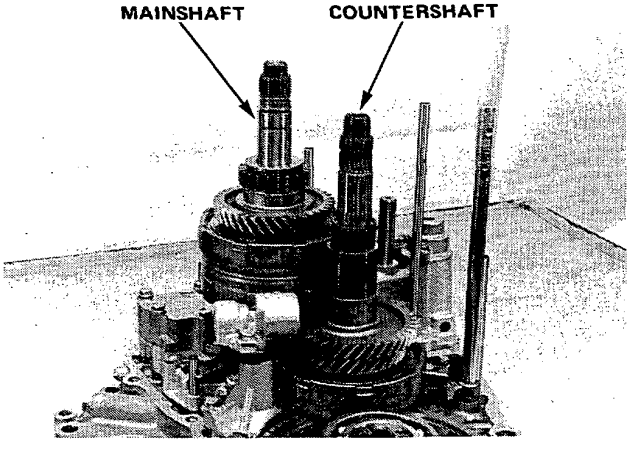


21. Install the governor valve using new lock plates, and the three 6 mm bolts.



22. Set the countershaft and mainshaft in place as an assembly.

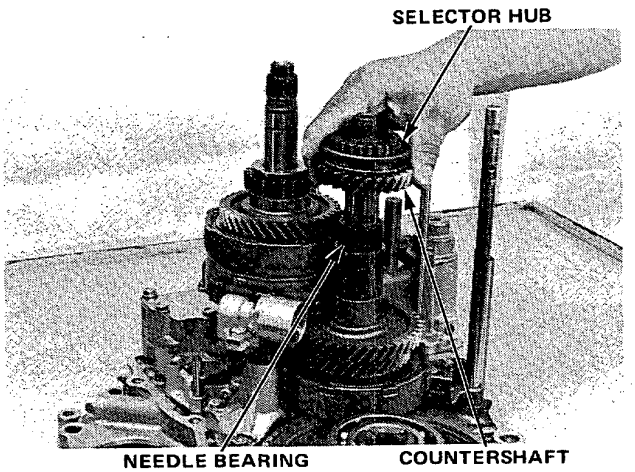
NOTE: Do not tap on the shafts with a hammer to drive in.



(cont'd)

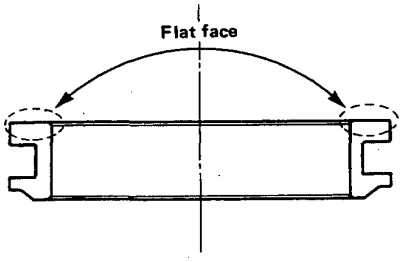
Reassembly (cont'd)

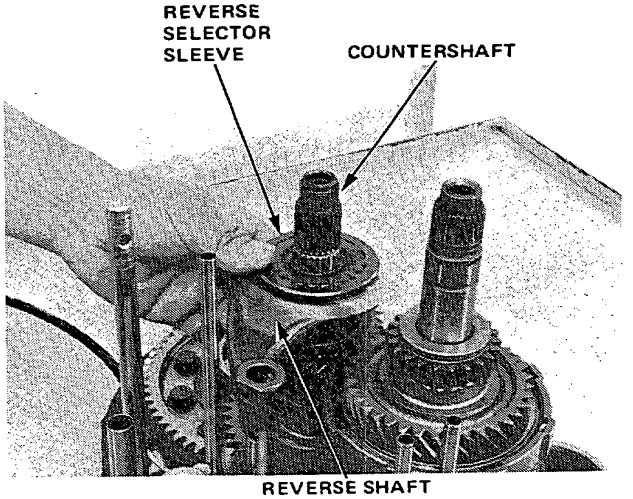
23. Install the selector hub, countershaft 4th gear and needle bearing.



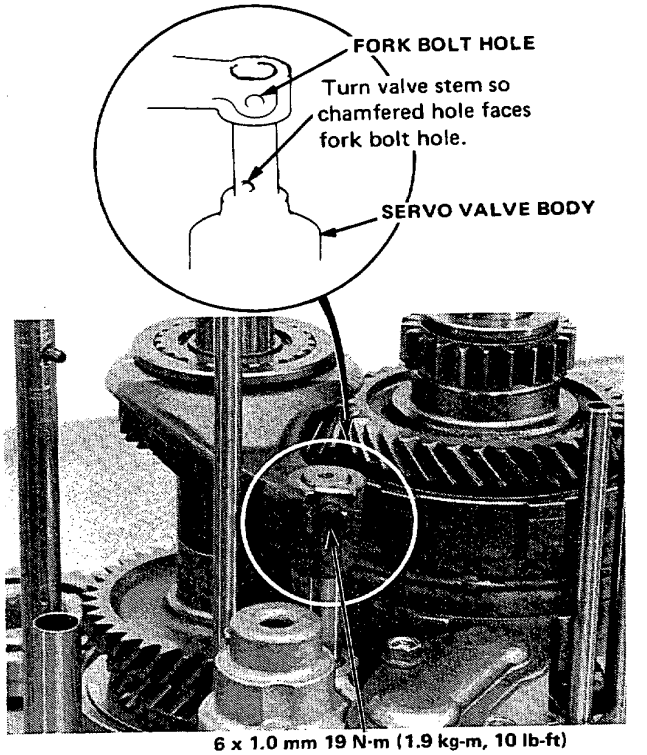
24. Assemble the reverse shift fork and selector sleeve, then install them as an assembly on the countershaft.

NOTE: Install the sleeve with its flat face up.

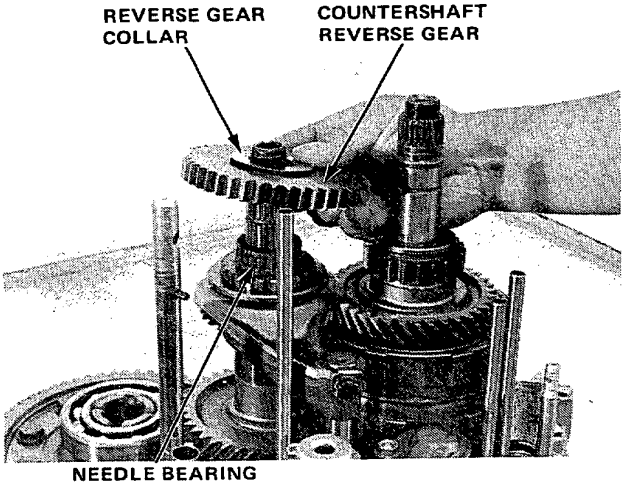




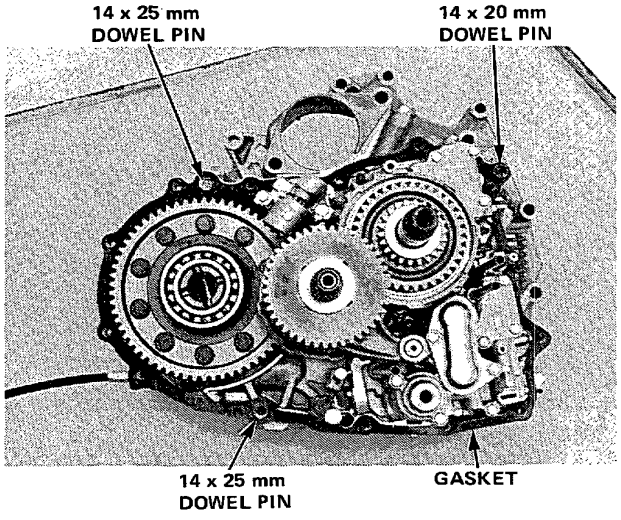
25. Install the reverse shift fork over the servo valve stem. Align the hole in the stem with hole in fork as shown, and install the bolt and new lock plate. Bend the lock tab against the bolt head.



26. Install the countershaft reverse gear, needle bearing, and reverse gear collar.

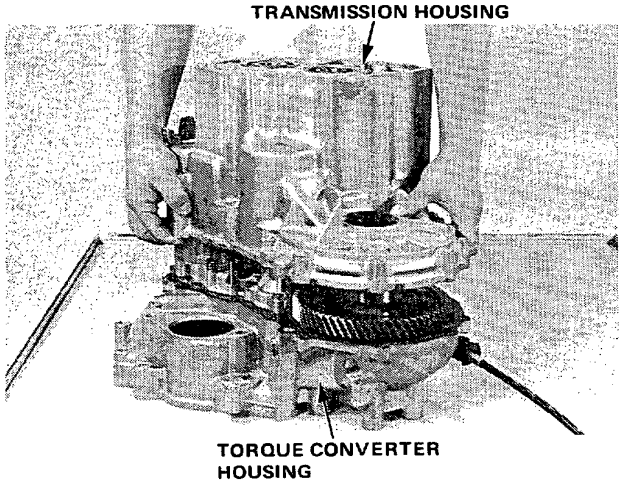


27. Install the new gasket and three dowel pins in the torque converter housing.



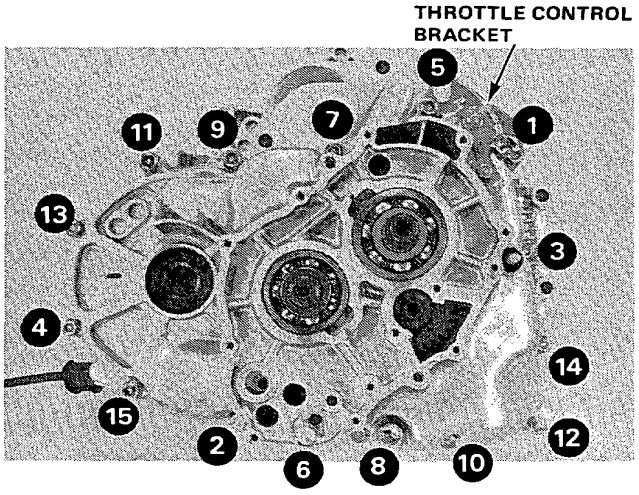
28. Place the transmission housing on the torque converter housing.

NOTE: Be sure the main valve control shaft lines up with the hole in the housing and that the reverse idle gear meshes with the mainshaft and countershaft, or the housing will not go on.



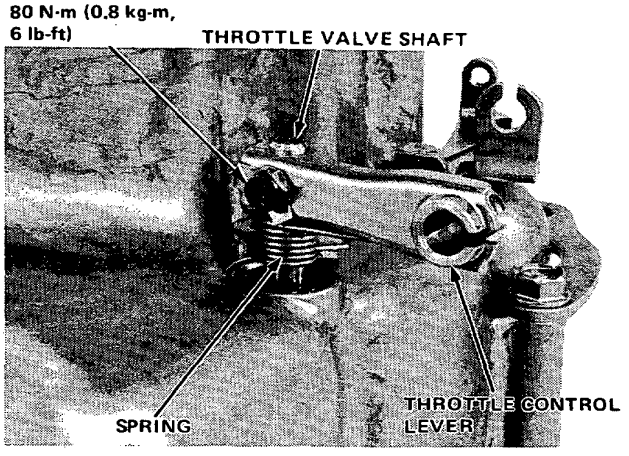
29. Torque bolts to 27 N·m (2.7 kg-m, 20 lb-ft) in order of (1) thru (15) in two or more steps.

NOTE: When tightening the transmission housing bolts, take care that you do not distort or damage the throttle control bracket; distortion or damage to the bracket will change transmission shift points.



30. Install the throttle control lever and spring on the throttle control shaft.

31. Install the bolt and new lock plate. Bend the lock tab against the bolt head.

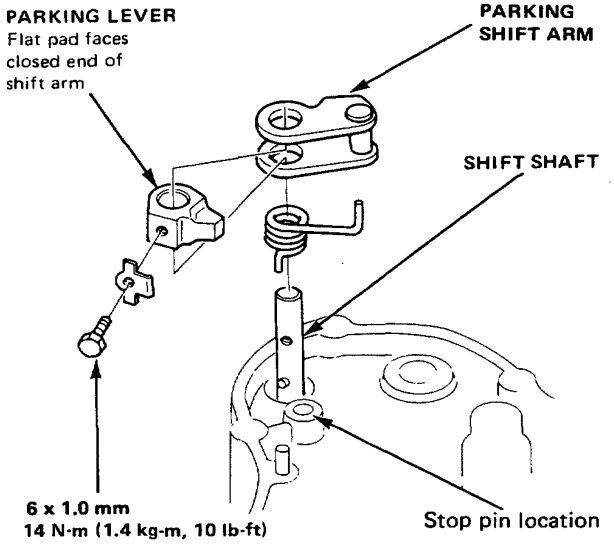


(cont'd)

Reassembly (cont'd)

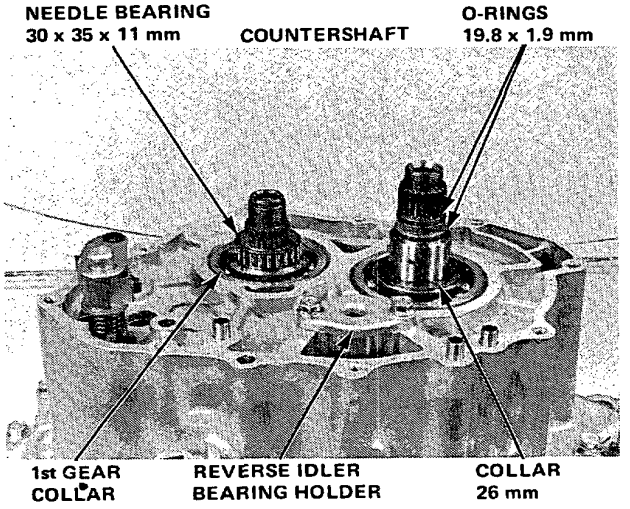
32. Install the parking shift arm and spring on the shift shaft with the bolt and a new lock plate. Bend the lock tab against the bolt head.

NOTE: The spring should put clockwise tension on the shift arm, forcing it against the stop pin.



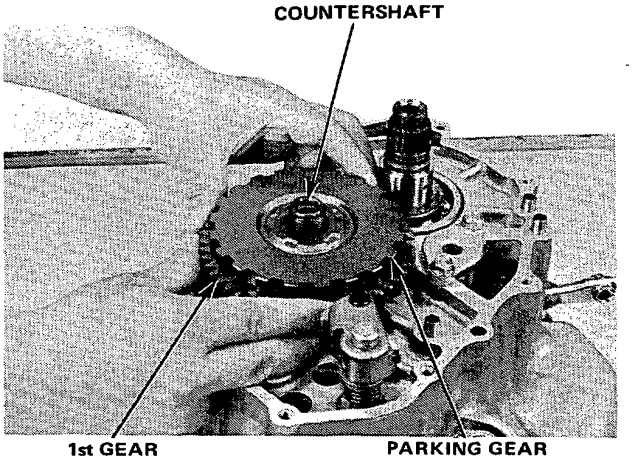
33. Install the 1st gear collar and needle bearing on the countershaft. Install the 26 mm collar on the mainshaft.

34. Install the reverse idler bearing holder.

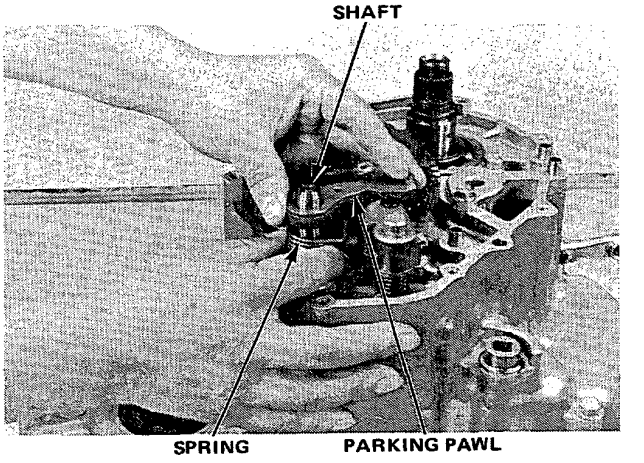


35. Install the 19.8 x 1.9 mm O-rings on the mainshaft.

36. Install the countershaft 1st gear and parking gear on the countershaft.



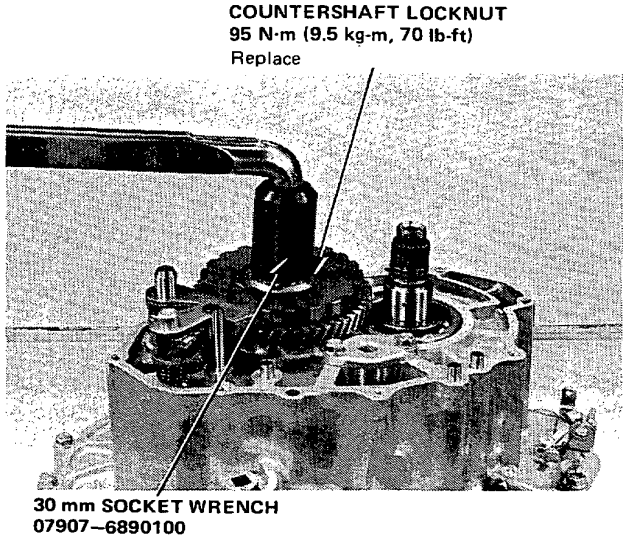
37. Install the stop pin, parking pawl shaft, parking pawl, and pawl release spring.



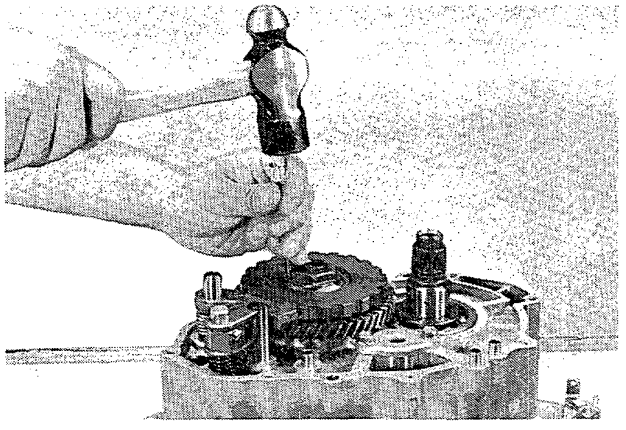
NOTE:
- The end of the parking pawl release spring fits into the hole in the parking pawl.
- The release spring should put clockwise tension on the pawl, forcing it away from the parking gear.

38. Shift to PARK and install the mainshaft holder.

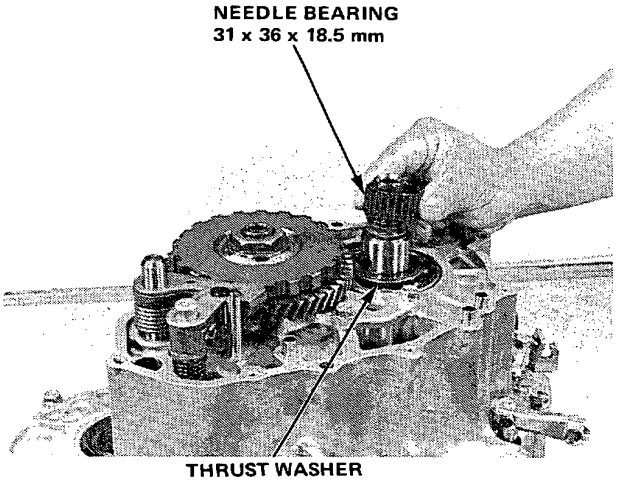
39. Install and torque the new countershaft locknut.



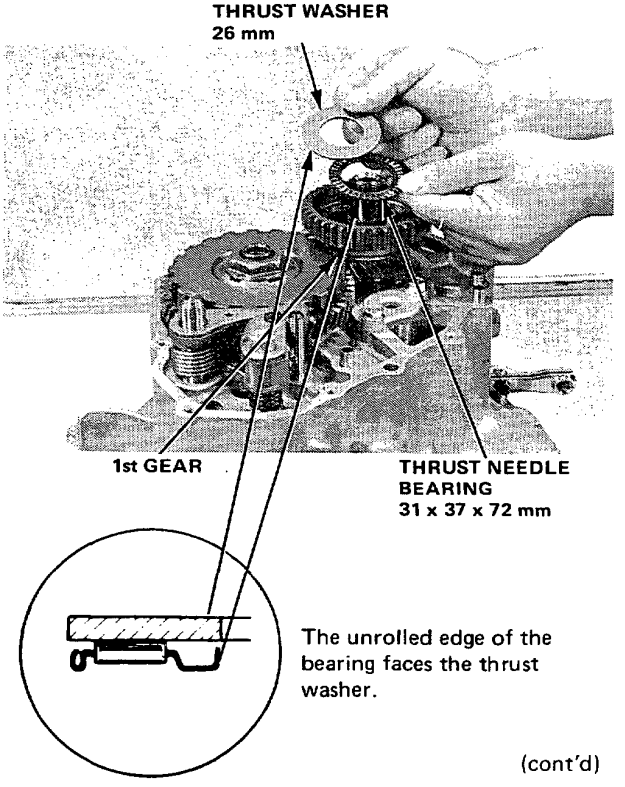
40. Stake the locknut flange into the gear groove.



41. Install 31 x 36 x 18.5 mm needle bearing and thrust washer on the mainshaft.



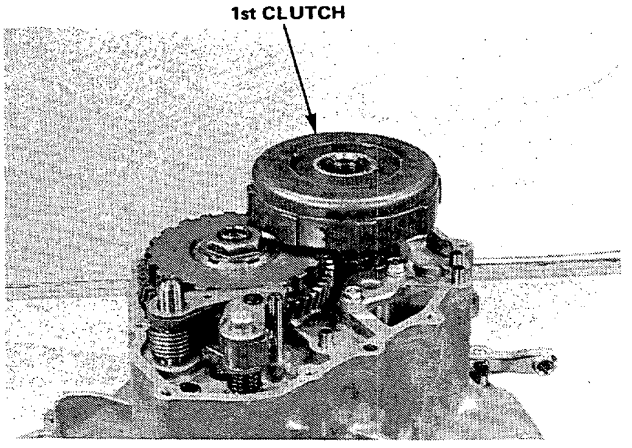
42. Install 1st gear, the needle bearing, and the thrust washer on the mainshaft.



(cont'd)

Reassembly (cont'd)

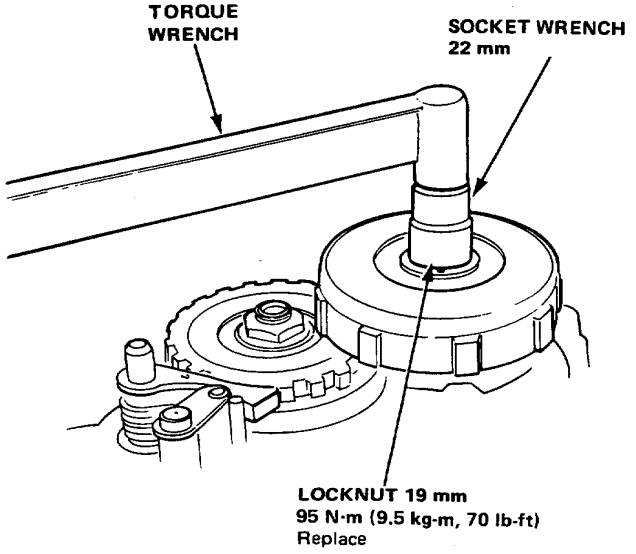
43. Install the 1st clutch on the mainshaft.



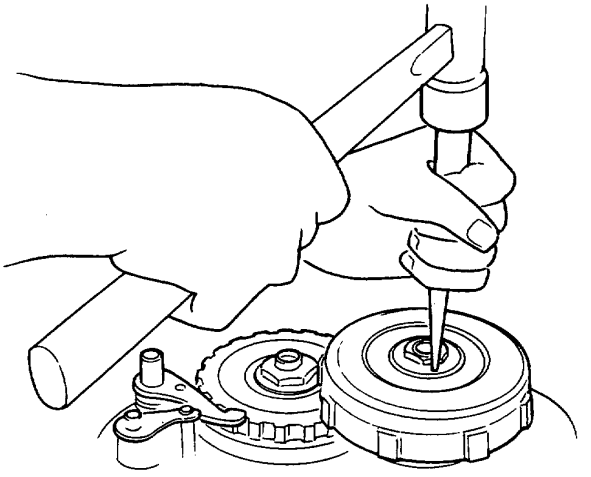
44. Attach the mainshaft holder 07932–6890202 from the underside of the torque converter case.

45. Install and torque the new mainshaft locknut.

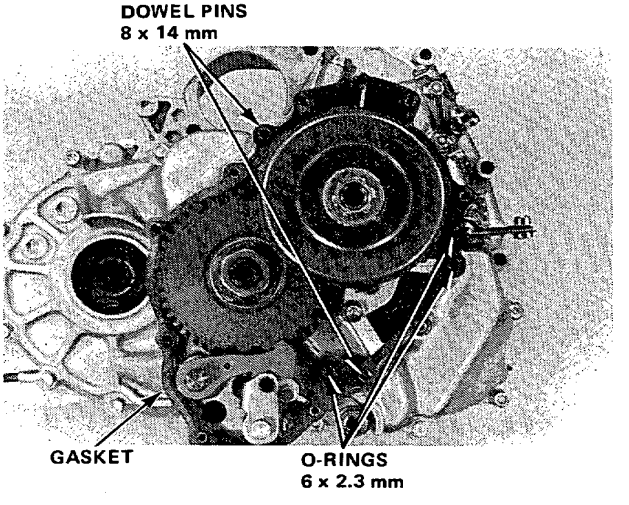
CAUTION: Locknut has left-hand threads.



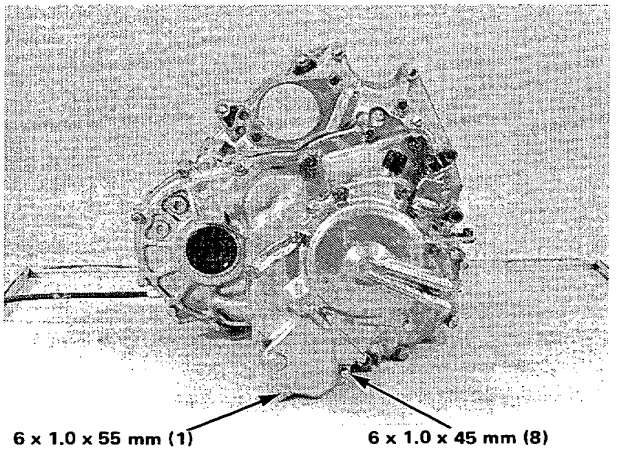
46. Stake the locknut flange into the groove in the 1st clutch.



47. Install the gasket, dowel pins, and O-rings on the transmission housing.

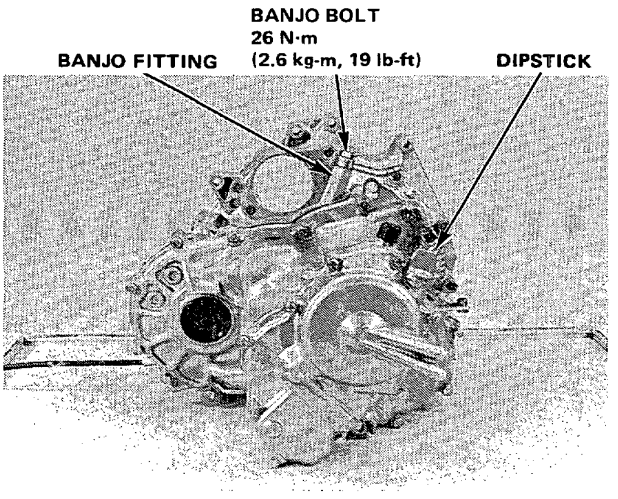


48. Install the end cover and torque all bolts (9) to 12 N·m (1.2 kg-m, 9 lb-ft).

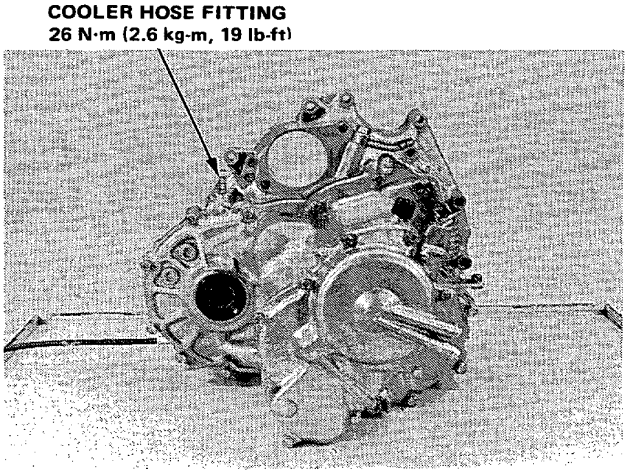


49. Install the dipstick.

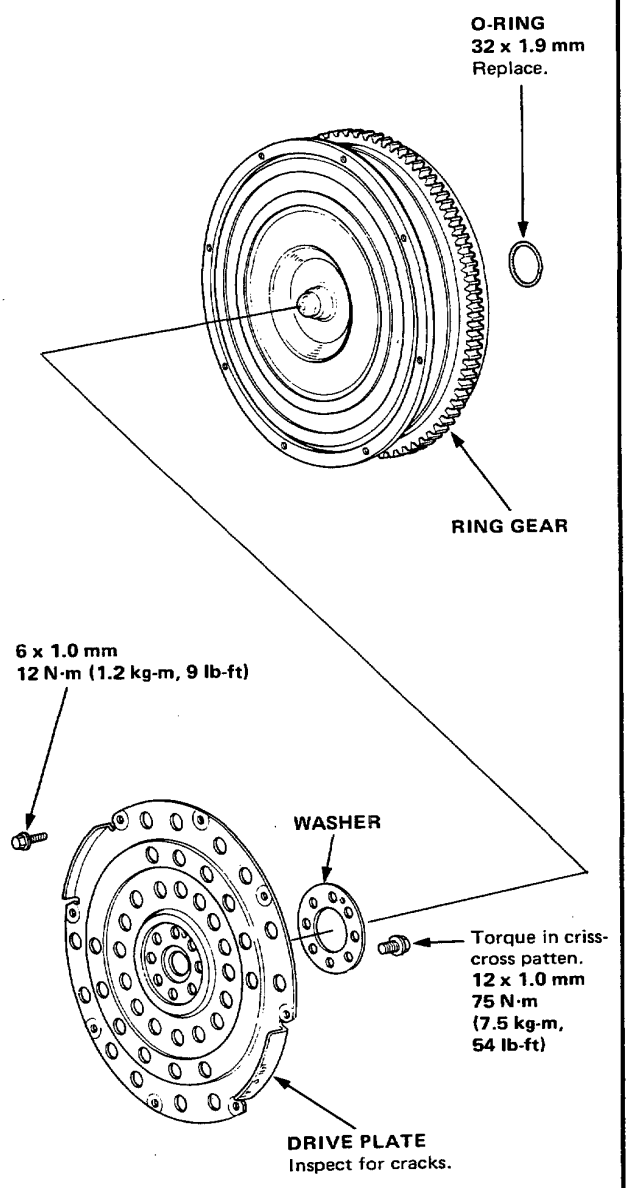
50. Install the transmission cooler banjo fitting, but do not tighten until the transmission is installed in the car and the hose is positioned properly.



51. Install the transmission cooler hose fitting and torque to 26 N·m (2.6 kg-m, 19 lb-ft).

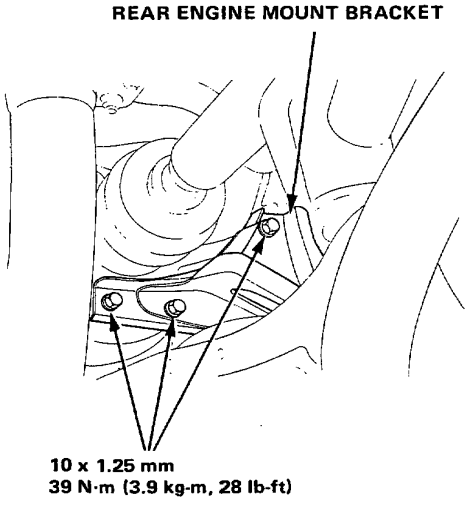


Torque Converter Disassembly

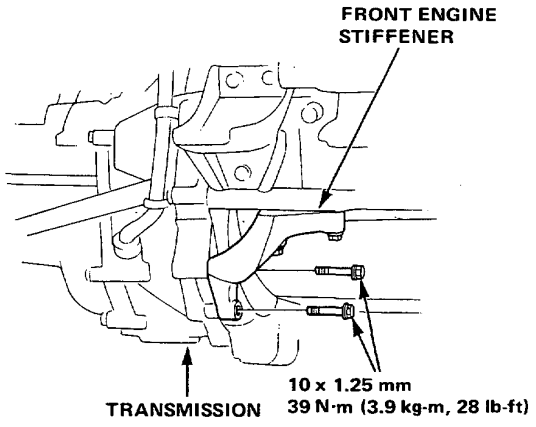


Installation

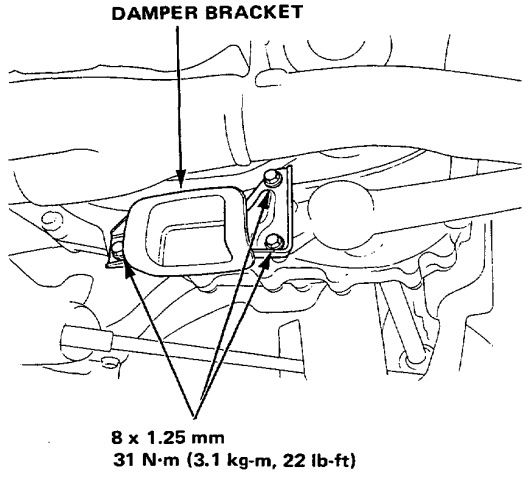
1. Attach shift cable to shift arm with pin, then secure cable to edge of housing with cable holder and bolts, 12 N·m (1.2 kg-m, 9 lb-ft).
2. Install torque converter on transmission.
3. Place transmission on transmission jack, and raise to engine level.
4. Hook hanger plate with hoist and make hoist chain tight.
5. Check that the two 14 mm dowel pins are installed in transmission housing.
6. Install new 26 mm spring clips on the end of each axle.
7. Align dowel pins with holes in block; align torque converter bolt head with holes in drive plate.
8. Fit the left axle into the differential as you raise the transmission up to the engine.
9. Secure transmission to engine with two (10 x 1.25 x 90 mm) lower mounting bolts, torque bolts when others are installed in step 23.
10. Install rear engine mounts on transmission housing, torque to 39 N·m (3.9 kg-m, 28 lb-ft).



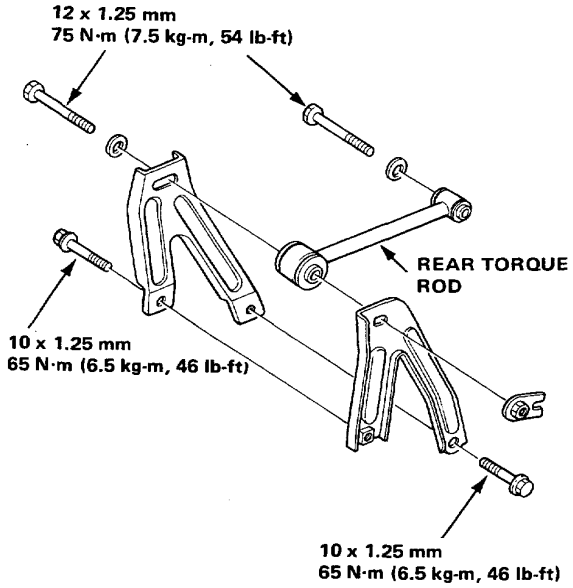
11. Install the front engine stiffener mount bolts torque to 39 N·m (3.9 kg-m, 28 lb-ft).



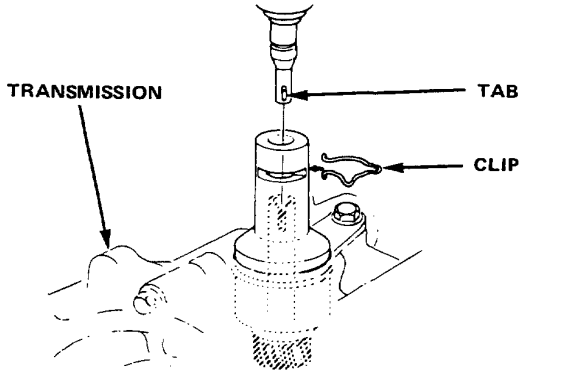
12. Attach torque converter to drive plate with eight (6 x 1.0 x 12 mm bolts, and torque to 12 N·m (1.2 kg-m, 9 lb-ft). Rotate crank as necessary to tighten bolts to 1/2 torque, the final torque, in a criss-cross pattern. Check for free rotation after tightening last bolt.
13. Remove transmission jack.
14. Install torque converter cover plate, torque two 6 x 1.0 mm bolts (in oil pan flange) to 12 N·m (1.2 kg-m, 9 lb-ft).
15. Install damper bracket, torque two 10 x 1.25 mm nuts to 55 N·m (5.5 kg-m, 40 lb-ft) and three 8 x 1.25 mm bolts to 31 N·m (3.1 kg-m, 22 lb-ft).



16. Remove hoist from transmission.
17. Install starter with engine side mount bolt (10 x 1.25 x 125 mm) and torque to 45 N·m (4.5 kg-m, 33 lb-ft).
18. Install the rear torque rod bracket as shown.



19. Turn right steering knuckle fully outward, and slide axle into differential until you feel its spring clip engage side gear. Check that the left axle spring clip is engaged in its side gear.
20. Reconnect ball joint to knuckle, then torque its 10 x 1.25 mm pinch bolt to 50 N·m (5.0 kg-m, 36 lb-ft).
21. Install speedometer cable.
    - Align tab on cable end with slot in holder.
    - Install clip so bent leg is on groove side.



NOTE: After installing, pull speedometer cable to see that it is secure.

(cont'd)

Installation (cont'd)

22. Install front wheels, lower car to ground, and torque nuts to 80 N·m (8.0 kg-m, 58 lb-ft).

23. Install transmission-side starter mounting bolt (10 x 1.25 x 125 mm), and top transmission mounting bolt (10 x 1.25 x 90 mm) and torque all bolts to 45 N·m (4.5 kg-m, 33 lb-ft).

24. Connect cooler hoses, and torque banjo bolts to 35 N·m (3.5 kg-m, 25 lb-ft).

25. Connect wiring:

    - Battery positive cable to starter.
    - Black/white wire to starter solenoid.
    - Yellow/green wire to water temperature sending unit.
    - Black/yellow and yellow wires to ignition timing thermosensor.

26. With ignition key in 0 position, connect ground cable to battery and transmission.

27. Unscrew dipstick from top of transmission end cover and add 3.0 ℓ Dexron® ATF through the hole. Reinstall dipstick.

    NOTE: If transmission and torque converter have been disassembled, add a total of 6.0 ℓ.

28. Install and reconnect shift cable (page 15-62).

29. Install console.

30. Start engine, set parking brake, and shift transmission through all gears three times. Check for proper shift cable adjustment (page 15-61 and 62).

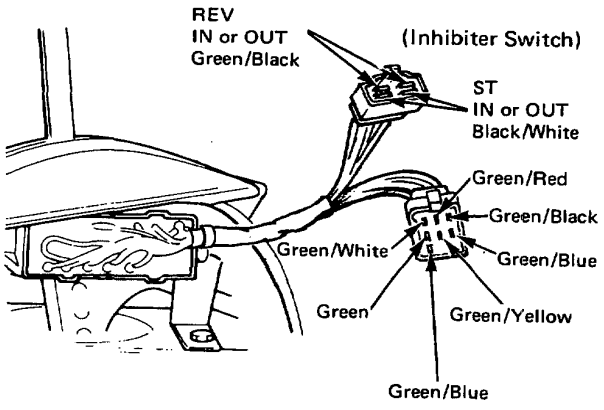
31. Let engine reach operating temperature with transmission in Neutral or Park, then turn it off and check fluid level.

32. Install throttle control cable and adjust.

33. Road test as described on page 15-64.

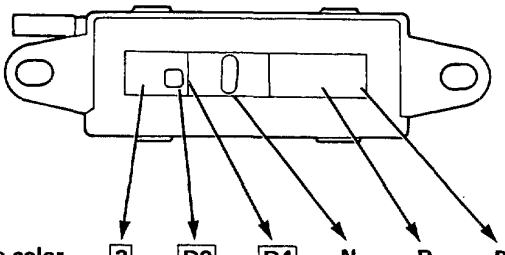
Neutral/Back-up Light Switch Check and Installation

Move selector lever to Park, Reverse, and Neutral to check continuity of combined neutral safety (inhibitor) and back-up light switch.
Replace the switch if there is no continuity between connector terminals shown on the chart.



(Neutral/Back-up Switch)

NEUTRAL/BACK-UP SWITCH

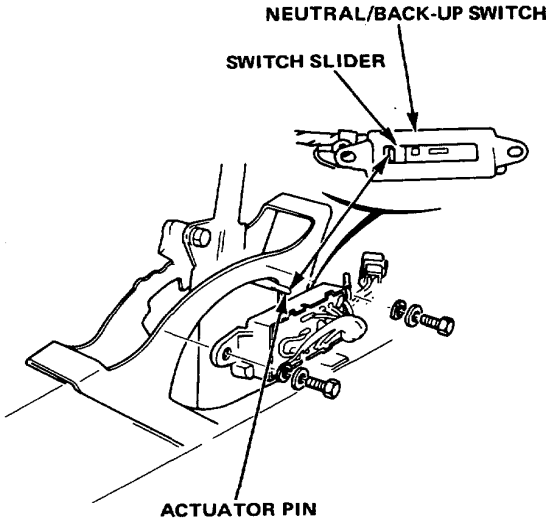


Wire color	2	D3	D4	N	R	P
Green/ Blue	○	○	○			
GND	○	○	○	○	○	○
Green/ Yellow	○					
Green/ Blue		○				
Green/ Black			○			
Green				○		
Green/ Red					○	
Green/ White						○

INHIBITER SIWTCH

Wire color	N	R	P
Black/ White	○		○
Green/ Black		○	
Black/ White	○		○
Green/ Black		○	

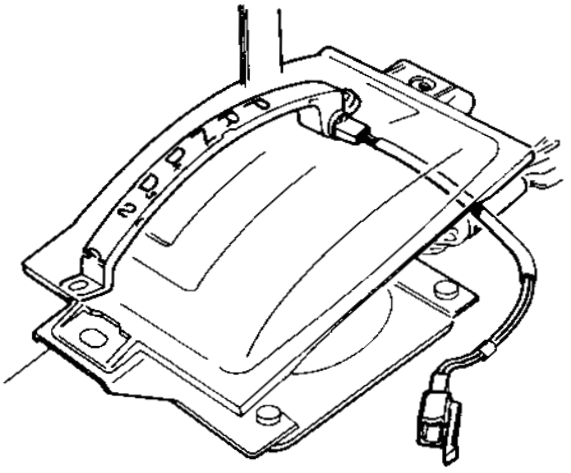
1. Position the switch slider to parking, as shown.
2. Shift selector lever to parking.



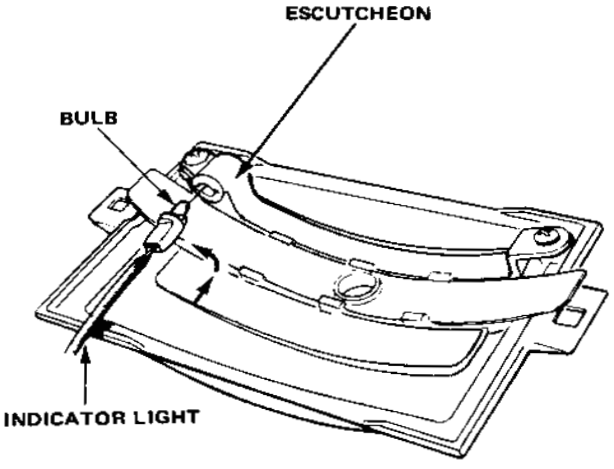
3. Tighten switch with two bolts and lockwashers.

Shift Indicator Light Check and Installation

Check for continuity between indicator light connector terminals as shown. If there is no continuity, check for burned out bulb or open circuit.



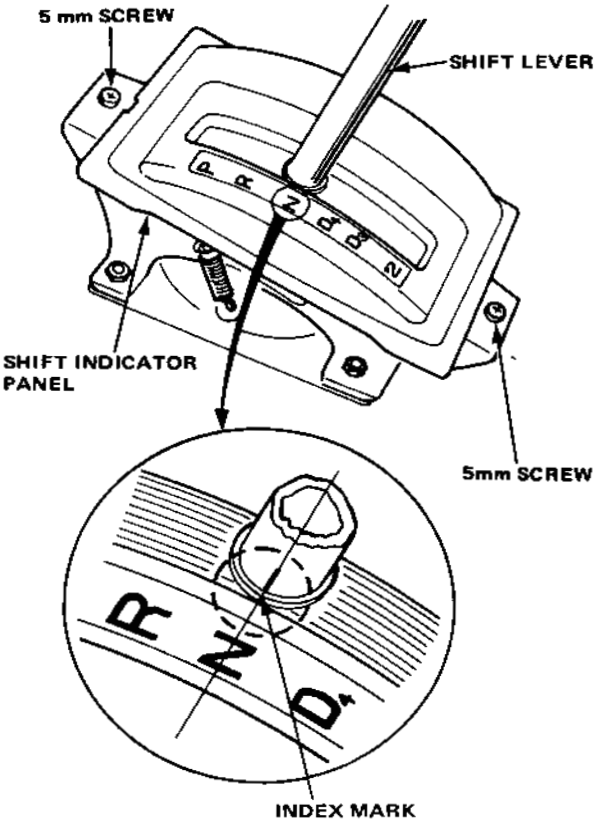
1. Install the indicator bulb in the bulb housing. Insert bulb housing into slot in escutcheon, then turn 90° to bulb housing.



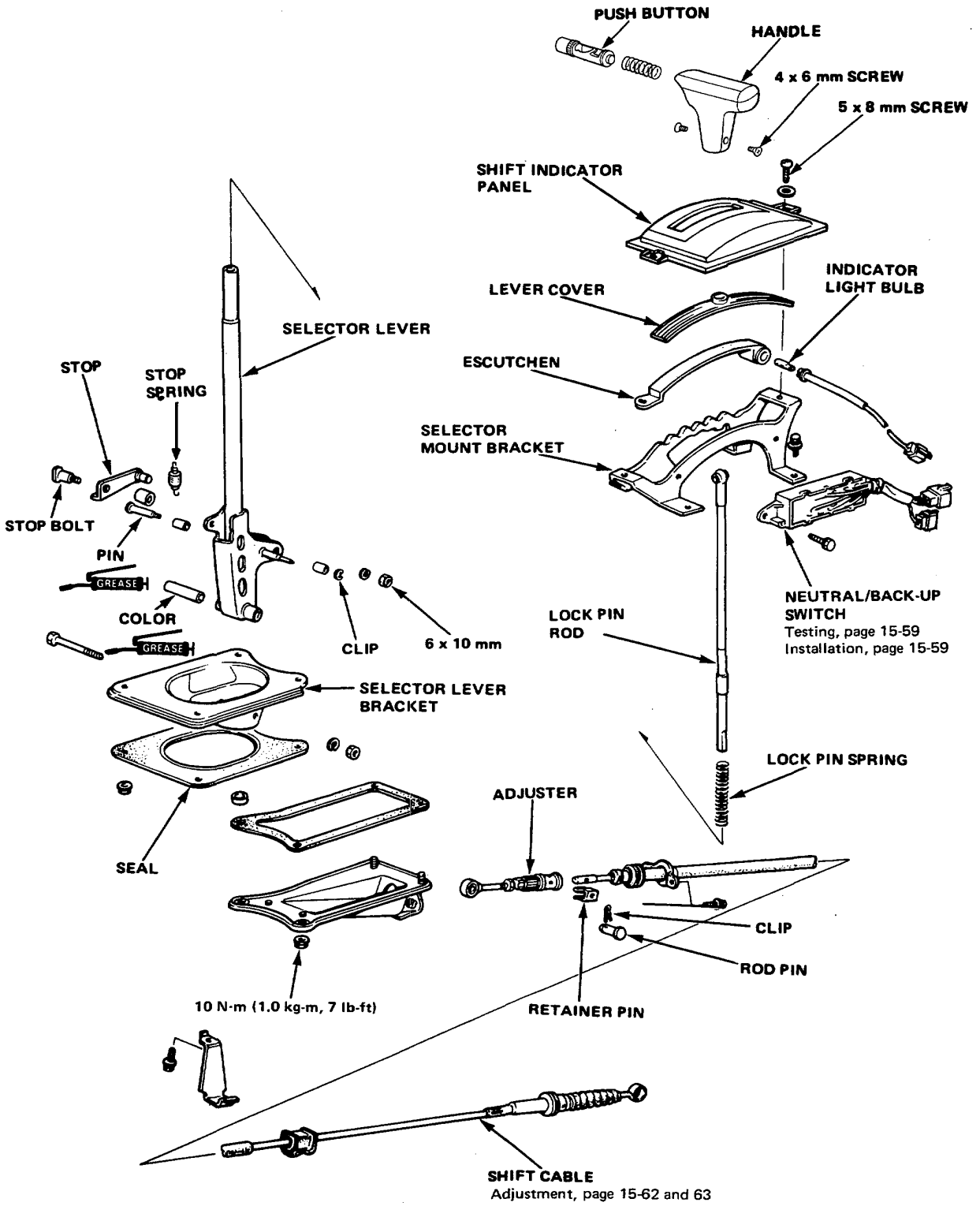
Shift Indicator Panel Position Adjustment

1. Check that the index mark of the indicator aligns with the N mark of the shift indicator panel when the transmission in NEUTRAL.
2. If not aligned, remove panel mounting screws and adjust by moving panel.

   NOTE: Whenever escutchen is removed for indicator bulb replacement etc., reinstall the panel as described above.



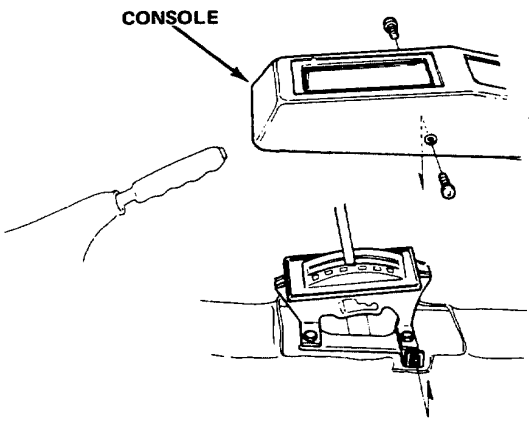
Gear Shift Selector



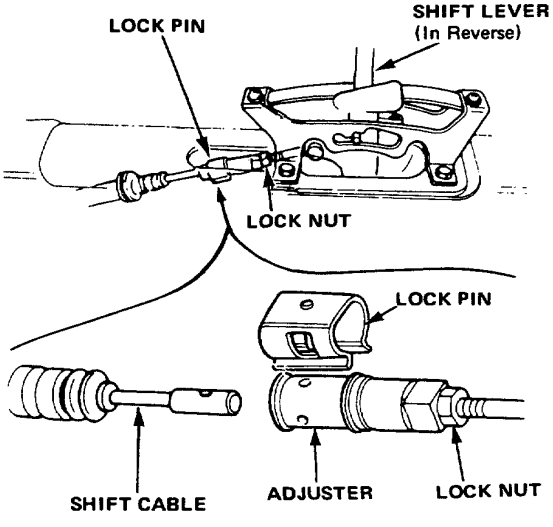
Shift Cable Adjustment

1. Start engine. Shift to reverse to see if reverse gear engages. If not, refer to troubleshooting on page 15-4.

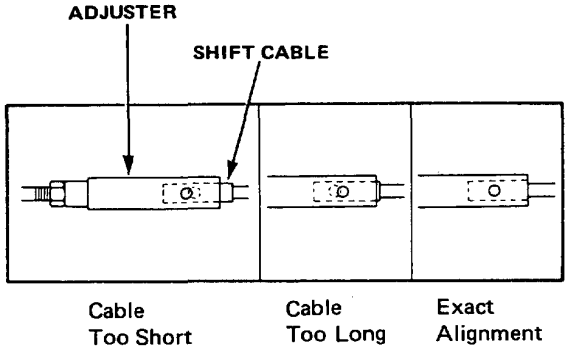
2. With engine off, remove console.



3. Shift to Drive, then remove lock pin from cable adjuster.



4. Check that the hole in the adjuster is perfectly aligned with the hole in the shift cable.



NOTE: There are two holes in the end of the shift cable . They are positioned 90° apart to allow cable adjustments in 1/4 turn increments.

5. If not perfectly aligned, loosen locknut on shift cable and adjust as required.

6. Tighten the locknut.

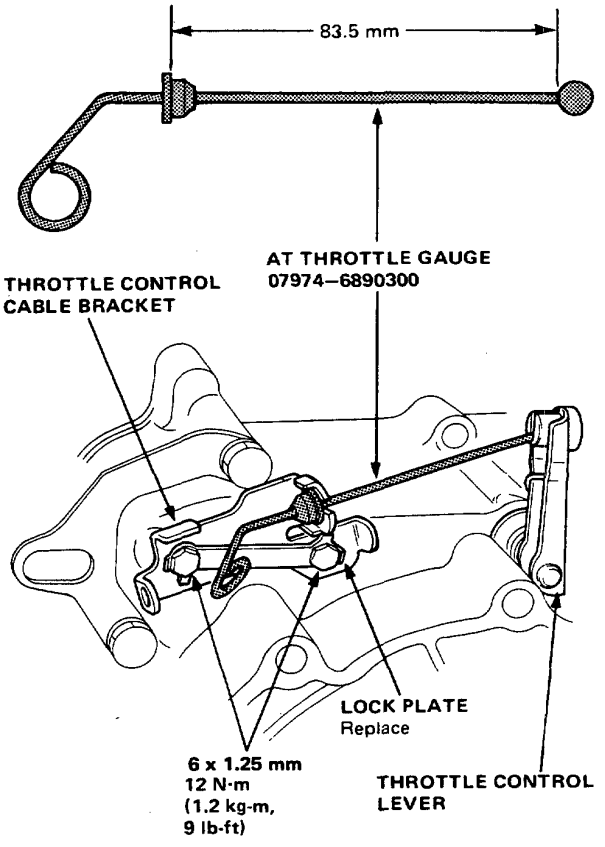
7. Install lock pin on adjuster.

NOTE: If you feel the lock pin binding as you reinstall it, the cable is still out of adjustment and must be readjusted again.

8. Start engine and check shift lever in all gears. If any gear does not work properly, refer to troubleshooting on page 15-4.

Throttle Control Cable Bracket Adjustment

Adjust the throttle control cable bracket with the special tool, so the distance between it and the lever is 83.5 mm. After adjustment, tighten the two 6 mm bolts securely and bend the lock tabs up against the bolt heads.

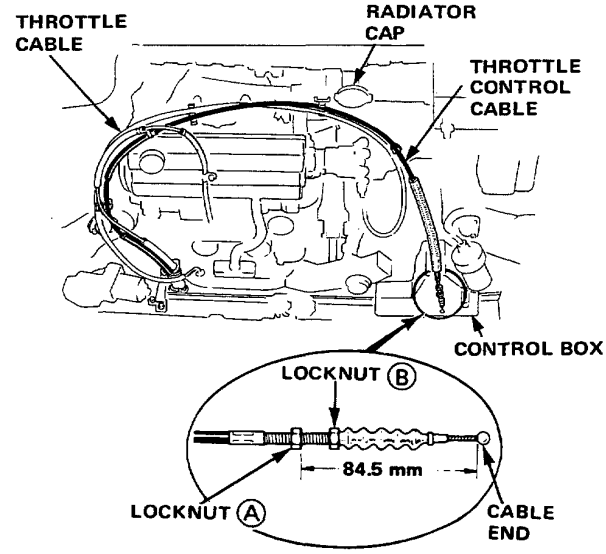


Throttle Control Cable Adjustment/Installation

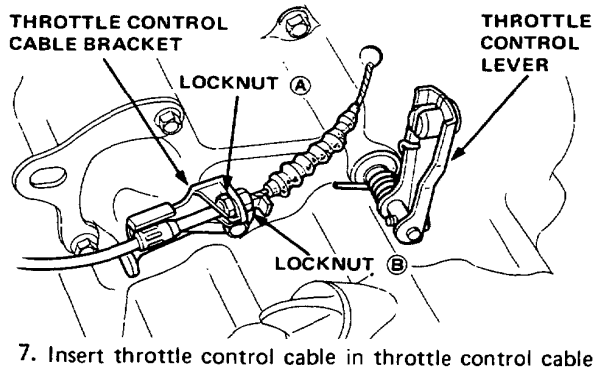
CAUTION: Before adjusting the cable, warm up the engine to operating temperature.

1. Secure throttle control cable with clamps as shown.
2. Remove the hot air tube.
3. Ley end of the throttle control cable on control box.
   R/H type cars:
   Roote the throttle control cable toward the radiator cap straightly.
4. Depress accelerator pedal until there is no slack in carburetor throttle cable.
5. Adjust distance between throttle control cable end and nut (A) to 84.5 mm.

NOTE: Do not turn nut (A) after adjustment.



6. Insert end of throttle control cable in groove of throttle control lever.



7. Insert throttle control cable in throttle control cable bracket and secure with locknut (B). Tighten securely.
   NOTE: Make sure throttle control cable is not kinked or twisted.
8. Check that cable moves freely by depressing accelerator pedal.

Road Test

After transmission is installed:

NOTE:

- Make sure the floor mat does not interfere with accelerator pedal travel. Fully depress accelerator pedal and check carburetor to make sure throttle lever is fully opened.
- Release accelerator pedal and check both inner control cables to be sure they have slight play.

Warm up engine to operating temperature.

[D3] and [D4] Range

1. Apply parking brake and block the wheels. Move selector to [D4] while depressing brake pedal. Start engine, depress accelerator pedal, and release it suddenly. Engine should not stall.
2. Check that shift points occur at approximate speeds shown. Also check for abnormal noise and clutch slippage.

- **Upshift**

	1st → 2nd	2nd → 3rd	3rd → 4th
Fuel-throttle Acceleration from a stop	35 – 40 mph (56 – 64 km/h)	60 – 67 mph (96 – 107 km/h)	93 – 99 mph (148 – 158 km/h)
Half-throttle Acceleration from a stop	17 – 21 mph (27 – 34 km/h)	33 – 42 mph (53 – 67 km/h)	55 – 65 mph (88 – 104 km/h)
Closed-throttle Coasting down-hill from a stop	12 – 15 mph (19 – 24 km/h)	22 – 25 mph (35 – 40 km/h)	25 – 32 mph (40 – 51 km/h)

- **Downshift**

	4th → 3rd	3rd → 2nd	2nd → 1st
Fuel-throttle When car is slowed by increased grade, wind, etc.	83 – 90 mph (132 – 144 km/h)	52 – 60 mph (83 – 96 km/h)	26 – 33 mph (42 – 53 km/h)
Closed-throttle Coasting or braking to a stop	–	18 – 21 mph (29 – 34 km/h)	5 – 8 mph (8 – 13 km/h)

3. Accelerate to about 35 mph so transmission is in 4th, then shift from [D4] to [2]. The car should immediately begin slowing down from engine braking.

CAUTION: Do not shift from [D4] or [D3] to [2] at speeds over 60 mph (96 km/h); you may damage the transmission.

[2] (2nd Gear)

1. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
2. Upshifts and downshifts should not occur with the selector in this range.

[R] (Reverse)

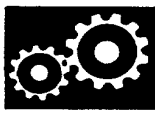
Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.

[P] (Park)

Park car on a slope (approx. 16°), apply the parking brake, and shift into Park. Then release the brake; the car should not move.

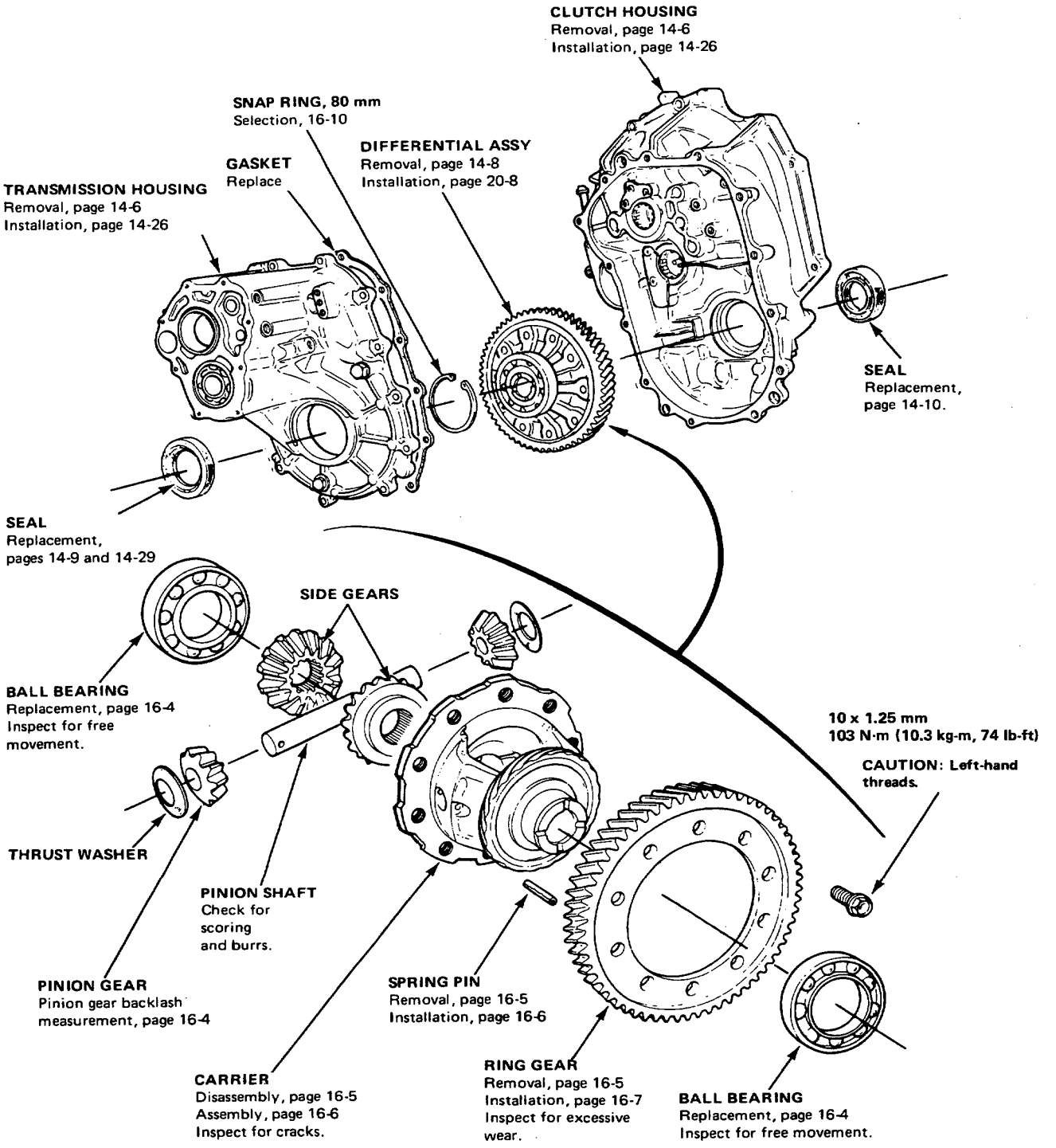
Differential

Illustrated Index 16-2
Inspection/Disassembly 16-5
Reassembly 16-6
Installation 16-8



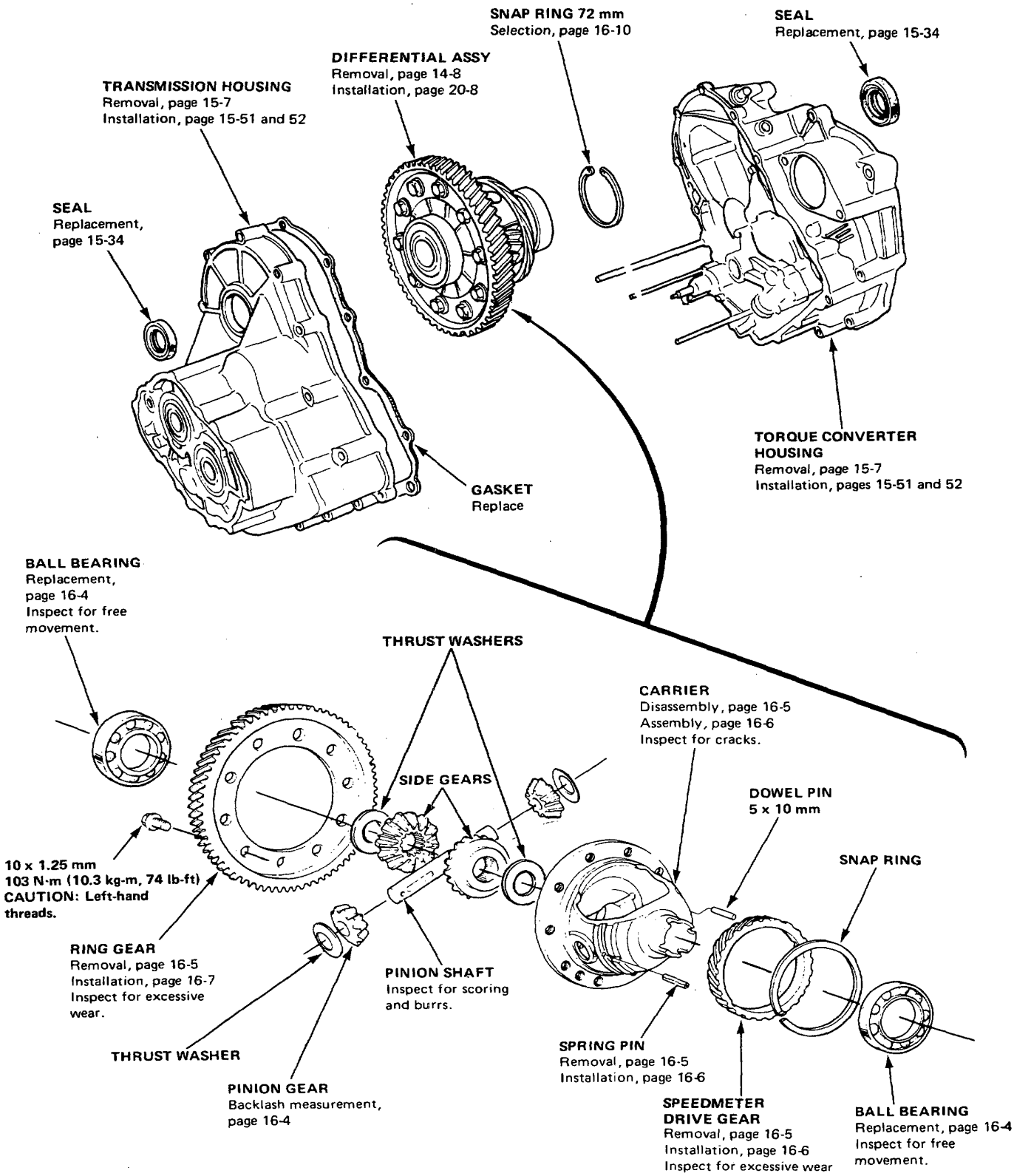
Differential(Manual Transmission)

Index



Differential(Automatic Transmission)

Index

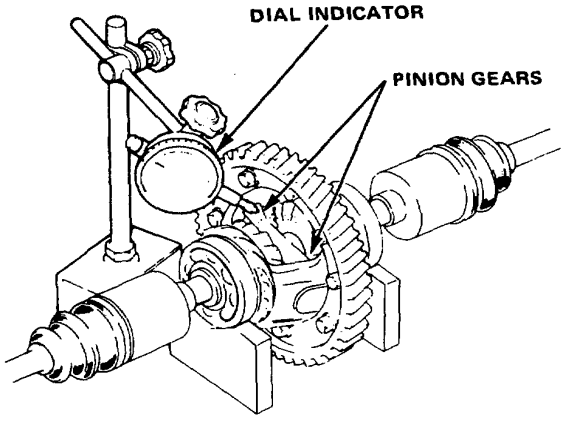


Differential

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.)

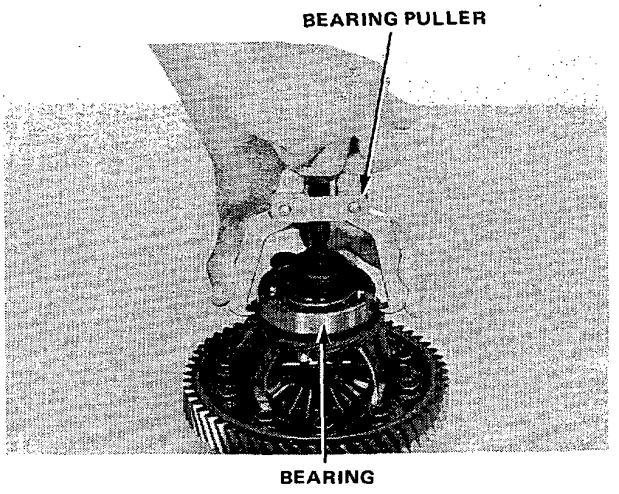


3. If our of tolerance, disassemble differential and select new thrust washers as shown page 16-6.

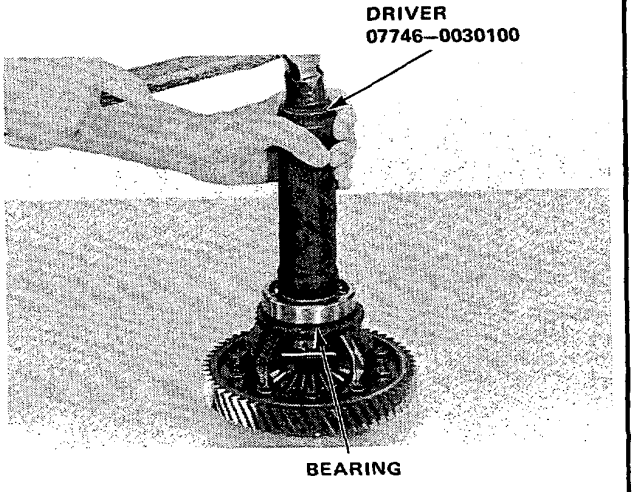
Bearing Replacement

NOTE: Check bearings for wear and rough rotation. If bearings are OK, removal is not necessary.

1. Remove bearings using a standard bearing puller.



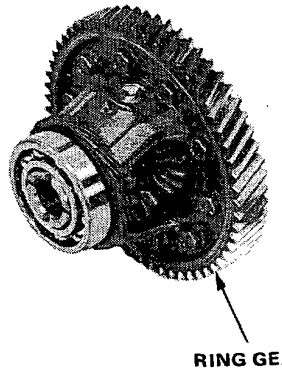
2. Install new bearings.



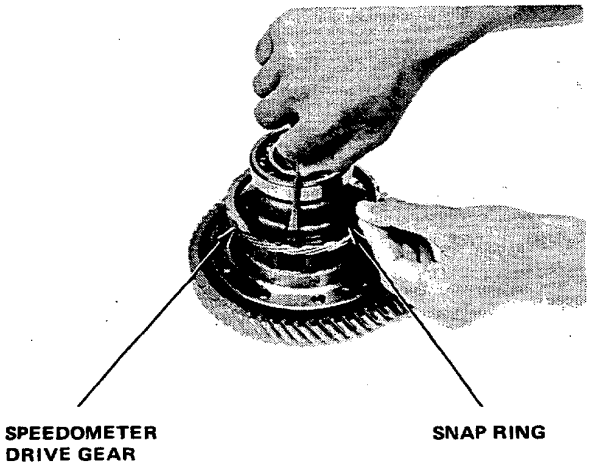
Inspection/Disassembly

1. Remove ring gear and inspect teeth for excessive wear.

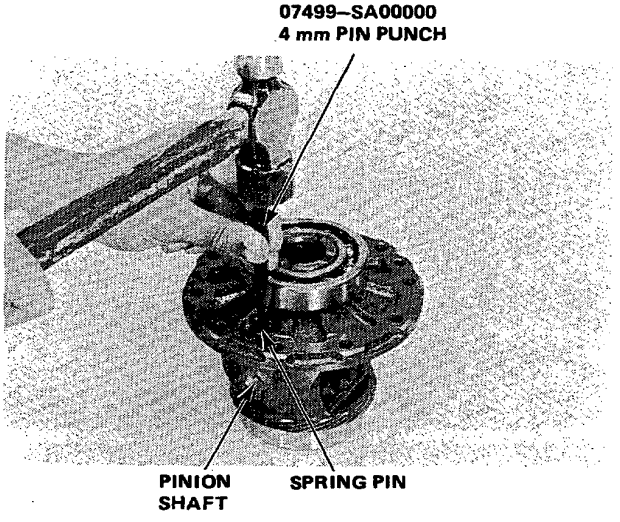
CAUTION: The ring gear bolts have left-hand threads.



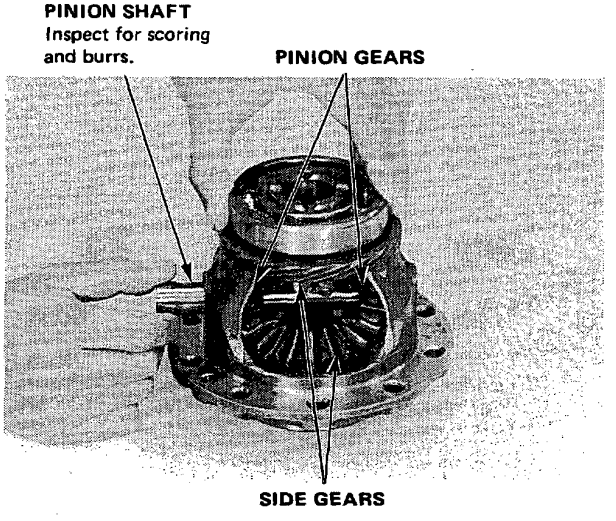
2. Automatic Only:
Pry snap ring off carrier, then remove speedometer gear and dowel pin.



3. Drive out spring pin with pin punch.



4. Remove pinion shaft, pinion gears, and thrust washers.



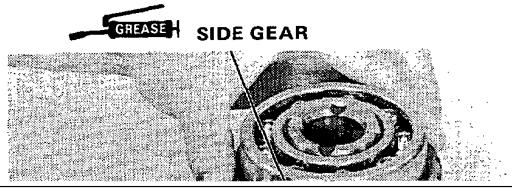
5. Wash parts thoroughly in solvent and dry with compressed air. Inspect all parts for wear or damage and replace any that are defective.

Differential

Reassembly

1. Install the side gears in differential carrier.

   CAUTION: Coat all gears with molybdnum disulfide grease on all side.

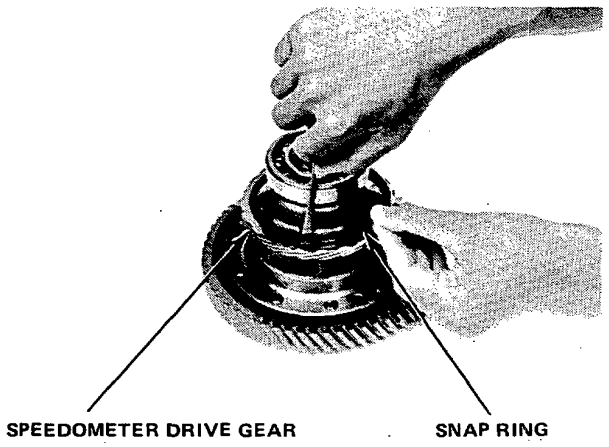


3. Rotate gears as shown until shaft holes in pinion gears line up with shaft holes in carrier.

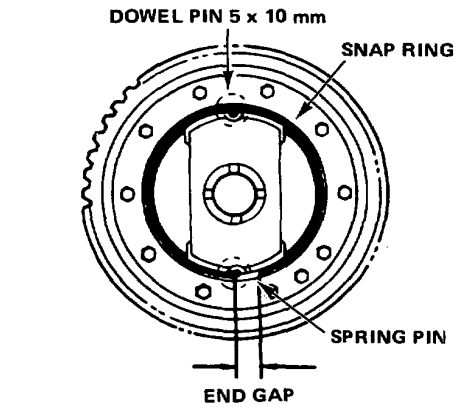
4. Insert pinion shaft and align spring pin holes in one end with matching hole in carrier.

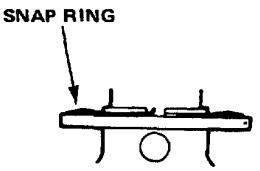


7. Automatic Only:
Install speedometer drive gear with its chamber (on inside diameter) facing carrier and secure with snap ring.



8. Automatic Only:
Align snap ring on carrier as shown.

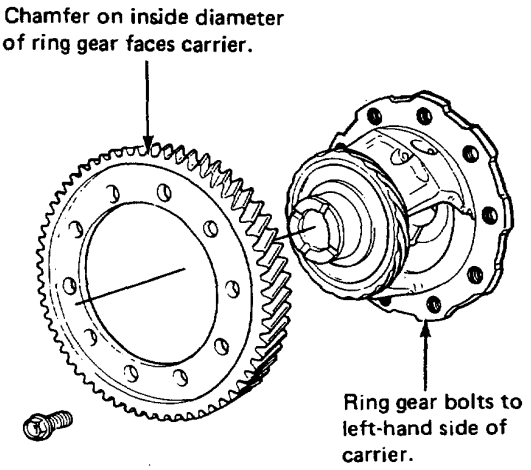




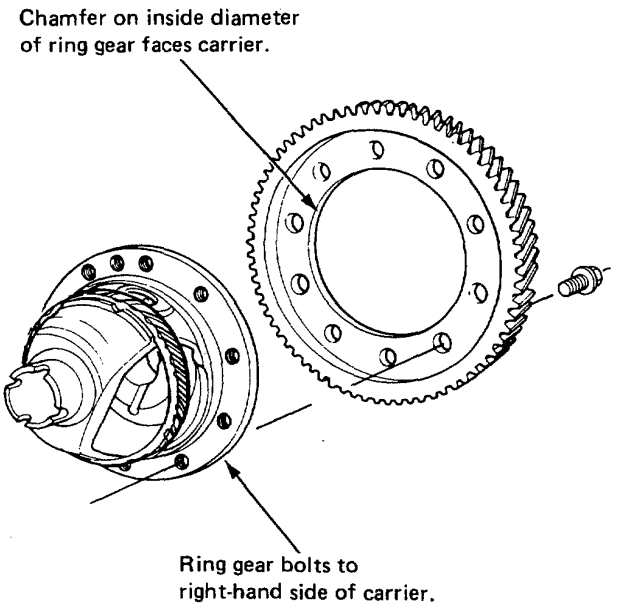
9. Install ring gear. Torque bolts to 103 N·m (10.3 kg-m, 74 lb-ft).

CAUTION: Ring gear bolts have left-hand threads.

Manual

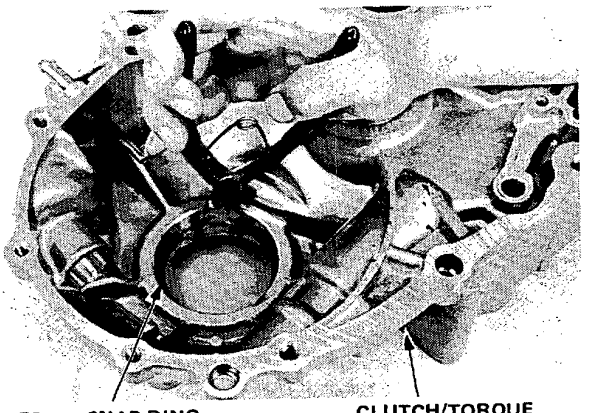


Automatic

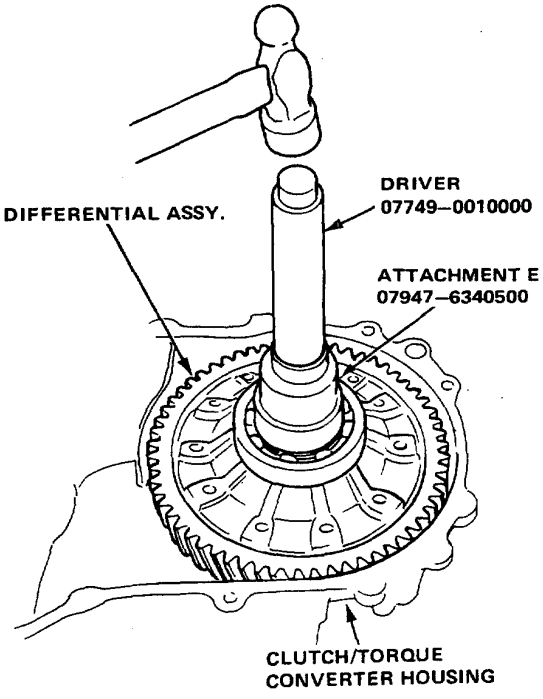


Installation

1. Automatic Only:
   Install 72 mm snap ring in clutch/torque converter housing. Do not install oil seal yet.



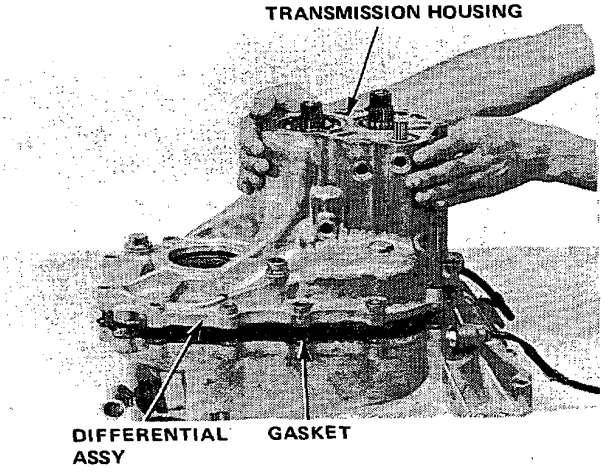
2. Install differential assembly in clutch/torque converter housing using driver. Tap on differential with driver and attachment to seat the snap ring in clutch/torque converter housing.



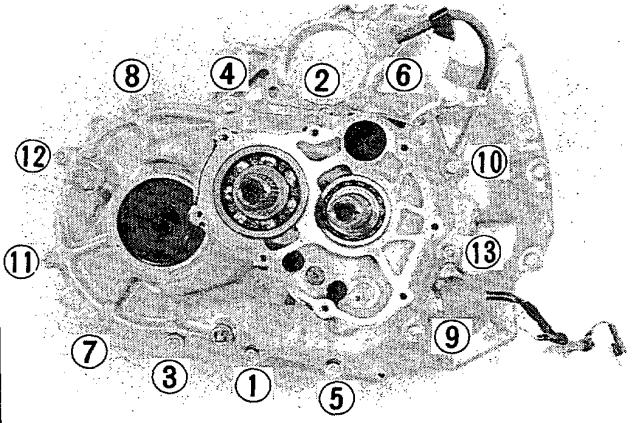
3. Install all transmission gear assemblies in clutch/torque converter housing. Refer to Page 14-24 (Manual) or Page 15-45 (Automatic).

4. Manual Only:
   Shift transmission into 3rd gear to position shift guide shaft for reassembly.

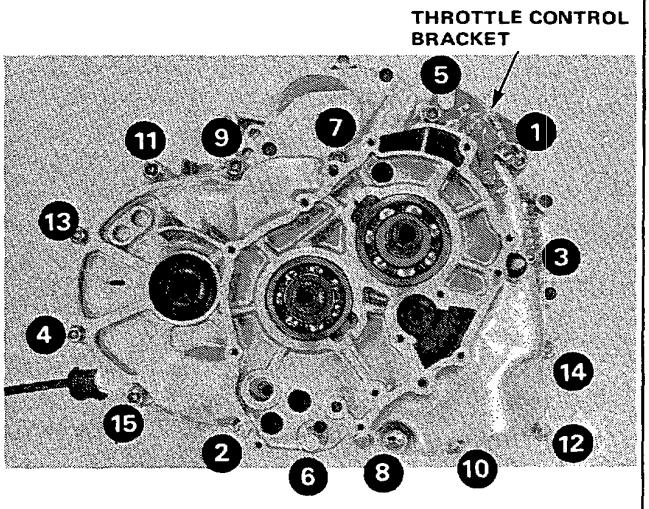
5. Place new gasket on clutch/torque converter housing and install both dowel pins, then carefully lower then transmission housing into place.



6. Manual Only:
   Bolt housings together and torque all thirteen bolts to 27 N·m (2.7 kg-m, 20 lb-ft) in squence shown.

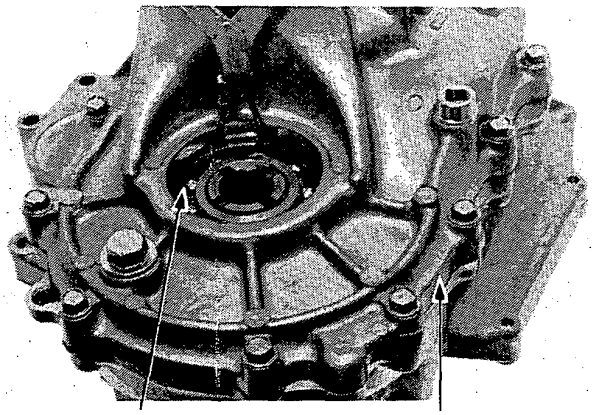


7. Automatic Only:
Torque bolt to 27 N·m (2.7 kg-m, 20 lb-ft) in order of (1) thru (15) in two or more steps.



NOTE: When tightening transmission housing bolts, take care that you do not distort or damage the throttle control bracket; distortion or damage to bracket will change transmission shift points.

8. Manual Only:
Install 80 mm snap ring in transmission housing.



Side Clearance Measurement:

NOTE: If torque converter housing, transmission housing, differential carrier, or differential bearings were replaced, the differential side clearance must be measured.

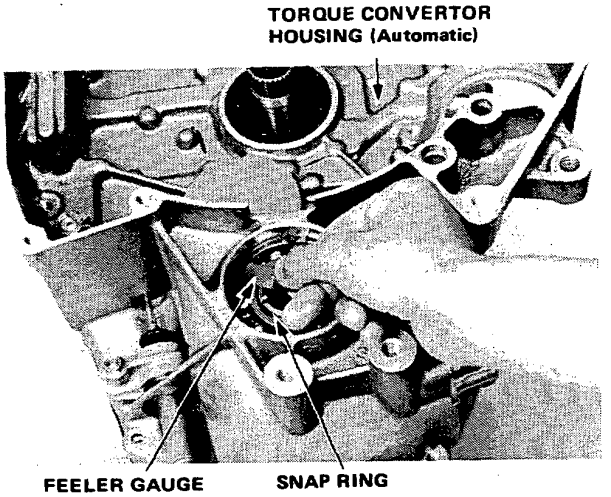
9. Use driver and attachment to bottom differential assembly in transmission housing.



Differential

Installation (cont'd)

10. Measure clearance between snap ring and outer race of bearing in transmission housing (Manual), or torque converter housing (Automatic).



If out of limits, select new snap ring from following table and install:

Side Clearance: 0.15 mm (0.006 in.) Max.

Manual Only:

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.)

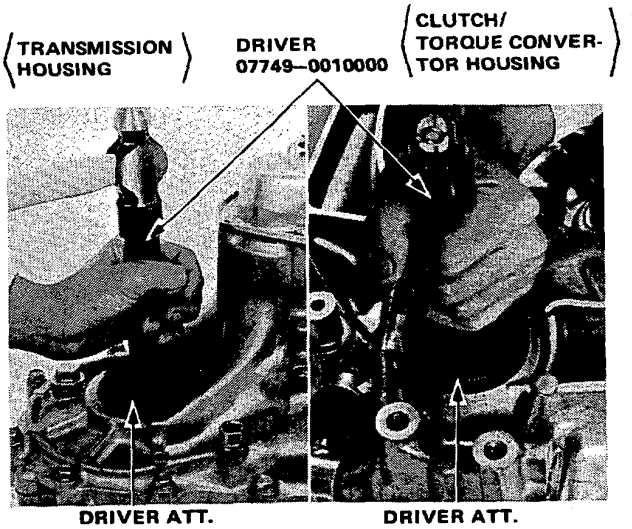
Automatic Only:

Part Number	Thickness
90414-634-000	2.45 mm (0.096 in.)
90415-634-000	2.55 mm (0.100 in.)
90416-634-000	2.65 mm (0.104 in.)
90417-634-000	2.75 mm (0.108 in.)
90418-634-000	2.85 mm (0.112 in.)
90419-634-000	2.95 mm (0.116 in.)

11. Turn transmission over and seat new snap ring against the cltuch/torque converter housing as shown in step 2.

12. Then turn transmission back over, seat differential again as shown in step 9, and re-check bearing-to-snap ring clearance.

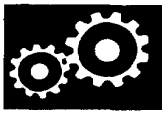
13. Apply oil to new differential seals and install them in clutch/torque converter housing and transmission housing with special tools as shown.



Refer to page 14-30 (Manual) or page 15-41. (Automatic) for assembly of remaining parts.

Driveshafts

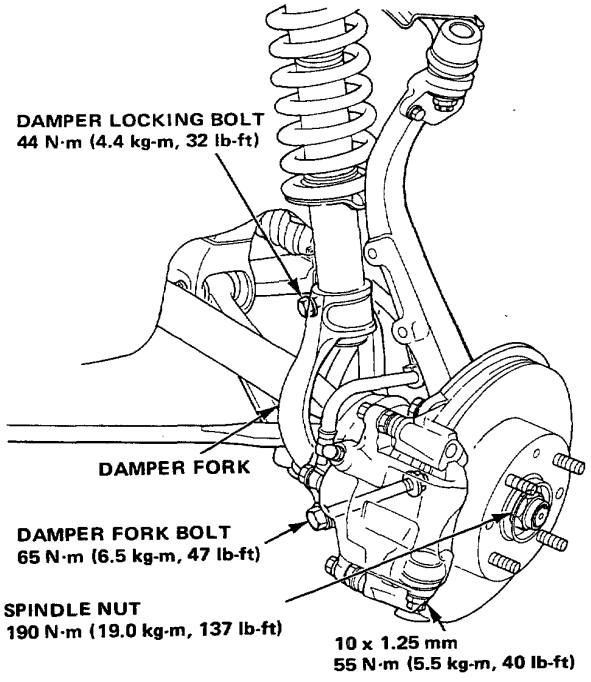
Removal..... 17-2
Disassembly/Inspection..... 17-3
Reassembly 17-4



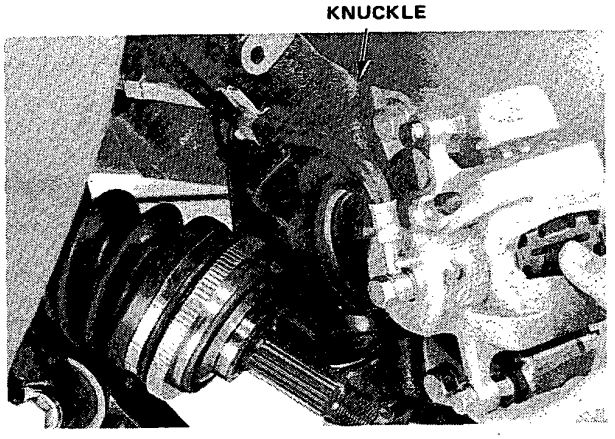
Driveshafts

Removal

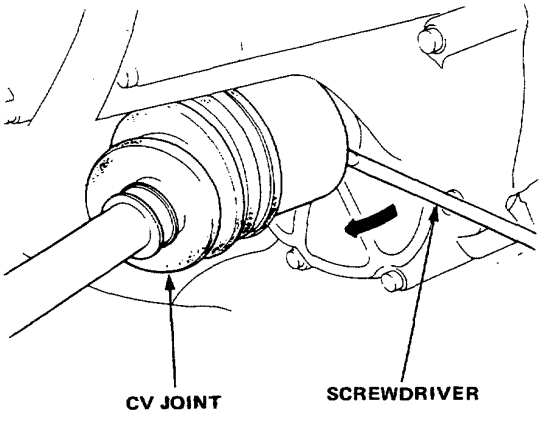
1. Loosen the front wheel lug nuts.
2. Raise the front end of the car and place safety stands in the proper locations. Remove the front wheels.
3. Drain the transmission oil. (page 5-3).
4. Raise the locking tab on the spindle nut and remove it with a 32 mm socket wrench (page 20-10).
5. Remove the damper fork bolt and damper lock bolt. Remove the damper fork.



6. Separate the lower arm ball joint from the lower control arm (page 20-11).
7. Pull the front hub outward, all the way off the driveshaft.



8. Pry the inboard CV joint out approximately 12 mm (1/2 in.) to force spring clip past the groove in splines of differential side gear, then pull the driveshaft out of the transmission case.

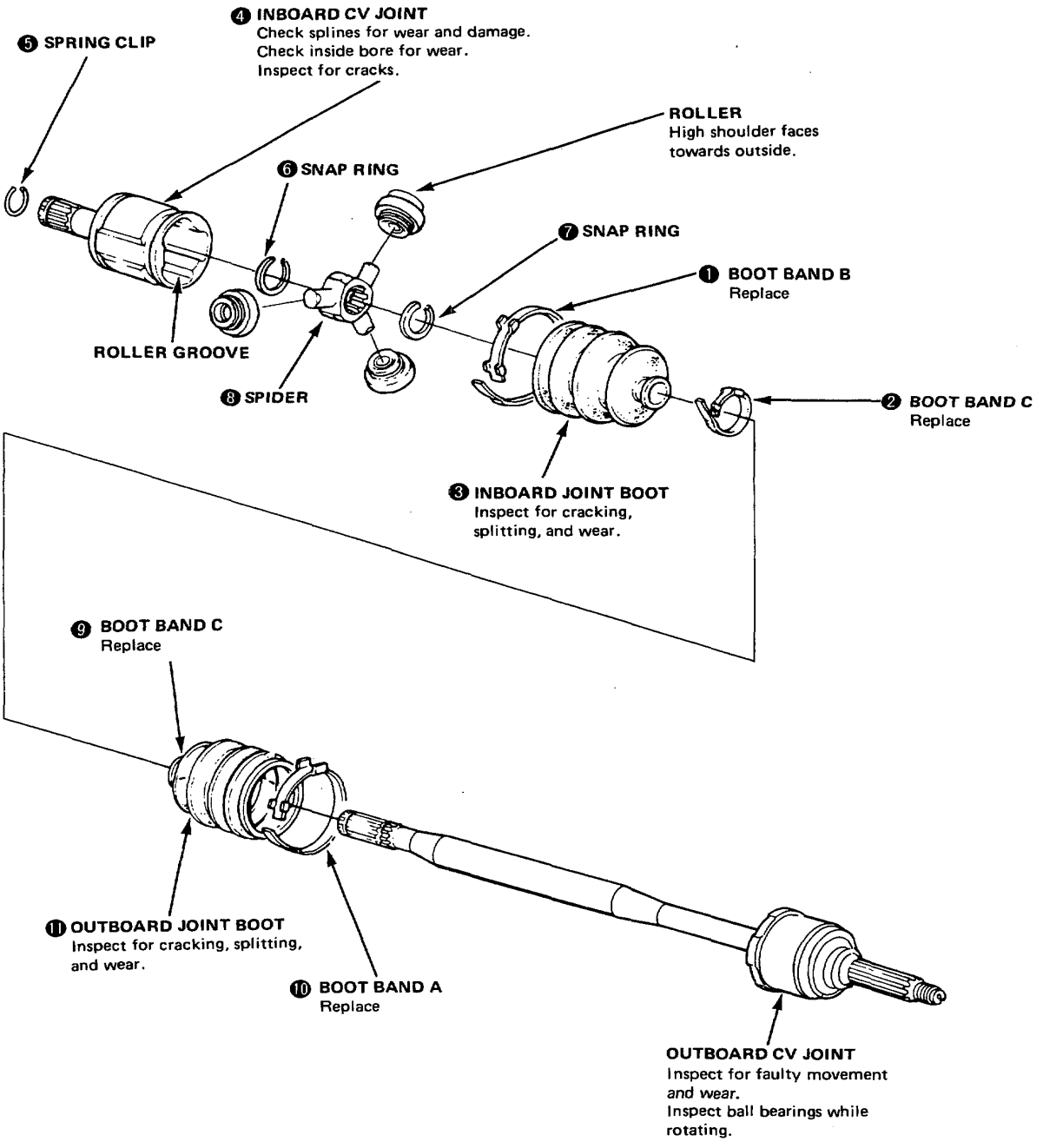


CAUTION:
- **Do not pull on the inboard CV joint, it may come apart.**
- **Use care when prying with a screwdriver to avoid damaging the sealing lips of the oil seal with the end.**

Disassembly/Inspection

Disassemble in numbered sequence.

NOTE: Mark the rollers and roller grooves during disassembly to ensure proper positioning during reassembly.



Driveshafts

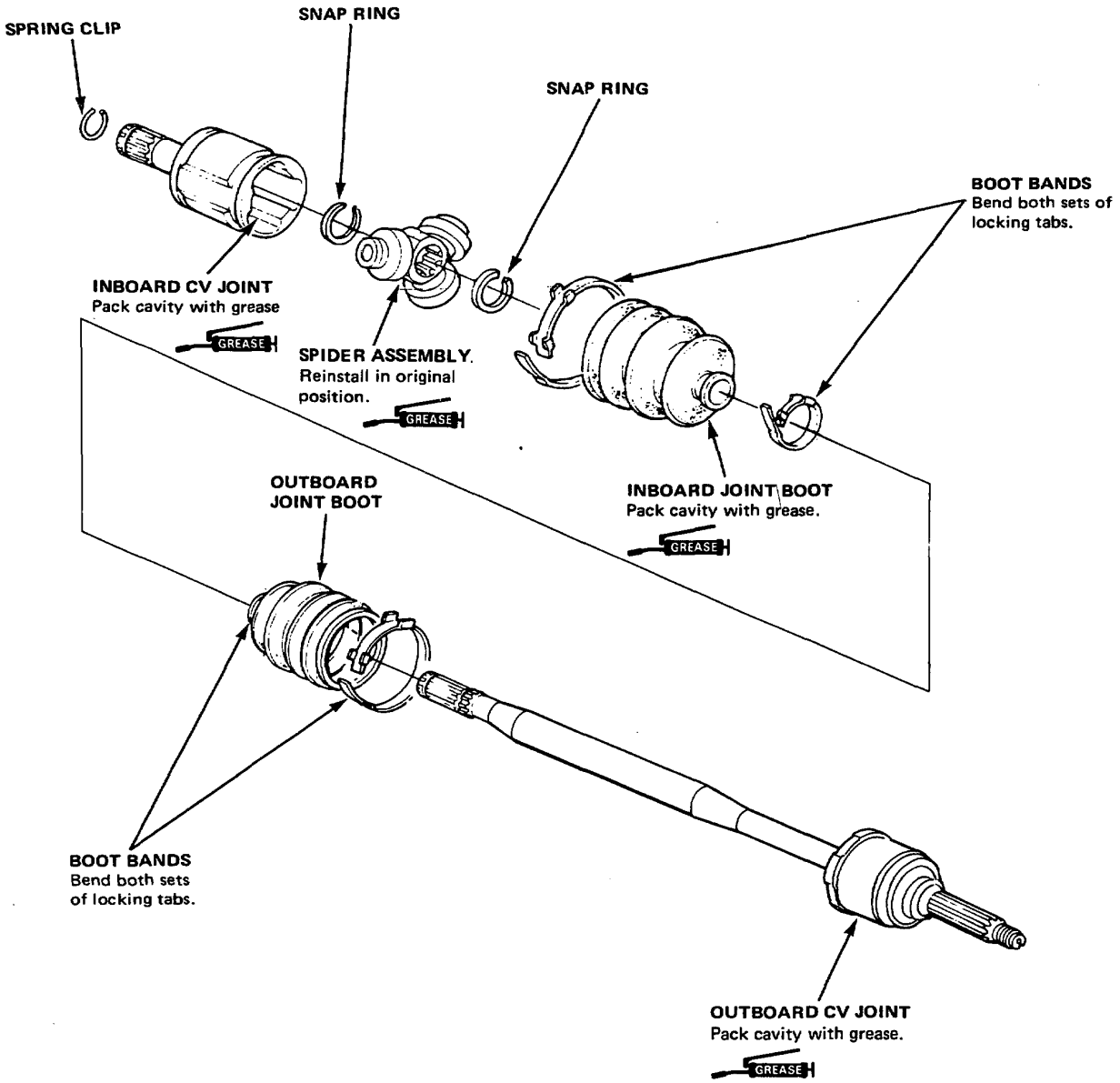
Reassembly

1. Reassemble the driveshafts in reverse order of disassembly.

GREASE Thoroughly pack the bearings and both the inboard and outboard CV joints with high quality molybdenum disulfide grease when reassembling the driveshaft.

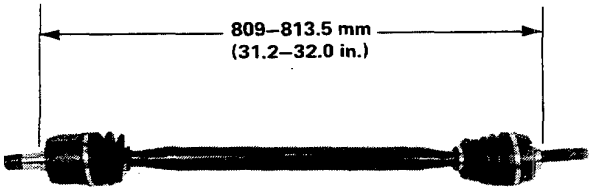
2. Install the rollers and bearing races on the spider shafts, then slide the spider assembly into the inboard shaft joint.
CAUTION: Avoid getting oil or grease on the rubber parts.

3. Slide the boots into place and install new bands on the small ends.
Position the bands so they are centered between the locating humps at each end of the driveshaft. Expand and compress the boots until they return to their normal shape and length.

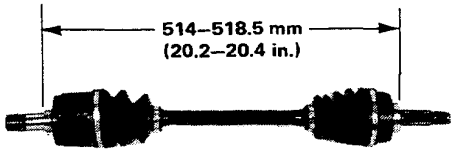


4. Adjust the length of the driveshafts to the figures given below.

LEFT DRIVE SHAFT



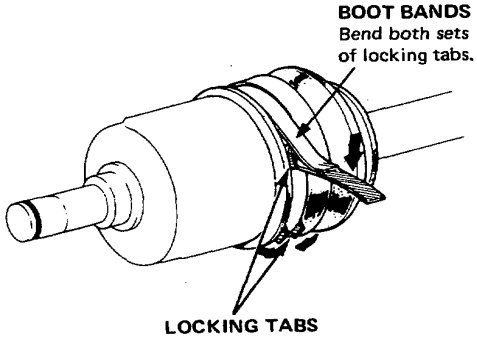
RIGHT DRIVESHAFT



5. Install the new bands on the boots.

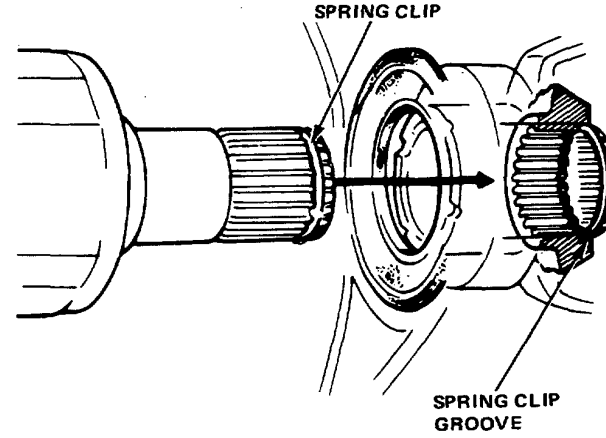
NOTE:
- Be sure to bend both sets of the locking tabs.
- Lightly tap on the doubled-over portions to reduce their height.

CAUTION: Do not strike the boot.



6. Install the inboard end of the driveshaft.

CAUTION:
- **When reinstalling, make sure that the CV joint subaxle bottoms in the differential and that the spring clip locks in differential side gear groove.**
- **Replace the spring clip with a new one whenever the driveshaft is disassembled.**



7. Add the transmission oil.
Use only SAE30, 10W-30, 10W-40 or 20W-40 weight oil grade SE or SF grade (See page 14-2).

MEMO

Steering

MANUAL STEERING

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Gearbox 18-4
Steering Wheel 18-10
Column 18-11

POWER STEERING

NOTE: For Steering Wheel and Steering Column information, refer to the Manual Steering Section.

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Troubleshooting 19-3
Special Tools 2-3
Maintenance 19-10
On-Car Checks 19-12
Pump 19-16
Gear box 19-25



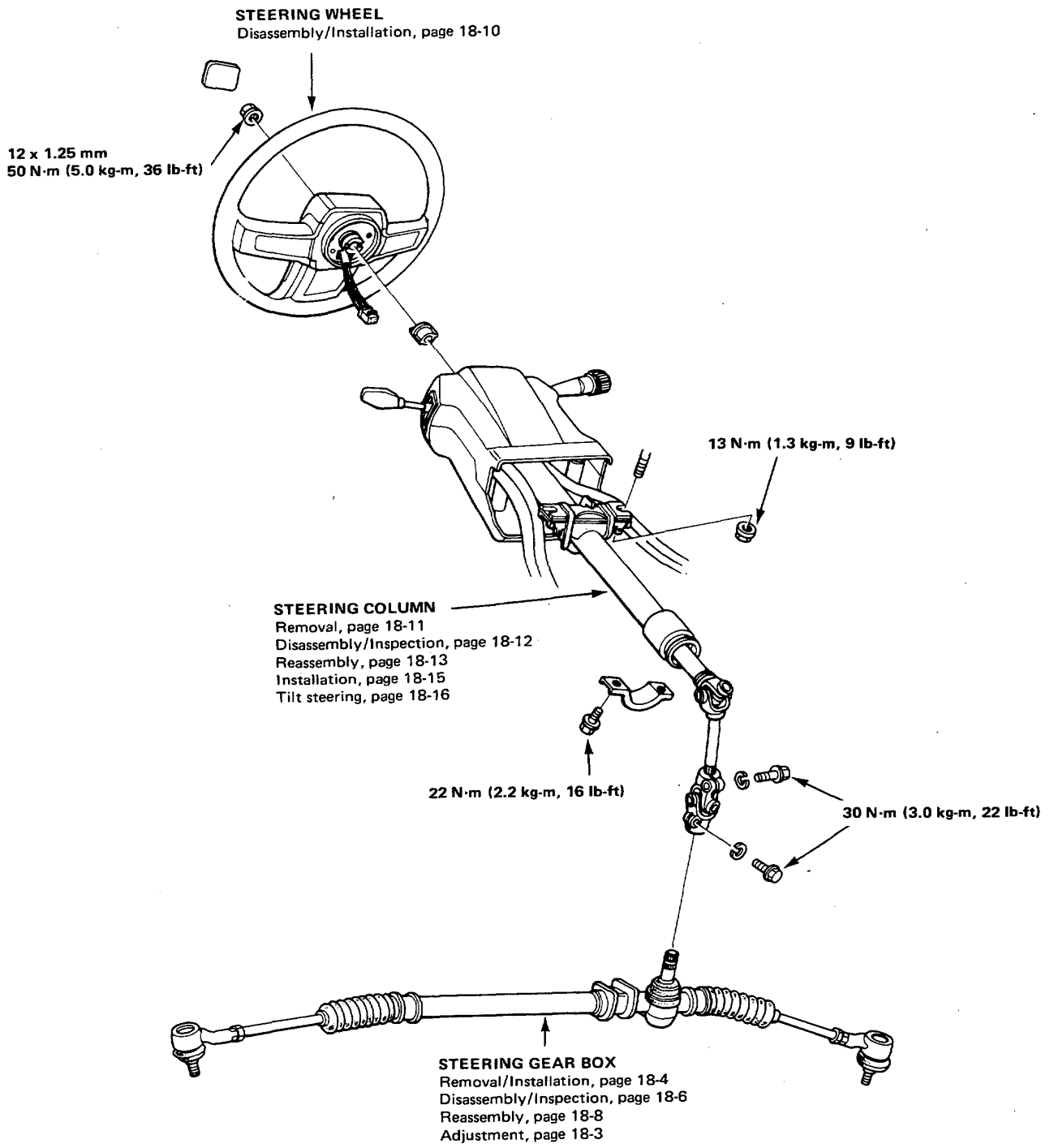
Manual Steering

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Steering

Index

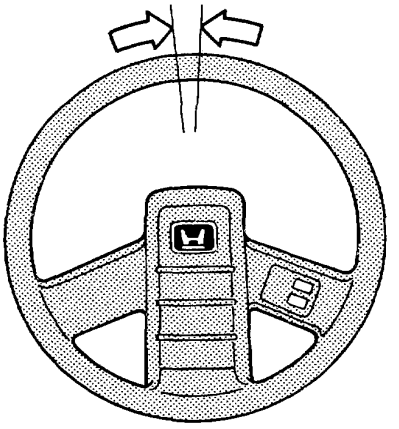


Inspection

Steering Wheel Rotational Play

1. Place the front wheels in a straight ahead position and measure the distance the steering wheel can be turned without moving the front wheels.
2. If the play exceeds the service limit, check all steering components.

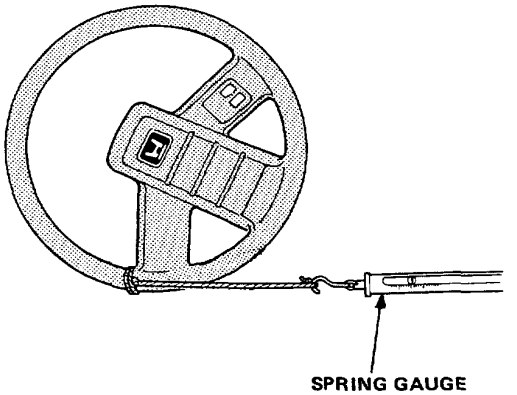
   Service Limit: 10 mm (0.4 in.)



Steering Effort Check

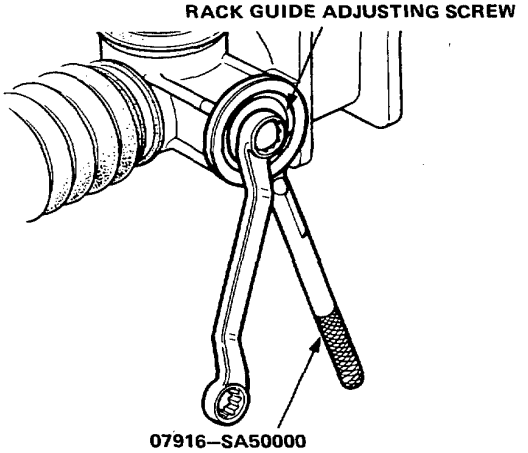
1. Raise the front wheels off the ground.
2. Turn the steering wheel with a spring gauge and check its reading.
3. If the reading exceeds the service limit, adjust the steering gearbox as shown below.

   Service Limit: 15 N (1.5 kg, 3.3 lbs)



Steering Gearbox Adjustment

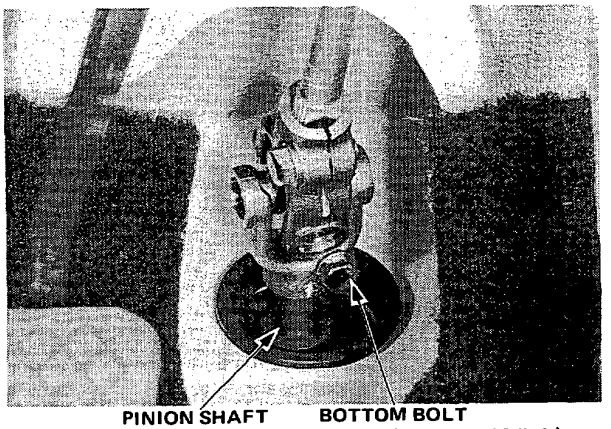
1. Loosen the rack screw locknut.
2. Tighten the rack guide screw until lightly bottomed.
3. Back off the screw 45° from the bottomed position and tighten the locknut.
4. Check for tight or loose steering by turning the front wheels through complete travel.
5. Recheck steering effort as shown above.



Gearbox

Replacement

1. Remove the bottom bolt in the steering shaft connector, and pull the connector up off the pinion shaft.

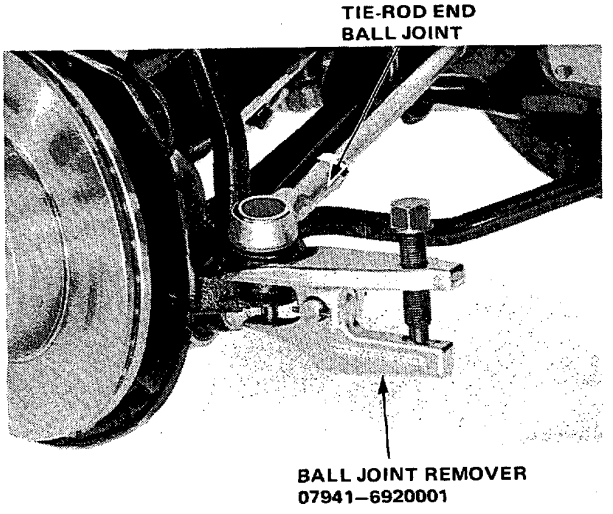


2. Remove the front wheels and raise the front of car on jack stands.

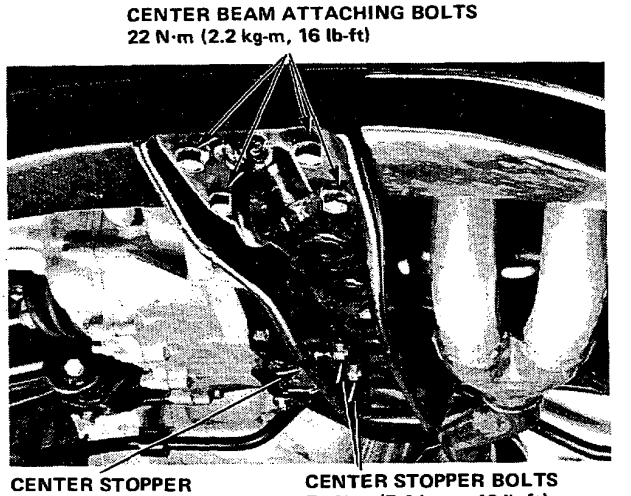
3. Remove the cotter pins, and unscrew the tie-rod end ball joint nuts halfway.

4. Break the ball joints loose using the Ball Joint Remover.

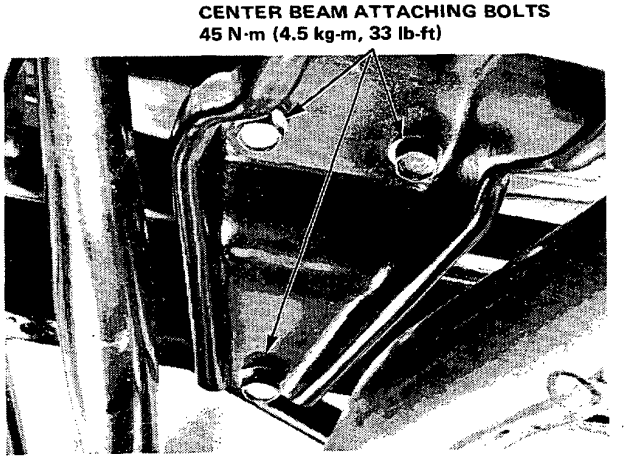
5. Then remove the nuts, and lift the tie-rod ends out of the steering knuckles.



6. Remove the center beam.

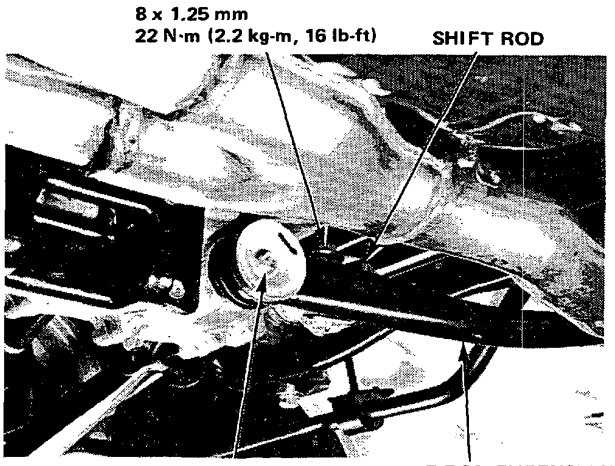


NOTE: On installation, check that the insulator is centered with its mount on the transmission. If necessary, loosen the center beam bolts and insulator nots and adjust positions as required.



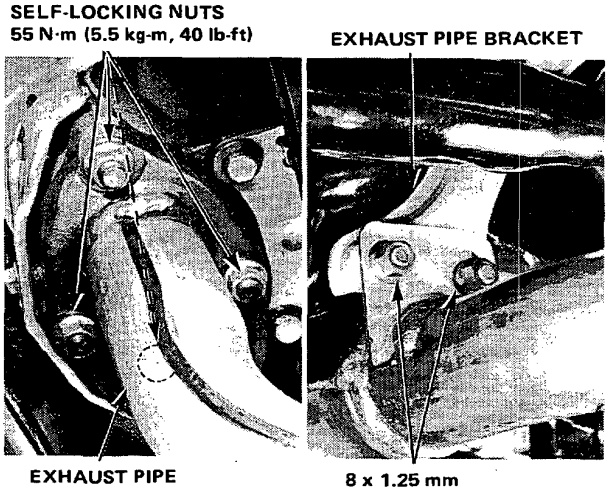
7. Manual Transmission Only:

   Disconnect the shift rod and extension from the transmission.



   NOTE: On models equipped with automatic transmission, remove the shift cable guide from the floor and pull the shift cable down by hand.

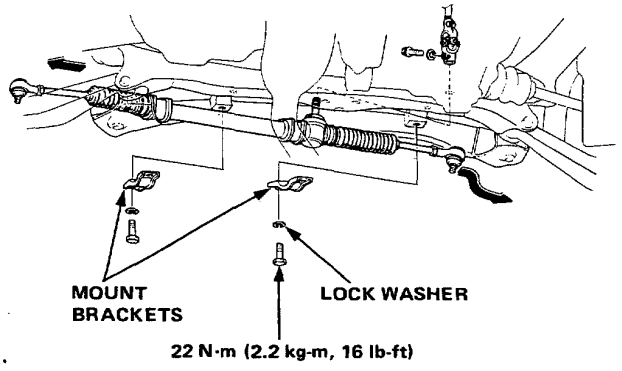
8. Remove the self-locking nuts connecting the exhaust pipe to the manifold, and exhaust pipe bracket to the engine.



9. Push the rack all the way to the right (simulate a left turn), then remove the gearbox brackets.

10. Drop the gearbox far enough so the end of the pinion shaft comes out of its hole in the frame channel, then rotate it forward until the shaft is pointing to the rear.
    Slide the gearbox to the right until the left tie-rod clears the exhaust pipe, then drop it down and out of the car to the left.

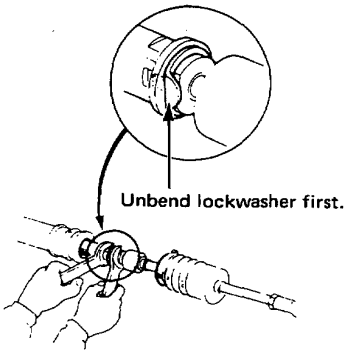
    NOTE: On right hand steered models, slide the gearbox to the left.

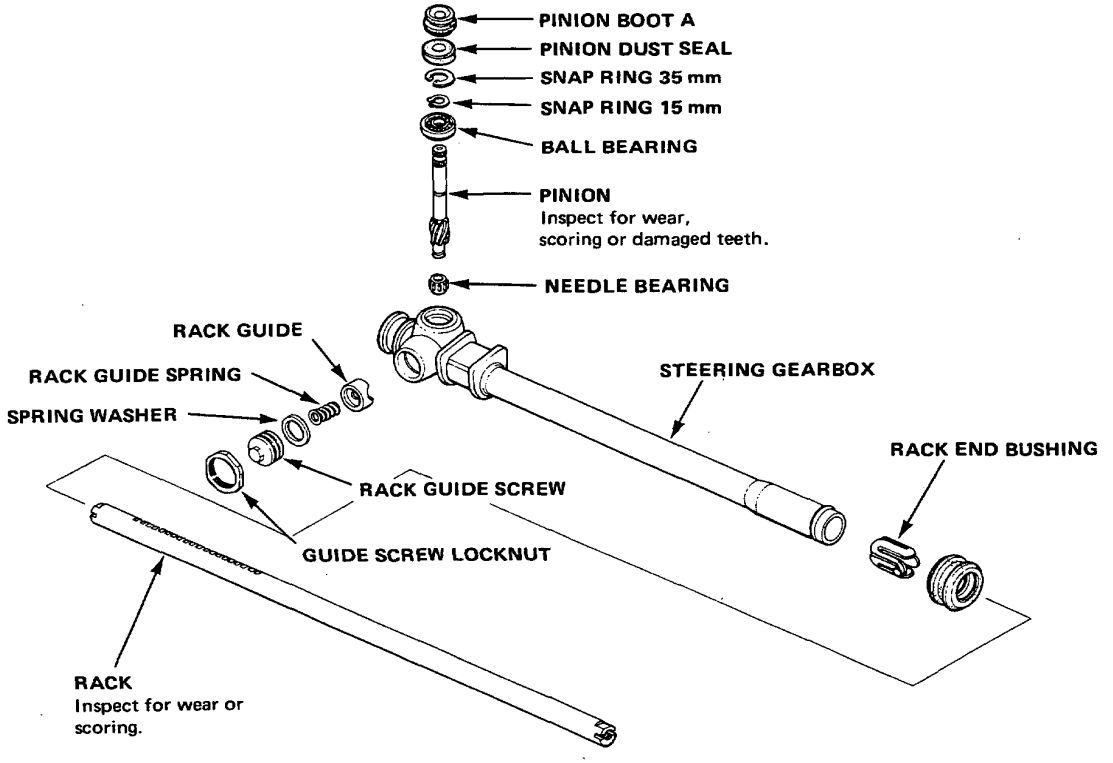


Gearbox

Disassembly/Inspection

1. Carefully clamp the gearbox in a vise.
2. Loosen the bands, then pull the boots away from the ends of the gearbox and unbend the tie-rod lockwashers.
3. Hold the rack with a 21 mm wrench and unscrew the tie-rods with a 17 mm wrench.
4. Remove the rack guide components from the gearbox.



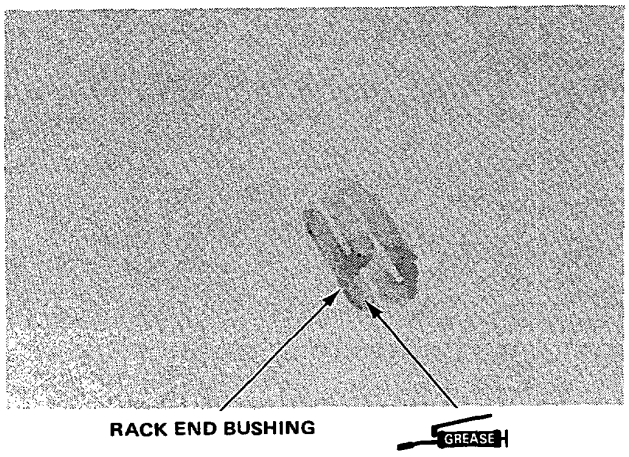


5. Remove the pinion boot, pinion dust seal, and 35 mm snap ring, then pull the pinion out of the gearbox.
6. Slide the rack out of the gearbox.

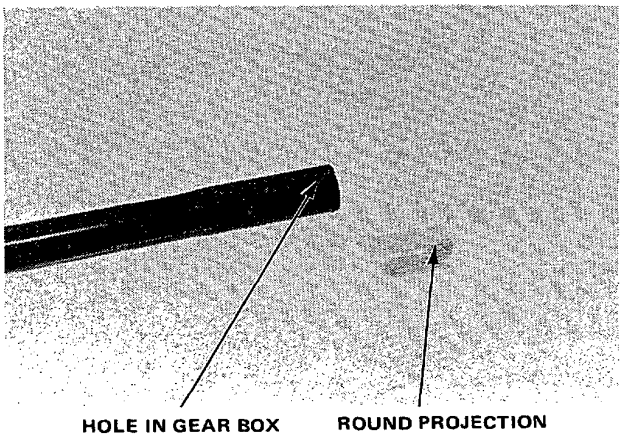
Rack End Bushing Installation

1. Apply a thin coat of grease to the inside surface of the rack end bushing.

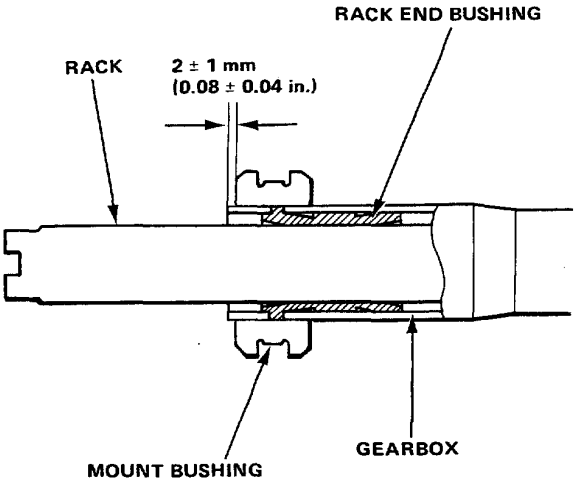
   CAUTION: Do not fill the slots with grease; they must remain open to serve as air passages.



2. Install the rack end bushing by aligning the round projections on the bushing with the holes in the gearbox.



3. Slide the mount bushing onto the gearbox as shown.

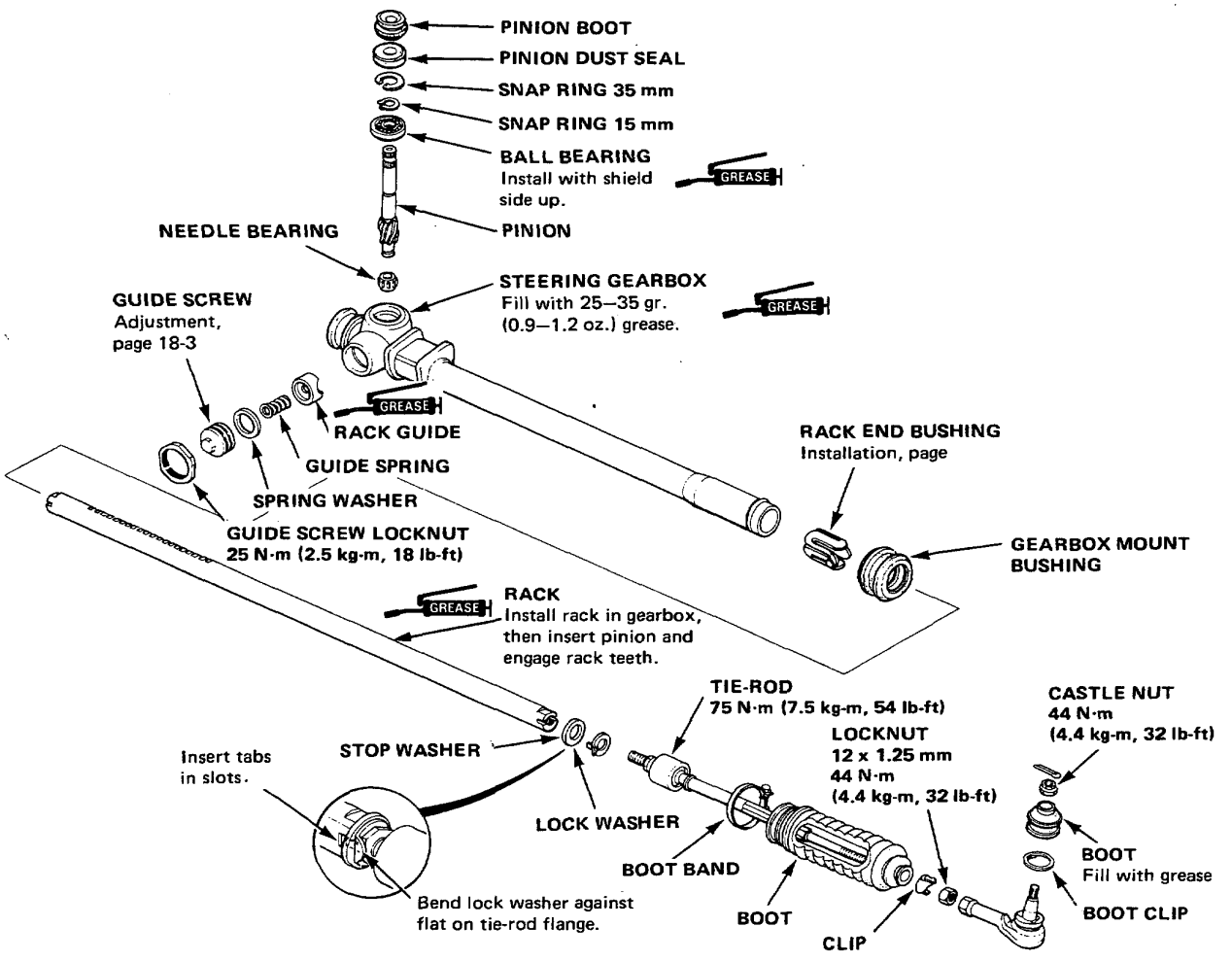


Gearbox

Reassembly

Reassemble the gearbox in the reverse order of disassembly, then:

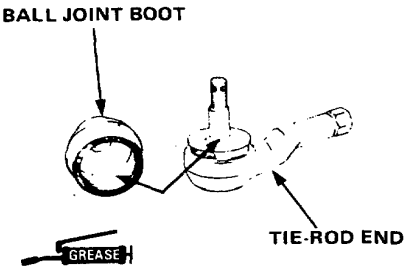
1. Put a new lockwasher and stop washer on both tie-rods.
2. Screw each tie-rod into the rack while holding the lockwasher so the tabs are in the slots in the rack end. Tighten the tie-rod securely, then bend a lockwasher back against the flat on the flange as shown.
3. Install the boots and secure with the bands.
4. Pack the tie-rod ends with grease, then install on the tie-rods. Do not tighten the locknuts until after tie-rod adjustment (page 20-3).
5. Fill the tie-rod end boots with grease and install as shown; replace the boots that are cut or split.
6. Bleed air from the boots by gently squeezing them from the bottom up.
7. Reinstall the gearbox (page 18-4).
8. Adjust the gearbox (page 18-3).

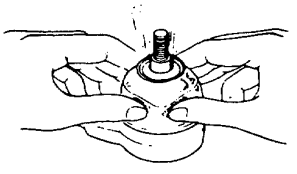


Ball Joint/Boot Clip

Installation

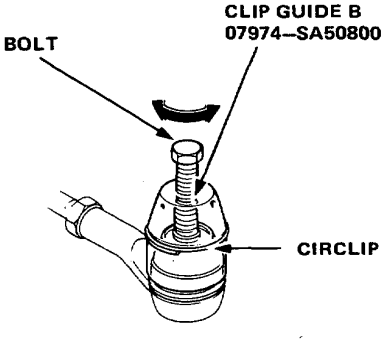
CLIP TYPE:



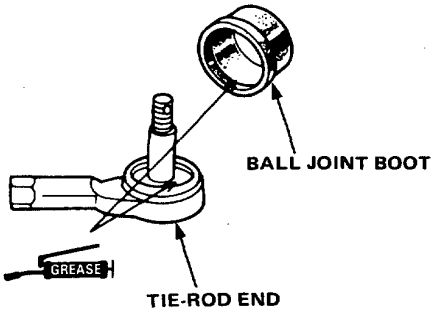


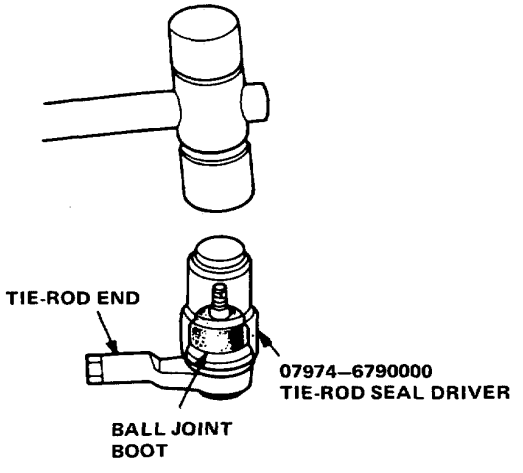
AIR-BLEEDING

Install the circlip on the CLIP GUIDE, adjust the boot height with the bolt, and press the clip down onto the boot.



PRESS-ON TYPE:





NOTE: After driving the boot onto the ball joint, apply sealant between the tie-rod end and ball joint boot.

Steering Wheel

Disassembly/Reassembly

Removal

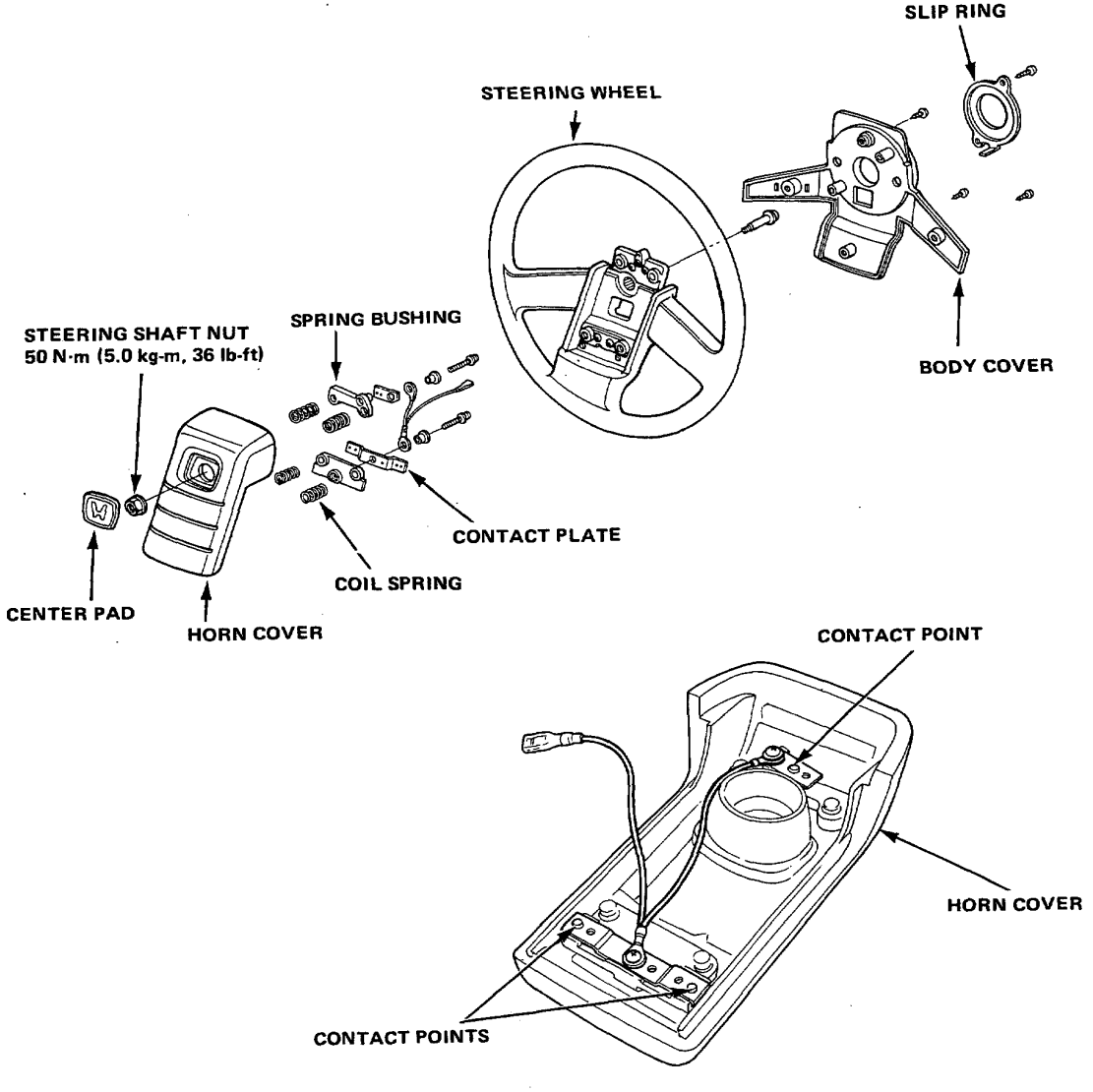
1. Remove the center pad.
2. Remove the steering shaft nut.
3. Remove the steering wheel by rocking it slightly side-to-side as you pull steadily with both hands.

Disassembly

1. Remove the horn cover.
2. Remove the contact plate. Check the contact points and repair if necessary.

Assembly

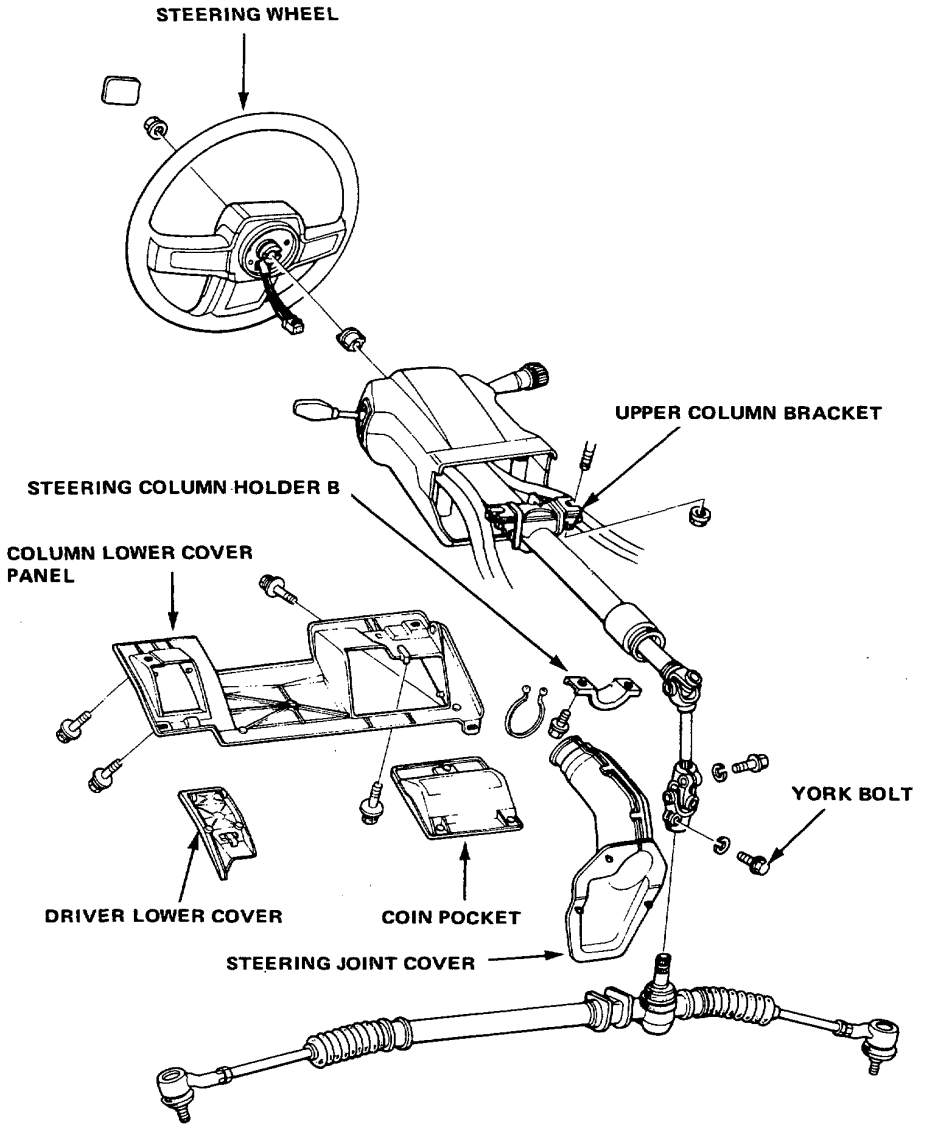
1. Clean the contact plate points.
2. Install the horn cover and body cover.
3. Turn the front wheels to a straight ahead position.
4. Install the steering wheel in a straight ahead position.
5. Tighten the steering wheel mount nut and tighten securely.
6. Install the center pad, then check that the horn works.



Columm

Removal

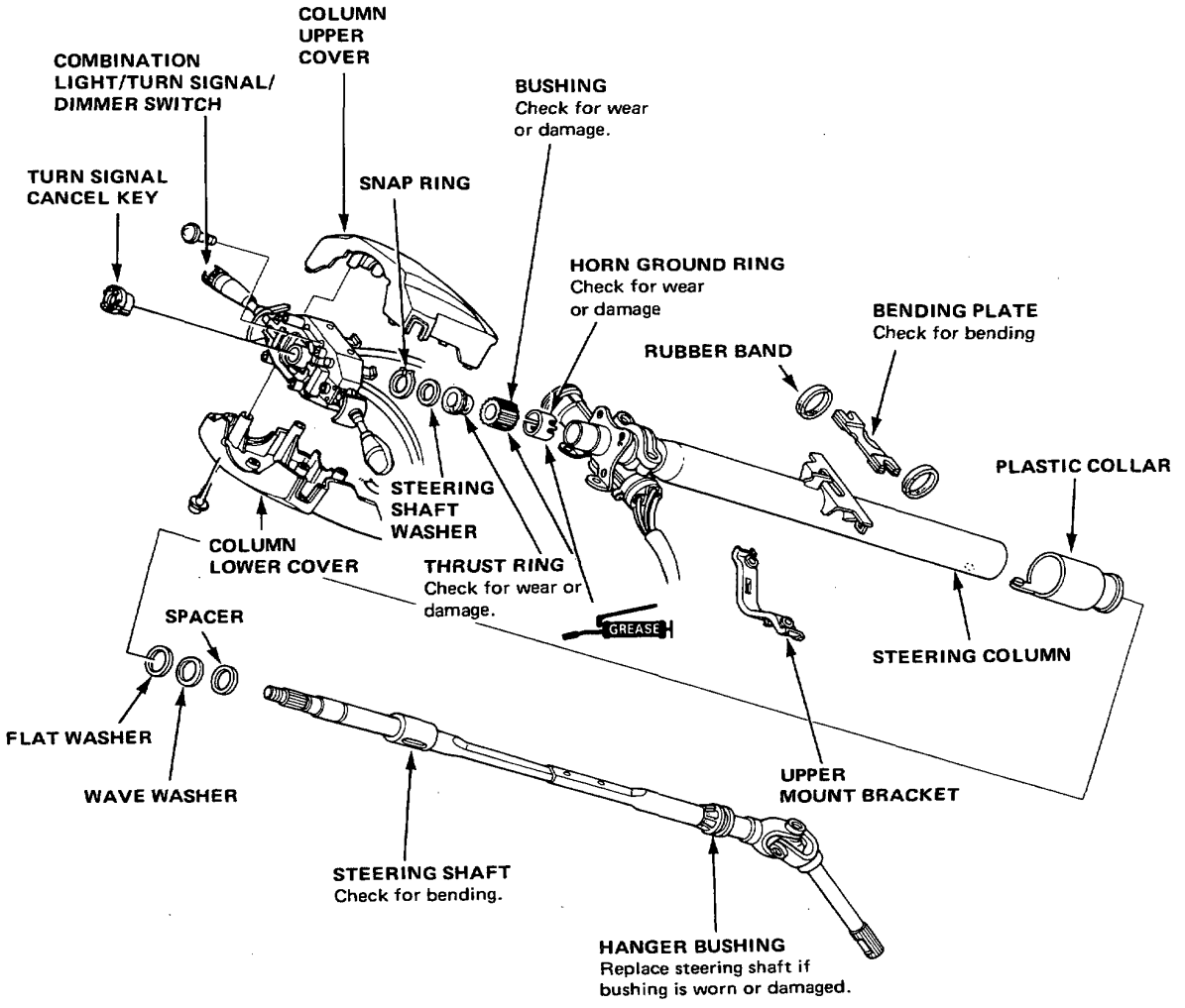
1. Remove the steering wheel (page 18-10).
2. Remove the coin pocket and driver lower cover.
3. Remove the column lower cover panel.
4. Remove the steering joint cover.
5. Remove the steering joint bolts.
6. Remove the steering column holder B.
7. Remove the upper column bracket.
8. Disconnect the steering joint from the gearbox.



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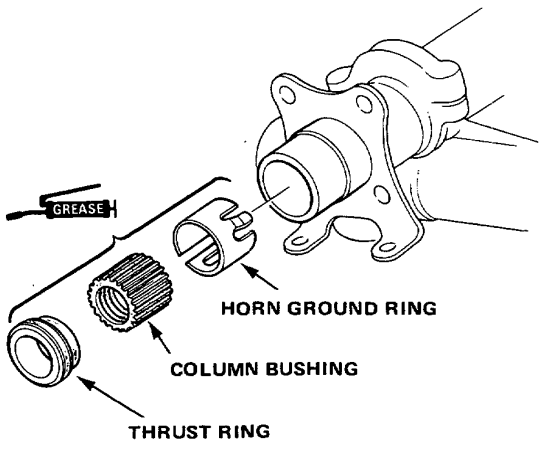
Disassembly/Inspection

1. Remove the upper and lower column covers.
2. Remove the turn signal cancelling sleeve.
3. Remove the screws holding turn signal switch, then remove the switch.
4. Remove the rubber bands, bending plate and upper mount bracket.
5. Remove 18 mm snap ring and retaining washer.
6. Turn the ignition switch to the I position.
7. Remove the plastic collar then remove the steering shaft from the bottom end of the column.
8. Remove the flat washer, wave washer and spacer from the top end of the shaft.
9. Remove the thrust ring, bushing and horn ground ring from the top end of the column.

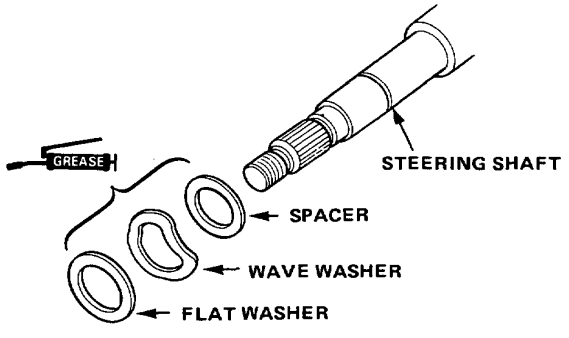


Reassembly

1. Install the horn ground ring.
2. Insert the column bushing.
3. Set the steering thrust ring in position.



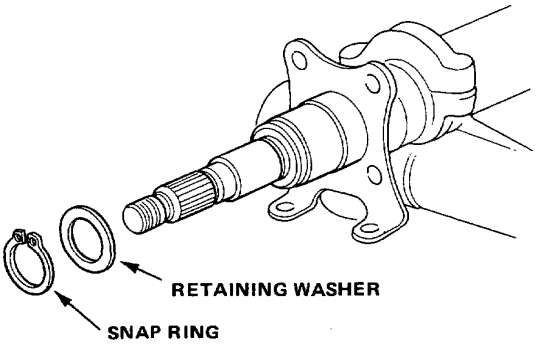
4. Apply grease to the bushings in the top of the column.
5. Install the spacer, wave washer and flat washer on the top end of the steering shaft.



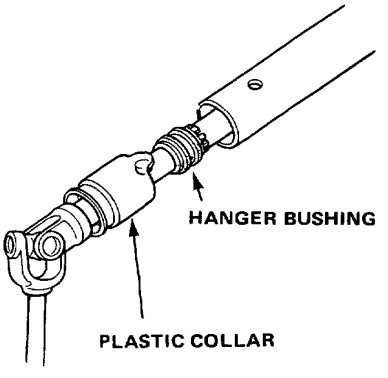
6. Coat the steering shaft with rust-preventive oil.
7. Carefully insert the steering shaft in the steering column from the bottom.

   CAUTION: Do not bend the horn ground ring.

8. Install the retaining washer and snap ring on the steering shaft.



9. Apply grease to the lower end of the steering shaft and inside of the column.
10. Push the hanger bushing into the bottom end of the column as far as it will go.

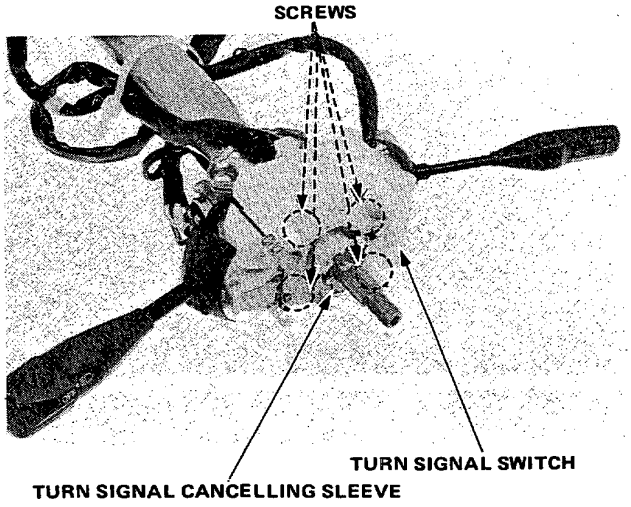


11. Install the plastic collar over the bottom end of the steering column by aligning the round projection inside the collar with the hole in the column.

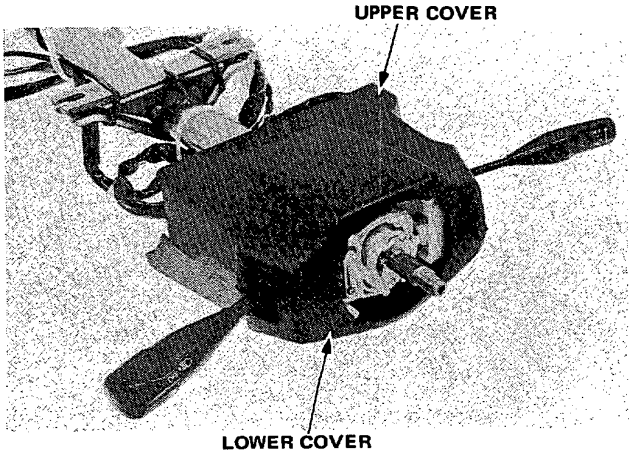
(cont'd)

Reassembly (cont'd)

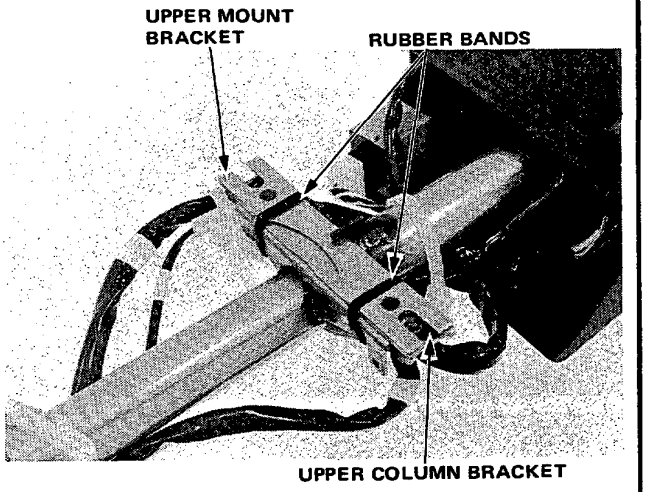
12. Install the turn signal switch (4 screws) and turn signal cancelling sleeve.



13. Install the column upper cover and lower cover.

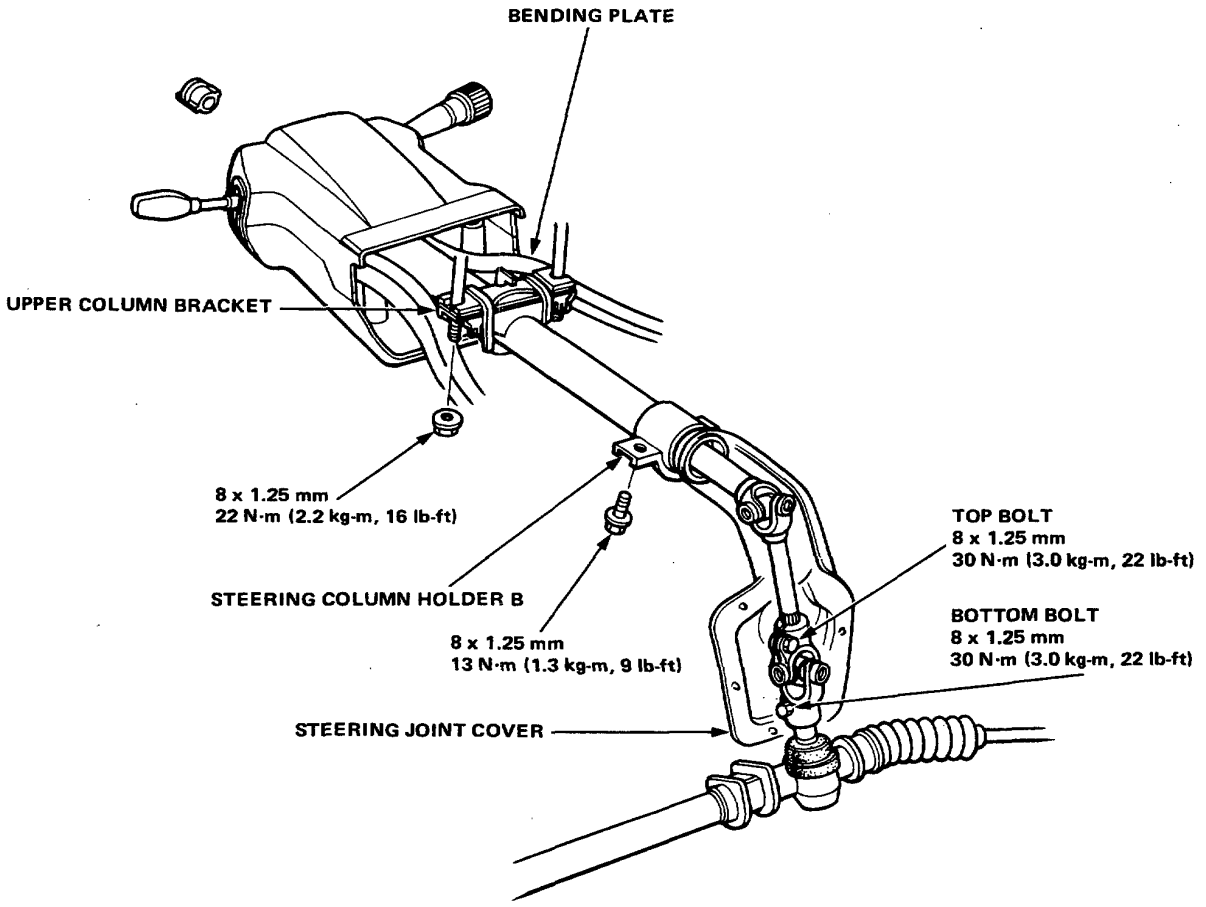


14. Install the upper column bracket, bending plate, and rubber band.



Installation

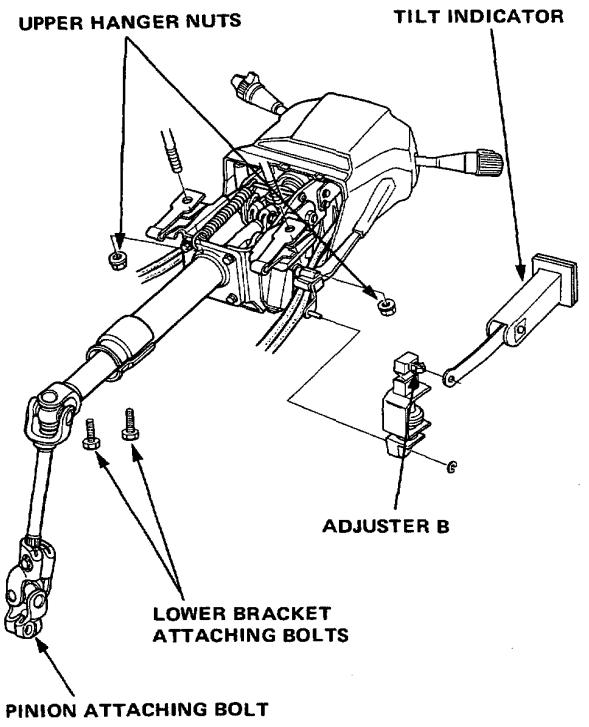
1. Hold the column in position while you loosely attach its upper bracket to the mounting studs.
2. Loosely install the lower bracket.
3. Pull down on the column to be sure the bending plate is seated snugly against the hook, then torque the upper bracket nuts to 13 N·m (1.3 kg-m, 9 lb-ft).
4. Torque the lower bracket bolts to 22 N·m (2.2 kg-m, 16 lb-ft).
5. Reconnect the wires harness connectors.
6. Slip the upper (longer) end of the joint onto the bottom end of the steering shaft, so its bolt hole lines up with the flat part of the shaft.
7. Slip the lower end of the joint onto the pinion shaft (line up its bolt hole with the groove around the shaft), install the bottom bolt and torque it to 30 N·m (3.0 kg-m, 22 lb-ft).
8. While pulling down on the steering shaft, install the top bolt in the joint; torque it to 30 N·m (3.0 kg-m, 22 lb-ft).



Tilt Steering

Removal

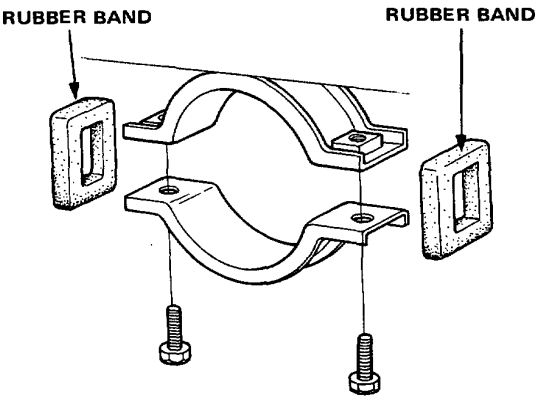
1. Remove the steering joint cover.
2. Remove the instrument panel lower cover.
3. Remove the pinion attaching bolt.
4. Remove the adjuster B from the tilt indicator.



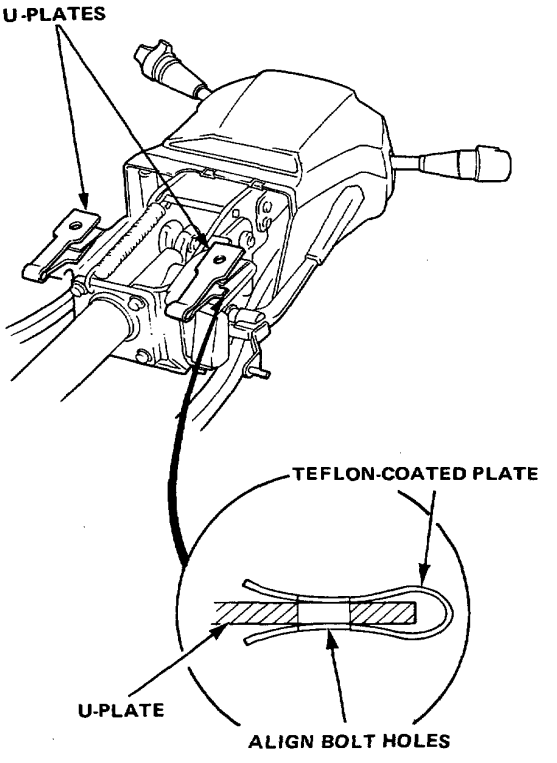
5. Remove the upper hanger mounting nuts.
6. Remove the lower bracket attaching bolts.
7. Disconnect the wire coupler and remove the steering column from the instrument panel.

Installation/Adjastment

1. Loosely install the lower bracket with two bolts and place the rubber bands on the ends of the brackets as shown.

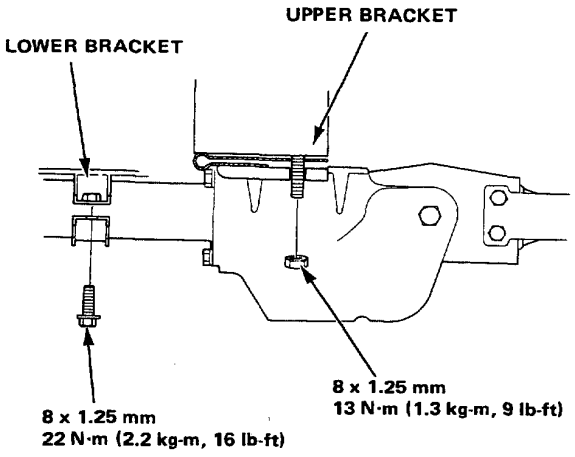


2. Slip the teflon-coated plate onto the column U-plates.

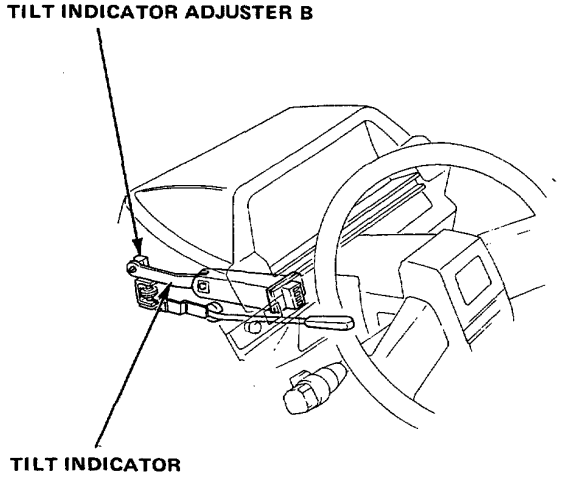


3. Slide the column through the lower bracket; install the steering wheel and pinion.

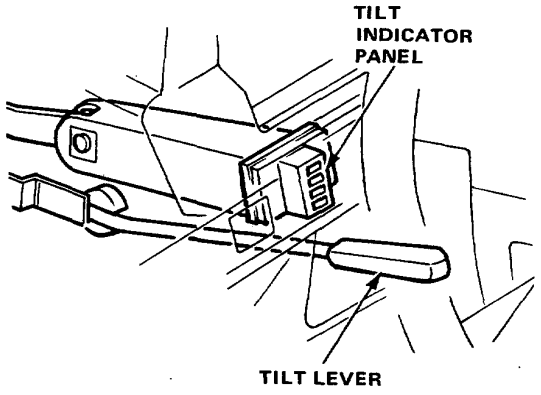
4. Tighten the two upper bracket nuts.



5. Tighten the two lower bracket bolts.
6. Set up the Tilt Indicator Adjuster B on the tilt Indicator.

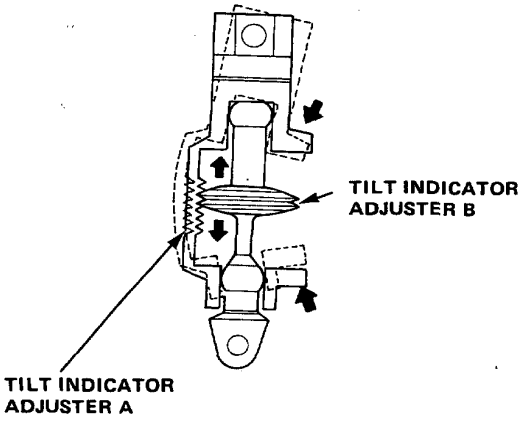


7. Push the tilt lever down all the way to the lowest position.
8. Check that the orange mark appears in the lowest window in the tilt indicator panel.



Adjust the tilt indicator if the orange mark does not align with the window properly;

- Squeeze the adjustar (B) on its shoulders until the stopper is clear of the toothed adjuster A.
- Relocate the stopper in grooves of the adjuster B so that the orange mark appears in the lowest window.



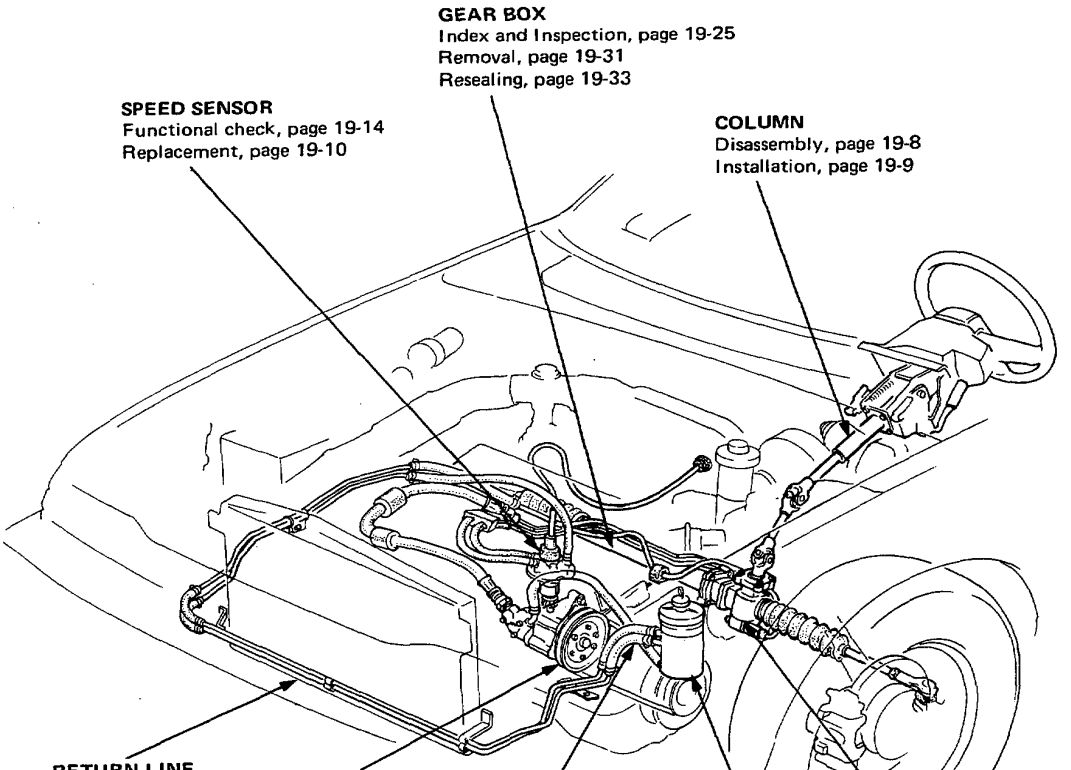
MEMO

Power Steering



Power Steering

Index

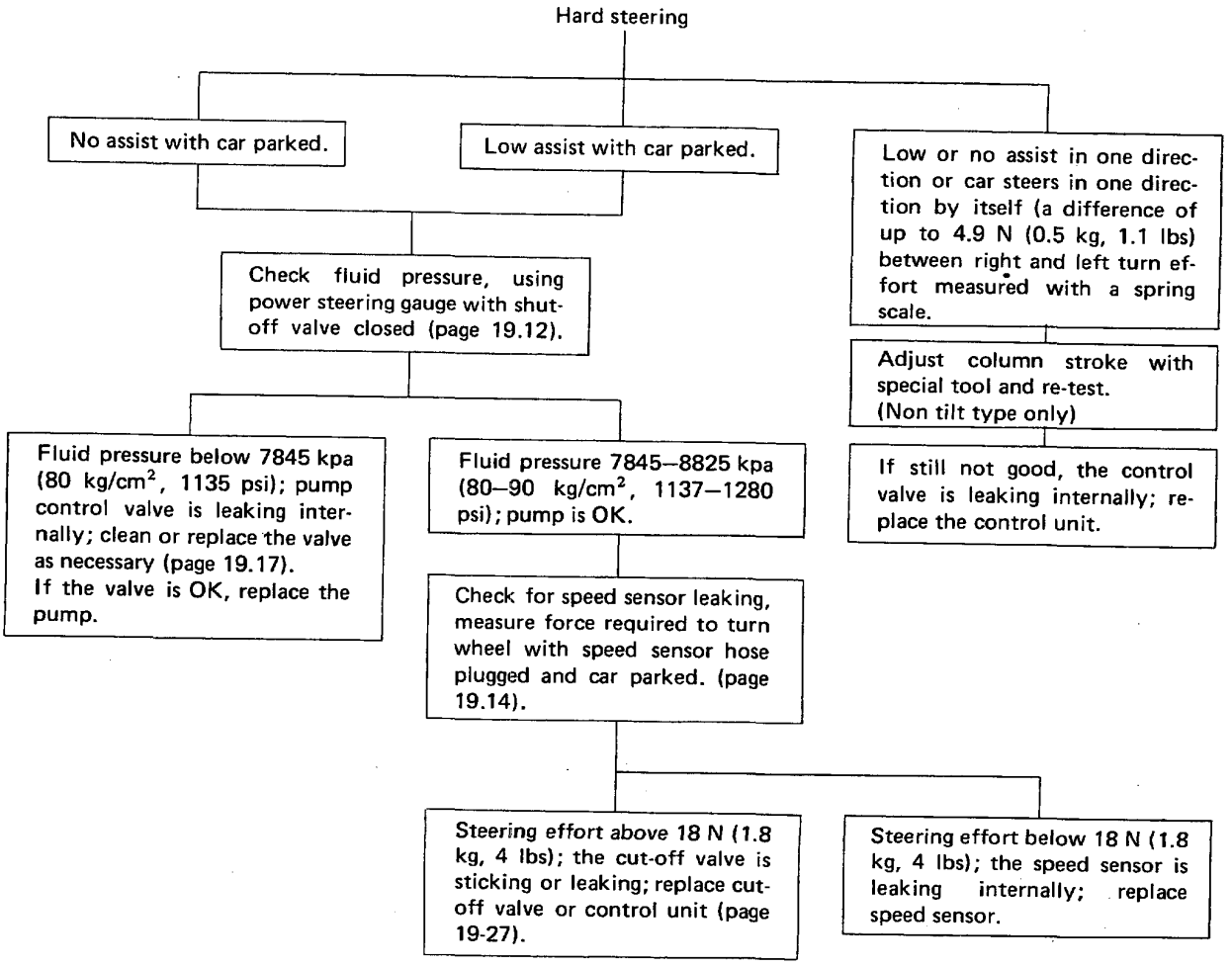


Troubleshooting

General

Check the following before you begin:

- Has the suspension been modified in a way that would affect steering?
- Are tire sizes and air pressure correct?
- Is the steering wheel original equipment or equivalent?
- Is the power steering pump belt properly adjusted?
- Is steering fluid reservoir filled to proper level?
- Is the engine idle speed correct and steady?

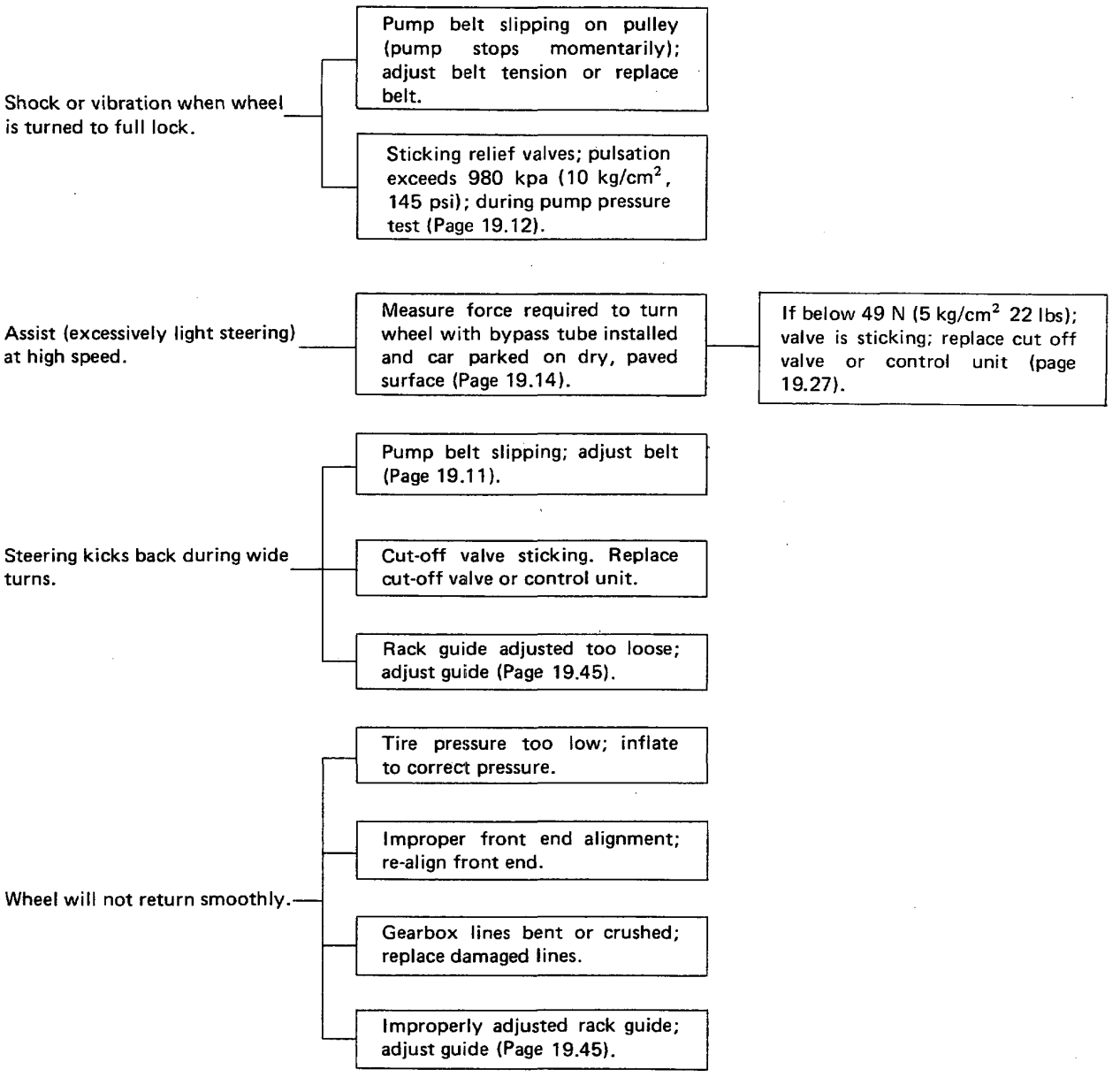


Troubleshooting

General (cont'd)

Uneven or rough steering.

- Belt slipping on pulley.
  Adjust belt tension. Replace belt if necessary (Page 19-10).
- Cut-off valve sticking or leaking.
  Replace cut-off valve or control unit (Page 19-27).
- Idle speed low or erratic (engine stalls when wheel is turned while car is stopped or moving at low speeds).
  Adjust carburetor idle (see Fuel section).
  - Check Power Steering Pump Preload (Page 19-17).
    If preload is above 4 N·m (0.4 kg-m, 3 lb-ft) the pump is probably damaged internally; clean or replace it as necessary (Page 19-16).
- Improperly adjusted steering shaft stroke;
  adjust shaft (Page 19-15).
- Air bubbles visible in reservoir fluid.
  Check fluid level.
  If low, check for leaks.
  Add fluid to proper level.
  - If fluid level is OK, check the pump inlet hose (both ends) and O-rings under the inlet-outlet fitting, for suction leaks. Replace parts as necessary.
- Improperly adjusted rack guide.
  Adjust rack guide (Page 19.11).
  - If the rack guide adjustment is OK, check the pinion bearings for wear; if worn, replace them (Pages 19-34 and 36).


Shock or vibration when wheel is turned to full lock.
Pump belt slipping on pulley (pump stops momentarily); adjust belt tension or replace belt.
Sticking relief valves; pulsation exceeds 980 kpa (10 kg/cm², 145 psi); during pump pressure test (Page 19.12).
Assist (excessively light steering) at high speed.
Measure force required to turn wheel with bypass tube installed and car parked on dry, paved surface (Page 19.14).
If below 49 N (5 kg/cm² 22 lbs); valve is sticking; replace cut off valve or control unit (page 19.27).
Steering kicks back during wide turns.
Pump belt slipping; adjust belt (Page 19.11).
Cut-off valve sticking. Replace cut-off valve or control unit.
Rack guide adjusted too loose; adjust guide (Page 19.45).
Wheel will not return smoothly.
Tire pressure too low; inflate to correct pressure.
Improper front end alignment; re-align front end.
Gearbox lines bent or crushed; replace damaged lines.
Improperly adjusted rack guide; adjust guide (Page 19.45).

Troubleshooting

Noise and Vibration

NOTE: Pump noise within 2–3 minutes after starting in cold weather (–20°F or colder) is normal.

Humming
- Humming, due to pulsation of fluid, is normal, particularly when wheel is turned with car stopped.
- If Automatic transmission, hum could be torque converter noise; confirm by temporarily removing pump belt.
- High pressure line touching the frame; reposition the line.

Squeaking
- Belt slipping; tighten or replace belt.
- Pinion shaft seal not lubricated; grease it.
- Horn contact not lubricated, or under too much pressure; grease the contact, or bend it to reduce the pressure.
- Burrs on the pinion gear; remove pinion and file burrs smooth.

Rattling or chattering
- Normal "clunk" of linkage taking up clearance when wheel is turned with engine off.
- Loose pump pulley; tighten or replace it. If shaft is loose, replace the pump.
- Loose steering shaft connector, tie-rod, or ball joint; check and tighten, or replace parts.
- Lower column hanger bushing damaged; replace bushing.

Hissing
- Lines or hoses from the control unit touching each other; reposition lines so they don't touch.
- If the control unit lines are not touching, and noise is from control valve replace the control unit.

Pump gear noise
- Normal. Check pump noise on a car you know is OK, then compare.

Grating noise from pump (cavitation caused by air bubbles in fluid.)
- Check fluid level; if low, fill reservoir to proper level, and check for leaks. Tighten or replace parts.
- Check for crushed suction hose or loose hose clamp allowing air into the system. Tighten or replace parts.

Fluid Leaks

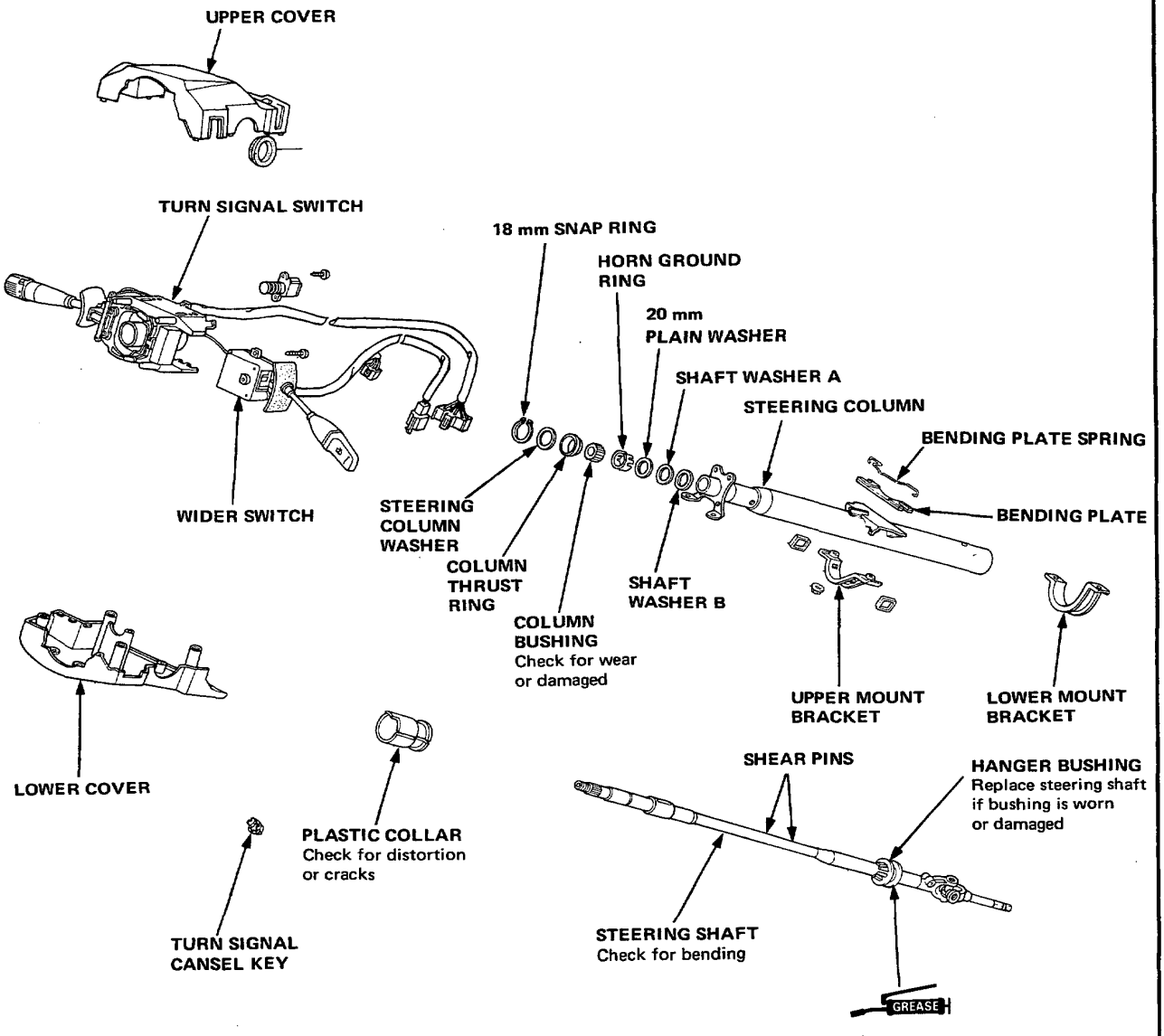
Steering gearbox	Leaking from cylinder end seal into tie-rod boots; replace seals.	
	Leaking from top (gearbox face) or either side of valve body; replace all control unit seals and O-rings.	
	Leaking from drilled passage plug (steel ball); replace control valve body.	
Pump	Front seal leaking; replace it (page 19-21).	
	Pump housing leaks at either end; replace housing O-rings.	If housing still leaks, replace the pump (page 19-21).
	Inlet-outlet fitting leaks from its base; replace fitting O-rings.	
	Leaking from return fitting (on front of pump), or from drilled passage plug; replace the pump.	
	Leaking from hose connection at inlet-outlet fitting; tighten the connection.	If it still leaks, check for damage and foreign matter in the hose and the fitting; if necessary, replace the hose and/or fitting.
Speed sensor	Leaking anywhere; replace the sensor.	
Reservoir	Leaking from around dipstick; reservoir overfilled. Pull off hose and drain to proper level.	
Pump outlet line (high pressure)	Leaking at threaded fitting; tighten fitting. If still leaking, replace hose.	
	Leaking at swaged joint; replace hose.	
Low pressure hoses	Leaking because of damage, deterioration, or improper assembly; replace or repair as necessary.	

Column

Disassembly/Inspection (Non tilt type, For canadian model)

CAUTION: Do not drop the steering shaft; the impact may break the shear pin in the steering shaft.

1. Remove the upper and lower column covers.
2. Remove the screws holding turn signal switch, then remove switch.
3. Remove the bending plate, and upper mount bracket.
4. Turn ignition switch to I position.
5. Remove the 18 mm snap ring from top end of the steering shaft.
6. Remove the plastic collar, then remove the shaft from bottom end of the column.
7. Remove the column washer, thrust ring, bushing, plain washer. Shaft washers A. B, from top end of column.



Installation/Adjustment (Non tilt type, For canadian model)

NOTE:

- On models equipped with a non-tilt steering column, a special tool is required to position the column during removal and installation. When properly adjusted, the column should move 1 mm out when the steering wheel is turned left, and 1 mm in when the wheel is turned right, for a total of 2 mm movement.
- When cars are equipped with a tilt type power steering, no special tool is required to position the steering column. This type can be serviced in the same manner as for the non-tilt type steering column except for steps regarding the special tool.

Non-tilt type

1. Install the special tool on the top end of the steering column as far as it will go.
2. Loosely install the upper bracket nuts and pull down on the column to be sure the bending plate is seated snugly against the hook.
3. Loosely install the lower bracket and pull down on the column so that there is no clearance between the bending plate and hook.
4. Tighten the upper bracket nuts to the specified torque.

   TORQUE: 14 N·m (1.4 kg-m, 10 lb-ft)

5. Tighten the lower bracket bolts to the specified torque.

   TORQUE: 22 N·m (2.2 kg-m, 16 lb-ft)

6. Pull down on the column joint fully, tighten the top bolt.

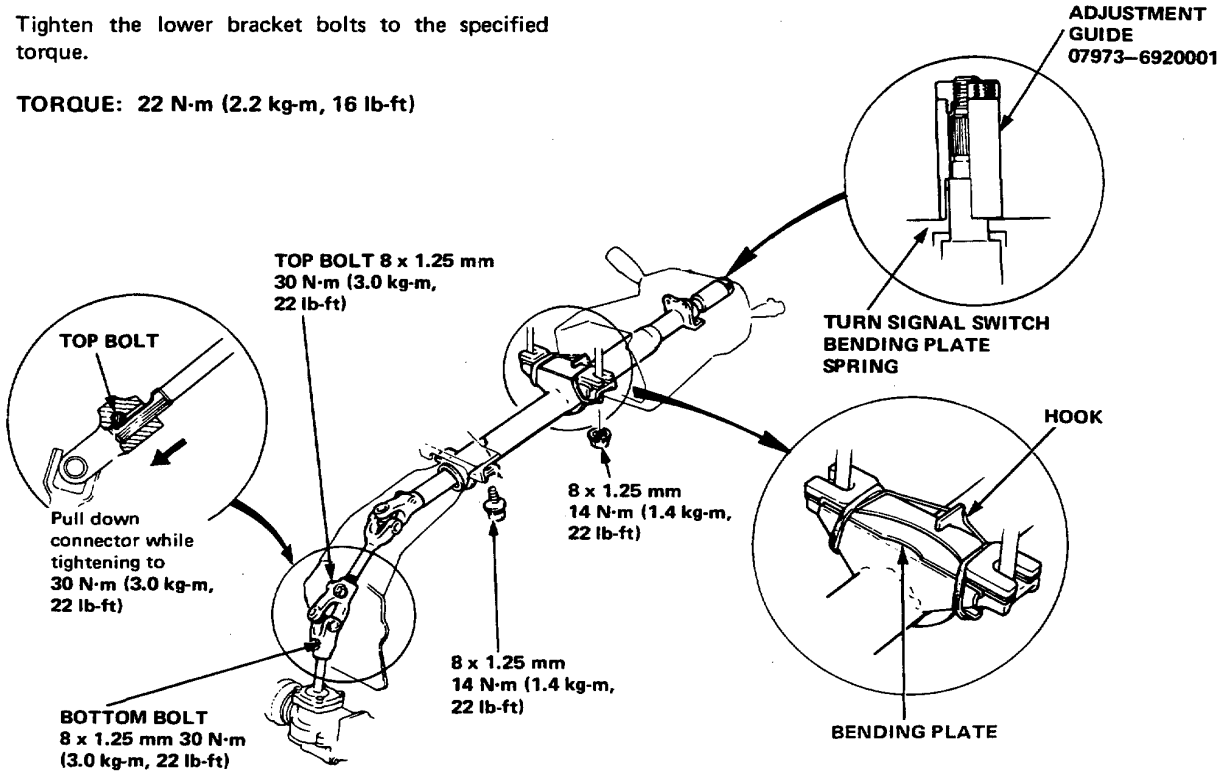
   TORQUE: 30 N·m (3,0 kg-m, 22 lb-ft)

7. Tighten the bottom bolt.

   TORQUE: 30 N·m (3.0 kg-m, 22 lb-ft)

   NOTE: Make sure that the end of the tool should bottom against the combination switch as shown.

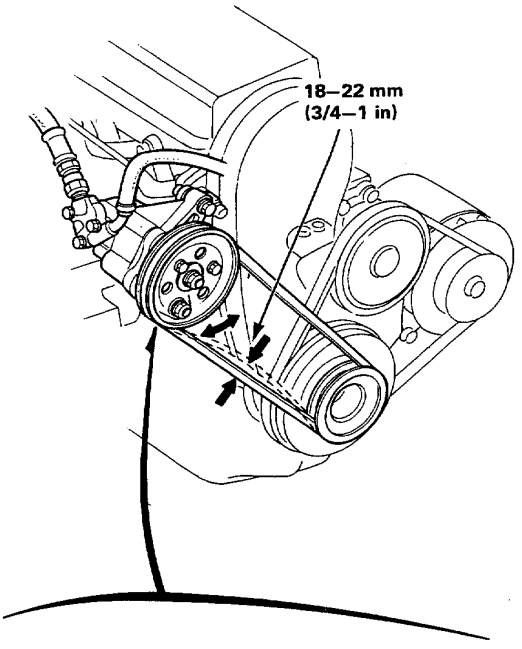
8. Install the column boot.

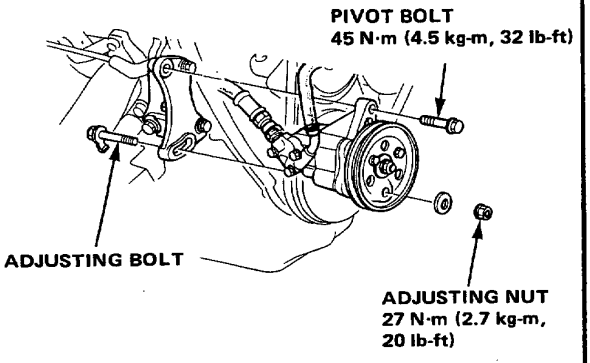


Pump Belt Adjustment

A properly adjusted belt should deflect about 18–22 mm (3/4–1 in) when you push on it mid-way between the pulleys with a force of about 100 N (10 kg, 22 lbs).

1. Loosen the pump adjusting nut.

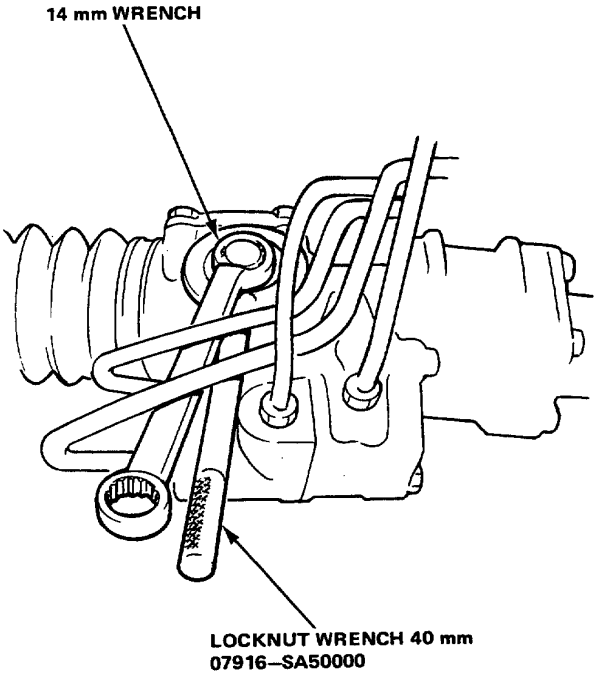




2. Pry the pump away from its bracket to get the proper tension, then retighten the nut.

Rack Guide Adjustment

1. Loosen the locknut on the rack guide screw with the special wrench as shown.



2. Tighten the guide screw until it compresses the spring and seats against the guide; then loosen it, and retighten it to about 3 N·m (0.3 kg-m, 2 lb-ft) and back it off about 35° (about 1/10 of a turn). Tighten the locknut to about 25 N·m (2.5 kg-m, 18 lb-ft) while holding the guide screw there.

3. Check the steering effort as described on page 19-15.

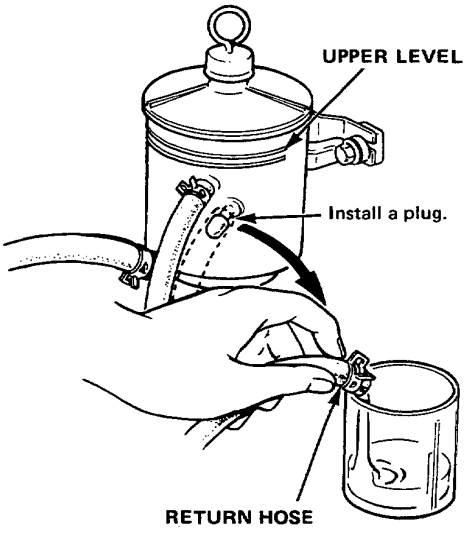
Fluid Replacement

Check the reservoir at regular intervals, and add fluid as necessary.

CAUTION: Use only GENUINE HONDA power steering Fluid. Using other fluids such as ATF or other manufacturer's power steering fluid will damage the system.

The fluid should be replaced whenever the system is opened for repairs or if the fluid gets water or dirt in it.

1. Disconnect the return hose from the gearbox at the reservoir, and put the end in a suitable container.
2. Start the engine, let it run at idle, and turn the steering wheel from lock-to-lock several times. When fluid stops running out of the hose, shut off the engine. Discard the fluid.



3. Fill the reservoir to the upper level mark.
4. 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.
5. Recheck the fluid level and add some if necessary.

CAUTION: Do not fill the reservoir beyond the upper level mark.

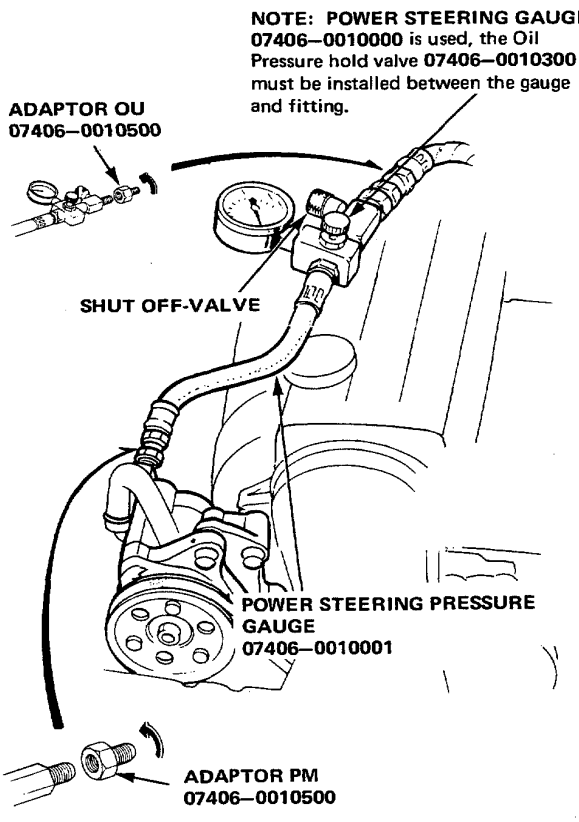
On-Car Checks

Pump Pressure Check

Check fluid pressure as follows to determine whether the trouble is in the pump or gearbox:

NOTE: First check the power steering fluid level and pump belt tension.

1. Disconnect the outlet hose from the pump outlet fitting, and install the pressure gauge and the adaptor OU, PM as shown.



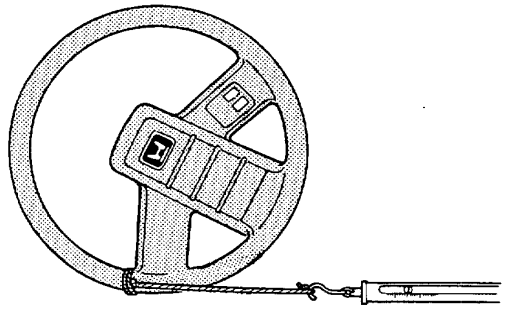
2. Open the shut-off valve fully.
3. Open the pressure control valve fully.
4. Start the engine and let if idle.
   Idle speed:
   Manual **750 ± 50 rpm**
   Automatic: **750 ± 50 rpm (in gear)**
5. Turn the steering wheel from lock-to-lock several times to get the fluid up to operating temperature.
6. Close the shut-off valve, then, close the pressure control valve gradually until the pressure gauge needle is stable, then read pressure.
7. Open the shut-off valve fully.

   CAUTION: Do not keep the shut-off valve closed more then 5 seconds or the pump could be damaged by over heating.

   If the pump is OK, the gauge should read at least 7845 kPa (80 kg/cm^2 1135 psi). A low reading means pump output is too low for full assist. Repair or replace the pump.

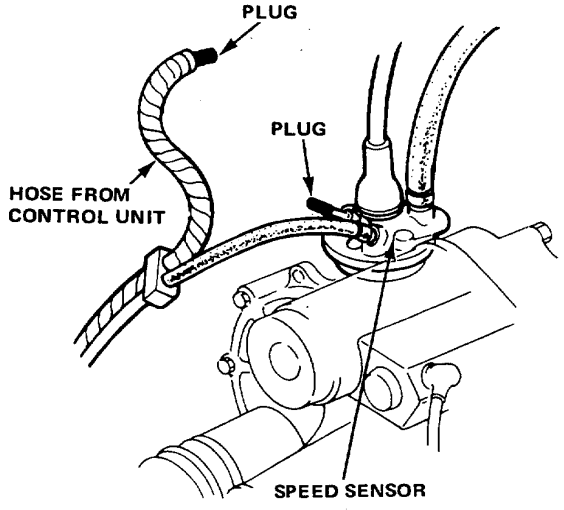
Assist Check with Car Parked

1. Check the power steering fluid level and pump belt tension.
2. Start the engine, allow to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid.
3. Attach a spring scale to the steering wheel. With the engine idling and the car on a clean, dry floor, pull the scale as shown and read it as soon as the tires begin to turn.



The scale should read no more than 18 N (1.8 kg, 4 lbs); if it reads more, go on to Step 4.

4. Stop the engine. Disconnect the large diameter hose running from the control unit to the speed sensor and plug the hose and the sensor fitting.

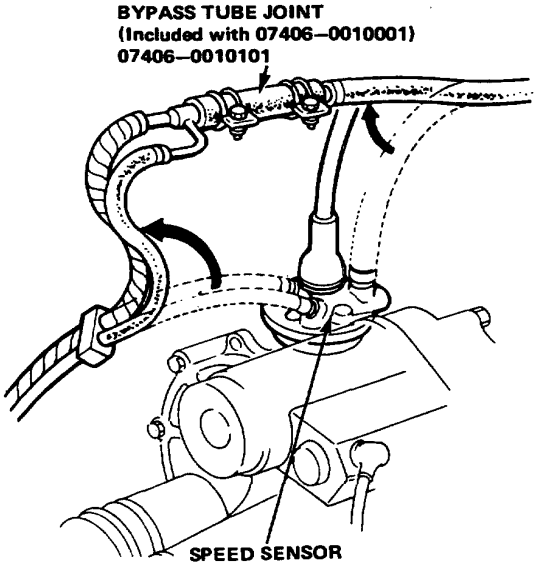


5. Start the engine and let it idle.
   - If the reading is less than 18 N (1.8 kg, 4 lbs); replace the speed sensor (Page 19-12).
   - If the reading is more than 18 N (1.8 kg, 4 lbs); check the gearbox and pump.

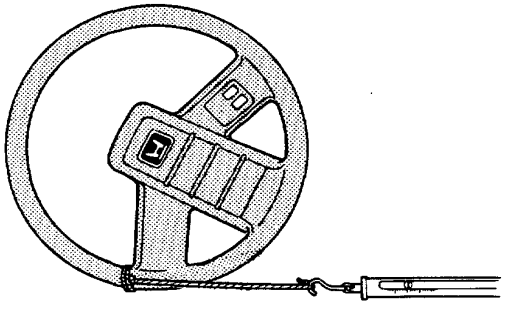
On-Car Checks

Asist check at Simulated 30mph

1. Check the power steering fluid level and pump belt tension.
2. Start the engine, let it warm up to normal temperature, and turn the steering wheel lock-to-lock few times to warm up the fluid.
3. Stop the engine. To simulate speeds above 50 km/h (30 mph), disconnect all three hoses from the speed sensor and connect them to the special bypass tool.



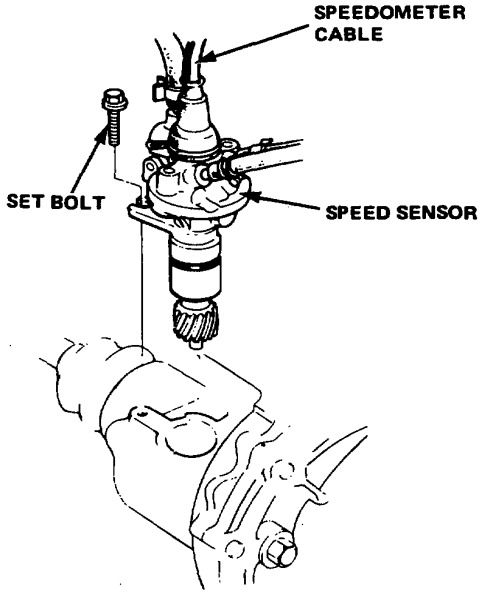
4. Start the engine and let it idle. with the car on a clean, dry floor, attach a scale as shown, and record the pull required to move the front wheels.



- If the scale reads a normal 49 N·m (4.9 kg-m, 11 lb-ft), or more, the assist at high speeds is being caused by reduced speed sensor output. Replace the sensor.
- If the scale reads less than 49 N·m (4.9 kg-m, 11 lb-ft), the sensor is OK, and the problem is in the sensor feed line, the pump, or the gearbox. See if the feed line is pinched or bent then check pump.

Speed Sensor Replacement

1. Pull up the speedometer cable boot, remove the clip, and pull out the cable.
2. Disconnect and plug the speed sensor hoses, back off the speedometer gear set bolt, and lift the speed sensor out.



NOTE: When removing the transmission, leave the hoses attached and lift the sensor out. Do not disassemble the sensor; separate parts are not available.

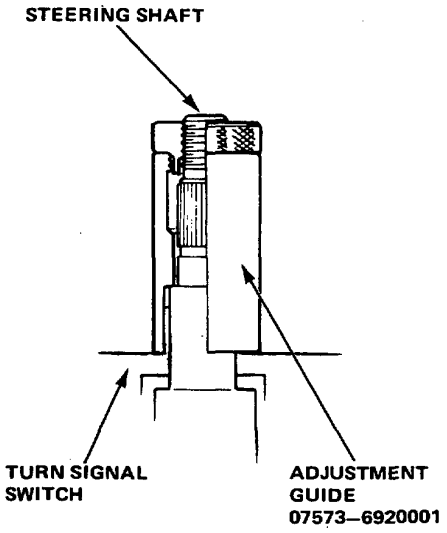
3. After installing a new sensor, turn the steering wheel from lock-to-lock with the engine idling, to bleed air from the system.
4. Check the reservoir and add fluid if necessary.

Steering Shaft Adjustment (Non tilt type only)

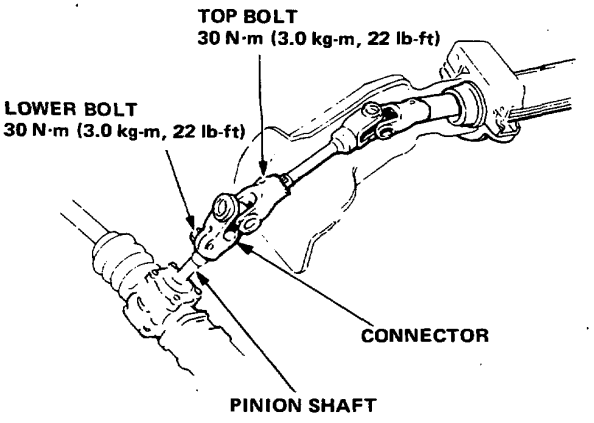
NOTE: A special tool is required to position the steering shaft during column installation. Lowering the column for access to gauges and wiring, without loosening the connector bolts, does not require repositioning.

When properly adjusted, the shaft should move 1 mm in when the steering wheel is turned left, and 1 mm out when the wheel is turned right, for a total of 2 mm, movement.

1. Remove the steering wheel and the turn signal cancelling sleeve..
2. Install the special tool on the top end of the steering shaft as far as it will go; the end of the tool should bottom against the turn signal switch as shown.



3. Remove the boot from the base of the steering column, and loosen the top bolt in the connector assembly. Check the upper and lower bolts to be sure they are tight.



4. Then pull down on the top half of the connector while you tighten the top bolt. Check to be sure the legs to the tool are now seated against the turn signal switch body.
5. Reinstall the boot, cancelling sleeve, and steering wheel. Be sure the lugs on the cancelling sleeve are lined up with the grooves in the steering wheel hub before tightening the steering shaft nut.

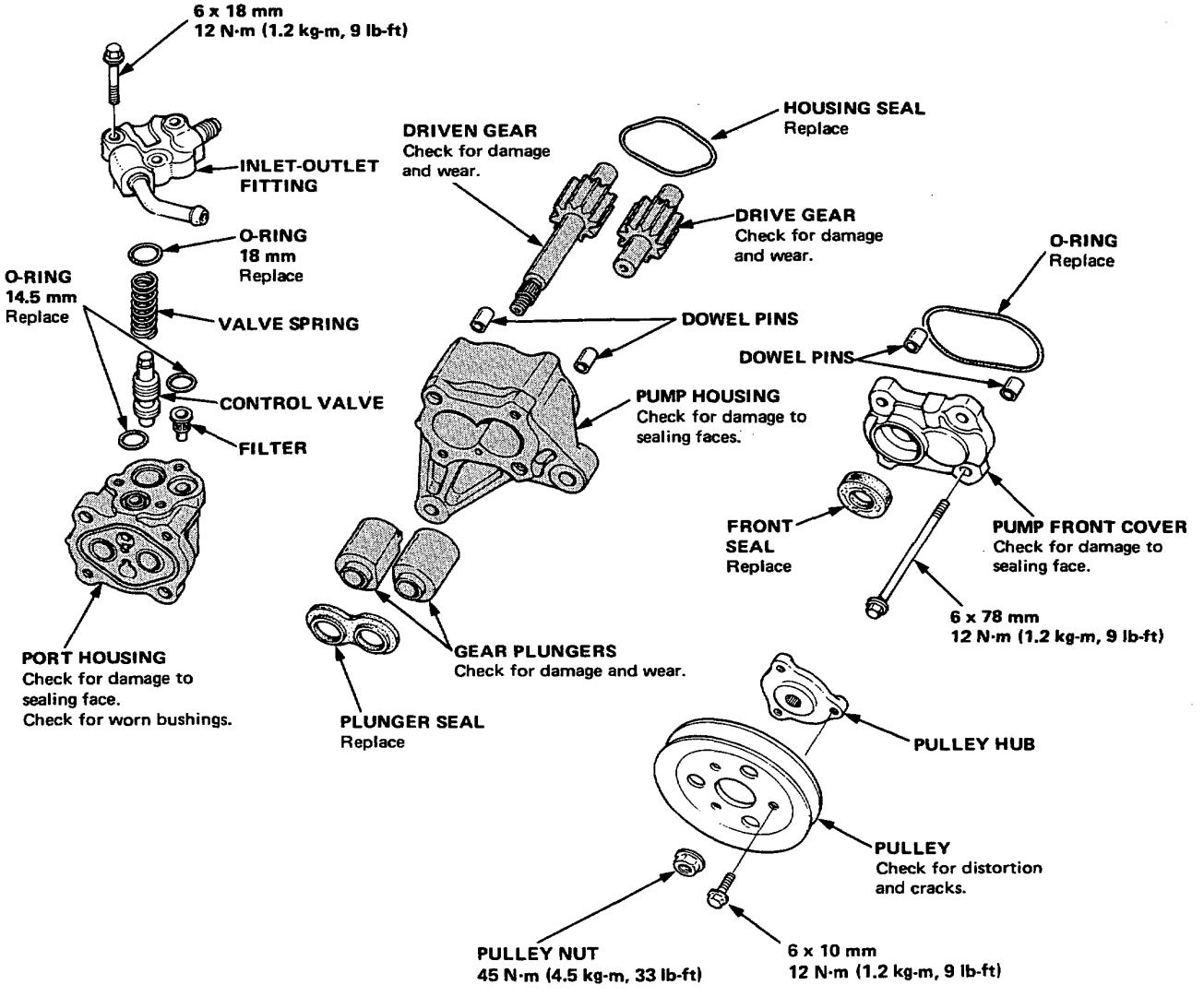
Pump

Index and Inspection

GREASE Use only STEERING GREASE ..... (Honda part number 08740–99969) on seals and O-rings.

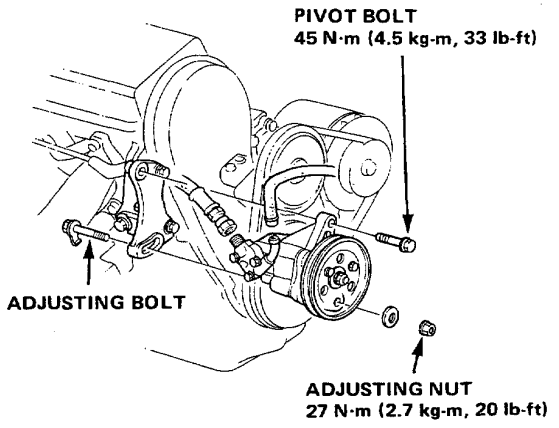
CAUTION: Pump components are made of aluminum. Be careful not to damage them when servicing.

- Clean all the disassembled parts thoroughly.
- Replace all O-rings and seals. *Do not dip new O-rings and seals in solvent; coat O-rings with steering grease before* installation, and make sure they stay in place during reassembly.
- The shaded parts are selectively fitted, and should not be disassembled except to replace seals. If any one of them is faulty, replace the whole pump as an assembly.



Replacement

1. Drain most of the fluid from the system (page 19-10).
2. Disconnect the inlet, outlet, and lubrication return hoses at the pump.
3. Remove the belt by loosening the pump pivot bolt and adjusting nut.

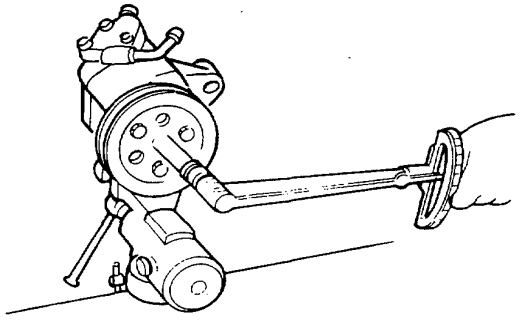


4. Remove both bolts and remove the pump.

Preload Inspection

Check pump preload with a torque wrench.

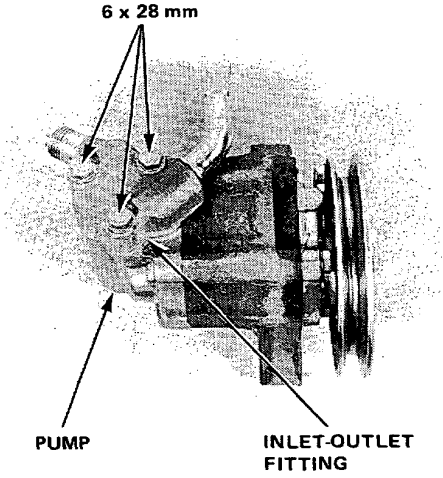
Preload: 4 N·m (0.4 kg-m, 3 lb-ft) max.



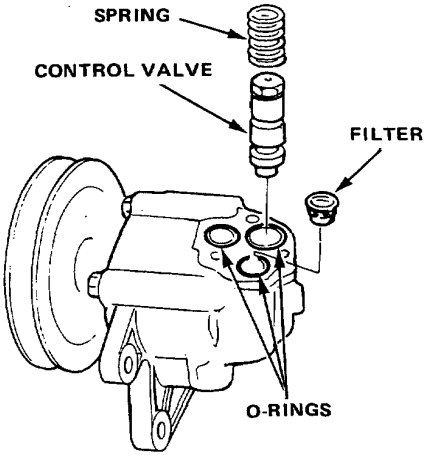
5. Install the pump in the reverse order of removal.
6. After installing the pump adjust belt tension (page 19-10).
7. Fill the reservoir with new fluid, to the FULL mark on the reservoir.
8. Start the engine and let it run at fast idle while turning the steering wheel lock-to-lock several times to bleed air from the system.
9. Check the reservoir and add fluid if necessary.

Control Valve Inspection and Replacement

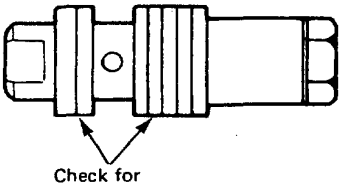
1. Remove the pump from the car (see previous column).
2. Then remove the inlet-outlet fitting from the pump (3 bolts).



3. Remove the O-rings, then pull the filter out of the port housing, and inspect it.



4. Pull the spring and valve out of the housing.
5. Check for wear, burrs, and other damage to the edges of the grooves in the valve.

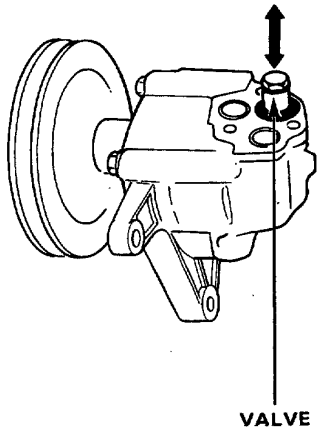


(cont'd)

Pump

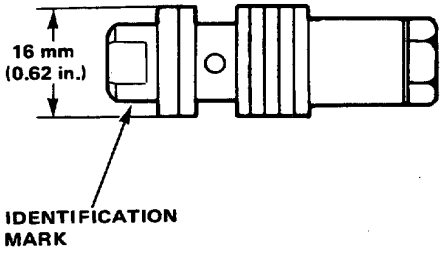
Control Valve Inspection and Replacement (cont'd)

6. Slip the valve back in the pump and check that it moves up and down smoothly.



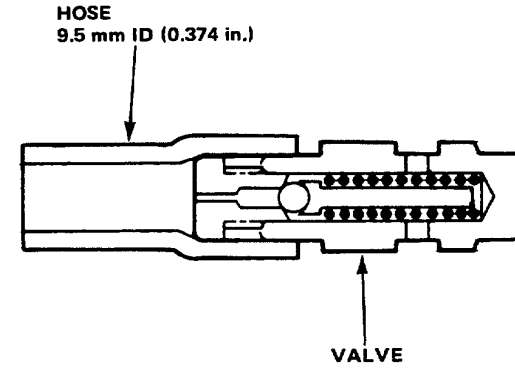
If OK, go on to step 7, if not, replace the valve:

- The original valve was selected for a precise fit in the port housing bore, so make sure the new one has the same identification mark.

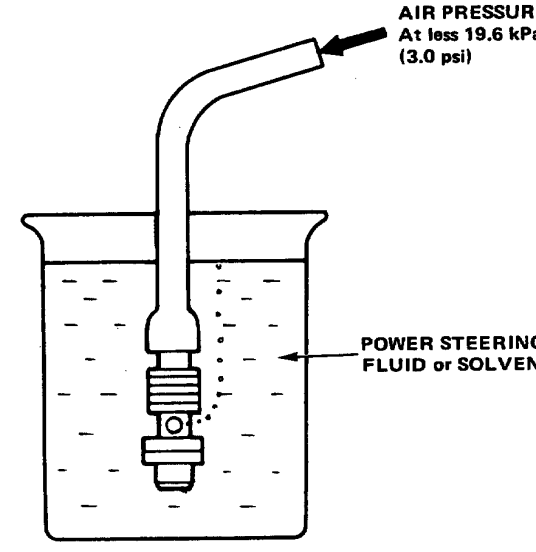


Mark	Part Name	Part No.
A	CONTROL VALVE NO. 1	56350–PC1–0000
Without mark	CONTROL VALVE NO. 2	56360–PC1–0000

7. Attach a hose to the end of the valve.



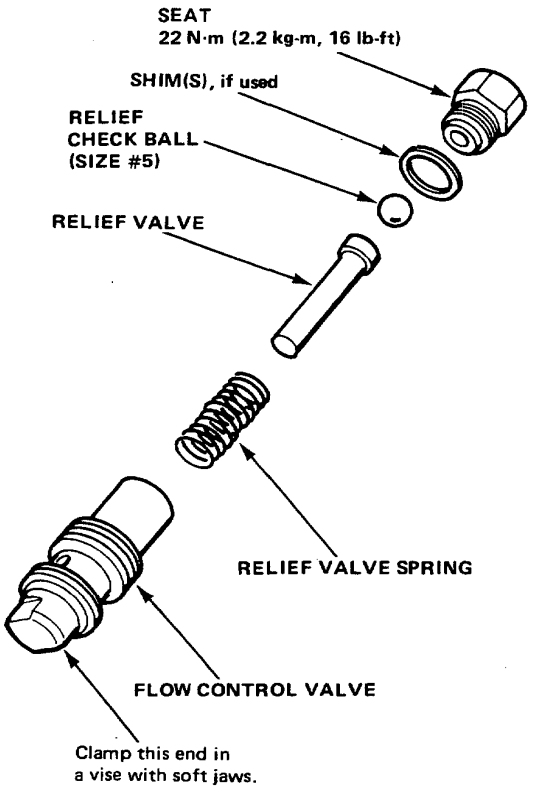
8. Then submerge the valve in a container of power steering fluid or solvent, and blow on the hose.



Replace the valve or repair it (next page) if you see air bubbles leak through it.

9. If the valve leaks, clamp the bottom end of it in a vise that has soft jaws.

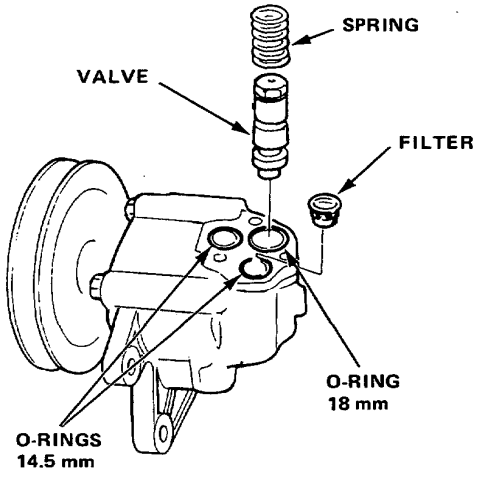
10. Unscrew the seat in the top end of the valve, and remove any shims, the check ball, the relief valve and its spring.



11. Clean all the parts in solvent, dry them off, then reassemble and re-test the valve.

NOTE: If necessary, relief pressure is adjusted at the factory by adding shims under the check ball seat. If you found shims in your valve, be sure you reinstall as many as you took out.

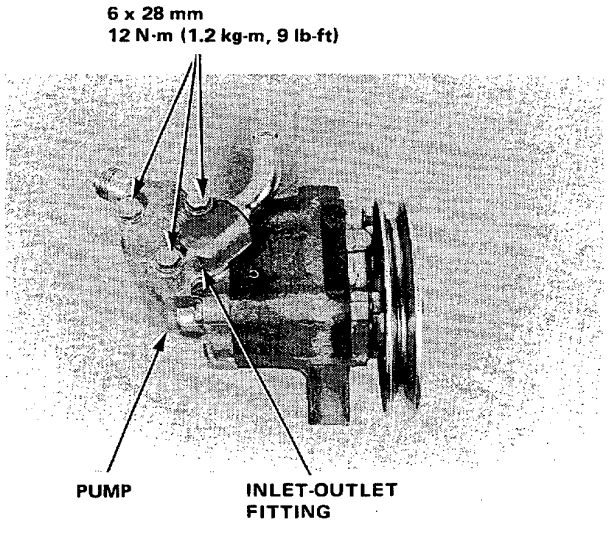
12. Coat the new O-rings with grease to hold them in place, then install them on the port housing.



13. Reinstall the filter in the Port housing.

14. Coat the valve with power steering Fluid, then install it and its spring.

15. Reinstall the inlet-outlet fitting on the pump, then reinstall the pump on the car.



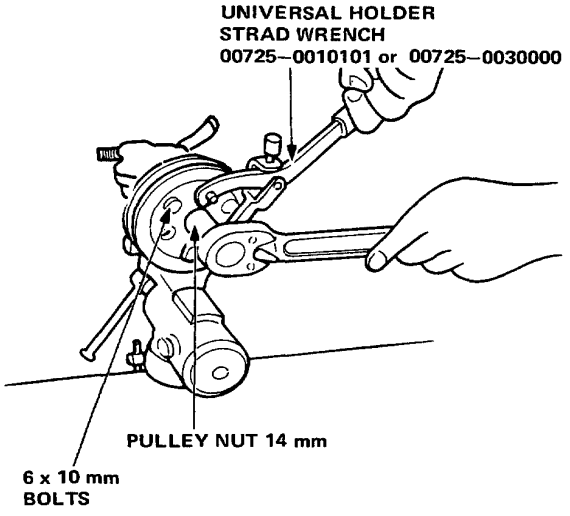
Pump

Resealing

CAUTION: Do not drop or impart shocks to the pump as the alminum parts may be damaged.

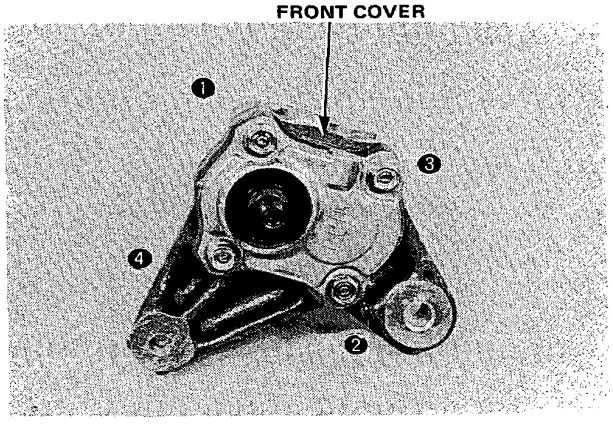
1. Remove the pump from the car (page 19-17), and mount it in a vise as shown.

2. Remove the pulley. If it's damaged, remove its 3 hub bolts first, if not, just remove the pulley nut with a wrench and the strap wrench shown.



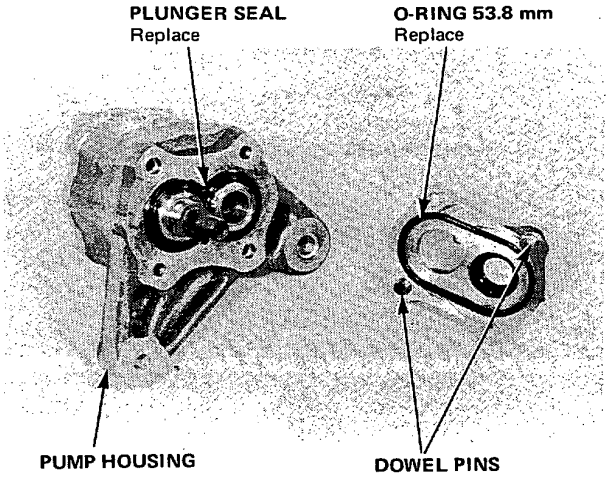
3. If parts other than the front seal are leaking, go on to step 4. If only the front seal is leaking, remove four bolts on the front cover and pry out the front seal with a screwdriver.
   Get new seal started by hand, then use a 19 mm socket to push it in the rest of the way.
   NOTE: Make sure the oil passage in the front cover is not clogged (See page 19-22).
   Go on the step 23 and subsequent steps.

4. Loosen the four bolts in the sequence shown, then remove them and the front cover.



   NOTE: Remove the inlet-outlet fitting and control valve only if they need repair (page 19-17).

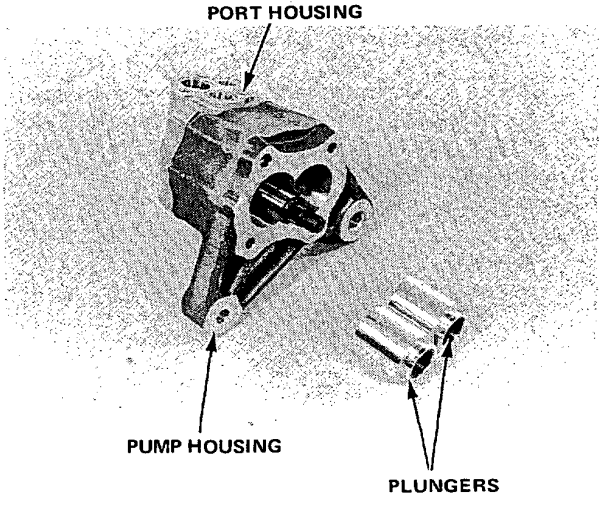
5. Remove the O-ring and dowel pins from the front cover.



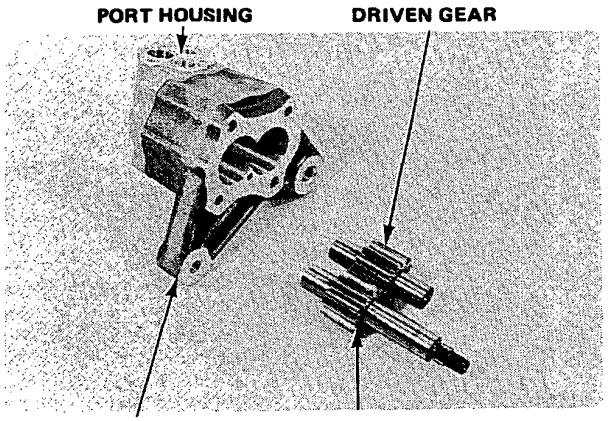
6. Remove the plunger seal from the pump housing.

7. Remove the plungers from the pump housing.

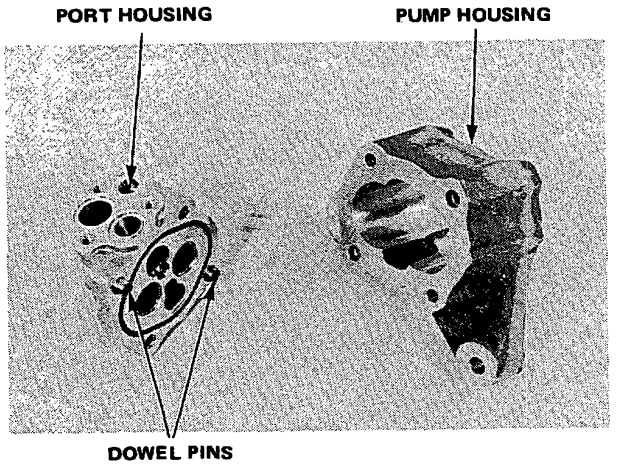
   NOTE: Do not separate the pump housing and port housing before removing the plungers and gears, the plungers and gears may fall out and be damaged.



8. Remove the drive and driven gears from the pump.

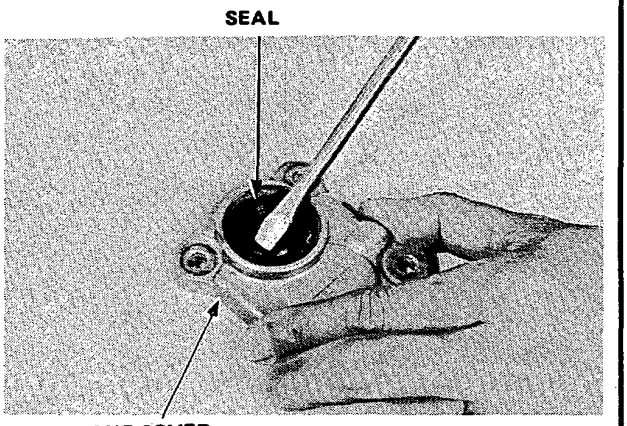


9. Separate the pump housing from the port housing.

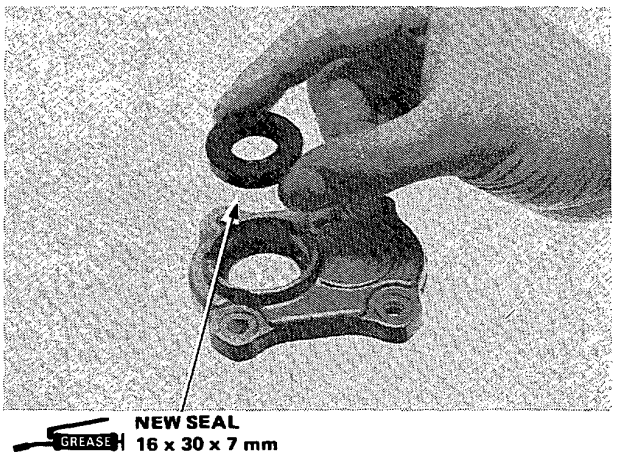


10. Remove the housing seal and dowel pins from the Port housing.

11. Pry the seal out of the front cover.



12. Install a new seal in the cover; get it started by hand, then use a 19 mm socket to push it in the rest of the way.



13. Coat the lip of the seal with grease.

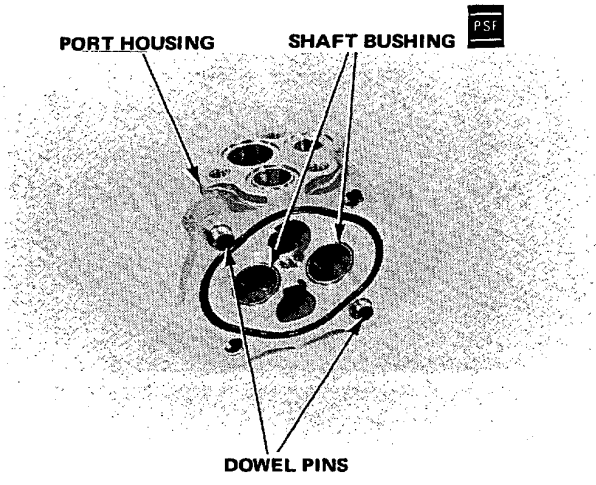
(cont'd)

Pump

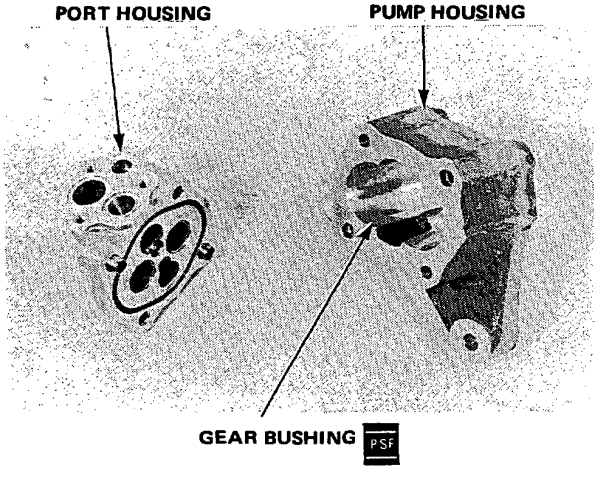
Resealing (cont'd)

14. Put grease in the groove first, then position a new O-ring on the Port housing.

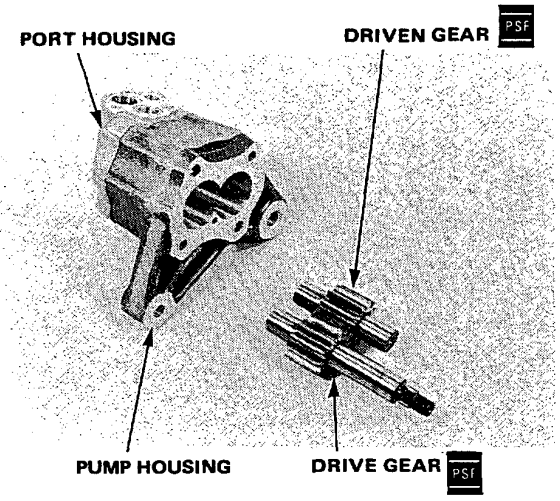
15. Lubricate the shaft bushing and inside surface of the port housing with power steering fluid.



16. Lubricate the gear bushings and inside surface of the pump housing with power steering fluid.

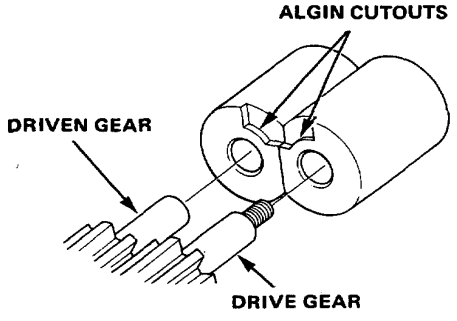


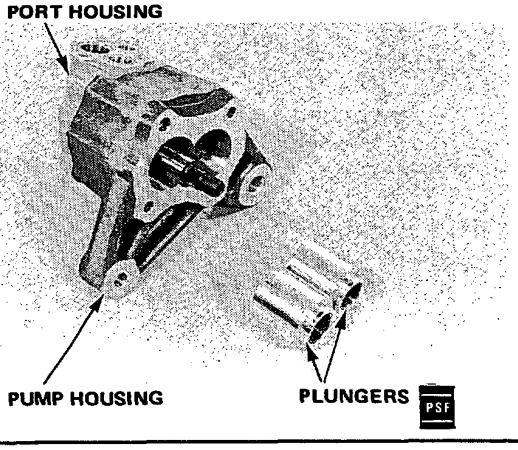
17. Lubricate the gears with power steering fluid, then insert them in the pump casing/body aseembly.



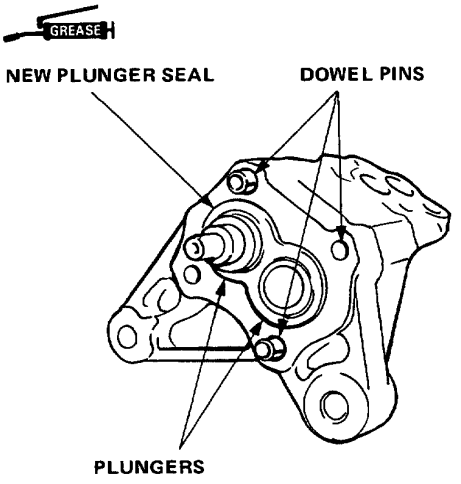
18. Coat the entire surfaces of the plungers with the POWER STEERING FLUID, then install them in the pump housing.

NOTE: Install the plungers so the cutouts are aligned as shown.



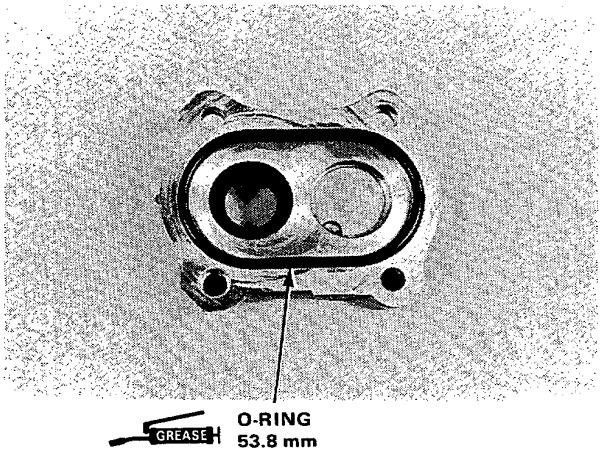


19. Grease the new plunger seal, then install it over the plungers.



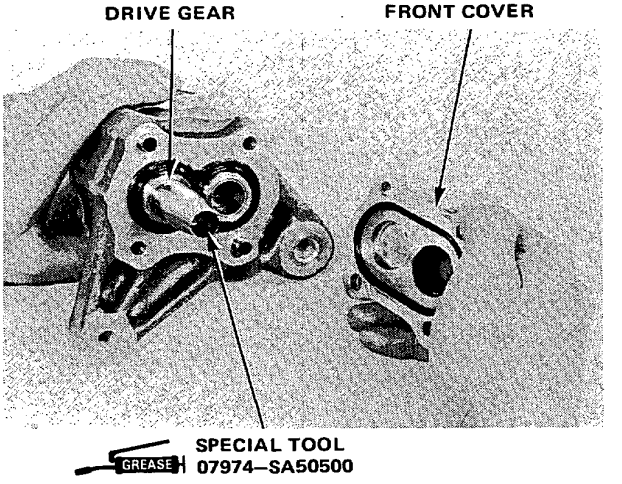
20. Install the dowel pins to the pump casing.

21. Put grease in the groove of the pump front cover first, then position a new O-ring on the cover.

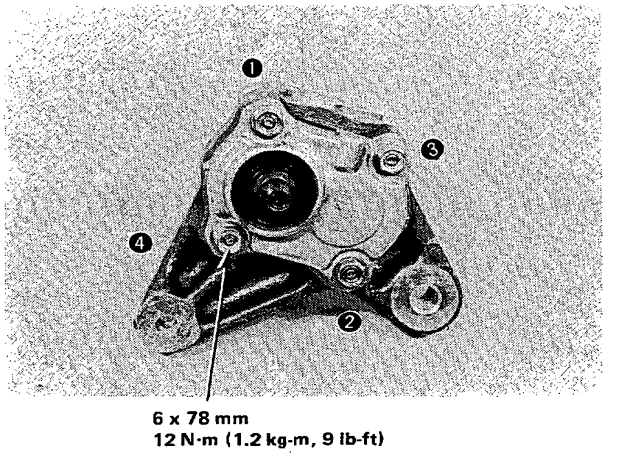


22. Grease the special tool, install it over the drive gear, then install the pump front cover on the pump.

CAUTION: Be careful not to damage the lip of the front cover oil seal with the end of the tool.



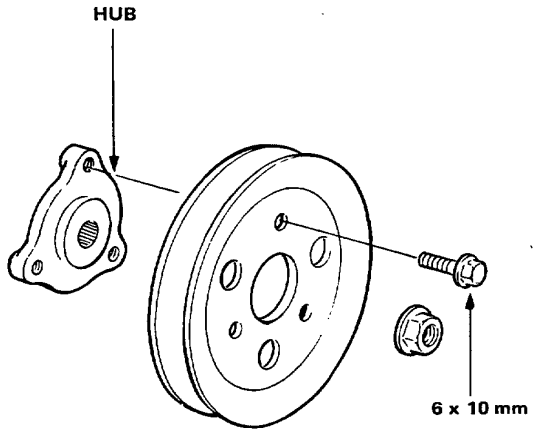
23. Install the four bolts. Torque them to the specified torque in the sequence shown.



(cont'd)

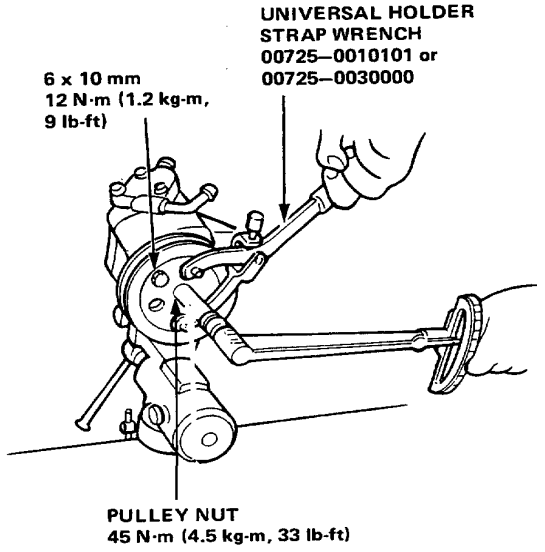
Resealing (cont'd)

24. If the old pulley was replaced, loosely install the new one on the hub with the 6 x 10 mm bolts.



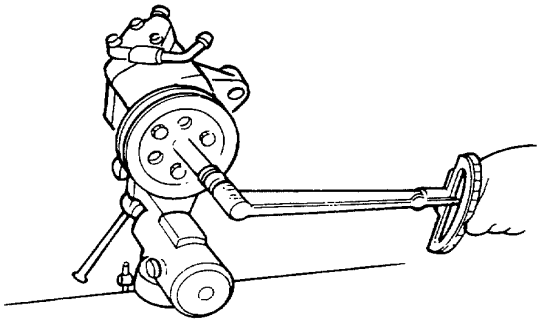
25. If the control valve and inlet-outlet fitting were removed, reinstall them (page 19-19).

26. Slide the pulley onto the pump shaft and hold it with the strap wrench while you tighten the three bolts and the nut.



27. Check oil pump preload with a torque wrench.

Preload: 4 N·m (0.4 kg-m, 3 lb-ft)

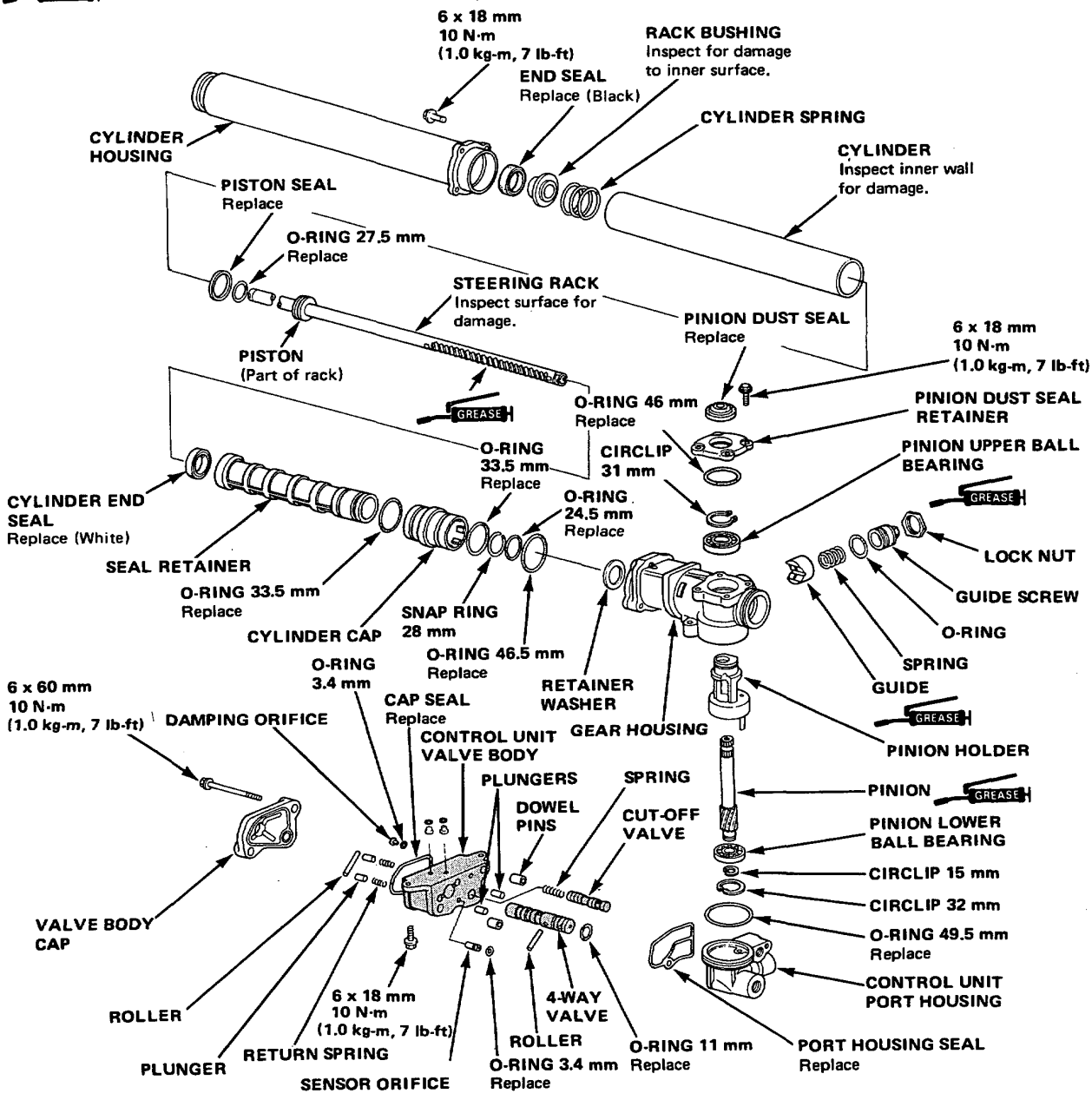


Gearbox

Inspection

1. Before disassembling the gearbox, wash it off with solvent and a brush.
2. Thoroughly clean all disassembled parts.
3. Always repalce O-rings and seals.
4. Replace parts with damaged sliding surfaces.
5. Do not dip seals and O-rings in solvent; coat O-rings with grease, and make sure they stay in position during re-assembly.
6. The shaded parts are a matched set; if any of them are faulty, replace all of them.

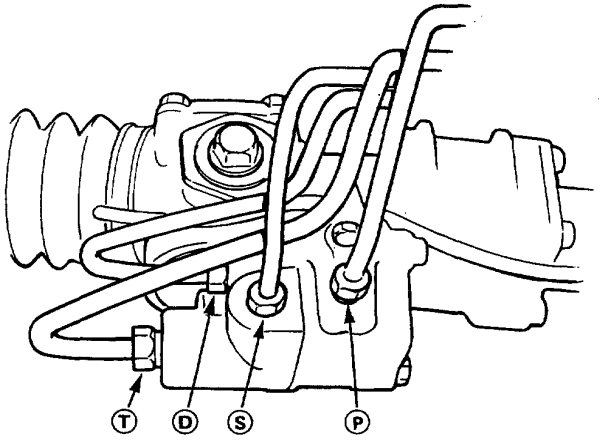
GREASE • STEERING GREASE ..... Honda parts number 08740–99969



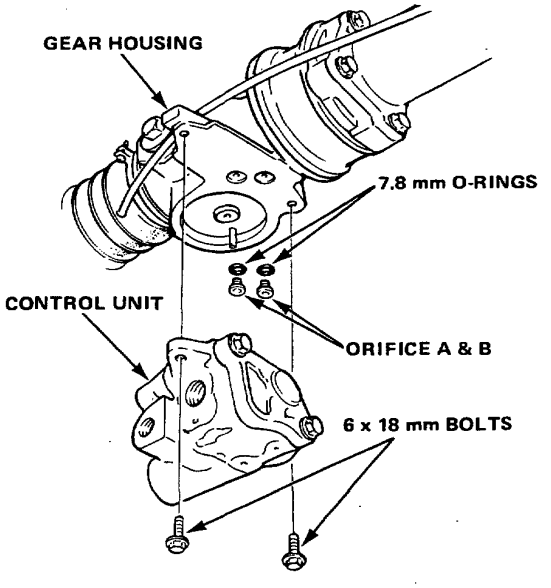
Control Unit Disassembly

1. Drain the power steering fluid (page 19-10).
2. Remove the gearbox shield.
3. Using solvent and a brush, wash any oil and dirt off the control unit, its lines, and that end of the gearbox. Blow dry with compressed air.
4. Using flare nut wrenches, disconnect the four lines from the control unit.

P:	From pump	14 mm wrench
S:	To speed sensor	12 mm
D:	To reservoir thru speed sensor	12 mm
T:	To reservoir thru cooler	17 mm

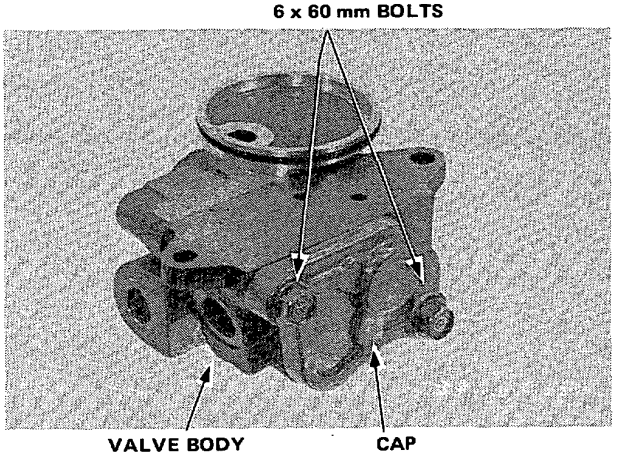


5. Remove the two 6 mm bolts holding the control unit to the gear housing.

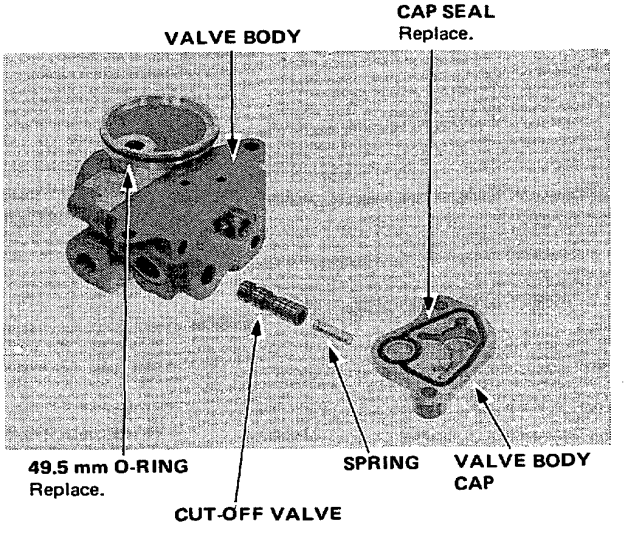


6. Remove orifice A, B and their 7.8 mm O-rings.

7. Remove the two 6 x 60 mm bolts and remove the cap from the valve body.

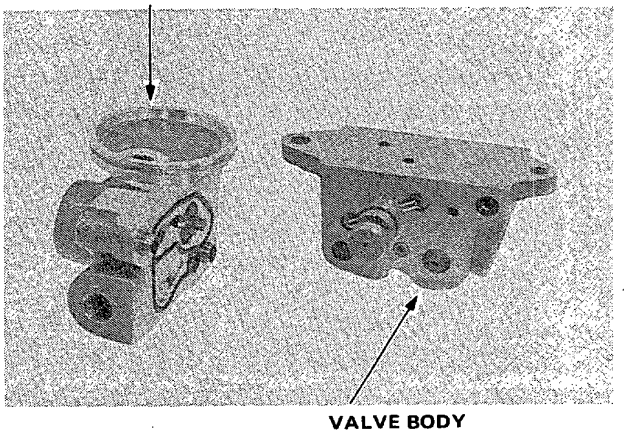


8. Remove the 49.5 mm O-ring.

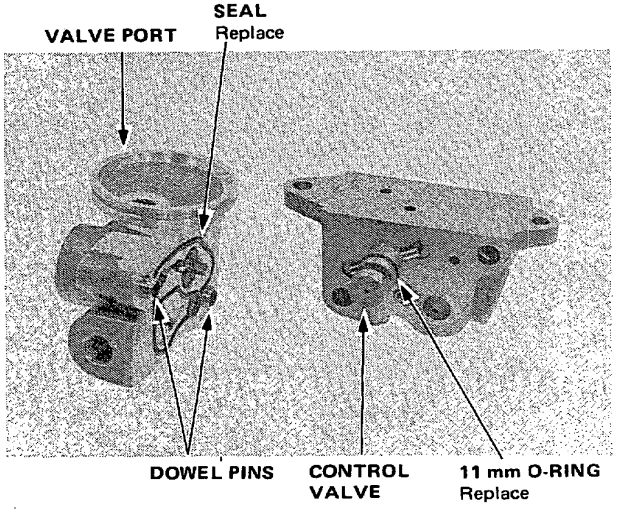


9. Remove the cap seal from the valve body cap.
10. Remove the cut-off valve and spring from the valve body.

11. Separate the valve body and port housing.



12. Remove the seal and dowel pins from the valve port housing.



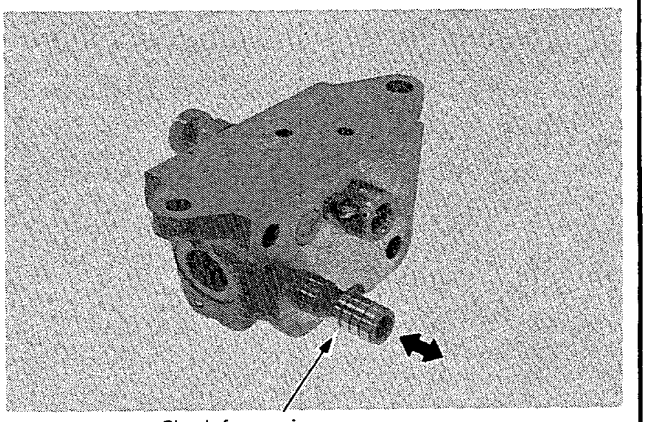
13. Remove the 11 mm O-ring from the control valve.

14. Check the cut-off valve:

- Inspect its surface for scoring or scratches.
- Slip it back into the valve body, and make sure it slides smoothly.
  Without drag and without side play.

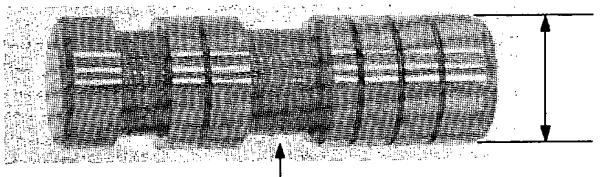
NOTE:

- The cut-off valve is sized to fit the valve body, so, if you replace it, make sure the new valve has the same indification mark on it.
- If the valve body is damaged, replace all three parts (valve body, cut-off valve and control valve) as a set.



Check for scoring or scratches, and rough operation.

CUT-OFF VALVE



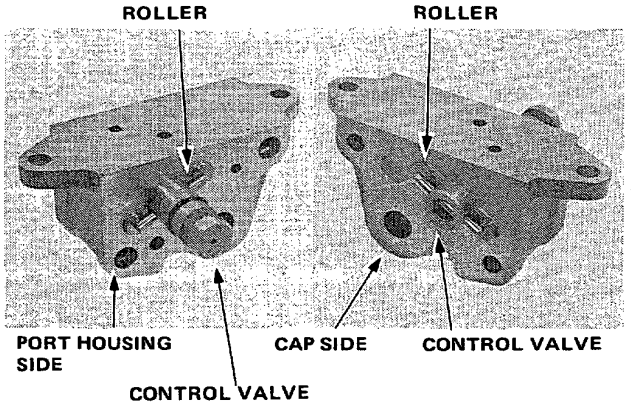
Identification mark	Outside diameter	Part number
A	10.000–10.005 mm (0.3937–0.3939 in.)	53650–SA5–9500
B	9.995–10.000 mm (0.3935–0.3937 in.)	53651–SA5–9500
C	9.990–9.995 mm (0.3933–0.3935 in.)	53652–SA5–9500

(cont'd)

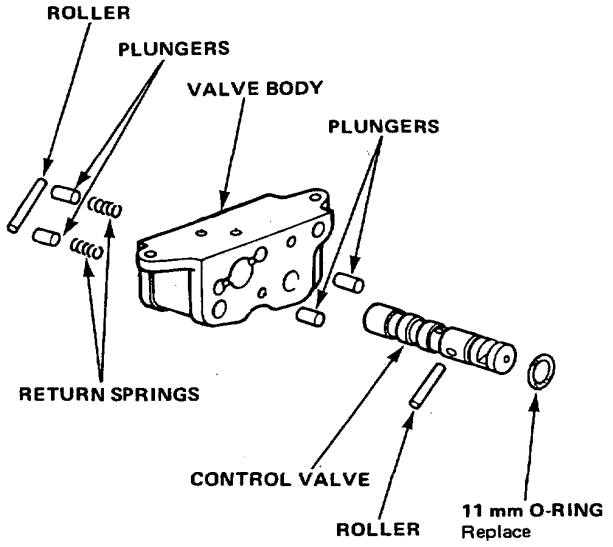
Control Unit Disassembly (cont'd)

15. Remove the rollers from the control valve by pushing the valve out one side of the valve body, and then the other.

    NOTE: When removing the rollers, hold the plungers with your fingers to keep them from popping out.



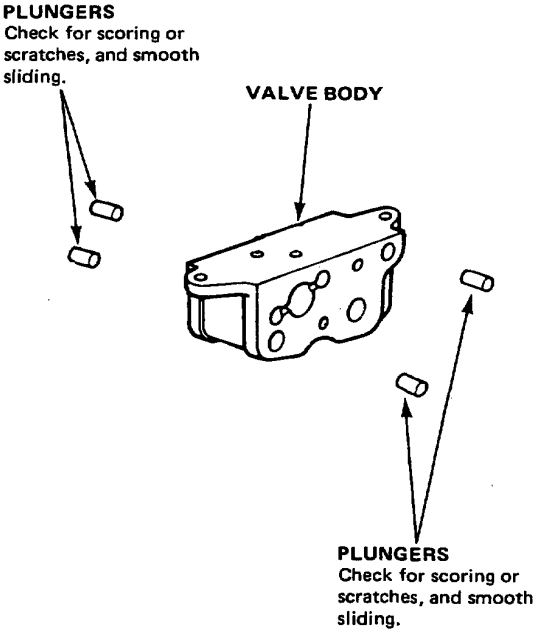
VALVE BODY, CONTROL VALVE, PLUNGERS and RELATED PARTS



16. Check the plungers.

    - *Inspect their surface for scoring or scratches.*
    - Slip each plunger into the valve body, and make sure if slides smoothly, without drag or side play. If any plunger is damaged, replace it.

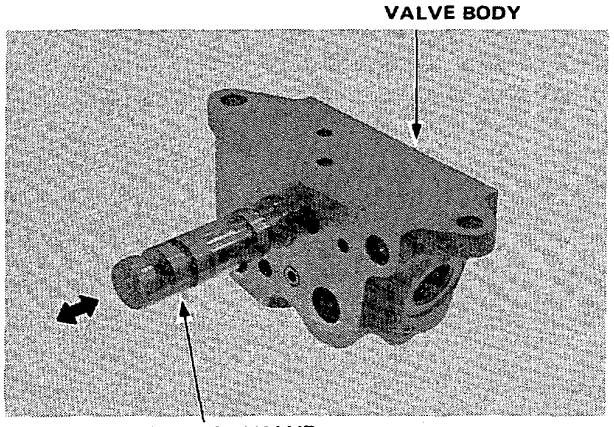
    NOTE: If the valve body is damaged, replace all three parts (valve body, cut-off valve and control valve) as a set.

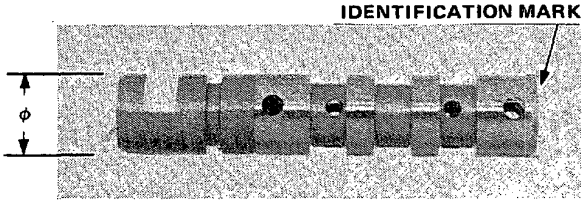


17. Check the control valve.

- Inspect its surface for scoring or scratches.
- Slip it into the valve body, and make sure it slides smoothly, without drag or side play.

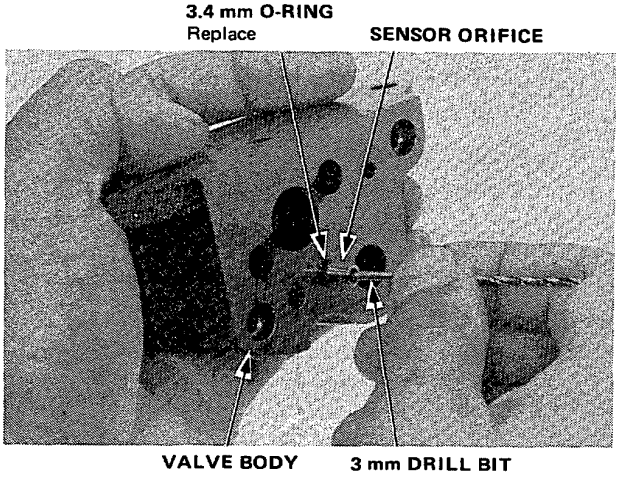
NOTE:
- The control valve is sized to fit the valve body, so, if you replace it, make sure the new valve has the same identification mark on it.
- If the valve body is damaged, replace all three parts (valve body, control valve and cut-off valve) as a set.





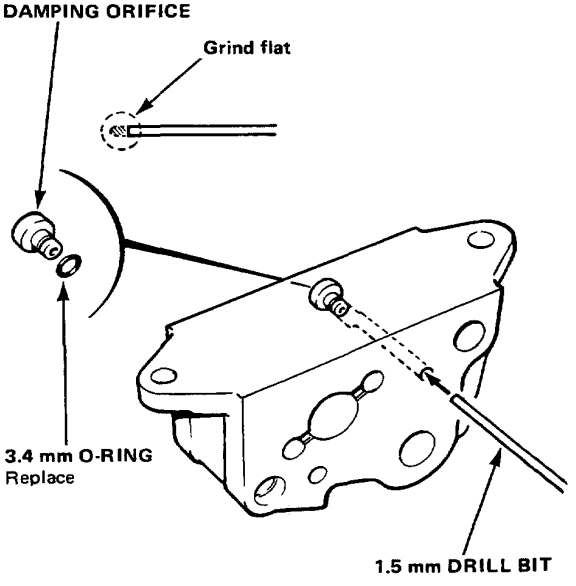
Identification mark	Outside diameter	Part number
X	13.998–14.003 mm (0.5511–0.5513 in.)	53646–SA5–9511
Y	13.993–13.998 mm (0.5509–0.5511 in.)	53647–SA5–9511
Z	13.988–13.993 mm (0.5507–0.5509 in.)	53648–SA5–9511

18. Using a 3 mm (1/64") drill bit, remove the sensor orifice and 3.4 mm O-ring.



19. Using a 1.5 mm (3/64") drill bit, push the damping orifice and 3.4 mm O-ring out of the valve body.

CAUTION: Grind the shank end of the drill bit flat before using.



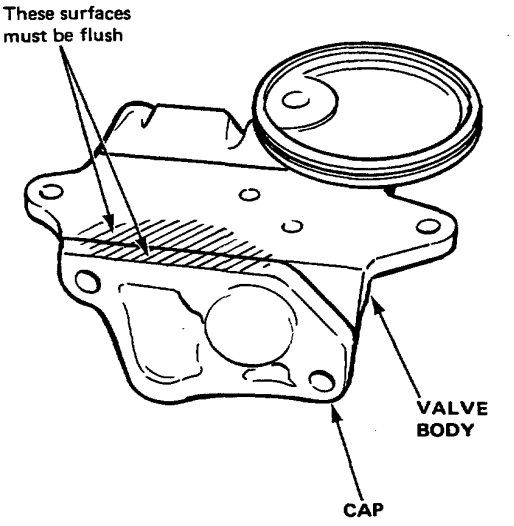
(cont'd)

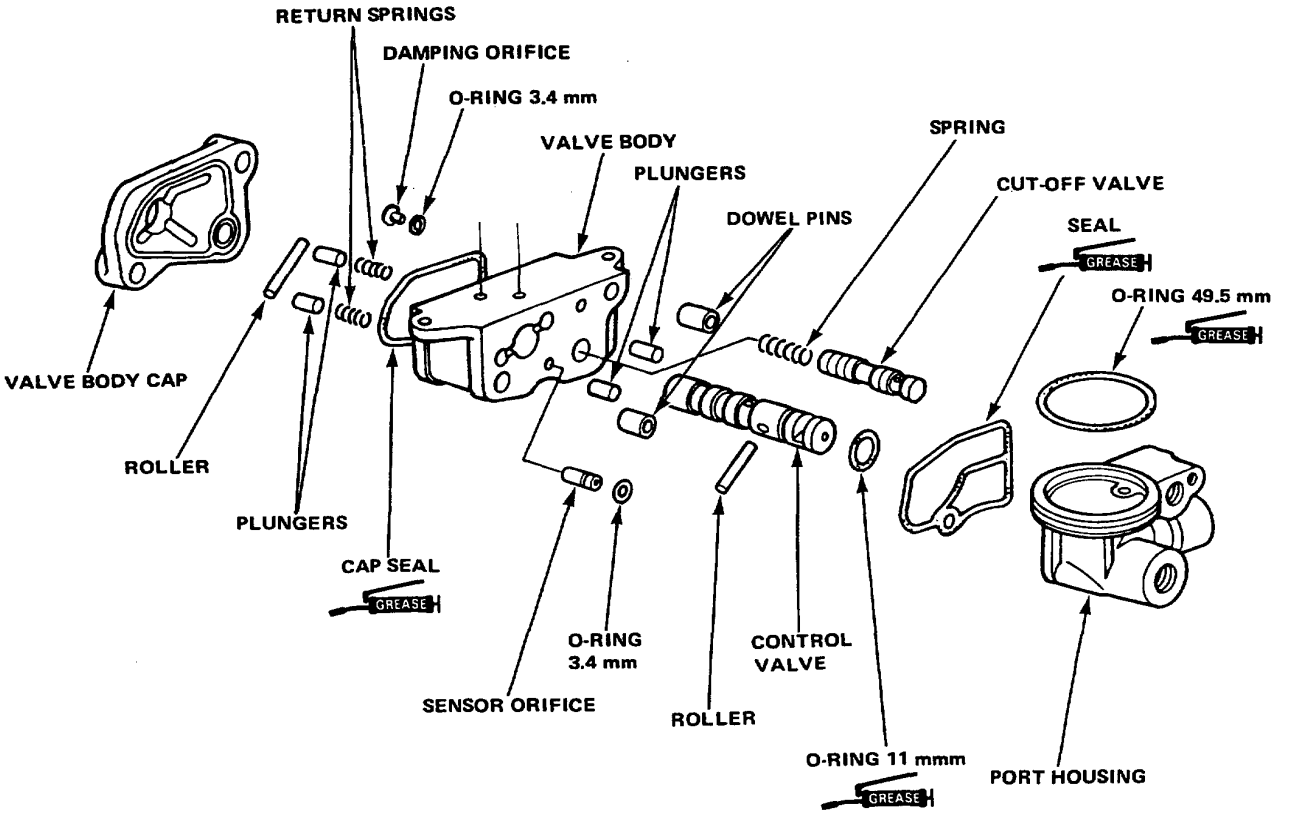
Gearbox Removal

1. Thoroughly clean the disassembled parts shown below.
2. Coat the plungers, cut-off valve and control valve surfaces with power steering fluid.
3. Reassemble the parts in reverse order of disassembly.

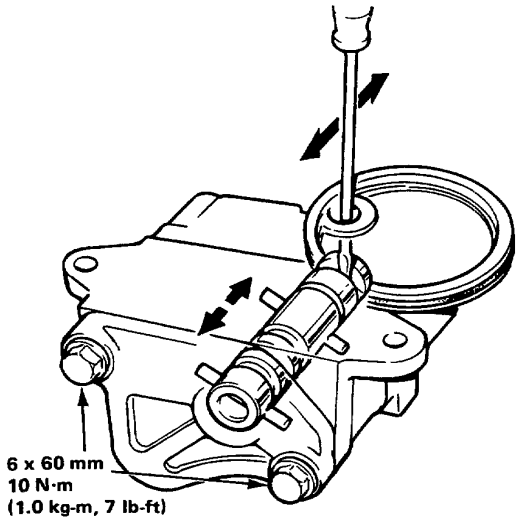
CAUTION:

- **Replace the O-rings and seals with new ones.**
- **Do not dip the O-rings and seals in solvent.**
- **Apply grease in the cap seal and port housing seal grooves to keep the seals in place.**
- **Apply grease to the O-ring for the port housing, and the O-ring for the control valve to keep them in place.**
- **Make sure the mating surfaces of the valve body and cap are flush at the upper side.**



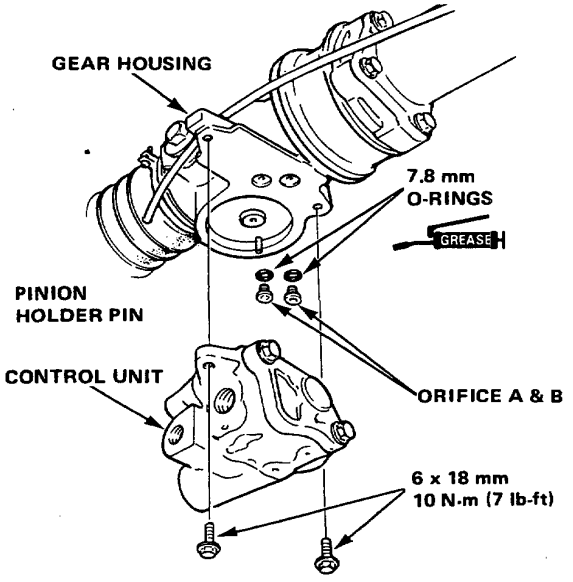


4. Tighten the 6 x 60 mm bolts in the control unit.



5. Make sure the control valve moves smoothly, and returns to neutral position.

6. Coat the 7.8 mm O-rings with grease, and install them together with orifices A and B.



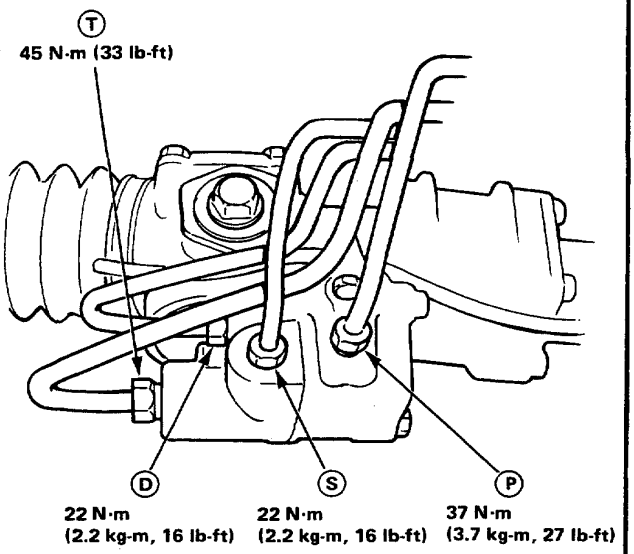
7. Install the control unit on the gear housing with the two 6 x 18 mm bolts.

CAUTION:

- **When installing, be carefull not to hit the pinion holder pin.**
- **Make sure the 49.5 mm O-ring is not pinched or missing.**

8. Connect the four lines to the control unit, using flare nut wrenches.

P:	From pump	14 mm wrench
S:	To speed sensor	12 mm
D:	To reservoir thru speed sensor	12 mm
T:	To reservoir thru cooler	17 mm



9. Fill the reservoir with power steering fluid, and bleed air from the system.

10. Make sure there are no fluid leaks, then install the shield.

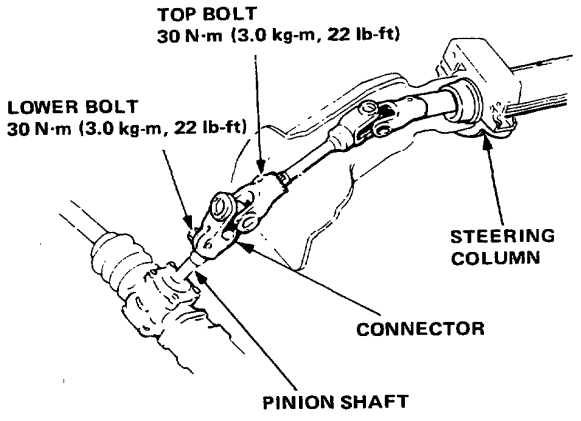
11. Recheck the fluid level in the reservoir.

Gear Box

Removal

1. Turn the steering wheel all the away to the left.

2. Remove the boot from the base of the steering column, loosen the top and lower bolts in the steering shaft connector, and slide the connector up off the pinion shaft.



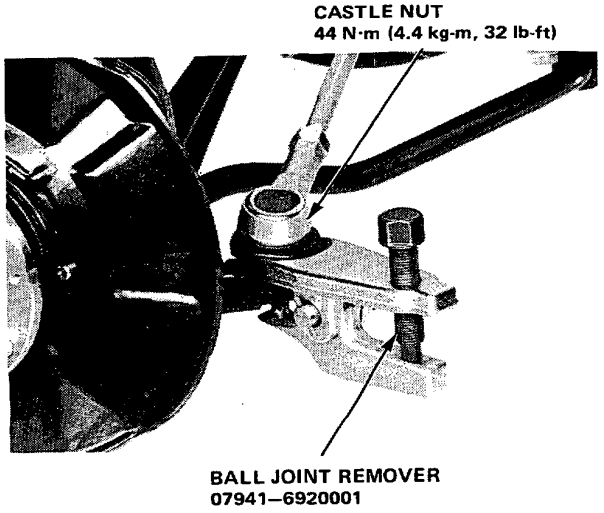
3. Drain the power steering fluid as described on page 19.10.

4. Remove the gearbox shield.

5. Using solvent and a brush, wash any oil and dirt off the control unit, its lines, and that end of the gearbox. Blow dry with compressed air.

6. Remove the front wheels.

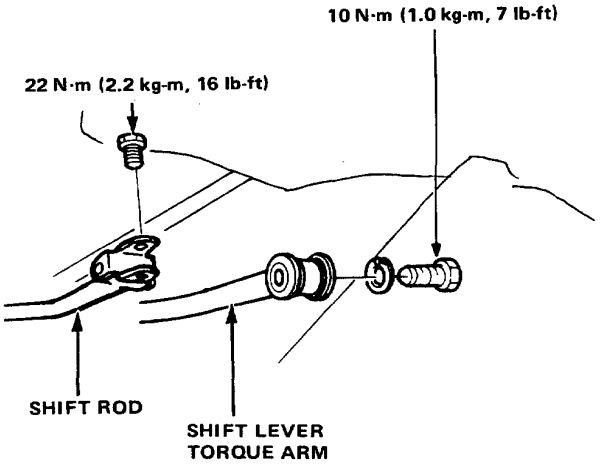
7. Disconnect the tie rods from the steering knuckles using the special tools shown:



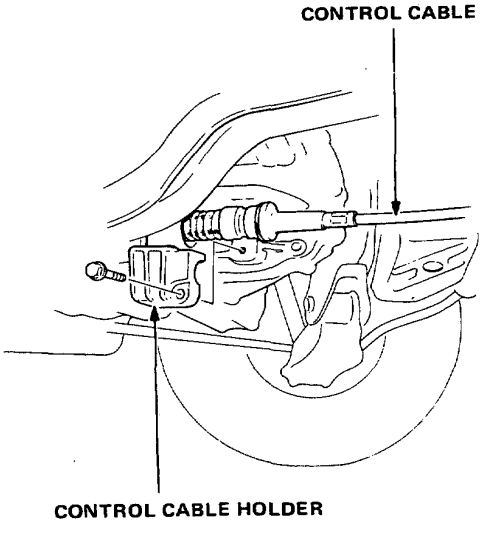
8. Remove the center beam.

9. On cars with 5-speed transmission, remove the bolt from the shift rod clevis (shift to 1st or 3rd so you can reach it), then disconnect the shift rod.

10. Then, on cars with 5-speed, disconnect the shift lever torque arm from the transmission.

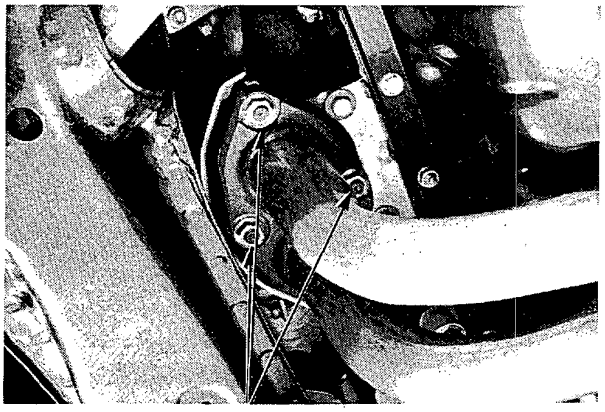


11. On cars with automatic transmission, remove the control cable holder.



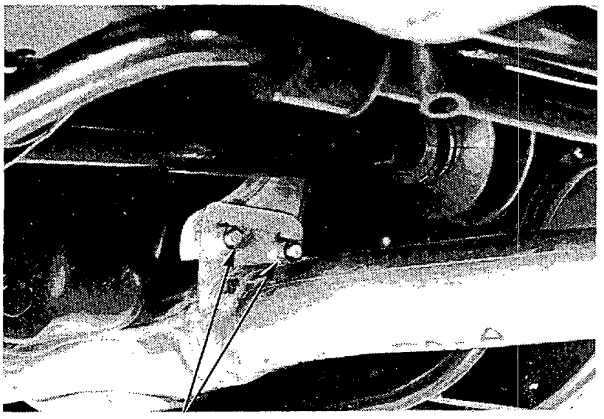
12. Disconnect the exhaust header pipe at the manifold.

CAUTION: Replace the exhaust gasket and self-locking nuts when you reinstall the pipe.



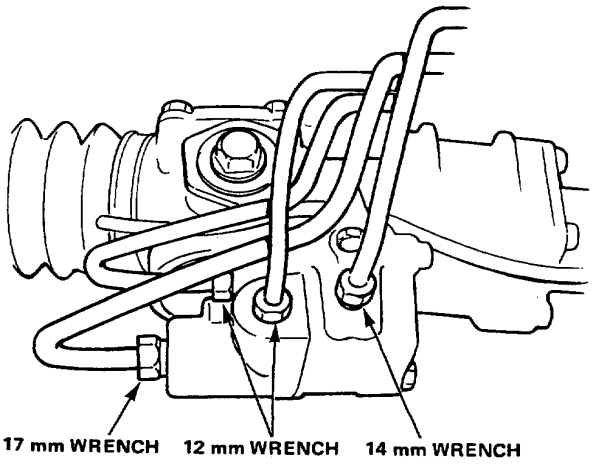
SELF LOCKING NUTS
50 N·m (5.0 kg-m, 36 lb-ft)

13. Remove the exhaust header pipe joint nuts.



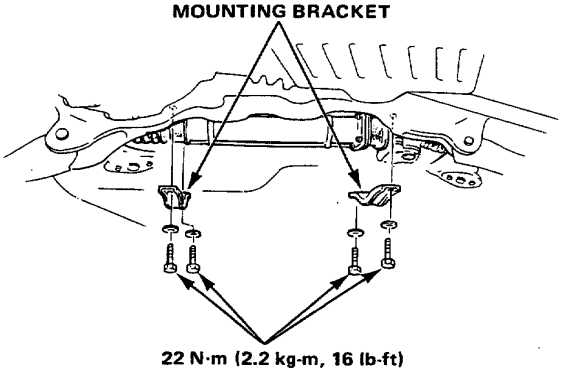
JOINT NUTS
22 N·m (2.2 kg-m, 16 lb-ft)

14. Using the size flare nut wrenchs shown, disconnect the fluid lines from the control unit.



17 mm WRENCH **12 mm WRENCH** **14 mm WRENCH**

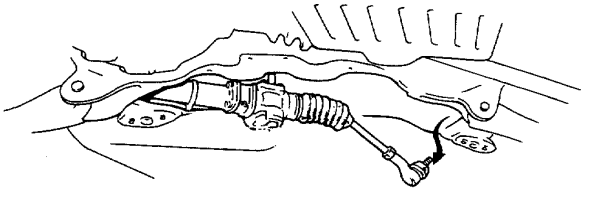
15. Remove the steering gearbox mounting brackets.



MOUNTING BRACKET

22 N·m (2.2 kg-m, 16 lb-ft)

16. Pull the gearbox down (so the end of the pinion shaft clevis clears the frame), then move it all the way to the right (so the left tie rod drops free), and lower it out of the car to the left.



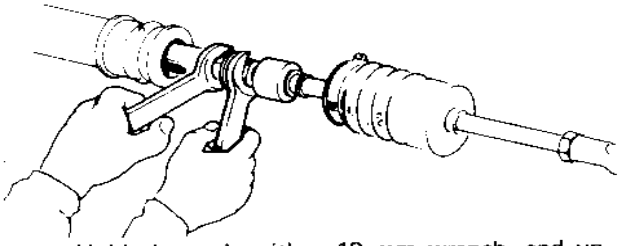
Gear box

Resealing

1. Remove the control unit as described on page 19-26.

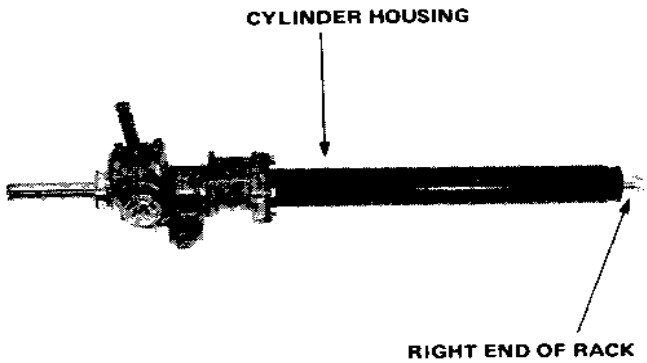
2. Remove the tie rods from the rack:

   - Carefully clamp the gear box in a vise.
   - Loosen the bands, pull the boots away from the ends of the gear box, and unbend the tie-rod lock washers.

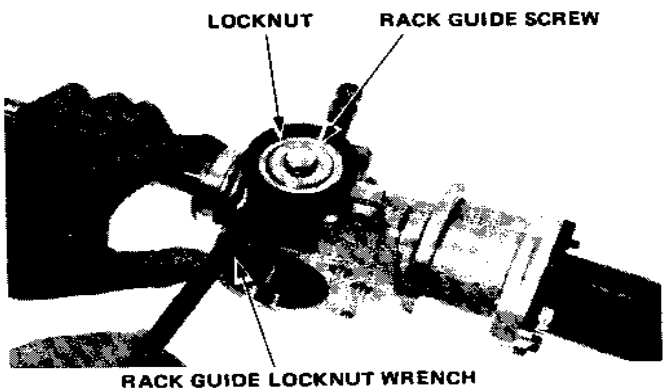


   - Hold the rack with a 19 mm wrench, and unscrew the tie-rods with 19 mm wrench.

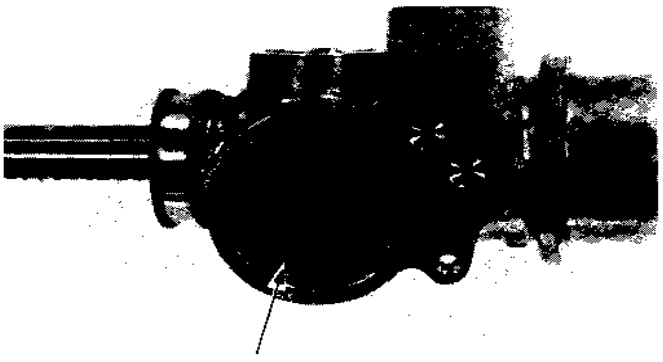
3. Push the right and of the rack back in to the cylinder housing so its smooth surface that rides against the seal won't be damaged.



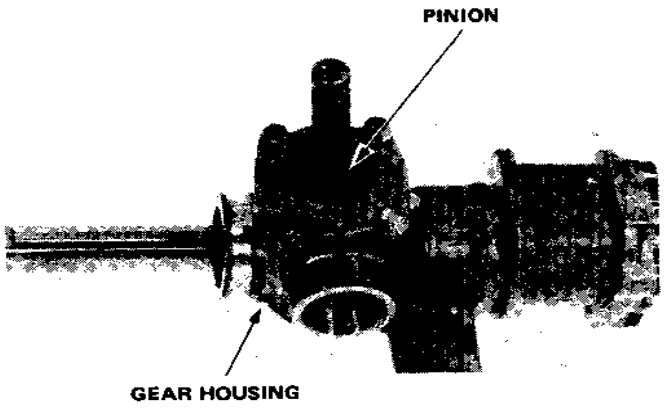
4. Remove the locknut and rack guide screw.



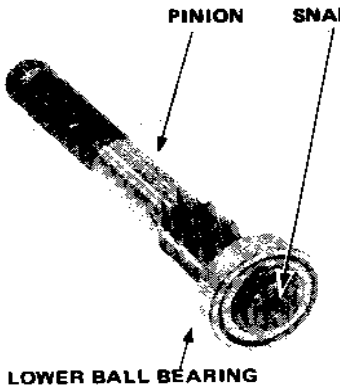
5. Remove the 35 mm snap ring securing the pinion lower ball bearing.



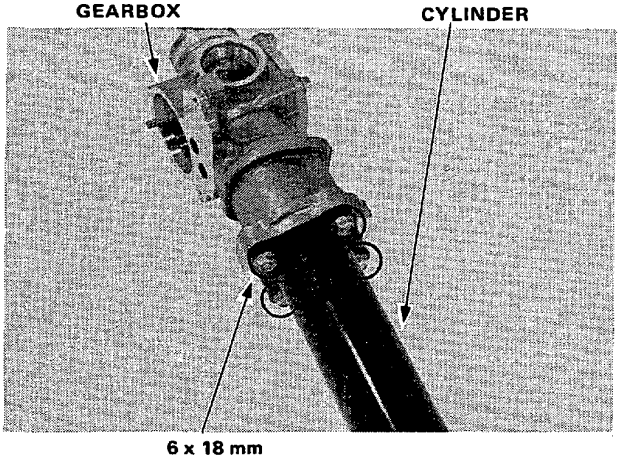
6. Remove the pinion from the gear housing by tapping it lightly.



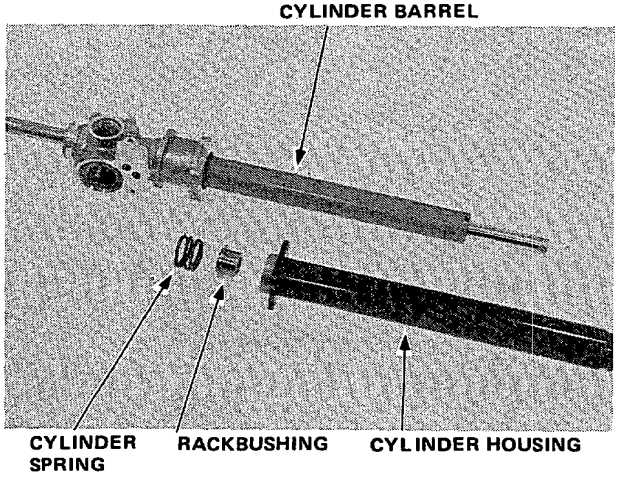
7. Remove the 15 mm snap ring, then separate the pinion and the lower ball bearing.



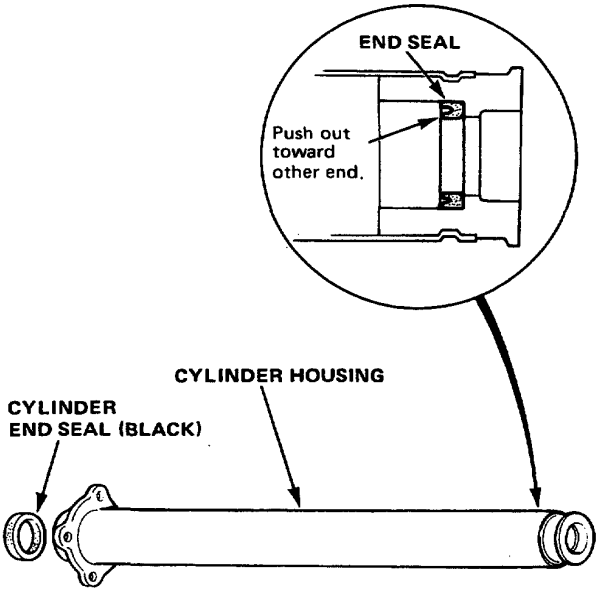
8. Remove the four bolts from the end of the cylinder housing, then slide the housing off the rack.



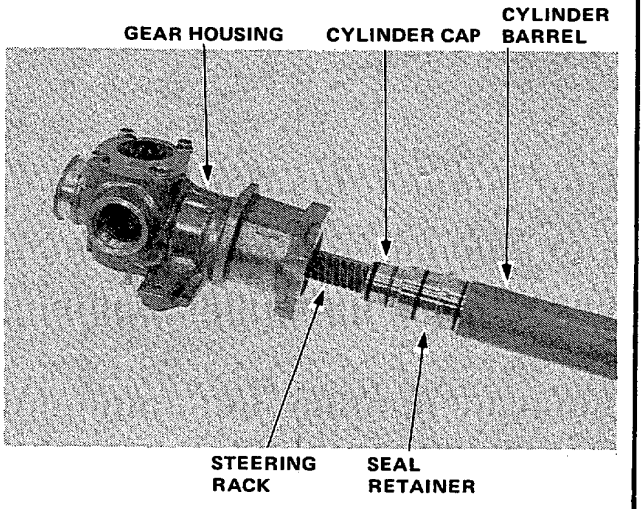
9. Remove the rack bushing and cylinder spring.



10. Remove the cylinder end seal from the cylinder. Use your fingers or a wooden stick to avoid damaging the housing.



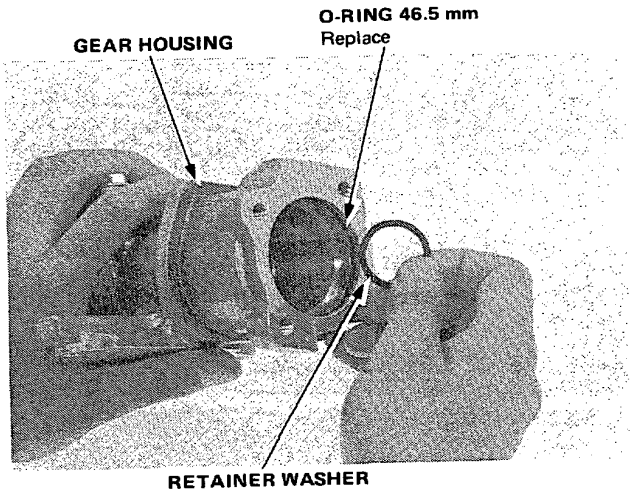
11. Remove the cylinder seal retainer, cylinder cap and steering rack from the gear housing.



(cont'd)

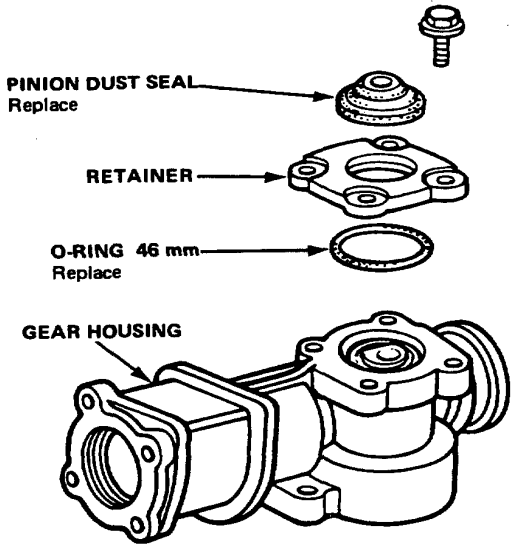
Resealing (cont'd)

12. Remove the retainer washer from the gear housing.



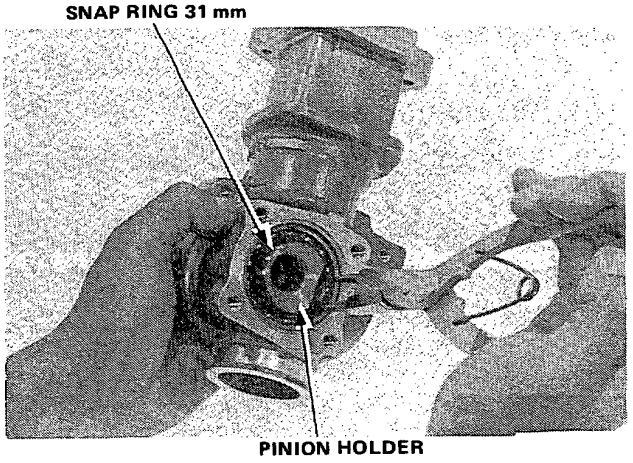
13. Remove the 46.5 mm O-ring from the gear housing.

14. Remove the bolts, then remove the pinion dust seal retainer from the gear housing. Remove the dust seal and 46 mm O-ring from the retainer.

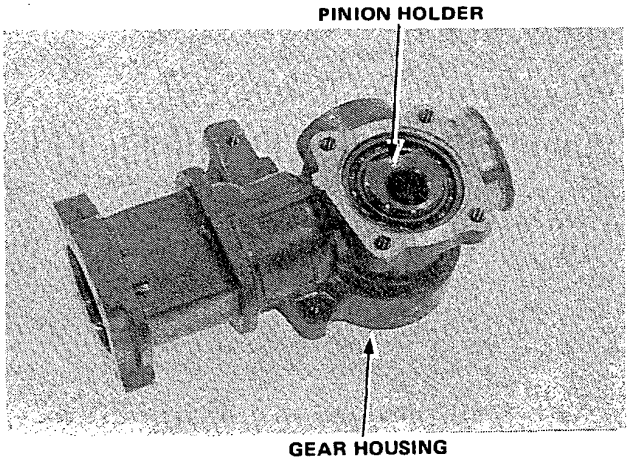


15. Check the upper bearing for free movement and excessive play; if it is OK and grease in it is clean, go on to step 16. If it is damaged, or if dirt has gotten past the seal into the grease replace the bearing.

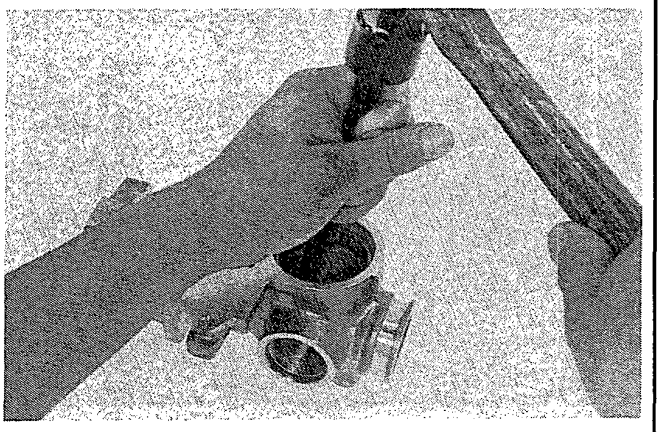
- Remove the 31 mm snap ring from the pinion holder.



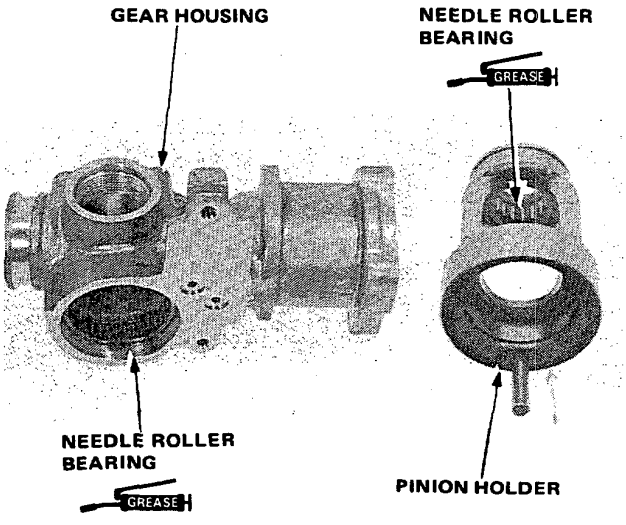
- Remove the pinion holder from the gear housing.



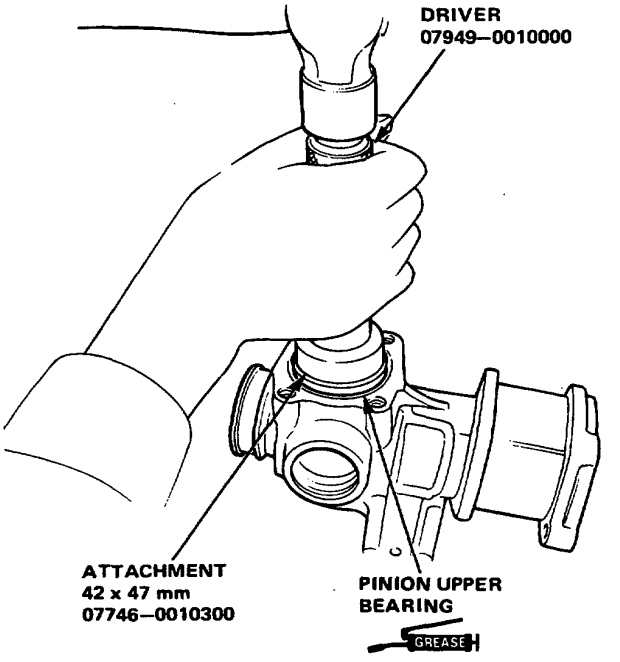
- Drive out the pinion upper bearing.



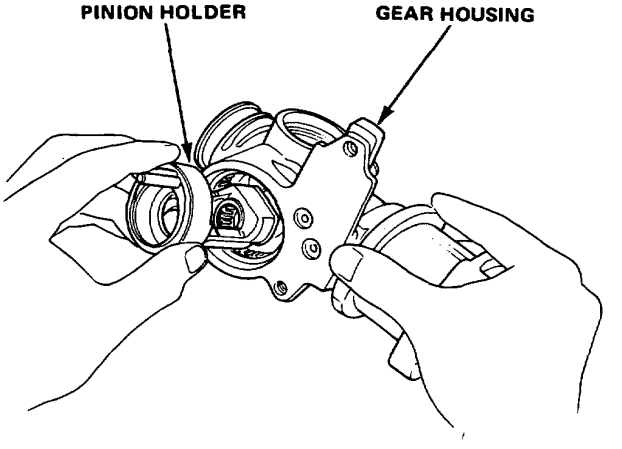
- Check the needle roller bearings in the pinion holder and in the gear housing for damage; if they are OK, pack them with grease. If the bearings are damaged, replace them.



- Pack a new upper bearing with grease, then install it with the tools shown.



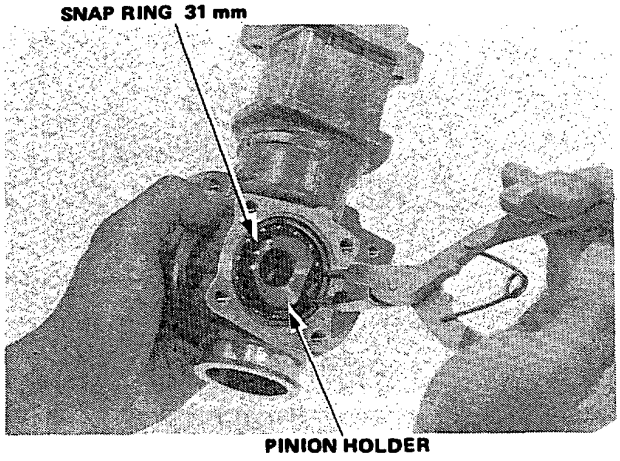
- Install the pinion holder in the gear housing.



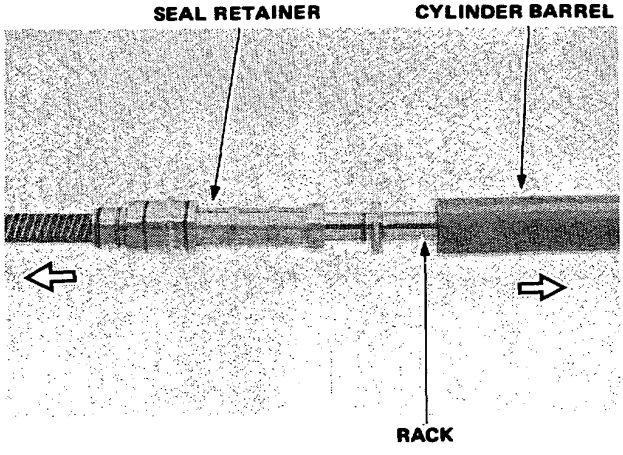
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Resealing (cont'd)

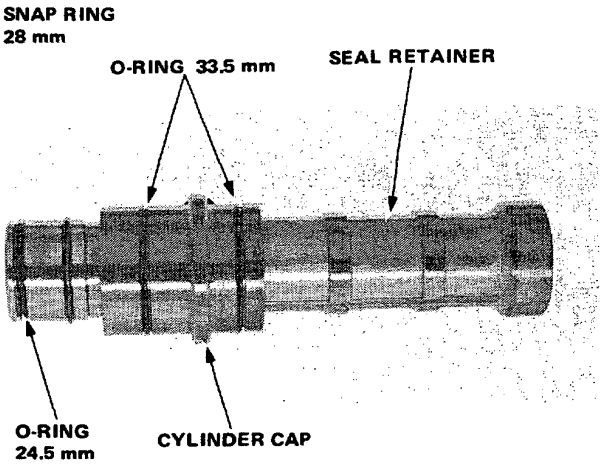
- Reinstall the snap ring.



16. Remove the cylinder and seal retainer from the rack.

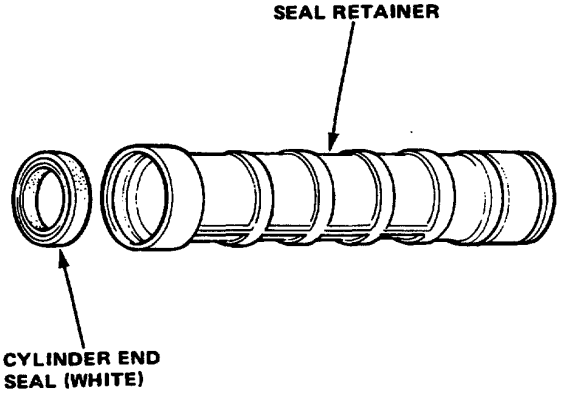


17. Remove the two 33.5 mm O-rings from the cylinder cap.

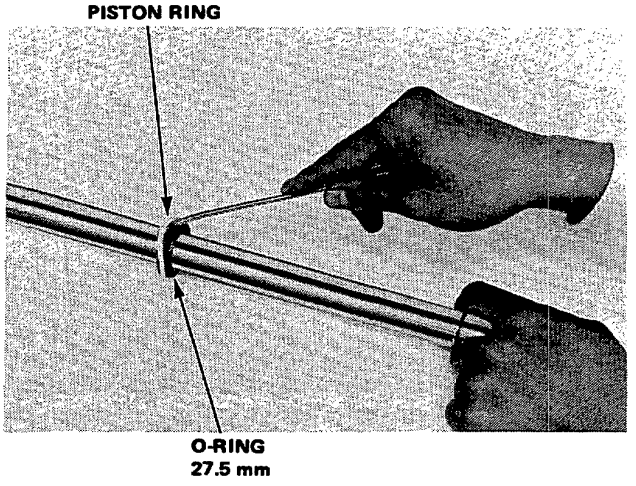


18. Remove the 24.5 mm O-ring and 28 mm snap ring from the seal retainer then slide the cylinder cap off the seal retainer.

19. Carefully pry the cylinder end seal off the seal retainer.

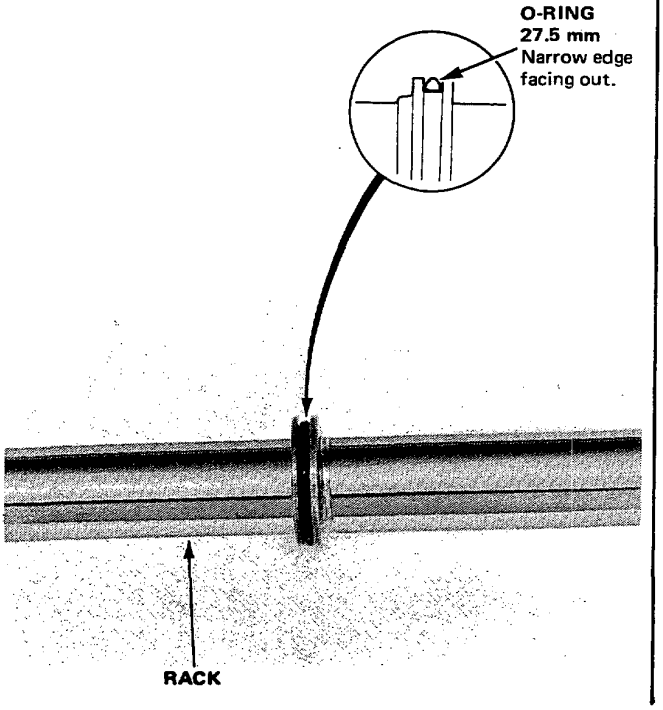


20. Carefully pry the piston ring and the O-ring under it off the rack.



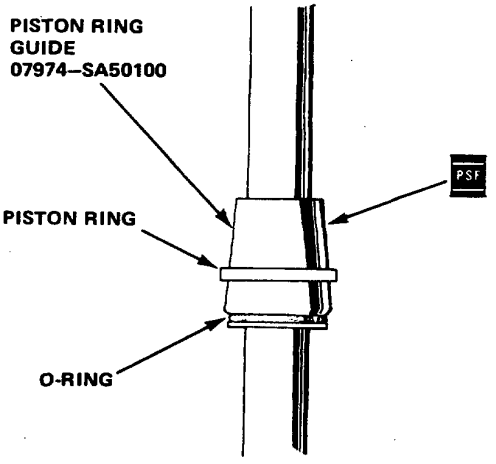
NOTE: Before reassembling any parts, inspect them as described on page 19-25, and make sure they are clean. Replace worn or damaged parts.

21. Install a new O-ring on the rack.



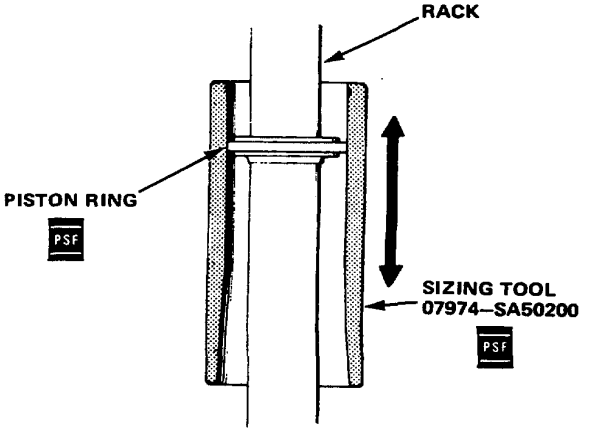
22. Install a new piston ring:

- Coat the piston ring guide tool with power steering fluid, and slide it onto the rack, big end first.



- Slide the new piston ring onto the guide tool, work it down to the big end of the tool, and then pull it off into the piston groove, on top of the O-ring.

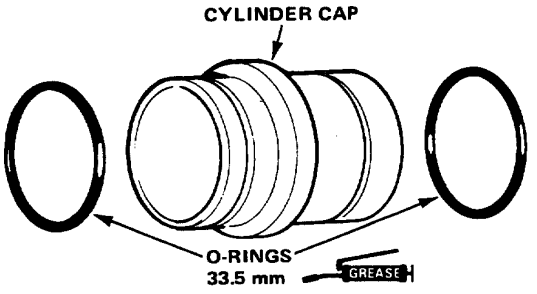
23. Coat the piston ring and the inside of the sizing tool with power steering fluid.
Carefully slide the tool onto the rack and over the piston ring, then rotate the tool as you move it up and down to break-in the piston ring.



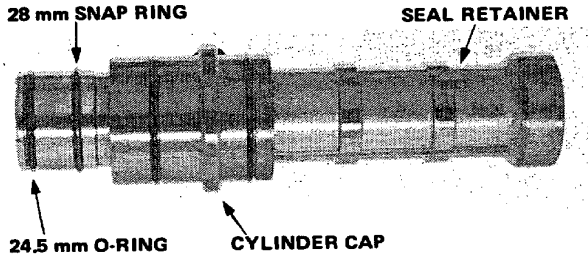
(cont'd)

Resealing (cont'd)

24. Coat new O-rings with grease and install them on the cylinder cap.



25. Slide the cylinder cap onto the seal retainer.

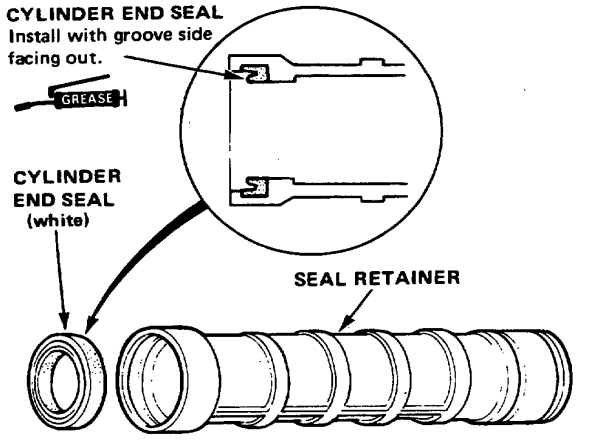


26. Reinstall the 28 mm snap ring on the seal retainer.

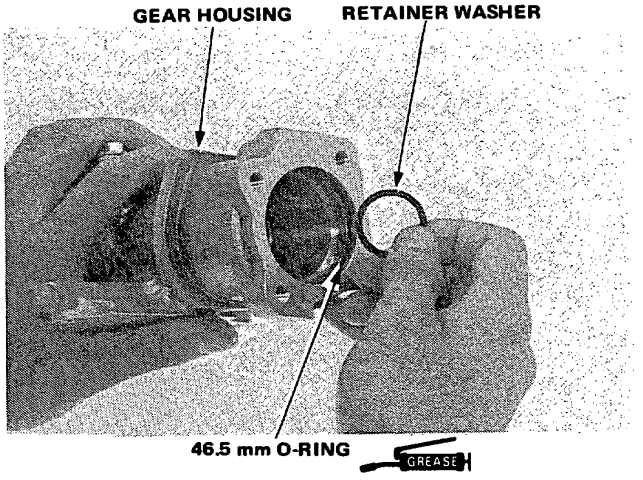
27. Install a new 24.5 mm O-ring on the retainer.

28. Grease the sliding surface of a new cylinder end seal (white) and install it in the seal retainer.

CAUTION:
- **Install the seal with its groove side facing out.**
- **Both cylinder end seals are the same size, but are not interchangeable: the white seal goes in the end of the retainer; the black seal in the end of the cylinder housing.**

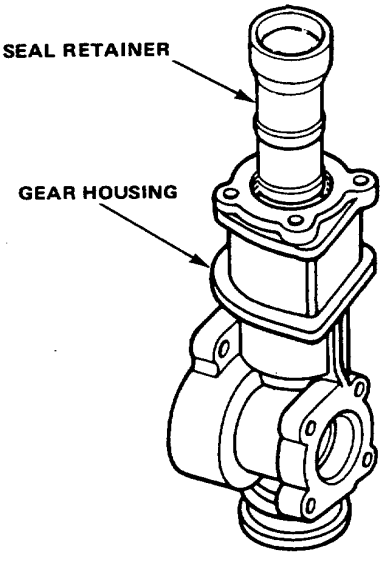


29. Reinstall the 46.5 mm O-ring and retainer washer into the gear housing.

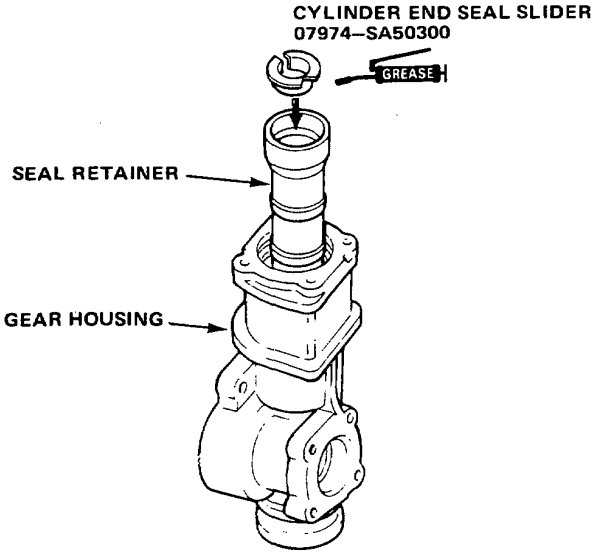


30. Apply grease on the O-ring surface.

31. Press the seal retainer into the gear housing and stand the housing on the work bench.

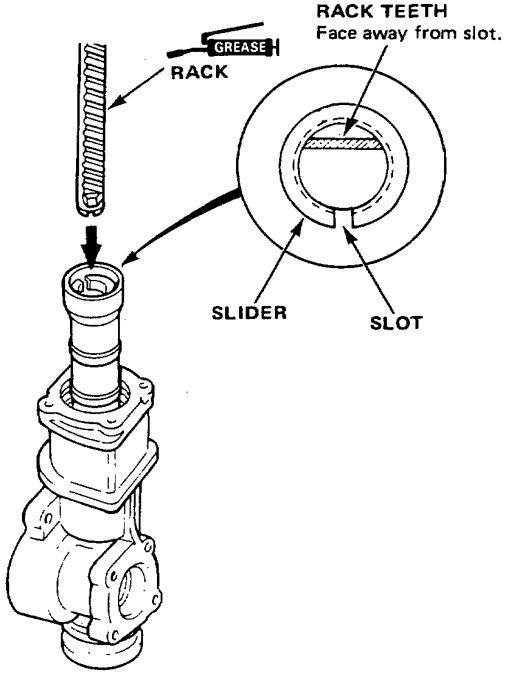


32. Coat the end seal slider tool with grease, and make sure its surface is not damaged.
Then install on the seal retainer.

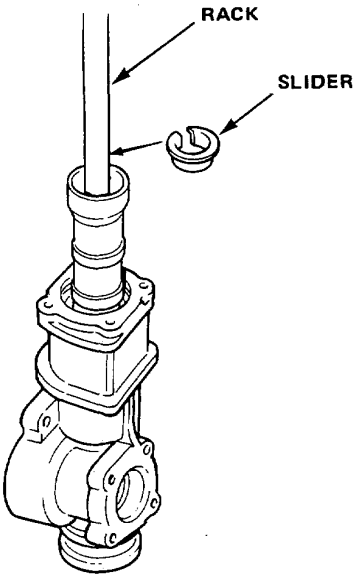


33. Coat the rack and fill its teeth with grease, then insert the rack into the seal retainer.

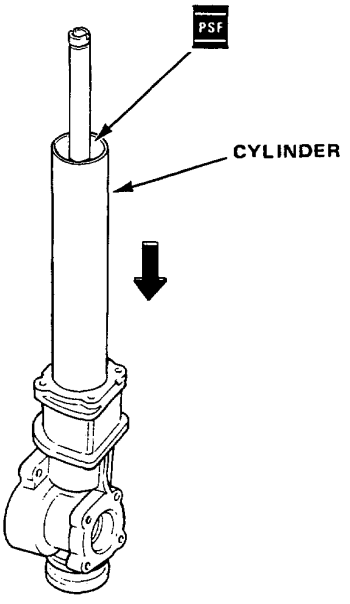
CAUTION: Make sure the rack teeth do not face the slot in the slider tool.



34. Pull the slider tool out of the retainer, spread its ends and remove it from the rack.



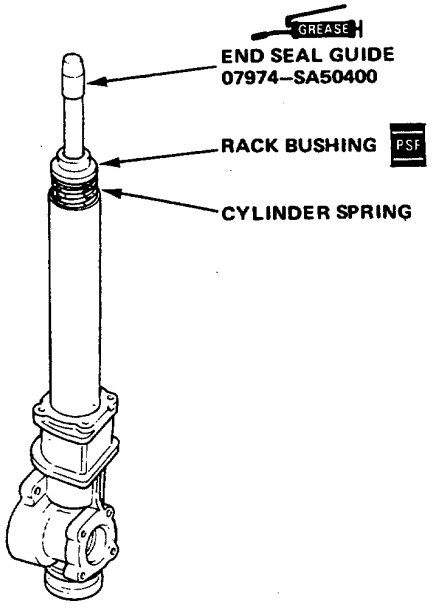
35. Coat the inside surface of the cylinder with power steering fluid, slide it over the rack and into the gear housing; press it in to the housing until it seats.



(cont'd)

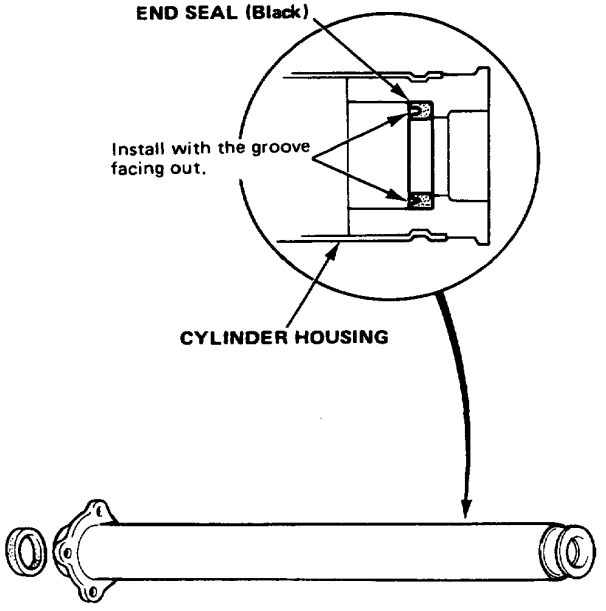
Resealing (cont'd)

36. Install the cylinder spring over the rack, then coat the rack bushing with power steering fluid, and install it on the spring.



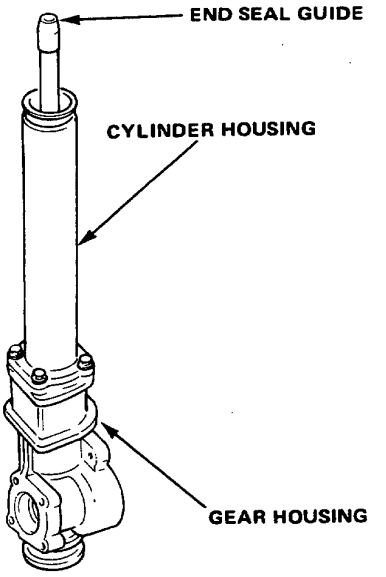
37. Coat the end seal guide tool with grease and slip it onto the end of the rack.

38. Coat the inside surface of the cylinder housing with Power Steering fluid and install the cylinder end seal (black).



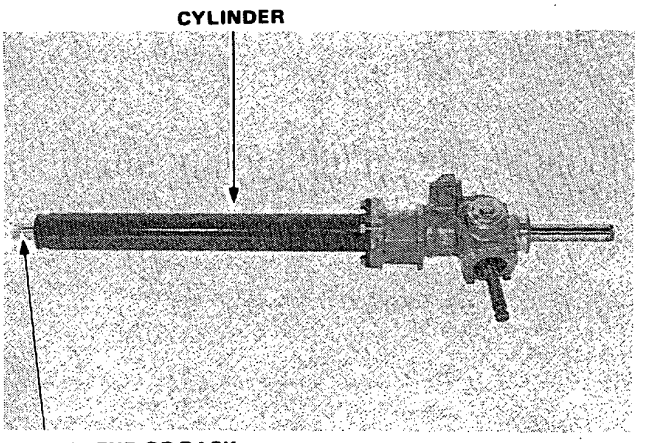
39. Carefully slide the cylinder housing over the rack and install it on the gear housing.

CAUTION: **Be carefull not to damage the end seal in the housing.**



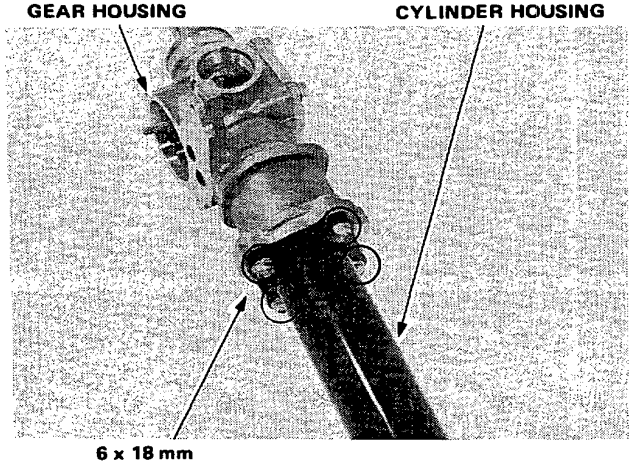
40. Slip the end seal guide off the rack.

41. Lay the gearbox down, and push the right end of the rack back into the cylinder housing so its smooth surface cannot be damaged.

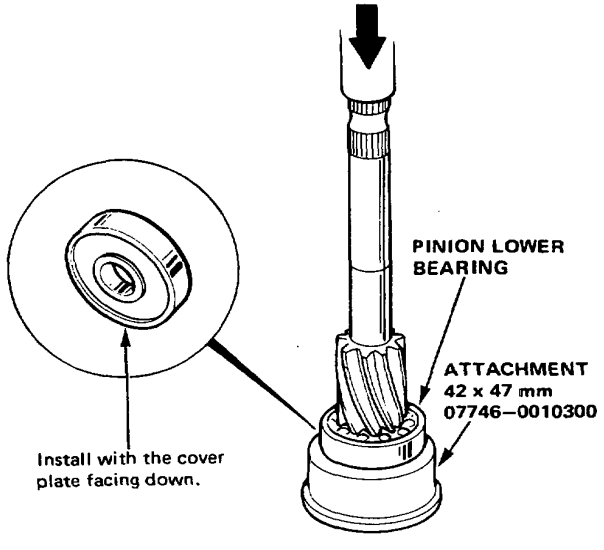


42. Secure the cylinder housing to the gear housing with the four 6 x 18 mm bolts.

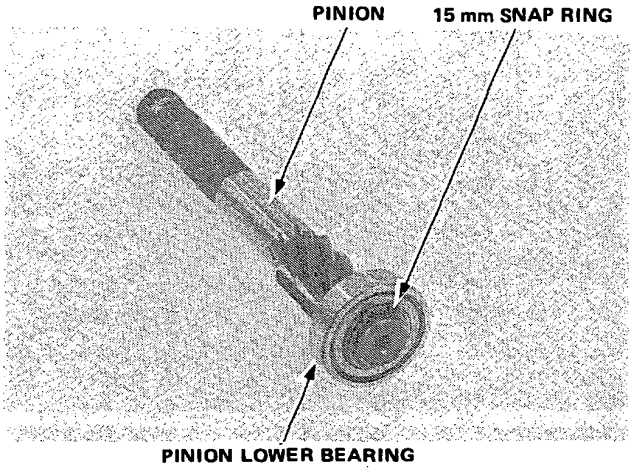
    NOTE: Before tightening, make sure the mating surfaces of the cylinder and gear housings fit properly by pushing them together; hold them together while you tighten the bolt.



43. Using a press install the lower bearing on the pinion, with its cover plate facing down.

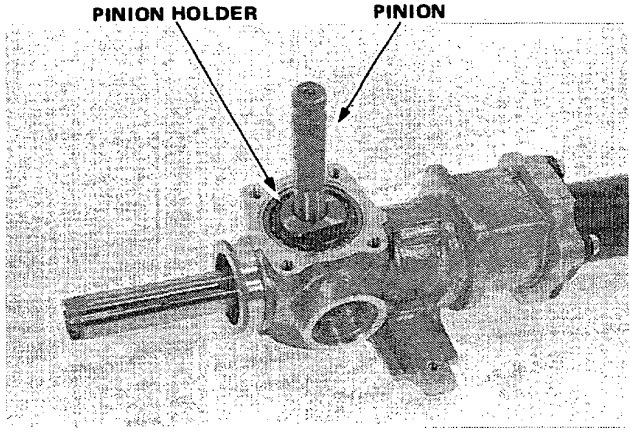


44. Install the 15 mm snap ring on the pinion.



45. Grease the lower bearing and make sure that it turns smoothly.

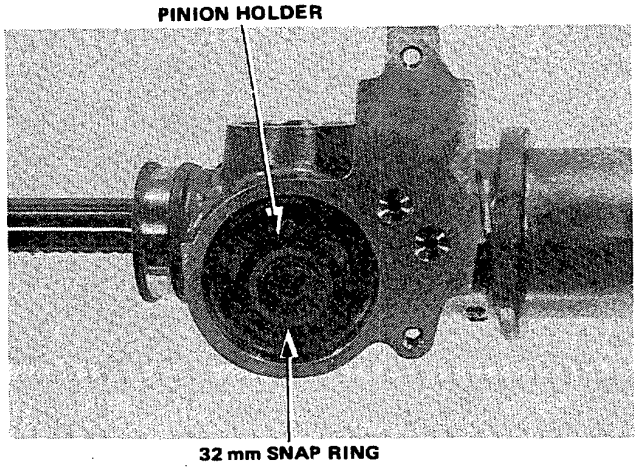
46. Install the pinion and the pinion holder in the gear housing.



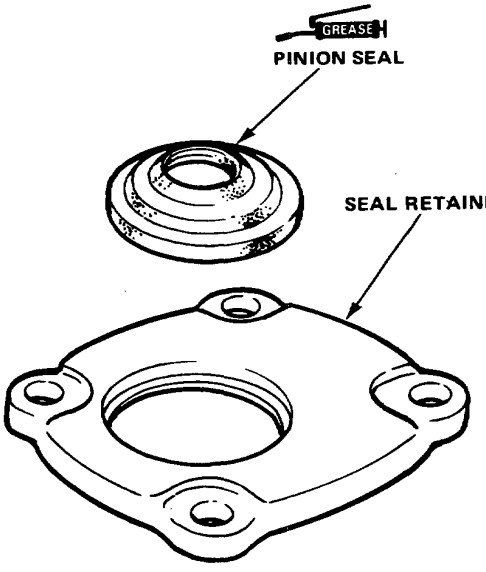
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Resealing (cont'd)

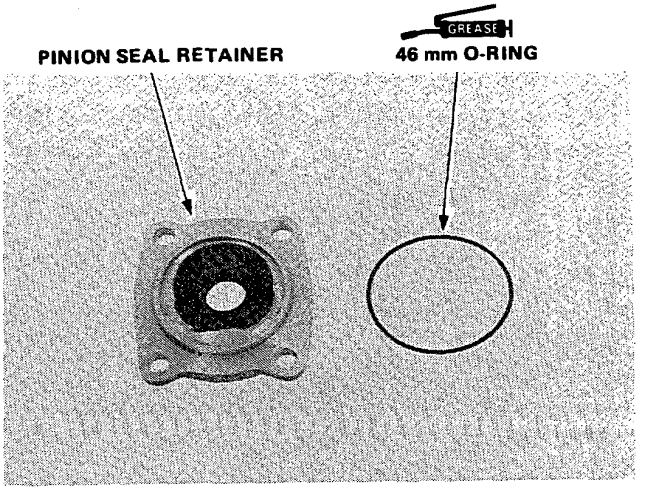
47. Install the 32 mm snap ring in the groove in the pinion holder from the underside of the gear housing.



48. Coat the lip of the pinion seal with grease and install it in the retainer.

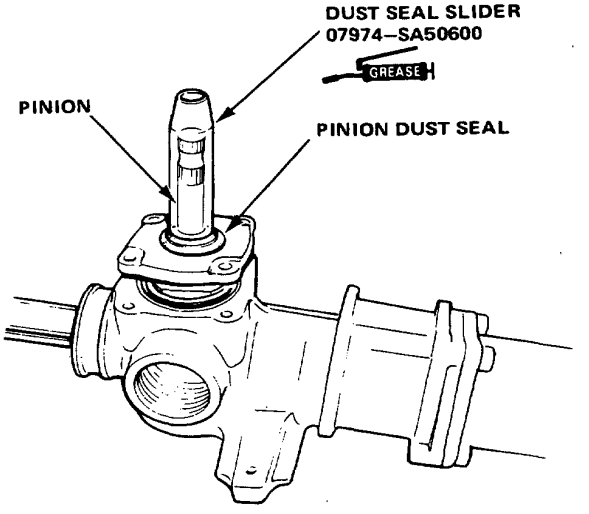


49. Coat the 46 mm O-ring with grease and install it in the groove in the seal retainer.

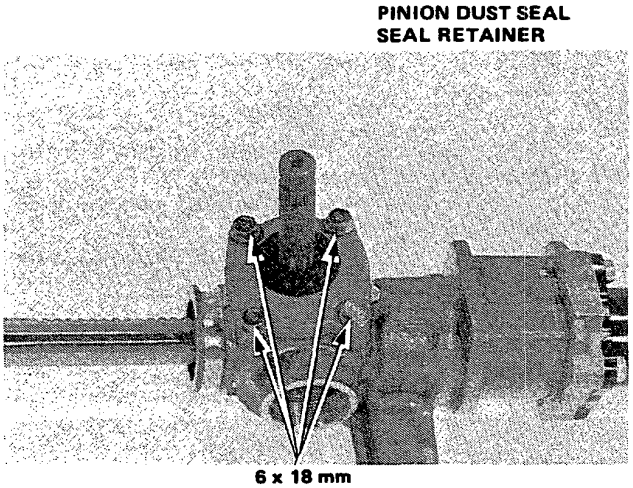


50. Grease the special tool, install it over the pinion, then install the dust seal on the Pinion.

CAUTION: **Be carefull not to damage or distort the lip** of the seal, or the spring fitted in the seal may dislodge.

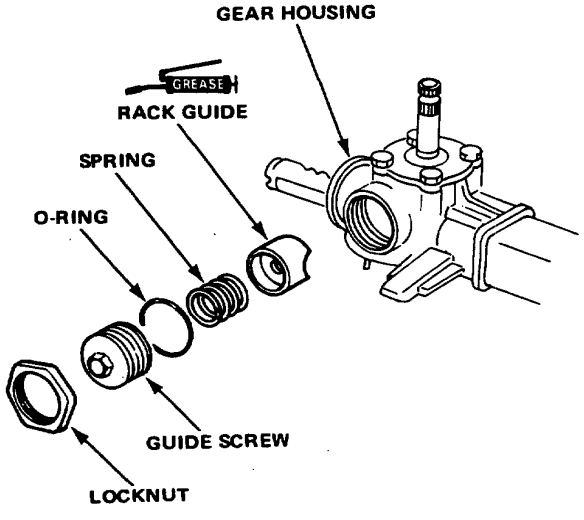


51. Tighten the four 6 x 18 mm bolts to secure the retainer to the gear housing.



52. Install the control unit on the gear housing (page 19-31).

53. Coat the rack guide with grease.

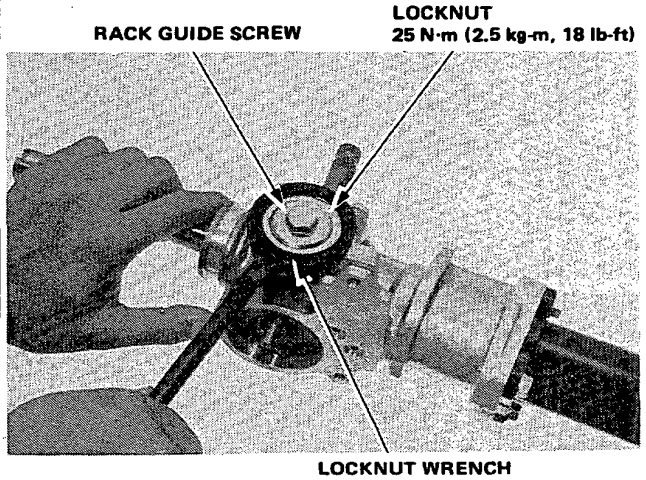


54. Install the rack guide, spring, O-ring and rack guide screw in the gear housing.

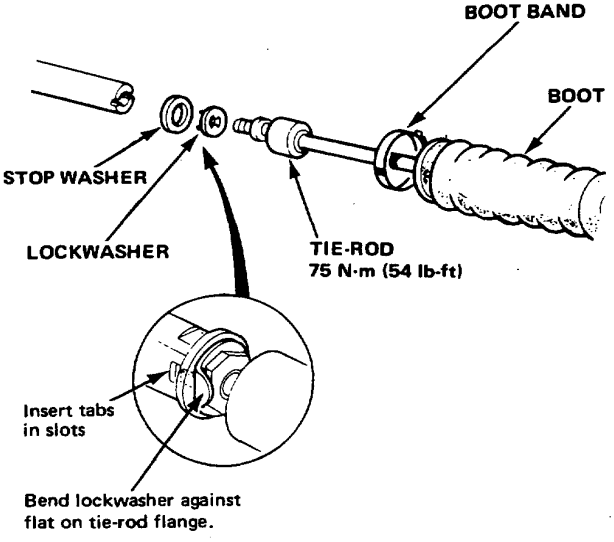
55. Install the locknut on the rack guide screw finger tight.

56. Tighten the guide screw until it compresses the spring and seats against the guide, then loosen it. Then retighten it to 3 N·m (0.3 kg-m, 2 lb-ft) and back off about 35° (about 1/10 of a turn).

While holding the guide screw in its position, tighten the locknut to 25 N·m (2.5 kg-m, 18 lb-ft) with the locknut wrench.



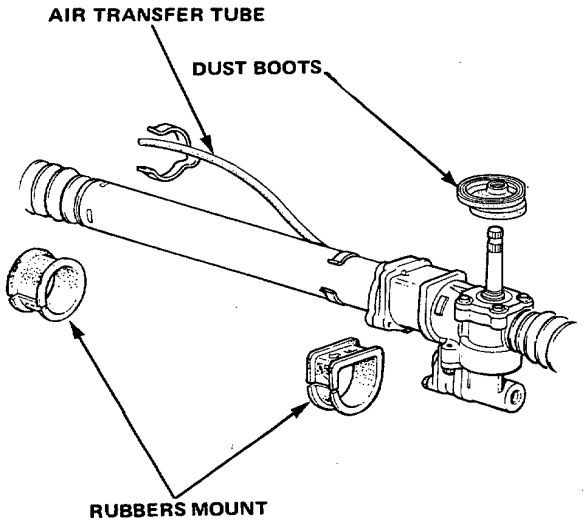
57. Screw each tie-rod into the rack while holding the lockwasher so its tabs are in the slots in the rack end. Tighten the tie-rod securely, then bend the lockwasher back against the flat on the flange as shown. Install the boots and bands.



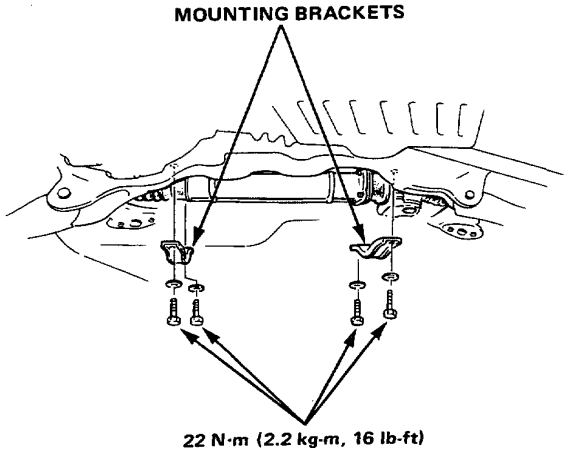
(cont'd)

Resealing (cont'd)

58. Reinstall the boots on the top of the gear housing, and install the air transfer tube between the boots.



59. Resinstall the rubber mount on the gearbox, then reinstall the gearbox.



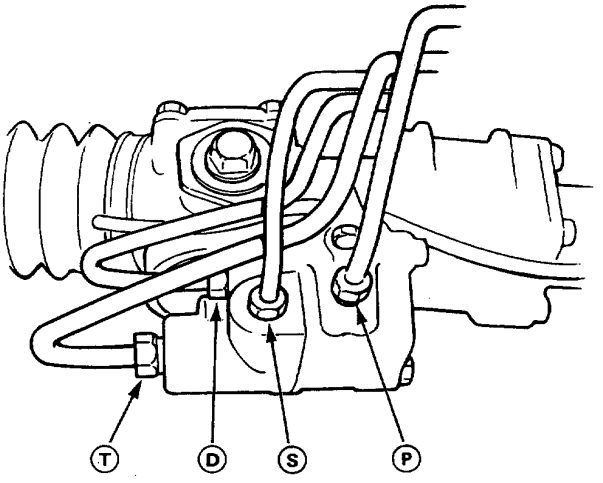
60. Re-connect the shift rod torque arm, and tighten the bolt to 11 N·m (1.1 kg-m, 9 lb-ft).

61. On cars with 5-speed transmission, reconnect shift rod, and torque the clevis bolt to 22 N·m (2.2 kg-m, 16 lb-ft).

62. On car with automatic transmission, snap the rubber cushion on the shift cable back into its bracket.

63. Unplug the fluid lines, and re-connect them to the control unit:

P: From Pump 37 N·m (3.7 kg-m, 27 lb-ft)
S: To speed sensor 22 N·m (2.2 kg-m, 16 lb-ft)
D: To reservoir thru speed sensor
22 N·m (2.2 kg-m, 16 lb-ft)
T: To reservoir thru cooler
45 N·m (4.5 kg-m, 33 lb-ft)



64. Reinstall the center beam, and tighten the bolts to 22 N·m (2.2 kg-m, 16 lb-ft).

65. Reconnect the header pipe with a new gasket, and tighten the new nuts to 50 N·m (5.0 kg-m, 36 lb-ft).

66. Reinstall the exhaust joint pipe nuts to 22 N·m (2.2 kg-m, 16 lb-ft).

67. Reconnect the tie-rods to the steering knuckles, torque the castle nuts to 43 N·m (4.3 kg-m, 32 lb-ft), and install new cotter pins.

68. Reconnect the steering shaft connector, and adjust the steering shaft as shown on page 19.15.

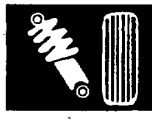
69. Fill the system:
    - Fill the reservoir with new Honda Power Steering Fluid.
    - Start the engine and let it run at fast idle, then turn the steering wheel from lock-to-lock several times to bleed air from the system.
    - Check the fluid again, and add more if necessary.

70. Check the control unit for leaks, then reinstall the shield.

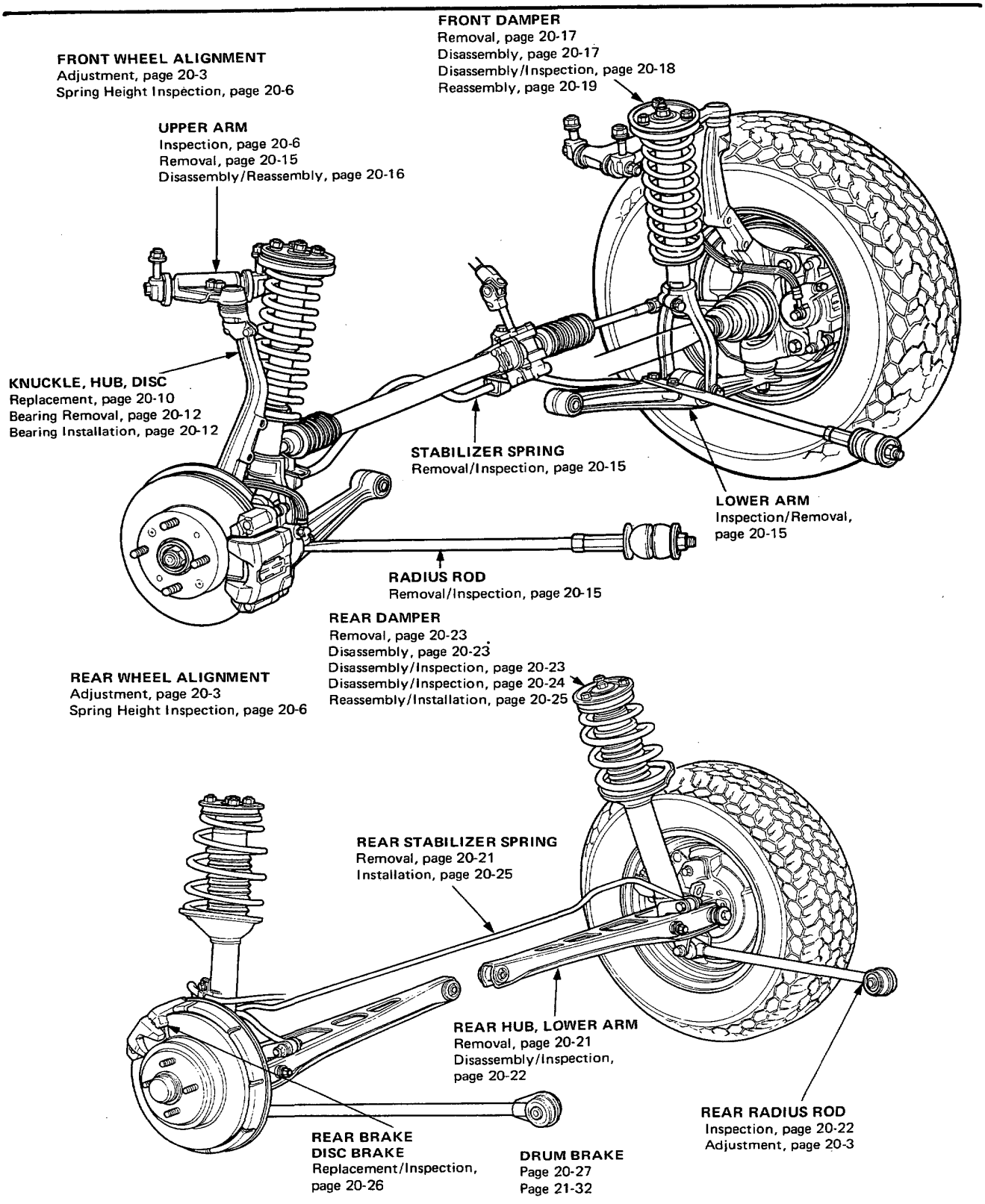
71. Reinstall the front wheels.

Suspension

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Wheel Alignment

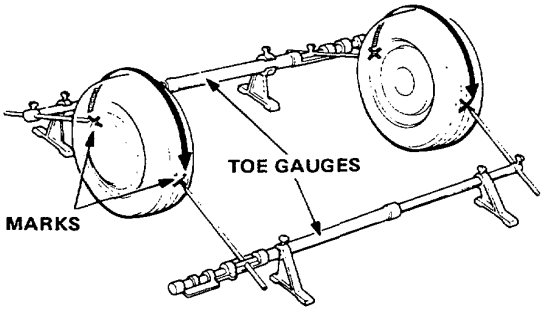
Toe Inspection

Toe Measurement

1. Center steering wheel spokes before toe is measured.

Front:	0	In :	3 mm (0.078 in.)
		Out:	3 mm (0.078 in.)
Rear:	In: 2 mm	In :	2 mm (0.078 in.)
		Out:	2 mm (0.078 in.)

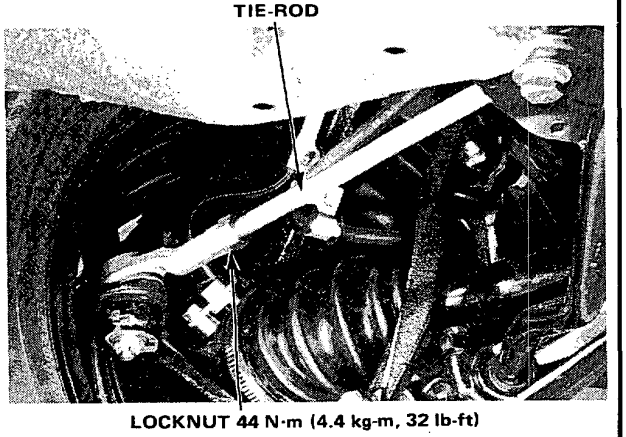
NOTE: Measure difference in the measurements with the wheels pointed straight ahead.



Front Wheel Toe Adjustment

1. Loosen the tie-rod locknuts and turn both tie-rods in the same direction until the front wheels are in straight ahead position.
2. Turn both tie-rods equally until the toe reading is correct with a turning radius gauge.
3. After adjusting, tighten the tie-rod locknuts.

NOTE: Reposition the tie rod boot if twisted or displaced after adjustment has been made.

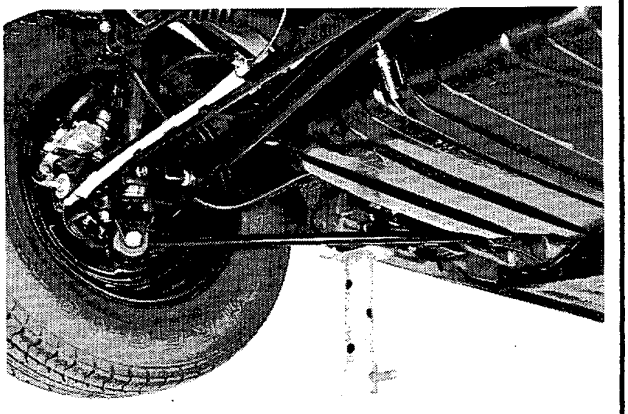


Rear Wheel Toe Adjustment

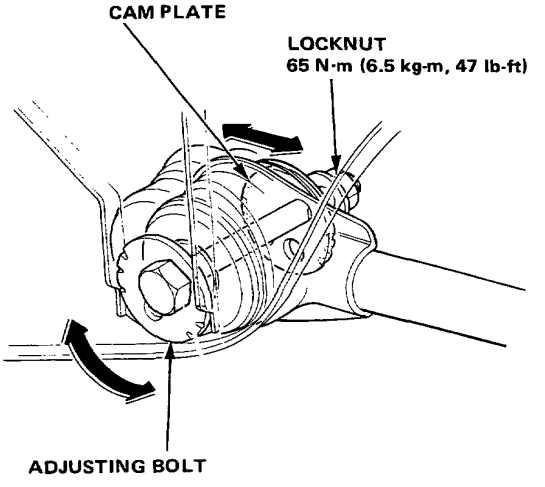
1. Release parking brake.

   NOTE: If the parking brake is engaged, you may get an incorrect reading.

2. Loosen locknut while holding adjusting bolt.
3. Turn adjusting bolt until toe-in correct.



4. Tighten locknut after adjustment.

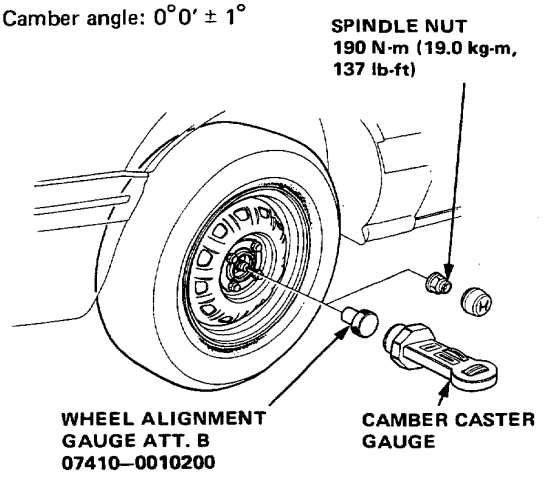


Wheel Alignment

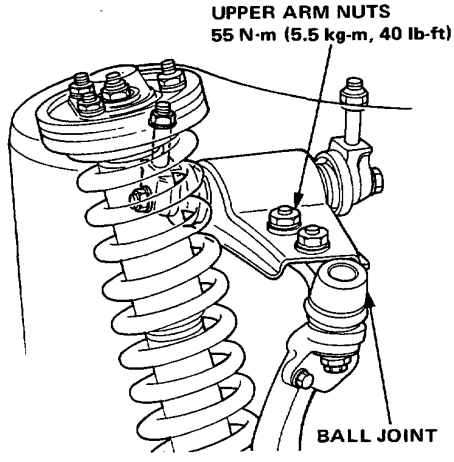
Camber Inspection/Adjustment

1. With the wheels in a straight ahead position, remove the spindle nut and install the special tool on the spindle as shown.
2. Set up the camber/caster gauge.
3. Read the camber on the gauge with the bubble at the center of the gauge.

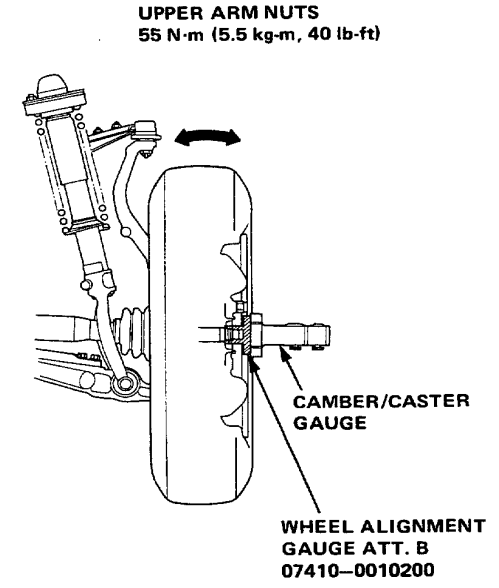
   Camber angle: 0°0′ ± 1°



4. If adjustment is required, go to step 5. If adjustment is not required, remove alignment equipment.
5. Loosen the upper arm nuts so that the ball joint slides freely.



6. Hold the wheel by hand and adjust camber to 0°0′ on the gauge.
7. Tighten the upper arm nuts.



8. Remove the gauge and reinstall the spindle nut.
   TORQUE: 190 N·m (19.0 kg-m, 137 lb-ft)

Caster Inspection/Adjustment

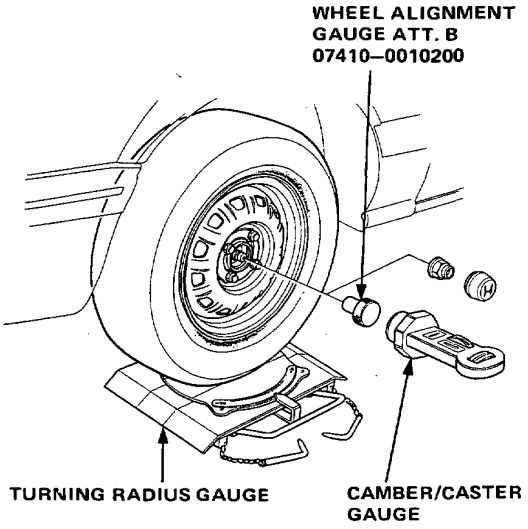
1. Jack up the front of the car and set the turning radius gauges beneath the front wheels, them lower the car.

2. Remove the spindle nut and install special tool Wheel Alignment Gauge Attachment Body.

3. Install Camber/Caster Gauge on the Attachment and apply the front brake. Turn the wheel 20° inward.

4. Turn the adjust screw so that the bubble in the caster gauge is at 0°.

   Caster angle: 0° ± 30'

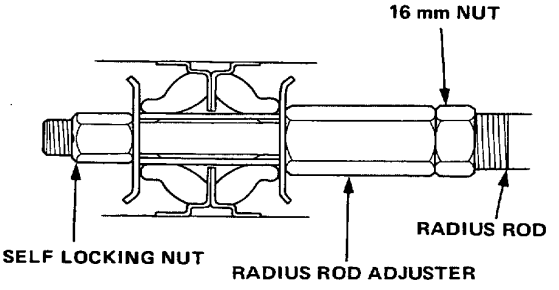


5. If adjustment is required, go to step 7. If adjustment is not required, remove alignment equipment.

   NOTE: Caster must be adjusted after camber has been adjusted.

6. Record the difference between the measurement and the standard.

7. Loosen the 15 mm nuts on the front beam radius rods.



8. Adjust caster angle by turning the lock nut on the end of the radius rod as required.

   To increase . . . . Turn counterclockwise.
   To decrease . . . . Turn clockwise.

   NOTE: Turning the adjuster one full turn changes caster 0°8' (the radius rod is moved 1.25 mm (0.049 in.)).

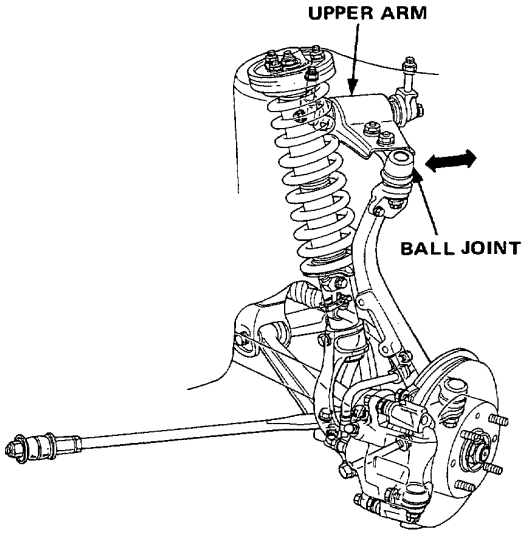
9. Hold the nylon lock nut and lightly tighten the adjuster. Tighten the 16 mm nut to 80 N·m (8.0 kg-m, 58 lb-ft) torque while holding the adjuster.

10. Hold the 16 mm nut and tighten the nylon lock nut to 44 N·m (4.4 kg-m, 32 lb-ft) torque.

Upper Arm Assy.

Play

1. Remove the front wheels.
2. Rock the upper ball joint with a force of approx. 30 kg (65 lb).
3. Replace the upper arm bushings if there is any appreciable play. (Page 20-16)



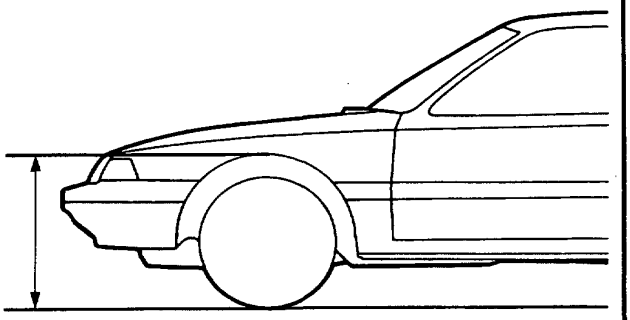
Spring Height

Inspection

NOTE: Car must be empty, parked on a level surface, and tires checked for proper inflation and wear (tread wear indicator must not be showing).

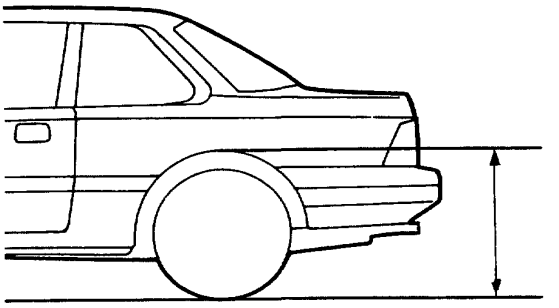
Front Spring Height

Standard (New): 665 mm (26.2 in)
Service Limit: 650 mm (25.6 in)



Rear Spring Height

Standard (New): 657 mm (25.8 in)
Service Limit: 642 mm (25.3 in)

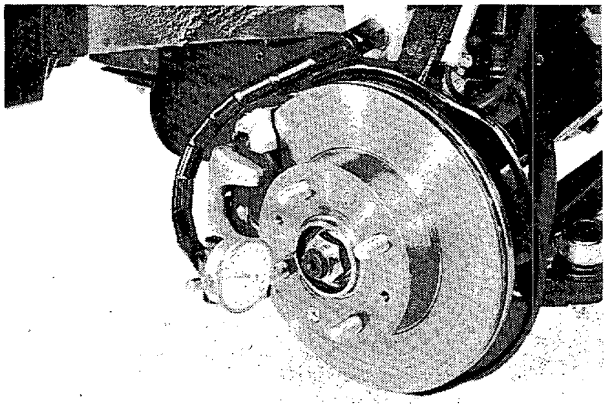


Wheel

Bearing End Play

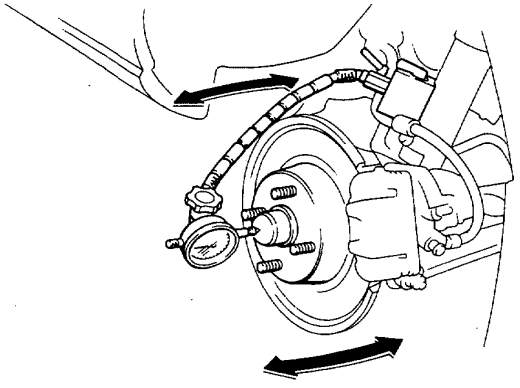
Front Wheel End Play

Standard: 0–0.05 mm (0–0.002 in.)



Rear Wheel End Play

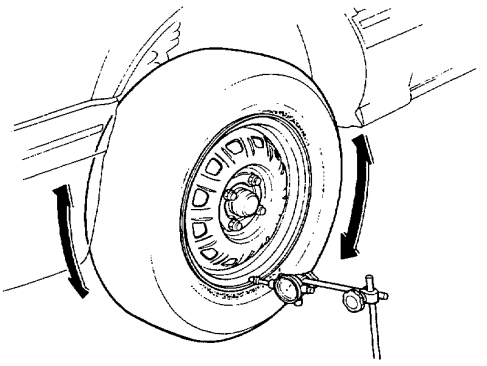
Standard: 0



Runout

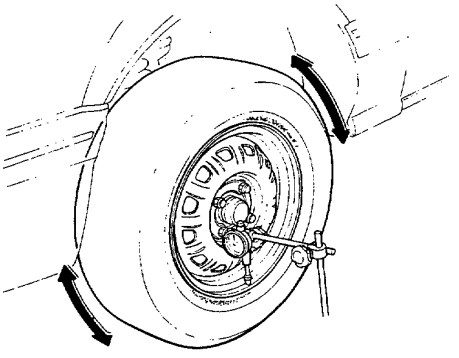
Front and Rear Wheel Axial Runout

Standard: Steel – 0–1.3 mm (0.051 in.)
Aluminum – 0–1.0 mm (0.04 in.)



Front and Rear Wheel Radial Runout

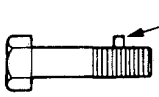
Standard: Steel – 0–1.0 mm (0.039 in.)
Aluminum – 0–0.7 mm (0.028 in.)



Front Suspension

—Index

NOTE: Replace the self-locking bolts if you can easily thread a nut past their nylon locking inserts.



NYLON INSERT

SELF-LOCKING NUT
14 x 1.5 mm
30 N·m (3.0 kg-m, 22 lb-ft)
Replace

SELF-LOCKING NUT
12 x 1.25 mm
83 N·m (8.3 kg-m, 60 lb-ft)

10 x 1.25 mm
40 N·m (4.0 kg-m, 29 lb-ft)

SELF-LOCKING NUT
10 x 1.25 mm
55 N·m (5.5 kg-m, 40 lb-ft)

FRONT DAMPER ASSY
Removal, page 20-17
Disassembly/Inspection, page 20-17
Reassembly, page 20-19
Installation, page 20-19

SELF-LOCKING NUT
10 x 1.25 mm
55 N·m (5.5 kg-m, 40 lb-ft)

CASTLE NUT
12 x 1.25 mm
44 N·m (4.4 kg-m, 32 lb-ft)

DAMPER-LOCKING BOLT
10 x 1.25 mm
44 N·m (4.4 kg-m, 32 lb-ft)

6 x 1.0 mm
18 N·m (1.8 kg-m, 13 lb-ft)

8 x 1.25 mm
22 N·m (2.2 kg-m, 16 lb-ft)

LOWER ARM BOLT
10 x 1.25 mm
55 N·m (5.5 kg-m, 40 lb-ft)

8 x 1.25 mm
22 N·m (2.2 kg-m, 16 lb-ft)

6 x 1.0 mm
10 N·m (1.0 kg-m, 7 lb-ft)

CASTLE NUT
10 x 1.25 mm
44 N·m (4.4 kg-m, 32 lb-ft)

LOCKING NUT
16 x 1.5 mm
80 N·m (8.0 kg-m, 58 lb-ft)

10 x 1.25 mm
55 N·m (5.5 kg-m, 40 lb-ft)

10 x 1.25 mm
45 N·m (4.5 kg-m, 33 lb-ft)

DAMPER FORK BOLT
12 x 1.25 mm
65 N·m (6.5 kg-m, 47 lb-ft)

CALIPER PIN A BOLT
8 x 1.25 mm
18 N·m (1.8 kg-m, 13 lb-ft)

SELF-LOCKING NUT
12 x 1.25 mm
44 N·m (4.4 kg-m, 32 lb-ft)

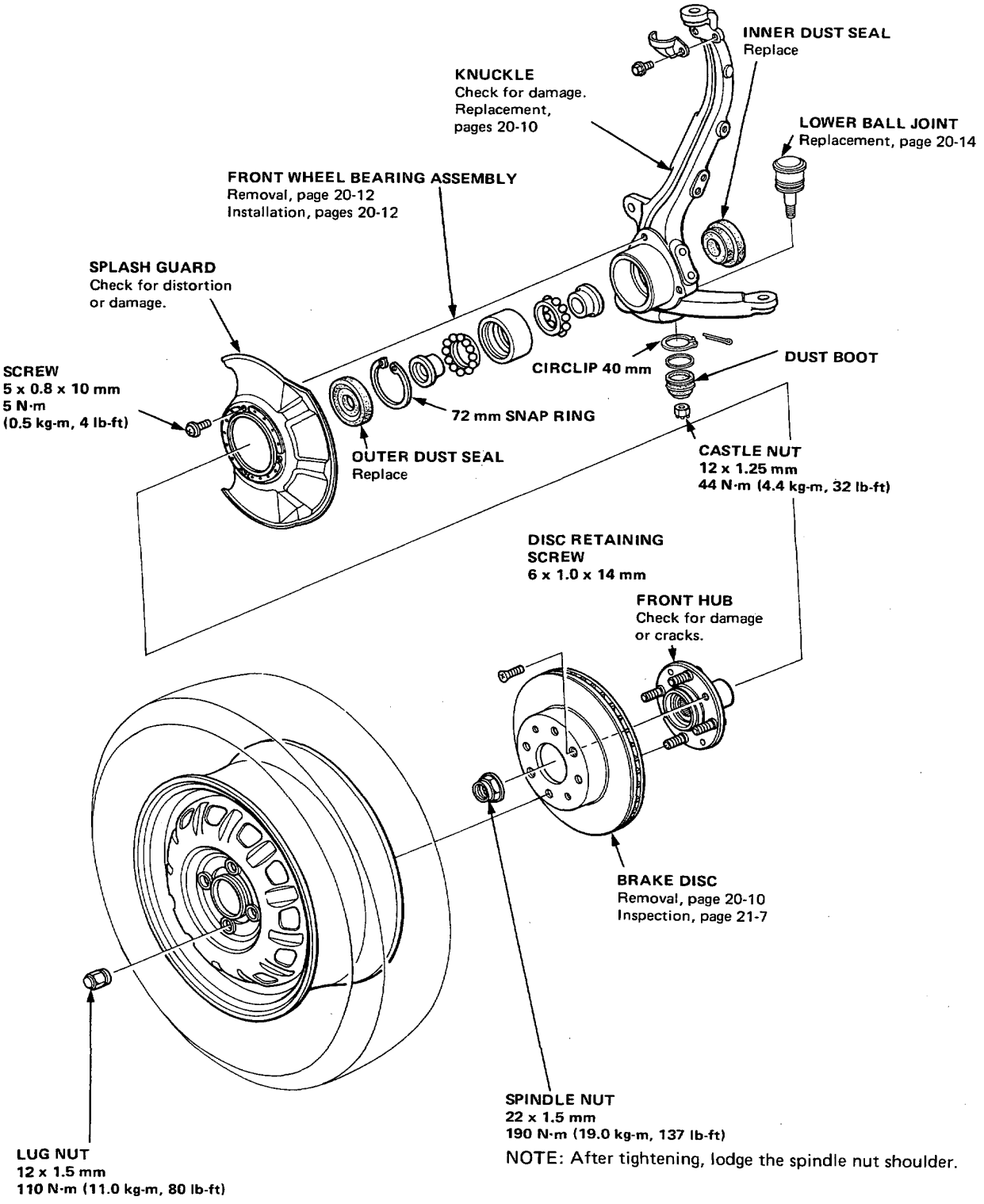
12 x 1.25 mm
78 N·m (7.8 kg-m, 56 lb-ft)

CASTLE NUT
12 x 1.25 mm
55 N·m (5.5 kg-m, 40 lb-ft)

SPINDLE NUT
22 x 1.5 mm
190 N·m (19.0 kg-m, 137 lb-ft)
Replace

Knuckle/Hub

—Index

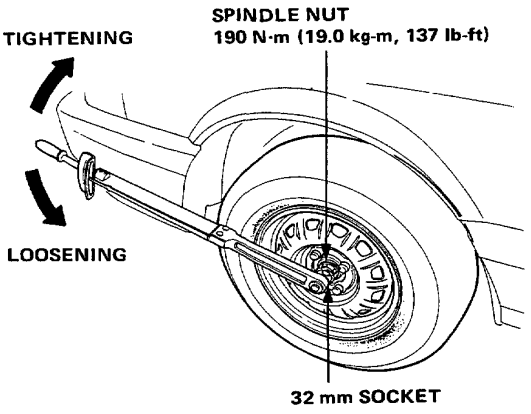


NOTE: After tightening, lodge the spindle nut shoulder.

Knuckle/Hub

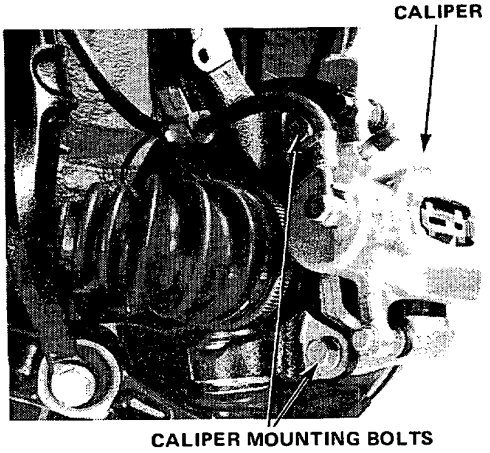
Replacement

1. Pry the nut lock tab away from the spindle, then loosen the nut using a 32 mm socket.



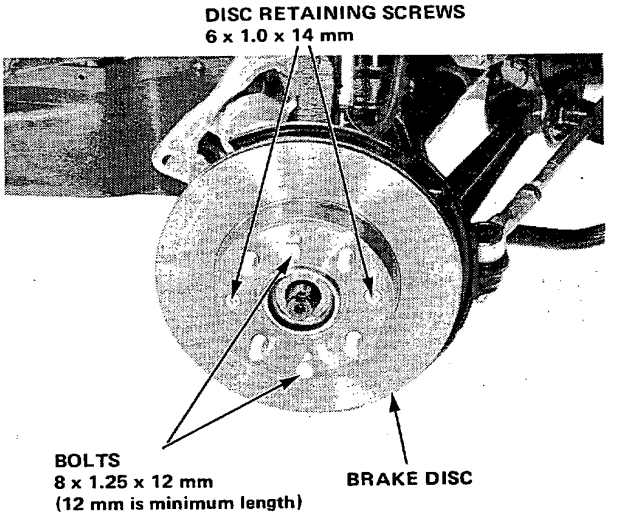
2. Loosen the lug nuts slightly.
3. Raise the front of car and support on safety stands in proper locations.
4. Remove the lug nuts, wheel, and spindle nut.
5. Remove the caliper mounting bolts and hang the caliper assembly to one side.

CAUTION: To prevent accidental damage to the caliper assembly or brake hose, use a short piece of wire to hang the caliper assembly from the undercarriage.

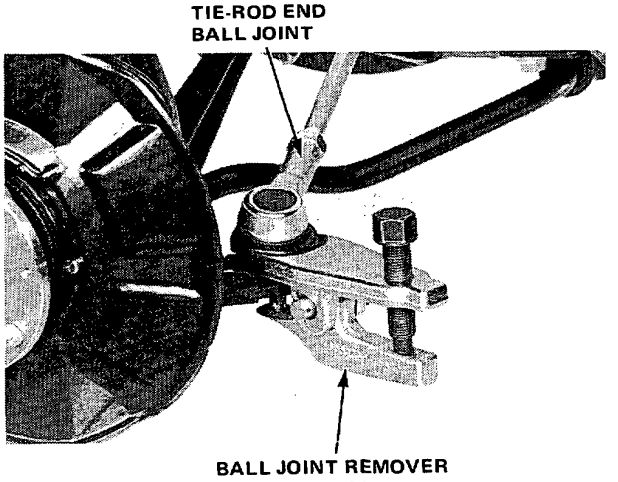


6. Remove the 6 mm disc retaining screws.
7. Screw the two 8 x 1.25 x 12 mm bolts into the disc to push it away from the hub.

NOTE: Turn each bolt two turns at a time to prevent cocking disc excessively.

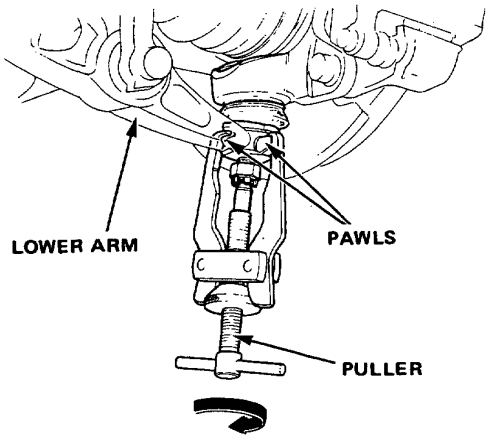


8. Remove the cotter pin from the tie-rod end and remove the castle nut.
9. Break loose the tie-rod ball joint using Ball Joint Remover, then lift the tie-rod out of the knuckle.



10. Pry the cotter pin off and loosen the lower arm ball joint nut half the length of the joint threads.

11. Remove the ball joint using a puller with the pawls applied to the lower arm.



NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

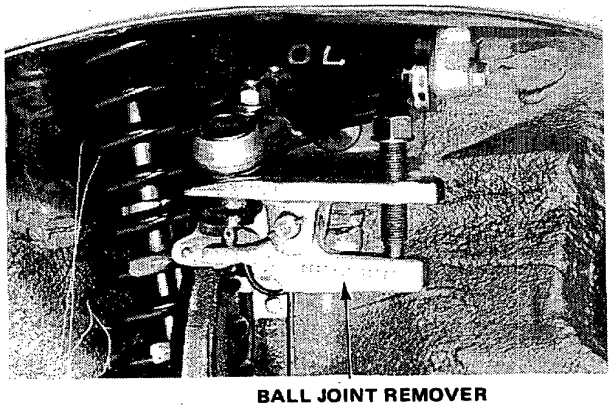
CAUTION: Avoid damaging the ball joint boot.

12. Remove the knuckle protector.

13. Pry off the cotter pin and remove the upper arm ball joint nut.

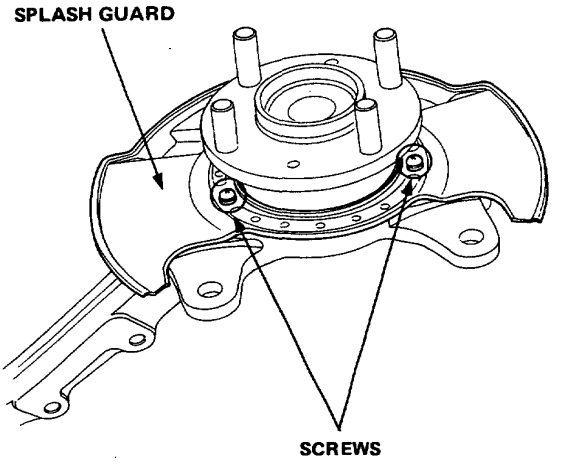
14. Separate the ball joint using Ball Joint Remover.

15. Pull the drive shaft off the knuckle and remove the knuckle.



BALL JOINT REMOVER
07941–6920001

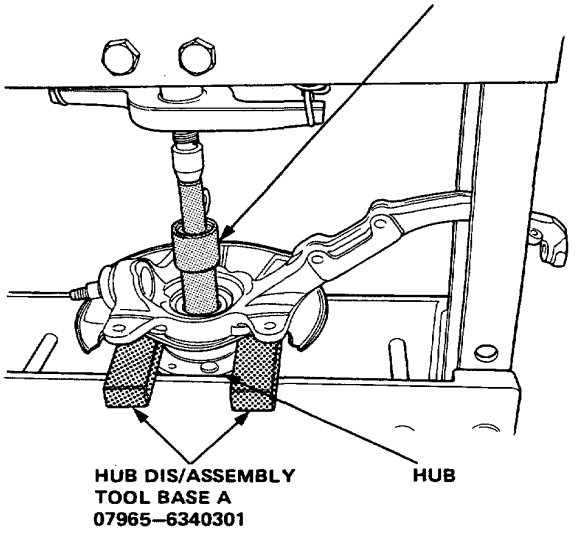
16. Remove the two screws from the splash guard.



17. Remove the hub from the knuckle using special tools and a hydraulic press.

CAUTION:
- **Take care not to distort the splash guard.**
- **Hold the hub by hand to prevent it from falling.**

FRONT HUB DIS/ASSEMBLY TOOL PIN A
07965–6340100

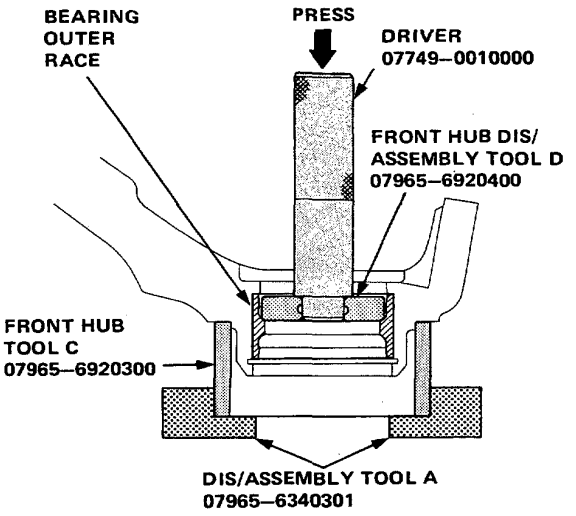


NOTE: Install the hub and knuckle in the reverse order of disassembly. Use a new spindle nut, and stake after torquing.

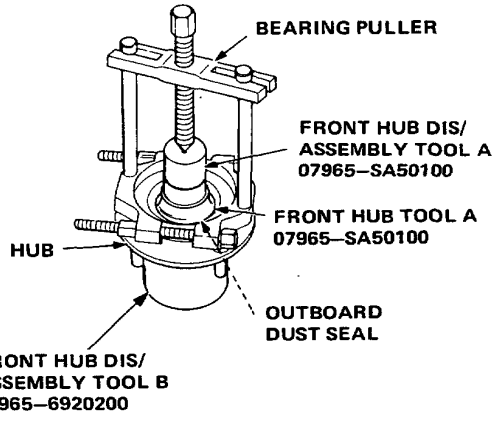
Front Wheel Bearings

Removal

1. Remove the splash guard and 72 mm snap ring, then remove the outboard bearing.
2. Flip the knuckle over and remove the inboard dust seal, inboard bearing and inner race.
3. Press the bearing outer race out of the knuckle using special tools as shown.



4. Remove the outboard bearing inner race from the hub using special tools and a bearing puller.



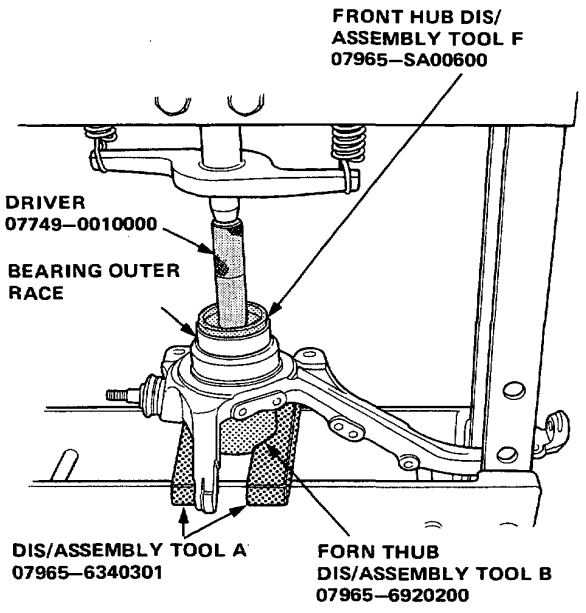
5. Then, remove the outbard dust seal from the hub.

   NOTE: Wash the knuckle and hub thoroughly before re-assembly.

Installation

1. Press the bearing outer race into the knuckle using special tools.

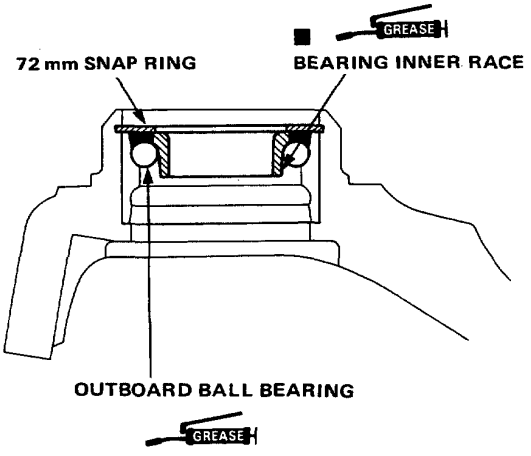
   CAUTION: Maximum press load: 2.5 tons.



2. Install the outboard ball bearing and its inner race in the knuckle.

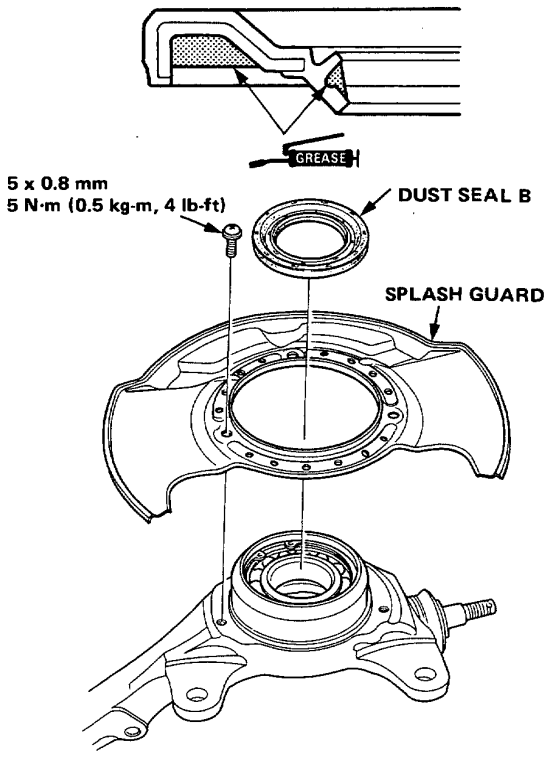
   NOTE: Pack both wheel bearings with grease before installation. Also apply grease to the outer race and both inner races.

3. Install the 72 mm snap ring in the knuckle groove securely.

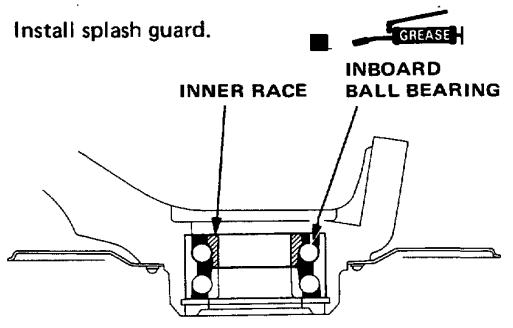


4. Pack grease in the groove and around the sealing lip of the outboard dust seal.

5. Drive the outboard dust seal into the knuckle, using special tools and hammer, until it is flush with the knuckle surface.



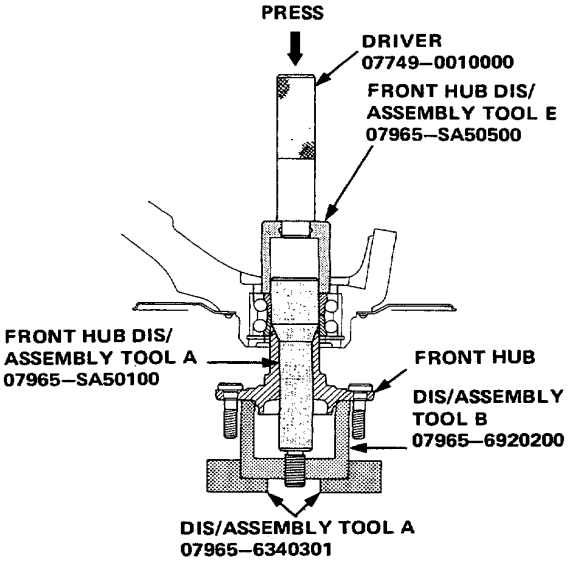
6. Install splash guard.



7. Turn the knuckle upside down and install the inboard ball bearing and its inner race.

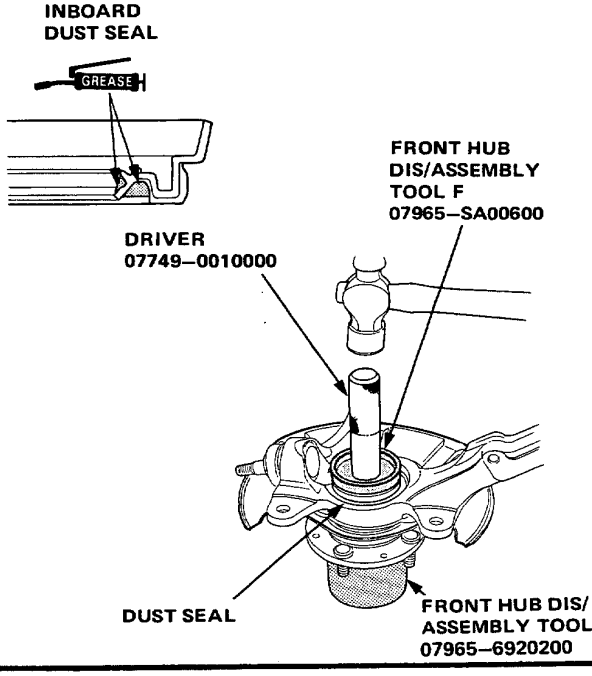
8. Place the front hub in special tool fixture, then set the knuckle in position and apply downward pressure with a hydraulic press.

CAUTION: Maximum press load: 2.0 tons



9. Pack grease in the groove and around the sealing lip of the inboard dust seal.

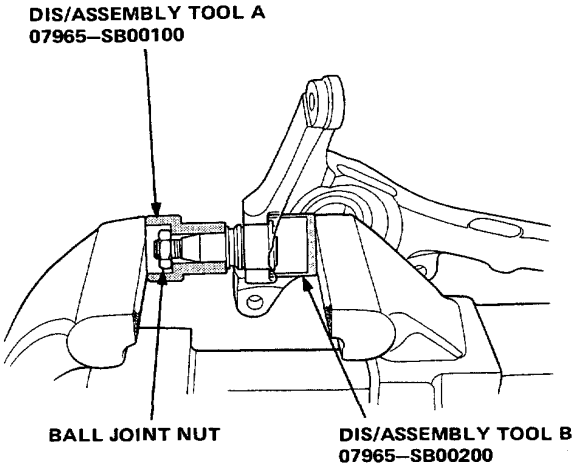
10. Drive the inboard dust seal into the knuckle using special tools.



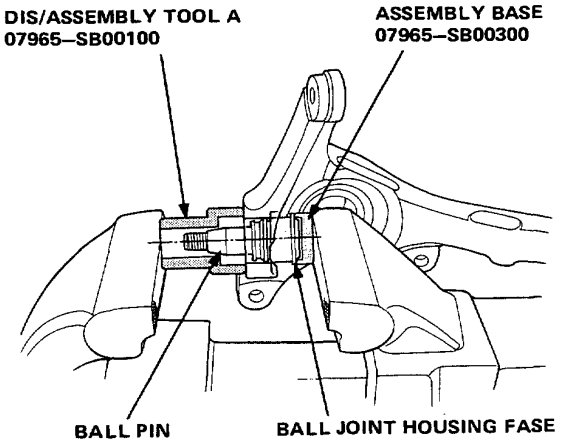
Lower Boll Joint

Replacement

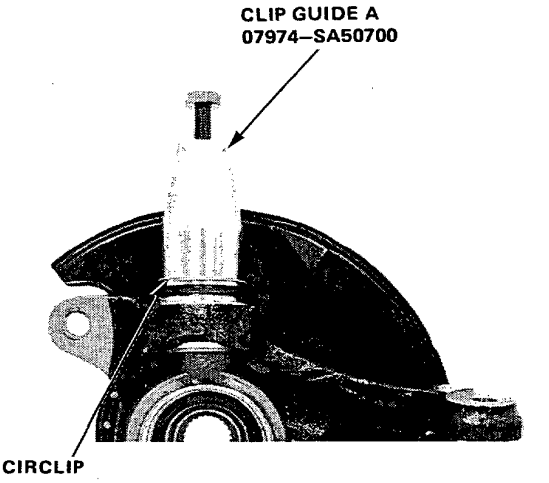
1. Remove the boot by prying the snap rings off.
2. Pry the snap ring out of groove in the ball joint.
3. Tighten the ball joint nut using the special tool A.



4. Position special tool B between the ball joint housing and knuckle and set them in a vise. Press the ball joint out of the knuckle.
5. Press the ball joint into place in hole of the knuckle by hand.
6. Install the special tool A on the ball joint inside out.



7. Install special tool C between the jaws of a vise and end of the ball joint housing and press the ball joint into place in the knuckle.
8. Seat snap ring in groove of the ball joint.
9. Install the boot and snap ring using the Clip Guide A.

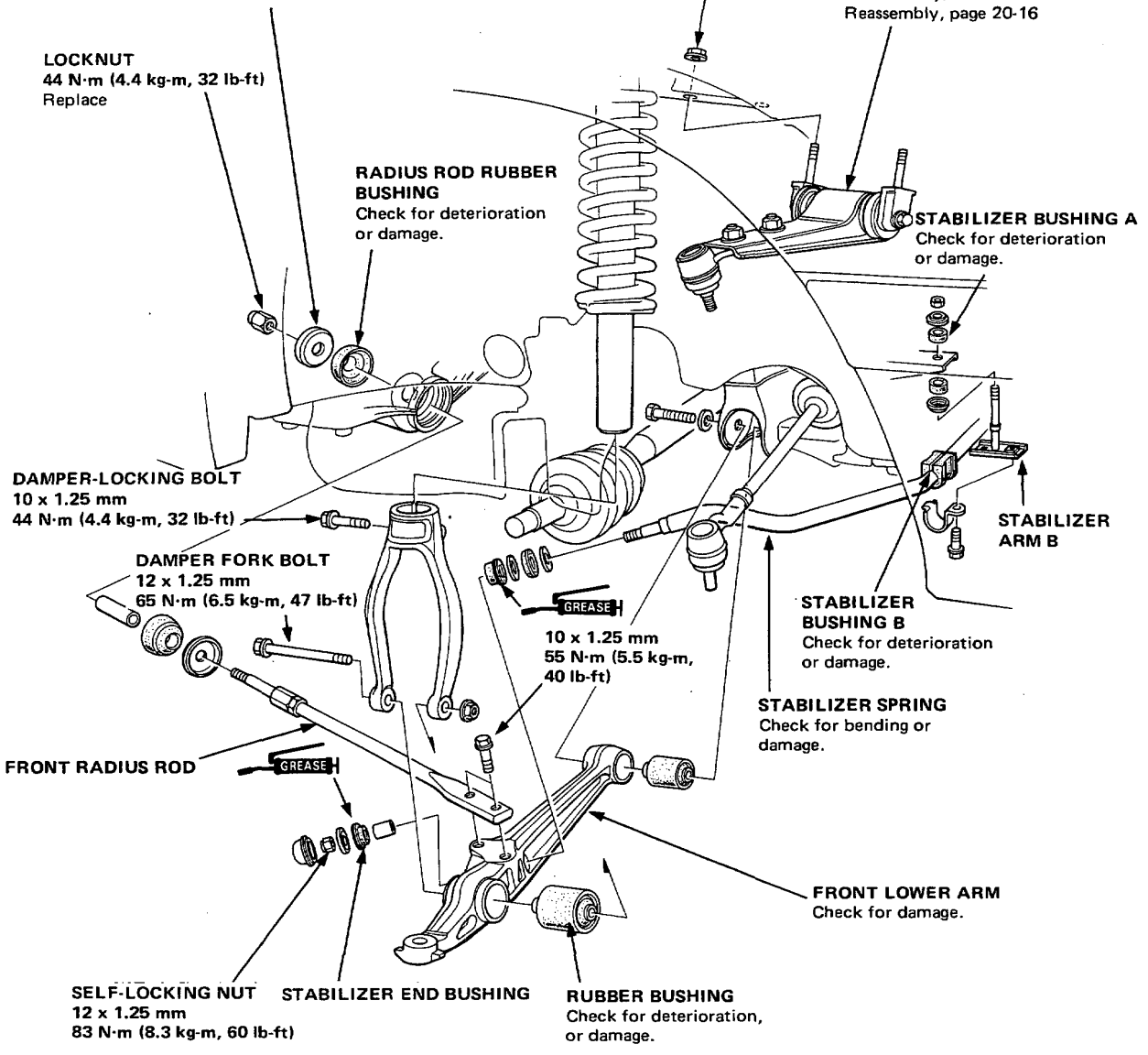


Upper Arm/Stabilizer Spring/Lower Arm

Removal/Inspection

RADIUS ROD WASHER
Replace

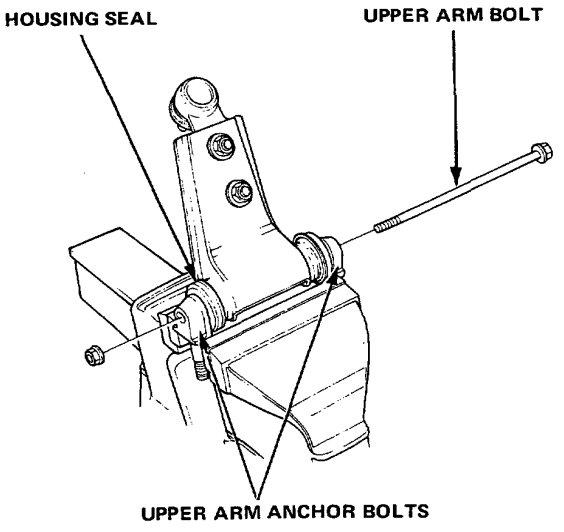
CAUTION: To remove the washer, first loosen the self-locking nut, then loosen the washer from the bushing by lightly tapping it around with a hammer and a drift. After making sure that the washer is loose, remove the washer and nut.



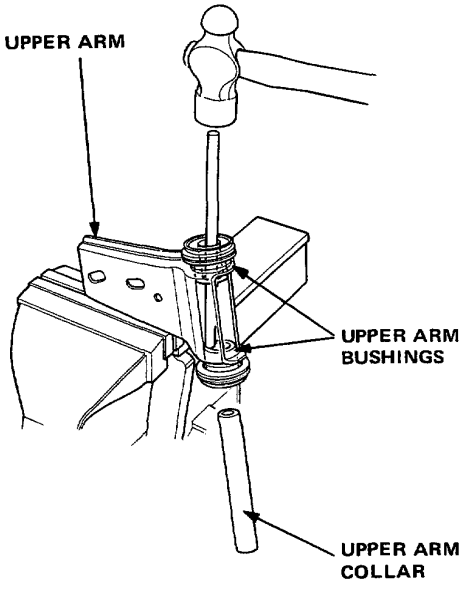
Upper Arm Assy.

Disassembly/Installation

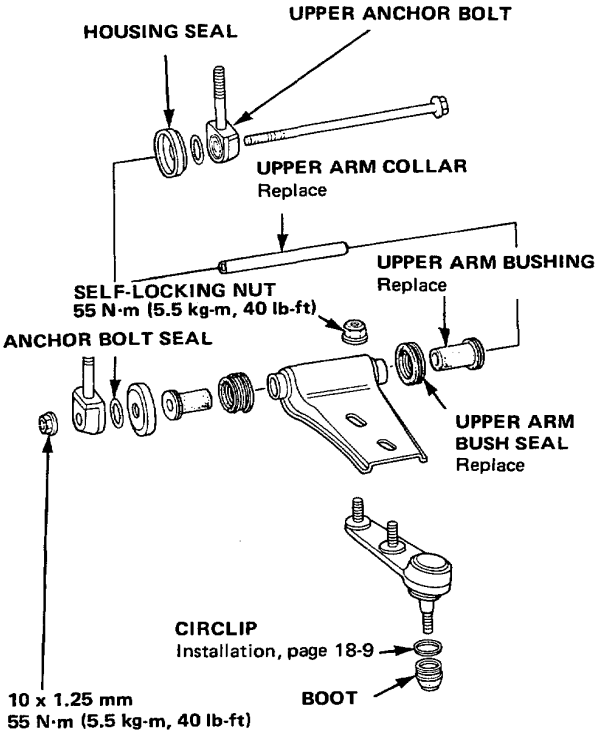
1. Lightly hold the upper arm anchor bolts in the jaws of a vise as shown.



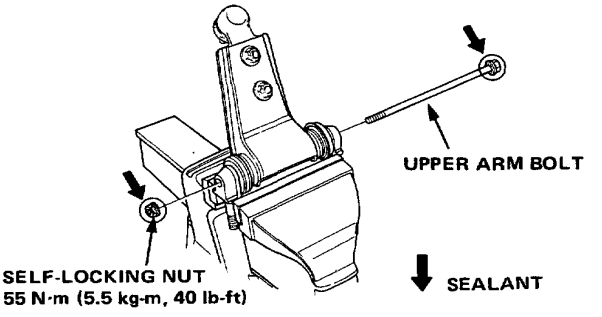
2. Remove the upper arm bolt, upper arm anchor bolts and seals.
3. Install the upper arm in a vice.
4. Remove the upper arm collar.



5. Drive out the upper arm bushings with the round end of a bar.
6. Replace the upper arm bushings, upper arm bushing seals and upper arm collar with new ones.



7. Coat the ends and insides of the upper arm bushings and sealing lips of the upper arm bushing seals with grease.
8. Lightly hold the upper arm anchor bolts in a vise.



9. Apply sealer to the threads and underside of the upper arm bolt heads and self-locking nut. Install the upper arm bolt and tighten the self-locking nut.

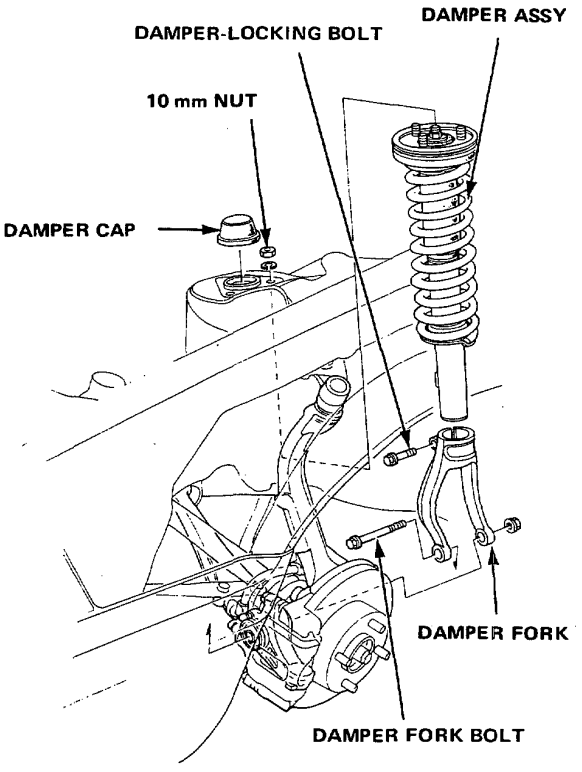
   NOTE: Do not apply sealant to the areas other than specified.

10. After installing, adjust the camber (page 20-4).

Front Damper Assy

Removal

1. Remove the damper locking bolt.
2. Remove the damper fork bolt and remove the damper fork.

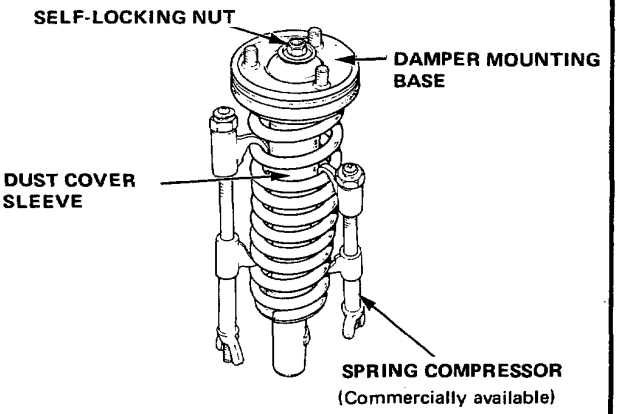


3. Remove the damper assembly.

Disassembly

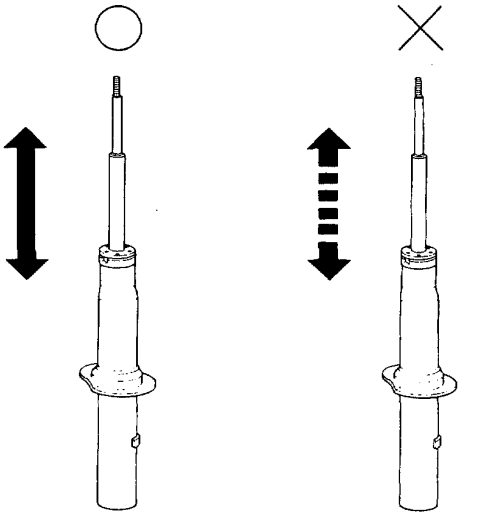
1. Compress the Damper spring using Spring Compressor, then remove the self-locking nut.

WARNING **Follow spring compressor manufacturer's instructions carefully. Do not compress the spring more than necessary for access to seat the nut.**



2. Remove the spring compressor and disassemble the Damper (page 20-17).
3. Check for smooth operation through full stroke.
4. Also move the piston rod back-and-forth 5–10 cm (2–4 in.) to check for smooth operation.

   Replace the shock absorber if resistance is uneven or jerky.

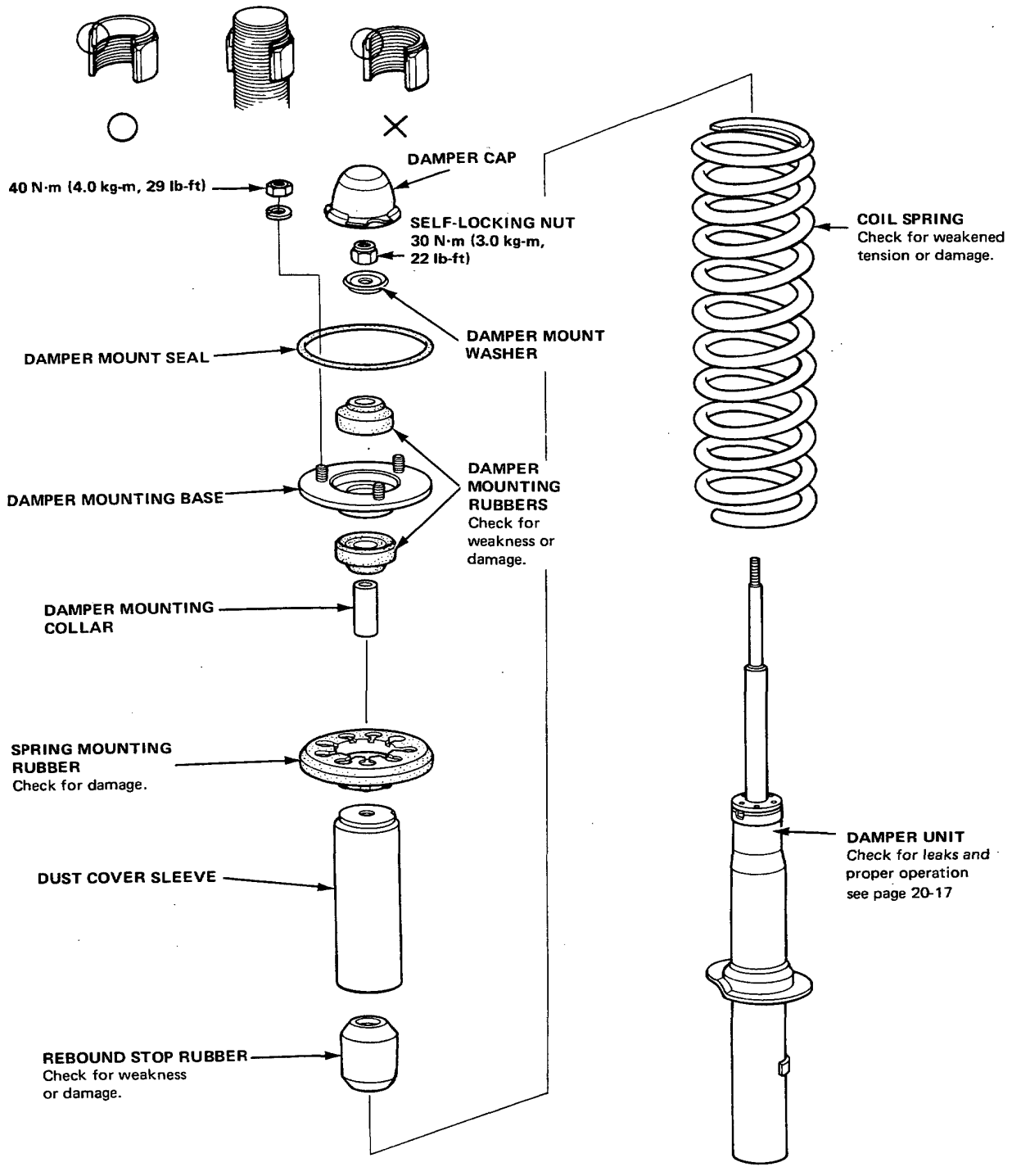


5. Check for abnormal noise or binding during above tests.
6. Check for oil leaks.

Front Damper Assy

Disassembly/Inspection

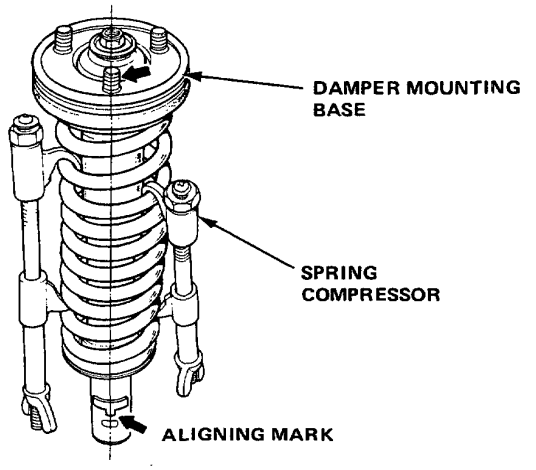
NOTE: Replace the self-locking bolts if you can easily thread a nut past their nylon locking inserts.



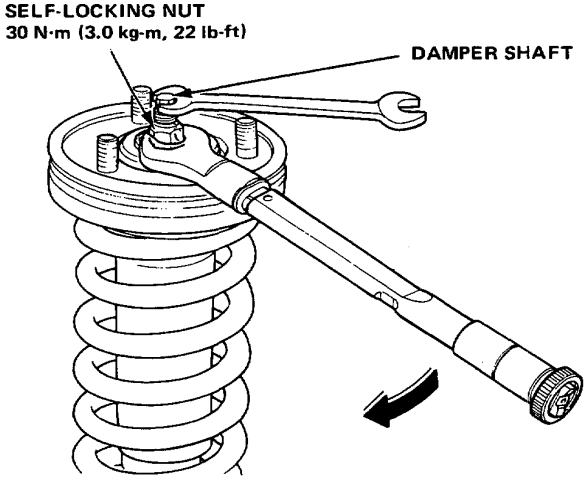
Front Damper Assy

Reassembly

1. Compress the shock absorber spring in the Spring Compressor, and install the spring on the damper.
2. Install the dust cover sleeve, damper mount collar, damper mount rubber and spring mount rubber on the damper shaft.

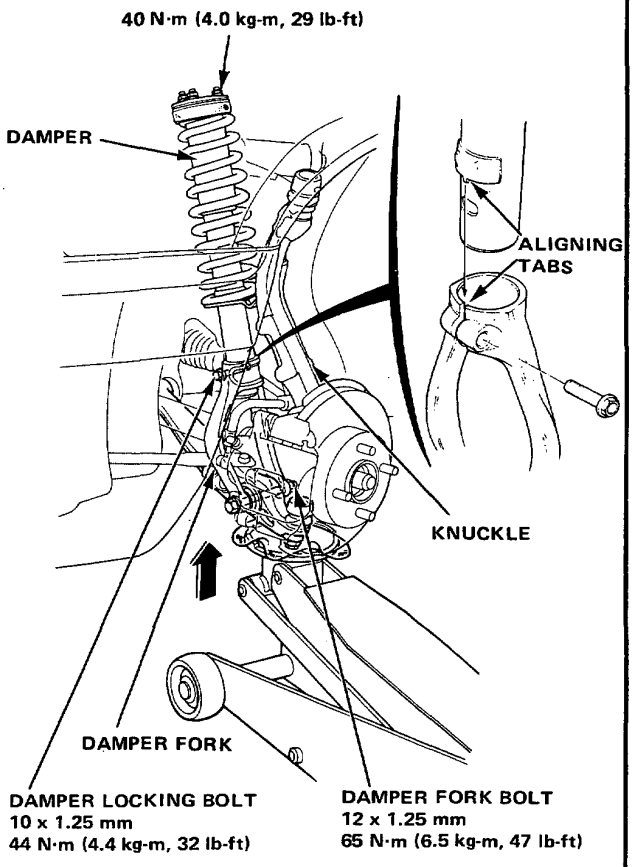


3. Install the damper mount base on the damper shaft. Position the mount base so that one of the three stud bolts on the base aligns with the aligning mark on the damper shaft within ± 10°.
4. Install the damper mount rubber and washer on the damper shaft. Install and tighten the self-locking nut.



Installation

1. Temporarily install the damper on the frame with the aligning mark facing the inside of the frame.
2. Install the damper fork on the driveshaft and lower arm. Install the damper in the damper fork with the aligning tab aligned with the slot in the damper fork.



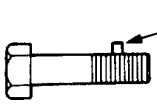
3. Raise the knuckle until the weight of the car is placed on the damper.

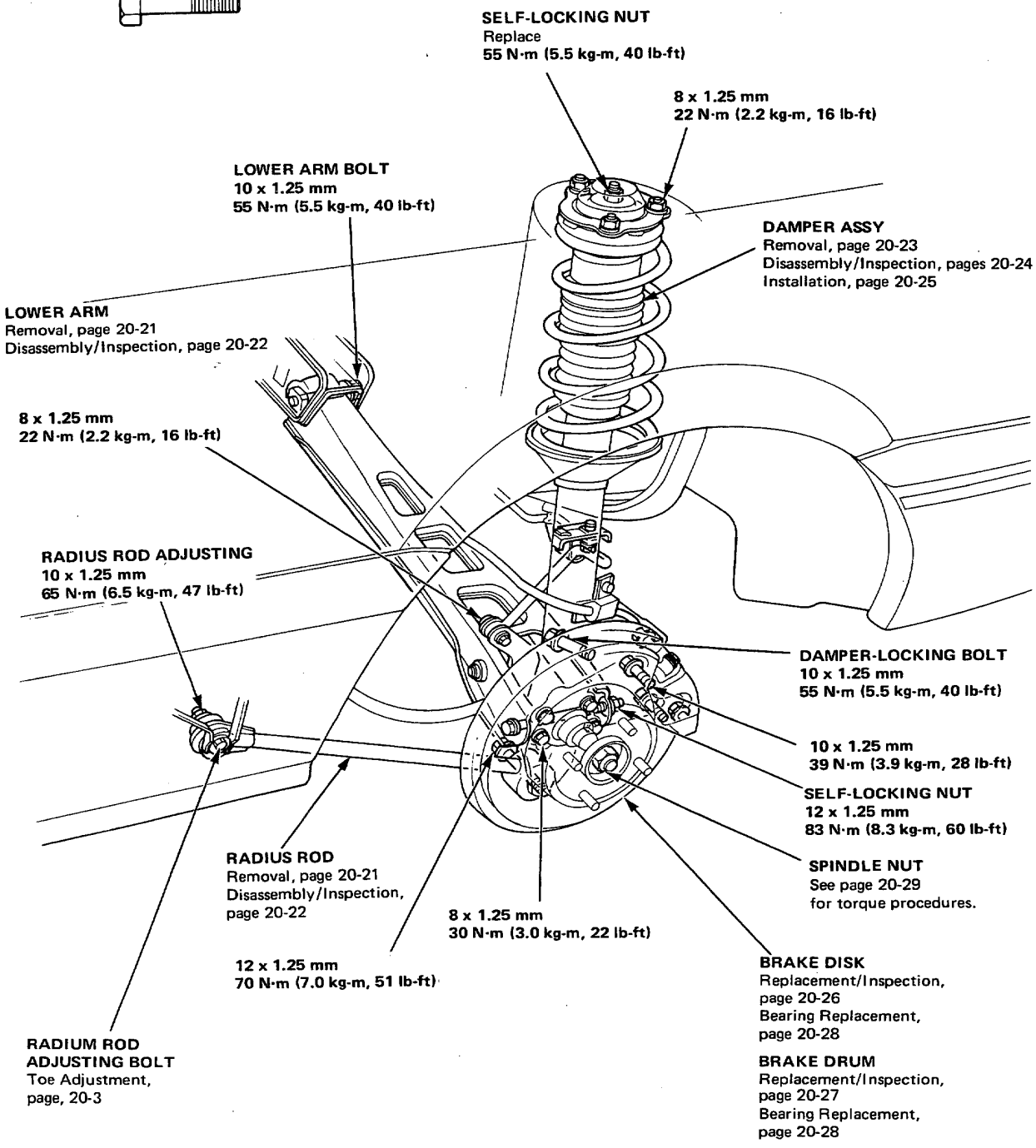
   NOTE: The rubber bushing should be tightened with the damper under vehicle load.
4. Tighten the damper fork pinch bolt.
5. Tighten the damper fork bolt.
6. Secure the damper to the frame with the 8 mm mount nuts.

Rear Suspension

Index

NOTE: Replace the self-locking bolts if you can easily thread a nut past their nylon locking inserts.



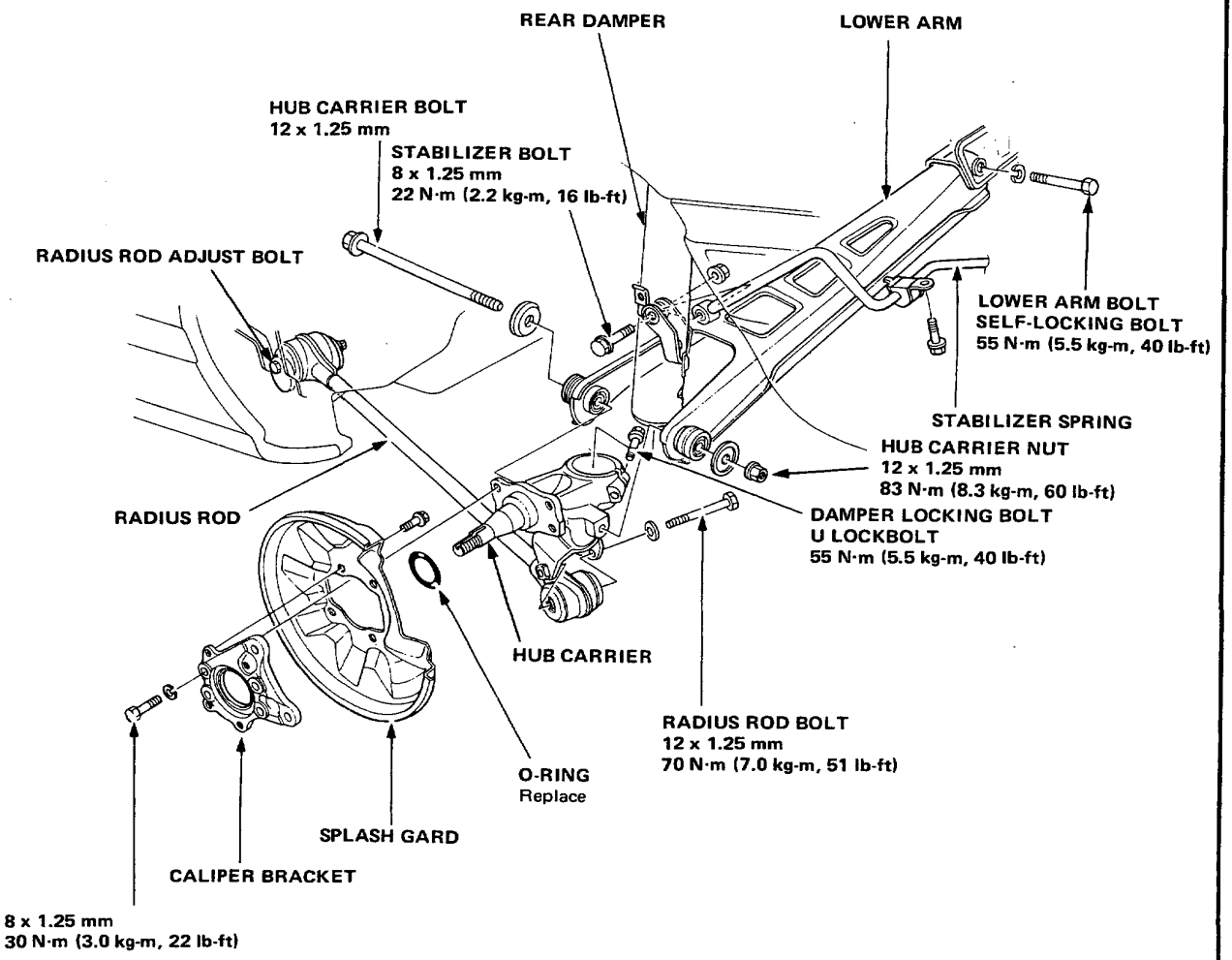


Lower Arm/Radius Rod/Hub Carrier

Removal

WARNING **Block the front wheels before jacking up the car.**

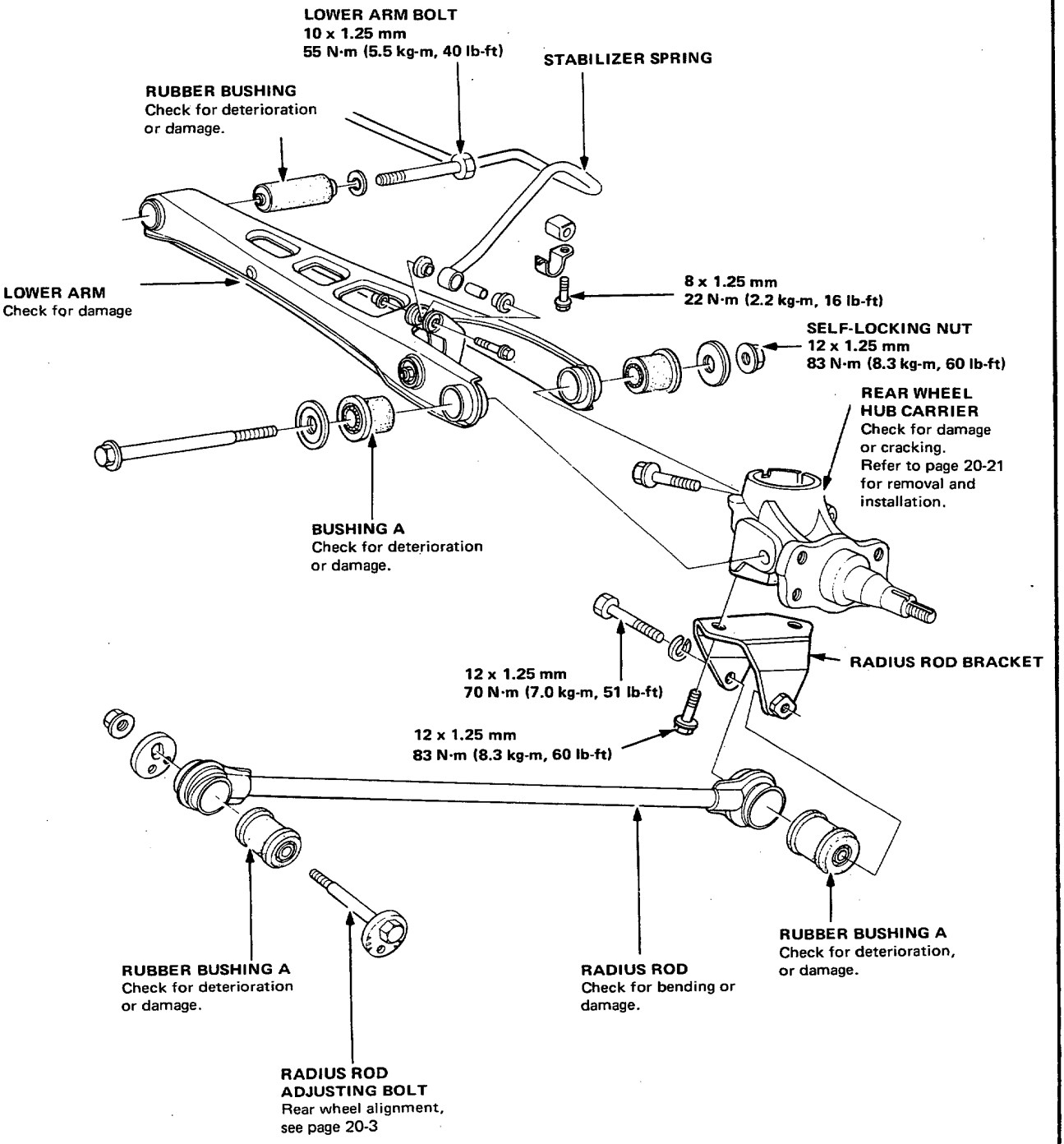
1. Jack up the rear of the car and support with safety stands in proper locations.
2. Remove the rear wheels and brake discs or brake drums.
3. Disconnect the brake hoses and pipes (drum brake).
4. Disconnect the parking brake cable (drum brake).
5. Remove the caliper bracket or backing plate (drum brake).
6. Remove the radius rod bolt and radius rod adjust bolt, then remove the radius rod.
7. Unscrew the stabilizer bolt and remove the stabilizer spring.
8. Loosen off the damper lock bolt and remove the hub carrier from the rear damper.
9. Unscrew the lower arm bolt and remove the lower arm.



Rear Lower Arm/Radius Rod

Disassembly/Inspection

NOTE:
- Check all rubber parts for deterioration or damage.
- Adjust the rear wheel alignment when any of these parts is serviced.

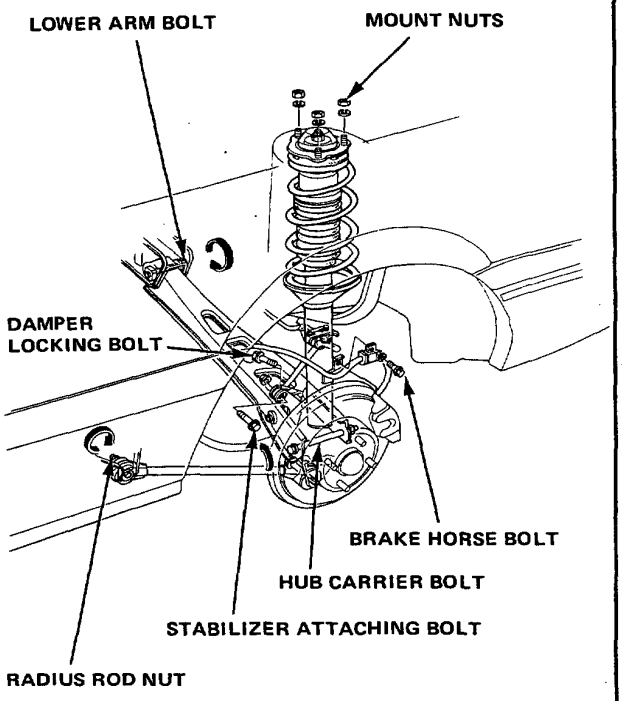


Rear Damper

Removal

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

1. Jack up rear of car and support on safety stands in proper locations.
2. Remove rear wheel.
3. Remove the brake hose clamp bolt (For drum brake, disconnect the brake hose from the brake pipe).
4. Remove the stabilizer from the lower arm.
5. Loosen the lower arm bolt.
6. Loosen the radius rod nut and hub carrier bolt.



7. Remove the damper lock bolt and remove the damper from the hub carrier.
8. Unscrew the mount nuts and remove the damper.

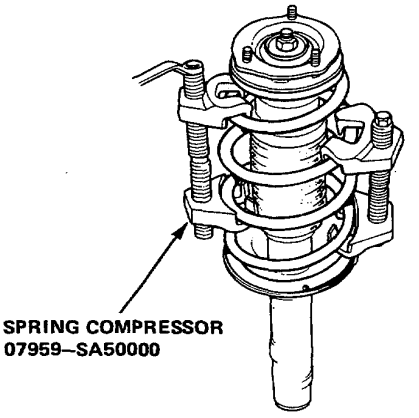
Disassembly/Inspection/Reassembly

1. Compress the Damper spring using Spring Compressor and remove the self-locking nut.

WARNING **Follow spring compressor manufacturer's instructions carefully.**

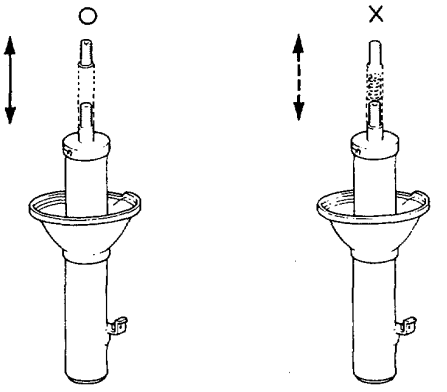
CAUTION: Do not compress the *spring more* than necessary to loosen the center locknuts.

2. Remove Spring Compressor and disassemble the damper. See page 20-24.



3. Check for smooth operation through full stroke.
4. Also move piston rod back-and-forth 5–10 cm (2–4 in.) to check for smooth operation.

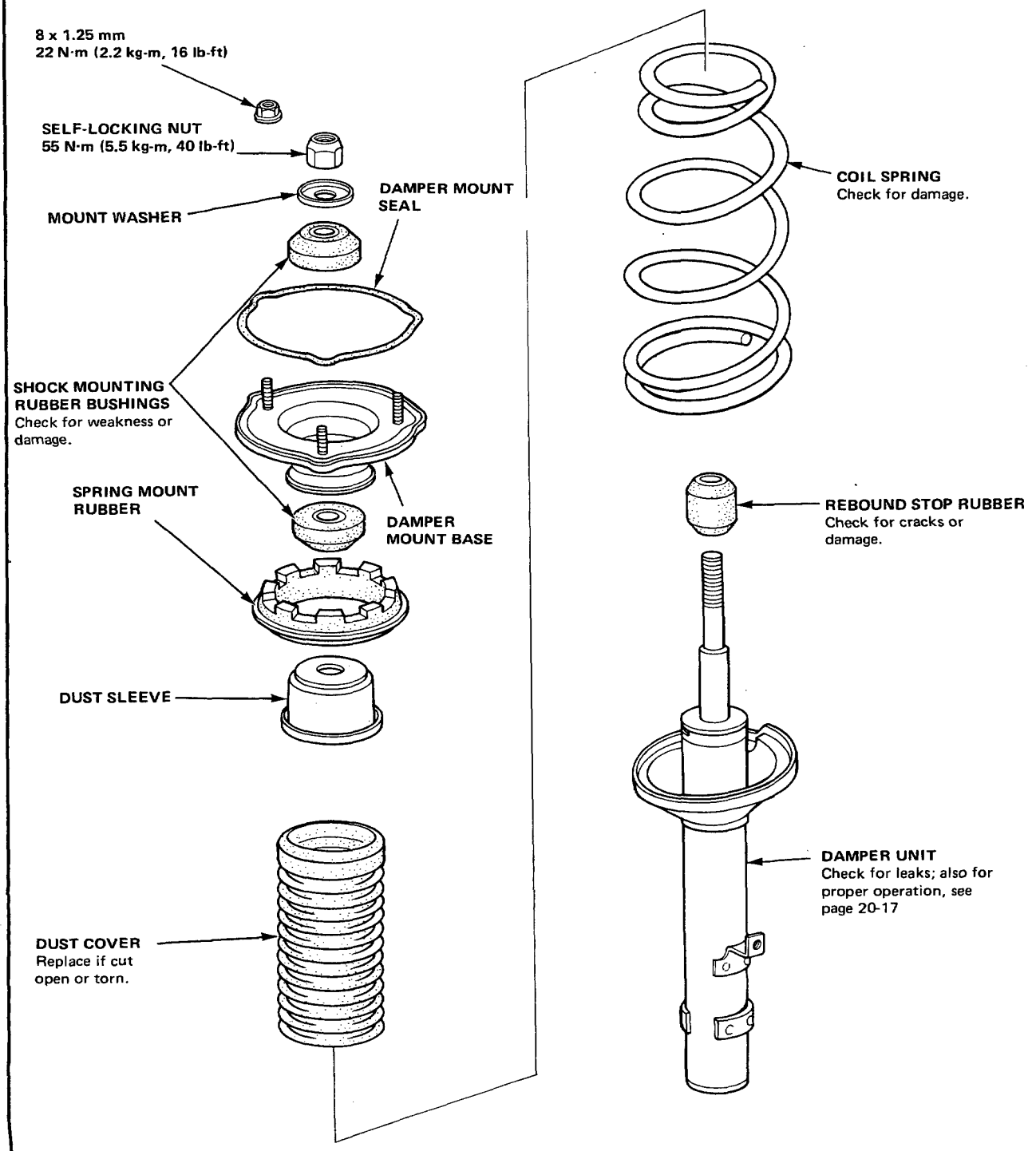
   Replace the shock absorber if resistance is uneven or jerky.



5. Check for abnormal noise or binding during above tests.
6. Check for oil leaks.

Rear Damper

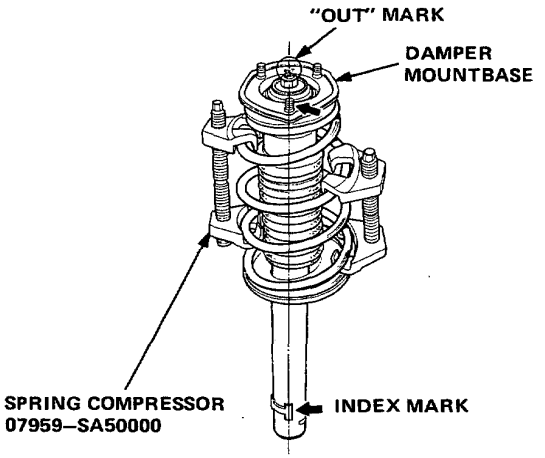
Overhaul/Inspection



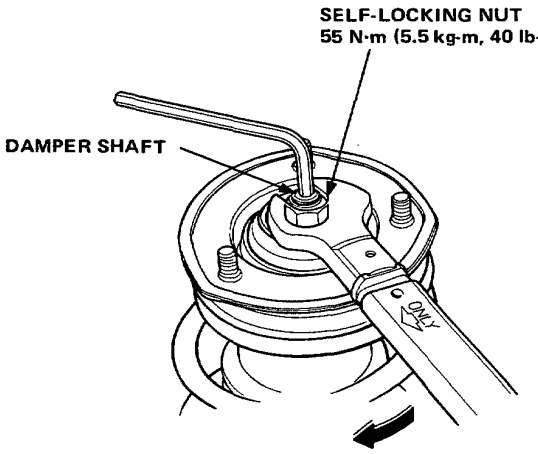
Rear Damper

Assembly

1. Compress the shock absorber spring in the Spring Compressor and install the spring on the damper.
2. Install the rebound stop rubber, dust sleeve, dust cover and spring mount rubber.



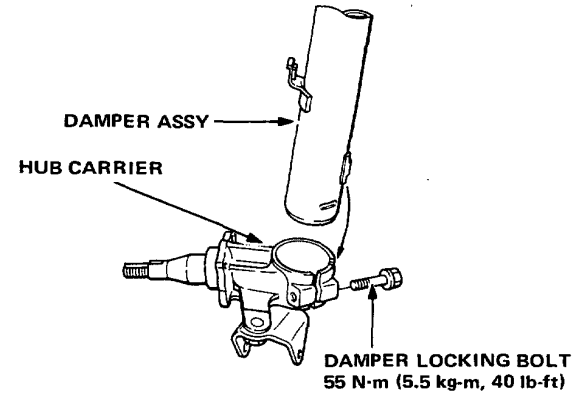
3. Install the damper mount base with the "OUT" mark opposite the index mark on the damper (stud on the opposite side aligns with the index mark on the damper).
4. Install the damper mount rubber and damper mount washer on the damper shaft. Install and loosely tighten the lock nut.



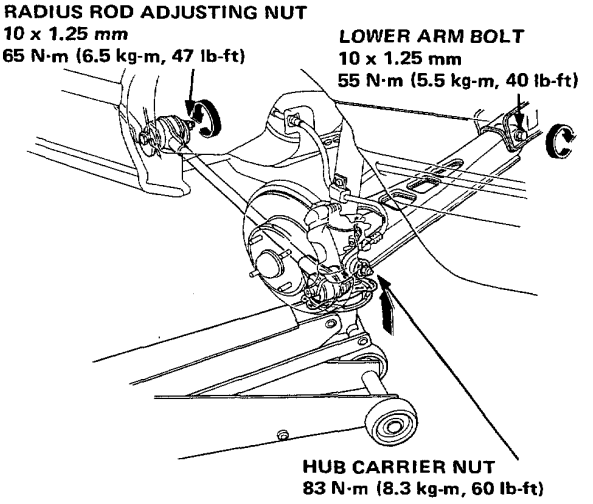
Installation

NOTE: Install the rear suspension in the reverse order of removal, noting following:

1. Align the tab on the shock absorber with the slot in the hub carrier and assemble.



2. Tighten the self-locking bolt to the specified torque.
3. Tighten the lower arm bolt and the radius rod adjusting bolt loosely in frame.

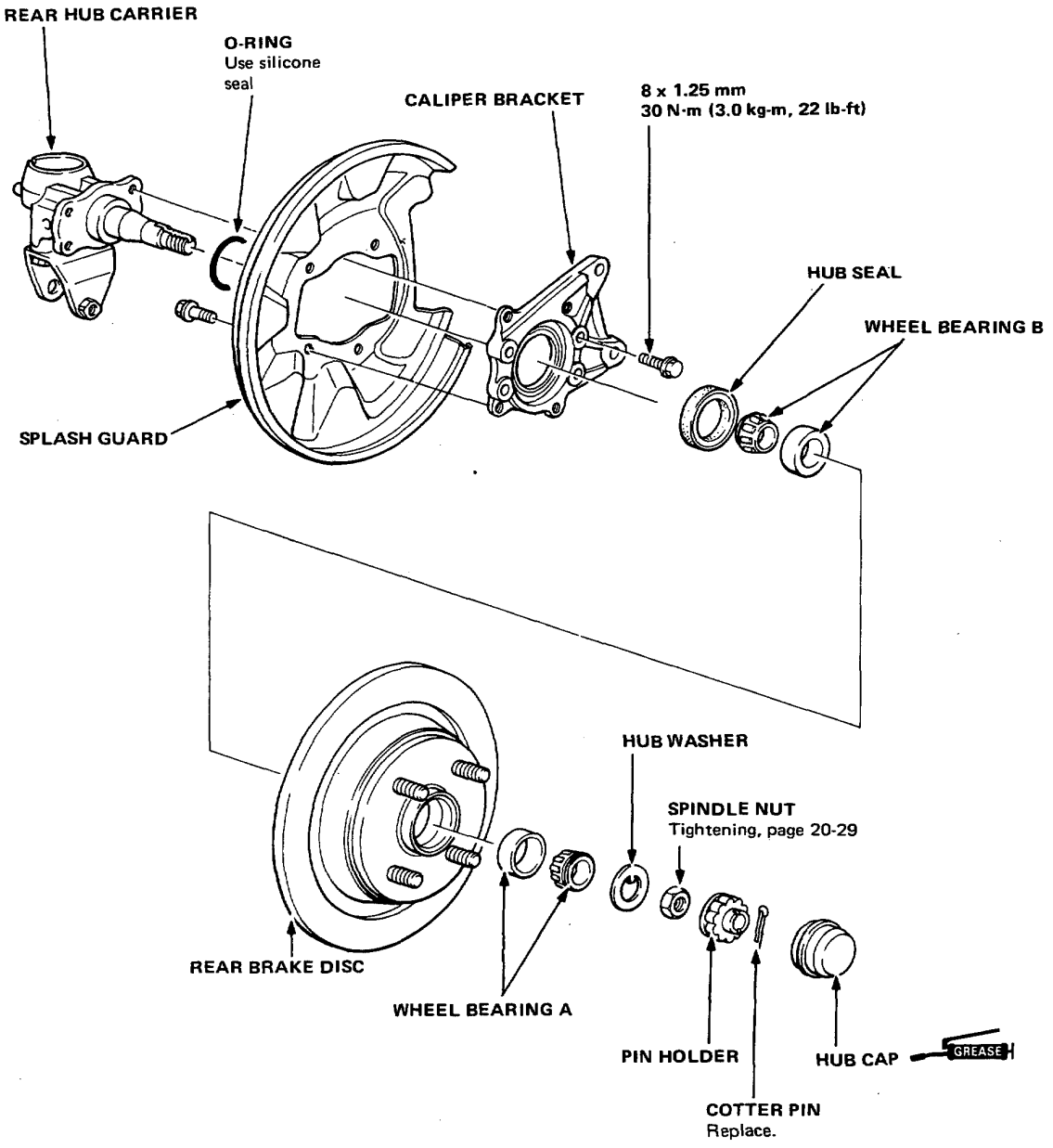


4. Place jack under the HUB CARRIER and raise until the car just lifts off of safety stand.
5. Tighten the lower arm bolt to the specified torque.
6. Install the stabilizer spring.
7. Tighten the radius rod adjusting bolt to the specified torque.

Brake Disc

Replacement/Inspection

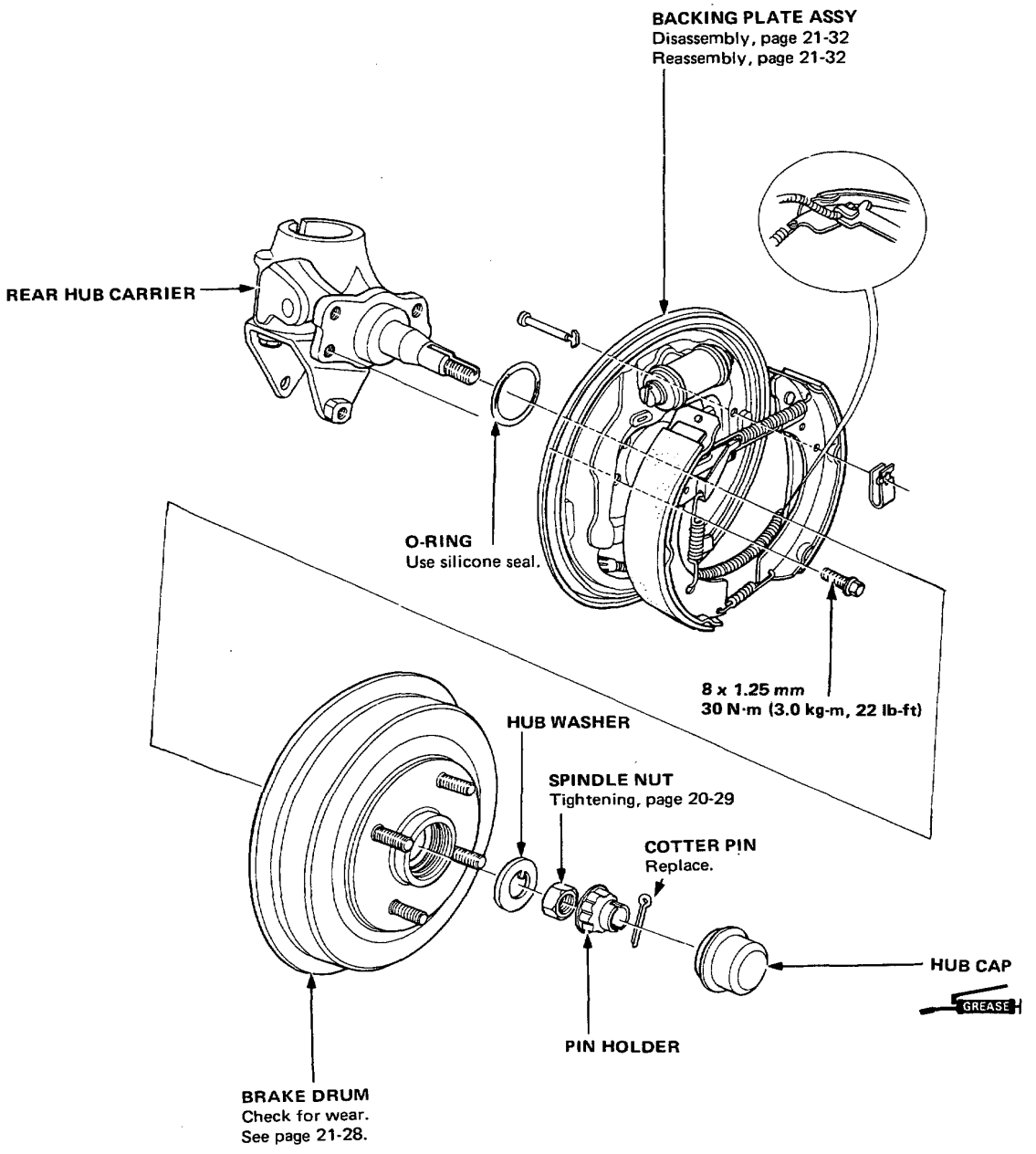
1. Remove the rear brake caliper (page 21-24).
2. Remove the rear hub cap.
3. Pry off the cotter pin and remove the pin holder.
4. Loosen off the spindle nut and remove the rear brake disc.
5. Remove the 8 mm bolt and brake caliper bracket.



Brake Drum

Replacement/Inspection

1. Remove the rear hub cap.
2. Remove the cotter pin and pin holder.
3. Remove the spindle nut, then pull the brake drum off.
4. Disconnect the hydraulic brake line and parking brake cable.
5. Remove the four 8 mm bolts and remove the backing plate and spindle.

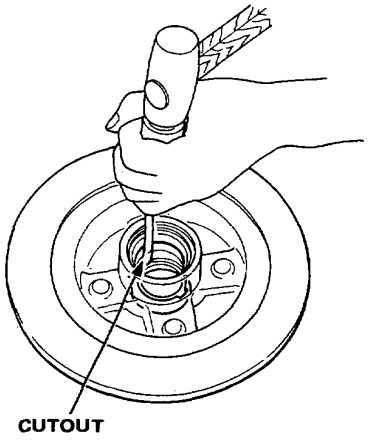


Rear Wheel Bearings/Hub Seal

Replacement

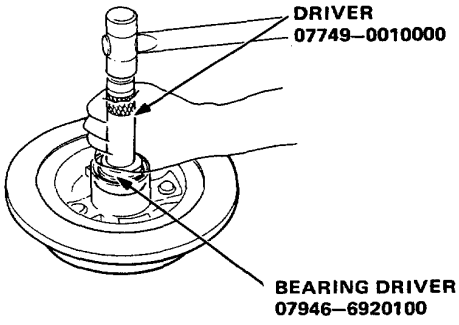
1. Drive the outboard and inboard bearing races out of the brake disc or drum. Punch in a criss-cross pattern to avoid cocking the bearing race in the bore.

   NOTE: Clean bearing seats thoroughly before going on to next step.

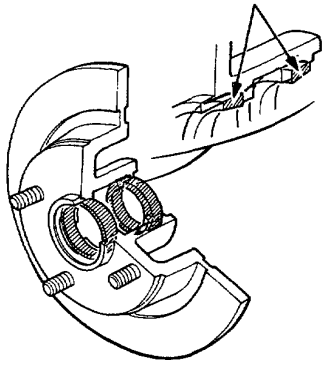


2. Drive in the inboard bearing race using Driver and Attachment.

3. Turn the drum over and drive in the outboard bearing race.



4. Check that the bearing races are seated properly.

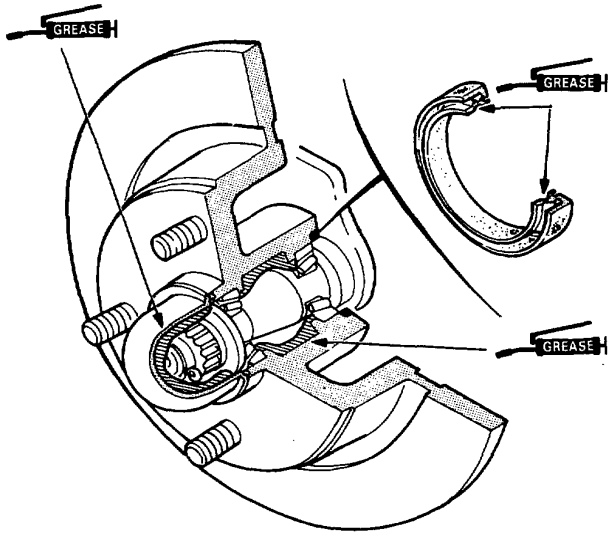


5. Pack multipurpose grease into both bearings and also in the shaded areas shown below.

6. Place the inboard bearing in the drum.

7. Apply grease to the hub seal, as shown below, and carefully tap into place using a mallet.

   NOTE: Tap in a criss-cross pattern to prevent cocking the seal in the bore.



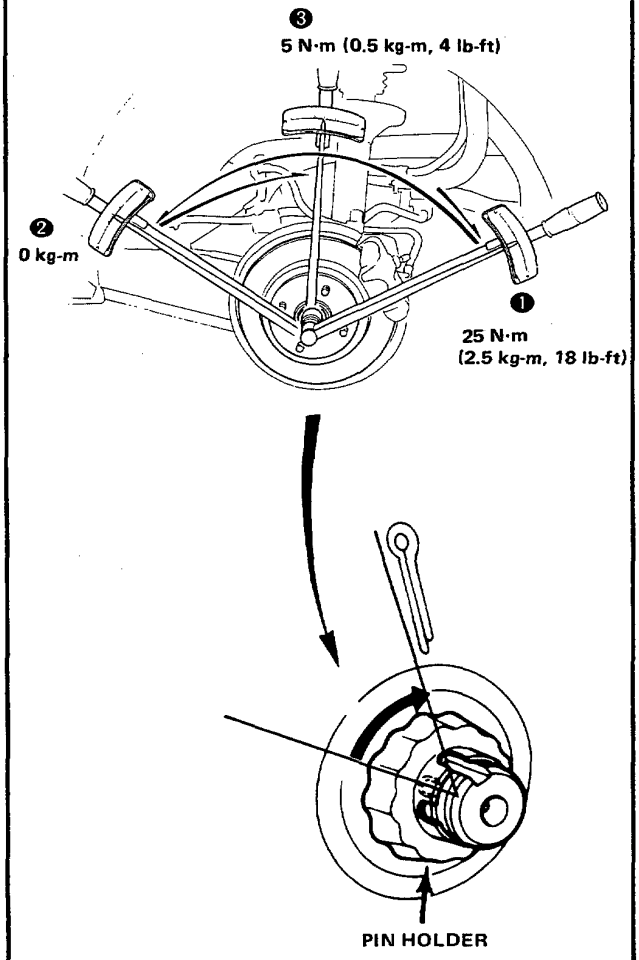
8. Slip the drum over the spindle, then install the outboard bearing, hub washer, and spindle nut.

9. Torque the spindle nut and secure as shown in page 20-29.

Rear Wheel

Spindle Nut Adjustment

1. Tighten the spindle nut to 25 N·m (2.5 kg-m, 18 lb-ft) and rotate the brake drum by hand.
2. Loosen the spindle nut.
3. Now tighten the nut to the specified torque of 5 N·m (0.5 kg-m, 4 lb-ft).
4. Set Pin Holder so the slots will be as close as possible to the hole in the spindle.
5. Tighten the spindle nut just enough to align the slot and hole, then secure with a new cotter pin.

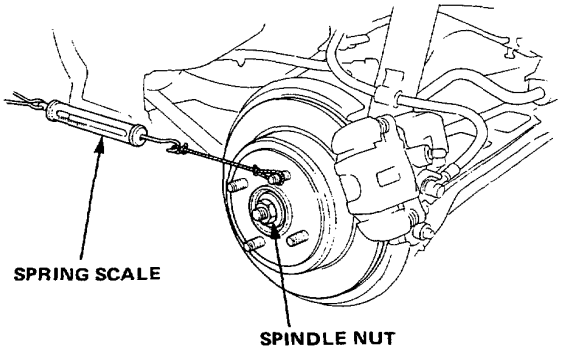


Drag Measurement

1. Check drag on the rear bearing by turning the brake drum with a spring scale as shown.

   Standard: 4.0—18 N (0.4—1.8 kg, 0.9—4.0 lb)

   * If the reading exceeds the limit, check the spindle nut torque.
   * Check for damage to the bearing.



MEMO

Brakes

Illustrated Index 21-2
Front Brakes 21-3
Master Cylinder 21-10
Master Power 21-13
Rear Brakes 21-23
Brake Warning System Circuit. . . 21-41
4W-ALB (4-Wheel Anti-Lock Brake) System 21-42



Brakes

Illustrated

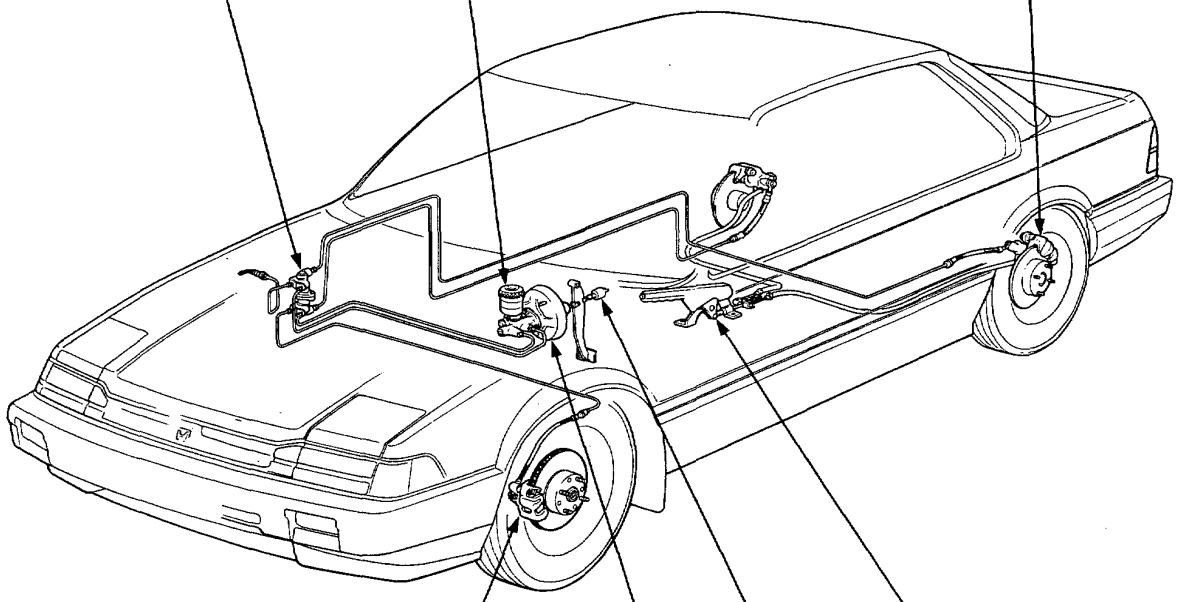
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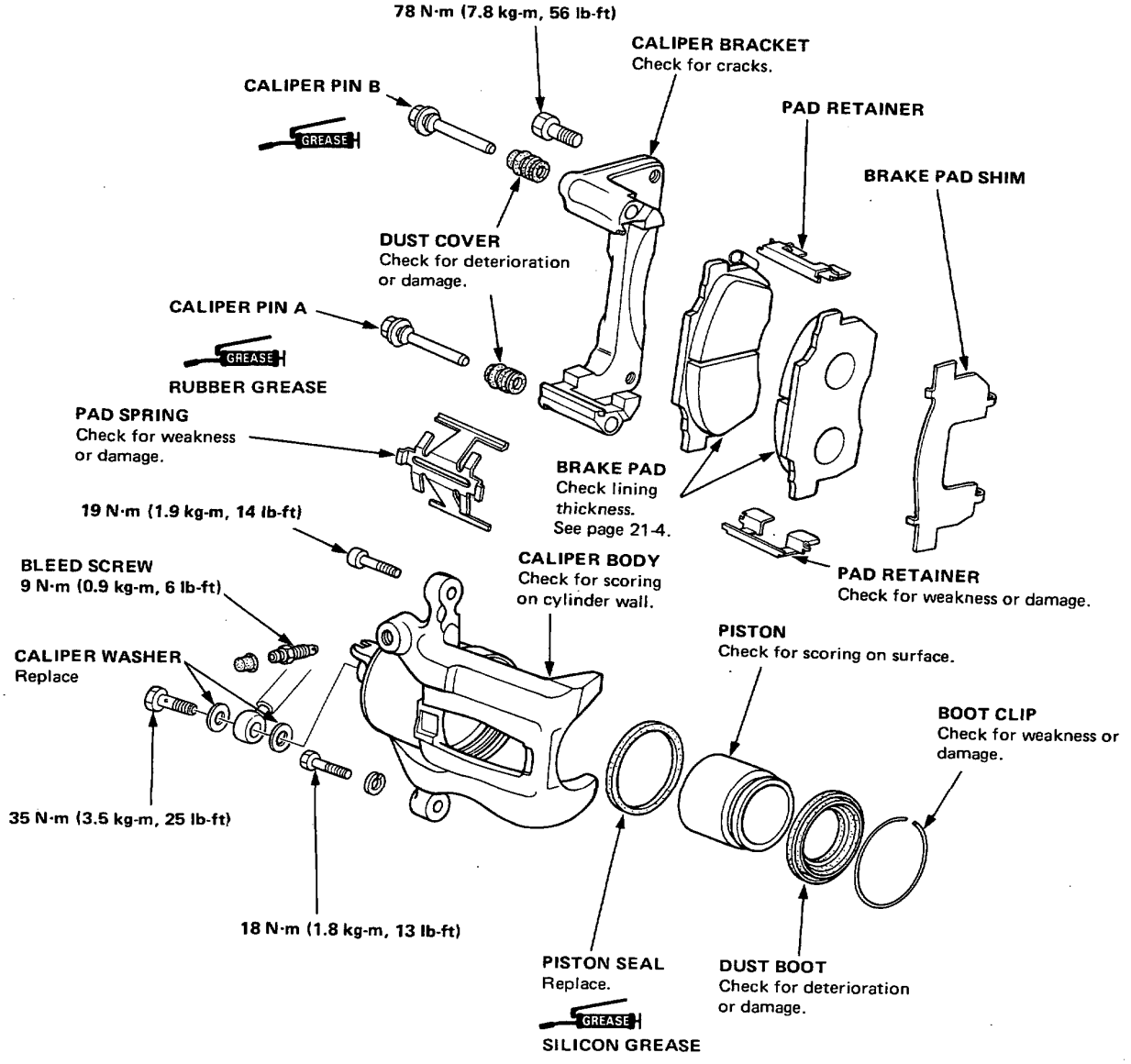
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Front Brake

Inspection

NOTE:

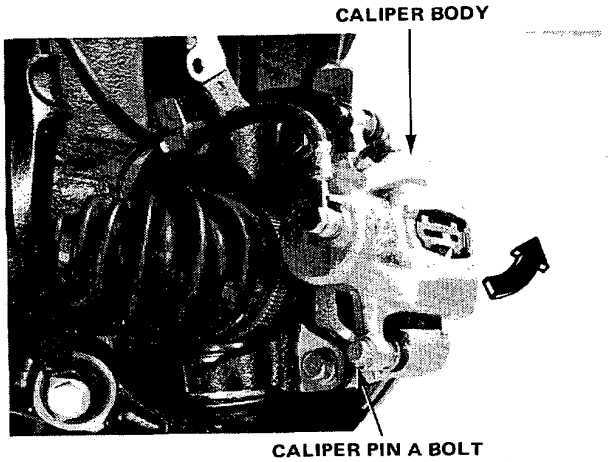
- Coat piston, piston seal, and caliper bore with clean brake fluid and with silicon grease.
- Replace all rubber parts with new ones whenever disassembled.



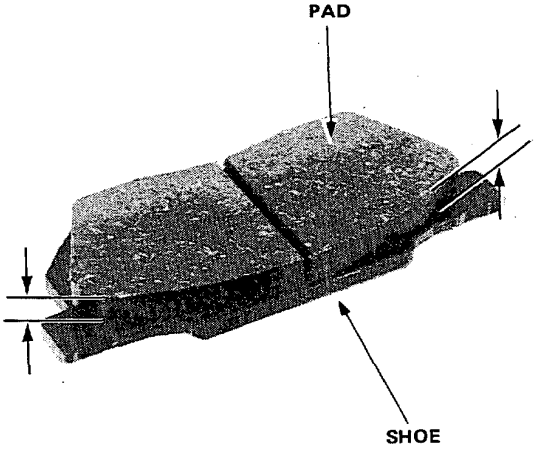
Brake Pad

Inspection/Replacement

1. Remove the front wheels and support the front of car on safety stands.
2. Remove caliper pin A bolt and pivot caliper up out of the way.



3. Remove the pad shim and pads.
4. Using a vernier caliper, measure the thickness of each brake pad lining.

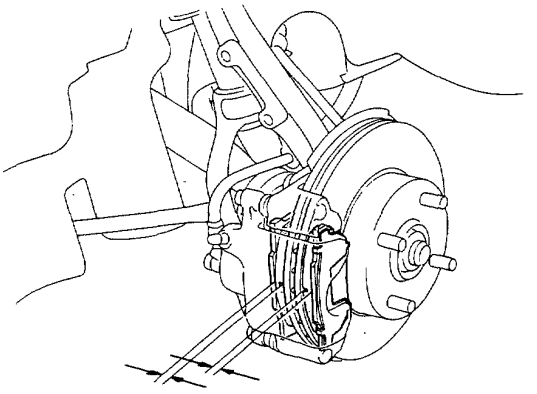


NOTE: Measurement does not include shoe thickness.

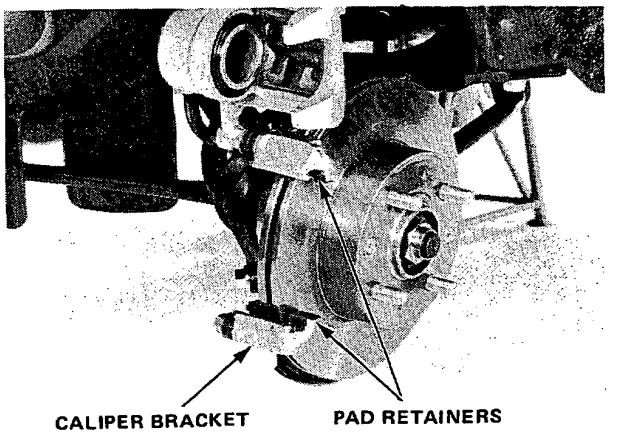
Brake Pad Thickness:

Standard:	**9.5 mm (0.374 in.)**
Service Limit:	**3.0 mm (0.118 in.)**

5. If lining thickness is less than service limit, replace both pads as a set.

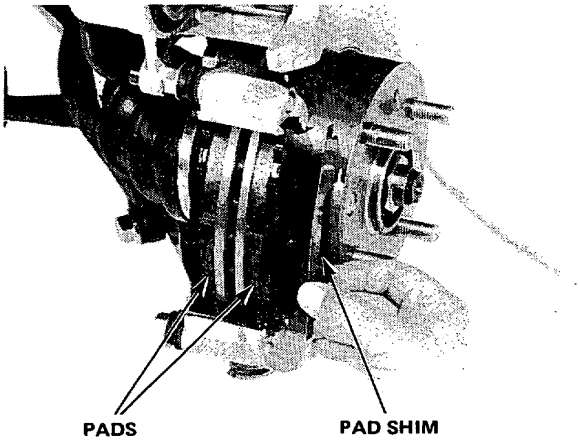


6. Check for grooves, cracks or rust.
   Clean the caliper thoroughly and remove all rust.
7. Install the pad retainers.



8. Install the new pads and pad shim.

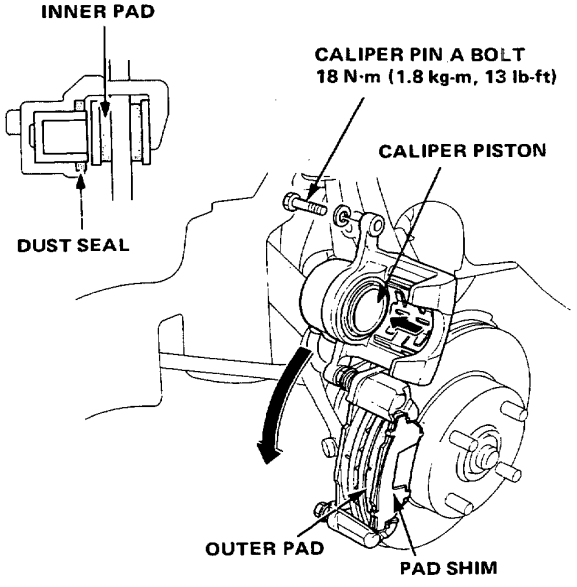
   NOTE: Install the shim on the outside.



9. Loosen the bleed screw slightly and push in the piston so the caliper will fit over the pads. Tighten the bleed screw.

10. Pivot the caliper down into position, then reinstall the caliper pin A bolt and tighten to 18 N·m (1.8 kg-m, 13 lb-ft).

    NOTE: Install the inner pad with wear pad indicator on the inside.



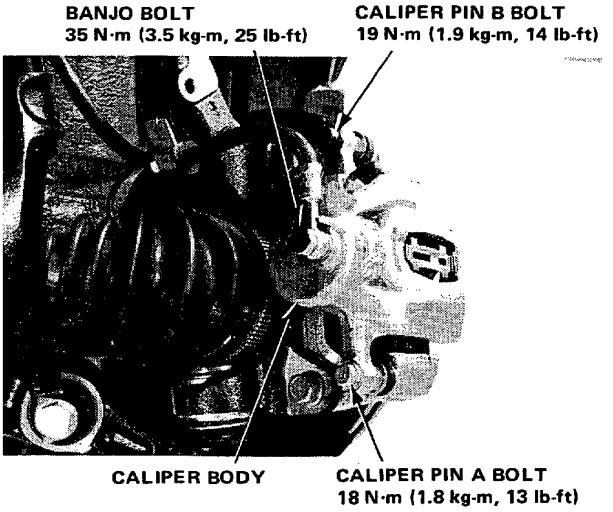
10. Depress the brake pedal several times to make sure the caliper works, then road-test.

Disassembly

1. Unscrew the banjo bolt and remove the brake line.

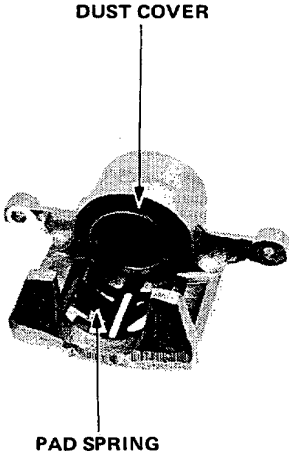
2. Remove the caliper pin bolts, then remove the caliper.

   NOTE: Avoid damaging the splash guard on the caliper pin B side.



CAUTION:
- **Avoid spilling brake fluid on paint as it may damage the finish.**
- **Plug the end of the brake hose with a shop rag to prevent brake fluid from flowing out of the brake hose after disconnecting.**

3. Remove the boot clip dust seal and pad spring.



(cont'd)

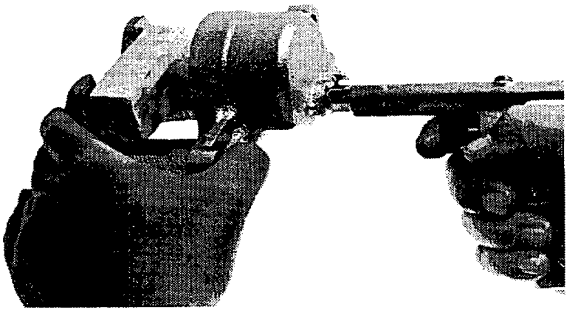
Brake Caliper

Disassembly (cont'd)

4. Place a shop rag in the caliper opposite the piston, then carefully remove the piston from the caliper by applying air pressure through the brake line hole.

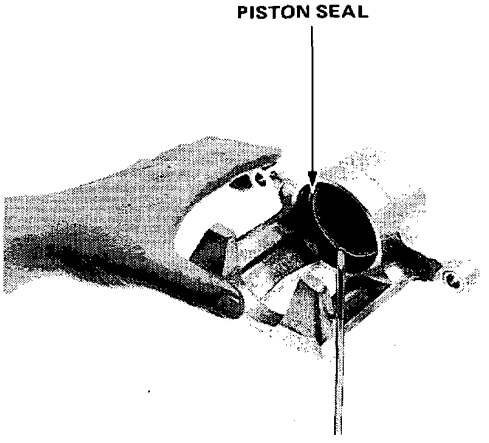
WARNING

- **Do not place your fingers in front of the piston.**
- **Do not use high air pressure; use an OSHA-approved 30 PSI nozzle.**



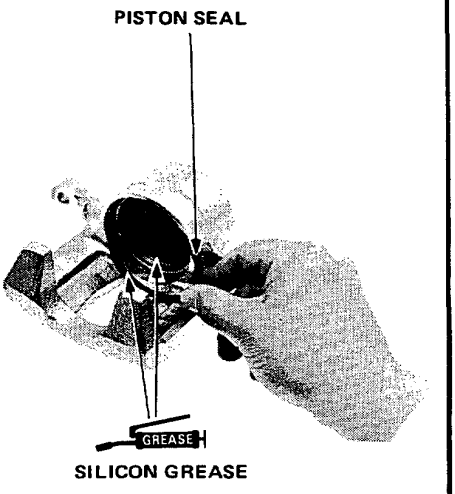
5. Remove the piston seal.

CAUTION: Take care not to damage the cylinder bore.

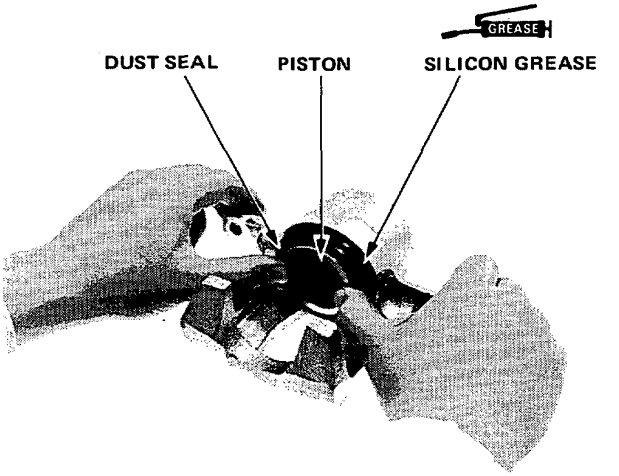


Reassembly

1. Clean the piston and cylinder bore with brake fluid and inspect for wear or damage.
2. Apply brake fluid to a new piston seal, then install the piston seal in the cylinder groove.



3. Install the dust seal in the cylinder groove.
4. Gently push the piston into the caliper until the boot inner lip slips into the piston groove.



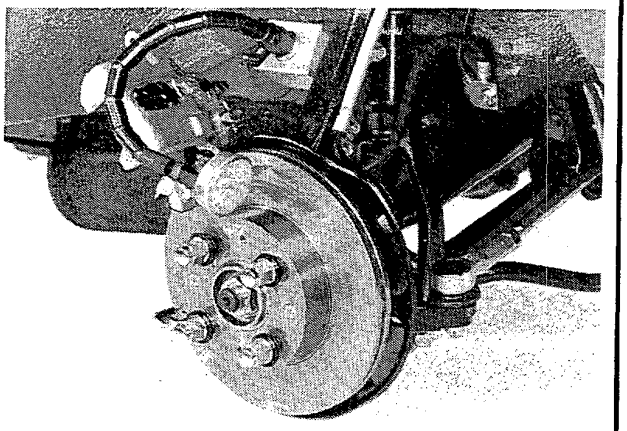
5. Continue reassembly in the reverse order of disassembly.

Front Brake Disc

Run-Out

1. Remove the front wheels, and support the front of car on safety stands.

2. Remove caliper pin A bolt, then pivot the caliper up out of the way on the upper guide pin bolt, and remove the pads and pad retainers (page 21-4).



3. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.

4. Use the lug nuts to hold the disc securely against the hub, then mount a dial indicator as shown.

   Brake Disc Runout:
   Service Limit: 0.1 mm (0.004 in.)

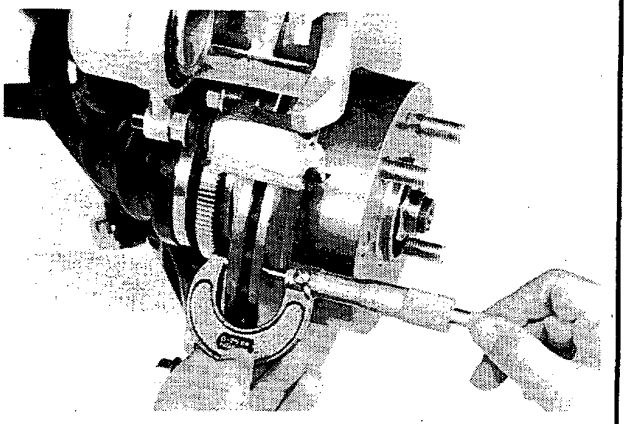
5. Replace the disc if beyond the service limit. Remove the caliper bracket, remove the old disc and install a new one. Then reinstall the caliper bracket, and torque the bolts to 78 N·m (7.8 kg-m, 56 lb-ft).

Thickness and Parallelism

1. Remove the front wheels, and support the front of car on safety stands.

2. Move the caliper and pads out of the way as described in the preceding column.

3. Using a micrometer, measure disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in.) in from the outer edge of the disc.



MICROMETER
Measure at 10 mm (0.39 in.) from edge.

Replace the disc if it exceeds the folliwing service limits:

Brake Disc Parallelism:
Standard: 19 mm (0.75 in.)
Max. Refinishing Limit: 17 mm (0.67 in.)

NOTE: If the refinishing limit stamped on the disc does not match the one listed above, use the one on the disc.

Brake Disc Paralleism:
The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in.).

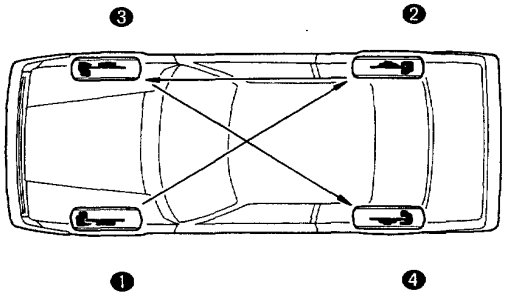
4. Replace the disc if beyond the limits. Remove the caliper mount, remove the old disc and install a new one. Then reinstall the caliper mount, and torque the bolts to 78 N·m (7.8 kg-m, 56 lb-ft).

Bleeding

NOTE: The reservoir on the master cylinder must be full at the start of bleeding procedure and checked after bleeding each wheel cylinder. Add fluid as required. Use only DOT 3 or 4 brake fluid.

1. Have someone slowly pump brake pedal several times, then apply steady pressure.
2. Loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.

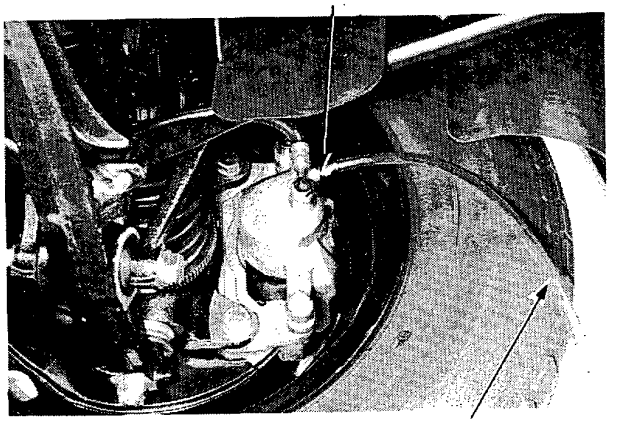
Bleeding Sequence



3. Repeat the procedure for each wheel in the sequence shown above, until air bubbles no longer appear in the fluid.

FRONT

BRAKE BLEED SCREW
10 x 1.0 mm
9 N·m (0.9 kg-m, 7 lb-ft)

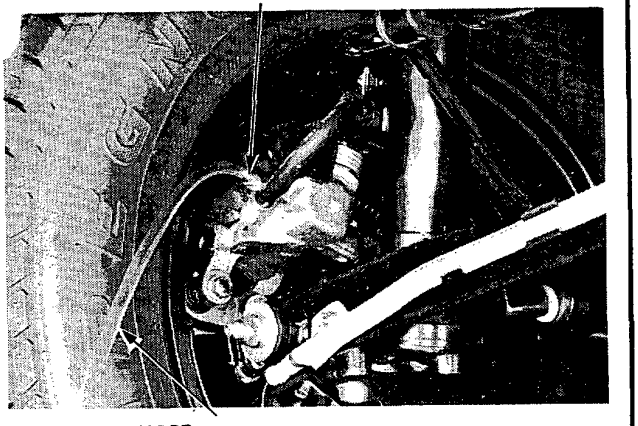


BLEED HOSE
(Insert in clear plastic bottle half-filled with brake fluid.)

REAR

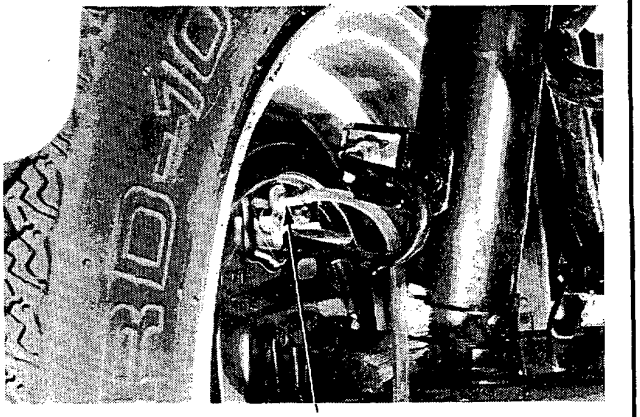
DISC BRAKE

BRAKE BLEED SCREW
9 N·m (0.9 kg-m, 7 lb-ft)



BLEED HOSE
(Insert in clear plastic bottle half-filled with brake fluid.)

DRUM BRAKE



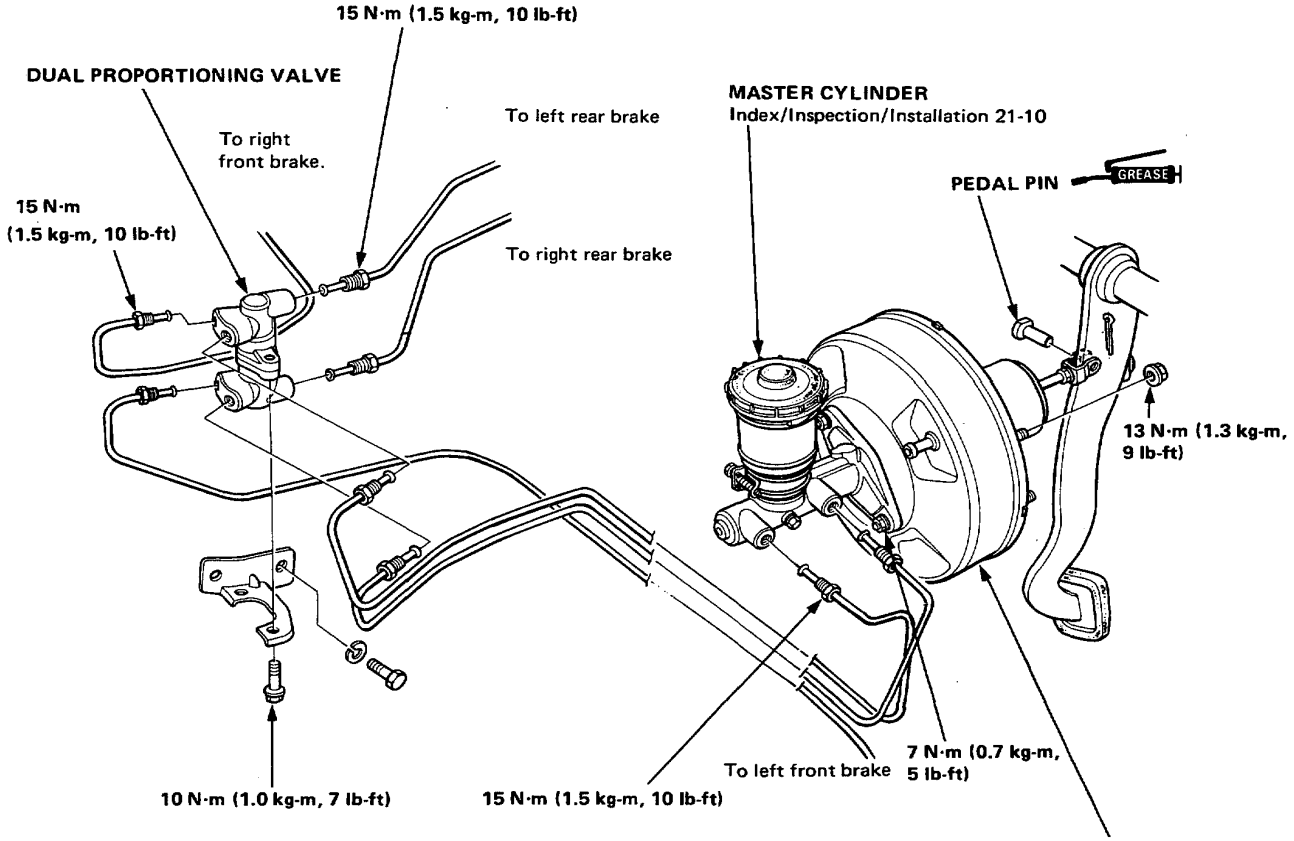
BRAKE BLEED SCREW
7 N·m (0.7 kg-m, 5 lb-ft)

4. Check brake performance by road testing.

Master Power, Master Cylinder, Proprtioning Valve

—Index

CAUTION: Avoid spilling brake fluid on painted surfaces as severe damage can result. Wipe up spilled fluid at once and rinse well with clean water.



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Reassembly, page 21-17

Master Cylinder

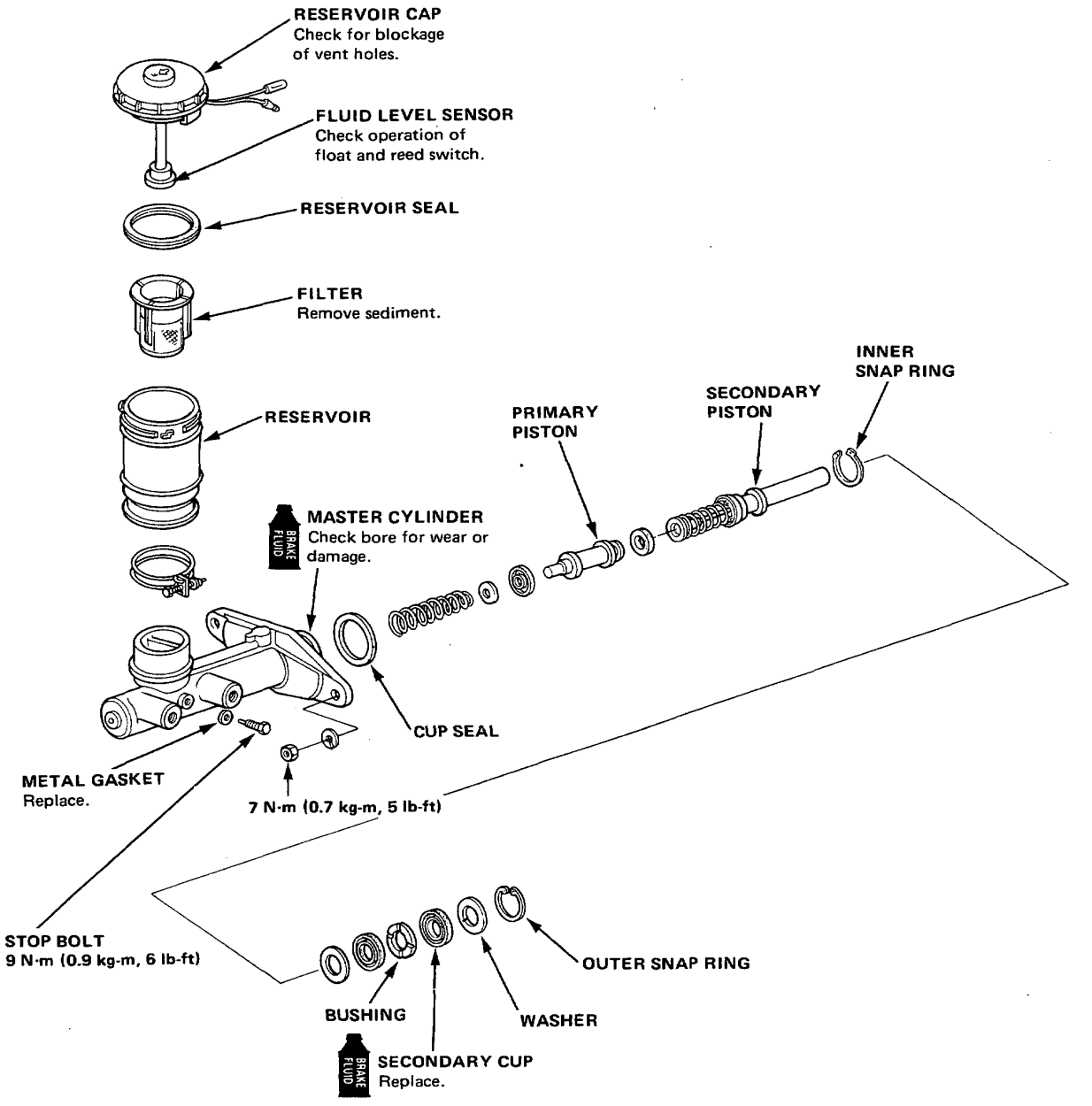
Overhaul/Inspection

CAUTION:

- Avoid spilling brake fluid on painted surfaces as severe damage can result. Wipe up spilled fluid at once and rinse well with clean water.
- This symbol BRAKE FLUID represents brake fluid. Use only DOT 3 or 4 brake fluid.

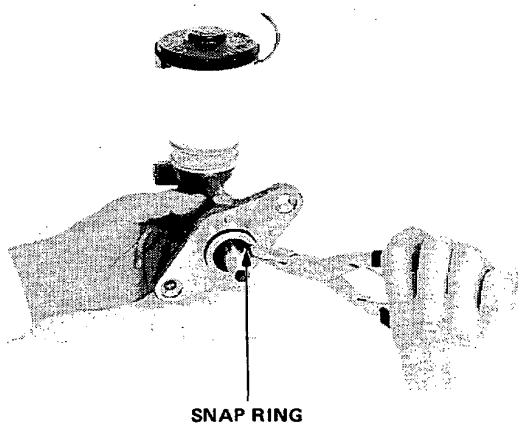
NOTES:

- Wash all removed parts in brake fluid and blow dry with a compressed air. Blow open all passages and fluid ports.
- Replace all rubber parts with new ones whenever the cylinder is disassembled.
- To prevent damage, liberally apply clean brake fluid to the piston cups before installation. Use special tool to install the cups.



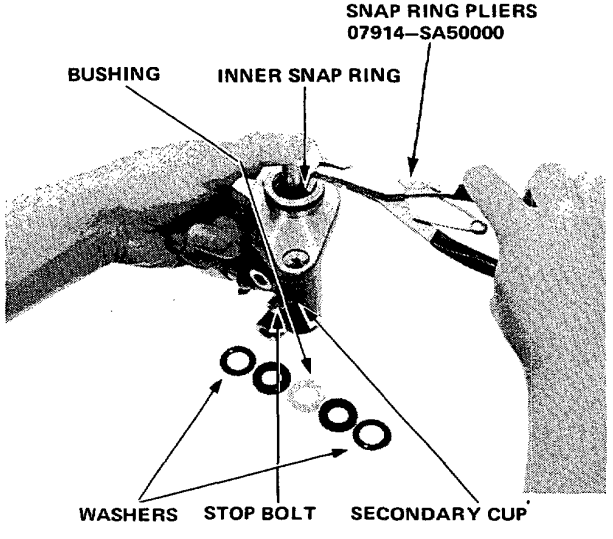
Disassembly

1. Remove the outer snap ring.



2. Remove the washer, secondary cup, and secondary piston bushing.

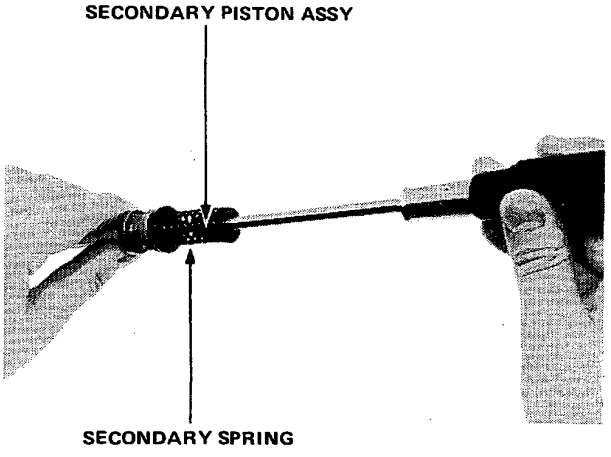
3. Remove the stop bolt, and remove the inner snap ring with the snap ring pliers while pushing on the secondary piston assy.



NOTE: Avoid damaging the master cylinder wall.

4. Remove the secondary and primary assembly.

5. Remove the screw from the secondary piston assy, and remove the secondary spring.



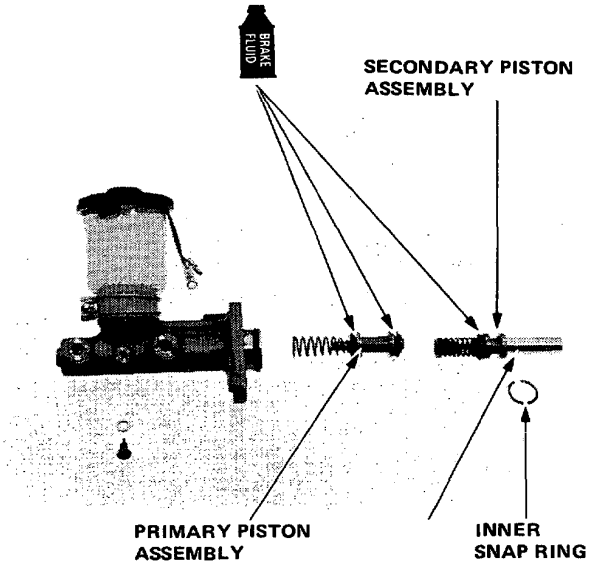
6. Clean all parts thoroughly with BRAKE FLUID only.

Master Cylinder

Reassembly

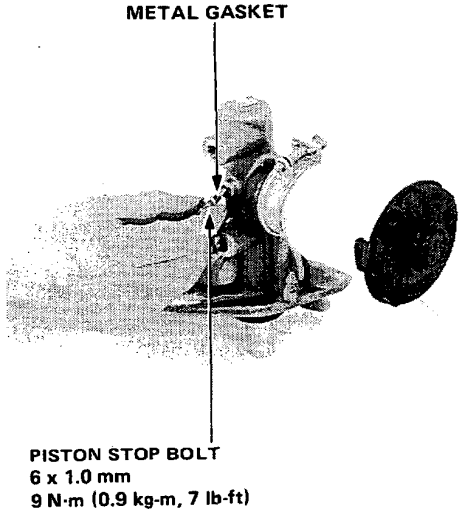
1. Lubricate new piston assemblies with brake fluid, then install in the master cylinder.

   NOTE: To ease assembly, rotate the pistons while inserting.



2. Press down on the cylinder as shown, then install the stop bolt.

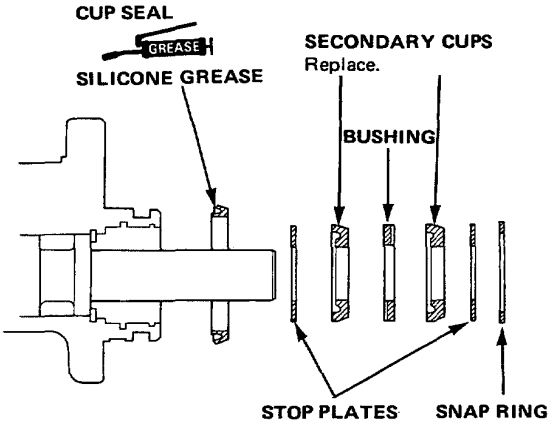
   NOTE: Replace the piston stop bolt metal gasket with a new one.



3. Turn the master cylinder over, press down on the secondary piston, then install the inner snap ring.

4. Install the secondary cups, bushing, and outer snap ring.

5. Install the seal on the master cylinder mounting flange.



NOTE: Master cylinder push rod-to-piston clearance must be checked and adjustments made, if necessary, before installing the master cylinder (page 21-21).

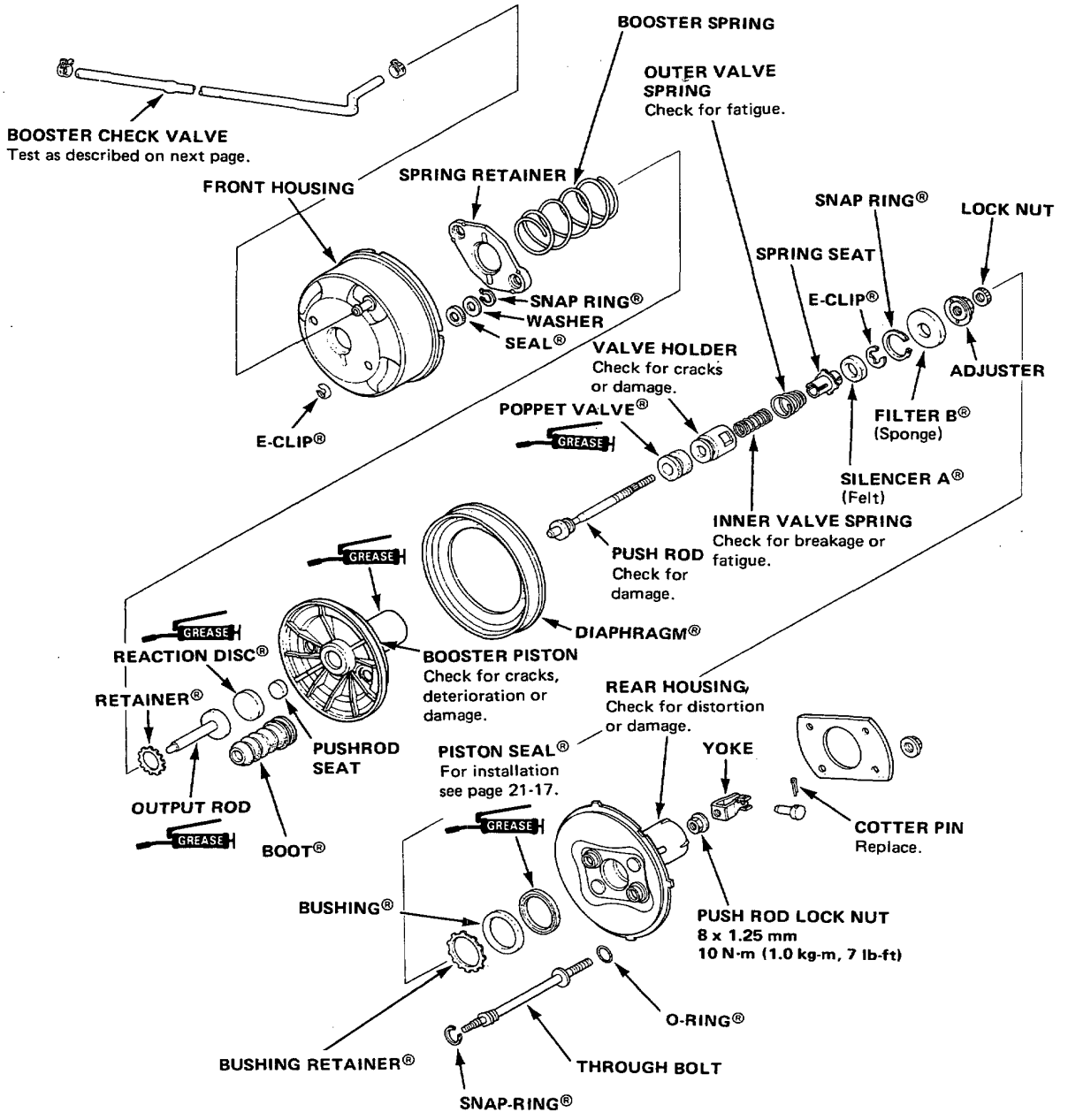
Master Power

Index and Inspection

Booster testing is on next page.

NOTE:

- Parts marked® are available with rebuild kit and must be replaced whenever disassembled.
- GREASE on this page refers to silicone grease.
- NOTE: Scribe an aligning mark across the front and rear housings so you can reassemble in their original positions (page 21-15).



Master Power

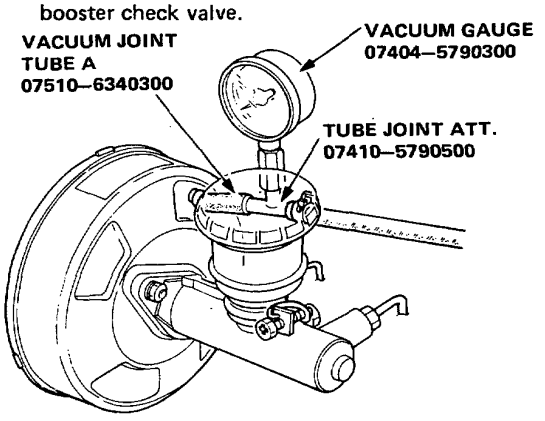
Inspection

Functional Test

1. With the engine stopped, depress the brake pedal several times, then depress the pedal hard and hold that pressure for 15 seconds. If the pedal sinks, the master cylinder, brake line or wheel cylinder is faulty.
2. Start the engine with the pedal depressed. If the pedal sinks slightly, the vacuum booster is working. If the pedal height does not vary, the booster is faulty.

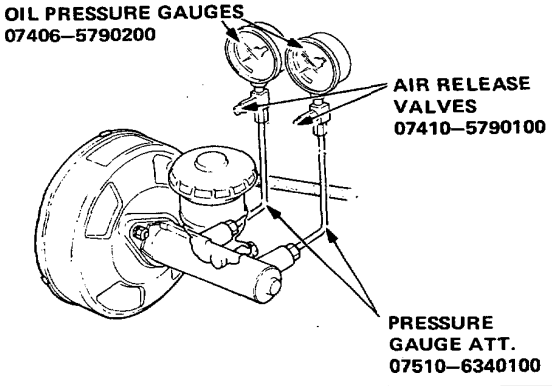
Leak Test

1. Depress the brake pedal with the engine running, then stop the engine. If the pedal height does not vary while depressed for 30 seconds, the vacuum booster is OK. If the pedal rises, the booster is faulty.
2. With the engine stopped, depress the brake pedal several times using normal pressure. When the pedal is first depressed, it should be low. On consecutive applications, pedal height should gradually rise. If the pedal position does not vary, check the booster check valve.

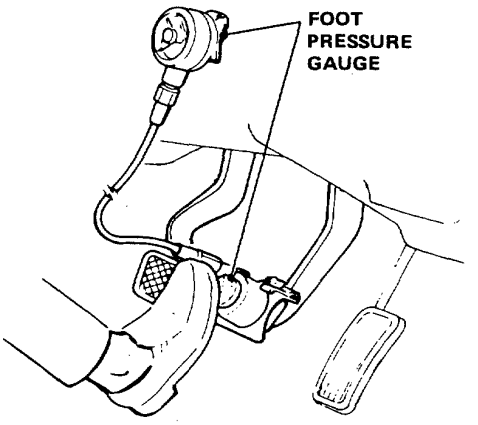


Performance Test

1. Connect the oil pressure gauges to the brake booster using the attachments as shown.
2. Bleed air through the valves.



3. With the engine running, depress the brake pedal with a 20 kg of pressure. The folliwing pressures should be observed at the vacuums indicated.



Vacuum (mmHg)	Pedal pressure (kg)	Line pressure (kg/cm²)	
		Rear: drum	Rear: disc
0	20	15 min.	13 min.
300	20	50 min.	53 min.
500	20	65 min.	65 min.

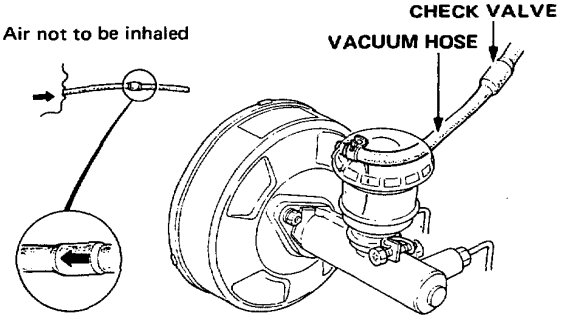
4. Inspect the master cylinder pistons and cups if the readings do not fall within the limits shown above.

CAUTION: Avoid spilling brake fluid on paint or instrument lenses as it may damage the finish.

Check Valve Test

1. Disconnect both ends of master power vacuum hose; the check-valve is inside the hose and cannot be removed.

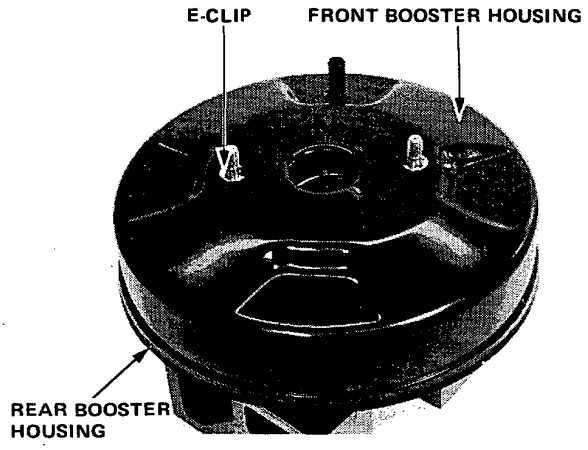
   NOTE: Mark the hose ends so they can be reinstalled correctly when the test is completed – if the hose ends are reversed, the master power will not work.



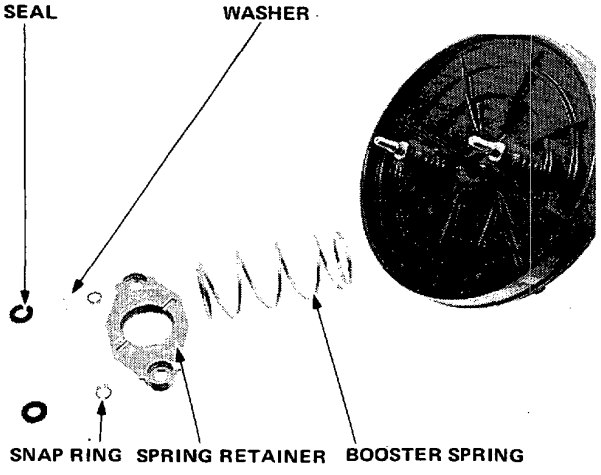
2. Blow on one end of the hose and then the other: If you can blow through the booster end, but not through the manifold end, the check valve is OK.

Disassembly (cont'd)

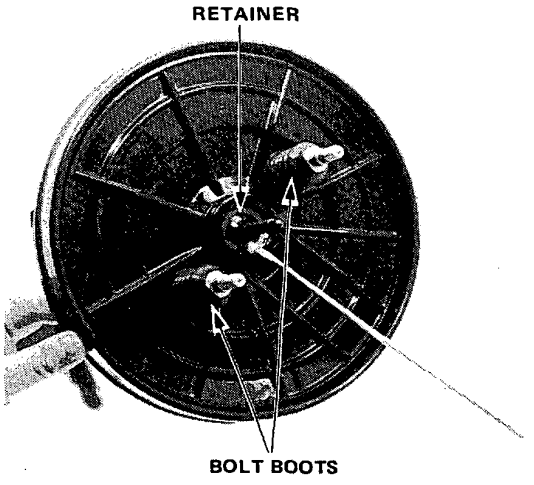
1. Scribe an aligning mark across the front and rear booster housings to ensure proper positioning of parts on reassembly.
2. Remove the master cylinder.
3. Remove the E-clips, and separate the front booster housing and the rear booster housing.



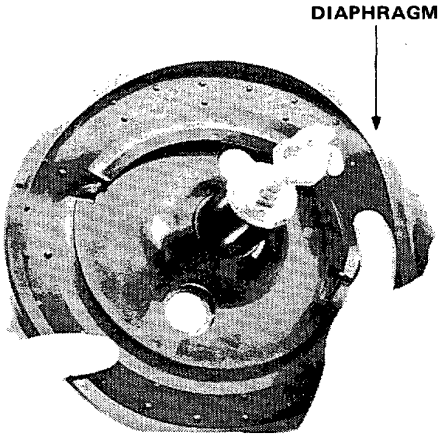
4. Remove the washers and seals from the rear housing, then remove the snap ring.



5. Remove the spring retainer and booster spring.
6. Remove the retainer and the through bolt boots.



7. Remove the diaphgram from the rear housing.



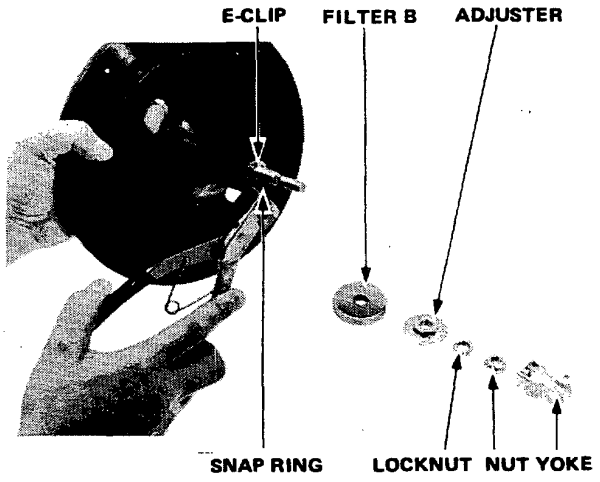
(cont'd)

Master Power

Disassembly (cont'd)

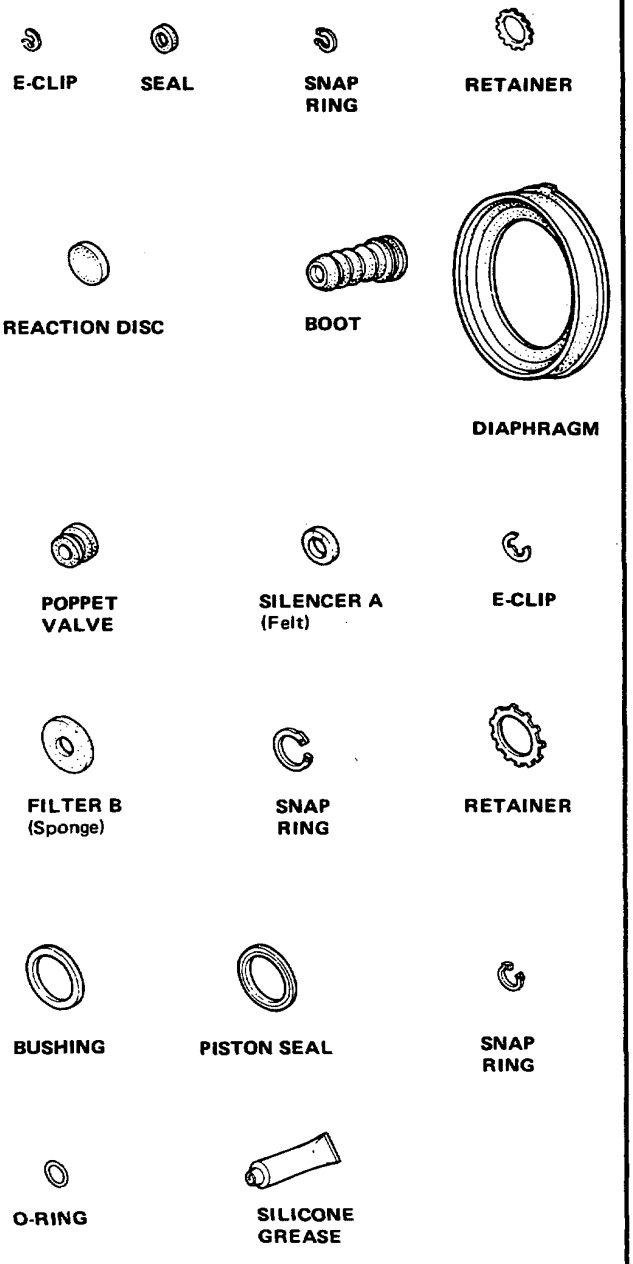
8. Remove the yoke, push rod locknut, star locknut, adjuster and filter.

9. Remove the snap ring, then remove the valve holder assembly.



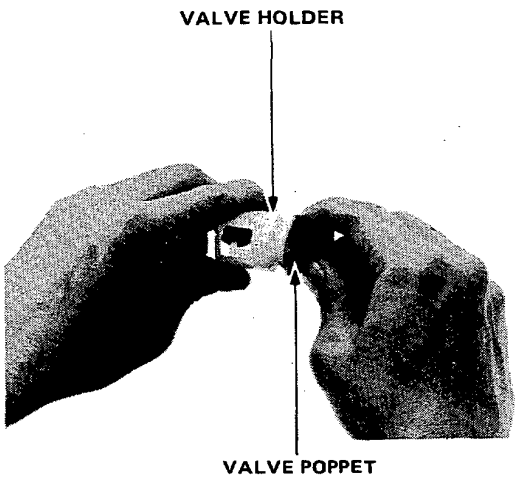
Remove the E-clip from the valve holder assembly and disassemble.

Rebuild Kit

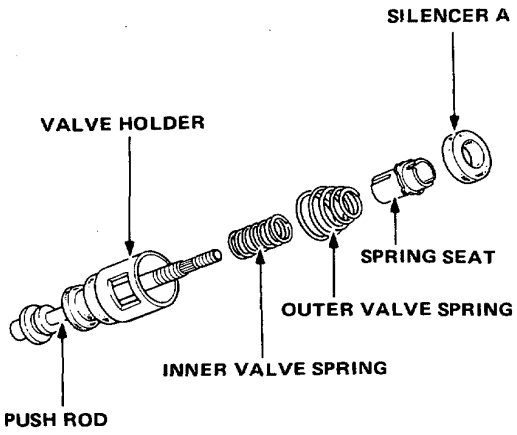


Reassembly

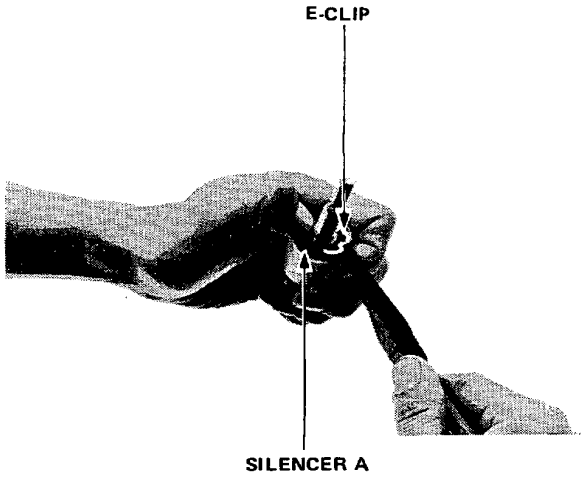
1. Install the poppet valve on the valve holder.



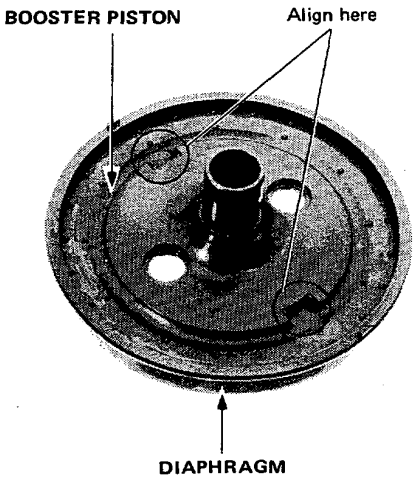
2. Install the valve holder, inner valve spring, outer valve spring, and spring seat onto the push rod.



3. Install the silencer with the E-clip.



4. Install the diaphragm onto the booster piston with the diaphragm tabs aligned with the slots in the piston.

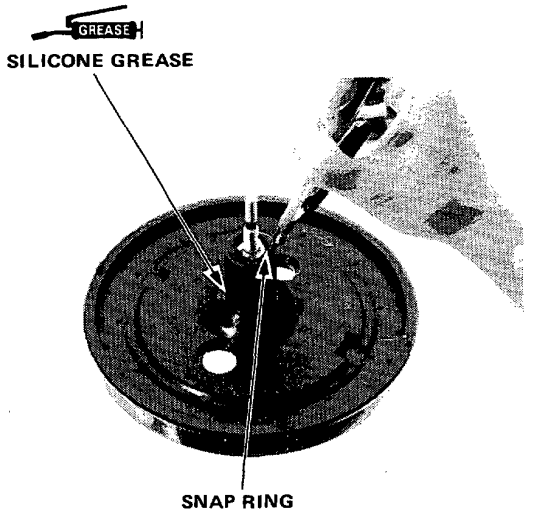


(cont'd)

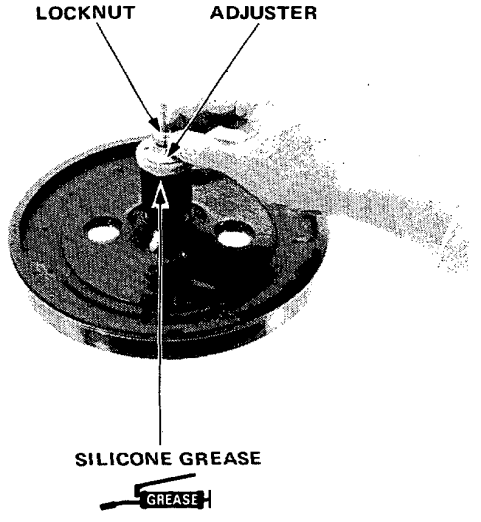
Reassembly (cont'd)

5. Apply silicone grease to the inner and outer surfaces of the piston tube.

   Press the valve holder assembly into the booster piston tube, and install the snap ring.



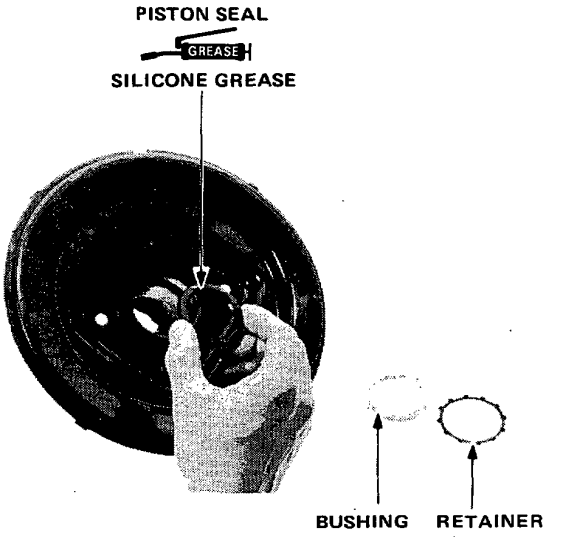
6. Slip the filter (foam) over the end of the pushrod. Thread the adjuster and locknut onto the shaft but do not tighten.

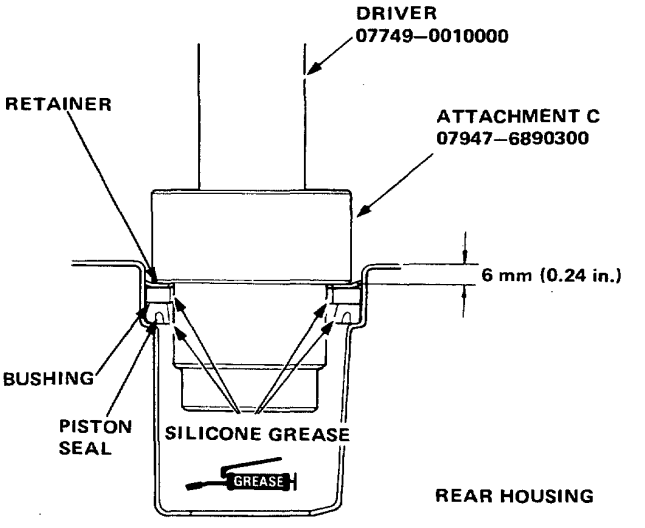


7. Apply silicone grease to the piston seal, then set the seal in position on the housing.

   NOTE: Make sure the lip of the seal is facing in, as shown in drawing below.

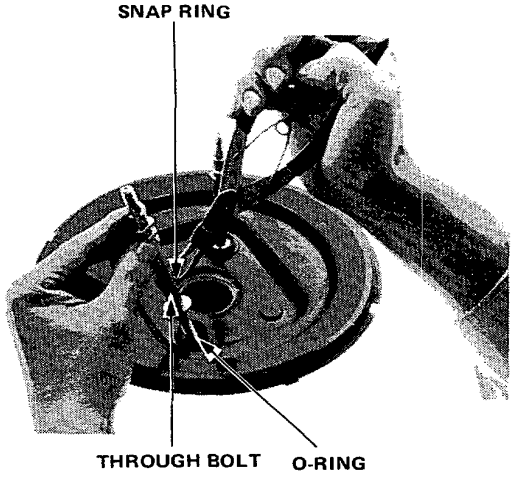
8. Install the piston seal, and bushing in the rear housing, and drive the retainer in until the seal bottoms.



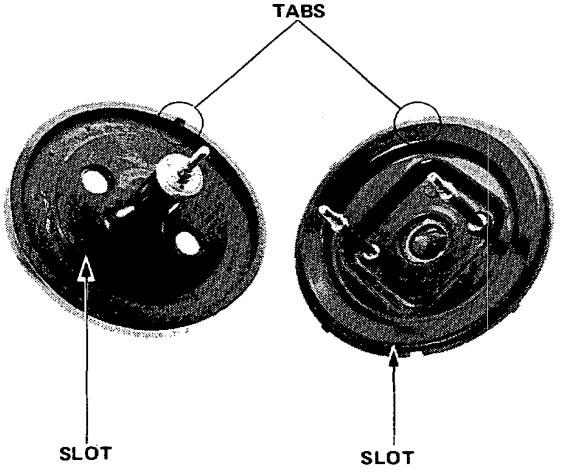


— Reassembly (cont'd)

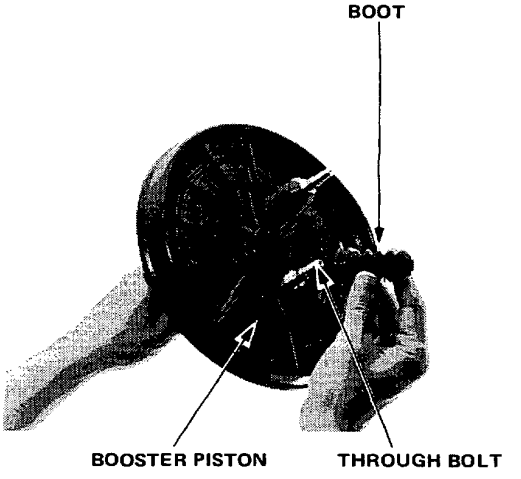
9. Install both through bolts, using the O-rings and snap rings.



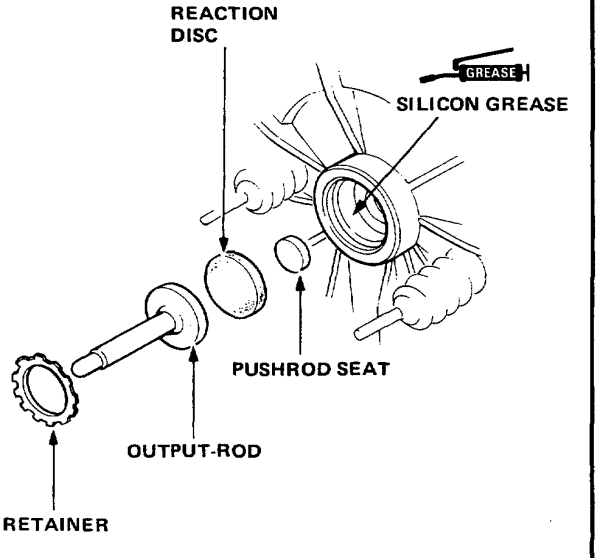
10. Attach the booster piston to the rear housing, aligning the tab of the booster piston with the slot in the rear housing.



11. Install the boots onto the through bolts.



12. Apply silicone grease to the bore of the booster piston, then install the push rod seat, reaction disc, output-rod, and retainer.

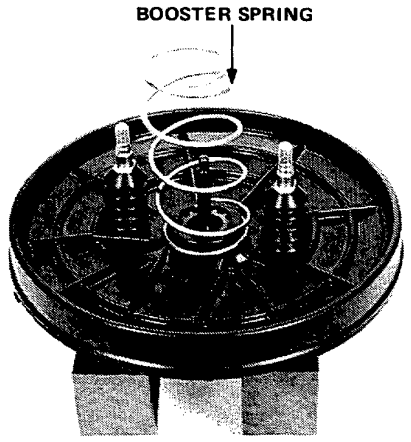


(cont'd)

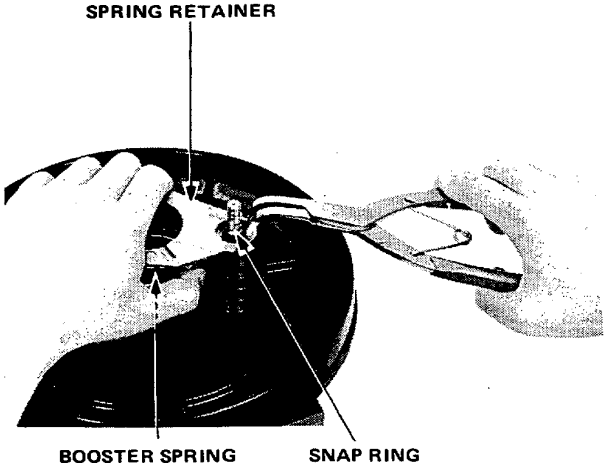
Master Power

Reassembly (cont'd)

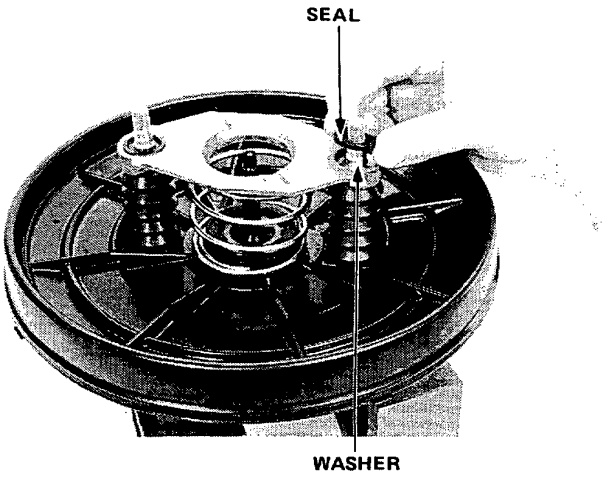
13. Install the booster spring.



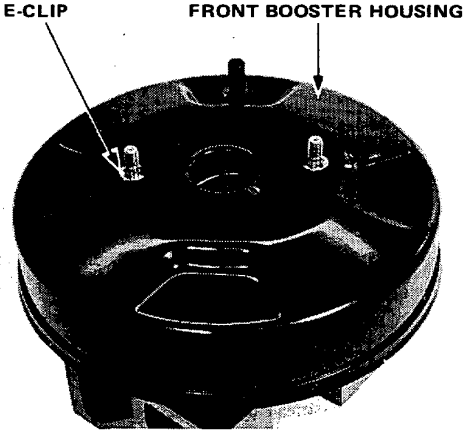
14. Install the spring retainer by compressing the booster spring, then installing the snap rings on the through bolts.



15. Install the washers and seals.



16. Assemble the front booster housing onto the rear booster housing, press down on the front housing, then install the E-clips on the through bolts.



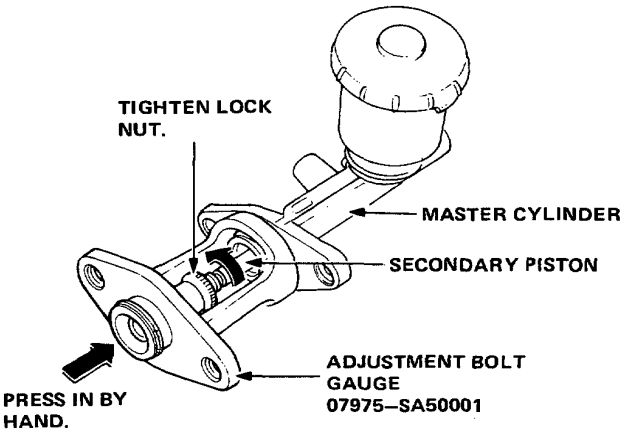
17. Install the master cylinder.

Pushrod Clearance

Adjustment

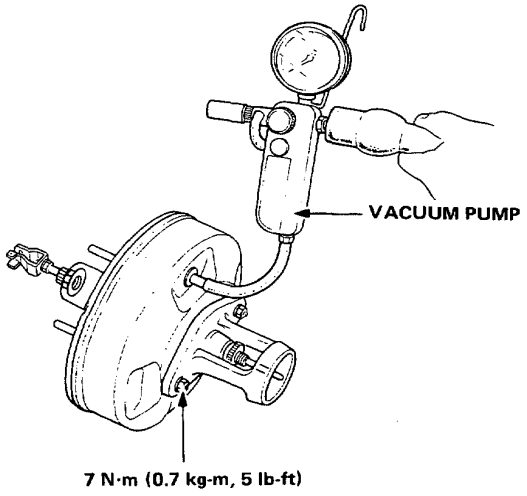
WARNING **Master cylinder push rod-to-piston clearance must be checked and adjustments made if necessary, before installing the master cylinder.**

1. Using the Rod Bolt Adjustment Gauge, adjust the bolt height so that the top of the adjusting bolt is flush with the end of the master cylinder piston.

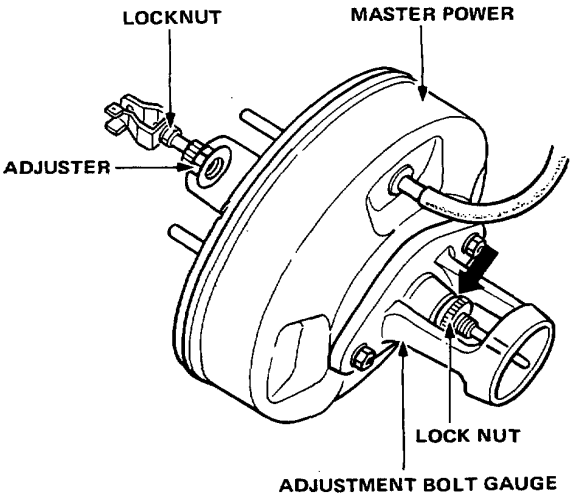


2. Loosen the brake master power adjuster lock nut.

3. Connect a hand vacuum pump to the brake master power, apply a 500 mm (20 in.) Hg vacuum and hold.



4. Without disturbing the adjusting bolt position, place the gauge upside down on the master power body and measure the clearance between output rod and adjusting bolt.



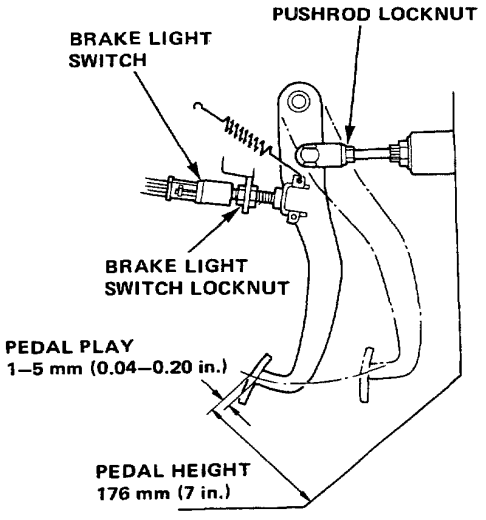
5. If clearance is incorrect, loosen the locknut and turn the adjuster in or out to adjust.

Specified clearance: 0–0.4 mm (0–0.016 in.)

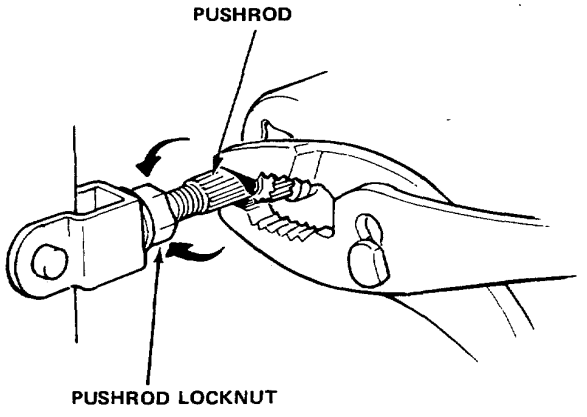
Pedal Height

Adjustment

1. Loosen the brake light switch locknut and back off the brake light switch until it is no longer touching the brake pedal.

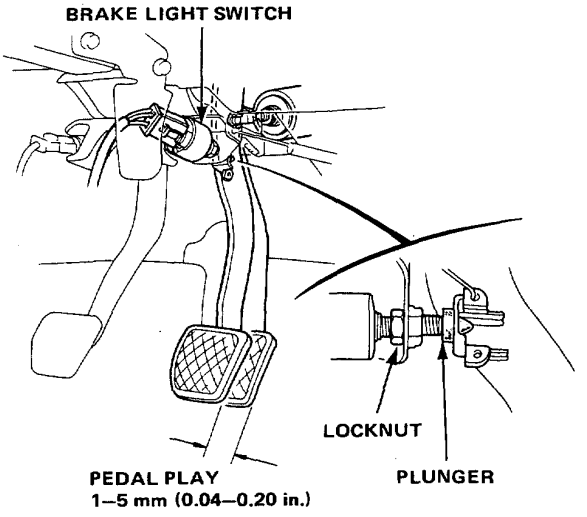


2. Loosen the pushrod locknut and screw the pushrod in or out with pliers until the pedal is 176 mm (7 in.) from the floor. After adjustment, tighten the locknut firmly.



3. Screw in the brake light switch until its plunger is fully depressed (threaded end touching the pad on the pedal arm). Then back off the switch 1/2 turn and tighten the locknut firmly.

CAUTION: Check that brake lights go off when pedal is released.



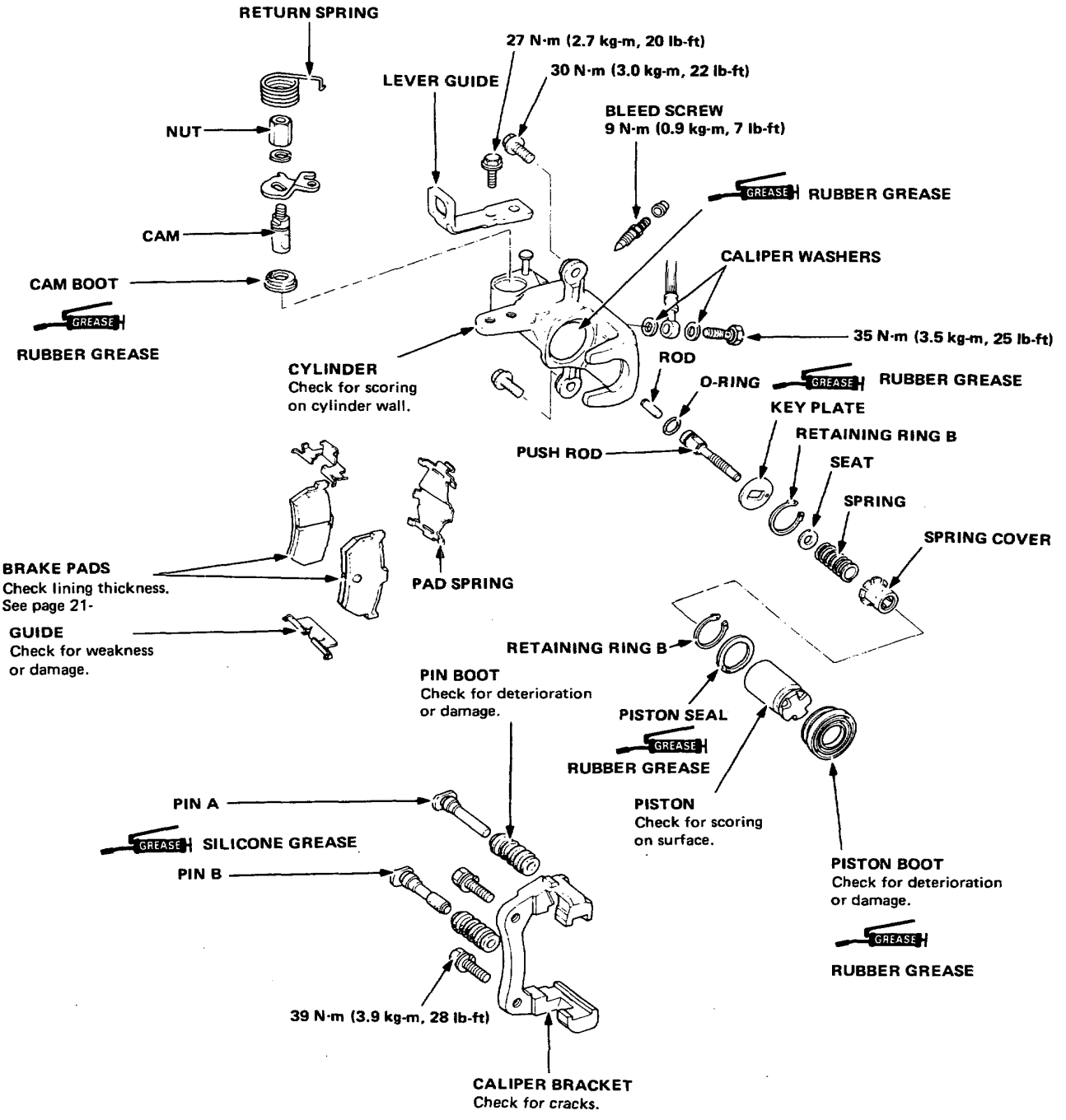
Pedal Free Play

With the engine stopped and the master power relieved of vacuum, check for pedal play by applying a light finger pressure to the brake pedal.

Pedal play: 1–5 mm (0.04–0.20 in.)

NOTE:

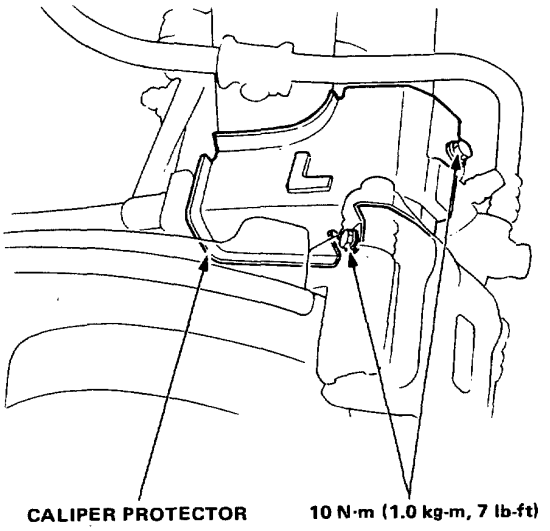
- Do not push on the pushrod when adjusting pedal free play. Brake drag will result if free play is too little.
- Check that the brake stop lights remain off with the brake pedal released.


RETURN SPRING
27 N·m (2.7 kg-m, 20 lb-ft)
30 N·m (3.0 kg-m, 22 lb-ft)
LEVER GUIDE
BLEED SCREW
9 N·m (0.9 kg-m, 7 lb-ft)
NUT
GREASE
RUBBER GREASE
CAM
CALIPER WASHERS
CAM BOOT
35 N·m (3.5 kg-m, 25 lb-ft)
GREASE
RUBBER GREASE
ROD
CYLINDER
Check for scoring
on cylinder wall.
O-RING
GREASE
RUBBER GREASE
KEY PLATE
RETAINING RING B
PUSH ROD
SEAT
SPRING
SPRING COVER
BRAKE PADS
Check lining thickness.
See page 21-
PAD SPRING
GUIDE
Check for weakness
or damage.
RETAINING RING B
PIN BOOT
Check for deterioration
or damage.
PISTON SEAL
GREASE
RUBBER GREASE
PISTON
Check for scoring
on surface.
PIN A
GREASE
SILICONE GREASE
PIN B
PISTON BOOT
Check for deterioration
or damage.
GREASE
RUBBER GREASE
39 N·m (3.9 kg-m, 28 lb-ft)
CALIPER BRACKET
Check for cracks.

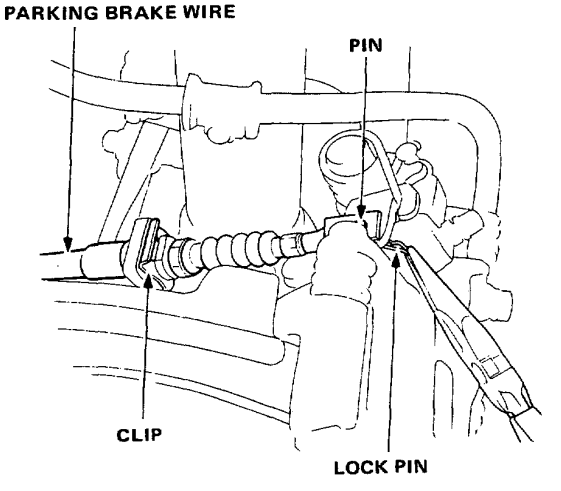
Brake Pad

Inspection/Replacement

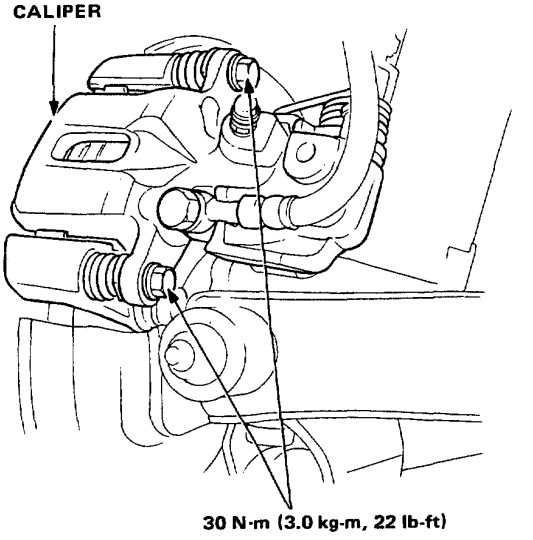
1. Remove the caliper protector.



2. Remove the parking brake wire from the caliper.



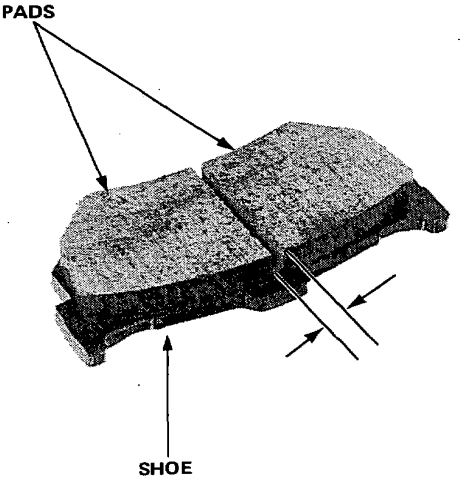
3. Remove the caliper by removing the bolts.



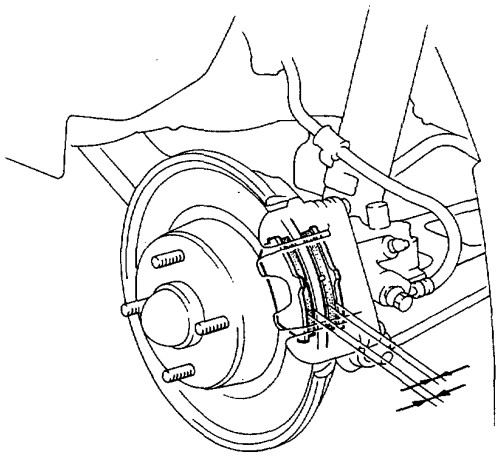
4. Remove the pads and using a vernier caliper, measure the thickness of each brake pad lining.

NOTE: Measurement does not include shoe thickness.

Brake Pad Thickness:
Standard: 8.0 mm (0.315 in.)
Service Limit: 1.6 mm (0.063 in.)



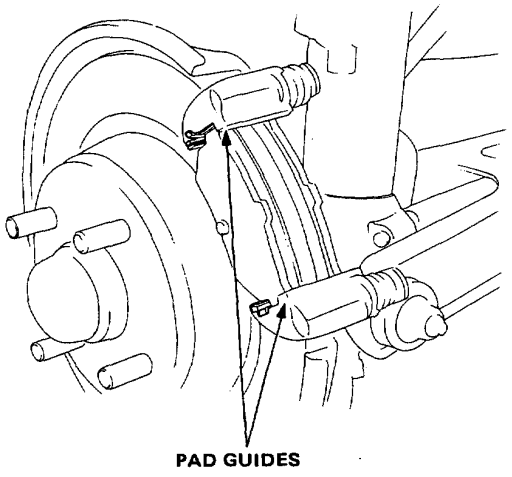
5. If lining thickness is less than the service limit, replace both pads as a set.



6. Remove the pads and pad guides.

7. Inspect for grooves, cracks and rust.

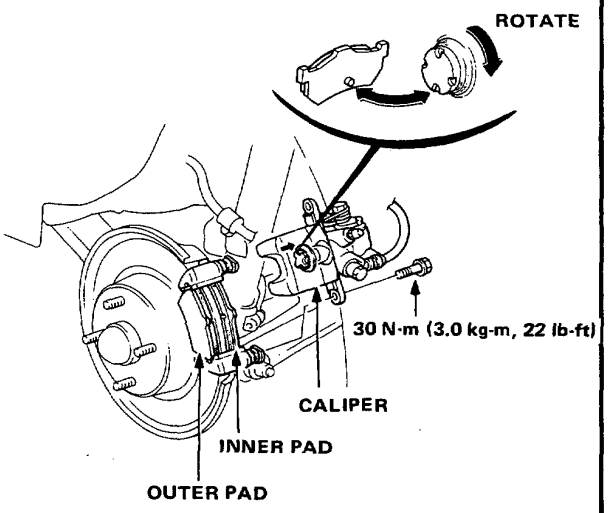
8. Clean the caliper thoroughly and remove all rust. Install the pad guides.



9. Install the brake pads.

10. Rotate the caliper piston into place in the master cylinder until the cutout in the piston engages the tab on the inner pad.

11. Install the brake caliper.

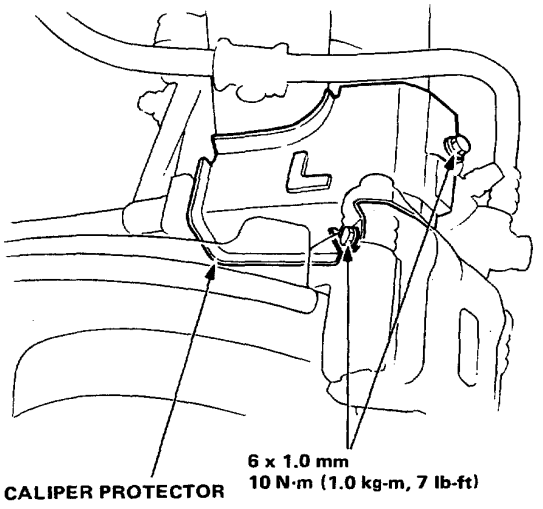


12. Install the parking brake wire.

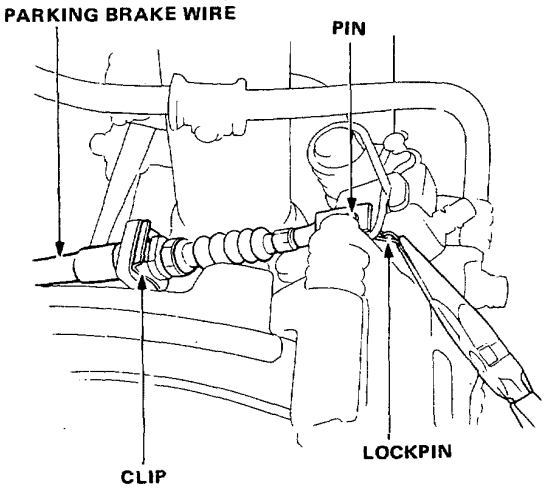
Brake Caliper

Disassembly

1. Remove the caliper protector.

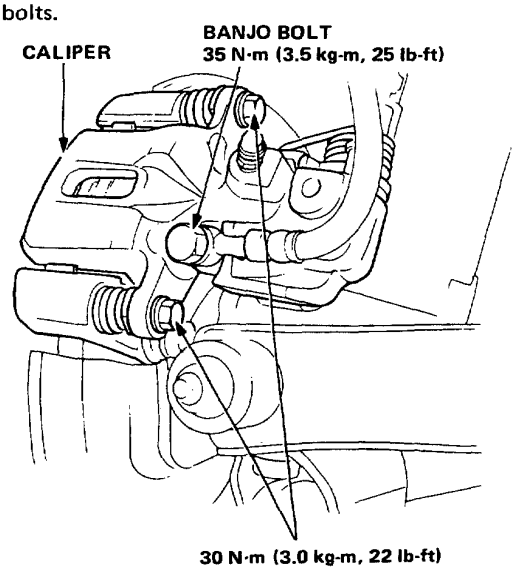


2. Remove the parking brake wire.



3. Disconnect the brake hose from the caliper by removing the banjo bolt.

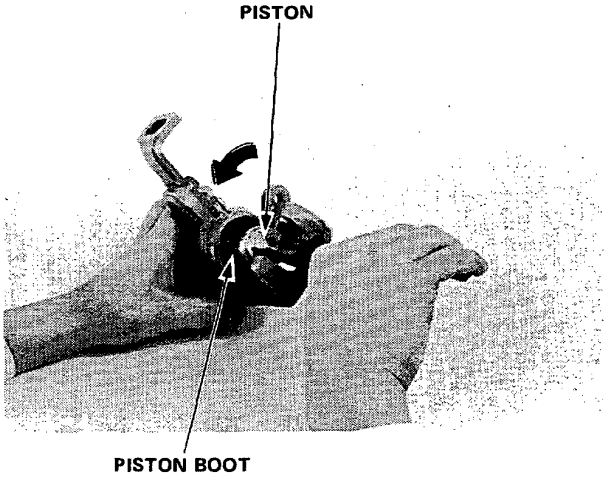
4. Remove the caliper by removing the caliper mount bolts.



CAUTION:
- **Avoid spilling brake fluid on paint and instrument lenses as it may damage the finish.**
- **After disconnecting the brake hose, plug the end with a shop rag to prevent brake fluid from flowing out.**
- **Thoroughly clean the caliper to prevent dust and dirt from entering inside.**

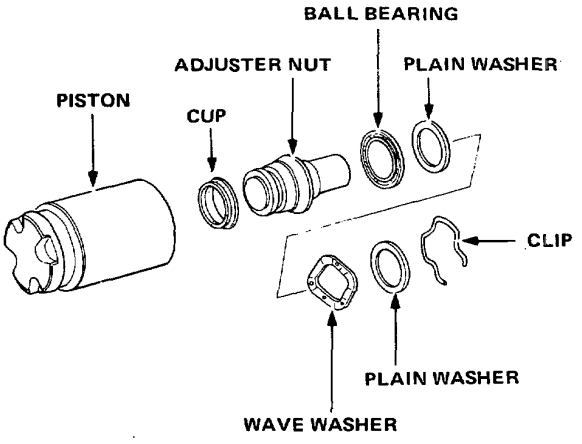
5. Remove the piston and piston boot while rotating the piston.

NOTE: Avoid damaging the piston and piston boot.



6. Pry off the clip and remove the adjuster nut.

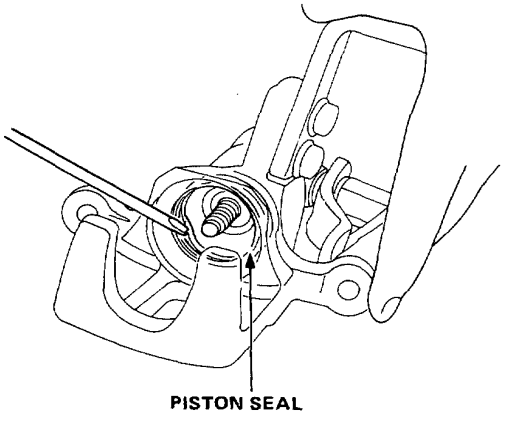
7. Remove the cup.



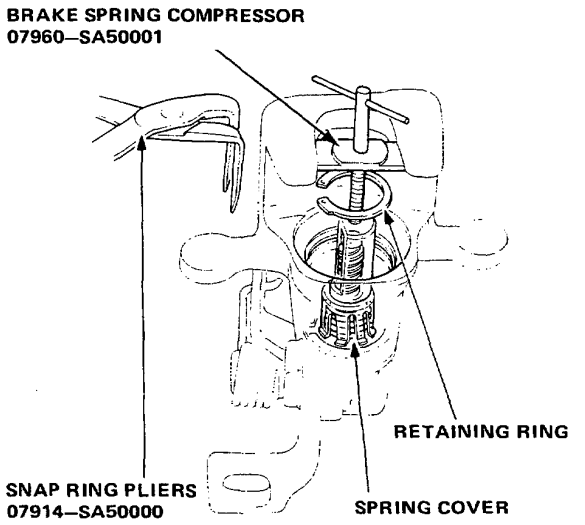
8. Remove the plain washer, wave washer and ball bearing.

9. Remove the piston seal.

CAUTION: Take care not to damage the cylinder bore.

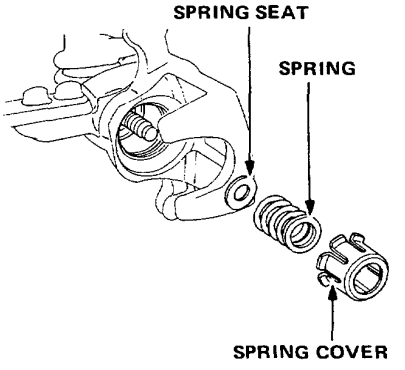


10. Set up the special tool Spring Compressor in the caliper body through the spring cover as shown.



11. Compress the spring by turning the compressor forcing bolt.

12. Remove the retaining ring with special tool Snap Ring Pliers.

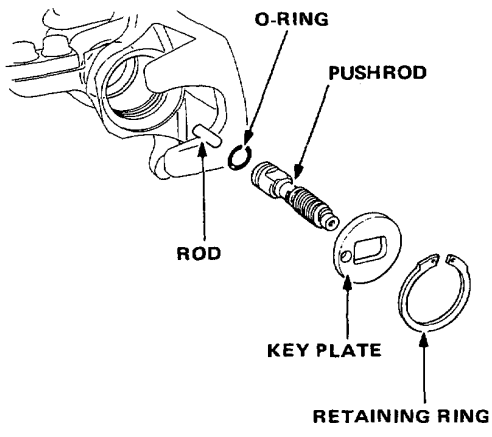


13. Remove the special tools, then remove the spring cover, spring and seat.

(cont'd)

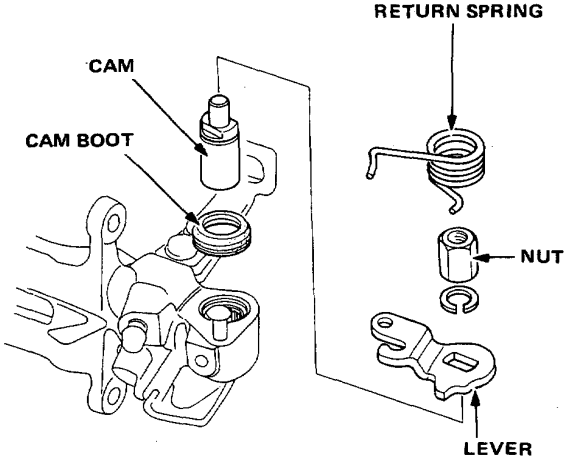
Disassembly (cont'd)

14. Pry off the retaining ring with help of a pair of pliers.



15. Remove the key plate, pushrod, O-ring and rod.

16. Remove the return spring, nut, lever, cam and cam boot.

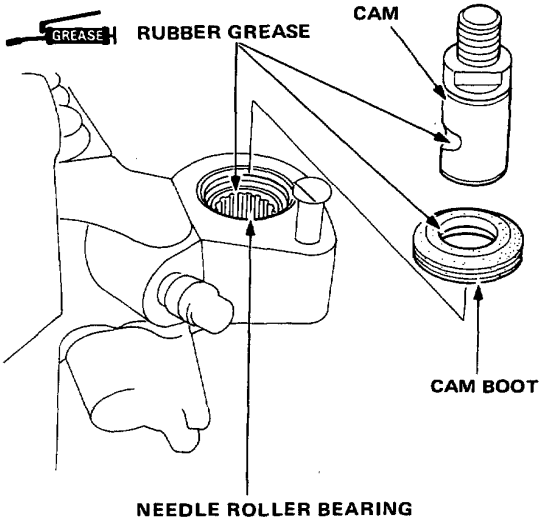


17. Wash clean all removed parts in/with only clean brake fluid.

Reassembly

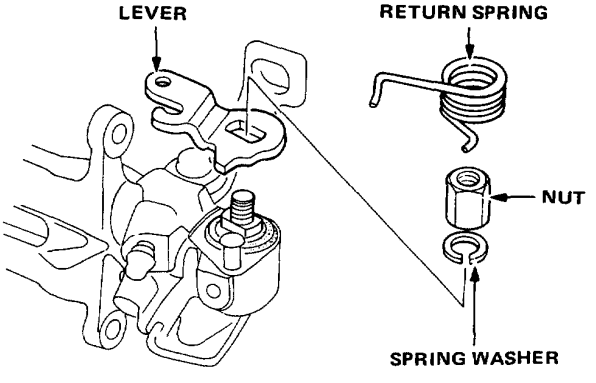
1. Coat the cam boot with rubber grease.

2. Pack all cavities of the needle roller bearing with rubber grease and install the cam with the rod end facing the cylinder.



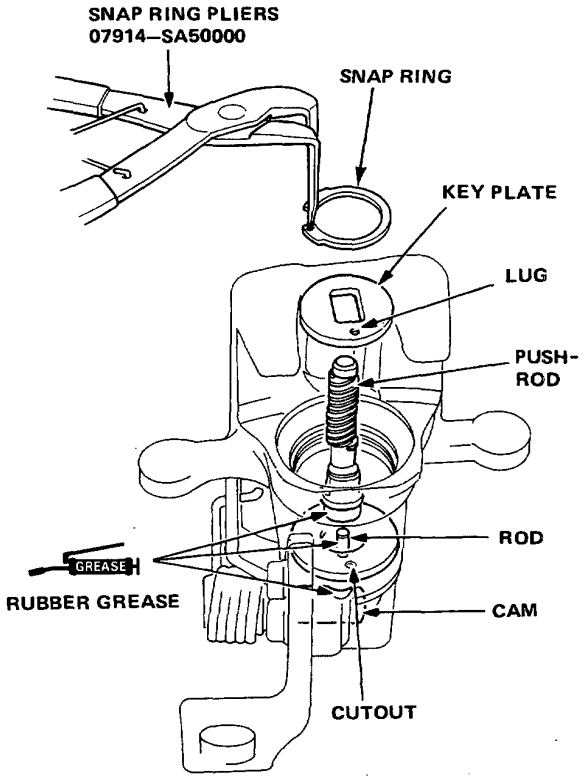
CAUTION: Avoid damaging the cam boot since it must be installed before installing the cam.

3. Install the lever, spring washer and nut.



4. Install the return spring.

5. Install the key plate on the pushrod using a new O-ring.



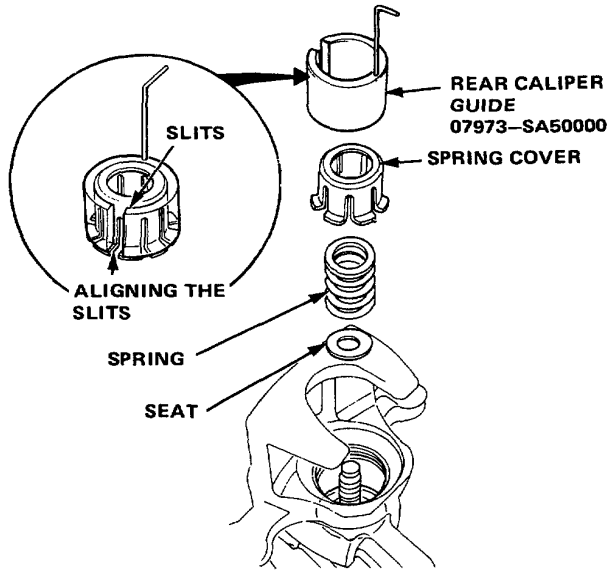
6. Coat the pushrod with clean grease and install on the cam being careful not to let it fall.

   NOTE: Align the lug on the key plate with the cut-out in the cylinder.

7. Using a pair of pliers, install the retaining ring on the pushrod.

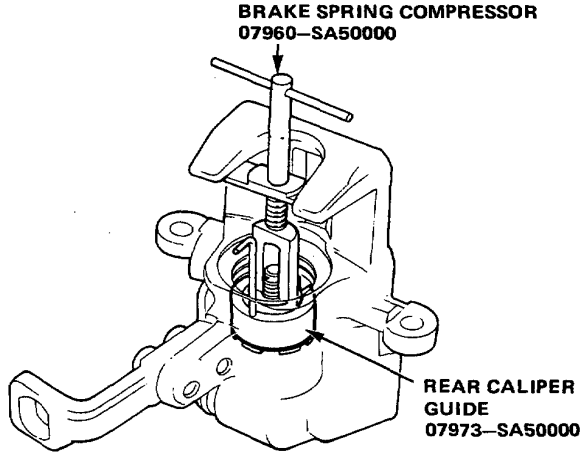
8. Install the seat and spring on the pushrod. Place the spring cover in the cylinder aligning the slits in the rear caliper guide with the grooves in the cover.

   NOTE: Make sure that the grooves in the spring cover are aligned with the slits in the guide when installing the cover.



9. Set up the special tool Brake Spring Compressor on the spring cover.

   NOTE: Position the Caliper Guide and Brake Spring Compressor as shown.



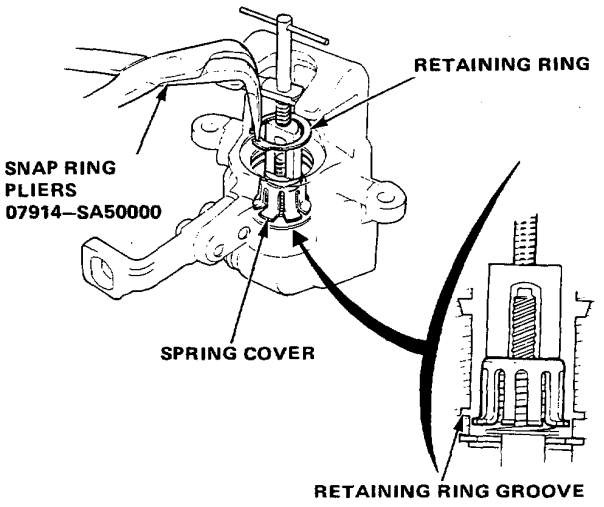
10. Compress the spring until the compressor forcing bolt will no longer go.

    NOTE: Check that the caliper guide follows while the spring is being compressed. (cont'd)

Brake Caliper

Reassembly (cont'd)

11. Remove the Caliper Guide. Check that the flared end of the spring cover is below the retaining ring groove as shown.



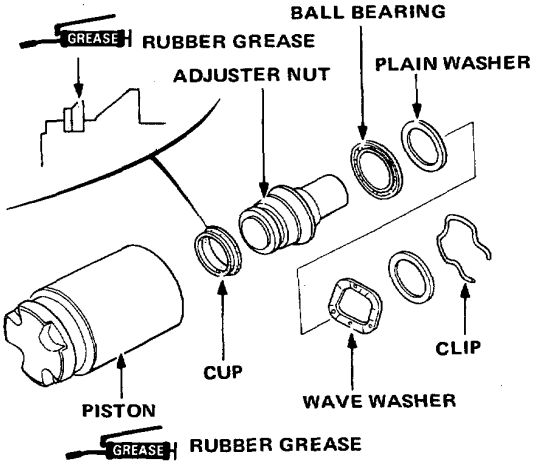
12. With help of Snap Ring Pliers, install the retaining ring in the ring groove.

13. Remove the Brake Spring Compressor.

    NOTE: Check that the snap ring is seated in the ring groove using an inspection light.

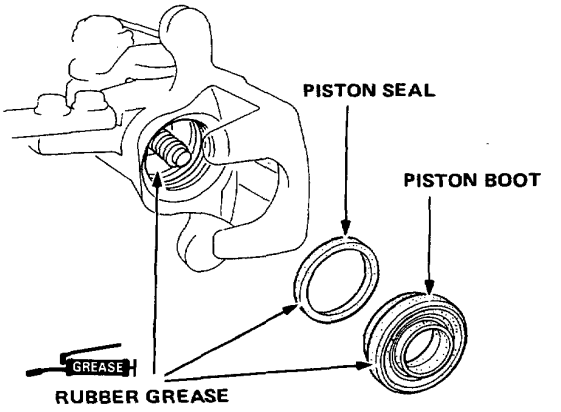
14. Apply a film of rubber grease to a new piston cup and install on the adjuster nut.

    NOTE: Note the installation direction.



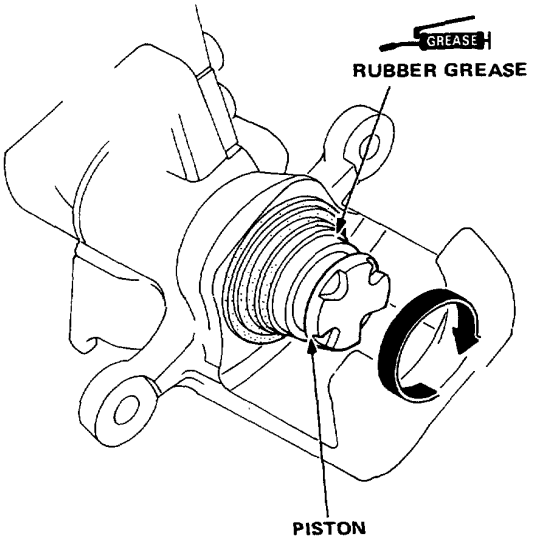
15. Install the ball bearing, plain washer, wave washer and plain washer on the adjuster nut. Slide the nut into the piston and secure with the clip.

16. Coat a new piston seal and piston boot with rubber brease and install in the caliper.



17. Apply a coat of rubber grease to the entire periphery of the piston and install the piston on the pushrod while rotating it clockwise.

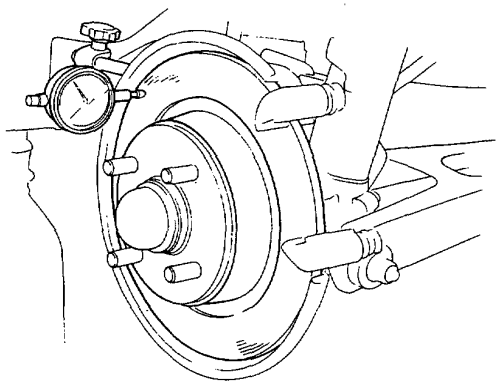
CAUTION: Avoid damaging the piston boot.



Rear Brake Disc

Run-Out

1. Remove the rear wheels, and support rear of car on safety stands.
2. Remove the caliper bolts, then remove the caliper up out of the way, and remove the pads and pad guides (page 21-24).



3. Inspect the disc surface for grooves, cracks, and rust. Clean disc thoroughly and remove all rust.
4. Mount a dial indicator as shown.

   Brake Disc Runout:
   Service Limit: 0.15 mm (0.006 in.)

5. Replace the disc if beyond the service limit. Remove the caliper bracket, remove the old disc and install a new one. Then reinstall the caliper bracket, and torque the bolts to 39 N·m (3.9 kg-m, 28 lb-ft).

Thickness and Parallelism

1. Remove the rear wheels, and support the rear of car on safety stands.
2. Move the caliper and pads out of the way as described in the preceding column.
3. Using a micrometer, measure the disc thickness at eight points, approximately 45° apart and 10 mm (0.39 in.) from the outer edge of the disc.

   Replace the disc if it exceeds the following service limits:

   Brake Disc Thickness:
   Standard: 10.0 mm (0.39 in.)
   Max. Refinishing Limit: 8.0 mm (0.31 in.)

   NOTE: If the refinishing limit stamped on the disc does not match the one listed above, use the one on the disc.

   Brake Disc Parallelism:
   The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in.).

4. Replace the disc if beyond the limits. Remove the caliper mount, remove the old disc and install a new one. Then reinstall the caliper mount, and torque the bolts to 39 N·m (3.9 kg-m, 28 lb-ft).

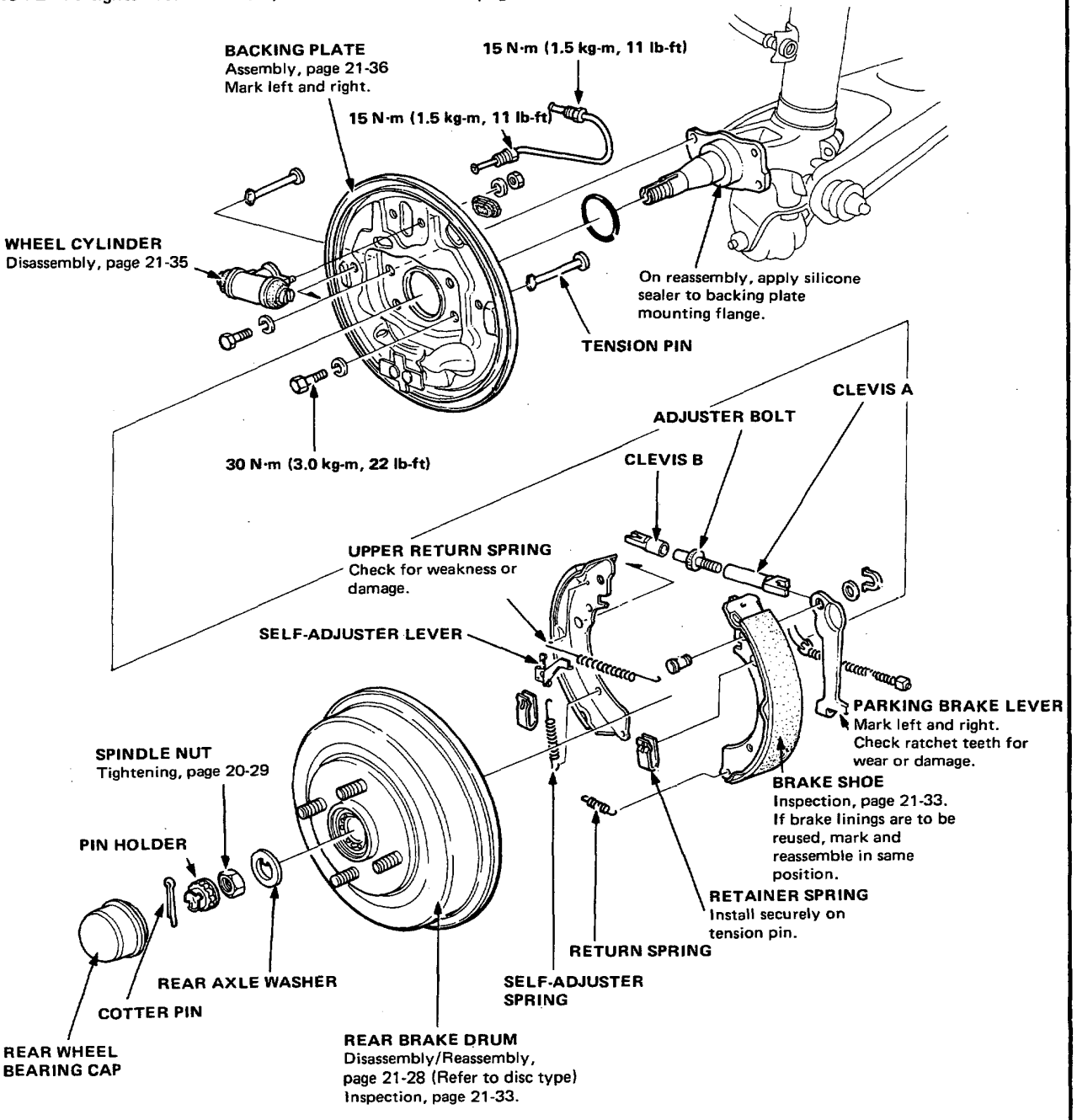
Rear Brakes

Index and Inspection

WARNING

- **Block the front wheels before jacking up the rear of the car.**
- **Do not use air hose to blow the brake assembly clean. Use an OSHA-approved vacuum cleaner, to avoid breathing the brake lining dust.**

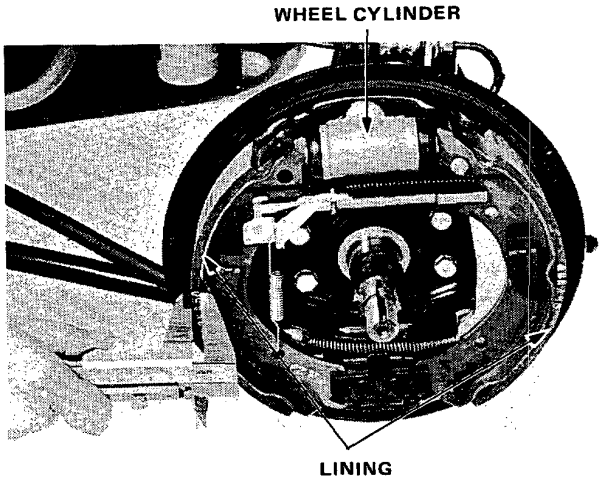
NOTE: To tighten rear axle nuts, follow instructions on page 20-29.



Inspection

1. Inspect the wheel cylinders for leakage.
2. Inspect the brake linings for cracking, glazing, wear or contamination.
3. Measure the brake lining thickness.

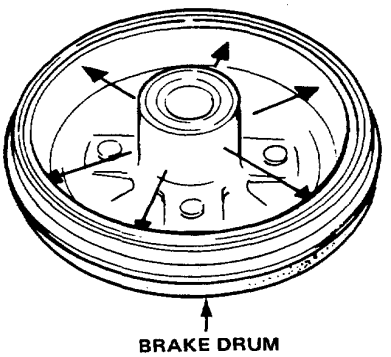
   Lining Thickness
   (Does not include brake shoe thickness)
   Standard: 4.5 mm (0.177 in.)
   Service Limit: 2.0 mm (0.079 in.)



4. Inspect the bearings in the drum for smooth operation. If faulty, refer to page 20-28.
5. Measure the inside diameter of the brake drum.

   Drum Inside Diameter:
   Standard: 200 mm (7.87 in.)
   Service Limit: 201 mm (7.91 in.)

   NOTE: If the refinishing limit stamped on the drum does not match the one listed above, use the one on the drum.

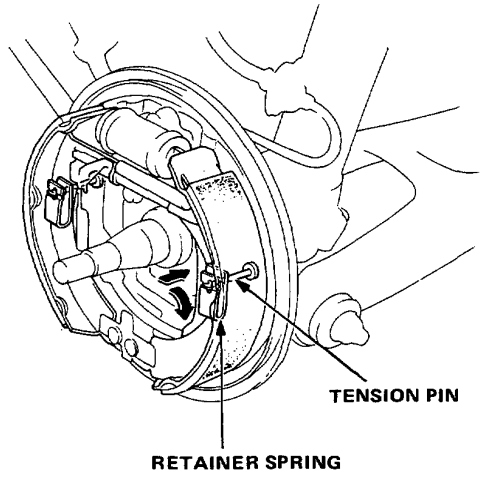


6. Inspect the brake drum for scoring, grooving, or cracks.

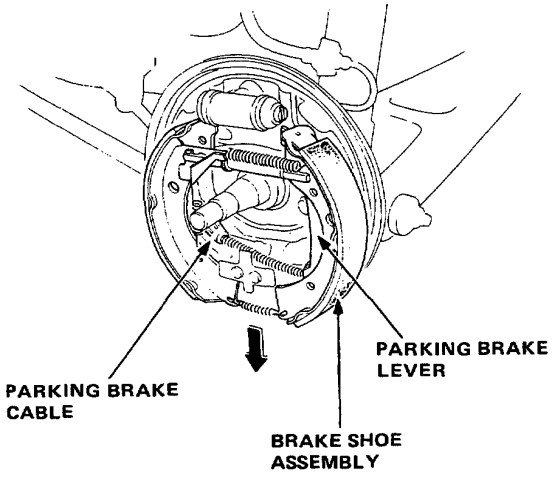
Rear Brake

Disassembly

1. To remove the tension pins, push the retainer springs and turn them.

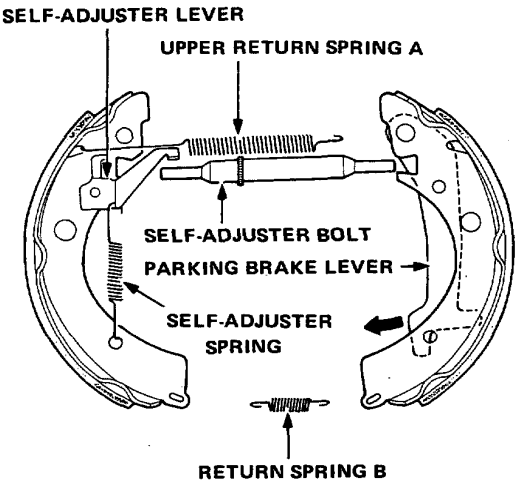


2. Lower the brake shoe assembly and remove it from the backing plate.



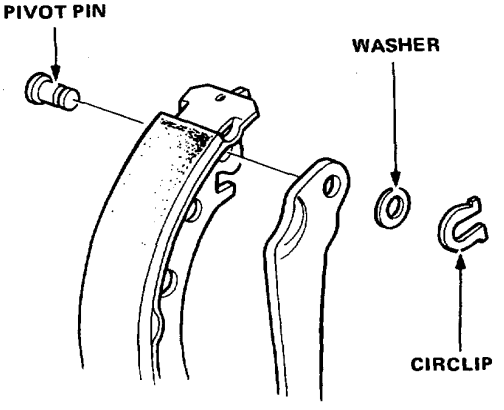
3. Disconnect the parking brake cable from the parking brake lever.

4. Remove the return springs, then separate the brake shoes.



5. Remove the self-adjuster bolt, lever and spring.

6. Pry off the circlip, and remove the washer, pivot pin and parking brake lever.

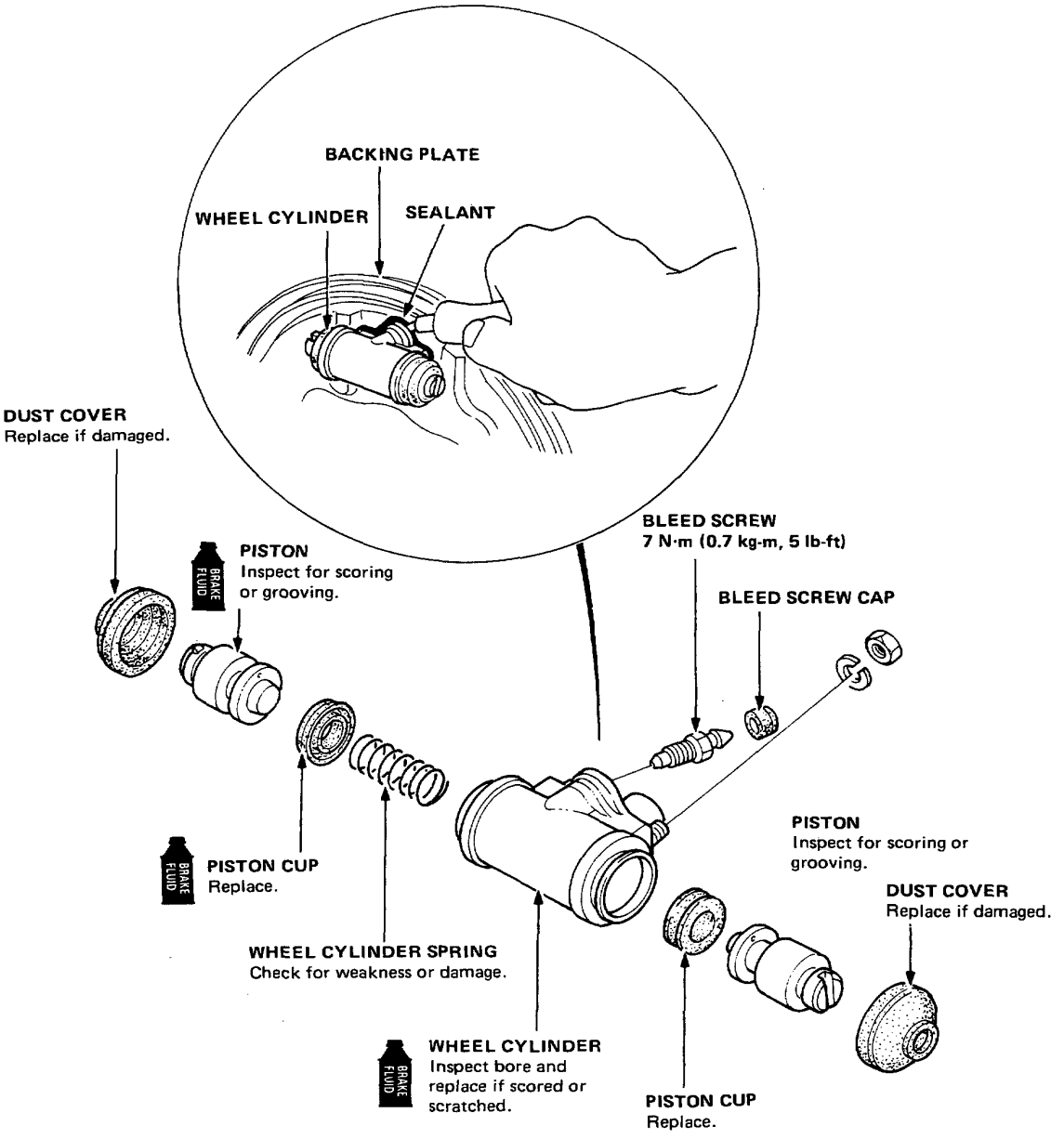


Wheel Cylinder

Disassembly and Inspection

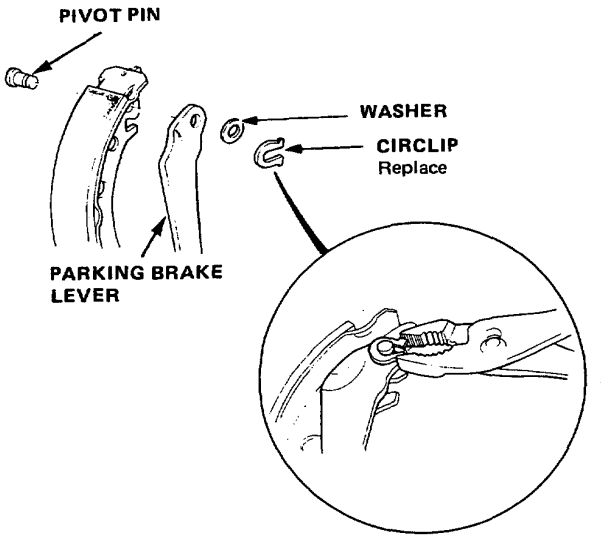
CAUTION:

- **Clean all parts thoroughly with BRAKE FLUID only.**
- **Blow out all passages with compressed air.**
- **Lubricate all parts with brake fluid during reassembly.**
- **Apply sealant between the wheel cylinder and backing plate whenever the wheel cylinder is removed.**



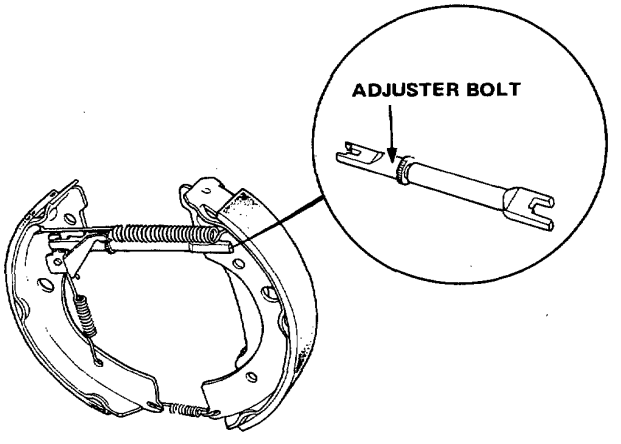
Reassembly

1. Install the parking brake lever by inserting pivot pin, then lock them with circlip and washer.



2. Screw in the self-adjuster bolt until it stops.

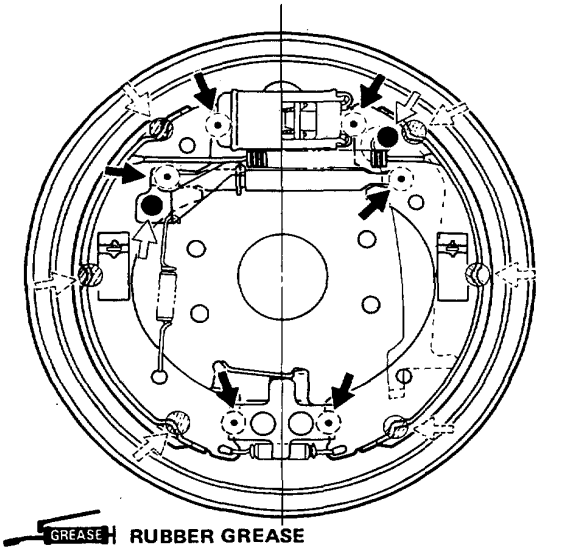
3. Hook the adjuster spring at the lever, then install them on the shoe.



4. Install the self-adjuster bolt and return springs on the brake shoes as shown.

5. Apply grease on metal-to-metal contact areas as shown.

NOTE: Do not get grease or oil on lining surface.



Greasing symbols:

- **Brake shoe ends**
- **Opposite the edge of the shoe,**
- **Sliding surface**

6. Connect the parking brake cable, then install the brake shoe assembly on the backing plate.

7. Apply sealant between the tension pin and backing plate.

8. Install the brake shoe assembly and retainer springs.

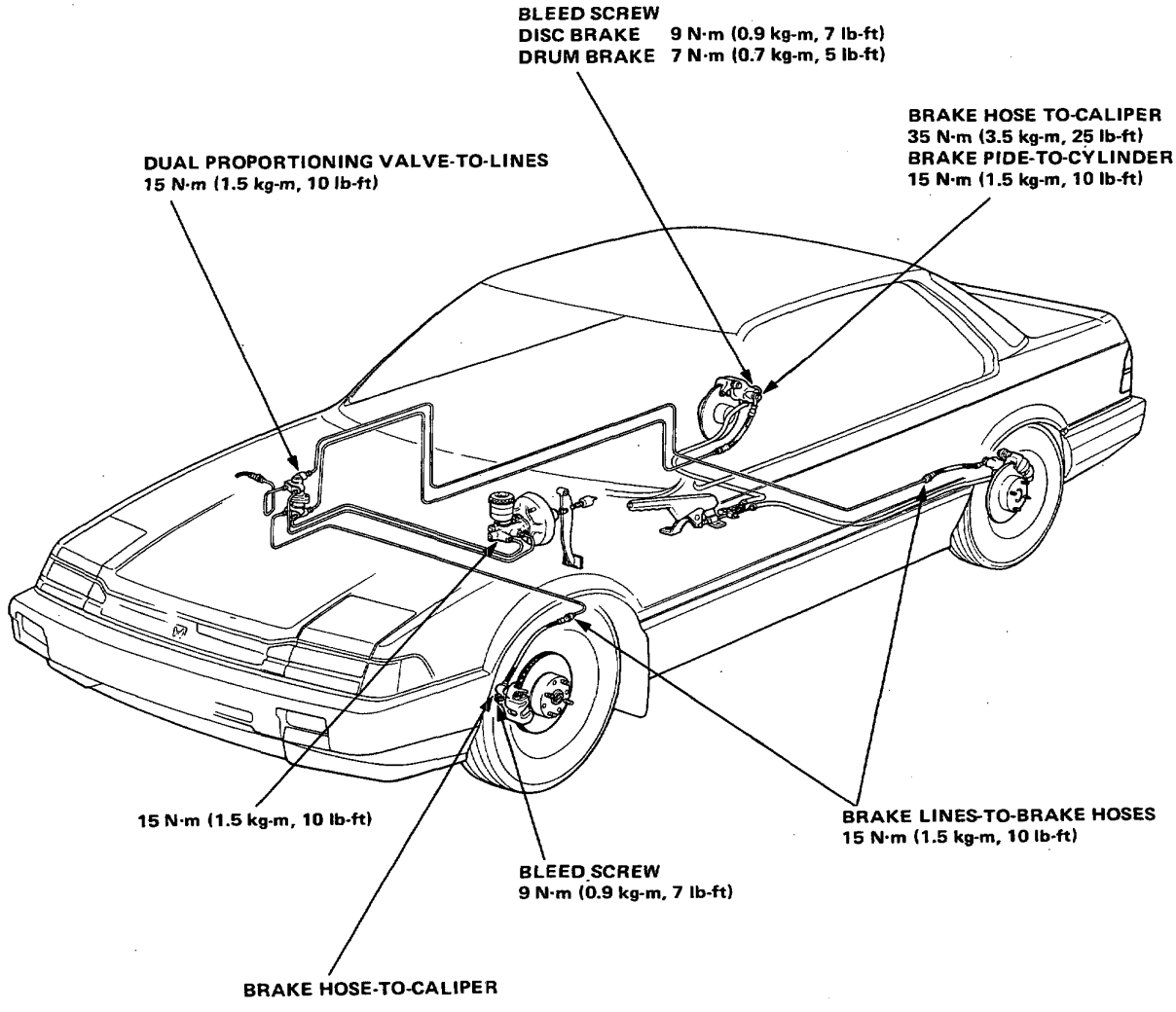
9. Install brake drum (pages 21-27 and 29).

10. Bleed and adjust as described on pages 21-8.

Brake Lines and Hoses

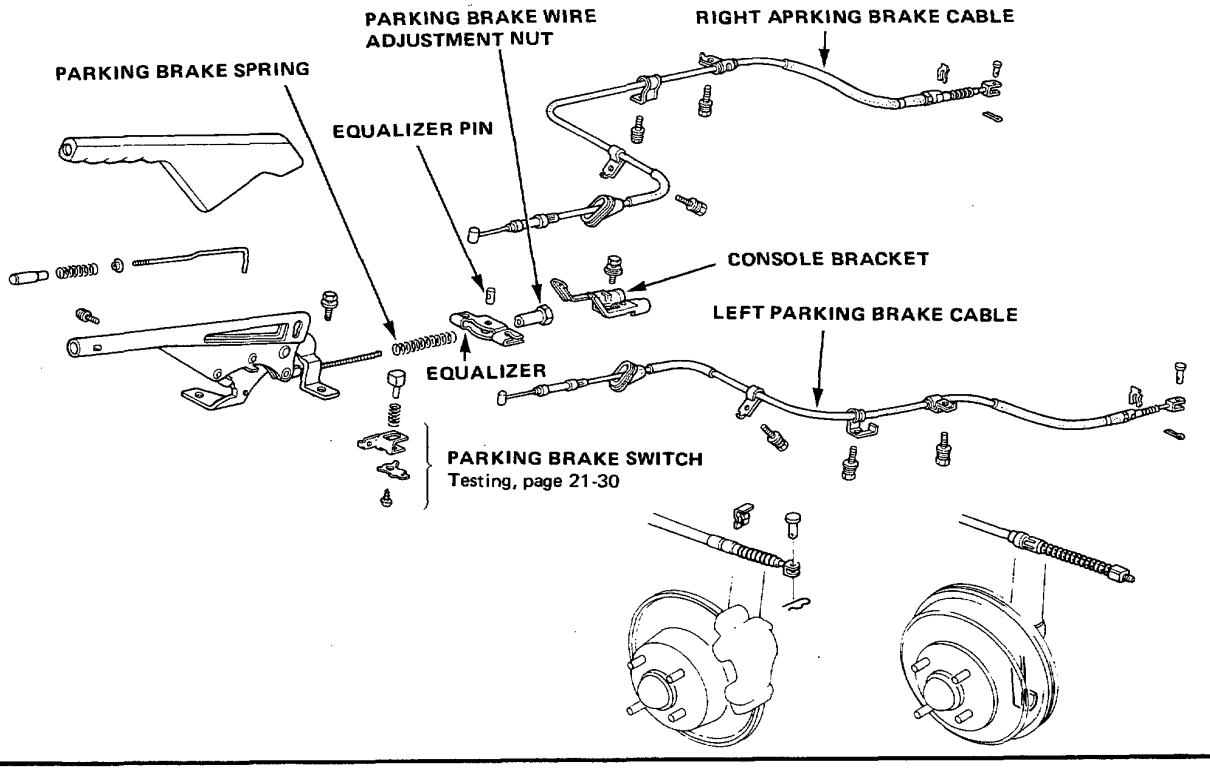
—Inspection

1. Inspect the brake hoses for damage, leaks, interference or twisting.
2. Check the brake lines for of damage, rusting or leakage. Also check for bent brake lines.
3. Check for leaks at hose and pipe joints or connections, and retighten if necessary.



Parking Brake

Disassembly/Reassembly



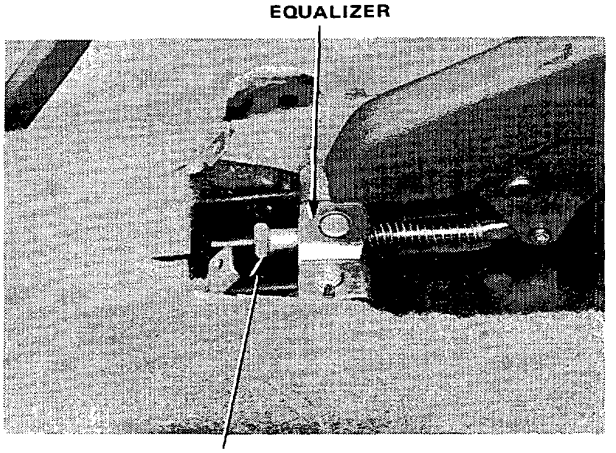
Adjustment

NOTE: When the brake drum has been serviced, depress the brake pedal several times to set the self-adjusting brakes before adjusting the parking brake cable.

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

1. Raise the rear wheels off the ground.
2. Loosen the equalizer adjusting nut in the console.
3. Pull the parking brake lever up one notch.
4. Tighten the equalizer adjusting nut until the rear wheels drag slightly when turned.
5. Release the brake lever and check that the rear wheels do not drag when turned. Readjust if necessary.

   With the equalizer properly adjusted, the rear brakes should be fully applied when the parking brake lever is pulled up 4 to 8 clicks.

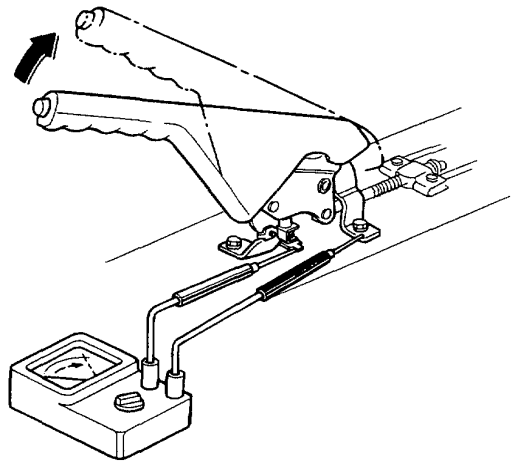


Parking Brake Switch

Testing

Attach one test probe of an ohmmeter to the switch, and the other to the body.

- With the brake lever up, there should be continuity.
- With the brake lever down, there should be no continuity.



If continuity readings are incorrect, replace switch.

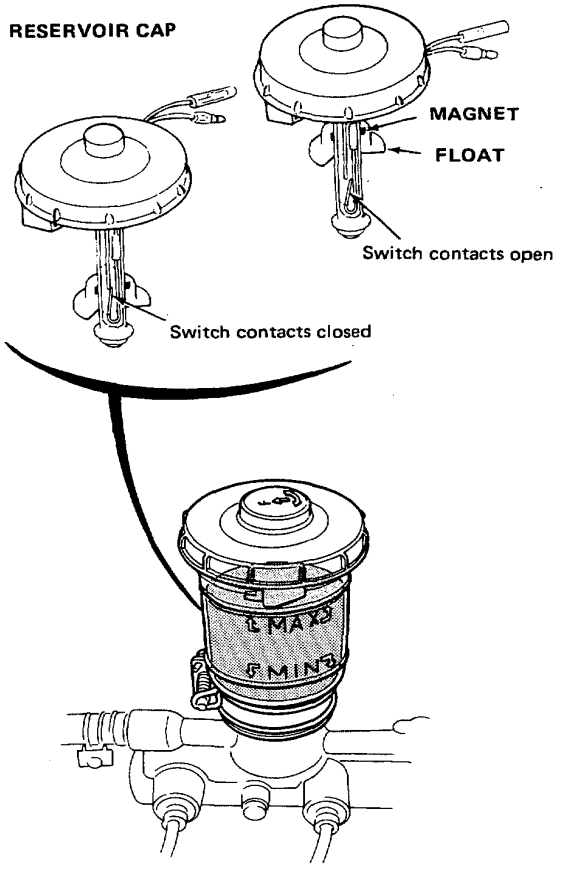
Warning System Testing

Brake Fluid Level Switch

A float level sensor switch is part of the cap on the master cylinder reservoir. When fluid level drops below limits, the switch is actuated by a magnet in the float which completes the ground circuit to the BRAKE indicator light.

To check the brake fluid level switch:

1. Put the transmission in gear and release the parking brake.
2. Turn the ignition switch to ON.
3. Remove the reservoir cap and lift the float level switch out of the reservoir.
4. Check that the BRAKE indicator light turns on.



Brake Light Switch

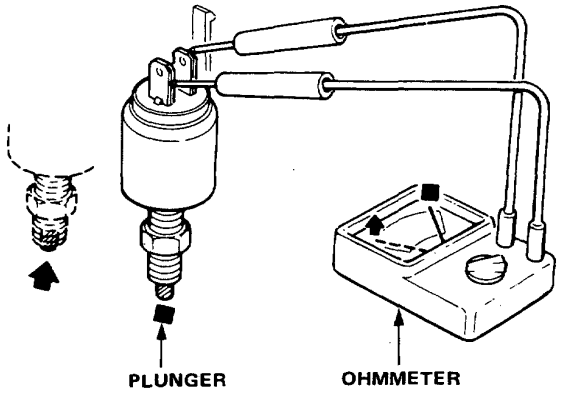
Testing

Check for continuity between both terminals with an ohmmeter.

- With the switch plunger pushed in, there should be no continuity.
- With the switch plunger released, there should be continuity.

If no continuity, replace switch.

NOTE: If you replace the brake light switch, or change its position, readjust pedal height (page 21-22).



Brake Warning Indicator Light

1. Be sure the brake master cylinder is full.
2. Set the parking brake, then turn the ignition switch to ON. The warning light should come on.
   - If it does not come on at all, check the fuse.
   - If the fuse is OK, check the fluid level switch (see the previous procedure), then check the bulb.
   - If the light still does not come on, check the parking brake switch.
3. Then release the parking brake; the warning light should go out.
   - If the light does not go out, check the parking brake switch, fluid level switch (see page 21-30), and the bulb check unit (included in warning display circuit board).
4. Be sure the transmission is in neutral, then turn the key to START. The warning light should come on again.
   - If the light does not come on, check the bulb check unit (included in warning display circuit board).

Brake Warning System Circuit

Brake Fluid Level Switch

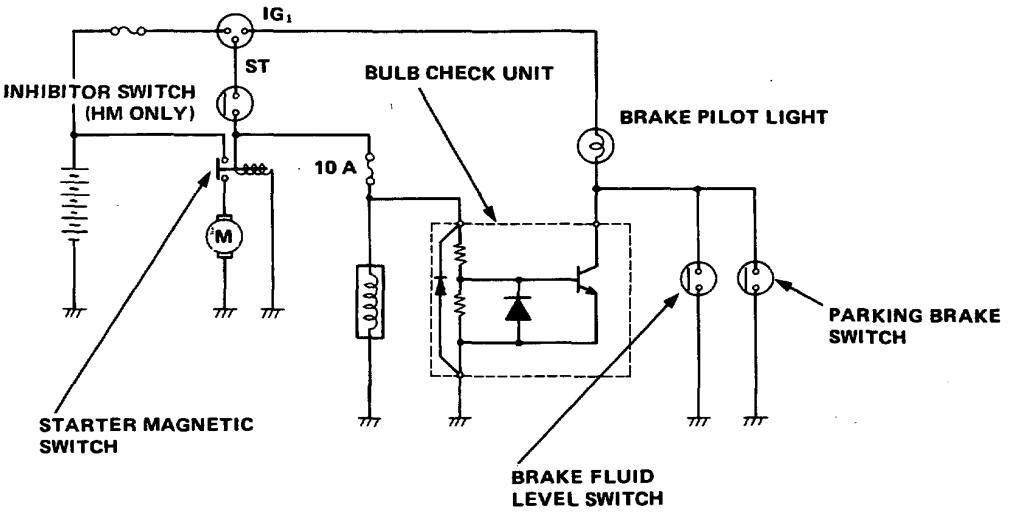
A float level sensor type switch is installed in the master cylinder reservoir. When fluid level drops below limits, the switch is actuated by a magnet in the float which completes the ground circuit to the brake fluid level warning light. The brake fluid level warning light comes on when the ignition switch is turned to "III" (start) position, to indicate that the bulb is working properly by means of the bulb check unit.

Parking Brake Switch

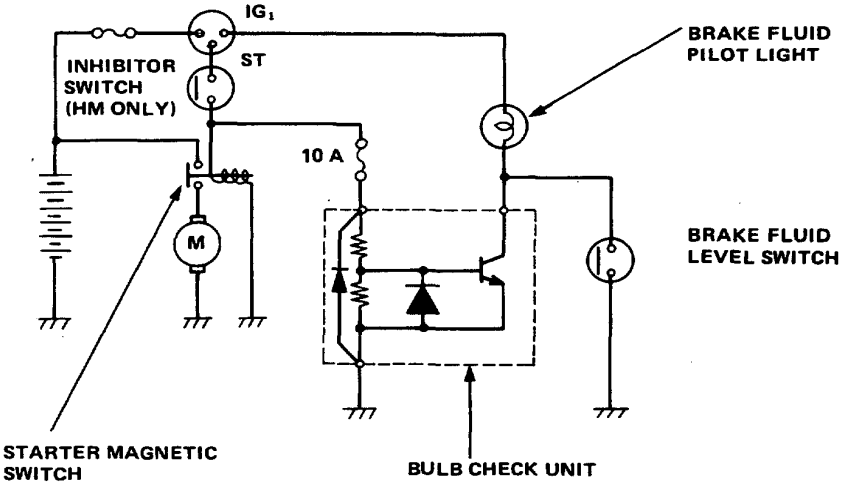
Parking brake warning light comes on when the parking brake is engaged with the ignition in position "IL or III" and goes off when the parking brake released.

KC and KY models

BRAKE WARNING SYSTEM CIRCUIT



EC, KQ and KT models



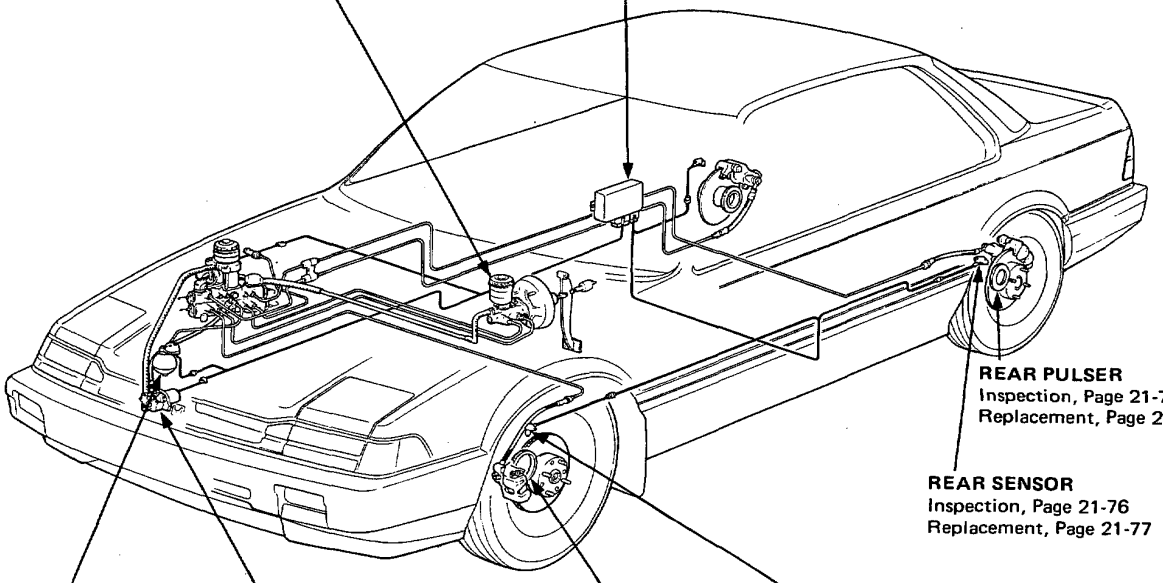
MODULATOR ASSY
Index/Inspection, Page 21-58
Solenoid Assy:
Removal, Page 21-60
Inspection/Assembly, Pages 21-59, -61
Stroke switch:
Removal, Page 21-62
Inspection, Page 21-63
Installation, Page 21-65
Piston comp.:
Removal, Page 21-62
Assembly, Page 21-64

NOTE: When disassembling the pump, accumulator, pressure switch, accumulator pipes, high pressure hoses, solenoid valves and solenoid head, to drain the high pressure brake fluid, follow the procedures described in Page 21-57 "Draining High Pressure Brake Fluid".

MASTER CYLINDER
Index/inspection, Page 21-52
Disassembly, Page 21-53
Assembly, Page 21-54
Push rod clearance adjustment, Page 21-56

AIR BLEEDING, Page 21-70

CONTROL UNIT/FAIL-SAFE RELAY
Removal/Installation, Page 21-69



REAR PULSER
Inspection, Page 21-76
Replacement, Page 21-78

REAR SENSOR
Inspection, Page 21-76
Replacement, Page 21-77

FRONT SENSOR
Inspection, Page 21-76
Replacement, Page 21-77

ACCUMULATOR PRESSURE SWITCH
Index/Inspection, Page 21-68
Disassembly, assembly, Page 21-68

POWER UNIT
Index/Inspection, Page 21-65
Disassembly, Page 21-66
Reassembly, Page 21-67

FRONT PULSER
Inspection, Page 21-76
Replacement, Page 21-78

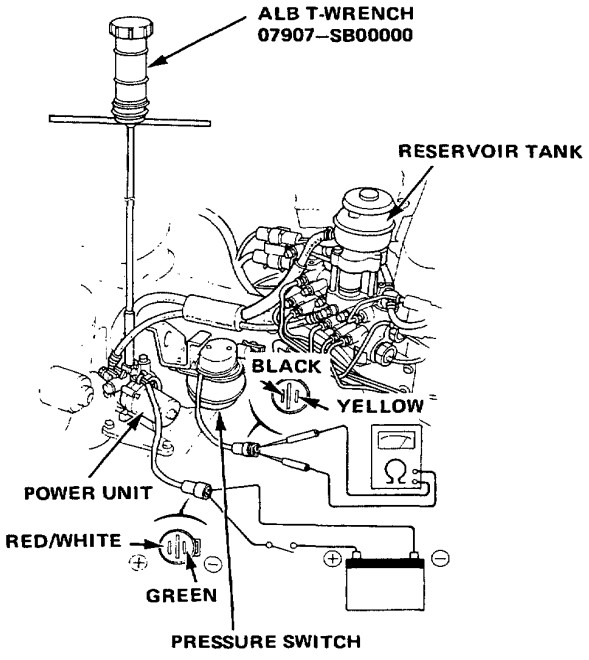
Power Unit Accumulator

Fluid Delivery

NOTE: Perform the following checks should the ALB Light go on due to faults in the high pressure circuits.

Pump delivery

1. Remove the red cap from the bleeder on the pump body.
2. Apply the LAB T-wrench to the bleeder and turn out the bleeder slowly about 90° to let the high pressure brake fluid go up into the wrench reservoir. Turn out the bleeder further one complete turn to aid in complete fluid recovery into the wrench reservoir.
3. Retighten the bleeder nut. Discard the brake fluid in the reservoir.
4. Check that the brake fluid reservoir tank is filled to the proper level.



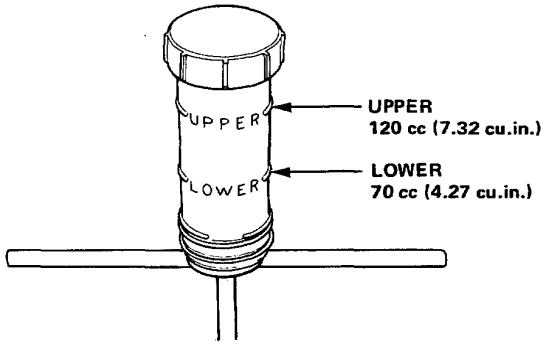
5. Connect the probes of an ohmmeter to the Black and Yellow terminals of the accumulator pressure switch coupler (pink).
6. Attach the positive (+) lead of a fully charged 12 V battery to the Red/White terminal of the power unit motor wire coupler (yellow), and negative (–) lead to the Green terminal. Hook up a battery switch between the battery positive terminal and Red/White terminal as shown.

   NOTE: Use only a fully charged 12 V battery.

7. Turn the battery switch on and measure time before the tester shows continuity.
   30–60 seconds approx.: Normal
   Less than 30 seconds: Abnormal
   Replace pressure switch.
   Over 60 seconds: Abnormal
   (See Page 21-50)

Accumulator delivery

1. If the pump is normal, operate it further for 4 seconds.
2. Using the ALB T-wrench, again loosen the bleeder.

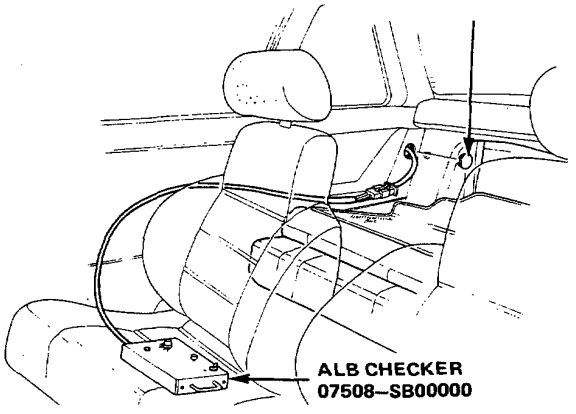


Between UPPER (120 cc, 7.32 cu.in.) and LOWER (70 cc, 4,27 cu.in.): Normal
Over UPPER level: Abnormal
Replace accumulator.
Below LOWER level: Abnormal
(See Page 21-50)

Functional Test

NOTE:
- Start and run the vehicle for at least 2 minutes at speeds above 20 km/h. Stop the vehicle.
- Perform the following inspections. The procedures described below are to test each individual function of the system by simulating actual operating conditions.

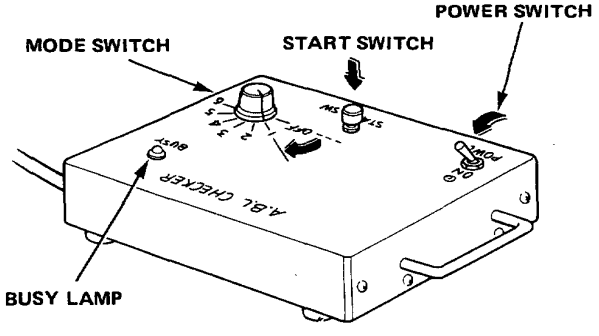
1. Remove the rear seatback.
2. Remove the access cover from the side garnish and connect the 6-P inspection coupler to the ALB CHECKER.



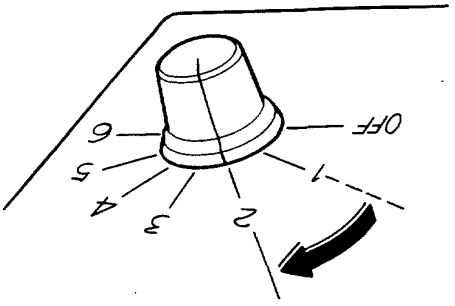
3. Start the engine and release the parking brake lever.

   NOTE: Place the vehicle upright on level ground with the wheels blocked. Put the transmission in neutral for manual transmission models, and in P for automatic transmission models.

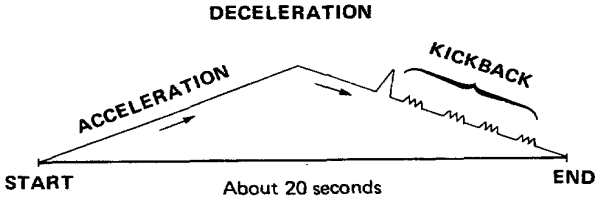
4. Operate the ALB CHECKER as follows:
   1) Turn the power switch ON.



   2) Turn the mode switch to "1".
   3) Press the start switch.
      - The ALB, (!) or BRAKE Lamp should not go on while the BUSY Lamp is ON.
      - If the ALB, (!) or BRAKE Lamp should go on, follow the steps described in TROUBLESHOOTING (page 21-45).
   4) Turn the mode switch further to "2".



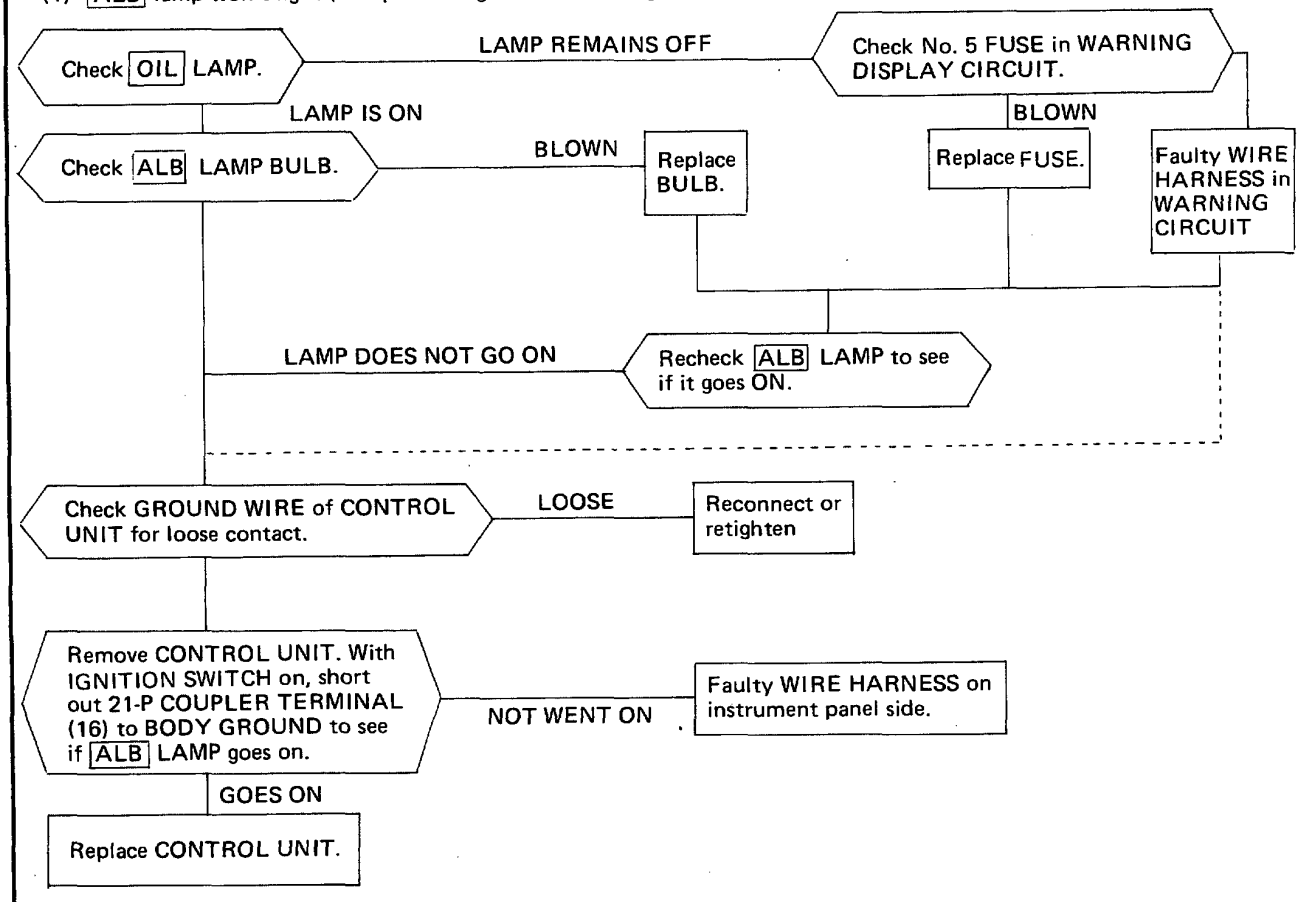
   5) Press the brake pedal down.
   6) Press the start switch.
      - MODE SWITCH POSITIONS 2, 3 and 6.



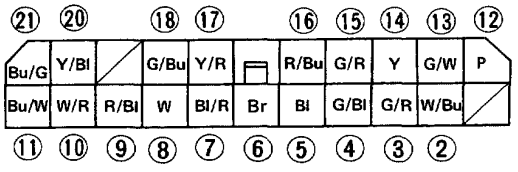
      - The ALB, (!) or BRAKE Lamp should not light while the BUSY Lamp is on. There should be kickback on the brake pedal.
      - If otherwise, follow the instructions described in TROUBLESHOOTING (page 21-45).
   7) Rotate the mode switch to "3" and perform the Steps 5) thru 6).
   8) Turn the mode switch to "4".
   9) Press the brake pedal.
   10) Press the start switch
      - The ALB, (!) or BRAKE Lamp should not light while the BUSY Lamp is on. There should be no kickback on the brake pedal (slight kickback is normal).
   11) Rotate the mode switch to "5" and perform the Steps 9) thru 10).
   12) Turn the mode switch to "6" and perform the Steps 5) thru 6).

AT ENGINE STARTING

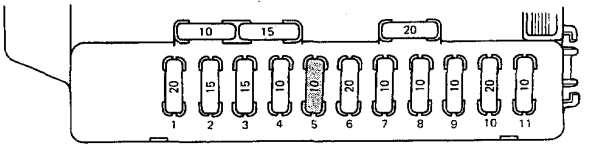
(1) [ALB] lamp won't light (Lamp should go on when the ignition switch is turned on).



CONTROL UNIT 21-P COUPLER



FUSE BOX ASSY



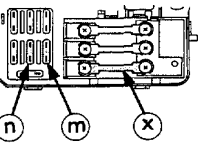
* View from wire side.

Troubleshooting (cont'd)

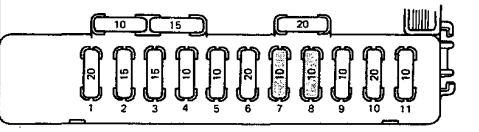
(2) ALB lamp remains ON after engine is started (Lamp should go off within 0.5 seconds after starting).

Check CHG LAMP.
- REMAINED ON → Check AC GENERATOR (See page 27-8).
- REMAINED OFF
- WENT OFF → Disconnect CONTROL UNIT COUPLER. With IGNITION SWITCH on, measure voltages between TERMINAL (7), (8), (24) or (29) of 11-P and 21-P COUPLERS and BODY.
  - 0 V → Check following FUSES and replace if necessary:
    - No. 7 in FUSE BOX for terminal (7)
    - No. x in ENGINE ROOM RELAY BOX for terminal (8)
    - No. 8 in FUSE BOX for terminal (24)
    - No. (m) in ENGINE ROOM RELAY BOX for terminal (29)

ENGINE ROOM RELAY BOX



FUSE BOX ASSY



- 10–14 V INDICATED → Disconnect CONTROL UNIT COUPLER. With IGNITION SWITCH on, short out TERMINAL (12) of 21-P COUPLER to BODY. Check that 10–14 V appears between TERMINAL (10) and BODY.
  - NO VOLTAGE INDICATED → Check FUSE (n) in ENGINE ROOM RELAY BOX and replace if necessary.
  - VOLTAGE INDICATED → Disconnect CONTROL UNIT COUPLER. With IGNITION SWITCH on, short out TERMINAL (12) of 21-P COUPLER to BODY. Check that 10–14 V appears between TERMINAL (10) and BODY GROUND.
    - NO VOLTAGE INDICATED
    - 0 V → Replace FAILSAFE RELAY (See page 21-69)
- NO VOLTAGE INDICATED → Disconnect CONTROL UNIT COUPLER and check that resistance between TERMINAL (9), (20), (28) or (30) of 11- and 21-P COUPLER and BODY is 2.5–10 Ω.
  - THERE IS 0 Ω READING. (OVER OR UNDER 2.5–10 Ω) → Check RELATIVE SOLENOID (Page 21-60):
    (9) - (20) FRONT SOLENOID
    (28) - (30) REAR SOLENOID
    - CORRECTED → WIRE HARNESS pinched between SOLENOID and CONTROL UNIT, etc.
    - Replace SOLENOID
  - 2.5–10 Ω → Replace CONTROL UNIT.

CONTROL UNIT

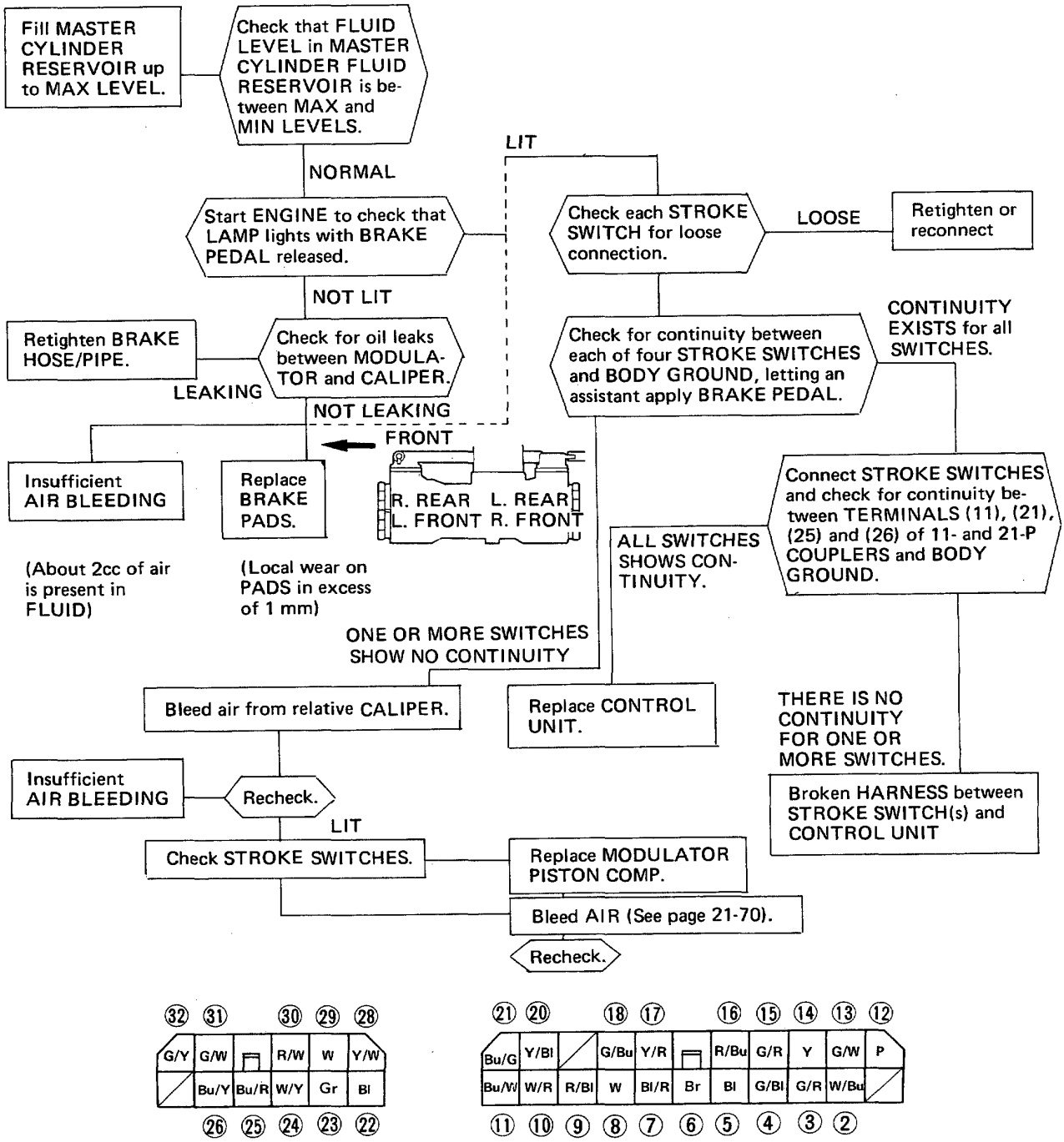
11-P COUPLER

32	31		30	29	28
G/Y	G/W		R/W	W	Y/W
	Bu/Y	Bu/R	W/Y	Gr	Bl
26	25		24	23	22

21-P COUPLER

21	20		18	17		16	15	14	13	12
Bu/G	Y/Bl		G/Bu	Y/R		R/Bu	G/R	Y	G/W	P
Bu/W	W/R	R/Bl	W	Bl/R	Br	Bl	G/Bl	G/R	W/Bu	
11	10	9	8	7	6	5	4	3	2	

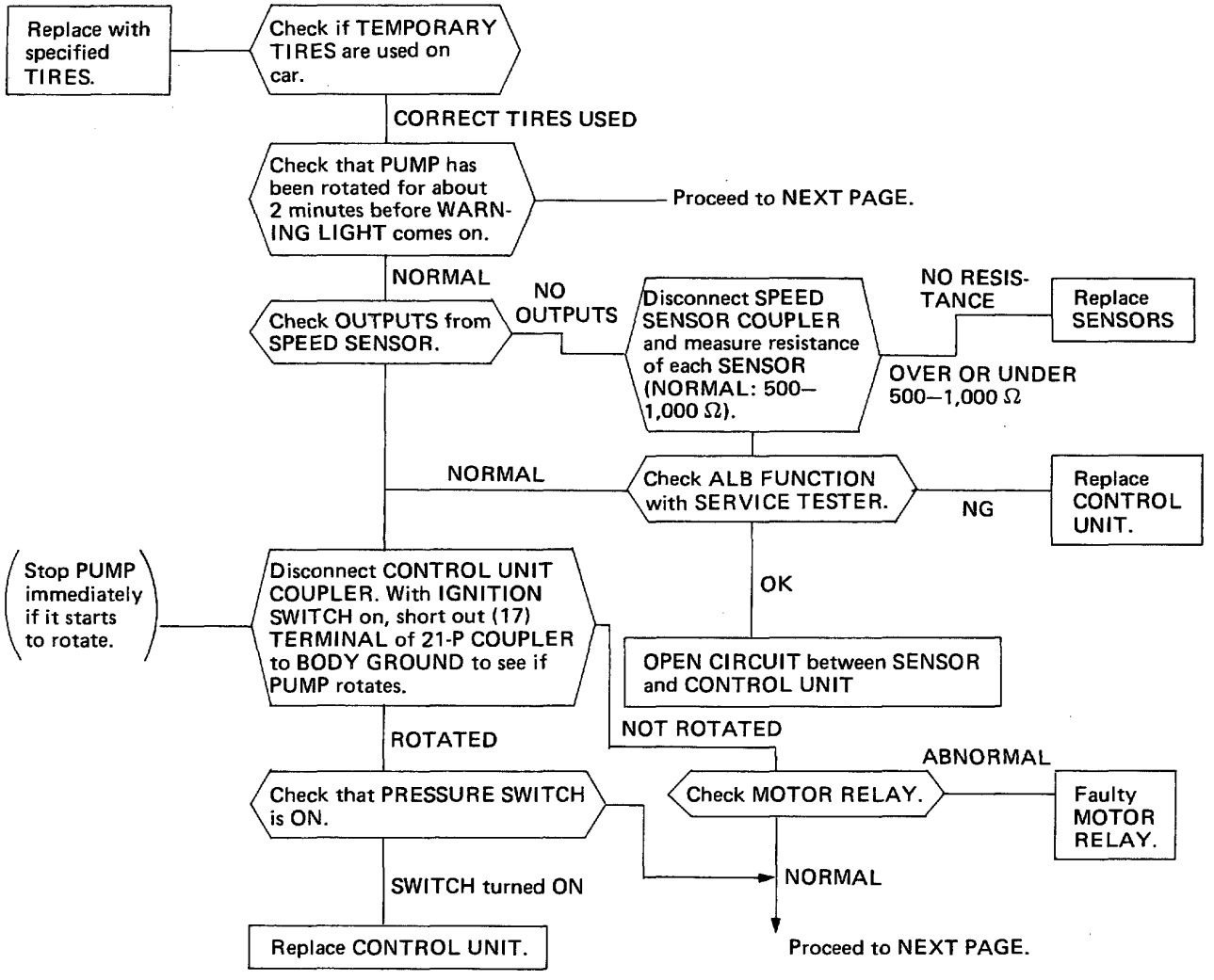
(3) (①) OR BRAKE LAMP won't go OFF (LAMP should be reset after engine has been restarted).



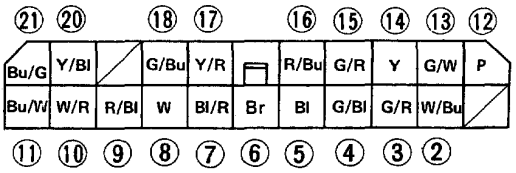
Troubleshooting (cont'd)

DURING RUNNING

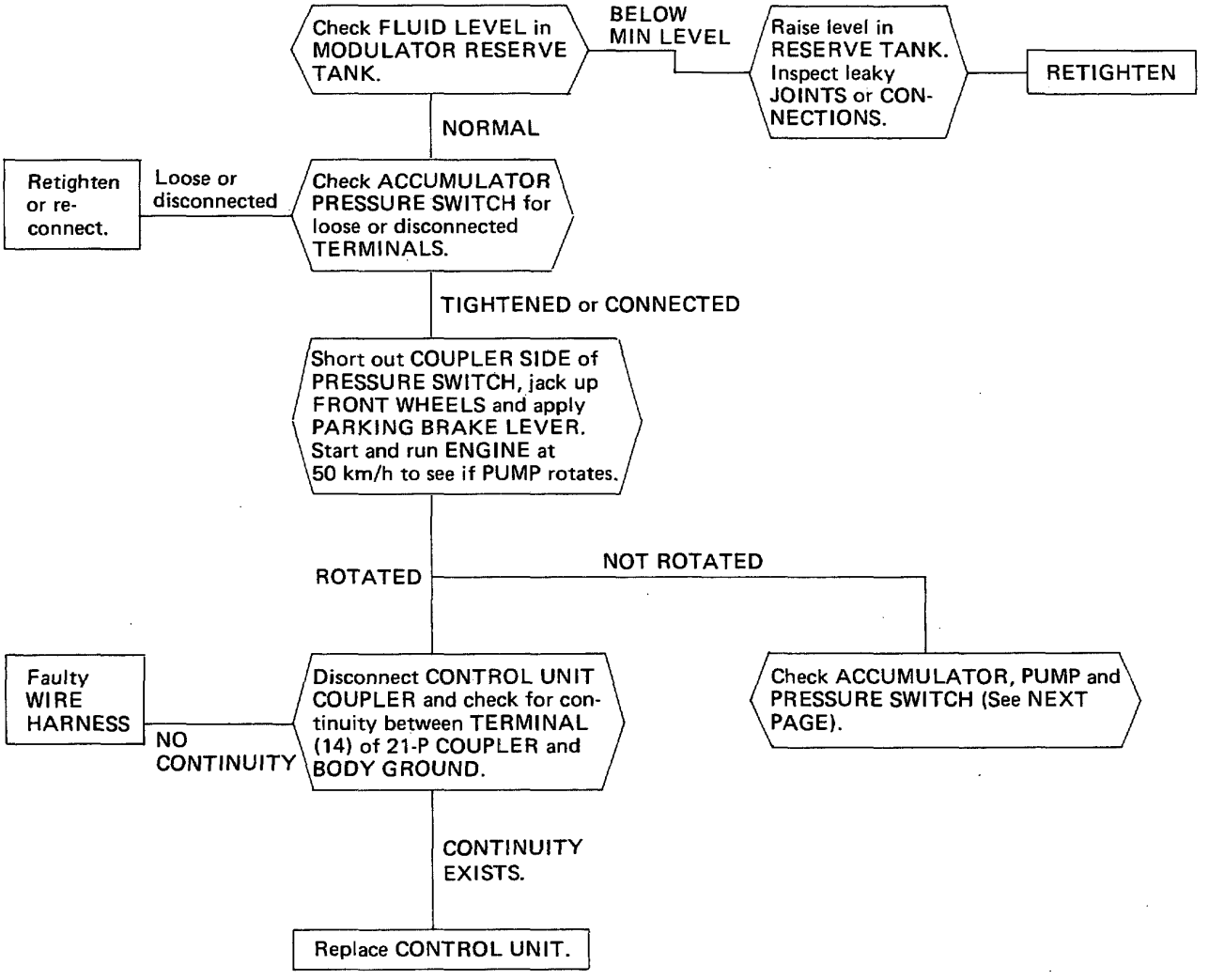
(1) ALB lamp comes on or remains on. (Remains on or comes on frequently ..... ABNORMAL)



CONTROL UNIT 21-P COUPLER

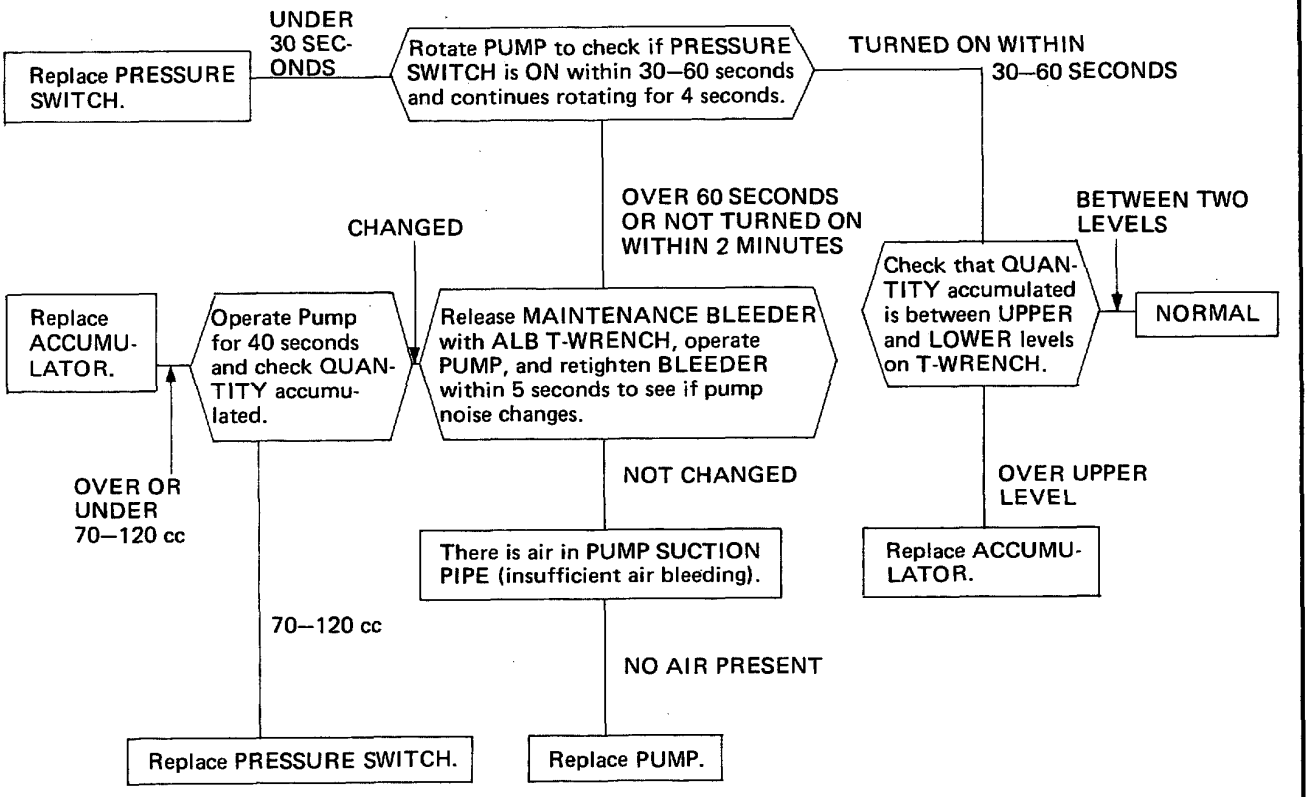


(1) Too frequent pump rotation; ALB lamp also comes ON (Pump may rotate when ALB SYSTEM is operated. System is normal if pump is rotated for about 15 seconds, 1—2 times/day when car is used every day).



Troubleshooting

INSPECTION OF ACCUMULATOR, PUMP AND PRESSURE SWITCH

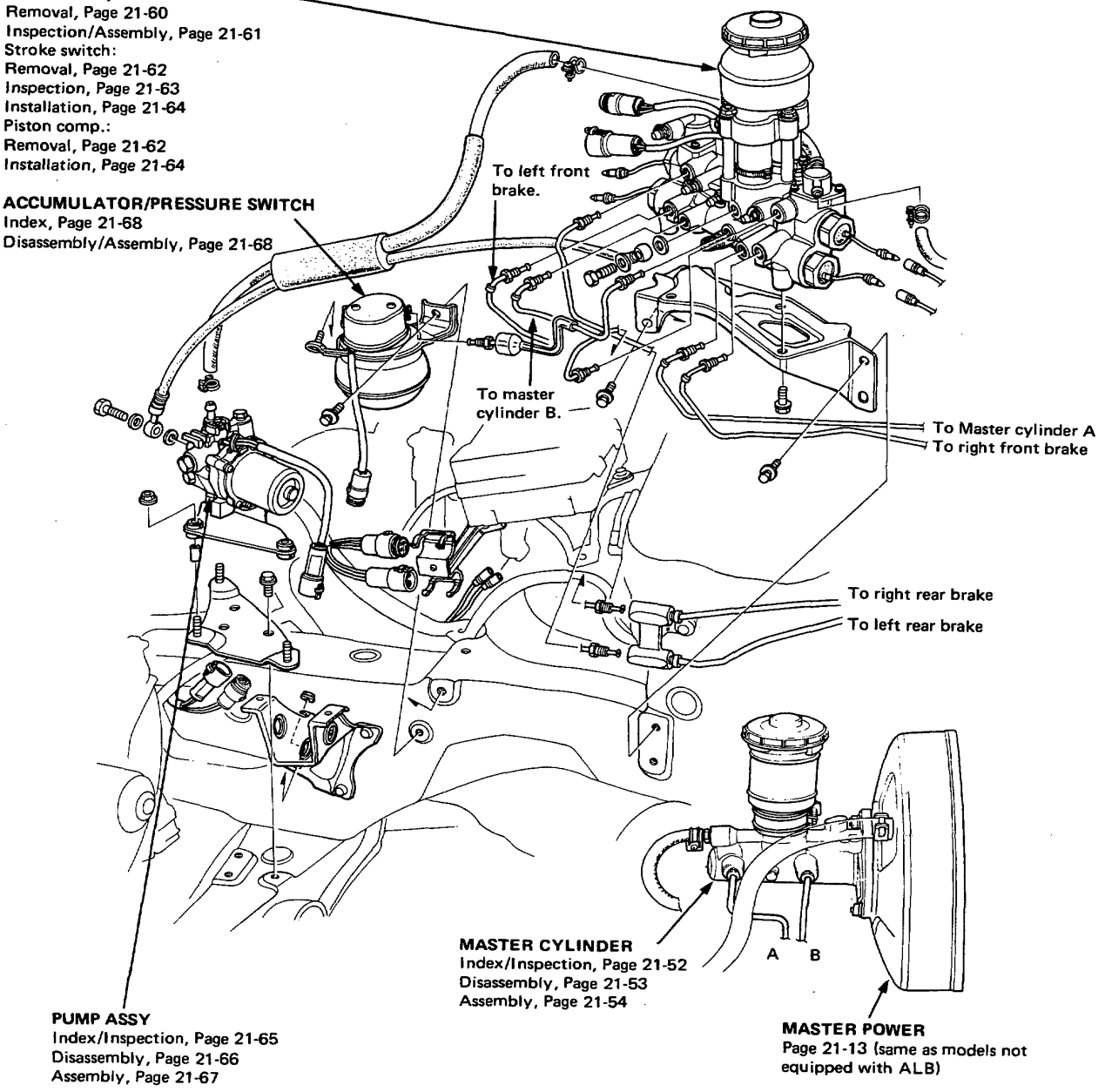


Master Power/Master Cylinder/ Modulator Assy/Power Unit Accamulator

Index

CAUTION:

- **Avoid spilling brake fluid on painted surfaces or instruments as severe damage can result. Wipe up spilled fluid at once and rinse well with clean water.**
- **The flare nuts should be tightened to 15 N·m (1.5 kg-m, 11 lb-ft).**
- **The brake pipes and modulator port fittings are color coded.**

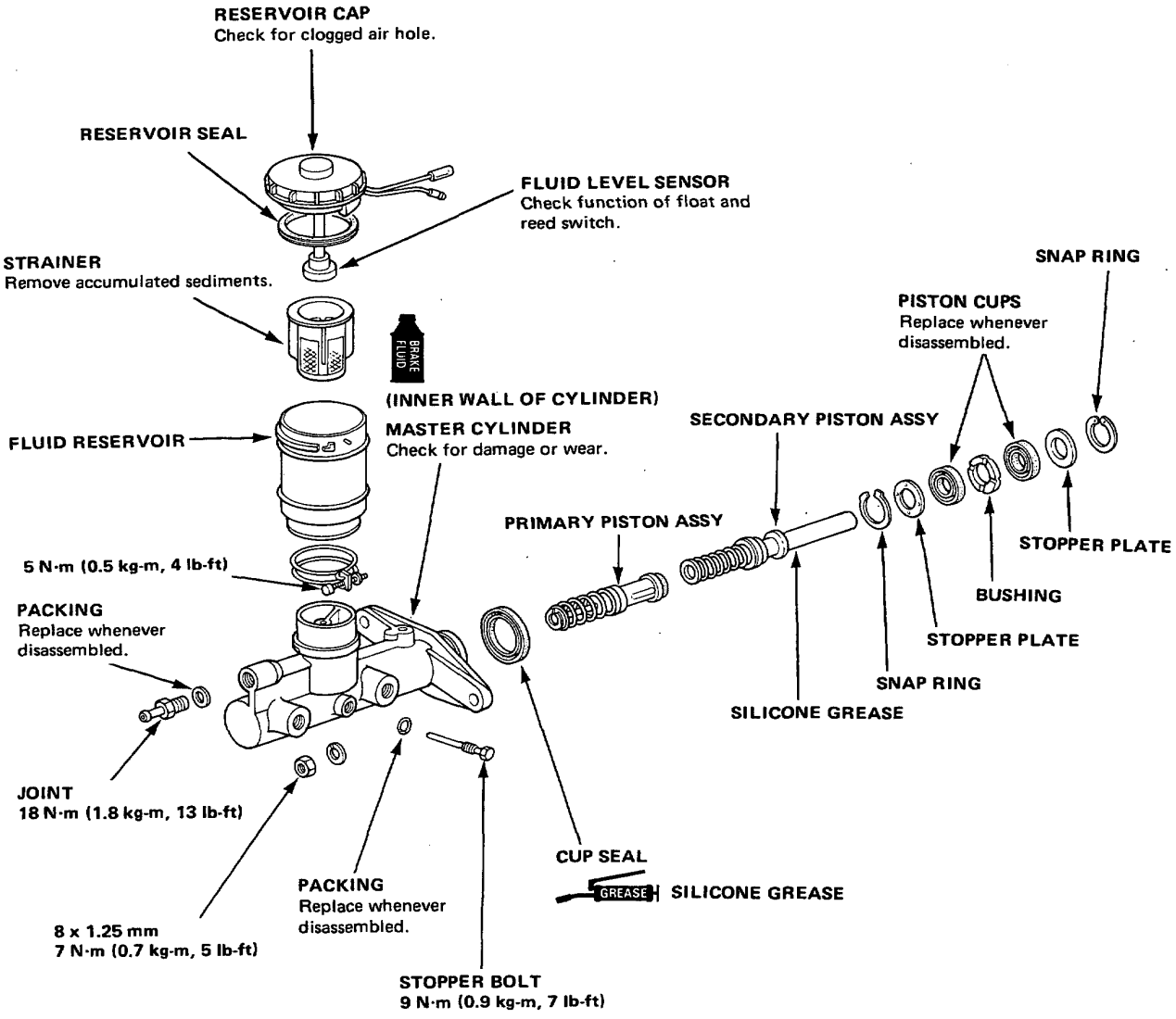


Master Cylinder

—Index/Inspection

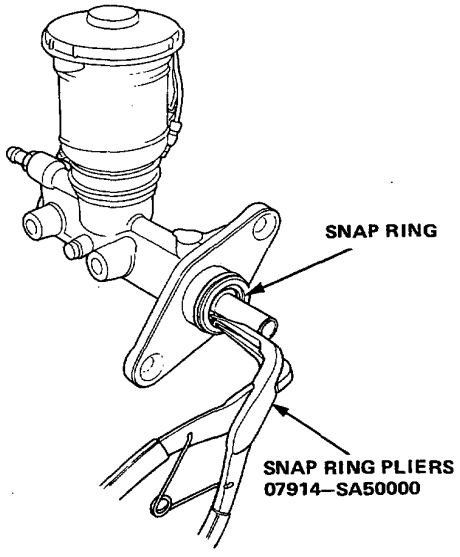
CAUTION:

- **Avoid spilling brake fluid on painted surfaces or instruments as severe damage can result. Wipe up spilled fluid at once and rinse well with clean water.**
- **The symbol BRAKE FLUID represents brake fluid. Use only DOT 3 or 4 brake fluid.**
- **Wash all removed parts in brake fluid and blow dry with a compressed air. Blow open all passages and fluid ports.**
- **Replace all rubber parts with new ones whenever cylinder is disassembled.**
- **To prevent damage, liberally apply clean brake fluid to piston cups before installation. Use special tool to install cups.**

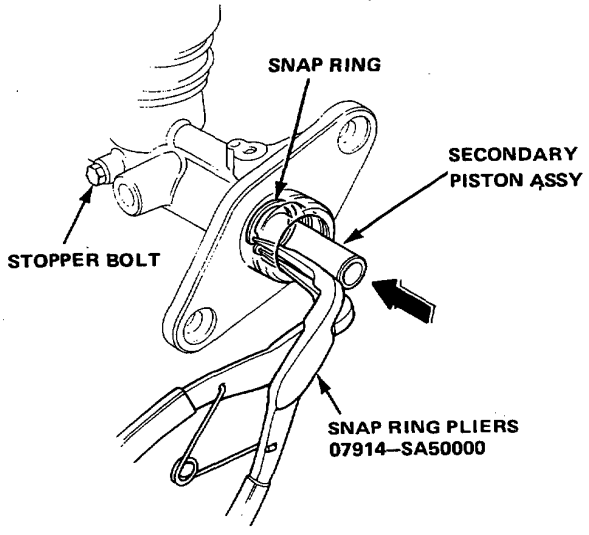


Disassembly

1. Remove the snap ring.



2. Remove the stopper plate, secondary piston cup and bushing.



3. Loosen off the stopper bolt. With help of snap ring pliers, remove the snap ring wile pressing the secondary piston in.

CAUTION: Avoid scratching or scoring the inner wall of the master cylinder and outside of the secondary piston.

4. Remove the primary piston assembly from the master cylinder. If necessary, wrap a shop rag over the end of the cylinder, and carefully blow the piston out with compressed air.

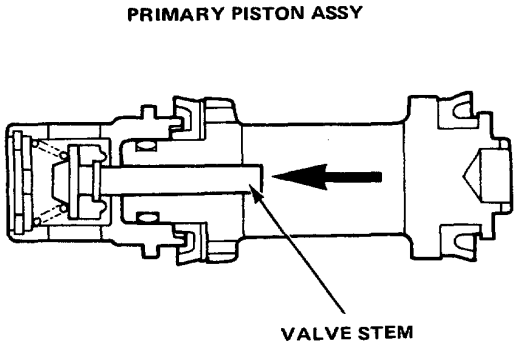
CAUTION: Use extreme care when blowing the piston out as it can be a projectile.

5. Clean all parts thoroughly with BRAKE FLUID only.

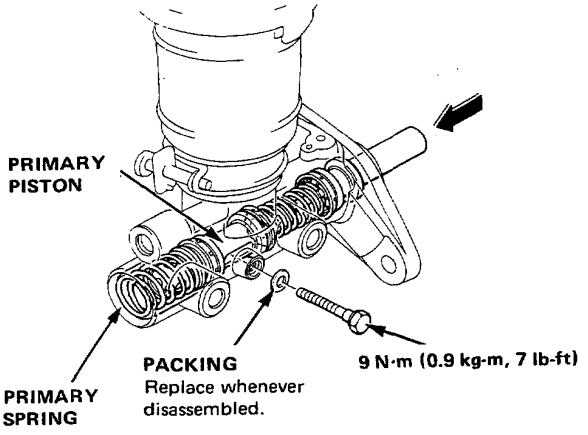
Master Cylinder

Reassembly

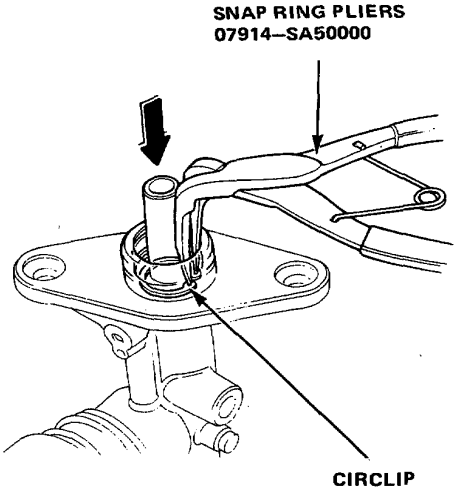
1. Reaching through the primary piston stop bolt hole, lightly press on the valve stem to see if it is moved smoothly.



2. Slide the primary spring, primary piston and secondary piston into the master cylinder.
   - Install the primary piston with the slot on the cylinder stop bolt hole side.
   - Apply BRAKE FLUID only to the piston cups, being careful that they are not inverted inside out during installation.

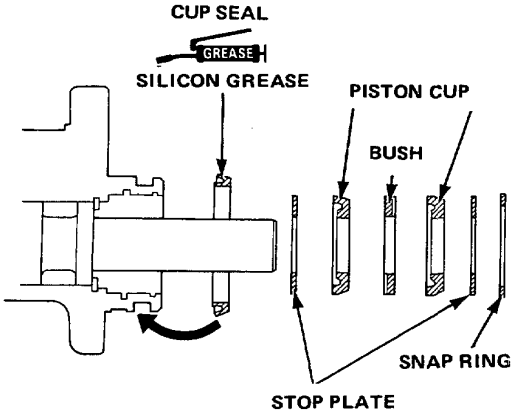


3. Press the secondary piston in until the slot aligns with the stop bolt hole. Install and tighten the stop bolt.



NOTE: Avoid damaging the sliding surfaces of the secondary piston when installing the circlip.

4. Install the stop plate, piston cups and stop plate on the secondary piston and secure with the 26 mm circlip in the master cylinder.



Install the vacuum seal.

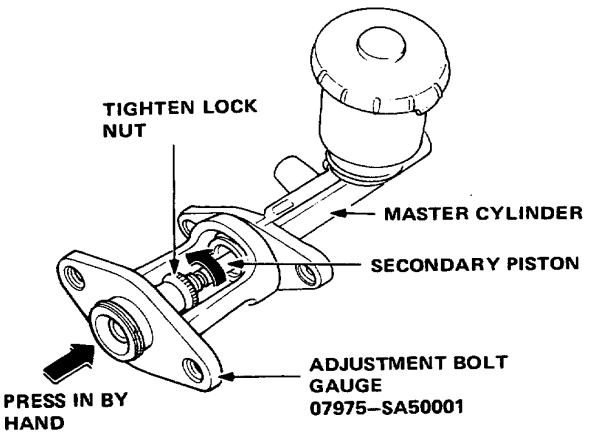
NOTE: Note the installation direction of the vacuum seal and cup.

Pushrod Clearance

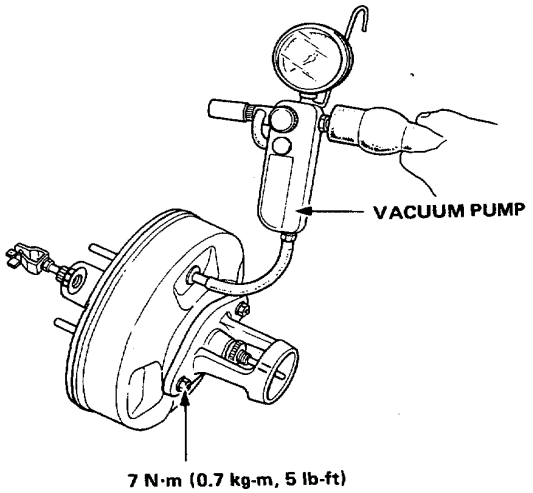
Adjustment

WARNING **Master cylinder push rod-to-piston clearance must be checked and adjustments made if necessary, before installing the master cylinder.**

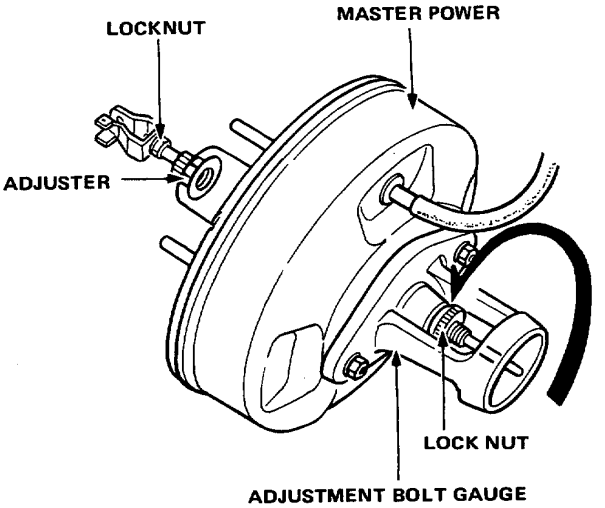
1. Using the special tool Rod Bolt Adjustment Gauge, adjust the bolt height so that the top of the adjusting bolt is flush with the end of the master cylinder piston.



2. Loosen the brake master power adjuster locknut.
3. Connect a hand vacuum pump to the brake master power, apply a 500 mm (20 in.) Hg vacuum and trap.



4. Without disturbing the adjusting bolt position, place the gauge upside down on the master power body and measure the clearance between the output rod and adjusting bolt.



Specified clearance: 0.2–0.4 mm (0.009–0.016 in.)

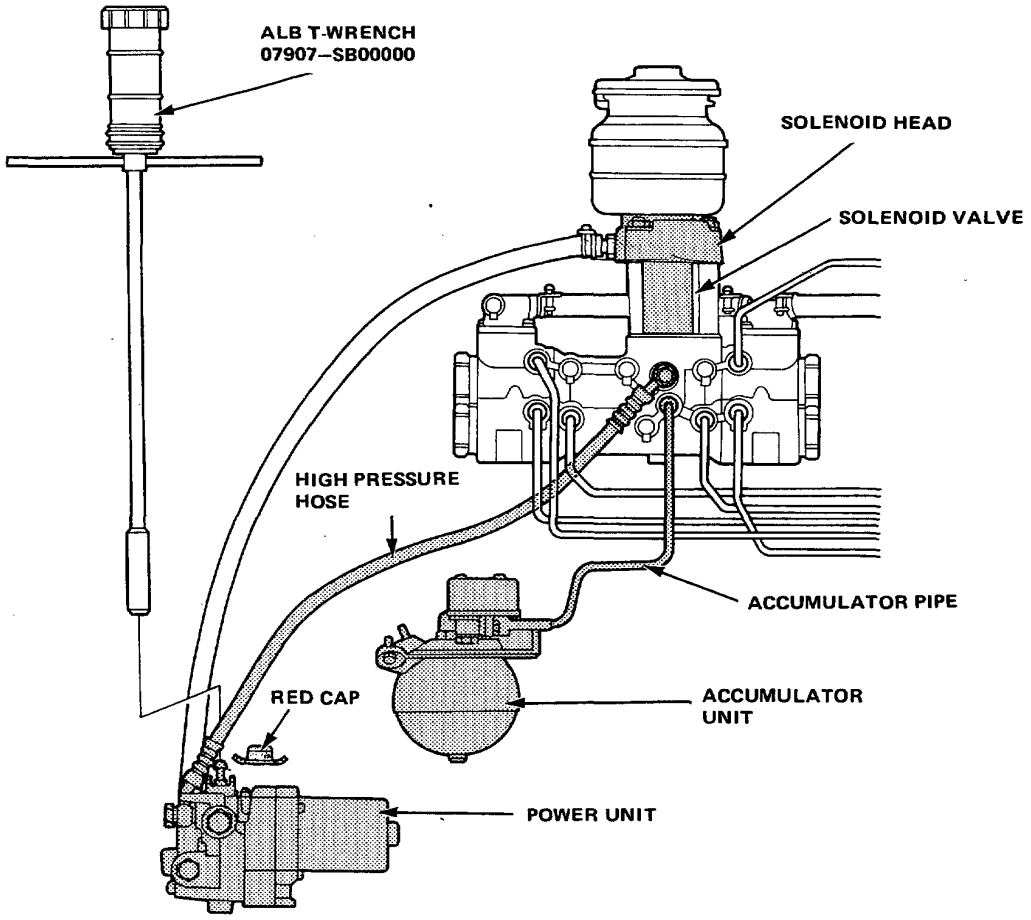
5. If clearance is incorrect, loosen the locknut and turn the adjuster in or out to adjust.

Power Unit/Accumulator Unit/Accumulator Pipe/ High Pressure Hose/Solenoid Valve/Solenoid Head

Draining High Pressure Brake Fluid

WARNING **USE the ALB T-WRENCH before disassembling the parts shadowed in the illustration.**

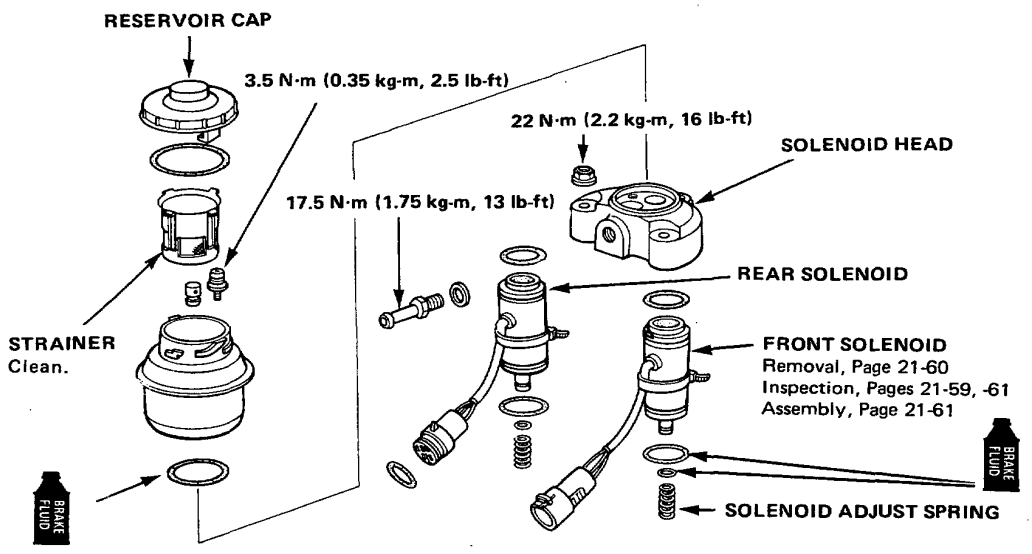
1. Drain the brake fluid from the master cylinder modulator oil reservoir thoroughly.
2. Remove the red cap from the bleeder on the top of the power unit.
3. Install the ALB T-WRENCH on the bleeder nut and turn it out slowly 90° to collect high pressure fluid into reservoir. Turn the T-WRENCH out one complete turn to drain the brake fluid thoroughly.
4. Retighten the bleeder nut.
5. Reinstall the red cap.

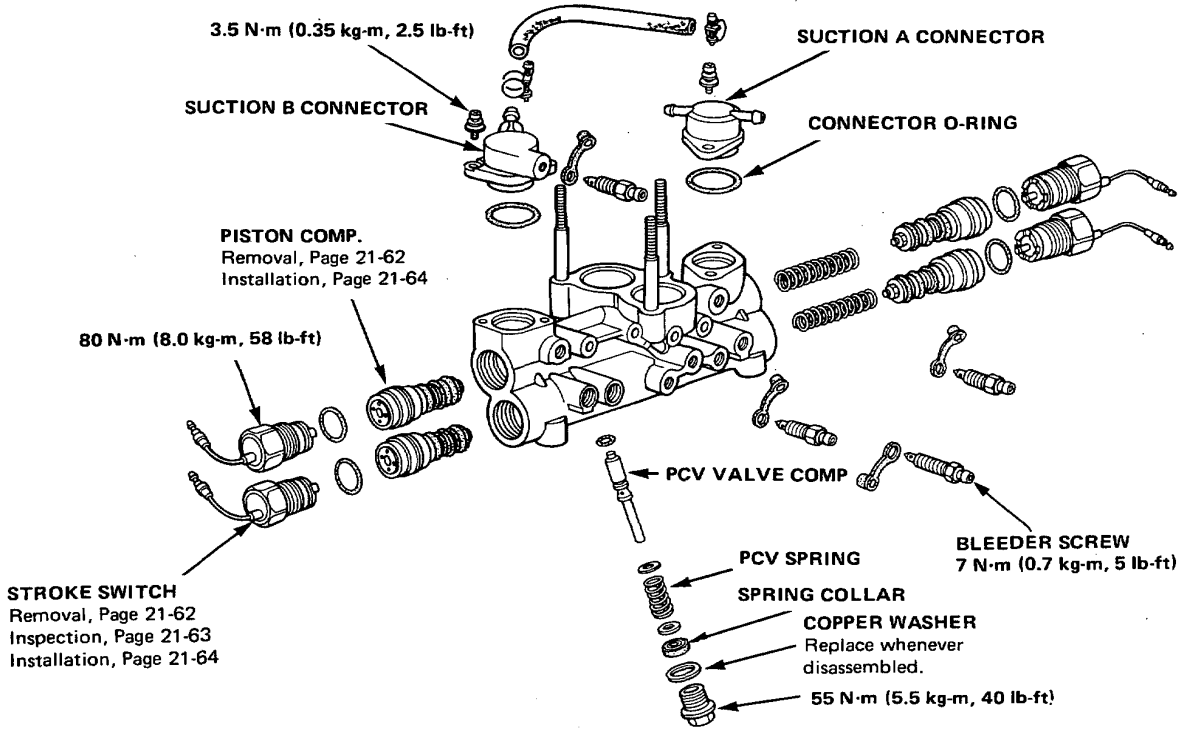


Modulator Assy

Index/Inspection

CAUTION: Do not spill brake fluid on painted surfaces as severe damage can result. Wipe up spilled fluid at once and rinse well with clean water.





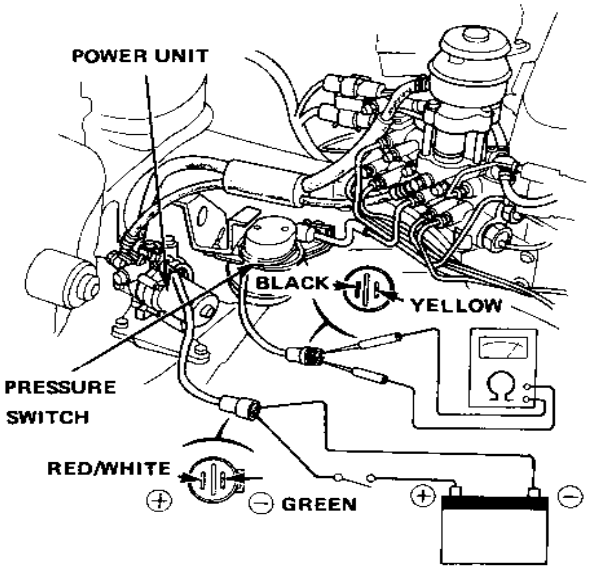
Solenoid

Leak Lest

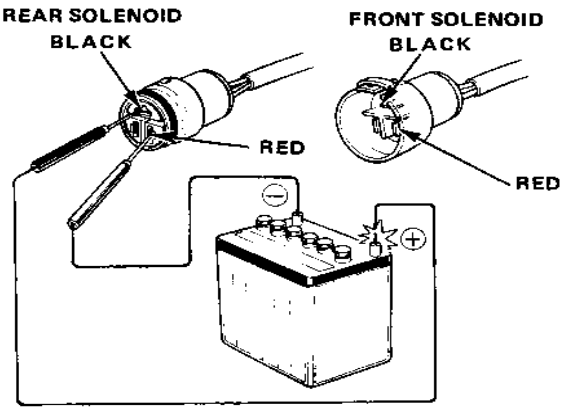
1. Check for the resistance between the Black and Yellow terminals of the accumulator pressure switch coupler (pink) with an ohmmeter.

2. Attach the positive (+) lead of a fully charged 12 V battery to the Red/White terminal of the power unit motor coupler (yellow) and negative (−) lead to the Green terminal with a battery switch in between as shown.

3. Turn the battery switch ON and check for continuity between the terminals. For subsequent testing, to allow sufficient pressure to build up within the accumulator, rotate the power unit for 4 seconds, then turn the battery switch OFF, after the pressure switch has been turned ON.



4. Apply a 12 V across the Black and Red terminals of the solenoid coupler (pink) momentarily.

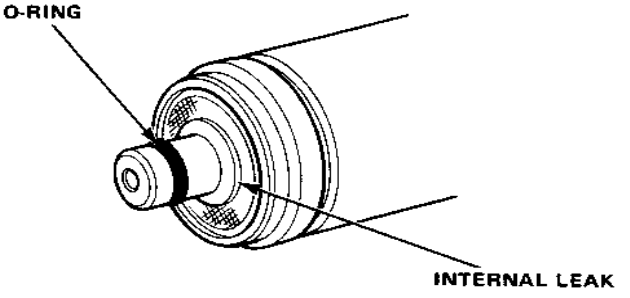


- Check if the solenoid hisses or squeaks. Replace the solenoid with a new one if it hisses or squeaks.

- Make sure that the solenoid does not hiss or squeak after it has clicked into position. Replace with a new one if it hisses or squeaks.

- Check the pressure switch for continuity within one minute. It is normal if there is continuity. If there is no continuity, solenoid is faulty and must be replaced.

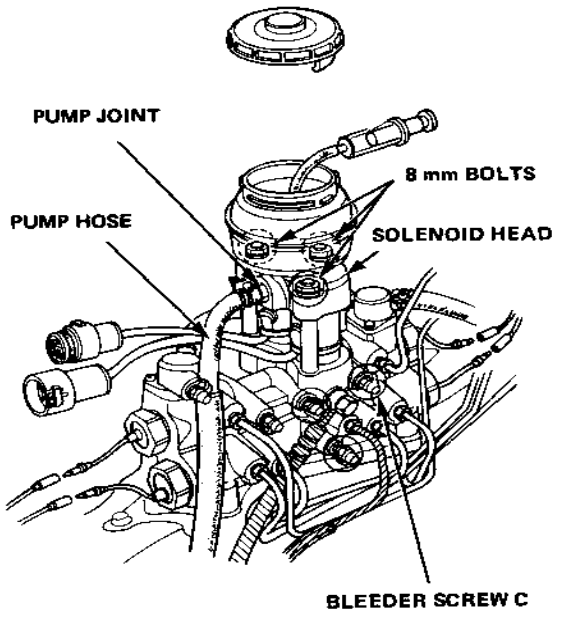
  NOTE: The solenoid must be replaced with a new one as a unit except when the O-ring is faulty.



Master Cylinder/ Modulator Tank

Brake Fluid Draining

1. Draining brake fluid from modulator tank.
   The brake fluid may be sucked out through the top of the modulator tank with a syringe. It may also be drained through the pump joint after disconnecting the pump hose.



2. Draining brake fluid from master cylinder:
   Loosen the bleeder and pump the brake pedal to drain the brake fluid from the master cylinder.

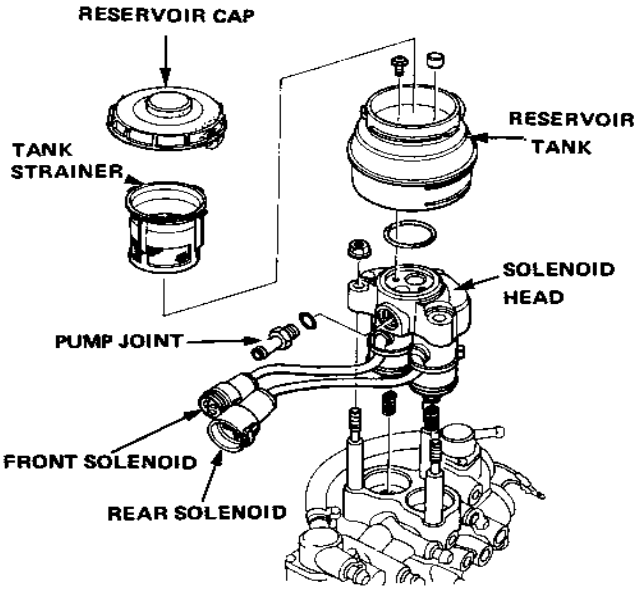
WARNING

- **High pressure fluid will be squirted out if the tube shadowed is removed or solenoid head 8 mm nuts are loosened.**
- **To drain high pressure brake fluid, follow the procedure under Draining of High Pressure Brake Fluid on Page 21-57.**

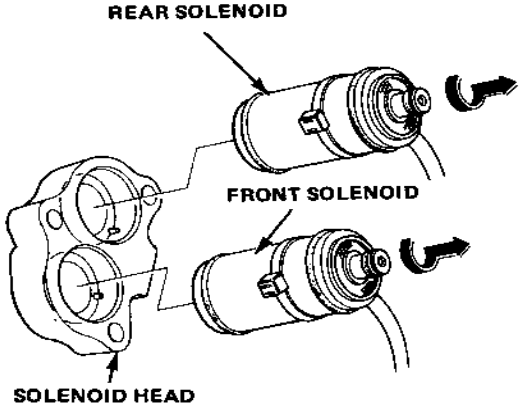
Solenoid Assy

Removal

1. Drain the brake fluid from the modulator tank.
2. Drain high pressure brake fluid (See Page 21-57).
3. Remove the modulator tank strainer, 5 mm screws and tank reservoir.
4. Remove the solenoid head by removing the 8 mm nuts with the solenoids as a unit.



5. Remove the solenoids from the solenoid head.



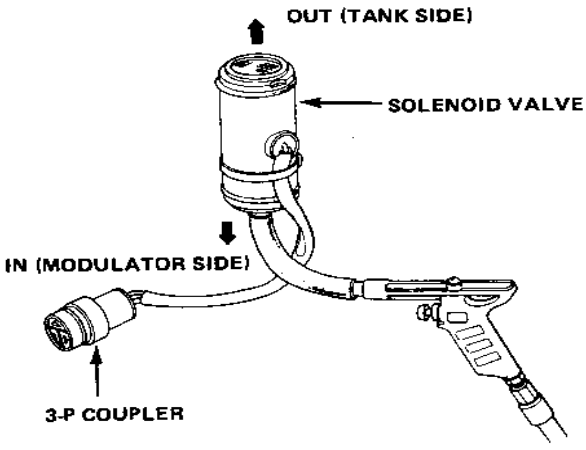
Solenoid Assy

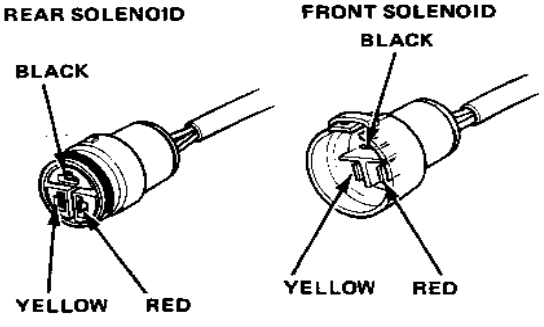
Inspection

1. Connect a tube to the inlet of the solenoid valve. Apply compressed air to the solenoid valve through the tube.

2. Check the solenoid valve for proper operation by connecting a 12 V fully charged battery to the 3-P coupler terminals:

Voltage not applied:	There should be no air flow.
Black – Red:	There should be air flow through IN and OUT.
Black – Red:	There should be air flow
Black – Yellow:	through IN.





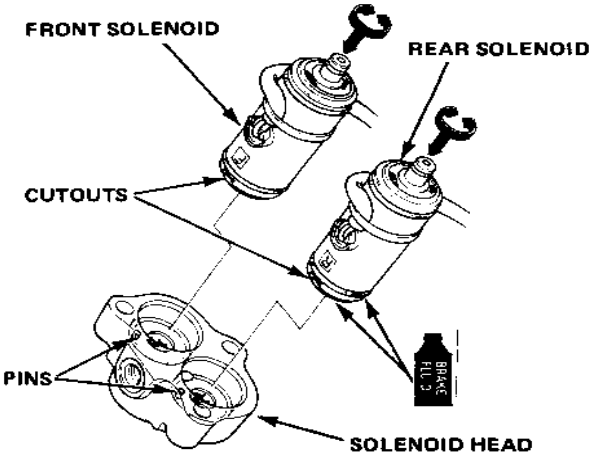
NOTE: Handle the solenoid valve with care as it may be damaged if dropped.

Reassembly

1. Dip the O-rings in clean brake fluid and install on the solenoid valves.

2. Insert the pins in the holes of the solenoid head; install the solenoid valves with the markings "F" and "R" on the solenoids aligned with the markings "F" and "R" on the solenoid head.

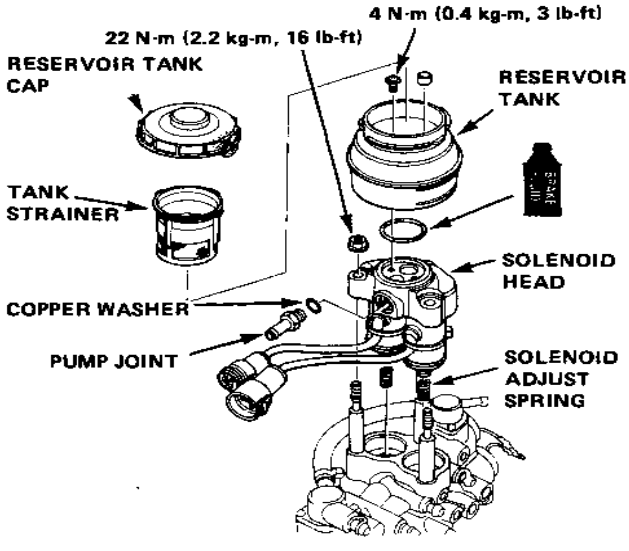
   NOTE: Align the pins with the cutouts in the solenoid valves.



WARNING: Do not interchange the front and rear solenoids in the head or the system will not work properly.

3. Install the solenoid adjust springs on the modulator.

4. Install the solenoid valve assembly.

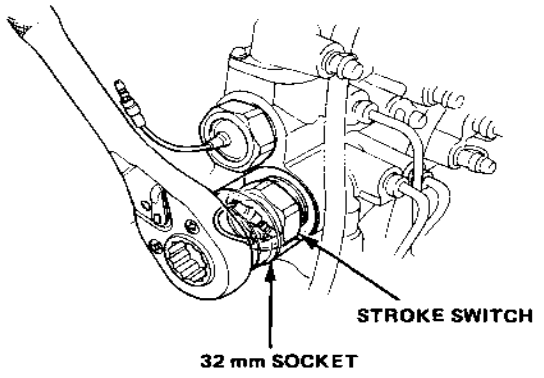


5. Install the reservoir.

Stroke Switch/Piston Comp

Removal

1. Remove the terminal from each stroke switch, and tuck it into the recess of a 32 mm socket out of way. Loosen off the switch using the socket.



NOTE: Place a pan or shop rag under the switch to receive the brake fluid drained.

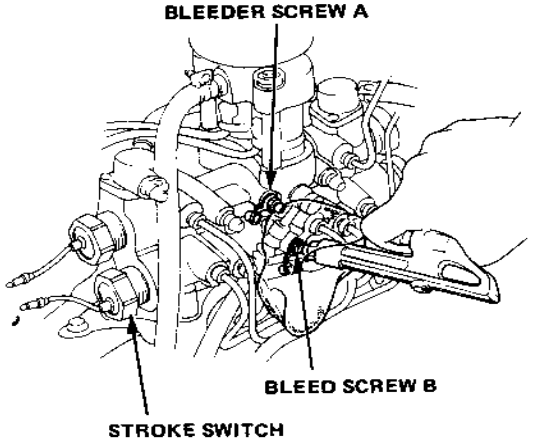
2. Screw the stroke switch into the modulator two complete turns.

3. Apply the same procedure to the remaining solenoid switches.

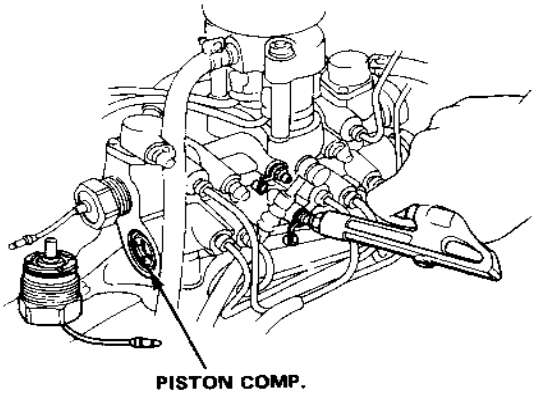
4. Loosen the bleeder screws A and B.

5. Blow air through the holes in the bleeder screws A and B for a few seconds.

NOTE: Place a shop towel around the holes as brake fluid will be blown out by the compressed air.



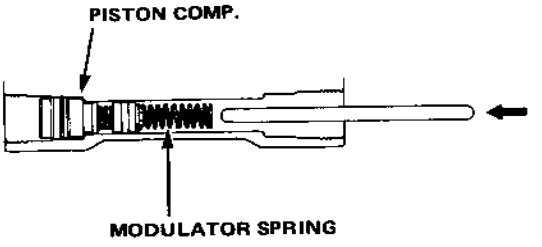
6. Remove the stroke switches and pry the pistons out with the help of the special tool Snap Ring Pliers.



NOTE: Should difficulty be encountered in removing the piston, further blow air for several seconds.

CAUTION: Place the piston end of the switch with a shop rag as the piston can be a projectile.

7. Remove the modulator spring from the cylinder.



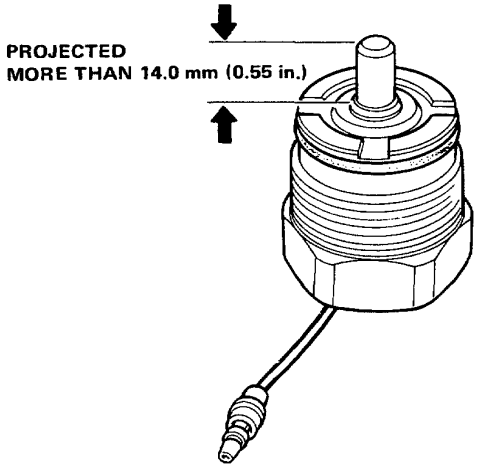
8. Press the remaining piston out using a bar with a round end as shown.

CAUTION: Take care not to damage the cylinder wall.

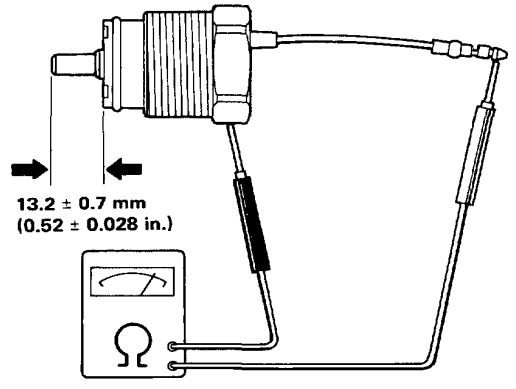
Stroke Switch

Inspection

1. Press down on the end of the piston with a finger pressure (1 kg, 7 lb). The piston should come out more than 14.0 mm (0.55 in) when released.

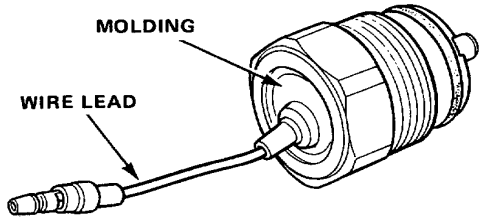


2. Check for continuity between the switch lead and body ground.
   There should be no continuity when the projected height of the piston is above 13.2 ± 0.7 mm (0.52 ± 0.028 in.). There should be continuity when the height is below 13.2 ± 0.7 mm (0.52 ± 0.028 in.).



3. Check the wire lead, body (threads) and molding for damage, cracks or other faults.

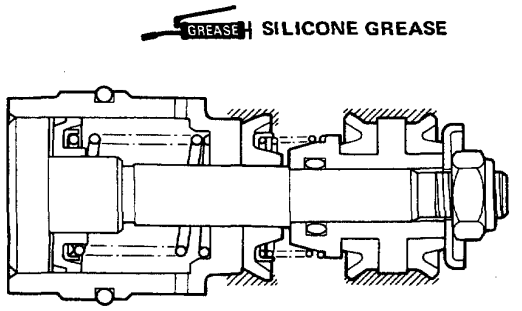
NOTE: Do not let the switch fall.



Stroke Switch/Piston Comp

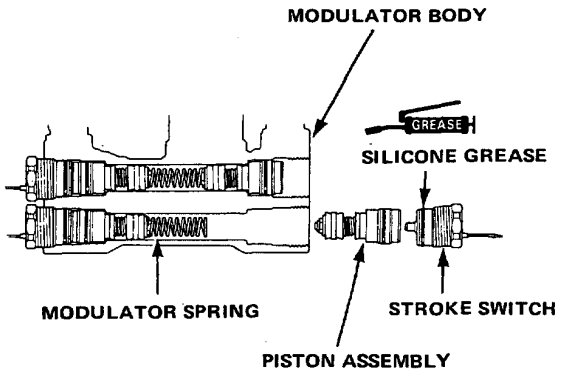
Installation

1. Apply silicone grease to the areas indicated by diagonal lines.



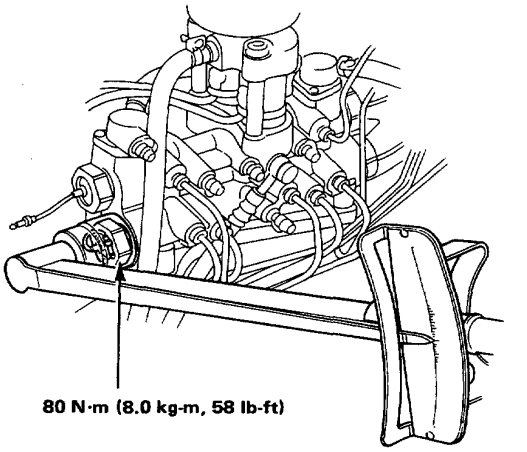
2. Insert the modulator springs in the modulator. Slide the piston assembly into the modulator, being careful not to invert the piston cup inside out.

   NOTE: Note the direction of the piston assembly.



3. Loosely install the stroke switches using a 32 mm socket.

   NOTE: Under no circumstances should an impact wrench be used in installing the switches.

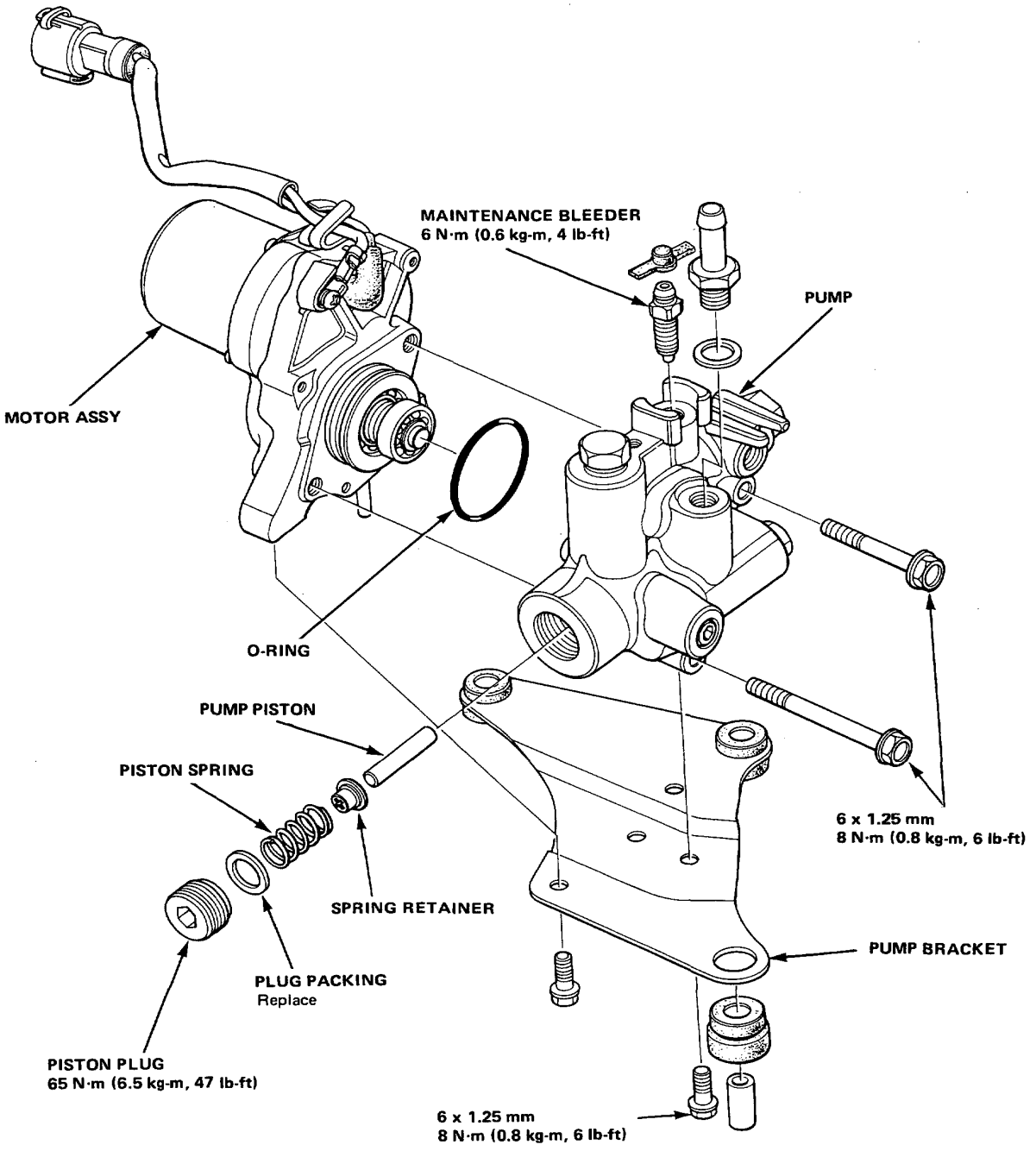


4. Tighten the stroke switches.

Pump Assy

Index/Inspection

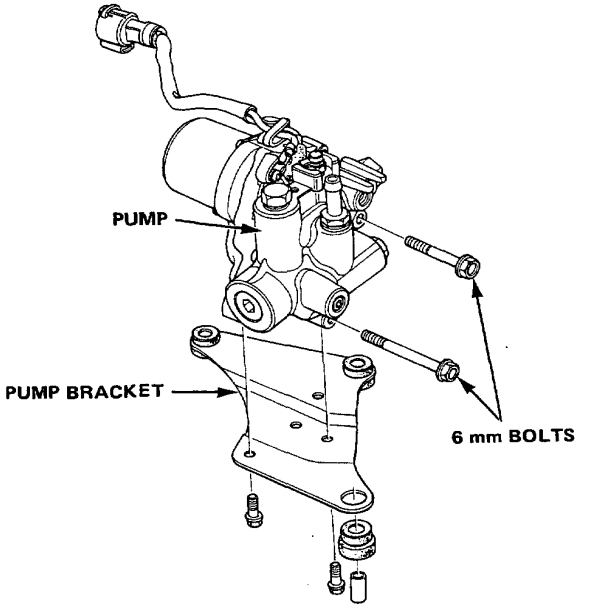
CAUTION: Do not attempt to disassemble the pump parts except for those shown exploded in this illustration.



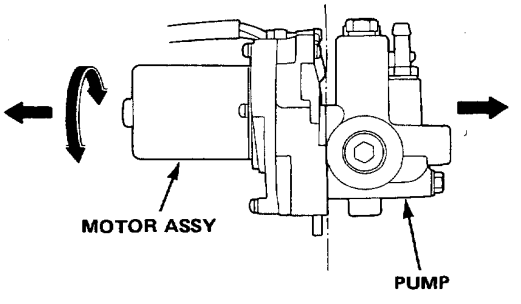
Pump Assy

Disassembly

1. Remove the pump bracket.
2. Remove the 6 mm bolts attaching the pump to the pump motor.

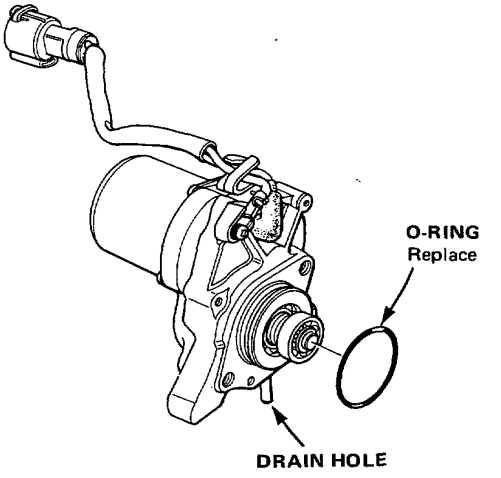


3. Separate the motor from the pump while rotating the pump right and left.



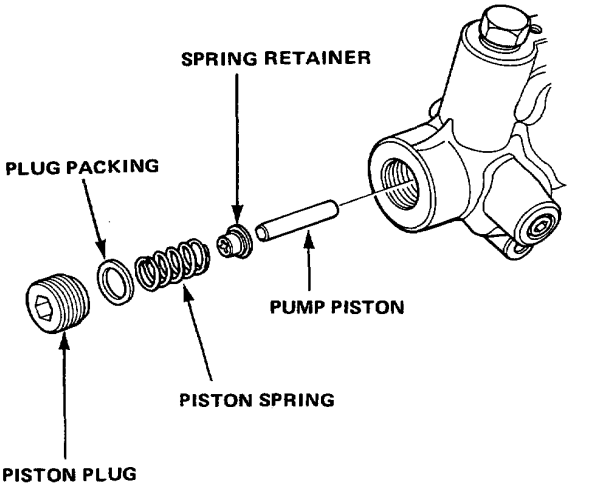
NOTE: An about 10 cc (0.6 cu-in) of brake fluid will flow out when the motor is removed from the pump.

4. Wash the motor with clean brake fluid only on the exposed end and blow dry with compressed air.



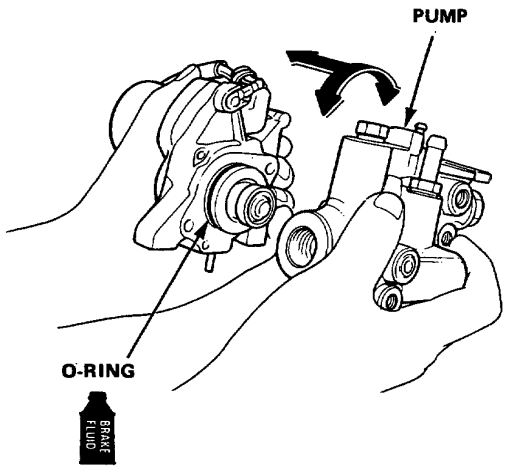
NOTE: Do not wash or dip the motor in brake fluid. Also be careful not to allow oil or water to enter the inside through the water drain hole.

5. Remove the plug and take out the packing, piston spring, spring retainer and pump piston from the pump.

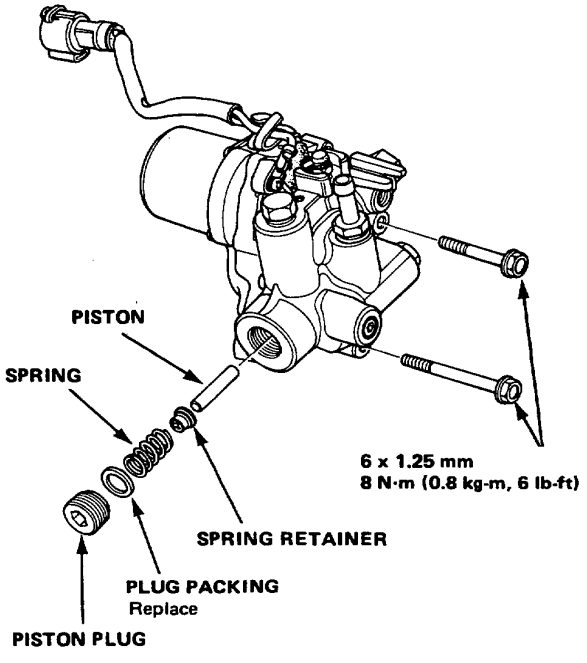


Reassembly

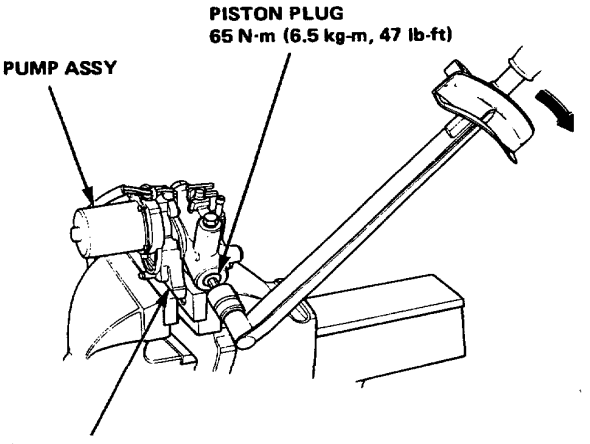
1. Install the O-ring on the pump motor.
2. Coat the O-ring with clean brake fluid and install the pump on the motor while rotating it right and left by hand.



3. Install the 6 mm bolts and tighten.

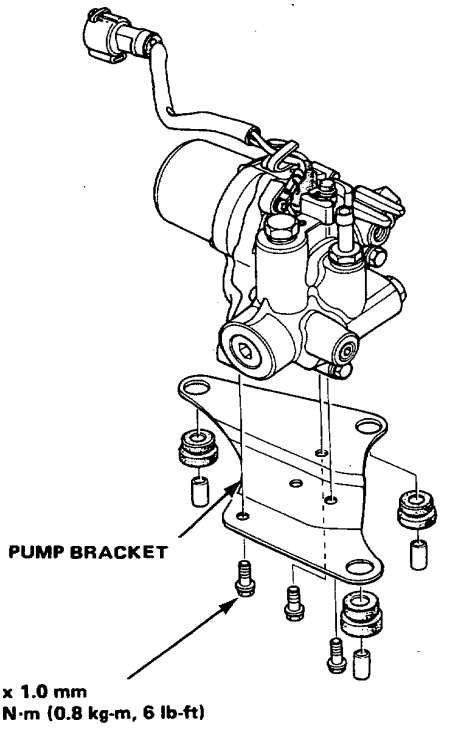


4. Insert the piston, spring retainer, spring, packing and piston plug into the pump. Loosely install the piston plug.
5. Place the pump in a vise as shown and tighten the piston plug.



NOTE: Do not place the pump in a vise at locations other than shown above.

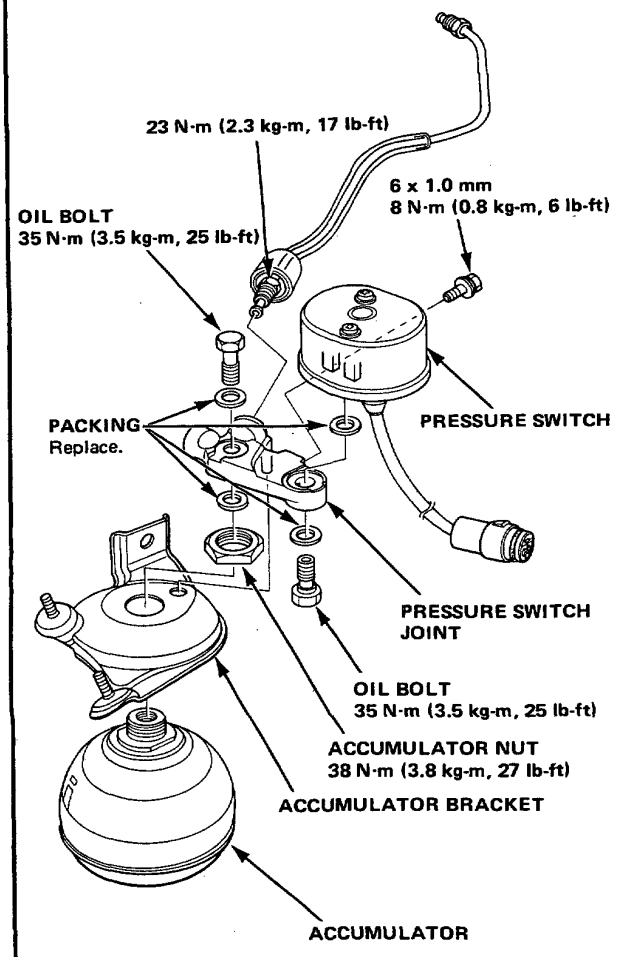
6. Install the pump bracket.



Accumulator/Pressure Switch

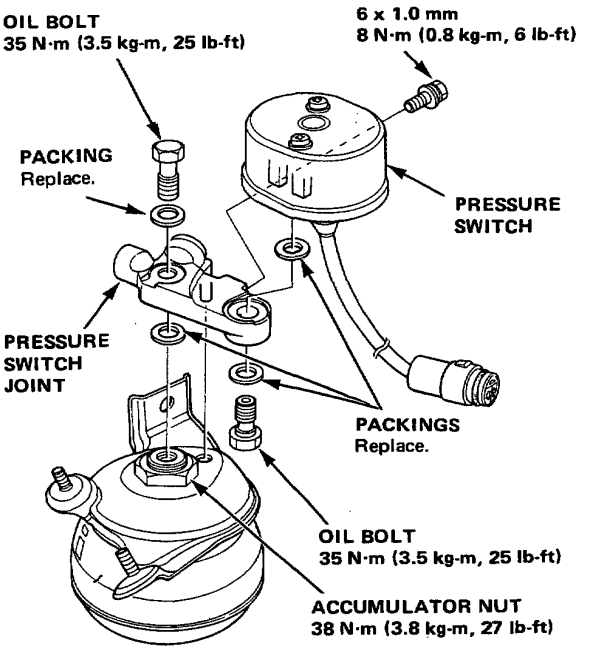
Index/Inspection

CAUTION: Do not spill brake fluid on painted surfaces as severe damage can result. Wipe up spilled fluid at once and rinse well with clean water.

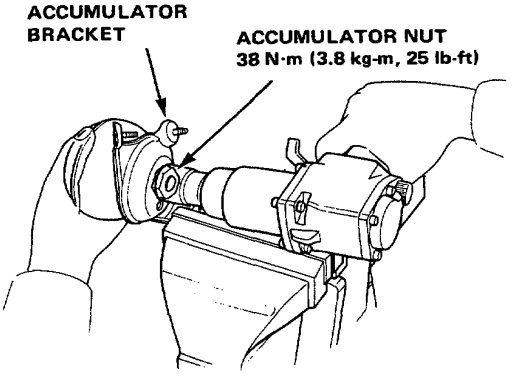


Disassembly/Assembly

1. Remove the drain bolt from the accumulator.
2. Remove the pressure switch from the pressure switch joint.



3. Place the accumulator in a vise on its bracket and remove the accumulator nut from the accumulator with an impact wrench and a 27 mm socket.



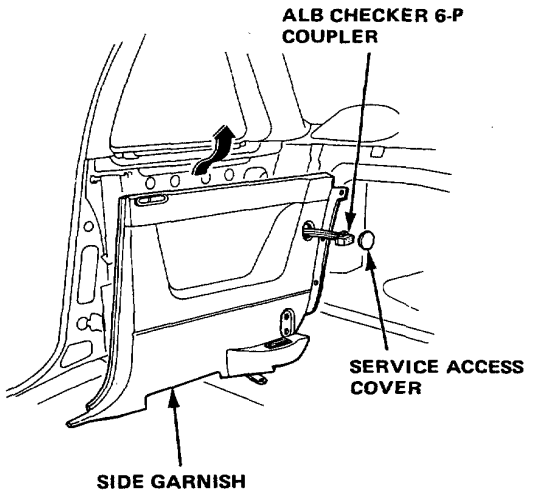
NOTE:
- Hold the accumulator by hand while removing the nut.
- Do not overtighten the vise jaws or the accumulator bracket will be distorted.
- Use a torque wrench to tighten the nut.

Control Unit/Fail-Safe Relay

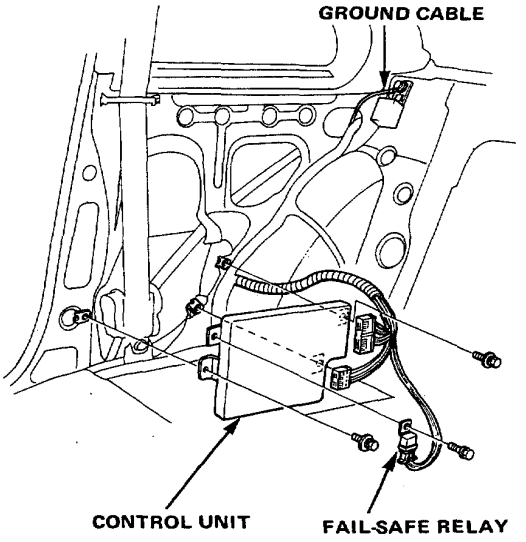
Removal/Installation

1. Remove the seat cushion (Page 22-27).
2. Remove the seatback and rear seat headrest (Page 22-28).
3. Remove the side garnish.

   NOTE:
   - Remove the ALB checker 6-P coupler from the service access cover.
   - To remove the side garnish, pull it up while pulling it backward.



4. Disconnect the ground cable.
5. Remove the fail-safe relay and control unit.



   NOTE: Handle the control unit with care.

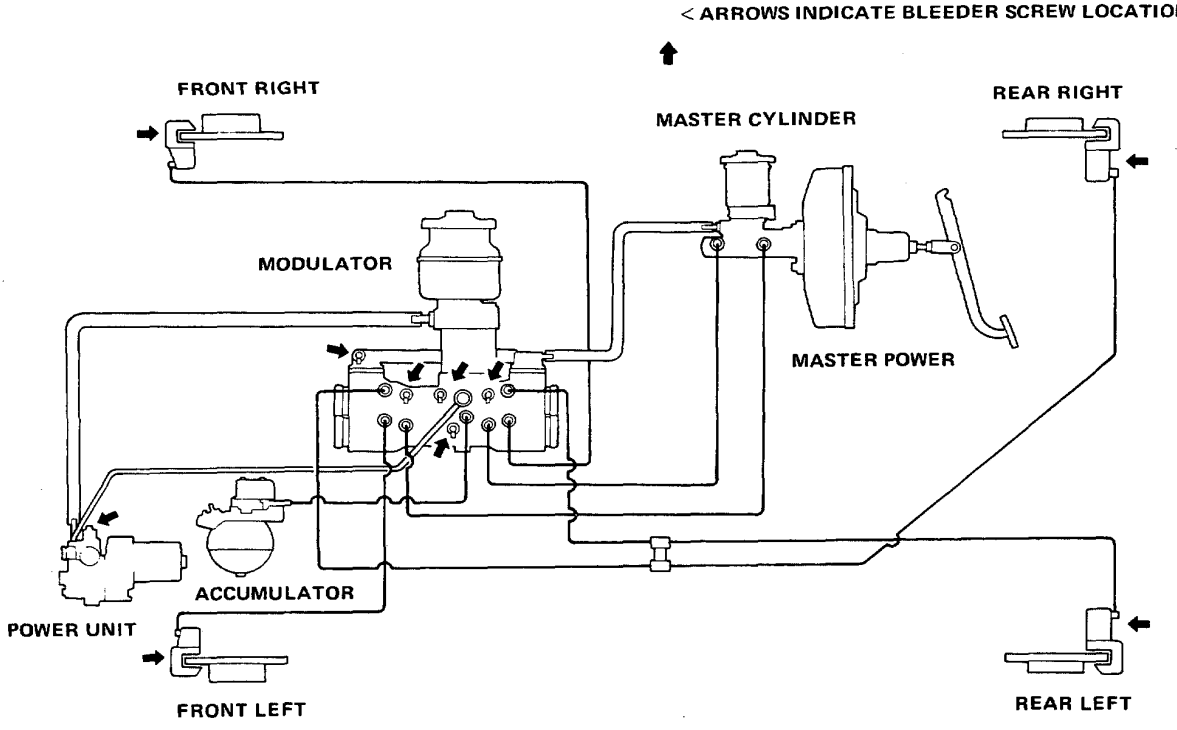
6. The installation sequence is essentially the reverse order of removal.

4W-ALB (4-Wheel Anti-Lock Brake) SYSTEM

Air Bleeding

Air must be bled from the two hydraulic systems:

- Main hydraulic brake system
- ALB control hydraulic system



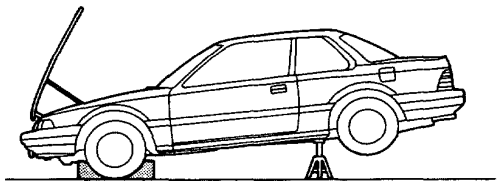
NOTE:

- ALB equipped models have a modulator inserted in the circuits between the master cylinder and individual wheel cylinders in place of the proportioning valves. To bleed air from the systems, it is essential that the five bleeders on the modulator be loosened in the specific ways.
- The description which follows relates mainly to manual bleeding, with added notes and explanations on Hondaline vacuum changer (07468–0010001) and pressure type changer which is commercially available for the purpose.

Main Hydraulic Brake System

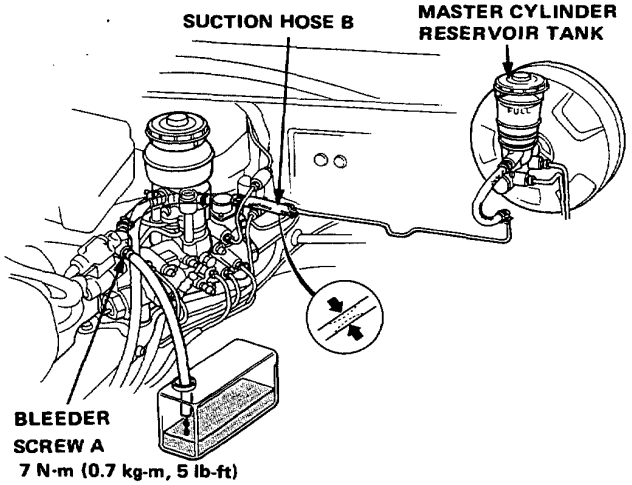
Air Bleeding (manual)

1. With the front wheels blocked, raise the rear of car and support with safety stands in proper locations.



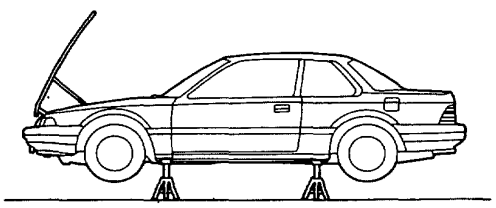
NOTE: On manual transmission models, shift the transmission in R. On automatic transmission models, shift the transmission in P. Be sure to block the front wheels.

2. Fill the master cylinder reservoir with recommended brake fluid up to MAX mark.



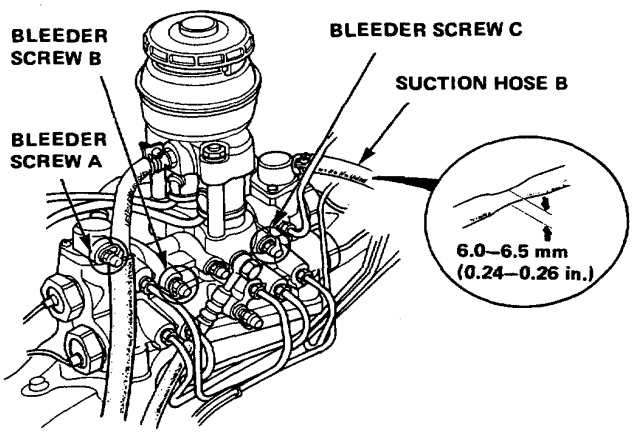
3. Turn the modulator bleeder screw A out about 3 turns.

4. Retighten the bleeder screw A after being sure that there is no air in the suction hose B by pinching it with fingers several times.



5. Raise the front of car and support with safety stands in proper locations.

6. Bleed air by loosening the bleeder screws B and C.



7. Have someone get into the car and pump the brake pedal several ten times with full strokes. Stop pumping and keep the brake pedal down when the fluid starts to flow from the bleeder screws.

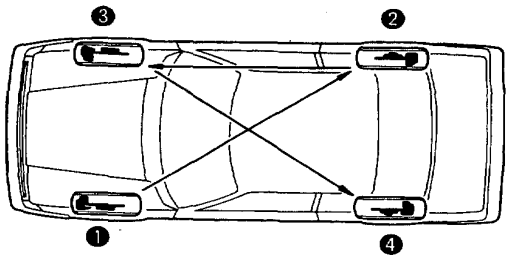
   NOTE: Pump the brake pedal more slowly than on models not equipped with ALB system.

8. Continue pumping until the fluid flows out in a solid stream that is almost free of air bubbles.

   NOTE: Pinch the suction hose B to 6.0–6.5 mm (0.24–0.26 in.) as shown.

9. Bleed air from each wheel cylinder.

Bleeding Sequence



10. Loosen the bleeder screw about 2 turns and pump the brake pedal slowly. When the fluid starts to flow in a solid stream, pump several times with full strokes and tighten the bleeder screw with the pedal held down.

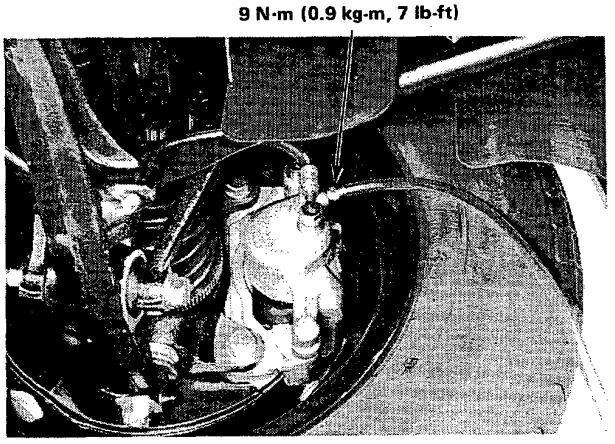
Main Hydraulic Brake System

Air Bleeding (manual)

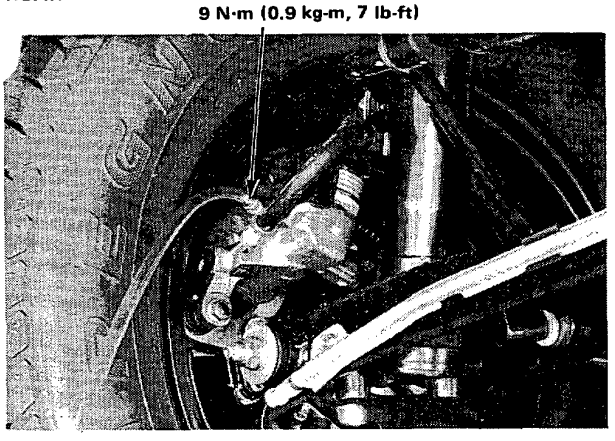
11. Loosen the bleeder screw. Retighten the bleeder screw after the fluid stops flowing out. Repeat the operation until the fluid flows out in a solid stream that is free of air bubbles.

12. Repeat the operation at the other wheel cylinders.

FRONT



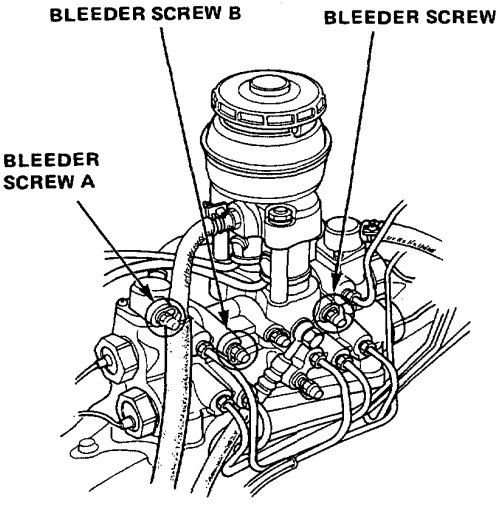
REAR



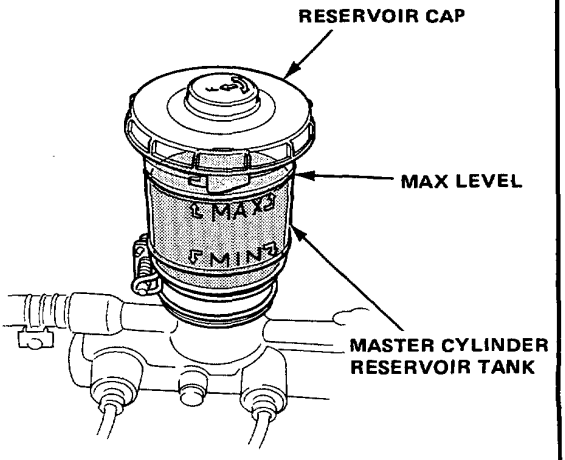
13. Bleed air from the bleeder screws B and C.

14. Have someone pump the brake pedal several times, then hold the pedal down to the floor.

15. Retighten the bleeder screws B and C when the fluid flows in a solid stream that is free of air bubbles.



16. Fill the master cylinder reservoir to the MAX level.



17. Install the reservoir cap with the mark "F" facing the front.

NOTE: The ALB system may still not function properly.

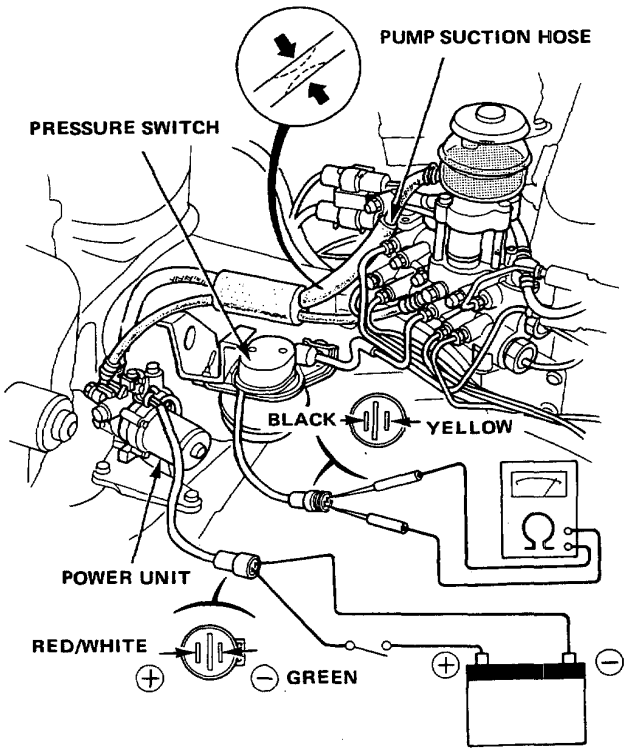
18. Road test to see if the brakes are operating properly.

19. After bleeding the ALB system, check its function (Page 21-43).

ALB Control Hydraulic System

Air Bleeding (manual)

1. Fill the modulator reservoir up to the MAX level.
2. Bleed air from the ALB system until there is no air in the pump suction hose. To check, pinch the hose with your fingers.



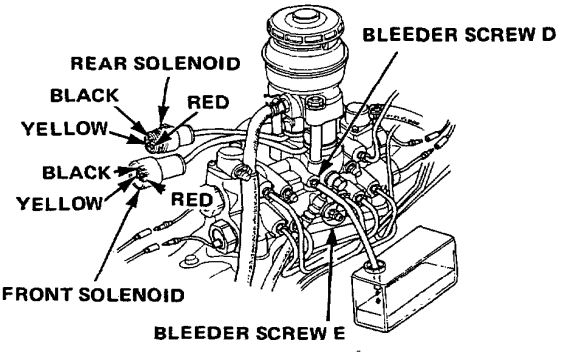
3. Connect the probes of an ohmmeter to the BLACK and YELLOW terminals of the accumulator pressure switch coupler (PINK).
4. Connect the positive lead of a battery to the RED/WHITE terminal of the power unit motor coupler (YELLOW), and negative lead to the GREEN terminal, with a battery switch next to the positive battery terminal as shown.

   NOTE: Use a fully charged 12 V battery.
5. Check for continuity by turning the switch ON for 4 seconds.
6. Bleed air from the circuit between the accumulator and modulator.

   NOTE: Air can be bled by operating the solenoids, or by loosening the bleeder screws D and E.

- Bleeding with solenoids

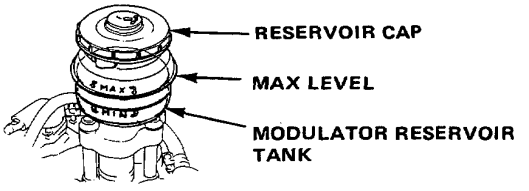
1) Apply 12 V across the BLACK and RED terminals of the solenoid coupler (PINK) (front or rear).
2) Turn the battery switch off when the fluid coming up into the reservoir is free of air bubbles (about 4–5 minutes).
3) Repeat the steps 5, 6-1 and 6-2 three times.



- Bleeding with bleeder screws D and E

4) Connect the positive lead of a fully charged battery to the RED and YELLOW terminals of the solenoid coupler (PINK), and negative lead to the BLACK terminal.
5) Loosen the bleeder screws slightly:
   Front solenoid . . . . . Bleeder screw E
   Rear solenoid . . . . . Bleeder screw D
6) Tighten the bleeder screws when there is no air in the fluid flowing out of the bleeder screws.

7. Perform the Step 5 and reconnect the coupler.
8. Fill the modulator reservoir up to the MAX level.



9. Install the reservoir cap with the mark "F" facing the front.
10. Check the operation of the ALB system (Page 21-44).

Air Bleeding (with a pressure changer)

The numbers (1) thru (7) indicate the bleeding sequence.

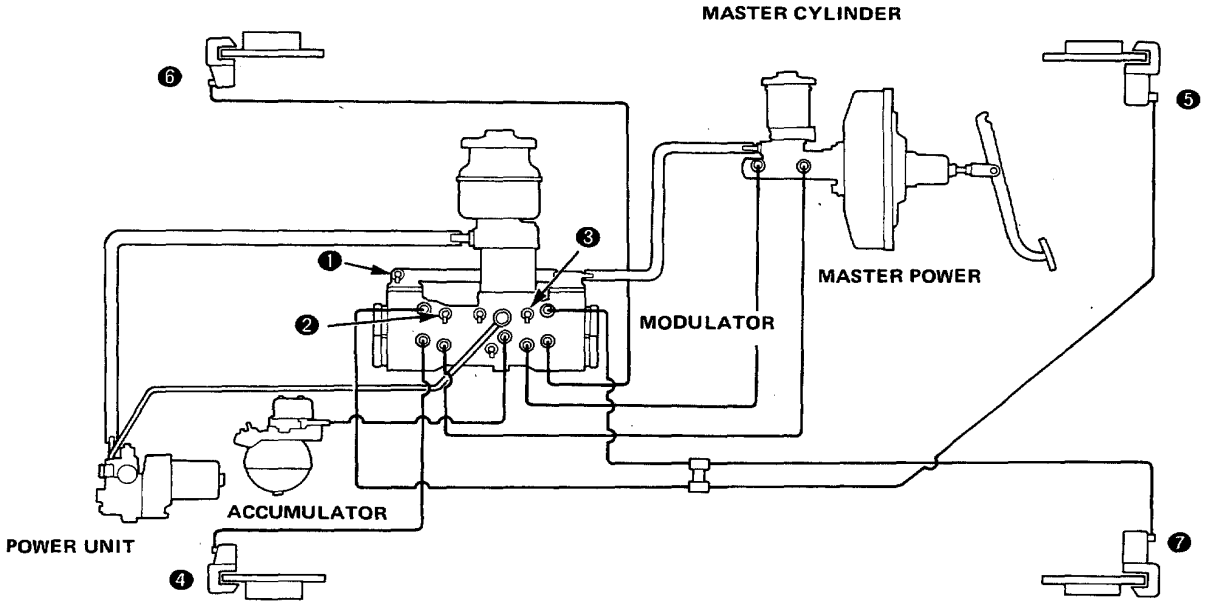
Main brake system:

1. Fill the master cylinder reservoir up to level 50 mm from the bottom.
2. Install the changer.

   NOTE:
   - Follow the changer manufacturer's instructions.
   - Make sure that there are no fluid leaks past the pipe joints or connections by operating the changer.
3. If the fluid flowing out of the bleeder screws (2) and (3) still contains bubbles after 10 times of loosening/tightening, air must be bled through the bleeders (4) thru (7) before continuing bleeding.

ALB control system:

1. Install the changer on the modulator reservoir tank.
2. Follow the steps described in page 21-73 except for the step 2 "Pinching Suction Hose" to feel presence of air in the hose.



Air Bleeding (with a vaccum changer)

The numbers (1) thru (7) indicate the bleeding sequence.

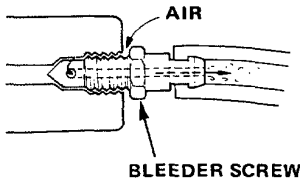
Main brake system:

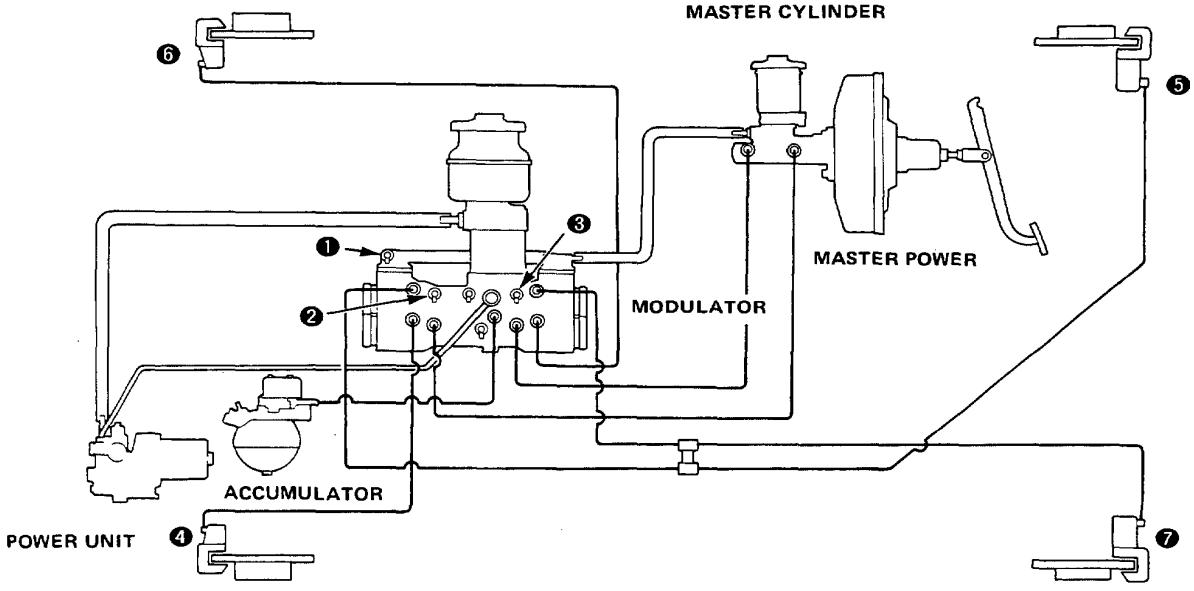
1. Fill the master cylinder reservoir up to the proper level.
2. Install the changer.
3. Close the changer valve when the level of the fluid in the reservoir falls 1 cm.

   NOTE: Air will be sucked in through the bleeder screw when the vacuum valve is fully opened. To cope with this, open the valve slightly so that the least possible amount of fluid is sucked in by the changer. Before closing, have someone pump the brake pedal to make sure there is no air in the system.

ALB control system:

Follow the steps for manual bleeding on page 21-73.



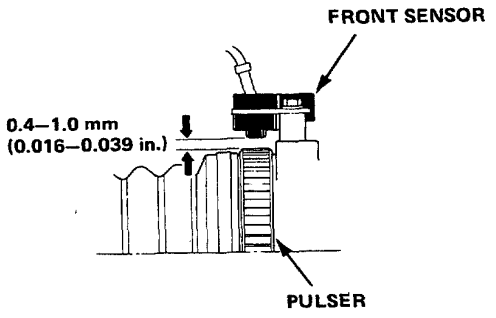


Pulsers/Sensors

Inspection

Front

1. Check the pulser for chipped or damaged teeth and replace if necessary (Page 21-78).



2. Measure air gap between the sensor and pulser all the way around while rotating the driveshaft by hand.

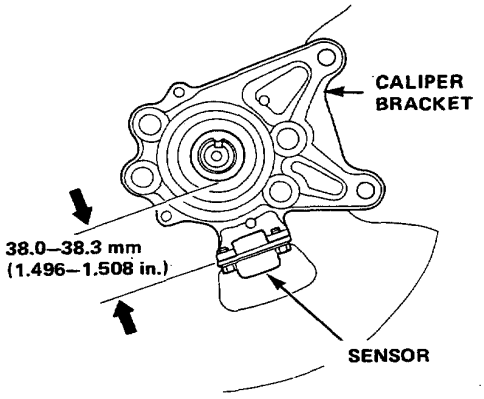
   STANDARD: 0.4–1.0 mm (0.016–0.039 in.)

   NOTE: If the gap exceeds 1.0 mm (0.039 in.), the probability is a distorted knuckle which should be replaced.

Rear

NOTE: Follow the steps described below as the air gap between the pulser and sensor cannot be measured.

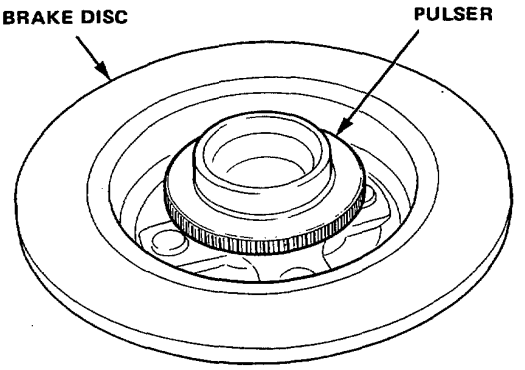
1. Remove the rear wheels.
2. Remove the caliper protector, parking brake cable and caliper, then remove the brake disc (Pages 20-26, 21-23).



3. Measure the distance between the sensor and hub carrier bearing as shown.

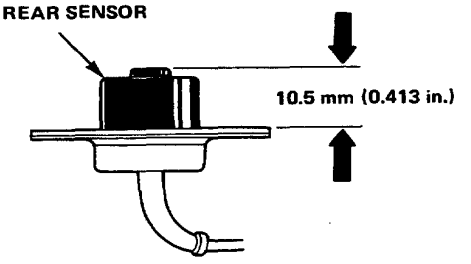
   STANDARD: 38.0–38.3 mm (1.496–1.508 in.)

4. Inspect the pulser for chipped or damaged teeth and replace if necessary (Page 20-26).



5. Measure the height of the sensor.

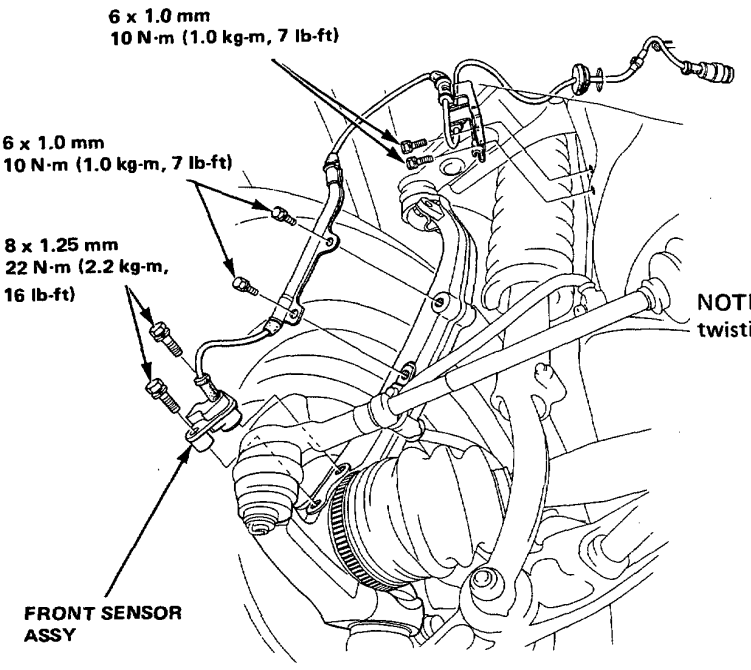
   STANDARD: 10.5 mm (0.413 in.)

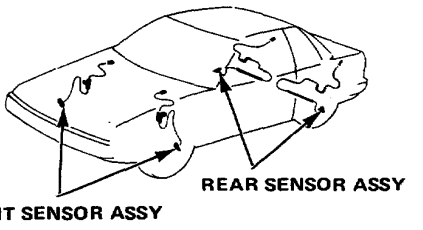


NOTE: Replace the sensor with a new one if the height is below the specified value.

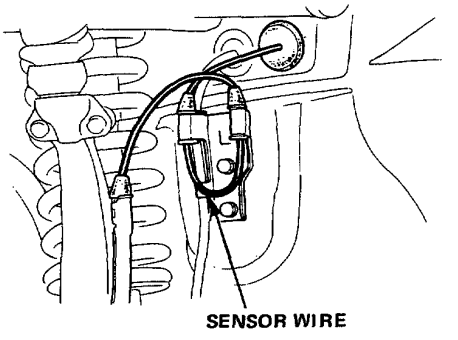
Sensors

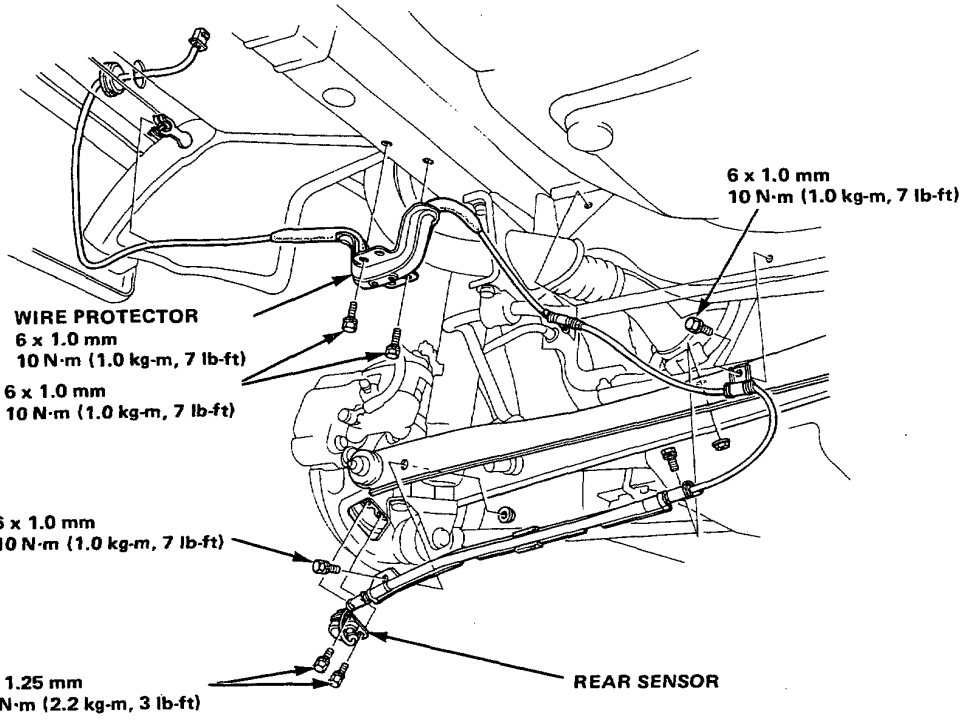
Front Sensor Replacement





NOTE: Be careful when installing the sensors to avoid twisting the wires using the white line as a guide.



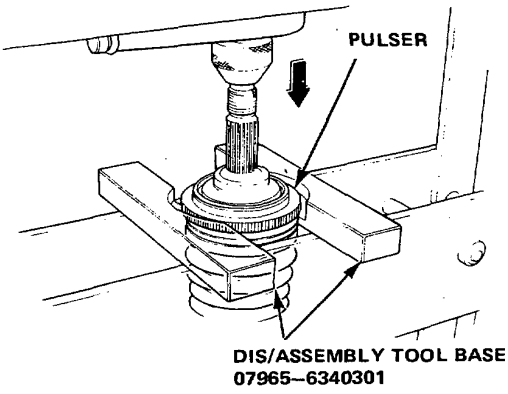


Pulser

Replacement

Front

1. Remove the drive shaft (Page 17-2).
2. Press the pulser off the drive shaft using special tool Hub Dis/Assembly Tool Base A and a hydraulic press as shown.

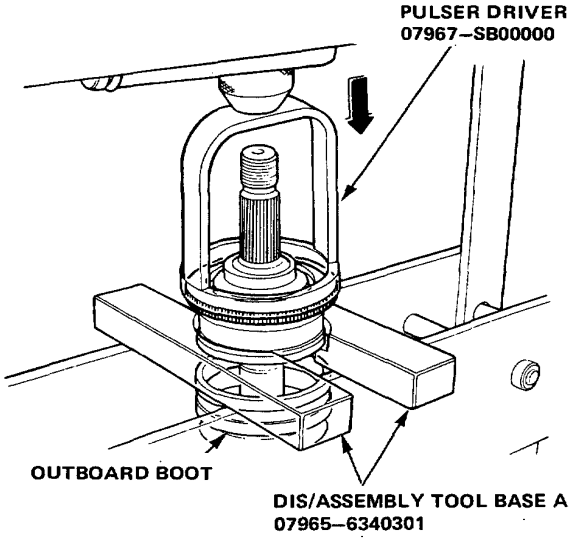


NOTE: The drive shaft will drop when it clears of the pulser.

3. Remove the boot band A and slide the outboard boot down out of way. Set the outboard joint on the special tool Hub Dis/Assembly Tool Base A.

NOTE: Thoroughly clean the pulser attaching surface.

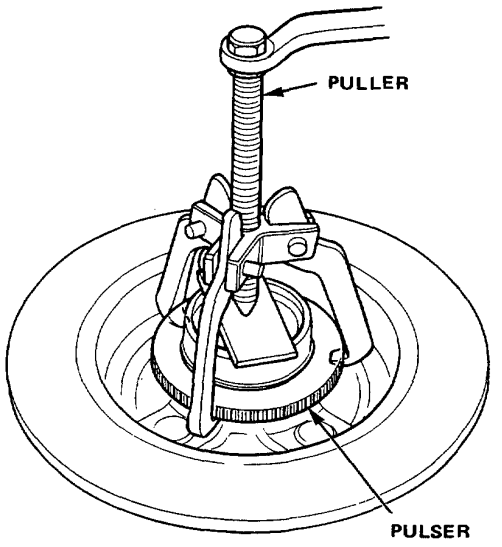
4. Press the front pulser onto the drive shaft using the special tool Pulser Driver and a hydraulic press.



5. Reinstall the boot band.

Rear

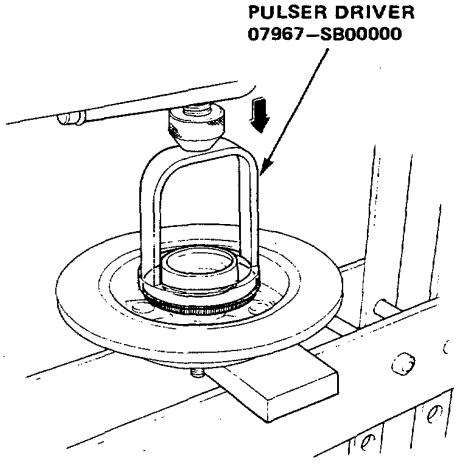
1. Remove the rear brake disc (Page 20-26, 21-23).



2. Remove the rear pulser from the brake disc using a bearing remover.

NOTE: Before installation, clean the attaching surface thoroughly.

3. Press the rear pulser onto the brake disc using the special tool Pulser Driver and a hydraulic press.

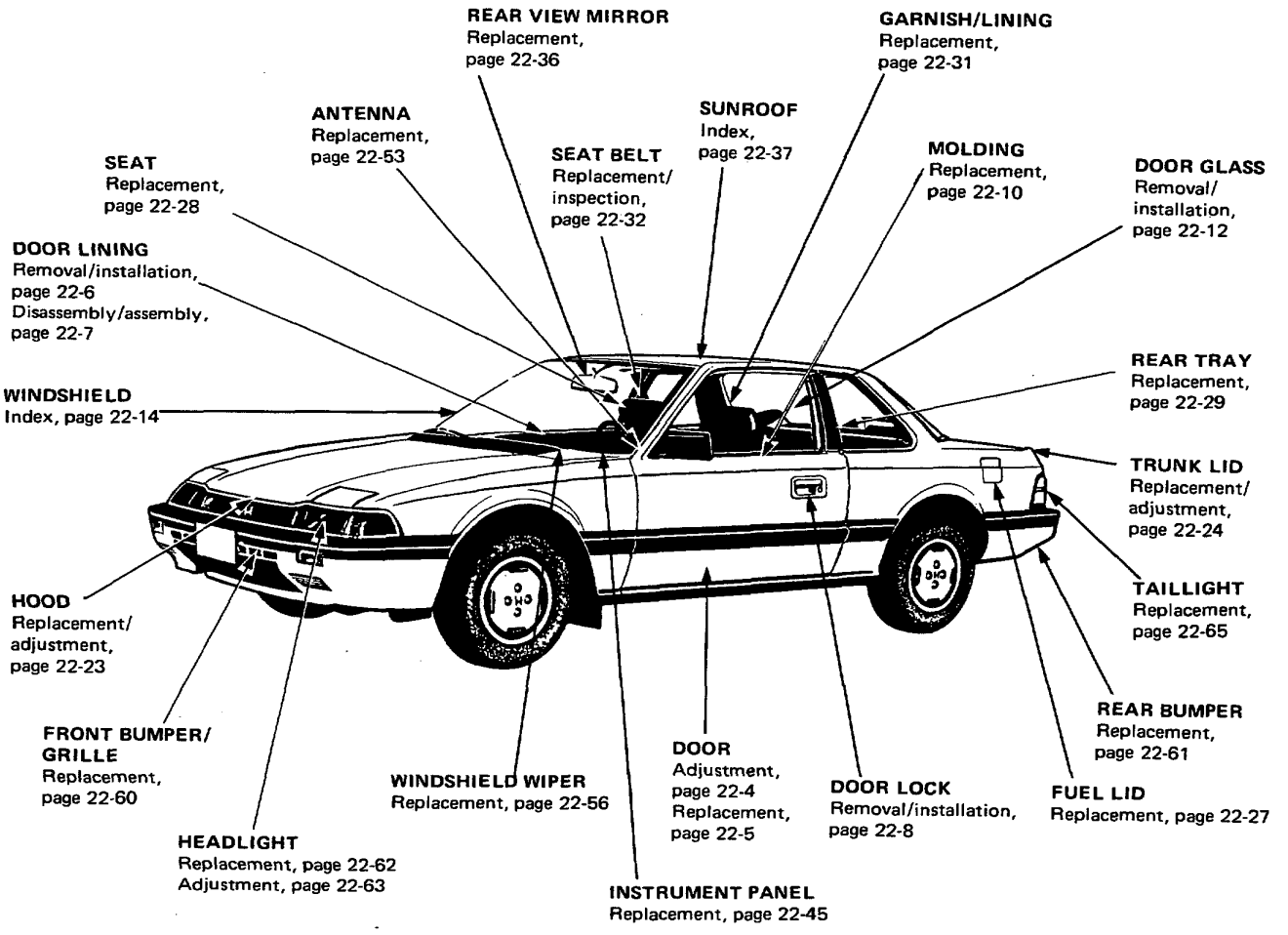


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Door

Troubleshooting

Abnormal noise when opening or closing door
- Door hinges starved of lubrication
- Foreign matter inside door

Excessive play in door
- Faulty door lock
- Improperly installed door striker
- Improperly adjusted door stopper
- Loose door hinge
- Deteriorated door seal

Door cannot be closed
- Faulty door lock
- Improperly installed door striker
- Improperly adjusted door stopper

Door cannot be opened
- Faulty door lock
- Improperly installed inside door handle cable

Door is not aligned with door opening
- Improperly installed door hinges
- Improperly installed door striker

Door glass moves but sluggishly
- Regulator not lubricated
- Weatherstrip stuck between glass and door sash
- Distorted or improperly installed door sash
- Run channel stuck between glass and door

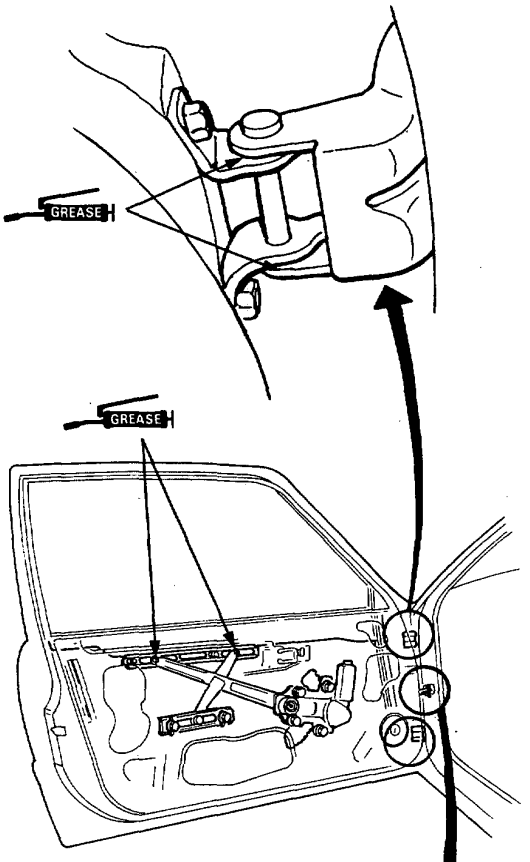
Excessive play in door glass
- Loose mounting bolts
- Loose door sash
- Loose regulator
- Deteriorated run channel

Water leak or excessive wind noise
- Regulator not installed properly
- Deformed weatherstrip
- Deformed run channel
- Deformed door seal
- Separated door hole seal
- Door not installed properly

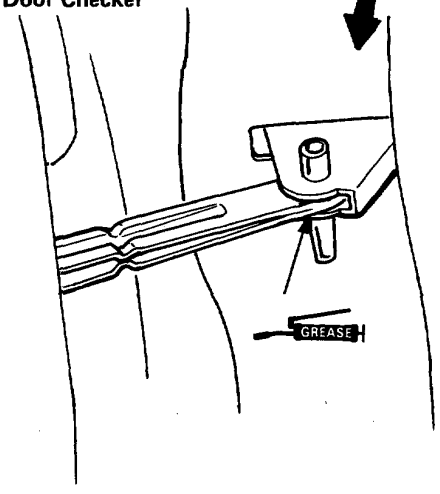
Lubrication Points

Apply grease at the time of inspection. At this time, remove excessive grease.

Door Hinge



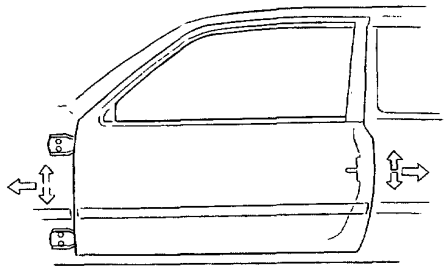
Door Checker



Door

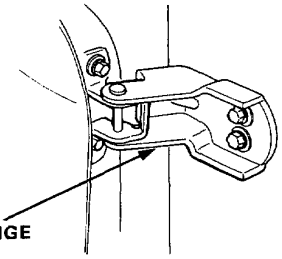
Door Position Adjustment

Body press line deviation and fender gap adjustment



Adjust door fit at the upper and lower hinges as shown.

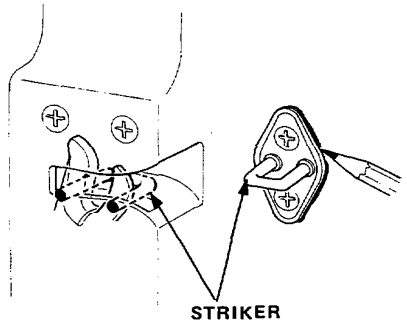
1. Remove the front inner fender.
2. Before loosening the hinge bolts, draw a line around the hinge for reference.



3. Place a jack under the bottom edge of the front door.

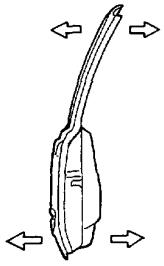
   NOTE: Place a rag or shop towel on the jack to prevent damage to the door when the hinge bolts are loosened.
4. Loosen the hinge bolts slightly and move the door up or down, or back or forth.
   Then lightly tighten the bolts and recheck. If the door fits properly, tighten the bolts securely.
5. Remove the jack and adjust the door striker.
6. Recheck door fit.

   NOTE: Make sure that the door is flush with the body with equal gap between the front and rear, and top and bottom door edges and body.



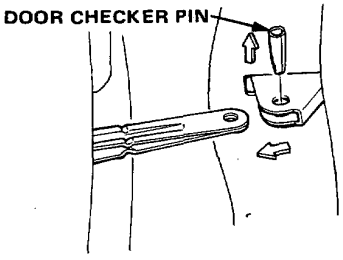
7. Repeat the step (2) thru (6) if necessary.

Body press line deviation and body step adjustment

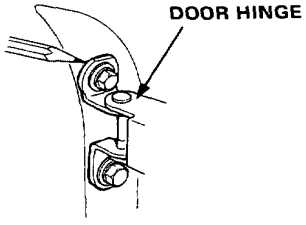


Adjust door fit at the upper and lower hinges as shown.

1. Punch the door checker pin with a hammer.



2. Draw a line around the hinge for reference.

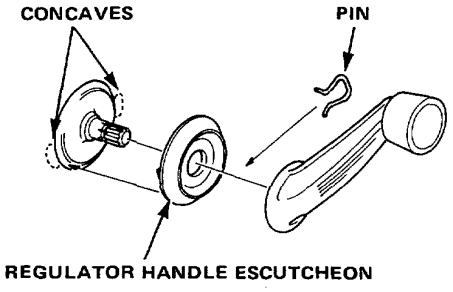


3. Place a jack under the bottom edge of the front door.

   NOTE: Place a rag or shop towel on the jack to prevent damage to the door when the hinge bolts are loosened.
4. Loosen the hinge bolts slightly and move the door up or down, or back or forth.
   Then lightly tighten the bolts and recheck. If the door fits properly, tighten the bolts securely.
5. Remove the jack and adjust the door striker.
6. Recheck door fit.

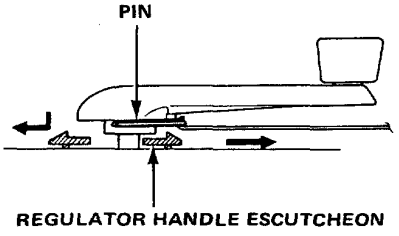
   NOTE: Make sure that the door is flush with the body with equal gap between the front and rear, and top and bottom door edges and body.
7. Repeat the step (2) thru (6) if necessary.

Regulator Handle Removal /Installation



Removal

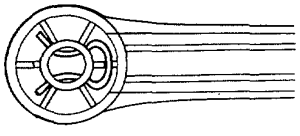
- Slide the regulator handle escutcheon and pull the clip off the regulator handle with a wire hook.

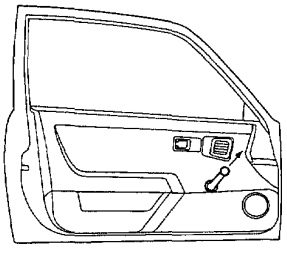


Installation

1. Roll window glass down fully.
2. Install the pin in the regulator handle.
3. Install the handle on the regulator shaft.

NOTE: Install the handle so that it is at 45° forward with the window closed.

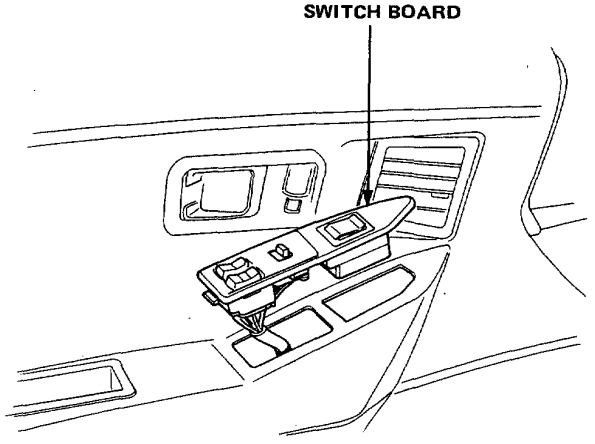




Power Window Switch Replacement

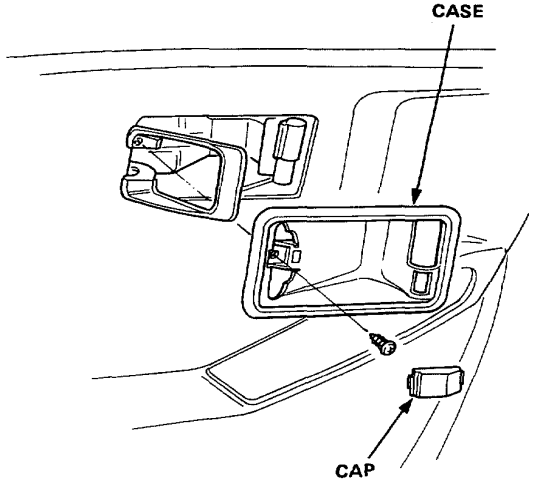
Remove the switch board carefully to avoid damaging it.

NOTE: When removal is difficult, remove the door panel for the removal.



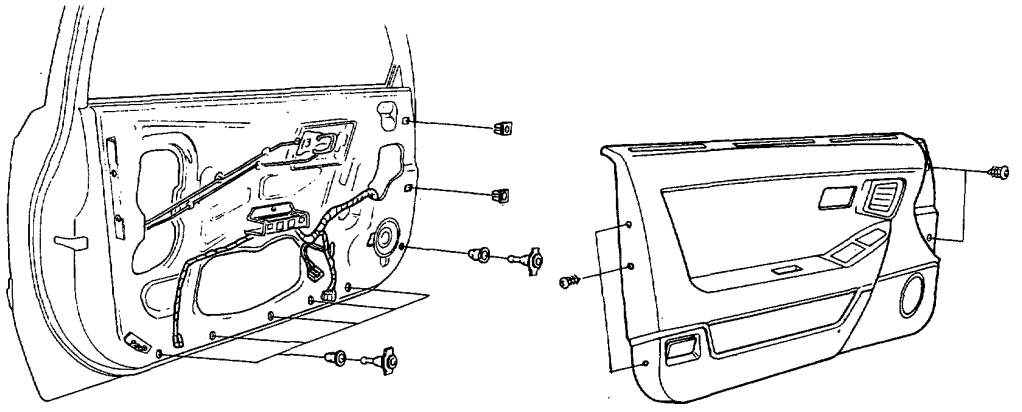
Inside Handle Case Replacement

Remove the cap from the case and remove the screw. Then pull the handle and remove the case.



Door

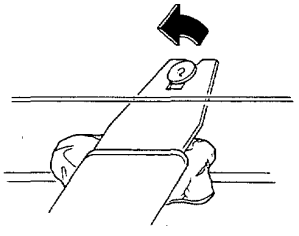
Door Lining Removal/Installation

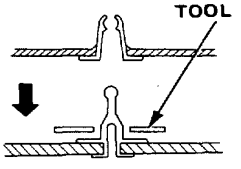


Removal

1. Remove the regulator handle or the power window switch.
2. Remove the inside handle case.
3. Remove the screws of the front and rear of the lining.
4. Remove the lining from the door. To remove, insert the tool between the door and panel, slide it around the edge of the door panel until it hits a retainer clip, then pry up to remove the clip.

   NOTE: Do not pull the door panel off the door with force.

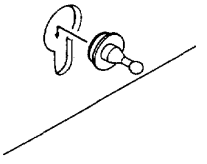


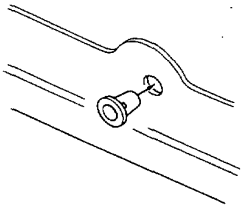


Installation

1. Install the clips on the door and door lining and install the lining by driving with a soft hammer.

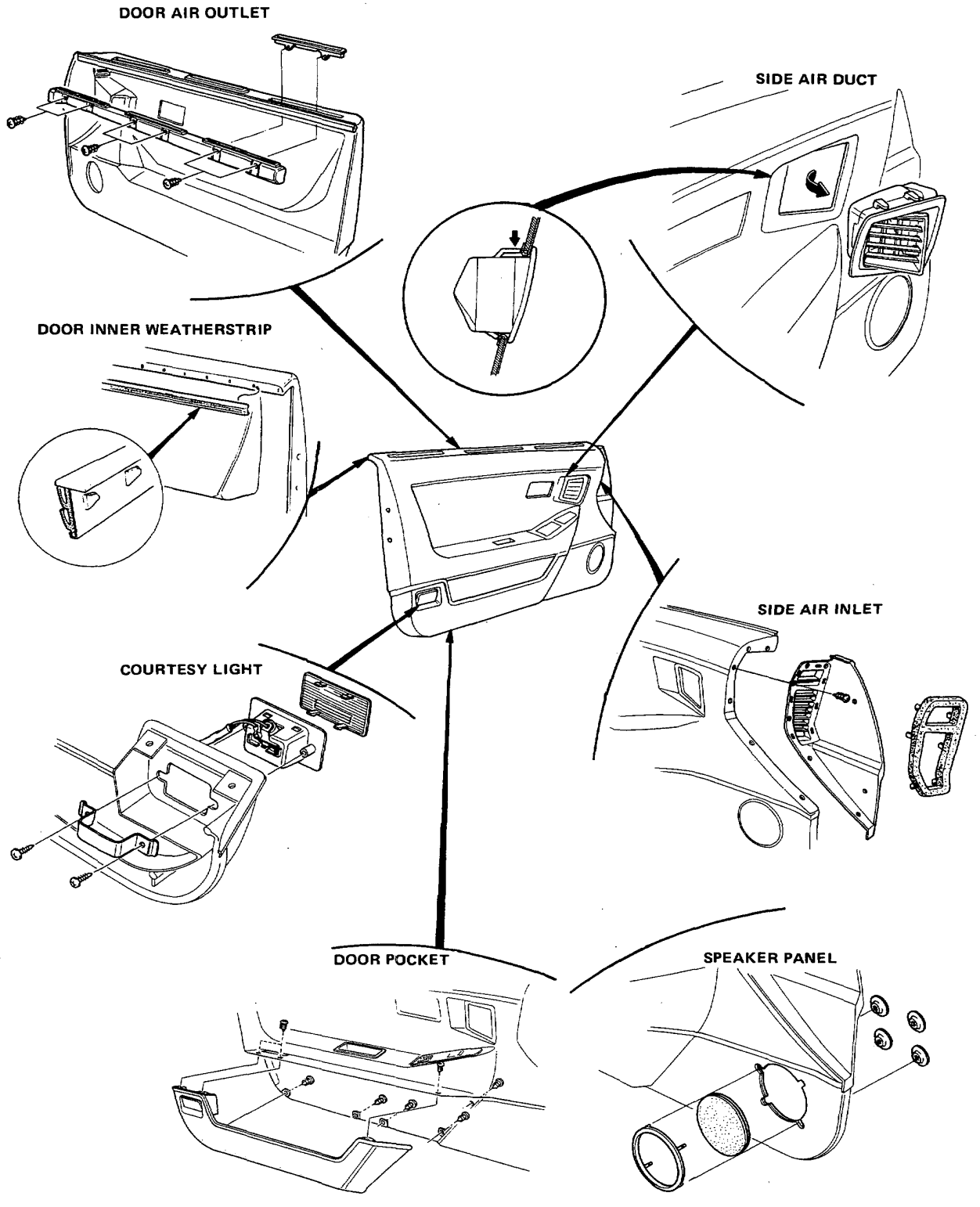
   NOTE: Make sure that the lining is installed properly without lifting.





2. Install the screws of the front and rear of the lining.
3. Install the inside handle case.
4. Install the regulator handle or the power window switch.

Door Lining Disassembly/Assembly



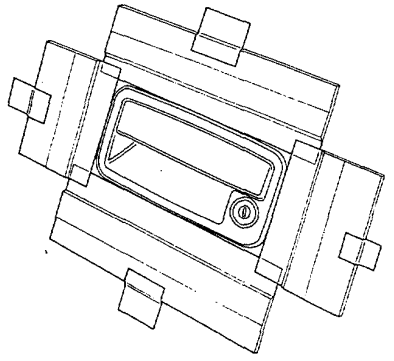
Door

Door Lock Removal/Installation

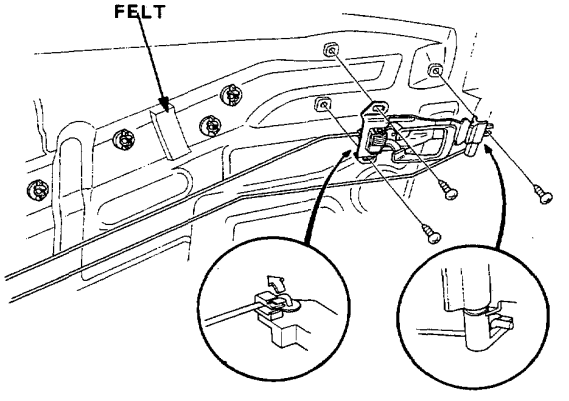
CAUTION: Work with extreme care to prevent damage to the painted surfaces of the body.

Removal

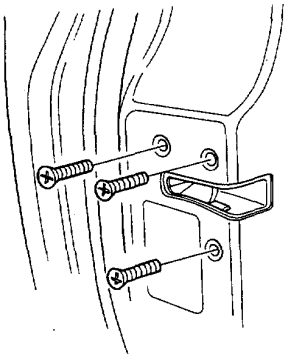
1. Use adhesive cloth tape to attach cardboard around the door handle.



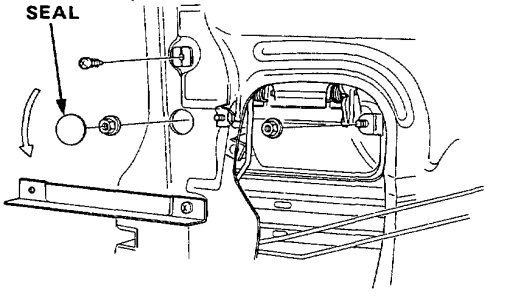
2. Remove the door lining.
3. Remove the inner handle.



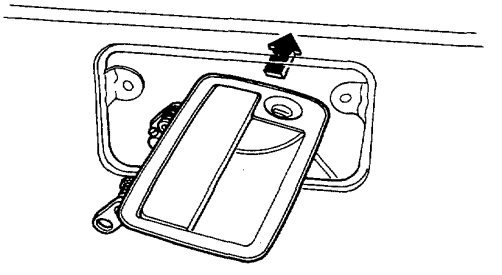
4. Remove the screws and the door lock.



5. Remove the outer handle mounting nut.



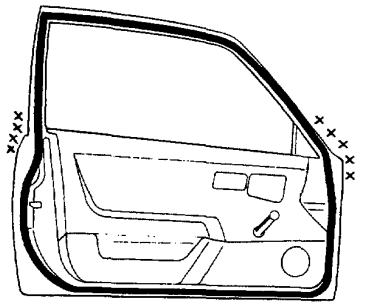
6. Remove the screw part of the outer handle from the door panel.
   Remove the lock mechanism through the door hole so that the screw of the joint bushing of the outer handle will not be turned.



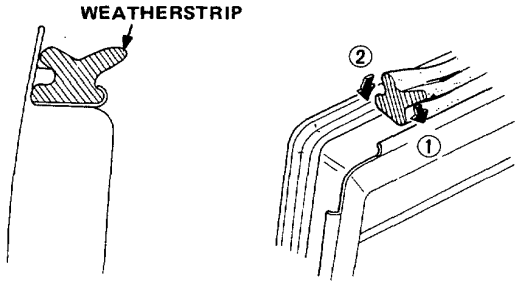
Installation

Install in reverse order of the removal.

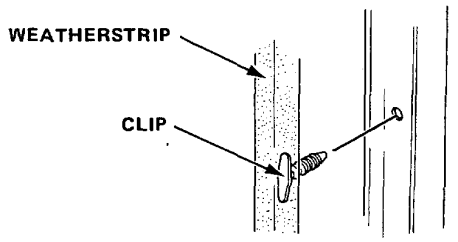
Weatherstrip Replacement



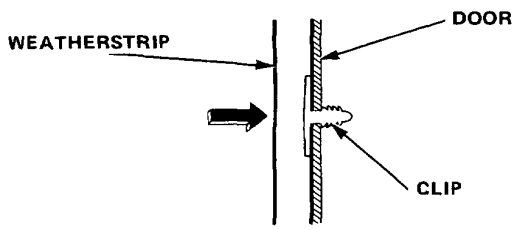
Area marked by "x" should be cemented.



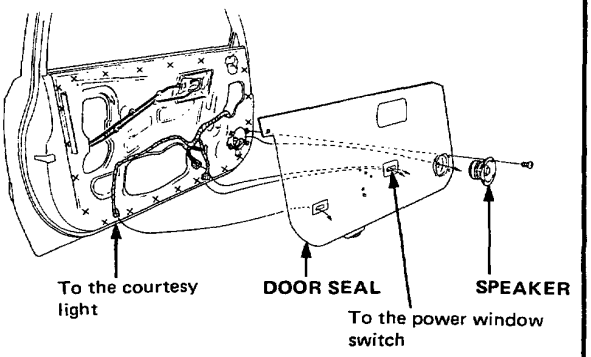
NOTE: If the seal is to be reused, do not pull on the weatherstrip. Insert a wide end of a screwdriver between the weatherstrip and door and pry the clip up out of the hole in the door.



NOTE: Press the clips into the holes in the door fully.



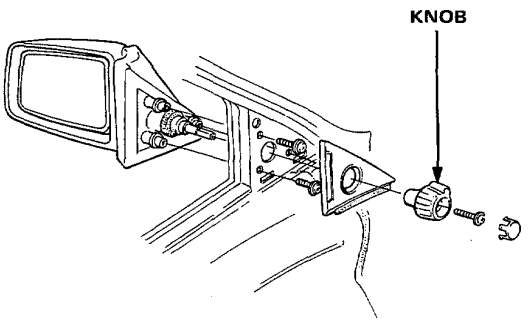
Door Seal Replacement



NOTE: Apply sealing agent at the part marked by x. At this time, carefully wipe off any protruding sealing agent.

Door Mirror Replacement

1. Remove the screw and control knob.
2. Carefully pry off the cover panel with a screwdriver to avoid damaging it, then, while holding the mirror with one hand, remove its 3 screws with the other.
3. Remove the mirror from the door.

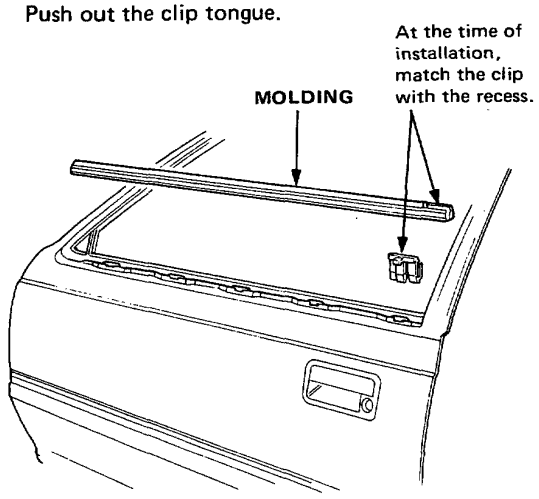


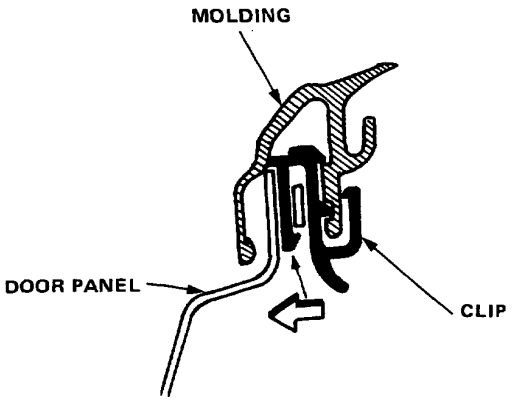
Door

Molding Replacement

Outer Molding

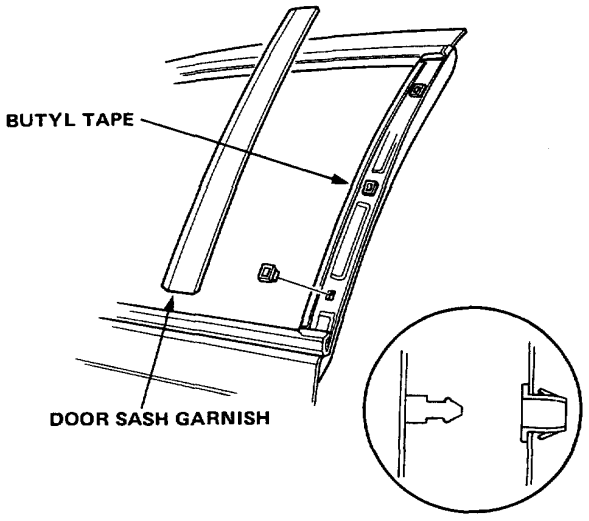
1. Lower the door glass.
2. Remove the door mirror.
3. Remove the door lining.
4. Push out the clip tongue.





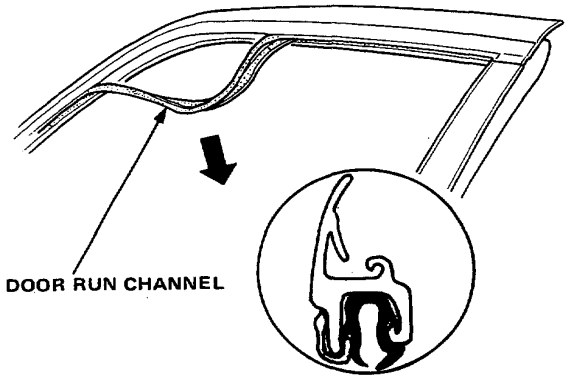
Door Sash Garnish

Remove by pulling alternately to the left and the right.

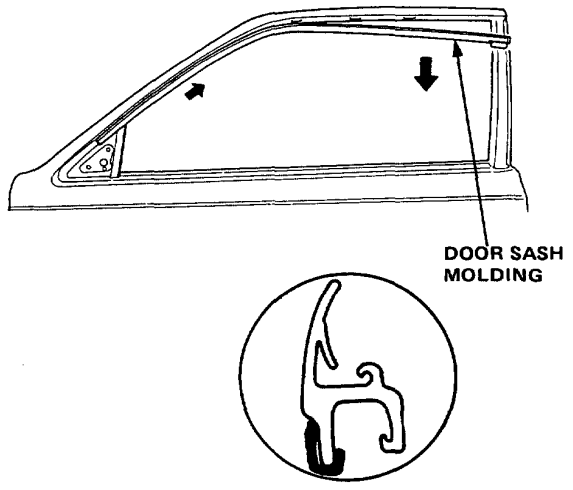


Door Sash Molding

1. Pull the door run channel from the door panel.

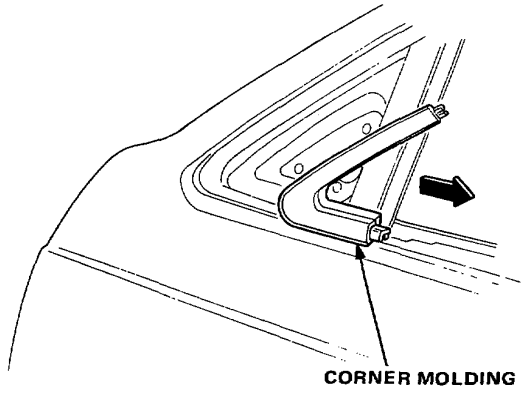


2. Remove the molding from the door sash.

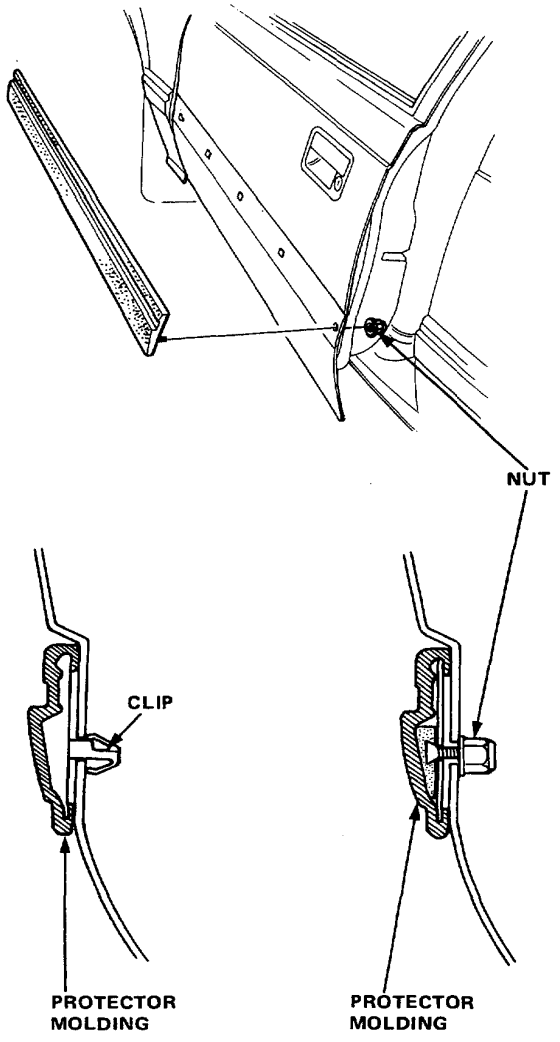


Corner Molding

1. Remove the door mirror.
2. Remove the outer molding and the door sash molding.

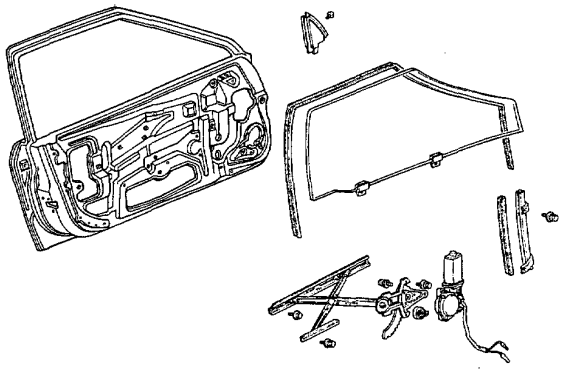


Protector Molding



Door

Door Glass Removal/Installation

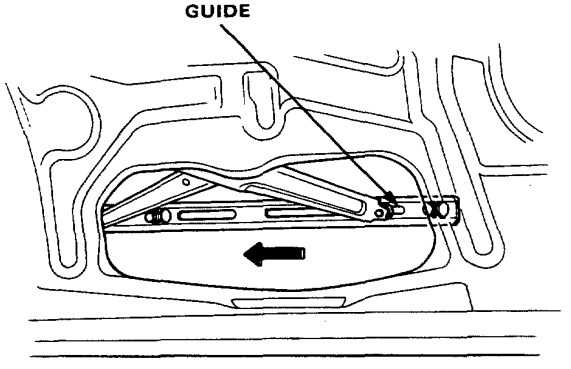


Removal

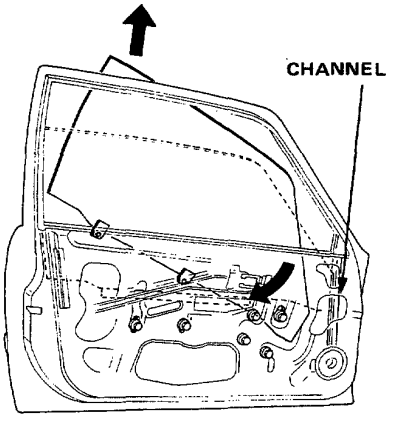
1. Remove the door lining.
2. Remove the door seal.

CAUTION: Take care that the sealing agent does not get onto the seats etc.

3. Lower the door glass to a position where the door glass mounting bolts can be seen.

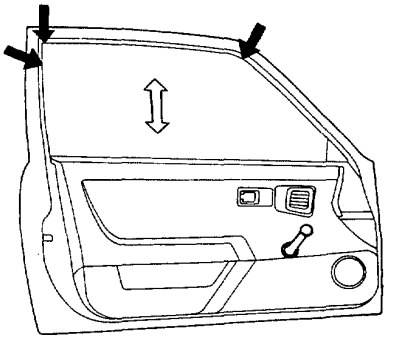


4. Loosen the door mounting bolts and slide the guide forward. Remove the glass from the guide. Remove the 2 bolts from the glass.
5. Lower the glass, disengage the front side from the channel, and remove the glass.

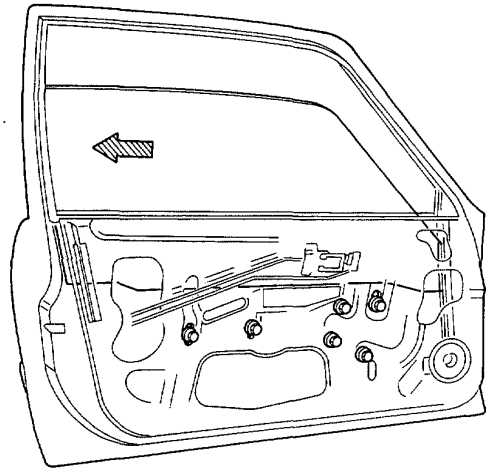


Installation

1. Install the glass on the regulator guide.
2. Roll the glass up and down to see if it moves freely without binding. Also make sure that there is no clearance between the glass and door sash when the glass is closed.



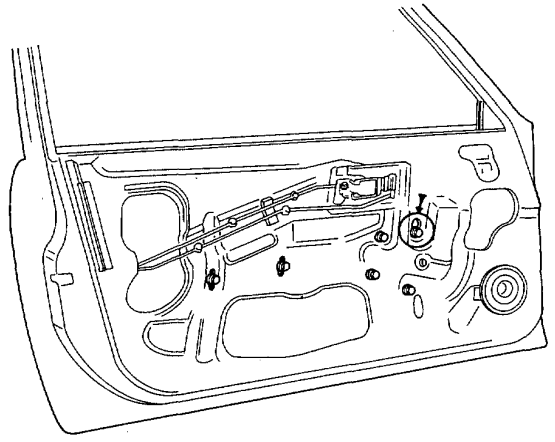
3. When there is a gap for the glass (inclination), push the glass to the rear and once tighten the regulator mounting bolts and the door sash mounting bolts lightly.



Regulator Replacement

1. Remove the door glass.
2. Remove the regulator mounting bolts.

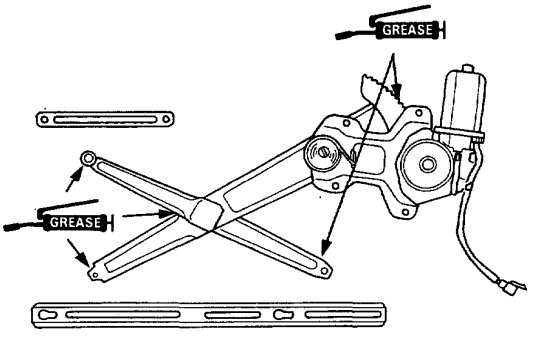
NOTE: The bolt marked by ○ should only be loosened.



3. Remove the regulator.

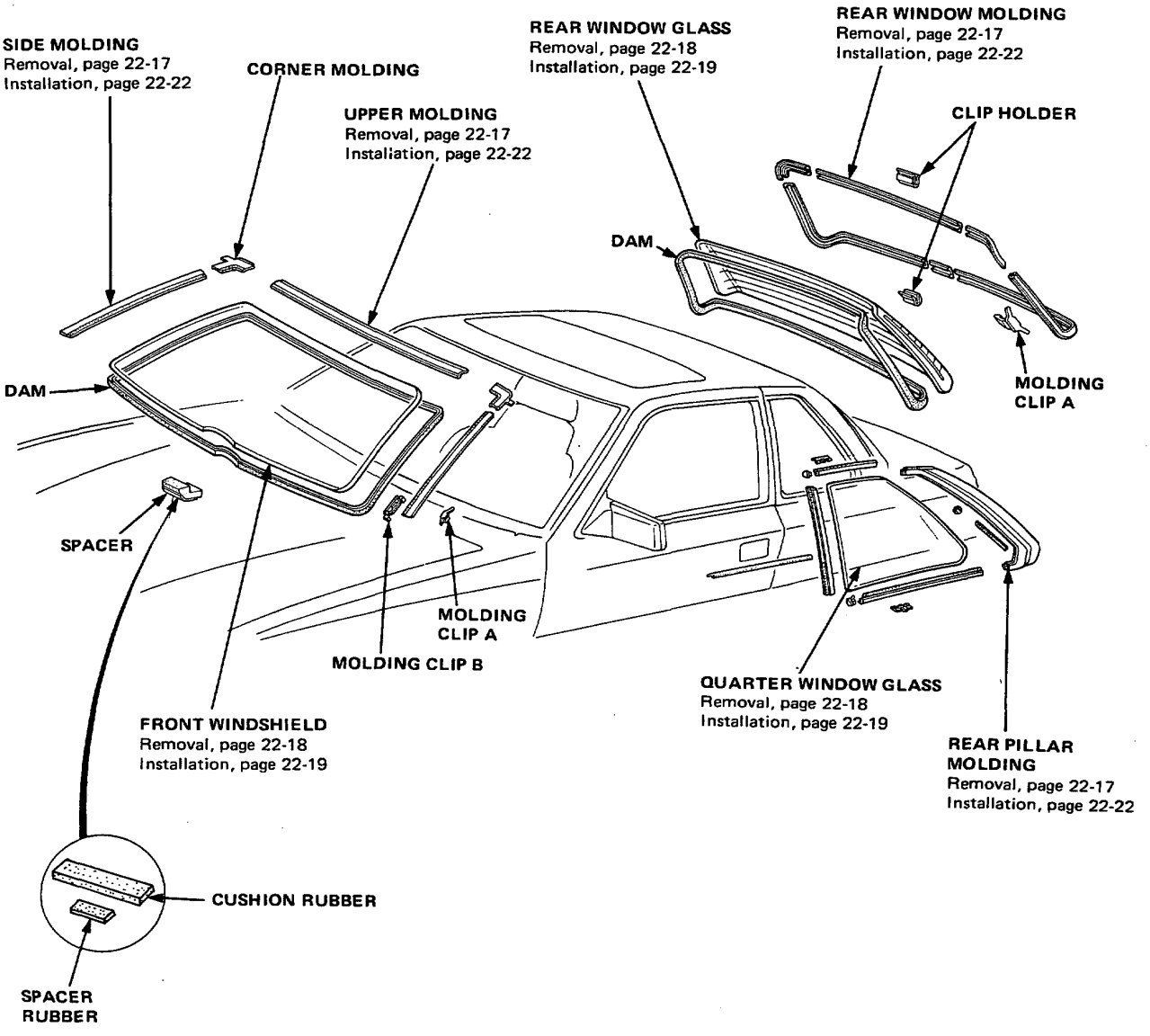
NOTE:
- Take care not to damage the door panel.
- Inspect for regulator gear wear, damage, spring slackness, loose linkage, etc. Exchange in case of defects.

4. Lubricate all sliding or rotating parts with grease.

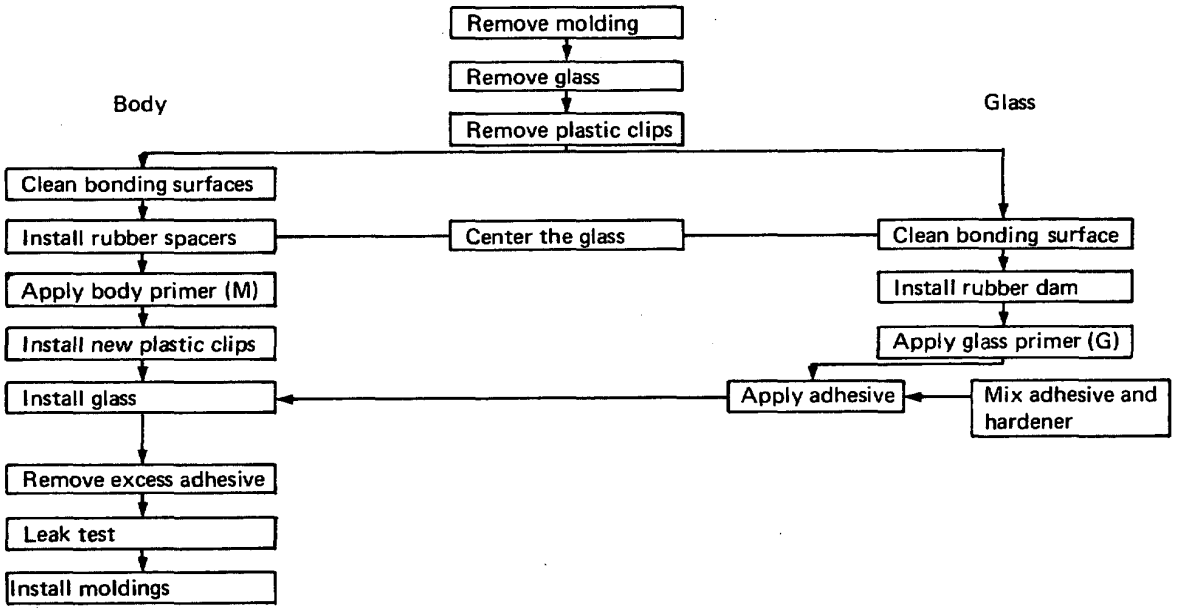


Windshield and Window Glass

Index



Installtion



Parts

Part Number	Contents	Comment
Adhesive kit — Low temperature 08718–99960 High temperature 08718–99961	Adhesive sealant (500 g) Hardener (75 g) Glass primer G (20 g) Body primer M (20 g) Piano wire (0.6ϕ x 1 m (3f)) Gauze Cartridge Sponge	 For glass primer (G) For applying primers

Tools

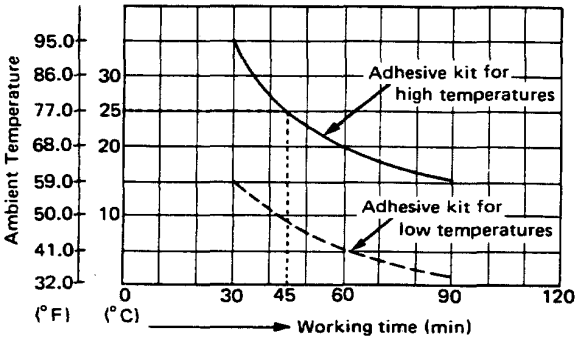
Tool/Material	Remarks
Glass or steel plate	To mix adhesive and hardener on
Putty knife	To mix adhesive and remove excess
Caulking gun	To apply bead of adhesive to windshield.
Suction cups	To install windshield
Knife	To scrape bonding surface around window opening
Awl	To make hole through existing adhesive for piano wire
Two wood sticks	To hold piano wire
Toluene or alcohol	To clean bonding surfaces

Windshield and Window Glass

Workable Time

Adhesive workable time varies widely according to temperature, so choose the correct adhesive kit for the temperature range you will be working in.
After mixing and applying adhesive, you should install the windshield within the time shown on the chart.

For example, when the ambient temperature is 25°C (77°F), the glass should be installed within 45 minutes using the high temperature type adhesive.
Kit part numbers and contents are listed on the page before.



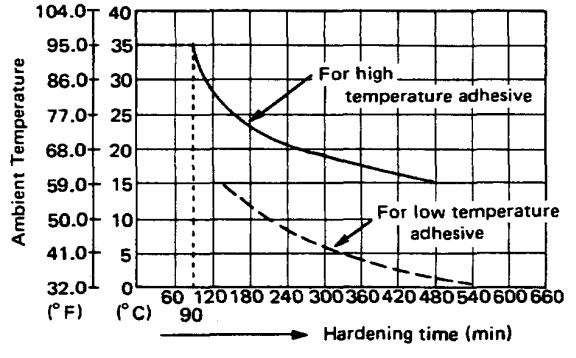
Notes

- Both kits have two types of adhesive primer: one for the body (metal), and one for glass.
- Always use new genuine Honda adhesive, or equivalent.
- Do not use the adhesive if 6 months have elapsed since date of manufacture.
- Store adhesive in a cool, dry place.
- Open only immediately before you are going to use it.

Hardening Time

Hardening time can be shortened by heating with infrared light.

For example, the adhesive will start to harden within 270 minutes mixing at 20°C (63°F). If however, it is heated to 35°C (95°F), it will start to harden within 90 minutes.



Broken Glass Removal

Remove as much broken glass as possible with a vacuum cleaner.
Blow out the glass in the heater and behind the dashboard with low pressure compressed air:

WARNING **Wear eye protection while using the air gun.**

(1) Set the temperature control lever to COLD.

(2) Push the HEAT button on the function pawel.

(3) Make sure the recirculation bullon is out (OFF).

(4) Blow compressed air through the defroster center vent outlet.

(5) Remove the blower duct, and remove any glass from the air mix chamber.

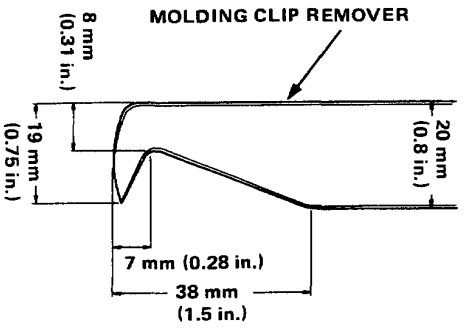
(6) Remove the any glass from the top of the vent/defrost door.

(7) Remove any glass from top and bottom of carpet and seats with a vacuum cleaner.

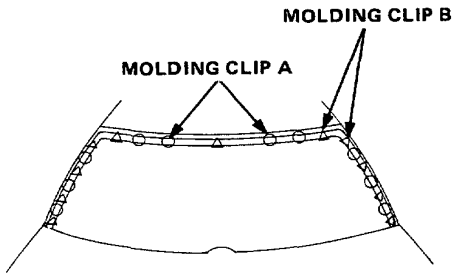
NOTE: It is recommended to remove the seats to shake off any glass (page 22-35).

Molding Removal

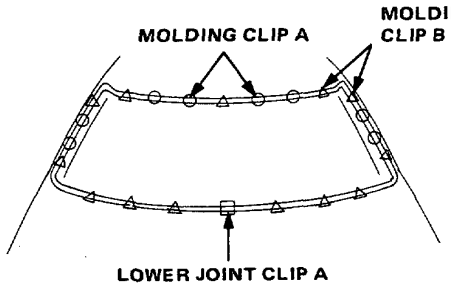
1. Remove the side molding, next the corner moldings and then the upper modling, by releasing the clips at the locations shown, as follows:



Front



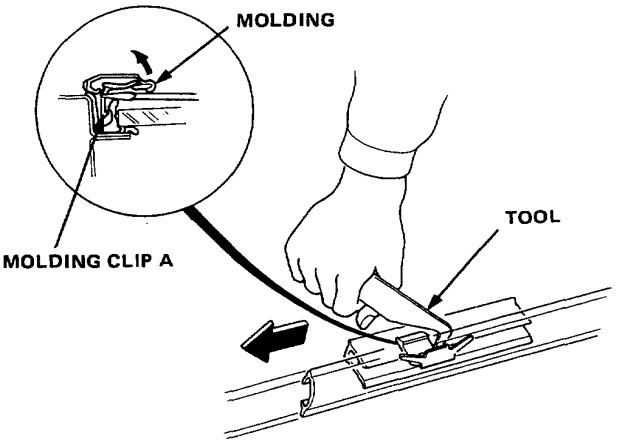
Rear



2. Lift the inside edge of the molding slightly, then slip the hook of the tool under the clip A, and slide it sideways to release the molding.

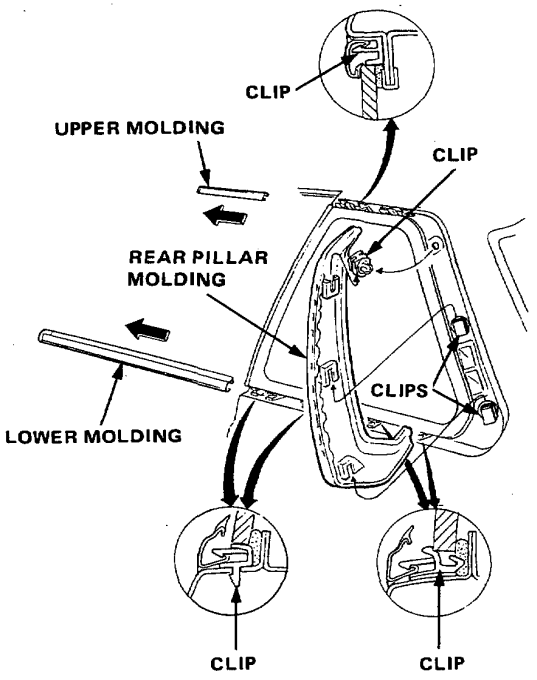
   NOTE: If the adhesive sticks tightly to the molding, raise the molding slightly on the glass side, and cut the adhesive with a cutter. When the glass is to be removed, the clips may be cut.

   CAUTION: Be careful not to damage the body and glass with the tool.



3. Remove the quarter window upper and lower moldings by sliding them to the side.

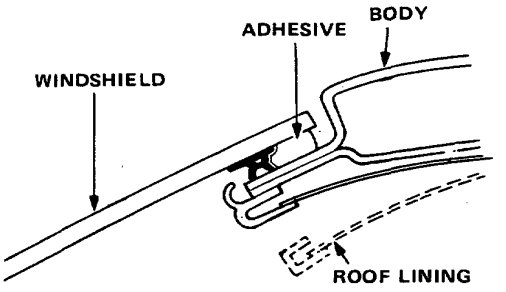
4. To remove the rear pillar molding, first remove the clip on the upper with the molding, and then remove the clips on the middle and lower, by sliding up the molding.



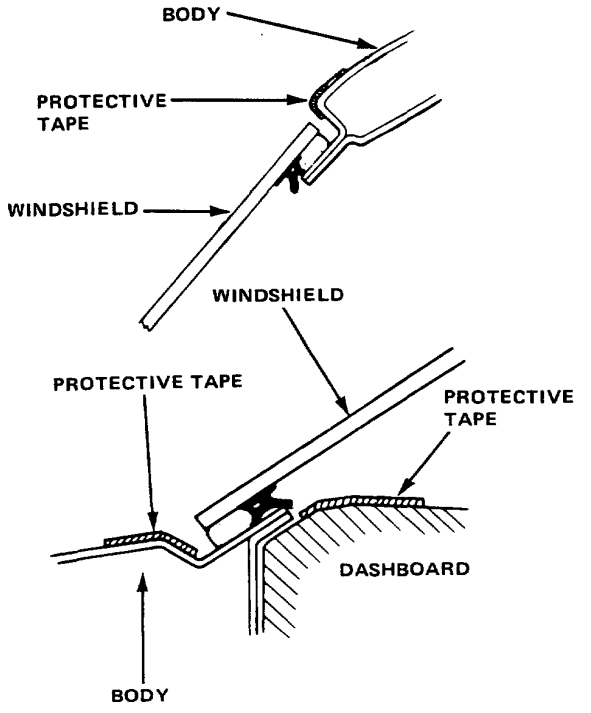
Windshield and Window Glass

Removal

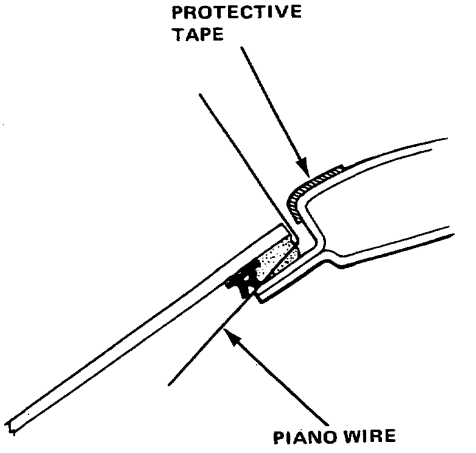
1. In order to facilitate the work and to prevent equipment damage, remove the following parts in advance.
   - Front window
   Room mirror, sun visor, front pillar garnish, roof lining trim, wipers
   - Rear window
   Rear pillar garnish, roof lining trim, rear speakers, wiper
   - Quarter window
   Side upper garnish
2. Remove the windshield molding. Lower the roof lining.
   NOTE: Take care not to bend the roof lining excessively.



3. Apply protective tape along the edge of the dashboard and body next to the windshield as shown.

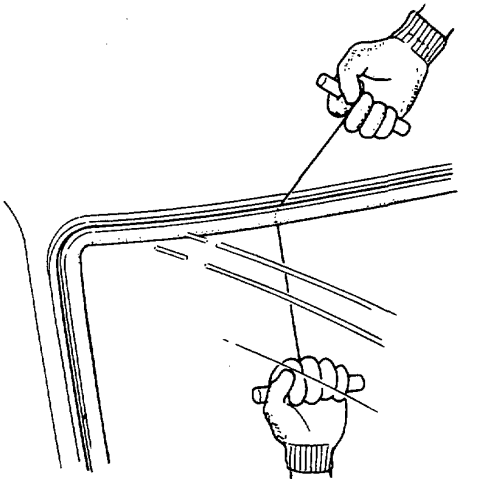


4. Using an awl, make a hole through the windshield adhesive from inside the car. Push piano wire through the hole and wrap end around a piece of wood.



5. With a helper on the outside, pull the wire back and forth in a sawing motion and carefully cut through the adhesive around the entire windshield.

   CAUTION: Hold the piano wire as close to the glass as possible to prevent damage to the body and dashboard.



6. Windshield molding clips and rubber spacers are cemented to the body. Cut them away from the body with a knife.

   NOTE: Replace the windshield clips and rubber spacers with new ones whenever the windshield has been removed.

Installation

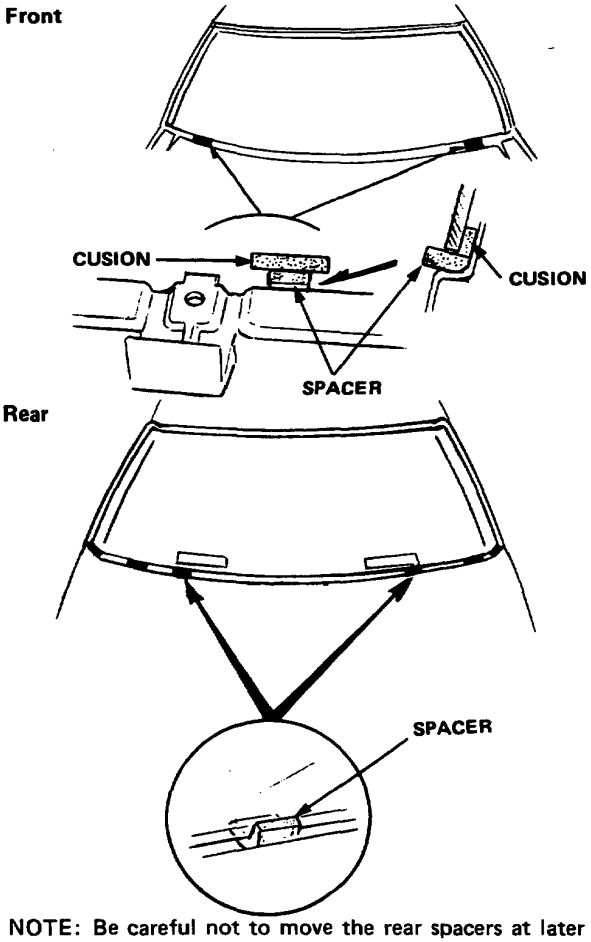
1. Scrape the old adhesive smooth with a knife, to a thickness of about 2 mm (0.08 in.) on the bonding surface around the entire windshield flange.

   NOTE:
   - Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
   - Remove all traces of the rubber spacer material from the body.
   - Mask off surrounding surfaces before painting.

2. Clean the body bonding surface with a sponge dampened in alcohol.

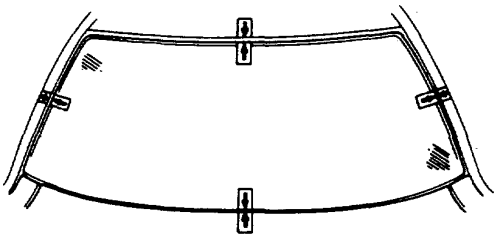
   NOTE: After cleaning, keep oil, grease or water from getting on the surface.

3. Peel the lining off each spacer, then install the spacers by pressing them into place with your hand as hard as you can. Install 2 flat spacers as shown.



NOTE: Be careful not to move the rear spacers at later work since no sealer is applied to them.

4. Set a new windshield upright on the spacers, and center it in the opening. Make the location by scribing lies across the glass and body with a grease pencil at the four points shown.

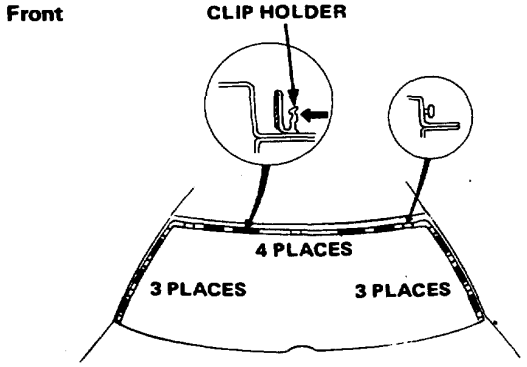


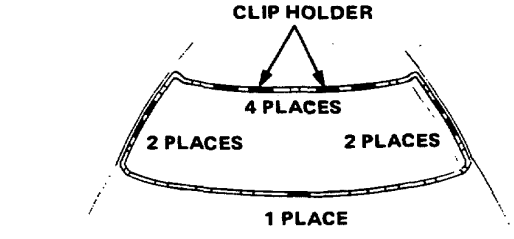
ALIGNMENT MARKS

5. Heat the clip holder bonding surfaces on the body to about 40°C (105°F) using a dryer. Do not get water, oil, or grease on them.

6. Peel off the lining and install the clip holder using maximum hand pressure (see step 17).

   NOTE: Install the clip holder as soon as possible after applying heat to the body. Make sure they are cemented securely.

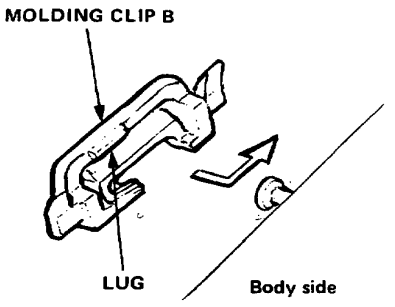




(cont'd)

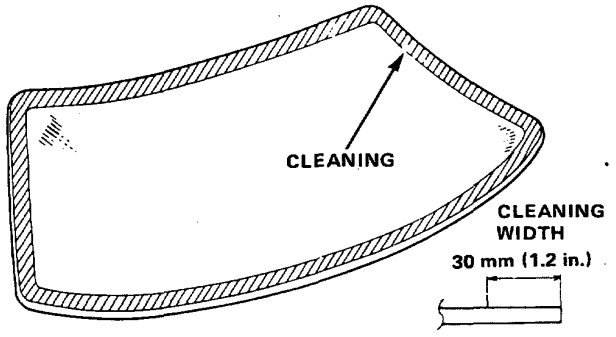
Installation (cont'd)

7. Install the molding clips B as shown (see page 22-17).



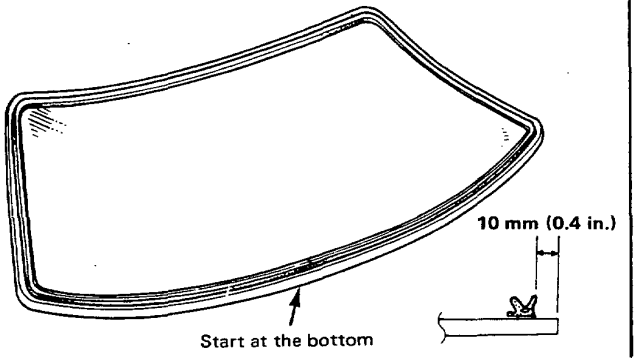
8. If the glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alchol where new adhesive is to be applied.

   NOTE: Make sure the bonding surface is kept free of water, oil and grease.



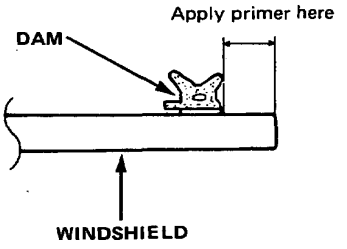
9. Glue the rubber dam to the inside face of the windshield around the entire edge as shown, to contain the adhesive during installation.

   NOTE: Be careful when installing the dam not to touch the glass where adhesive is to be applied.

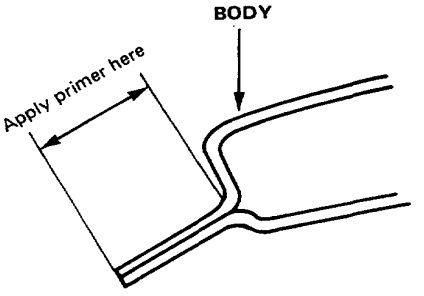


10. With a sponge, apply a light coat of glass primer if off to the surface outboard of the dam, then lightly wiper with gauze or chessecloth.

    NOTE:
    - Do not apply body primer to the glass, and do not get body and glass primer sponges mixed up.
    - Never touch the primed surfaces with your hands.
    - Keep water, dust, and abrasive materials away from the primed surface.



11. With a sponge, apply a light coat of body primer to original adhesive remaining around the window opening flange. The glass should be installed 10 minutes after you apply the primer.

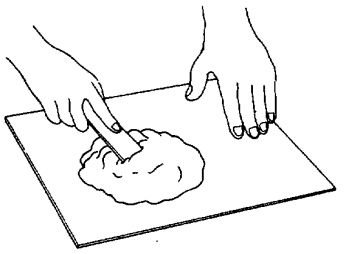


    NOTE:
    - Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
    - Never touch the primed surfaces with your hands.
    - Mask off the dashboard before painting the flange.

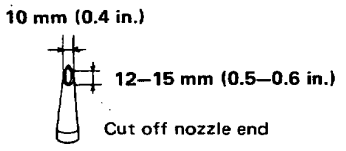
12. Thoroughly mix all the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE:

- Clean the plate with a sponge and alcohol before mixing.
- Follow the instructions that come with the adhesive.

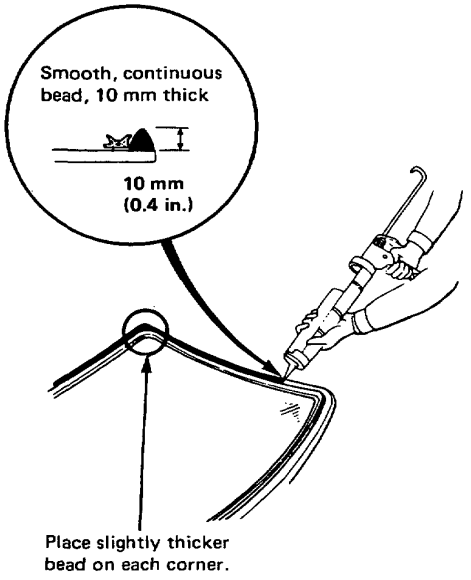


13. Before filling a cartridge, cut off the end of the nozzle at the angle shown.

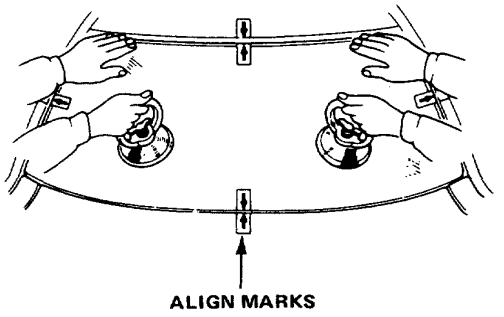


14. Pack adhesive into the cartridge without air pockets, to ensure continuous delivery. Put the cartridge in a caulking gun, and run a bead of adhesive around the edge of the glass as shown.

NOTE: Apply the adhesive within 30 minutes after applying the glass primer.



15. Use suction cups to hold the glass over the opening, align it with the marks made in step 4 and set it down on the adhesive. Lightly push on the glass until its edge is fully seated on the adhesive all the way around.

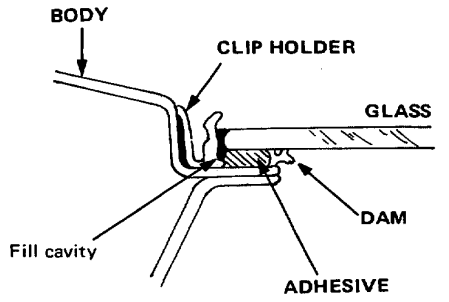


16. Scrape or wipe excess adhesive off with putty knife or gauze. Fill all cavities around clips holder.

17. Spray water on the windshield 1–2 hours after installing the glass. Mark any leaks and let the windshield dry, then seal leaking area with sealant.

- Do not squirt water on freshly applied adhesive.
- Drive the car slowly if it must be driven during the first 4 hours after the windshield has been installed.

CAUTION: Let the adhesive dry for at least 4 hours before installing the moldings.

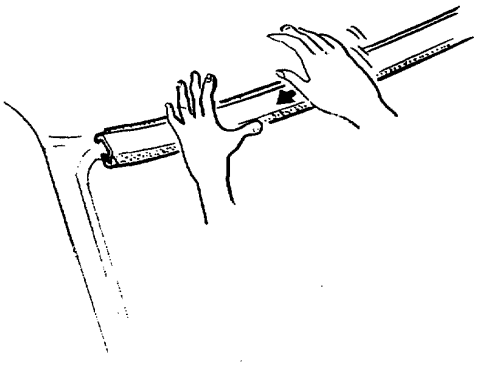


Windshield and Window Glass

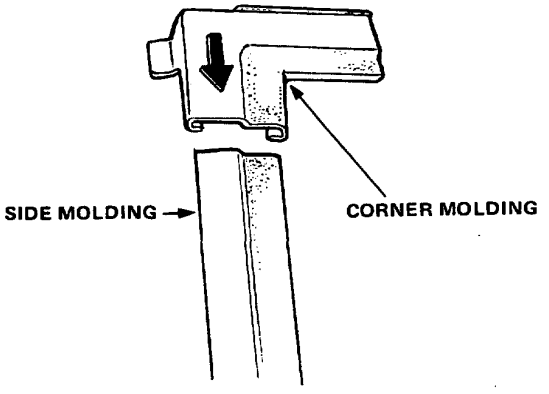
Molding Installation

Front

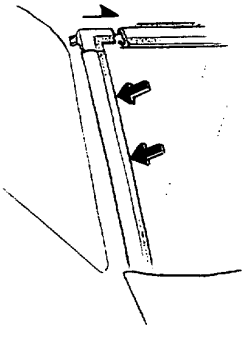
1. Hold the upper molding in place and tap on it until the upper edge snaps over the molding clips.



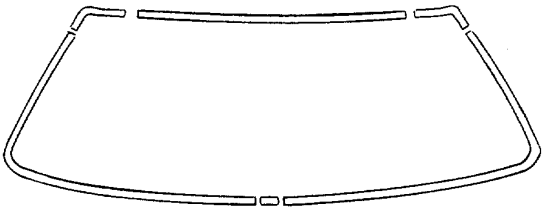
2. Slide the corner moldings over the upper end of the side moldings.



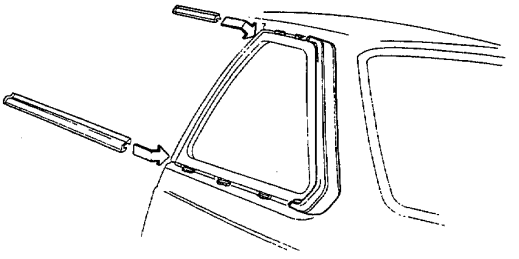
3. Snap corner molding onto the upper molding, then push to the middle.
   Push the side molding at the place where molding clips A and B meet.



Rear



Quarter

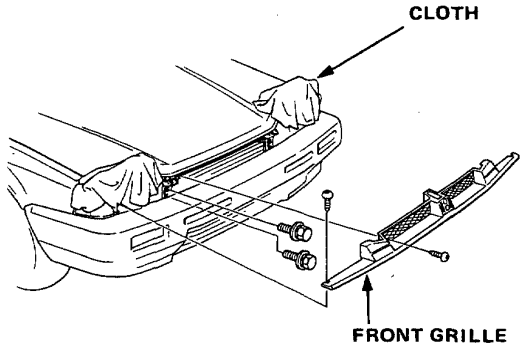


Hood

Replacement, and Adjustment

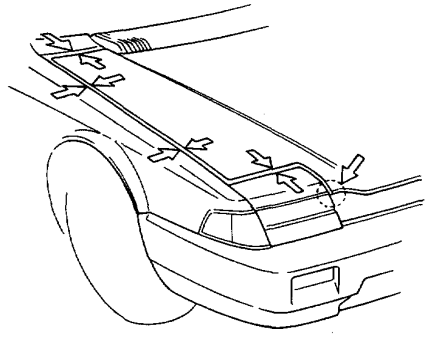
Removal

1. Raise the headlights and apply cloth to prevent damage.
2. Unlock the hood latch.
3. Remove the front grille (page 22-60).
4. Remove the 4 hood hinge bolts.
5. Raise the hood with two persons, and place it onto a surface covered with cardboard.



Installation, Adjustment

1. Apply cloth to the front fenders to prevent damage.
2. Raise the headlights and apply cloth to prevent damage.
3. Raise the hood with 2 persons, and place it onto the engine room.
4. Temporarily tighten 1 hood hinge bolt each on the left and the right side.
5. Confirm the gaps with the various body parts.



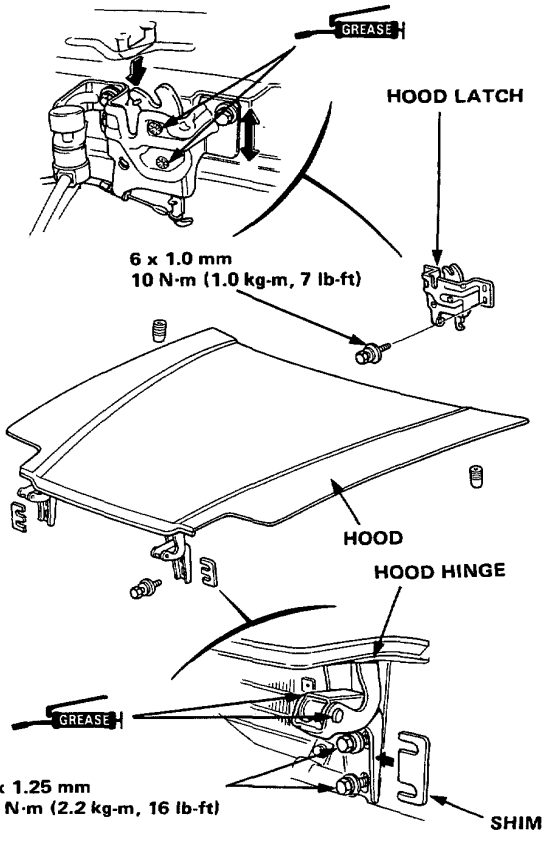
6. When everything is correct, tighten the hood hinges with the 4 bolts.

- Longitudinal direction
  Insert shims between the hood hinges and the body and adjust.

- Vertical direction
  Adjust by moving the hood hinges and the hood lock up and down.

  NOTE: Adjust the cushion rubbers so that the hood is not loose.

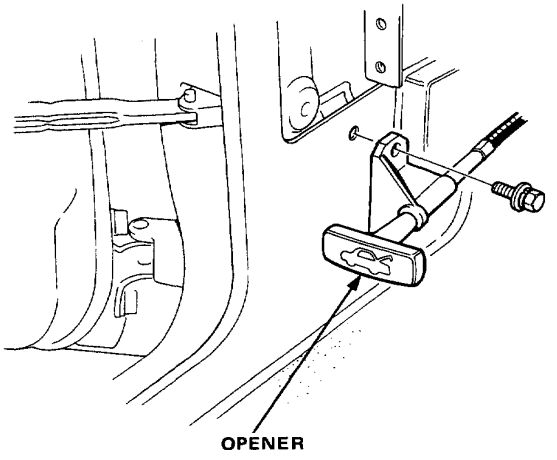
- Lateral direction
  Adjust by moving the hood hinges and the hood latch to the left and the right.



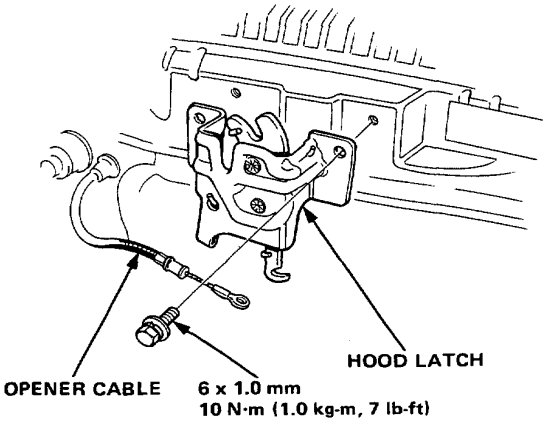
Hood

Opener and Latch

Inside



Engine room

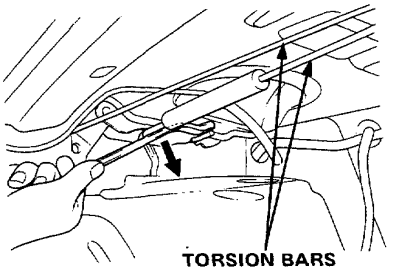


Trunk Lid

Replacement, and Adjustment

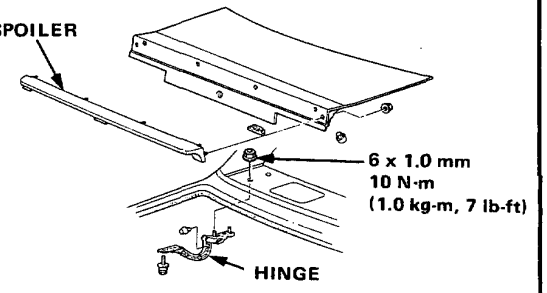
1. Remove the trunk lid hinge bolts, then lift off the lid.
2. Remove the torsion bars by hand.

NOTE: The work will be facilitated when a double head box spanner is used as shown in the illustration.



WARNING **Pay attention to the reaction force of the torsion bars.**

3. Remove the rear tray (page 22-29).
4. Remove the hinge bracket mounting nuts, then remove the hinge from the trunk.
5. Before tightening the hinge bolts, check the adjustments shown below:

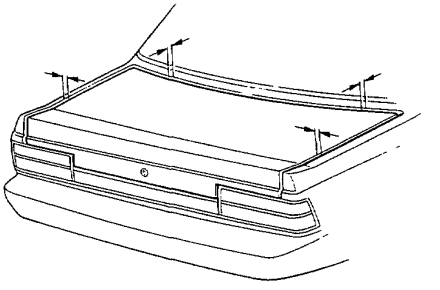


NOTE: Apply grease to the hinge sliding surface.

6. Remove the 6 nuts from the rear of the trunk lid, and remove the tail spoiler (for cars equipped with a tail spoiler).

Adjustment

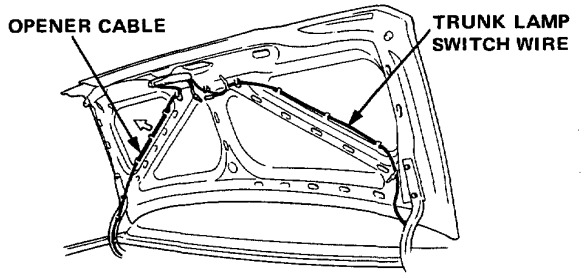
Loosen the trunk hinge bolts slightly and adjust by moving the trunk lid up, down, forward and backward.



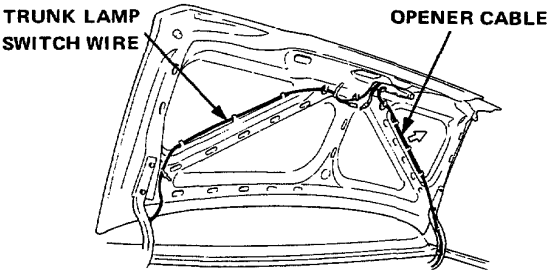
Latch Replacement

1. Remove the connection of the trunk lamp switch.
2. Remove the opener cable from the clamp.

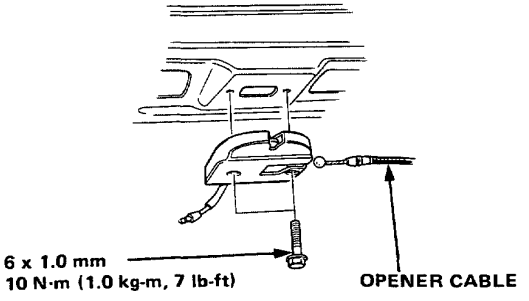
L/H Drive



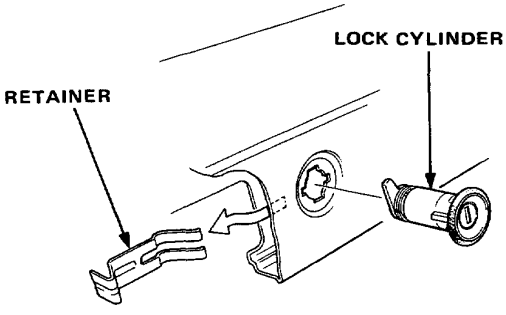
R/H Drive



3. Remove the bolts and remove the opener cable.

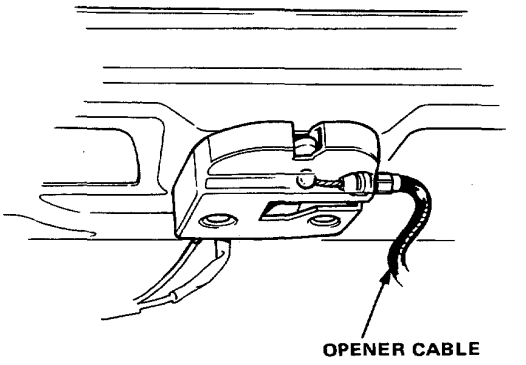


4. Remove the retainer and lock cylinder.

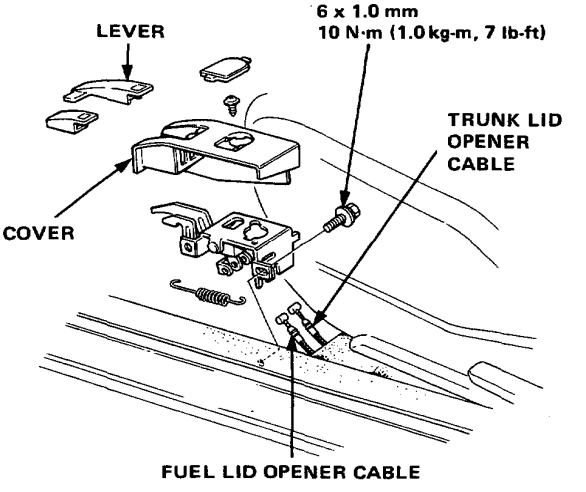


Opener Replacement

1. Remove the opener cable from the lock.



2. Remove the opener lever by pulling it to the front.
3. Remove the cap, the screw, and the opener cover.
4. Remove the cable.



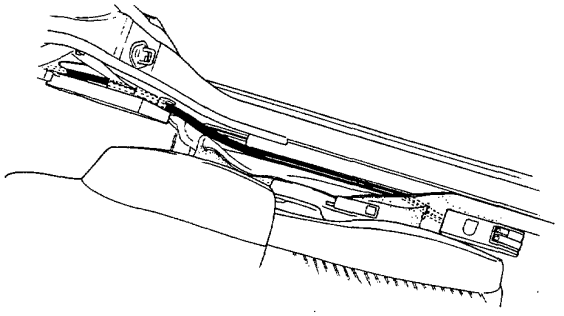
5. For exchange of the cable, remove the garnish and the linings.

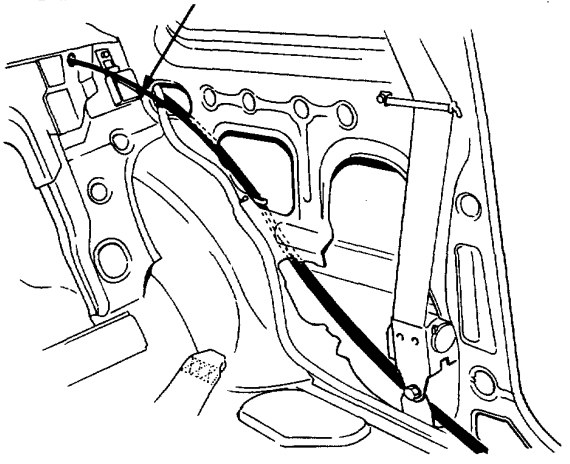
Trunk Lid

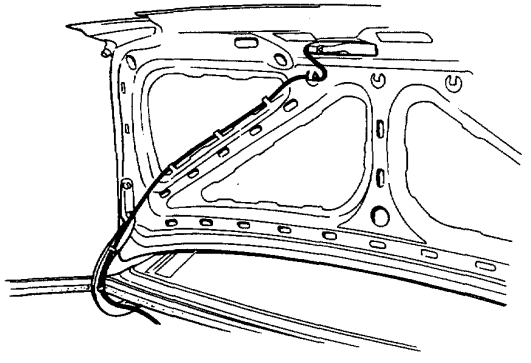
Opener Cable Wiring

Route the cable as shown below.

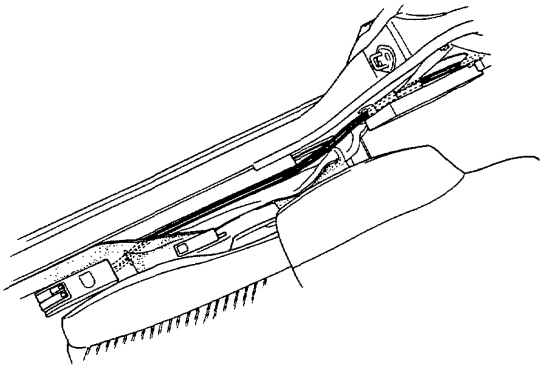
LEFT STEERING WHEEL DRIVE

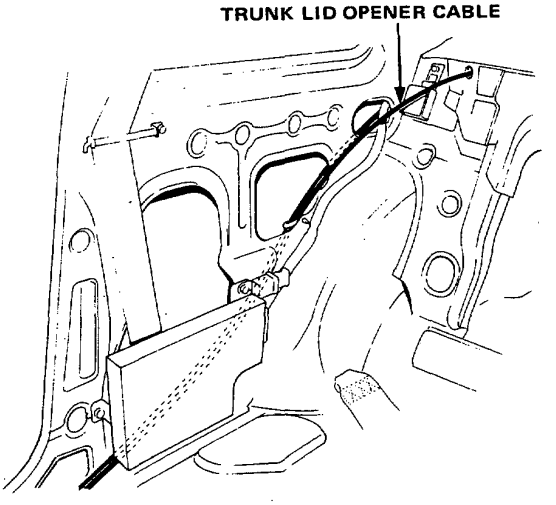


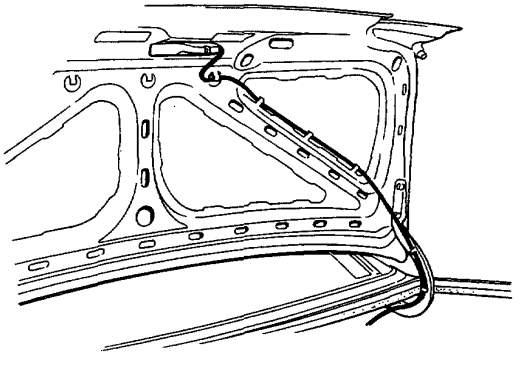




RIGHT STEERING WHEEL DRIVE



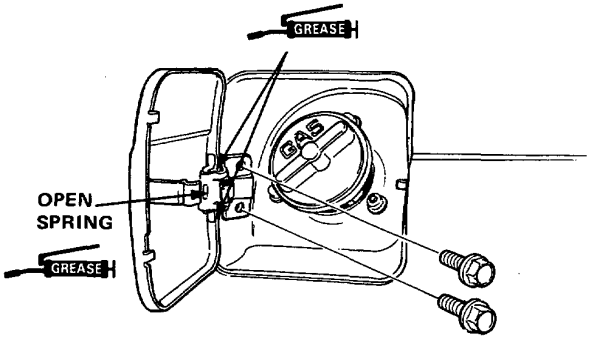




Fuel Lid

Replacement

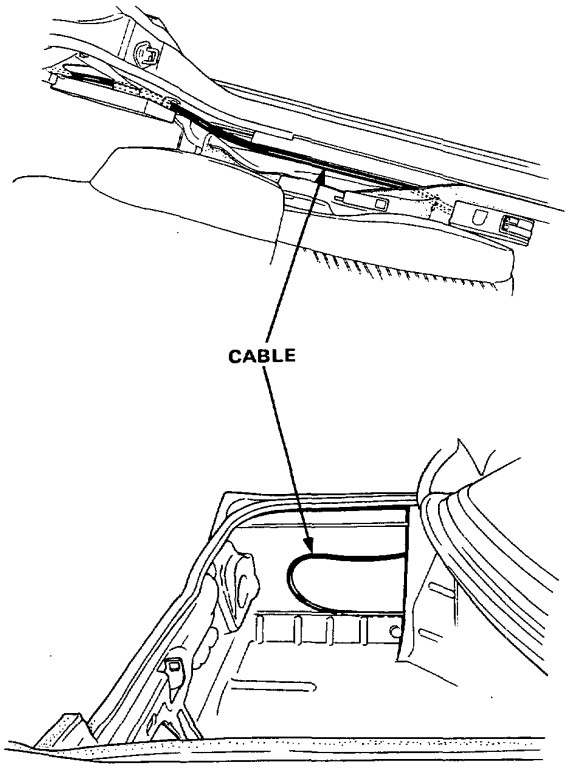
1. When the lid is closed, it must be flush with the body.



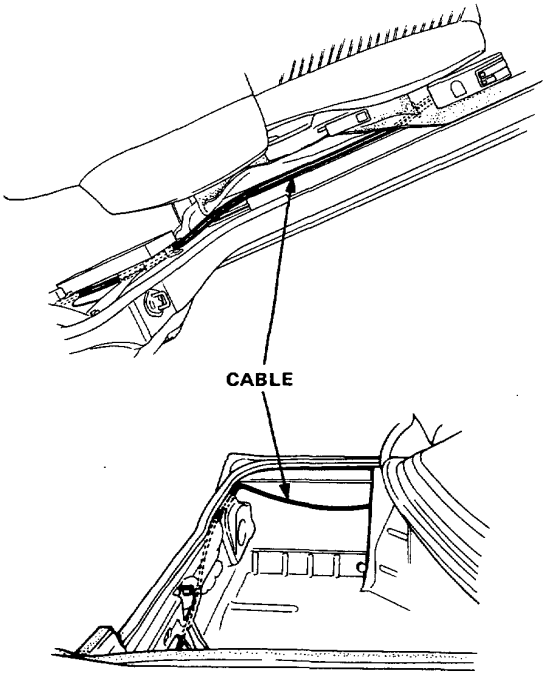
2. Remove the opener knob in the same way as the trunk lid opener (page 22-25).

3. Route the cable as shown below.

LEFT STEERING WHEEL DRIVE

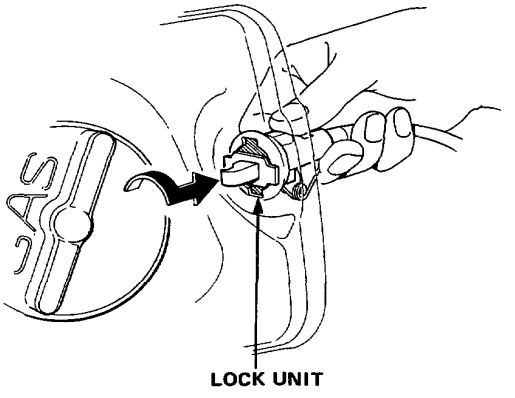


RIGHT STEERING WHEEL DRIVE



4. Remove the lock unit.

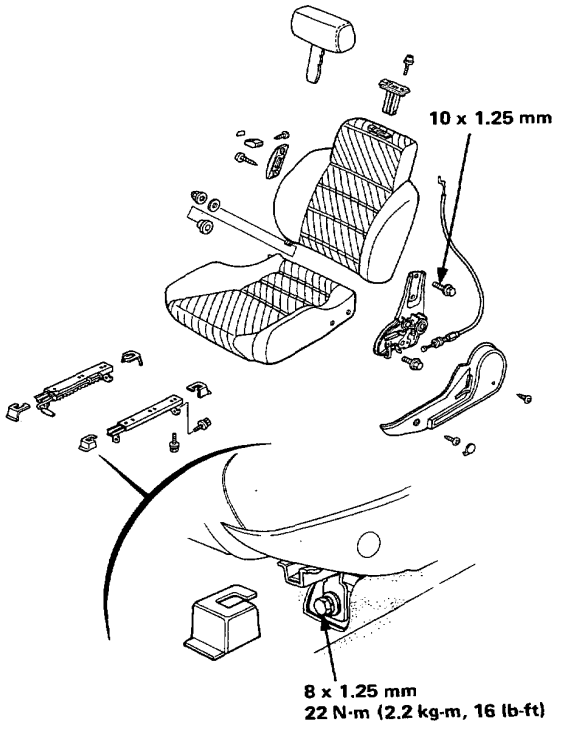
5. Remove the garnish, and turn the lock unit in the arrow direction from.



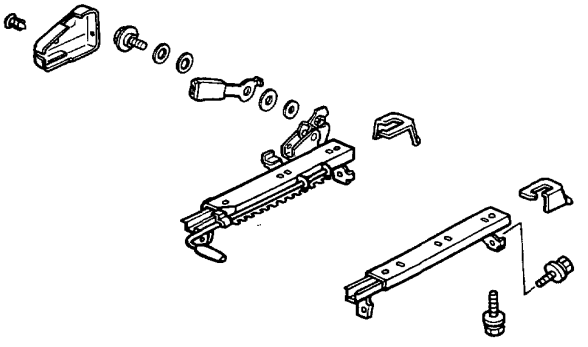
Seat

Front Seat Replacement

Remove the seat mounting bolt cover, and remove the bolts.



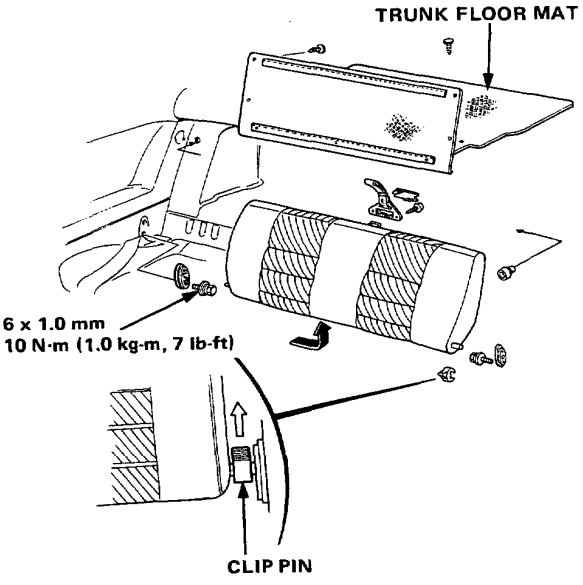
When the seat belt is incorporated in the inner seat.



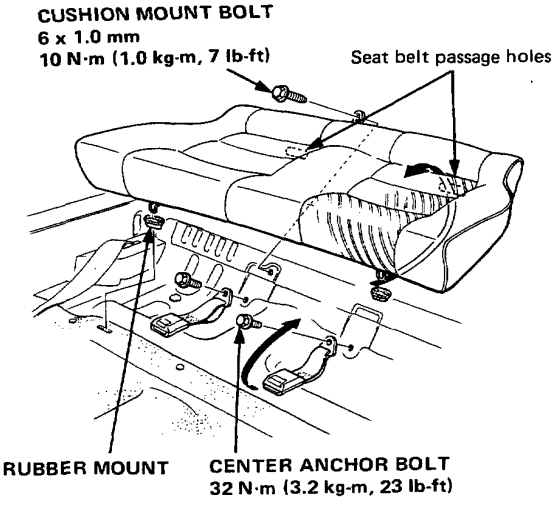
NOTE: For cars equipped with heated seats, the coupler connection under the seat must be disconnected before the seat is removed.

Rear Seat Replacement

1. Pull the seat-back all the way down, and pull the trunk floor mat from the trunk to the inside.
2. Pull the clip pin on the left side of the seat, and remove the seat-back by sliding it to the left.



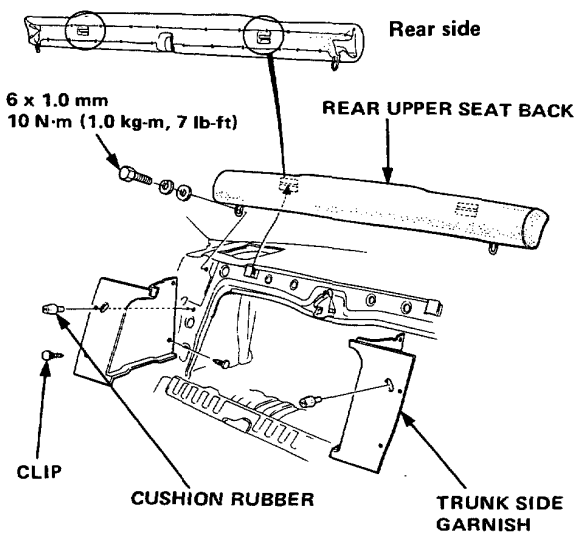
3. Remove the seat cushion mounting bolts raise the seat to the front, and disengage the front hooks from the floor holes.



4. Remove the clips and cushion rubbers of the trunk side garnishes.

5. Remove the two mounting bolts of the rear upper seat back.

6. Pull the bottom of the rear upper seat back to the front and raise it to remove it from the hooks.

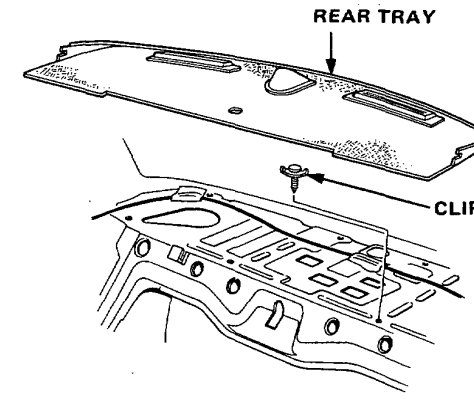


Rear Tray Replacement

1. Remove the quarter lining, the speakers, and the rear wiper (when installed).

2. Remove the clips by hitting them lightly with a plastic hammer from the underside of the rear tray panel.

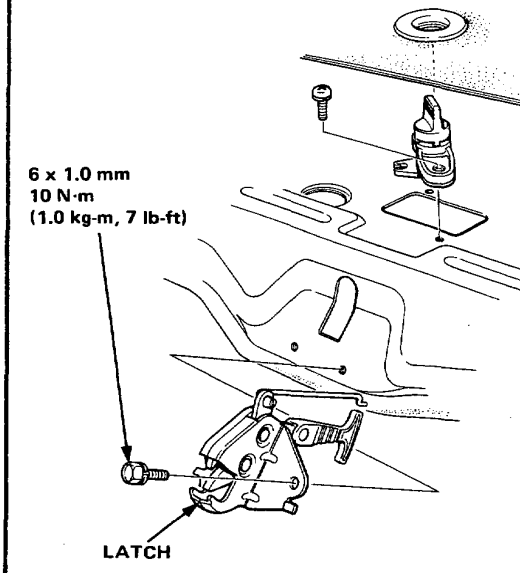
CAUTION:
- **Do not bend the rear tray excessively, as it breaks easily.**
- **At the time of installation, confirm the wiring for the rear heating wires.**



Rear Seat Latch Replacement

1. Remove the rear tray.

2. Remove the rear upper seat back.

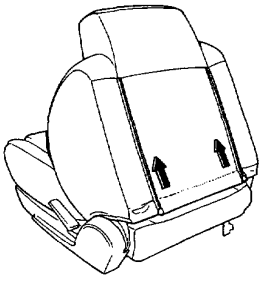


Seat

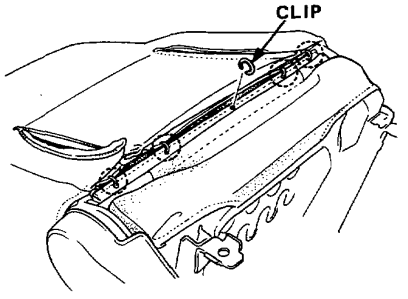
Seat Cover Replacement

Front seat back

1. Open the fasteners on the rear of the seat.

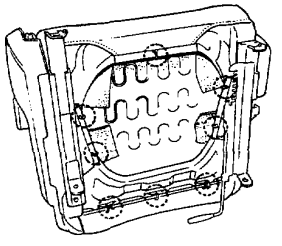


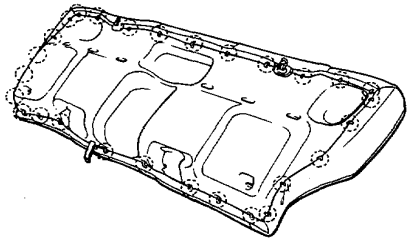
2. Remove the clips, and separate the outer leather from the seat cushion.



Other seats

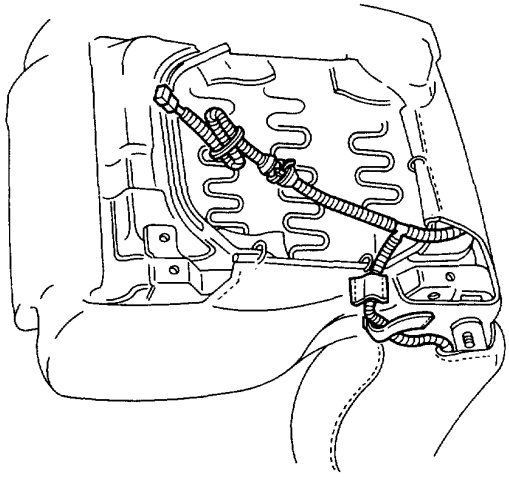
1. Open all clips on the rear of the seat and remove them.

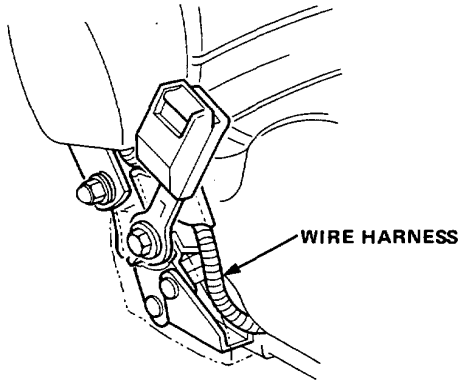




NOTE: After seat exchange, confirm that there are no wrinkles and twists in the outer leather of the seat.

NOTE: For cars with a heated seat, confirm the installation condition of the wire harness and the heating wires at the time of installation of the front seat cover.





Heated seat inspection is on page 25-48.

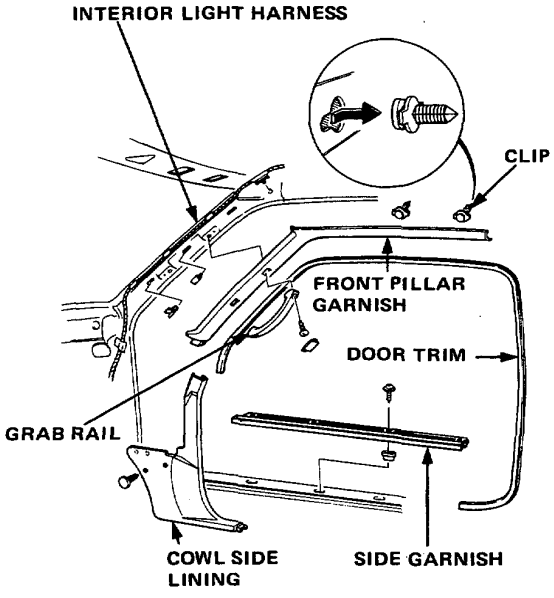
Garnish/Lining

Replacement

Front Pillar Garnish

1. Remove the door trim.
2. Remove the grab rail (only passenger side).
3. Insert a thin plate between garnish and front pillar, remove the 3 clips, and remove the garnish.
4. Slide the garnish to the rear, and remove it from the roof clip.

NOTE:
- For the installation, move the clip to the garnish side.
- Install the door trim cleanly.
- When there are an antenna wire and sunroof motor wires, confirm the wiring.

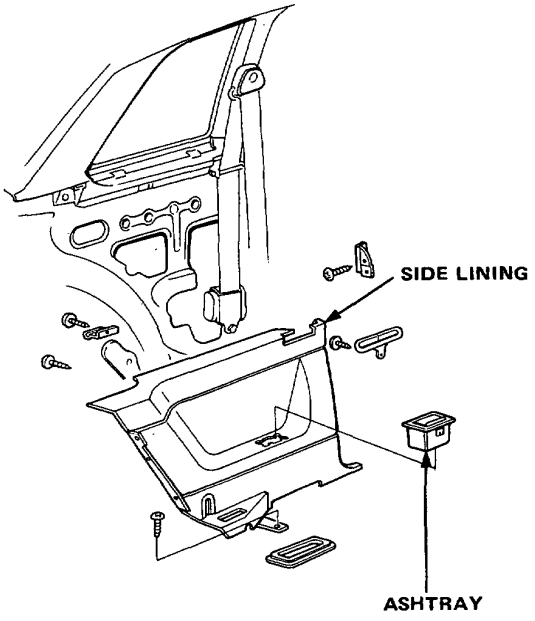


Side Garnish

NOTE:
- At the time of installation, confirm that the floor mat is applied to the flange part.
- Remove earth and other foreign matter completely from the gap with the body.

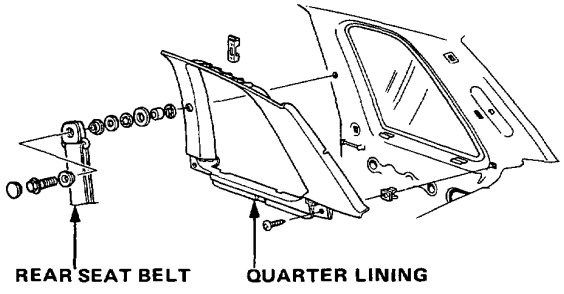
Side Lining

1. Remove the rear seat (page 22-28).
2. Remove the screw, pull the upper part towards you to remove the clip from the body, and remove the side lining.



Quarter Lining

1. Remove the rear seat belt (page 22-33).
2. Remove the side lining.
3. Remove the screw, and remove the quarter lining from the clip part.



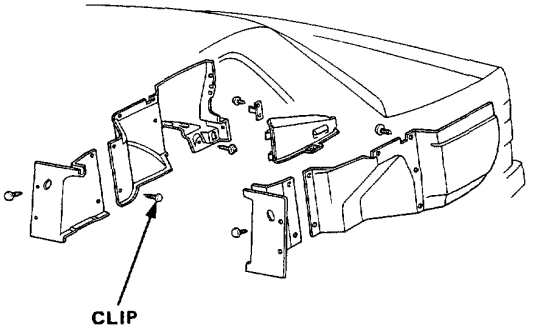
(cont'd)

Garnish/Lining

Replacement (cont'd)

Trunk Side Garnish

1. Remove all screws and clips, and remove the trunk side garnish.



NOTE: After the installation, confirm that there is no looseness for clips and garnish.

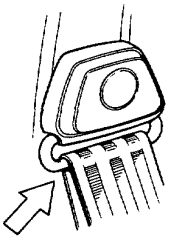
Front Seat Belts

Replacement, and Inspection

Inspection

1. Pull out the seat belt and inspect it for absence of damage. Confirm that the seat belt is wound correctly when it is released.

2. When the winding is not good, inspect the hanger part for contamination.

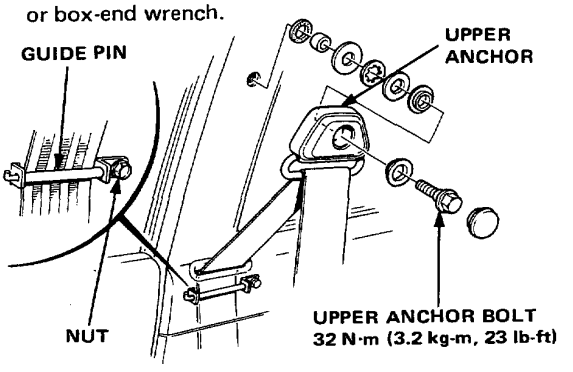


3. Confirm that the belt locks when it is pulled strongly. Confirm that there is no bolt looseness.

Replacement

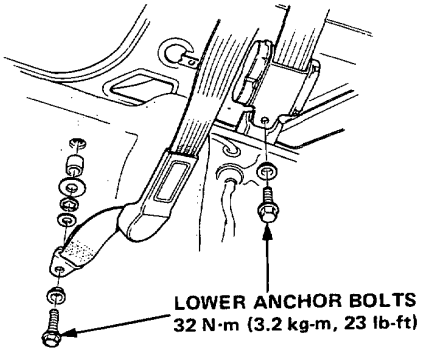
1. Remove the rear seat, and remove the side lining (pages 22-28, 31).

2. Remove the upper anchor bolt with a 17 mm socket or box-end wrench.

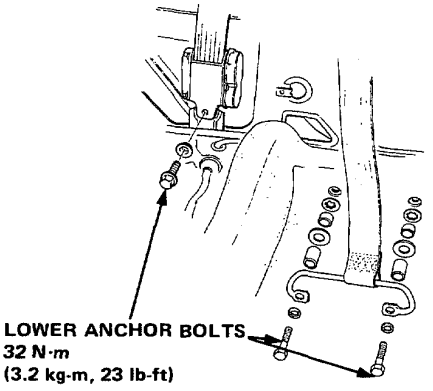


3. Remove the belt guide pin and nut.

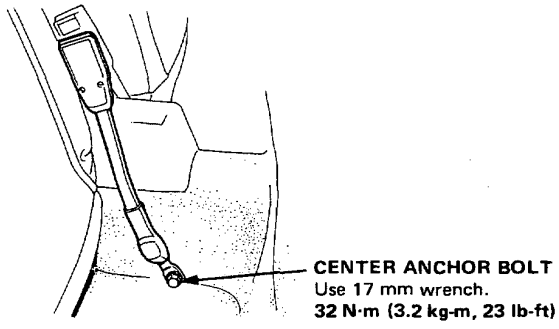
4. Remove the lower anchor bolt and retractor bolt.



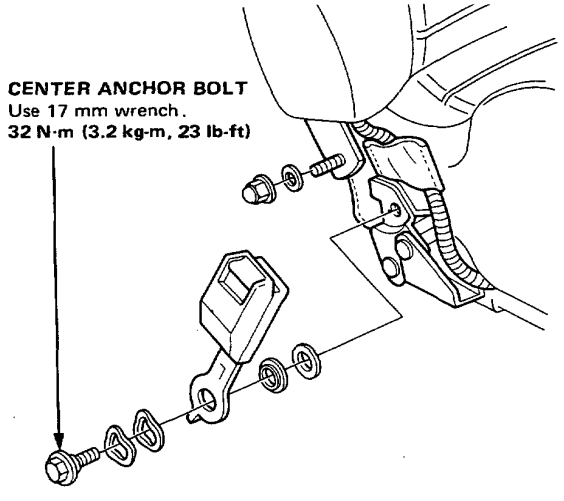
When the lower anchor is a slide type



5. Slide the front seat forward until the seat belt center anchor bolts is accessible, then remove the bolt and the center anchor.



When the center anchor is incorporated in the seat



NOTE: For tightening of the bolt of the center anchor incorporated in the seat, the center anchor must be held so that it will not move.

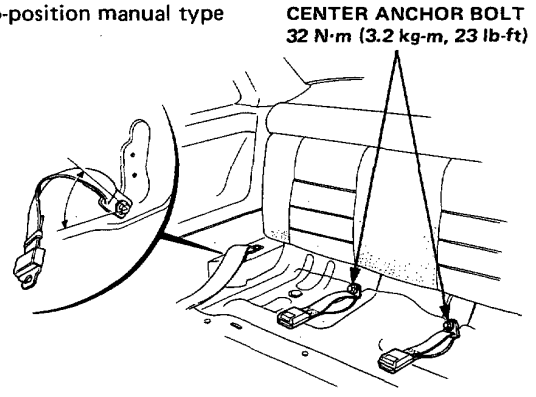
Inspection

1. Inspect the seat belt for absence of damage.
2. Confirm that there is no bolt looseness.

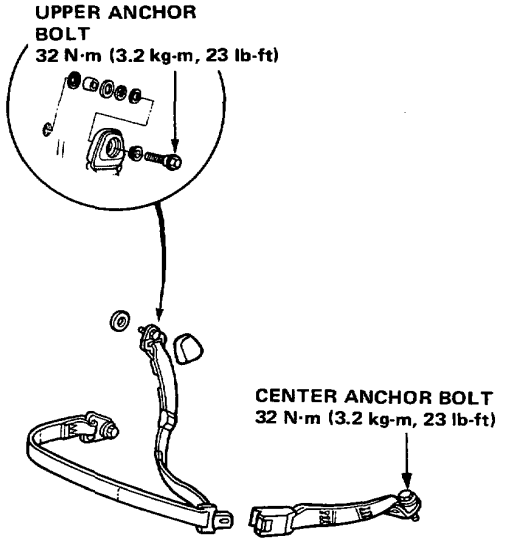
Replacement

1. Remove the rear seat, and remove the side lining (pages 22-28, 31).
2. Remove the bolts and the seat belts.

Two-position manual type



Three-position manual type



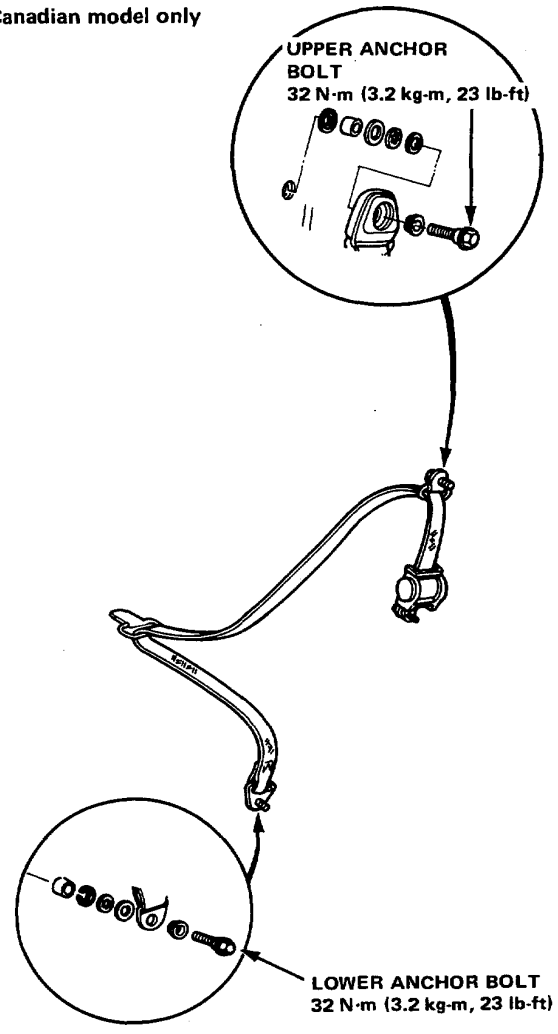
NOTE: Install the seat belt on the outside so that it is inclined 45° up from the horizontal of the car body.

(cont'd)

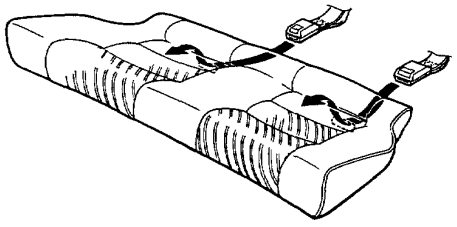
Rear Seat Belts

Replacement, and Inspection (cont'd)

Canadian model only



3. At the time of seat cushion installation, pass the seat belts through the notches of the seat cushion.



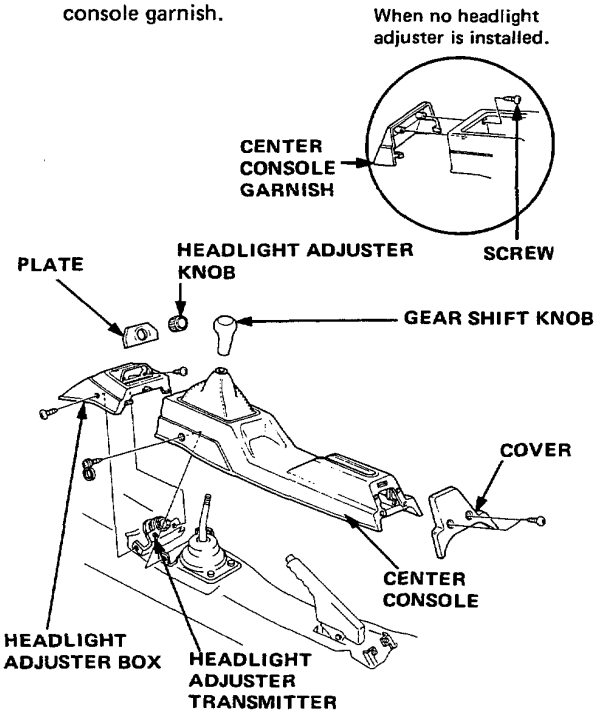
Center Console

Replacement

1. On headlight adjuster equipped model, remove headlight adjuster knob and plate if equipped.
2. Remove the gear shift knob (5-speed) or selector lever handle (automatic).
3. Remove the 4 mounting screws of the center console, and remove the center console and its cover.

NOTE: Take care not to break the projection connecting the center console and the headlight adjuster box (for cars equipped with a headlight adjuster).

4. Remove the 2 mounting screws of the headlight adjuster box and then remove the box. When no headlight adjuster is installed, remove the 2 screws from the rear of the console and remove the center console garnish.

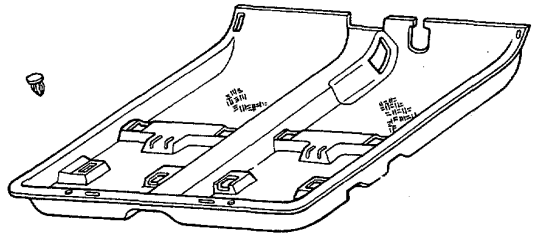


NOTE: After the assembly, the mark of the gear shift knob must face to the front. Also, the groove of the headlight adjuster knob must be engaged correctly.

Carpet and Grommet

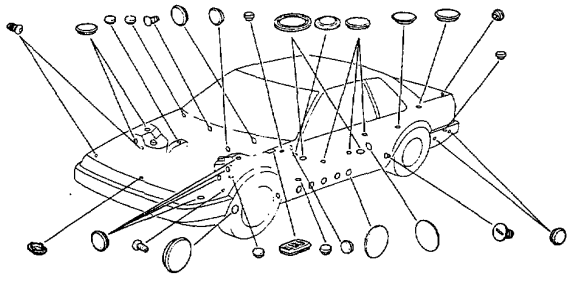
Carpet Replacement

1. Remove the seats, the console, the seat belts, and the side garnishes.
2. Remove the carpet from the hooks on the floor below the dashboard.



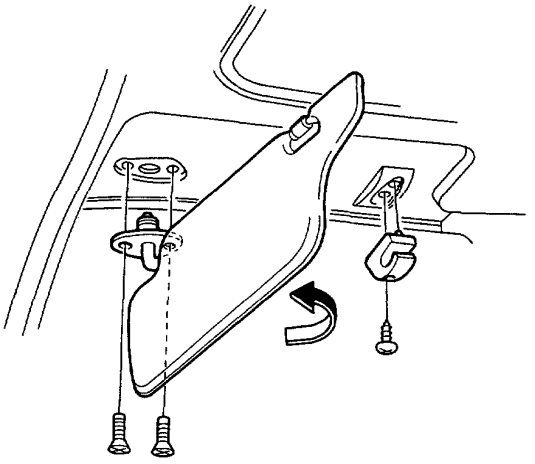
Grommet Replacement

Remove the floor carpet and inspect the seal attachment condition and the grommet installation condition. In case of peeling or deformation, clean the installation place and then attach the seal again.



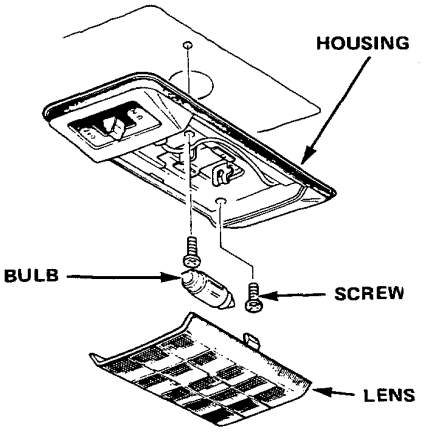
Sunvisor and Interior Light

Sunvisor Replacement



Interior Light Replacement

1. Interior light switch "OFF".
2. Pry off the lens.
3. Remove the bulb and replace if necessary.
4. Remove the two screws from the interior light and remove the housing.

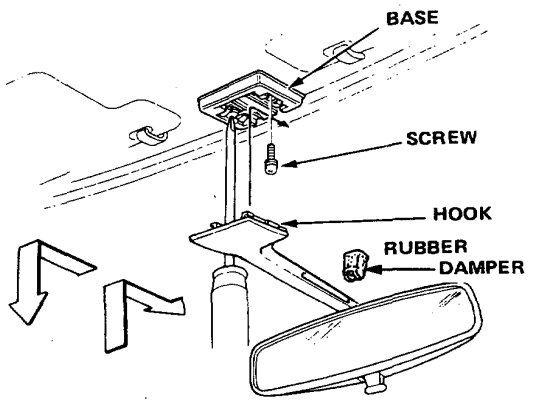


Inspection is on page 25-13.

Rear View Mirror

Replacement

1. Remove the rubber damper.
2. Slide the mirror back to remove it.
3. Unscrew the two screws and then remove the mirror base.



4. When you install the mirror base, face the cutout toward the front.
5. Install the mirror by inserting its hooks in the base and sliding the mirror forward to lock it in place.

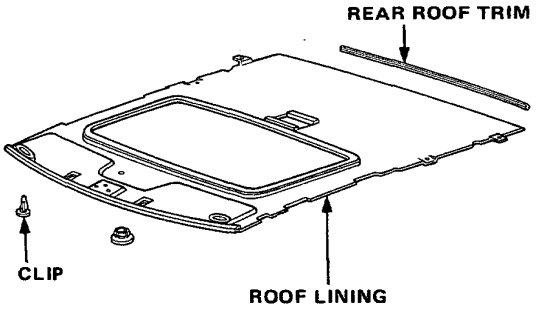
CAUTION:

- **Install the base in the correct direction.**
- **Installation is executed in the reverse order of the removal, but care must be taken that the tip of the mirror hook is not pushed beyond the front edge of the base, as then the projection of the mirror base will break and reuse will not be possible.**

Roof Lining

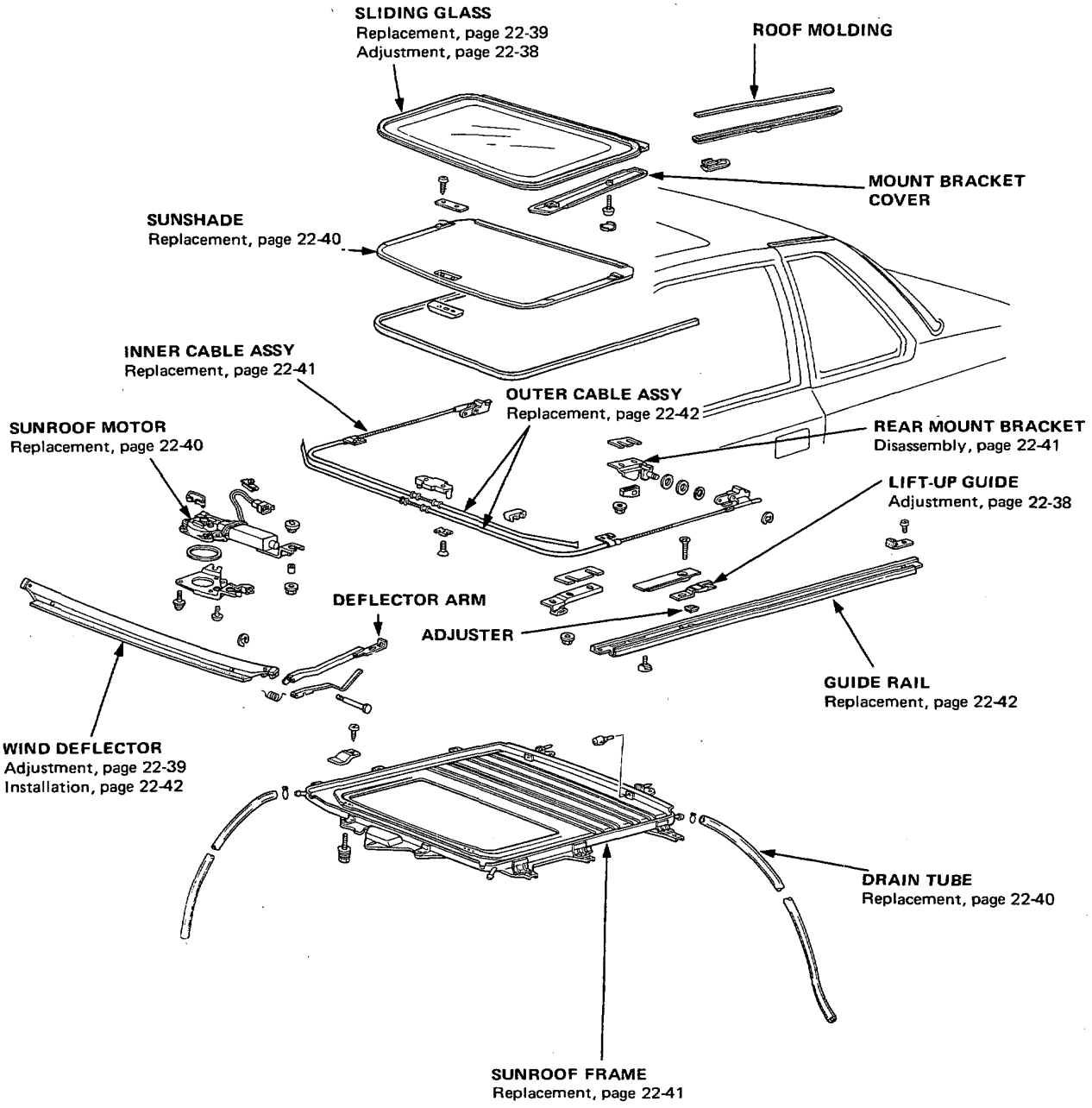
Replacement

1. Remove:
   - Sunvisors
   - Rear view mirror.
   - Front pillar garnishes.
   - Interior light.
   - Quartor linings.
2. Remove the rear roof trim and the clips, then remove the roof lining.



Sunroof

Index

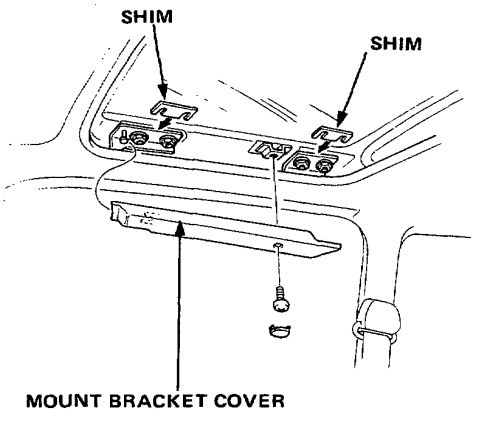


Sunroof

Glass Height Adjustment

Roof molding should be even with the glass weatherstrip, to within 1 ± 1.5 mm (0.04 ± 0.06 in.) all the way around. If not, slide sunshade back, and:

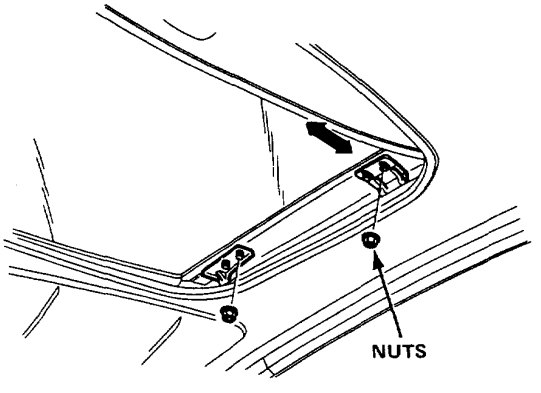
1. Pry plug out of the glass mount bracket cover, remove screw, then slide cover off to the rear.
2. Loosen mount bracket nuts and install shims between glass frame and bracket as shown.
3. Repeat on opposite side if necessary.



Glass Side Clearance Adjustment

If glass weatherstrip fits too tight against the roof molding on one side when closed, slide sunshade back, then:

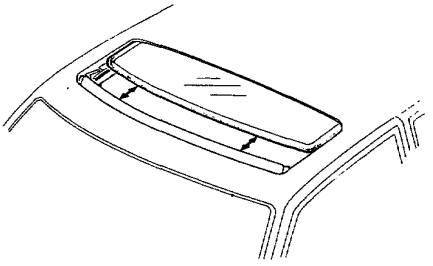
1. Pry plug out of each mount bracket cover, remove screw, then slide cover off to the rear.
2. Loosen all eight mount bracket nuts.
3. Move the glass right or left as necessary.
4. Tighten nuts.

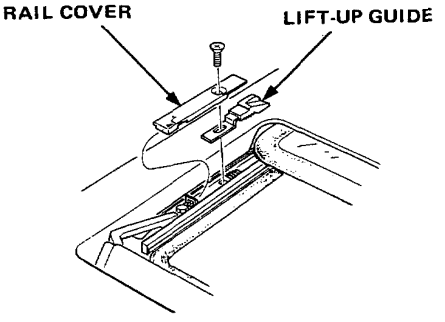


Rear Edge Closing Adjustment

Open the glass about a foot then close it to check where rear edge begins to rise.
If it rises too soon and seats too tight against roof molding, or too late and does not seat tight enough, adjust it;

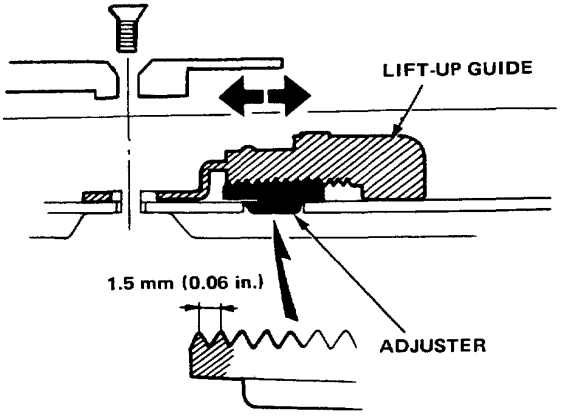
1. Open the glass fully.
2. Remove the rail covers from both sides, and loosen lift-up guide nuts.





3. Move the guides forward or back, then tighten nuts and re-check roof closing.

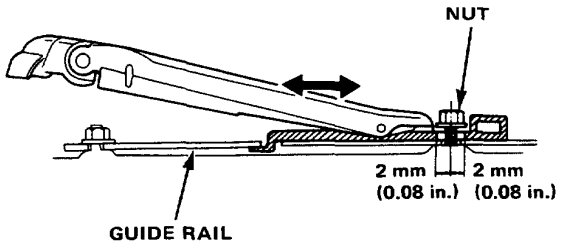
   The guides have pitches of 1.5 mm (0.06 in.) each and can be adjusted 2 pitches forward or back.



Wind Deflector Adjustment

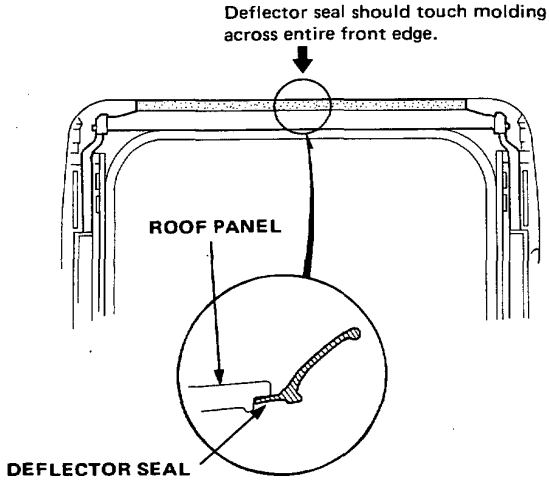
1. Open sunroof and pry rail covers off both sides.
2. Loosen deflector mounting nuts.

   NOTE: Wind deflector can be adjusted 2 mm (0.08 in.) forward or back.



3. Adjust deflector forward or back so the edge of its seal touches the roof molding evenly.

   NOTE: A gap between deflector seal and roof molding will cause wind noise when driving at high speed with the roof open.

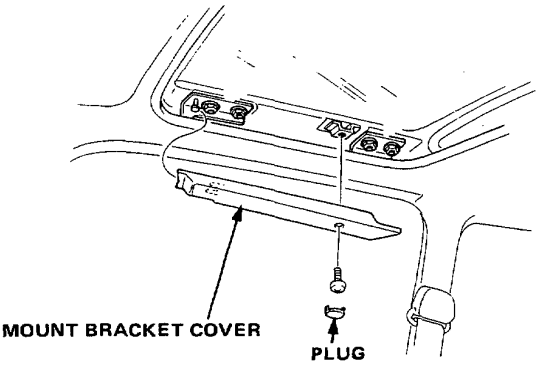


4. Check deflector height.

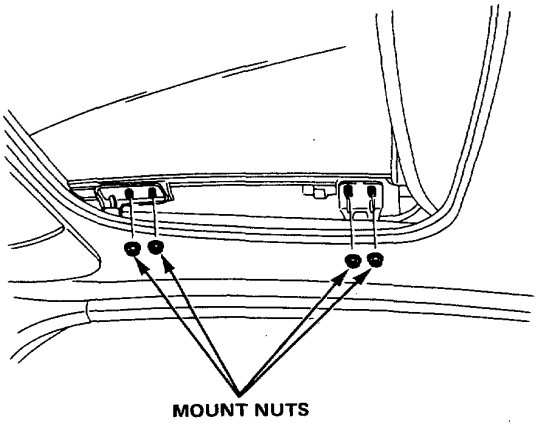
   NOTE: Deflector height cannot be adjusted. If damaged or deformed, replace it.

Glass Replacement

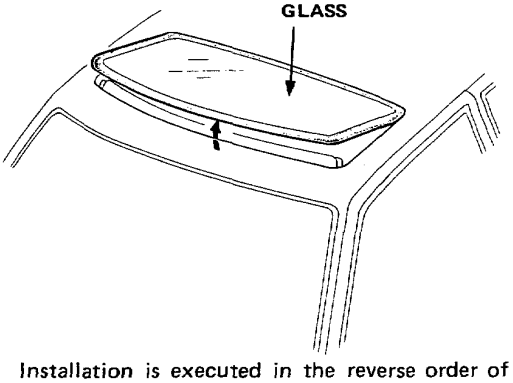
1. Slide sunshade all the way back.
2. Pry plug out of each bracket cover, remove screw, and slide cover off to the rear.



3. Close the glass fully.
4. Remove the nuts from front and rear mounts on both sides.



5. Remove the glass by lifting up and pulling forward as shown.



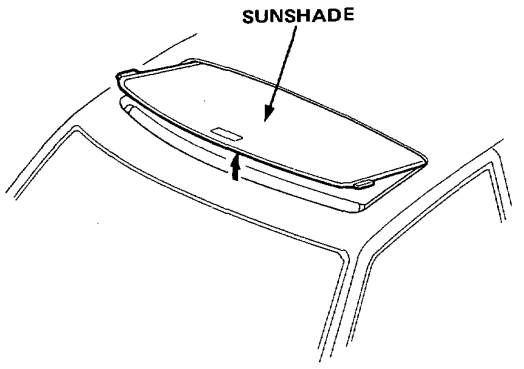
6. Installation is executed in the reverse order of the removal, and glass height and parallelity must be confirmed after the installation.

Sunroof

Sunshade Relpacement

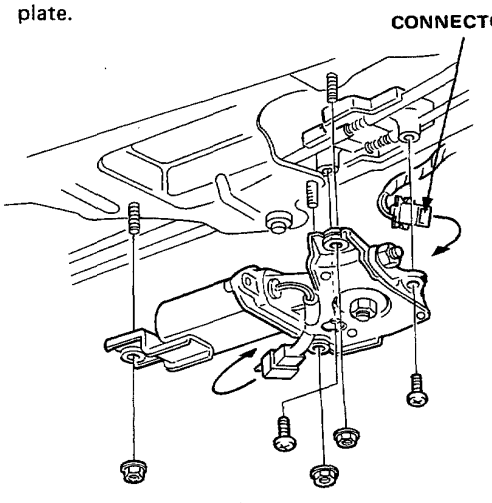
1. Remove the sunroof glass.
2. Slide sunshade out.

NOTE: The sunshade may be flexed slightly.



Motor Replacement

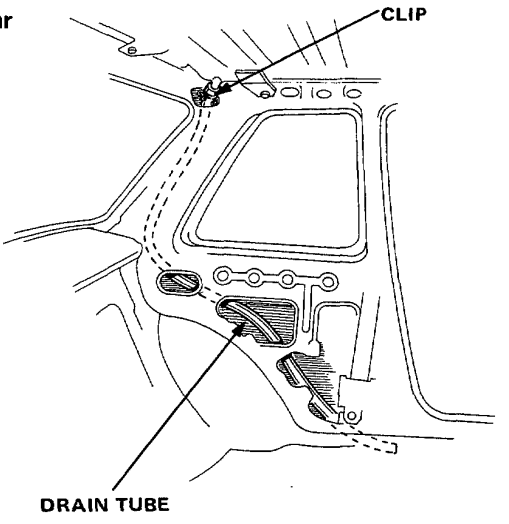
1. Remove the roof lining (page 22-36).
2. Disconnect the wireharness at connector and remove the motor.
3. Remove the sunroof motor by removing two bolts and three nuts from bottom of the motor mount plate.



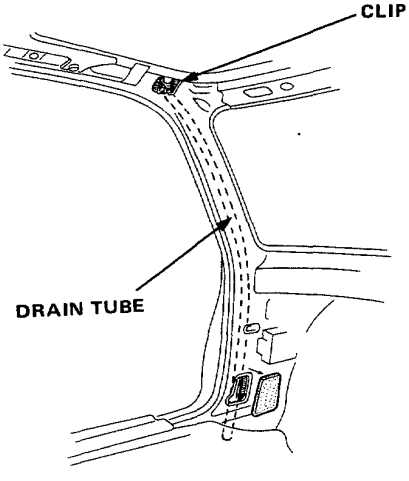
Drain Tube Replacement

1. Remove the roof lining (page 22-36).
2. Move the drain tube clipper band and remove the drain tube from the sunroof frame.

Rear



Front



3. At the time of installation, pay attention to the drain tube wiring.

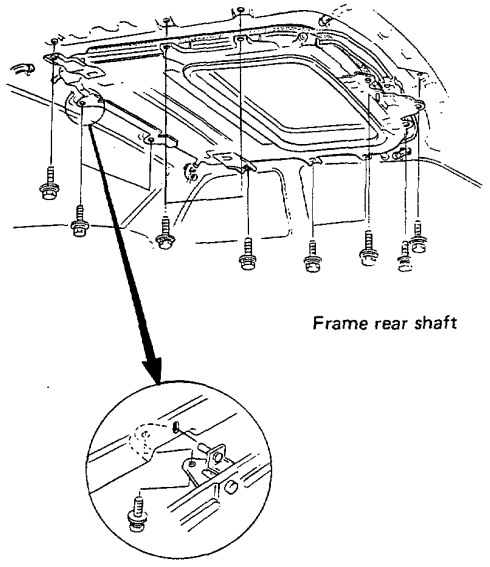
Frame Replacement

1. Remove:
   - Sunroof glass.
   - Sunshade.
   - Roof lining (page 22-36).
   - Sunroof motor.
   - Drain tube.
2. Remove the sunroof frame mounting bolts.

NOTE: Remove the bolt on the very rear of the frame last.

3. Support the front of the frame, remove the bolt, and remove the frame from the car.

CAUTION: Take care that the seats etc. in the car do not become dirty.



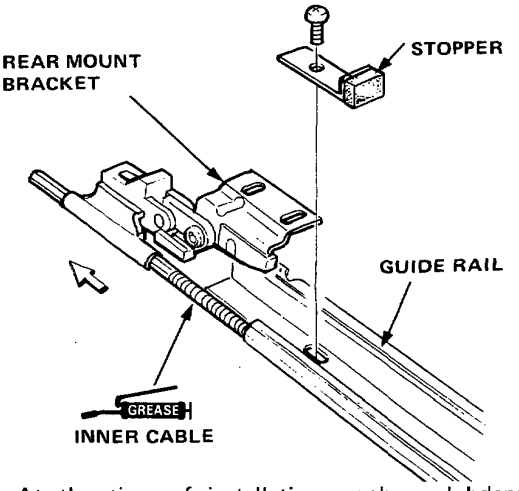
Frame rear shaft

4. Clean the top of the frame.
5. At the time of installation, confirm the wiring of the interior light.
6. At the time of installation, insert the frame rear shaft into the body hole.

Inner Cable Replacement

1. Remove the sunroof frame.
2. Remove the stopper, and pull the rear mount bracket from the rail.

CAUTION: As sealant is applied between guide rail and frame, take care not to bend the guide rail.

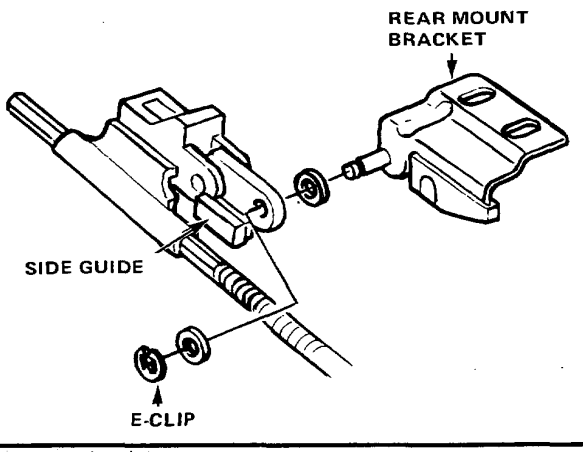


3. At the time of installation, apply molybdenum grease to the inner cable.

Rear Mount Bracket Disassembly

1. Remove the inner cables.
2. Remove the side guides from rear mount brackets.
3. Pry E-clip off pin, and remove the rear mount bracket from cable.

NOTE: Replace the guides and E-clips with new ones whenever disassembled.

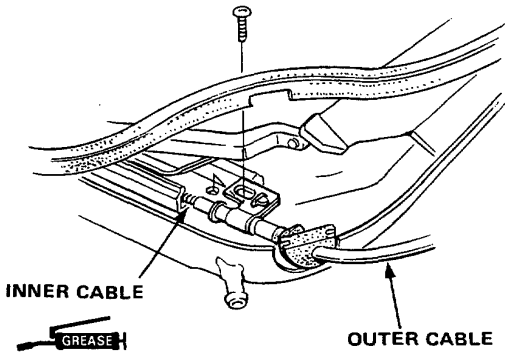


Sunroof

Outer Cable Replacement

1. Remove the sunroof frame.
2. Remove the outer cable mounting bolt, and remove the outer cable from the frame.

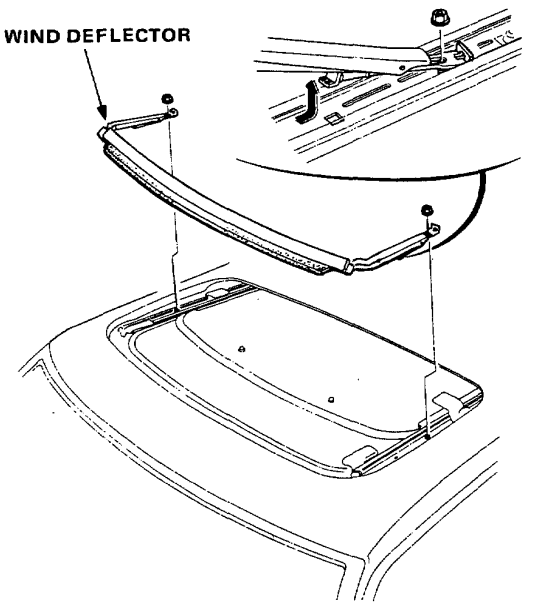
CAUTION: As sealant is applied between guide rail and frame, take care not to bend the guide rail.



3. At the time of installation, apply molybdenum grease to the inner cable.

Wind Deflector Installation

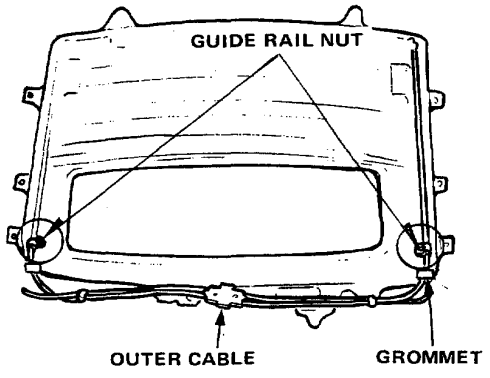
Installation is done in the reverse order of removal. When installing, make sure to insert the deflector ends tightly into the guide rails and arrange the deflector and rails in parallel.



Guide Rail Replacement

With sunroof out of car, remove the guide rail mounting nuts, lift off the guide rails, and remove the cables with rear mount brackets attached.

NOTE: Fill groove in each grommet with sealant when installing cable.

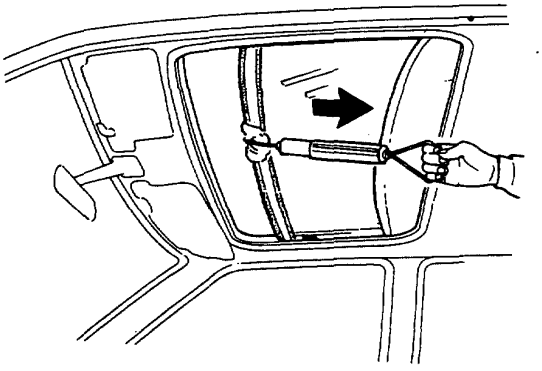


Closing Drag Check (Motor Removed)

Before installing the sunroof motor, measure effort required to close sliding panel using a spring scale as shown.

If load is over 98 N (10 kg, 22 lb), check side clearance and sliding panel height (page 22-31).

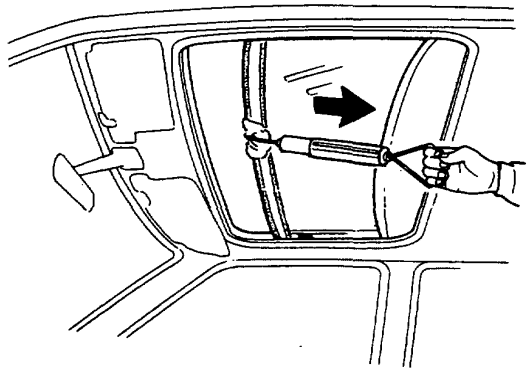
Closing Drag: Less than 98 N (10 kg, 22 lb)



Closing Force Check (Motor Installed)

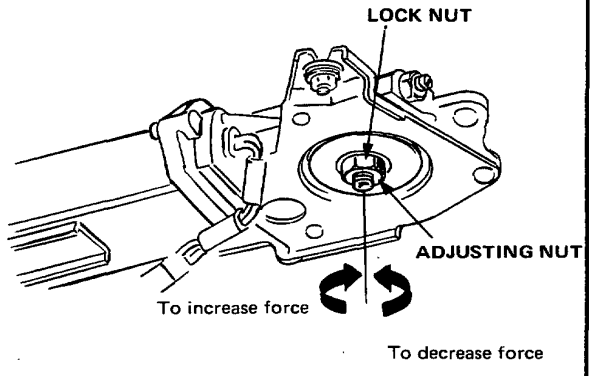
1. After installing all removed parts, have a helper hold switch to close sunroof while you measure force required to stop it. Attach spring scale as shown. Read force as soon as glass stops moving, then immediately release switch and spring scale.

   Closing Force: 196–245 N (20–30 kg, 44–66 lb)



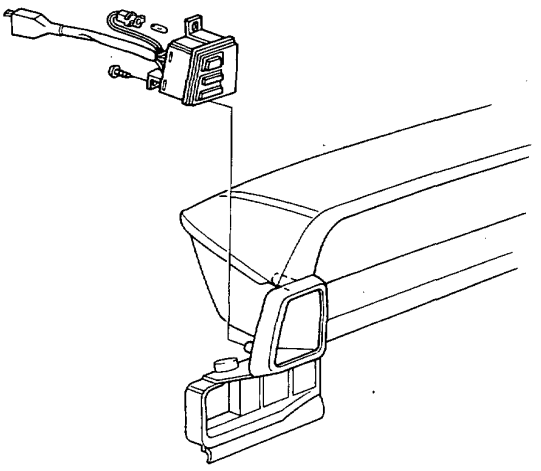
2. If force is not within specification, adjust by turning sunroof motor clutch adjusting nut.

   NOTE: After adjusting secure with lock washer.



Switch Replacement

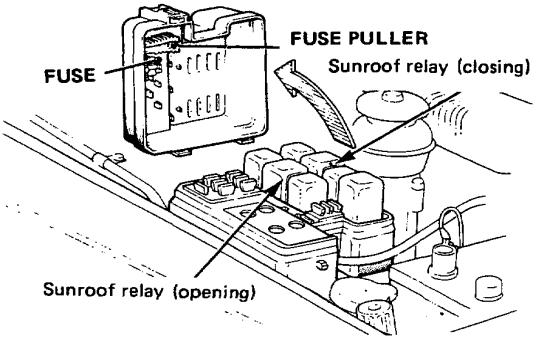
1. Remove the instrument panel (page 22-45).
2. Remove the screws, then remove the switch.



Switch testing is on page 25-39.

Relay Replacement

Engine room



Sunroof

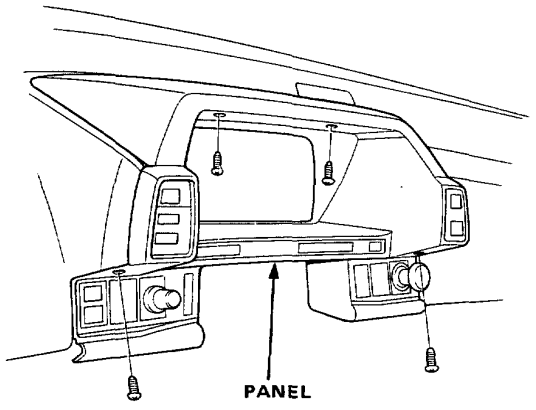
Troubleshooting

Symptom	Probable Cause
Water leak	1. Gap between glass weatherstrip and roof panel. 2. Deflective or improperly installed glass weatherstrip. 3. Clogged drain tube. 4. Gap between glass weatherstrip and body.
Wind noise	1. Excessive clearance between glass weatherstrip and roof panel.
Deflector noise	1. Improper clearance between deflector blade and roof panel. 2. Insufficient deflector extension. 3. Deformed deflector.
Motor noise	1. Loose motor. 2. Worn gear or bearing. 3. Outer cable deformed.
Sliding panel does not move, but motor turns	1. Foreign matter stuck between guide rail and sliding panel. 2. Interference between parts. 3. Outer cable loose. 4. Outer cable not attached properly. 5. Clutch out of adjustment.
Sliding panel does not move and motor does not turn (Sliding panel can be moved with sunroof wrench)	1. Blown fuse. 2. Faulty switch. 3. Battery run down. 4. Defective motor.

Instrument Panel

Replacement

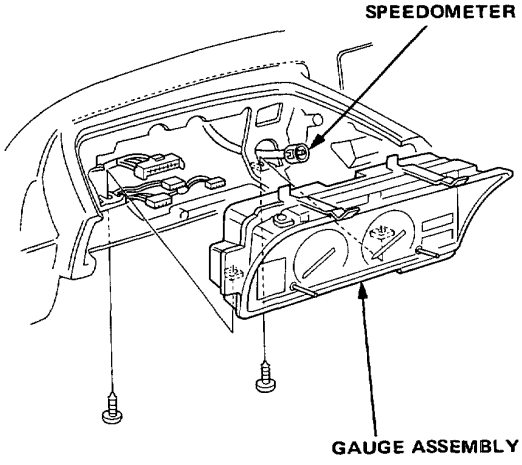
1. Remove the lower panel (page 22-46).
2. Remove the four screws.
3. Pull the instrument panel out, then disconnect the wire connectors.
4. Remove the panel.



5. Remove the four screws, then lift the gauge assembly so you can reach the wire connectors.

   CAUTION: Do not pull on the wires when disconnecting connectors.

6. Disconnect the speedometer cable and wire connectors, then remove the gauge assembly.

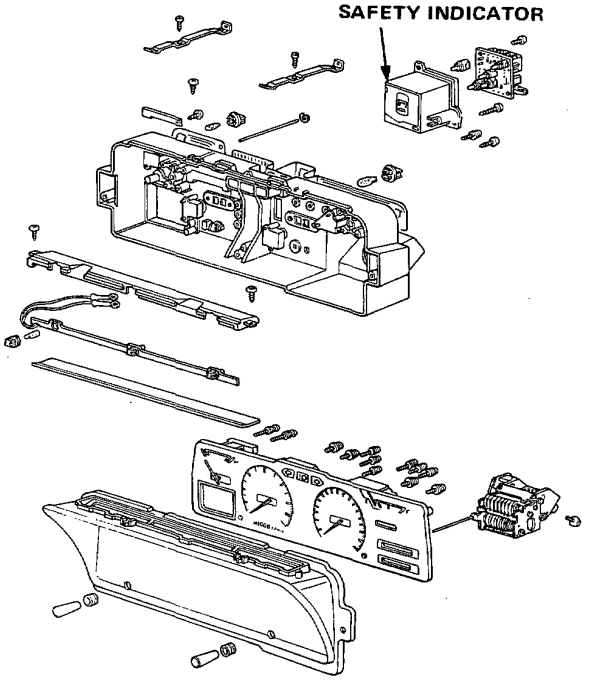


7. At the time of installation, connect the wire harness securely and correctly (page 22-48).

Gauges

Overhaul

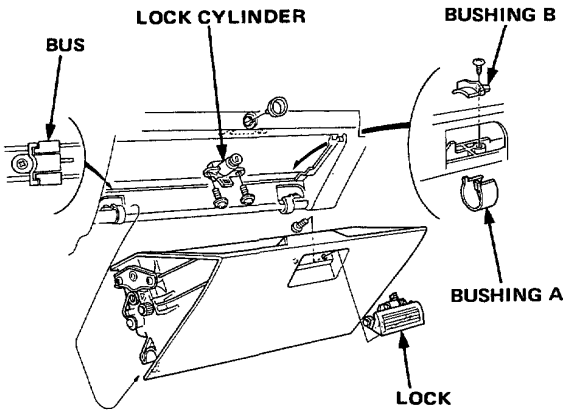
CAUTION:
- **Do not touch the meter indication plates.**
- **Avoid damaging coupler terminals and printed circuit.**



Glove Box

Replacement

1. Remove the assist lower panel.
2. Remove the bushing B screws on each side, then lift the bushings off the shaft.
3. Slide bushing A, one on each side, to the outside and lift the glove box off the shaft.
4. Remove the 2 screws, and remove the lock cylinder from the dashboard.
5. Remove the 2 screws, and remove the lock from the glove box.

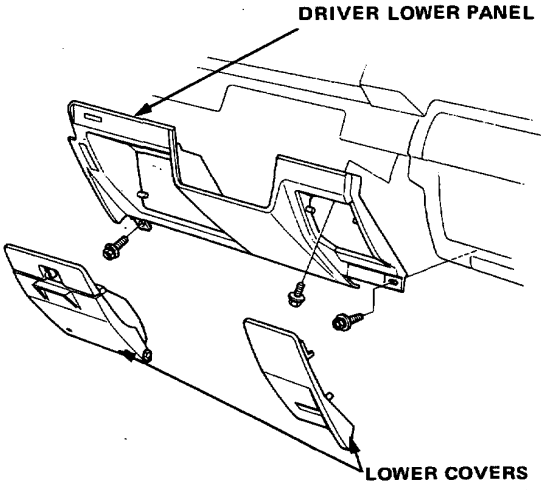


6. Installation is executed in reverse order of the removal, and after the installation, the locking condition of the glove box is adjusted by moving the lock cylinder.

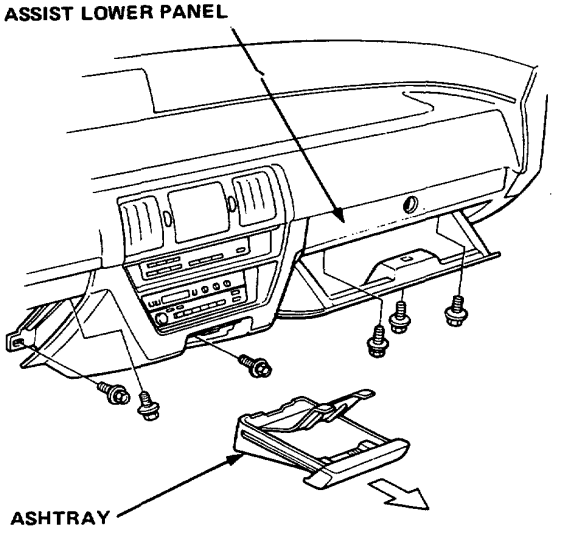
Dashboard

Replacement

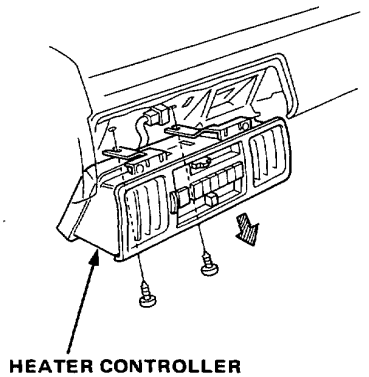
1. Remove the 2 lower covers, and then remove the driver lower panel by removing the 4 bolts. At this time, pay attention to the wire harness connection.



2. Open the glove box and remove the ashtray.
3. Remove the assist lower panel by removing the bolts. At this time, remove the wire harness for glove box light, ashtray light, and radio.

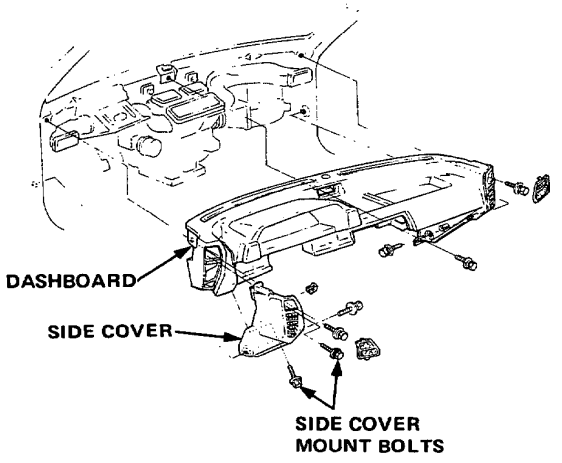


4. Remove the heater controller by removing the 2 screws.
5. Remove the cable mounting screw to remove the cable, and separate the wire harness connection.

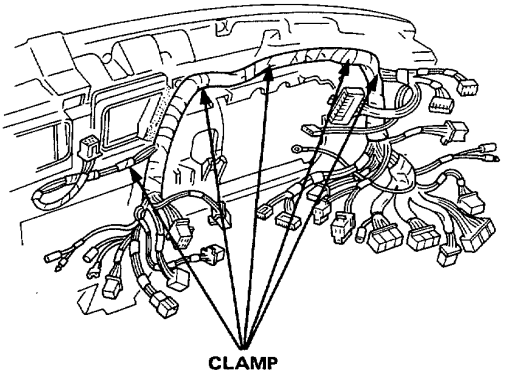


6. Remove the instrument panel and the clock (pages 22-45, 52).
7. Remove the 5 mounting bolts and raise the dashboard to remove it. At this time, also separate the wire harness connection.

CAUTION: When removing the dashboard, take care not to damage the surroundings, and pay attention to catching of the wire harness.



Wiring on the rear of the dashboard



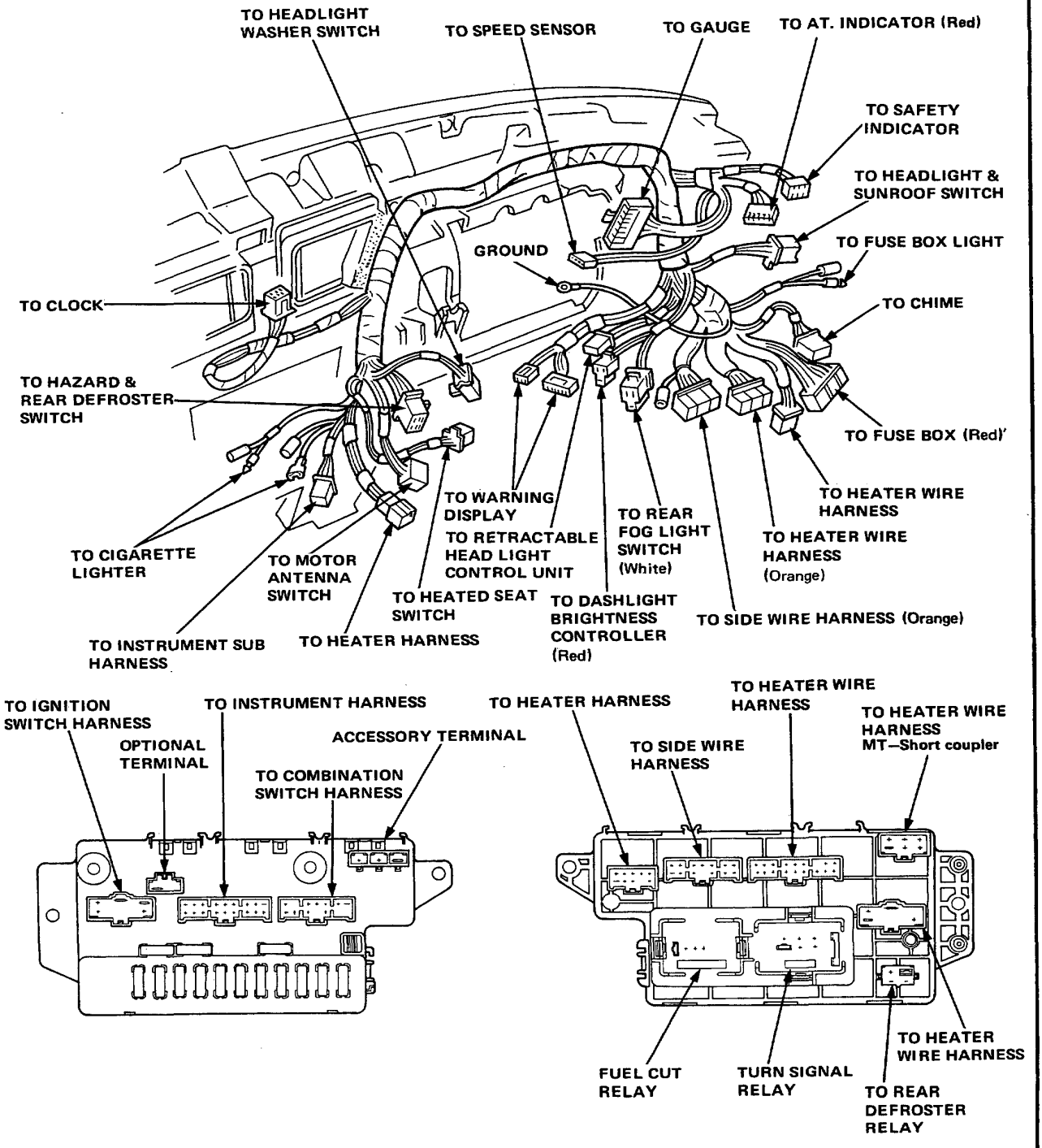
8. Install the dashboard in the reverse of removal.

CAUTION:
- **Before tightening the dashboard bolts, make sure the instrument wire harness are not pinched.**
- **Connect the wire harness securely and correctly (page 22-48).**

Instrument Panel/Dashboard Wiring

Wire Harness Connections

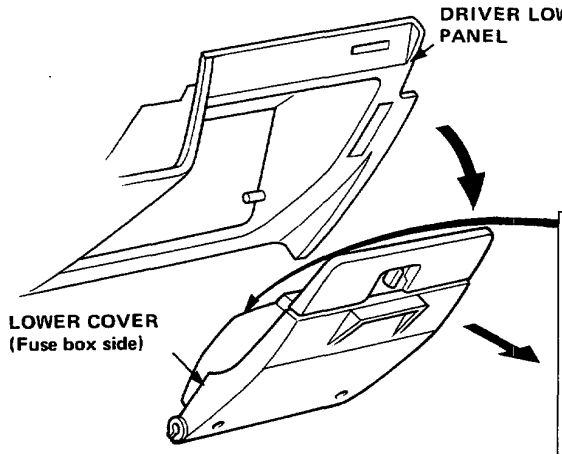
The coupler colors are shown in brackets.



Fuse Box

Replacement

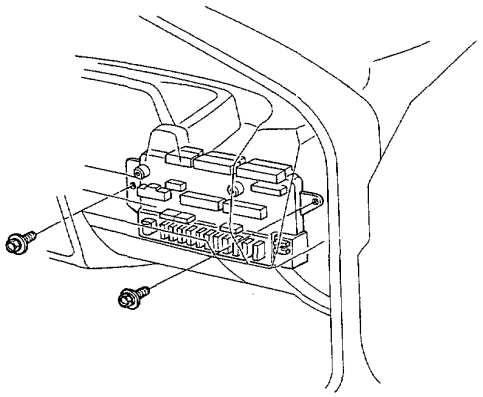
Dashboard side



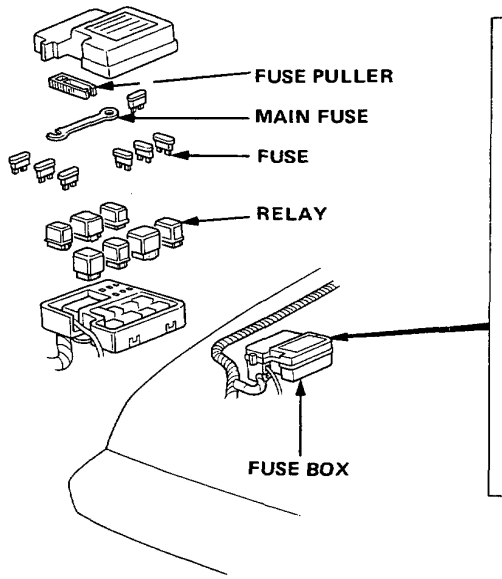
10A SPARE FUSE	15A SPARE FUSE	20A SPARE FUSE	USE ONLY CORRECT CAPACITY FUSES DO NOT USE METAL FOIL OR WIRE : THEY MAY START FIRE

FUSE PULLER	20A	10A	20A	10A	10A	15A	10A	10A	10A	20A	10A
	REAR DEFROSTER	CIGARETT LIGHTER / INTERIOR LIGHT	HEAD LIGHT WASHERS	TURN SIGNALS	BACK-UP LIGHTS / FUEL GAUGE	WIPER WASHER	(ALB)	COOLING FAN	REAR DEFROSTER RELAY	HEATER	(RADIO)
	1	2	3	4	5	6	7	8	9	10	11

10A	INSTRUMENT LIGHTS	1
15A	TAIL LIGHTS	2
15A	(R POWER WINDOW)	3
15A	(L POWER WINDOW)	4



Engine room side



DONT USE OTHER THAN SPECIFIED FUSE WIRE NOR METAL FOIL.
FIRE HAZARD MAY RESULT.

LIGHTING RELAY	(SUNROOF RELAY (CLOSE))	(POWER WINDOW RELAY)	DIMMER RELAY
COOLING FAN RELAY	(SUNROOF RELAY (OPEN))	(ALB MOTOR RELAY)	

15A	15A	10A
R HEAD LIGHT	L HEAD LIGHT	REGULATOR
15A	15A	15A
HORN	R RETRACTOR MOTOR	L RETRACTOR MOTOR

(20A)	(20A)	(20A)
(ALB B1)	(ALB B2)	(ALB B3)

MAIN FUSE	
	65A
	65A
	(65A)

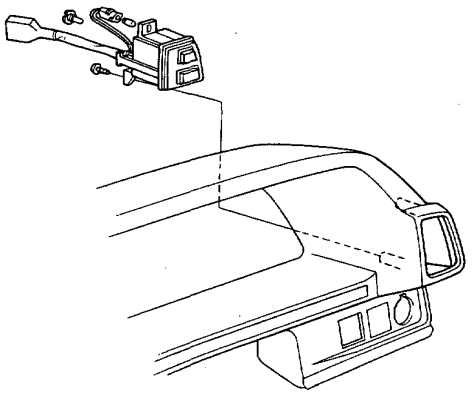
◇ 6000

10A	STARTER SIGNAL

Dashboard Switch Illuminations

Hazard and Rear Window defroster Switch Replacement

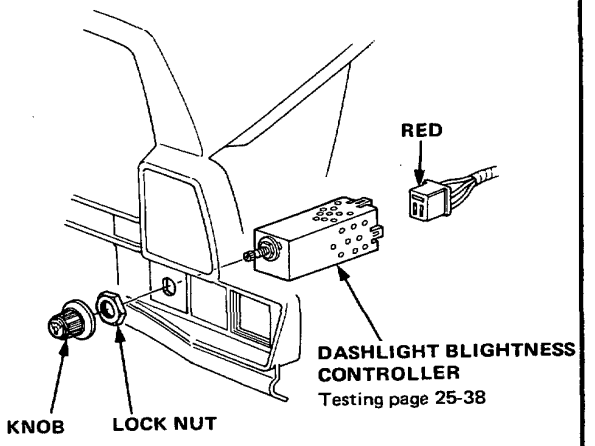
1. Remove the instrument panel (page 22-45).
2. Remove the screws, then remove the switch.



Switch testing is on page 25-11.

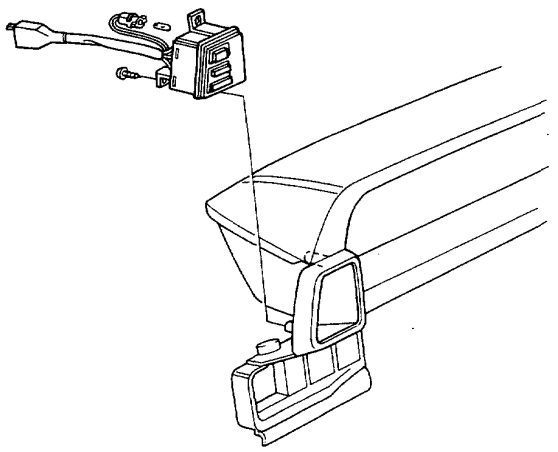
Dashlight Brightness Controller Replacement

1. Remove the lower panel (page 22-46).
2. Remove the dashlight brightness controller knob.
3. Remove the lock nut, then remove the switch.
4. At the time of installation, pay attention to the coupler colors.



Retractable Headlight and Sunroof Switch Replacement

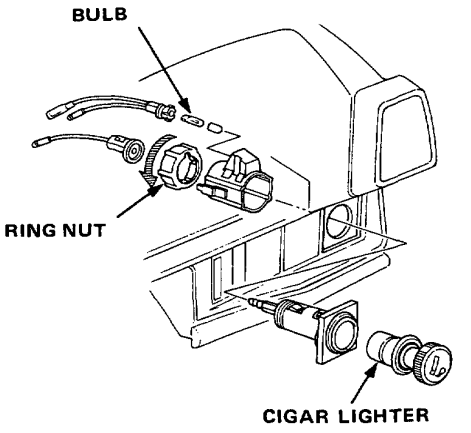
Remove the switch in the same way as the hazard and rear window defroster switch.



Retractable Headlight switch testing is on page 25-21.
Sunroof switch testing is on page 25-39.

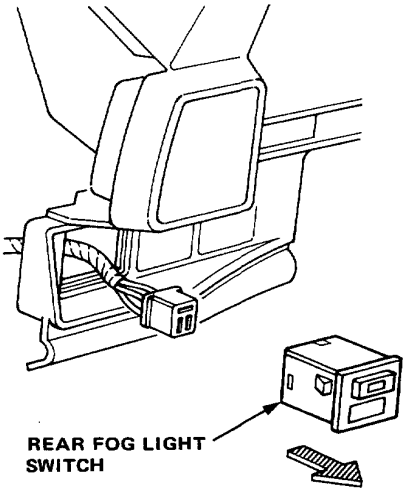
Cigar Lighter Replacement

1. Remove the lower panel (page 22-46).
2. Disconnect the wire harness at the cigar lighter.
3. Remove the ring nut and remove the cigar lighter together with the protector.
4. Bend up the staking, pull the bulb socket off and remove the bulb.



Rear Fog Light Switch Replacement

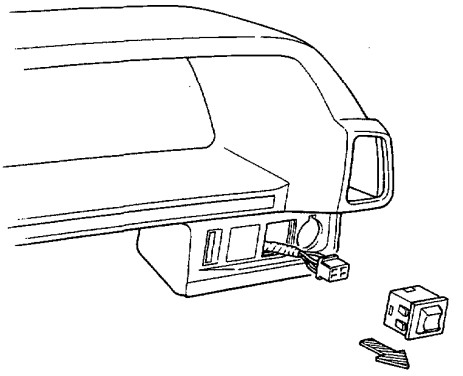
1. Remove the lower panel (page 22-46).
2. Disconnect the wire harness from behind the console.
3. Release the switch pawls and remove the switch.



Switch testing is on page 25-46.

Power Antenna Switch Replacement

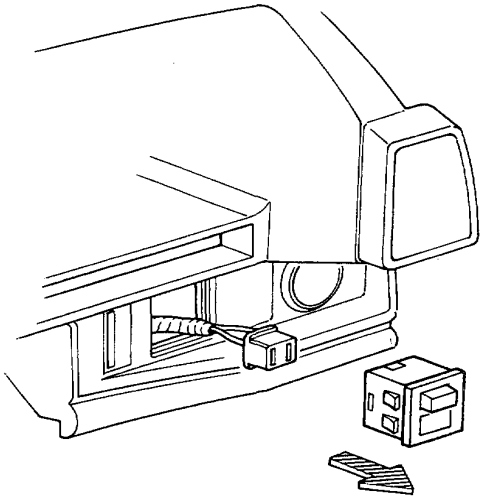
Remove the switch in the same way as rear fog light switch.



Switch testing is on page 25-41.

Headlight Washer Switch Replacement

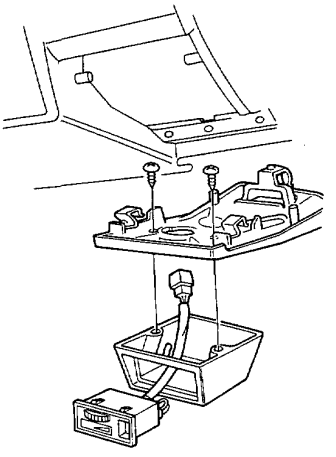
Remove the switch in the same way as the rear fog light switch.



Switch testing is on page 25-51.

Heated Seat Controller Replacement

1. Remove the lower cover, then disconnect the wire harness.
2. Remove the screws, then remove the switch.

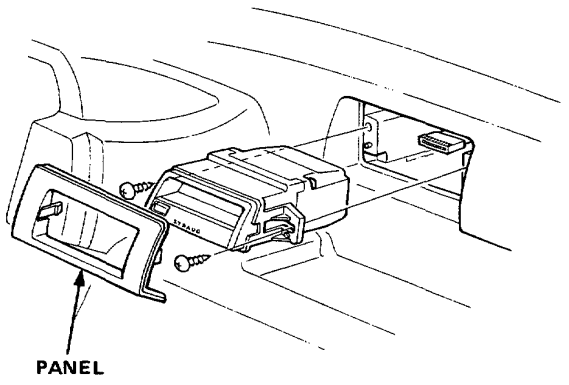


Dashboard Switch Illuminations

Clock/Electronic Navigator Display

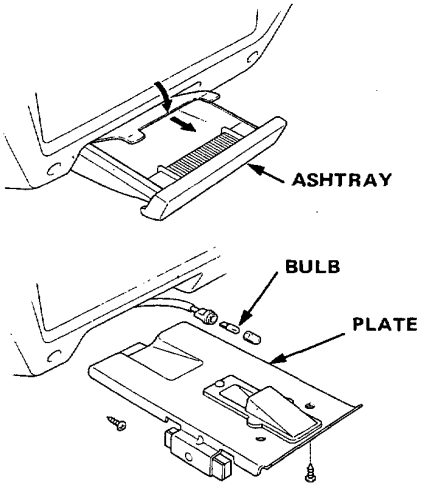
1. Pry off the dashboard trim panel with a screwdriver.
2. Remove the two clock mounting screws, disconnect the clock connector then remove the clock.

NOTE: For the type KY, the display part of the electronic navigator is installed around the clock.



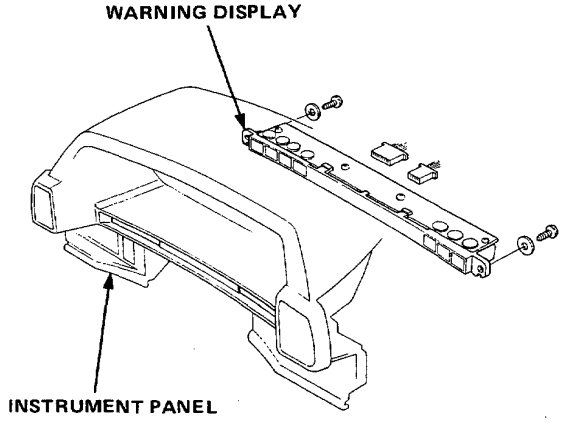
Ashtray Light Bulb Replacement

1. Remove the ashtray.
2. Remove the three screws and plate.
3. Turn the socket 90° counterclockwise and remove the bulb.



Warning Display Replacement

1. Remove the instrument panel (page 22-45).
2. Remove the screws, then remove the warning display.

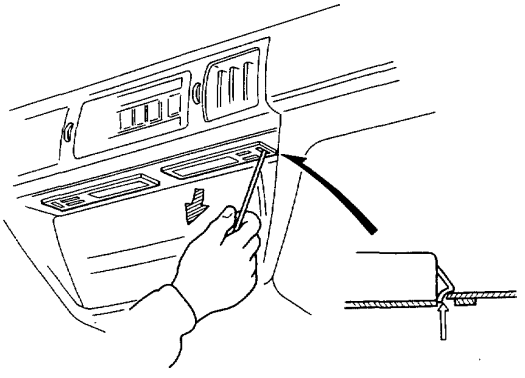


Instrument Panel Light Bulb Replacement

1. Use a flat screwdriver to depress the spring-loaded projection from the hole in the case cover, and lower it in this condition.

NOTE: Be careful not to use too much force, as the case cover breaks easily.

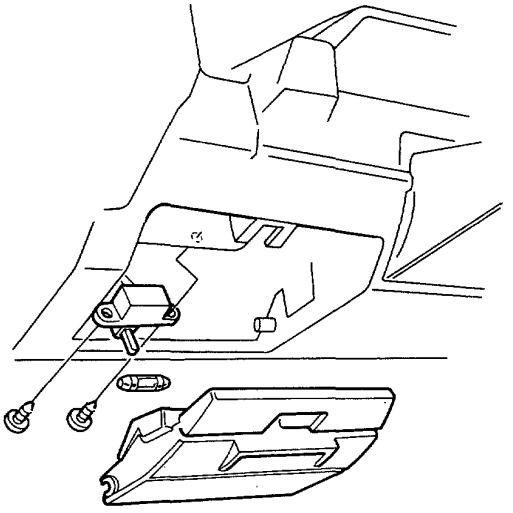
2. Disconnect the wire harness from the light case.
3. Remove the case cover and replace the bulb.



Antenna

Fuse Box Light Bulb Replacement

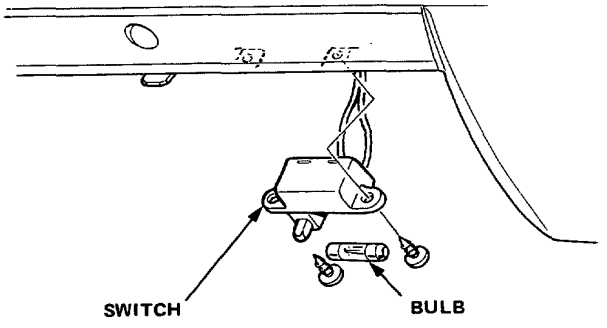
1. Remove the lower cover.
2. Remove the screws and switch.
3. Remove the switch case cover and replace the bulb.



Inspection is on page 25-12.

Glove Box Light Bulb Replacement

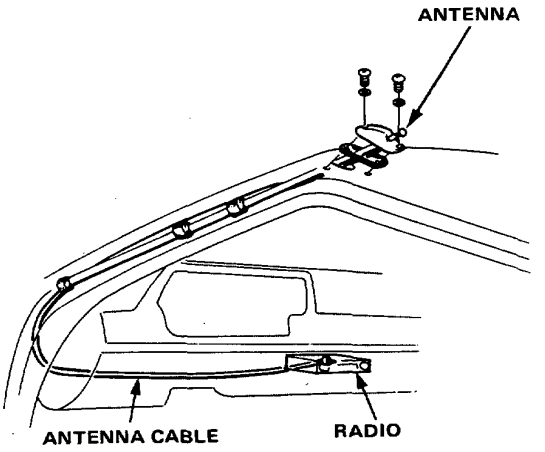
1. Open the glove box.
2. Remove the two screws and switch.
3. Replace the bulb.



Inspection is on page 25-12.

Antenna Replacement

1. Remove the radio and disconnect the antenna cable from the radio (page 22-46).
2. Remove the two antenna mounting screws.
3. Tie a piece of string or wire to the antenna cable plug before pulling antenna cable out, then use it to install.
4. Remove the antenna.

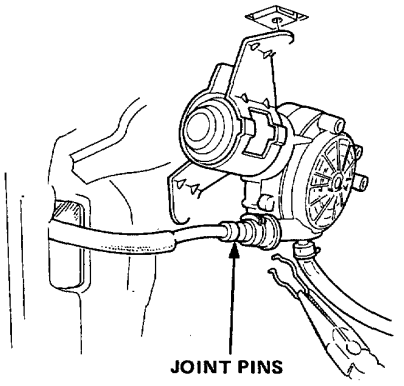


Auto Antenna

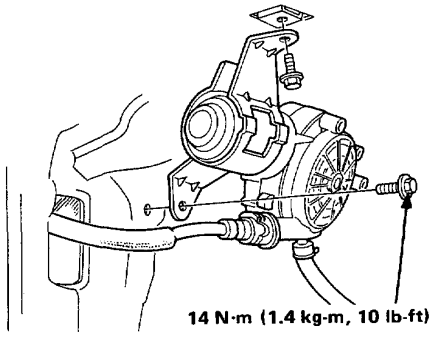
Removal

CAUTION: Be careful not to damage the antenna drive cord.

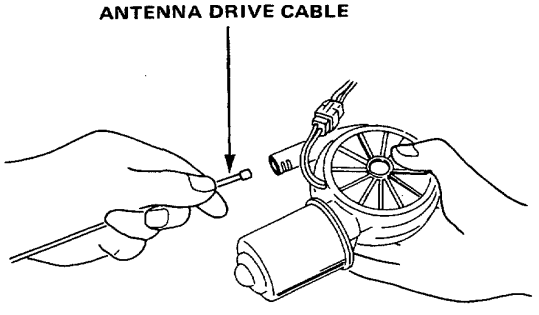
1. Turn the ignition switch to ACC. Turn the auto antenna switch to ▲ position until the step is extended, then turn off the switch to stop the antenna.
2. Remove joint pins securing cable guide.



3. Remove auto antenna motor.

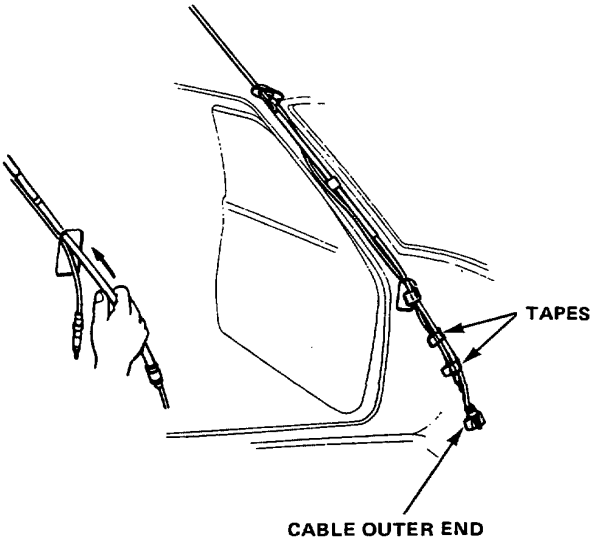


4. While lightly pulling antenna drive cable, turn ignition switch to ACC and antenna switch on so the antenna motor operates and drive cable is forced out. Cable will be removed from the motor.
5. Pull antenna up and remove it.

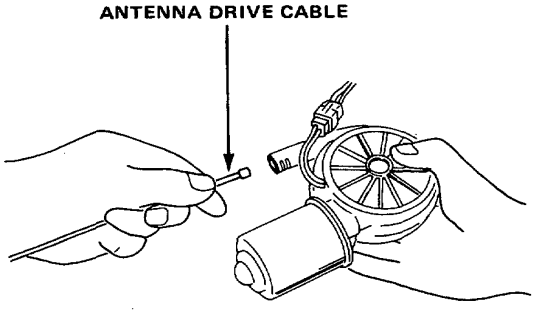


Installation

1. With antenna fully extended, feeder cord taped to the drive cable outer and the end of outer wrapped with tape, insert antenna assembly into body from the roof side.
2. Remove the tapes and slide cable outer up to the expose drive cable.
   Pass the cable through cable guide.

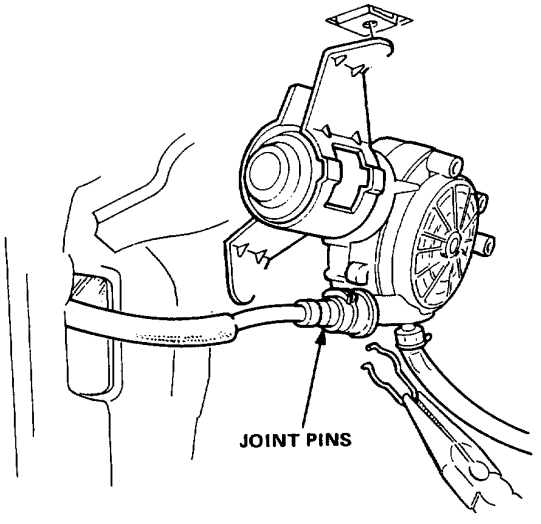


3. Insert drive cable end into antenna motor, then turn ignition switch to ACC and antenna switch off. The drive cable will be retracted by the motor.

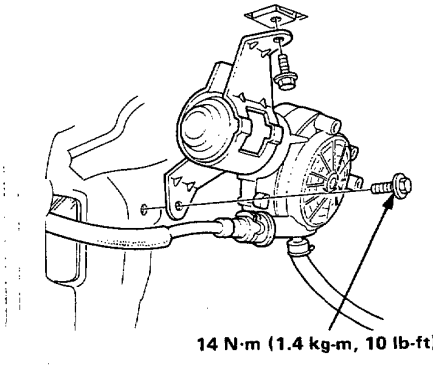


Speaker

4. After the drive cable is retracted and the motor stopped, install cable guide to the motor and outer, and secure with joint pins.



5. Turn ignition switch to OFF. Install the antenna motor on the motor bracket.

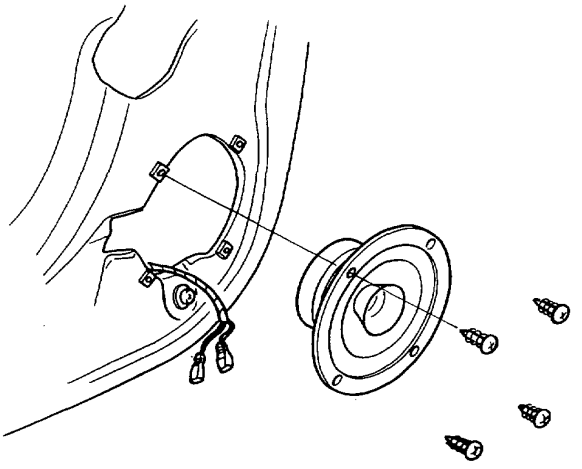


Replacement

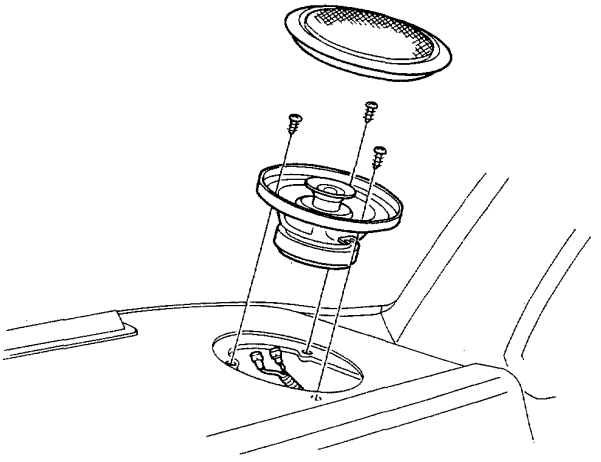
NOTE: Make sure that there are no screws or anything else attracted by speaker magnet.

Front

1. Remove the front door lining (page 22-6).



Rear

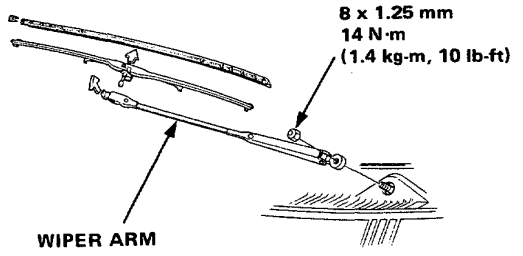


Windshield Wiper and Washer

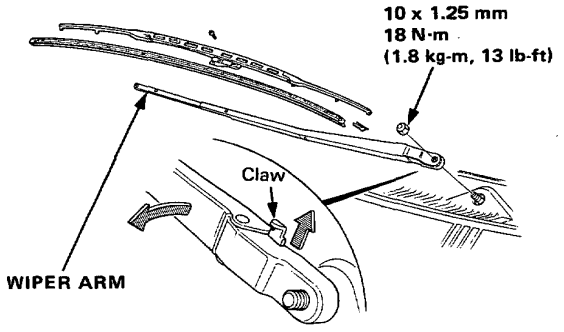
Front Window Wiper Replacement

1. Remove the nut, raise the arm, and remove the wiper arm.
   For cars with a single wiper, remove the nut, raise the arm, pull out the claw to free the arm, and remove the arm.

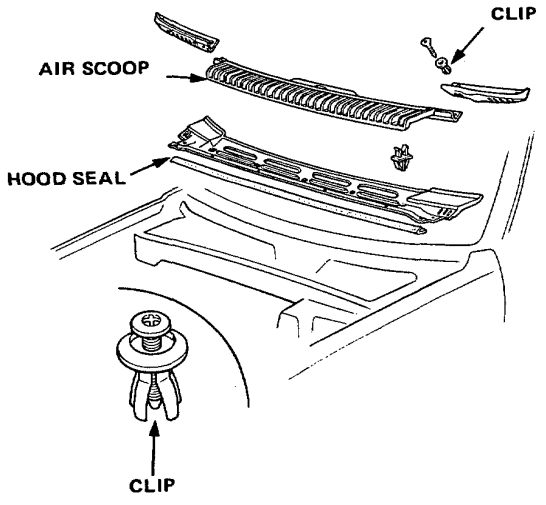
Double-wiper car



Single-wiper car

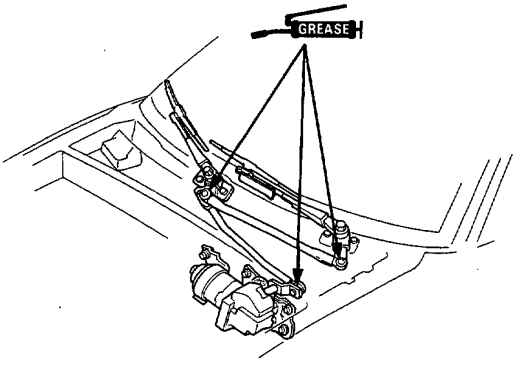


2. Remove the scoop and hood seal.

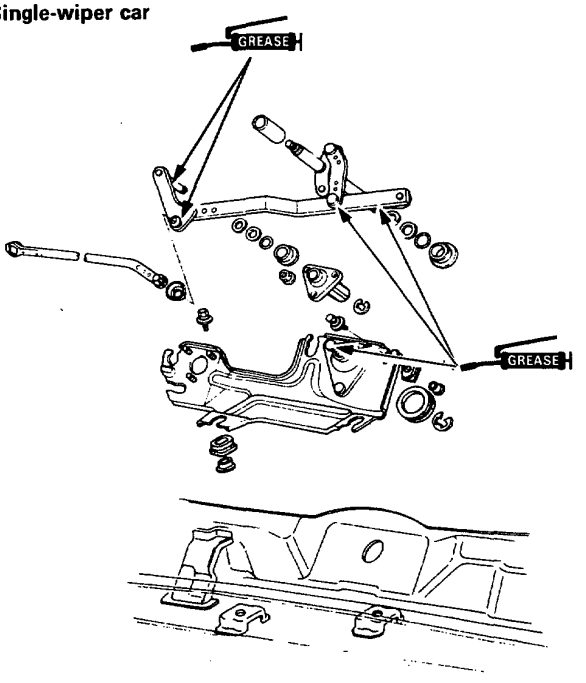


3. Disconnect the joint to motor and remove the linkage.

Double-wiper car

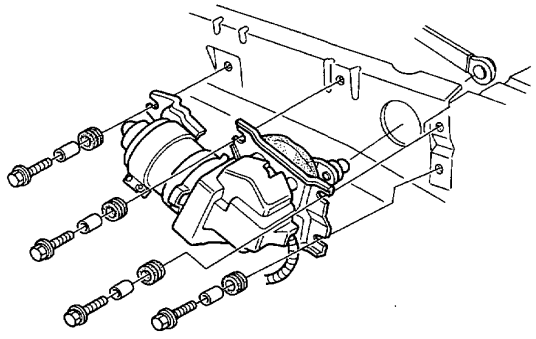


Single-wiper car



4. At the time of installation, pay attention to the linkage direction.

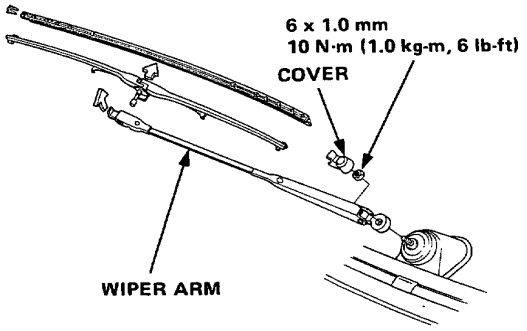
5. Remove four motor mounting bolts, and disconnect connector, then remove wiper motor.



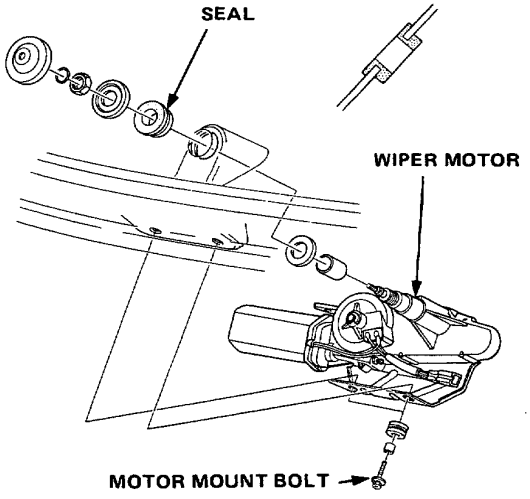
Inspection is on page 25-9.

Rear Window Wiper Replacement

1. Remove wiper arm cover and 6 mm nut, then remove wiper arm.



2. Disconnect connector from wiper motor.
3. Remove mounting bolts, then remove wiper motor.



Inspection is on page 25-10.

CAUTION: When the installation is not executed accurately, rain leakage may be caused. When required, exchange the seal.

Windshield Wiper and Washer

Wiper Arm Tension Check /Installation

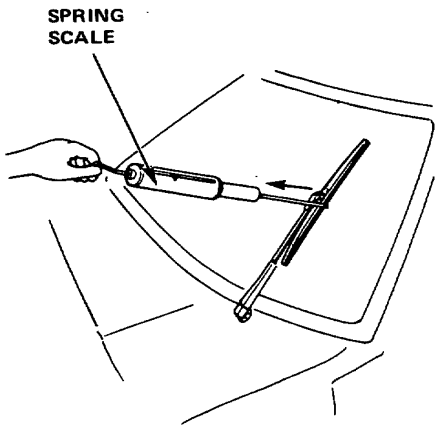
Check wiper arm tension as follows:

1. Attach spring scale to end of wiper arm and pull just enough to lift wiper off the windshield.

Front
U.K. model
750 ± 50 G (27 ± 1.8 oz) with arm perpendicular to window base.

Other models
650 ± 50 G (23 ± 1.8 oz)

Rear
550 ± 50 G (20 ± 1.8 oz) with arm perpendicular to window base.



Installation and Travel

2. Adjust wipers so the tips are 20–30 mm (0.8–1.2 in.) from weatherstrip at rest.

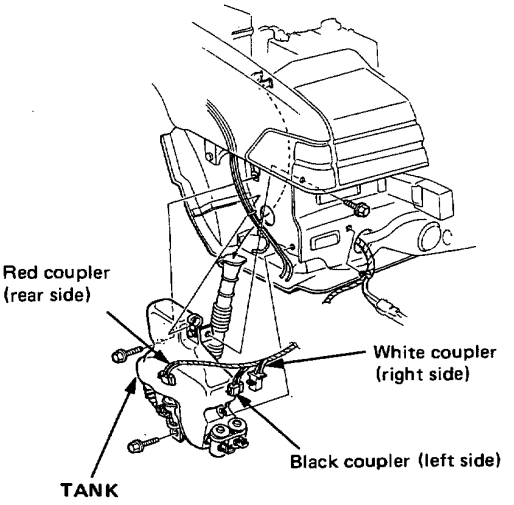
Front
Double-wiper car
Wiper Blade Travel on Driver side: 88° ± 2°
On passenger side: 99°48′ ± 2°
Single-wiper car: 144°30′ ± 3°

Rear 170°30′ ± 3°

Windshield Washer Replacement

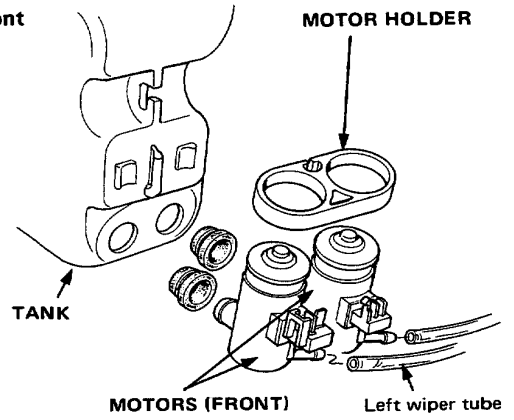
1. Remove the front bumper (page 22-60).

2. Remove the couplers and the tubes, and remove the tank by removing the 3 bolts.

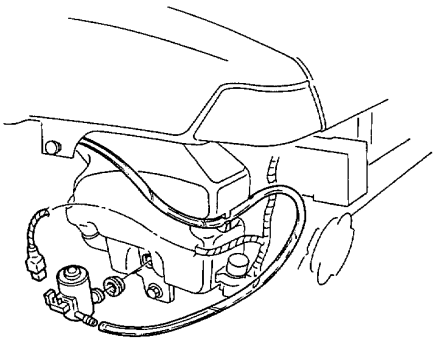


3. Remove the motor holder, and remove the front motor from the tank. For cars equipped with a rear wiper, also remove the rear wiper.

Front

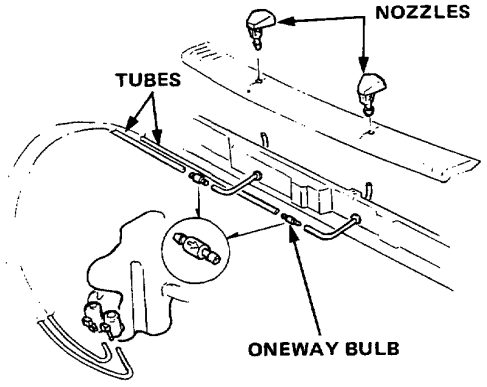


Rear

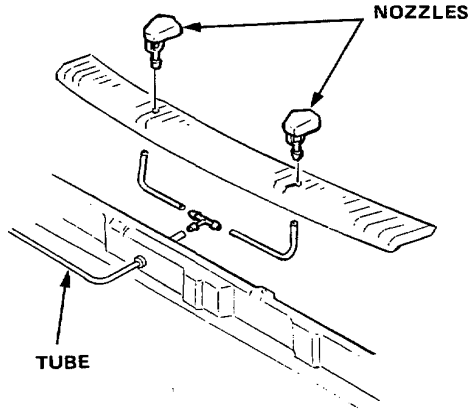


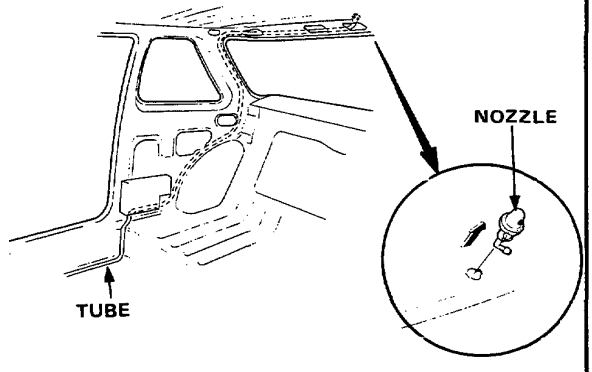
4. Remove the air scoop, then remove the tubes and nozzles.

Type with 2 front motors



Type with 1 front motor



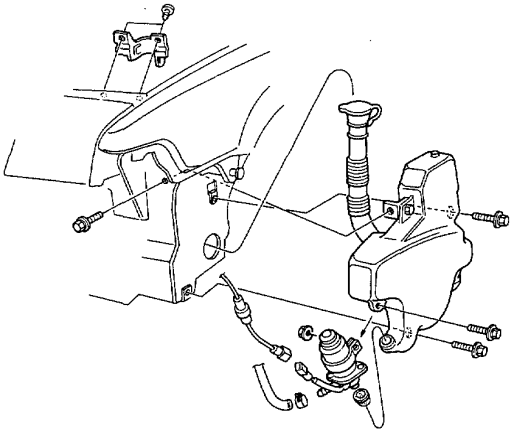


5. At the time of installation, do not confuse the right and the left tube. Also confirm that the washer liquid from the washer nozzle reaches the wiper blade position.

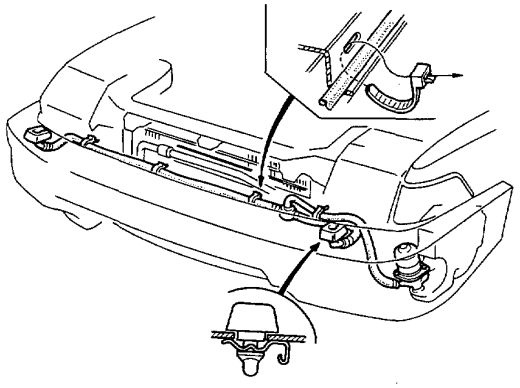
Replacement

1. Remove the front bumper (page 22-60).

2. Remove the couplers and the tubes, and remove the tank.



3. Separate the tube connection on the rear of the bumper, remove the nozzle clip, and remove the washer nozzle.

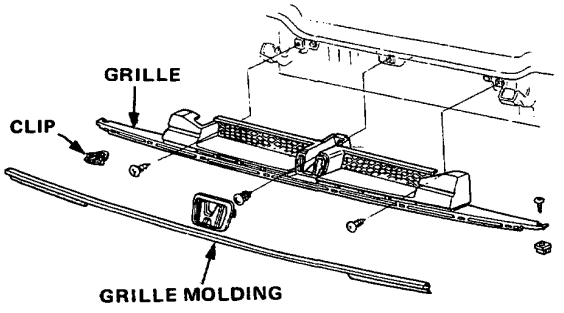


4. After the installation, confirm that washer liquid is sprayed from the washer nozzle.

Grille and Rear Molding

Replacement

1. Raise the headlights, and remove the 2 screws on both sides.
2. Remove the 3 screws on the grille front.
3. Remove the grille molding by sliding it to the side.

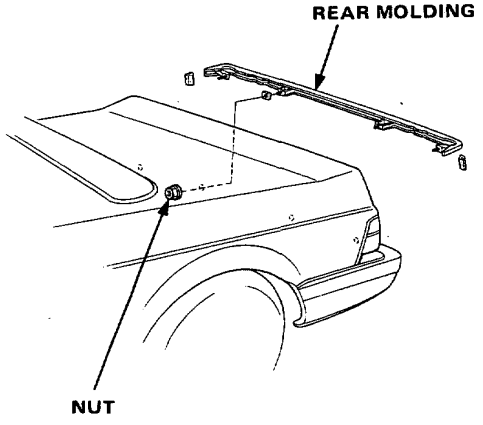


4. At the time of installation, install the grille molding after installing the clip on the grille molding.

NOTE: Pay attention to the direction of the clip.

5. Remove the rear molding by removing the 4 nuts on the inside of the trunk.

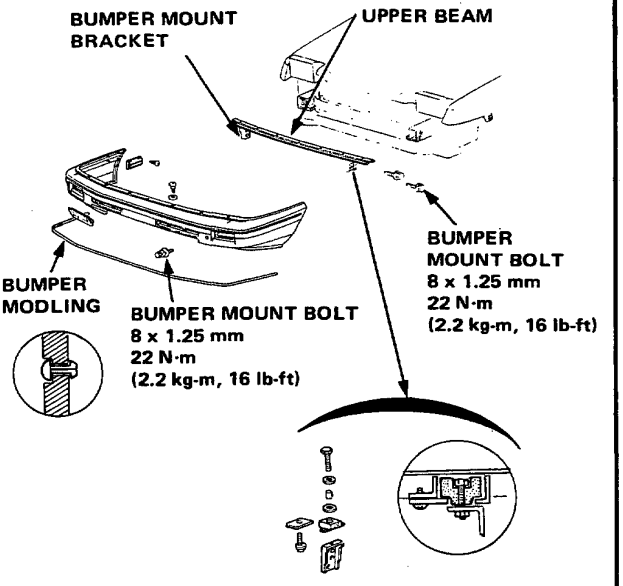
NOTE: When the nuts at both ends are difficult to remove, remove the tail light cover and the trunk side garnish (page 22-32).



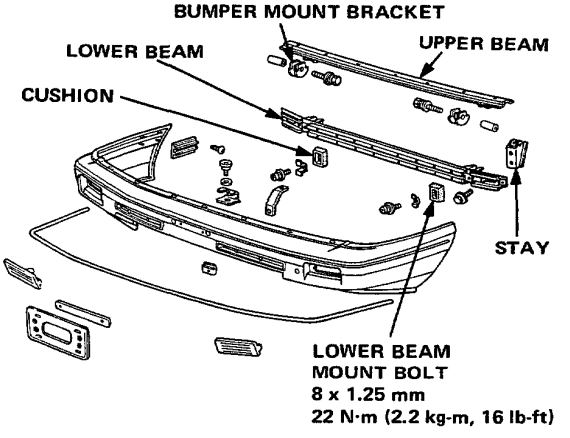
Front Bumper

Replacement

1. Remove the turn signal light, and separate the wire harness connection (page 22-65).
2. For cars equipped with a daytime running light, also separate the connection of the wire harness of this light.
3. Remove the bumper mounting bolts.
4. Slide the bumper to the front and remove it.
5. Remove the Bumper lower Beam by removing the 7 bolts. Then remove the bumper mounting bracket.
6. Remove the bumper molding.



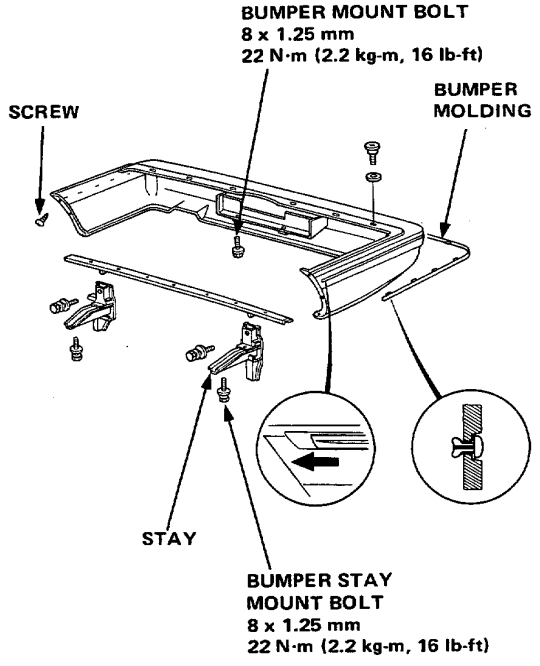
7. For cars equipped with an impact-absorbing bumper, remove the lower beam by removing the 2 bumper lower beam mounting bolts. Then remove the cushions by removing the bolts.



Rear Bumper

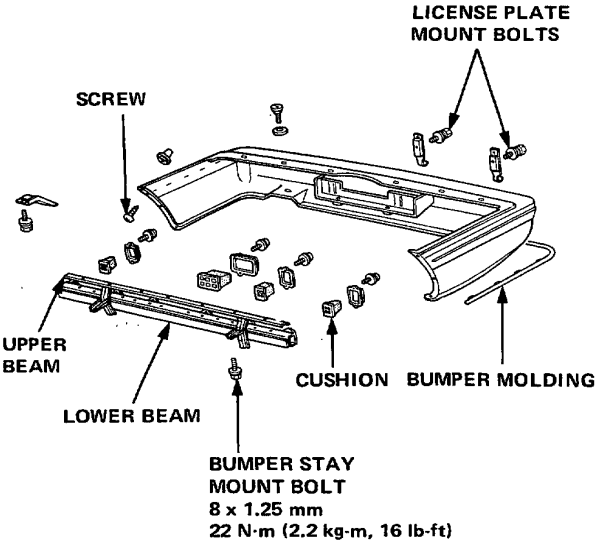
Replacement

1. Remove the 4 bumper stay mounting bolts on the lower side of the trunk floor panel and the 2 bumper mounting bolts.
2. Remove the 6 screws of the rear wheel arch, and separate the connection of the wire harness of the licence plate light. Then remove the rear bumper.
3. Remove the stays from the bumper by removing the bolts.
4. Remove the upper beam by removing the 7 bolts.
5. Remove the bumper molding.



Replacement (Cars equipped with impact-absorbing bumper)

1. Remove the 4 bumper stay mounting bolts on the lower side of the trunk floor panel.
2. Remove the 6 screws of the rear wheel arch.
3. Remove the 2 licence plate mounting bolts, and separate the connection of the wire harness of the licence plate light. Then remove the rear bumper.
4. Remove the bolts, remove the bumper lower beam from the bumper, and remove the cushions.
5. Remove the upper beam by removing the 7 bolts.
6. Remove the bumper molding.

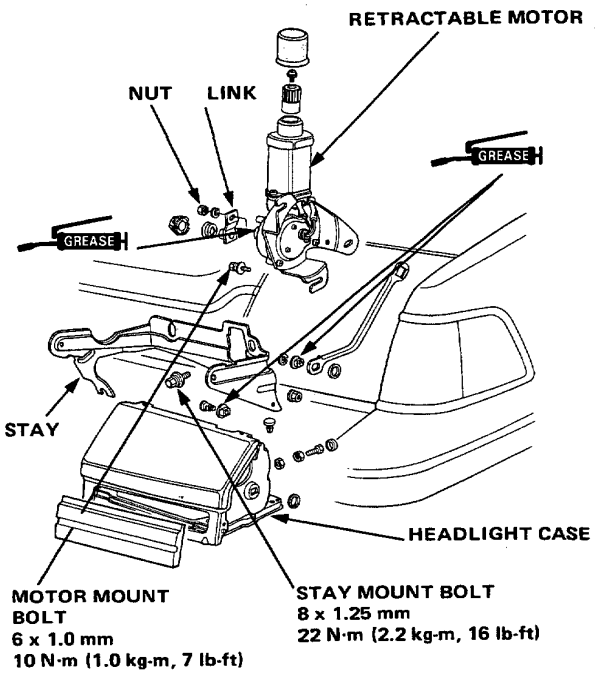


Headlight

Replacement

1. Open the hood.
2. Remove the nut of the link, and separate the connection between retractable motor and link.
3. Remove the coupler from the headlight.
4. For cars equipped with a headlight adjuster, remove the actuator from the case (page 22-63).
5. Remove the headlight case by removing the 4 stay mounting bolts.

NOTE: The headlight case and stay must be replaced as an assembly.



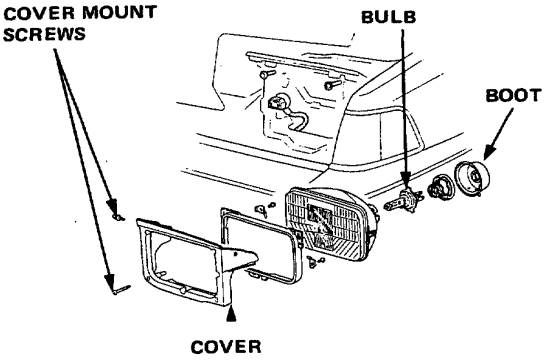
6. Remove the 3 motor mounting bolts, remove the coupler, and remove the retractable motor.
7. At the time of installation, pay attention to the following items.
   - Engagement of the notch part of the link hole with the notch part of the motor shaft.
   - Flush matching with bonnet and fender. Execute adjustment with loosened stay mounting bolts.
   - Wire harness catching.

Bulb Replacement

CAUTION:

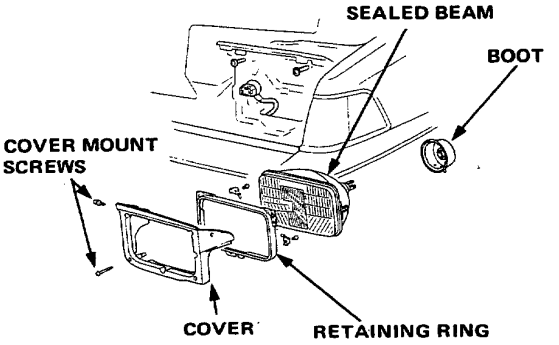
- **Do not touch the glass surface of bulbs with bare hand or dirty glove. Otherwise it may cause damage their proper function.**
- **Do not touch bulbs with hands or skin while they are on or just after they are put out. They are hot.**
- **Do not try to replace bulbs or clean the headlight until with lights on.**
- **After replacing bulbs, install the boot while pushing it tightly to the unit. Also set the top mark above.**

1. Raise the headlight.
2. Remove the headlight cover by removing the 4 cover mounting screws.
3. Push the headlight to the inside, slide it upwards, and remove it from the adjusting screw.
4. Remove the coupler and the boot, and remove the bulb.



Canadian model

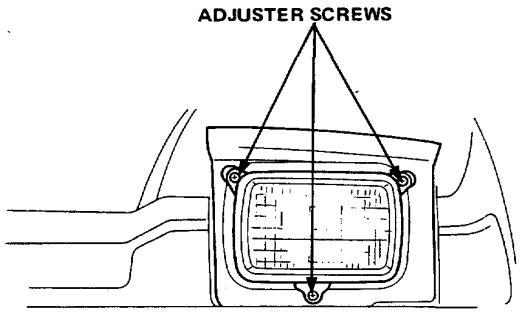
1. Raise the headlight.
2. Remove the headlight cover by removing the 4 cover mounting screws.
3. Remove the retaining ring by removing the 3 screws.
4. Remove the coupler and the boot, and remove the sealed beam.



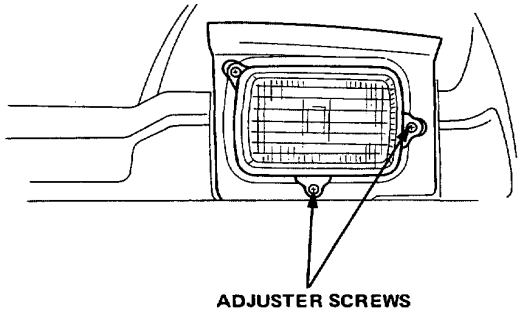
Headlight Adjuster

Adjustment

NOTE:
- Adjust headlight to local requirements.
- If headlight adjuster is equipped, adjust headlight with adjuster knob in "0" position.



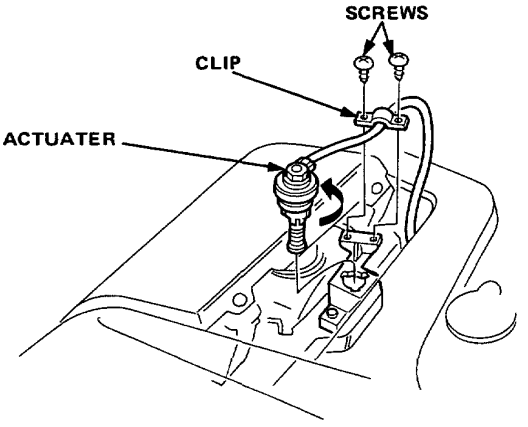
Canadian model



Replacement

NOTE: The headlight adjuster must be replaced as an assembly.

1. Raise the left and the right headlight, and remove the adjusting screw underneath.
2. Lower the left and the right headlight, and open the hood.
3. Remove the screws and the clips, and remove the actuaters by turning them.



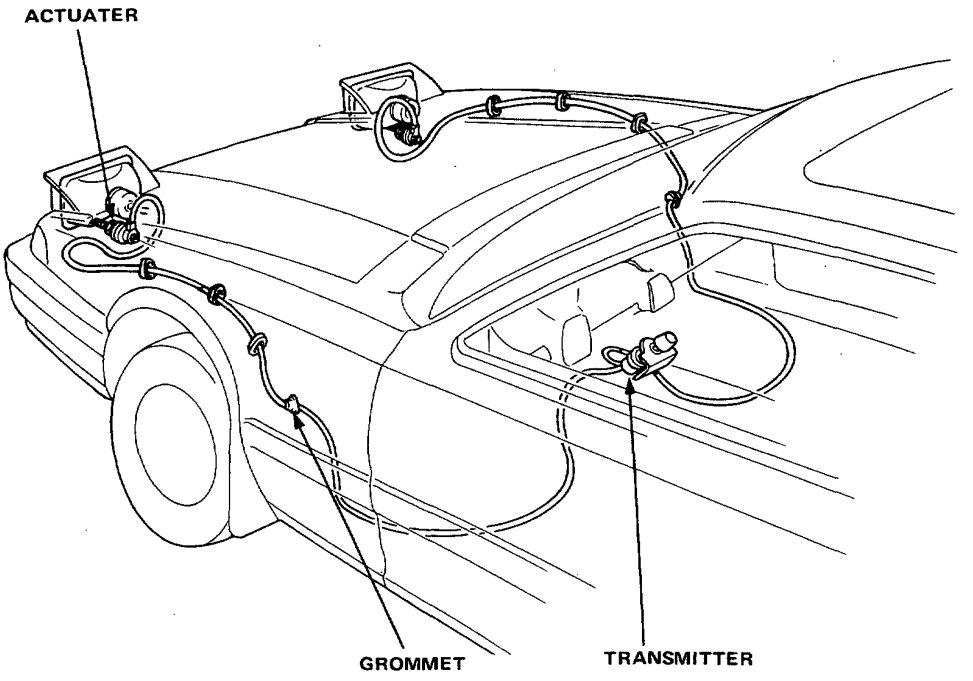
4. Remove the actuaters from the headlights.
5. Remove the right and left inner fenders.
6. Pull the actuaters out of the engine compartment through the grommet.
7. Unclamp the adjuster tubes.
8. Remove the front of the carpet (page 25-35).
9. Pull in the actuaters and tubes through the grommet holes.
10. Remove the headlight adjuster box (page 22-34).
11. Remove the transmitter from its bracket.
12. Replace the headlight adjuster assembly with a new one.
13. Install the headlight adjuster assembly in the reverse order of removal.

CAUTION:
- **When installing the grommet, apply sealant around it to prevent leakage.**
- **Make sure that the tube is properly routed and secured with clamps.**

(cont'd)

Headlight Adjuster

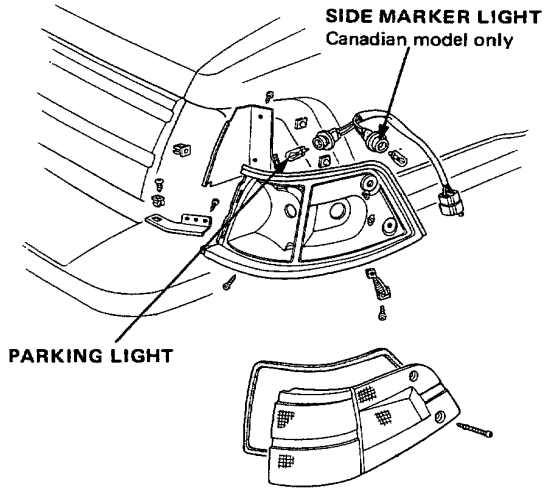
Replacement (cont'd)



Side Turn Signal Light Parking Light

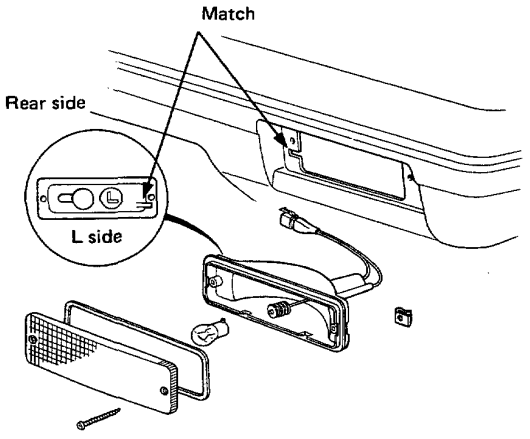
Replacement

For removal of the reflector, raise the headlight and remove the screws on both sides of the front grille.



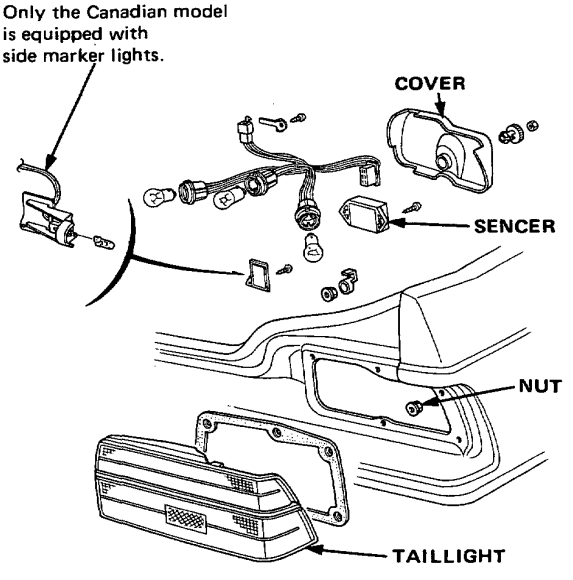
Front Turn Signal Light and Taillight

Front Turn Signal Light Replacement



Taillight Replacement

Unscrew the nut, and remove the taillight.

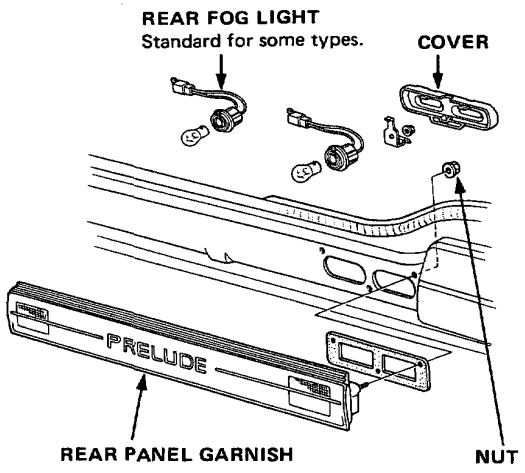


Remove the cover to replace the bulb.

Rear Panel Garnish and License Plate Light

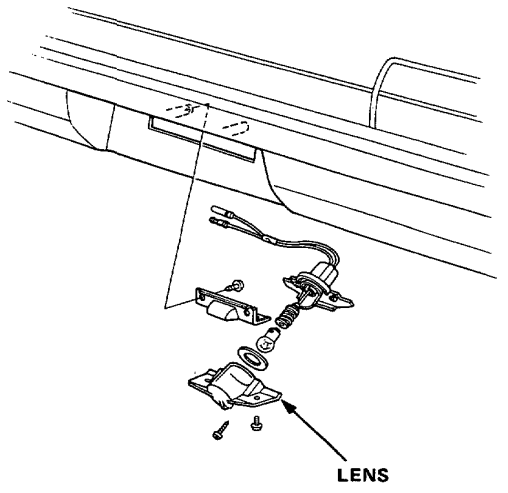
Rear Panel Garnish Replacement

Unscrew the nut, and remove the rear panel garnish.



Remove the cover to replace the bulb.

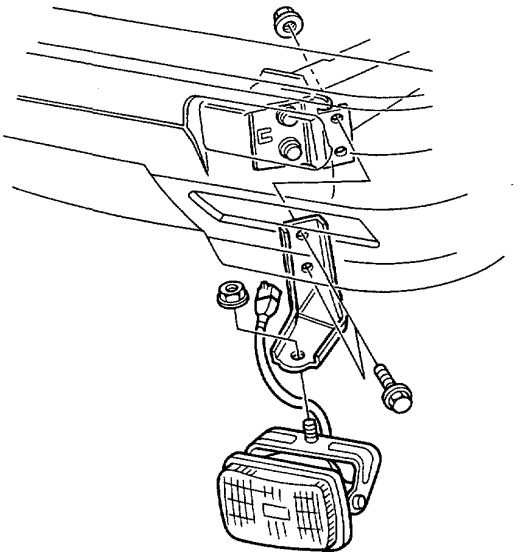
License Plate Light Replacement



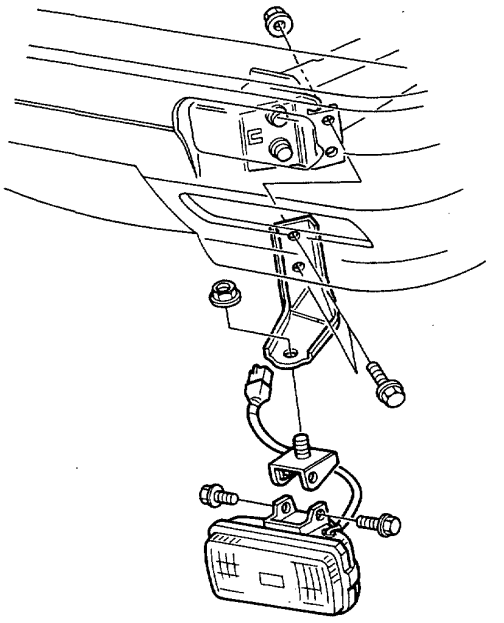
To replace bulb only, remove lens from outside.

Daytime Running Light and Over Taking Light

Daytime Running Light Replacement

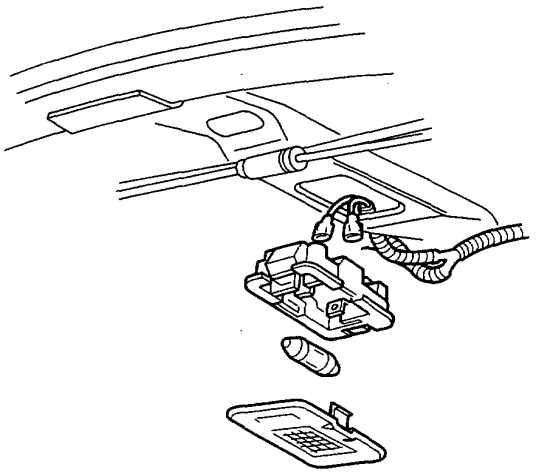


Over Taking Light Replacement



Trunk Lamp

Replacement



To replace bulb only, remove lens from outside.

MEMO

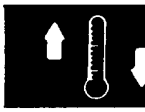
Heating and Air Conditioning

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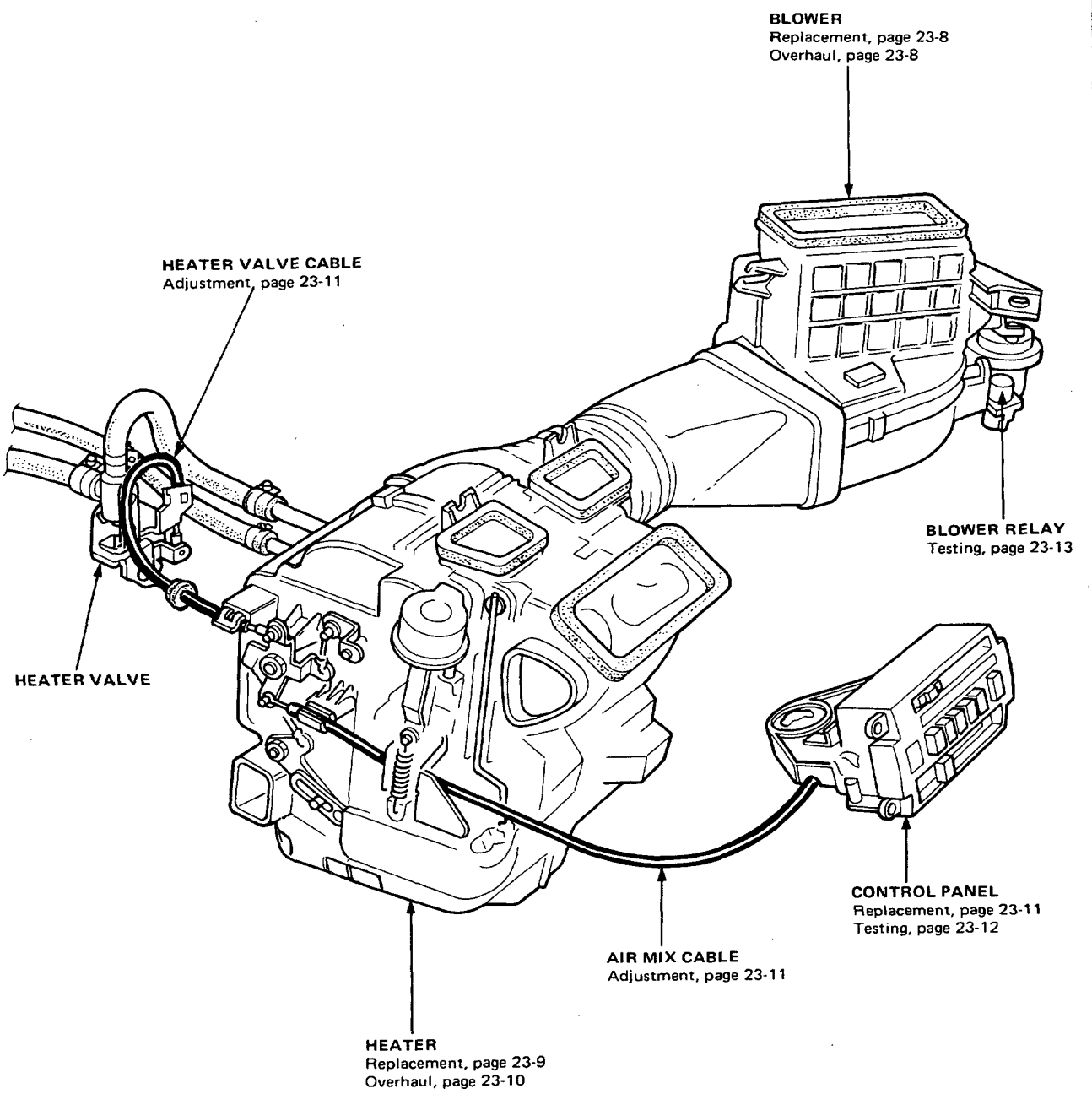


Heating

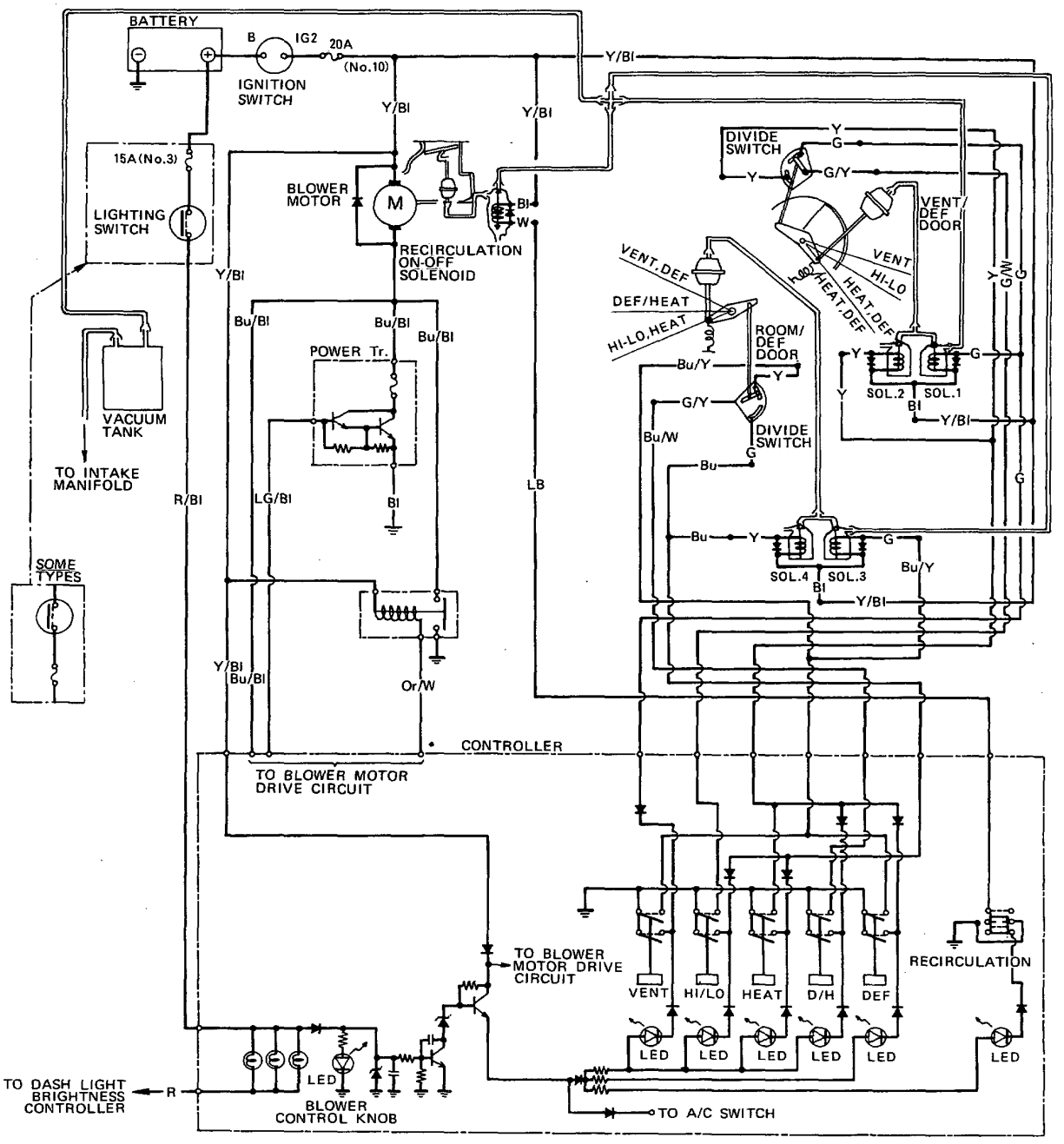
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Wiring and Tubing Diagram



Troubleshooting

1. **Insufficient heating**
   - Faulty blower motor and blower motor circuit (see No. 6 troubleshooting)
   - Duct clogged or disconnected
   - Broken air outlet
   - Clogged heater valve
   - Heater valve control cable misadjusted or disconnected
   - Air mix control cable misadjusted or disconnected
   - Faulty cooling system thermostat
   - Clogged heater hose
   - Clogged heater core

2. **Air flow not changed with any button pushed**
   - Blownout No. 10 fuse (Blower doesn't turned)
   - Open circuit in Y/Bl lead between fuse and controller
   - Faulty controller
   - Open circuit in heater wire harness between controller and heater sub harness
   - Open circuit in heater sub harness
   - Faulty DVV
   - Faulty divide switch
   - Leaking or clogged vacuum line

3. **Abnormal air flow from defroster or center/side outlet**
   - Faulty VENT/DEF DVV
   - Faulty VENT/DEF divide switch
   - Faulty wire harness between controller and heater sub hearness
   - Faulty heater sub harness
   - Faulty controller
   - Leaking or clogged vacuum line

4. **Abnormal air flow from floor or defroster**
   - Faulty ROOM/DEF DVV
   - Faulty ROOM/DEF divide switch
   - Faulty wire harness between controller and heater sub harness
   - Faulty heater sub harness
   - Faulty controller
   - Leaking or clogged vacuum line

5. **Recirculation door mulfunction**
   - Faulty recirculation on-off solenoid
   - Faulty heater wire harness between controller and solenoid
   - Faulty controller
   - Leaking or clogged vacuum line

6. Blower motor doesn't rotate.

Turn ignition switch on.

Push mode control switches.

Check to see switch LED.

LED goes on. — Not OK → Check No. 10 fuse.

OK

Normal — Not OK → Repair and recheck.

OK

Turn ignition switch off.

Disconnect wire harness from controller.

Check for continuity between BI lead of wire harness and ground.

There is continuity. — Not OK → Poor ground

OK

Turn ignition switch on.

Measure voltage between Y/BI lead (positive) and BI lead (negative) of wire harness.

There is 12V. — Not OK → Open circuit between No. 10 fuse and controller

OK

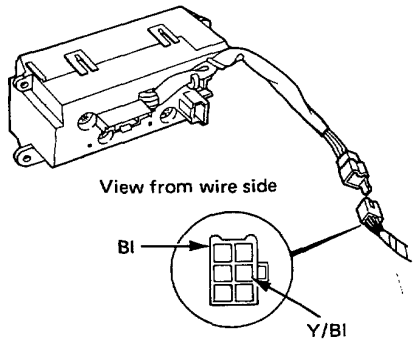
Faulty controller

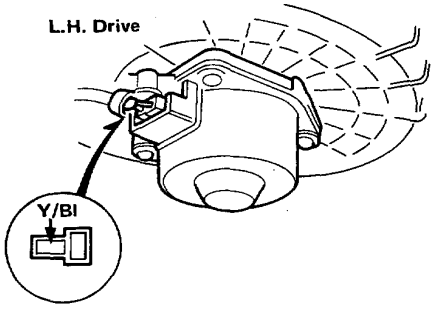
Measure voltage between Y/BI lead (positive) and ground at blower motor.

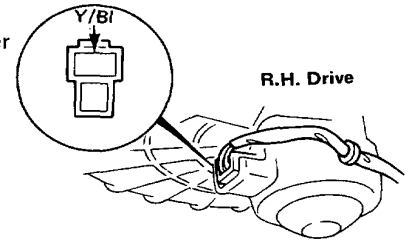
There is 12V. — Not OK → Open circuit between No. 10 fuse and blower motor

OK

(cont'd)







Troubleshooting (cont'd)

(cont'd)

Connect Bu/Bl lead to ground by using jumper wire.

Check blower motor.

Blower motor rotates.
- Not OK — Faulty blower motor
- OK

Turn ignition switch off.

Disconnect wire harness from power transistor.

Check Bu/Bl lead for continuity between power transistor and blower motor.

There is continuity.
- Not OK — Open circuit
- OK

Pull out LG/Bl lead from connector.

Connect 1.2–3.4 W bulb as shown.

Reconnect wire harness to power transistor.

Turn ignition switch on.

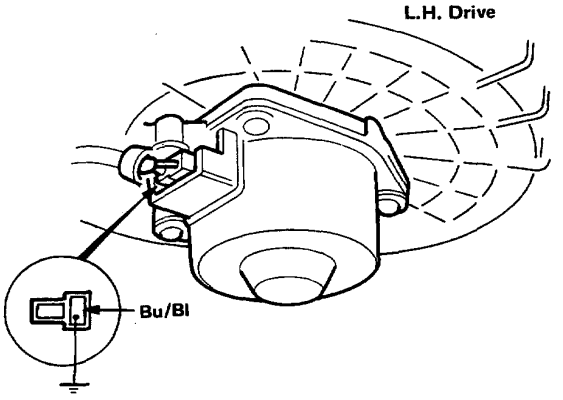
Check blower motor.

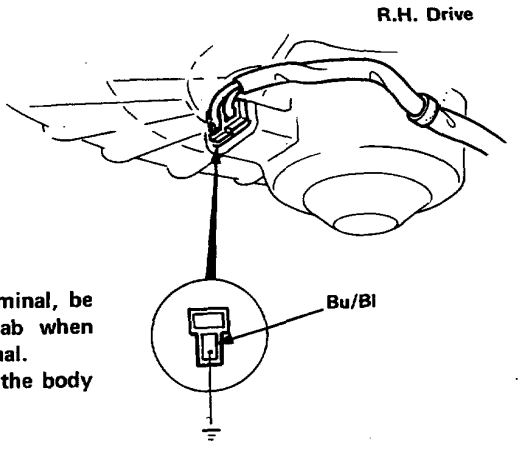
Blower motor rotates.
- Not OK — Faulty power transistor
- OK

Faulty controller

or

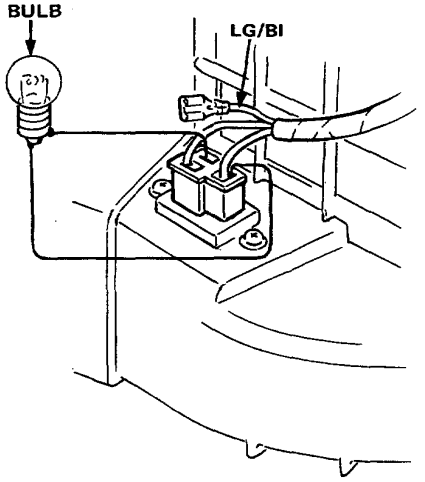
Open circuit between controller and power transistor





CAUTION:

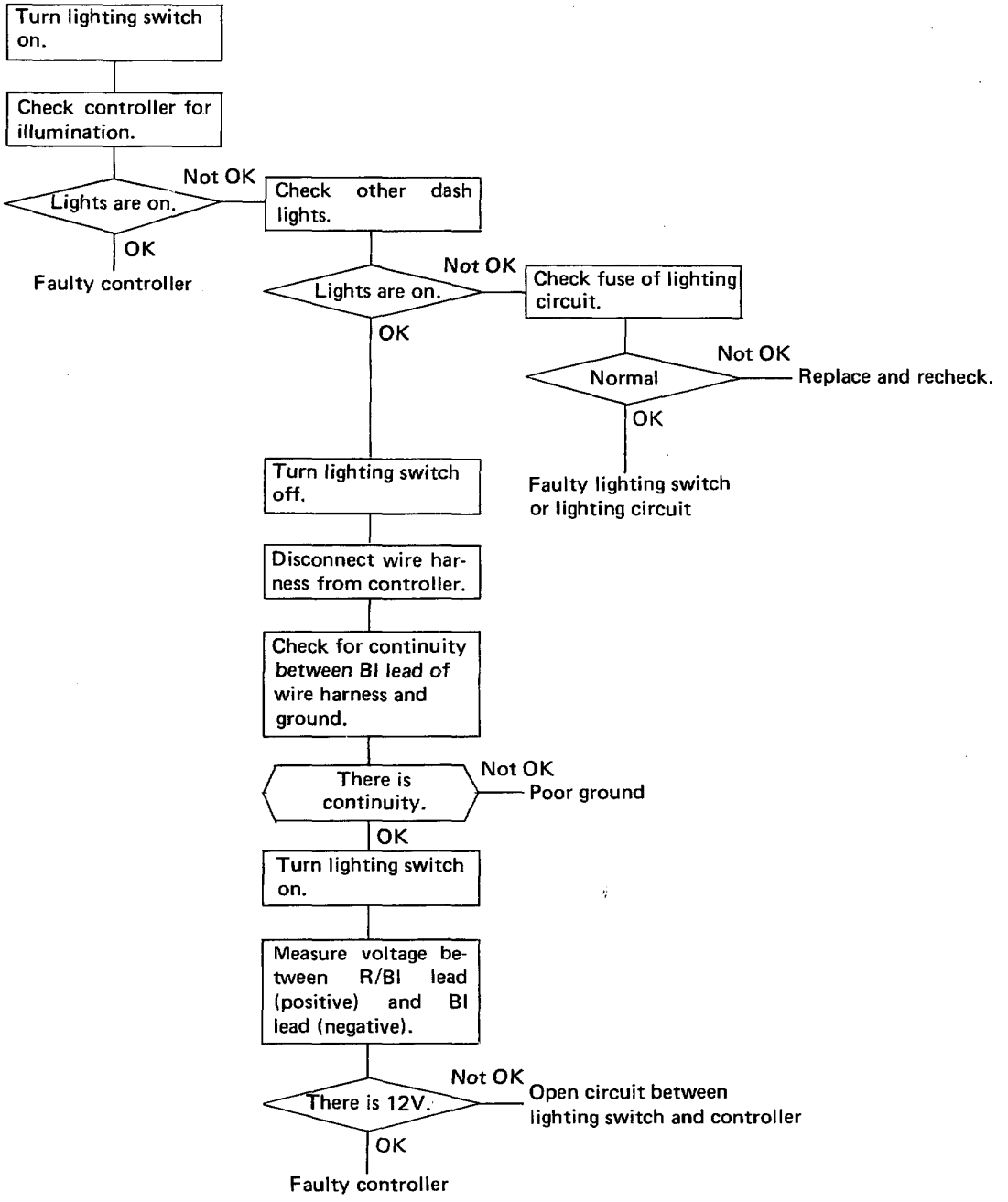
- **To avoid a loose or disconnected terminal, be careful not to damage the locking tab when disconnecting and connecting the terminal.**
- **Insulate the LG/Bl lead terminal from the body until the testing is completed.**



7. **All LED's are not lit.**
   See No. 6 troubleshooting.

8. **An LED of the mode control switch is not lit when pressed (However air flow is normal).**
   Faulty controller

9. **Brightness of LED is not reduced when lighting switch is turned on.**

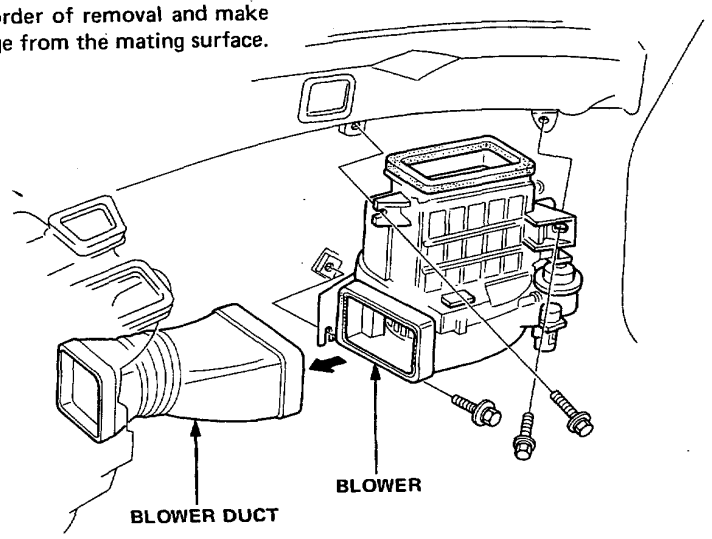


Blower

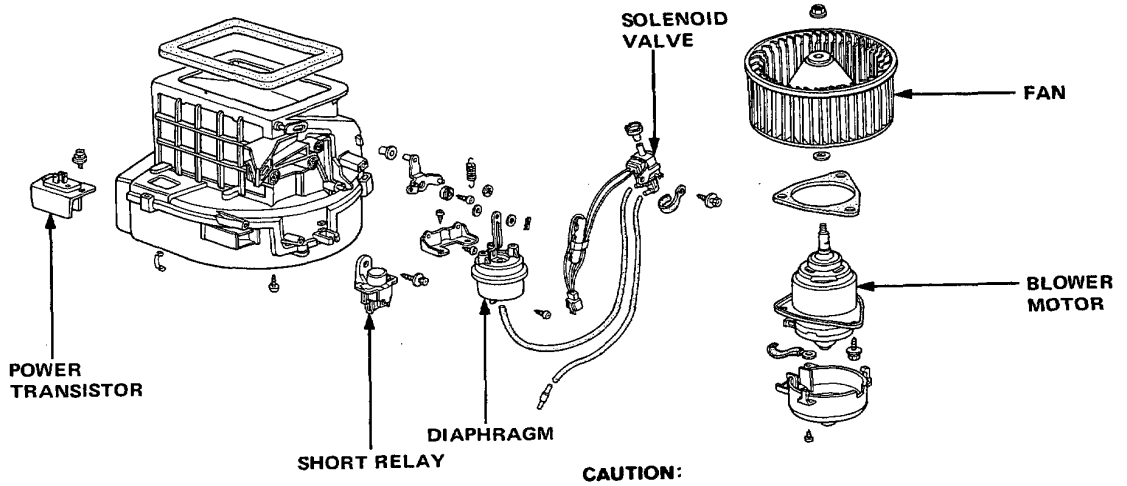
Replacement

1. Remove the glove box.
2. Remove the blower duct.
3. Disconnect the wire connector and vacuum tube from the blower.
4. Remove the three mounting bolts from the blower.
5. Remove the blower.

Install the blower in reverse order of removal and make sure that there is no air leakage from the mating surface.



Overhaul



CAUTION:

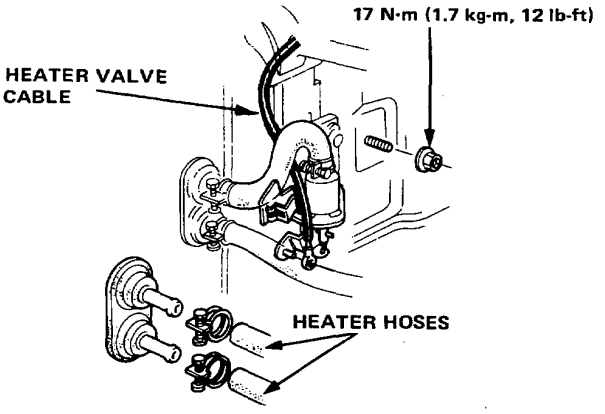
- **Before reassembly, make sure the air door and linkage are moved smoothly without binding.**
- **When re-attaching the diaphragm, make sure its positioning will not allow the air door to be pulled too far. Attach the diaphragm and all linkage, then apply vacuum and watch the door movement. If necessary, loosen the holding screw and move the diaphragm up or down.**

Heater

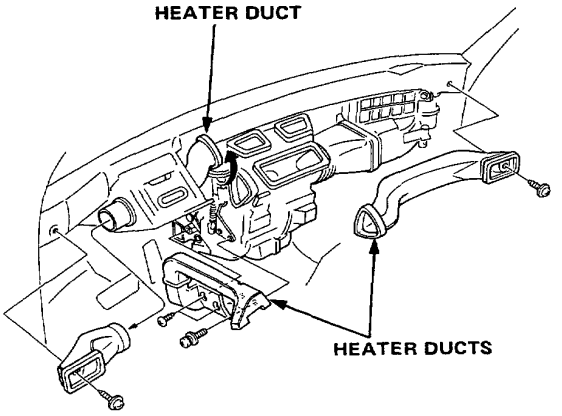
Replacement

1. Drain coolant at the radiator.
2. Disconnect the heater hoses at the firewall.

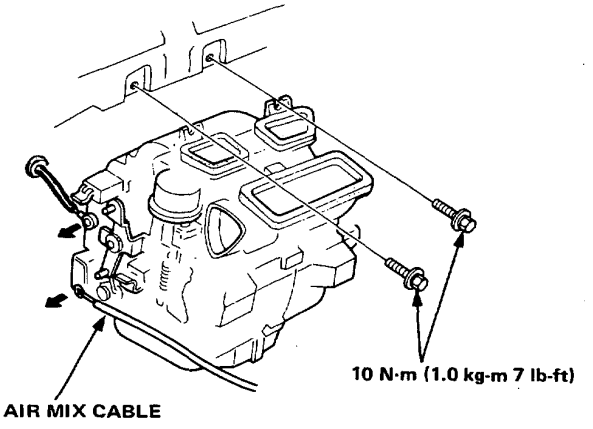
   NOTE: Coolant will run out when the hoses are disconnected; drain it into a clean drip pan.
3. Disconnect the heater valve cable from the heater valve.
4. Remove the heater lower mounting nut.



5. Remove the dashboard (page 22-46).
6. Remove the heater ducts.



7. Disconnect the air mix cable from the heater.
8. Disconnect the heater sub harness from the heater wire harness.
9. Disconnect the vacuum hose at the tube joint.
10. Remove the heater mounting bolts (2), then pull the heater away from the body, then remove the heater.



Install in reverse of removal, and:

- Apply a sealant to the grommets.
- Do not interchange the inlet and outlet hoses. Make sure that hose clamps are secure.
- Loosen the bleed bolt on the engine and refill the radiator and reservoir tank with the proper coolant mixture.
  Tighten the bleed bolt when all trapped air has escaped and coolant begins to flow from it.
- Connect all cables so they are properly adjusted (see page 23-10).

Heater

Heater Core Replacement (L. H. Drive Only)/Overhaul

Heater Core Replacement (L.H. Drive Only)

NOTE: The heater core can be removed without removing the heater.

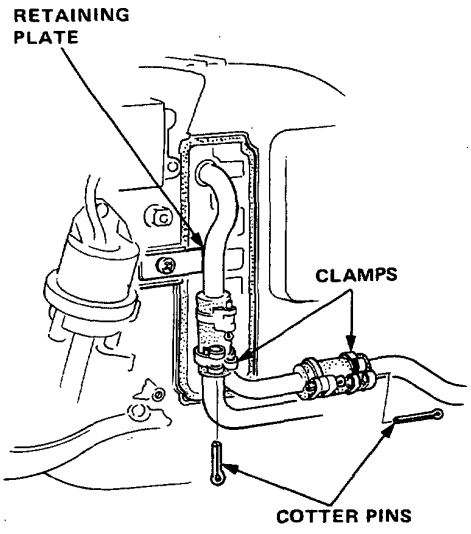
1. Drain coolant at the radiator.
2. Remove the heater pipe cover and heater pipe clamp.
3. Remove the heater core retaining plate.
4. Pull out the cotter pin of the joint hose clamp and separate the heater pipes.

   NOTE: Coolant will run out when the heater pipes are disconnected; drain it into a clean drip pan.

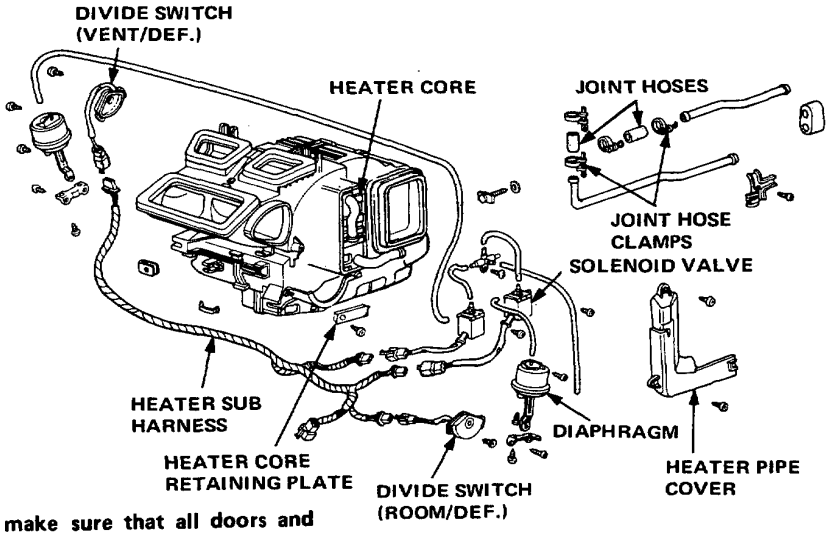
5. Pull out the heater core from the heater housing.

Install in reverse order of removal, and:

- Replace the joint hose clamps with new ones.
- Turn the cotter pin of the joint hose clamps securely to prevent coolant leakage.
- Loosen the bleed bolt on the engine and refill the radiator and reservoir tank with the proper coolant mixture. Tighten the bleed bolt when the trapped air has escaped and coolant begins to flow from it.



Overhaul

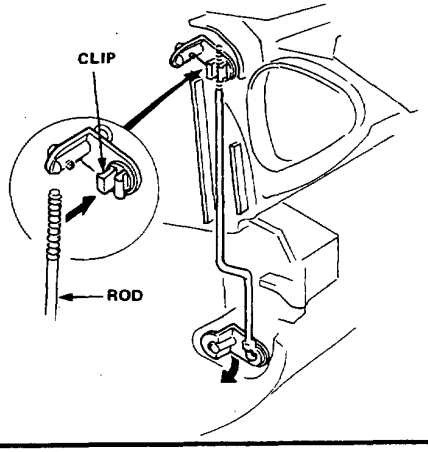


CAUTION:

- **Before installing, make sure that all doors and links move smoothly.**
- **When re-attaching the diaphragm, make sure its positioning will not allow the air doors to be pulled too far. Attach the diaphragm and all linkages, then apply vacuum and watch the door move. If necessary, loosen the holding screw and move the diaphragm up or down.**

Defroster Shutter Adjustment

1. Move the ROOM/DEF door to DEF position by using hand vacuum pump.
2. Open the defroster shutter fully.
3. Insert the control rod into the clip.

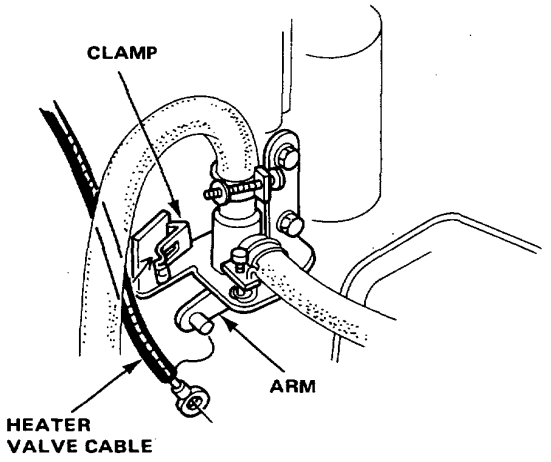


Control Cable

Adjustment and Installation

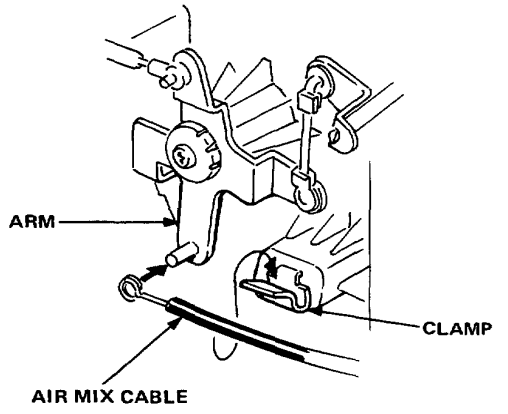
Heater Valve Cable

1. Slide temperature control lever to COLD.
2. Close the heater valve fully, then connect the end of the heater valve cable to the valve arm, and secure the cable housing with the clamp as shown.



Air Mix Cable

1. Slide temperature control lever to HOT.
2. Open air mix door in front of heater core, then connect end of cable to arm. Gently slide cable housing back from end – enough to take up any slack in the cable, but not enough to make dashboard lever move – then snap housing into clamp.

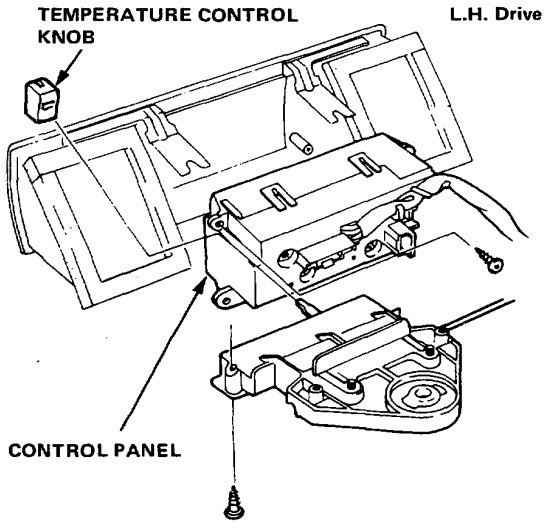


NOTE: Heater valve cable adjustment should be made, if the air mix cable is disconnected.

Control Panel

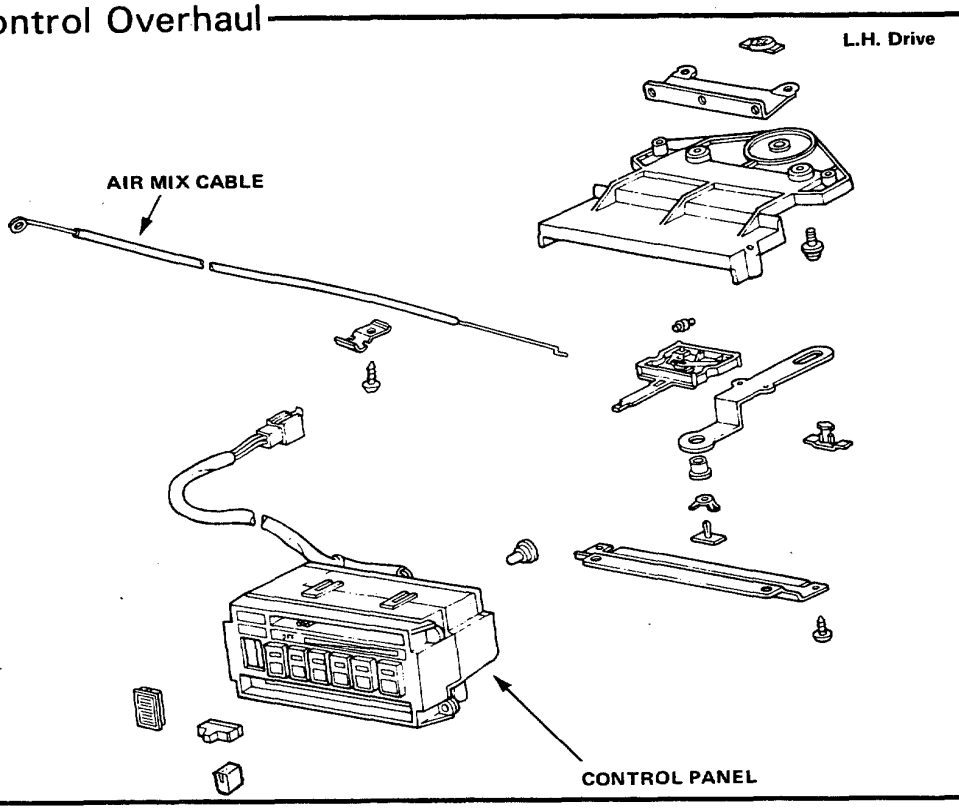
Replacement

1. Disconnect the heater valve cable from the air mix control arm.
2. Remove the instrument under cover with the radio.
3. Remove the air outlet/heater control assembly from the dashboard.
4. Remove the heater control by removing the screws.



Control Controller

Heater Control Overhaul

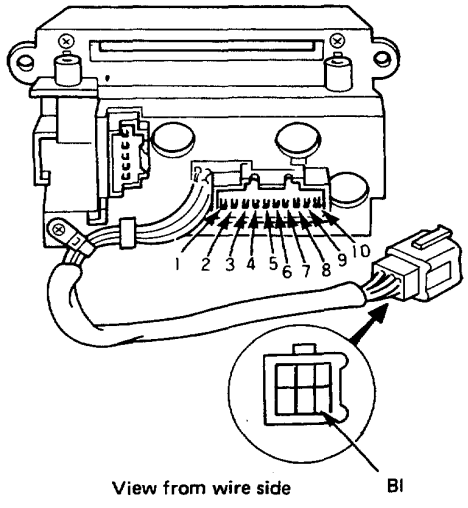


Controller Testing

Check for continuity between "O" and BI lead in each switch position.

NOTE:
- Connect the ohmmeter positive probe to the black lead of the connector.
- For the recirculation switch only, there is continuity when the switch is not pushed in.

	1	2	3	4	5	6	7	8	9	10	
		O					O				VENT
			O	O							HI-LO
				O	O						HEAT
					O	O					H/DEF
					O		O				
								O			REC

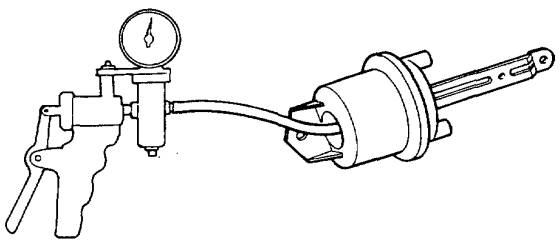


Diaphragm Short Relay

Diaphragm Testing

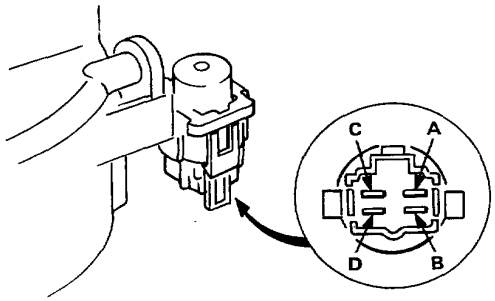
1. Connect a vacuum pump to the diaphragm as shown.
2. Draw vacuum. Vacuum should remain steady, and the linkage rod should move in.
   - If the diaphragm won't hold vacuum, or the rod doesn't move in, replace the diaphragm.
3. Release the diaphragm. The rod should return.
   - If the rod does not return fully, replace the diaphragm.

CAUTION: Don't move the linkage rod by hand. The diaphragm may be damaged.



Short Relay Testing

When the A terminal is connected to the battery positive terminal, and B terminal to the battery negative terminal, there should be continuity between the C and D terminals.
There should be no continuity with the battery disconnected.



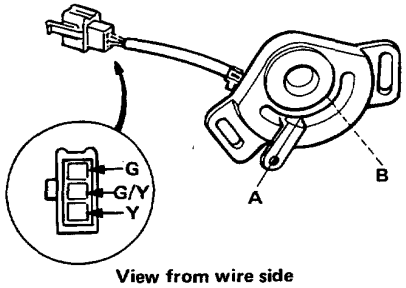
Divide Switch

Testing

Check for continuity according to the table below.

L.H. Drive

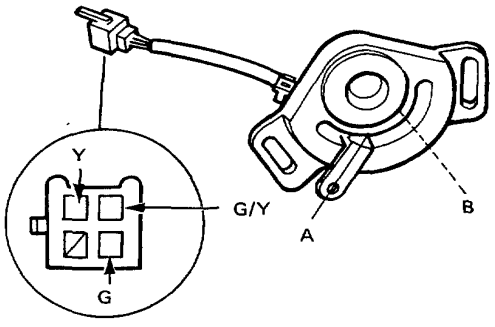
	G	G/Y	Y
A		○—○	
Neutral			
B	○—○		



View from wire side

R.H. Drive

	G	G/Y	Y
A	○—○		
Neutral			
B		○—○	

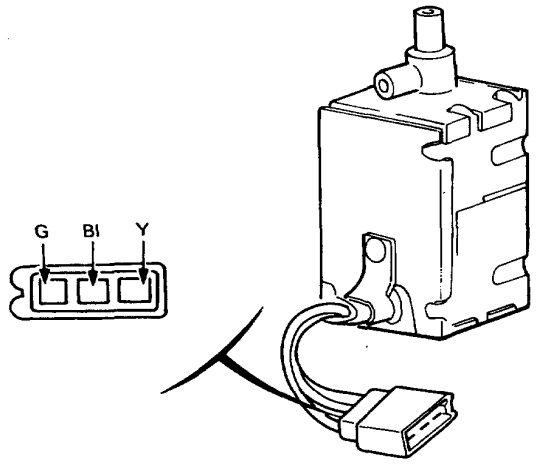


DVV

Testing

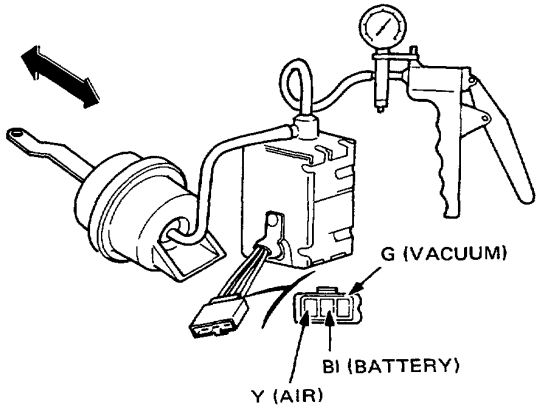
Continuity Test

Check for continuity between the G and BI, BI and Y and Y and G terminals.



With Diaphragm

1. Connect the diaphragm to the DVV.
2. Draw vacuum.
3. Connect a lead from the battery positive terminal to the BI terminal of the DVV and another lead from the battery negative terminal to the G terminal of the DVV. The arm of the diaphragm should retract. If the arm remains steady, replace the DVV.
4. Disconnect the battery. The arm should remain steady. If the arm moves, replace the DVV.
5. Connect the battery positive lead to the BI terminal, and the negative lead to the Y terminal of the DVV. The arm of the diaphragm should be released. If the arm remains steady, replace the DVV.

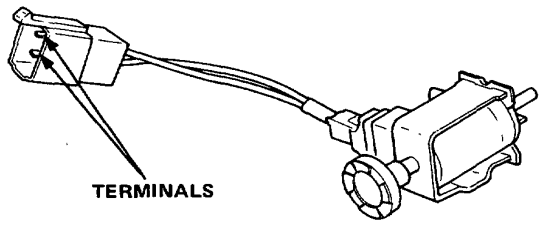


Recirculation Solenoid

Testing

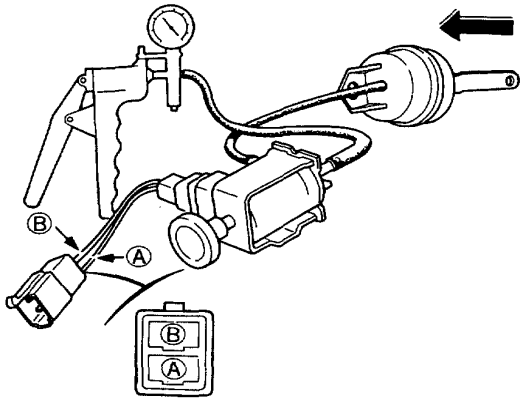
Continuity Test

Check for continuity between the terminals.



With Diaphragm

1. Connect the diaphragm.
2. Draw vacuum.
3. Connect a lead from the battery positive terminal to the A terminal of the solenoid and another lead from the battery negative terminal to the B terminal of the solenoid. The arm of the diaphragm should retract. If the arm remains steady, replace the solenoid.
4. Disconnect the battery leads. The arm should be released. If the arm remains steady, replace the solenoid.

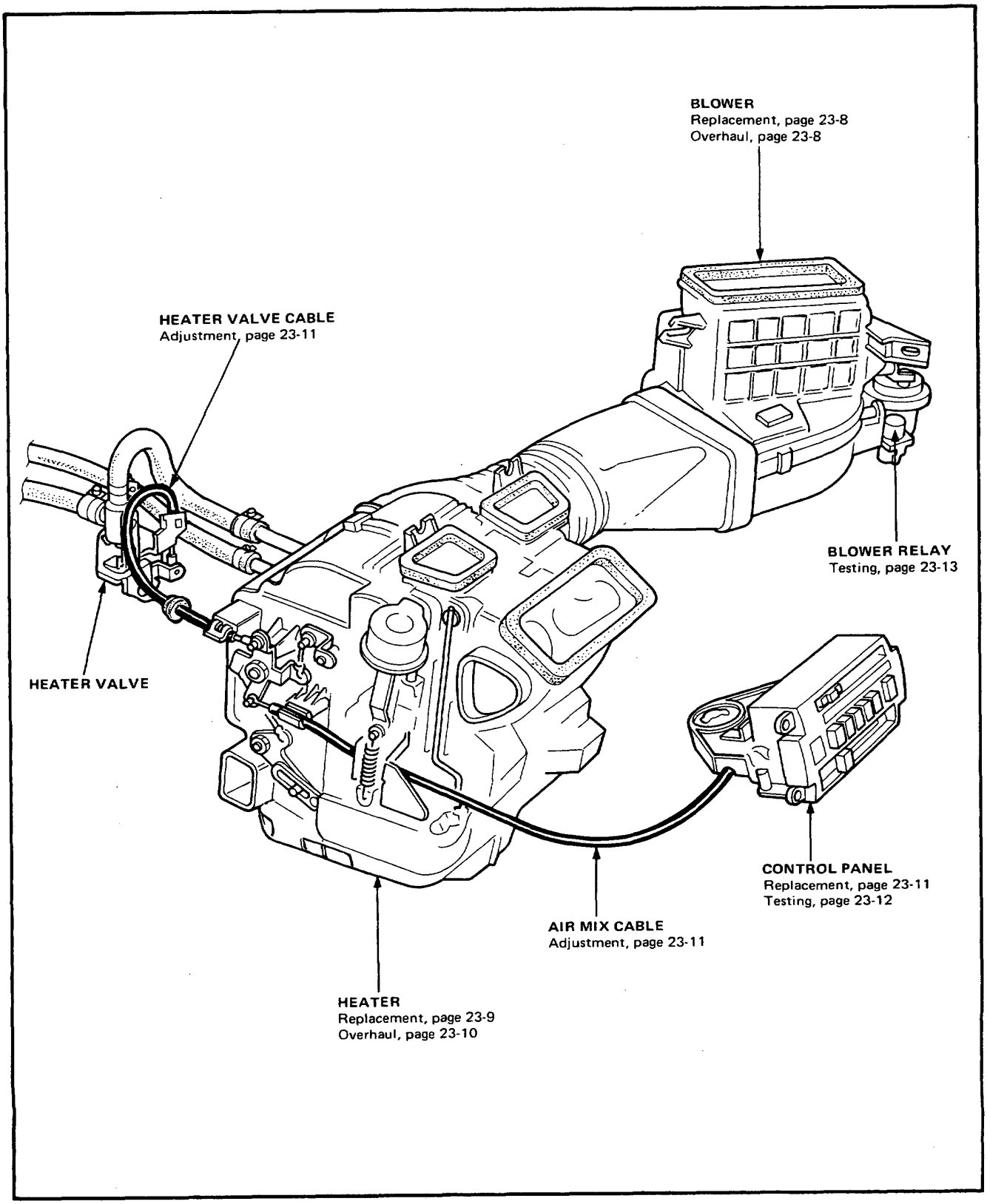


Heating

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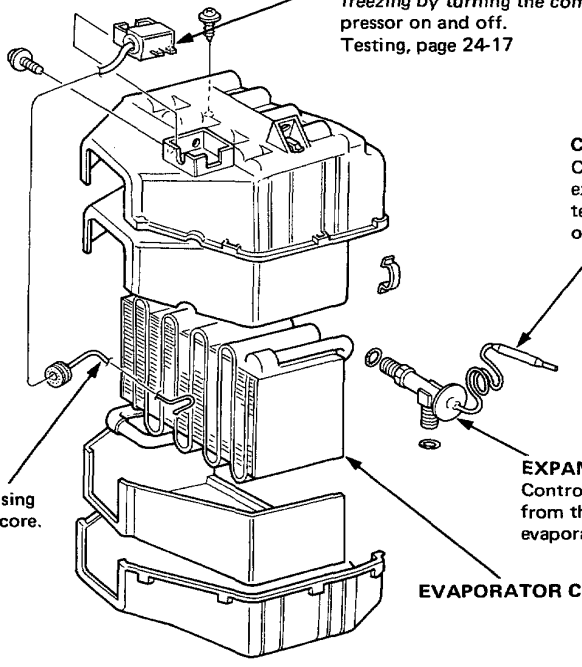


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Evaporator

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THERMOSTAT
Prevents the evaporator from freezing by turning the compressor on and off.
Testing, page 24-17

CAPILLARY TUBE
Controls the operation of the expansion valve by sensing the temperature of the refrigerant outlet.

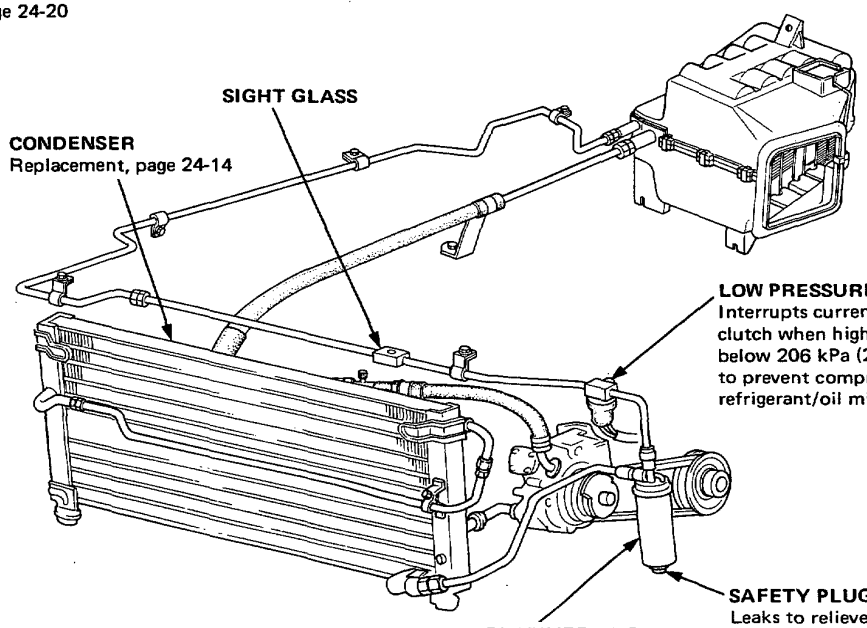
EXPANSION VALVE
Controls the flow of refrigerant from the receiver into the evaporator.

CAPILLARY TUBE
Controls thermostat by sensing temperature of evaporator core.

EVAPORATOR CORE

Condenser

CHARGING and TESTING VALVES
System charging, page 24-22
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SIGHT GLASS

CONDENSER
Replacement, page 24-14

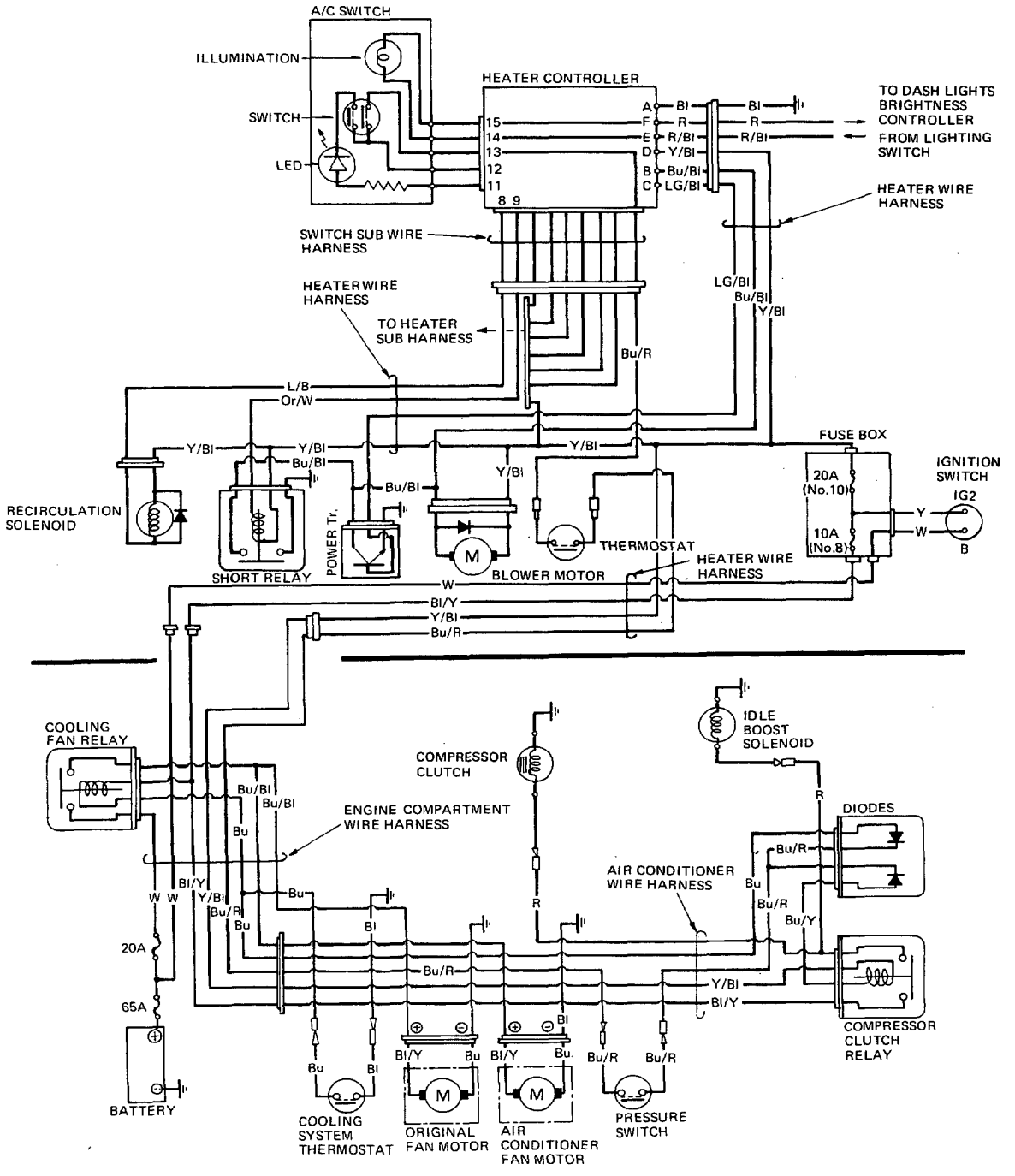
LOW PRESSURE SWITCH
Interrupts current to compressor clutch when high pressure drops below 206 kPa (2.1 kg/cm², 28 psi), to prevent compressor damage if refrigerant/oil mix is lost from system.

SAFETY PLUG
Leaks to relieve abnormally high refrigerant pressure and prevent damage to system. Receiver – dryer must be replaced if plug leaks.

RECEIVER AND FILTER/DRYER

Wiring Diagram

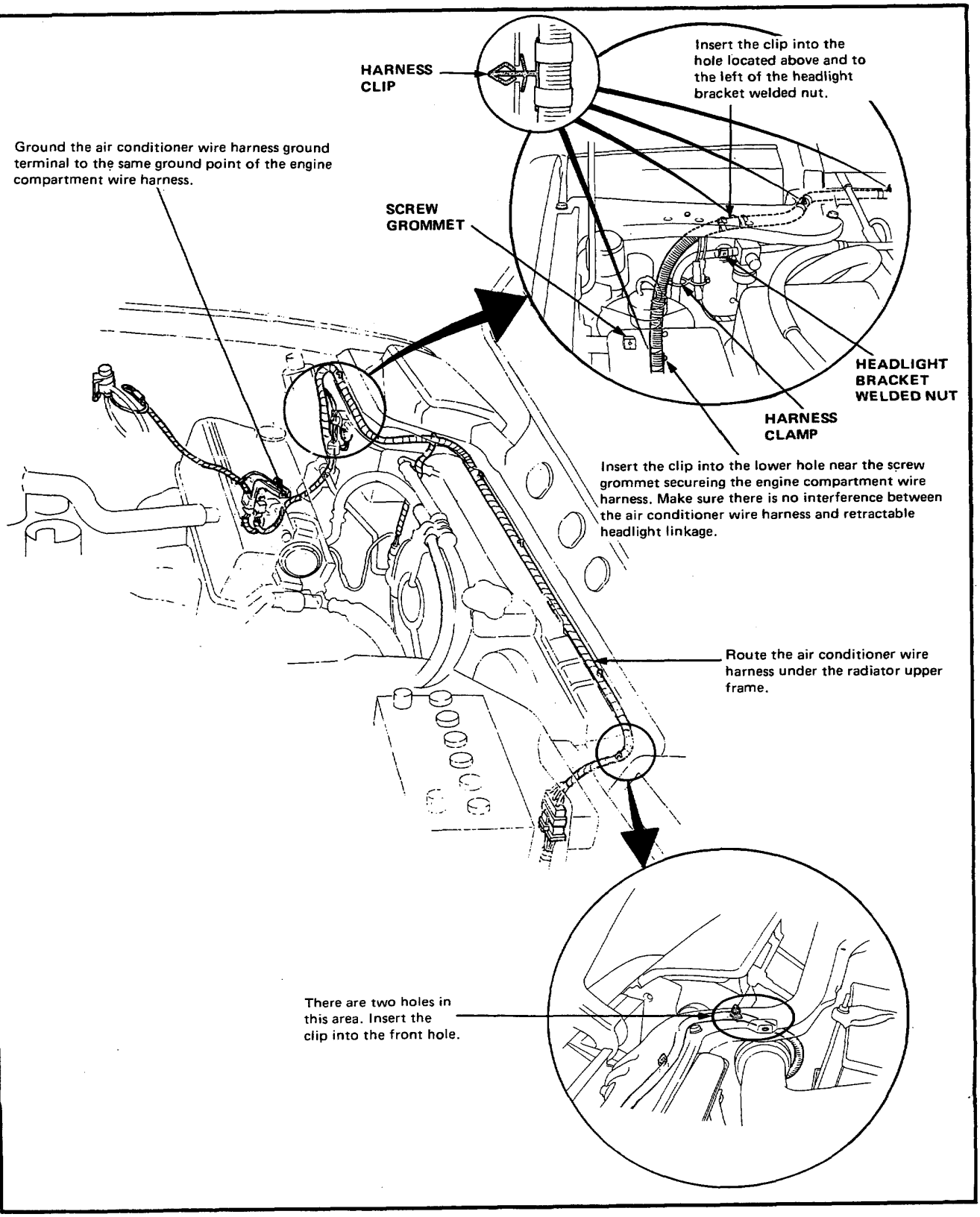
NOTE: L.H. Drive shown;
R.H. Drive basically similar



Specifications

Item		Specification
Cooling capacity – Conditions: Compressor rpm Outside air temperature Outside air humidity Condenser air temperature Condenser air velocity Blower capacity		3,350 K cal (13,292 Btu/h) 1,800 min^{-1} (rpm) 27.5°C (81.5°F) 50% 35°C (95°F) 4.5 m/sec. 340 m^3/h (12,006 cu.ft/h)
Compressor	Type No. of cylinders Piston Displacement Max. rpm Lubricant/capacity	Radial type 4 150 cc/rev. (9.15 cu.in/rev.) 6,600 min^{-1} (rpm) SUNISO No. 5 GS/80 cc (2.7 US oz., 2.3 Imp. oz.)
Receiver Dryer	With dessicant	Includes fusible safety plug.
Condenser		Corrugated fin type
Evaporator		Corrugated fin type
Blower	Type Motor input Speed control Max. capacity	Sirocco fan 145 W (12 V) Infinitely variable 390 m^3/h (13,771 cu.ft/h)
Temp. Control		Air-mix type
Compressor Clutch	Type Power consumption	Dry, single plate, V-belt-1A 48 W max. (12 V)
Refrigerant	Type Quantity	R-12 0.8 ± 0.05 kg (1.76 ± 0.11 lbs)

Wire Harness



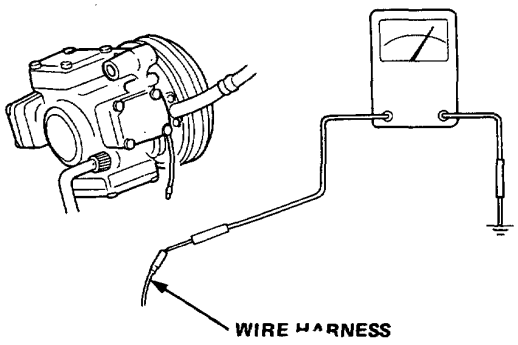
Troubleshooting

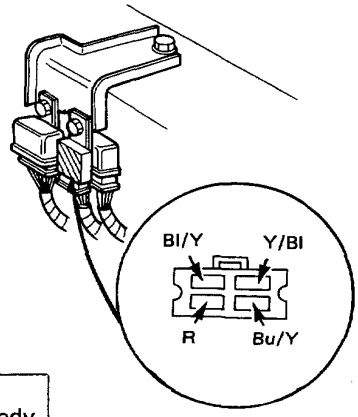
Electrical Troubleshooting

1. Compressor clutch isn't engaged, when A/C switch is turned on.

Check 65 A fuse.
→ Normal — Not OK → Replace and recheck.
→ OK
Check No. 8 fuse (10 A).
→ Normal — Not OK → Replace and recheck.
→ OK
Check No. 10 fuse (20 A).
→ Normal — Not OK → Replace and recheck.
→ OK
Disconnect wire harness from pressure switch.
Connect two leads to each other on wire harness side.
Disconnect wire harness from compressor clutch.
Turn ignition switch on.
Turn fan switch on.
Turn A/C switch on.
Measure voltage between R lead (positive) of wire harness and body ground.
→ There is 12 V. — Not OK → Measure voltage between Bl/Y lead (positive) and body ground at clutch relay.
→ OK
Faulty compressor clutch

(cont'd)





Electrical Troubleshooting (cont'd)

(cont'd)

There is 12 V.
- Not OK → Open circuit between No. 8 fuse and clutch relay
- Not OK → Open circuit between ignition switch and No. 8 fuse.
- OK

Measure voltage between R lead (positive) and body ground at clutch relay.

There is 12 V.
- Not OK → Measure voltage between Y/Bl lead (positive) and body ground at clutch relay.
- OK → Open circuit between clutch relay and compressor clutch

There is 12 V.
- Not OK → Open circuit between No. 10 fuse and clutch relay
- Not OK → Open circuit between ignition switch and No. 10 fuse
- OK

Measure voltage between Bu/Y lead (positive) and body ground at clutch relay.

There is 12 V.
- Not OK → Turn off all switches.
- OK → Faulty clutch relay

Check Bu/Y lead for continuity between clutch relay and diode.

There is continuity.
- Not OK → Open circuit
- OK

Remove heater controller.

Remove A/C switch from heater controller.

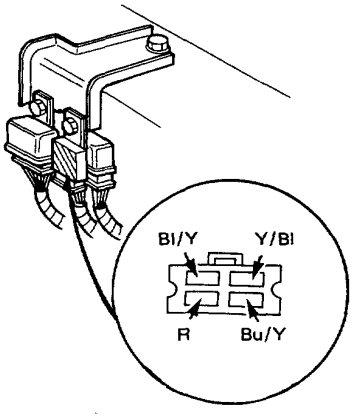
Check Bu/R lead for continuity between diode and heater controller.

There is continuity.
- Not OK → Open circuit
- OK

Check heater controller for continuity between No. 1 and No. 13 terminals.

There is continuity.
- Not OK → Faulty heater controller

(cont'd)



(cont'd)

Check A/C switch.

Switch works properly. — Not OK → Faulty A/C switch

OK → Faulty heater controller

2. A/C switch LED doesn't go on when A/C switch is turned on (Air conditioning works properly).

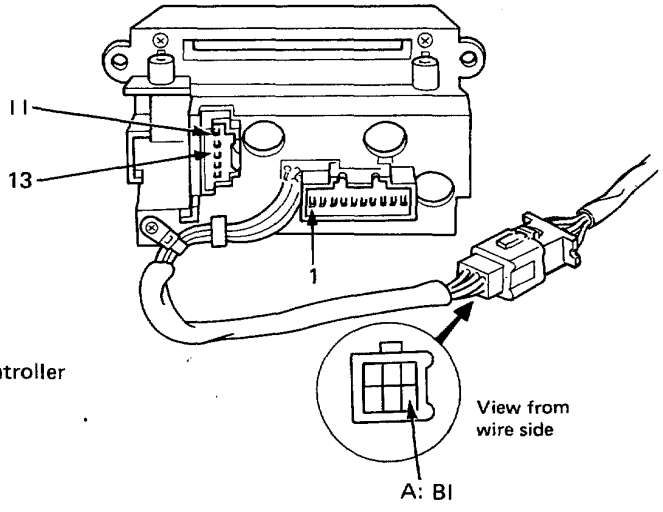
Remove A/C switch from heater controller.

Turn ignition switch on.

Measure voltage between No. 11 (positive) and A (negative) terminals of heater controller.

There is 12 V. — Not OK → Faulty heater controller

Faulty A/C switch



3. A/C switch LED won't dim when lighting switch is turned on (Heater controller LED works properly).

- Faulty heater controller

NOTE: If the heater controller is OK, there should be approximately 5 V between No. 11 and A terminals with the ignition switch and lighting switch turned on.

Troubleshooting

Compressor Troubleshooting

TEST RESULTS	RELATED SYMPTOMS	PROBABLE CASE	REMEDY
Discharge (high) pressure abnormally high (Test on page 24-20)	After stopping compressor, pressure drops to about 195 kPa (2 kg/cm^2, 28 psi) quickly, and then falls gradually.	Air in system	Evacuate system; then recharge. Evacuation: page 24-21 Recharging: page 24-22
	Normal pressure is not shown when condenser is cooled by water.	Excessive refrigerant in system	Discharge refrigerant as required
	Reduced air flow through condenser	• Clogged condenser or radiator fins • Original and air conditioner fans not working properly	• Clean. • Check voltage and fan rpm.
	Line to condenser is excessively hot.	Restricted flow of refrigerant in system	Repair.
Discharge pressure abnormally low (Test on page 24-20)	Excessive bubbles in sight glass; condenser is not hot.	Insufficient refrigerant in system	Charge system.
	High and low pressures are balanced soon after stopping compressor.	• Faulty compressor discharge or inlet valve. • Faulty compressor seal	Replace compressor.
	Outlet of expansion valve is not frosted; low pressure gauge indicates vacuum.	• Leaking thermostat • Frozen expansion valve • Faulty expansion valve	Repair or replace.
Suction (low) pressure abnormally low (Test on page 24-20)	Excessive bubbles in sight glass; condenser is not heated.	Insufficient refrigerant	Check for leaks. Charge as required.
	Expansion valve is not frosted and low pressure line is not cooled. Low pressure gauge indicates vacuum.	• Leaking thermostat • Frozen expansion valve • Faulty expansion valve	Replace expansion valve.
	Outlet temperature is low; no air flow.	Frozen evaporator	Run the fan with compressor off.
	Expansion valve frosted	Clogged expansion valve	Clean or replace
	Low pressure hose is cooler than expansion valve outlet and evaporator.	Collapsed or restricted low pressure hose	Clean, repair or replace.
Suction (low) pressure abnormally high (Test on page 24-20)	Low pressure hose and check joint are cooler than around evaporator.	• Expansion valve open too long • Loose thermostat (poor contact)	Repair or replace.
	Suction pressure is lowered when condenser is cooled by water (High pressure side also heated).	Excessive refrigerant in system	Discharge refrigerant as necessary.
	High and low pressures are balanced too early when compressor is stopped.	• Faulty gasket • Faulty high pressure valve • Foreign particle stuck in high pressure valve	• Replace compressor. • Replace compressor. • Replace compressor.

Service Tips and Precautions

CAUTION:

1. *Always disconnect the negative cable from* the battery whenever replacing air conditioner parts.
2. Keep moisture and dust out of the system. When disconnecting any lines, plug or cap the fittings immediately; don't remove the caps or plugs until just before the lines are reconnected.
3. Before connecting any hose or line, apply a few drops of refrigerant oil to the seat of the O-ring or flare nut.
4. When tightening or loosening a fitting, use a second wrench to support the matching fitting.
5. When discharging the system, don't let refrigerant escape too fast; it will draw the compressor oil out of the system.
6. Add *refrigerant oil after* replacing the following parts:

Compressor	When a new compressor is installed, drain 30 cm^3 (1 fl oz) of refrigerant oil thru the suction fitting on the compressor.
Condenser	10 cm^3 (1/3 fl oz)
Evaporator	30 cm^3 (1 fl oz)
Line or hose	10 cm^3 (1/3 fl oz)
Receiver	10 cm^3 (1/3 fl oz)

7. Tighten nuts to the following torque:

Line or hose dia. in (mm)	Torque N·m (kg-m, lb-ft)	Application
3/8 (9.53)	17 (1.7, 12)	• Sight glass • Condenser • Receiver • Receiver pipe
1/2 (12.7)	22 (2.2, 16)	• Discharge hose
5/8 (15.88)	32 (3.2, 23)	• Suction hose
8 mm bolts	30 (3.0, 21)	• Suction hose

WARNING When handling refrigerant (R-12):

- Always wear eye protection.
- Do not let refrigerant get on your skin or in your eyes. If it does:
  - Do not rub your eyes or skin.
  - Splash large quantities of cool water in your eyes or on your skin.
  - Rush to a physician or hospital for immediate treatment. Do not attempt to treat it yourself.
- Keep refrigerant containers (cans of R-12) stored below 40°C (100°F).
- Do not handle or discharge refrigerant *in an enclosed area near an open flame*: it may ignite and produce a poisonous gas.

Performance Testing

NOTE: Performance must be tested when humidity is 60–80%. If below 50%, the temperature and pressure readings will be lower than the range on the graph below; if above 80%, readings will be higher.

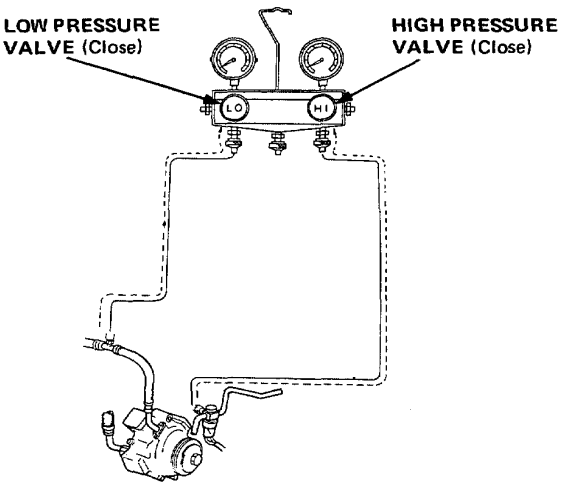
1. Connect gauges as shown.
2. Insert a dry bulb thermometer in the coil air outlet, and place the psychrometer (dry and wet bulb thermometer) close to the inlet of blower.
3. Test conditions:
   - Avoid direct sunlight.
   - Open engine hood.
   - Open front doors and windows.
   - Set the temperature control lever to "COLD" (left end). Push the "VENT" and "RECIRC" buttons.
   - Turn the fan switch to HI (right end).
   - Turn the A/C switch on.
   - Run the engine at 1,500 min^{-1} (1,500 rpm).
   - No driver and passengers in car.
4. After running the system for about 10 minutes under the above conditions, read the thermometer and pressure valve.
5. The performance of the system is satisfactory if the measurements are within the range bands shown on the Performance Chart.

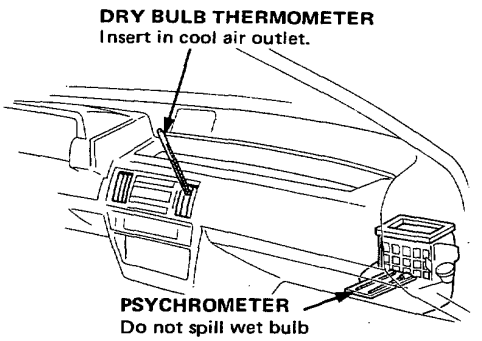
Examples

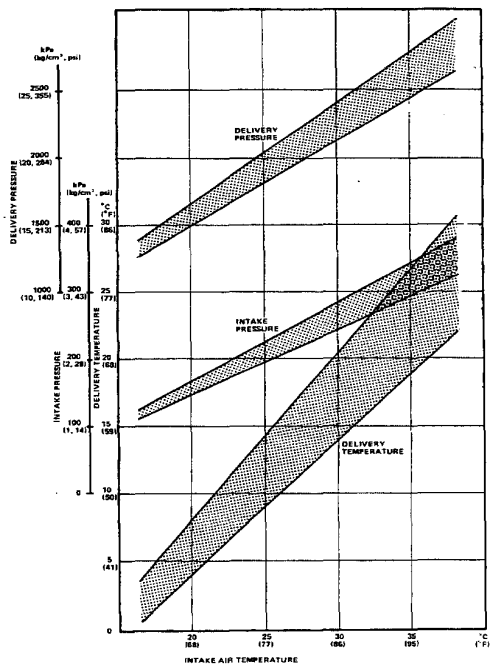
Measurements:

Intake temperature (Wet bulb): 25.5°C (78°F)
(Dry bulb): 30°C (86°F) 70% humidity
Delivery temperature: 17°C (63°F)
Delivery pressure: 2,250 kPa (22.5 kg/cm², 320 psi)
Intake pressure: 260 kPa (2.6 kg/cm², 37 psi)

Proper intake/delivery pressure, and temperature ranges are shown on the chart at right.
Find your intake temperature across the bottom, and the relative intake and delivery pressures up the side: Lines down at right angles to your measurements should cross within the range bands on the graph.







Compressor

Replacement

1. Run the engine at idle speed and turn on the air conditioner for a few minutes.
2. Disconnect the battery negative terminal.
3. Disconnect the compressor clutch lead.
4. Discharge the refrigerant very slowly from the system (page 24-20).
5. On the car with a power steering, loosen the oil pump adjusting and mounting bolts.
6. Lift the power steering belt off the pully.
7. Remove the power steering oil pump.
8. Disconnect the suction and discharge hoses from the compressor.

   CAUTION: Cap the open fittings immediately to keep moisture and dirt out of the system.

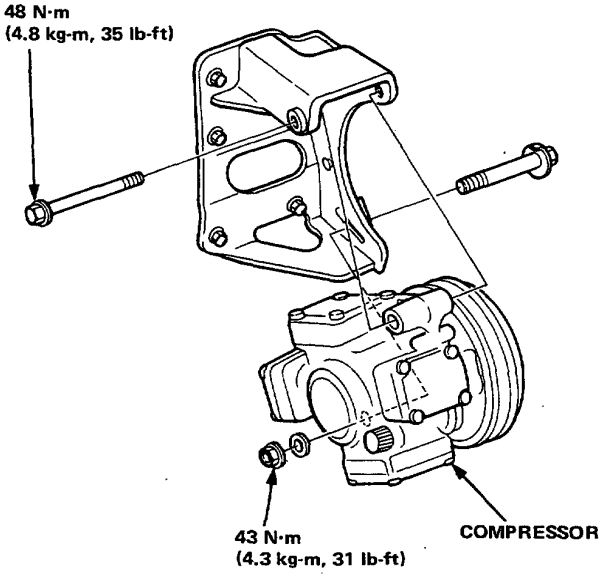
9. Loosen the compressor adjusting/mounting bolts and nut, then lift the belt off the pully.
10. Remove the air conditioner cooling fan motor with the motor mounting frame.
11. Remove the mounting bolts and compressor and put on the engine support beam.
12. Remove the compressor bracket.
13. Remove the compressor from the engine compartment.

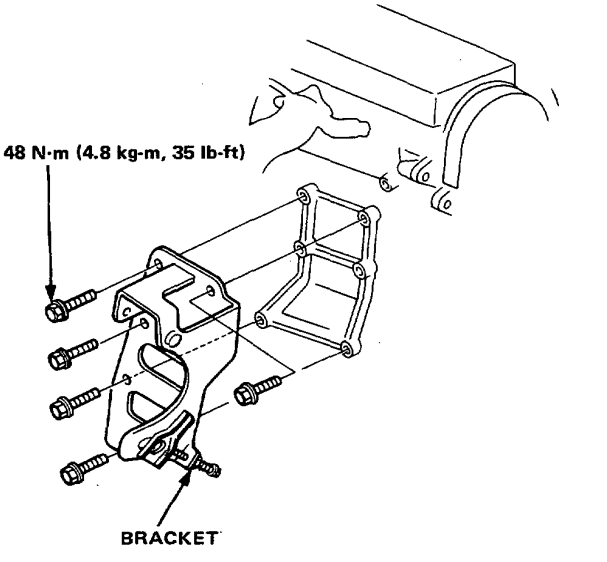
Install the compressor in the reverse order of removal, and:

- If a new compressor is installed, drain 30 cm^3 (1 fl oz) of refrigerant oil through the suction fitting on the compressor.
- Adjust the belt.

  BELT TENSION: 10–12 mm (3/8–1/2 in.) when 98 N (10 kg, 22 lbs) force is applied between pulleys.
- Charge the system (page 24-22).
- Test the performance (page 24-12).

  CAUTION: *Don't loosen the cylinder cover bolts of the compressor.*





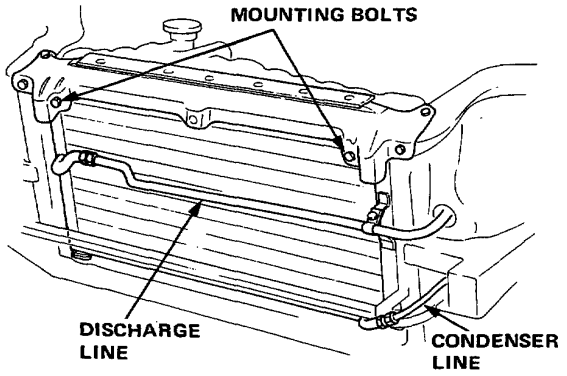
Condenser

Replacement

1. Disconnect the battery negative terminal.
2. Discharge the refrigerant (page 24-20).
3. Remove the front grille.
4. Disconnect the condenser line and discharge line from the condenser.

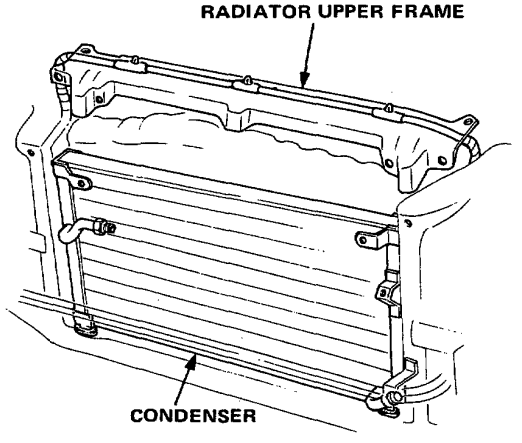
CAUTION:
- **Cap the open fittings immediately to keep moisture and dirt out of the system.**
- **Be careful not to damage the condenser fins and tubes.**

5. Remove the condenser mounting bolts.



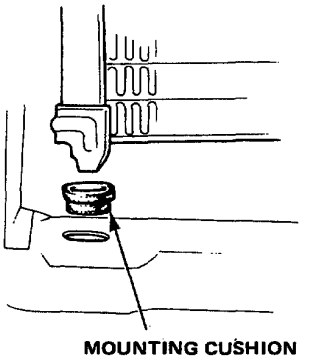
6. Remove the radiator upper frame mounting bolts and move the upper frame slightly.

CAUTION: Move the upper frame as required to obtain access to the condenser for its removal, because the upper frame has the air conditioner wire harness.



7. Pull out the condenser upward.

Install the condenser in the reverse of removal, and:
- If a new condenser is installed, add 10 cm^3 (1/3 fl oz) of refrigerant oil to it.
- Insert the condenser legs into the mounting cushions.



- Apply an anti-rust material to the upper frame mounting bolt areas.
- Charge the system (page 24-22).
- Test the performance (page 24-12).

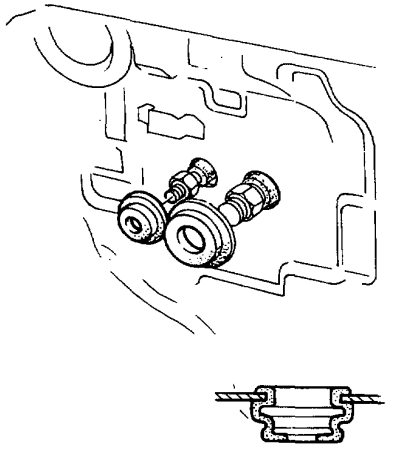
Evaporator

Replacement

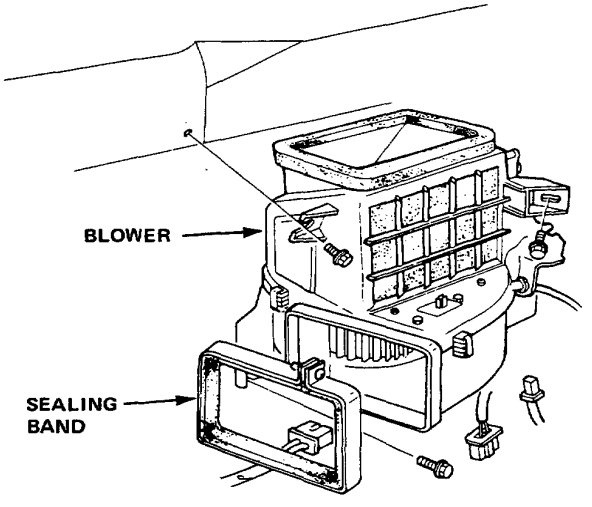
1. Disconnect the battery negative terminal.
2. Discharge the refrigerant (page 24-20).
3. Disconnect the receiver line and suction hose from the evaporator.

   CAUTION: Cap the open fittings immediately to keep moisture and dirt out of the system.

4. Remove the grommets.

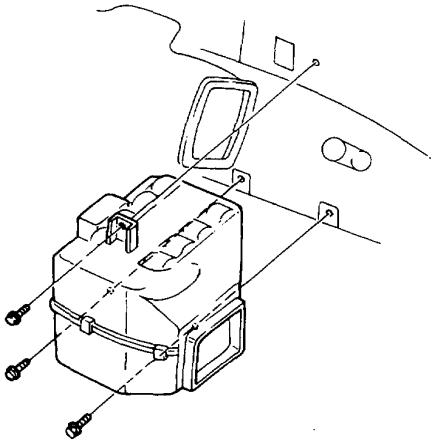


5. Remove the instrument panel under cover (page 22-46).
6. Disconnect the vacuum line and wire harness from the blower.
7. Remove the sealing band from between the blower and evaporator.
8. Remove the blower.



9. Remove the evaporator.

   NOTE: Carefully disconnect the wire harness from the thermostat.



Install the evaporator in the reverse of removal, and:

- If a new evaporator is installed, add 30 cm^3 (1 fl oz) of refrigerant oil to it before charging.
- Don't forget to install the joint and tighten the sealing band securely to prevent air leaking.
- Charge the system (page 24-22).
- Test the performance (page 24-12).

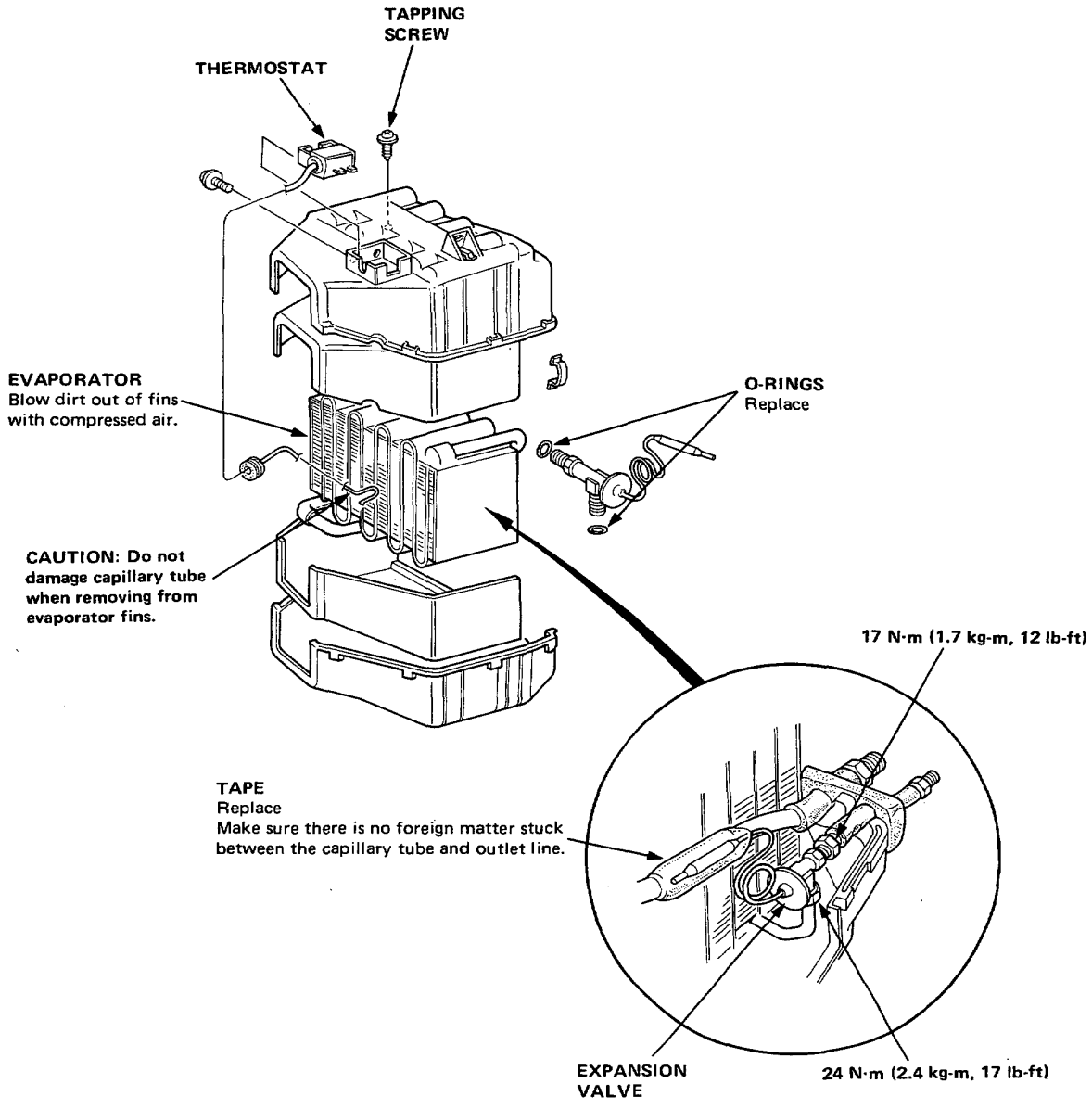
Evaporator

Overhaul

1. Remove the tapping screws and clips from the housing.
2. Carefully separate the housings as required to obtain access to the capillary tube in the housings.
3. Pull out the capillary tube of the thermostat from the evaporator fins.
4. Separate the housings and remove the evaporator covers.
5. Remove the expansion valve if necessary.

Assemble the evaporator in the reverse of disassembly, and:

- Install the expansion cover capillary tube against the suction line, and wrap it with tape.
- Reinstall the thermostat capillary tube in its original location.
- Reassemble the upper and lower housings with the clips, make sure there are no gaps between them.



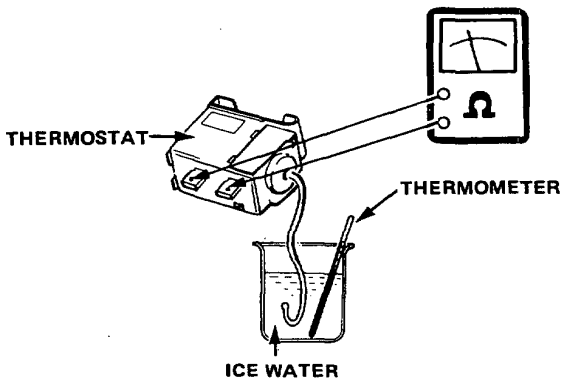
Thermostat Clutch Relay

Thermostat Testing

Dip the thermostat capillary tube into a pan filled with ice water, and check for continuity.

Cut-off . . . . . 1.5–0.5°C (35–33°F)
Cut-in . . . . . 3.0–5.0°C (37–41°F)

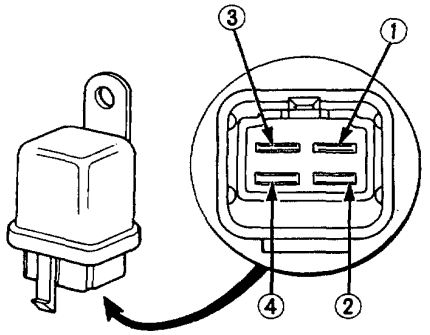
If cut-off or cut-in temperature is too low or too high, replace the thermostat.



Clutch Relay Testing

1. Check for continuity between the terminals 3 and 4. There should be no continuity.

2. Connect a 12 V battery across the terminals 1 and 2.
There should be continuity between the terminals 3 and 4.

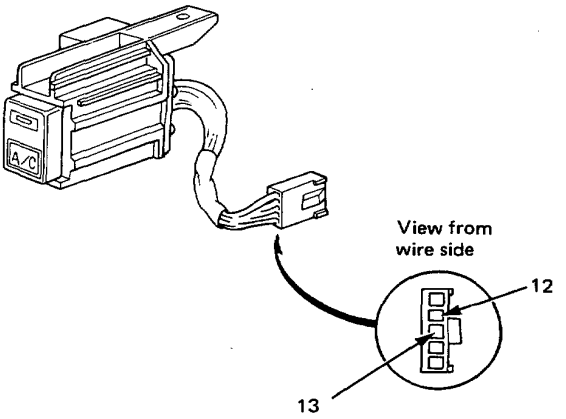


A/C Switch

Testing

There should be continuity between No. 12 and No. 13 terminals when the switch is pushed in. There should be no continuity when the switch button is released off.

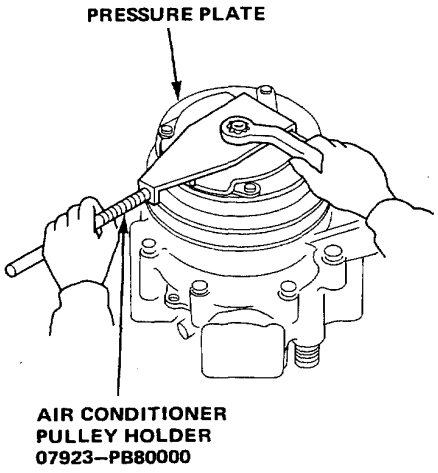
NOTE: The A/C switch contains an LED circuit and cannot be tested with ordinary circuit testers. If there is any abnormality in LED, see page 24-9 to determine the cause of the trouble.



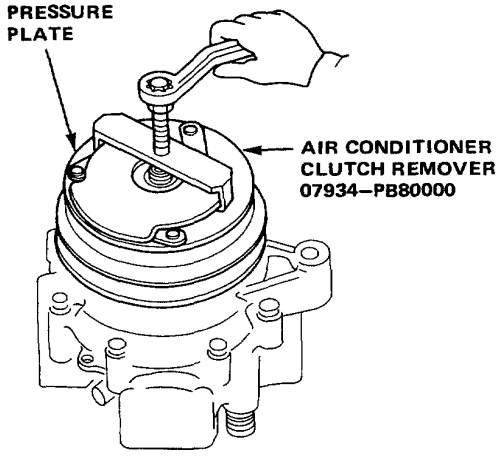
Compressor Clutch

Overhaul

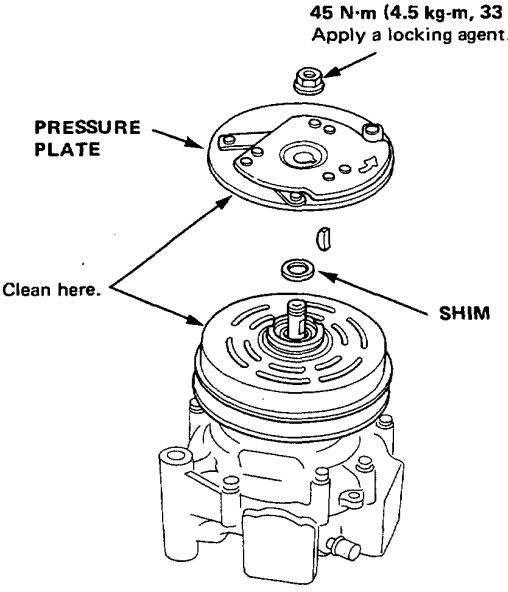
1. Remove the nut while holding the pressure plate with the tool shown.



2. Install the clutch remover tool on the pressure plate and remove it by screwing in the center bolt.

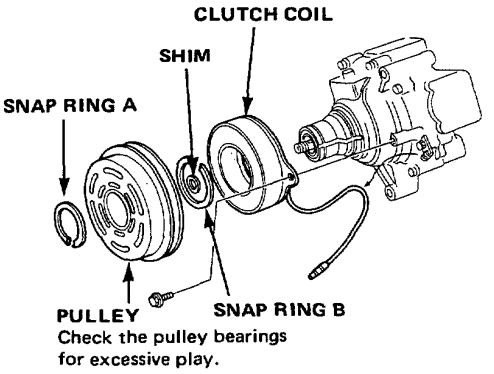


3. Clean the mating surfaces of the pulley and pressure plate with a non-petroleum solvent.



4. Use snap ring pliers to take off snap ring A, then remove the pulley from the shaft with a 2 or 3 jaw puller.

CAUTION: When removing the snap rings, be careful not to damage the aluminum compressor snout.



5. Remove the shim from the compressor shaft, then use snap ring pliers to remove snap ring B.

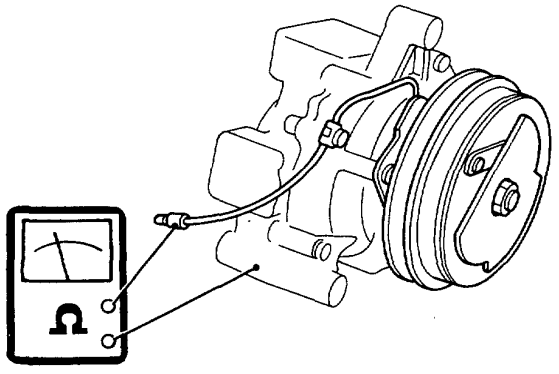
6. Unscrew the clutch coil mounting bolt, then remove the clutch coil.

NOTE: It's not necessary to remove the clutch wire clamp; just pry it up enough to remove the wire.

7. Check the resistance of the coil.

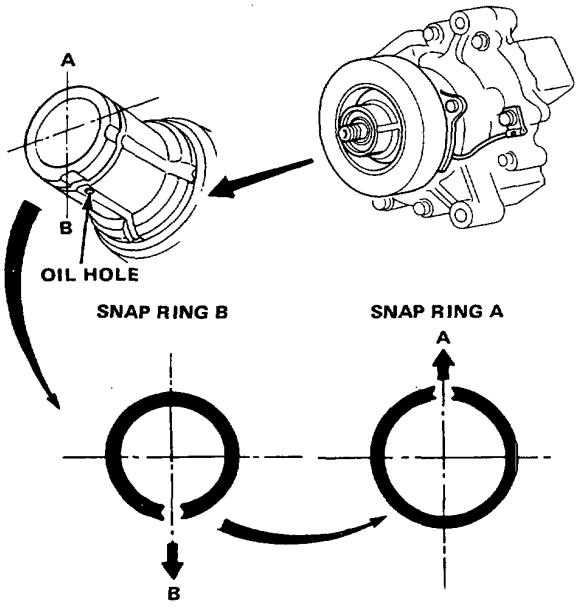
Coil Resistance:
3.0 ± 0.3 Ω at 20°C (68°F)

If resistance is not within specifications, replace the clutch coil with a new one.



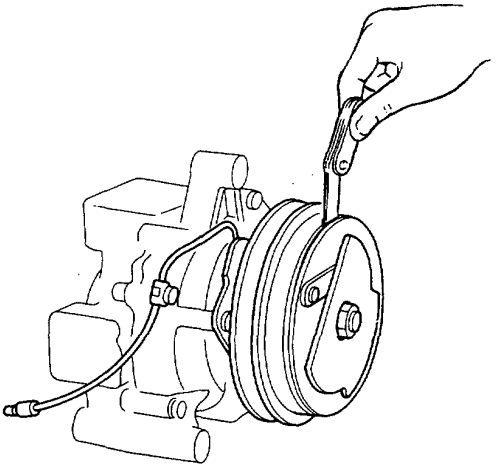
Assemble in reverse order, and:

- Install both snap rings with their chamfered sides facing out.
- The end gap in snap ring B must align with the oil hole in the compressor snout; the end gap in snap ring A must be opposite that of B.



- Tighten the hub nut to 45 N·m (4.5 kg-m, 33 ft-lb) and measure the clearance between the pulley and the pressure plate all the way around. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as required.

Rotor-to-Flange Clearance:
0.3–0.6 mm (0.012–0.024 in.)

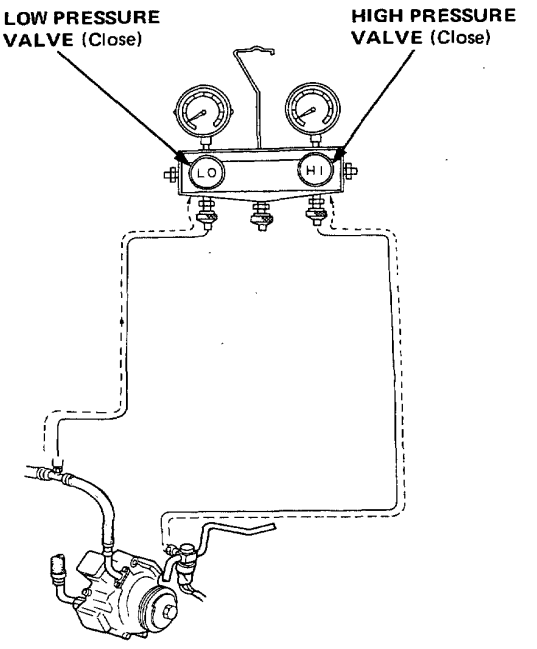


Pressure Test
Discharge Procedure

Pressure Test

1. Connect the gauges as shown.
2. Close both high and low pressure valves.
3. Test with the hood up, doors and windows open, temperature lever on COLD (left end), function button on VENT and fan maximum high speed.
4. Leave the air conditioner on about 10 min. The sight glass should be free of bubbles.

   NOTE: Run the engine at 1,500 rpm.
5. The high pressure reading should be about 2,250 kPa (22.5 kg/cm^2, 320 psi).
   Low pressure reading: about 260 kPa (2.6 kg/cm^2, 37 psi)
   If the readings are not correct, refer to the trouble-shooting chart on page 24-10.



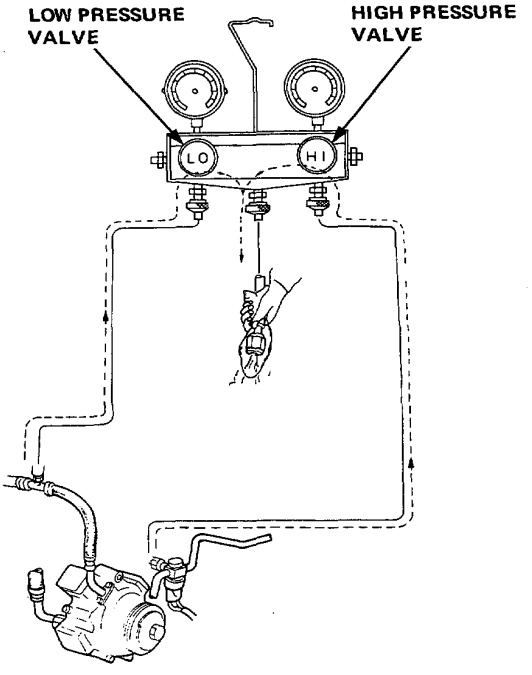
Discharge Procedure

WARNING

- **Keep away from open flames. The refrigerant, although nonflammable, will produce a poisonous gas if burned.**
- **Work in a well-ventilated area. Refrigerant evaporates quickly, and can force all the air out of a small enclosed area.**

1. Connect the gauges as shown.
2. Disconnect the center hose of the gauge set and place the free end in a shop towel.
3. Slowly open the high side manifold valve slightly to let refrigerant flow from the center hose only. Do not open the valve too wide. Check the shop towel to make sure no oil is being discharged with the refrigerant.

   CAUTION: If refrigerant is allowed to escape too fast, compressor oil will be drawn out of the system.
4. After the high pressure gauge reading has dropped below 1,000 kPa (10.0 kg/cm^2, 142 psi), open the low side valve to discharge both high and low sides of the system.
5. Note the gauge readings and, as system pressure drops, gradually open both high and low side valves fully until both gauges indicate 0 kPa (0 kg/cm^2, 0 psi).

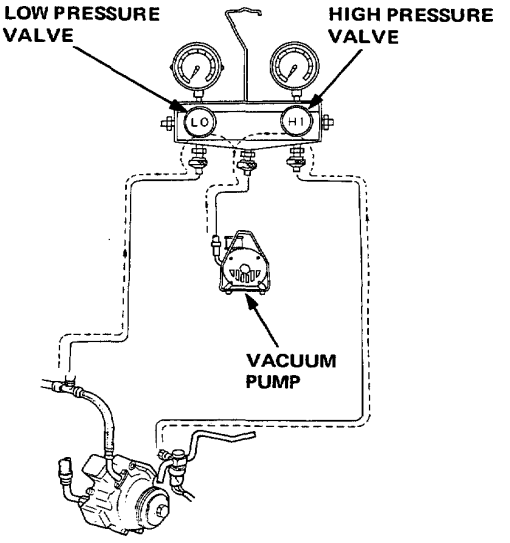


System Evacuation Leak Testing

System Evacuation

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a vacuum pump. (If the system has been open for several days, the receiver-dryer should be replaced).
2. Attach a gauge set and pump as shown, connecting the center charging hose to the pump inlet.
3. Start the pump, then open both gauge valves. Run the pump for about 15 minutes. Close the valves and stop the pump. The low gauge should indicate above 700 mm Hg (27 in-Hg) and remain steady with the valves closed.

   NOTE: If low pressure does not reach more than 700 mm Hg (27 in-Hg) in 15 minutes, there is probably a leak in the system. Check for leaks, and repair (see Leak Test below).
4. If there are no leaks, open the valves and continue pumping for at least another 15 minutes, then close both valves, stop the pump and disconnect it from the center charging hose.

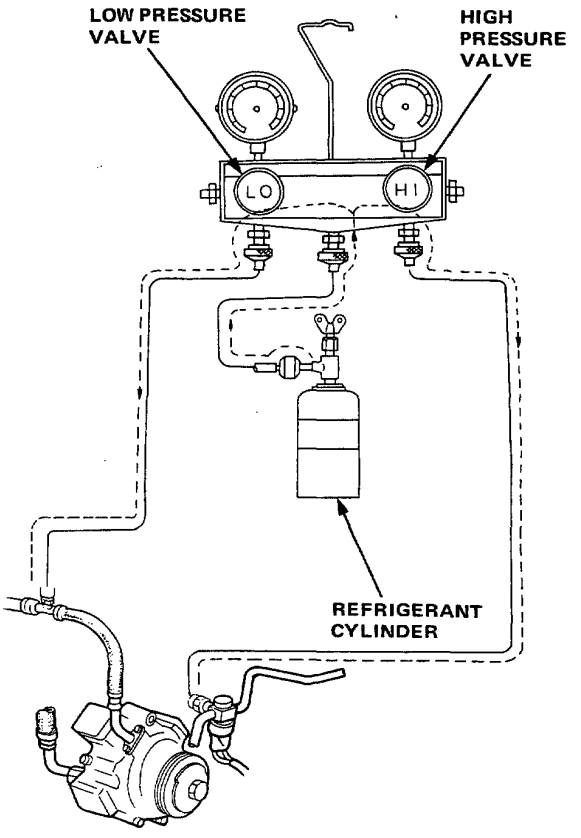


Leak Testing

WARNING When handling refrigerant (R-12):

- **Always wear eye protection.**
- **Do not let refrigerant get on your skin or in your eyes. If it does:**
  - **Do not rub your eyes or skin.**
  - **Splash large quantities of cool water in your eyes or on your skin.**
  - **Rush to a physician or hospital for immediate treatment. Do not attempt to treat it yourself.**
- **Keep refrigerant containers (cans of R-12) stored below 40°C (100°F).**
- **Keep away from open flame. Refrigerant, although non-flammable, will produce poisonous gas if burned.**
- **Work in well ventilated area. Refrigerant evaporates quickly, and can force all the air out of a small, enclosed area.**

1. Attach a refrigerant supply and gauge set as shown, with all valves closed. Then open the refrigerant supply valve on the can.
2. Loosen the center charging hose fitting at the gauge to purge any air from the hose, until it hisses for a few seconds, then tighten it again.
3. Open both gauge valves to charge the system to about 100 kPa (1.0 kg/cm^2, 14 psi), then close the supply valve.
4. Check the system for leaks using a leak detector.
5. If you find leaks that require the system to be opened (to repair or replace hoses, fittings, etc.), release any charge in the system according to the Discharge Procedure on the previous page.
6. After checking and repairing leaks, the system must be evacuated (see System Evacuation above).



System Charging

WARNING **Always wear eye protection when charging the system.**

The A/C system may be charged with refrigerant by either Vapor or Liquid method:

CAUTION: Do not overcharge the system; the compressor will be damaged.

VAPOR CHARGING, through the low side:

1. Connect a gauge set and refrigerant can (right side up) as shown, with the gauge valves closed. Purge air from the charging hose by opening the refrigerant valve, then, loosening the center connector at the gauge, letting it hiss for a few seconds, and tightening it.
2. Open the low gauge valve [adjust it as necessary so pressure does not exceed 415 kPa (4.15 kg/cm^2, 60 psi) while charging].
3. Start the engine and switch the air conditioner fan on high.

   NOTE: Run the engine below 1,500 rpm.
4. Keep the refrigerant can right side-up. Charge the system with 750–850 g (26–30 oz.) of refrigerant until sight glass is free of any bubbles, indicating a full charge. Do not exceed 1,336 kPa (13.4 kg/cm^2, 190 psi).
5. When fully charged, close the gauge valves, then the valve on the can. Slowly disconnect the refrigerant hose from the center gauge connection to allow excess refrigerant to escape. Quickly remove the gauges from the system to minimize refrigerant loss.

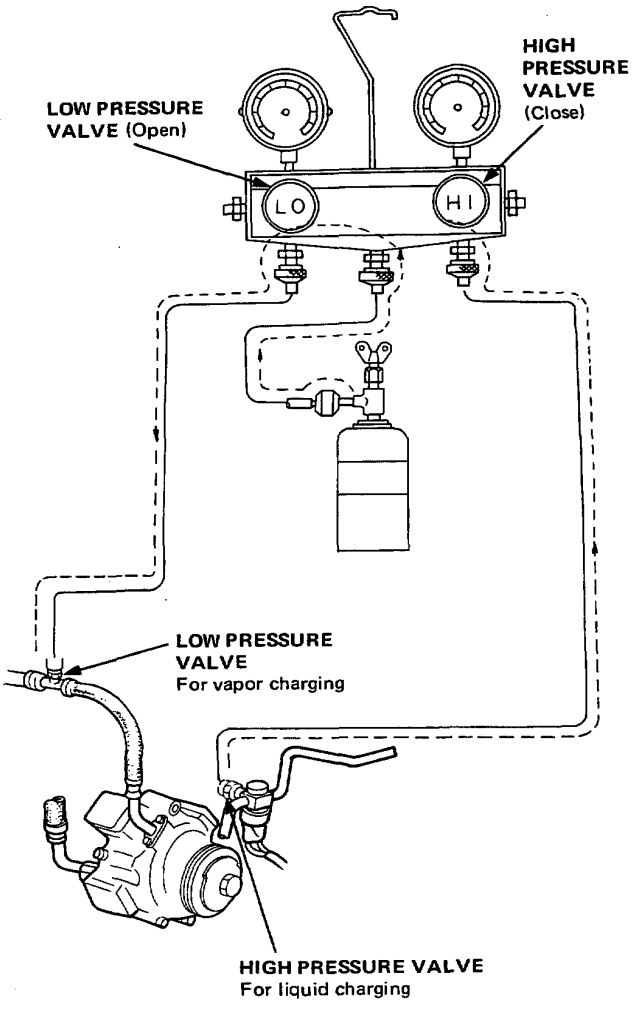
LIQUID CHARGE through the high pressure side:

Following the charging station manufacturer's instructions, charge the system with 750–850 g (26–30 oz.) of refrigerant.

WARNING

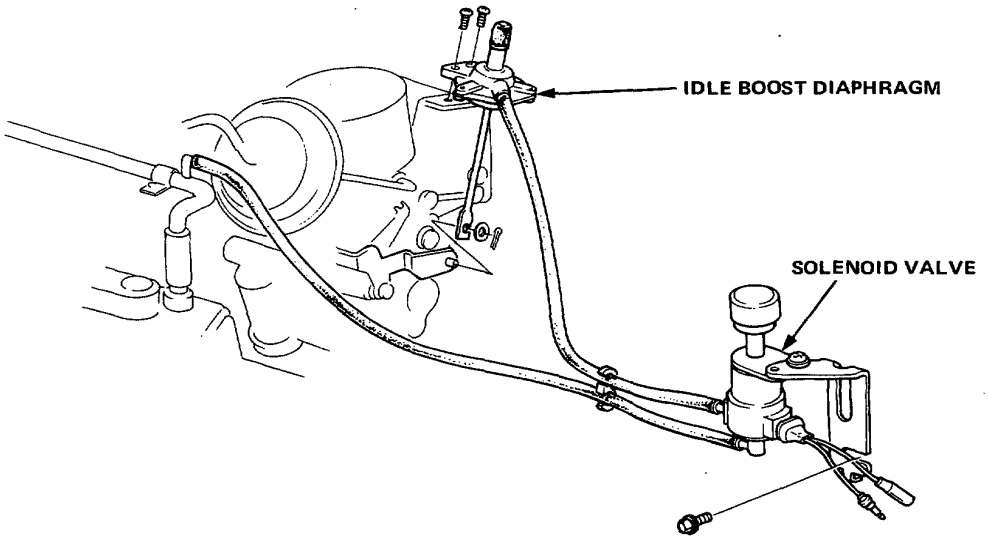
- **Do not use disposable cans to charge through the high pressure side of the system. System pressure could transfer into the can causing it to explode. Use only the bulk supply of refrigerant from the charging station.**
- **Do not run the engine during liquid charge; the compressor will be damaged.**

Vapor Charging



Idle Boost

Replacement



Idle Adjustment

After charging, adjust the idle speed with the air conditioner on:

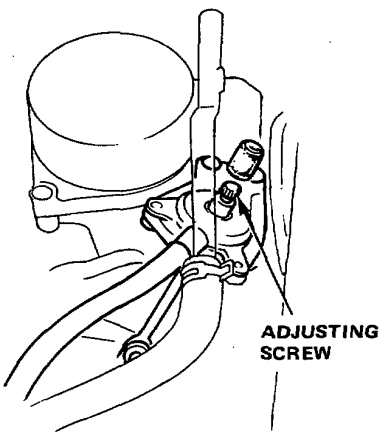
- Apply the parking brake and block the wheels.
- Headlights . . . . . OFF
- A/C temperature lever . . . . . COLD (left end)
- Vent and RECIRC buttons . . . ON
- Fan switch . . . . . HI (right end)
- Gearshift – Manual . . . . . Neutral
  Automatic . . . . . In Drive

1. Start the engine and warm it up to normal operating temperature (when radiator fan comes on). Check the idle speed with the A/C OFF, and adjust it, if necessary.

   IDLE SPEED: Manual – 750 ± 50 rpm
   Automatic – 750 ± 50 rpm (in gear)

2. Turn the fan on HI, and check the idle speed again; it should be the same as with the fan OFF; if not, adjust it by turning the adjusting screw.

3. Turn the fan switch OFF and ON several times and make sure the idle speed does not change.



MEMO

Electrical

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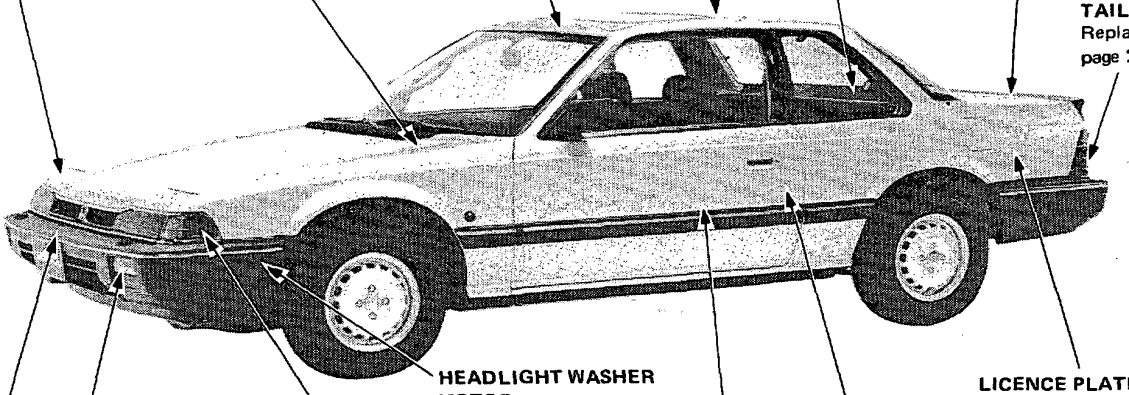


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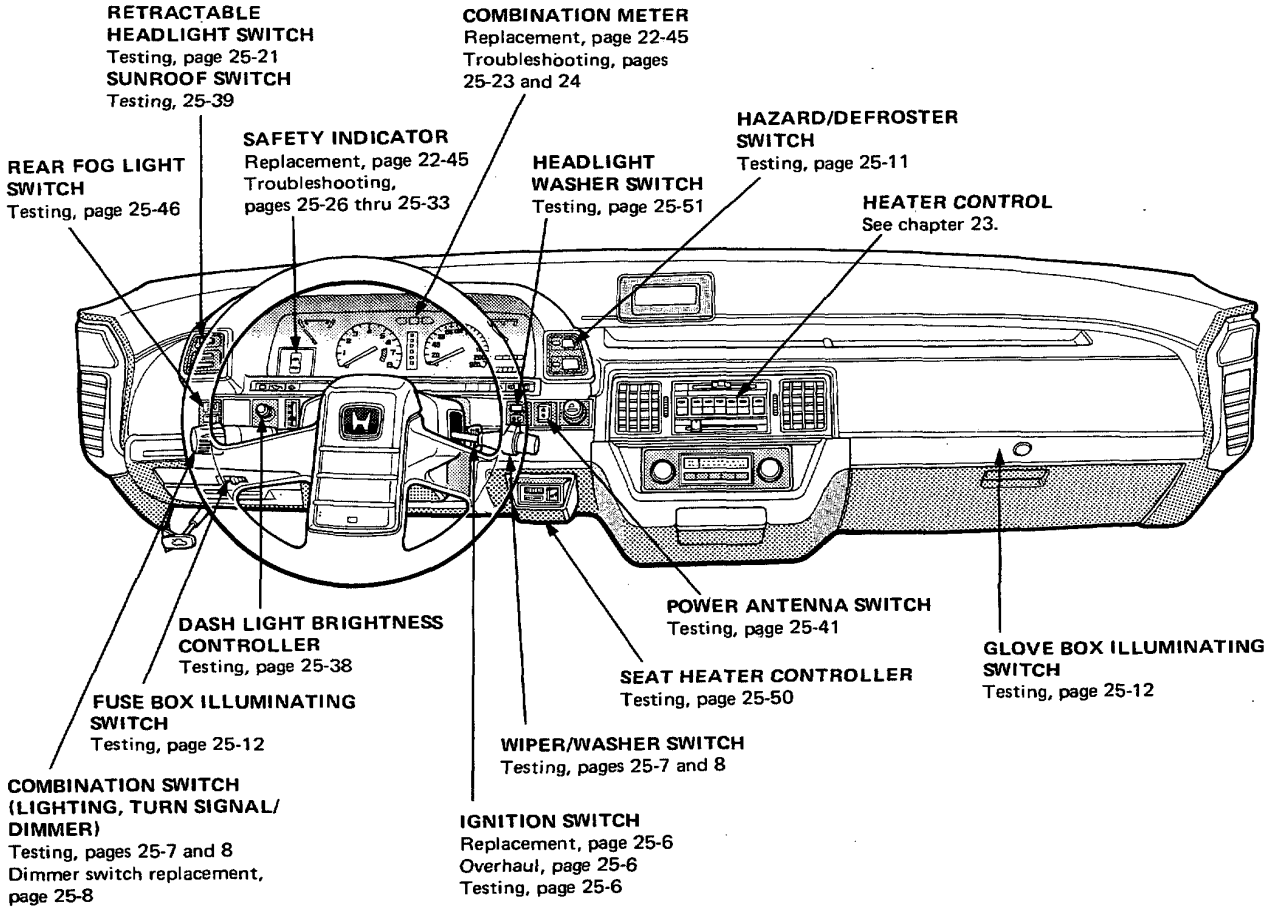
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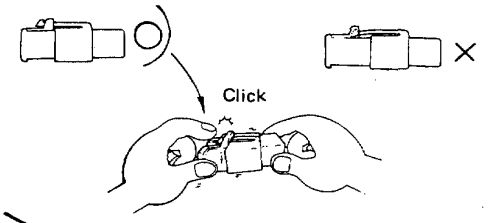
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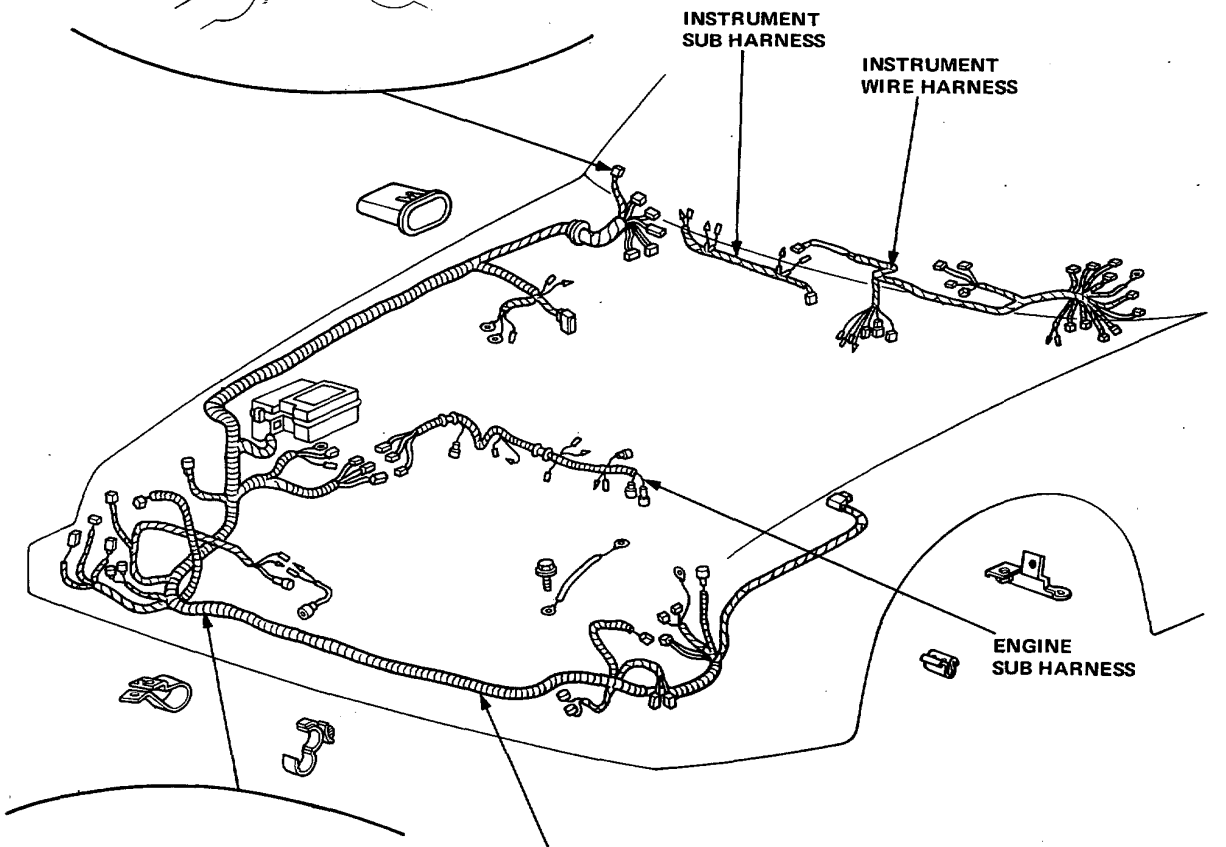
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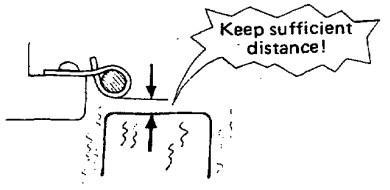
Wire Harness

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

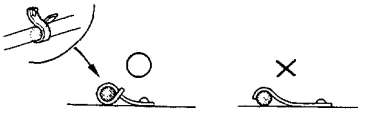


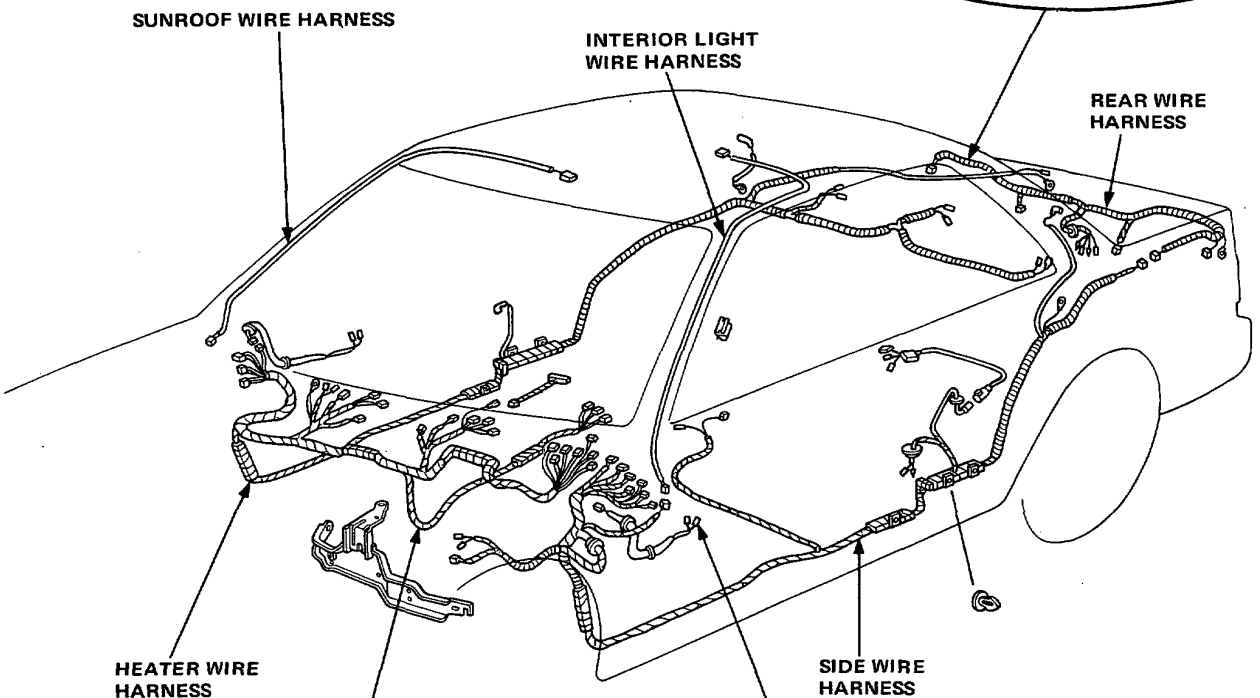


- Keep wire harnesses away from the exhaust pipes and other hot parts.

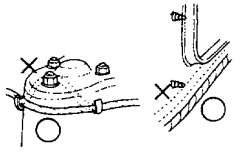


- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations.
- Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.

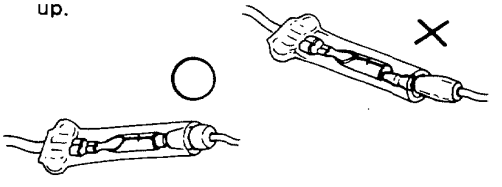




- Do not bring wire harnesses in direct contact with sharp edges or corners.
- Also avoid contact with the projected ends of bolts, screws and other fasteners.



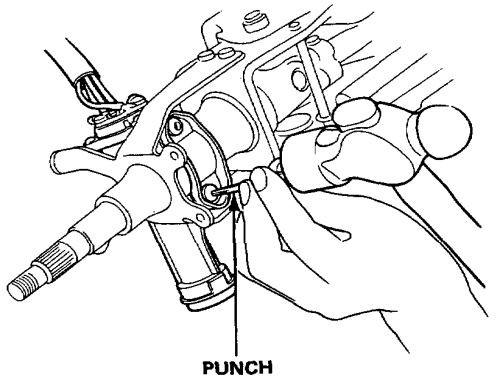
- *Insert male connectors into the female connectors* fully until they will no longer go.
- Be sure that plastic cover is placed over the connection.
- Don't place the opening of each plastic cover facing up.



Ignition Switch

Replacement

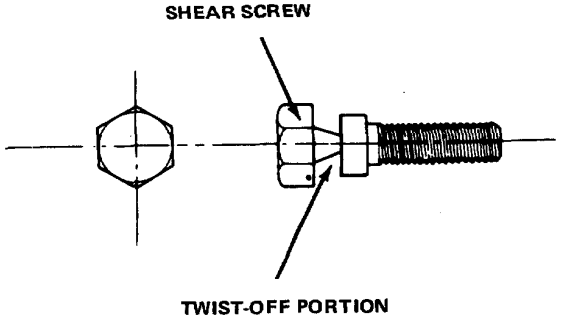
1. Remove the steering column covers.
2. Disconnect the ignition switch connector.
3. Center punch each of the 2 shear screws and drill their heads off with a 3/8 in. drill bit.



4. Install the new ignition switch without the key inserted.
5. Hand tighten the new shear screws.

   NOTE: Make sure the projection of the ignition switch is aligned with the hole of the steering column.

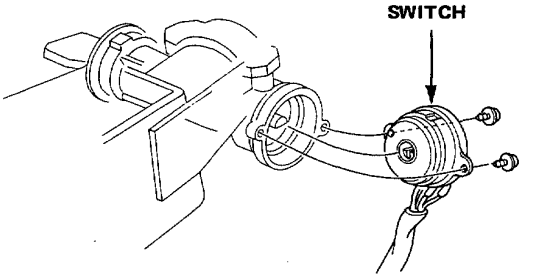
6. Insert the ignition key and check for proper operation of the steering wheel lock.
7. Tighten the shear screws until the hex heads twist off.



Overhaul (Electrical Switch Replacement)

NOTE: The mechanical part of the switch does not have to be removed to replace the electrical part.

1. Remove the steering column lower cover.
2. Disconnect the ignition switch connector.
3. Insert the key and turn it to "O".
4. Remove two screws and replace the base of the switch.

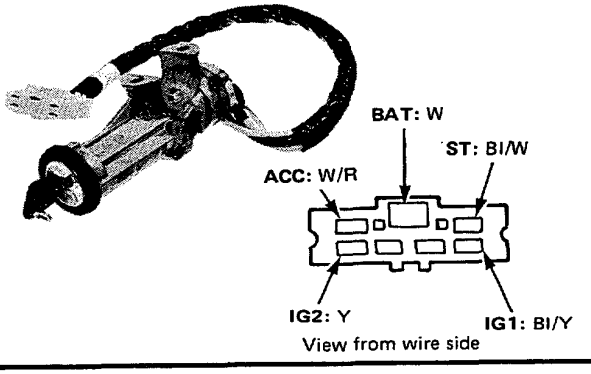


NOTE: Make sure the recess of the switch is aligned with the projection of the lock when installing.

Testing

Check for continuity according to the table.

TERMINAL / POSITION	ACC	BAT	IG1	IG2	ST
0					
I	○	○			
II	○	○	○	○	
III		○	○		○
WIRE COLOR	W/R	W	Bl/Y	Y	Bl/W



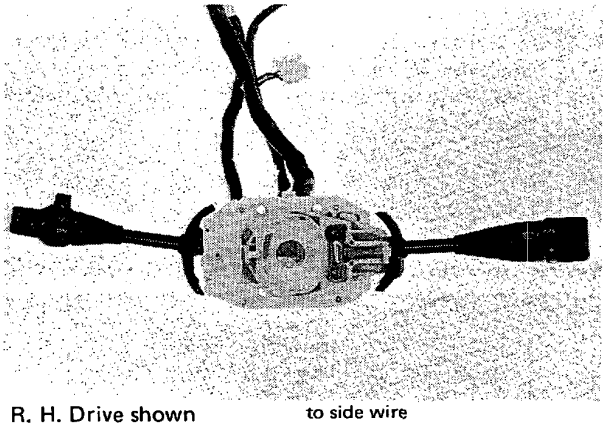
Combination Switch

Testing

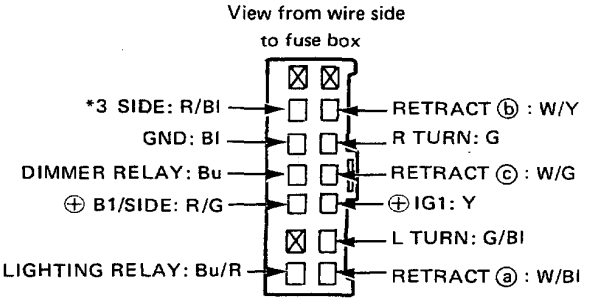
See pages 18-12 to 18-14 for removal.
Check for continuity between the terminals in each switch position according to the table below.

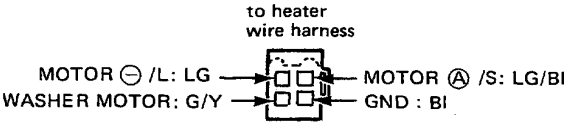
CAUTION:

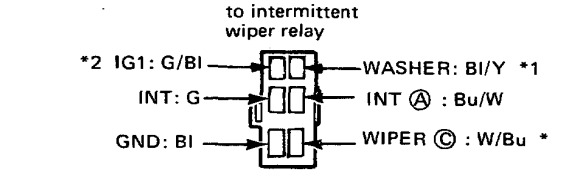
- **Make sure the wire leads are not pulled when the lever is moved.**
- **Check that the lever works freely without binding.**

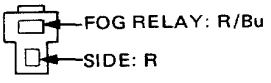


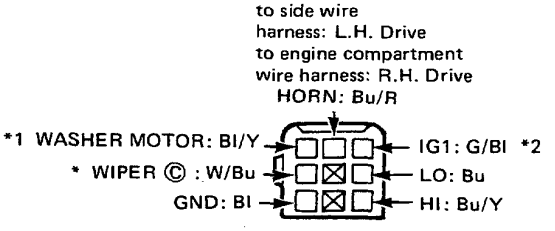
R. H. Drive shown











NOTE:

- The connectors having the same mark are internally connected.
- *3 terminal is not equipped on cars with rear fog light.

Front Wiper Switch

TERMINAL / POSITION	IG1	INT	INTⒶ	LO	HI	GND
OFF			○	○		
NT	○	○	○	○		
LO				○		○
HI					○	○
WIRE COLOR	G/Bl	G	Bu/W	Bu	Bu/Y	Bl

Front Washer Switch (R.H. Drive)

TERMINAL / POSITION	WASHER MOTOR	GND
OFF		
ON	○	○
WIRE COLOR	Bl/Y	Bl

Turn Signal Switch

TERMINAL / POSITION		⊕IG1	(DIODE)		R TURN	L TURN
OFF				○		
ON	R	○	▶	○	○	
	L			○		○
WIRE COLOR		Y			G	G/Bl

Lighting Switch (Cars without rear fog light)

TERMINAL / POSITION	⊕B1 (SIDE)	SIDE	RETRACT ⓒ	RETRACT ⓐ	RETRACT ⓑ	LIGHTING RELAY	GND
OFF			○		○		
•	○	○					
●	○	○	○	○		○	○
WIRE COLOR	R/G	R/Bl	W/G	W/Bl	W/Y	Bu/R	Bl

Dimmer Switch

TERMINAL / POSITION	GND	DIMMER RELAY
HIGH	○	○
LOW		
WIRE COLOR	Bl	Bu

Over-Taking Switch

TERMINAL / POSITION	LIGHTING RELAY	GND	DIMMER RELAY
OFF			
ON	○	○	○
WIRE COLOR	Bu/R	Bl	Bu

(cont'd)

Combination Switch

Testing (cont'd)

Front Washer Switch (L.H. Drive)

TERMINAL / POSITION	WASHER MOTOR	IG1
OFF		
ON	○	○
WIRE COLOR	Bl/Y	G/Bl

Lighting Switch (Cars with rear fog light)

TERMINAL / POSITION	⊕B1 (SIDE)	SIDE	RETRACT Ⓒ	RETRACT Ⓑ	RETRACT Ⓓ	FOG RELAY	GND
OFF			○		○		
	○	○					
	○	○	○	○		○	○
WIRE COLOR	R/G	R	W/G	W/Bl	W/Y	R/Bu	Bl

Horn Switch

TERMINAL / POSITION	HORN	GND
OFF		
ON	○	⏚
WIRE COLOR	Bu/R	

Rear Wiper Switch

TERMINAL / POSITION	L	S	GND
OFF	○	○	
ON	○		○
WIRE COLOR	LG	LG/Bl	Bl

Rear Washer Switch

TERMINAL / POSITION	WASHER MOTOR	IG1
OFF		
ON	○	○
WIRE COLOR	G/Y	G/Bl

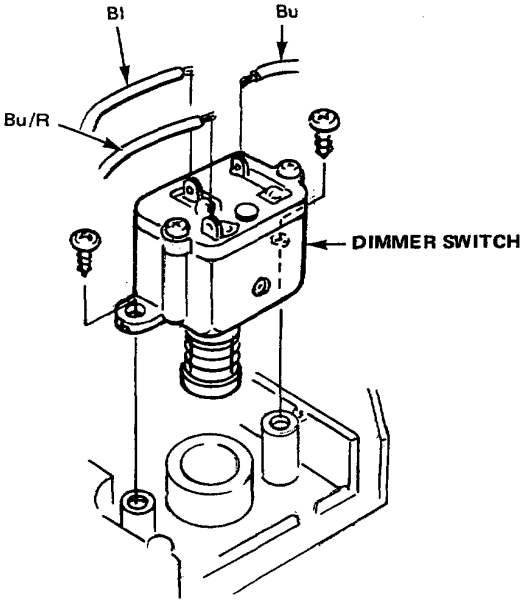
Dimmer Switch Replacement

1. Disconnect the dimmer switch wires from the switch by using soldering iron.

   CAUTION:
   - **Don't cut the wires to ensure the original slack.**
   - **Use a soldering iron with a 30–60 W rating. Reshape the iron end if the roughened or rusted.**

2. Remove the two screws and dimmer switch.

3. Install the new dimmer switch and check for proper operation by moving the dimmer switch lever. Also make sure that the wires are not kinked and have no excessive slack.



4. Connect the dimmer switch wires to the switch terminals by using a soldering iron.

   NOTE:
   - Use good quality rosin core type solders.
   - Solder only correct terminals and wires. Record the wire position before removal.
   - Apply enough heat to ensure the smooth surface of the solder.

5. Make sure that the wires are securely soldered by pulling the wires.

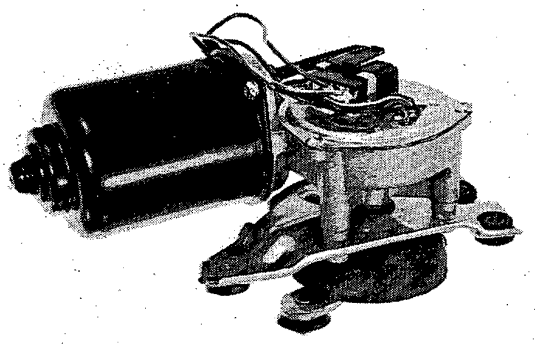
Front Wiper Motor

Testing

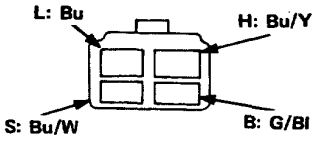
1. Test motor low speed by applying battery voltage to the G/Bl and Bu leads.
2. Test motor high speed by applying battery voltage to the G/Bl and Bu/Y leads.
3. If the motor fails to turn smoothly, replace the motor assembly.

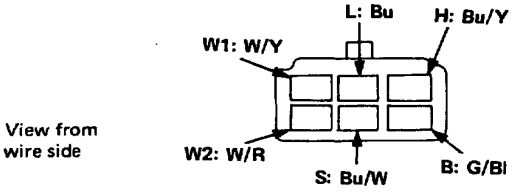
For R.H. Drive wiper motor, check the following items:

1. *Connect the wiper motor and run.*
2. Measure the voltage between W1 (W/Y: positive) terminal and body ground.
3. Make sure the voltmeter needle swings between 0 and 12V.
4. Measure the voltage between W2 (W/R: positive) terminal and body ground.
5. Make sure the voltmeter needle swings between 0 and 12V.



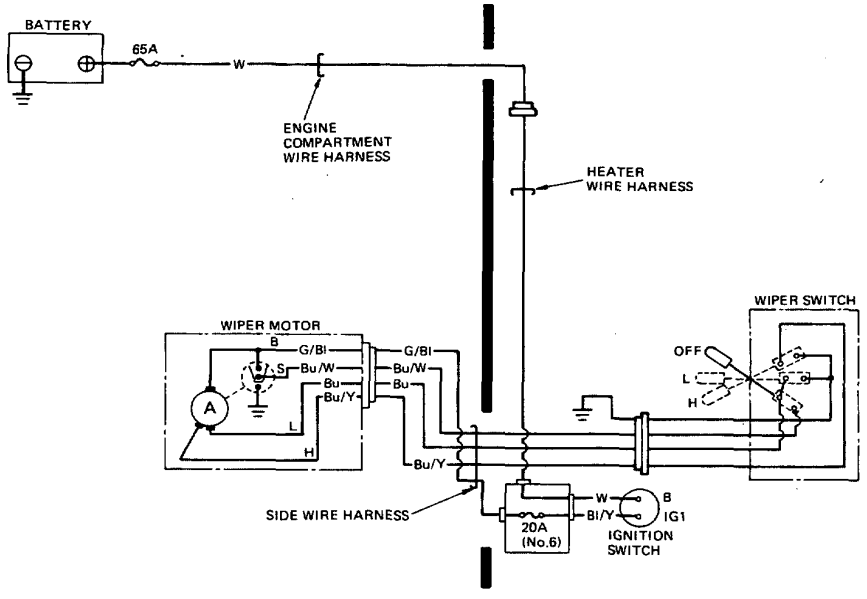
R.H. Drive





Wiring Diagram (L.H. Drive)

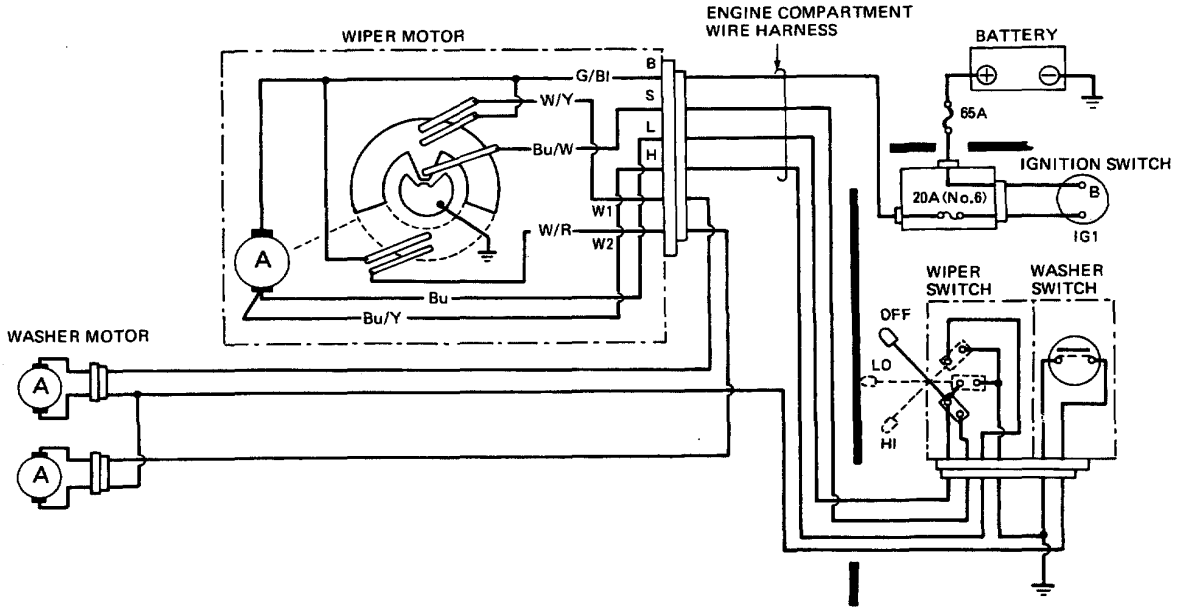
NOTE: This wiring diagram doesn't contains intermittent wiper circuit.



Front Wiper Motor
Rear Wiper Motor

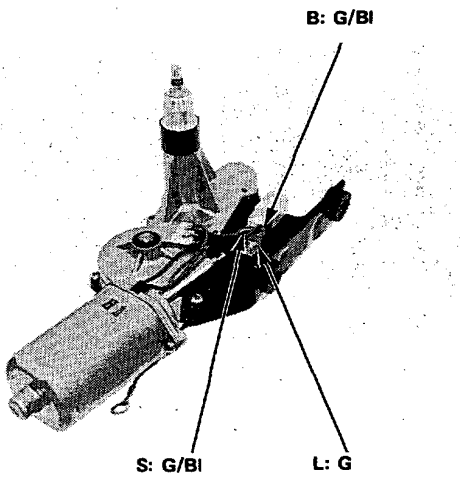
Front Wiper Motor Wiring Diagram (R.H. Drive)

NOTE: This wiring diagram doesn't contains intermittent wiper circuit.

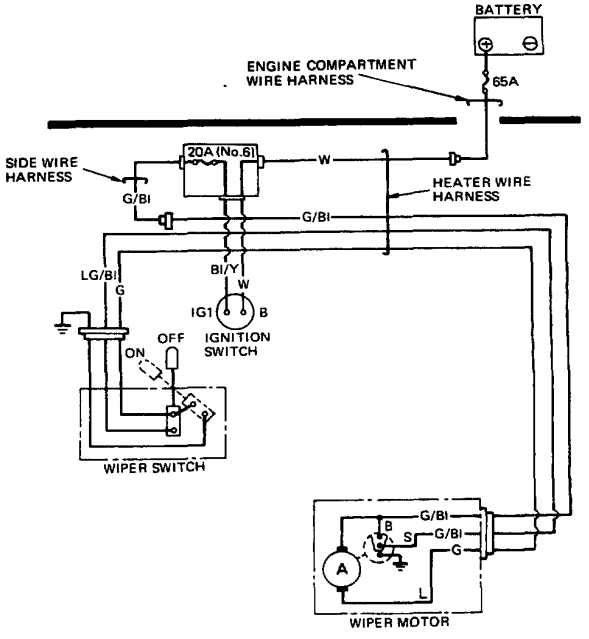


Rear Wiper Motor Testing

1. Test motor speed by applying battery voltage to the G/Bl (B) and G leads.
2. If the motor fails to turn smoothly, replace the motor assembly.



NOTE: L.H. Drive shown; R.H. Drive basically similar

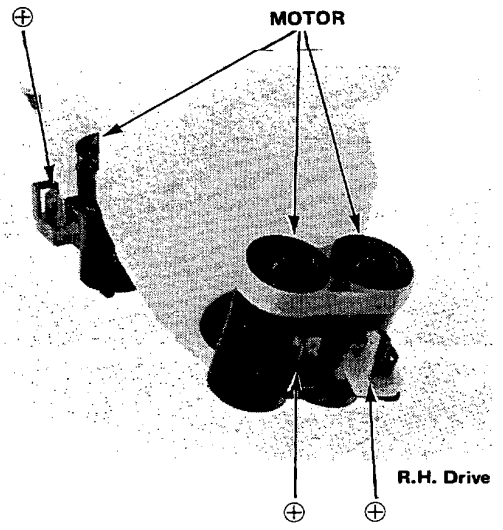


Washer Motor Horn Switch

Washer Motor Testing

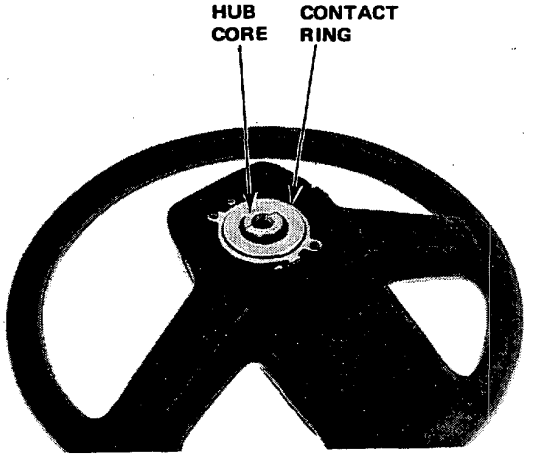
Test motor speed by applying the battery voltage to its terminals.

NOTE: Connect the battery positive cable to the lock side terminal of the motor.



Horn Switch Testing

Use an ohmmeter.
There should be continuity between the contact ring and hub core when the horn switch is depressed, and no continuity when released.



Hazard/Defroster Switch

Testing

Check for continuity according to the table below.

Hazard Switch (European Type)

TERMINAL / POSITION	B	S		L	R	W
OFF		○	▶	○		
		○	▶		○	
		○	▶			○
ON		○	▶	○		
	○	○	▶		○	
		○	▶			○
WIRE COLOR	W/G			Bu/Y	Bu/G	Or

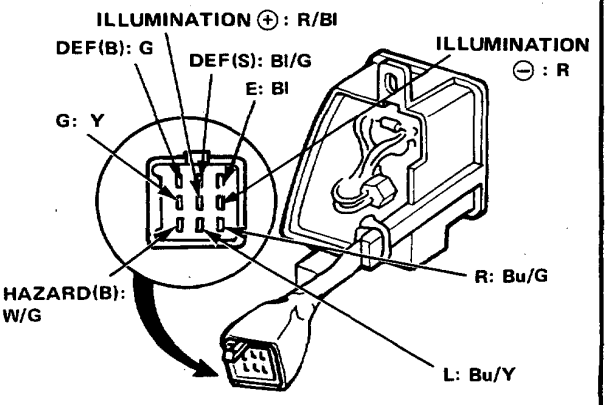
NOTE: There should be no continuity between B terminal (W/G) and other terminal, when the hazard switch is in off position.

Hazard Switch (Other Type)

TERMINAL / POSITION	B	S		L	R
OFF		○	▶		○
		○	▶	○	
ON		○	▶	○	
	○	○	▶		○
WIRE COLOR	W/G			Bu/Y	Bu/G

Defroster Switch

TERMINAL / POSITION	S		E	B
OFF	○	⌀	○	
ON	○	⌀	○	○
WIRE COLOR	Bl/G		Bl	G



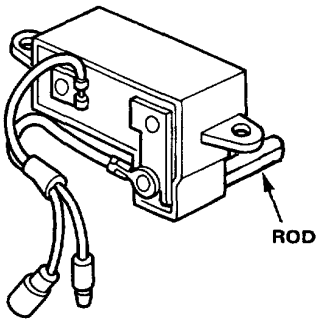
View from terminal side

Fuse Box Illuminating Switch
Glove Box Illuminating Switch

Fuse Box Illuminating Switch Testing

There should be no continuity between the switch terminals when the rod is pushed, and continuity when released.

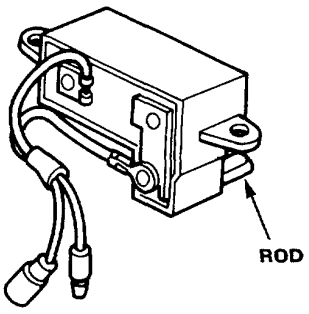
NOTE: Test the switch with the normal bulb installed.



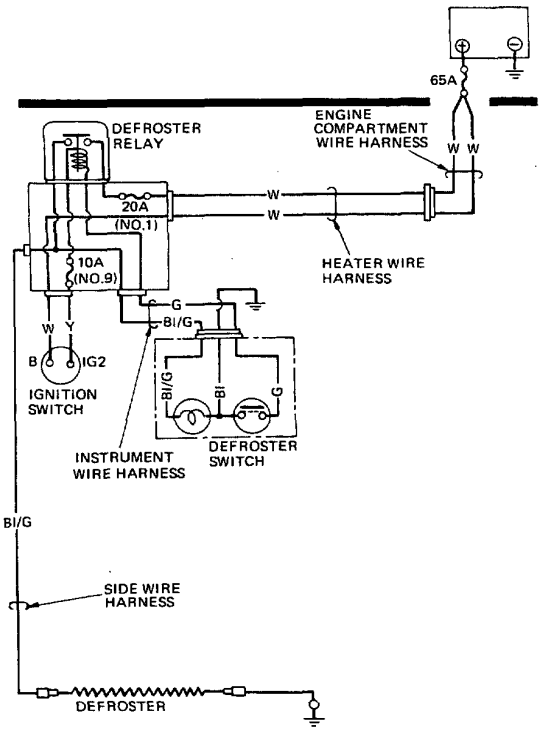
Glove Box Illuminating Switch Testing

There should be no continuity between the switch terminals when the rod is pushed, and no continuity when released.

NOTE: Test the switch with the normal bulb installed.



Rear Window Defroster

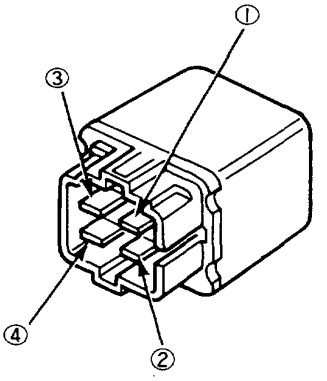


NOTE: L.H. Drive shown; R.H. Drive basically similar

NOTE: For switch testing, see page 25-11.

Relay Testing

There should be continuity between (4) and (3) terminals when the battery positive cable is connected to (1) terminal and the negative cable is connected to (2) terminal. There should be no continuity when the battery is disconnected.

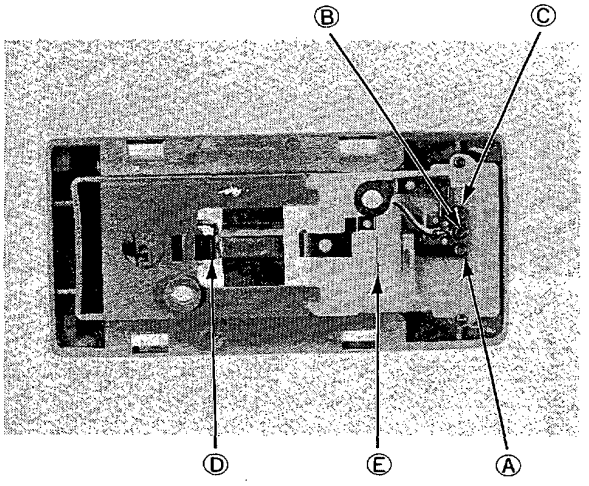


Interior Light Switch
Door Switch

Interior Light Switch Testing

Check for continuity according to the table.

TERMINAL / POSITION	A	B	C	D	E
OFF				○—○	
MID.	○—○			○—○	
ON		○—○		○—○	



Door Switch Testing

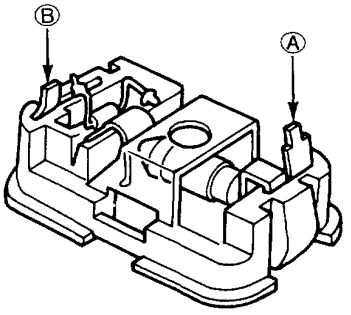
There should be no continuity when the switch is pulled (door is closed), and continuity when the switch is released (door is open).



Trunk Light
Luggage Light Switch

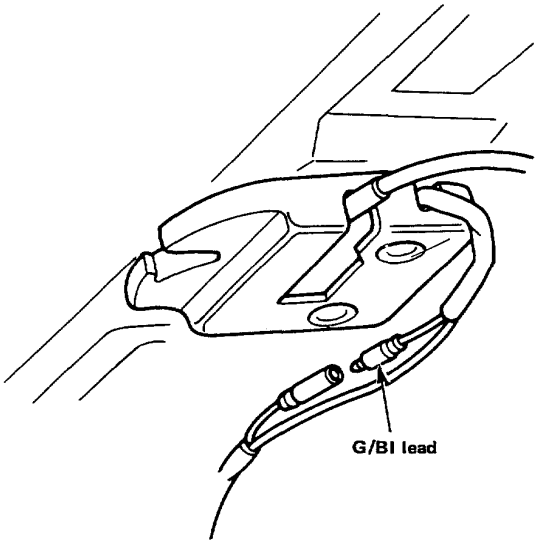
Trunk Light Testing

Check the trunk light for continuity between A and B terminals. Reverse the leads and recheck.
Continuity should exist in one direction only. Replace the trunk light if there is continuity in both directions or no continuity.



Luggage Light Switch Testing

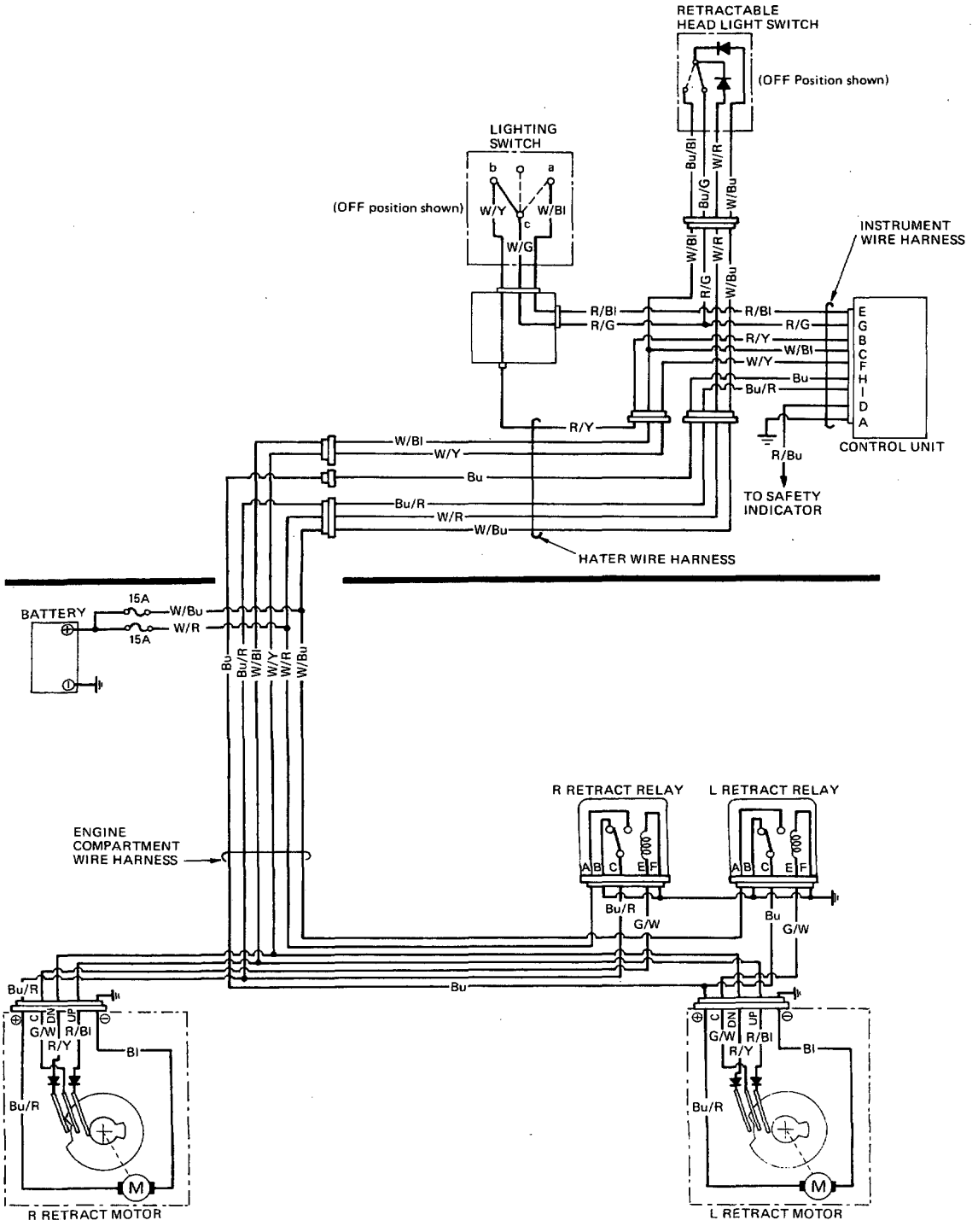
There should be continuity between G/BI lead and ground when the trunk lid is open, and no continuity when the trunk lid is closed.



Retractable Headlights and Lighting Relays

Wiring Diagram

NOTE: L.H. Drive shown; R.H. Drive basically similar



1. Headlight doesn't rise when retractable headlight switch is turned on.

Check fuse.

Normal — Not OK → Replace and recheck.

OK

Check freezing or stuck foreign matter in retract mechanism.

Normal — Not OK → Remove fuse. → Repair, insert fuse, and recheck.

OK

Measure voltage between A (positive) and B (negative) terminals at retract relay.

There is 12V. — Not OK → Open circuit between fuse and retract relay

OK

Measure voltage between C (positive) and B (negative) terminals at retract relay.

There is 12V. — Not OK → Measure voltage between E (positive) and F (negative) terminals at retract relay.

OK → (cont'd – A)

There is 12V. — Not OK → Disconnect wire harness from retract motor.

OK → (cont'd–B)

Measure voltage between W/Bl (positive) and Bl (negative) leads at wire harness.

Thereis 12V. — Not OK → Check for continuity between Bl lead and body ground at wire harness.

OK → (cont'd–C)

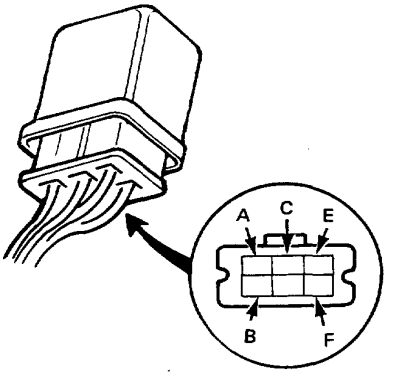
There is continuity. — Not OK → Poor ground

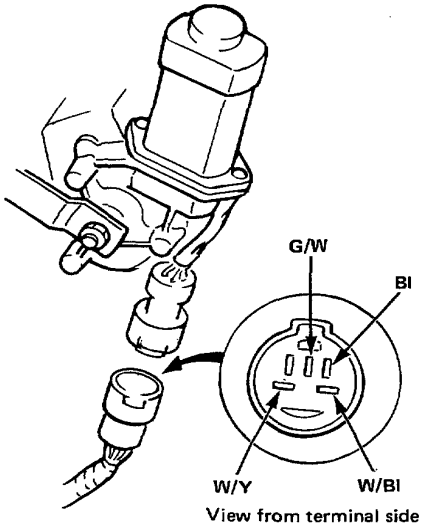
OK

Remove retractable headlight switch.

Check retractable headlight switch.

(cont'd–D)

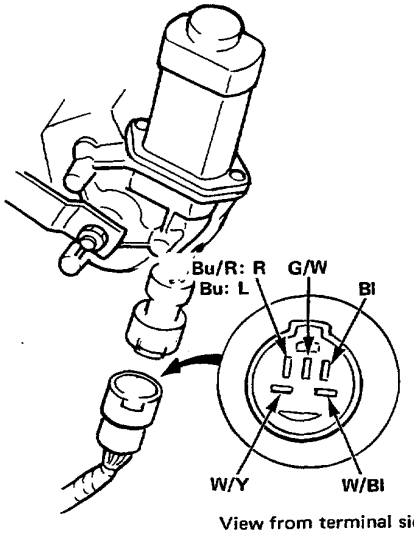




View from terminal side

Retractable Headlights and Lighting Relays

Troubleshooting (cont'd)



View from terminal side.

(cont'd—A)

Disconnect wire harness from retract motor.

Check Bu/R lead for continuity between retract motor and relay.

There is continuity.
Not OK — Open circuit
OK

Check for continuity between Bl lead and body ground at wire harness.

There is continuity.
Not OK — Poor ground
OK

Faulty retract motor

NOTE: Bu/R is for right motor. Left motor is connected to Bu.

(cont'd—B)

Check for continuity between F terminal and body ground at retract relay.

There is continuity.
Not OK — Poor ground
OK

Faulty retract relay

(cont'd—C)

Check G/W lead for continuity between retract motor and relay.

There is continuity.
Not OK — Open circuit
OK

Connect W/Bl lead to G/W lead with jumper wire at wire harness connector.

CAUTION: Avoid contact to other terminal and erroneous connection.

Measure voltage between C (positive) and B (negative) terminals at retract relay.

There is 12V.
Not OK
OK

Faulty retract motor

Check for continuity between B terminal and body ground at retract relay.

There is continuity.
Not OK — Poor ground
OK

Faulty retract relay

(cont'd—D)

Faulty retractable headlight switch
Not OK

Normal
OK

NOTE: W/R is for right motor. Left motor is connected to W/Bu.

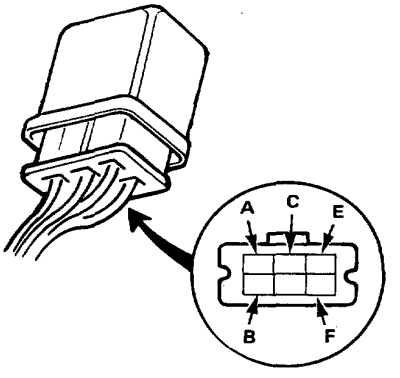
Measure voltage between W/R (positive) and Bl (negative) leads at wire harness.

Open circuit between fuse and retractable headlight switch
Not OK

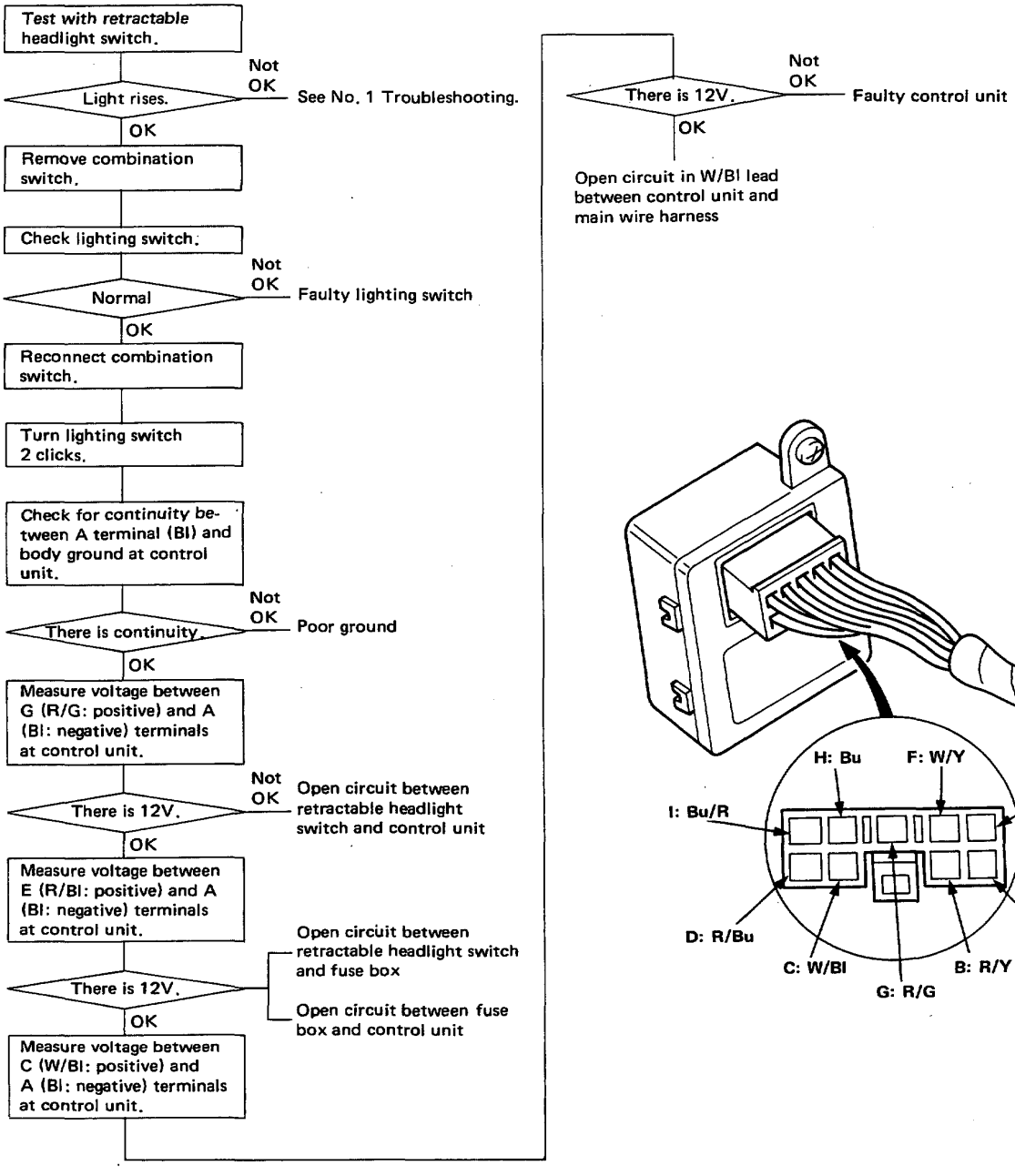
There is 12V.
OK

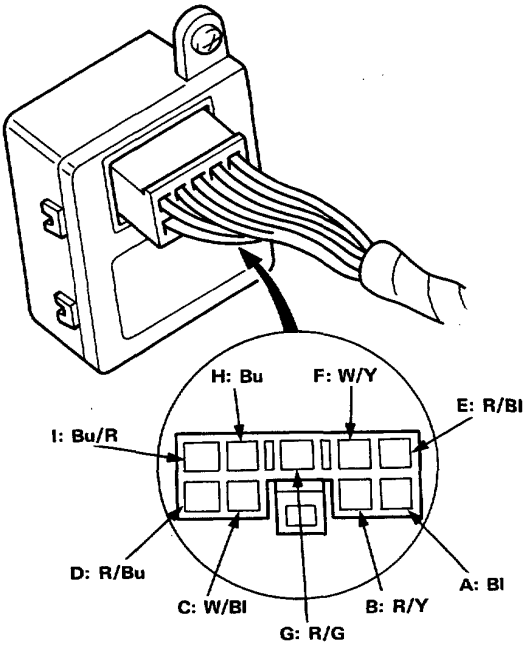
Check W/Bl lead for continuity between retractable headlight switch and motor.

There is continuity.
Not OK — Open circuit
OK



2. Headlight doesn't rise when headlight is turned on with lighting switch.

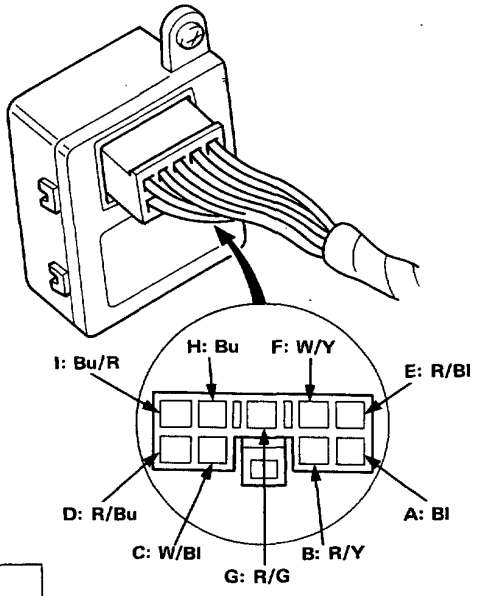




(cont'd)

Troubleshooting (cont'd)

3. Headlight doesn't retract when retractable headlight switch and lighting switch are turned off.



Check fuse.
- Not OK → Replace and recheck.
- OK → Check freezing or stuck foreign matter in retract mechanism.

Check freezing or stuck foreign matter in retract mechanism.
- Not OK → Remove fuse. → Repair, insert fuse, and recheck.
- OK → Remove combination switch.

Remove combination switch.

Check lighting switch.
- Not OK → Faulty lighting switch
- OK → Remove retractable headlight switch.

Remove retractable headlight switch.

Check retractable headlight switch.
- Not OK → Faulty retractable headlight switch
- OK → Measure voltage between W/R lead (positive) and body ground.

Measure voltage between W/R lead (positive) and body ground.

NOTE: W/R is for right motor. Left retract relay is connected to W/Bu.
- Not OK → Open circuit between fuse and retractable headlight switch
- OK → Reconnect switches.

Reconnect switches.

Make sure all switches are in off position.

Check for continuity between A(Bl) terminal and body ground at control unit.
- Not OK → Poor ground
- OK → Measure voltage between B(R/Y: positive) and A (Bl: negative) terminals at control unit.

Measure voltage between B(R/Y: positive) and A (Bl: negative) terminals at control unit.
- Not OK → Open circuit between retractable headlight switch and fuse box. / Open circuit between fuse box and control unit
- OK → Measure voltage between G(R/G: positive) and A (Bl: negative) terminals at control unit.

Measure voltage between G(R/G: positive) and A (Bl: negative) terminals at control unit.
- Not OK → Open circuit between retractable headlight switch and control unit.
- OK → Measure voltage between F(W/Y: positive) and A (Bl: negative) terminals at control unit.

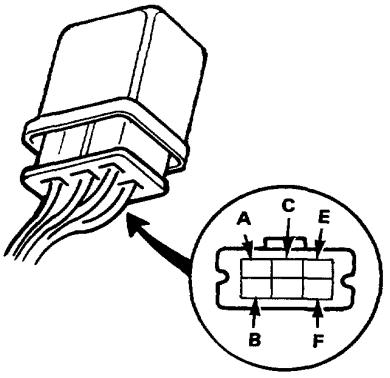
Measure voltage between F(W/Y: positive) and A (Bl: negative) terminals at control unit.
- Not OK → Faulty control unit
- OK

(cont'd—E)

(cont'd–E)

Measure voltage between A (positive) and B (negative) terminals at retract relay.

There is 12V.
- Not OK → Check for continuity between B terminal and body ground at retract relay.
  - There is continuity.
    - Not OK → Poor ground
    - OK → Open circuit between fuse and retract relay
- OK



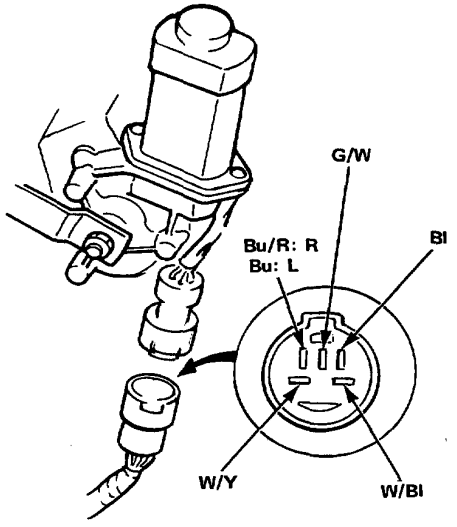
Measure voltage between C (positive) and B (negative) terminals at retract relay.

There is 12V.
- Not OK → Measure voltage between E (positive) and F (negative) terminals at retract relay.
  - There is 12V.
    - Not OK → Check for continuity between F terminal and body ground at retract relay.
      - There is continuity.
        - Not OK → Poor ground
        - OK → Disconnect wire harness from retract motor.
          - Measure voltage between W/Y (positive) and Bl (negative) leads at wire harness.
            - There is 12V.
              - Not OK → Check for continuity between Bl lead and body ground at wire harness.
                - There is continuity.
                  - Not OK → Poor ground
                  - OK → Open circuit between control unit and retract motor
              - OK → Check G/W lead for continuity between retract motor and relay.
                - There is continuity.
                  - Not OK → Open circuit
                  - OK → Connect W/Y lead to G/W lead with jumper wire at wire harness. → (cont'd–H)

CAUTION: Avoid contact to other terminals and erroneous connection.

(cont'd–F)

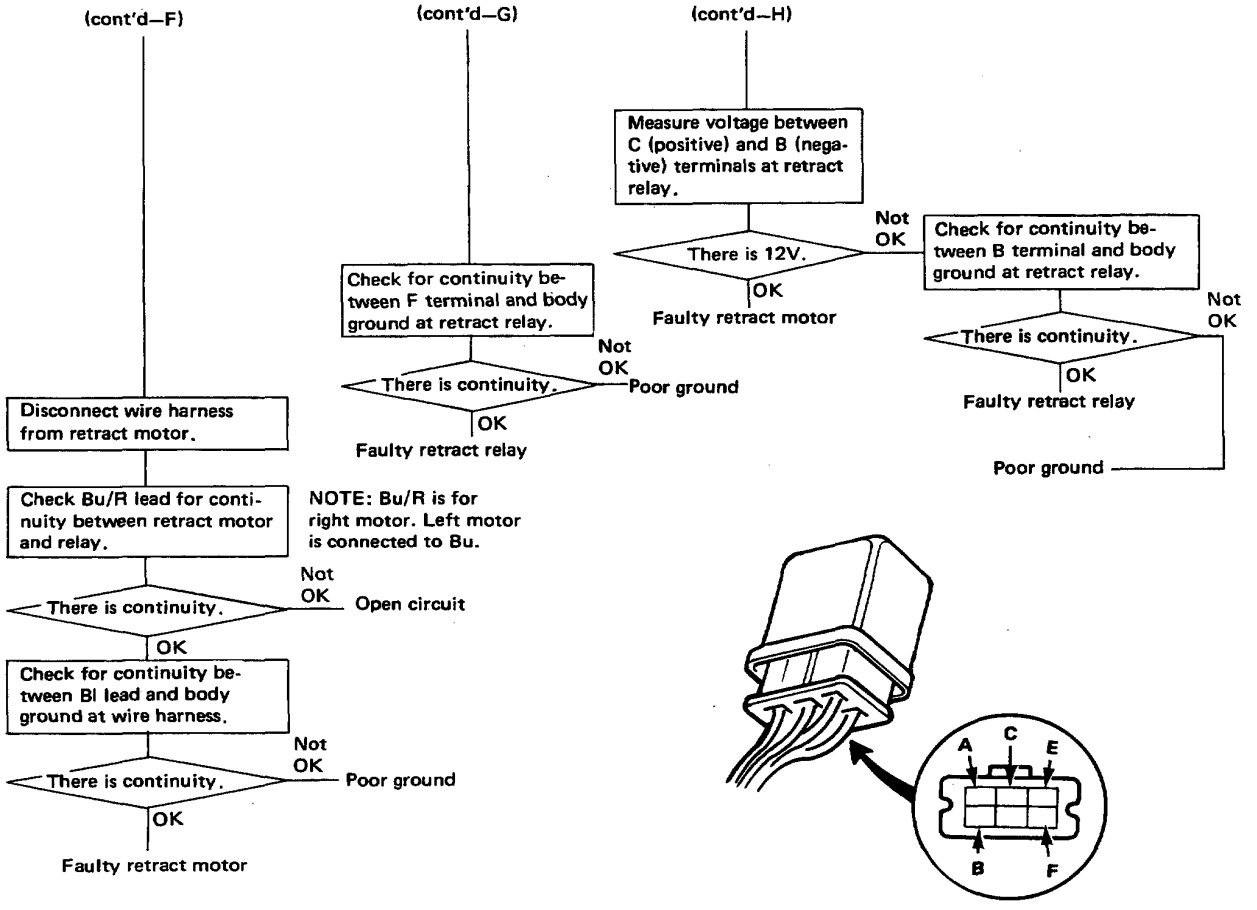
(Cont'd–G)



(cont'd)

Retractable Headlights and Lighting Relays

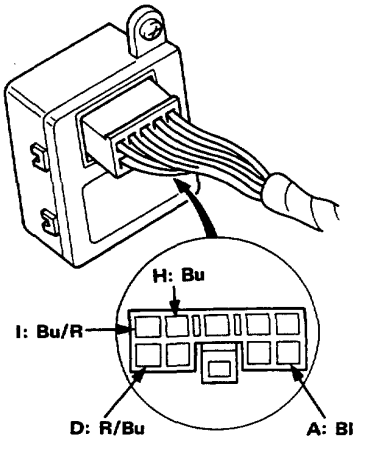
Troubleshooting (cont'd)



Warning Output of Control Unit Testing

1. Disconnect the retractor relays from the wire harness.
2. Connect the battery positive cable to H terminal of the control unit, and negative cable to A terminal.
3. The left warning circuit is normal, if there is voltage between D (positive) and A (negative) terminals at approximately 2.5 – 5.5 seconds after connecting the battery.

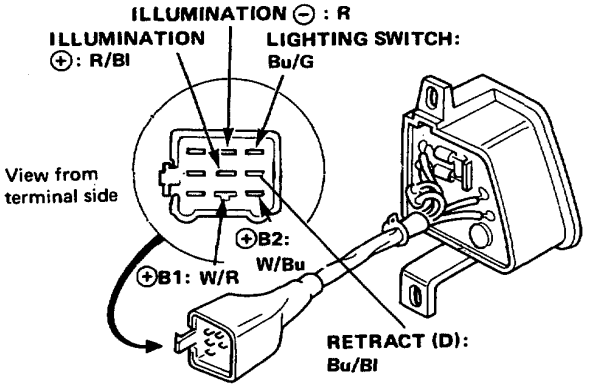
   NOTE: For right warning circuit check, connect the battery positive cable to I terminal and perform the same procedure as for the light circuit.



Retractable Headlight Switch Testing

Check for continuity according to the table below.

TERMINAL / POSITION	LIGHTING SW	RETRACT (D)		⊕ B1	⊕ B2
OFF	○	——	○		
ON		○	—— ○		
WIRE COLOR	Bu/G	Bu/Bl		W/R	W/Bu

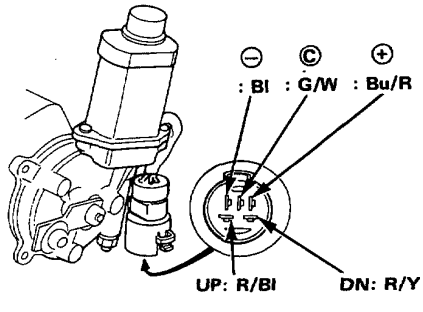


Retract Motor Testing

1. Test the retract motor by applying the battery voltage to Bu/R (positive) and Bl (negative) leads.
2. Connect ohmmeter probes to R/Bl and G/W leads, and R/W and G/W leads.
3. Rotate the motor by hand.
4. Ohmmeter needle should indicate continuity and no continuity repeatedly.

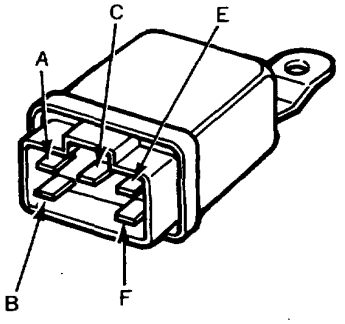
CAUTION: Before installing the motor, remove 15A fuse.

NOTE: Install the cap correctly.



Retract Relay Testing

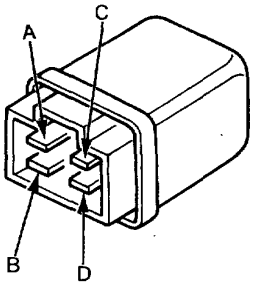
There should be no continuity between C and B terminals and continuity between C and A terminals, when the battery positive cable is connected to E terminal and negative cable to F terminal.
There should be continuity between C and B terminals and no continuity between C and A terminals with the battery disconnected.



Retractable Headlights and Lighting Relays

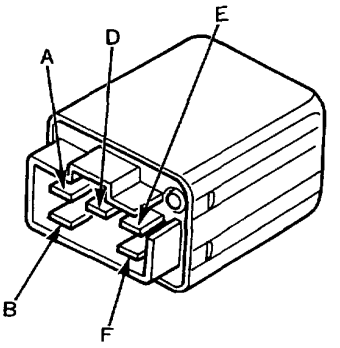
Lighting Relay Testing

There should be continuity between A and B terminals, when applying the battery voltage to C (positive) and D (negative) terminals. There should be no continuity when the battery is disconnected.

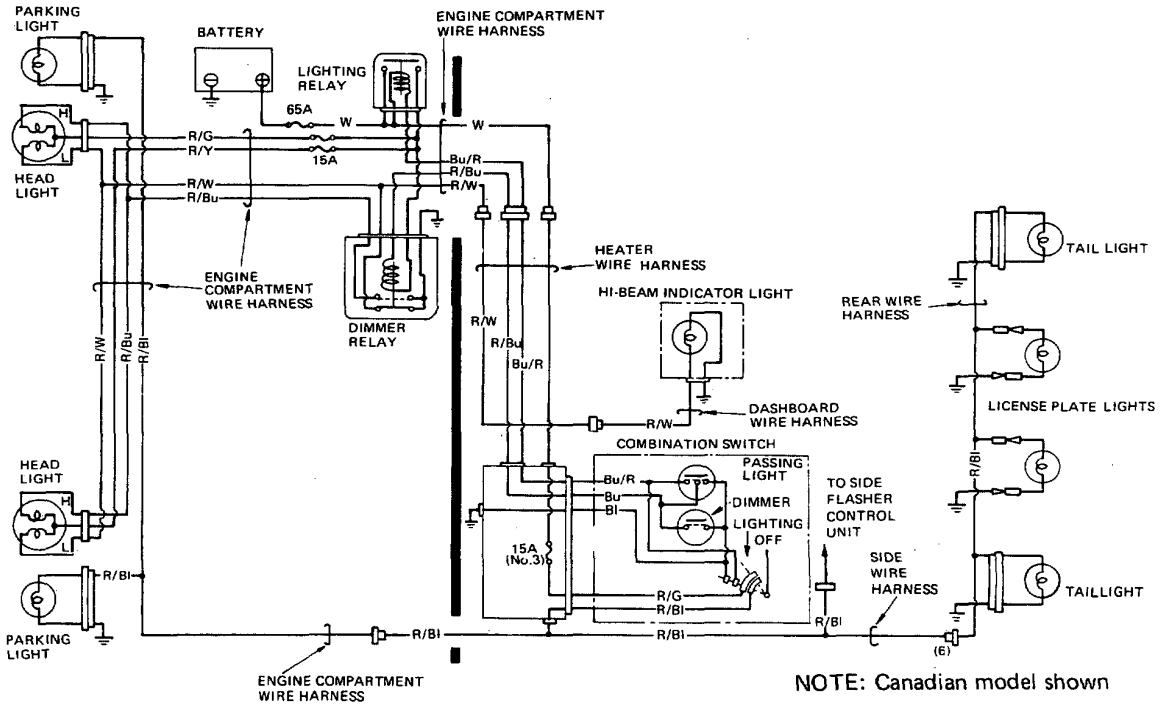


Dimmer Relay Testing

There should be no continuity between B and D terminals and continuity between A and D terminals, when the battery positive cable is connected to E terminal and negative cable to F terminal.
There should be continuity between B and D terminals and no continuity between A and D terminals with the battery disconnected.



Lighting Circuit



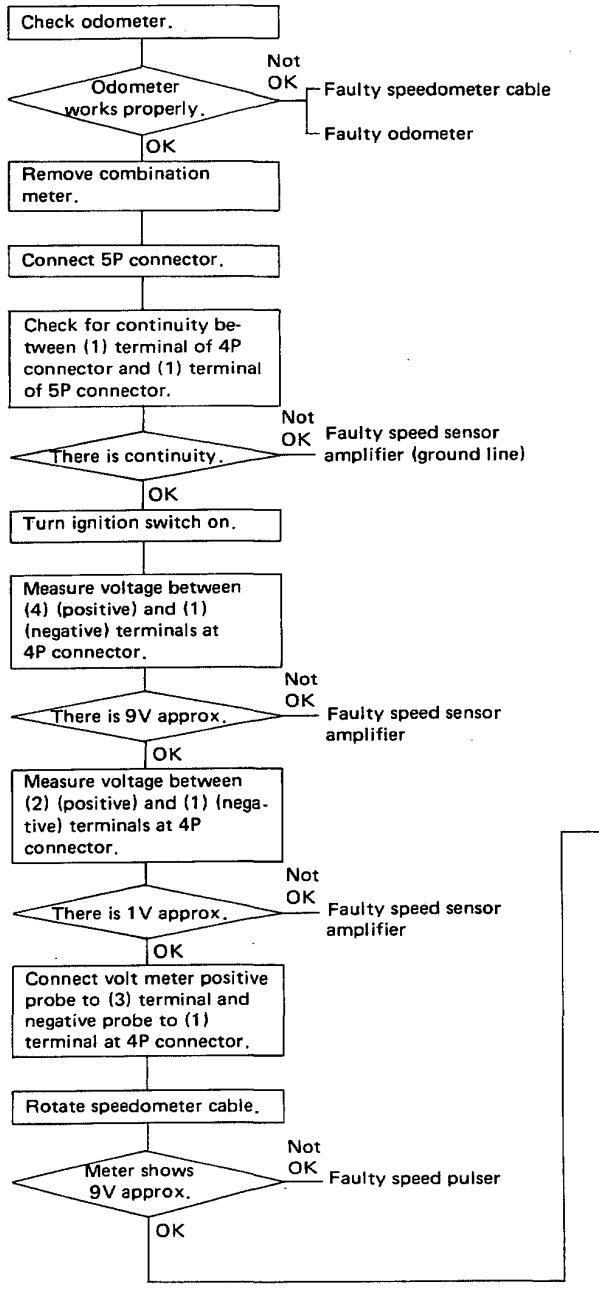
NOTE: Canadian model shown

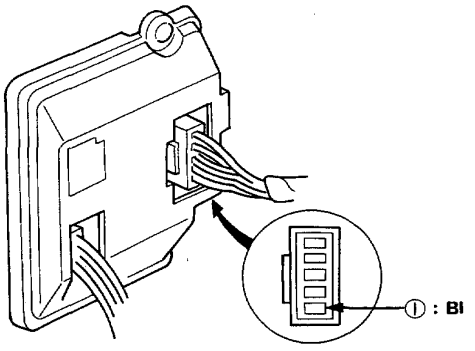
Combination Meter

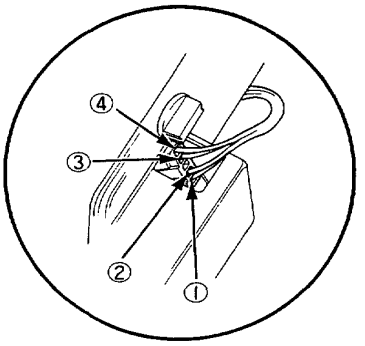
Troubleshooting

1. Speedometer needle doesn't swing or indicates but abnormally (on KC, KX-MT and KY).

NOTE: Make sure other functions are normal.





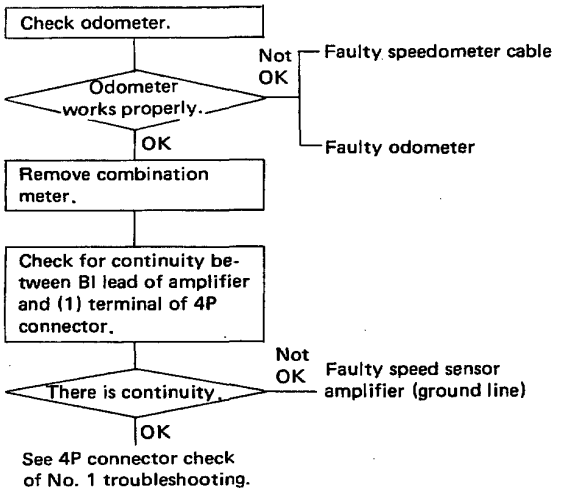


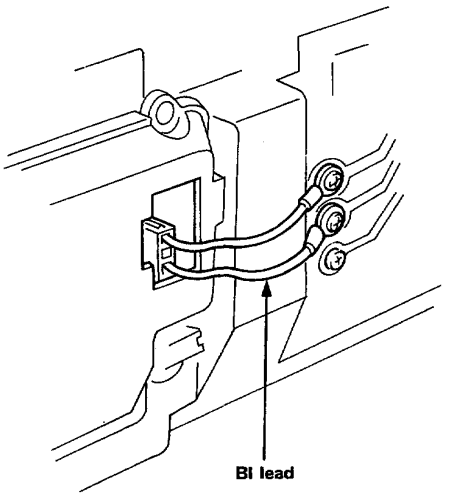
NOTE: Voltage appears intermittently. However, volt meter shows average voltage.

Combination Meter

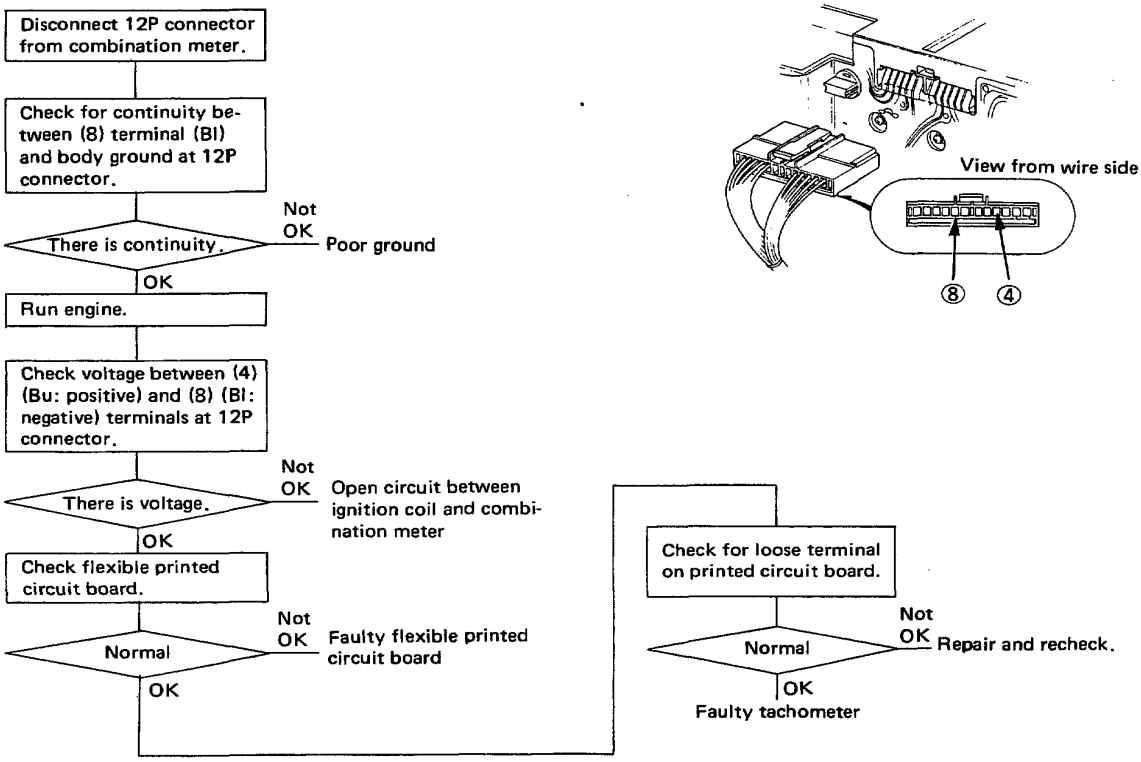
Troubleshooting (cont'd)

2. Speedometer needle doesn't swing or indicates but abnormally (other models).





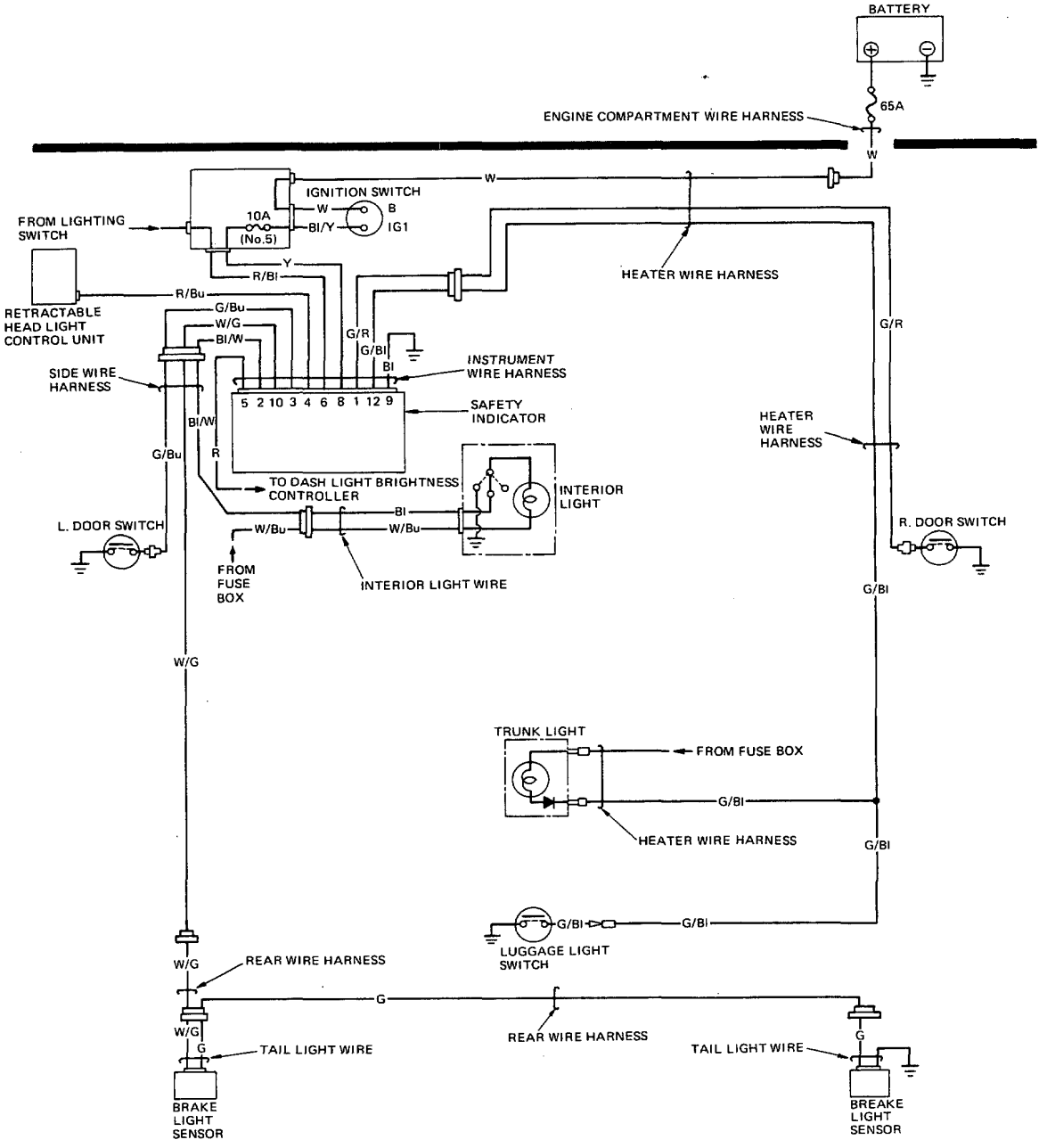
3. Tachometer needle doesn't swing.



Safety Indicator

Wiring Diagram

NOTE: L.H. Drive shown; R.H. Drive basically similar



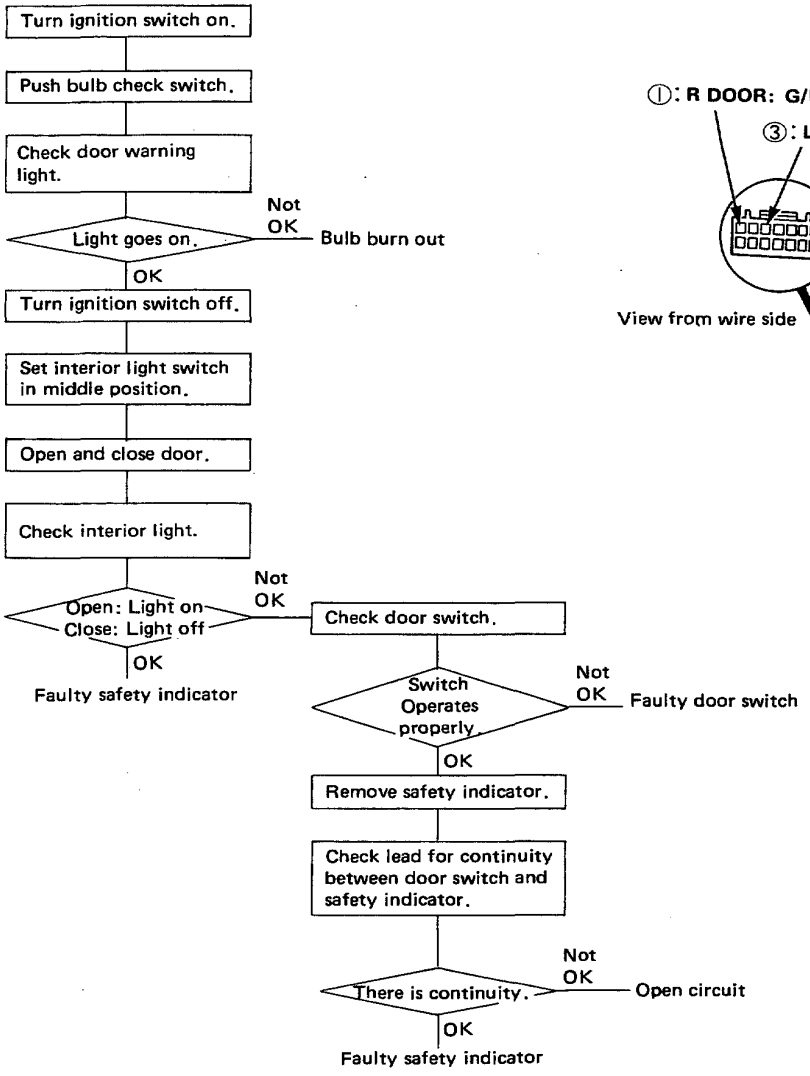
Safety Indicator

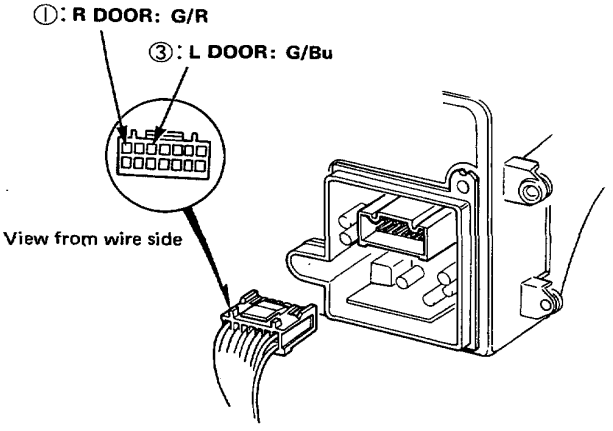
Troubleshooting

NOTE:

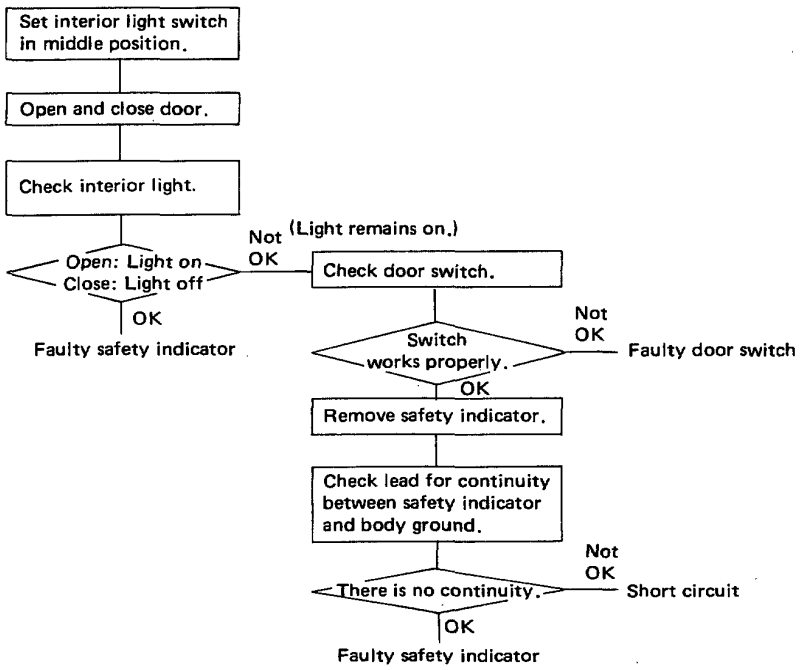
- The safety indicator is a fully transistorized unit and cannot be tested with circuit testers as a single unit. For this reason, the following descriptions are limited to the inputs and outputs to be measured at the wire harness as a guide to determine whether or not it is functioning properly.
- Prior to making check, ensure that all fuses, and bulbs for the interior light and trunk light are OK.
- Prior to making check, ensure that the ground circuits are OK.

1. Door warning light doesn't go on when door is open.

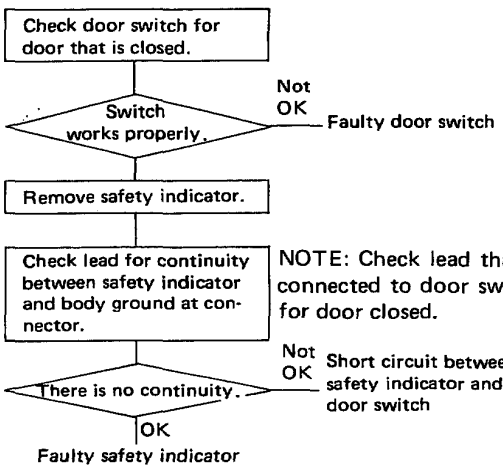




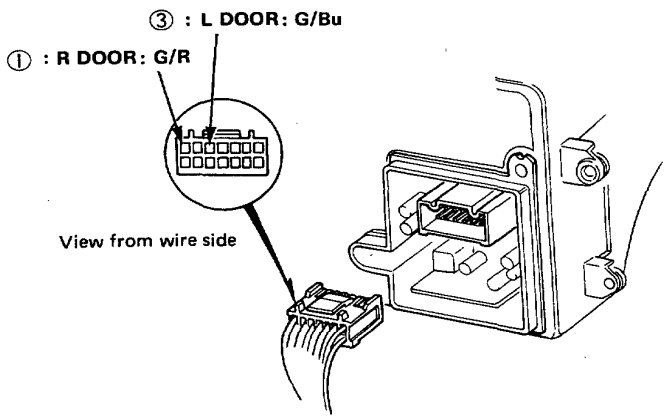
2. Door warning light doesn't go out when door is closed.



3. Right and left door warning lights go on when right or left door is closed.



NOTE: Check lead that is connected to door switch for door closed.

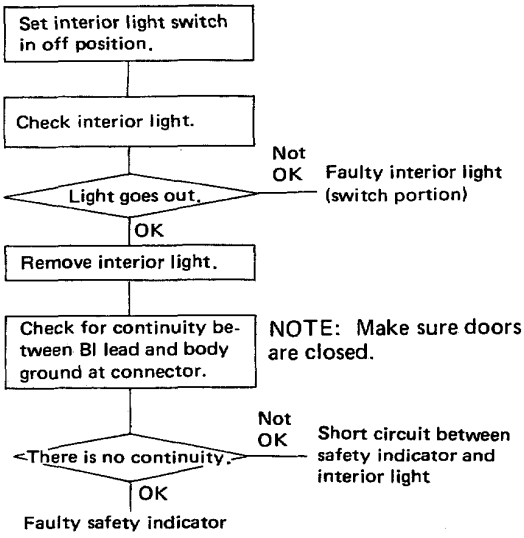


(cont'd)

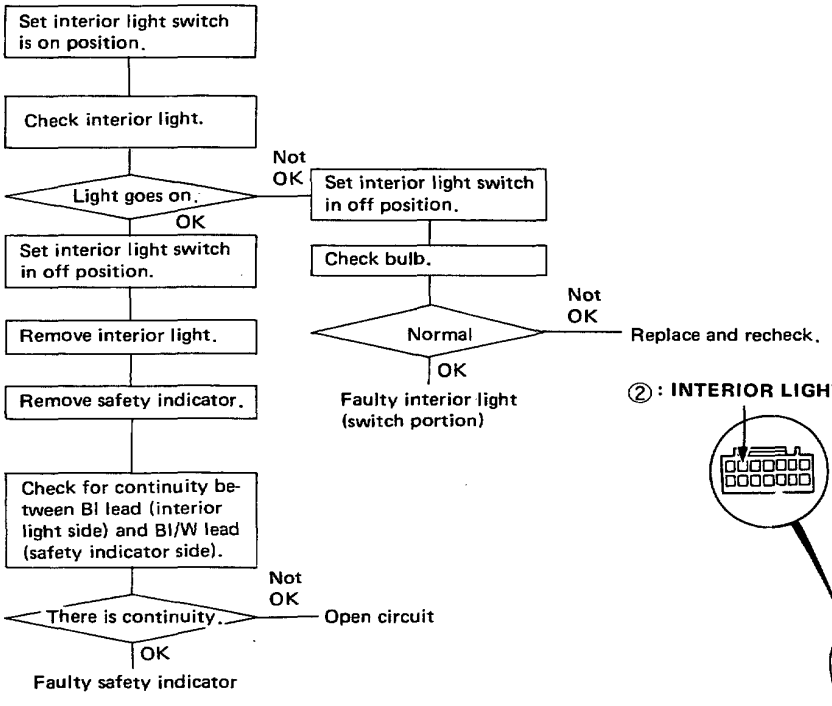
Safety Indicator

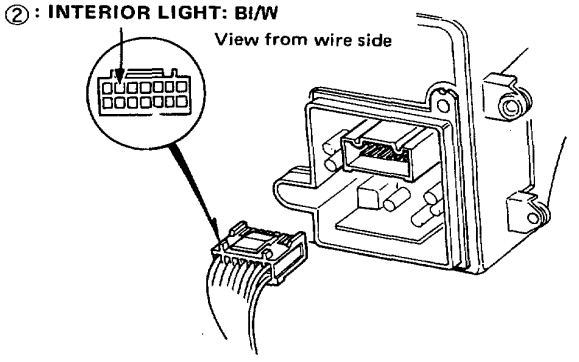
Troubleshooting (cont'd)

4. Interior light doesn't go out when door is closed (Door warning light operates properly).

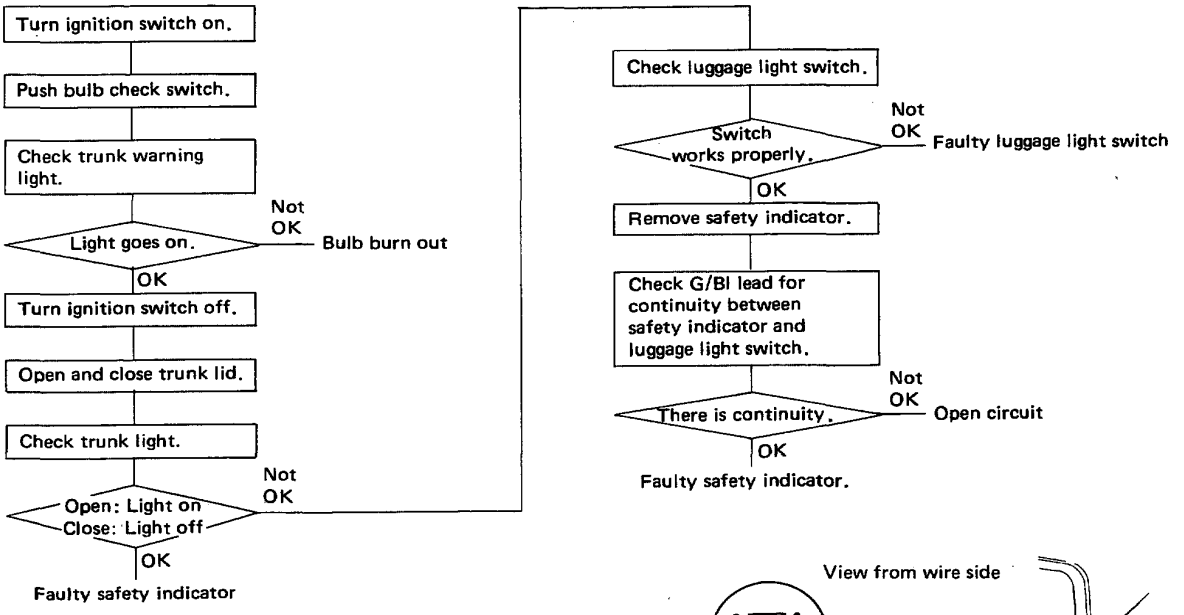


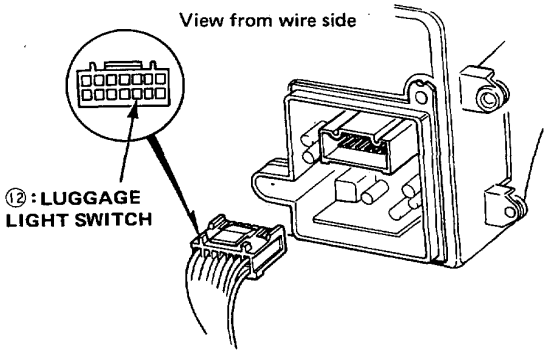
5. Interior light doesn't go on when door is opened (Door warning light operates properly).



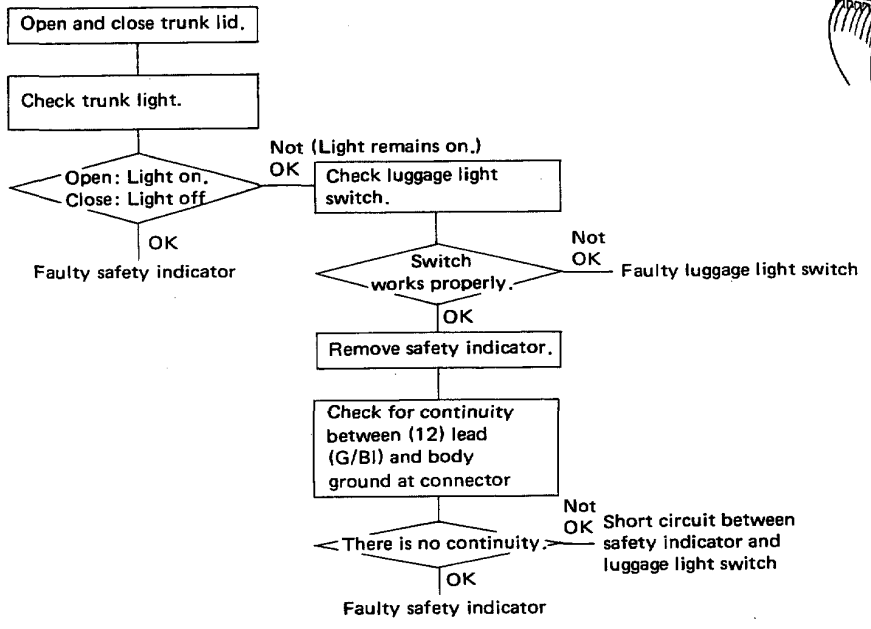


6. Trunk warning light doesn't go on with trunk open.





7. Trunk warning light remains on with trunk closed.

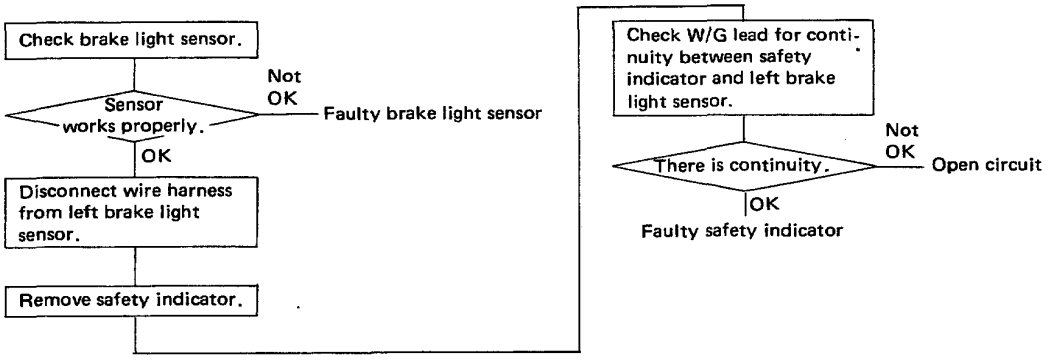


(cont'd)

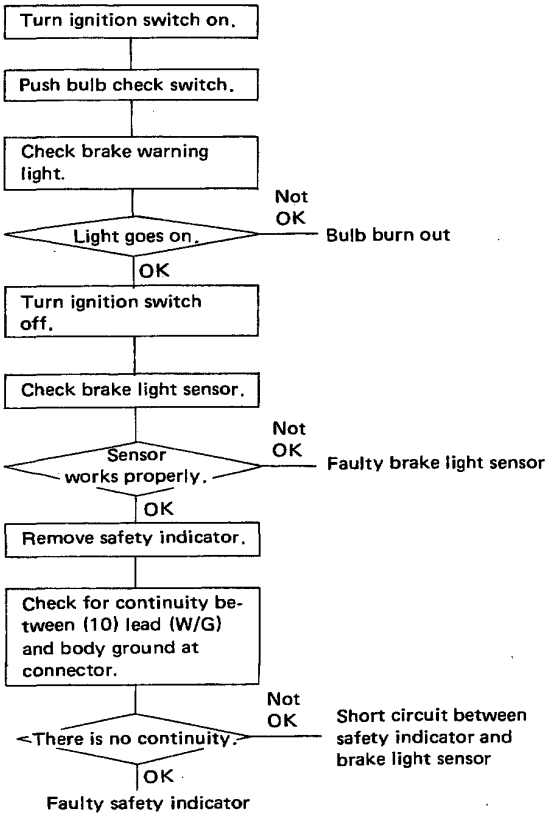
Safety Indicator

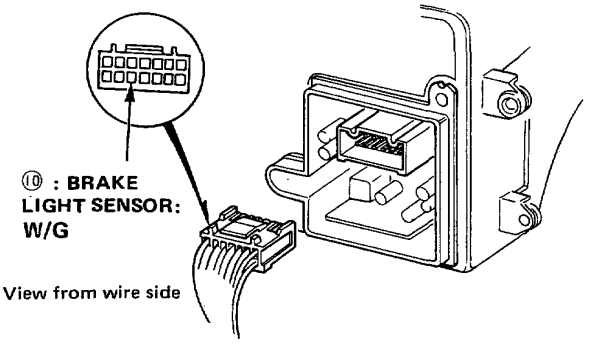
Troubleshooting (cont'd)

8. Brake warning light goes on when brake light is functional.

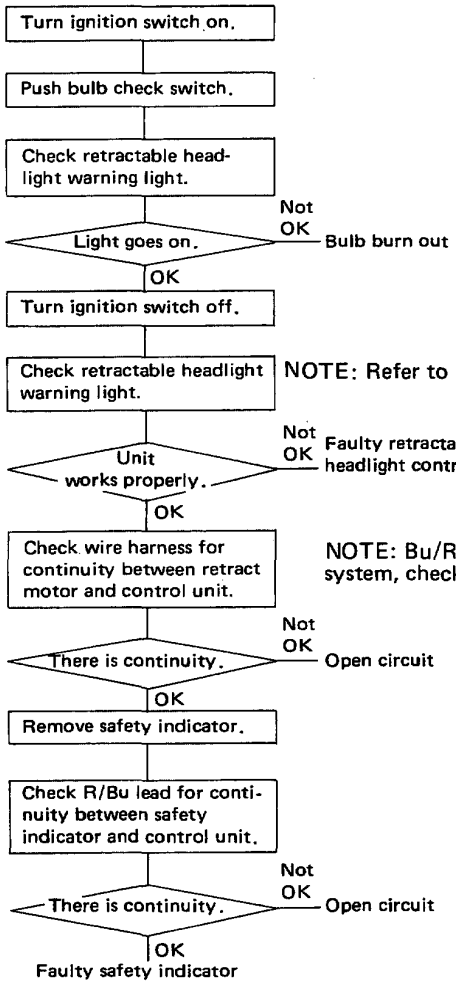


9. Brake warning light doesn't go on with brake pedal depressed, even with burned out brake light.

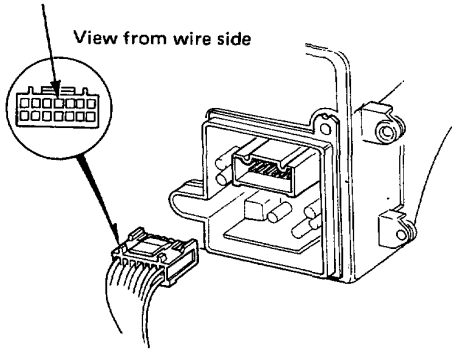




10. Retractable headlight warning light doesn't go on when retractable headlight system is abnormal.



④ : **RETRACTABLE HEADLIGHT CONTROL UNIT: R/Bu**



11. Some of warning lights don't go on when bulb check switch is pushed.

- Bulb(s) burn out.

12. All warning lights don't go on when bulb check switch is pushed.

- Faulty safety indicator

(cont'd)

Safety Indicator

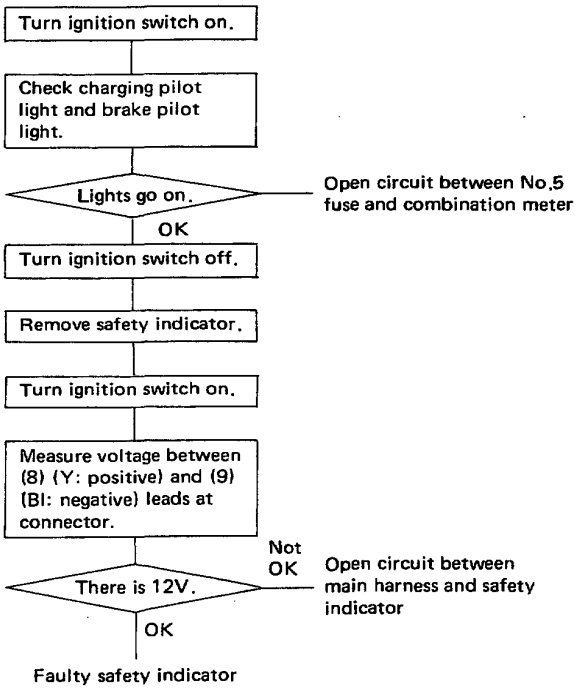
Troubleshooting (cont'd)

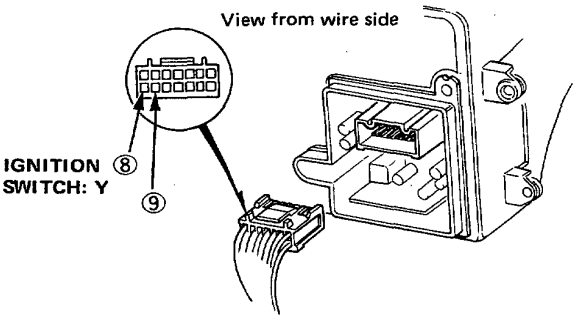
13. All warning lights go on with ignition switch on.

- Faulty safety indicator

14. Safety indicator doesn't operate at all.

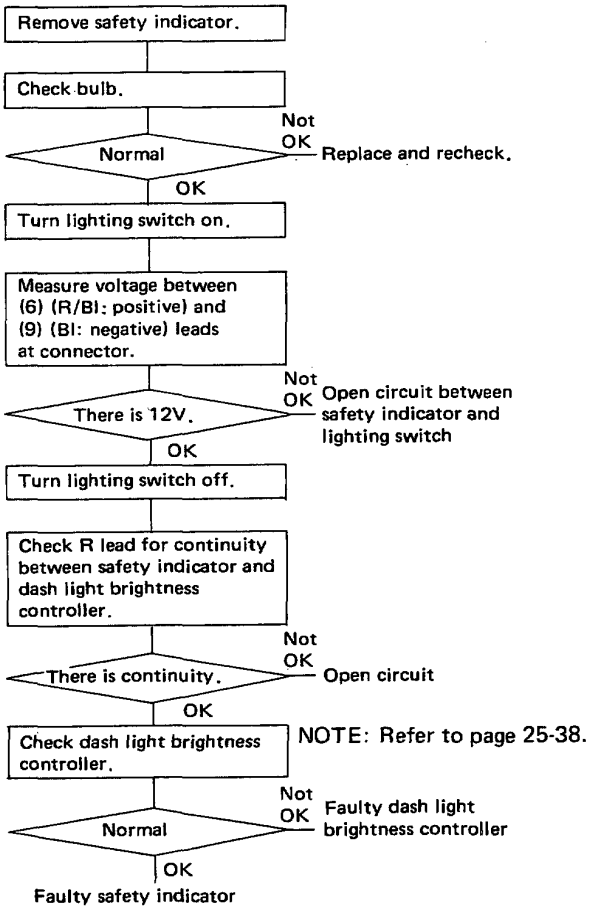
NOTE: Make sure the ignition switch is in good condition.

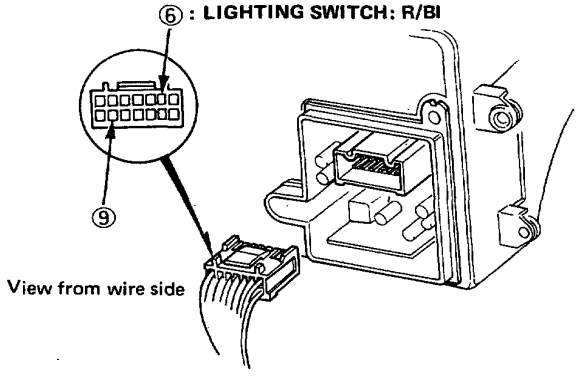




15. **Brightness of car outline (for safety indicator display) doesn't change when dashlight brightness controller is turned.**
    - Faulty dashlight brightness controller

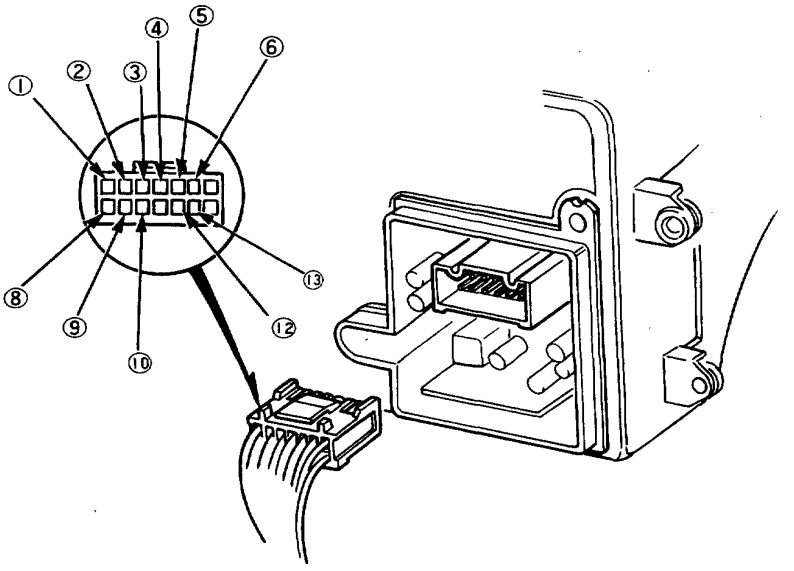
16. **Car outline (for safety indicator display) doesn't go on when lighting switch is turned on.**





Safety Indicator

Connector



Disconnect the wire harness from the safety indicator and check the following items on the wire harness side:

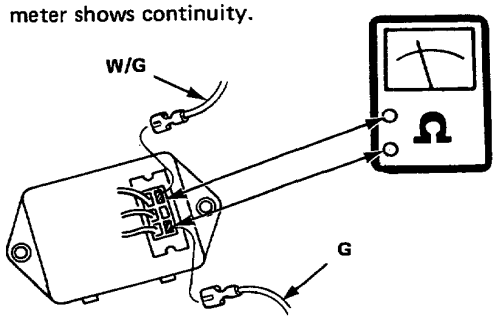
- Continuity between **(1) (G/R)** and (9) (Bl) leads when the **right door** is opened; no continuity when closed
- 12V between **(2) (Bl/W: positive)** and (9) (Bl: negative) leads with all doors closed and **interior light** switch at mid-position
- Continuity between **(3) (G/Bu)** and (9)(Bl) leads when the **left door** is opened; no continuity when closed
- 12V between **(4) (R/Bu: positive)** and (9) (Bl: negative) leads when **retractable headlight** system trouble occurs
- Voltage changed between **(5) (R: positive)** and (9) (Bl: negative) leads when the lighting switch is in on position and **dash light brightness controller** is turned
- 12V between **(6) (R/Bl: positive)** and (9) (Bl: negative) leads with the **lighting switch** turned on
- 12V between **(8) (Y: positive)** and (9) (Bl: negative) leads with the **ignition switch** turned on
- Continuity between **(9) (Bl)** lead and **body ground**
- Continuity between **(10) (W/G: positive)** and (9) (Bl: negative) leads with the ohmmeter in the x100 range or kΩ range
- 12V between **(12) (G/Bl: positive)** and (9) (Bl: negative) leads when the **trunk lid** is closed; 0V between (12) (positive) and (9) (negative) leads when opened.
- 12V between **(13) (G/R: positive)** and (9) (Bl: negative) lead with the **ignition switch** turned on

NOTE: No. 13 lead is equipped for European model only.

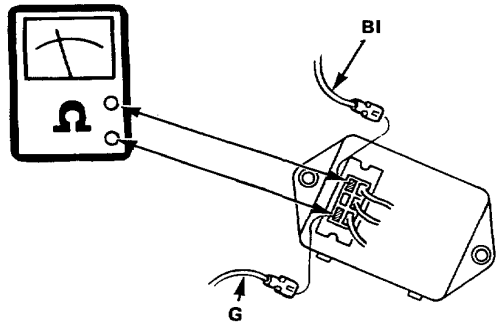
Replace the safety indicator with a new one if it indicates abnormality, provided that the above items, the switches, wire harnesses and bulbs are not dammaged and in good condition.

Brake Light Sensor Testing

1. Make sure the brake lights are in good condition.
2. Disconnect the 6P connector from the left brake light sensor.
3. Carefully pull out the G/W and G leads from the 6P connector.
   CAUTION: To prevent a loose or disconnected connector, be careful not to damage the locking tab when servicing.
4. Reconnect the connector.
5. Attach the ohmmeter probes to the terminals from which the leads were pulled off.
   NOTE: Measure in x100 or kΩ range.
6. Press the brake pedal.
7. The left brake light sensor is normal, if the ohmmeter shows continuity.



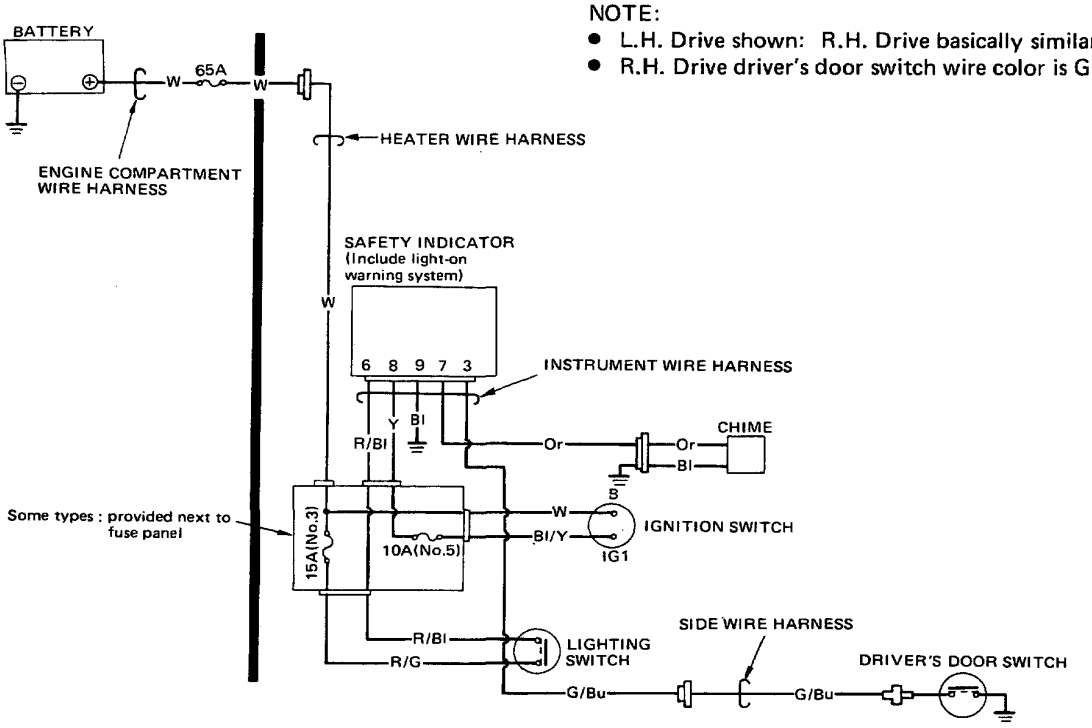
8. Disconnect the 6P connector from the right brake light sensor.
9. Carefully pull out the G and Bl leads from the 6P connector.
10. Reconnect the 6P connector.
11. Attach the ohmmeter probes to the terminals from which the leads were pulled off.
12. Press the brake pedal.
13. The right brake light sensor is normal, if the ohmmeter shows continuity.



Light-On Warning System

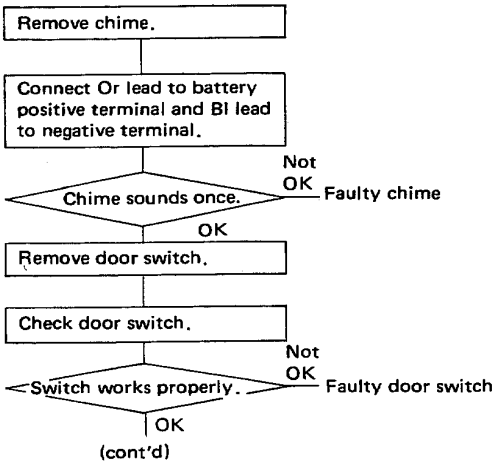
Wiring Diagram

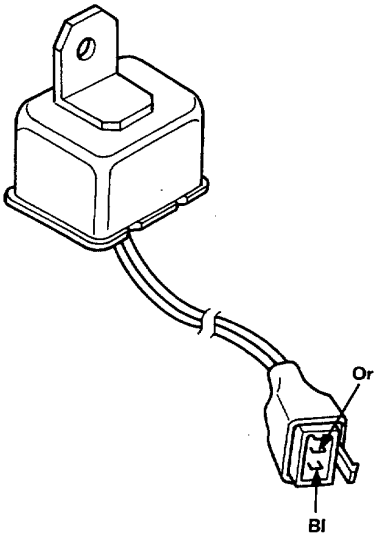
NOTE:
- L.H. Drive shown: R.H. Drive basically similar.
- R.H. Drive driver's door switch wire color is G/R.



Troubleshooting

1. Chime doesn't sound.





(cont'd)

Reconnect door switch.

Remove safety indicator.

Check for continuity of Or lead between chime and safety indicator.

There is continuity. — Not OK → Open circuit

OK

Check for continuity between BI lead and body ground.

There is continuity. — Not OK → Poor ground

OK

Check G/Bu lead for continuity between door switch and safety indicator.

There is continuity. — Not OK → Open circuit

OK

Turn lighting switch on.

Measure voltage between (6) terminal (R/BI: positive) and (9) terminal (BI: negative).

There is 12V. — Not OK → Open circuit in R/BI lead

OK

Connect volt meter positive probe to (8) terminal (Y) and negative probe to (9) terminal (BI).

Turn ignition switch on and off.

On: 12V
Off: 0V — Not OK → Faulty Y lead

OK

Faulty safety indicator

NOTE:

- G/Bu lead is connected to L.H. Drive driver's door switch and G/R lead is to R.H. Drive driver's door switch.
- Make sure driver's door is open.

2. Chime won't shut off.

Check door switch.

Switch works properly. — Not OK → Faulty door switch

OK

Remove safety indicator.

Check for continuity between BI lead and body ground.

There is no continuity. — Not OK → Poor ground

OK

Check for continuity between G/Bu lead and BI lead.

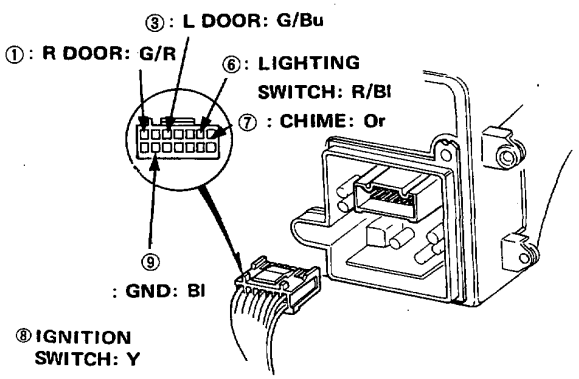
There is no continuity. — Not OK → Short circuit

OK

Faulty safety indicator

NOTE:

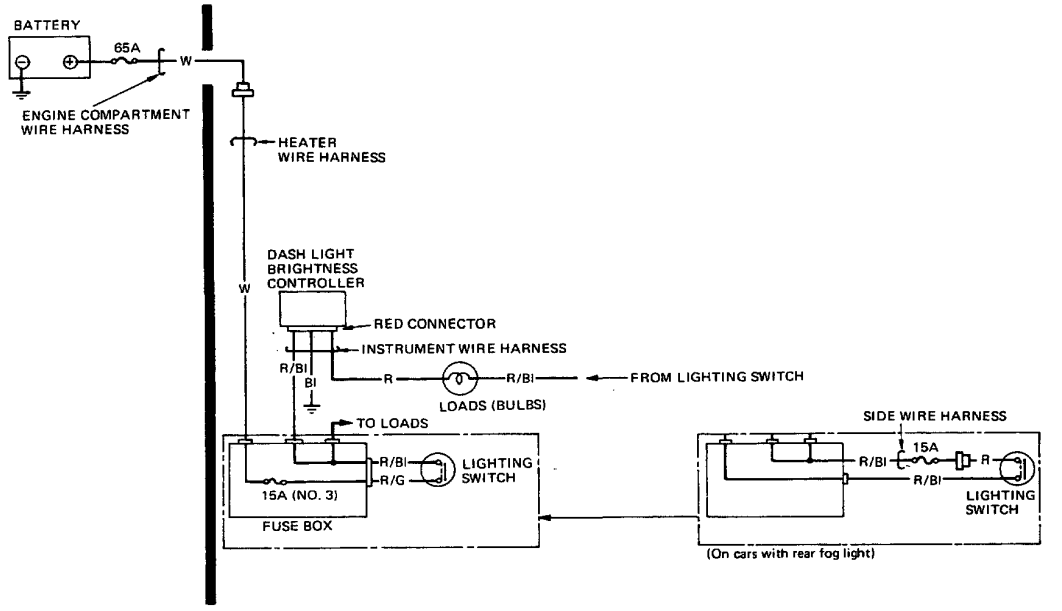
- G/Bu lead is connected to L.H. Drive driver's door switch and G/R lead is to R.H. Drive driver's door switch.
- Make sure driver's door is closed.



Dash Light Brightness Control

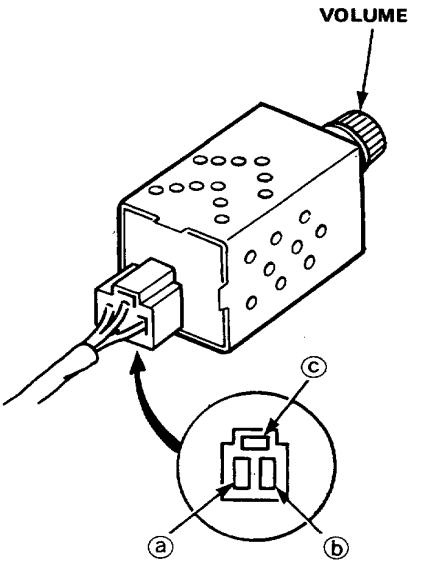
Wiring Diagram

NOTE: L.H. Drive shown; R.H. Drive basically similar



Controller Testing

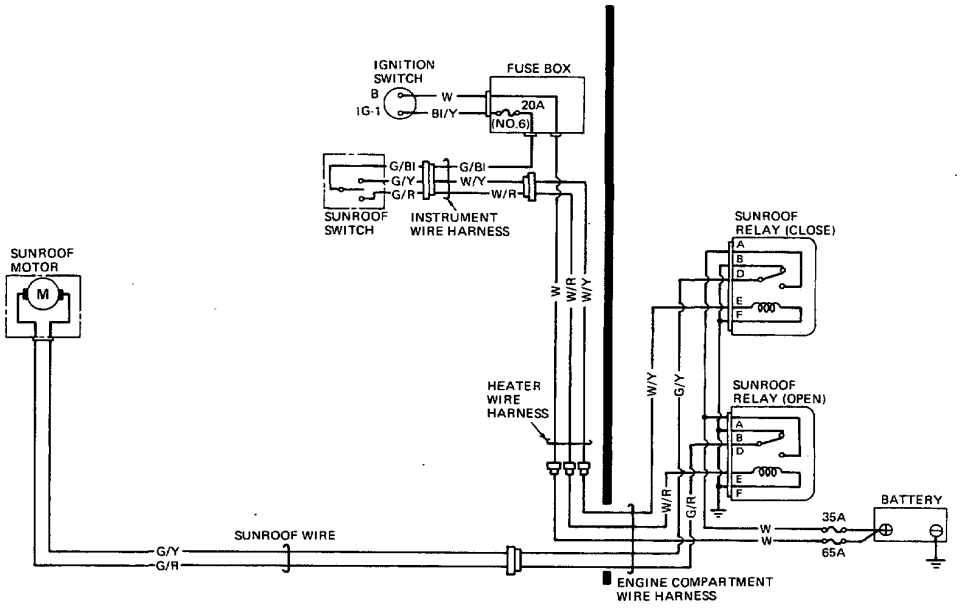
1. Turn the lighting switch on.
2. Connect the volt meter positive prove to (a) terminal and negative probe to (b) terminal (BI lead).
3. Turn the controller volume.
4. The controller is normal if the voltage varies.



Sunroof

Wiring Diagram

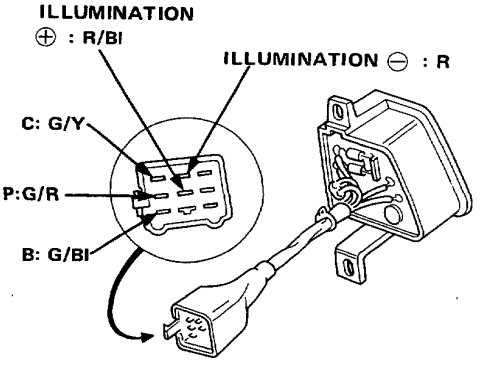
NOTE: L.H. Drive shown; R.H. Drive basically similar



Switch Testing

Check for continuity

TERMINAL / POSITION	B	P	C
OFF			
OPEN	○	○	
CLOSE	○		○
WIRE COLOR	G/BI	G/R	G/Y

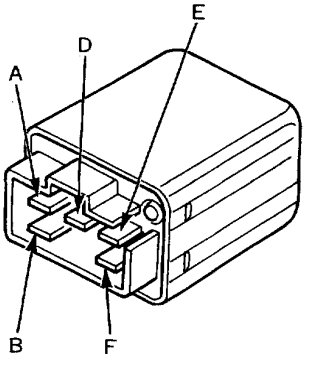


View from terminal side

Relay Testing

There should be no continuity between Band D terminals and continuity between A and D terminals, when the battery positive cable is connected to the E terminal and negative cable to F terminal.

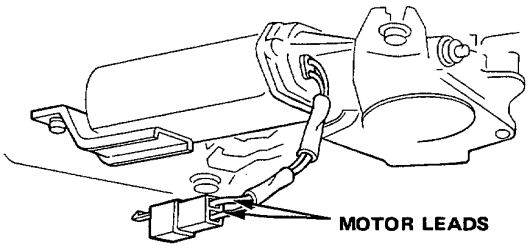
There should be continuity between B and D terminals and no continuity between A and D terminals with the battery disconnected.



Sunroof

Motor Testing

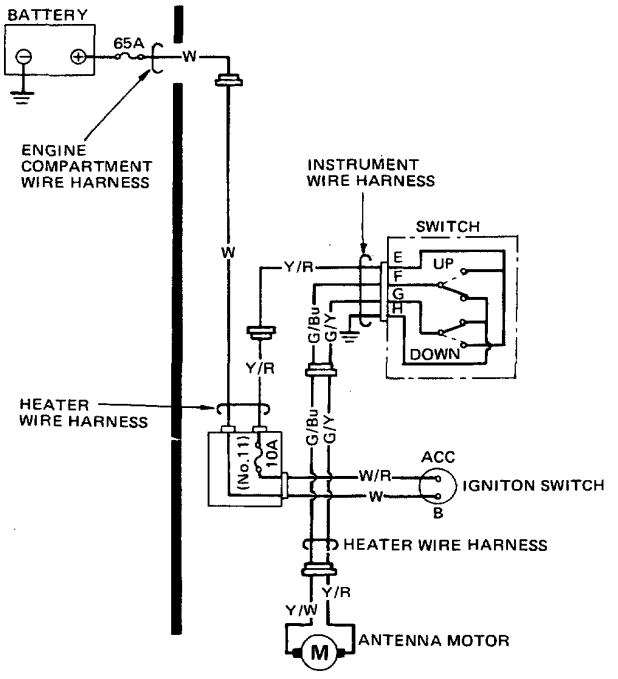
Check motor operation by connecting a wire from the battery positive terminal to one of the motor leads, and a battery ground to the other. Reverse the wires to be sure the motor will run in both directions.



Power Antena

Wiring Diagram

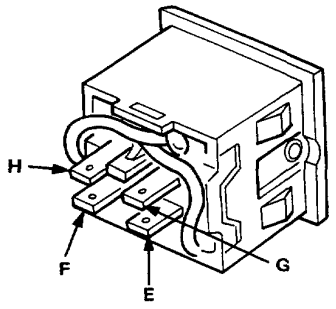
NOTE: L.H. Drive shown; R.H. Drive basically similar



Switch Testing

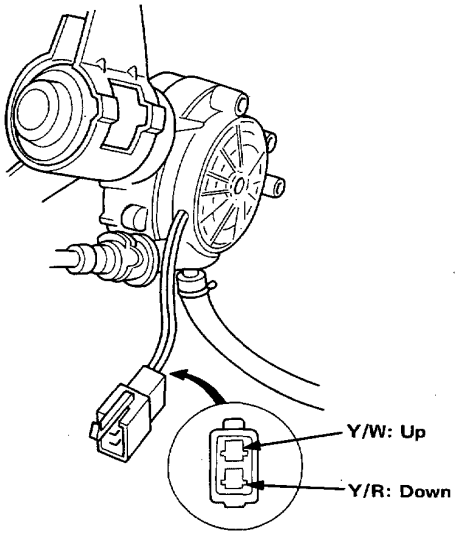
Check for continuity according to the table below.

	E	F	G	H
▲	○—○			
			○—○	
OFF		○—○	○—○	○—○
▼	○—○		○—○	
		○—○		○—○



Motor Testing

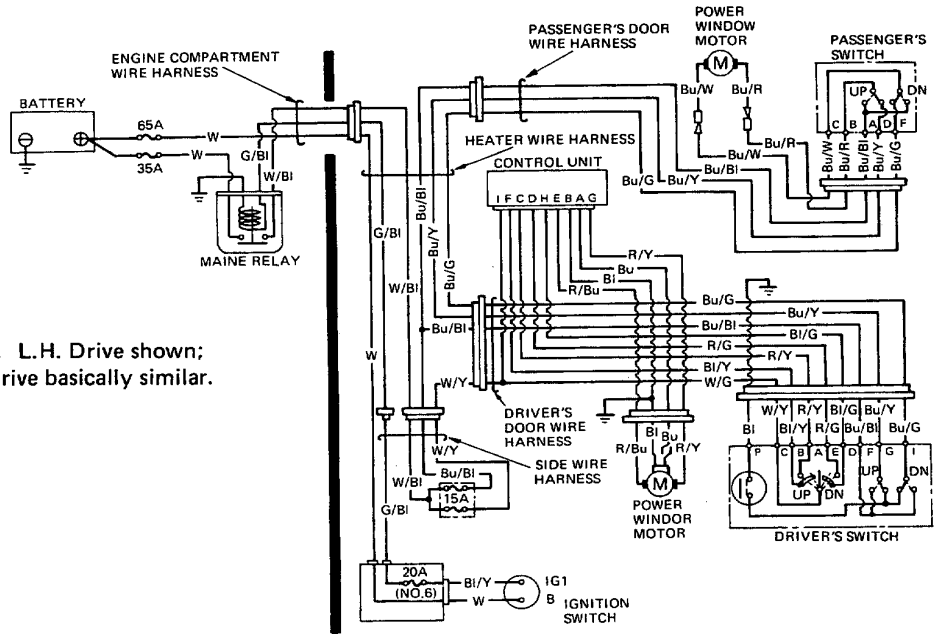
Check motor operation by connecting a lead from the battery positive terminal to one of the motor leads, and a battery ground to the other. Reverse the wires to be sure the motor will run in both directions.



View from wire side

Power Window

Wiring Diagram



NOTE: L.H. Drive shown;
R.H. Drive basically similar.

Troubleshooting

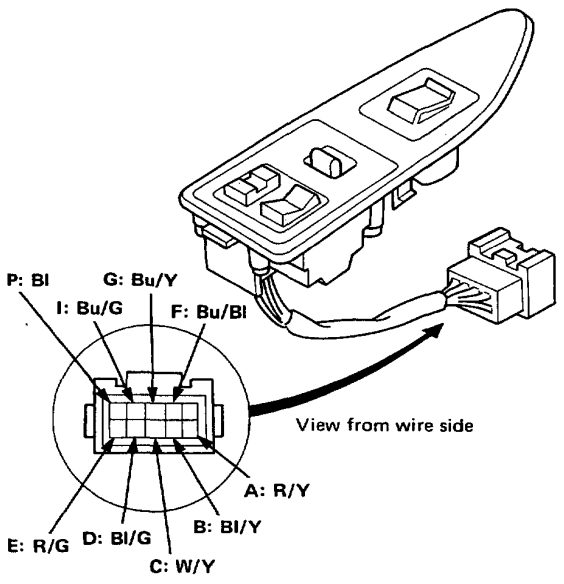
1. **All power windowes don't work.**
   - Blown out fuses (35A fuse and 15A fuses).

     NOTE: Check the main fuse and No. 6 fuse, if necessary.
   - Faulty main relay
2. **Driver side power window doesn't work.**
   - Blown out 15A fuse
   - Faulty control unit
   - Faulty driver's switch
   - Faulty driver side motor
3. **Passenger side power window doesn't work.**
   - Blown out 15A fuse
   - Faulty passenger's switch
   - Faulty driver's switch (main switch portion)
   - Faulty passenger side motor

Driver's Switch Testing

Check for continuity according to the table.

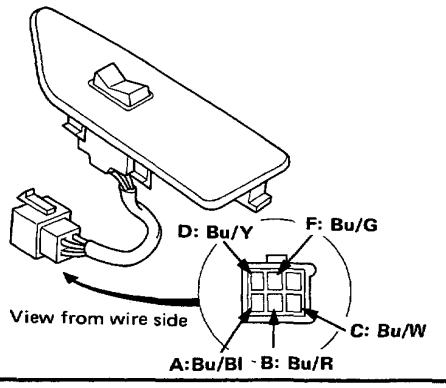
		R					L				MAIN SWITCH
TERMINAL		A	B	C	D	E	F	G		I	P
UP (AUTO)		○	○	○							
UP			○	○			○	○			
									○	○	
OFF								○	○	○	
DOWN							○		○	○	
				○	○			○	○		
DOWN (AUTO)				○	○	○					
MAIN SWITCH	ON								○	○	
	OFF										
WIRE COLOR		R/Y	Bl/Y	W/Y	Bl/G	R/G	Bu/Bl	Bu/Y		Bu/G	Bl



Passenger's Switch Testing

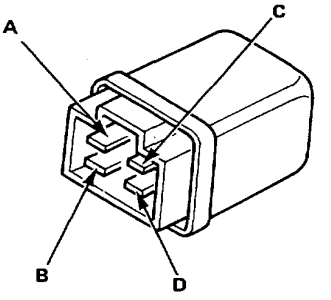
Check for continuity according to the table.

	A	B	C	D	F
UP	○	○			
			○		○
OFF			○		○
		○		○	
DOWN	○		○		
		○		○	
WIRE COLOR	Bu/Bl	Bu/R	Bu/W	Bu/Y	Bu/G



Main Ralay Testing

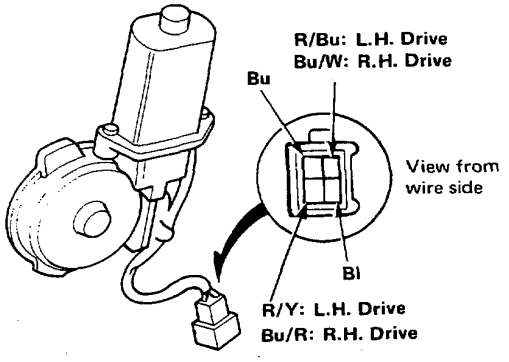
There should be continuity between A and B terminals when the battery positive cable is connected to C terminal and the negative cable to D terminal. There should be no continuity when the battery is disconnected.



Power Window

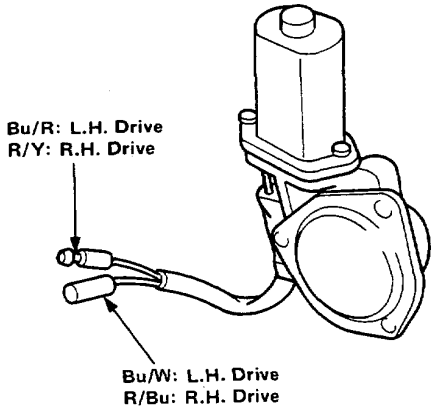
Driver Side Motor Testing

1. Connect a fully charged battery to R/Bu and R/Y terminals. The motor is normal if it turns smoothly without noises:
   NOTE: R/Bu and R/Y leads are for L.H. Drive driver side motor. R.H. Drive driver side motor has Bu/W and Bu/R leads.
2. Attach the ohmmeter probes to the Bu and Bl terminals while the motor is in rotation. Meter needle should be between 0 and ∞Ω (Meter shows 20–50Ω approx.)
3. Meter needle should indicate 0 or ∞Ω, when the motor is stopped.



Passenger Side Motor Testing

Check motor operation by connecting a wire from the battery positive terminal to one of the motor leads, and a battery ground to the other. Reverse the wires to be sure the motor will run in both directions.

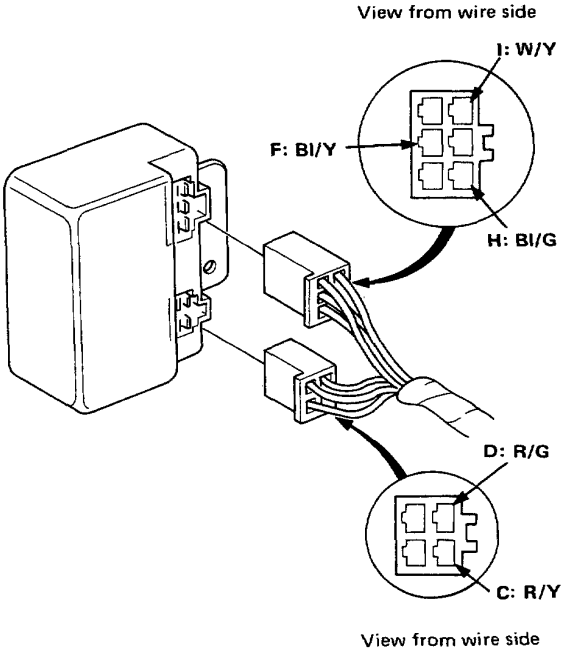


Control Unit Testing

NOTE: The control is a fully transistorized unit and cannot be tested with circuit testers as a single unit. For this reason, the following descriptions are limited to the inputs and outputs to be measured at the wire harness as a guide to determine whether or not it is functioning properly.

1. Disconnect the wire harness from the control unit; turn the ignition switch on. Check the following items:

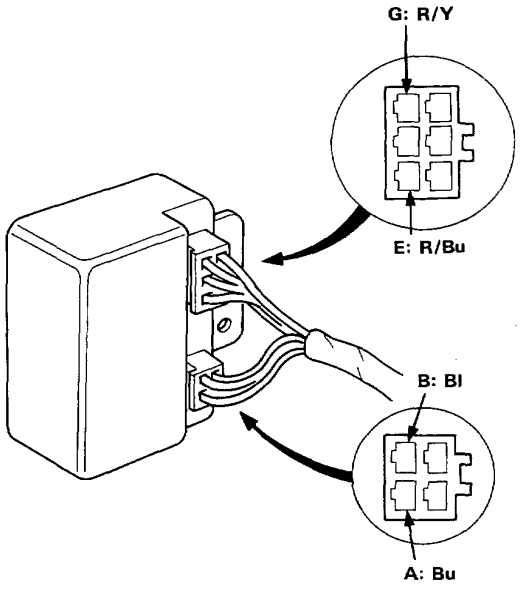
   - 12V between the W/Y terminal (positive) and body ground.
   - 12V between the Bl/Y terminal (positive) and body ground in UP.
   - 12V between the Bl/Y terminal (positive) and body ground, and R/Y terminal (positive) and body ground, in UP-AUTO.
   - 12V between the Bl/G (positive) terminal and body ground in DOWN.
   - 12V between the Bl/G terminal (positive) and body ground, R/G terminal (positive) and body ground, on DOWN-AUTO.



2. Reconnect the connectors, and turn the ignition switch on, and check the following items:

   - 12V between the R/Y terminal (positive) and Bl terminal (negative) in UP and UP-AUTO.
   - 12V between the R/Bu terminal (positive) and Bl terminal (negative) in DOWN and DOWN-AUTO.
   - Ohmmeter needle swung with the meter probes attached to the Bu terminal and body ground and driver's side motor in rotation (tester in resistance range).

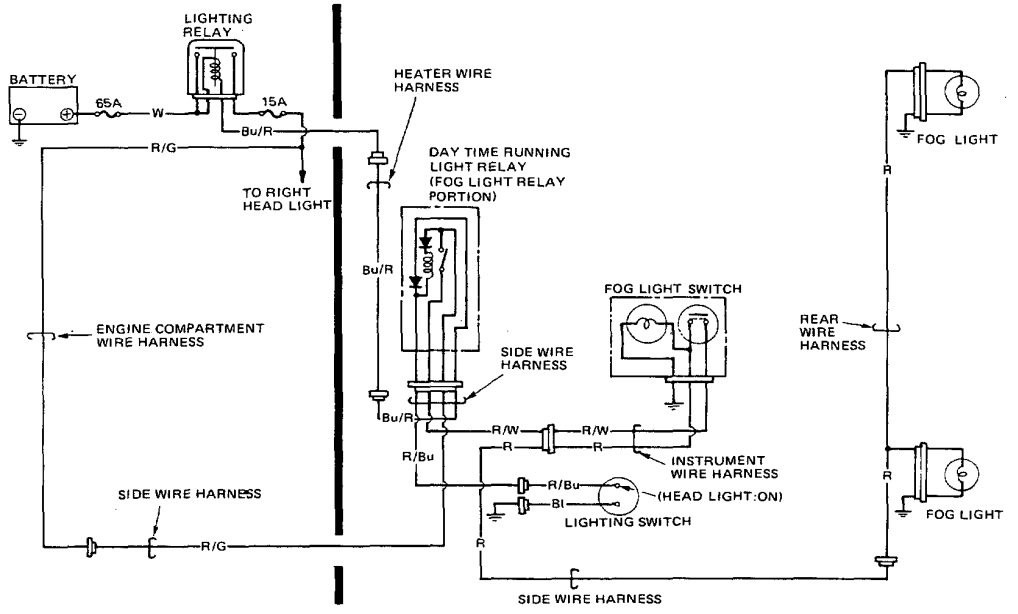
   NOTE: The ohmmeter may show 20–50Ω approximately.



Rear Fog Light

Wiring Diagram

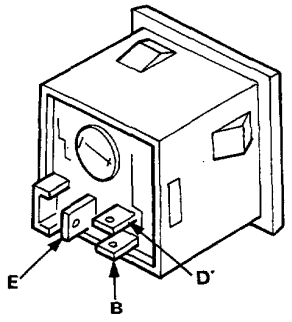
NOTE:
- L.H. Drive shown; R.H. Drive basically similar
- This wiring diagram includes the headlight-on circuit. The fog lights cannot be lit unless the headlight is on.



Switch Testing

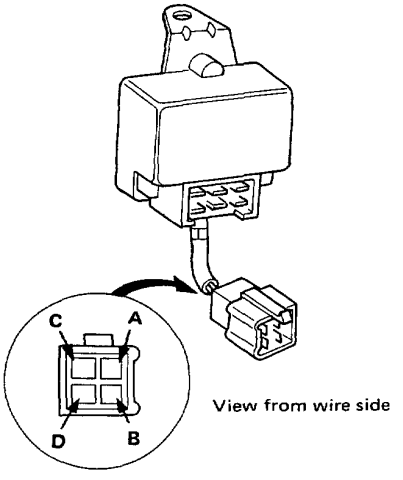
Check for continuity according to the table below.

	B	D		E
OFF		○	○	○
ON	○	○	○	○



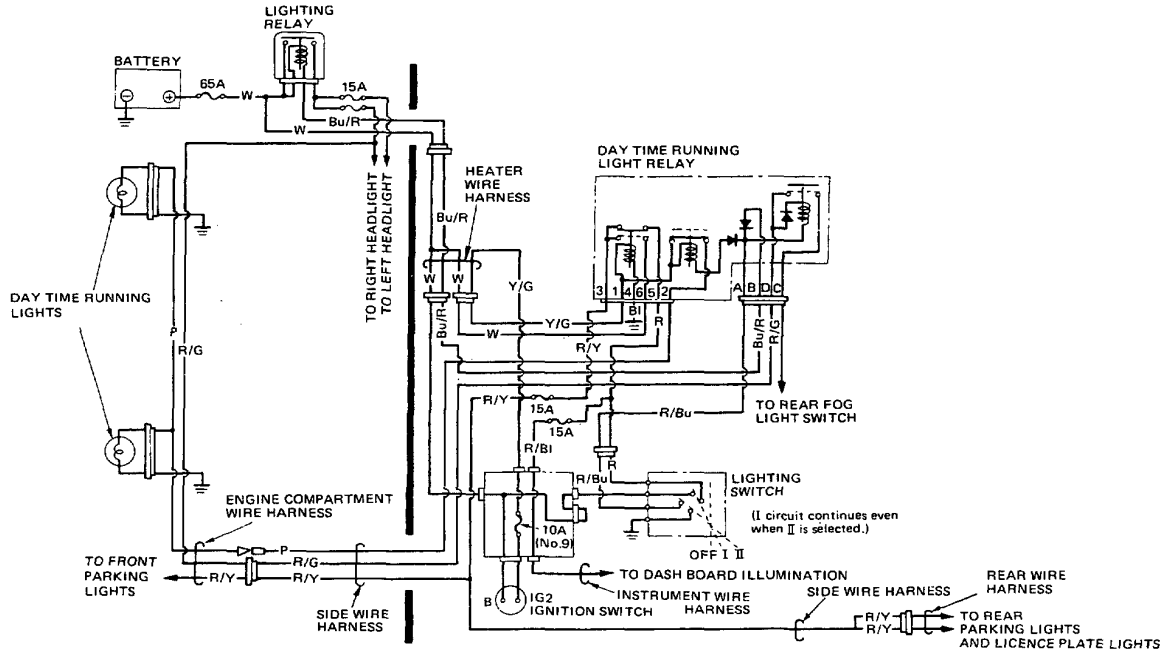
Relay Testing

- There should be continuity between B (positive) and A (negative) terminals.
- When D lead is connected to the battery positive terminal and the A lead to the battery negative terminal, there should be 12V between C and A leads.



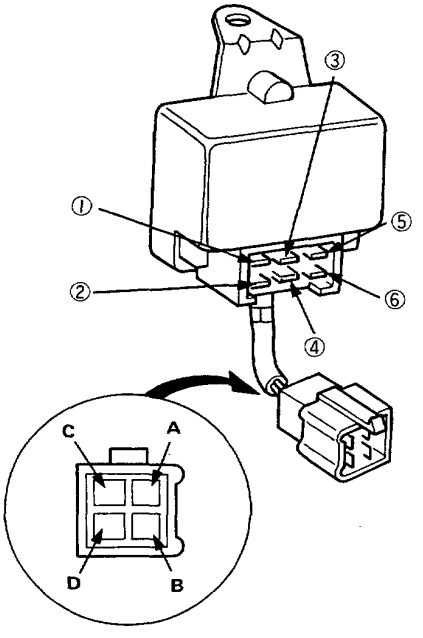
Day Time Running Light

Wiring Diagram



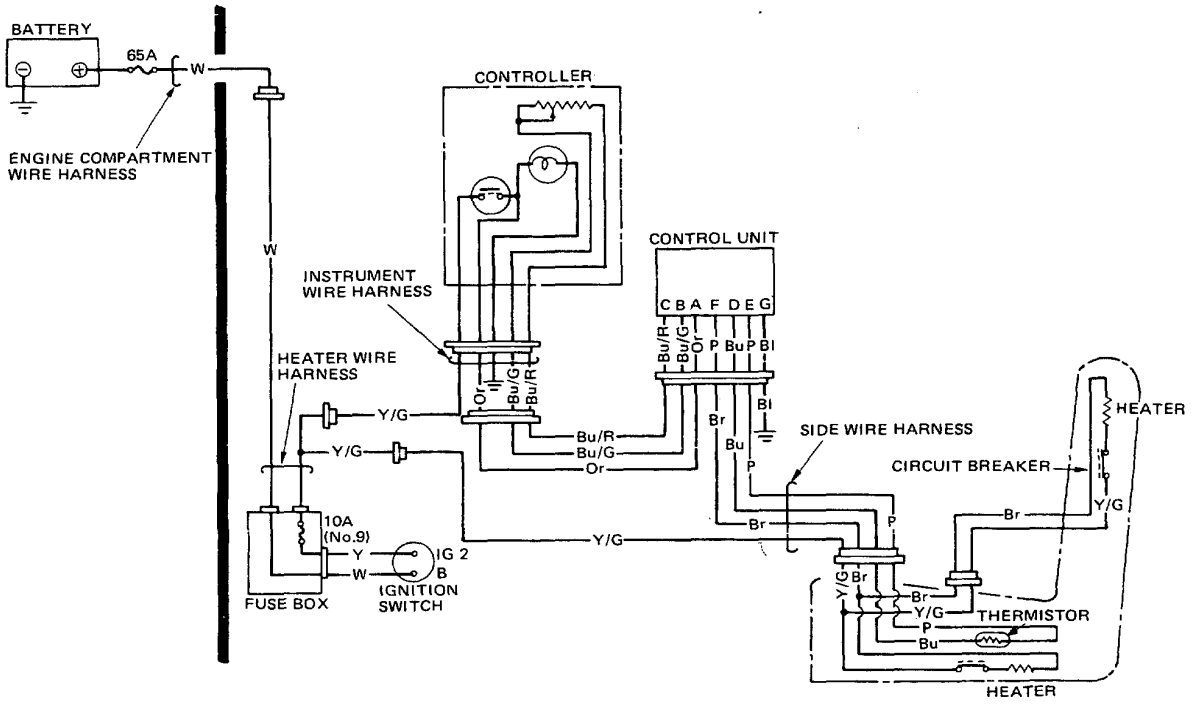
Relay Testing

1. Check for continuity with the battery disconnected.
   - There should be continuity between (5) and (3) terminals.
   - There should be continuity between (1) and (2) terminals.
   - There should be continuity between (B) (positive) and (A) (negative) leads.
2. Check for continuity and voltage with the battery connected.
   - There should be continuity between (6) and (3) terminals, when the battery positive wire is connected to (1) terminal and negative wire to (4) terminal.
   - There should be no voltage between (1) and (2) terminals, when the battery positive wire is connected to (1) terminal and negative wire to (A) lead.
   - There should be 12V between (C) and (A) leads, when the battery positive wire is connected to (D) lead and negative wire to (A) lead.



Seat Heater

Wiring Diagram



Troubleshooting

1. Seat is not heated.

Disconnect wire harness from controller.

Check controller. NOTE: See page 25-50.

Normal — Not OK → Faulty controller

OK

Disconnect wire harness from seat cushion.

Measure resistance between Y/G and Br leads on seat cushion side. NOTE: Make sure seat back wire is disconnected.

There is 20 Ω approx. — Not OK → Faulty seat cushion (heater)

OK

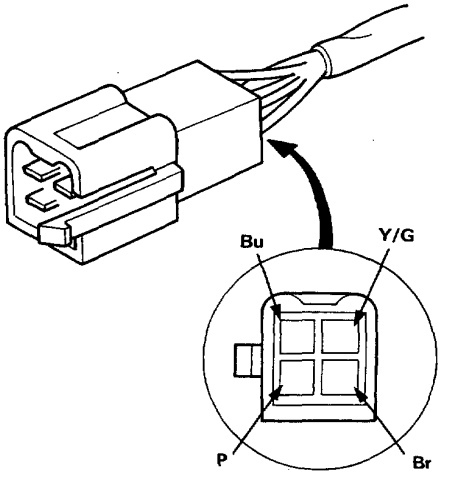
Measure resistance between Bu and P leads.

There is 7 kΩ approx. — Not OK → Faulty seat cushion (thermistor)

OK

(cont'd)

SEAT CUSHION SIDE



View from wire side

(cont'd)

Disconnect wire harness from seat back.

Measure resistance between Bl/Y and Br leads.

There is 12 Ω approx.? — Not OK → Faulty seat back (heater)

OK

Check for continuity between Bl lead and body ground.

There is continuity? — Not OK → Poor ground

OK

Turn ignition switch on.

Measure voltage between Y/G lead (positive) and Bl lead (negative) on instrument wire harness side.

There is 12V.? — Not OK → Blown fuse / Open circuit in Y/G lead

OK

Measure voltage between Y/G lead (positive) and body ground on side wire harness side.

There is 12V.? — Not OK → Open circuit in Y/G lead

OK

Turn ignition switch off.

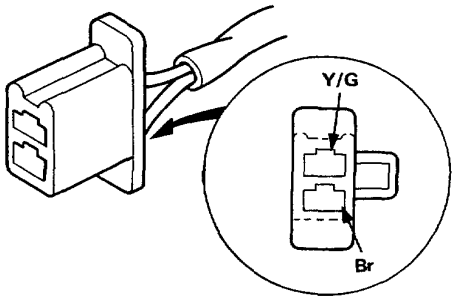
Check for continuity between terminals of all leads.

There is continuity? — Not OK → Open circuit

OK

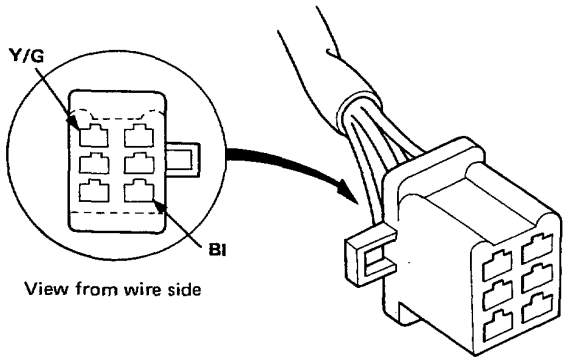
Faulty control unit

SEAT BACK SIDE



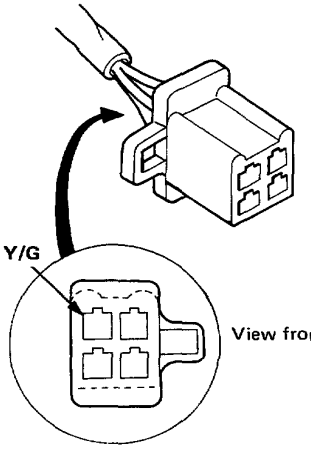
View from wire side

INSTRUMENT WIRE HARNESS



View from wire side

SIDE WIRE HARNESS



View from wire side

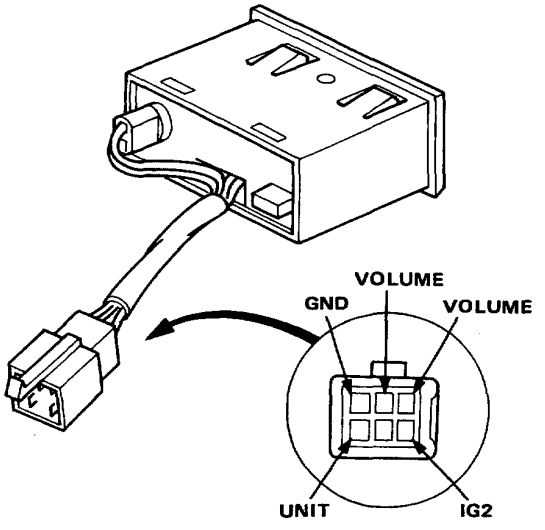
2. **Heater temperature cannot be changed when the volume is turned.**

   - Check controller.
   - Check seat cushion.
   - If they are OK, replace control unit.

Seat Heater

Controller Testing

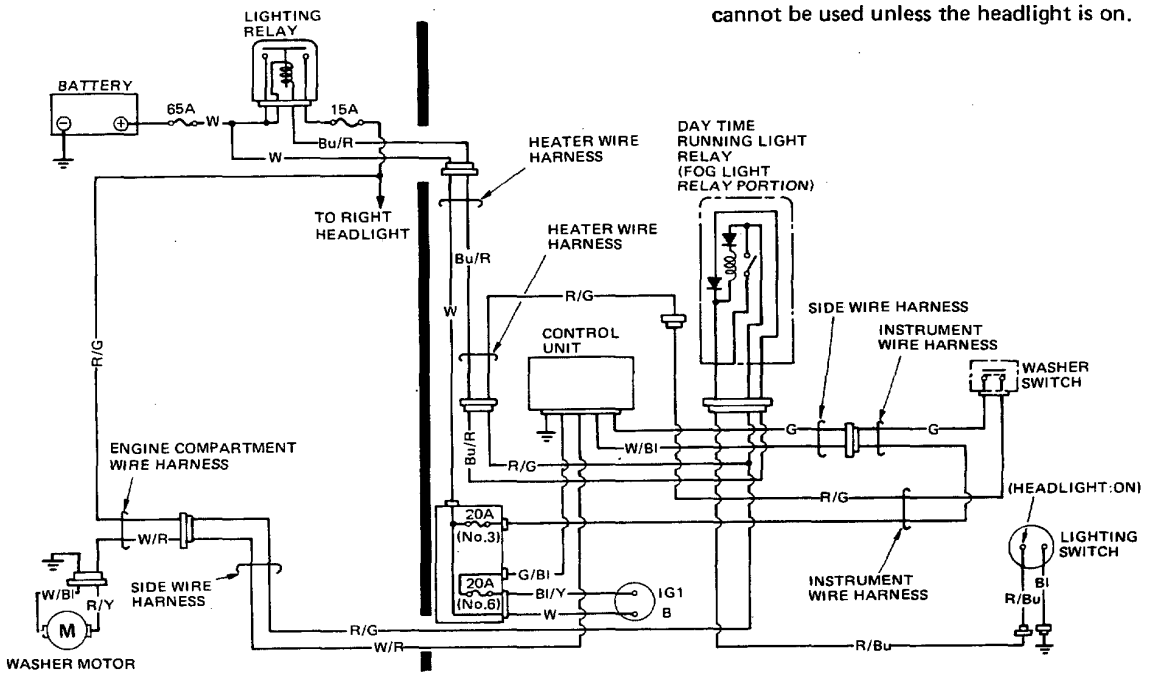
1. There should be continuity between IG2 and UNIT terminals when the switch is turned on and no continuity when the switch is turned off.
2. Attach the ohmmeter probes to the VOLUME terminals.
3. Turn the volume slowly.
4. There should be 10kΩ approx. at the minimum position and 0kΩ at the maximum position.



Headlight Washer

Wiring Diagram

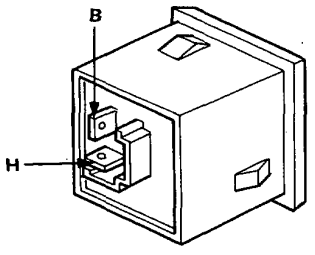
NOTE: This wiring diagram includes the headlight-on circuit. The headlight washer cannot be used unless the headlight is on.



Switch Testing

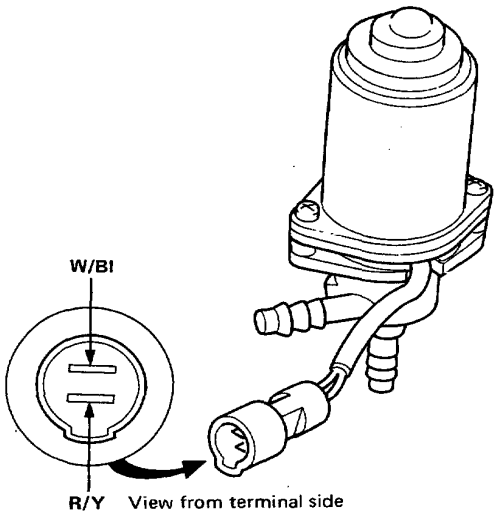
Test continuity according to the table.

	B	H
OFF		
ON	○	○



Washer Motor Testing

Test motor by applying battery voltage to R/Y (positive) and W/Bl (negative) leads.

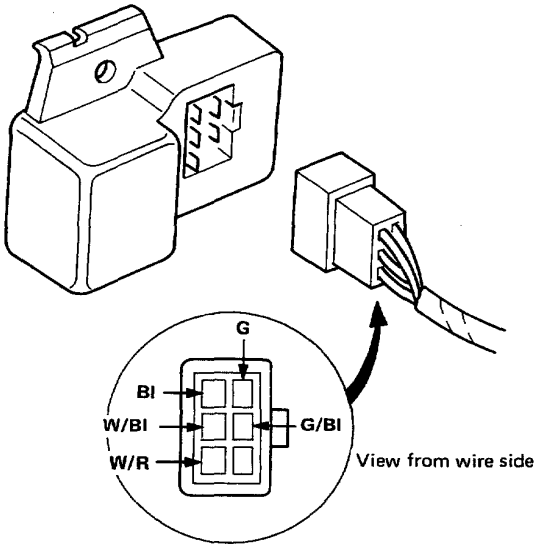


Headlight Washer

Control Unit Testing

NOTE: The control unit is transistorized and cannot be tested with circuit testers with a single unit. For this reason, the following descriptions are limited to the inputs and outputs to be measured at the wire harness as a guide to determine whether or not it is functioning properly.

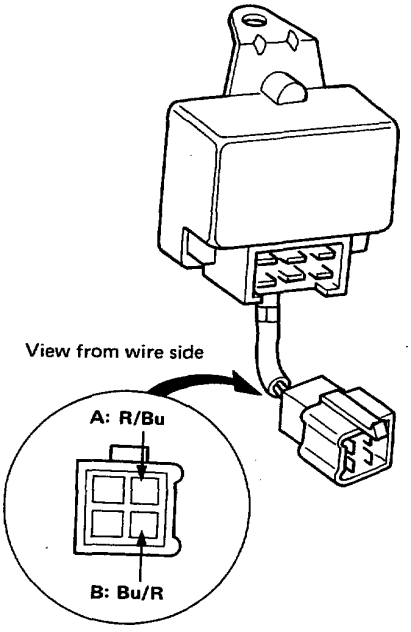
1. Disconnect the wire harness from the control unit. Check for continuity between Bl lead and body ground.
2. Turn on the ignition switch. Check the following items.
   - 12V between the G/Bl (positive) and Bl (negative) leads.
   - 12V between the W/Bl (positive) and Bl (negative) leads.
3. Turn on the headlights and washer switch. Check the following item.
   - 12V between the G (positive) and Bl (negative) leads.



4. Turn the all switches off. Connect the wire harness to the control unit.
5. Turn the all switches on and check the following item.
   - 12V between the W/R (positive) and Bl (negative) leads.

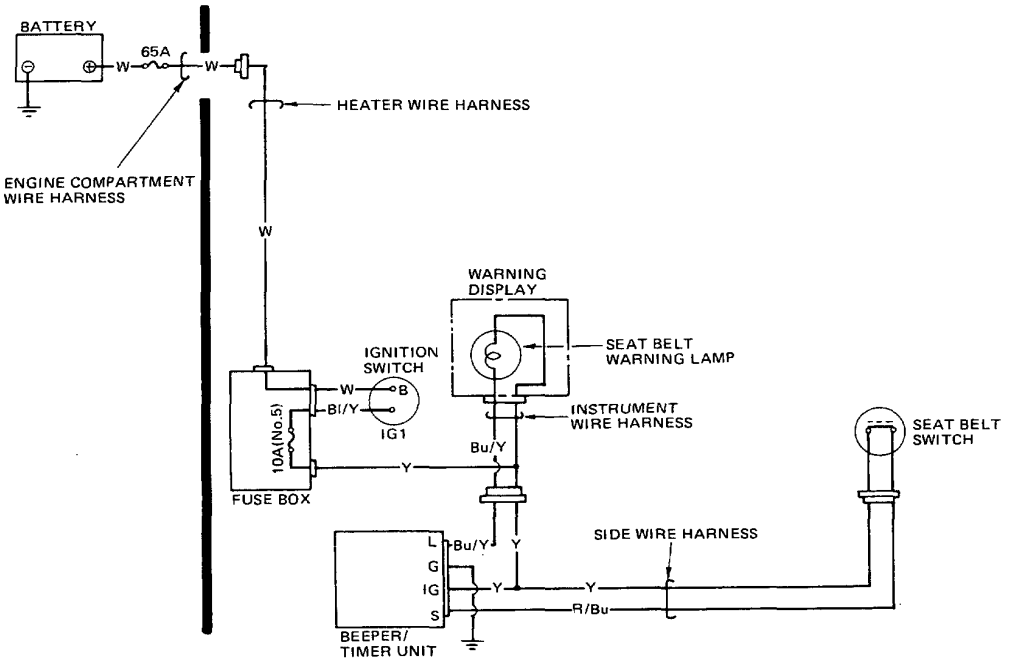
Relay Testing

There should be continuity between Bu/R (positive) and R/Bu (negative) leads.



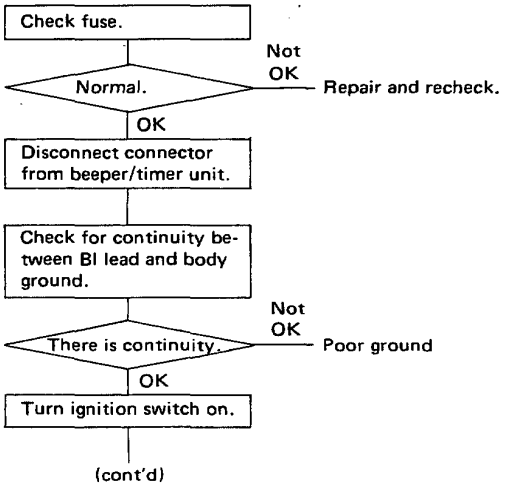
Seat Belt Warning System

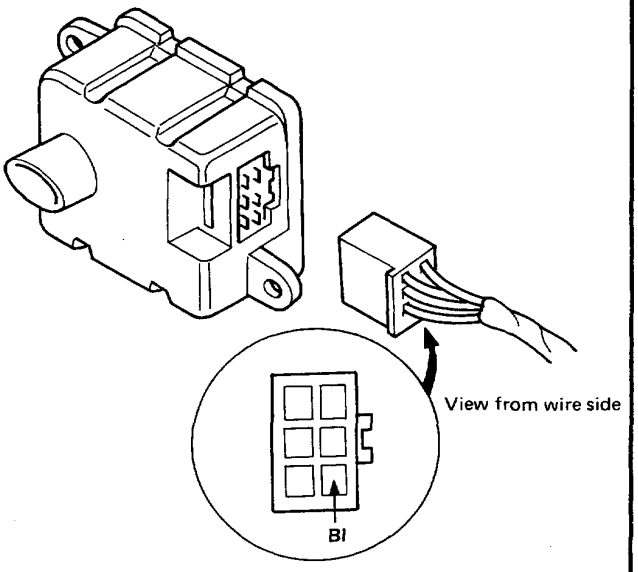
Wiring Diagram



Troubleshooting

1. Light and beeper don't work.





Seat Belt Warning System

Troubleshooting (cont'd)

(cont'd)

Measure voltage between Y lead (positive) and Bl lead (negative).

There is 12V.
- Not OK → Open circuit between fuse and beeper/timer unit
- OK → Faulty beeper/timer unit

2. Light doesn't flash.

Check beeper operation.

Beeper works properly.
- Not OK → See No. 1 troubleshooting.
- OK

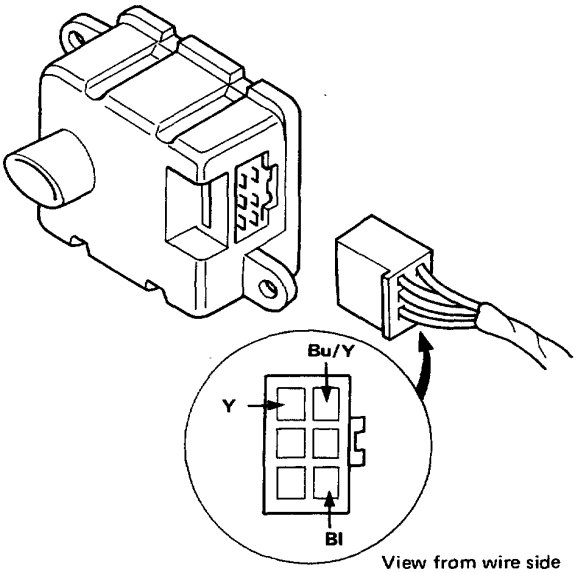
Turn ignition switch off.

Disconnect connector from beeper/timer unit.

Connect Bu/Y lead to Bl lead by using jumper wire.

Turn ignition switch on.

Light goes on.
- Bulb burn out
- Open circuit in Bu/Y lead
- OK → Faulty beeper/timer unit



View from wire side

3. Beeper doesn't work.

Check warning light operation.

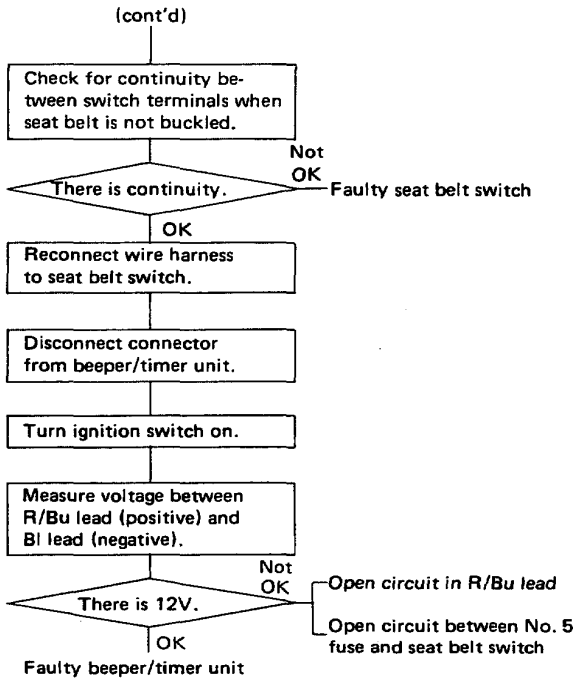
Light flashes properly.
- Not OK → See No. 1 Troubleshooting.
- OK

Turn ignition switch off.

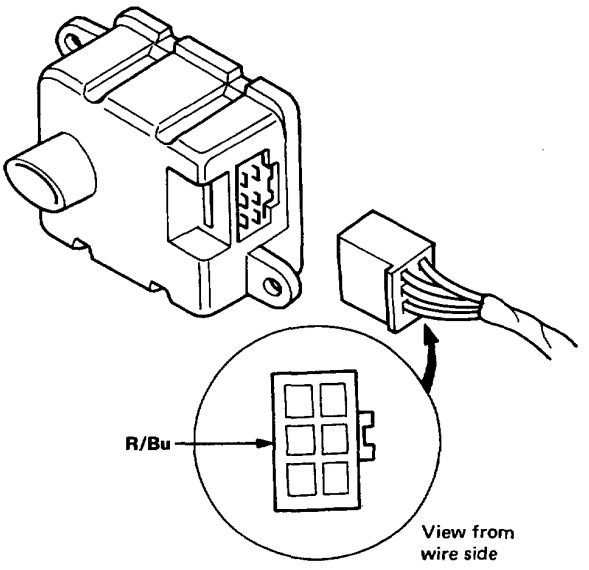
Disconnect wire harness from seat belt switch.

(cont'd)

Troubleshooting (cont'd)



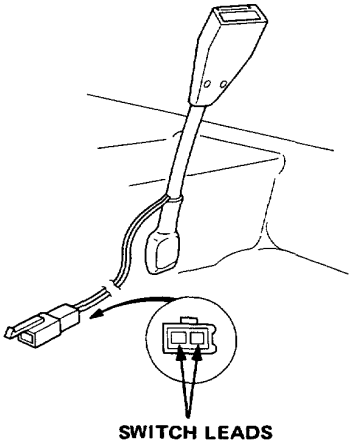
4. **Light stays on constantly.**
   - Short circuit in Bu/Y lead
5. **Light continues to flash and beeper won't shut off over 6 seconds.**
   - Faulty beeper/timer unit



Seat Belt Switch Testing

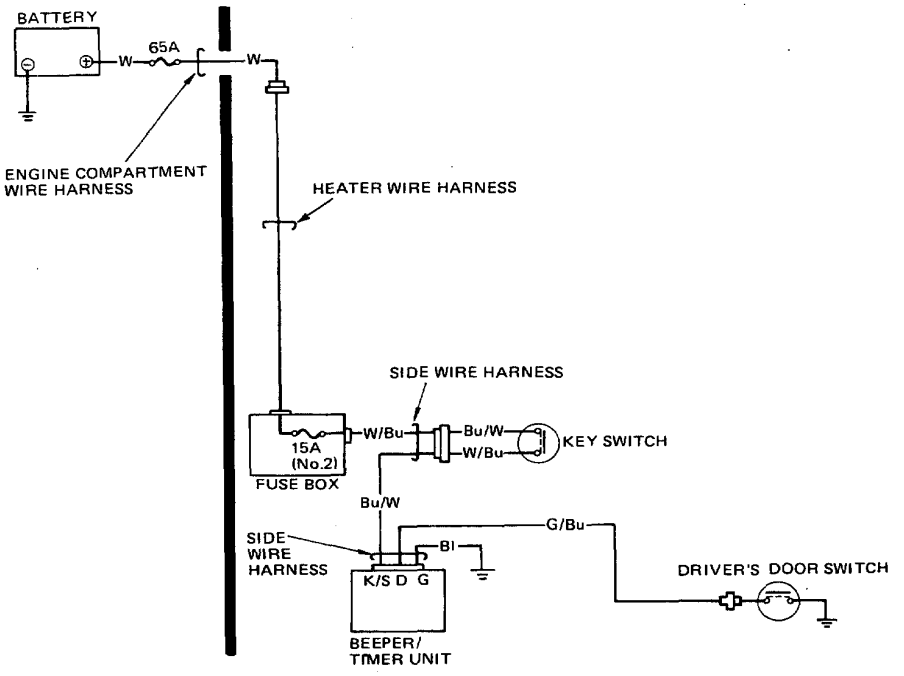
Check for continuity.

- There should be continuity when the seat belt is not buckled.
- There should be no continuity when the seat belt is buckled.



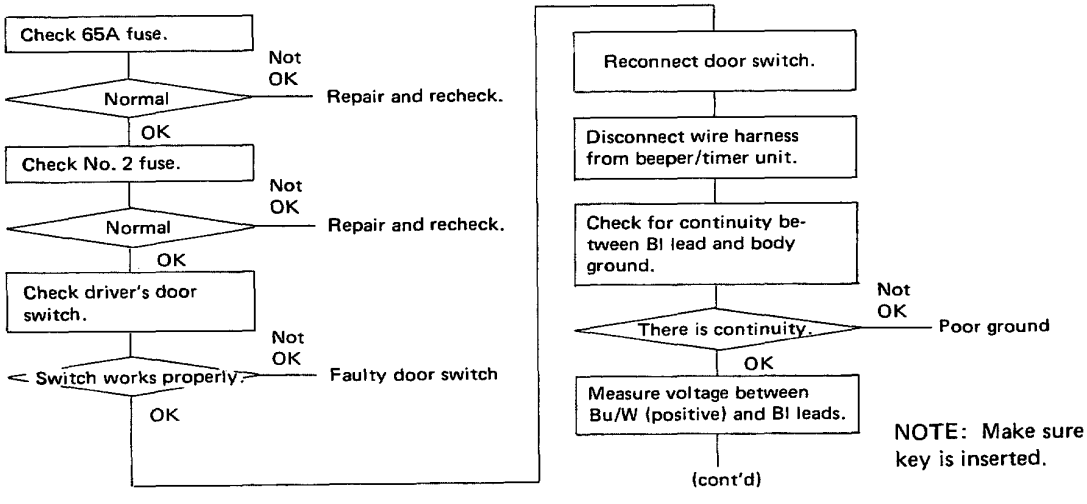
Key-On Warning System

Wiring Diagram



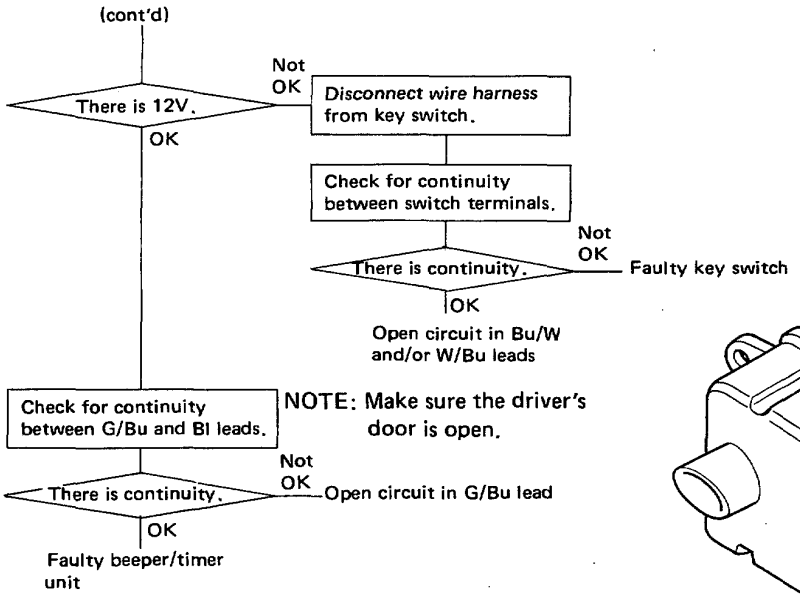
Troubleshooting

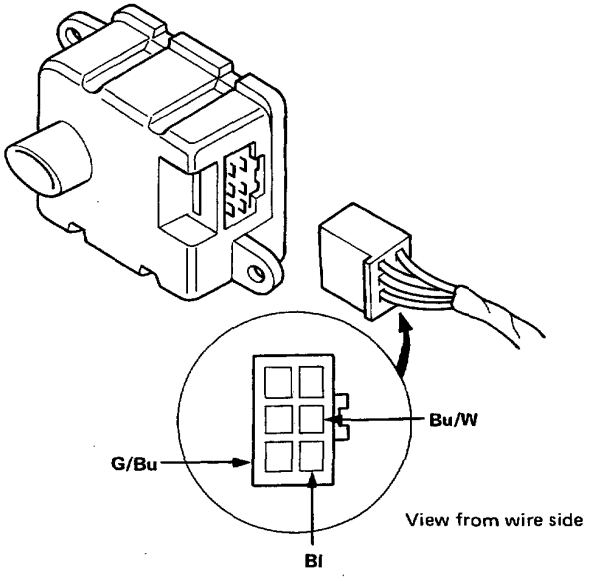
1. Beeper doesn't work.



NOTE: Make sure the ignition key is inserted.

Troubleshooting (cont'd)



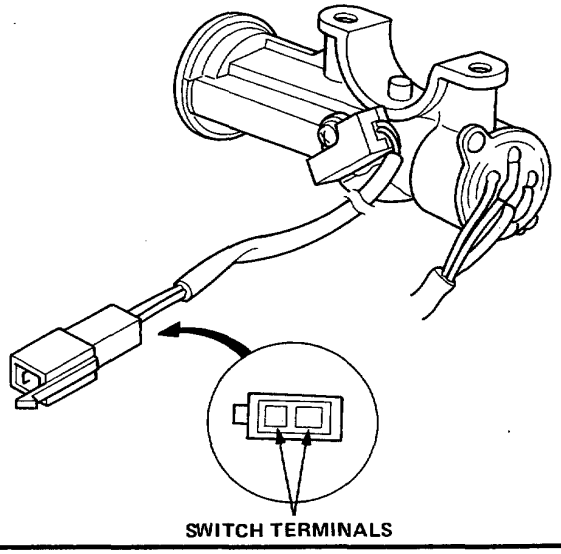


2. **Beeper won't shut off when driver's door is closed.**
   - Faulty driver's door switch (switch remains on.)
   - Short circuit in G/Bu lead
   - Faulty beeper/timer unit
3. **Beeper won't shut off when ignition key is removed.**
   - Faulty key switch (switch remains on.)

Key Switch Testing

Check for continuity.

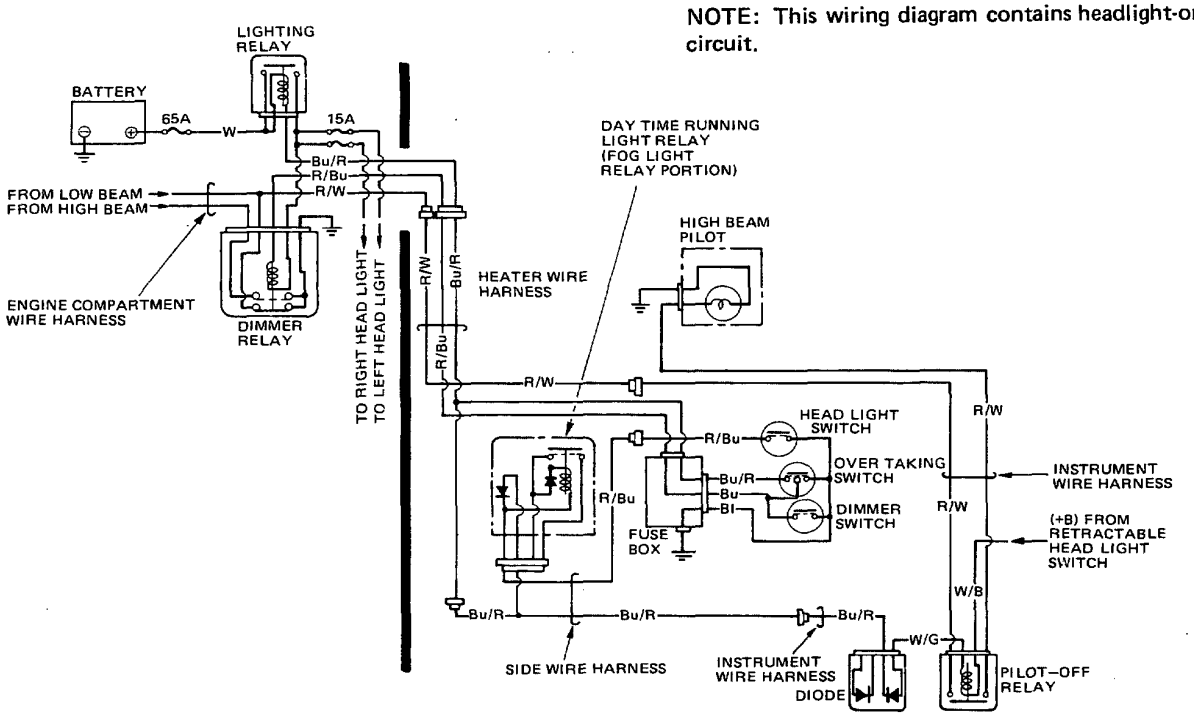
- Turn the ignition switch on, then turn to LOCK position. There should be continuity when the ignition key is inserted.
- There should be no continuity when the ignition key is removed.



High Beam Pilot Off Circuit

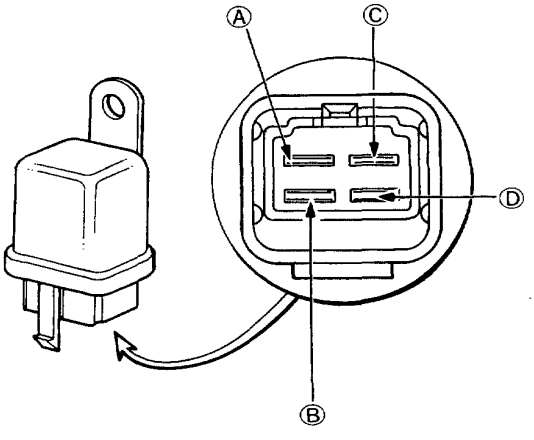
Wiring Diagram

NOTE: This wiring diagram contains headlight-on circuit.



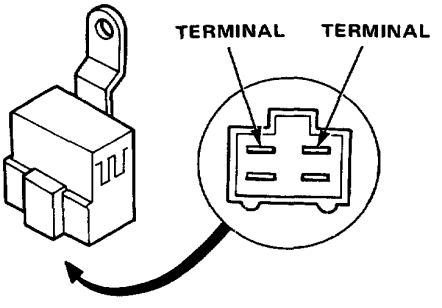
Relay Testing

There should be continuity between the A and B terminals when the C terminal is connected to the battery positive terminal and the D terminal is connected to the battery negative terminals. There should be no continuity with the battery disconnected.



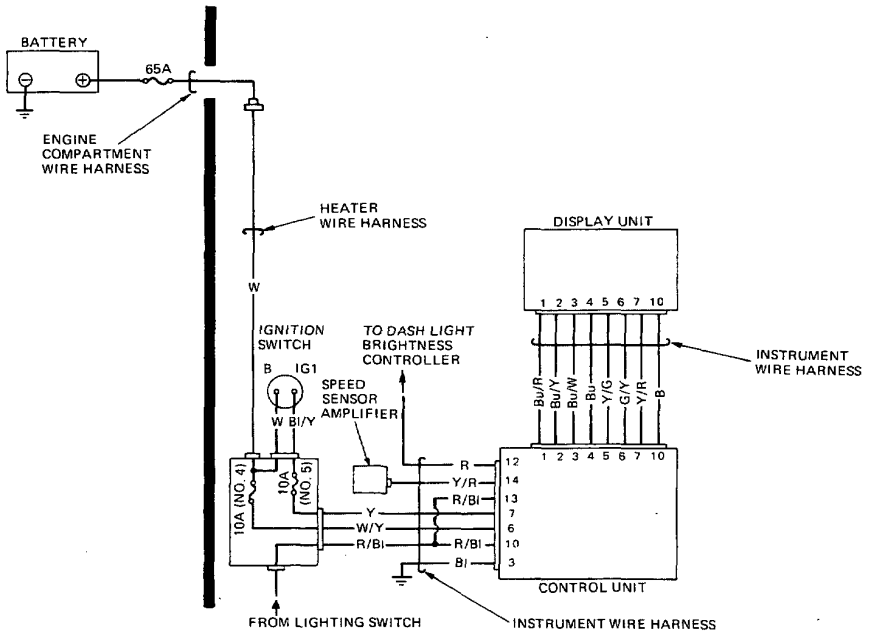
Diode Testing

Check the diode for continuity between the terminals shown below. Reverse the leads and check again. Continuity should exist in one direction only. Replace the diode if there is continuity in both directions or no continuity.



Electronic Navigator

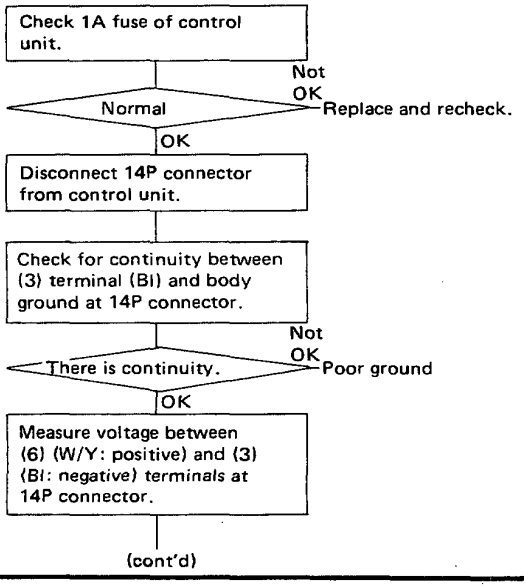
Wiring Diagram

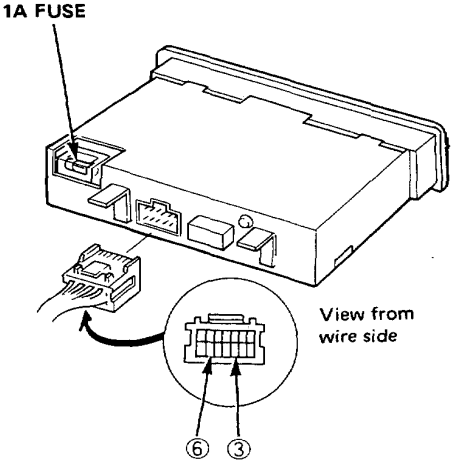


Troubleshooting

NOTE: Make sure No. 4 and No. 5 fuses are in good condition before troubleshooting

1. Data are not displayed.





Troubleshooting (cont'd)

(cont'd)

There is 12V.
- Not OK → Open circuit between No. 4 fuse and control unit
- OK →

Turn ignition switch on.

Measure voltage between (7) (Y: positive) and (3) (Bl: negative) terminals at 14P connector.

There is 12V.
- Not OK → Open circuit between No. 5 fuse and control unit
- OK →

Turn ignition switch off.

Disconnect 10P connector from control unit.

Disconnect 10P connector from display unit.

Check leads for continuity between 10P connectors color to color.

There is continuity.
- Not OK → Open circuit
- OK →

Reconnect 10P and 14P connectors to control unit.

Check for continuity between (10) terminal (Bl) and body ground as shown below.

There is continuity.
- Not OK → Faulty control unit (ground circuit)
- OK →

Turn ignition switch on.

Measure voltage between (1) (Bu/R: positive) and (10) (Bl: negative) terminals as shown below.

There is 2V approxi.
- Not OK → Faulty control unit
- OK →

Connect voltmeter positive probe to (2) (Bu/Y) terminal and negative prove to (10) (Bl) terminal.

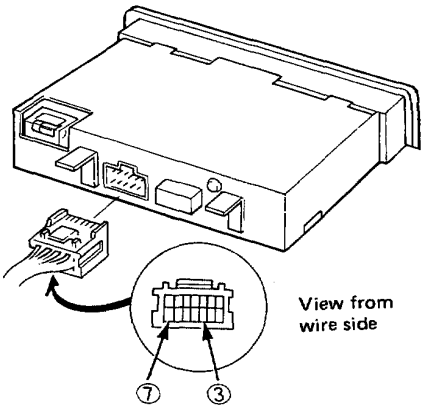
NOTE: Turn the voltage range selector from high to low.

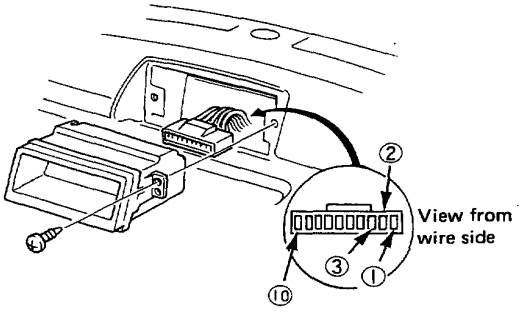
Meter shows voltage.
- Not OK → Faulty control unit
- OK →

Measure voltage between (3) (Bu/W: positive) and (10) (Bl: negative) terminals as shown below.

There is 5V approxi.
- Not OK → Faulty control unit
- OK →

Faulty display unit





2. Speed and travel date are abnormal.

Connect voltmeter positive probe to (14) terminal (Y/R) and negative probe to (3) terminal (Bl).

Turn ignition switch on.

Rotate speedometer cable.

Make sure voltmeter will show 5V and 0V repeatedly.

Normal — Not OK → Turn ignition switch off.

OK → Faulty control unit

Turn ignition switch off.

Disconnect 14P connector from control unit

Connect volt meter and 10 kΩ resistance as shown.

Turn ignition switch on.

Rotate speedometer cable.

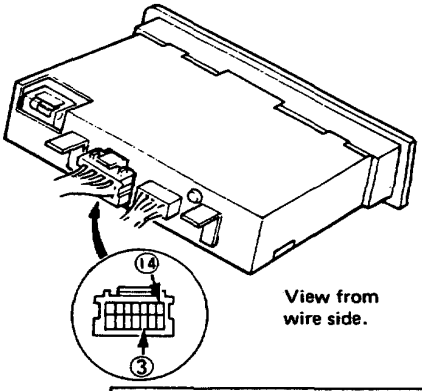
Make sure voltemter will show 12V and 0V repeatedly.

Normal — Not OK → Faulty speedometer

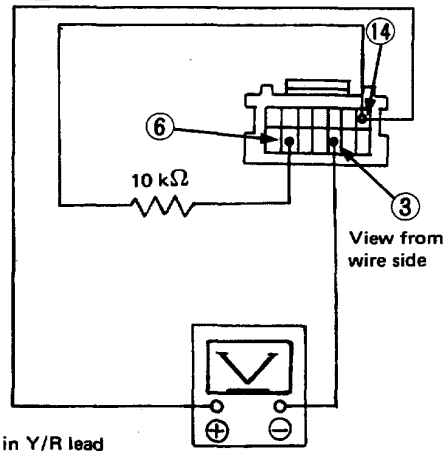
OK → Faulty control unit

Open circuit in Y/R lead between speedometer and control unit

Faulty speed pulser



View from wire side.



View from wire side

NOTE: See page 25-23 for meter troubleshooting.

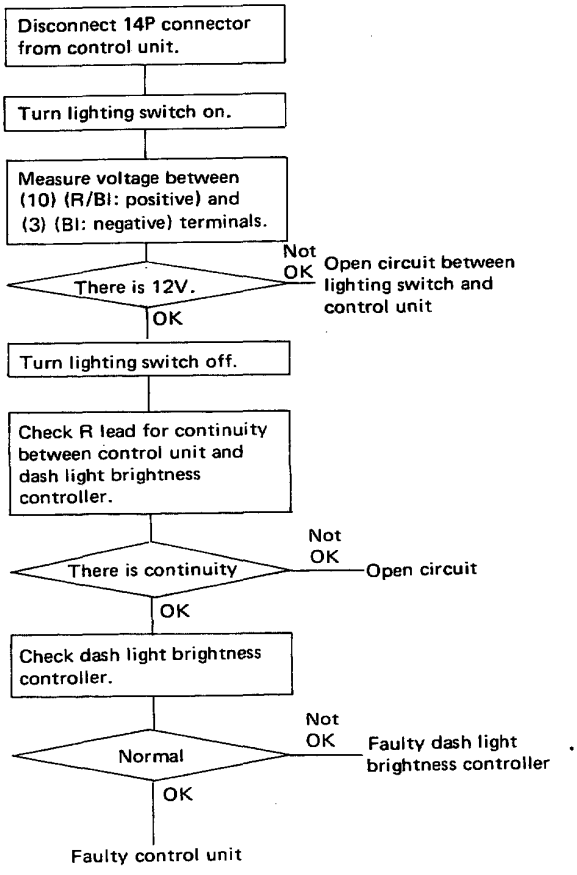
3. Time data are abnormal.

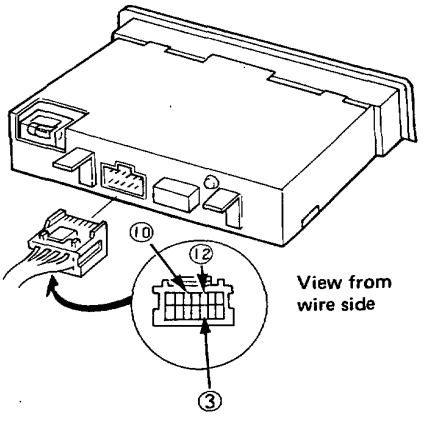
- Faulty control unit

(cont'd)

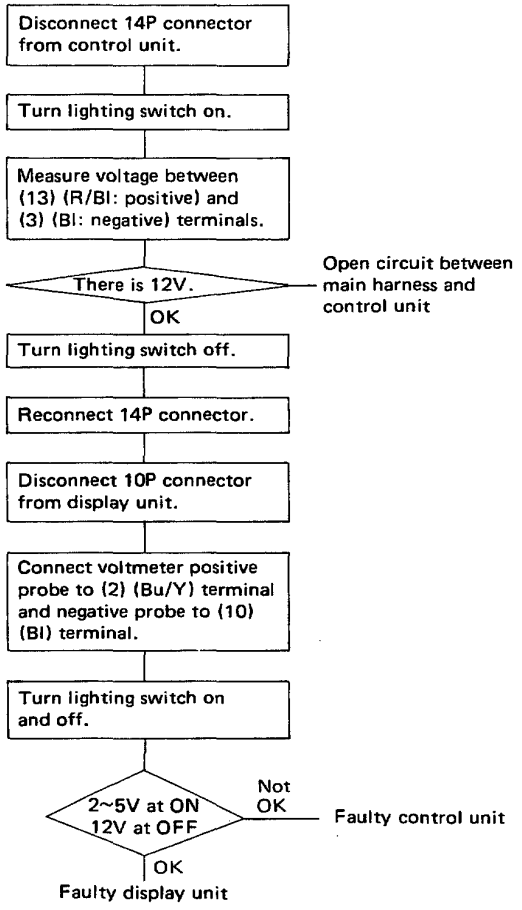
Troubleshooting (cont'd)

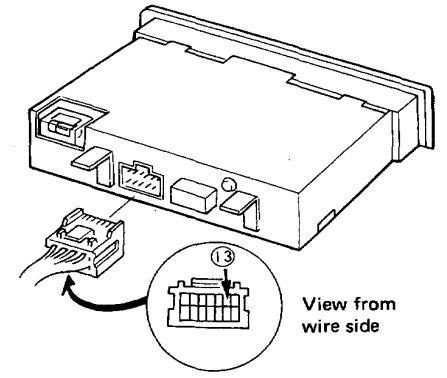
4. Control unit is not illuminated, when lighting switch is turned on.

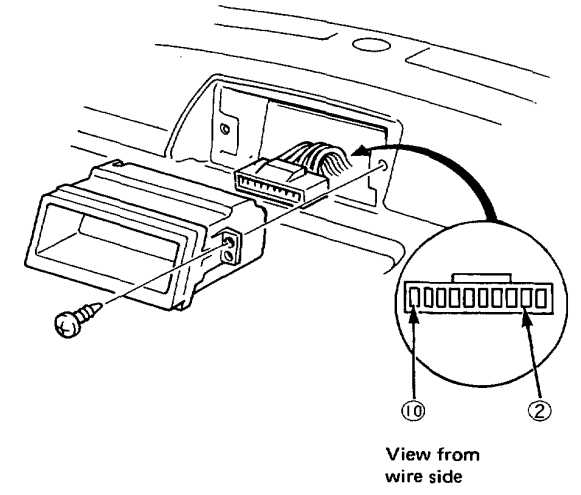




5. **Display brightness doesn't reduce, when lighting switch is turned on.**







6. **One or more displays don't show.**

   - Faulty control unit

MEMO

Ignition

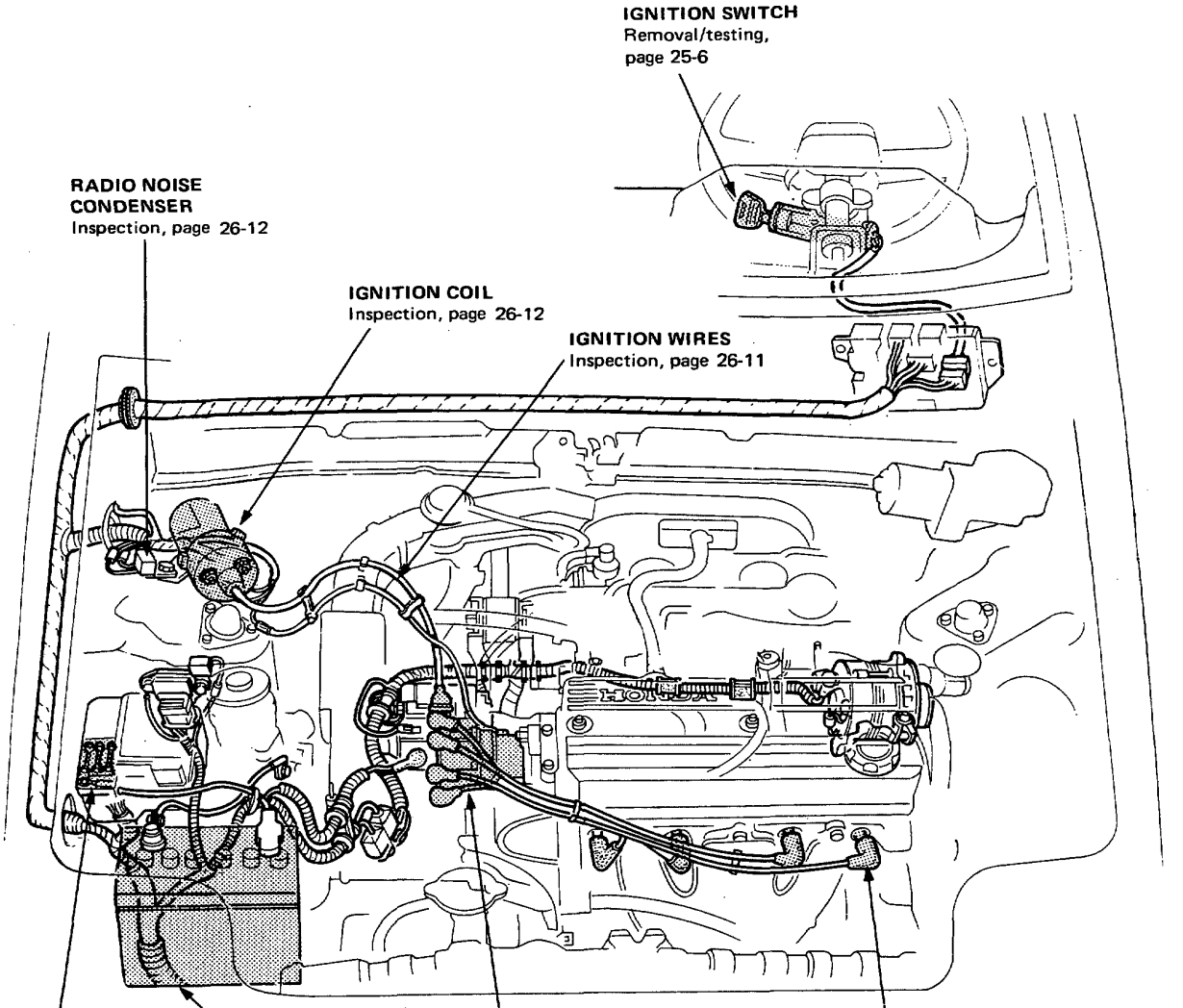
Illustrated Index 26-2
Wiring Diagram 26-3
Troubleshooting 26-4
Distributor Overhaul 26-7
Distributor Removal 26-13
Distributor Top End Inspection ...26-16
Distributor Installation 26-17
Timing 26-17
Ignition Advance Inspection 26-18
Spark Plug Inspection 26-21



Ignition

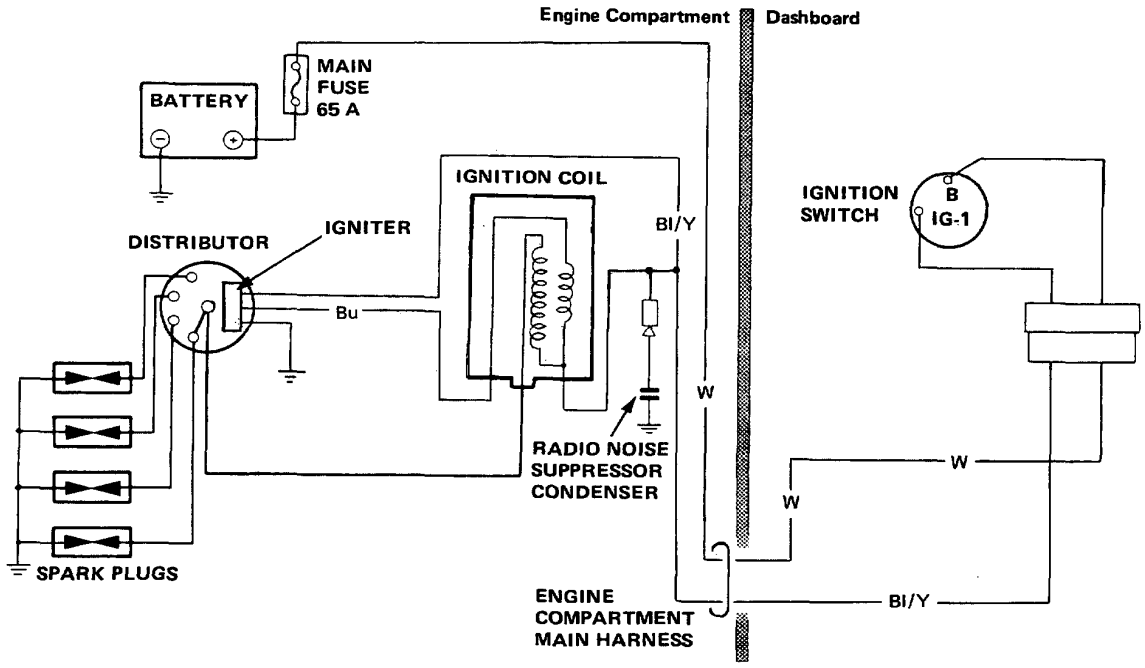
Illustrated Index

NOTE: IGNITION TROUBLESHOOTING page 26-4 through 6.

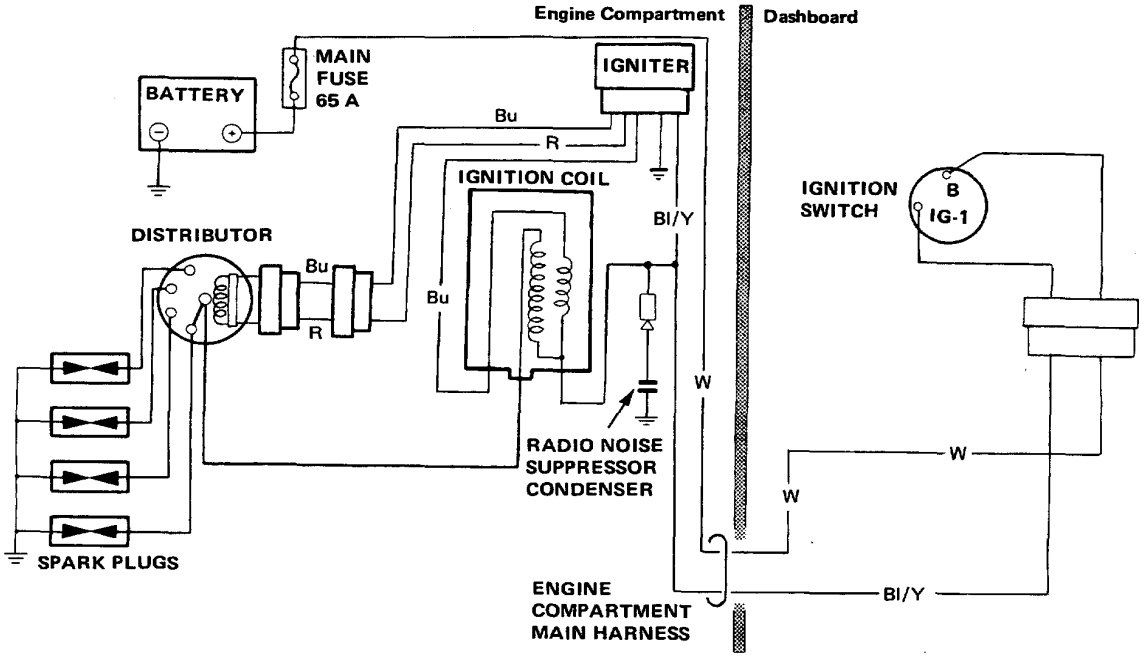


Wiring Diagram

Canadian model



Other models



Ignition

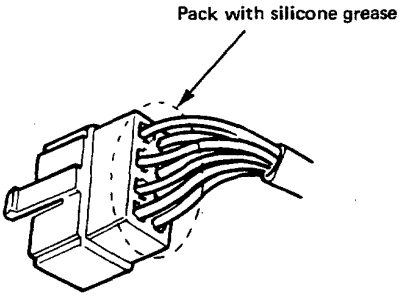
Troubleshooting Precautions

Before Troubleshooting:

1. Check main fuse and fuse box for blown fuses.
2. Make sure battery posts and terminals are clean and tight.
3. Check battery for damage.
4. Check battery state of charge.
5. Check alternator belt for proper tension.
6. Check that connectors in the defective circuit are clean, properly connected, and that a pin or receptacle is not loose in a connector housing.

CAUTION:

- **Do not quick-charge a battery unless the battery ground strap has been disconnected, or you will damage the alternator diodes.**
- **Do not attempt to crank the engine with the ground strap disconnected or you will severely damage the wiring.**
- **Do not pull on wires when disconnecting connectors.**
- **When connecting a connector, push it until it clicks into place.**
- **After connecting connector, cover with connector boot if it has one.**
- **Check to make sure that multi-pin connectors are packed with grease.**

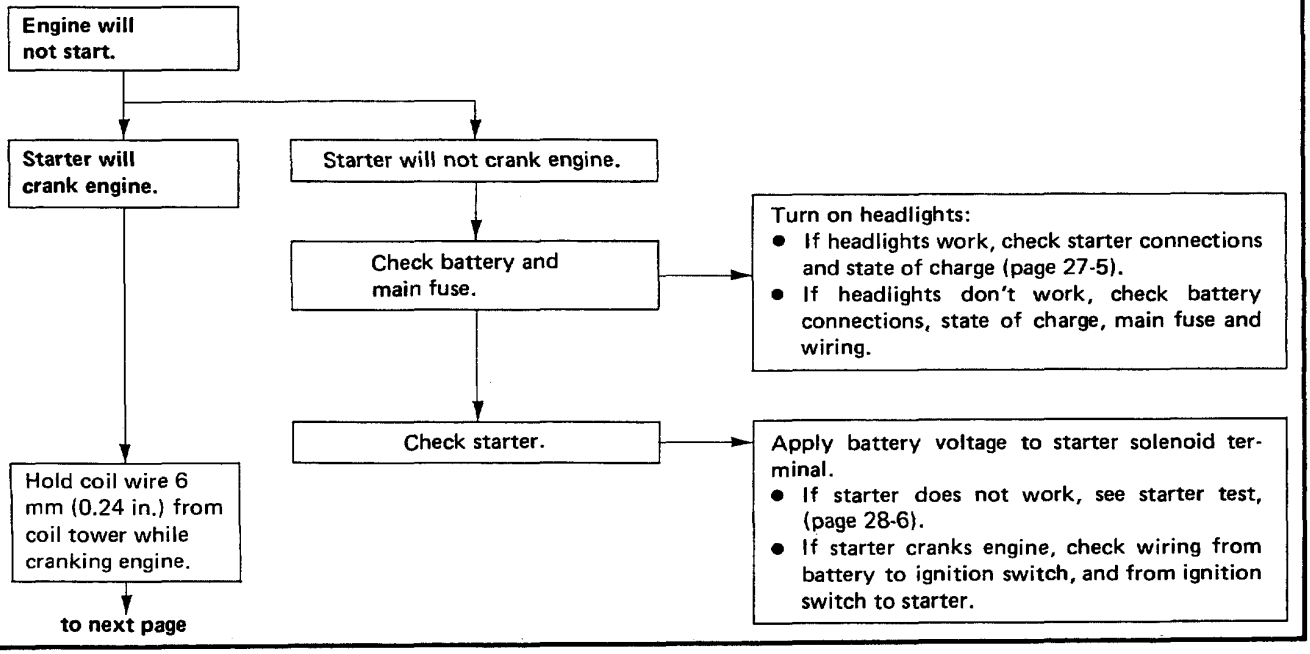


- **When connecting battery terminals make sure they are clean and tightened securely.**

TO AVOID DAMAGING TRANSISTORIZED IGNITION

- Never hook up (+) and (−) battery cables backwards.
- Do not let pulse generator wires touch ignition wires.
- Do not do anything that will produce abnormal pulses.
- Always connect pulse type tachometer to negative (−) terminal of ignition coil.
- Make sure all wires and cables are connected properly.

Troubleshooting



Troubleshooting

From previous pages

Spark from coil

No spark or weak spark from coil

Check voltage between coil primary winding positive (+) terminal and body ground with ignition switch on:
Should be battery voltage

NO → Check wiring from ignition switch to coil (page 26-2).

YES

Check voltage between coil primary winding negative (–) terminal and body ground with ignition switch on:
Should be battery voltage

NO →
- Check wiring from coil primary winding negative (–) terminal to igniter (page 26-2).
- Check coil primary winding resistance (page 26-12).

YES

Disconnect coil secondary wire from distributor and ground it. Check voltage between coil primary winding positive (+) and negative (–) terminals with engine cranking:
Should be 1–3 volts

YES →
- Check ignition coil primary and secondary winding resistance (page 26-12).
- Check ignition wire resistance (page 26-11).e

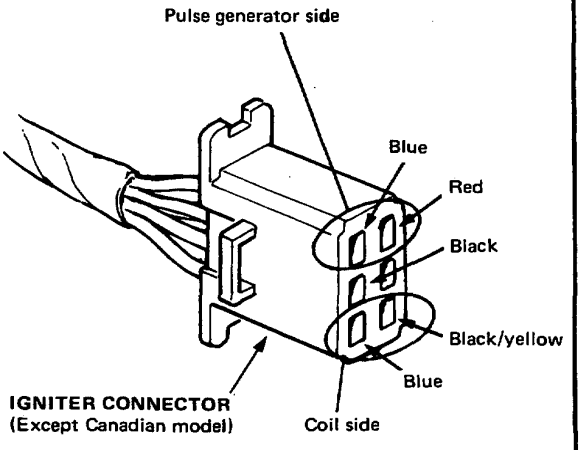
NO

Disconnect connector from igniter. Check voltage on coil side of connector between black and blue (to ignition coil) wires, black and black/yellow wires, with ignition switch on:
Should be battery voltage
NOTE: For Canadian model, see page 26-10.

NO → Check wiring from ignition coil to igniter (page 26-3).

YES

Disconnect connectors from igniter and pulse generator.
Check continuity of red wire and continuity of blue wire between igniter and pulse generator:
There should be continuity
NOTE: For Canadian model, disconnect lead wires from igniter unit. Check continuity between terminals of igniter unit. (page 26-10).



Ⓐ to next page

Ⓑ to next page

(cont'd)

Troubleshooting (cont'd)

From previous page (A)

Hold spark plug wire terminal 6 mm (0.24 in.) away from spark plug while cranking engine.

- Spark at plug.
  - **Check fuel system:** Remove air cleaner cover and look for fuel spray when opening throttle. If no spray, check:
    - Fuel pump and relay.
    - Fuel line and fuel filter for restriction.
    - If fuel sprays, check the fuel cut-off solenoid valves (page 11-7).
  - **Check spark plug:** Inspect (page 26-21).
  - **Check ignition timing:** Set No. 1 piston at TDC and note position of distributor rotor. (Rotor should point to No. 1 wire). Check that plug wires are routed properly: 1-3-4-2 clockwise.
  - **Check valve timing:** Set No. 1 piston at TDC and check alignment marks on cam pulley (page 6-21).
- No spark at plug.

From previous page (B)

For all except Canadian model, check resistance of pulse generator (page 26-11).
Resistance should be 600–800 ohms

Replace igniter and repeat spark test.

No spark at plug.

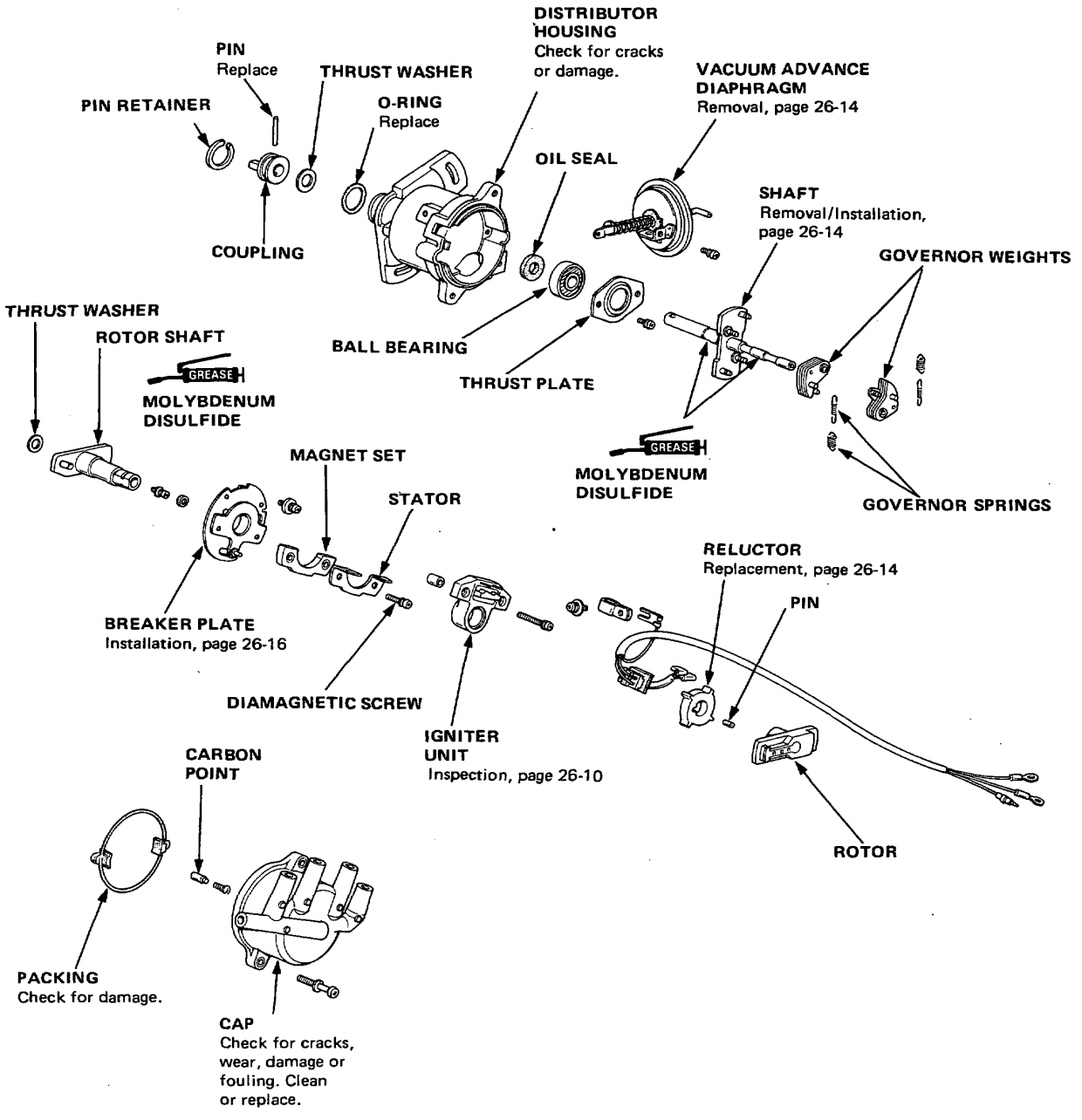
Check condition of spark plug wires.
- Check for:
  - Cut or damaged insulation.
  - Loose or damaged terminal.
  - Open circuit or high resistance (page 26-11).

Inspect distributor cap.
- Check for:
  - Cracks and tracking:
  - Weak carbon brush spring.
  - Rough or dirty cap terminals (check inside and outside).

Inspect distributor rotor.
- Check for:
  - Rough or dirty rotor tip.
  - Grounded rotor at distributor shaft.

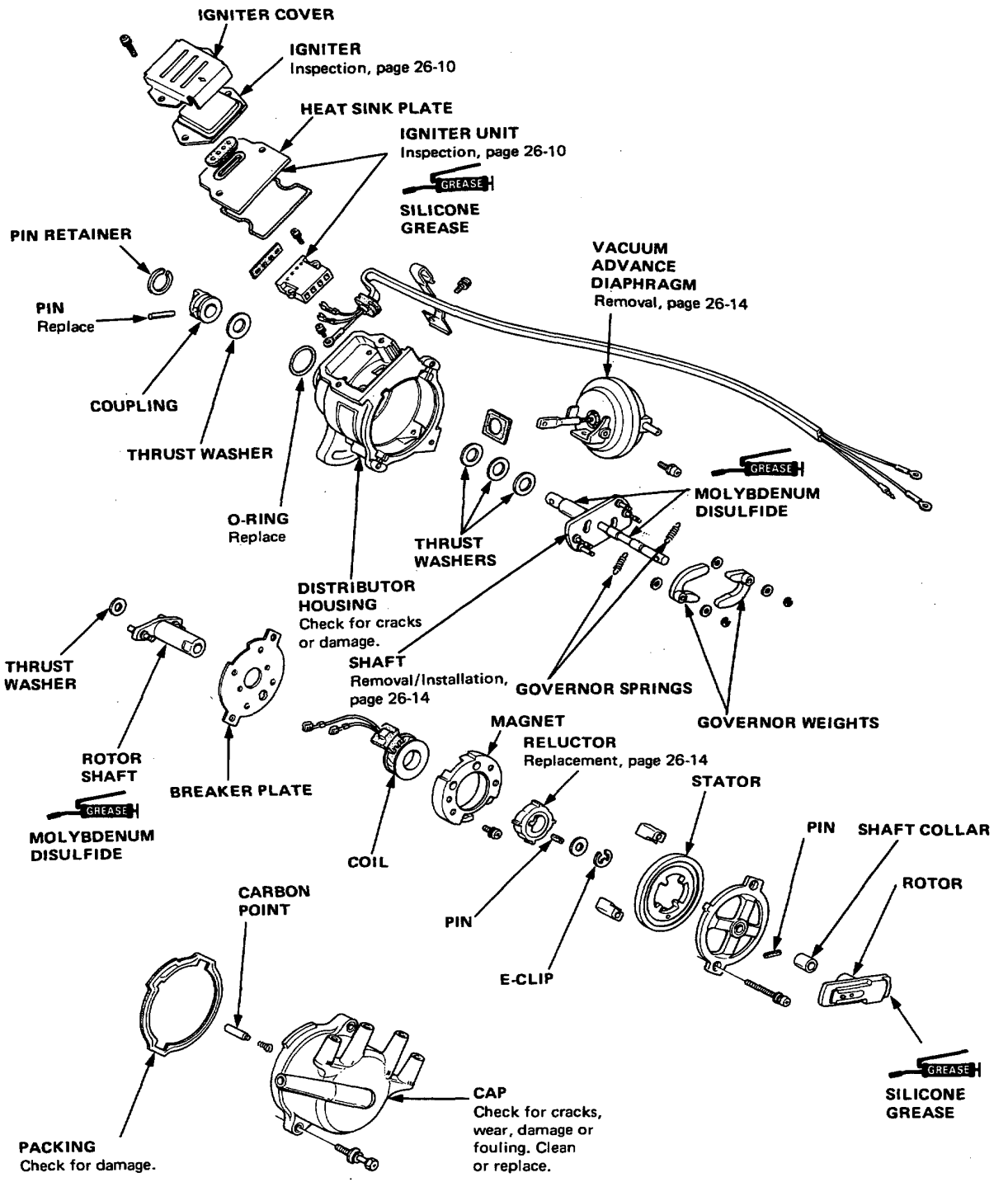
Replace igniter unit and repeat spark test.

Distributor Overhaul (Hitachi Type)

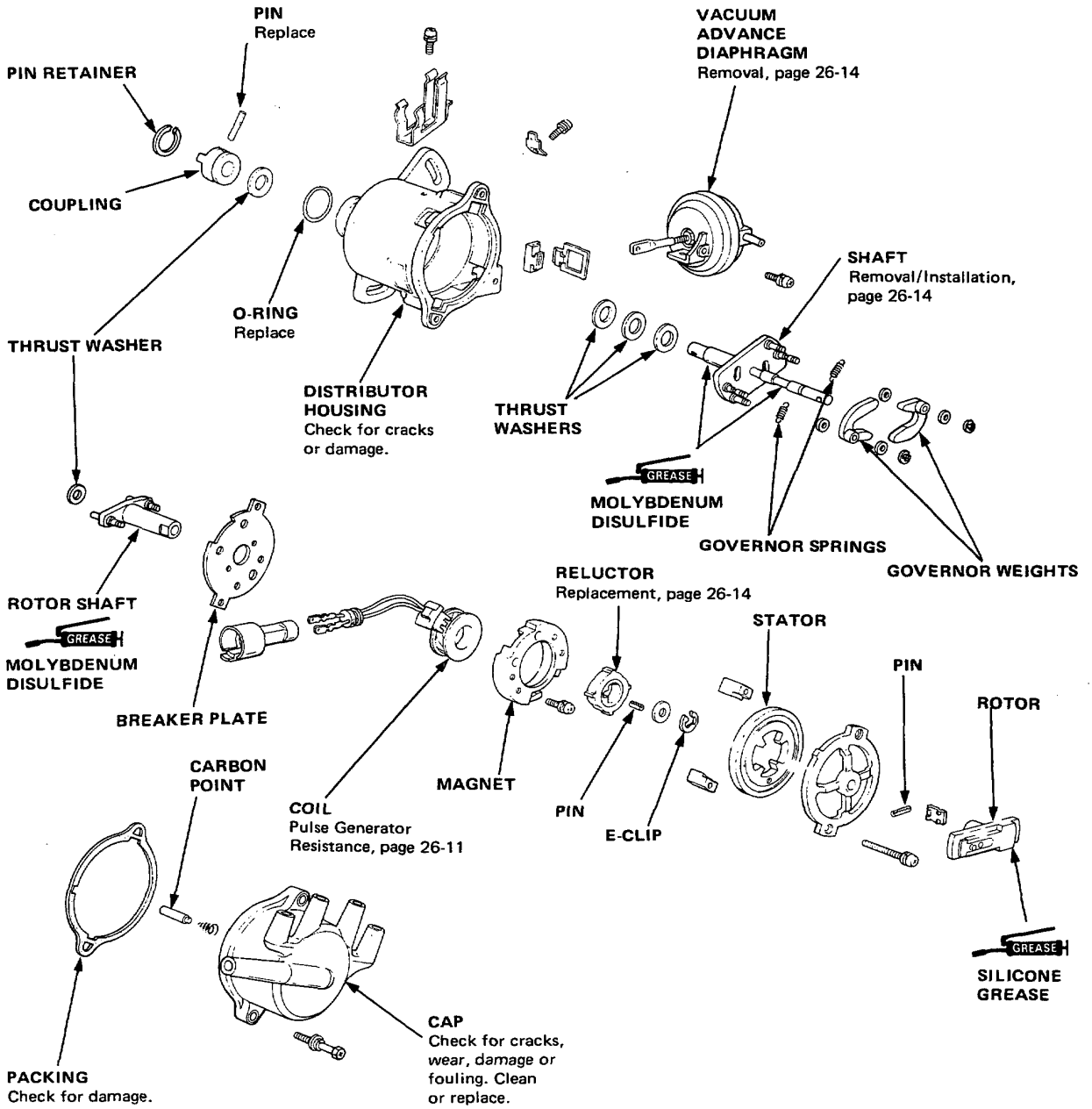


Distributor Overhaul (Toyo Denso Type)

Canadian model



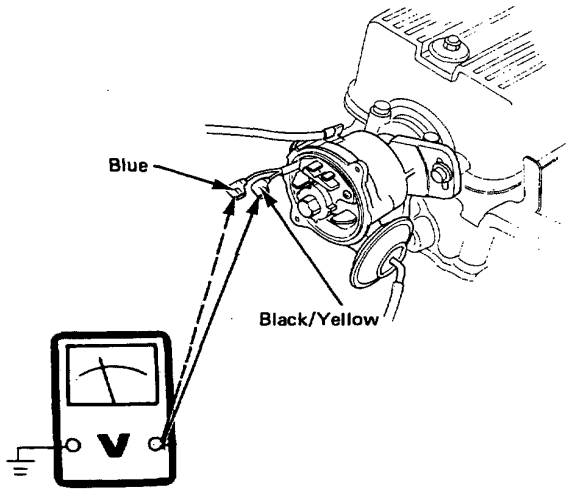
Other models



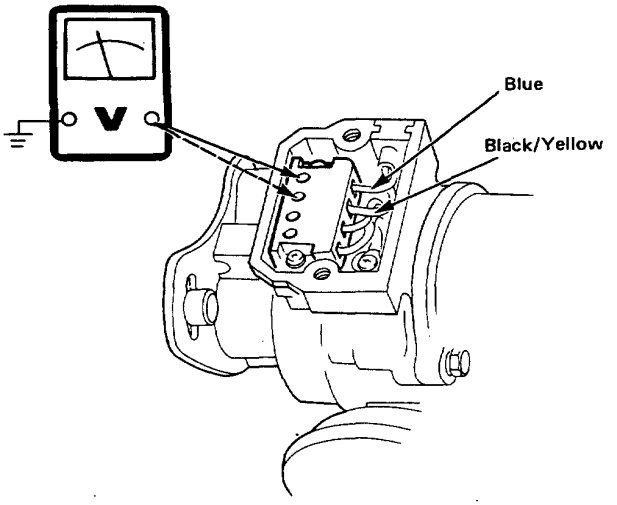
Igniter Unit Inspection (Canadian model)

1. Disconnect lead wires from igniter unit. Check voltage between blue wire and body ground, black/yellow wire and body ground, with ignition switch ON. There should be battery voltage.

Hitachi Type



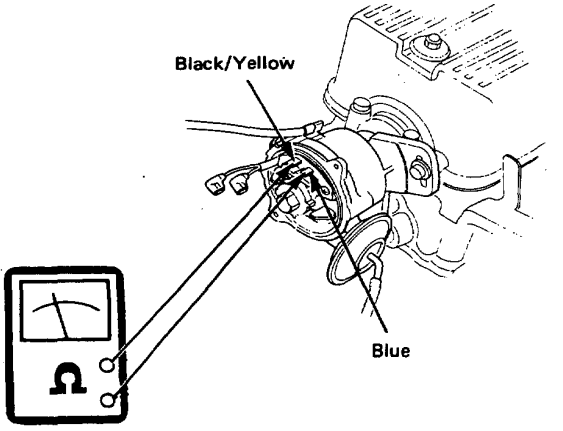
Toyo Denso Type



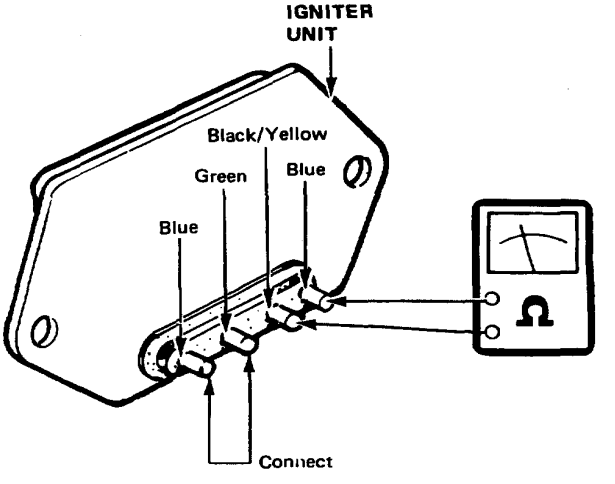
NOTE: When installing igniter, apply silicone grease to connector case.

2. With lead wires disconnected, check continuity between igniter unit terminals using ohmmeter. (R x 100 scale)
   There should be no continuity with positive probe to black/yellow wire terminal and negative probe to blue wire terminal.
   There should be continuity with positive probe to blue wire terminal and negative probe to black/yellow wire terminal.

Hitachi Type



Toyo Denso Type

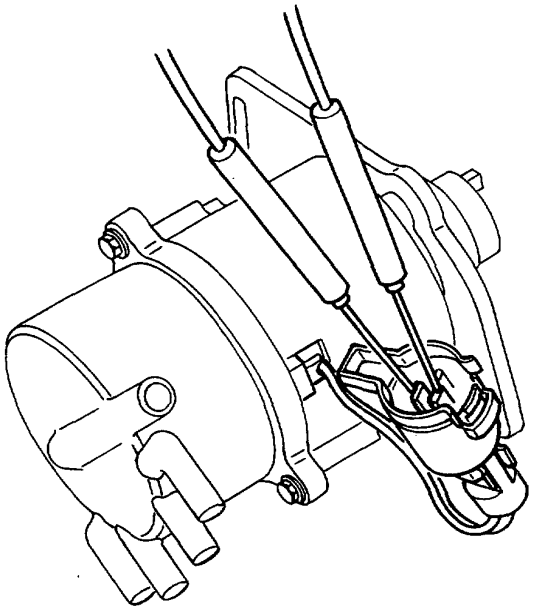


NOTE: When installing igniter, apply silicone grease to the connector jacks.

Pulse Generator Resistance

1. Disconnect coupler from distributor.
2. Connect ohmmeter probes across coupler terminals and measure resistance.

   Resistance: 600—800 ohms at 20°C (70°F)

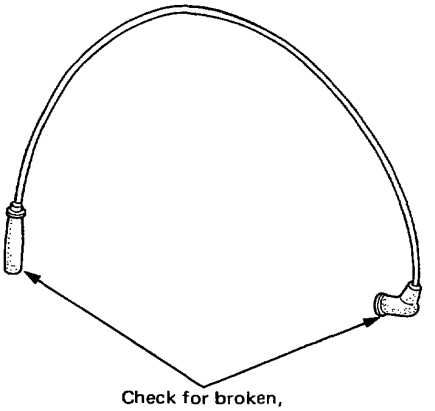


Replace pulse generator if resistance reading is outside limits.

Ignition Wire Inspection

CAUTION: Carefully remove ignition wires by pulling on rubber boot. Do not bend wire, or conductor may be broken.

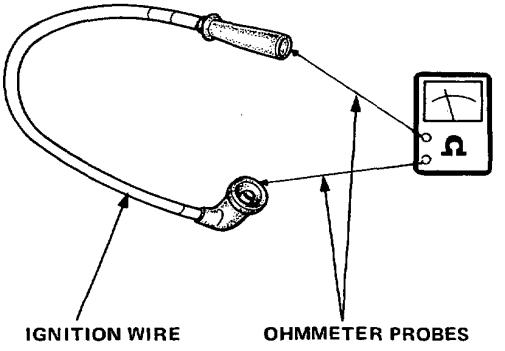
1. Check condition of wire terminals. If any terminal is corroded, clean it, and if it is broken or distorted, replace wire.



Check for broken, corroded, or bent terminals.

2. Connect ohmmeter probes and measure resistance.

   Ignition Wire Resistance: 25,000 ohms maximum.



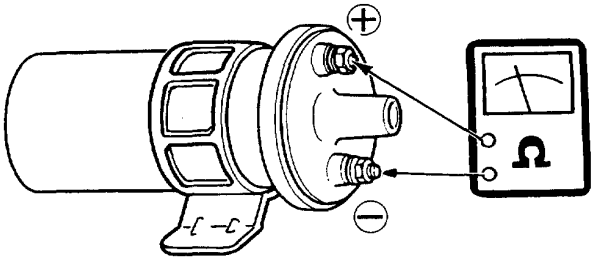
If resistance exceeds 25,000 ohms, replace ignition wire.

Ignition

Ignition Coil Resistance

1. With ignition switch OFF, connect ohmmeter probes across the positive and negative primary winding terminals of the ignition coil, and measure the resistance.

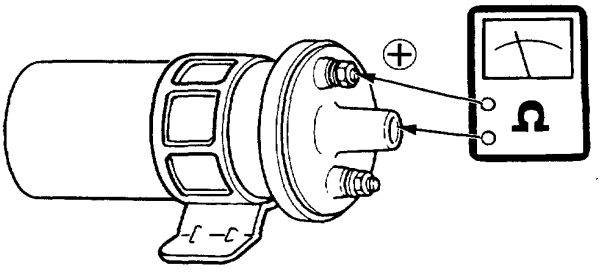
   Primary Winding Resistance:
   Canadian model:
   1.06 to 1.24 ohms at 20°C (68°F)
   Other models:
   1.78 to 2.08 ohms at 20°C (68°F)



   NOTE: Resistance will vary with coil temperature.

2. Turn ignition switch OFF. Connect ohmmeter probes to secondary winding terminal and primary winding positive terminal, and measure resistance.

   Secondary Winding Resistance:
   Canadian model:
   7,400 to 11,000 ohms at 20°C (68°F)
   Other models:
   8,800 to 13,200 ohms at 20°C (68°F)

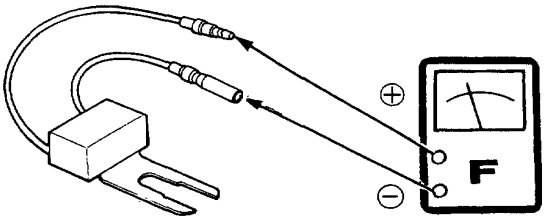


NOTE: Resistance will vary with coil temperature. Replace coil if resistance reading is outside limits.

Radio Condenser Capacity Test

Use a commercially available condenser tester.

Condenser Capacity:
0.47 ± 0.09 microfarads (μF)

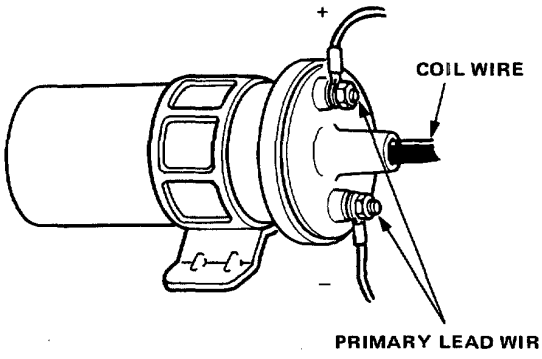


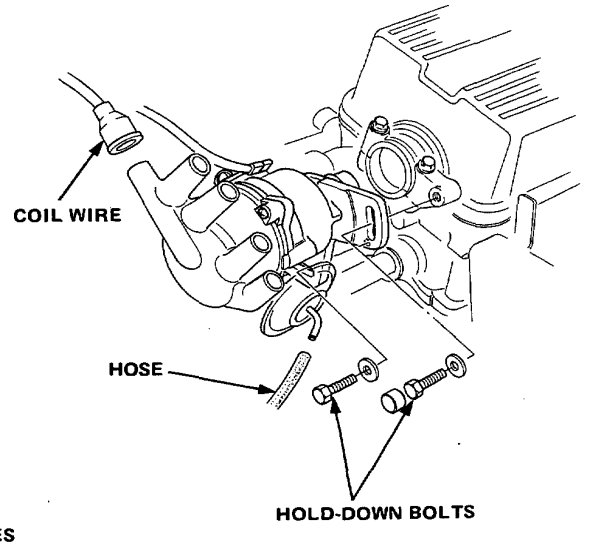
NOTE: The radio condenser is intended to reduce ignition noise; however, condenser failure may cause the engine to stop running.

Distributor Removal

Canadian model

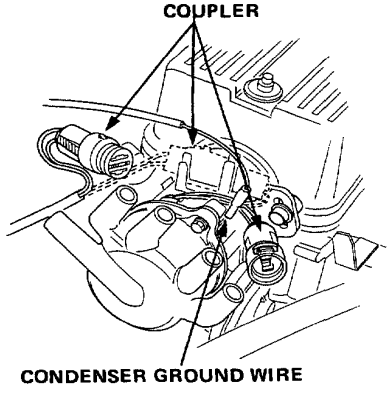
1. Disconnect the spark plug wires.
2. Disconnect the hose from the advance diaphragm.
3. Disconnect the coil wire and the primary lead wires from the ignition coil.
4. Remove the distributor hold-down bolts, and remove the distributor from the cylinder head.

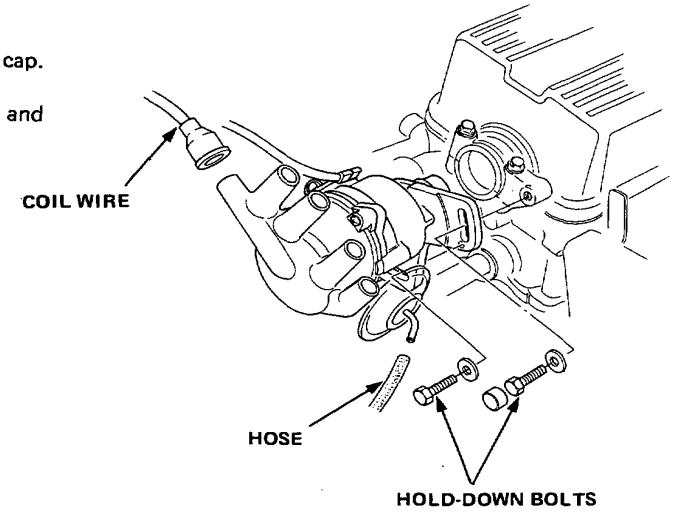




Other models

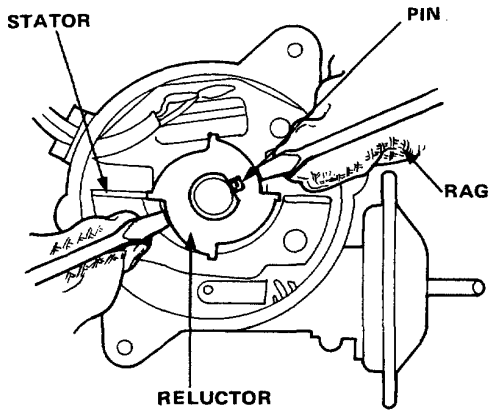
1. Disconnect the spark plug wires.
2. Disconnect the hose from the advance diaphragm.
3. Disconnect the condenser ground wire connector and distributor coupler.
4. Disconnect the coil wire from the distributor cap.
5. Remove the distributor hold-down bolts, and remove the distributor from the cylinder head.





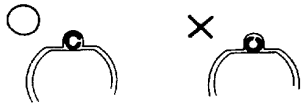
Reluctor Replacement

1. Carefully pry up reluctor by using two screwdrivers as shown. Do not damage reluctor and stator.



2. When installing reluctor, be sure to drive in pin with its gap away from shaft.

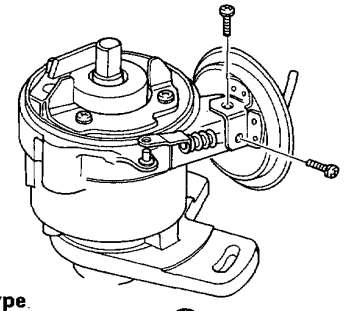
NOTE: Be careful to insert the pin in the proper direction.



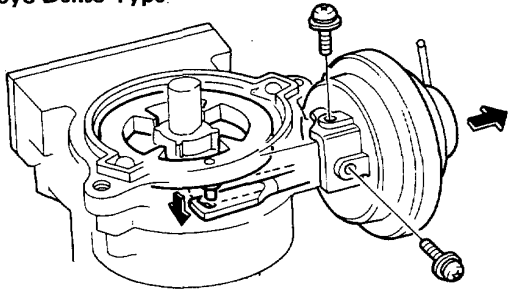
Advance Diaphragm Removal

1. Remove the advance diaphragm mount screws.
2. Disconnect the diaphragm arm, then pull diaphragm out of distributor.

Hitachi Type



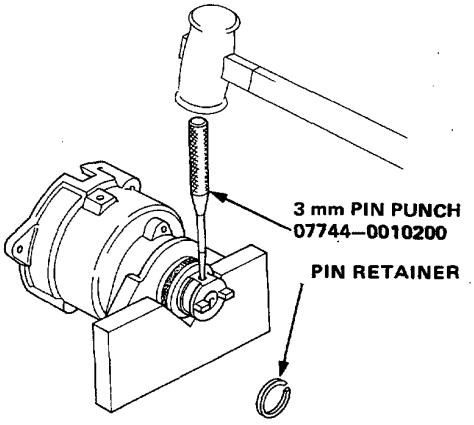
Toyo Denso Type



Distributor Shaft Removal/Installation

Removal

1. Slide off the spring, being careful not to stretch it.
2. Drive out roll pin as shown.

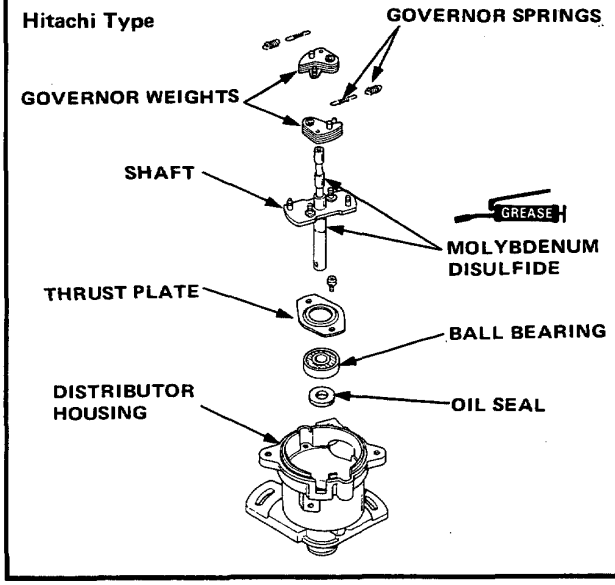


3. Remove shaft and gear from housing and replace parts as necessary.

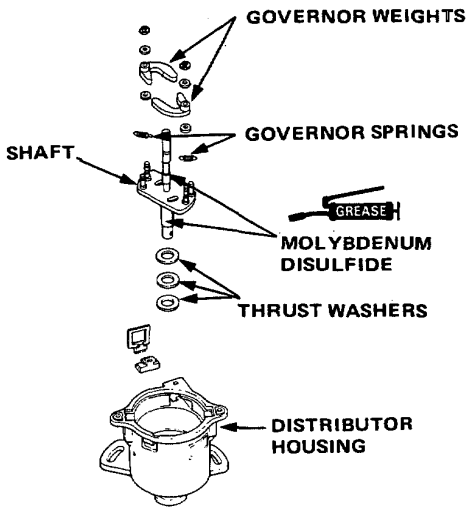
Installation

1. Hold the ball bearing and the thrust plate in the distributor housing, and install the governor weights on the shaft (For Hitachi type).
   Install the governor weights and three washers on the shaft (For Toyo Denso type).
2. Grease shaft and install it in distributor housing.

Hitachi Type

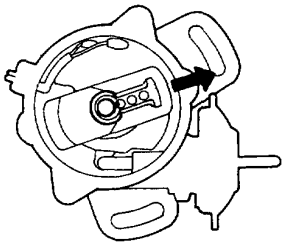


Toyo Denso Type

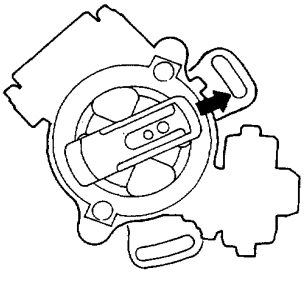


3. Install the rotor, then turn it so that it faces in the direction shown (forward No. 1 cylinder).

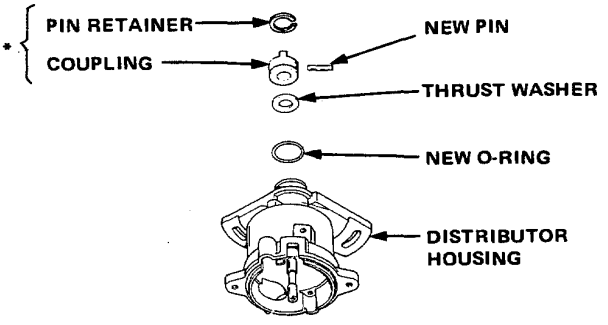
Hitachi Type



Toyo Denso Type



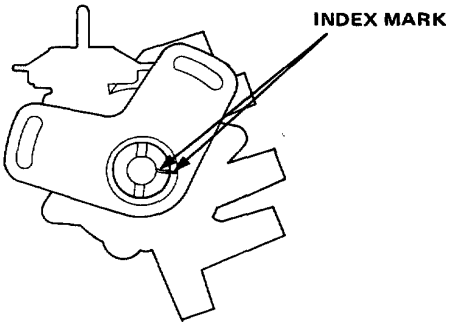
4. Turn the distributor upside down and install the thrust washer and coupling on the shaft and a new O-ring on the housing



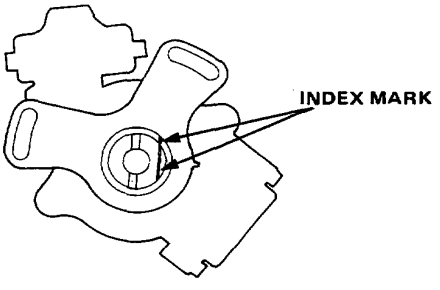
* Install in step 5.

5. Check that the rotor is still pointing toward No. 1 cylinder, then align the index mark on the housing with the index mark on the coupling.
Now, drive in the new pin and secure it with the pin retainer.

Hitachi Type



Toyo Denso Type

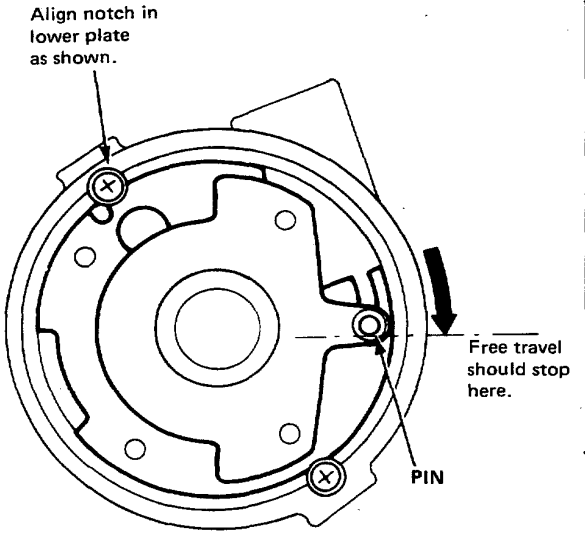


Ignition

Breaker Plate Installation

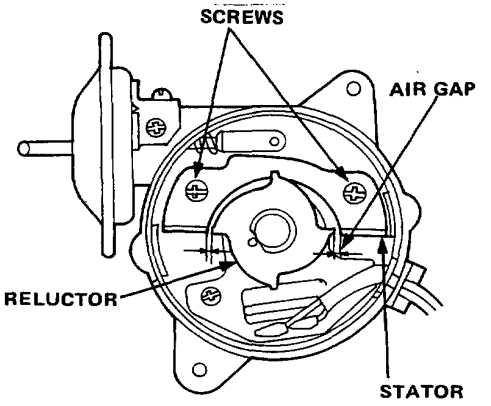
On Hitachi Type:

1. Align breaker plate in distributor housing as shown before tightening hold-down screws.
2. Check that upper plate moves freely. Be sure the diaphragm arm attachment pin does not rotate past the end of the slot in the lower plate. If it does, adjust the range of free travel by forcibly rotating the plate past its limit in the opposite direction, then recheck.

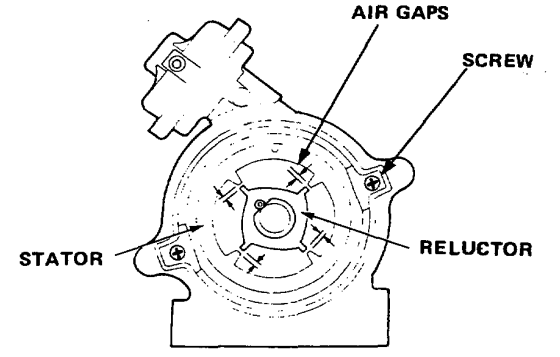


Distributor Top End Inspection

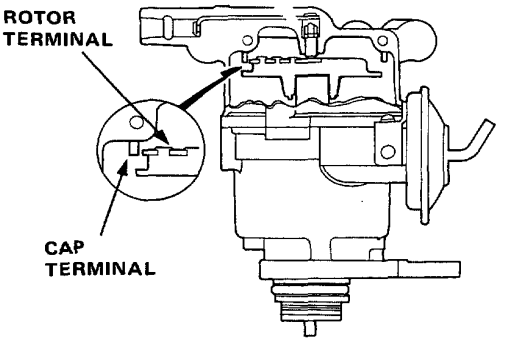
1. Check to be sure that the air gaps are equal.
2. Hitachi type only:
   If necessary, back off the screws and move stator as required to adjust.



3. Toyo Denso type only:
   If the air gaps are not to equal, check for damage to the stator or reluctor.



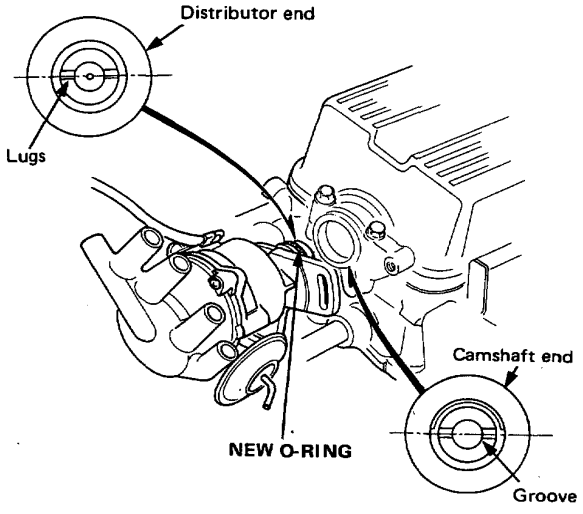
4. Check for rough or pitted rotor and cap terminals.
5. Scrape or file off carbon deposits.
   Smooth rotor terminal with an oil stone or No. 600 sandpaper if rough.
6. Apply a thin coat of silicone grease to the tip of the rotor.



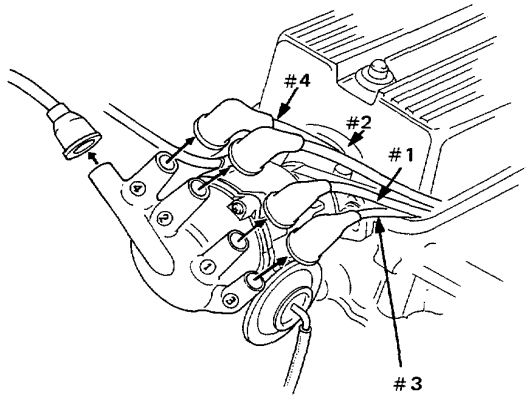
Installing Distributor in Cylinder Head

1. Install a new O-ring on the distributor housing.
2. Slip the distributor into position.

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



3. Install the adjusting bolts and tighten temporarily. Final tightening should be done after the timing has been adjusted.
4. Connect the plug wires as shown.



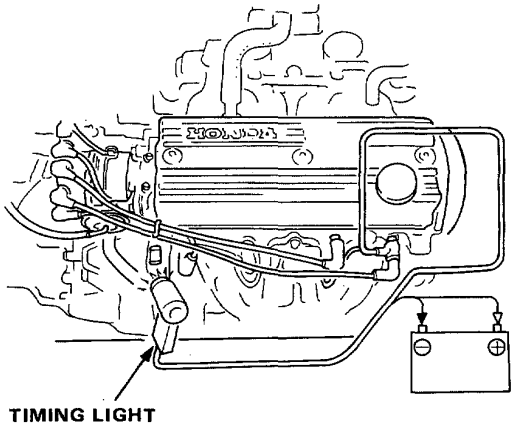
5. Set the timing with a timing light as shown on pages 26-17 and 18:

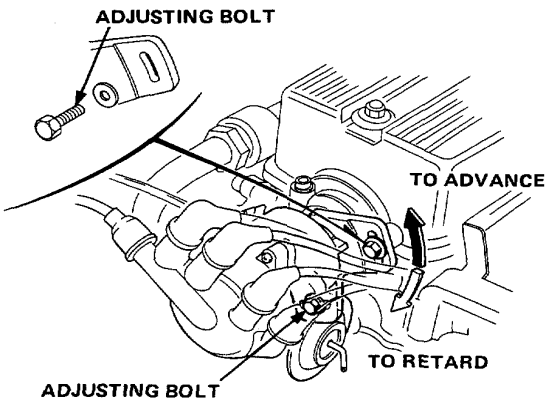
Ignition Timing

1. Warm up engine to normal operating temperature.
2. Connect timing light and tachometer.
3. Start the engine and allow to idle. Adjust idle speed if necessary.

   Manual (in neutral): 750 ± 50 min^{-1} (rpm)
   Automatic (in gear): 750 ± 50 min^{-1} (rpm)

4. Remove the rubber cap from inspection window of cylinder block and while engine idles, point timing light toward flywheel or drive plate.
5. Set timing according to the table on next page or by the under hood label.
6. Loosen distributor adjusting bolt, and turn distributor housing counterclockwise to advance timing or clockwise to retard timing.
7. Tighten adjusting bolts.
8. Recheck the timing.



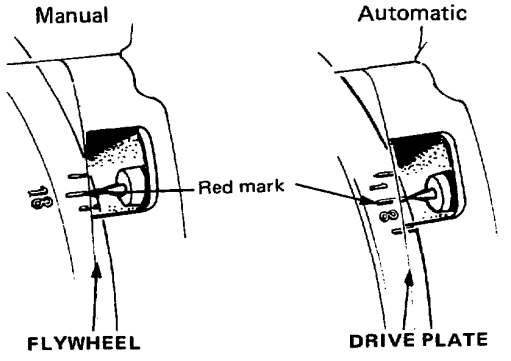


(cont'd)

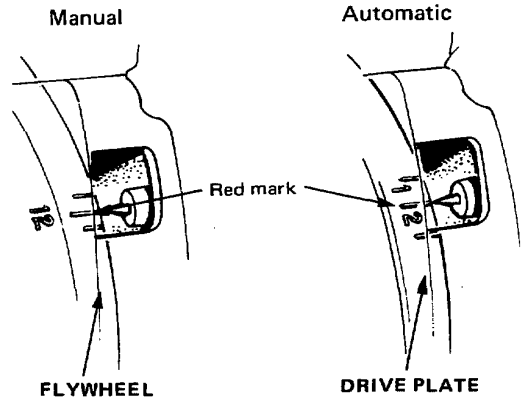
Ignition Timing (cont'd)

Ignition Timing:

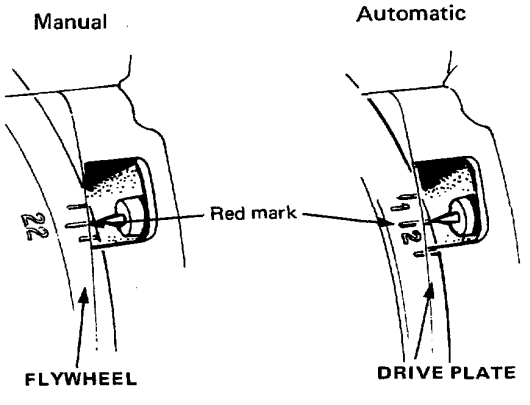
- **KE, KF, KG, KB, KW, KY models**
  Manual: 18 ± 2° BTDC (Red) in neutral
  Automatic: 18 ± 2° BTDC (Red) in gear



- **KS, KQ, KX, KT models**
  Manual: 12 ± 2° BTDC (Red) in neutral
  Automatic: 12 ± 2° BTDC (Red) in gear

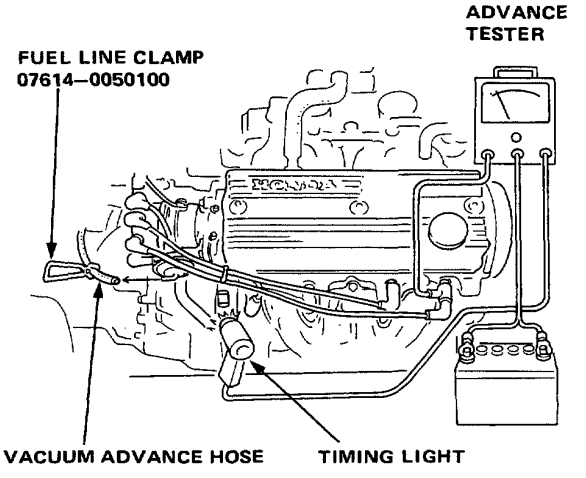


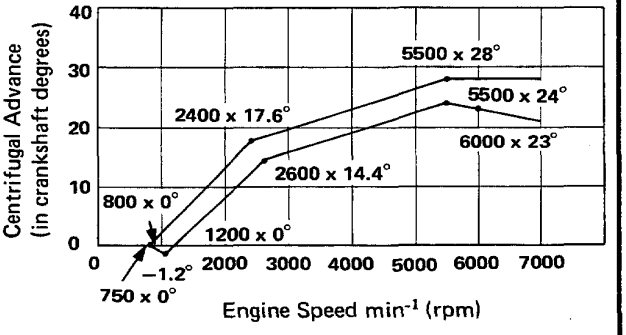
- **KC model**
  Manual: 22 ± 2° BTDC (Red) in neutral
  Automatic: 12 ± 2° BTDC (Red) in gear



Centrifugal Advance Inspection

1. Disconnect vacuum advance hoses from distributor, and pinch end of hose using fuel line clamp, 07614–0050100.
2. Connect timing light and start engine.
3. Increase rpm. Timing mark (T) should appear to move past the pointer toward the firewall, indicating an increase in ignition advance. If not, check centrifugal advance mechanism for sticking or binding.

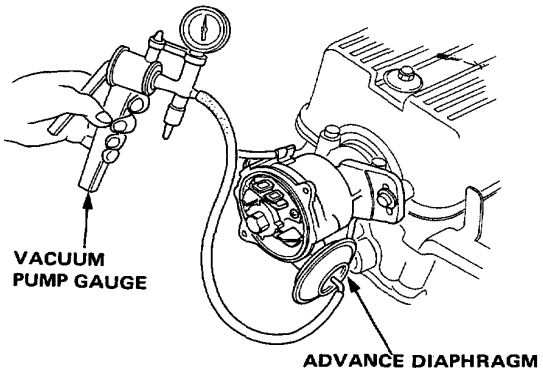




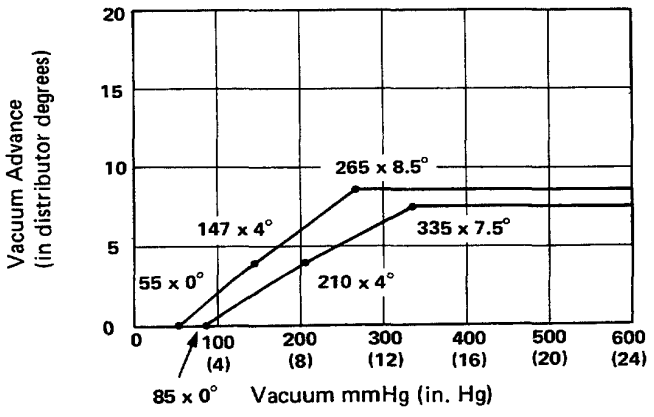
Vacuum Advance Inspection

1. Remove distributor cap.
2. Disconnect vacuum hose from distributor advance diaphragm.
3. Connect vacuum pump to the diaphragm and gradually draw a vacuum while watching breaker plate movement. Check for smooth operation with no evidence of binding.

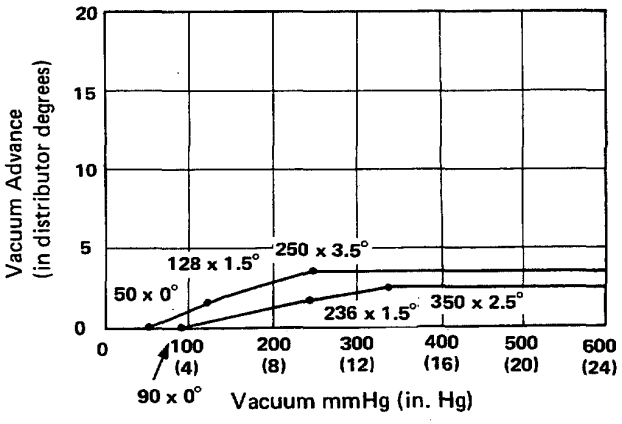
   NOTE: If vacuum pump gauge indicates a loss of vacuum, diaphragm is defective.
4. Turn breaker plate right and left to check for freedom of movement.
5. If inspections 1 – 4 reveal no abnormality, check the vacuum from the vacuum hose.



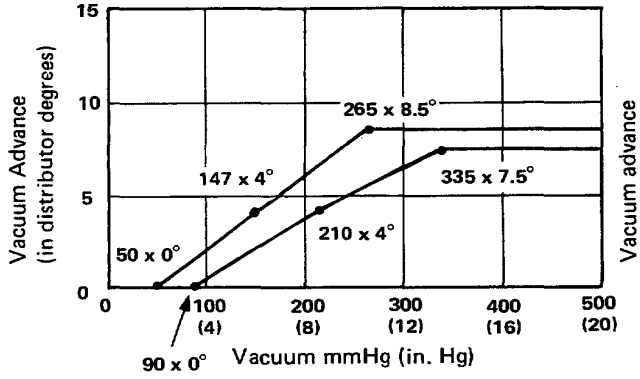
KC model Manual Transmission Cars
(HITACHI: D4R82-23)



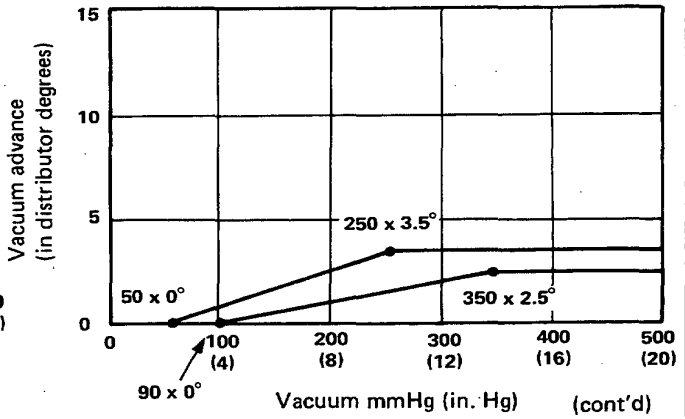
KC model Automatic Cars
(HITACHI: D4R82-26)



KC model Manual Transmission Cars
(TOYO: TD-06H)



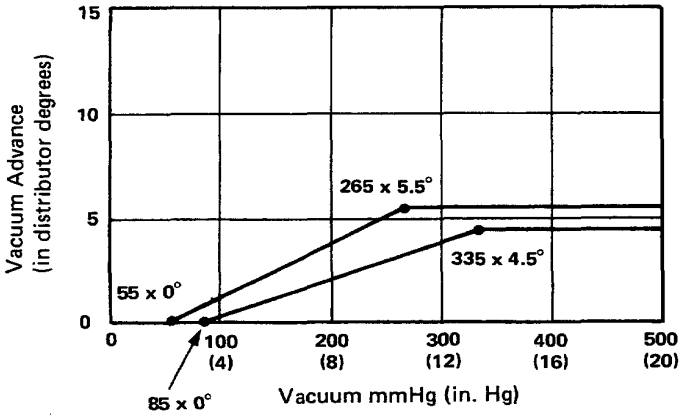
KC model Automatic Cars
(TOYO: TD-07H)



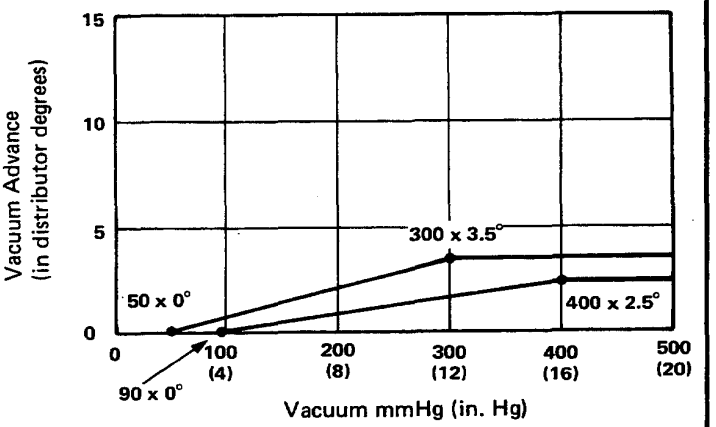
(cont'd)

Vacuum Advance Inspection (cont'd)

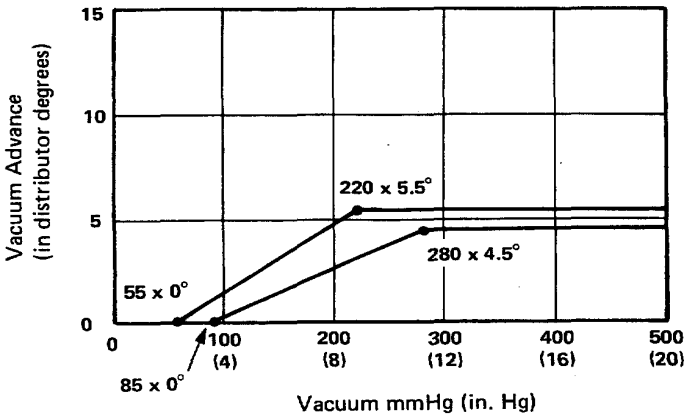
KE, KF, KG, KB, KW, KY models
Manual Transmission Cars,
and KY model Automatic Cars
(TOYO: TD-01G)



KS, KQ, KX, KT models
Manual Transmission Cars,
and Automatic Cars
(TOYO TD-05G)



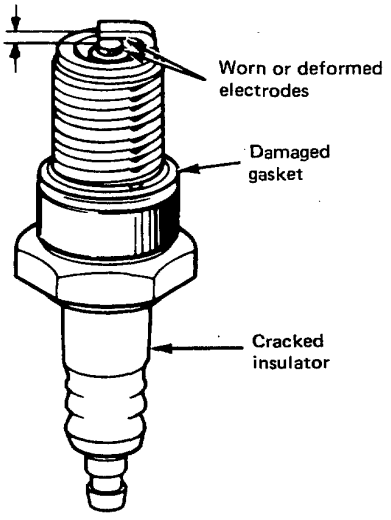
KE, KF, KG, KB, KW models
Automatic Cars
(TOYO: TD-02G)



Spark Plug Inspection

1. Inspect electrodes and ceramic insulator for:

- Improper gap
- Oil-fouling
- Carbon deposits
- Cracked center electrode insulator



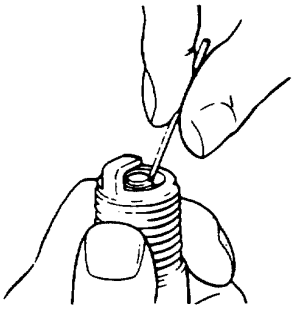
Burned or worn electrodes may be caused by:

- Lean fuel mixture
- Advanced ignition timing
- Loose spark plug
- Incorrect heat range plug

Fouled plug may be caused by:

- Rich fuel mixture
- Retarded ignition timing
- Oil in combustion chamber
- Incorrect spark plug gap

2. Clean electrodes in spark plug cleaning machine, or with a wire brush. Clean between outer shell and center insulator with stiff wire as shown. Clean plug threads with a wire brush.



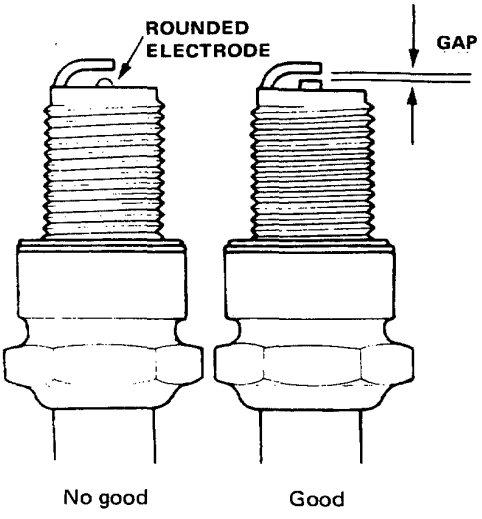
3. Replace plug if center electrode is rounded as shown.

4. Adjust gap with suitable gapping tool.

Model	Standard Plug	Gap
Canada	NGK BPR6EY-11 ND W20EXR-U11	③
Europe	NGK BPR6EY, *BPR5EY, *BPR7EY	①
	NGK BPR6ES, *BPR5ES, *BPR7ES	②
	ND W20EXR-U, *W16EXR-U, *W22EXR-U, W20EPR-U, *W16EPR-U, *W22EPR-U	
Others	NGK BP6EY, *BP5EY, *BP7EY	①
	NGK BP6ES, *BP5ES, *BP7ES	②
	ND W20EX-U, *W16EX-U, *W22EX-U, W20EP-U, *W16EP-U, *W22EP-U	

*Optional Plug

① 0.8–0.9 mm (0.031–0.035 in.)
② 0.7–0.8 mm (0.028–0.031 in.)
③ 1.0–1.1 mm (0.039–0.043 in.)



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

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

MEMO

Charging

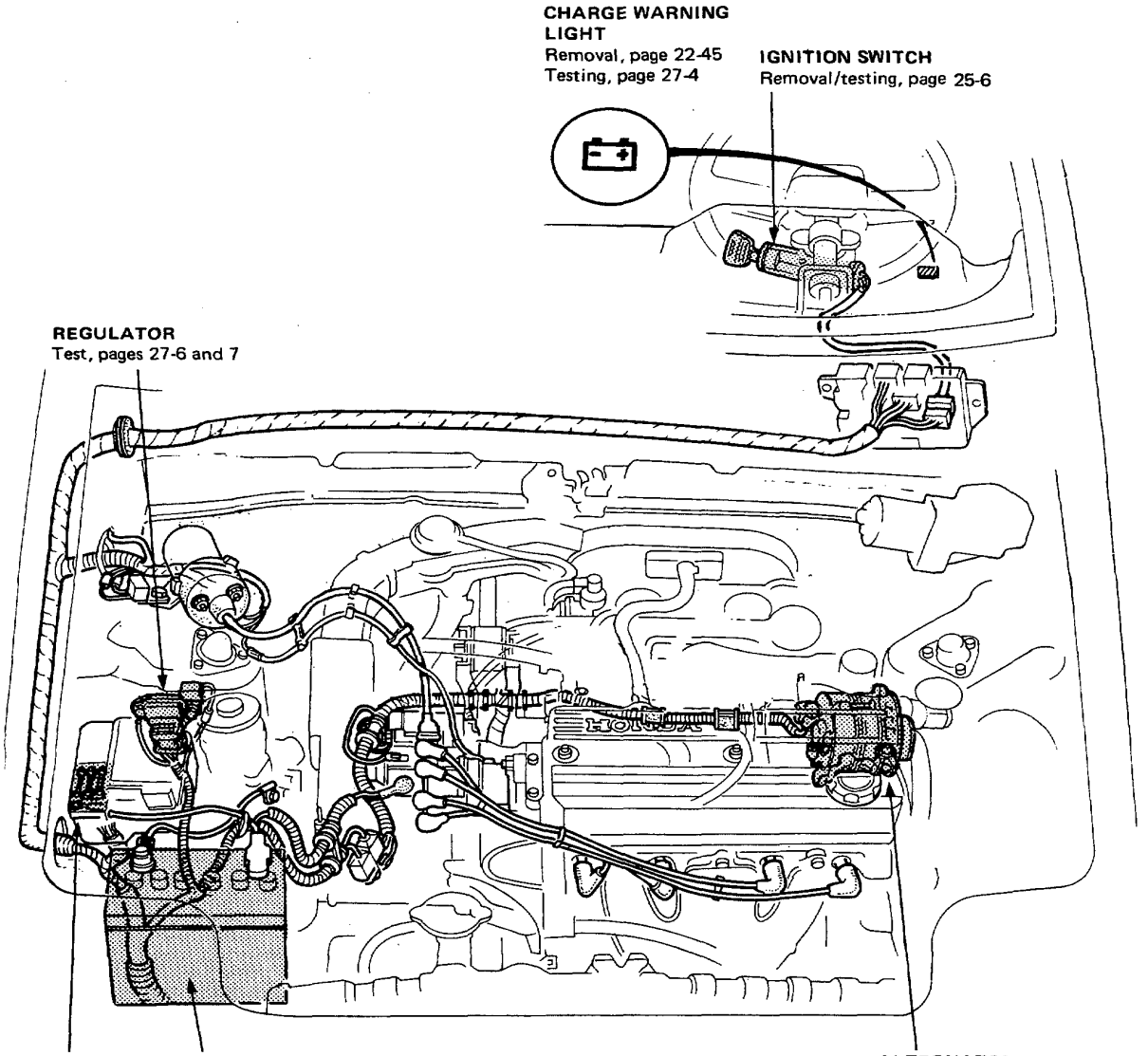
Illustrated Index 27-2
Troubleshooting Precaution 27-3
Wiring Diagram.....27-3
Specifications.....27-4
Battery Inspection and Charging .27-5
Voltage Regulator Inspection 27-6
Alternator Output Test 27-8
Alternator Overhaul 27-9
Alternator Replacement 27-10



Charging

— Illustrated Index

The battery charging system consists of an alternator and a regulator. As the rotor turns within the stator, 3-phase alternating current is induced in the stator coils. This alternating current is full wave rectified (converted to DC current) by six silicon diodes (rectifiers) built into the end frame. The regulator limits current flowing to the field coil to keep alternator output constant.



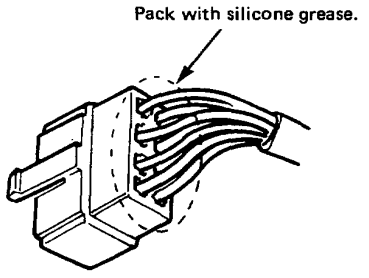
Troubleshooting Precautions

Before Troubleshooting:

1. Check main fuse and fuse box for blown fuses.
2. Make sure battery posts and terminals are clean and tight.
3. Check battery for damage.
4. Check battery state of charge.
5. Check alternator belt for proper tension.
6. Check that connectors in the defective circuit are clean, properly connected, and that a pin or receptacle is not loose in a connector housing.

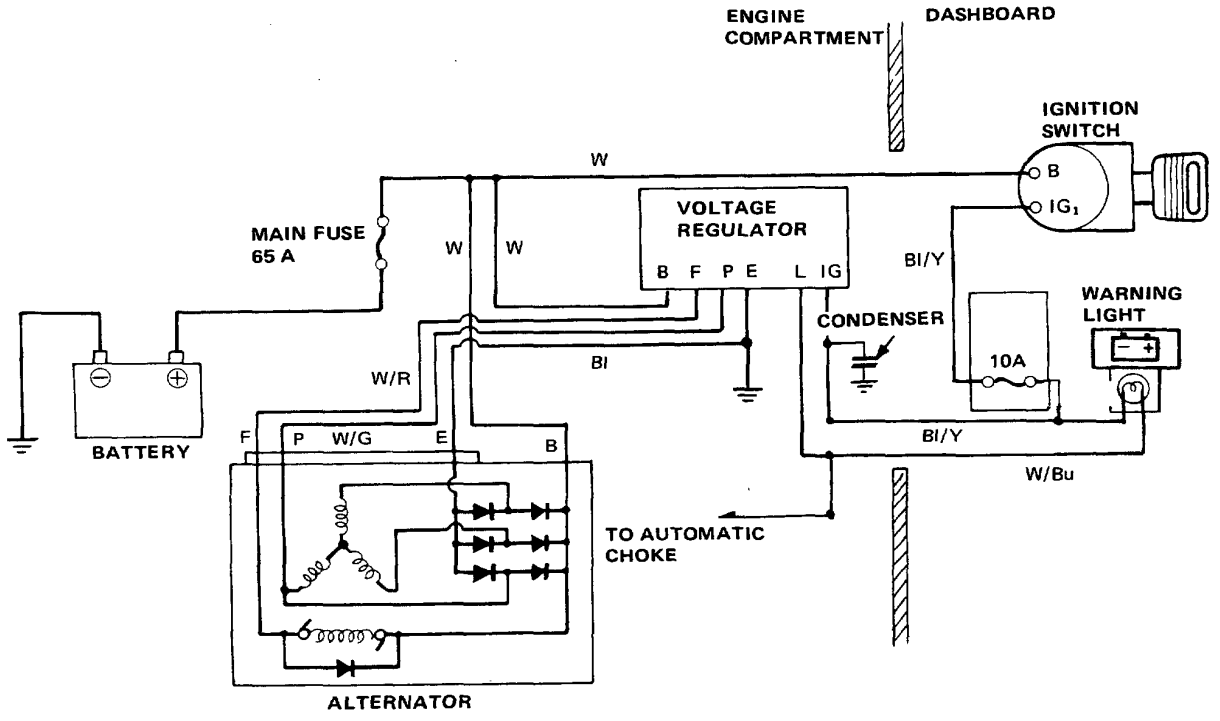
CAUTION:

- **Do not quick-charge a battery unless the battery ground strap has been disconnected, or you will damage the alternator diodes.**
- **Do not attempt to crank the engine with the ground strap disconnected ro you will severely damage the wiring.**
- **Do not pull on wires when disconnecting connectors.**
- **When connecting a connector, push it until it clicks into place.**
- **Check to make sure that multi-pin connectors are packed with grease.**



- **When connecting battery terminals make sure they are clean and tightened securely.**

Wiring Diagram



Charging

Specifications

Battery:

Type	Model	Voltage and Output
NX100-S6G	KF, KG, KB, KS, KW, KX	12V–47AH
NS60S	KE	12V–45AH
N40	KT, KQ, KY	12V–40AH
55D20R-MF	KC	12V–50AH

Alternator:
Nominal output: 60A
Direction of rotation: Counterclockwise as viewed from pulley side.

Regulator
Type: IC
Regulated voltage: 14.1–14.8V

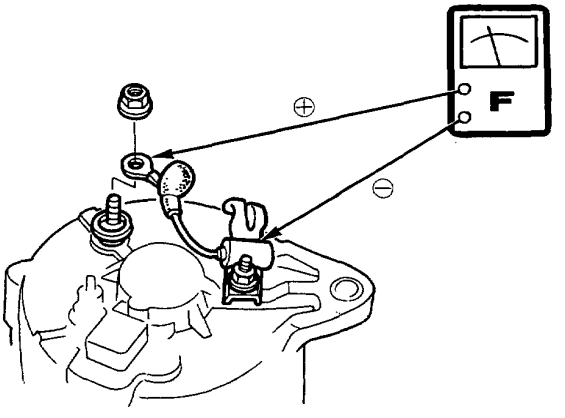
Charge Warning Light Test

NOTE: Before testing, check wire harness connections and alternator belt tension.

1. Turn ignition switch to on.
   Charge warning light should come on.
   If warning light does not come on:
   - Unplug voltage regulator connector and short pin of white/blue wire to ground.
   - If charge warning light does not come on, check fuse, connectors (voltage regulator, cabin-instrument wire harness and warning light panel) and related wires for open circuit. Check bulb, and replace if burned out.
   - If charge warning light comes on, regulator warning relay contacts are not completing circuit to ground. Replace voltage regulator and repeat test.
2. Start engine and let idle.
   Charge warning light should go off.
   - If light stays on all the time, or stays on at idle and goes off with an increase in engine speed, Check alternator neutral wire circuit, alternator output, and voltage regulator.

Condenser Capacity Check

Disconnect condenser terminal and short it out to any convenient ground to discharge remaining energy. Then, check for capacity, using a condenser tester.



Condenser capacity: 0.5 μF ± 0.1 μF

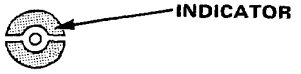
Battery Inspection and Charging

Inspection

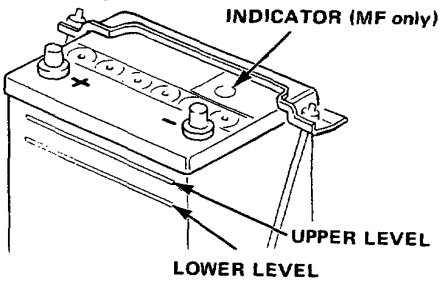
1. Check battery case for loose parts, cracked case or top. Inspect cells for sulfation. Replace if damaged or sulfated.

2. Check electrolyte level in each cell. If low, add distilled water to bring level to UPPER mark.

   NOTE: On cars equipped with a sealed battery, you can check the electrolyte level using the upper and lower marks on the case or by using the indicator. Add distilled water if the level drops to the lower mark or if the indicator is red.



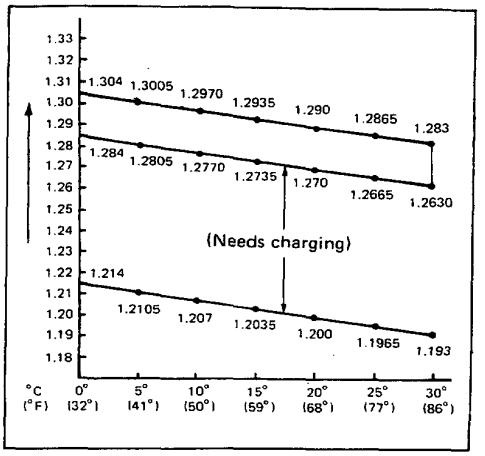
CAUTION: Battery electrolyte is a sulphuric acid solution. Do not allow it to contact painted surfaces, clothing or skin. If it does, rinse with water immediately to minimize the damage.
Do not overfill battery.



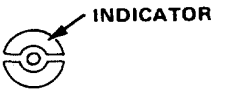
3. Check electrolyte specific gravity

   - Use a hydrometer and the correct specific gravity range for your temperature.
     - If the reading is at, or below, the "Needs charging" level, the battery must be charged.

Variation of Specific Gravity with Temperature



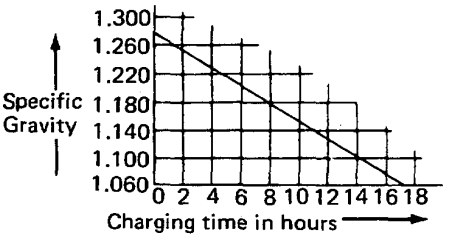
NOTE: On cars equipped with a sealed battery, check the specific gravity of the electrolyte by the indicator on top of the battery. Charge the battery if the indicator is white.



Charging

4. Charge at 10% of the ampere-hour rating until battery specific gravity is at least 1.250.

SLOW CHARGE PROCEDURE

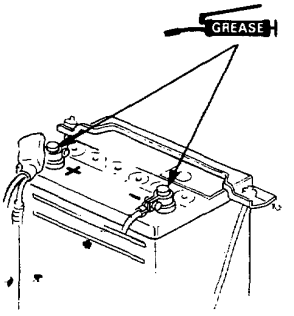


WARNING **Keep sparks, flames and cigarettes away while charging battery.**

5. Keep battery and terminals clean. If necessary, brush with backing-soda solution and flush with clean, lukewarm water. Check for loose terminal clamps.

6. If clamps become corroded inside, clean out with a wire brush or coarse emery cloth.

   NOTE: Coat terminals lightly with petroleum jelly to retard corrosion. Baking soda may be mixed with the jelly for additional protection against acid build-up.



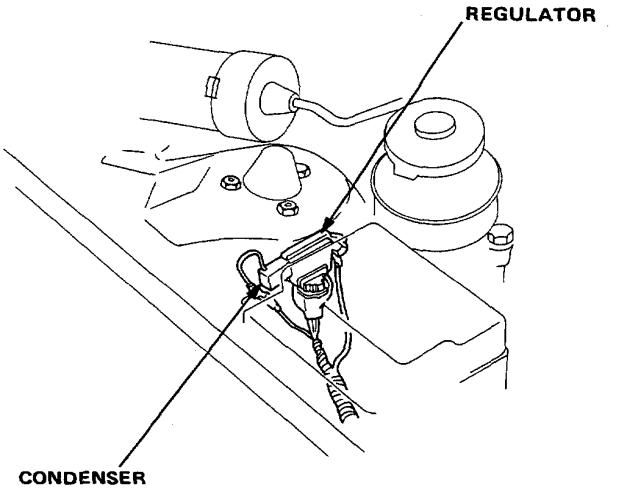
Charging

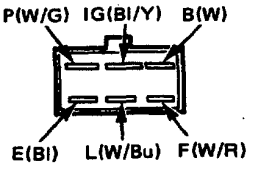
Voltage Regulator Inspection

< On the car >

1. Remove the regulator with the condenser.

   NOTE: Inspect the regulator with the 6-P coupler connected.





2. Measure voltages between the E (ground, black) and each terminal.

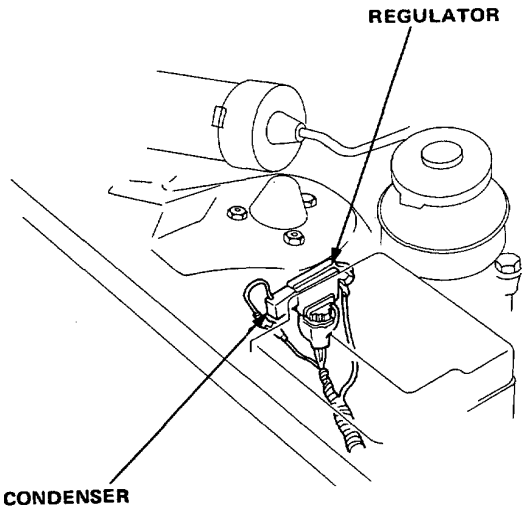
IG SW position / Terminal	OFF, ACC	ON (Engine stopped)	ON (Engine idling)	1000 rpm	2000 rpm	3000 rpm
B	Battery voltage	←	Charging voltage: 14.5–15.1V (13.8–14.4V at 60°C, 140°F)	←	←	←
IG	0V	Battery voltage	Charging voltage: 14.5–15.1V (13.8–14.4V at 60°C, 140°F)	←	←	←
P	0V	←	7.5V approx.	←	←	←
F	Battery voltage	9–11V	5–7.5V	9V approx.	11V approx.	12V approx.
L	0V	←	Charging voltage: 14.5–15.1V (13.8–14.4V at 60°C, 140°F)	←	←	←

3. Check for loose harness coupler, broken wires or blown fuse if the measurements do not fall within the limits shown above.

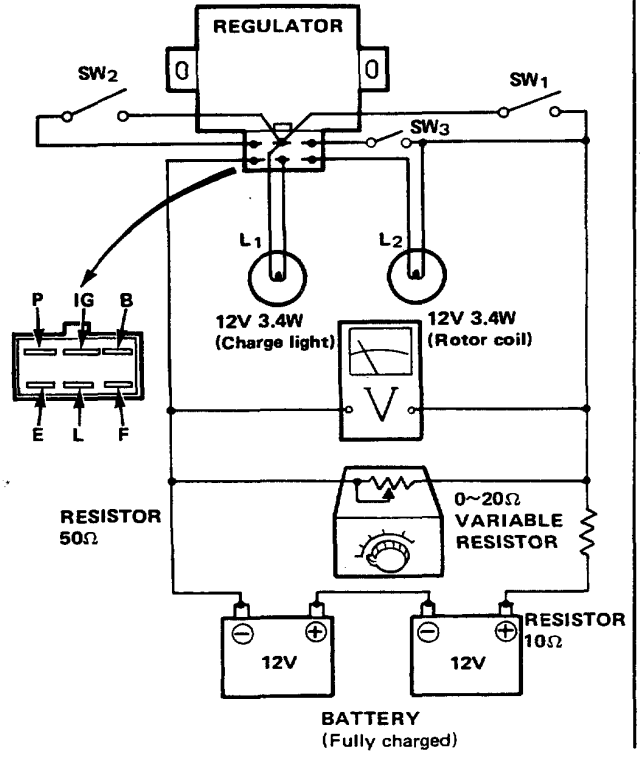
4. If the voltage at the terminal F is out of the specification, replace the IC regulator and re-test.

Voltage Regulator Inspection

1. Remove four relay box mounting bolts, and remove the regulator.



2. Hook up the regulator, battery, voltmeter, lights, switches and resistor as shown.



3. Turn the switches 1 and 2 OFF; adjust the voltage to 12V.

4. Turn the switch 1 ON, and switch 2 OFF with the switch 3 ON; adjust the voltage to 12V.

5. Turn the switch 1 ON, and switch 2 ON with the switch 3 ON; adjust the voltage to 12V.

6. Adjust the voltage to 16V with the switches 1 and 2 ON with the switch 3 ON.

7. For Nippon Denso Regulator: Adjust the voltage to 12V with the switches 1 and 2 ON with the switch 3 OFF.

The regulator is normal if it meets the following conditions in each test:

Test	Nippon Denso regulator	
	Lamp L_1	Lamp L_2
3	OFF	OFF
4	ON (Bright)	ON (Dim)
5	OFF	ON
6	OFF	OFF
7	ON	OFF

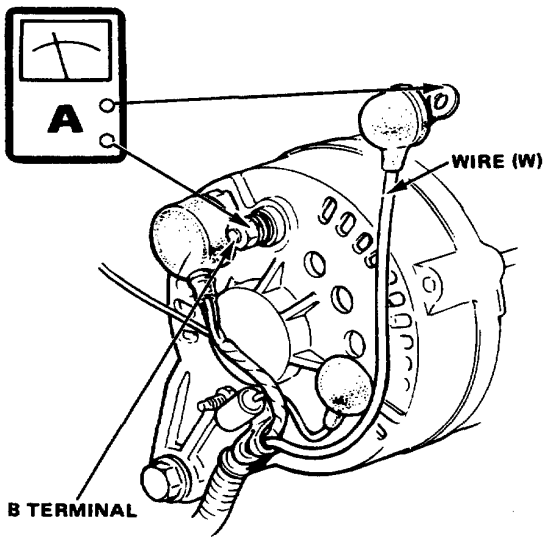
NOTE:

- Do not disturb the above sequence as the regulator will not function properly if the correct sequence is not observed.
- Perform the above tests quickly.
- As an alternate to the above test procedure, you may check for a failed regulator by temporarily installing a regulator you know is good. If the symptom that indicated regulator failure goes away, replace the failed unit.

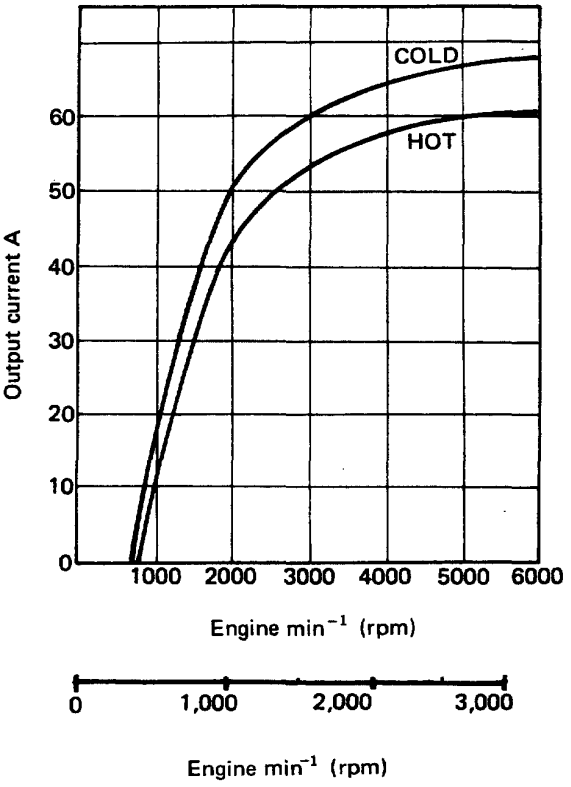
Charging

Alternator Output Test

1. With engine off, disonnect the alternator terminal (W).
2. Hook up an ammeter as shown.

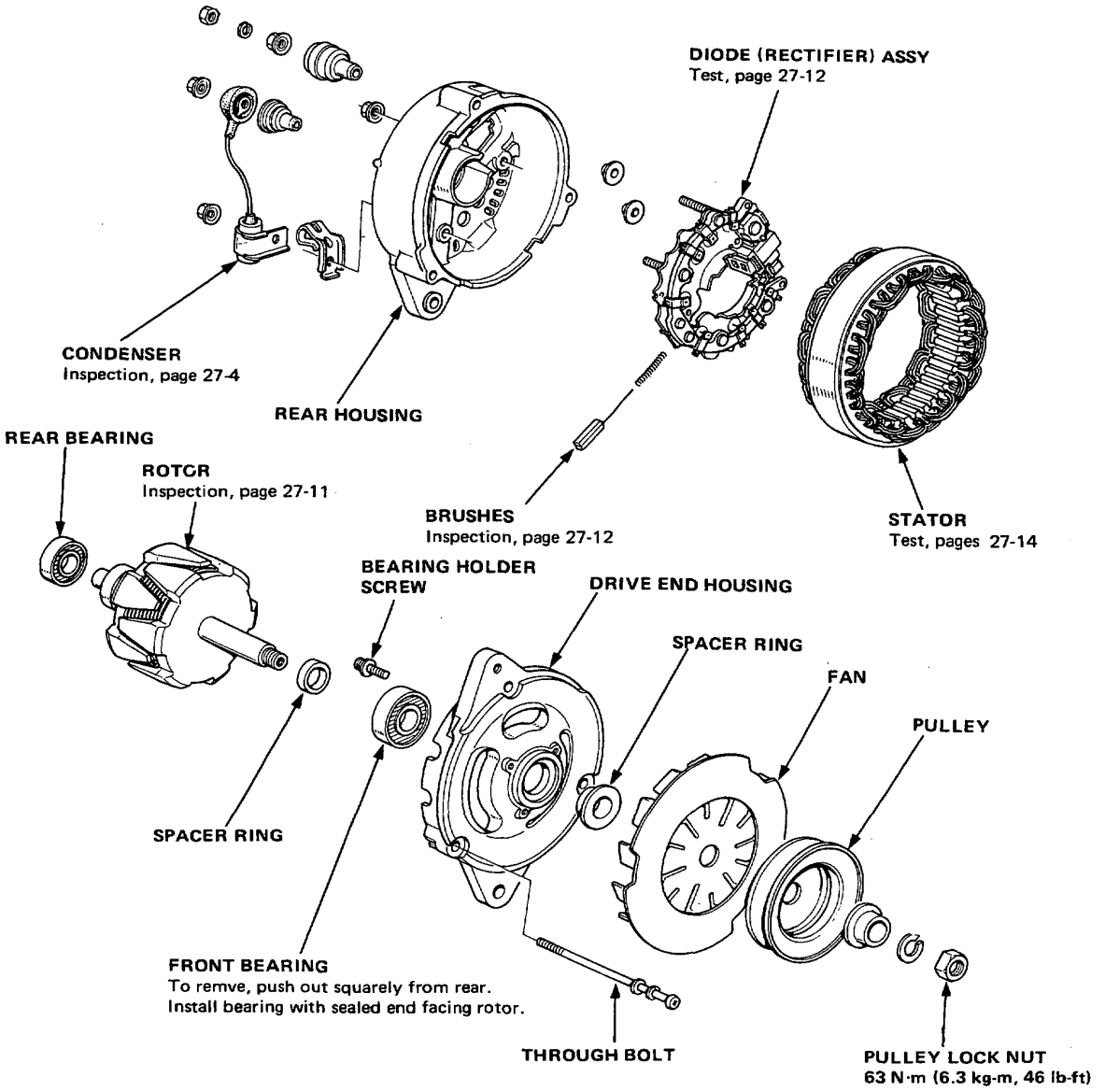


3. Start the engine.
4. Turn on.
   - Head light switch (high beam).
   - Rear window defroster switch.
   - Heater fan switch (HI).
5. Check alternator output.
   If within the output curve shown at right, the alternator is good.
   If the alternator has no output or its output is not within specification, see the alternator checks starting on page 27-11.



Alternator Overhaul

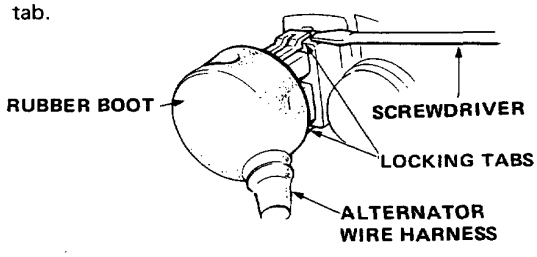
ALTERNATOR
Disassembly, page 27-11
Assembly, page 27-14



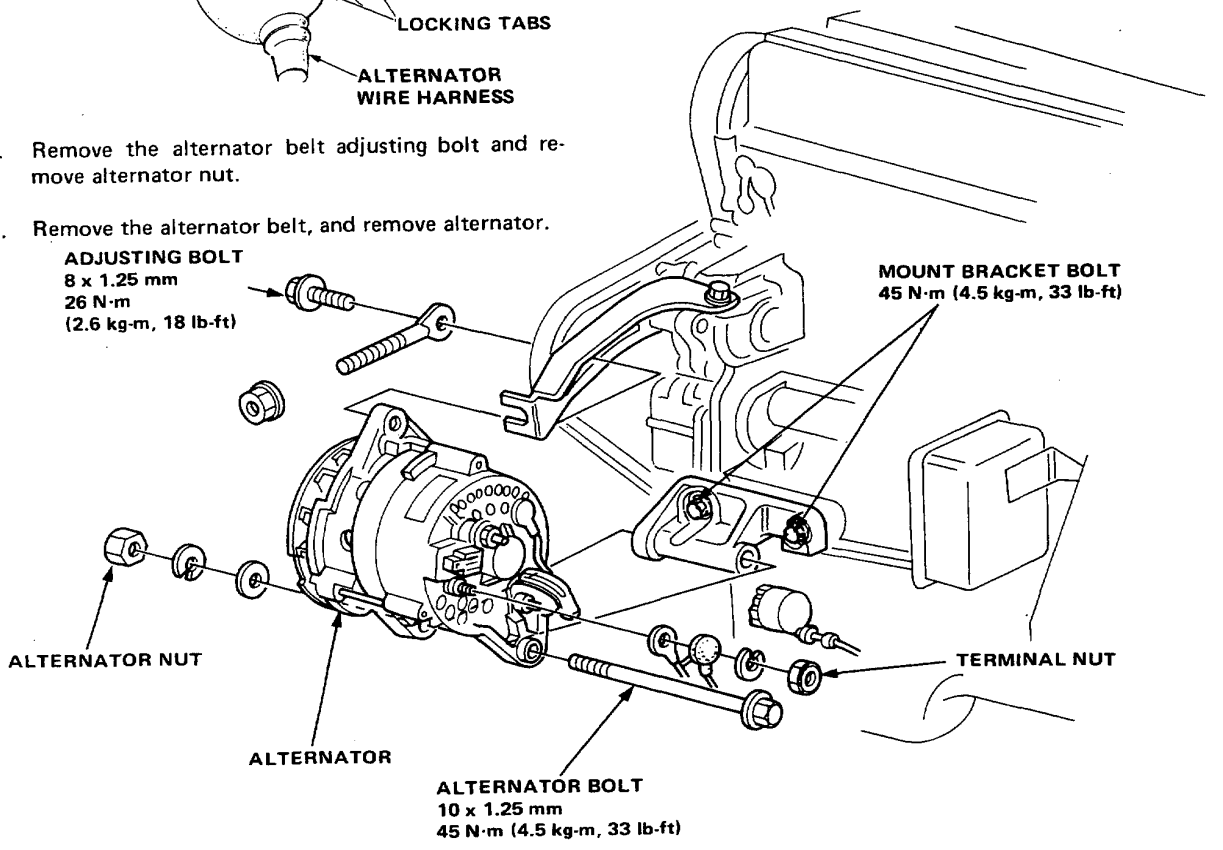
Charging

Alternator Replacement

1. Disconnect the ground cable from battery negative (−) post.
2. Remove the air cleaner assembly.
3. Disconnect the alternator wire harness connector by removing the locking tabs on both sides with the screwdriver and remove terminal nut.
4. Disconnect the coupler by prying up the locking tab.

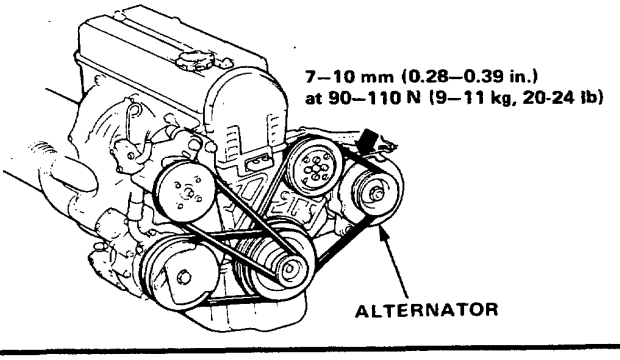


5. Remove the alternator belt adjusting bolt and remove alternator nut.
6. Remove the alternator belt, and remove alternator.



7. Install in reverse order of removal.
8. Adjust alternator belt tension after installing.

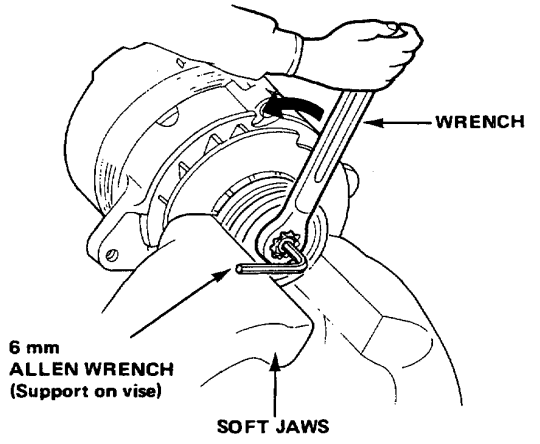
Used Belt Deflection: 7–10 mm (0.28–0.39 in.) at 90–110 N (9–11 kg, 20–24 lb)
New Belt Deflection: 6 mm (0.24 in) at 90–110 N (9–11 kg, 20–24 lb)



Alternator Disassembly

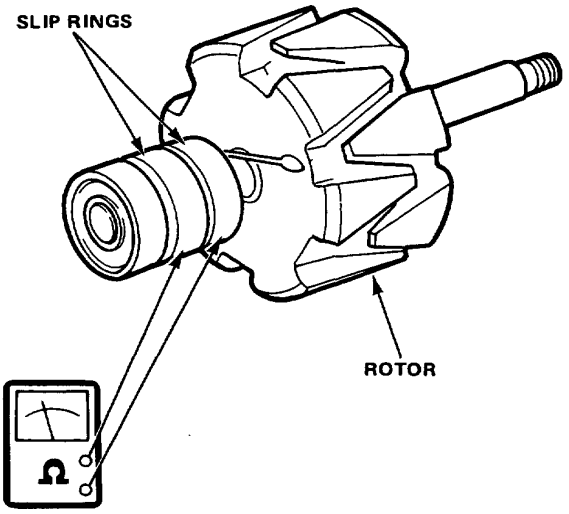
NOTE: Removing the pulley and fan is not necessary unless the front bearing must be replaced.

1. To remove pulley and fan, use a 6 mm allen wrench and a 21 mm box wrench to loosen pulley lock nut. Use impact wrench to remove nut if necessary.

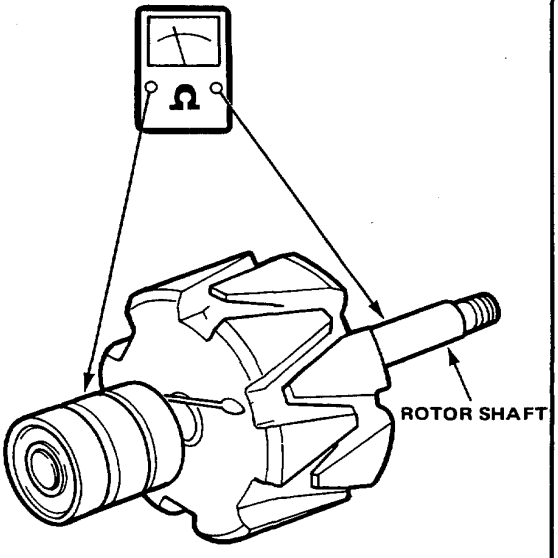


Rotor Slip Ring Check

1. Check that there is continuity between the slip rings.



2. Check that there is no continuity between the slip rings and the rotor or rotor shaft.



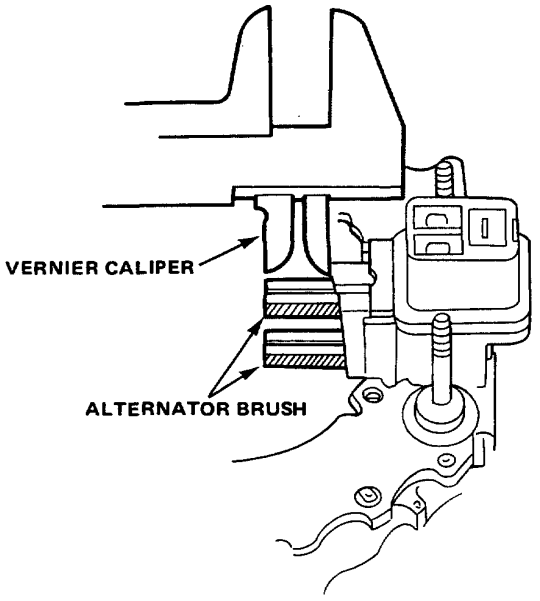
3. If the rotor fails either continuity check, replace it.

Charging

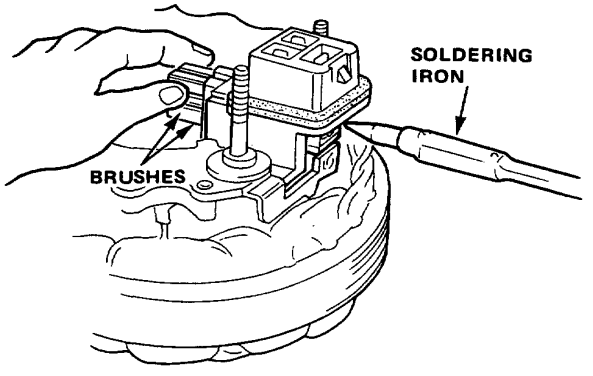
Alternator Brush Length Inspection

1. Measure length of brushes with a vernier caliper.

   Alternator Brush Length:
   Standard: 15.5 mm (0.61 in.)
   Service Limit: 5.3 mm (0.21 in.)



2. If brushes are not within service limit, replace them.



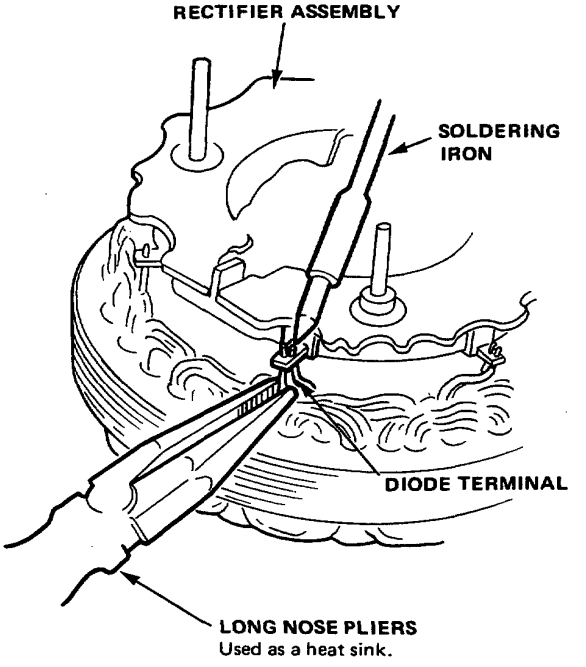
NOTE: When replacing the brushes, use only rosin core type solder or solder joints will corrode.

Rectifier/Stator Overhaul

NOTE: To test the rectifier or stator, you must separate them by unsoldering the connecting wires.

1. Unsolder wires from stator using as little heat as possible.

   CAUTION: Use only as much heat as required to melt solder. Diodes will be damaged by excessive heat.



2. Pull the stator leads from the diode terminals with long nose pliers as the solder melts. The pliers also act as a heat sink to protect the diodes.

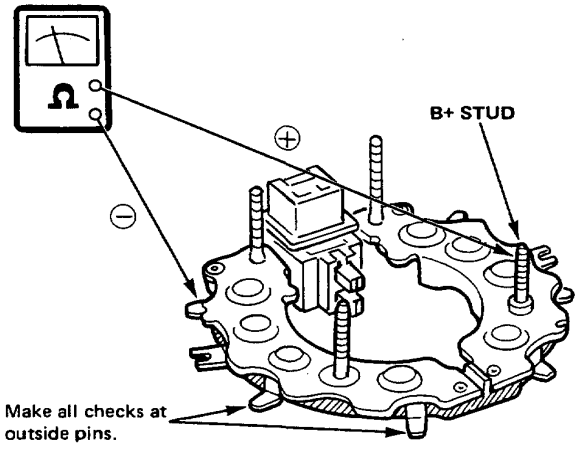
   NOTE: When re-soldering, be sure there is a good bond between each wire and terminal. Use only rosin core solder or solder joints will corrode.

Rectifier Testing

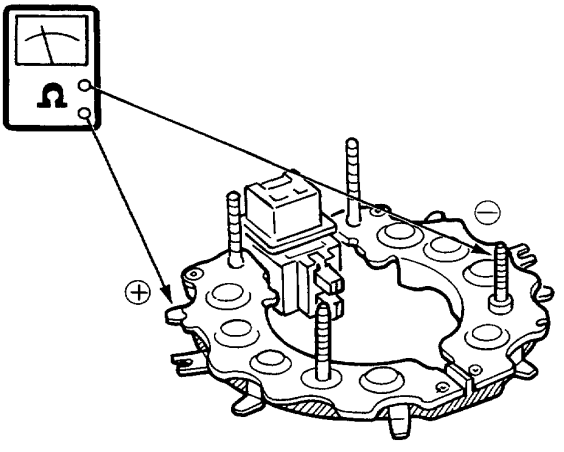
NOTE: Diodes are designed to pass current in one direction and block current in the opposite direction. Since the alternator rectifier is made up of six diodes (3 pairs), each diode must be tested for continuity in both directions – a total of 12 checks.

1. Using an ohmmeter or continuity tester (test light), check one diode from each pair, in both directions:

   - Connect POSITIVE test probe to B+ stud and NEGATIVE test probe to outside pin of each diode pair. Note readings.

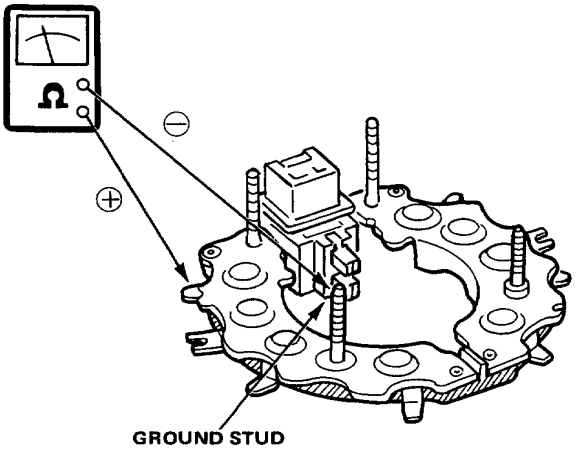


   - Reverse probe position and check diodes at outside pins again.

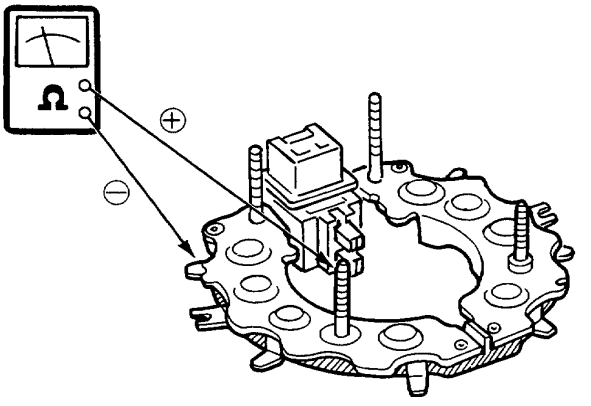


2. Check the other diode from each pair, in both directions:

   - Connect NEGATIVE test probe to ground stud and POSITIVE probe to outside pin of each diode pair.



   - Reverse probe positions and check diodes at outside pins again.



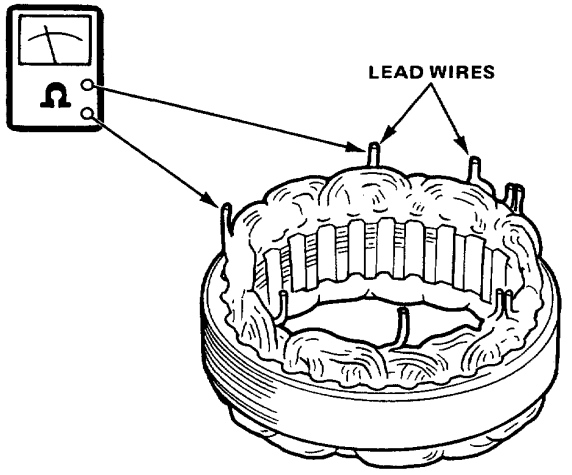
3. If any of the 12 checks shows continuity in both directions, or no continuity in both directions, the diode is defective and the rectifier assembly must be replaced. (Diodes are not available separately.)

(cont'd)

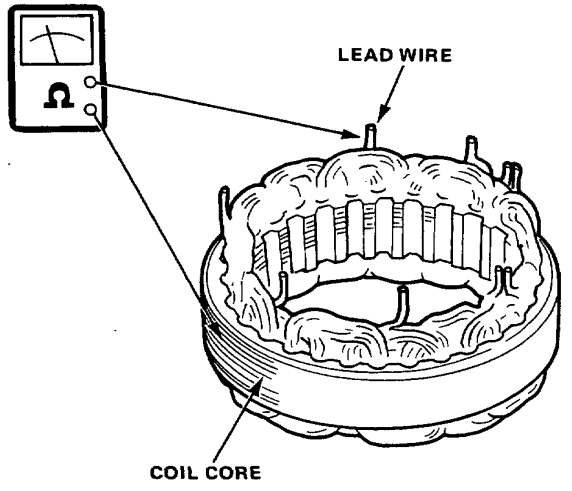
Rectifier/Stator Overhaul (cont'd)

Stator Testing

1. Check that there is continuity between each pair of lead wires.



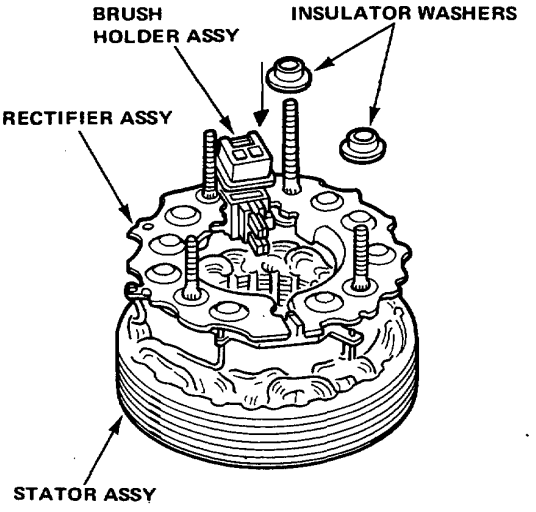
2. Check that there is no continuity between each lead wire and the coil core.



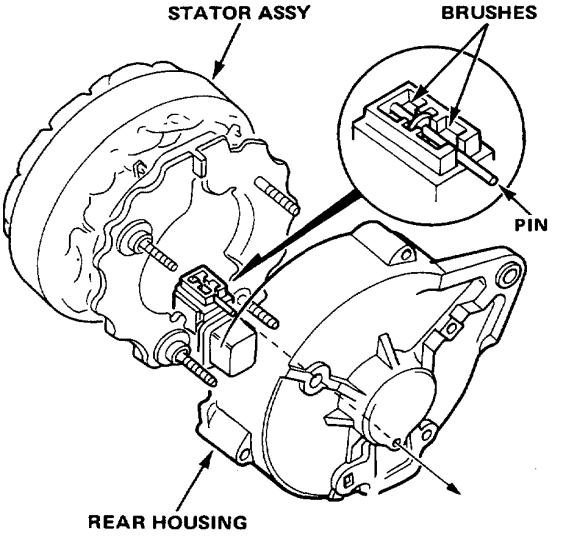
3. If the coil fails either continuity check, replace the stator.

Alternator Assembly

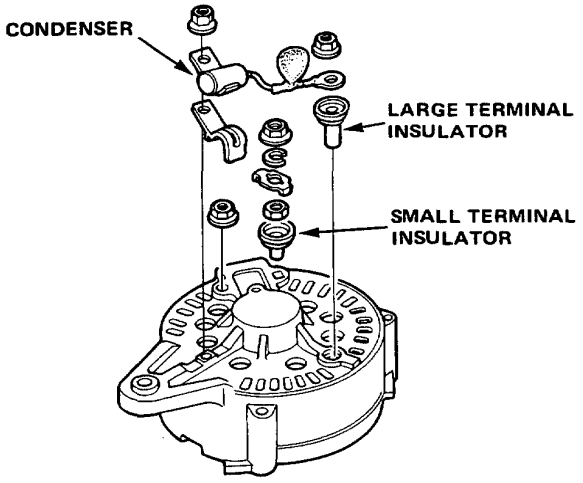
1. Assemble stator rectifier assembly as shown.



2. Push brushes down in holder and insert pin as shown to hold them in place. Apply grease to bearing holder, inside of rear housing.
Then assemble stator rectifier assembly and rear housing.

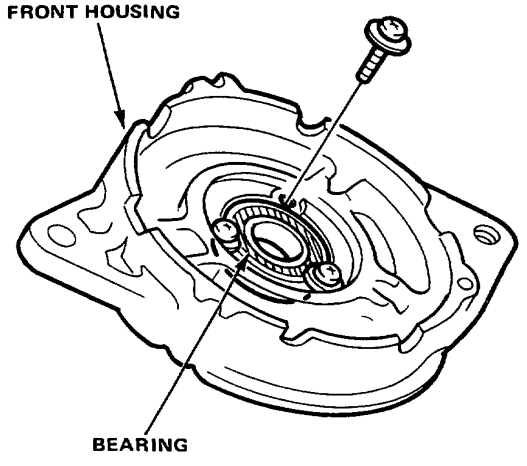


3. Install the condenser and the terminal insulators with flange nuts as shown.

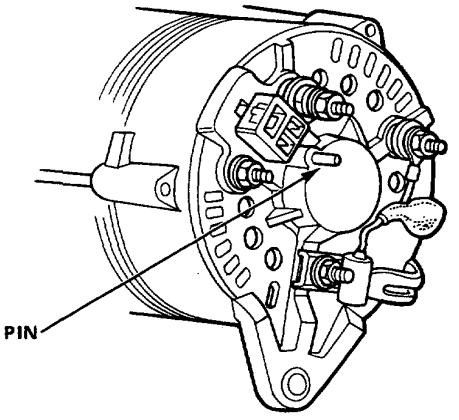


4. Install the sealed bearing in the front housing with the sealed end facing the rotor.

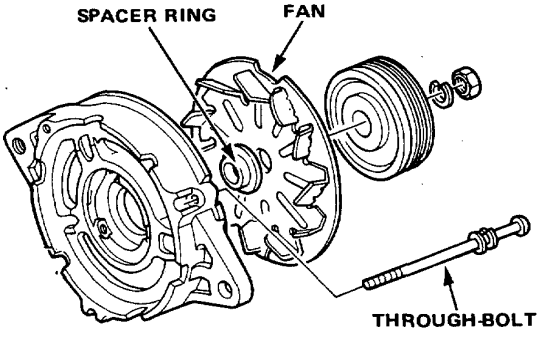
5. Install three 5 x 15 mm screws to retain bearing.



6. Install rotor assembly in rear housing.
Remove the pin that is holding the brushes and plug the hole of rear housing with putty.

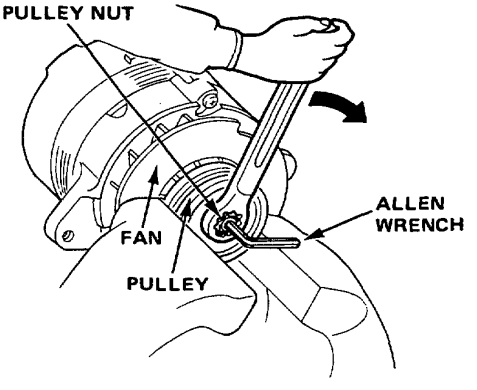


7. Assemble front and rear sections of alternator with through bolts.



8. Rotate shaft by hand to see if rotor turns freely without binding.

9. Install fan and pulley and tighten nut to approximately 63 N·m (6.3 kg-m, 46 lb-ft).



MEMO

Starting

Illustrated Index 28-2
Troubleshooting Precautions 28-4
Wiring Diagram 28-4
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Troubleshooting. 28-6
Solenoid Check 28-8
Starter Removal/Installation 28-8
Starter Disassembly. 28-9
Starter Check. 28-9
Starter Reassembly 28-13

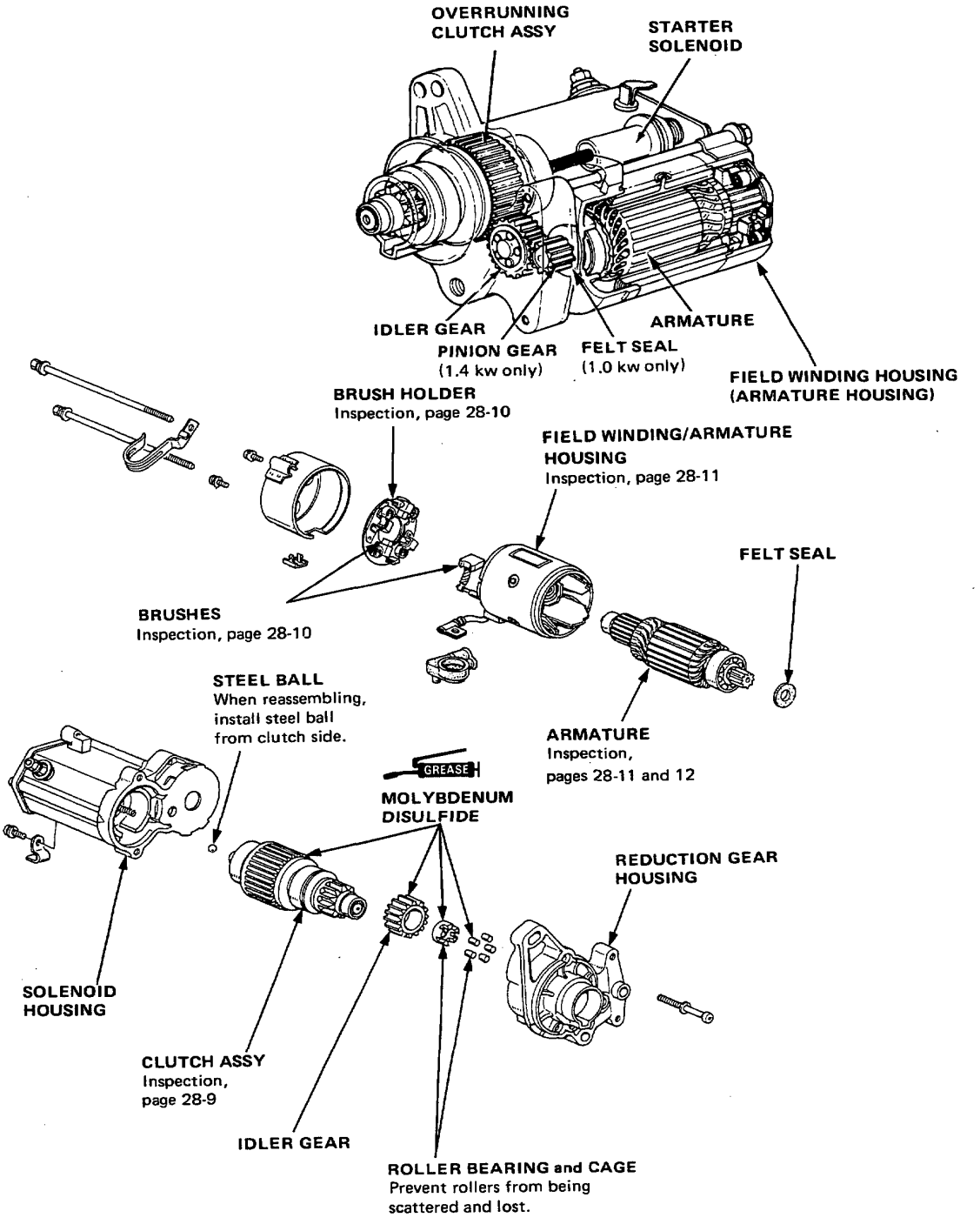


Starting

– Illstrated Index

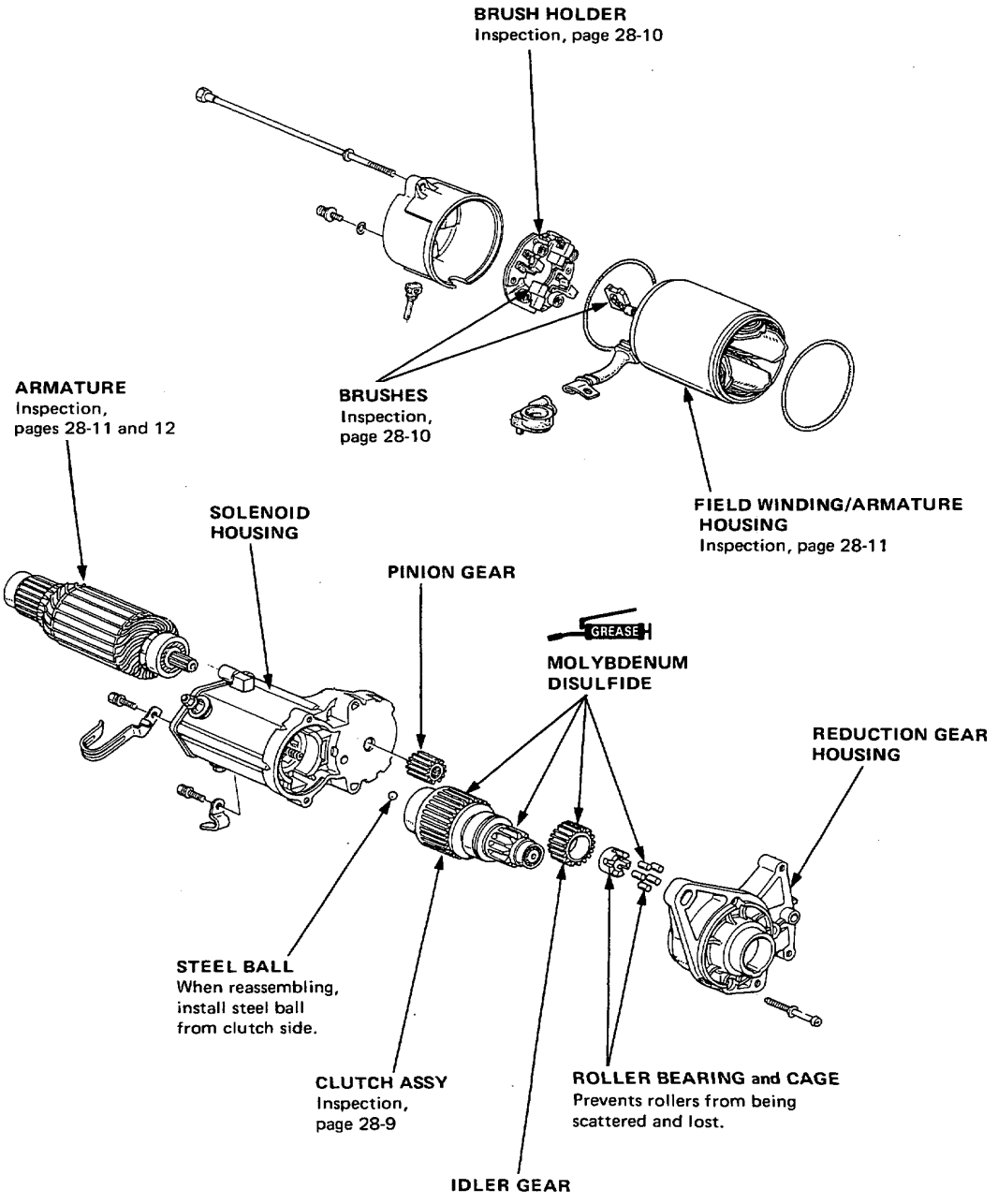
CAUTION: Disconnect ground cable from battery post before removing starter.

NIPPON DENSO (REDUCTION TYPE) 1.0 KW



CAUTION: **Disconnect ground cable from battery post before removing starter.**

NIPPON DENSO (REDUCTION TYPE) 1.4 KW



Starting

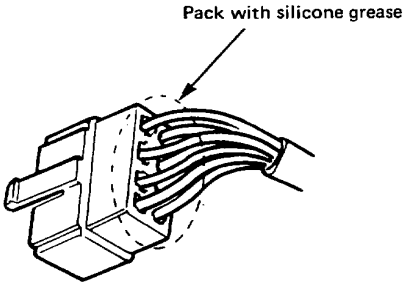
Troubleshooting Precautions

Before Troubleshooting:

1. Check main fuse and fuse box for blown fuses.
2. Make sure battery posts and terminals are clean and tight.
3. Check battery for damage.
4. Check battery state of charge.
5. Check alternator belt for proper tension (section 27).
6. Check that connectors in the defective circuit are clean, properly connected, and that a pin or receptacle is not loose in a connector housing.

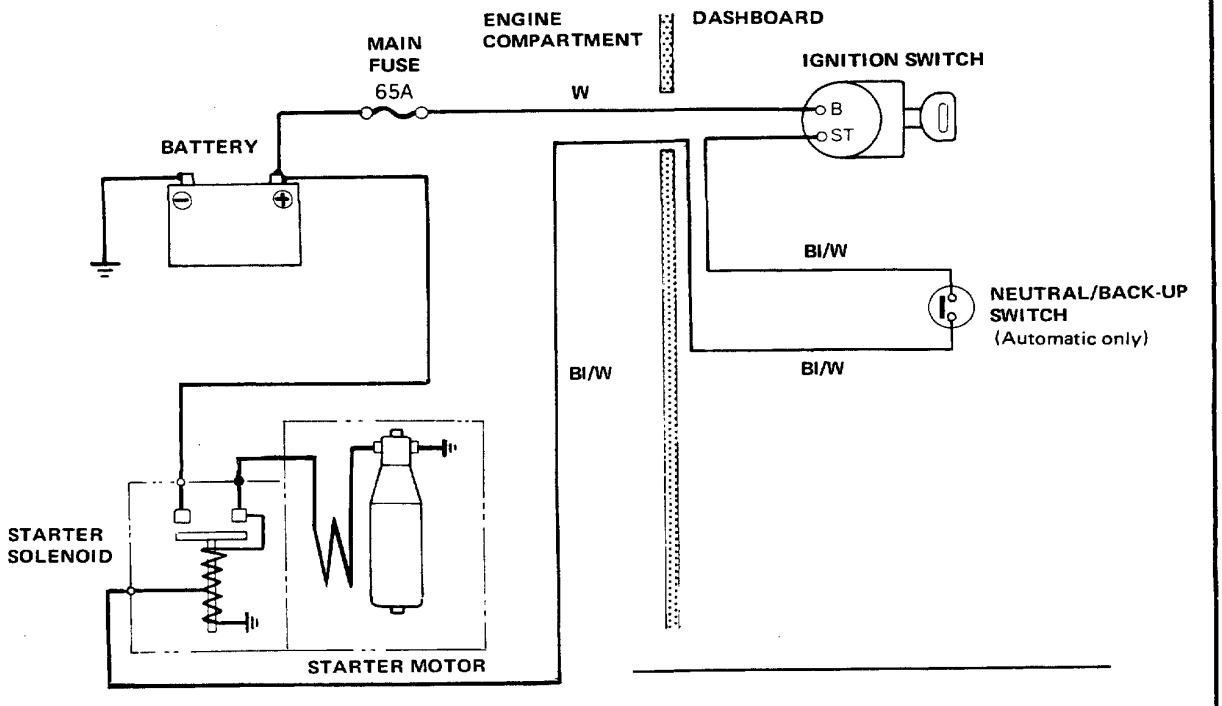
CAUTION:

- **DO NOT QUICK-charge a battery unless the battery ground strap has been disconnected, or you will damage the alternator diodes.**
- **Do not attempt to crank the engine with the ground strap disconnected or you will severely damage the wiring.**
- **Do not pull on wires when disconnecting connectors.**
- **After connecting the connector, cover with the connector boot if it has one.**
- **When connecting a connector, push it until it clicks into place.**
- **Check to make sure that multi-pin connectors are packed with grease.**



- **When connecting battery terminals make sure they are clean and tightend securely.**

Wiring Diagram



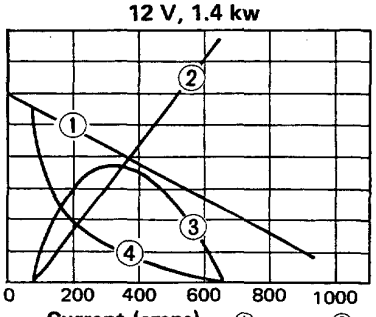
Specifications

	NIPPON DENSO 1.0 kw	NIPPON DENSO 1.4 kw
Type	DR-DF3	DR-DIV
Normal output	1.0 kw	1.4 kw
Nominal voltage	12 V	
Hour rating	30 seconds	
Direction of rotation	Clockwise as viewed from pinion gear side	
Weight	3.85 kg (8.5 lb)	4.5 kg (9.9 lb)

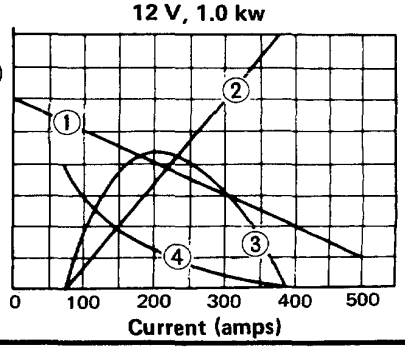
			NIPPON DENSO 1.0 kw	NIPPON DENSO 1.4 kw
No load	Terminal voltage	V	11.5	11.5
	Current	A	90 max.	90 max.
	Draw speed	min^{-1} (rpm)	3,000 min.	3,500 min.
Load	Terminal voltage	V	8	8.5
	Torque	N·m (kg-m, lb-ft)	6.5 (0.65, 4.7)	13.5 (1.35, 9.8)
	Current	A	230 max.	350 max.
	Draw speed	min^{-1} (rpm)	1,180 min.	1,000 min.
Braked	Terminal voltage	V	3.5 at 20°C (68°F).	2.4 at 20°C (68°F).
	Current draw	A	460 max.	450 max.
	Torque	N·m (kg-m, lb-ft)	11 (1.1, 7.9) min.	11 (1.1, 7.9) min.

STARTER PERFORMANCE CURVES ① Voltage ② Torque ③ Output ④ min^{-1} (rpm)

① V	② N·m	② lb-ft	② kg-m	③ kW	④ min^{-1} (rpm)
12	24	17.4	2.4	2.4	6000
10	20	14.5	2.0	2.0	5000
8	16	11.6	1.6	1.6	4000
6	12	8.7	1.2	1.2	3000
4	8	5.8	0.8	0.8	2000
2	4	2.9	0.4	0.4	1000
0	0	0	0	0	0



① V	② N·m	② lb-ft	② kg-m	③ kW	④ min^{-1} (rpm)
12	12	8.7	1.2	1.2	6000
10	10	7.25	1.0	1.0	5000
8	8	5.8	0.8	0.8	4000
6	6	4.35	0.6	0.6	3000
4	4	2.9	0.4	0.4	2000
2	2	1.45	0.2	0.2	1000
0	0	0	0	0	0



Troubleshooting

NOTE: Vehicle must be between 15 and 38°C (60 and 100°F) before testing.

Recommended Procedure:

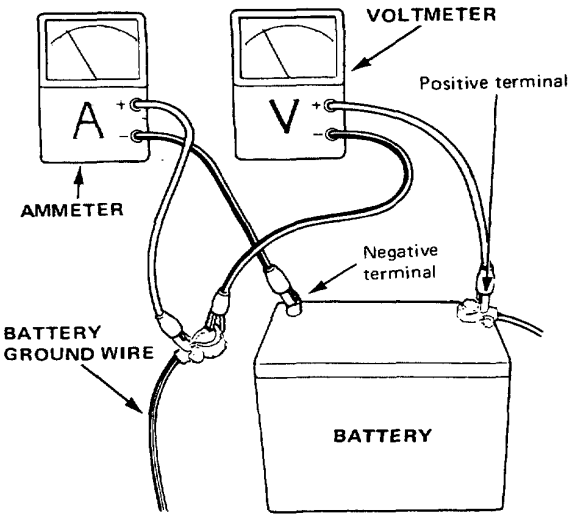
Use a Starter System Tester.
Connect and operate the equipment in accordance with manufacturer's instructions.
Test and troubleshoot as described starting with step 2.

Alternate Procedure:

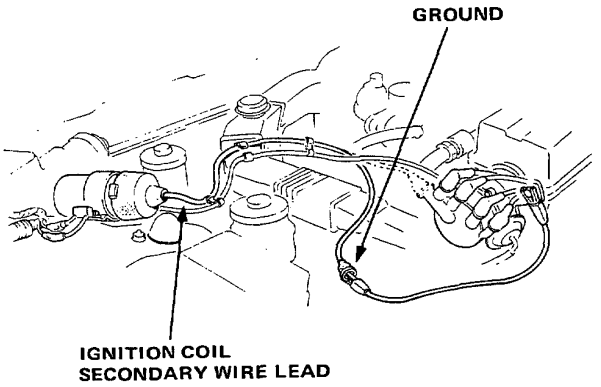
Use the following equipment:

- Ammeter, 0—400A
- Voltmeter, 0—20 volts (accurate within 0.1 volt)
- Tachometer 0—1200 min^{-1} (rpm)

1. Hook up voltmeter and ammeter as shown.



2. Disconnect ignition coil secondary wire from distributor, and ground it.



3. Check starter engagement.
Turn ignition switch to III. Starter should crank engine.

- If starter does not crank engine, bypass ignition switch circuit as follows: Unplug connector (black/white wire) from starter. Connect jumper wire from battery positive (+) terminal to solenoid terminal.
Starter should carnak engine.
  - If starter still does not crank engine, check battery, battery positive cable and ground, and cable connections for looseness or corrosion.
If starter still does not crank the engine, remove starter and diagnose internal problems pages 28-8 through 28-14.
  - If starter cranks engine, check for open wiere in the black/white wire circuit between the starter and ignition switch, and connectors. Check ignition switch. On Automatic, check NEUTRAL/BACK-UP switch and connectors. See page 15-59.

4. Check for wear or damage.
Starter should crank engine smoothly and steadily.

- If starter engages, but cranks engine erratically, remove starter motor. Inspect starter, drive gear and flywheel ring gear for damage. Check drive gear overrunning clutch for binding or slipping when armature is rotated with drive gear held. Replace gears if damaged. See pages 28-2 and 28-3.

5. Check cranking voltage and current draw (page 28-5).

Voltage should be no less than 8 volts.
Current should be no greater than specified amperes as below.

Nippondenso 1.4 kw: 350 amperes
Nippondenso 1.0 kw: 230 amperes

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

- Battery fully charged (page 27-5).
- Open circuit in starter armature commutator segments (page 28-12).
- Starter armature dragging.
- Shorted armature winding (see page 28-11).
- Excessive drag in engine.

6. Check cranking rpm.

Engine speed during cranking should be approximately 400 min^{-1} (rpm).

If cranking rpm is too low, check for:

- Loose battery or starter terminals.
- Excessively worn starter brushes (see page 28-10).
- Open circuit in commutator segments (see page 28-12).
- Dirty or damaged helical spline on drive gear.
- Defective drive gear overrunning clutch (see page 28-9).

7. Check starter disengagement:

Turn ignition switch to III and release to II.

Starter drive gear should disengage from flywheel.

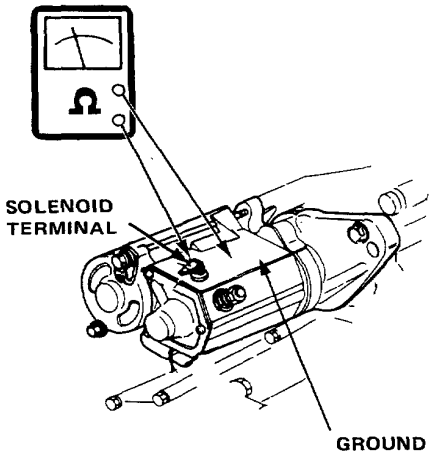
If drive gear hangs up in flywheel, check:

- Starter solenoid plunger and switch for malfunction.
- Drive gear assembly for dirty or damaged helical spline (see page 28-9).

Starting

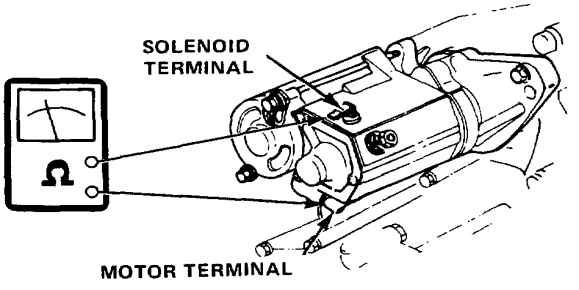
Starter Solenoid Check

1. Check pull-in coil continuity between the solenoid terminal and any convenient ground. Coil is OK if there is continuity.



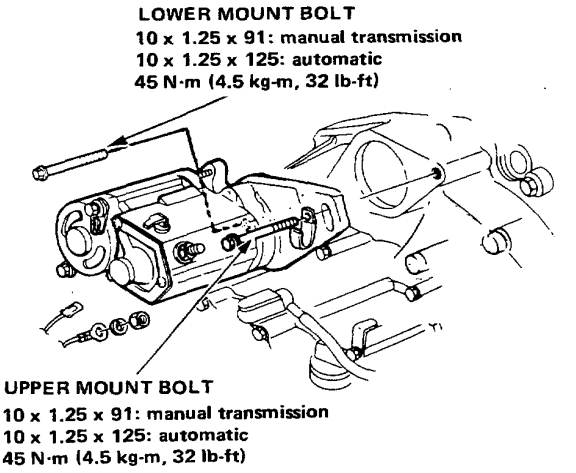
2. Check hold-in coil continuity between the solenoid terminal and motor terminal on the solenoid.

   Coil is OK if there is continuity.



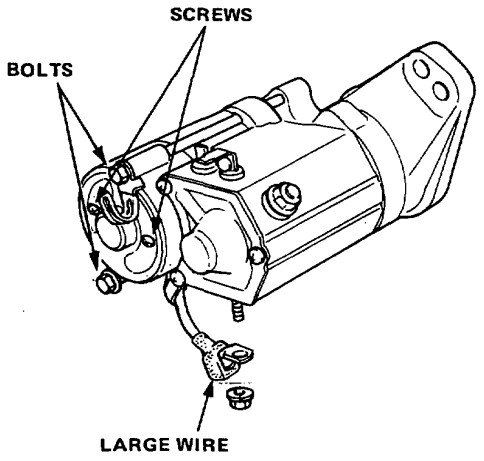
Starter Removal/Installation

1. Disconnect battery negative (–) terminal and starter cable at the positive terminal.
2. Disconnect starter cable at terminal on starter motor.
3. Remove two bolts holding starter motor, and remove starter motor.

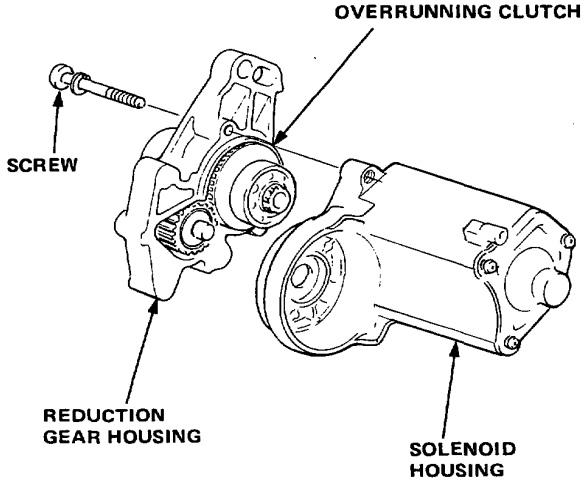


Starter Disassembly

1. Disconnect the large wire that goes from the solenoid to the motor.
2. Remove the two bolts and two screws from the end cover. Remove the end cover. Then, take out the armature and brushes.



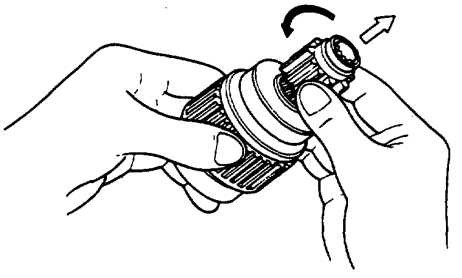
3. Remove the screws from the gear housing, then remove the solenoid and overrunning clutch.



Overrunning Clutch Check

1. Move overrunning clutch along shaft.

   If it doesn't move freely, or if clutch slips when armature is rotated while holding drive gear, replace clutch assembly.

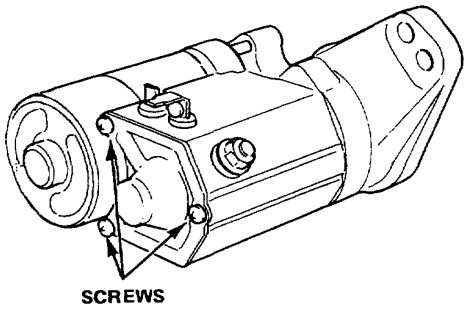


If gear is worn or damaged, replace complete overrunning clutch assembly; the gear is not available separately.

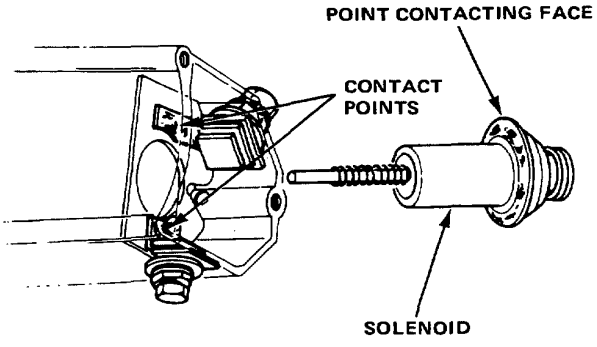
NOTE: Check condition of flywheel or drive plate ring gear if starter drive gear teeth are damaged.

Solenoid Plunger Check

1. Remove three bolts from solenoid cover if necessary for inspection.



2. Check contact points, and face of starter solenoid plunger for burning, pitting or any other defects. If surfaces are rough, recondition with a strip of #500 or #600 sandpaper.

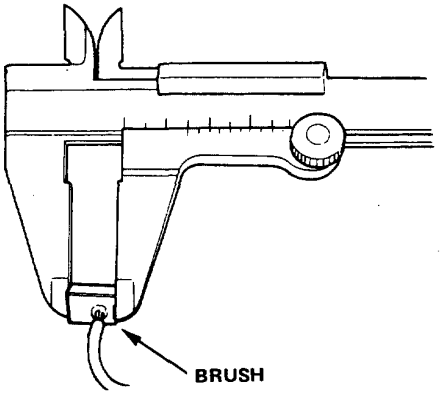


Starter Brush Check

1. Measure brush length. If not within service limit, replace armature-housing and brush holder assembly.

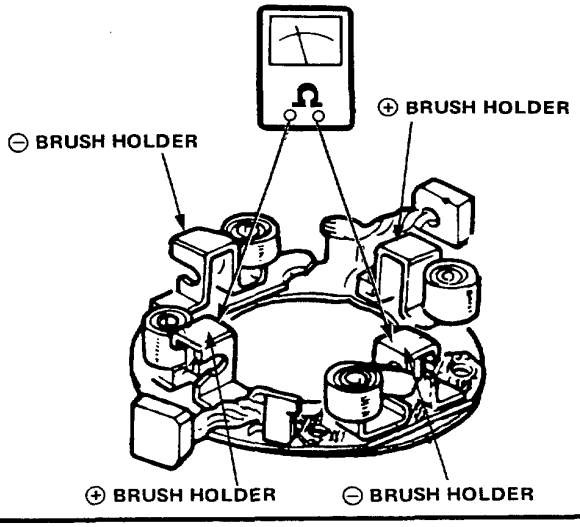
Standard (New):
Nippondenso 1.4 kw: 12.5–13.5 mm (0.49–0.53 in.)
Nippondenso 1.0 kw: 14.5–15.5 mm (0.57–0.61 in.)
Service Limit:
Nippondenso 1.4 kw: 8.5 mm (0.33 in.)
Nippondenso 1.0 kw: 10.0 mm (0.39 in.)

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



2. With ohmmeter, check that no continuity exists between positive (+) and negative (–) brush holder.

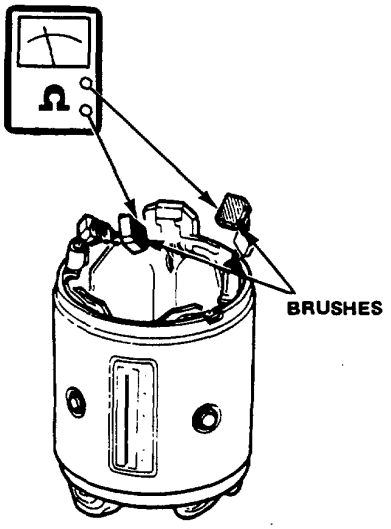
If continuity exists, replace brush holder assy.



Starter Field Winding Check

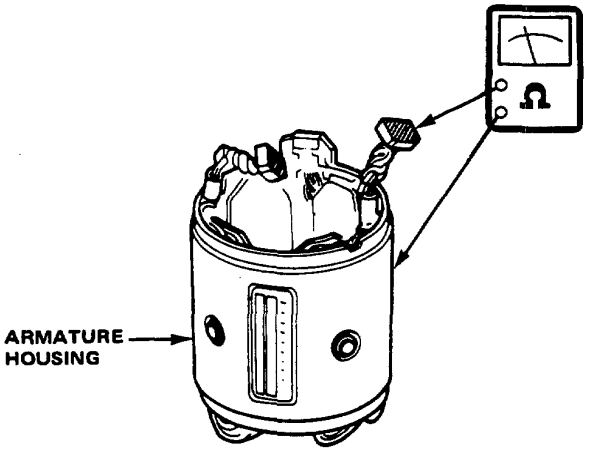
1. Using an ohmmeter, check that continuity exists between brushes.

   If no continuity, replace armature housing.



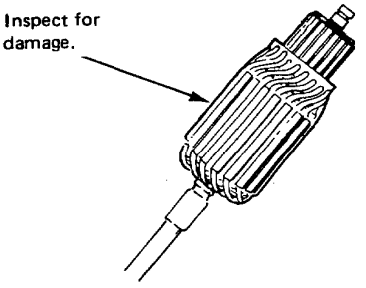
2. With ohmmeter, check that no continuity exists between field coil and armature housing.

   If continuity exists, replace armature housing.



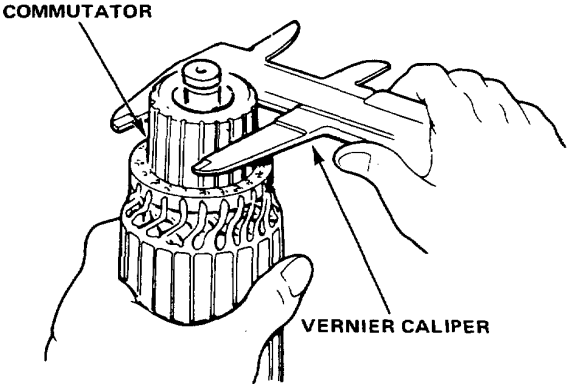
Armature Check

1. Inspect armature for wear or damage due to contact with field coil magnets.



2. A dirty or burnt surface may be resurfaced with emery cloth or lathe within the following specifications.

   Commutator Specifications:
   Runout: 0–0.02 mm (0–0.001 in.)
   Service limit: 0.05 mm (0.002 in.)
   Diameter: 29.9–30.0 mm (1.177–1.181 in.)
   Service limit: 29 mm (1.142 in.)

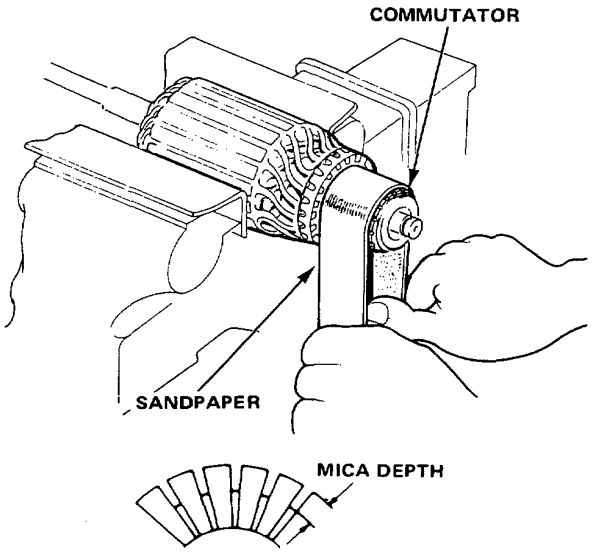


3. If commutator runout and diameter are within specifications, check commutator for damage or for carbon dust or brass chips between segments.

(cont'd)

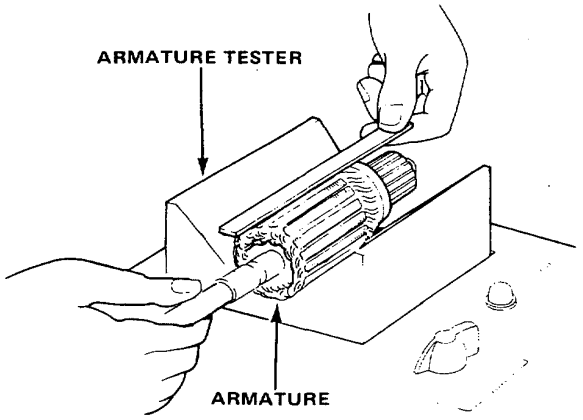
Armature Check (cont'd)

4. If surface is dirty, recondition it with a #500 or #600 sandpaper. Then check mica depth. If necessary, undercut mica with a hacksaw blade to achieve proper depth as shown.



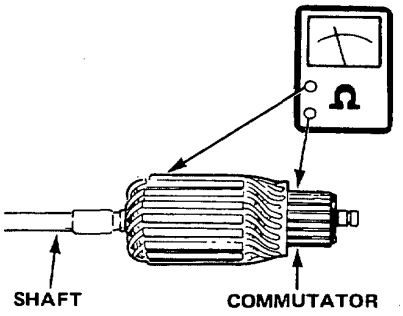
Commutator Mica Depth: 0.5–0.8 mm (0.020–0.031 in.)
Service Limit: 0.2 mm (0.008 in.)

5. Place the armature on an armature tester. Hold the hacksaw blade on the armature core.

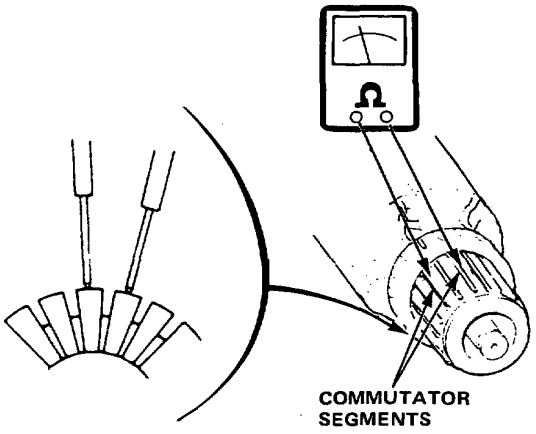


If the blade is attracted to the core or vibrates while core is turned, the armature is shorted. Replace armature.

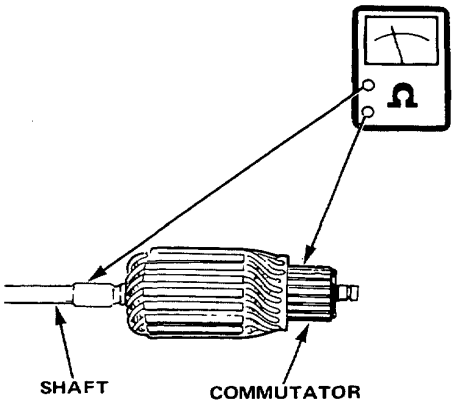
6. With ohmmeter, check that no continuity exists between commutator and armature coil core. If continuity exists, replace armature.



7. Check for continuity between each segment of the commutator. If an open circuit exists between any segment, replace armature.

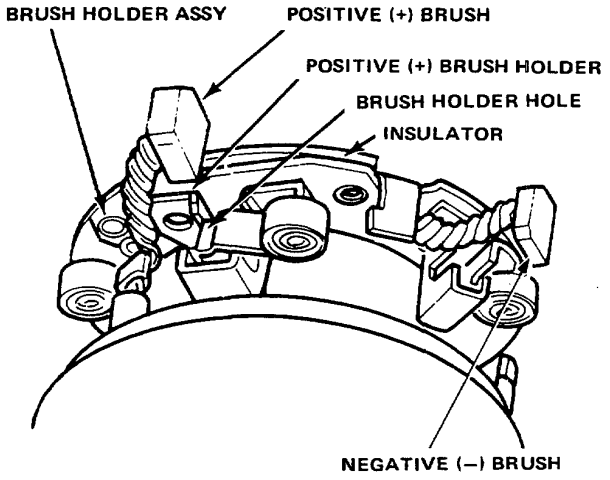


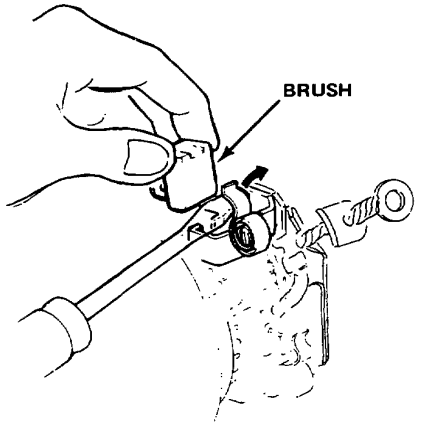
8. Check to see if there is any continuity between the commutator and armature shaft. If there is continuity, replace the armature.



Starter Reassembly

1. Install brushes by raising up springs with a screw driver, and slipping the brushes into place.

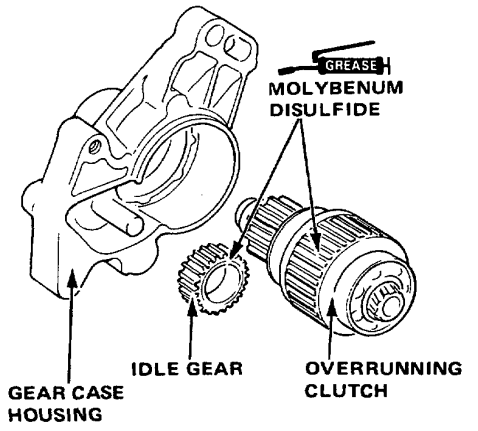




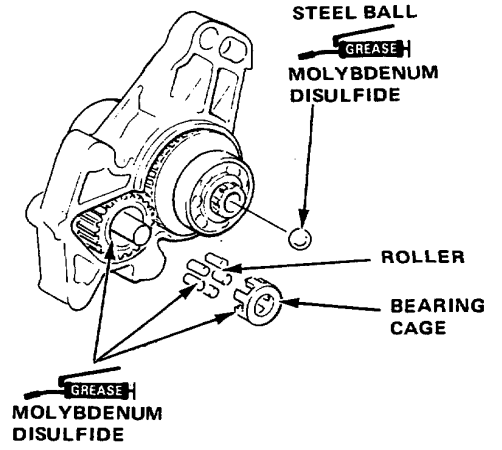
2. Pry back the spring, then raise the brush partway and release the spring to hold it in place. Then install the armature. Again pry back the springs, then push the brushes down until they contact the commutator and the end of the spring is pushing on the wire-end of the brush.



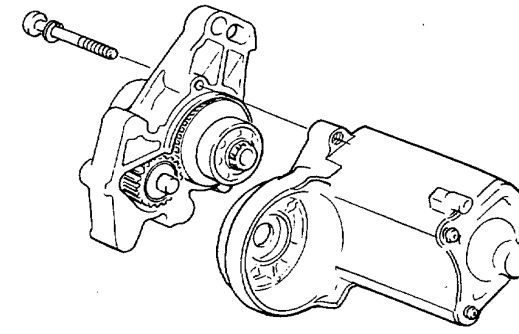
3. Install the overrunning clutch and idle gear.



4. Install the rollers and cage.



5. Install the solenoid housing on the reduction gear housing.



(cont'd)

Starter Reassembly (cont'd)

6. When you assemble the motor and solenoid, don't forget to install the felt seal. Make sure that convex of the armature housing seats in concave of the solenoid housing properly.

