Chassis and Engine Numbers

Vehicle Identification Number (1.8 ℓ Carbureted Engine)

JHM CB1 5 2 0 0 C 0 00001

Manufacturer Code and Vehicle Type
JHM: HONDA MOTOR CO., LTD., JAPAN. HONDA Passenger Car
Body and Engine Type
CB1: ACCORD 1.8 ℓ
Door and Transmission Type
5 : 4-door, 5-speed Manual
Vehicle Grade
2 : LX (KB)
3 : EX (KB)
Fixed Code
Auxiliary Number
Factory Code
C: Sayama Factory in Japan
Model Year
0: 1990
Serial Number

Vehicle Identification Number (2.0 ℓ Carbureted Engine)

JHM CB3 5 2 0 0 C 0 00001

Manufacturer Code and Vehicle Type
JHM: HONDA MOTOR CO., LTD., JAPAN. HONDA Passenger Car
Body and Engine Type
CB3: ACCORD 2.0 ℓ
Door and Transmission Type
5 : 4-door, 5-speed Manual
6 : 4-door, 4 speed Automatic
Vehicle Grade
2 : DX, F20A2 (KG, KS)
F20A3 (KW)
: LX, F20A2 (KQ)
F20A3 (KP, KT, KU, KY)
3 : EX, F20A2 with CATA (KG, KX, KS)
F20A2 without CATA (KF, KE)
F20A3 (KB, KW, KP, KT, KU, KY)
F20A6 (KG)
: EX with ALB,
F20A2 with CATA (KG, KS)
F20A2 without CATA (KF)
F20A3 (KB)
Fixed Code
Auxiliary Number
Factory Code
C : Sayama Factory in Japan
Model Year
0 : 1990
Serial Number

Vehicle Identification Number (2.0 ℓ Fuel-Injected Engine)

JHM CB3 5 4 0 0 C 0 00001

Manufacturer Code and Vehicle Type
JHM: HONDA MOTOR CO., LTD., JAPAN. HONDA Passenger Car
Body and Engine Type
CB3: ACCORD 2.0 ℓ
Door and Transmission Type
5 : 4-door, 5-speed Manual
6 : 4-door, 4-speed Automatic
Vehicle Grade
4 : 2.0i, F20A4 with CATA (KG, KS)
F20A4 without CATA (KF, KE)
F20A5 (KB, KW)
2.0i with ALB,
F20A4 with CATA (KG, KX, KS)
F20A4 without CATA (KF, KE)
F20A5 (KB, KW)
EXi, F20A5 (KU)
EXi with ALB, F20A5(KU)
Fixed Code
Auxiliary Number
Factory Code
C : Sayama Factory in Japan
Model Year
0 : 1990
Serial Number

Vehicle Identification Number (2.2 ℓ Fuel-Injected Engine)

JHM CB7 5 5 0 0 C 0 00001

Manufacturer Code and Vehicle Type
JHM: HONDA MOTOR CO., LTD., JAPAN HONDA Passenger Car
Body and Engine Type
CB7: ACCORD 2.2 ℓ
Door and Transmission Type
5 : 4-door, 5-speed Manual
6 : 4-door, 4-speed Automatic
Vehicle Grade
5 : 2.2i, F22A3 with CATA (KF, KG, KX, KS, KE)
EXi, F22A2 (KY)
F22A5 with CATA (KQ)
Fixed Code
Auxiliary Number
Factory Code
C : Sayama Factory in Japan
Model Year
0 : 1990
Serial Number

Engine Number (DX: European, LX: General and EX: KG 90 ps)

F18A2 - 10 00001

Engine Type
- F18A2 : 1.8 ℓ SOHC Carbureted Leaded gasoline: KB
- F20A2 : 2.0 ℓ SOHC Carbureted Unleaded gasoline with CATA : KG/KS (DX), KQ (LX)
- F20A3 : 2.0 ℓ SOHC Carbureted Leaded gasoline: KW (DX), KP/KT/KU/KY (LX)
- F20A6 : 2.0 ℓ SOHC Carbureted (90ps) Unleaded gasoline with CATA : KG (EX 90ps)

Transmission Type
- 10: 5-speed manual
- 15: 4-speed automatic

Serial Number

Engine Number (EX except KG 90 ps)

F20A2 - 10 00001

Engine Type
- F20A2 : 2.0 ℓ SOHC Carbureted Unleaded gasoline with CATA : KG, KX, KS
  2.0 ℓ SOHC Carbureted Unleaded gasoline without CATA : KF, KE
- F20A3 : 2.0 ℓ SOHC Carbureted Leaded gasoline :KB, KW, KP, KT, KU, KY

Transmission Type
- 10: 5-speed manual
- 15: 4-speed automatic

Serial Number

Engine Number (2.0i: European and EXi: KU)

F20A4 - 10 00001

Engine Type
- F20A4 : 2.0 ℓ SOHC Fuel-Injected Unleaded gasoline with CATA : KG, KX, KS
  2.0 ℓ SOHC Fuel-Injected Unleaded gasoline without CATA: KF, KE
- F20A5 : 2.0 ℓ SOHC Fuel-Injected Leaded gasoline: KB, KW, KU

Transmission Type
- 10: 5-speed manual
- 15: 4-speed automatic

Serial Number

Engine Number (2.2i: European)

F22A3 - 10 00001

Engine Type
- F22A3 : 2.2 ℓ SOHC Fuel-Injected Unleaded gasoline with CATA

Transmission Type
- 10: 5-speed manual
- 15: 4-speed automatic

Serial Number

Engine Number (EXi: KQ, KY)

F22A2 - 1000001

Engine Type
- F22A2 : 2.2 ℓ SOHC Fuel-Injected Leaded gasoline: KY
- F22A5 : 2.2 ℓ SOHC Fuel-Injected Unleaded gasoline with CATA : KQ

Serial Number

Manual Transmission Number

H2A5 - 1000001

Transmission Type
- H2C4: 2.0 ℓ Fuel-Injected and 2.2 ℓ Fuel-Injected except KQ
- H2S8: 1.8 ℓ and 2.0 ℓ Carbureted
- H2U5: 2.2 ℓ Fuel-Injected: KQ

Serial Number

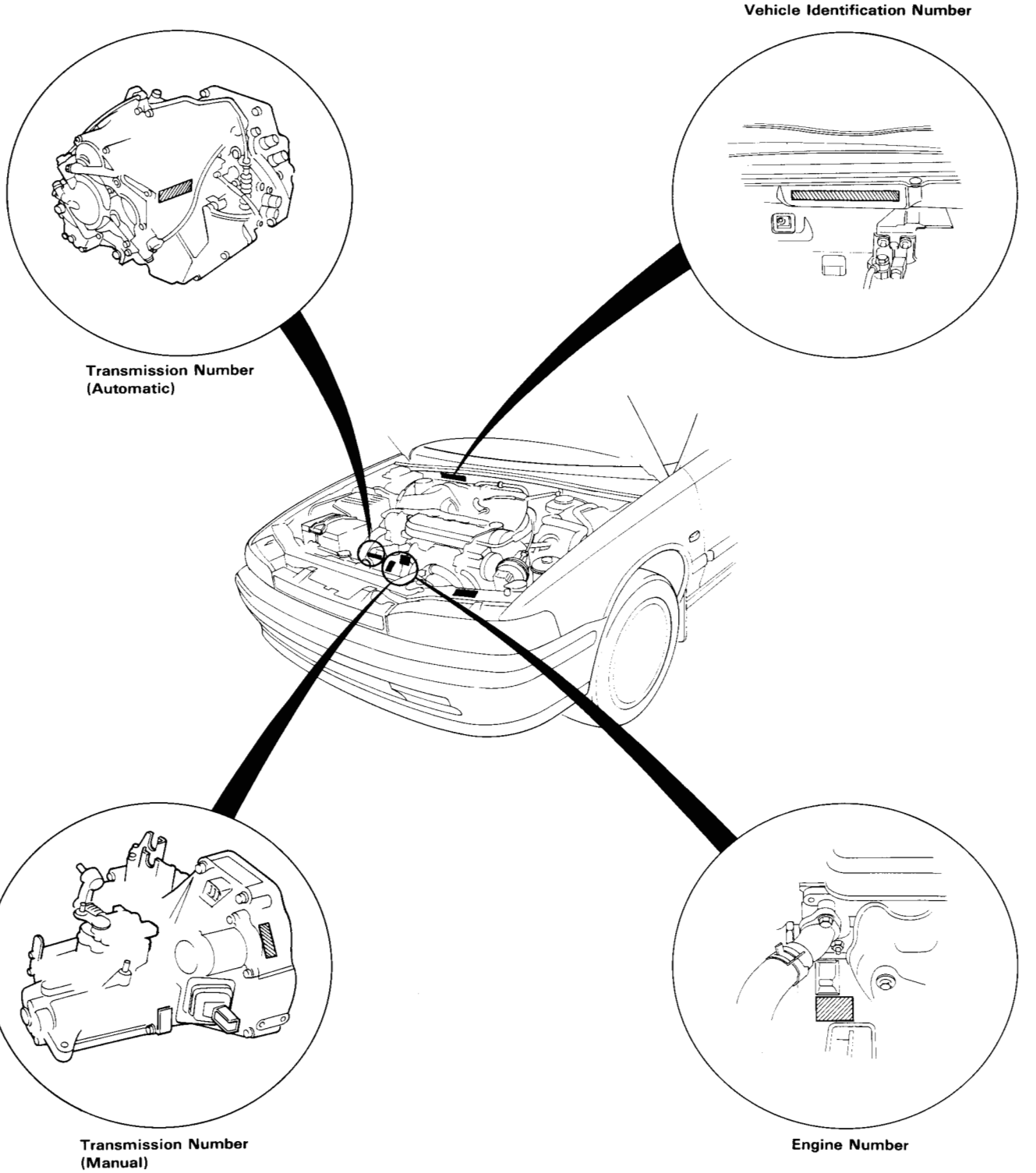
Automatic Transmission Number

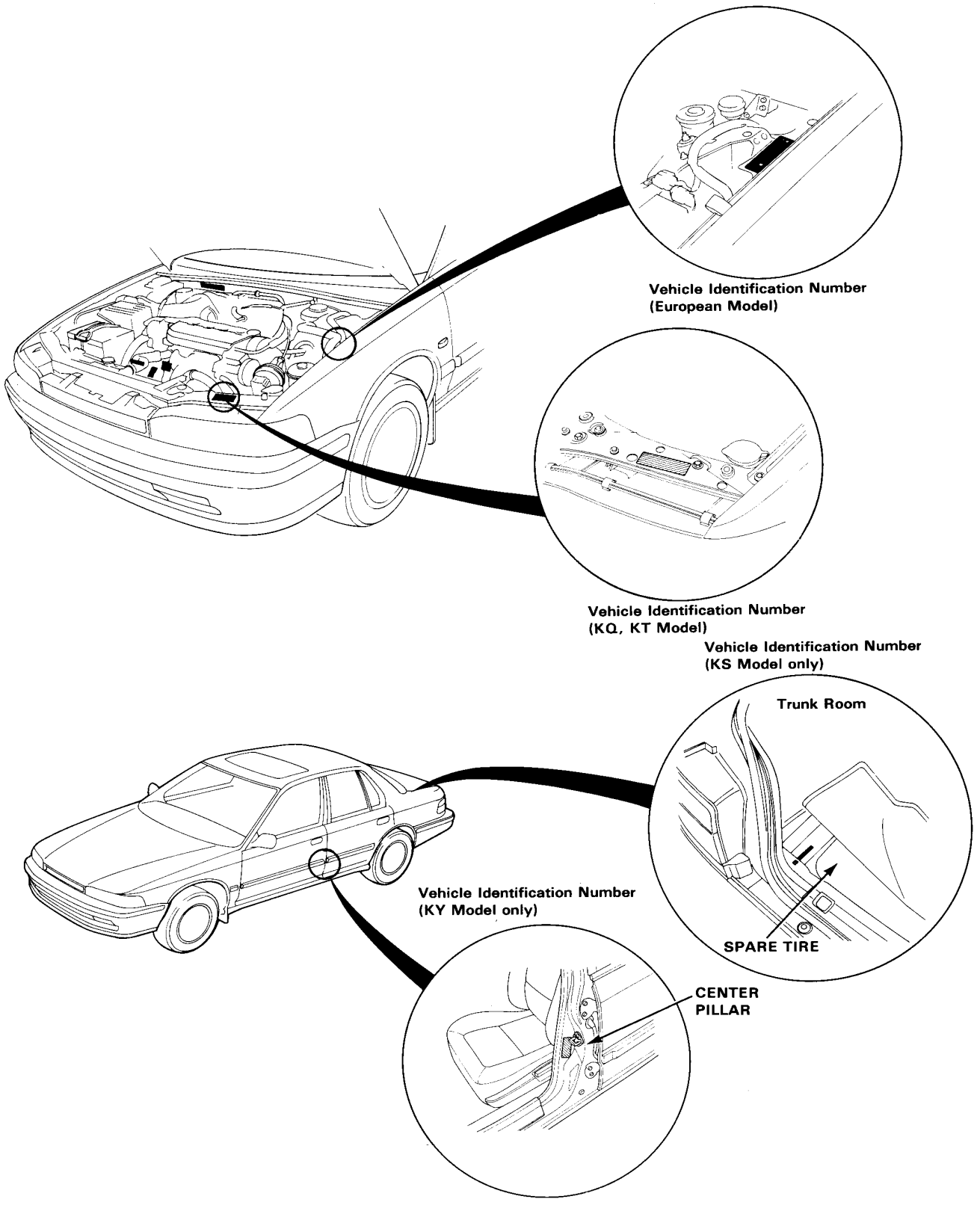
PX4B - 1000001

Transmission Type

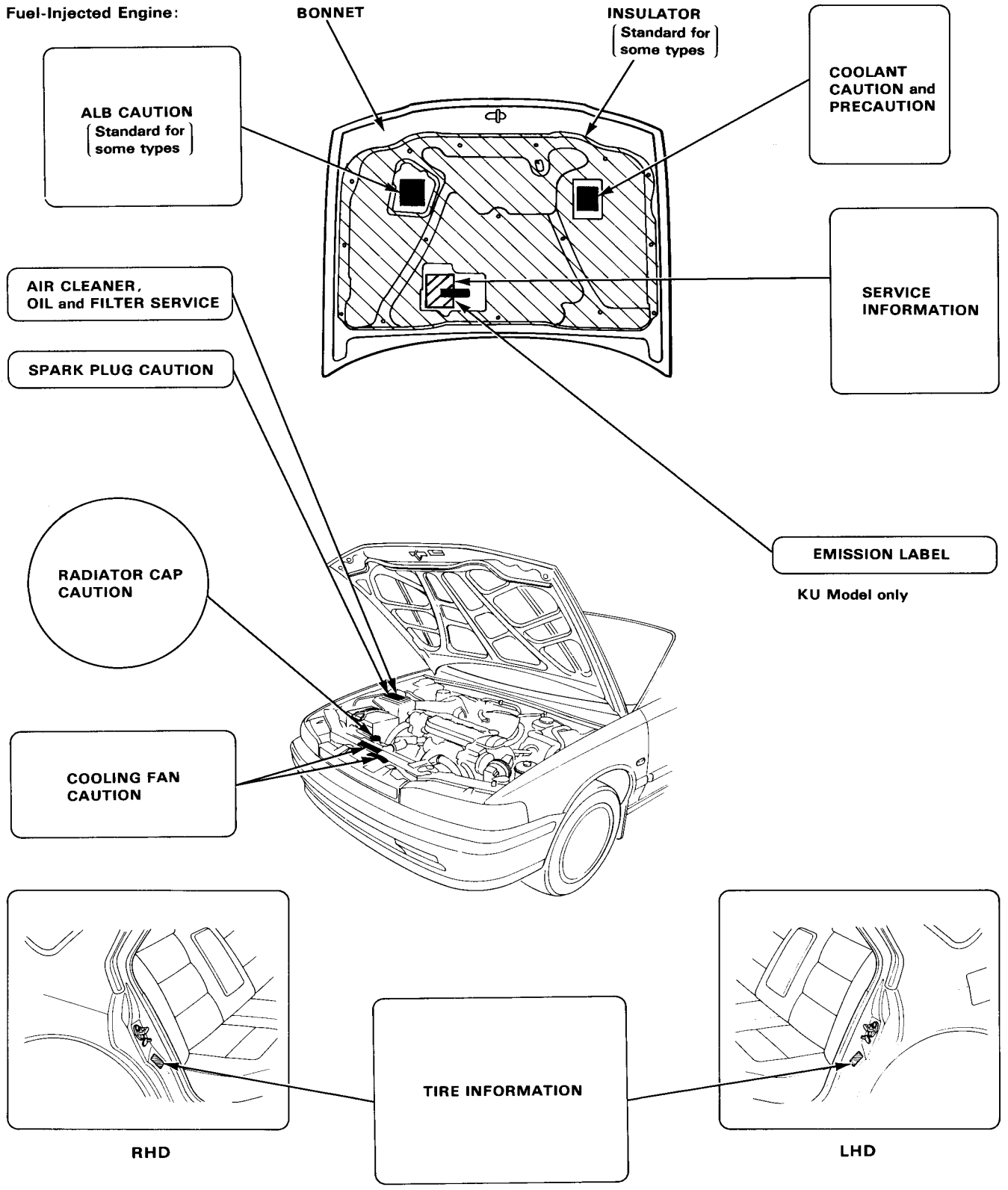
Serial Number

Identification Number Locations




Vehicle Identification Number
(European Model)
Vehicle Identification Number
(KQ, KT Model)
Vehicle Identification Number
(KS Model only)
Trunk Room
SPARE TIRE
Vehicle Identification Number
(KY Model only)
CENTER
PILLAR

Label Locations



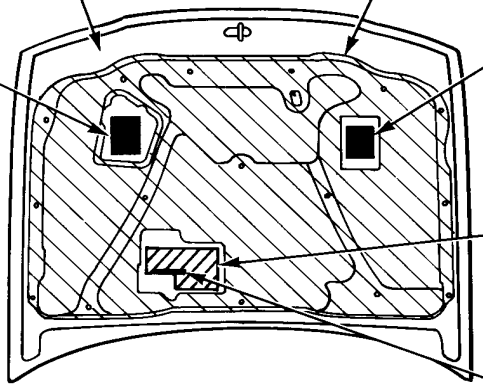
Carbureted Engine:

BONNET

INSULATOR
(Standard for some types)

ALB CAUTION
(Standard for some types)

COOLANT CAUTION and PRECAUTION



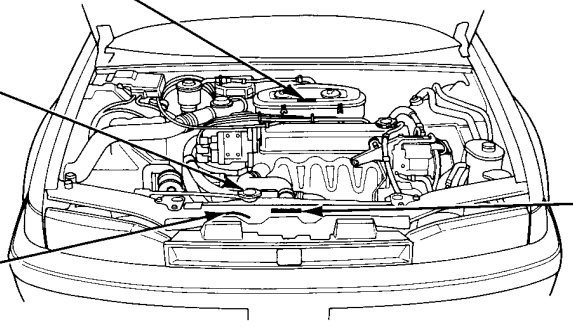
SERVICE INFORMATION

EMISSION LABEL

KU Model only

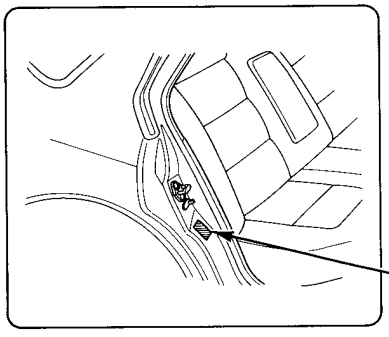
AIR CLEANER, OIL and FILTER SERVICE

RADIATOR CAP CAUTION



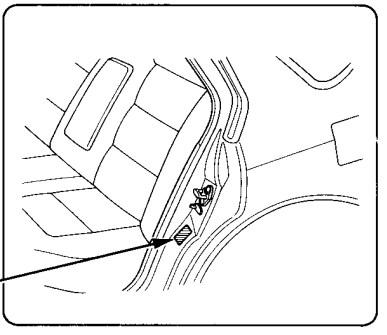
COOLING FAN CAUTION

COOLING FAN CAUTION



RHD

TIRE INFORMATION



LHD

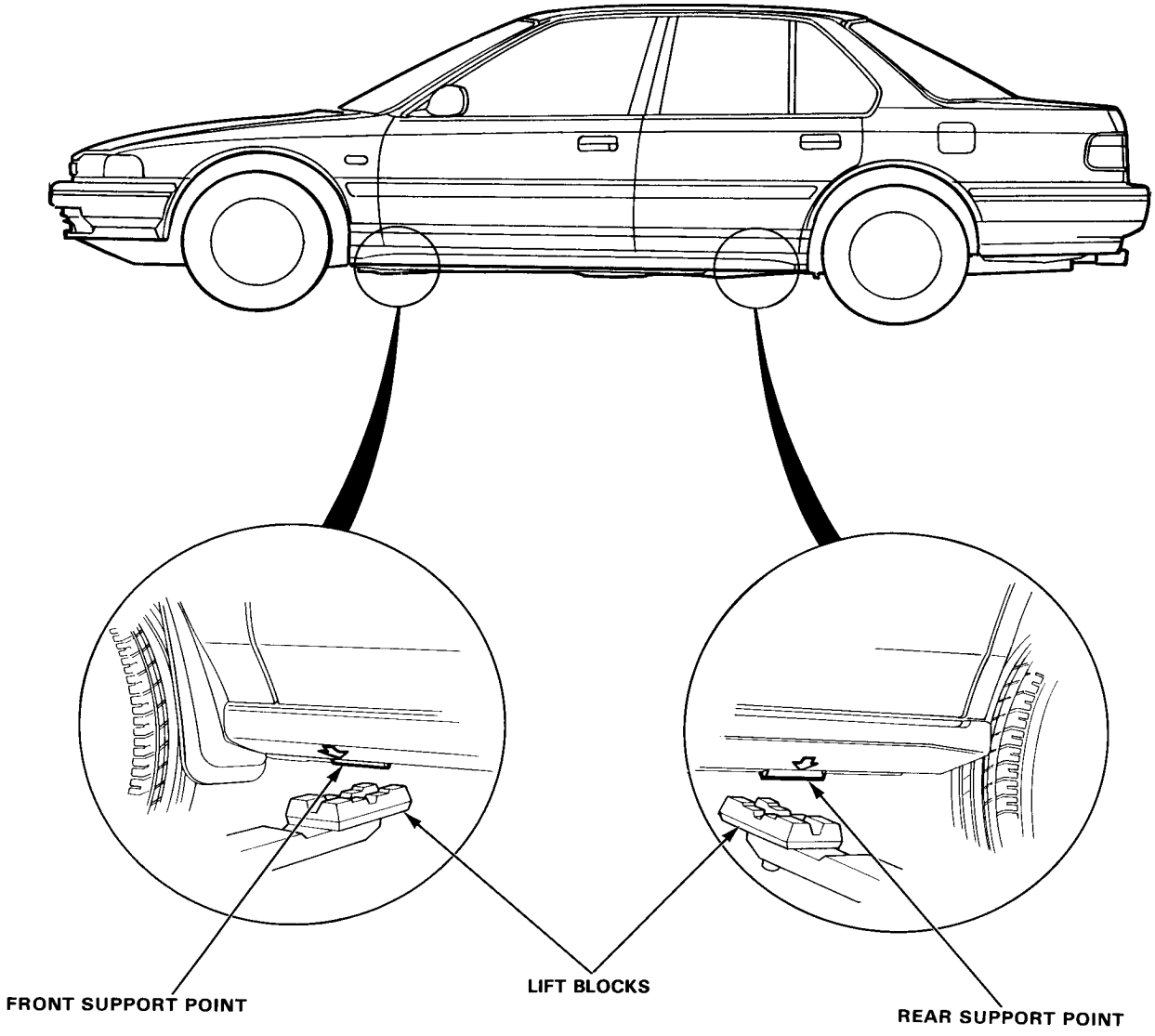
Lift and Support Points

Hoist

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

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

NOTE: Since each tire/wheel assembly weighs approximately 14 kg (30 lbs), placing the front wheels in the trunk will assist with the weight transfer.



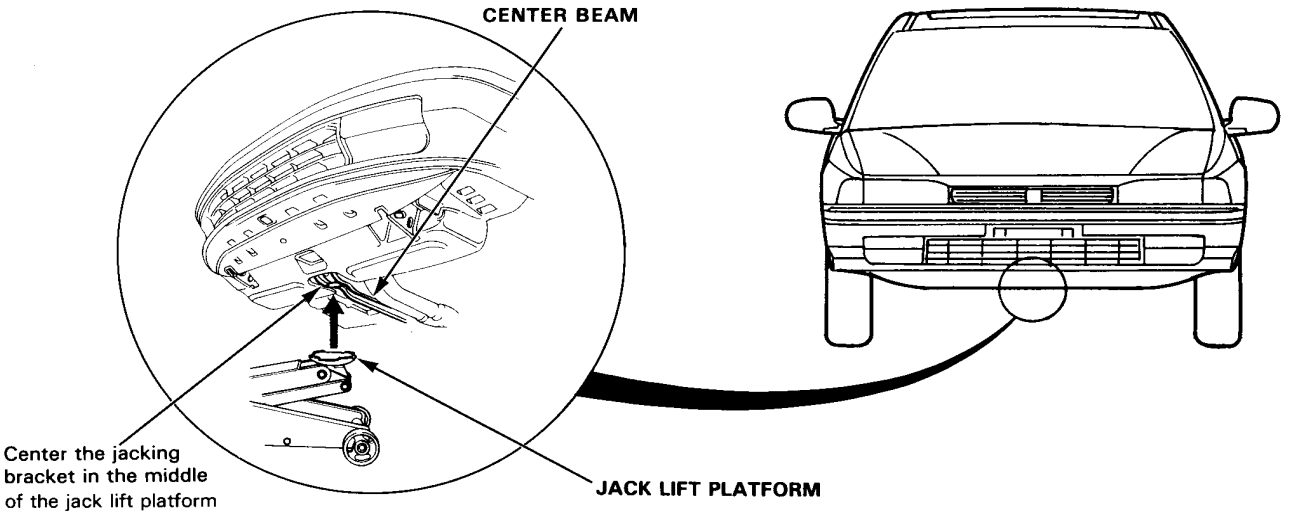
Floor Jack

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

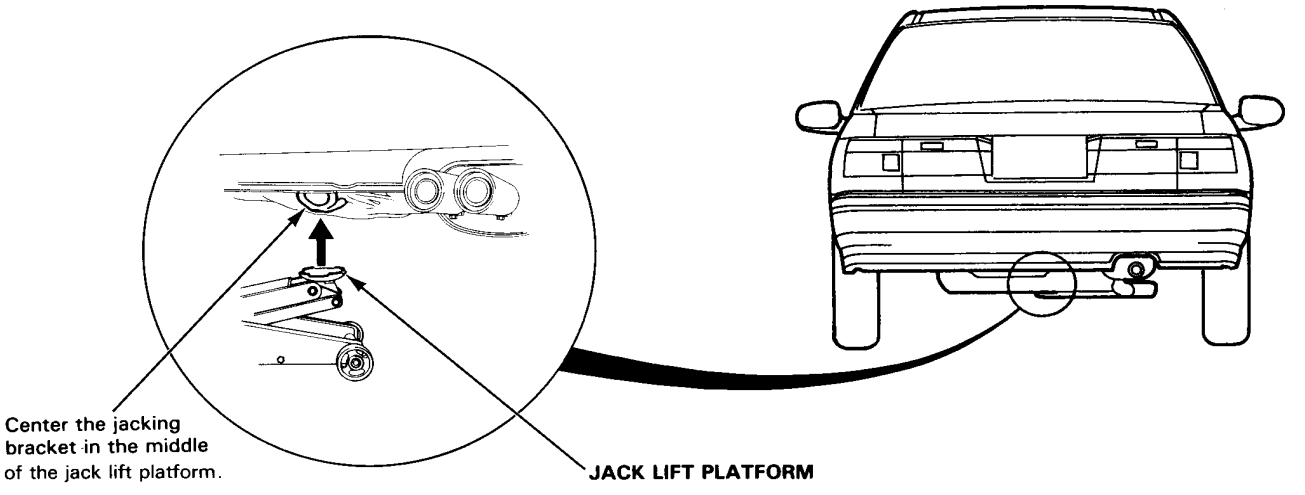
⚠WARNING

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

Front



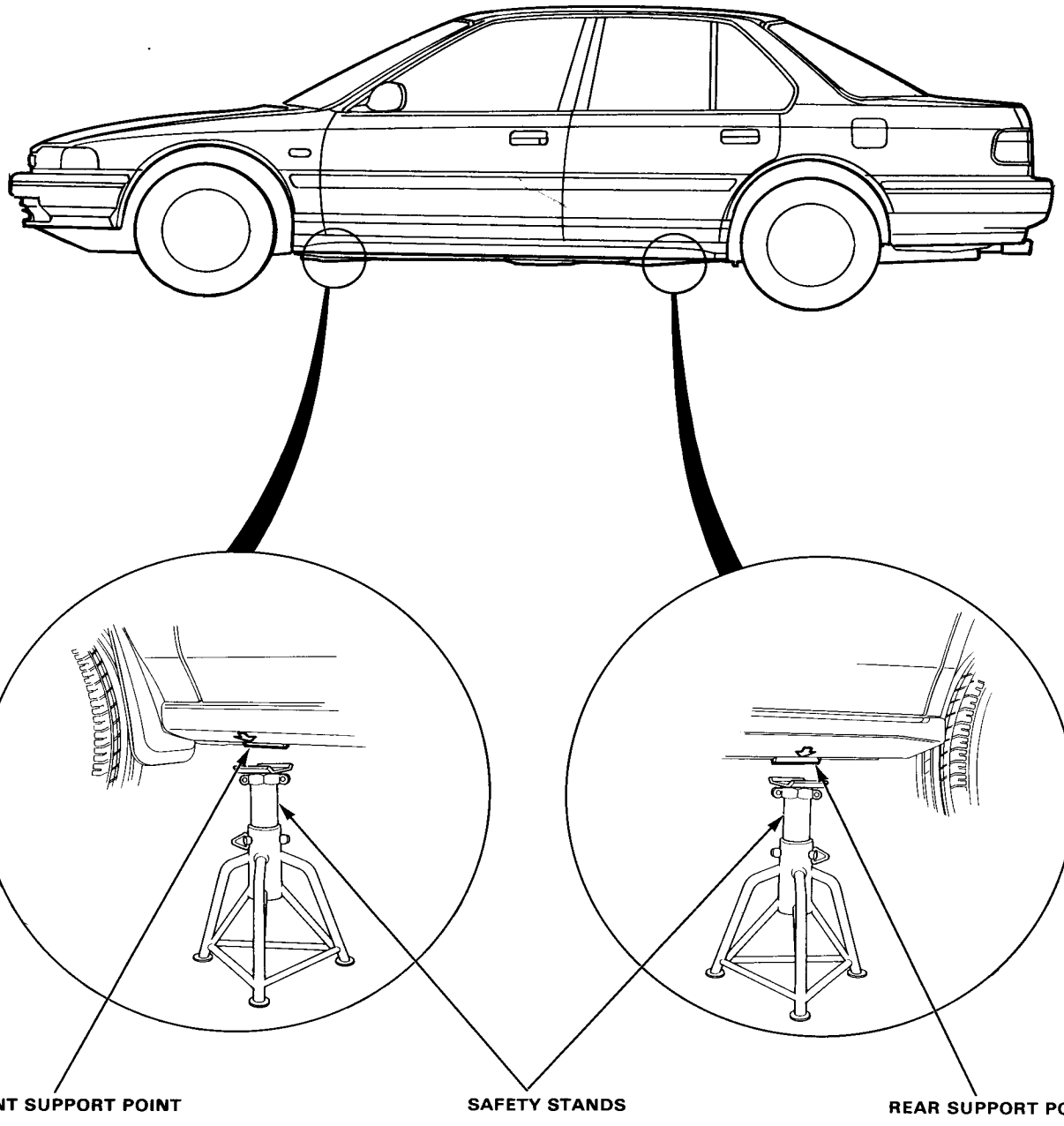
Rear



(cont'd)

Lift and Support Points (cont'd)

Safety Stands



Towing

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

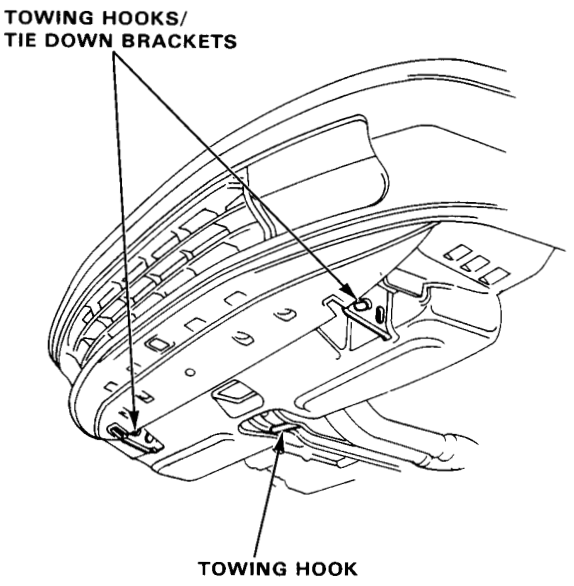
We recommend the following:
Flat Bed Equipment—Entire car is winched on a flat bed vehicle. This is the best way of transporting the car.
Wheel Lift Type—Tow with the front wheels off the ground.

If the car can only be towed with the front wheels on the ground: make sure the transmission is full of fluid (see Section 9) and tow with the transmission in neutral (N) and the ignition key in the I position.

CAUTION: To avoid serious damage on automatic transmission cars, first start the engine and shift to D4, then to N and shut the engine off. If the engine does not run or the transmission cannot be shifted while the engine is running, the car must be transported on flat bed equipment.
When towing the 2.2i (with 4WS) even with the front wheels off the ground, center the steering and tie the steering wheel in place.

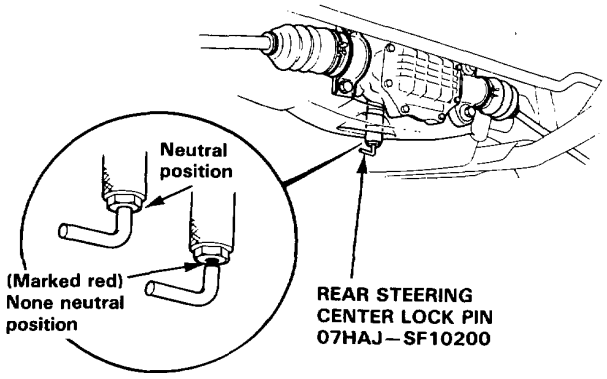
Check local regulations for towing.

CAUTION:
- **Do not exceed 35 mph (55 km/h) or tow for distances of more than 50 miles (80 km).**
- **If a sling type tow is used, the tow truck driver should position wood spacer blocks between the car's frame and the chains and lift straps to avoid damaging the bumper and the body.**
- **Do not use the bumpers to lift the car or to support the car's weight while towing.**

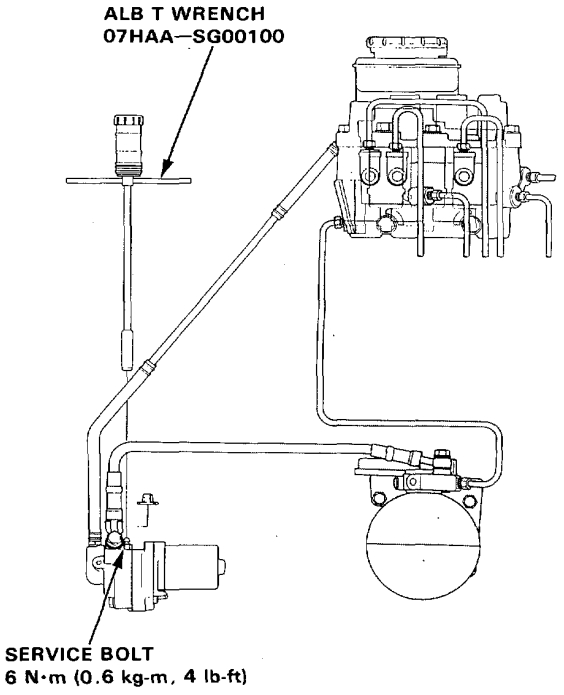


Special Caution Items For This Car

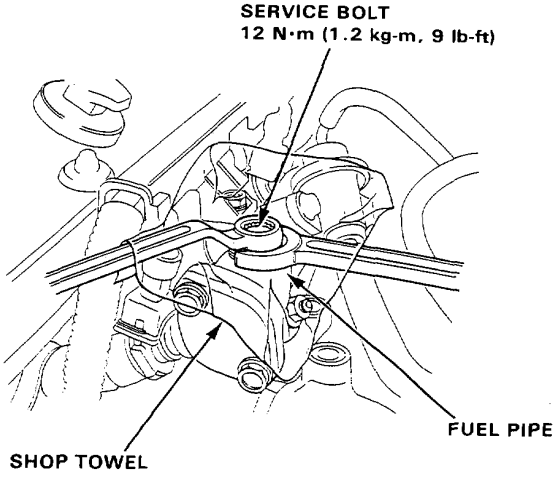
1. 4WS system servicing (with 4WS)
   - Do not disassemble the rear steering gear box.
   - When towing the car even with the front wheels off the ground, center the steering and tie the steering wheel in place.
   - When testing or adjusting the wheel alignment, attach the rear steering center lock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



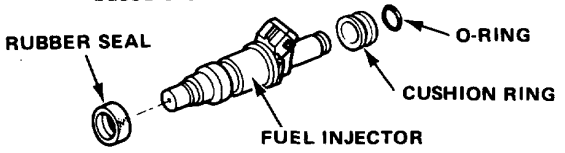
2. ALB piping system servicing
   - Disassemble the ALB piping system after relieve the high-pressured brake fluid.
   - Otherwise, the high-pressured brake fluid will burst out and it is very dangerous.
   - See section 13 how to relieve the high-pressured brake fluid.



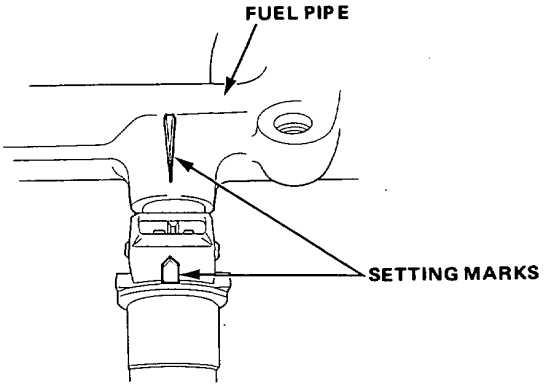
3. Fuel Line Servicing
   - Relieve fuel pressure by loosening the service bolt provided on the top of the fuel filter before disconnecting a fuel hose or a fuel pipe.



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



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



4. Inspection for fuel leakage
   - After assembling fuel line parts, turn ON the ignition switch (do not operate the starter) so that the fuel pump is operated for approximately two seconds and the fuel is pressurized. Repeat this operation two or three times and check whether any fuel leakage has occurred in any of the various points in the fuel line.

5. Installation of an amateur radio for cars equipped with PGM-FI.
   Care has been taken for the Fuel-Injection, Carburetor, A/T, Cruise control and ALB control units and its wiring to prevent erroneous operation from external interference, but erroneous operation of the control units may be caused by entry of extremely strong radio waves. Attention must be paid to the following items to prevent erroneous operation of the control units.
   - The antenna and the body of the radio must be at least 200 mm (7.9 in.) away from the control units.

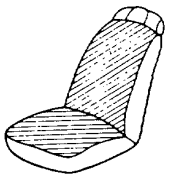
   The control unit locations:
   - Fuel-Injection, Carburetor, A/T: Passenger's side front floor panel.
   - Cruise control: Under dash panel of driver's side.
   - ALB: Right side panel of trunk room.
   - Do not lead the antenna feeder and the coaxial cable over a long distance parallel to the car's wiring.
     When crossing the wiring is required, execute crossing at a right angle.
   - Do not install a radio with a large output (max. 10 W).

6. Apply liquid gasket to the transmission, oil pump cover, right side cover and water outlet. Use HONDA genuine Liquid gasket part No. 0Y740 —99986.
   - Check that the mating surfaces are clean and dry before applying liquid gasket. Degrease the mating surfaces if necessary.
   - Apply liquid gasket evenly, being careful to cover all the mating surface.
   - To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
   - Do not install the parts if 20 minutes or more have elapsed since applying liquid gasket. In that case, reapply liquid gasket after removing the old residue.
   - Wait at least 30 minutes before filling with appropriate liquid (engine oil, coolant and similar fluids).

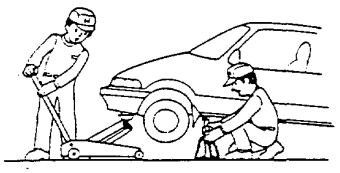
Preparation of Work

CAUTION: Observe all safety precautions and notes while working.

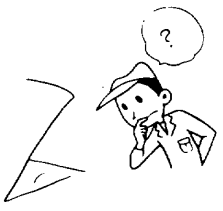
1. Protect all painted surfaces and seats against dirt and scratches with a clean cloth or vinyl cover.



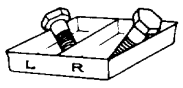
2. Work safely and give your work your undivided attention. When either the front or rear wheels are to be raised, block the remaining wheels securely. Communicate as frequently as possible when a work involves two or more workers. Do not run the engine unless the shop or working area is well ventilated.



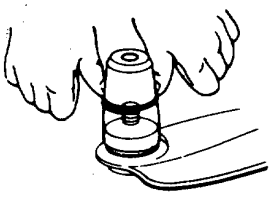
3. Prior to removing or disassembling parts, they must be inspected carefully to isolate the cause for which service is necessary. Observe all safety notes and precautions and follow the proper procedures as described in this manual.



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

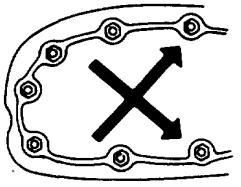


5. Use the special tools when use of such is specified.

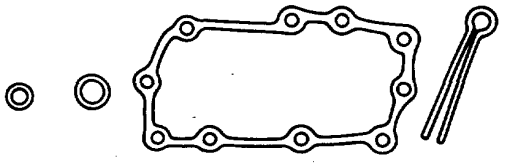


6. Parts must be assembled with the proper torque according to the maintenance standards established.

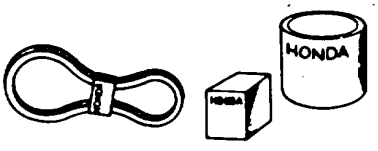
7. When tightening a series of bolts or nuts, begin with the center or larger diameter bolts and tighten them in crisscross pattern in two or more steps.



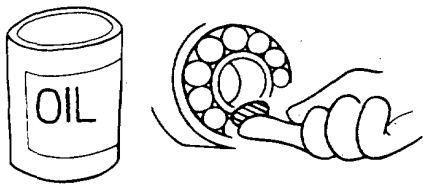
8. Use new packings, gaskets, O-rings and cotter pins whenvere reassembling.



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



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

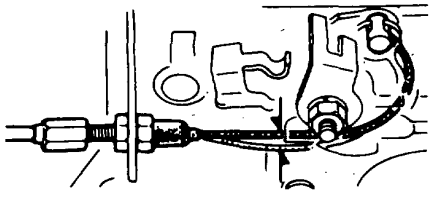


11. Brake fluid and hydraulic components
    - When replenishing the system, use extreme care to prevent dust and dirt from entering the system.
    - Do not mix different brands of fluid as they may not be compatible.
    - Do not reuse drained brake fluid.
    - Brake fluid can cause damage to painted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



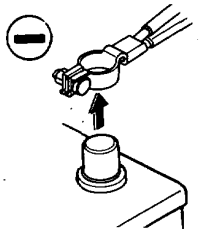
    - Keep disassembled parts from air-borne dust and abrasives.
    - Check that parts are clean before assembly.

12. Avoid oil or grease getting on rubber parts and tubes, unless specified.
13. Upon assembling, check every part for proper installation and operation.

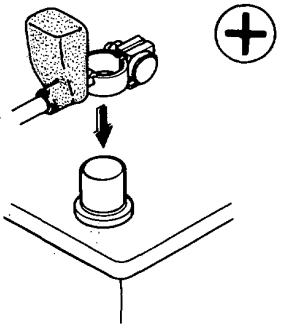


Electrical

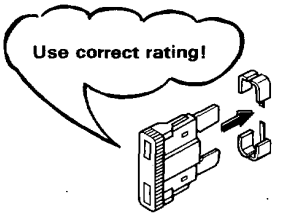
- Before making any repairs on electric wires or parts, disconnect the battery cables from the battery staring with the negative (−) terminal.



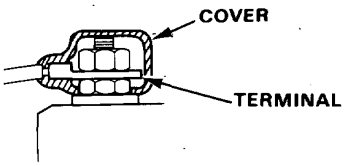
- After making repairs, check each wire or part for proper routing and installation. Also check to see that they are connected properly.
- Always connect the battery positive (+) cable first, then connect the negative (−) cable.



- 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.

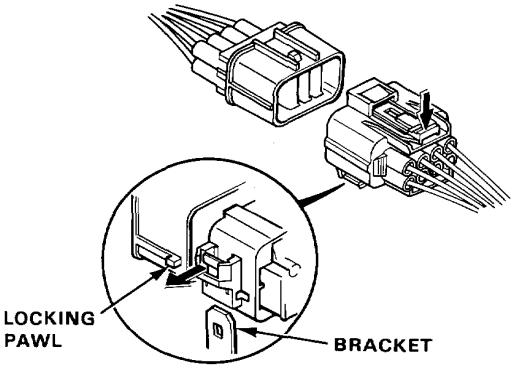


(cont'd)

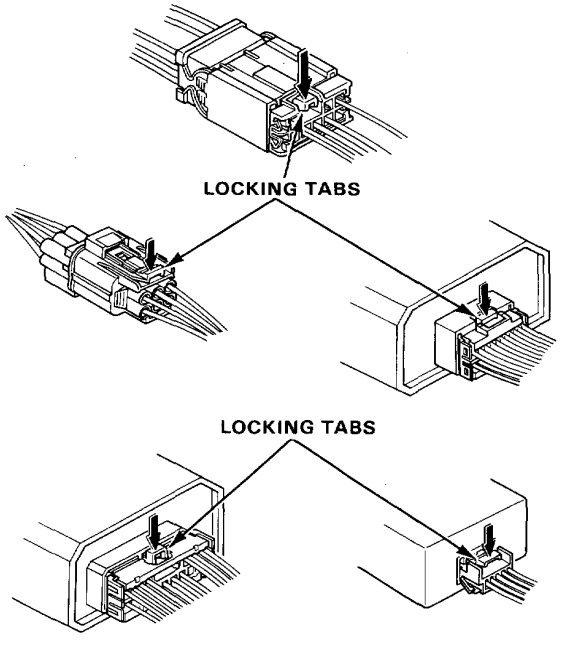
Electrical (cont'd)

Since new type connectors are used, connection and disconnection of them should be done paying attention to the following precautions.

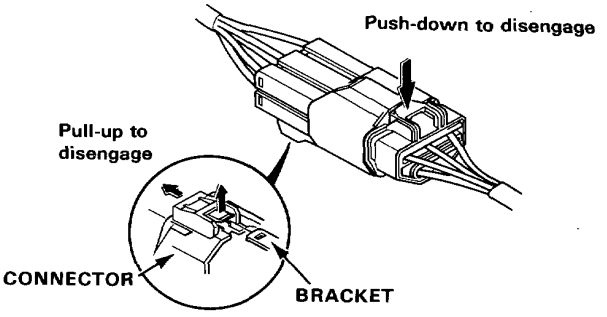
- Because all the connectors except terminal of 1-P are equipped with push-down type locks, unlock them first before disconnecting the connectors.
- On the connectors installed on the bracket a pull type lock is equipped between the bracket and the connector. Some connectors of this type can not be disconnected unless they are removed from their brackets. When disconnecting, check their shapes.
- On the bracket mounted connector with dual locks, remove the connector from the bracket before disconnecting.



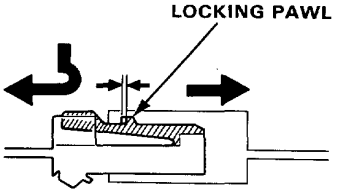
- Push the locking tab to disconnect.



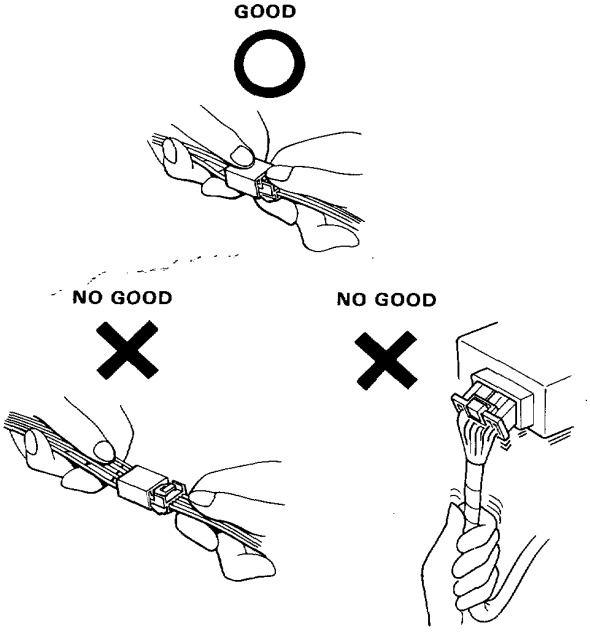
- Pull up the locking tab to remove the connector from the bracket.



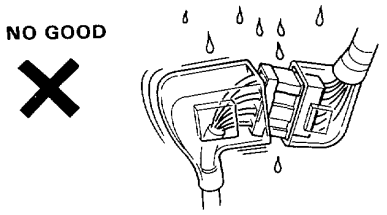
- When disconnecting locks, first press in the connector tightly (to provide clearance to the locking device), then operate the tab fully and remove the connector in the designated manner.



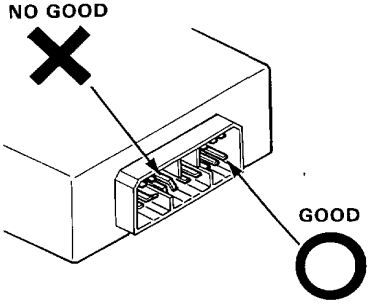
- When disconnecting a connector, pull it off from the mating coupler by holding on both connectors.
- Never try to disconnect connectors by pulling on their wires.



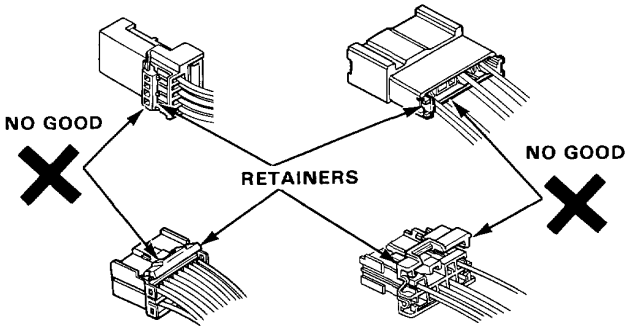
- Place the plastic cover over the mating connector after reconnecting. Also check that the cover is not distorted.



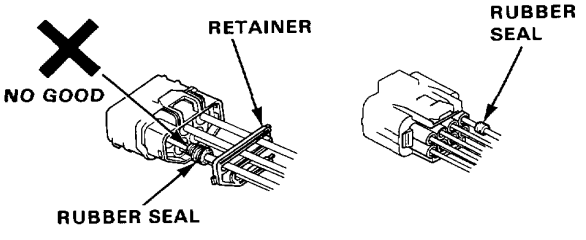
- Before connecting connectors, check to see that the terminals are in place and are not bent or distorted.



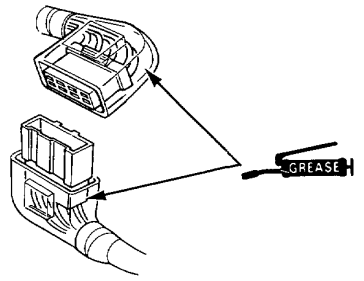
- Check for loose retainers and rubber seals. The illustration shows examples of terminal and seal abnormality.



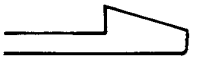
Example of waterproof connector:



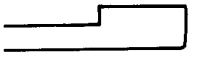
- For the connector which uses insulation grease, clean the connector then apply grease if the grease is insufficient or contaminated.



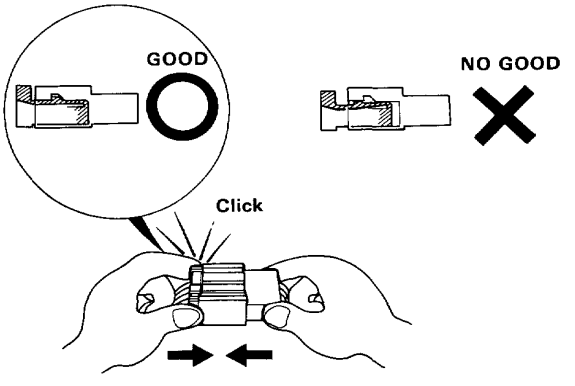
- Insert the connector tightly and make sure it is securely locked.
- Check all the wire harnesses are connected.
- There are two types of locking tab: one that you have to push and the other you should not touch when connecting the connector. Check the shape of the locking tab before connecting.
- The locking tab having a taper end should not be touched when connecting.



- The locking tab with an angle end should be pushed when connecting.



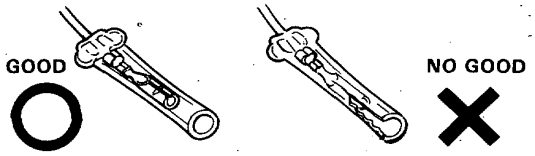
- Insert connectors fully until they will no longer go.
- The connectors must be aligned and engaged securely.
- Don't use wire harnesses with a loose wire or coupler.



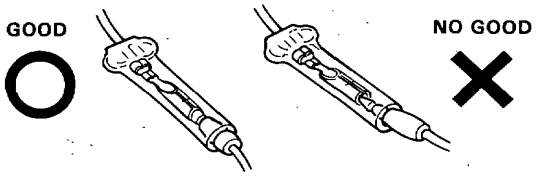
(cont'd)

Electrical (cont'd)

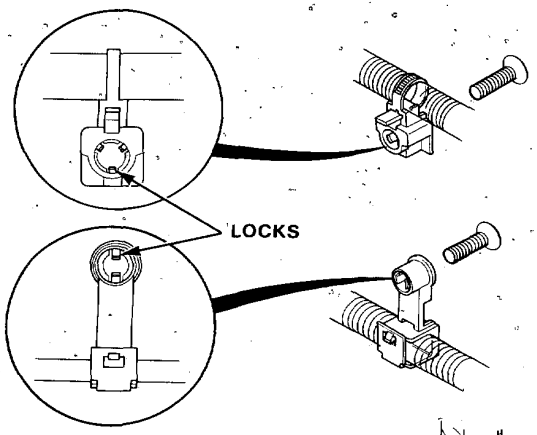
- Before connecting, check each connector cover for damage. Also make sure that the female connector is tight and not loosened from the previous use.

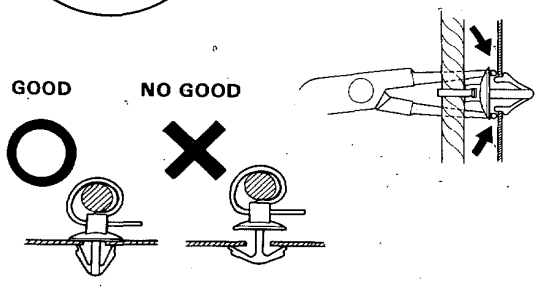


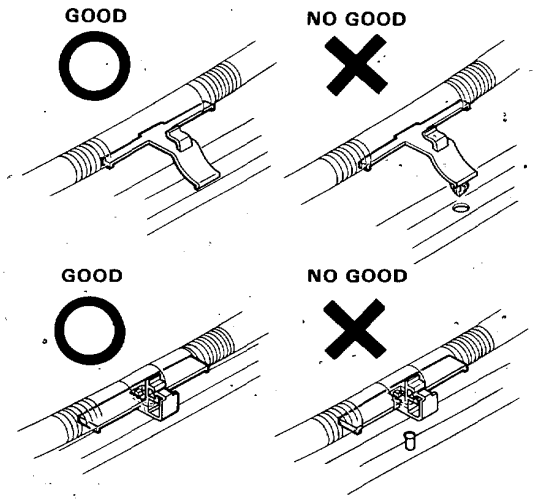
- Insert male connectors into the female connectors fully until they will no longer go.
- Be sure that plastic cover is placed over the connection.
- Position the wires so that the open of the cover is not facing upward.



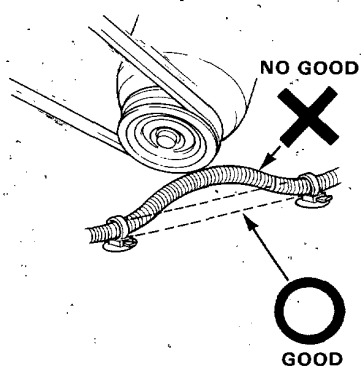
- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations. Position the wiring in the bands so that only the insulated surfaces contact the wires or wire harnesses.
- Remove with care not to damage the lock.



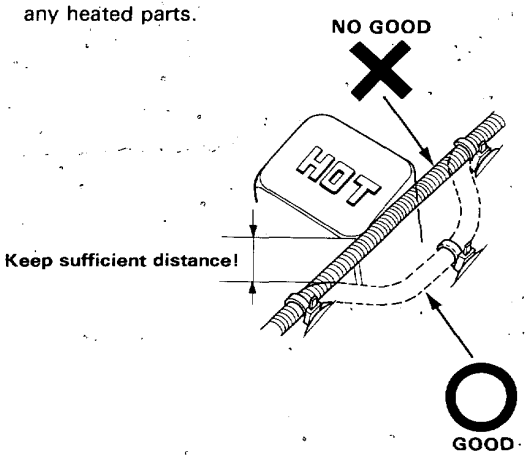




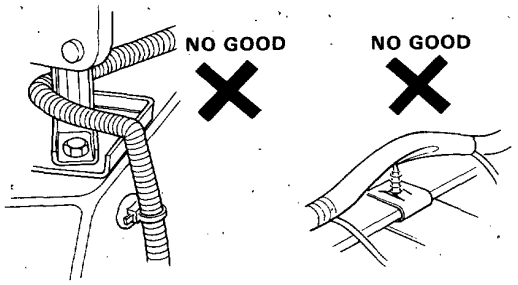
- After clamping, check each harness to be certain that it is not interfering with any moving or sliding parts of the vehicle.
- Keep wire harnesses away from the exhaust pipes and other hot parts.



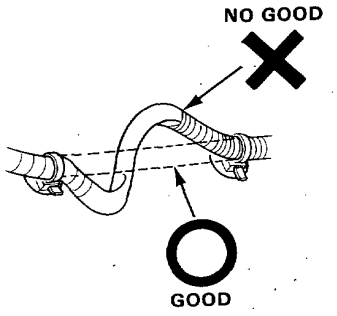
- Always keep a safe distance between wire harnesses and any heated parts.



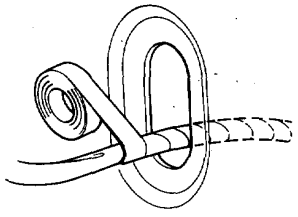
- Do not bring wire harnesses in direct contact with sharp edges or corners.
- Also avoid contact with the projected ends or bolts, screws and other fasteners.



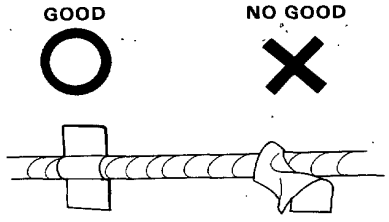
- Route harnesses so they are not pulled taut or slackened excessively.



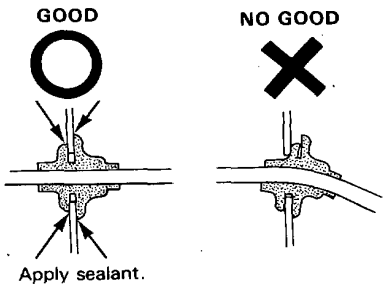
- Protect wires and harnesses with a tape or a tube if they are in contact with a sharp edge or corner.



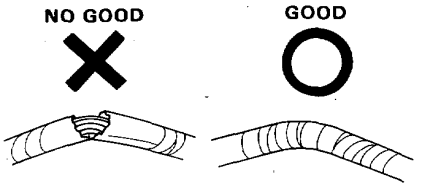
- Clean the attaching surface thoroughly if an adhesive is used. First, wipe with solvent or alcohol if necessary.



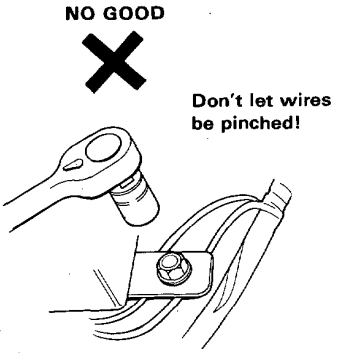
- Seat grommets in their grooves properly.



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



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

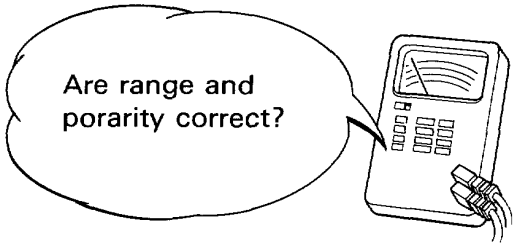


- After routing, check that the wire harnesses are not twisted or kinked.
- Wire harnesses should be routed so that they are not pulled taut, slackened excessively, pinched or interfering with adjacent or surrounding parts in all steering positions.

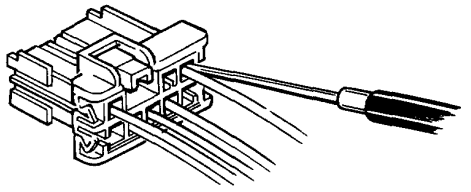
(cont'd)

Electrical (cont'd)

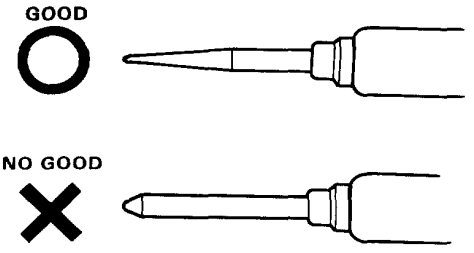
- When using the Service Tester, follow the manufacturer's instructions and those described in the Shop Manual.



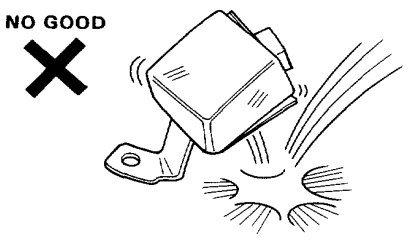
- Always insert the probe of the tester from the wire harness side (except waterproof connectors).



- Make sure to use the probe with a taper tip.



- Do not drop parts.



The following symbols stand for:



:Apply engine oil.



:Apply brake fluid.



:Apply grease.



:Apply DEXRON® II Automatic Transmission Fluid.



:Apply Power Steering Fluid.


:Apply or check vacuum.

①, ②, ③,·····
❶, ❷, ❸,····· :Sequence for removal or installation.

Abbreviation

2WS	Front Wheel Steering
4WS	Four Wheel Steering
A/C	Air Conditioner
ALB	Anti Lock Brake
A/T	Automatic Transmission
ATF	Automatic Transmission Fluid
B or BAT	Battery
CATA	Catalytic Converter
EACV	Electronic Air Control Valve
ECU	Electronic Control Unit for Fuel-Injection System
EGR	Exhaust Gas Recirculation
EX	Exhaust
GND	Ground
IG	Ignition
IN	Intake
INT	Intermittent
L.	Left
LHD	Left Hand Drive
M/T	Manual Transmission
PCV	Positive Crankcase Ventilation
PGM-FI	Programmed Fuel-Injection
P/S	Power Steering
R.	Right
RHD	Right Hand Drive
SW	Switch
SOL.V	Solenoid Valve
TDC	Top Dead Center

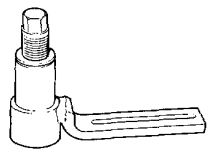
P	Parking
R	Reverse
N	Neutral
D_4	Drive Position (1st—4th)
D_3	Drive Position (1st—3rd)
2	Fixed 2nd speed
1	Fixed 1st speed
S	S Signal/S Switch

Special Tools

New Tools

Only new tools are listed below. As to other tools, refer to each section.

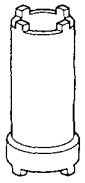
Ref. No.	Tool Number	Description	Q'ty	Remarks	Sec.
①	07LAA—PT50100	O_2 Sensor Socket Wrench	1		
②	07LAA—SM40100	Locknut Wrench 43 mm	1		11
③	07LAA—SM40200	Locknut Wrench 36 x 43 mm	1		11
④	07LAD—SM40100	Seal Driver Attachment	1		10
⑤	07LAE—PX40100	Clutch Spring Compressor Attachment	1		9
⑥	07LAF—PT00110	Clutch Alignment Shaft	1		7
⑦	07LAF—PT20100	Bearing Replacment Tool Set	1	Refer to F18A/F20A/F22A ENGINE Maintenance and Repair	—
⑧	07LAF—SM40200	Brake Spring Installer	1		13
⑨	07LAF—SM40300	Support Base Attachment	1		10
⑩	07LAG—PT20100	Balancer Shaft Lock Pin	1		5



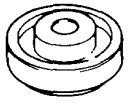
①



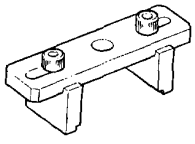
②



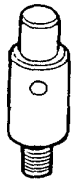
③



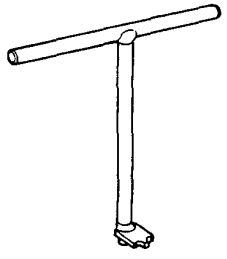
④



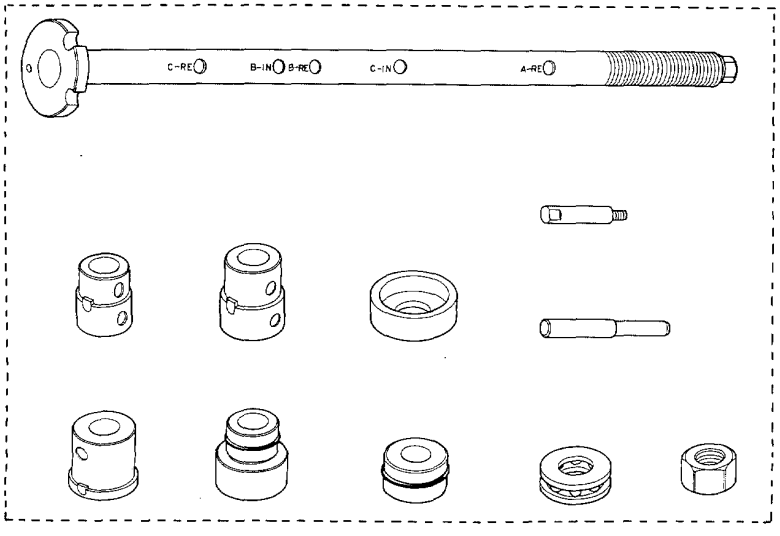
⑤



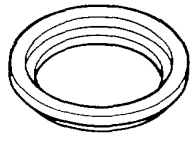
⑥



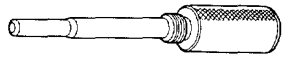
⑧



⑦

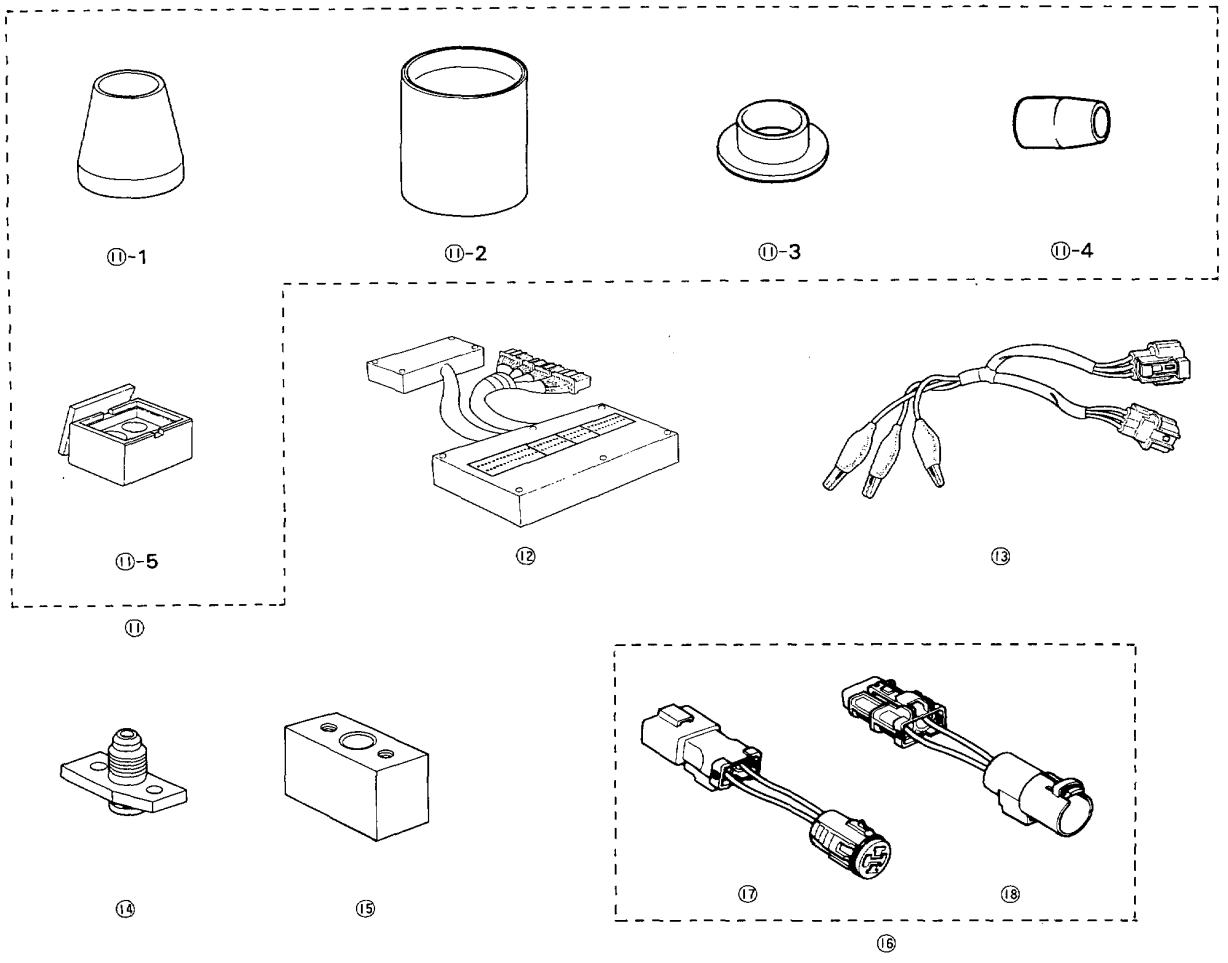


⑨



⑩

Ref. No.	Tool Number	Description	Q'ty	Remarks	Sec.
⑪	07LAG—SM40000	4WS Tool Kit	1		11
⑪-1	07LAG—SM40100	Piston Seal Ring Guide	1		11
⑪-2	07LAG—SM40200	Piston Seal Ring Sizing Tool	1		11
⑪-3	07LAG—SM40300	Cylinder End Seal Slider	1		11
⑪-4	07LAG—SM40400	Cylinder End Seal Guide	1		11
⑪-5	07LAG—SM40500	Tool Box	1		11
⑫	07LAJ—PT30100	ECU Test Harness	1		6,9,11
⑬	07LAJ—PT30200	Test harness	1		6
⑭	07LAK—SM40110	P/S Joint Adaptor (Pump)	1		11
⑮	07LAK—SM40100	P/S Joint Adaptor (Hose)	1		11
⑯	07LAZ—PT30100	R.P.M. Connecting Adaptor	1		5,6
⑰	07LAZ—PT30110	R.P.M. Connecting Adaptor (A)	1		5,6
⑱	07LAZ—PT30120	R.P.M. Connecting Adaptor (B)	1		5,6



5. Engine

Number	Tool Number	Description	Q'ty	Remarks
①	07HAD—PJ70200	Valve Stem Seal Installer	1	
②	07HAF—PL20102	Piston Base Head	1	
③	07HAH—PJ70100	Valve Guide Reamer, 5.5 mm	1	
④	07JAB—0010000	Crank Pulley Holder Set	1	
④-1	07JAA—0010200	Socket Wrench 19 mm	(1)	
④-2	07JAB—0010200	Handle	(1)	
⑤	07JAB—0010400	Pulley Holder Attachment HEX 50 mm	1	
⑥	07JAZ—SH20100	R.P.M. Connecting Adaptor	1	
⑦	07JGG—0010100	Belt Tension Gauge	1	
⑧	07GAF—PH70100	Pilot Collar	1	
⑨	07LAF—PT20100	Bearing Replacement Tool Set	1	
⑩	07LAG—PT20100	Balancer Shaft Lock Pin	1	
⑪	07LAZ-PT30100	R.P.M. Connecting Adaptor	1	
⑫	07LAZ-PT30110	R.P.M. Connecting Adaptor A	1	
⑬	07LAZ-PT30120	R.P.M. Connecting Adaptor B	1	
⑭	07406—0030000	Oil Pressure Gauge Adaptor	1	
	07742—0010100	Valve Guide Remover, 5.5 mm		
⑮	07746—0010300	Driver Attachment	1	for Crankshaft
⑯	07746—0010400	Driver Attachment	1	for Balancer Shaft
⑰	07749—0010000	Driver	1	
⑱	07757—0010000	Valve Spring Compressor	1	
⑲	07912—6110001	Oil Filter Socket	1	
⑳	07924—PD20003 or 07924—PD20002	Ring Gear Holder	1	
㉑	07984—6570101	Valve Guide Reamer, 6.6 mm	1	
㉒	07942—8920000	Valve Guide Driver, 5.5 mm	1	
㉓	07948—SB00101	Driver Attachment	1	
㉔	07973—PE00310	Piston Pin Driver Shaft	1	
㉕	07973—PE00320	Piston Pin Driver Head	1	
㉖	07973—PE00400	Piston Pin Base Insert	1	
㉗	07973—6570500	Piston Base	1	
㉘	07973—6570600	Piston Base Spring	1	
㉙	07GAF—PH60300 or 07993—PE00400	Piston Pin Base Insert	1	

6. Fuel and Emissions

Number	Tool Number	Description	Q'ty	Remarks
①	07JAZ—SH20100	R.P.M. Connector	1	
②	07LAA—PT50100	O_2 Sensor Socket Wrench	1	
③	07LAJ—PT30100	ECU Test Harness	1	
④	07LAJ—PT30200	Test Harness	1	
⑤	07LAZ—SH20100	R.P.M. Connecting Adaptor	1	
⑥	07LAZ—PT30100	R.P.M. Connecting Adaptor	1	
⑥-1	07LAZ—PT30110	R.P.M. Connecting Adaptor (A)	(1)	Component Tools
⑥-2	07LAZ—PT30120	R.P.M. Connecting Adaptor (B)	(1)	
⑦	07406—0040001	Fuel Pressure Gauge Set	1	
⑦-1	07406—0040100	Pressure Gauge	(1)	Component Tools
⑦-2	07406—0040201	Hose Assembly	(1)	
⑧	07411—0020000	Digital Circuit Tester	1	
⑨	07614—0050100	Fuel Line Clamp	1	

7. Clutch

Number	Tool Number	Description	Q'ty	Remarks
①	07JAF—PM7011A	Clutch Alignment Disc	1	
②	07LAF—PT00110	Clutch Alignment Shaft	1	
③	07924—PD20003 or 07924—PD20002	Ring Gear Holder	1	
④	07936—3710100	Handle	1	

8. Manual Transmission

Number	Tool Number	Description	Q'ty	Remarks
①	07GAJ—PG20102	Mainshaft Inspection Tool Set	1	
①-1	07GAJ—PG20110	Mainshaft Holder	(1)	Component Tools
①-2	07GAJ—PG20130	Mainshaft Base	(1)	
②	07HAJ—PK40201	Preload Inspection Tool	1	
③	07JAC—PH80000	Adjusting Bearing Remover Set	1	
③-1	07JAC—PH80100	Bearing Remover Attachment	(1)	Component Tools
③-2	07JAC—PH80200	Bearing Remover Handle	(1)	
③-3	07741—0010201	Bearing Remover Weight	(1)	
④	07JAD—PH80400	Pilot Driver 28 mm	1	
⑤	07JAD—SH30100	Oil Seal Driver	1	
⑥	07744—0010400	Pin Driver 5.0 mm	1	07944—6110100 may also be used
⑦	07746—0010300	Attachment 42 x 47 mm	1	
⑧	07746—0010400	Attachment 52 x 55 mm	1	
⑨	07746—0010500	Attachment 62 x 68 mm	1	
⑩	07746—0010600	Attachment 72 x 75 mm	1	
⑪	07746—0030100	Driver	1	
⑫	07746—0030200	Inner Driver 25 mm	1	
⑬	07749—0010000	Driver	1	
⑭	07944—SA00000	Pin Driver 4.0 mm	1	
⑮	07947—6110501	Oil Seal Driver	1	
⑯	07979—PJ40001	Magnet Stand Base	1	

Standards and Service Limits

5. Engine/Cylinder Head, Valve Train

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Compression	250 min^{-1} (rpm) and wide-open throttle	1.8 ℓ	Nominal Minimum Maximum variation	1,177 kPa (12.0 kg/cm², 171 psi) 931 kPa (9.5 kg/cm², 135 psi) 196 kPa (2 kg/cm², 28 psi)
		2.0 ℓ 2.2 ℓ	Nominal Minimum Maximum variation	1226 kPa (12.5 kg/cm², 178 psi) 931 kPa (9.5 kg/cm², 135 psi) 196 kPa (2 kg/cm², 28 psi)
Cylinder head	Warpage Height		— 99.95—100.05 (3.935—3.938)	0.05 (0.002) —
Camshaft	End play Oil clearance Runout Cam lobe height	IN 1. F18A2: 2. F20A2: 3. F20A3: 4. F20A4: 5. F20A5: 6. F20A6: 7. F22A2: 8. F22A3: 9. F22A5: EX 1. F18A2: 2. F20A2: 3. F20A3: 4. F20A4: 5. F20A5: 6. F20A6: 7. F22A2: 8. F22A3: 9. F22A5:	0.05—0.15 (0.002—0.006) 0.05—0.089 (0.002—0.0035) 0.015 (0.0006) 38.095 (1.4998) 38.526 (1.5167) 38.526 (1.5167) 38.741 (1.5252) 38.741 (1.5252) 38.526 (1.5167) 38.741 (1.5252) 39.167 (1.5420) MT 38.741 (1.5252) AT 38.526 (1.5167) 37.890 (1.4917) 38.778 (1.5266) 38.778 (1.5266) 38.972 (1.5343) 38.972 (1.5343) 38.778 (1.5266) 38.972 (1.5343) 39.356 (1.5494) MT 38.972 (1.5343) AT 38.778 (1.5266)	0.50 (0.020) 0.150 (0.006) 0.030 (0.001) — — — — — — — — — — — — — — — — — — —
Valve	Valve clearance Valve stem O.D. Stem-to-guide clearance	IN EX IN CARB PGM-FI EX IN CARB PGM-FI EX	0.24—0.28 (0.0094—0.0110) 0.28—0.32 (0.0110—0.1259) 5.485—5.495 (0.2159—0.2163) 5.480—5.490 (0.2157—0.2161) 5.450—5.460 (0.2145—0.2149) 0.020—0.045 (0.0007—0.0017) 0.025—0.050 (0.0009—0.0019) 0.055—0.080 (0.0021—0.0031)	— — 5.455 (0.2147) 5.450 (0.2145) 5.420 (0.2133) 0.075 (0.0029) 0.080 (0.0031) 0.12 (0.0047)
Valve seat	Width Valve stem installed height	IN and EX IN EX	1.25—1.55 (0.049—0.0610) 48.245—48.715 (1.8994—1.9179) 50.315—50.785 (1.9809—1.9994)	2.00 (0.0787) — —
Valve spring	Free Length	IN (NH) 1. F18A2: 2. F20A2: 3. F20A3: 4. F20A4: 5. F20A5: 6. F20A6: 7. F22A2: 8. F22A3: 9. F22A5: (CH) 1. F18A2: 2. F20A2: 3. F20A3: 4. F20A4: 5. F20A5: 6. F20A6: 7. F22A2: 8. F22A3: 9. F22A5:	56.28 (2.2157) 54.82 (2.1582) 54.82 (2.1582) 53.15 (2.0925) 53.15 (2.0925) 54.82 (2.1582) 53.15 (2.0925) 53.15 (2.0925) 54.82 (2.1582) 56.26 (2.2149) 54.81 (2.1578) 54.81 (2.1578) 53.16 (2.0929) 53.16 (2.0929) 54.81 (2.1578) 53.16 (2.0929) 53.16 (2.0929) 54.81 (2.1578)	— — — — — — — — — — — — — — — — — —

1. F18A2: 1.8 ℓ CARB
2. F20A2: 2.0 ℓ CARB with CATA
3. F20A3: 2.0 ℓ CARB
4. F20A4: 2.0 ℓ PGM-FI with CATA
5. F20A5: 2.0 ℓ PGM-FI
6. F20A6: 2.0 ℓ CARB with CATA
7. F22A2: 2.2 ℓ PGM-FI
8. F22A3: 2.2 ℓ PGM-FI with CATA
9. F22A5: 2.2 ℓ PGM-FI with CATA

NH: NIHON HATSUJO
CH: CHUO HATSUJO

Unit of length: mm (in.)

5. Engine/Cylinder Head, Valve Train

MEASUREMENT			STANDARD (NEW)	SERVICE LIMIT
Valve spring	Free length	EX (NH) 1. F18A2:	59.89 (2.3578)	—
		2. F20A2:	59.89 (2.3578)	—
		3. F20A3:	59.89 (2.3578)	—
		4. F20A4:	55.78 (2.1960)	—
		5. F20A5:	55.78 (2.1960)	—
		6. F20A6:	59.89 (2.3578)	—
		7. F22A2:	55.78 (2.1960)	—
		8. F22A3:	55.78 (2.1960)	—
		9. F22A5:	56.28 (2.2157)	—
		(CH) 1. F18A2:	59.88 (2.3574)	—
		2. F20A2:	59.88 (2.3574)	—
		3. F20A3:	59.88 (2.3574)	—
		4. F20A4:	55.80 (2.1968)	—
		5. F20A5:	55.80 (2.1968)	—
		6. F20A6:	59.88 (2.3574)	—
		7. F22A2:	55.80 (2.1968)	—
		8. F22A3:	55.80 (2.1968)	—
		9. F22A5:	55.80 (2.1968)	—
Valve guide	I.D.	IN and EX	5.515—5.530 (0.2171—0.2177)	5.53 (0.2177)
	Valve guide installed height	IN	23.75—24.25 (0.9148—0.9547)	—
		EX	15.05—15.55 (0.5925—0.6122)	—
Rocker arm	Arm-to shaft clearance	IN	0.017—0.050 (0.0007—0.0020)	0.080 (0.0031)
		EX	0.018—0.054 (0.0007—0.0021)	0.080 (0.0031)

5. Engine/Engine Block

MEASUREMENT			STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface		0.07 (0.003) max.	0.10 (0.004)
	Bore diameter		85.00—85.02 (3.3464—3.3472)	85.07 (3.3492)
	Bore taper		—	0.05 (0.002)
	Reboring limit		—	0.5 (0.02)
Piston	Skirt O.D. (At 21 mm (0.83 in) from bottom of skirt)		A	84.98—84.99 (3.3456—3.4605)	84.97 (3.3452)
			B	84.97—84.98 (3.3452—3.3456)	84.96 (3.3448)
	Clearance in cylinder			0.02—0.04 (0.0008—0.0016)	0.05 (0.0020)
Piston ring	Piston-to-ring clearance	Top		0.035—0.060 (0.0014—0.0024)	0.130 (0.0051)
		Second		0.030—0.055 (0.0011—0.0022)	0.130 (0.0051)
	Ring end gap	Top		0.20—0.35 (0.0079—0.0138)	0.60 (0.0236)
		Second		0.40—0.55 (0.0157—0.0217)	0.70 (0.0276)
		Oil		0.20—0.70 (0.0079—0.0276)	0.80 (0.0315)
Connecting rod	Pin-to rod interference			0.013—0.032 (0.0005—0.0013)	—
	Small end bore diameter			21.968—21.981 (0.8649—0.8654)	—
	Large end bore diameter	1.8 ℓ, 2.0 ℓ		Nominal 48 (1.890)	—
		2.2 ℓ		Norminal 51 (2.008)	—
	End play installed on crankshaft			0.15—0.30 (0.006—0.012)	0.40 (0.016)
Crankshaft	Main journal diameter	No.1, 2 Journals		49.976—50.000 (1.9676—1.9685)	—
		No.3 Journal		49.972—49.996 (1.9674—1.9683)	—
		No.4, 5 Journals		49.948—50.008 (1.9665—1.9688)	—
	Taper/out-of-round, main journal			0.005 (0.0002) max.	0.010 (0.0004)
	Rod journal diameter			44.976—45.000 (1.7710—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			0.015 max (0.0006)	0.020 (0.0008)
Bearings	Main bearing-to journal oil clearance	No.1, 2 Journals		0.021—0.045 (0.0009—0.0018)	0.05 (0.002)
		No.3 Journal		0.035—0.044 (0.0014—0.0017)	0.054 (0.0021)
		No.4, 5 Journals		0.013—0.037 (0.0005—0.0015)	0.05 (0.002)
	Rod bearing-to journal oil clearance	2.2 ℓ		0.021—0.044 (0.0008—0.0017)	0.05 (0.002)
		others		0.015—0.044 (0.0006—0.0017)	0.05 (0.002)

1. F18A2: 1.8 ℓ CARB
2. F20A2: 2.0 ℓ CARB with CATA
3. F20A3: 2.0 ℓ CARB
4. F20A4: 2.0 ℓ PGM-FI with CATA
5. F20A5: 2.0 ℓ PGM-FI
6. F20A6: 2.0 ℓ CARB with CATA
7. F22A2: 2.2 ℓ PGM-FI
8. F22A3: 2.2 ℓ PGM-FI with CATA
9. F22A5: 2.2 ℓ PGM-FI with CATA

Standards and Service Limits

5. Engine/Engine Block

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Balancer Shaft	Journal diameter	No.1 journal (Front)	42.722—42.734 (1.6820—1.6824)	—
		(Rear)	20.938—20.950 (0.8243—0.8248)	—
		No.2 journal	38.712—38.724 (1.5241—1.5246)	—
		No.3 journal	34.722—34.734 (1.3670—1.3674)	—
	Journal taper		0.005 (0.0002)	—
	End play	(Front)	0.100—0.350 (0.0040—0.0138)	—
		(Rear)	0.060—0.180 (0.0024—0.0070)	—
	Runout		0.020 (0.0008)	—
	Oil Clearance	No.1 journal (Rear)	0.050—0.075 (0.0020—0.0030)	—
		No.1, 3 journal	0.066—0.118 (0.0026—0.0046)	—
		No.2, journal	0.076—0.128 (0.0030—0.0050)	—
Balancer Shaft Bearing	I.D	No.1 journal (Front)	42.800—42.820 (1.6850—1.6858)	—
		(Rear)	21.000—21.013 (0.8268—0.8273)	—
		No.2 journal	38.800—38.820 (1.5276—1.5283)	—
		No.3 journal	34.800—34.820 (1.3701—1.3710)	—

5. Engine/Engine Lubrication

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity (US. qt., Imp. qt.)		4.9 (5.2, 4.3) After engine disassembly 3.8 (4.0, 3.3) After oil change, including oil filter 3.5 (3.7, 3.1) After oil change, without oil filter	
Oil pump	Displacement		43.9 ℓ (11.6 US. gal., 9.7 Imp. gal.)/6,000 min⁻¹ (rpm)	
	Inner-to-outer rotor radial clearance		0.02—0.16 (0.0008—0.0063)	0.2 (0.008)
	Pump body-to-rotor radial clearance		0.10—0.19 (0.0040—0.0075)	0.21 (0.0083)
	Pump body-to-rotor side clearance		0.02—0.07 (0.001—0.003)	0.12 (0.005)
Relief valve	Pressure setting 80°C (176°F)	Idle	69 kPa (0.7 kg/cm², 10 psi) min.	
		3,000 min⁻¹ (rpm)	3431 kPa (3.5 kg/cm², 50 psi)	

Unit of length: mm (in.)

5. Engine/Cooling

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Thermostat	Starts to open Full open Valve lift at full open	78°C±2 (172°F±3) 90°C (194°F) 8 (0.31) max.	86—90°C (187—194°F)
Water Pump	Displacement	160 ℓ (42.2 US gal, 35.2 Imp gal)/6,000 min⁻¹ (rpm)	
Radiator	Capacity (incl. heater) ℓ (US.qt., Imp. qt) (Includes reservoir tank 0.6 (0.63, 0.53)		
	after overhaul 1. F18A2:	MT: 6.6 (6.97, 5.81) AT: 6.5 (6.87, 6.72)	
	2. F20A2:	7.2 (7.61, 6.34) 7.1 (7.50, 6.23)	
	3. F20A3:	7.2 (7.61, 6.34) 7.1 (7.50, 6.23)	
	4. F20A4:	7.2 (7.61, 6.34) 7.1 (7.50, 6.23)	
	5. F20A5:	7.2 (7.61, 6.34) 7.1 (7.50, 6.23)	
	6. F20A6:	7.2 (7.61, 6.34) 7.1 (7.50, 6.23)	
	7. F22A2:	6.6 (6.97, 5.81) 7.1 (7.50, 6.23)	
	8. F22A3:	7.2 (7.61, 6.34) 7.1 (7.50, 6.23)	
	9. F22A5:	6.6 (6.97, 5.81) 7.1 (7.50, 6.23)	
	at change 1. F18A2:	MT: 3.0 (3.17, 2.64) AT: 2.9 (3.06, 2.55)	
	2. F20A2:	3.6 (3.80, 3.17) 3.5 (3.70, 3.08)	
	3. F20A3:	3.6 (3.80, 3.17) 3.5 (3.70, 3.08)	
	4. F20A4:	3.6 (3.80, 3.17) 3.5 (3.70, 3.08)	
	5. F20A5:	3.6 (3.80, 3.17) 3.5 (3.70, 3.08)	
	6. F20A6:	3.6 (3.80, 3.17) 3.5 (3.70, 3.08)	
	7. F22A2:	3.0 (3.17, 2.64) 3.0 (3.17, 2.64)	
	8. F22A3:	3.6 (3.80, 3.17) 3.6 (3.80, 3.17)	
	9. F22A5:	3.0 (3.17, 2.64) 3.5 (3.70, 3.08)	
	pressure cap opening pressure	88.3—123 kpa (0.9—1.25 kg/cm², 12.8—17.8 psi)	
Cooling fan	"ON" temperature	87°—93°C (189°—199°F)	
	"OFF" temperature	80°—91°C (176°—196°F)	
	"ON" temperature (Fan timer)	105°—111°C (221°—231°F)	
	"OF" temperature (Fan timer)	98°—109°C (208°—228°F)	

1. F18A2: 1.8 ℓ CARB
2. F20A2: 2.0 ℓ CARB with CATA
3. F20A3: 2.0 ℓ CARB
4. F20A4: 2.0 ℓ PGM-FI with CATA
5. F20A5: 2.0 ℓ PGM-FI
6. F20A6: 2.0 ℓ CARB with CATA
7. F22A2: 2.2 ℓ PGM-FI
8. F22A3: 2.2 ℓ PGM-FI with CATA
9. F22A5: 2.2 ℓ PGM-FI with CATA

Standards and Service Limits

6. Fuel and Emissions

	MEASUREMENT		STANDARD (NEW)
Fuel Pump (Carburated engine)	Delivery pressure Displacement (minimum in 10 seconds) Relief valve opening pressure		250 kPa (2.55 kg/cm², 36 psi) 230 cc (7.8 US oz., 8.1 Imp oz.) 441—588 kPa (4.5—6.0 kg/cm², 64—85 psi)
Fuel Pump (PGM-FI)	Delivery pressure Displacement (minimum in minute at 12V)		9—14 kPa (0.09—0.14 kg/cm², 1.3—2.0 psi) 760 cc (25.7 US oz., 26.8 Imp oz.)
Pressure Regulator (PGM-FI)	Pressure		240—279 kPa (2.45—2.85 kg/cm², 35—41 psi)
Fuel Tank	Capacity	2WS: 4WS:	65 ℓ (17.2 US gal., 14.3 Imp gal.) 60 ℓ (15.9 US gal., 13.2 Imp gal.)
Engine	Fast idle		1,400 min^{-1} (rpm)
	Idle speed (with headlights and cooling fan OFF)	MT with carburated engine: MT with PGM-FI engine: AT with carburated engine: AT with PGM-FI engine:	800±50 min^{-1} (rpm) 770±50 min^{-1} (rpm) 750±50 min^{-1} (rpm) in D position 770±50 min^{-1} (rpm) in D or N positions
	Idle CO	With CATA: Without CATA:	0.1% maximum 1.0±1.0%

7. Clutch

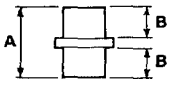
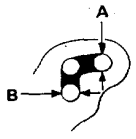
	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height Stroke Pedal play Disengagement height	210 (8.3) to floor 142.0 (5.6) 9—15 (0.4—0.6) 90 (3.5) min. to floor 80 (3.1) min. to carpet	— — — — —
Flywheel	Clutch surface runout	0.05 (0.002) max.	0.15 (0.006)
Clutch disc	Rivet head depth Surface runout Thickness	1.3 (0.05) min. 0.8 (0.03) max. 8.5—9.2 (0.33—0.36)	0.2 (0.008) 1.0 (0.04) 6.1 (0.24)
Clutch cover	Uneveness of diaphragm spring	0.6 (0.02) max.	0.8 (0.03)

8. Manual Transmission

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (U.S. qt., Imp. qt.)	1.9 (2.0, 1.7) at assembly 2.0 (2.1, 1.8) at oil change	
Mainshaft	End play Diameter of ball bearing contact area Diameter of third gear contact area Diameter of ball bearing contact area Runout	0.10—0.16 (0.0039—0.0063) 27.977—27.990 (1.1015—1.1020) 37.984—38.000 (1.4954—1.4961) 27.987—28.000 (1.1018—1.1024) 0.02 (0.008) max.	Adjust with a shim. 29.93 (1.1783) 37.930 (1.4933) 27.940 (1.1000) 0.05 (0.002)
Mainshat third and fourth gears	I.D. End play Thickness 3rd gear 4th gear	43.009—43.025 (1.6933—1.6939) 0.06—0.21 (0.0024—0.0083) 32.42—32.47 (1.276—1.278) 30.92—30.97 (1.217—1.219)	43.080 (1.6961) 0.30 (0.012) 32.3 (1.27) 30.8 (1.21)
Mainshaft fifth gear	I.D End play Thickness	43.009—43.025 (1.6933—1.6939) 0.06—0.21 (0.0024—0.0083) 30.42—30.47 (1.198—1.200)	43.080 (1.6961) 0.30 (0.012) 30.3 (1.193)
Countershaft	End play Diameter of needle bearing contact area Diameter of ball bearing needle bearing contact area Diameter of low gear contact area Runout	0.05—0.21 (0.0019—0.0083) 33.000—33.015 (1.2992—1.2998) 24.987—25.000 (0.9837—0.9845) 39.984—40.000 (1.5742—1.5748) 0.02 (0.0008) max.	0.50 (0.02) 32.95 (1.297) 24.94 (0.982) 39.93 (1.572) 0.05 (0002)

Unit of length: mm (in.)

8. Manual Transmission

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Countershaft low gear	I.D. End play	46.009—46.025 (1.8114—1.8120) 0.04—0.10 (0.002—0.004)	46.08 (1.814) Adjust with a washer.
Countershaft second gear	I.D. End play Thickness	50.009—50.025 (1.9689—1.9695) 0.04—0.10 (0.002—0.004) 33.92—33.97 (1.335—1.337)	50.08 (1.972) Adjust with a collar. 32.8 (1.2913)
Spacer collar (Countershaft second gear)	I.D. O.D. Length A B	36.48—36.49 (1.4362—1.4366) 43.989—44.000 (1.7318—1.7323) 29.03—29.05 (1.1429—1.1437) 28.98—29.00 (1.1409—1.1417)	36.50 (1.437) 43.94 (1.730) — —
Spacer collar (Mainshaft fourth and fifth gears)	I.D. O.D. Length A B 	31.002—31.012 (1.2205—1.2209) 37.989—38.000 (1.4956—1.4961) 56.45—56.55 (2.222—2.226) 26.03—26.08 (1.0248—1.0268)	31.06 (1.223) 37.94 (1.494) — 26.01 (1.024)
Reverse idler gear	I.D. Gear-to-reverse gear shaft clearance	20.016—20.043 (0.7880—0.7891) 0.036—0.084 (0.0014—0.0033)	20.09 (0.7909) 0.160 (0.0006)
Synchronizer ring	Ring-to-gear clearance (ring pushed against gear)	0.85—1.10 (0.0335—0.0433)	0.40 (0.016)
Shift fork	Synchronizer sleeve groove width *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	Pawl groove width Fork-to-reverse idle gear clearance Groove width at A at B Fork-to fifth/ reverse shift Shaft clearance at A at B 	13.0—13.3 (0.51—0.52) 0.5—1.1 (0.02—0.43) 7.05—7.25 (0.278—0.2854) 7.4—7.7 (0.29—0.30) 0.05—0.35 (0.002—0.014) 0.4—0.8 (0.02—0.03)	— 1.8 (0.07) — — 0.5 (0.02) 1.0 (0.04)
Shift arm	I.D. Shift arm-to-shaft clearance Shift fork diameter at contact area Shift-arm-to-shift fork shaft clearance	15.973—16.000 (0.6289—0.6299) 0.005—0.059 (0.0002—0.0023) 12.9—13.0 (0.508—0.512) 0.2—0.5 (0.01—0.02)	— — — 0.6 (0.02)
Select lever	Pin size of contact area Shaft outer diameter Shift arm cover clerance	7.9—8.0 (0.311—0.315) 15.41—15.68 (0.607—0.617) 0.032—0.102 (0.0013—0.0040)	— — —
Shift arm lever	O.D. Transmission housing clearance	15.941—15.968 (0.6276—0.6287) 0.027—0.139 (0.0011—0.0055)	— —
Inter lock	Bore diameter Shift arm lever clearance	16.00—16.05 (0.630—0.632) 0.032—0.109 (0.0013—0.0043)	— —
Ring gear	Backlash	0.085—0.142 (0.0033—0.0056)	0.200 (0.0079)
Differential carrier	Pinion shaft bore diameter Carrier-to-pinion shaft clearance Driveshaft bore diameter Carrier-to-driveshaft clearance R L	18.000—18.018 (0.7087—0.7094) 0.017—0.047 (0.0007—0.0019) 28.005—28.025 (1.1026—1.1033) 0.020—0.062 (0.0008—0.0024) 0.055—0.091 (0.0022—0.0036)	— 0.100 (0.0039) — 0.120 0.150
Differential pinion gear	Backlash Pinion gear bore diameter Pinion gear-to-pinion shaft clearance	0.05—0.15 (0.002—0.006) 18.042—18.066 (0.7103—0.7113) 0.059—0.095 (0.0023—0.0037)	Selection with 7 types of washers. — 0.150 (0.0059)
Differential taper roller bearing	Preload	1.4—2.6 N·m (14—26 kg-cm, 1.0—1.9 lb-ft)	Selection with 20 types of shims.

Standards and Service Limits

9. Automatic Transmission

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (U.S. qt., Imp. qt.)		2.4 (2.5, 2.1) at oil change 6.0 (6.4, 5.2) at assembly	
Hydrauric pressure	Line pressure at 2,000 min^{-1} (rpm)	Carburetor	760 kPa (7.75 kg/cm², 110 psi) Throttle valve full- closed ↓ 808 kPa (8.25 kg/cm², 117 psi) Throttle valve more than 2/8 open	710 kPa (7.25kg/cm², 103 psi) Throttle valve more than 2/8 open
		PGM-FI	784 kPa (8.0 kg/cm², 113 psi) Throttle valve full-closed ↓ 833 kPa (8.5 kg/cm², 120psi) Throttle valve more than 2/8 open	735 kPa (7.5 kg/cm², 106 psi) Throttle valve more than 2/8 open
	4th clutch pressure at 2,000 min^{-1} (rpm)	Carburetor	411 kPa (4.2 kg/cm², 59 psi) Throttle valve full-closed ↓ 808 kPa (8.25 kg/cm², 117 psi) Throttle Valve more than 2/8 open	352 kPa (3.6 kg/cm², 51 spi) Throttle valve full-closed ↓ 710 kPa (7.25 kg/cm², 103 psi) Throttle valve more than 2/8 open
		PGM-FI	509 kPa (5.2 kg/cm², 74 psi) Throttle valve full-closed ↓ 833 kPa (8.5 kg/cm², 120 psi) Throttle valve more than 2/8 open	460 kPa (4.7 kg/cm², 66 psi) Throttle valve full-closed ↓ 735 kPa (7.5 kg/cm², 106 psi) Throttle valve more than 2/8 open
	3rd clutch pressure at 2,000 min^{-1} (rpm)	Carburetor	392 kPa (4.0 kg/cm², 57 psi) Throttle valve full-closed ↓ 808 kPa (8.25 kg/cm², 117 psi) Throttle valve more than 2/8 open	352 kPa (3.6 kg/cm², 51 psi) Throttle volve full-closed ↓ 710 kPa (7.25 kg/cm², 103 psi) Throttle volve more than 2/8 open
		PGM-FI	490 kPa (510 kg/cm², 71 psi) Throttle valve full-closed ↓ 833 kPa (8.5 kg/cm², 120 psi) Throttle valve more than 2/8 open	441 kPa (4.5 kg/cm², 64 psi) Throttle valve full-closed ↓ 735 kPa (7.5 kg/cm², 106 psi) Throttle valve more than 2/8 open
	2nd clutch pressure at 2,000 min^{-1} (rpm)	Carburetor	392 kPa (4.0 kg/cm², 57 psi) Throttle valve full-closed ↓ 808 kPa (8.25 kg/cm², 117 psi) Throttle valve more than 2/8 open	352 kPa (3.6 kg/cm², 51 psi) Throttle valve full-closed ↓ 710 kPa (7.25 kg/cm², 103 psi) Throttle valve more than 2/8 open
		PGM-FI	490 kPa (5.0 kg/cm², 71 psi) Throttle valve full-closed ↓ 833 kPa (8.5 kg/cm², 120 psi) Throttle valve more than 2/8 open	441 kPa (4.5 kg/cm², 64 psi) Throttle valve full-closed ↓ 735 kPa (7.5 kg/cm², 106 psi) Throttle valve more than 2/8 open
	1st clutch pressure at 2,000 min^{-1} (rpm)	Carburetor	750—808 kPa (7.75—8.25 kg/cm², 110—117 psi)	710 kPa (7.25 kg/cm², 103 psi)
		PGM-FI	784—833 kPa (8.0—8.5 kg/cm², 113—120 psi)	735 kPa (7.5 kg/cm², 106 psi)

9. Automatic Transmission

Unit of length: mm (in.)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Hydrouric pressure	Governor pressure at (37.5 mph) 60 km/h	Carburetor with CATA	225—235 kPa (2.30—2.40 kg/cm², 32—34 psi)	220 kPa (2.25 kg/cm², 32 psi)
		Carburetor without CATA	166—176 kPa (1.70—1.80 kg/cm², 24—25 psi)	162 kPa (1.65 kg/cm², 23 psi)
	Throttle pressure A	Carburetor with CATA	closed 0	—
			open 514—530 kPa (5.25—5.4 kg/cm², 74—76 psi)	509 kPa (5.2 kg/cm², 73 psi)
		Carburetor with CATA	closed 0	—
			open 485—500 kPa (4.95—5.10 kg/cm², 70—72 psi)	480 kPa (4.9 kg/cm², 69 psi)
	Throttle pressure B	Carburetor	closed 0	—
			open 760—808 kPa (7.75—8.25 kg/cm², 110—117 psi)	710 kPa (7.25 kg/cm², 103 psi)
		PGM-FI	closed 0	—
			open 784—833 kPa (8.0—8.5 kg/cm², 113—120 psi)	735 kPa (7.5 kg/cm², 106 psi)
Stall speed	Check with car on level ground	Carburetor (1.8 ℓ)	2,450—2,750 min^{-1} (rpm)	
		Others	2,350—2,650 min^{-1} (rpm)	
Clutch	Clutch initial clearance	1st hold	0.8—1.0 (0.031—0.039)	—
		1st, 2nd	0.65—0.85 (0.026—0.033)	—
		3rd, 4th	0.4—0.6 (0.016—0.024)	—
	Clutch return spring free length	Carburetor	1st, 33.9 (1.334) 2nd, 30.3 (1.192) 3rd, 32.1 (1.263) 4th, 32.1 (1.263)	31.9 (1.255) 28.3 (1.114) 30.1 (1.185) 30.1 (1.185)
		PGM-FI	1st, 2nd, 3rd, 4th, 33.5 (1.318)	31.5 (1.240)
	Clutch disc thickness		1.88—2.0 (0.074—0.079)	Until grooves worn out
	Clutch plate thickness	Carburetor	1st, 3rd, 4th, 1.95—2.05 (0.0767—0.0807)	Discoloration ↑
			2nd, 2.55—2.65 (0.1003—0.1043)	
		PGM-FI	1st, 1.95—2.05 (0.0767—0.0807)	
			2nd, 2.55—2.65 (0.1003—0.1043)	
			3rd, 4th, 2.25—2.35 (0.0885—0.0925)	
	Clutch end plate thickness	Mark 1	2.05—2.10 (0.081—0.83)	↓ Discoloration
		Mark 2	2.15—2.20 (0.085—0.087)	
		Mark 3	2.25—2.30 (0.089—0.091)	
		Mark 4	2.35—2.40 (0.093—0.094)	
		Mark 5	2.45—2.50 (0.096—0.098)	
		Mark 6	2.55—2.60 (0.100—0.102)	
		Mark 7	2.65—2.70 (0.104—0.106)	
		Mark 8	2.75—2.80 (0.108—0.110)	
		Mark 9	2.85—2.90 (0.112—0.114)	
		*Mark 10	2.95—3.00 (0.116—0.118)	

*Carburated engine only.

Standards and Service Limits

9. Automatic Transmission (cont'd)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Valve body	Stater camshaft needle bearing contact area I.D. (torque converter side)	27.000—27.021 (1.0630—1.0638)	Wear or damage
	Stater camshaft needle bearing contact area I.D. (oil pump side)	29.000—29.013 (1.417—1.1422)	—
	Oil pump driven gear I.D.	14.016—14.034 (0.5518—0.5525)	Wear or damage
	Oil pump shaft O.D.	13.980—13.990 (0.5504—0.5508)	Wear or damage
	Oil pump gear side clearance	0.03—0.05 (0.0012—0.0020)	0.07 (0.0028)
	Oil pump gear-to-body clearance Drive	0.21—0.265 (0.0083—0.0104)	—
	Oil pump gear-to-body clearance Driven	0.07—0.125 (0.0027—0.0049)	—
Regulator valve body	Sealing ring contact area diameter	35.000—35.025 (1.3780—1.3789)	35.050 (1.3799)
Accumulator body	Sealing ring contact area diameter	32.000—32.025 (1.2598—1.2608)	32.05 (1.2618)
Stator camshaft	Sealing ring contact area diameter	29.000—29.013 (1.1417—1.1422)	29.05 (1.1436)
Shifting device and parking brake control	Reverse shift fork thickness	5.90—6.00 (0.232—0.236)	5.40 (0.213)
	Parking brake ratchet pawl	—	Wear or other defect
	Parking gear	—	Wear or other defect
	Throttle cam stopper Carburetor	18.5—18.6 (0.7283—0.7322)	—
	Throttle cam stopper PGM-FI	17.0—17.1 (0.6692—0.6732)	—
Servo body	Shif fork Shaft I.D. A	14.000—14.005 (0.5512—0.5514)	—
	Shif fork Shaft I.D. B	14.006—14.010 (0.5514—0.5516)	—
	Shif fork Shaft I.D. 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)
Transmission	Diameter of needle bearing contact area On mainshaft and stator shaft	22.980—23.000 (0.9047—0.9055)	Wear or damage
	On mainshaft 4th gear collar	31.984—32.000 (1.2592—1.2598)	↑
	On mainshaft 3rd gear collar Carburetor	41.984—42.000 (1.6529—1.6535)	↑
	On mainshaft 3rd gear collar PGM-FI	45.984—46.000 (1.8103—1.8110)	↑
	On counter shaft 1st gear collar	40.984—42.000 (1.6135—1.6535)	↑
	On counter shaft 4th gear collar	35.980—35.996 (1.4165—1.4171)	↑
	On counter shaft reverse gear collar	35.984—36.000 (1.4166—1.4173)	↑
	On counter shaft parking gear	39.984—40.000 (1.5741—1.5748)	↑
	On secondary shaft 1st gear	31.975—31.991 (1.2588—1.2594)	↑
	On secondary shaft 2sd gear	35.984—36.000 (1.4166—1.4173)	↑
	Reverse idle shaft holder I.D.	14.416—14.434 (0.5675—0.5682)	↑
	Mainshaft 3rd gear I.D.	52.000—52.019 (2.0472—2.0479)	↑
	4th gear I.D.	38.000—38.016 (1.4960—1.4966)	Wear or damage

9. Automatic Transmission

Unit of length: mm (in.)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission	Couter shaft 1st gear I.D.	47.000—47.016 (1.8504—1.8510)	Wear or damage
	4th gear I.D.	42.000—42.016 (1.6535—1.6541)	↑
	reverse gear I.D.	42.000—42.016 (1.6535—1.6541)	↑
	idle gear I.D.	48.000—48.016 (1.8897—1.8903)	↑
	Secondary shaft 1st gear I.D.	37.000—37.016 (1.4566—1.4573)	↑
	2nd gear I.D.	42.010—42.025 (1.6539—1.6545)	↑
	Mainshaft 3rd gear collar length	20.000—20.050 (0.7874—0.7893)	↑
	4th gear collar length	47.500—47.550 (1.8700—1.8720)	↑
	Counter shaft 1st gear collar length	27.500—27.550 (1.0826—1.0846)	↑
	4th gear collar length	20.04—20.08 (0.7889—0.7905)	↑
	reverse gear collar length	15.00—15.05 (0.5905—0.5925)	↑
	Secondary shaft distance collar length	4.95—5.00 (0.1948—0.1968)	↑
	Counter shaft 1st gear thickness	1.45—1.50 (0.0570—0.0590)	↑
	Counter shaft parking gear length	25.030—25.048 (0.9854—0.9861)	Wear or damage

Standards and Service Limits

9. Automatic Transmission (cont'd)

Unit of length: mm (in.)

	MEASUREMENT		STANDARD (NEW)			
			WIRE DIA.	O.D.	FREE LENGTH	No. of COILS
Spring (Carburetor)	1st One way ball spring		0.29 (0.0114)	4.0 (0.01574)	14.0 (0.5511)	13.0
	Regulator valve spring A		1.80 (0.0708)	14.7 (0.5787)	85.1 (3.3503)	16.5
	Regulator valve spring B		1.80 (0.0708)	9.6 (0.3779)	44.0 (1.7328)	7.5
	Stator reaction spring		5.50 (0.2165)	37.4 (1.4724)	30.3 (1.1929)	2.1
	Throttle modulator spring	with CATA	1.20 (0.0472)	9.4 (0.3700)	27.2 (1.0708)	8.0
		without CATA	1.20 (0.0472)	9.4 (0.3700)	26.3 (1.0354)	8.0
	Torque convertor check valve spring		1.10 (0.0433)	8.4 (0.3307)	36.8 (1.4488)	12.0
	Relife valve spring		1.00 (0.0393)	8.4 (0.3307)	39.1 (1.5393)	15.1
	Cooler check valve spring		1.10 (0.0433)	8.4 (0.3307)	46.8 (1.8425)	17.0
	Governer spring A	with CATA	1.0 (0.0393)	18.8 (0.7401)	44.3 (1.7440)	4.0
		without CATA	1.0 (0.0393)	18.8 (0.7401)	25.8 (1.0157)	4.0
	Governor spring B	with CATA	0.9 (0.0354)	11.8 (0.4645)	18.4 (0.7244)	6.2
		without CATA	0.9 (0.0354)	11.8 (0.4645)	21.4 (0.8425)	6.2
	Second olifice control spring		0.7 (0.0275)	6.6 (0.2598)	53.3 (2.0984)	20.5
	Servo olifice spring		0.9 (0.0354)	7.1 (0.2795)	61.2 (2.4094)	28.2
	Throttle spring A		1.0 (0.0393)	8.5 (0.3346)	21.0 (0.8267)	5.8
	Throttle adjust spring A		0.8 (0.0314)	6.2 (0.2440)	30.0 (1.1811)	8.0
	Throttle spring B		1.6 (0.0629)	8.5 (0.3346)	41.4 (1.6299)	11.7
	1-2 shift spring	with CATA	0.5 (0.0196)	4.6 (0.1811)	42.3 (1.6653)	25.0
		without CATA	0.6 (0.0236)	6.1 (0.2401)	42.3 (1.6653)	21.1
	1-2 shiftball spring	with CATA	0.4 (0.0157)	4.5 (0.1771)	13.0 (0.5118)	8.7
		without CATA	0.4 (0.0157)	4.5 (0.1771)	12.6 (0.4960)	8.7
	2-3 shift spring	with CATA	0.9 (0.0354)	7.6 (0.2992)	70.0 (2.7559)	28.2
		without CATA	0.8 (0.0314)	7.6 (0.2992)	58.9 (2.3188)	16.8
	2-3 shft ball spring	with CATA	0.5 (0.0196)	4.5 (0.1771)	11.7 (0.4606)	10.5
		without CATA	0.5 (0.0196)	4.5 (0.1771)	14.1 (0.5551)	10.5
	3-4 shift spring	with CATA	0.9 (0.0354)	9.6 (0.3779)	35.8 (1.4094)	10.3
		without CATA	0.9 (0.0354)	9.6 (0.3779)	27.7 (1.0905)	10.3
	3-4 shift ball spring	with CATA	0.5 (0.0196)	4.5 (0.1771)	11.5 (0.4527)	7.4
		without CATA	0.5 (0.0196)	4.5 (0.1771)	11.3 (0.4448)	7.4
	1st hold accumulator spring		4.0 (0.1574)	21.5 (0.8464)	71.7 (2.8228)	8.3
	1st accumulator spring		2.1 (0.0826)	16.3 (0.6417)	96.0 (3.7795)	17.1
	4th accumulator spring		2.6 (0.1023)	16.0 (0.6292)	84.6 (3.3307)	14.3
	2nd accumulator spring		3.2 (0.1259)	20.7 (0.8149)	80.7 (3.1771)	10.8
	3rd accumulator spring		2.6 (0.1023)	17.5 (0.6889)	78.6 (3.0944)	11.0
	L/C shift spring		0.9 (0.0354)	7.6 (0.2992)	73.7 (2.9015)	32.0
	L/C timing spring B	with CATA	1.0 (0.0393)	6.6 (0.2598)	84.0 (3.3070)	42.4
		without CATA	1.0 (0.0393)	6.6 (0.2598)	79.1 (3.1141)	42.4
	L/C timing spring A	with CATA	0.9 (0.0354)	6.6 (0.2598)	55.9 (2.2007)	27.3
		without CATA	0.9 (0.0354)	6.6 (0.2598)	50.0 (1.9685)	27.3
	Governor cut spring		0.8 (0.0314)	7.6 (0.2992)	44.5 (1.7519)	17.0
	L/C control spring		0.7 (0.0275)	6.6 (0.2598)	42.9 (1.6889)	14.1
	CPC valve spring		1.4 (0.0551)	9.4 (0.3700)	31.2 (1.2283)	10.9
	3rd kick dawn spring		0.9 (0.0354)	7.6 (0.2992)	62.7 (2.4684)	27.5
	Reverse control spring		0.7 (0.0275)	7.1 (0.2795)	40.0 (1.5748)	20.8
	L/C cut spring		0.7 (0.0275)	7.6 (0.2992)	31.0 (1.2204)	12.7
	Accumulator control spring		1.2 (0.0472)	7.7 (0.3031)	45.6 (1.7952)	21.8
	2nd kick down spring		1.2 (0.0472)	7.1 (0.2795)	46.9 (1.8464)	20.6
	Servo control spring		0.9 (0.0354)	6.4 (0.2519)	32.5 (1.2795)	17.5
	2-1 timing spring		0.7 (0.0275)	5.6 (0.2204)	33.0 (1.2992)	21.7
	4th exhaust spring		0.8 (0.0314	6.1 (0.2401)	51.1 (2.0118)	26.6

Unit of length: mm (in.)

9. Automatic Transmission

	MEASUREMENT	STANDARD (NEW)			
		WIRE DIA.	O.D.	FREE LENGTH	No. of COILS
Spring (PGM-FI)	Regulator valve Spring A	1.8 (0.0709)	14.7 (0.5887)	86.5 (3.4055)	16.5
	Regulator valve Spring B	1.8 (0.0709)	6.0 (0.2336)	44.0 (1.7323)	12.7
	Stator reaction spring	5.5 (0.2165)	37.4 (1.4724)	30.3 (1.1929)	2.1
	Torque converter check valve spring	1.1 (0.0433)	8.4 (0.3307)	33.8 (1.3307)	12.5
	Relief valve spring	1.0 (0.0394)	8.4 (0.3307)	39.1 (1.5393)	15.1
	Cooler check valve spring	1.1 (0.0433)	8.4 (0.3307)	46.8 (1.8425)	17.0
	2nd orifice spring	0.6 (0.0236)	6.6 (0.2598)	52.2 (2.0551)	21.0
	Servo orifice spring	0.8 (0.0315)	6.6 (0.2598)	52.2 (2.0551)	33.0
	4th exhaust spring	0.9 (0.0354)	7.1 (0.2795)	60.8 (2.3936)	28.9
	1-2 shift spring	1.0 (0.0393)	8.6 (0.3386)	41.3 (1.6259)	16.9
	2-3 shift spring	0.9 (0.0354)	7.6 (0.2992)	57.0 (2.2440)	26.8
	1st accumulator spring	2.1 (0.0826)	16.3 (0.6417)	96.0 (3.7795)	17.1
	4th accumulator spring	2.9 (0.1142)	22.0 (0.8661)	84.5 (3.3267)	10.9
	2nd accumulator spring	3.2 (0.1260)	20.7 (0.8149)	80.7 (3.1771)	10.8
	3rd accumulator spring	2.8 (0.1102)	17.5 (0.6889)	94.2 (3.7086)	16.1
	L/C shift spring	0.9 (0.0354)	7.6 (0.2992)	73.7 (2.9016)	32.0
	L/C timing spring	0.8 (0.0314)	6.6 (0.2598)	64.0 (2.5196)	40.1
	D-inhibitor spring	1.0 (0.0394)	8.1 (0.3188)	52.6 (2.0708)	22.4
	3rd kick-down spring	1.1 (0.0433)	7.6 (0.2992)	48.3 (1.9015)	23.3
	2nd kick-down spring	1.2 (0.0472)	7.1 (0.2795)	46.9 (1.8464)	20.6
	Throttle adjust spring	0.8 (0.0314)	6.2 (0.2440)	30.0 (1.1811)	8.0
	Throttle B spring	1.5 (0.0591)	8.5 (0.3346)	41.5 (1.6334)	11.2
	1st hold spring	4.0 (0.1574)	25.0 (0.9842)	64.7 (2.5472)	7.3
	L/C modulator valve spring	1.4 (0.0551)	9.4 (0.3700)	33.0 (1.2992)	10.5
	L/C control spring	0.8 (0.0314)	6.6 (0.2598)	41.0 (1.6141)	25.0

Standards and Service Limits

9. Automatic Transmission (cont'd)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Rign gear	Backlash	0.085—0.142 (0.003—0.006)	0.200 (0.008)
Differential carrier	Pinion shaft bore diameter	18.000—18.018 (0.7087—0.7094)	—
	Carrier-to-pinion shaft clearance	0.017—0.047 (0.001—0.002)	0.100 (0.004)
	Driveshaft bore diameter	28.005—28.025 (1.1026—1.1033)	—
	Carrier-to driveshaft clearance	0.025—0.066 (0.001—0.003)	0.120 (0.005)
Differential pinion gear	Backlash	0.08—0.15 (0.03—0.006)	Adjust with a washer
	Pinion gear bore diameter	18.042—18.066 (0.710—0.711)	—
	Pinion gear-to pinion shaft clearance	0.059—0.095 (0.002—0.004)	0.150 (0.006)
Differential taper roller bearing preload	For used bearing	2.5—3.7 N·m (25—37 kg—cm, 1.8—2.7 lb-ft)	Adjust with a washer
	After replacement of bearing	2.8—4.0 N·m (28—48 kg-cm, 2.0—2.9 lb-ft)	Adjust with a washer

11. Steering

	MEASUREMENT		STANDARD (NEW)
Steering wheel	Play		10 (0.39) maximum
Gearbox	Pinion starting torque		Below 1.ON-m (10 kg-cm, 0.72 lb-ft)
	Angle of rack guide screw loosend from locked position		35° $^{+8}_{0}$
Pump	Pump pressure with valve closed (oil temperature: 40°C/104°F minimum) Do not run for more than 5 seconds		7,845—8,826 kPa (80—90 kg/cm², 1,138—1,280 psi) at idle
Power steering fluid	Capacity	Reservoir	0.5 ℓ (0.53 US qt., 0.44 Imp qt.)
		At change (approx.)	1.8 ℓ 1.90 US qt. 1.58 Imp qt.)
Power steering belt	Deflection between pulleys with 98 N (10 kg, 22 lbs) force	For used belt	12.5—16.0 (0.50—0.62)
		For new belt	9.5—11.5 (0.37—0.45)
	Belt tension between pulleys (measured with tension gauge)	For used belt	343—490 N (35—50 kg, 77—110 lb)
		For new belt	686—882 N (70—90 kg, 154—198 lb)

12. Suspension

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Wheel alignment	Total toe	Front	0±2 (0±0.08)	—
		Rear 2WS:	IN 2±2 (0.08±0.08)	—
		4WS:	IN 3±2 (0.12±0.08)	—
	Camber	Front	0° 00′ ± 1°	—
		Rear 2WS:	−0° 30′ ± 1°	—
		4WS:	−0° 20′ ± 1°	—
	Caster	Front	3° 00′ ± 1°	—
	Front Wheel turning angle	Inward wheel	2.0/2.2 ℓ engine: 39° ± 2°	—
			1.8 ℓ engine: 40° 50′ ± 2°	—
			4WS: 38° 50′ ± 2°	—
		Outward wheel (reference)	2.0/2.2 ℓ engine: 29° 30′	—
			1.8 ℓ engine: 31° 10′	—
			4WS: 29° 30′	—
	Rear Wheel turning angle (4WS only)	Inward wheel	5° 50′ ± 1°	—
		Outward wheel (reference)	6° 10′ ± 1°	—
Wheel	Rim runout Steel wheel	Axial	Below 1.0 (0.04)	2.0 (0.08)
		Radial	Below 1.0 (0.04)	1.5 (0.06)
	Aluminum wheel	Axial	Below 0.7 (0.03)	2.0 (0.08)
		Radial	Below 0.7 (0.03)	1.5 (0.06)
Wheel bearing	End play	Front	0—0.05 (0—0.002)	—
		Rear	0—0.05 (0—0.002)	—

13. Brakes

Unit of length: mm (in.)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Parking brake lever	Play in stroke 200 N (20 kg, 44 lbs)		To be locked when pulled 4—8 notches	—
Foot brake pedal	Pedal height (from floor)	MT	190 (7.5)	—
		AT	195 (7.7)	—
Master cylinder	Piston-to-push rod clearance		0—0.4 (0—0.016)	—
Brake drum	I.D.		220 (8.66)	221 (8.70)
Lining	Thickness		4.5 (0.18)	2.0 (0.08)
Disc brake	Disc thickness	Front	23.0 (0.91)	21.0 (0.83)
		Rear	10.0 (0.39)	8.0 (0.32)
	Disc runout	Front	—	0.10 (0.004)
		Rear	—	0.15 (0.006)
	Disc parallelism	Front and rear	—	0.015 (0.0006)
	Pad thickness	Front	12.5 (0.49)	1.6 (0.06)
			2.2 ℓ model: 12.0 (0.47)	1.6 (0.06)
		Rear	9.0 (0.35)	1.6 (0.06)
Brake booster	Characteristics at 20 kg (44 lbs) pedal pressure		Line pressure Unit: kPa (kg/cm²/psi)	
	Vacuum \ Brakes		Conventional type	with ALB system
	0 mm (0 in) Hg		922 (9.4/134) minimum	813 (8.3/118) minimum
	300 mm (11.8 in) Hg		5,494 (56/796) minimum	6,076 (62/882) minimum
	500 mm (19.7 in) Hg		8,535 (87/1,237) minimum	8,134 (83/1,180) minimum

15. Air Conditioner

	MEASUREMENT		STANDARD (NEW)
Air conditioner system	Lubricant capacity	Condenser	10 cc (0.3 US oz., 0.4 Imp oz.)
		Evaporator	25 cc (0.8 US oz., 0.9 Imp oz.)
		Line or hose	10 cc (0.3 US oz., 0.4 Imp oz.)
		Reservoir	10 cc (0.3 US oz., 0.4 Imp oz.)
Compressor	Lubricant capacity		900—950 g (31.7—33.5 oz)
	Stator coil resistance at 20°C (68°F)		3.4—3.8 Ω
	Pulley-to pressure plate clearance		0.35—0.65 (0.014—0.026)
Compressor belt	Deflection between pulleys with 98N (10 kg, 22 lbs) force	For used belt	10—12 (0.4—0.5)
		For new belt	8.5—11 (0.3—0.4)
	Belt tension between pulleys (measured with tension gauge)	For used belt	441—588 N (45—60 kg, 99—132 lbs)
		For new belt	931—1,127 N (95—115 kg, 209—254 lbs)

Standards and Service Limits

16. Electrical

Unit of length: mm (in.)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Ignition coil	Rated voltage		12 Volts	
	Winding resistance < >: Carburated engine	Primary Secondary	0.6—0.8 Ω <0.5—0.7 Ω> 12.9—19.3 kΩ <14.4—21.6 kΩ>	
Ignition wire	Resistance		25 kΩ maximum	
Spark plug	Type ( ): Manufacturer	standard	ZFR6F-11 (NGK) or KJ20CR-L11 (ND) KP, KT: ZFR5F-11 (NGK) or KJ16CR-L11 (ND)	
		Option *: Except 2.2 ℓ engines other than KQ, KY types	*: ZFR5F-11 (NGK) or KJ16CR-L11 (ND) KP, KT only: UFR6F-11 (NGK) or KJ20CR-L11 (ND) Except KP, KT: ZFR7F-11 (NGK) or KJ22CR-L11 (ND)	
	Gap		1.0—1.1 (0.039—0.043)	
Ignition timing	At idling KF, KB, KE, KW, KU, KT, KP (AT) KY (AT/MT)		15° ± 2° BTDC 10° ± 2° BTDC 10° ± 2° BTDC	
Battery	Lighting capacity (20-hours ratio) < >: KY, KQ, KP, KT		65Ah <47Ah>	
	Starting capacity (voltage after 5 sec.)		8.4 V minimum/300 ampere draw at −15°C (59°F)	
Alternator	Output < >: Carburated engine (except KS, KW, KY)		80A <70A>	
	Rotor coil resistance Slip ring O.D. Brush length Brush spring tension		2.8—3.0 Ω 14.4 (0.57) 10.5 (0.41) 300—360 g (10.6—12.7 oz)	— 14.0 (0.55) 5.5 (0.22) —
Alternator belt	Deflection at midway between pulleys with 98 N (10 kg, 22 lbs) force		10—12 (0.39—0.47) for used belt 8.5—11.0 (0.33—0.43) after replacement of belt	
Starting motor	Output	European Except European	MT: 1.4 kw (2.2 ℓ : 1.6 kw) MT: 1.4 kw	AT:1.6 kw AT:1.4 kw
	Manufacturer: Mitsuba	Mica depth Commutator runout Commutator O.D. Brush length Brush spring tension	0.4—0.5 (0.016—0.02) 0—0.02 (0—0.001) 28.0—28.1 (1.10—1.11) 15.8—16.2 (0.62—0.64) 16—18N (1.6—1.8 kg, 3.5—4.0 lbs)	0.15 (0.006) 0.05 (0.002) 27.5 (1.08) 10.0 (0.39) —
	Manufacturer: ND	Mica depth Commutator runout Commutator O.D. Brush length Brush spring tension	0.5—0.8 (0.02—0.03) 0—0.02 (0—0.001) 29.9—30.0 (1.18—1.18) 15.0—15.5 (0.59—0.61) 19—24N (1.9—2.4 kg, 4.2—5.31 lbs)	0.2 (0.01) 0.05 (0.002) 29.0 (1.14) 10.0 (0.39) —

Design Specifications

specs

ITEMS		METRIC	ENGLISH	NOTES
DIMENSIONS	Overall length	4,685 mm	184.4 in	
		4,680 mm	184.3 in	KY
		4,695 mm	184.8 in	KW
		4,700 mm	185.0 in	KQ
	Overall width	1,695 mm	66.7 in	
		1,720 mm	67.7 in	KY
		1,725 mm	67.9 in	KQ
	Overall height	1,390 mm	54.7 in	
		1,400 mm	55.1 in	KY
	Wheelbase	2,720 mm	107.1 in	
	Track Front	1,475 mm	58.1 in	
	Rear	1,480 mm	58.3 in	
	Ground clearance	160 mm	6.3 in	
		170 mm	6.7 in	KY
	Seating capacity	Five		
	Turning circle diameter (at tire center)	4.9 m	16.1 ft	4WS
		5.4 m	17.7 ft	2WS
WEIGHT	Curb weight	See page 3-19		
	Max permissible weight (for European)			
	1.8/2.0 ℓ without ALB	1,740 kg	3,836 lb	
	1.8/2.0 ℓ with ALB	1,760 kg	3,880 lb	
	2.2 ℓ	1,840 kg	4,056 lb	
ENGINE	Type	Water-cooled, 4-stroke OHC		
	Cylinder arrangement	In-line, 4-cylinders		
	Bore and stroke	85×81.5 mm	3.35×3.21 in	1.8 ℓ
		85×88 mm	3.35×3.46 in	2.0 ℓ
		85×95 mm	3.35×3.74 in	2.2 ℓ
	Displacement	1,849 cm³	112.8 cu. in	1.8 ℓ
		1,997 cm³	121.8 cu. in	2.0 ℓ
		2,156 cm³	131.5 cu. in	2.2 ℓ
	Compression ratio Carbureted	9.0: 1 〈8.9 : 1〉		〈 〉: With catalytic converter
	2.0 ℓ fuel-injected	9.6 : 1 〈9.5 : 1〉		
	2.2 ℓ European	9.8 : 1		
	2.2 ℓ KY	8.9 : 1		
	2.2 ℓ KQ	8.8 : 1		
	Valve train	Belt driven, Single Overhead Camshaft		
	Lubrication system	Forced and wet sump		
STARTER	Type	Gear reduction		
	Normal output European	MT: 1.4 kw (2.2 ℓ : 1.6 kw)	AT: 1.6 kw	
	Except European	MT: 1.4 kw	AT: 1.4 kw	
	Nominal voltage	12 V		
	Hour rating	30 seconds		
	Direction of rotation	Clockwise as viewed from gear end		
	Weight ND	4.75 kg	10.5 lb	
	Mitsuba 1.6 kw	3.7 kg	8.2 lb	
	Mitsuba 1.4 kw	3.5 kg	7.7 lb	
TRANSMISSION	Clutch MT	Single plate dry, *diaphragm spring*		
	AT	Torque converter with lock-up clutch		
	Clutch lining area	217 cm²	33.6 sq. in	
	Transmission MT	Synchronized 5-speed forward, 1 reverse		
	AT	4-speed forward automatic, 1 reverse or Electronically controlled dual range 4-speed forward automatic, 1 reverse		
	Primary reduction ratio	1 : 1 (Direct)		

Gear ratio ①: Carbureted ②: 2.0 ℓ PGM-FI ③: 2.2 ℓ (except KQ) ④: 2.2 ℓ KQ ⑤: Carbureted 2.0 ℓ PGM-FI (KT) 2.2 ℓ KY ⑥: 2.0 ℓ PGM-FI/2.2 ℓ (except KT, KQ, KY) ⑦: 2.2 ℓ KQ	Gear	MT ①	MT ②	MT ③	MT ④	AT ⑤	AT ⑥	AT ⑦
	1st	3.307	3.307	3.307	3.307	2.705	2.705	2.705
	2nd	1.857	1.809	1.809	1.809	1.464	1.366	1.464
	3rd	1.269	1.230	1.230	1.230	1.028	1.028	1.028
	4th	0.966	0.933	0.933	0.903	0.731	0.731	0.674
	5th	0.787	0.757	0.757	0.705	——	——	——
	Reverse	3.000	3.000	3.000	3.000	2.047	2.047	2.047
	Final	4.266	4.266	4.266	4.062	4.285	4.285	4.285

Design Specifications

	ITEMS	METRIC	ENGLISH	NOTES
AIR CONDITIONER	Cooling capacity	4,350 kcal/h	17,259 BTU/h	
	-Condition: Compressor speed	1,900 min^{-1} (rpm)		
	Outside air temperature	27°C	81°F	
	Outside air humidity	50 %		
	Condenser air temperature	35°C	95°F	
	Condenser air velocity	4.5 m/sec.	14.8 ft/sec.	
	Blower capacity	440 m^3	15,542 cu.ft/h	
	Compressor Type	Swash-plate		
	No. of cylinders	10		
	Capacity	178 cc/rev.	10.9 cu.in/rev.	
	Maximum speed	8,800 min^{-1} (rpm)		
	Lubricant capacity	90—120 cc	3.0—4.0 US oz. 3.2—4.2 Imp oz.	
	Condenser	Corrugated fin type		
	Evaporator	Corrugated fin type		
	Blower Type	Sirocco fan		
	Motor input	210 W (12 V)		
	Speed control	5-speed		
	Maximum capacity	500 m^3/h	17,662 cu.ft/h	
	Temperature control	Air-mix type		
	Clutch Type	Dry single-plate		
	Power consumption	40W (12V) maximum		
	Refrigerant Type	R-12		
	Quantity	0.90—0.95 kg	2.0—2.1 lb	
STEERING SYSTEM	Type	Rack and pinion		
	Overall ratio	16.1 : 1 〈13.0 : 1〉		〈 〉: 4WS
	Turns, lock-to-lock	3.13 〈2.5〉		〈 〉: 4WS
	Steering wheel diameter	375 mm	14.8 in	
	Power steering fluid capacity	1.8 ℓ	1.9 US qt. 1.6 Imp qt.	
	Power steering fluid	Genuine Power Steering Fluid P/N: 08208—99961		
SUSPENSION	Type Front	Independent double wishbone, coil spring		
	Rear	Independent double wishbone, coil spring		
	Shock absorber Front and rear	Telescopic, hydraulic (nitrogen gas-filled)		( ): except KP, KT
WHEEL ALIGNMENT	Total toe Front	0±3 mm	0±0.12 in	
	Rear 2WS	IN 2±2 mm	0.08±0.08 in	
	4WS	IN 3±2 mm	0.12±0.08 in	
	Camber Front	0° 00′ ± 1°		
	Rear 2WS	−0° 30′ ± 1°		
	4WS	−0° 20′ ± 1°		
	Caster Front	3°00′		
BRAKE SYSTEM	Type Front	Ventilated disc		
	Rear	Drum 2.2 ℓ (except KY) or ALB or 4WS: Solid disc		
	Pad and lining swept area (total)			
	Front 15 in	415 cm^2	64 sq. in	
	14 in	311 cm^2	48 sq. in	
	Rear Drum	242 cm^2	38 sq. in	
	Disc	281 cm^2	44 sq. in	
TIRES	Size	185/70R14 88H 185/65R15 87H 195/60R15 87V 195/60R15 87H T105/70 D14		
	Spare tire	T135/90 D15		
ELECTRICAL	Fuses In the ALB fuse box	15A, 40A		
	In the fuse box	7.5A, 10A, 15A, 30A		
	In the relay box	7.5A, 10A, 15A, 20A, 30A, 40A, 50A, 80A		
	Headlights High/Low	12V-65/55W		
	Turn signal lights Front	12V—21W		
	Rear	12V—21W		
	Position lights	12V—5W		
	License plate light	12V—5W		
	Buck-up lights	12V—21W		
	Stop lights	12V—21W		
	High mount brake light	12V—27W		
	Taillight	12V—5W		
	Rear fog light	12V—21W		
	Dome lights	12V—8W		
	Door courtesy lights	12V—3.4W		
	Vanity mirror light	12V—1.8W		
	Trunk light	12V—3.4W		
	Gauge lights	12V—3.4/1.4W		
	Indicator lights	12V—0.84/0.91/1.12/1.4W		
	Warning lights	12V—1.4/3.4W		
	Glove box light	12V—3.4W		
	Illumination and pilot lights	12V—1.4/1.2W LED: 0.91W, 0.84W		
	Heater illumination lights	12V—1.2/1.4W		

Unit: kg (lb)

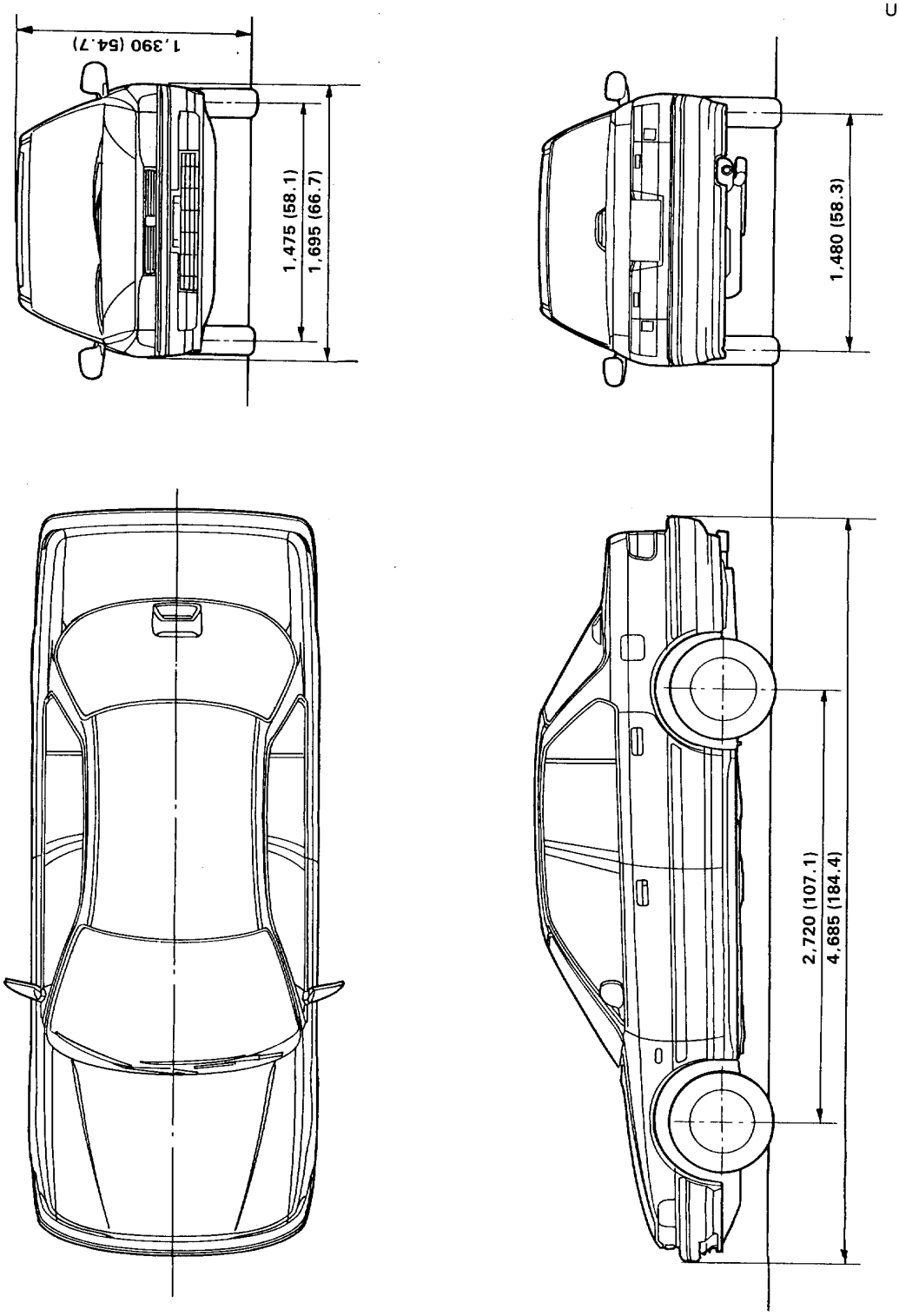
WEIGHT SPECIFICATIONS

ENGINE	TYPE	GRADE	Manual Transmission		Automatic Transmission	
			CARB WEIGHT	WEIGHT DISTRIBUTION (FR/RR)	CARB WEIGHT	WEIGHT DISTRIBUTION (FR/RR)
1.8 ℓ Carbureted	KB	LX	1,200 (2,646)	730/470 (1,609/1,036)	—	—
		EX	1,215 (2,679)	735/480 (1,620/1,058)	—	—
2.0 ℓ Carbureted	KG	DX, EX	1,220 (2,690)	740/480 (1,631/1,058)	1,245 (2,745)	765/480 (1,687/1,058)
	KX	EX	1,220 (2,690)	740/480 (1,631/1,058)	1,245 (2,745)	765/480 (1,687/1,058)
	KS	DX	1,225 (2,701)	745/480 (1,642/1,058)	1,250 (2,756)	770/480 (1,698/1,058)
	KS	EX	1,230 (2,712)	750/480 (1,653/1,058)	1,255 (2,767)	775/480 (1,709/1,058)
	KF	EX	1,220 (2,690)	740/480 (1,631/1,058)	1,245 (2,745)	765/480 (1,687/1,058)
	KB	EX	1,215 (2,679)	740/475 (1,631/1,047)	1,240 (2,734)	765/475 (1,687/1,047)
	KE	EX	1,225 (2,701)	740/485 (1,631/1,069)	1,250 (2,756)	765/485 (1,687/1,069)
	KW	DX, EX	1,225 (2,701)	745/480 (1,642/1,058)	1,250 (2,756)	770/480 (1,698/1,058)
	KU, KP, KT	LX	1,215 (2,679)	735/480 (1,620/1,058)	1,245 (2,745)	765/480 (1,687/1,058)
	KU, KP, KT	EX	1,220 (2,690)	735/485 (1,620/1,069)	1,250 (2,756)	765/485 (1,687/1,069)
	KQ	LX	1,210 (2,668)	730/480 (1,609/1,058)	1,240 (2,734)	760/480 (1,675/1,058)
	KY	LX	1,245 (2,745)	760/485 (1,675/1,069)	1,275 (2,811)	790/485 (1,742/1,069)
	KY	EX	1,250 (2,756)	765/485 (1,687/1,069)	1,280 (2,822)	795/485 (1,753/1,069)
2.0 ℓ PGM-FI	KG	2.0i	1,240 (2,734)	750/490 (1,653/1,080)	1,270 (2,800)	780/490 (1,720/1,080)
	KX	2.0i	1,265 (2,789)	770/495 (1,698/1,091)	1,295 (2,855)	800/495 (1,764/1,091)
	KS	2.0i	1,250 (2,756)	760/490 (1,675/1,080)	1,280 (2,822)	790/490 (1,742/1,080)
	KF, KB, KW	2.0i	1,245 (2,745)	755/490 (1,664/1,080)	1,275 (2,811)	785/490 (1,731/1,080)
	KE	2.0i	1,255 (2,767)	760/495 (1,675/1,091)	1,285 (2,833)	790/495 (1,742/1,091)
	KU, KP, KT	EXi	1,240 (2,734)	750/490 (1,653/1,080)	1,275 (2,811)	785/490 (1,731/1,080)
2.2 ℓ PGM-FI	KG	2.2i-2WS	1,305 (2,877)	795/510 (1,753/1,124)	1,335 (2,943)	825/510 (1,819/1,124)
	KG	2.2i-4WS	1,330 (2,932)	795/535 (1,753/1,179)	1,360 (2,998)	825/535 (1,819/1,179)
	KX, KS	2.2i-2WS	1,310 (2,888)	800/510 (1,764/1,124)	1,340 (2,954)	830/510 (1,830/1,124)
	KX, KS	2.2i-4WS	1,335 (2,943)	800/535 (1,764/1,179)	1,365 (3,009)	830/535 (1,830/1,179)
	KF	2.2i-2WS	1,290 (2,844)	785/505 (1,731/1,113)	1,320 (2,910)	815/505 (1,797/1,113)
	KF	2.2i-4WS	1,315 (2,899)	785/530 (1,731/1,168)	1,345 (2,965)	815/530 (1,797/1,168)
	KE	2.2i-2WS	1,300 (2,866)	790/510 (1,742/1,124)	1,330 (2,932)	820/510 (1,808/1,124)
	KE	2.2i-4WS	1,325 (2,921)	790/535 (1,742/1,179)	1,355 (2,987)	820/535 (1,808/1,179)
	KQ	EXi	1,240 (2,734)	745/495 (1,642/1,091)	1,270 (2,800)	775/495 (1,709/1,091)
	KY	EXi	1,320 (2,910)	790/530 (1,742/1,168)	1,350 (2,976)	825/525 (1,819/1,157)

Body Specifications

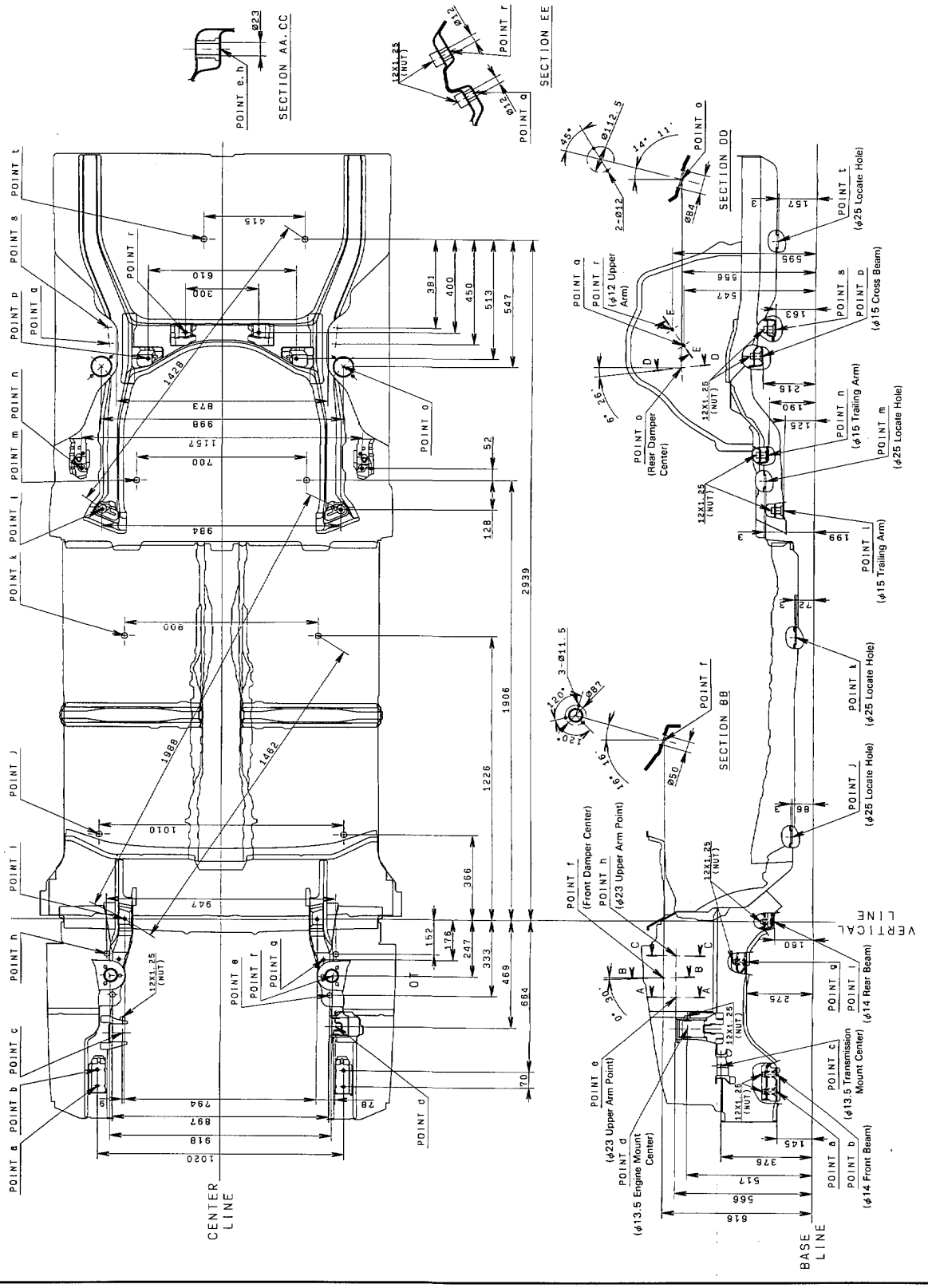
2WS M/T Model

Unit: mm (in)



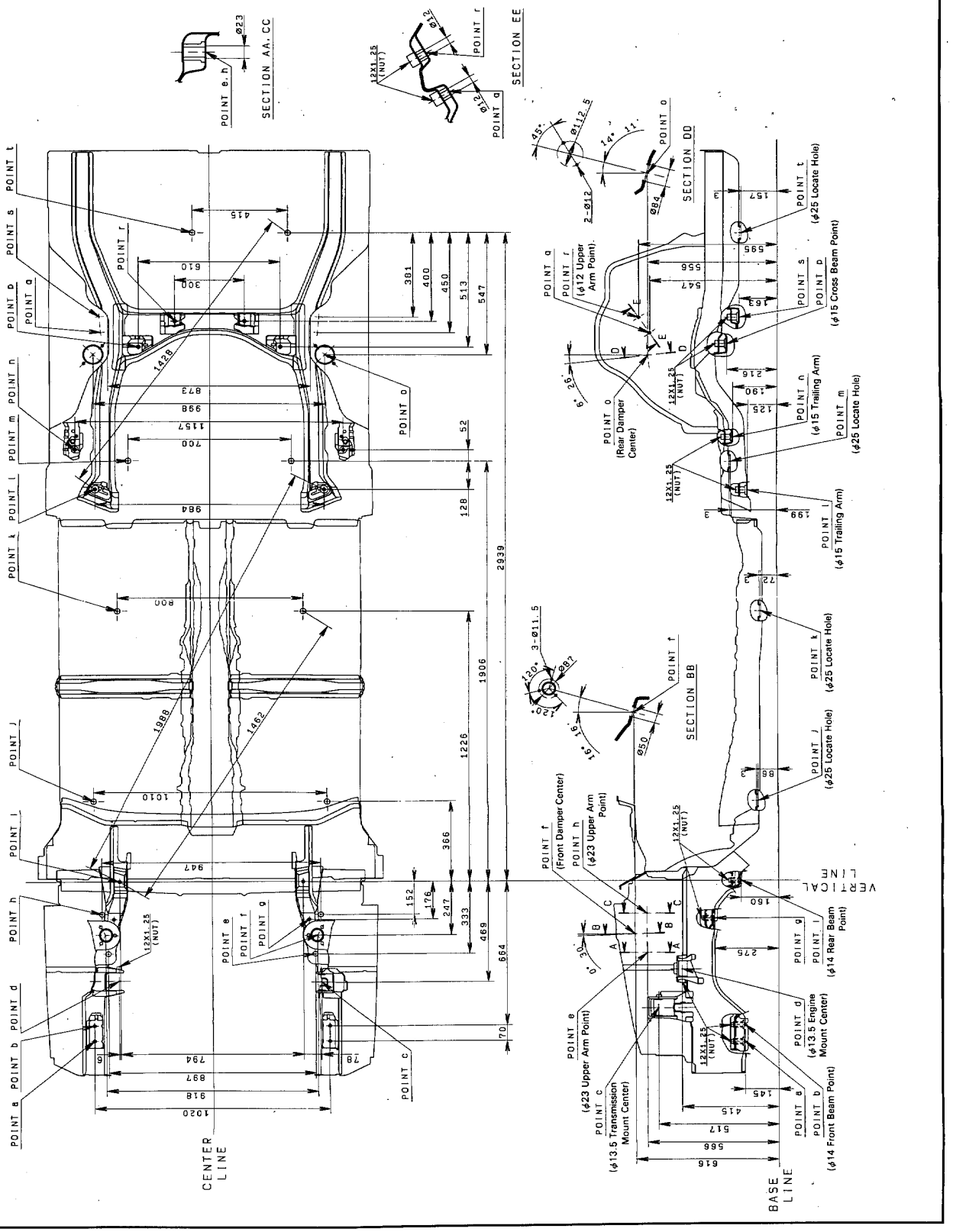
Frame Repair Chart

2WS M/T Model

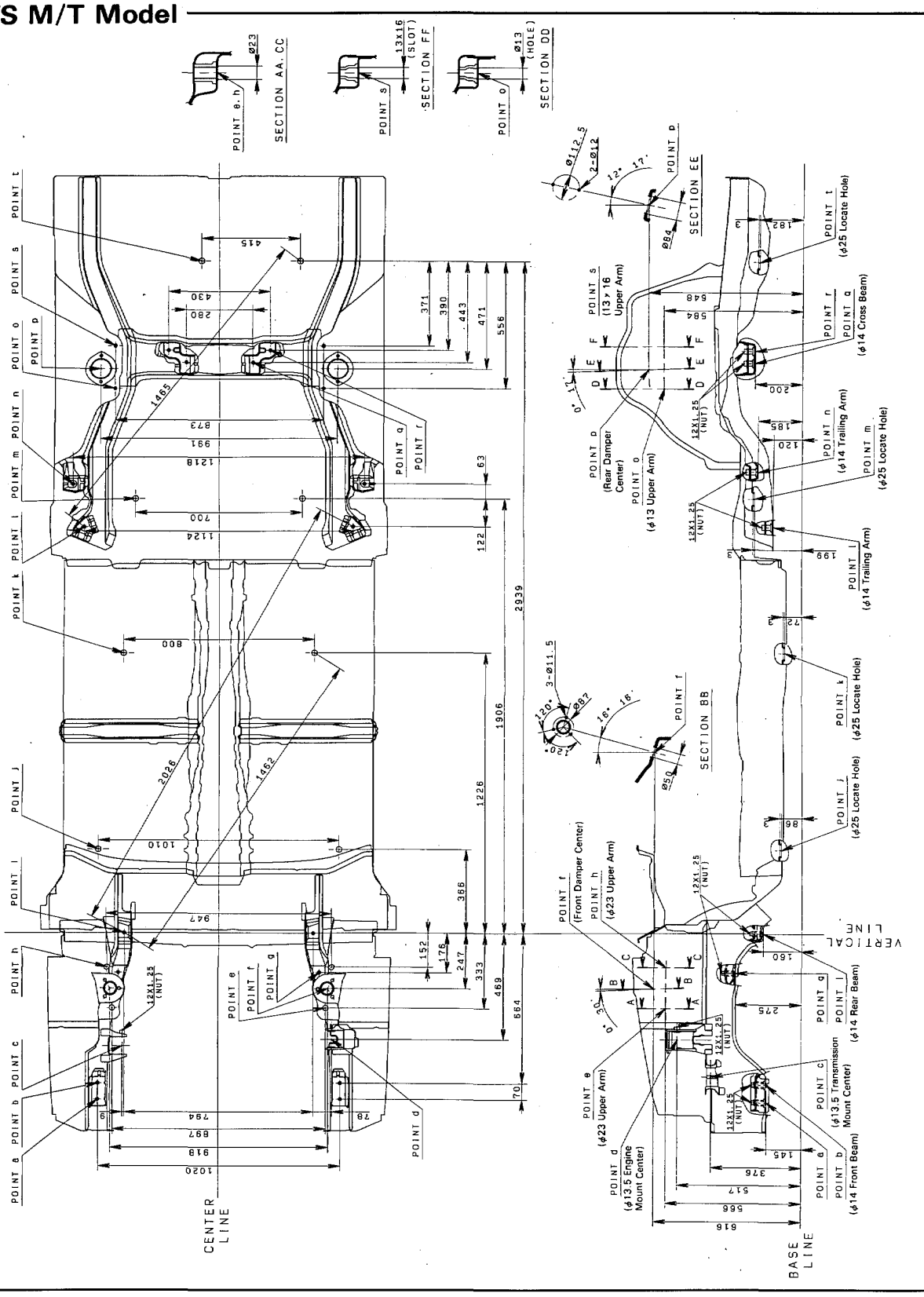


Frame Repair Chart

2WS A/T Model

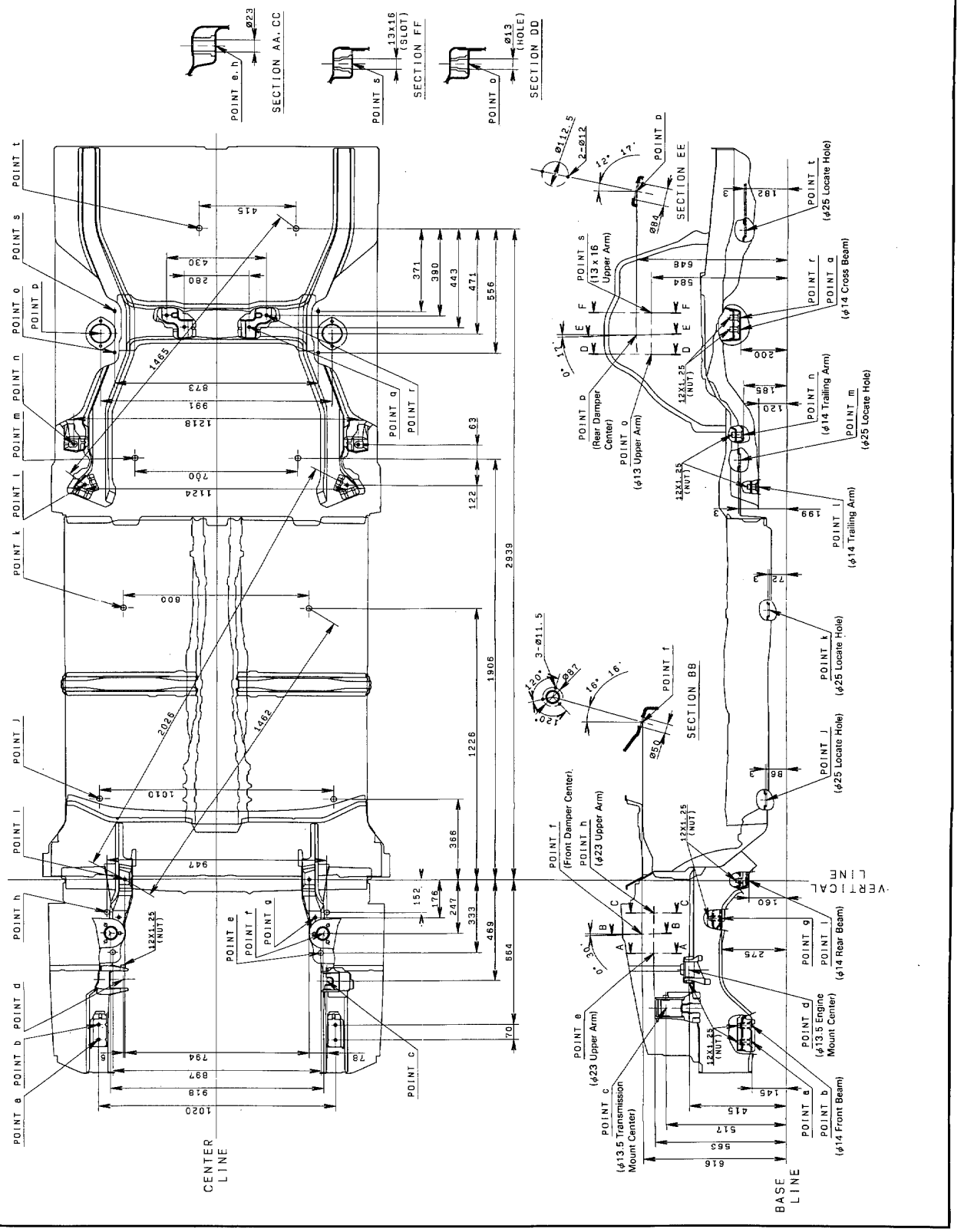


4WS M/T Model


SECTION AA, CC
SECTION FF
SECTION DD
SECTION EE
SECTION BB
CENTER LINE
BASE LINE
VERTICAL LINE
POINT a
POINT b
POINT c
POINT d
POINT e
POINT f
POINT g
POINT h
POINT i
POINT j
POINT k
POINT l
POINT m
POINT n
POINT o
POINT p
POINT q
POINT r
POINT s
POINT t
(Front Damper Center)
(Rear Damper Center)
(ø23 Upper Arm)
(ø13 Upper Arm)
(ø13.5 Engine Mount Center)
(ø13.5 Transmission Mount Center)
(ø14 Front Beam)
(ø14 Rear Beam)
(ø14 Cross Beam)
(ø14 Trailing Arm)
(ø25 Locate Hole)
(13 x 16 Upper Arm)
12x1.25 (NUT)
2939
1906
1226
1020
947
784
897
918
1010
1124
700
1218
991
873
1465
2026
1462
415
430
280
371
390
443
471
556
63
122
800
366
152
176
247
333
469
664
70
78
616
556
517
376
145
275
160
548
584
200
182
120
185
199
86
250
Ø112.5
2-Ø12
Ø84
Ø82
3-Ø11.5
Ø23
13x16 (SLOT)
Ø13 (HOLE)

Frame Repair Chart

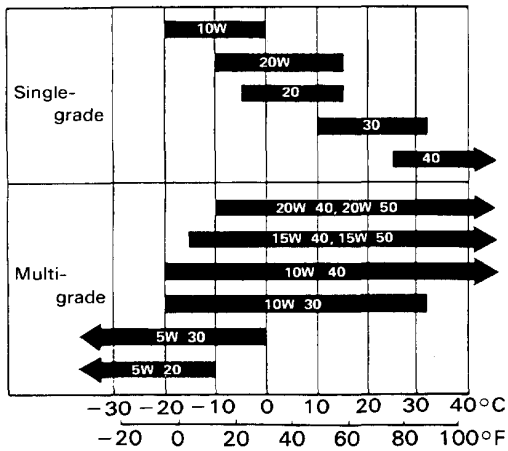
4WS A/T Model



Lubrication Points

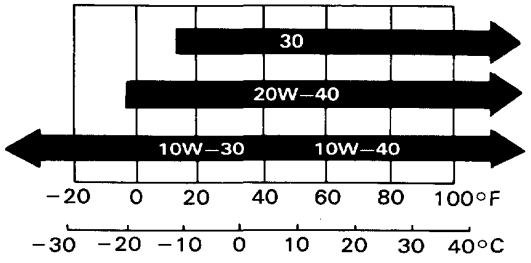
No.	LUBRICATION POINTS		LUBRICANT
1	Engine		API Service Grade: SF or SG SAE Viscosity: See chart below
2	Transmission	Manual Automatic	API Service Grade: SE or SF SAE Viscosity: See chart below DEXRON® or DEXRON® II Automatic transmission fluid
3	Brake line		Brake fluid DOT3 or DOT4
4	Clutch line		Brake fluid DOT3
5	Power steering gearbox		Steering grease P/N 08733—B070E
6	Shift lever pivots (Manual)		Silicone grease with molybdenum disulfide
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	Steering ball joints Suspension ball joints Steering boots Steering column bushings Select lever (Automatic) Pedal linkage Intermediate shaft Brake master cylinder pushrod Trunk hinges Door hinges upper and lower Door opening detents Fuel filler lid Engine hood hinges Engine hood latch Tilt lever Rear brake shoe linkage		Multi-purpose grease
23	Caliper	Piston seal Dust seal Caliper pin Piston	Silicone grease
24	Power steering system		Power steering fluid P/N 08208—99961

Recommended Engine Oil
(SF or SG Grade Oil)



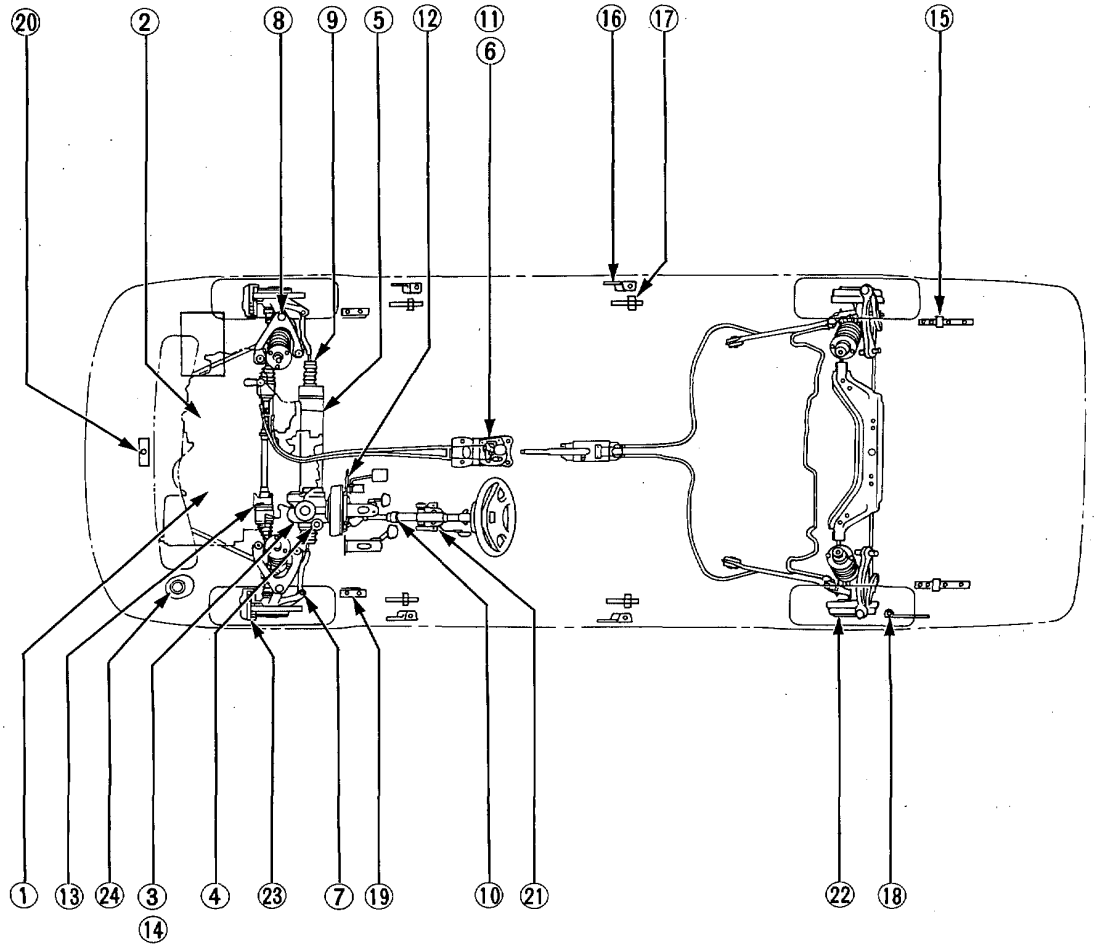
Engine oil viscosity for
ambient temperature ranges

Recommended Manual Transmission Oil
(SE or SF Grade Oil)



Transmission oil viscosity for
ambient temperature ranges

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


20
2
8
9
5
12
11
6
16
17
15
1
13
24
3
14
4
23
7
19
10
21
22
18

Maintenance Schedule

Service at the interval listed x 1,000 km (or miles) or after that number of months, whichever comes first.	R—Replace C—Clean	I—Inspect. After inspection, clean, adjust, repair or replace if necessary.				
ITEM	x 1,000 km x 1,000 miles months	20 12 12	40 24 24	60 36 36	80 48 48	100 60 60
Idle speed and idle CO*3		I	I	I	I	I
Idle speed and idle CO*4						I
Valve clearance		I	I	I	I	I
Alternator drive belt			I		I	
Timing belt and timing balancer belt						R
Water pump						I
■Engine oil and oil filter		Replace every 10,000 km (6,000 miles) or 6 months				
■Transmission oil			R		R	
■Radiator coolant					R*1	
Cooling system hoses and connections			I		I	
E.G.R. system (Standard for some types)						I
Secondary air supply system (Standard for some types)						I
Air cleaner element (Viscous type for European and KQ models)			R		R	
Air cleaner element (Dry type except European and KQ models)		R	R	R	R	R
Fuel filter (Including aux filter*5)			R		R	
Tank, fuel line and connections			I		I	
Intake air temp. control system*3, *5						I
Throttle control system*4, *5			I		I	
Choke mechanism*5			I		I	
Choke mechanism*7				C*8		I
Choke opener operation (only for carburetor automatic choke type)						I
Evaporative emission control system*6						I
Ignition timing and control system*3			I		I	
Ignition timing and control system*4						I
Spark plugs (for cars using unleaded gasoline)			R*2		R*2	
Spark plugs (for cars using leaded gasoline)		R	R	R	R	R
Distributor cap and rotor*3			I		I	
Distributor cap and rotor*4						I
Ignition wiring*3			I		I	
Ignition wiring*4						I
Positive crankcase ventilation valve*3			I		I	
Positive crankcase ventilation valve*4						I
Blow-by filter*5			I		I	

■: These service intervals assume routine checking and replenishment has been done, as needed, by the customer.
*1 Thereafter, replace every 2 years or 40,000 km (24,000 miles), whichever comes first.
*2 For KS type, replace every 2 years or 40,000 km (24,000 miles) whichever comes first after 30,000 km (18,000 miles).
*3 Except KS, KX models
*4 KS, KX models
*5 Only for carbureted type (except KS model)
*6 Except KP, KT and 2.0 i of KE, KF
*7 Only for carbureted type (KS model)
*8 Recommended by manufacturer only

Service at the interval listed x 1,000 km (or miles) or after that number of months, whichever comes first.		R—Replace		I—Inspect. After inspection, clean, adjust, repair or replace if necessary.			
ITEM		x 1,000 km x 1,000 miles months	20 12 12	40 24 24	60 36 36	80 48 48	100 60 60
Brake hoses and lines (Including ALB hoses and pipes for ALB models)			I	I	I	I	I
Brake fluid (Including ALB fluid for ALB models)				R		R	
Front brake discs and calipers			I	I	I	I	I
Front brake pads			Inspect every 10,000 km (6,000 miles) or 6 months				
Rear brake discs, calipers and pads (for disk brake type)				I		I	
Rear brake drums, wheel cylinders and linings (for drum brake type)				I		I	
Parking brake			I	I		I	
Exhaust pipe and muffler			I	I	I	I	I
Suspension mounting bolts			I	I	I	I	I
Front wheel alignment (except 4WS models)			I	I	I	I	I
Front and rear wheel alignment (4WS models)			I	I	I	I	I
Steering operation, tie rod ends, steering gear box and boots (Including center shaft for 4WS models)	Except 4WS models		I	I		I	
	4WS models		I	I	I	I	I
ALB high pressure hose (for ALB models)						✓ R	
ALB operation (for ALB models)			I	I		I	
Power steering system			I	I	I	I	I
Power steering pump belt				I		I	
Catalytic converter heat shield (Standard for some types)							I

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

Severe driving conditions include:
A : Repeated short distance driving
B : Driving in dusty conditions
C : Driving in severe, cold weather
D : Driving in areas using road salt or other corrosive materials
E : Driving on rough and/or muddy roads
F : Towing a trailer
R—Replace.
I— Inspect. After inspection, clean, adjust, repair or replace if necessary.

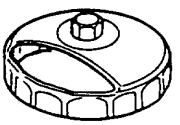
Condition	Maintenance item	Maintenance operation	Interval
A B • • • F	Engine oil and oil filter	R	Every 5,000 km (3,000 miles) or 3 months
• • • • • F	Transmission oil	R	Every 20,000 km (12,000 miles) or 12 months
A B • D E F	Front brake discs and calipers	I	Every 10,000 km (6,000 miles) or 6 months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

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

Special Tools

Special Tools

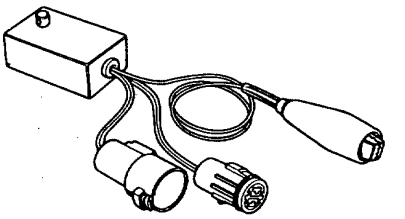
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07912—610001	Oil Filter Socket	1	
②	07406—0030000	Oil Pressure Gauge Adaptor	1	
③	07JAZ—SH20100	R.P.M. Connecting Adaptor	1	
④	07LAZ-PT30100	R.P.M. Connecting Adaptor	1	
⑤	07LAZ-PT30110	R.P.M. Connecting Adaptor A	1	
⑥	07LAZ-PT30120	R.P.M. Connecting Adaptor B	1	
⑦	07JGG—0010100	Belt Tension Gauge	1	



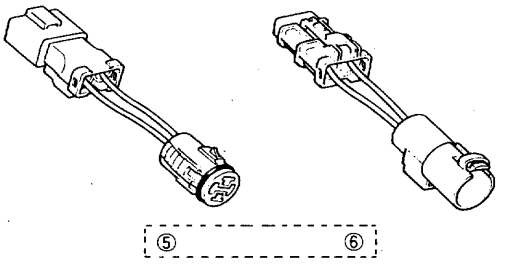
①



②

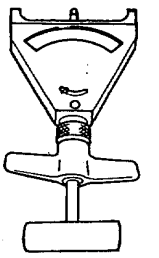


③



⑤ ⑥

④



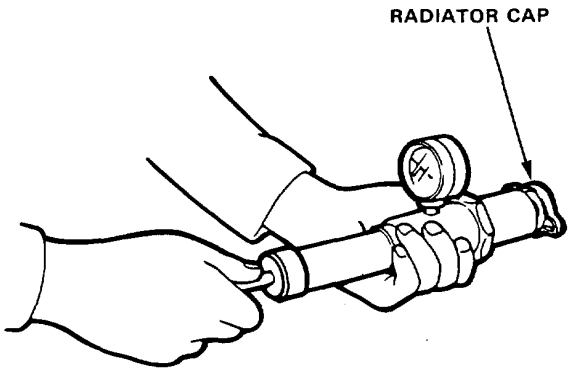
⑦

Engine Tune-up

Radiator Cap Testing

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

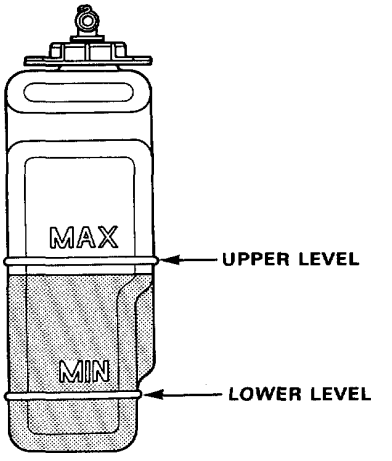
1. Remove the radiator cap, wet its seal with coolant, then install it on the pressure tester.
2. Apply pressure of 93—123 kPa (0.95—1.25 kg/cm², 14—18 psi).
3. Check for a drop in pressure.
4. If there is a drop in pressure, replace the cap.



Coolant Level Inspection

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

1. Check whether the coolant level in the coolant reservoir is between "MAX" and "MIN"



2. Supply the coolant reservoir with coolant to "MAX", if the coolant level is lower than "MIN" or near to "MIN"

NOTE:
- Use only HONDA-RECOMMENDED anti-freeze/coolant.
- For best corrosion protection, the coolant concentration must be maintained year-round at 50% MINIMUN. 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 antirust products; they may not be compatible with the recommended coolant.**

Radiator Coolant Refill Capacity: including reservoir (0.6ℓ(0.6 US qt, 0.5 Imp qt)) and heater.

1.8ℓ
M/T: 6.6ℓ (7.0 US qt, 5.8 Imp qt)
A/T: 6.5ℓ (6.8 US qt, 5.7 Imp qt)
2.0ℓ and 2.2ℓ (except 2.2i)
M/T: 7.2ℓ (7.6 US qt, 6.4 Imp qt)
A/T: 7.1ℓ (7.5 US qt, 6.3 Imp qt)
2.2ℓ (2.2i)
M/T: 6.6ℓ (7.0 US qt, 5.8 Imp qt)
A/T: 7.1ℓ (7.5 US qt, 6.3 Imp qt)

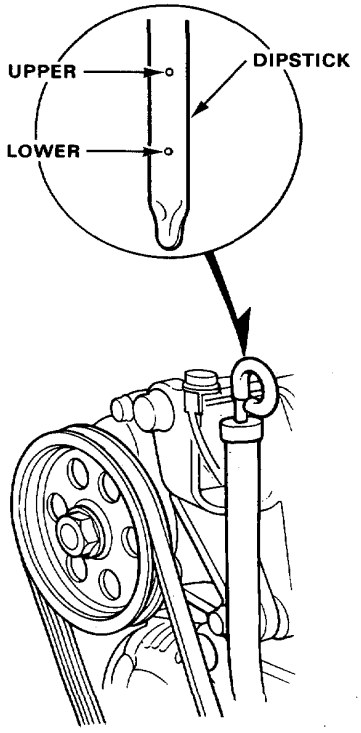
3. See page 5-69 for refilling.

Engine Tune-up

Oil Level Inspection

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

CAUTION: Insert the dipstick carefully to avoid bending it.



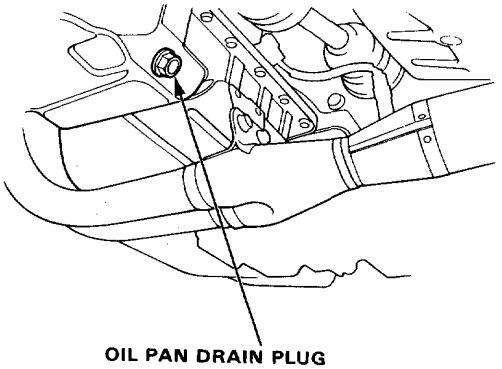
Engine Oil Replacement

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

⚠WARNING **Be careful when loosening the drain bolt while the engine is hot. Burns can result because the oil temperature is very high.**

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

NOTE : Remove the filler cap to speed draining.

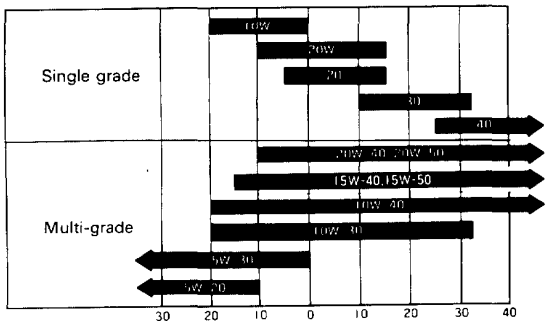


OIL PAN DRAIN PLUG
45 N·m (4.5 kg-m, 33 lb-ft)

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

Capacity	3.8 ℓ (4.0 US qt, 3.3 Imp qt) at change, including filter 4.9 ℓ (5.2 US qt, 4.3 Imp qt)
Change	Every 10,000 km (6,000 miles) or 6 months

Recommended Engine Oil (SF or SG Grade only)



Engine oil viscosity for ambient temperature ranges.

NOTE :

- Oil filter should be replaced at each oil change.
- Because the oil will deteriorate rapidly under the following conditions, it should be changed sooner than usual.
  - Frequent traveling on unpaved roads.
  - Use in cold climates.
  - Frequent idling.
  - Repeated short distance travel.
  - Use as a tractor.

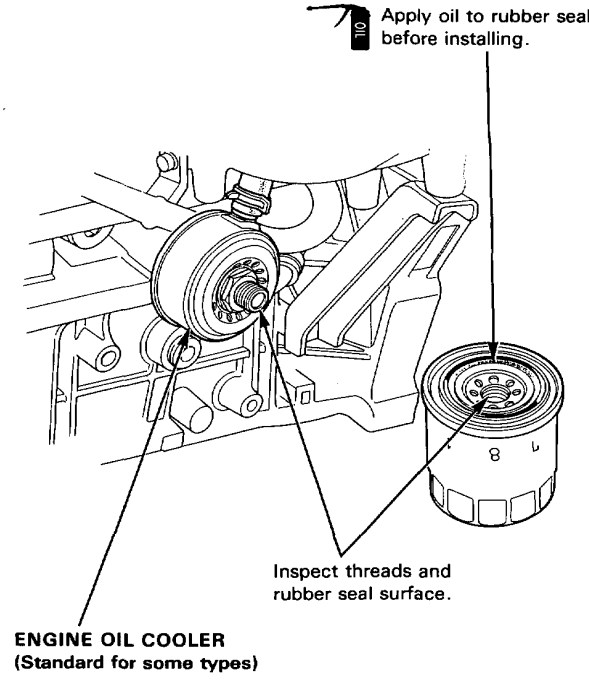
Oil Filter Replacement

⚠WARNING After the engine has been run, the exhaust pipes will be hot; be careful when working around the exhaust manifold.

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

1. Remove the oil filter with the special oil filter socket.
2. Inspect the threads and rubber seal on the new filter. Wipe off seat on engine block, then apply a light coat of oil to the filter rubber seal.

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



(cont'd)

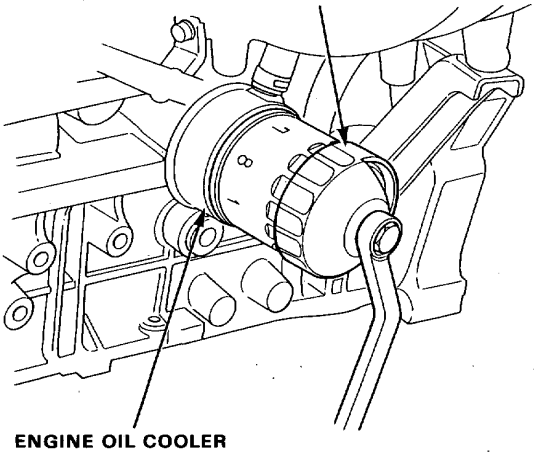
Oil Filter Replacement (cont'd)

3. Install the oil filter by hand.
4. After the rubber seal is seated, tighten the oil filter clockwise with the special tool.

Tighten: 7/8 turn clockwise.
Tightening torque: 22 N·m (2.2 kg-m, 16 lb-ft)

CAUTION: Installation other than the above procedure could result in serious engine defects due to oil leakage.

OIL FILTER WRENCH
07912—6110001



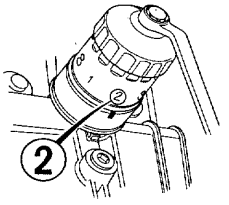
ENGINE OIL COOLER
(Standard for some types)

Eight numbers (1 to 8) are printed on the surface of the filter.

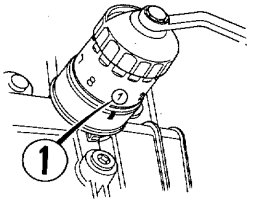
The following explains the procedure for tightening filters using these numbers.

1) Make a mark on the cylinder block under the number that shows at the bottom of the filter when the rubber seal is seated.

2) Tighten the filter by turning it clockwise seven numbers from the marked point. For example, if a mark is made under the number 2 when the rubber seal is seated, the filter should be tightened until the number 1 comes up to the marked point.



Number when rubber seal is seated.



Number after tightening.

Number when rubber seal is seated	1	2	3	4	5	6	7	8
Number after tightening	8	1	2	3	4	5	6	7

5. After installation, fill the engine with oil up to the specified level, run the engine for more than 3 minutes, then check for oil leakage.

Oil Pressure Test

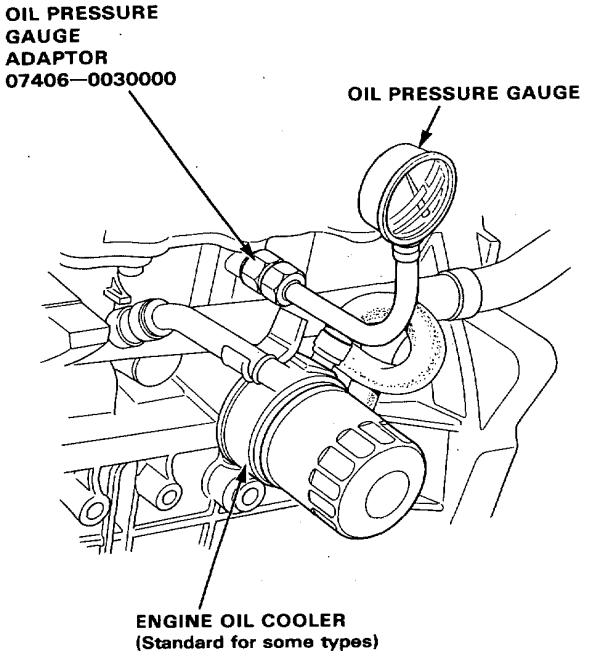
If the oil pressure warning light stays on with the engine running, check the engine oil level. If the oil level is correct:

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

Engine Oil Pressure: 80°C (176°F)

At Idle:	**69 kPa (0.7 kg/cm², 10 psi) minimum**
At 3,000 min⁻¹ (rpm):	**343 kPa (3.5 kg/cm², 50 psi) minimum**

- If oil pressure is within specifications, replace the oil pressure sender and recheck.
- If oil pressure is NOT within specifications, inspect the oil pump.



Air Cleaner Element Inspection/ Replacement

Inspection

1. Remove the air cleaner element.
2. Check the air cleaner element for fouling.

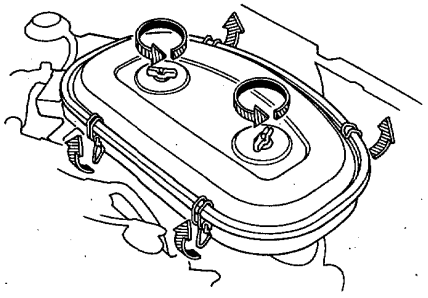
NOTE : No cleaning is necessary for the air cleaner element, because its filter takes in oil (: viscous type).

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

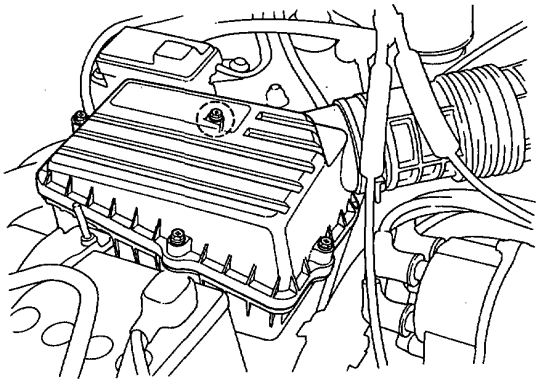
Replacement

1. Remove the air cleaner cover.

Carbureted Engine:



Fuel-Injected Engine:



(cont'd)

Oil Pressure Test

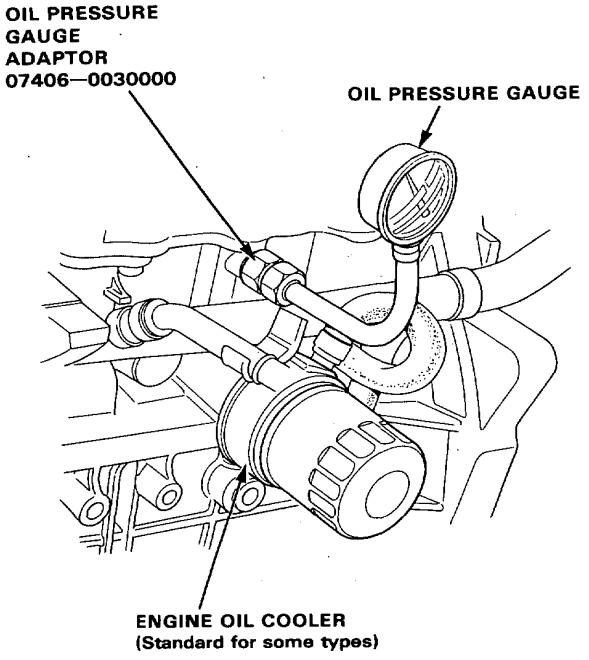
If the oil pressure warning light stays on with the engine running, check the engine oil level. If the oil level is correct:

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

Engine Oil Pressure: 80°C (176°F)

At Idle:	**69 kPa (0.7 kg/cm², 10 psi) minimum**
At 3,000 min⁻¹ (rpm):	**343 kPa (3.5 kg/cm², 50 psi) minimum**

- If oil pressure is within specifications, replace the oil pressure sender and recheck.
- If oil pressure is NOT within specifications, inspect the oil pump.



Air Cleaner Element Inspection/ Replacement

Inspection

1. Remove the air cleaner element.
2. Check the air cleaner element for fouling.

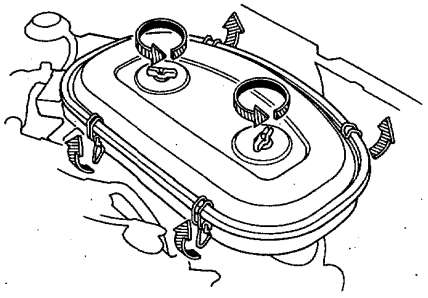
NOTE : No cleaning is necessary for the air cleaner element, because its filter takes in oil (: viscous type).

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

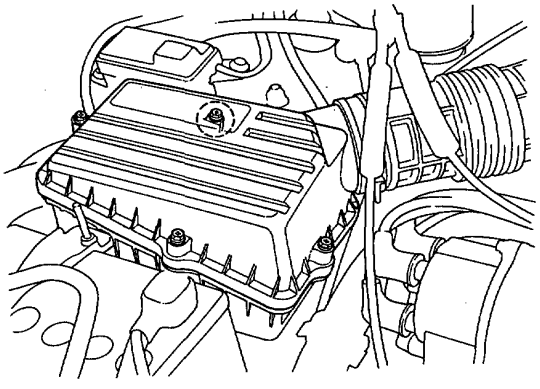
Replacement

1. Remove the air cleaner cover.

Carbureted Engine:



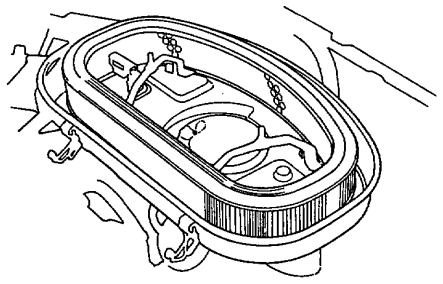
Fuel-Injected Engine:



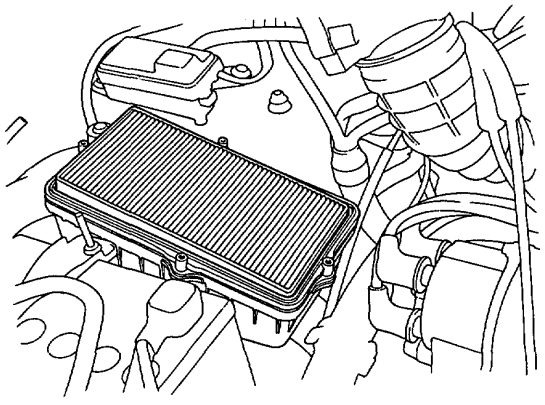
(cont'd)

Air Cleaner Element Inspection/ Replacement (cont'd)

Carbureted Engine:



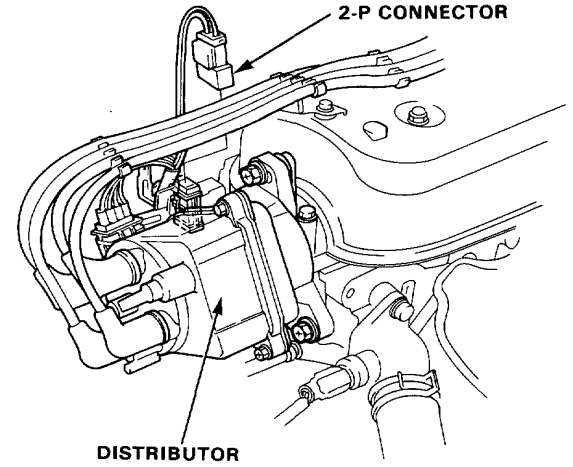
Fuel-Injected Engine:



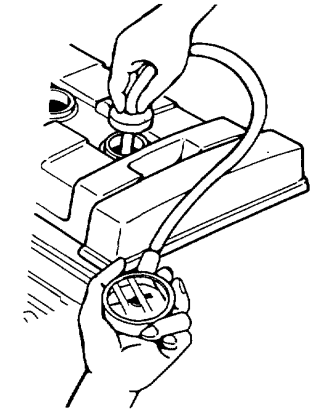
2. Replace the element, install the air cleaner cover and tighten the nuts or clips securely.

Compression Pressure Inspection

1. Before inspection, run the engine until it warms up (the cooling fan comes on at least twice).
2. Disconnect spark plugs (4).
3. Disconnect the 2-P connector (ignition coil primary lead) from the distributor.



4. Fit the compression gauge adapter into a plug hole.
   - Measure compression pressure at each cylinder.

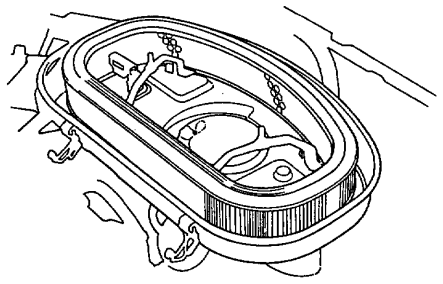


Compression pressure :
1.8ℓ : 1,177 kPa (12.0 kg/cm², 171 psi) at 250 min⁻¹(rpm)
2.0ℓ, 2.2ℓ : 1,226 kPa (12.5 kg/cm², 178 psi) at 250 min⁻¹(rpm)
Limit : 932 kPa (9.5 kg/cm², 135 psi) at 250 min⁻¹(rpm)
Difference between cylinders : 196 kPa (2.0 kg/cm², 28 psi)
NOTE : Use a full charged battery.

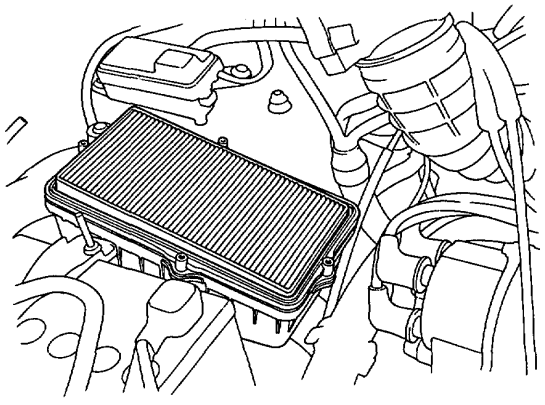
5. If compression pressure is low, it is caused by wear or damage of piston rings or head gasket, and improper seated valves.
6. When the pressure is high, inspect the following item.
   - Accumulated carbon on the piston head and the cylinder head.

Air Cleaner Element Inspection/ Replacement (cont'd)

Carbureted Engine:



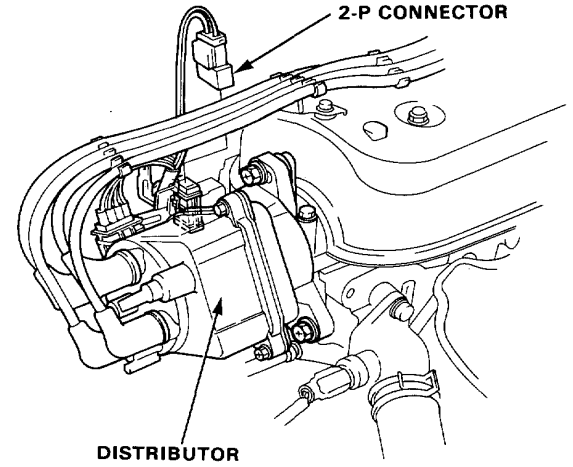
Fuel-Injected Engine:



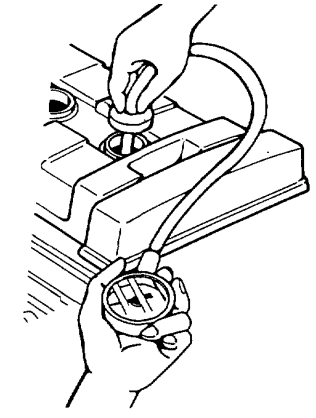
2. Replace the element, install the air cleaner cover and tighten the nuts or clips securely.

Compression Pressure Inspection

1. Before inspection, run the engine until it warms up (the cooling fan comes on at least twice).
2. Disconnect spark plugs (4).
3. Disconnect the 2-P connector (ignition coil primary lead) from the distributor.



4. Fit the compression gauge adapter into a plug hole.
   - Measure compression pressure at each cylinder.

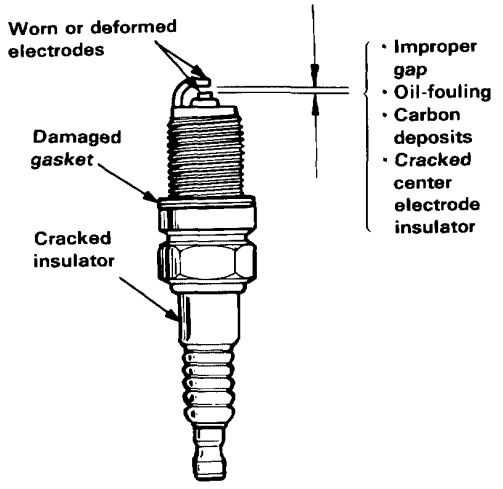


Compression pressure :
1.8ℓ : 1,177 kPa (12.0 kg/cm², 171 psi) at 250 min⁻¹(rpm)
2.0ℓ, 2.2ℓ : 1,226 kPa (12.5 kg/cm², 178 psi) at 250 min⁻¹(rpm)
Limit : 932 kPa (9.5 kg/cm², 135 psi) at 250 min⁻¹(rpm)
Difference between cylinders : 196 kPa (2.0 kg/cm², 28 psi)
NOTE : Use a full charged battery.

5. If compression pressure is low, it is caused by wear or damage of piston rings or head gasket, and improper seated valves.
6. When the pressure is high, inspect the following item.
   - Accumulated carbon on the piston head and the cylinder head.

Spark Plug Inspection

1. Inspect the electrodes and ceramic insulator for:



Burned or worn electrodes may be caused by:
- Advanced ignition timing
- Loose spark plug
- Plug heat range too low
- Insufficient cooling

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

2. Replace the plug if the center electrode is rounded as shown below:
NOTE:
- Do not use spark plugs other than those listed below, because those plugs are a new type (ISO standard).
- These marks are sealed on the air cleaner cover.



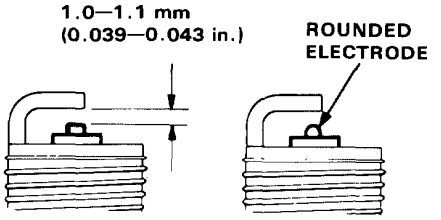
Spark Plug:
Except KP and KT models

	Standard	Optional
NGK	ZFR6F-11	ZFR5F-11* ZFR7F-11
ND	KJ20CR-L11	KJ16CR-L11* KJ22CR-L11

*: Except KF, KG, KS, KW, KE and KX models

KP and KT models

	Standard	Optional
NGK	ZFR5F-11	ZFR6F-11
ND	KJ16CR-L11	KJ20CR-L11



3. Adjust the gap with a suitable gapping tool.

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

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

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

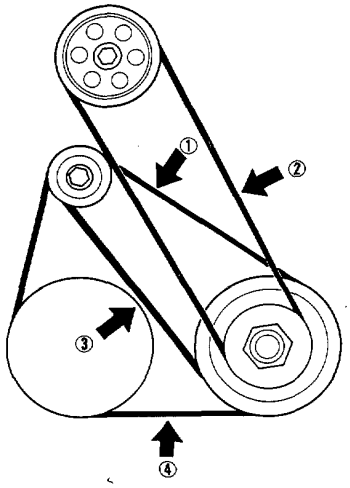
Drive Belts Inspection

Drive Belts Deflection:
(When applying a force of 98 N (10 kg, 22 lb))

	Used Belt	New Belt
①Alternator Belt	10.0—12.0 mm (0.39—0.47 in.)	8.5—11.0 mm (0.33—0.43 in.)
①Alternator Belt with A/C	10.0—12.0 mm (0.39—0.47 in.)	4.5—7.0 mm (0.18—0.28 in.)
②P/S Pump Belt	13.0—16.0 mm (0.51—0.63 in.)	9.5—11.5 mm (0.37—0.45 in.)

Measure with the belt tension gauge:

	Used Belt	New Belt
③Alternator Belt	343—490 N { 35—50 kg 77—110 lb }	441—637 N { 45—65 kg 99—143 lb }
④Alternator Belt with A/C	441—588 N { 45—60 kg 99—132 lb }	932—1,128 N { 95—115 kg 209—254 lb }
②P/S Pump Belt	343—490 N { 35—50 kg 77—110 lb }	686—883 N { 70—90 kg 154—198 lb }

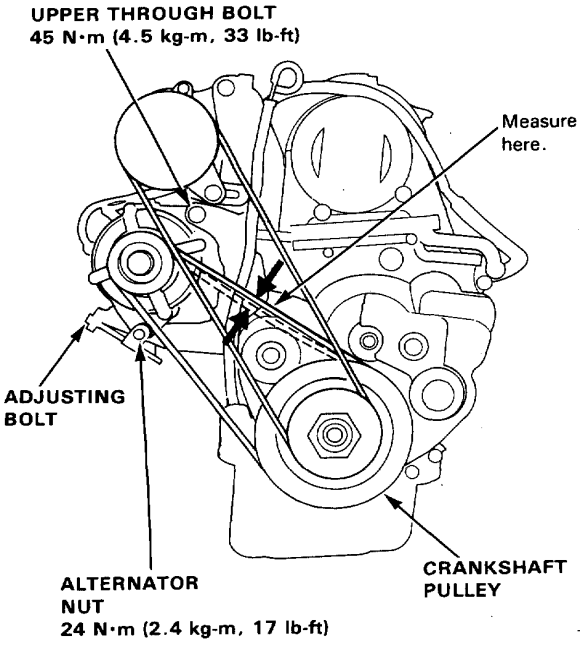


Alternator (A/C Compressor) Belt Adjustment

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

   Deflection: 10—12 mm (0.39—0.47 in.)

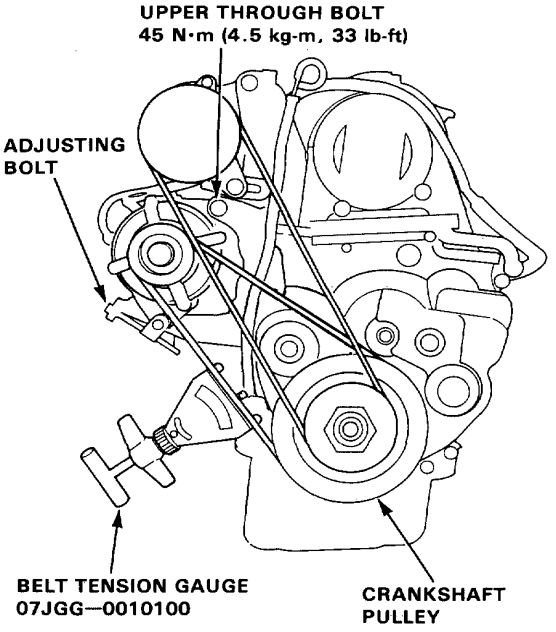
   NOTE: On a brand-new belt, the deflection should be 8.5—11 mm (0.33—0.43 in.) when first measured.



Measure with the belt tension gauge:
Attach the belt tension gauge to the belt and measure the tension of the belt.

Tension: 294—441 N (30—45 kg, 66—99 lb)

NOTE: On a brand-new belt, the tension should be 441—637 N (45—65 kg, 99—143 lb) when first measured.



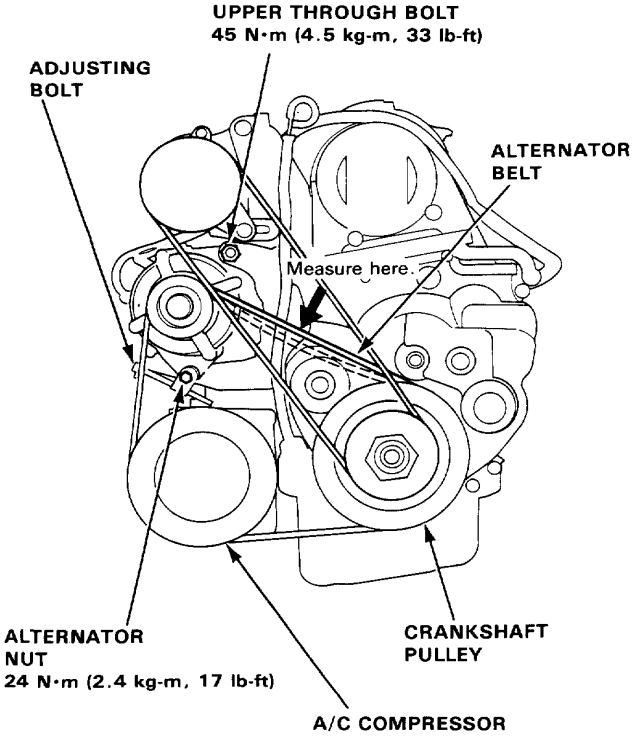
2. Loosen the upper through bolt and alternator nut.
3. Move the alternator to obtain the proper belt tension, then retighten the alternator nut and upper through bolt.
4. Recheck the deflection of the belt.
5. After adjusting, if necessary, adjust the P/S pump belt (see section 17).

Alternator (A/C Compressor) Belt Adjustment

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

   Deflection: 10—12 mm (0.39—0.47 in.)

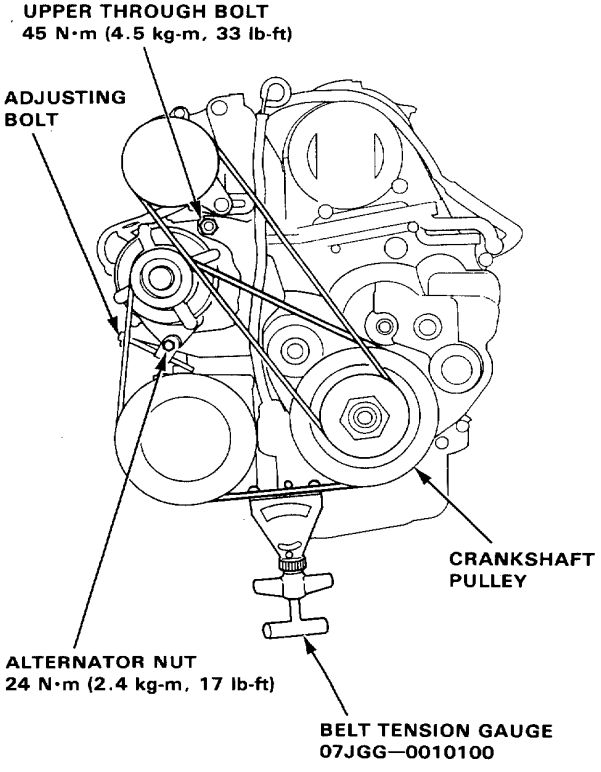
   NOTE:
   - On a brand-new belt, the deflection should be 4.5 —7 mm (0.18—0.28 in.) when first measured.
   - If there are cracks or any damage evident on the belt, replace it with a new one.



Measure with the belt tension gauge:
Attach the belt tension gauge to the belt and measure the tension of the belt.

Tension: 441—558 N (45—60 kg, 99—132 lb)

NOTE:
- On a brand-new belt, the tension should be 931 —1127 N (95—115 kg, 209—253 lb) when first measured.
- See the instruction for the belt tension gauge.
- If there are cracks or any damage evident on the belt, replace it with a new one.

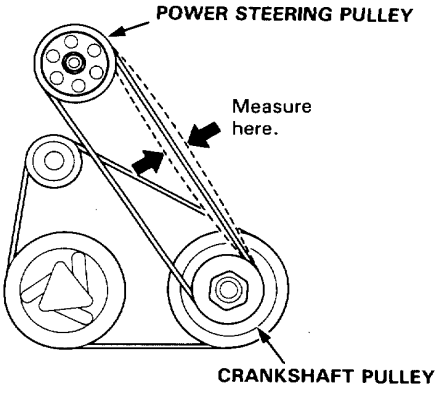


2. Loosen the upper through bolt and alternator nut.
3. Move the alternator to obtain the proper belt tension, then retighten the alternator nut and upper through bolt.
4. Recheck the deflection of the belt.
5. After adjusting, if necessary, adjust the P/S pump belt (see section 11)

P/S Pump Belt Adjustment

1. A properly adjusted belt should deflect about 12.5—16 mm (0.50—0.62 in) when you push on it the pulleys with a force of about 98 N (10 kg, 22 lbs).

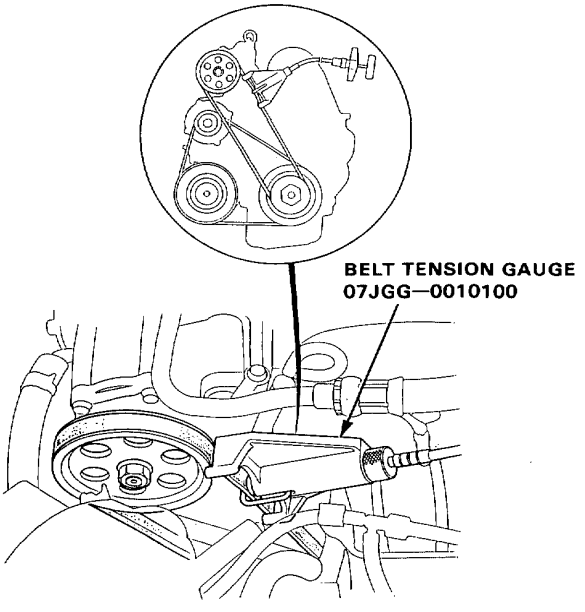
   NOTE: On a brand new belt, the deflection should be 9.5—11.5 mm (0.37—0.45 in) when first measured.



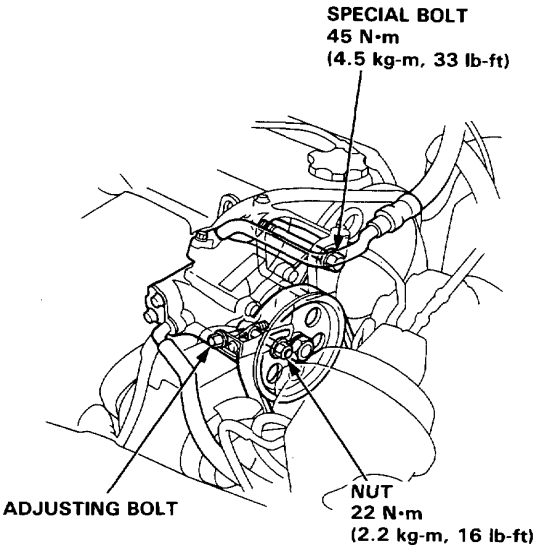
Test by the Belt Tension Gauge; 07JGG—0010100.
Attach the tension gauge to the belt and measure the tension of the belt.

Tension: 35—50 kg (77—110 lbs)

- On a brand-new belt, the tension should be 70—90 kg (154—198 lbs) when first measured.
- See the instructions for the tension gauge.



2. Loosen the special bolt and nut and turn the adjusting bolt to get proper tension, then retighten the special bolt and nut.

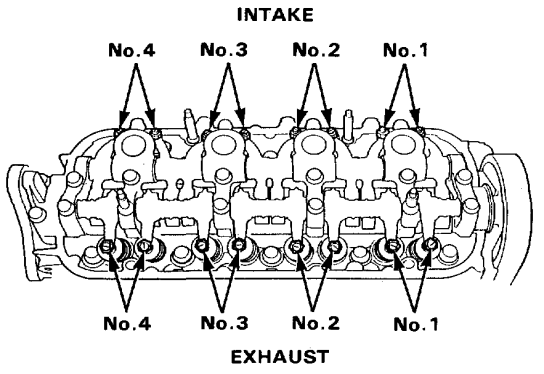


3. Start the engine and turn the steering wheel from lock-to-lock several times, then stop the engine and recheck the belt tension.

Valve Clearance Adjustment

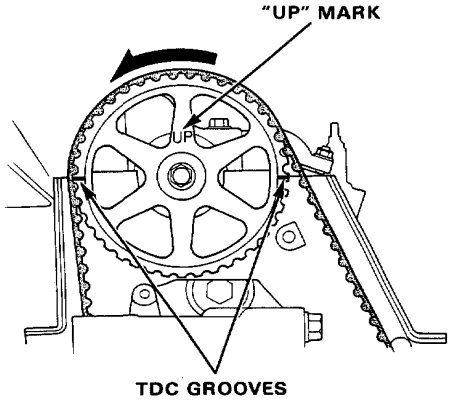
NOTE:
- Valves should be adjusted cold when the cylinder head temperature is less than 38 °C (100 °F).
  Adjustment is the same for intake and exhaust valves.
- If pulley bolt broke loose while turning crank, retorque it to 220 N·m (22.0 kg-m, 159 lb-ft).

1. Remove valve cover.

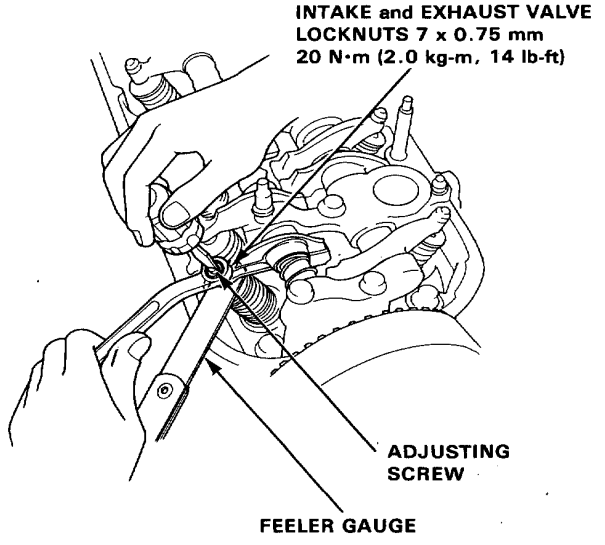


2. Set No.1 piston at TDC. "UP" mark on the pulley should be at top, and TDC grooves on the pulley should align with cylinder head surface. The distributor rotor must be pointing towards No.1 plug wire.

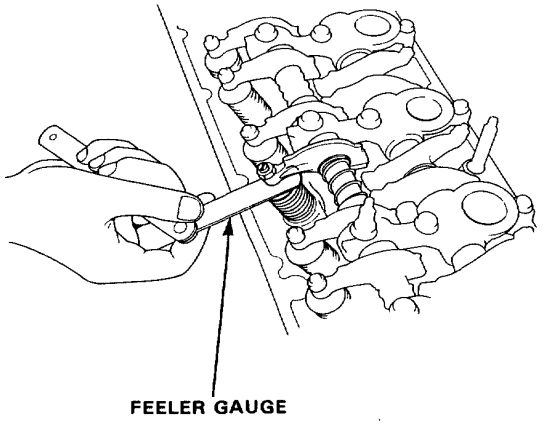
Number 1 piston at TDC



3. Adjust valves on No.1 cylinder.
   Intake: 0.26 ± 0.02 mm (0.010 ± 0.01 in.)
   Exhaust: 0.30 ± 0.02 mm (0.012 ± 0.01 in.)
4. Loosen locknut and turn adjustment screw until feeler gauge slides back and forth with slight amount of drag.

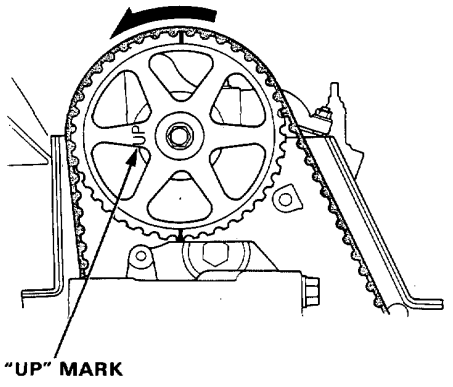


5. Tighten locknut and check clearance again. Repeat adjustment if necessary.



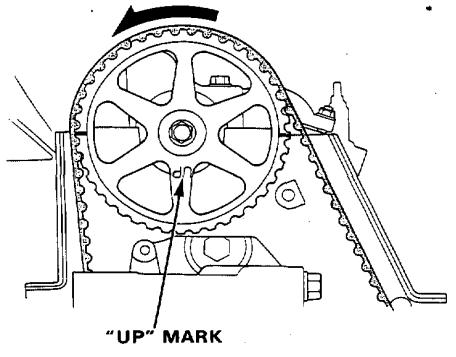
6. Rotate crankshaft 180° counterclockwise (cam pulley turns 90°). The "UP" mark should be at exhaust side. Distributor rotor should point to No.3 plug wire. Adjust valves on No.3 cylinder.

Number 3 piston at TDC



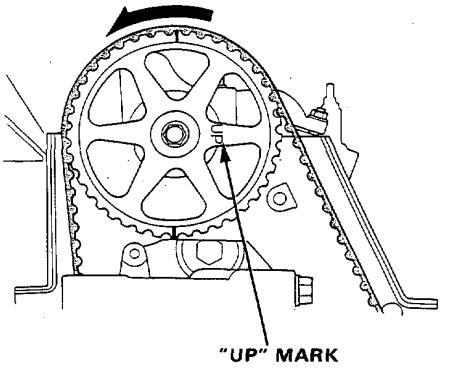
7. Rotate crankshaft 180° counterclockwise to bring No. 4 piston to TDC. Both TDC grooves are once again visible and distributor rotor points to No.4 plug wire. Adjust valves on No.4 cylinder.

Number 4 piston at TDC



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

Number 2 piston at TDC



Idle Speed Inspection/Adjustment

Carbureted Engine:

(KS KG, KQ)

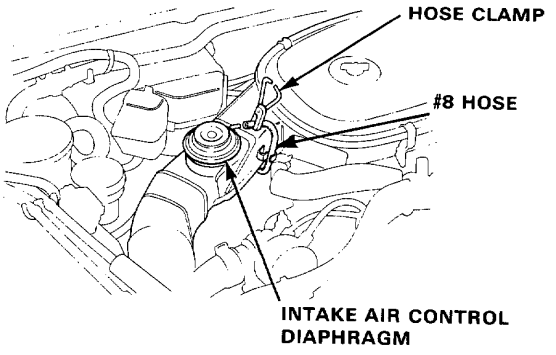
Inspection/Adjustment

Propane Enrichment Method

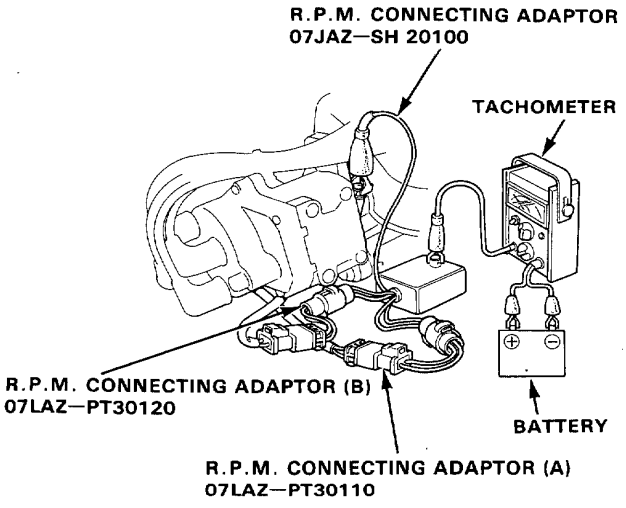
⚠WARNING Do not smoke during this procedure. Keep any open flame away from your work area.

NOTE:
- This procedure requires a propane enrichment kit.
- Check that the self diagnosis indicator before making idle speed and mixture inspections.

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

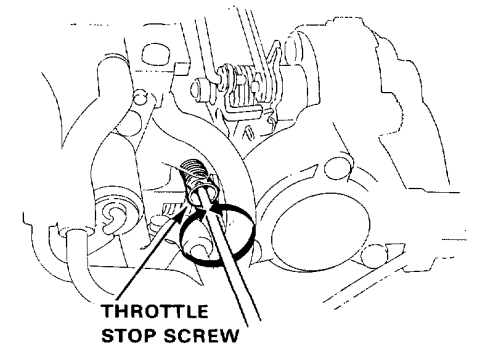


3. Connect a tachometer.



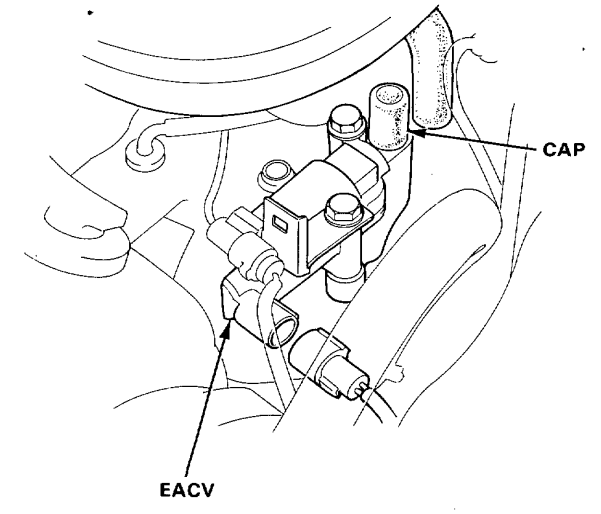
4. Turn the ignition switch OFF. Restart the engine and hold engine at idle for 2 minutes. And hold engine at 2,500—3,000 min^{-1} (rpm) for 1 minute.
Check idle speed with the headlights, heater blower, rear window defogger, cooling fan and air conditioner off.
Idle speed should be:

Manual	800 ± 50 min^{-1} (rpm)
Automatic	750 ± 50 min^{-1}(rpm) (in "D")

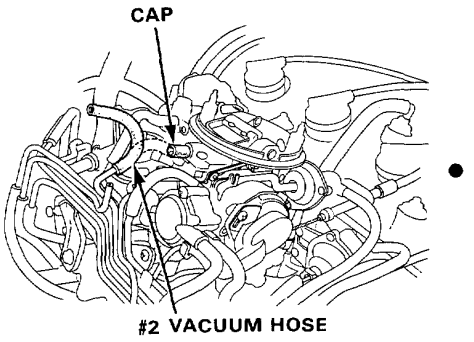


Adjust the idle speed, if necessary, by turning the throttle stop screw.
NOTE: If the idle speed is excessively high, check the throttle control system (page 6-112)

5. Disconnect the 2P connector from the EACV and disconnect the hose from the EACV, then cap the EACV.

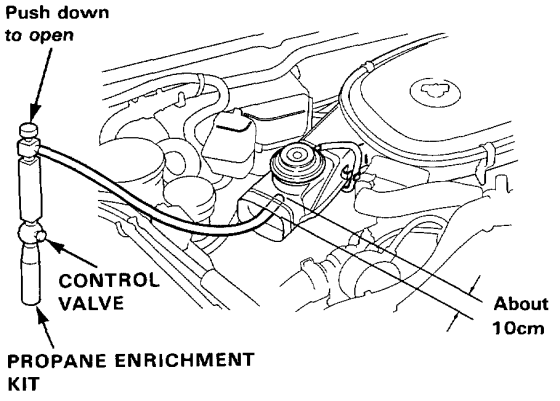


6. Disconnect the #2 vacuum hose from the carburetor, then cap the carburetor.



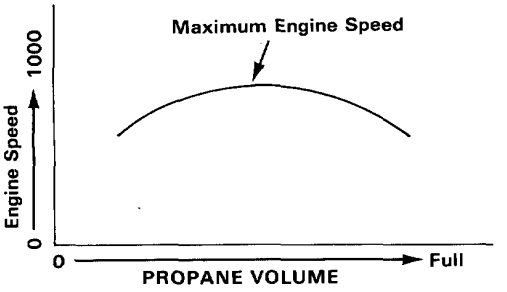
7. Disconnect air cleaner intake tube from air intake duct.

8. Insert the hose of the propane enrichment kit into the intake tube about 10 cm.
NOTE: Check that propane bottle has adequate gas before beginning test.



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

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



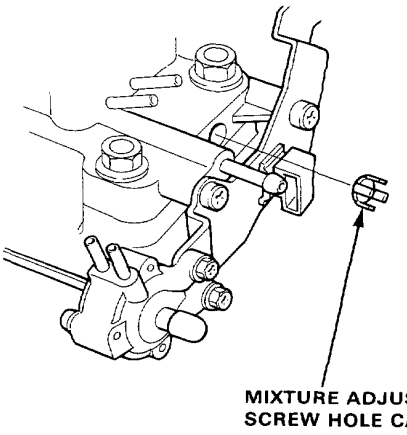
Engine speed increase should be:

Manual	160 ± 20 min^{-1} (rpm)
Automatic	50 ± 10 min^{-1} (rpm) (in "D")

- If engine speed does not increase per specification, mixture is improperly adjusted. Go to step 10.
- If engine speed increases per specification, go to step 14.

10. Remove the air cleaner and close the propane cotrol valve.

11. Remove the mixture adjusting screw hole cap.



(cont'd)

Idle Speed Inspection/Adjustment (cont'd)

12. Start engine and warm up to normal operating temperature ; the cooling fan will come on.
13. Reinstall the propane enrichment kit and recheck maximum propane enriched engine speed.
    - If the propane enriched speed is too low, mixture is too rich: turn the mixture screw 1/4-turn clockwise and recheck.
    - If the propane enriched speed is too high, mixture is to lean: turn the mixture screw 1/4-turn counterclockwise and recheck.
14. Close the propane control valve speed and remove the BACK UP fuse for 10 seconds to reset control unit. Recheck idle speed.

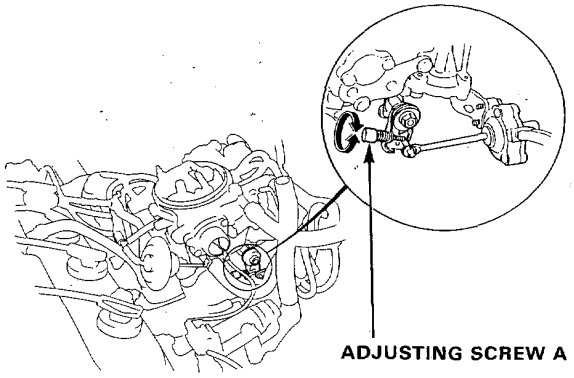
    Idle speed should be:

Manual	800±50min^{-1} (rpm)
Automatic	750±50min^{-1} (rpm) (in "D")

    - If idle speed is as specified (step 4), go to step 15.
    - If idle speed is not as specified, adjust by turning throttle stop screw, then repeat steps 13 and 14.
15. Remove propane enrichment kit and reconnect air cleaner intake tube on the air intake duct.
16. Reinstall the mixture adjusting screw hole cap.
17. Disconnect the connector on the P/S oil pressure switch, and check the idle speed.

    Idle speed should be:

Manual	950 ± 50 min^{-1} (rpm)
Automatic	820 ± 50 min^{-1} (rpm) (in "D")

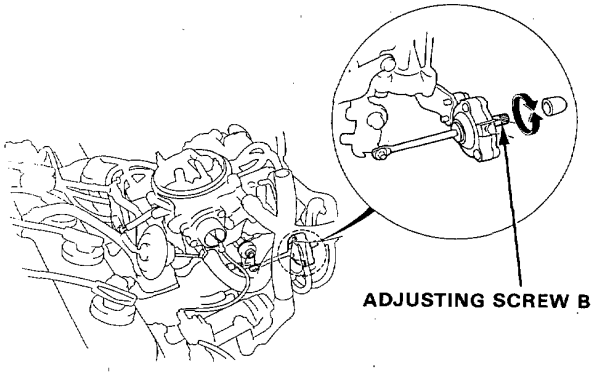


Adjust the idle speed, if necessary, by turning the adjusting screw A.

18. If equipped with air conditioner, check the idle speed with the A/C on.

    Idle speed should be:

Manual	800±50min^{-1} (rpm)
Automatic	750±50min^{-1} (rpm) (in "D")



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

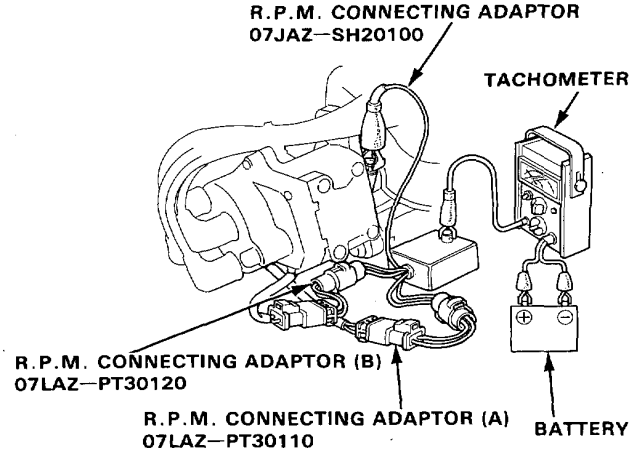
(Except KS, KG, KQ)

CO Meter Method

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

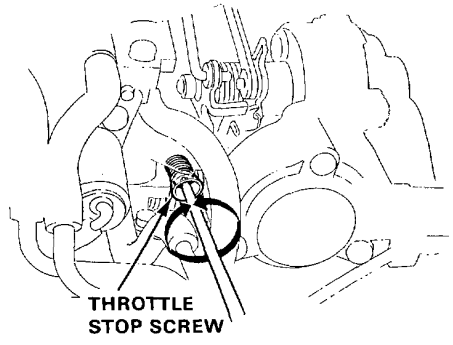
NOTE: Check that the self-diagnosis indicator (KX) before making idle speed and mixture inspections.

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



3. Turn the ignition switch OFF. Restart the engine and hold engine at idle for 2 minutes. And hold engine at 2,500—3,000min^{-1} (rpm) for 1 minute.
   Check idle speed with the headlights, heater blower, rear window defogger, cooling fan and air conditioner off.
   Idle speed should be:

Manual	800±50min^{-1} (rpm)
Automatic	750±50min^{-1} (rpm)(in "D")



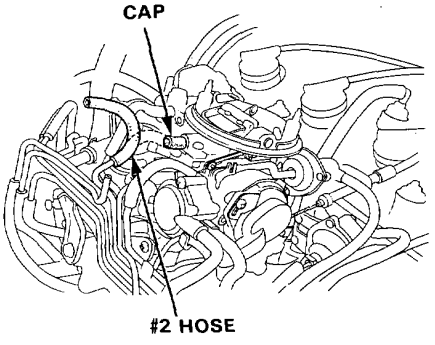
   Adjust the idle speed, if necessary, by turning the throttle stop screw.
   NOTE: If the idle speed is excessively high, check the throttle control system (page 6-112)

4. Calibrate the NDIR CO Meter in accordance with the *manufacturer's recommended procedures.*
   Insert exhaust gas sampling probe into the tailpipe at least 40 cm.
5. Turn the ignition switch OFF. Restart the engine and hold engine at idle for 2 minutes. And hold engine at 2,500—3,000 min^{-1} (rpm) for 1 minute.
   Check specification for idle CO with cooling fan, air conditioner OFF and headlights OFF.

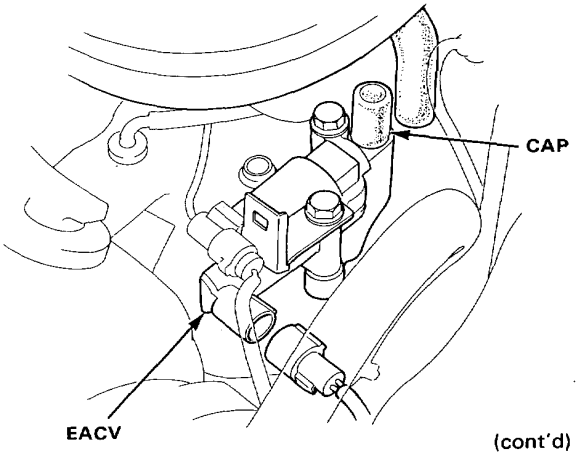
   Specified CO%:
   KX: 0.1% maximum
   Except KX: 1±1%

   - If idle CO is as specified, go to step 14.
   - If not, go to step 6 through 13.

6. KX ;
   Disconnect the #2 vacuum hose from the carburetor, then cap the carburetor.



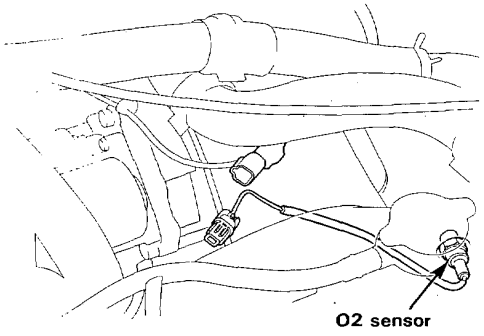
7. KX:
   Disconnect the 2P connector from the EACV and disconnect the hose from the EACV, then cap the EACV.



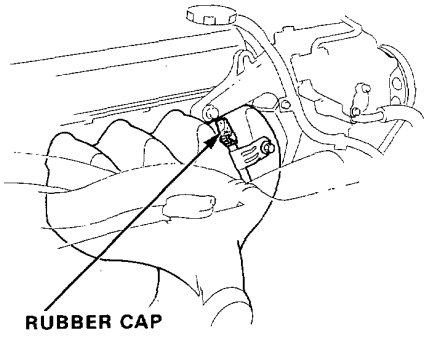
(cont'd)

Idle Speed Inspection/Adjustment (cont'd)

8. KX:
   Disconnect the wire harness from the O^2 sensor.



9. KX:
   Remove the rubber cap from the gas pipe.



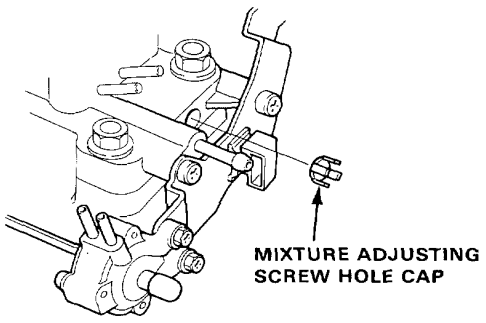
10. KX:
    Turn the ignition switch OFF. Restart the engine and hold engine at idle for 2 minutes. And hold engine at 2,500—3,000 min^{-1} (rpm) for 1 minute.
    Check specification for idle CO.

    Specified CO%: 2.3±1.0%

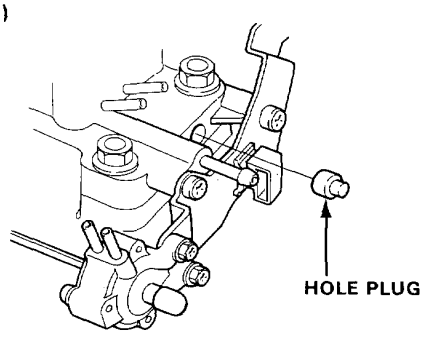
    - If not, specification, go to step 11.

11. Remove mixture adjusting screw hole plug and adjust by turning mixture adjusting screw to obtain proper CO reading.

(KX)



(Except KX)



— Turning mixture adjusting screw

clockwise: CO reading decreases
counterclockwise: CO reading increases

Readjust idle speed if necessary, and recheck idle CO.

12. KX:
    Reconnect the connector and hose.
    Remove BACK UP fuse for 10 seconds to reset control unit.

13. KX:
    Turn the ignition switch OFF. Restart the engine and hold engine at idle for 2 minutes. And hold engine at 2,500—3,000 min^{-1} (rpm) for 1 minute.
    Recheck idle CO.

    Specified CO%: 0.1%

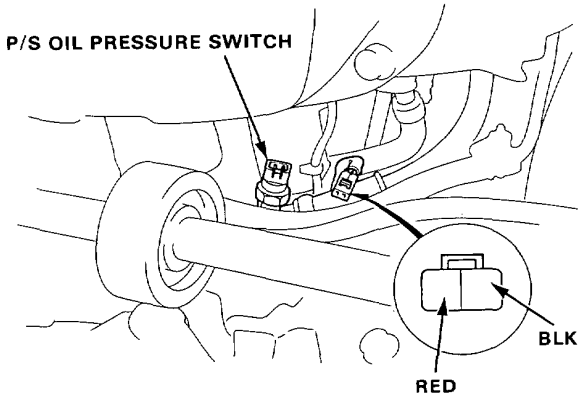
    - If idle CO is as specified, go to step 14.
    - If not, check the self-diagnosis indicator (page 6-22). If not, inspect the EACV (page 6-104) and the catalytic converter (page 6-103), then repeat step 6.

14. Recheck idle speed.
    Idle speed should be:

Manual	800±50 min^{-1} (rpm)
Automatic	750±50 min^{-1} (rpm) (in "D")

- If idle speed is as specified, go to step 15.
- If idle speed is not as specified, adjust by turning throttle stop screw, then repeat step 5.

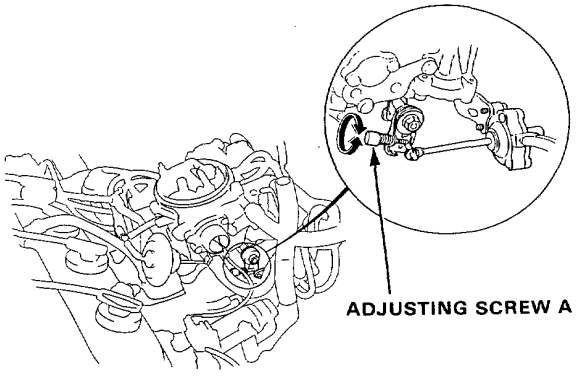
15. Reinstall the mixture adjusting screw hole cap.
16. Disconnect the connector on the P/S oil pressure switch.
    Except KX; Connect a jumper wire between the RED terminal and the BLK terminal.



17. Check the idle speed.

Idle speed should be :

Manual	950 ± 50 min^{-1} (rpm)
Automatic	820 ± 50 min^{-1} (rpm) (in "D")

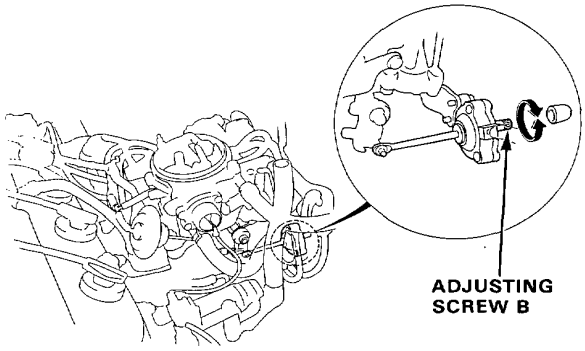


Adjust the idle speed, if necessary, by turning the adjusting screw A.

18. If equipped with air conditioner, check the idle speed with the A/C on.

Idle speed should be:

Manual	800±50 min^{-1} (rpm)
Automatic	750±50 min^{-1} (rpm) (in "D")



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

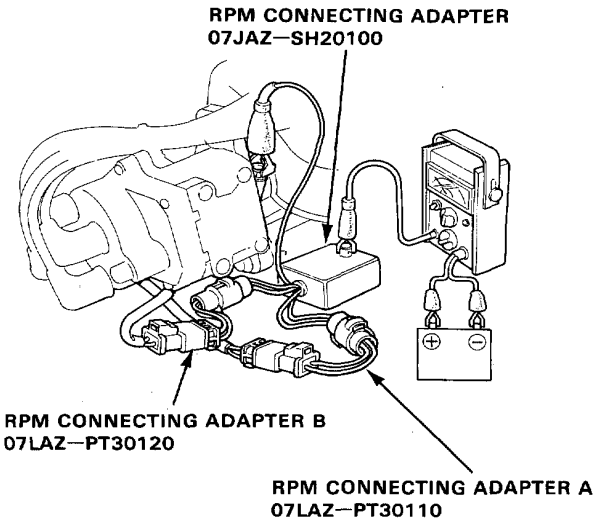
(cont'd)

Idle Speed Inspection/Adjustment (cont'd)

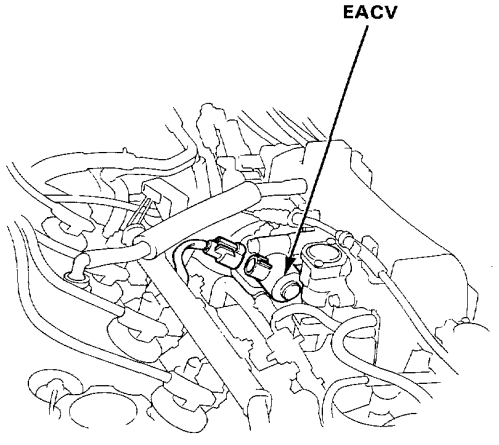
Fuel-Injected Engine:

Inspection/Adjustment

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



3. Disconnect the 2P connector from the EACV.



4. Check idling in no- l pad conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating.

Idle speed should be:

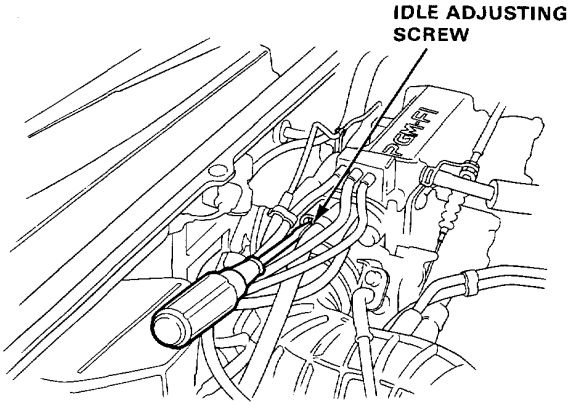
(Except KS, KW)

Manual	600±50 min^{-1} (rpm)
Automatic	600±50 min^{-1} (rpm) (in N or P)

(KS, KW)

Manual	550 ± 50 min^{-1} (rpm)
Automatic	550 ± 50 min^{-1} (in N or P)

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



5. Turn the ignition switch OFF.
6. reconnect the 2P connector on the EACV, then remove BACK UP fuse in the underhood relay box for 10 seconds to reset ECU.
7. Restart an idle the engine with no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating for one minute, then check the idle speed.

Idle speed should be:

Manual	700±50 min^{-1} (rpm)
Automatic	700±50 min^{-1} (rpm)

8. Idle the engine for one minute with headlights (Hi) and rear defogger ON and check the idle speed.

Idle speed should be:

Manual	770±50 min^{-1} (rpm)
Automatic	770±50 min^{-1} (rpm)

9. Idle the engine for one minute with heater fan switch at HI and air conditioner on, then check the idle speed.

Idle speed should be:

Manual	770±50 min^{-1} (rpm)
Automatic	770±50 min^{-1} (rpm)

NOTE: If the idle speed is not within specifications, see System Troubleshooting Guide on page 6-192.

Tailpipe Emissions Inspection

Carbureted Engine:

Inspection

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

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

1. KX, KS, KG, KQ:
   Check the idle speed/mixture using the propane enrichment method.
2. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
3. Start the engine and warm it up to normal operating temperature (the cooling fan comes on twice).
4. Turn the ignition switch OFF. Restart the engine and hold engine at idle for 2 minutes.
   And hold engine at 2,500—3,000 min^{-1} (rpm) for I minute.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

   Specified CO %:
   KX, KS, KG, KQ: 0.1% maximum
   Except KX, KS, KG, KQ: 1.0 ± 1.0%

Fuel-Injected Engine:

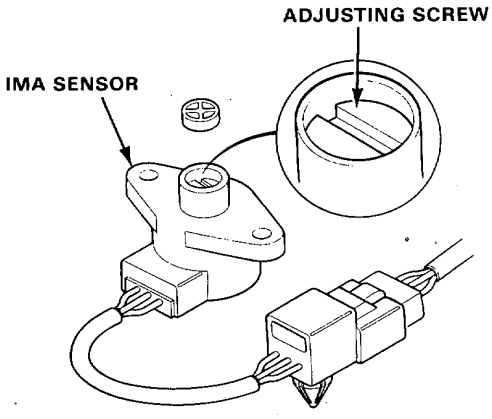
Inspectin

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

1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
2. Connect tachometer.
3. Check idle speed and adjust the idle speed, if necessary (page 6-207)
4. Warm up and calibrate the CO meter according to the meter manufacture's instructions.
5. Check idle CO with the headights, heater blower, rear window defogger, cooling fan, and air conditioner off.

   Specified CO%:
   With CATA: 0.1 % maximum
   Without CATA: 1.0±1.0 %

   ● If unable to obtain this reading :
   On With CATA, see ECU troubleshooting guide (page 6-144).
   On other models, adjust by turning the adjusting screw of the IMA sensor.



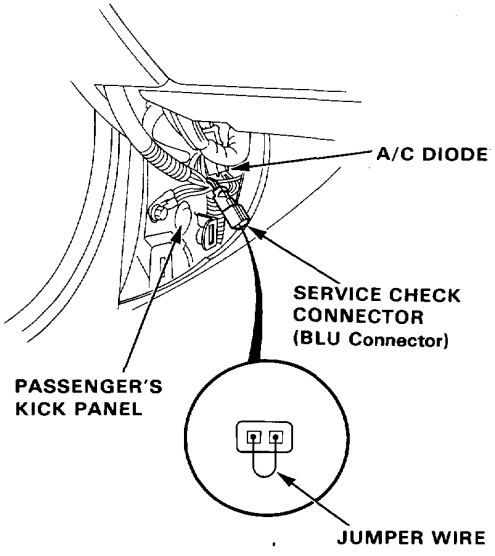
— If unable to obtain a CO reading of specified % by this procedure, check the engine tune-up condition.

Ignition Timing Inspection and Setting

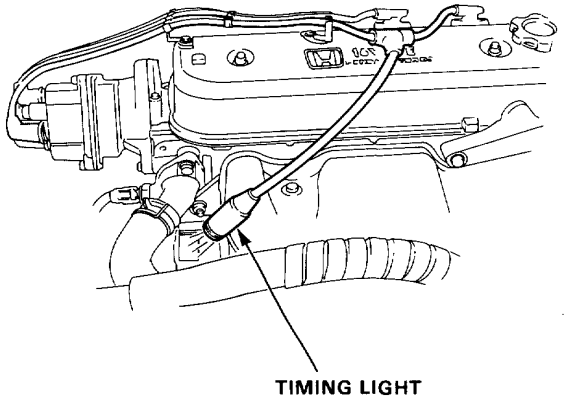
Euel-Injected Engine:

<KG, KS, KX and KQ models>
NOTE: To be made at idle with the service check connector shorted, the blue service check connector is located in the far passenger corner under the dashboard.

1. Start the engine and allow it to warm up (cooling fan comes on).
2. Connect the ORN/RED and GRN/WHT terminals of the service check connector (BLU) with a jumper wire.



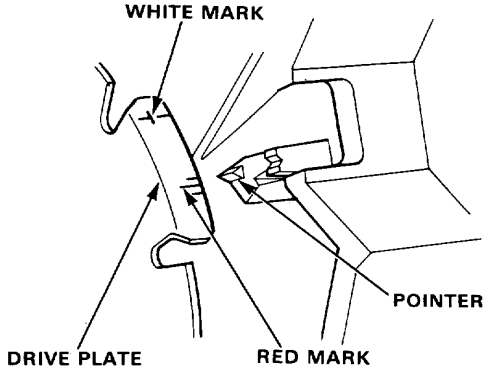
3. Connect a timing light to the engine; while the engine idles, point the light toward the pointer on the flywheel (for M/T), or on the drive plate (for A/T).



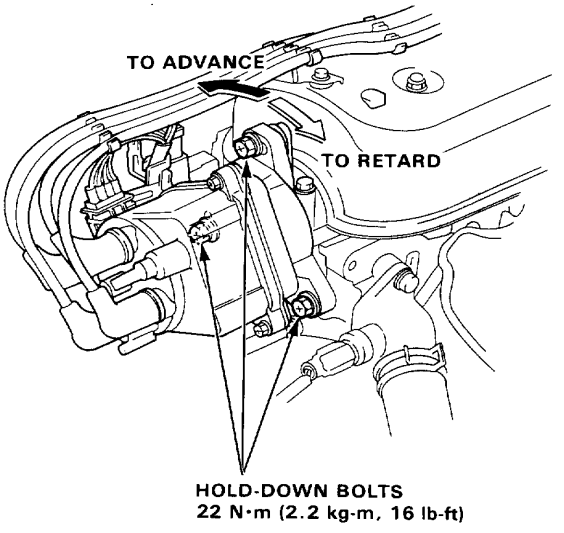
4. Adjust ignition timing, if necessary, to the following specifications:

Ignition Timing
- **All models: 15 ± 2° BTDC (RED) at 800 ± 50 min^{-1} (rpm) in neutral**

NOTE: The illustration shows A/T.



5. Adjust as necessary by loosening the distributor adjusting bolts, and turn the distributor housing counter-clockwise to advance the timing, or colckwise to retard the timing.

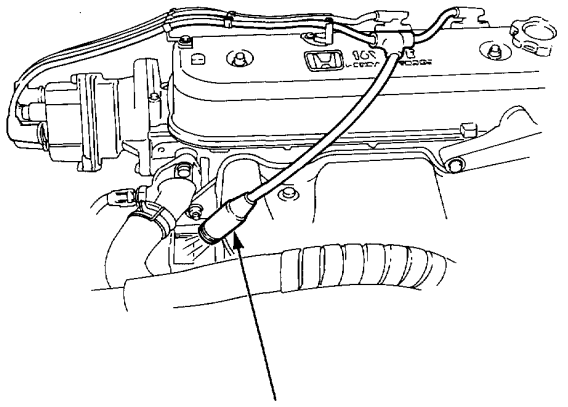


6. Tighten the adjusting bolts and recheck the timing.
7. Remove the jumper wire and install the rubber caps to the inspection window.

<Except KG, KS, KX and KQ models>

1. Start the engine and allow it to warm up (cooling fan comes on).

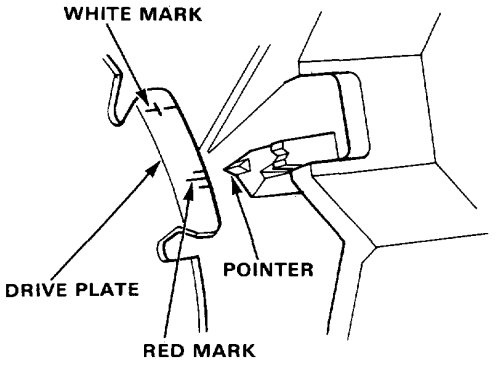
2. Connect a timing light to the engine; while the engine idles, point the light toward the pointer on the flywheel (for M/T), or on the drive plate (for A/T).



3. Inspection ignition timing at idle.

   Ignition Timing:
   15±2° BTDC (RED) at 800 ± 50 min^{-1} (rpm) in neutral

NOTE: The illustration shows A/T.

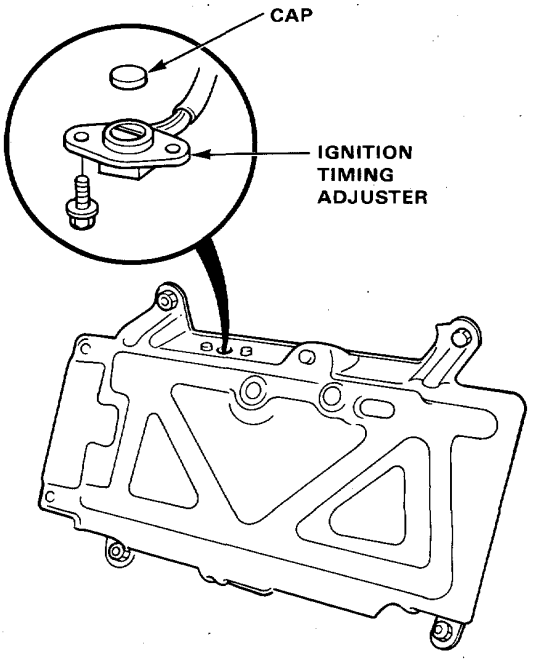


4. Adjust ignition timing, if necessary, by turning the adjusting screw on the ignition timing adjuster in the control box.

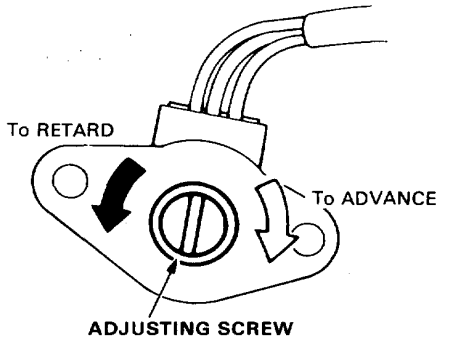
(cont'd)

Ignition Timing Inspection and Setting (cont'd)

5. Remove the cap from the ignition timing adjuster.



6. Adjust as necessary by turning the adjusting screw on the adjuster; turn the adjusting screw counterclockwise to retard the timing, or clockwise to advance the timing.

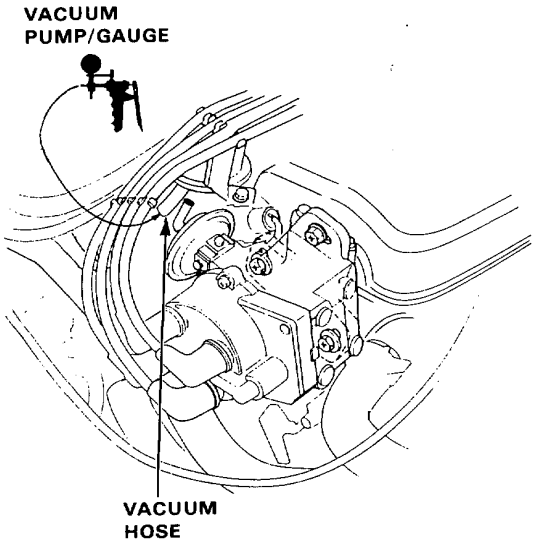


7. After adjusting, reinstall the cap to the ignition timing adjuster.

Carbureted Engine:

<KP, KT, KU and KY (A/T) models>

1. Disconnect the vacuum hose from the vacuum advance diaphragm, then connect the vacuum pump/gauge to the vacuum hose.



2. Start the engine.

   KP and KT models: Let it idle.
   KY (A/T) model: Hold the engine at 4,000 min^{-1} (rpm).

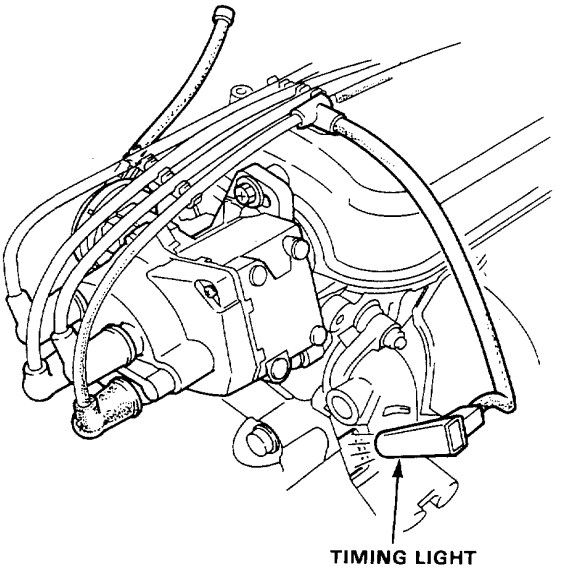
3. Check the vacuum hose for vacuum.
   The vacuum hose should have vacuum.

   - If the vacuum hose has no vacuum, check the vacuum hose of proper connection, cracks, blockage or disconnected hose.

4. Connect the vacuum hose to the vacuum advance diaphragm and allow the engine to warm up (cooling fan comes on).

5. Disconnect the vacuum hose from the vacuum advance diaphragm and plug them.

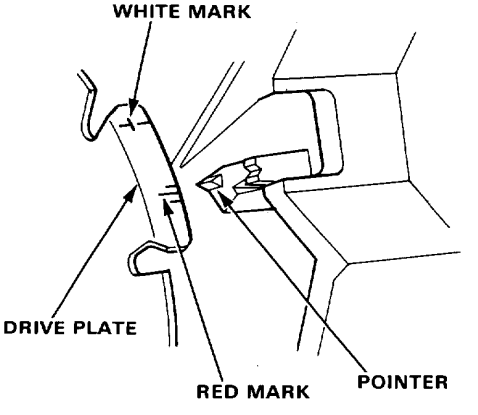
6. Connect a timing light to the engine; while the engine idles, point the light toward the pointer on the flywheel (for M/T), or on the drive plate (for A/T).



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

   Initial Timing: 0° TDC
   - **Manual Transmission [at 800 ± 50 min^{-1} (rpm) in neutral]**
   - **Automatic Transmission [at 750 ± 50 min^{-1} (rpm) in gear]**

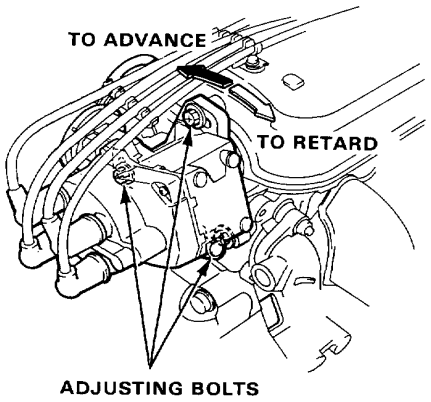
NOTE: The illustration shows A/T.



(cont'd)

Ignition Timing Inspection and Setting (cont'd)

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



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

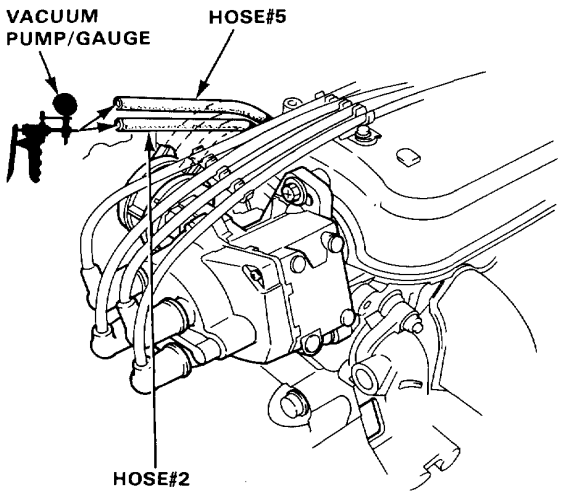
10. Connect the vacuum hose to the vacuum advance diaphragm and inspect ignition timing at idle.

Ignition Timing
M/T: 15° ± 2° BTDC (Red)
A/T: 10° ± 2° BTDC (Red)
- **Manual Transmission [at 800 ± 50 min^{-1} (rpm) in neutral]**
- **Automatic Transmission [at 750 ± 50 min^{-1} *(rpm) in gear*]**

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

<KP, KT and KY (A/T) models>

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



2. Start the engine and let it idle.

3. When the engine is cool, coolant temperature is below 55°C (131°F).
   Check each hose for vacuum. The #2 and #5 hoses should have vacuum.

   - If the #2 hose has no vacuum, check the #2 hose of proper connection, cracks, blockage or disconnected hose.

   - If the #5 hose has no vacuum, check the #5 and connected hoses for proper connections, cracks, blockage or disconnected hoses, and the check valve is not clogged.
     If the #5 and connected hoses, and the check valve have no problem, recheck the #5 hose for vacuum.

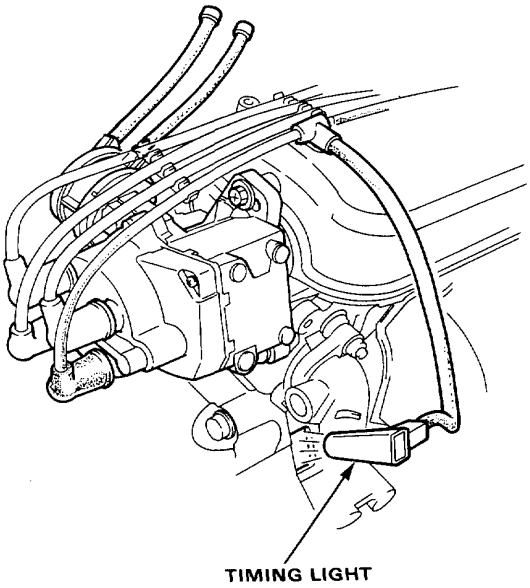
4. Connect the vacuum hoses to the vacuum advance diaphragm and allow the engine to warm up. (cooling fan comes on).

5. Disconnect the #5 hose from the vacuum advance diaphragm and connect the vacuum pump/gauge to the #5 hose.

6. Check the #5 hose for vacuum.
   The #5 hose should have no vacuum.

7. Disconnect the vacuum hoses from the vacuum advance diaphragm and plug them.

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



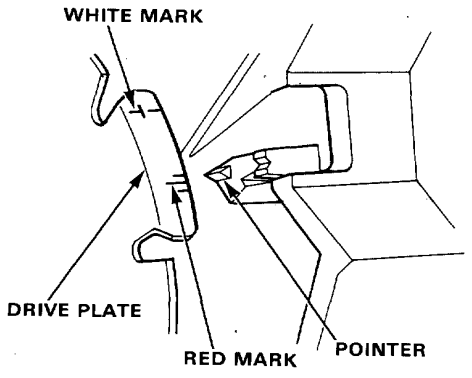
(cont'd)

Ignition Timing Inspection and Setting (cont'd)

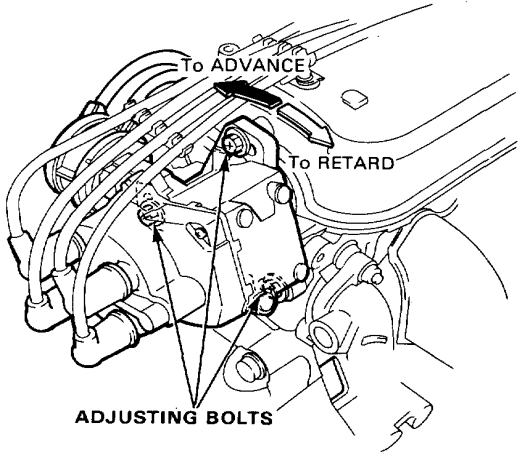
9. Read initial timing when timing mark (white) is aligned to the pointer.

Initial Timing
All models: 0° BTDC
- **Manual Transmission [at 800 ± 50 min^{-1} (rpm) in neutral]**
- **Automatic Transmission [at 750 ± 50 min^{-1} (rpm) in gear]**

NOTE: The illustration shows A/T.



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



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

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

Ignition Timing
M/T: 15° ± 2° BTDC
A/T: 10° ± 2° BTDC (Except KQ, KX, KS and KG models)
15° ± 2° BTDC (KQ, KX, KS and KG models)
- **Manual Transmission [at 800 ± 50 min^{-1} (rpm) in neutral]**
- **Automatic Transmission [at 750 ± 50 min^{-1} (rpm) in gear]**

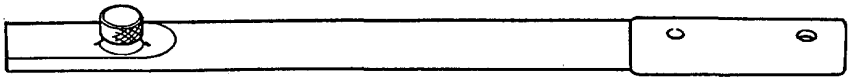
If advance is not as specified, check the vacuum advance diaphragm and distributor advance mechanism.

Special Tools (Common with Other Models)

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07JAB—0010000	Crank Pulley Holder Set	1	for crankshaft pulley bolt
①-1	07JAA—0010200	Socket Wrench 19 mm	(1)	
①-2	07JAB—0010400	Handle	(1)	
②	07JAB—0010400	Pulley Holder Attachment HEX 50 mm	1	
③	07LAG—PT20100	Balancer Shaft Lock Pin	1	



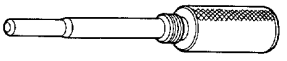
①-1



①-2



②

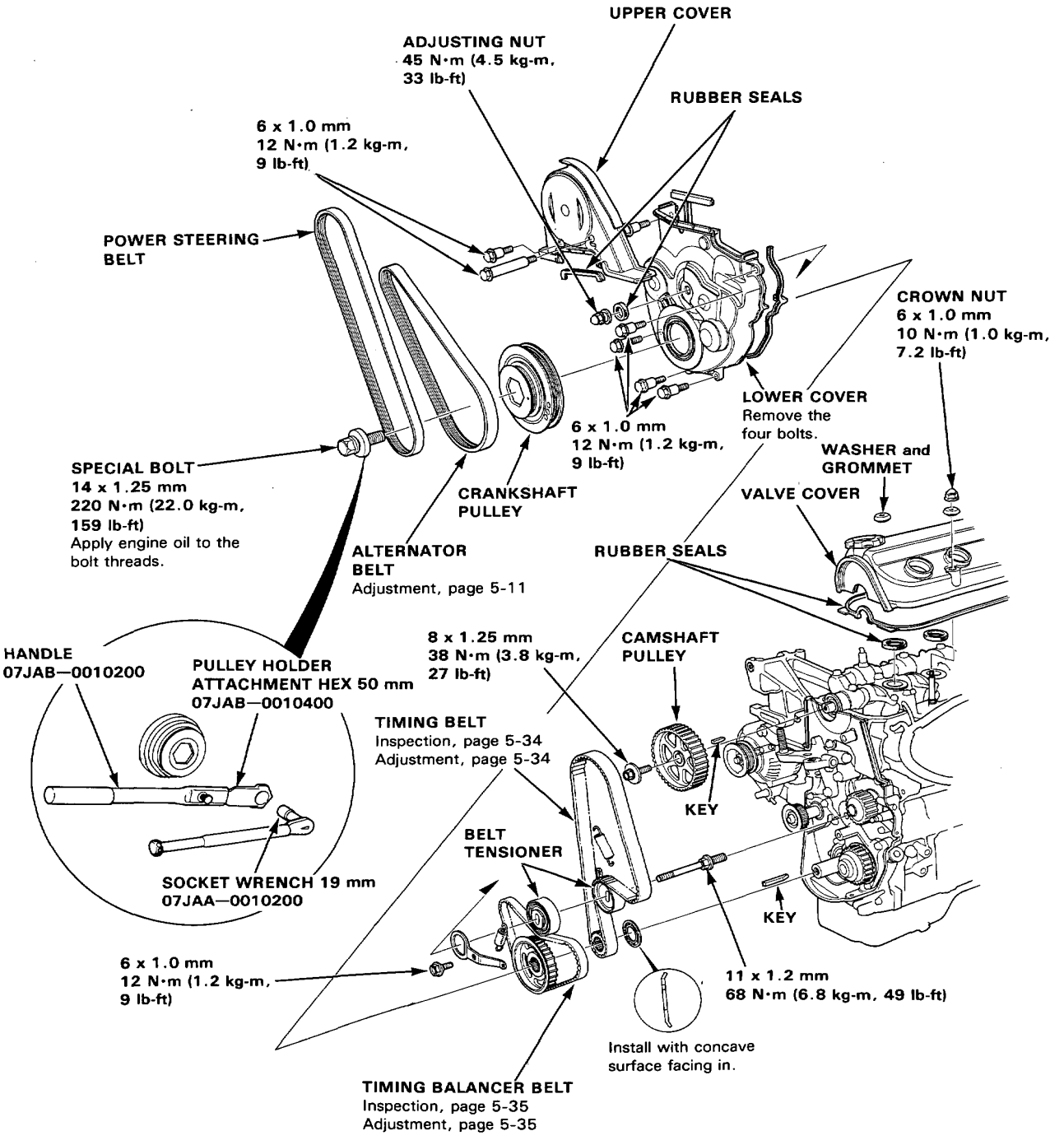


③

Timing Belt

Illustrated Index

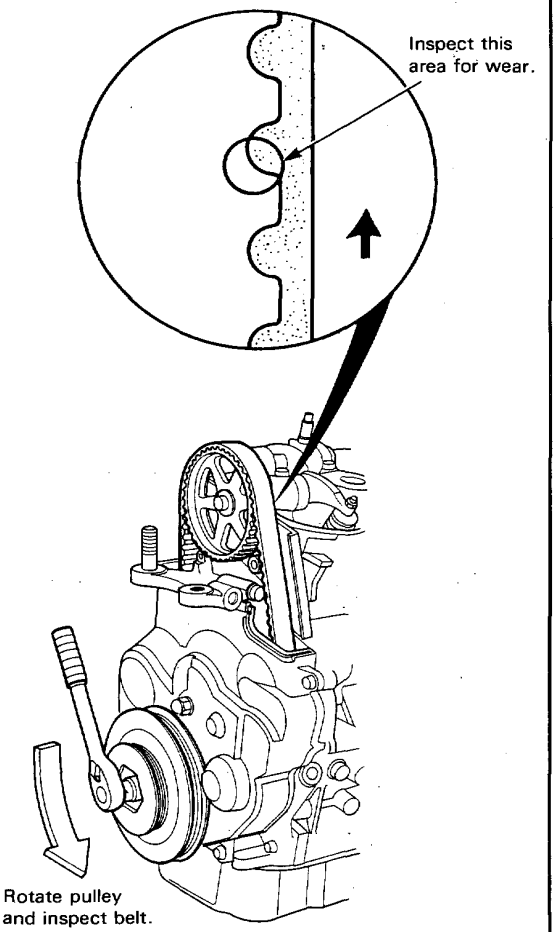
NOTE:
- Refer to page 5-39 for positioning crank and pulley before installing timing belt.
- Before removing, mark direction of rotation.



Timing Belt

Inspection

1. Disconnect the alternator terminal and the connector, then remove the engine wire harness from the valve cover.
2. Remove the valve cover.
3. Remove the timing belt upper cover.
4. Inspect the timing belt for cracks and oil soaking.
   NOTE:
   - Replace the belt if oil soaked.
   - Remove any oil or solvent that gets on the belt.



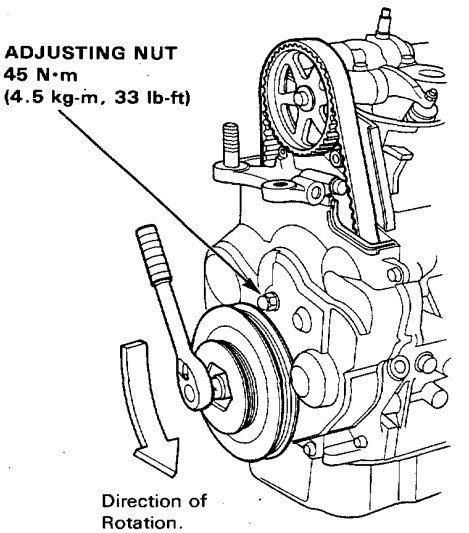
5. If the pulley bolt loosens while turning the crank, retorque it to 220 N·m (22.0 kg-m, 159 lb-ft).

Tension Adjustment

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

NOTE:
- Tensioner is spring-loaded to apply proper tension to the belt automatically after making the following adjustment.
- Inspect the timing balancer belt before belt tension adjusting.
- *Do not loosen the adjusting nut more than one full turn.*

1. Disconnect the alternator terminal and the connector, then remove the engine wire harness from the valve cover.
2. Remove the valve cover.
3. Set the No.1 piston at TDC (page 5-41).
4. Loosen the adjusting nut 2/3-1 turn, then tighten the adjusting nut.

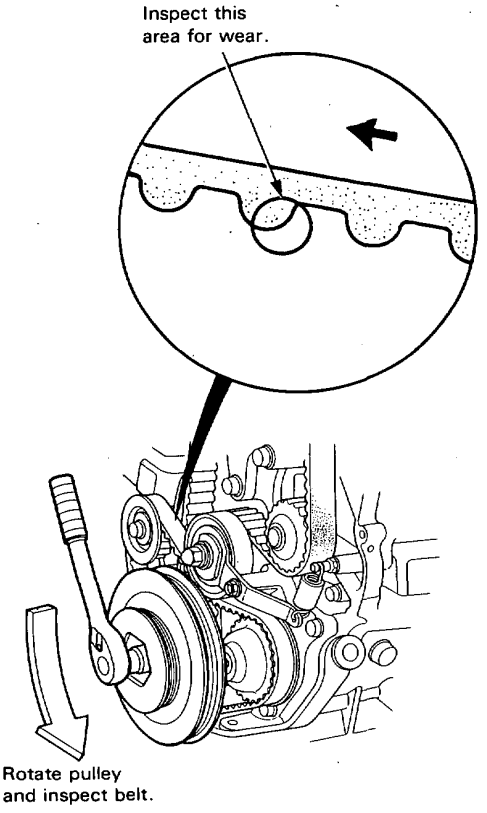


5. Rotate the crankshaft counterclockwise 3-teeth on the camshaft pulley, then reloosen the adjusting nut to create tension on the timing belt.
6. Tighten the adjusting nut.
7. If the pulley bolt loosens while turning the crank, retorque it to 220 N·m (22.0 kg-m, 159 lb-ft).

Timing Balancer Belt

Inspection

1. Disconnect the alternator terminal and the connector, then remove the engine wire harness from the valve cover.
2. Remove the valve cover.
3. Remove the timing belt upper cover.
4. Remove the crankshaft pulley.
5. Remove the timing belt lower cover.
6. Install the crankshaft pulley.
7. Inspect the timing balancer belt for cracks and oil soaking.
   NOTE:
   - Replace the belt if oil soaked.
   - Remove any oil or solvent that gets on the belt.



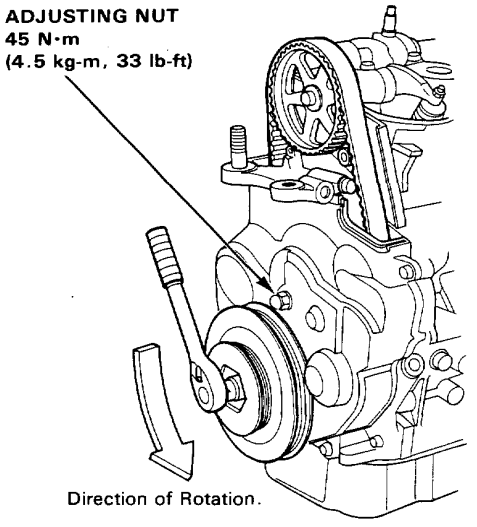
8. If the pulley bolt loosens while turning the crank, retorque it to 220 N·m (22.0 kg-m, 159 lb-ft).

Tension Adjustment

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

NOTE:
- Tensioner is spring-loaded to apply proper tension to the belt automatically after making the following adjustment.
- Inspect the timing balancer belt before belt tension adjusting.
- Do not loosen the adjusting nut more than one full turn.

1. Disconnect the alternator terminal and the connector, then remove the engine wire harness from the valve cover.
2. Remove the valve cover.
3. Set the No.1 piston at TDC (page 5-41).
4. Loosen the adjusting nut 2/3-1 turn, then tighten the adjusting nut.

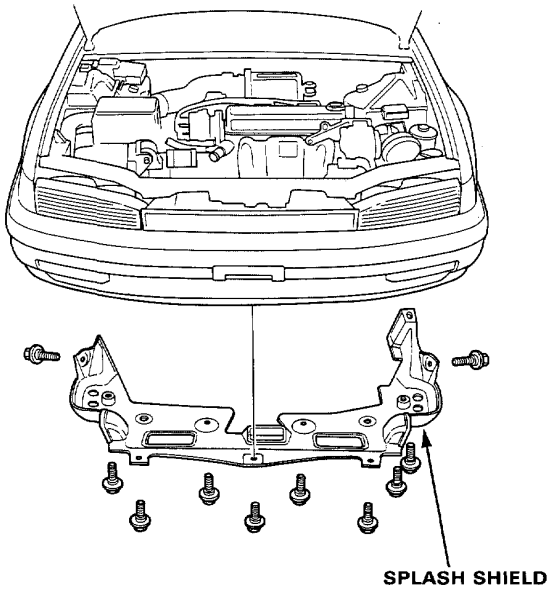


5. Rotate the crankshaft counterclockwise 3-teeth on the camshaft pulley, then reloosen the adjusting nut to create tension on the timing belt.
6. Tighten the adjusting nut.
7. If the pulley bolt loosens while turning the crank, retorque it to 220 N·m (22.0 kg-m, 159 lb-ft).

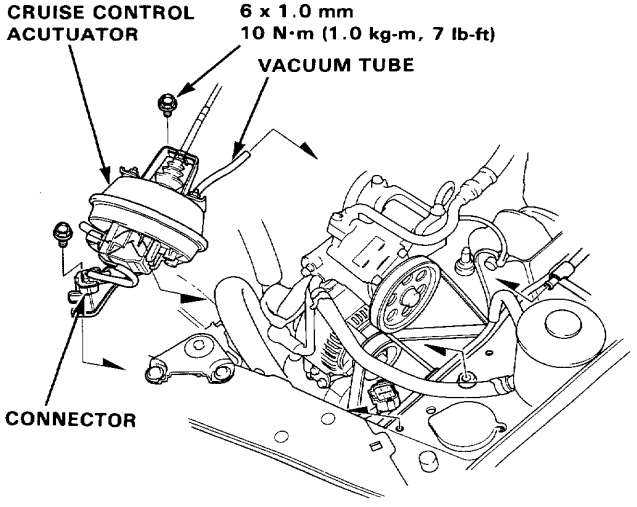
Timing Belt and Timing Balancer Belt

Replacement

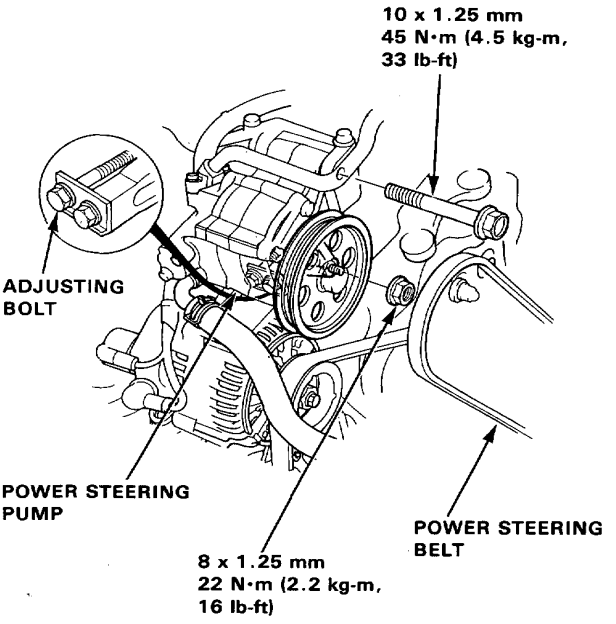
NOTE:
- Turn the crankshaft so that the No.1 cylinder is at TDC.
- Inspect the water pump after removing the timing belt.



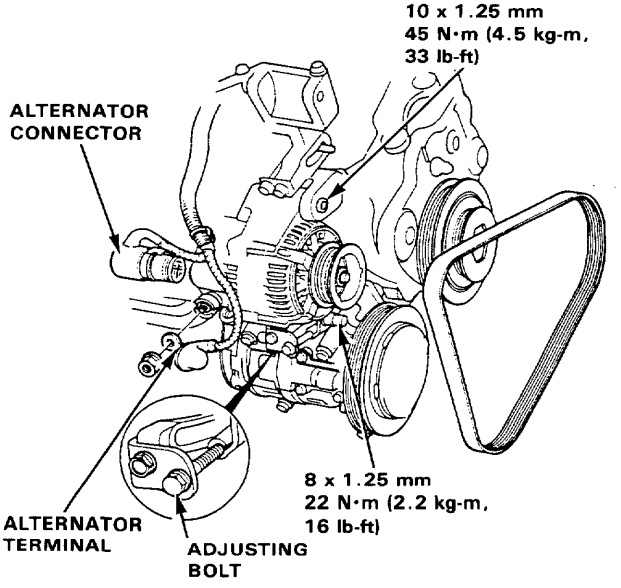
2. Disconnect the connector, then remove the cruise control actuator.
   NOTE:
   - Do not disconnect the control cable.
   - Take care not to bend the cable when removing the actuator. Always replace a kinked cable with a new one.



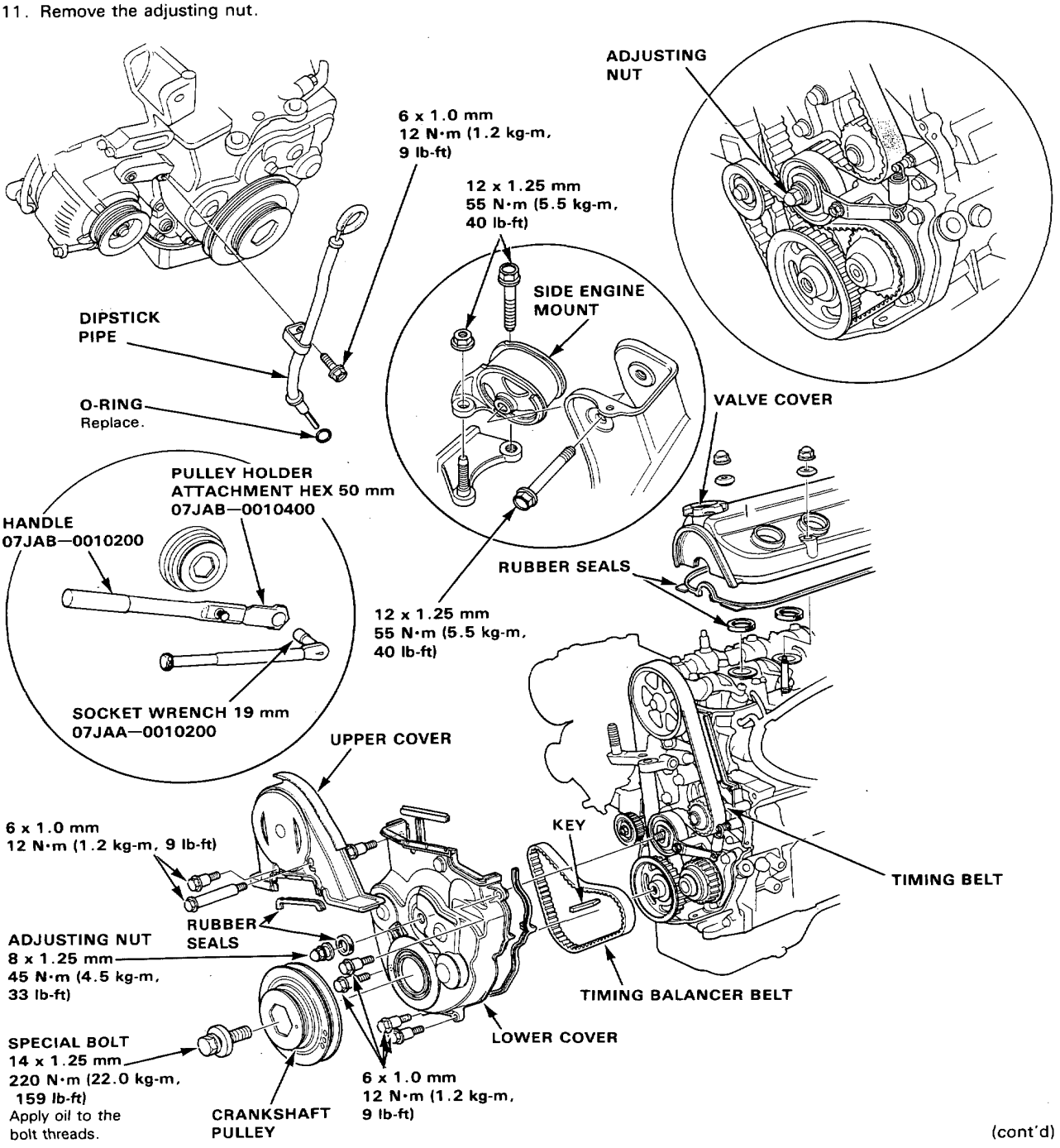
3. Remove the mounting bolt, nut and V-belt from the power steering pump, then without disconnecting the hoses, pull the pump away from the mounting bracket.



4. Disconnect the alternator terminal and the connector, then remove the engine wire harness from the valve cover.
5. Loosen the alternator mounting bolts and the adjusting nut, then remove the alternator belt.



6. Remove the valve cover.
7. Remove the side engine mount bracket stay B (Standard for some types).
8. Remove the upper cover.
9. Remove the side engine mount.
10. Remove the dipstick and the pipe.
11. Remove the adjusting nut.
12. Remove the special bolt and the crankshaft pulley.
13. Remove the lower cover.
14. Push the timing balancer belt tensioner and the timing belt tensioner to remove tension of the belts, then tighten the adjusting nut.
15. Remove the timing balancer belt and the timing belt.



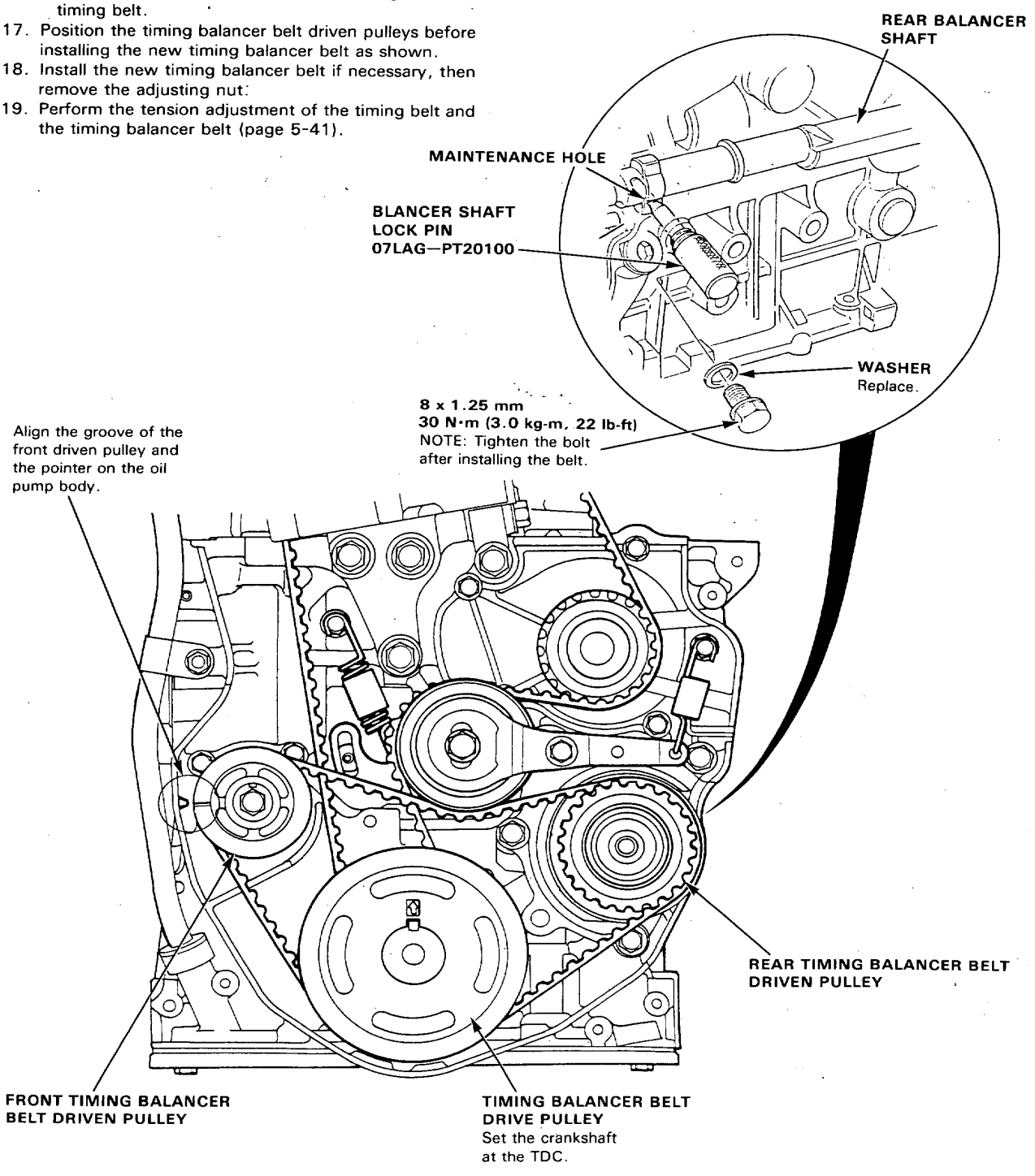
(cont'd)

Timing Belt and Timing Balancer Belt

Replacement (cont'd)

16. Install the timing belt in the reverse order of removal; adjust the valve clearances (page 5-14).
    —Refer to page 5-41 for positioning the crankshaft and the camshaft pulley before installing the new timing belt.
17. Position the timing balancer belt driven pulleys before installing the new timing balancer belt as shown.
18. Install the new timing balancer belt if necessary, then remove the adjusting nut.
19. Perform the tension adjustment of the timing belt and the timing balancer belt (page 5-41).

NOTE: Align the bolt hole and the balancer shaft hole, then insert the special tool to fix the rear balancer shaft.

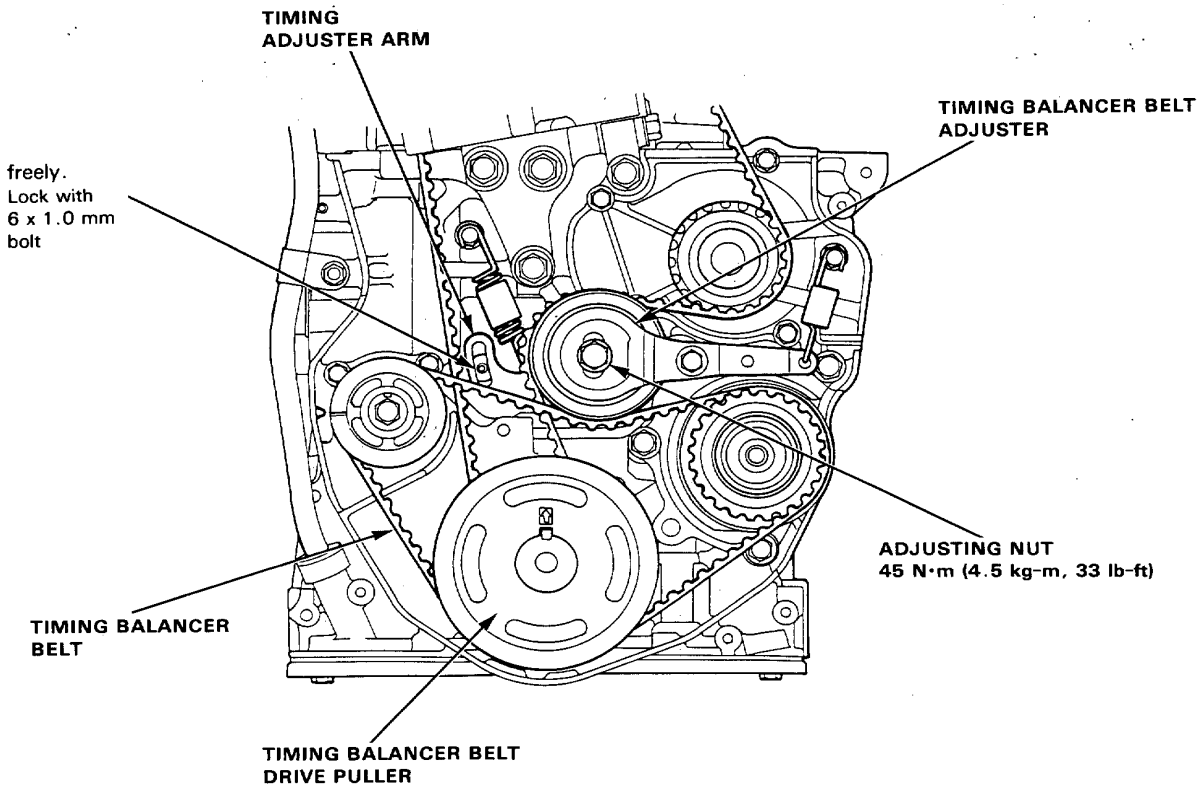


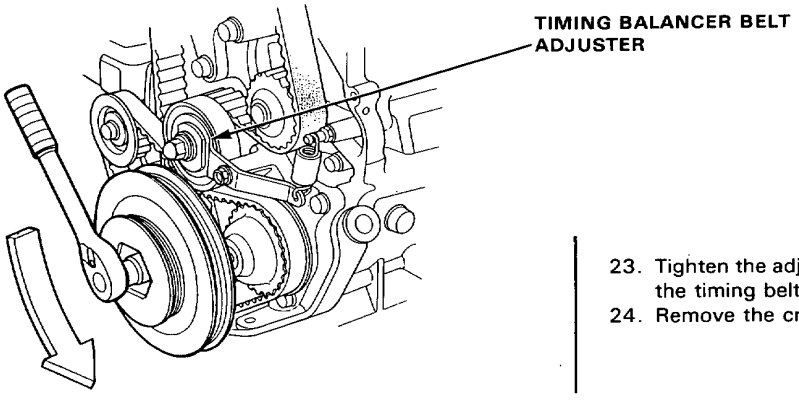
20. After adjusting the belt tension, lock the timing belt adjuster arm with the 6 x 10 mm bolt used to tighten timing belt lower cover.
21. Loosen the adjusting nut and check that the timing balancer belt adjuster moves freely.

22. Turn the crankshaft pulley about noe turn; tighten the adjusting nut (adjustment is completed).

    NOTE: Do not apply tension on the tensioner when tightening the adjusting nut as the tensioner is spring loaded.

    COUTION: Do not apply excessive tension to the timing balancer belt. It is designed to operate with smaller tension than those of other belts.





23. Tighten the adjusting nut and the 6 x 1.0 mm bolt from the timing belt adjuster arm.
24. Remove the crankshaft pulley.

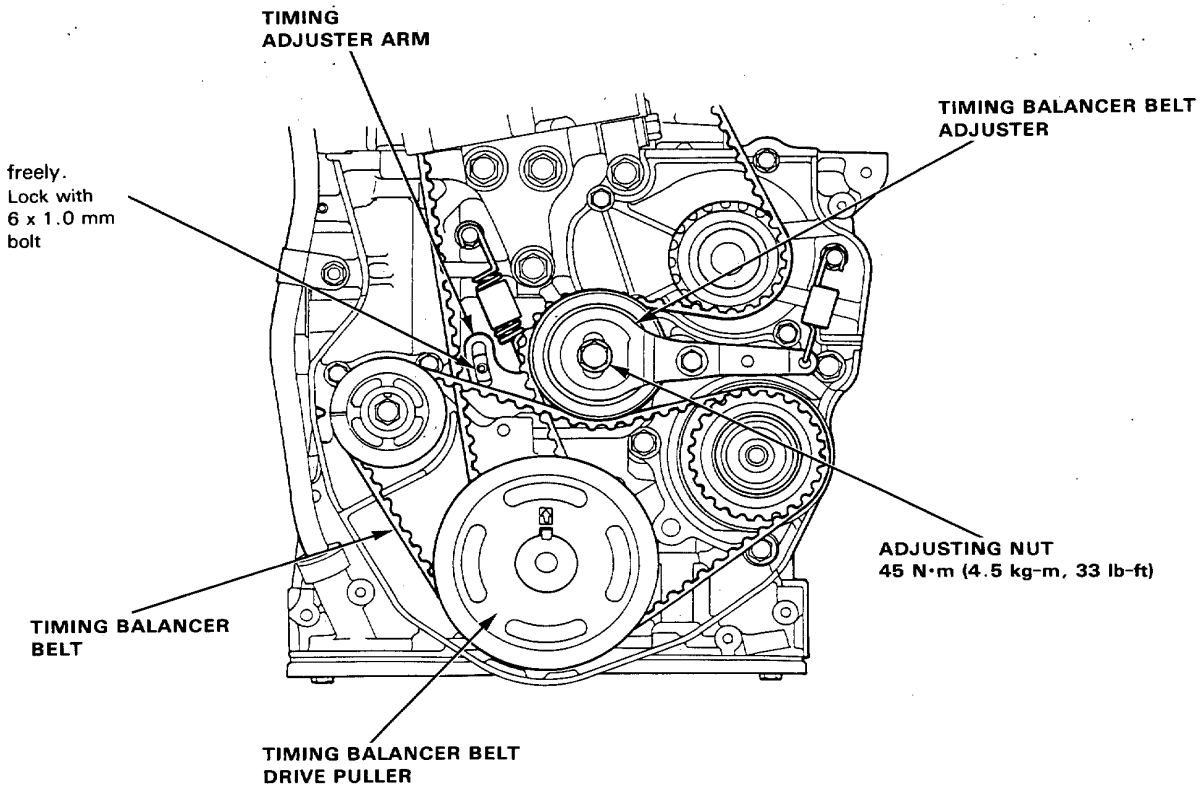
(cont'd)

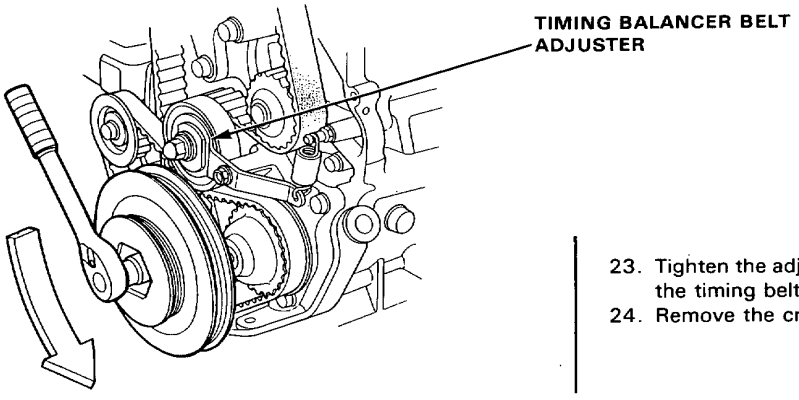
20. After adjusting the belt tension, lock the timing belt adjuster arm with the 6 x 10 mm bolt used to tighten timing belt lower cover.
21. Loosen the adjusting nut and check that the timing balancer belt adjuster moves freely.

22. Turn the crankshaft pulley about noe turn; tighten the adjusting nut (adjustment is completed).

    NOTE: Do not apply tension on the tensioner when tightening the adjusting nut as the tensioner is spring loaded.

    COUTION: Do not apply excessive tension to the timing balancer belt. It is designed to operate with smaller tension than those of other belts.





23. Tighten the adjusting nut and the 6 x 1.0 mm bolt from the timing belt adjuster arm.
24. Remove the crankshaft pulley.

(cont'd)

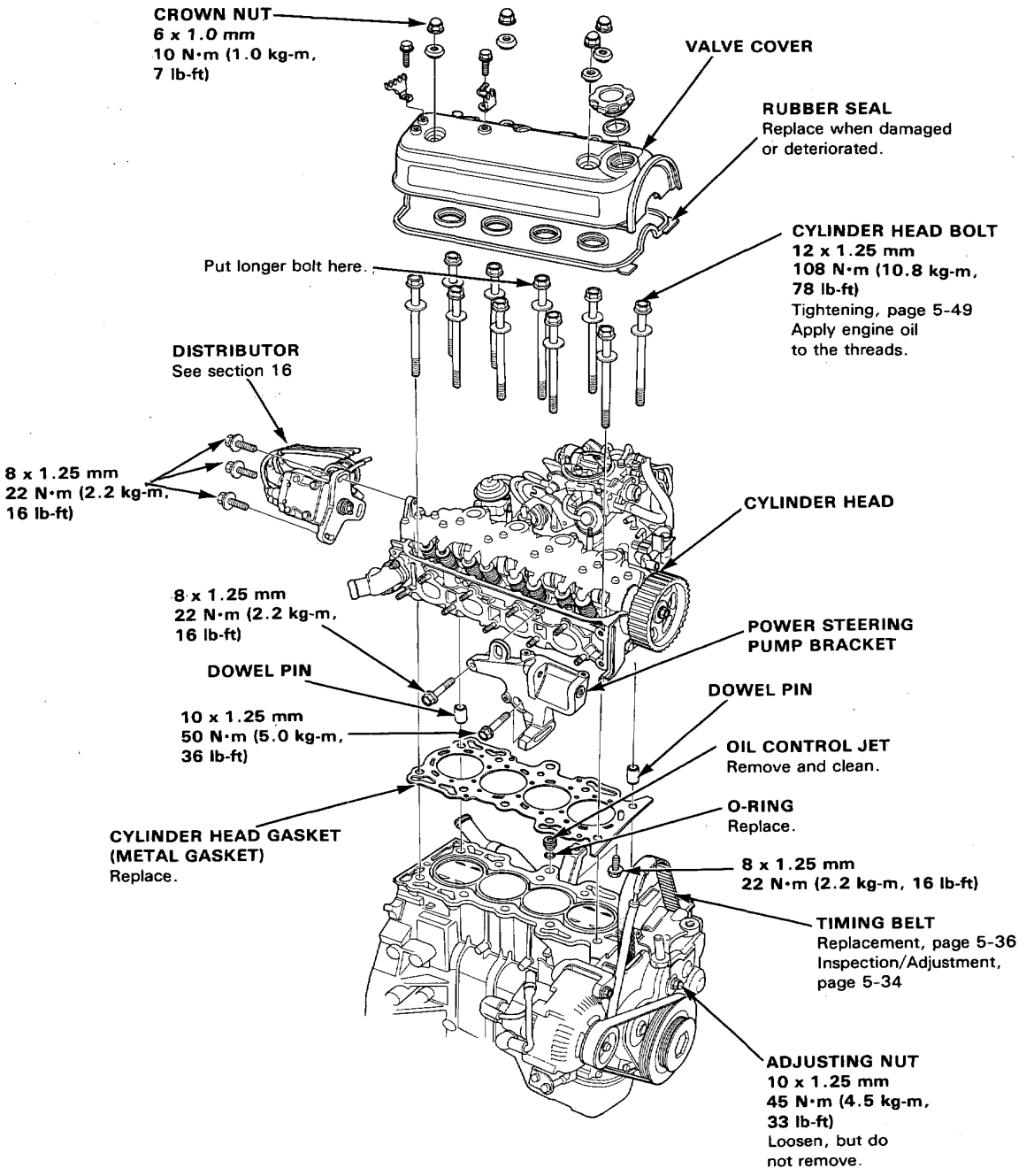
Cylinder Head

Removal

CAUTION:

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

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

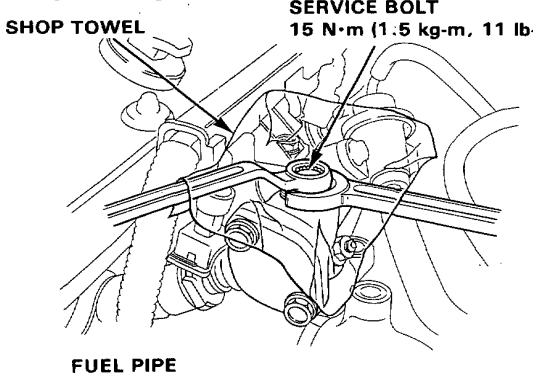


NOTE: Engine removal is not required in this procedure.
CAUTION: To avoid damaging the cylinder head, wait until the coolant temperature drops below 38 °C (100 °F) before loosening the retaining bolts.
NOTE:
- Inspect the timing belt before removing the cylinder head.
- Turn the crankshaft so that the No.1 cylinder is at top-dead-center (page 5-41).
- Mark all emissions hoses before disconnecting them.

1. Disconnect the negative terminal from the battery.
2. Drain the cooling system (page 5-69).
3. Relieve fuel pressure (Fuel-Injected Engine).

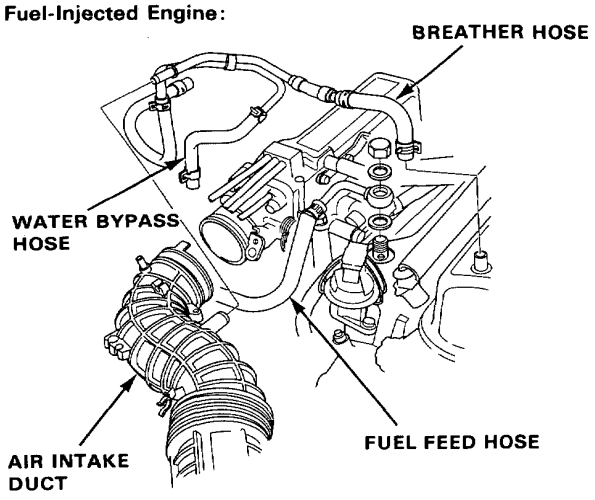
⚠WARNING Do not smoke while working on fuel system, keep open flame or spark away from work area. Drain fuel only into an approved container.

Fuel-Injected Engine:



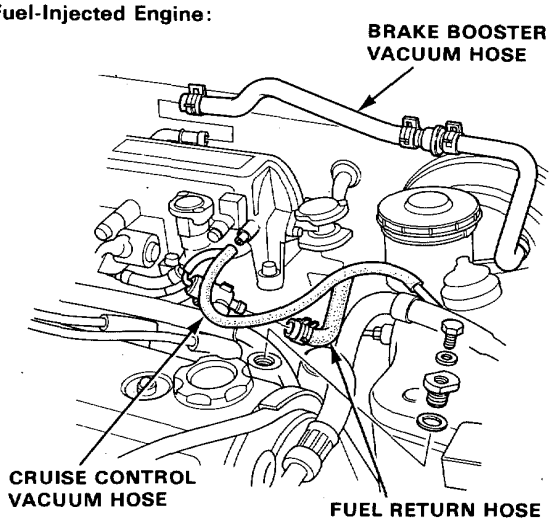
4. Disconnect the fuel feed hose.
5. Remove the vacuum hose, breather hose and air intake duct.
6. Remove the water bypass hose from the cylinder head.
7. Remove the charcoal canister hose from the throttle body.

Fuel-Injected Engine:



8. Remove the brake booster vacuum hose and mount vacuum tube (A/T only) from the intake manifold.
9. Remove the fuel return hose.
10. Remove the cruise control vacuum hose.

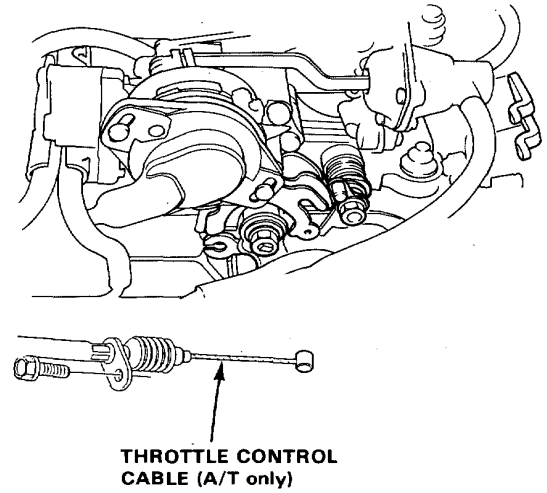
Fuel-Injected Engine:



11. Remove the throttle cable from the throttle body (page 5-55).
12. Remove the throttle control cable at the throttle body (A/T only).

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

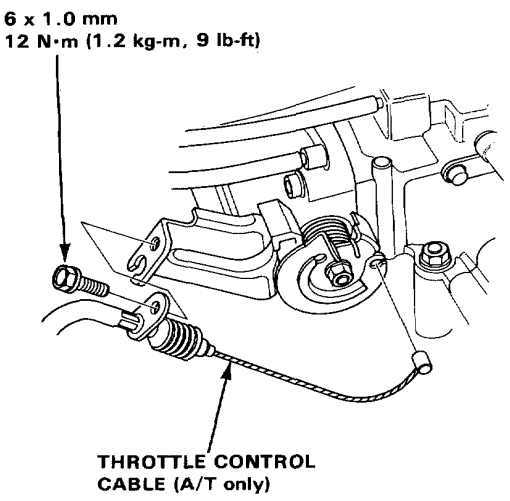
Carbureted Engine:



(cont'd)

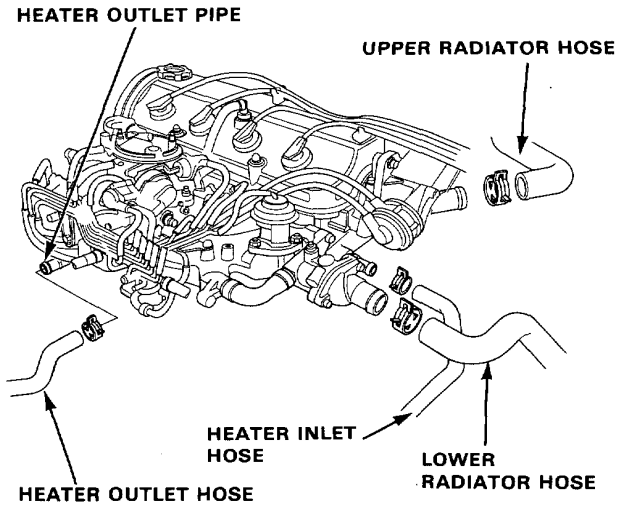
Removal (cont'd)

Fuel-Injected Engine:

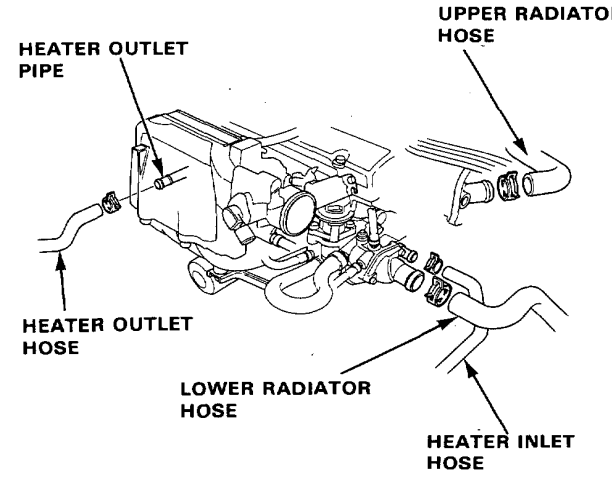


13. Disconnect the two connectors from the distributor.
    - Ignition coil connector
    - TDC/CRANK/CYL sensor connector
14. Remove the spark plug caps and distributor.
15. Remove the emission control box (page 5-55).
    - Do not disconnect emission hoses.
    - Disconnect the two connectors before removing it.
16. Remove the connector and the terminal from the alternator, then remove the engine wire harness from the valve cover.
17. Disconnect the engine wire harness connectors, then remove the harness clamps from the cylinder head and the intake manifold.
    - Four injector connectors (Fuel-Injected Engine)
    - EACV connector
    - TA sensor connector (Fuel-Injected Engine)
    - Thermoswitch (thermostat cover)
    - EGR valve lift sensor connector (Standard for some types)
    - Throttle angle sensor connector (Fuel-Injected Engine)
    - TW sensor connector
    - Coolant temperature gauge sending unit
    - Thermoswitch (water outlet cover) (Standard for some types)
    - Carburetor solenoid valve connectors (Carbureted Engine)
    - Air vent cut solenoid valve connector (Carbureted Engine except KP, KT models)
18. Remove the radiator hoses and heater hoses, then remove the heater outlet pipe bracket bolt from the intake manifold.

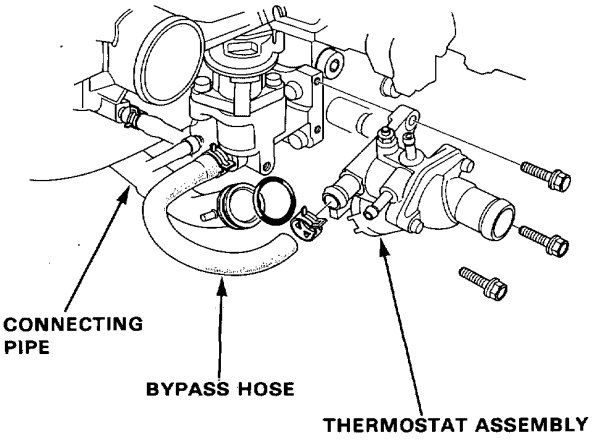
Carbureted Engine:



Fuel-Injected Engine:

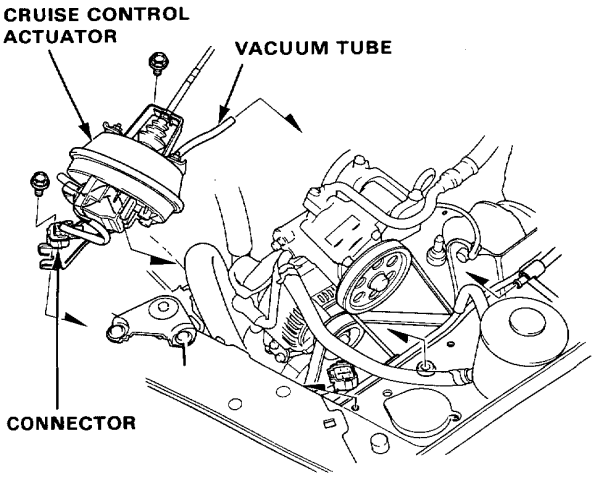


19. Remove the thermostat assembly from the intake manifold.

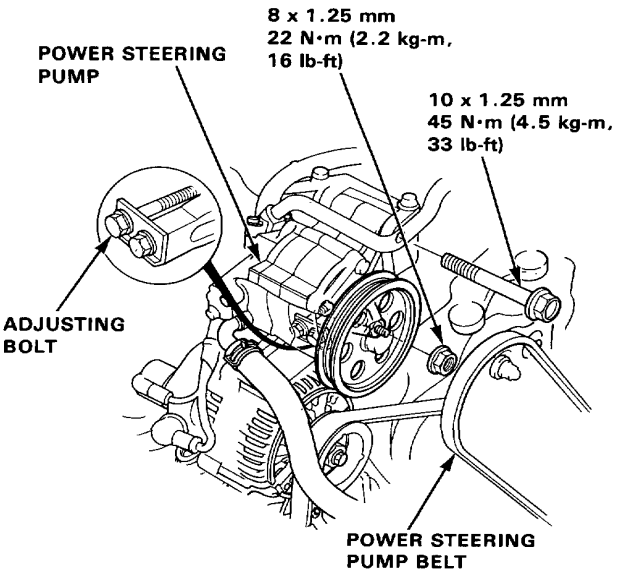


20. Disconnect the connector and the vacuum tube, then remove the cruise control actuator.

NOTE:
- Do not disconnect the control cable.
- Take care not to bend the cable when removing the actuator. Always replace a kinked cable with a new one.



21. Remove the mounting bolts and the V-belt from the power steering pump, then without disconnecting the hoses, pull the pump away from the mounting bracket.



22. Lift the car up and support it on safety stands.

⚠WARNING
- **Make sure jacks and safety stands are placed properly and hoist brackets are attached to correct positions on the engine (See section 1)**
- **Apply parking brake and block rear wheels, so the car will not roll off stands and fall while you are working under it.**

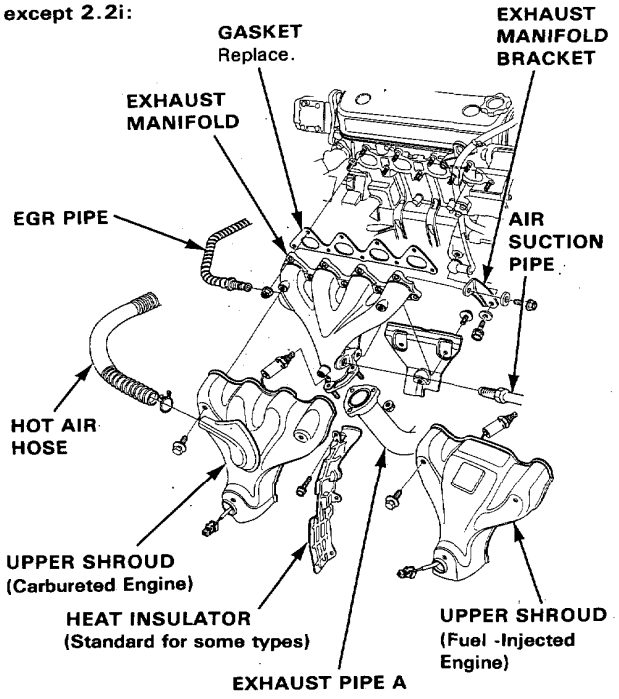
23. Remove the left front wheel.
24. Remove the splash shield (page 5-36).
25. Remove the intake manifold bracket bolts.

(cont'd)

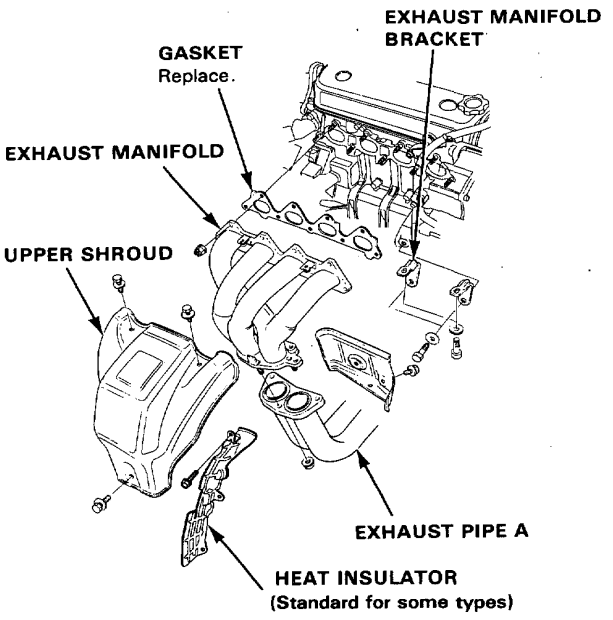
Removal (cont'd)

26. Remove the exhaust manifold upper shroud.
27. Remove the exhaust manifold bracket.
28. Disconnect the exhaust pipe A from the exhaust manifold.
29. Remove the exhaust manifold from the cylinder head.
30. Remove the exhaust manifold heat insulator.

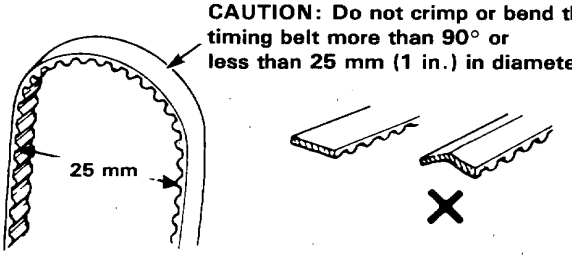
except 2.2i:



2.2i:

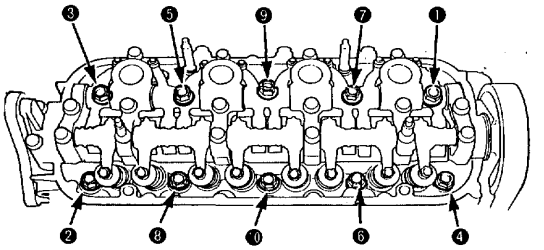


31. Remove the valve cover and engine ground wire.
32. Remove the side engine mount bracket stay, then remove the timing belt upper cover.
33. Loosen the timing belt adjusting bolt, and release the timing belt.
    NOTE: Push the tensioner to release tension from the belt, then retighten the adjusting bolt.
34. Remove the timing belt from the driven pulley.

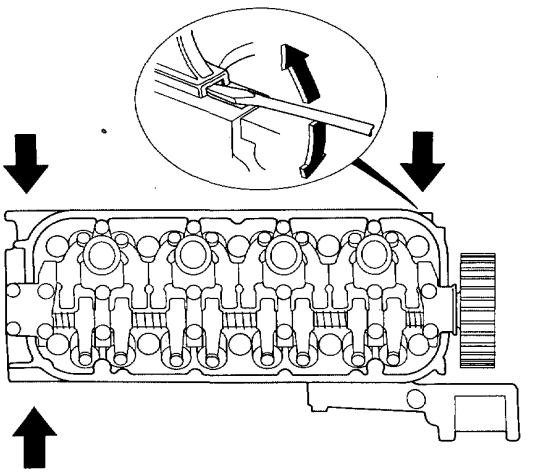


35. Remove the cylinder head bolts, then remove the cylinder head.
    CAUTION: To prevent warpage, unscrew the bolts in sequence 1/3 turn at a time; repeat the sequence until all bolts are loosened.

CYLINDER HEAD BOLTS LOOSENING SEQUENCE

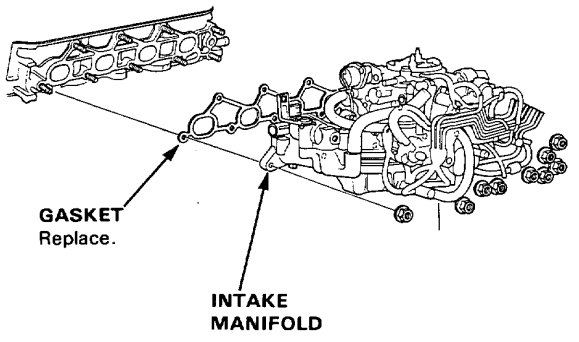


NOTE: Separate the cylinder head from the block with a flat brade screwdriver as shown.

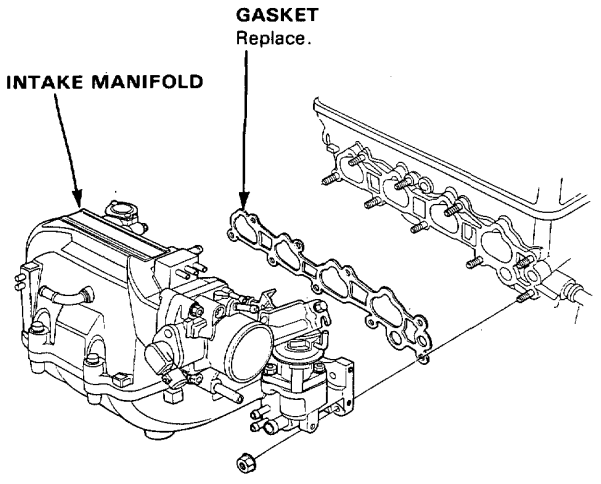


36. Remove the intake manifold.

Carbureted Engine:



Fuel-Injected Engine:



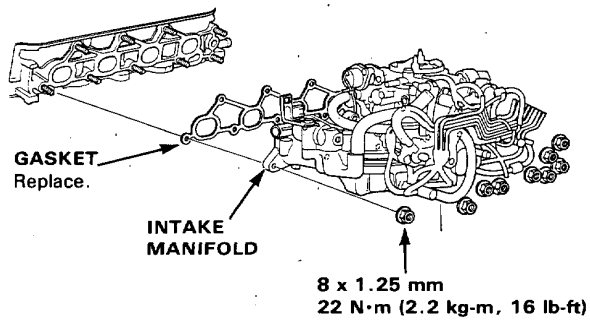
Installation

Install the cylinder head in the reverse order of removal:

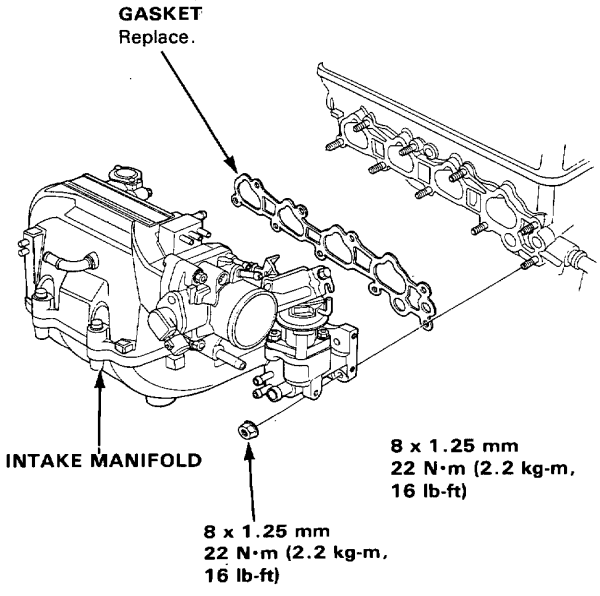
- Always use a new head gasket.
- Cylinder head and engine block surface must be clean.
- "UP" mark on camshaft pulley should be at the top.
- Turn the crankshaft so the No.1 cylinder is at TDC (top dead center) (page 5-41).

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

Carbureted Engine:



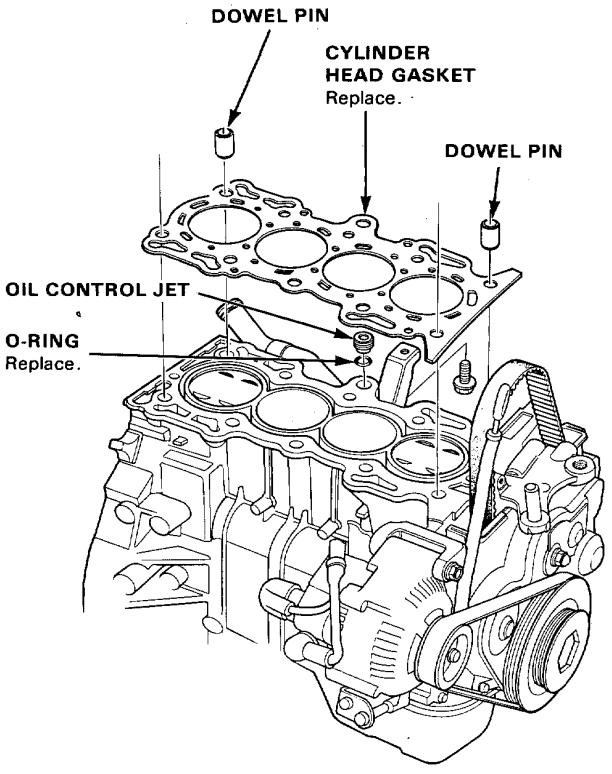
Fuel-Injected Engine:



(cont'd)

Installation (cont'd)

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

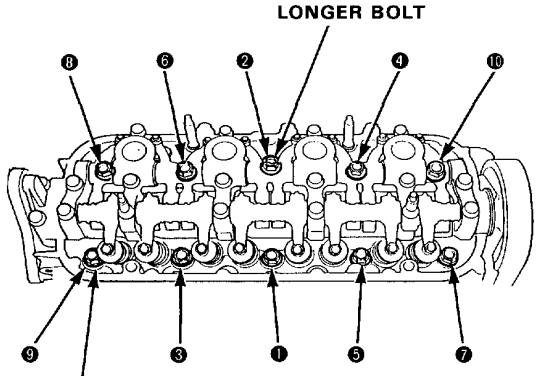


3. Install the bolts that secure the intake manifold to its bracket but do not tighten them yet.
4. Position the cam correctly (page 5-41).
5. Tighten the cylinder head bolts sequentially in three steps.

1st step torque: 40 N·m (4.0 kg-m, 29 lb-ft)
2nd step torque: 70 N·m (7.0 kg-m, 51 lb-ft)
3rd step torque: 108 N·m (10.8 kg-m, 78 lb-ft)

NOTE:
- We recommend to use a plate-type torque wrench. When using a preset-type torque wrench, be sure to tighten slowly and not to overtighten.
- If the bolt sounds, retighten the bolt from 1st step.

CYLINDER HEAD BOLT TORQUE SEQUENCE



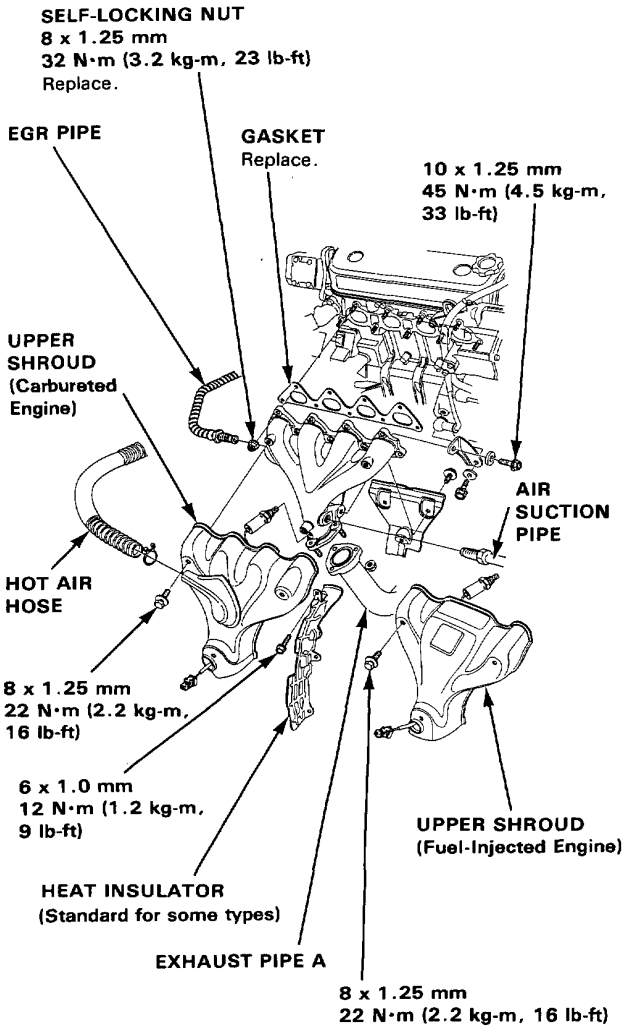
CYLINDER HEAD BOLT
12 x 1.25 mm
108 N·m (10.8 kg-m, 78 lb-ft)
Apply clean engine oil to bolt thread and under bolt heads.

6. Install the heat insulator to the cylinder head and the cylinder block.

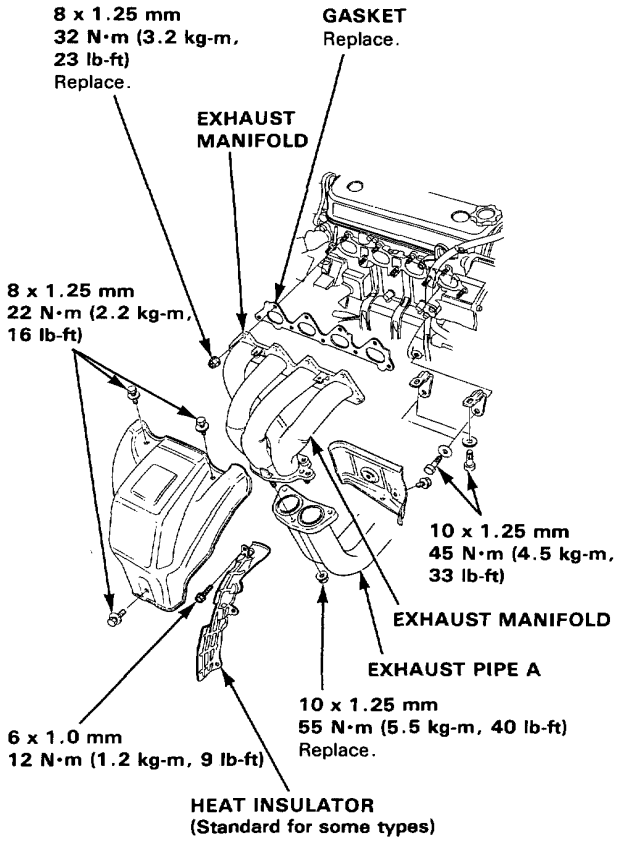
7. Install the exhaust manifold and tighten the nuts in a criss-cross pattern in 2 or 3 steps, beginning with the inner nut.
   - Always use a new exhaust manifold gasket.

8. Install the exhaust manifold bracket, then install the exhaust pipe A and the bracket, and then install the upper cover.

except 2.2i:

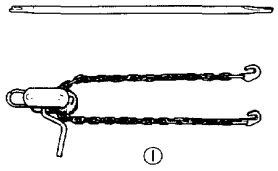


2.2i:



Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07KAK—SJ40100	Engine Tilt Hanger Set	1	



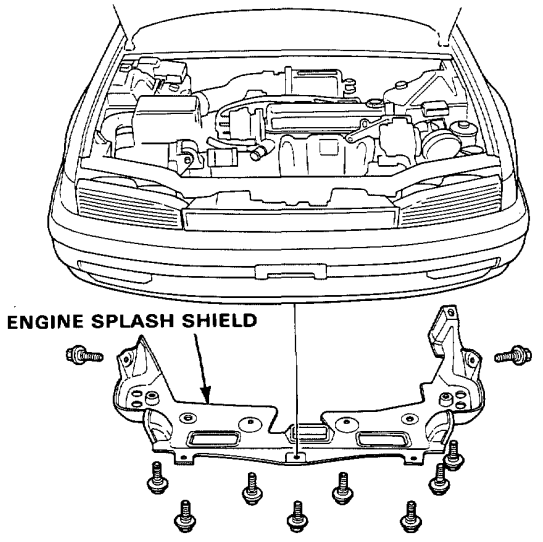
⚠WARNING

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

CAUTION:

- **Use fender covers to avoid damaging painted surfaces.**
- **Unspecified items are common for the carburetor cars, PGM-FI cars, M/T cars, A/T cars, and the A/C equipped cars.**
- **Remove the wiring slowly while holding the coupler and the connector portion to avoid disconnecting.**
- **Mount the wiring or tubes to avoid misconnection. Also, be sure that they do not contact other cords or tubes or interference with other parts.**

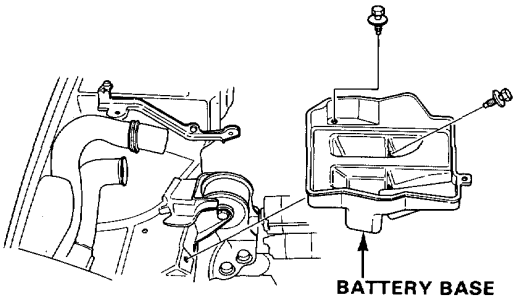
1. Fix the engine hood in a vertical position.
   - Do not remove the hood.
2. Remove the engine splash shield.



3. Disconnect the battery negative terminal first, then the positive terminal. Remove the battery.

   CAUTION: Clean battery posts and cable terminals with sandpaper, assemble, then apply grease to prevent corrosion.

4. Remove the battery base.



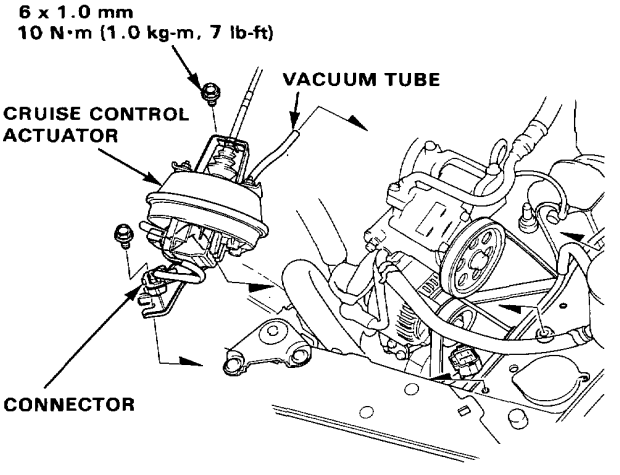
5. Drain the engine oil. Remove the oil filler cap to speed draining. Reinstall the drain plug using a new washer.

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

6. Drain the coolant from the radiator into a clean pan so it may be reused. Remove the radiator cap to speed draining.

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

7. Drain transmission oil/fluid. Use a 3/8" drive socket wrench to remove the drain plug. Remove the oil filler plug or gauge to speed draining. Reinstall the drain plug using a new washer.
8. Remove the air intake duct and the air cleaner.
9. Disconnect the connector and the vacuum tube, then remove the cruise control actuator.



(cont'd)

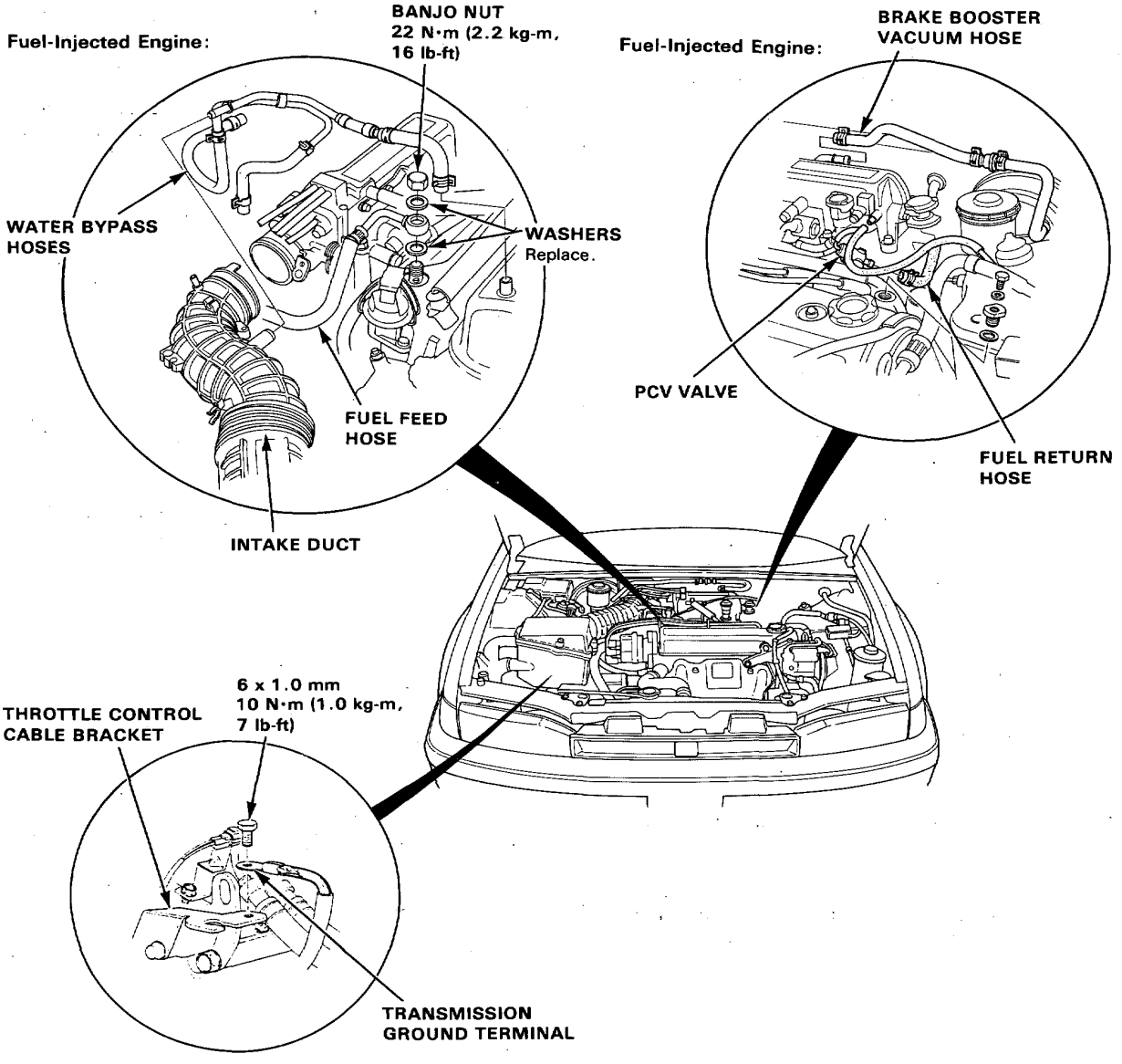
(cont'd)

10. Relieve fuel pressure by slowly loosening the service bolt on the fuel pipe about one turn (Fuel-Injected Engine) (See section 11).

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

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

11. Remove the fuel feed hose.
12. Remove the fuel return hose from the PCV valve.
13. Disconnect the vacuum tube *from the* charcoal canister.
14. Disconnect the charcoal canister hose from throttle body.
15. Remove the brake booster vacuum hose and mount vacuum tube from the intake manifold.
16. Remove the ground cable from transmission.



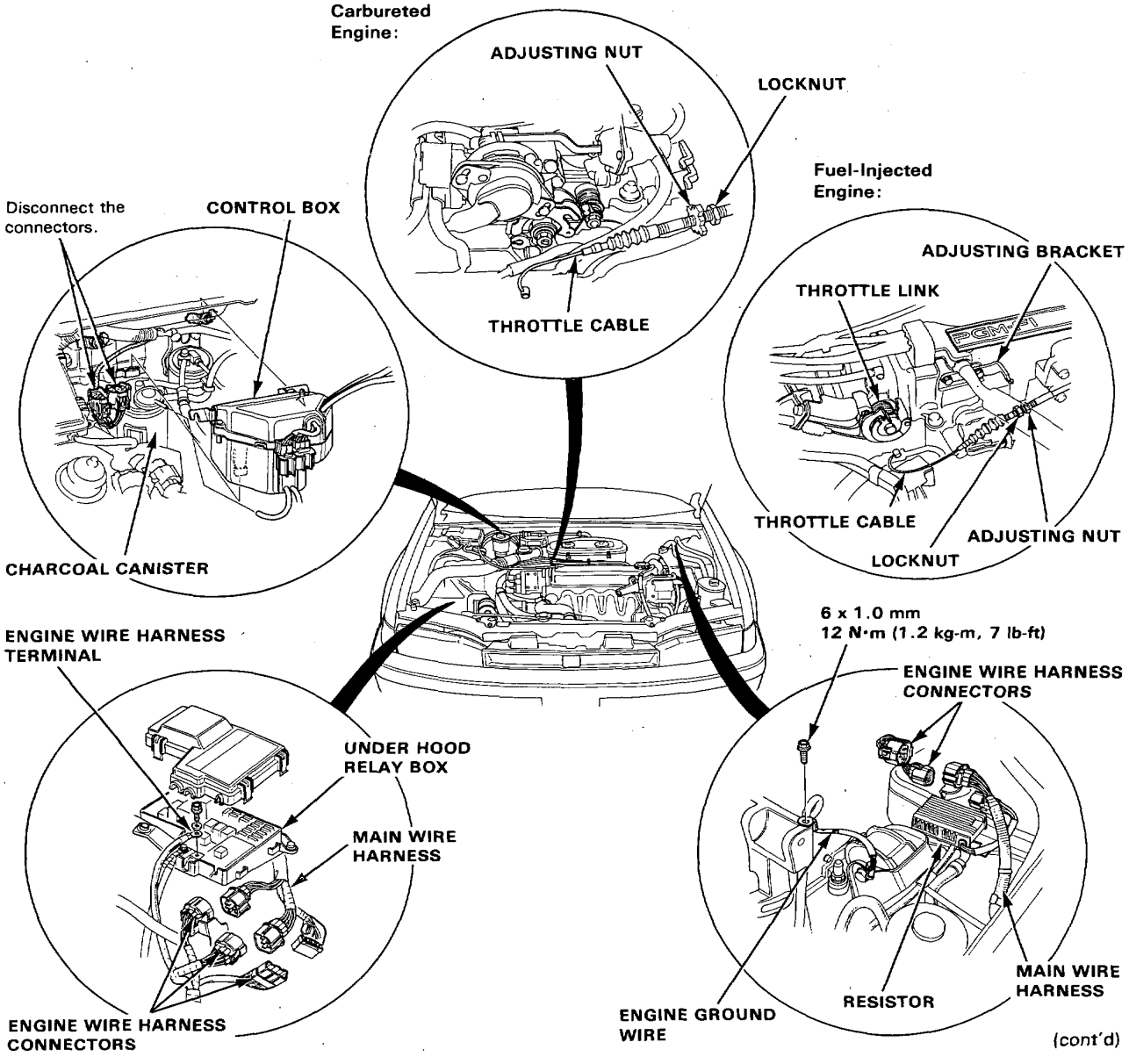
17. Disconnect two connectors and remove the control box from the fire wall.

    NOTE: Do not disconnect the vacuum hoses.

18. Disconnect three engine wire harness connectors from the main wire harness at right side of engine room, and remove the engine wire harness terminal and the starter cable terminal from under hood relay box and clamps. Then remove the transmission ground terminal.

19. Disconnect two engine wire harness connectors from main wire harness and resistor at left side of engine room.
20. Remove the engine ground wire from cylinder head cover and power steering pump bracket.
21. Remove the throttle cable by loosening the locknut, then slip the cable end out of the throttle bracket and accelerator linkage.

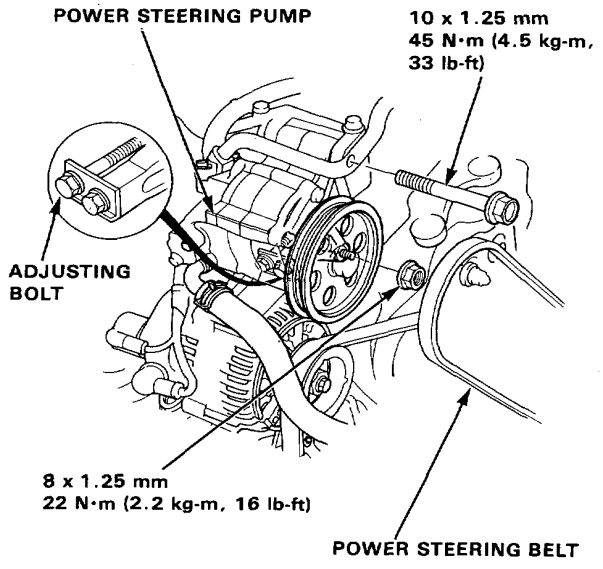
    NOTE: Take care not to bend the cable when removing it. Do not use pliers to remove the cable from the linkage. Always replace a kinked cable with a new one.



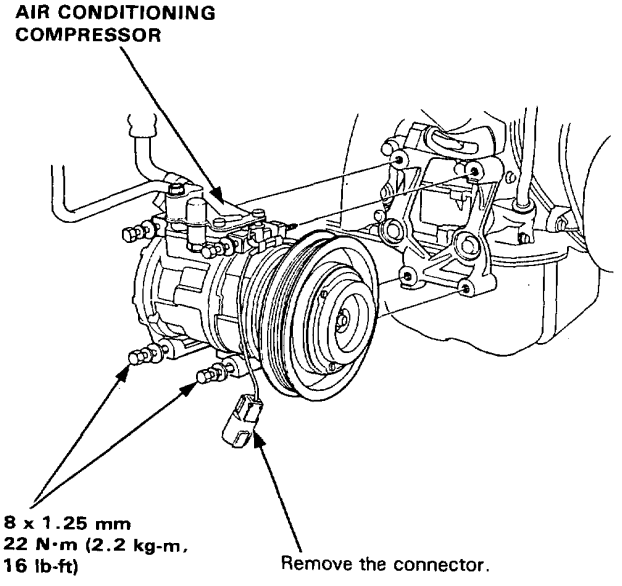
(cont'd)

(cont'd)

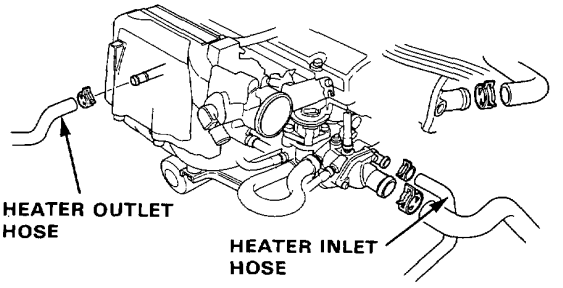
22. Remove the mounting bolts and V-belt from the power steering pump, then without disconnecting the hoses, pull the pump away from the mounting bracket.



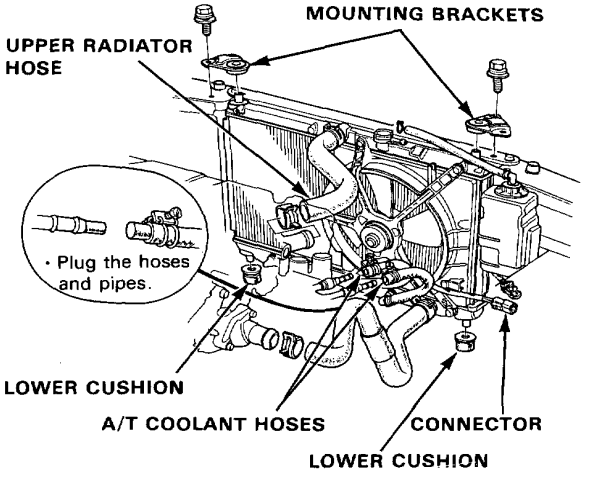
23. Remove the mounting bolts and V-belt from the air conditioning compressor, then without disconnecting the hoses, pull the compressor away from the mounting bracket.



24. Disconnect the heater inlet hose from the cylinder head and the heater outlet hose from the connecting pipe.

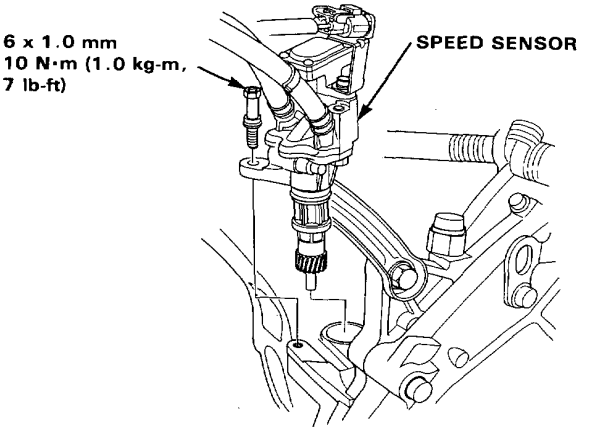


25. Disconnect the hoses and connectors to remove the radiator assembly.
    - Upper and lower radiator hoses
    - A/T cooler hoses
    - Cooling fan motor connectors



26. Remove the speed sensor.

    NOTE: Do not disconnect the hoses and the connector.



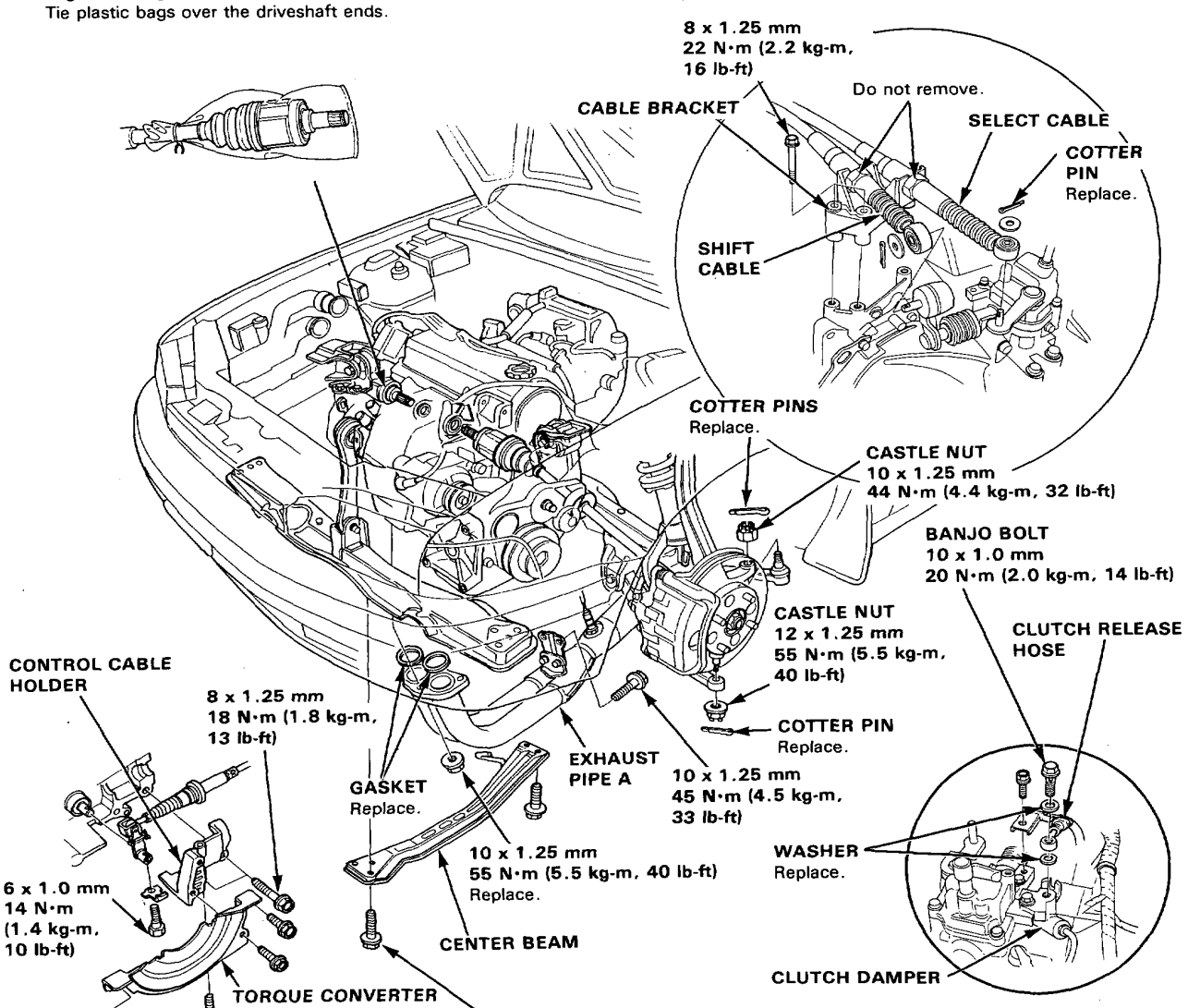
27. Remove the center beam.
28. Remove the exhaust pipe A self-locknut and bracket mounting bolts.
29. Remove the balljoints of the tierod ends and suspension lower arms (See section12).
30. Remove the driveshafts (See section 10).

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

Manual transmission equipped cars:

31. Remove the clutch release hose from the clutch damper on the transmission housing.
32. Remove the shift cable and the select cable with the cable bracket from the transmission.

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



Automatic transmission equipped cars:

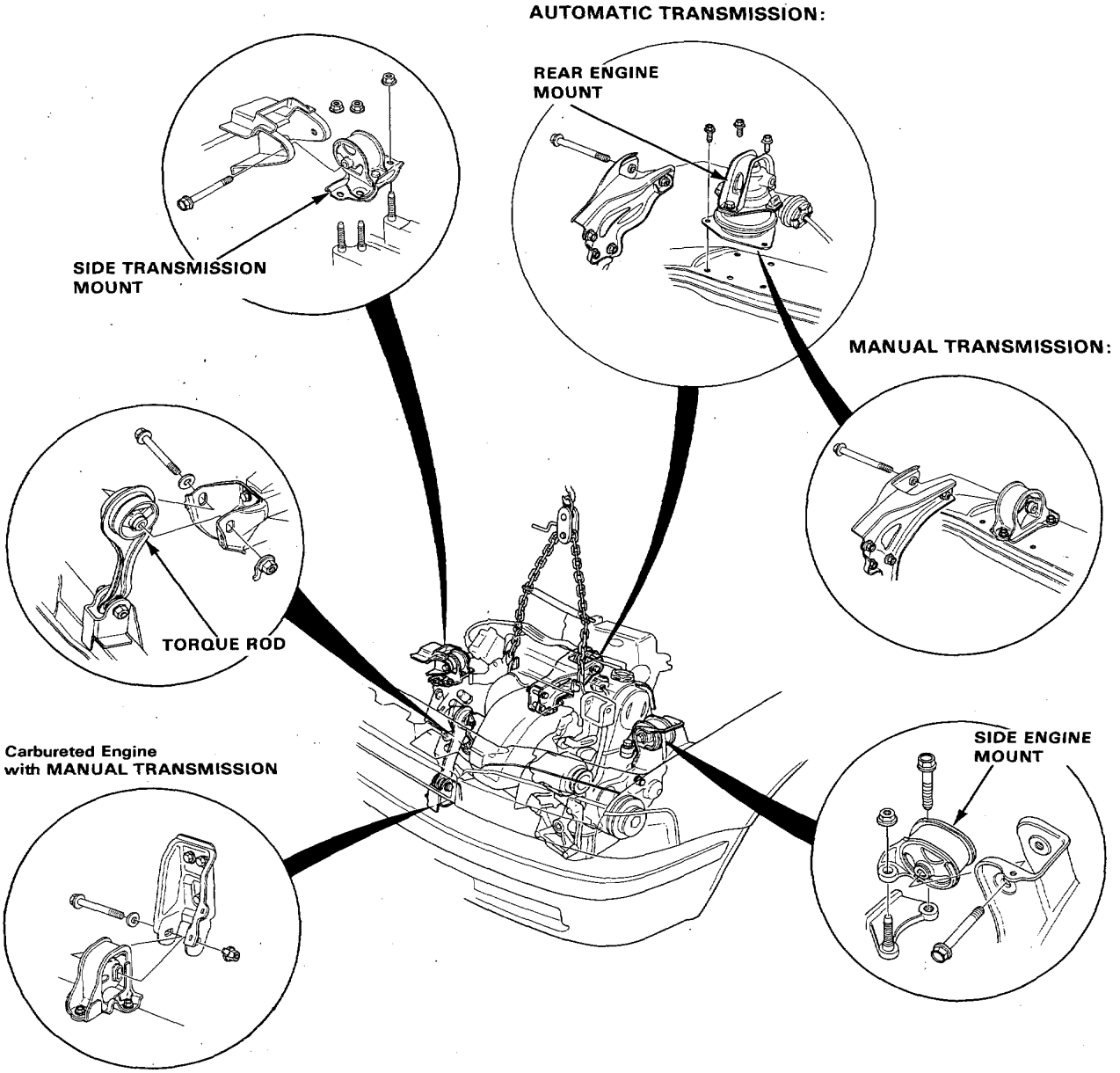
33. Remove the engine stiffener, then remove the torque converter cover.
34. Remove the cable holder, then remove the shift control lever bolt and shift control cable.

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

Engine Removal/Installation

(cont'd)

35. Attach a chain hoist to the engine. Raise the hoist to remove all slack from the chain.
36. Remove the rear engine mounting bolt.
37. Remove the front engine mounting bolt.
38. Remove the side transmission mount and mounting bolt.
39. Remove the side engine mount and mounting bolt.
40. Check that the engine/transaxle is completely free of vacuum tubes, fuel and coolant hoses, and electric wires.
41. Slowly raise the engine approximately 6. Check once again that all tubes, hoses and wires have been disconnected from the engine/ transaxle.
42. Raise the engine/transaxle all the way and remove it from the car.
43. Remove the rolling insulator from the rear beam.



44. Install the engine in the reverse order of removal. After the engine is in place:
- Torque the engine mounting bolts in sequence shown below.

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

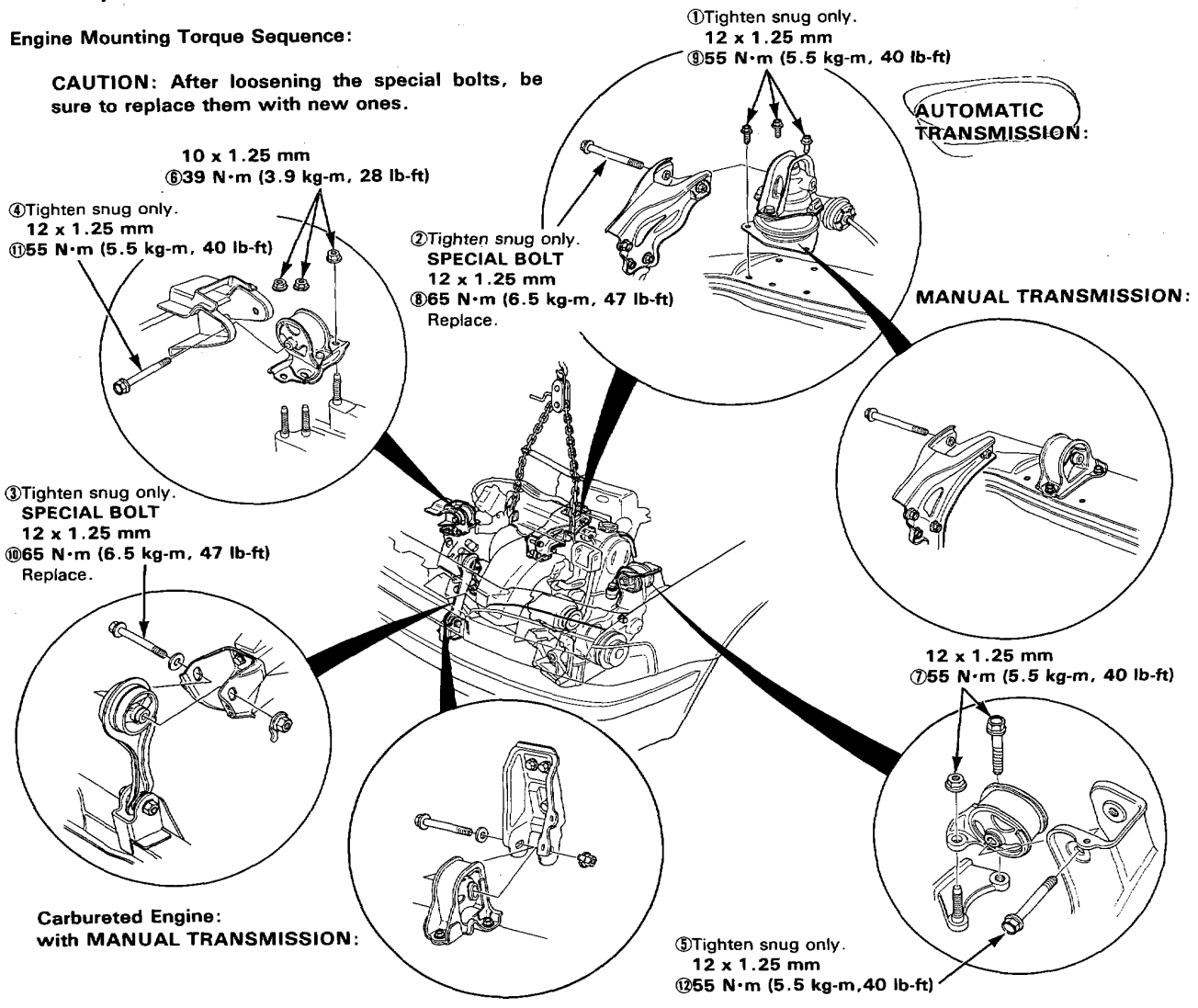
- Check that the spring clip on the end of each driveshaft clicks into place.

CAUTION: Use new spring clips on installation.

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

Engine Mounting Torque Sequence:

CAUTION: After loosening the special bolts, be sure to replace them with new ones.



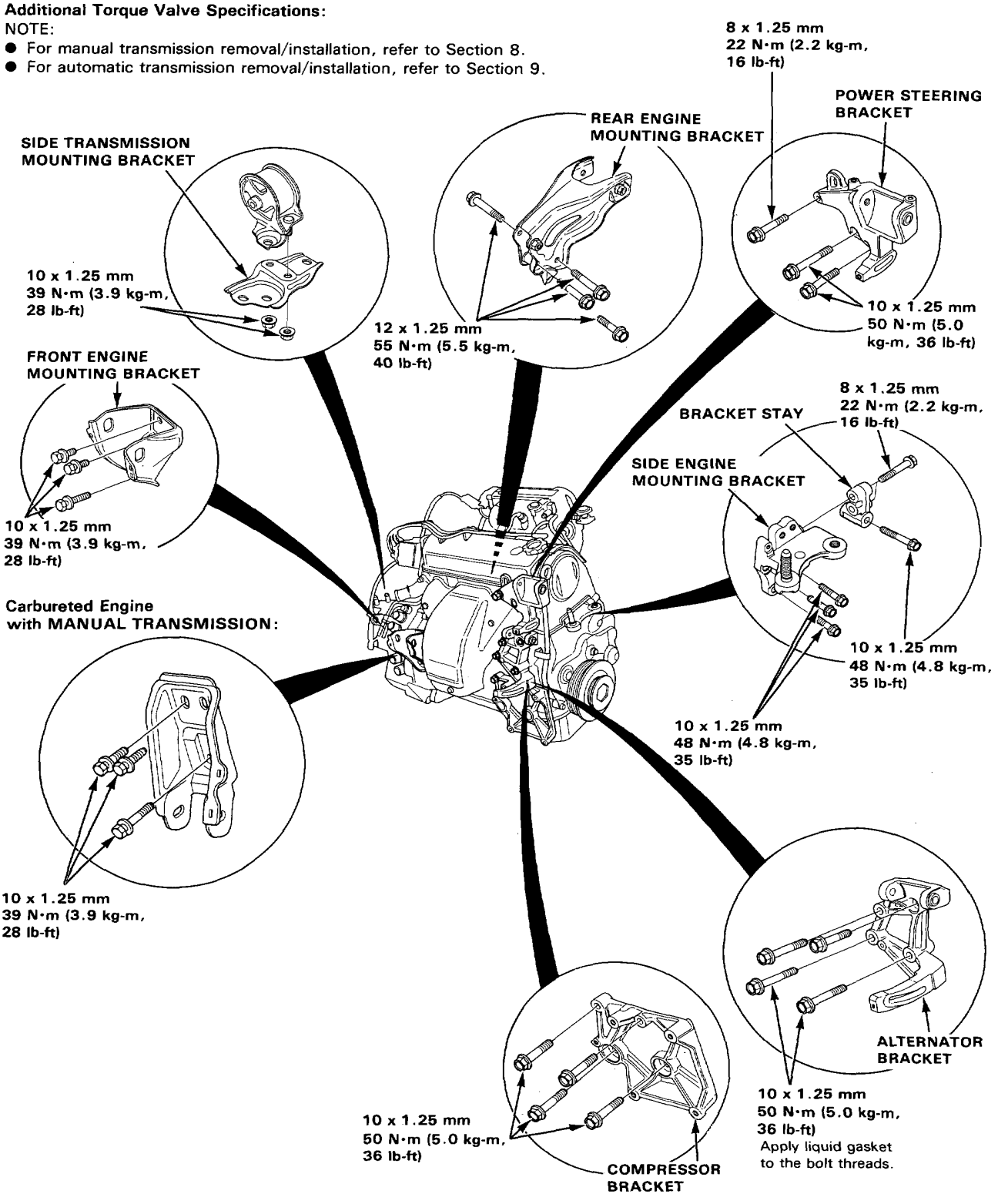
- Check the clutch pedal free play.
- Check that the transmission shifts into gear smoothly.
- Adjust the tension of the following drive belts Alternator (Air Conditioner) belt (page 5-11). Power steering belt (page 5-13).
- Clean battery posts and cable terminals with sandpaper, assemble, then apply grease to prevent corrosion.
- Inspection for fuel leakage.
  - After assembling fuel line parts, turn on the ignition switch (do not operate the starter) so that the fuel pump is operated for approximately two seconds and the fuel is pressurized. Repeat this operation two or three times and check whether any fuel leakage has occurred at any point in the fuel line.

(cont'd)

Additional Torque Valve Specifications:

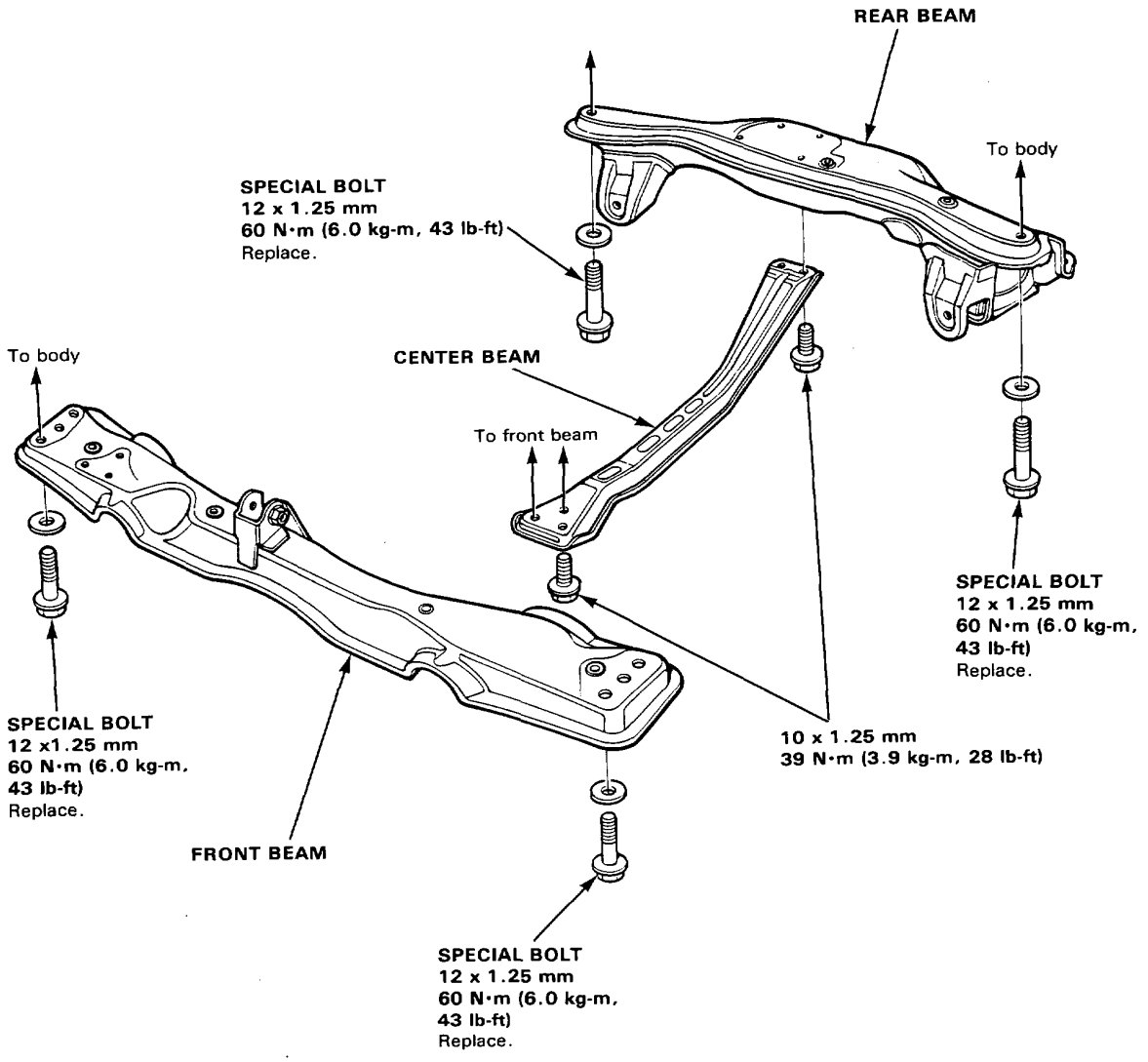
NOTE:

- For manual transmission removal/installation, refer to Section 8.
- For automatic transmission removal/installation, refer to Section 9.



Subframe Torque Value Specifications:

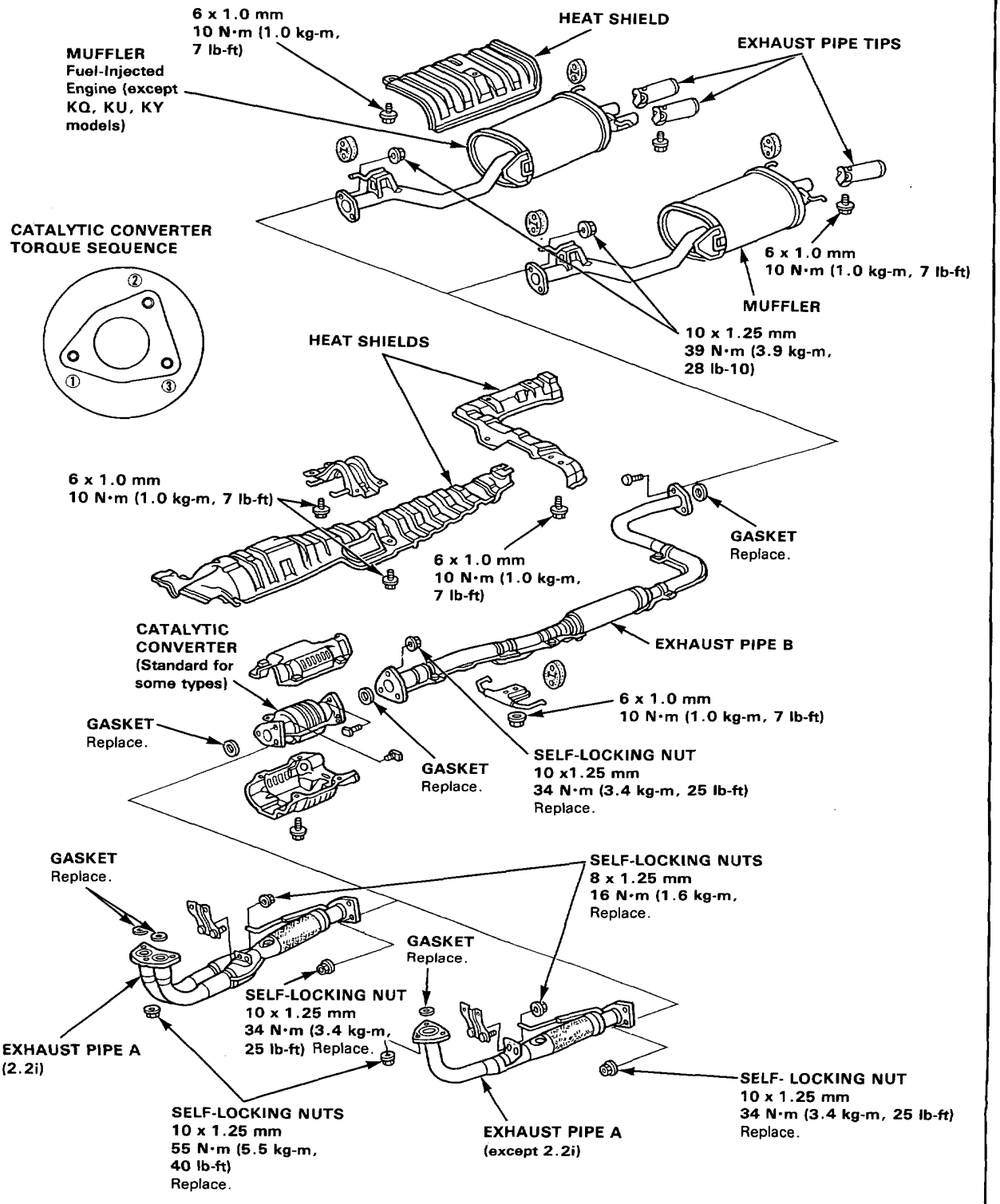
CAUTION: After loosening the special bolts, be sure to replace them with new ones.



Exhaust Pipe and Muffler

Replacement

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



Radiator

Illustrated Index

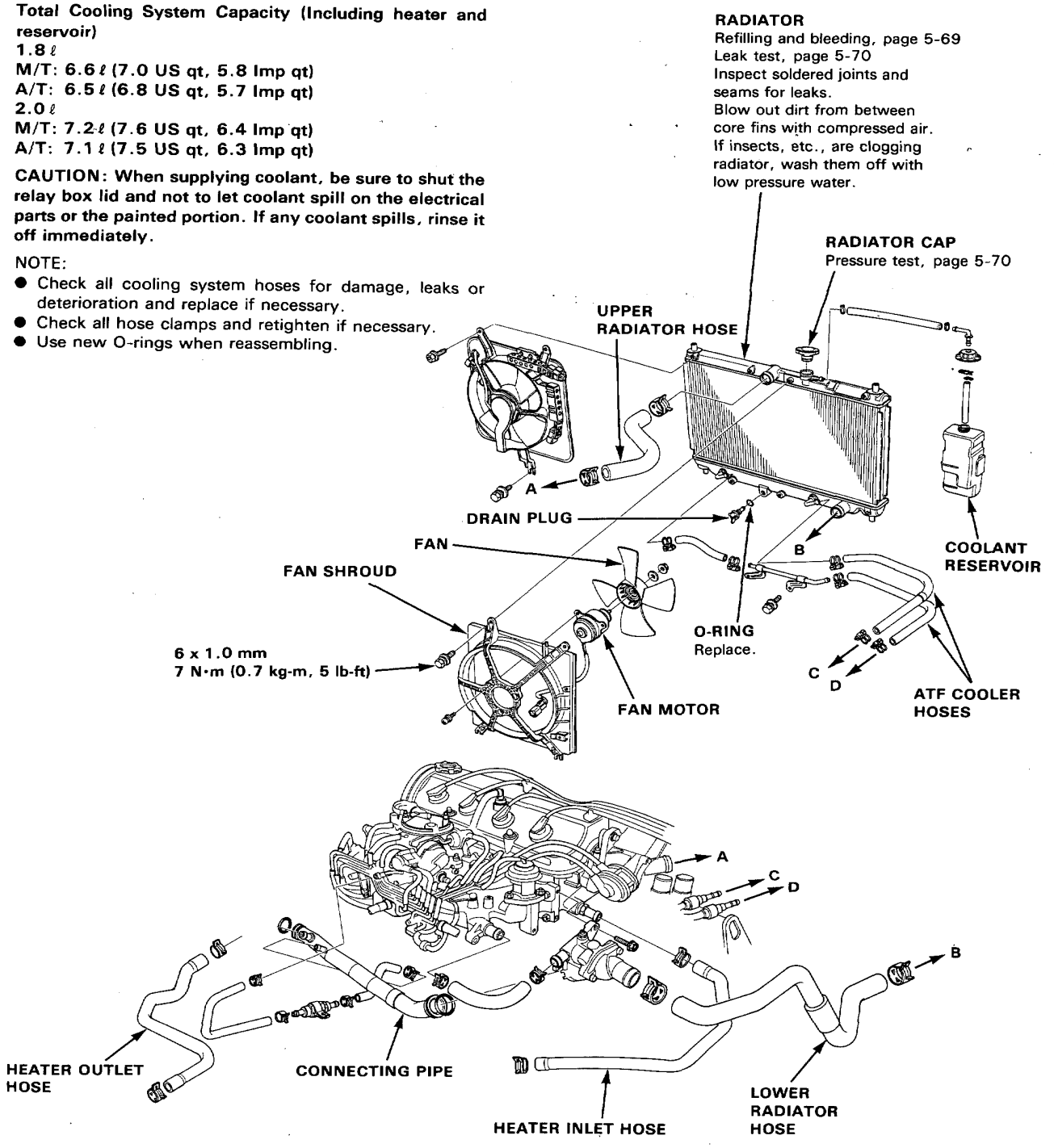
Carbureted Engine:

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

Total Cooling System Capacity (Including heater and reservoir)
1.8 ℓ
M/T: 6.6 ℓ (7.0 US qt, 5.8 Imp qt)
A/T: 6.5 ℓ (6.8 US qt, 5.7 Imp qt)
2.0 ℓ
M/T: 7.2 ℓ (7.6 US qt, 6.4 Imp qt)
A/T: 7.1 ℓ (7.5 US qt, 6.3 Imp qt)

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

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



Fuel-Injected Engine:

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

Total Cooling System Capacity (Including heater and reservoir)

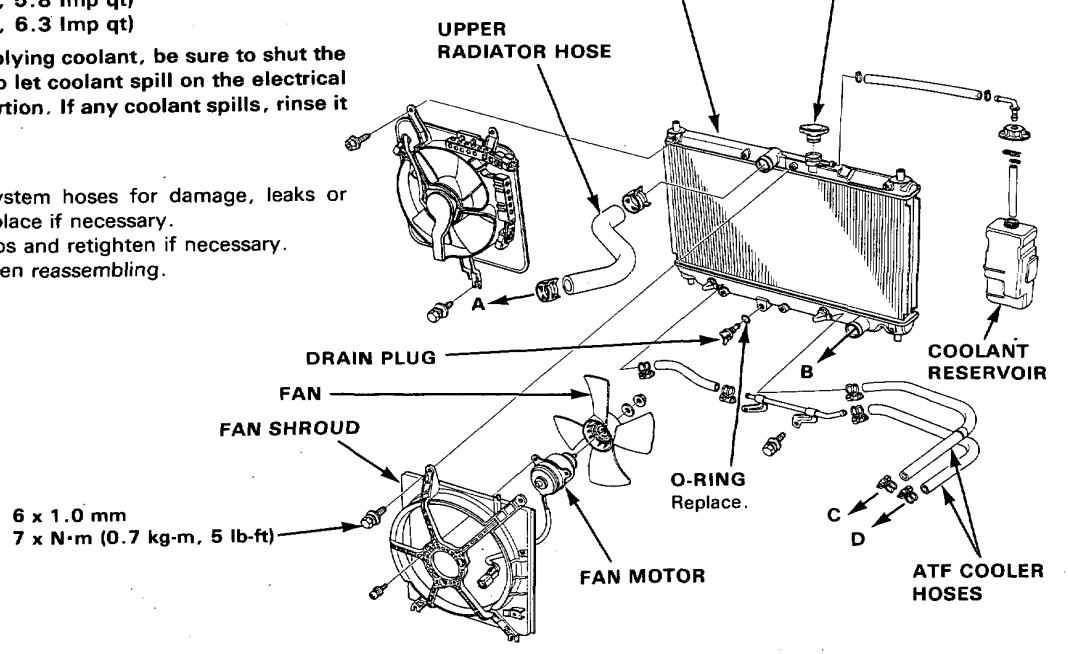
2.0 ℓ and 2.2 ℓ (except 2.2i)
M/T: 7.2 ℓ (7.6 US qt, 6.4 Imp qt)
A/T: 7.1 ℓ (7.5 US qt, 6.3 mp qt)
2.2 ℓ (2.2i)
M/T: 6.6 ℓ (7.0 US qt, 5.8 Imp qt)
A/T: 7.1 ℓ (7.5 US qt, 6.3 Imp qt)

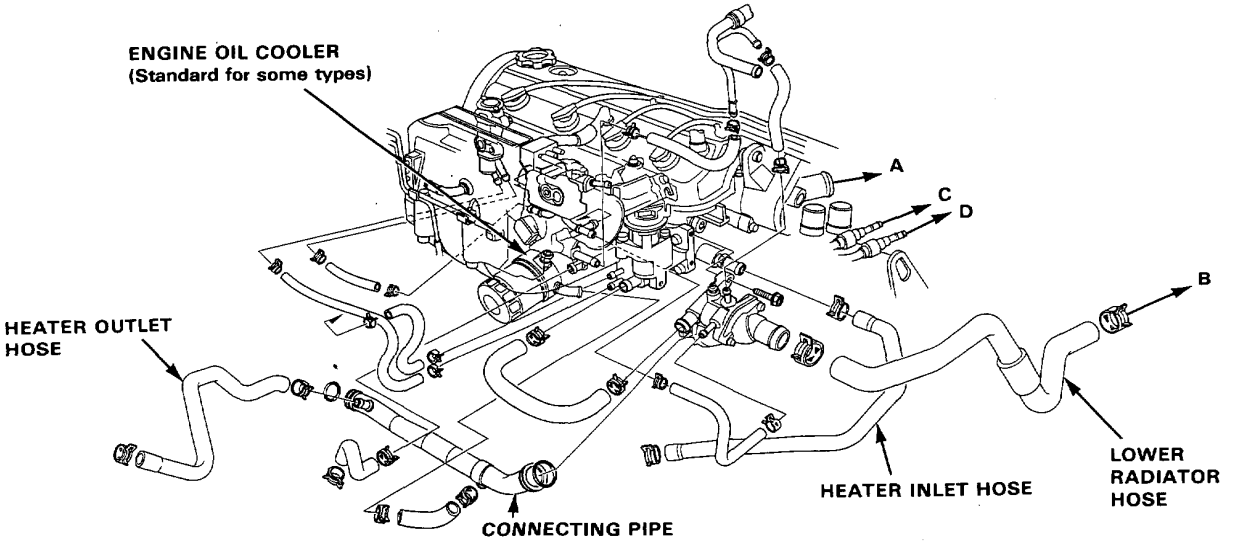
CAUTION: When supplying coolant, be sure to shut the relay box lid and not to let coolant spill on the electrical parts or the painted portion. If any coolant spills, rinse it off immediately.

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

RADIATOR
Refilling and bleeding, page 5-69
Leak test, page 5-70
Inspect soldered joints and seams for leaks.
Blow out dirt from between core fins with compressed air.
If insects, etc., are clogging radiator, wash them off with low pressure water.

RADIATOR CAP
Pressure test, page 5-70





Radiator

Replacement

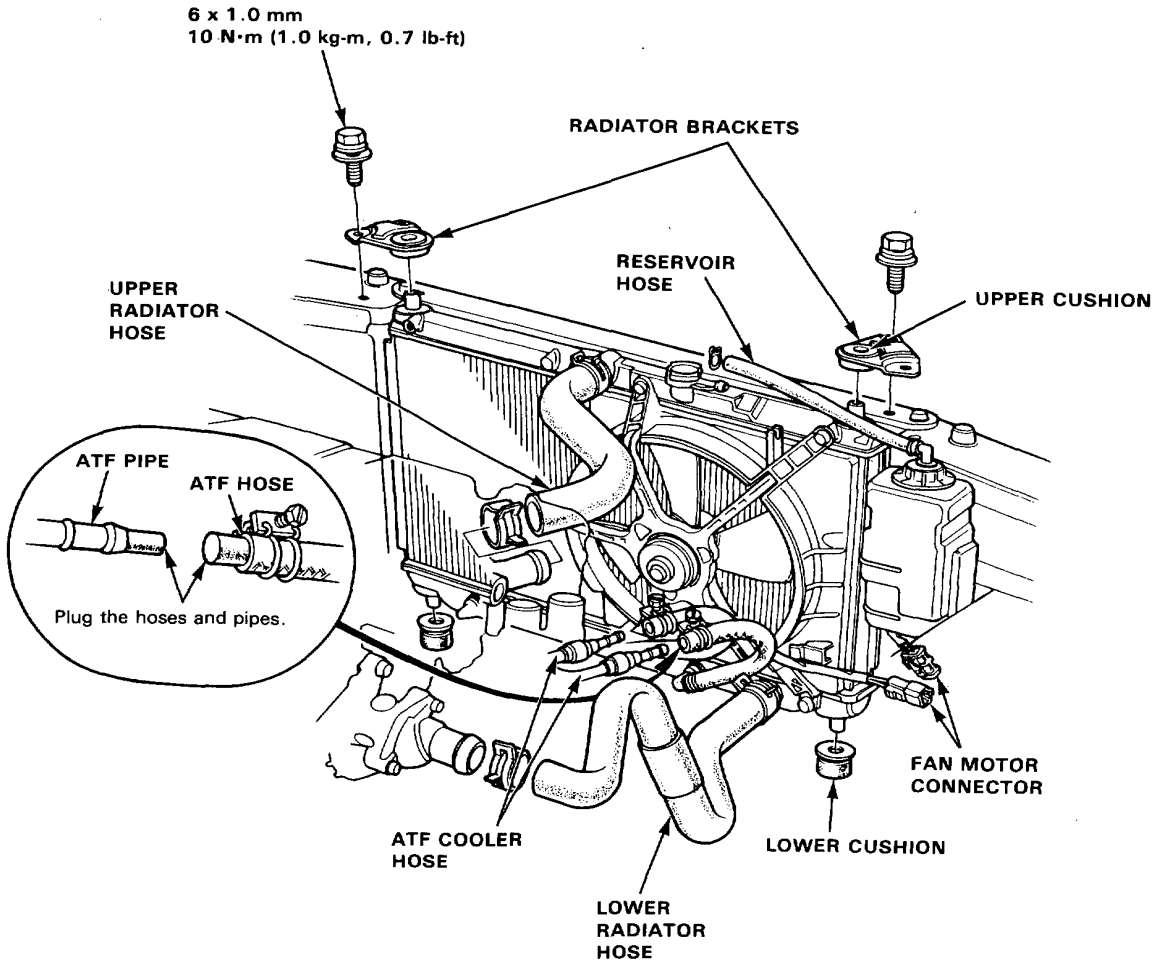
1. Drain the coolant from the radiator.
   - Remove the radiator cap to speed draining.

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

2. Remove the connectors from the cooling fan motor and thermoswitch.
3. Disconnect the upper and lower radiator hoses from cylinder head.
4. Disconnect the ATF cooler hose (A/T).

   NOTE: Plug the hoses and pipes.

5. Remove the radiator bracket and radiator.



NOTE:
- Install the radiator in the reverse order of removal.
- Before installing the radiator, set the radiator lower cushion securely under it.

Refilling and Bleeding

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

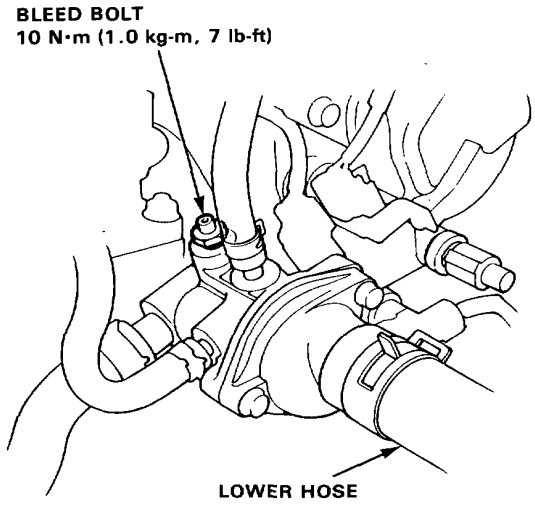
1. Set the heater temperature dial to maximum heat.
2. Remove the engine splash shield under the engine.
3. When the radiator is cool, remove the radiator cap. Loosen the drain plug, and drain the radiator.
4. Remove the drain bolt from the rear side of the cylinder block to drain the block and heater.
5. Apply liquid gasket to the drain bolt threads, then reinstall the bolt with a new washer and tighten it securely.
6. Tighten the radiator drain plug securely.
7. Remove, drain and reinstall the reservoir. Fill the tank halfway to the MAX mark with water, then up to the MAX mark with coolant.
8. Mix the recommended anti-freeze with an equal amount of water in a clean container.

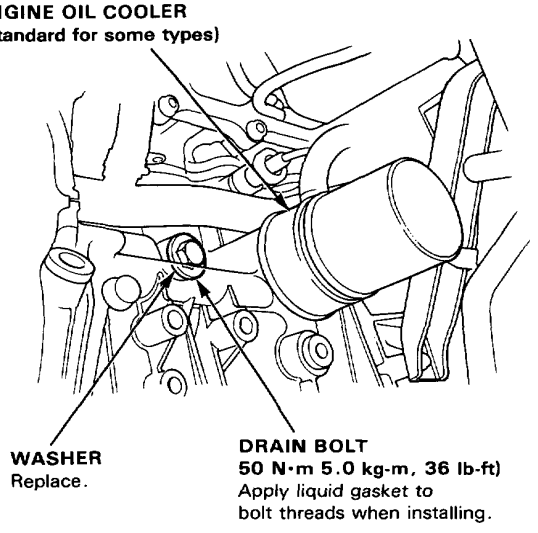
   NOTE:
   - Use only HONDA-RECOMMENDED anti-freeze/ coolant.
   - For best corrosion protection, the coolant concentration must be maintained year-round at 50 % MINIMUM. Coolant concentrations less than 50 % may not provide sufficient protection against corrosion or freezing.
   - Coolant concentrations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

   CAUTION:
   - **Do not mix different brands of 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: including reservoir (0.6 ℓ (0.6 US qt, 0.5 Imp qt)) and heater.

   1.8 ℓ
   M/T: 6.6 ℓ (7.0 US qt, 5.8 Imp qt)
   A/T: 6.5 ℓ (6.8 US qt, 5.7 Imp qt)
   2.0 ℓ and 2.2 ℓ (except 2.2i)
   M/T: 7.2 ℓ (7.6 US qt, 6.4 Imp qt)
   A/T: 7.1 ℓ (7.5 US qt, 6.3 Imp qt)
   2.2 ℓ (2.2i)
   M/T: 6.6 ℓ (7.0 US qt, 5.8 Imp qt)
   A/T: 7.1 ℓ (7.5 US qt, 6.3 Imp qt)
9. *Loosen the air bleed bolt in the water inlet, then fill the radiator to the bottom of the filler neck with the coolant mixture. Tighten the bleed bolt as soon as coolant starts to run out in a steady stream without bubbles.*



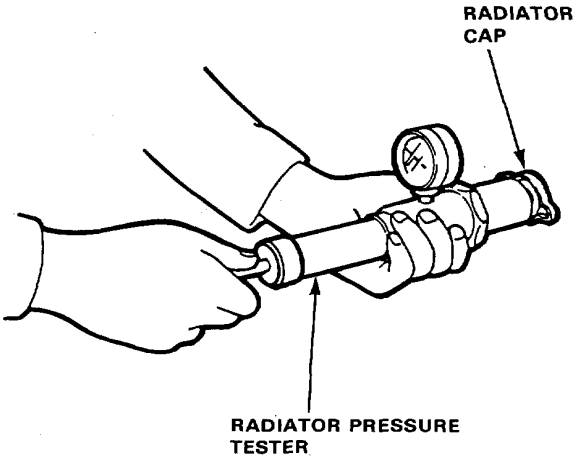


10. With the radiator cap off, start the engine and let it run until warmed up (the cooling fan comes on at least twice).
    Then, if necessary, add more coolant mix to bring the level back up to the bottom of the filler neck.
11. Put the radiator cap on, then run the engine again and check for leaks.

Radiator

Cap Testing

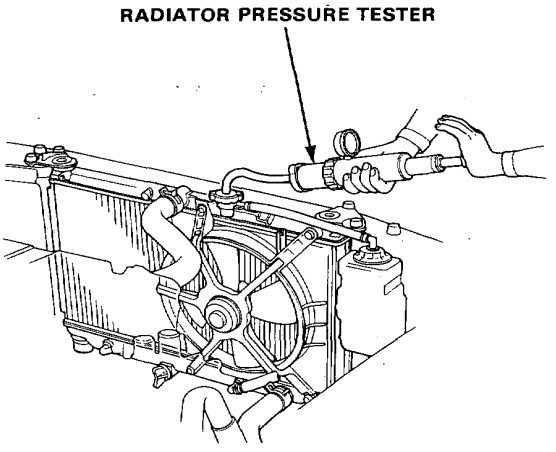
1. Remove the radiator cap, wet its seal with coolant, then install it on the pressure tester.
2. Apply a pressure of 93—123 kPa (0.95—1.25 kg/cm², 14—18 psi).
3. Check for a drop in pressure.
4. If the pressure drops, replace the cap.



Testing

1. Wait until the engine is cool, then carefully remove the radiator cap and fill the radiator with coolant to the top of the filler neck.
2. Attach the pressure tester to the radiator and apply a pressure of 93—123 kPa (0.95—1.25 kg/cm², 14—18 psi).
3. Inspect for coolant leaks and a drop in pressure.
4. Remove the tester and reinstall the radiator cap.

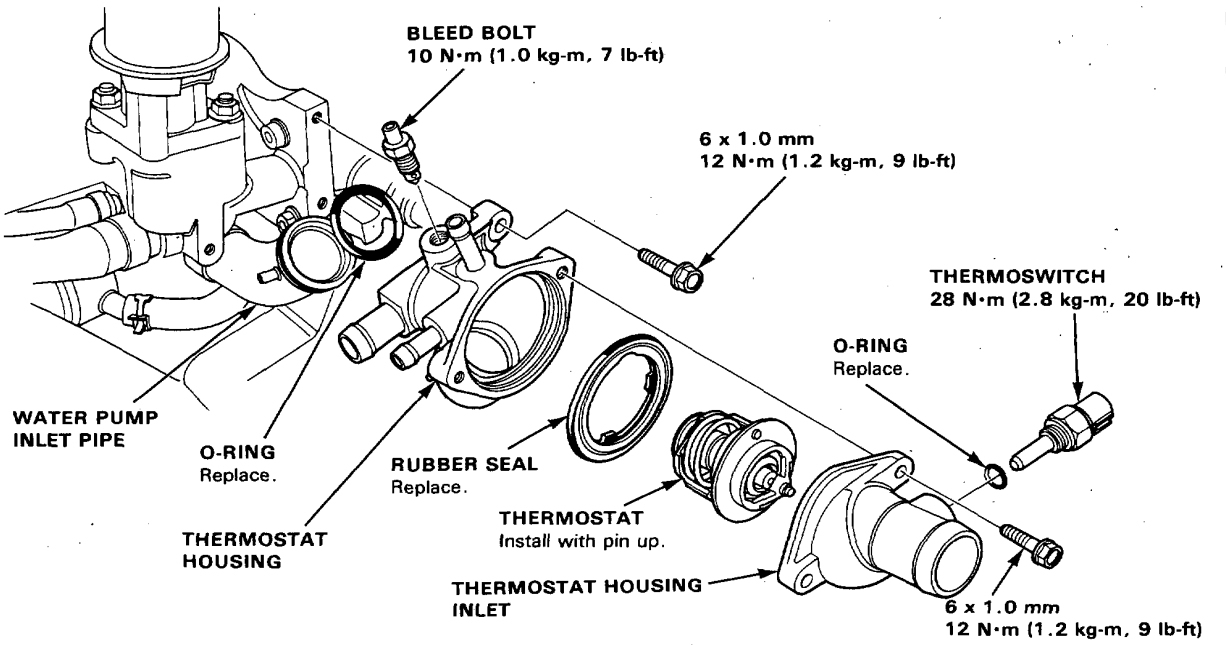
   NOTE: Check for engine oil in the coolant and/or coolant in engine oil.



Thermostat

Replacement

NOTE: Use new O-rings when reassembling.



Testing

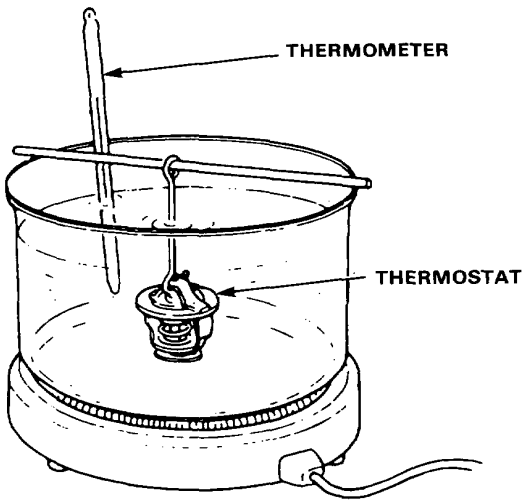
Replace the thermostat if it is open at room temperature.

To test a closed thermostat:

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

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

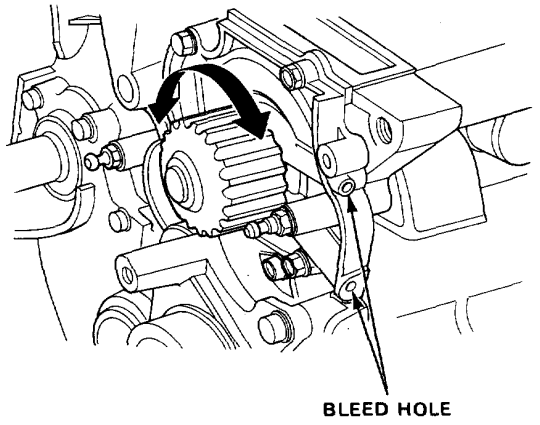
   STANDARD THERMOSTAT
   Lift height: above 8.0 mm (0.31 in.)
   Starts opening: 76—80 °C (169—176 °F)
   Fully open: 90 °C (194 °F)



Water Pump

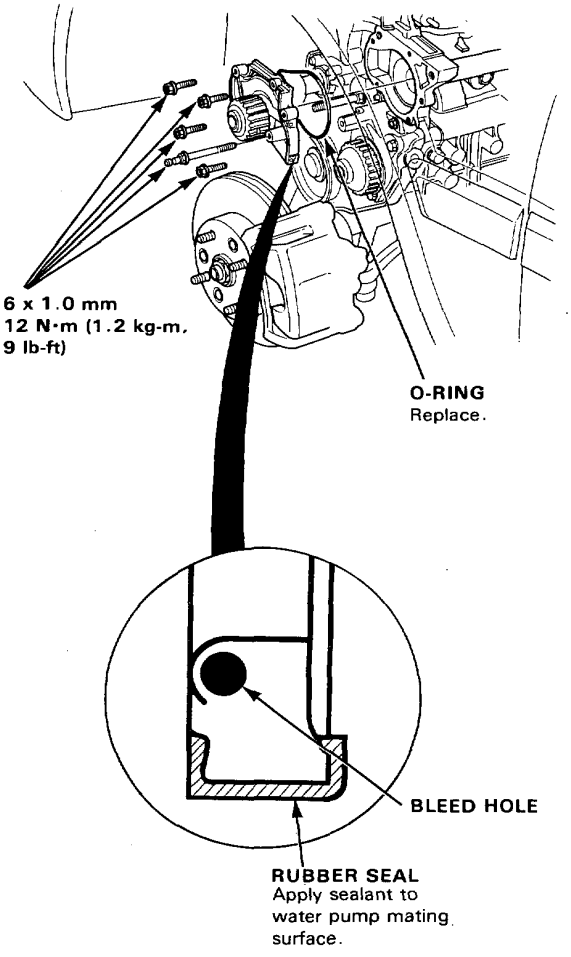
Inspection

1. Remove the timing belt (page 5-36).
2. Check the water pump pulley turns freely.
   NOTE: Small amount of "weeping" from the bleed hole is normal.



Replacement

1. Remove the timing belt (page 5-36).
2. On screw the bolt, then remove the water pump.



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

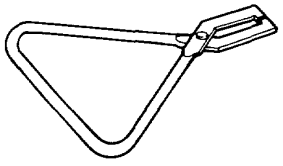
Special Tools

Special Tools

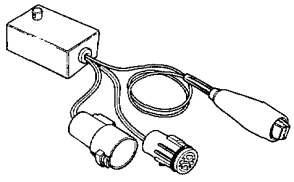
Ref. No.	Tool Number	Description	Q'ty	Remark
①	07411—0020000	Digital Circuit Tester	1	
②	07614—0050100	Fuel Line Clamp	1	
③	07JAZ—SH20100	R.P.M. Connecting Adaptor	1	
④	07LAJ—PT30100	ECU Test Harness	1	
⑤	07LAJ—PT30200	Test Harness	1	
⑥	07LAZ—PT30100	R.P.M. Connecting Adaptor	1	
⑥-1	07LAZ—PT30110	R.P.M. Connecting Adaptor (A)	(1)	Component Tools
⑥-2	07LAZ—PT30120	R.P.M. Connecting Adaptor (B)	(1)	
⑦	07LAA—PT50100	O_2 Sensor Socket Wrench	1	



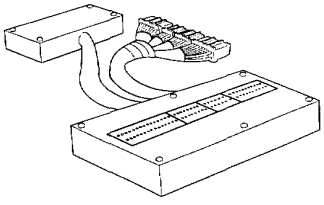
①



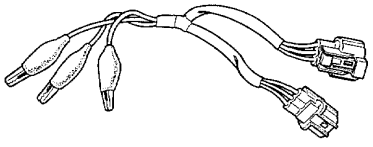
②



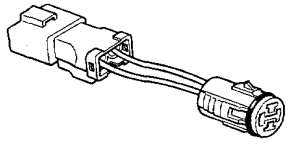
③



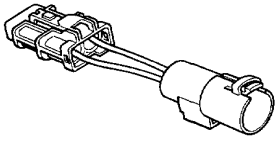
④



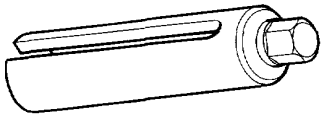
⑤



⑥(⑥-1)



⑥(⑥-2)

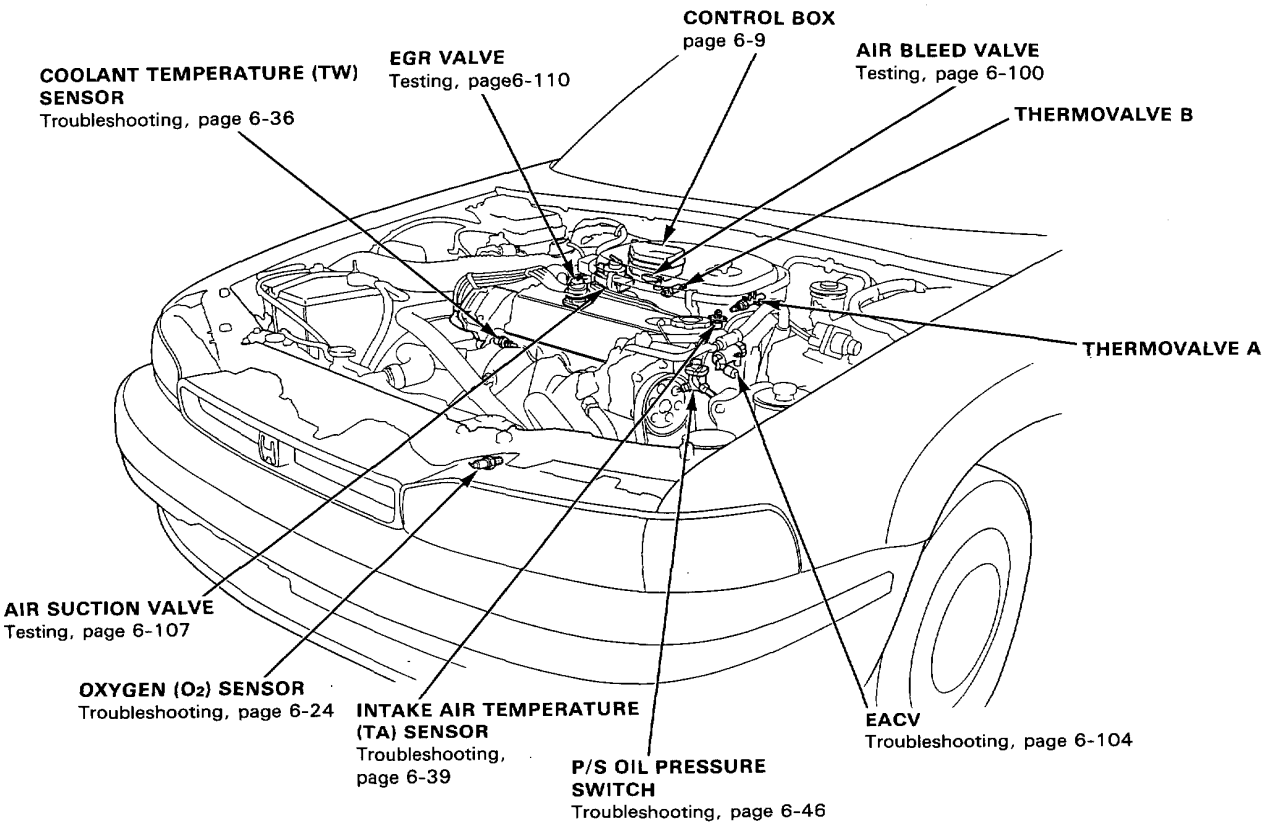


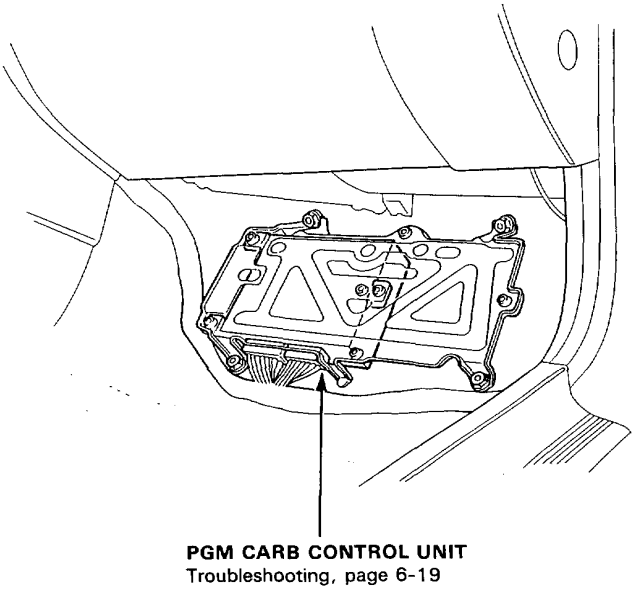
⑦

Component Locations

Index

(KX, KS, KG)

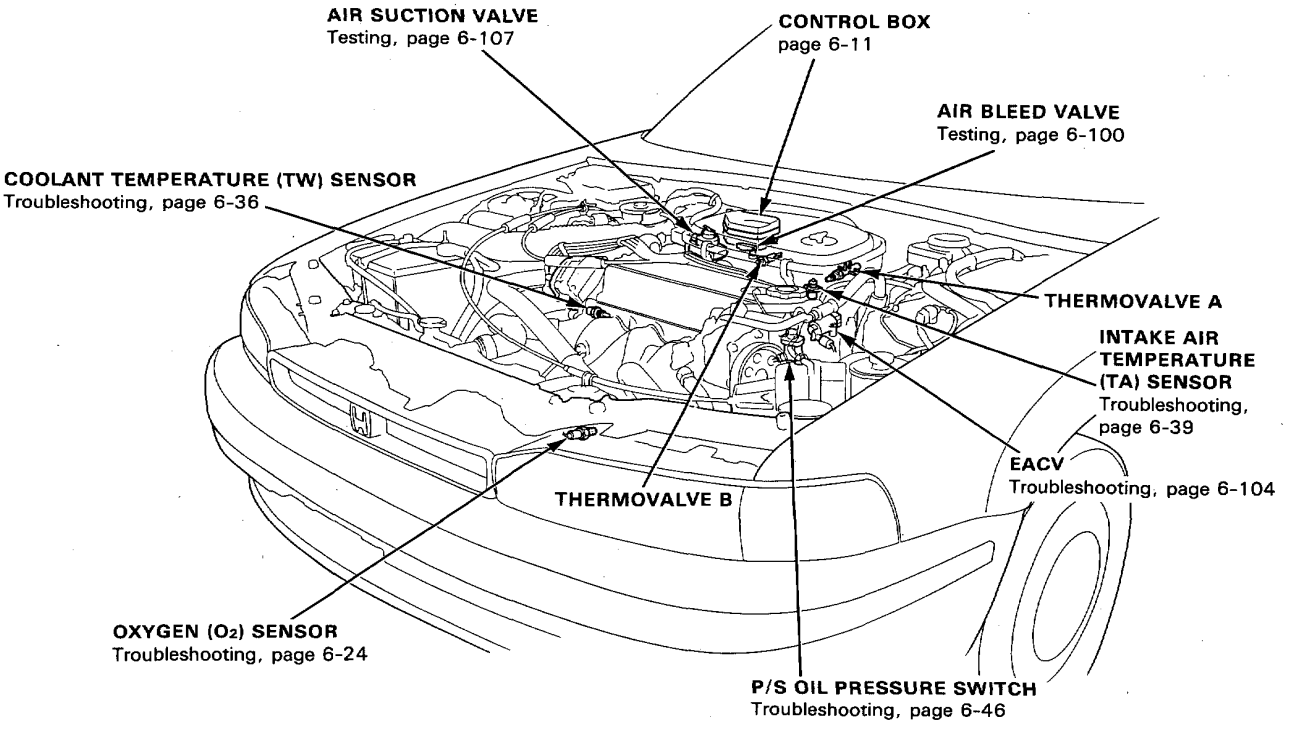


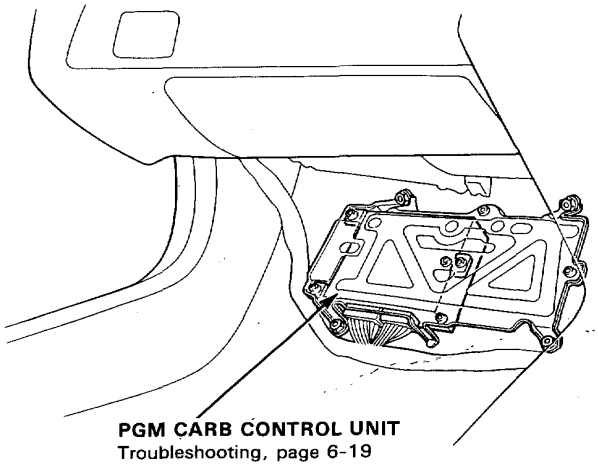


Component Locations

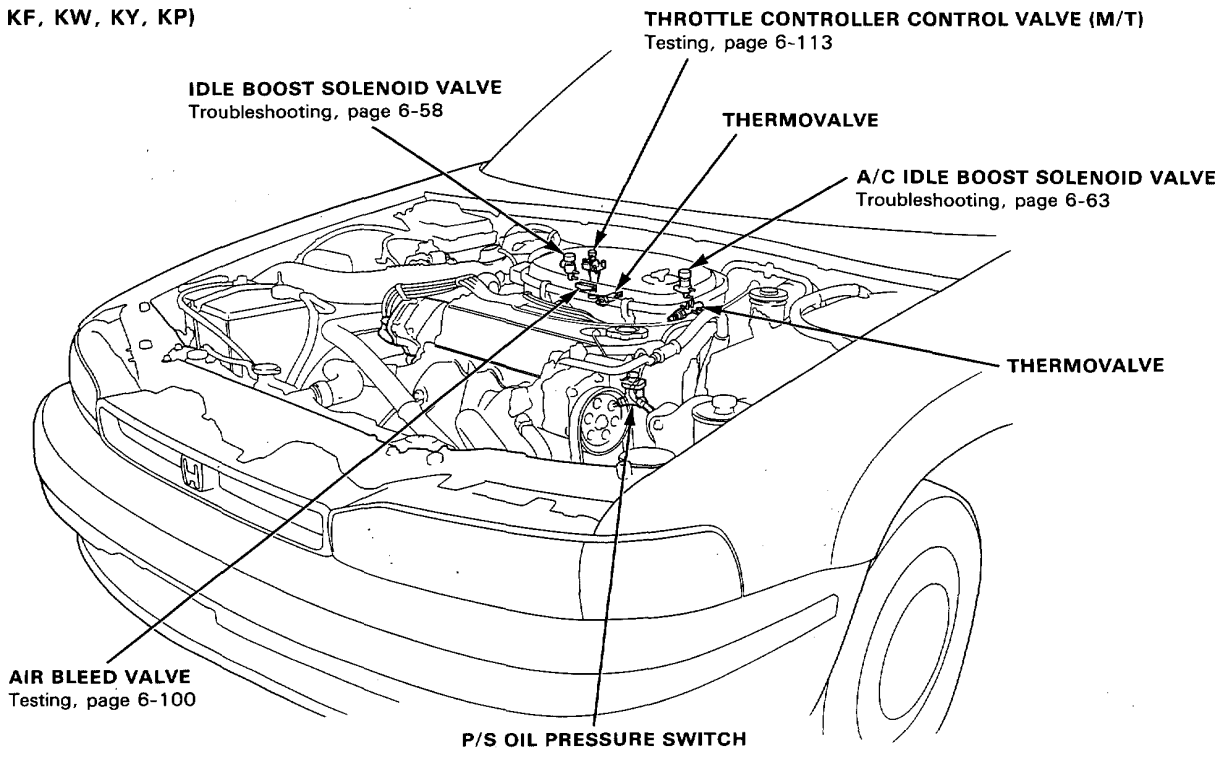
Index

(KQ)

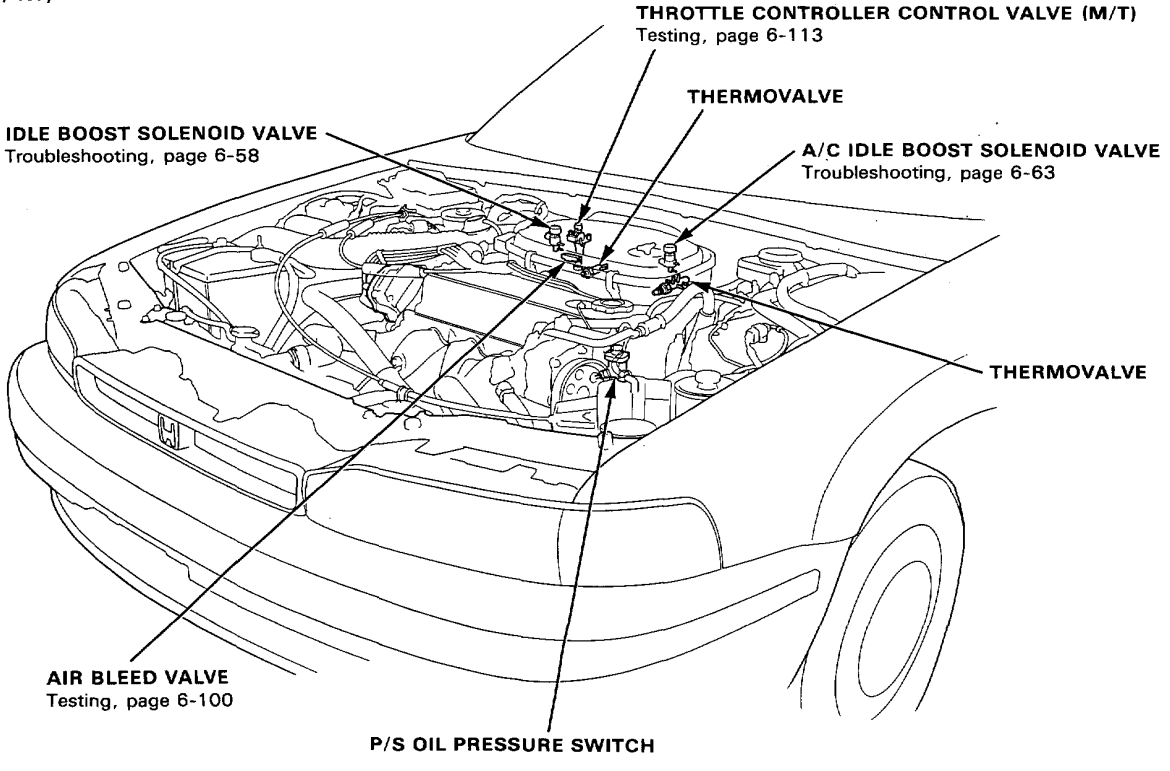




(KB, KF, KW, KY, KP)

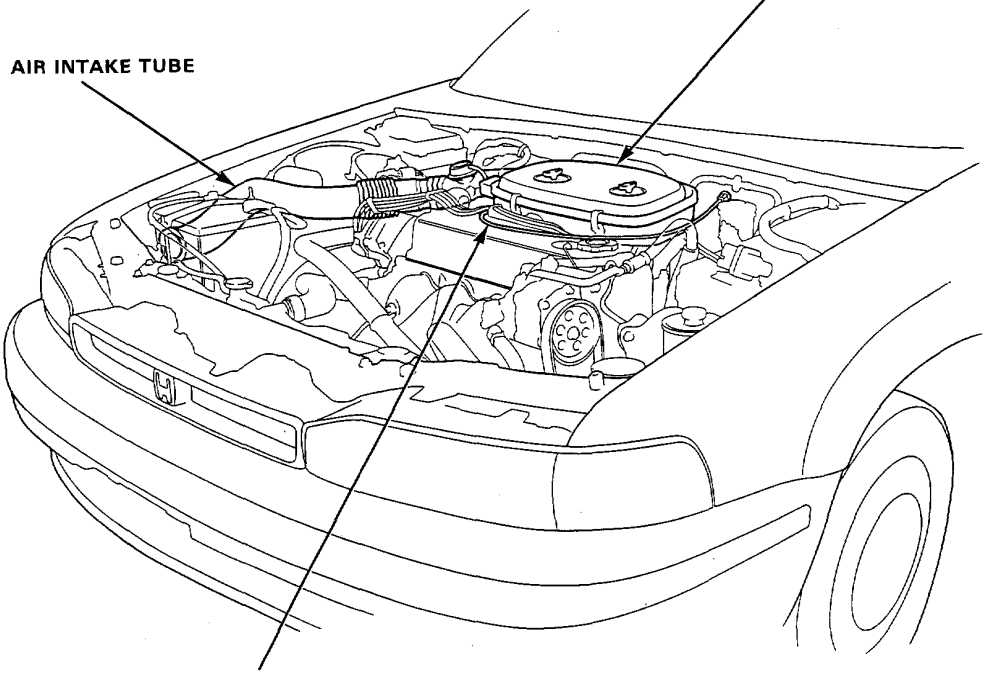


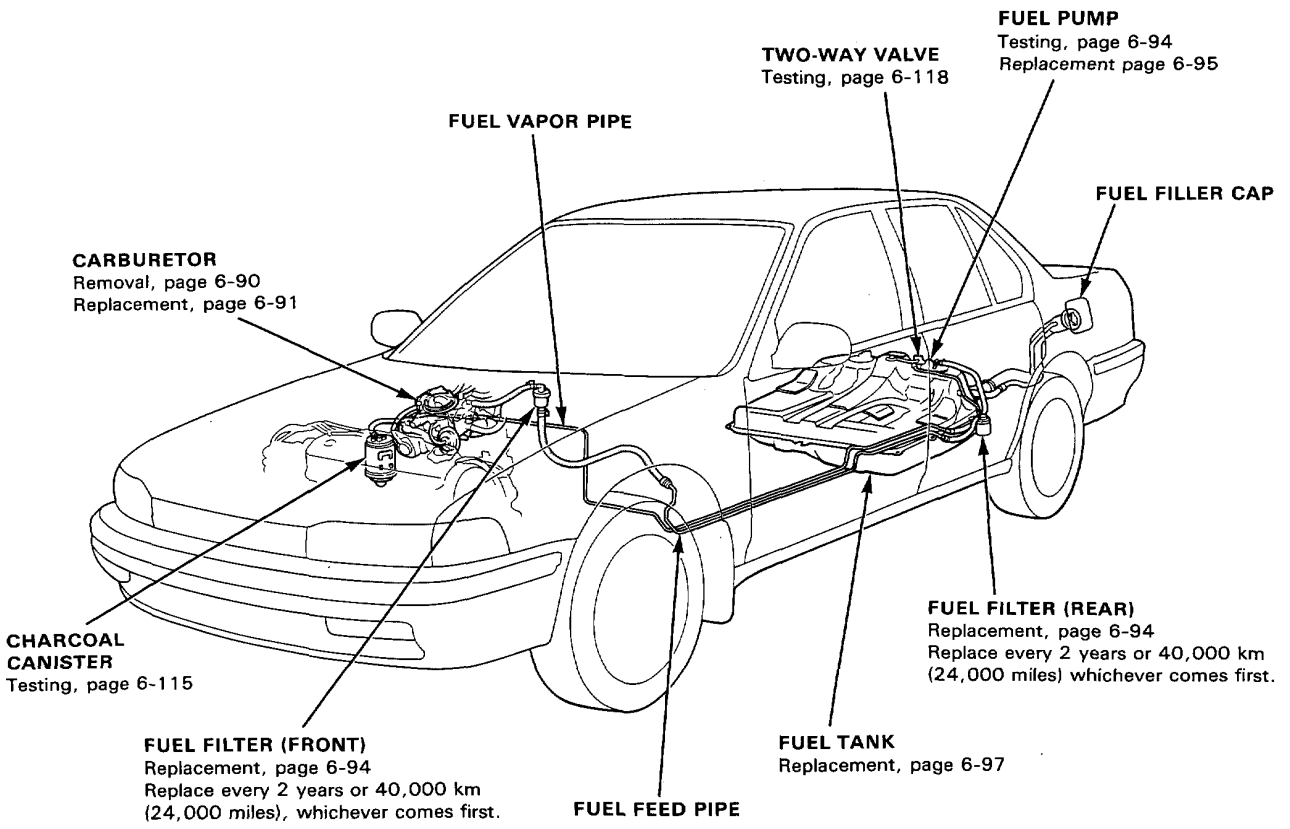
(KE, KT)



Component Locations

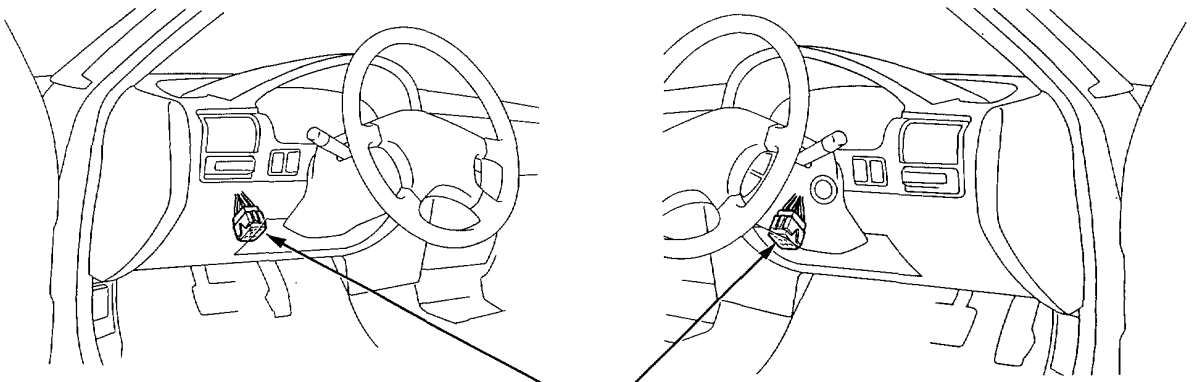
Index




FUEL PUMP
Testing, page 6-94
Replacement page 6-95
TWO-WAY VALVE
Testing, page 6-118
FUEL VAPOR PIPE
FUEL FILLER CAP
CARBURETOR
Removal, page 6-90
Replacement, page 6-91
CHARCOAL CANISTER
Testing, page 6-115
FUEL FILTER (REAR)
Replacement, page 6-94
Replace every 2 years or 40,000 km (24,000 miles) whichever comes first.
FUEL FILTER (FRONT)
Replacement, page 6-94
Replace every 2 years or 40,000 km (24,000 miles), whichever comes first.
FUEL FEED PIPE
FUEL TANK
Replacement, page 6-97

(LH)

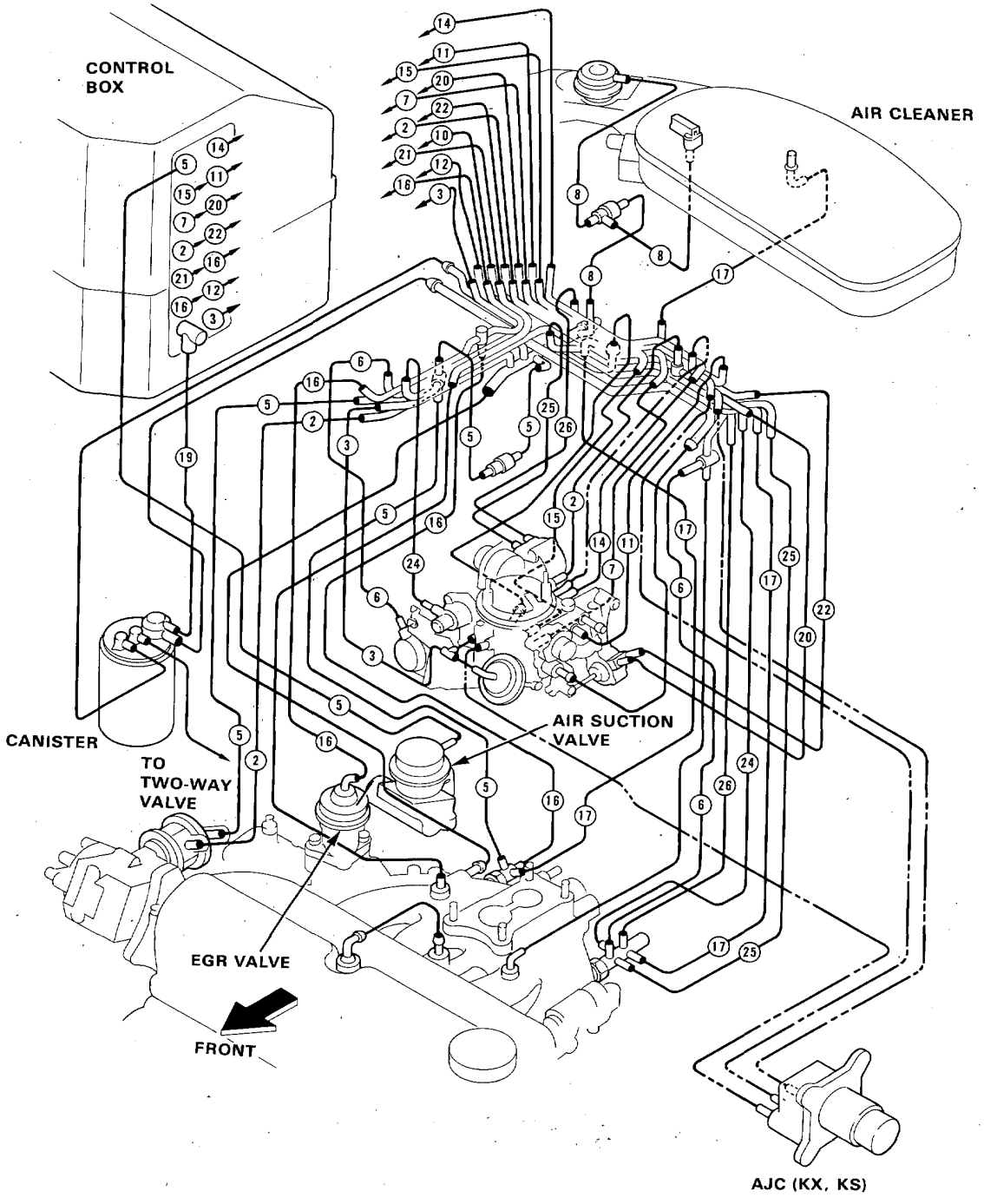
(RH)


FUEL CUT-OFF RELAY
Testing, page 6-96

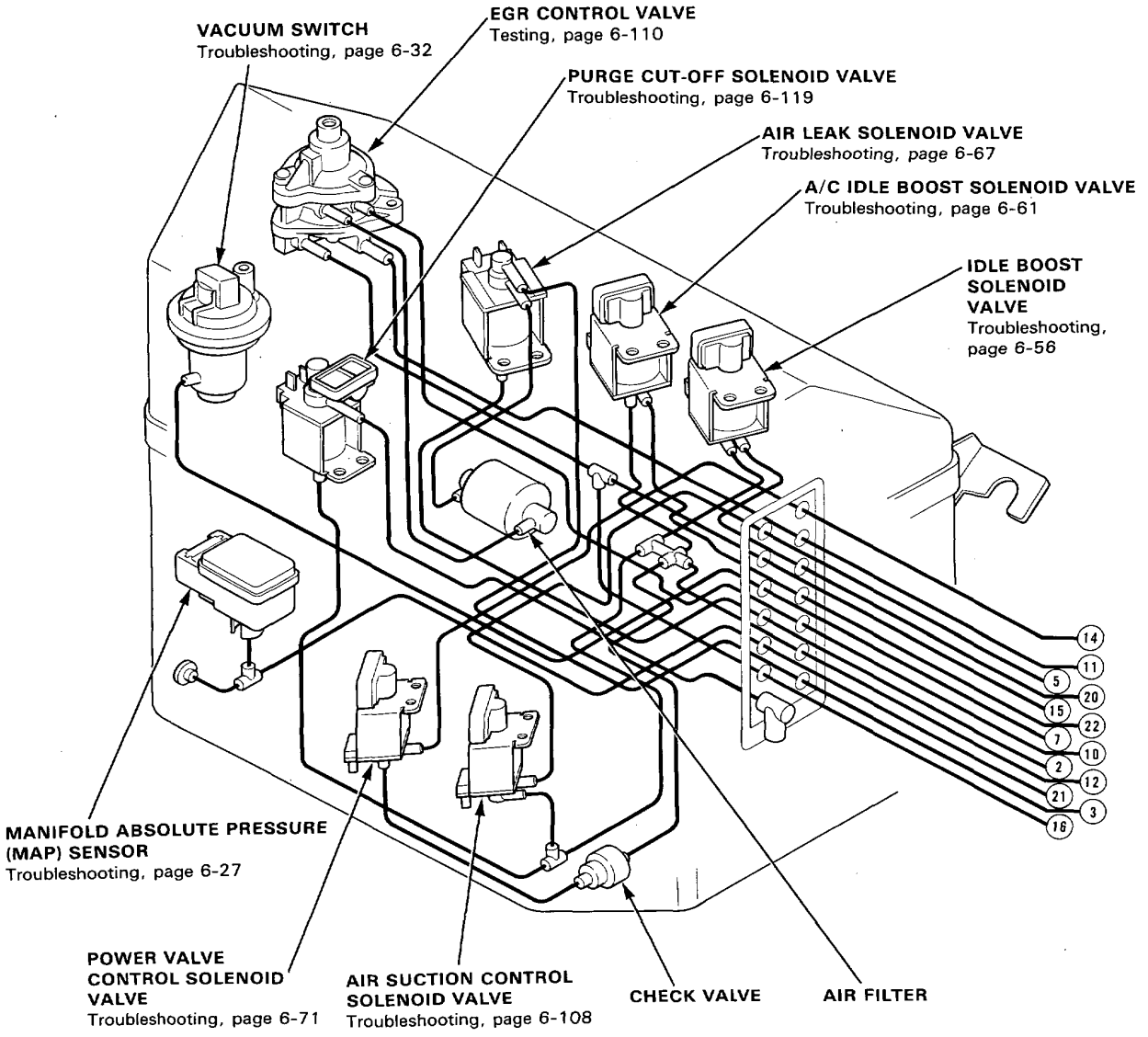
System Description

Vacuum Connections

(KX, KS, KG)



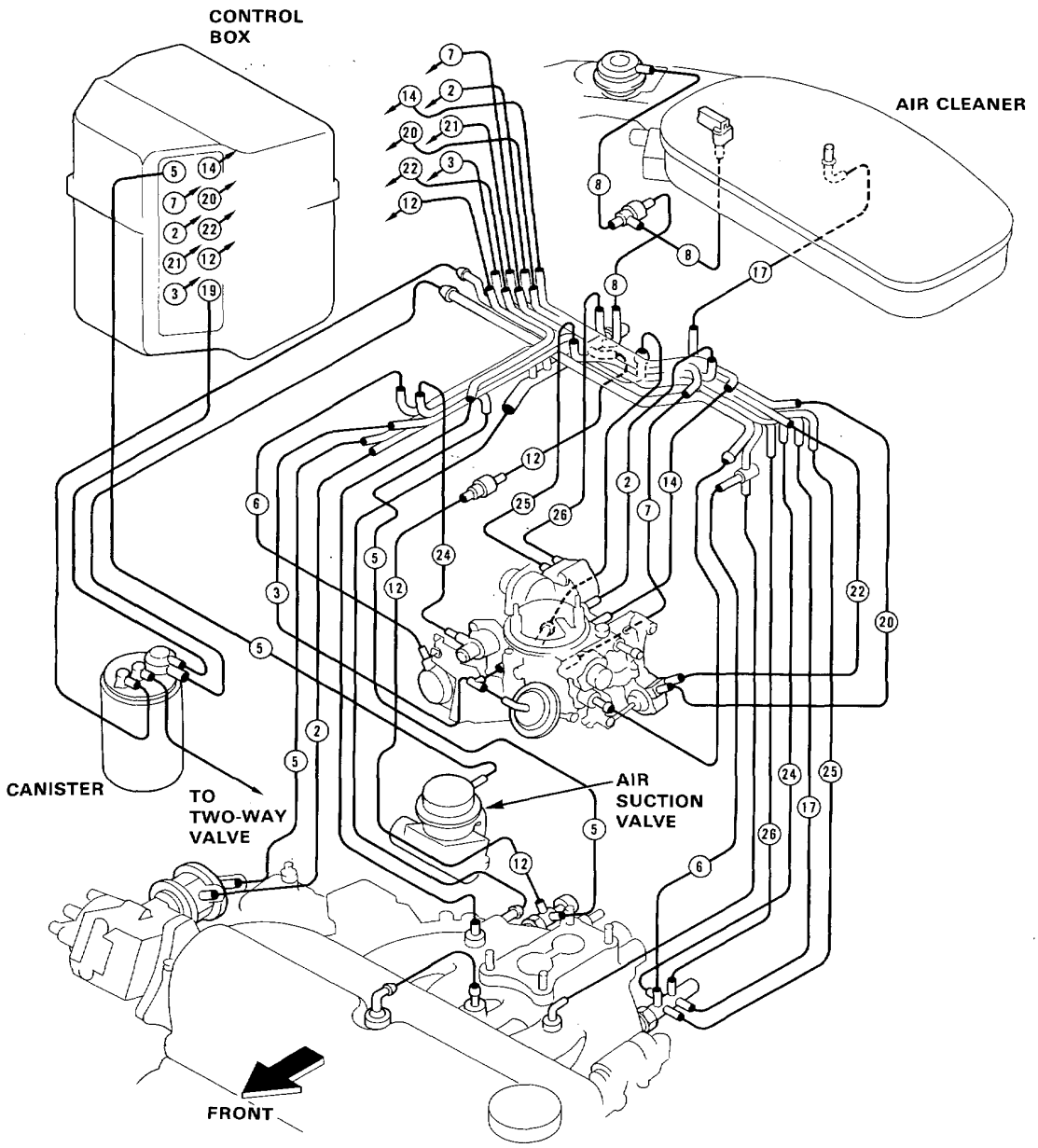
Control Box
(KX, KS, KG)



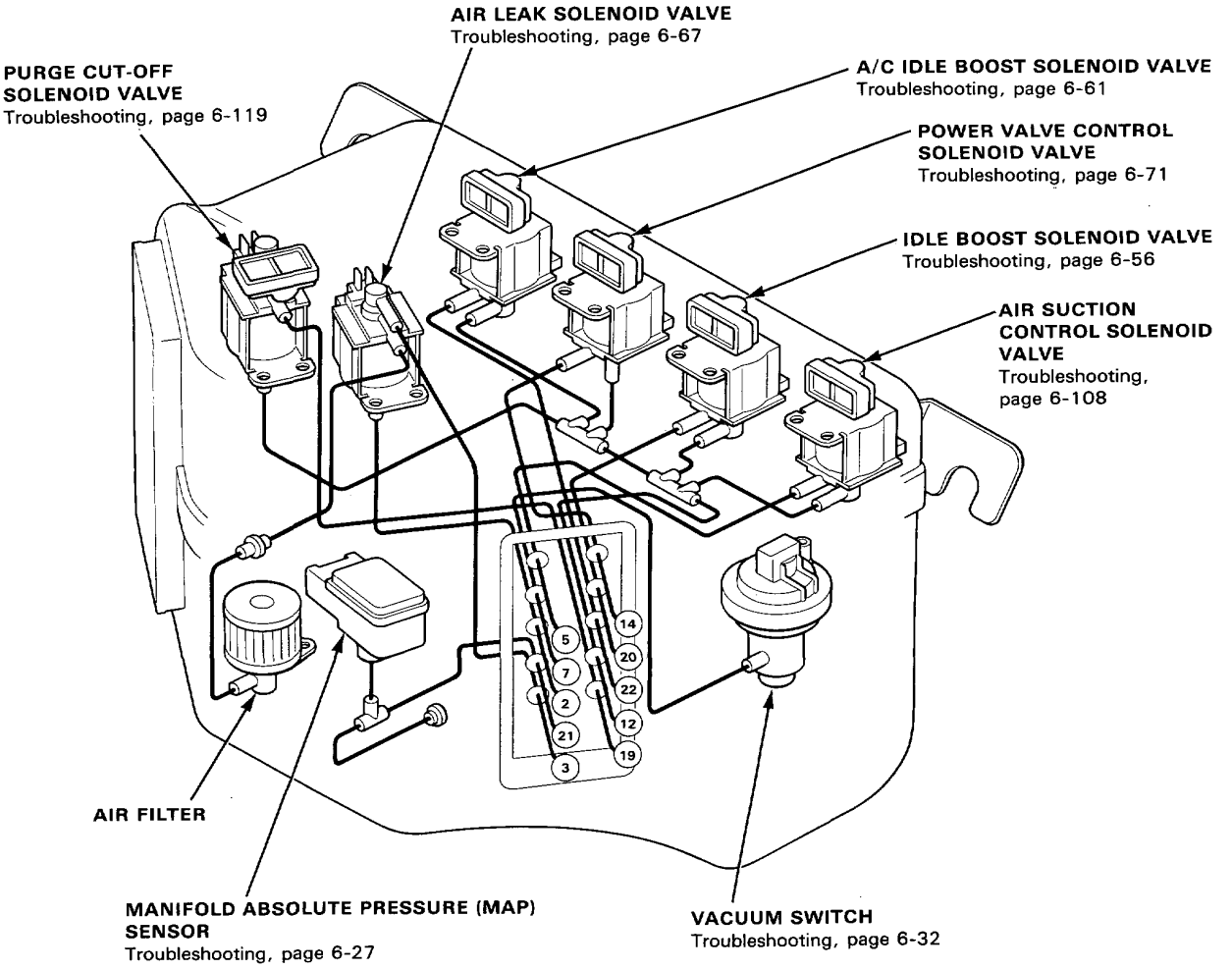
System Description

Vacuum Connections

(KΩ)



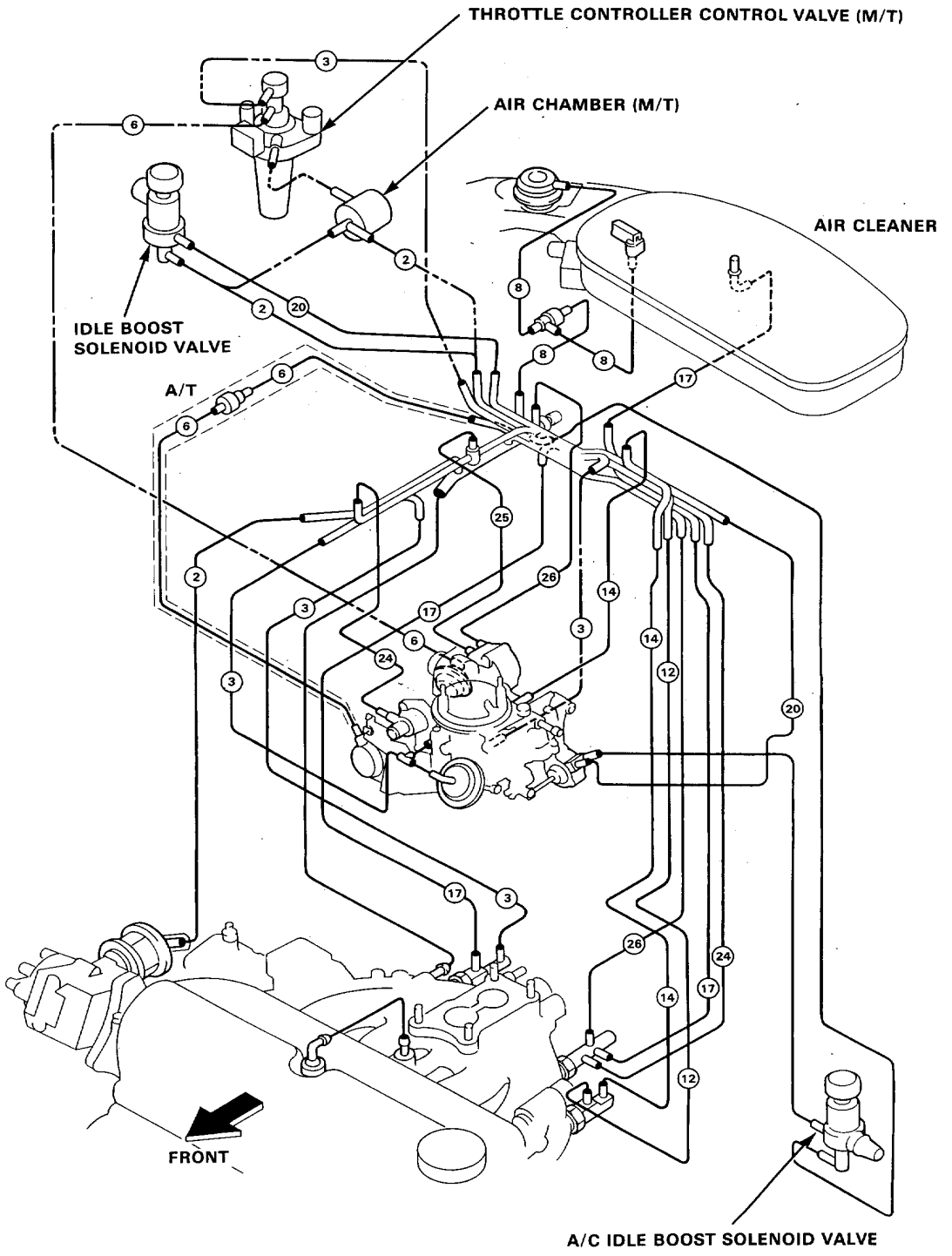
Control Box
(KQ)



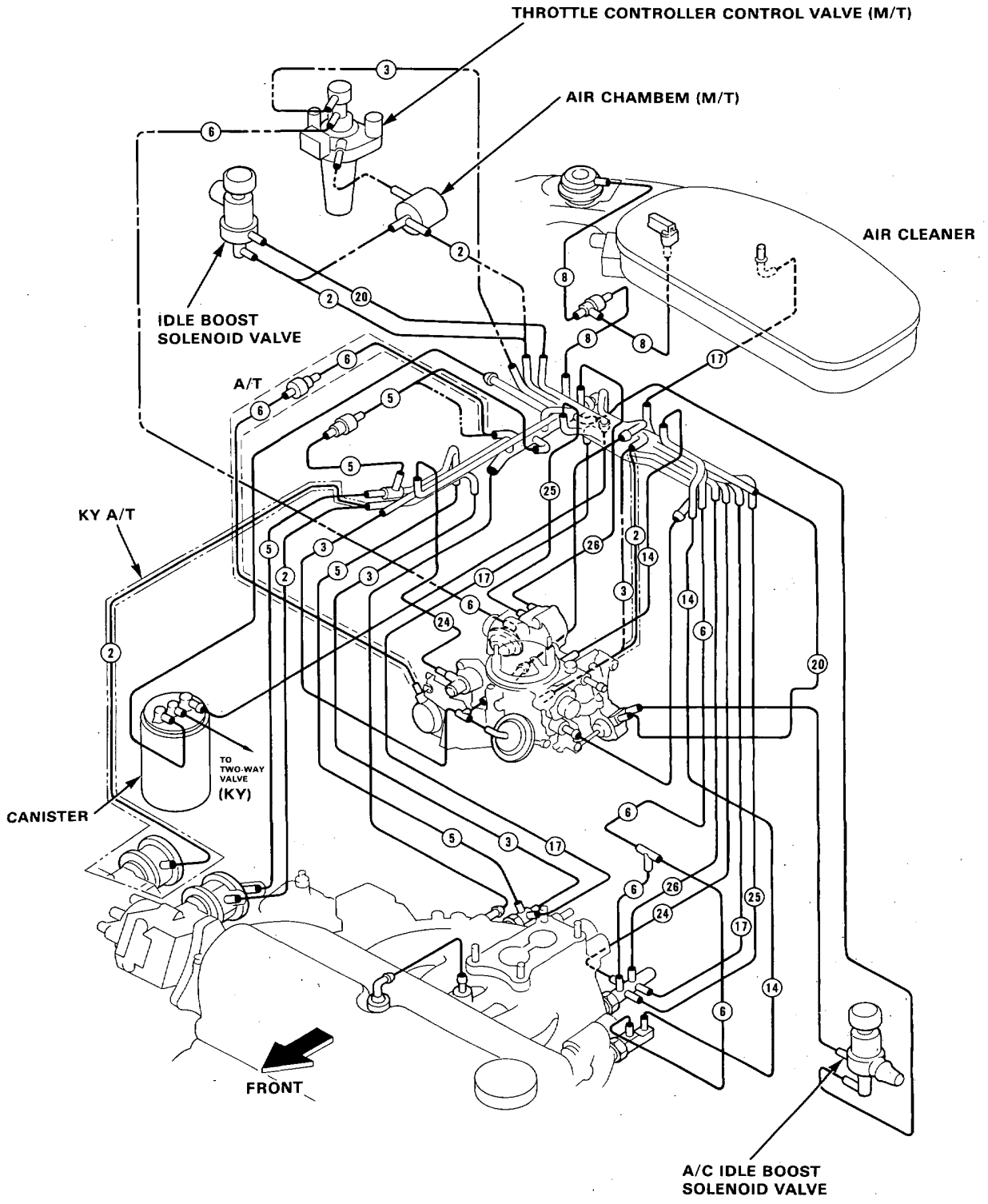
System Description

Vacuum Connection

(KT, KP)



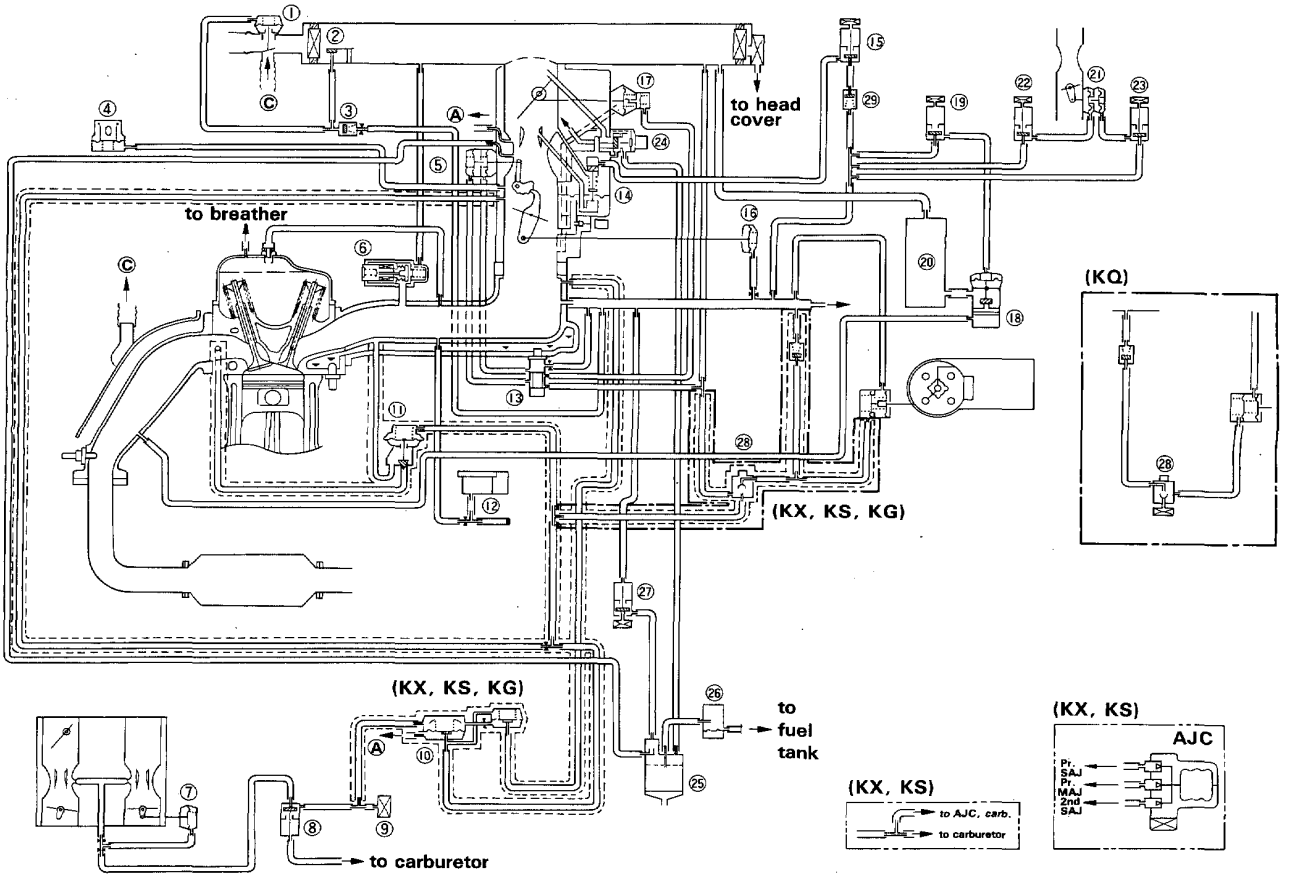
(KY, KF, KB, KE, KW)


THROTTLE CONTROLLER CONTROL VALVE (M/T)
AIR CHAMBEM (M/T)
AIR CLEANER
IDLE BOOST SOLENOID VALVE
A/T
KY A/T
TO TWO-WAY VALVE (KY)
CANISTER
FRONT
A/C IDLE BOOST SOLENOID VALVE

System Description

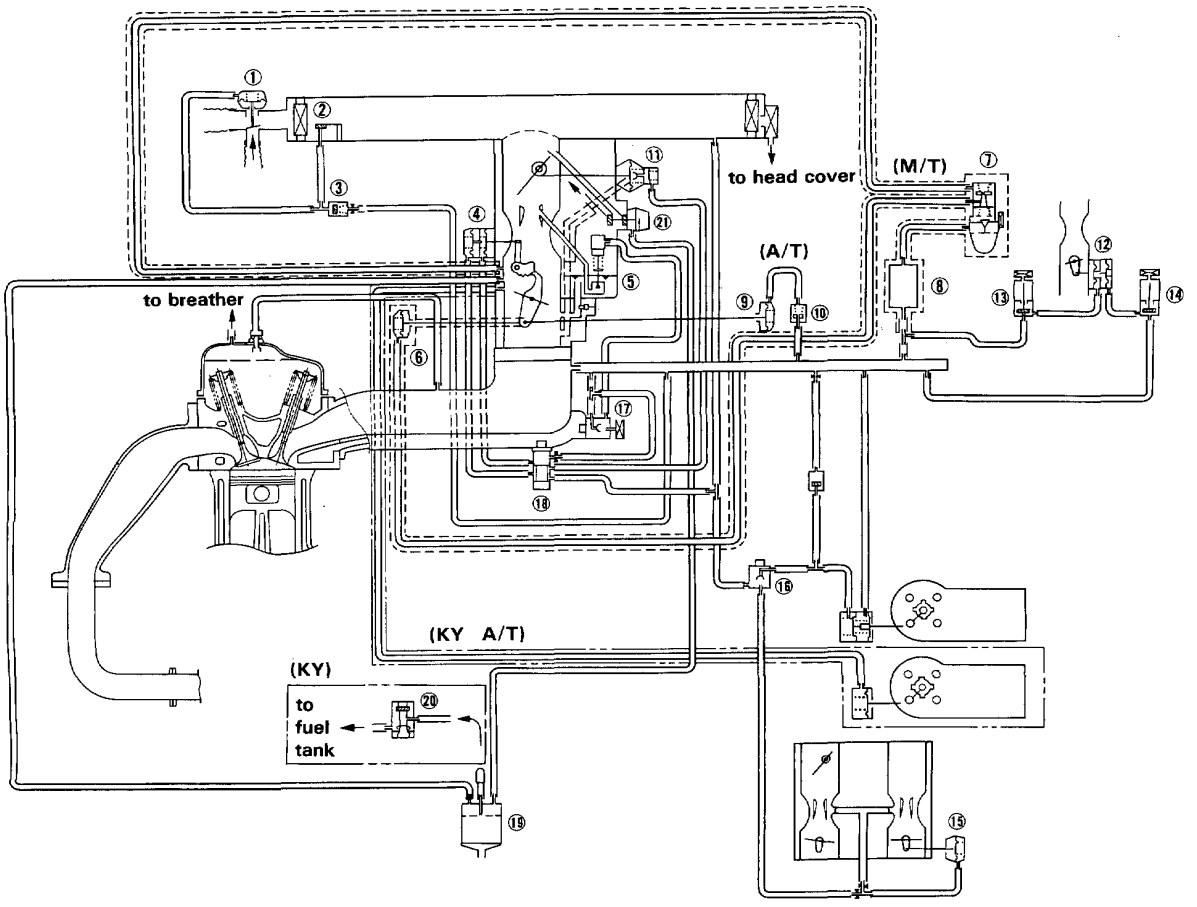
Vacuum Connections

(KX, KS, KG, KQ)



①AIR CONTROL DIAPHRAGM
②AIR BLEED VALVE
③CHECK VALVE
④VACUUM SWITCH
⑤FAST IDLE UNLOADER
⑥EACV
⑦SECONDARY DIAPHRAGM
⑧AIR LEAK SOLENOID VALVE
⑨AIR FILTER
⑩EGR CONTROL VALVE
⑪EGR VALVE
⑫MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
⑬THERMOVALVE A
⑭POWER VALVE
⑮POWER VALVE CONTROL SOLENOID VALVE
⑯THROTTLE CONTROLLER
⑰CHOKE OPENER
⑱AIR SUCTION VALVE
⑲AIR SUCTION CONTROL SOLENOID VALVE
⑳AIR CHAMBER
㉑IDLE BOOST THROTTLE CONTROLLER
㉒IDLE BOOST SOLENOID VALVE
㉓A/C IDLE BOOST SOLENOID VALVE
㉔AIR VENT CUT-OFF SOLENOID VALVE
㉕CANISTER
㉖TWO-WAY VALVE
㉗PURGE CUT-OFF SOLENOID VALVE
㉘THERMOVALVE B
㉙CHECK VALVE

(KF, KB, KE, KY, KW)

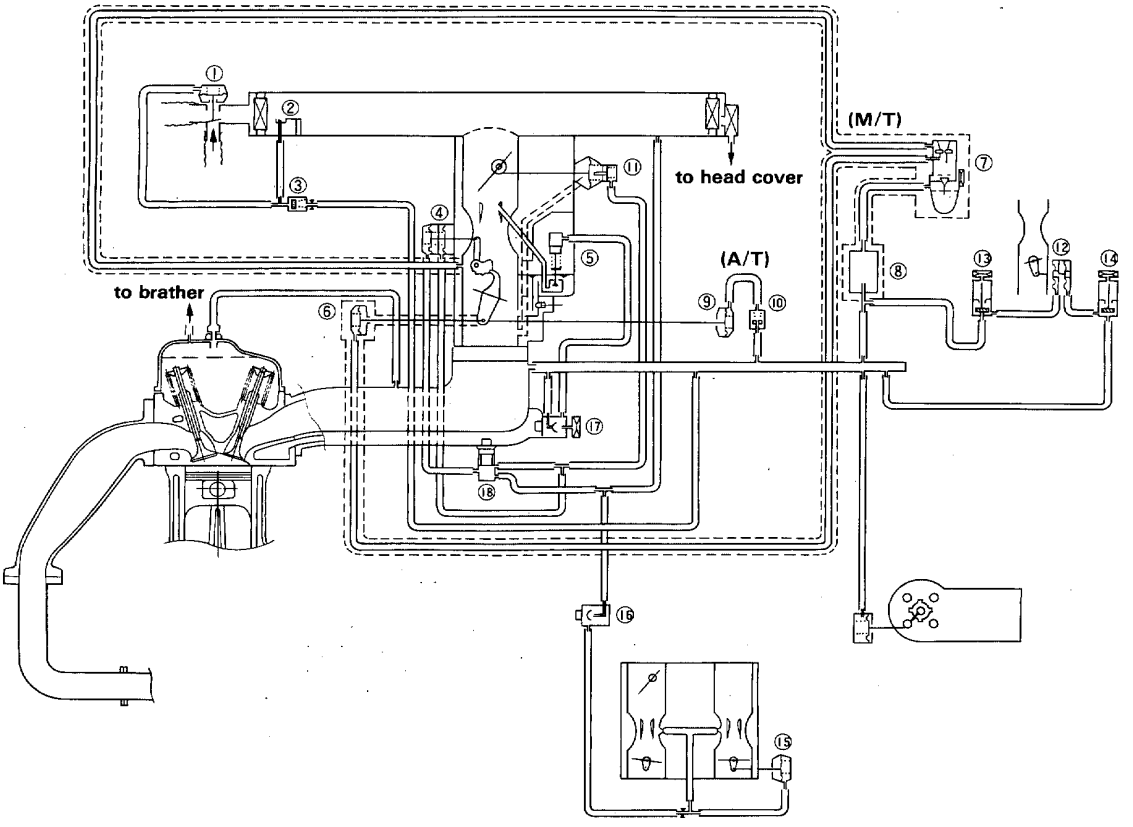


①AIR CONTROL DIAPHRAGM
②AIR BLEED VALVE
③CHECK VALVE
④FAST IDLE UNLOADER
⑤POWER VALVE
⑥THROTTLE CONTROLLER (M/T)
⑦THROTTLE CONTROLLER CONTROL VALVE (M/T)
⑧AIR CHAMBER (M/T)
⑨THROTTLE CONTROLLER (A/T)
⑩CHECK VALVE (A/T)
⑪CHOKE OPENER
⑫IDLE BOOST THROTTLE CONTROLLER
⑬IDLE BOOST SOLENOID VALVE
⑭A/C IDLE BOOST SOLENOID VALVE
⑮SECONDARY DIAPHRAGM
⑯THERMOVALVE D
⑰THERMOVALVE C
⑱THERMOVALVE A
⑲CANISTER
⑳TWO-WAY VALVE
㉑AIR VENT CUT-OFF SOLENOID VALVE

System Description

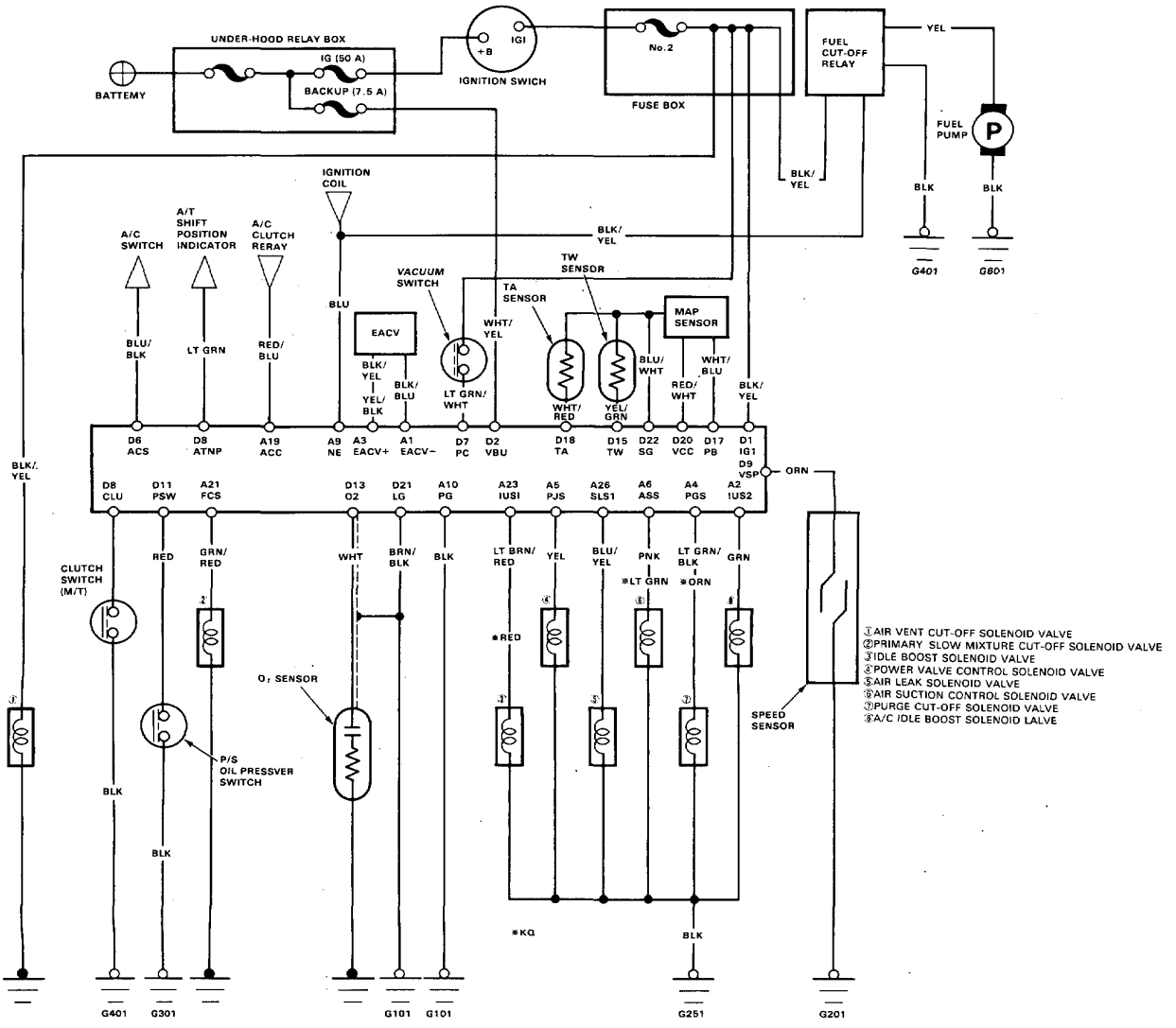
Vacuum Connections

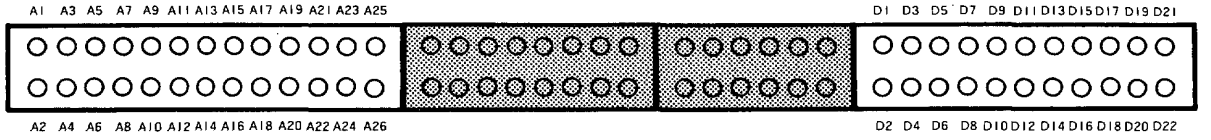
(KP, KT)



①AIR CONTROL DIAPHRAGM
②AIR BLEED VALVE
③CHECK VALVE
④FAST IDLE UNLOADER
⑤POWER VALVE
⑥THROTTLE CONTROLLER (M/T)
⑦THROTTLE CONTROLLER CONTROL VALVE (M/T)
⑧AIR CHAMBER (M/T)
⑨THROTTLE CONTROLLER (A/T)
⑩CHECK VALVE (A/T)
⑪CHOKE OPENER
⑫IDLE BOOST THROTTLE CONTROLLER
⑬IDLE BOOST SOLENOID VALVE
⑭A/C IDLE BOOST SOLENOID VALVE
⑮SECONDARY DIAPHRAGM
⑯THERMOVALVE D
⑰THERMOVALVE C
⑱THERMOVALVE A

(KX, KS, KG, KQ)



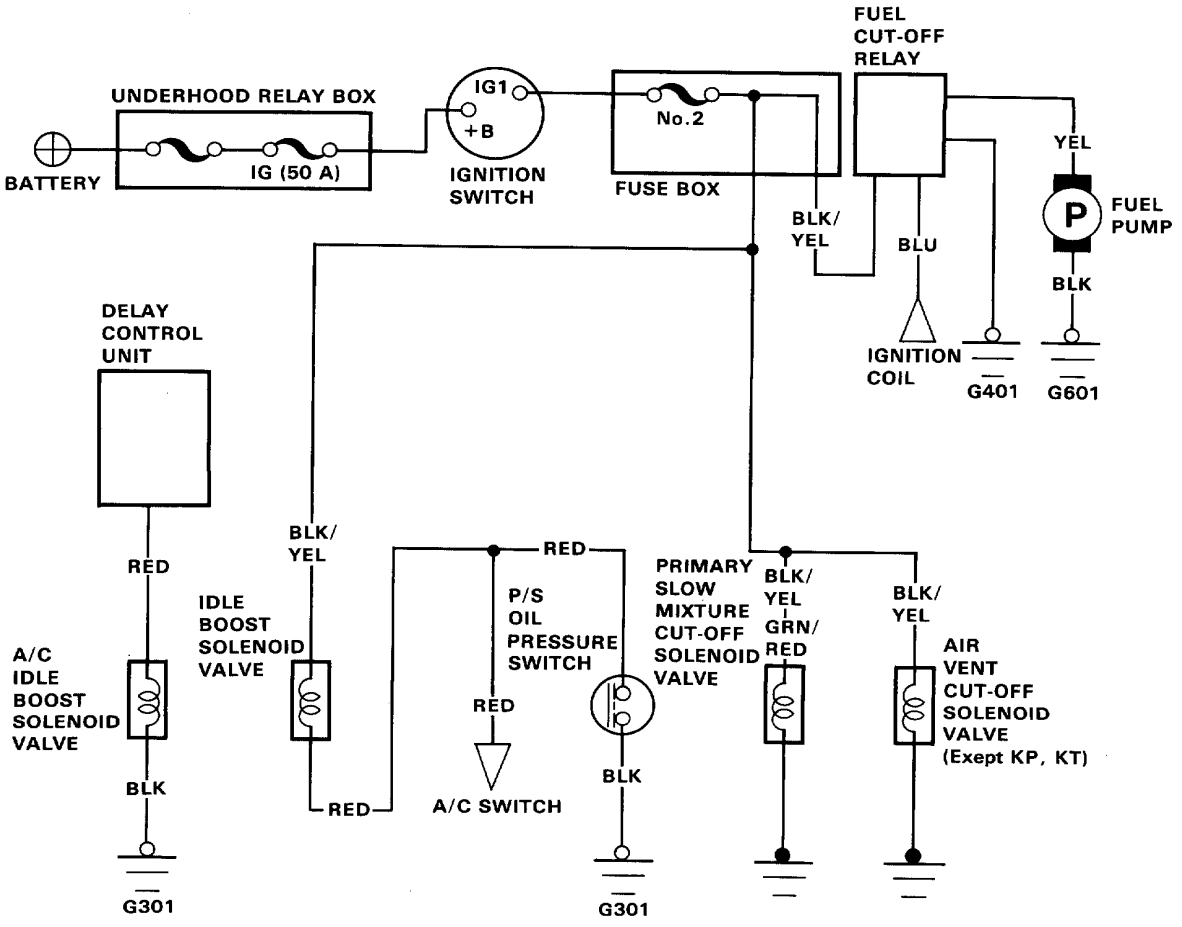


TERMINAL LOCATION

System Description

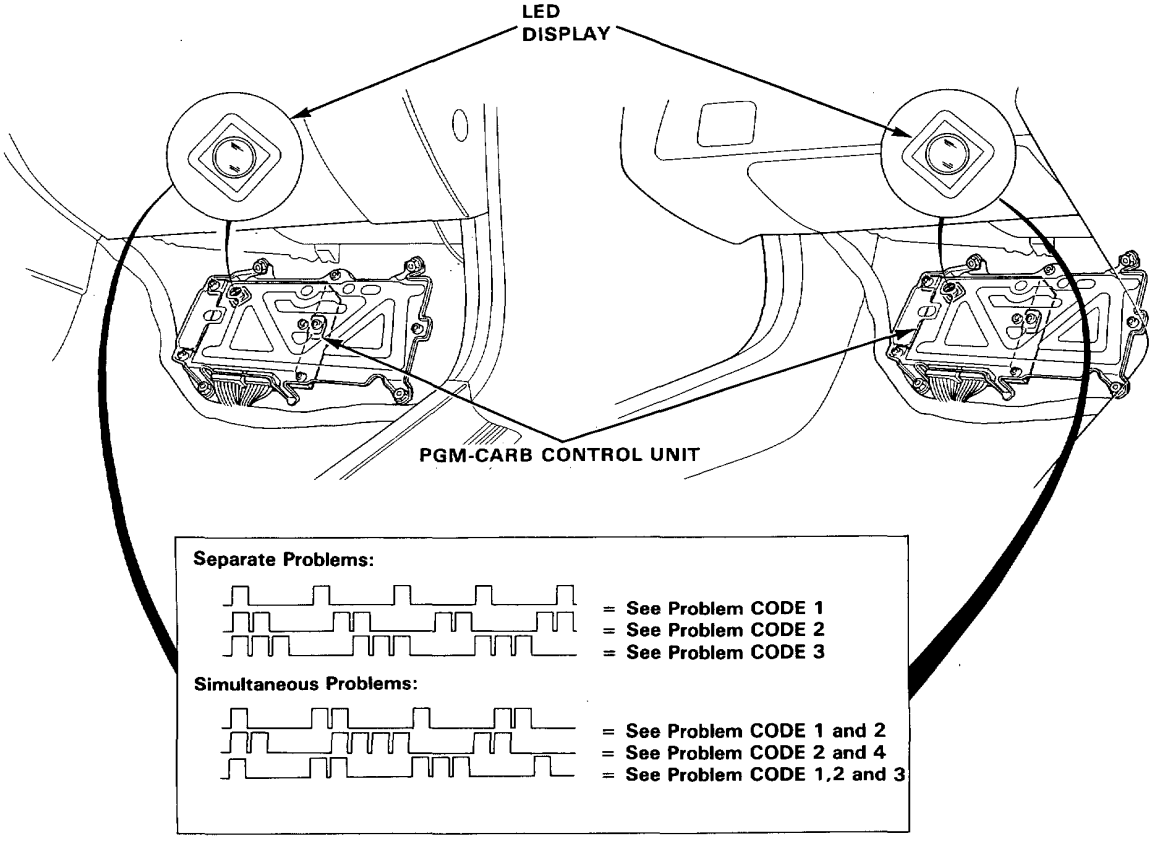
Electrical Connections

(Except KX, KS, KG, KQ)



Self-Diagnostic Procedure

Turn the ignition on, pull down the passenger's side carpet from under the dashboard and observe the LED on the top of the control unit. The LED indicates a system failure code by its blinking frequency.
The control unit LED can indicate any number of simultaneous component problems by blinking separate codes, one after another.



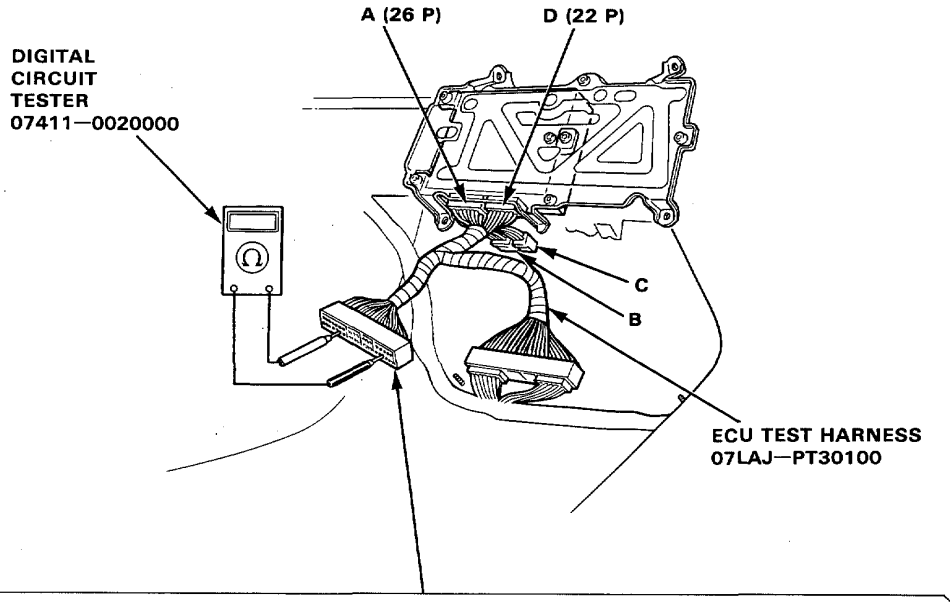
SELF-DIAGNOSIS INDICATOR BLINKS	SYSTEM INDICATED	PAGE
1	OXYGEN CONTENT	6—24
2	VEHICLE SPEED PULSER	6—26
3	MANIFOLD ABSOLUTE PRESSURE	6—27
4	VACUUM SWITCH SIGNAL	6—32
5	MANIFOLD ABSOLUTE PRESSURE	6—29
6	COOLANT TEMPERATURE	6—36
8	IGNITION COIL SIGNAL	6—38
10	INTAKE AIR TEMPERATURE	6—39
14	ELECTRONIC AIR CONTROL	6—105

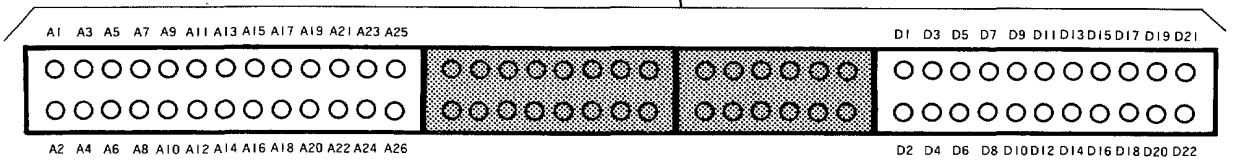
If CODE 7, 9, 11, 12, 13 (or more than 14), count the number of blinks again; if the indicator is in fact blinking these codes, substitute a known-good control unit and recheck. If the indication goes away, replace the original control unit. The control unit LED may come on, indicating a system problem, when, in fact, there is a poor or intermittent electrical connection. First, check the electrical connections, clean or repair connections if necessary.

(cont'd)

Self-Diagnostic Procedure (cont'd)

If the inspection for a particular code requires the ECU test harness, remove the door sill molding, the small cover on the kick panel, and pull the carpet back to expose the control unit. Unbolt the control unit bracket. Remove the control unit from the bracket. Connect the ECU test harness. Then check the system according to the procedure described for the appropriate code (s) listed on the following pages.

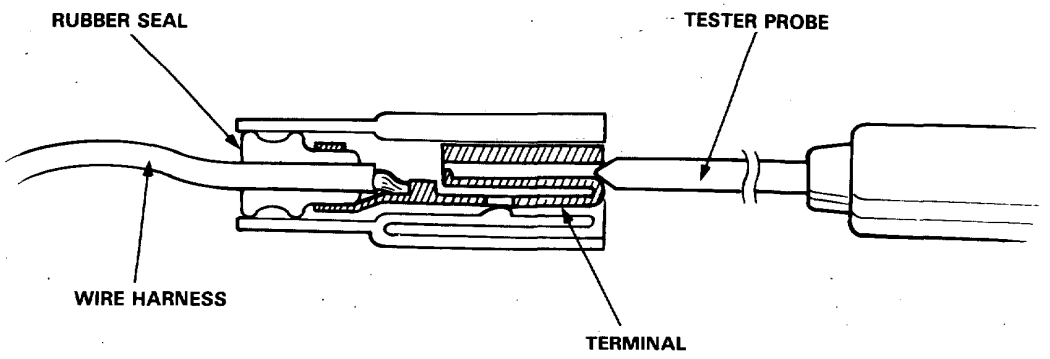




TERMINAL LOCATION

CAUTION:

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



How to Read Flow Charts

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

START (bold type)	Describes the conditions or situation to start a troubleshooting flow chart.
ACTION	Asks you to do something; perform a test, set up a condition, etc.
DECISION	Asks you about the result of an action by giving an "answer" and asking did you get the same answer: Yes or No.
STOP (bold type)	The end of a series of actions and decisions, describes a final repair action and sometimes directs you to an earlier part of the flow to confirm your repair.

NOTE:

- The term "Intermittent Failure" is used several times in these charts. It simply means a system may have had a failure, but it checks out OK through all your tests. You may need to road test the car to reproduce the failure or if the problem was a loose connection, you may have unknowingly solved it while doing the tests.
- "Open" and "Short" are common electrical terms. An open is a break in a wire or at a connection. A short is an accidental connection of a wire to ground. In simple electronics, this usually means something won't work at all. In complex electronics (like electronic control units), this can sometimes mean something works, but not the way it's supposed to.
- If the electrical readings are not as specified when using the ECU test harness, check the test harness connections before proceeding.

Symptom-to System Chart

(KX, KS, KG, KQ)

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

PAGE / SYSTEM / SYMPTOM		PGM-CARB CONTROL SYSTEM						
		PGM-CARB CONTROL UNIT	OXYGEN SENSOR	VEHICLE SPEED PULSER	MANIFOLD ABSOLUTE PRESSURE SENSOR	VACUUM SWITCH	COOLANT TEMPERATURE SENSOR	IGNITION COIL SIGNAL
		41	24	26	27, 29	32	36	38
SELF-DIAGNOSIS INDICATOR (LED) BLINKS		⓪ or ✱	①	②	③ or ⑤	④	⑥	⑧
ENGINE WON'T START								
DIFFICULT TO START ENGINE WHEN COLD		(BU)						
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFIC	(BU)						
	ROUGH IDLE	(BU)	③		②			
	WHEN WARM ENGINE SPEED TOO HIGH	(BU)						
	WHEN WARM ENGINE SPEED TOO LOW	(BU)						
FREQUENT STALLING	WHILE WARMING UP	(BU)			②		③	
	AFTER WARMING UP	(BU)			②			
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	(BU)	③	③	②			
	FAILS EMISSION TEST	(BU)	②		①			
	LOSS OF POWER	(BU)			③			

* CODE 7, 9, 11, 12, 13, or exceeds 14: count the number of blinks again. If the indicator is in fact blinking these codes, substitute a known-good control unit and recheck. If the indication goes away, replace the original ECU.

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

PGM-CARB CONTROL SYSTEM					CARBURETOR	FUEL SUPPLY	AIR INTAKE	EMISSION CONTROL	
INTAKE AIR TEMPERATURE SENSOR	A/T SHIFT POSITION SIGNAL	CLUTCH SWITCH SIGNAL	P/S OIL PRESSURE SWITCH	A/C SIGNAL				ELECTRONIC AIR CONTROL VALVE	OTHER EMISSION CONTROL
39	42	44	46	48	50	93	98	105	101
⑩								⑭	
					②	①			
					①				
③					①				③
③					①			③	③
			③	③	①				
					①				
					①			③	
					①			①	
					①	②			
					②		③	③	③
					③	②	①		②

Troubleshooting Flow Chart — Oxygen Sensor

① Self-diagnosis LED blinks once: A problem in the Oxygen (O_2) Sensor circuit.

LED indicates CODE 1.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset control unit.

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

Does LED indicate CODE 1 ? — NO → **Intermittent failure (test drive may be necessary).**

YES

Inspect fuel pressure at the fuel filter.

Is pressure as specified ? — NO → **Repair fuel supply system (page 6-93).**

YES

Disconnect wire harness from indicated O_2 sensor.

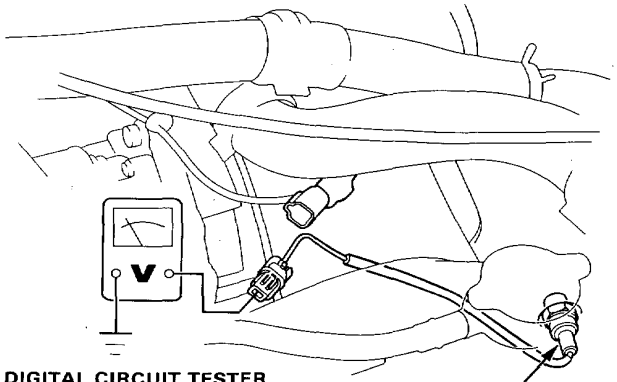
Warm up engine to normal operating temperature again, then open the throttle wide open then close it.

Measure voltage between the connector terminal and body ground.

Is voltage above 0.6 V at wide open throttle and below 0.4 V when the throttle is quickly released ? — NO → **Replace O_2 sensor.**

YES

(To page 6-25)



DIGITAL CIRCUIT TESTER
07411—002000

O_2 SENSOR
45 N·m (4.5 kg-m, 33 lb-ft)

(From page 6-24)

Stop engine.

Reconnect O_2 sensor.

Connect the ECU test harness between the control unit and connector (page 6-20).

Restart and warm up engine to normal operating temperature, then open the throttle wide open then close it.

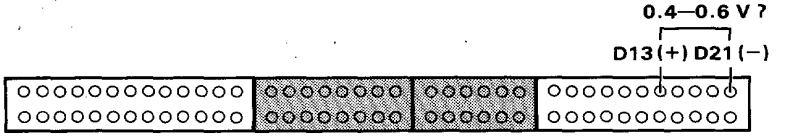
Measure voltage between D13 (+) terminal and D21 (−) terminal.

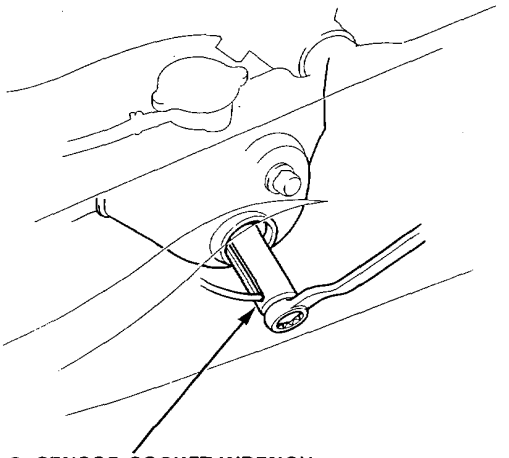
Is voltage above 0.6 V at wide open throttle and below 0.4 V when the throttle is quickly released ?

NO → **Repair open or short in WHT wire between control unit (D13) and the O_2 sensor.**

YES

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





O_2 SENSOR SOCKET WRENCH
07LAA—PT50100
45 N·m (4.5 kg-m, 33 lb-ft)

Troubleshooting Flow Chart — Vehicle Speed Sensor

(2) Self-diagnosis LED indicator blinks two times: A problem in the Vehicle Speed circuit.

LED indicates CODE 2.

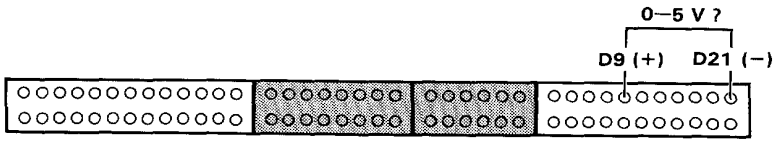
Connect the ECU test harness between the control unit and connector (page 6-20).

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

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

Turn the ignition switch ON.

Slowly rotate front wheel and measure voltage between D9 (+) terminal and D21 (−) terminal.



Does voltage pulse 0 V and 5 V ?

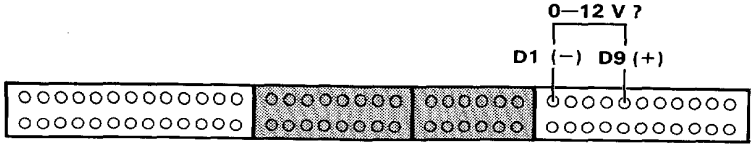
NO

Turn the ignition switch OFF.

Disconnect D connector from the control unit only, not the wire harness.

Turn the ignition switch ON.

Slowly rotate front wheel and measure voltage between D1 (−) terminal and D9 (+) terminal.



Does voltage pulse 0 V and 12 V ?

NO

—Repair open or short in ORN wire between control unit (D9) and the speed sensor.
—Faulty speed sensor.

YES

Substitute a known-good control unit and recheck. If prescribed voltage is now available replace the original control unit.

YES

Substitute a known-good control unit and recheck. If prescribed voltage in now available replace the original control unit.

Troubleshooting Flow Chart —— MAP Sensor

③ Self-diagnosis LED indicator blinks three times: Most likely an electrical problem in the Manifold Absolute Pressure (MAP) Sensor system.

⑤ Self-diagnosis LED indicator blinks five times: Most likely a mechanical problem (broken hose) in the Manifold Absolute Pressure (MAP) Sensor system.

③

—**Engine is warm and running.**
—**LED indicates CODE 3.**

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset control unit.

Start the engine and allow to idle.

Does LED indicate CODE 3 ? NO → **Intermittent failure (test drive may be necessary).**

YES

Turn the ignition switch OFF.

Connect the test harness between the MAP sensor and wire harness.

Turn the ignition switch ON.

Measure voltage between RED (+) terminal and GRN (−) terminal.

Is there approx. 5 V ? NO → Measure voltage between RED (+) terminal and body ground.

YES

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

(To page 6-28)

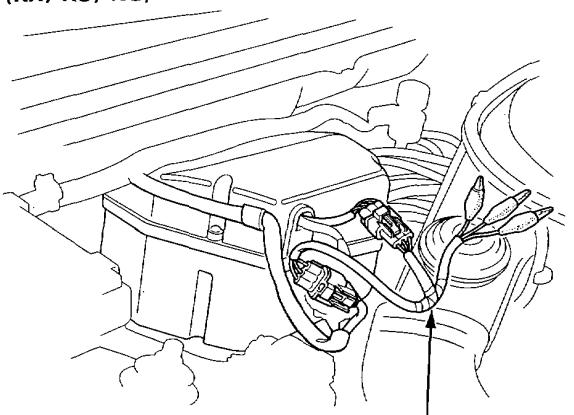
Is there approx. 5 V ? YES → **Repair open in BLU/WHT wire between control unit (D22) and MAP sensor.**

NO

Turn the ignition switch OFF.

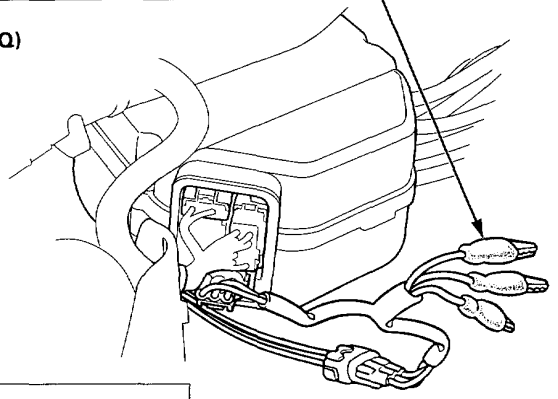
(To page 6-28)

(KX, KS, KG)



TEST HARNESS 07LAJ—PT30200

(KQ)



(cont'd)

Troubleshooting Flow Chart — MAP Sensor (cont'd)

(From page 6-27)

Is there approx. 3 V ?

NO

- **Replace MAP sensor.**
- **Repair short in WHT/BLU wire between control unit (D17) and MAP sensor.**

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the control unit and connector (page 6-20).

Turn the ignition switch ON.

Measure voltage between D17 (+) terminal and D22 (−) terminal.

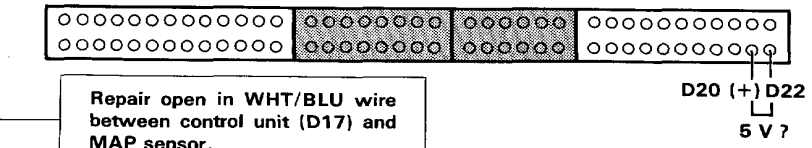
Is there approx. 3 V ?

NO

Repair open in WHT/BLU wire between control unit (D17) and MAP sensor.

YES

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



(From page 6-27)

Connect the ECU test harness between the control unit and connector (page 6-20).

Measure voltage between D20 (+) terminal and D22 (−) terminal with the ignition switch on.

Is there approx. 5 V ?

YES

Repair open in RED/WHT wire between control unit (D20) and MAP sensor.

NO

Substitute a known-good control unit and recheck. If prescribed voltage is now available, replace the original control unit.



⑤

LED indicates CODE 5.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset control unit.

Start engine and keep engine speed at idle.

Does LED indicate CODE 5 ? NO → **Intermittent failure (test drive may be necessary).**

YES

Stop engine.

Remove #21 hose from the vacuum hose manifold and connect a T-fitting from a vacuum gauge between the vacuum hose manifold and the MAP sensor.

Start engine.

Is there vacuum ? NO → **Repair as necessary.**

YES

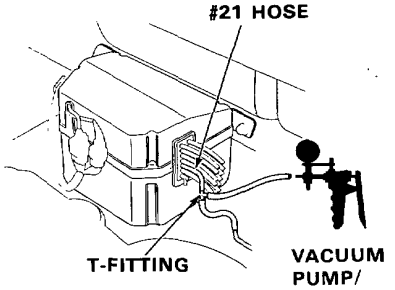
Connect a vacuum pump to #21 hose and apply vacuum.

Does it hold vacuum ? NO → **Replace #21 hose.**

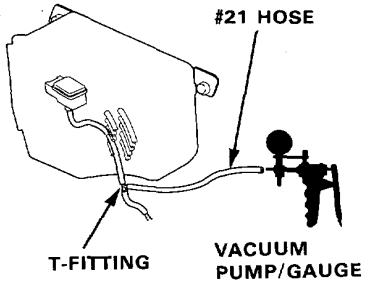
YES

(To page 6-30)

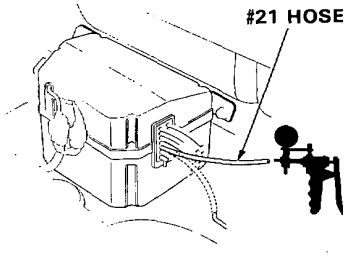
(KX, KS, KG)



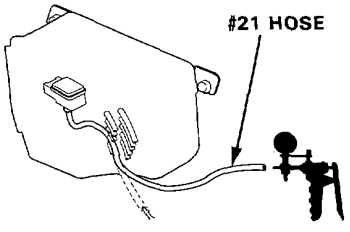
(KQ)



(KX, KS, KG)



(KQ)



(cont'd)

Troubleshooting Flow Chart —— MAP Sensor (cont'd)

(From page 6-29)

Stop engine.

Connect the test harness between the MAP sensor and wire harness.

Turn the ignition switch ON.

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

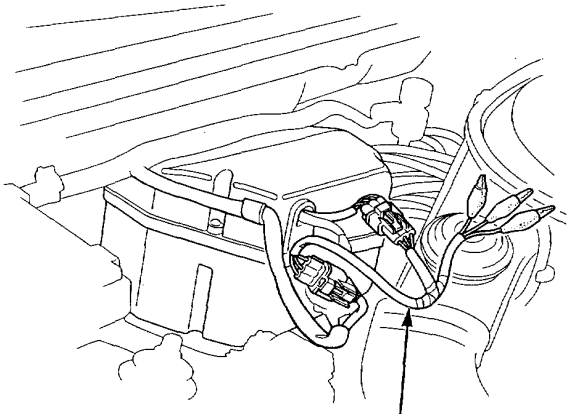
Is there approx. 3 V ?

NO → **Replace MAP sensor.**

YES

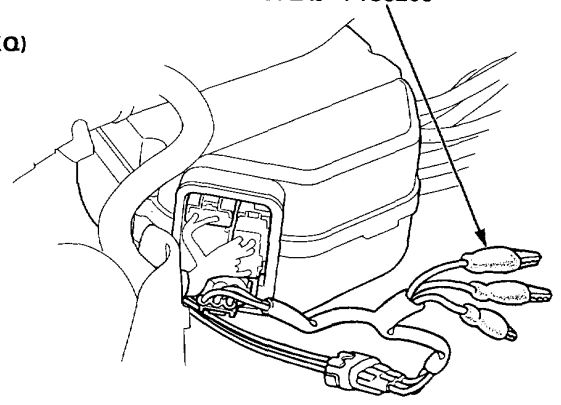
Substitute a known-good control unit and recheck. If symptom/ indication goes away, replace the original control unit.

(KX, KS, KG)



TEST HARNESS
07LAJ—PT30200

(KQ)



④ Self-diagnosis LED indicator blinks four times: A problem in the vacuum switch.

—Engine is warm running.
—LED indicates CODE 4.

Turn the ignition switch OFF.

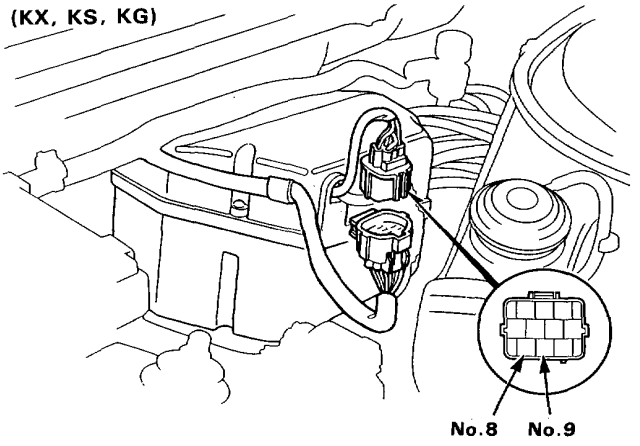
Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset control unit.

KX, KS, KG:
Disconnect the 10P connector on the control box.
KQ:
Disconnect the 2P connector on the control box.

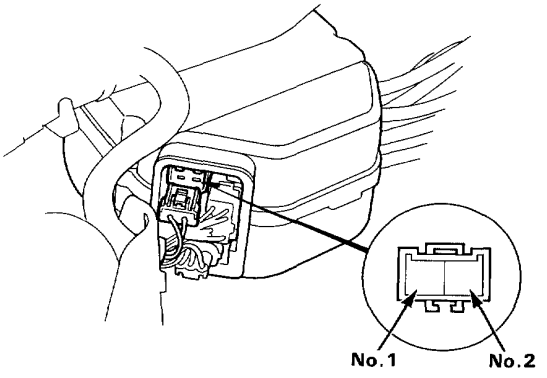
KX, KS, KG:
Measure resistance between No.8 terminal and No.9 terminal on the control box.
KQ:
Measure resistance between No.1 terminal and No.2 terminal on the control box.

(To page 6-33)

(KX, KS, KG)



(KQ)



(From page 6-32)

Does continuity exist ?

YES → Remove #7 hose from the vacuum hose manifold and connect a T-fitting from a vacuum gauge between the vacuum hose manifold and the vacuum switch.

NO

Turn the ignition switch ON.

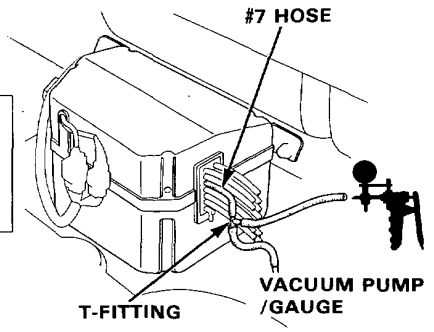
Measure voltage between BLK/YEL terminal and body ground on the wire harness.

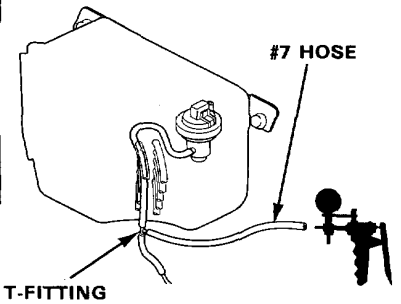
Is there more than 30 mmHg of vacuum ?

NO → —Replace vacuum switch.
—Repair open BLK/YEL or WHT wire in the control box.

YES → Check routing of #7 hose.

(KX, KS, KG)





Is there battery voltage ?

NO → Repair open in BLK/YEL wire between connector and No.2 fuse.

YES

Turn the ignition switch OFF.

Reconnect the connector to the control box.

Connect the ECU test harness between the control unit and connector (page 6-20).

Turn the ignition switch ON.

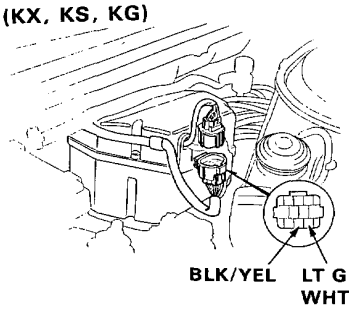
Remove #7 hose from the vacuum hose manifold and connect a vacuum pump.

Apply vacuum.

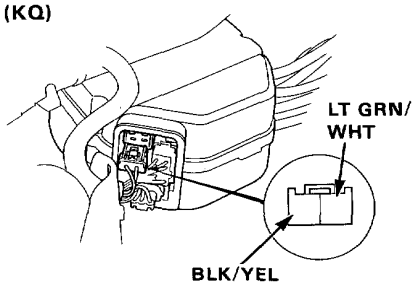
Measure voltage between D7 (+) terminal and D21 (−) terminal.

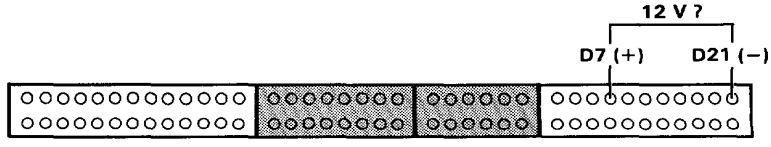
(To page 6-34)

(KX, KS, KG)



(KQ)

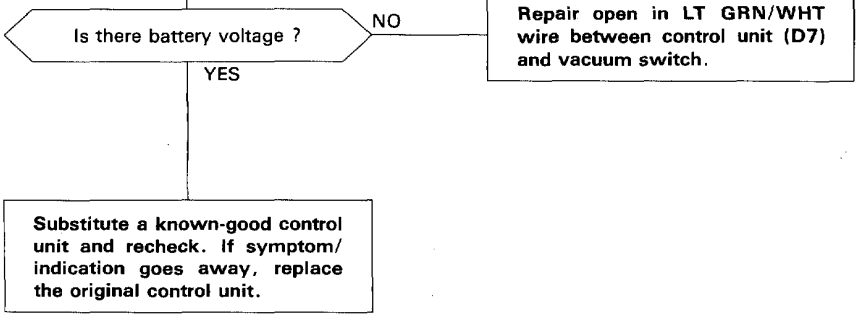




(cont'd)

Troubleshooting Flow Chart —— Vacuum Switch (cont'd)

(From page 6-33)



Troubleshooting Flow Chart — TW Sensor

⑥ Self-diagnosis LED indicator blinks six times: Most likely a problem in the Coolant Temperature (TW) Sensor circuit.

LED indicates CODE 6.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset control unit.

Turn the ignition switch ON.

Does LED indicates CODE 6 ?

NO → **Intermittent failure (test drive may be necessary).**

YES

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

Disconnect the 2P connector on the TW sensor.

Measure resistance between the 2 terminals on the TW sensor.

Is there 200–400 Ω ?

NO → **Replace TW sensor.**

YES

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

Is there approx. 5 V ?

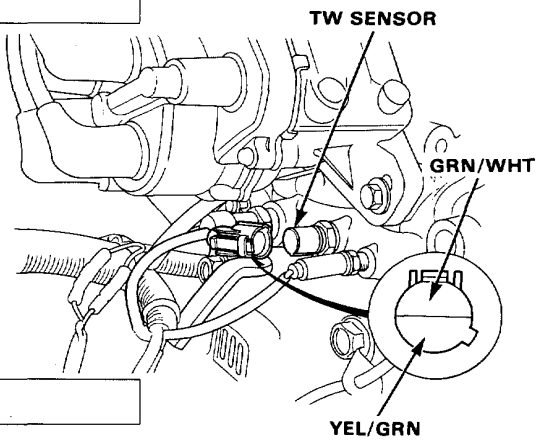
NO → Turn the ignition switch OFF.

Connect the ECU test harness between the control unit and connector (page 6-20).

(To page 6-37)

YES

(To page 6-37)



(From page 6-36)

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

Is there approx. 5 V ?

NO → **Repair open in BLU/WHT wire between control unit (D22) and TW sensor.**

YES

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

(From page 6-36)

Turn the ignition switch ON.

Measure voltage between D15 (+) terminal and D22 (−) terminal.

Is there approx. 5 V ?

YES → **Repair open in YEL/GRN wire between control unit (D15) and TW sensor.**

NO

Disconnect D connector from the wire harness only, not the control unit.

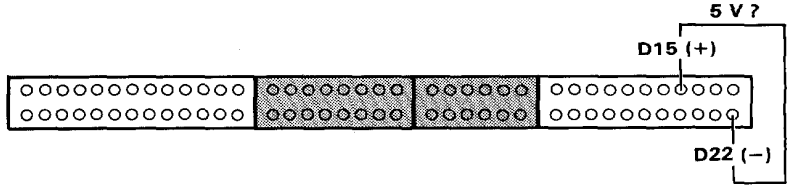
Measure voltage between D15 (+) terminal and D22 (−) terminal.

Is there approx. 5 V ?

YES → **Repair short in YEL/GRN wire between control unit (D15) and TW sensor.**

NO

Substitute a known-good control unit and recheck. If prescribed voltage is now available, replace the original control unit.



Troubleshooting Flow Chart — Ignition Coil Signal

(8) Self-diagnosis LED indicator blinks eight times: A problem in the ignition coil signal circuit.

LED indicates CODE 8.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset control unit.

Turn the ignition switch ON.

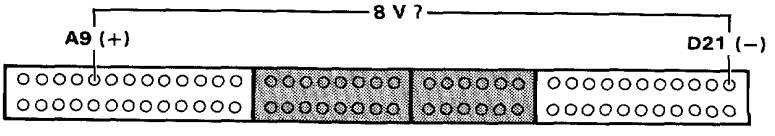
Does LED indicates CODE 8 ?

NO — **Intermittent failure (test drive may be necessary).**

YES

Start the engine.

Connect the ECU test harness between the control unit and connector (page 6-20).



Measure voltage between A9 (+) terminal and D21 (−) terminal.

Is voltage above approx. 8 V ?

NO — **Repair short or open BLU wire between control unit (A9) and ignition coil.**

YES

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

Troubleshooting Flow Chart — TA Sensor

⑩ Self-diagnosis LED indicator blinks ten times: Most likely a problem in the Intake Air Temperature (TA) Sensor circuit.

LED indicates CODE 10.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset control unit.

Turn the ignition switch ON.

Does LED indicates CODE 10 ?

NO — **Intermittent failure (test drive may be necessary).**

YES

Disconnect the 2P connector on the TA sensor.

Measure resistance between the 2 terminals on the TA sensor.

Is there 1—4 kΩ ?

NO — **Replace TA sensor.**

YES

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

Is there approx. 5 V ?

NO — Turn the ignition switch OFF.

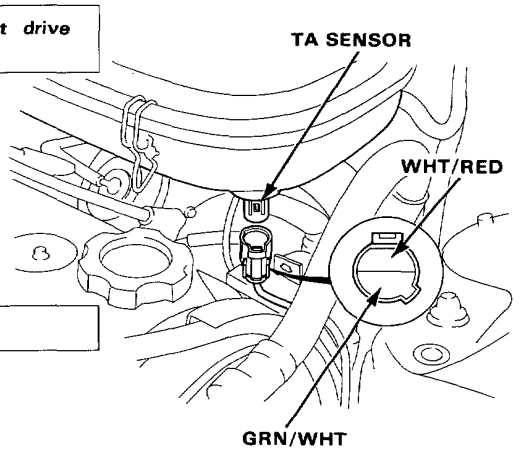
YES

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

Connect the ECU test harness between the control unit and connector (page 6-20).

(To page 6-40)

(To page 6-40)



(cont'd)

Troubleshooting Flow Chart — TA Sensor (cont'd)

(From page 6-39)

Is there approx. 5 V ?

NO → **Repair open in BLU/WHT wire between control unit (D22) and TA sensor.**

YES → **Substitute a known-good control unit and recheck. If symptom/indication goes away, replace the original control unit.**

(From page 6-39)

Turn the ignition switch ON.

Measure voltage between D18 (+) terminal and D22 (−) terminal.

Is there approx. 5 V ?

YES → **Repair open in WHT/RED wire between control unit (D18) and TA sensor.**

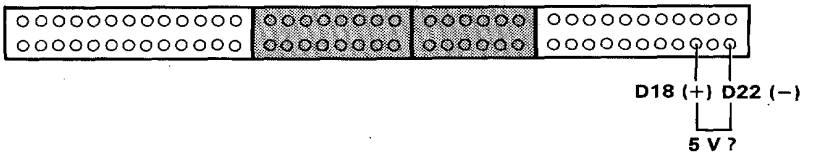
NO → Disconnect D connector from the wire harness only, not the control unit.

Measure voltage between D18 (+) terminal and D22 (−) terminal.

Is there approx. 5 V ?

YES → **Repair short in WHT/RED wire between control unit (D18) and TA sensor.**

NO → **Substitute a known-good control unit and recheck. If prescribed voltage is now available, replace the original control unit.**

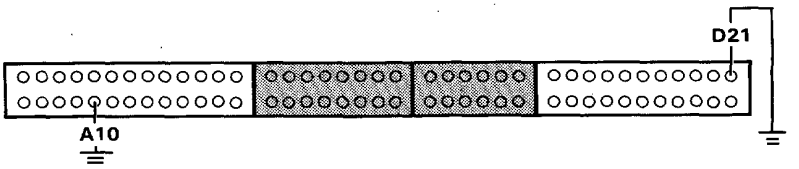


Input Troubleshooting Flow Chart — Power Source (IG1, Bat) and Ground

Inspection of Power Source (IG1, Bat) and Ground.

Connect the ECU test harness between the control unit and connector (page 6-20).

Check for continuity between the body ground and the following terminals individually: ●A10, ● D21.



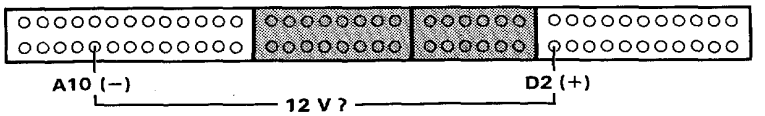
Does continuity exist ?

NO

- **Repair open in BRN/BLK wire between control unit (D21) and G101.**
- **Repair open in BLK wire between control unit (A10) and G101.**

YES

Measure voltage between D2 (+) terminal and A10 (−) terminal.



Is there battery voltage ?

NO

Inspect BACK UP fuse.

YES

Turn the ignition switch ON.

Is BACK UP fuse OK ?

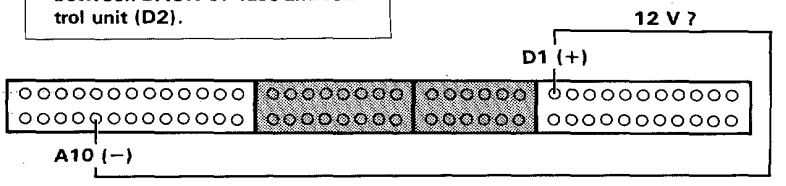
NO

Replace fuse.

YES

Repair open in WHT/YEL wire between BACK UP fuse and control unit (D2).

Measure voltage between D1 (+) terminal and A10 (−) terminal.



Is there battery voltage ?

NO

Turn the ignition switch OFF.

YES

Inspect No.2 fuse.

Power Source (IG1, Bat) and Ground are OK.

Is No.2 fuse OK ?

NO

Replace fuse.

YES

Repair open in BLK/YEL wire between No.2 fuse and control unit (D1).

Input Troubleshooting Flow Chart — A/T Shift Position Signal (A/T only)

Inspection of A/T Shift Position Signal.

Turn the ignition switch ON.

Observe the A/T shift indicator and select each position separately.

Does the indicator light properly ?

NO → **See A/T shift position indicator inspection (section 16).**

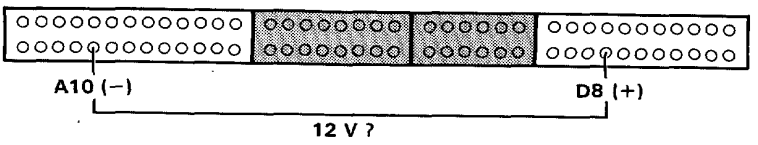
YES

Turn the ignition switch OFF.

Connect the ECU test harness between the control unit and connector. But disconnect D connector from the wire harness only, not the control unit (page 6-20).

Turn the ignition switch ON.

Measure voltage between D8 (+) terminal and A10 (−) terminal.



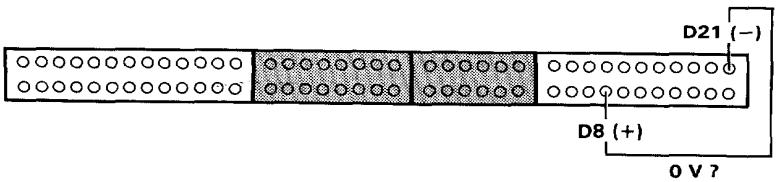
Is there battery voltage ?

NO → **Substitute known-good control unit and recheck. If prescribed voltage is now available, replace the original control unit.**

YES

Reconnect D connector to the wire harness.

Measure voltage between D8 (+) terminal and D21 (−) terminal in Neutral position.



(To page 6-43)

(From page 6-42)

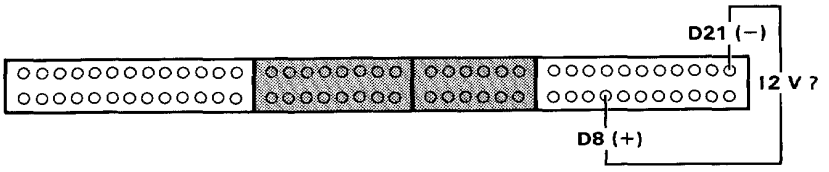
Is there voltage ?

YES

—Repair open in LT GRN wire between control unit (D8) and combination meter.
—Repair open in the GRN wire between the combination meter and A/T shift position switch.

NO

Measure voltage between D8 (+) terminal and D21 (−) terminal in all other shift positions except Neutral.



Is there battery voltage ?

NO

Repair short in LT GRN wire between combination meter and control unit (D8).

YES

A/T Shift Position Signal is OK.

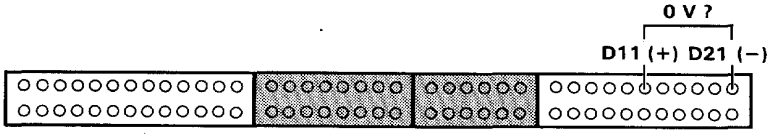
Input Troubleshooting Flow Chart —— P/S Oil Pressure Switch Signal

Inspection of P/S Oil Pressure Switch Signal.

Connect the ECU test harness between the control unit and connector (page 6-20).

Turn the ignition switch ON.

Measure voltage between D11 (+) terminal and D21 (−) terminal.



Is there voltage ?

YES

Turn the ignition switch OFF.

Disconnect the 2P connector on the P/S oil pressure switch.

Connect RED terminal to BLK terminal.

Turn the ignition switch ON.

Is there voltage ?

NO

Replace the P/S oil pressure switch.

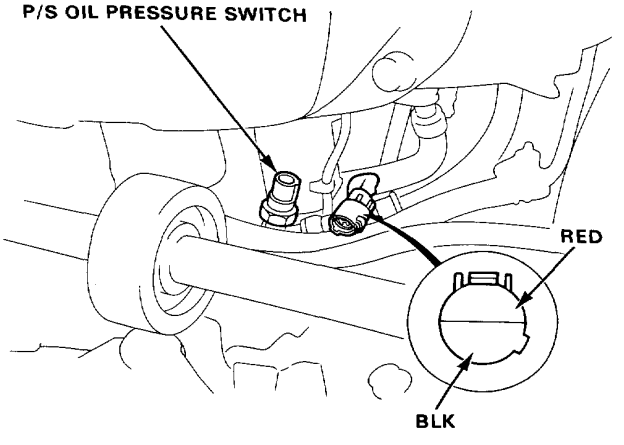
YES

—Repair open in RED wire between control unit (D11) and P/S oil pressure switch.
—Repair open in BLK wire between P/S oil pressure switch and G301.

NO

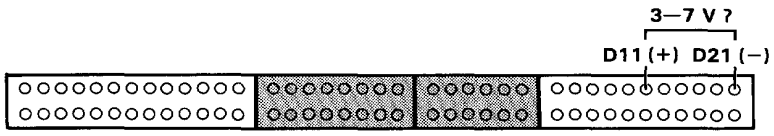
Turn steering wheel slowly.

(To page 6-47)



(From page 6-46)

Measure voltage between D11 (+) terminal and D21 (−) terminal while steering wheel is turning.



Is there battery voltage ?

NO

Turn the ignition switch OFF.

Disconnect the 2P connector on the P/S oil pressure switch.

Check for continuity between the 2 terminals on the P/S oil pressure switch.

Does continuity exist ?

YES

Replace the P/S oil pressure switch.

NO

—Repair short in RED wire between control unit (D11) and P/S oil pressure switch.
—Substitute a known-good ECU and recheck. If prescribed voltage in now available, replace the original ECU.

YES

P/S Oil Pressure Switch Signal is OK.

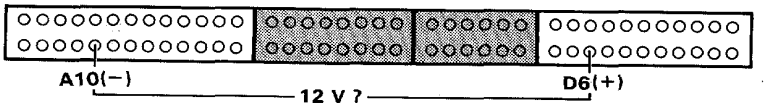
Input Troubleshooting Flow Chart — Air Conditioning Signal

Inspection of Air Conditioning Signal.

Connect the ECU test harness between the control unit and connector (page 6-20). Disconnect "D" connector from the main wire harness only, not the control unit.

Turn the ignition switch ON.

Measure voltage between D6 (+) terminal and A10 (−) terminal.



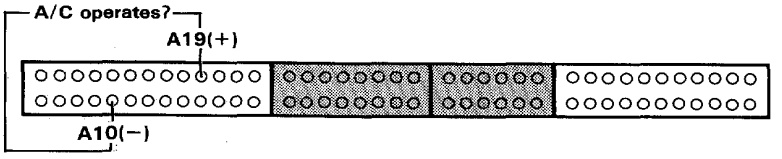
Is there battery voltage ?

NO → **Substitute a known-good control unit and recheck. If prescribed voltage is now available, replace the original control unit.**

YES

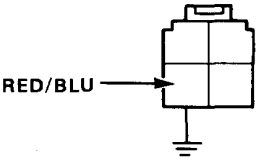
Reconnect "D" connector to the main wire harness.

Connect A19 terminal to A10 terminal.



Does A/C operate ?

NO → Connect the RED/BLU terminal of the 4P connector on the A/C clutch relay to body ground.



YES

Start engine.

Blower switch ON.

Does A/C operate ?

NO → **See Air conditioner inspection (section 15).**

YES → **Repair open in RED/BLU wire between ECU (A19) and A/C clutch relay.**

(To page 6-49)

(From page 6-48)

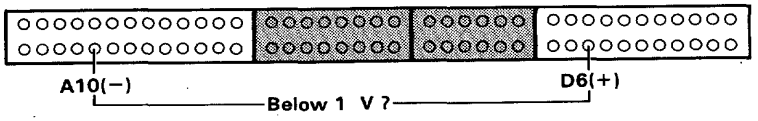
A/C switch ON.

Does A/C operate ?

NO → **See Air conditioner inspection (section 15).**

YES

Measure voltage between D6 (+) terminal and A10 (−) terminal.



Is voltage below 1 V ?

NO → **Repair open in BLU/BLK wire between ECU (D6) and A/C switch.**

YES

Air Conditioning Signal is OK.

Symptom-to-Sub System Chart

(KX, KS, KG, KQ)

NOTE:

- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the self-diagnosis indicator, valve clearance, air cleaner, and PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spak plugs. If those items are all within specifications, begin with the troubleshooting listed in pages 6-50 and 6-51.

PAGE / SYSTEM / SYMPTOM		IDLE SPEED/ MIXTURE	IDLE BOOST	AUTOMATIC CHOKE/ FAST IDLE SYSTEM	AIR VENT CUT-OFF SOLENOID VALVE FLOAT LEVEL
		80	54	84	83, 121
ENGINE WON'T START					①
DIFFICULT TO START ENGINE	WHEN COLD			①	②
	WHEN WARM				②
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION		②	①	
	WHEN WARM ENGINE SPEED TOO HIGH	①	②	③	
	WHEN WARM ENGINE SPEED TOO LOW	①	①		
	ROUGH IDLE/ FLUCTUATION	①	③		②
FREQUENT STALLING	WHILE WARMING UP		②	①	
	AFTER WARMING UP	①	②		②
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING			①	①
	LOSS OFF POWER				②
	AFTERBURN	①			
	HESITATION/SURGE				

POWER VALVE	PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE	SLOW AIR JET CONTROL	VACUUM CONTROLLED SECONDARY	ACCELE-RATOR PUMP
69	73	67	65	26
	②	②		
	①			②
	①	②		
②	②			
		②		
		②		
		③	②	
②	①			
	①	①		
			②	
③			①	③
②				①

Symptom-to System Chart

(Except KS, KX, KG, KQ)

NOTE:

- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the self-diagnosis indicator, valve clearance, air cleaner, and PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begin with the troubleshooting listed in pages 6-52 and 6-53.

PAGE / SYSTEM / SYMPTOM		CARBURETOR			
		IDLE SPEED/ MIXTURE	IDLE BOOST	AUTOMATIC CHOKE/ FAST IDLE SYSTEM	AIR VENT CUT-OFF SOLENOID VALVE FLOAT LEVEL
		80	55	84	83, 121
ENGINE WON'T START					①
DIFFICULT TO START ENGINE	WHEN COLD			①	②
	WHEN WARM				②
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION		②	①	
	WHEN WARM ENGINE SPEED TOO HIGH	①	②	③	
	WHEN WARM ENGINE SPEED TOO LOW	①	①		
	ROUGH IDLE/ FLUCTUATION	①	③		②
FREQUENT STALLING	WHILE WARMING UP		②	①	
	AFTER WARMING UP	①	②		②
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING			①	①
	LOSS OFF POWER				②
	AFTERBURN	①			
	HESITATION/SURGE				

CARBURETOR				FUEL SUPPLY	AIR INTAKE	EMISSION CONTROLS
POWER VALVE	PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE	VACUUM CONTROLLED SECONDARY	ACCELERATOR PUMP			
70	75	66	83	93	98	102
	②			①		③
	①		②			③
	①					③
②	②					③
						③
						②
		②				②
②	①					③
	①					③
		②		③		③
③		①	③	②	①	①
					②	①
②			③	②	①	①

Idle Control System

Testing

(KX, KS, KG, KQ)

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

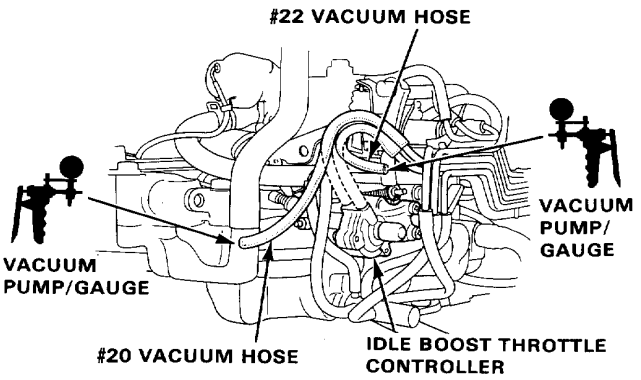
Idle speed should be:

Manual	800 ± 50 min^{-1} (rpm)
Automatic	750 ± 50 min^{-1} (rpm) (in "D")

- If OK, go to step 4.
- If not, go to step 3.

3. Disconnect the two vacuum hoses at idle boost throttle controller and check each for vacuum.

   There should be no vacuum in both hoses.



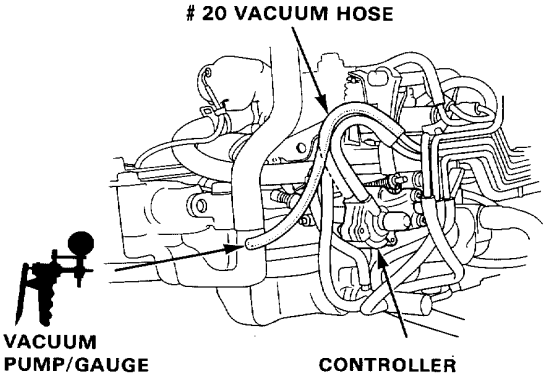
- If there is no vacuum, check the throttle valve shaft for binding or sticking and replace the idle boost throttle controller.
- If there is vacuum at the #20 vacuum hose, go to idle boost solenoid valve troubleshooting (page 6-56).
- If there is vacuum at the #22 vacuum hose, go to A/C idle boost solenoid valve troubleshooting (page 6-61).

4. Disconnect the connector on the P/S oil pressure switch, and check the idle speed.
   Idle speed should be:

Manual	950 ± 50 min^{-1} (rpm)
Automatic	820 ± 50 min^{-1} (rpm) (in "D")

- If OK, go to step 6.
- If not, go to step 5.

5. Disconnect the #20 vacuum hose at idle boost throttle controller and check vacuum wheel is turning. There should be vacuum.



- If there is vacuum, check the throttle valve shaft for binding or sticking and replace the idle boost throttle controller.
- If there is no vacuum, check the #20 and #12 vacuum line for proper connection, cracks, blockage or disconnected hose. If OK, go to the idle boost solenoid valve troubleshooting (page6-56).

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

Idle speed should be:

Manual	800 ± 50 min^{-1} (rpm)
Automatic	750 ± 50 min^{-1} (rpm) (in "D")

- If not, disconnect the two vacuum hoses at idle boost throttle controller and check each for vacuum.
  - If there is no vacuum at the #20 vacuum hose, check the #20 and #12 vacuum line for proper connection, cracks, blockage or disconnected hose. If OK, go to the idle boost solenoid valve troubleshooting (page6-56).
  - If there is no vacuum at the #22 vacuum hose, check the #22 and #12 vacuum line for proper connection, cracks, blockage or disconnected hose. If OK, go to the A/C idle boost solenoid valve troubleshooting (page 6-61).

Testing
(Except KX, KS, KG, KQ)

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

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

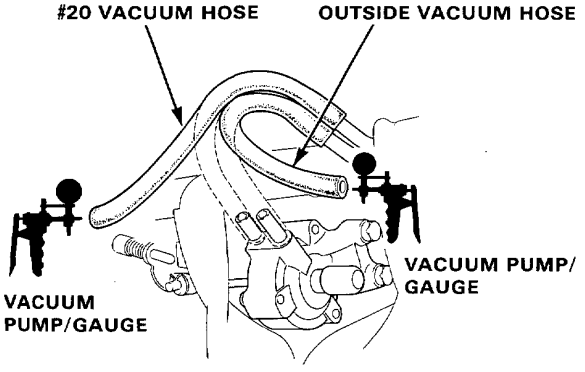
   Idle speed should be:

Manual	800 ± 50 min^{-1} (rpm)
Automatic	750 ± 50 min^{-1} (rpm) (in "D")

   - If OK, go to step4.
   - If not, go to step3.

3. Disconnect the vacuum hoses at idle boost throttle controller and check each for vacuum.

   There should be no vacuum in both hoses.



   - If there is no vacuum, check the throttle valve shaft for binding or sticking and replace the idle boost throttle controller.
   - If there is vacuum at the #20 vacuum hose, go to idle boost solenold valve troubleshooting (page 6-58).
   - If there is vacuum at the outside vacuum hose, go to A/C idle boost solenoid valve troubleshooting (page 6-63).

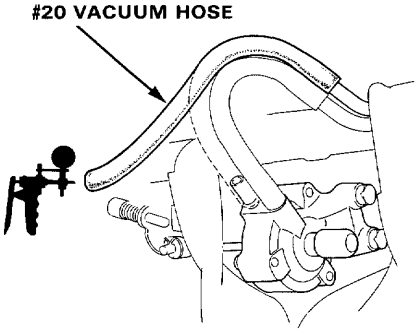
4. Disconnect the connector on the P/S oil pressure switch. Connect a jumper wire between the RED terminal and the BLK terminal.
   Check the idle speed.
   Idle speed should be:

Manual	950 ± 50 min^{-1} (rpm)
Automatic	820 ± 50 min^{-1} (rpm) (in "D")

   - If ok, go to step 6.
   - If not, go to step 5.

5. Disconnect the #20 vacuum hose at idle boost throttle controller and check vacuum.

   There should be vacuum.



   - If there is vacuum, check the throttle valve shaft for binding or sticking and replace the idle boost throttle controller.
   - If there is no vacuum, check the #20 and # 2 vacuum line for proper connection, cracks, blockage or disconnected hose. If OK, go to the idle boost solenoid valve troubleshooting (page 6-58).

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

   Idle speed should be:

Manual	800 ± 50 min^{-1} (rpm)
Automatic	750 ± 50 min^{-1} (rpm) (in "D")

   - If not, disconnect the two vacuum hoses at idle boost throttle controller and check each for vacuum.

     There should be vacuum in both hoses.

   — If there is vacuum in both hoses, replace the idle boost throttle controller.
   — If there is no vacuum at the # 20 vacuum hose, check the #20 and #2 vacuum line for proper connection, cracks, blockage or disconnected hose. If OK, go to the idle boost solenoid valve troubleshooting (page6-58).
   — If there is no vacuum at the outside vacuum hose, check the vacuum line for proper connection, cracks, blockage or disconnected hose.
   If OK, go to the A/C idle boost solenoid valve trouble shooting (page 6-63).

(cont'd)

Idle Control System (cont'd)

Troubleshooting Flowchart (KX, KS, KG, KQ)

Inspection of Idle Boost Solenoid Valve.

Open the control box.

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

Disconnect #20 vacuum hose of the solenoid valve from the vacuum hose manifold and connect a vacuum gauge.

Start the engine.

Apply vacuum.

Is vacuum indicated on the gauge ? YES → Turn the ignition switch OFF.

NO

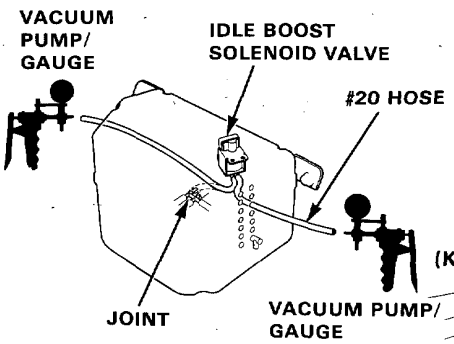
Turn steering wheel slowly.

Apply vacuum.

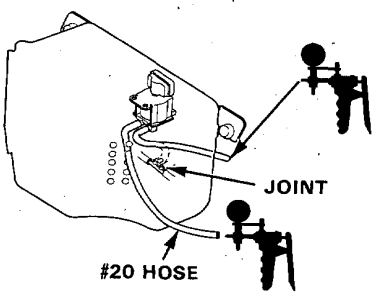
(To page 6-57)

Idle Boost Solenoid Valve

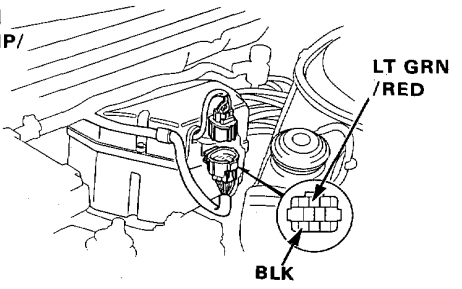
(KX. KS. KG)



(KQ)



(KX. KS. KG)



Turn the ignition switch OFF.

Disconnect the connector on the control box.

Start the engine.

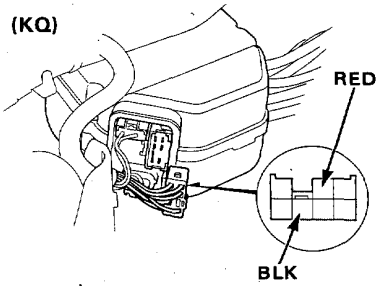
Measure voltage between;
KX, KS, KG: LT GRN (+) and BLK (−) terminals
KQ: RED (+) and BLK (−) terminals

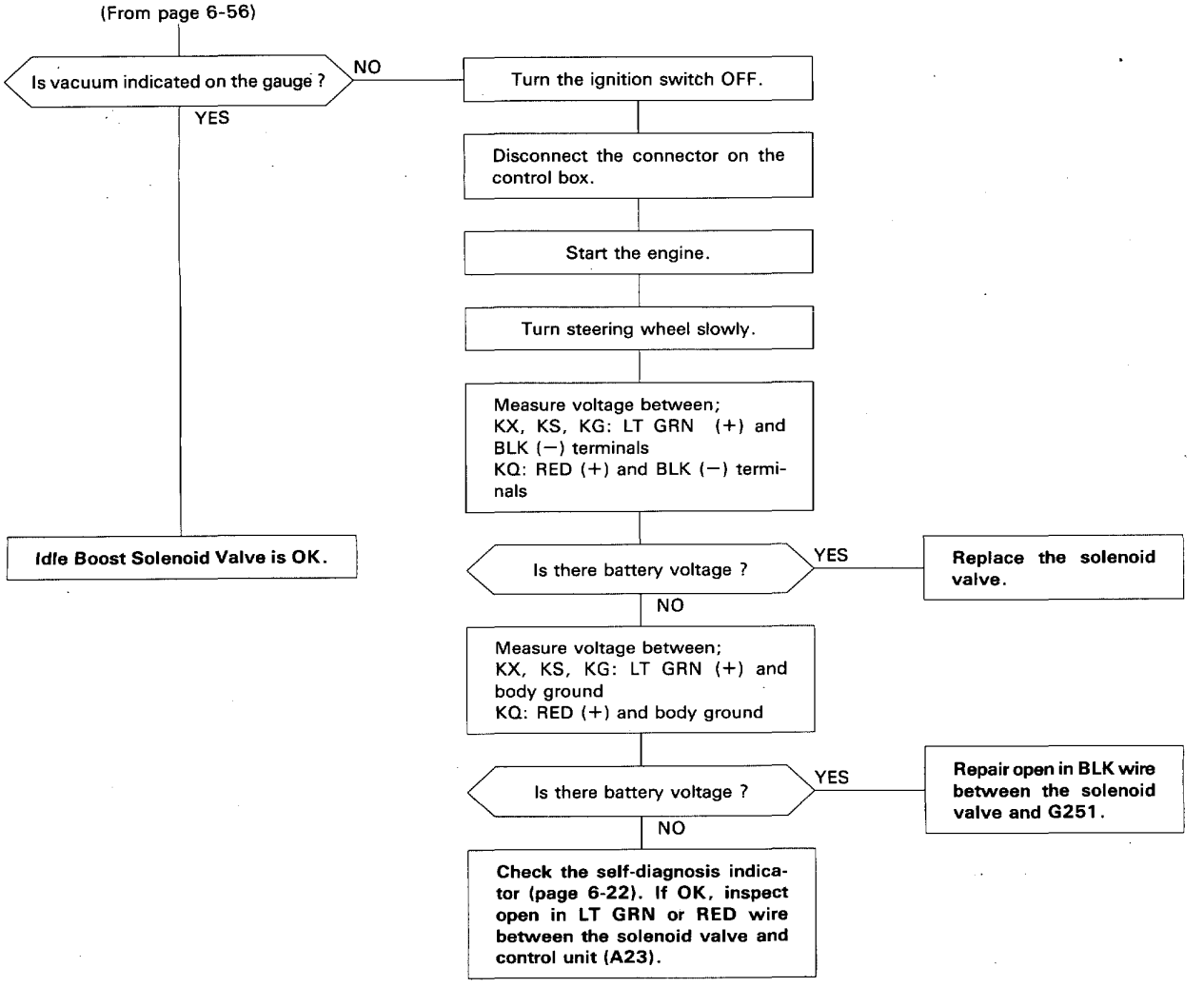
Is there voltage ? YES → **Check the self-diagnosis indicator (page 6-22). If OK, check the input troubleshooting (page 6-22).**

NO

Replace the solenoid valve.

(KQ)




(From page 6-56)
Is vacuum indicated on the gauge ?
NO
YES
Turn the ignition switch OFF.
Disconnect the connector on the control box.
Start the engine.
Turn steering wheel slowly.
Measure voltage between;
KX, KS, KG: LT GRN (+) and BLK (−) terminals
KQ: RED (+) and BLK (−) terminals
Idle Boost Solenoid Valve is OK.
Is there battery voltage ?
YES
Replace the solenoid valve.
NO
Measure voltage between;
KX, KS, KG: LT GRN (+) and body ground
KQ: RED (+) and body ground
Is there battery voltage ?
YES
Repair open in BLK wire between the solenoid valve and G251.
NO
Check the self-diagnosis indicator (page 6-22). If OK, inspect open in LT GRN or RED wire between the solenoid valve and control unit (A23).

(cont'd)

Idle Control System (cont'd)

Troubleshooting Flowchart (Except KX, KS, KG, KQ)

Inspection of Idle Boost Solenoid Valve.

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

Disconnect #20 vacuum hose of the solenoid valve from the vacuum hose manifold and connect a vacuum gauge.

Start the engine.

Apply vacuum.

Is vacuum indicated on the gauge ? YES → Turn the ignition switch OFF.

NO

Turn steering wheel slowly.

Apply vacuum.

Disconnect the connector on the solenoid valve.

Turn the ignition switch ON.

Measure voltage between BLK/YEL (+) terminal and RED (−) terminal on the solenoid valve.

Is there voltage ? NO → **Replace the solenoid valve.**

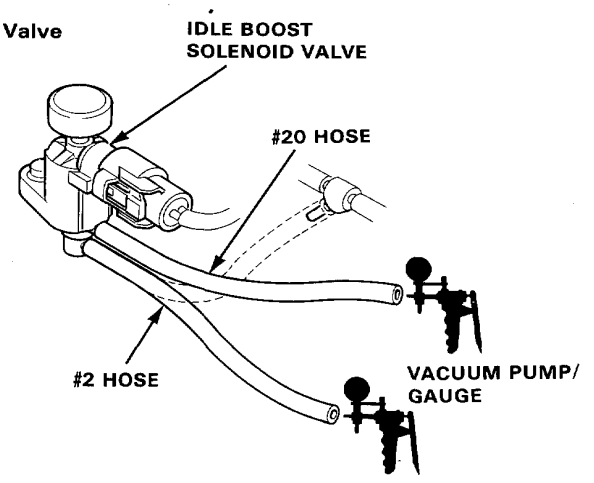
YES

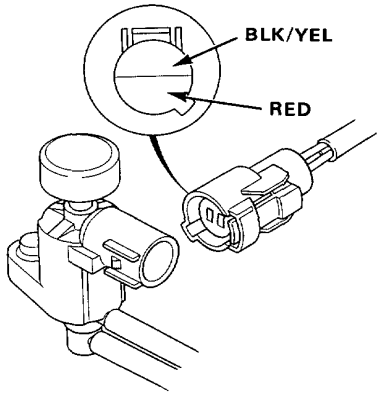
Disconnect the connector on the P/S oil pressure switch.

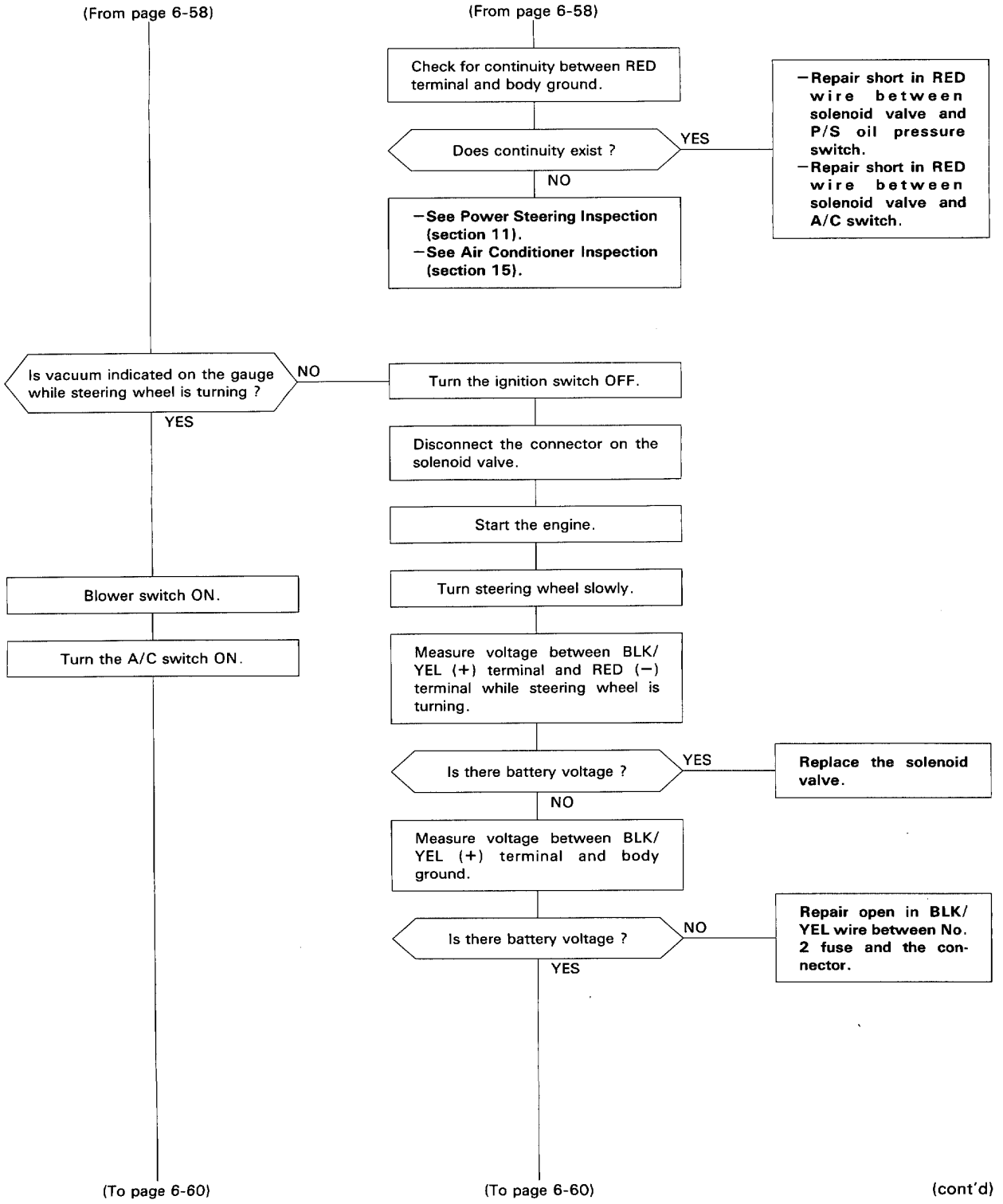
(To page 6-59)

(To page 6-59)

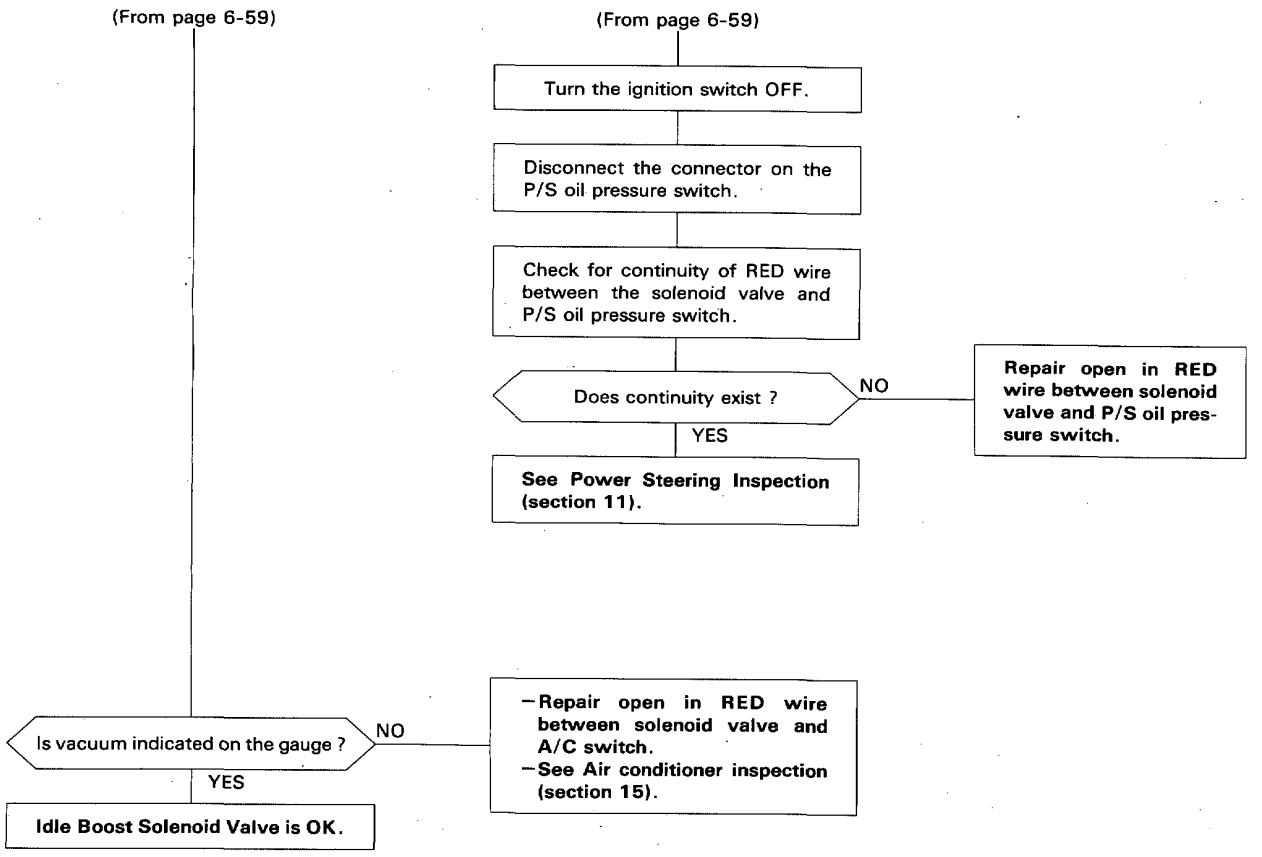
Idle Boost Solenoid Valve






(From page 6-58)
(From page 6-58)
Check for continuity between RED terminal and body ground.
Does continuity exist ?
YES
NO
–Repair short in RED wire between solenoid valve and P/S oil pressure switch.
–Repair short in RED wire between solenoid valve and A/C switch.
–See Power Steering Inspection (section 11).
–See Air Conditioner Inspection (section 15).
Is vacuum indicated on the gauge while steering wheel is turning ?
NO
YES
Turn the ignition switch OFF.
Disconnect the connector on the solenoid valve.
Start the engine.
Turn steering wheel slowly.
Measure voltage between BLK/YEL (+) terminal and RED (–) terminal while steering wheel is turning.
Blower switch ON.
Turn the A/C switch ON.
Is there battery voltage ?
YES
NO
Replace the solenoid valve.
Measure voltage between BLK/YEL (+) terminal and body ground.
Is there battery voltage ?
NO
YES
Repair open in BLK/YEL wire between No. 2 fuse and the connector.
(To page 6-60)
(To page 6-60)
(cont'd)

Idle Control System (cont'd)



Troubleshooting Flowchart (KX, KS, KG, KQ) **A/C Idle Boost Solenoid Valve**

Inspection of A/C Idle Boost Solenoid Valve

Open the control box.

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

Disconnect #22 vacuum hose of the solenoid valve from the vacuum hose manifold and connect a vacuum gauge.

Start the engine.

Apply vacuum.

Is vacuum indicated on the gauge ? YES → Turn the ignition switch OFF.

NO

Blower switch ON.

Turn the A/C switch ON.

Disconnect the connector on the control box.

Start the engine.

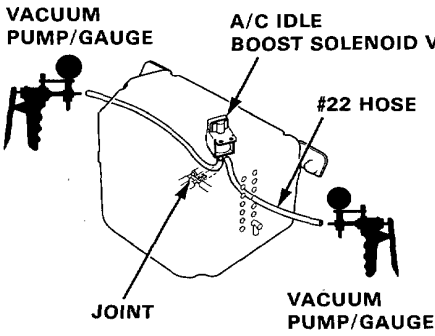
Measure voltage between GRN (+) terminal and BLK (−) terminal.

Is there voltage ? YES → **Check the self-diagnosis indicator (page 6-22). If OK, check the input troubleshooting (page 6-22).**

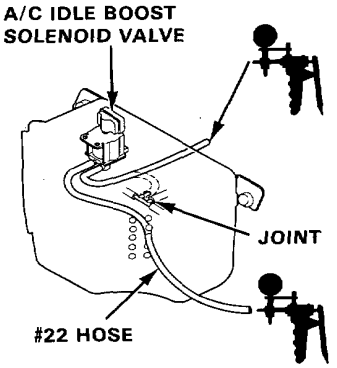
NO

Replace the solenoid valve.

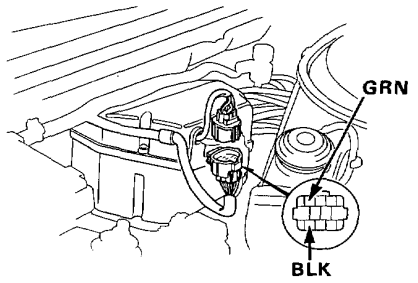
(KX. KS. KG)



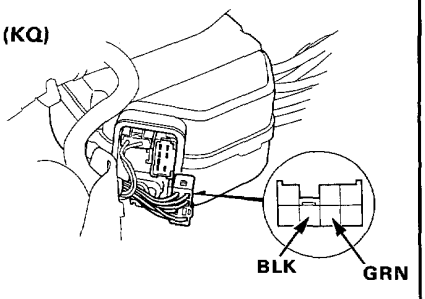
(KQ)



(KX. KS. KG)



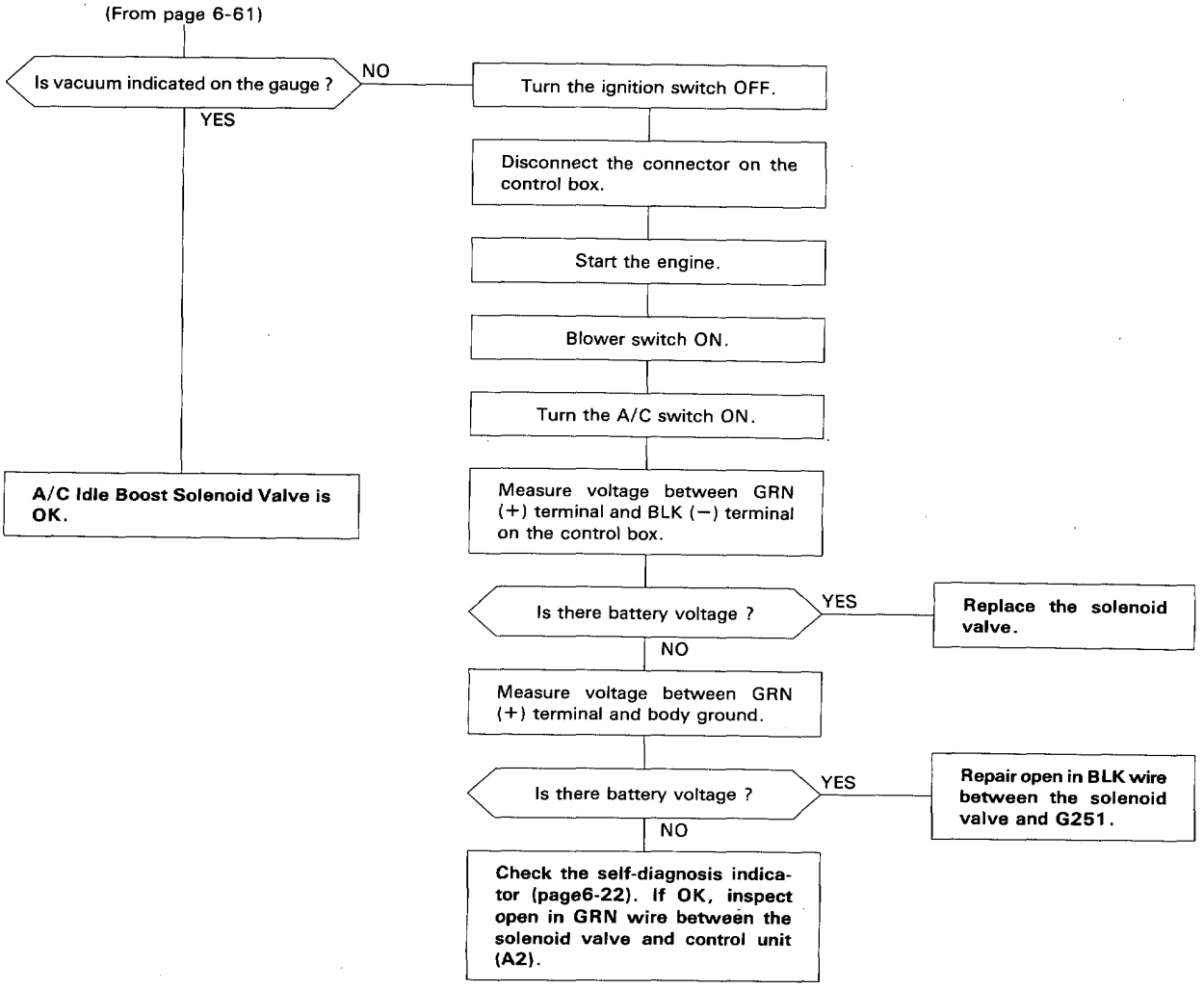
(KQ)



(To page 6-62)

(cont'd)

Idle Control System (cont'd)



Troubleshooting Flowchart (Except KX, KS, KG, KQ) **A/C Idle Boost Solenoid Valve**

Inspection of A/C Idle Boost Solenoid Valve

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

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

Start the engine.

Apply vacuum.

Is vacuum indicated on the gauge ?

YES

Turn the ignition switch OFF.

Disconnect the connector on the solenoid valve.

Start the engine.

Measure voltage between RED (+) terminal and BLK (−) terminal.

Is there voltage ?

YES

See Air Conditioner inspection (section 15).

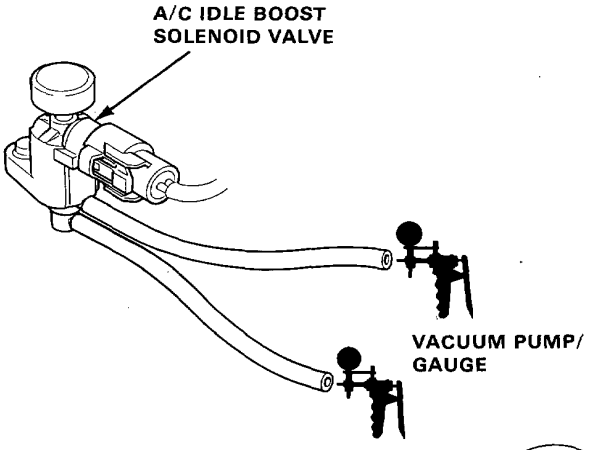
NO

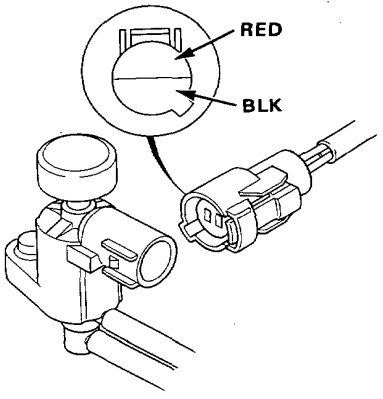
Replace the solenoid valve.

NO

Blower switch ON.

Turn A/C switch ON.

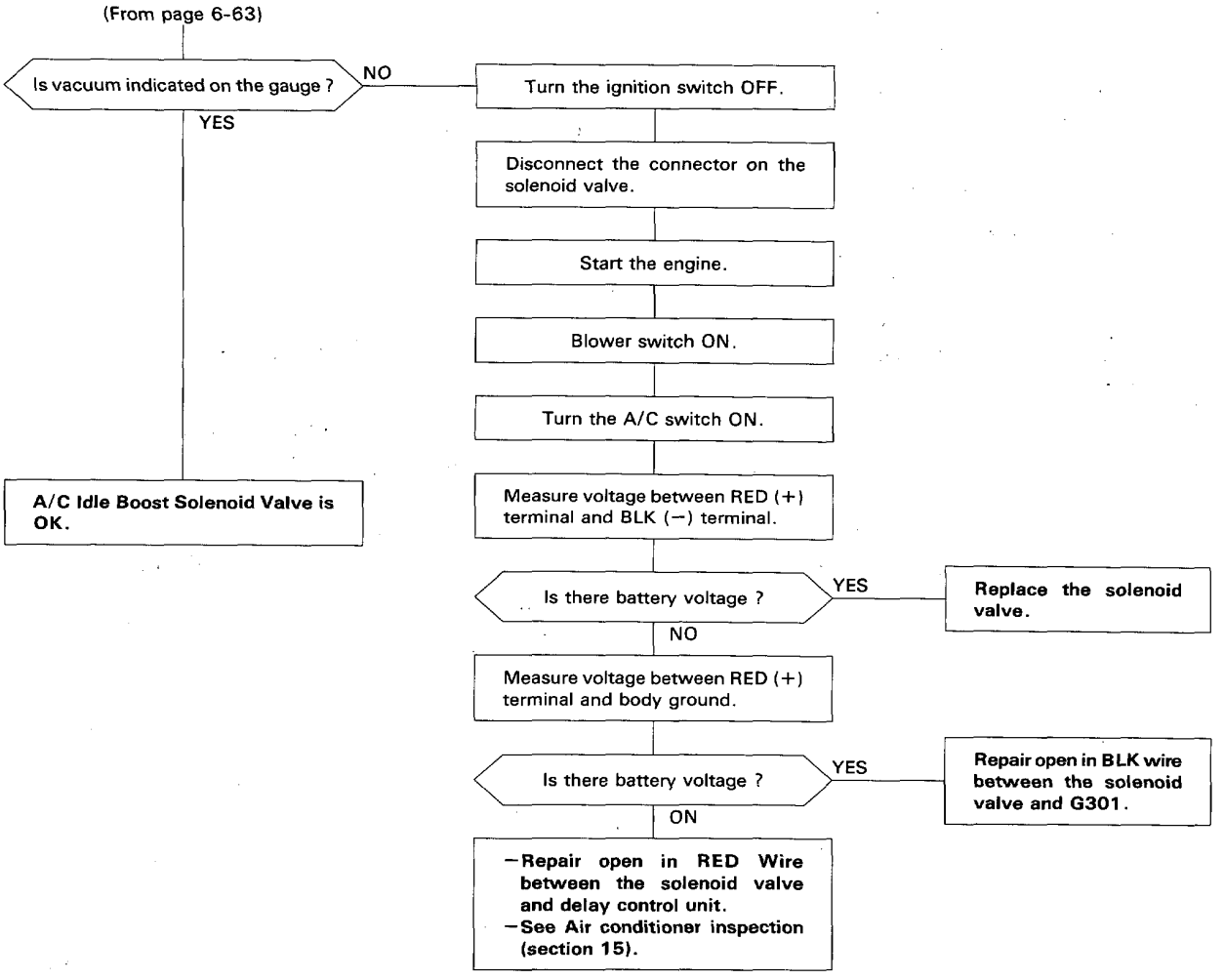




(To page 6-64)

(cont'd)

Idle Control System (cont'd)

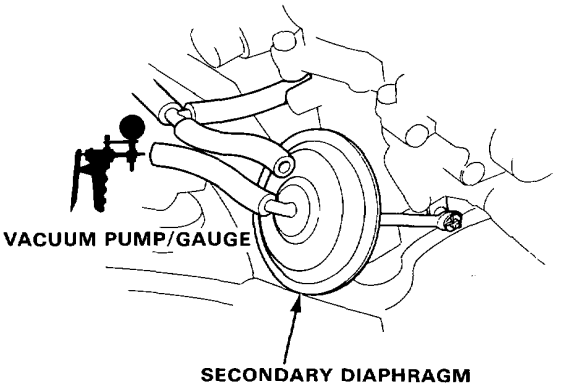


Vacuum Controlled Secondary

Testing
(KX, KS, KG, KQ)

1. Disconnect the secondary diaphragm vacuum hose and attach a spare piece of hose between the diaphragm and a vacuum pump.

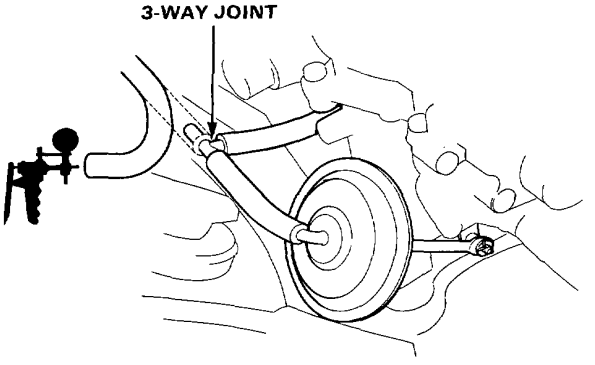
2. Open the throttle valve fully and apply a vacuum. Check the diaphragm rod moves as vacuum is applied and that the vacuum then remains steady.



- If the vacuum does not hold or the rod does not move, first check the hose for proper connection and condition, then replace the diaphragm and recheck.

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

4. Disconnect the vacuum hose from the 3-way joint connect a vacuum pump and apply vacuum.
   It should not hold vacuum.



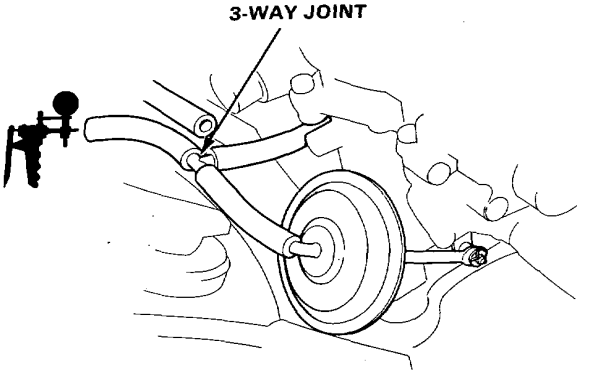
- If it holds vacuum, check the vacuum line for proper connection or cracks. If OK, go to the air leak solenoid valve troubleshooting (page 6-67).

5. Raise the engine speed to 5,000 min^{-1} (rpm), then close the throttle suddenly. And then appy vacuum.

   It should hold vacuum.

- If it does not hold vacuum, check the vacuum line for proper connection, blockage or disconnected hose. If OK, go to the air leak solenoid valve troubleshooting (page 6-67).

6. Disconnect the vacuum hose from the 3-way joint and connect to a vacuum pump/gauge.
   Apply a vacuum.
   It should not hold vacuum.



- If vacuum does not hold, test is complete.
- If vacuum is held, check the hose, the 3-way joint and clean the vacuum port.

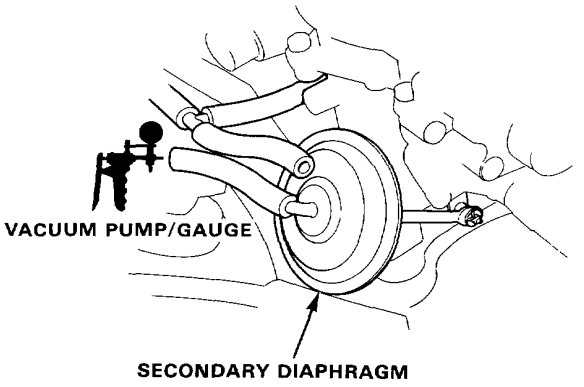
(cont'd)

Vacuum Controlled Secondary (cont'd)

(Except KX, KS, KG, KQ)

1. Disconnect the secondary diaphragm vacuum hose and attach a spare piece of hose between the diaphragm and a vacuum pump.

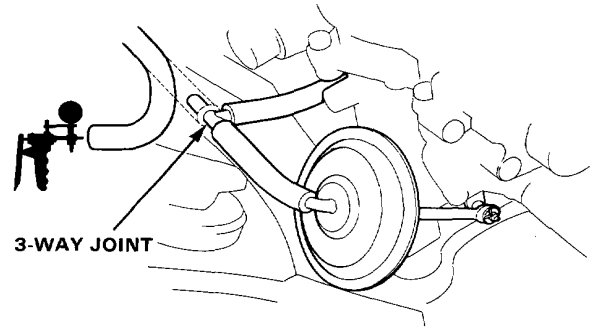
2. Open the throttle valve fully and apply a vacuum. Check the diaphragm rod moves as vacuum is applied and that the vacuum then remains steady.



- If the vacuum does not hold or the rod does not move, first check the hose for proper connection and condition, then replace the diaphragm and recheck.

3. Disconnect the vacuum hose from the 3-way joint, connect a vacuum pump and apply vacuum.
   NOTE: KP, KT ; The engine coolant temperature must be below 60°C (140°F).
   Except KP, KT ; The engine coolant temperature must be below 55°C (131°F).

   It should not hold vacuum.



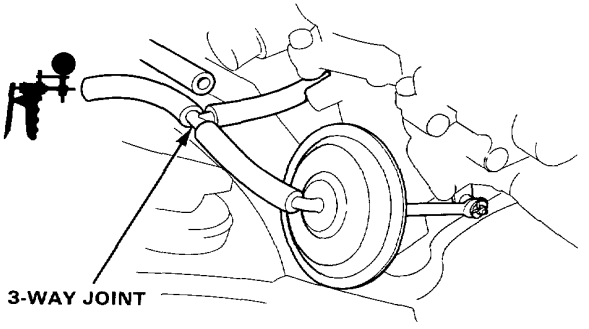
- If it holds vacuum, check the vacuum line for proper connection or cracks. If OK, replace the thermovalve D.

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

5. Apply vacuum.
   It should hold vacuum.

   - If it does not hold vacuum, check the vacuum line for proper connection, blockage or disconnected hose. If OK, replace the thermovalve D.

6. Disconnect the vacuum hose from the 3-way joint and connect to a vacuum pump/gauge.
   Apply a vacuum.
   It should not hold vacuum.



- If vacuum does not hold, test is complete.
- If vacuum is held, check the hose, the 3-way joint and clean the vacuum port.

Troubleshooting Flowchart (KX, KS, KG, KQ)

Inspection of Air Leak Solenoid Valve.

Disconnect the #2 vacuum hose from the carburetor and connect a vacuum pump, then cap the carburetor.

Start the engine.

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

Does solenoid valve hold vacuum ?

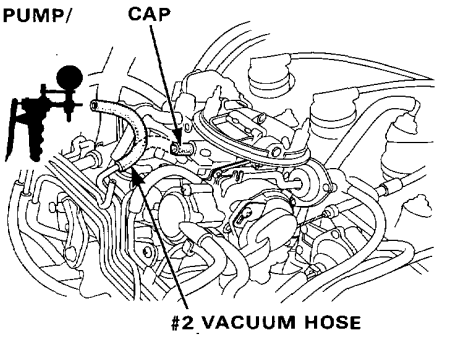
NO → *Turn the ignition switch OFF.*

YES

Raise the engine speed to 5,000 min^{-1} (rpm), then close the throttle suddenly.

(To page 6-68)

Air Leak Solenoid Valve



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

Disconnect the connector on the control box.

Start the engine.

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

Is there battery voltage ?

YES → **Replace the solenoid valve.**

NO

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

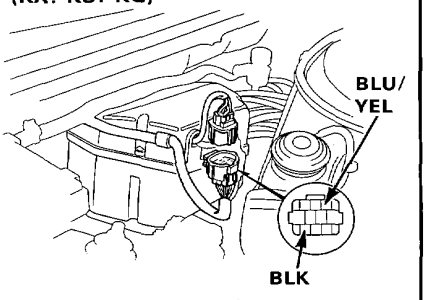
Is there battery voltage ?

YES → **Repair open in BLK wire between the solenoid valve and G251.**

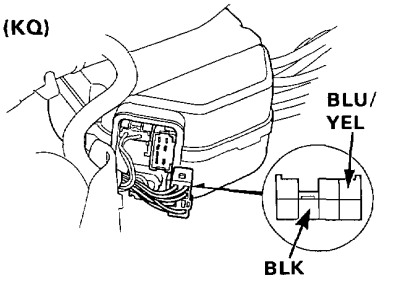
NO

Check the self-diagnosis indicator (page 6-22). If OK, inspect open in wire between the solenoid valve and control unit (A26).

(KX. KS. KG)

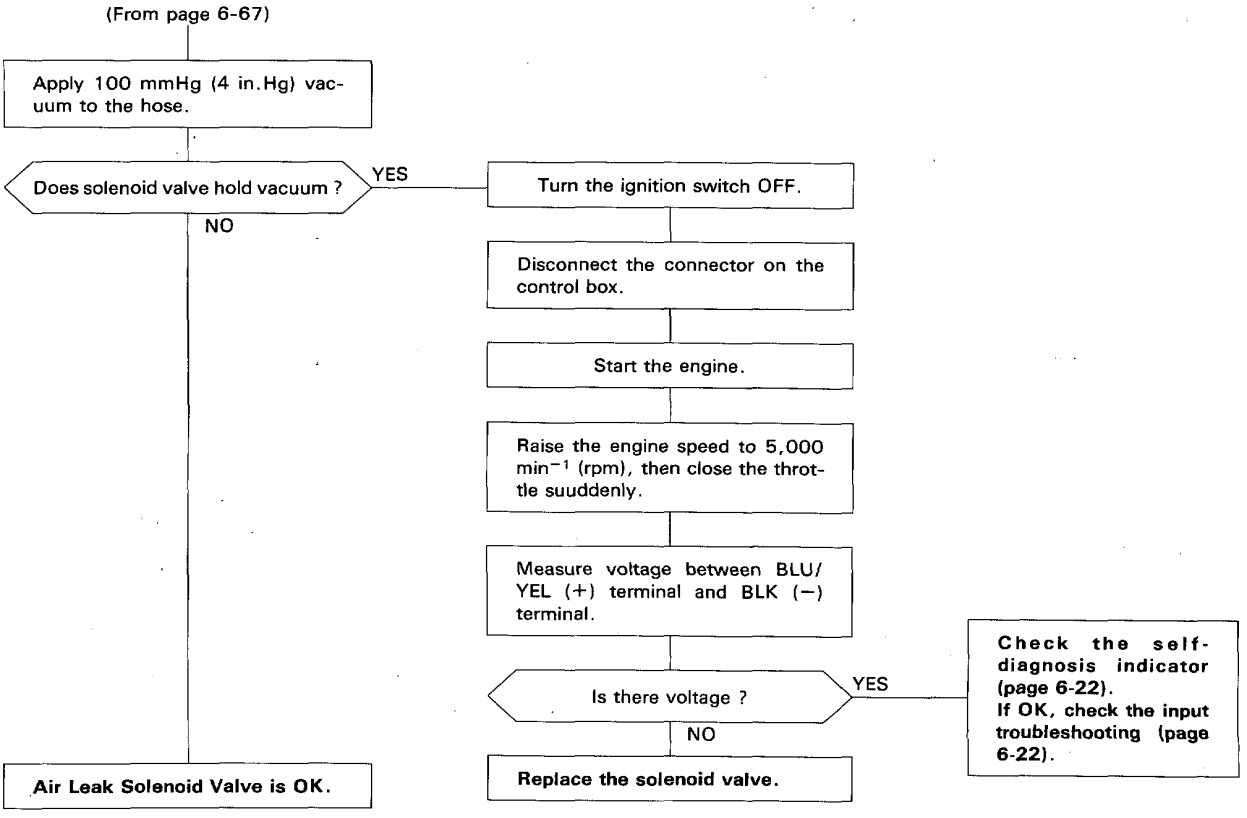


(KQ)



(cont'd)

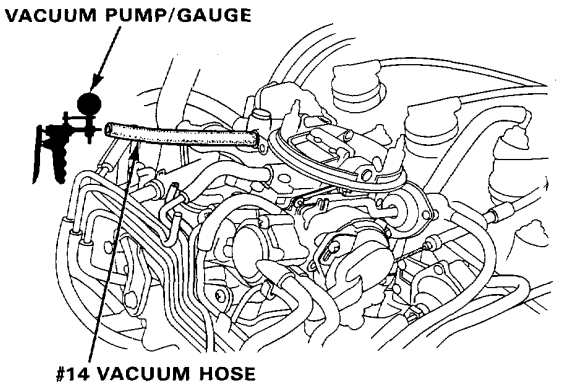
Slow Air Jet Control System (cont'd)



Power Valve

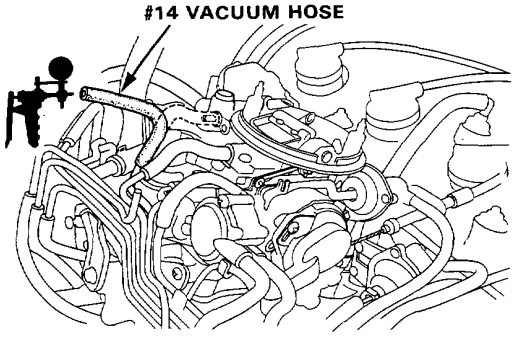
Testing
(KX, KS, KG, KQ)

1. Disconnect the #14 vacuum hose from the vacuum hose manifold and connect a vacuum pump. Apply vacuum and listen for a clicking noise from the power valve.



- If a clicking sound is heard, go on to step 2.
- If no sound is heard, replace the power valve and retest.

2. Disconnect the #14 vacuum hose from the carburetor and connect a vacuum gauge to the hose.



3. Start the engine and check the vacuum.
   There should be no vacuum for about 3 seconds after the engine is started. And there should be vacuum within 15 seconds after the engine is started.
   NOTE: The engine coolant temperature must be below 30°C (86°F).
   - If not, check the #14 and #12 vacuum line for proper connection, cracks, blockage or disconnected hose. If OK, go to the power valve control solenoid valve troubleshooting (page 6-71).

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

5. Check the vacuum.

   There should be vacuum.

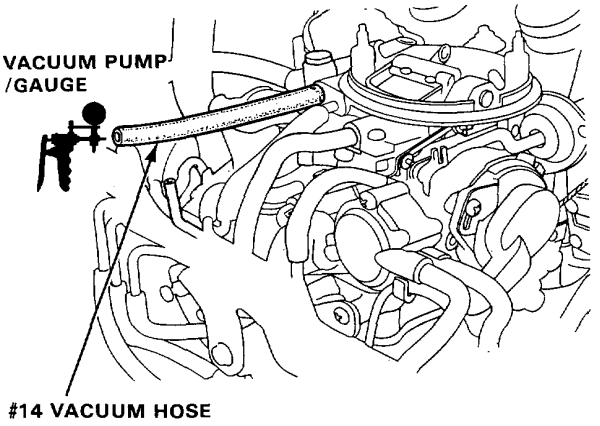
   - If not, check the #14 and #12 vacuum line for proper connection, cracks, blockage or disconnected hose. If OK, go to the power valve control solenoid valve troubleshooting (page 6-71).

(cont'd)

Power Valve (cont'd)

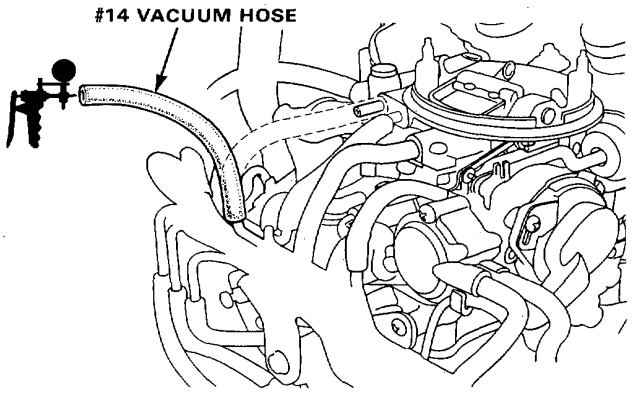
Testing
(Except KX, KS, KG, KQ)

1. Disconnect the #14 vacuum hose from the vacuum hose manifold and connect a vacuum pump. Apply vacuum and listen for a clicking noise from the power valve.



- If a clicking sound is heard, go on to step 2.
- If no sound is heard, replace the power valve and retest.

2. Disconnect the #14 vacuum hose from the carburetor and connect a vacuum gauge to the hose.



3. Start the engine and check the vacuum.
   NOTE: The engine coolant temperature must be below 35°C (95°F).
   There should be no vacuum.

- If there is vacuum, check the #14 and #6 (KT, KP: #12) vacuum line for proper connection.
- If there is vacuum, check the vacuum hose for proper connection. If OK, replace the thermovalve C.

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

5. Check the vacuum.

   There should be vacuum.

- If there in no vacuum, check the #14 and #6 (KT, KP: #12) vacuum line for proper connection, cracks, blockage or disconnected hose. If OK, replace the thermovalve C.

Troubleshooting Flowchart (KX, KS, KG, KQ)

Inspection of Power Valve control Solenoid Valve.

Open the control box.

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

Disconnect #14 vacuum hose of the solenoid valve from the vacuum hose manifold and connect a vacuum gauge.

Start engine.

Apply vacuum for about 3 seconds after the engine is started.

Is vacuum indicated on the gauge ? YES

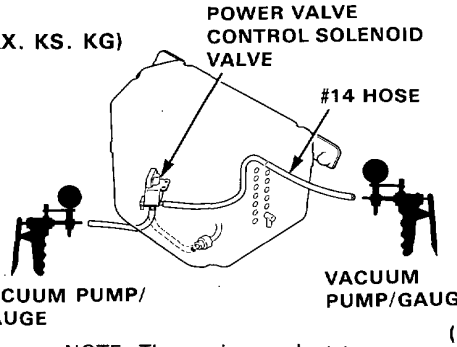
NO

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

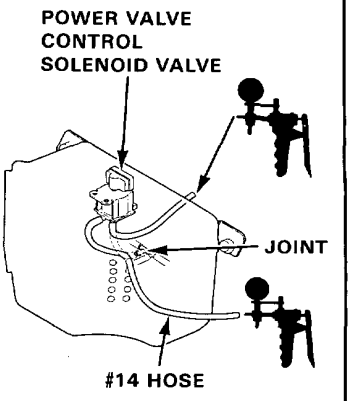
(To page 6-72)

Power Valve Control Solenoid Valve

(KX. KS. KG)

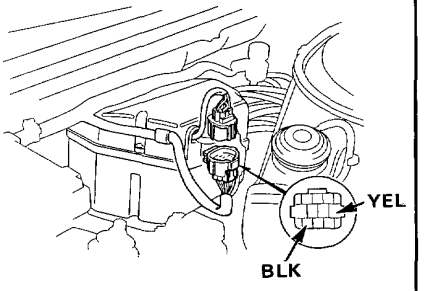


(KQ)

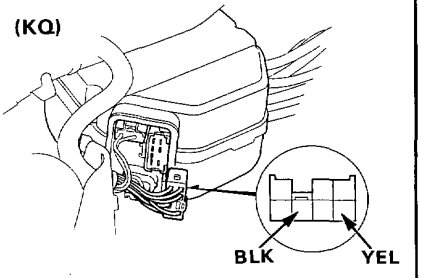


NOTE: The engine coolant temperature must be below 30°C (86°F).

(KX. KS. KG)



(KQ)



Turn the ignition switch OFF.

Disconnect the connector on the control box.

Start the engine.

Measure voltage between YEL (+) terminal and BLK (−) terminal.

Is there voltage ? YES

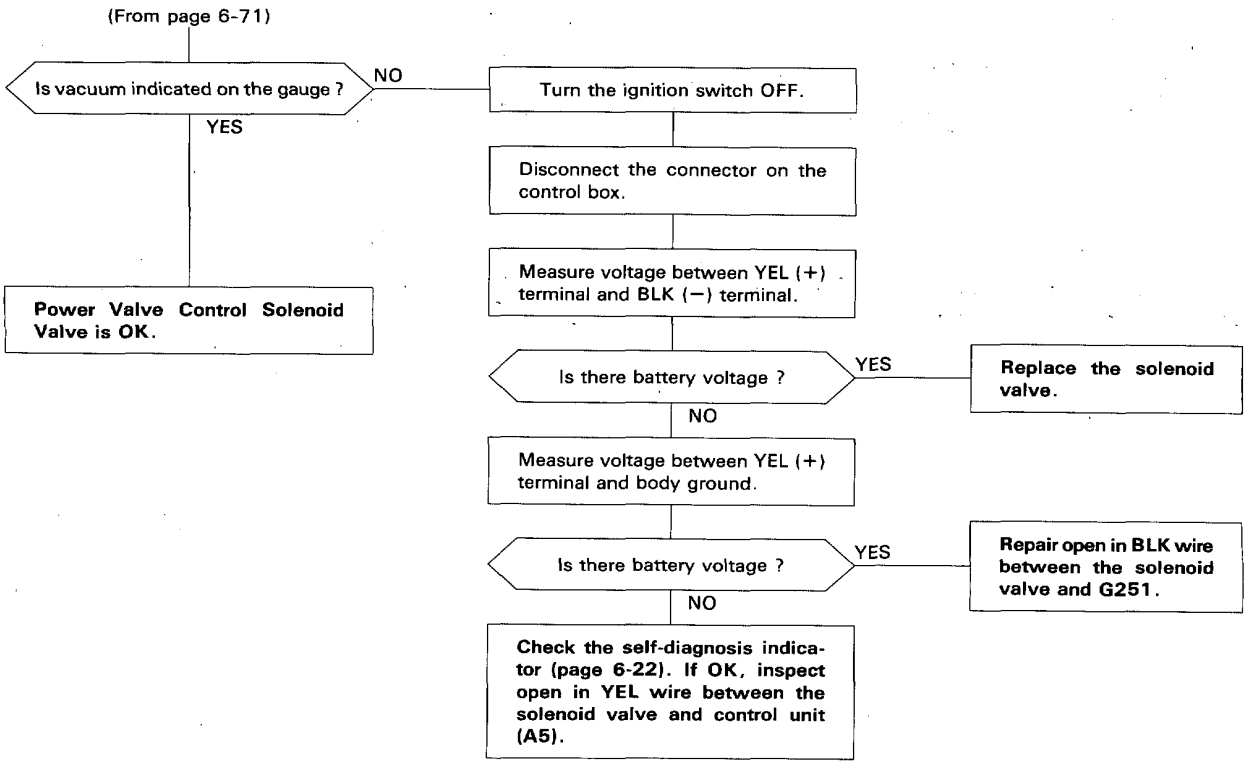
NO

Replace the solenoid valve.

Check the self-diagnosis indicator (page 6-22). If OK, substitute a known-good control unit and retest. If symptom goes away, replace the original control unit.

(cont'd)

Power Valve (cont'd)



Primary Slow Mixture Cut-off Solenoid Valve

Troubleshooting Flowchart (KX, KS, KG, KQ)

Inspection of Primary Slow Mixture Cut-off Solenoid Valve.

Turn the ignition switch ON.

Check the clicking sound of solenoid valve.

Does the solenoid valve click ?

NO

Turn the ignition switch OFF.

Disconnect the 2P connector.

Turn the ignition switch ON.

Measure voltage between GRN/RED (+) terminal and body ground.

Is there battery voltage ?

YES

Replace the solenoid valve.

NO

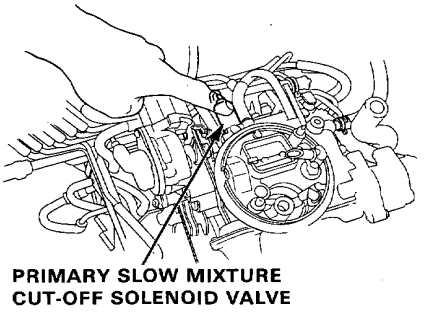
- **Repair open in GRN/RED wire between the solenoid valve and control unit (A21).**
- **Check the self-diagnosis indicator (page 6-22). If OK, check the input troubleshooting (page 6-22).**

YES

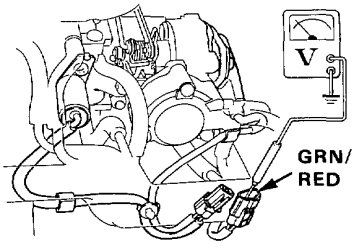
Start the engine and warm up to normal operating temperature (the cooling fan comes on).

(To page 6-74)

Primary Slow Mixture Cut-off Solenoid Valve

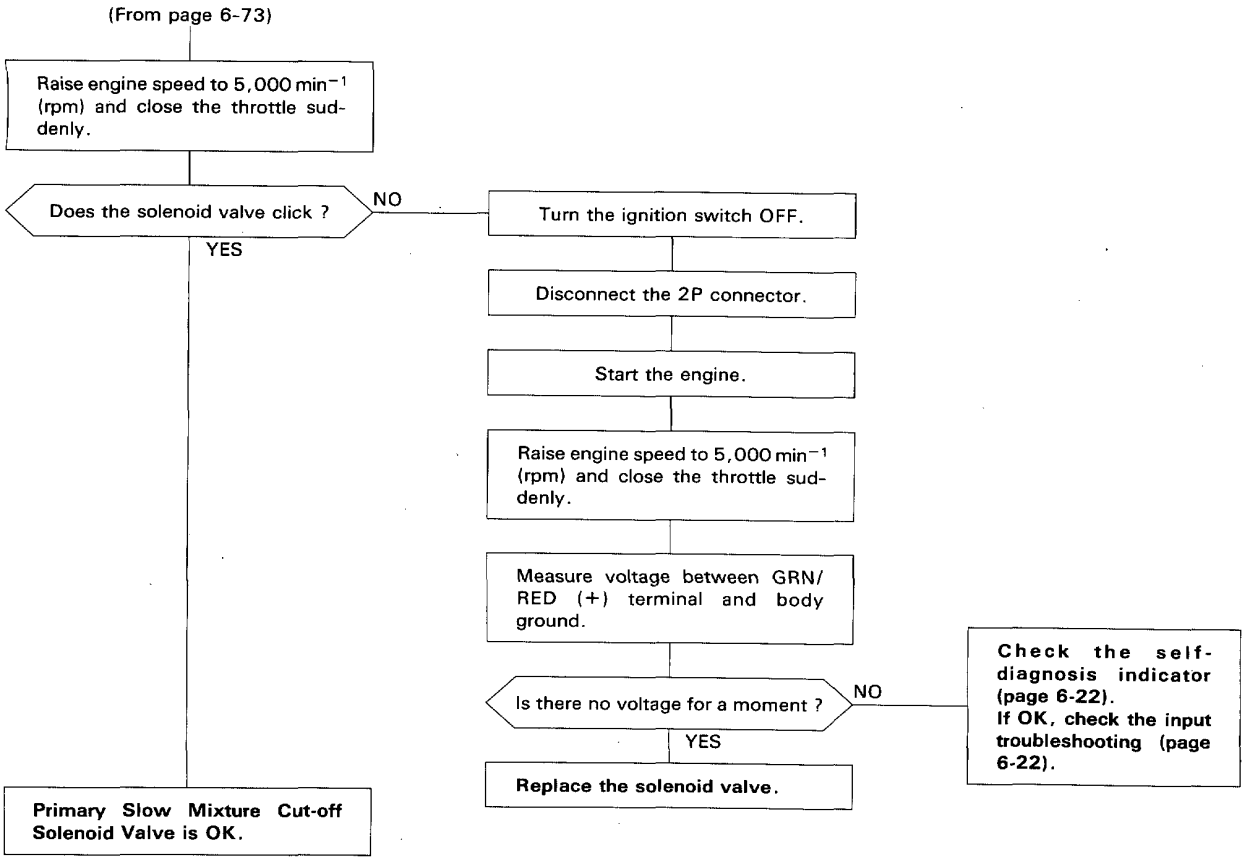


PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE



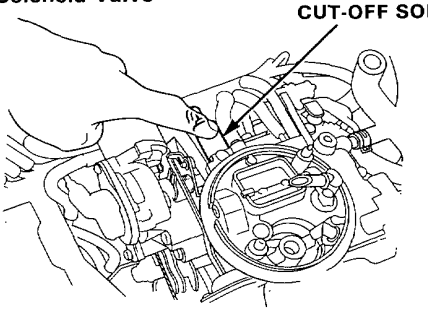
(cont'd)

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



Troubleshooting Flowchart (Except KX, KS, KG, KQ)

Primary Slow Mixture Cut-off Solenoid Valve



Inspection of Primary Slow Mixture Cut-off Solenoid Valve.

Turn the ignition switch ON.

Check the clicking sound of solenoid valve.

Does the solenoid valve click ?

NO

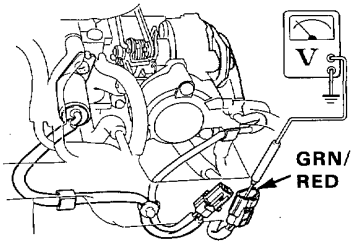
Turn the ignition switch OFF.

YES

Disconnect the 2P connector.

Turn the ignition switch ON.

Measure voltage between GRN/RED (+) terminal and body ground.



Is there battery voltage ?

YES

Replace the solenoid valve.

NO

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

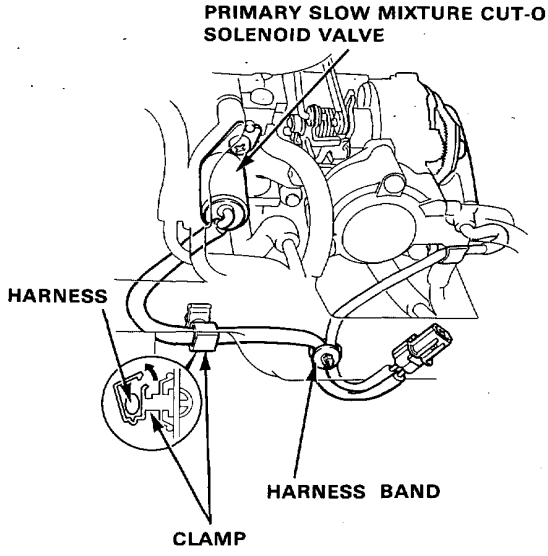
Primary Slow Mixture Cut-off Solenoid Valve is OK.

(cont'd)

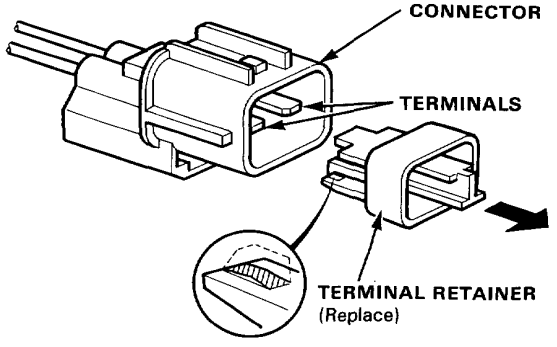
Primary Slow Mixture Cut-off Solenoid Value (cont'd)

1. Remove the 2P connector, cut the harness band, and open the harness clamp on the idle controller bracket. Disconnect the fuel cut-off solenoid valve harness from the clamp.

   CAUTION: Take care not to apply excessive force on the clamp at it is broken easily.

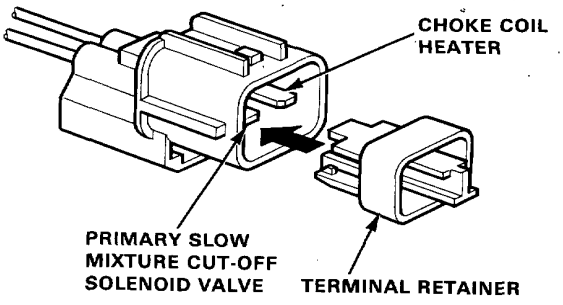


2. Disconnect the terminal retainer from the connector and remove the two terminals.

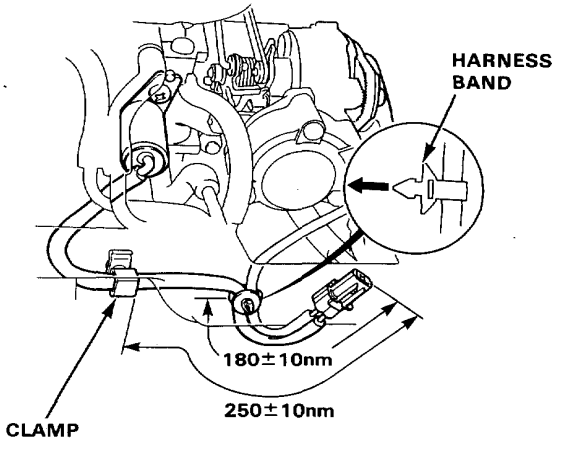


3. Replace the solenoid valve.

4. Connect the respective terminals to a new connector and install a new terminal retainer.
   NOTE:
   - Be sure to connect the terminal before installing the terminal retainer.
   - Replace the connector and terminal retainer with the new ones.
   - Note the location of the terminal.



5. Secure the harness with the clamp as shown in the drawing and use the harness band to hold the two harnesses together 180mm from the tip of the connector.
   CAUTION: Cut off the excess of the harness band and set it on the harnesses so that the tip of the band points to the vacuum hose manifold.



(KS KG, KQ)

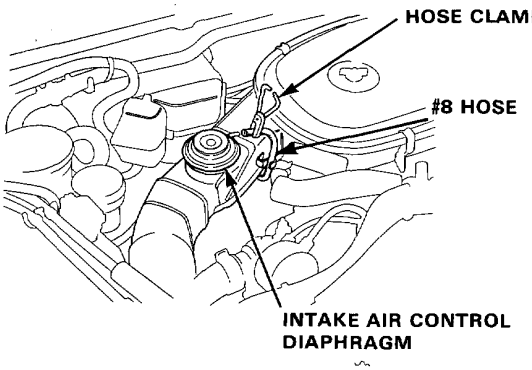
Inspection/Adjustment

Propane Enrichment Method

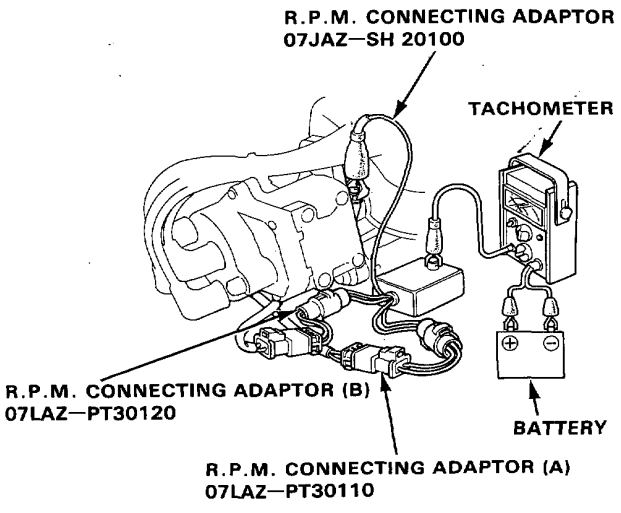
⚠WARNING Do not smoke during this procedure. Keep any open flame away from your work area.

NOTE:
- This procedure requires a propane enrichment kit.
- Check that the self diagnosis indicator before making idle speed and mixture inspections.

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

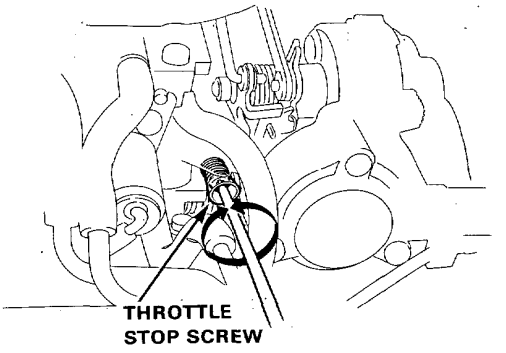


3. Connect a tachometer.



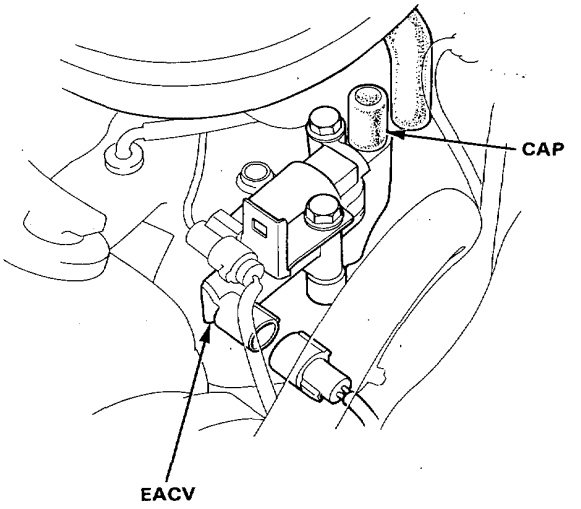
4. Turn the ignition switch OFF. Restart the engine and hold engine at idle for 2 minutes. And hold engine at 2,500—3,000 min^{-1} (rpm) for 1 minute.
Check idle speed with the headlights, heater blower, rear window defogger, cooling fan and air conditioner off.
Idle speed should be:

Manual	800 ± 50 min^{-1} (rpm)
Automatic	750 ± 50 min^{-1}(rpm) (in "D")



Adjust the idle speed, if necessary, by turning the throttle stop screw.
NOTE: If the idle speed is excessively high, check the throttle control system (page 6-112)

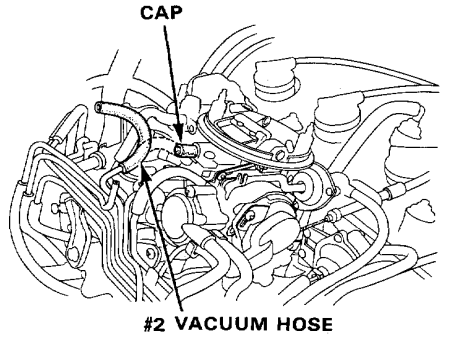
5. Disconnect the 2P connector from the EACV and disconnect the hose from the EACV, then cap the EACV.



(cont'd)

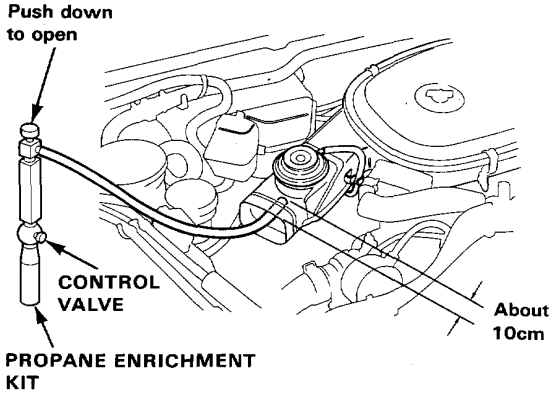
Idle Speed/Mixture (cont'd)

6. Disconnect the #2 vacuum hose from the carburetor, then cap the carburetor.



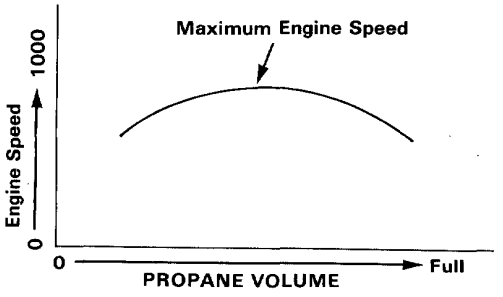
7. Disconnect air cleaner intake tube from air intake duct.

8. Insert the hose of the propane enrichment kit into the intake tube about 10 cm.
NOTE: Check that propane bottle has adequate gas before beginning test.



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

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



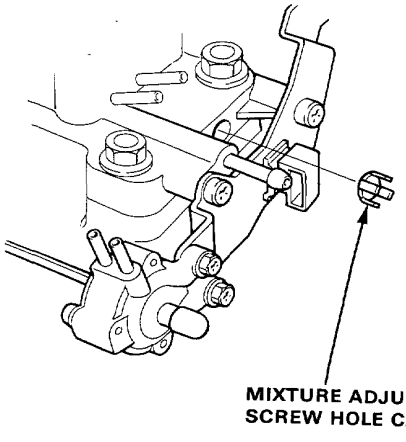
Engine speed increase should be:

Manual	160 ± 20 min^{-1} (rpm)
Automatic	50 ± 10 min^{-1} (rpm) (in "D")

- If engine speed does not increase per specification, mixture is improperly adjusted. Go to step 10.
- If engine speed increases per specification, go to step 14.

10. Remove the air cleaner and close the propane cotrol valve.

11. Remove the mixture adjusting screw hole cap.



12. Start engine and warm up to normal operating temperature ; the cooling fan will come on.
13. Reinstall the propane enrichment kit and recheck maximum propane enriched engine speed.

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

14. Close the propane control valve speed and remove the BACK UP fuse for 10 seconds to reset control unit. Recheck idle speed.

    Idle speed should be:

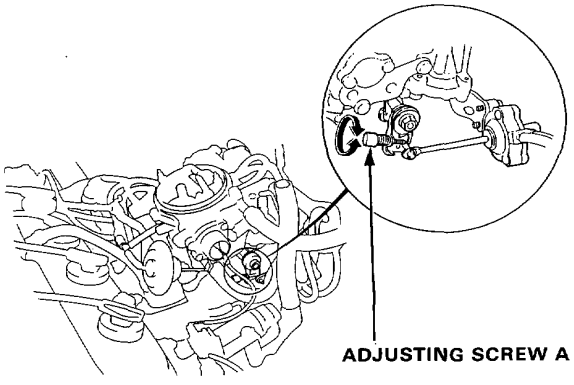
Manual	800±50min^{-1} (rpm)
Automatic	750±50min^{-1} (rpm) (in "D")

    - If idle speed is as specified (step 4), go to step 15.
    - If idle speed is not as specified, adjust by turning throttle stop screw, then repeat steps 13 and 14.

15. Remove propane enrichment kit and reconnect air cleaner intake tube on the air intake duct.
16. Reinstall the mixture adjusting screw hole cap.
17. Disconnect the connector on the P/S oil pressure switch, and check the idle speed.

    Idle speed should be:

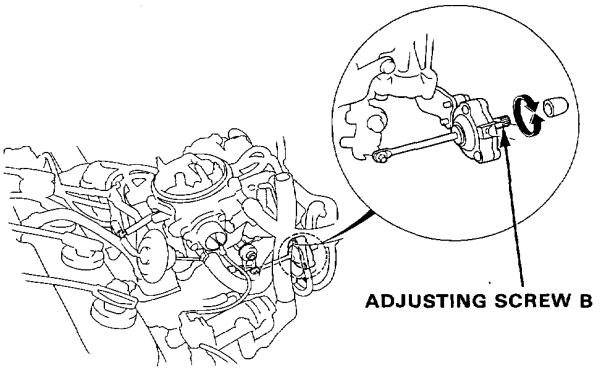
Manual	950 ± 50 min^{-1} (rpm)
Automatic	820 ± 50 min^{-1} (rpm) (in "D")



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

18. If equipped with air conditioner, check the idle speed with the A/C on.
    Idle speed should be:

Manual	800±50min^{-1} (rpm)
Automatic	750±50min^{-1} (rpm) (in "D")



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

(cont'd)

Idle Speed / Mixture (cont'd)

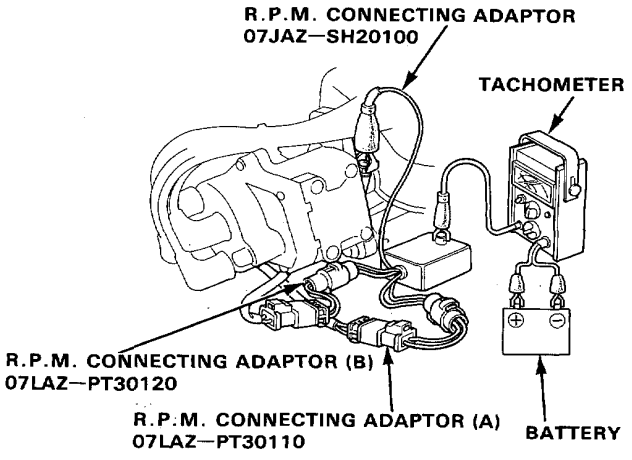
(Except KS, KG, KQ)

CO Meter Method

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

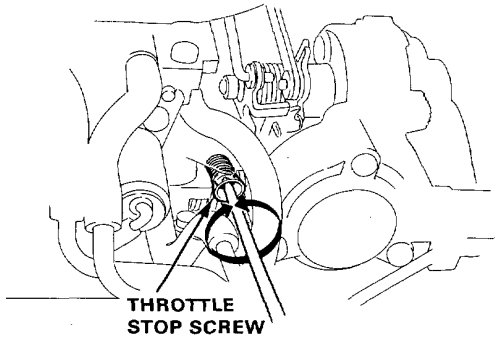
NOTE: Check that the self-diagnosis indicator (KX) before making idle speed and mixture inspections.

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



3. Turn the ignition switch OFF. Restart the engine and hold engine at idle for 2 minutes. And hold engine at 2,500—3,000min^{-1} (rpm) for 1 minute.
   Check idle speed with the headlights, heater blower, rear window defogger, cooling fan and air conditioner off.
   Idle speed should be:

Manual	800±50min^{-1} (rpm)
Automatic	750±50min^{-1} (rpm)(in "D")



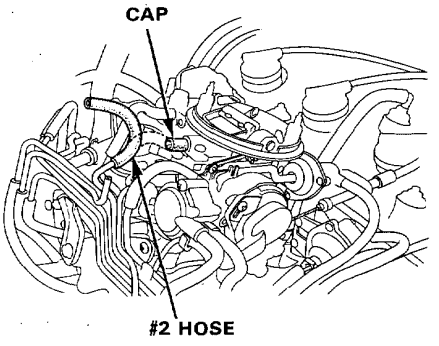
   Adjust the idle speed, if necessary, by turning the throttle stop screw.
   NOTE: If the idle speed is excessively high, check the throttle control system (page 6-112)

4. Calibrate the NDIR CO Meter in accordance with the manufacturer's recommended procedures.
   Insert exhaust gas sampling probe into the tailpipe at least 40 cm.
5. Turn the ignition switch OFF. Restart the engine and hold engine at idle for 2 minutes. And hold engine at 2,500—3,000 min^{-1} (rpm) for 1 minute.
   Check specification for idle CO with cooling fan, air conditioner OFF and headlights OFF.

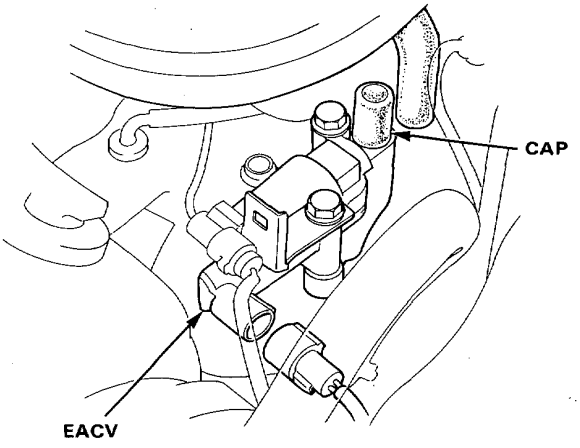
   Specified CO%:
   KX: 0.1% maximum
   Except KX: 1±1%

   - If idle CO is as specified, go to step 14.
   - If not, go to step 6 through 13.

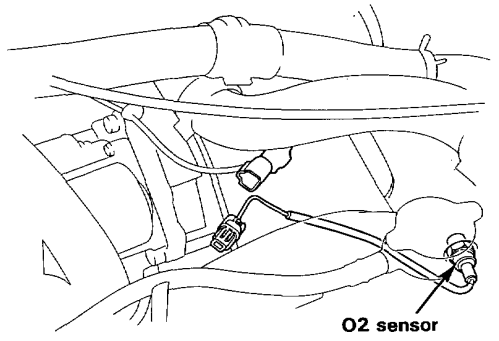
6. KX ;
   Disconnect the #2 vacuum hose from the carburetor, then cap the carburetor.



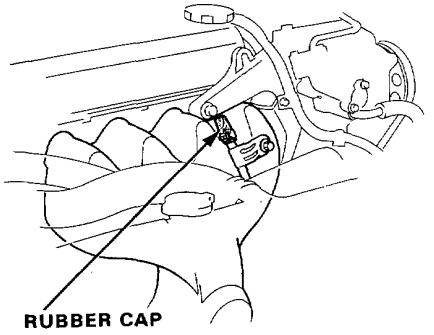
7. KX:
   Disconnect the 2P connector from the EACV and disconnect the hose from the EACV, then cap the EACV.



8. KX:
Disconnect the wire harness from the O^2 sensor.



9. KX:
Remove the rubber cap from the gas pipe.



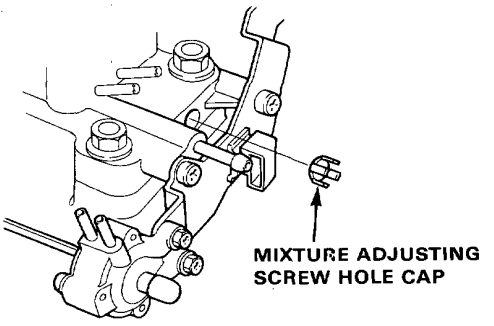
10. KX:
Turn the ignition switch OFF. Restart the engine and hold engine at idle for 2 minutes. And hold engine at 2,500—3,000 min^{-1} (rpm) for 1 minute.
Check specification for idle CO.

Specified CO%: 2.3±1.0%

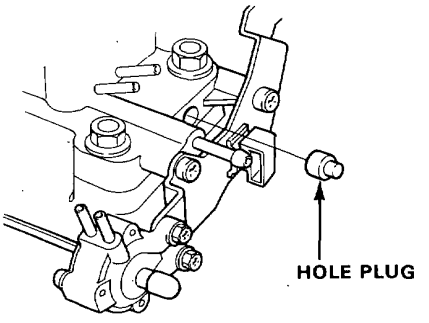
- If not, specification, go to step 11.

11. Remove mixture adjusting screw hole plug and adjust by turning mixture adjusting screw to obtain proper CO reading.

(KX)



(Except KX)



— Turning mixture adjusting screw

clockwise: CO reading decreases
counterclockwise: CO reading increases

Readjust idle speed if necessary, and recheck idle CO.

12. KX:
Reconnect the connector and hose.
Remove BACK UP fuse for 10 seconds to reset control unit.

13. KX:
Turn the ignition switch OFF. Restart the engine and hold engine at idle for 2 minutes. And hold engine at 2,500—3,000 min^{-1} (rpm) for 1 minute.
Recheck idle CO.

Specified CO%: 0.1% maximum

- If idle CO is as specified, go to step 14.
- If not, check the self-diagnosis indicator (page 6-22). If not, inspect the EACV (page 6-104) and the catalytic converter (page 6-103), then repeat step 6.

14. Recheck idle speed.
Idle speed should be:

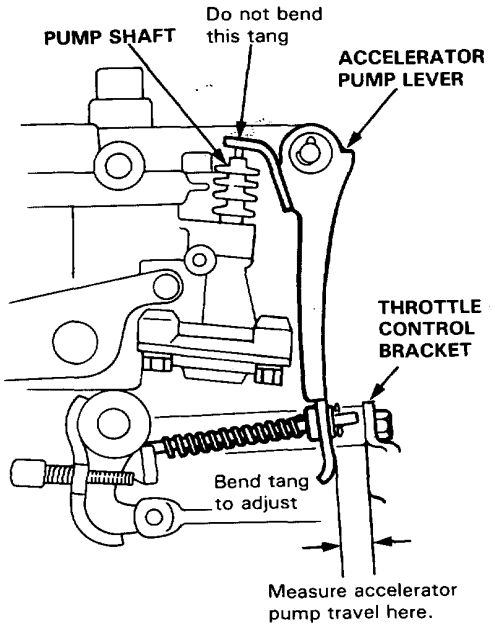
Manual	800±50 min^{-1} (rpm)
Automatic	750±50 min^{-1} (rpm) (in "D")

(cont'd)

Accelerator Pump

Inspection

1. Before measuring the accelerator pump linkage travel, make sure the pump shaft travels freely throughout the pump stroke. Make sure the pump lever is in contact with the pump shaft.



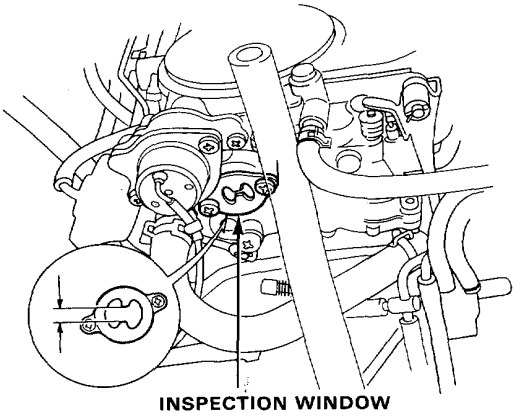
2. To check linkage travel, measure gap between bottom end of pump lever (tang) and stop as shown.
   ***Limits*: 11.5 to 12.0 mm (29/64" to 31/64")**

Float Level

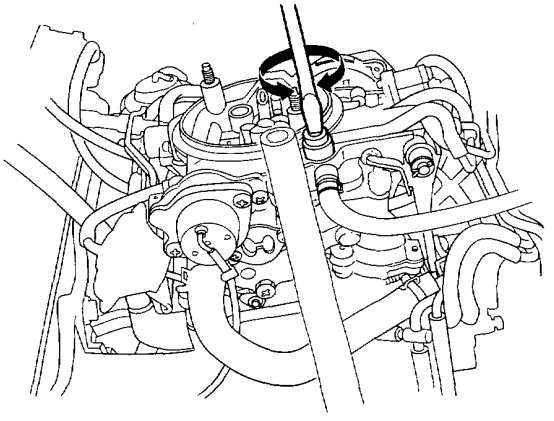
Adjustment

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

1. Place the car on level ground.
2. Start and warm up the engine, snap the throttle between idle and 3,000 min^{-1} (rpm) several times then allow it to idle.
3. When the fuel level stabilizes, check that it is centered in the inspection window.



4. If the fuel level is not centered, adjust it by slowly turning the adjusting screw.
5. Paint the adjustment screw with white paint after adjustment.
   NOTE: Do not turn the adjusting screw more than 1/8-turn every 15-seconds.



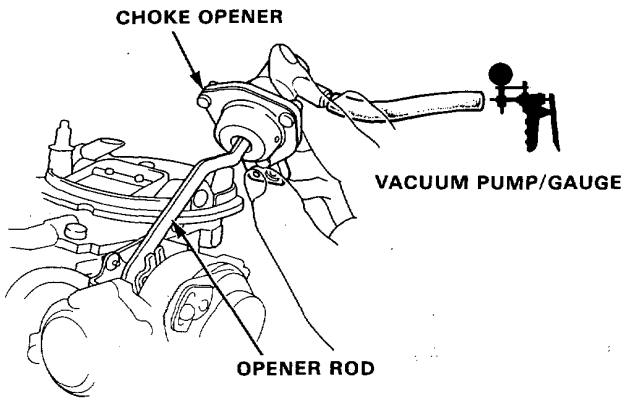
Choke Opener

Testing

1. Disconnect the 2P connector of the choke coil heater.
2. Open and close the throttle fully to let the choke close.
3. Start the engine.

   The choke valve should partially open.

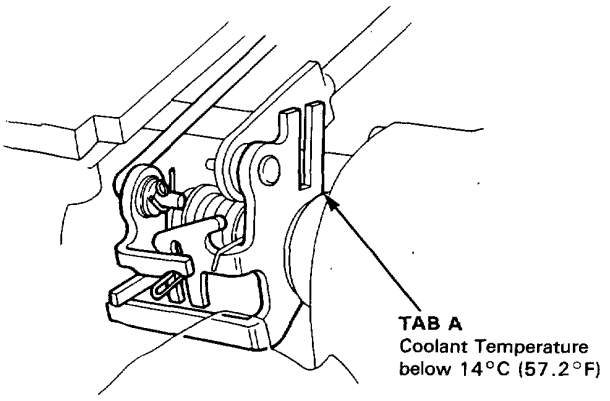
   - If the choke partially opens, go on to step 4 or step 5, depending on coolant temperature.
   - If the choke does not open partially, check the linkage for free movement, repair as necessary, and retest.
   - If the choke valve still does not open partially, check the choke opener diaphragm: Remove the choke opener, and connect a vacuum pump. Block the orifice in the opener while you apply enough vacuum to pull the opener rod all the way in, then stop.



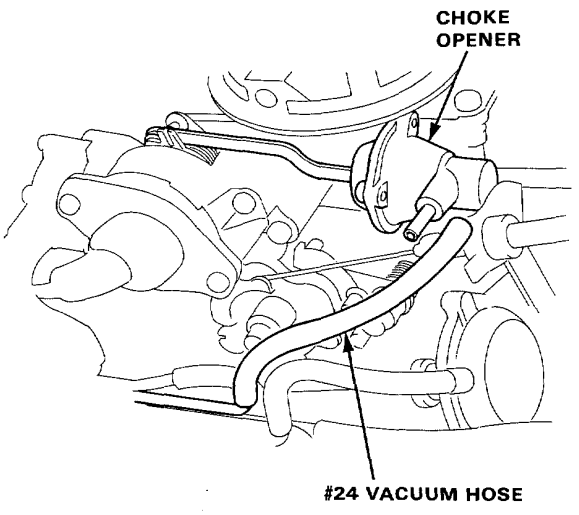
   — If the rod will not stay in, replace the opener.
   — If the rod stays in, check the vacuum port in the carburetor for blockage.

   NOTE: After replacing or reinstalling the choke opener, retest it, then adjust it if necessary (page 6-88).

4. If coolant temperature is below about 14°C (57.2°F), Tab A on the choke opener lever should not be seated against the carburetor.

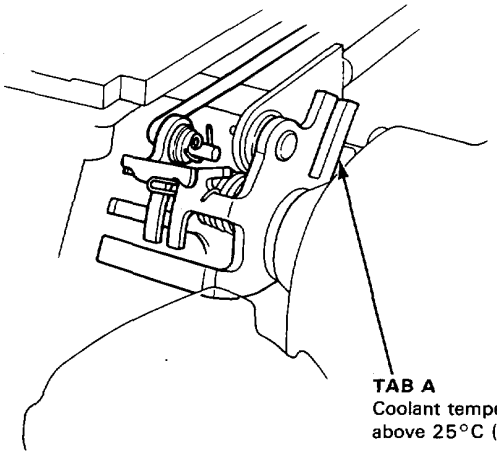


   - If Tab A is not seated, go on to step 5.
   - If Tab A is seated, disconnect the #24 vacuum hose from the choke opener.



   — If Tab A comes off its seat, check the #24 vacuum line for proper connection or disconnected hose. If OK, replace the thermovalve A.

5. If coolant temperature is above about 25°C (77°F), Tab A on the choke opener lever should be seated against the carburetor.



TAB A
Coolant temperature above 25°C (77°F)

- If Tab A is not seated, check the #24 vacuum line for proper connection, cracks, blockage or disconnected hose. If OK, replace the thermovalve A.

Choke Coil Tension and linkage

Inspection (COLD ENGINE)

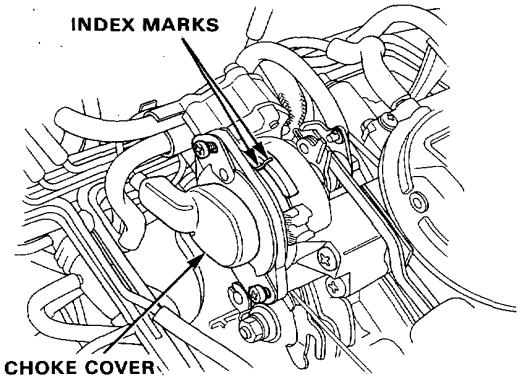
1. Remove the air cleaner.
2. Open and close the throttle fully to let the choke close.

   The choke valve should close completely.

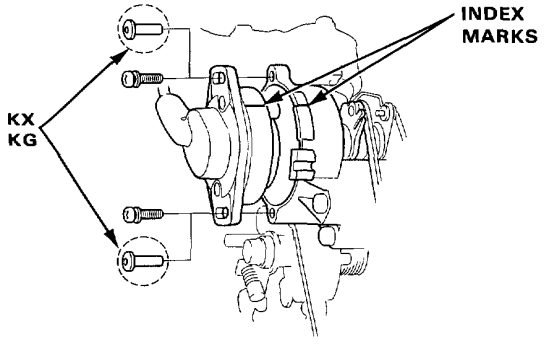
   NOTE; Above about 28°C (82°F) the choke will not close completely, but should still close to less than 3 mm (1/8 in.).

   - If the choke closes properly, go on on to the fast idle unloader test on page 6-89.
   - If the choke does not close properly, spray its linkage with carburetor cleaner, and check the linkage for sings of mechanical binding (use a spray can with an extension on the nozzle to reach the linkage).

   CAUTION: Carburetor cleaner is very caustic; always wear safety goggles or a face shield when spraying.



   - If the choke still does not close properly, remove the choke cover (page 6-86) 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 retest.
   - If the choke still does not close properly, replace the cover (page 6-86).



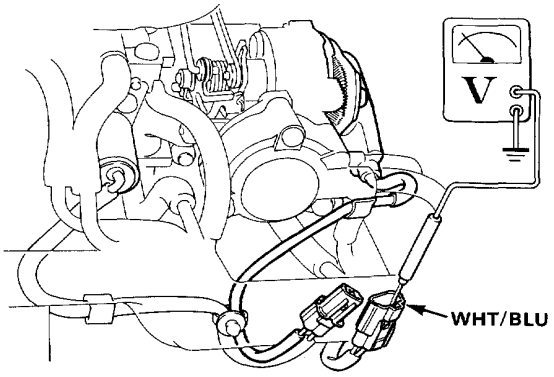
Choke Coil Heater

Testing

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

- If it does, go on to the fast idle unloader test on page 6-89.
- If it doesn't inspect the linkage, and clean or repair it as necessary (page 6-85).
- If the choke still does not open all the way, disconnect the connector, and measure voltage between WHT/BLU (+) terminal and body ground.

  There should be battery voltage with the engine running.

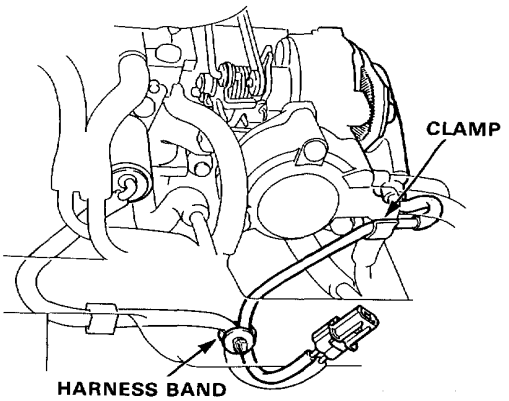


— If there is no voltage, inspect open in WHT/BLU wire between the connector and the alternator.
If OK, inspect the alternator (section 16).

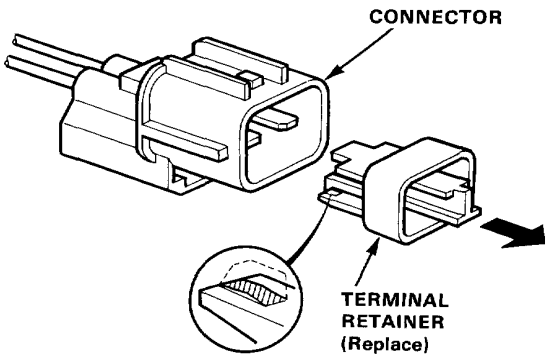
Replacement

1. Remove the air cleaner.
2. Remove the 2P connector, cut the harness band and disconnect the choke cap harness from clamp.

   CAUTION: Take care not to apply excessive force on the clamp as it is broken easily.



3. Disconnect the terminal retainer from the connector and remove the two terminals.

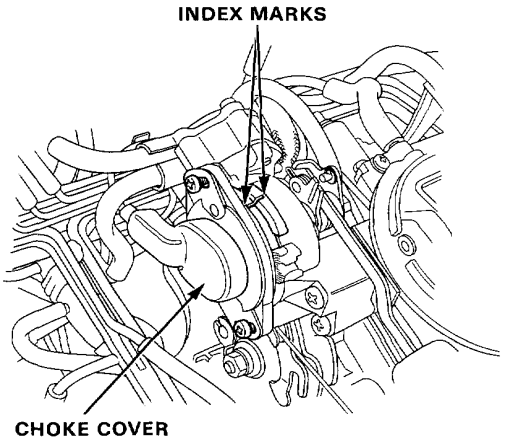


4. KX, KG:
Using a 5/32" or 4.1 mm diameter drill, drill out the rivets and remove the choke cover.

CAUTION: *Cover the carburetor with a clean shop rag to prevent chips from falling into the carburetor throat.*

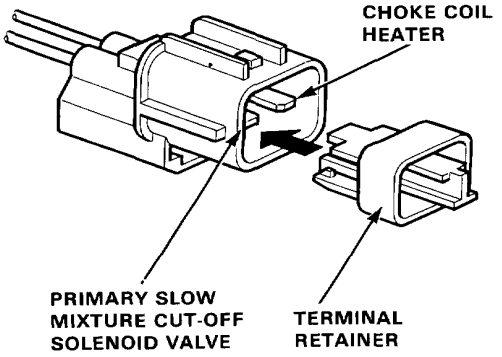
Except KX, KG:
Remove the screws and remove the choke cover.

5. Reinstall the cover and adjust it so that index marks align (KX, KG:, then secure it with rivets).



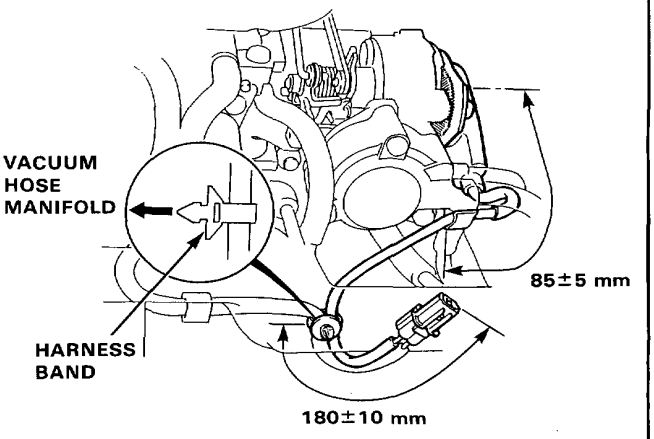
6. Connect the respective terminals to a new connector and install a new terminal retainer.

NOTE:
- Be sure to connect the terminal before installing the terminal retainer.
- Replace the connector and terminal retainer with the new ones.
- Note the location of the terminal.



7. Secure the harness with the clamp as shown in the drawing and use the harness band to hold the two harnesses together 180 mm from the tip of the connector.

CAUTION: Cut off the excess of the harness band and set it on the harnesses so that the tip of the band points to the vacuum hose manifold.



8. Reconnect the connector and reinstall the air cleaner.

Choke Linkage

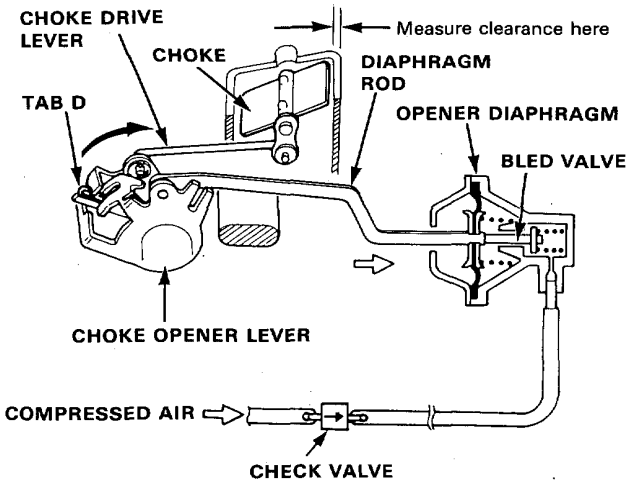
Adjustment

NOTE:
- This check is not necessary unless the linkage has been bent, choke opener has been replaced, or the car has poor cold starting.
- This check can be made with the engine HOT or COLD.

1. Remove the choke cover (page 6-87)

2. While holding the choke valve closed, open and close the throttle fully to engage the choke and fast idle linkage.

3. Disconnect the choke opener hose from the vacuum hose manifold, and attach a check valve to it as shown. Then pressurize the choke opener with low pressure compressed air, 103—586 kPa (15—85 psi) is OK, to hold the bleed valve in it closed.

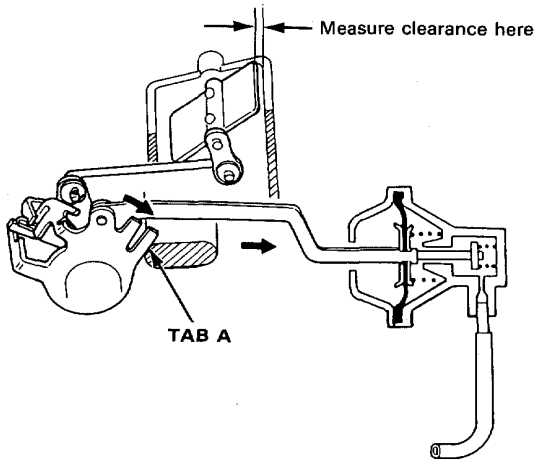


4. Gently push the choke opener lever towards the opener until is stops (until you feel the opener rod seat against the pressurized bleed valve), then pull the choke drive lever down against the opener lever (to take all free play out of the linkage), and measure the clearance between the choke blade and casting:

1st Stage Clearance
0.88 ± 0.07 mm (0.035 ± 0.003 in.)
Adjust clearance by bending Tab D.

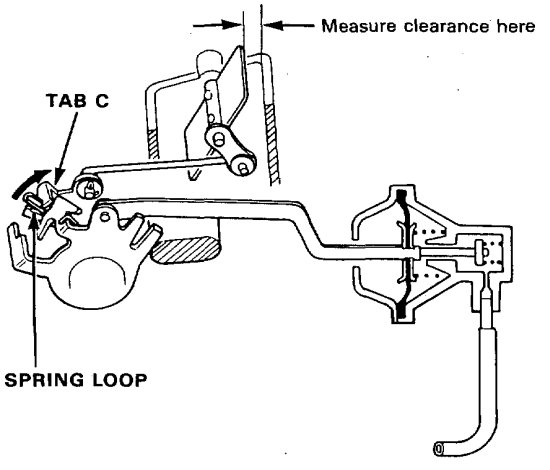
5. Remove the check valve, and reconnect the choke opener hose.

6. Hold both levers together, then push them toward the diaphragm again until they stop (Tab A on the opener lever seats against the carburetor), and measure the clearance at the choke valve.



2nd Stage clearance:
3.1 ± 0.11 mm (0.122 ± 0.004 in.)
Adjust clearance by bending Tab A.

7. While still holding opener lever Tab A against its seat, release the choke drive lever, and meassure the clearance at the choke valve (Tab C on the drive lever should stay seated against the spring loop; if not, repeat step 2 and recheck):

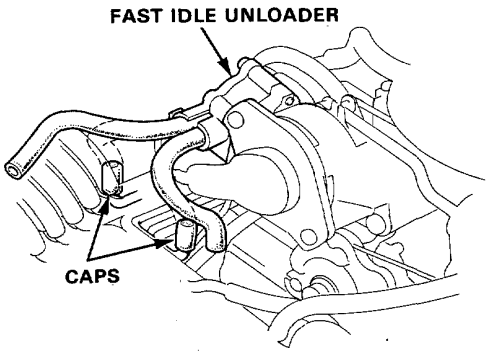


3rd Stage Clearance:
5.2 ± 0.28 mm (0.205 ± 0.011 in.)

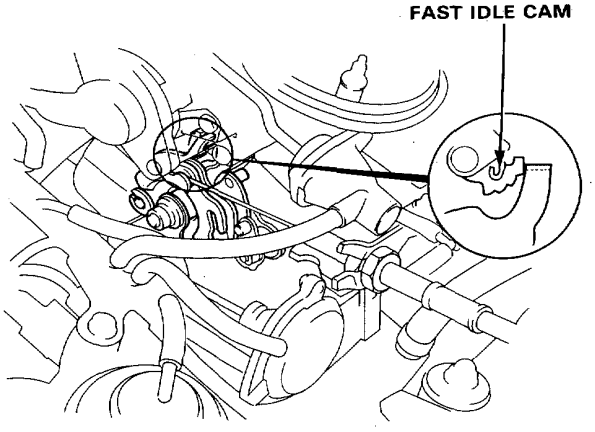
Fast Idle

Testing

1. Disconnect the two hoses from the fast idle unloader.



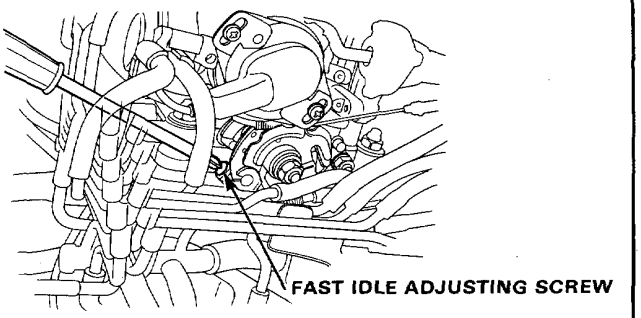
2. Open and close the throttle fully to engage the fast idle cam.



3. Start the engine.

   Fast idle should be 3,400 ± 500 min^{-1} (rpm)

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

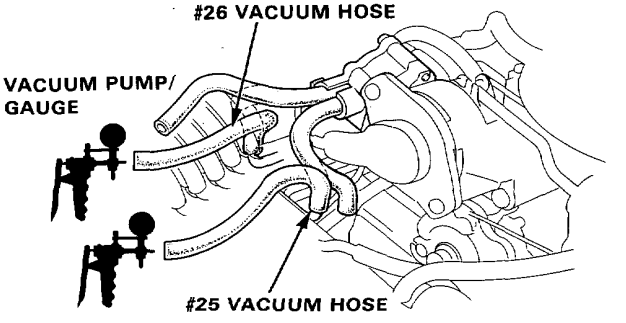


5. Reconnect the hoses.

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

   When the engine warms up, its speed should drop below 1,400 min^{-1} (rpm) as the unloader pulls the internal choke linkage off the fast idle cam.

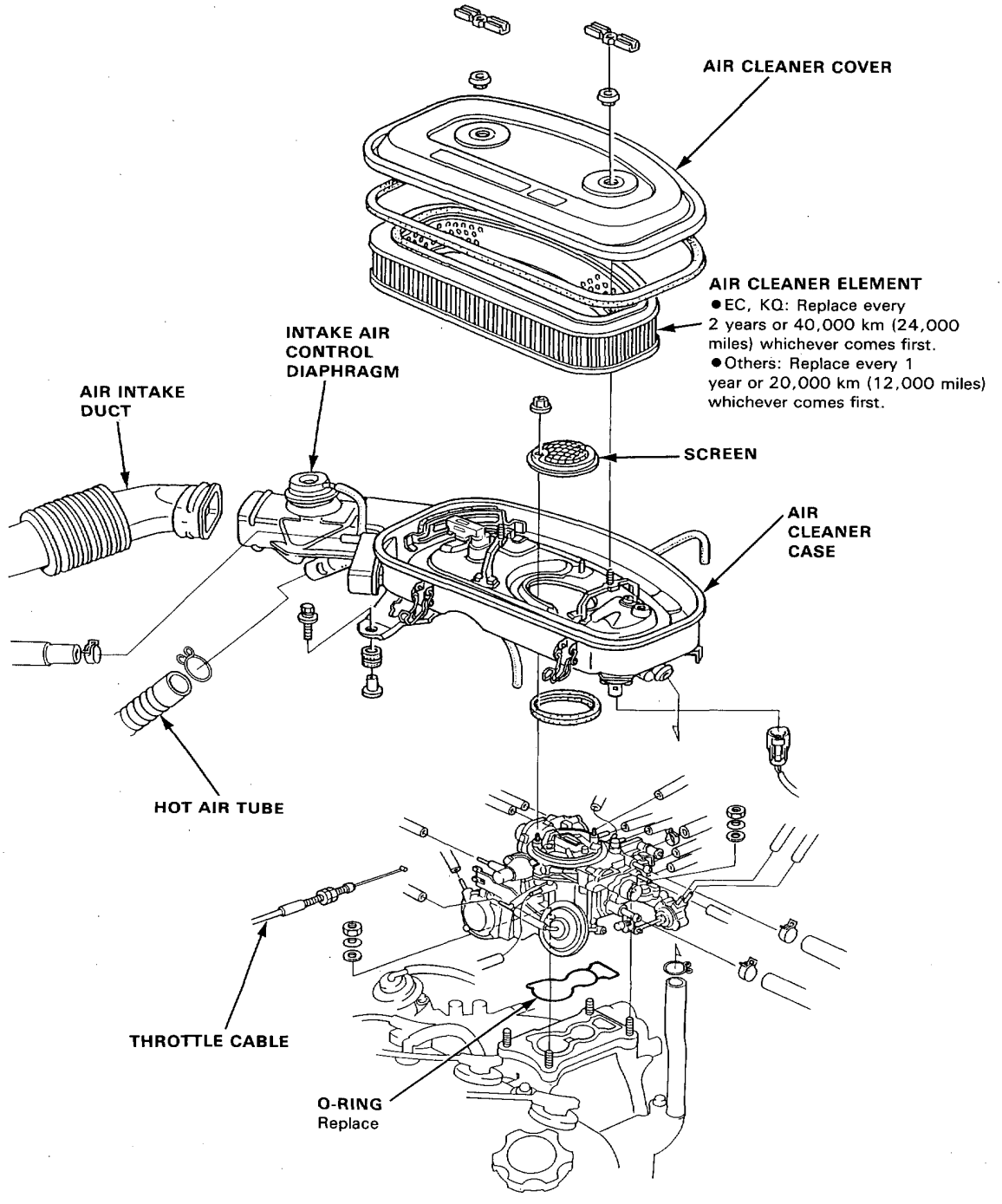
   - If fast idle does not drop below 1,400 min^{-1} (rpm), disconnect the two unloader hoses, and check the vacuum.



   - If there is no vacuum, check the #25 and #26 vacuum line for proper connection, cracks, blockage or disconnected hose. If OK, replace the thermovalve A.
   - If there is vacuum, replace the fast idle unloader, and then inspect the choke coil tension and linkage (page 6-85).

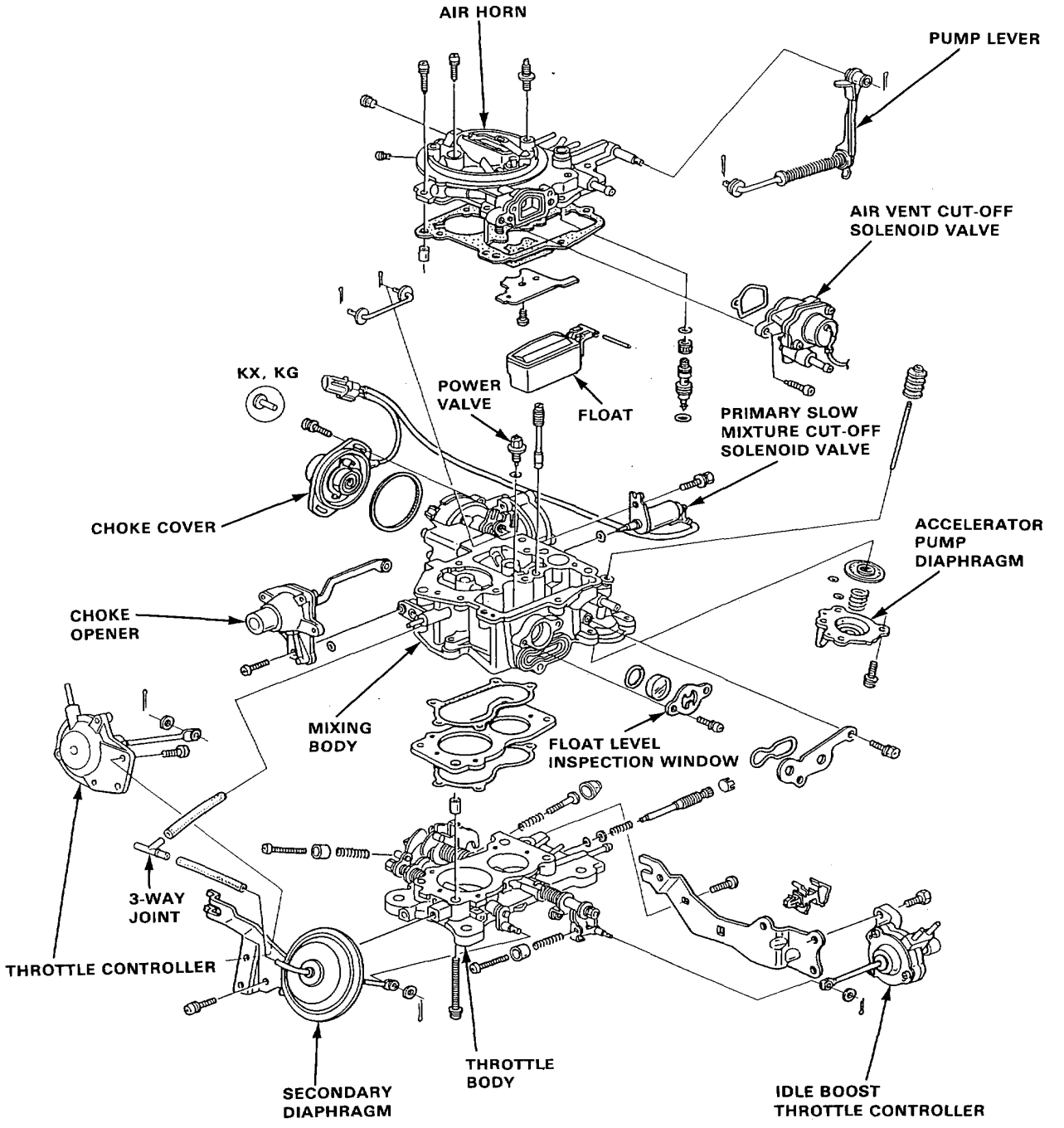
Carburetor

Remova



Replacement

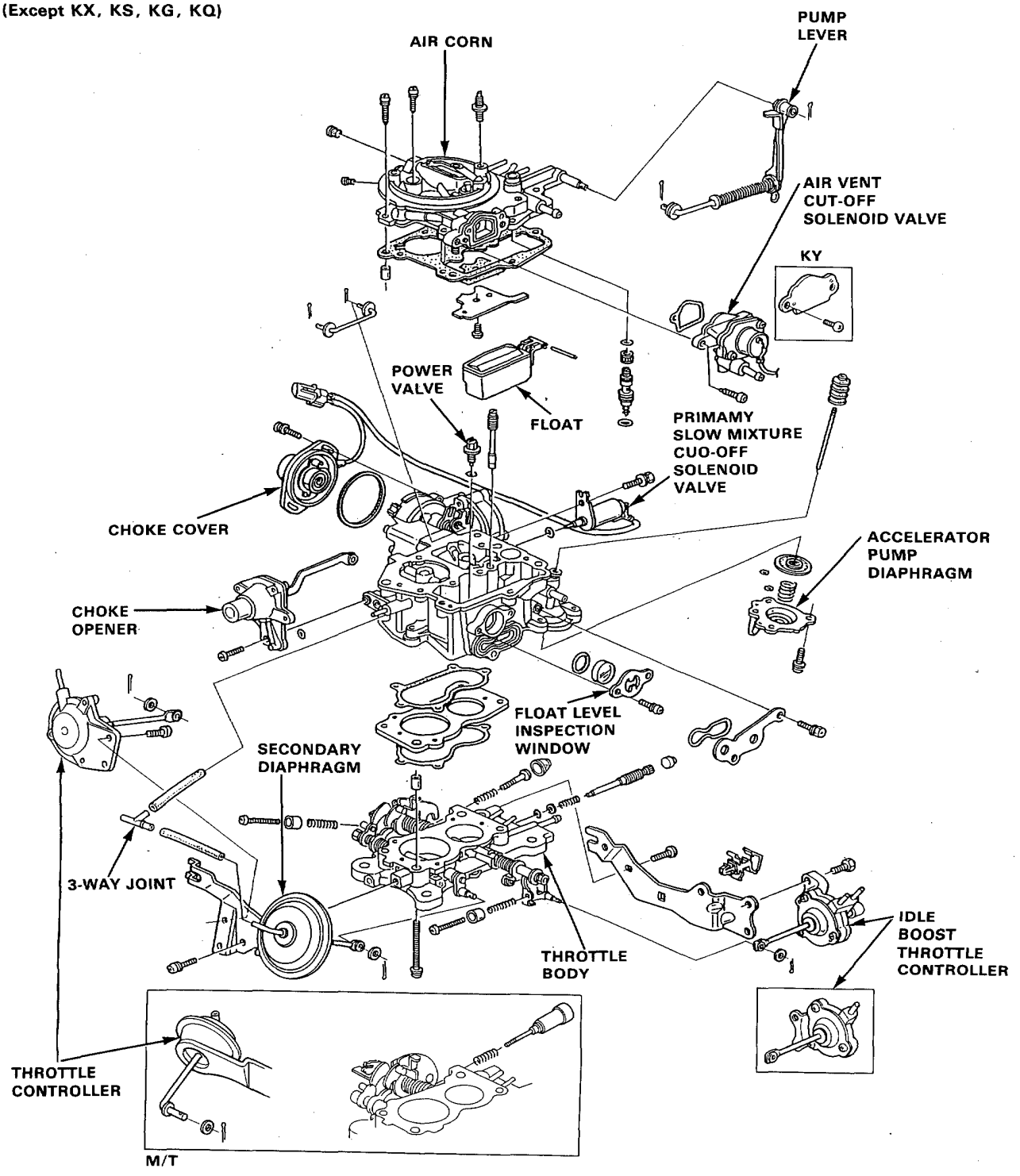
(KX, KS, KG, KQ)



Carburetor

Replacement

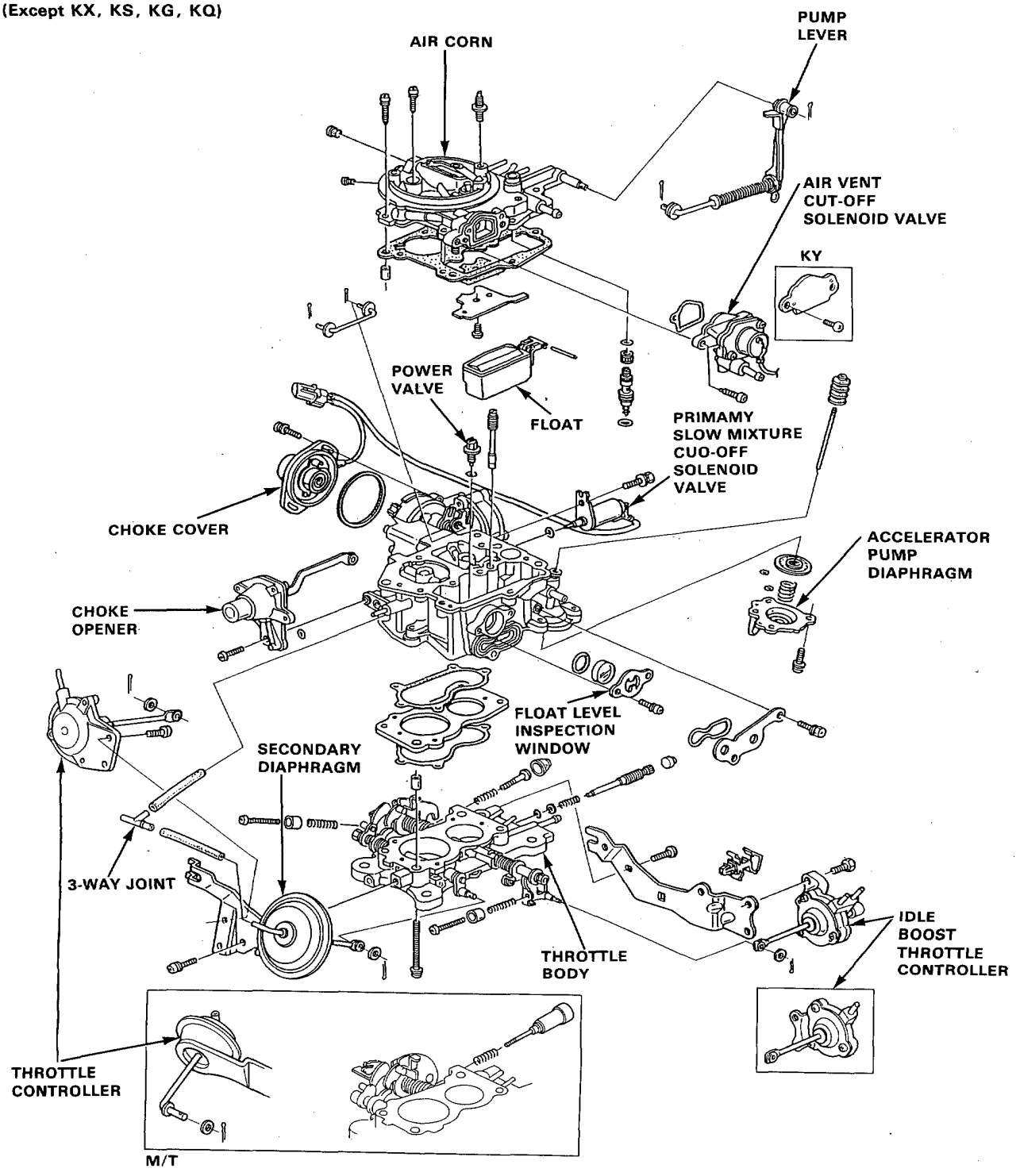
(Except KX, KS, KG, KQ)



Carburetor

Replacement

(Except KX, KS, KG, KQ)



Fuel Supply System

Symptom-to-sub System Chart

NOTE:

- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the self-diagnosis indicator, valve clearance, air cleaner, and PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begin with the troubleshooting listed in this page.

PAGE / SYSTEM / SYMPTOM		FUEL FILTERS	FUEL PUMP	FUEL CUT-OFF RELAY	FUEL TANK	CONTAMI-NATED FUEL
		94	94	96	97	*
ENGINE WON'T START		③	①	②		②
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	①				①
	LOSS OF POWER	①				①

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

Fuel Supply System

Fuel Filters

Replacement

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

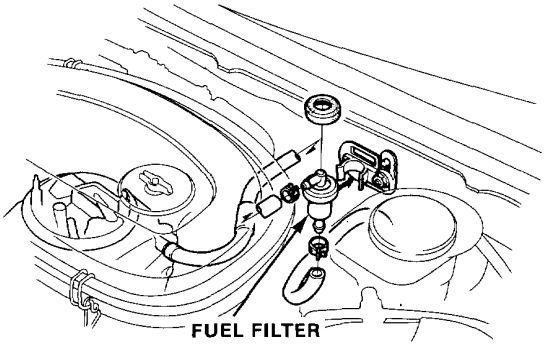
⚠WARNING Do not smoke while working on the fuel system. Keep open flame away from work area.

Front

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

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

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

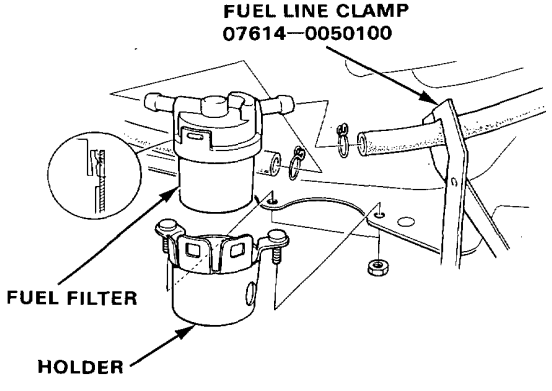


Rear

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

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

4. Install in the reverse order of removal.



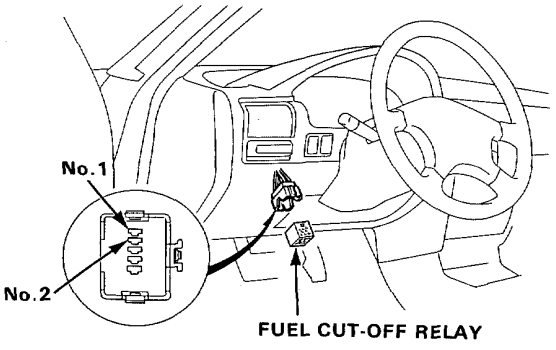
Fuel Pump

Testing

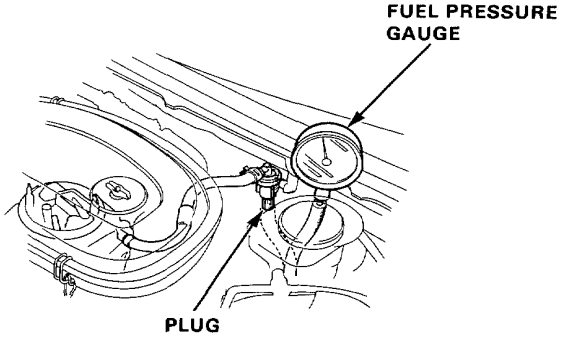
⚠WARNING Do not smoke during the test. Keep any open flame away from your work area.

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

1. Remove the dashboard under cover and the fuel cut-off relay.
2. Connect a jumper wire between the No.1 terminal and the No.2 terminal.



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



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

Pressure should be 8.8–13.7 kPa (1.3–2.0 psi).

- If gauge shows at least 8.8 kPa (1.3 psi), go on to step 5.
- If gauge shows less than 8.8 kPa (1.3 psi), replace the pump and retest.

Fuel Cut-off Relay

Testing

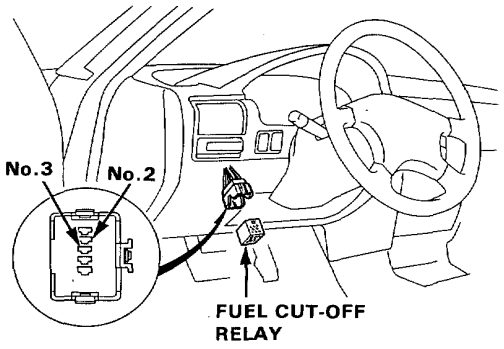
1. With the ignition switch off, remove the dashboard under cover.
2. Remove the fuel cut-off relay.
3. Check for continuity between the No.3 terminal and body ground.

   Continuity should exist.

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

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

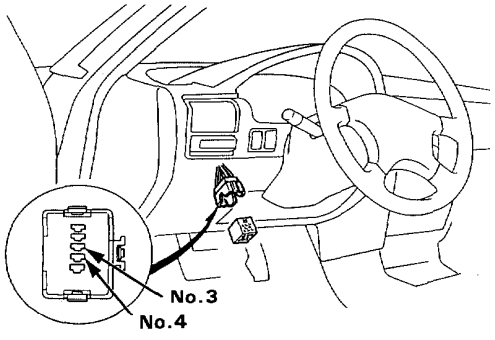
   Battery voltage should be available.



   - If there is no voltage, check the BLK/YEL wire from the ignition switch and fuel cut-off relay as well as No.2 fuse.

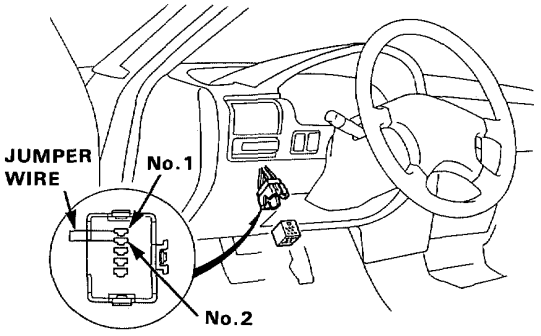
5. Turn the ignition switch OFF.
   Attach the positive probe of the voltmeter to the No.4 terminal and the negative probe to the No.3 terminal. Then turn the ignition switch ON.

   Battery voltage should be available.



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

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

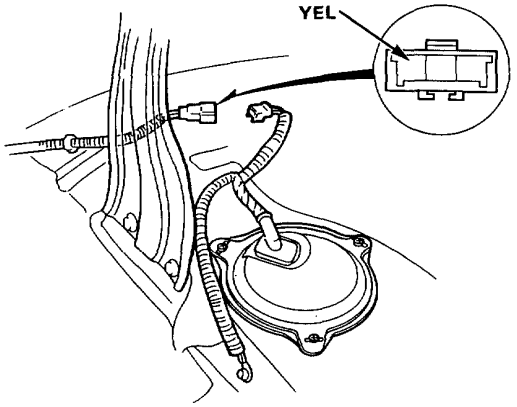


7. Turn the ignition switch ON.

   The fuel pump should run.

   - If the fuel pump does not run, and disconnect the 3P connector in the luggage area.
     Attach the positive probe of the voltmeter to YEL terminal and negative probe to body ground.

     Battery should be available.



     — If OK, check BLK wire between the fuel pump and G601, and YEL wire between the fuel pump and 3P connector. If OK, replace the fuel pump.
     — If not, check YEL wire between the fuel cut-off relay and fuel pump.

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

Fuel Tank

Replacement

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

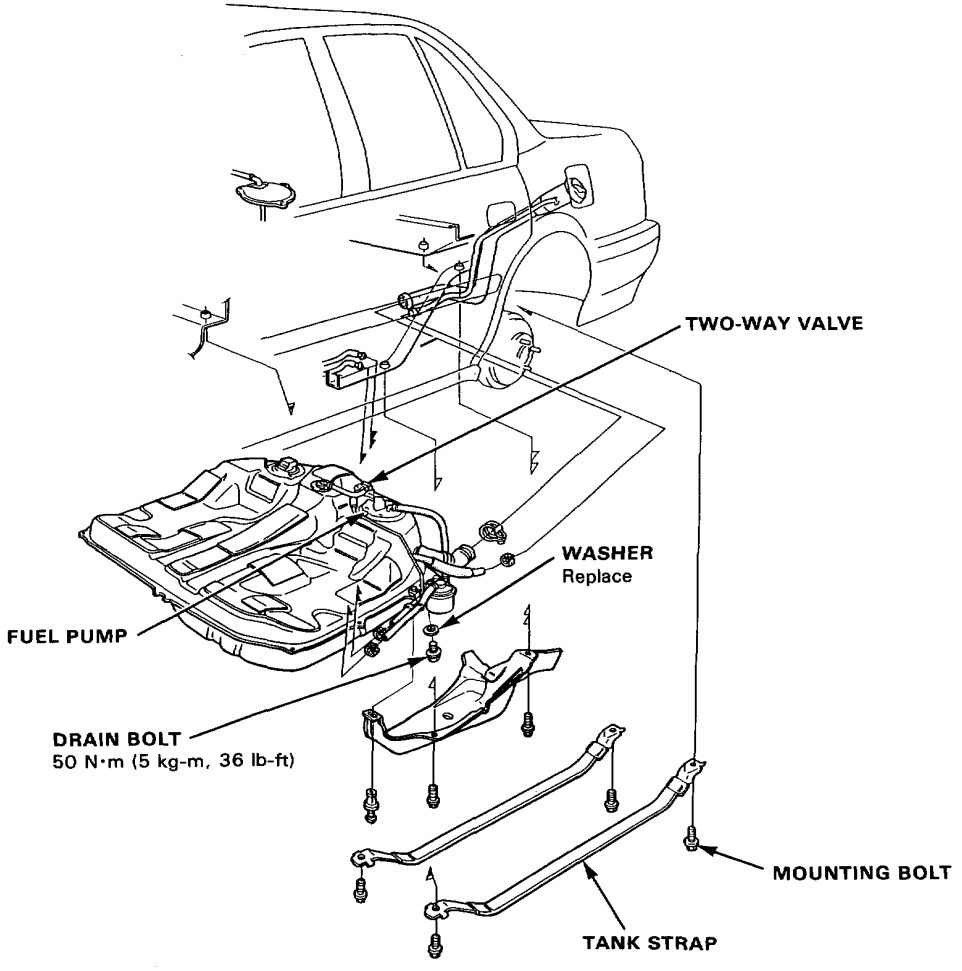
1. Block front wheels. Jack up the rear of the car and support with jackstands.
2. Remove the drain bolt and drain the fuel into an approved container.
3. Disconnect the fuel gauge sending unit and fuel pump connectors.
4. Disconnect the hoses.

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

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

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

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



Air Intake System

Symptom-to-Sub System Chart

NOTE:

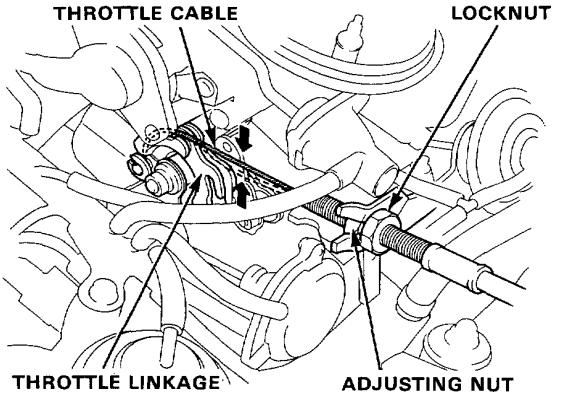
- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the self-diagnosis indicator, valve clearance, air cleaner, PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begin with the trouble-shooting listed in this page.

PAGE / SYSTEM / SYMPTOM	THROTTLE CABLE	AIR INTAKE CONTROL
	99	100
LOSS OF POWER		①
AFTERBURN		①
HESITATION/SURGE		①

Throttle Cable

Inspection/Adjustment

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

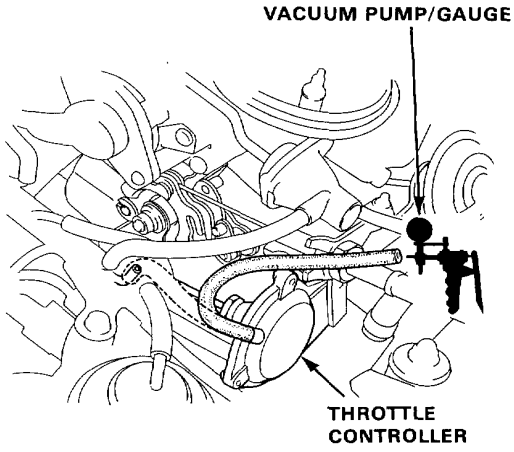


4. If deflection is not within specs, loosen locknut and turn adjusting nut until you can deflect cable as specified. Then tighten locknut.
5. With cable properly adjusted, check throttle valve to be sure it opens fully when you push accelerator pedal to the floor.

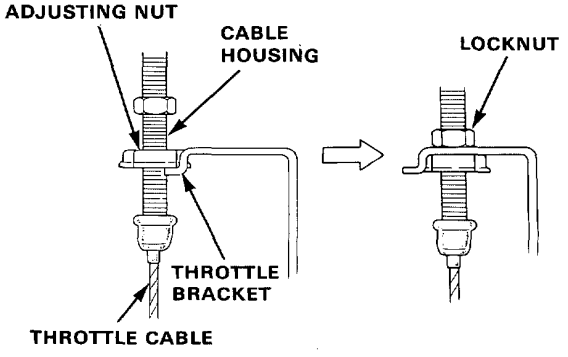
CAUTION: Check throttle valve to be sure it returns to idle position whenever you release accelerator.

Installation

1. KX, KS, KG, KQ and KF, KB, KE, KY, KW, KP, KT (M/T);
   Disconnect the hose from the throttle controller and connect a vacuum pump to the controller, then apply vacuum.



2. Fully open the throttle and choke valves, then close the throttle valve. Now, release the choke valve; the throttle linkage will be off the fast idle cam.
3. Install the throttle cable in the throttle linkage.
4. Remove the cable housing from the throttle bracket, set the adjusting nut on throttle bracket.
   Adjust the adjusting nut so that its free play is 0 mm.
5. Remove the cable housing from the throttle bracket, reset the adjusting nut and tighten the bocknut.



6. KX, KS, KG, KQ and KF, KB, KE, KY, KW, KP, KT (M/T):
   Disconnect the vacuum pump and reconnect the throttle controller hose.
7. On models with automatic transmission, adjust the throttle control cable. See section 9.

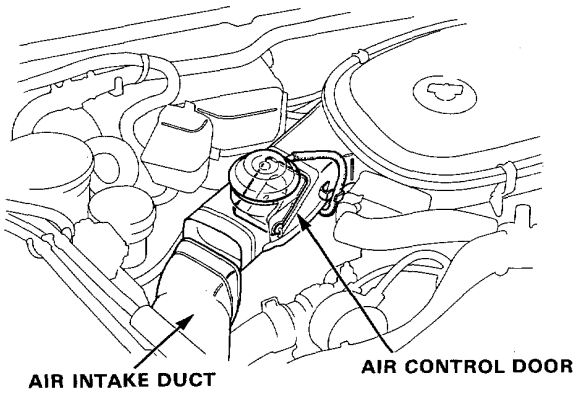
Intake Air Control System

Testing (COLD ENGINE)

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

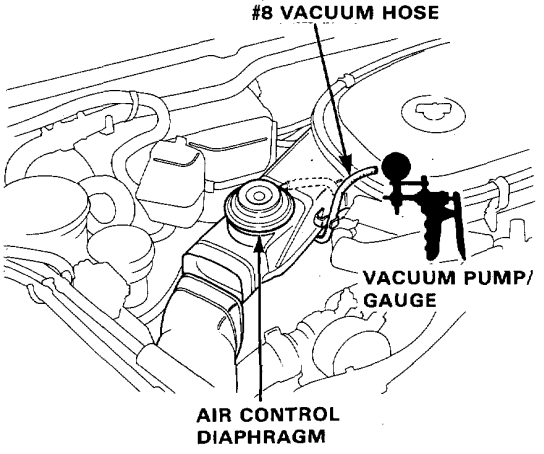
1. Disconnect the air intake duct and start the engine.

   The air control door should rise.



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

  There should be vacuum.

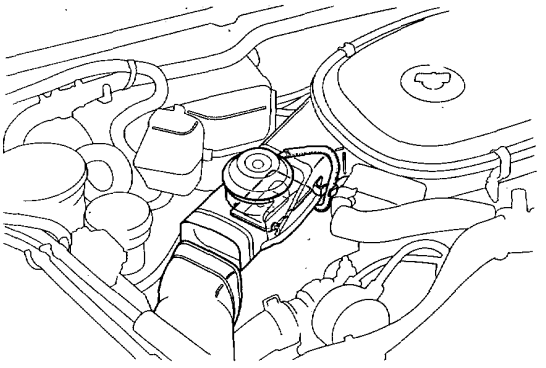


  — If there is vacuum, replace the air control diaphragm and retest.
  — If there is no vacuum, check the #8 vacuum hose for proper connection, cracks, brockage or disconnected hose, and replace the air bleed valve.

Testing (HOT ENGINE)

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

   The air control door should be down.



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

  There should be no vacuum.

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

Emission Control System

Symptom-to-sub System Chart

(KX, KS, KG, KQ)

NOTE:

- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try next system ②, etc.
- Before starting inspection, check that other items that affect engine performance are within specification. Check the self-diagnosis indicator, valve clearance, air cleaner, and PCV valve. In addition, check the ignition timing, function of the vacuum and centrifugal advance, and the condition of the spark plugs. If those items are all within specifications, begin with the troubleshooting listed in this page.

PAGE / SYSTEM / SYMPTOM		FEEDBACK CONTROL	THROTTLE CONTROL	EGR	EVAPORATIVE CONTROL	AIR INJECTION
		104	112	110	115	107
ENGINE WON'T START				②	①	
DIFFICULT TO START ENGINE	WHEN COLD	①	②	②	①	
	WHEN WARM	①	②	③	①	
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION	①	②	②		
	WHEN WARM ENGINE SPEED TOO HIGH		①			
	WHEN WARM ENGINE SPEED TOO LOW	①		②		
	ROUGH IDLE/ FLUCTUATION	①		②		
FREQUENT STALLING	WHILE WARMING UP	①		②		
	AFTER WARMING UP	①		②		
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	②		①		
	LOSS OFF POWER	①			①	
	AFTERBURN	①	②			②
	HESITATION/SURGE	①		②		

Emission Control System

Symptom-to-sub System Chart

(Except KX, KS, KG, KQ)

PAGE / SYSTEM / SYMPTOM		THROTTLE CONTROL	EVAPORATIVE CONTROL
		113	117
ENGINE WON'T START		②	①
DIFFICULT TO START ENGINE	WHEN COLD	②	①
	WHEN WARM	②	①
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION	①	
	WHEN WARM ENGINE SPEED TOO HIGH	②	①
	WHEN WARM ENGINE SPEED TOO LOW	②	①
	ROUGH IDLE/ FLUCTUATION	②	①
FREQUENT STALLING	WHILE WARMING UP	②	①
	AFTER WARMING UP	②	①
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING		①
	LOSS OFF POWER		①
	AFTERBURN	①	②
	HESITATION/SURGE		①

Tailpipe Emissions

Inspection

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

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

1. KX, KS, KG, KQ:
   Check the idle speed/mixture using the propane enrichment method.
2. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
3. Start the engine and warm it up to normal operating temperature (the cooling fan comes on twice).
4. Turn the ignition switch OFF. Restart the engine and hold engine at idle for 2 minutes.
   And hold engine at 2,500—3,000 min^{-1} (rpm) for I minute.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

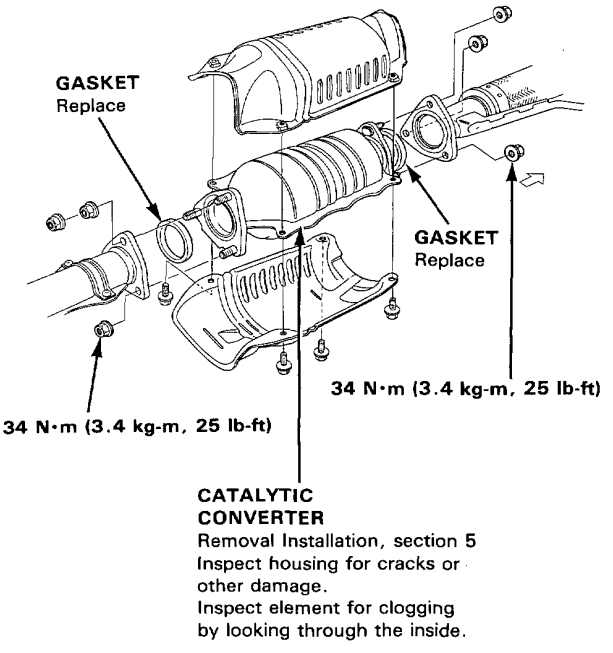
Specified CO %:
KX, KS, KG, KQ: 0.1% maximum
Except KX, KS, KG, KQ: 1.0 ± 1.0%

Catalytic Converter

(KX, KS, KG, KQ)

Inspection

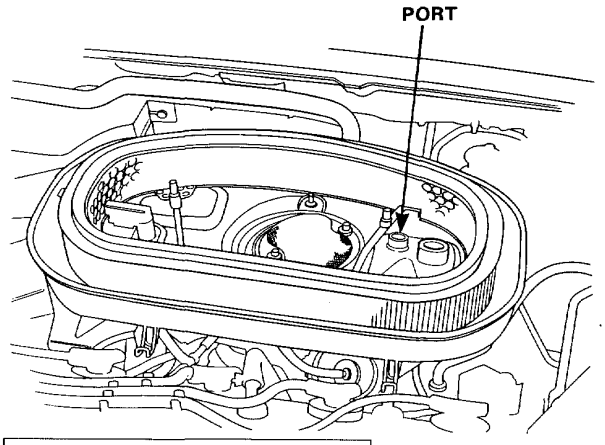
If excessive exhaust system back-pressure is suspected, remove the catalytic converter from the car and make a visual check for plugging, melting or cracking of the catalyst, Replace the catalytic converter if any of the visible area is damaged or plugged.



Feedback Control

Troubleshooting Flow Chart EACV

(KX, KS, KG, KQ)



Inspection of EACV.

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

Remove the air cleaner cover.

Raise the engine speed to 5,000 min^{-1} (rpm).

Is there vacuum ?

YES → **Check the self-diagnosis indicator (page 6-22). If OK, replace the EACV and retest.**

NO

Raise the engine speed to 5,000 min^{-1} (rpm), then close the throttle suddenly.

Is there vacuum ?

NO → Check the self-diagnosis indicator (page 6-22).

YES

Does LED indicate code 14 ?

YES → **Go to EACV troubleshooting flowchart (page 6-105).**

NO

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

EACV is OK.

(14) Self-diagnosis LED indicator blinks fourteen times: A problem in the Electronic Air Control Valve (EACV) circuit.

—Engine is running.
—LED indicates CODE 14.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset control unit.

Start engine.

Does LED indicates CODE 14 ?

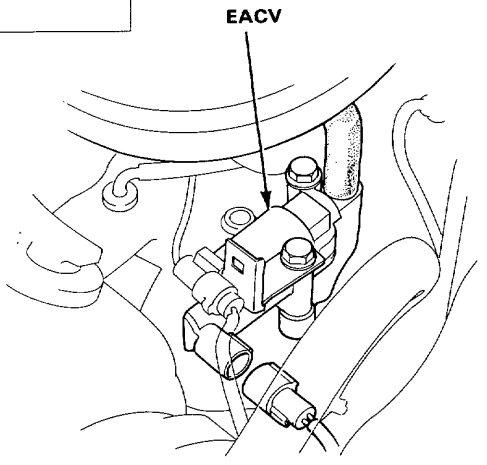
NO → **Intermittent failure (test driving may be necessary).**

YES

Stop engine.

Disconnect the 2P connector on the EACV.

Measure resistance between the 2 terminals on the EACV.



Is there 10—15 Ω ?

NO → **Replace EACV.**

YES

Check for continuity to body ground on each terminal on the EACV.

Does continuity exist ?

YES → **Replace EACV.**

NO

(To page 6-106)

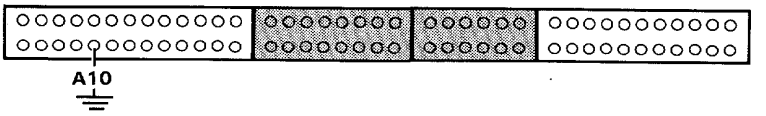
(cont'd)

Feedback Control (cont'd)

(From page 6-105)

Reconnect the 2P connector to EACV.

Connect the ECU test harness between the control unit and connector (page 6-20). Disconnect "A" connector from the main wire harness only, not the control unit.



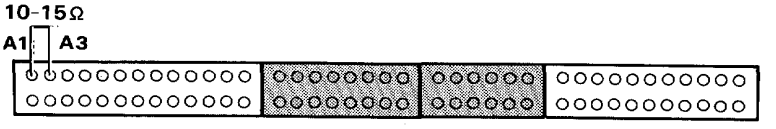
Check for continuity between A10 terminal and the body ground.

Does continuity exist ?

NO → **Repair open in BLK wire between control unit (A10) and G101.**

YES

Measure resistance between A1 (+) terminal and A3 (−) terminal.



Is there 10—15 Ω ?

NO → **Repair open in BLK/BLU wire between control unit (A1) and EACV or YEL/BLK wire between control unit (A3) and EACV.**

YES

Substitute a known-good control unit and recheck. If prescribed voltage is now available replace the original control unit.

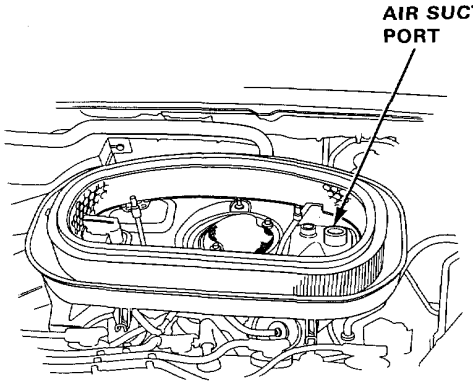
(KX, KS, KG, KQ)

Testing

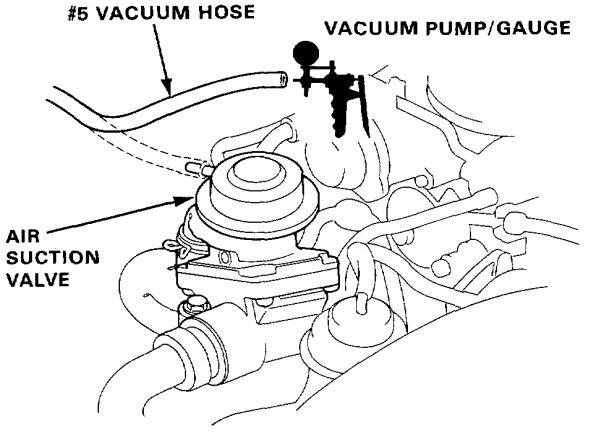
1. Start the engine.
2. Remove the air cleaner cover and filter.
3. Start the engine and check for a bubbling noise from the air suction port idle.

   A bubbling noise should not be heard.

   NOTE: Engine coolant temperature must be below 30°C (86°F)



- If a bubbling noise is heard, disconnect the #5 vacuum hose from the air suction valve and connect a vacuum pump.
  There should be no vacuum.



  — If there is no vacuum, replace air suction valve and retest.
  — If there is vacuum, go to troubleshooting (page 6-108).

4. Warm up to normal operating temperature.
   NOTE: Engine coolant temperature must be below 70°C (158°F).

   A bubbling noise should be heard.

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

  There should be vacuum.

  — If there is vacuum, replace the air suction valve and retest.
  — If there is no vacuum, check the #5 and #12 vacuum line for proper connection, cracks, blockage or disconnected hose. If OK, go to troubleshooting (page 6-108).

(cont'd)

Air Injection Control (cont'd)

Troubleshooting Flow Chart Air Suction Control Solenoid Valve

Inspection of Air Suction Control Solenoid Valve.

Open the control box lid.

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

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

Start the engine.

Apply vacuum.

Does solenoid valve hold vacuum ?

NO

Turn the ignition switch OFF.

Disconnect the connector on the control box.

YES

Warm up normal operating temperature.

NOTE: Engine coolant temperature must be below 70 °C (158 °F)

Start the engine.

Measure voltage between;
KX, KS, KG: PNK (+) and BLK (−) terminals
KQ: LT GRN (+) and BLK (−) terminals

Is there voltage ?

YES

Check the self-diagnosis indicator (page 6-22). If OK, substitute a known-good control unit and retest. If symptom goes away, replace the original control unit.

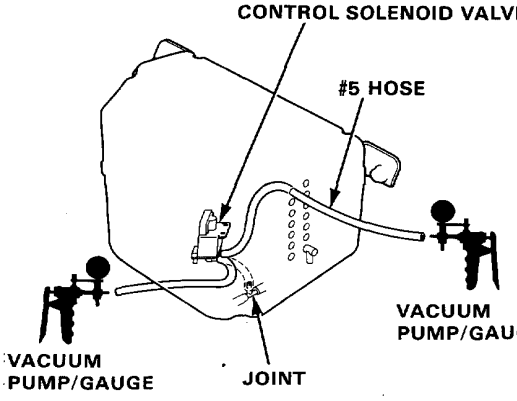
NO

Replace the solenoid valve.

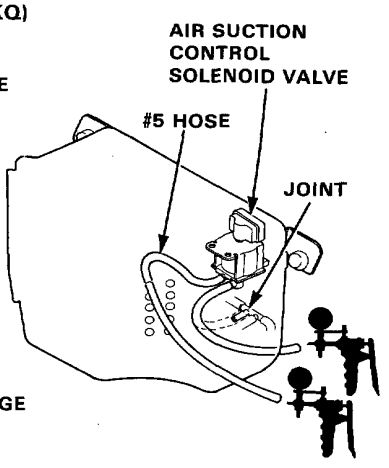
(page 6-109)

NOTE: Engine coolant temperature must be below 30 °C (86 °F)

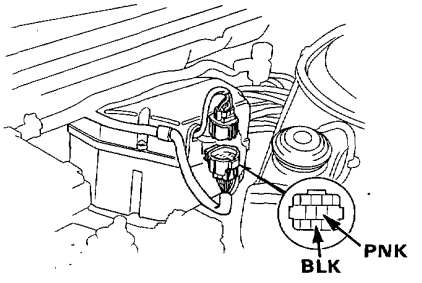
(KX. KS. KG)



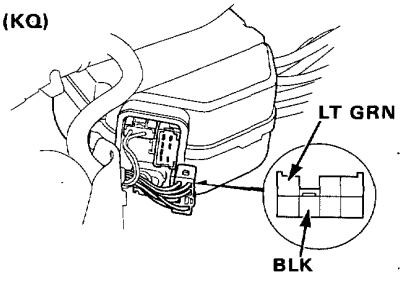
(KQ)

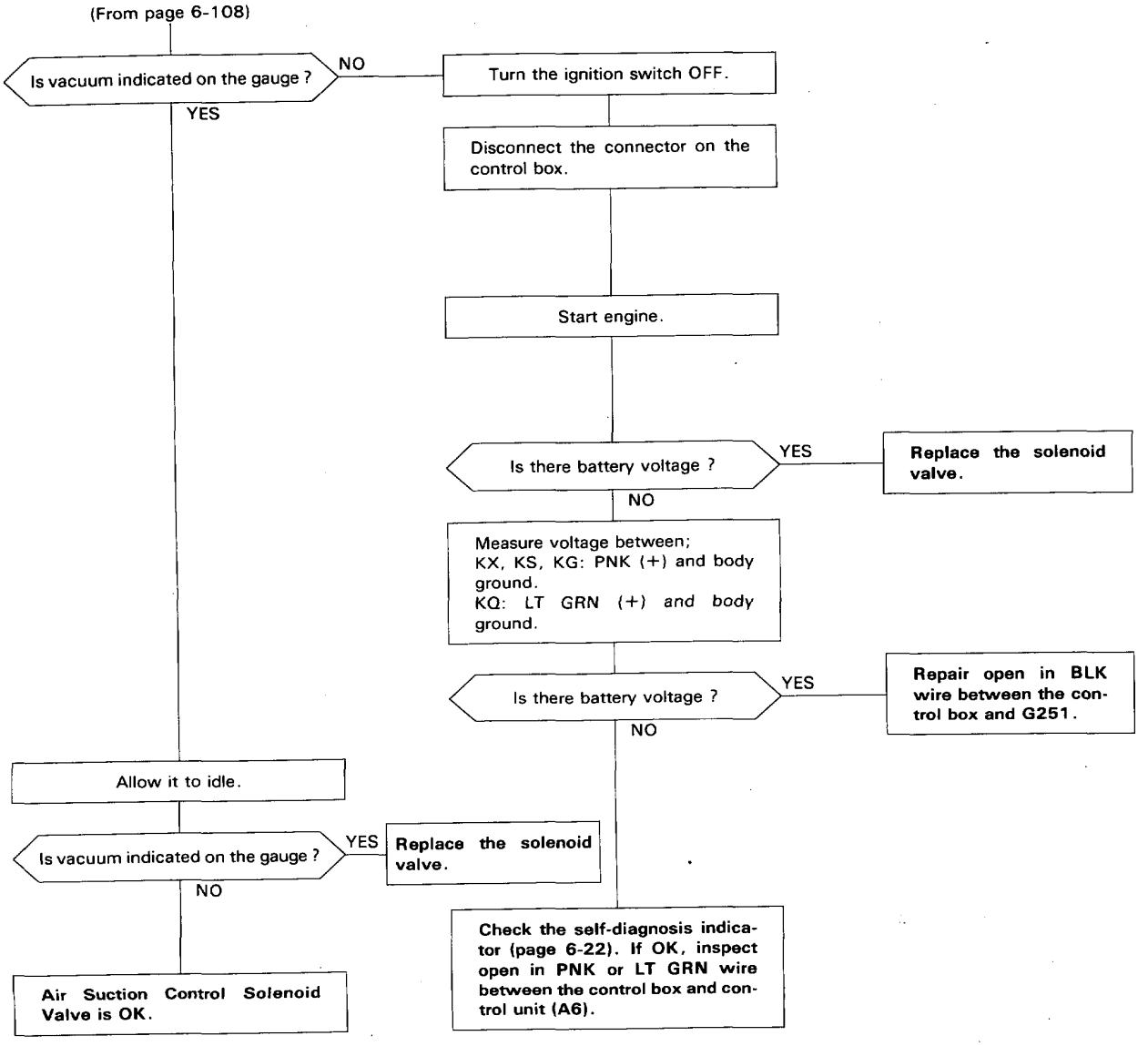


(KX. KS. KG)



(KQ)



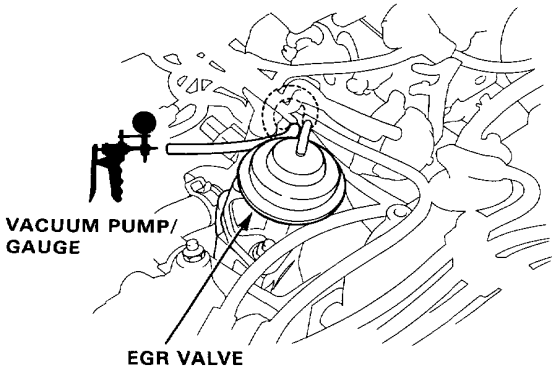

(From page 6-108)
Is vacuum indicated on the gauge ?
NO
YES
Turn the ignition switch OFF.
Disconnect the connector on the control box.
Start engine.
Is there battery voltage ?
YES
Replace the solenoid valve.
NO
Measure voltage between;
KX, KS, KG: PNK (+) and body ground.
KQ: LT GRN (+) and body ground.
Is there battery voltage ?
YES
Repair open in BLK wire between the control box and G251.
NO
Allow it to idle.
Is vacuum indicated on the gauge ?
YES
Replace the solenoid valve.
NO
Air Suction Control Solenoid Valve is OK.
Check the self-diagnosis indicator (page 6-22). If OK, inspect open in PNK or LT GRN wire between the control box and control unit (A6).

EGR System

Testing (COLD ENGINE)

NOTE: The engine coolant temperature must be below the thermovalve B set temperature (55°C, 131°F).

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



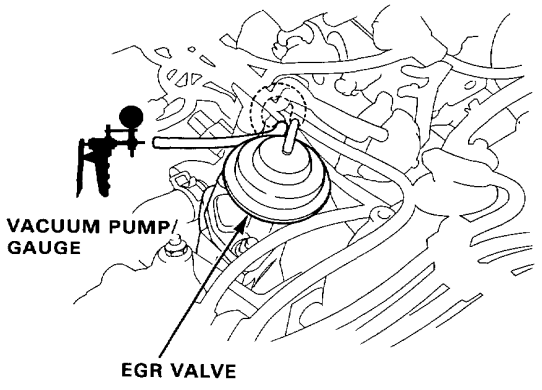
2. Start the engine and raise the engine speed to 3,000 min^{-1} (rpm)

   Vacuum should not be available.

   - If vacuum is not available, go on to the hot engine inspection (right column).
   - If vacuum is available, replace thermovalve B and retest.

Testing (HOT ENGINE)

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

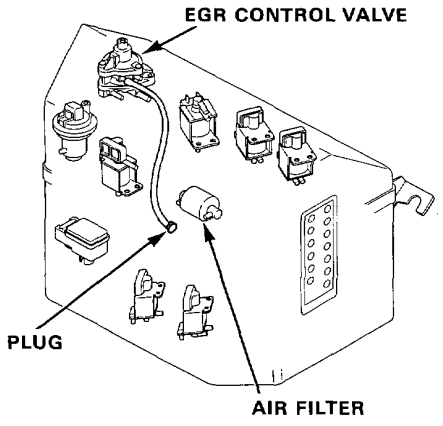


2. Start the engine and wait for the cooling fan to come on.

3. Remove the control box and remove the control box cover.

   Vacuum should be as shown below:

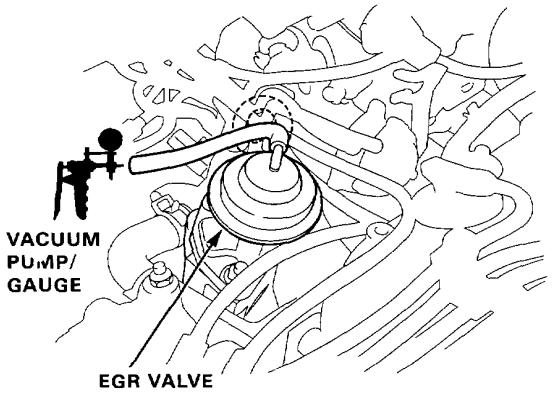
	Condition	Vacuum at EGR hose
1	Idle	No
2	3,000 min^{-1} (rpm)	Yes, 50—152 mm
3	3,000 min^{-1} (rpm) with blocked vacuum bleed (shown next column)	Less than 50 mm Hg
4	Rapid acceleration	Yes, 50—152 mm Hg
5	Deceleration	No



- If vacuum is available at idle (condition 1) check the vacuum hoses for proper routing and connections, then check for correct idle speed and idle mixture, and make adjustment as necessary.
- If there is no vacuum in conditions 2 and 4, check the #10, #11, #15, #16 and #17 vacuum line for proper connection, cracks, blockage or disconnected hose. If OK, replace the thermovalve B and retest.
- If vacuum is more than 50 mm Hg in condition 3, replace the EGR control valve and check the vacuum hoses for proper routing and connections.

EGR Valve

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



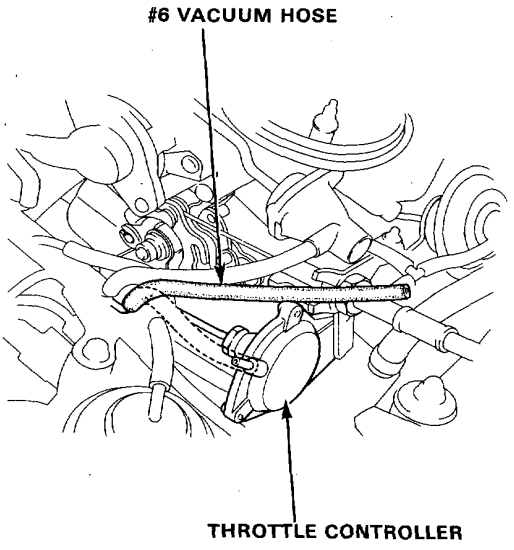
3. Apply 150 mm Hg (6 in. Hg) vacuum to EGR Valve. Vacuum should remain steady and engine should die.
   - If vacuum remains steady and engine dies, EGR valve is working properly, remove the vacuum pump and reconnect EGR vacuum hose ; test is complete.
   - If vacuum does not remain steady and engine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

Throttle Control System

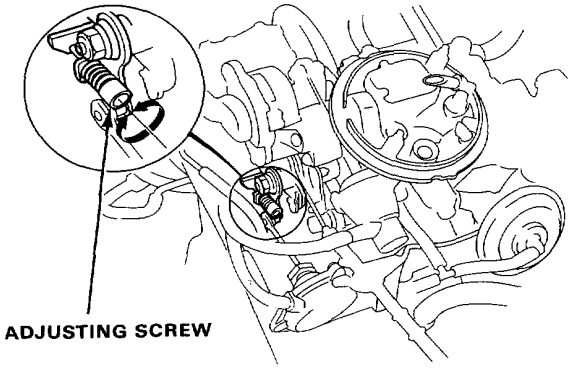
Testing (HOT ENGINE)
[KX, KS, KG, KQ AND KF, KB, KE, KY, KW, KP, KT (A/T)]

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

   Engine speed should be: 1,800 ± 300 min^{-1} (rpm)

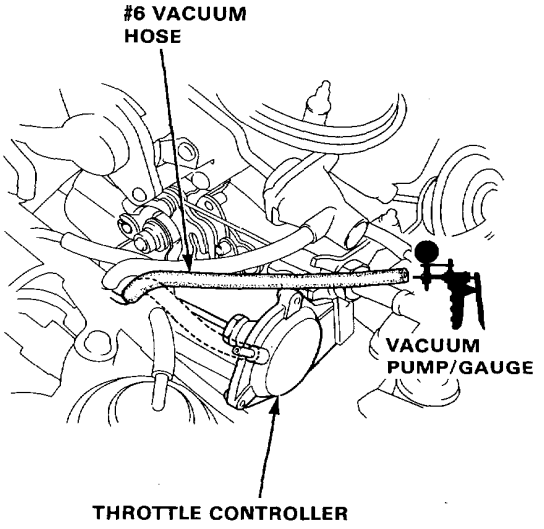


- If the engine speed is excessively high, adjust by turning the adjusting screw.



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

  There should be vacuum.



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

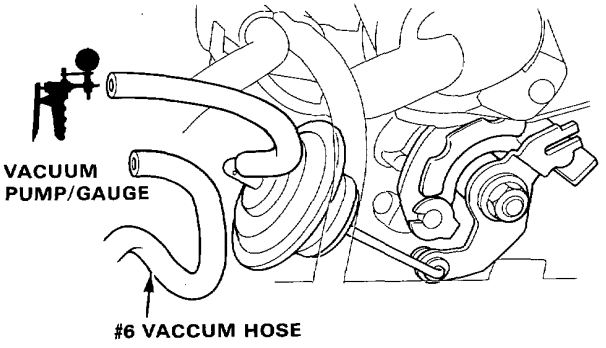
3. Reconnect the #6 vacuum hose and check the idle speed.
   Idle speed should be within specification (page 6-77).

Testing
(Except KX, KS, KG, KQ and KF, KB, KE, KY, KW, KP, KT (A/T))

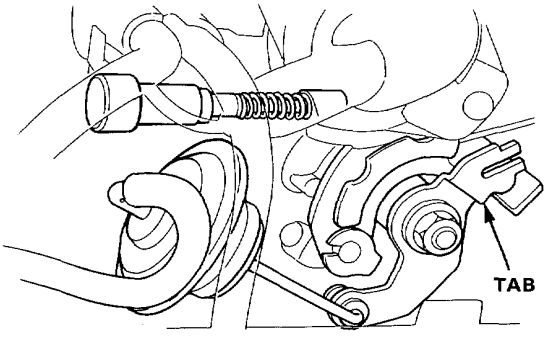
1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).

2. Disconnect #6 vacuum hose from the throttle controller, connect a vacuum pump to the controller and apply 400 mmHg (16 in. Hg) vacuum.

   Engine speed should rise to 1,300—2,300 min^{-1} (rpm) with in 1 minute.



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



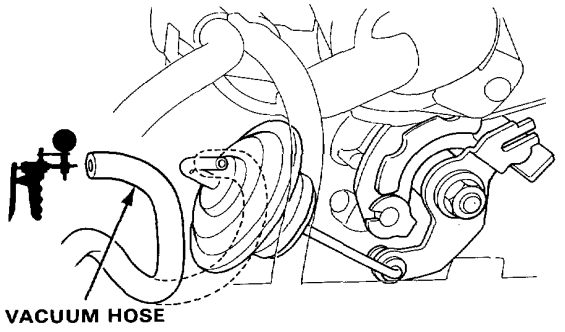
- If the engine speed does not change, replace the throttle controller and retest.

Throttle Controller Control Valve Testing
(Except KX, KS, KG, KQ AND KF, KB, KE, KY, KW, KP, KT (A/T))

1. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
2. Connect a vacuum pump to the #6 vacuum hose.

   Raise the engine speed to 3,500 min^{-1} (rpm) and close the throttle suddenly, then check vacuum.

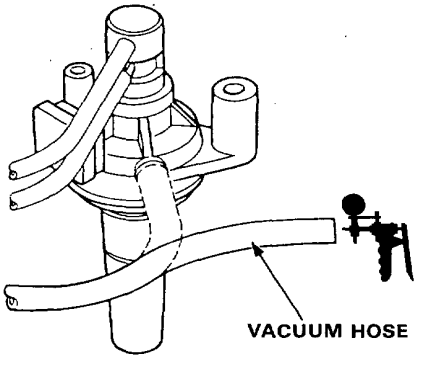
   There should be vacuum.



- If there is vacuum, replace the throttle controller and retest.

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

  There should be vacuum.



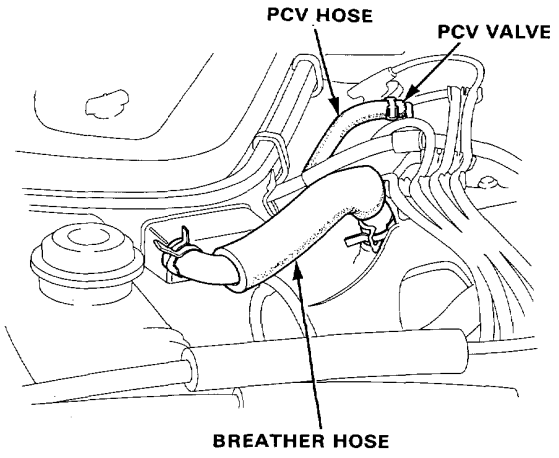
  — If there is no vacuum, check the lower and #3 vacuum line for proper connection, cracks, blockage or disconnected hose.
  If OK, replace the throttle controller control valve.

3. Reconnect the #6 vacuum hose and check the idle speed.
   Idle speed should be within specification (page 6-77).

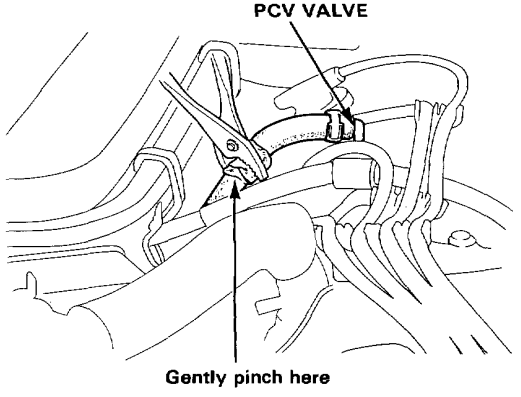
Positive Crankcase Ventilation System

PCV Valve Testing

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



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



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

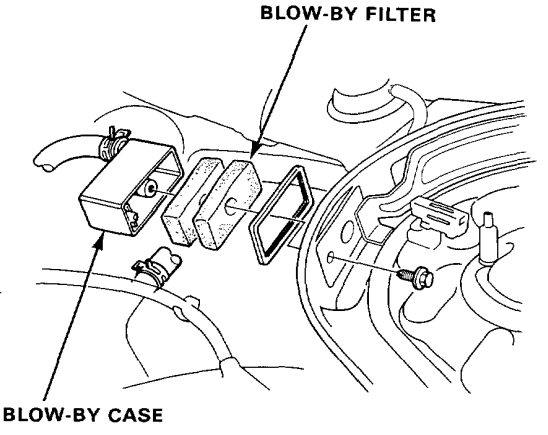
Blow-by Filter Testing

Inspect the condition of the blow-by filter.

- Replace the filter in the following instances;

— When the filter is stuck fast and oil is dripping or seeping through.

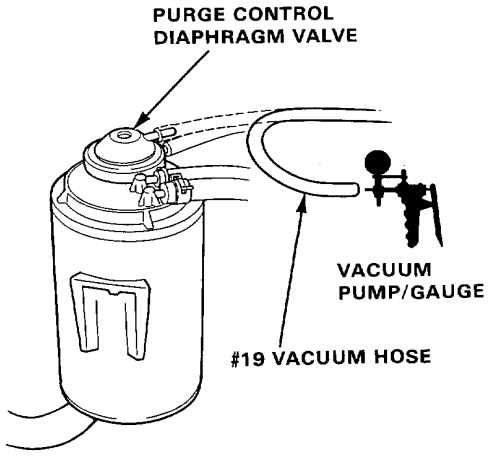
— When the filter is covered with dust and dirt so that clogging is evident.



(KX, KS, KG, KQ)
Testing (COLD ENGINE)

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

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



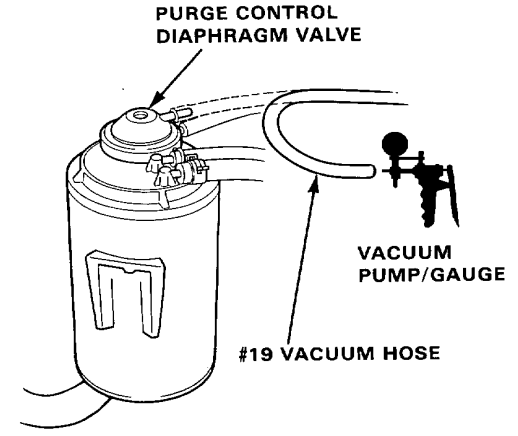
2. Start the engine and allow to idle.

   There should be no vacuum.

   - If there is no vacuum, go to hot engine test (next column).
   - If there is vacuum, go to troubleshooting (page 6-119).

Testing (HOT ENGINE)

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



2. Start the engine and warm up to normal operating temperature (the cooling fan comes on).
   Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.

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

   Place the shift or selector lever in 2nd gear or "2" range and accelerate above 5 km/h, 2,000 min^{-1} (rpm).

   There should be vacuum.

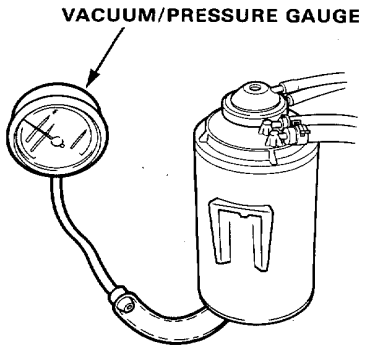
   - If there is vacuum, go to step 3.
   - If there is no vacuum, check the #19 and #12 vacuum line for proper connection, cracks, blockage or disconnected hose. If OK, go to troubleshooting (page 6-119).

3. Disconnect a vacuum pump/gauge and reconnect hose.
4. Remove fuel filler cap.

(cont'd)

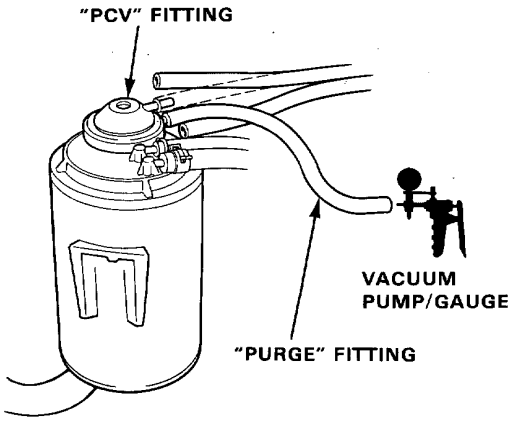
Evaporative Emission Controls (cont'd)

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



6. Place the shift or selector lever in 2nd gear or "2" range and raise the engine speed to 3,500 min^{-1} (rpm).
   Vacuum should appear on the gauge within 1 minute.
   - If vacuum appears on the gauge in 1 minute, remove the gauge and go on to step 8.
   - If no vacuum, disconnect the vacuum gauge and reinstall the fuel filler cap.
7. Remove the charcoal canister and check for signs of damage.
   - If damaged, replace the canister.
   - If OK, go on to step 8.
8. Stop the engine. Disconnect the hose from the canister PCV fitting.
   Connect a vacuum pump to the canister PURGE fitting as shown, and apply vacuum.

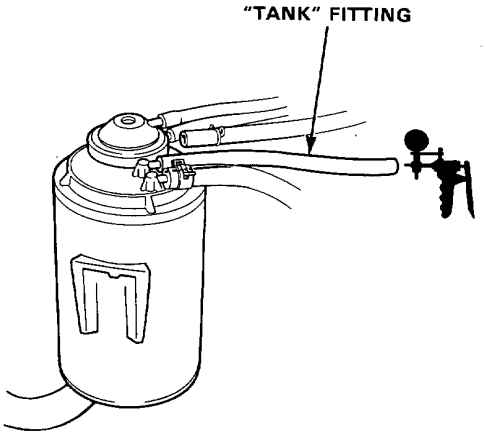
   Vacuum should remain steady.



   - If vacuum remains steady, go on to step 9.
   - If vacuum drops, replace the canister and retest.
9. Restart the engine. Reconnect the hose to the canister PCV fitting, and raise engine to 3,500 min^{-1} (rpm) (in 2nd gear or "2" range).

   PURGE side vacuum should drop to zero.
   - If PURGE side vacuum does not drop to zero, replace the canister and retest.
10. Connect a vacuum pump to TANK fitting as shown, and apply vacuum.

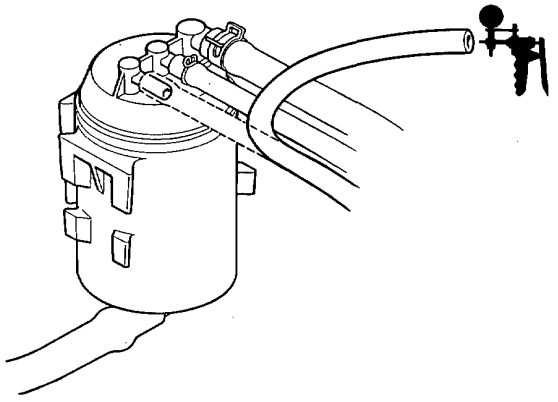
    If should not hold vacuum.



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

(Except KX, KS, KG, KQ)
Testing

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



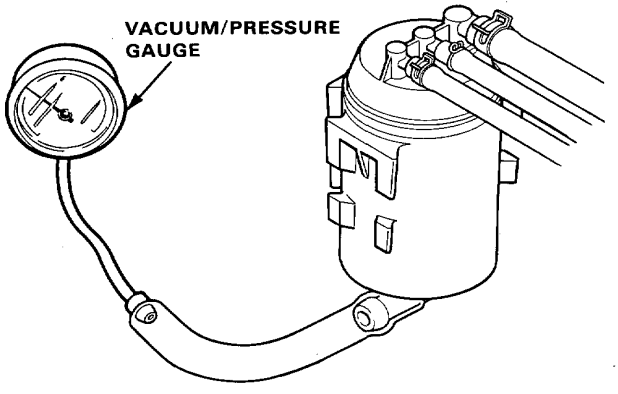
2. Start the engine and raise speed to 3,500 min^{-1} (rpm).

   There should be vacuum.

   - If vacuum is available, go on to step 3.
   - If vacuum is not available, check the vacuum line.

3. Disconnect a vacuum pump/gauge and reconnect hose. Remove fuel filler cap.

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



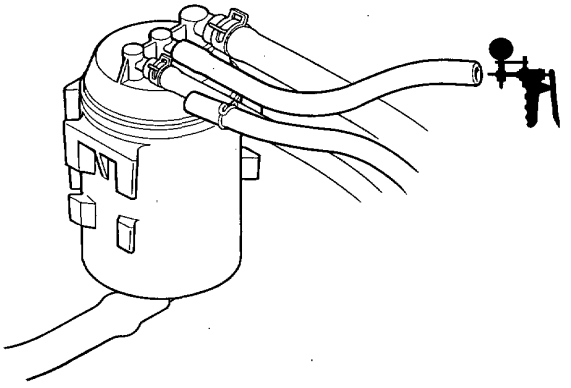
5. Raise engine speed to 3,500 min^{-1} (rpm). Vacuum should appear on gauge within 1 minute.

   - If vacuum appears on gauge in 1 minute, remove gauge and go on to step 7.
   - If no vacuum, disconnect a vacuum pump/gauge and go on to step 6.

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

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

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



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

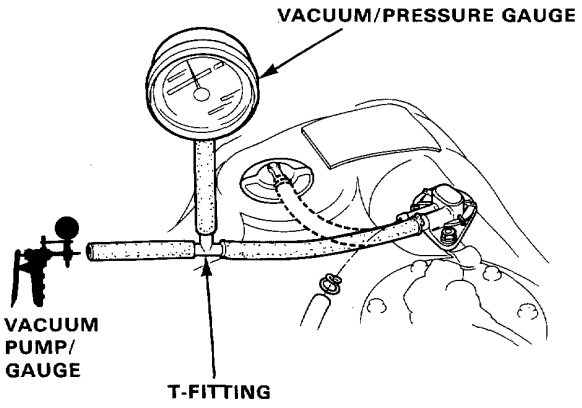
(cont'd)

Evaporative Emission Controls (cont'd)

(KX, KS, KG, KQ, KY)
Two-Way Valve

1. Remove the filler cap.

2. Remove vapor line from the fuel tank and connect a T-fitting from a vacuum gauge and vacuum pump as shown.

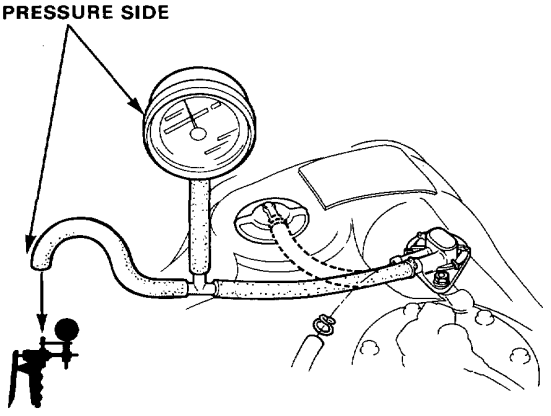


3. Slowly draw a vacuum while watching the gauge.

   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 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 10 to 35 mmHg (0.4 to 1. 4 in.Hg).

   - If pressure momentarily stabilizes (valve opens) at 10 to 35 mmHg (0.4 to 1.4 in.Hg), the valve is OK.
   - If pressure stabilizes below 10 mmHg (0.4 in. Hg) or above 35 mmHg (1.4 in.Hg), install a new valve and retest.

Troubleshooting Flowchart (KX, KS, KG, KQ) **Purge Cut-off Solenoid Valve**

Inspection of Purge Cut-off Solenoid valve.

Open the control box.

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

Disconnect vacuum hose (KQ:# 19) of the solenoid valve from the vacuum hose manifold and connect a vacuum gauge.

Start the engine.

Apply vacuum.

Is vacuum indicated on the gauge ?

YES → Turn the ignition switch OFF.

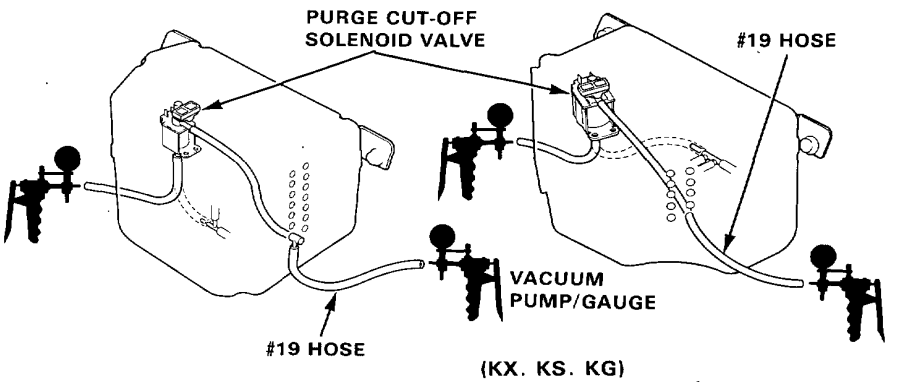
NO

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

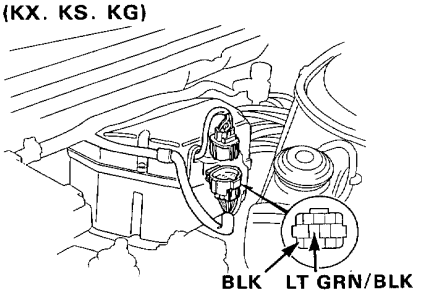
Place the shift or selector lever in second or "2" and accelerate above 5 km/h, 2,000 min^{-1} (rpm).

(To page 6-120)

(KX. KS. KG) (KQ)



(KX. KS. KG)

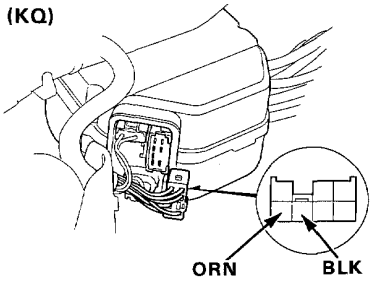


Disconnect the connector on the control box.

Start the engine.

Measure voltage between;
KX, KS, KG: LT GRN/BLK (+) and BLK (−) terminals.
KQ: ORN (+) and BLK (−) terminals.

(KQ)



Is there battery voltage ?

YES → **Replace the solenoid valve.**

NO

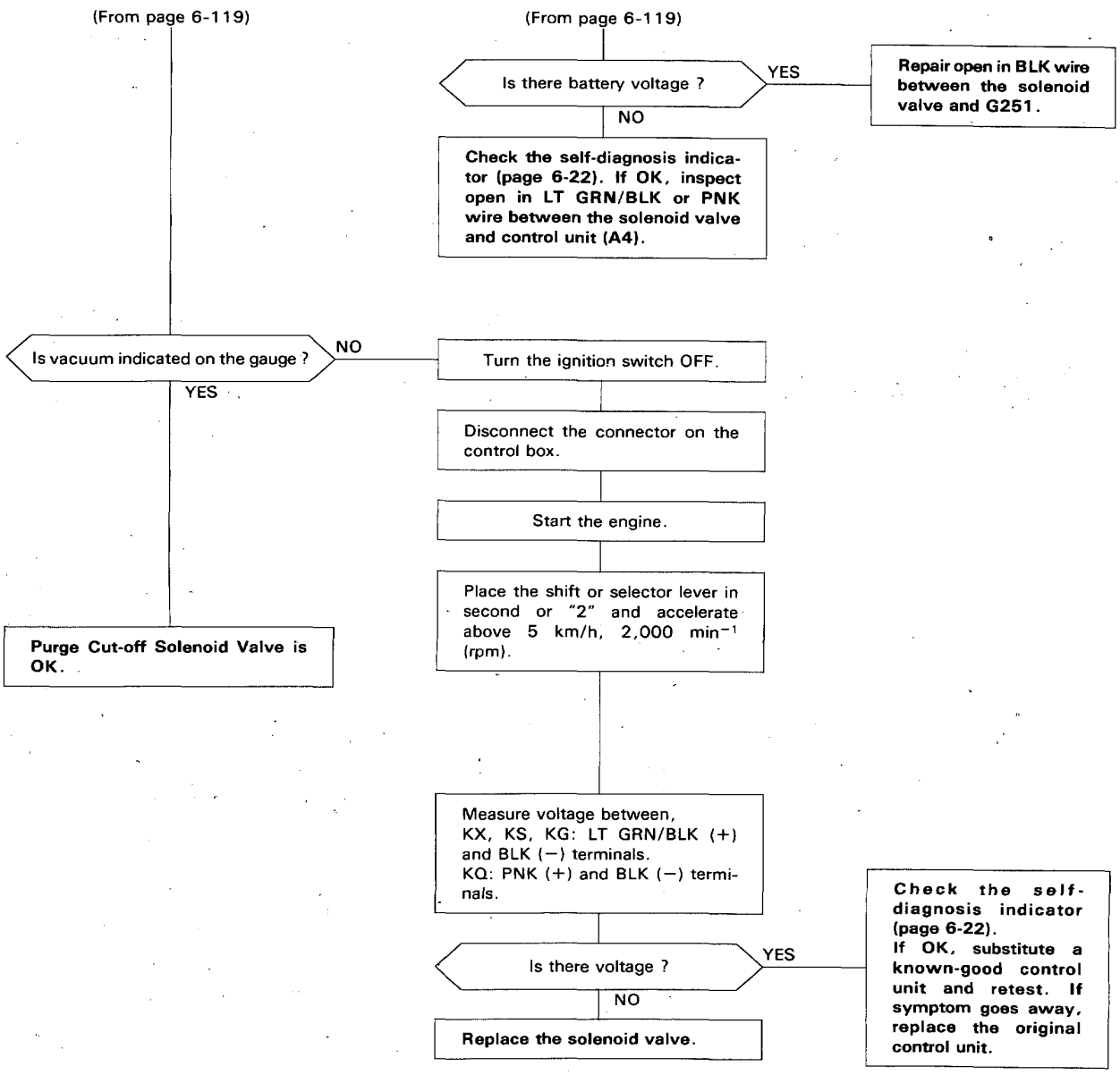
Measure voltage between;
KX, KS, KG: LT GRN/BLK (+) and body ground.
KQ: ORN (+) and body ground.

(To page 6-120)

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

(cont'd)

Evaporative Emission Controls (cont'd)



Troubleshooting Flowchart (Except KT, KP) **Air Vent Cut-off Solenoid Valve**

Inspection of Air Vent Cut-off Solenoid Valve.

Disconnect the vacuum hose from the vacuum hose manifold.

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

Does solenoid valve hold vacuum ? YES → **Replace the solenoid valve.**

NO

Turn the ignition switch ON.

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

Does solenoid valve hold vacuum ? NO → Turn the ignition switch OFF.

YES

Air Vent Cut-off Solenoid Valve is OK.

Disconnect the connector of the solenoid valve.

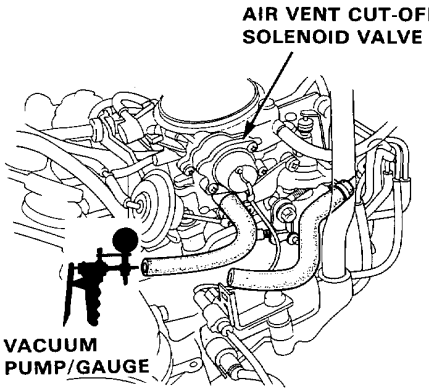
Turn the ignition switch ON.

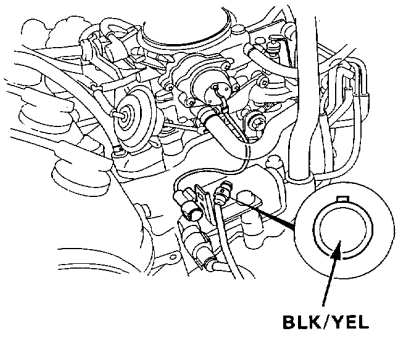
Measure voltage between BLK/YEL (+) terminal and body ground.

Is there battery voltage ? NO → **Repair open in BLK/YEL wire between the ignition switch and the connector as well as No.2 fuse.**

YES

Replace the solenoid valve.



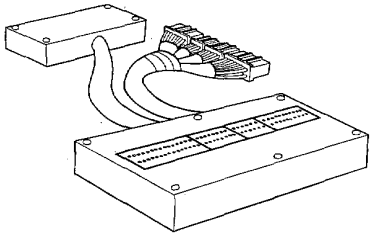


Special Tools

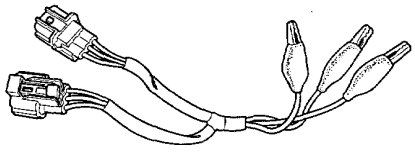
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07LAA—PT50100	O_2 Sensor Socket Wrench	1	
②	07LAJ—PT30100	ECU Test Harness	1	
③	07LAJ—PT30200	Test Harness	1	
④	07JAZ—SH20100	R.P.M. Connecting Adaptor	1	
⑤	07LAZ—PT30100	R.P.M. Connecting Adaptor	1	
⑤-1	07LAZ—PT30110	R.P.M. Connecting Adaptor (A)	(1)	Component Tools
⑤-2	07LAZ—PT30120	R.P.M. Connecting Adaptor (B)	(1)	Component Tools
⑥	07406—0040001	Fuel Pressure Gauge Set	1	
⑥-1	07406—0040100	Pressure Gauge	(1)	Component Tools
⑥-2	07406—0040201	Hose Assembly	(1)	Component Tools
⑦	07411—0020000	Digital Circuit Tester	1	



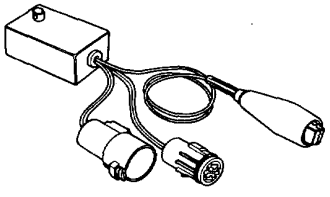
①



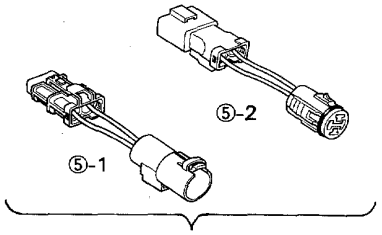
②



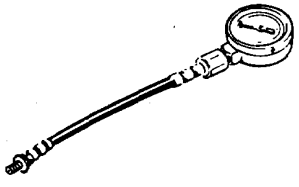
③



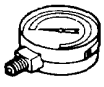
④



⑤



⑥



⑥-1



⑥-2

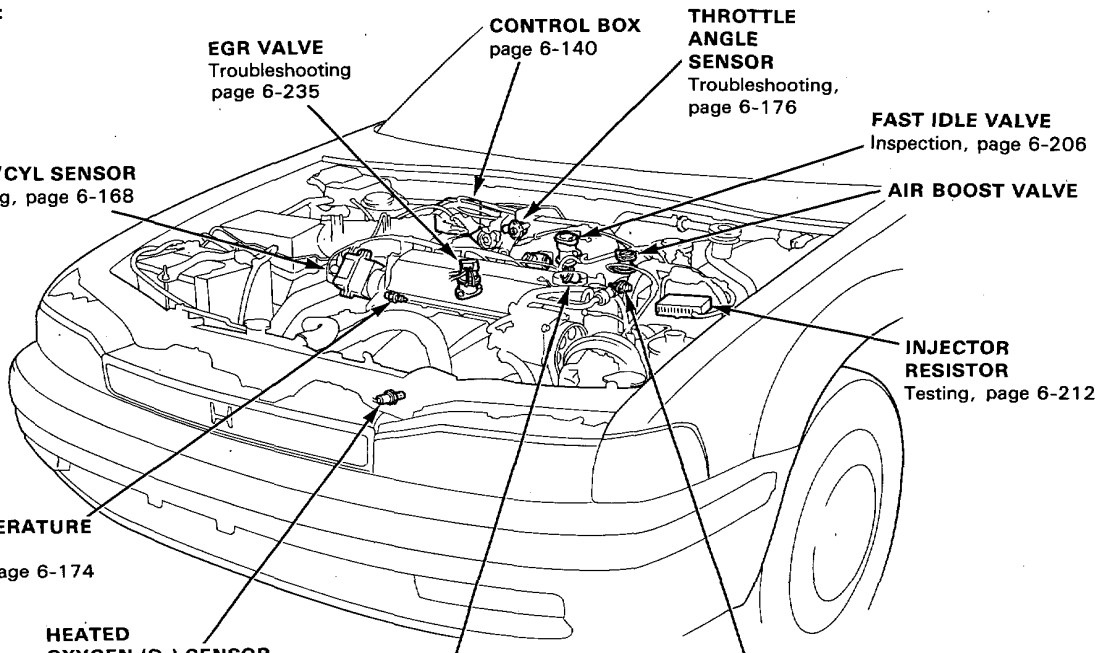


⑦

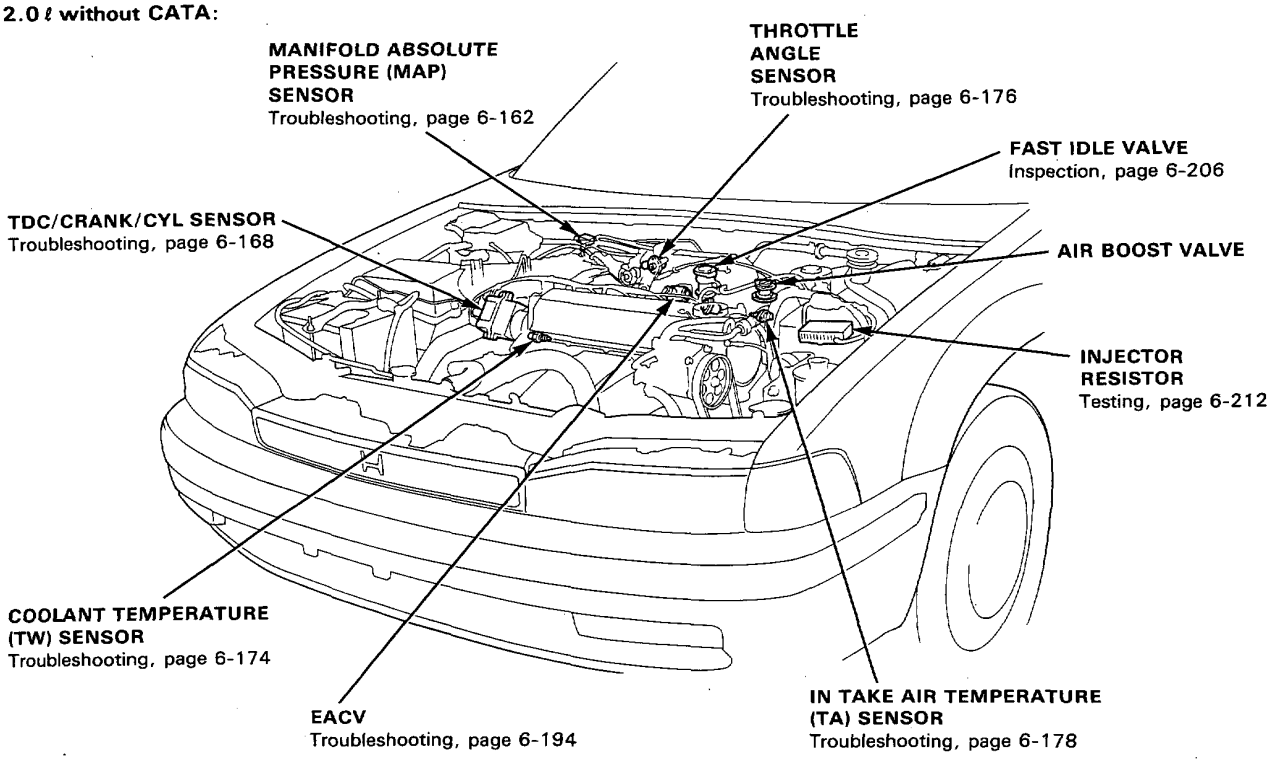
Component Locations

Index

2.0 ℓ with CATA:



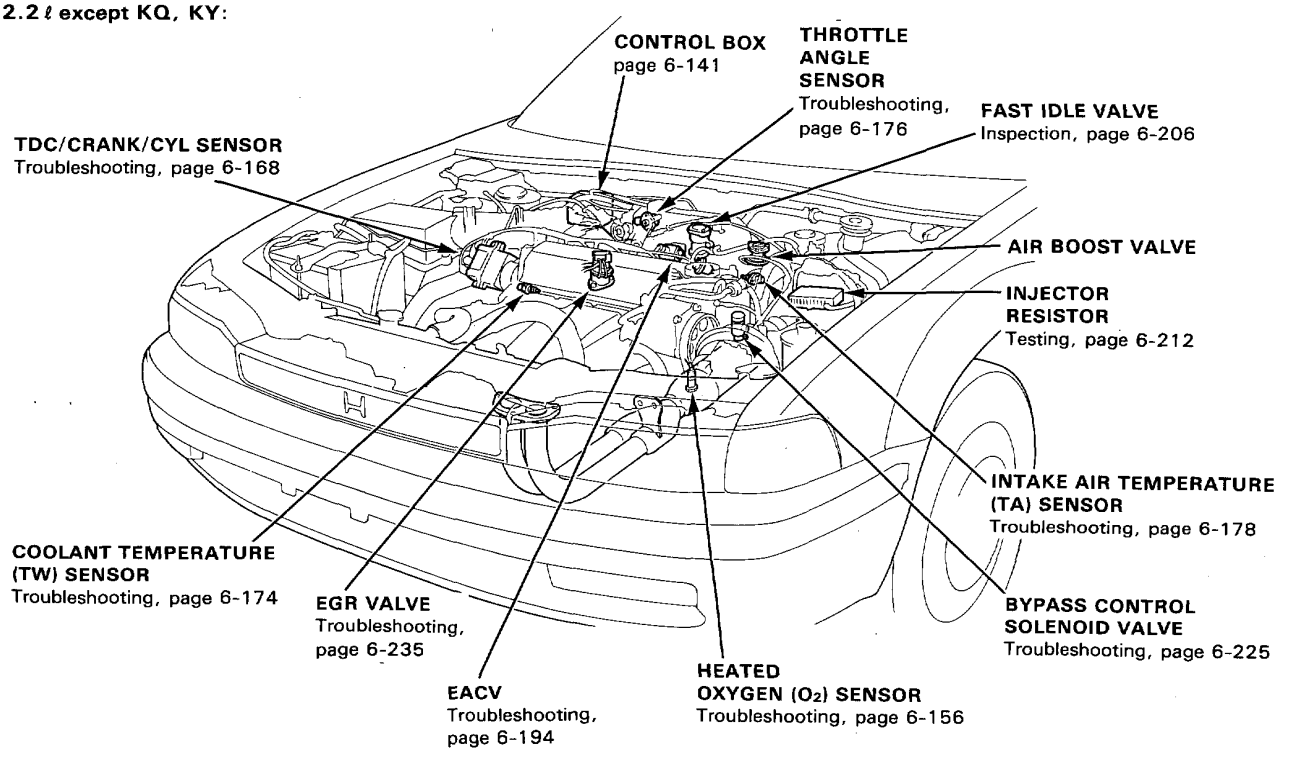
2.0 ℓ without CATA:



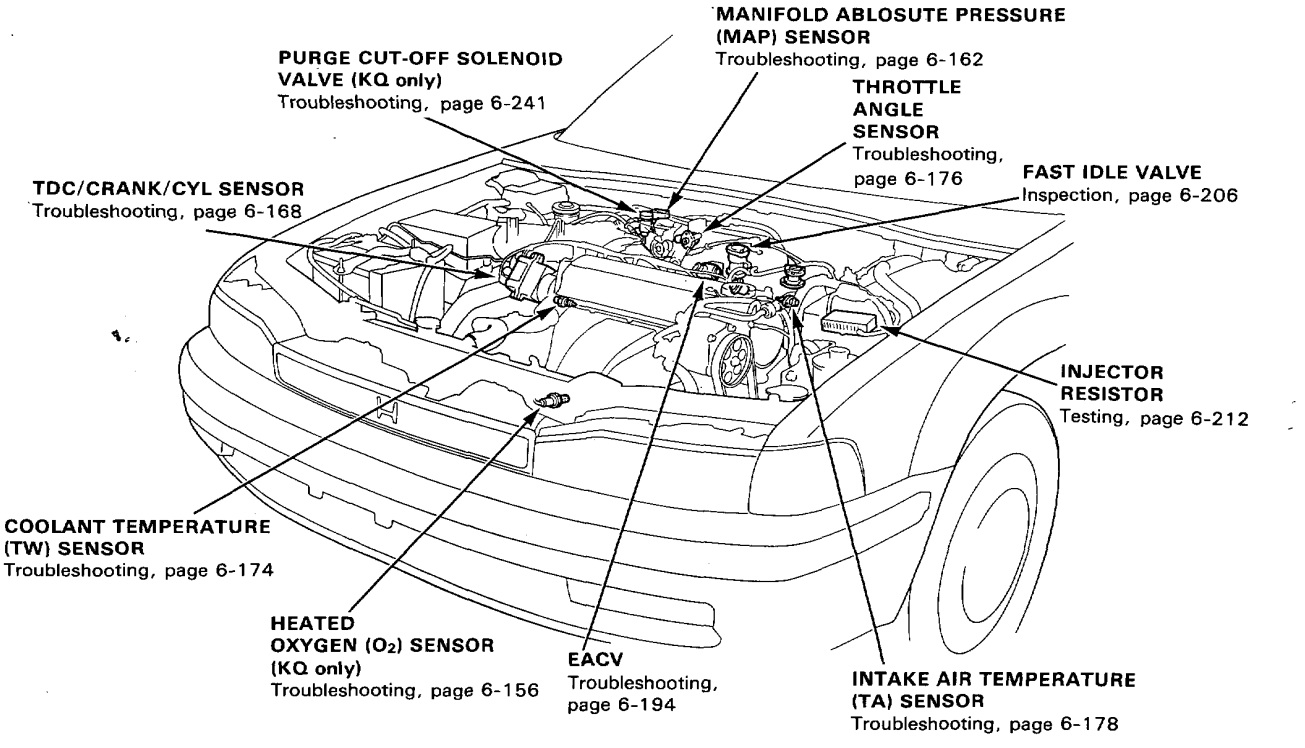
Component Locations

Index

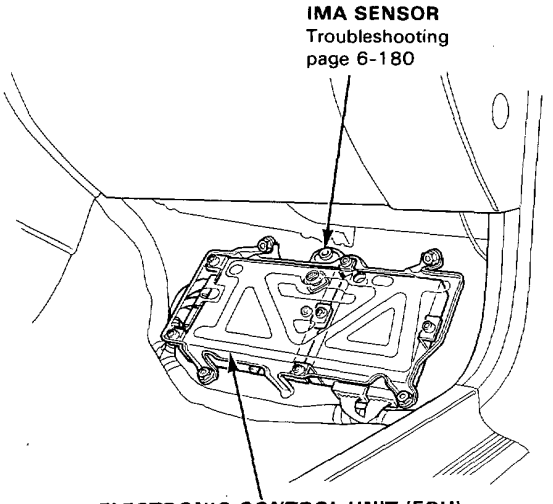
2.2 ℓ except KQ, KY:

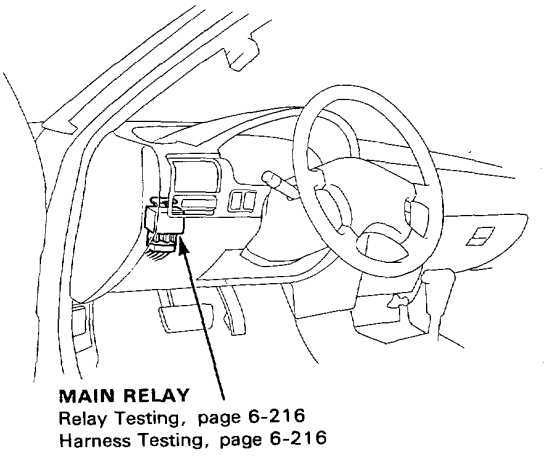


2.2 ℓ KQ, KY:

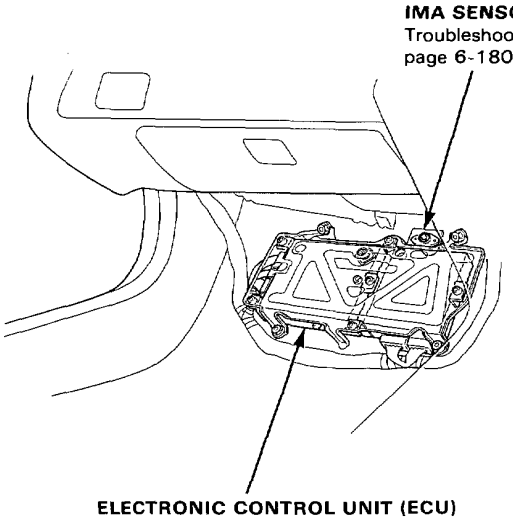


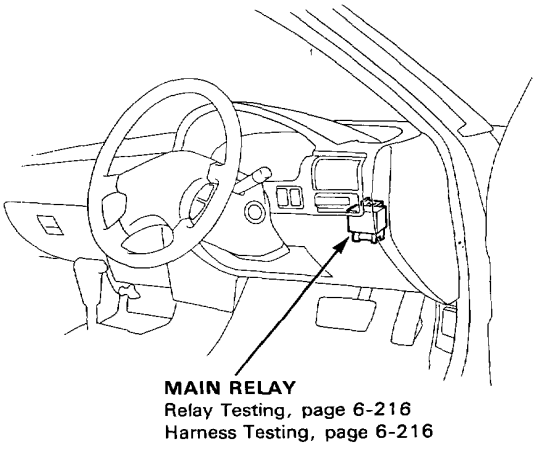
LH:


IMA SENSOR
Troubleshooting
page 6-180
ELECTRONIC CONTROL UNIT (ECU)
Troubleshooting, page 6-152


MAIN RELAY
Relay Testing, page 6-216
Harness Testing, page 6-216

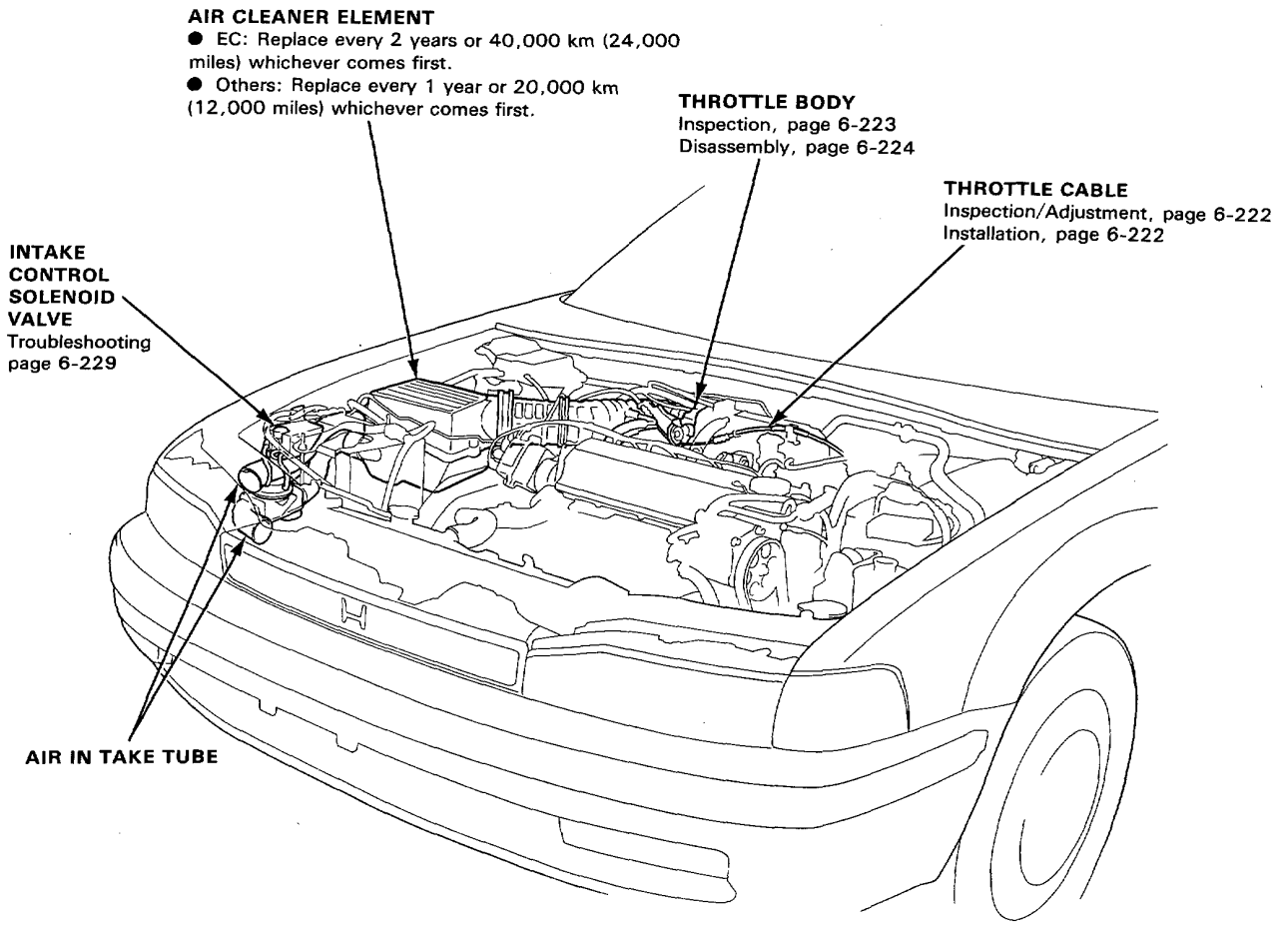
RH:


IMA SENSOR
Troubleshooting
page 6-180
ELECTRONIC CONTROL UNIT (ECU)
Troubleshooting, page 6-152

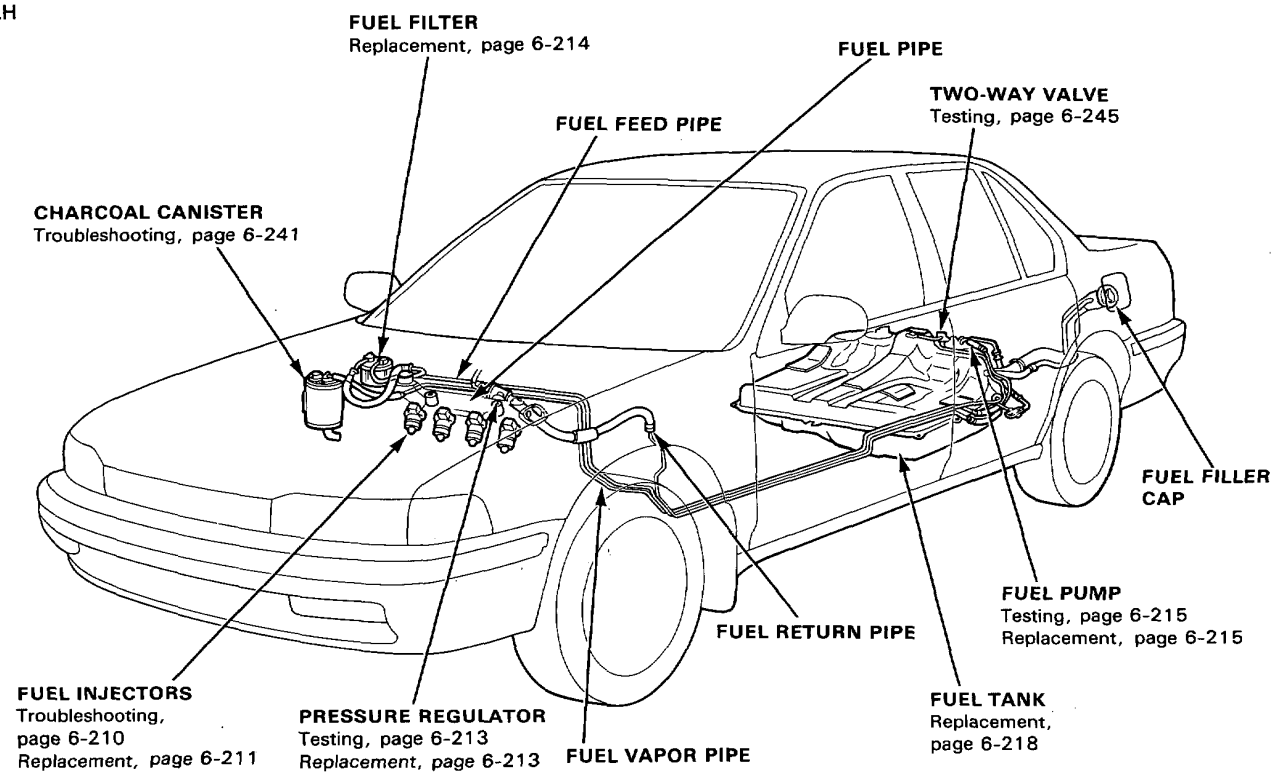

MAIN RELAY
Relay Testing, page 6-216
Harness Testing, page 6-216

Component Locations

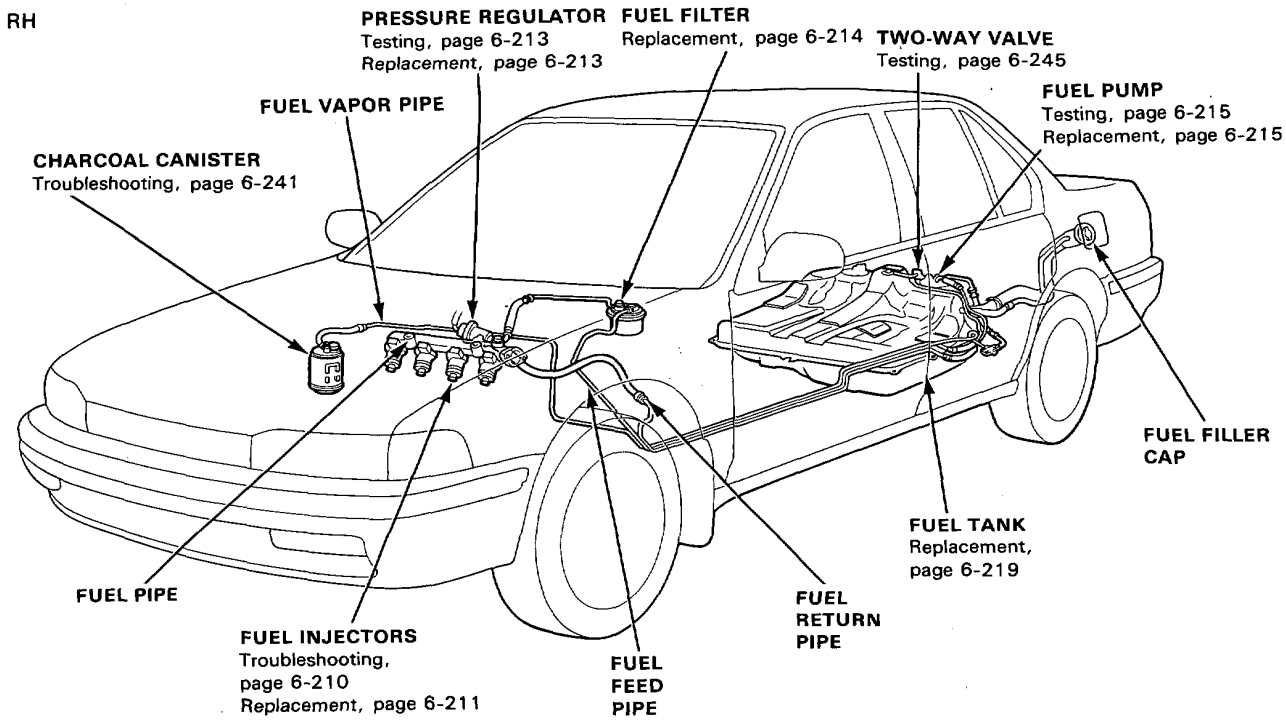
Index



LH


FUEL FILTER
Replacement, page 6-214
FUEL PIPE
TWO-WAY VALVE
Testing, page 6-245
FUEL FEED PIPE
CHARCOAL CANISTER
Troubleshooting, page 6-241
FUEL FILLER CAP
FUEL PUMP
Testing, page 6-215
Replacement, page 6-215
FUEL RETURN PIPE
FUEL INJECTORS
Troubleshooting, page 6-210
Replacement, page 6-211
PRESSURE REGULATOR
Testing, page 6-213
Replacement, page 6-213
FUEL VAPOR PIPE
FUEL TANK
Replacement, page 6-218

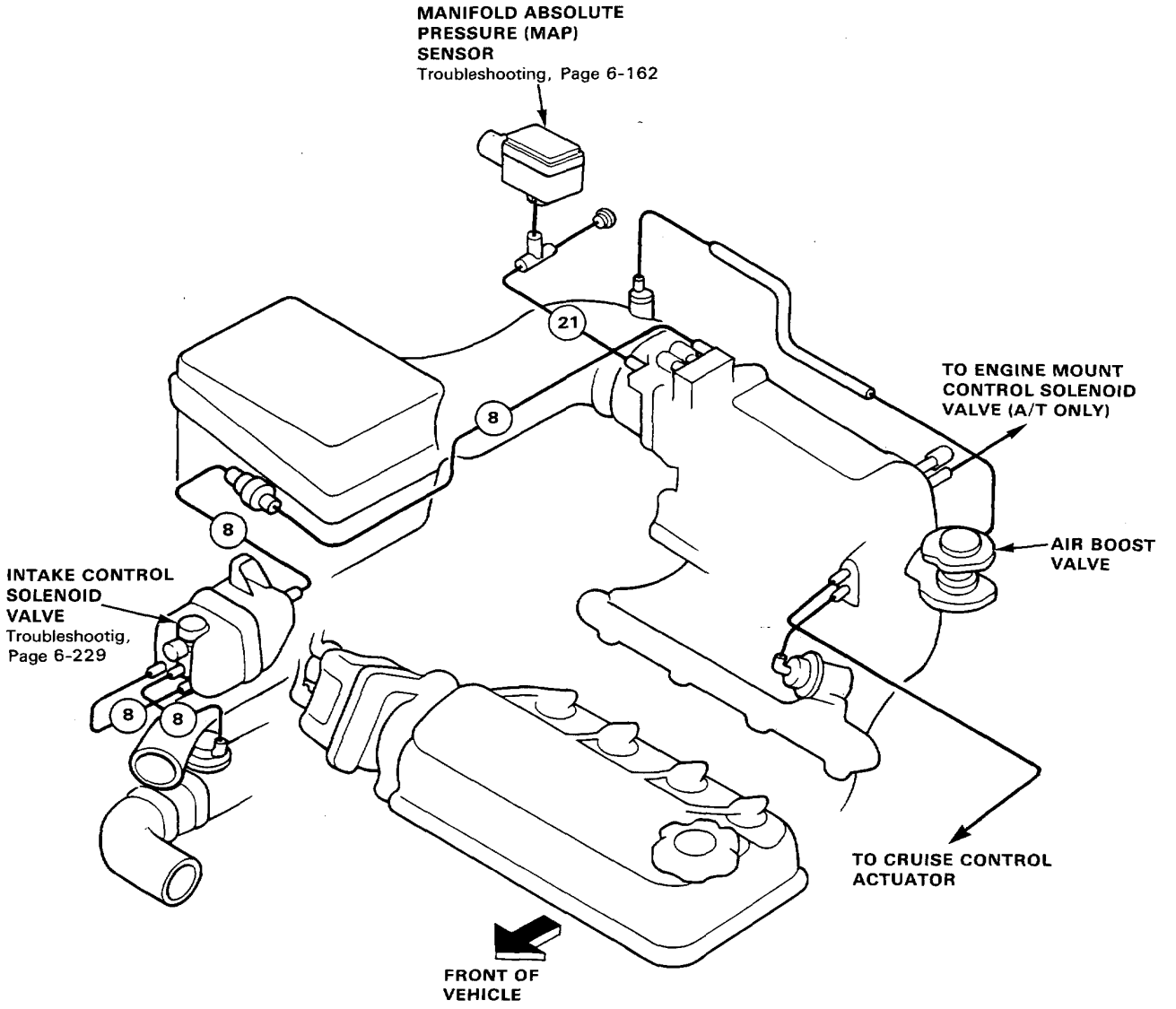
RH


PRESSURE REGULATOR
Testing, page 6-213
Replacement, page 6-213
FUEL FILTER
Replacement, page 6-214
TWO-WAY VALVE
Testing, page 6-245
FUEL PUMP
Testing, page 6-215
Replacement, page 6-215
FUEL VAPOR PIPE
CHARCOAL CANISTER
Troubleshooting, page 6-241
FUEL FILLER CAP
FUEL TANK
Replacement, page 6-219
FUEL PIPE
FUEL RETURN PIPE
FUEL INJECTORS
Troubleshooting, page 6-210
Replacement, page 6-211
FUEL FEED PIPE

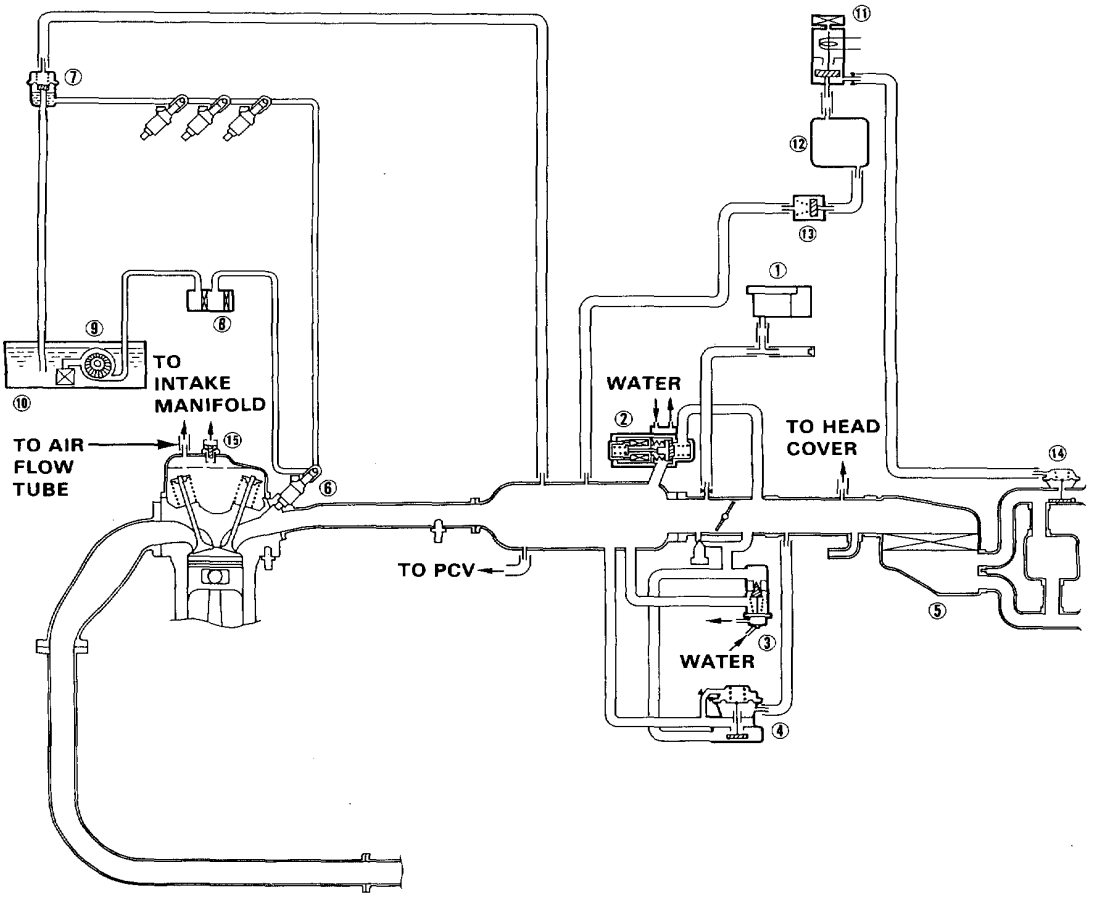
System Description

Vacuum Connections

2.0 ℓ without CATA:



2.0 ℓ without CATA:

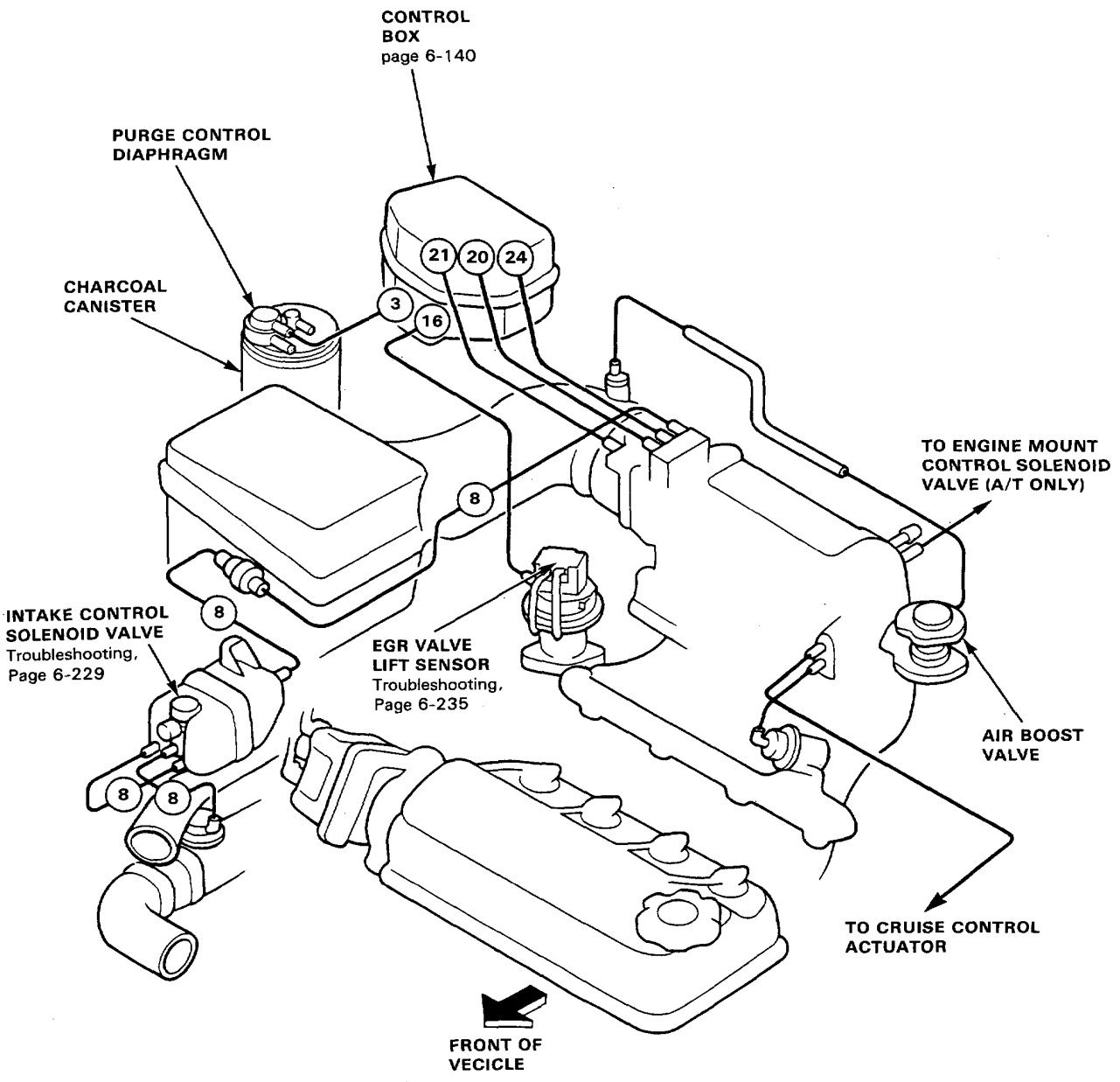


① MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
② ELECTRONIC AIR CONTROL VALVE (EACV)
③ FAST IDLE VALVE
④ AIR BOOST VALVE
⑤ AIR CLEANER
⑥ FUEL INJECTOR
⑦ PRESSURE REGULATOR
⑧ FUEL FILTER
⑨ FUEL PUMP
⑩ FUEL TANK
⑪ INTAKE CONTROL SOLENOID VALVE
⑫ AIR CHAMBER
⑬ CHECK VALVE
⑭ INTAKE CONTROL DIAPHRAGM
⑮ PCV VALVE

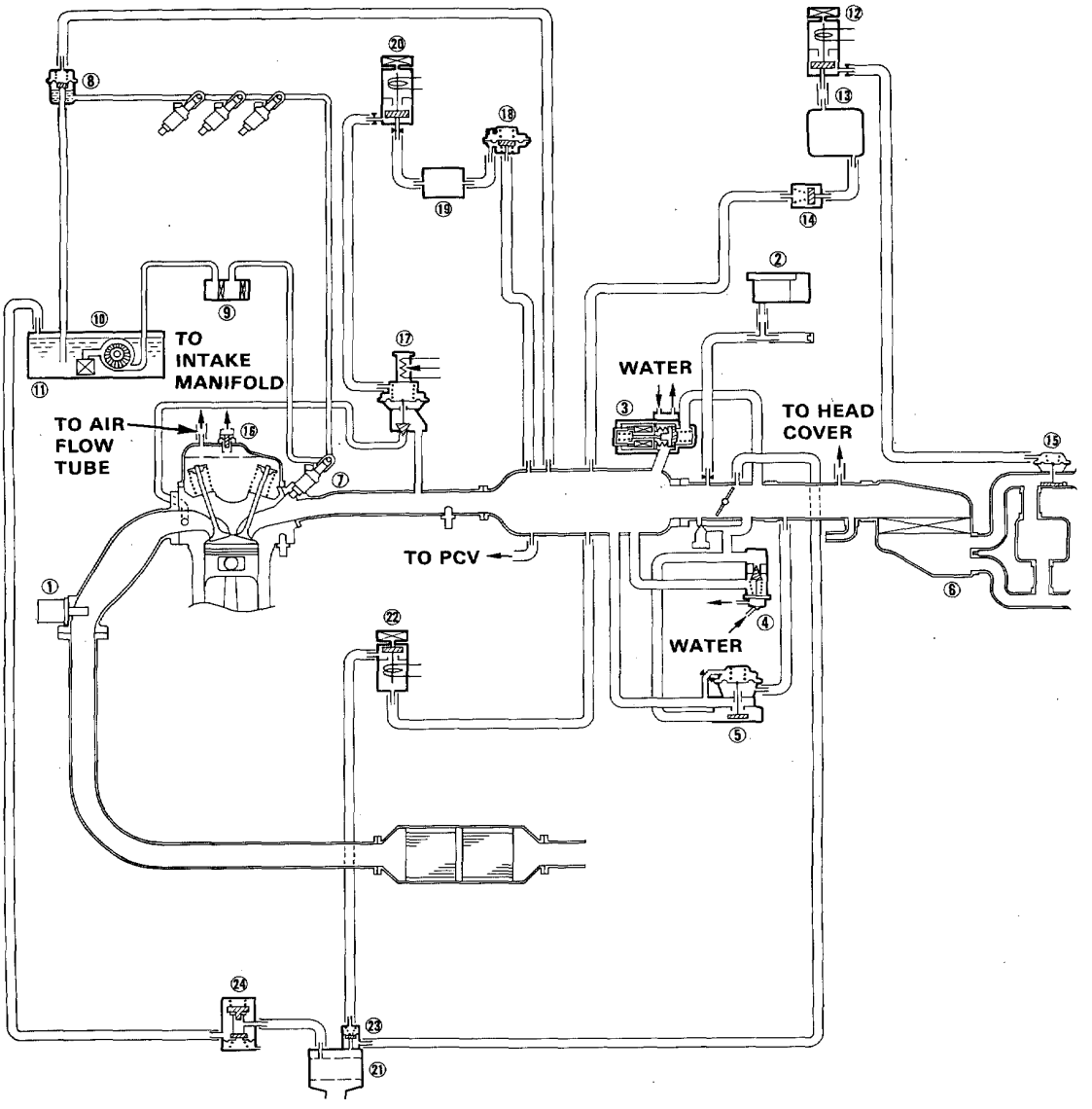
System Description

Vacuum Connections

2.0 ℓ with CATA:



2.0 ℓ with CATA:

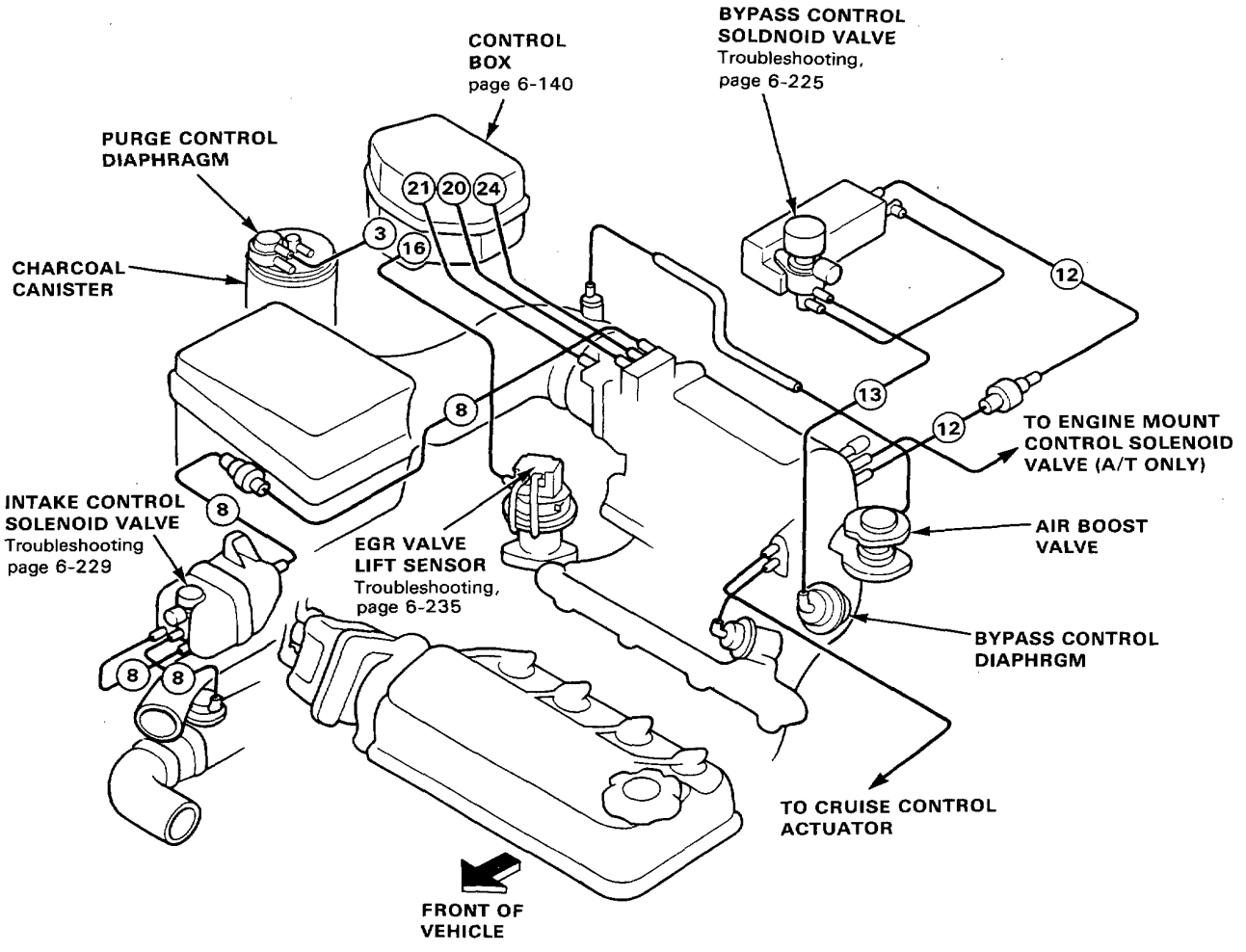


①OXYGEN (O_2) SENSOR
②MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
③ELECTRONIC AIR CONTROL VALVE (EACV)
④FAST IDLE VALVE
⑤AIR BOOST VALVE
⑥AIR CLEANER
⑦FUEL INJECTOR
⑧PRESSURE REGULATOR
⑨FUEL FILTER
⑩FUEL PUMP
⑪FUEL TANK
⑫INTAKE CONTROL SOLENOID VALVE
⑬AIR CHAMBER
⑭CHECK VALVE
⑮INTAKE CONTROL DIAPHRAGM
⑯PCV VALVE
⑰EGR VALVE
⑱CONSTANT VACUUM CONTROL (CVC) VALVE
⑲AIR CHAMBER
⑳EGR CONTROL SOLENOID VALVE
㉑CHARCOAL CANISTER
㉒PURGE CUT-OFF SOLENOID VALVE
㉓PURGE CONTROL DIAPHRAGM VALVE
㉔TWO-WAY VALVE

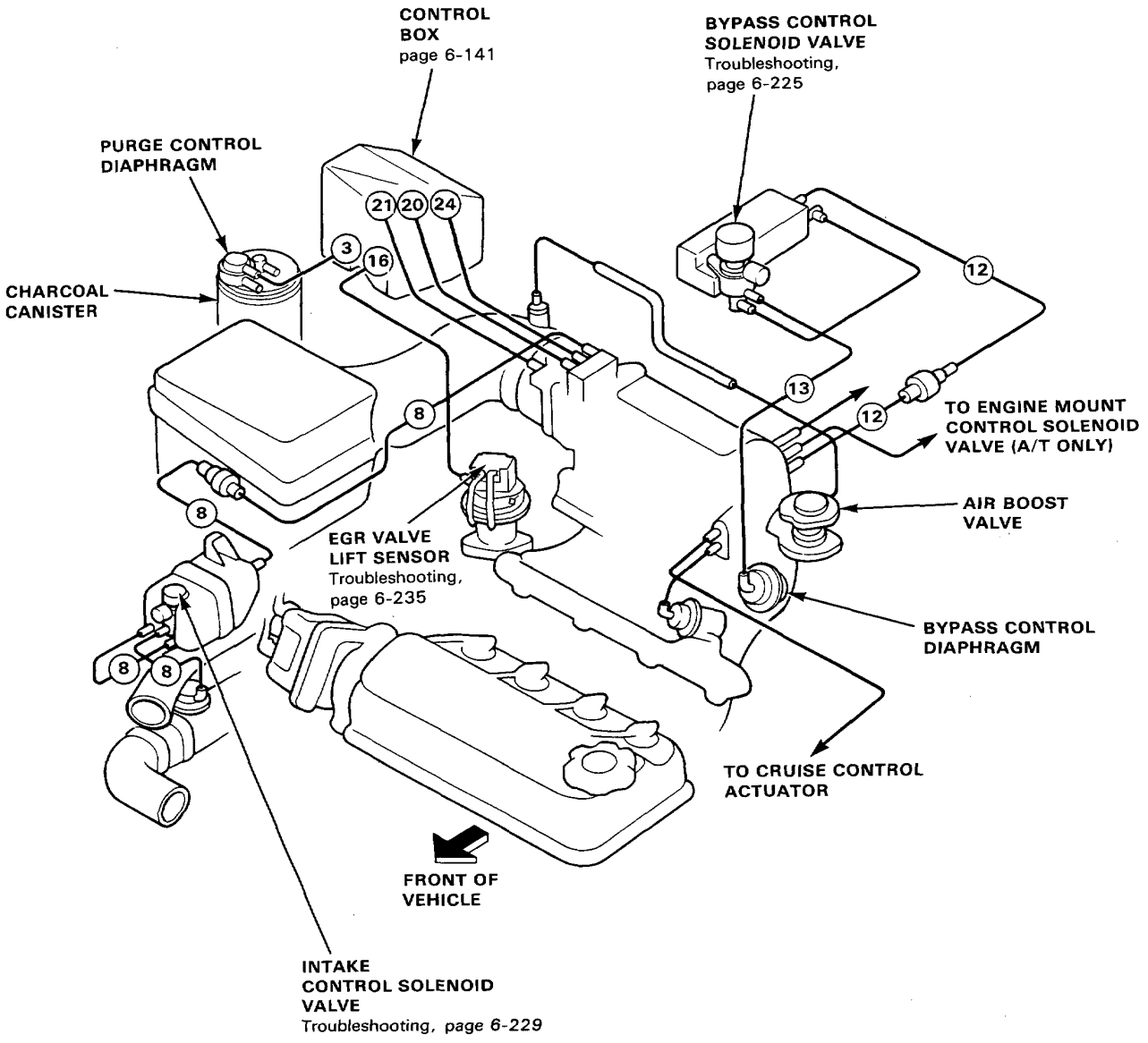
System Description

Vacuum Connections

2.2 ℓ Except KE, KQ, KY:



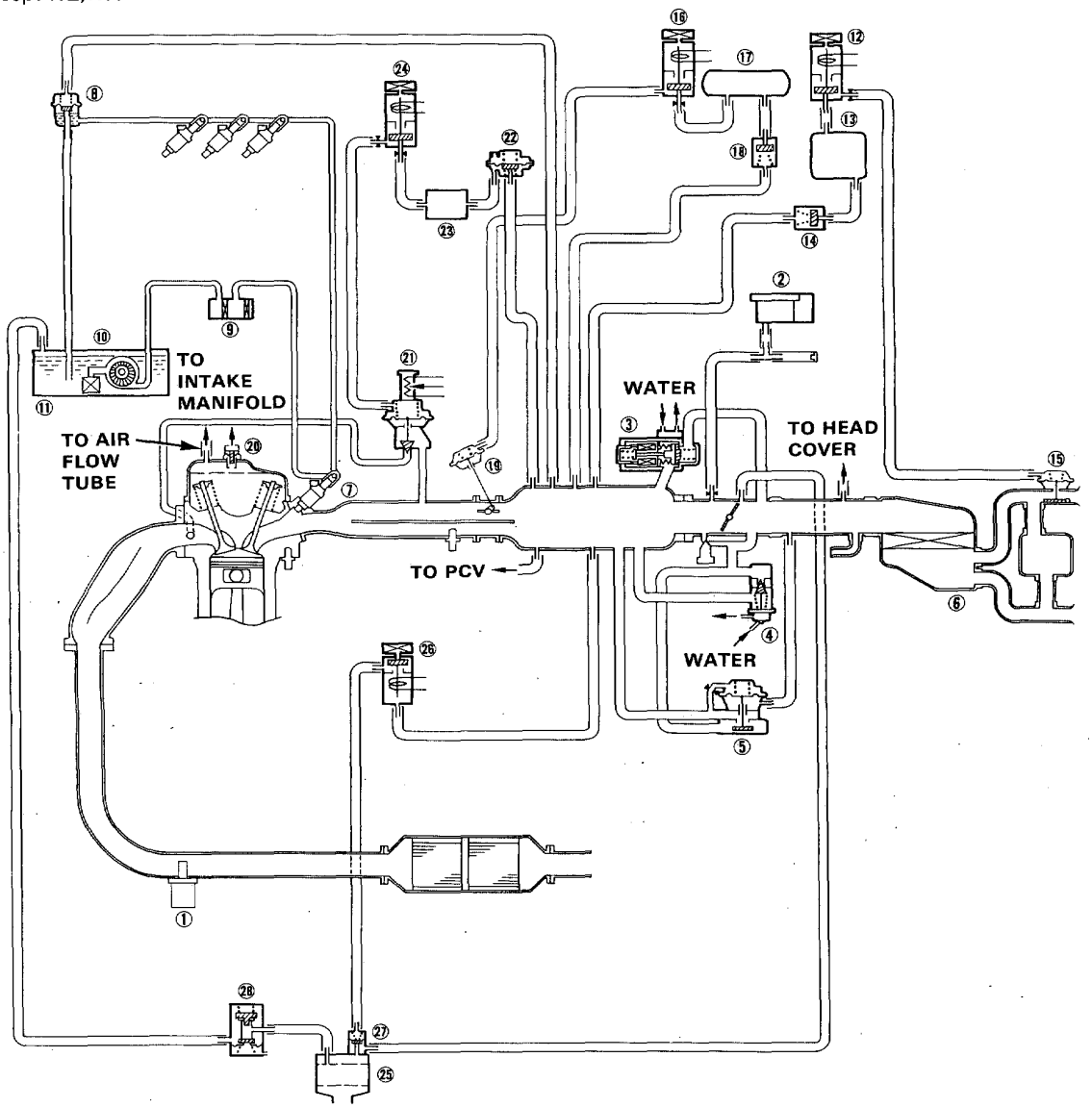
2.2 ℓ KE:


CONTROL BOX
page 6-141
BYPASS CONTROL SOLENOID VALVE
Troubleshooting, page 6-225
PURGE CONTROL DIAPHRAGM
CHARCOAL CANISTER
21
20
24
3
16
12
13
8
TO ENGINE MOUNT CONTROL SOLENOID VALVE (A/T ONLY)
AIR BOOST VALVE
EGR VALVE LIFT SENSOR
Troubleshooting, page 6-235
BYPASS CONTROL DIAPHRAGM
TO CRUISE CONTROL ACTUATOR
FRONT OF VEHICLE
INTAKE CONTROL SOLENOID VALVE
Troubleshooting, page 6-229

System Description

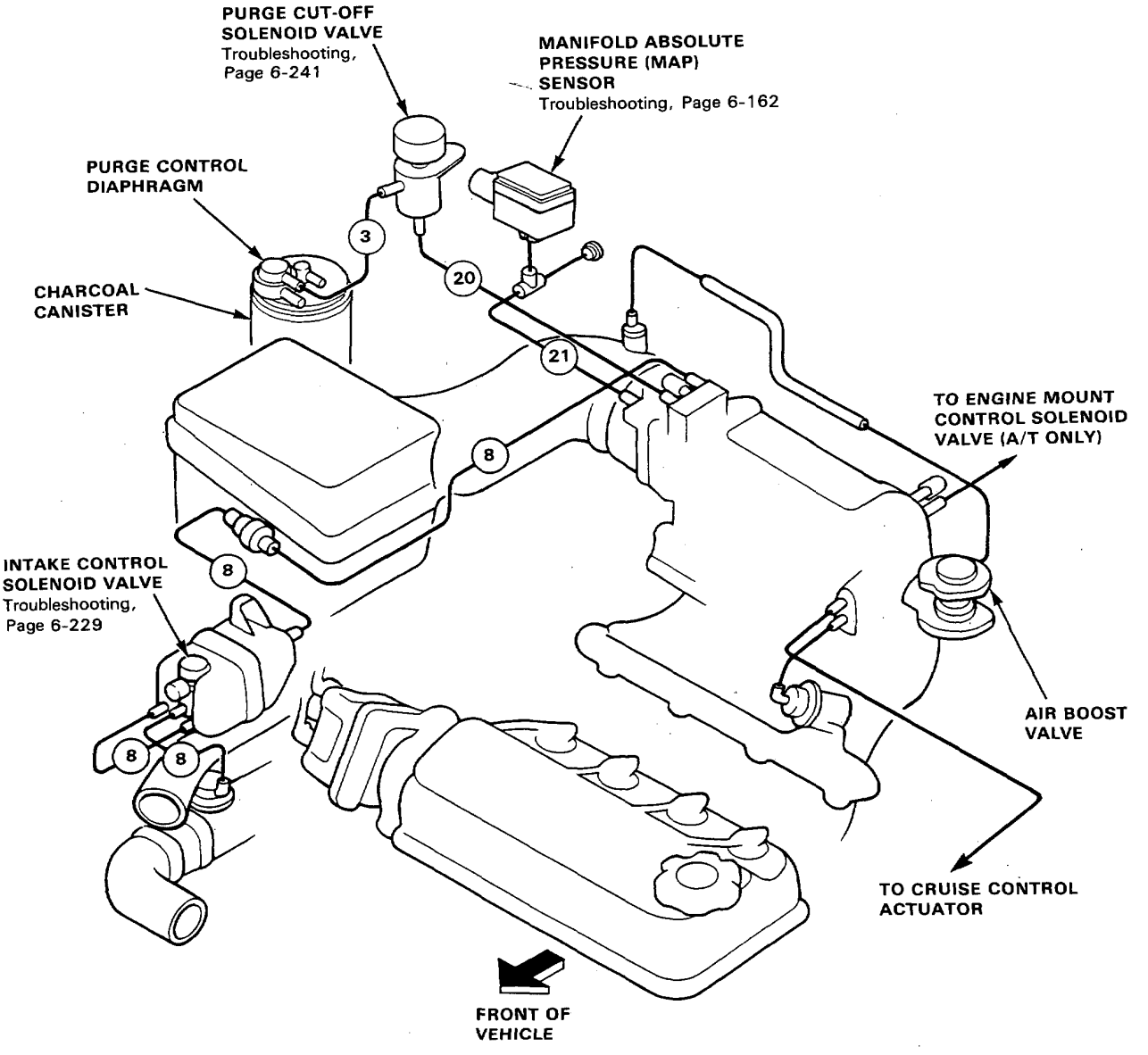
Vacuum Connections

2.2 ℓ Except KQ,KY:



①OXYGEN (O_2) SENSOR
②MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
③ELECTRONIC AIR CONTROL VALVE (EACV)
④FAST IDLE VALVE
⑤AIR BOOST VALVE
⑥AIR CLEANER
⑦FUEL INJECTOR
⑧PRESSURE REGULATOR
⑨FUEL FILTER
⑩FUEL PUMP
⑪FUEL TANK
⑫INTAKE CONTROL SOLENOID VALVE
⑬AIR CHAMBER
⑭CHECK VALVE
⑮INTAKE CONTROL DIAPHRAGM
⑯BYPASS CONTROL SOLENOID VALVE
⑰AIR CHAMBER
⑱CHECK VALVE
⑲BYPASS CONTROL DIAPHRAGM
⑳PCV VALVE
㉑EGR VALVE
㉒CONSTANT VACUUM CONTROL (CVC) VALVE
㉓AIR CHAMBER
㉔EGR CONTROL SOLENOID VALVE
㉕CHARCOAL CANISTER
㉖PURGE CUT OFF SOLENOID VALVE
㉗PURGE CONTROL DIAPHRAGM VALVE
㉘TWO-WAY VALVE

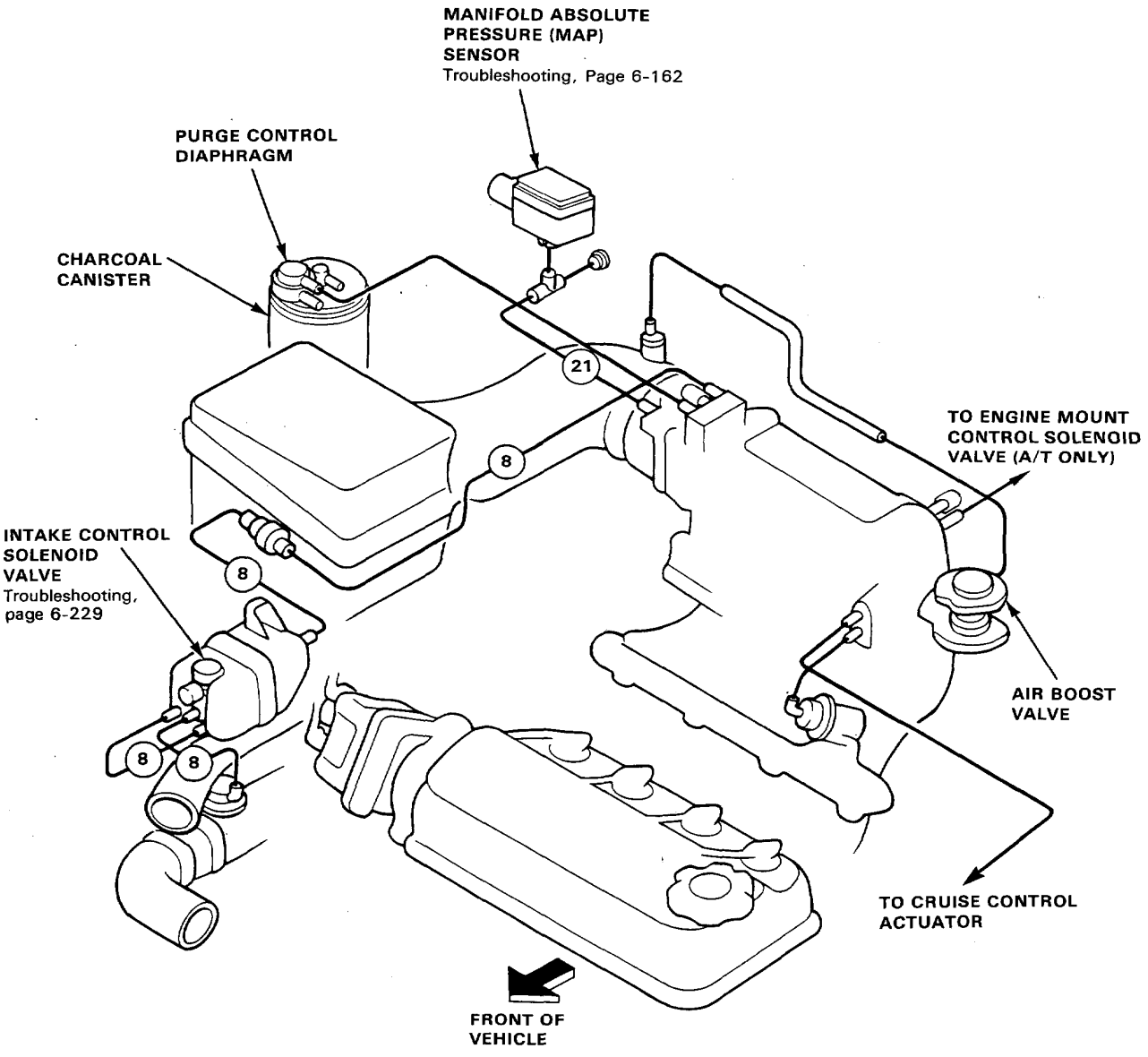
2.2 ℓ KQ:


PURGE CUT-OFF SOLENOID VALVE
Troubleshooting, Page 6-241
MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
Troubleshooting, Page 6-162
PURGE CONTROL DIAPHRAGM
CHARCOAL CANISTER
3
20
21
8
TO ENGINE MOUNT CONTROL SOLENOID VALVE (A/T ONLY)
INTAKE CONTROL SOLENOID VALVE
Troubleshooting, Page 6-229
AIR BOOST VALVE
TO CRUISE CONTROL ACTUATOR
FRONT OF VEHICLE

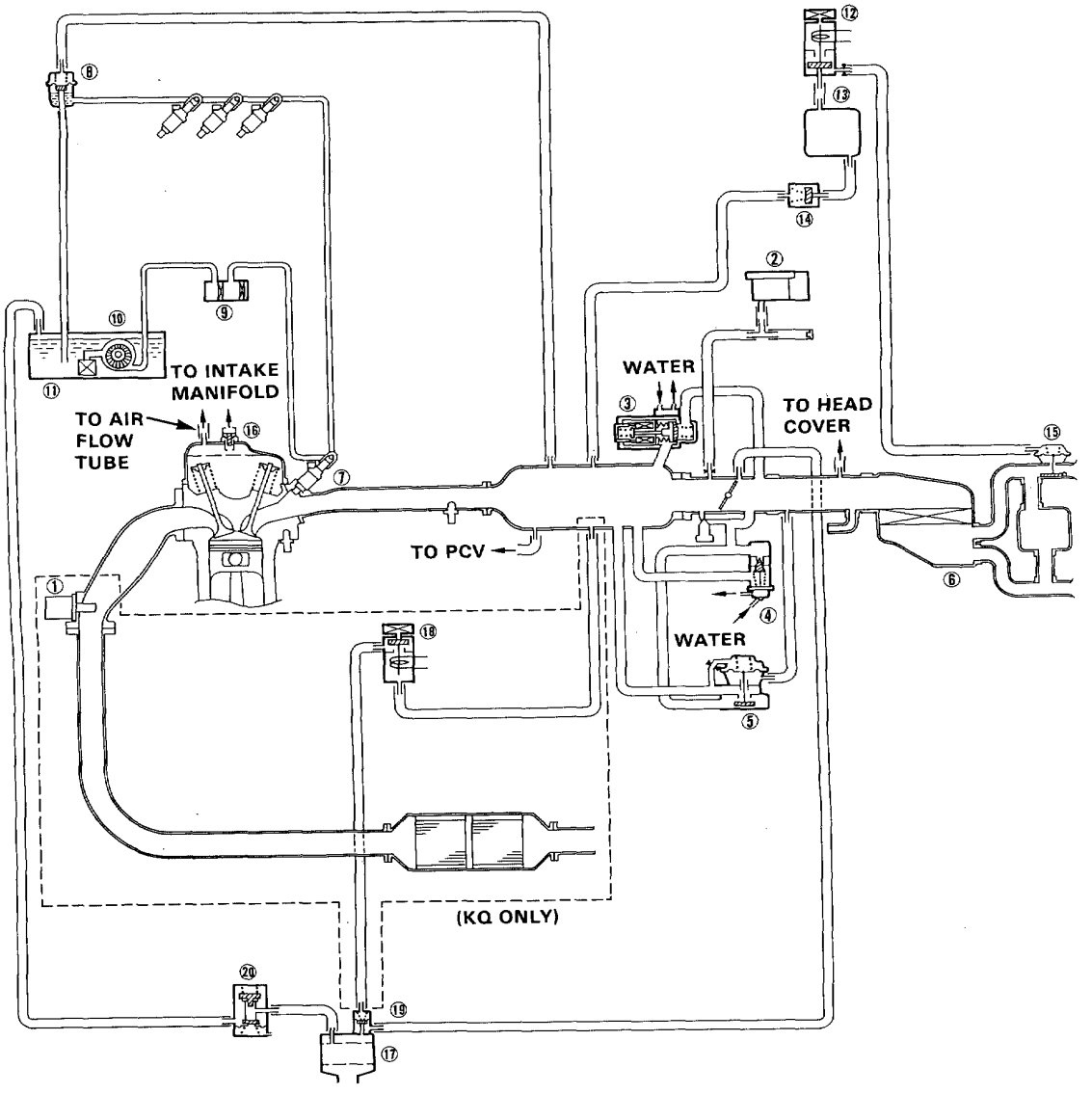
System Description

Vacuum Connections

2.2 ℓ KY:

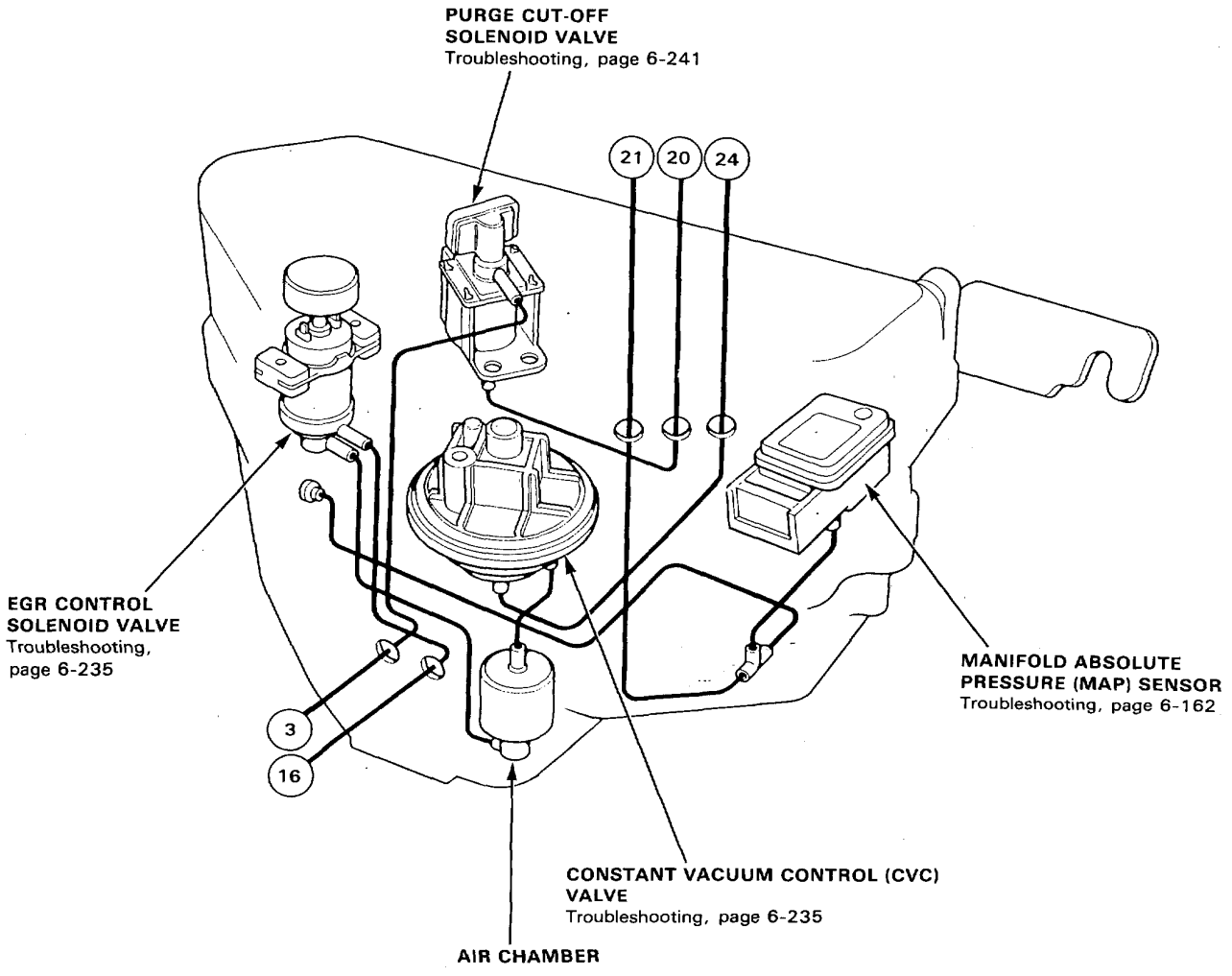


2.2 ℓ KQ, KY:

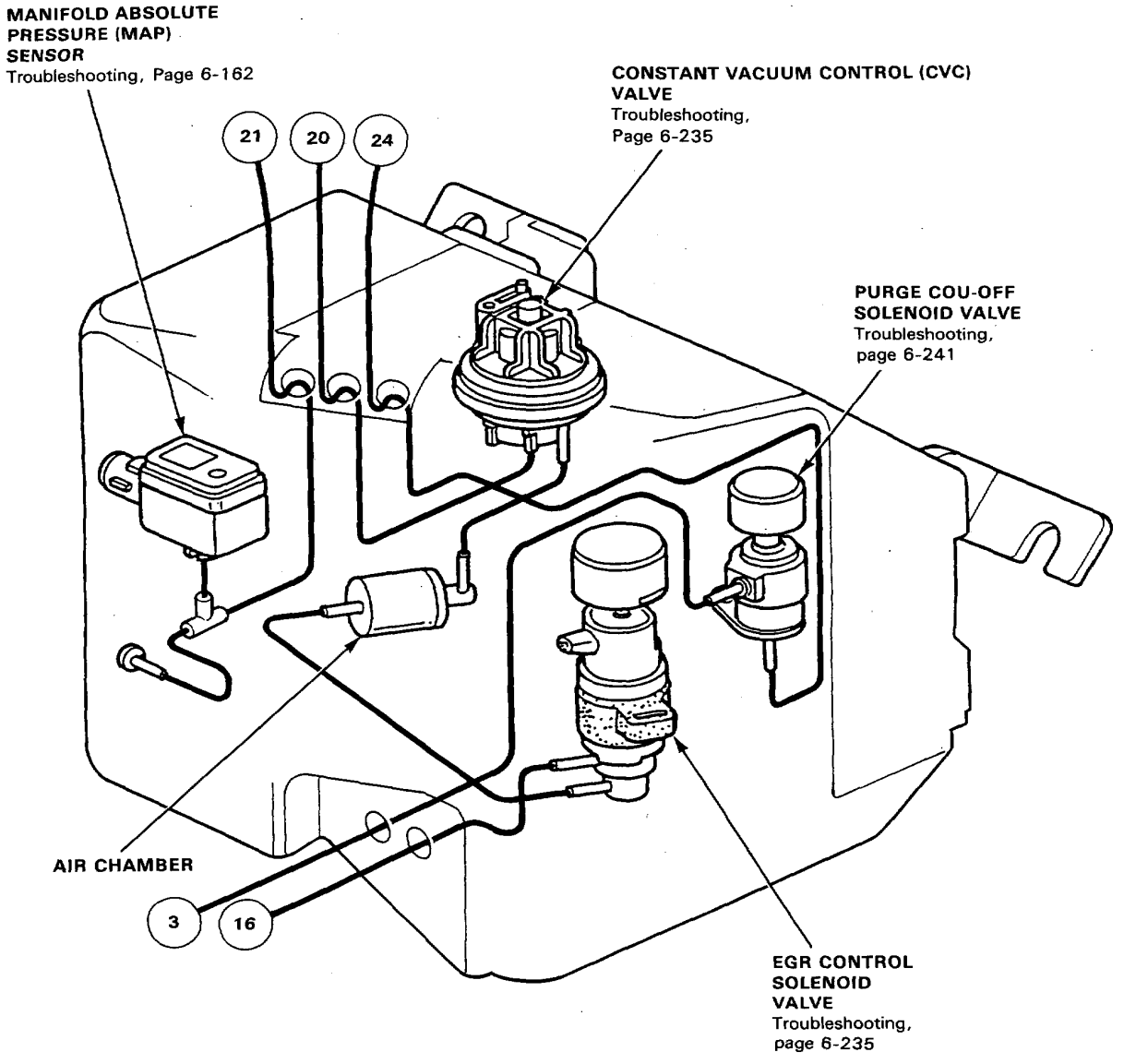


①OXYGEN (O_2) SENSOR (KQ only)
②MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
③ELECTRONIC AIR CONTROL VALVE (EACV)
④FAST IDLE VALVE
⑤AIR BOOST VALVE
⑥AIR CLEANER
⑦FUEL INJECTOR
⑧PRESSURE REGULATOR
⑨FUEL FILTER
⑩FUEL PUMP
⑪FUEL TANK
⑫INTAKE CONTROL SOLENOID VALVE
⑬AIR CHAMBER
⑭CHECK VALVE
⑮INTAKE CONTROL DIAPHRAGM
⑯PCV VALVE
⑰CHARCOAL CANISTER
⑱PURGE CUT-OFF SOLENOID VALVE
⑲PURGE CONTROL DIAPHRAGM VALVE (KQ only)
⑳TWO-WAY VALVE

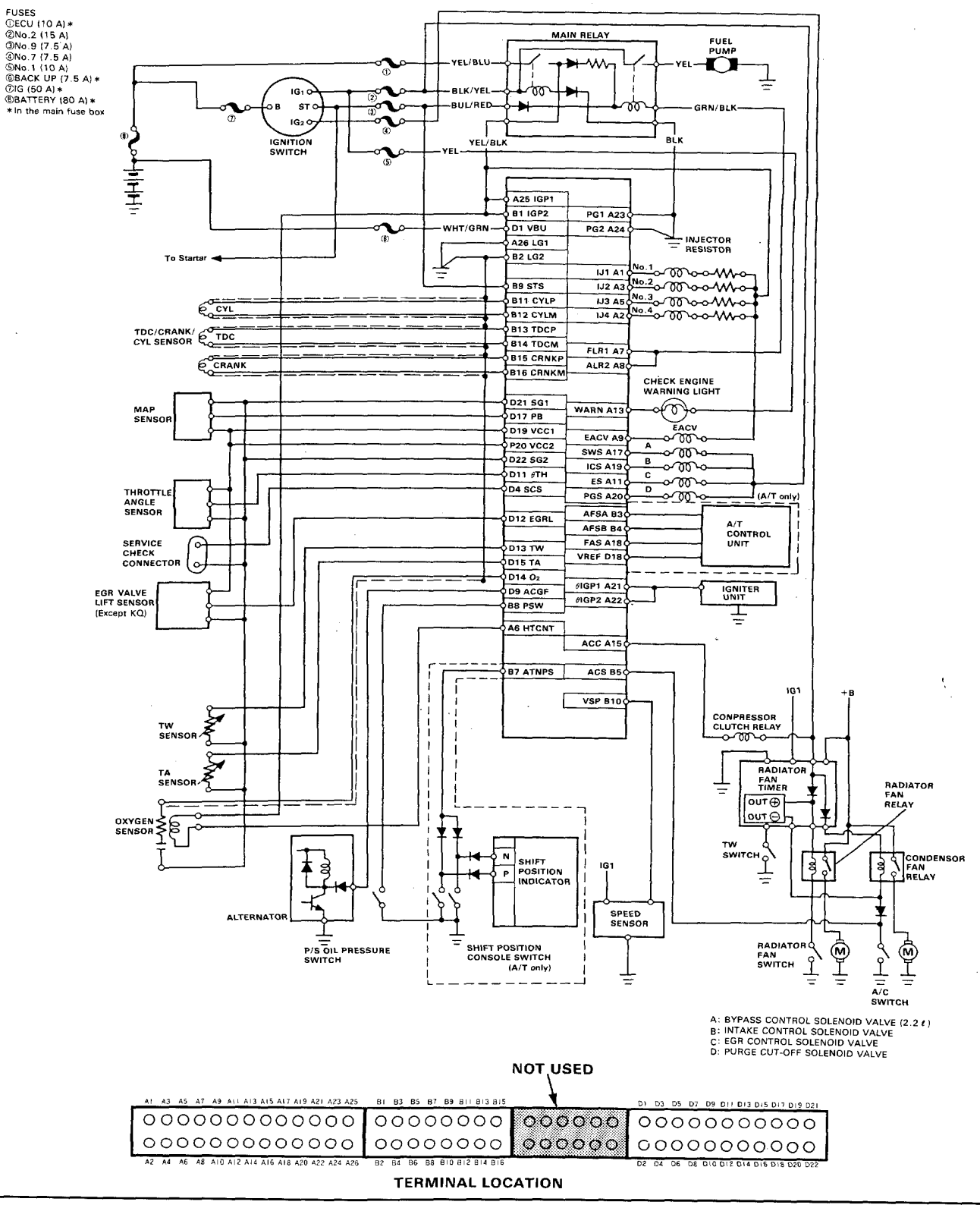
Control Box (Except 2.2ℓ KE):



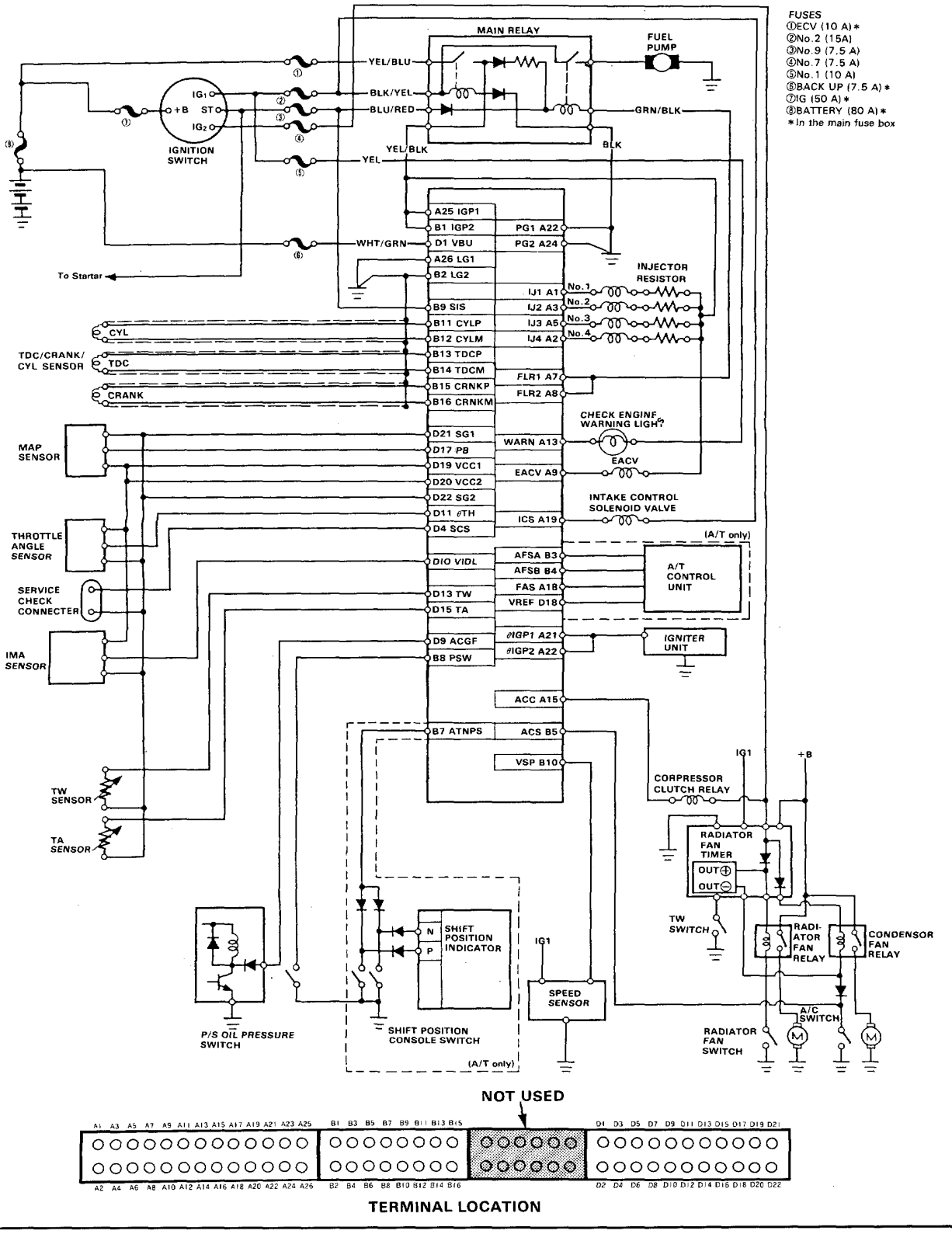
Control Box (2.2ℓ KE):



Electrical Connections (With CATA)



Electrical Connections (Without CATA)



Troubleshooting

Troubleshooting Guide [With CATA]

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

PAGE / SYSTEM / SYMPTOM		PGM-FI							
		ECU	OXYGEN SENSOR	MANIFOLD ABSOLUTE PRESSURE SENSOR	TDC/CRANK/CYL SENSOR	COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR	INTAKE AIR TEMPERATURE SENSOR	ATMOSPHERIC PRESSURE SENSOR
		152	156,158	162	168	174	176	178	182
CHECK ENGINE WARNING LIGHT TURNS ON		or							
SELF-DIAGNOSIS INDICATOR (LED) BLINKS		0 or *	1 or 41	3 or 5	4 or 8 or 9	6	7	10	13
ENGINE WON'T START		3			3				
DIFFICULT TO START ENGINE WHEN COLD		BU		3	3	1			3
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	BU				3			
	ROUGH IDLE	BU		3					
	WHEN WARM IDLE SPEED TOO HIGH	BU							
	WHEN WARM IDLE SPEED TOO LOW	BU							
FREQUENT STALLING	WHILE WARMING UP	BU				3			
	AFTER WARMING UP	BU							3
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	BU			3				
	FAILS EMISSION TEST	BU	3	2					
	LOSS OF POWER	BU		3			2		

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

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

PGM-FI		A/T FI Signal A	A/T FI Signal B	IDLE CONTROL		FUEL SUPPLY		AIR INTAKE	EMISSION CONTROL	
IGNITION OUTPUT SIGNAL	VEHICLE SPEED SENSOR			ELEC-TRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTOR	OTHER FUEL SUPPLY		EGR CONTROL SYSTEM	OTHER EMISSION CONTROLS
184	186	188	190	194	192	210	208	221	235	232
										
⑮	⑰	㉚	㉛	⑭		⑯			⑫	
①						②	③			
					②					
				①	②					
				①		②			③	
				①	②					
				①		②				
				①	②		③			
				③	①		②		③	
				③		①			③	
						②	③			①
						③	①	③		③

Troubleshooting

Troubleshooting Guide [Without CATA]

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

PAGE / SYSTEM / SYMPTOM		PGM-FI							
		ECU	MANIFOLD ABSOLUTE PRESSURE SENSOR	TDC/CRANK/CYL SENSOR	COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR	INTAKE AIR TEMPERATURE SENSOR	IMA SENSOR	ATMOSPHERIC PRESSURE SENSOR
		152	162	168	174	176	178	180	182
CHECK ENGINE WARNING LIGHT TURNS ON		or							
SELF-DIAGNOSIS INDICATOR (LED) BLINKS		0 or *	3 or 5	4 or 8 or 9	6	7	10	11	13
ENGINE WON'T START		3		3					
DIFFICULT TO START ENGINE WHEN COLD		BU	3	3	1				3
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	BU			3				
	ROUGH IDLE	BU	3						
	WHEN WARM IDLE SPEED TOO HIGH	BU							
	WHEN WARM IDLE SPEED TOO LOW	BU							
FREQUENT STALLING	WHILE WARMING UP	BU			3				
	AFTER WARMING UP	BU							3
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	BU		3					
	FAILS EMISSION TEST	BU	2						
	LOSS OF POWER	BU	3			2			

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

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

PGM-FI				IDLE CONTROL		FUEL SUPPLY			
IGNITION OUTPUT SIGNAL	VEHICLE SPEED SENSOR	A/T FI Signal A	A/T FI Signal B	ELEC-TRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTOR	OTHER FUEL SUPPLY	AIR INTAKE	EMISSION CONTROL
184	186	188	190	194	192	210	208	221	232
									
⑮	⑰	㉚	㉛	⑭		⑯			
①						②	③		
					②				
				①	②				
				①		②			
				①	②				
				①		②			
				①	②		③		
				③	①		②		
				③		①			
						②	③		①
						③	①	③	③

PGM-FI		A/T FI Signal A	A/T FI Signal B	IDLE CONTROL		FUEL SUPPLY		AIR INTAKE	EMISSION CONTROL	
IGNITION OUTPUT SIGNAL	VEHICLE SPEED SENSOR			ELEC-TRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTOR	OTHER FUEL SUPPLY		EGR CONTROL SYSTEM	OTHER EMISSION CONTROLS
184	186	188	190	194	192	210	208	221	235	232
										
⑮	⑰	㉚	㉛	⑭		⑯			⑫	
①						②	③			
					②					
				①	②					
				①		②			③	
				①	②					
				①		②				
				①	②		③			
				③	①		②		③	
				③		①			③	
						②	③			①
						③	①	③		③

Troubleshooting

Troubleshooting Guide [Without CATA]

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

PAGE / SYSTEM / SYMPTOM		PGM-FI							
		ECU	MANIFOLD ABSOLUTE PRESSURE SENSOR	TDC/CRANK/CYL SENSOR	COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR	INTAKE AIR TEMPERATURE SENSOR	IMA SENSOR	ATMOSPHERIC PRESSURE SENSOR
		152	162	168	174	176	178	180	182
CHECK ENGINE WARNING LIGHT TURNS ON		or							
SELF-DIAGNOSIS INDICATOR (LED) BLINKS		0 or *	3 or 5	4 or 8 or 9	6	7	10	11	13
ENGINE WON'T START		3		3					
DIFFICULT TO START ENGINE WHEN COLD		BU	3	3	1				3
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	BU			3				
	ROUGH IDLE	BU	3						
	WHEN WARM IDLE SPEED TOO HIGH	BU							
	WHEN WARM IDLE SPEED TOO LOW	BU							
FREQUENT STALLING	WHILE WARMING UP	BU			3				
	AFTER WARMING UP	BU							3
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	BU		3					
	FAILS EMISSION TEST	BU	2						
	LOSS OF POWER	BU	3			2			

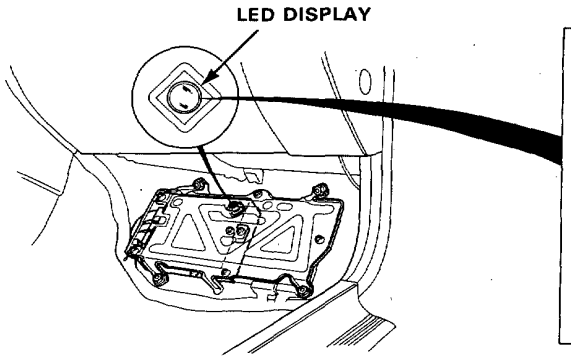
* if codes other than those listed above are indicated, count the number of blinks again. If the indicator is in fact blinking these codes, substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.

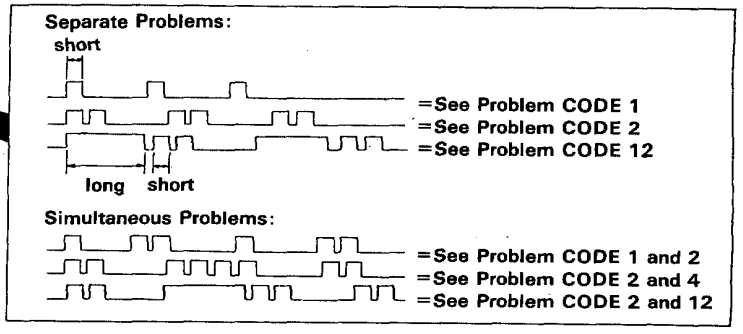
(BU): When the Check Engine warning light and the self-diagnosis indicator are on, the back-up system is in operation. Substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.

PGM-FI				IDLE CONTROL		FUEL SUPPLY			
IGNITION OUTPUT SIGNAL	VEHICLE SPEED SENSOR	A/T FI Signal A	A/T FI Signal B	ELEC-TRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS	FUEL INJECTOR	OTHER FUEL SUPPLY	AIR INTAKE	EMISSION CONTROL
184	186	188	190	194	192	210	208	221	232
									
⑮	⑰	㉚	㉛	⑭		⑯			
①						②	③		
					②				
				①	②				
				①		②			
				①	②				
				①		②			
				①	②		③		
				③	①		②		
				③		①			
						②	③		①
						③	①	③	③

Self-diagnostic Procedure

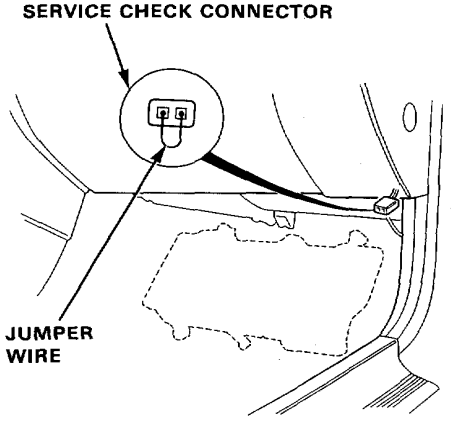
When the Check Engine warning light has been reported on, turn the ignition on, pull down the passenger's side carpet from under the dashboard and observe the LED on the top of the ECU. The LED indicates a system failure code by blinking frequency. The ECU LED can indicate any number of simultaneous component problems by blinking separate codes, one after another. Problem codes 1 through 9 are indicated by individual short blinks. Problem codes 10 through 41 are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the problem code.

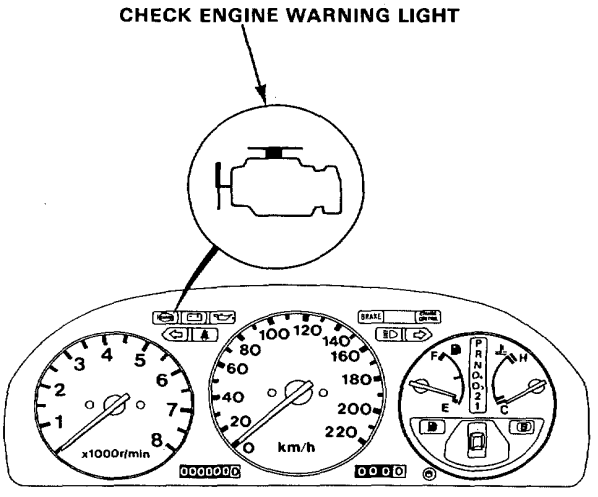




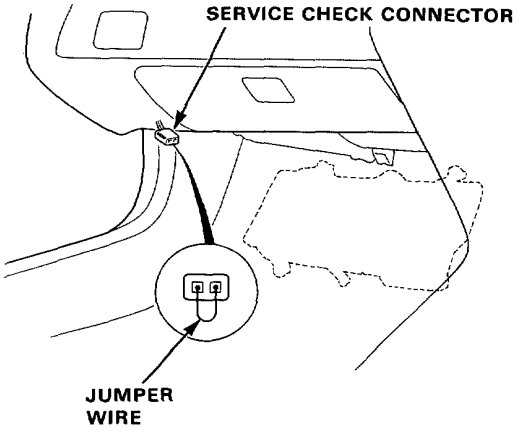
When the two terminals of the service check connector are connected with a jumper wire the LED on the ECU, the check engine warning light will indicate the same code.

LH:





RH:



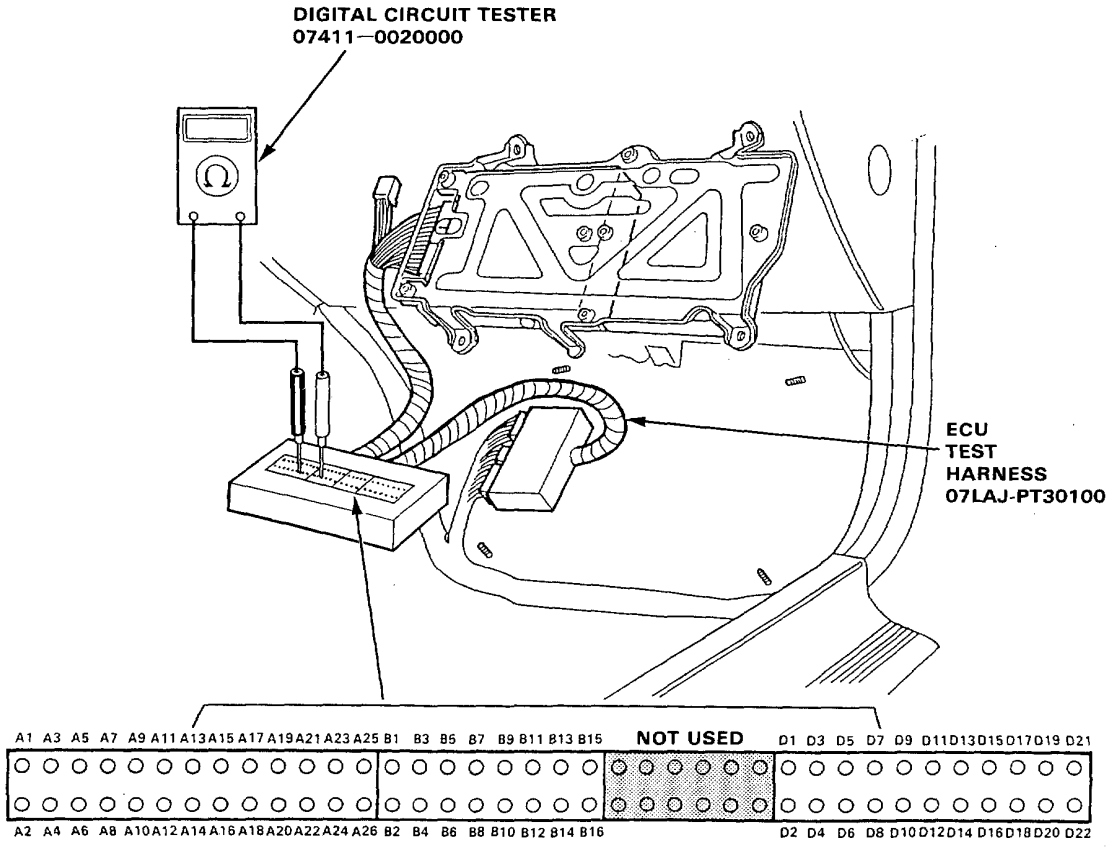
SELF-DIAGNOSIS INDICATOR BLINKS	SYSTEM INDICATED	PAGE
0	ECU	6-152
1	OXYGEN CONTENT (With CATA)	6-156
3	MANIFOLD ABSOLUTE PRESSURE	6-162
5		6-166
4	CRANK ANGLE	6-168
6	COOLANT TEMPERATURE	6-174
7	THROTTLE ANGLE	6-176
8	TDC POSITION	6-170
9	NO.1 CYLINDER POSITION	6-172
10	INTAKE AIR TEMPERATURE	6-178
11	IMA (Without CATA)	6-180
12	EXHAUST GAS RECIRCULATION SYSTEM	6-235
13	ATMOSPHERIC PRESSURE	6-182
14	ELECTRONIC AIR CONTROL	6-194
15	IGNITION OUTPUT SIGNAL	6-184
17	VEHICLE SPEED SENSOR	6-186
30	A/T FI SIGNAL A	6-188
31	A/T FI SIGNAL B	6-190
41	OXYGEN SENSOR HEATER (With CATA)	6-158

- If codes other than those listed above are indicated, verify the code. If the code indicated is not listed above, replace the ECU.
- The Check Engine warning light may come on, indicating a system problem, when, *in fact, there is a poor or intermittent electrical connection*. First, check the electrical connections, clean or repair connections if necessary.
- The Check Engine warning light and S_4 warning light may light simultaneously when the self-diagnosis indicator blinks 6, 7 and 17 Check the PGM-FI system according to the PGM-FI control system troubleshooting, then recheck the S_4 warning light. If it lights, see page 9-28, 29.
- The Check Engine warning light does not come on when there is a malfunction in the A/T FI signal. However the ECU LED will indicate the codes.

(cont'd)

Self-diagnostic Procedure (cont'd)

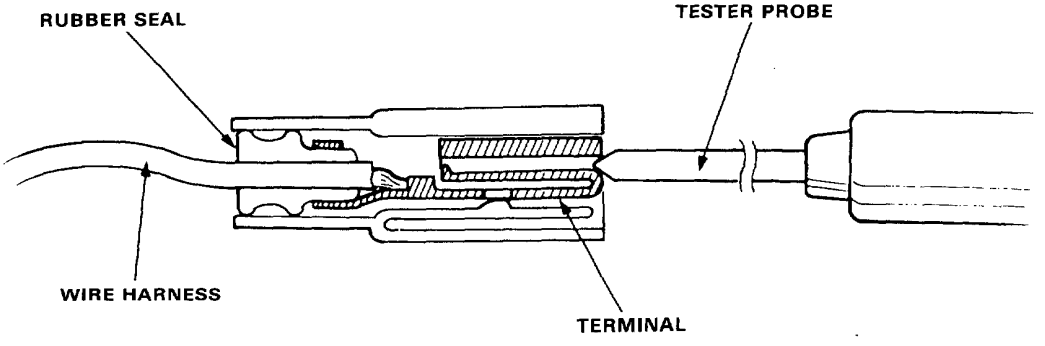
If the inspection for a particular failure code requires the ECU test harness, remove the right door sill molding, the small cover on the right kick panel, and pull the carpet back to expose the ECU. Unbolt the ECU bracket. Connect the ECU test harness. Then check the system according to the procedure described for the appropriate code(s) listed on the following pages.



TERMINAL LOCATION

CAUTION:

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



How to Read Flowcharts

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

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

NOTE:

- The term "Intermittent Failure" is used in these charts. It simply means a system may have had a failure, but it checks out OK through all your tests. You may need to road test the car to reproduce the failure or if the problem was a loose connection, you may have unknowingly solved it while doing the tests. In any event, if the warning light on the dash does not come on, check for poor connections or loose wires at all connectors related to the circuit that you are troubleshooting.
- Most of the troubleshooting flowcharts have you reset the ECU and try to duplicate the problem code. If the problem is intermittent and you can't duplicate the code, do not continue through the flowchart. To do so will only result in confusion and, possibly a needlessly replaced ECU.
- "Open" and "Short" are common electrical terms. An open is a break in a wire or at a connection. A short is an accidental connection of a wire to ground or to another wire. In simple electronics, this usually means something won't work at all. In complex electronics (like ECUs), this can sometimes mean something works, but not the way it's supposed to.
- If the electrical readings are not as specified when using the ECU harness, check the test harness connections before proceeding.

Troubleshooting Flowchart — ECU

Check Engine warning light isn't on for two seconds after ignition is first turned on.

Is oil pressure warning light on ? — NO → Inspect No. 1 fuse.

YES

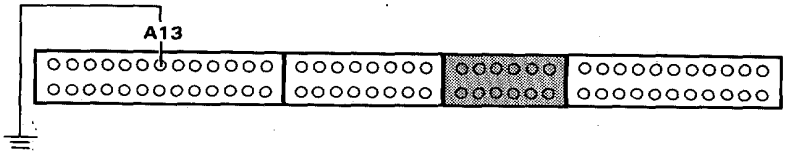
Turn the ignition switch OFF.

Inspect No. 1 fuse. → Is No. 1 fuse OK ? — NO → **Replace fuse.**

YES → **Repair open in YEL wire between No. 1 fuse and combination meter.**

Connect the ECU test harness between the control unit and connector (page 6-150).

Connect A13 terminal to body ground.

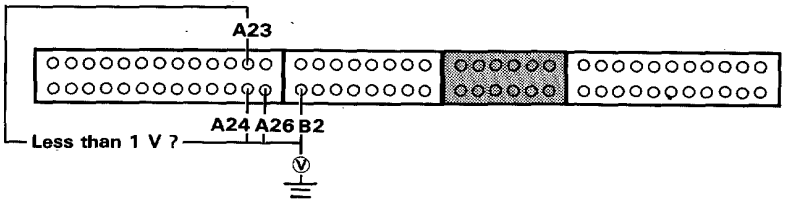


Turn the ignition switch ON.

Is Check Engine warning light on ? — NO → **—Replace warning light bulb. —Repair open in GRN/RED wire between ECU (A13) and combination meter.**

YES

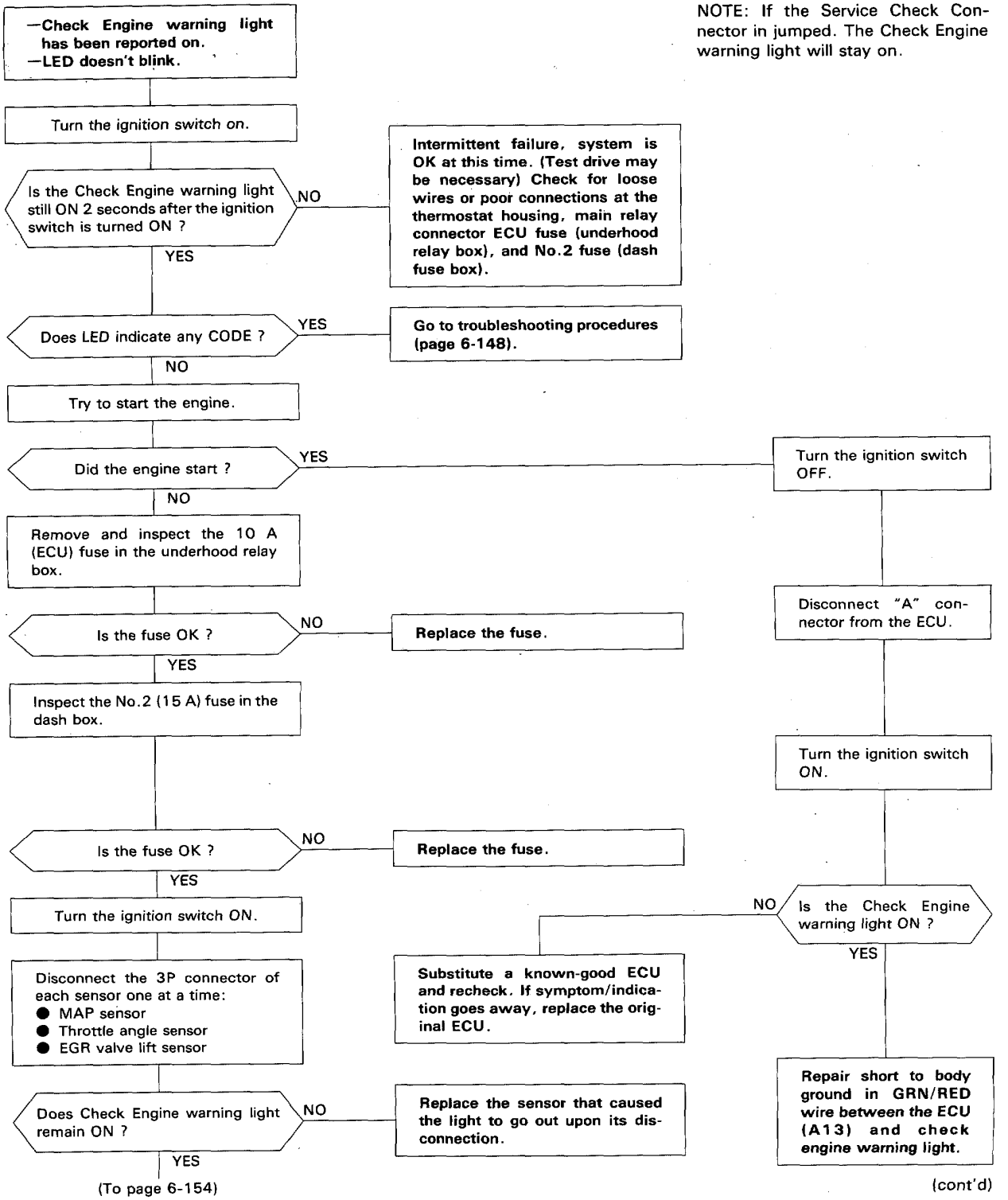
Measure voltage between body ground and the following terminals individually to: ● A23, ● A24, ● A26, ● B2



Is there less than 1 V ? — NO → **Repair open in wire between ECU and thermostat housing (G101) that had more than 1 V.**

YES

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



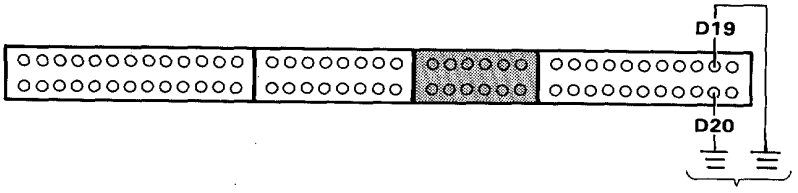
NOTE: If the Service Check Connector in jumped. The Check Engine warning light will stay on.

Troubleshooting Flowchart — ECU (cont'd)

(From page 6-153)

Turn the ignition switch OFF.

Connect the ECU test harness (page 6-150). But disconnect the "D" connector from the ECU only, not the main wire harness.



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

Does continuity exist ?

YES — **Repair short to body ground in RED/WHT wire between ECU (D19), YEL/WHT wire between ECU (D20) and throttle angle sensor, EGR valve lift sensor and MAP sensor.**

NO

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

Turn the ignition switch ON.

Individually connect the following terminal to Body Ground. B2 • A26

Is the Check Engine warning light still ON after 2 seconds ?

NO — **—Repair open in BLK/RED wire between ECU (A26) and G101.**
—Repair open in BRN/BLK wire between ECU (B2) and G101.

YES

Measure voltage between A26 (−) and the following: B1 (+) and A25 (+).

Is there battery voltage ?

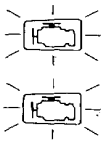
NO — **—Repair open in YEL/BLK wire between ECU (A25, B1) and main relay.**
—Check main relay and wiring connectors at main relay (page 6-216).

YES

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



Troubleshooting Flowchart — Oxygen Sensor



① Self-diagnosis LED indicates code 1: A problem in the Heated Oxygen (O_2) Sensor circuit.

—Check Engine warning light has been reported on.
—LED indicates CODE 1.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset ECU.

Inspect fuel pressure (page 6-213).

Is it normal ?

NO → **Go to page 6-208 Fuel Supply System.**

YES

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

Run engine for 10 seconds.

Road test with the Transmission in 2nd gear, accelerate using wide open throttle for at least 5 seconds. Then decelerate for at least 5 seconds with the throttle completely closed.

Is Check Engine warning light on and does LED indicate CODE 1 ?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires.**

YES

(To page 6-157)

(From page 6-156)

Turn the ignition switch OFF.

Disconnect the O_2 sensor connector and connect A (−) terminal to B (+) terminal with a battery.

After two minutes, measure voltage between C (−) terminal and D (+) terminal.

Start the engine.

Is the voltage above 0.6 V at wide open throttle to 4,500 min^{-1}(rpm) and below 0.4 V when the throttle is quickly released from 4,500 min^{-1}(rpm) ?

NO → **Replace O_2 sensor.**

YES

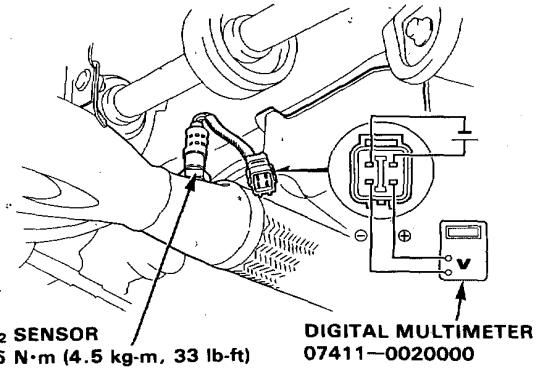
Stop engine.

Connect the O_2 sensor connector to engine wire harness.

Connect the ECU test harness between the ECU and connector (page 6-150).

(To page 6-158)

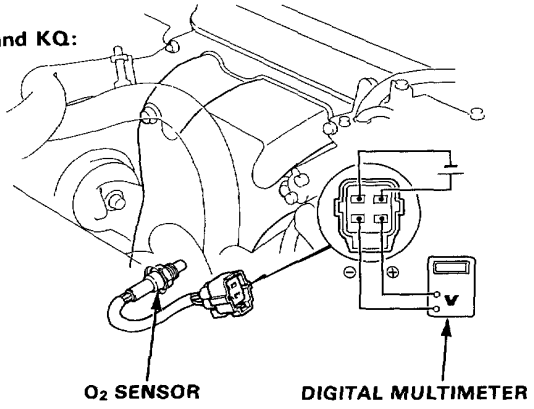
2.2 ℓ except KQ:



O_2 SENSOR
45 N·m (4.5 kg-m, 33 lb-ft)

DIGITAL MULTIMETER
07411—0020000

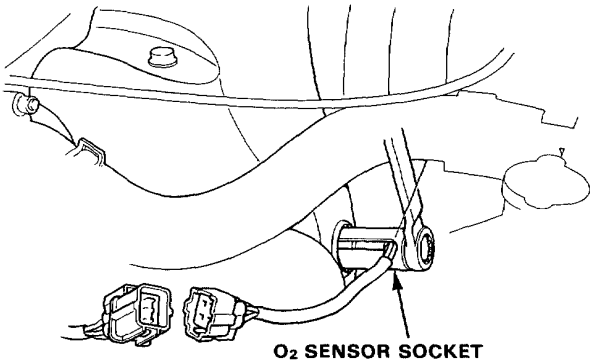
2.0 ℓ and KQ:



O_2 SENSOR

DIGITAL MULTIMETER

2.0 ℓ and KQ:



O_2 SENSOR SOCKET WRENCH
07LAA—PT50100
45 N·m (4.5 kg-m, 33 lb-ft)

(cont'd)

Troubleshooting Flowchart — Oxygen Sensor (cont'd)

(From page 6-157)

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

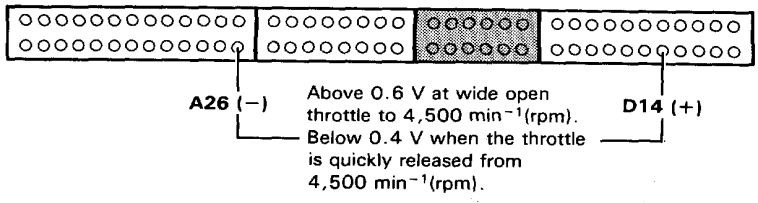
Measure voltage between D14 (+) and A26 (−) terminal.

Is the voltage above 0.6 V at wide open throttle to 4,500 min^{-1}(rpm) and 0.4 V when the throttle is quickly released from 4,500 min^{-1}(rpm) ?

NO → **Repair short or open in WHT wire between ECU (D14) and O_2 sensor.**

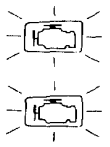
YES

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





Troubleshooting Flowchart — Oxygen Sensor Heater



(41) Self-diagnosis LED indicates code 41: A problem in the Oxygen (O_2) Sensor Heater circuit.

—Engine is running.
—Check Engine warning light has been reported on.
—LED indicates CODE 41.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset ECU.

Start engine.

Is Check Engine warning light on and does LED indicate CODE 41 ?

NO → **Intermittent failure, system is OK at this time (test driving may be necessary). Check for poor connections or loose wires at O_2 sensor connector.**

YES

Stop engine.

Disconnect the 4P connector from the O_2 sensor.

Measure resistance between terminals A and B on the O_2 sensor.

Is there 15—20 Ω ?

NO → **Replace O_2 sensor.**

YES

Check for continuity to body ground on each terminal on the O_2 sensor.

Does continuity exist ?

YES → **Replace O_2 sensor.**

NO

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

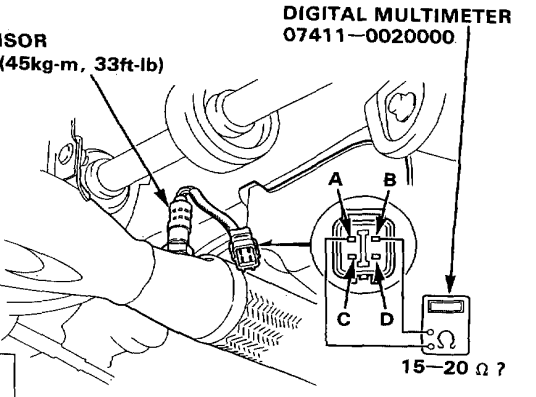
Does continuity exist ?

YES → **Replace O_2 sensor.**

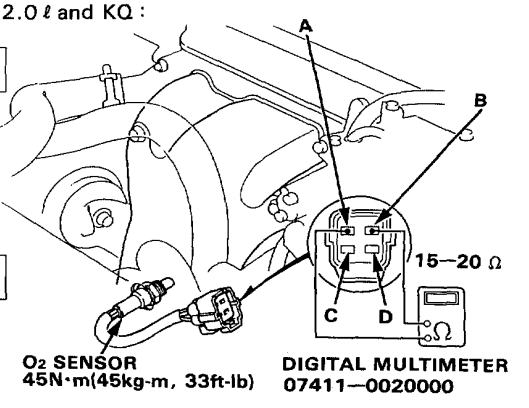
NO

(To page 6-161)

2.2 ℓ except KQ :



2.0 ℓ and KQ :



(From page 6-160)

Turn the ignition switch ON.

Measure voltage between YEL/BLK (+) terminal and ORN/BLK (−) terminal.

Is there battery voltage ?

YES → Disconnect the "A" connector from the ECU.

NO

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

Is there battery voltage ?

NO → **—Repair open in YEL/BLK wire between the O_2 sensor and Main Relay.**
—Replace blown ECU fuse (10A) in the underhood relay box.

YES

Turn the ignition switch OFF.

Reconnect the 4P connector to O_2 sensor.

Connect the ECU test harness "A" connector to the main wire harness only, not the ECU (page 6-150).

Turn the ignition switch ON.

Measure voltage between A6 (+) terminal and A23 (−) terminal.

Is there battery voltage ?

NO → **Repair open in ORN/BLK wire between ECU (A6) and O_2 Sensor.**

YES

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

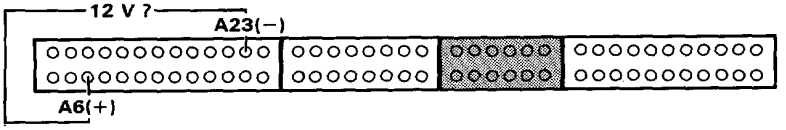
Measure voltage between YEL/BLK (+) terminal and ORN/BLK (−) terminal.

Is there battery voltage ?

YES → **Repair short in ORN/BLK wire between ECU (A6) and O_2 sensor.**

NO

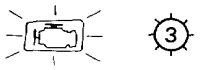
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.



Troubleshooting Flowchart — MAP Sensor

Self-diagnosis LED indicates code 3: Most likely an electrical problem in the Manifold Absolute Pressure (MAP) Sensor system.

Self-diagnosis LED indicates code 5: Most likely a mechanical problem (broken hose) in the Manifold Absolute Pressure (MAP) Sensor system.



—Engine is warm and running.
—Check Engine warning light has been reported on.
—LED indicates CODE 3.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset ECU.

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

Is Check Engine warning light on and does LED indicate CODE 3 ?

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

YES

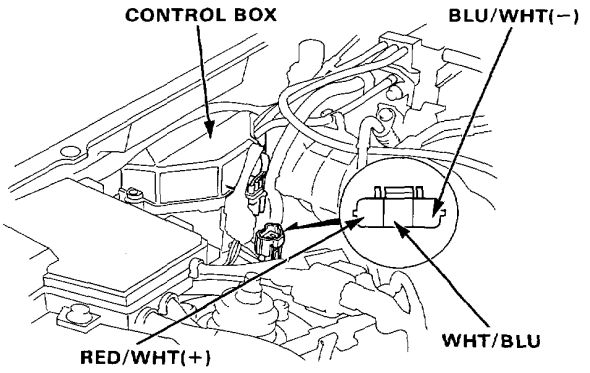
Turn the ignition switch OFF.

Disconnect the 3P connector from the MAP sensor.

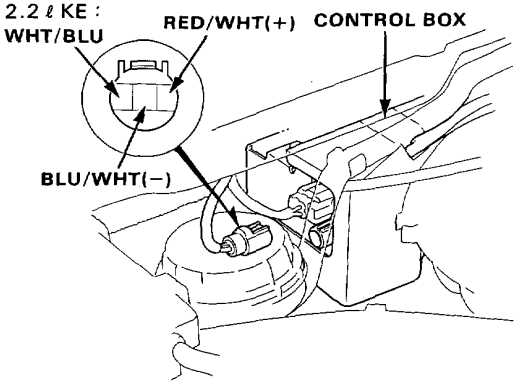
Turn the ignition switch ON.

(To page 6-163)

Except 2.2 ℓ KE :



2.2 ℓ KE :



(From page 6-162)

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

Is there approx. 5 V ?

YES

NO

Repair open in RED/WHT wire between ECU (D19) and MAP sensor.
If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

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

Is there approx. 5 V ?

NO

Repair open in BLU/WHT wire between ECU (D21) and MAP sensor.
If wire is OK, substitute a known-gttd ECU and recheck. If prescribed voltage is now available, replace the original ECU.

YES

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

Is there approx. 5 V ?

NO

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

YES

Turn the ignition switch OFF.

Reconnect the 3P connector to the MAP sensor.

Connect the ECU test harness between the ECU and connector (page 6-150).

Turn the ignition switch ON.

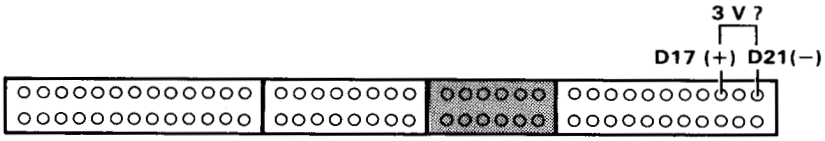
(To page 6-164)

(cont'd)

Troubleshooting Flowchart — MAP Sensor (cont'd)

(From page 6-163)

Measure voltage between D17 (+) terminal and D21 (−) terminal.



Is there approx. 3 V ?

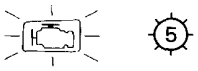
NO → **Replace MAP sensor.**

YES

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



Troubleshooting Flowchart — MAP Sensor (cont'd)



—Check Engine warning light has been reported on.
—LED indicates CODE 5.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset ECU.

Start the engine.

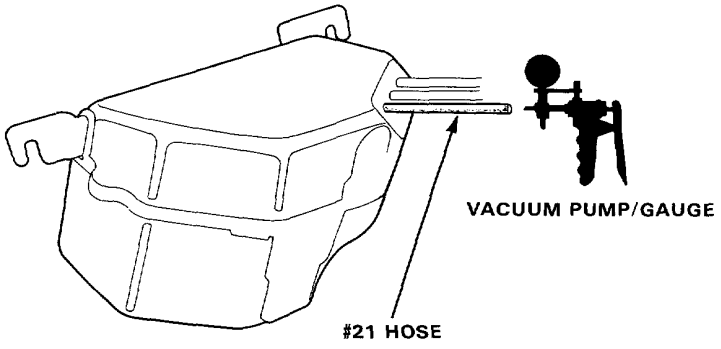
Is Check Engine warning light on and does LED indicate CODE 5 ? — NO

—Intermittent failure, system is OK at this time (test drive may be necessary).
—Check vacuum hoses, pipes and connections.
—Make sure all connectors are secure.

YES

Stop engine.

Disconnect #21 hose from the throttle body, connect vacuum pump to the hose and apply vacuum.



Does it hold vacuum ? — NO

Connect a vacuum pump to the MAP sensor and apply vacuum.

YES

Does it hold vacuum ? — NO

Replace MAP sensor.

YES

Replace #21 hose.

Connect a T-fitting from a vacuum gauge between the throttle body and MAP sensor.

(To page 6-167)

(From page 6-166)

Start engine.

Is there manifold vacuum ?

NO → —Remove restriction from throttle body.
—Replace throttle body.

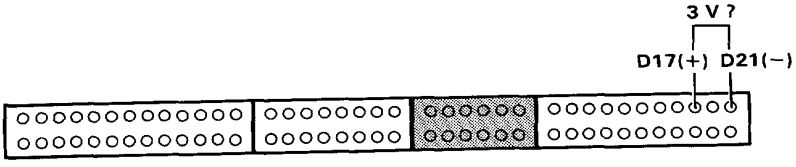
YES

Stop engine.

Connect the ECU test harness between the ECU and connector (page 6-150).

Turn the ignition switch ON.

Measure voltage between D17 (+) terminal and D21 (−) terminal.



Is there approx. 3V ?

NO → **Replace the MAP sensor.**

YES

Start the engine and allow it to idle.

Is there approx. 1V ?

NO → **Replace MAP sensor.**

YES

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

Troubleshooting Flowchart — TDC/CRANK/CYL Sensors

(4) Self-diagnosis LED indicates code 4: A problem in the circuit of the CRANK Sensor.

(8) Self-diagnosis LED indicates code 8: A problem in the circuit of the TDC Sensor.

(9) Self-diagnosis LED indicates code 9: A problem in the circuit of the CYL Sensor.

(4)

—Check Engine warning light has been reported on.
—LED indicates CODE 4.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset ECU.

Start engine.

Is Check Engine warning light on and does LED indicate CODE 4 ?

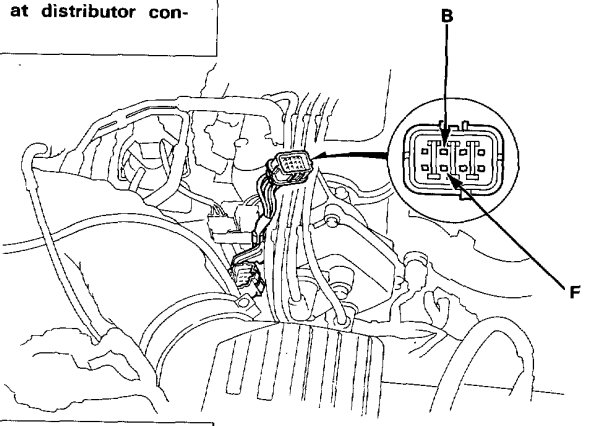
NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at distributor connector.

YES

Stop engine.

Disconnect the 8P connector from the TDC/CRANK/CYL sensor.

Measure resistance between B terminal and F terminal.

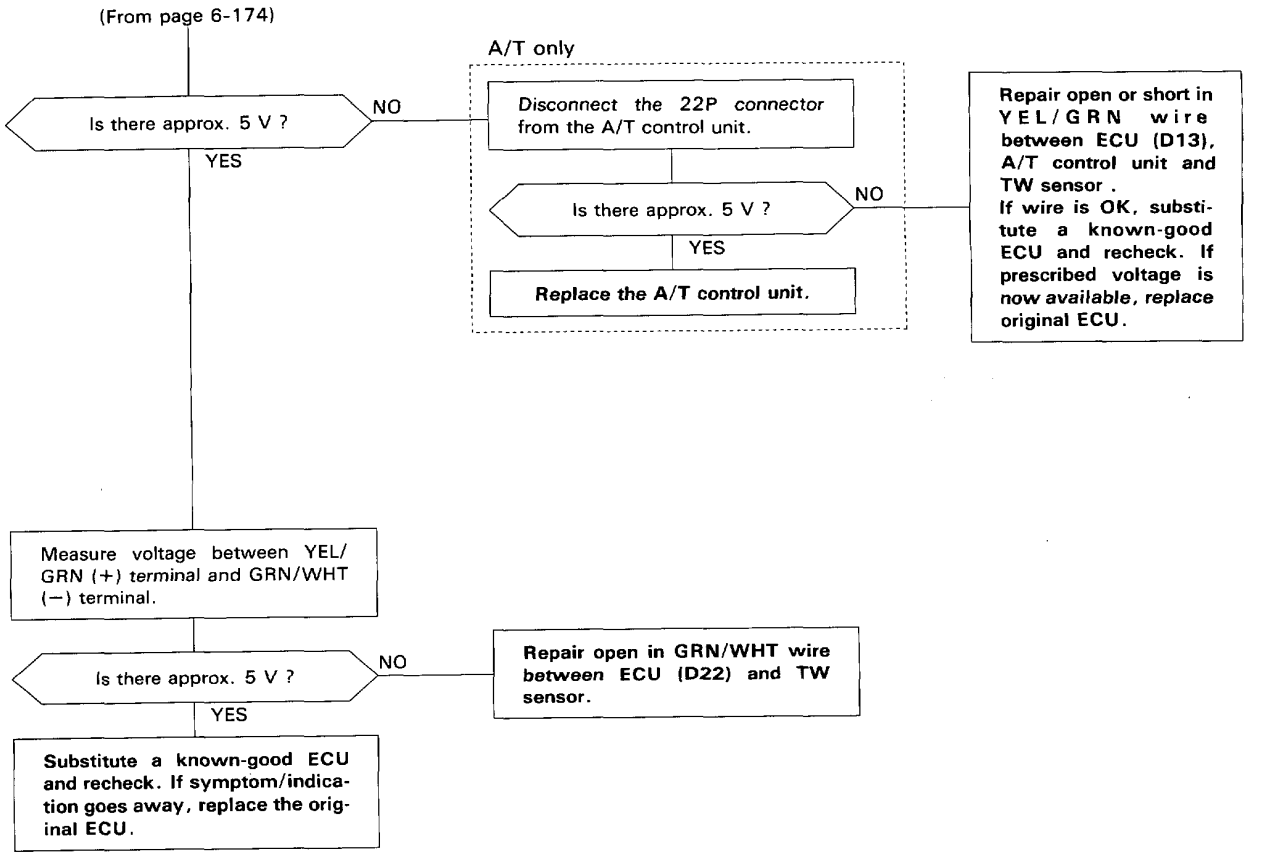


Is there 350—700 Ω ?

NO → **Replace the distributor assembly (section 16).**

YES

(To page 6-169)


(From page 6-174)
Is there approx. 5 V ?
NO
YES
A/T only
Disconnect the 22P connector from the A/T control unit.
Is there approx. 5 V ?
NO
YES
Replace the A/T control unit.
Repair open or short in YEL/GRN wire between ECU (D13), A/T control unit and TW sensor .
If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace original ECU.
Measure voltage between YEL/GRN (+) terminal and GRN/WHT (−) terminal.
Is there approx. 5 V ?
NO
YES
Repair open in GRN/WHT wire between ECU (D22) and TW sensor.
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

Troubleshooting Flowchart — Throttle Angle Sensor

Self-diagnosis LED indicates code 7: Most likely a problem in the Throttle Angle Sensor circuit.

—Engine is running.
—Check Engine warning light has been reported on.
—LED indicates CODE 7.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay for 10 seconds to reset ECU.

Start engine.

Is Check Engine warning light on and does LED indicate CODE 7 ?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at throttle angle sensor connector.**

YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the throttle angle sensor.

Turn the ignition switch ON.

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

Is there approx. 5 V ?

NO → Measure voltage between YEL/WHT (+) terminal and body ground.

YES

Turn the ignition switch OFF.

Reconnect the 3P connector.

Connect the ECU test harness between the ECU and connector (page 6-150).

(To page 6-177)

Is there approx. 5V ?

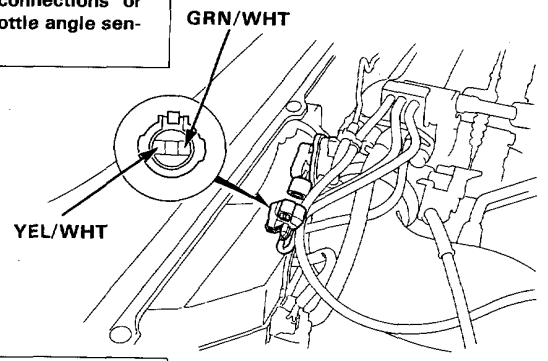
YES → **Repair open in GRN/WHT wire between ECU (D22) and throttle angle sensor.**

NO

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 6-150).

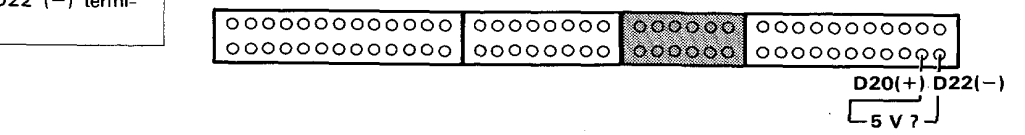
(To page 6-177)



(From page 6-176)

Turn the ignition switch ON.

Measure voltage between D11 (+) terminal and D22 (−) terminal.



Is voltage approx. 0.5 V at full close throttle, and approx. 4.5 V at full open throttle ?
NOTE: There should be a smooth transition from 0.5 V to 4.5 V as the throttle is depressed.

NO

A/T only

Disconnect the 22P connector from the A/T control unit.

Is voltage approx. 0.5 V at full close throttle, and approx. 4.5 V at full open throttle ?
NOTE: There should be a smooth transition from 0.5 V to 4.5 V as the throttle is depressed.

NO

— Replace throttle angle sensor.
— Repair open or short in RED/BLK wire between ECU (D11), A/T control unit and throttle angle sensor.

YES

Replace the A/T control unit.

YES

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

(From page 6-176)

Turn the ignition switch ON.

Measure voltage between D20 (+) terminal and D22 (−) terminal.

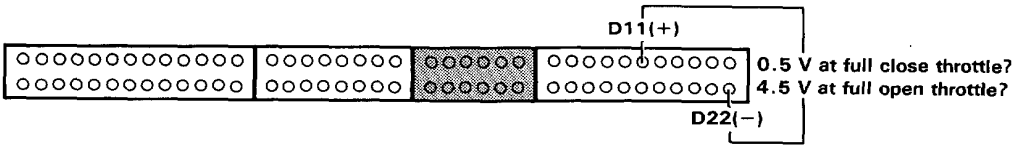
Is there approx. 5 V ?

YES

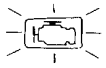
Repair open in YEL/WHT wire between ECU (D20) and throttle angle sensor.

NO

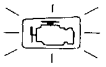
Substitute a known-good ECU and recheck. If prescribed voltage is now available. replace the original ECU.

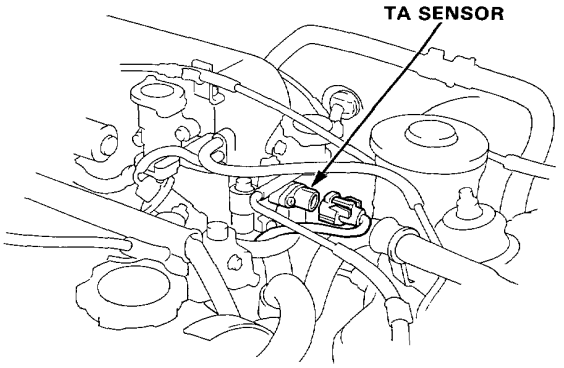


Troubleshooting Flowchart — TA Sensor




Self-diagnosis LED indicates code 10: Most likely a problem in the Intake Air Temperature (TA) Sensor circuit.



—Check Engine warning light has been reported on
—LED indicates CODE 10.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset ECU.

Turn the ignition switch ON.

Is Check Engine Warning light on and does LED indicate CODE 10 ?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at TA sensor connector.

YES

Turn the ignition switch OFF.

Disconnect the 2P connector from the TA sensor.

Measure resistance between the 2 terminals on the TA sensor.

Is there 1—4 kΩ ?

NO → **Replace TA sensor.**

YES

Turn the ignition switch ON.

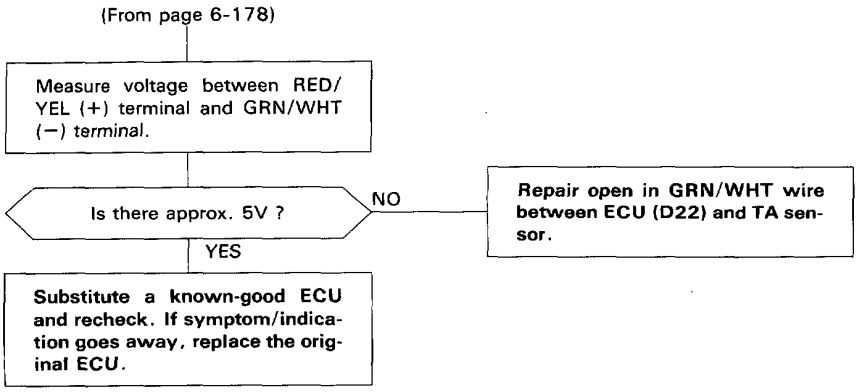
Measure voltage between RED/YEL (+) terminal and body ground.

Is there approx. 5 V ?

NO → **Repair open or short in RED/YEL wire between ECU (D15) and TA sensor.**
If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace original ECU.

YES

(To page 6-179)


(From page 6-178)
Measure voltage between RED/YEL (+) terminal and GRN/WHT (−) terminal.
Is there approx. 5V ?
NO
Repair open in GRN/WHT wire between ECU (D22) and TA sensor.
YES
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

Troubleshooting Flow Chart — IMA Sensor (Without CATA)

(11) Self-diagnosis LED indicates code11: Most likely a problem in the IMA Sensor circuit.

–Check Engine warning light has been reported on.
–LED indicates CODE 11

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset ECU.

Turn the ignition switch ON.

Is check Engine warning light on ? and does LED indicate CODE 11 ?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections of loose wires at the IMA sensor connector.

YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the IMA sensor.

Measure resistance between A terminal and C terminal on IMA sensor harness.

Is there 4—6 kΩ ?

NO → **Replace IMA sensor.**

YES

Measure resistance between A and B terminals and between C and B terminals.

Does the sum of the two resistance checks equal 4—6 kΩ ?

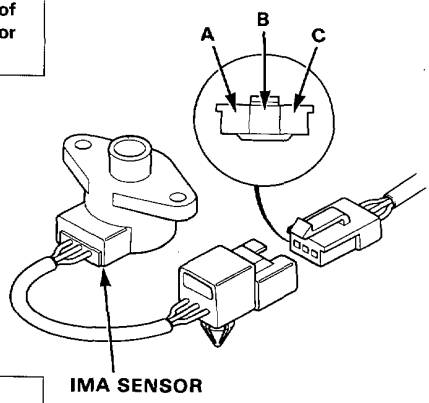
NO → **Replace IMA sensor.**

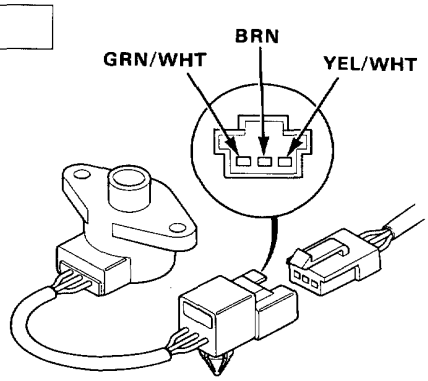
YES

Turn the ignition switch ON.

Measure voltage between YEL/WHT (+) terminal and GRN/WHT (–) terminal on the wire harness.

(To page 6-181)





(From page 6-180)

Is there approx. 5 V ?
NO
YES

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

Is there approx. 5 V ?
YES
NO

Repair open in GRN/WHT wire between ECU. (D22) and IMA sensor.

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 6-150)

Turn the ignition switch ON.

Measure voltage between D10 (+) terminal and D22 (−) terminal.

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 6-150).

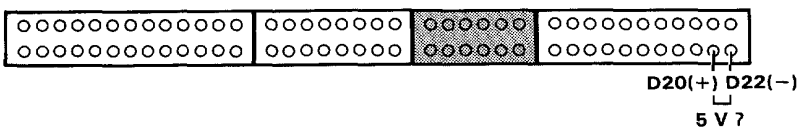
Turn the ignition switch ON.

Measure voltage between D20 (+) terminal and D22 (−) terminal.

Is there approx. 5 V ?
YES
NO

Repair open in YEL/WHT wire between ECU (D20) and IMA sensor.

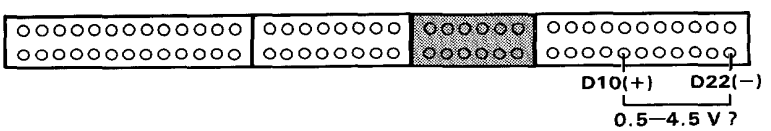
Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.



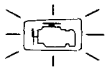
Is voltage 0.5—4.5 V ?
NO
YES

Repair open or short in BRN wire between ECU (D10) and IMA sensor.

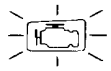
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.



Troubleshooting Flowchart — PA Sensor



Self-diagnosis LED indicates code 13: A problem in the Atmospheric Pressure (PA) Sensor.



–Check Engine warning light has been reported on.
–LED indicates CODE 13.

↓

Turn the ignition switch OFF.

↓

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset ECU.

↓

Turn the ignition switch ON.

↓

Is Check Engine warning light on and does LED indicate CODE 13 ?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**

YES ↓

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



Troubleshooting Flowchart — Ignition Output Signal

Self-diagnosis LED indicates code 15: A problem in the Ignition Output Signal circuit.

–Check Engine warning light has been reported.
–LED indicates CODE 15.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset ECU.

Start engine.

Is Check Engine warning light on and does LED indicate CODE 15 ?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at the distributor connector.

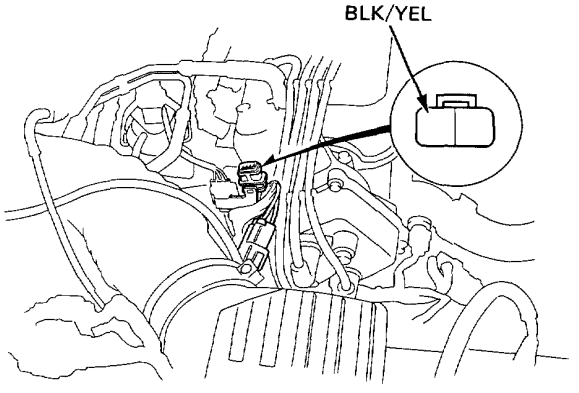
YES

Turn the ignition switch OFF.

Disconnect the 2P connector from the distributor.

Turn the ignition switch ON.

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



Is there battery voltage ?

NO → **Repair open in BLK/YEL wire between the 2P connector and ignition switch.**

YES

Turn the ignition switch OFF.

Reconnect the 2P connector.

(To page 6-185)

(From page 6-184)

Connect the PGM-FI test harness between the ECU and connector (page 6-150).

Turn the ignition switch ON.

Measure voltage individually between A21 (+), A22 (+) terminals and A26 (−)terminal.

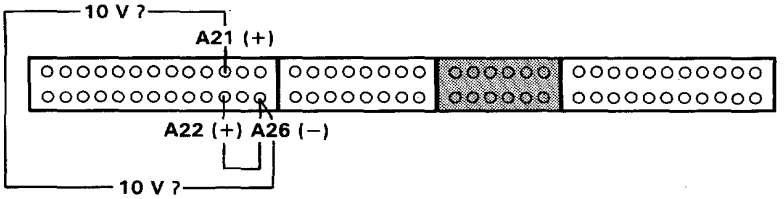
Is there approx. 10 V ?

NO

- **Replace the igniter unit.**
- **Repair open or short YEL/GRN wires between distributor and ECU (A21 or A22).**

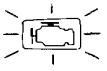
YES

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



NOTE: If the YEL/GRN wire was shorted, the igniter may be damaged.

Troubleshooting Flowchart — Vehicle speed Sensor



(17) Self-diagnosis LED indicates code 17: A problem in the Vehicle Speed Sensor circuit.

–Check Engine warning light has been reported on.
–LED indicates CODE 17.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset ECU.

Road test necessary.
In 2nd gear accelerate to 3,500 min $^{-1}$ (rpm), then decelerate to 1,500 min $^{-1}$ (rpm) with throttle fully closed.

Is Check Engine warning light on and does LED indicate CODE 17 ?

NO → **Intermittent failure, system is OK at this time. Check for poor connections or loose wires.**

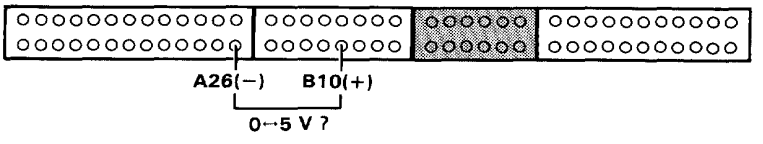
YES

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

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

Connect the ECU test harness between the ECU and connector (page 6-150).

Turn the ignition switch ON.



Slowly rotate left front wheel and measure voltage between B10 (+) terminal and A26 (–) terminal.

Does voltage pulse 0 V and 5 V ?

NO →
–Repair open or short in ORN wire between ECU (B10) and the speed sensor.
–Faulty speed sensor.
–Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

YES

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



Troubleshooting Flowchart — A/T FI Signal A

(30) Self-diagnosis LED indicates code 30: A problem in the line (B3) of between A/T control unit and PGM-FI ECU.

(31) Self-diagnosis LED indicates code 31: A problem in the (B4) of between A/T control unit and PGM-FI PGM-FI ECU.

(30)

LED indicates CODE 30.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset ECU.

Test drive necessary.
Drive the car for several miles so that the transmission upshifts and downshifts several times.

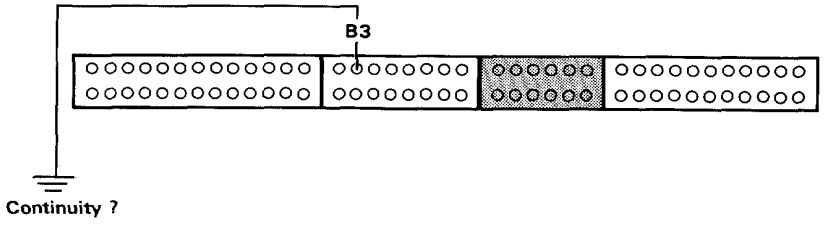
Does LED indicate CODE 30 ?

NO → **Intermittent failure, system is OK at this time.**

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector not to the ECU (page 6-150).



Disconnect the 22P connector from the A/T control unit.

Check for continuity between B3 terminal and body ground.

Does continuity exist ?

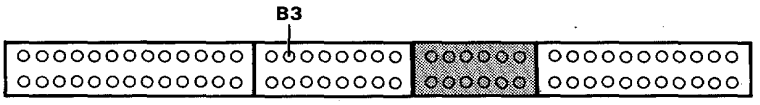
YES → **Repair short in WHT/RED wire between ECU (B3) and the A/T control unit.**

NO

(To page 6-189)

(From page 6-188)

Check for Continuity WHT/RED wire between B3 and 22P connector of the A/T control unit.



Does continuity exist ?

NO

Repair open in WHT/RED wire between ECU (B3) and the A/T control unit.

YES

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

Troubleshooting Flowchart — A/T FI Signal B



LED indicates CODE 31.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset ECU.

Test drive necessary.
Drive the car for several miles so that the transmission upshifts and downshifts several times.

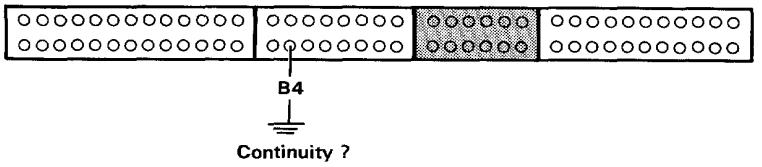
Does LED indicate CODE 31 ?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector not to the ECU (page 6-150)



Disconnect the 22P connector from the A/T control unit.

Check for continuity between B4 terminal and body ground.

Does continuity exist ?

YES → **Repair short in GRN wire ECU (B4) and the A/T control unit.**

NO

(To page 6-191)

(From page 6-190)

Check for Continuity GRN wire between B4 and 22P connector of the A/T control unit.

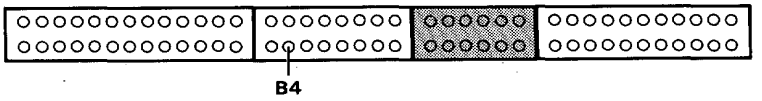
Does continuity exist ?

NO

Repair open in GRN wire between ECU (B4) and the A/T control unit.

YES

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



Idle Control System

Symptom Troubleshooting Guide

NOTE:

- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- If the idle speed is out of specification and LED does not blink CODE 14, go to inspection described on page 6-193.

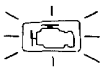
PAGE / SUB SYSTEM / SYMPTOM		IDLE ADJUSTING SCREW	EACV	AIR CONDITIONING SIGNAL	ALTERNATOR FR SIGNAL	A/T SHIFT POSITION SIGNAL (A/T ONLY)	STARTER SWITCH SIGNAL	P/S OIL PRESSURE SWITCH SIGNAL	FAST IDLE VALVE	AIR BOOST VALVE	HOSES AND CONNECTIONS
		207	194	198	200	202	204	205	206	—	*
DIFFICULT TO START ENGINE WHEN COLD									①		
WHEN COLD FAST IDLE OUT OF SPEC [1,000–2,000min^{-1}(rpm)]		③	②						①		
ROUGH IDLE			②								①
WHEN WARM RPM TOO HIGH		③	①					③	②		③
WHEN WARM RPM TOO LOW	Idle speed is below specified engine speed (no load)	②	①								
	Idle speed does not increase after initial start up.		①								
	On models with automatic transmission, the idle speed drops in gear		②			①					
	Idle speeds drops when air conditioner in ON		②	①							
	Idle speed drops when steering wheel is turning		②					①			
	Idle speed fluctuates with electrical local		②								①
FREQUENT STALLING	WHILE WARMING UP		①								
	AFTER WARMING UP	①									
FAILS EMISSION TEST											①

1. When the idle speed is out of specification and LED does not blink CODE 14, check the following items:
   - Adjust the idle speed (page 6-207)
   - Air conditioning signal (page 6-198)
   - Alternator FR signal (page 6-200)
   - A/T shift position signal (page 6-202)
   - Starter switch signal (page 6-204)
   - P/S oil pressure signal (page 6-205)
   - Fast idle valve (page 6-206)
   - Air boost valve
   - Hoses and connections
   - EACV and it mounting O-rings

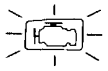
2. If the above items are normal, substitute a known-good EACV and readjust the idle speed (page 6-194)

   ● If the idle speed still cannot be adjusted to specification (and LED dose not blink CODE 14) after EACV replacement, substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.

Troubleshooting Flowchart —— EACV




Self-diagnosis LED indicates code 14: A problem in the Electronic Air Control Valve (EACV) circuit.




—Engine is running.
—Check Engine warning light has been reported on.
—LED indicates CODE 14.

Turn the ignition switch OFF.

Remove BACK UP fuse in the under-hood relay box for 10 seconds to reset ECU.

Start engine.

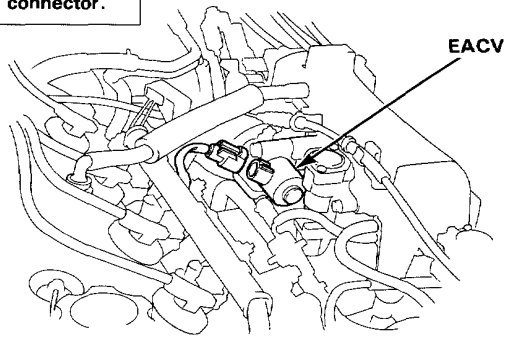
Is Check Engine warning light on and does LED indicate CODE 14 ?

NO → **Intermittent failure, system is OK at this time (test driving may be necessary).**
Check for poor connections or loose wires at EACV connector.

YES

Stop engine.

Disconnect the 2P connector from the EACV.



Measure resistance between the 2 terminals on the EACV.

Is there 8—15Ω ?

NO → **Replace EACV.**

YES

Check for continuity to body ground on each terminal on the EACV.

Does continuity exist ?

YES → **Replace EACV.**

NO

Turn the ignition switch ON.

(To page 6-195)

(From page 6-194)

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

Is there battery voltage ?

YES → Disconnect the "A" connector from the ECU.

NO

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

Is there battery voltage ?

YES → **Repair short in BLK/BLU wire between ECU (A9) and EACV.**

NO

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

Is there battery voltage ?

NO → **Repair open in YEL/BLK wire between the EACV and Main Relay.**

YES

Turn the ignition switch OFF.

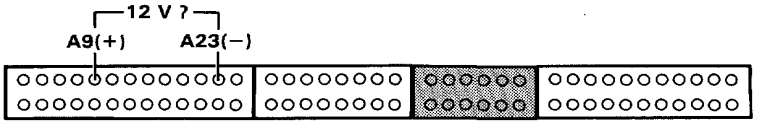
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

Reconnect the 2P connector to EACV.

Connect the ECU test harness "A" connector to the main wire harness only, not the ECU (page 6-150).

Turn the ignition switch ON.

Measure voltage between A9 (+) terminal and A23 (−) terminal.



Is there battery voltage ?

NO → **Repair open in BLK/BLU wire between ECU (A9) and EACV.**

YES

(To page 6-196)

(cont'd)

Troubleshooting Flowchart —— EACV (cont'd)

(From page 6-195)

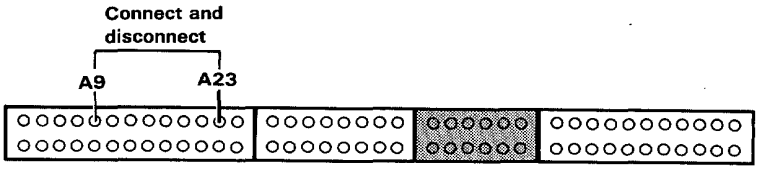
Connect and disconnect A9 terminal to A23 terminal.

Does EACV click when the connector is connected and disconnected ?

NO → **Replace EACV.**

YES

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





Troubleshooting Flowchart — Air Conditioning Signal

Inspection of Air Conditioning Signal.

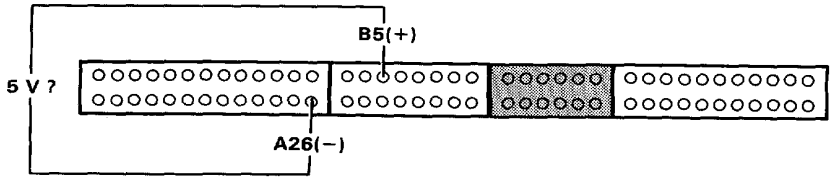
Connect the ECU test harness between the ECU and connector (page 6-150).
Disconnect "B" connector from the main wire harness only, not the ECU.

Turn the ignition switch ON.

Measure voltage between B5 (+) terminal and A26 (−) terminal.

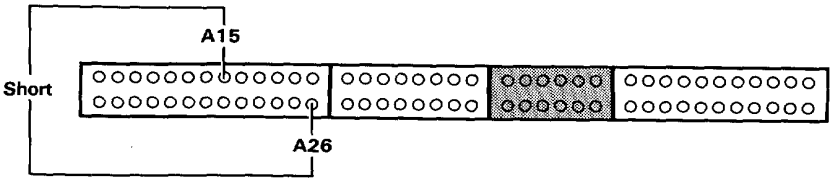
Is there approx. 5 V ? — NO → **Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.**

YES



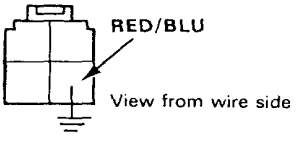
Reconnect "B" connector to the main wire harness.

Momentarily connect A15 terminal to A26 terminal several times.



Is there a clicking noise from the A/C compressor clutch ? — NO → Connect the RED/BLU terminal of the 4P connector on the A/C clutch relay to body ground.

YES



Start engine.

Blower switch ON.

Is there a clicking noise from the A/C compressor clutch ? — NO → **See Air conditioner inspection (section 15).**

YES

Repair open in RED/BLU wire between ECU (A15) and A/C clutch relay.

(To page 6-199)

(From page 6-198)

A/C switch ON.

Does A/C operate ?

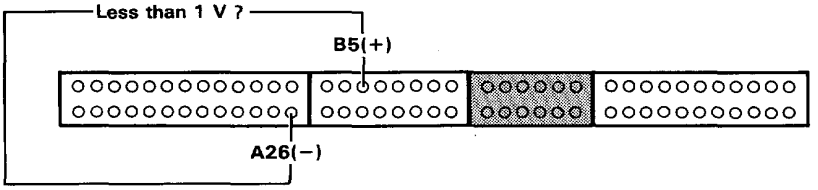
NO

YES

Air conditioning signal is OK.

Measure voltage between B5 (+) terminal and A26 (−) terminal.

Less than 1 V ?



Is voltage less than 1 V ?

NO

YES

Repair open in BLU/BLK wire between ECU (B5) and A/C switch.

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

Idle Control System

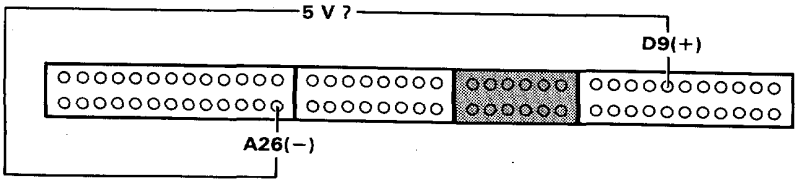
Troubleshooting Flowchart — Alternator FR Signal

Inspection of Alternator FR signal.

Connect the ECU test harness between the ECU and connector (page 6-150).
Disconnect "D" connector from the main wire harness only, not the ECU.

Turn the ignition switch ON.

Measure voltage between D9 (+) terminal and A26 (−) terminal.



In there approx. 5V ?

NO → **Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.**

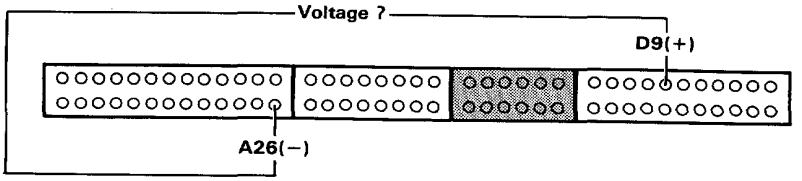
YES

Turn the ignition switch OFF.

Reconnect "D" connector to the main wire harness.

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

Measure voltage between D9 (+) terminal and A26 (−) terminal.



Does the voltage decrease when headlights and rear defogger are turned on ?

NO → Stop engine.

YES

Alternator FR signal is OK.

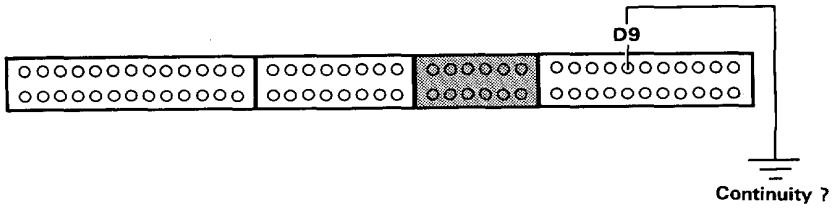
(To page 6-201)

(From page 6-200)

Disconnect "D" connector from ECU only, not the main wire harness.

Disconnect the negative battery cable from the battery.

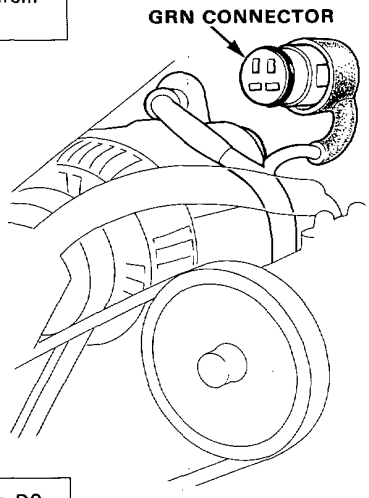
Check for continuity between D9 terminal and body ground.



Does continuity exist ?

YES

Disconnect GRN connector from the alternator.



NO

Disconnect GRN connector from the alternator.

Connect WHT/RED wire to body ground.

Check for continuity between D9 terminal and body ground.

Does continuity exist ?

YES

Repair short in WHT/RED wire between ECU (D9) and alternator.

NO

See Alternator Inspection (section 16).

Check for continuity between D9 terminal and body ground.

Does continuity exist ?

YES

See Alternator Inspection (section 16).

NO

Repair open in WHT/RED wire between ECU (D9) and alternator.

Troubleshooting Flowchart — A/T Shift Position Signal

Inspection of A/T Shift Position Signal.

Turn the ignition switch ON.

Observe the A/T shift indicator and select each position separately.

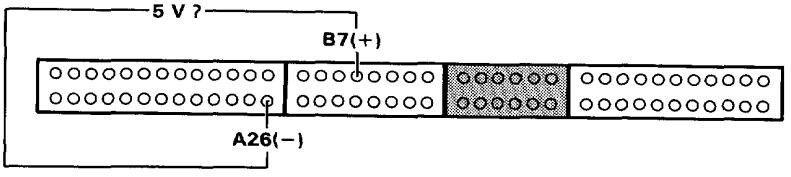
Does the indicator light properly ?

NO → **See A/T shift position Indicator Inspection (section 16).**

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 6-150). Disconnect "B" connector from the main wire harness only, not the ECU.



Turn the ignition switch ON.

Measure voltage individually between B7 (+) terminal and A26 (−) terminal.

Is there approx. 5 V ?

NO → **Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.**

YES

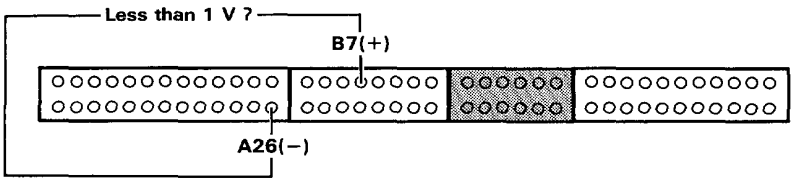
Turn the ignition switch OFF.

Reconnect "B" connector to the main wire harness.

Turn the ignition switch On.

(To page 6-203)

(From page 6-202)

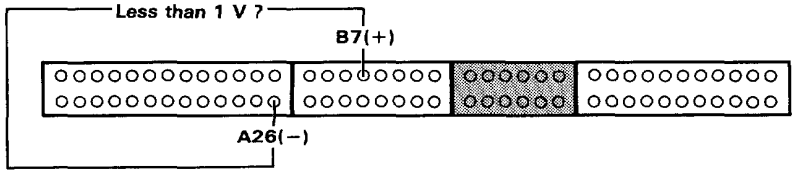


Measure voltage between B7 (+) terminal and A26 (−) terminal in Neutral position.

Is voltage less than 1 V ? NO

YES

- **Repair open in LT GRN wire between ECU (B7) and combination meter.**
- **Repair open in GRN wire between the combination meter and shift position console switch.**



Measure voltage between B7 (+) terminal and A26 (−) terminal in Park position.

Is voltage less than 1 V ? NO

YES

Repair open in GRN/WHT wire between combination meter and shift position console switch.

Measure voltage between B7 (+) terminal and A26 (−) except in Park and Neutral.

Is there approx. 5 V ? NO

YES

Repair short in LT GRN wire between ECU (B7) and combination meter.

A/T shift position signal is OK.

Troubleshooting Flowchart — Starter Switch Signal

Inspection of Starter Switch Signal.

Connect the ECU test harness between the ECU and connector (page 6-150).

Measure voltage between B9 (+) terminal and A26 (−) terminal with ignition switch in the start position.

Is there battery voltage ?

NO → Inspect No.9 fuse.

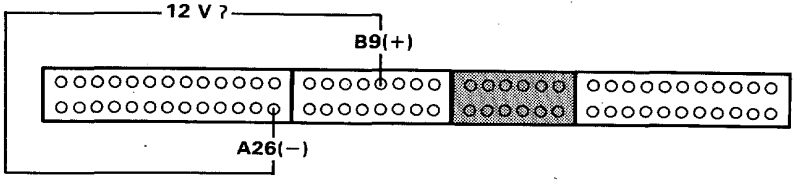
Inspect No.9 fuse.

Is No.9 fuse OK ?

NO → **Replace fuse.**

YES → **Repair open in BLU/RED wire between ECU (B9) and No.9 fuse.**

YES → **Starter switch signal is OK.**



NOTE: Clutch pedal must be depressed on M/T models.

Troubleshooting Flowchart — P/S Oil Pressure Signal

Inspection of P/S Oil Pressure Signal

Connect the ECU test harness between the ECU and connector (page 6−150).

Turn the ignition switch ON.

Measure voltage between B8 (+) terminal and A26 (−) terminal.

Is there voltage ?

YES → Disconnect the 2P connector on the P/S oil pressure switch.

Disconnect the 2P connector on the P/S oil pressure switch.

Connect RED terminal to BLK terminal.

Is there voltage ?

NO → **Replace P/S oil pressure switch.**

YES → **Repair open in RED wire between ECU (B8) and P/S oil pressure switch or BLK wire between P/S oil pressure switch and G301.**

NO

Start engine.

Turn steering wheel slowly.

Measure voltage between B8 (+) terminal and A26 (−) terminal while steering wheel is turning.

Is there battery voltage ?

NO → Turn the ignition switch OFF.

Turn the ignition switch OFF.

Disconnect "B" connector from main wire harness only, not the ECU.

Turn the ignition switch ON.

Is there battery voltage ?

NO → **Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.**

YES

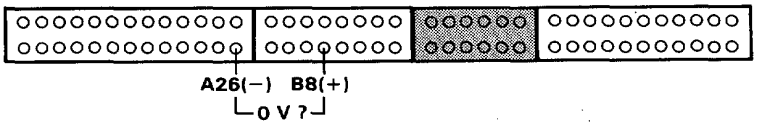
Reconnect "B" connector to main wire harness and disconnect 2P connector on the P/S oil pressure switch.

Is there battery voltage ?

YES → **Replace P/S oil pressure switch.**

NO → **Repair short in RED wire between ECU (B8) and the P/S oil pressure switch.**

YES → **P/S oil pressure signal is OK.**



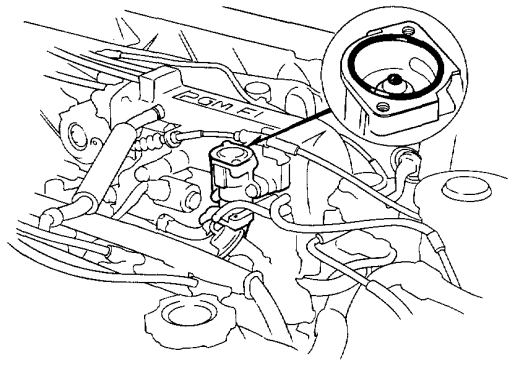
Idle Control System

Fast Idle Valve

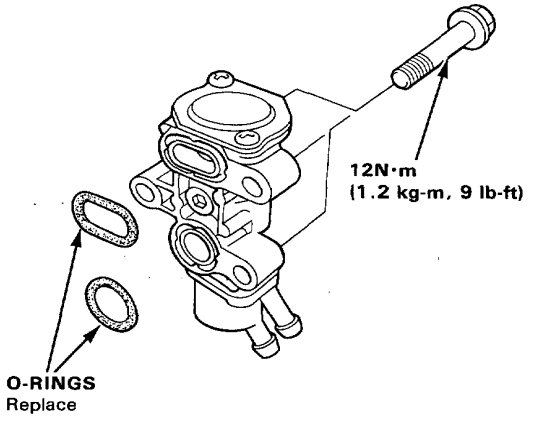
Inspection

NOTE: The fast idle valve is factory adjusted, it should not be disassembled.

1. Start the engine.
2. Remove the cover of the fast idle valve.
3. Put your finger on the valve seat area and make sure that there is air flow with the engine cold (coolant temperature below 30°C, 86°F) and idling.



- If not, replace the fast idle valve and retest.

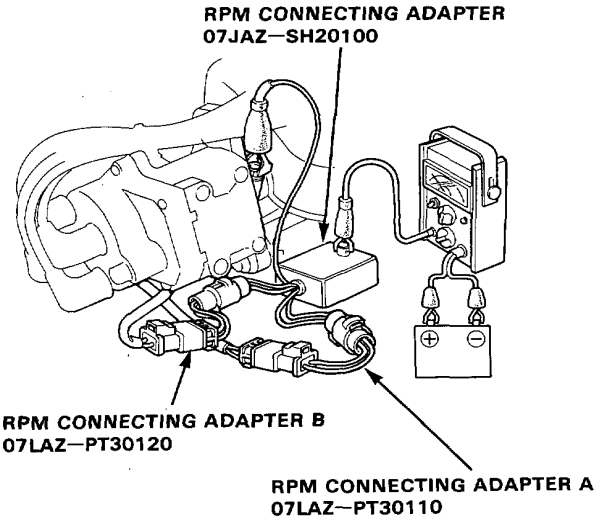


4. Warm up the engine (cooling fan comes on).
5. Check that the valve is completely closed. If not, air suction can be felt in the valve seat area.
   - If any suction is, felt the valve is leaking. Replace the fast idle valve and recheck.

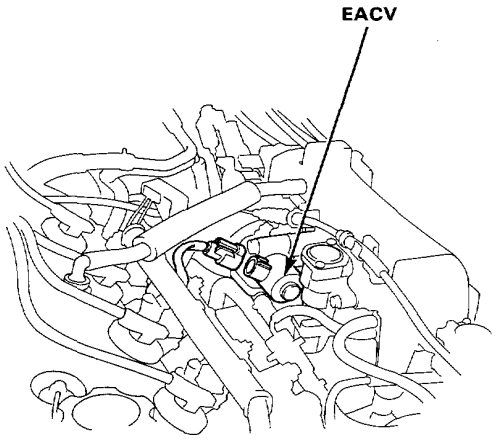
Idle Speed Setting

Inspection/Adjustment

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



3. Disconnect the 2P connector from the EACV.



4. Check idling in no- l pad conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating.

Idle speed should be:

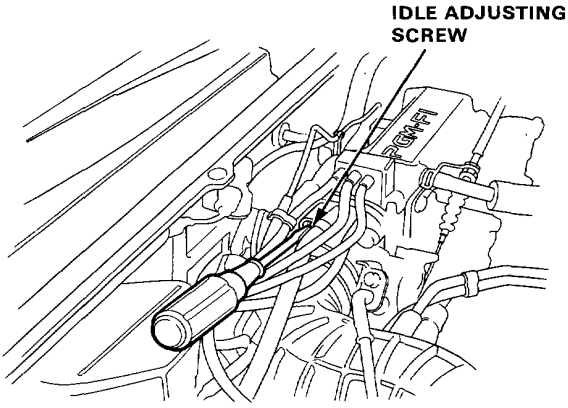
(Except KS, KW)

Manual	600±50 min^{-1} (rpm)
Automatic	600±50 min^{-1} (rpm) (in N or P)

(KS, KW)

Manual	550 ± 50 min^{-1} (rpm)
Automatic	550 ± 50 min^{-1} (in N or P)

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



5. Turn the ignition switch OFF.
6. reconnect the 2P connector on the EACV, then remove BACK UP fuse in the underhood relay box for 10 seconds to reset ECU.
7. Restart an idle the engine with no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating for one minute, then check the idle speed.

Idle speed should be:

Manual	700±50 min^{-1} (rpm)
Automatic	700±50 min^{-1} (rpm)

8. Idle the engine for one minute with headlights (Hi) and rear defogger ON and check the idle speed.

Idle speed should be:

Manual	770±50 min^{-1} (rpm)
Automatic	770±50 min^{-1} (rpm)

9. Idle the engine for one minute with heater fan switch at HI and air conditioner on, then check the idle speed.

Idle speed should be:

Manual	770±50 min^{-1} (rpm)
Automatic	770±50 min^{-1} (rpm)

NOTE: If the idle speed is not within specifications, see System Troubleshooting Guide on page 6-192.

Fuel Supply System

Symptom Troubleshooting Guide

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

PAGE / SUB SYSTEM / SYMPTOM		FUEL INJECTOR	INJECTOR RESISTOR	PRESSURE REGULATOR	FUEL FILTER	FUEL PUMP	MAIN RELAY	CONTAMI-NATED FUEL
		210	212	213	214	215	216	*
ENGINE WON'T START		③	③		③	①	②	③
DIFFICULT TO START ENGINE WHEN COLD OR HOT								①
ROUGH IDLE		①	②					③
POOR PERFORMANCE	MISFIRE OR ROUGH RUN-NING	①	②	③				③
	FAILS EMISSION TEST	②	③	①				
	LOSS OF POWER	③	③		①	③		②

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

Fuel Pressure

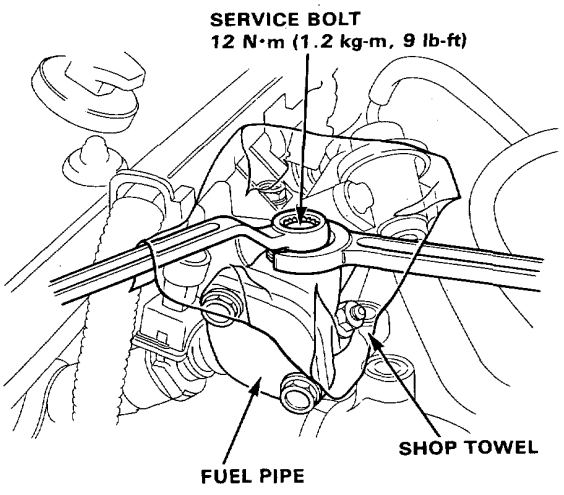
Relieving

⚠WARNING

- **Do not smoke while working on the fuel system. Keep open flames or sparks away from the work area.**
- **Be sure to relieve fuel pressure while the engine is off.**

NOTE: Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the 6 mm service bolt at the fuel pipe.

1. Remove fuel filter cap.
2. Disconnect the battery negative cable from the battery negative terminal.
3. Use a box end wrench on the 6 mm service bolt at the fuel pipe, white holding the special banjo bolt with another wrench.
4. Place a rag or shop towel over the 6 mm service bolt.
5. Slowly loosen the 6 mm service bolt one complete turn.



NOTE:

- A fuel pressure gauge can be attached at the 6 mm service bolt hole.
- Always replace the washer between the service bolt and the special banjo bolt, whenever the service bolt is loosened to relieve fuel pressure.
- Replace all washers whenever the bolts are removed to disassemble parts.

Inspection

Inspection

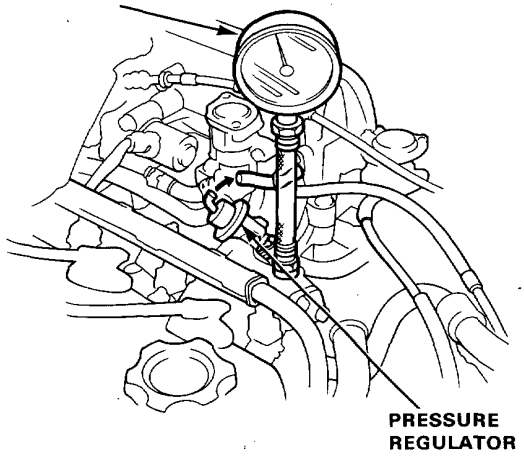
1. Relieve fuel pressure.
2. Remove the service bolt on the fuel pipe while holding the banjo bolt with another wench and attach the fuel pressure gauge.
3. Start the engine. Measure the fuel pressure with the engine idling and vacuum hose of the pressure regulator disconnected.

   Pressure should be:
   240–279 kPa (2.45–2.85 kg/cm², 35-41 psi)

4. Reconnect vacuum hose to the pressure regulator.

   Pressure should be:
   200–240 kPa (2.04–2.45 kg/cm², 29-35 psi)

FUEL PRESSURE GAUGE
07406–0040001



- If the fuel pressure is not as specified, first check the fuel pump (page 6-215), If the pump is OK, check the following:

— If the pressure is higher than specified, inspect for:
  - Pinched or clogged fuel return hose or piping.
  - Faulty pressure regulator (page 6-213).

— If the pressure is lower than specified, inspect for:
  - Clogged fuel filter.
  - Pressure regulator failure (page 6-213).
  - Leakage in the fuel line.

Fuel Injectors

Testing

NOTE: Check the following items before testing: idle speed, ignition timing and idle CO %

If the engine will run:

1. With the engine idling, disconnect each injector connector individually and inspect the change in the idling speed.

   - If the idle speed drop is almost the same for each cylinder, the injectors are normal.

   - If the idle speed or quality remains the same when you disconnect a particular injector, replace the injector and re-test.

2. Check the clicking sound of each injector by means of a stethoscope when the engine is idling.



   - If any injector fails to make the typical clicking sound, check the sound again after replacing the injector.

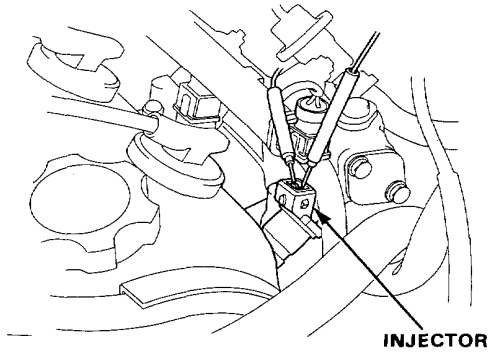
   — If clicking sound is still absent, check the following.
   - Whether there is any short-circuiting, wire breakage or poor connection in the YEL/BLK wire between the main relay and the resistor.
   - Whether the resistor is open or corroded (page 6-212).
   - Whether there is any short-circuiting, wire breakage or poor connection in the RED/BLK wire between the resister and the injector.
   - Whether there is any short-circuiting, wire breakage or poor connection in the wire between the injector and the ECU.

   If all is OK, check the ECU (page 6-144).

If the engine cannot be started:

1. Remove the connector of the injector, and measure the resistance between the 2 terminals of the injector.

   Resistance should be: 1.5—2.5 Ω



   - If the resistance is not as specified, replace the injector.

   - If the resistance is as specified, check the fuel pressure (page 6-209).

   — If the fuel pressure is as specified, check the following:
   - Whether there is any short-circuiting, wire breakage or poor connection in the YEL/BLK wire between the main relay and the resistor.
   - Whether the resistor is open or corroded (page 6-212).
   - Whether there is any short-circuiting, wire breakage, or poor connection in the RED/BLK wire between the resistor and the injector
   - Whether there is any short-circuiting, wire breakage or poor connection in the wire between the injector and the ECU.

   If all is OK, check the ECU (page 6-144).

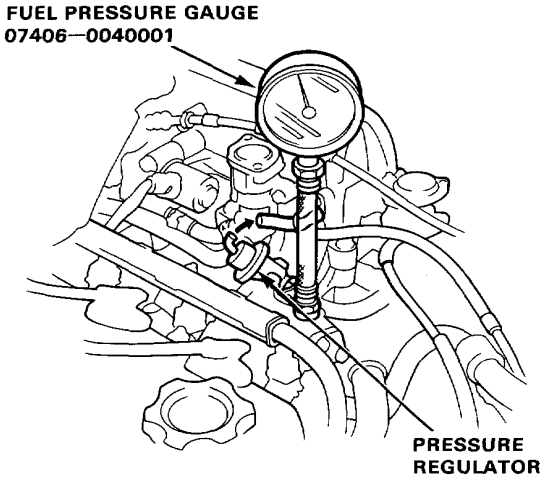
Pressure Regulator

Testing

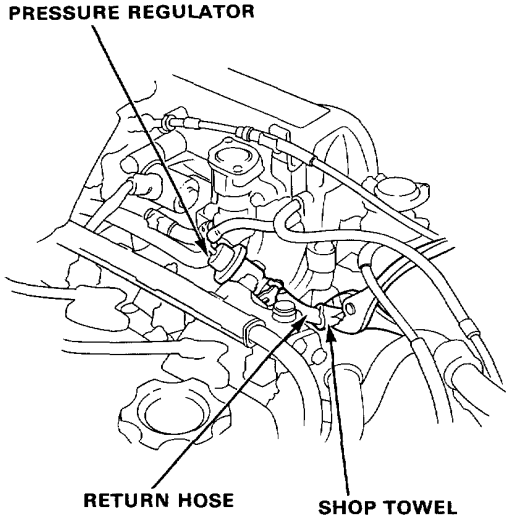
⚠WARNING Do not smoke during the test, Keep open flames away from your work area.

1. Attach a pressure gauge to the service port of the fuel pipe (page 6-209)

   Pressure should be:
   240—279 kpa (2.45—2.85 kg/cm², 35—41 psi)
   (with the regulator vacuum hose disconnected)



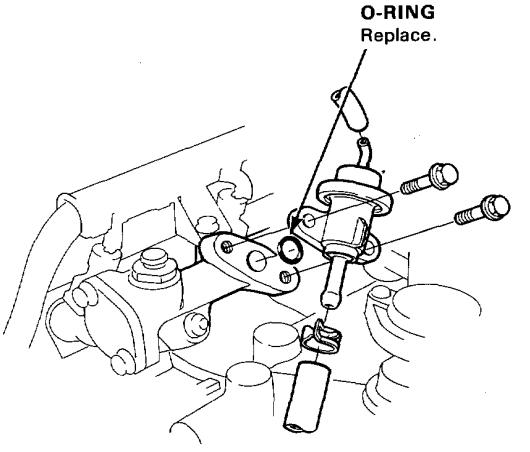
2. Reconnect the vacuum hose to the pressure regulator.
3. Check that the fuel pressure rises when the vacuum hose from the regulator is disconnected again.
   - If the fuel pressure did not rise, replace the regulator and retest.
   - Check vacuum hose and port for kinks or blockage.



Replacement

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

1. Place a shop towel under pressure regulator, then relieve fuel pressure (page 6-209).
2. Disconnect the vacuum hose and fuel return hose.
3. Remove the two 6 mm retainer bolts.



NOTE:
- Replace the O-ring.
- When assembling the regulator, apply clean engine oil to the O-ring and assemble it into its proper position, taking care not to damage the O-ring.

Fuel Supply System

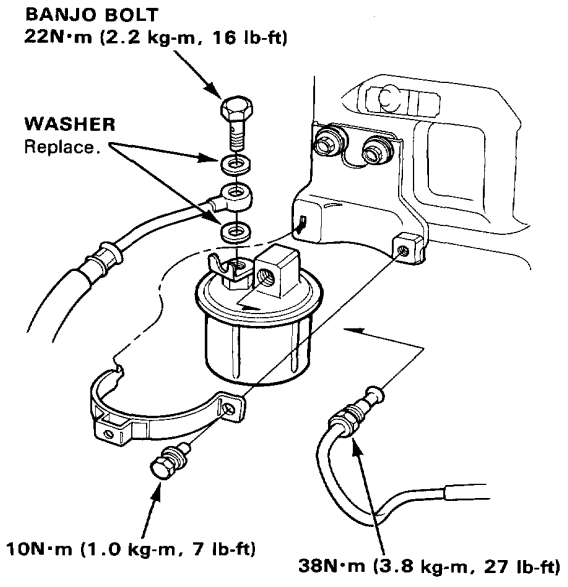
Fuel Filter

Replacement

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

The filter should be replaced : every 2 years or 40,000 km, (24,000 miles), whichever comes first or whenever the fuel pressure drops below the specified value (240—279) kPa, 2.45—2.85 kg—cm², 35—41 psi with the pressure regulator vacuum hose disconnected after making sure that the fuel pump and the pressure regulator are OK.

1. Place a shop towel under and around the fuel filter.
2. Relieve fuel pressure (page 6-209)
3. Remove the 12 mm banjo bolt and the fuel feed pipe from the filter.
4. Remove the fuel filter clamp and fuel filter.
5. When assembling, use new washers, as shown.



CAUTION: Clean the flared joint of high pressure hoses throughly before reconnecting them.

Fuel Pump

Testing

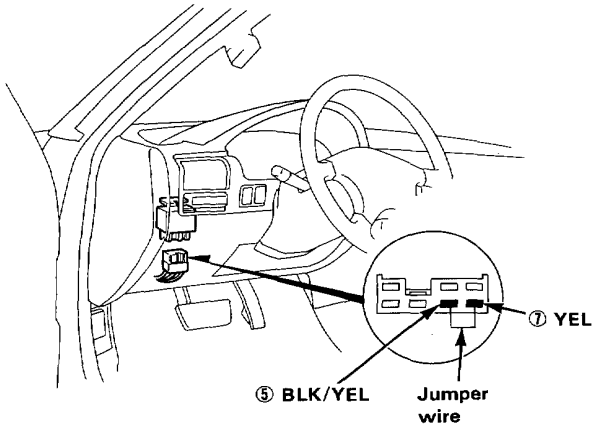
⚠WARNING Do not smoke during the test. Keep open flame away from your work area.

If you suspect a problem with the fuel pump, check that the fuel pump actually runs; when it is ON, you will hear some noise if you hold your ear to the fuel filler port with the fuel filler cap removed. The fuel pump should run for two seconds, when ignition switch is first turned on. If the pump does not make noise, check as follows:

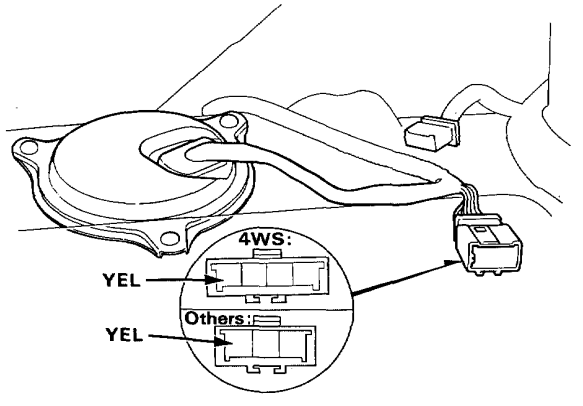
1. Disconnect the 3P or 4P connector in the trunk.

   CAUTION: Be sure to turn the ignition switch OFF before disconnecting the wires.

2. Disconnect the main relay connector and connect the BLK/YEL ⑤ wire and YEL ⑦ wire with a jumper wire.



3. Check that battery voltage is available at the fuel pump connector when the ignition switch is turned ON (positive probe to the YEL wire, negative probe to the body ground).



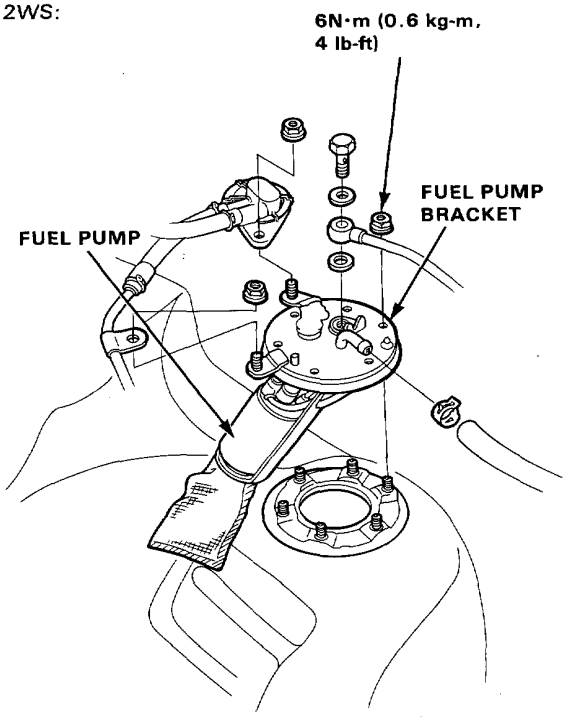
- If battery voltage is available, replace the fuel pump.
- If there is no valtage, check the main relay and wire harness (page 6-216).

Replacement

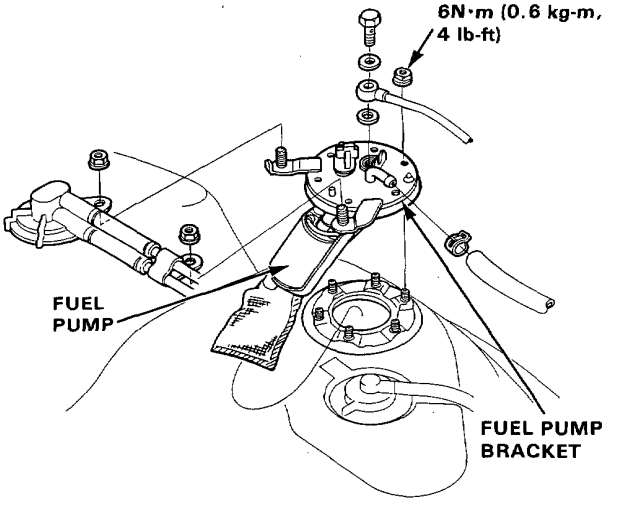
⚠WARNING Do not smoke while working on fuel system. Keep open flames away from your work area.

1. Remove the fuel tank (page 6-218).
2. Remove the fuel pump mounting nuts.
3. Remove the fuel pump from the fuel tank.

2WS:



4WS:



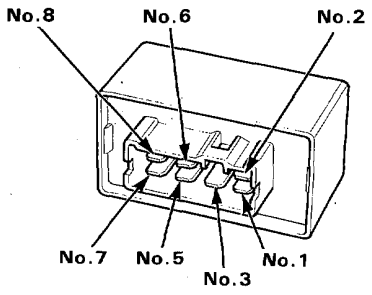
Main Relay

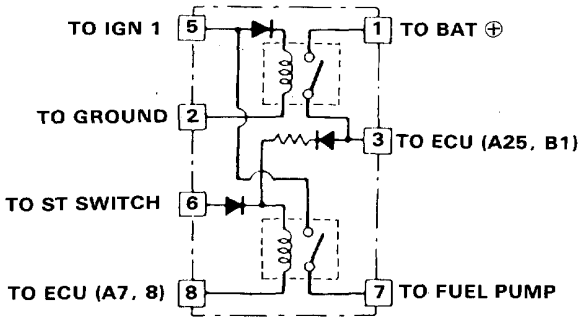
Relay Testing

NOTE: If the car starts and continues to run, the main relay is OK.

1. Remove the main relay.
2. Attach the battery positive terminal to the No.6 terminal and the battery negative terminal to the No.8 terminal of the main relay. Then check for continuity between the No. 5 terminal and No.7 terminal of the main relay.

   - If there is continuity, go on to step 3.
   - If there isno continuity, replace the relay and retest.





3. Attach the battery positive terminal to the No.5 terminal and the battery negative terminal to the No.2 terminal of the main relay. Then check that there is continuity between the No.1 terminal and No.3 terminal of the main relay.

   - If there is continuity, go on to step 4.
   - If there is no continuity, replace and retest.

4. Attach the battery positive terminal to the No.3 terminal and battery negative terminal to the No.8 terminal of the main relay. Then check that there is continuity between the No.5 terminal and No.7 terminal of the main relay.

   - If there is continuity, the relay is Ok;
     If the fuel pump still does not work, go to harness Testing in the next column.
   - If there is no continuity, replace the realy and retest.

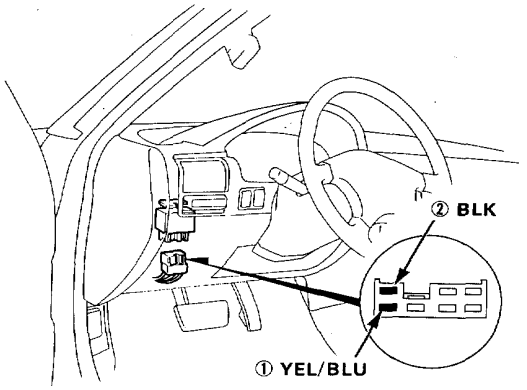
Harness Testing

1. Keep the ignition switch in the OFF position.
2. Disconnect the main relay connector.

3. Check for continuity between the BLK wire ① *in the* connector and body ground.

   - If there is continuity, go to step 4.
   - If there is no contintnuity, repair open in BLK wire.

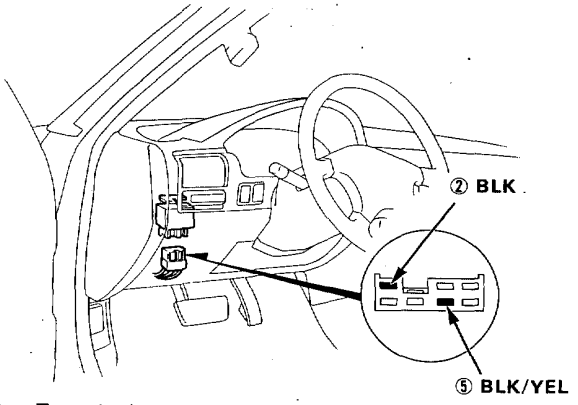
4. Attach the positive probe of volmeter to the YEL/BLU wire ① and the negative probe to the BLK wire ②.



Battery voltage should be available.

- If there is no voltage, check the ECU fuse (main fuse box) and the wiring between the main relay and the ECU fuse (10 A).

5. Attach the positive probe of voltmeter to the BLK/YEL wire⑤ and the negative probe to the BLK wire②.



6. Turn the ignition switch ON.

   Battery voltage should be available.

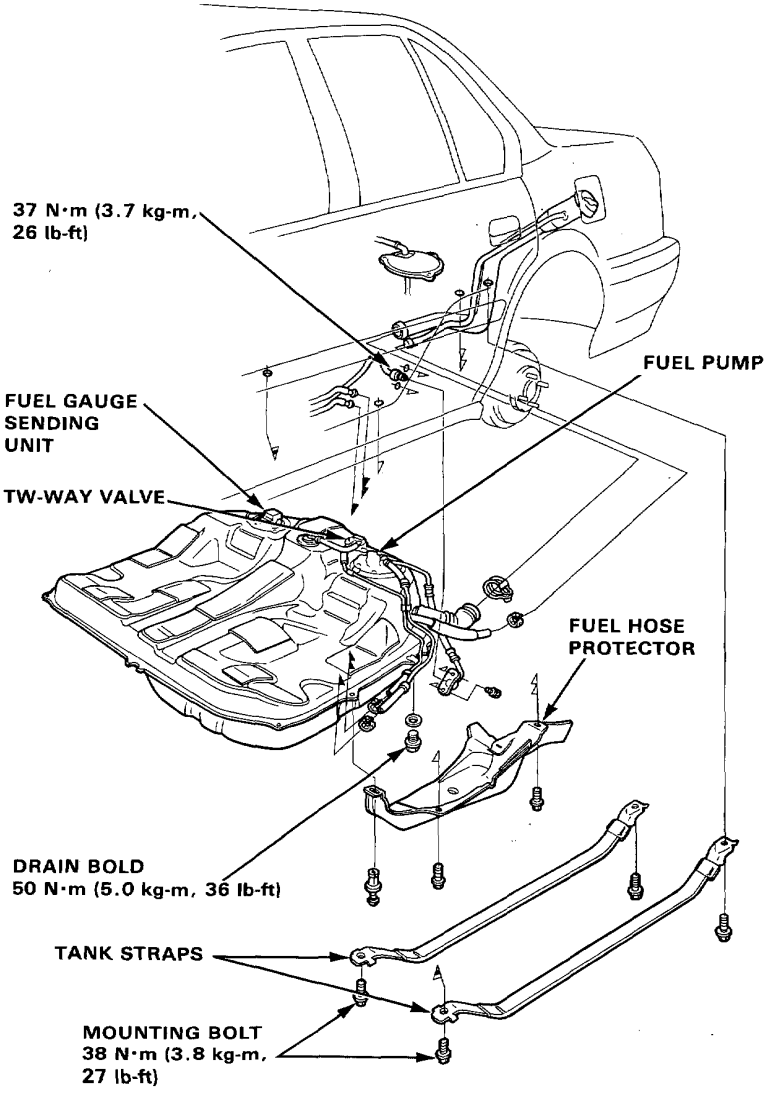
   - If there is no voltage, check No.2 fuse and the wiring from the ignition switch to the fuse box and the wiring from the fuse box to the main relay.

Fuel Tank (2WS)

Replacement

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

1. Block front wehhls. Jack up the rear of the car and support with jackstands.
2. Remove the drain bolt and drain the fuel into an approbed container.
3. Disconnect the 3P connector in the trunk.
4. Remove the two-way valve cover and fuel hose protector.
5. Disconnect the hoses.
   CAUTION:
   - **When disconnecting the hoses, slide back the clamps, then twist hoses as you pull, to avoid damaging them.**
   - **Clean the flared joint of high pressure hoees thoroughly before reconnecting them.**
6. Place a jack, or other support, under the tank.
7. Remove the strap and let the straps fall free.
8. Remove the fuel tank.
   NOTE: The tank may stick on the undercoat applied to its mount. To remove, carefully pry it off the mount.
9. Install a new washer on the drain bolt, then install parts in the reverse order of removal.

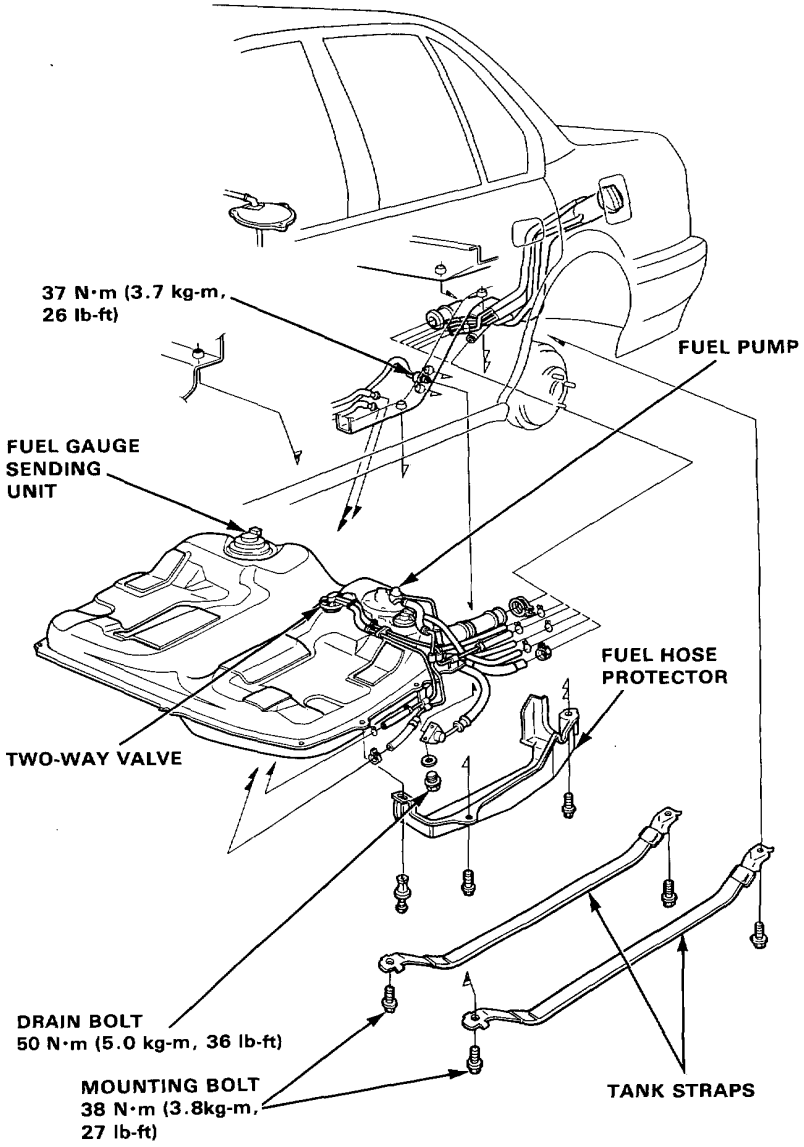


Fuel Tank (4WS)

Replacement

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

1. Block front wheels. Jack up the rear of the car and support with jackstands.
2. Remove the drain bolt and drain the fuel into an approbed container.
3. Disconnect the 4P in the trunk.
4. Remove fuel hose protector.
5. Disconnect the hoses.
   CAUTION:
   - **When disconecting the hoses, slide back the clamps, then twist hoses as you pull, to avoid damaging them.**
   - **Clean the flared joint of high pressure hoses thorooughly before reconnecting them.**
6. Place a jack, or other support, under the tank.
7. Remove the strap bolts and let the straps fall free.
8. Remove the fuel tank.
9. Install a new washer on the drain bolt, then install parts in the reverse order of removal.



Air Intake System

System Troubleshooting Guide

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

2.0ℓ and KQ, KY:

PAGE / SUB SYSTEM / SYMPTOM	THROTTLE CABLE 222	THROTTLE BODY 223	INTAKE CONTROL SYSTEM 229
WHEN WARM RPM TOO HIGH	②	①	
LOSS OF POWER		①	②

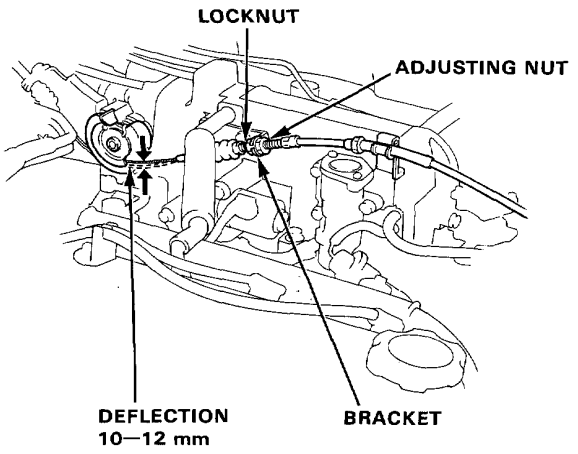
2.2ℓ except KQ, KY:

PAGE / SUB SYSTEM / SYMPTOM	THROTTLE CABLE 222	THROTTLE BODY 223	INTAKE CONTROL SYSTEM 229	BYPASS CONTROL 225
WHEN WARM RPM TOO HIGH	②	①		
LOSS OF POWER		①	③	②

Throttle Cable

Inspection/Adjustment

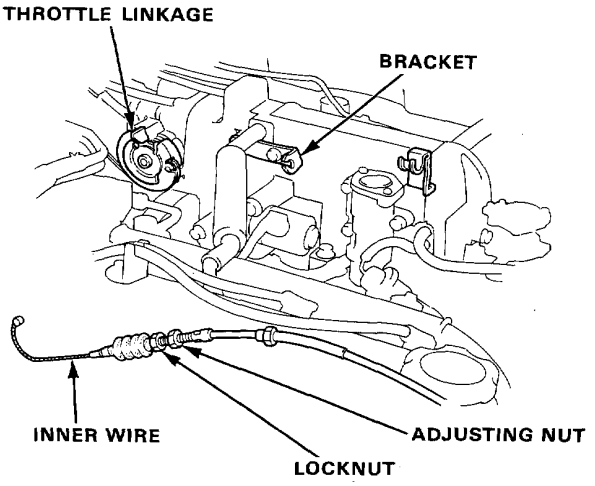
1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necesary.
3. Cehck cable free play at the throttle lingage. Cable deflection should be 10—12 mm (0.39—0.47 in.).



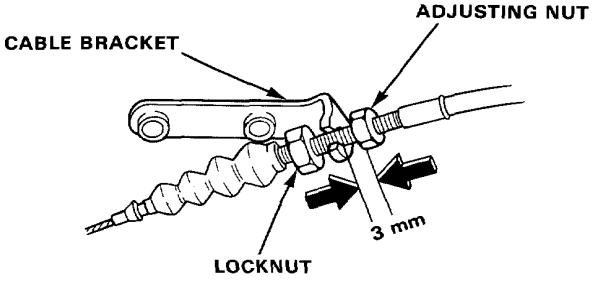
4. If deflection is not within specs, loosen the locknut and turn the adjusting nut until the deflection is as specified.
5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure it returns to the idle position whenever you release the accelerator.

Installation

1. Fully open the throttle valve, then install the throttle cable in the throttle inkage and install the cable housing in the cable bracket.
2. Warm up the engine to normal operating temperature (the cooling fan comes on).



3. Hold the cable sheath, removing all slack from the cable.
4. Turn the adjusting nut until it is 3 mm awayfrom the cable bracket.
5. Tighten the locknut. The cable deflection should now be 10—12 mm. If not, see inspection/Adjustment.



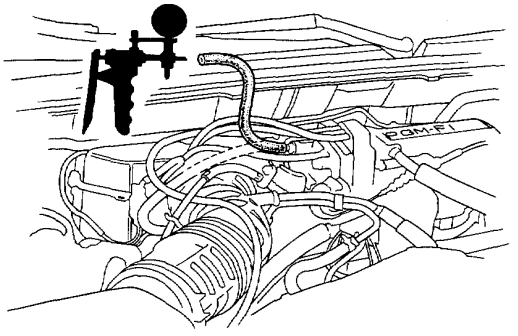
Throttle Body

Inspection

CAUTION: Do not adjust the throttle stop screw since it can not be reset except at the factory.

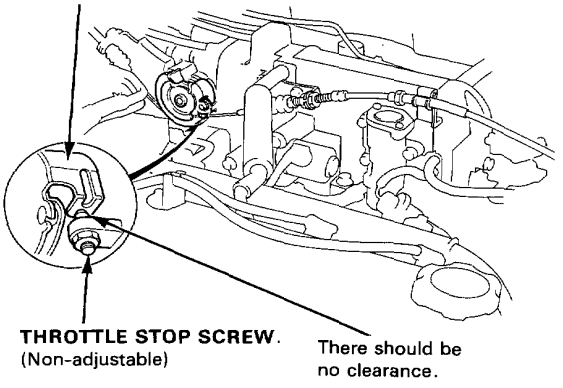
1. Start the engine and allow to reach normal operating temperature (cooling fan comes on).
2. Disconnect the vacuum hose (to the canister) from the top of the throttle body ; connect a vacum gauge to the throttle body.

VACUUM PUMP/GAUGE



3. Allow the engine to idel and check that the gauge indicates no vacuum.
   - If there is vcuum, check the throttle cable (page 6-222).
4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.
   - If the gauge indicates no vacuum, check the throttle body port is clogged, clean it with carburetor cleaner.
5. Stop the engine and check that the throttole cable operates smoothly without binding or sticking.
   - If there are any abnormalities in the above steps, check for:
     - — Excessive wear or play in the throttle valve shaft.
     - — Sticky or binding throttle lever at full close position.
     - — Clearance between throttle stop screw and throttle lever at full close position.

THROTTLE LEVER



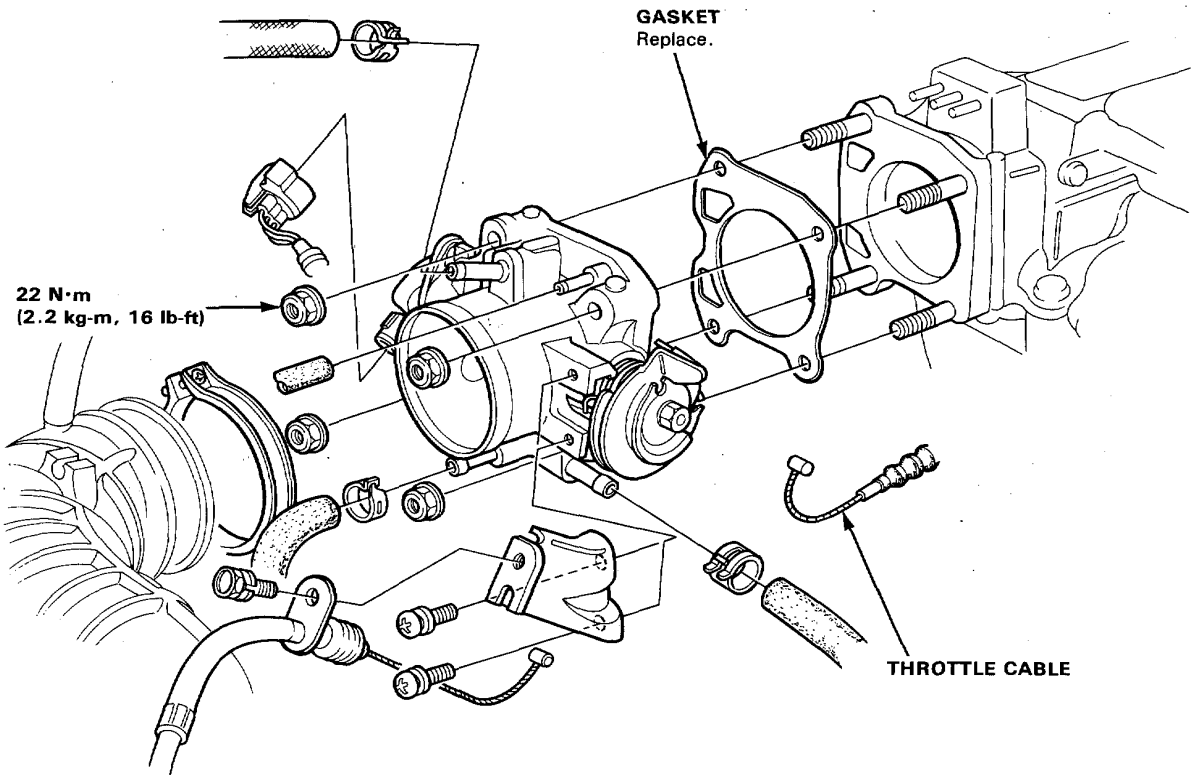
THROTTLE STOP SCREW.
(Non-adjustable)

There should be no clearance.

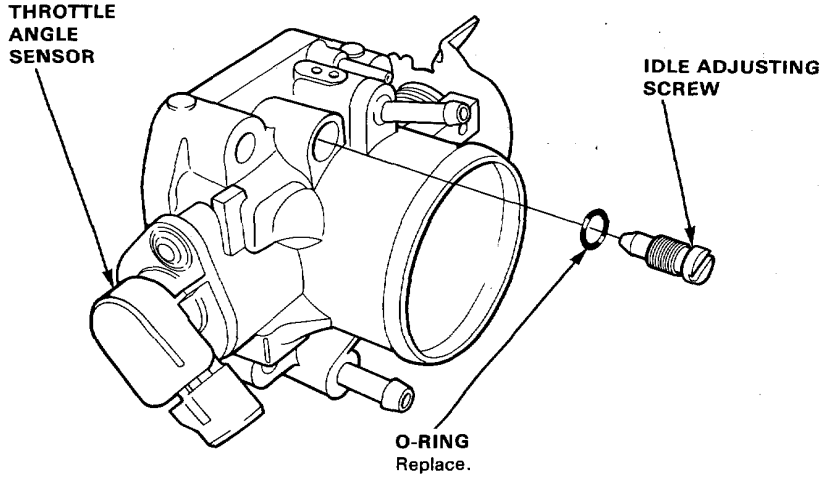
Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

Throttle Body

Disassembly



CAUTION:
- The throttle stop screw in non-adjustable.
- After reassembly, adjust the throttle cable (page 6-222).



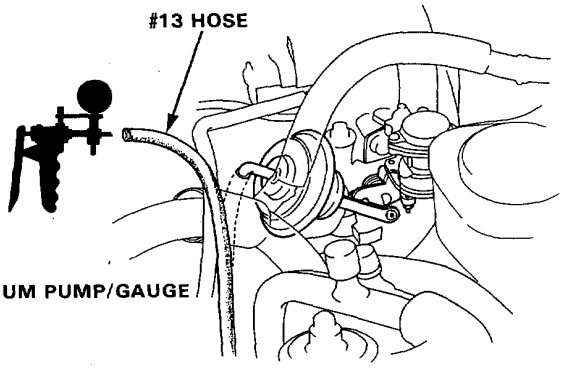
Bypass Control System (2.2 ℓ Except KQ, KY)

Troubleshooting Flowchart

Inspection of Bypass Control System

Start engine and allow to idle.

Remove #13 vacuum hose from the bypass control diaphragm and connect vacuum gauge to the hose.



Is there vacuum ?

NO

Remove #12 vacuum hose from the vacuum tank, then check for vacuum at the tank.

Is there vacuum ?

NO

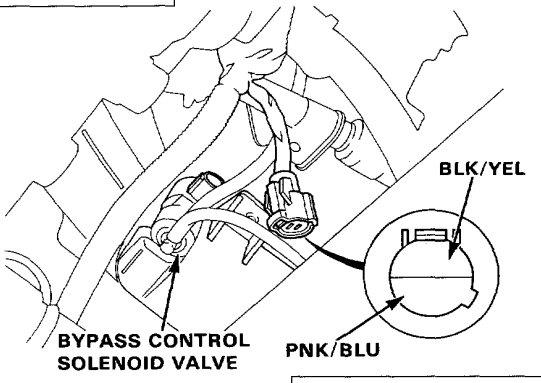
Repair the blockage or vacuum leak between the vacuum tank and the intake manifold.

YES

YES

Disconnect the 2P connector from the Bypass Control Solenoid Valve.

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



Is there battery voltage ?

YES

Replace the bypass control solenoid valve.

NO

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

(To page 6-226)

(To page 6-226)

(cont'd)

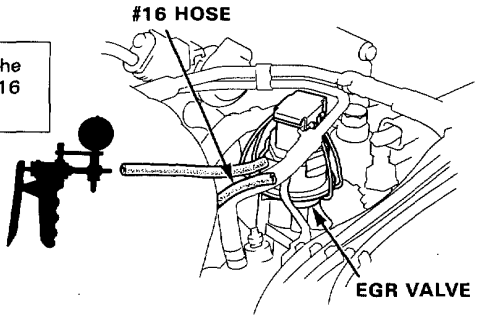
Exhaust Gas Recirculation System (cont'd)

(From page 6-235)

Is there any vacuum ?

YES → Disconnect 4P connector from the control box and check the #16 hose for vacuum again.

NO → Move the vacuum pump/gauge to the EGR valve.



With the engine at idle, apply 200 mmHg of vacuum to the EGR valve.

Is there any vacuum ?

YES → **Check vacuum hose routing of the entire EGR system. If hose routing is OK, replace EGR control solenoid valve.**

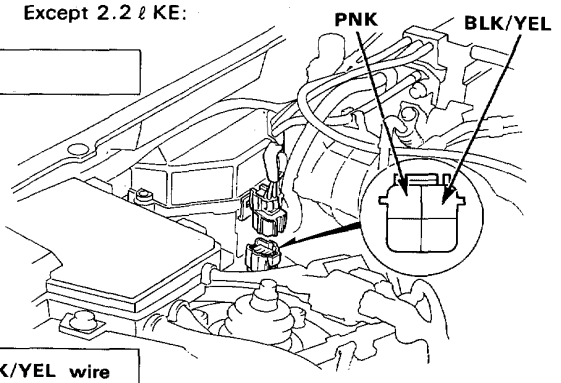
NO → **Inspect for short to body ground in PNK wire between EGR control solenoid valve and ECU(A8). If wire is OK, substitute a known-good ECU and retest. If symptom/indication goes away, replace the original ECU.**

Does the engine stall and does the EGR valve hold vacuum ?

NO → **Replace EGR valve.**

YES → Disconnect the 4P connector from the control box.

Except 2.2 ℓ KE:



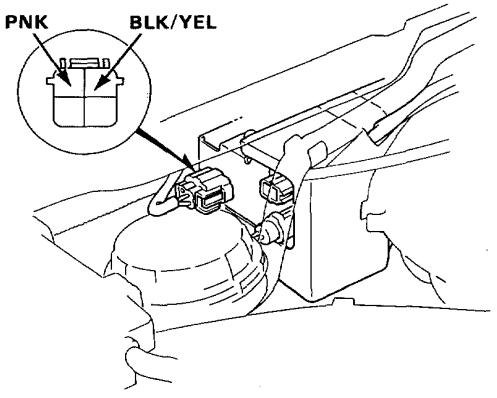
Measure voltage between BLK/YEL (+) terminal on the main wire harness and body ground.

Is there battery voltage ?

NO → **Repair open in BLK/YEL wire between the solenoid valve and No.2 fuse.**

YES → Reconnect the vacuum pump/gauge to the #16 hose.

2.2 ℓ KE:



Start the engine and allow it to idle.

(To page 6-237)

(From page 6-236)

Connect the battery positive terminal to the B terminal of the 4P connector. While watching the vacuum gauge, connect the battery negative terminal to the D terminal.

Is there approx. 200 mmHg within 1 second ?

NO

Turn the ignition switch OFF and inspect the #16 and #24 hoses for leaks, restrictions, or mis-routing.

YES

Turn the ignition switch OFF and reconnect the 4P connector.

Are the hose OK ?

NO

Connect as necessary.

YES

Disconnect the lower hose on EGR control solenoid valve and connect a vacuum gauge to the hose.

Start the engine and allow it to idle.

Is there 150—250mmHg of vacuum ?

NO

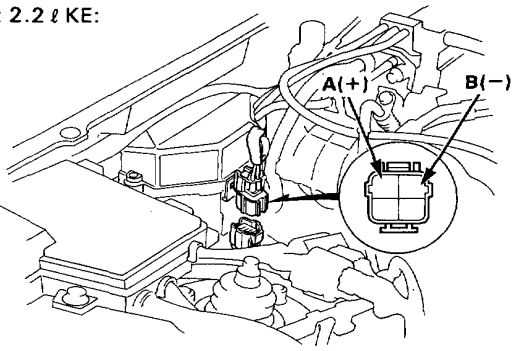
Replace CVC valve.

YES

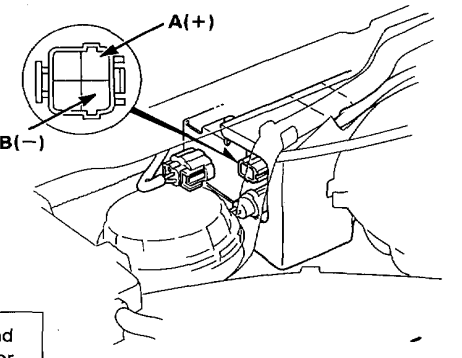
Replace the EGR control solenoid valve.

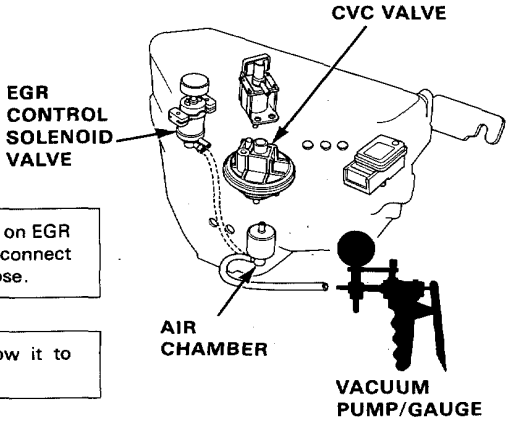
(To page 6-238)

Except 2.2 ℓ KE:



2.2 ℓ KE:





(cont'd)

Exhaust Gas Recirculation System (cont'd)

(From page 6-237)

Connect the test harness between the EGR valve lift sensor and engine wire harness.

Turn the ignition switch ON.

Measure voltage between RED (+) terminal and GRN (−) terminal.

Is there approx. 5 V ?

NO

—Repair open in YEL/WHT wire between EGR valve and ECU (D20).
—Repair open in GRN/WHT wire between EGR valve and ECU (D22).

YES

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

Is there approx. 1.2V ?

NO

—Replace EGR valve.
—Repair short in WHT/BLK wire between ECU (D12) and EGR valve lift sensor.
—Substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

YES

While watching the voltmeter, slowly apply a continuous 200 mmHg of vacuum to the EGR valve. Repeat several times, completely releasing vacuum between.

Is the maximum voltage approx. 4 V ?

NO

Replace EGR valve.

YES

Does the voltage consistently increase/decrease as the vacuum increases decreases ?

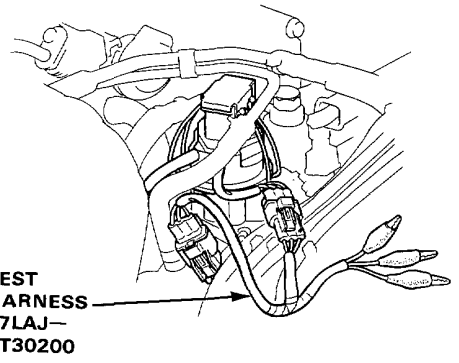
NO

Replace EGR valve.

YES

Reconnect the #16 hose to the EGR valve.

(To page 6-239)



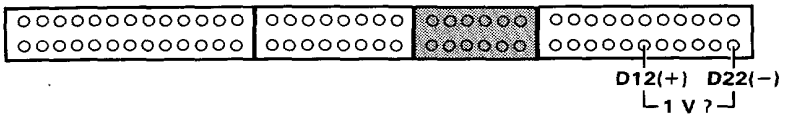
(From page 6-238)

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 6-150).

Start the engine and allow it to idle.

Measure voltage between D12 (+) terminal and D22 (−) terminal.



Is there approx. 1.2 V ?

NO → **Repair open in WHT/BLK wire between ECU (D12) and the sensor.**

YES

Connect A11 terminal to A26 terminal with a jumper wire.

Did the engine stall ?

NO → **Repair open in PNK wire between ECU (A11) and EGR control solenoid valve.**

YES

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

Intake Control System (cont'd)

(From page 6-229)

Raise engine speed to 3,700 min^{-1} (rpm).

Is there vacuum ?

YES

Disconnect the 2P connector.

Is there vacuum ?

YES

Replace intake control solenoid valve.

NO

Turn the ignition switch OFF.

Disconnect "A" connector from ECU.

Check for continuity to ground on WHT wire.

(To page 6-231)

(From page 6-229)

Is there battery voltage ?

NO

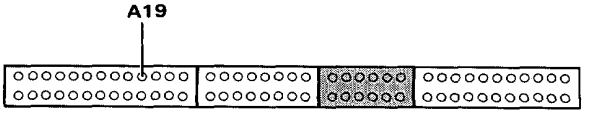
Repair open in BLK/YEL wire between the 2P connector and No.2 (10 A) fuse.

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the ECU and connector (page 6-150).

Check for continuity of WHT wire between ECU (A19) and the 2P connector.



Does continuity exist ?

NO

Repair open in WHT wire between ECU (A19) and the 2P connector.

YES

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

(To page 6-231)

(From page 6-230)

(From page 6-230)

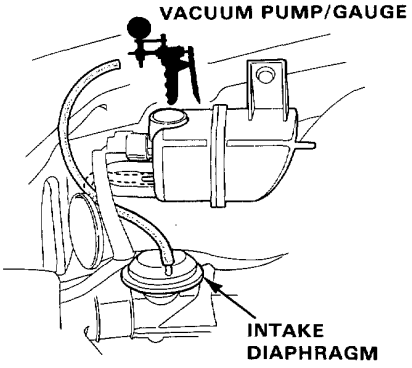
Is there continuity to ground ?

YES

Repair short to ground in WHT wire between ECU (A19) and the 6P connector.

NO

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



Connect a vacuum pump to the #8 vacuum hose.

Apply vacuum.

Does it hold vacuum ?

NO

Check the vacuum line for proper connection or disconnected hose.
If OK, replace the intake diaphragm.

YES

Intake control system is OK.

Emission Control System

System Troubleshooting Guide

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

With CATA:

PAGE / SUB SYSTEM / SYMPTOM		CATALYTIC CONVERTER	EGR SYSTEM (except KQ)	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
		234	235	240	241
ROUGH IDLE			①	②	
FREQUENT STALLING (AFTER WARMING UP)			①		
POOR PERFORMANCE	FAILS EMISSION TEST	①			②
	LOSS OF POWER	①			

KY:

PAGE / SUB SYSTEM / SYMPTOM		POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
		240	241
ROUGH IDLE		①	
POOR PERFORMANCE (FAILS EMISSION TEST)			①

Tailpipe Emission

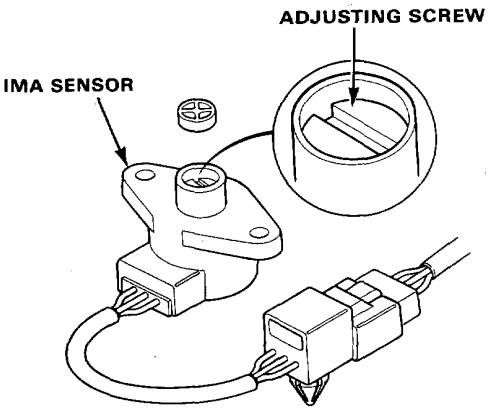
Inspectin

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

1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
2. Connect tachometer.
3. Check idle speed and adjust the idle speed, if necessary (page 6-207)
4. Warm up and calibrate the CO meter according to the meter manufacture's instructions.
5. Check idle CO with the ceadights, heater blower, rear window defogger, cooling fan, and air conditioner off.

   Specified CO%:
   With CATA: 0.1 % maximum
   Without CATA: 1.0±1.0 %

   ● If unable to obtain this reading :
   On With CATA, see ECU troubleshooting guide (page 6-144).
   On other models, adjust by turning the adjusting screw of the IMA sensor.



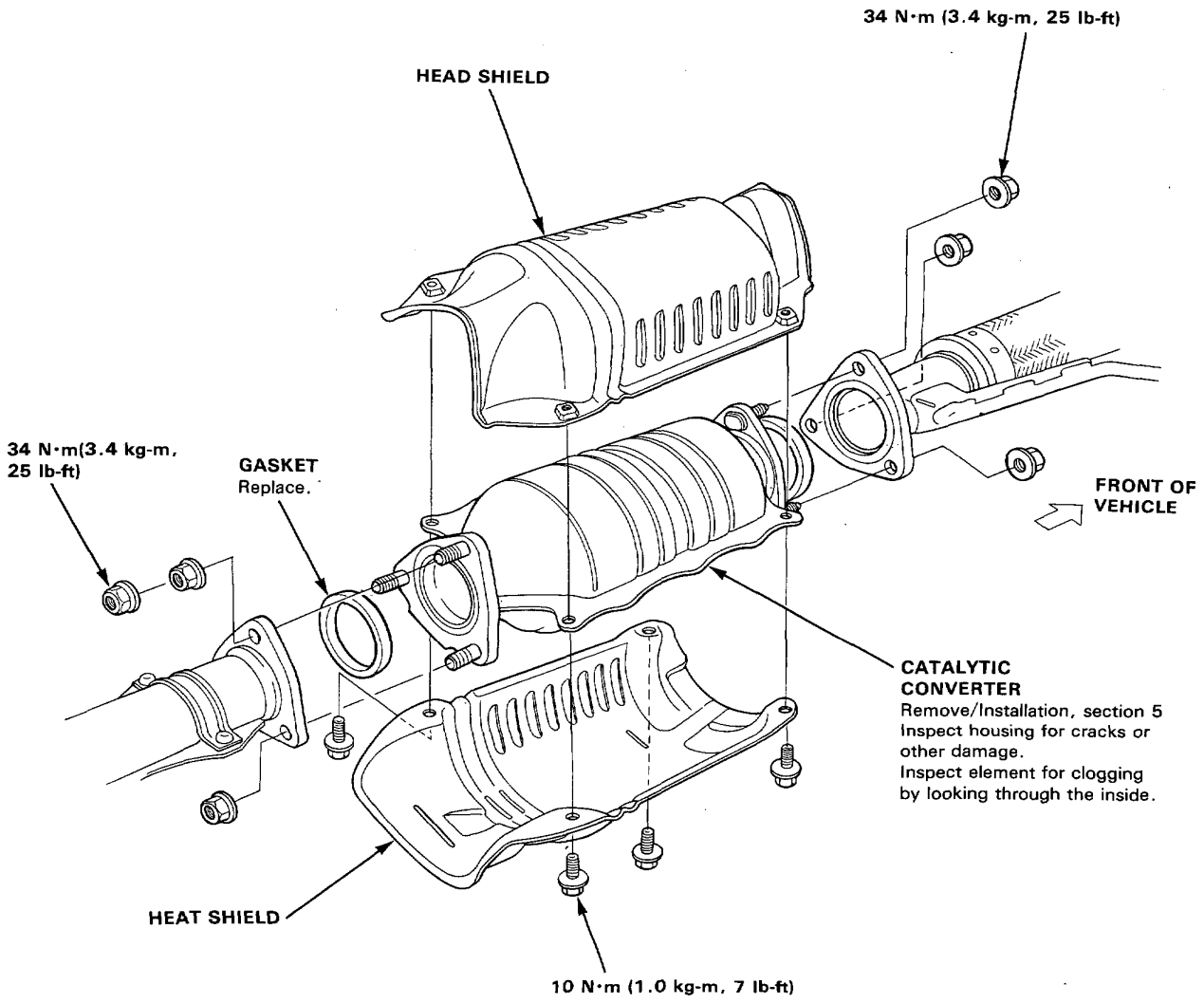
   — If unable to obtain a CO reading of specified % by this procedure, check the engine tune-up condition.

Emission Control System

Catalytic Converter

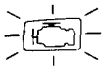
Inspection

If excessive exhaust system back-pressure is suspected, remove the catalytic converter from the car and make a visual check for plugging, melting or cracking of the catalyst. Replace the catalytic converter if any of the visible area is damaged or plugged.

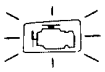


Exhaust Gas Recirculation System

Troubleshooting Flowchart




Self diagnosis indicates code 12: Most likely a problem in the Exhaust Gas Recirculation (EGR) system.




—Check Engine warning light has been reported on.
—LED indicates CODE 12.

Turn the ignition switch OFF.

Remove the BACK UP fuse in the under-hood relay box for 10 seconds to reset ECU.

Road test necessary: Warm up the engine to normal operating temperature (cooling fan comes on). Drive the car on the road for approx. 10 minutes. Try to keep the engine speed in the 1700—2500 range.

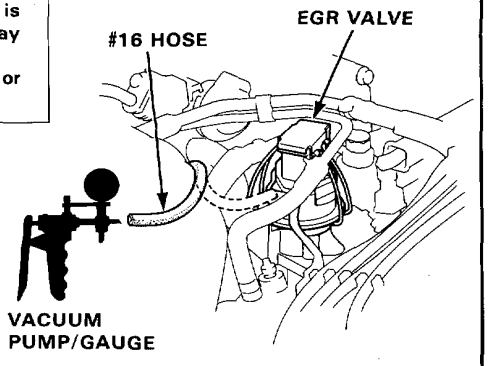
Is Check Engine warning light on and does LED indicated CODE 12 ?

NO

Intermittent failure, system is OK at this time (test drive may be necessary).
Check for poor connections or loose wires at EGR and ECU.

YES

With the engine at idle, disconnect the #16 hose from the EGR valve and connect a vacuum pump/gauge to the hose.



(To page 6-236)

(cont'd)

Troubleshooting Flowchart

Inspection of Evaporative Emission Controls.

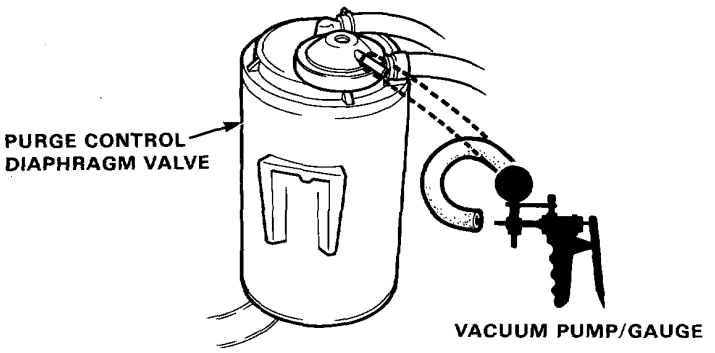
Disconnect #3 vacuum hose from the purge control diaphragm valve (on the charcoal canister) and connect a vacuum gauge to the hose.

Start the engine and allow to idle. NOTE: Engine coolant temperature must be below 75°C (167° F).

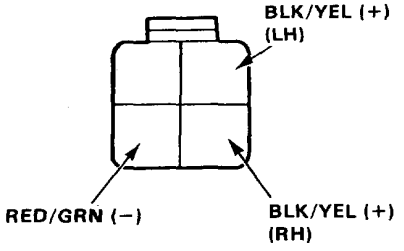
Is there vacuum ?

YES → Disconnect the 4P (KQ: 2P) connector.

NO



Except KQ:



Measure voltage between BLK/YEL (+) terminal and RED/GRN (−) terminal.

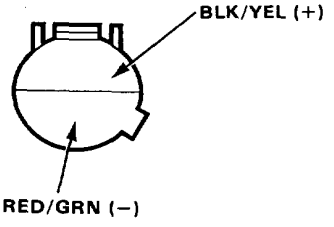
Is there battery voltage ?

YES → **Inspect vacuum hose routing. If OK, replace purge cut-off solenoid valve.**

NO

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

KQ:



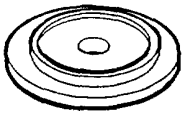
(To page 6-242)

(To page 6-242)

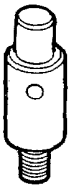
(cont'd)

Special Tools

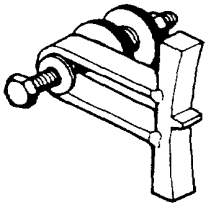
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07JAF—PM7011A	Clutch Alignment Disc	1	12-8
②	07LAF—PT00110	Clutch Alignment Shaft	1	12-8, 11
③	07924—PD20003 or 07924—PD20002	Ring Gear Holder	1	12-8, 9, 10
④	07936—3710100	Handle	1	12-8, 11



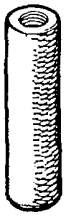
①



②

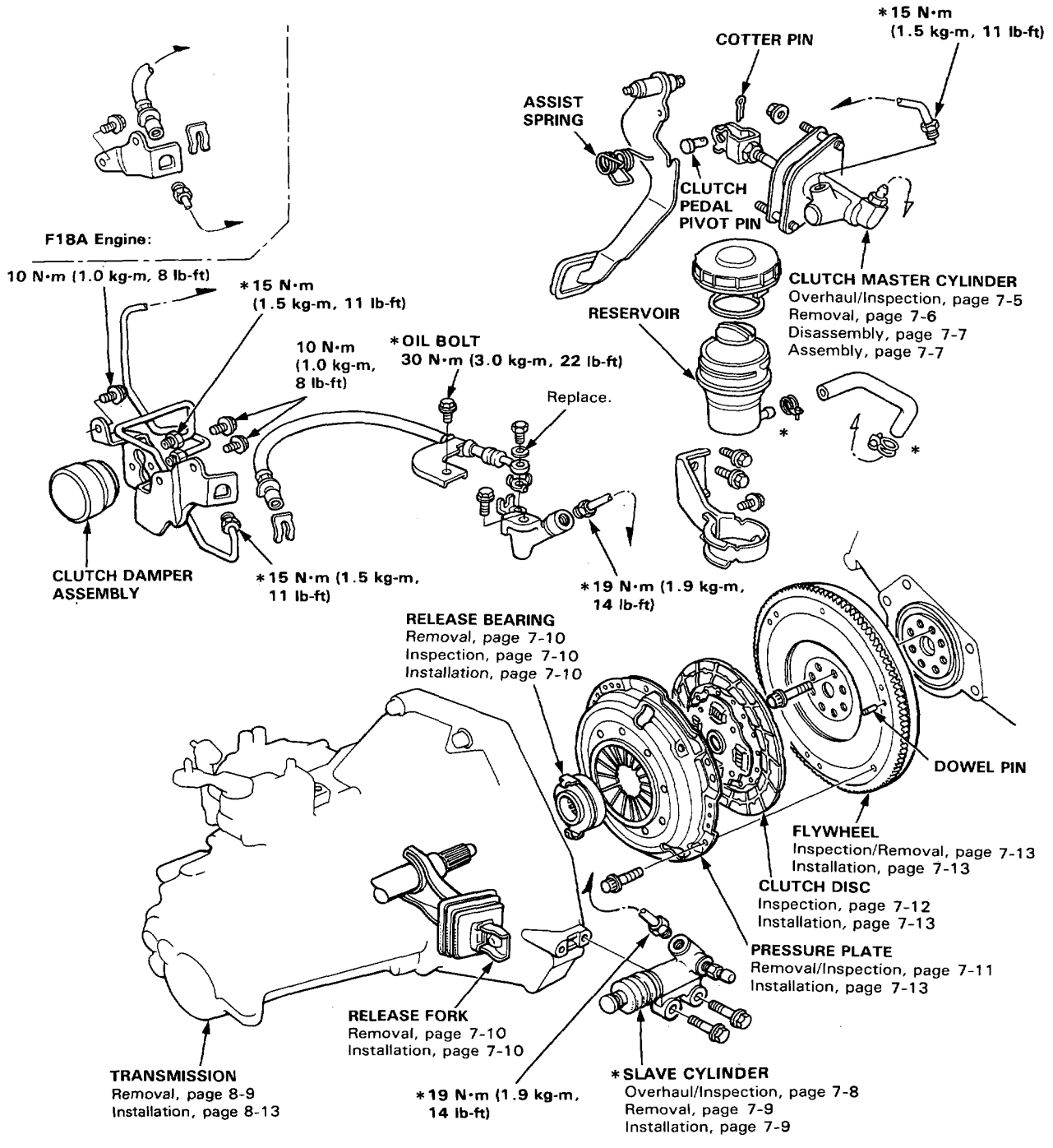


③

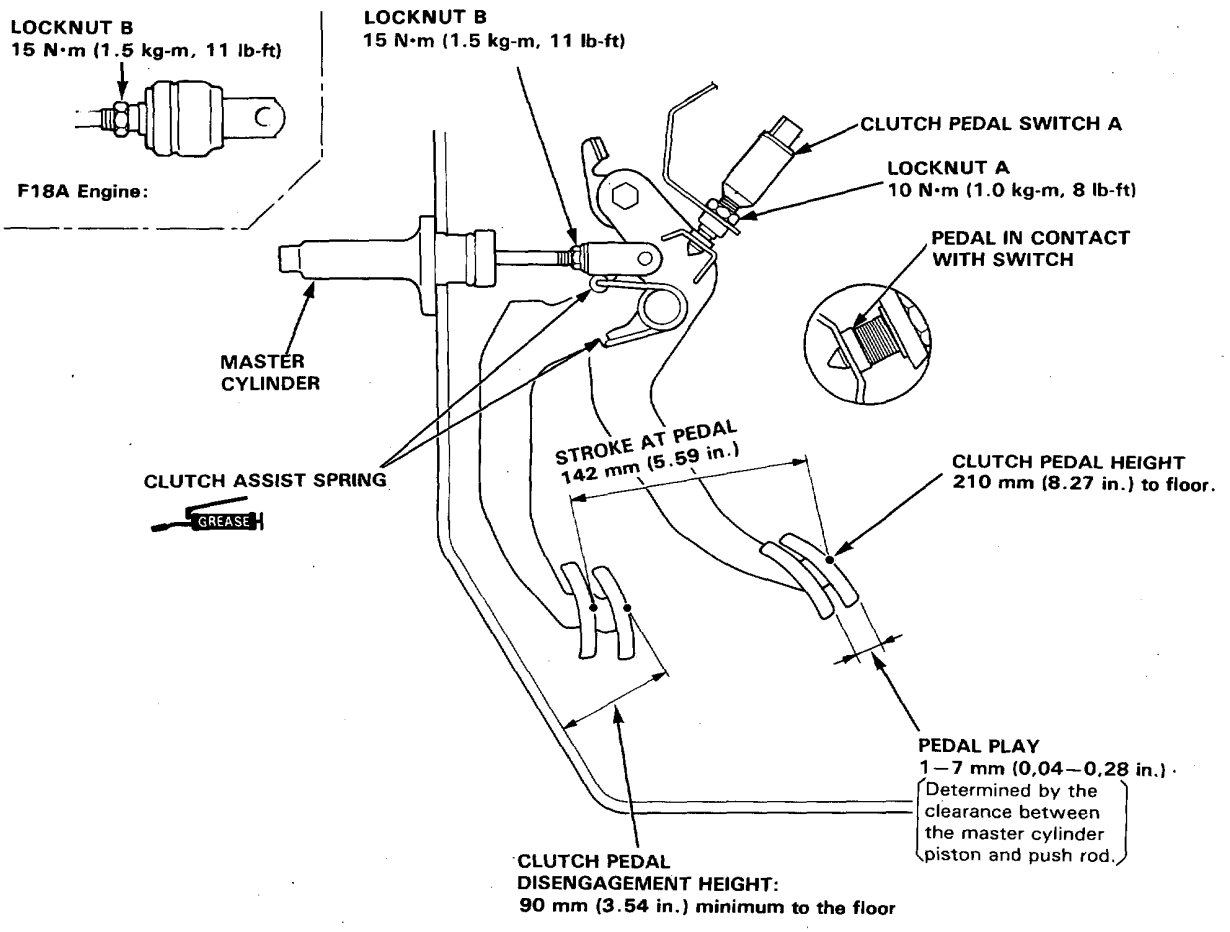


④

NOTE:
- Whenever the transmission is removed, release bearing sliding surface should be cleaned and greased.
- If the * mark parts were removed, the clutch hydraulic system must be bled.



Pedal Free Play



NOTE:

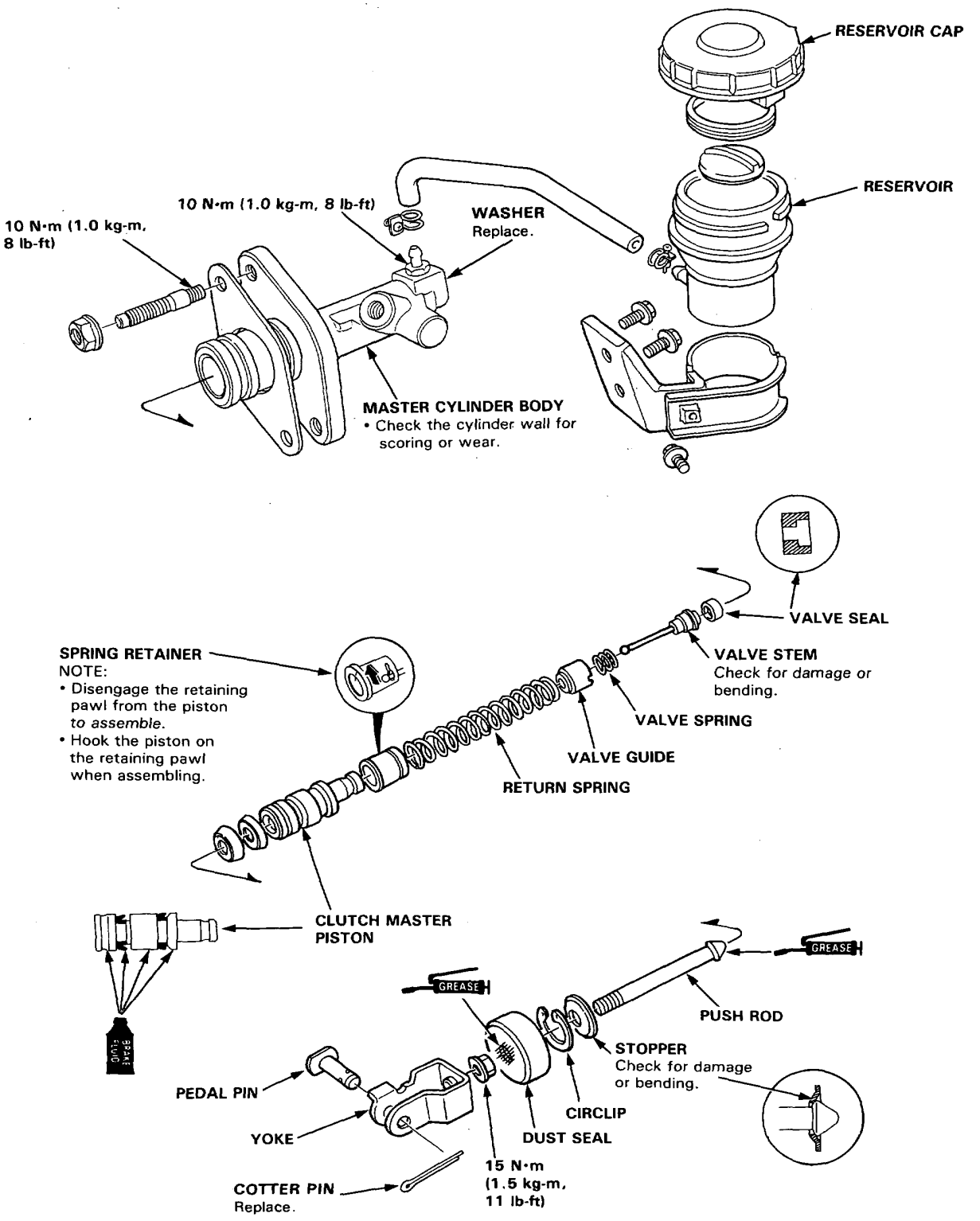
- The clutch is self-adjusting to compensate for wear.
- Total clutch pedal free play is 9–15 mm (0.35–0.59 in).

CAUTION: If there is no clearance between the master cylinder piston and push rod, the release bearing is held against the diaphragm spring, resulting is slipping clutch or other faulty clutch operation.

1. Loosen locknut A, and back off the pedal switch until it no longer touches the clutch pedal.
2. Loosen locknut B, and turn the push rod in or out to get the specified stroke and height at the clutch pedal.
3. Tighten locknut B.
4. Screw in the clutch pedal switch until it contacts the clutch pedal.
5. Turn the switch in further 1/4–1/2 turn.
6. Tighten the locknut A.

Clutch Master Cylinder

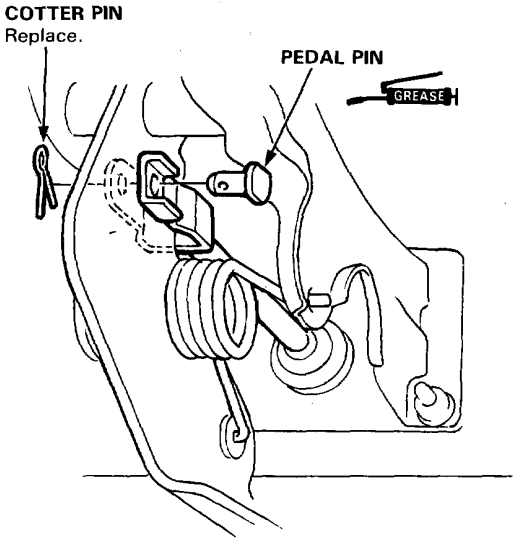
Overhaul/Inspection



Clutch Master Cylinder

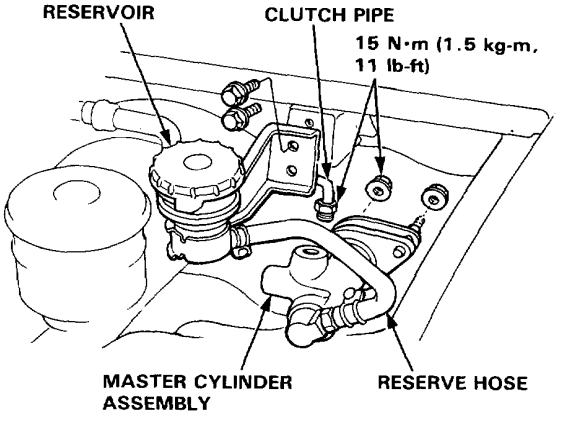
Removal

1. Pry out the cotter pin, and pull the pedal pin out of the yoke.



2. Remove the nuts and bolts attaching the master cylinder and remove the cylinder from the engine compartment.
3. Remove the clutch pipe and reserve hose from the master cylinder.

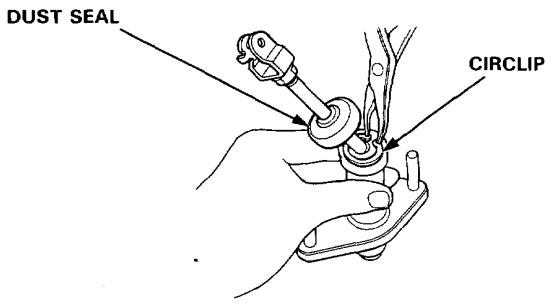
CAUTION:
- **Avoid spilling brake fluid on paint as it may damage the finish.**
- **Plug the end of the clutch pipe and reserve hose with a shop towel prevent fluid from flowing out of the clutch pipe and reserve hose after disconnecting.**



Disassembly

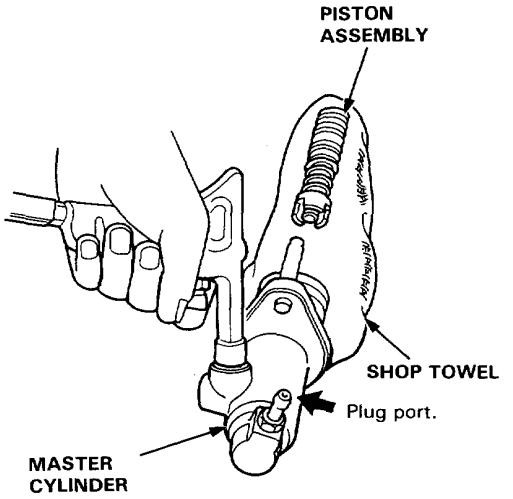
CAUTION: Avoid spilling brake fluid on paint as it may damage the finish.

1. Remove the dust seal from the master cylinder.



2. Pry the circlip off the master cylinder.
3. Carefully remove the piston by applying air pressure through the clutch line hole.

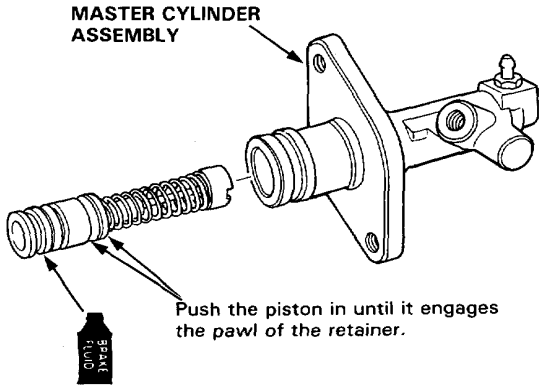
CAUTION:
- **Hold a shop towel over the master cylinder, to stop the piston in case it comes out suddenly.**
- **Plug the end of the clutch hose port with a shop towel to prevent fluid from coming out.**
- **Clean all disassembled parts in solvent and blow through all ports and passages with compressed air.**



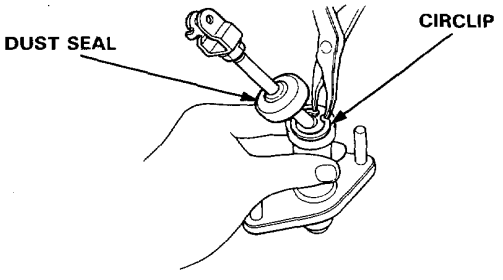
Assembly

CAUTION:
- **Before assembling, make sure all parts are completely clean.**
- **Replace parts with new ones whenever specified to do so.**
- **Do not allow dust or water to enter the system.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the brake fluid which was drained out.**
- **Avoid spilling the brake fluid on painted surfaces, as it may damage the finish.**

1. Assemble the piston noting the proper direction of the parts (page 7-5).



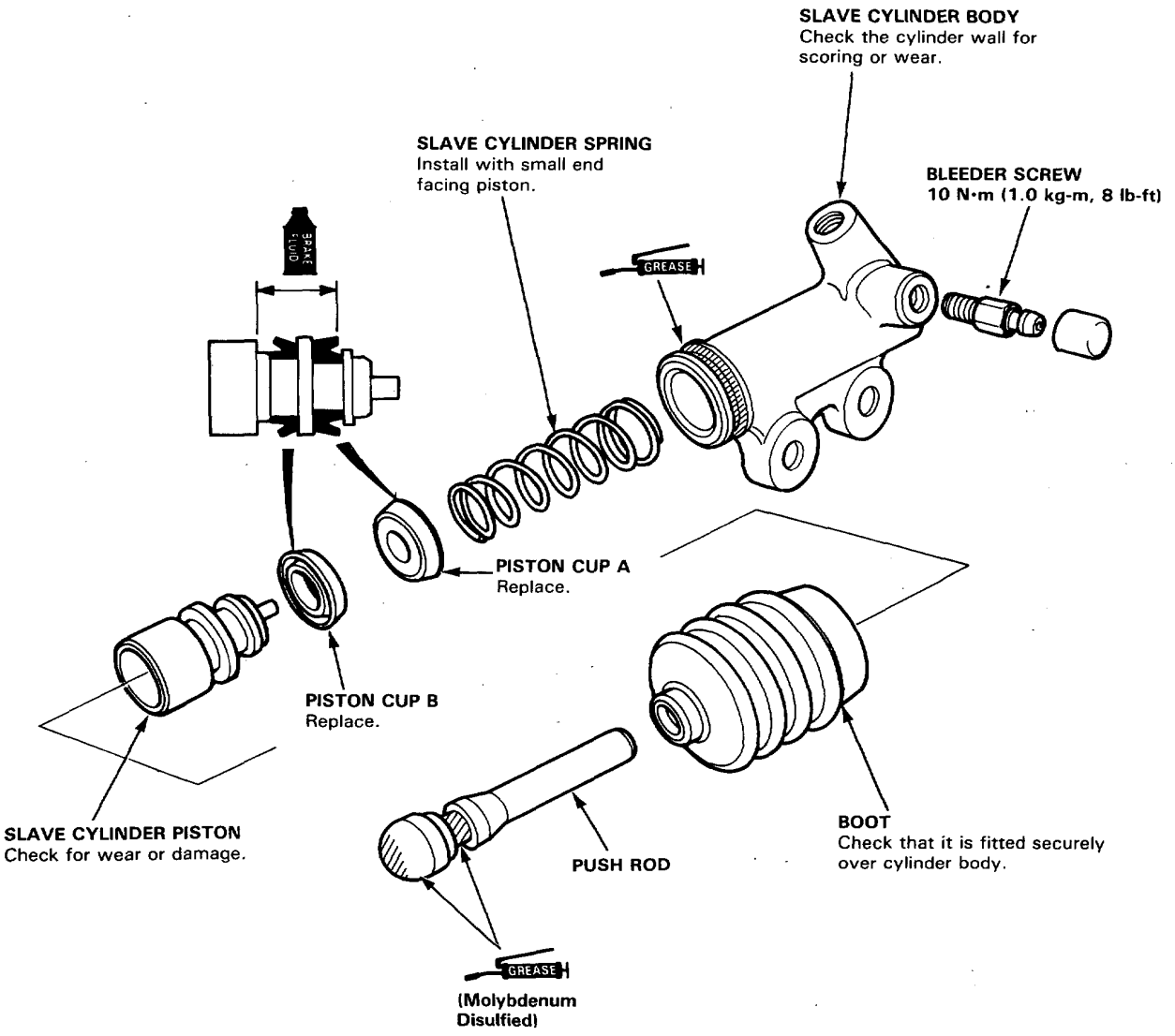
2. Slide the piston assembly into the master cylinder.
3. Install the circlip in the groove of the master cylinder.



4. Install the dust seal.

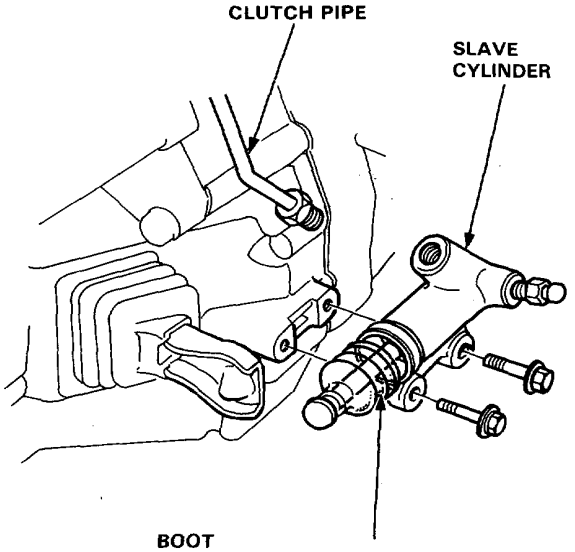
Slave Cylinder

Overhaul/Inspection



Removal

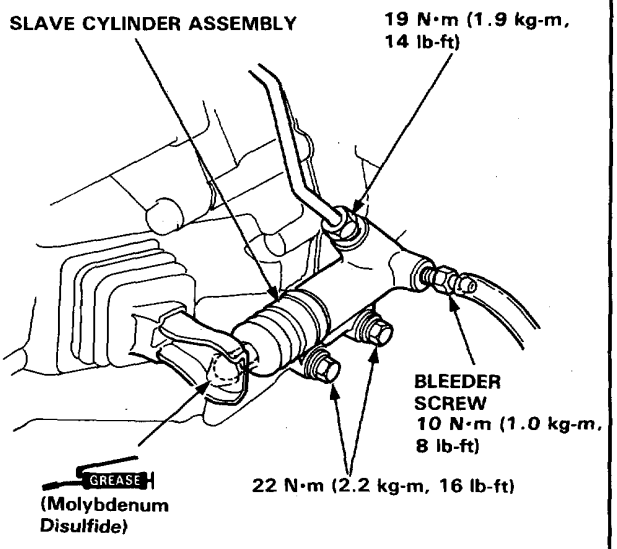
1. Disconnect the clutch pipe from the slave cylinder.
   CAUTION:
   - **Avoid spilling brake fluid on the painted surfaces, as it may damage the finish.**
   - **Plug the end of the clutch pipe with a shop towel to prevent brake fluid from coming out.**
2. Remove the slave cylinder from the clutch housing.



BOOT
Remove and check for signs of leaking or deterioration.

Installation

1. Install the slave cylinder assembly on the clutch housing.

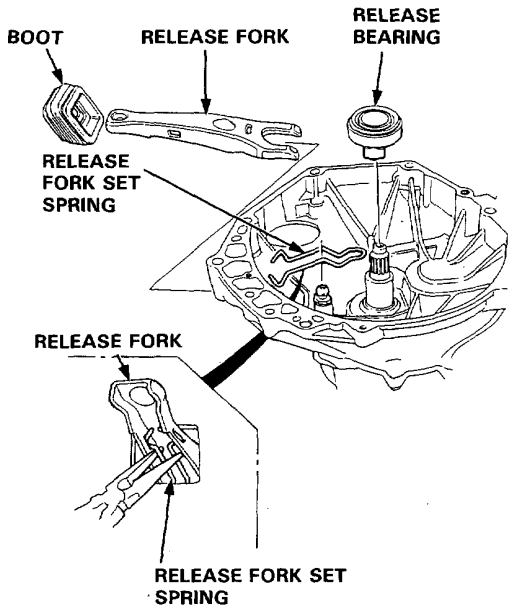


2. Bleed the clutch hydraulic system:
   - Attach a hose to the bleeder fitting and suspend the hose in a container of brake fluid.
   - Make sure there is an adequate supply of fluid at the master cylinder, then slowly pump the clutch pedal until no more bubbles appear at the bleeder hose.
   - Re-fill the master cylinder fluid when done.
   - Use only DOT 3 brake fluid.

Release Bearing and Release Fork

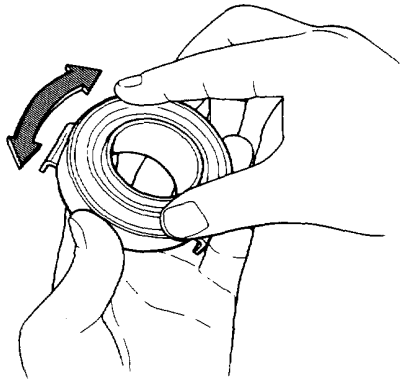
Disassembly/Inspection

1. Remove the boot from the clutch housing.
2. Remove the release fork from the clutch housing by squeezing the release fork set spring with pliers. Remove the release bearing.



3. Check the release bearing for play by spinning it by hand.

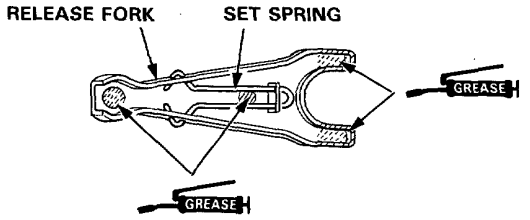
CAUTION: The bearing is packed with grease. Do not wash it in solvent.



4. Replace the bearing with a new one if there is excessive play.

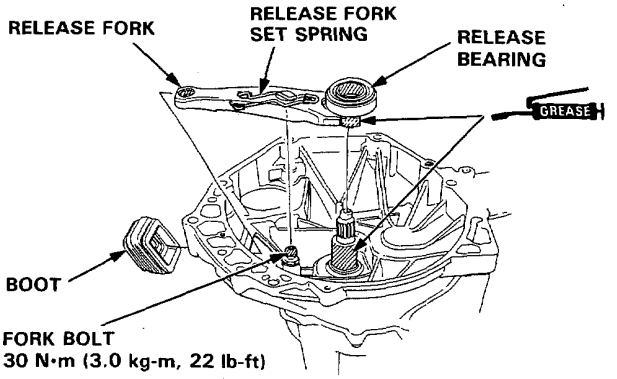
Installation

1. Install the release fork set spring on the release fork.



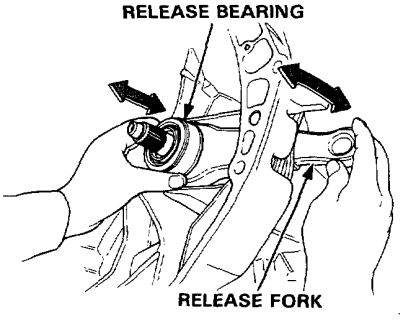
CAUTION: Use only molybdenum disulfide grease in this step.

2. With the release fork slid between the release bearing pawls, install the bearing on the mainshaft while inserting the release fork through the hole in clutch housing.
3. Align the detent of the release fork with the release fork bolt and press down on the fork on the release fork bolt squarely.



CAUTION: Use only molybdenum disulfide grease in this step.

4. Install the boot, being sure that there is no clearance: release fork-to-boot, and boot-to-clutch housing.
5. Move the release fork right and left to make sure that the fork fits properly against the bearing, and that the bearing slides smoothly.



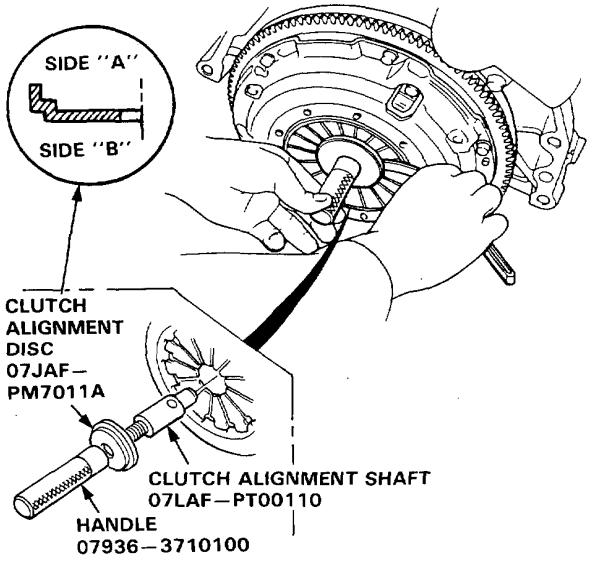
Pressure Plate

Removal/Inspection

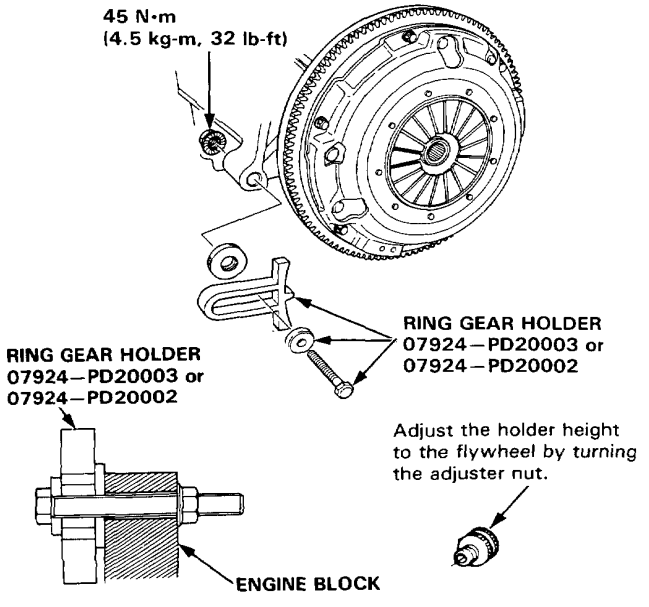
1. Inspect the fingers of the diaphragm spring for wear at the release bearing contact area.

2. Assemble the special tools as shown.
   NOTE: Assemble the Clutch Alignment Disc with side "A" facing the diaphragm as shown.
3. Check the diaphragm spring fingers for height using the special tools and feeler gauge.

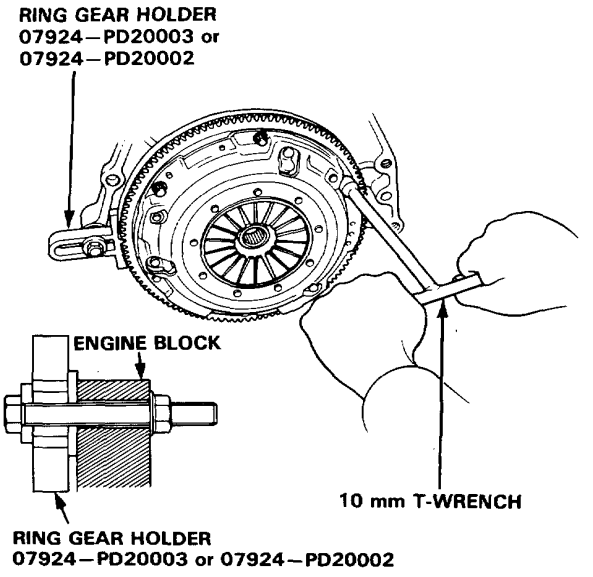
   Standard (New): 0.6 mm (0.02 in.) Min.
   Service Limit: 0.8 mm (0.03 in.) Max.



4. Install the Ring Gear Holder.



5. To prevent warping, unscrew the pressure plate mounting bolts two turns at a time in a crisscross pattern using a 10 mm T-wrench, then remove the pressure plate and clutch disc.

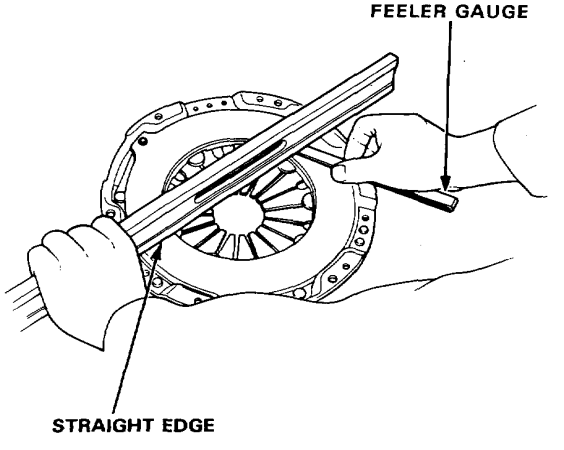


6. Inspect the pressure plate surface for wear, cracks, or burning.

7. Inspect for warpage using a straight edge and feeler gauge.

   Standard (New): 0.03 mm (0.001 in.) Min.
   Service Limit: 0.15 mm (0.006 in.) Max.

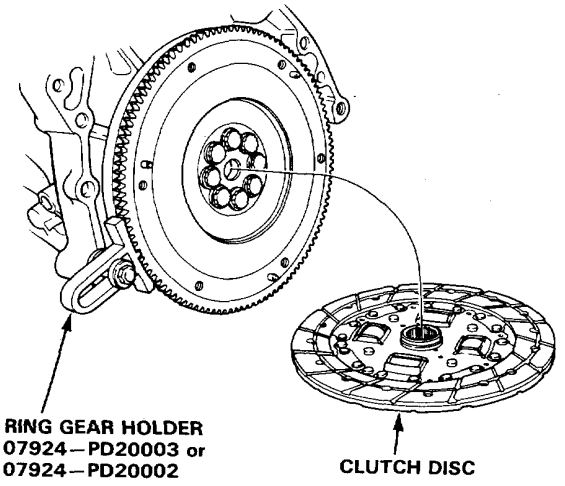
   Measure across pressure plate.



Clutch Disc

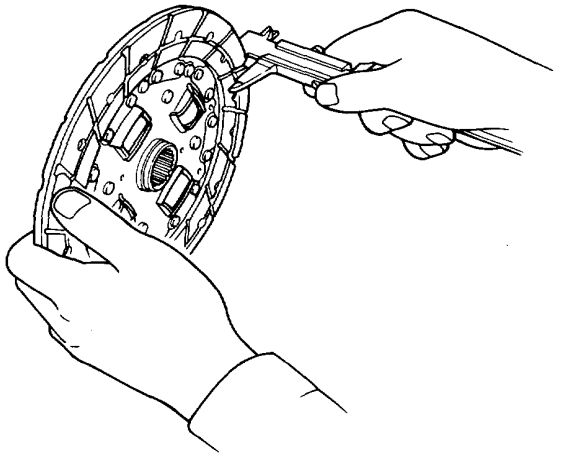
Inspection

1. Remove the clutch disc.
2. Inspect lining of the clutch disc for signs of slipping or oil. Replace it if it is burned black or oil soaked.



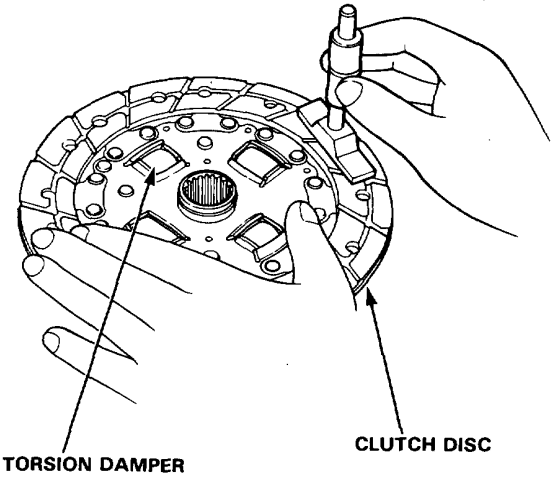
3. Measure the clutch disc thickness.

Clutch Disc Thickness:
Standard (New): 8.5—9.2 mm (0.33—0.36 in.)
Service Limit: 6.1 mm (0.24 in.)



4. Check for loose rubber torsion dampers. Replace the clutch disc if any are loose.
5. Measure the depth from the lining surface to the rivets, on both sides.

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



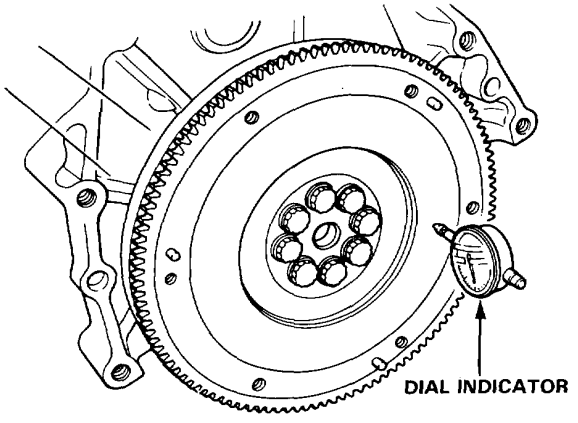
Flywheel

Inspection/Removal

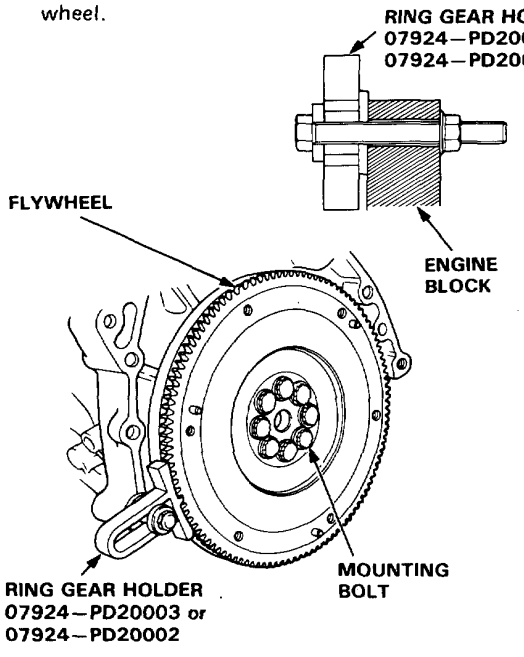
1. Inspect the ring gear teeth for wear or damage.
2. Inspect the clutch disc mating surface on the flywheel for wear, cracks or burning.
3. Measure the flywheel runout using a dial indicator through at least two full turns. Push flywheel to ward engine to take up the crankshaft thrust washer clearance.

   NOTE: The runout can be measured with engine installed.

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



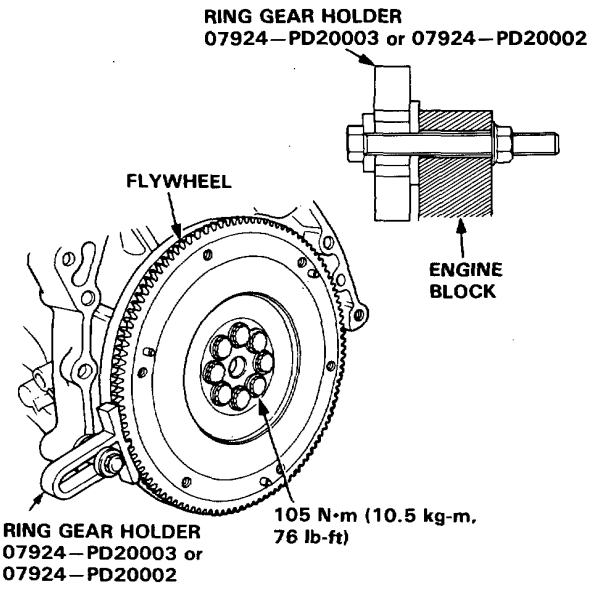
4. Remove the eight flywheel mounting bolts and flywheel.



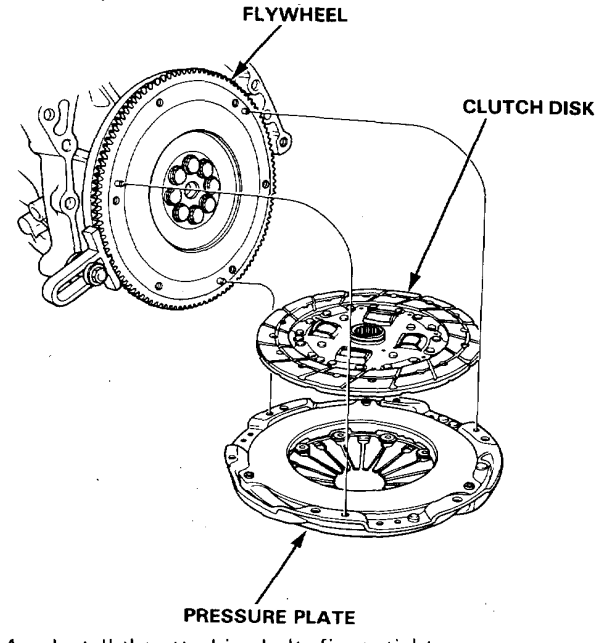
Flywheel and Clutch Disc

Installation

1. Align the hole in flywheel with the crankshaft dowel pin and assemble. Install the bolts only finger tight.
2. Install the Ring Gear Holder, then torque the flywheel bolts in a crisscross pattern, as shown.



3. Install the clutch disc and pressure plate by aligning the flywheel dowels with dowel holes in the pressure plate.



4. Install the attaching bolts finger tight.

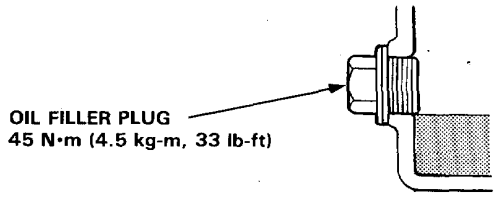
(cont'd)

Maintenance

Transmission oil

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

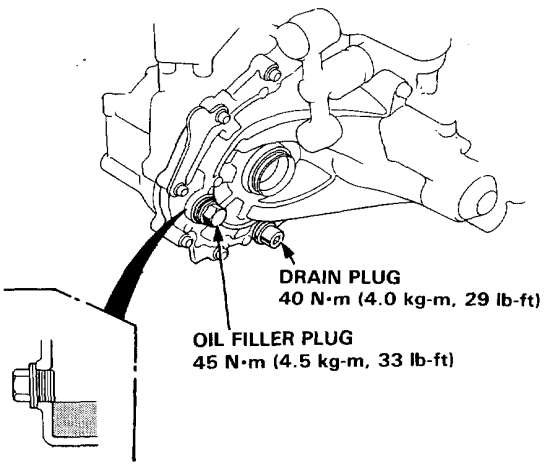
Use only SAE 10W—30 or 10W—40 oil rated SF grade

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

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

Oil Capacity

1.9 ℓ (2.0 U.S. qt.) after drain.
2.0 ℓ (2.1 U.S. qt.) after overhaul.

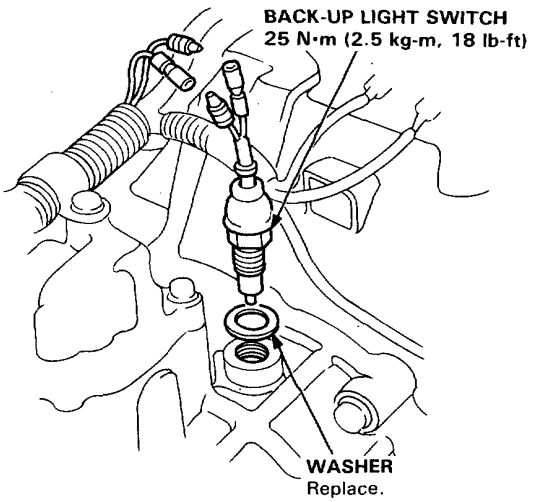


Back-up Light Switch

Replacement

NOTE: Check the switch see Section 16.

1. Disconnect the back-up light switch wire connectors.
2. Remove the back-up light switch.

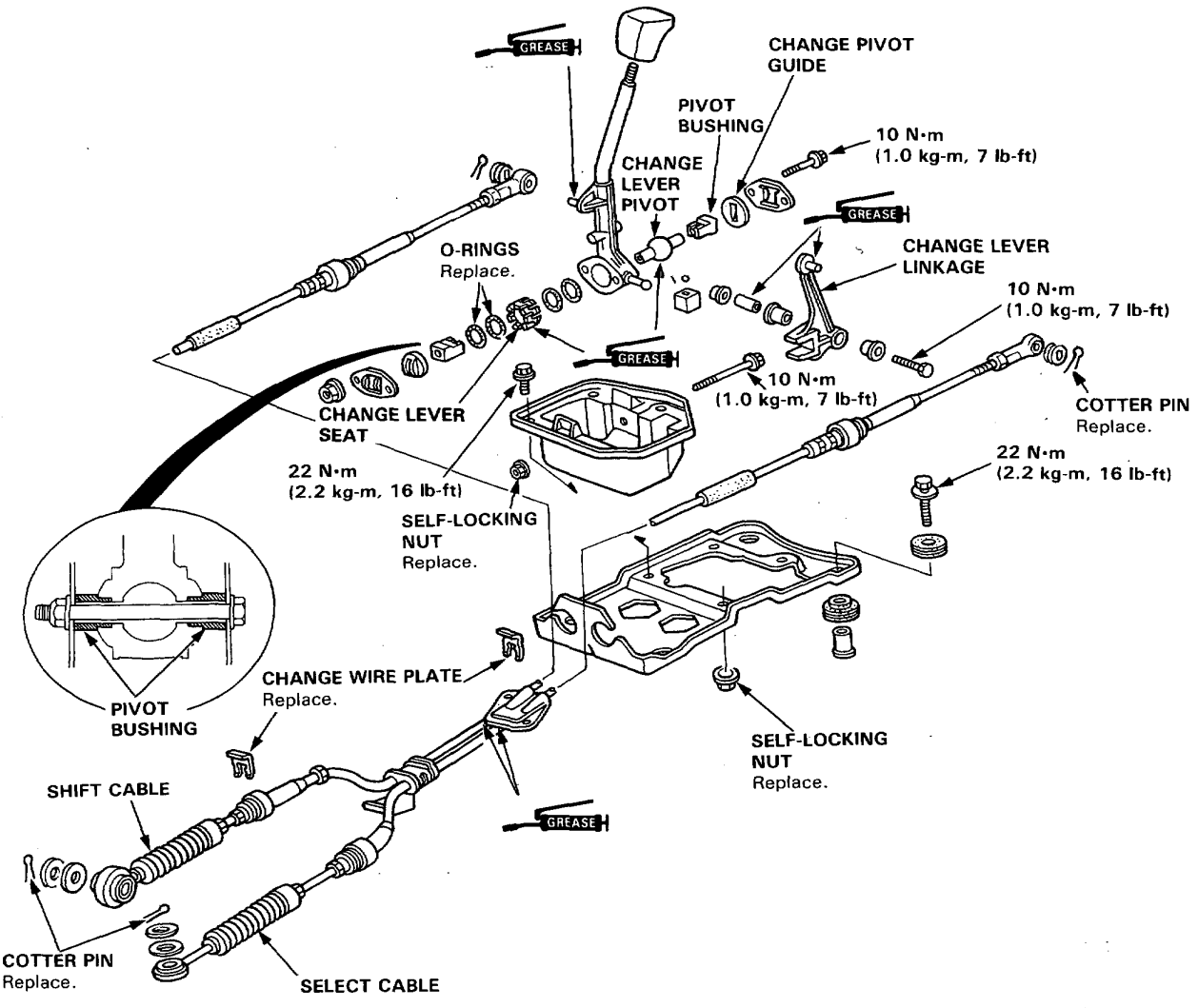


3. Install the new washer and back-up light switch.

Gearshift Mechanism

Overhaul

NOTE:
- Inspect rubber parts for wear or damage when disassembling.
- Check that new cotter pin is seated firmly.

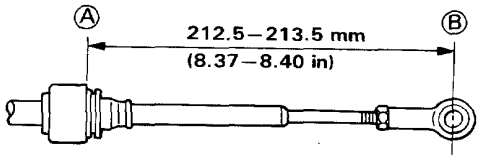


Gearshift Mechanism

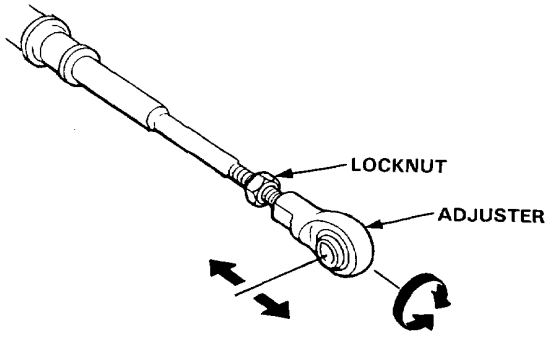
Cable Adjustment

Select Cable:

1. With the transmission in neutral, measure the clearance between Ⓐ and Ⓑ.

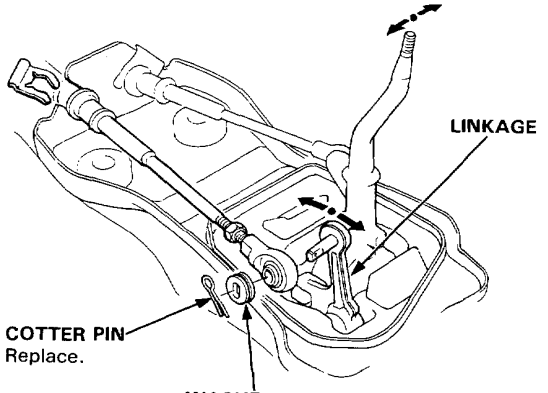


2. If there is no clearance between Ⓐ and Ⓑ, loosen the locknut and turn the adjuster as necessary.



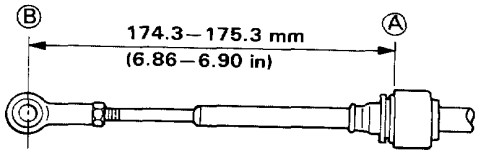
3. Tighten the locknut and install the select cable to the linkage.

NOTE:
- Check that new cotter pin is seated firmly.
- After adjustment, check operation of the gearshift lever.

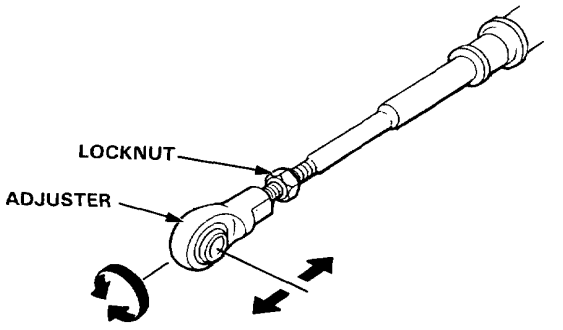


Shift Cable:

1. With the transmission in neutral, measure the clearance between Ⓐ and Ⓑ.

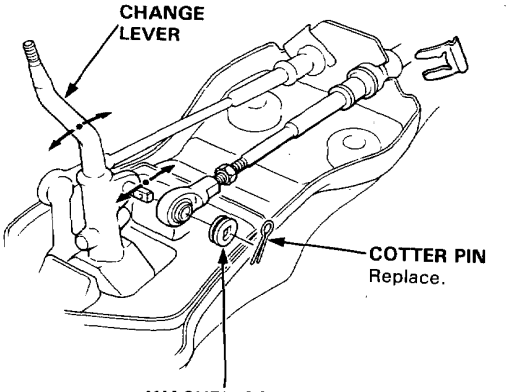


2. If there is no clearance between Ⓐ and Ⓑ, loosen the locknut and turn the adjuster as necessary.



3. Tighten the locknut and install the shift cable to the change lever.

NOTE:
- Check that new cotter pin is seated firmly.
- After adjustment, check operation of the gearshift lever.



Transmission Assembly

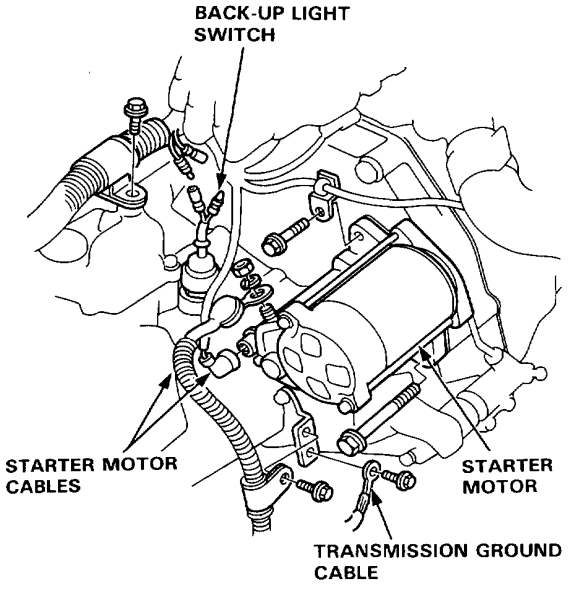
Removal

⚠ WARNING

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

CAUTION: Use fender covers to avoid damaging painted surfaces.

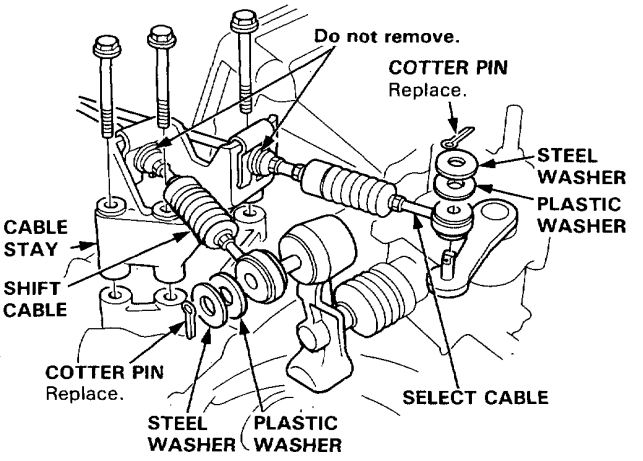
1. Disconnect the battery negative (−) and positive (+) cables from the battery, and remove the battery.
2. Remove the air intake hose and battery base.
3. Disconnect the starter motor cables, remove the starter mounting bolts, then remove the starter motor.
4. Disconnect the transmission ground cable.
5. Disconnect the back-up light switch wire.



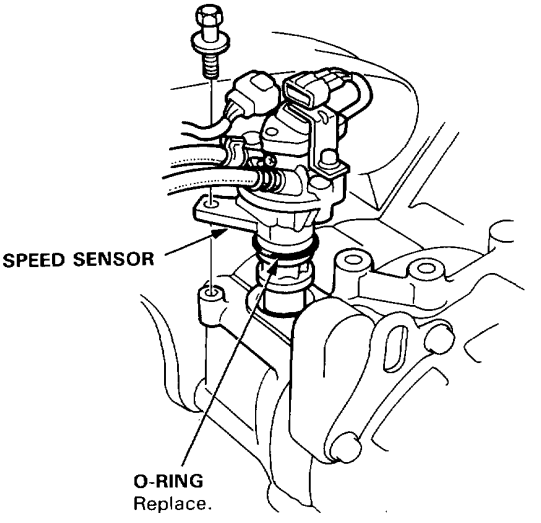
6. First remove the cable stay and disconnect the cables from the top housing of the transmission.

NOTE: Remove both cables and the stay together.

CAUTION: Take care not to bend the cables.



7. Disconnect the connector and remove the speed sensor, but leave its hoses connected.

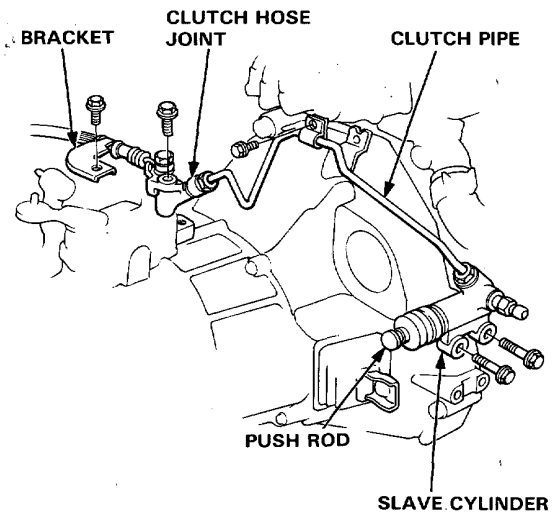


(cont'd)

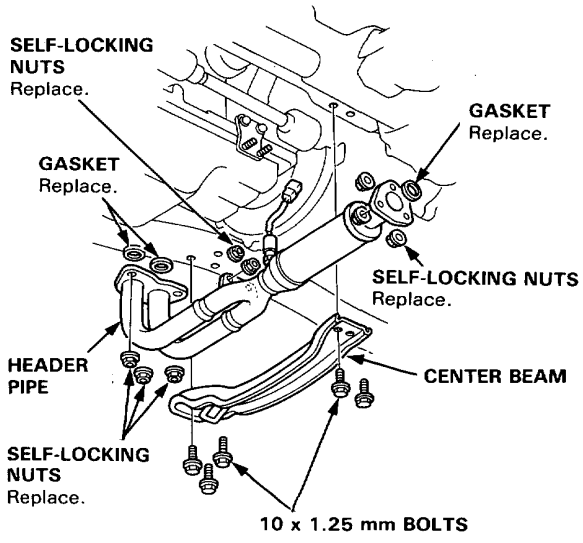
Removal (cont'd)

8. Remove both front wheels.
9. Remove the undercarriage splash shield.
10. Drain transmission oil.
11. Remove the mounting bolts and clutch slave cylinder with the clutch pipe and push rod.
12. Remove the mounting bolt and clutch hose joint with the clutch pipe and clutch hose.

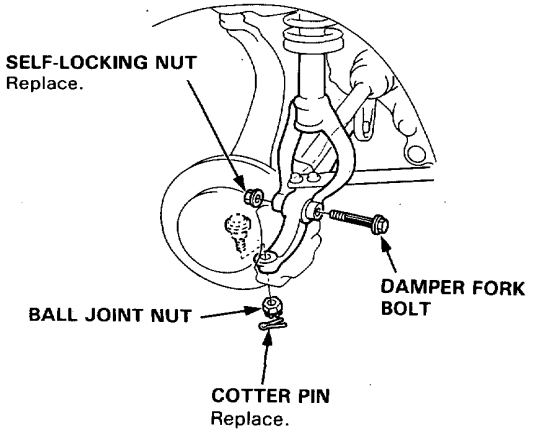
    NOTE:
    - Do not operate the clutch pedal once the slave cylinder has been removed.
    - Take care not to bend the pipe.



13. Remove the center beam.
14. Remove the header pipe.



15. Remove the cotter pin and lower arm ball joint nuts, then separate the ball joints and lower arms (See Section 12).
16. Remove the damper fork bolt.

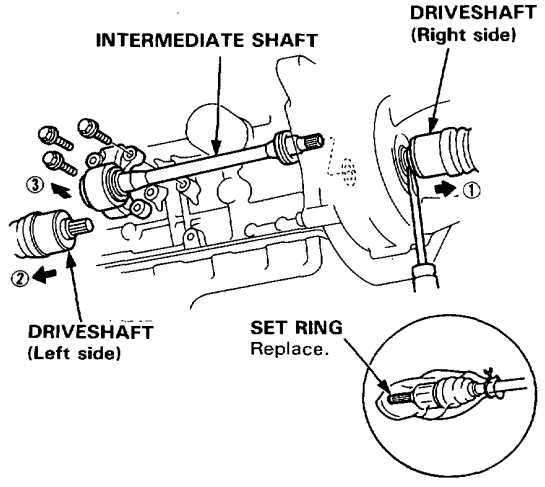


17. Pry the right and left driveshafts out of the differential and the intermediate shaft.

18. Pull on the inboard joint and remove the right and left driveshafts (See section 10).

19. Remove the 3 mounting bolts and lower the bearing support.

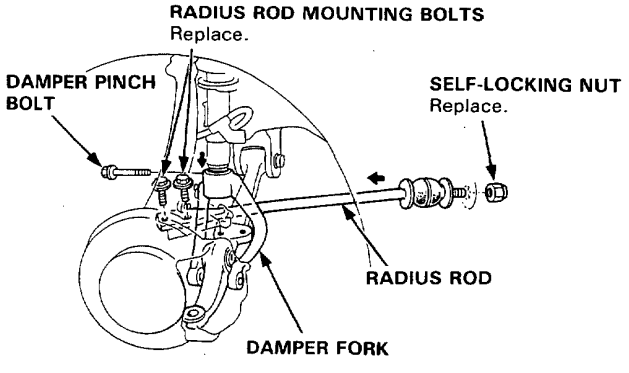
20. Remove the intermediate shaft from the differential (See section 10).



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

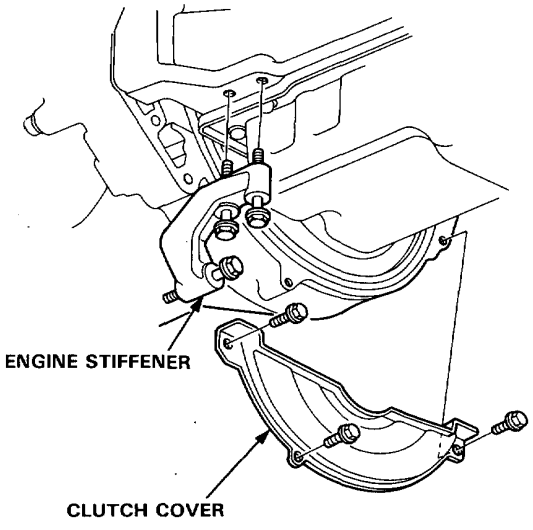
21. Remove the right damper pinch bolt, then separate the damper fork and damper.

22. Remove the bolts and nut, then remove the right radius rod.

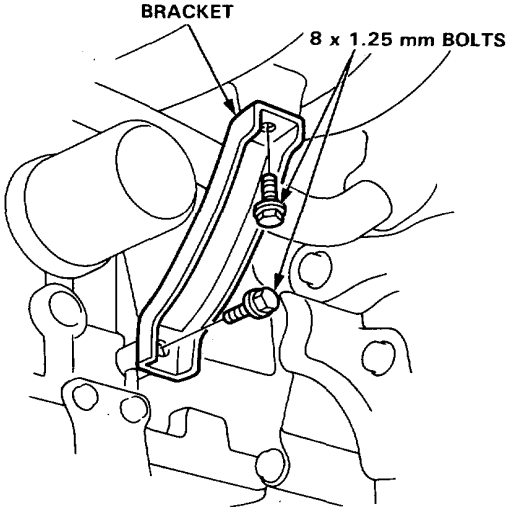


23. Remove the engine stiffener.

24. Remove the clutch cover.



25. Remove the intake manifold bracket.



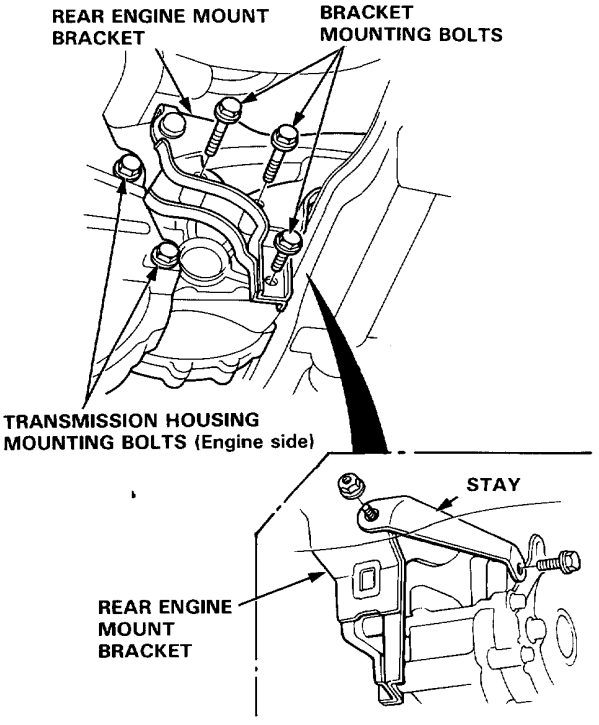
(cont'd)

Removal (cont'd)

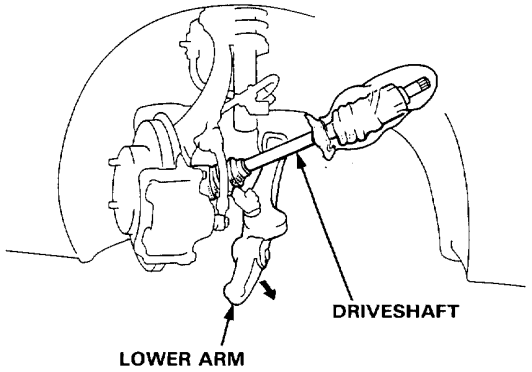
26. Remove the rear engine mount bracket stay.

27. Remove the 3 rear engine mount bracket mounting bolts.

28. Remove the transmission housing mounting bolt (Engine side).



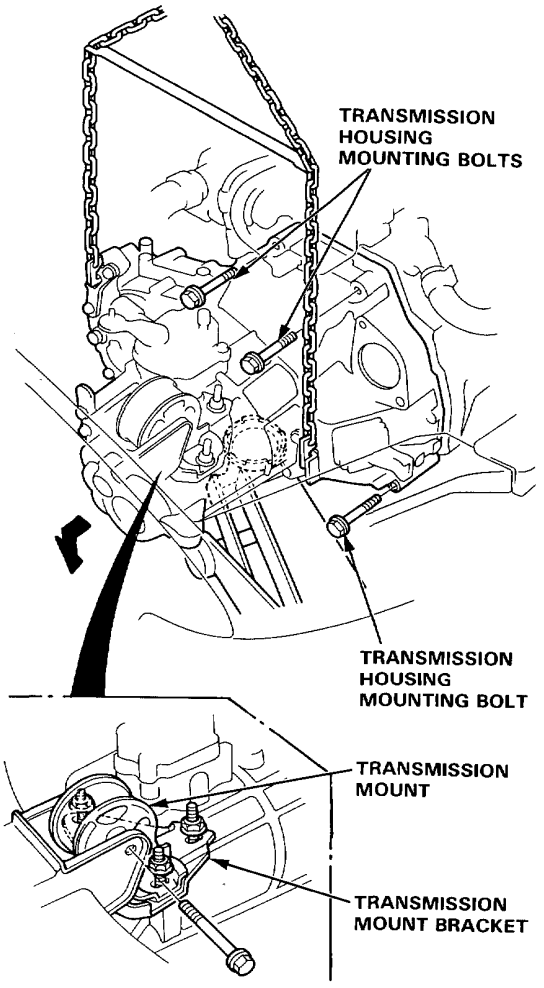
29. Swing the right driveshaft to the inner fender.



30. Place a floor jack under the transmission and raise transmission just enough to take weight off mounts.

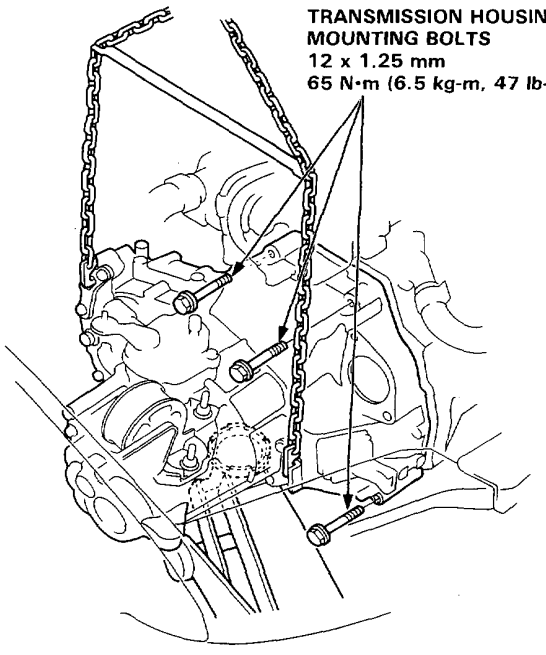
31. Remove the transmission mount mounting bolt and loosen the mount bracket mounting nuts.

32. Remove the 3 transmission housing mounting bolts.



Installation

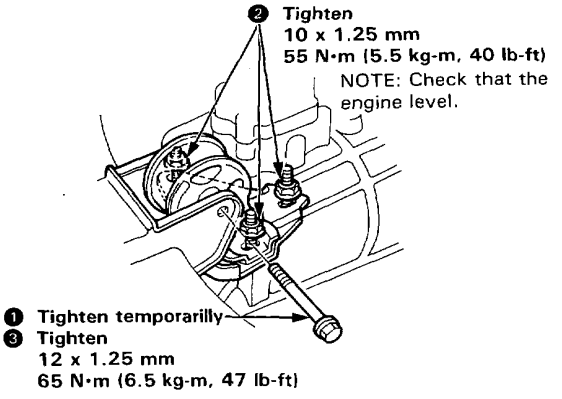
1. *Place* the transmission on the transmission jack, and raise to the engine level.
2. Check that the 4 dowel pins are installed.
3. Install the 3 transmission housing mounting bolts.



4. Install the transmission mount and mount bracket.

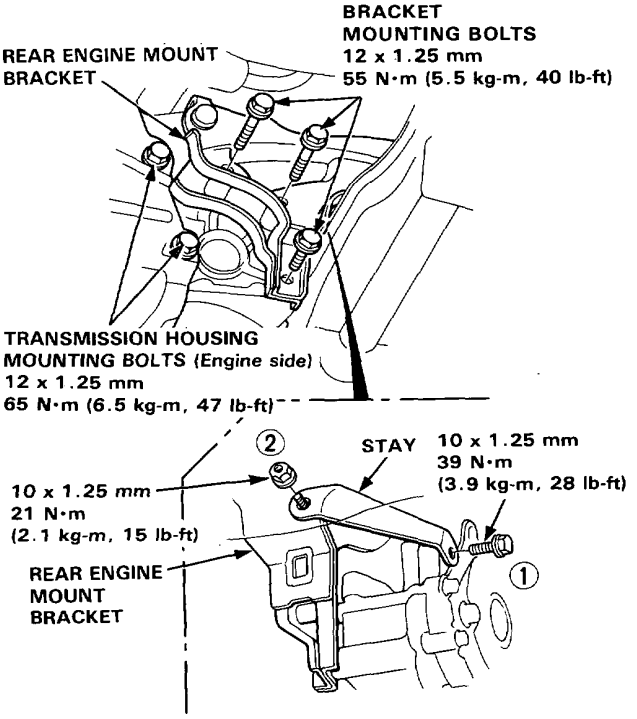
   NOTE: Torque mounting bolt and nuts in sequence shown.

   CAUTION: Check that the bushings are not twisted or offset.

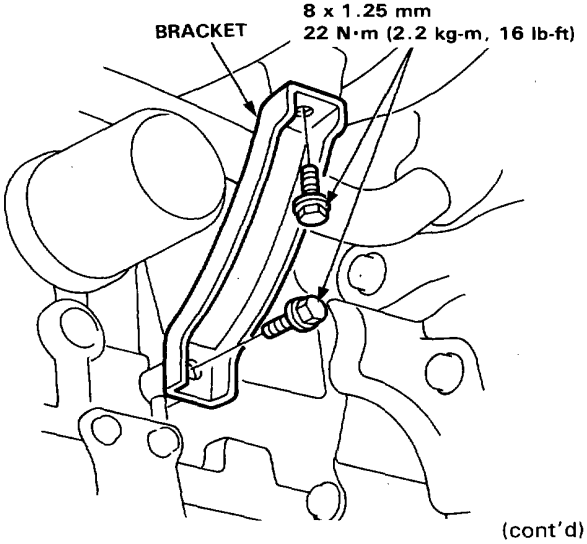


5. Install the transmission housing mounting bolts (Engine side).
6. Install the 3 rear engine bracket mounting bolts.
7. Install the rear engine mount bracket stay.

   NOTE: Loosely install the stay mounting bolt and nut, then torque in the sequence shown.



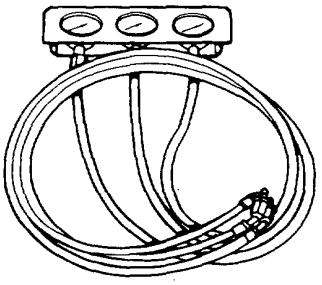
8. Install the intake manifold bracket.



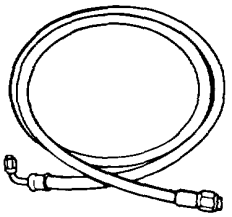
(cont'd)

Special Tools

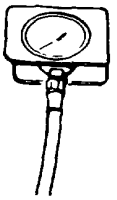
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07406—0020003	Oil Pressure Gauge Set	1	Component Tool
①-1	07406—0020201	Oil Pressure Gauge Hose	1	
②	07406—0070000	Low Pressure Gauge	1	



①



①-1



②

Symptom-to-Component Chart

Hydraulic System

SYMPTOM	Check these items on the PROBABLE CAUSE LIST	Check these items on the NOTES CHART
Engine runs, but car does not move in any gear.	1, 6, 7, 16	K, L, R, S
Car moves in R and 2, but not in D_3, D_4 or 1.	8, 29, 44, 48	C, M, O
Car moves in D_3, D_4, 1, R, but not in 2.	9, 30, 49	C, L
Car moves in D_3, D_4, 2, 1, but not in R.	1, 11, 34, 38, 39, 40	C, L, Q
Car moves in N.	1, 8, 9, 10, 11, 46, 47	C, D
Excessive idle vibration.	5, 17	B, K, L
Slips in all gears.	6, 7, 16	C, L, U
No engine braking in [1] position.	12	C, D, L
Slips in low gear.	8, 29, 44, 48	C, N, O, U
Slips in 2nd gear.	9, 20, 23, 30, 49	C, L, U
Slips in 3rd gear.	10, 21, 23, 31, 44	C, L, U
Slips in 4th gear.	11, 23, 32	C, L, U
Slips in reverse gear.	11, 32, 34	C
Flares on 1—2 upshift.	3, 15	E, L, V
Flares on 2—3 upshift.	3, 15, 24, 44	E, L, V
Flares on 3—4 upshift.	3, 15, 25, 44	E, L, V
No upshift, trans stays in low gear.	14, 19, 23	G, L
No downshift to low gear.	12, 19	G, L
Late upshift.	14	L, V
Erratic shifting.	2, 14, 26	V
Harsh shift (up and down shifting).	2, 4, 15, 23, 24, 27, 47	A, E, H, I, L, V
Harsh shift (1—2).	2, 9	C, D, V
Harsh shift (2—3).	2, 10, 23, 24	C, D, H, L, V
Harsh shift (3—4).	2, 11, 23, 25	C, D, I, L, V
Harsh kickdown shifts.	2, 23, 27, 28	L, V, Q
Harsh kickdown shift (2—1).	48	O
Harsh downshift at closed throttle.	15	E, T
Harsh shift when manually shifting to [1].	33	L
Axle(s) slips out of trans on turns.	43, 50	L, P, Q
Axle(s) stuck in trans.	43	L, Q
Ratcheting noise when shifting into R.	6, 7, 38, 39, 40	K, L, Q
Loud popping noise when taking off in R.	38, 39, 40	L, Q
Ratcheting noise when shifting from R to P or from R to N.	38, 39, 40, 45	L, Q
Noise from trans in all selector lever positions.	6, 17	K, L, Q
Noise from trans only when wheels are rolling.	39, 42	L, Q
Gear whine, rpm related (pitch changes with shifts).	8, 13, 41	K, L, Q
Gear whine, speed related (pitch changes with speed).	38, 42	L, Q
Trans will not shift into 4th gear in D_4.	1, 21, 28, 32	L
Lock-up clutch does not lock up smoothly.	17, 36, 37	L
Lock-up clutch does not operate properly.	2, 3, 15, 18, 35, 36, 37	E, L, V
Transmission has multitude of problems shifting. At disassembly, large particles of metal are found on magnet.	43	L, Q

	PROBABLE CAUSE
1.	Shift cable broken/out of adjustment.
2.	Throttle cable too short.
3.	Throttle cable too long.
4.	Wrong type ATF.
5.	Idle rpm too low/high.
6.	Oil pump worn or binding.
7.	Pressure requlator stuck.
8.	1st clutch defective.
9.	2nd clutch defective.
10.	3rd clutch defective.
11.	4th clutch defective.
12.	1st hold clutch defective.
13.	Mainshaft, countershaft, and secondary shaft idler gears worn/damage.
14.	Modulator valve stuck.
15.	Throttle B valve stuck.
16.	ATF strainer clogged.
17.	Torque convertor defective.
18.	Torque convertor check valve stuck.
19.	1—2 shift valve stuck.
20.	2—3 shift valve stuck.
21.	3—4 shift valve stuck.
22.	EAT D inhibitor valve stuck.
23.	Clutch pressure control valve stuck.
24.	2nd orifice control valve stuck.
25.	Orifice control valve stuck.
26.	3—2 kickdown valve stuck.
27.	3rd kickdown valve stuck.
28.	4th exhaust valve stuck.
29.	1st accumulator defective.
30.	2nd clutch accumulator defective.
31.	3rd clutch accumulator defective.
32.	4th/reverse accumulator defective.
33.	1st hold clutch accumulator defective.
34.	Servo valve stuck.
35.	Lock-up clutch timing valve stuck.
36.	Lock-up clutch shift valve stuck.
37.	Lock-up clutch control valve stuck.
38.	Shift fork bent.
39.	Reverse gears worn/damaged (3 gears).
40.	Reverse selector worn.
41.	3rd gears worn/damaged (2 gears).
42.	Final gears worn/damaged (2 gears).
43.	Differential pinion shaft worn.
44.	Feedpipe O-ring broken.
45.	4th gears worn/damaged (2 gears).
46.	Gear clearance incorrect.
47.	Clutch clearance incorrect.
48.	Sprag clutch defective.
49.	Sealing rings/guide worn.
50.	Axle-inboard joint clip missing.

Symptom-to-Component Chart

Hydraulic System (cont'd)

The following symptoms can be caused by improper repair or assembly.	Check these items on the PROBABLE CAUSE DUE TO IMPROPER REPAIR	Items on the NOTES CHART
Car creeps in N.	R1, R2	
Car does not move in D_3 or D_4.	R4	
Trans locks up in R.	R3, R12	
Excessive drag in trans.	R6	R, K
Excessive vibration, rpm related.	R7	
Noise with wheels moving only.	R5	
Main seal pops out.	R8	S
Various shifting problems.	R9, R10	
Harsh upshifts.	R11	

PROBABLE CAUSE DUE TO IMPROPER REPAIR	
R1.	Improper clutch clearance.
R2.	Improper gear clearance.
R3.	Parking brake lever installed upside down.
R4.	Sprag clutch installed upside down.
R5.	Reverse hub installed upside down.
R6.	Oil pump binding.
R7.	Torque converter not fully seated in oil pump.
R8.	Main seal improperly installed.
R9.	Springs improperly installed.
R10.	Valves improperly installed.
R11.	Ball check valves not installed.
R12.	Shift fork bolt not installed.

NOTES	
A.	Flush ATF in the ATF cooler.
B.	Set idle rpm in gear to specified idle speed. If still no good, adjust motor mounts as outlined in engine section of service manual.
C.	If the large clutch piston O-ring is broken, inspect the piston groove for rough machining.
D.	If the clutch pack is seized or is excessively worn, inspect the other clutches for wear and check the orifice control valves and throttle valves for free movement.
E.	If throttle valve B is stuck, inspect the clutches for wear.
G.	If the 1—2 valve is stuck closed, the transmission will not upshift. If stuck open the transmission has no 1st gear.
H.	If the 2nd orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I.	If the orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J.	If the clutch pressure control valve is stuck closed, the transmission will not shift out of 1st gear.
K.	Improper alignment of main valve body and torque convertor case may cause oil pump seizure. The symptoms are mostly an rpm-related ticking noise or a high pitched squeek.
L.	If the oil screen is clogged with particles of steel or aluminum, inspect the oil pump and differential pinion shaft. If both are OK and no cause for the contamination is found, replace the torque converter.
M.	If the 1st clutch feedpipe guide in the end cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the transmission housing. If OK, replace the end cover as it is dented. The O-ring under the guide is probably worn.
N.	Replace the mainshaft if the bushings for the 1st and 4th feedpipe are loose or damaged. If the 1st feedpipe is damaged or out of round, replace it. If the 4th feedpipe is damaged or out of round, replace the end cover.
O.	A worn or damaged sprag clutch is mostly a result of shifting the trans in D_3 or D_4 while the wheels rotate in reverse, such as rocking the car in snow.
P.	Inspect the frame for collision damage.
Q.	Inspect for damage or wear: 1. Reverse selector gear teeth chamfers. 2. Engagement teeth chamfers of countershaft 4th and reverse gear. 3. Shift fork for scuff marks in center.. 4. Differential pinion shaft for wear under pinion gears. 5. Bottom of 3rd clutch for swirl marks. Replace items 1, 2, 3 and 4 if worn or damaged. If trans makes clicking, grinding or whirring noise, also replace mainshaft 4th gear and reverse idler gear and countershaft 4th gear in addition to 1, 2, 3 or 4. If differential pinion shaft is worn, overhaul differential assembly and replace oil screen and thoroughly clean trans, flush torque converter, cooler and lines. If bottom of 3rd clutch is swirled and trans makes gear noise, replace the countershaft and ring gear.
R.	Be very careful not to damage the torque converter case when replacing the main ball bearing. You may also damage the oil pump when you torque down the main valve body. This will result in oil pump seizure if not detected. Use proper tools.
S.	Install the main seal flush with the torque converter case. If you push it into the torque converter case until it bottoms out, it will block the oil return passage and result in damage.
T.	Harsh downshifts when coasting to a stop with zero throttle may be caused by a bent-in throttle valve retainer/cam stopper. Throttle cable adjustment may clear this problem.
U.	Check if servo valve stopper cap is installed. If it was not installed, the check valve may have been pushed out by hydraulic pressure causing a leak (internal) affecting all forward gears.
V.	Throttle cable adjustment is essential for proper operation of the transmission. Not only does it affect the shift points if misadjusted, but also the shift quality and lock-up clutch operation. A too long adjusted cable will result in throttle pressure being too low for the amount of engine torque input into the transmission and may cause clutch slippage. A too short adjusted cable will result in too high throttle pressures which may cause harsh shifts, erratic shifts and torque converter hunting.

NOTE: After transmission is installed:
- Make sure the floor mat does not interfere with accelerator pedal travel. Fully depress accelerator pedal and check to make sure the throttle lever is fully opened.
- Release the accelerator pedal and check both inner control cables to be sure they have slight play.

Warm up the engine to operating temperature.

D4 and D3 Range

1. Apply parking brake and block the wheels. Start the engine, then move the selector to D4 while depressing the brake pedal. Depress the accelerator pedal, and release it suddenly. Engine should not stall.
2. Check that shift points occur at approximate speeds shown. Also check for abnormal noise and clutch slippage.
3. Apply parking brake and block the wheels. Start the engine, then move the selector to D3 while depressing the brake pedal. Depress the accelerator pedal, and release it suddenly. Engine should not stall.

KF, KW, KB, KE, KY, KP, KT and KU Models

- **Upshift**
  D4 (and D3)

		1st—2nd	2nd—3rd	3rd—4th	Lock up Clutch ON	Full Lock up ON
1/8 throttle Coasting down-hill from a stop	km/h	15—19	33—37	42—48	49—53	68—74
	mph	9—12	21—23	26—30	30—33	42—46
1/2 throttle Acceleration from a stop	km/h	26—32	66—72	96—104	92—99	96—103
	mph	16—20	41—45	60—65	57—62	60—64
Full-throttle Acceleration from a stop	km/h	48—55	100—108	146—155	—	135—143
	mph	30—34	62—67	91—96	—	84—89

- **Downshift**
  D4 (and D3)

		Lock up Clutch OFF	4th—3rd	3rd—2nd	2nd—1st
1/8 throttle Coasting or braking to a stop	km/h	49—53	—	(4th—2nd) 13—19	7—13
	mph	30—33	—	(4th—2nd) 8—12	4—8
1/2 throttle When car is slowed by increased grade, wind, etc.	km/h	92—99	—	—	—
	mph	57—62	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	—	129—138	85—94	41—48
	mph	—	80—86	53—58	25—30

KS, KX, KQ and KG Models

● **Upshift**
[D4] (and [D3])

		1st—2nd	2nd—3rd	3rd—4th	Lock up Clutch ON	Full Lock up ON
1/8 throttle Coasting down-hill from a stop	km/h	16—19	33—37	42—48	49—53	66—72
	mph	10—12	21—23	26—30	30—33	41—45
1/2 throttle Acceleration from a stop	km/h	26—32	66—72	95—104	92—99	96—104
	mph	16—20	41—45	59—65	57—62	60—65
Full-throttle Acceleration from a stop	km/h	48—56	100—108	146—156	—	135—143
	mph	30—35	62—67	91—97	—	84—89

● **Downshift**
[D4] (and [D3])

		Lock up Clutch OFF	4th—3rd	3rd—2nd	2nd—1st
1/8 throttle Coasting or braking to a stop	km/h	49—53	—	(4th—2nd) 13—19	7—13
	mph	30—33	—	(4th—2nd) 8—12	4—8
1/2 throttle When car is slowed by increased grade, wind, etc.	km/h	92—99	—	—	—
	mph	57—62	—	—	—
Full-throttle When car is slowed by inreased grade, wind, etc.	km/h	—	146—156	85—95	39—47
	mph	—	91—97	53—59	24—29

CAUTION: Do not shift from [D] or [S] to [2] at speeds over 100 km/h (62.5 mph); you may damage the transmission.

[1] (1st 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.

[2] (2nd Gear)

1. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
2. Upshifts and downshifts should not occur with the selector in this range.

[R] (Reverse)

Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.

[P] (Park)

Park car on a slope (approx. 16°), apply the parking brake, and shift into Park. Release the brake; the car should not move.

Pressure

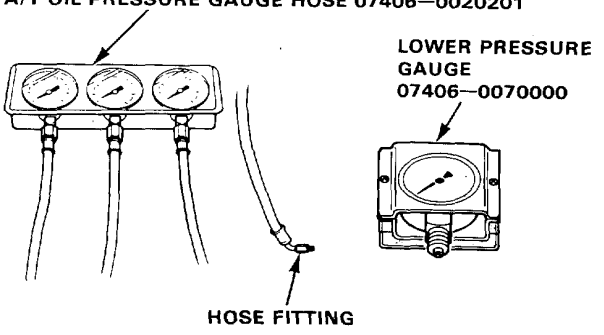
Testing

CAUTION:
- **Before testing, be sure the transmission is filled to the proper level.**
- **Connect an oil pressure gauge securely, being sure not to allow dust and other foreign particles to enter the inspection hole.**
- **Warm up the engine before testing.**
- **Set the parking brake securely, and block both rear wheels.**
- **Raise the front of the car and support with safety stands.**

NOTE: Do not reuse old aluminum washers.
Install the sealing bolt in the inspection hole and tighten to the specified torque 18 N·m (1.8 kg-m, 12 lb-ft).

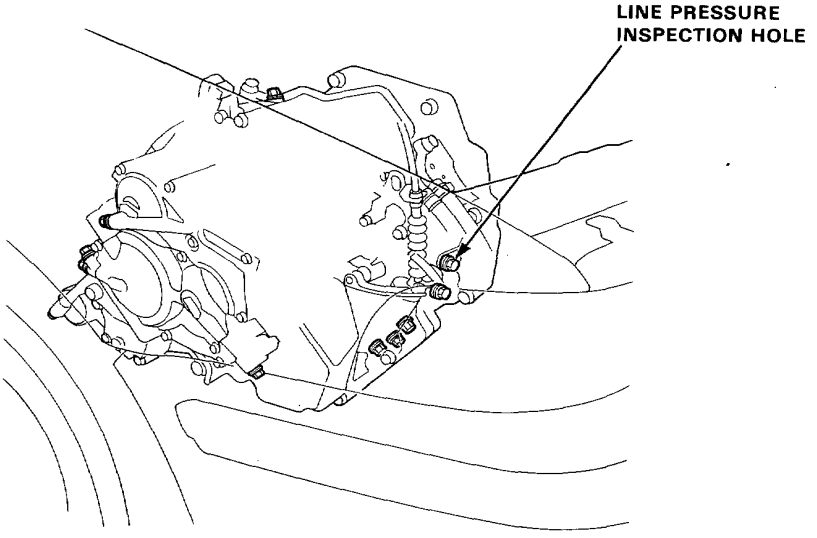
1. Stop the engine and connect a tachometer.
2. Connect an oil pressure gauge to each inspection hole.

GAUGE SET 07406—0020003 (Includes Pressure Hoses)
A/T OIL PRESSURE GAUGE HOSE 07406—0020201



3. Start the engine and measure respective pressures as follows.

Line Pressure Measurement
1. Set the parking brake and block both rear wheels securely.
2. Run the engine at 2,000 min^{-1} (rpm).
3. Measure the line pressure.

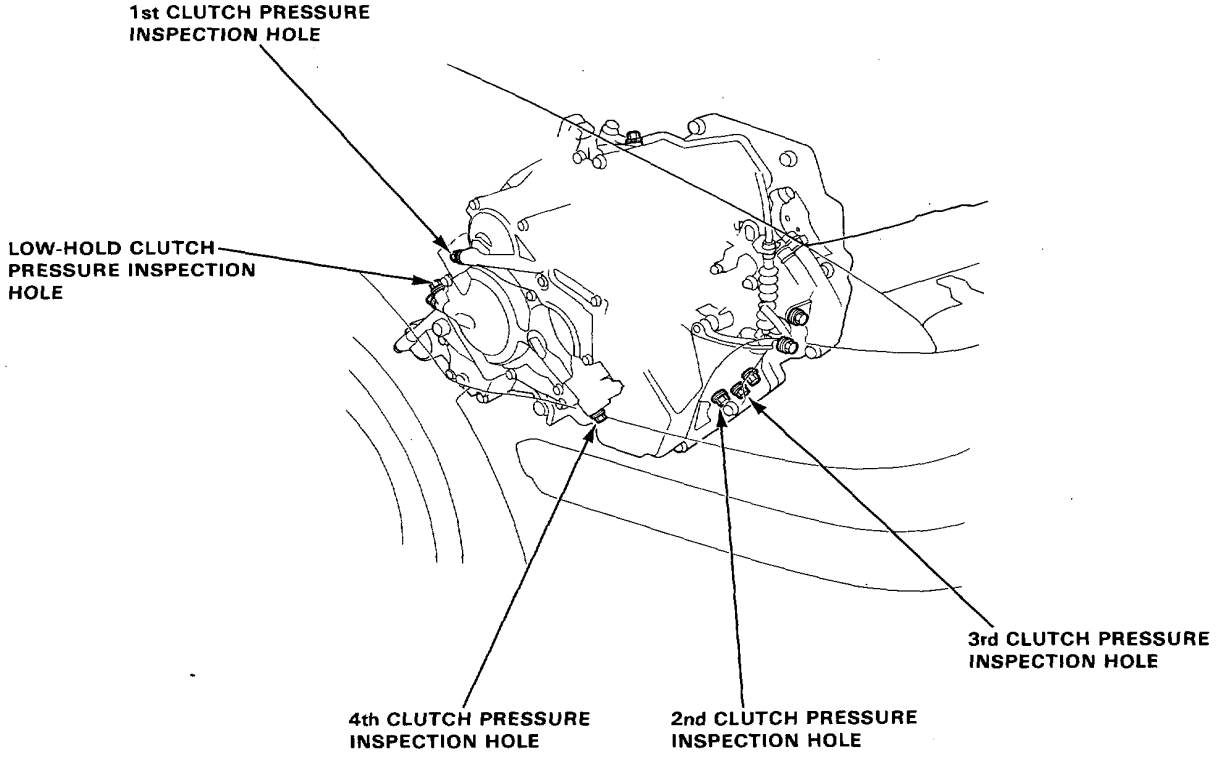


PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	N or P	No (or low) Line pressure	Torque converter, oil pump pressure regulator, torque converter check valve, oil pump	760—809 kPa (7.75—8.25 kg/cm², 110—117 psi)	711 kPa (7.25 kg/cm², 103 psi)

NOTE: Higher pressures may be indicated if measurements are made in selector positions other than N or P.

Clutch Pressure Measurement

1. Set the parking brake and block both rear wheels securely.
2. Raise the front of the car and support with safety stands.
3. Allow the front wheels to rotate freely.
4. Run the engine at 2,000 min^{-1} (rpm).
5. Measure the clutch pressure.



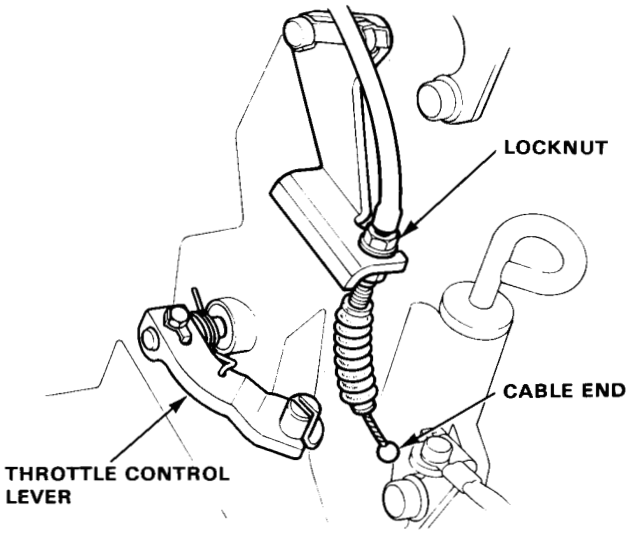
PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Low-Hold Clutch	1	No or low low-hold pressure	Low-Hold Clutch	765—814 kPa (7.8—8.3 kg-m/cm², 111—118 psi)	716 kPa (7.3 kg-m/cm², 104 psi)
1st Clutch	1	No or low 1st pressure	1st Clutch		
2nd Clutch	2	No or low 2nd pressure	2nd Clutch		
3rd Clutch	D3 or D4	No or low 3rd pressure	3rd Clutch		
4th Clutch	D4	No or low 4th pressure	4th Clutch		
4th Clutch	R	No or low 4th pressure	Servo Valve 4th Clutch		

Testing (cont'd)

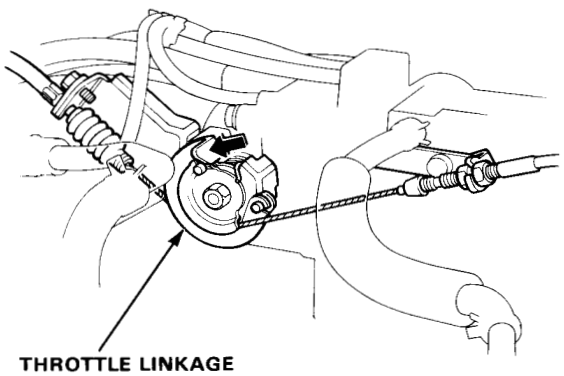
Clutch Low/High Pressure Test

1. Raise the car and support with safety stands.
2. Attach the gauge set to the appropriate pressure test port.
3. Remove the cable end of the throttle control lever.

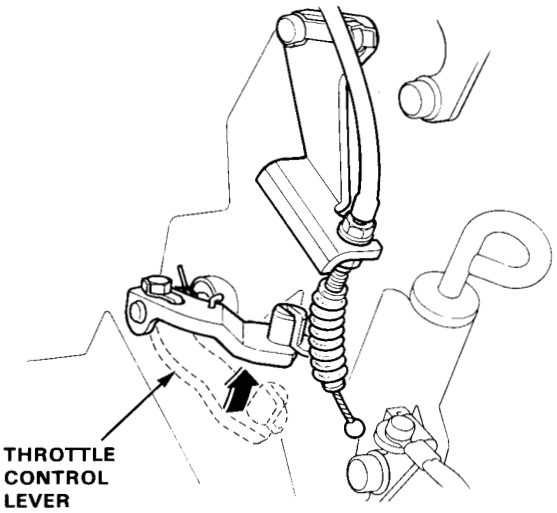
   NOTE: Do not loosen the locknuts, simply unhook the cable end.



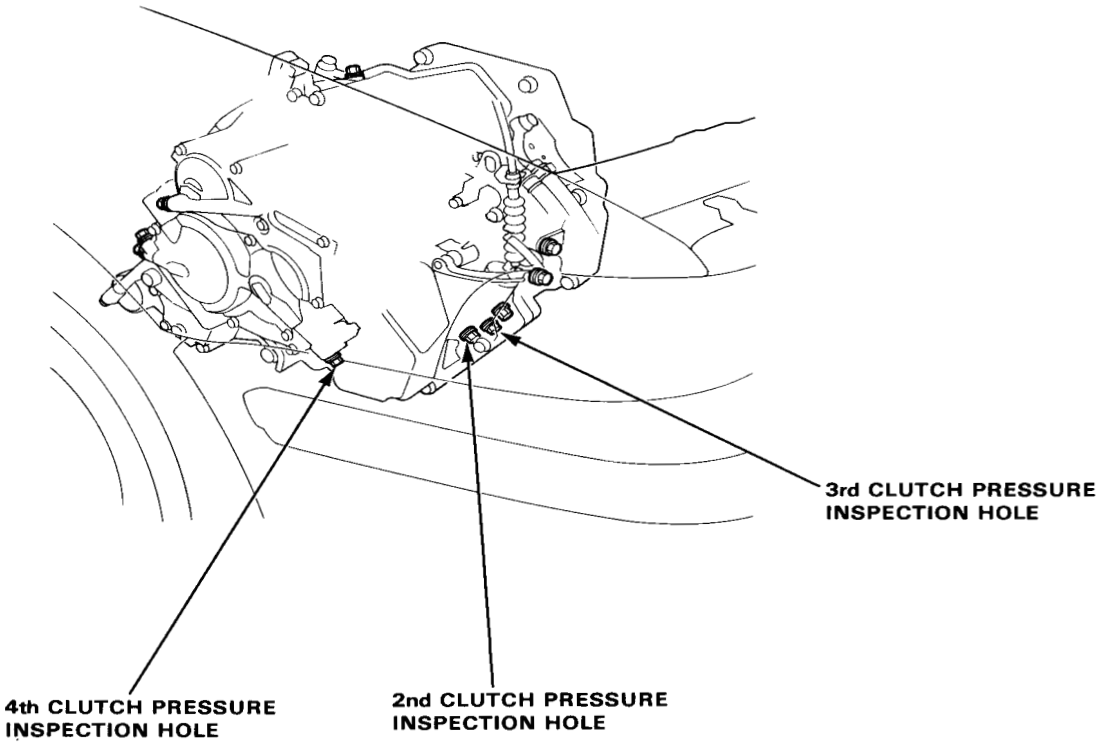
4. Warm up the engine to normal operating temperature (cooling fan comes on).
5. With the engine idling, move the selector lever to D3 or D4.
6. Slowly move the throttle linkage to increase engine rpm until pressure is indicated on the appropriate gauge. Then release the throttle linkage, allowing the engine to return to an idle, and record the pressure reading.
7. Repeat step 6 for each clutch pressure being inspected.



8. With the engine idling, lift the throttle control lever up approximately 1/2 of its possible travel and increase the engine rpm until pressure is indicated on the appropriate gauge. Record the highest pressure reading obtained.



9. Repeat step 8 for each clutch pressure being inspected.

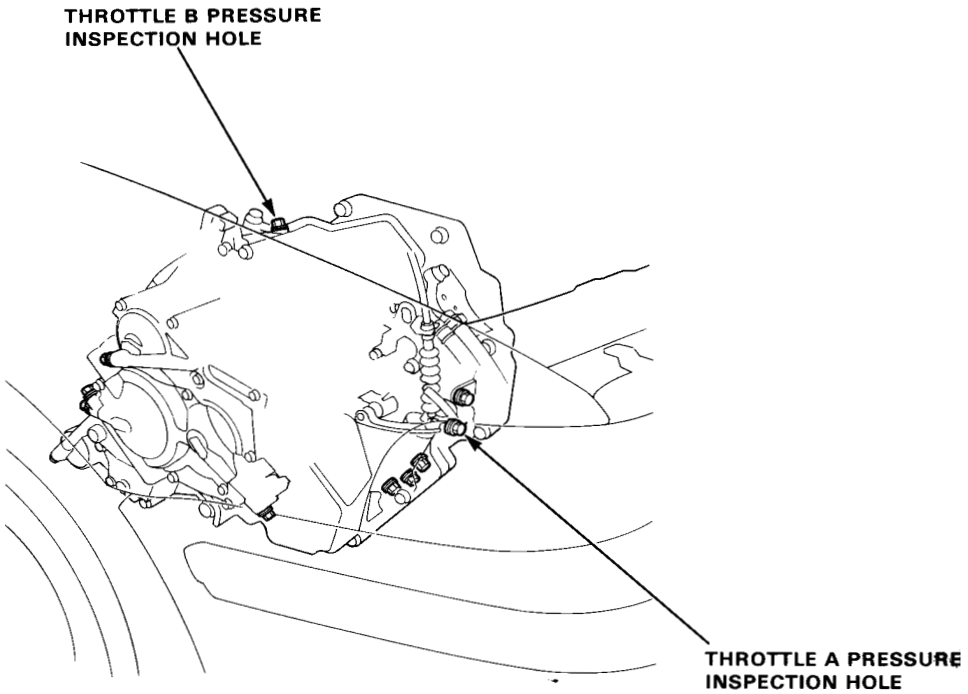


PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
2nd Clutch	D3 or D4	No or low 2nd pressure	2nd Clutch	392—814 kPa (4.0—8.3 kg/cm², 57—118 psi)	343 kPa (3.5 kg/cm², 50 psi) with lever released. 735 kPa (7.3 kg/cm², 104 psi) with lever in half or more throttle position.
3rd Clutch	D3 or D4	No or low 3rd pressure	3rd Clutch		
4th Clutch	D4	No or low 4th pressure	4th Clutch	422—814 kPa (4.3—8.3 kg/cm², 61—118 psi)	373 kPa (3.8 kg/cm², 54 psi) with lever released. 735 kPa (7.3 kg/cm², 104 psi) with lever in half or more throttle position.

Testing (cont'd)

Throttle Pressure Measurement

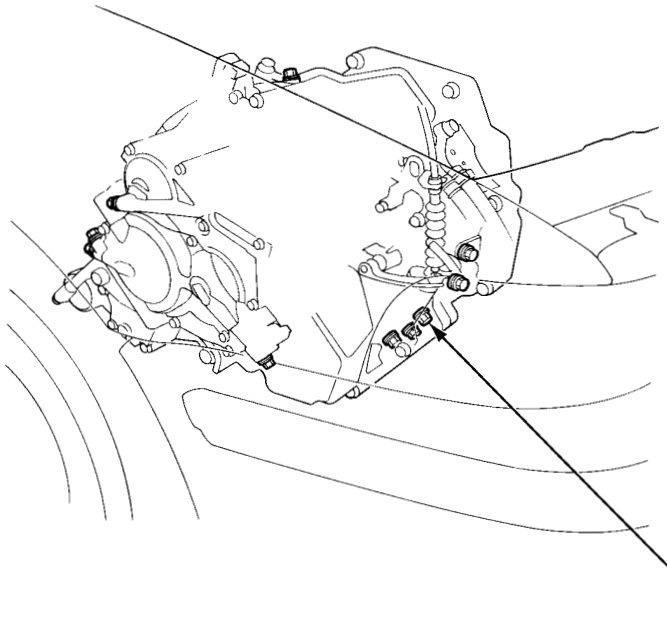
1. Set the parking brake and block both rear wheels securely.
2. Run the engine at 1,000 min^{-1} (rpm).
3. Disconnect the throttle control cable from the throttle lever and set the control lever in full throttle position.



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE		
				Standard		Service Limit
Throttle A	D3 or D4	No or low Throttle A pressure	Throttle valve A	with CATA	514—530 kPa (5.25—5.4 kg/cm², 74—76 psi)	509 kPa (5.2 kg/cm²,, 73 psi)
				without CATA	485—500 kPa (4.95—5.1 kg/cm², 70—72 psi)	480 kPa (4.9 kg/cm², 69 psi)
Throttle B	D3 or D4	No or low Throttle B pressure	Throttle valve B	760—808 kPa (7.75—8.25 kg/cm², 110—117 psi)		710 kPa (7.25 kg/cm², 103 psi)

Governor Pressure Measurement

1. Set the parking brake and block both rear wheels securely.
2. Raise the front of the car and support with safety stands.
3. Run the vehicle at 60 km/h (38 mph).



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE		
				Standard		Service Limit
Governor	D3 or D4	No or low governor pressure	Governor valve	with CATA	225—235 kPa (2.3—2.4 kg/cm², 32—34 psi)	220 kPa (2.25 kg/cm², 32 psi)
				without CATA	166—176 kPa (1.7—1.8 kg/cm², 24—25 psi)	162 kPa (1.65 kg/cm², 23 psi)

Stall Speed

Test

CAUTION:
- **To prevent transmission damage, do not test stall speed for more than 10 seconds at a time.**
- **Do not shift the lever while raising the engine speed.**
- **Be sure to remove the pressure gauge before testing stall speed.**

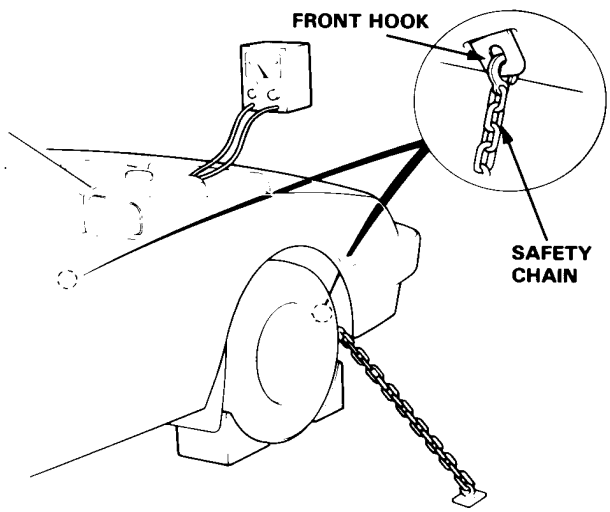
1. Engage parking brake and block the front wheels.
2. Connect safety chains to both front two hooks and attach, with minimum slack, to some strong stationary object.
3. Connect tachometer, and start the engine.
4. After the engine has warmed up to normal operating temperature, shift into D4.
5. Fully depress the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
6. Allow 2 minutes for cooling, then repeat same test in 1 and R.

Stall speed in D4, 1 and R must be the same, and must also be within limits:

NOTE:
Stall speed test must be made only for checking the cause of trouble.

Stall Speed RPM:
Specification: 2,500 min^{-1} (rpm)
Service Limit: 2,350—2,650 min^{-1} (rpm)

TROUBLE	PROBABLE CAUSE
Stall rpm high in D4, 1 & R	• Low fluid level or oil pump output. • Clogged oil strainer. • Pressure regulator valve stuck closed. • Slipping clutch.
Stall rpm high in R	• Slippage of 4th clutch
Stall rpm high in D4 & 1	• Slippage of 1st clutch or 1st gear one-way clutch
Stall rpm low in D4, 1 & R	• Engine output low • Torque converter one-way clutch slipping

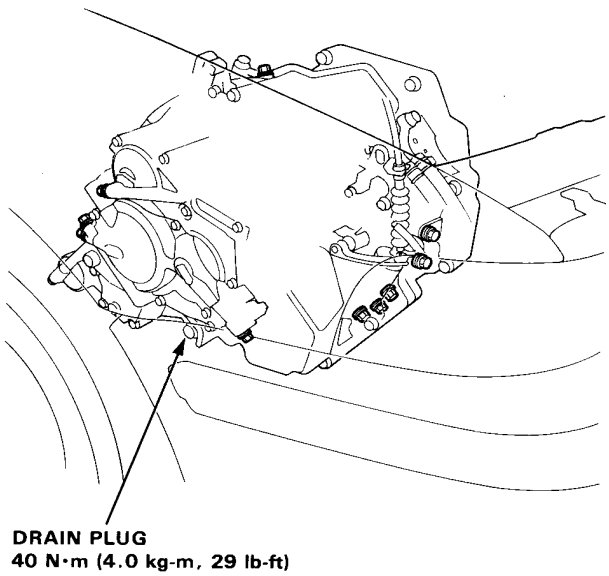


Fluid Level

Checking/Changing

Checking

With the car on level ground, pull the transmission dipstick and check the level of fluid immediately after the engine is shut off (within one minute). The fluid level should be between the full and low marks. Push the dipstick all the way in to check the fluid level. If the level is at, or below, the low mark, add DEXRON-II type automatic transmission fluid.



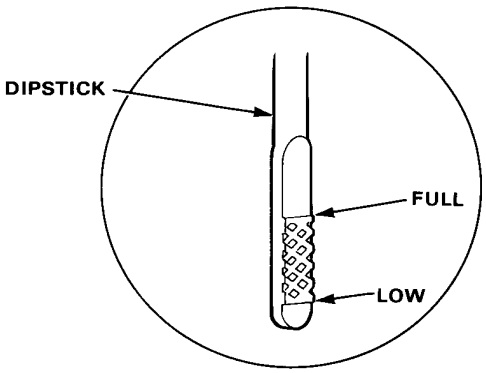
DRAIN PLUG
40 N·m (4.0 kg-m, 29 lb-ft)

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.

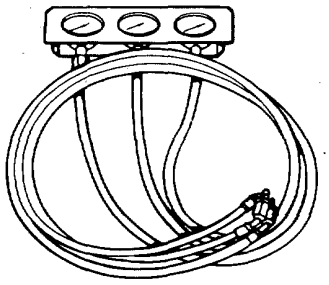
2. Reinstall the drain plug with a new washer, then refill the transmission to the full mark on the dipstick.

   Automatic transmission Capacity:
   2.4 ℓ (2.5 us qts, 2.1 Imp qts) at change
   6.0 ℓ (6.3 us qts, 5.3 Imp qts) after overhaul

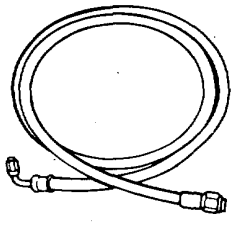


Special Tool

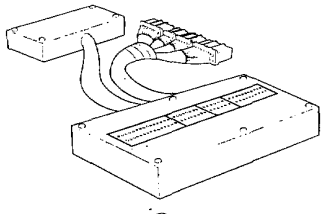
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07406—0020003	Oil Pressure Gauge Set	1	
①-1	07406—0020201	Oil Pressure Gauge Hose	1	Component Tool
②	07LAJ-PT30100	ECU Test Harness	1	



①



①-1

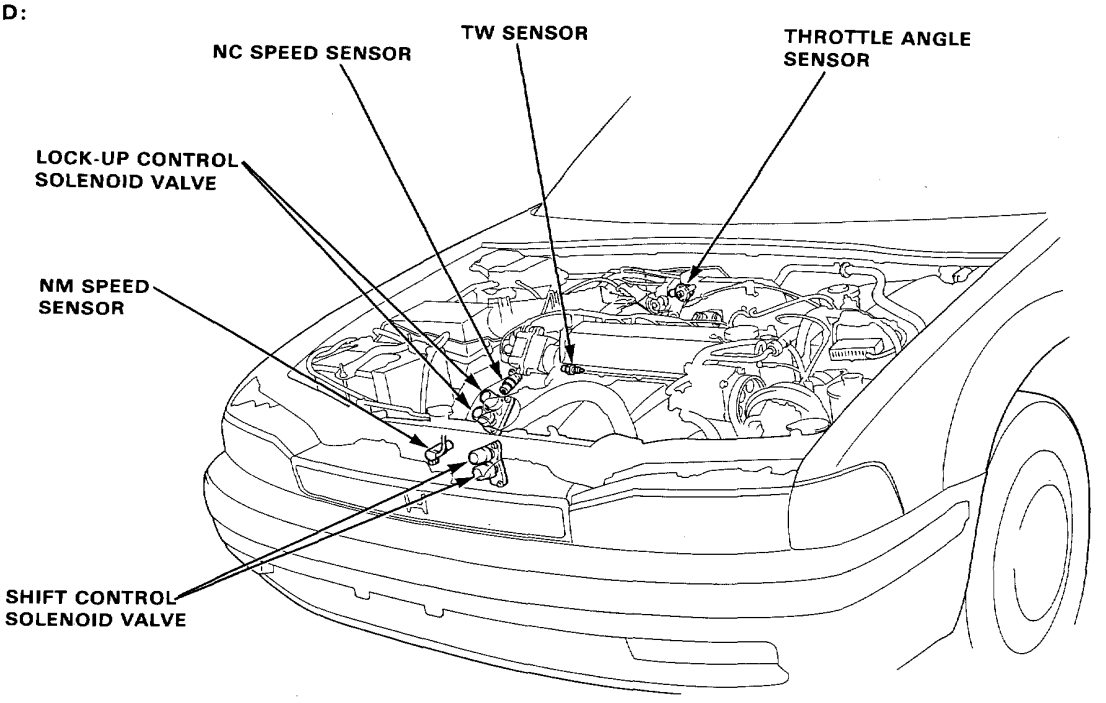


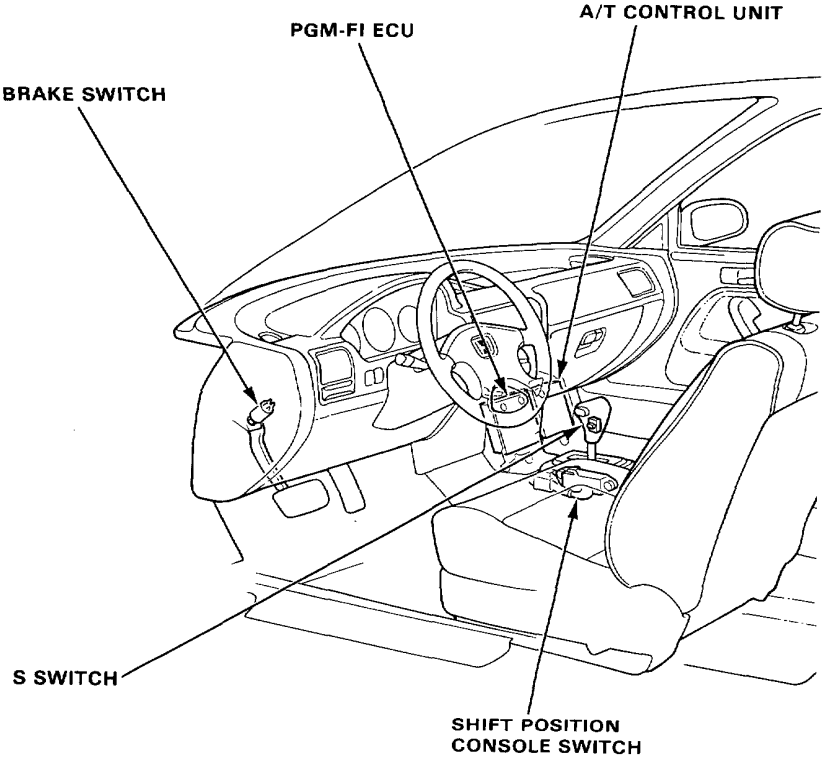
②



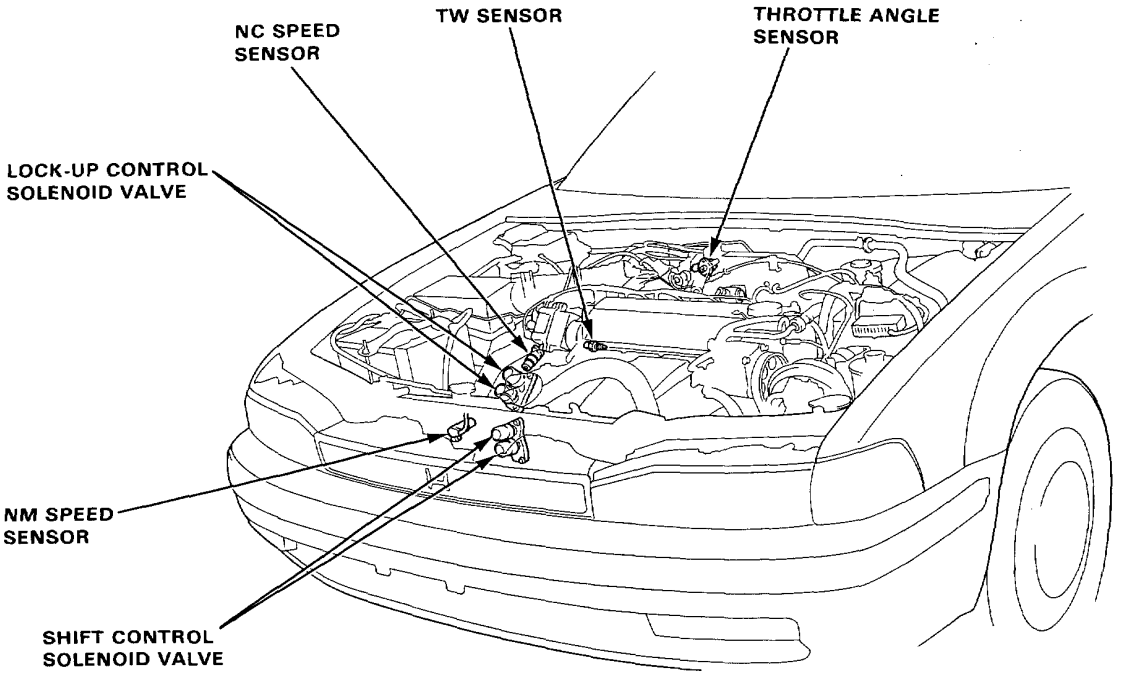
Component Location

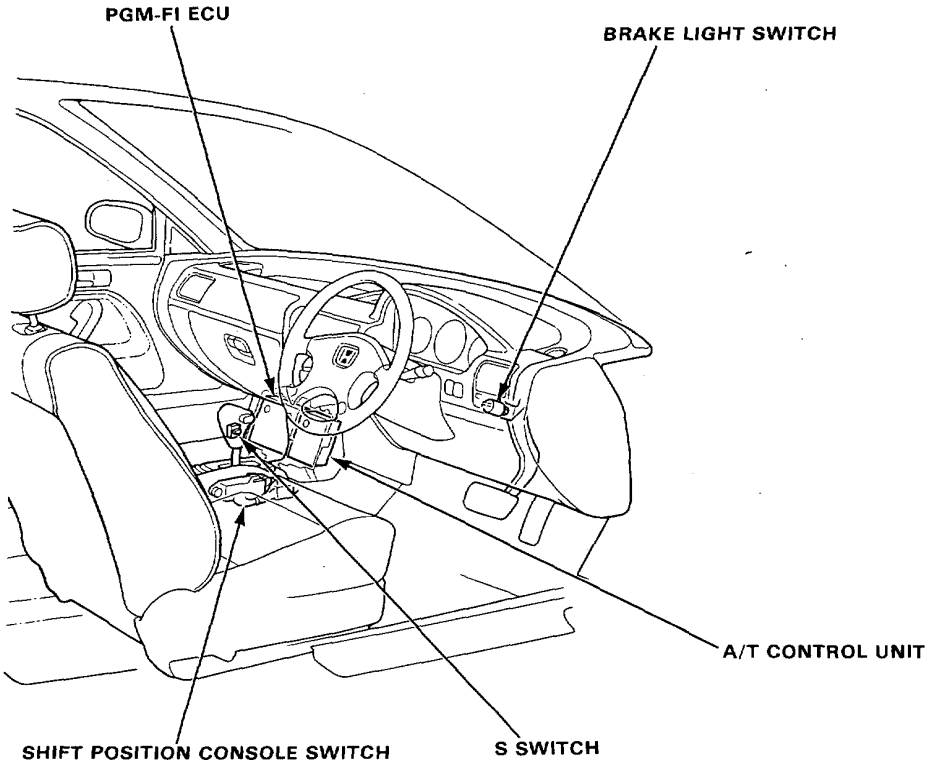
LHD:



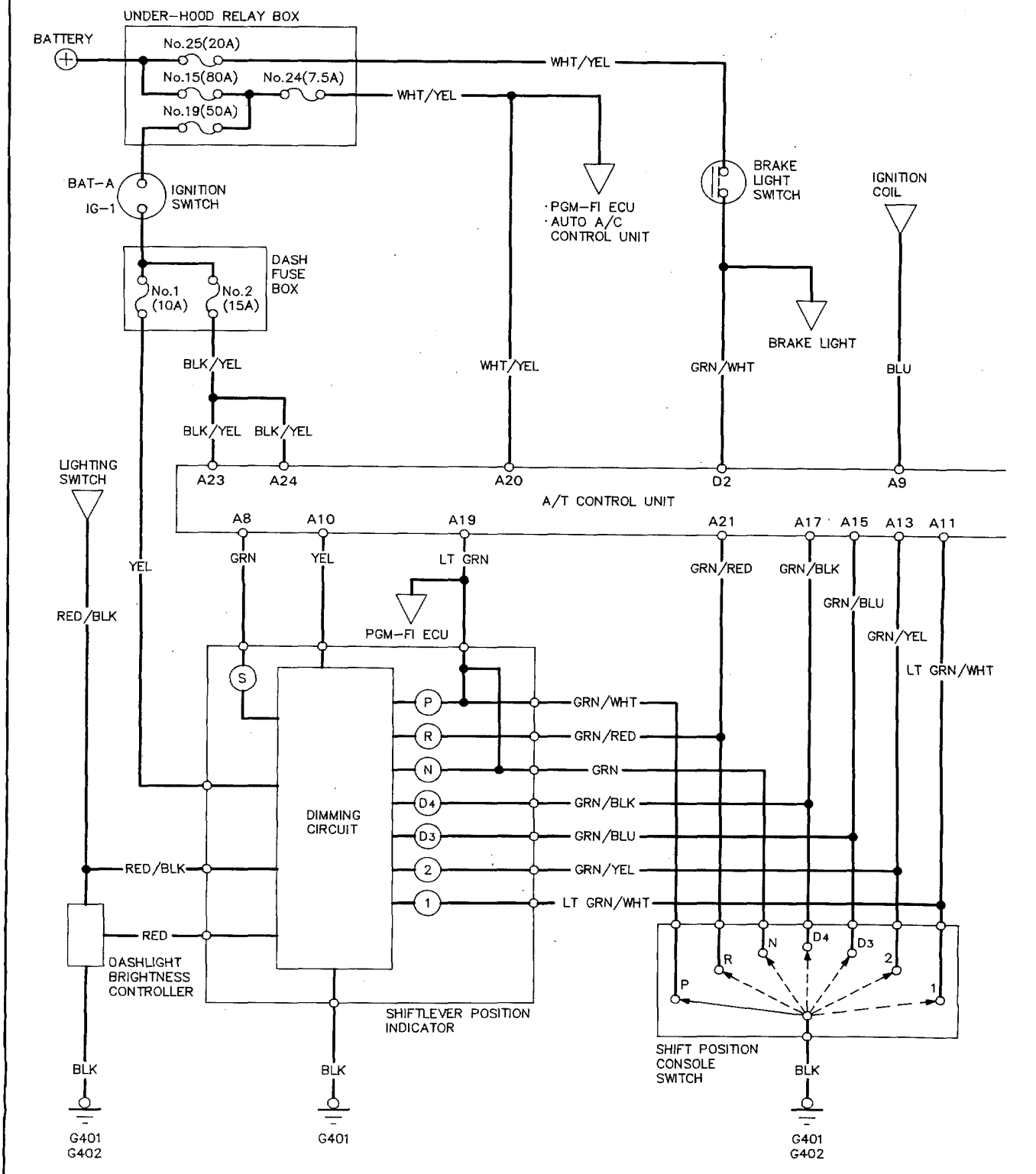


RHD:

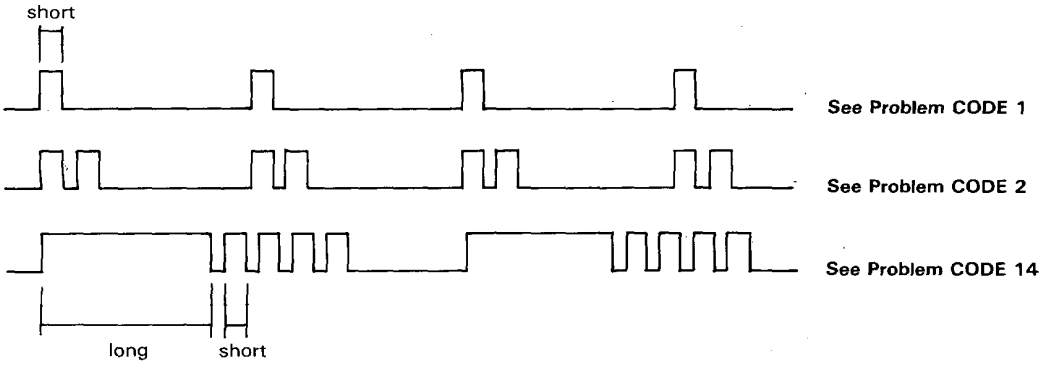

NC SPEED SENSOR
TW SENSOR
THROTTLE ANGLE SENSOR
LOCK-UP CONTROL SOLENOID VALVE
NM SPEED SENSOR
SHIFT CONTROL SOLENOID VALVE


PGM-FI ECU
BRAKE LIGHT SWITCH
A/T CONTROL UNIT
SHIFT POSITION CONSOLE SWITCH
S SWITCH

Circuit Diagram

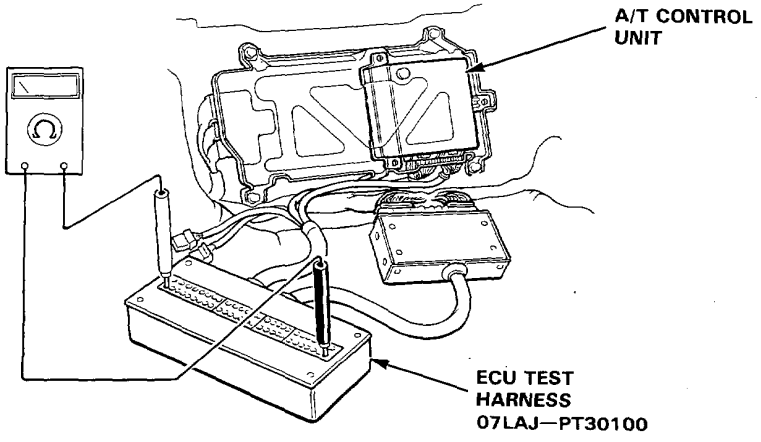


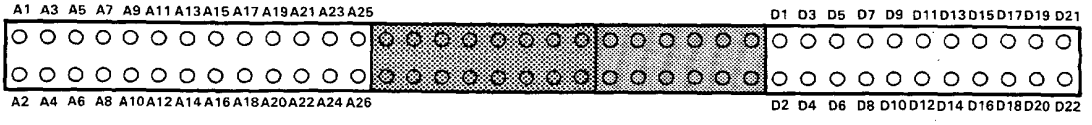
Problem codes 1 through 9 are indicated by individual short blinks, Problem codes 10 through 15 are indicated by a series of long and short blinks. One long blink equals 10 short blinks. Add the long and short blinks together to determine the problem code. After determining the problem code, refer to the electrical system Symptom-to-Component Chart on page 9-28.



Some PGM-FI problems will also make the S indicator light come on. After repairing the PGM-FI system, disconnect the Back Up fuse (7.5 A) in the under-hood relay box for more than 10 seconds to reset the A/T control unit memory.

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





Terminal Locations

NOTE:
- Only the A and D sections of the ECU test harness are used for A/T troubleshooting.
- Unless otherwise noted, use only the Digital Multimeter for testing.

Symptom-to-Component Chart

Electrical System

Number of LED display blinks	S indicator light	Possible Cause	Symptom	Refer to page
1	Blinks	• Disconnected lock-up control solenoid valve A coupler • Short or open in lock-up control solenoid valve A wire • Faulty lock-up control solenoid valve A	• Lock-up clutch does not engage. • Lock-up clutch does not disengage. • Frequent engine stalling.	9-30
2	Blinks	• Disconnected lock-up control solenoid valve B coupler • Short or open in lock-up control solenoid valve B wire • Faulty lock-up control solenoid valve B	• Lock-up clutch does not engage.	9-31
3	Blinks or OFF	• Disconnected throttle angle sensor coupler • Short or open in throttle angle sensor wire • Faulty throttle angle sensor	• Lock-up clutch does not engage.	9-32
4	Blinks	• Disconnected sensor coupler • Short of open in speed sensor wire • Faulty speed sensor	• Lock-up clutch does not engage.	9-33
5	Blinks	• Short in shift position console switch wire • Faulty shift position console switch	• Fails to shift other than 2nd ⟷ 4th gears. • Lock-up clutch does not engage.	9-34
6	OFF	• Disconnected shift position console switch coupler • Open in shift position console switch wire • Faulty shift position console switch	• Fails to shift other than 2nd ⟷ 4th gears. • Lock-up clutch does not engage. • Lock-up clutch engages and disengages alternately.	9-36
7	Blinks	• Disconnected shift control solenoid valve A coupler • Short or open in shift control solenoid valve A wire • Faulty shift control solenoid valve A	• Fails to shift (between 1st ⟷ 4th, 2nd ⟷ 4th or 2nd ⟷ 3rd gears only). • Fails to shift (stuck in 4th gear)	9-38
8	Blinks	• Disconnected shift control solenoid valve B coupler • Short or open in shift control solenoid valve B wire • Faulty shift control solenoid valve B	• Fails to shift (stuck in 1st or 4th gears).	9-39

Number of LED display blinks	S indicator light	Possible Cause	Symptom	Refer to page
9	Blinks	• Disconnected NC speed sensor coupler • Short or open in the NC speed sensor wire • Faulty NC speed sensor	• Lock-up clutch does not engage.	9-40
10	Blinks	• Disconnected water temperature sensor coupler • Short or open in the water temperature sensor wire • Faulty water temperature sensor	• Lock-up clutch does not engage.	9-42
11	OFF	• Disconnected ignition coil coupler • Short or open in ignition coil wire • Faulty ignition coil	• Lock-up clutch does not engage.	9-44
14	OFF	• Short or open in FAS wire • Trouble in PGM-FI unit	• Transmission jerks hard when shifting.	9-46
15	OFF	• Disconnected NM speed sensor coupler • Short of open in NM speed sensor wire • Faulty NM speed sensor	• Transmission jerks hard when shifting.	9-50

- If a customer describes the symptoms for codes 3, 6, or 11, yet the LED is not blinking, it will be necessary to recreate the symptom by test driving, and then checking the LED with the ignition still ON.
- If the LED displays codes other than those listed above or stays lit continuously, the control unit is faulty.
- Sometimes the S indicator light and the Check Engine warning light may come on simultaneously. If so, check the PGM-FI system according to the number of blinks on the PGM-FI ECU self-diagnosing indicator, then reset the memory by removing the Back Up fuse in the under hood relay box for more than 10 seconds. Drive the vehicle for several minutes at speed over 50 km/h (30 mph), then recheck the lights.

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

Troubleshooting Flowchart

Self-diagnosis LED indicator blinks once.

Disconnect the 26P connector from the control unit.

Turn the ignition switch ON.

Measure the voltage between the A6 (YEL) and A25 (BLK/RED) terminals.

Is there voltage? — YES → **Repair short to power source in YEL wire between the A6 terminal and the lock-up control solenoid valve A.**

NO

Turn the ignition switch OFF.

Disconnect the 2P connector from the lock-up control solenoid valve assembly.

Check for continuity between the A6 (YEL) and A25 (BLK/RED) terminals.

Is there continuity? — YES → **Repair short to ground in YEL wire between the A6 terminal and the lock-up control solenoid valve A.**

NO

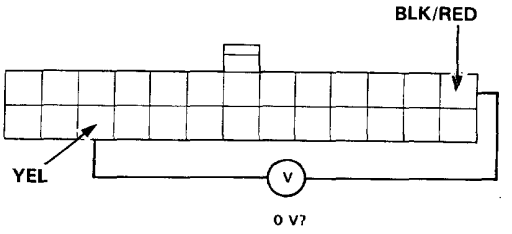
Connect the 2P connector to the lock-up control solenoid valve assembly.

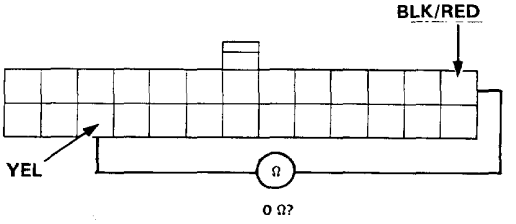
Measure the resistance between the A6 (YEL) and A25 (BLK/RED) terminals.

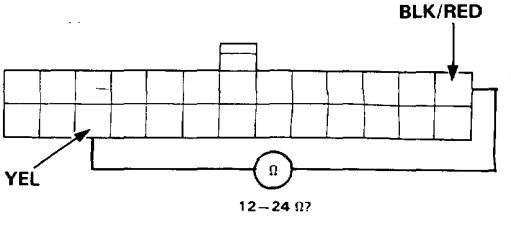
Is the resistance 12 – 24 Ω? — NO → **Check for open in YEL wire between the A6 terminal and the lock-up control solenoid valve A. If wire is OK, check the Lock-up Control Solenoid Valve A.**

YES

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.







Self-diagnosis LED indicator blinks twice.

Disconnect the 26P connector from the control unit.

Turn the ignition switch ON.

Measure the voltage between the A4 (GRN/BLK) and A25 (BLK/RED) terminals.

Is there voltage? YES → **Repair short to power source in GRN/BLK wire between the A4 terminal and the lock-up control solenoid valve B.**

NO

Turn the ignition switch OFF.

Measure the resistance between the A4 (GRN/BLK) and A25 (BLK/RED) terminals.

Is the resistance 12—24 Ω? NO → **Check for open in GRN/BLK wire between the A4 terminal and the lock-up control solenoid valve B. If wire is OK, check the Lock-Up Control Solenoid Valve B.**

YES

Disconnect the 2P connector from the lock-up control solenoid valve assembly.

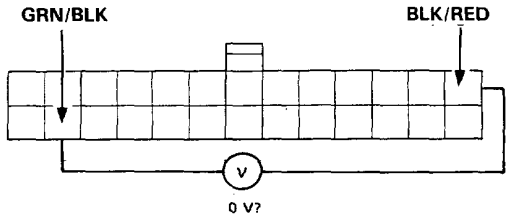
Check for continuity between the A4 (GRN/BLK) and A25 (BLK/RED) terminals.

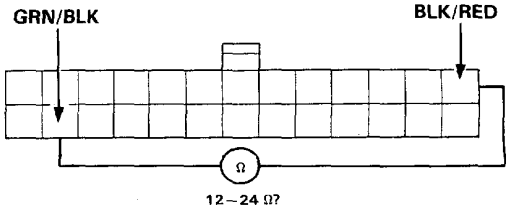
Is there continuity? YES → **Repair short to ground in GRN/BLK wire between the A4 terminal and the lock-up control solenoid valve B.**

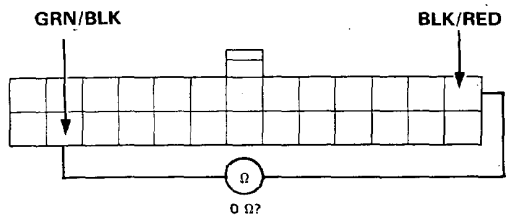
NO

Connect the 2P connector to the lock-up control solenoid valve assembly.

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.







(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis LED indicator blinks three times.

Turn the ignition switch ON.

Check whether the PGM-FI LED display blinks (Section 6).

Does the LED blink? — YES → **Repair the PGM-FI System.**

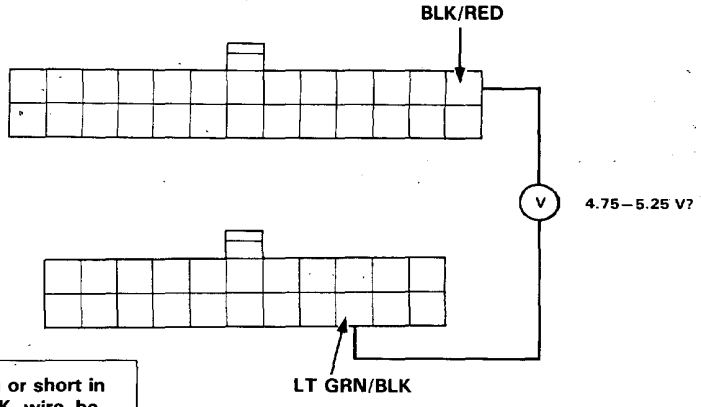
NO

Turn the ignition switch OFF.

Disconnect the 26P and 22P connectors from the control unit.

Turn the ignition switch ON.

Measure the voltage between the D18 (LT GRN/BLK) and A25 (BLK/RED) terminals.

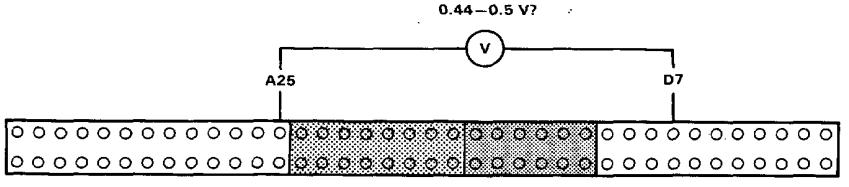


Is the voltage 4.75–5.25 V? — NO → **Repair open or short in LT GRN/BLK wire between the D18 terminal and the D14 terminal of the PGM-FI ECU.**

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the connectors and the control unit.



Turn the ignition switch ON.

Measure the voltage between the D7 and A25 terminals.

Is the voltage 0.44–0.56 V?* — NO → **Repair open or short in RED/BLK wire between the D7 terminal and the throttle angle sensor.**

YES

* ± 10%

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

Self-diagnosis LED indicator blinks four times.

Jack up the front of the car and block one wheel.

Shift transmission to [N].

Disconnect the 26P and 22P connectors from the control unit.

Turn the ignition switch ON.

Rotate the front wheel and check for voltage between the A25 (BLK/RED) and D9 (ORN) terminals.

Does the voltage 0—5 V appear alternately?

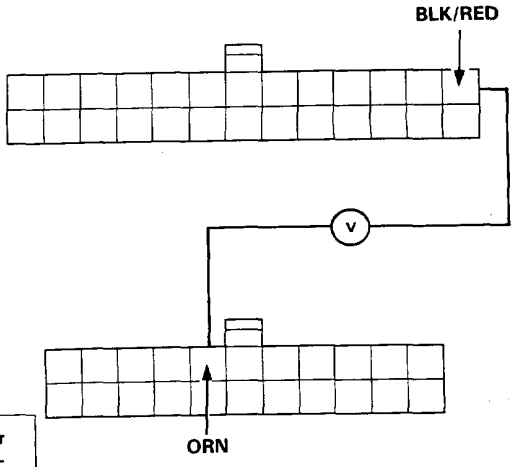
NO → **Check for short or open in ORN wire between the D9 terminal and the Speed Sensor. If wire is OK, check the Speed Sensor.**

YES

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

⚠ WARNING

- **Set the parking brake securely and block the rear wheels.**
- **Jack up the front of the car and support with a rigid rack.**



(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis LED indicator blinks five times.

Turn the ignition switch ON.

Observe the A/T shift indicator and select each position separately.

Does the indicator light properly? NO → **See A/T shift position indicator inspection (Section 16).**

YES

Turn the ignition switch OFF.

Connect the ECU test harness between the control unit and connectors.

Turn the ignition switch ON.

Shift to other than [R] position.

Measure the voltage between the A21 (GRN/RED) and A25 (BLK/RED) terminals.

Is there battery voltage? NO → **Check for short in GRN/RED wire between the A21 terminal and the shift position console switch. If wire is OK, check for loose connectors. If necessary, substitute a known-good control unit and recheck.**

YES

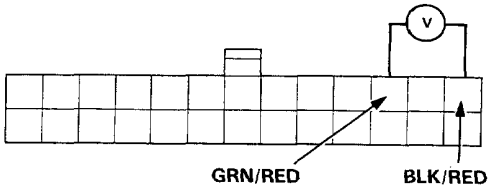
Shift to other than [N] and [P] position.

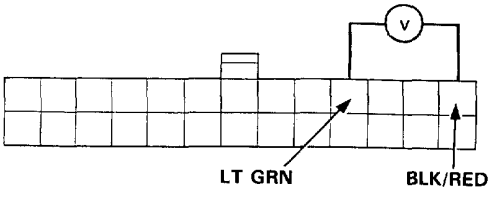
Measure the voltage between the A19 (LT GRN) and A25 (BLK/RED) terminals.

Is there battery voltage? NO → **Check for short in LT GRN wire between the A19 terminal and the shift position console switch. If wire is OK, check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.**

YES

To page 9-35





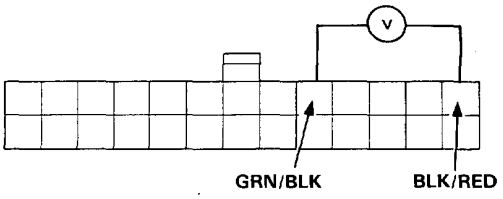
From page 9-34

Shift to other than D4 position.

Measure the voltage between the A17 (GRN/BLK) and A25 (BLK/RED) terminals.

Is there battery voltage?

NO → **Check for short in GRN/BLK wire between the A17 terminal and the shift position console switch. If wire is OK, check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.**



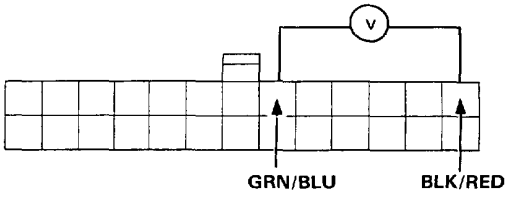
YES

Shift to other than D3 position.

Measure the voltage between the A15 (GRN/BLU) and A25 (BLK/RED) terminals.

Is there battery voltage?

NO → **Check for short in GRN/BLU wire between the A15 terminal and the shift position console switch. If wire is OK, check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.**



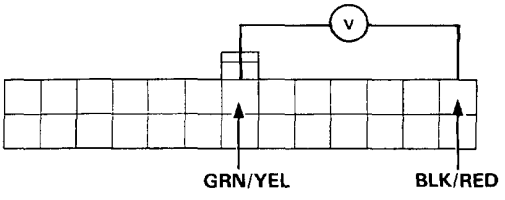
YES

Shift to other than 2 position.

Measure the voltage between the A13 (GRN/YEL) and A25 (BLK/RED) terminals.

Is there battery voltage?

NO → **Check for short in GRN/YEL wire between the A13 terminal and the shift position console switch. If wire is OK, check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.**



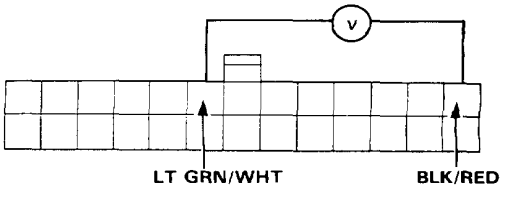
YES

Shift to other than 1 position.

Measure the voltage between the A11 (LT GRN/WHT) and A25 (BLK/RED) terminals.

Is there battery voltage?

NO → **Check for short in LT GRN/WHT wire between the A11 terminal and shift position console switch or shift position indicator. If wire is OK, check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.**



YES

Substitute a known-good control unit and recheck.

(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis LED indicator blinks six times.

Turn the ignition switch ON.

Observe the A/T shift indicator and select each position separately.

Does the indicator light properly? — NO → **See A/T shift position indicator.**

YES

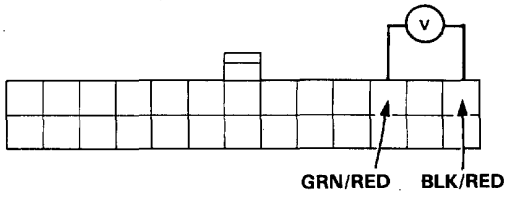
Turn the ignition switch OFF.

Connect the ECU test harness between the control unit and connectors.

Turn the ignition switch ON.

Shift to [R] position.

Measure the voltage between the A21 (GRN/RED) and A25 (BLK/RED) terminals.

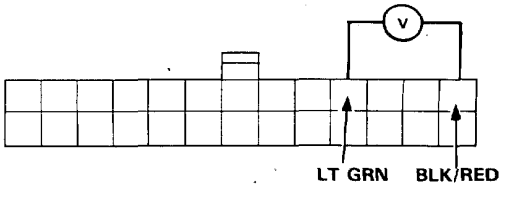


Is there voltage? — YES → **Repair open in GRN/RED wire between the A21 terminal and the shift position console switch.**

NO

Shift to [N] or [P] position.

Measure the voltage between the A19 (LT GRN) and A25 (BLK/RED) terminals.



Is there voltage? — YES → **Repair open in LT GRN wire between the A19 terminal and the shift position console switch.**

NO

To page 9-37

From page 9-36

Shift to D4 position.

Measure the voltage between the A17 (GRN/BLK) and A25 (BLK/RED) terminals.

Is there voltage?

YES → **Repair open in GRN/BLK wire between the A17 terminal and the shift position console switch.**

NO

Shift to D3 position.

Measure the voltage between the A15 (GRN/BLU) and A25 (BLK/RED) terminals.

Is there voltage?

YES → **Repair open in GRN/BLU wire between the A15 terminal and the shift position console switch.**

NO

Shift to 2 position.

Measure the voltage between the A13 (GRN/YEL) and A25 (BLK/RED) terminals.

Is there voltage?

YES → **Repair open in GRN/YEL wire between the A13 terminal and the shift position console switch.**

NO

Shift to 1 position.

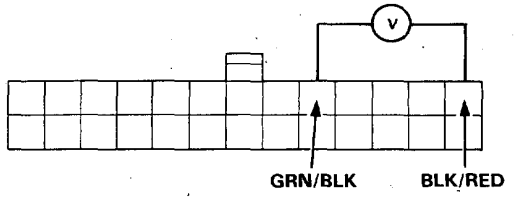
Measure the voltage between the A11 (LT GRN/WHT) and A25 (BLK/RED) terminals.

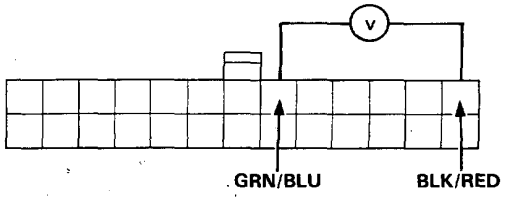
Is there voltage?

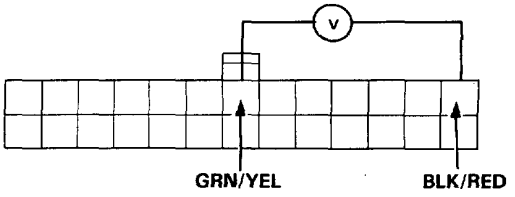
YES → **Repair open in LT GRN/WHT wire between the A11 terminal and the shift position console switch.**

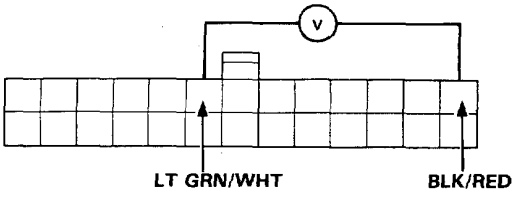
NO

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.









(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis LED indicator blinks seven times.

Disconnect the 26P connector from the control unit.

Turn the ignition switch ON.

Measure the voltage between the A5 (BLU/YEL) and A25 (BLK/RED) terminals.

Is there voltage? YES → **Repair short to power source in BLU/YEL wire between the A5 terminal and the shift control solenoid valve A.**

NO

Turn the ignition switch OFF.

Measure the resistance between the A5 (BLU/YEL) and A25 (BLK/RED) terminals.

Is the resistance 12—24 Ω? NO → **Check for open in BLU/YEL wire between the A5 terminal and the shift control solenoid valve A. If wire is OK, check the Shift Control Solenoid Valve A.**

YES

Disconnect the 2P connector from the shift control solenoid valve assembly.

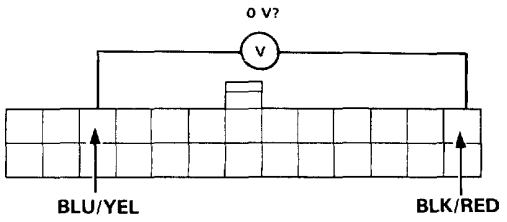
Check for continuity between the A5 (BLU/YEL) and A25 (BLK/RED) terminals.

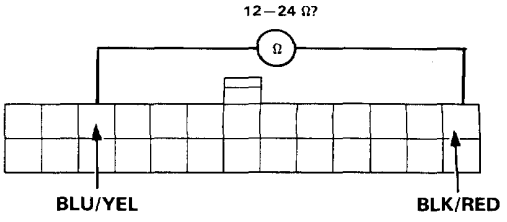
Is there continuity? YES → **Repair short to ground in BLU/YEL wire between the A5 terminal and the shift control solenoid valve A.**

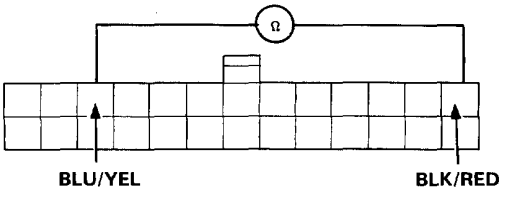
NO

Connect the 2P connector to the shift control solenoid valve assembly.

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.







Self-diagnosis LED indicator blinks eight times.

Disconnect the 26P connector from the control unit.

Turn the ignition switch ON.

Measure the voltage between the A3 (GRN/WHT) and A25 (BLK/RED)terminals.

Is there voltage? YES → **Repair short to power source in GRN/WHT wire between the A3 terminal and shift control solenoid valve B.**

NO

Turn the ignition switch OFF.

Measure the resistance between the A3 (GRN/WHT) and A25 (BLK/RED) terminals.

Is the *resistance* 12 – 24 Ω? NO → **Check for open in GRN/WHT wire between the A3 terminal and the shift control solenoid valve B. If wire is OK, check the Shift Control Solenoid Valve B.**

YES

Disconnect the 2P connector from the shift control solenoid valve assembly.

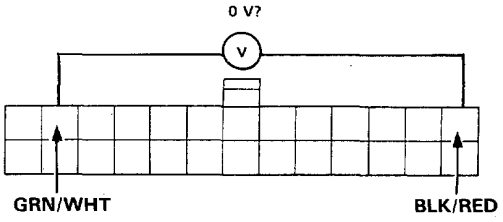
Check for continuity between the A3 (GRN/WHT) and A25 (BLK/RED) terminals.

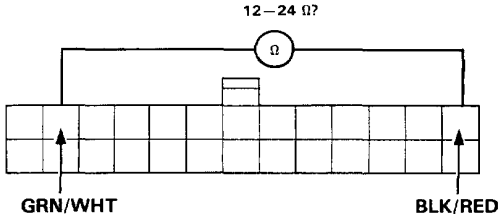
Is there continuity? YES → **Repair short to ground in GRN/WHT wire between the A3 terminal and the shift control solenoid valve B.**

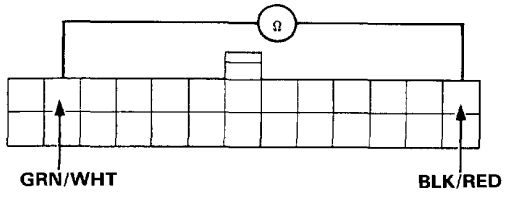
NO

Connect the 2P connector to the shift control solenoid valve assembly.

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.







(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis LED indicator blinks nine times.

Check the state of installation of the NC SPEED SENSOR.

OK? — NO → **Reinstall and recheck.**

YES

Disconnect the 2P connector from the NC speed sensor coupler.

Measure the resistance of the NC speed sensor.

Is the resistance 400—600 ohms? (20°C) — NO → **Replace the NC speed sensor.**

YES

Reconnect the NC speed sensor.

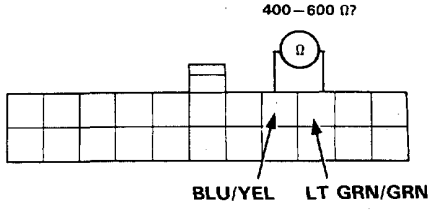
Disconnect the 22P coupler from the control unit.

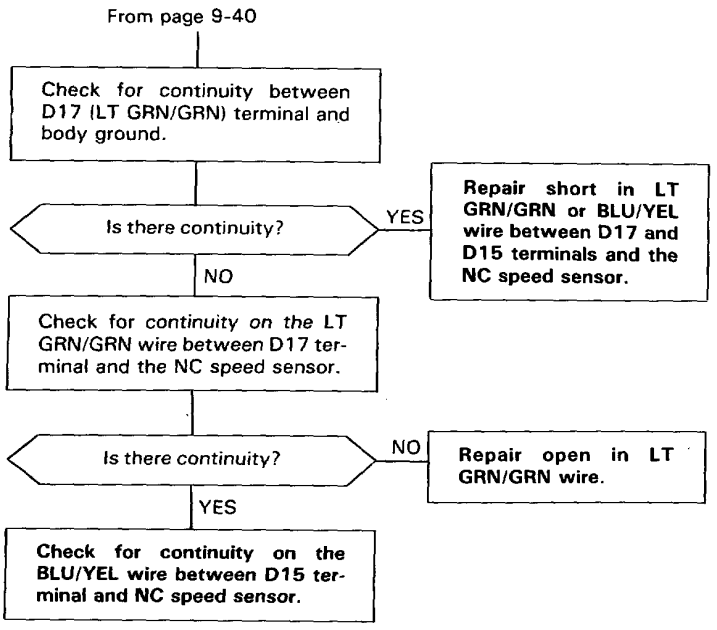
Measure the resistance between D17 (LT GRN/GRN) and D15 (BLU/YEL).

Is the resistance 400—600 ohms? (20°C) — NO → To page 9-41

YES

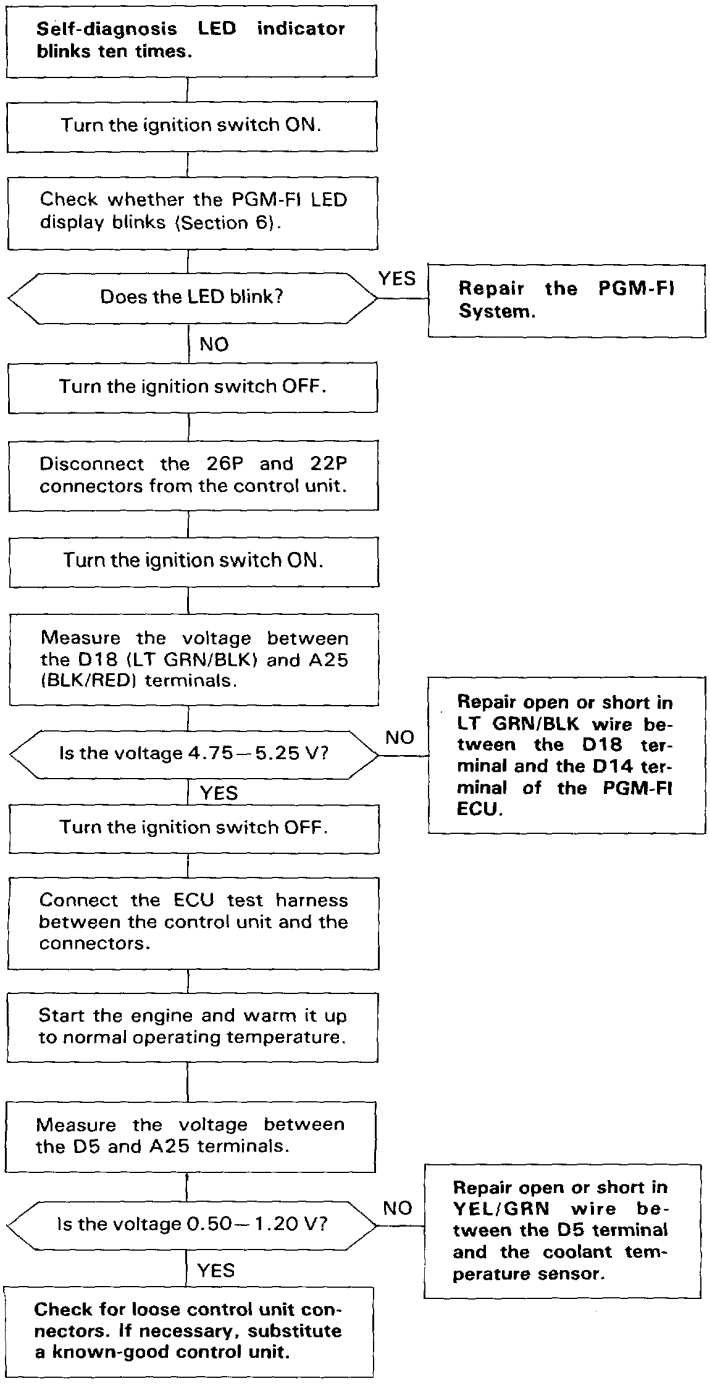
Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

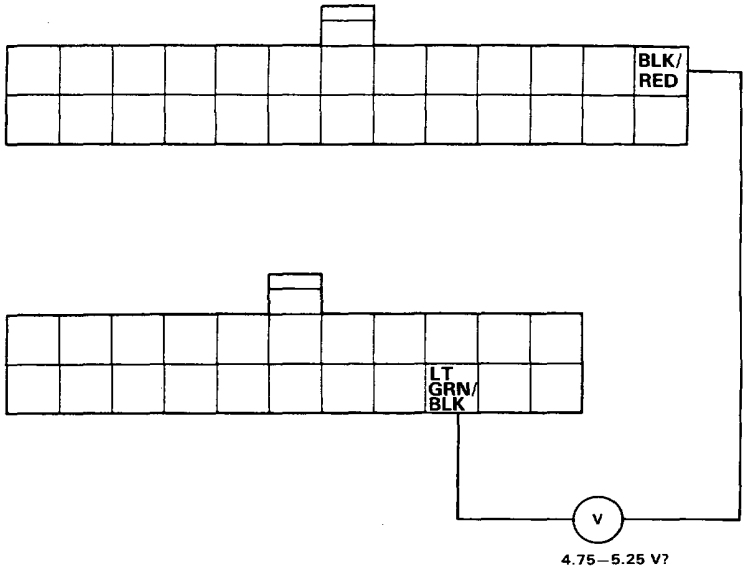


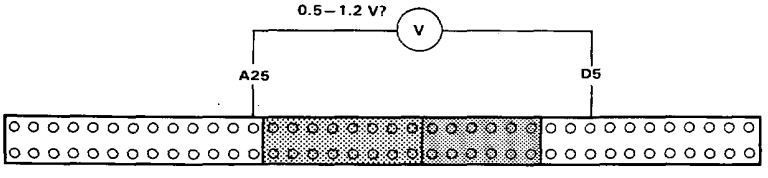

From page 9-40
Check for continuity between D17 (LT GRN/GRN) terminal and body ground.
Is there continuity?
YES
Repair short in LT GRN/GRN or BLU/YEL wire between D17 and D15 terminals and the NC speed sensor.
NO
Check for continuity on the LT GRN/GRN wire between D17 terminal and the NC speed sensor.
Is there continuity?
NO
Repair open in LT GRN/GRN wire.
YES
Check for continuity on the BLU/YEL wire between D15 terminal and NC speed sensor.

(cont'd)

Troubleshooting Flowchart (cont'd)

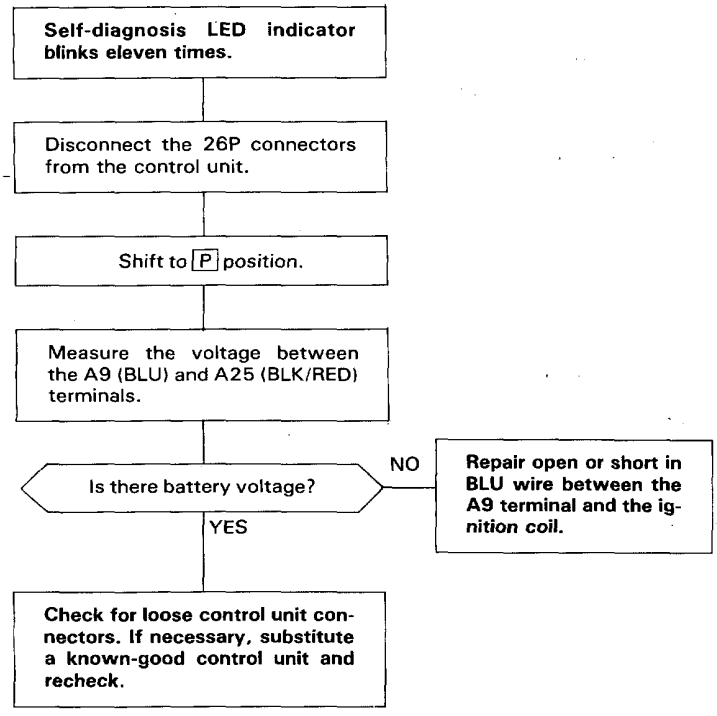


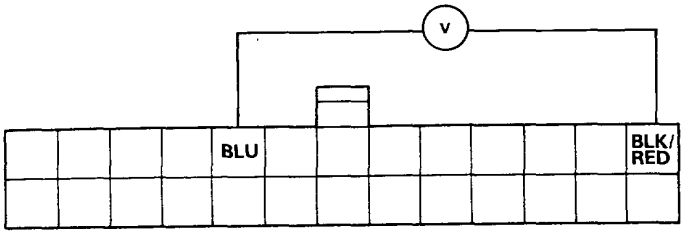




(cont'd)

Troubleshooting Flowchart (cont'd)





(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis LED indicator blinks fourteen times.

Start the engine and warm it up to normal operating temperature.

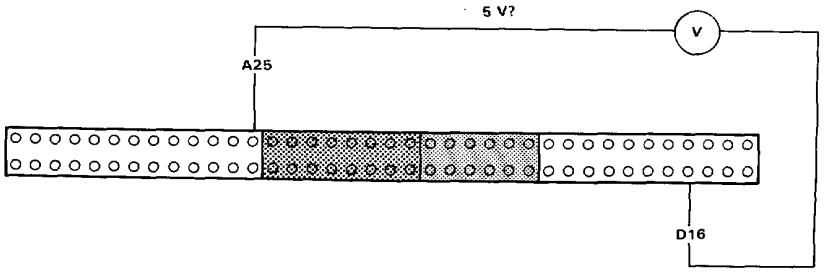
Shift to [P] position.

Turn the ignition switch OFF.

Connect the ECU test harness between the control unit and connectors.

Turn the ignition switch ON and wait for at least two seconds.

Using an analog voltmeter, measure the voltage between the D16 (+) and A25 (−) terminals.



Is there approx. 5 V for over five seconds?

NO → Does the meter jerk from 0 V to 4 V approx. every four seconds?

YES → **Refer to PGM-FI A/T Signal (Section 6).**

NO → Is the Check Engine warning light on?

YES → **Repair the PGM-FI System (Section 6).**

NO → Turn the ignition switch OFF.

Disconnect the A connector from the PGM-FI ECU.

To page 9-47

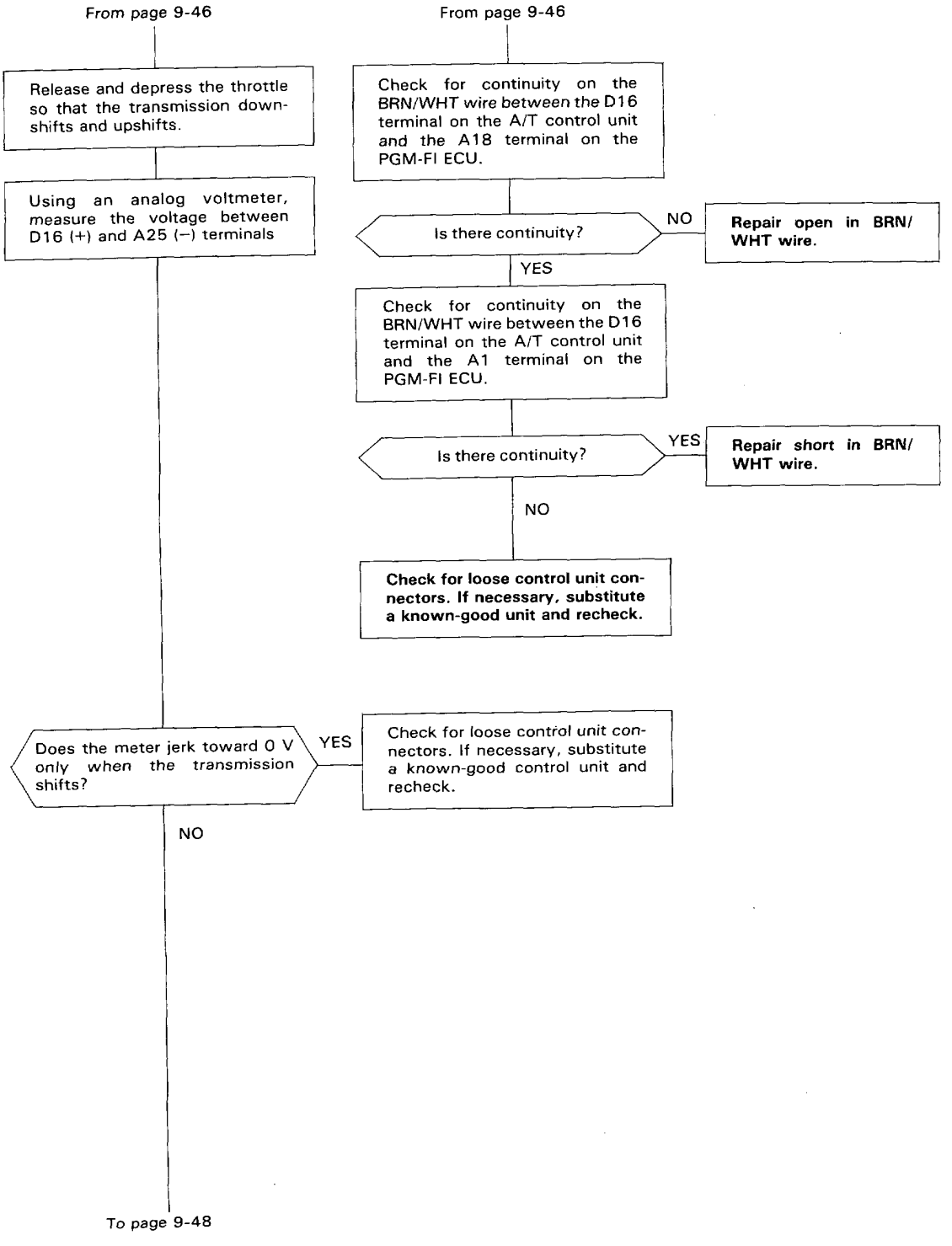
YES → Jack up the front of the car.

Start the engine.

Shift to [D4] position.

Raise the engine to over 2,000 min^{-1} (rpm) (over 40 mph in 4th gear) for five seconds.

To page 9-47


From page 9-46
Release and depress the throttle so that the transmission downshifts and upshifts.
Using an analog voltmeter, measure the voltage between D16 (+) and A25 (–) terminals
Does the meter jerk toward 0 V only when the transmission shifts?
YES
Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.
NO
To page 9-48
From page 9-46
Check for continuity on the BRN/WHT wire between the D16 terminal on the A/T control unit and the A18 terminal on the PGM-FI ECU.
Is there continuity?
NO
Repair open in BRN/WHT wire.
YES
Check for continuity on the BRN/WHT wire between the D16 terminal on the A/T control unit and the A1 terminal on the PGM-FI ECU.
Is there continuity?
YES
Repair short in BRN/WHT wire.
NO
Check for loose control unit connectors. If necessary, substitute a known-good unit and recheck.

(cont'd)

Troubleshooting Flowchart (cont'd)

From page 9-47

Apply the brake and shift to [P] position.

Turn the ignition switch OFF.

Disconnect the A connector from the PGM-FI ECU.

Check for continuity on the BRN/WHT wire between the D16 terminal on the A/T control unit and the A18 terminal on the PGM-FI ECU.

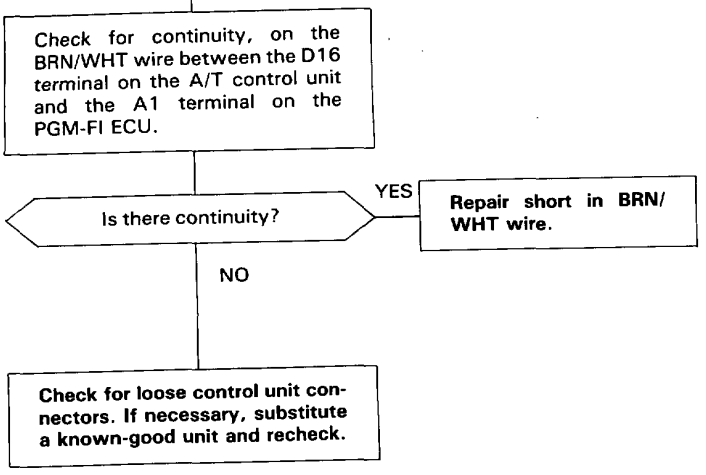
Is there continuity?

NO → **Repair open in BRN/WHT wire.**

YES

To page 9-49

From page 9-48



(cont'd)

Troubleshooting Flowchart (cont'd)

Self-diagnosis LED indicator blinks fifteen times.

Check the state of installation of NM (NC) speed sensor.

OK? — NO → **Reinstall and recheck.**

YES

Disconnect the 2P connector from the NM speed sensor.

Measure the resistance of the NM speed sensor.

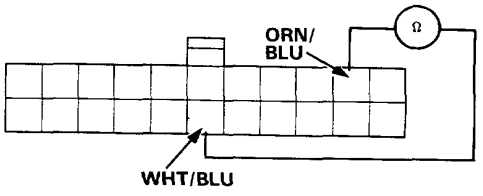
Is the resistance 400–600 ohms? — NO → **Replace the NM speed sensor.**

YES

Reconnect the 2P connector to the NM speed sensor.

Disconnect the 22P connector from the control unit.

Measure the resistance between D19 (ORN/BLU) and D12 (WHT/BLU) terminals.



Is the resistance 400–600 ohms? (20°C) — NO → Check for continuity between D19 (ORN/BLU) terminal and body ground.

YES

Disconnect the 2P connector from the NC speed sensor.

Measure the resistance of the NC speed sensor.

To page 9-51

Is there continuity? — YES → **Repair short in ORN/BLU or WHT/BLU wires between D19 and D12 terminals and the NM speed sensor.**

NO

Check for continuity between D19 (ORN/BLU) terminal and the NM speed sensor.

To page 9-51

From page 9-50

From page 9-50

Is there continuity?

NO

Repair open in ORN/BLU wire between D19 terminal and the NM speed sensor.

YES

Check for continuity between D12 (WHT/BLU) terminal and the NM speed sensor.

Is there continuity?

NO

Repair open in WHT/BLU wire between D12 terminal and the NM speed sensor.

YES

Check for loose control unit connectors. If necessary, substitute a known-good unit and recheck.

Is the resistance 400—600 ohms? (20°C)

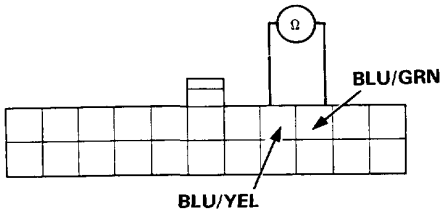
NO

Replace the NC speed sensor.

YES

Reconnect the 2P connector to the NC speed sensor.

Measure the resistance between D17 (BLU/ORN) and D15 (BLU/YEL) terminals.



Is the resistance 400—600 ohms? (20°C)

YES

Check for loose control unit connectors. If necessary, substitute a known-good control unit and recheck.

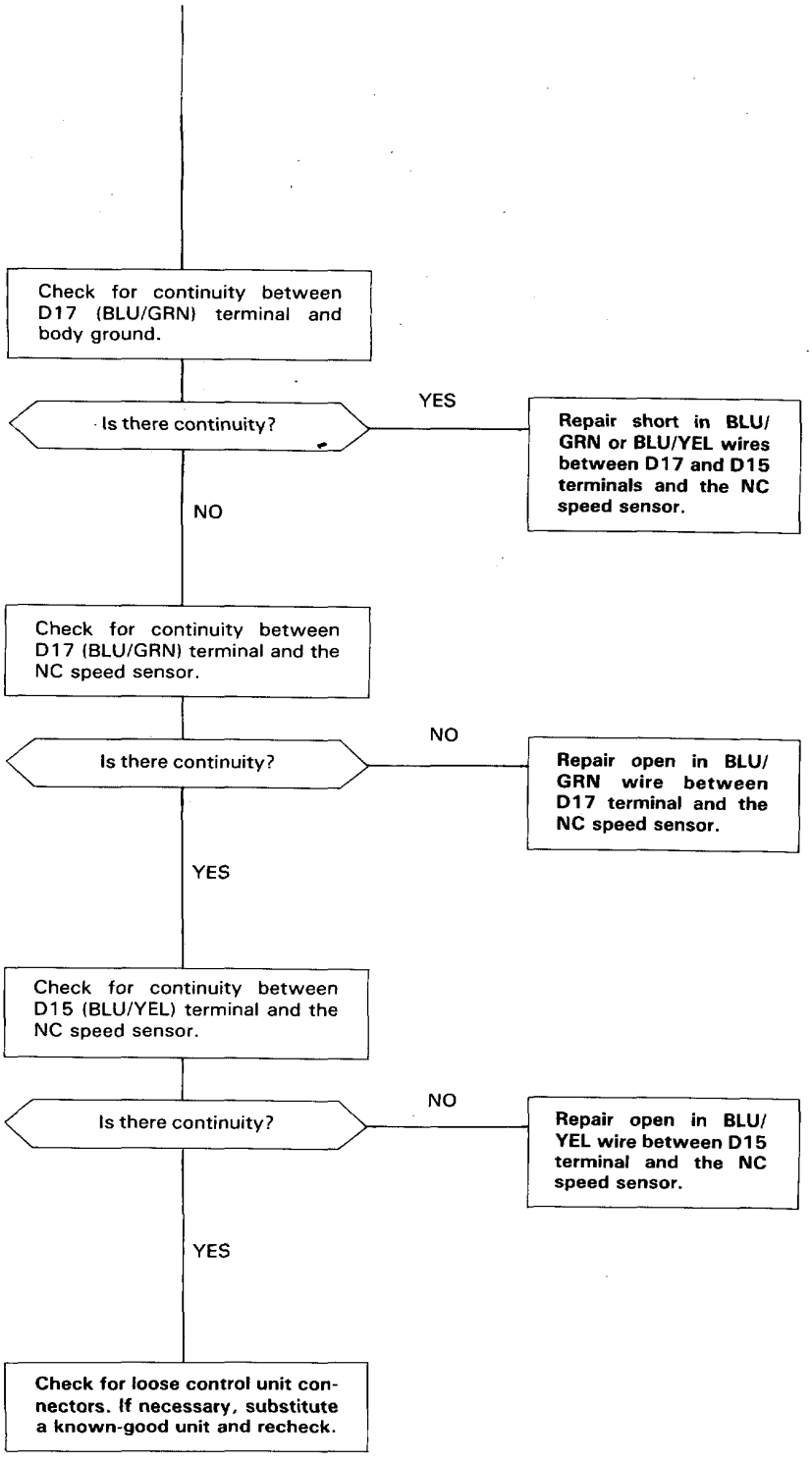
NO

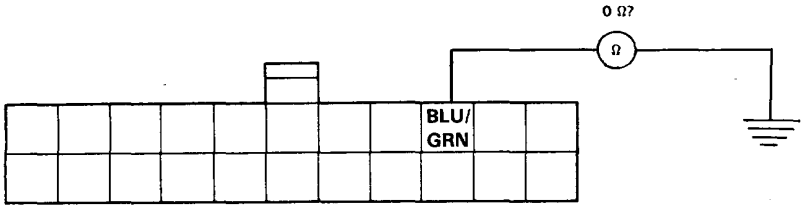
To page 9-52

(cont'd)

Troubleshooting Flowchart (cont'd)

From page 9-51





(cont'd)

Troubleshooting Flowchart (cont'd)

Inspection of the brake light signal.

Check that the brake lights come on with the brake pedal pushed.

Are brake lights ON? — NO → **Faulty brake light circuit.**

YES

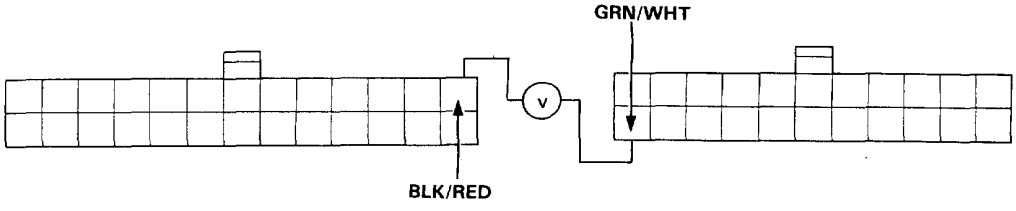
Disconnect the 26P and 22P connectors from the control unit.

Measure the voltage between D2 (GRN/WHT) and A25 (BLK/RED) terminal with the brake pedal pushed.

Is there battery voltage? — NO → **Repair open in (GRN/WHT) wire between D2 terminal and brake light switch.**

YES

Brake light signal OK.



Inspection of the A/C signal.

Start the engine.

Turn the blower switch ON.

Push the A/C switch ON.

Does A/C compressor clutch engage? NO → **See Air Conditioner inspection.**

YES

Stop the engine.

Disconnect the 26P connector from the control unit.

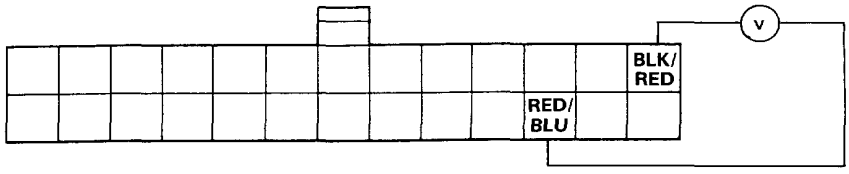
Start the engine.

Measure the voltage between A22 (RED/BLU) and A25 (BLK/RED) terminals. (A/C compressor OFF)

Is there battery voltage? NO → **Repair open in RED/BLU wire between A22 terminal and A/C clutch relay.**

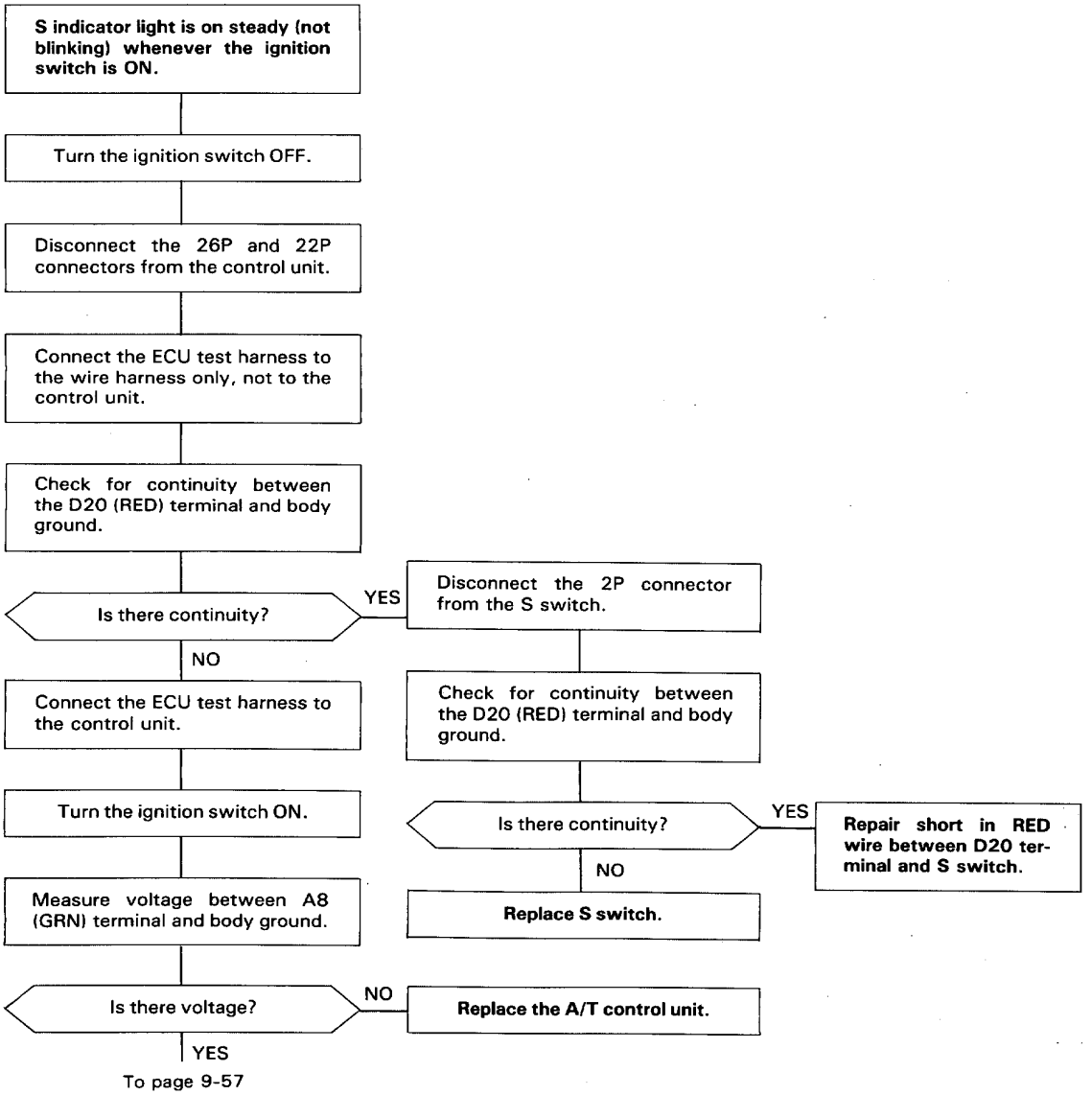
YES

A/C signal is OK.

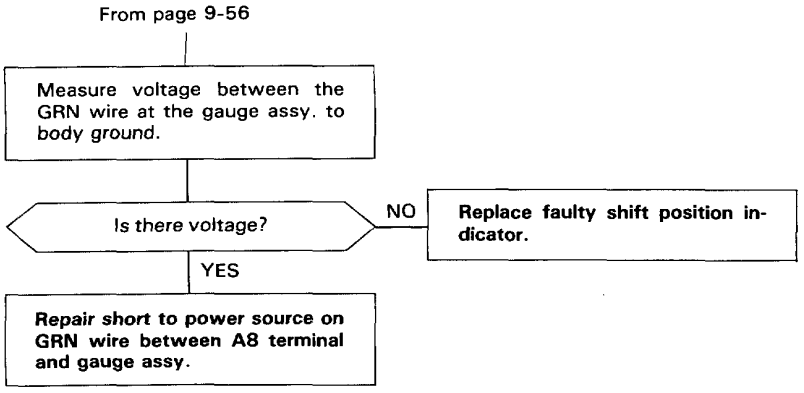


(cont'd)

Troubleshooting Flowchart (cont'd)

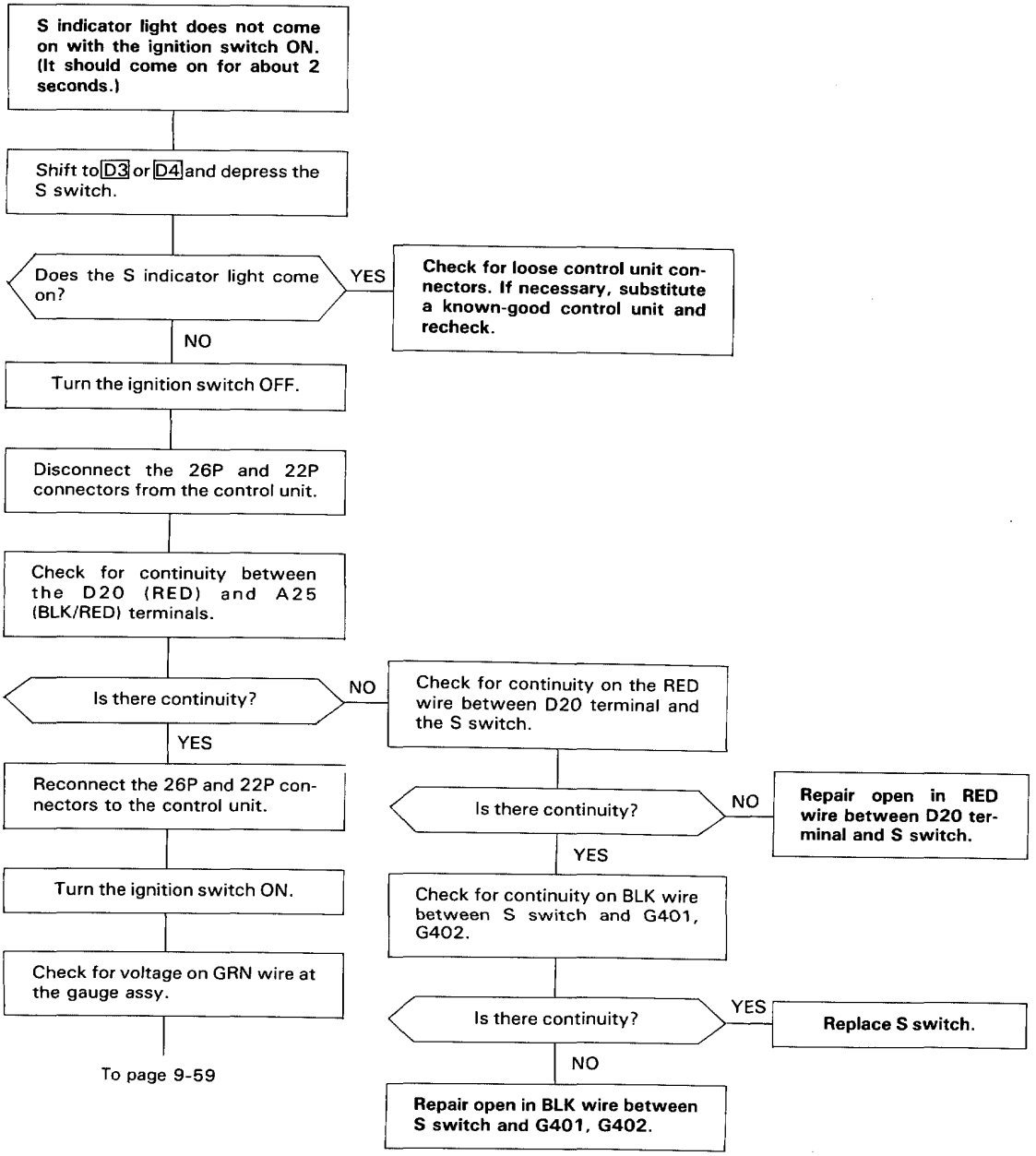


To page 9-57

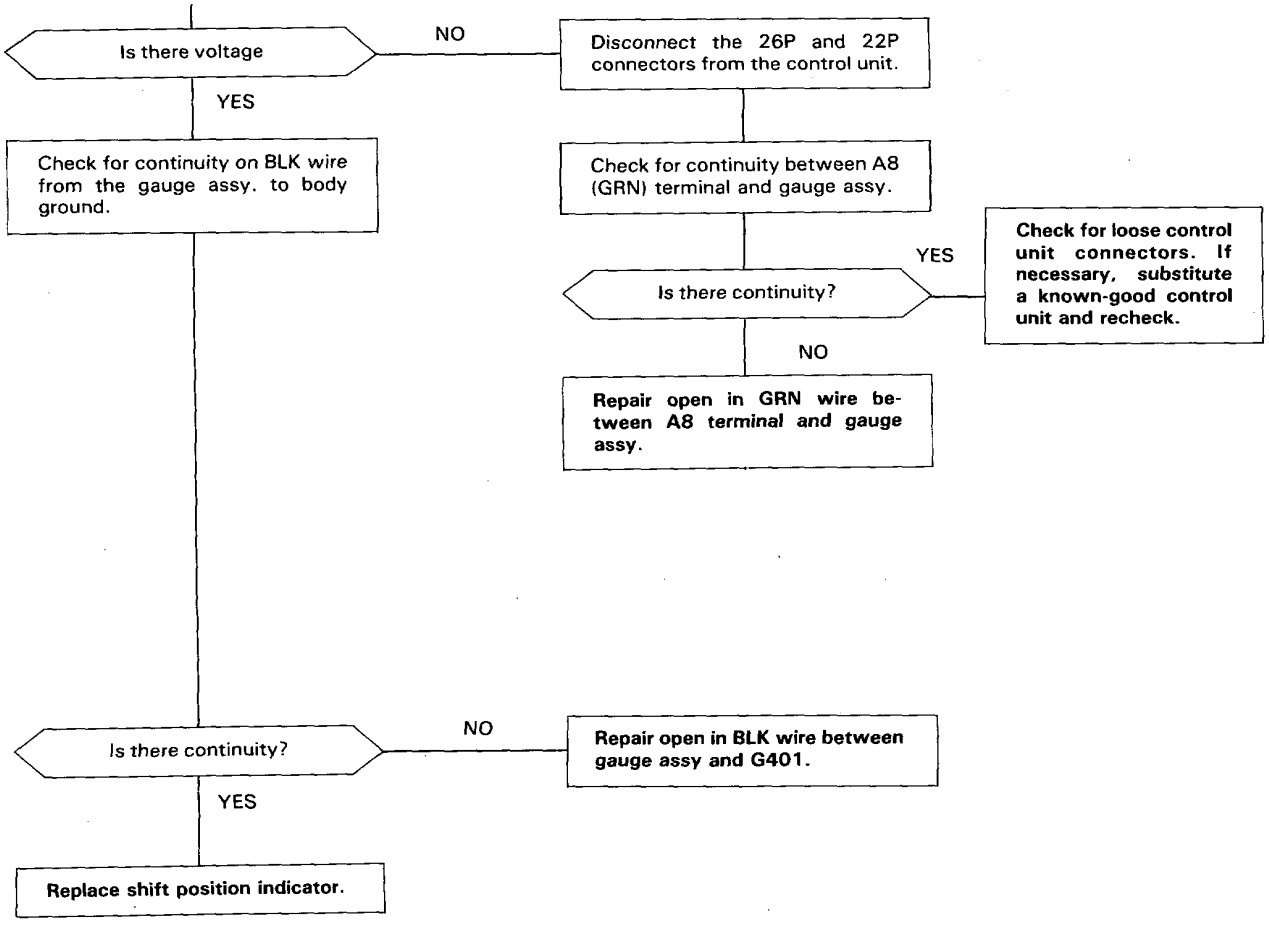

From page 9-56
Measure voltage between the GRN wire at the gauge assy. to body ground.
Is there voltage?
NO
Replace faulty shift position indicator.
YES
Repair short to power source on GRN wire between A8 terminal and gauge assy.

(cont'd)

Troubleshooting Flowchart (cont'd)



From page 9-58



Lock-up Control Solenoid Valve A/B

Test

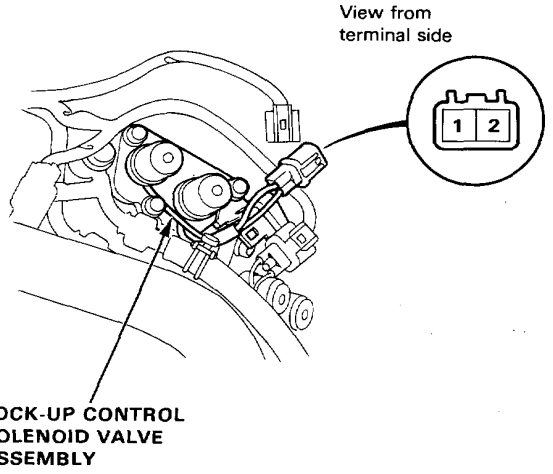
NOTE: Lock-up control solenoid valves A and B must be removed/replaced as an assembly.

1. Disconnect the connector from the lock-up control solenoid valve A/B.

   NOTE: Do not remove the lock-up control solenoid valve A/B stay.

2. Measure the resistance between the No.1 terminal (SOL. V A) of the lock-up control solenoid valve connector and body ground and between the No. 2 terminal (SOL. V B) and body ground.

   STANDARD: 14—16 Ω (25°C)



3. Replace the lock-up control solenoid valve assembly if the resistance is out of specification.

4. Connect the No.1 terminal of the lock-up control solenoid valve connector to the battery positive terminal. Connect the No.2 terminal to the battery positive terminal.
   A clicking sound should be heard each time the connection is made.

5. If not, check for continuity between the A/T control unit A24 or A25 harness and body ground. (page 9-30, 31).

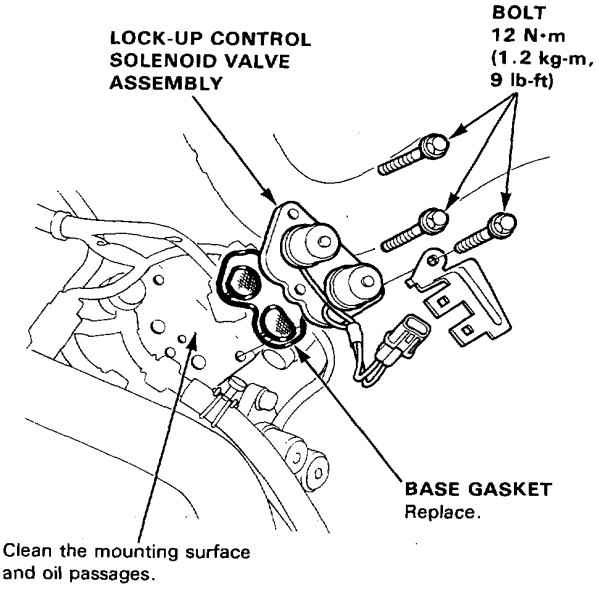
6. Replace the lock-up control solenoid valve assembly if there is continuity between the A/T control unit A 24 or A 25 harness and body ground. (page 9-30, 31)

Replacement

1. Remove the mounting bolts and lock-up control solenoid valve assembly.

   NOTE: Be sure to remove or replace the lock-up control solenoid valves A and B as an assembly.

2. Check the lock-up control solenoid valve oil passages for dust or dirt and replace as an assembly, if necessary.



3. Clean the mounting surface and oil passages of the lock-up control solenoid valve assembly and install a new base gasket.

4. Check the connector for rust, dirt or oil and reconnect it securely.

Shift Control Solenoid Valve A/B

Test

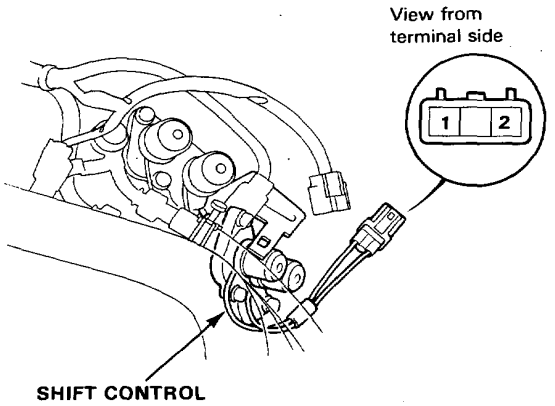
NOTE: Shift control solenoid valves A and B must be removed/replaced as an assembly.

1. Disconnect the connector from the shift control solenoid valve A/B.

   NOTE: Do not remove the shift control solenoid valve A/B stay.

2. Measure the resistance between the No.1 terminal (SOL. V A) of the shift control solenoid valve connector and body ground and between the No.2 terminal (SOL. V B) and body ground.

   STANDARD: 14—16 Ω (25°C)



3. Replace the shift control solenoid valve assembly if the resistance is out of specification.

4. Connect the No.1 terminal of the shift control solenoid valve connector to the battery positive terminal. Connect the No.2 terminal to the battery positive terminal. A clicking sound should be heard each time the connection is made.

5. If not, check for continuity between the A/T control unit A11 or A12 harness and body ground. (page 9-38, 39).

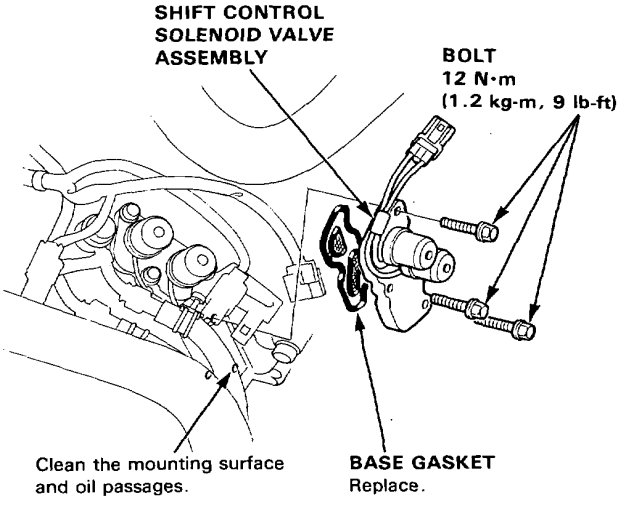
6. Replace the shift control solenoid valve assembly if there is continuity between the A/T control unit A11 or A12 harness and body ground. (page 9-38, 39)

Replacement

1. Remove the mounting bolts and shift control solenoid valve assembly.

   NOTE: Be sure to remove or replace the shift control solenoid valves A and B as an assembly.

2. Check the shift control solenoid valve oil passages for dust or dirt and replace as an assembly, if necessary.



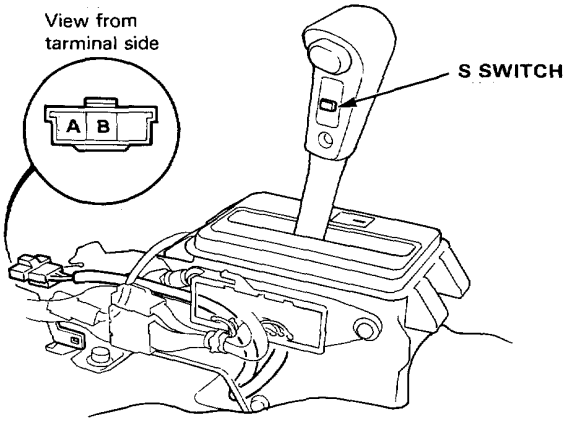
3. Clean the mounting surface and oil passages of the shift control solenoid valve assembly and install a new base gasket.

4. Check the connector for rust, dirt or oil and reconnect it securely.

S Switch

Test

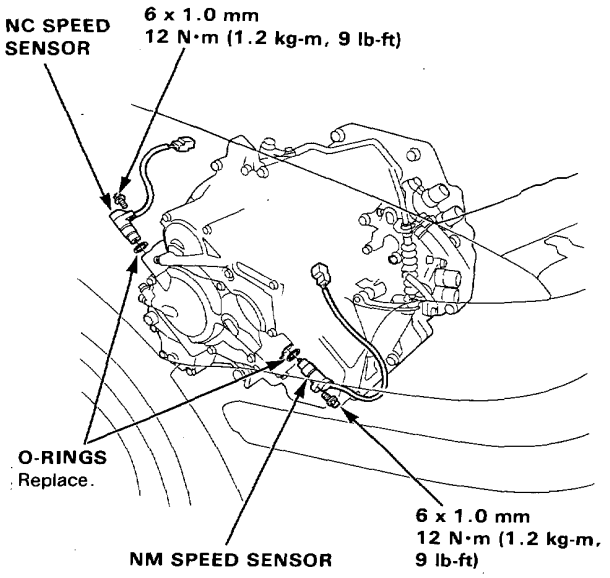
1. Remove the center console.
2. Disconnect the switch connector.
3. Check for continuity between A and B terminals. There should be continuity when the switch is pressed.



A/T Speed Sensor

Replacement

1. Remove the 6 mm bolt from the transmission housing and remove the A/T speed sensor assembly.



2. Replace the O-ring with a new one before reassembling the A/T speed sensor.
   CAUTION: Carefully inspect the A/T speed sensor before installing. Do not install if it shows signs of being dropped or improperly handled.

Symptom-to-Component Chart

Hydraulic System

SYMPTOM	Check these items on the PROBABLE CAUSE LIST	Check these items on the NOTES CHART
Engine runs, but car does not move in any gear.	1, 6, 7, 16	K, L, R, S
Car moves in R and 2, but not in D_3, D_4 or 1.	8, 29, 44, 48	C, M, O
Car moves in D_3, D_4, 1, R, but not in 2.	9, 30, 49	C, L
Car moves in D_3, D_4, 2, 1, but not in R.	1, 11, 22, 34, 38, 39, 40	C, L, Q
Car moves in N.	1, 8, 9, 10, 11, 46, 47	C, D
Excessive idle vibration.	5, 17	B, K, L
Slips in all gears.	6, 7, 16	C, L, U
No engine braking in [1] position.	12	C, D, L
Slips in low gear.	8, 29, 44, 48	C, N, O, U
Slips in 2nd gear.	9, 20, 23, 30, 49	C, L, U
Slips in 3rd gear.	10, 21, 23, 31, 44	C, L, U
Slips in 4th gear.	11, 23, 32	C, L, U
Slips in reverse gear.	11, 32, 34	C
Flares on 1—2 upshift.	3, 15	E, L, V
Flares on 2—3 upshift.	3, 15, 24, 44	E, L, V
Flares on 3—4 upshift.	3, 15, 25, 44	E, L, V
No upshift, trans stays in low gear.	14, 19, 23	G, L
No downshift to low gear.	12, 19	G, L
Late upshift.	14	L, V
Erratic shifting.	2, 14, 26	V
Harsh shift (up and down shifting).	2, 4, 15, 23, 24, 27, 47	A, E, H, I, L, V
Harsh shift (1—2).	2, 9	C, D, V
Harsh shift (2—3).	2, 10, 23, 24	C, D, H, L, V
Harsh shift (3—4).	2, 11, 23, 25	C, D, I, L, V
Harsh kickdown shifts.	2, 23, 27, 28	L, V, Q
Harsh kickdown shift (2—1).	48	O
Harsh downshift at closed throttle.	15	E, T
Harsh shift when manually shifting to [1].	33	L
Axle(s) slips out of trans on turns.	43, 50	L, P, Q
Axle(s) stuck in trans.	43	L, Q
Ratcheting noise when shifting into R.	6, 7, 38, 39, 40	K, L, Q
Loud popping noise when taking off in R.	38, 39, 40	L, Q
Ratcheting noise when shifting from R to P or from R to N.	38, 39, 40, 45	L, Q
Noise from trans in all selector lever positions.	6, 17	K, L, Q
Noise from trans only when wheels are rolling.	39, 42	L, Q
Gear whine, rpm related (pitch changes with shifts).	8, 13, 41	K, L, Q
Gear whine, speed related (pitch changes with speed).	38, 42	L, Q
Trans will not shift into 4th gear in D_4.	1, 21, 28, 32	L
Lock-up clutch does not lock up smoothly.	17, 36, 37	L
Lock-up clutch does not operate properly.	2, 3, 15, 18, 35, 36, 37	E, L, V
Transmission has multitude of problems shifting. At disassembly, large particles of metal are found on magnet.	43	L, Q

	PROBABLE CAUSE
1.	Shift cable broken/out of adjustment.
2.	Throttle cable too short.
3.	Throttle cable too long.
4.	Wrong type ATF.
5.	Idle rpm too low/high.
6.	Oil pump worn or binding.
7.	Pressure requlator stuck.
8.	1st clutch defective.
9.	2nd clutch defective.
10.	3rd clutch defective.
11.	4th clutch defective.
12.	1st hold clutch defective.
13.	Mainshaft, countershaft, and secondary shaft idler gears worn/damage.
14.	Modulator valve stuck.
15.	Throttle B valve stuck.
16.	ATF strainer clogged.
17.	Torque convertor defective.
18.	Torque convertor check valve stuck.
19.	1—2 shift valve stuck.
20.	2—3 shift valve stuck.
21.	3—4 shift valve stuck.
22.	EAT D inhibitor valve stuck.
23.	Clutch pressure control valve stuck.
24.	2nd orifice control valve stuck.
25.	Orifice control valve stuck.
26.	3—2 kickdown valve stuck.
27.	3rd kickdown valve stuck.
28.	4th exhaust valve stuck.
29.	1st accumulator defective.
30.	2nd clutch accumulator defective.
31.	3rd clutch accumulator defective.
32.	4th/reverse accumulator defective.
33.	1st hold clutch accumulator defective.
34.	Servo valve stuck.
35.	Lock-up clutch timing valve stuck.
36.	Lock-up clutch shift valve stuck.
37.	Lock-up clutch control valve stuck.
38.	Shift fork bent.
39.	Reverse gears worn/damaged (3 gears).
40.	Reverse selector worn.
41.	3rd gears worn/damaged (2 gears).
42.	Final gears worn/damaged (2 gears).
43.	Differential pinion shaft worn.
44.	Feedpipe O-ring broken.
45.	4th gears worn/damaged (2 gears).
46.	Gear clearance incorrect.
47.	Clutch clearance incorrect.
48.	Sprag clutch defective.
49.	Sealing rings/guide worn.
50.	Axle-inboard joint clip missing.

Symptom-to-Component Chart

Hydraulic System (cont'd)

The following symptoms can be caused by improper repair or assembly.	Check these items on the PROBABLE CAUSE DUE TO IMPROPER REPAIR	Items on the NOTES CHART
Car creeps in N.	R1, R2	
Car does not move in D_3 or D_4.	R4	
Trans locks up in R.	R3, R12	
Excessive drag in trans.	R6	R, K
Excessive vibration, rpm related.	R7	
Noise with wheels moving only.	R5	
Main seal pops out.	R8	S
Various shifting problems.	R9, R10	
Harsh upshifts.	R11	

PROBABLE CAUSE DUE TO IMPROPER REPAIR	
R1.	Improper clutch clearance.
R2.	Improper gear clearance.
R3.	Parking brake lever installed upside down.
R4.	Sprag clutch installed upside down.
R5.	Reverse hub installed upside down.
R6.	Oil pump binding.
R7.	Torque converter not fully seated in oil pump.
R8.	Main seal improperly installed.
R9.	Springs improperly installed.
R10.	Valves improperly installed.
R11.	Ball check valves not installed.
R12.	Shift fork bolt not installed.

NOTES	
A.	Flush ATF in the ATF cooler.
B.	Set idle rpm in gear to specified idle speed. If still no good, adjust motor mounts as outlined in engine section of service manual.
C.	If the large clutch piston O-ring is broken, inspect the piston groove for rough machining.
D.	If the clutch pack is seized or is excessively worn, inspect the other clutches for wear and check the orifice control valves and throttle valves for free movement.
E.	If throttle valve B is stuck, inspect the clutches for wear.
G.	If the 1—2 valve is stuck closed, the transmission will not upshift. If stuck open the transmission has no 1st gear.
H.	If the 2nd orifice control valve is stuck, inspect the 2nd and 3rd clutch packs for wear.
I.	If the orifice control valve is stuck, inspect the 3rd and 4th clutch packs for wear.
J.	If the clutch pressure control valve is stuck closed, the transmission will not shift out of 1st gear.
K.	Improper alignment of main valve body and torque convertor case may cause oil pump seizure. The symptoms are mostly an rpm-related ticking noise or a high pitched squeek.
L.	If the oil screen is clogged with particles of steel or aluminum, inspect the oil pump and differential pinion shaft. If both are OK and no cause for the contamination is found, replace the torque converter.
M.	If the 1st clutch feedpipe guide in the end cover is scored by the mainshaft, inspect the ball bearing for excessive movement in the transmission housing. If OK, replace the end cover as it is dented. The O-ring under the guide is probably worn.
N.	Replace the mainshaft if the bushings for the 1st and 4th feedpipe are loose or damaged. If the 1st feedpipe is damaged or out of round, replace it. If the 4th feedpipe is damaged or out of round, replace the end cover.
O.	A worn or damaged sprag clutch is mostly a result of shifting the trans in D_3 or D_4 while the wheels rotate in reverse, such as rocking the car in snow.
P.	Inspect the frame for collision damage.
Q.	Inspect for damage or wear: 1. Reverse selector gear teeth chamfers. 2. Engagement teeth chamfers of countershaft 4th and reverse gear. 3. Shift fork for scuff marks in center. 4. Differential pinion shaft for wear under pinion gears. 5. Bottom of 3rd clutch for swirl marks. Replace items 1, 2, 3 and 4 if worn or damaged. If trans makes clicking, grinding or whirring noise, also replace mainshaft 4th gear and reverse idler gear and countershaft 4th gear in addition to 1, 2, 3 or 4. If differential pinion shaft is worn, overhaul differential assembly and replace oil screen and thoroughly clean trans, flush torque converter, cooler and lines. If bottom of 3rd clutch is swirled and trans makes gear noise, replace the countershaft and ring gear.
R.	Be very careful not to damage the torque converter case when replacing the main ball bearing. You may also damage the oil pump when you torque down the main valve body. This will result in oil pump seizure if not detected. Use proper tools.
S.	Install the main seal flush with the torque converter case. If you push it into the torque converter case until it bottoms out, it will block the oil return passage and result in damage.
T.	Harsh downshifts when coasting to a stop with zero throttle may be caused by a bent-in throttle valve retainer/cam stopper. Throttle cable adjustment may clear this problem.
U.	Check if servo valve stopper cap is installed. If it was not installed, the check valve may have been pushed out by hydraulic pressure causing a leak (internal) affecting all forward gears.
V.	Throttle cable adjustment is essential for proper operation of the transmission. Not only does it affect the shift points if misadjusted, but also the shift quality and lock-up clutch operation. A too long adjusted cable will result in throttle pressure being too low for the amount of engine torque input into the transmission and may cause clutch slippage. A too short adjusted cable will result in too high throttle pressures which may cause harsh shifts, erratic shifts and torque converter hunting.

NOTE: After transmission is installed:
- Make sure the floor mat does not interfere with accelerator pedal travel. Fully depress accelerator pedal and check to make sure the throttle lever is fully opened.
- Release the accelerator pedal and check both inner control cables to be sure they have slight play.

D4 and D3 Range

1. Apply parking brake and block the wheels. Start the engine, then move the selector to D4 while depressing the brake pedal. Depress the accelerator pedal, and release it suddenly. Engine should not stall.

3. Apply parking brake and block the wheels. Start the engine, then move the selector to D3 while depressing the brake pedal. Depress the accelerator pedal, and release it suddenly. Engine should not stall.

KF, KB, KE, KW, KY, KT and KU Models

- **Upshift**
  D4 (and D3)

		1st—2nd	2nd—3rd	3rd—4th	Lock up Clutch ON
1/8 throttle Coasting down-hill from a stop	km/h	14—18	27—31	40—46	17—21
	mph	9—11	17—19	25—29	11—13
1/2 throttle Acceleration from a stop	km/h	27—33	52—58	74—82	97—104
	mph	17—21	32—36	46—51	60—65
Full-throttle Acceleration from a stop	km/h	42—49	102—110	149—158	129—137
	mph	26—30	63—68	93—98	80—85

- **Downshift**
  D4 (and D3)

		Lock up Clutch OFF	4th—3rd	3rd—2nd	2nd—1st
1/8 throttle Coasting or braking to a stop	km/h	15—21	26—32	—	(3rd—1st) 8—14
	mph	9—13	16—20	—	(3rd—1st) 5—9
1/2 throttle When car is slowed by increased grade, wind, etc.	km/h	87—94	—	—	—
	mph	54—58	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	126—134	124—133	85—94	39—46
	mph	78—83	77—83	53—58	24—29

- **Upshift**
  D4 (and D3 with S switch in operation)

		1st—2nd	2nd—3rd	3rd—4th	Lock up clutch ON
1/8 throttle Coasting down-hill from a stop	km/h	17—21	27—31	46—52	24—28
	mph	11—13	17—19	29—32	15—17
1/2 throttle Acceleration from a stop	km/h	37—43	72—78	106—114	118—125
	mph	23—27	45—48	66—71	73—78
Full-throttle Acceleration from a stop	km/h	43—50	102—110	149—158	130—138
	mph	27—31	63—68	93—98	81—86

- Downshift
  D4 (and D3 with S switch in operation)

		Lock up Clutch OFF	4th—3rd	3rd—2nd	2nd—1st
1/8 throttle Coasting or braking to a stop	km/h	23—28	31—37	—	(3rd—1st) 11—17
	mph	14—17	19—23	—	(3rd—1st) 7—11
1/2throttle When car is slowed by increased grade, wind, etc.	km/h	98—105	—	—	—
	mph	61—65	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	126—134	124—133	85—94	39—46
	mph	78—83	77—83	53—58	24—29

KS, KX, KG and KQ Models

● **Upshift**
[D4] (and [D3])

		1st—2nd	2nd—3rd	3rd—4th	Lock up Clutch ON
1/8 throttle Coasting down-hill from a stop	km/h	21—25	41—45	58—64	23—27
	mph	13—16	25—28	36—40	14—17
1/2 throttle Acceleration from a stop	km/h	28—34	57—63	88—96	96—103
	mph	17—21	35—39	55—60	60—64
Full-throttle Acceleration from a stop	km/h	48—55	106—114	154—163	131—139
	mph	30—34	66—71	96—101	81—86

● **Downshift**
[D4] (and [D3])

		Lock up Clutch	4th—3rd	3rd—2nd	2nd—1st
1/8 throttle Coasting or braking to a stop	km/h	21—27	29—35	—	(3rd—1st) 10—16
	mph	13—17	18—22	—	(3rd—1st) 6—10
1/2 throttle When car is slowed by increased grade, wind, etc.	km/h	77—84	—	—	—
	mph	48—52	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	127—135	125—134	86—95	40—47
	mph	79—84	78—83	53—59	25—29

● **Upshift**
[D4] (and [D3] with S switch in operation)

		1st—2nd	2nd—3rd	3rd—4th	Lock up Clutch ON
1/8 throttle Coasting down-hill from a stop	km/h	17—21	38—42	61—67	38—42
	mph	11—13	24—26	38—42	24—26
1/2 throttle Acceleration from a stop	km/h	28—34	66—72	100—108	111—118
	mph	17—21	41—45	62—67	69—73
Full-throttle Acceleration from a stop	km/h	48—55	106—114	154—163	131—139
	mph	30—34	66—71	96—101	81—86

● **Downshift**
[D4] (and [D3] with S switch in operation)

		Lock up Clutch OFF	4th—3rd	3rd—2nd	2nd—1st
1/8 throttle Coasting or braking to a stop	km/h	35—41	29—35	—	(3rd—1st) 10—16
	mph	22—25	18—22	—	(3rd—1st) 6—10
1/2 throttle When car is slowed by increased grade, wind, etc.	km/h	84—91	—	—	—
	mph	52—57	—	—	—
Full-throttle When car is slowed by increased grade, wind, etc.	km/h	127—135	125—134	89—98	40—47
	mph	79—84	78—83	55—61	25—29

CAUTION: Do not shift from [D4] or [D3] to [2] at speeds over 100 km/h (62.5 mph); you may damage the transmission.

[1] (1st 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.

[2] (2nd Gear)
1. Accelerate from a stop at full throttle. Check that there is no abnormal noise or clutch slippage.
2. Upshifts and downshifts should not occur with the selector in this range.

[R] (Reverse)
Accelerate from a stop at full throttle, and check for abnormal noise and clutch slippage.

[P] (Park)
Park car on a slope (approx. 16°), apply the parking brake, and shift into Park. Release the brake; the car should not move.

Pressure

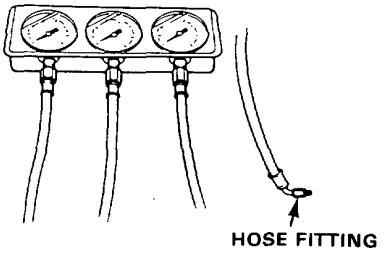
Testing

CAUTION:
- **Before testing, be sure the transmission is filled to the proper level.**
- **Connect an oil pressure gauge securely, being sure not to allow dust and other foreign particles to enter the inspection hole.**
- **Warm up the engine before testing.**
- **Set the parking brake securely, and block both rear wheels.**
- **Raise the front of the car and support with safety stands.**

NOTE:Do not reuse old aluminum washers.
Install the sealing bolt in the inspection hole and tighten to the specified torque 18 N·m (1.8 kg-m, 12 lb-ft).

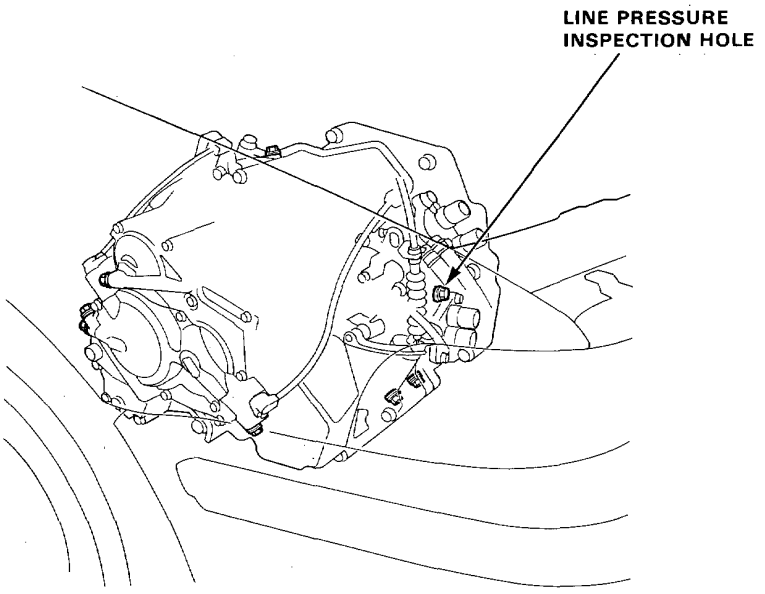
1. Stop the engine and connect a tachometer.
2. Connect an oil pressure gauge to each inspection hole.

GAUGE SET 07406—0020003 (Includes Pressure Hoses)
A/T OIL PRESSURE GAUGE HOSE 07406—0020201



3. Start the engine and measure respective pressures as follows.

Line Pressure Measurement
1. Set the parking brake and block both rear wheels securely.
2. Run the engine at 2,000 min^{-1} (rpm).
3. Measure the line pressure.

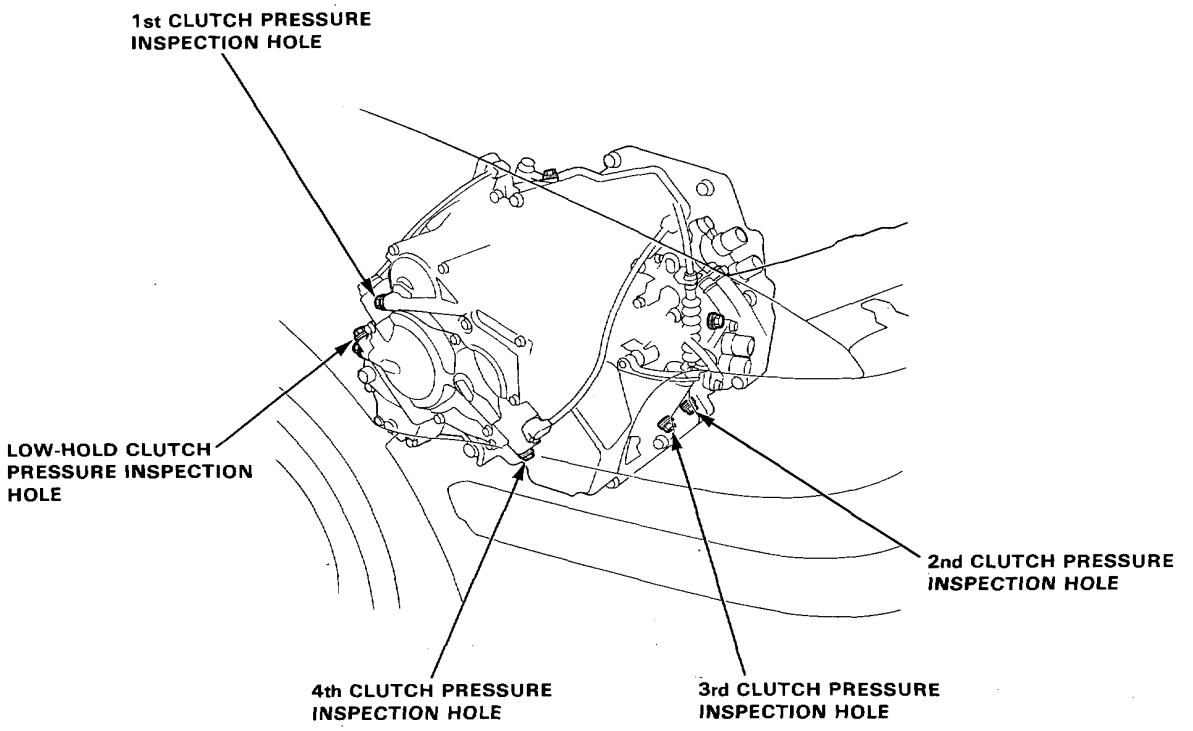


PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	N or P	No (or low) Line pressure	Torque converter, oil pump pressure regulator, torque converter check valve, oil pump	785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	735 kPa (7.5 kg/cm², 107 psi)

NOTE: Higher pressures may be indicated if measurements are made in selector positions other than N or P.

Clutch Pressure Measurement

1. Set the parking brake and block both rear wheels securely.
2. Raise the front of the car and support with safety stands.
3. Allow the front wheels to rotate freely.
4. Run the engine at 2,000 min^{-1} (rpm).
5. Measure the clutch pressure.



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Low-Hold Clutch	1	No or low low-hold pressure	Low-Hold Clutch	784—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	735 kPa (7.5 kg/cm², 107 psi)
1st Clutch	1	No or low 1st pressure	1st Clutch		
2nd Clutch	2	No or low 2nd pressure	2nd Clutch		
3rd Clutch	D3	No or low 3rd pressure	3rd Clutch	490 kPa (5.0 kg/cm², 71 psi) (throttle fully closed) 785-834 kPa (8.0-8.5 kg/cm², 114-121 psi) (throttle more than 2/8 opend)	441 kPa (4.5 kg/cm², 64 psi) (throttle fully closed) 735 kPa (7.5 kg/cm², 107 psi) (throttle more than 2/8 opend)
4th Clutch	D4	No or low 4th pressure	4th Clutch		
4th Clutch	R	No or low 4th pressure	Servo Valve 4th Clutch	785-834 kPa (8.0-8.5 kg/cm², 114-121 psi)	735 kPa (7.5 kg/cm², 107 psi)

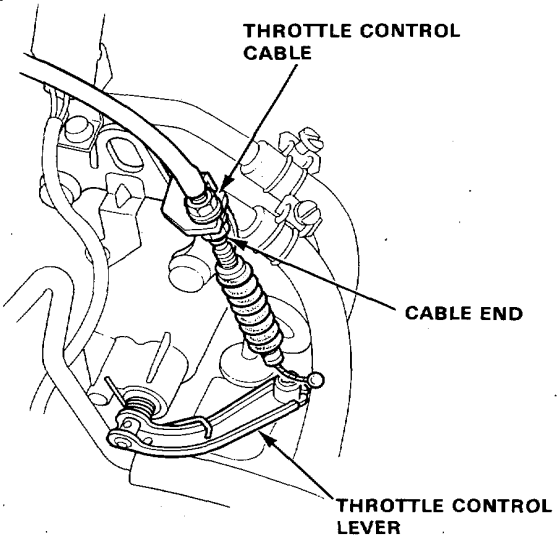
(cont'd)

Testing (cont'd)

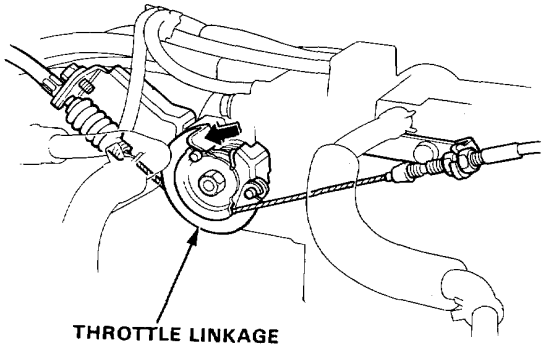
Clutch Low/High Pressure Test

1. Raise the car and support with safety stands.
2. Attach the gauge set to the appropriate pressure test port.
3. Remove the cable end of the throttle control lever.

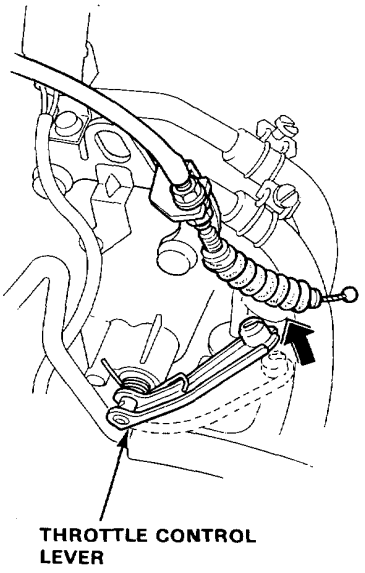
NOTE: Do not loosen the locknuts, simply unhook the cable end.



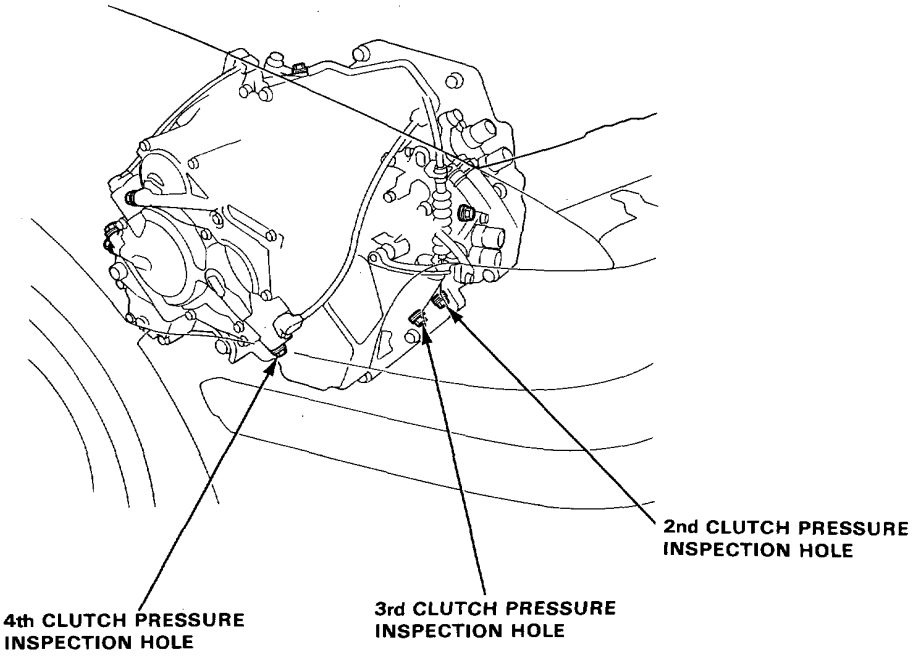
4. Warm up the engine to normal operating temperature (cooling fan comes on).
5. With the engine idling, move the selector lever to D_3 or D_4.
6. Slowly move the throttle linkage to increase engine rpm until pressure is indicated on the appropriate gauge. Then release the throttle linkage, allowing the engine to return to an idle, and record the pressure reading.
7. Repeat step 6 for each clutch pressure being inspected.



8. With the engine idling, lift the throttle control lever up approximately 1/2 of its possible travel and increase the engine rpm until pressure is indicated on the appropriate gauge. Record the highest pressure reading obtained.



9. Repeat step 8 for each clutch pressure being inspected.



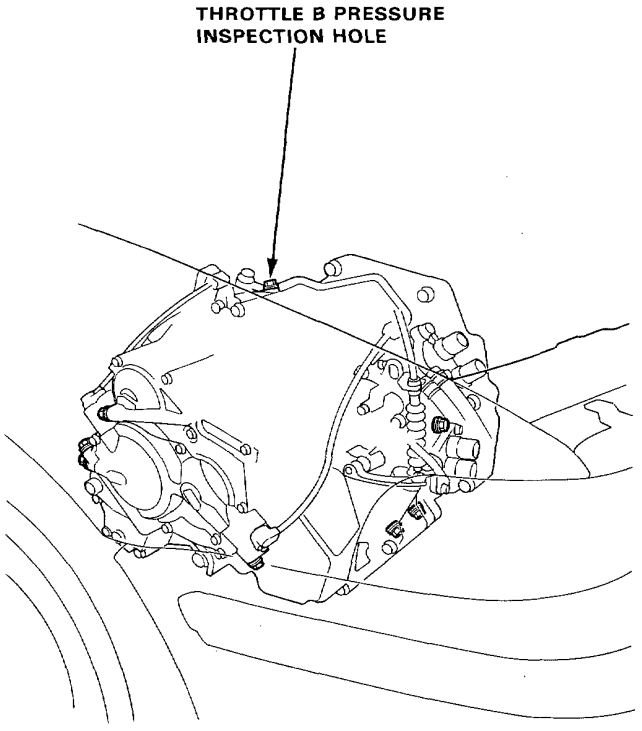
PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
2nd Clutch	D3 or D4	No or low 2nd pressure	2nd Clutch	471—834 kPa (4.8—8.5 kg/cm², 68—121 psi)	735 kPa (7.5 kg/cm², 107 psi)
3rd Clutch	D3 or D4	No or low 3rd pressure	3rd Clutch		
4th Clutch	D4	No or low 4th pressure	4th Clutch		

(cont'd)

Testing (cont'd)

Throttle B Pressure Measurement

1. Set the parking brake and block both rear wheels securely.
2. Run the engine at 1,000 min^{-1} (rpm).
3. Disconnect the throttle control cable from the throttle lever and set the control lever in full throttle position.



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Throttle B	D3 or D4	No (or low) Throttle B pressure	Throttle valve B	784—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	735 kPa (7.5 kg/cm², 107 psi)

Pressure

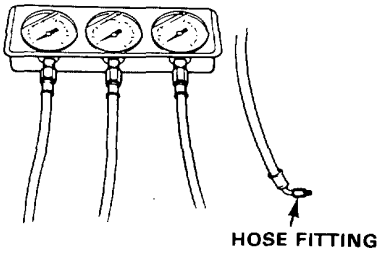
Testing

CAUTION:
- **Before testing, be sure the transmission is filled to the proper level.**
- **Connect an oil pressure gauge securely, being sure not to allow dust and other foreign particles to enter the inspection hole.**
- **Warm up the engine before testing.**
- **Set the parking brake securely, and block both rear wheels.**
- **Raise the front of the car and support with safety stands.**

NOTE:Do not reuse old aluminum washers.
Install the sealing bolt in the inspection hole and tighten to the specified torque 18 N·m (1.8 kg-m, 12 lb-ft).

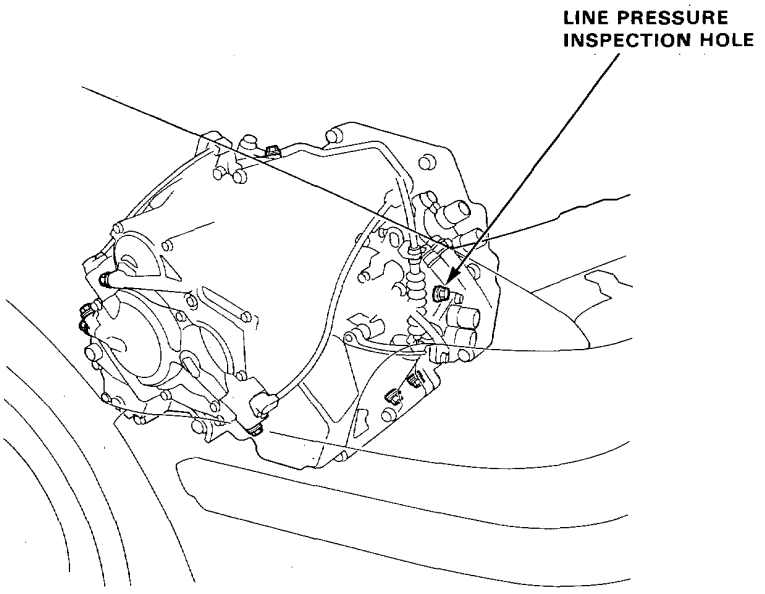
1. Stop the engine and connect a tachometer.
2. Connect an oil pressure gauge to each inspection hole.

GAUGE SET 07406—0020003 (Includes Pressure Hoses)
A/T OIL PRESSURE GAUGE HOSE 07406—0020201



3. Start the engine and measure respective pressures as follows.

Line Pressure Measurement
1. Set the parking brake and block both rear wheels securely.
2. Run the engine at 2,000 min^{-1} (rpm).
3. Measure the line pressure.



PRESSURE	SELECTOR POSITION	SYMPTOM	PROBABLE CAUSE	FLUID PRESSURE	
				Standard	Service Limit
Line	N or P	No (or low) Line pressure	Torque converter, oil pump pressure regulator, torque converter check valve, oil pump	785—834 kPa (8.0—8.5 kg/cm², 114—121 psi)	735 kPa (7.5 kg/cm², 107 psi)

NOTE: Higher pressures may be indicated if measurements are made in selector positions other than N or P.

Stall Speed

Test

CAUTION:
- **To prevent transmission damage, do not test stall speed for more than 10 seconds at a time.**
- **Do not shift the lever while raising the engine speed.**
- **Be sure to remove the pressure gauge before testing stall speed.**

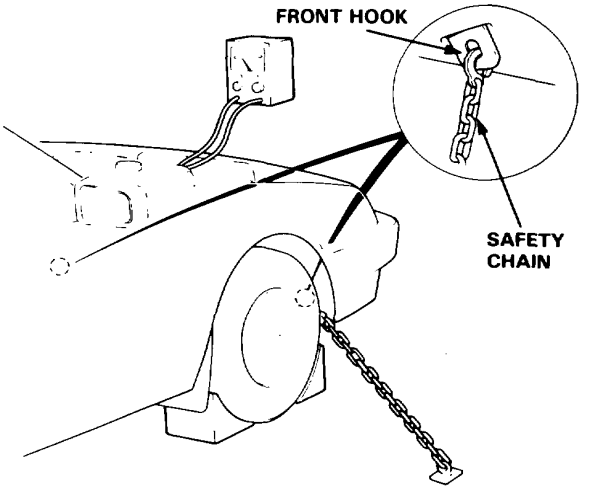
1. Engage parking brake and block the front wheels.
2. Connect safety chains to both front two hooks and attach, with minimum slack, to some strong stationary object.
3. Connect tachometer, and start the engine.
4. After the engine has warmed up to normal operating temperature, shift into D4.
5. Fully depress the brake pedal and accelerator for 6 to 8 seconds, and note engine speed.
6. Allow 2 minutes for cooling, then repeat same test in 1 and R.

Stall speed in D4, 1 and R must be the same, and must also be within limits:

NOTE:
Stall speed test must be made only for checking the cause of trouble.

Stall Speed RPM:
Specification: 2,500 min^{-1} (rpm)
Service Limit: 2,350—2,650 min^{-1} (rpm)

TROUBLE	PROBABLE CAUSE
Stall rpm high in D4, 1 & R	• Low fluid level or oil pump output. • Clogged oil strainer. • Pressure regulator valve stuck closed. • Slipping clutch.
Stall rpm high in R	• Slippage of 4th clutch
Stall rpm high in D4 & 1	• Slippage of 1st clutch or 1st gear one-way clutch
Stall rpm low in D4, 1 & R	• Engine output low • Torque converter one-way clutch slipping

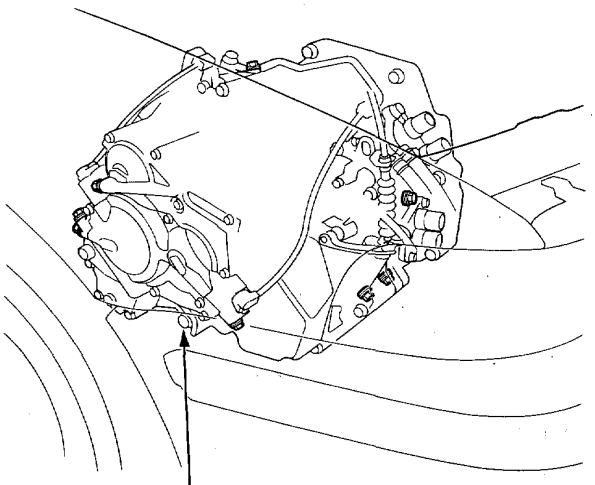


Fluid Level

Checking/Changing

Checking

With the car on level ground, pull the transmission dipstick and check the level of fluid immediately after the engine is shut off (within one minute). The fluid level should be between the full and low marks. Push the dipstick all the way in to check the fluid level. If the level is at, or below, the low mark, add DEXRON-II type automatic transmission fluid.



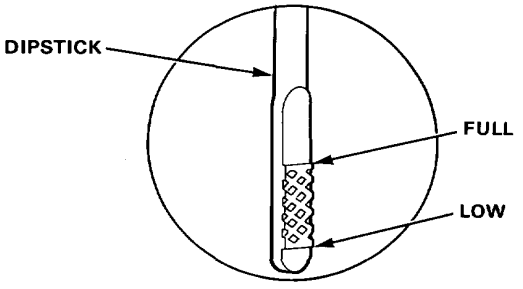
DRAIN PLUG
40 N·m (4.0 kg-m, 29 lb-ft)

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:
2.4 ℓ (2.5 us qts, 2.1 Imp qts) at change
6.0 ℓ (6.3 us qts, 5.3 Imp qts) after overhaul



Removal

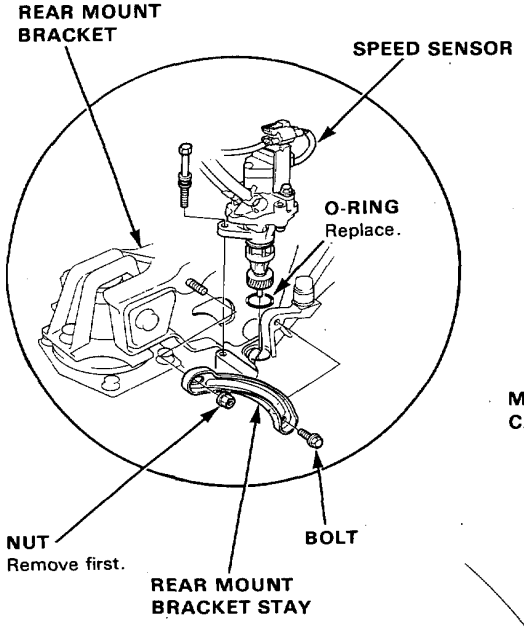
⚠WARNING

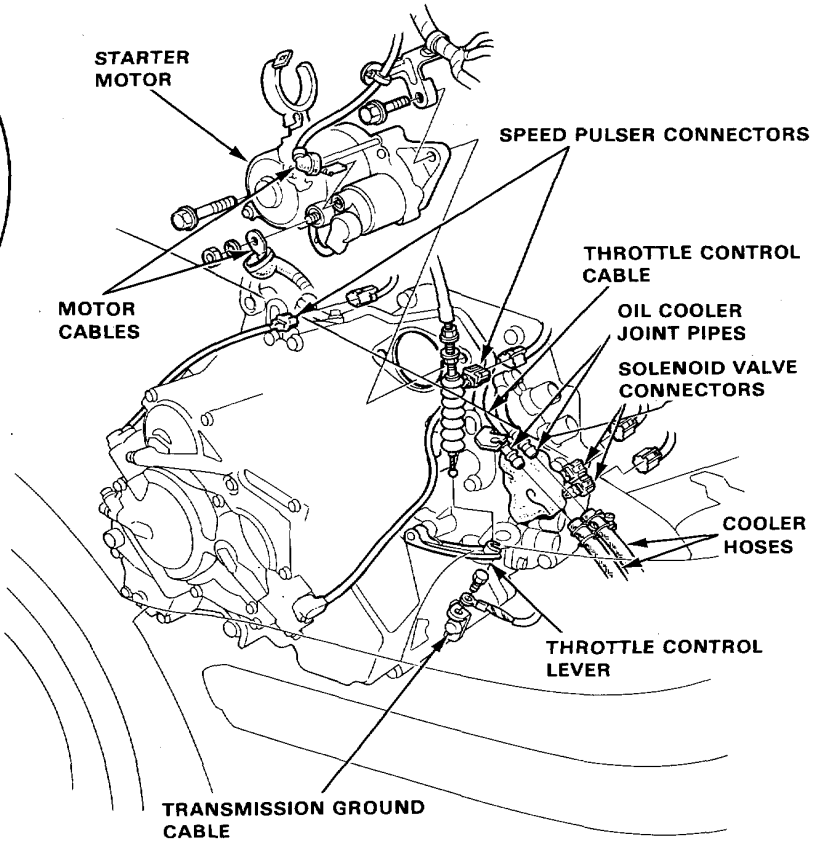
- **Make sure jacks and safety stands are placed properly, and hoist brackets are attached to correct positions on the engine.**
- **Apply parking brake and block rear wheels, so car will not roll off stands and fall on you while working under it.**

CAUTION: Use fender covers to avoid damaging painted surfaces.

1. Disconnect the battery negative (-) and positive (+) cable from the battery, and remove the battery.
2. Remove the air intake hose, air cleaner case and battery base (See section 5).
3. Disconnect the throttle cable from the throttle control lever.
4. Disconnect the transmission ground cable.
5. Disconnect the speed pulser connectors.
6. Disconnect the starter motor cables, remove the starter mounting bolts, then remove the starter motor.
7. Remove the rear mount bracket stay nut first. Remove the bolt, then remove the rear mount bracket stay.
8. Remove the speed sensor, but leave its hoses connected.
9. Disconnect the lock-up control solenoid valve and shift control solenoid valve wire connectors.
10. Drain transmission fluid. Use a socket wrench to remove the drain plug. Remove the oil filter plug to speed draining. Reinstall the drain plug with a new washer.
11. Disconnect the cooler hoses at joint pipes. Turn the ends up to prevent ATF from flowing out.

    NOTE: Check for any signs of leakage at the hose joints.

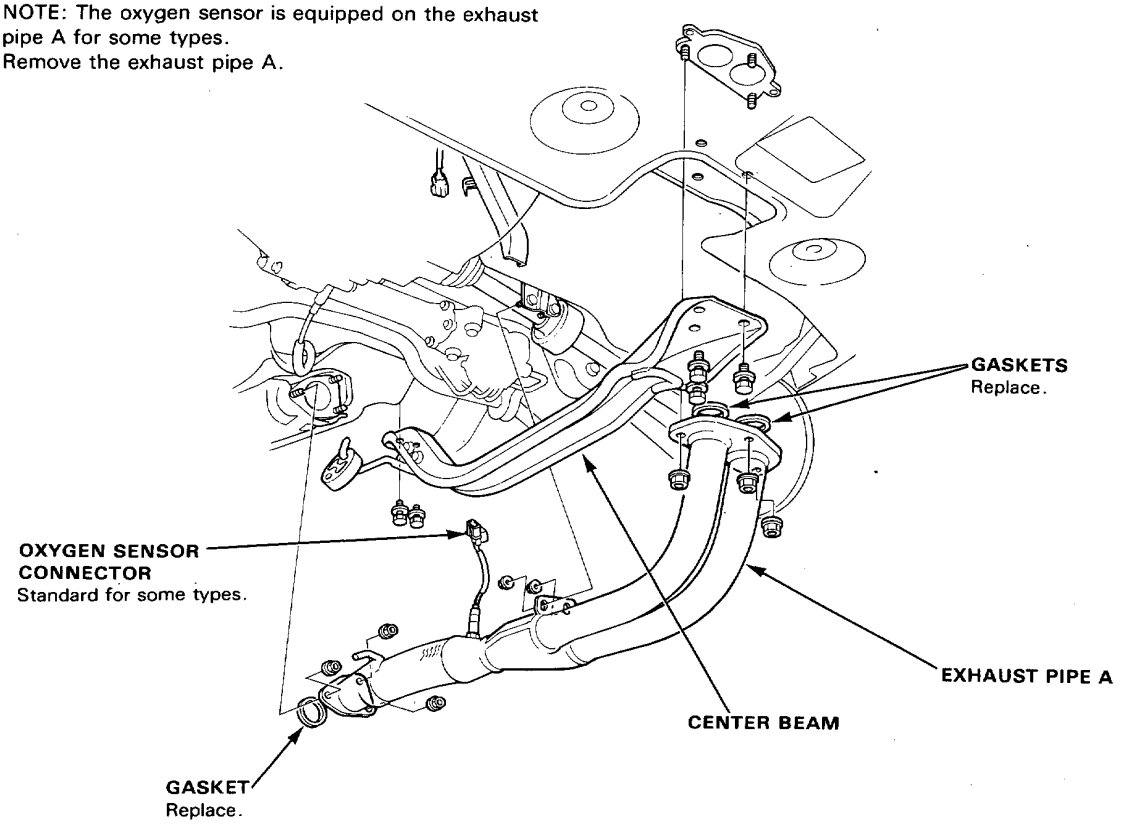




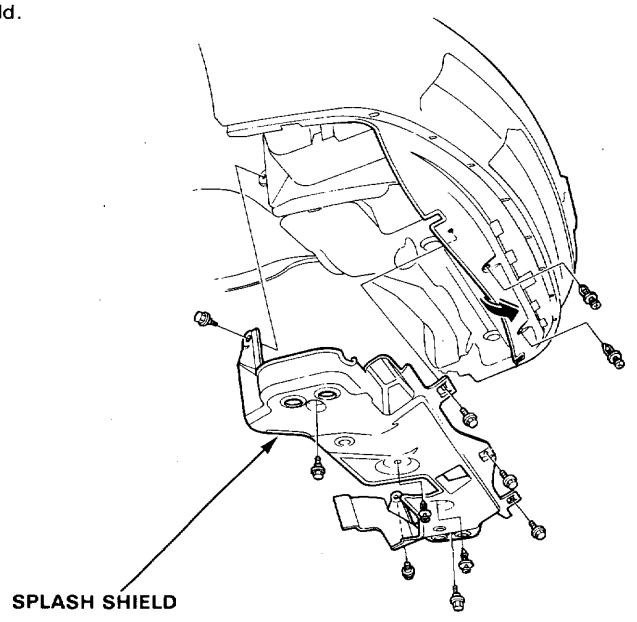
(cont'd)

Removal (cont'd)

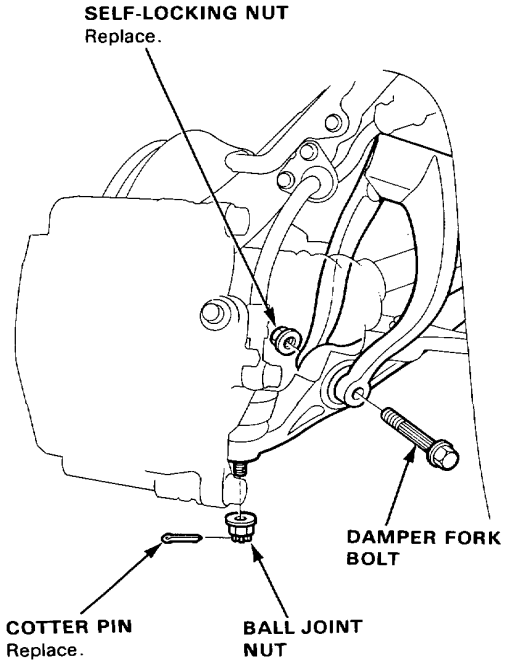
12. Remove the center beam.
13. Remove the oxygen sensor connector.
    NOTE: The oxygen sensor is equipped on the exhaust pipe A for some types.
14. Remove the exhaust pipe A.



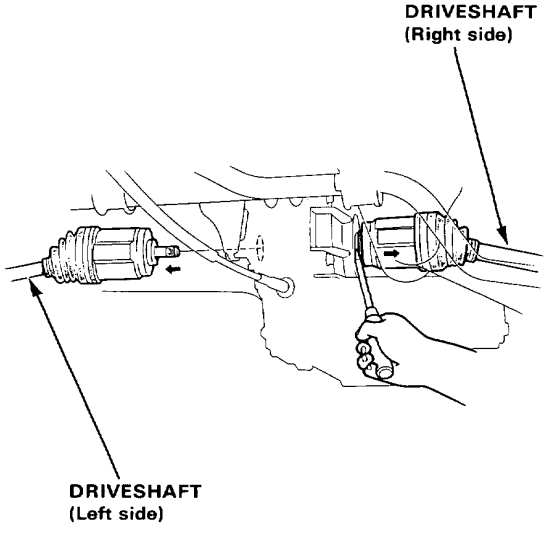
15. Remove the splash shield.



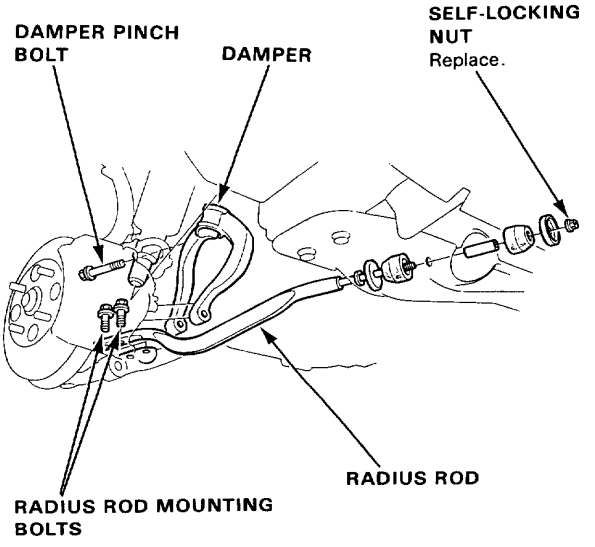
16. Remove the cotter pins and lower arm ball joint nuts, then separate the ball joints and lower arms (See section 12).



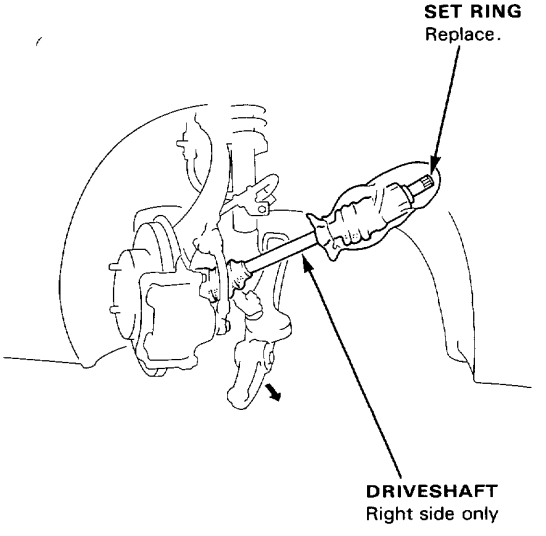
17. Pry the right and left driveshafts out of the differential.
18. Pull on the inboard joint and remove the right and left driveshafts (See section 10).



19. Remove the right damper pinch bolt, then separate the damper fork and damper.
20. Remove the bolts and nut, then remove the right radius rod.



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



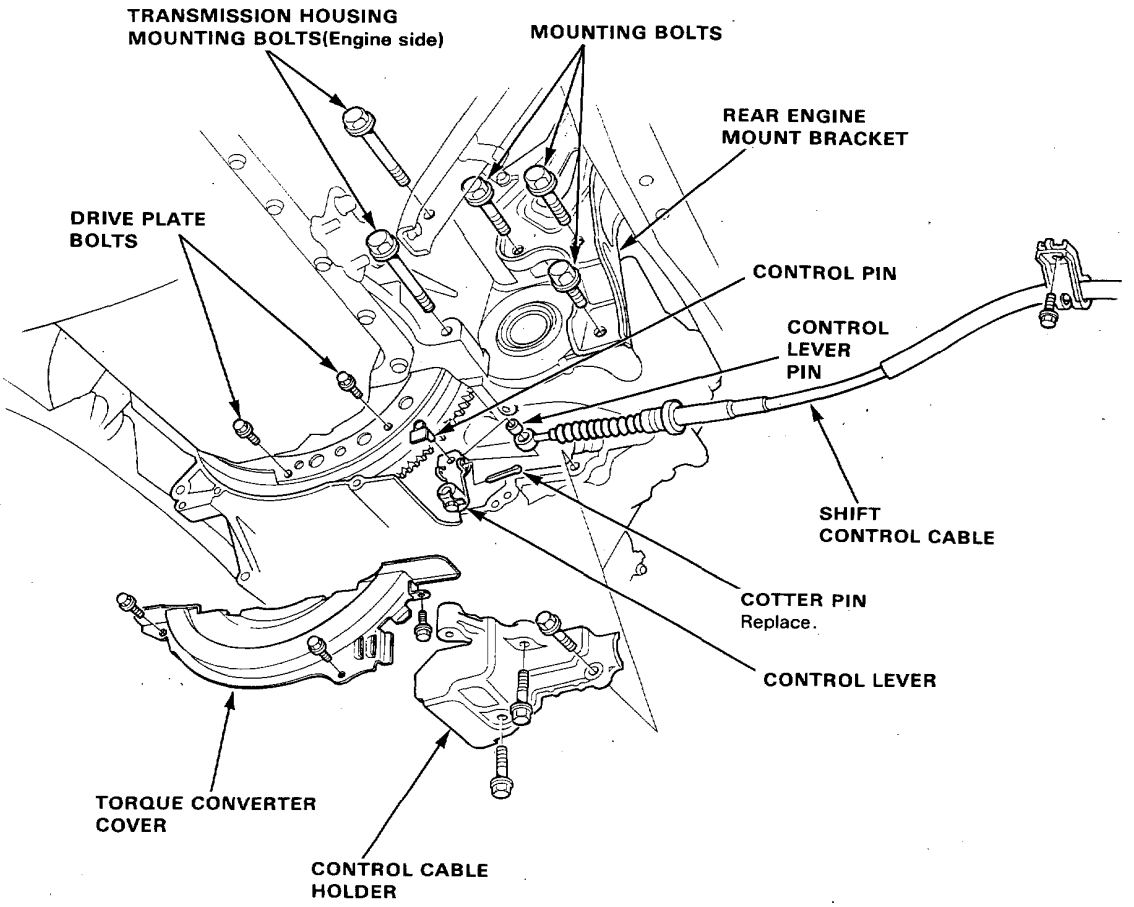
(cont'd)

Removal (cont'd)

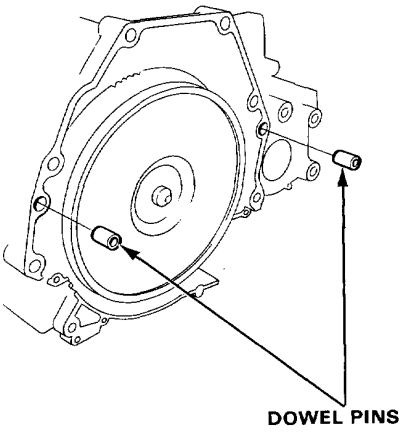
23. Remove the torque converter cover and control cable holder.
24. Remove the shift control cable by removing the cotter pin, control pin and control lever roller from the control lever.

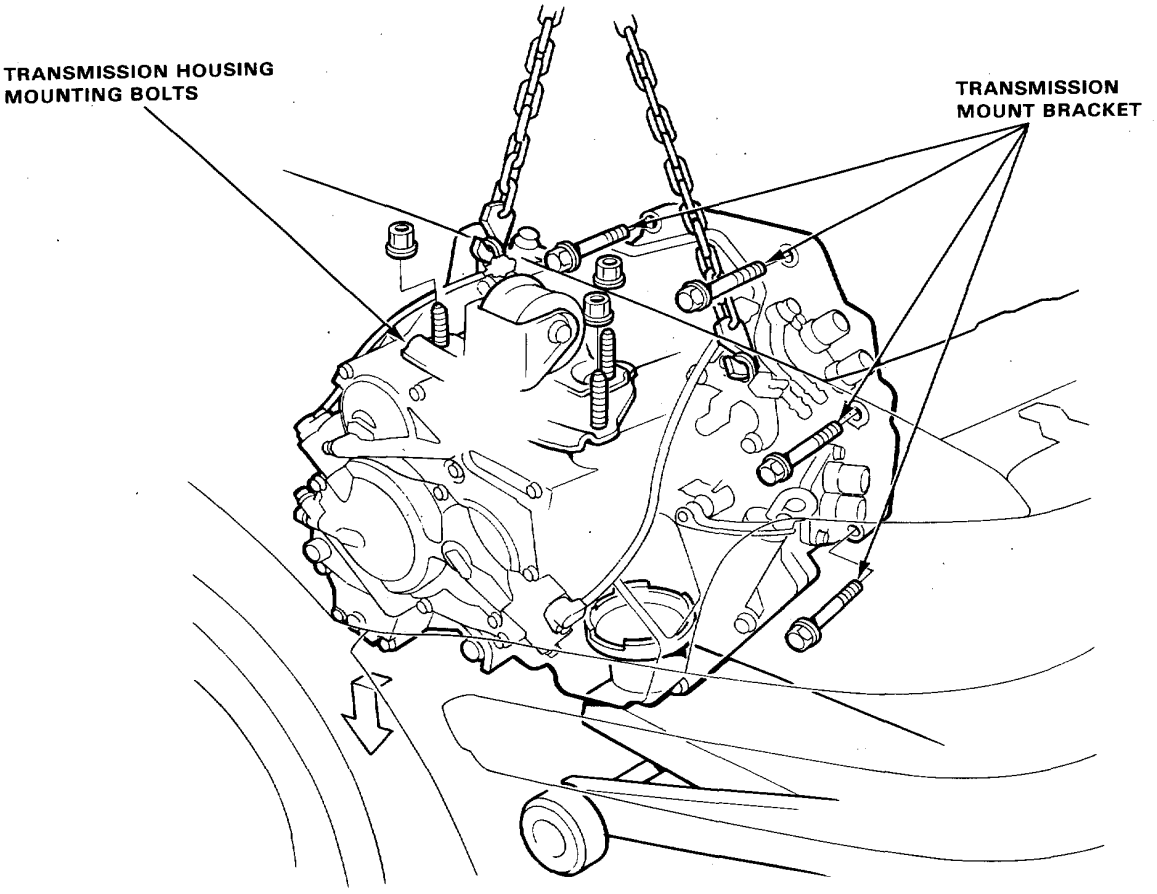
CAUTION: Take care not to bend the control cable.

25. Remove the plug, then remove the drive plate bolts one at a time while rotating the crankshaft pulley.
26. Remove the rear transmission housing mounting bolts (Engine side).
27. Remove the mounting bolts from the rear engine mount bracket.



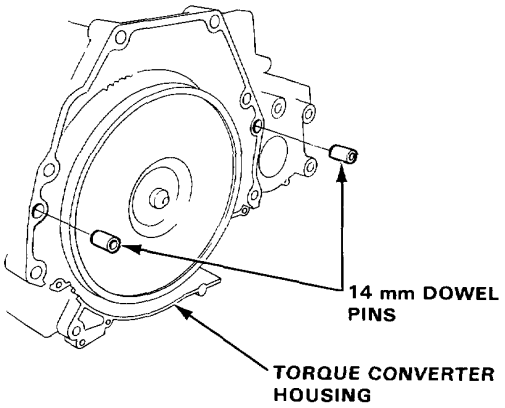
28. Attach a chain hoist to the transmission housing hoisting brackets, then lift the engine slightly.
29. Place a jack under the transmission and raise transmission just enough to take weight off mounts.
30. Remove the 4 transmission housing mounting bolts and 3 mount bracket nuts.
31. Pull the transmission away from the engine until it clears the 14 mm dowel pins, then lower it on the transmission jack.

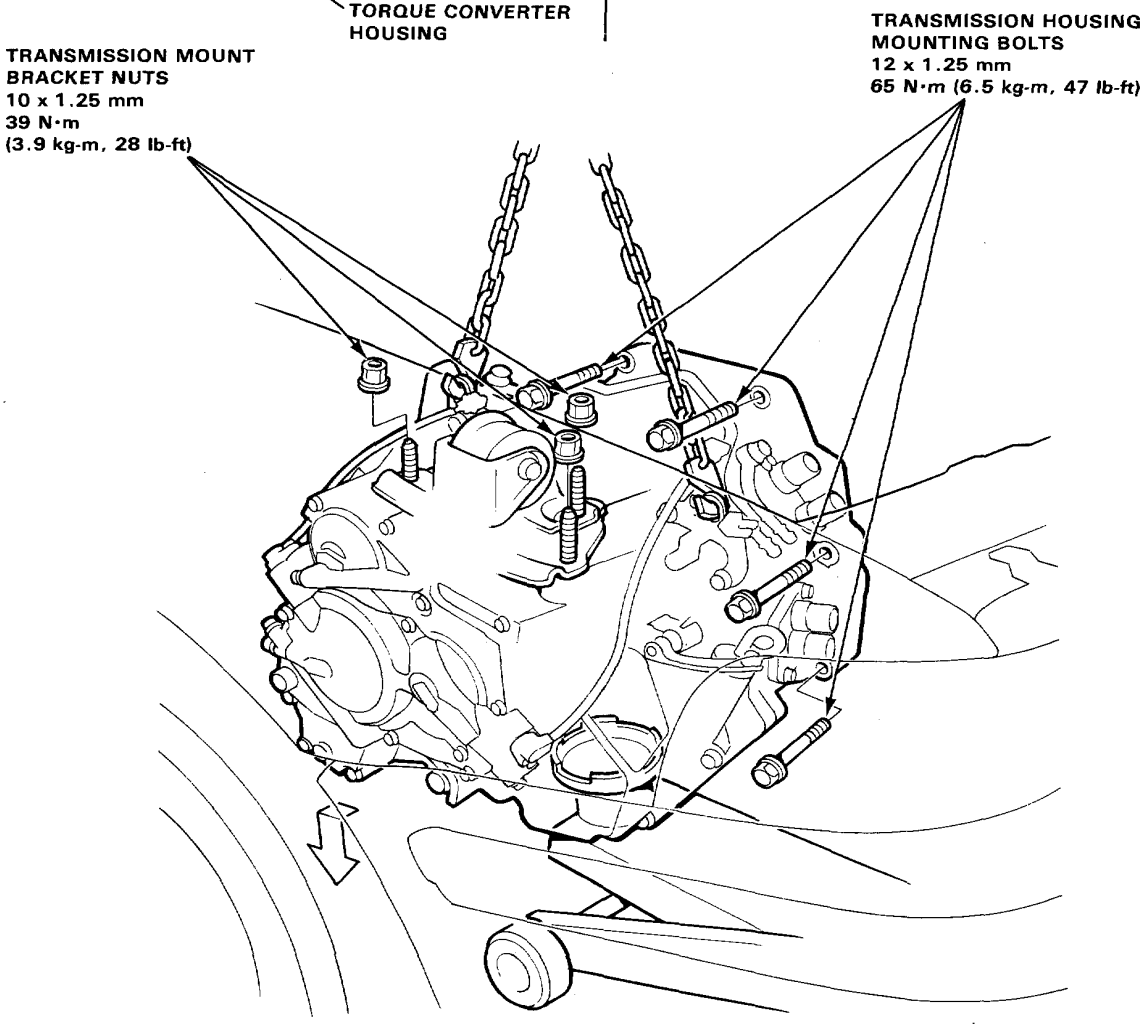




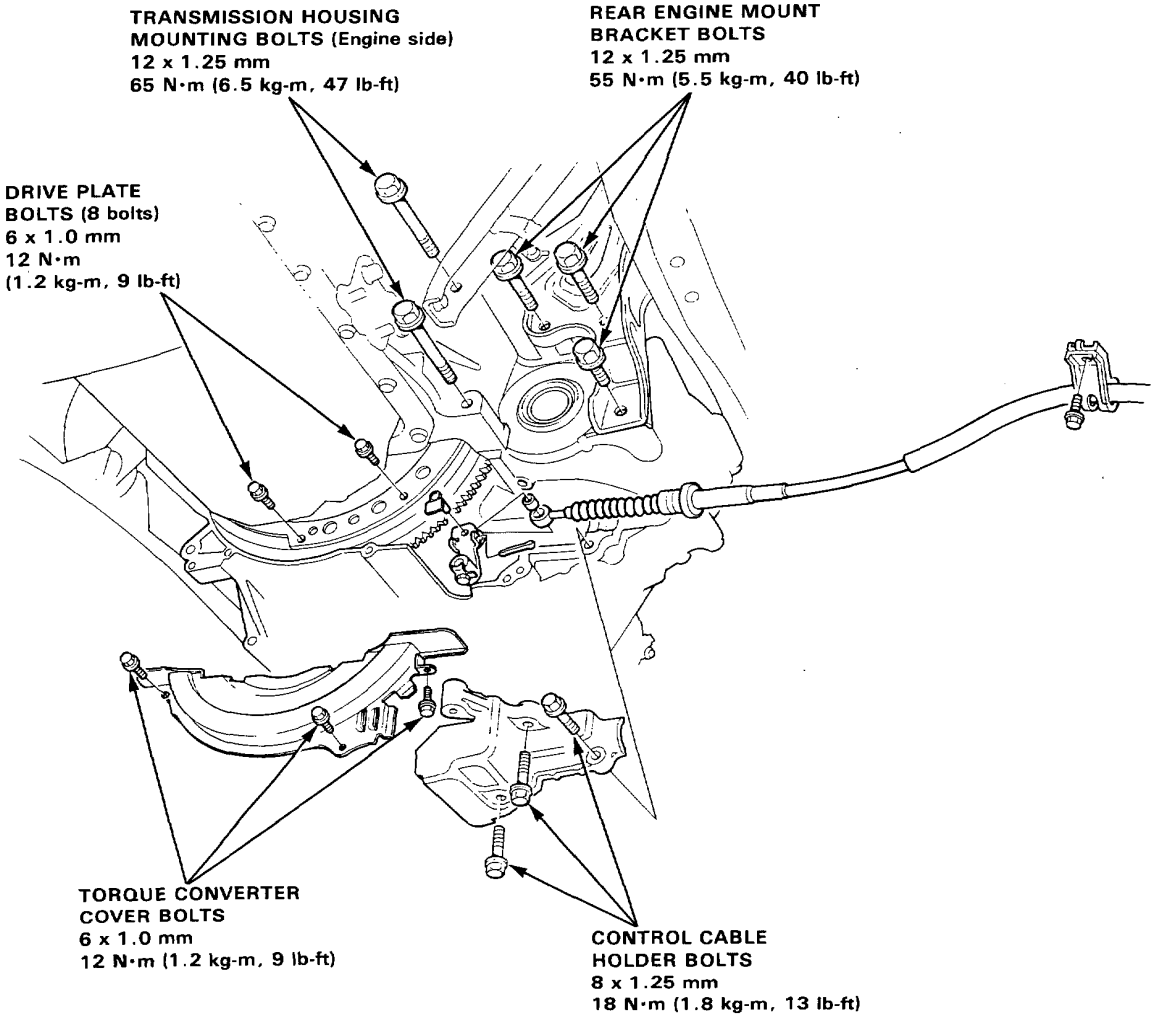
Installation

1. Place the transmission on the transmission jack, and raise to the engine level.
2. Check that the two 14 mm dowel pins are installed in the torque converter housing.
3. Install the 4 transmission housing mounting bolts, then install the transmission on the engine block.
4. Install the transmission to transmission mount bracket.
5. Remove the transmission jack.





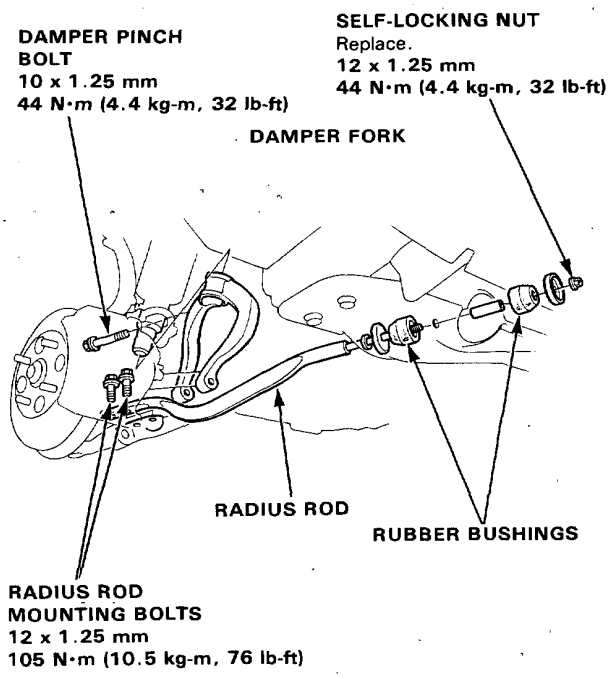
6. Install the 2 transmission housing mounting bolts (Engine side) and rear engine mount bracket bolts.
7. Attach the torque converter to the drive plate with eight bolts, and torque to 12 N·m (1.2 kg-m, 9 lb-ft). Rotate the crankshaft as necessary to tighten bolts to 1/2 torque, then final torque, in a criss-cross pattern. Check for free rotation after tightening the last bolt.
8. Install the shift control cable and control cable holder. **CAUTION: Take care not to bend the shift control cable.**
9. Install the torque converter cover.
10. Remove the chain hoist by removing the hanger plates.



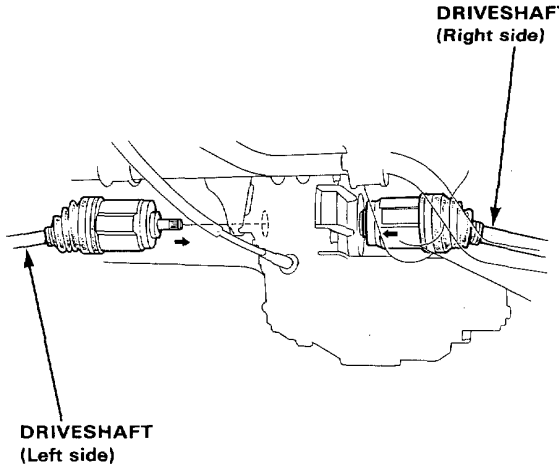
(cont'd)

Installation (cont'd)

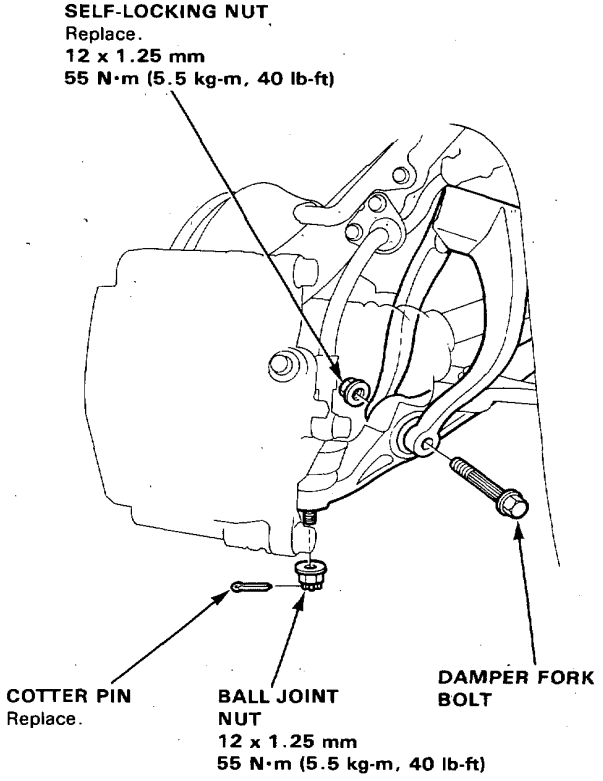
11. Install the radius rod.
    NOTE: Check for deterioration or damage of the radius rod rubber bushings.
12. Install the damper fork.



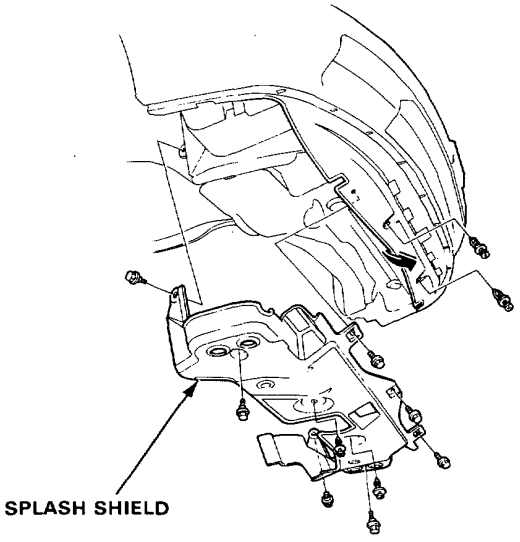
13. Install a new set ring on the end of each driveshaft.
14. Install the right and left driveshafts (See section 10).
    NOTE: Turn the right and left steering knuckle fully outward, and slide axle into the differential until you feel its spring clip engage the side gear.



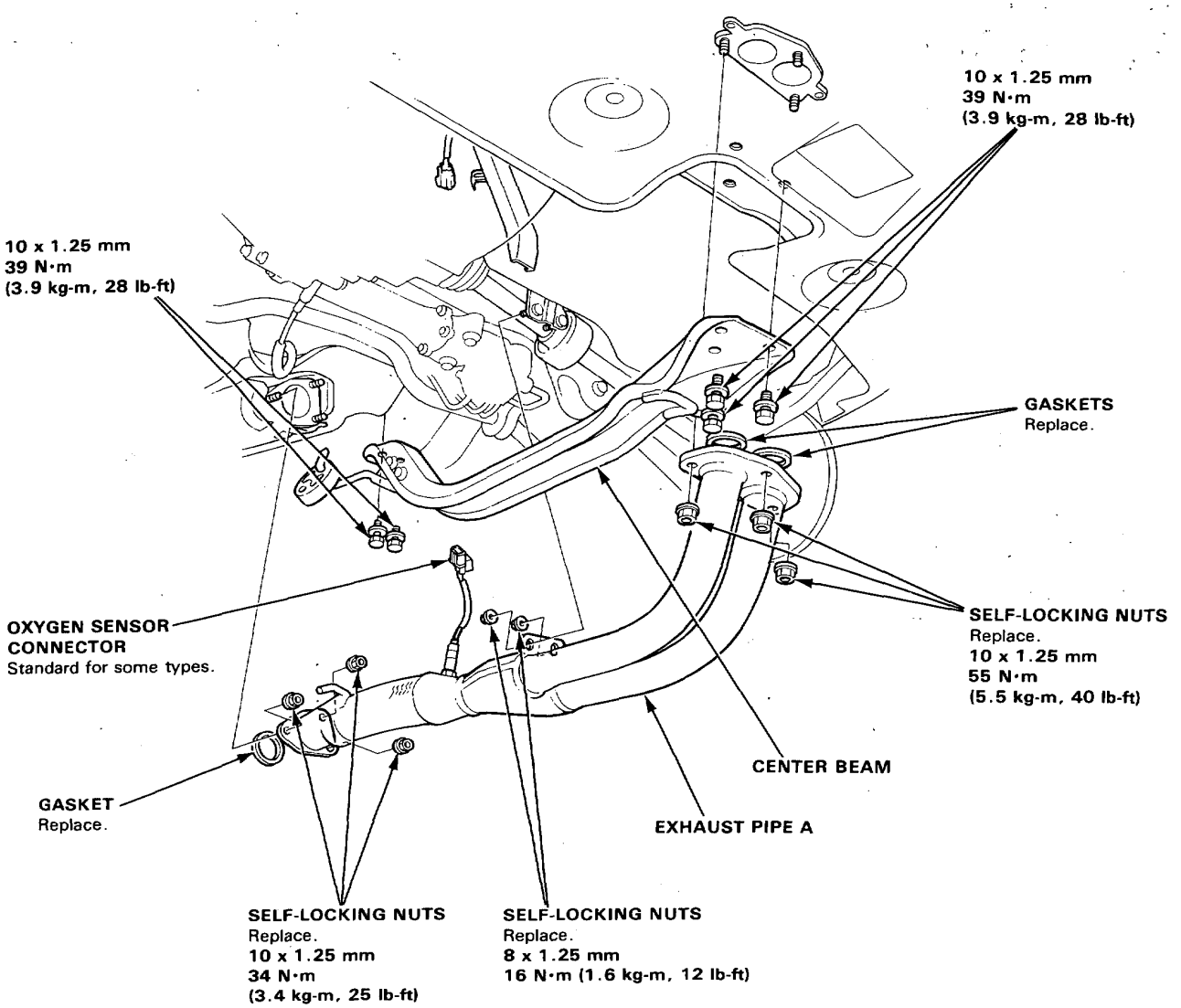
15. Install the damper fork bolts and ball joint nuts to the lower arms.



16. Install the splash shield.



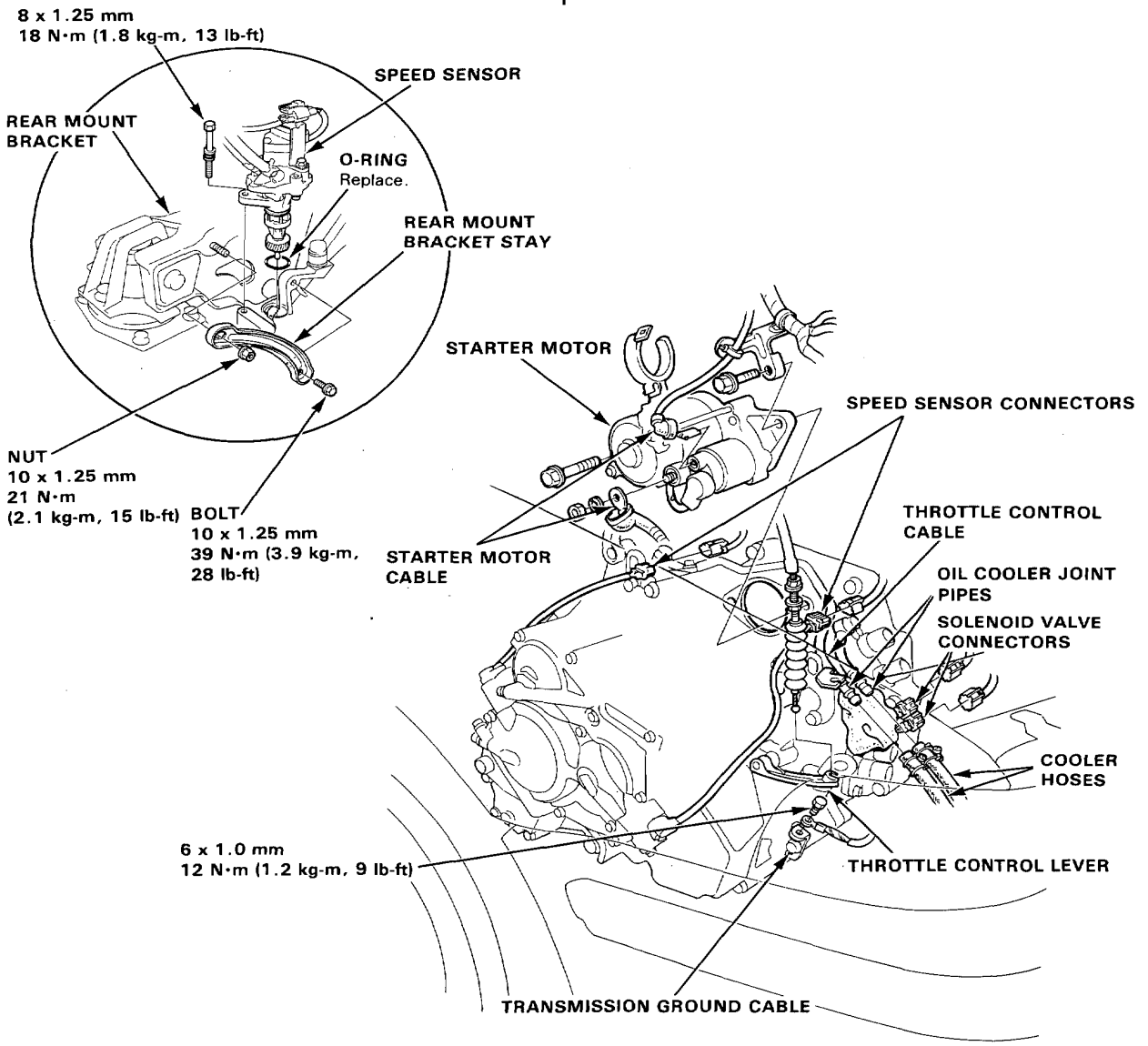
17. Install the center beam and exhaust pipe A.
18. Connect the oxygen sensor connector.
    NOTE: The oxygen sensor is equipped on the exhaust pipe A for some types.



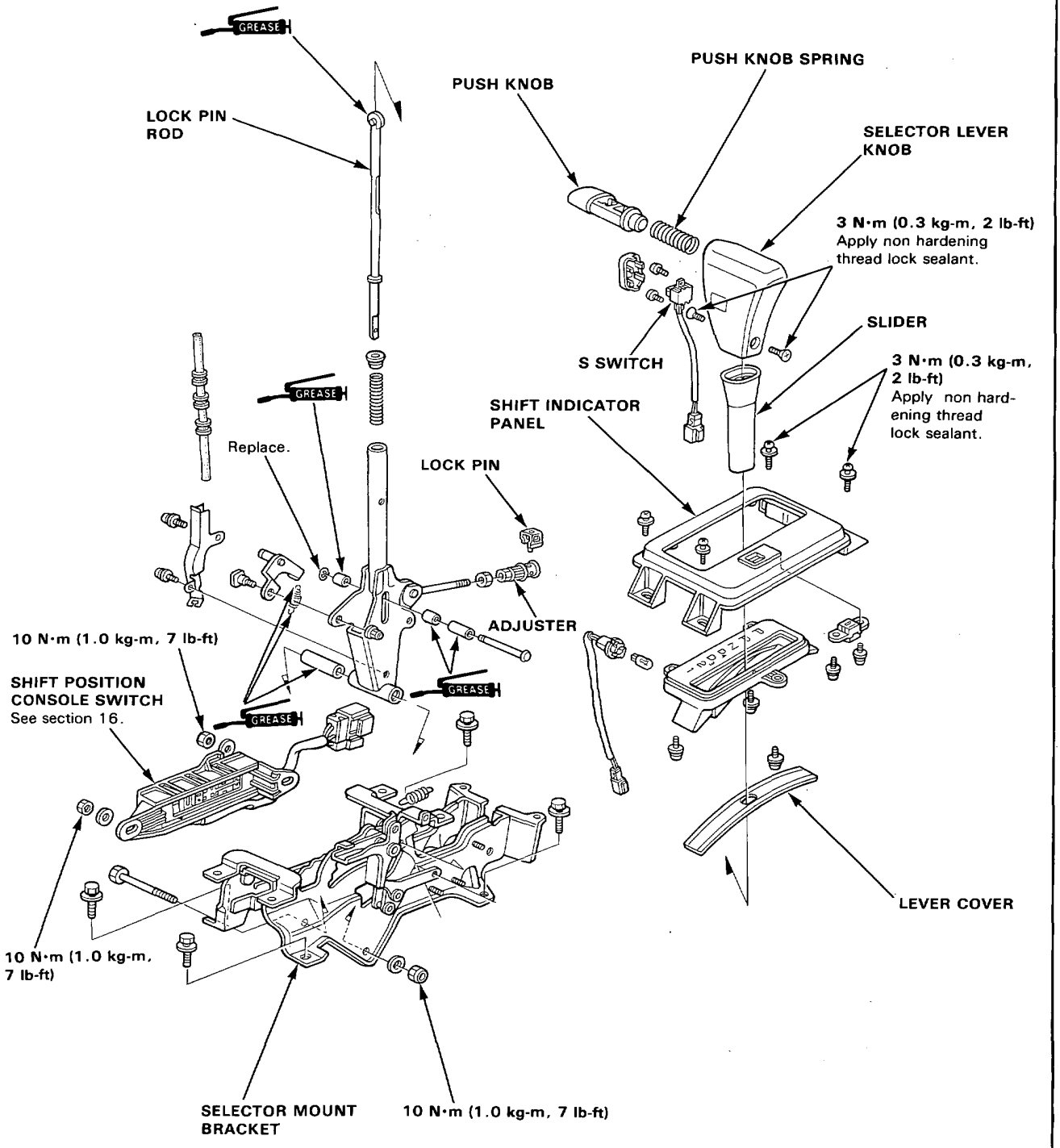
(cont'd)

Installation (cont'd)

19. Install the speed sensor.
20. Install the rear mount bracket stay.
    NOTE: Tighten the bolt first and then tighten the nut.
21. Install the starter motor and connect the starter motor cable.
22. Connect the lock-up control solenoid valve and shift control solenoid valve connectors.
23. Connect the speed sensor connectors.
24. Connect the transmission ground cable.
25. Connect the throttle control cable.
26. Install the battery base, air cleaner case and air intake hose.
27. Install the battery.
28. Connect the battery positive (+) and negative (−) cables to the battery.
29. Start the engine. Set the parking brake, and shift the transmission through all gears three times. Check for proper control cable adjustment.
30. Check the ignition timing (See section 16).
31. Let the engine reach operating temperature with the transmission in Neutral or Park, then turn it off and check the fluid level.
32. Road test as described on page 9-68.



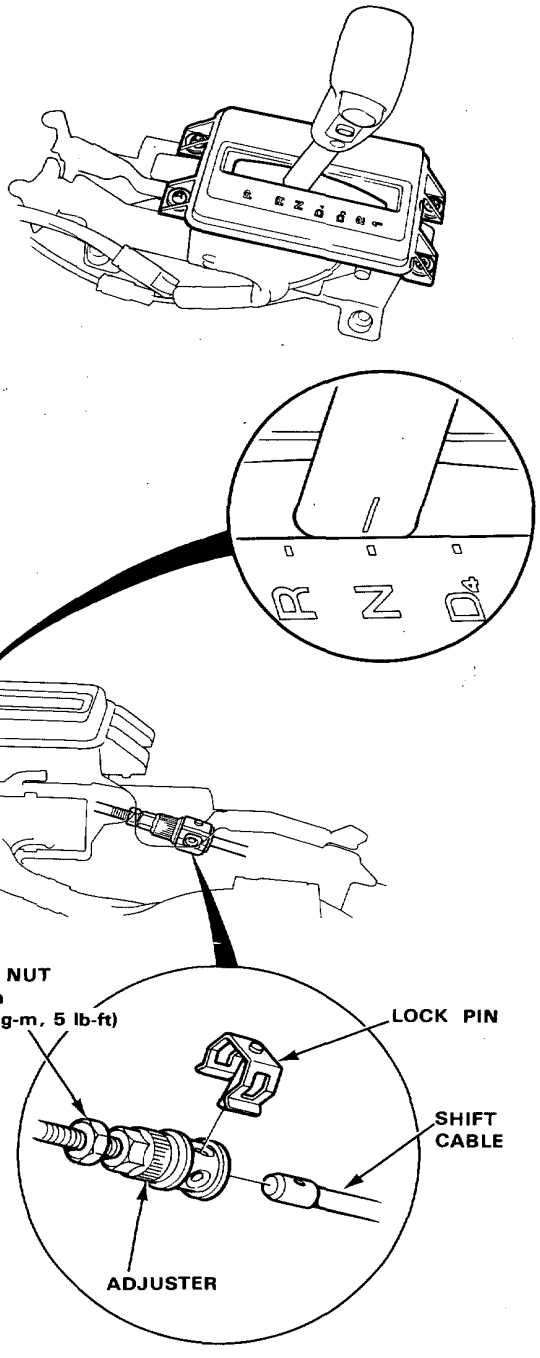
Gear Shift Selector



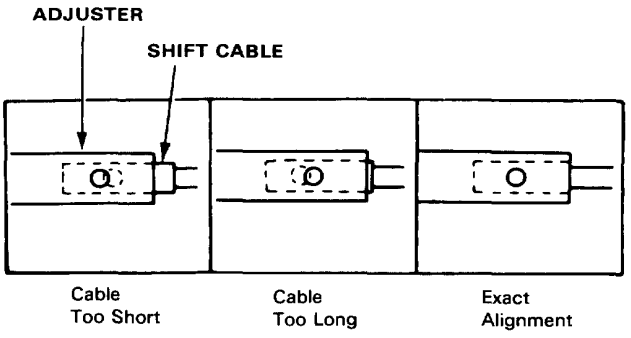
Shift Cable

Adjustment

1. Start the engine. Shift to reverse to see if the reverse gear engages. If not, refer to Troubleshooting.
2. With the engine off, remove the console.
3. Shift to [N] position, then remove the lock pin from the cable adjuster.



4. Check that the hole in the adjuster is perfectly aligned with the hole in the shift cable.



NOTE: There are two holes in the end of the shift cable. They are positioned 90° apart to allow cable adjustments in 1/4 turn increments.

5. If not perfectly aligned, loosen the lock nut on shift cable and adjust as required.
6. Tighten the lock nut.
7. Install the lock pin on the adjuster.

   NOTE: If you feel the lock pin binding as you reinstall it, the cable is still out of adjustment and must be readjusted.

8. Start the engine and check the shift lever in all gears. If any gear does not work properly, refer to trouble-shooting on page 9-64 thru 67.

Removal/Installation

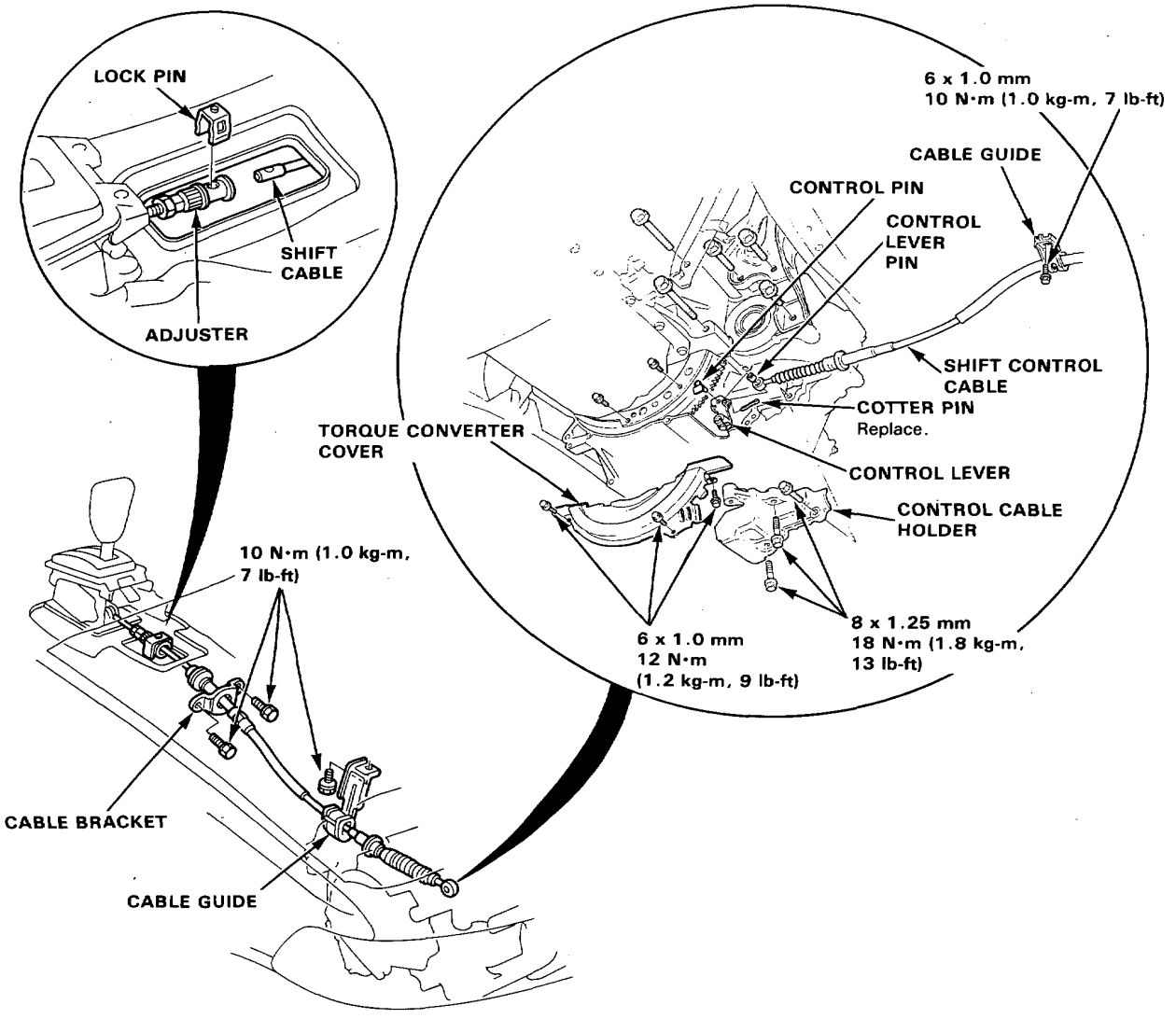
⚠WARNING

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

1. Remove the front console.
2. Remove the lock pin from the cable adjuster.
3. Remove the bolts, then remove the cable bracket and cable guide.
4. Remove the exhaust pipe A and center beam.
5. Remove the torque converter cover and cable holder.
6. Remove the shift cable by removing the cotter pin, control lever pin and control lever roller from the control lever.

   CAUTION: Take care not to bend the cable when removing it.

7. Install the shift cable in the reverse order of removal.
   NOTE: On reassembly, check the cable adjustment.



Throttle Control Cable

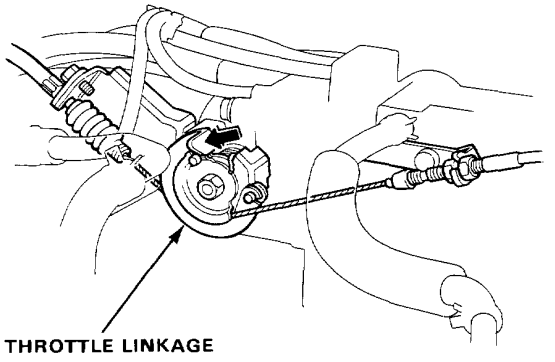
Adjustment/Inspection

NOTE: Before adjusting the throttle control cable, make sure:

- The throttle cable free play is correct. (See section 6)
- The engine is at normal operating temperature (cooling fan comes on).
- The idle speed is correct. (See section 6)

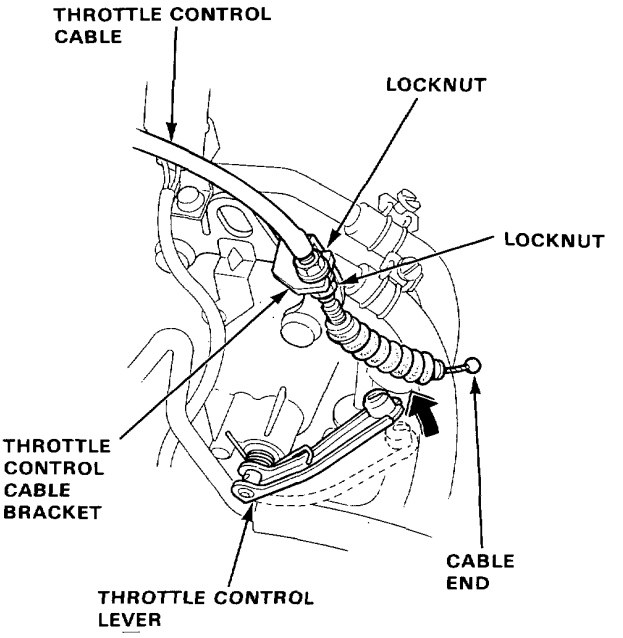
Inspection:
NOTE: You can work the throttle linkage body with your hand.

1. Remove the throttle cable free play.
2. Apply light thumb pressure to the throttle control lever, then work the accelerator or throttle linkage. The lever should move just as the engine speed increases above idle. If not, proceed to Adjustment.



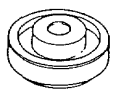
Adjustment:
1. Loosen the nuts on the control cable at the transmission end and synchronize the control lever to the throttle.

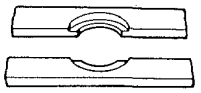
NOTE: To tailor the shift/lock-up characteristics to a particular customers driving expectations, you can adjust the control cable up to 3 mm shorter than the "synchronized" point.

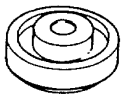


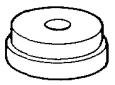
Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07GAD—PG40100	Seal Driver Attachment	1	
②	07GAF—SD40700	Hub Dis/Assembly Base	2	
③	07LAD—SM40100	Seal Driver Attachment	1	
④	07746—0010200	Attachment, 37 x 40 mm	1	
⑤	07746—0010300	Attachment, 42 x 47 mm	1	
⑥	07746—0030100	Driver, 40 mm I.D.	1	
⑦	07749—0010000	Driver	1	
⑧	07947—SD90101	Seal Driver Attachment	1	
⑨	07965—SD90100	Support Base	1	
⑩	07LAF—SM40300	Support Base Attachment	1	

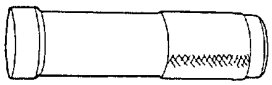

①


②

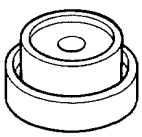

③

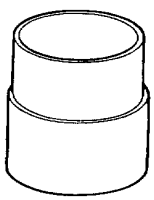

④

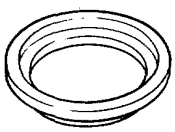

⑤


⑥


⑦

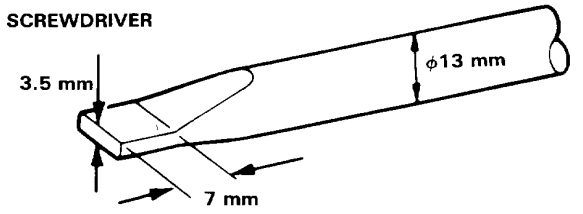

⑧


⑨

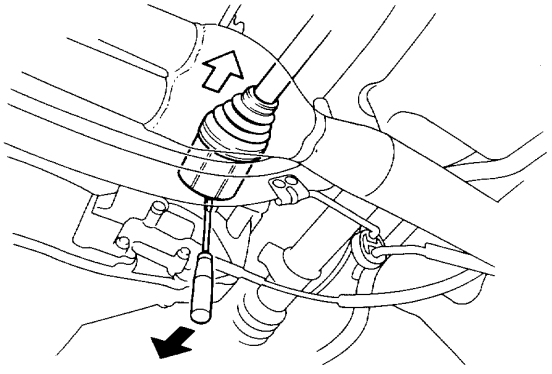

⑩

Removal (cont'd)

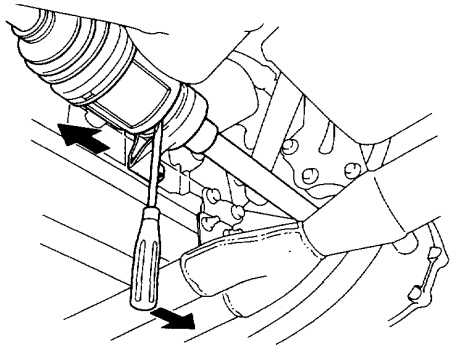
10. Pry the driveshaft assembly with a screwdriver as shown to force the set ring at the driveshaft end past the groove.



11. Pull the inboard joint and remove the driveshaft and CV joint out of the differential case or intermediate shaft as an assembly.



with intermediate shaft:



CAUTION:

- **Do not pull on the driveshaft, as the CV joint may come apart.**
- **Use care when prying out the assembly and pull it straight to avoid damaging the differential oil seal or intermediate shaft dust seal.**

Disassembly/Inspection

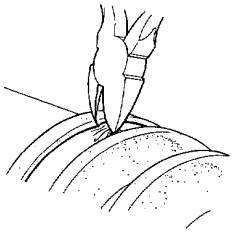
NOTE:
- Mark the rollers and roller grooves during disassembly to ensure proper positioning during reassembly.
- Before disassembly, mark the spider and driveshaft so they can be reinstalled in their original positions.
- The inboard joint must be removed to replace the boots.
- If the boot band is the welded type, cut off as shown.

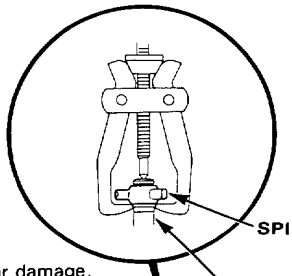
CAUTION: Take care not to damage the boots.

GREASE Thoroughly pack the inboard joint and both joint boots with high quality molybdenum disulfide grease when reassembling.

Grease Quantity:

Inboard Joint	120~130 g
Outboard Joint	130~140 g

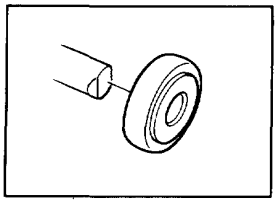




SPIDER

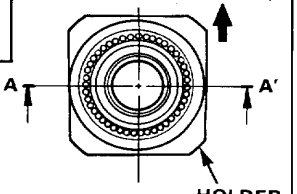
DRIVESHAFT

Automatic Transmission

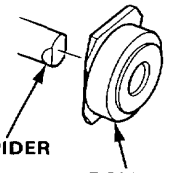


Install the holder or roller toward the slot of the inboard joint as shown below.

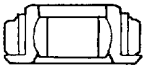
Spline direction



Manual Transmission



ROLLER
High shoulder faces toward outside.



Section AA'

INBOARD JOINT
Check splines for wear or damage.
Check inside bore for wear.
Inspect for cracks.

SET RING
Replace.

GREASE
Pack cavity with grease.

CIRCLIP

STOPPER RING

GREASE
Pack cavity with grease.

INBOARD JOINT BOOT
Inspect for cracking, splitting and wear.

BOOT BAND
Replace.

BOOT BAND
Replace.

BAND
Replace.

GREASE
Pack cavity with grease.

DYNAMIC DAMPER
Automatic Transmission left driveshaft only.

BOOT BAND
Replace.

OUTBOARD JOINT BOOT
Inspect for cracking, splitting and wear.

BOOT BAND
Replace.

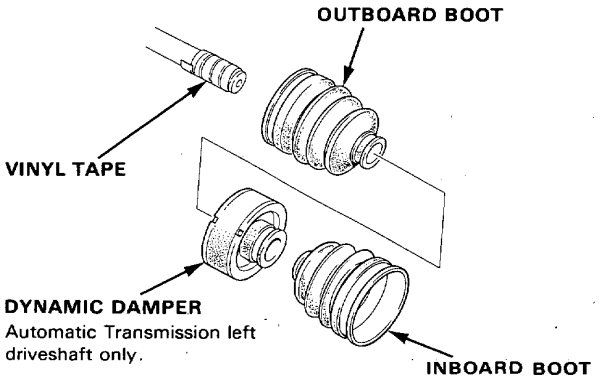
OUTBOARD JOINT
Inspect for faulty movement and wear.
Inspect ball bearings while rotating.
Do not try to disassemble.

OUTBOARD RING
Check for damage.

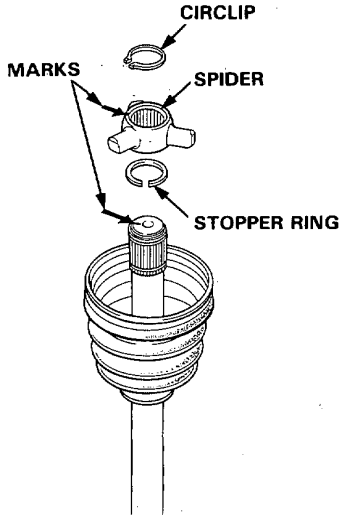
DRIVESHAFT

Reassembly

1. Wrap the splines with vinyl tape to prevent damage to the boots and dynamic damper.
2. Install the outboard boot, dynamic damper and inboard boot to the driveshaft, then remove the vinyl tape.

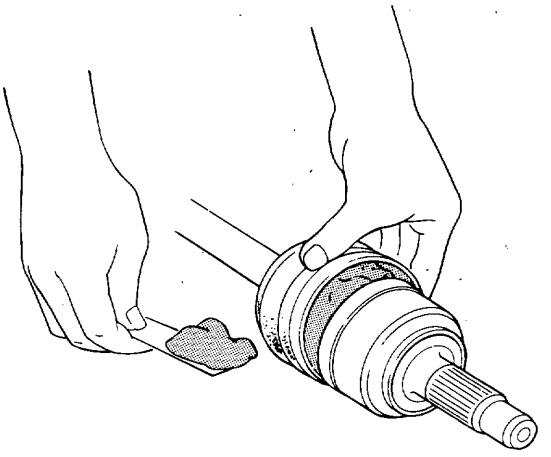


3. Install the stopper ring onto the driveshaft groove.
4. Install the spider on the driveshaft by aligning the marks on the spider and end of the driveshaft.
5. Fit the circlip onto the driveshaft groove.



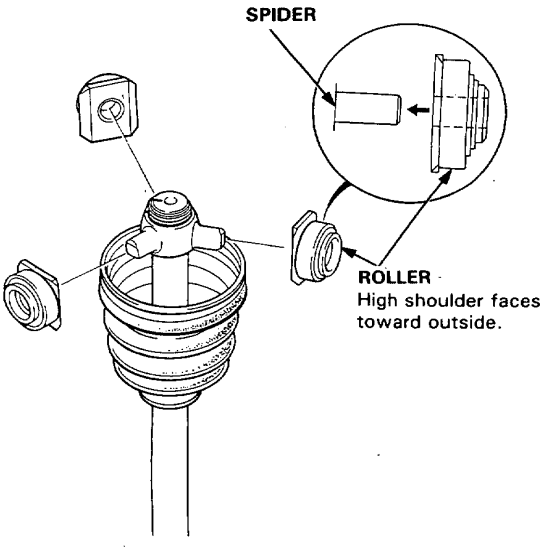
6. Pack the outboard joint boot with molybdenum disulfide grease.

Grease Quantity: **130~140 g**



7. Fit the rollers to the spider with their high shoulders facing outward.

CAUTION:
- **Reinstall the rollers to their original positions on the spider.**
- **Hold the driveshaft assembly so the spider and roller points up, to prevent it from falling off.**

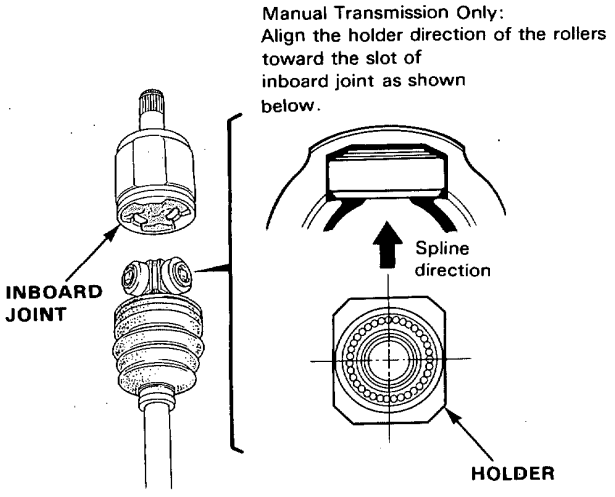


8. Pack the inboard joint with molybdenum disulfide grease.

Grease Quantity: 120~130g

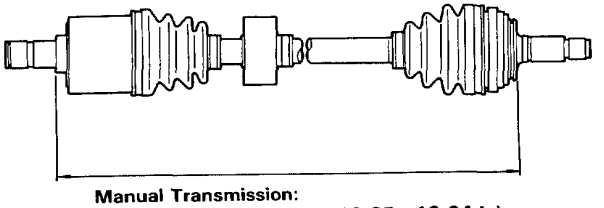
9. Fit the inboard joint onto the driveshaft.

CAUTION: Hold the driveshaft assmbly so the inboard joint points up, to prevent it from falling off.



10. Adjust the length of the driveshafts to the figure below, then adjust the boots to halfway between full compression and extension.

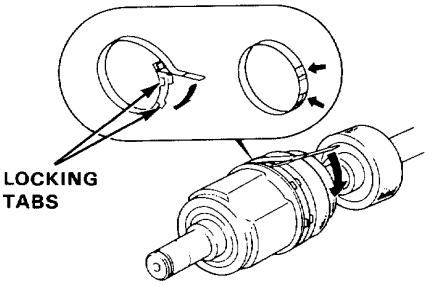
NOTE: The ends of boots seat in the groove of the driveshaft and joint.



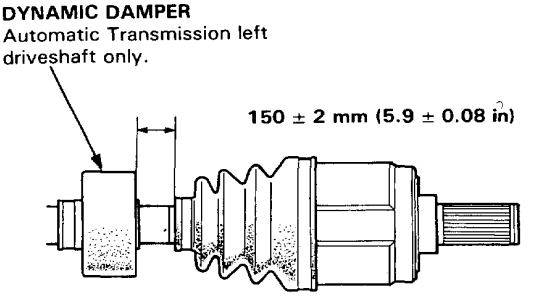
Manual Transmission:
L. R. 478.7—483.7 mm (18.85—19.04 in)
Automatic Transmission:
L. 836.7—841.7 mm (32.94—33.14 in)
R. 478.7—483.7 mm (18.85—19.04 in)

11. Install new boot bands on the boot and bend both sets of locking tabs.

12. Lightly tap on the doubled-over portions to reduce their height.



13. Position the dynamic damper as shown below.



14. Lightly tap on the doubled-over portion to reduce its height.

15. Install a new dynamic damper band and bend down both sets of locking tabs.

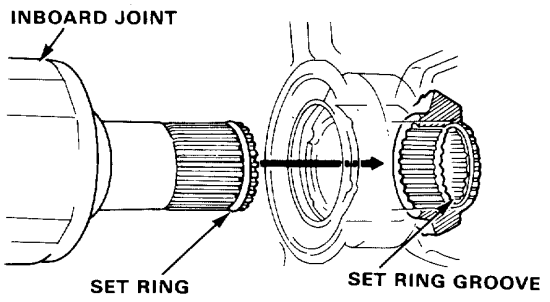
(cont'd)

Reassembly (cont'd)

16. Install a new set ring in the driveshaft groove.

17. Install the inboard end of the driveshaft into differential or intermediate shaft.

CAUTION:
- **Always use a new set ring whenever the driveshaft is being installed.**
- **Make sure the driveshaft locks in the differential side gear groove, and the CV joint subaxle bottoms in the differential or intermediate shaft.**

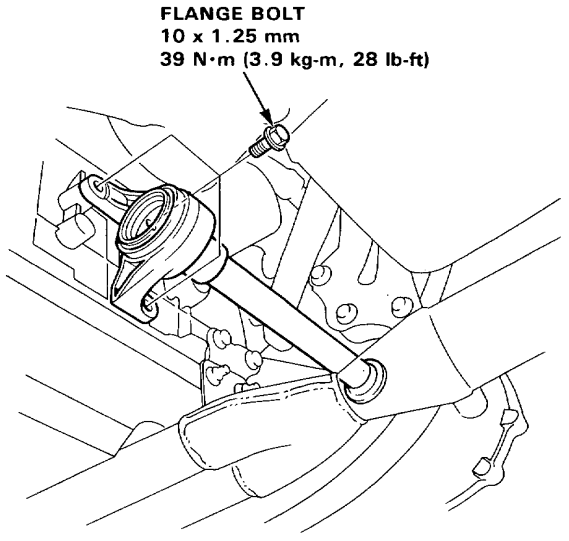


18. Refill the transmission.

Replacement

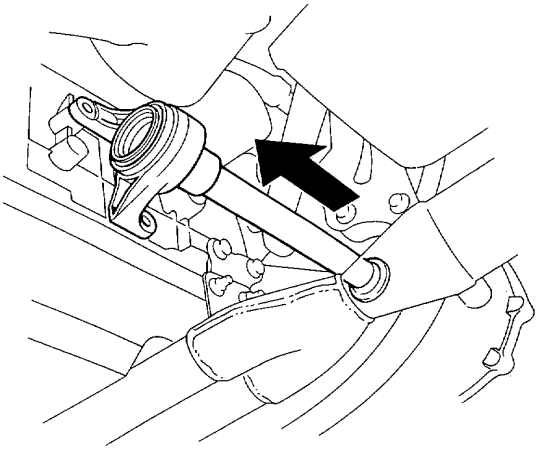
1. Drain oil from the transmission.

2. Remove the three 10 mm flange bolts.



3. Lower the bearing support close to the steering gearbox and remove the intermediate shaft from the differential.

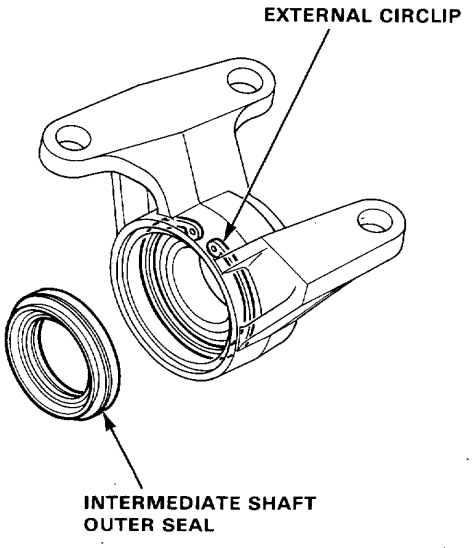
CAUTION: To prevent damage to the differential oil seal, hold the intermediate shaft horizontal until it is clear of the differential.



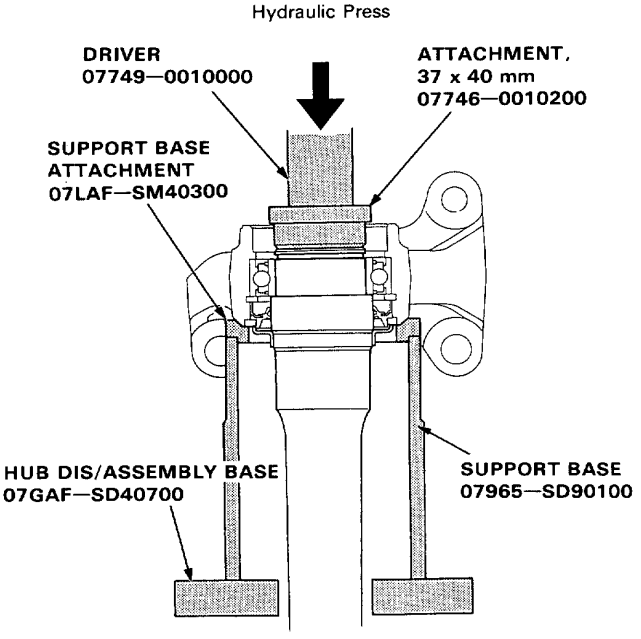
Installation is the reverse order of removal.

Disassembly

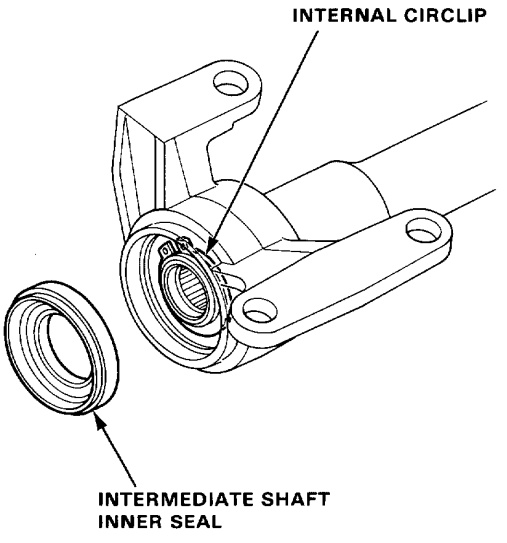
1. Remove the intermediate shaft outer seal.
2. Remove the external circlip.



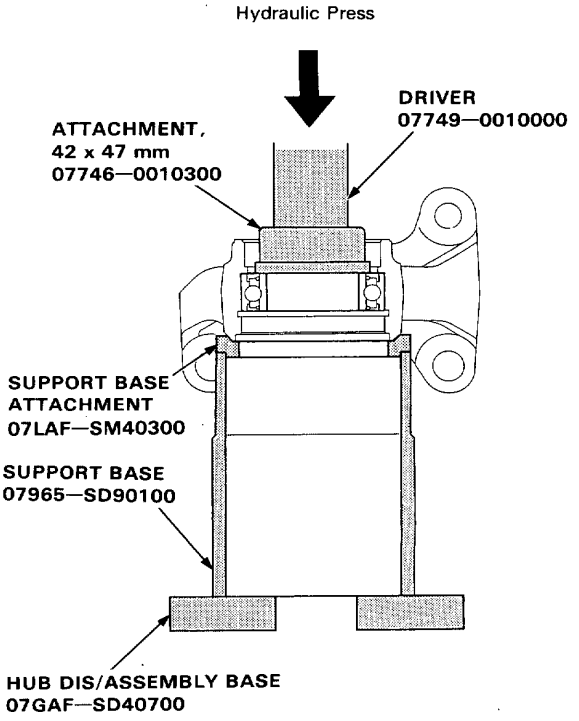
3. Press the intermediate shaft out of the shaft bearing using the special tool.



4. Remove the intermediate shaft inner seal.
5. Remove the internal circlip.

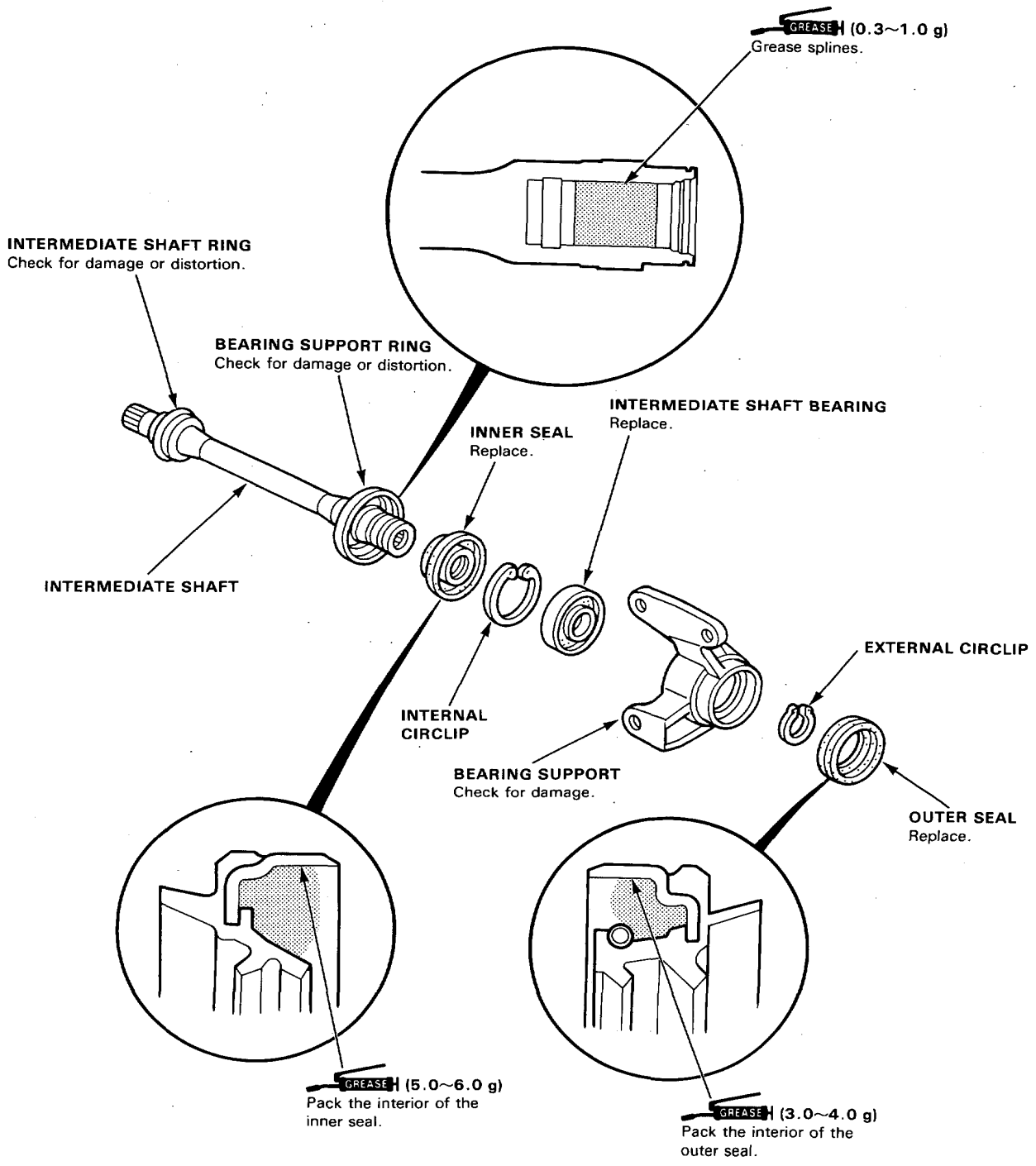


6. Press the intermediate shaft bearing out of the bearing support.



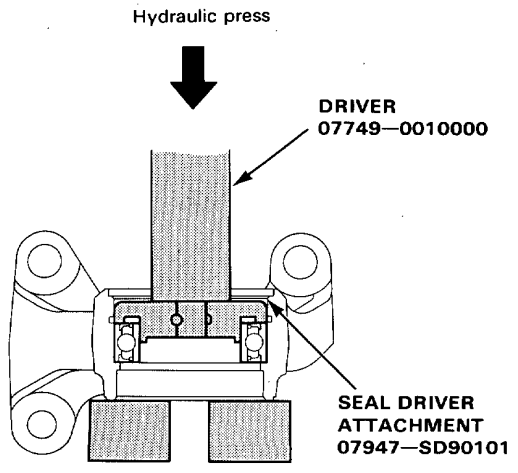
Intermediate Shaft

Index/Inspection



Reassembly

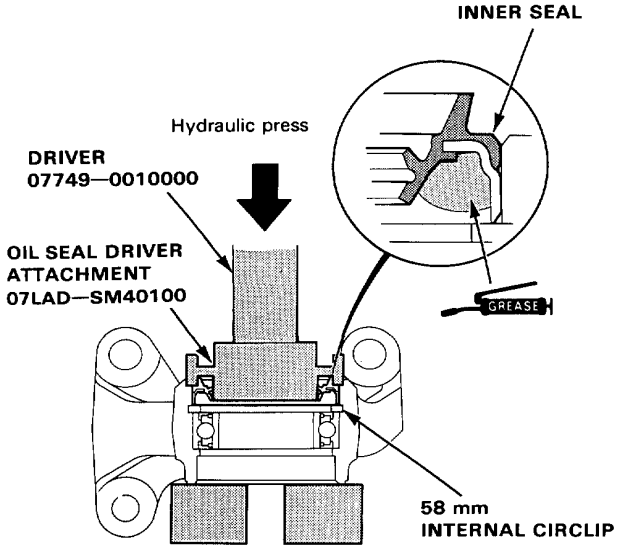
1. Press the intermediate shaft bearing into the bearing support using the special tool.



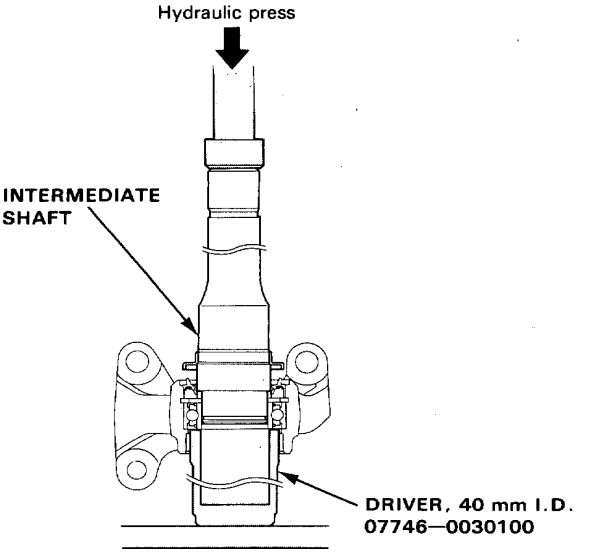
2. Seat the 58 mm internal circlip in the groove of the bearing support.

   CAUTION: Install the circlip with the tapered end facing out.

3. Press the intermediate shaft inner seal into the bearing support using the special tool.



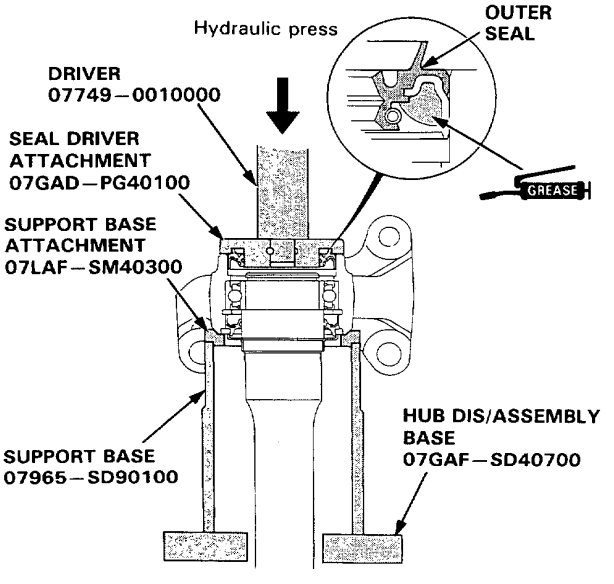
4. Press the intermediate shaft into the shaft bearing.



5. Seat the 38 mm external circlip in the groove of the intermediate shaft.

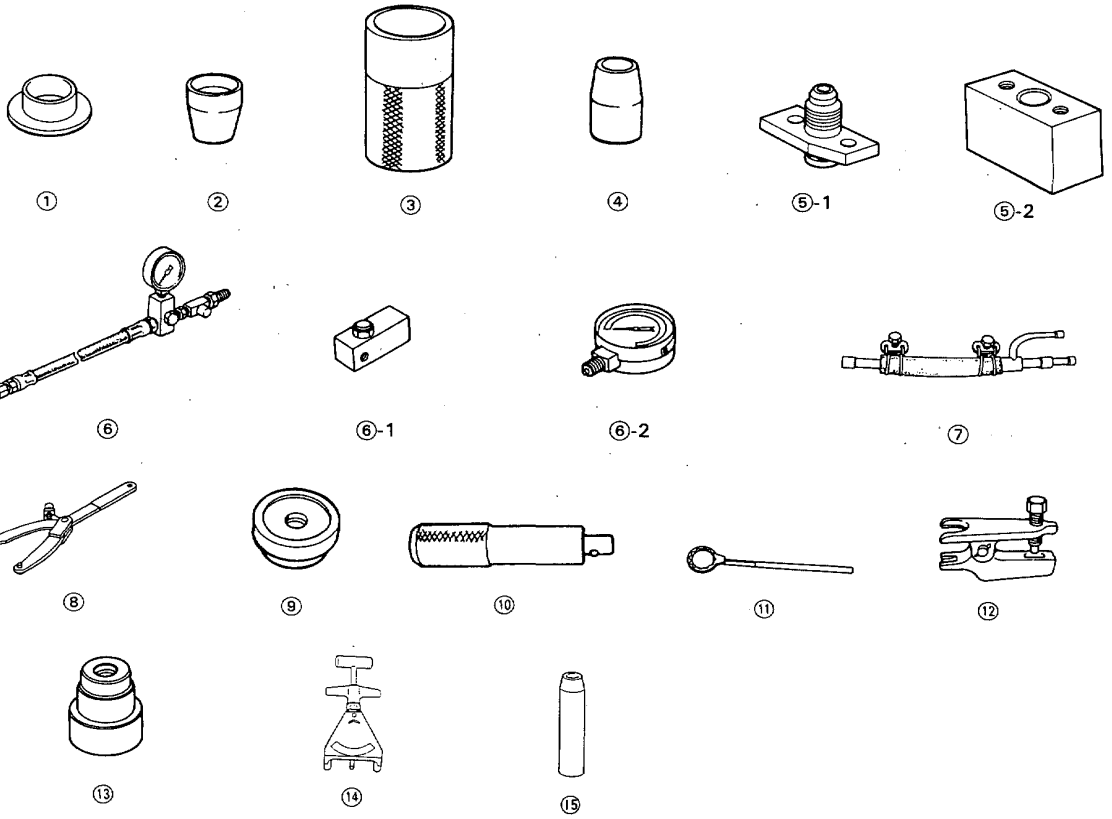
   CAUTION: Install the circlip with the tapered end facing out.

6. Press the outer seal into the bearing support using the special tool.



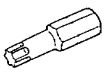
Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07GAG—SD40300	Cylinder End Seal Slider	1	
②	07HAG—SF10100	Piston Seal Ring Guide	1	
③	07HAG—SF10200	Piston Seal Ring Sizing Tool	1	
④	07HAG—SD40400	Pinion Seal Ring Guide	1	
⑤-1	07LAK—SM40110	P/S Joint Adapter (Pump)	1	
⑤-2	07LAK—SM40120	P/S Joint Adapter (Hose)	1	
⑥	07406—0010001	P/S Pressure Gauge Set	1	
⑥-1	07406—0010300	Pressure Control Valve	1	
⑥-2	07406—0010400	Pressure Gauge	1	
⑦	07406—0010101	Bypass Tube Joint (included with 07406—0010001)	1	
⑧	07725—0030000	Universal Holder	1	
⑨	07746—0010300	Attachment 42 x 47 mm	1	
⑩	07749—0010000	Driver	1	
⑪	07916—SA50001	Locknut Wrench 40 mm	1	
⑫	07941—6920003	Ball Joint Remover	1	
⑬	07947—6340300	Driver Attachment	1	
⑭	07JGG—0010100	Belt Tension Gauge	1	
⑮	07974—SA50600	Pinion Seal Guide	1	

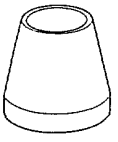


Special Tools (4WS only)

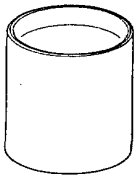
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07703—0010101	Torx Bit Driver T40	1	
②	07LAG—SM40000	4WS Tool Kit	1	
②-1	07LAG—SM40100	Piston Seal Ring Guide	1	
②-2	07LAG—SM40200	Piston Seal Ring Sizing Tool	1	
②-3	07LAG—SM40300	Cylinder End Seal Slider	1	
②-4	07LAG—SM40400	Cylinder End Seal Guide	1	
②-5	07LAG—SM40500	Tool Box	1	
③	07HAG—SF10000	4WS Tool Kit	1	
③-1	07HAG—SF10400	Pinion Seal Ring Sizing Tool	1	
③-2	07HAG—SF10500	Driven Seal Ring Guide	1	
④	07HAJ—SF10100	Rack Adjuster Gauge Holder Set	1	
⑤	07HAJ—SF10201	Rear Steering Center Lock Pin	1	
⑥	07HAJ—SF10300	Stroke Rod Holder Set	1	
⑦	07HAJ—SF10400	Inspection Adapter	1	
⑧	07LAA—SM40100	Lock Nut Wrench 43 mm	1	
⑨	07LAA—SM40200	Lock Nut Socket 36 x 43 mm	1	



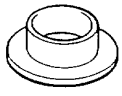
①



②-1



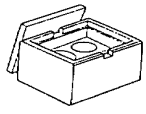
②-2



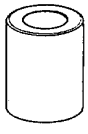
②-3



②-4



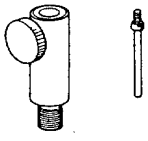
②-5



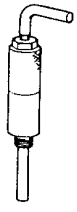
③-1



③-2



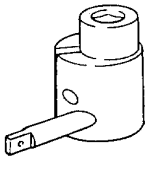
④



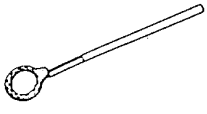
⑤



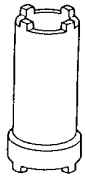
⑥



⑦



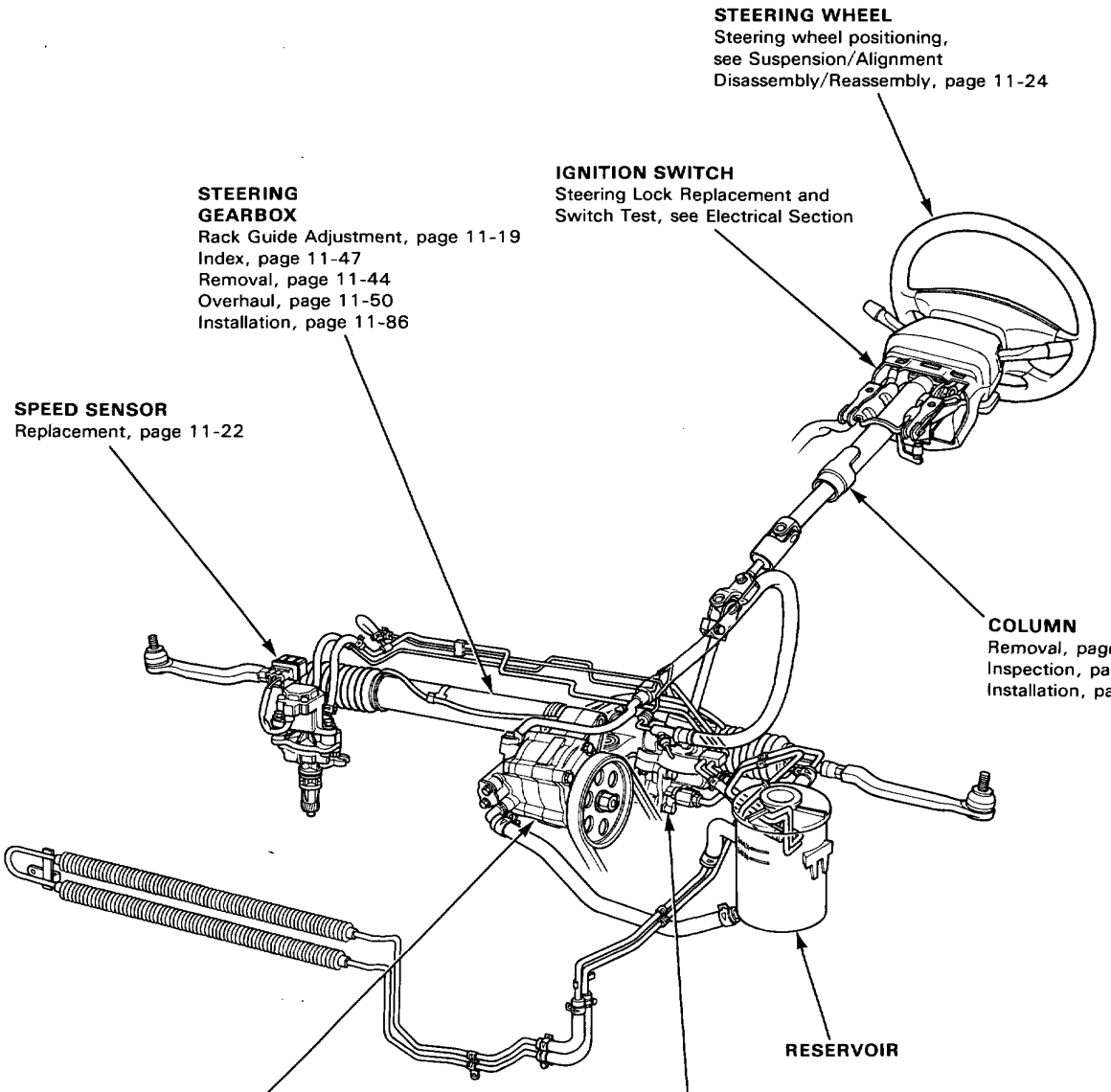
⑧



⑨

Component Location

Index



STEERING WHEEL
Steering wheel positioning,
see Suspension/Alignment
Disassembly/Reassembly, page 11-24

IGNITION SWITCH
Steering Lock Replacement and
Switch Test, see Electrical Section

STEERING GEARBOX
Rack Guide Adjustment, page 11-19
Index, page 11-47
Removal, page 11-44
Overhaul, page 11-50
Installation, page 11-86

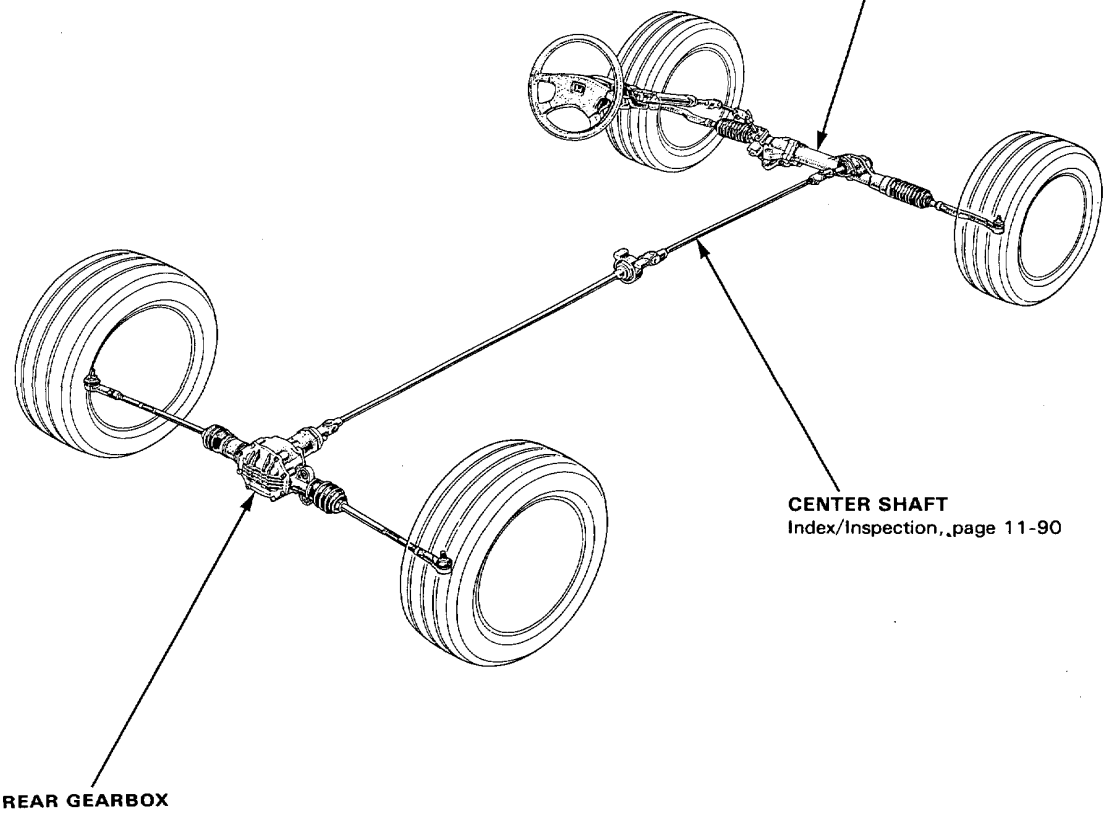
SPEED SENSOR
Replacement, page 11-22

COLUMN
Removal, page 11-25
Inspection, page 11-27
Installation, page 11-28

RESERVOIR

VALVE BODY UNIT
Removal, page 11-38
Overhaul, page 11-42
Installation, page 11-43

PUMP
Pump Belt Adjustment, page 11-18
Fluid Replacement, page 11-19
Pump Pressure Check, page 11-20
Inspection, page 11-31
Pump Replacement, page 11-31
Control Valve Inspection and Replacement, page 11-32
Housing Disassembly, page 11-35
Housing Reassembly, page 11-36



STEERING GEARBOX
Index, page 11-48
Removal, page 11-44
Overhaul, page 11-65
Installation, page 11-86

CENTER SHAFT
Index/Inspection, page 11-90

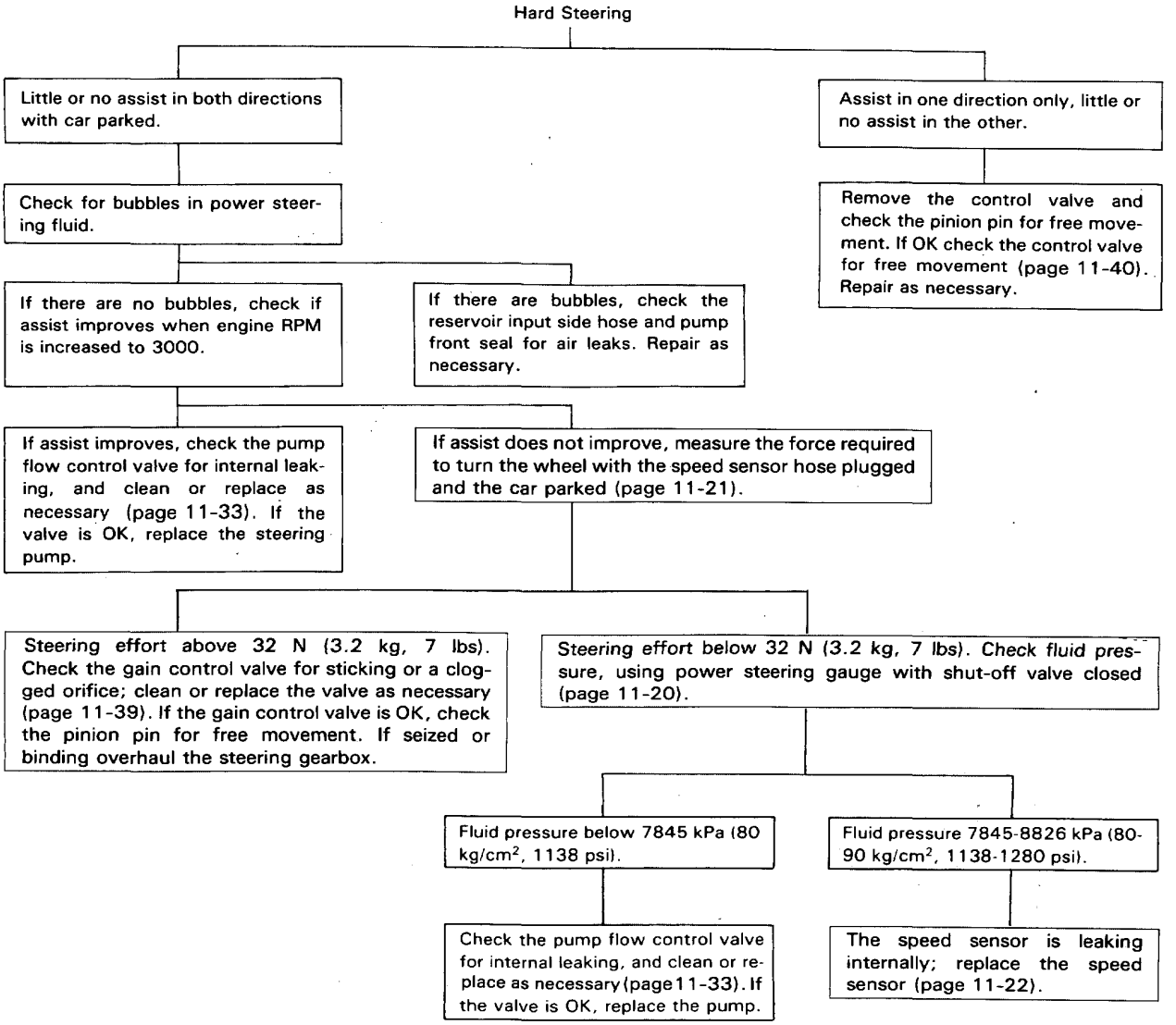
REAR GEARBOX
Replacement, page 11-91
Neutral Positioning, page 11-92
Stroke Rod Holders, page 11-93
Functional Inspection, page 11-94
Tie-rod Replacement, page 11-95
Off-set Shaft Cover Replacement, page 11-96

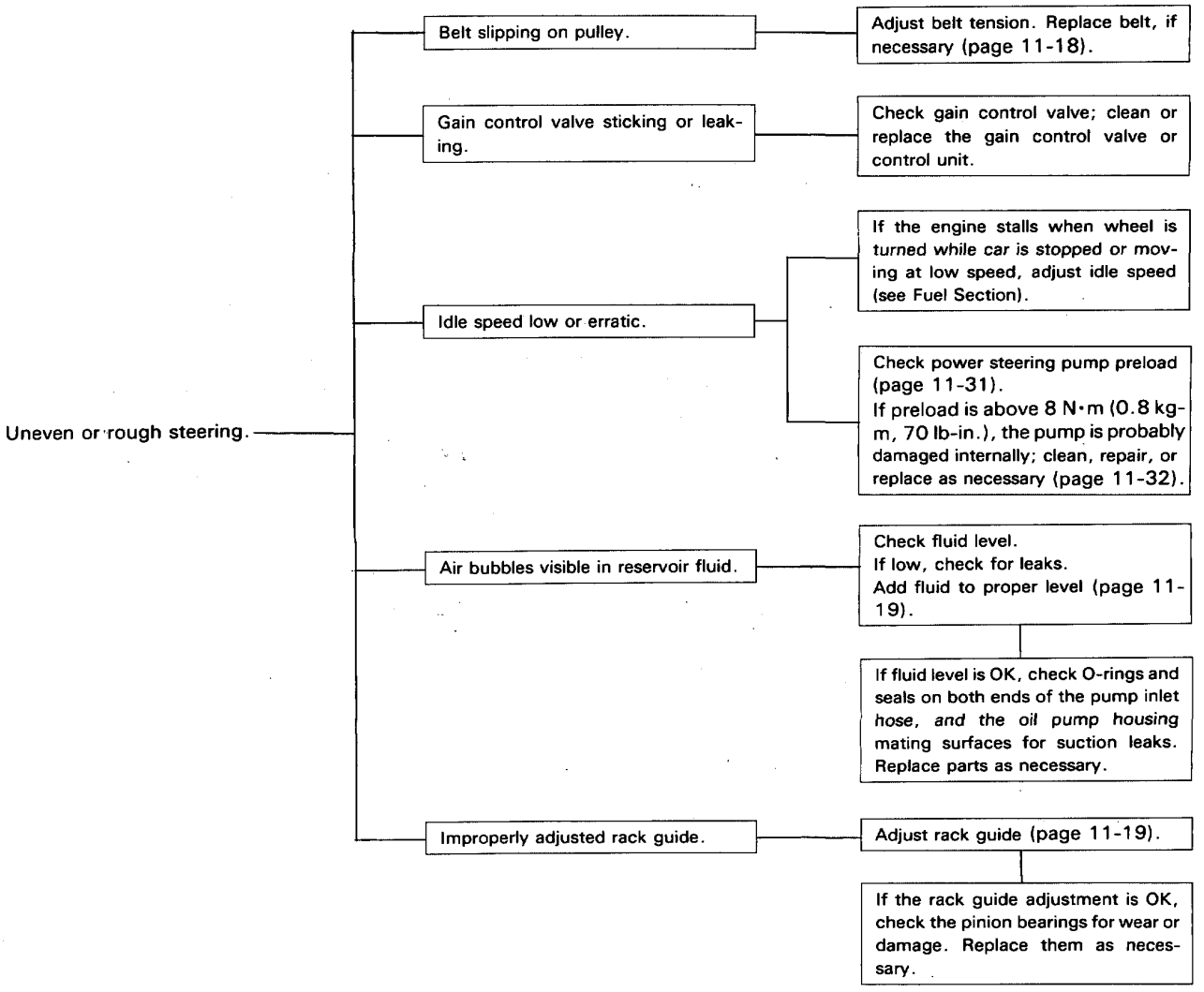
Troubleshooting (2WS)

General Troubleshooting

Check the following before you begin:

- Has the suspension been modified in a way that would affect steering?
- Are tire sizes and air pressure correct?
- Is the steering wheel original equipment or equivalent?
- Is the power steering pump belt properly adjusted?
- Is steering fluid reservoir filled to proper level?
- Is the engine idle speed correct and steady?




Uneven or rough steering.
Belt slipping on pulley.
Adjust belt tension. Replace belt, if necessary (page 11-18).
Gain control valve sticking or leaking.
Check gain control valve; clean or replace the gain control valve or control unit.
Idle speed low or erratic.
If the engine stalls when wheel is turned while car is stopped or moving at low speed, adjust idle speed (see Fuel Section).
Check power steering pump preload (page 11-31).
If preload is above 8 N·m (0.8 kg-m, 70 lb-in.), the pump is probably damaged internally; clean, repair, or replace as necessary (page 11-32).
Air bubbles visible in reservoir fluid.
Check fluid level.
If low, check for leaks.
Add fluid to proper level (page 11-19).
If fluid level is OK, check O-rings and seals on both ends of the pump inlet hose, and the oil pump housing mating surfaces for suction leaks. Replace parts as necessary.
Improperly adjusted rack guide.
Adjust rack guide (page 11-19).
If the rack guide adjustment is OK, check the pinion bearings for wear or damage. Replace them as necessary.

(cont'd)

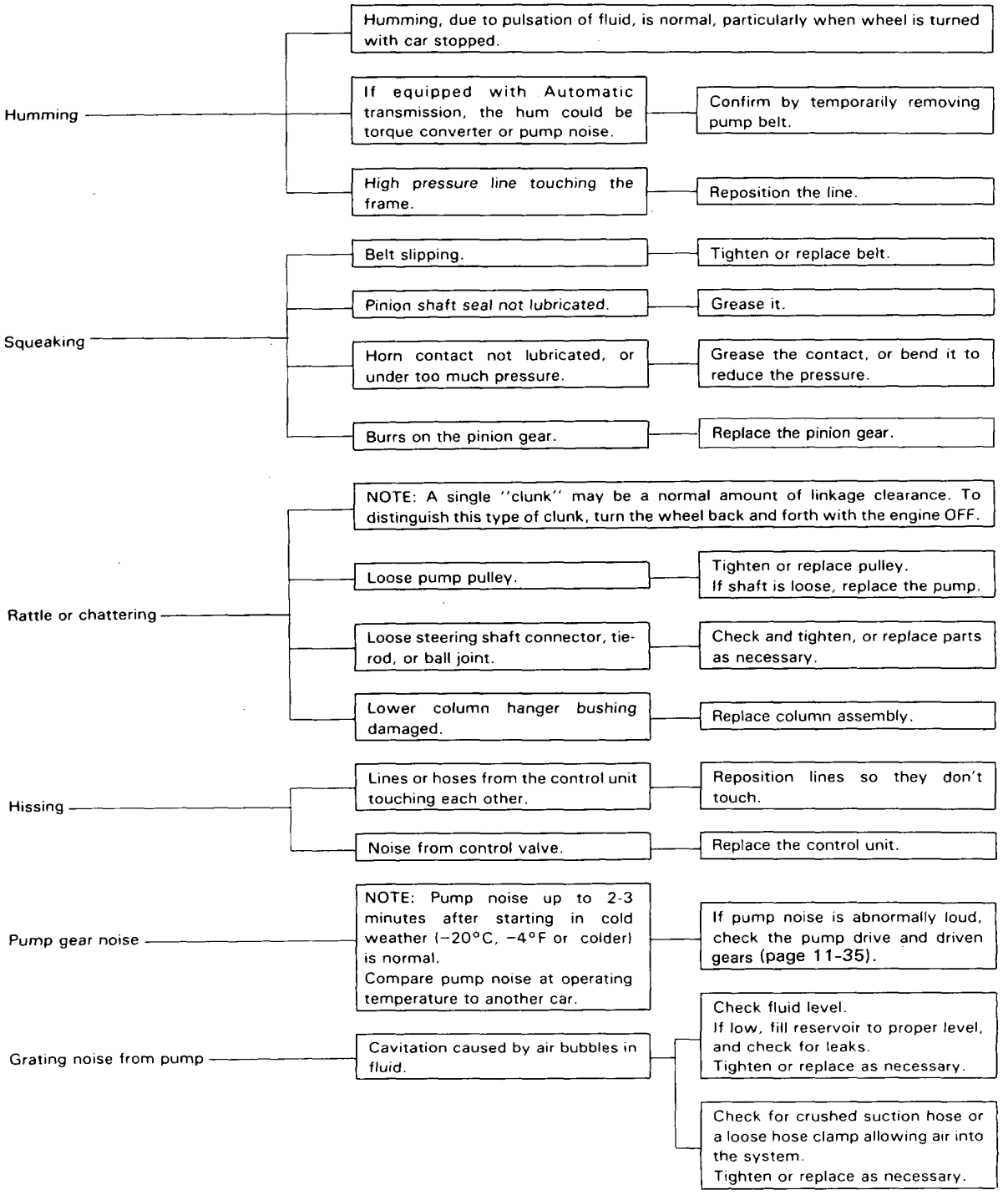
Troubleshooting (2WS)

General Troubleshooting (cont'd)

Shock or vibration when wheel is turned to full lock.	Pump belt slipping on pulley (pump stops momentarily).	Adjust belt tension (page 11-18) or replace belt.
	Sticking relief valve; pulsation exceeds 980 kPa (10 kg/cm², 142 psi).	Check flow control valve (page 11-33); clean or replace as necessary. If the flow control valve is OK, replace the pump.
Assist (excessively light steering) at high speed.	Measure force required to turn wheel with bypass tube joint installed, and car parked on dry paved surface (page 11-21).	If below 50 N (5.0 kg, 11 lbs), check gain control/pressure control valves and control unit and replace parts as necessary.
Steering kicks back during wide turns.	Pump belt slipping.	Adjust belt tension (page 11-18) or replace belt.
	Sticking gain control valve or control valve.	Replace gain valve or control unit.
	Rack guide adjusted too loose.	Adjust rack guide (page 11-19).
Wheel will not return smoothly.	Tire pressure too low.	Inflate to correct pressure.
	Improper front wheel alignment.	Readjust front wheel alignment or replace parts as necessary.
	Improperly adjusted rack guide.	Adjust rack guide (page 11-19).

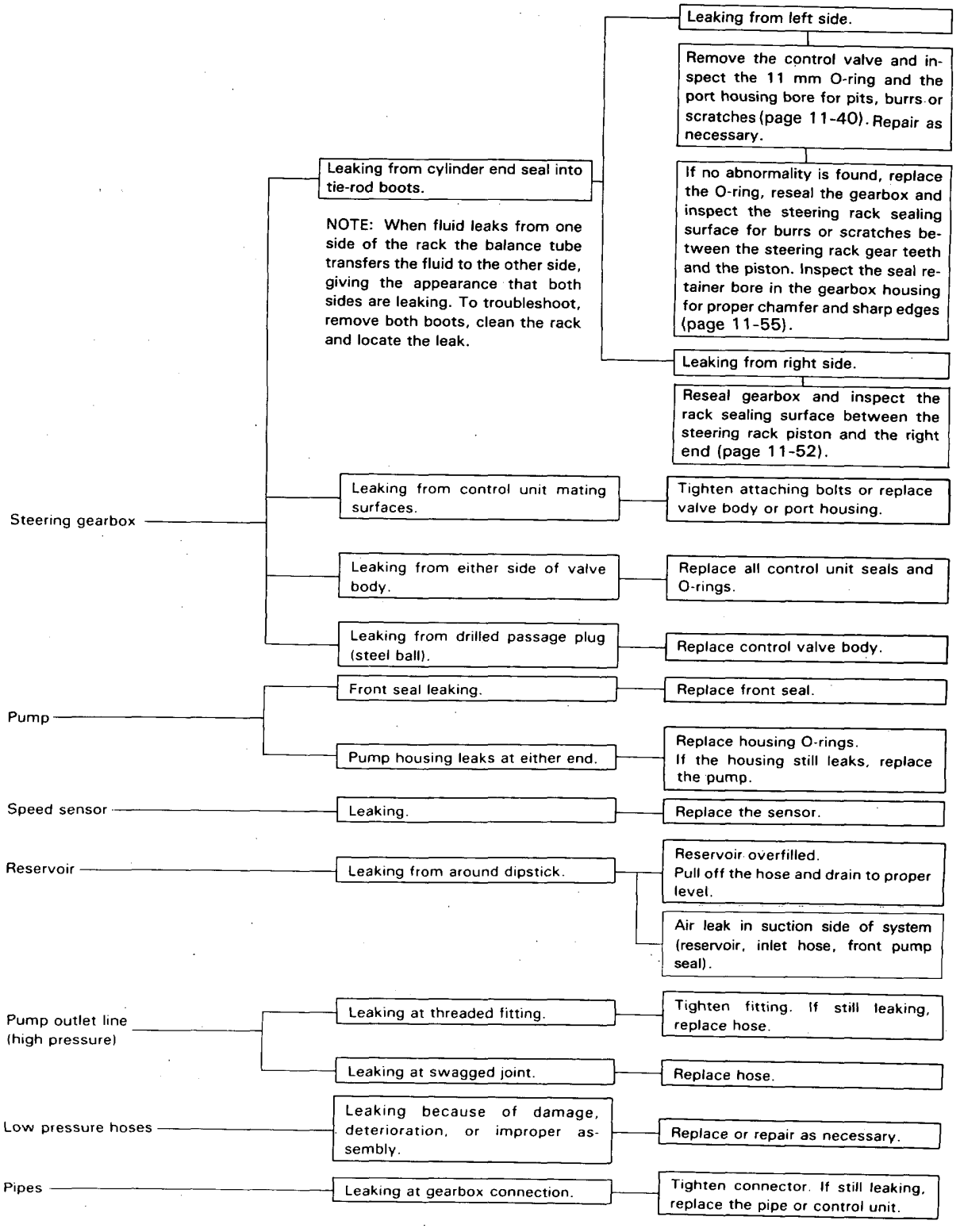
Noise and Vibration

NOTE: Pump noise in first 2—3 minutes after starting in cold weather (– 20°C, – 4°F or colder) is normal.



Troubleshooting (2WS)

Fluid Leaks

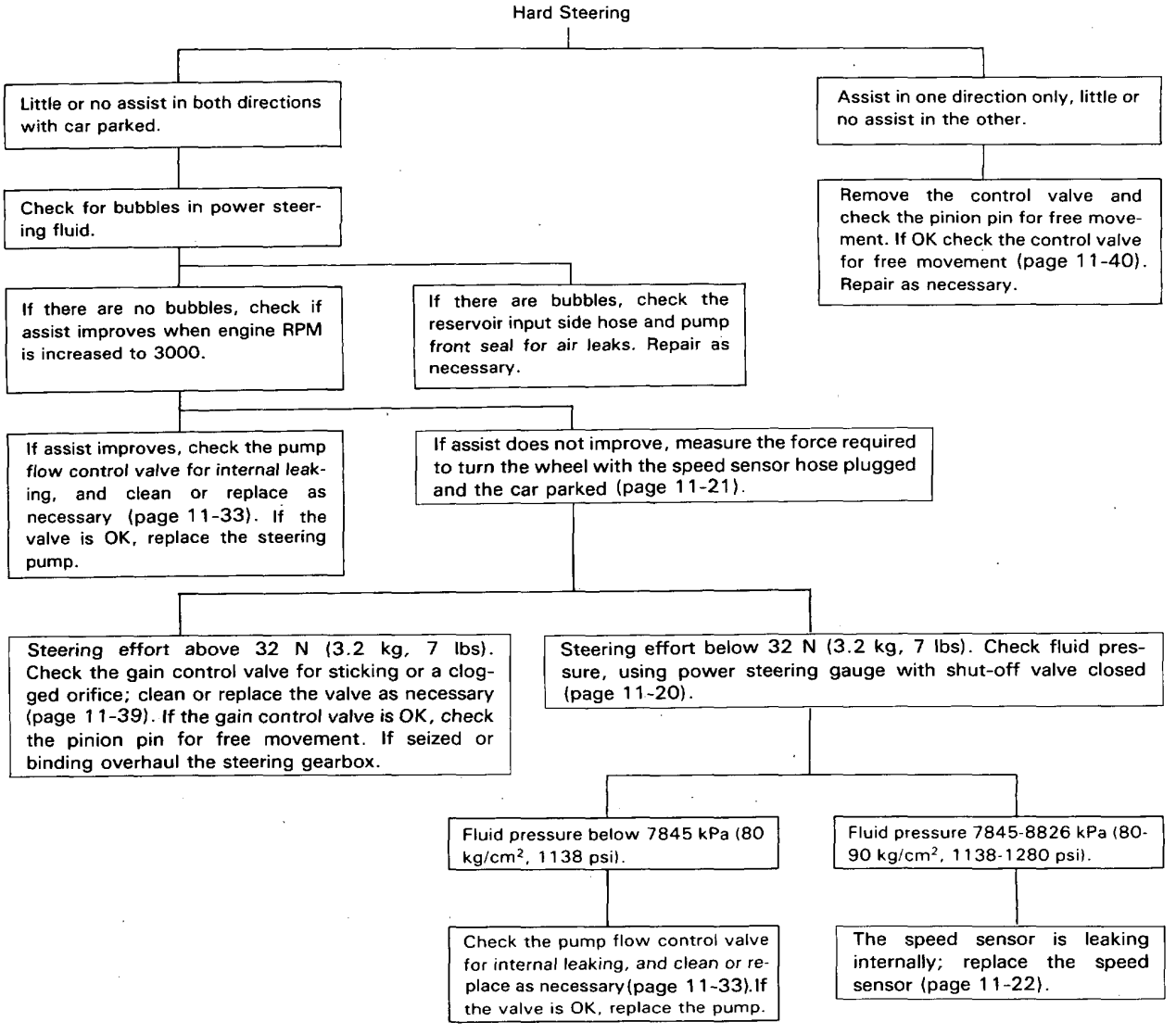


Troubleshooting (4WS)

General Troubleshooting

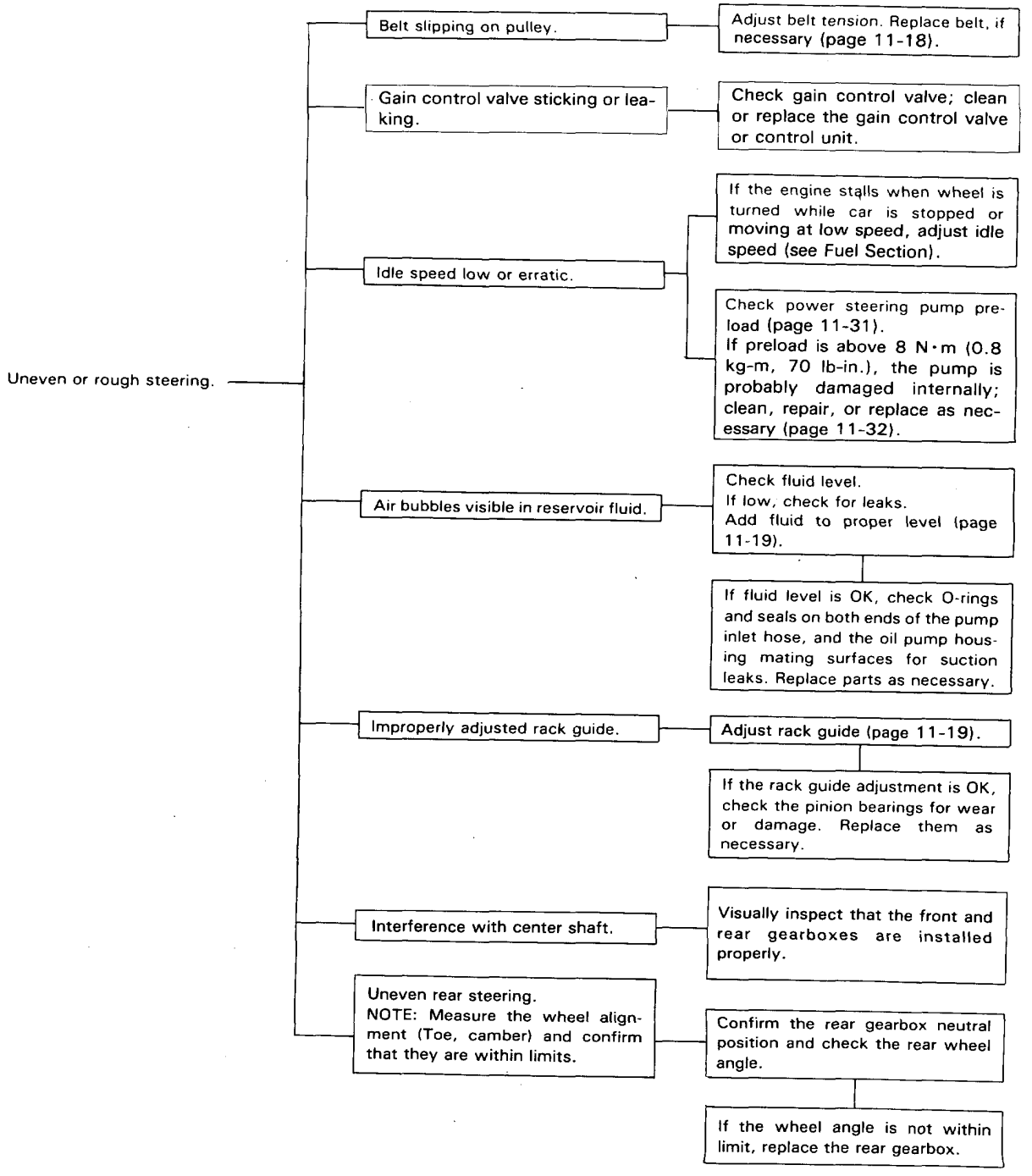
Check the following before you begin:

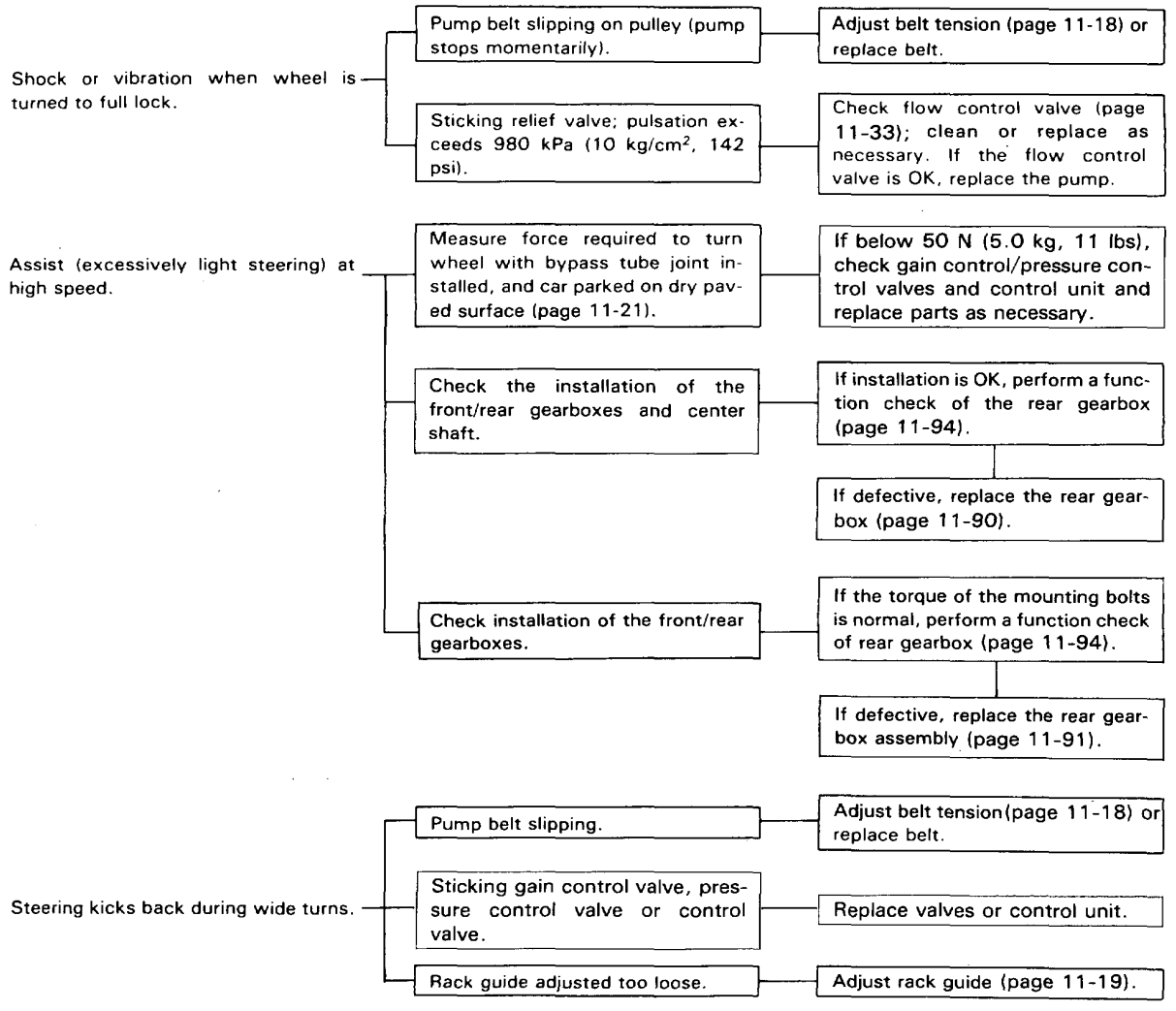
- Has the suspension been modified in a way that would affect steering?
- Are tire sizes and air pressure correct?
- Is the steering wheel original equipment or equivalent?
- Is the power steering pump belt properly adjusted?
- Is steering fluid reservoir filled to proper level?
- Is the engine idle speed correct and steady?



(cont'd)

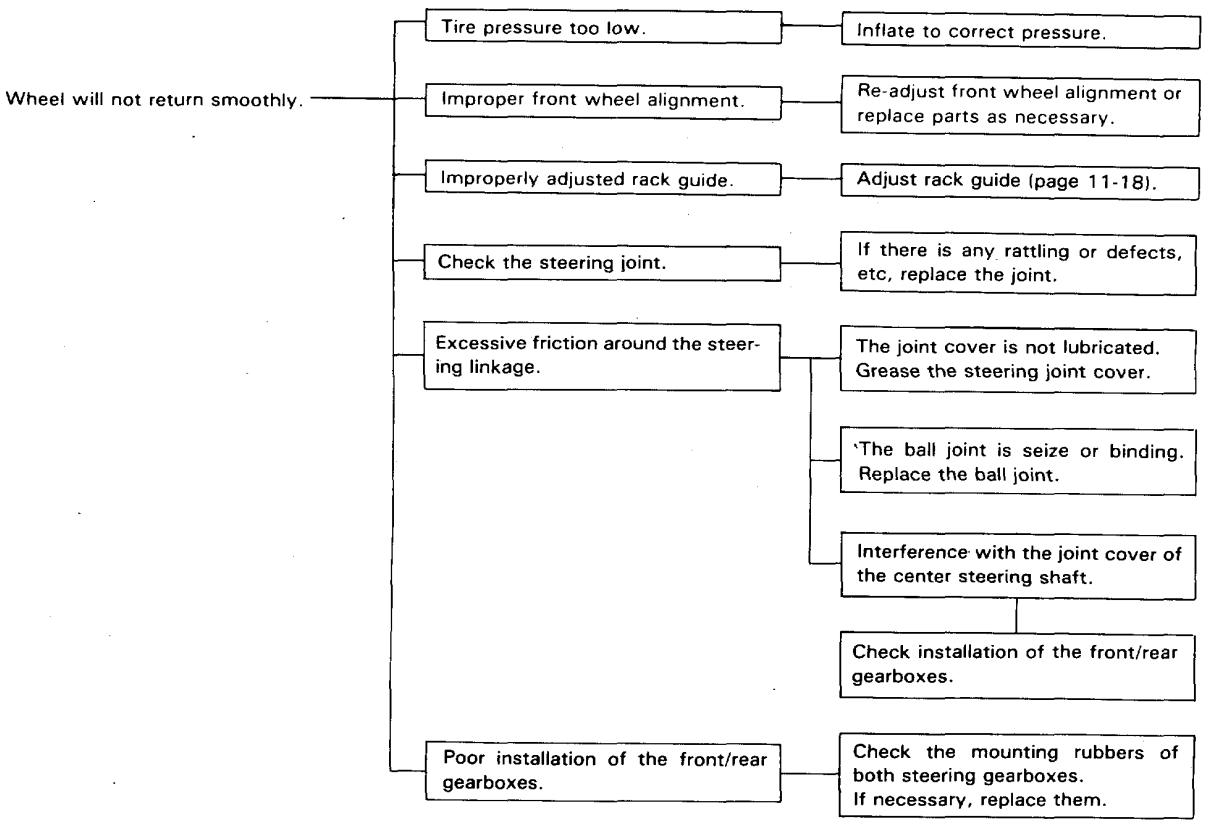
General Troubleshooting (cont'd)




Shock or vibration when wheel is turned to full lock.
Pump belt slipping on pulley (pump stops momentarily).
Adjust belt tension (page 11-18) or replace belt.
Sticking relief valve; pulsation exceeds 980 kPa (10 kg/cm², 142 psi).
Check flow control valve (page 11-33); clean or replace as necessary. If the flow control valve is OK, replace the pump.
Assist (excessively light steering) at high speed.
Measure force required to turn wheel with bypass tube joint installed, and car parked on dry paved surface (page 11-21).
If below 50 N (5.0 kg, 11 lbs), check gain control/pressure control valves and control unit and replace parts as necessary.
Check the installation of the front/rear gearboxes and center shaft.
If installation is OK, perform a function check of the rear gearbox (page 11-94).
If defective, replace the rear gearbox (page 11-90).
Check installation of the front/rear gearboxes.
If the torque of the mounting bolts is normal, perform a function check of rear gearbox (page 11-94).
If defective, replace the rear gearbox assembly (page 11-91).
Steering kicks back during wide turns.
Pump belt slipping.
Adjust belt tension(page 11-18) or replace belt.
Sticking gain control valve, pressure control valve or control valve.
Replace valves or control unit.
Rack guide adjusted too loose.
Adjust rack guide (page 11-19).

(cont'd)

General Troubleshooting (cont'd)



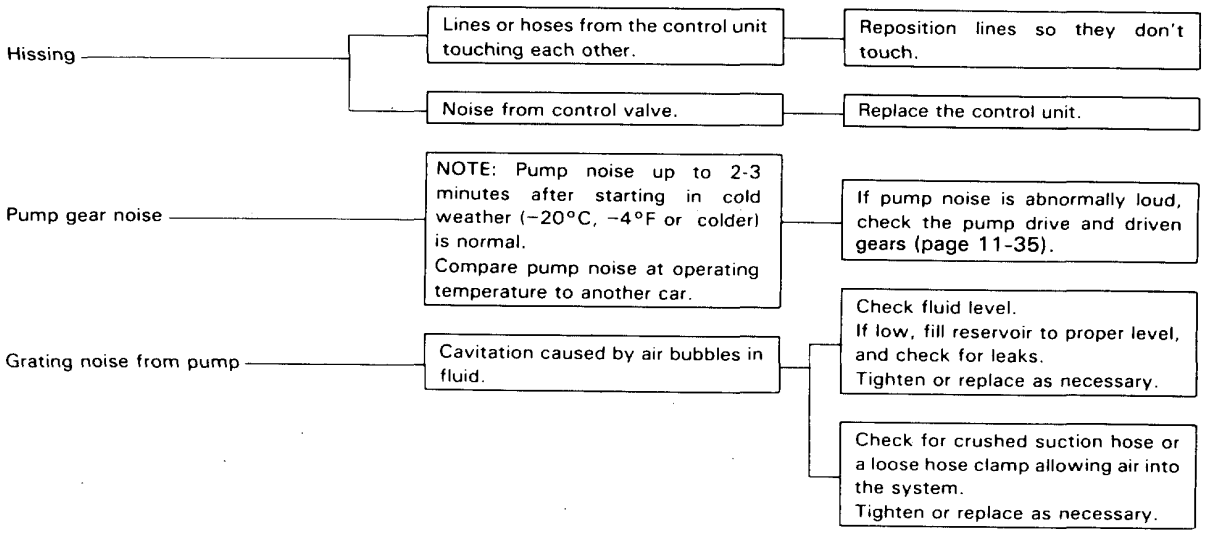
Noise and Vibration

NOTE: Pump noise in first 2—3 minutes after starting in cold weather (– 20°C, – 4°F or colder) is normal.

Humming	Humming, due to pulsation of fluid, is normal, particularly when wheel is turned with car stopped.	
	If equipped with Automatic transmission, the hum could be torque converter or pump 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.
	The joint cover is not lubricated or the joint dust seal is worn (the bushing section of the lower dashboard).	Grease the joint cover or replace the joint dust seal.
Rattle or chattering	NOTE: A single "clunk" may be a normal amount of linkage clearance. To distinguish this type of clunk, turn the wheel back and forth with the engine OFF.	
	Loose pump pulley.	Tighten or replace pulley. If shaft is loose, replace the pump.
	Loose steering shaft connector, tie-rod, or ball joint.	Check and tighten, or replace parts as necessary.
	Lower column hanger bushing damaged.	Replace column assembly.
	Manually rotate the center steering shaft, checking for rattling.	• Adjust the drive pinion assembly and the rack. • Tighten the steering joint. If necessary, replace it. • *Perform a function check of the* rear gearbox (page 11-94). If necessary, replace it.

(cont'd)

Noise and Vibration (cont'd)



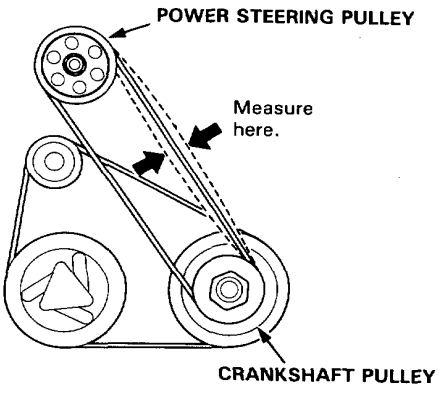
Fluid Leaks

Steering gearbox	Leaking from drive pinion area.	Tighten the drive pinion housing bolts or replace the seal rings.
	Leaking from cylinder end seal into tie-rod boots.	Leaking From left side: Remove the control valve and inspect the port housing for pits, burrs or scratches, steering rack sealing surface for burrs or scratches and seal retainer bore for proper chamfer and sharp edges (page 11-71). Leaking From right side: Inspect the rack sealing surface (page 11-68).
	NOTE: When fluid leaks from one side of the rack, balance tube trancefers the fluid to the other side, giring the apparance that both sides are leaking. To troubleshoot, remove both boots clean the rack and locate the leak.	
	Leaking from control unit mating surfaces.	Tighten attaching bolts or replace valve body or port housing.
	Leaking from 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 front seal.
	Pump housing leaks at either end.	Replace housing O-rings. If the housing still leaks, replace the pump.
Speed sensor	Leaking.	Replace the sensor.
Reservoir	Leaking from around dipstick.	Reservoir overfilled. Pull off the hose and drain to proper level.
Pump outlet line (high pressure)	Leaking at threaded fitting.	Tighten fitting. If still leaking, replace hose.
	Leaking at swagged joint.	Replace hose.
Low pressure hoses	Leaking because of damage, deterioration, or improper assembly.	Replace or repair as necessary.
Pipes	Leaking at gearbox connection.	Tighten connector. If still leaking, replace the pipe or control unit.
Rear gearbox	Mating surfaces of the rear gearbox cover.	Tighten the attaching bolts. If still leaking, replace the rear gearbox assembly (page 11-91).
	The offset shaft and the dust cover.	Replace the dust cover with a new one (page 11-96).

Pump Belt Adjustment

1. A properly adjusted belt should deflect about 12.5—16 mm (0.50—0.62 in) when you push on it the pulleys with a force of about 98 N (10 kg, 22 lbs).

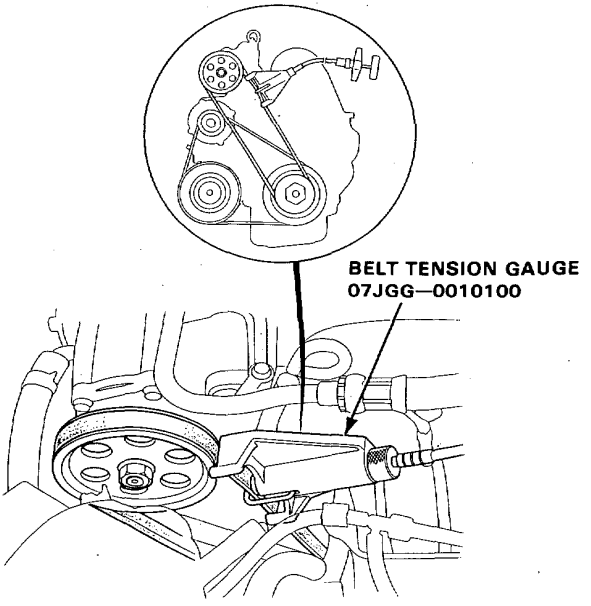
   NOTE: On a brand new belt, the deflection should be 9.5—11.5 mm (0.37—0.45 in) when first measured.



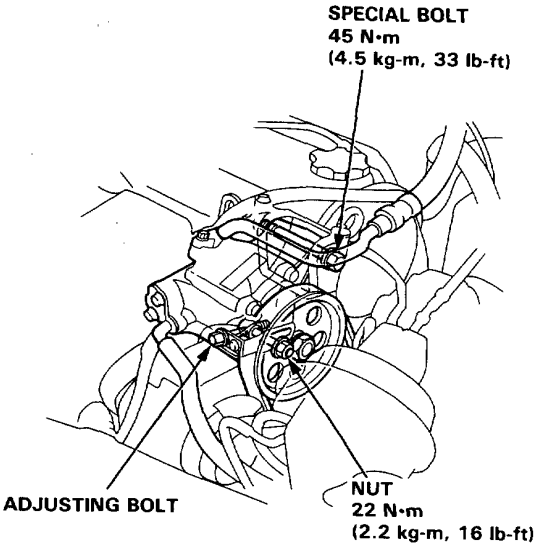
Test by the Belt Tension Gauge; 07JGG—0010100.
Attach the tension gauge to the belt and measure the tension of the belt.

Tension: 35—50 kg (77—110 lbs)

- On a brand-new belt, the tension should be 70—90 kg (154—198 lbs) when first measured.
- See the instructions for the tension gauge.



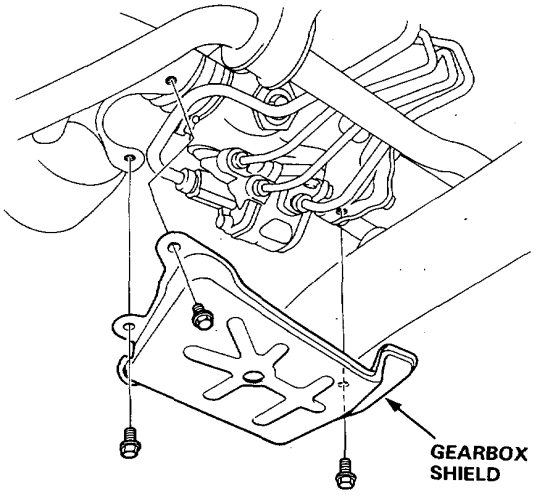
2. Loosen the special bolt and nut and turn the adjusting bolt to get proper tension, then retighten the special bolt and nut.



3. Start the engine and turn the steering wheel from lock-to-lock several times, then stop the engine and recheck the belt tension.

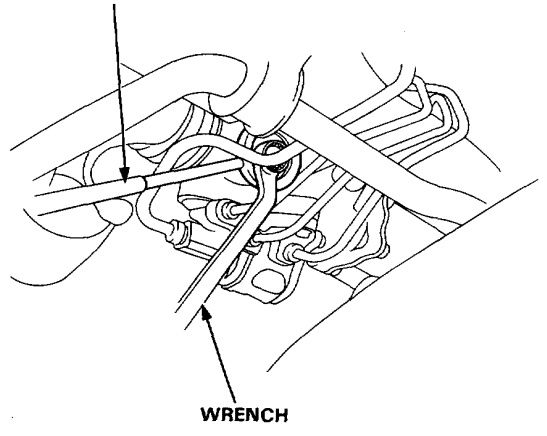
Rack Guide Adjustment

1. Remove the gearbox shield.



2. Loosen the locknut on the rack guide screw with the special tool as shown.

2WS: LOCKNUT WRENCH 40 mm
07916—SA50001
4WS: LOCKNUT WRENCH 43 mm
07LAA—SM40100



3. Tighten the guide screw until it compresses the spring and seats against the guide, then loosen it.
   Retighten it to about: 4 N·m (0.4 kg-m, 3 lb-ft)
Then back it off about: 35° ±5°
Tighten the locknut to about 25 N·m (2.5 kg-m, 18 lb-ft) while preventing the guide screw from turning.

4. Check the steering effort as described.

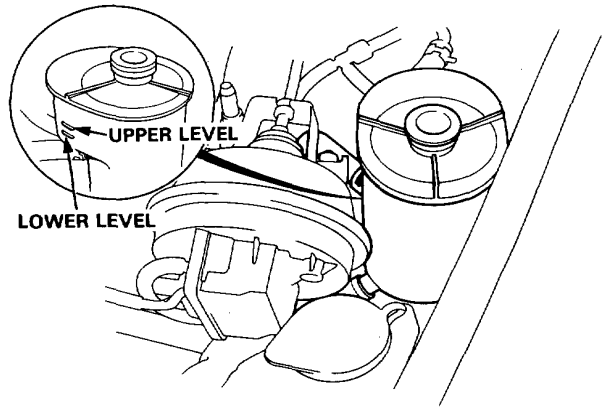
Fluid Replacement

Check the reservoir at regular intervals, and add fluid as necessary.

CAUTION: Use only GENUINE HONDA Power Steering Fluid. Using other fluids such as ATF or other manufacturer's power steering fluid will damage the system.

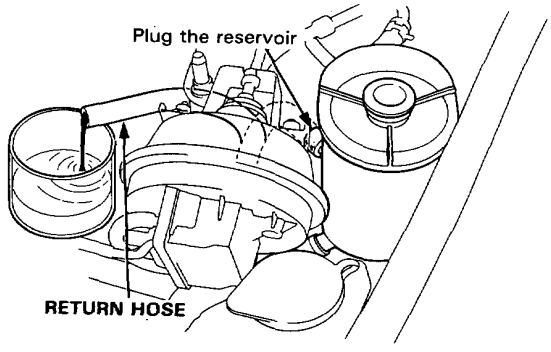
Fluid Replacement

CAPACITY: 1.8 liter (1.9 US qt, 1.58 Imp qt) at change



1. Disconnect the return hose from the gearbox at the reservoir, and put the end in a suitable container.

2. Start the engine, let it run at idle, and turn the steering wheel from lock-to-lock several times. When fluid stops running out of the hose, shut off the engine. Discard the fluid.



3. Refit the return hose on the reservoir.

4. Fill the reservoir to the upper level mark.

5. Start the engine and run it at fast idle, then turn the steering from lock-to-lock several times to bleed air from the system.

6. Recheck the fluid level and add some if necessary.

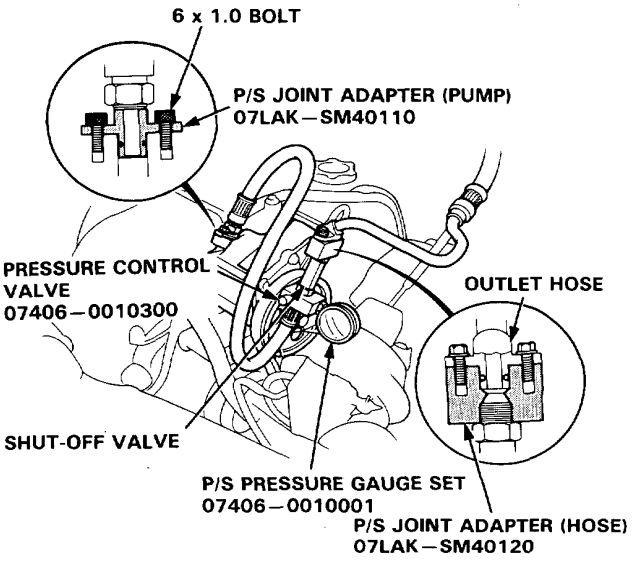
CAUTION: Do not fill the reservoir beyond the upper level mark.

Pump Pressure Check

Check the fluid pressure as follows to determine whether the trouble is in the pump or gearbox.

NOTE: First check the power steering fluid level and pump belt tension.

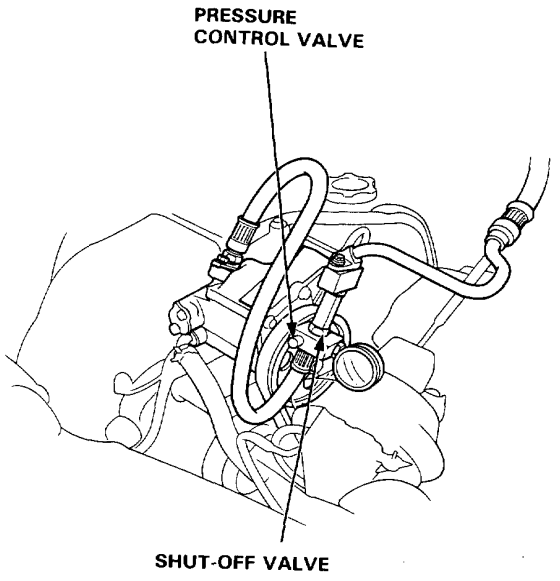
1. Disconnect the outlet hose from the pump outlet fitting, and install the pump joint adaptor on the pump outlet.
2. Connect the hose joint adaptor to the power steering pressure gauge, then connect the outlet hose to the adaptor.
3. Install the power steering pressure gauge to the pump joint adaptor as shown.



4. Open the shut-off valve fully.
5. Open the pressure control valve fully.
6. Start the engine and let it idle.
7. Turn the steering wheel from lock-to-lock several times to warm the fluid to operating temperature.
8. Close the shut-off valve, then close the pressure control valve gradually until the pressure gauge needle is stable. Read the pressure.
9. Immediately open the shut-off valve fully.

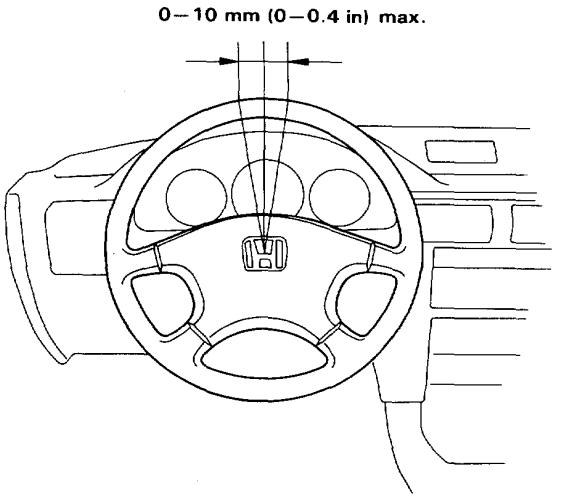
CAUTION: Do not keep the shut-off valve closed more than 5 seconds or the pump could be damaged by over-heating.

If the pump is in good condition, the gauge should read at least 7845—8826 kPa (80—90 kg/cm², 1138—1280 psi). A low reading means pump output is too low for full assist. Repair or replace the pump.



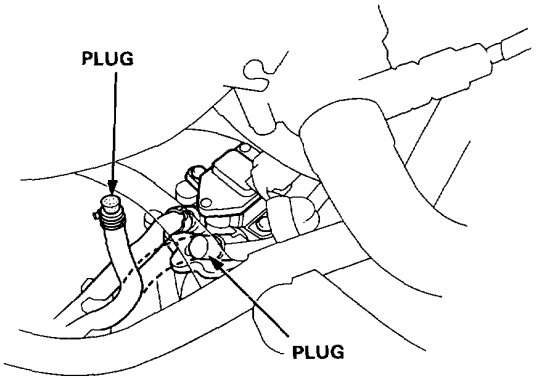
Steering Wheel Rotational Play

1. Place the front wheels in a straight ahead position and measure the distance the steering wheel can be turned without moving the front wheels.
2. If the play exceeds the service limit, check all steering components.

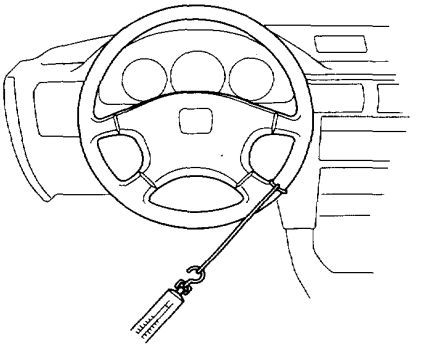


Power Assist Check with Car Parked

1. Check the power steering fluid level and pump belt tension.
2. Start the engine, allow it to idle, and turn the steering wheel from lock-to-lock several times to warm up the fluid.
3. Attach a spring scale to the steering wheel. With the engine idling and the car on a clean, dry floor, pull the scale as shown and read it as soon as the tires begin to turn.



4. The scale should read no more than 32 N (3.2 kg, 7 lbs). If it reads more or less, go on step 5.
5. Stop the engine. Disconnect the hose from the speed sensor and plug the hose and the sensor fitting as shown.

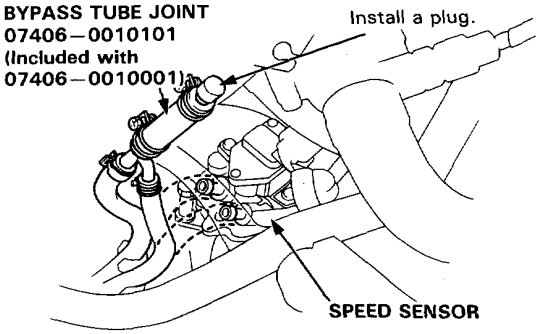


6. Start the engine and let it idle.
   - If the reading is now 32 N (3.2 kg, 7 lbs) or less, replace the speed sensor, see page 11-22.
   - If the reading is still more than 32 N (3.2 kg, 7 lbs), check the gearbox and pump.

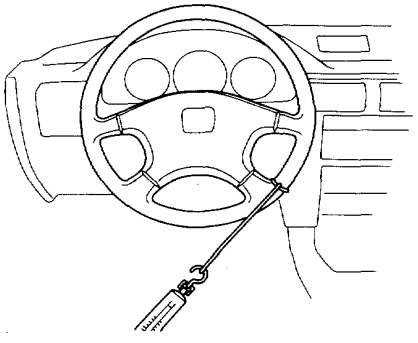
On Car Checks

Assist Check

1. Check the power steering fluid level and pump belt tension.
2. Start the engine, let it warm up to normal temperature, and turn the steering wheel lock-to-lock a few times to warm up the fluid.
3. Stop the engine. To simulate speeds above 50 km/h (30 mph), disconnect the hoses from the speed sensor and connect them to the Bypass Tube Joint. Plug the end of the bypass tube joint.



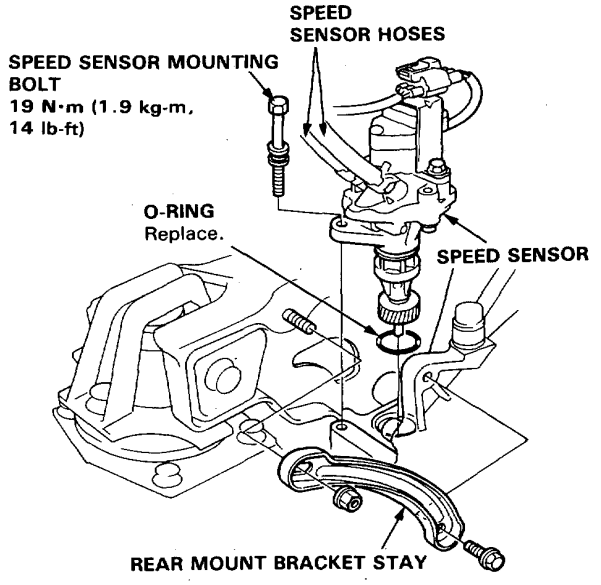
4. Attach the spring scale to the steering wheel. With the engine idling and the car on a clean, dry floor, pull the scale as shown and read it as soon as the tires begin to turn.



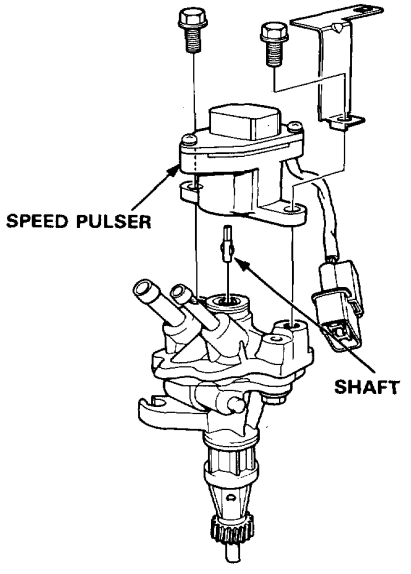
- If the scale reads a normal 50 N (5.0 kg, 11 lbs), or more, the assist problem at high speeds is being caused by reduced speed sensor output. Replace the sensor.
- If the scale reads less than 50 N (5.0 kg, 11 lbs), the sensor is OK, and the problem is in the sensor feed line, the pump, or the control unit. See if the feed line is pinched or bent then check pump.
- See General Troubleshooting (2WS: page 11-6, 4WS page 11-11).

Speed Sensor Replacement

1. Remove the rear mount bracket stay.
2. Disconnect the speed sensor wire coupler from the speed sensor.
3. Remove the speed sensor mounting bolt and pull the speed sensor from the transmission housing.
4. Disconnect the speed sensor hoses and plug the fittings.



5. Remove the speed pulser from the speed sensor.

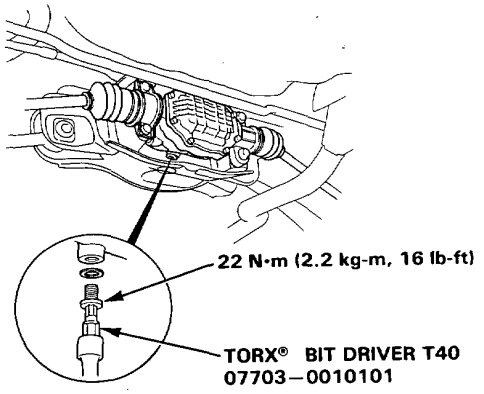


6. After installing a new sensor, turn the steering wheel lock-to-lock with the engine idling to bleed air from the system.
7. Check the reservoir and add fluid if necessary.

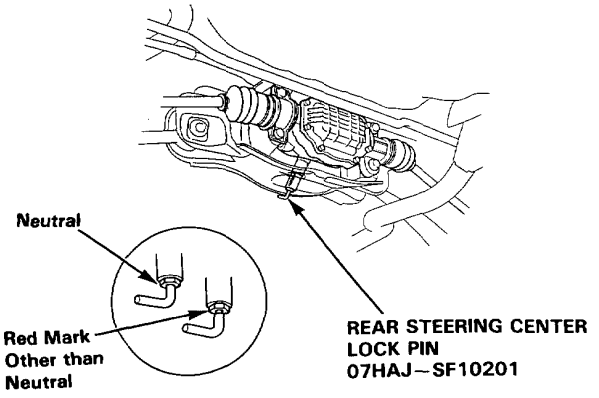
4WS Steering Gearbox Centering

NOTE: Use the following procedure after reassembling/replacing the steering gearbox components, or in preparing to solve customer complaints of mis-adjusted steering wheel angle.

1. Center the steering and steering wheel "by sight."
2. Install the Center Lock Pin in the rear steering gearbox.
   - Raise the rear of the car and support on safety stands in proper locations.
   - Remove the gearbox cap bolt using a Special Tool.

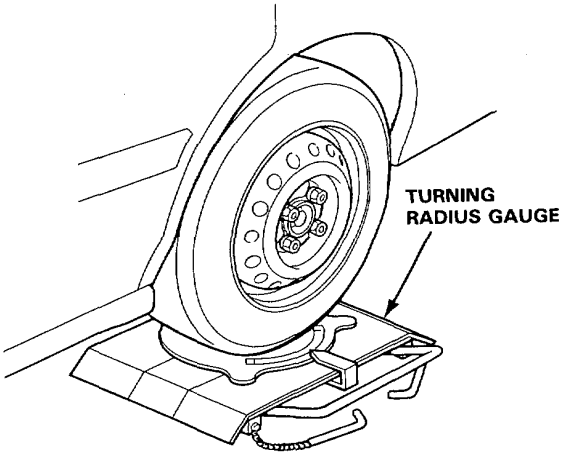


3. Turn the steering wheel right or left slightly until the Center Lock Pin seats fully.
   - The red mark on the pin should not be visible.
   - Do not turn the steering wheel quickly when the Center Lock Pin is seated and do not force past the locking point after the Pin is seated, or the Pin may be damaged.



Rear Wheel Turning Angle Inspection (4WS)

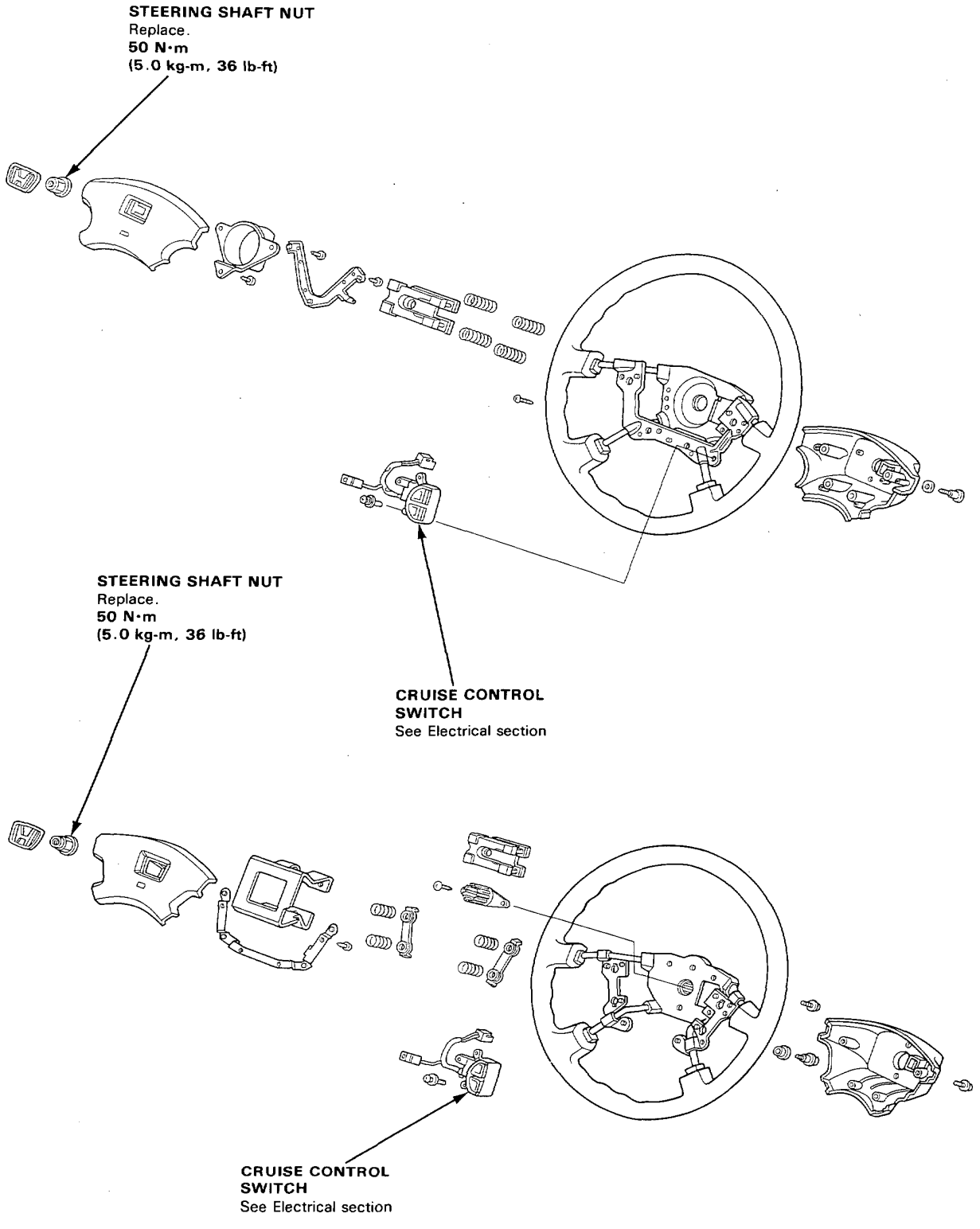
1. Set the turning radius gauges at the rear wheels.
2. Apply the brake turn the steering wheel 127° to right and check the rear wheel
   ***Turning angle:* 1° 05′ ± 30′**
3. Turn the steering back to center, apply the brake and turn the steering wheel 127° to the left. Check the rear wheel turning angle again: **1° 05′ ± 30′**
4. Apply the brake and turn the steering wheel right and left to full lock.
5. At both left and right full lock, the rear wheel max turning angle should be:
   Wheel pointing inward : 5° 50′ ± 1°
   Wheel pointing outward : 6° 10′ ± 1° (Reference)



6. If not as specified, see Alignment, see Suspension Section. If not correctable by re-alignment, the rear steering gearbox may need to be replaced.

Steering Wheel

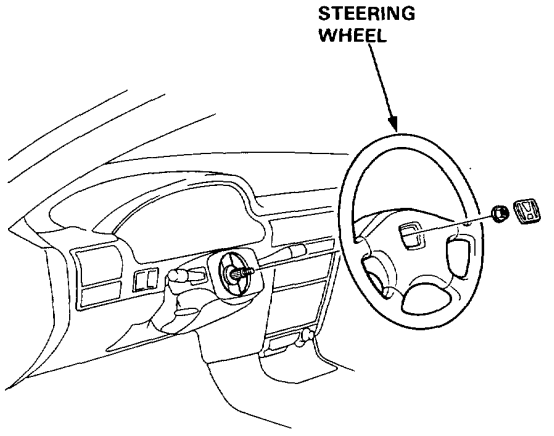
Disassembly/Reassembly



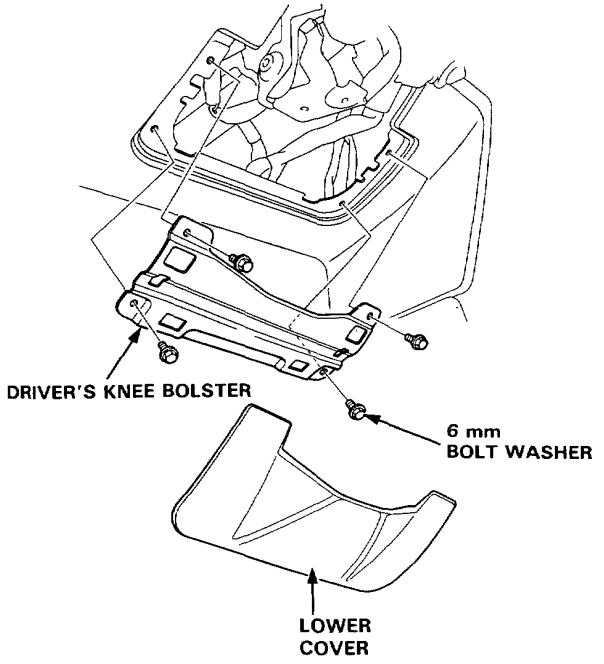
Column

Removal

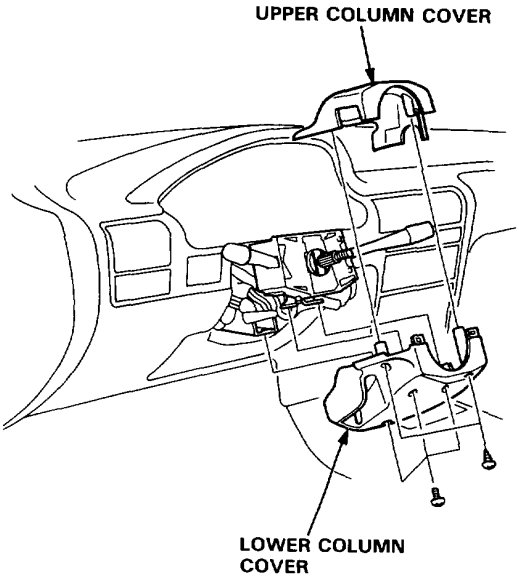
1. Remove the center pad.
2. Remove the steering shaft nut.
3. Remove the steering wheel by rocking it slightly from side-to-side as you pull steadily with both hands.



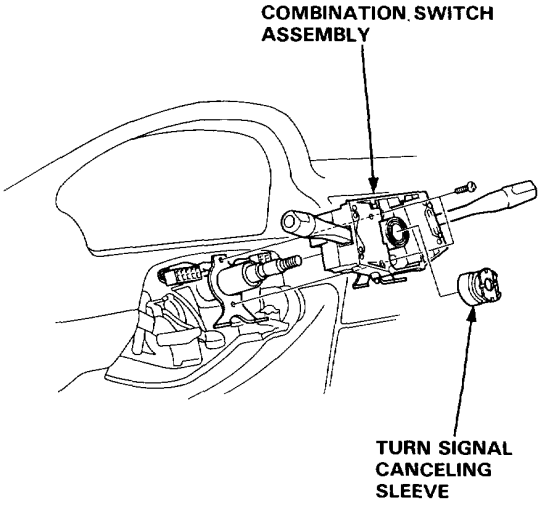
4. Remove the lower cover and driver's knee bolster.



5. Remove the upper and lower column covers.



6. Disconnect each wire coupler from the combination switch.
7. Remove the turn signal canceling sleeve and combination switch assembly.



(cont'd)

Wiring Diagrams

Index

Air Conditioner 17
Anti-Lock Brake System (ALB) 14
Automatic Transmission Control System 14
Battery 1
Blower Controls 17
Charging System 1
Cigarette Lighter 10
Clock 10
Cooling Fan Control 16
Cruise Control System 12
Defogger, Rear Window 11
Door Lock, Power 12
Fuel and Emissions 16
Gauges 2
Headlight Adjuster System 4
Horns 4
Ignition Switch 1
Ignition System 1
Indicators
- Cruise Control Indicator 2
- Trunk Open Indicator 2
- High Beam Indicator 2
- Shift Lever Position Indicator 4
- Turn Signal Indicator 2

Integrated Control Unit 5
Lights, Exterior
- Back-up Lights 10
- Brake Lights 3
- Hazard Lights 2
- Headlights 6
- License Plate Lights 6
- Marker Lights 6
- Taillights 6

Lights, Interior
- Courtesy Lights 3
- Dashlight Brightness Control 6
- Dome Lights 3
- Glove Box Light 6
- Trunk Light 6

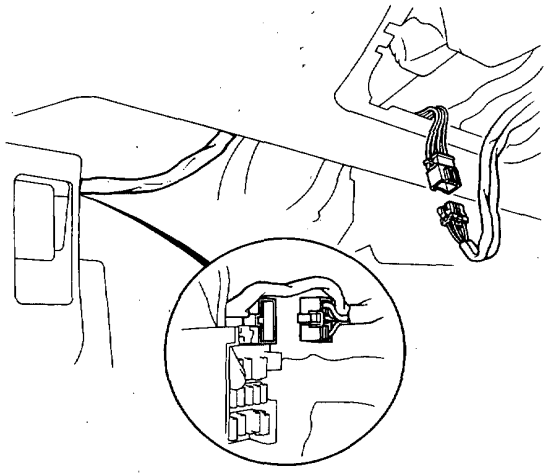
Vanity Mirror Light 6
Lighting System 6
Mirror, Power 6
Seat, Power 13
Starting System 1
Stereo Sound System 10
Sunroof 11
Turn Signal / Hazard Flasher System 13
Warning System
- ALB Warning 2
- Brake Warning 2
- Charge Warning 2
- Check Engine Warning 2
- Hazard Warning 2
- Light-on Warning 5
- Oil Pressure Warning 2

Washers
- Windshield 13
- Headlight Washer 13

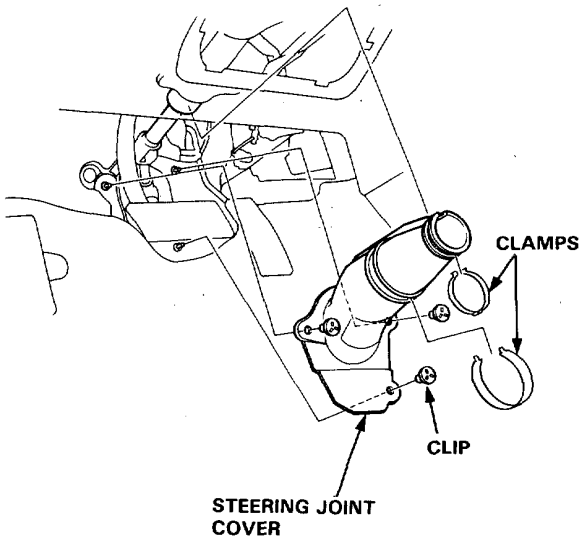
Windows, Power 7
Wipers
- Windshield 7

Removal (cont'd)

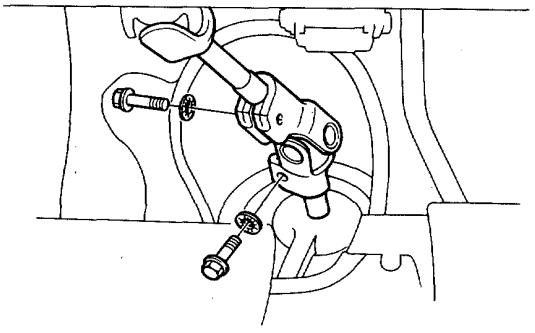
8. Disconnect each wire coupler from the fuse box under the left side of the dash.



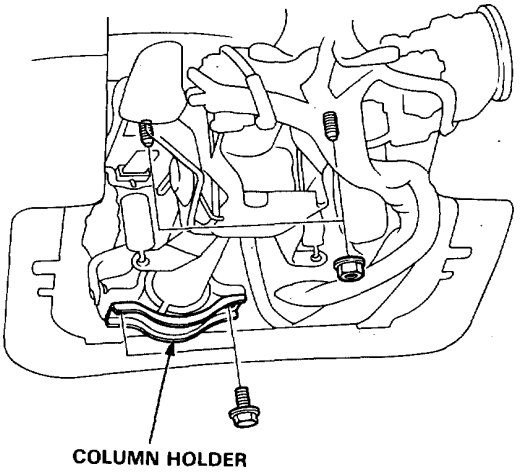
9. Remove the steering joint cover.



10. Remove the steering joint bolts and move the joint toward the column.



11. Remove the column holder.
12. Remove the attaching nuts, then remove the steering column assembly.

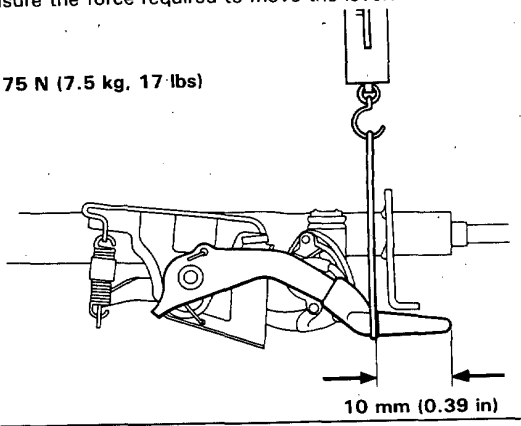


Inspection

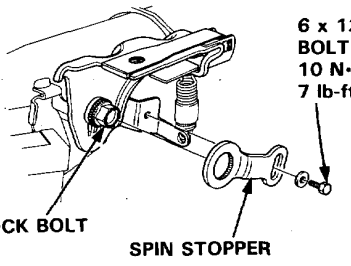
Tilt lever adjustment:

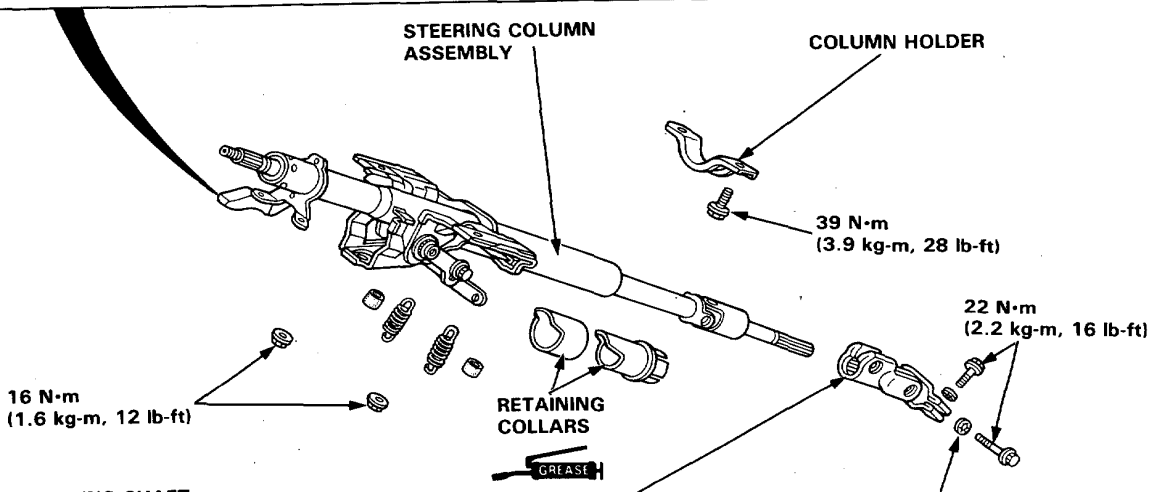
Attach a spring scale 10 mm (0.39 in) from the end of knob. Measure the force required to move the lever.

Preload: 75 N (7.5 kg, 17 lbs)



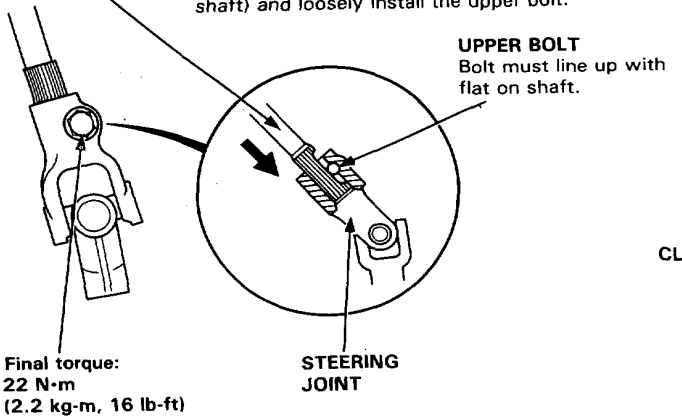
If the force measured is not within the specification, remove the spin stopper then adjust the tilt lock bolt (tighten or loosen) until the correct force can be obtained.

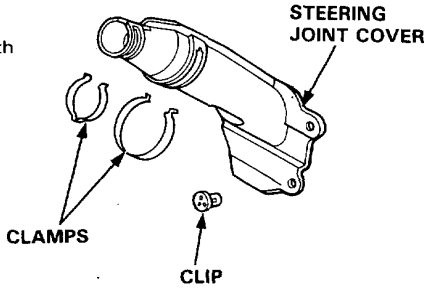




STEERING SHAFT
Pull down while tightening bolt.

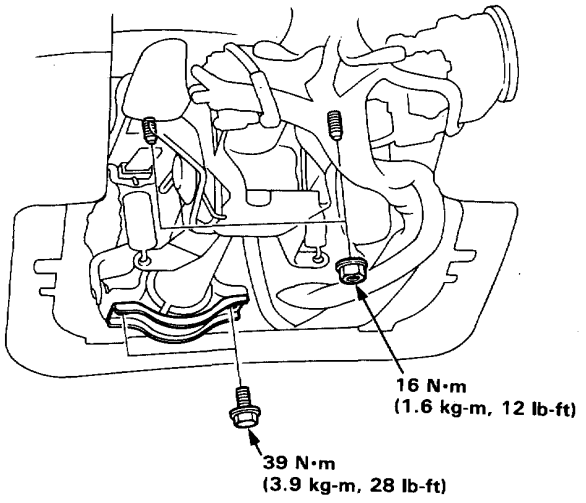
STEERING JOINT
Slip the upper end of the steering joint onto the steering shaft (line up the bolt hole with the groove around the shaft) and loosely install the upper bolt.



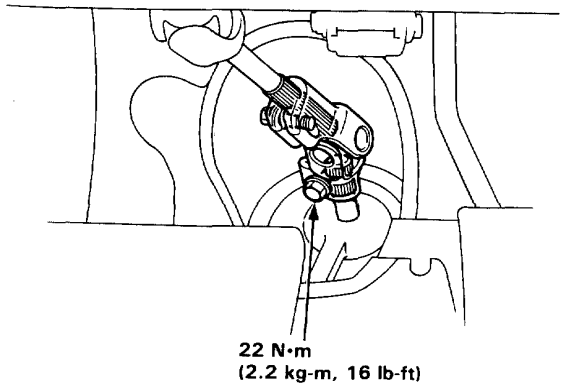


Installation

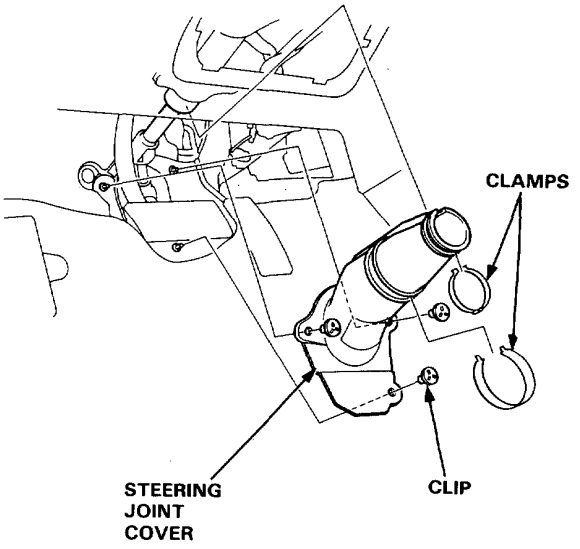
1. Slip the lower end of the steering joint onto the pinion shaft.
2. Install the steering column assembly with the nuts and column holder.



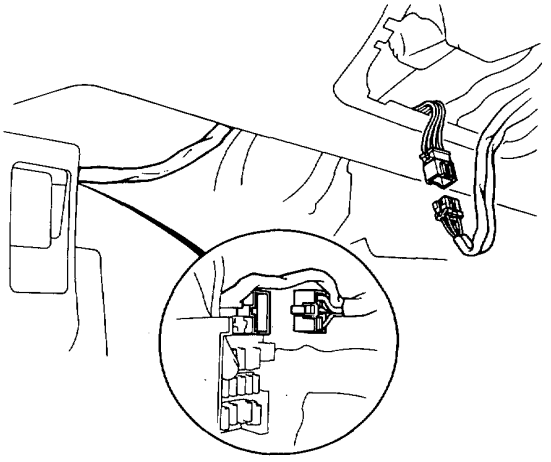
3. Loosely install the steering joint on the steering gearbox pinion.
   NOTE:
   - Be sure that the lower bolt is securely in the groove in the steering gearbox pinion.
   - Be sure the pinion shaft and the steering column shaft are aligned; the joint should slip on freely. If not, reposition the steering rack to correct the misalignment.



4. Install the steering joint cover with the clamps and clip.

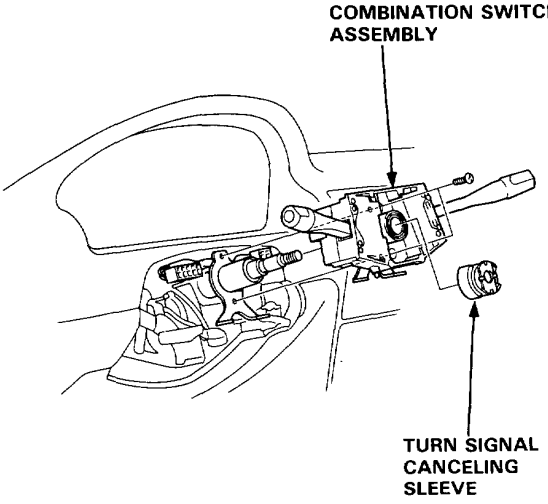


5. Connect each wire coupler to the fuse box under the left side of the dash.

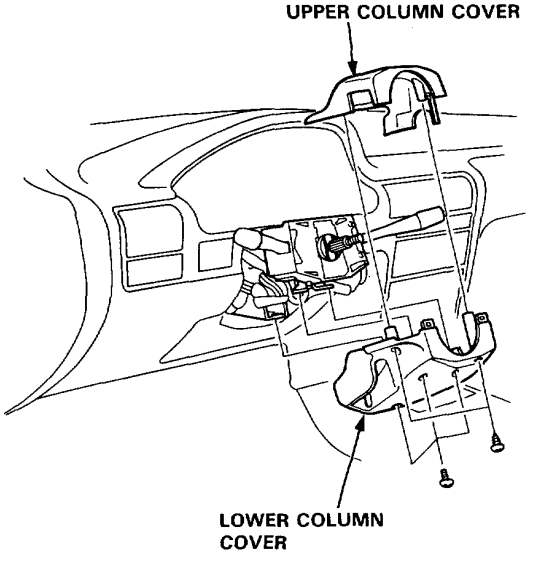


6. Install the combination switch assembly and turn signal canceling sleeve.

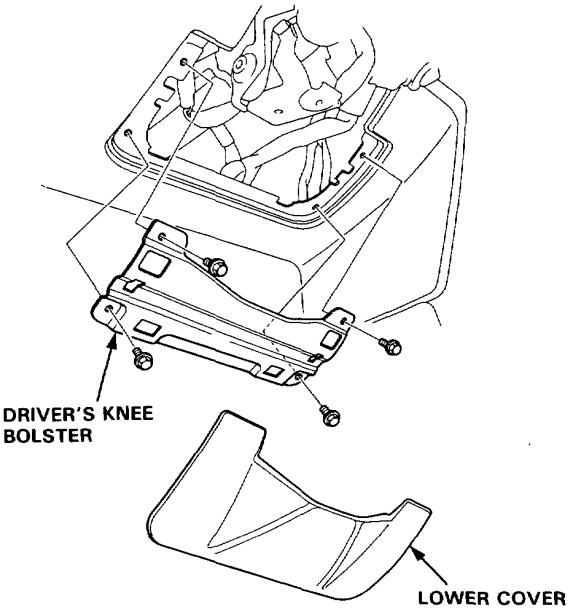
7. Connect each wire coupler to the combination switch.



8. Install the upper column cover and lower column cover.



9. Install the driver's knee bolster and lower cover.

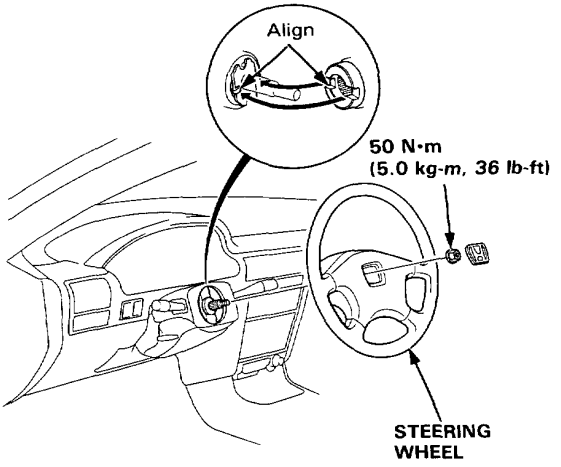


10. Install the steering wheel in a straight ahead position.

11. Tighten the steering shaft nut and torque to 50 N·m (5.0 kg-m, 36 lb-ft).

12. Check that the horn works properly, then install the center pad.

NOTE: Be sure the steering wheel engages the canceling sleeve.

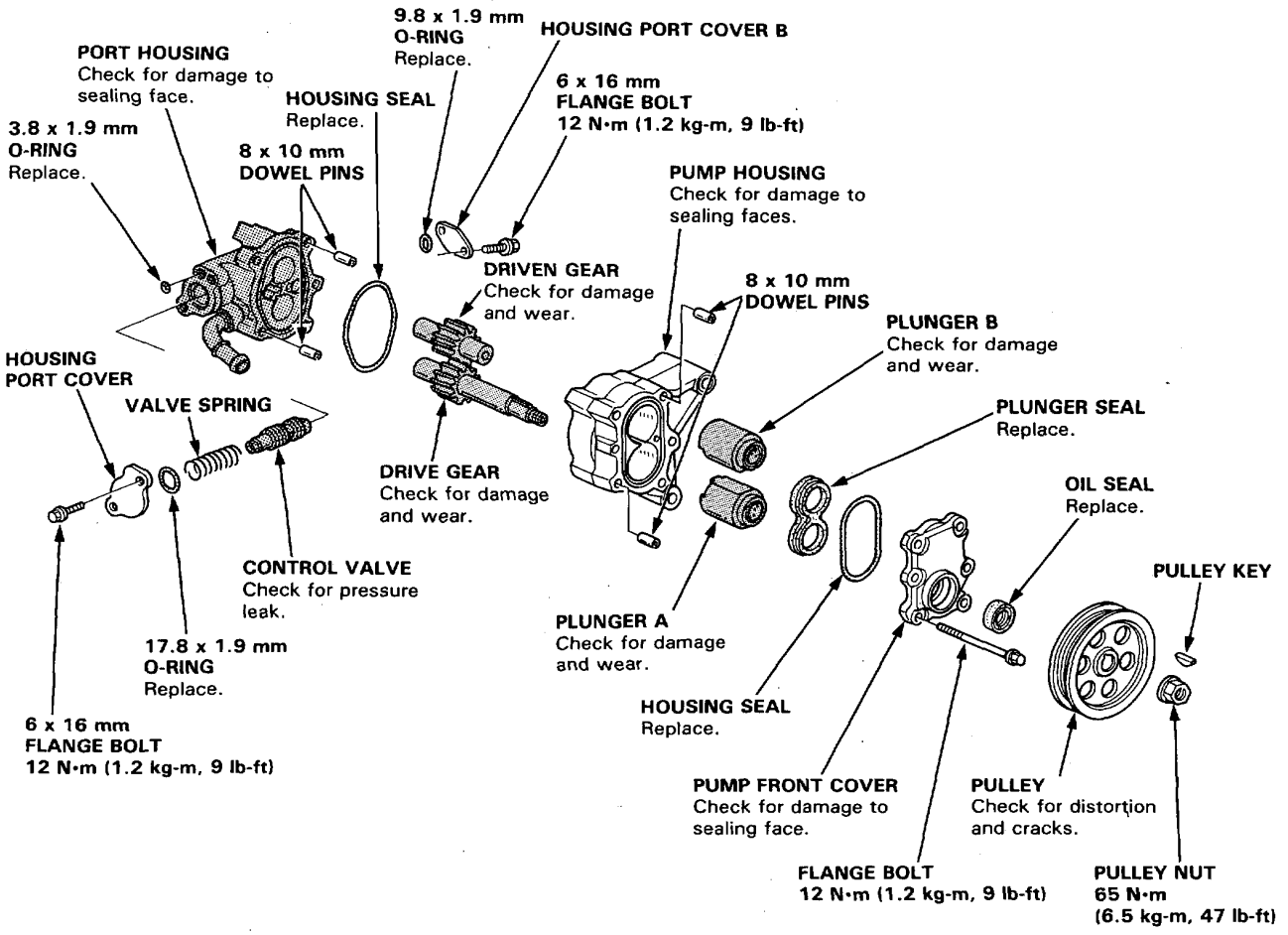


Steering Pump

Illustrated Index

CAUTION: Pump components are made of aluminum. Be careful not to damage them when servicing.

- Clean all of the disassembled parts thoroughly.
- Replace all O-rings and seals. Do not dip new O-rings and seals in solvent; coat O-rings with steering grease before installation, and make sure they stay in place during reassembly.
- The shaded parts are selectively fitted, and should not be disassembled except to replace seals If any one of them is faulty, replace the whole pump as an assembly.

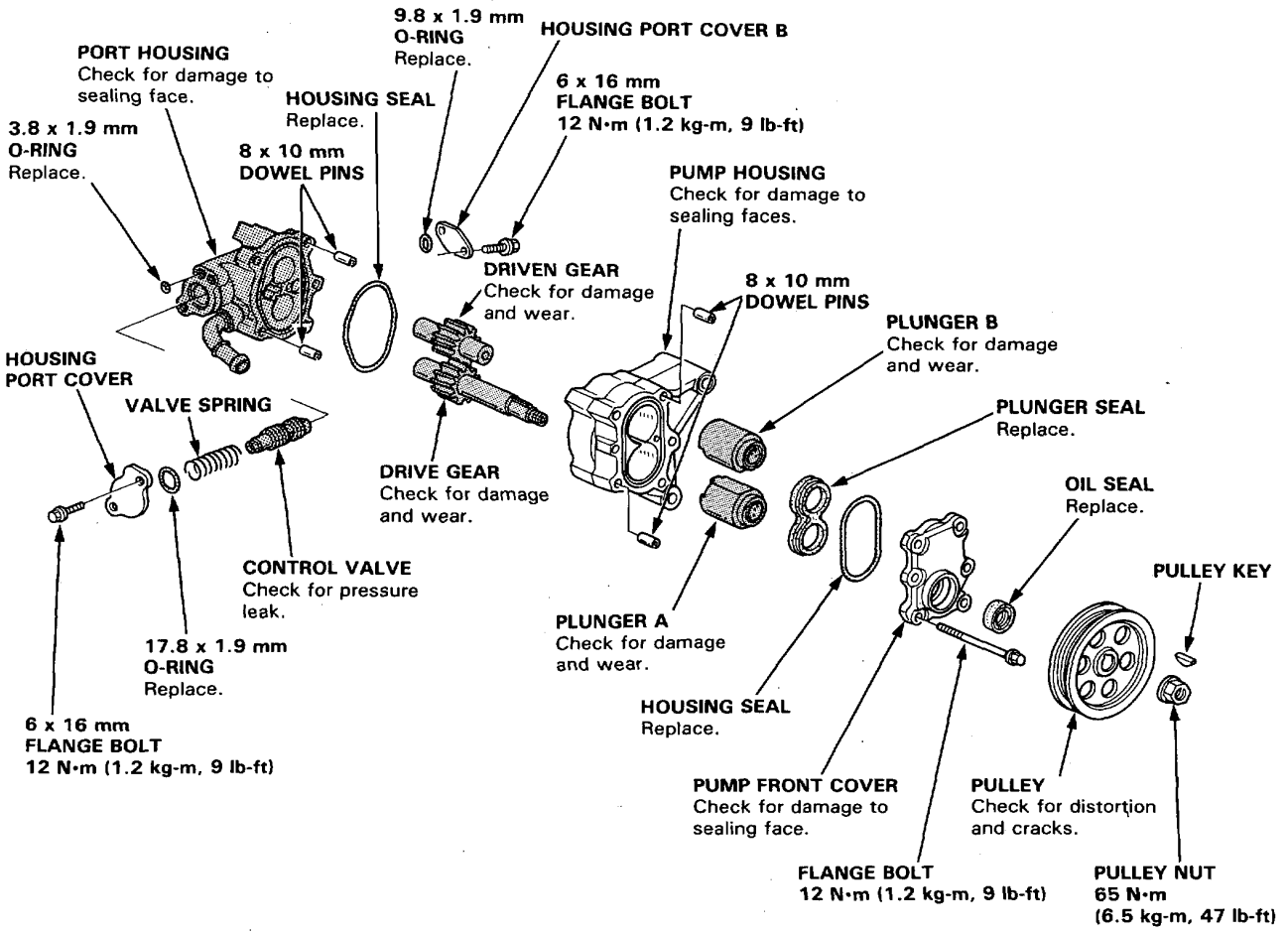


Steering Pump

Illustrated Index

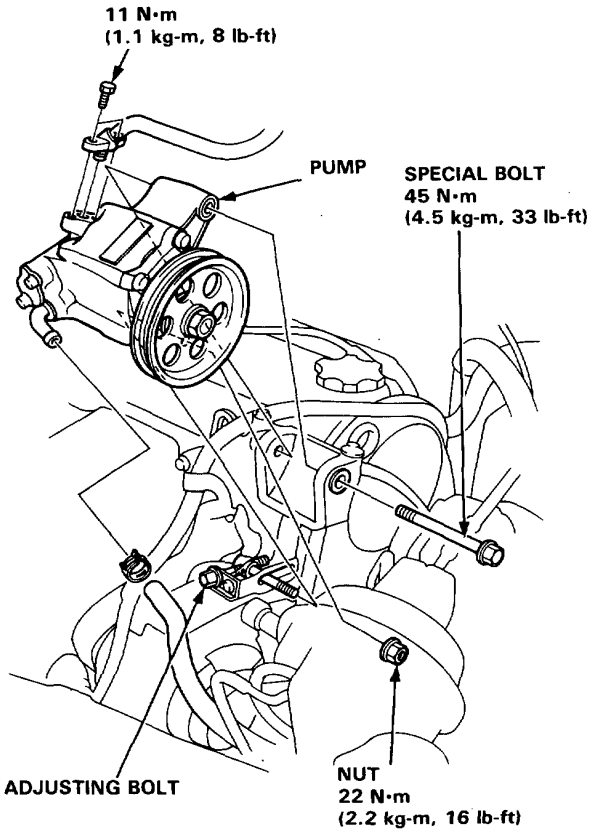
CAUTION: Pump components are made of aluminum. Be careful not to damage them when servicing.

- Clean all of the disassembled parts thoroughly.
- Replace all O-rings and seals. Do not dip new O-rings and seals in solvent; coat O-rings with steering grease before installation, and make sure they stay in place during reassembly.
- The shaded parts are selectively fitted, and should not be disassembled except to replace seals If any one of them is faulty, replace the whole pump as an assembly.



Replacement

1. Drain the fluid from the system (page 11-19).
2. Disconnect the inlet and outlet hoses from the pump and plug them.
3. Remove the belt by loosening the special bolt, nut and adjusting bolt.
4. Remove the special bolt and nut, then remove the pump.

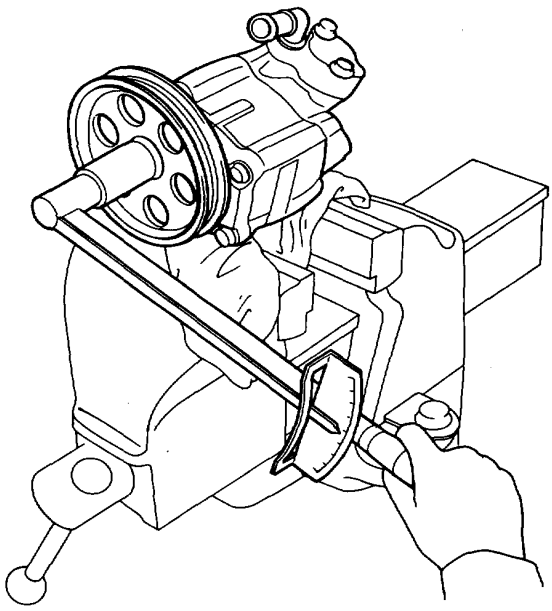


5. Loosely install a new pump on the bracket.
6. Connect the inlet and outlet hoses to the pump.
7. Install and adjust the belt (page 11-18).
8. Fill the reservoir with new fluid to the UPPER LEVEL on the reservoir.
9. Start the engine and let it run at fast idle while turning the steering wheel lock-to-lock several times to bleed air from the system.
10. Check the reservoir and add fluid if necessary.

Preload Inspection

Check the pump preload with a torque wrench after overhauling a pump or installing a replacement pump.

Preload: 8 N·m (0.8 kg-m, 70 lb-in.) max.

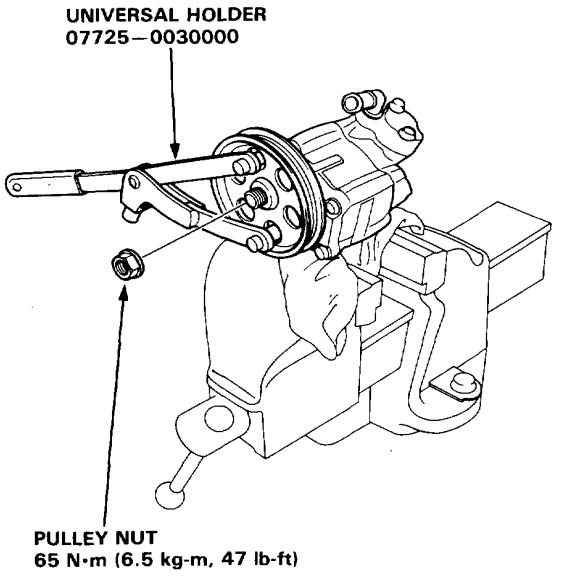


Steering Pump

Pulley Replacement

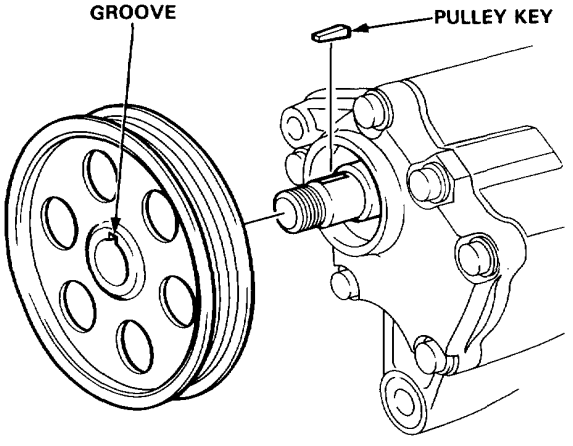
Removal:
Hold the steering pump in a vise with soft jaws, and hold the pulley with the special tool and remove the pulley nut and pulley.

NOTE: Pulley nut has left-hand threads.



Installation:

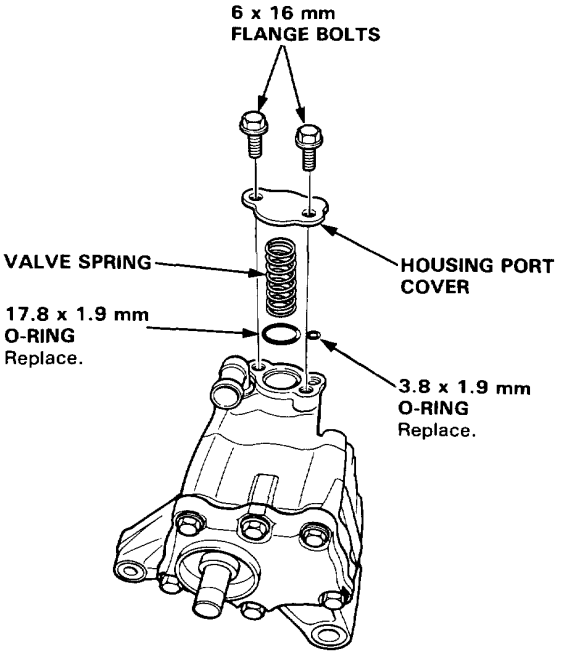
Installation:
1. Install the pulley key in the groove of the pump shaft.
2. Slide the pulley onto the pump shaft by aligning the groove of the pulley and pulley key.



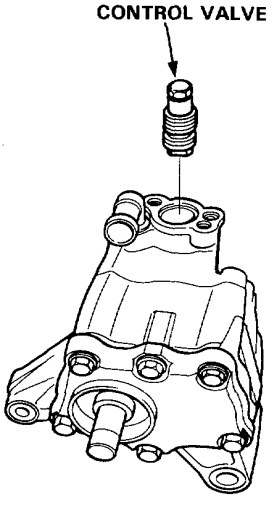
3. Hold the pully with the special tool and tighten the pulley nut.

Control Valve Inspection and Replacement

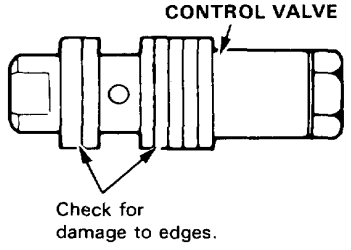
1. Remove the two 6 x 16 mm flange bolts, then remove the housing port cover, valve spring and O-rings.



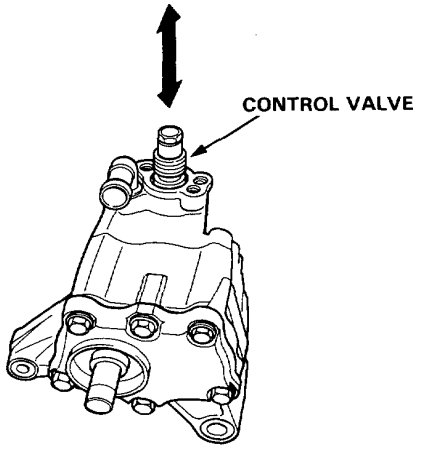
2. Remove the control valve from the port housing.



3. Check for wear, burrs, and other damage to the edges of the grooves in the valve.

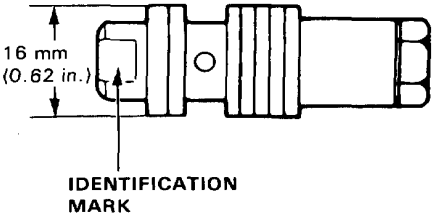


4. Slip the valve back in the pump and check that it moves in and out smoothly.



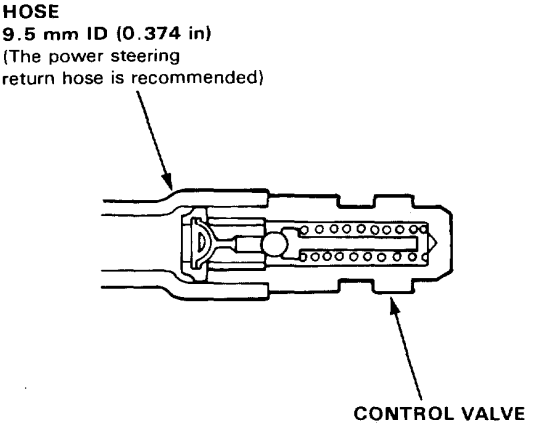
If OK, go on to step 5, if not, replace the valve:

- The original valve was selected for a precise fit in the pump housing bore, so make sure the new one has the same identification mark.



Mark	Part Number	Part Name	Size mm(in)
A	56350—PC1 —000	CONTROL VALVE A	15.995—16.000 (0.6297—0.6299)
Without mark	56360—PC1 —000	CONTROL VALVE B	16.000—16.006 (0.6299—0.6302)

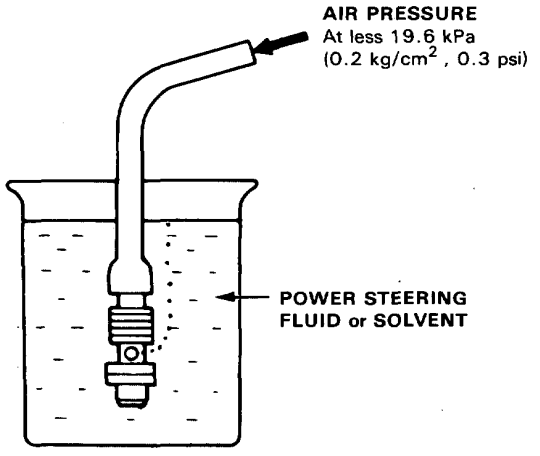
5. Attach a hose to the end of the valve as shown.



(cont'd)

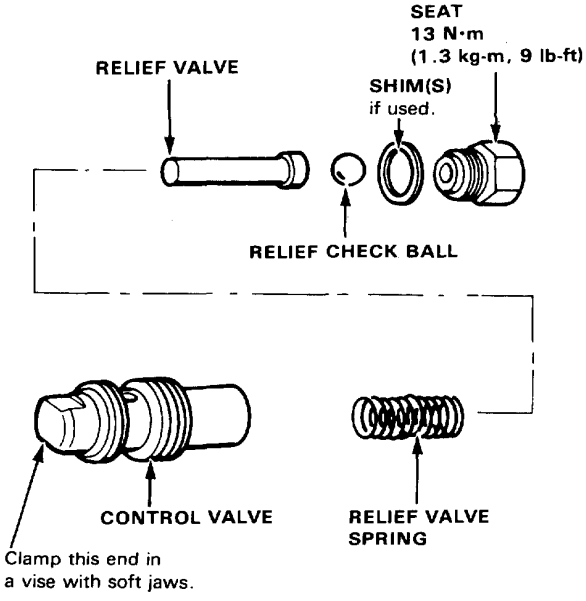
Control Valve Inspection and Replacement (cont'd)

6. Then submerge the valve in a container of power steering fluid or solvent, and blow on the hose. If air bubbles leak through the valve, replace or repair it as follows.



7. Clamp the bottom end of the valve in a vise with soft jaws.

8. Unscrew the seat in the top end of the valve, and remove any shims, the relief check ball, relief valve and relief valve spring.

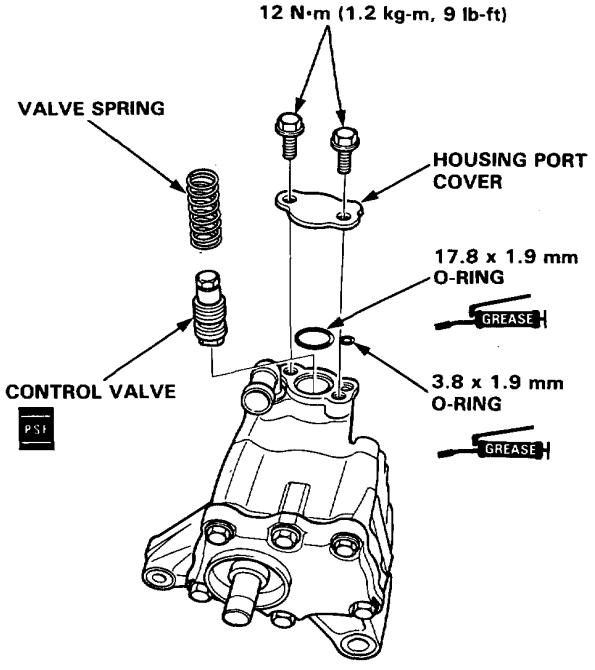


9. Clean all the parts in solvent, dry them off, then re-assemble and retest the valve.

   NOTE: If necessary, relief pressure is adjusted at the factory by adding shims under the check ball seat. If you found shims in your valve, be sure you reinstall as many as you took out.

10. Install the control valve in the reverse order of removal.

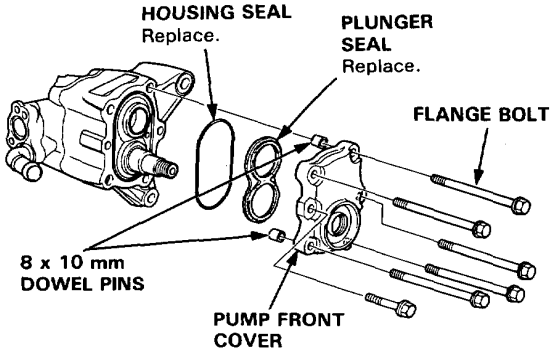
    - Apply steering grease (Honda P/N 08733—B070E) to new O-rings.
    - Coat the control valve with power steering fluid then install it and valve spring.



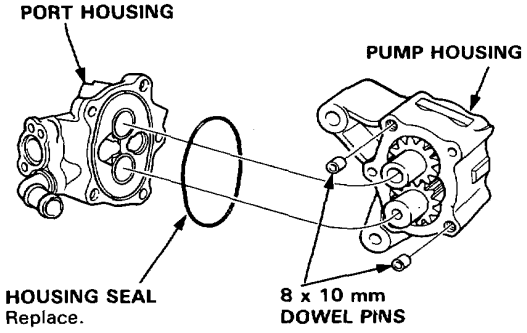
Housing Disassembly

CAUTION: The pump components are made of aluminum. Be careful not to damage them when servicing.

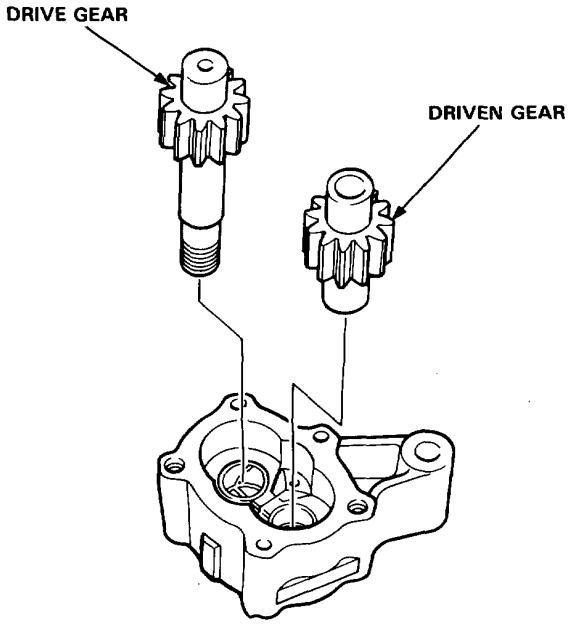
1. Remove the pump from car (page 11-31).
2. Remove the pulley (page 11-32).
3. Remove the control valve (11-34).
4. Remove the five bolts then remove the pump front cover, housing seal, plunger seal and dowel pins.



5. Remove the dowel pins and housing seal from the port housing.
6. Separate the port housing from the pump housing.



7. Remove the pump drive and driven gears from the pump housing.
8. Remove the plungers from the pump housing.



9. Pry the oil seal out from the pump front cover.

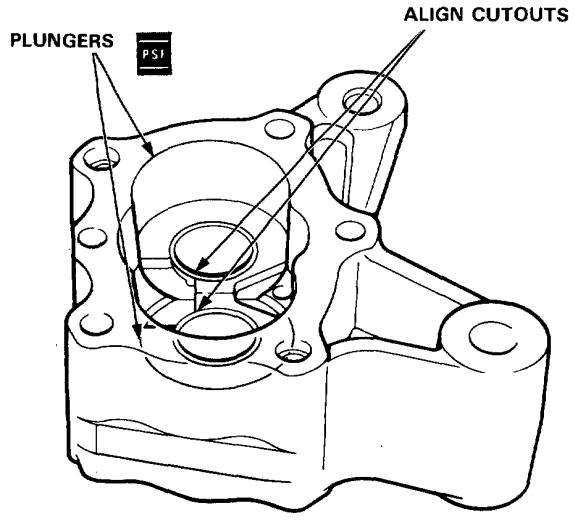


Steering Pump

Housing Reassembly

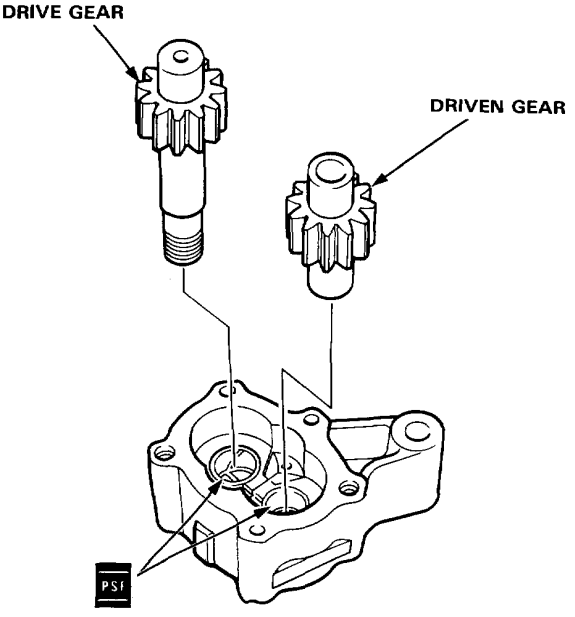
1. Coat the outer surfaces of the plungers with power steering fluid, then install them in the pump housing. Make sure the plunger holes are positioned as shown.

   NOTE: Install the plungers so the cutouts are aligned as shown.



2. Coat the inside of the plungers with power steering fluid.

3. Install the pump drive and driven gears in the pump housing.

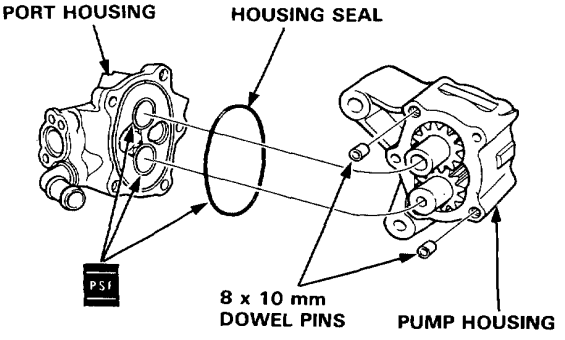


4. Coat the port housing groove with power steering fluid first, then position a new housing seal on the port housing.

5. Coat the bushings on the port housing with power steering fluid.

6. Install the dowel pins in the pump housing.

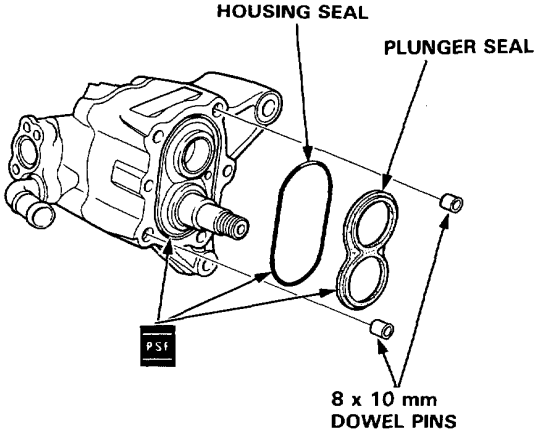
7. Install the port housing on the pump housing.



8. Coat the port housing groove with power steering fluid, then position a new housing seal on the pump housing.

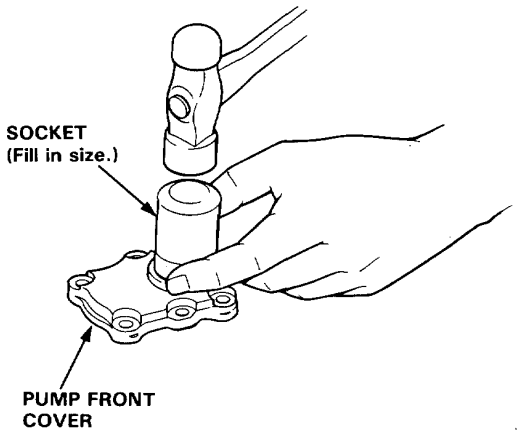
9. Coat the new plunger seal with the power steering fluid and install it over the plungers.

10. Install the dowel pins in the pump housing.

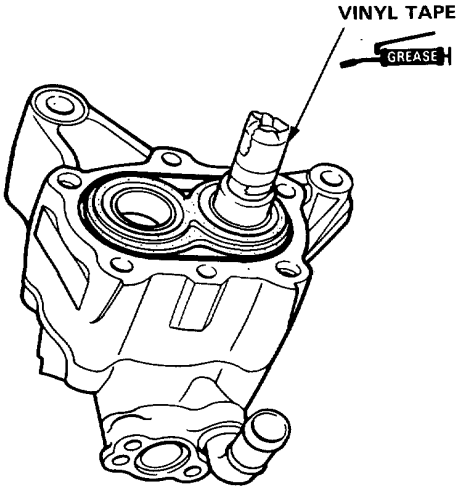


11. Install the new oil seal in the pump front cover; get it started by hand, then use a socket to push it in the rest of the way.

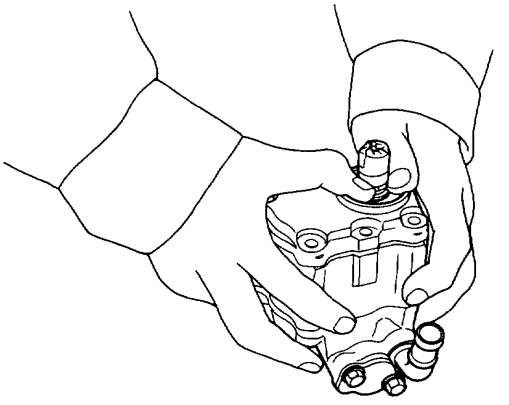
12. Coat the lip of the seal with steering grease (Honda P/N 08733—B070E).



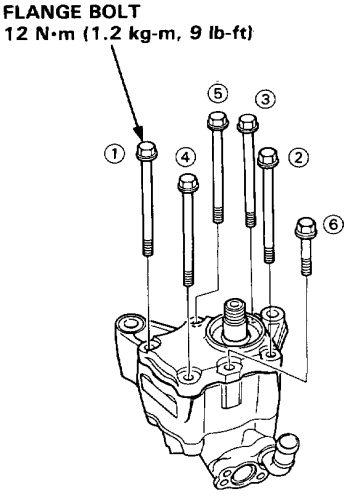
13. Wrap the splined area of the drive gear with vinyl tape and grease the surface of the tape.



14. Slide the pump front cover over the drive gear, being careful not to damage the sealing lip or dislodge the spring of the oil seal, then remove the vinyl tape.



15. Install the five bolts. Torque them to the specified torque in the order shown.



16. Install the control valve (page 11-34).

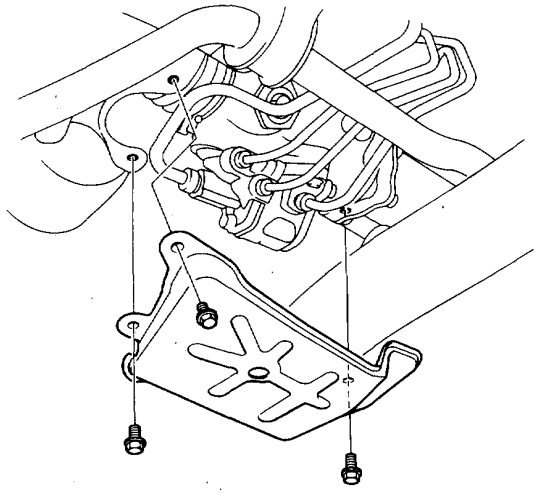
17. Install the pulley (page 11-32) and check the pump preload with a torque wrench (page 11-31).

Steering Gearbox

Valve Body Unit Overhaul

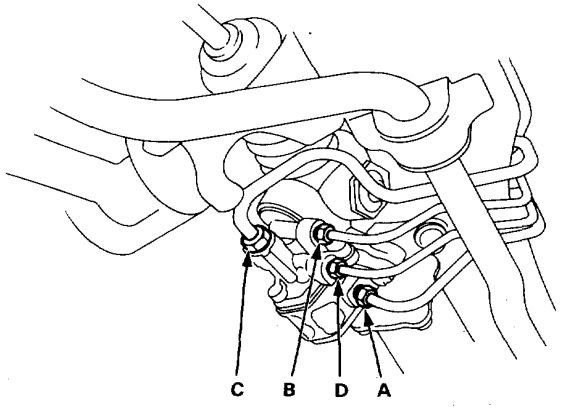
Removal:

1. Drain the power steering fluid (page 11-19).
2. Remove the gear box shield.

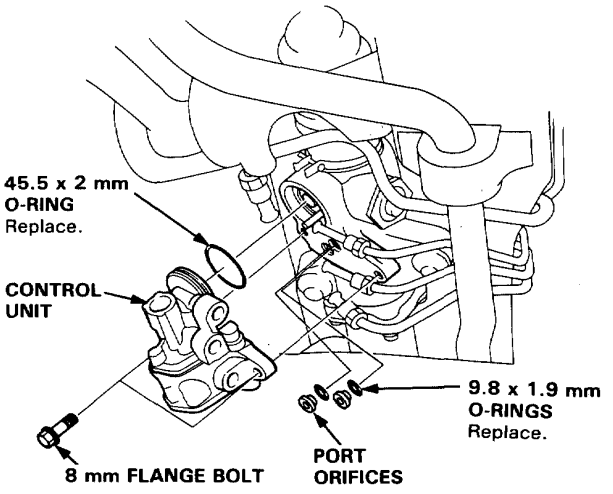


3. Using solvent and a brush, wash any oil and dirt off the control unit, its lines, and that end of the gearbox, Blow dry with compressed air.
4. Using flare nut wrenches, disconnect the four lines from the control unit.

   A: From pump: 14 mm wrench
   B: To oil cooler: 12 mm wrench
   C: To reservoir: 17 mm wrench
   D: To speed sensor: 12 mm wrench

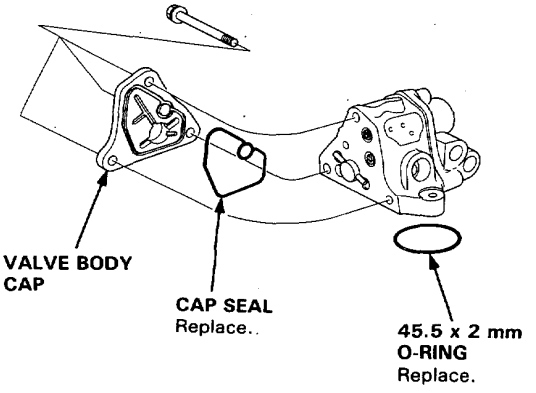


5. Remove the two 8 mm flange bolts and remove the control unit from the gearbox.
6. Remove the O-rings and port orifices from the gearbox.

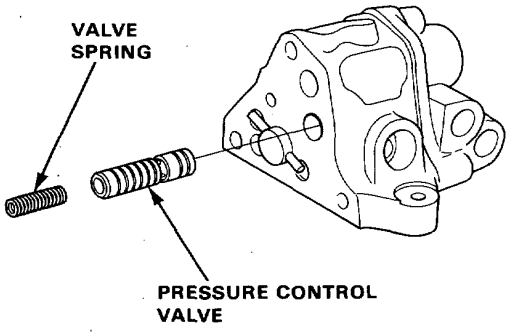


Disassembly:

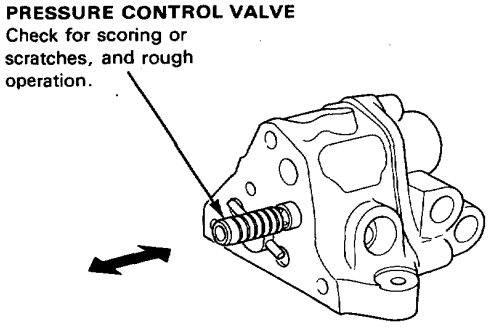
1. Remove the O-ring from the control unit.
2. Remove the three 6 mm flange bolts, and remove the cap from the valve body.
3. Remove the cap seal from the cap.



4. Remove the pressure control valve and spring from the valve body.

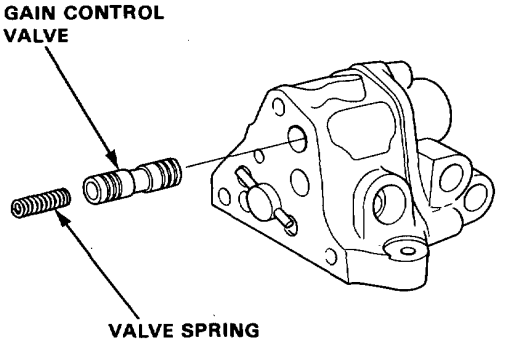


5. Check the pressure control valve:
   - Inspect its surface for scoring or scratches.
   - Slip it back into the valve body, and make sure it slides smoothly without drag and without side play.

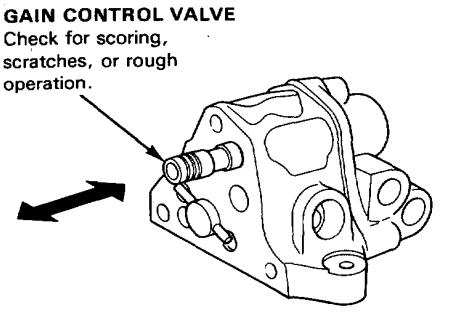


NOTE: If the valve body is damaged, replace the valve body unit (valve body, pressure control valve, gain control valve, control valve) as an assembly.

6. Remove the gain control valve and spring from the valve body.



7. Check the gain control 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.



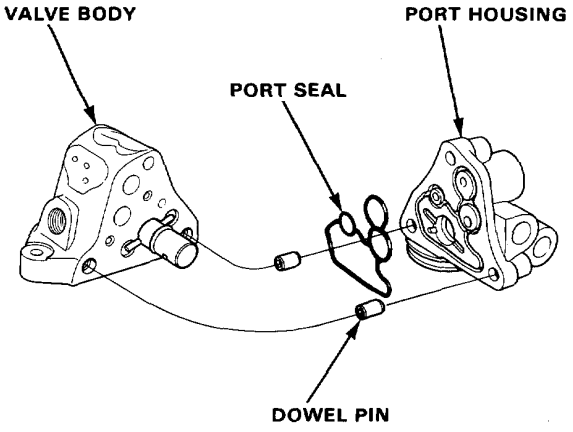
NOTE: If the valve body is damaged, replace the valve body unit (valve body, pressure control valve, gain control valve, control valve) as an assembly.

(cont'd)

Valve Body Unit Overhaul (cont'd)

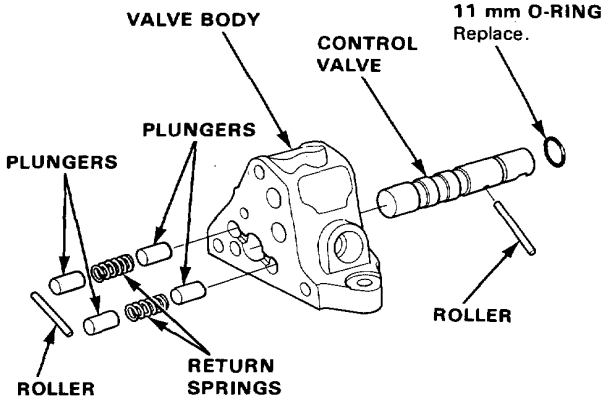
8. Separate the valve body and port housing.

9. Remove the seal and dowel pins from the port housing.



10. 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.



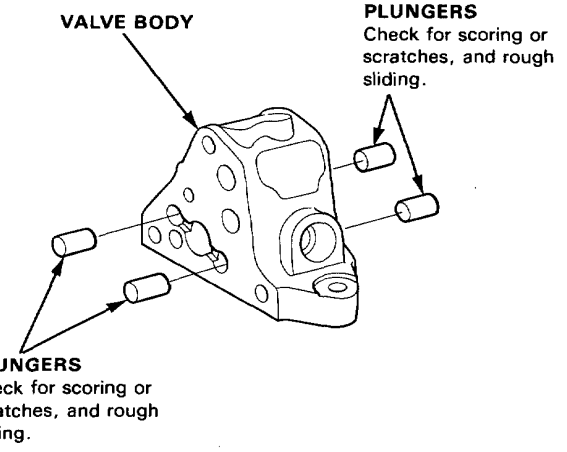
11. Remove the plungers, return springs and control valve from the valve body.

12. Remove the 11 mm O-ring from the control valve.

13. Check the plungers.

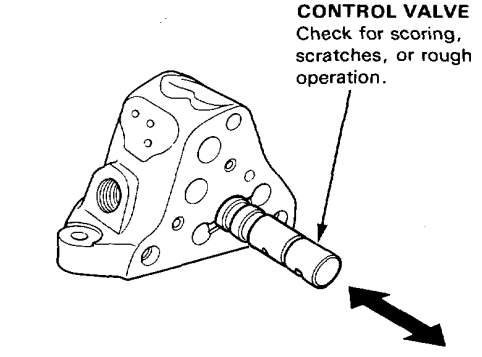
    - Inspect their surface for scoring or scratches.
    - Slip each plunger into the valve body, and make sure it slides smoothly, without drag or side play. If any plunger is damaged, replace it.

    NOTE: If the valve body is damaged, replace all three parts (valve body, cut-off valve and control valve) as a set.



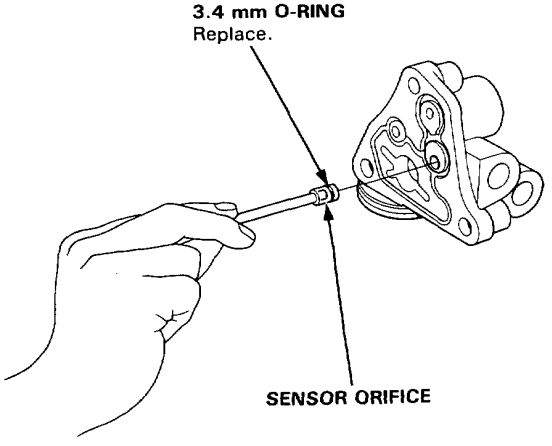
14. Check the control valve.

    - Inspect its surface for scoring or scratches.
    - Slip it into the valve body, and make sure it slidies smoothly, without drag or side play.



NOTE: If the valve body is damaged, replace the valve body unit (valve body, pressure control valve, gain control valve, control valve) as an assembly.

15. Using a 3 mm (1/64") drill bit, remove the sensor orifice and 3.4 m O-ring.



Steering Gearbox

Valve Body Unit Overhaul

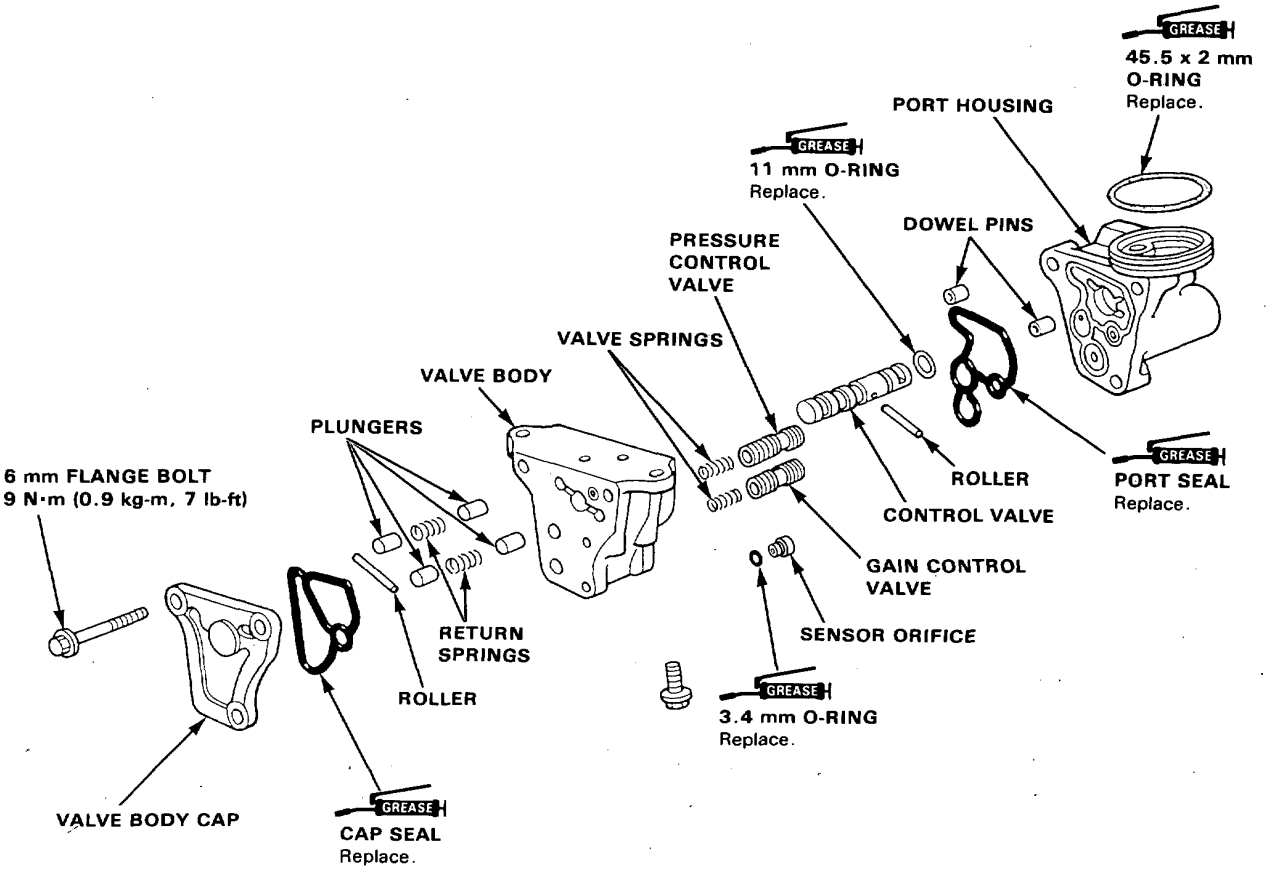
Assembly:

1. Thoroughly clean the disassembled parts shown below.
2. Coat the plungers, pressure control valve, gain control valve and control valve surfaces with power steering fluid.
3. Reassemble the parts in the reverse order of disassembly.

CAUTION:

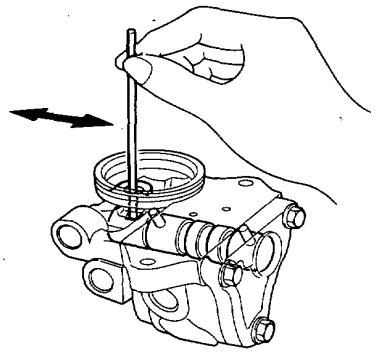
- **Replace the O-rings and seals with new ones.**
- **Do not dip the O-rings and seals in solvent.**
- **Apply grease in the seal grooves to keep the seals in place.**
- **Apply grease to new O-rings to keep them in place.**

- GREASE **STEERING GREASE ..... Part Number 08733—B070E**



NOTE: If the valve body is damaged, replace the valve body unit (valve body, pressure control valve, gain control valve, control valve) as an assembly.

4. Make sure the control valve moves smoothly, and returns to neutral position.

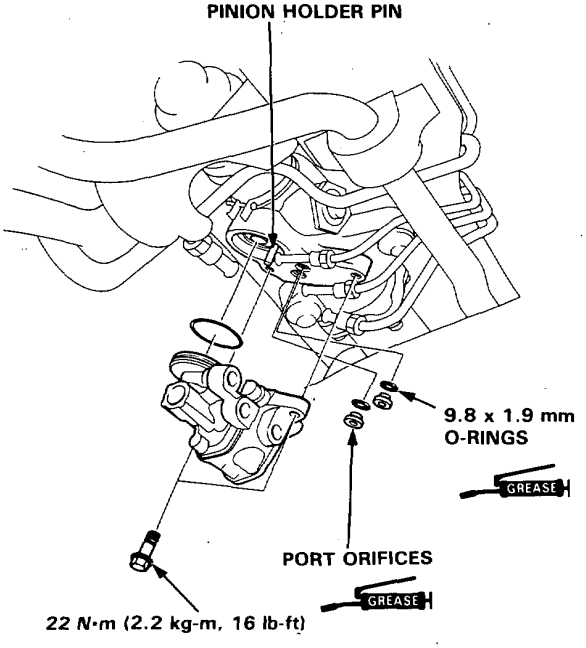


Installation:

1. Coat the 9.8 x 1.9 mm O-rings with grease, and install them together with the orifices.

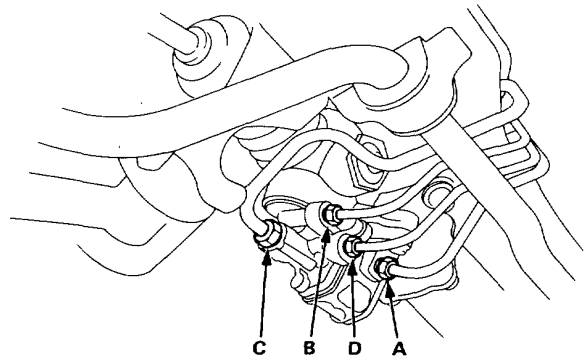
2. Install the valve body unit on the gear housing with the two 8 mm bolts.

   CAUTION:
   - **When installing, be careful not to hit the pinion holder pin.**
   - **Make sure the O-rings are in place and not pinched.**



3. *Connect the four lines to the control unit, using flare nut wrenches.*

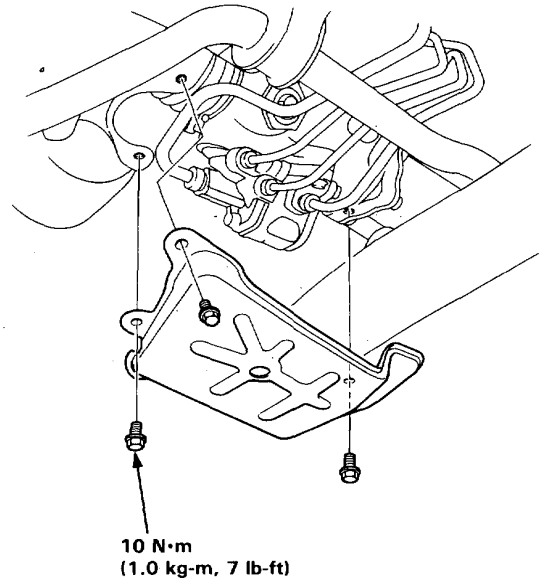
   A: From pump: 14 mm wrench
   38 N·m (3.8 kg-m, 28 lb-ft)
   B: To oil cooler: 12 mm wrench
   13 N·m (1.3 kg-m, 9 lb-ft)
   C: To reservoir: 17 mm wrench
   29 N·m (2.9 kg-m, 21 lb-ft)
   D: To speed sensor: 12 mm wrench
   13 N·m (1.3 kg-m, 9 lb-ft)



4. Fill the reservoir with power steering fluid and bleed air from the system by turning the steering wheel from lock to lock several times with the engine warm.

5. Make sure there are no fluid leaks, then install the shield.

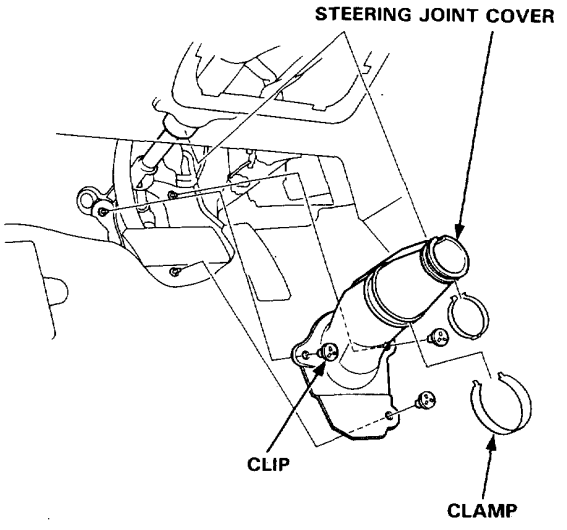
6. Recheck the fluid level in the reservoir.



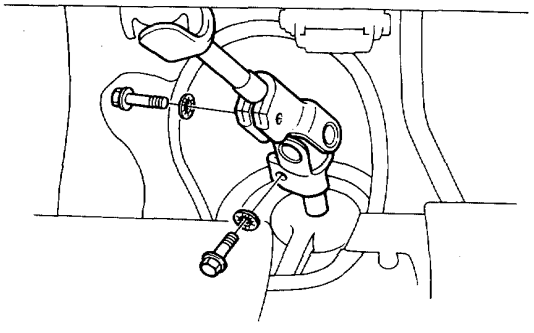
Steering Gearbox

Removal

1. Drain the power steering fluid as described on page 11-19.
2. Raise the front of car and support on safety stands in the proper locations.
3. Remove the front wheels.
4. Remove the steering joint cover.



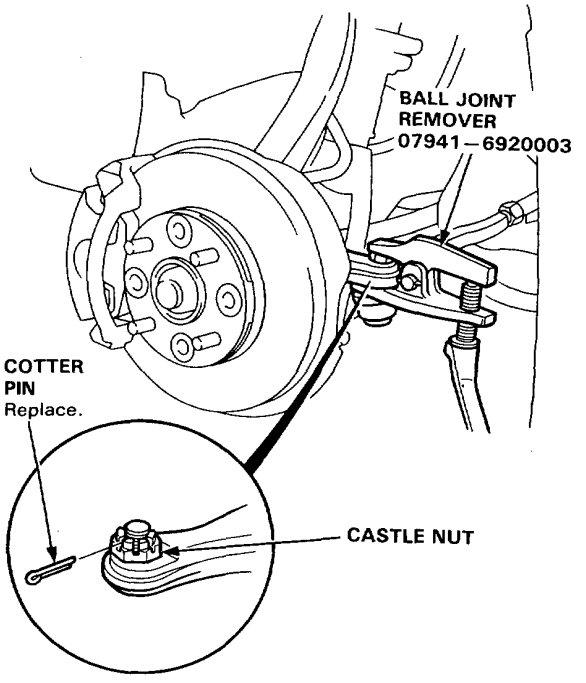
5. Remove the steering joint bolts, and move the joint toward the column.



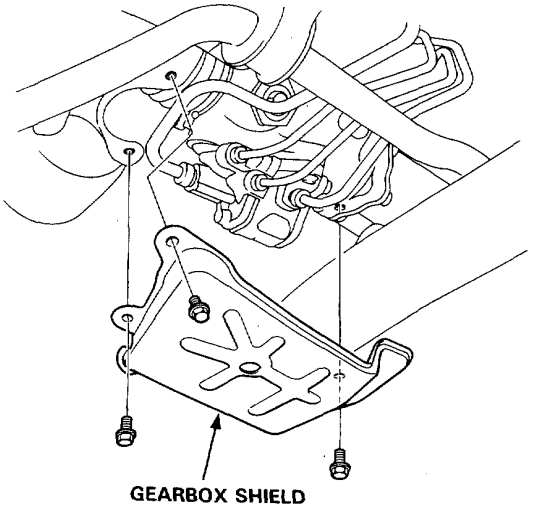
6. Disconnect the tie rods from the steering knuckles using the special tool shown.

CAUTION: Avoid damaging the ball joint boot.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.



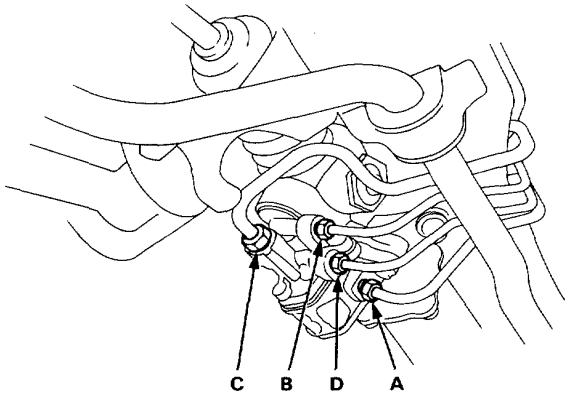
7. Remove the gear box shield.



8. 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.

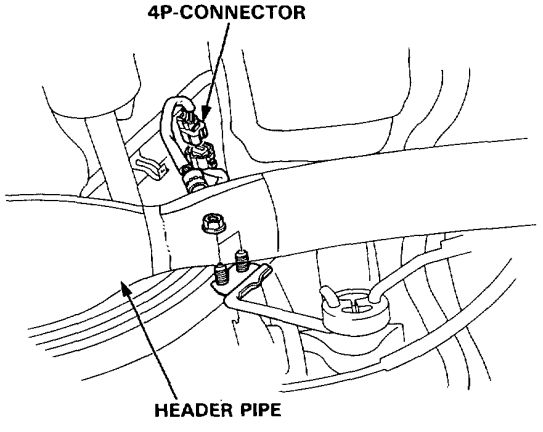
9. Using flare nut wrenches, disconnect the four lines from the control unit.

   A: From pump: 14 mm wrench
   B: To oil cooler: 12 mm wrench
   C: To reservoir: 17 mm wrench
   D: To speed sensor: 12 mm wrench



10. Disconnect the 4P connector from the oxygen sensor.

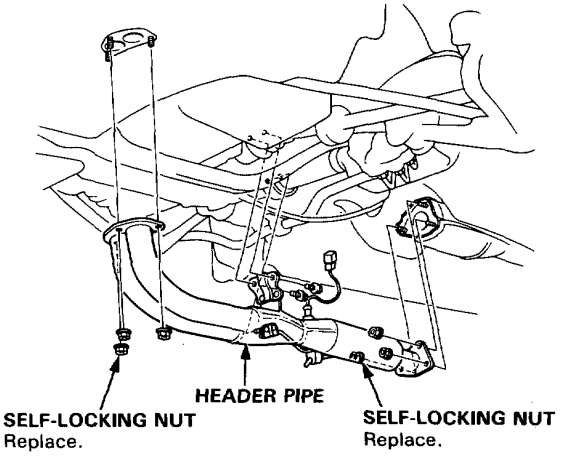
11. Remove the header pipe bracket nuts.



12. Remove the self-locking nuts that connect the header pipe to the catalytic converter, and the header pipe to the exhaust manifold.

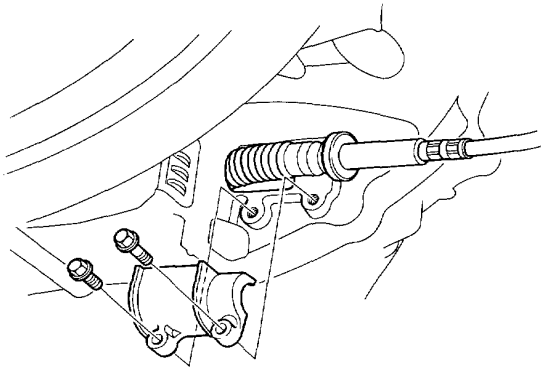
13. Remove the header pipe.

CAUTION: Replace the exhaust gasket and self-locking nuts when you reinstall the pipe.



Automatic transmission:

14. Remove the control cable from the clamp by removing the cable holder.

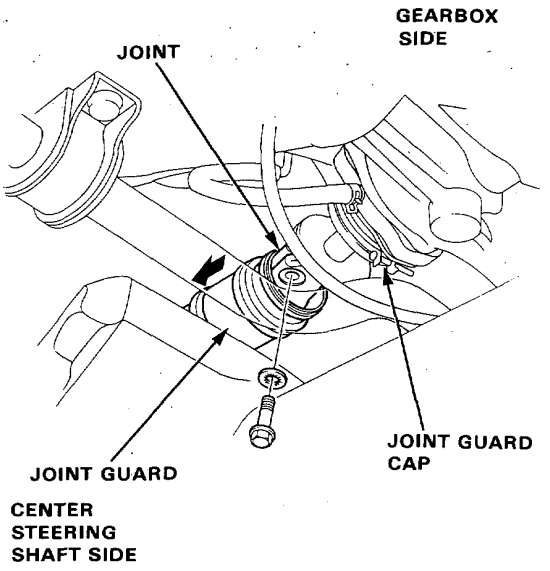


(cont'd)

Removal (cont'd)

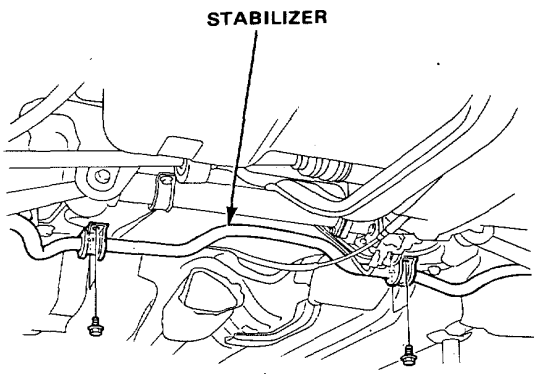
4WS Only.

- Separate the joint guard cap and the joint guard.
- Remove the joint bolt from the driven pinion side.

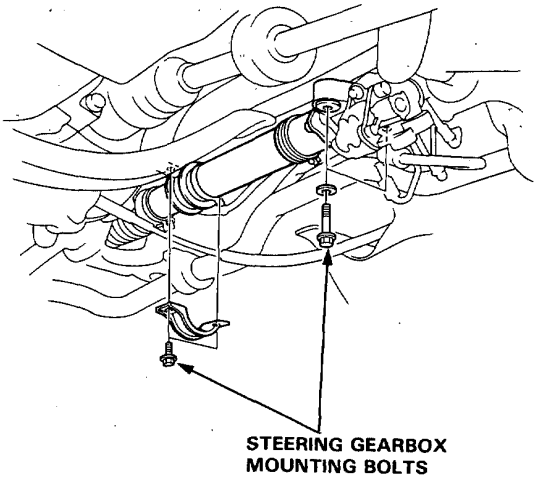


- Remove the joint bolt from the center steering shaft side, then slide the joint back to disconnect it from the driven pinion.

15. Remove the bolts, and lower the stabilizer.



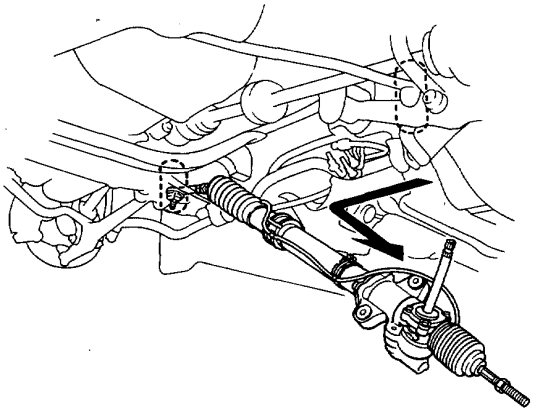
16. Remove the steering gearbox mounting bolts.



17. Slide the tie rod all the way to the right side.

18. Slide the gearbox right so that the left tie rod clears the bottom of the rear beam, then remove the gearbox.

CAUTION: Be careful not to bend or damage the four power steering lines when removing the gearbox assembly.

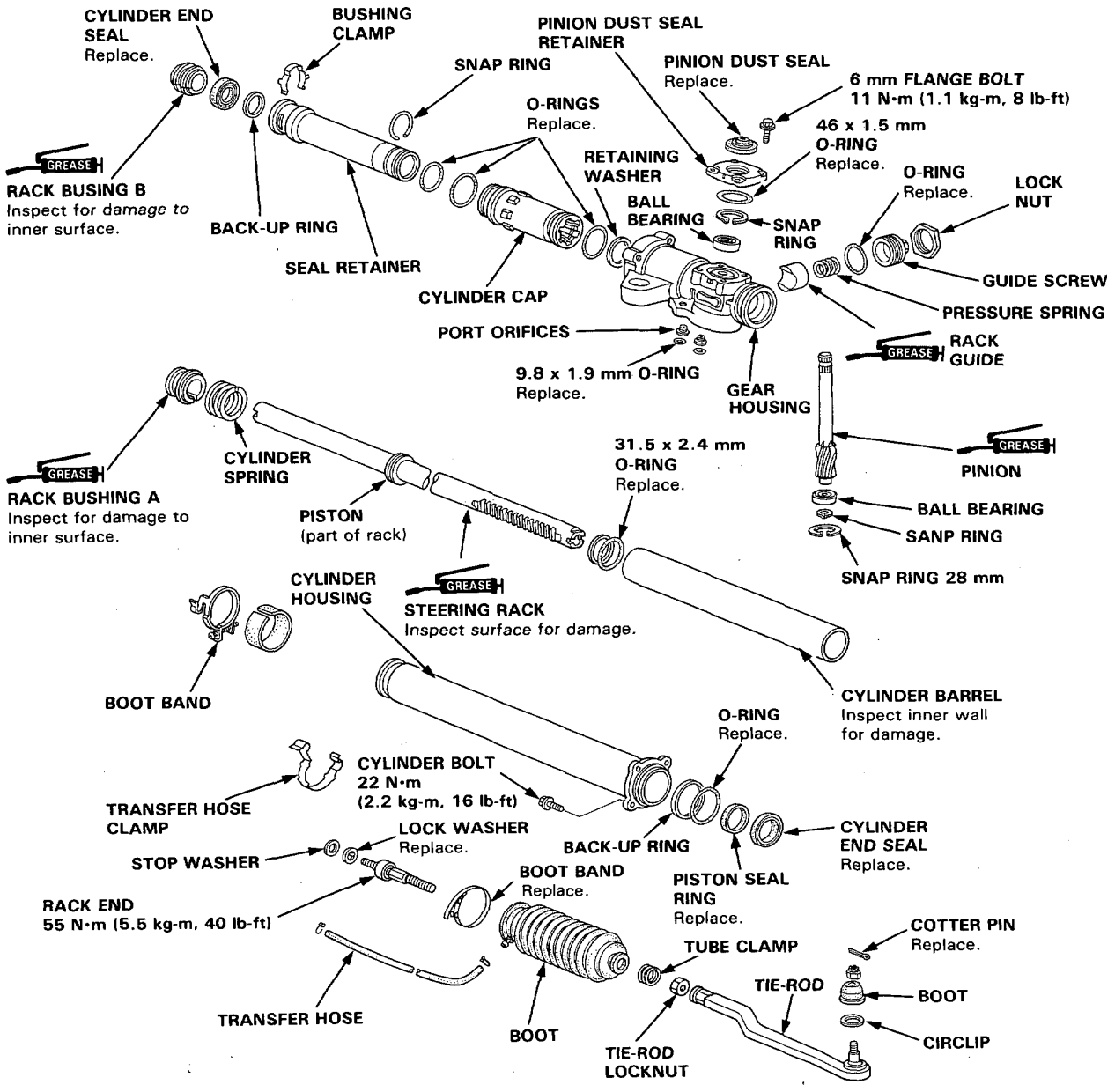


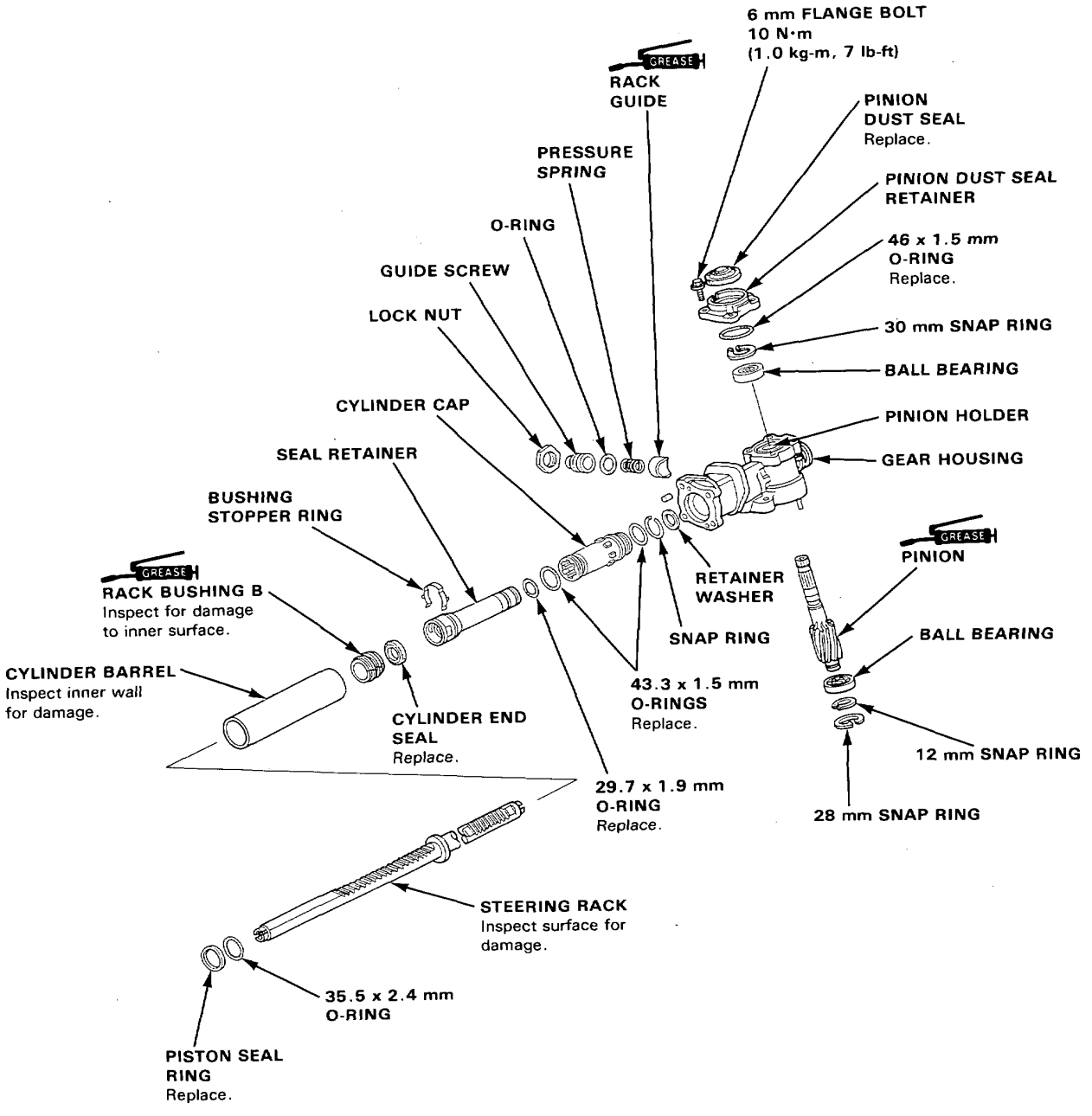
Steering Gearbox

Illustrated Index (2WS)

NOTE:
- LH Drive shown, RH Drive is similar.
- The valve body unit removal see pages 11-38.

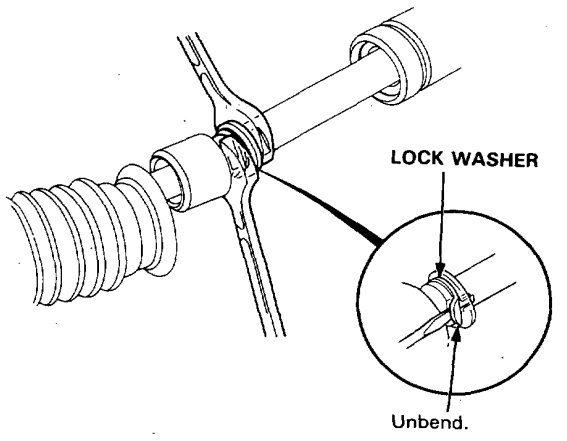
CAUTION:
- **Before disassembling the gearbox, wash it off with solvent and a brush.**
- **Thoroughly clean all disassembled parts.**
- **Always replace O-rings and seals.**
- **Replace parts with damaged sliding surfaces.**
- **Do not dip seals and O-rings in solvent; coat O-rings with grease, make sure they stay in position during reassembly, and use the appropriate special tools to install them where necessary.**
- GREASE **STEERING GREASE ..... Part Number 08733—B070E**



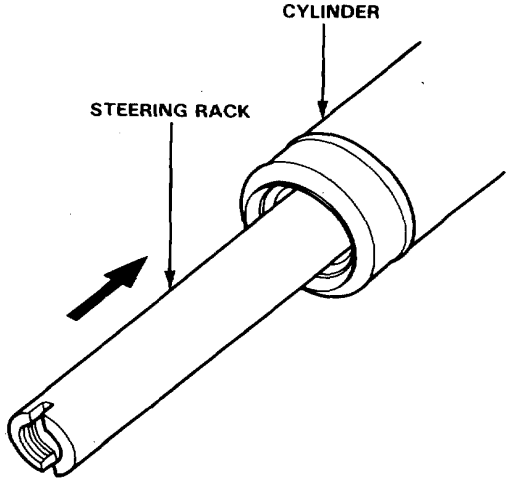

6 mm FLANGE BOLT
10 N·m
(1.0 kg-m, 7 lb-ft)
GREASE
RACK GUIDE
PINION DUST SEAL
Replace.
PRESSURE SPRING
PINION DUST SEAL RETAINER
O-RING
46 x 1.5 mm O-RING
Replace.
GUIDE SCREW
LOCK NUT
30 mm SNAP RING
BALL BEARING
CYLINDER CAP
PINION HOLDER
SEAL RETAINER
GEAR HOUSING
BUSHING STOPPER RING
GREASE
PINION
GREASE
RACK BUSHING B
Inspect for damage to inner surface.
RETAINER WASHER
SNAP RING
BALL BEARING
CYLINDER BARREL
Inspect inner wall for damage.
43.3 x 1.5 mm O-RINGS
Replace.
CYLINDER END SEAL
Replace.
12 mm SNAP RING
29.7 x 1.9 mm O-RING
Replace.
28 mm SNAP RING
STEERING RACK
Inspect surface for damage.
35.5 x 2.4 mm O-RING
PISTON SEAL RING
Replace.

Overhaul (2WS)

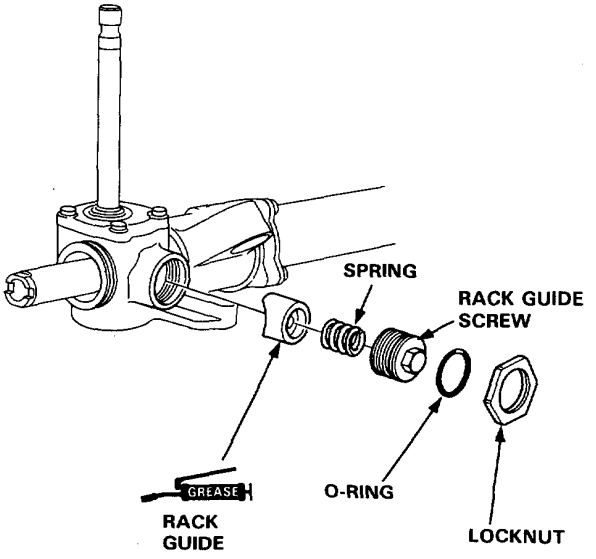
1. Remove the control unit as described on page 11-38.
2. Carefully clamp the gearbox in a vise with soft jaws.
3. Loosen the bands, pull the boots away from the ends of the gearbox, and unbend the tie-rod lock washers.
4. Hold the rack with a 22 mm wrench, and unscrew the tie-rods with a 17 mm wrench.



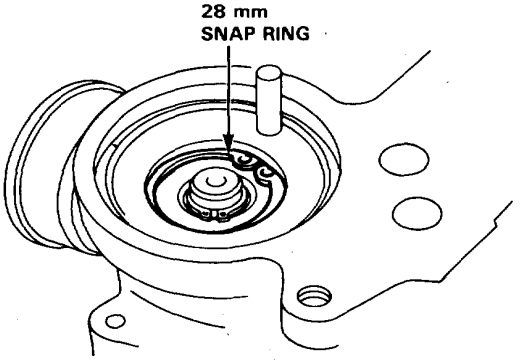
5. Push the right end of the rack back into the cylinder housing so the smooth surface that rides against the seal won't be damaged.



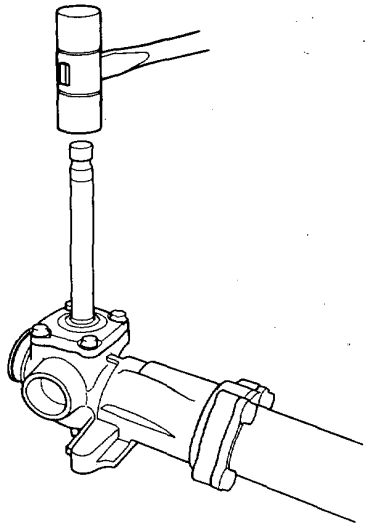
6. Loosen the rack screw locknut, and remove the rack guide screw.



7. Remove the 28 mm snap ring from the bottom of the gear housing.

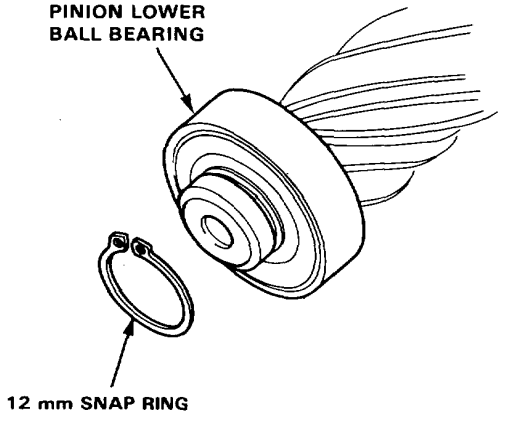


8. Remove the pinion from the gear housing by tapping it lightly.

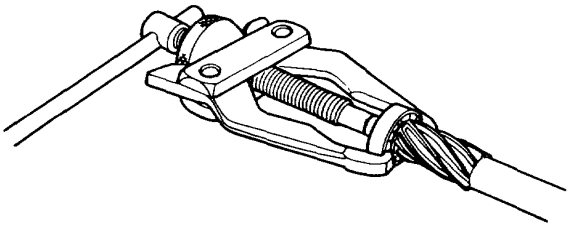


9. Check the pinion lower ball bearing for play; if it is good and the grease in it is clean, go on step 10. If the bearing is noisy or has excessive play, replace the bearing.

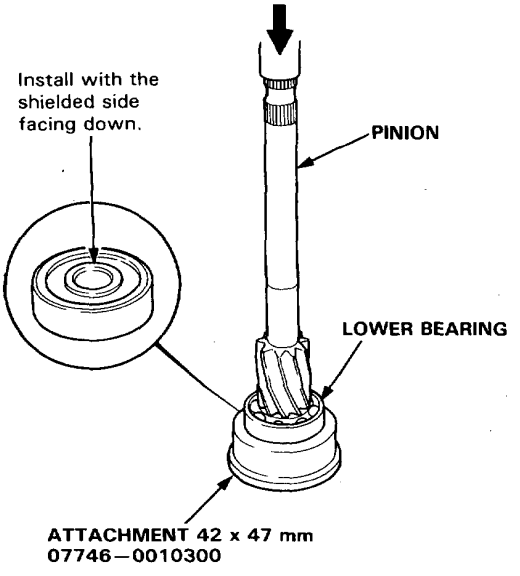
- Remove the 12 mm snap ring.



- Remove the bearing using a commercially available bearing pulley.



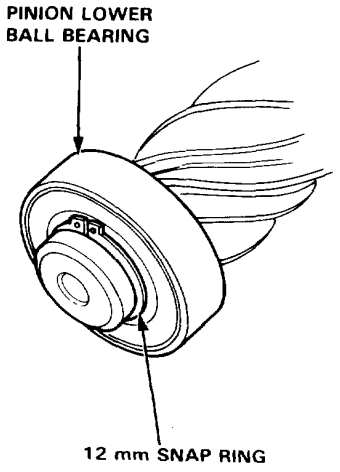
- Using a press, install the lower bearing on the pinion, with its shielded side facing down.



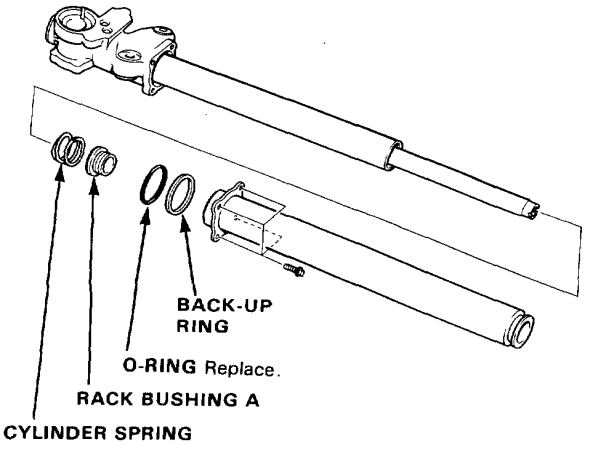
(cont'd)

Overhaul (2WS) (cont'd)

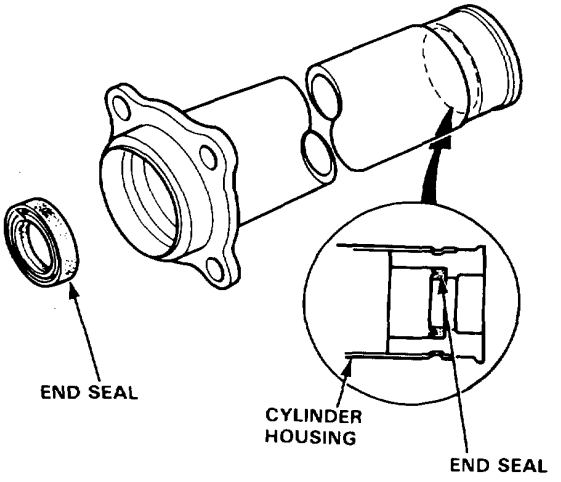
- Apply grease to the lower ball bearing and check for smooth operation. Install the 12 mm snap ring.



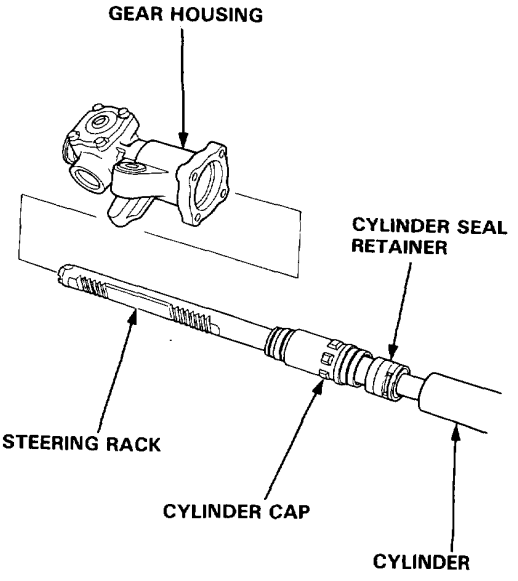
10. Remove the four bolts from the end of the cylinder housing, then slide the housing off the rack.
11. Remove the cylinder housing.



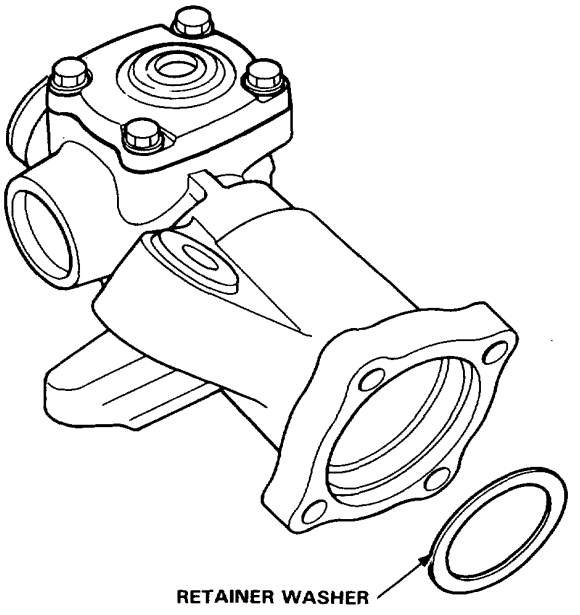
12. Remove the O-ring, back-up ring, steering rack bushing A and cylinder spring.
13. Remove the cylinder end seal from the cylinder housing.
14. Use your fingers or a wooden stick to avoid damaging the housing.



15. Remove the cylinder, cylinder seal retainer, cylinder cap and steering rack from the gear housing.

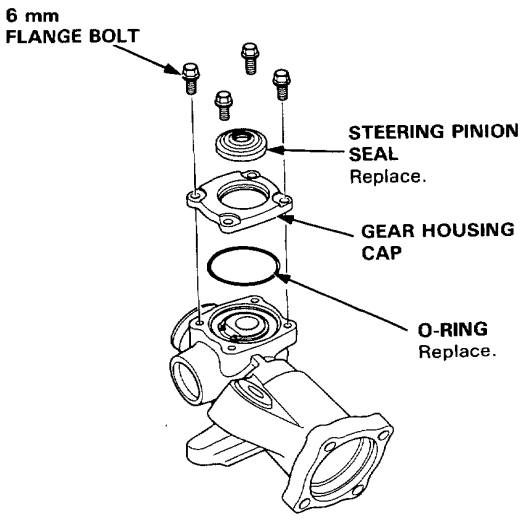


16. Remove the retainer washer from the gear housing.



17. Remove the gear housing cap from the gear housing by removing the four 6 mm flange bolts.

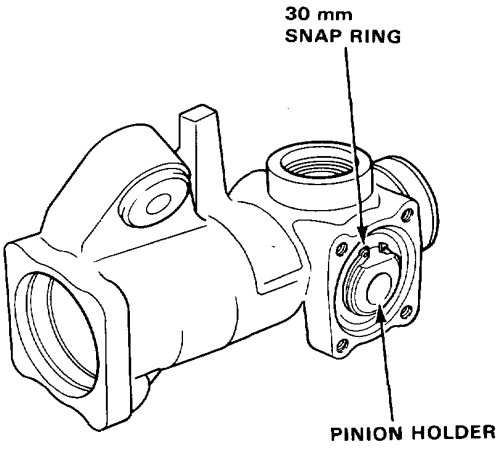
18. Remove the steering pinion seal from the gear housing cap.



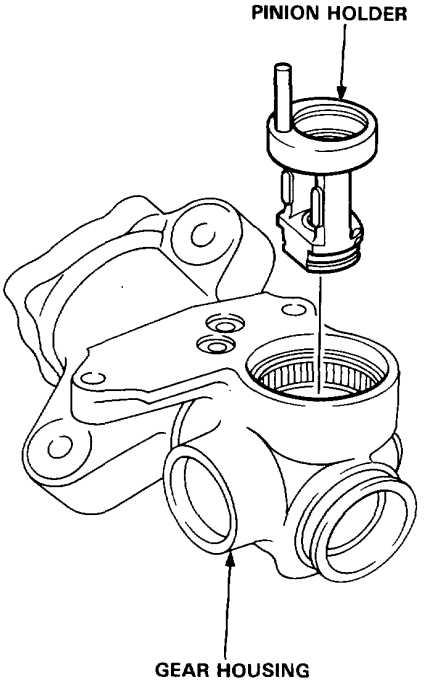
19. Remove the O-ring from the gear housing.

20. Check the upper bearing for free movement and excessive play; if it is good and the grease in it is clean, go on step 21.
If it is damaged, or if dirt has gone past the seal into the grease, replace the bearing.

- Remove the 30 mm snap ring from the pinion holder.



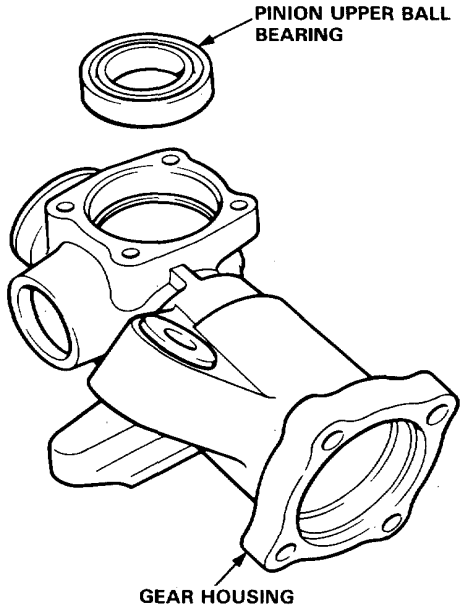
- Remove the pinion holder from the gear housing.



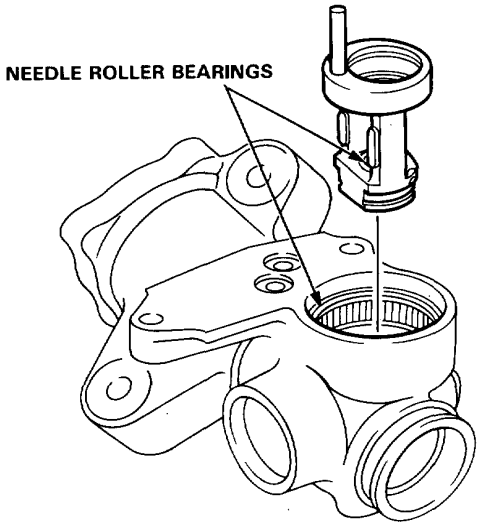
(cont'd)

Overhaul (2WS) (cont'd)

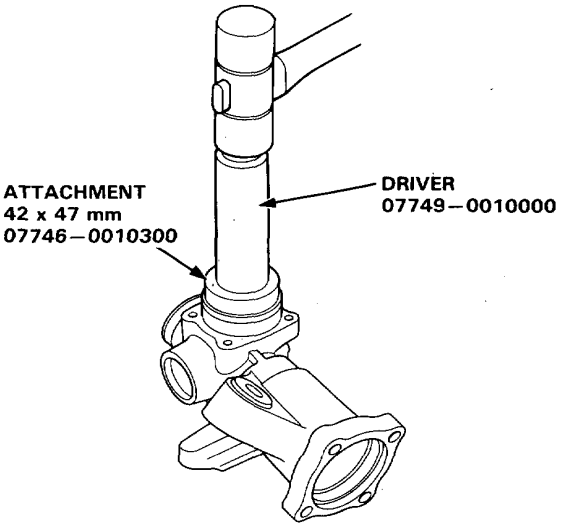
- Remove the pinion upper ball bearing from the gear housing.



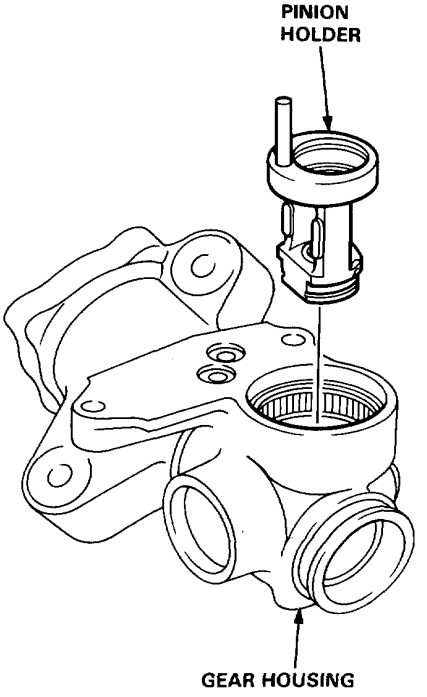
- Check the needle roller bearing in the pinion holder and in the gear housing for damage; if they are OK, pack them with grease. If the bearings are damaged, replace them as a set.



- Pack a new upper bearing with grease, then drive the bearing into the gear housing with its sealed side facing out.

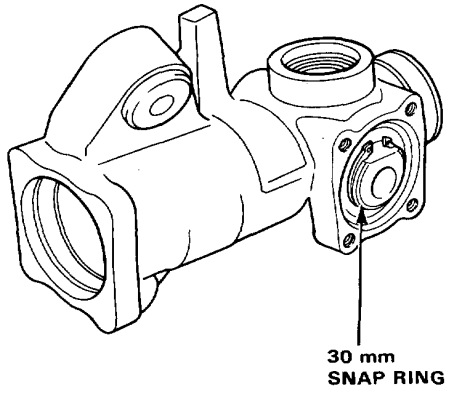


- Install the pinion holder in the gear housing.

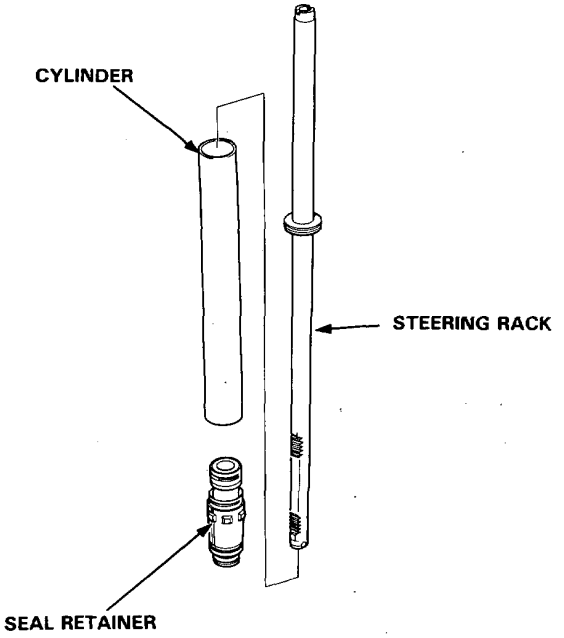


- Reinstall the 30 mm snap ring with its tapered side facing out.

NOTE: Snap ring ends must be aligned with the flat area.

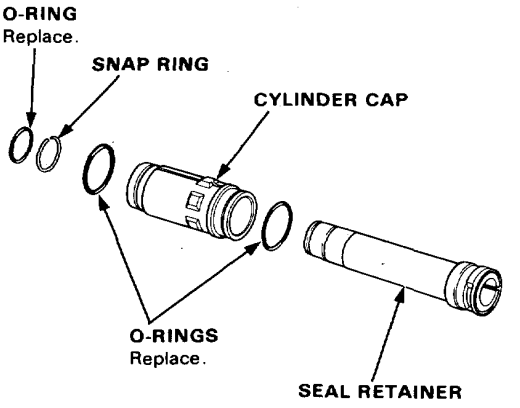


21. Remove the cylinder and seal retainer from the steering rack.



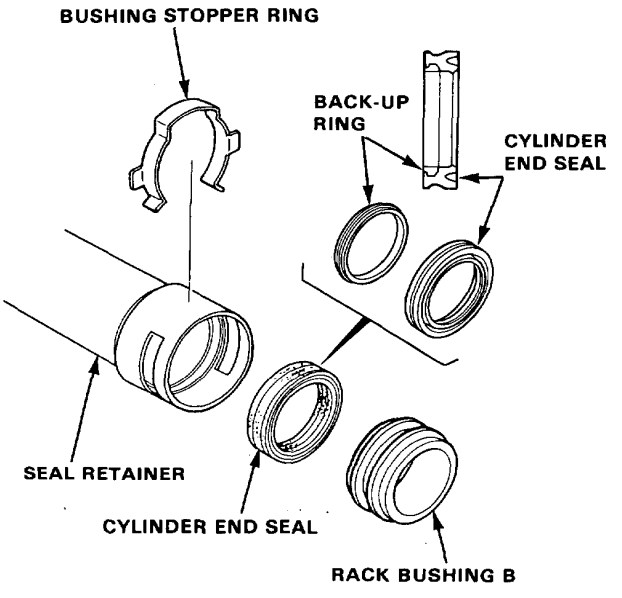
22. Remove the O-ring and snap ring from the seal retainer, then remove the cylinder cap from the seal retainer.

23. Remove the O-rings from the cylinder cap.



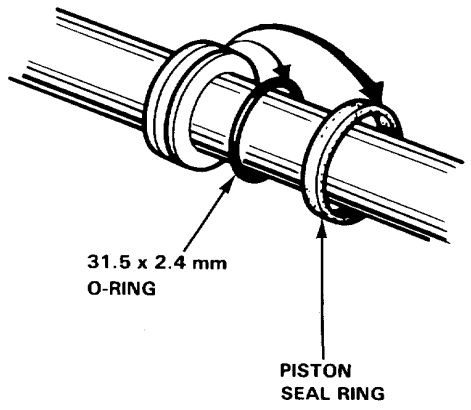
24. Remove the bushing stopper ring from the seal retainer.

25. Remove the cylinder end seal and rack bushing B.



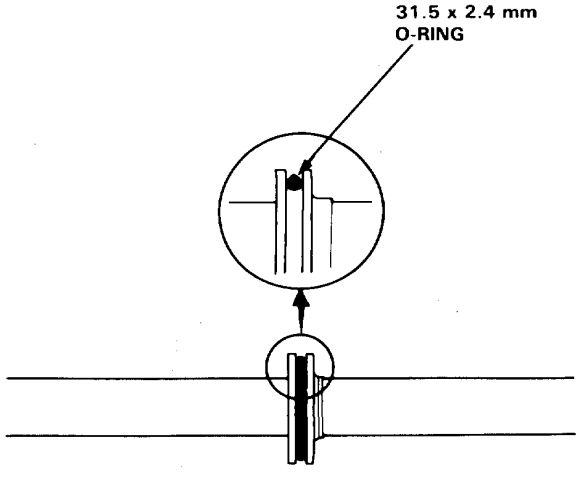
(cont'd)

26. Carefully pry the piston seal ring and O-ring off the rack.



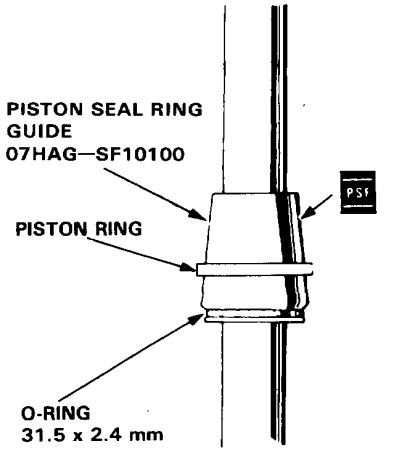
NOTE: Before reassembling any parts, inspect them as described on page 11-48 and make sure they are clean. Replace worn or damaged parts.

27. Install a new O-ring on the rack with its narrow edge facing out.

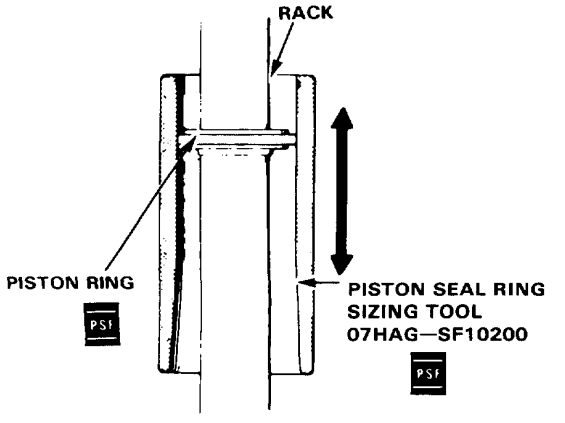


28. Coat the pinion seal ring guide with power steering fluid, then slide it onto the rack, big end first.

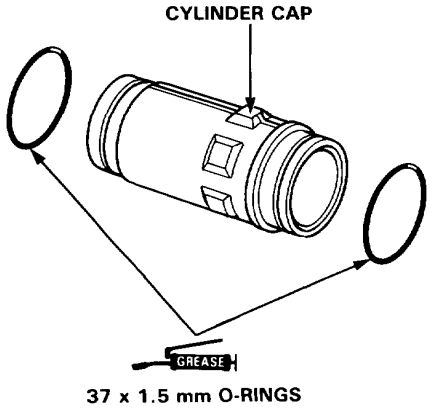
29. Position the new piston seal ring on the special tool, slide it down onto the big end of the tool, then pull it off into the piston groove on top the O-ring.



30. Coat the piston seal ring and inside of the special tool with power steering fluid.
Carefully slide the tool onto the rack and over the piston ring, then rotate the tool as you move it up and down to seat the piston ring.

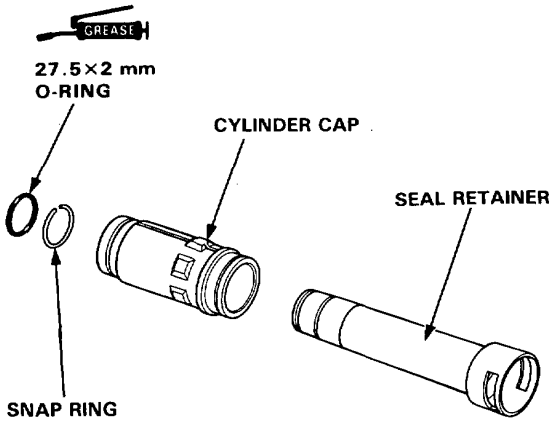


31. Coat new O-rings with grease and install them on the cylinder cap.

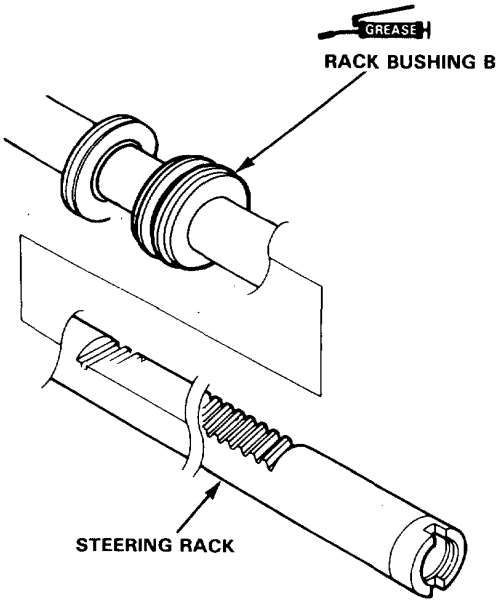


32. Slide the cylinder cap onto the seal retainer.

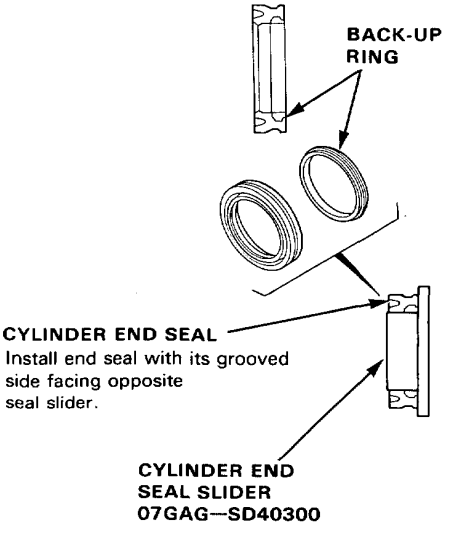
33. Install the snap ring and O-ring on the seal retainer.



34. Grease the sliding surface of the steering rack bushing B, and install the bushing on the steering rack with the groove of the bushing facing the steering rack piston.



35. Grease the sliding surfaces of the new cylinder end seal and the special tool , then place the seal on the special tool with its grooved side facing opposite the slider.

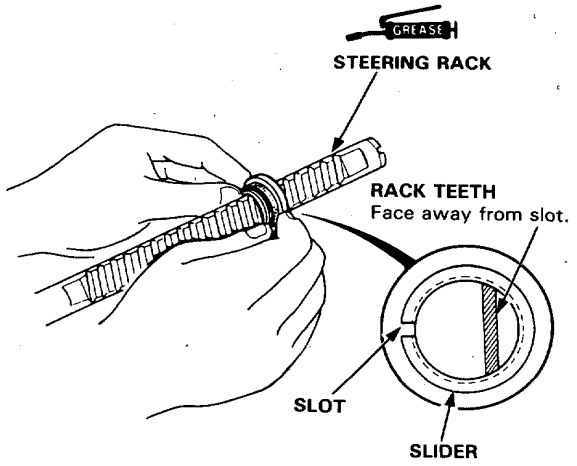


(cont'd)

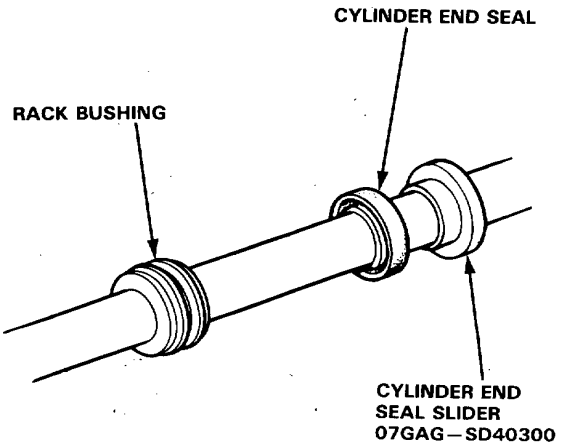
Overhaul (2WS) (cont'd)

36. Grease the steering rack, and install the special tool.

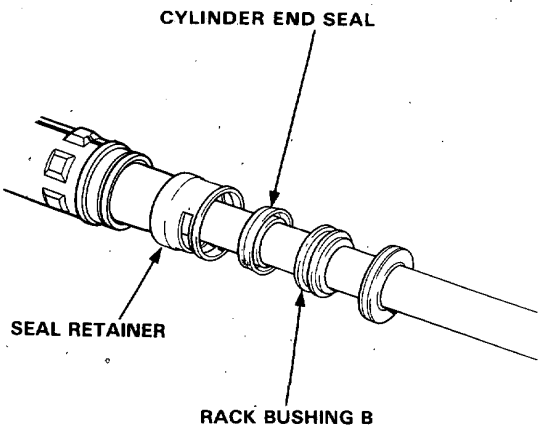
CAUTION: Make sure the rack teeth do not face the slot in the special tool.



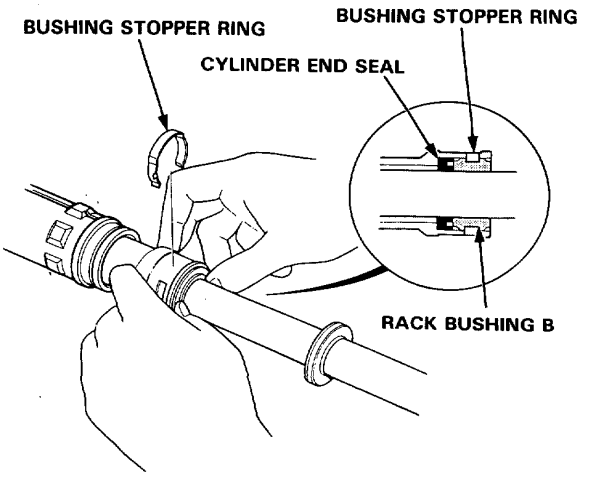
37. Remove the special tool from the cylinder end seal, then separate the ends of the tool and remove it from the rack.



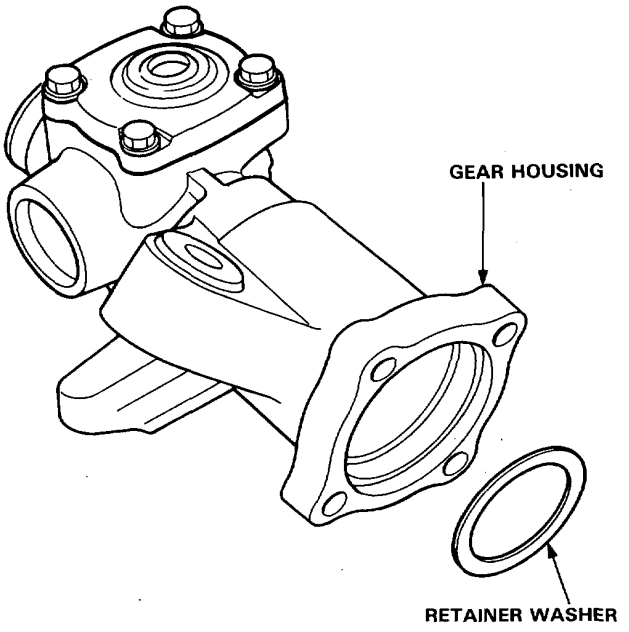
38. Fit the seal retainer on the steering rack.



39. Push the rack bushing B toward the seal retainer by hand until the cylinder end seal is seated in the retainer. Fit the seal stopper ring in the groove of the seal retainer securely.

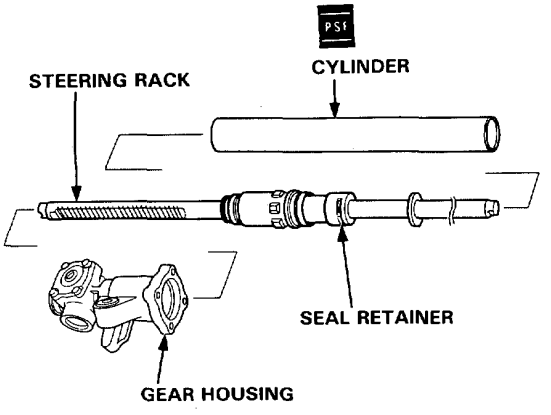


40. Install the retainer washer on the gear housing.



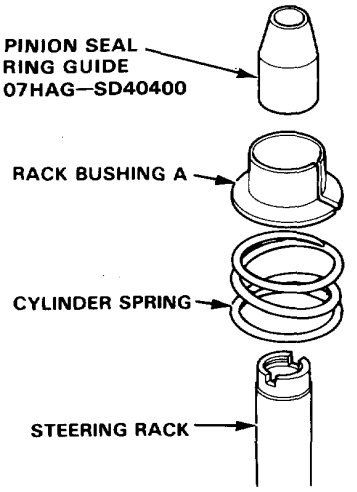
41. Place the gear housing on the work bench and insert the seal retainer and steering rack into the gear housing.

42. Coat the inside surface of the cylinder with power steering fluid, slide it over the rack and into the gear housing; press it into to housing until it seats.

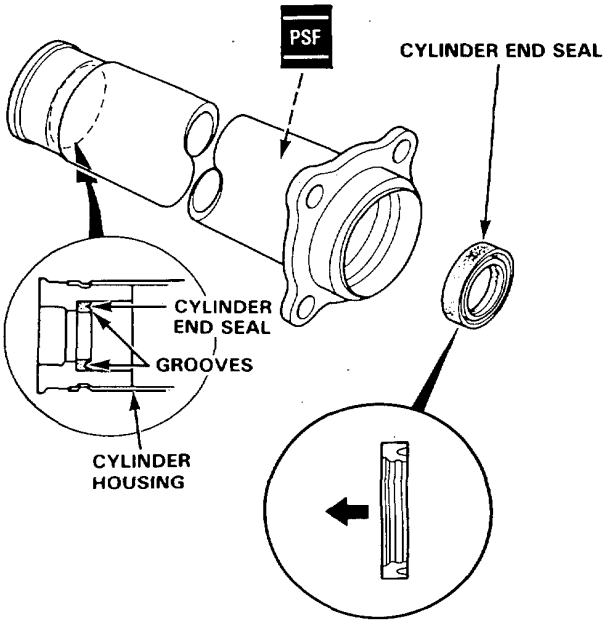


43. Install the cylinder spring over the rack, then coat the rack bushing A with power steering fluid and install it on the spring.

44. Wrap the end of the steering rack with vinyl tape or use the special tool. Coat the tape or tool with grease.



45. Coat the inside surface of the cylinder with power steering fluid and install the cylinder end seal with its grooved side facing out.



(cont'd)

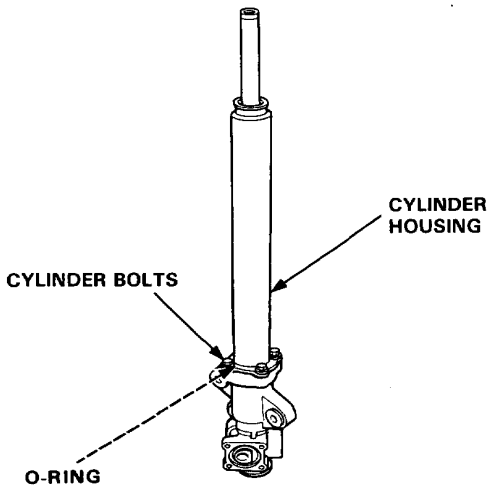
Overhaul (2WS) (cont'd)

46. Install the O-ring and back-up ring on the gear housing.

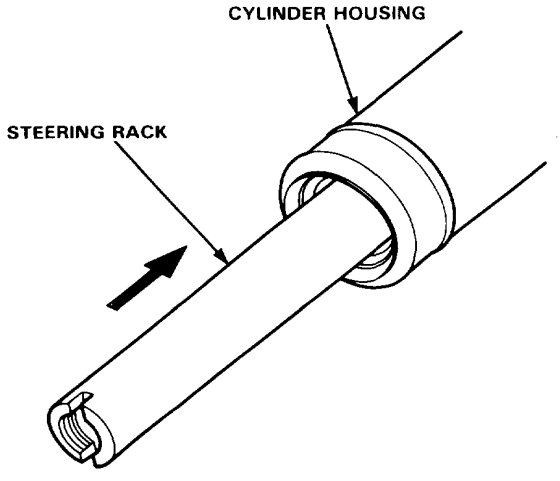
47. Carefully position the cylinder on the gear housing and loosely install with four bolts.

    CAUTION: Be careful not to damage the end seal in the cylinder housing.

48. Remove the special tool from the steering rack.

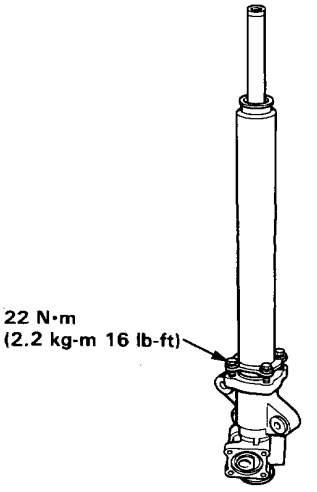


49. Insert the steering rack into the cylinder housing, being careful not to damage the steering rack sliding surface.

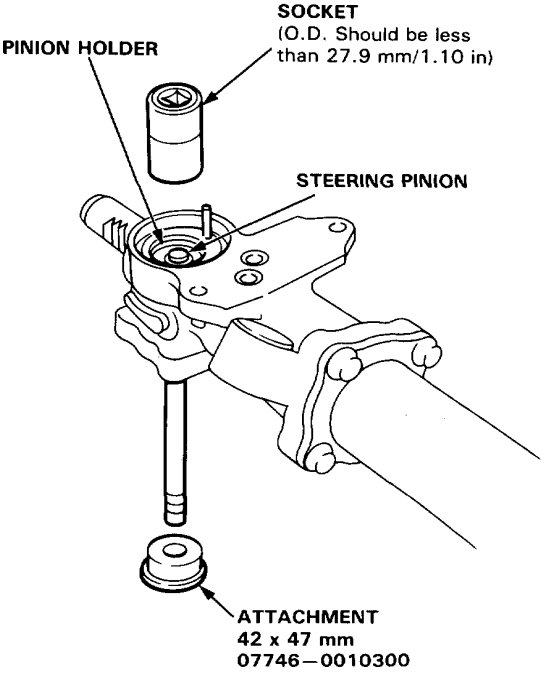


50. Tighten the cylinder housing to the gear housing.

    NOTE: Before tightening the bolts, make sure the mating surfaces of the cylinder and gear housings fit properly by pushing them together; hold them together while tightening the bolts.

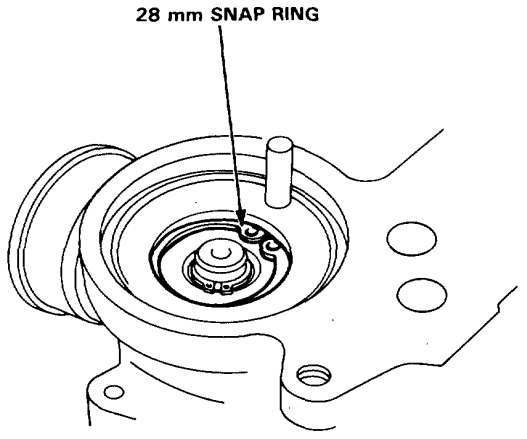


51. Install the steering pinion in the pinion holder.

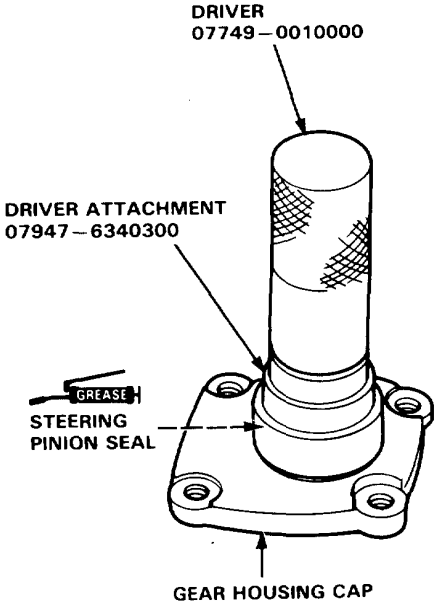


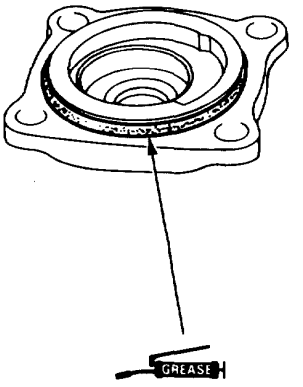
52. Install the 28 mm snap ring securely in the pinion holder groove.

NOTE: Install the snap ring with its tapered side facing out.

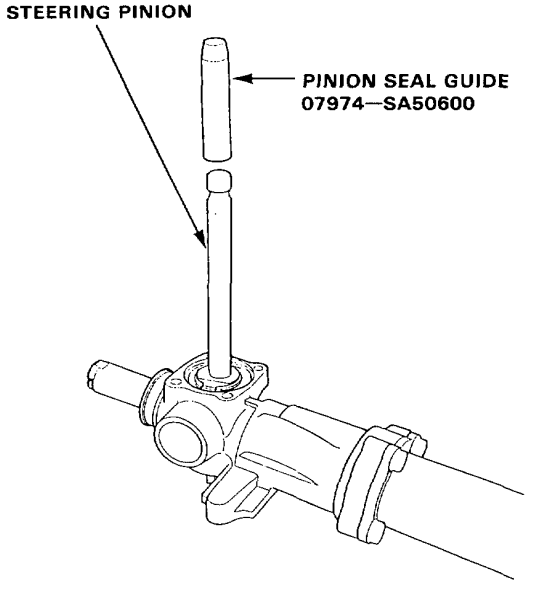


53. Grease the steering pinion seal, and install it on the gear housing using the special tools.





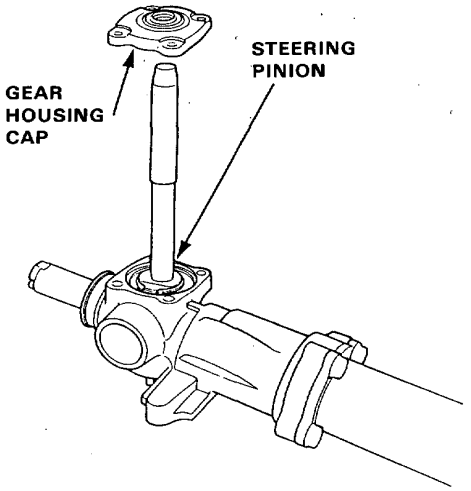
55. Grease the special tool and fit it over the steering pinion.



(cont'd)

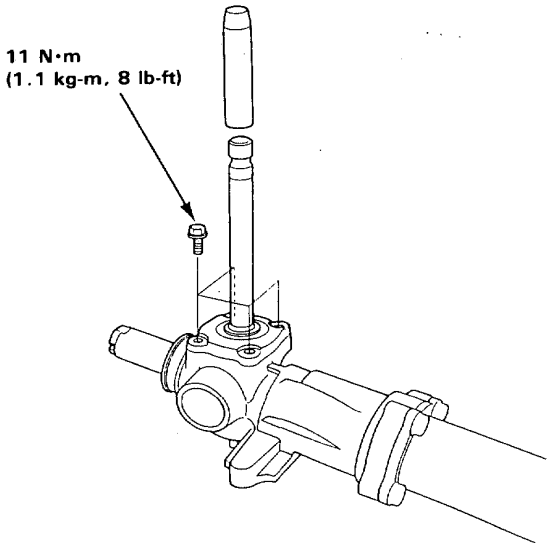
Overhaul (cont'd)

56. Slide the gear housing cap over the steering pinion, being careful not to damage the sealing lip of the pinion seal.



57. Remove the special tool.

58. Tighten the four flange bolts.

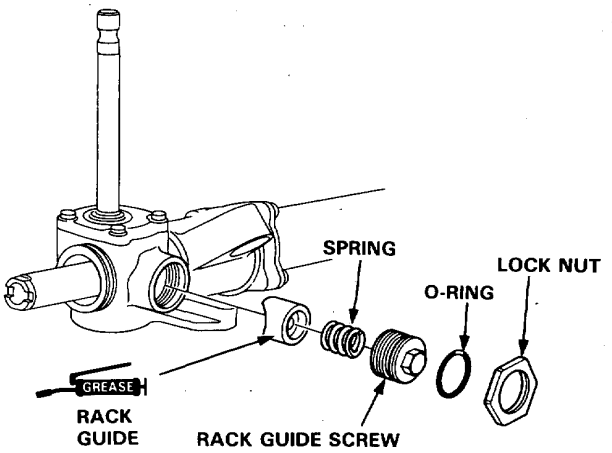


59. Install the O-ring on the rack guide screw.

60. Coat the rack guide with grease.

61. Install the rack guide, spring and rack guide screw on the gear housing.

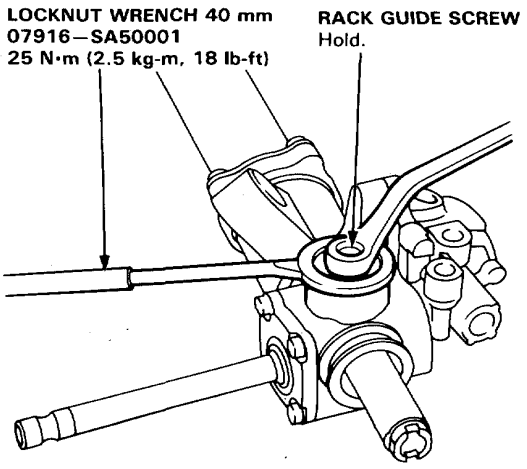
62. Install the control valve unit (page 11-43).



63. Tighten the rack guide screw until it compresses the spring and seats against the rack guide, then loosen it.

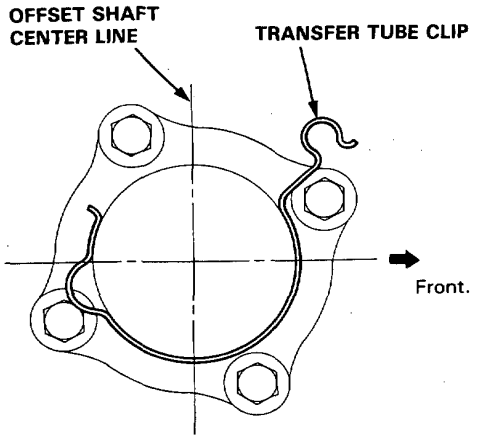
64. Retighten it to 4 N·m (0.4 kg-m, 2.9 lb-ft), back off about $35^{\circ}{}^{+5}_{0}$ and install the locknut on the rack guide screw.

65. Tighten the locknut while holding the rack guide screw with the special tool.



66. Install the transfer tube clip as shown.

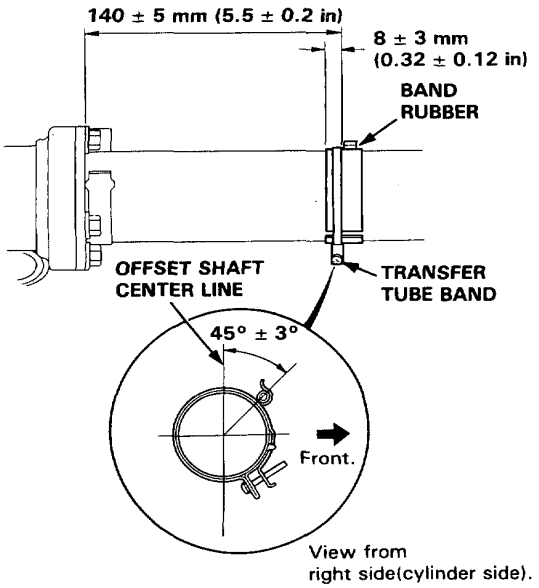
NOTE: LH Drive shown, RH Drive is similar.



View from right side (cylinder side).

67. Install the band rubber and band; position the band as shown and tighten it.

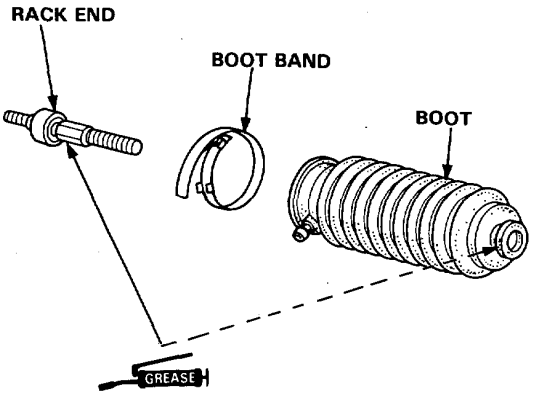
NOTE: LH Drive shown, RH Drive is similar.



View from right side(cylinder side).

68. Install the new boot band on the boot.

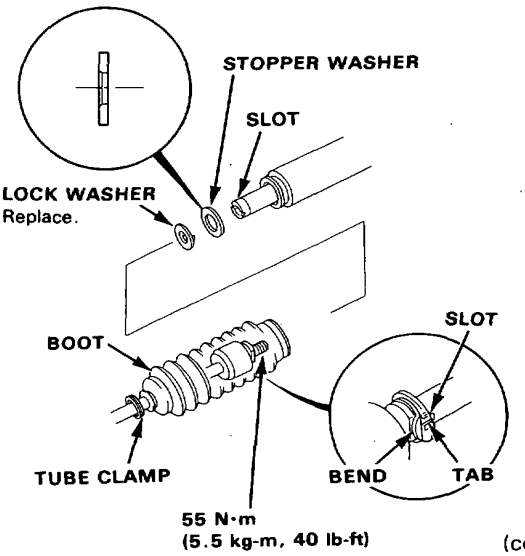
NOTE: Coat the rack end and inside of the boot with the grease.



69. Screw each tie-rod into the rack while holding the lock washer so its tabs are in the slots in the rack end.

NOTE: Install the stopper washer with the chamfered side facing out.

70. Tighten the tie-rod securely, then bend the lock washer back against the flat on the flange as shown.



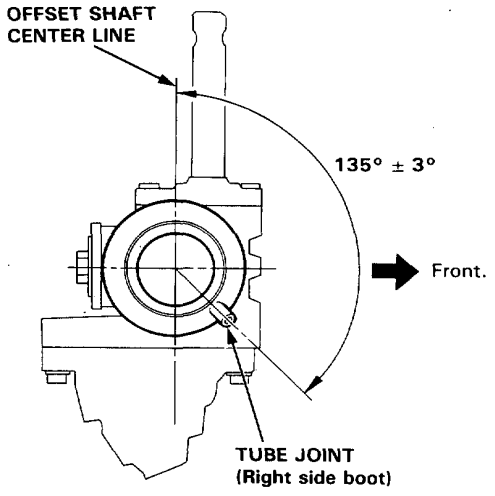
(cont'd)

Overhaul (2WS) (cont'd)

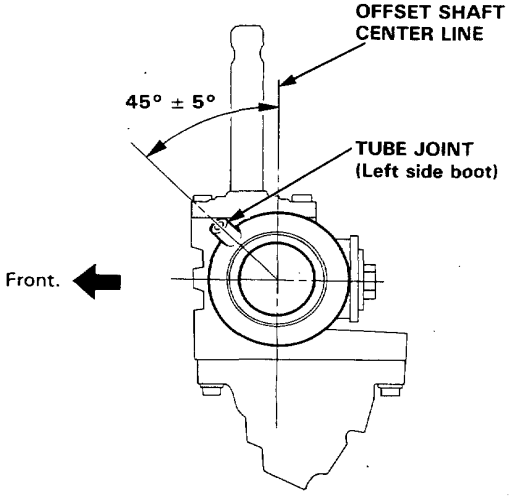
71. Install the boots so that the angle of the offset shaft center line is as shown.

    NOTE: LH Drive shown, RH Drive is similar.

<CYLINDER SIDE>

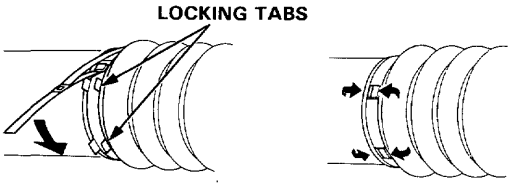


<GEAR HOUSING SIDE>



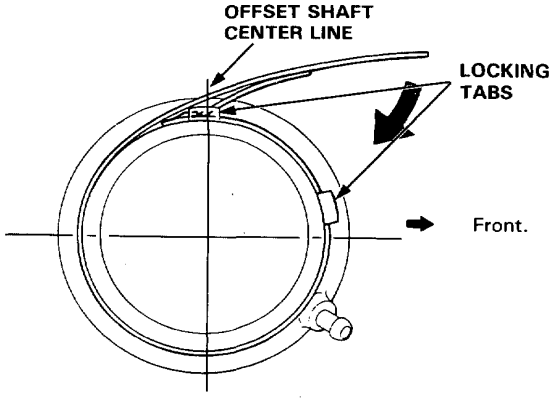
72. Install new boot bands on the boot and bend both sets of locking tabs.

73. Lightly tap on the doubled-over portions to reduce their height.

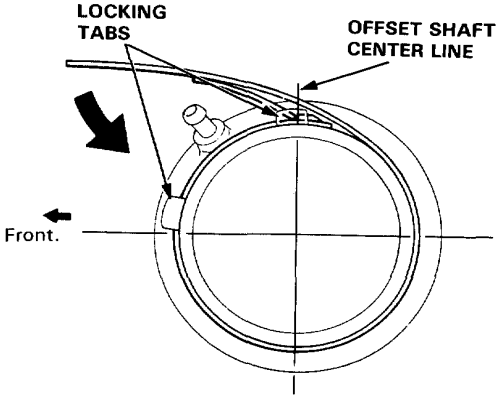


<CYLINDER SIDE>

NOTE: LH Drive shown, RH Drive is similar.



<GEAR HOUSING SIDE>

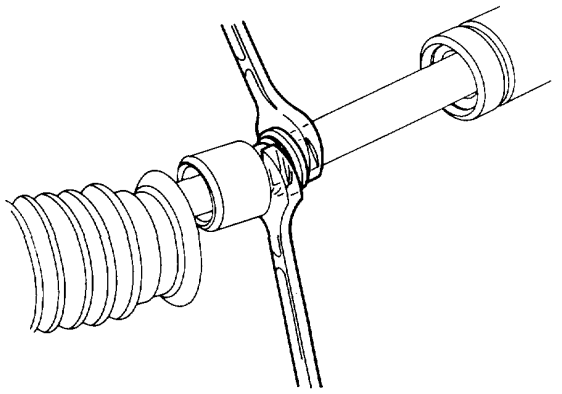


74. Install the air transfer tube.

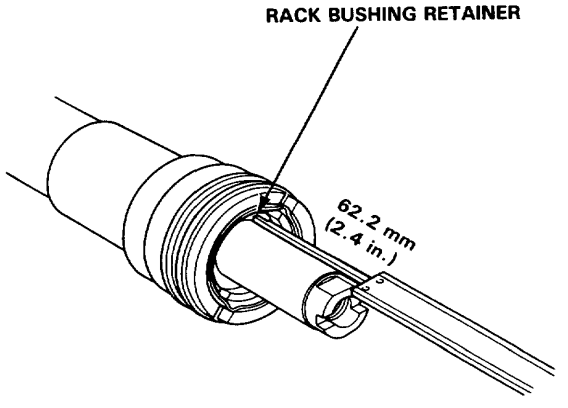
75. After assembling, slide the rack right and left to be certain that the boots are not deformed or twisted.

Overhaul (4WS)

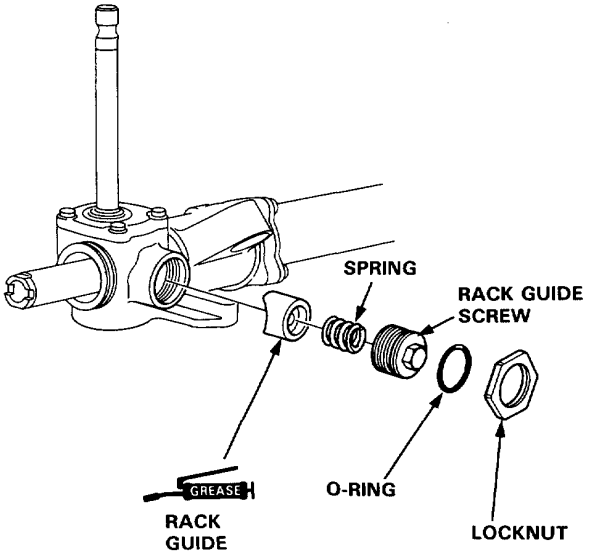
1. Remove the steering gearbox assembly (page 11-44).
2. Remove the control valve assembly (page 11-38).
3. Strainghten the tab of the lock washer.
4. While holding the steering rack with a 22 mm wrench, remove the tie-rod with a 17 mm wrench.



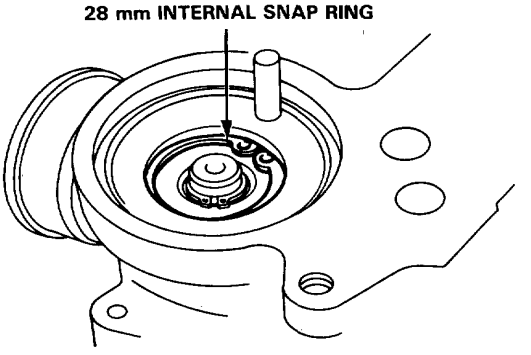
5. Slide the steering rack into the cylinder housing until the end is projected 62.2 mm (2.4 in.) from the rack bushing retainer.



6. Loosen the rack screw lock nut, and turn off the guide screw.



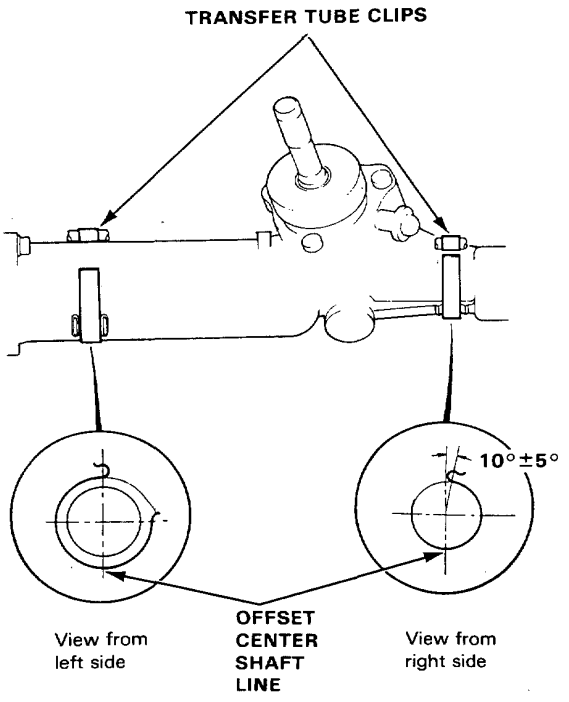
7. Remove the 28 mm internal snap ring from the bottom of the gear housing.



(cont'd)

Overhaul (4WS) (cont'd)

123. Install the transfer tube clips as shown.
NOTE: LH Drive shown, RH Drive is similar.



124. Install the air transfer tube.

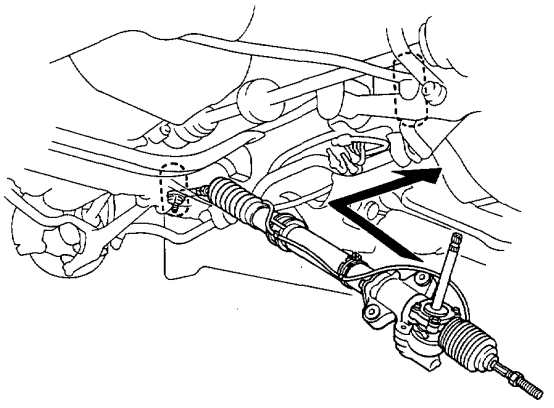
125. After assembling, slide the rack right and left to be certain that the boots are not deformed or twisted.

Installation

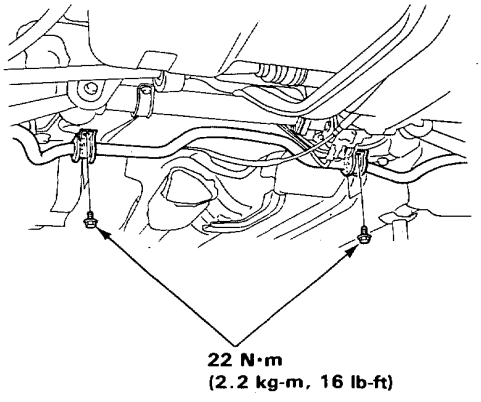
CAUTION: If the rear steering gearbox and center shaft are removed, care must be taken to reinstall them correctly. Be sure to refer to page 11-90 and install properly.

1. Reinstall the gearbox in the reverse order of removal.

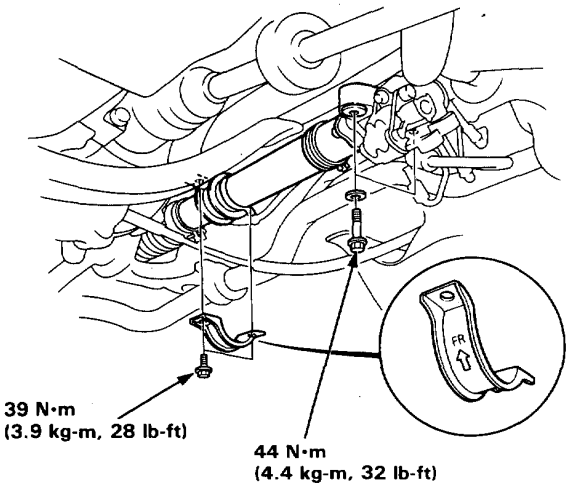
CAUTION: Be careful not to bend or damage the four power steering lines when installing the gearbox assembly.



2. Tighten the stabilizer mounting bolts.

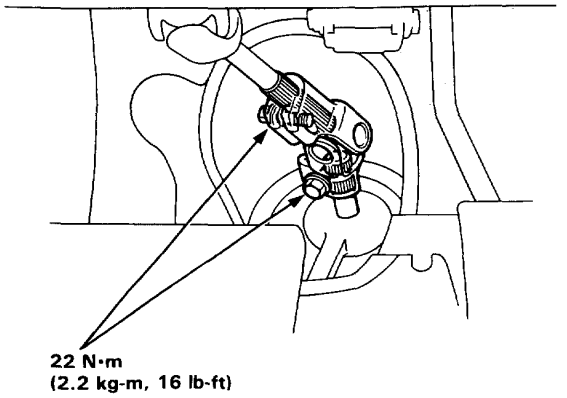


3. Tighten the gearbox mounting bolts.

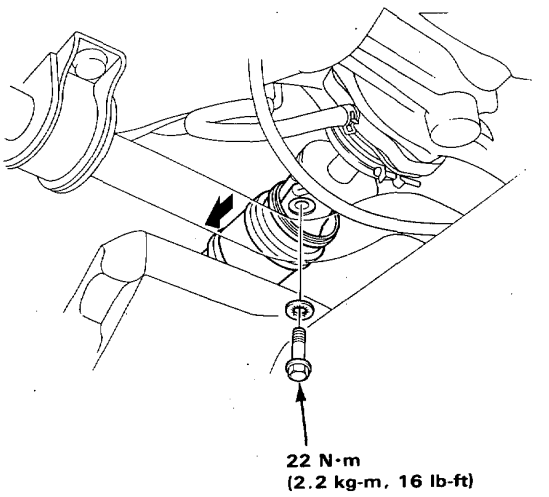


4. Install the steering joint on the steering gearbox pinion.

NOTE:
- Be sure that the lower bolt is securely in the groove in the steering gearbox pinion.
- Be sure the pinion shaft and the steering column shaft are aligned; the joint should slip on freely. If not, reposition the steering rack to correct the misalignment.

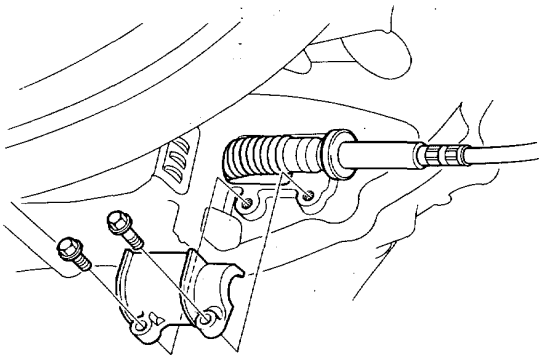


5. 4WS only
- Connect the joint and the driven pinion.



- Tighten the bolt at the driven pinion.
- Connect the joint guard and the joint guard cap.

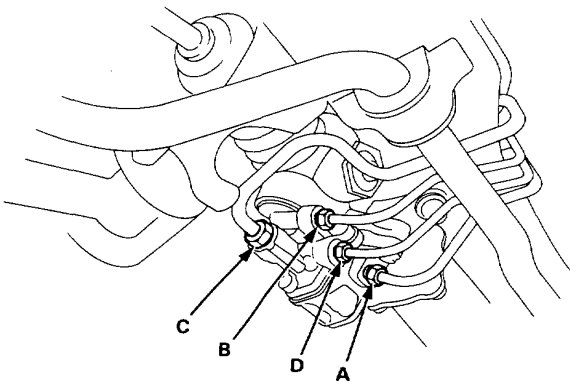
6. Automatic transmission only
- Install the control cable to the clamp.



(cont'd)

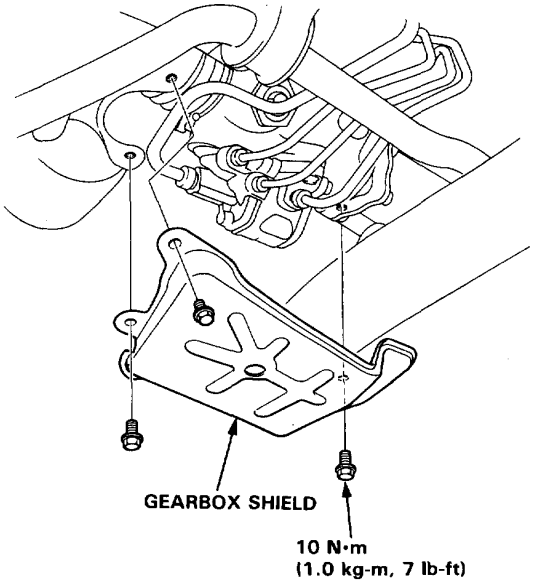
Installation (cont'd)

7. Connect the fluid lines to the control unit.
   A: From pump: 14 mm wrench
   38 N·m (3.8 kg-m, 28 lb-ft)
   B: To oil cooler: 12 mm wrench
   13 N·m (1.3 kg-m, 9 lb-ft)
   C: To reservoir: 17 mm wrench
   29 N·m (2.9 kg-m, 20 lb-ft)
   D: To speed sensor: 12 mm wrench
   13 N·m (1.3 kg-m, 9 lb-ft)



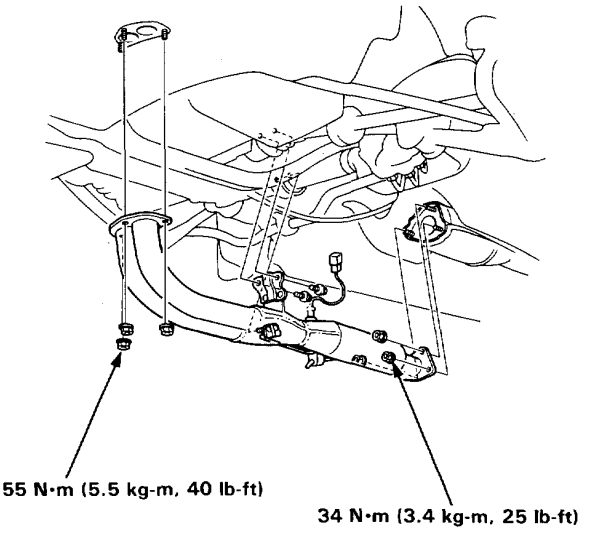
NOTE: Check the gearbox for leaks.

8. Install the splash guard.

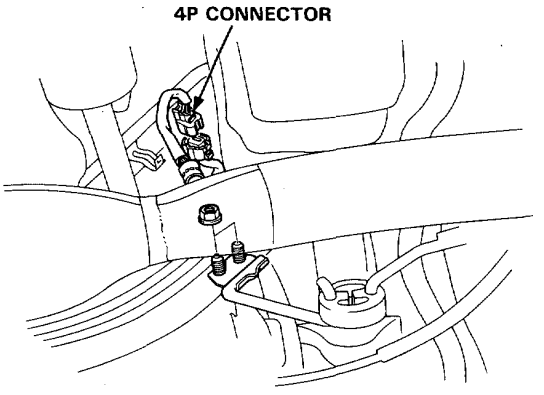


9. Install the header pipe with a new gasket, then tighten the new self-locking nuts and bolts.

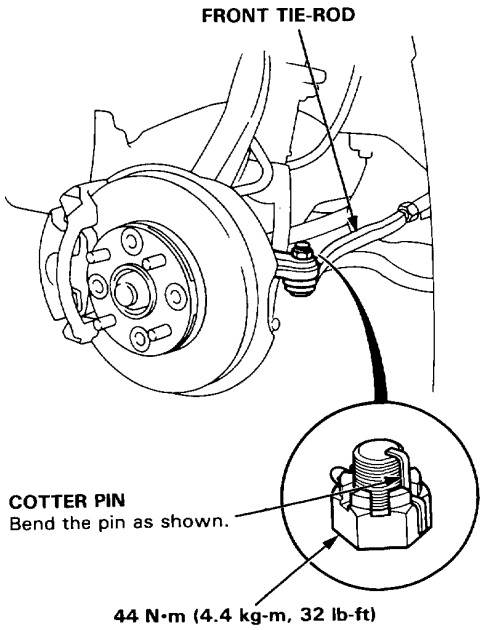
   CAUTION: Replace the exhaust gasket and self-locking nuts when you reinstall the pipe.



10. Install the header pipe bracket. Connect the 4P connector to the oxygen sensor.



11. Reconnect the tie-rods to the steering knuckles, tighten the ball joint nut to the specified torque, and install new cotter pins.



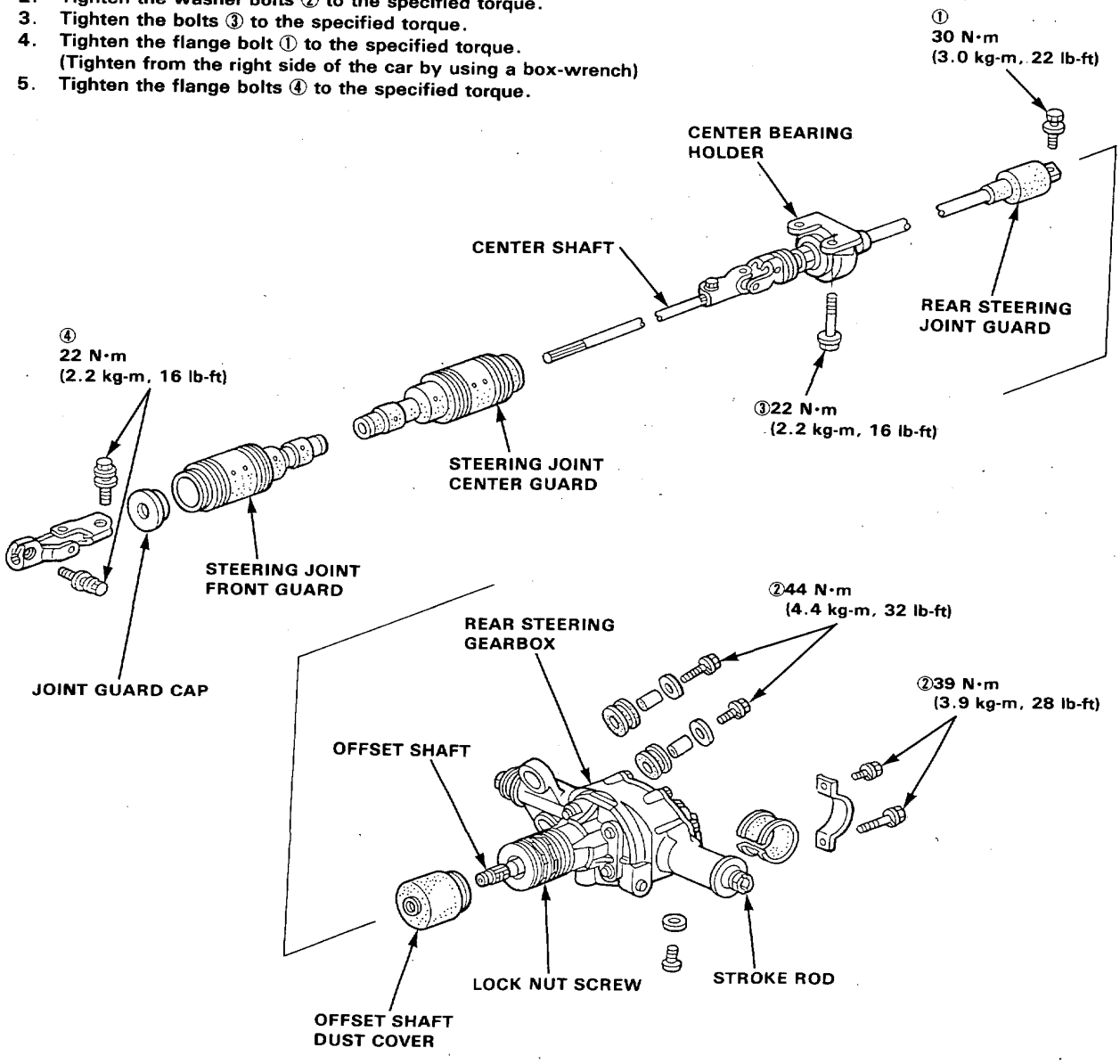
12. Fill the system:
    - Fill the reservoir with new Honda Power Steering Fluid.
    - Start the engine and let it run at fast idle, then turn the steering wheel from lock-to-lock several times to bleed air from the system.
    - Check the fluid again, and add more if necessary.

Rear Steering Gearbox

Illustrated Index

CAUTION:

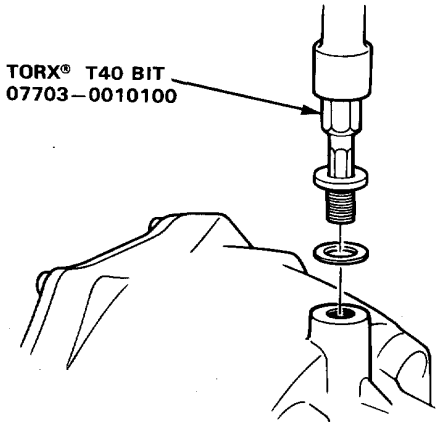
- Do not apply torque of more than 0.1 kg-m (0.72 lb-ft) to the offset shaft.
- Do not strike the stroke rod.
- Never loosen the offset shaft screw and lock nut screw.
- Do not remove the gearbox cover.
- Use the special tool "Rear Steering Gearbox Center Lock Pin" when removing the rear steering gearbox, and leave it intact except when the gearbox is inspected for function, etc.
- Also use the special tool "Rear Steering Gearbox Center Lock Pin" when removing the front or rear of the center shaft.
- If the rear steering gearbox and center shaft are removed, care must be taken to reinstall them correctly.
- When installing the rear steering gearbox and center shaft, take care not to apply directional strain and twisting force to the rubber section of the center bearing holder. Tighten the bolts in the following order.
  1. Loosely tighten the flange bolt ①.
  2. Tighten the washer bolts ② to the specified torque.
  3. Tighten the bolts ③ to the specified torque.
  4. Tighten the flange bolt ① to the specified torque. (Tighten from the right side of the car by using a box-wrench)
  5. Tighten the flange bolts ④ to the specified torque.



Rear Steering Gearbox

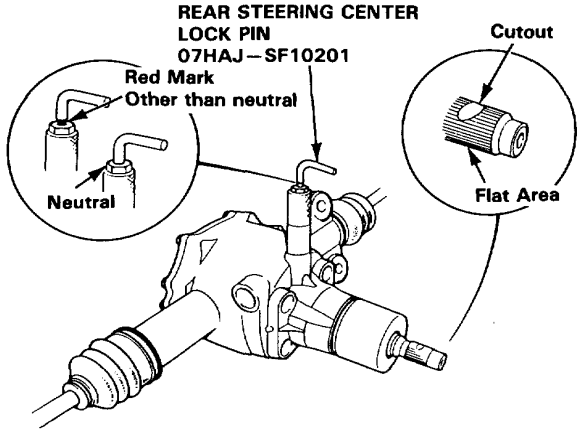
Neutral Positioning Off-car

1. Remove the cap bolt from the gearbox using a "TORX® BIT" T40.



2. Position the offset shaft so the cutout faces the underside of the gearbox and the flat area faces the top.

3. Install the special tool in the gearbox.



4. Turn the offset shaft by hand to be certain that the steering gear box is in the neutral position.

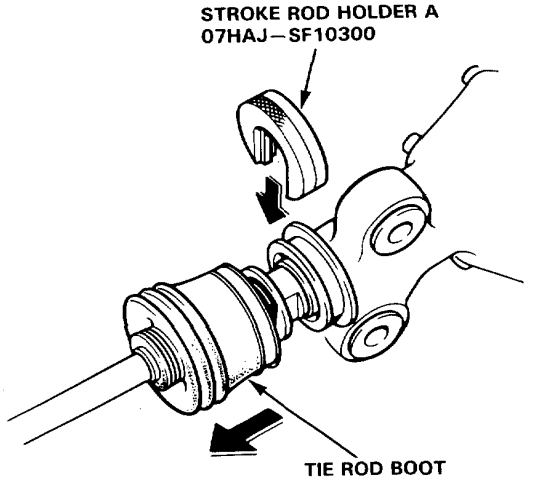
	Red Mark	Offset Shaft
Other than Neutral	Visible	Movable
Neutral	Not visible	Locked

5. Slide the tie-rod boots away from the housing to make sure the stroke rod is centered in the gearbox housing.

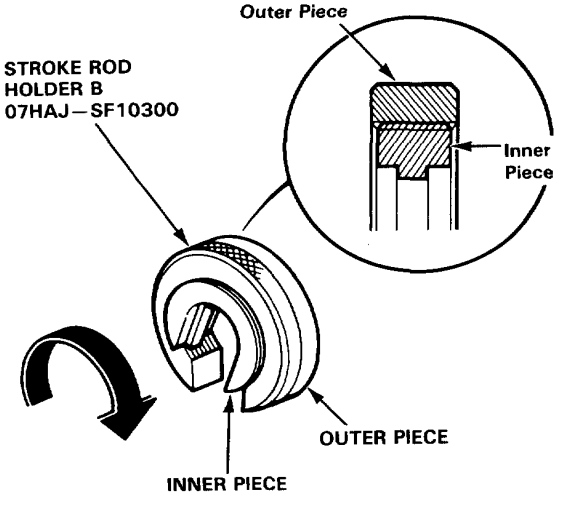
Stroke Rod Holders

NOTE: The stroke rod holders are used for the function inspection and rear tie-rod replacement.

1. Set the gearbox in the neutral position (page 11-92).
2. Loosen the tie-rod boot band, and slide the boot away from the gearbox housing.

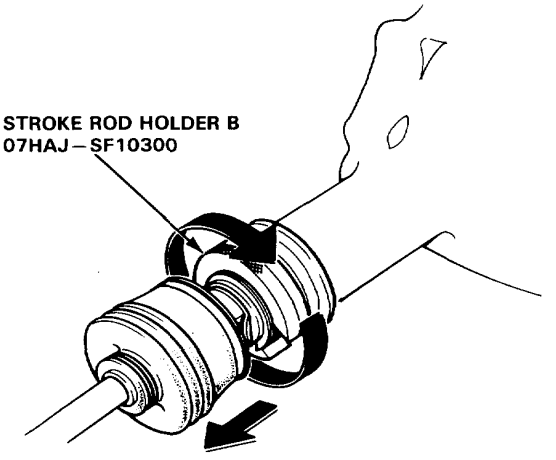


3. Slide the special tool between the tie-rod stopper washer and gearbox.
4. Screw the outer piece of the special tool onto the inner piece; align the cutouts.



5. Insert the tool betwen the tie-rod stopper washer and gearbox.
6. Remove the rear steering center lock pin from the gearbox housing.
7. Tighten stroke rod holder B (Turn counterclockwise to tighten).

   NOTE: There should be no play between the stroke rod holders and the gearbox housing.

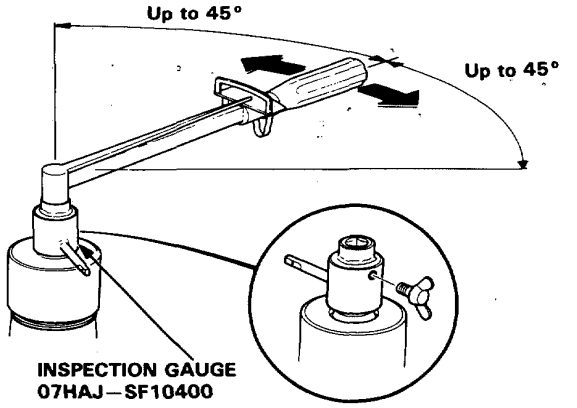


Rear Steering Gearbox

Function Inspection

Preload Inspection

1. Set the rear steering gearbox to neutral (page 11-92).
2. Remove the rear steering gearbox center lock pin.
3. Install the special tool in the offset shaft.



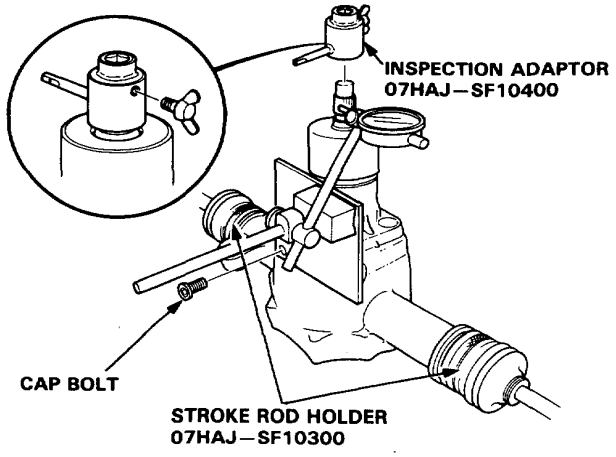
4. Install a torque wrench in the special tool, and check the starting torque when rotating the wrench in the clockwise and counterclockwise directions.

   Starting Torque: 1 N·m (0.1 kg-m, 0.7 lb-ft) or less

   NOTE:
   - Check the torque after several rotations.
   - Do not apply a torque of 5 N·m (0.5 kg-m, 4 lb-ft) or more to the offset shaft.

Free-play Inspection

1. Set the rear steering gearbox to neutral (page 11-92).
2. Remove the rear steering gearbox center lockpin and install the stroke rod holders (page 11-93).
3. Install the special tool in the offset shaft.

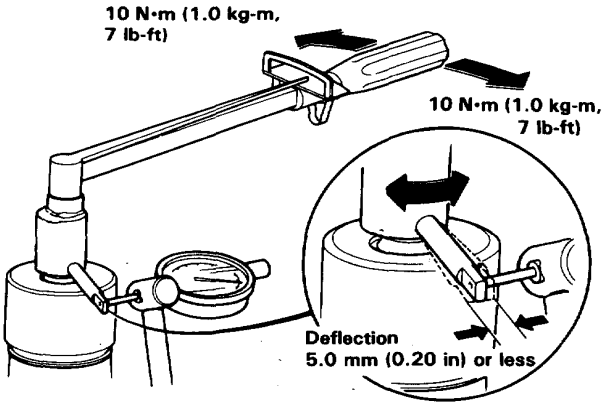


3. Install the dial indicator using a cap bolt.

   NOTE: Set the dial indicator on the flat end of the special tool.

4. Install the torque wrench in the special tool, then read the dial gauge when applying a torque of 10 N·m (1.0 kg-m, 7 lb-ft) in the clockwise and counterclockwise directions, respectively.

   The total deflection range when applying a torque of 10 N·m (1.0 kg-m, 7 lb-ft) in both directions should be 5.0 mm (0.20 in) or less.



   Example: With a deflection of 2.50 mm (0.10 in) in the clockwise derection and 2.40 mm (0.09 in) in the counterclockwise direction, the gearbox is OK.

   NOTE: If the total deflection is more than 5.0 mm (0.20 in) replace the rear steering gearbox assembly.

5. Remove the special tools, then screw in the cap bolt and sealing washer into place.

   Tightening Torque: 22 N·m (2.2 kg-m, 16 lb-ft)

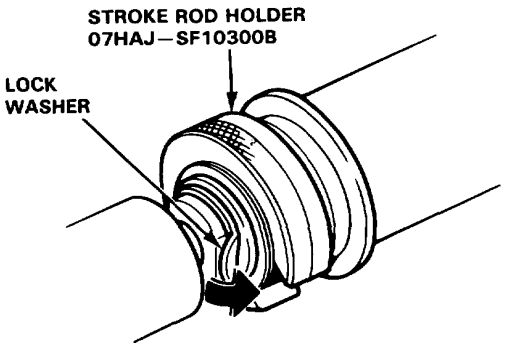
Tie-Rod Replacement

CAUTION: Never strike the stroke rod.

1. Set the gearbox in Neutral (page 11-92).
2. Loosen the tie-rod boot band, and remove the dust seal.
3. Install the stroke rod holders (page 11-93).

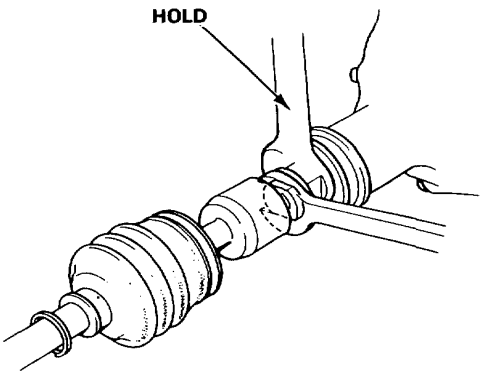
   NOTE: Be sure to use the stroke rod holders so as not to rotate or move the stroke rod in an axial direction.

4. Straighten the tab of the lock washer.

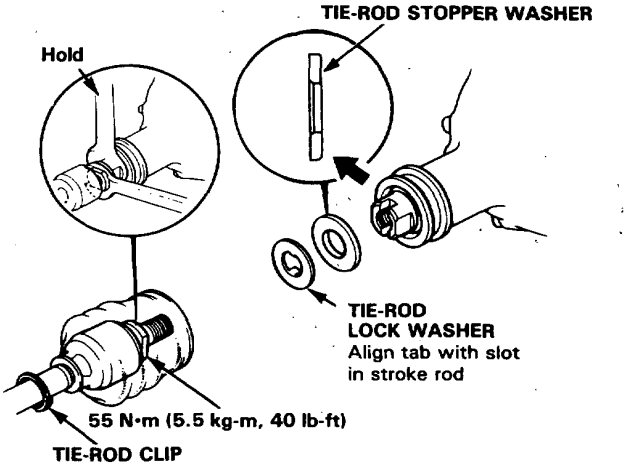


5. Remove the holder.
6. While holding the stroke rod with a 21 mm wrench, remove the tie-rod with a 17 mm wrench.

   CAUTION: Be sure to hold the stroke rod securely to prevent it from being turned with the tie-rod. Never turn the stroke rod.

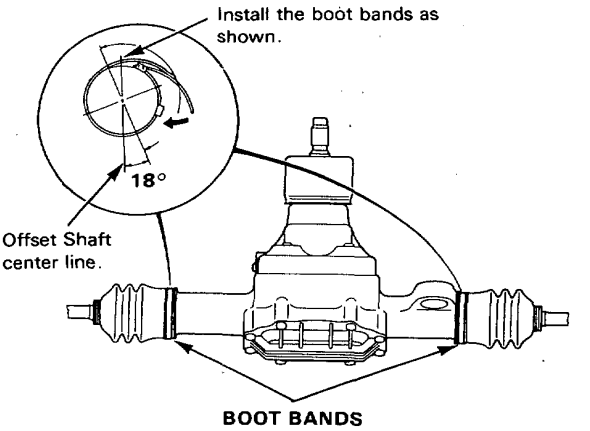


7. Install the tie-rod stopper washer, tie-rod lock washer and rack end on the stroke rod.



8. Hold the stroke rod with the special tool (page 11-93).
9. Bend the lock washer against the flat on the flange.
10. Remove the stroke rod holder.
11. Reinstall the tie rod dust seal.
12. Install the boot bands.

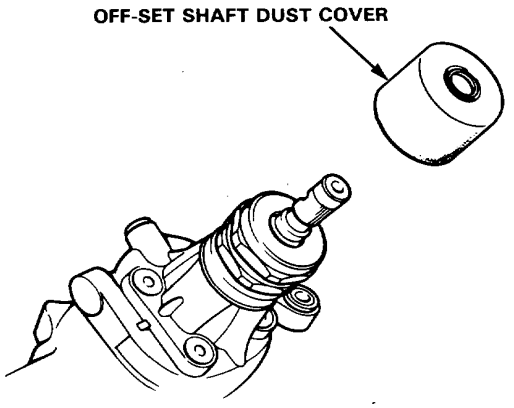
    NOTE: After tightening the boot bands, check that the boots are not twisted or distorted.



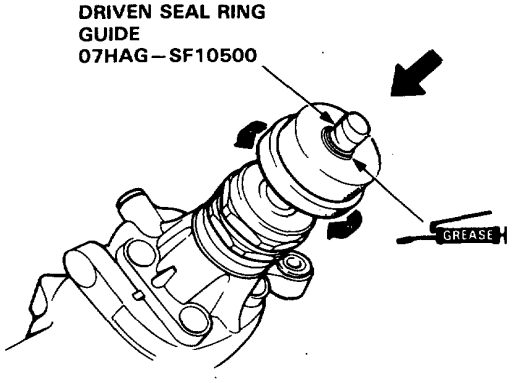
Rear Steering Gearbox

Off-set Shaft Dust Cover Replacement

1. Remove the off-set shaft dust cover.



2. Grease the special tool and fit it over the off-set shaft.
3. Pack the sealing lip of the dust cover with grease.

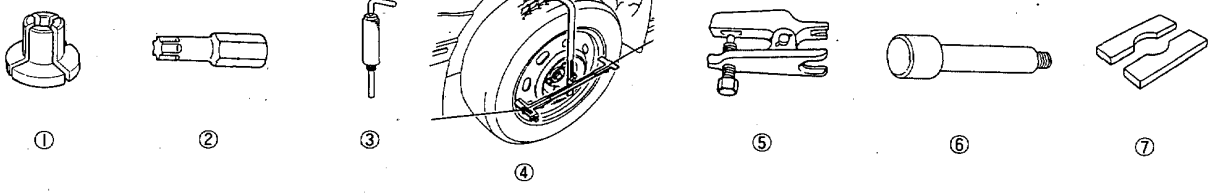


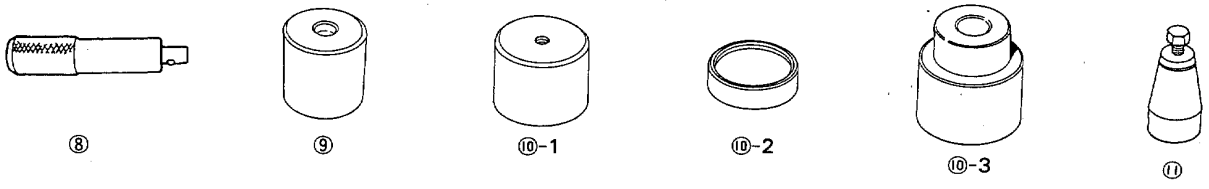
4. Invert the inner end of the dust seal, then place the end over the lock nut.
5. Remove the special tool.

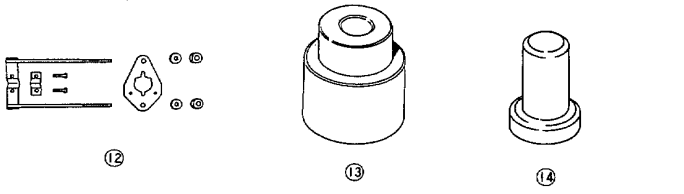
Special Tools

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07HGK—0010200	Wheel Alignment Gauge Attachment	1	
②	07703—0010100	TORX® T40 BIT	1	
③	07HAJ—SF10201	Rear Steering Center Lock Pin	1	4WS Only
④	07HGJ—0010000	Toe Inspection Gauge Set	1	
⑤	07941—6920003	Ball Joint Remover	1	
⑥	07GAF—SD40100	Hub Assembly Pin	1	
⑦	07965—6340301	Hub Dis/assembly Base	2	
⑧	07749—0010000	Driver	1	
⑨	07965—6920201	Hub Dis/Assembly Base	1	
⑩-1	07HAF—SF10110	Ball Joint Remover Base	1	
⑩-2	07HAF—SF10120	Ball Joint Installer Base	1	
⑩-3	07HAF—SF10130	Ball Joint Remover/Installer	1	
⑪	07GAG—SD40700	Ball Joint Boot Clip Installation Guide	1	
⑫	07GAE—SE00101	Spring Compressor	1	
⑬	07GAF—SD40330	Ball Joint Remover/Installer	1	4WS Only
⑭	07947—SB00100	Oil Seal Driver	1	
⑮	07GAF—SE00200	Hub Assembly Guide Attachment	1	





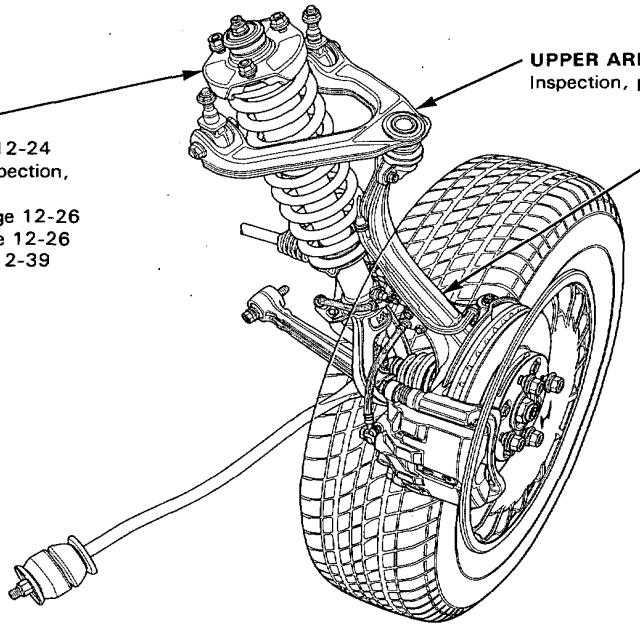


Component Location

Index

⚠WARNING **The front and rear dampers contain nitrogen gas and oil under pressure. The pressure must be relieved before disposal to prevent explosion and possible injury when scrapping.**

Front Suspension:

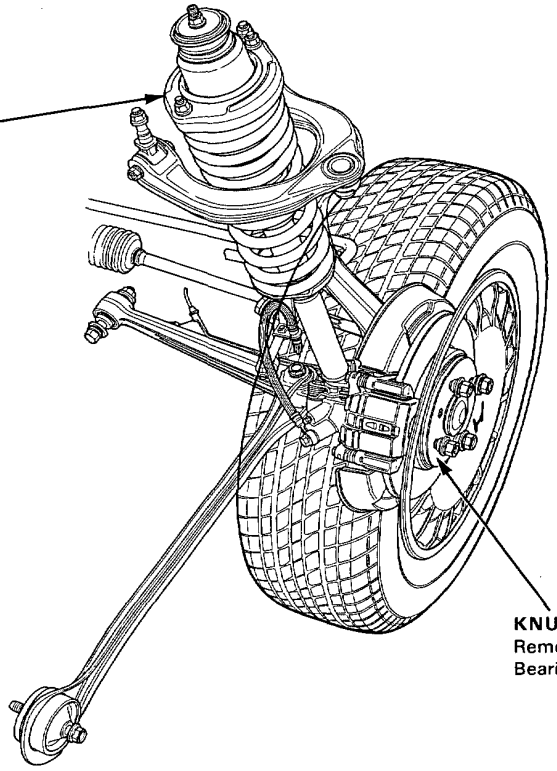


DAMPER
Removal, page 12-24
Disassembly/Inspection, page 12-24
Reassembly, page 12-26
Installation, page 12-26
Disposal, page 12-39

UPPER ARM
Inspection, page 12-23

KNUCKLE/HUB
Removal, page 12-17
Bearing removal, page 12-18

Rear Suspension:



DAMPER
Removal, page 12-38
Disassembly/Inspection, page 12-38
Reassembly, page 12-41
Installation, page 12-41
Disposal, page 12-39

KNUCKLE/HUB
Removal, page 12-31
Bearing removal, page 12-32

Wheel Alignment

Two Wheel Steering-2WS

Preparation

1. Check the tire pressure.
2. Check the steering wheel angle. If significantly off center, it may be necessary to remove the steering wheel and reposition it on the splines. Turn the steering wheel to the straight-ahead position.
3. Alignment should be checked/adjusted in one continuous procedure: caster, front camber, rear camber, rear toe, front toe and re-check.

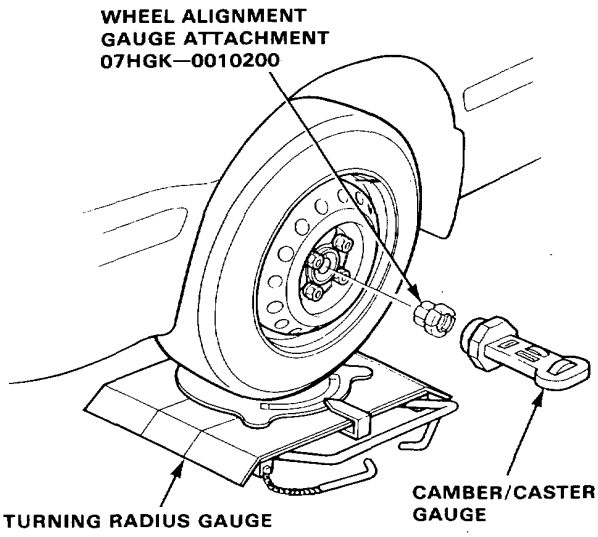
Front Caster:

1. Remove the center cap or wheel cap. Install the Wheel Alignment Gauge Attachments on the wheels.

   NOTE: Make sure the wheel hubs are clean and rust-free before installing the wheel alignment attachments.

2. Install a camber/caster gauge on the Wheel Alignment Gauge Attachment and apply the front brake. Turn the wheel 20° inward.
3. Turn the adjust screw so that the bubble in the caster gauge is at 0°.
4. Turn the wheel 20° outward and read the caster on the gauge with the bubble at the center of the gauge.

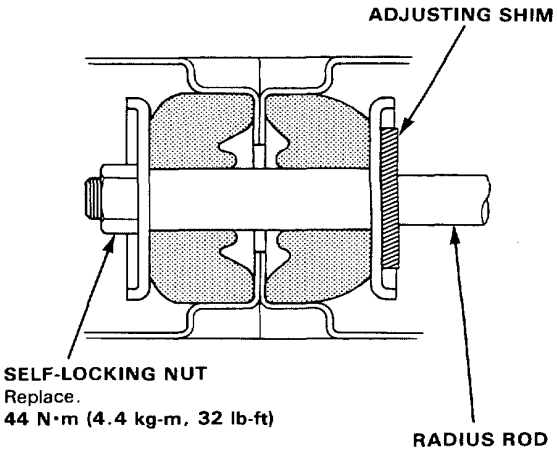
   Caster Angle: 3°00′ ± 1°



5. If adjustment is required, record the caster reading, then go to step 6. If adjustment is not required, proceed to step 11.

NOTE: Caster angle can be adjusted by increasing/decreasing the number of the adjusting shims. Remove and install the radius rod each time the caster angle is adjusted.

6. Raise the front end of the car and place safety stands in the proper locations.
7. Remove the self-locking nut on the end of the radius rod.
8. Remove the radius rod attaching bolts at the lower arm, and radius rod.
9. Adjust the caster angle by increasing/decreasing the adjusting shims.
   - One adjusting shim changes the caster angle by 25′ and the caster angle can be adjusted by 50′ maximum.
   - One adjusting shim is 3.2 mm (0.126 in) in thickness.



NOTE:
- Do not use more than two adjusting shims.
- After the adjustment, tighten the self-locking nut to the specified torque.

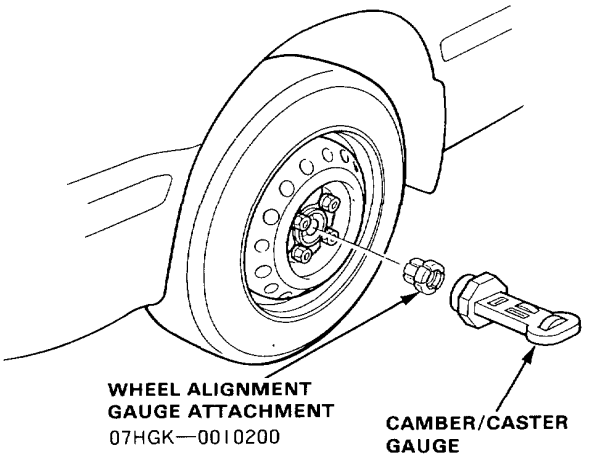
10. Recheck the caster angle.

Front Camber:

11. Return the steering wheel to the straight-ahead position.
12. Read the front camber on the gauge with the bubble at the center of the gauge.

    Front Camber Angle: 0°00′ ± 1°

13. If out of specification, check for bent or damaged suspension components.

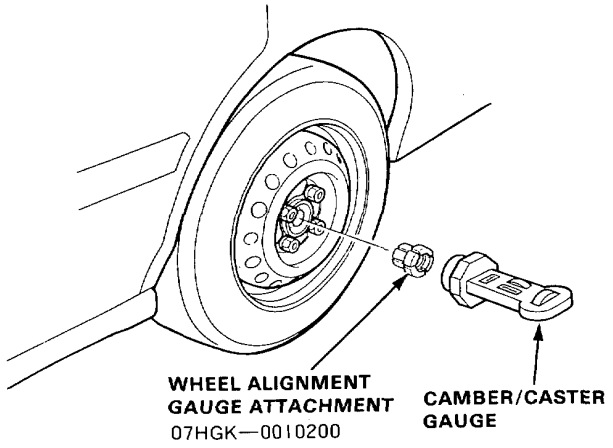


Rear Camber:

14. Read the rear camber on the gauge with the bubble at the center of the gauge.

    Rear Camber: −0°30′ ± 1°

15. If out of specification, check for bent or damaged suspension components.

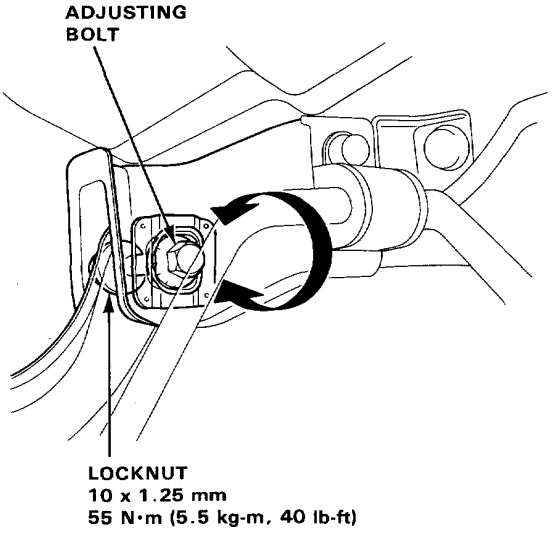


Toe:

16. Check the rear toe-in.

    Right Rear: 1 mm
    Left Rear: 1 mm
    Total: 2 ± 2 mm (0.08 ± 0.08 in)

    NOTE: Left and right toe should be the same.
    — If adjustment is required, go to step 17.
    — If no adjustment is required, proceed to step 20.
17. Hold the adjusting bolt on the rear lower arm A and loosen the locknut.
18. Adjust the rear toe by turning the adjusting bolt until toe is correct.
19. Install a new locknut and tighten while holding the adjusting bolt.

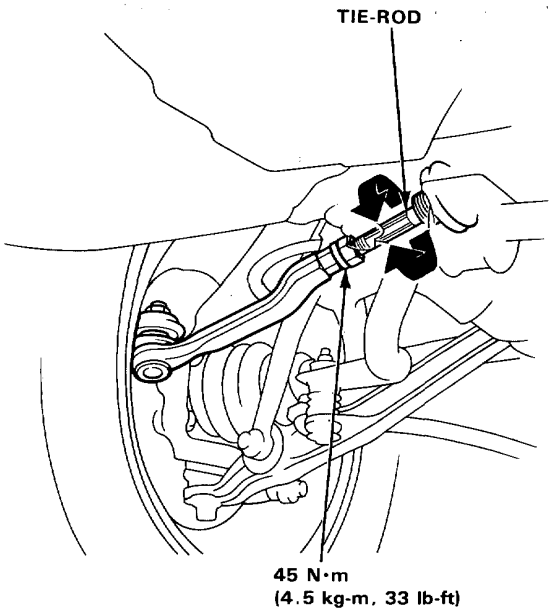


(cont'd)

Two Wheel Steering-2WS (cont'd)

20. Check the front toe-in:
    Right Front: 0 mm
    Left Front: 0 mm
    Total: 0 ± 2 mm (0 ± 0.08 in)

    — If adjustment is required, go to step 21.
    — If no adjustment is required, proceed to step 23.
21. Loosen the tie-rod locknut and turn the tie-rod until toe-in is correct.
22. After adjusting, tighten the tie-rod locknuts.
    NOTE: Reposition the tie-rod boots if twisted or displaced after adjustment has been made.



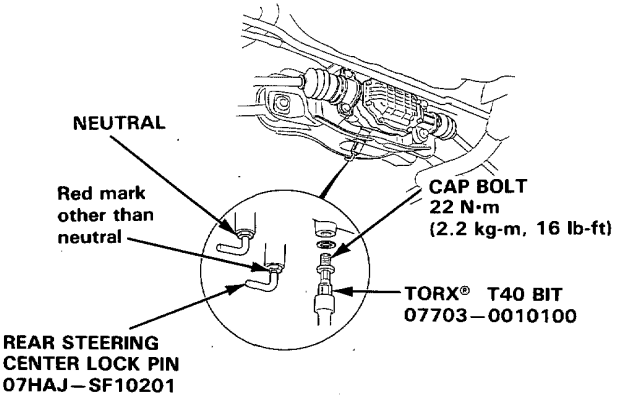
23. Recheck the camber. If camber still as specified alignment is finished.
    Front Camber Angle: 0°00′ ± 1°
    Rear Camber Angle: −0° 30′ ± 1°

Four Wheel Steering-4WS

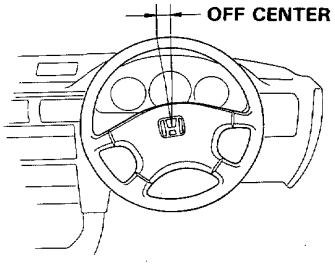
Using Toe Inspection Gauge:

Preparation

1. Check the tire pressure.
2. Remove the cap bolt from the rear steering gearbox, install the center lock pin in the rear steering gearbox and determine the neutral position.



3. Check the steering wheel angle.
- If it is more than 13 mm (0.512 in) (4°) off center, adjust it as follows:



OFF CENTER

1) Remove the center lock pin from the rear steering gearbox.
2) Loosen the steering wheel nut. (Do not remove the steering wheel this time.)
3) Install the center lock pin in the rear steering gearbox.
   Turn the steering wheel right or left slightly until the center lock pin seats fully. The red mark on the pin should not be visible.
   Do not turn the steering wheel quickly when the center lock pin is seated and do not force past the locking point after the pin is seted, or the gearbox may be damaged.
4) Remove the steering wheel and reset it in the position as close as to center.
5) Remove the center lock pin from the rear steering gearbox.

6) Tighten the steering wheel with a new steering wheel nut.

TORQUE: 50 N·m (5.0 kg-m, 36 lb-ft)

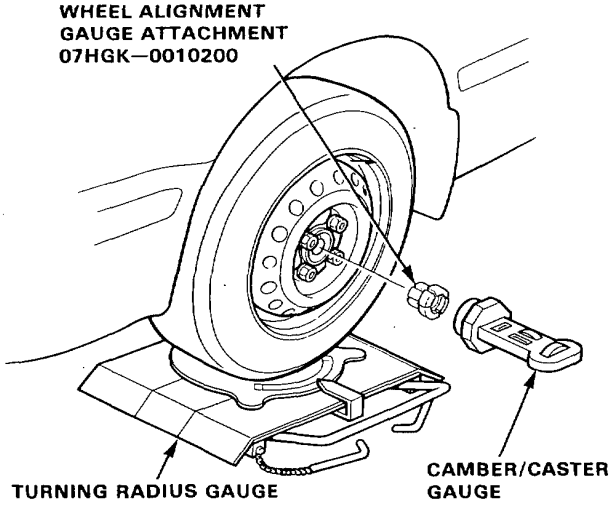
NOTE: On steering wheel nut removal/installation, be sure to remove the center lock pin from the rear steering gearbox to prevent damage to the gearbox.

4. Place the car on level surface.
5. Release the parking brake.
6. Move the car 1 m (3.28 ft.) forward and take off the slack in the bushing.
7. Turn the steering wheel to the straight-ahead position and hold it.
8. Alignment should be checked/adjusted in one continuous procedure: caster, front camber, rear camber, rear toe, front toe and re-check.

Front Caster:

1. Remove the center cap or wheel cap. Install the Wheel Alignment Gauge Attachments on the wheels.
   NOTE: Make sure the wheel hubs are clean and rust-free before installing the wheel alignment attachments.
2. Install a camber/caster gauge on the Wheel Alignment Gauge Attachment and apply the front brake. Turn the wheel 20° inward.
3. Turn the adjust screw so that the bubble in the caster gauge is at 0°
4. Turn the wheel 20° outward and read the caster on the gauge with the bubble at the center of the gauge.

   Caster Angle: 3°00′ ± 1°

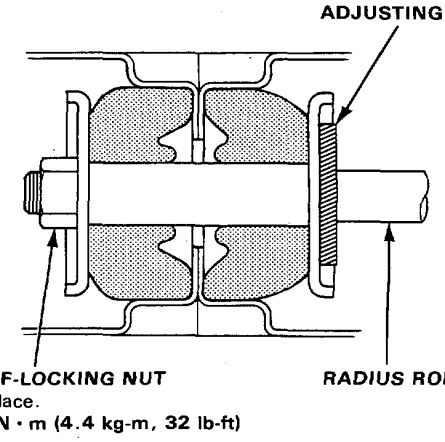


5. If adjustment is required, record the caster reading, then go to step 6. If adjustment is not required, proceed to step 11.

NOTE: Caster angle can be adjusted by increasing/decreasing the number of the adjusting shims. Remove and install the radius rod each time the caster angle is adjusted.

6. Raise the front end of the car and place safety stands in the proper locations.
7. Remove the self-locking nut on the end of the radius rod.
8. Remove the radius rod attaching bolts at the lower arm, and radius rod.
9. Adjust the caster angle by increasing/decreasing the adjusting shims.
   - One adjusting shim changes the caster angle by 25′ and the caster angle can be adjusted by 50′ maximum.
   - One adjusting shim is 3.2 mm (0.126 in) in thickness.

   NOTE:
   - Do not use more than two adjusting shims.
   - After the adjustment, tighten the self-locking nut to the specified torque.



10. Recheck the caster angle.

(cont'd)

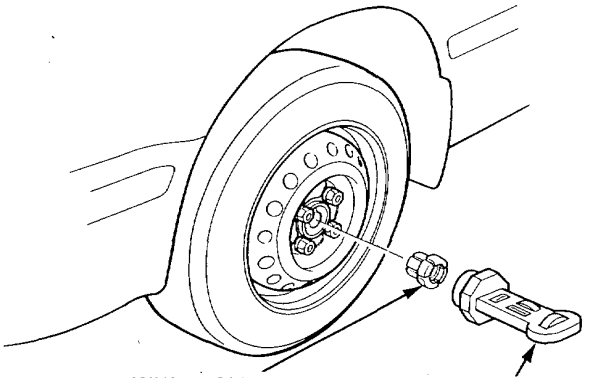
Four Wheel Steering-4WS (cont'd)

Front Camber:

11. Return the steering wheel to the straight-ahead position.
12. Read the front camber on the gauge with the bubble at the center of the gauge.

    Front Camber Angle: 0°00′ ± 1°

13. If out of specification, check for bent or damaged suspension components.

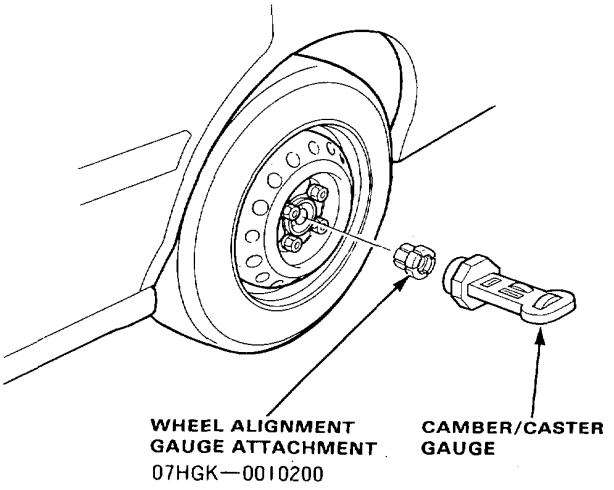


Rear Camber:

14. Read the rear camber on the gauge with the bubble at the center of the gauge.

    Rear Camber: −0°20′ ± 1°

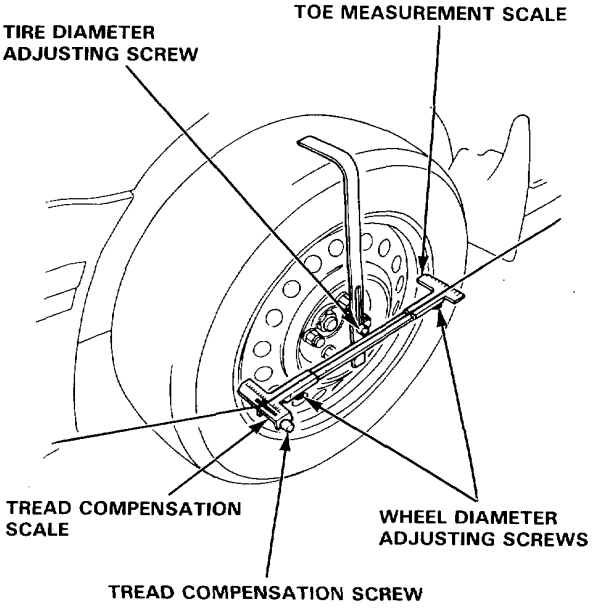
15. If out of specification, check for bent or damaged suspension components.



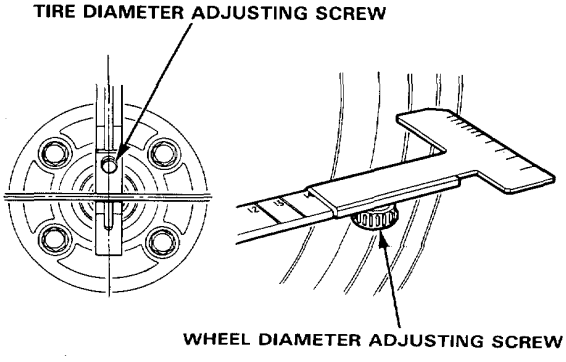
Toe:

16. Install the toe inspection gauge set attachment on each wheel and turn the wheel diameter adjusting screws and tire diameter adjusting screw right or left so that the attachment fits on the wheel disc securely.

    - Be sure that the tread compensation screw is on the front of the front wheel disc and on the rear of the rear wheel disc.

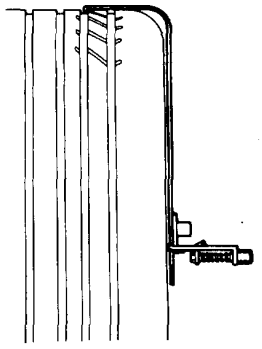


    - Align the center of the gauge with the center of the wheel.

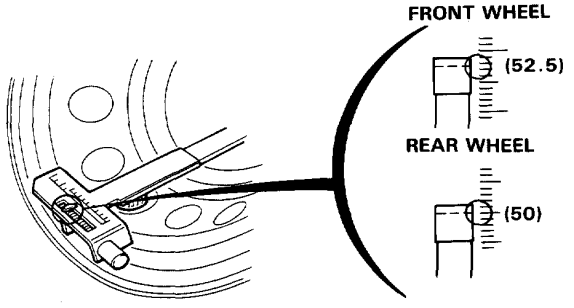


- Set the toe inspection gauge on each wheel so that it makes right angle to the wheel.

  NOTE: Be sure that the toe gauge does not interfere with the balance weight of the wheel.



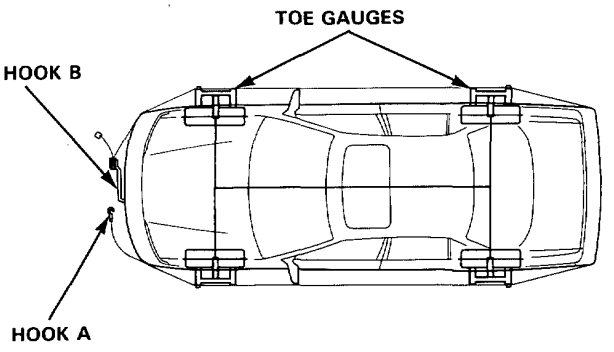
17. Set the tread compensation scale on the front wheel at 52.5 and on the rear wheel at 50.

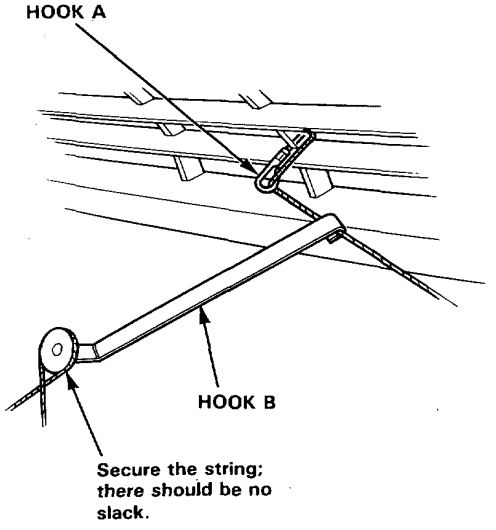


18. Attach the string to the bumper and secure with the hook A.

19. Route the string around the car and secure with the hook B. Be sure that there is no slack in the string.

  NOTE: Be sure that the string does not contact the exhaust pipe.

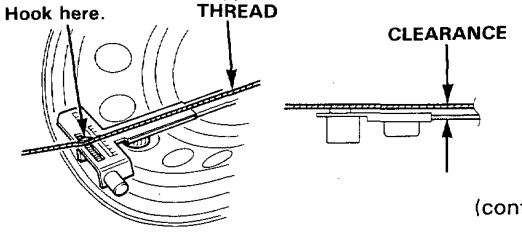




20. Hook the string on each tread compensation scale.

  - Keep a slight clearance between the string and toe gauge.

  - Be sure that the toe gauge is parallel with the ground.

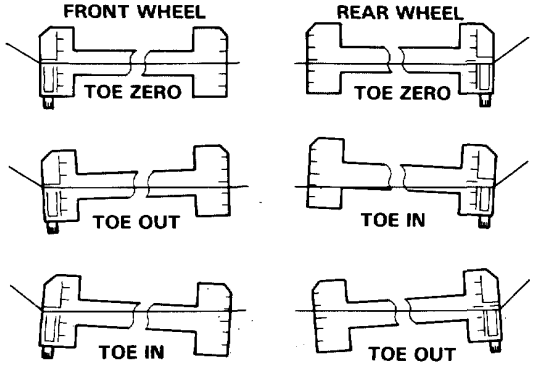


(cont'd)

Four Wheel Steering (4WS) (cont'd)

21. Read the tread compensation scale and measurement scale and culculate their difference.

    - Measurement varies according to the angle you are looking.
      Read all the measurements at the same height.
    - Check the side of the string that is closer to a division of the tread compensation scale, and read the measurement scale at the same side of the string.
    - Toe of all wheels is zero if the measurements of the tread compensation scale and measurement scale on each wheel are the same.

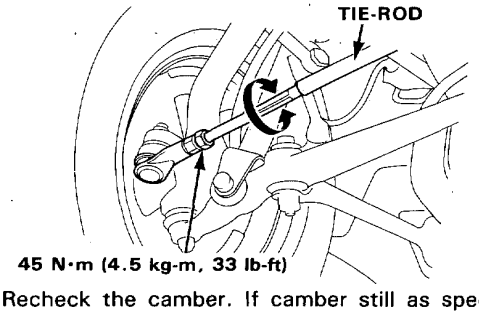


22. Adjust so that the front toe and rear toe are 0 when the front camber is 0° and rear camber −0° 20'.

23. After the front and rear toe are adjusted to zero, loosen the right and left rear wheel tie-rods 60° and set the rear toe-in to 2 mm (0.079 in).

24. After adjusting, tighten the tie-rod locknuts.

    NOTE: Reposition the tie-rod boots if twisted or displaced after adjustment has been made.



25. Recheck the camber. If camber still as specified alignment is finished.

    Front Camber Angle: 0° 00' ± 1°
    Rear Camber Angle: −0° 20' ± 1°

Using Full-floating Turn Table:

Preparation

NOTE: Alignment equipment must be capable of 4 wheel alignment and must use full-floating turntables at all four wheels.

1. Check the tire pressure.
2. Jack up the car and temporarily place on safety stands.
3. Install the 4WS Center Lock Pin (see page 12-6). Install lock pins in the full floating turntables.
4. Lower the car onto the turntables. Remove the turntable lock pins and "settle" the suspension by pushing the car up and down several times. Remove the 4WS Center Lock Pin.
5. Check the steering wheel angle. If significantly off center, it may be necessary to remove the steering wheel and reposition it on the splines (page 12-6). Turn the steering wheel to the straight-ahead position.

   NOTE: If the wheel removal is necessary, loosen the nut, then temporarily reinstall the 4WS Center Lock Pin before repositioning the wheel.

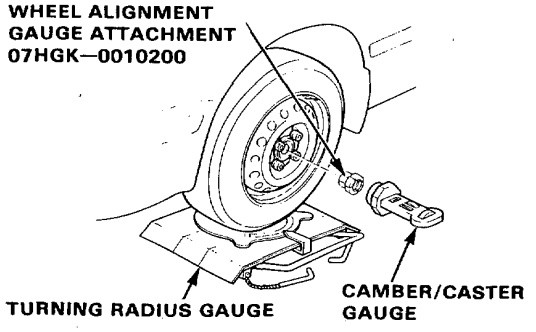
6. Alignment should be checked/adjusted in one continuous procedure: caster, front camber, rear camber, rear toe, front toe and re-check.

Front Caster:

1. Remove the center cap or wheel cap. Install the Wheel Alignment Gauge Attachments on the Wheels.

   NOTE: Make sure the wheel hubs are clean and rust-free before installing the wheel alignment attachment.
2. Install a camber/caster gauge on the Wheel Alignment Gauge Attachment and apply the front brake. Turn the wheel 20° inward.
3. Turn the adjust screw so that the bubble in the caster gauge is at 0°.
4. Turn the wheel 20° outward and read the caster on the gauge with the bubble at the center of the gauge.

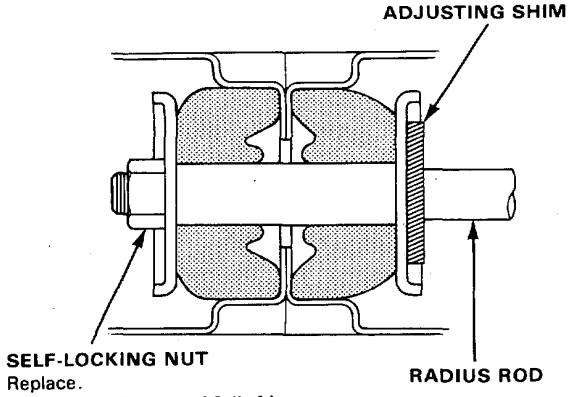
   Caster Angle: 3°00' ± 1°



5. If adjustment is required, record the caster reading, then go to step 6. If adjustment is not required, proceed to step 10.

   NOTE: Caster angle can be adjusted by increasing/decreasing the number of the adjusting shims. Remove and install the radius rod each time the caster angle is adjusted.

6. Raise the front end of the car and place safety stands in the proper locations.
7. Remove the self-locking nut on the end of the radius rod.
8. Remove the radius rod attaching bolts at the lower arm, and radius rod.
9. Adjust the caster angle by increasing/decreasing the adjusting shims.
   - One adjusting shim changes the caster angle by 25′ and the caster angle can be adjusted by 50′ maximum.
   - One adjusting shim is 3.2 mm (0.126 in) in thickness.



   NOTE:
   - Do not use more than two adjusting shims.
   - After the adjustment, tighten the self-locking nut to the specified torque.

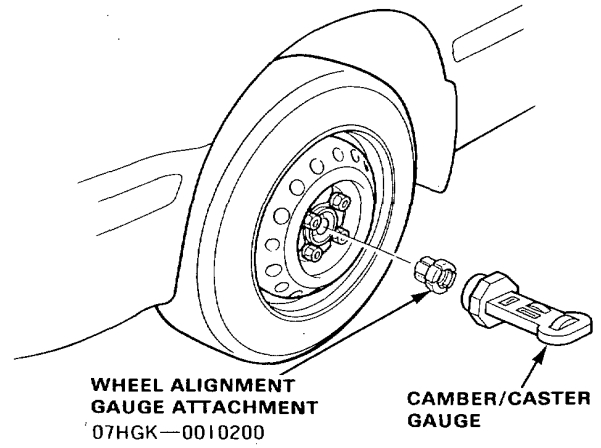
10. Recheck the caster angle.

Front Camber:

11. Return the steering wheel to the straight-ahead position.
12. Read the front camber on the gauge with the bubble at the center of the gauge.

    Front Camber Angle: 0°00′ ± 1°

13. If out of specification, check for bent or damaged suspension components.

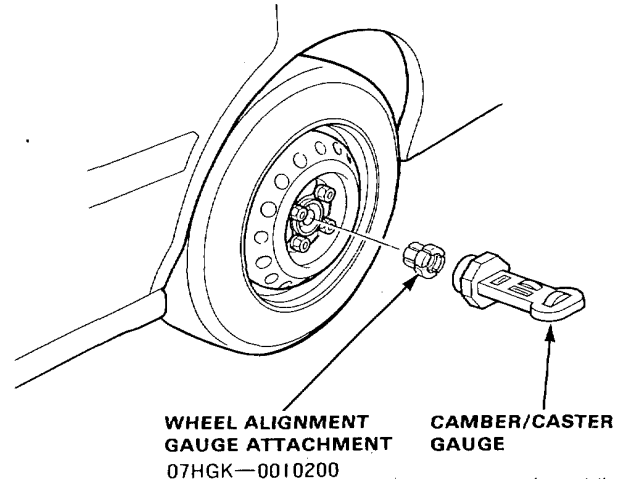


Rear Camber:

14. Read the rear camber on the gauge with the bubble at the center of the gauge.

    Rear Camber: −0°20′ ± 1°

15. If out of specification, check for bent or damaged suspension components.



(cont'd)

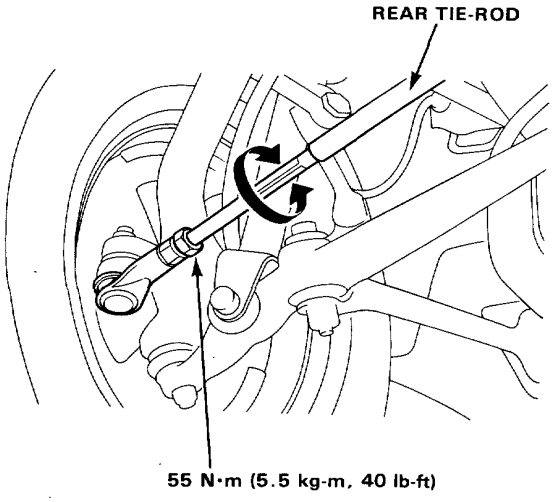
Four Wheel Steering-4WS (cont'd)

Toe:

16. Check the rear toe-in.
    Right Rear : 1.5 mm
    Left Rear : 1.5 mm
    Total : 3 ± 2 mm (0.12 ± 0.08 in)

    NOTE: Left and right toe should be the same.

    — If adjustment is required, go to step 17.
    — If no adjustment is required, proceed to step 19.
17. Loosen the tie-rod locknuts.
18. After adjusting, tighten the tie-rod locknuts.
    NOTE: Reposition the tie-rod boots if twisted or displaced after adjustment has been made.

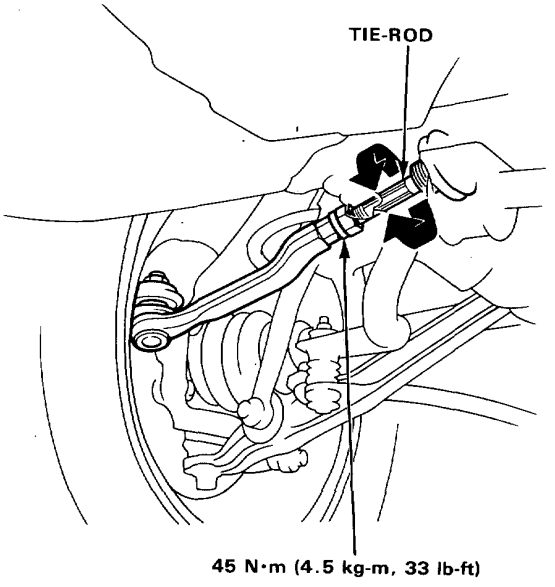


19. Check the front toe-in:
    Right Front : 0 mm
    Left Front : 0 mm
    Total : 0 ± 2 mm (0 ± 0.08 in)

    NOTE: Left and right toe should be the same.

    — If adjustment is required, go t step 20.
    — If no adjustment is required, proceed to step 21.
20. Loosen the tie-rod locknut and turn the tie-rod until toe-in is correct.
21. After adjusting, tighten the tie-rod locknuts.

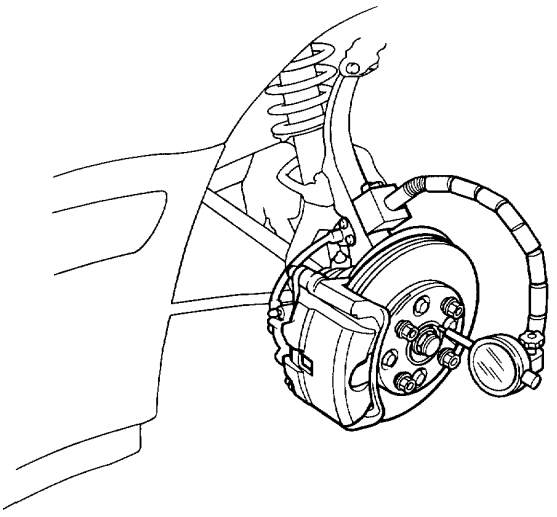
    NOTE: Reposition the tie-rod boots if twisted or displaced after adjustment has been made.



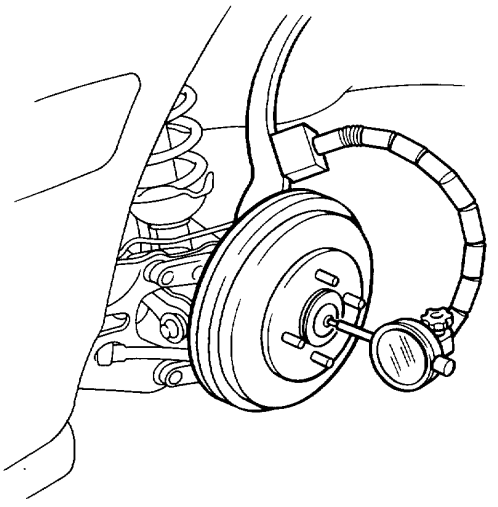
22. Recheck the camber. If camber still as specified alignment is finished.
    Front Camber Angle: 0°00′ ± 1°
    Rear Camber Angle: −0° 20′ ± 1°

Bearing End Play

Front Wheel End Play
Standard: 0—0.05 mm



Rear Wheel End Play
Standard: 0—0.05 mm

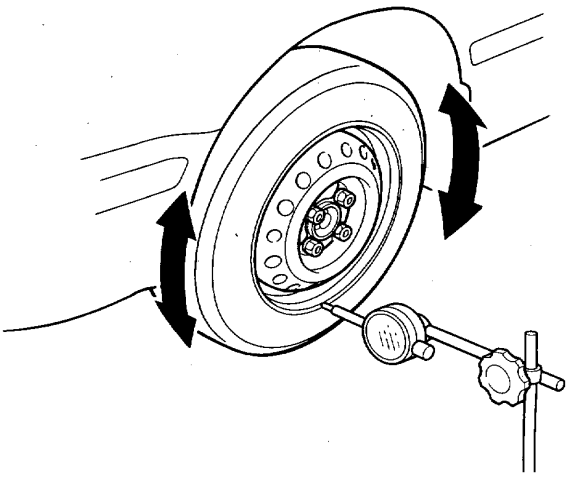


Wheel Measurements

Run out

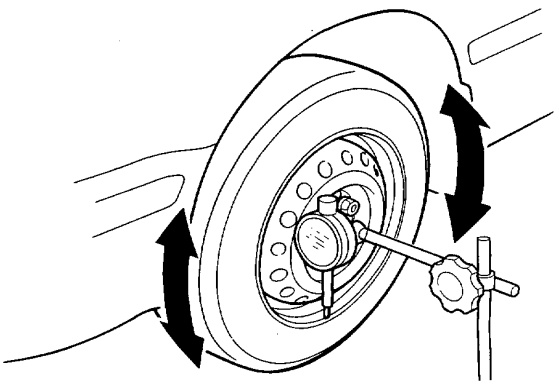
Front and Rear Wheel Axial Run out

Standard:
Steel Wheel: 0—1.0 mm
Aluminum Wheel: 0—0.7 mm



Front and Rear Wheel Axial Run out

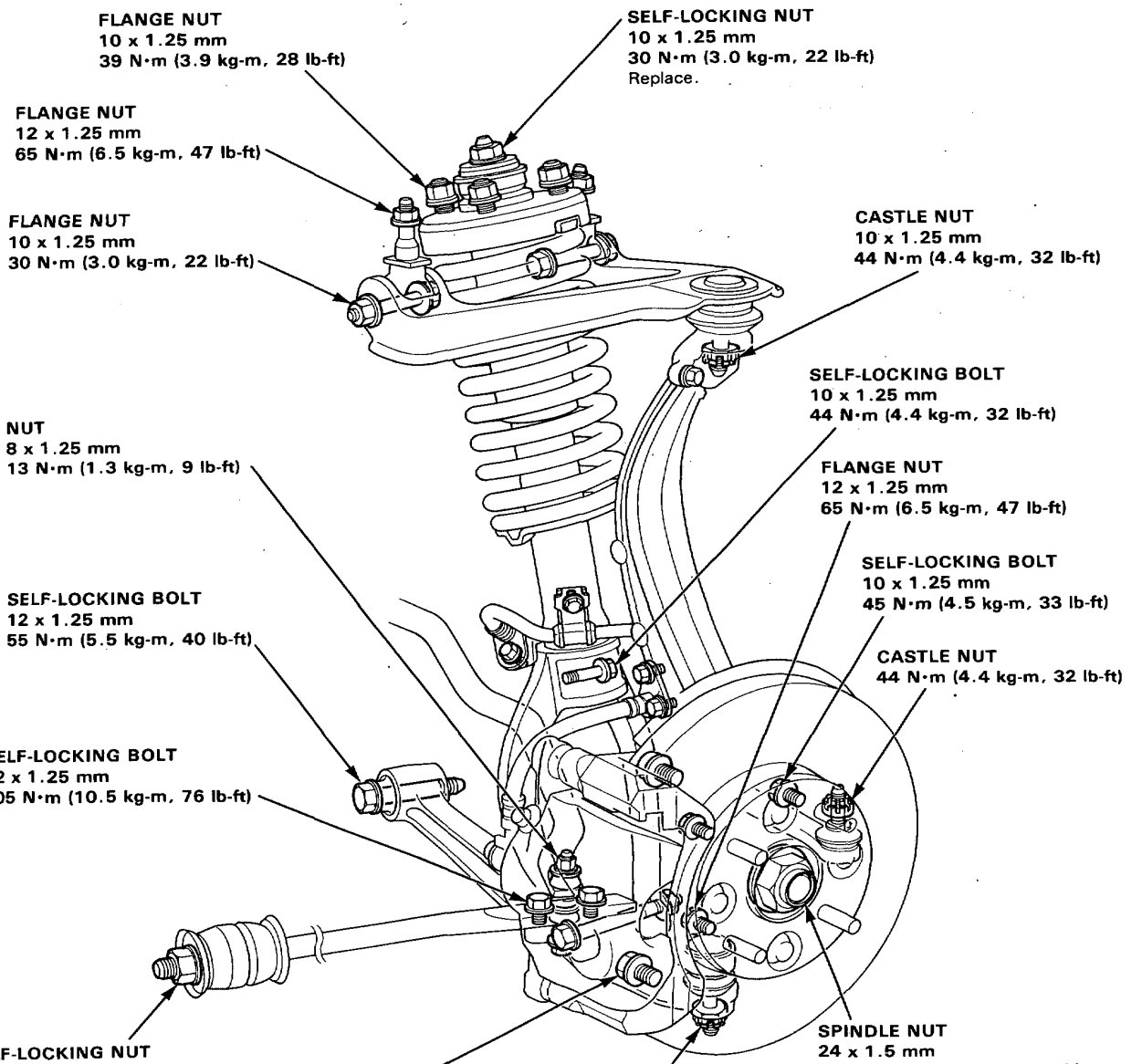
Standard:
Steel Wheel: 0—1.0 mm
Aluminum Wheel: 0—0.7 mm



Torque Specifications

CAUTION:
- **Replace the self-locking nuts after removal.**
- **Replace the self-locking bolts if you can easily thread a non-self-locking nut past their nylon locking inserts. (If should require 1 N·m (0.1 kg-m, 0.7 lb-ft) of torque to turn the test nut on the bolt).**
  The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

NOTE: Wipe off the grease before tightening the nut at the ball joint.

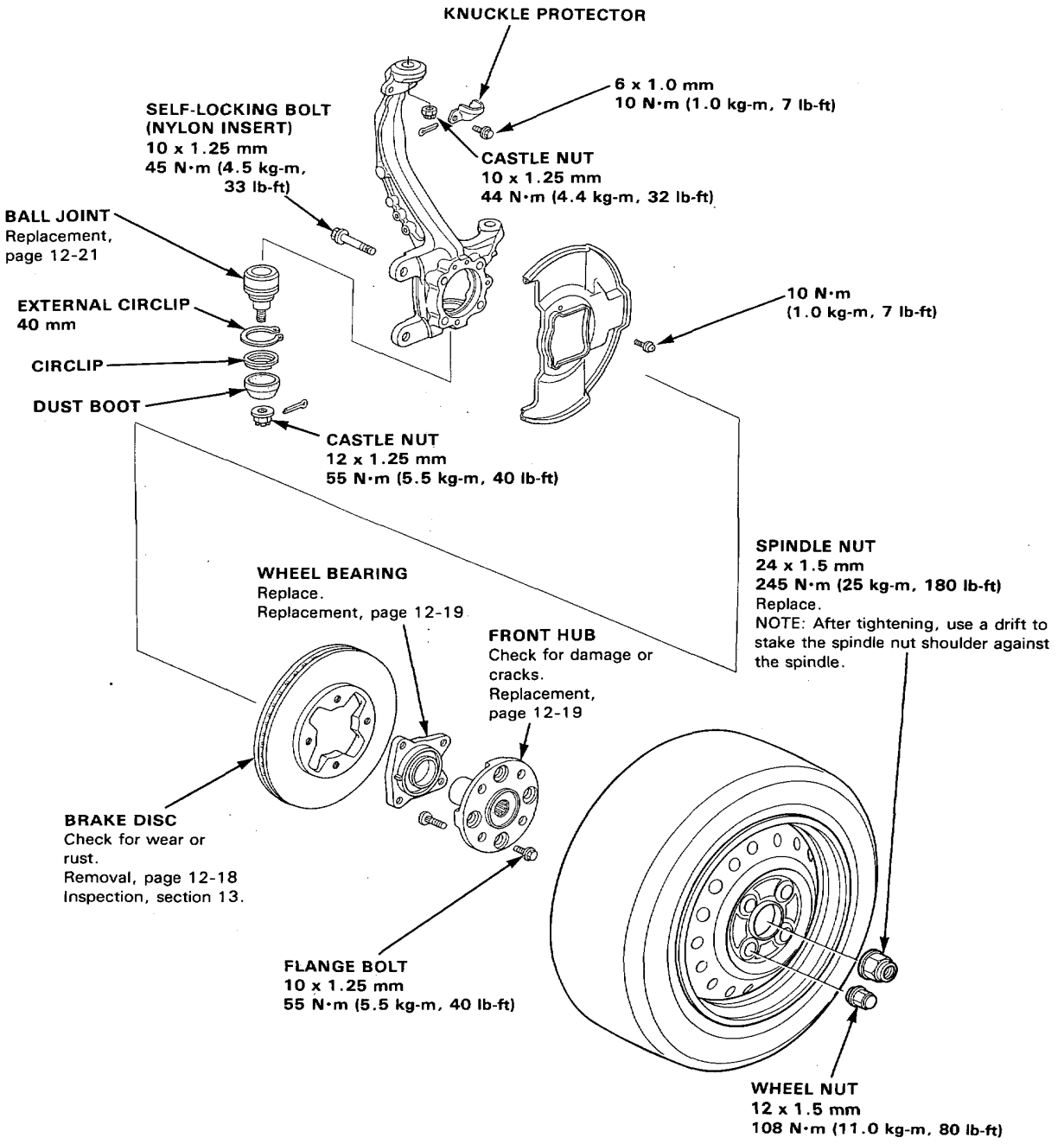


Front Suspension

Knuckle/Hub

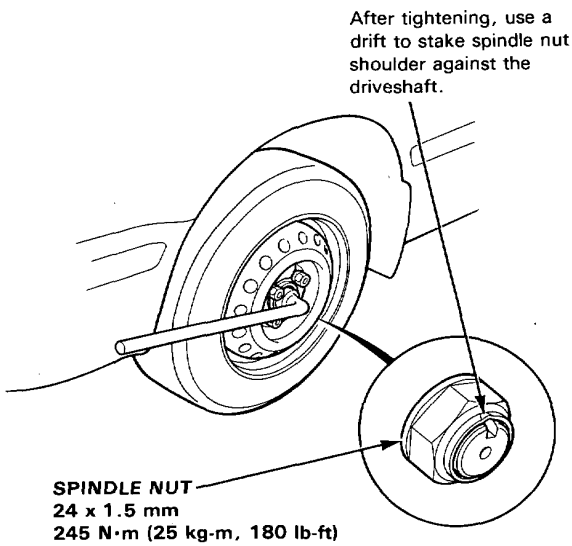
NOTE:
- Use only genuine Honda aluminum wheel weights. Non-genuine aluminum wheel weights may corrode and damage aluminum wheel.
- Remove the center cap by prying it out with a flat screwdriver. Avoid damage to the cap by not allowing it to fall during removal. Use a rag at the point you are going to pry, because aluminum alloy wheels can be easily damaged.

CAUTION: Use a rag at the point you are going to pry, because aluminum alloy wheels can be easily damaged.



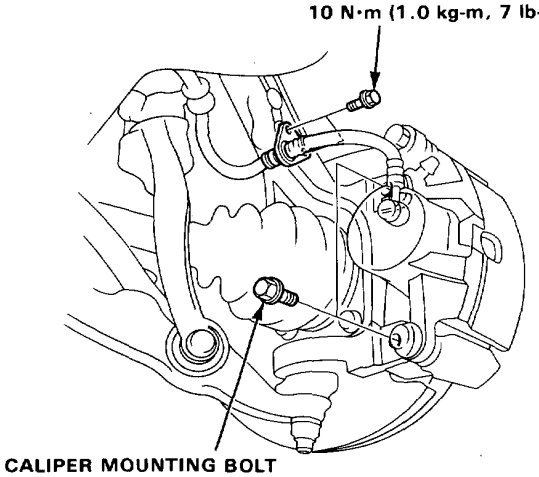
Knuckle/Hub Replacement

1. Pry the spindle nut stake away from the spindle, then loosen the nut.



2. Loosen the wheel nuts slightly.
3. Raise the front of car and support on safety stands in proper locations.
4. Remove the wheel nuts, wheel, and spindle nut.
5. Remove the caliper mounting bolts and hang the caliper assembly to one side.

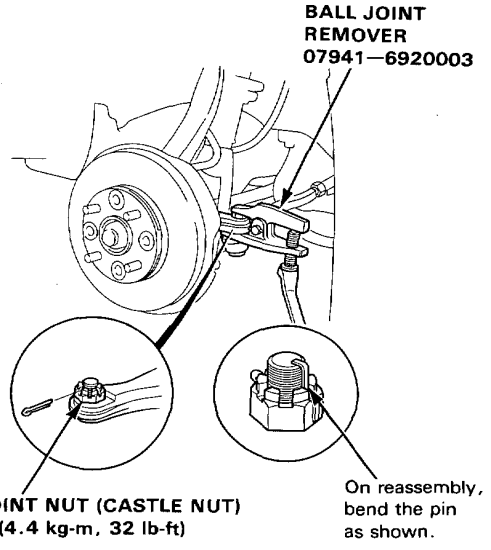
   CAUTION: To prevent accidental damage to the caliper assembly or brake hose, use a short piece of wire to hang the caliper assembly from the under-carriage.



6. Remove the cotter pin and the tie-rod ball joint nut.
7. Break loose the tie-rod ball joint using the special tool, then lift the tie-rod out of the knuckle.

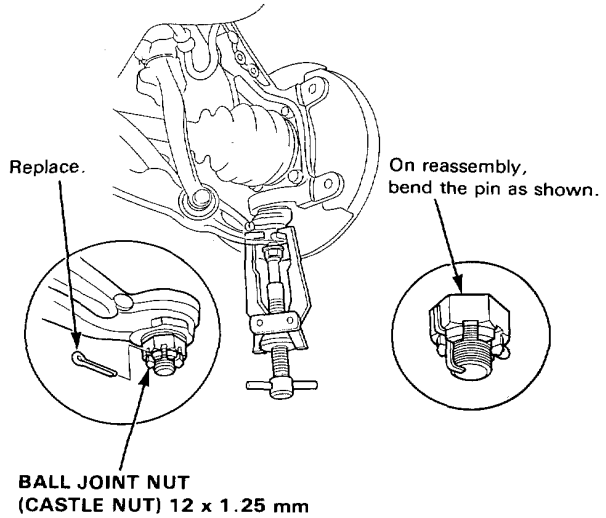
   CAUTION: Avoid damaging the ball joint boot.

   NOTE: If necessary, apply penetrating type lubricant to loose the ball joint.



8. Remove the cotter pin and loosen the lower arm ball joint nut half the length of the joint threads.
9. Separate the ball joint and lower arm using a puller with the pawls applied to the lower arm.

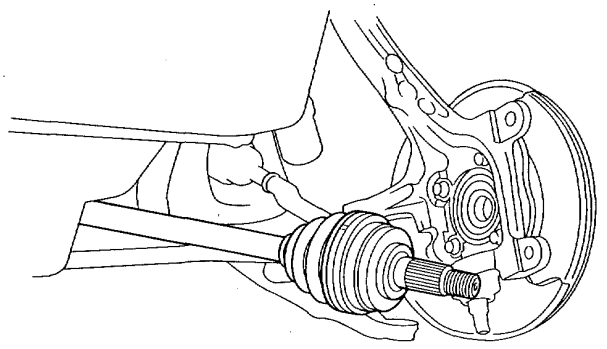
   CAUTION: Avoid damaging the ball joint boot.



(cont'd)

Knuckle/Hub Replacement (cont'd)

10. Pull the knuckle outward and remove the driveshaft outboard joint from the knuckle using a plastic hammer.

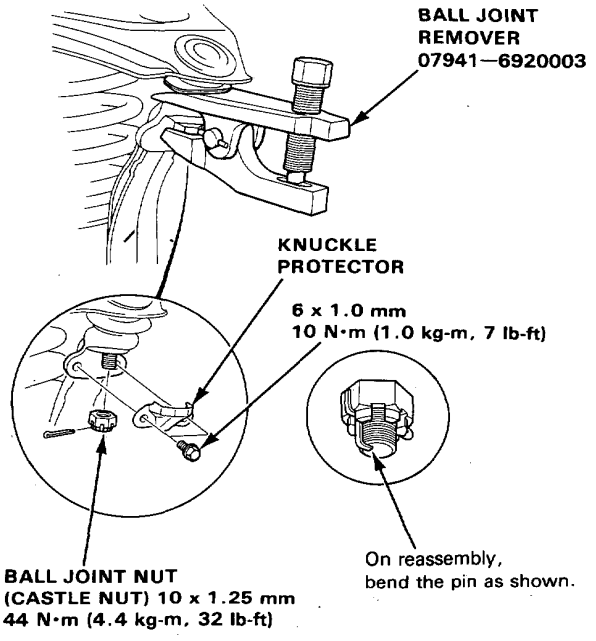


11. Remove the cotter pin and the upper ball joint nut.

12. Break loose the upper ball joint using special tool.

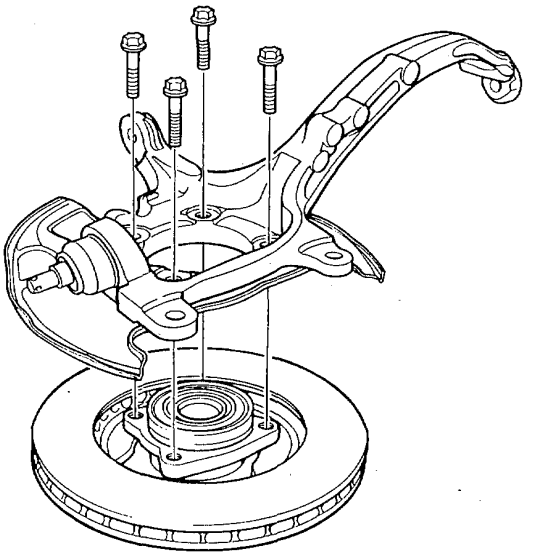
CAUTION: Avoid damaging the ball joint boot.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

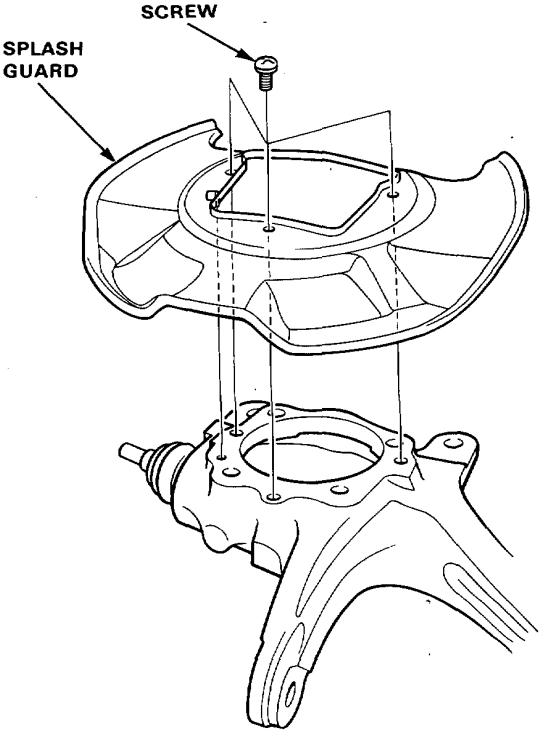


Hub unit and Wheel bearing Removal

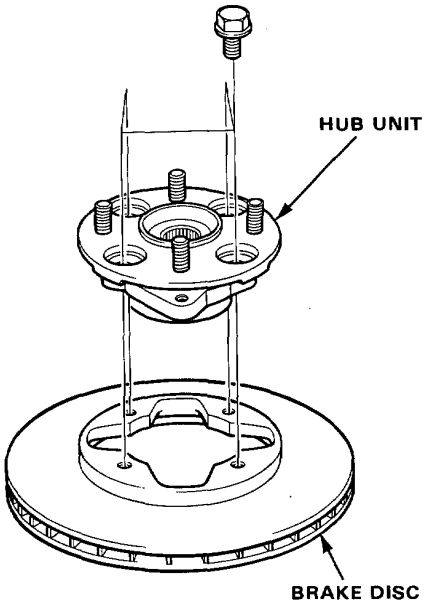
13. Remove the knuckle from the hub unit.



14. Remove the splash guard screws from the knuckle.

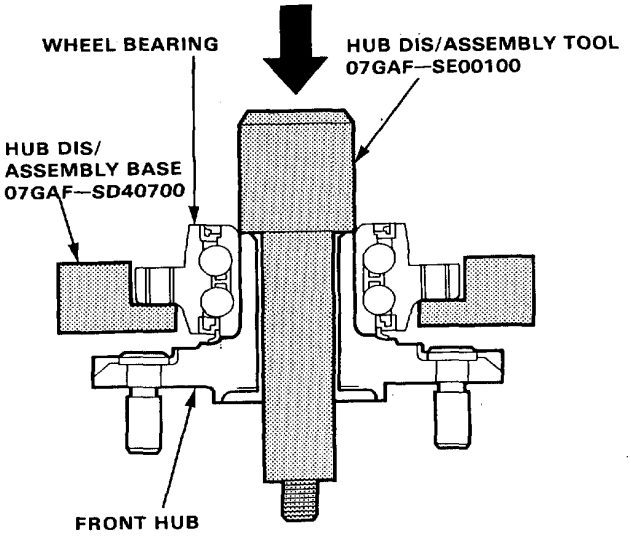


15. Remove the four bolts, then separate the hub unit from the brake disc.



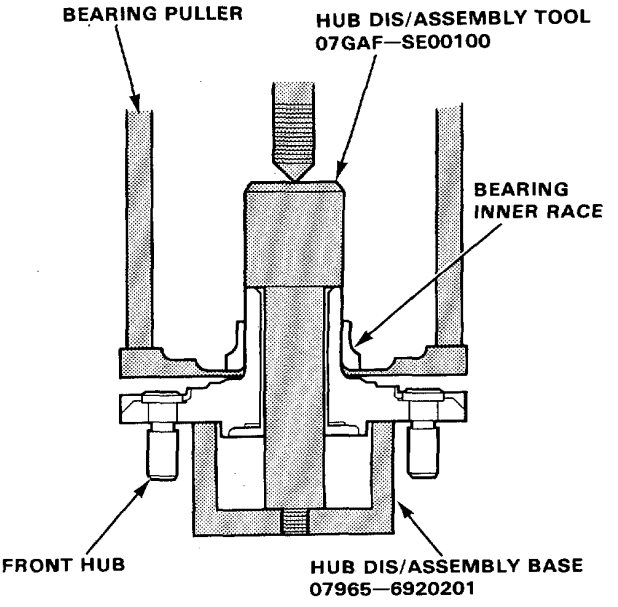
16. Separate the wheel bearing from the hub using the special tools and a hydraulic press.

CAUTION:
- **Hold onto the hub to keep it from falling when pressed clear.**
- **To prevent damage to the tool make sure the threads are fully engaged before pressing.**



17. Remove the outboard bearing inner race from the hub using the special tools shown and a bearing puller.

CAUTION: To prevent damage to the tool make sure the threads are fully engaged before pressing.



NOTE: Wash the knuckle and hub thoroughly in high flash point solvent before reassembly.

(cont'd)

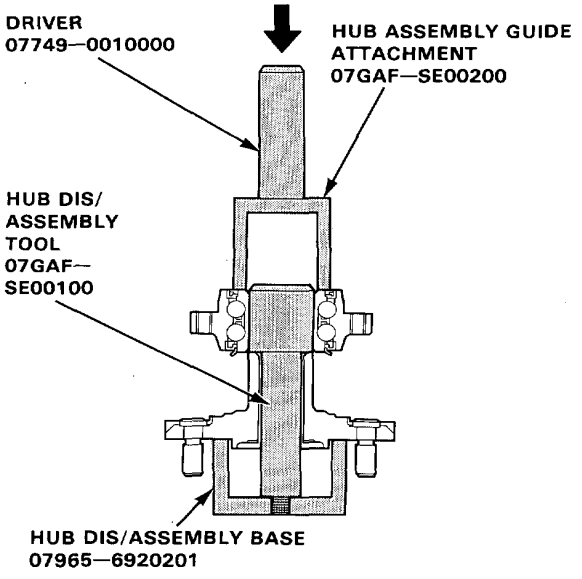
Knuckle/Hub Replacement (cont'd)

Wheel bearing and Hub unit Installation.

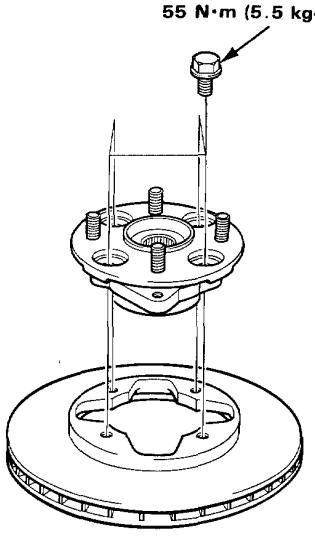
NOTE: Replace the bearing with a new one after removal.

18. Press a new wheel bearing into the hub using the special tools shown and a hydraulic press.

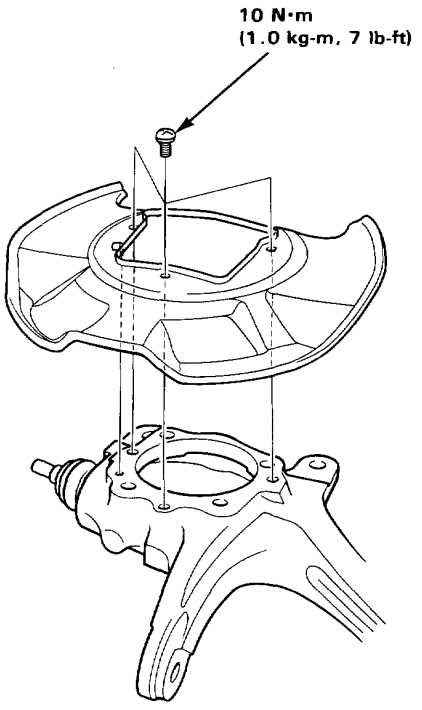
CAUTION: To prevent damage to the tool make sure the threads are fully engaged before pressing.



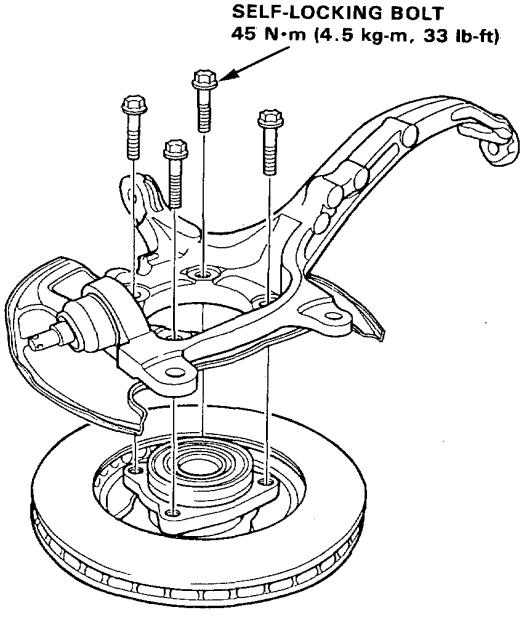
19. Install the hub unit on the brake disc and tighten the bolts.



20. Install the splash guard and tighten the screws.

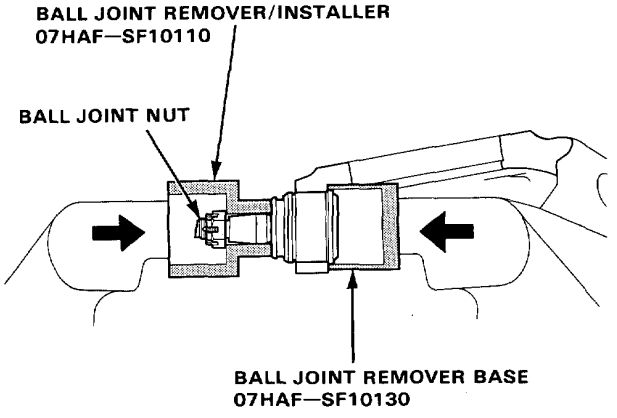


21. Install the knuckle on the hub unit and tighten the bolts.

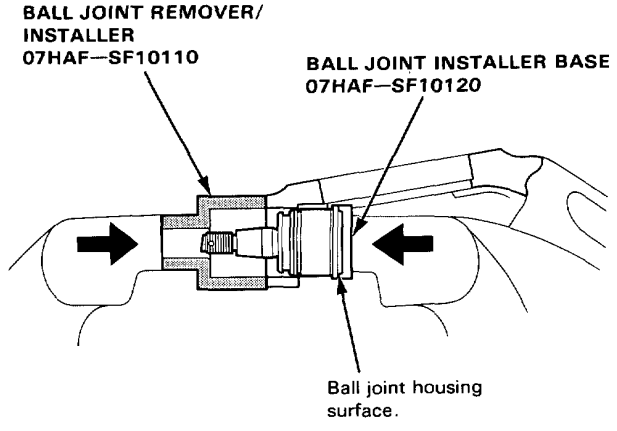


Lower Ball Joint Replacement

1. Remove the knuckle (page 12-17).
2. Remove the boot by prying the circlip off.
3. Remove the 40 mm circlip.
4. Install the special tool on the ball joint and tighten the ball joint nut.
5. Position the special tool over the ball joint as shown then set the assembly in a vise. Press the ball joint out of the knuckle.



6. Place the ball joint in position by hand.
7. Install the special tools over the ball joint as shown, then press the ball joint in.

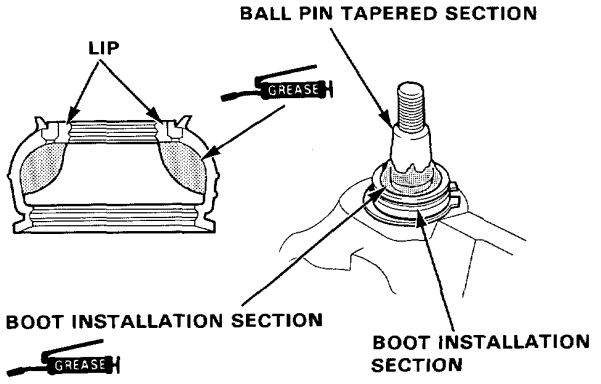


8. Install the 40 mm circlip.

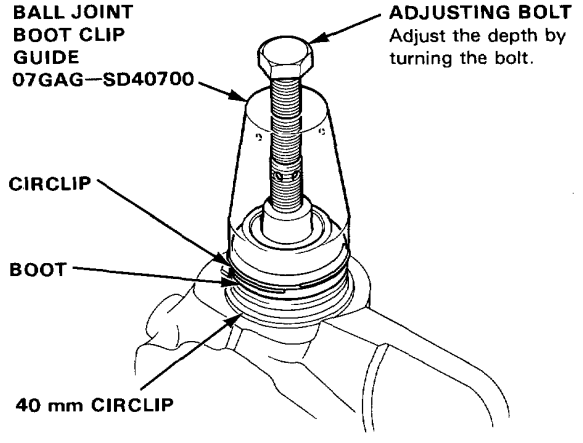
Ball Joint Boot Replacement

Jolt the ball pin and back and forth check the ball joint for wear. Replace the ball pin if it worn excessively.

1. Remove the circlip and the boot.
   CAUTION: Do not contaminate the boot installation section with grease.
2. Pack the interior of the boot and lip with grease.



3. Wipe the grease off the sliding surface of the ball pin and pack with fresh grease.
   CAUTION:
   - **Keep grease off the boot installation section and the tapered section of the ball pin.**
   - **Do not allow dust, dirt, or other foreign materials to enter the boot.**
4. Install the boot in the groove of the boot installation section securely, then bleed air.
5. Adjust the special tool with the adjusting bolt until the end of the tool aligns with the groove on the boot.
6. Slide the clip over the tool and into position.



CAUTION: After installing the boot, check the ball pin tapered section for grease contamination and wipe it if necessary.

Front Suspension

Illustrated Index

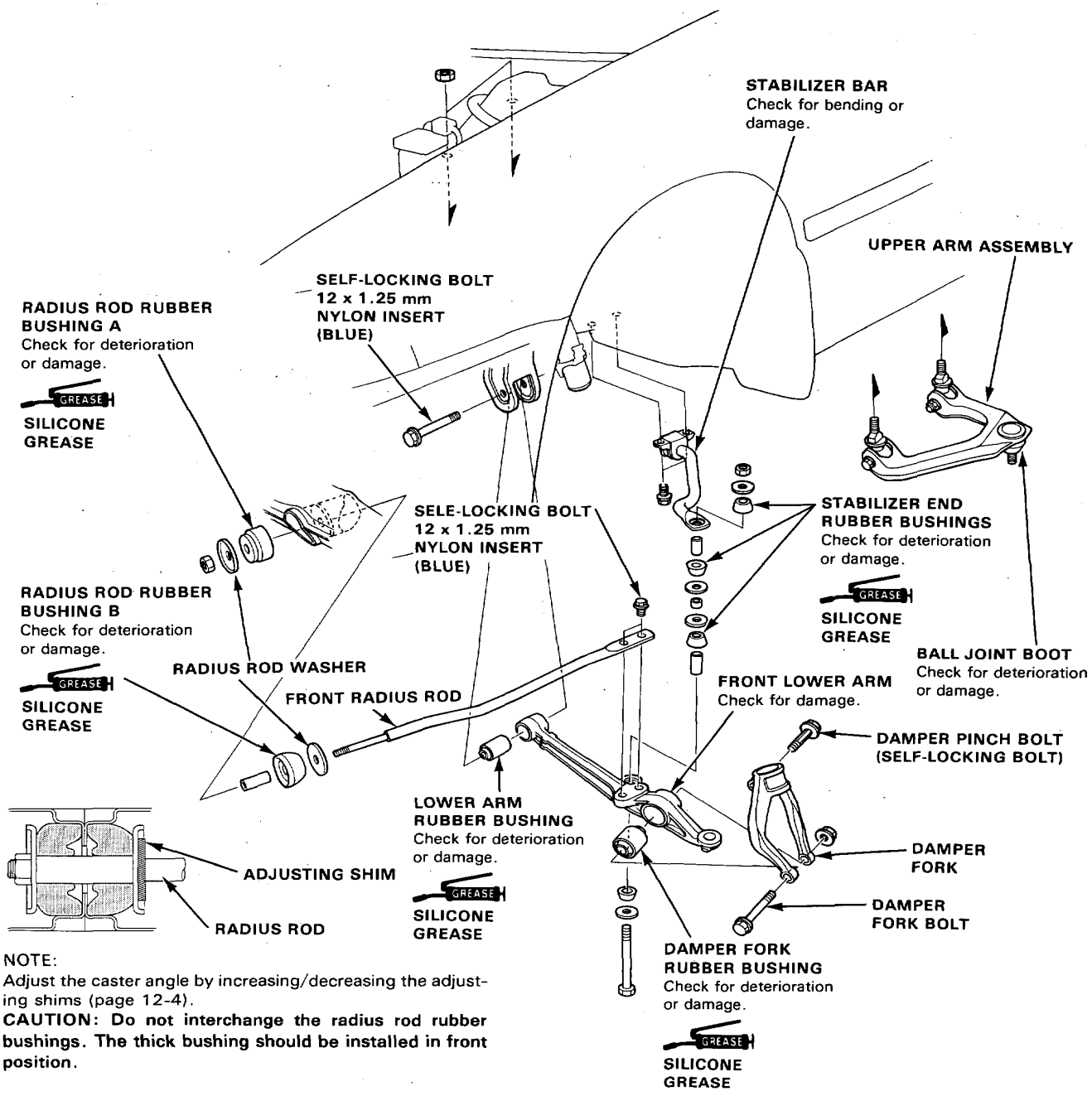
Overall Suspension

CAUTION:

- **Replace the self-locking nuts after removal.**
- **Replace the self-locking bolts if you can easily thread a non-self locking nut past their nylon locking inserts. (If should require 1 N·m (0.1 kg-m, 0.7 lb-ft) of torque to turn the test nut on the bolt).**

NOTE:

- Wipe off the grease before tightening the nut at the ball joint.
- Torque specifications, see page 12-15.



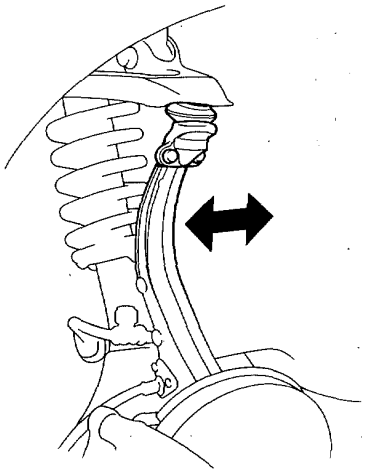
NOTE:

Adjust the caster angle by increasing/decreasing the adjusting shims (page 12-4).

CAUTION: Do not interchange the radius rod rubber bushings. The thick bushing should be installed in front position.

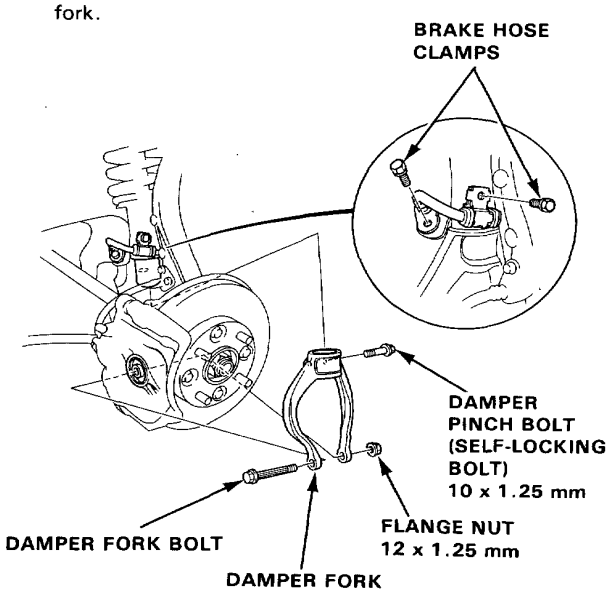
Upper Arm Ball Joint Inspection

1. Loosen the front wheel lug nuts.
2. Raise the front end of the car and place safety stands in the proper locations.
3. Remove the front wheels.
4. Rock the upper ball joint front-to-back.
5. Replace the upper arm assembly as follows if there is any play.

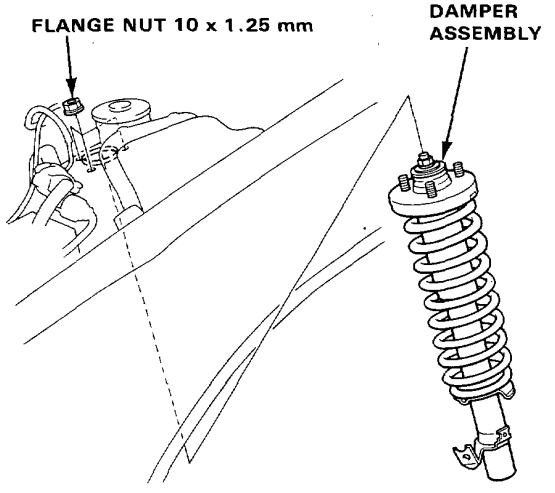


Damper Removal

1. Remove the brake hose clamps from the damper.
2. Remove the damper pinch bolt.
3. Remove the damper fork bolt and remove the damper fork.



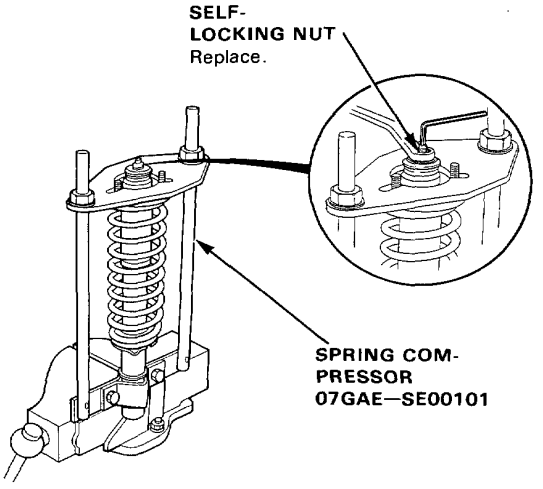
4. Remove the damper by removing the three flange nuts.



Damper Disassembly/Inspection

1. Compress the damper spring with the spring compressor according to the manufacturer's instructions, then remove the self-locking nut.

CAUTION: Do not compress the spring more than necessary to remove the nut.

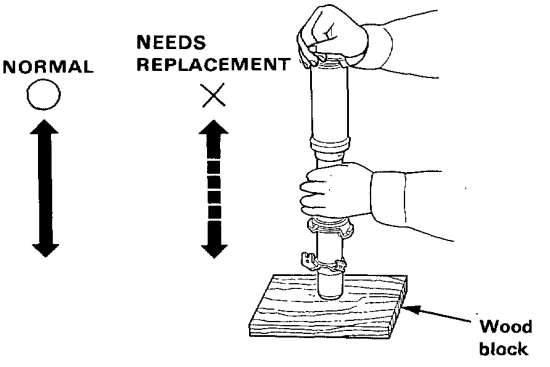


2. Remove the spring compressor then disassemble the damper as shown on the next page.

Inspection:

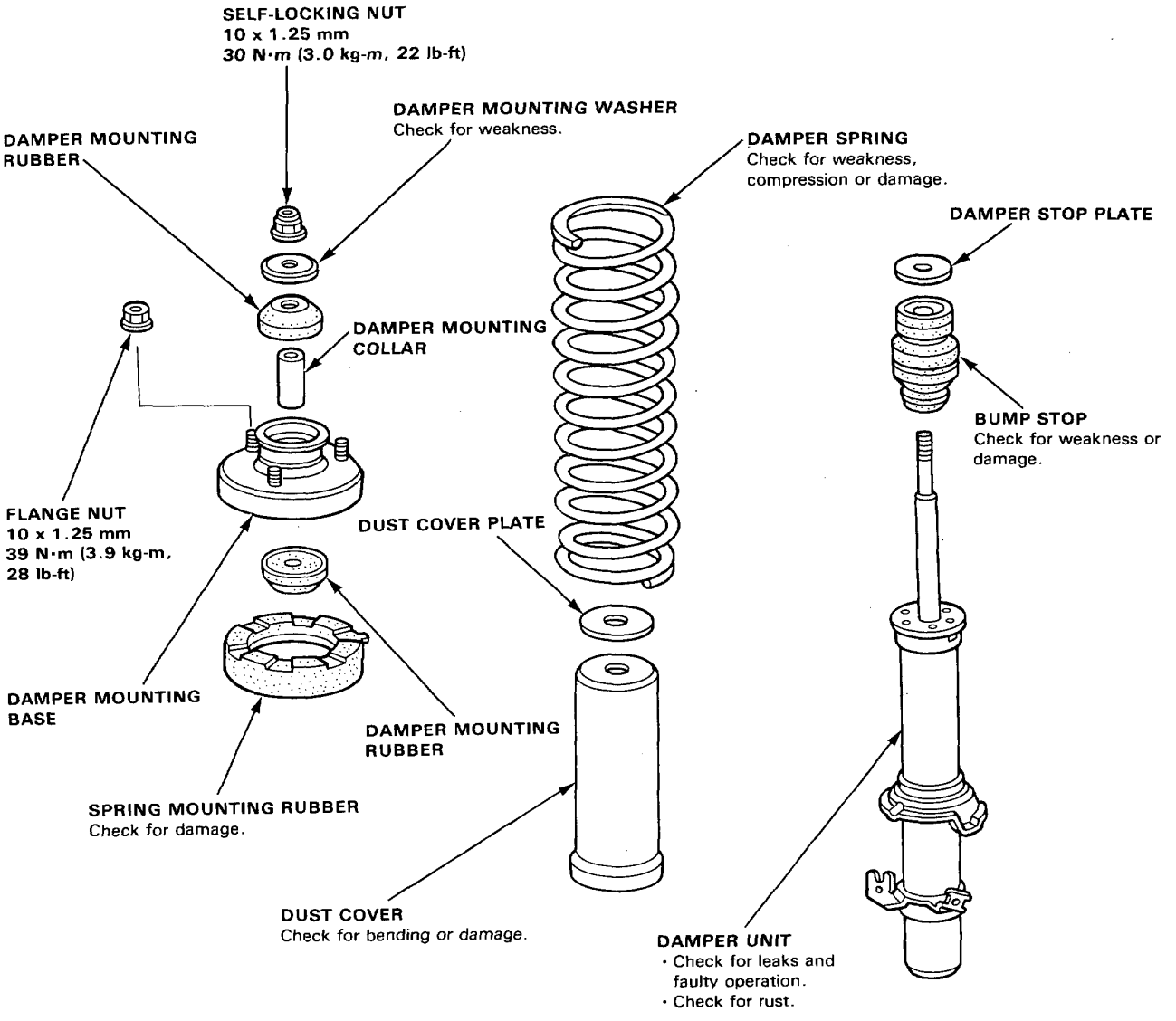
1. Reassemble all parts, except the spring.
2. Push on the damper assembly as shown.
3. Check for smooth operation through a full stroke, both compression and extension.

   NOTE: The damper should move smoothly. If it does not (no compression or no extension), then gas is leaking, and the damper should be replaced.



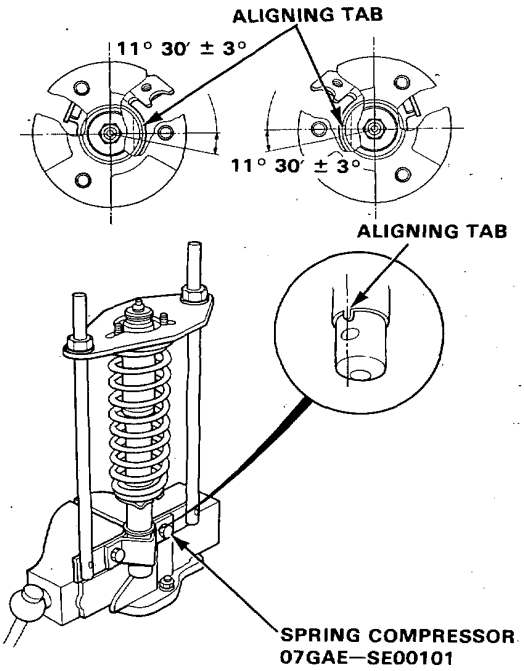
4. Check for oil leaks, abnormal noises or binding during these tests.

Inspection


SELF-LOCKING NUT
10 x 1.25 mm
30 N·m (3.0 kg-m, 22 lb-ft)
DAMPER MOUNTING WASHER
Check for weakness.
DAMPER MOUNTING RUBBER
DAMPER SPRING
Check for weakness, compression or damage.
DAMPER STOP PLATE
DAMPER MOUNTING COLLAR
BUMP STOP
Check for weakness or damage.
FLANGE NUT
10 x 1.25 mm
39 N·m (3.9 kg-m, 28 lb-ft)
DUST COVER PLATE
DAMPER MOUNTING BASE
DAMPER MOUNTING RUBBER
SPRING MOUNTING RUBBER
Check for damage.
DUST COVER
Check for bending or damage.
DAMPER UNIT
• Check for leaks and faulty operation.
• Check for rust.

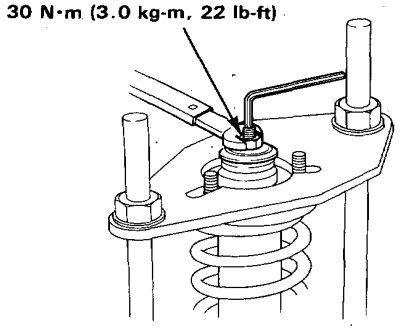
Damper Reassembly

1. Install the damper unit, damper spring, bump stop, boot, upper spring seat, damper bushings, and collar on the spring compressor.



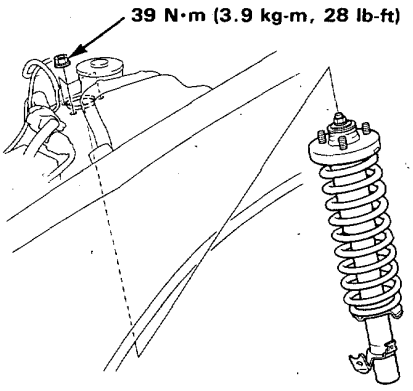
NOTE: Left side shown, right side is opposite.

3. Compress the damper spring.
4. Install the damper mount washer and a new self-locking nut 10 mm.
5. Hold the damper shaft and tighten the 10 mm self-locking nut.



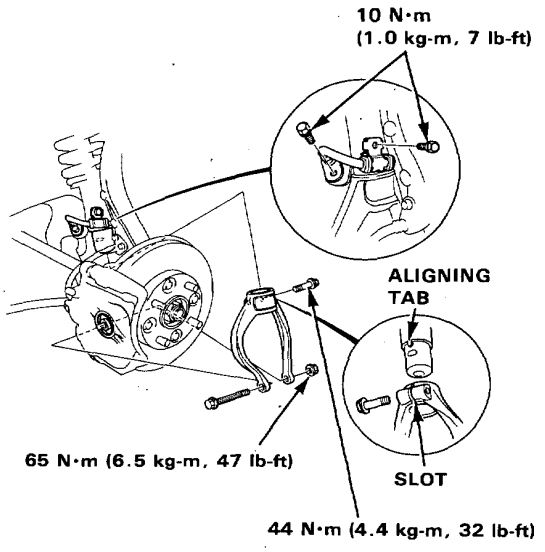
Damper Installation

1. Loosely install the damper on the frame with the aligning tab facing inside.



2. Install the damper fork on the driveshaft and lower arm. Install the damper in the damper fork so the aligning tab is aligned with the slot in the damper fork.
3. Hand tighten the bolts and nuts.
4. Raise the knuckle with a floor jack until the car just lifts off the safety stand.

NOTE: The bolts and nuts should be tightened with the vehicle's weight on the damper.



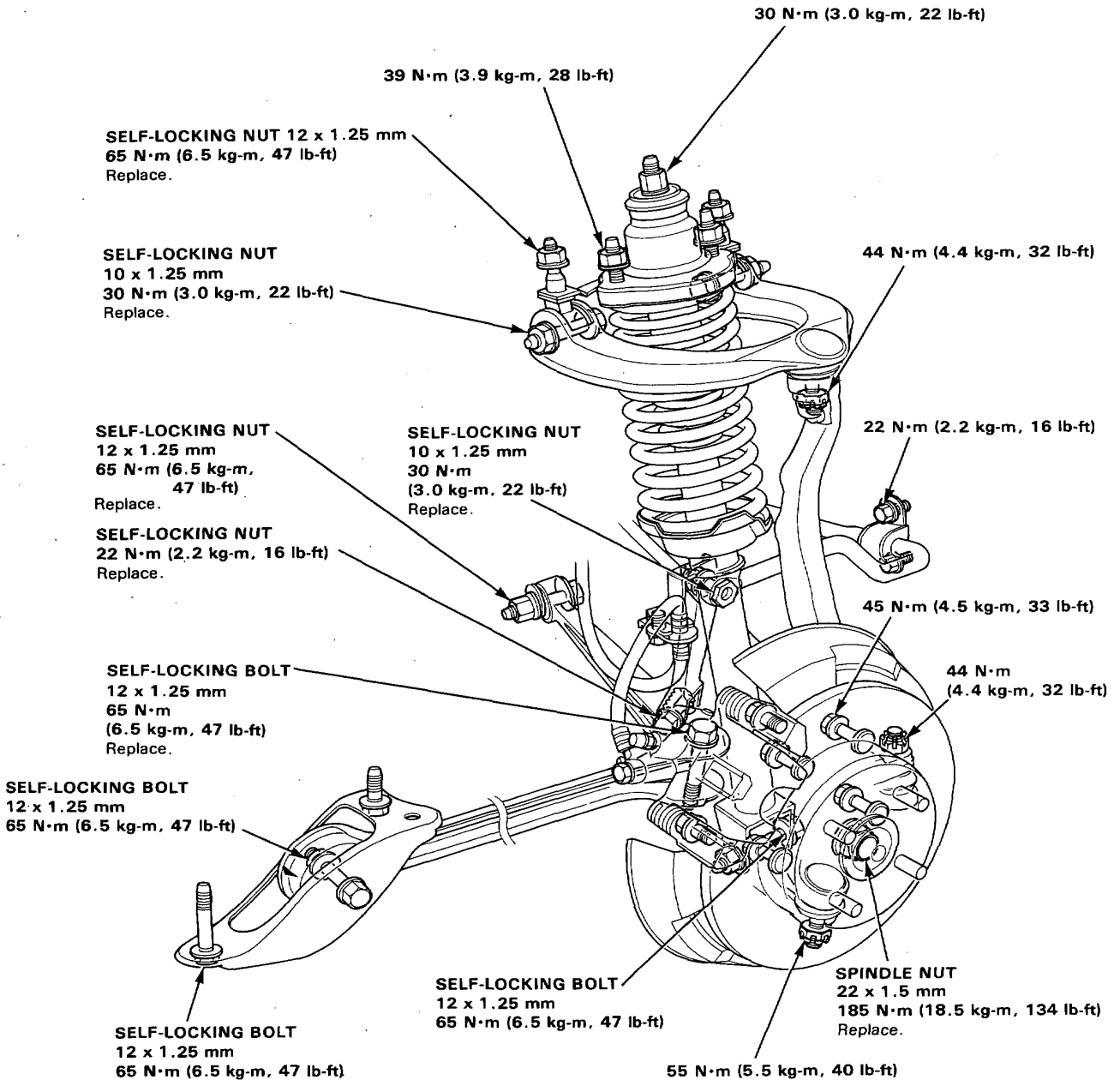
5. Tighten the damper pinch bolt.
6. Secure the damper fork bolt with *a new* 12 mm nut.
7. Secure the damper assembly to the frame with the flange nuts.
8. Install the brake hose clamps with the two bolts.

Torque Specifications-4WS

CAUTION:
- **Replace the self-locking nuts after removal.**
- **Replace the self-locking bolts if you can easily thread a non-self-locking nut past nylon locking inserts. (If should require 1 N·m (0.1 kg-m, 0.7 lb-ft) of torque to turn the test nut on the bolt).**

The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

NOTE: Wipe off the grease before tightening the nut at the ball joint.



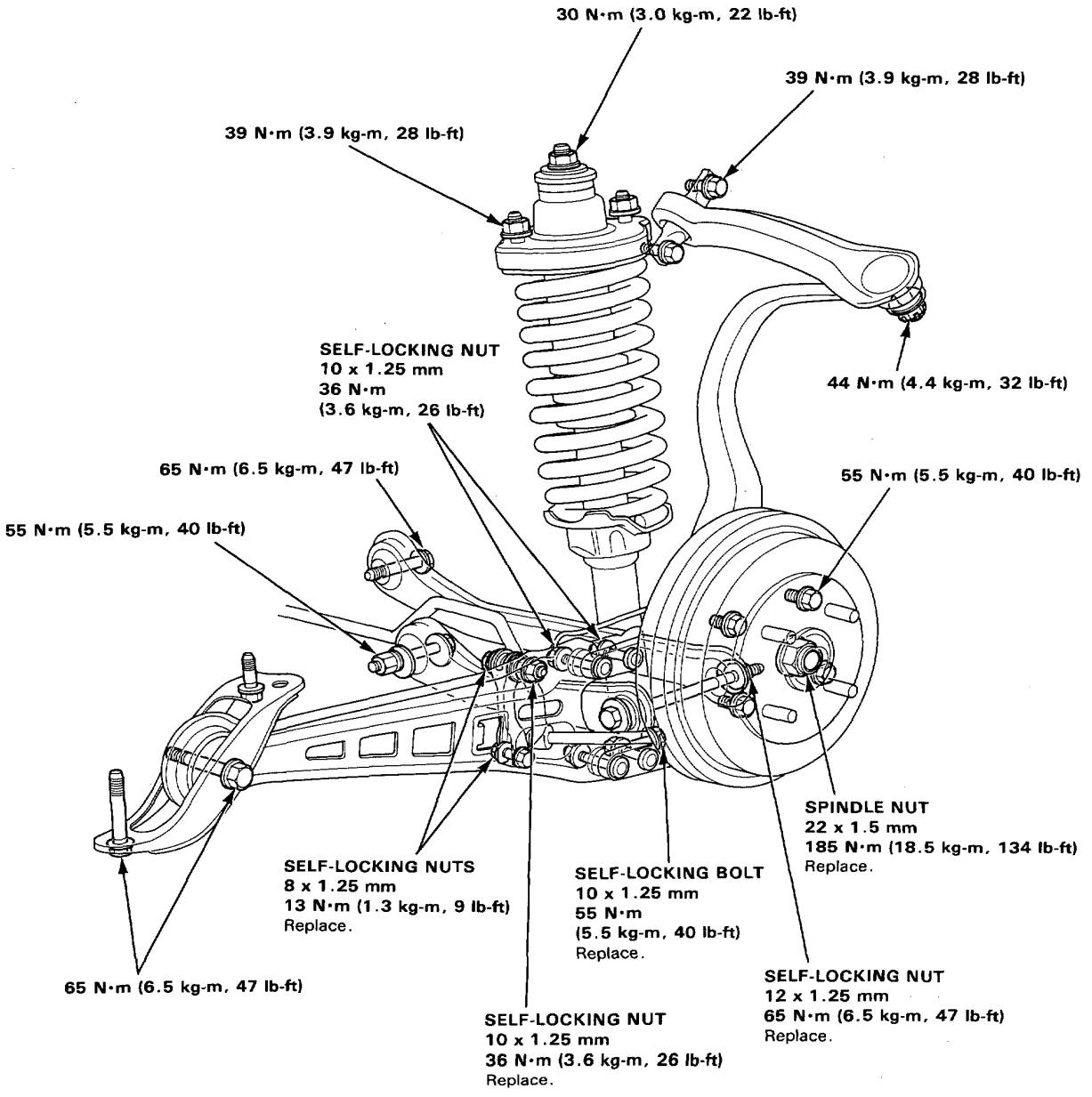
Rear Suspension

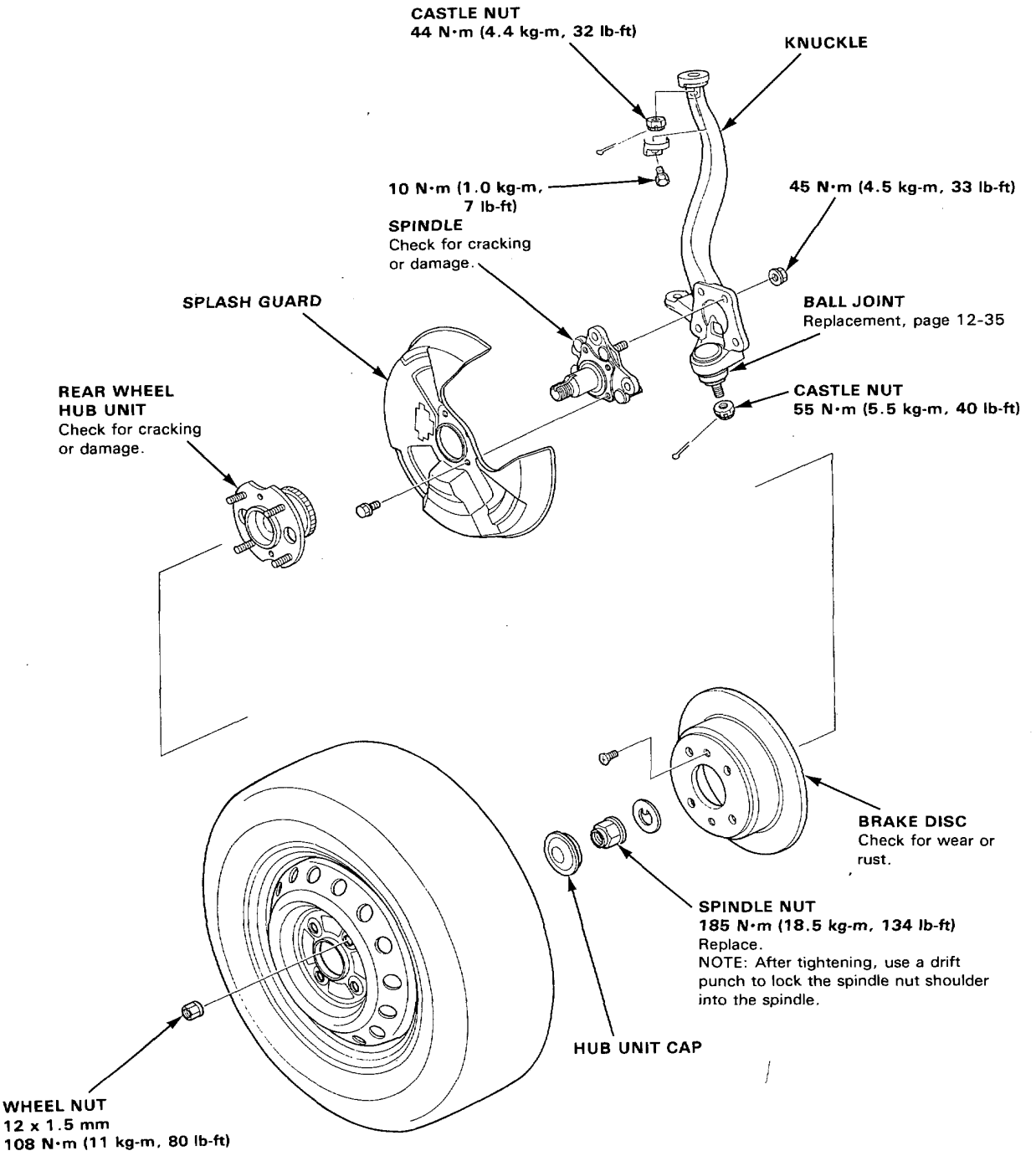
Torque Specifications-2WS

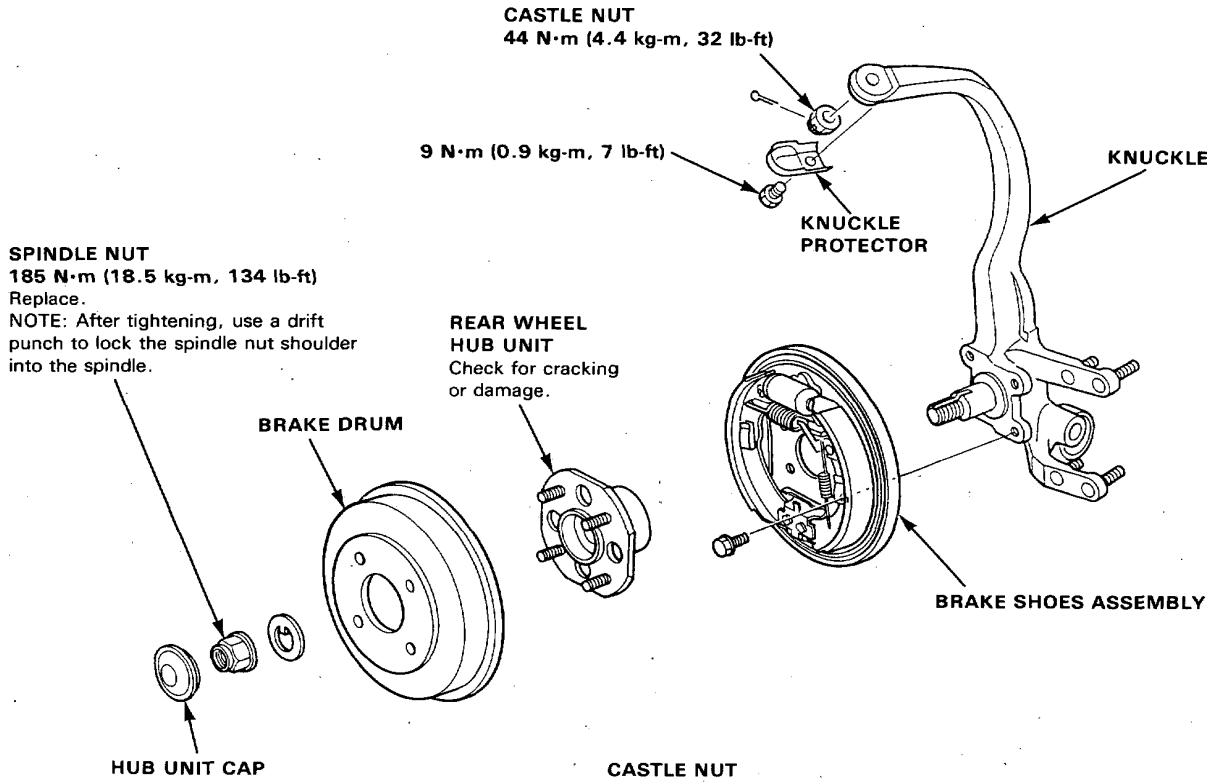
CAUTION:
- **Replace the self-locking nuts after removal.**
- **Replace the self-locking bolts if you can easily thread a non-self-locking nut past their nylon locking inserts. (If should require 1 N·m (0.1 kg-m, 0.7 lb-ft) of torque to turn the test nut on the bolt).**

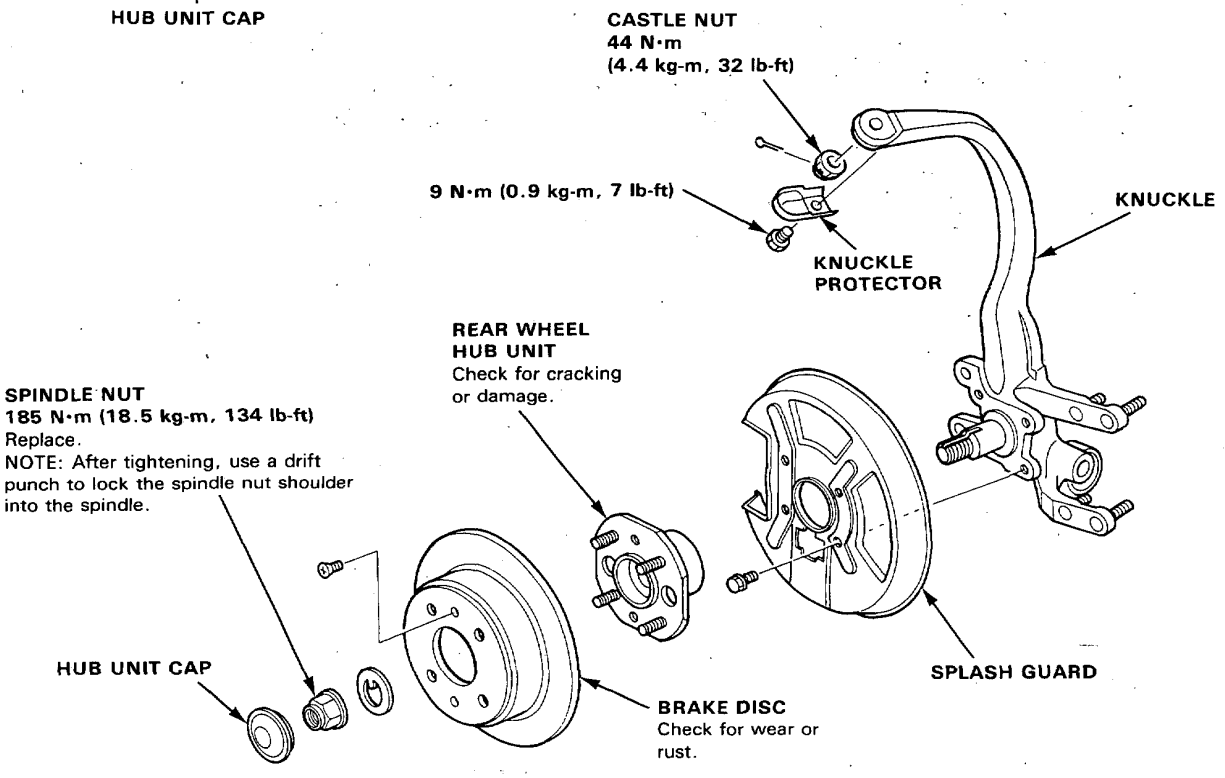
The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

NOTE: Wipe off the grease before tightening the nut at the ball joint.



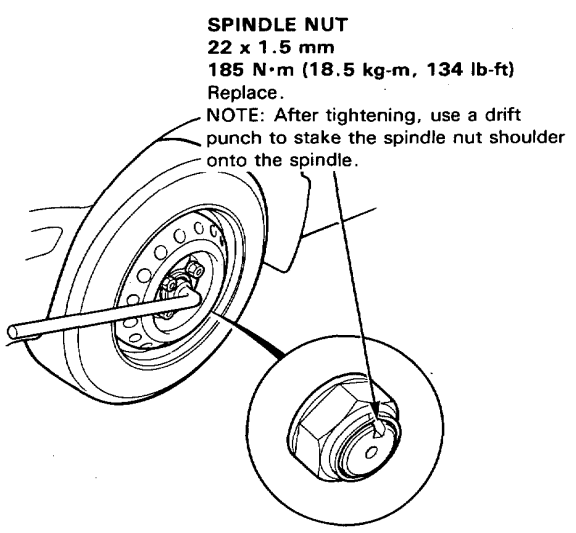

CASTLE NUT
44 N·m (4.4 kg-m, 32 lb-ft)
KNUCKLE
10 N·m (1.0 kg-m, 7 lb-ft)
45 N·m (4.5 kg-m, 33 lb-ft)
SPINDLE
Check for cracking or damage.
SPLASH GUARD
BALL JOINT
Replacement, page 12-35
REAR WHEEL HUB UNIT
Check for cracking or damage.
CASTLE NUT
55 N·m (5.5 kg-m, 40 lb-ft)
BRAKE DISC
Check for wear or rust.
SPINDLE NUT
185 N·m (18.5 kg-m, 134 lb-ft)
Replace.
NOTE: After tightening, use a drift punch to lock the spindle nut shoulder into the spindle.
HUB UNIT CAP
WHEEL NUT
12 x 1.5 mm
108 N·m (11 kg-m, 80 lb-ft)


CASTLE NUT
44 N·m (4.4 kg-m, 32 lb-ft)
9 N·m (0.9 kg-m, 7 lb-ft)
KNUCKLE
KNUCKLE PROTECTOR
SPINDLE NUT
185 N·m (18.5 kg-m, 134 lb-ft)
Replace.
NOTE: After tightening, use a drift punch to lock the spindle nut shoulder into the spindle.
REAR WHEEL HUB UNIT
Check for cracking or damage.
BRAKE DRUM
BRAKE SHOES ASSEMBLY
HUB UNIT CAP


CASTLE NUT
44 N·m
(4.4 kg-m, 32 lb-ft)
9 N·m (0.9 kg-m, 7 lb-ft)
KNUCKLE
KNUCKLE PROTECTOR
REAR WHEEL HUB UNIT
Check for cracking or damage.
SPINDLE NUT
185 N·m (18.5 kg-m, 134 lb-ft)
Replace.
NOTE: After tightening, use a drift punch to lock the spindle nut shoulder into the spindle.
HUB UNIT CAP
BRAKE DISC
Check for wear or rust.
SPLASH GUARD

Knuckle/Hub Replacement-4WS

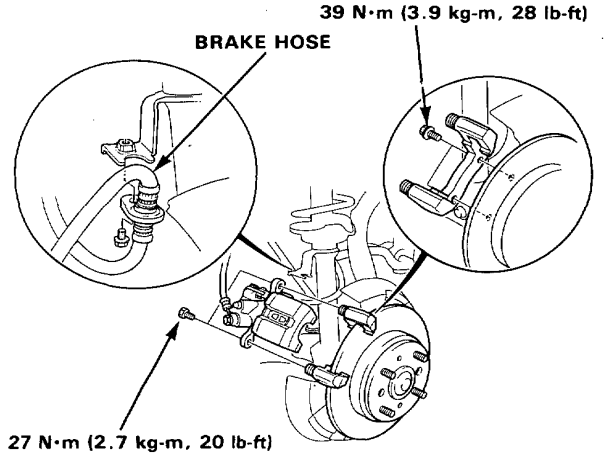
1. Pry the spindle nut stake away from the spindle, then loosen the nut.



2. Loosen the wheel nuts slightly.
3. Raise the front of car and support on safety stands in proper locations.
4. Remove the wheel nuts, wheel, and spindle nut.
5. Remove the caliper bolts and hang the caliper assembly to one side.

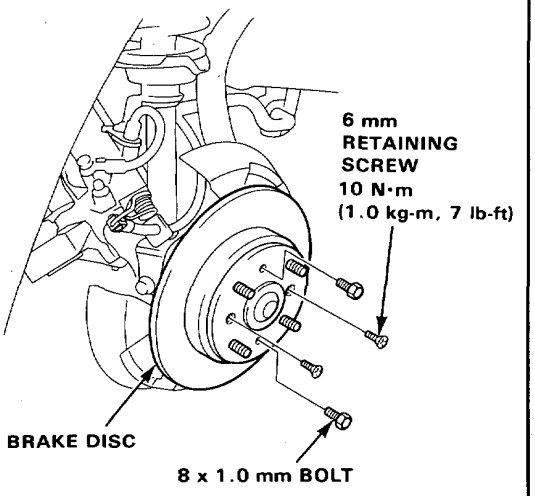
   CAUTION: To prevent accidental damage to the caliper assembly or brake hose, use a short piece of wire to hang the caliper assembly from the undercarriage.

6. Remove the caliper mounting bracket.

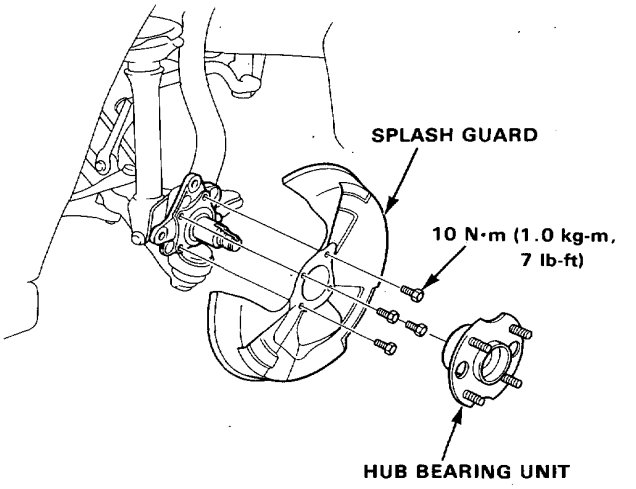


7. Remove the 6 mm brake disc retaining screws.
8. Screw two 8 x 1.0 mm bolts into the disc to push it away from the hub.

   NOTE: Turn each bolt two turns at a time to prevent cocking disc excessively.



9. Remove the hub bearing unit.
10. Remove the splash guard screws from the knuckle.

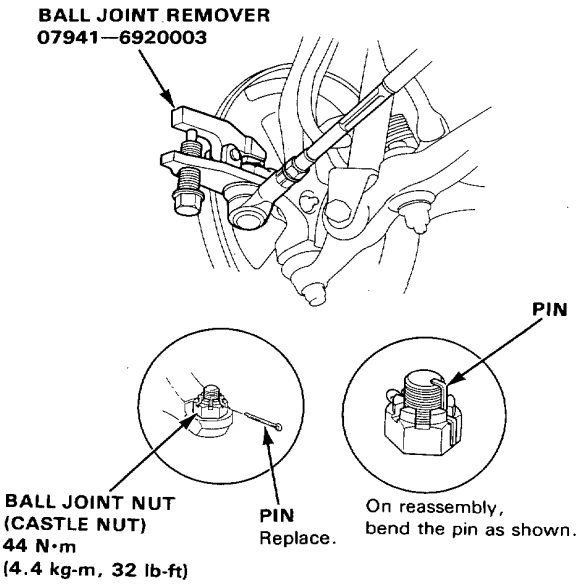


(cont'd)

Knuckle/Hub Replacement-4WS (cont'd)

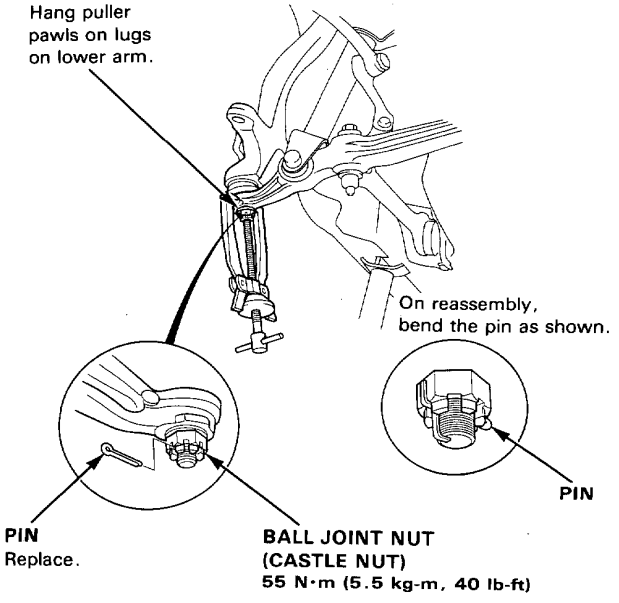
11. Remove the cotter pin from the tie-rod end and remove the castle nut.
12. Break loose the tie-rod ball joint using the special tool, then lift the tie-rod out of the knuckle.

CAUTION: Avoid damaging the ball joint boot.



13. Pry the cotter pin off and loosen the lower arm ball joint nut half the length of the joint threads.
14. Separate the ball joint and lower arm using a puller with the pawls applied to the lower arm.

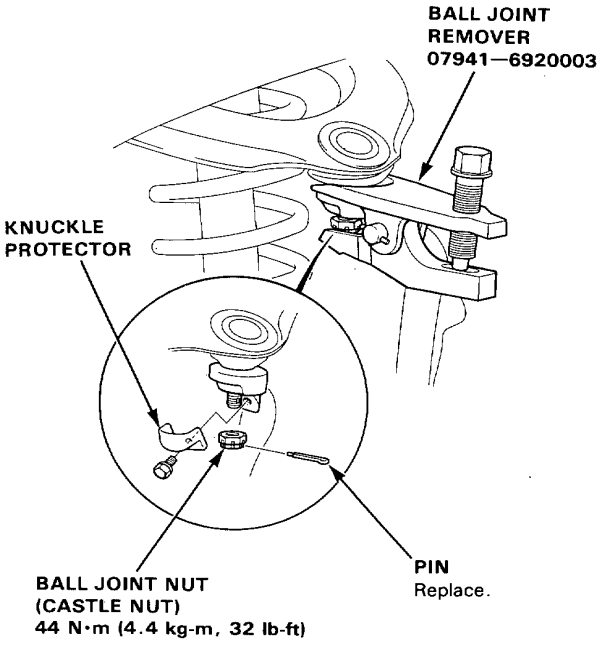
CAUTION: Avoid damaging the ball joint boot.



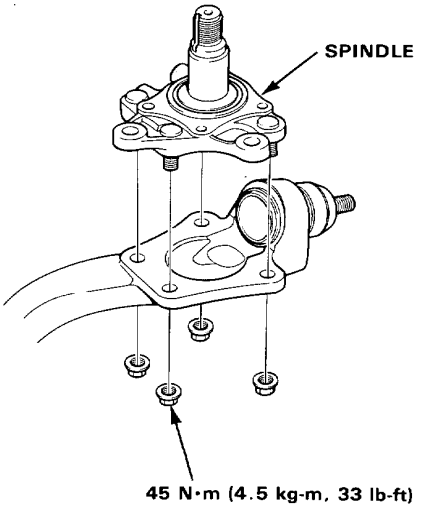
15. Remove the cotter pin and the upper ball joint nut.
16. Break loose the upper ball joint using the special tool, then remove the knuckle.

NOTE: If necessary, apply penetrating type lubricant to loosen the ball joint.

CAUTION: Avoid damaging the ball joint boot.



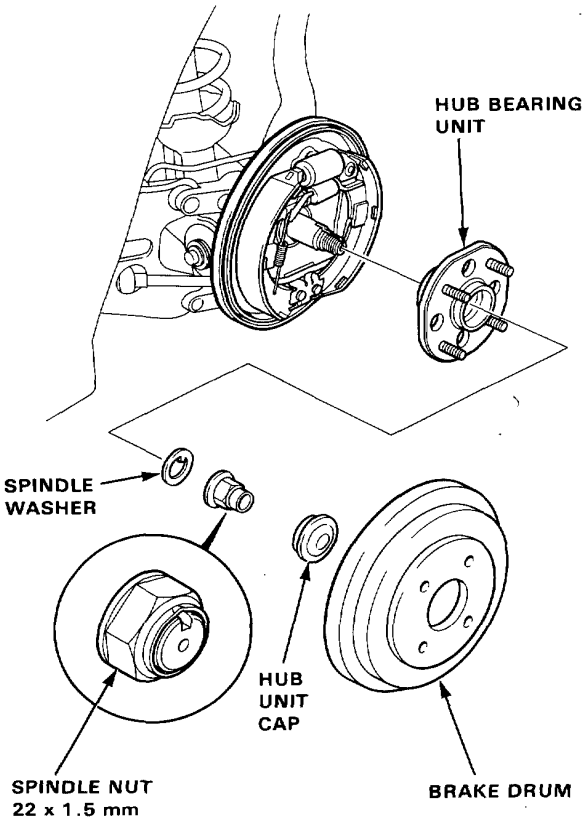
17. Remove the spindle from the knuckle.



18. Install in the reverse order of removal. Tighten the new spindle nut to specified torque, then stake the nut.

Hub Bearing Unit Replacement -2WS

1. Raise the rear of car and support it with safety stands in proper locations.
2. Remove the rear wheel.
3. Remove the brake drum.
   Rear Disc Brake:
   — Remove the rear brake caliper and brake disc.
4. Remove the hub unit cap, then pry the spindle nut lock tab away from the spindle and loosen the nut.
5. Remove the hub bearing unit.



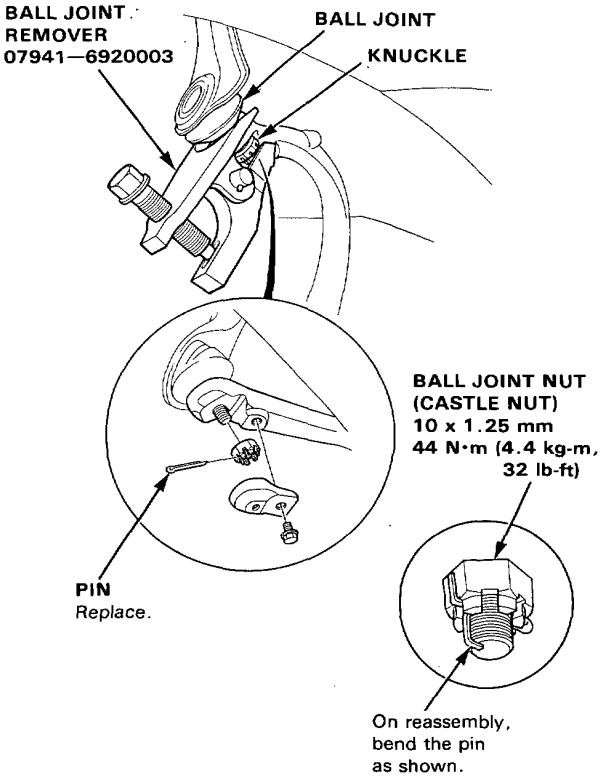
6. Install in the reverse order of removal. Tighten the new spindle nut to specified torque, then stake the nut.

Upper Arm Ball Joint Removal -2WS

1. Remove the cotter pin and loosen the upper ball joint nut half the length of the joint threads.

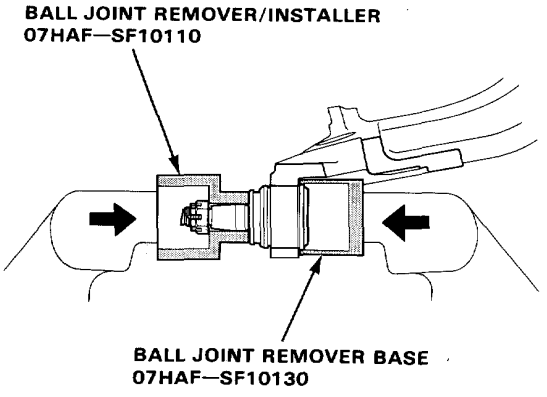
2. Position the special tool between the knuckle and upper arm as shown, and remove the knuckle from the upper arm.

   CAUTION: Avoid damaging the ball joint boot.

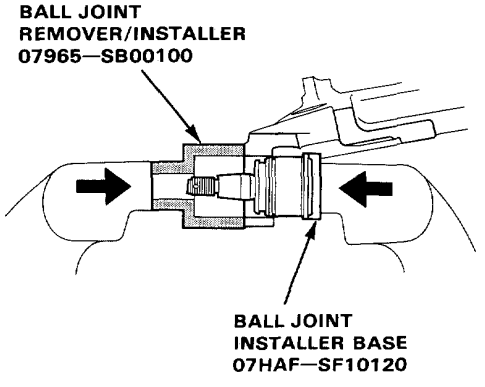


Lower Ball Joint Replacement -4WS

1. Remove the knuckle (page 12-31).
2. Remove the boot by prying the snap ring off.
3. Remove the 40 mm circlip.
4. Install the Ball Joint Remover/Installer on the ball joint and tighten the ball joint nut.
5. Position the Ball Joint Remover Base over the ball joint as shown below, then place the assembly in a vise. Press the ball joint out of the knuckle.

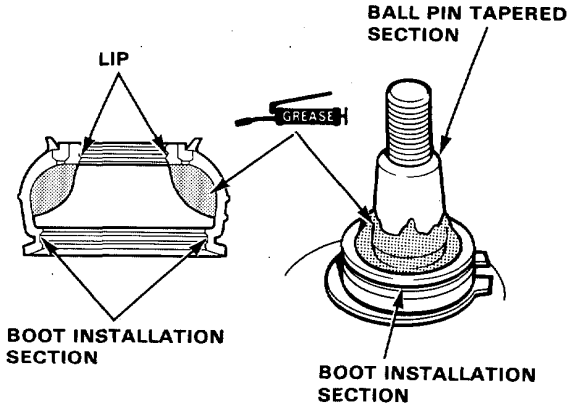


6. Place the new ball joint in position by hand.
7. Install the Ball Joint Installer Base over the ball joint as shown below, then press in the ball joint.

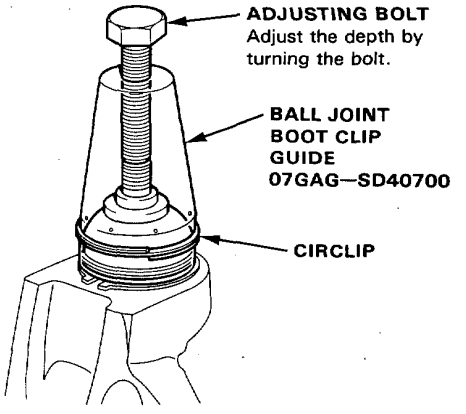


Lower Ball Joint Boot Replacement-4WS

1. Remove the circlip and the boot.
   CAUTION: Do not contaminate the boot installation section with grease.
2. Pack the interior of the boot and lip with grease.



3. Wipe the grease off the sliding surface of the ball pin and pack with fresh grease.
   CAUTION:
   - **Keep grease off the boot installation section and the tapered section of the ball pin.**
   - **Do not allow dust, dirt, or other foreign materials to enter the boot.**
4. Install the boot in the groove of the boot installation section securely, then bleed air.
5. Adjust the special tool with the adjusting bolt until the end of the tool aligns with the groove on the boot. Slide the clip over the tool and into position.



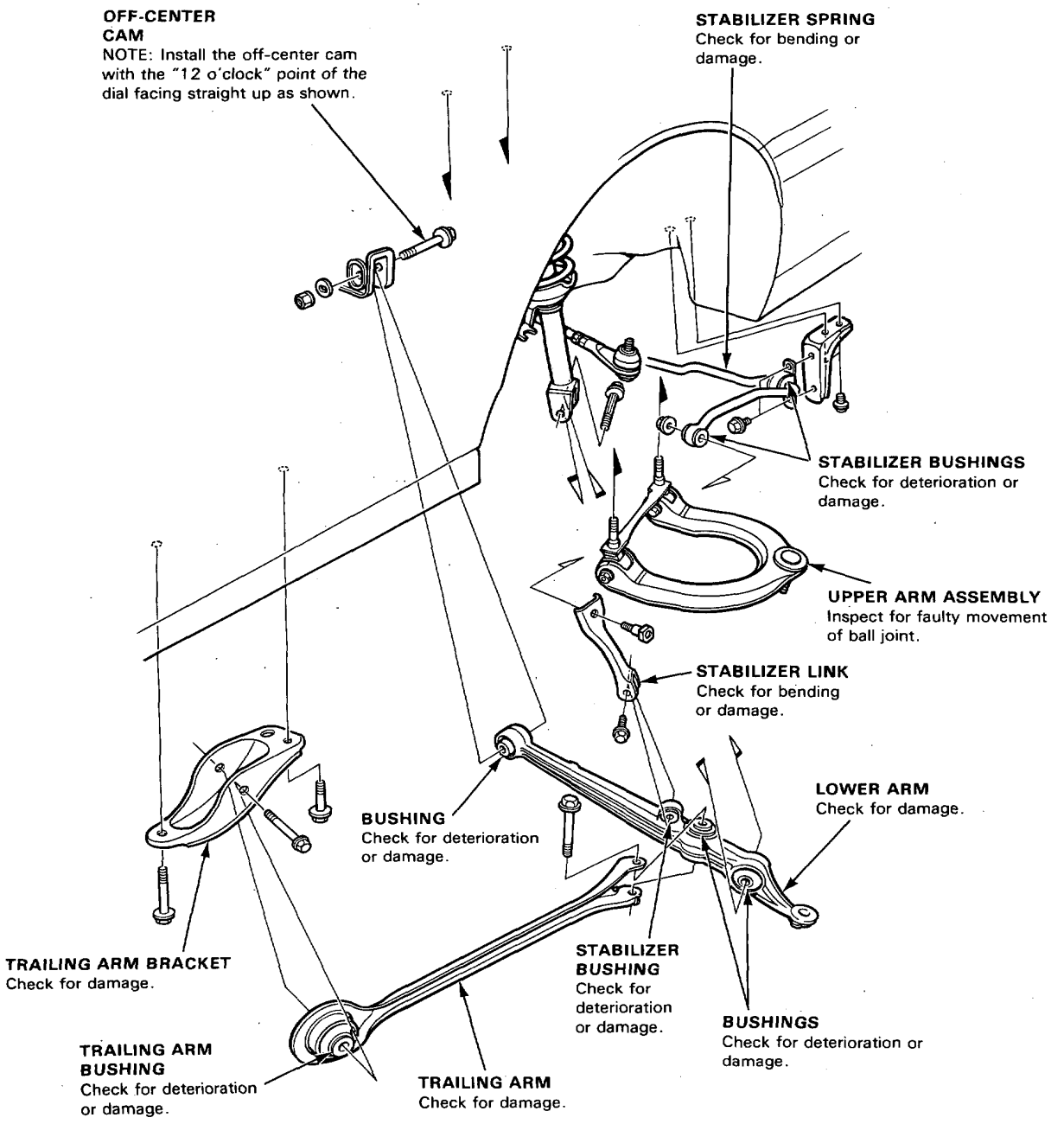
CAUTION: After installing the boot, check the ball pin tapered section for grease contamination and wipe it if necessary.

Index/Inspection-4WS

Overall Suspension

NOTE:

- Use only genuine Honda aluminum wheel weights. Non-genuine aluminum wheel weights may corrode and damage aluminum wheel.
- Remove the center cap by prying it out with a flat screwdriver. Avoid damage to the cap by not allowing it to fall during removal.
- Torque specifications, see page 12-27.



Upper Arm/Stabilizer/Trailing Arm/Lower Arm

Index/Inspection-2WS

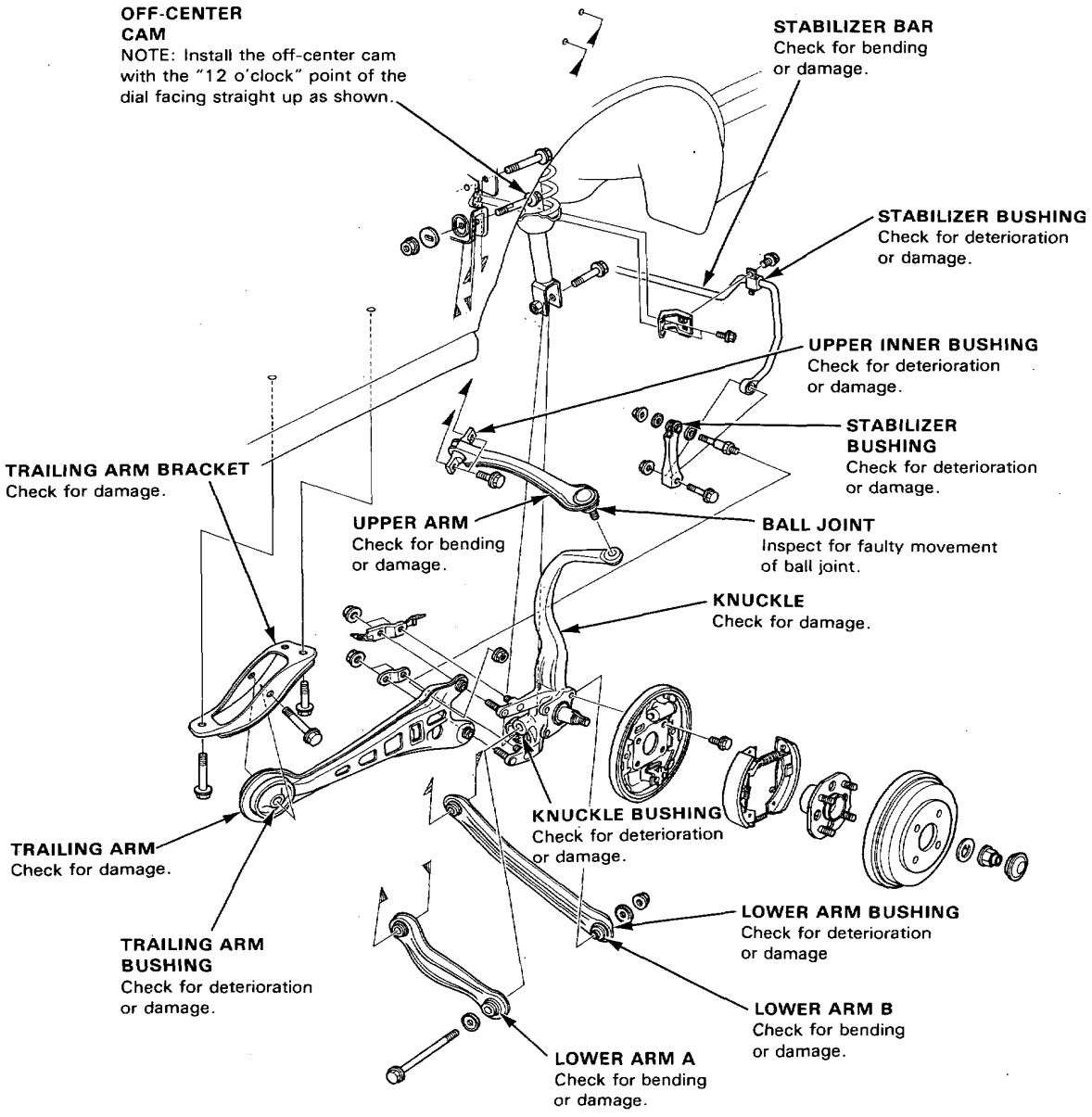
Overall Suspension

NOTE:

- Use only genuine Honda aluminum wheel weights. Non-genuine aluminum wheel weights may corrode and damage aluminum wheel.
- Remove the center cap by prying it out with a flat screwdriver. Avoid damage to the cap by not allowing it to fall during removal.
- Torque specifications, see page 12-28.

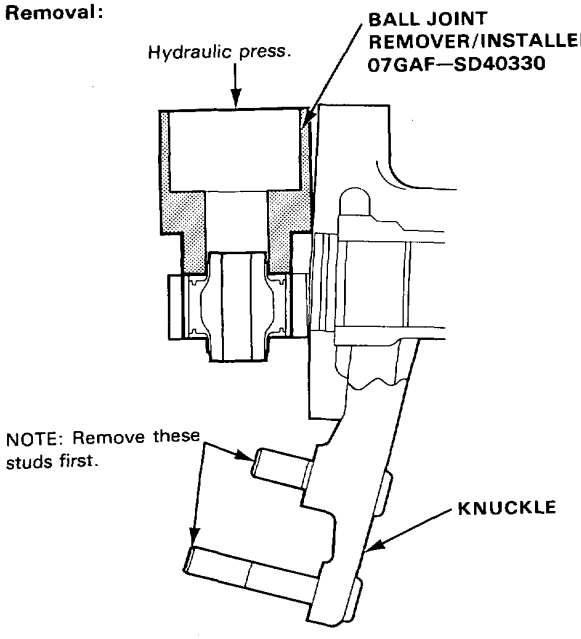
CAUTION:

- ***Use a rag at the point you are going to pry, because aluminum alloy wheels can be easily damaged.***
- **Lower arms A and B are interchangeable from side to side. Make sure their left and right side marks (⇧L. UP, ⇧R. UP) are facing up for assembly.**

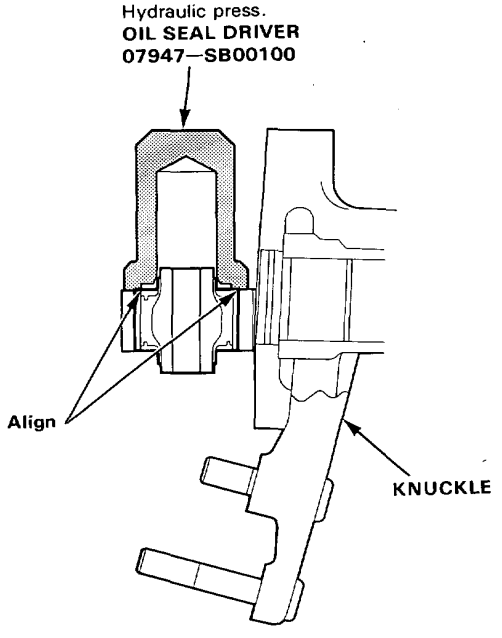


Bushing Replacement

Knuckle Bushing
Removal:

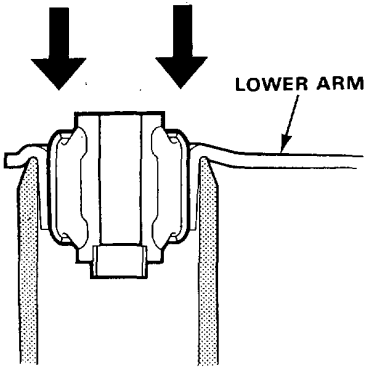


Installation:

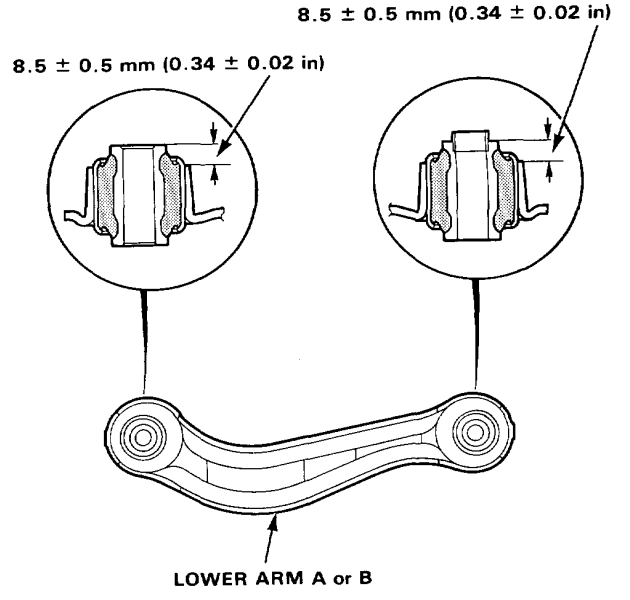


Lower Arm Bushings
(Lower Arm A/Lower Arm B)
Install the bushings so that 8.5 ± 0.5 mm (0.34 ± 0.02 in) protrudes from the lower arm A or B as shown.

Removal:

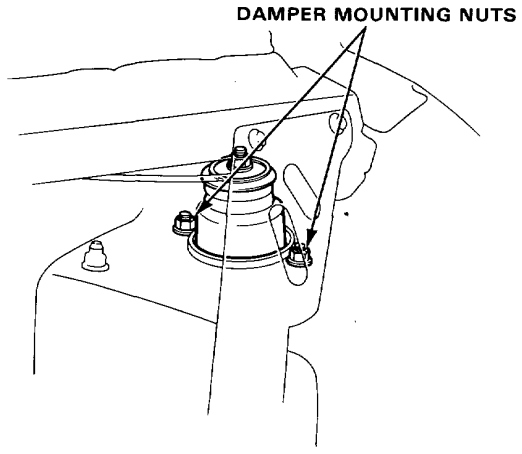


Installation:

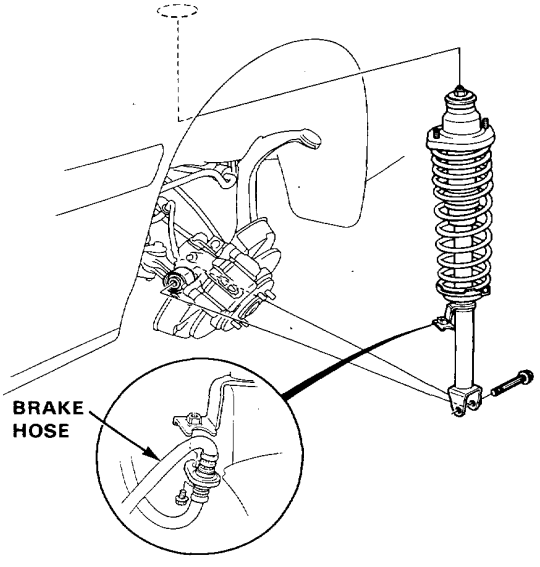


Damper Removal

1. Jack up the rear of car and support on safety stands in proper locations.
2. Remove the rear wheel.
3. Remove the trunk side garnish.
4. Remove the damper mounting nuts.



5. Break loose the upper ball joint (4WS: page 12-32, 2WS: page 12-33).
6. Remove the bolt fixing the brake hose to the damper assembly.
7. Remove the damper mounting bolt.
8. Depress the entire suspension, then remove the damper assembly.



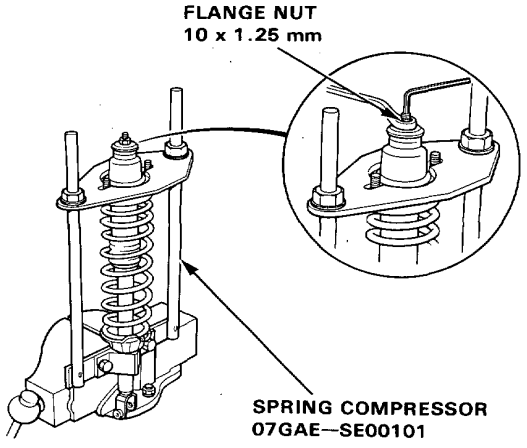
Damper Disassembly/Inspection

Disassembly:

1. Compress the damper spring with the spring compressor according to the manufacturer's instructions.

   CAUTION: Do not compress the spring more than necessary to remove the 10 mm flange nut.

2. Remove the 10 mm flange nut from the damper assembly.

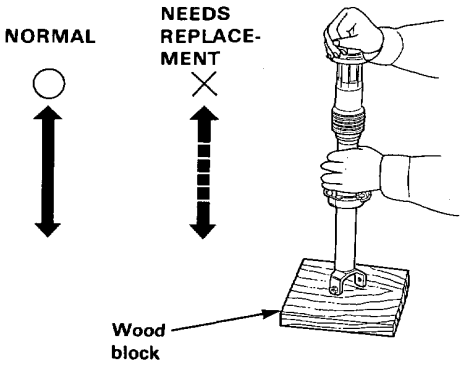


3. Remove the spring compressor and disassemble the damper as shown on page 12-40.

Inspection:

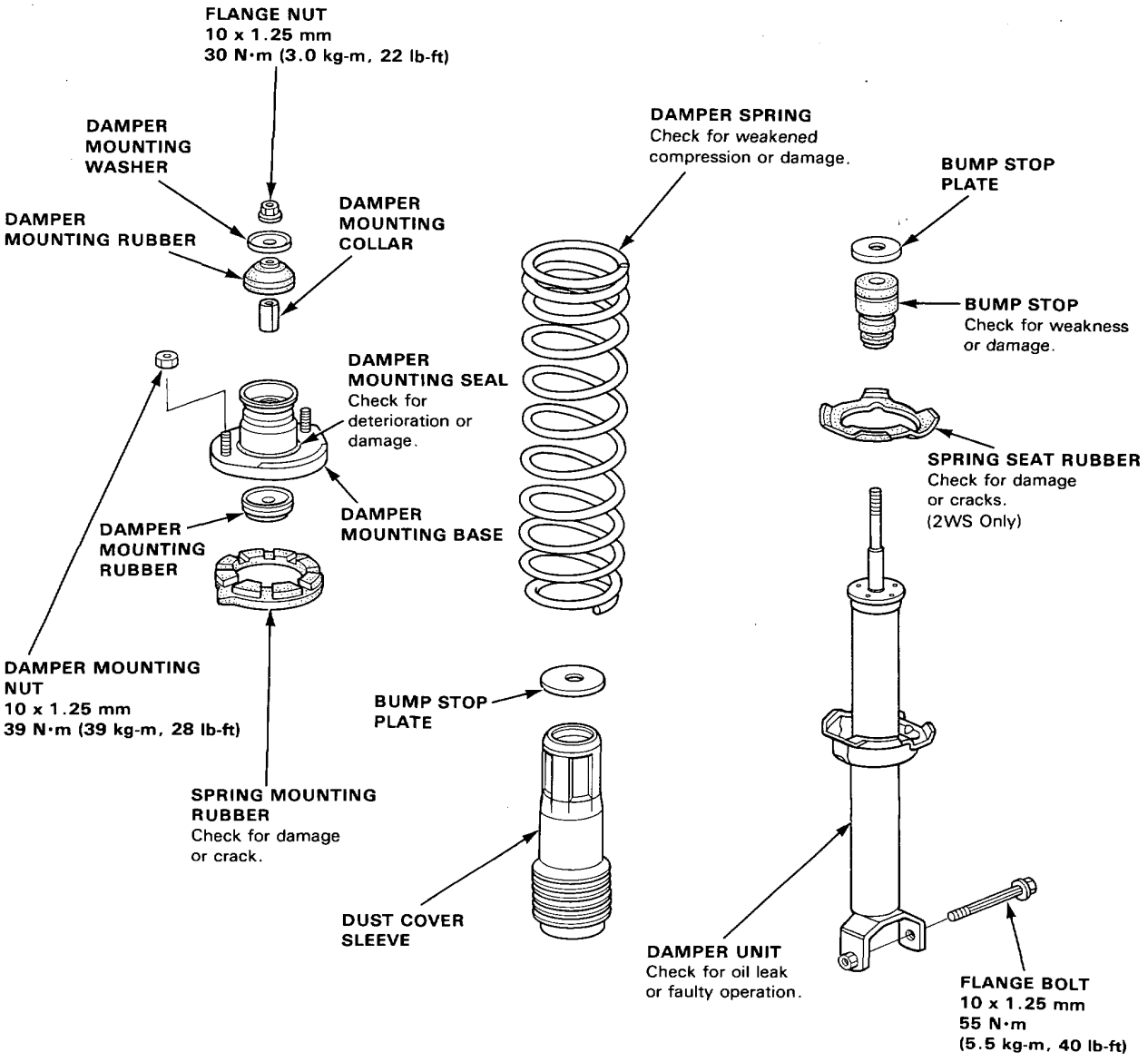
1. Reassemble all parts, except the spring.
2. Push on the damper assembly as shown.
3. Check for smooth operation through a full stroke, both compression and extension.

   NOTE: The damper should move smoothly.
   If it does not (no compression or no extension), then gas is leaking, and the damper should be replaced.



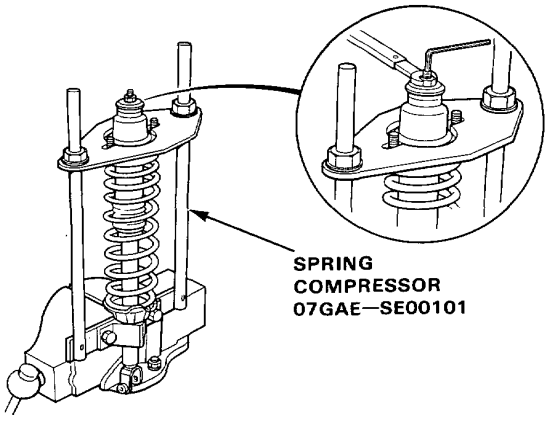
4. Check for oil leaks, abnormal noises or binding during these tests.

Inspection

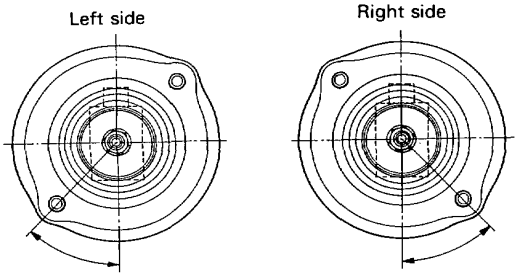

FLANGE NUT
10 x 1.25 mm
30 N·m (3.0 kg-m, 22 lb-ft)
DAMPER MOUNTING WASHER
DAMPER MOUNTING RUBBER
DAMPER MOUNTING COLLAR
DAMPER SPRING
Check for weakened compression or damage.
BUMP STOP PLATE
BUMP STOP
Check for weakness or damage.
DAMPER MOUNTING SEAL
Check for deterioration or damage.
SPRING SEAT RUBBER
Check for damage or cracks.
(2WS Only)
DAMPER MOUNTING BASE
DAMPER MOUNTING RUBBER
DAMPER MOUNTING NUT
10 x 1.25 mm
39 N·m (39 kg-m, 28 lb-ft)
BUMP STOP PLATE
SPRING MOUNTING RUBBER
Check for damage or crack.
DUST COVER SLEEVE
DAMPER UNIT
Check for oil leak or faulty operation.
FLANGE BOLT
10 x 1.25 mm
55 N·m
(5.5 kg-m, 40 lb-ft)

Reassembly

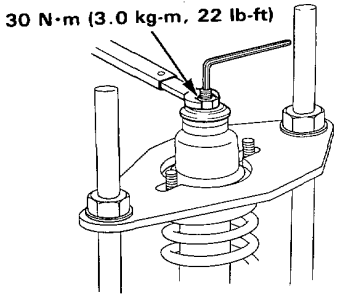
1. Install the damper unit on a spring compressor.
2. Install the spring seat rubber, bump stop, bump stop plate, dust cover sleeve, damper spring, bump stop plate, damper mounting collar, damper mounting rubber, spring mounting rubber and damper mounting base on the damper unit.
3. Compress the damper spring.



CAUTION: Install the damper mounting base so that the angle of the stud bolts is as shown.

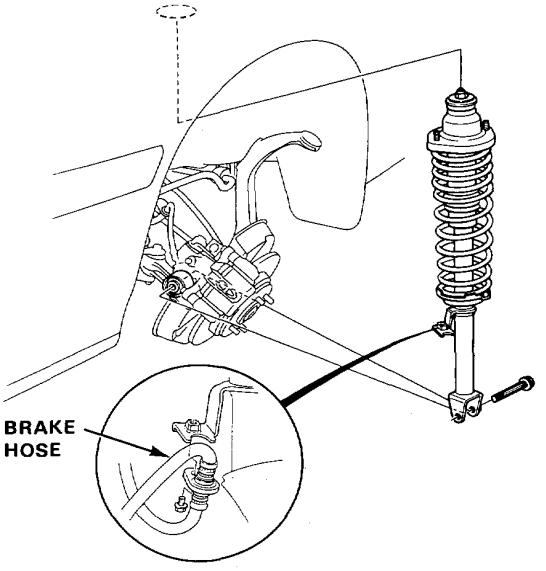


4. Install the damper mounting rubber and damper mounting washer, and loosely install a new 10 mm self-locking nut.
5. Hold the damper shaft and tighten the 10 mm flange nut.

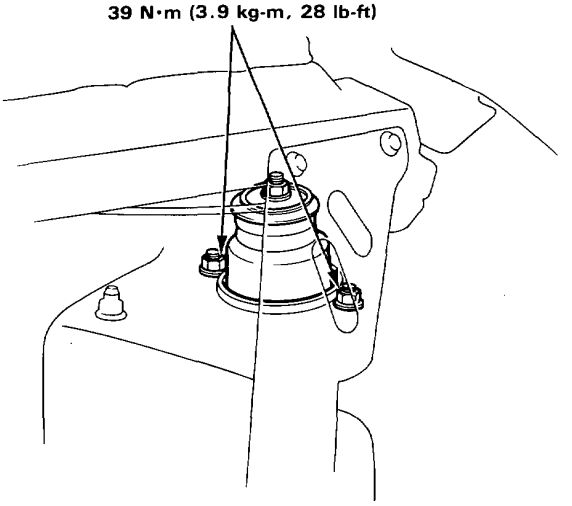


Installation

1. Lower the rear suspension and set the damper assembly in its original position.



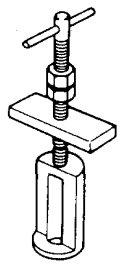
2. Loosely install the damper mounting bolts.
3. Raise the rear suspension with a floor jack until the weight of the car is on the damper.
4. Reconnect the upper arm to the knuckle, tighten the ball joint nut to the specified torque, and install the new cotter pin.
5. Loosely install the damper mounting nuts.
   NOTE: The bolts and nuts should be tightened with the damper under vehicle load.

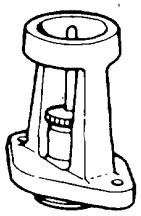


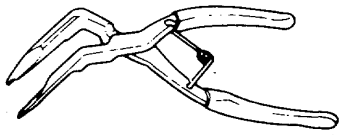
(cont'd)

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07HAE—SG00100	Brake Spring Compressor	1	13-25, 13-26, 13-27, 13-28, 13-29
②	07GAG—SE00100	Push rod Adjustment Gauge	1	13-17, 13-18
③	07914—SA50000	Snap Ring Pliers	1	13-26, 13-29
④	07973—SA50000	Rear Caliper Guide	1	13-25, 13-28
⑤	07921—0010001	Flare nut wrench	1	13-38
⑥	07LAF—SM40200	Brake spring installer	1	13-33, 13-35
⑦	07410—5790100	Pressure Gauge Attachment	2	13-16
⑧	07510—6340100	Pressure Gauge Joint Pipe	1	13-16
⑨	07HAK—SG00110	Pressure Gauge Joint Pipe	1	13-16
⑩	07510—6340300	Vacuum Joint Tube A	1	13-16
⑪	07404—5790300	Pressure Gauge Attachment	2	13-16
⑫	07410—5790500	Tube Joint Adaptor	1	13-16
⑬	07406—5790200	Pressure Gauges	2	13-16

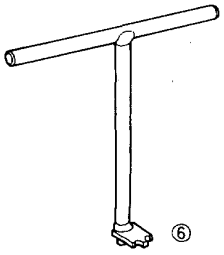

①

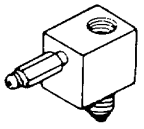

②

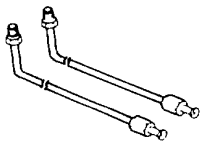

③

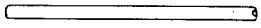

④

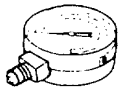

⑤

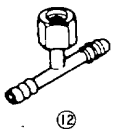

⑥

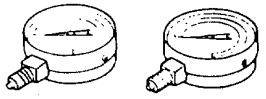

⑦


⑧ ⑨


⑩


⑪


⑫


⑬

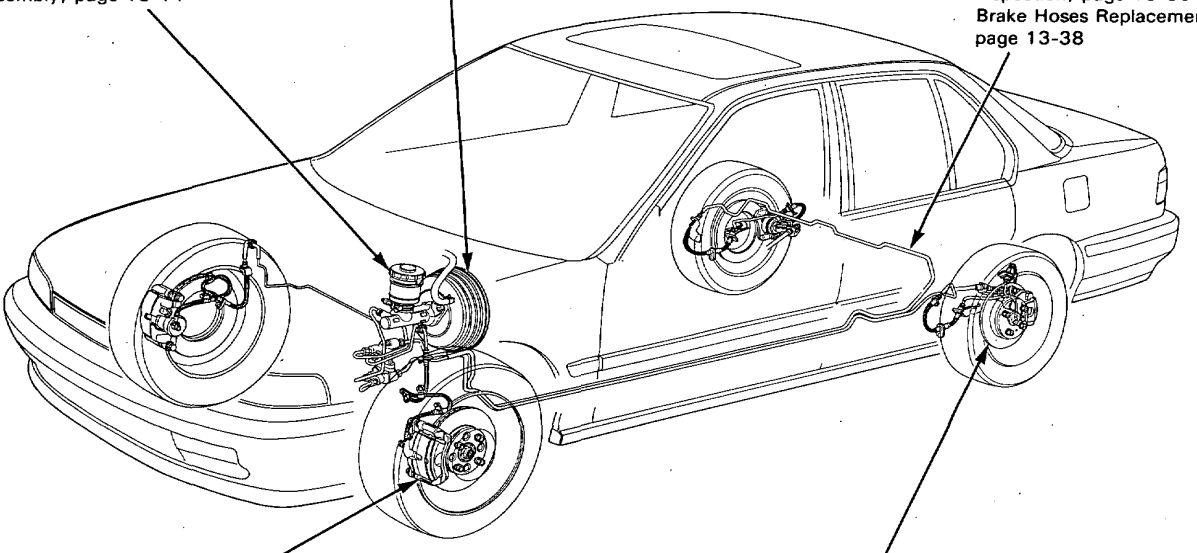
Illustrated Index

BRAKE BOOSTER
Do not disassemble
Testing, page 13-16
Pushrod Adjustment, page 13-17
Pushrod Clearance Adjustment, page 13-17

BRAKE PEDAL
Pedal Height Adjustment, page 13-4
Brake Light Switch Adjustment, page 13-4

MASTER CYLINDER
Index, page 13-11
Overhaul/Inspection, page 13-12
Disassembly, page 13-13
Reassembly, page 13-14

BRAKE HOSES/PIPES
Inspection, page 13-36
Brake Hoses Replacement, page 13-38



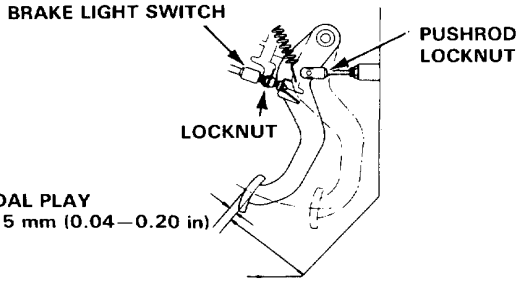
FRONT BRAKES
Inspection, page 13-5
Brake Pad Inspection/Replacement, page 13-6
Brake Caliper Disassembly/
Reassembly, page 13-7
Brake Disc Inspection, page 13-9
Bleeding, page 13-10

REAR BRAKE
DISC BRAKES
Inspection, page 13-19
Brake Pad Inspection/Replacement, page 13-21
Brake Caliper Disassembly, page 13-24
Brake Caliper Reassembly, page 13-27
BRAKE SHOES
Index and Inspection, page 13-31
Inspection, page 13-32
Disassembly, page 13-33
Reassembly, page 13-34
PARKING BRAKE
Adjustment, page 13-4
Disassembly and Reassembly, page 13-39

Pedal Height

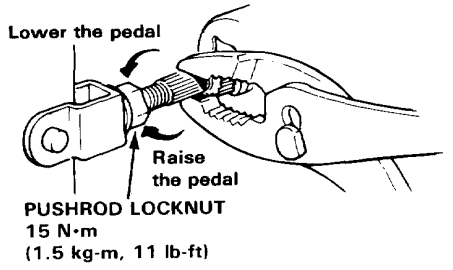
Adjustment

1. Loosen the brake light switch locknut and back off the brake light switch until it is no longer touching the brake pedal.



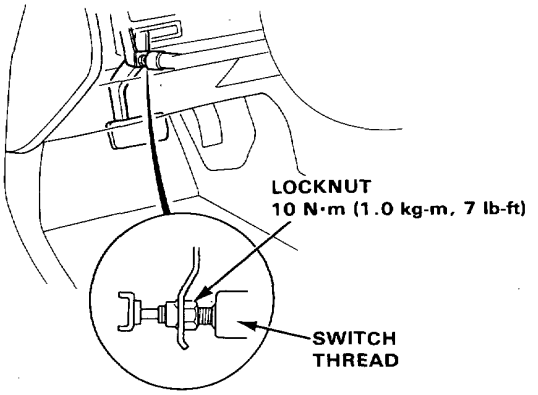
PEDAL HEIGHT:
MANUAL TRANSMISSION: 190 mm (7.5 in.)
AUTOMATIC TRANSMISSION: 195 mm (7.7 in.)
Measure without floormat.

2. Loosen the pushrod locknut and screw the pushrod in or out with pliers until the pedal height from the floor is properly adjusted. After adjustment, tighten the locknut firmly.



3. Screw in the brake light switch until its plunger is fully depressed (threaded end touching pad on pedal arm). Then back off switch 1/2 turn and tighten locknut firmly.

CAUTION: Check that the brake lights go off when the pedal is released.



NOTE: After adjusting the pedal height, check for cruise control operation.

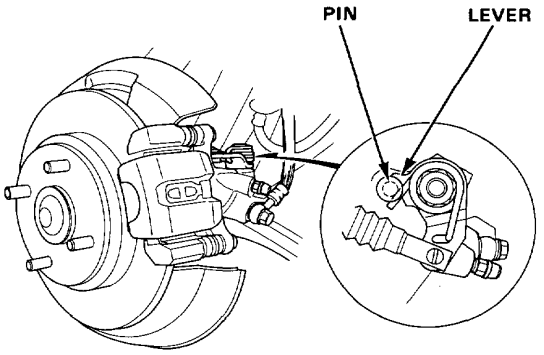
Parking Brake

Adjustment

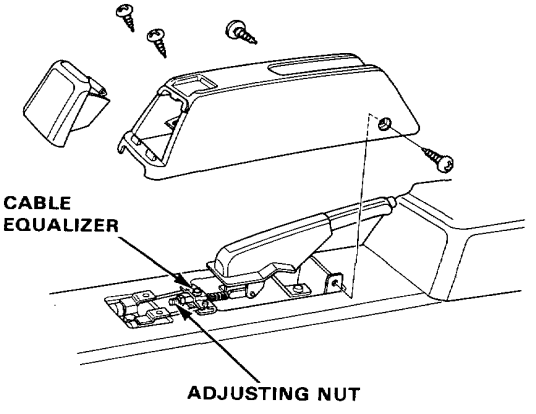
NOTE: After rear brake caliper servicing, loosen the parking brake adjusting nut, start the engine and depress the brake pedal several times to set the self-adjusting brakes before adjusting the brake pedal.

⚠WARNING Block the front wheels before jacking up the rear of the car.

1. *Raise the rear wheels off the ground.*
2. Make sure the lever of the rear brake caliper contacts the brake caliper pin.



3. Pull the parking brake lever up one notch.
4. Tighten the adjusting nut until the rear wheels drag slightly when turned.
5. Release the parking lever and check that the rear wheels do not drag when turned. Readjust if necessary.
6. With the equalizer properly adjusted, the rear brakes should be fully applied when the parking brake lever is pulled up 4 to 8 clicks.



Inspection

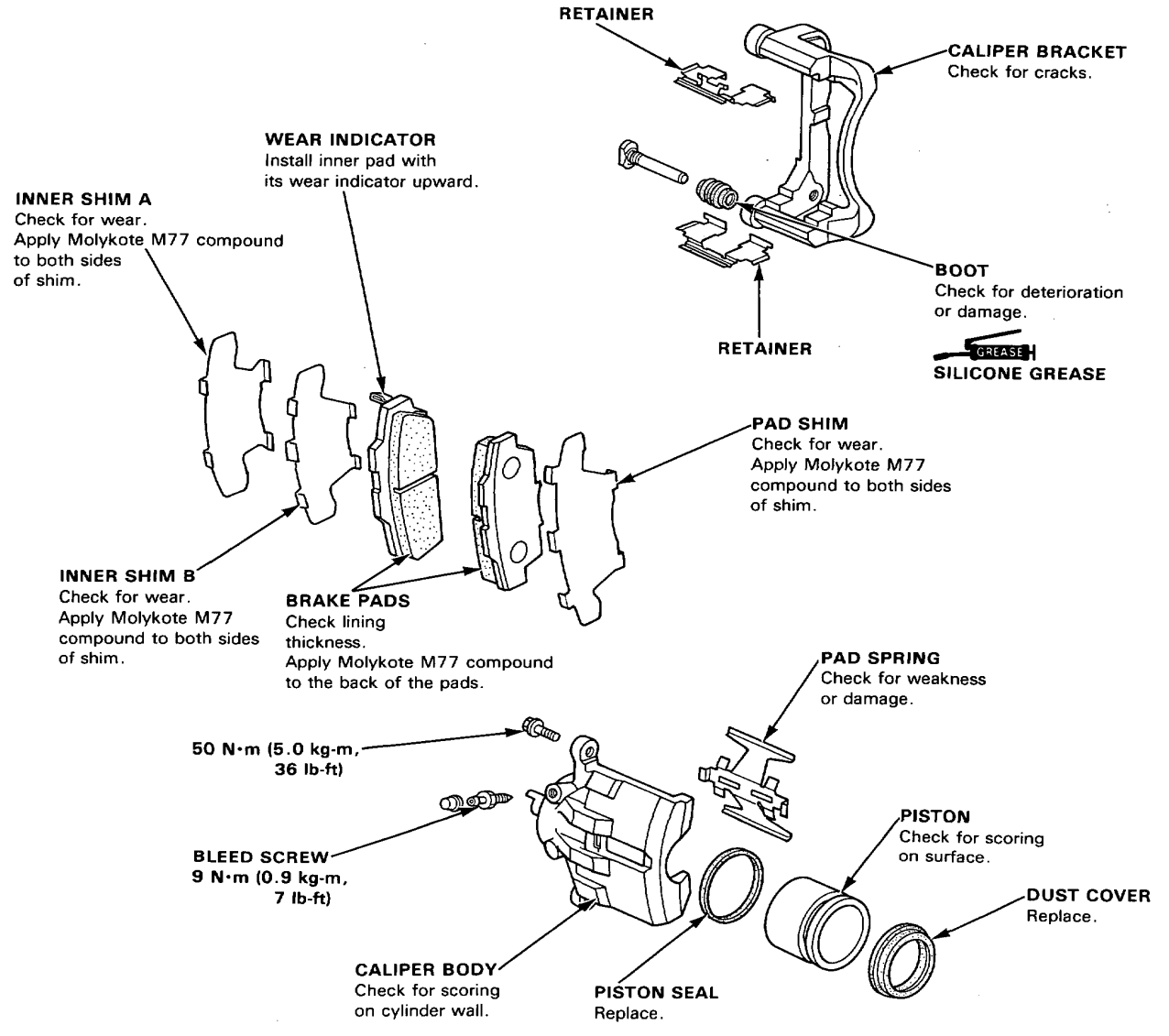
⚠WARNING **Do not use an air hose to blow the brake assembly clean. Use an OSHA-approved vacuum cleaner, to avoid breathing brake dust.**

CAUTION:

- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **To prevent spills, cover the hose joints with rags or shop towels.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the drained fluid.**

NOTE:

- Coat piston, piston seal and caliper bore with clean brake fluid.
- Use only DOT 3 or DOT 4 brake fluid.



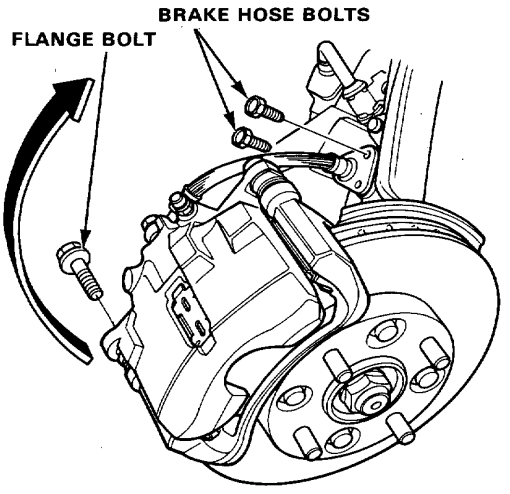
Brake Pad

Inspection/Replacement

⚠WARNING

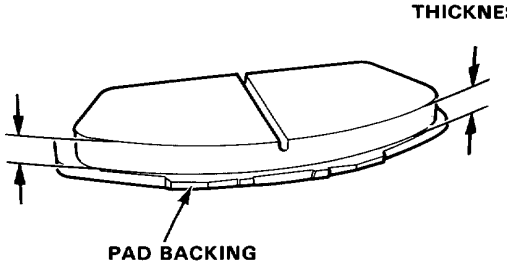
- **Do not use an air hose to blow the brake assembly clean. Use an OSHA-approved vacuum cleaner, to avoid breathing brake dust.**
- **Contaminated brake pads or disc reduce stopping power. Keep grease or oil off the brake pads or disc. Wipe any excess grease off the parts.**

1. Remove the front wheels and support the front of the car on safety stands.
2. Remove the caliper bolt (flange bolt) and pivot caliper up out of the way.



3. Remove the pad shims, pad retainers and pads.
4. Using vernier caliper, measure the thickness of each brake pad lining.

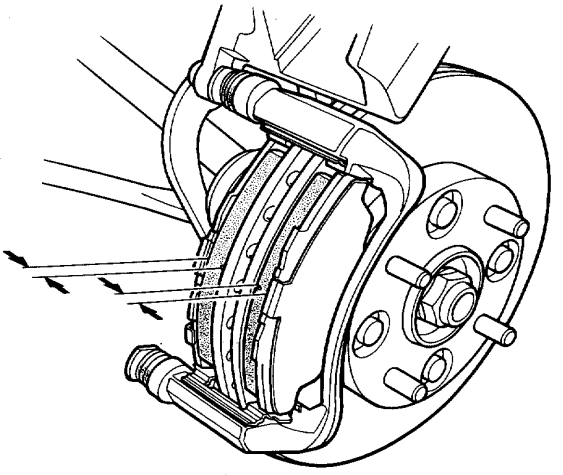
Brake Pad Thickness:
Standard: 12.5 mm (0.49 in.)
Service Limit: 1.6 mm (0.06 in.)
PGM-FI:
Standard: 12.0 mm (5.67 in.)
Service Limit: 1.6 mm (0.06 in.)



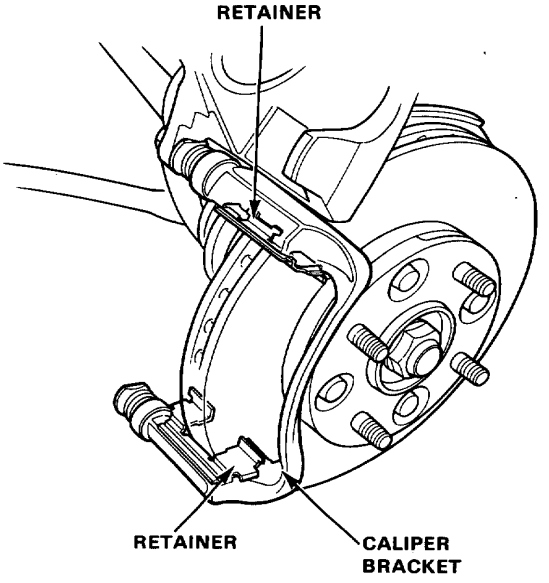
NOTE: Measurement does not include pad backing thickness.

5. If lining thickness is less than service limit, replace both pads as a set.

NOTE: Engagement of the brake may require a greater pedal stroke immediately after the brake pads have been replaced as a set. Several applications of the brake pedal will restore the normal pedal stroke.



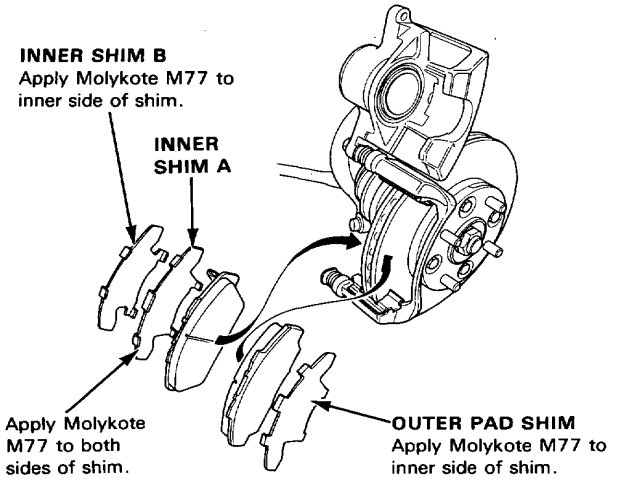
6. Clean the caliper thoroughly; remove any rust, and check for grooves or cracks.
7. Install the pad retainers.



8. Apply Molykote M77 compound to both sides of the pad shims and the back of the pads.

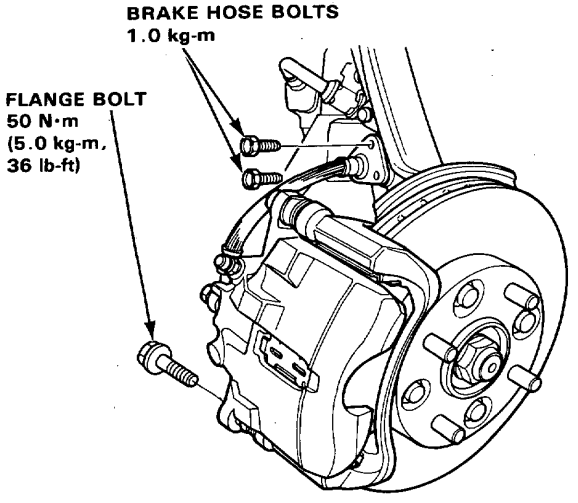
9. Install the brake pads and pad shims correctly.

   NOTE: Install the pad with the wear indicator on the inside.



10. Push in the piston so that the caliper will fit over the pads. Keep the boot in position to prevent damaging the boot when pivoting the caliper down.

11. Pivot the caliper down into position, then install the caliper bolt (flange bolt) and tighten to the specified torque.



   NOTE: Make sure the pin is clean before installation, then apply a clean silicone grease to the inside boot and pin.

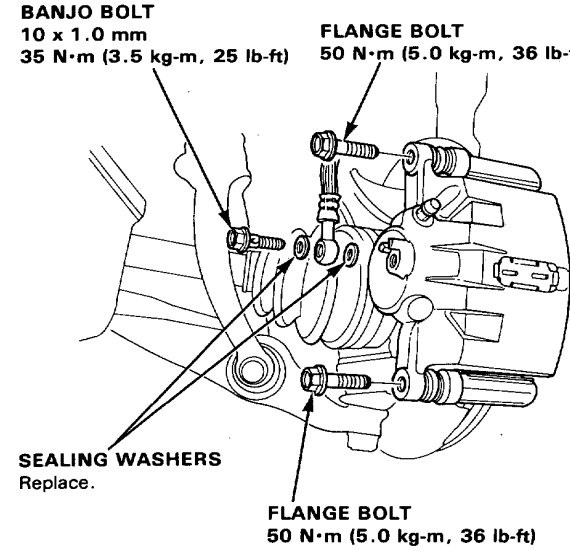
12. Depress the brake pedal several times to make sure the brakes work, then roadtest.

Disassembly/Reassembly

CAUTION:
- **Make sure all parts are clean before reassembly.**
- **Use only new replacement parts.**
- **Use only clean DOT 3 or DOT 4 brake fluid.**
- **Do not allow dirt or other foreign matter to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid.**
- **Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish; Wash spilled brake fluid off immediately with clean water.**

1. Remove the banjo bolt and disconnect the brake hose from the caliper.

2. Remove the caliper bolts, then remove the caliper.



(cont'd)

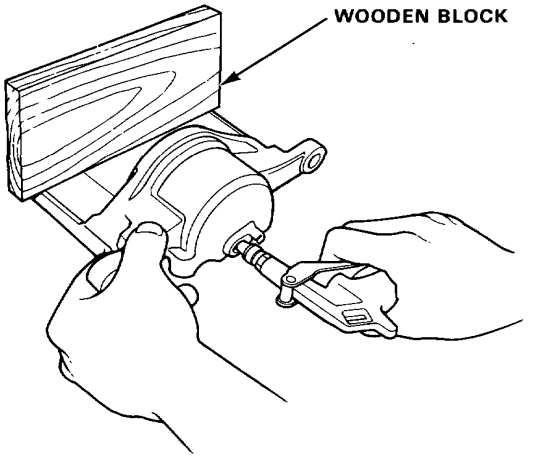
Brake Caliper

Disassembly/Reassembly (cont'd)

3. Remove the pad spring.
   Place a wooden block or shop rag in the caliper opposite the piston, then carefully remove the piston from the caliper by applying air pressure through the brake line hole.

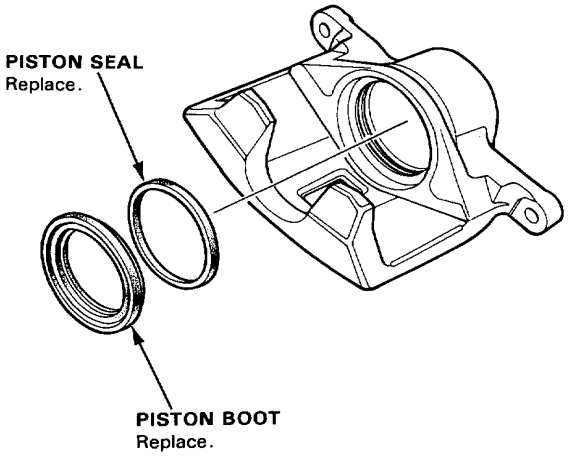
⚠WARNING

- **Do not place your fingers in front of the piston.**
- **Do not use high air pressure; use an OSHA approved 30 PSI nozzle.**



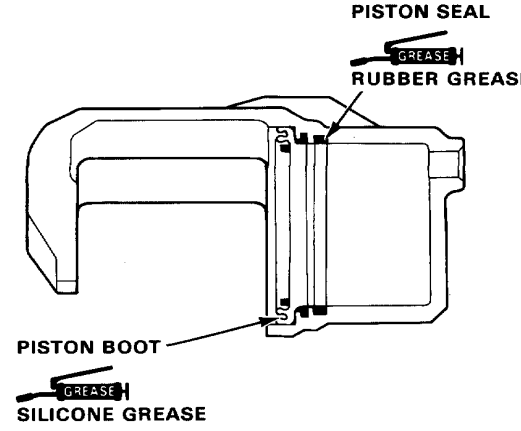
4. Remove the piston boot and piston seal.

   CAUTION: Take care not to damage the cylinder.



CAUTION:

- **Make sure all parts are clean before reassembly.**
- **Use only new replacement parts.**
- **Use only clean DOT 3 or DOT 4 brake fluid.**
- **Do not allow dirt or other foreign matter to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid.**
- **Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish.**
- **Wash spilled brake fluid off immediately with clean water.**

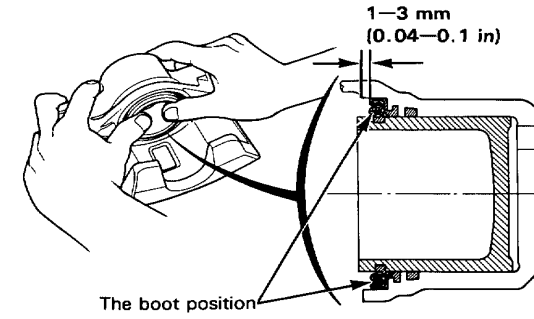


5. Clean the piston and caliper bore with brake fluid and inspect for wear or damage.

6. Apply rubber grease to a new piston seal, then install the piston seal in the cylinder groove.

7. Apply silicone grease to a new piston boot, then install the piston boot.

8. Lubricate the caliper cylinder and piston with brake fluid, then install the piston in the cylinder with the dished end facing in.



9. Reinstall the caliper in the reverse order of removal.

10. Fill the brake reservoir up and bleed the brake system (page 19-10).

Brake Disc

Run-Out Inspection

1. Remove the front wheels, and support the front of the car on safety stands.
   Install the flat washer and wheel nut.

   CAUTION: Use wheel nuts and 3 mm thick flat washers to hold the disc securely.

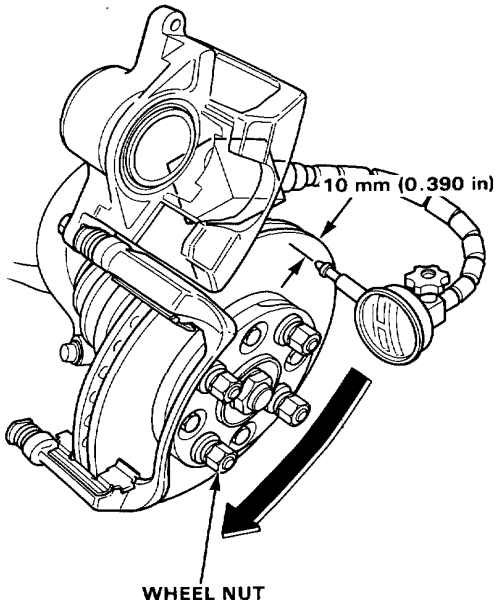
2. Remove the caliper bolt, pivot the caliper up out of the way on the caliper bolt, then remove the pads and pad retainers.

3. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.

4. Mount a dial indicator as shown and measure the runout at 10 mm (0.390 in.) in from the outer edge of the disc.

   Brake Disc Runout:
   Service Limit: 0.1 mm (0.004 in.)

5. If the disc is beyond the service limit, refinish the rotor with an on-car brake lathe. The Kwik-Lathe produced by Kwik-Way Manufacturing Co. is approved for this operation.

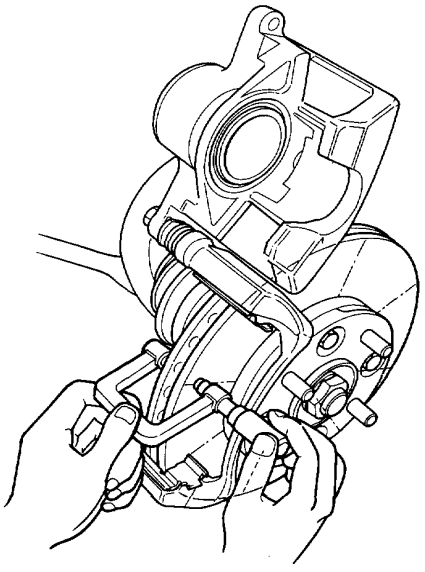


Thickness and Parallelism Inspection

1. Remove the front wheels, and support the front of the 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 (0.390 in.) in from the outer edge of the disc.



Brake Disc Thickness:
Standard: 23 mm (0.906 in.)
Max: Refinishing Limit: 21 mm (0.827 in.)

Brake Disc Parallelism:
The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in.)

4. If the disc is beyond the limits for thickness or parallelism, refinish the rotor with an on-car brake lathe. The Kwik-Lathe produced by Kwif-Way Manufacturing. Co. is approved for this operation.

   NOTE: A new disc should be ground if its run-out is greater than 0.10 mm (0.004 in.).

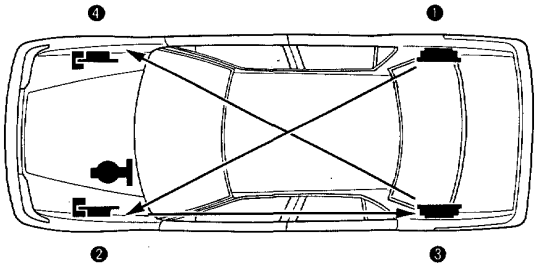
Bleeding

CAUTION

- **Make sure all parts are clean before reassembly.**
- **Use only clean DOT 3 or DOT 4 brake fluid.**
- **Do not allow dirt or other foreign matter to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid.**
- **Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish; Wash spilled brake fluid off immediately with clean water.**

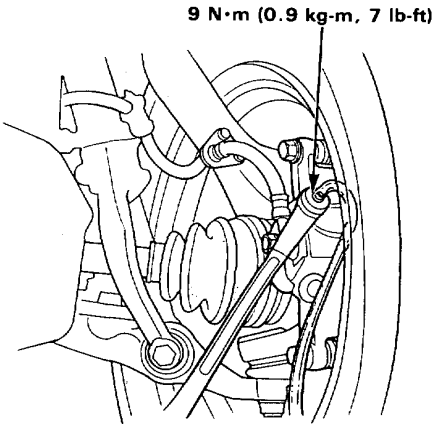
NOTE: The reservoir on the master cylinder must be full at the start of bleeding procedure, and checked after bleeding each wheel cylinder. Add fluid as required. Use only DOT 3 or 4 brake fluid.

Bleeding Sequence



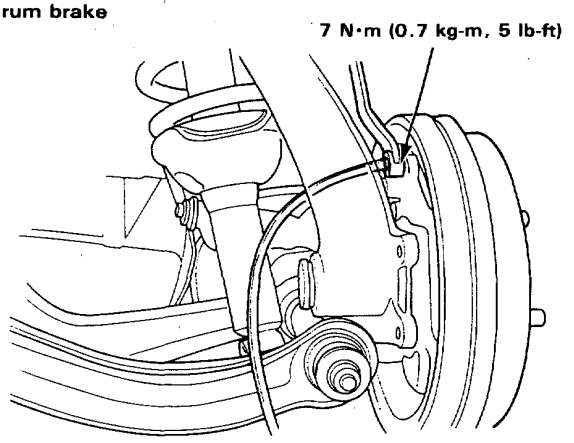
1. Have someone slowly pump the brake pedal several times, then apply steady pressure.
2. Loosen the brake bleed screw to allow air to escape from the system. Then tighten the bleed screw securely.
3. Repeat the procedure for each wheel in the sequence shown above, until air bubbles no longer appear in the fluid.
4. Check brake performance by road testing.

FRONT

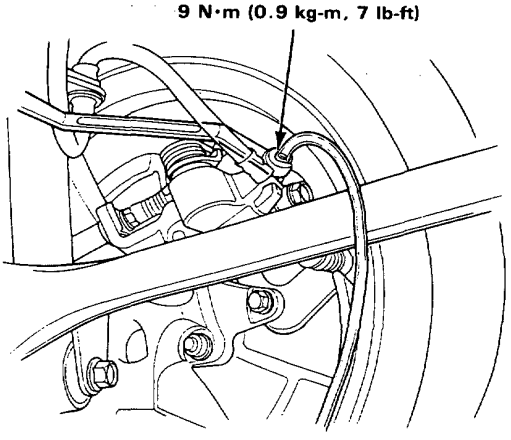


REAR

Drum brake



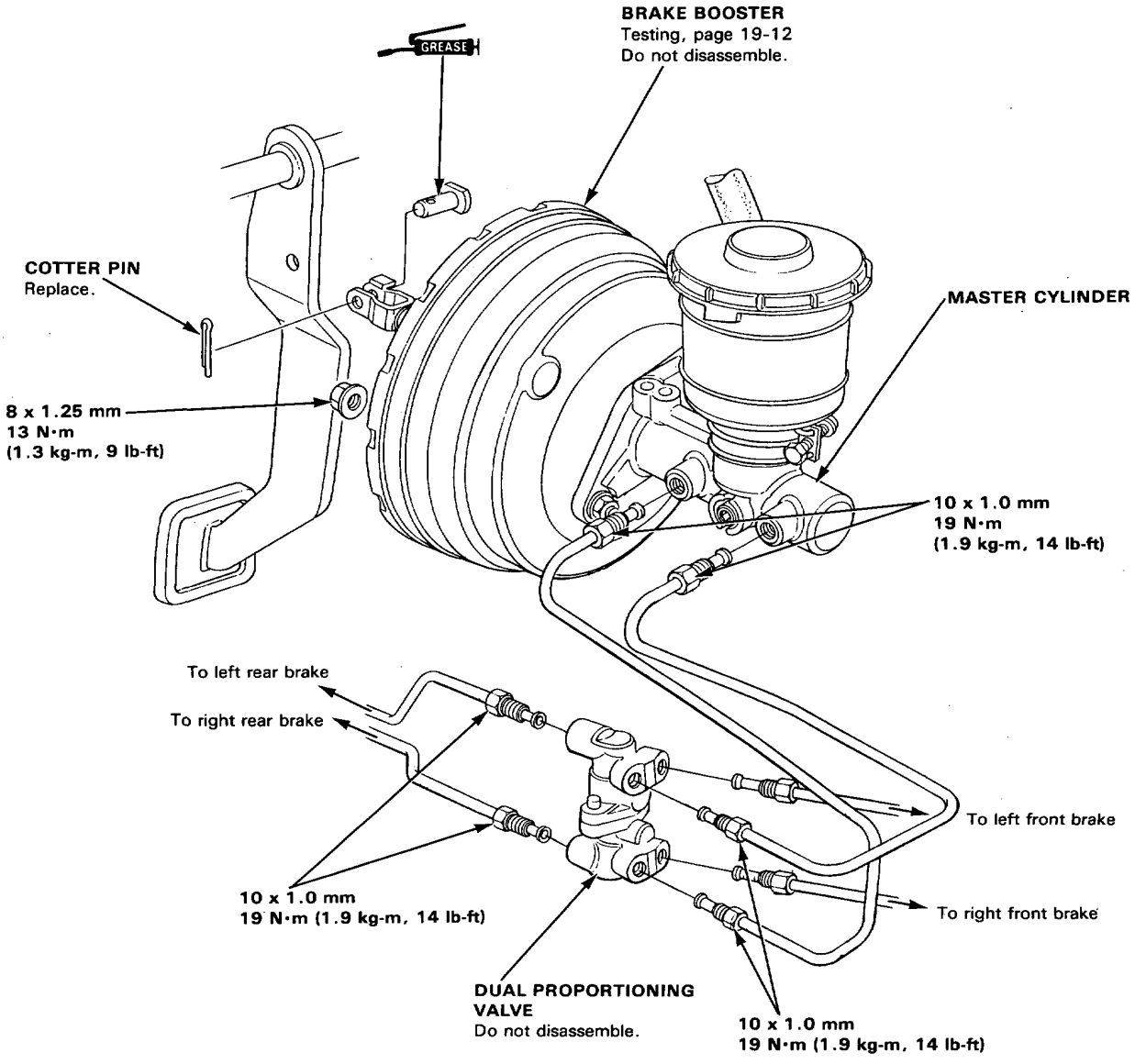
Disc brake



Master Cylinder, Booster

Index

CAUTION:
Master cylinder and booster does not disassembly.
Replace them with a component assembly.



Master Cylinder

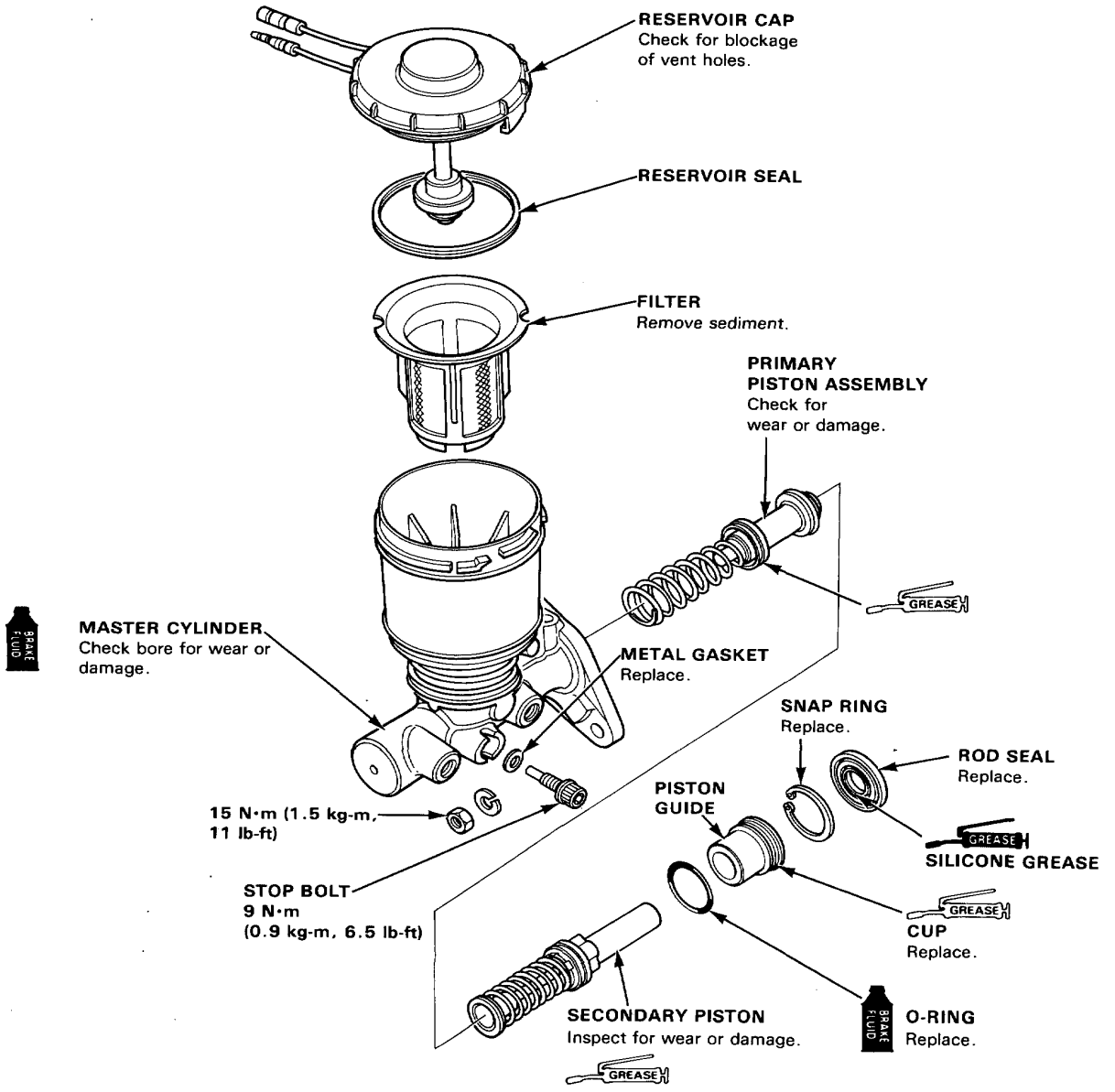
Overhaul/Inspection

CAUTION:

- **Avoid spilling brake fluid on painted surfaces as severe damage can result. Wipe up spilled fluid at once and rinse well clean water.**
- **This symbol represents brake fluid. Use only DOT 3 or 4 brake fluid.**
- **Use only HONDA Brake Cylinder Grease (P/N 08733—B020E) or equivalent.**
- **Carefully inspect the bore of the master cylinder for pits, scratches or scoring.**
- **Replace the master cylinder if the bore is damaged or worn. Do not hone or attempt to refinish the bore.**

NOTE:

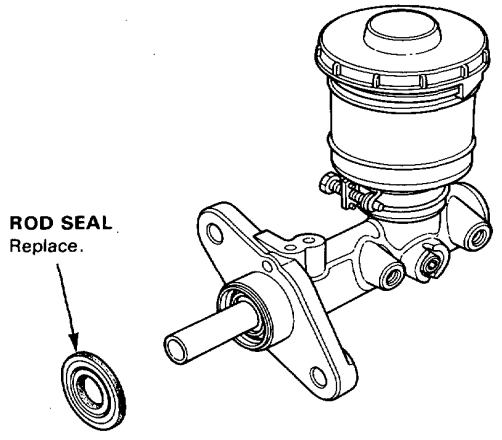
- Wash all removed parts in brake fluid and blow dry with compressed air. Blow open all passages and fluid ports.
- To prevent damage, liberally apply clean brake fluid to the piston cups before installation.
- Do not attempt to refinish master cylinder bore. Replace if pitted or worn.
- Use only DOT 3 or DOT 4 brake fluid.



Disassembly

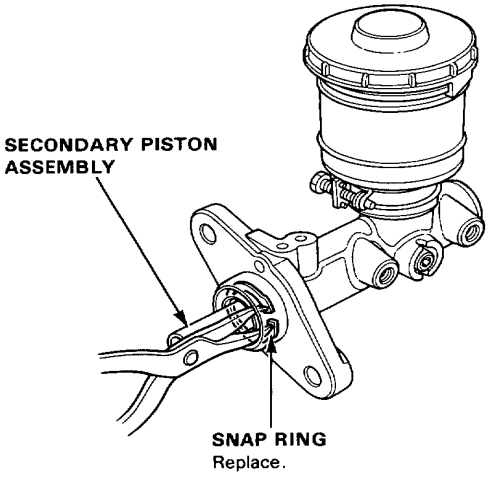
CAUTION:
- **Avoid spilling fluid on painted, plastic or rubber parts as it may damage the finish.**
- **Plug the end of the brake hose with a shop rag to prevent brake fluid from flowing out of the brake hose after disconnecting.**
- **Use only new clean DOT 3 or DOT 4 brake fluid.**
- **Clean all parts thoroughly with brake fluid. Blow out all passages with compressed air.**
- **Do not allow foreign matter to enter the system.**
- **Be careful not to bend or damage the brake pipe when removing the master cylinder.**

1. Remove the rod seal.

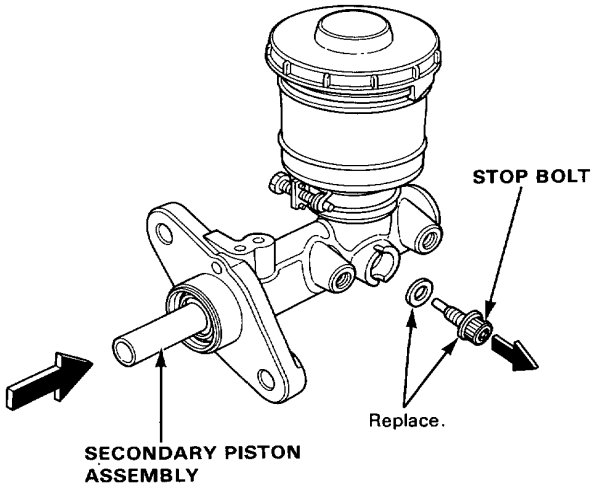


2. Push the secondary piston assembly, then remove the snap ring.

   CAUTION: Avoid damaging the master cylinder wall.



3. Remove the stop bolt while pushing in the secondary piston assembly.



4. Remove the piston guide, secondary piston assembly and primary piston assembly.

   NOTE: If the primary piston assembly is difficult to remove, apply compressed air from the primary piston side outlet.

   CAUTION:
   - **Do not use high pressure air or bring the nozzle too close to the inlet.**
   - **Place a shop rag over the master cylinder to prevent the primary piston from becoming a projectile.**

5. Clean all parts with brake fluid.

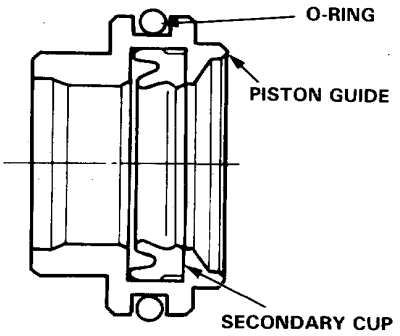
Master Cylinder

Reassembly

CAUTION:
- **Make sure all parts are clean before reassembly.**
- **Use only new replacement parts.**
- **Use only clean DOT 3 or DOT 4 brake fluid.**
- **Do not allow dirt or other foreign matter to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid.**
- **Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish. Wash spilled brake fluid off immediately with clean water.**

1. Lubricate the new piston assemblies with brake fluid.
2. Install the new O-ring and secondary cup onto the piston guide.

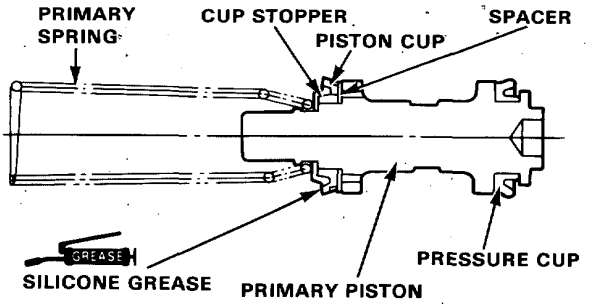
PISTON GUIDE ASSEMBLY



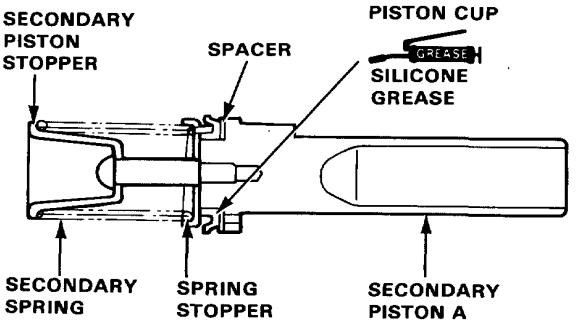
NOTE: Replace the secondary cup and piston guide as a set if necessary.

3. Make sure that the primary piston assembly and secondary piston assembly are in good condition.

PRIMARY PISTON ASSEMBLY



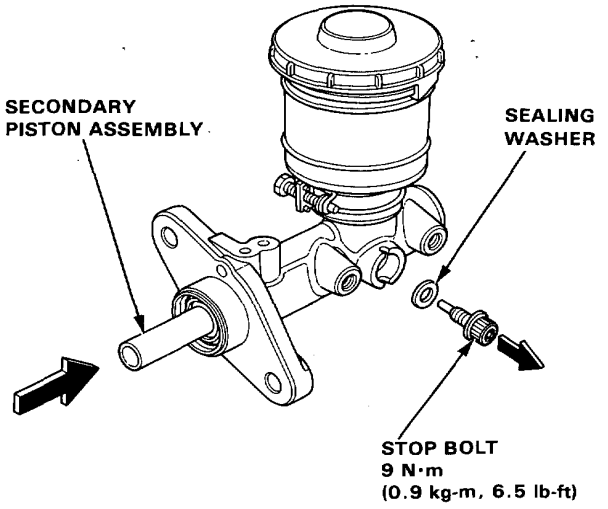
SECONDARY PISTON ASSEMBLY



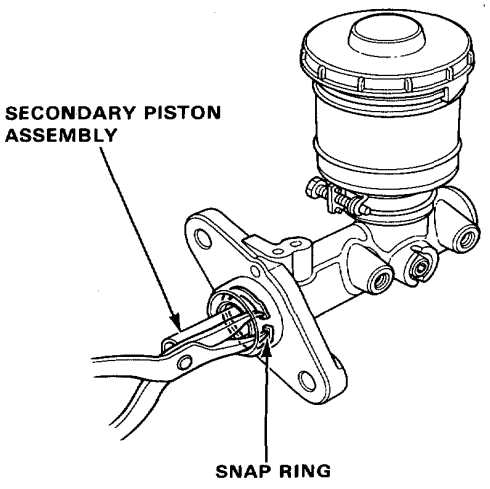
4. Install the piston assemblies in the master cylinder.

   NOTE: To ease assembly, rotate the pistons while inserting.

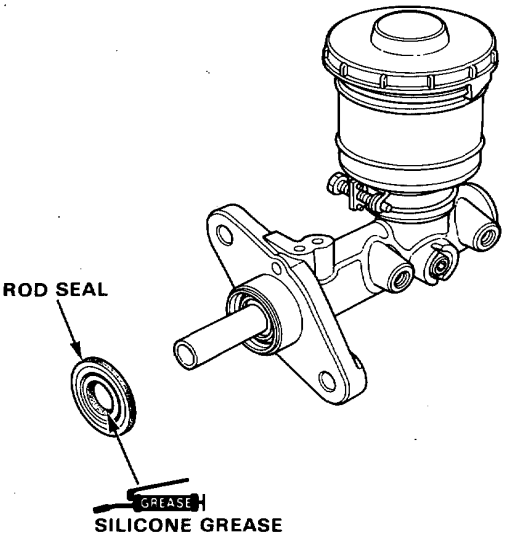
5. Install the stop bolt and new sealing washer while pushing in the secondary piston assembly, then tighten the stop bolt.



6. Install the snap ring while pushing in the secondary piston assembly.



7. Install a new rod seal.



CAUTION: When connecting the brake pipes, make sure that there is no interference between the brake pipes and other parts

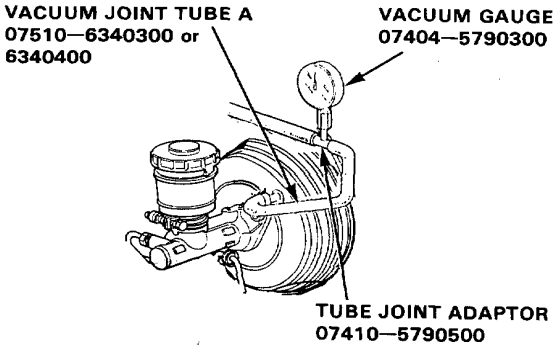
Brake Booster

Test

Leak Test

1. Install the Brake Power Kit (07504—6340100) as shown.
2. Start the engine, adjust the engine speed with the accelerator pedal so that the vacuum gauge readings show 300—500 mmHg (11.8—19.7 inHg), then stop the engine.
3. Read the vacuum gauge.

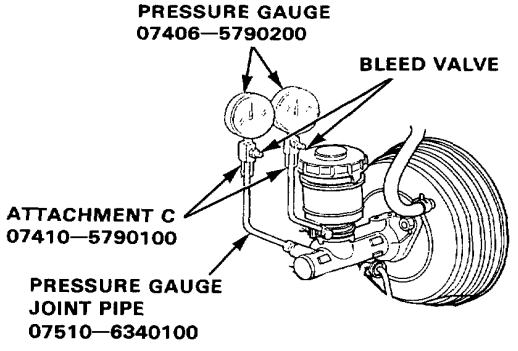
   If the vacuum readings decreases 20 mmHg (0.8 inHg) or more after 30 seconds, check following parts for leaks.
   - Check valve
   - Vacuum hose
   - Seals
   - Diaphragm
   - Master cylinder O-ring and cup



Function Test

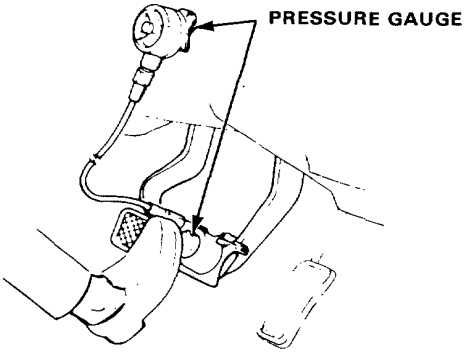
1. Install the vacuum gauge as same the leak test.
2. Connect the oil pressure gauges to the master cylinder using the attachments as shown.
3. Bleed air through the valves.

   CAUTION: Avoid spilling brake fluid on painted, plastic or rubber partsas it may damage the finish.



PRESSURE GAUGE JOINT PIPE (Use ALB Booster only)
07HAK—SG00110

4. Start the engine.
5. Depress the brake pedal with a 200 N (20 kg, 44 lbs) of pressure. The following pressures should be observed at the pressure gauges in each vacuum.

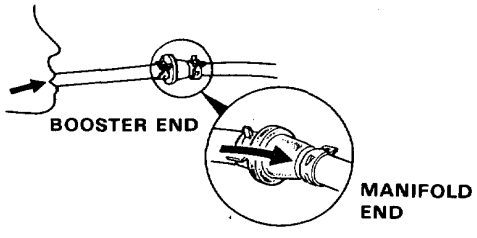


Vacuum mmHg	Line pressure kPa (kg/cm², psi	
	Without ALB	ALB
0	921 (9.4, 134)	814 (8.3, 118)
300	5491 (56.0, 797)	6080 (62.0, 882)
500	8532 (87.0, 1238)	8159 (83.2, 1183)

6. Inspect the master cylinder pistons and cups in the readings do not fall within the limits shown above.

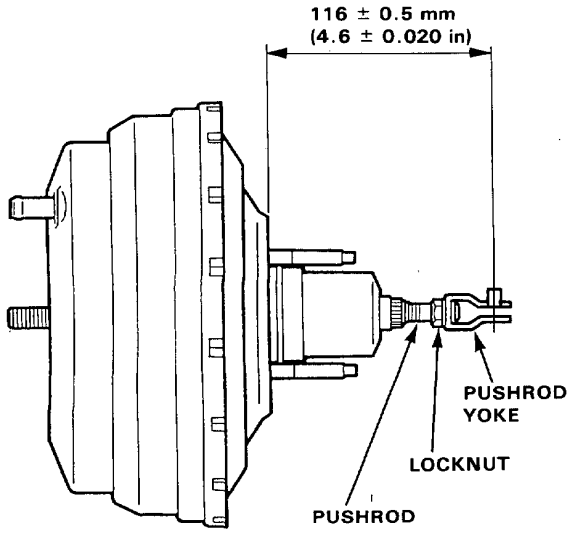
Check Valve Test

1. Remove the check valve, blow on one end of the hose and then the other; if you can blow through the booster end, but not through the manifold end, the check valve is OK.



Pushrod Adjustment

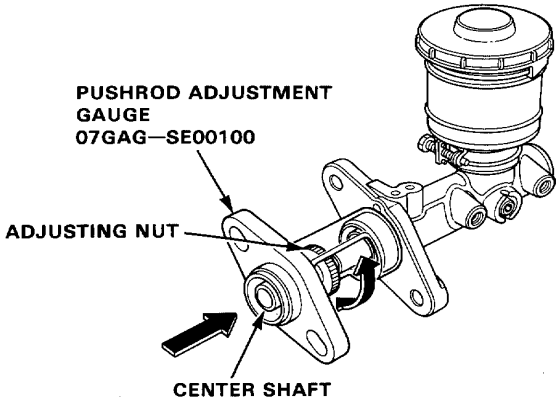
Install the locknut and pushrod yoke on the pushrod, and adjust the pushrod length as shown.



Pushrod Clearance Adjustment

NOTE: Master cylinder pushrod-to-piston clearance must be checked and adjustments made, if necessary, before installing or when replacing master cylinder or booster.

1. Using the special tool, adjust bolt so the top of it is flush with end of master cylinder piston.



2. Without disturbing the adjusting bolt's position, install the master cylinder rod seal on the special tool and put the special tool upside down on the booster.

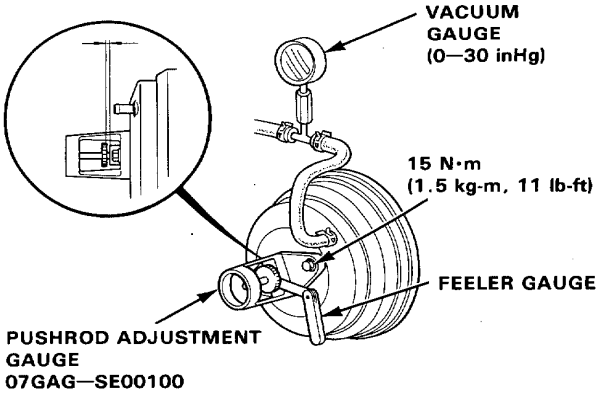
3. Install the master cylinder nuts and tighten to the specified torque.

4. Connect the booster in-line with a vacuum gauge (0—30 in Hg) to the booster's engine vacuum supply, and maintain an engine speed that will deliver 500 mm Hg (20 in Hg) vacuum.

5. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut as shown.

CLEARANCE: 0—0.4 mm (0—0.016 in.)

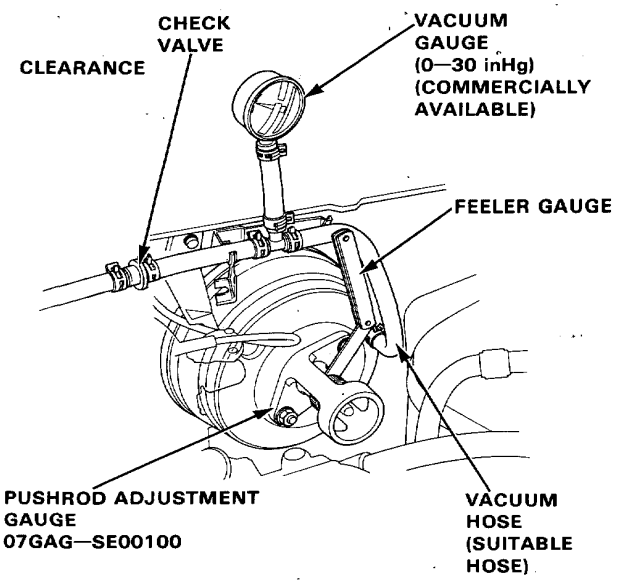
- Inspection with the booster off the car.



(cont'd)

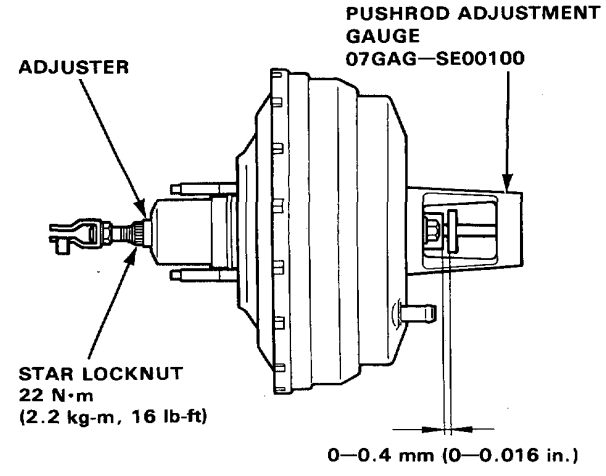
Pushrod Clearance Adjustment (cont'd)

• Inspection with the booster on the car.



6. If clearance is incorrect, loosen the star locknut and turn the adjuster in or out to adjust. Hold the clevis while adjusting.

7. Tighten the star locknut securely.



NOTE: If the clearance between the gauge body and adjusting nut is 0 mm, the pushrod-to-piston clearance is 0.4 mm. If the clearance between the gauge body and adjusting nut is 0.4 mm, the pushrod-to-piston clearance is 0 mm.

8. After adjustment, loosen the clevis end pushrod locknut and turn the pushrod to obtain the correct pedal height.

PEDAL HEIGHT FROM FLOOR:
MANUAL TRANSMISSION: 190 mm (7.5 in.)
AUTOMATIC TRANSMISSION: 195 mm (7.7 in.)
(with floor mat removed)
The pedal should have 1—5 mm free play.

9. Adjust the brake light switch (page 19-4).

Inspection

⚠WARNING **Do not use an air hose to blow the brake assembly clean. Use an OSHA-approved vacuum cleaner, to avoid breathing brake dust.**

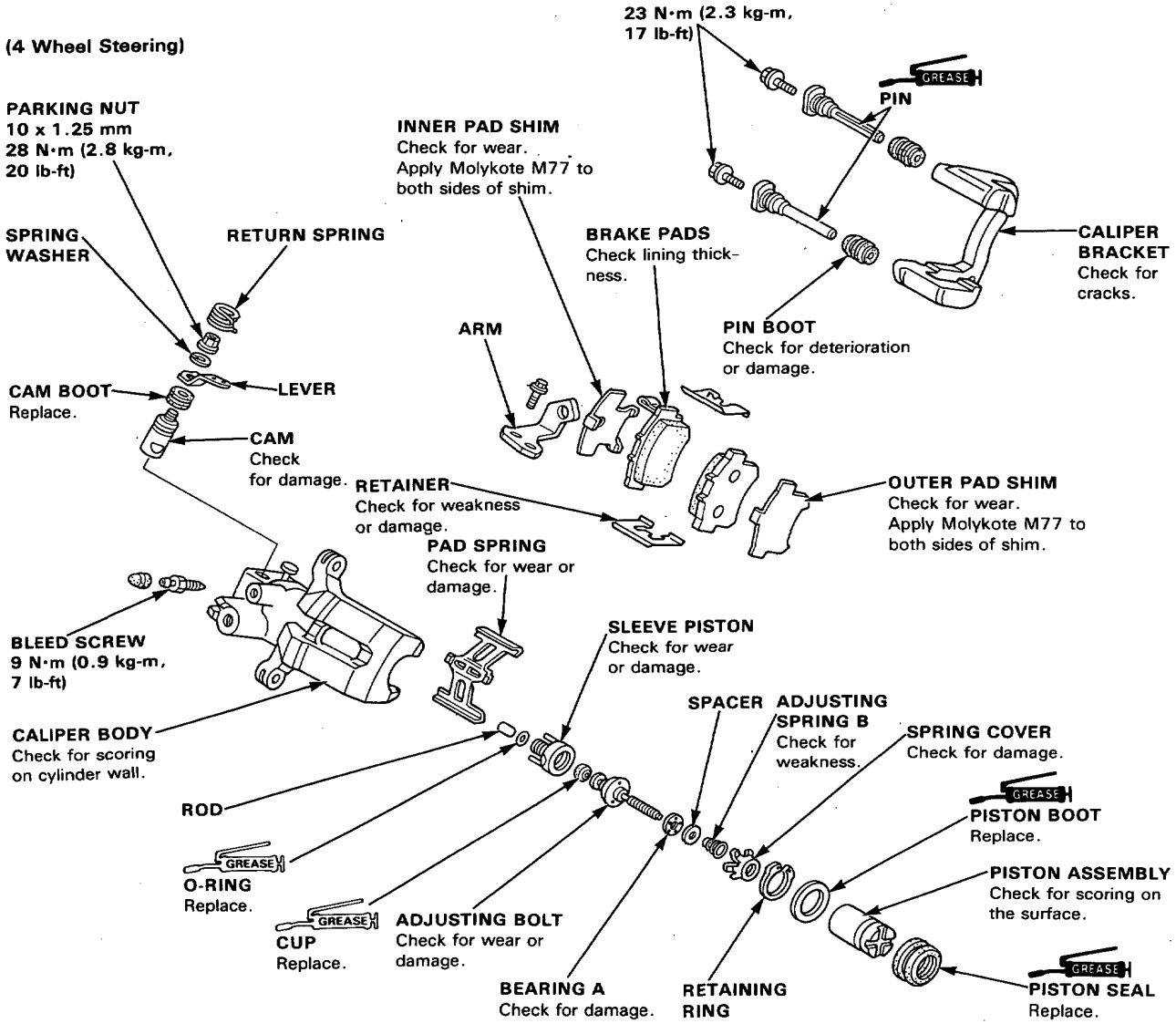
CAUTION:
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **To prevent spills, cover the hose joints with rags or shop towels.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**

GREASE : BRAKE CYLINDER GREASE (P/N 08733-B020E) OR EQUIVALENT RUBBER GREASE

GREASE : SILICONE GREASE

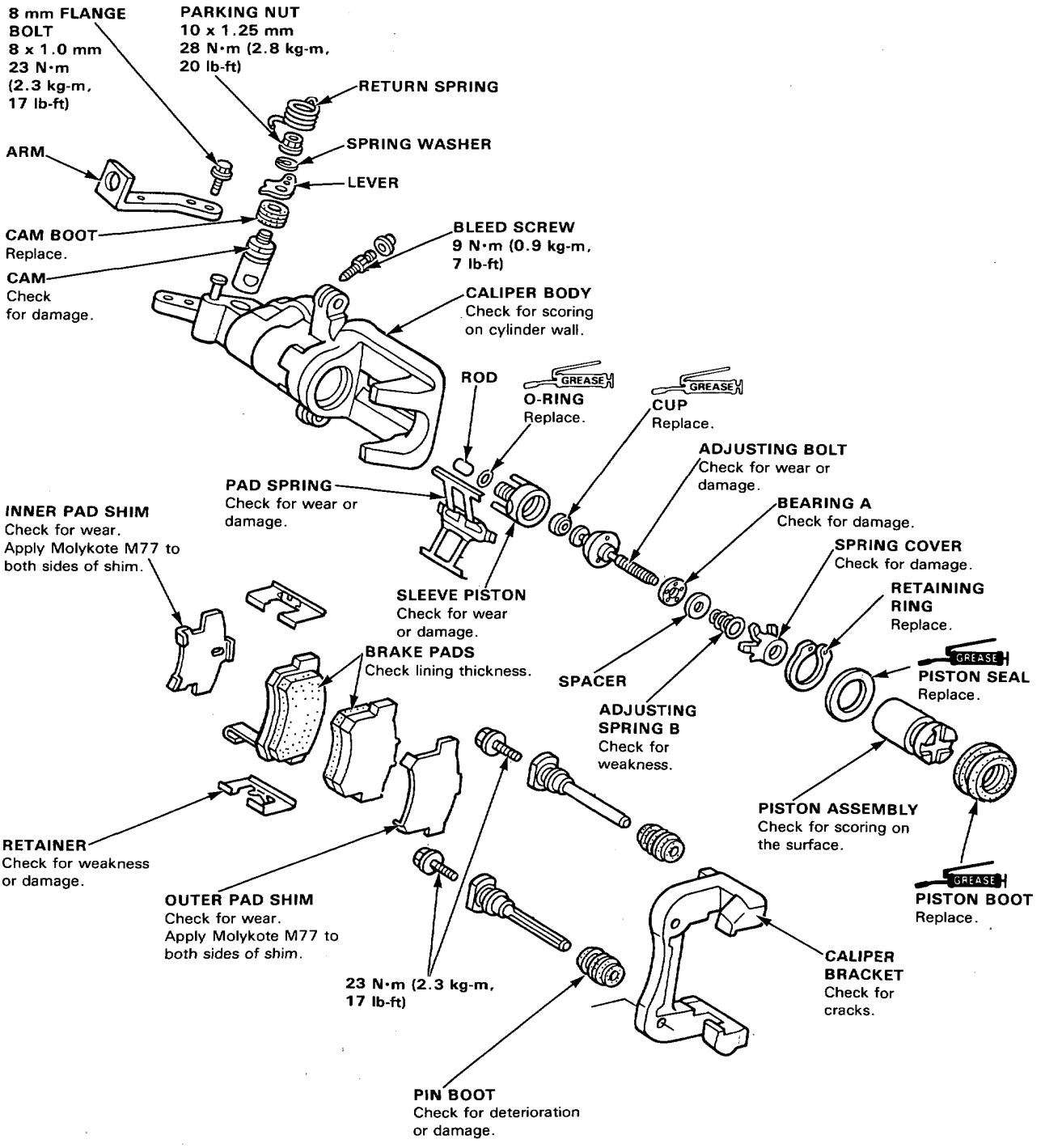
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the drained fluid.**

NOTE:
- Coat piston, piston seal and caliper bore with clean brake fluid.
- Use only DOT 3 or DOT 4 brake fluid.



Inspection (cont'd)

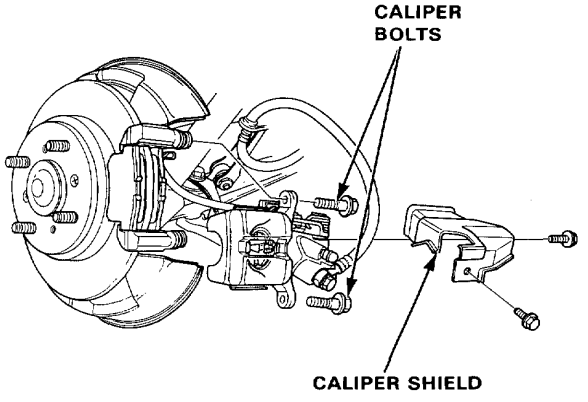
(2 Wheel Steering)



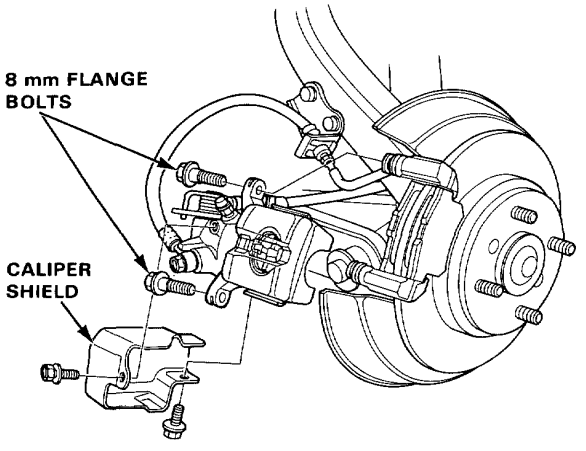
Inspection and Replacement

1. Block the front wheels, support the rear of the car on safety *stands*, then remove the rear wheels.
2. Remove the caliper shield.
3. Remove the two caliper bolts.

(4WS)

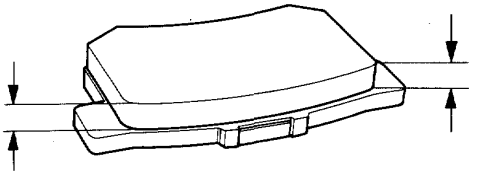


(2WS)



4. Remove the pad shims, pad retainers and pads.
5. Remove the pads and measure the thickness of each brake pad lining using a vernier caliper.

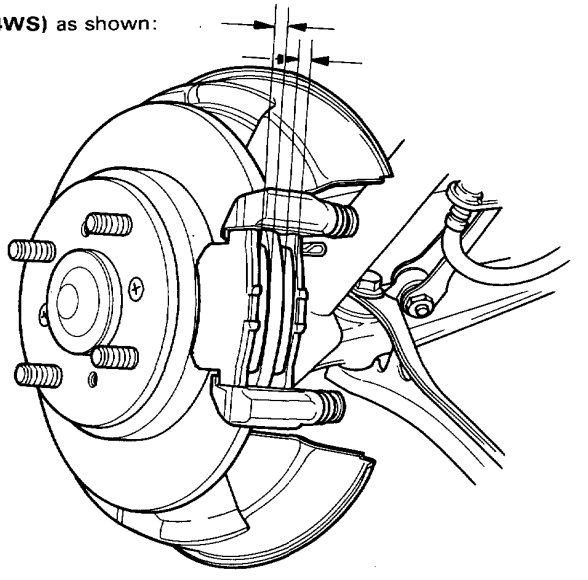
Brake Pad Thickness:
Standard: 9.0 mm (0.35 in.)
Service Limit: 1.6 mm (0.06 in.)



NOTE: Measurement does not include pad backing thickness.

6. If the lining thickness is less than service limit, replace the brake pads as a set.

(4WS) as shown:



Inspection and Replacement (cont'd)

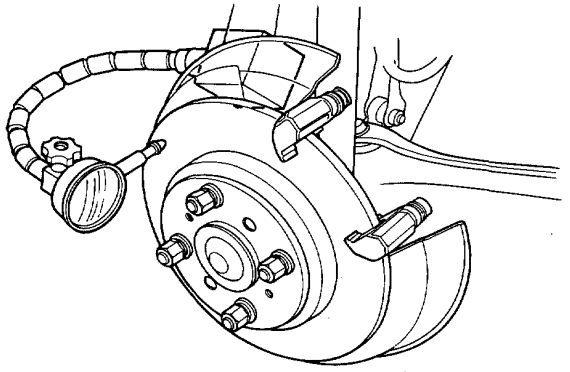
7. Inspect the disc surface for grooves, cracks, and rust. Clean the disc thoroughly and remove all rust.

8. Mount a dial indicator as shown and measure the runout at 10 mm (0.390 in.) in from the outer edge of the disc.

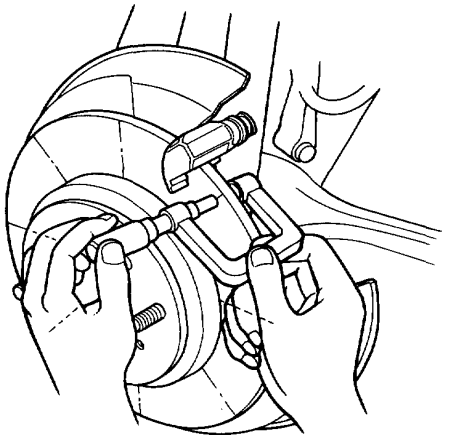
   CAUTION: Use wheel nuts and 3 mm thick flat washers to hold the disc securely.

   Brake Disc Run-out;
   Service Limit: 0.15 mm (0.006 in.)

9. Resurface or replace the brake disc if beyond the service limit.



10. Using a micrometer, measure the rear brake disc thickness at eight points, approximately 45° apart and 10 mm (0.390 in.) in from the outer edge of the disc.



11. Replace the disc if it exceeds the following service limits.

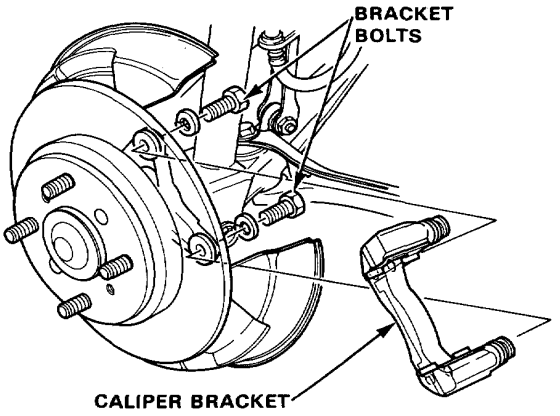
    Brake Disc Thickness:
    Standard: 23.0 mm (0.91 in.)
    Service Limit: 21.0 mm (0.83 in.)

    Brake Disc Parallelism:
    The difference between any thickness measurements should not be more than 0.015 mm (0.0006 in.).

12. Resurface or replace the brake disc if beyond the limits.

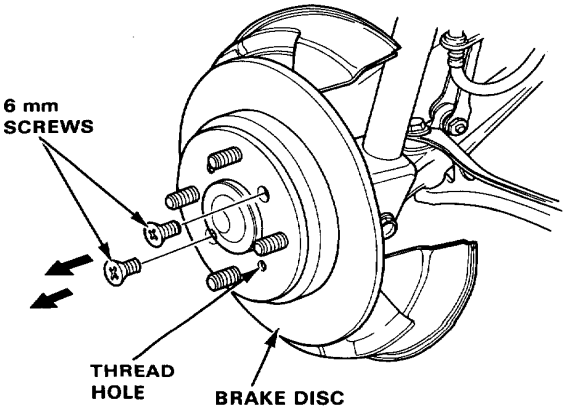
    NOTE: A new disc should be resurfaced if its run-out is greater than 0.15 mm (0.006 in.).

13. Remove the two caliper bracket bolts and caliper bracket.



14. Remove the two 6 mm screws and brake disc.

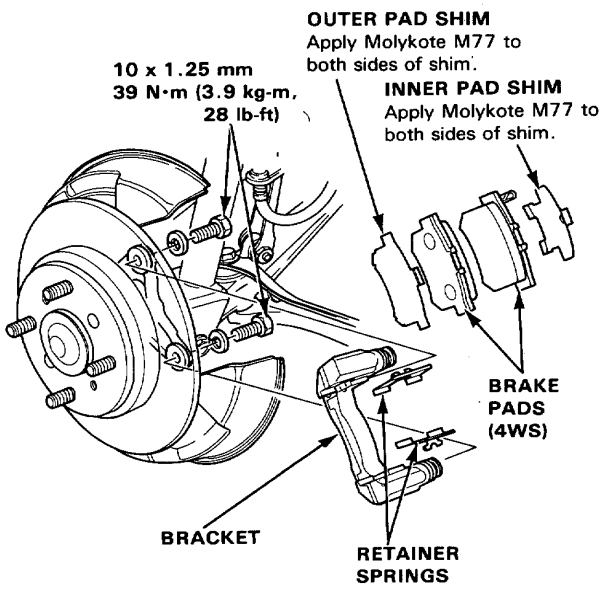
    NOTE: (Without 4WS) If the brake disc is difficult to remove, install 8 mm bolts into the threaded holes and tighten them.



15. Install the new or resurfaced brake disc.

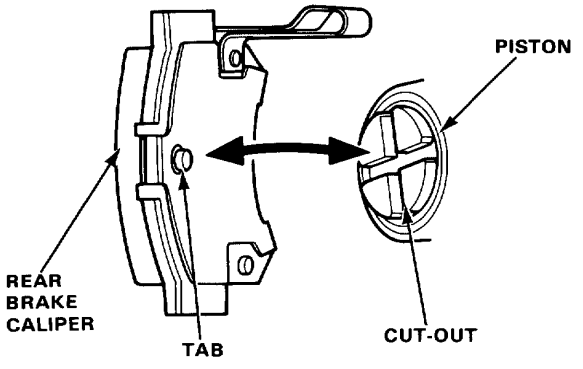
16. Clean the caliper bracket and retainers, then install the caliper bracket with two bolts and retainers.

    Install the new brake pads and pad shims onto the caliper bracket.



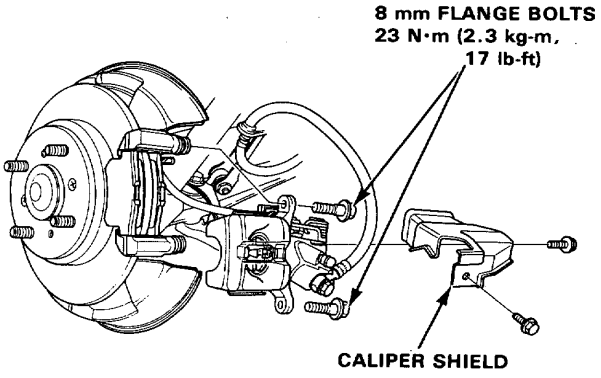
17. Rotate the caliper piston clockwise into place in the cylinder, then align the cutout in the piston with the tab on the inner pad by turning the piston back.

    CAUTION: Lubricate the boot with silicone grease to avoid twisting the piston boot. If the piston boot is twisted, back it out so it sits properly.

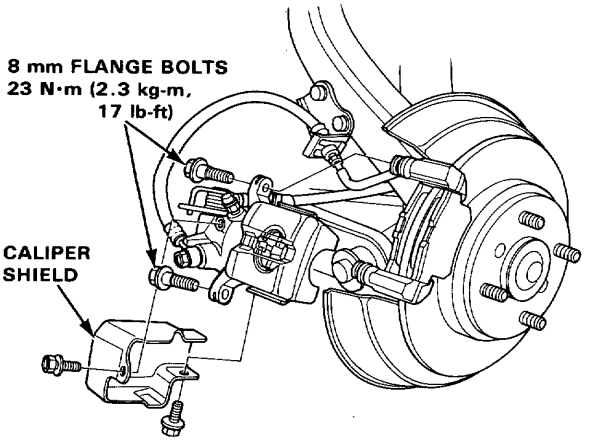


18. Install the brake caliper and caliper shield.

(4WS)



(2WS)



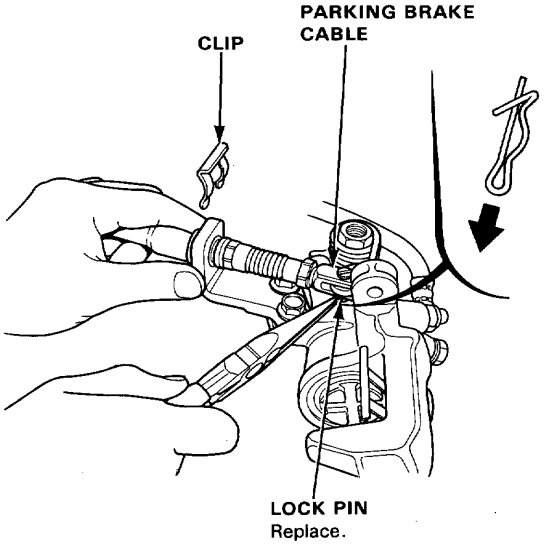
Rear Caliper

Disassembly

CAUTION:
- **Make sure all parts are clean before ressembly.**
- **Use only new replacement parts.**
- **Use only new clean DOT 3 or DOT 4 brake fluid.**
- **Do not allow dirt or other foreign matter to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid.**
- **Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage to finish. Wash spilled brake fluid off immediately with clean water.**

1. Remove the caliper shield (page 19-21).

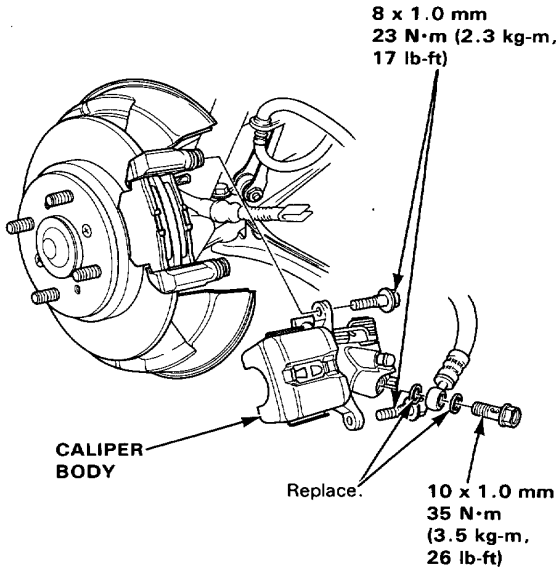
2. Disconnect the parking brake cable from the lever on the caliper by removing the lock pin.



3. Remove the banjo bolt and disconnect the brake hose from the caliper.

4. Remove the two caliper mounting bolts and the caliper from the bracket.

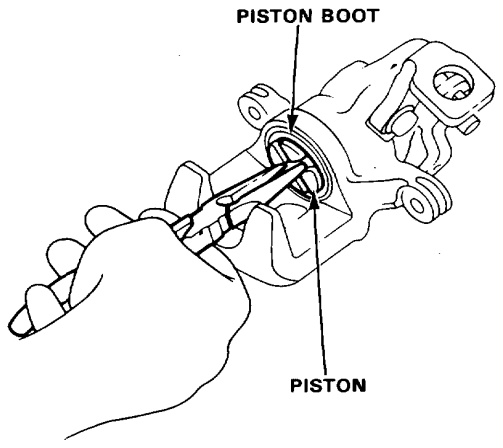
CAUTION:
- **Thoroughly clean the outside of the caliper to prevent dust and dirt from entering inside.**
- **Plug the end of the brake hose to prevent brake fluid from flowing out.**



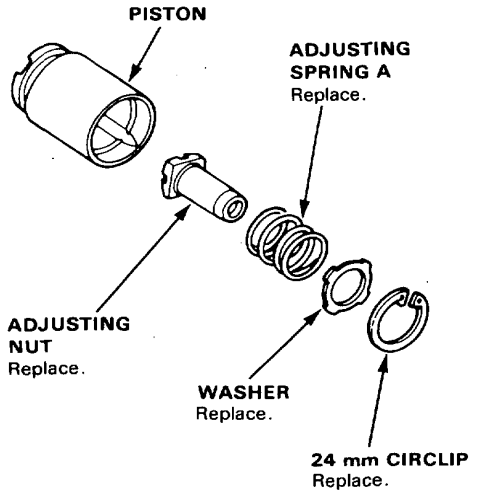
5. Remove the pad spring from the caliper.

6. Remove the piston and piston boot while rotating the piston.

CAUTION: Avoid damaging the piston and piston boot.

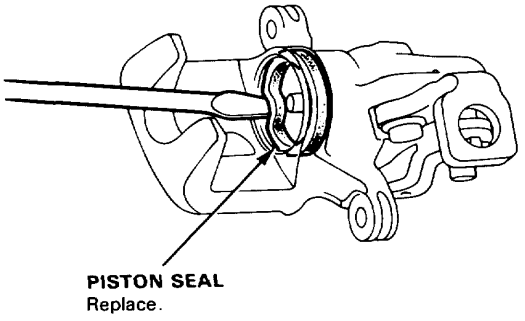


7. Remove the circlip, then washer, adjusting spring A, and the adjusting nut from the piston.

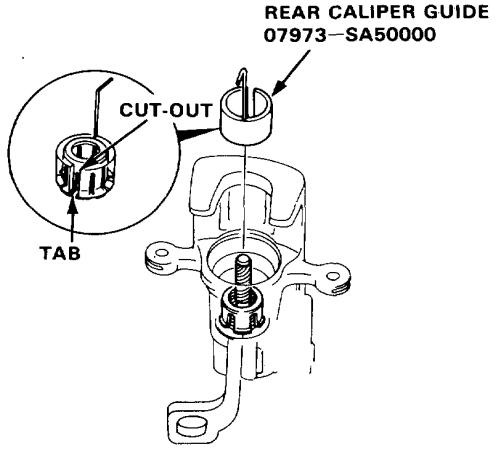


8. Remove the piston seal.

CAUTION: Take care not to damage the cylinder bore.



9. Install the special tool in the cylinder, aligning the cutout on the tool with the tab on the spring cover.



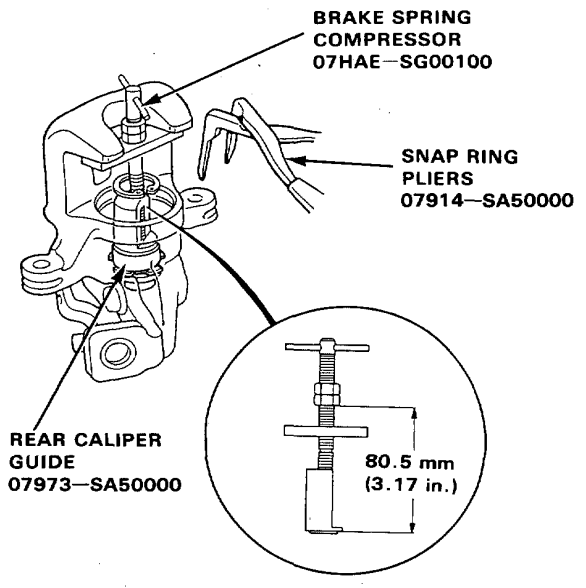
(cont'd)

Rear Caliper

Disassembly (cont'd)

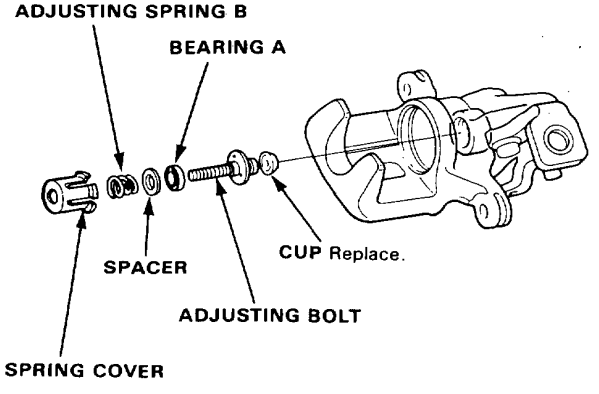
10. Install the special tool between the caliper body and rear caliper guide as shown.

11. Compress the adjusting spring B by turning the shaft of the special tool, then remove the circlip with snap ring pliers.

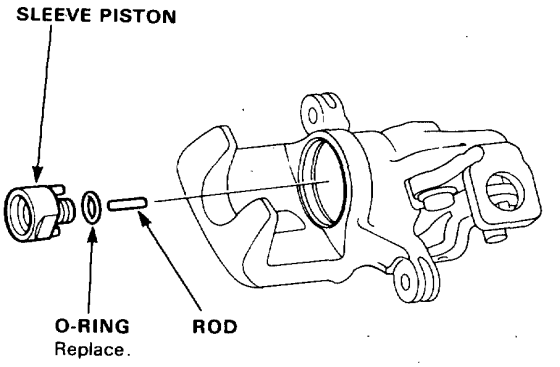


12. Remove the brake spring compressor from caliper body.

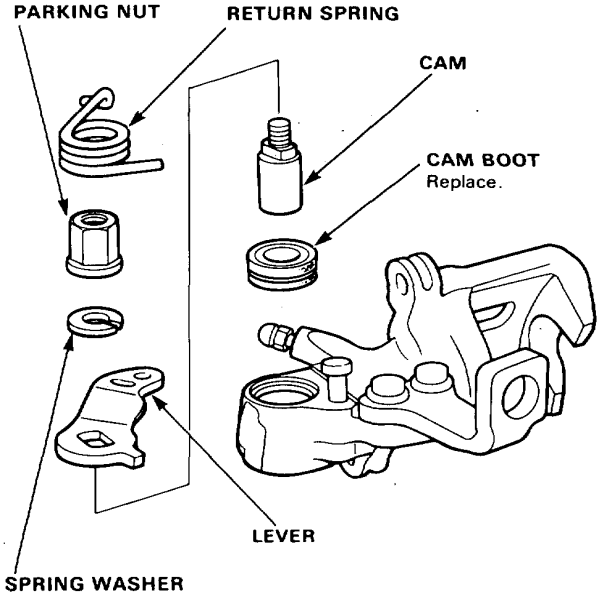
13. Remove the spring cover, adjusting spring B, spacer, bearing A, adjusting bolt and cup.



14. Remove the sleeve piston, then remove the rod from the cam.



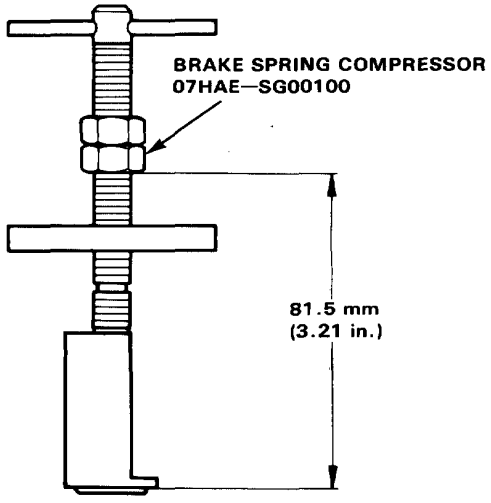
15. Remove the return spring, parking nut, spring washer, lever, cam and cam boot.



Reassembly

CAUTION:
- **Make sure all parts are clean before reassembly.**
- **Use only new replacement parts.**
- **Use only new clean DOT 3 or DOT 4 brake fluid.**
- **Do not allow dirt or other foreign matter to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid.**
- **Avoid spilling brake fluid on painted, plastic or rubber surfaces as it can damage the finish. Wash spilled brake fluid off immediately with clean water.**

1. Adjust the special tool as shown.

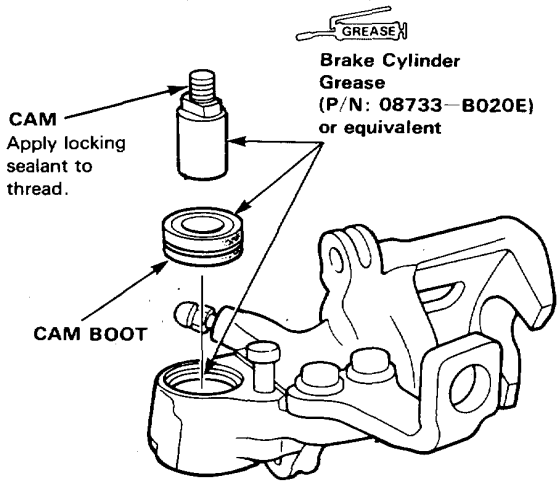


2. Pack all cavities of the needle bearing with Brake Cylinder Grease (P/N: 08733—B020E), or equivalent rubber grease.

3. Coat the new cam boot with Brake Cylinder Grease (P/N: 08733—B020E), or equivalent rubber grease and install in the caliper.

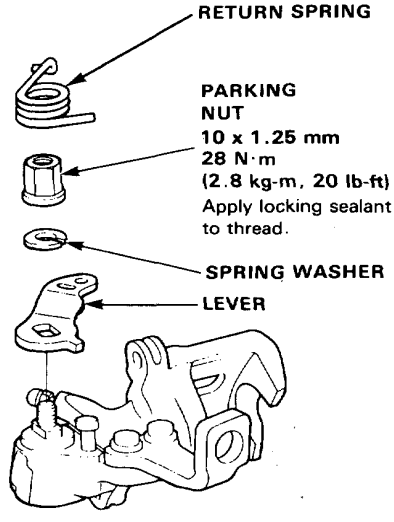
4. Install the cam with threaded end facing up.

   CAUTION: Avoid damaging the cam boot since it must be installed before the cam.



5. Install the lever and spring washer. Tighten the parking nut after applying locking sealant to thread.

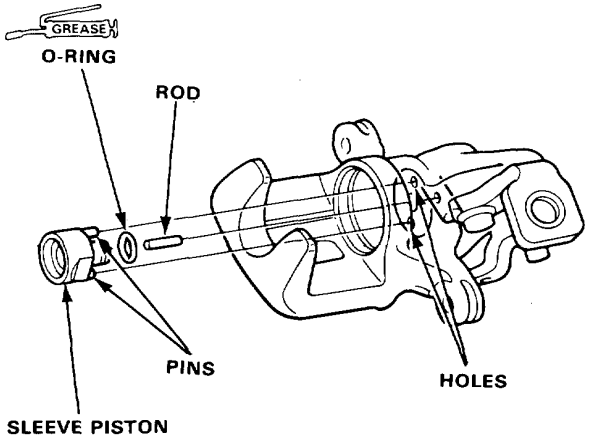
6. Install the return spring.



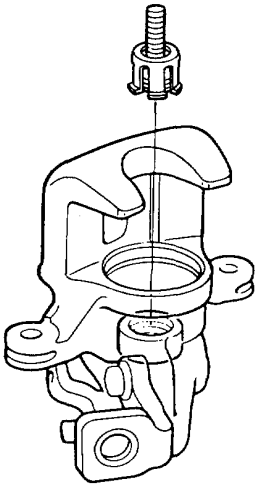
(cont'd)

Reassembly (cont'd)

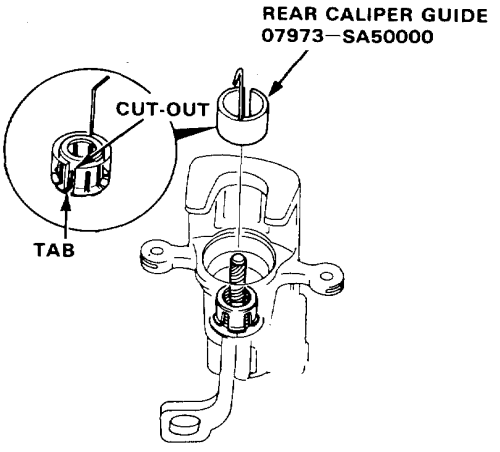
7. Install the rod in the cam.
8. Install a new O-ring on the sleeve piston.
9. Install the sleeve piston so the hole in the bottom of the piston is aligned with the rod in the cam, and the two pins on the piston are aligned with the holes in the caliper.



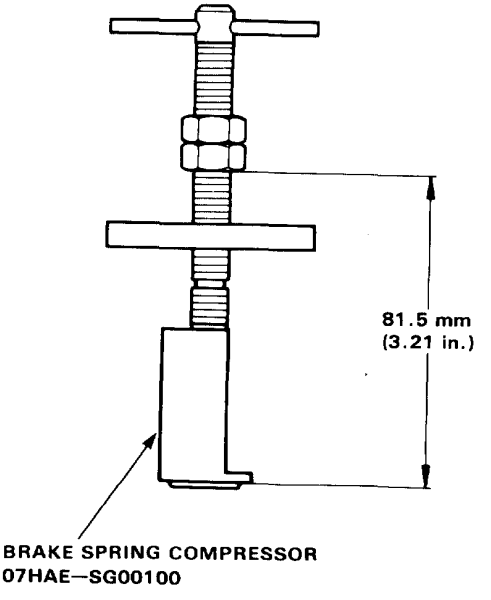
10. Install a new cup with its groove facing the bearing A side of the adjusting bolt.
11. Fit the bearing A, spacer, adjusting spring B and spring cover on the adjusting bolt, then install it in the caliper cylinder.



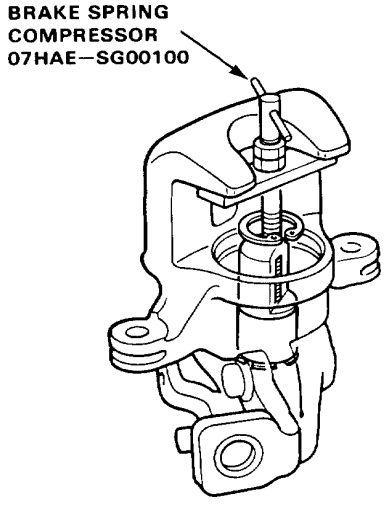
12. Install the special tool is the cylinder, aligning the cutout on the tool with the tab on the spring cover.



13. Adjust the special tool as shown.



14. Install the special tool as shown.

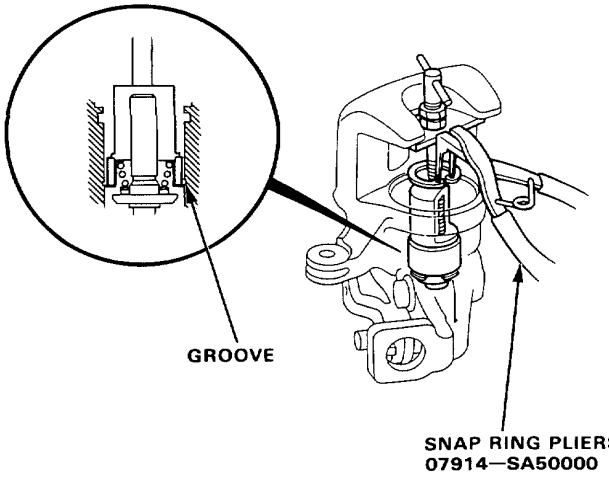


15. Compress the spring until it bottoms out.

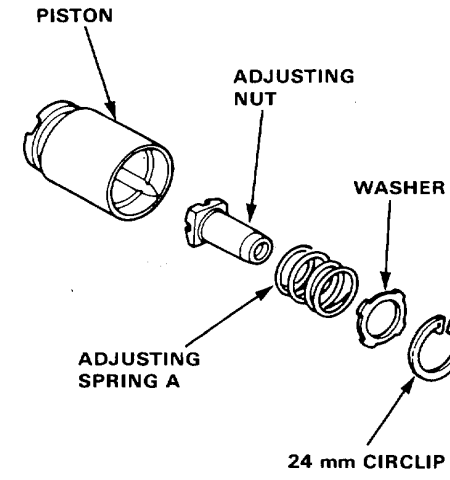
16. Check that the flared end of the spring cover is below the circlip groove.

17. Install the circlip, then remove the special tool.

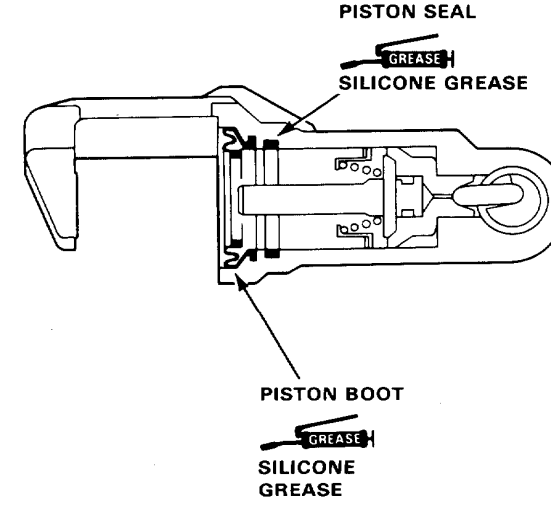
NOTE: Check that the circlip is seated in the groove properly.



18. Install the adjusting nut, adjusting spring A, and washer, then secure with the circlip.



19. Coat the new piston seal and piston boot with silicone grease and install them in the caliper.



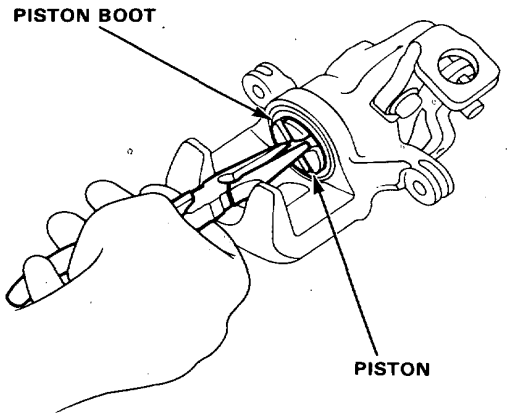
(cont'd)

Rear Caliper

Reassembly (cont'd)

20. Coat the outside of the piston with silicone grease, and install it on the adjusting bolt while rotating it clockwise.

    CAUTION: Avoid damaging the piston boot.



21. Install the brake pad retainers and brake pads.
22. Install the pad spring on the caliper.
23. Install the caliper on the caliper bracket and tighten the caliper bolts.
24. Connect the brake hose to the caliper with new sealing washers and tighten the banjo bolt.
25. Connect the parking brake cable to the arm on the caliper.
26. Fill the brake reservoir up and bleed the brake system (page 19-10).
27. Operate the brake pedal several times, then adjust the parking brake lever.

    NOTE: Before adjustments, make sure the parking brake arm on the caliper touches the pin.

28. Install the caliper shield and tighten the bolts.

Brake Shoes

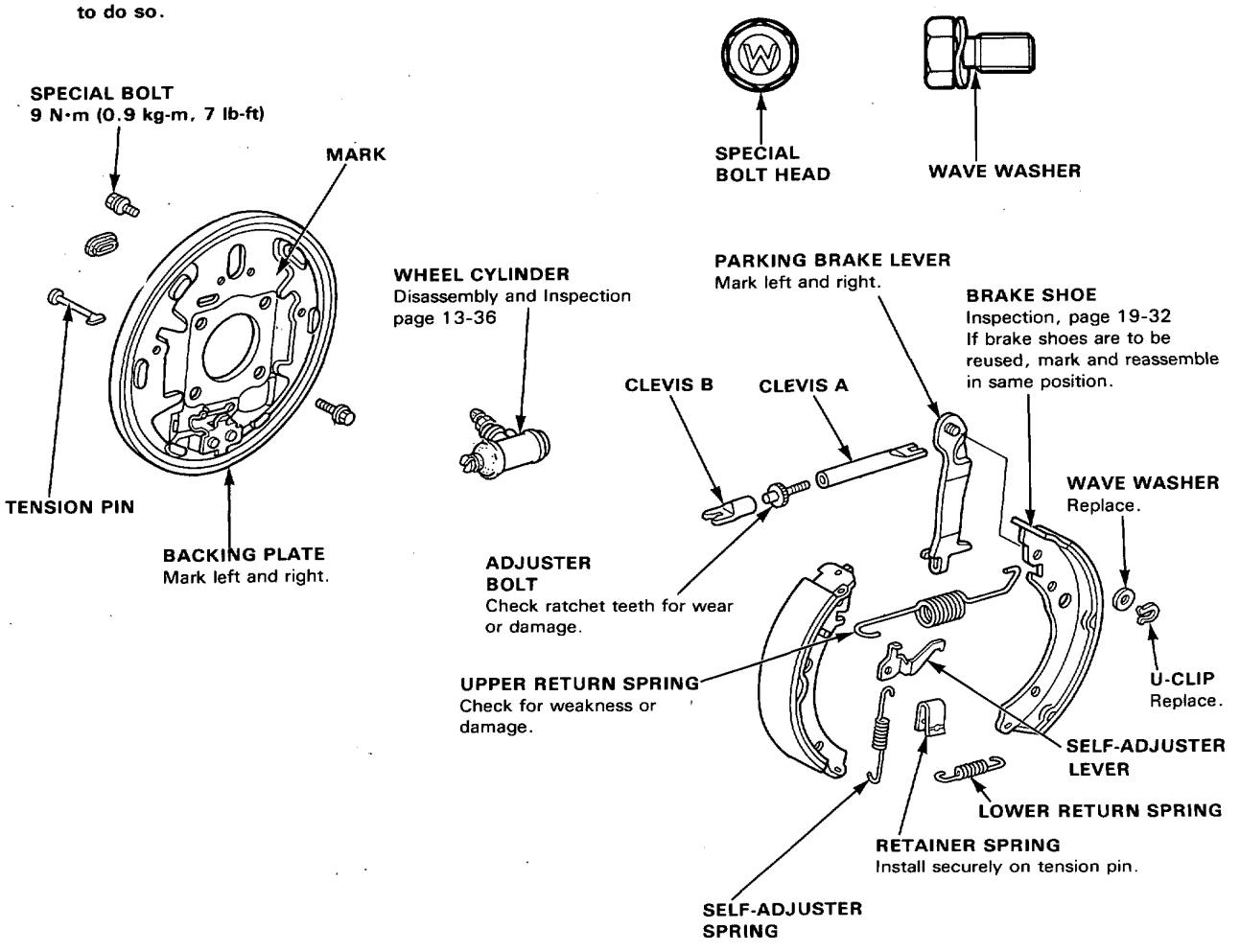
Index and Inspection

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

1. Raise the rear of the car and support with safety stands in proper locations.
2. Loosen the parking brake.
3. Remove the rear wheels and rear brake drum.

⚠WARNING **Do not use an air hose to blow the brake assembly clean. Use an OSHA-approved vacuum cleaner, to avoid breathing brake lining dust.**

CAUTION:
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **To prevent spills, cover the hose joints with rags or shop towels.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Use only DOT 3 or DOT 4 brake fluid.**
- **Use only a genuine Honda wheel cylinder special bolt.**
- **Do not reuse the drained fluid.**

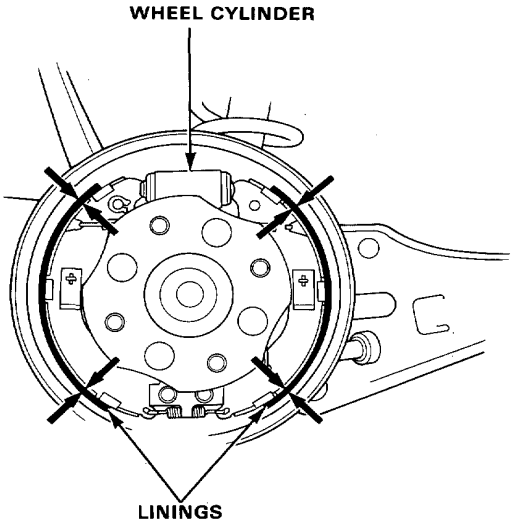


Brake Shoes

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.

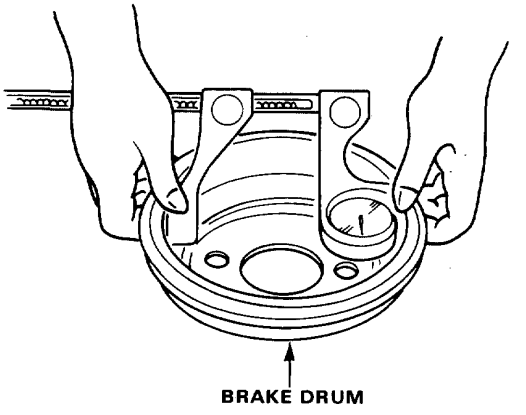
   Lining Thickness
   (Does not include brake shoe thickness)
   Standard: 4.5 mm (0.177 in.)
   Service Limit: 2.0 mm (0.079 in.)



4. Inspect bearings in hub unit for smooth operation. If defective, refer to Section 12.
5. Measure inside diameter of the brake drum.

   Drum Inside Diameter:
   Standard: 220 mm (8.661 in.)
   Service Limit: 221 mm (8.701 in.)

   NOTE: If the refinishing limit stamped on the drum does not match the one listed above, use the one on the drum.

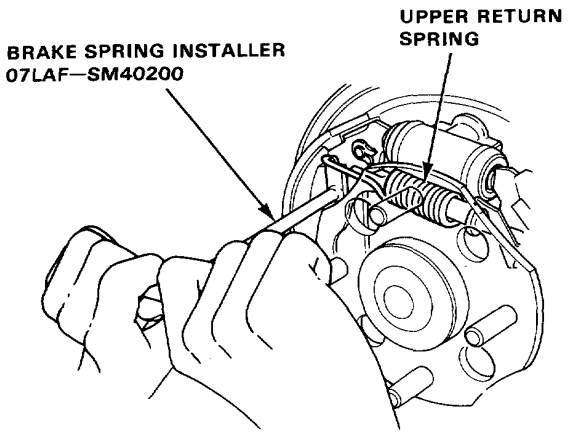


6. Inspect the brake drum for scoring, grooving, cracks.

Disassembly

1. Remove the upper return spring from the brake shoe as shown.

⚠WARNING
Wear eye protection when using the brake spring tool.

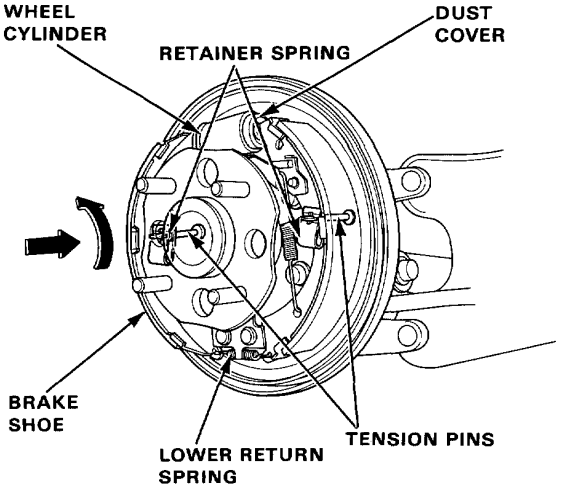


2. Remove the tension pins by pushing the retainer spring and turning them.

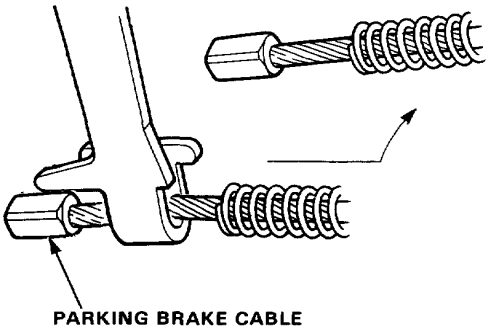
3. Lower the brake shoe assembly and remove the lower return spring.

   NOTE: Make sure not to damage the dust cover on the wheel cylinder.

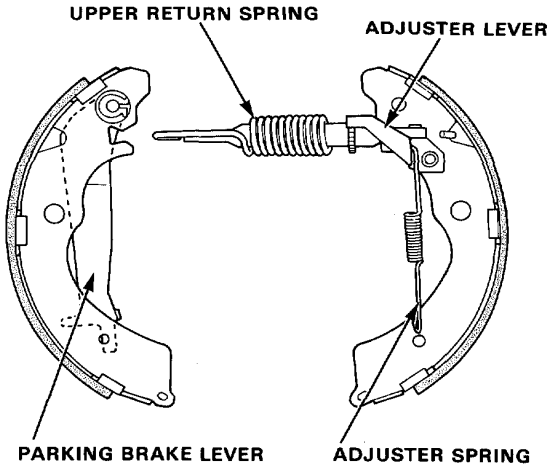
4. Remove the brake shoe assembly.



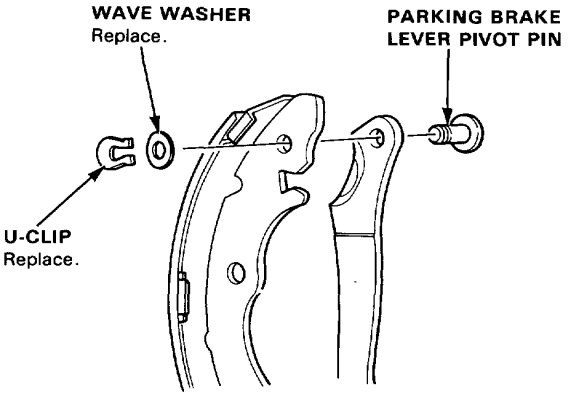
5. Disconnect the parking brake cable from the parking brake lever.



6. Remove the upper return spring, self-adjuster lever and self-adjuster spring, and separate the brake shoes.



7. Remove the wave washer, parking brake lever and pivot pin from the brake shoe by removing the U-clip.

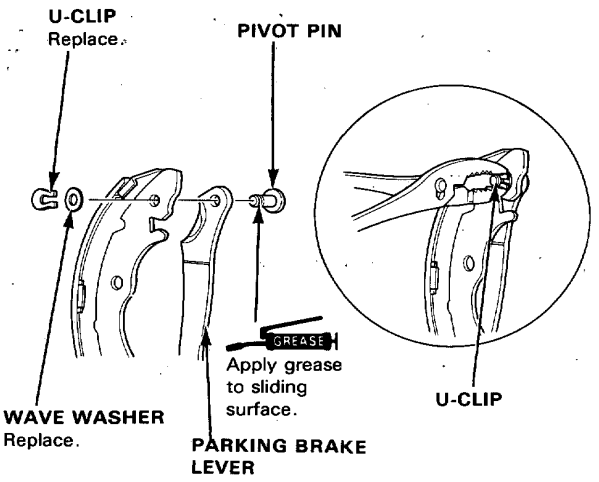


Brake Shoes

Reassembly

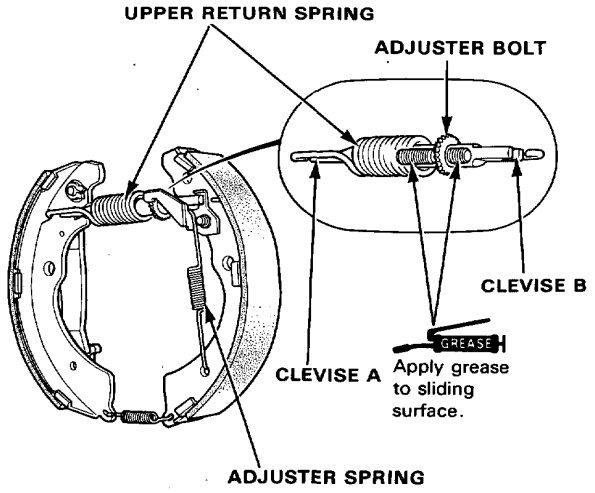
1. Apply brake cylinder grease to the sliding surface of the pivot pin, and insert the pin into the brake shoe.
2. Install the parking brake lever and wave washer on the pivot pin and secure with U-clip.

   NOTE: Pinch the U-clip securely to prevent the pivot pin from coming out of the brake shoe.



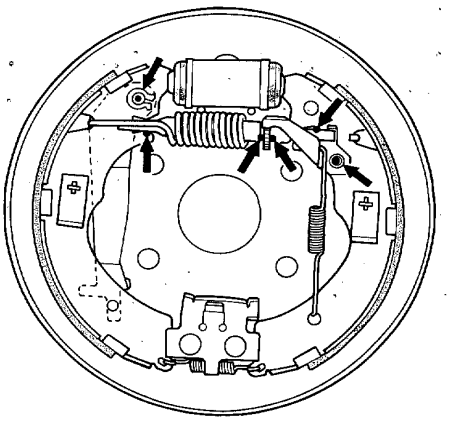
3. Connect the parking brake cable to the parking brake lever.
4. Apply grease on each sliding surface.

   CAUTION: Contaminated brake linings reduce stopping power. Keep grease or oil off the brake linings. Wipe any excess grease off the parts.

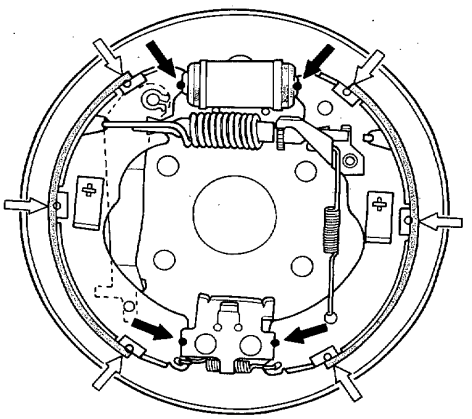


Apply grease on each sliding surface.

CAUTION: Contaminated brake linings reduce stopping power. Keep grease or oil off the brake linings. Wipe any excess grease off the parts.



Greasing symbols: rubber grease (made by COSMO)
➞ ● Moving portion

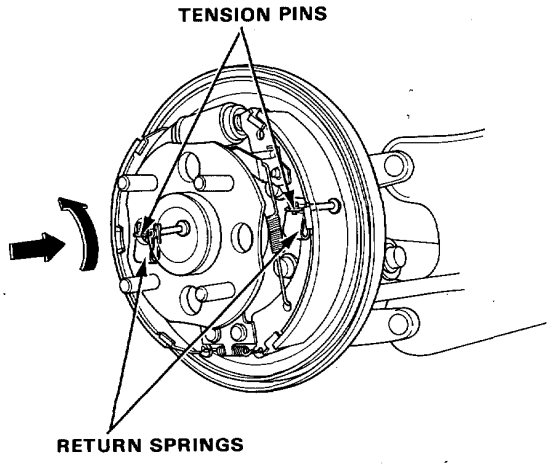


Grease symbols: MOLYKOTE 44MA
(Made by Dow Corning Co., ltd.)
➞ ● Brake shoe ends
⇨ ○ Opposite the edge of the shoe

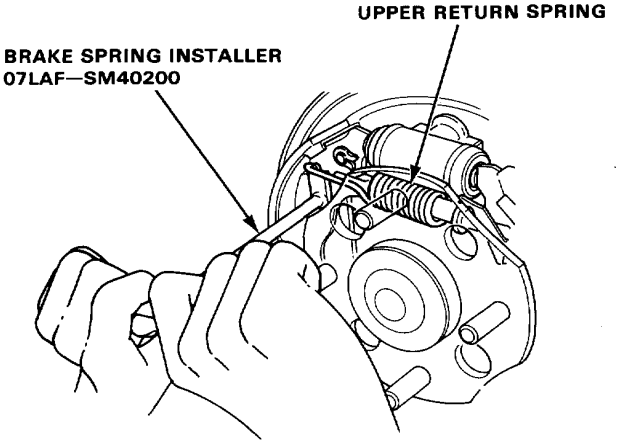
5. Clean the threaded portions of clevises A and B. Coat the threads of the clevises with grease. To shorten the clevises, turn the adjuster bolt.
6. Hook the adjuster spring to the adjuster lever first, then to the brake shoe.

7. Install the brake shoes onto the brake panel.
   NOTE: Make sure not to damage the wheel cylinder dust covers.

8. Install the tension pins and the return springs.



9. Install the upper spring with the special tool.



10. Install the brake drum.

11. If the wheel cylinder has been removed, bleed the brake system (page 19-10).

12. Depress the brake pedal several times to set the self adjusting brake.

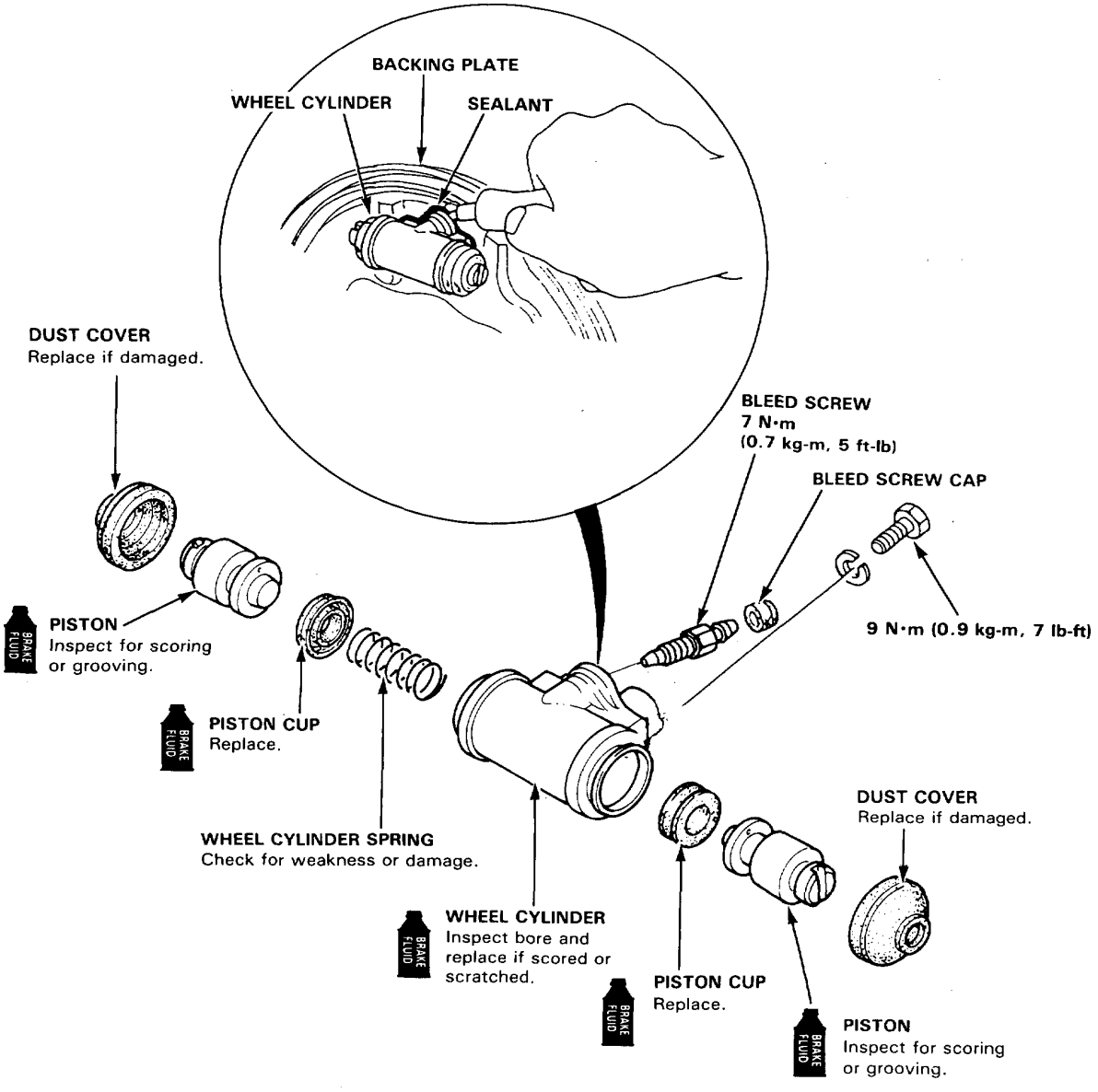
13. Adjust the parking brake (page 19-4).

Wheel Cylinder

Disassembly and Inspection

CAUTION:

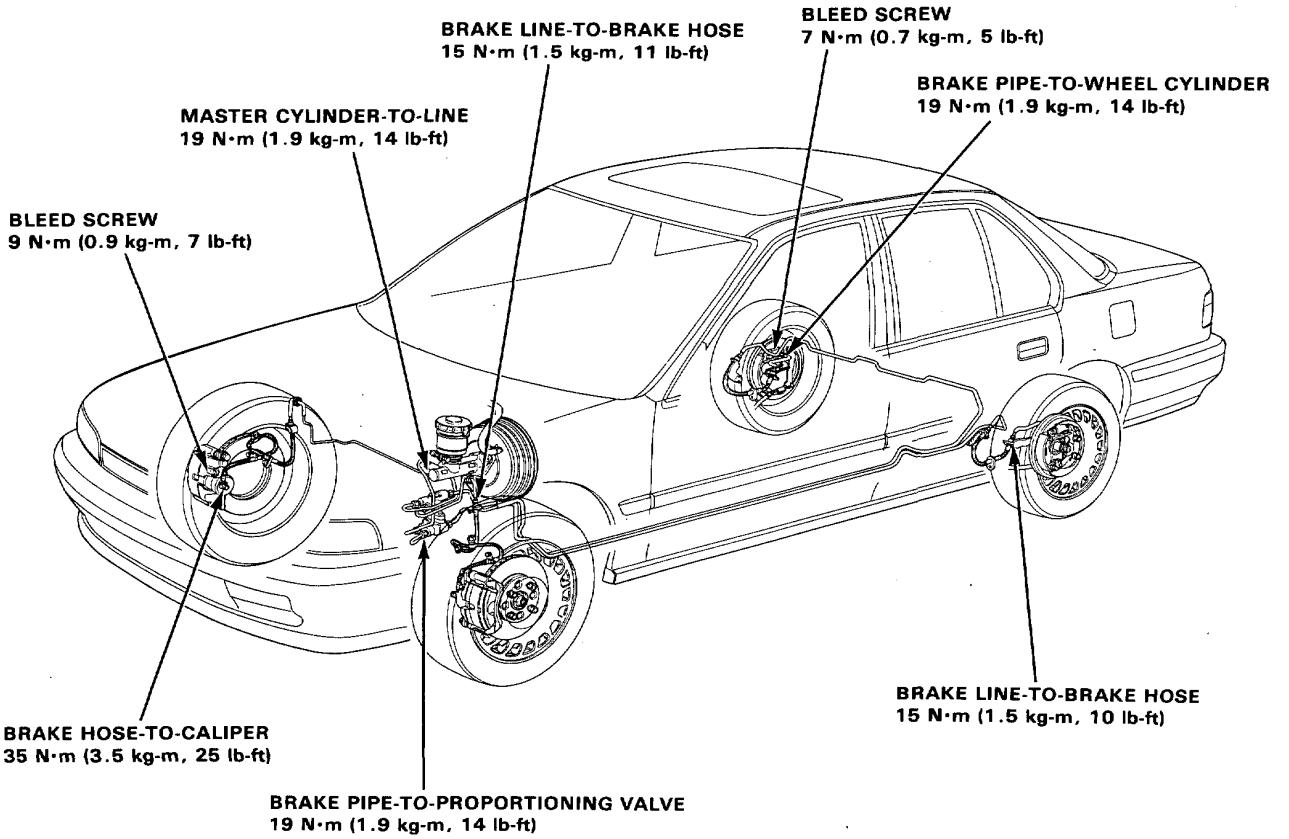
- Use only clean DOT 3 or DOT 4 brake fluid.
- Use only new replacement parts.
- Brake fluid will damage the painted, plastic and rubber parts. Whenever handling brake fluid, protect the painted, plastic or rubber parts by covering with a rag. If fluid does get on these parts, wipe it off with a clean cloth.
- Blow all passages with compressed air before reassembling.
- Clean all parts thoroughly with the clean brake fluid.
- Do not allow dirt or other foreign matter to contaminate the brake fluid.
- Do not mix different types of fluid. They are not compatible..
- Never reuse the brake fluid once it has been drained.
- Lubricate all parts with clean brake fluid during reassembly.
- Apply sealant between the wheel cylinder and backing plate whenever the wheel cylinder has been removed.



Brake Hoses/Pipes

Inspection

1. Inspect the brake hoses for damage, leaks, interference or twisting.
2. Check the brake lines for damage, rusting or leakage. Also check for bent brake lines.
3. Check for leaks at hose and line joints or connections, and retighten if necessary.

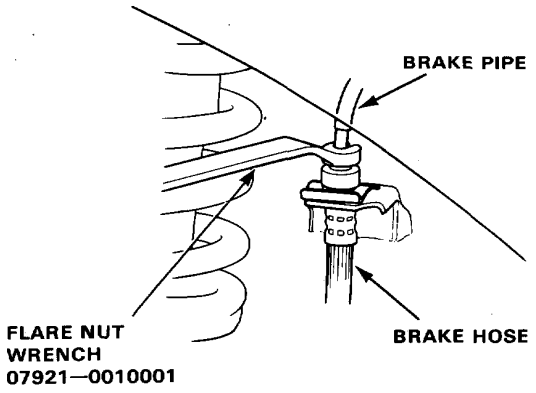


Brake Hose/Pipes

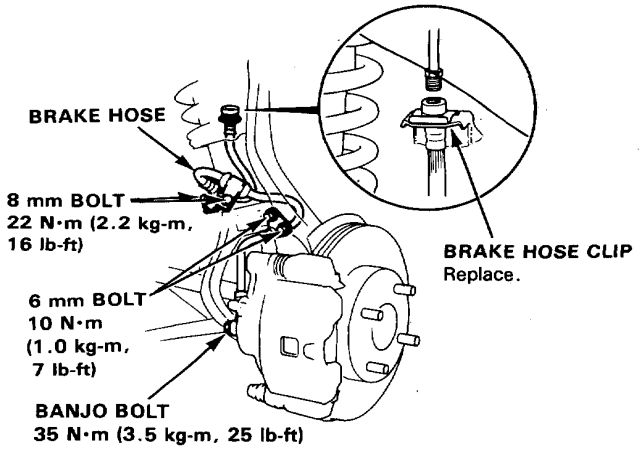
Brake Hose Replacement

CAUTION:
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Use only clean DOT 3 or DOT 4 brake fluid.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not spill brake fluid on the car, it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**

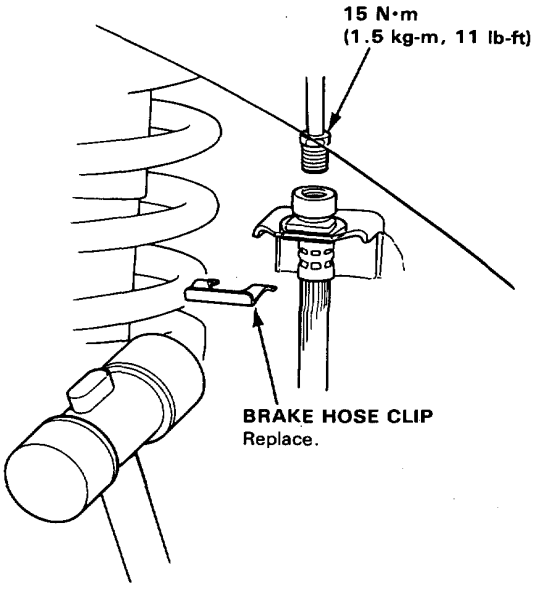
1. Replace the brake hose if the hose is twisted, cracked or if it leaks.
2. Disconnect the brake hose from the brake pipe using a 10 mm flare nut wrench.



3. Remove and discard the brake hose clip from the brake hose.
4. Remove the banjo bolt and disconnect the brake hose from the caliper.



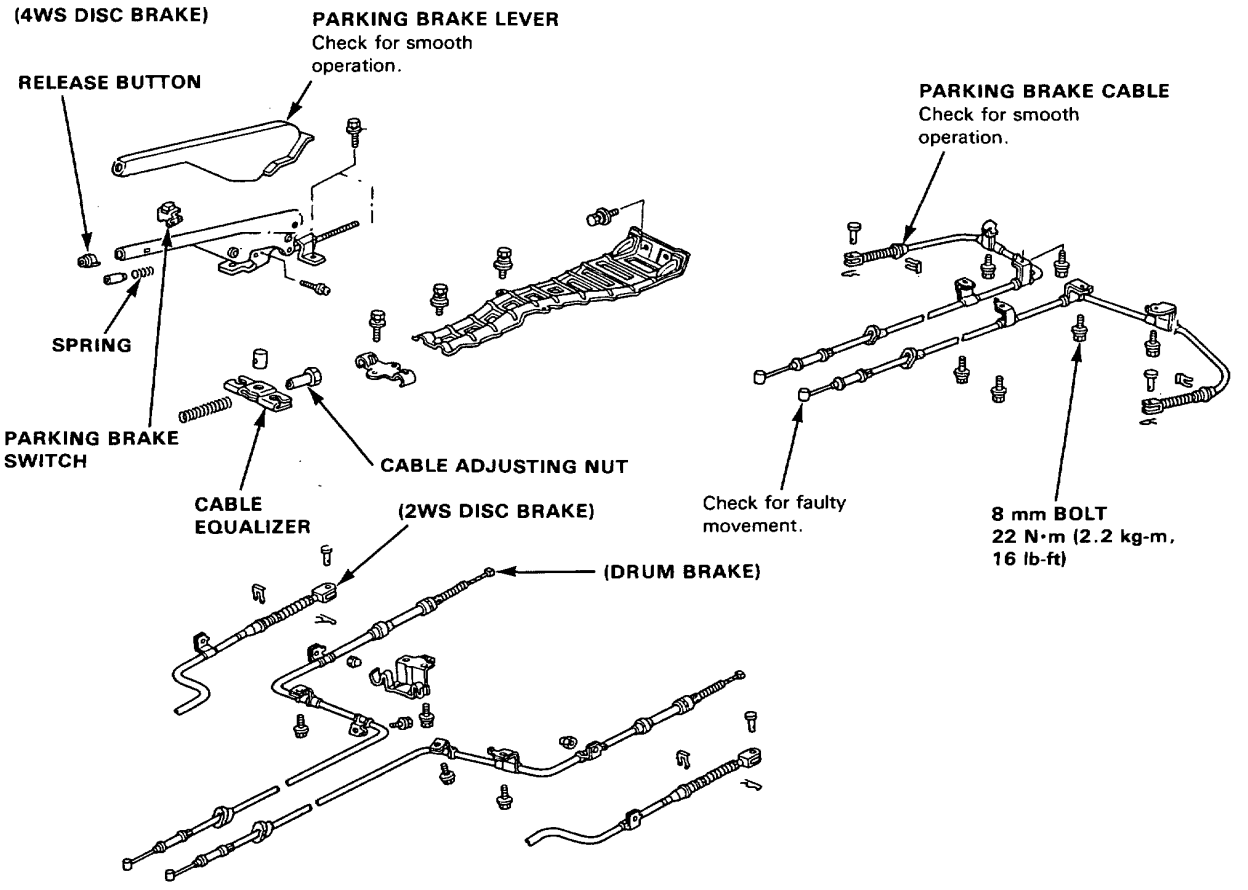
5. Install a new brake hose clip to the brake hose.
6. Connect the brake pipe to the brake hose.



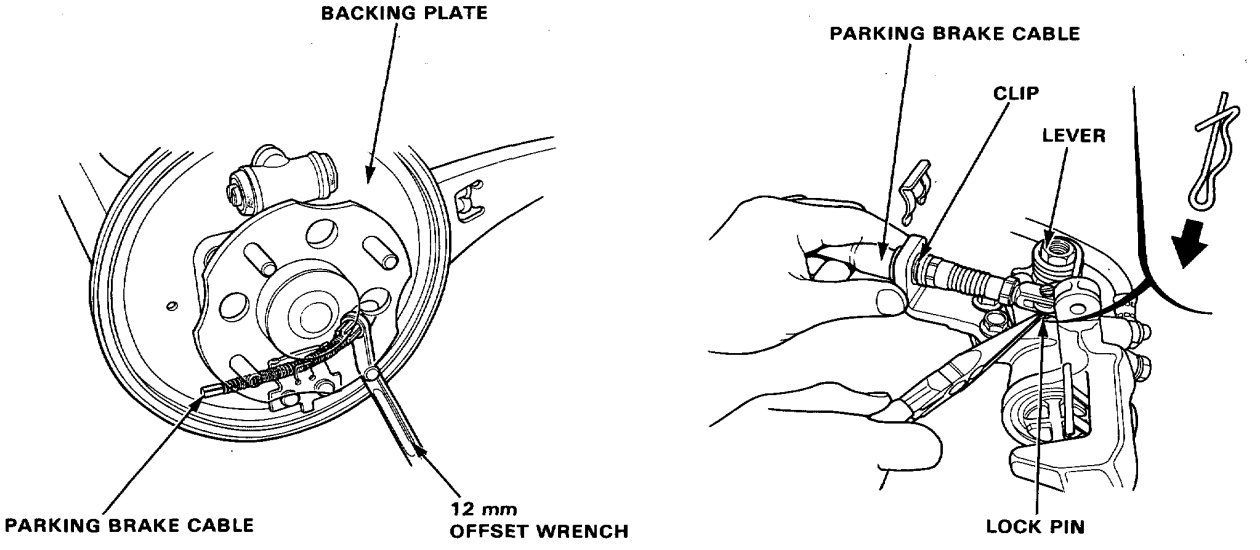
7. Connect the brake hose to the caliper.
8. Install the brake hose on the knuckle and damper mounting clamp.
9. After installing the brake hose, check the hose and line joints for leaks, and tighten if necessary.

Parking Brake

Disassembly and Reassembly



Disconnect the parking brake cable from the lever on the caliper by removing the lock pin.



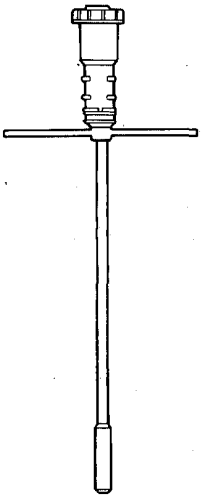
ALB

Special Tools 13-42
Illustrated Index 13-43
Circuit Diagram 13-44
ALB Checker
  Function Test 13-45
  Wheel Sensor Signal
  Confirmation.....13-47
Troubleshooting
  Dash Warning Light 13-48
  Symptom-to-System Chart.....13-50
  Flowcharts.....13-51
Hydraulic System
  Hydraulic Connections 13-63
  Relieving Accumulator/
  Line Pressure 13-64
Modulator
  Index/Inspection 13-65
Solenoid
  Solenoid Leak Test.....13-66
  Removal.....13-67
  Inspection 13-68
  Installation.....13-68
Piston
  Removal.....13-69
  Installation.....13-70
Power Unit
  Index/Inspection 13-71
  Disassembly/Reassembly 13-72
Accumulator Unit
  Index 13-73
  Accumulator/Pressure Switch ...13-74
  Accumulator Disposal 13-74
Master Cylinder
  Overhaul/Inspection 13-75
  Disassembly 13-76
  Reassembly 13-77
Bleeding.....13-79
Electronic Components
  Control Unit Replacement 13-80
  Relays Inspection 13-81
Pulsers/Sensors 13-81

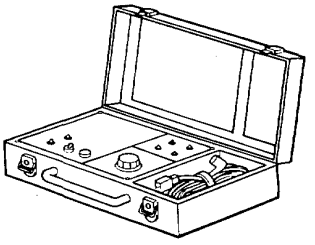


Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07HAA—SG00100	Bleeder T-Wrench	1	13-53, 13-64, 13-79
②	07HAJ—SG00601	ALB Checker	1	13-45, 13-47
	or			
	07508—SB00000	ALB Checker	1	13-45, 13-47
	—07HAJ—SG00400	Adaptor	1	13-45, 13-47



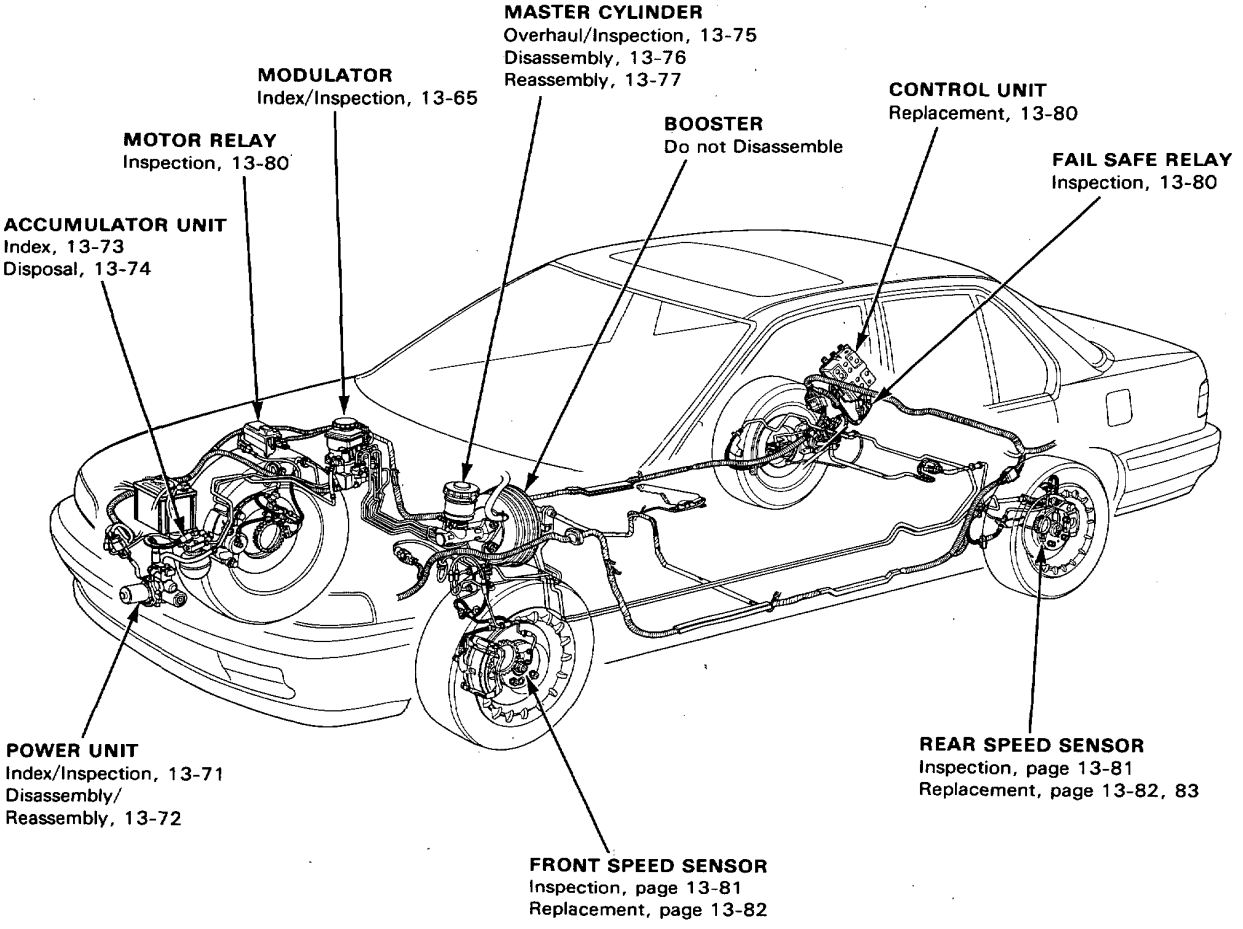
①



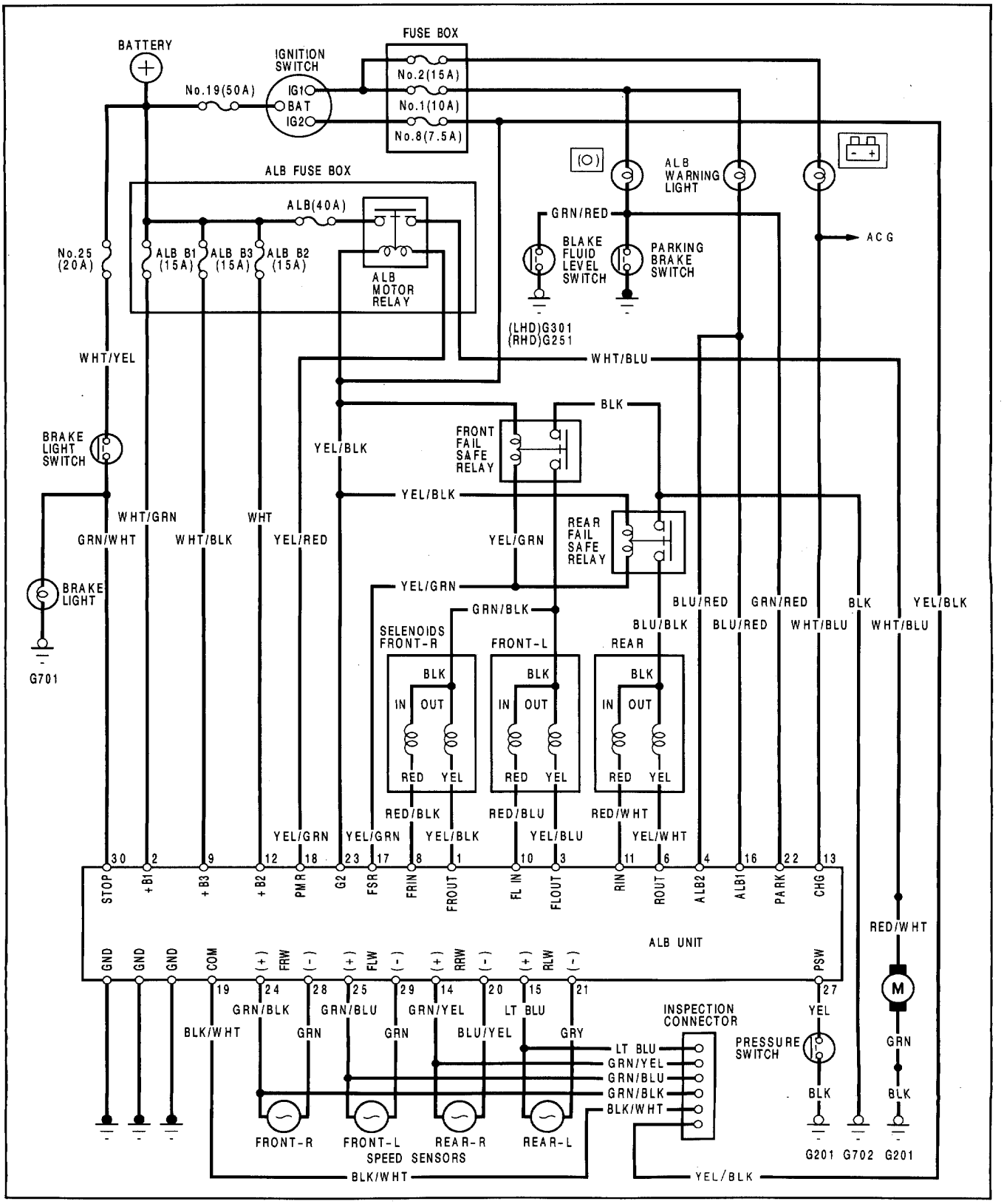
②

Illustrated Index

⚠WARNING The accumulator contains high pressure nitrogen gas, do not puncture expose to flame or attempt to disassemble the accumulator or it may explode; severe personal injury may result.



Circuit Diagram



ALB Checker

Function Test

NOTE:

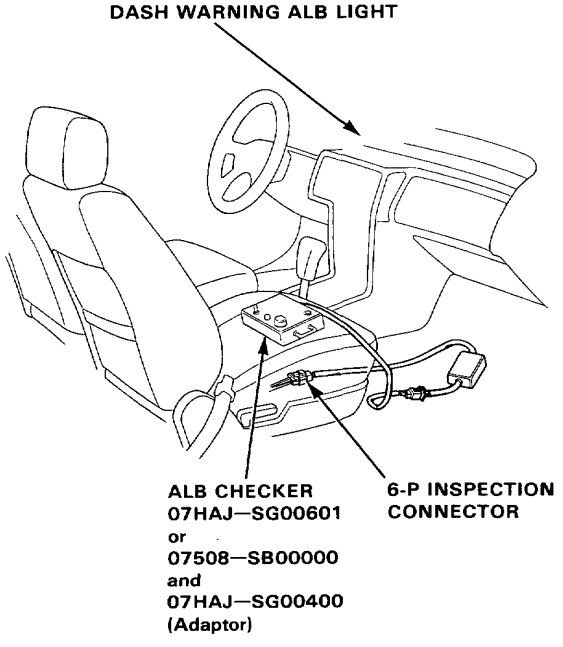
- The ALB checker is designed to confirm proper operation of the ALB system by simulating each system function and operating condition. Before using the checker, confirm that the dash ALB warning light is not indicating some other problem with the system. The light should go on when the ignition is first turned on and then go off and stay off two seconds after the engine is started.
- The checker should be used through all modes, 0-6, to confirm proper operation of the system, in any one of the following situations:

— After replacing any ALB system component.
— After replacing or bleeding the system fluid (0 mode not necessary).
— After any body or suspension repair that may have affected the sensors or their wiring.
— As part of P.D.I.

⚠WARNING Disconnect the ALB checker before driving the car. A collision can result from a reduction, or complete loss, of braking ability causing severe personal injury or death.

NOTE: Set the Pulse Selector switch to 50 when using ALB checker 07HAJ—SG00601.

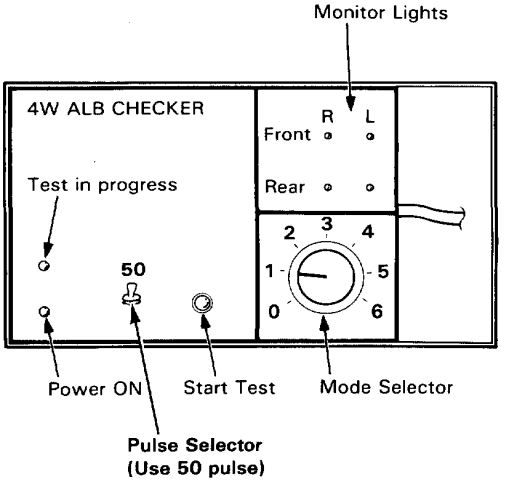
1. With the ignition switch off, disconnect the 6-P inspection connector from the connector cover under the passenger seat and connect the 6-P inspection connector to the ALB checker.



NOTE: Place the vehicle on level ground with the wheels blocked, put the transmission in neutral for manual transmission models, and in P for automatic transmission models.

2. Start the engine and release the parking brake,

3. Operate the ALB checker as follows,
   (1)Turn the Mode Selector switch to "1."
   (2)Push the Start Test switch:
   — The test in progress light should come ON.
   — In one or two more seconds, all four monitor lights should come on (If not the checker is faulty).
   — The dash warning ALB light should not come ON (If it comes on the checker harness to the 6-P connector connection is faulty).



(cont'd)

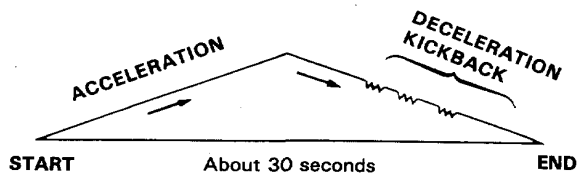
ALB Checker

Function Test (cont'd)

4. Turn the Mode Selector switch further to "2."

5. Depress the brake pedal and push the Start Test switch.
   The dash warning ALB light should not go on while the Test in Progress light is ON. There should be kickback on the brake pedal. If not as described, go to troubleshooting, page 13-50.

   NOTE: The operation sequence simulated by Modes 2, 3, 4, 5 and 6:



6. Turn the Mode Selector switch to 3, 4, 5.
   Perform step 5 for each of the test mode positions.

Mode 1:
Sends the simulated driving signal 0 km/h (0 mph) → 180 km/h (112.5 mph) → 0 km/h (0 mph) of each wheel to the control unit to check the control unit self diagnosis circuit. There should be NO kickback.

Mode 2:
Sends the driving signal of each wheel, then sends the lock signal of the rear left wheel to the control unit. There should be kickback.

Mode 3:
Sends the driving signal of each wheel, then sends the lock signal of the rear right wheel to the control unit. There should be kickback.

Mode 4:
Sends the driving signal of each wheel, then sends the lock signal of the front left wheel to the control unit. There should be kickback.

Mode 5:
Sends the driving signal of each wheel, then sends the lock signal of the front right wheel to the control unit. There should be kickback.

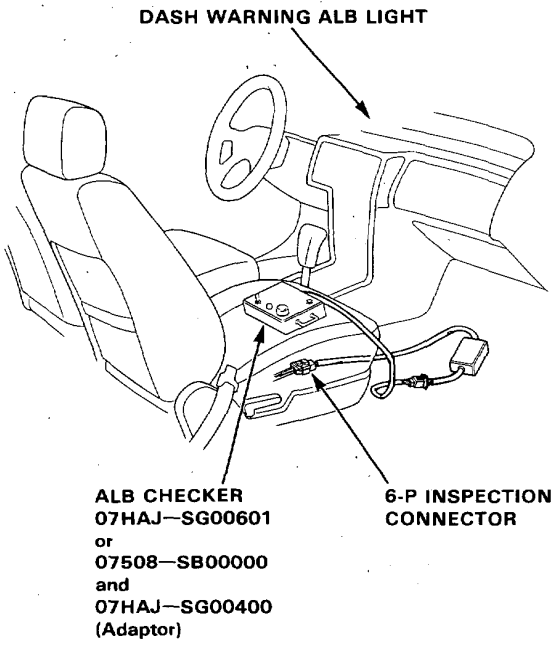
Sends the driving signal of each wheel, then sends the lock signal of both front wheels to the control unit. There should be strong kickback.

NOTE: If little or no kickback is felt from the brake pedal in modes 2-5, repeat the function test of modes 1-5 several times before beginning to troubleshoot other parts of the system.

Wheel Sensor Signal Confirmation

NOTE:
- Use the ALB checker (mode 0) to confirm proper wheel sensor operation.
- Set the Pulse Selector switch to 50 when using ALB checker 07HAJ—SG00601.

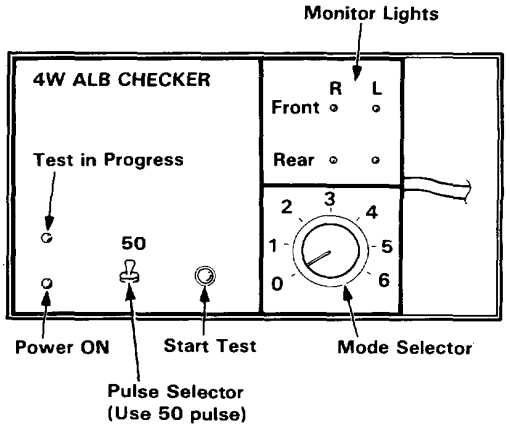
1. Disconnect the 6-P inspection connector from the connector cover under the passenger seat and connect the 6-P inspection connector to the ALB checker.



2. Raise the car so that all four wheels are off the ground and support on safety stands.

3. Turn the ignition switch ON.

4. Turn the Mode Selector switch to "0."



5. With the transmission in neutral, rotate each wheel briskly (one revolution per second) by hand, and confirm that its respective monitor light on the checker blinks as the wheel rotates.

NOTE:
- Rotating a wheel too slowly will produce only a weak blink of its monitor light that may be difficult to see.
- In bright sunlight, the monitor light may be difficult to see. Perform tests in a shaded area.
- In some instances, it may not be possible to spin the front wheels fast enough to get a monitor indication, if necessary, start the engine and slowly accelerate and decelerate the front wheels.
  The monitor lights should blink indicating a good wheel sensor signal.

If any monitor light fails to blink, check the suspected sensor, its air gap and its wiring/connectors.

Dash Warning Light

Temporary Driving Conditions:

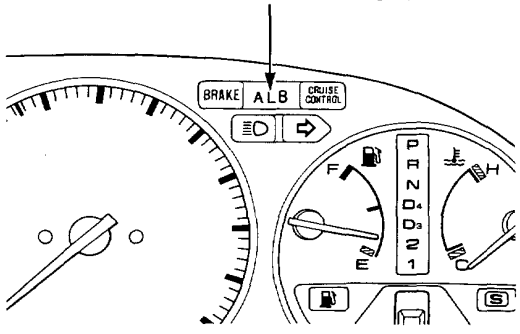
1. The dash warning light will come on and the control unit memorizes the problem under certain conditions.

   NOTE: Problem codes explained on pages 13-50.

   - The tire(s) adhesion is lost due to excessive cornering speed.
     Problem codes: 5, 5-4, 5-8.
   - The vehicle loses traction when starting from a stuck condition on a muddy, snowy, or sandy road.
     Problem code: 4.
   - When the parking brake is applied for more than 30 seconds while the vehicle is being driven.
     Problem code: 2.
   - The vehicle is driven on extremely rough road.

   The ALB system is OK, if the dash warning light: goes off after the engine is restarted.

DASH WARNING ALB LIGHT



2. If you receive a customer's report that the dash warning light, sometimes comes on, check the system using the ALB checker to confirm whether there is any trouble in the system.
   See page 13-45.

3. The dash warning light will come on and the LED (see page 13-49) will display a problem code when there is insufficient battery voltage to the control unit. An example would be when the battery is so weak that the car must be jump-started.
   After the battery is sufficiently recharged, the dash warning light will work normally after the engine is stopped and restarted.

   However, after recharging the battery, the LED problem code must be cleared from the control unit's memory by disconnecting the ALB B2 fuse for at least 3 seconds.

Warning Light Circuit:

1. The dash warning light, does not go on when the ignition switch is turned on.
   Check the following items. If they are OK, check the control unit connectors.
   If not loose or disconnected, install a new control unit and recheck:

   - Blown dash warning light bulb.
   - Open circuit in YEL lead between No.1 fuse and combination meter.
   - Open circuit in BLU/RED lead between combination meter and control unit.
   - Loose component grounding of the control unit to the body.

2. The dash warning light remains ON or after the engine is started, however the LED on the control unit does not blink any code, check for the following:

   - Loose or poor connection of the wire harness at the control unit.
   - Faulty ALB B2 (15 A) fuse.
   - Open circuit in WHT lead between ALB B2 (15 A) fuse and control unit.
   - Open circuit in YEL/BLK lead between fuse No.8 (7.5 A) and fail safe relay(s),
   - Open or short circuit in the YEL/GRN lead between control units.
   - Short circuit in BLU/RED lead between combination meter and control unit.
   - Open circuit in WHT/BLU lead between alternator and control unit.

   If the problem is not found substitute a known-good control unit and recheck whether the warning light remains ON.

Troubleshooting

Symptom-to-System Chart

PROBLEM CODE		PROBLEMATIC COMPONENT/ SYSTEM	AFFECTED				See page	OTHER COMPONENT	See page
MAIN CODE	SUB CODE		FRONT RIGHT	FRONT LEFT	REAR RIGHT	REAR LEFT			
1	–	Hydraulic Controlled Components	–	–	–	–	13-51	-ALB fuse -Motor relay -Pressure Switch -Accumulator -Modulator	13-80
2	–	Parking brake switch-related problem	–	–	–	–	13-54	Brake fluid level switch BRAKE light	
3	1	Pulser(s)	○				13-81		
	2			○					
	4				○	○			
4	1	Speed sensor	○				13-55		
	2			○					
	4				○				
	8					○			
5	–	Speed sensor (s)			○	○	13-56	-Modulator	
5	4				○				
	8					○			
6	–	Fail safe relay	–	–	–	–	13-57 (Function Test)	Front or rear fail safe relay	
6	1		–	–	–	–		Front fail safe relay	
	4		–	–	–	–		Rear fail safe relay	
7	1	Solenoid related problem (Open or short)	○				13-61	ALB 3 fuse	
	2			○				ALB 1 fuse	
	4				○	○		-Rear fail safe relay -Pressure Switch -Motor relay	

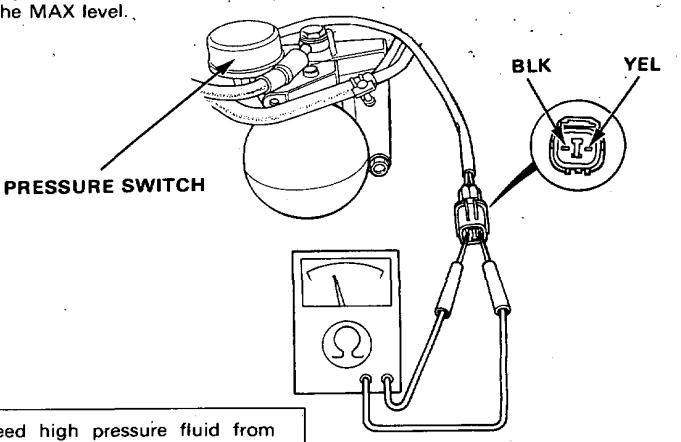
NOTE: In the event of simultaneous speed sensor or solenoid problems (codes 4 or 7), the control unit will only indicate the higher number sub-code.

Flowchart

Problem Code 1: Hydraulic Controlled Components.

NOTE: The LED does not blink when the following failures occur.
- The contact points of the motor relay remain closed (the motor runs continuously even after the ignition key is removed).
- YEL/RED lead is shorted or the control unit is internally shorted (the motor stops when the ignition switch is turned lock).

Pre-test steps:
- Check ALB 40A Fuse.
- Check all brake system hoses and pipes (low and high pressure) for signs of leaking, bending or kinking.
- Check reservoir fluid level, and if necessary, fill to the MAX level.



Disconnect the pressure switch connector and check the continuity between BLK and YEL terminals.

Is there continuity? YES → Bleed high pressure fluid from the maintenance bleeder with the ALB T-wrench. (see page 13-79).

NO

Check the continuity of pressure switch between BLK and YEL terminals.

Is there continuity? YES → **Replace the pressure switch (closed).**

NO

Reconnect the pressure switch connector.

Bleed high pressure fluid from the maintenance bleeder with the ALB T-wrench. (see page 13-79). Jack up the front of car and support with safety stands, then run the engine in gear above 6 mph (10 km/h).

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

(To page 13-52).

(cont'd)

Flowchart (cont'd)

(From page 13-51)

Does the pump motor run?
- YES → (To page 13-53)
- NO →

Disconnect the 18P connector from the control unit.

Check for continuity between the YEL terminal and body ground.

Is there continuity?
- YES → **Repair short in YEL wire between the control unit and pressure switch.**
- NO →

Connect the YEL/RED terminal to body ground using a jumper wire. *Turn the ignition switch ON.*

Does the pump motor run?
- YES → **Faulty control unit.**
- NO →

Remove the pump motor relay and check the pump motor relay (page 13-80).

Connect the motor side ⊕ terminal of the pump motor relay and its output terminal with jumper wire.

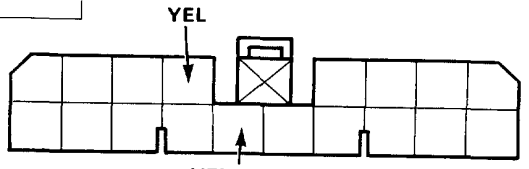
Does the pump motor run?
- NO → (To page 19-54)
- YES →

Check voltage between the pump motor relay motor side ⊕ terminal and body ground (−).

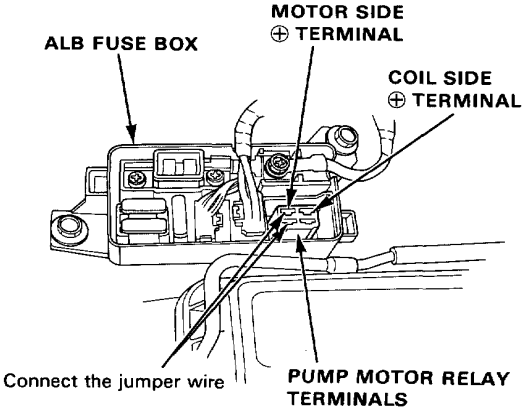
Is there battery voltage?
- NO → **Repair open in YEL/BLK wire between the No.8 (7.5 A) fuse and pump motor relay.**
- YES →

Repair open in YEL/RED wire between the control unit and pump motor relay.

CONTROL UNIT: 18P Connector



View from wire side



(From page 13-52)

Does the pump motor run with an increasingly loud, raspy sound?

NO → **Pump runs with a constant soft sound: Bleed air from ALB system using the procedure on page 13-79 and check the pump sound again.**

YES

Does the pump motor stop after about 60 seconds?

NO → **Pump stops after about 120 seconds: faulty pressure switch (open).**

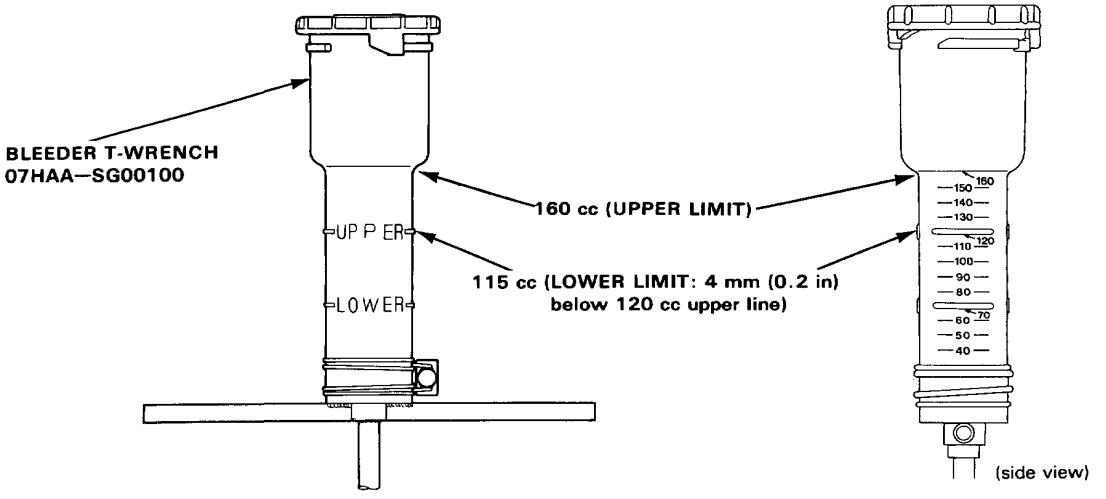
YES

Does the reservoir fluid level go down, and are there no bubbles in the modulator reservoir tank?

NO →
- **If level stays the same and there are bubbles in the modulator reservoir tank, check the accumulator fluid quantity by bleeding the high pressure line with the Bleeder T-wrench:**
  - **—If over 160 cc (upper limit), faulty accumulator.**
  - **—If under 115 cc (lower limit), modulator inlet solenoid leak or accumulator leak.**
- **If level goes up: faulty modulator assembly.**

YES

System is OK; recheck pump motor, to confirm no intermittent problem.



NOTE: The fluid enters the reservoir under pressure; wait 1 or 2 minutes for air bubbles to disappear and level to stabilize.

(cont'd)

Flowchart (cont'd)

(From page 13-53)

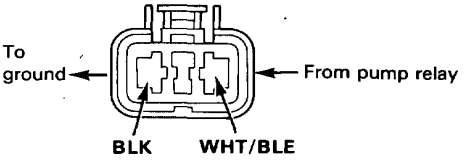
Measure voltage between the WHT/BLU terminal (+) of the pump motor and body ground (–).

Is there battery voltage?

NO → **Repair open in WHT/BLU wire between motor relay and pump motor, or open in BLK wire between pump motor and ground or poor ground.**

YES → **Faulty pump motor.**

PUMP MOTOR HARNESS SIDE CONNECTOR



View from terminal side

Problem code 2: Parking Brake Switch Related Problem

If the parking brake has been released, the following items are possible causes. If they are OK, check the control unit connectors for good connection. If not loose or disconnected, substitute a known-good control unit and recheck.

NOTE: Before Troubleshooting Problem Code 2, remove the ALB 2 fuse for three seconds to clear the control unit's memory, then test drive the car.

If the dash warning light and LED stay off, the probability is that the car was driven with the parking brake applied.

- The parking brake is applied for more than 30 seconds while driving.
- The brake fluid level in the master cylinder is too low.
- GRN/RED lead is shorted between the [BRAKE] warning light and parking brake switch.
- GRN/RED lead is shorted between the [BRAKE] warning light and brake fluid level switch.
- The [BRAKE] warning light is blown.
- GRN/RED has an open between the [BRAKE] warning light and parking brake.
- GRN/RED has an open between the parking brake switch and control unit.

Problem Code 4-1 to 4-8: Speed Sensor

NOTE: Control unit will only indicate the higher number sub-code.

Ignition switch: OFF

Disconnect wire harness from speed sensor.

Check for resistance between sensor terminals.

Is there 500–1,000 Ω? NO → **Faulty speed sensor.**

YES

Disconnect the 18P connector from the control unit.

Check each wire for continuity between the sensor and control unit:
GRN/BLK: Front Right Positive
GRN/BLU: Front Left Positive
GRN/YEL: Rear Right Positive
LT BLU: Rear Left Positive
GRN: Front Right Negative
BRN: Front Left Negative
BLU/YEL: Rear Right Negative
GRY: Rear Left Negative

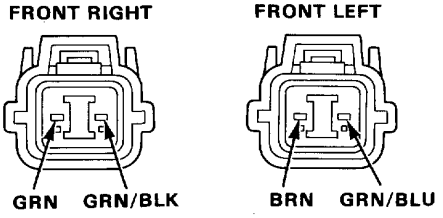
Is there continuity? NO → **Repair open in sensor wire:**

GRN/BLK: Front Right Positive
GRN/BLU: Front Left Positive
GRN/YEL: Rear Right Positive
LT BLU: Rear Left Positive
GRN: Front Right Negative
BRN: Front Left Negative
BLU/YEL: Rear Right Negative
GRY: Rear Left Negative

YES

Faulty control unit

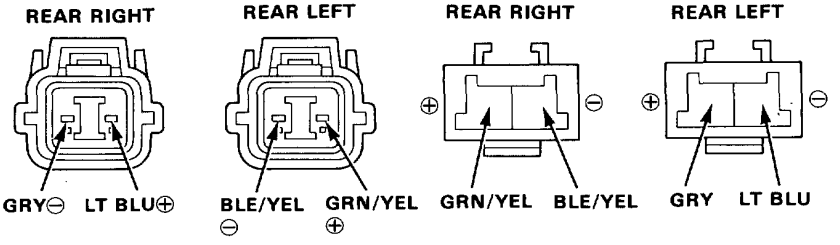
SENSOR SIDE CONNECTOR



View from terminal side

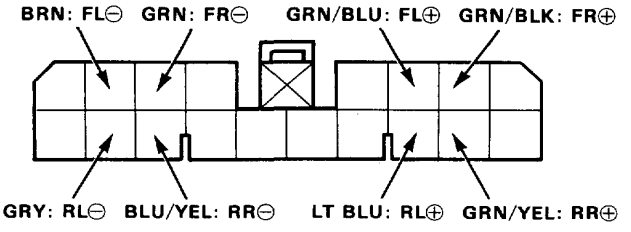
4WS: SENSOR SIDE CONNECTOR

2WS: SENSOR SIDE CONNECTOR



View from terminal side

CONTROL UNIT 18P CONNECTOR



View from wire side

(cont'd)

Flowchart (cont'd)

Problem Code 5 to 5-4, 5-8: Speed Sensor(s)

Disconnect wire harness from speed sensor.

Check for resistance between sensor terminals.

Is there 500–1,000 Ω? — NO → **Faulty speed sensor.**

YES

Disconnect the 18P connector from the control unit.

Check each wire for continuity between the sensor and control unit:
GRN/BLK: Front Right Positive
GRN/BLU: Front Left Positive
GRN/YEL: Rear Right Positive
LT BLU: Rear Left Positive
GRN: Front Right Negative
BRN: Front Left Negative
BLU/YEL: Rear Right Negative
GRY: Rear Left Negative

Is there continuity? — NO → **Repair open in sensor wire:**

GRN/BLK: Front Right Positive **GRN: Front Right Negative**
GRN/BLU: Front Left Positive **BRN: Front Left Negative**
GRN/YEL: Rear Right Positive **BLU/YEL: Rear Right Negative**
LT BLU: Rear Left Positive **GRY: Rear Left Negative**

YES

Reconnect the 18P connector to the control unit and connectors to the speed sensors.

Connect ALB checker to inspection connector.

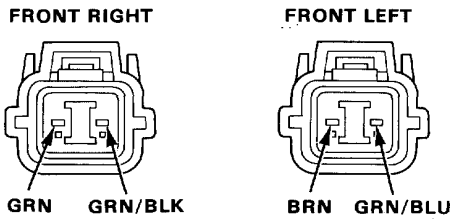
Check ALB function in MODE 2 and 3.

Does it work properly? — NO → **Faulty modulator.**

YES

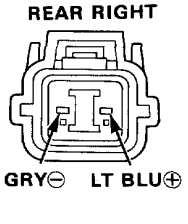
- **Incorrect the air gap (page 13-81)**
- **Faulty control unit.**

SENSOR SIDE CONNECTOR

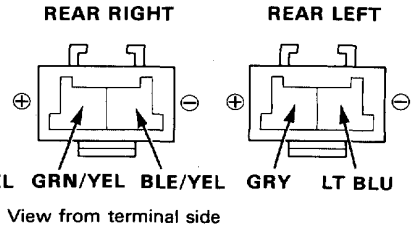


View from terminal side

4WS: SENSOR SIDE CONNECTOR

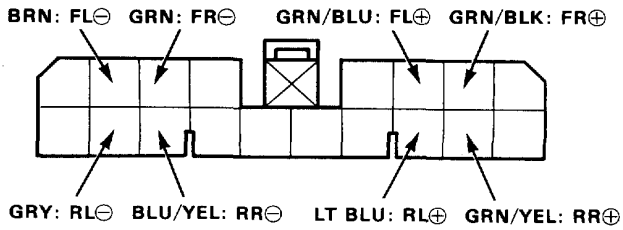


2WS: SENSOR SIDE CONNECTOR



View from terminal side

CONTROL UNIT 18P CONNECTOR



View from wire side.

Problem Code 6-1: Front Fail Safe Relay Circuit

Remove front fail safe relay.

Check relay function (page 13-80).

Does it work properly? NO → **Faulty the front fail safe relay.**

YES

Check for continuity between BLK lead and body ground.

Is there continuity? NO → **Repair open in BLK wire between the fail safe relay and ground or poor ground.**

YES

Turn ignition switch ON.

Check for voltage between YEL/BLK lead (+) and body ground (–).

Is battery voltage available? NO → **Repair open in YEL/BLK wire between the fail safe relay and No.8 fuse (7.5 A).**

YES

Turn ignition switch OFF.

Disconnect the 3P connectors from the front solenoids.

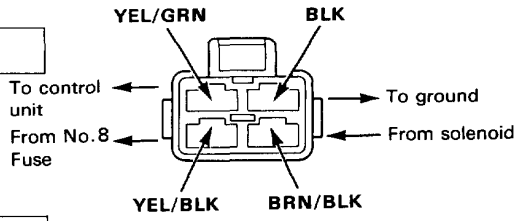
Check for continuity in BRN/BLK lead between fail safe relay and solenoids.

Is there continuity? NO → **Repair open in BRN/BLK wire between the solenoids and fail safe relay.**

YES

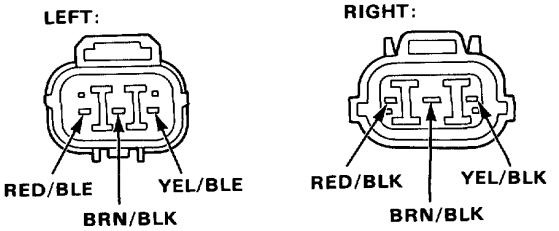
(To page 13-58)

FRONT FAIL SAFE RELAY CONNECTOR HARNESS SIDE



View from terminal side

FRONT SOLENOIDS CONNECTOR HARNESS SIDE



View from terminal side

(cont'd)

Flowchart (cont'd)

(From page 13-57)

Check for resistance between RED and BLK terminals of front solenoid.

Is there 1-3 Ω? NO → **Faulty solenoid.**

YES

Check for resistance between YEL and BLK terminals of front solenoid.

Is there 1-3 Ω? NO → **Faulty solenoid.**

YES

Disconnect the 12P connector from the control unit.

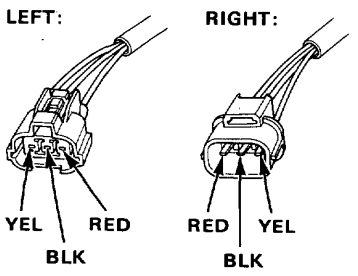
Check for continuity between control unit and front solenoid:
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet.

Is there continuity? NO → **Repair open in wire:**
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

YES

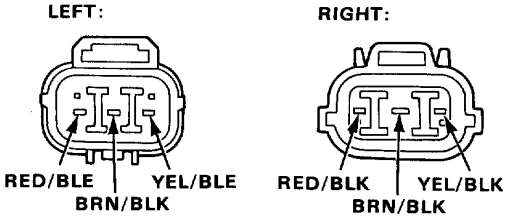
- **Faulty control unit.**
- **Incorrect air gap (page 13-81).**

FRONT SOLENOID CONNECTOR



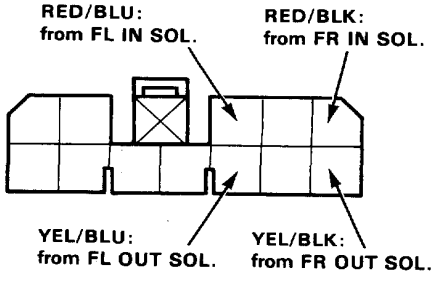
View from terminal side

FRONT SOLENOIDS CONNECTOR HARNESS SIDE



View from terminal side

CONTROL UNIT 12P CONNECTOR



View from wire side.

Problem Code 6-4: Rear Fail Safe Relay Circuit

Remove rear fail safe relay.

Check relay function (page 13-80).

Does it work properly? NO → **Faulty relay.**

YES

Check for continuity between BLK lead of wire harness and body ground.

Is there continuity? NO → **Repair open in BLK wire between the relay and ground or poor ground.**

YES

Turn ignition switch ON.

Check for voltage between YEL/BLK lead (+) of wire harness and body ground (–).

Is battery voltage available? NO → **Repair open in YEL/BLK wire between the relay and No.8 fuse.**

YES

Turn ignition switch off.

Disconnect the 3P connector from the rear solenoid.

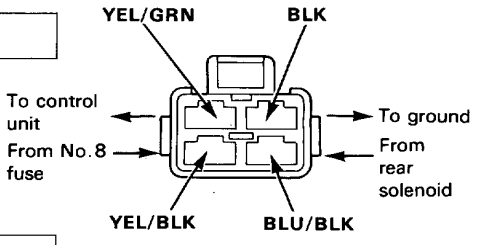
Check for continuity in BLU/BLK lead between fail safe relay and solenoid.

Is there continuity? NO → **Repair open in BLU/BLK wire between the relay and solenoid.**

YES

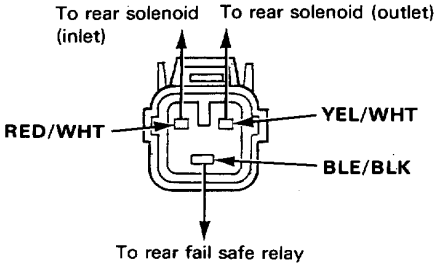
(To page 13-60)

REAR FAIL SAFE RELAY CONNECTOR HARNESS SIDE



View from terminal side

REAR SOLENOID CONNECTOR HARNESS SIDE



View from terminal side

(cont'd)

Flowchart (cont'd)

(From page 13-59)

Disconnect the 18P and 12P connectors from the control unit.

Check for continuity in YEL/GRN lead between fail safe relay and control unit.

Is there continuity? NO → **Repair open in YEL/GRN wire between the relay and control unit.**

YES

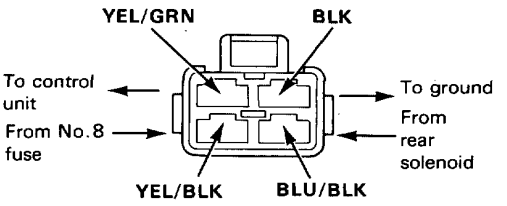
Check for continuity between control unit and rear solenoid.
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

Is there continuity: NO → **Repair open in wire between the solenoid and control unit:**
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet.

YES

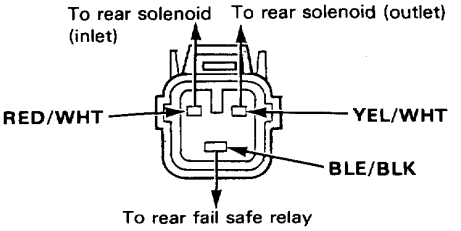
Faulty control unit.

REAR FAIL SAFE RELAY CONNECTOR
HARNESS SIDE



View from terminal side

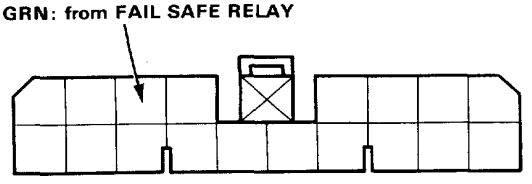
REAR SOLENOID CONNECTOR
HARNESS SIDE



View from terminal side

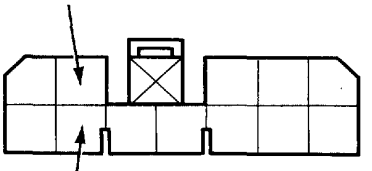
CONTROL UNIT 18P CONNECTOR

GRN: from FAIL SAFE RELAY



12P CONNECTOR

RED/WHT: from REAR IN SOL.



YEL/WHT: from REAR OUT SOL.

View from wire side

Problem Code 7-1 and 7-2 Front Solenoid Related Problem

Disconnect wire harness from front solenoids.

Check for resistance between RED and BLK terminals of front solenoid.

Is there 1-3 Ω? NO → **Faulty solenoid.**

YES

Check for resistance between YEL and BLK terminals of front solenoid.

Is there 1-3 Ω? NO → **Faulty solenoid.**

YES

Disconnect the 12P connector from the control unit.

Check for continuity between control unit and front solenoid:
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet.

Is there continuity ? NO → **Repair open in wire:**
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

YES

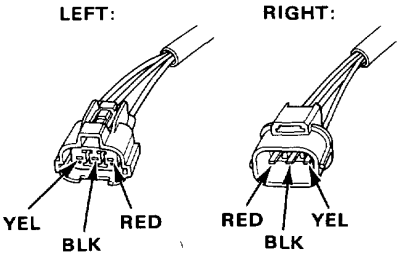
Check for continuity between control unit and body ground.
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

Is there continuity? YES → **Repair short in wire:**
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

NO

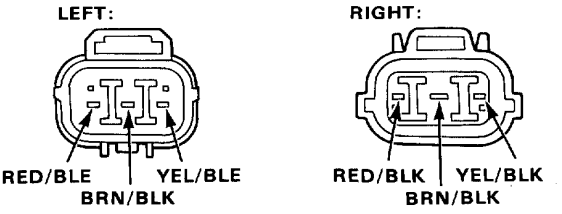
- **Faulty control unit.**
- **Incorrect air gap (page 13-81).**

FRONT SOLENOID CONNECTOR



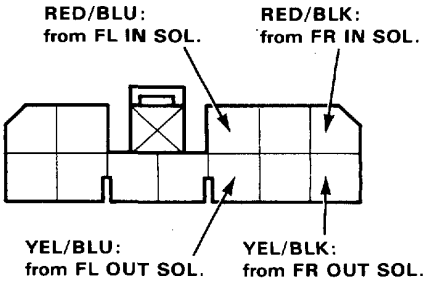
View from terminal side

FRONT SOLENOIDS CONNECTOR HARNESS SIDE



View from terminal side

CONTROL UNIT 12P CONNECTOR



View from wire side

(cont'd)

Flowchart (cont'd)

Problem Code 7-4: Rear Solenoid Related Problem

Disconnect wire harness from rear solenoid.

Check for resistance between RED and BLK terminals of rear solenoid.

Is there 1-3 Ω? NO → **Faulty solenoid.**

YES

Check for resistance between YEL and BLK terminals of rear solenoid.

Is there 1-3 Ω? NO → **Faulty solenoid.**

YES

Disconnect the 12P connector from the control unit.

Check for continuity between control unit and rear solenoid:
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

Is there continuity ? NO → **Repair open in wire between the rear solenoid and control unit:**
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

YES

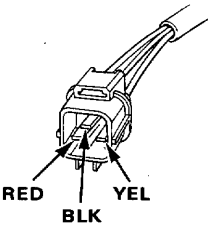
Check for continuity between control unit and body ground.
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

Is there continuity? YES → **Repair short in wire:**
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

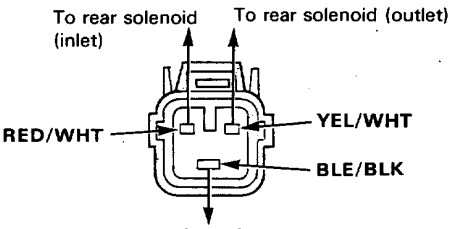
NO

Faulty control unit.

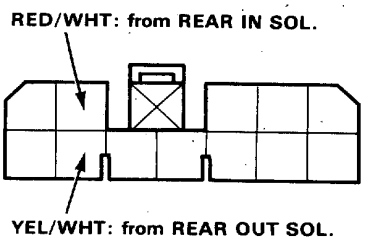
REAR SOLENOID CONNECTOR



REAR SOLENOID CONNECTOR HARNESS SIDE



View from terminal side



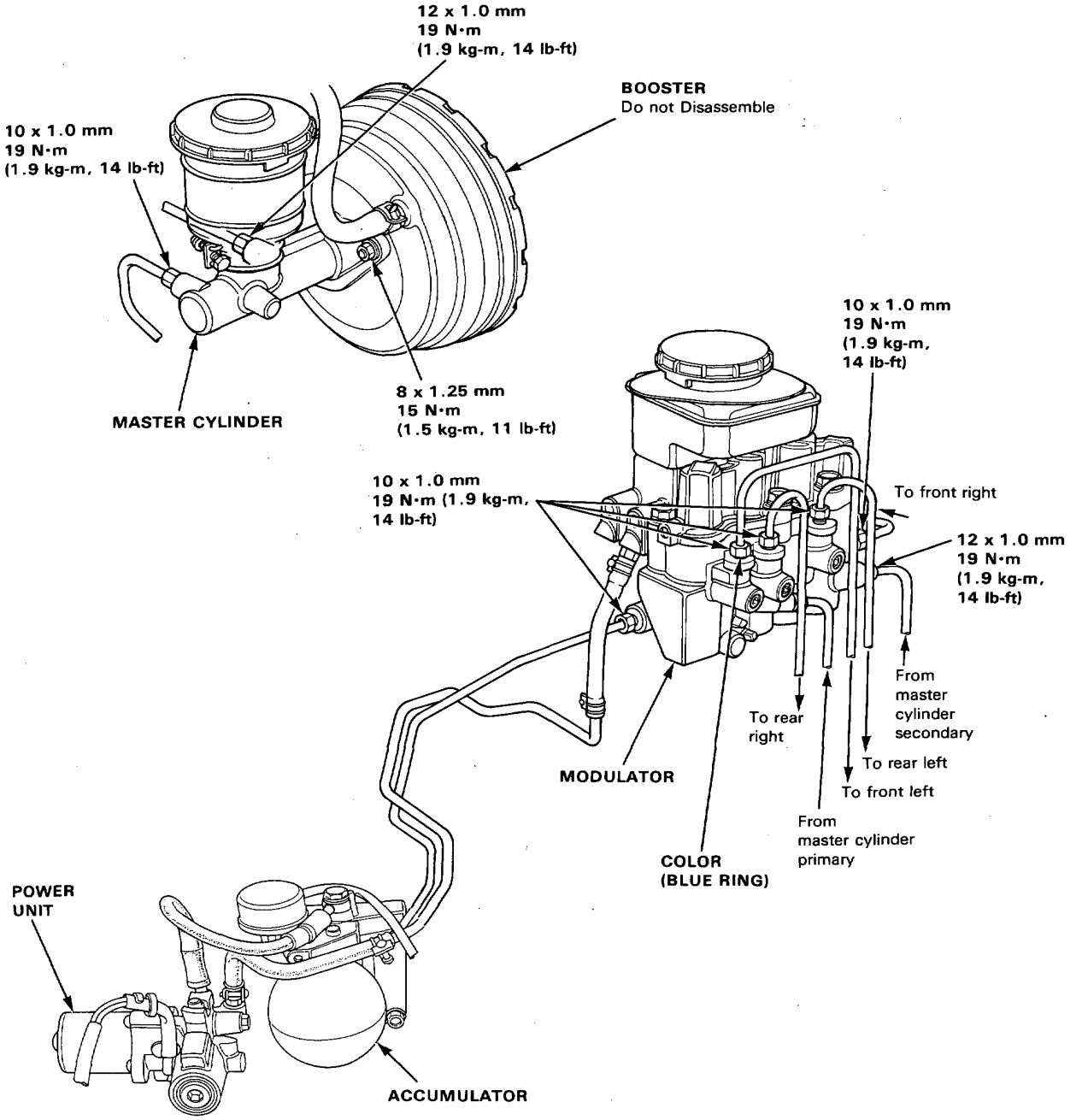
View from wire side.

Hydraulic System

Hydraulic Connections

CAUTION:

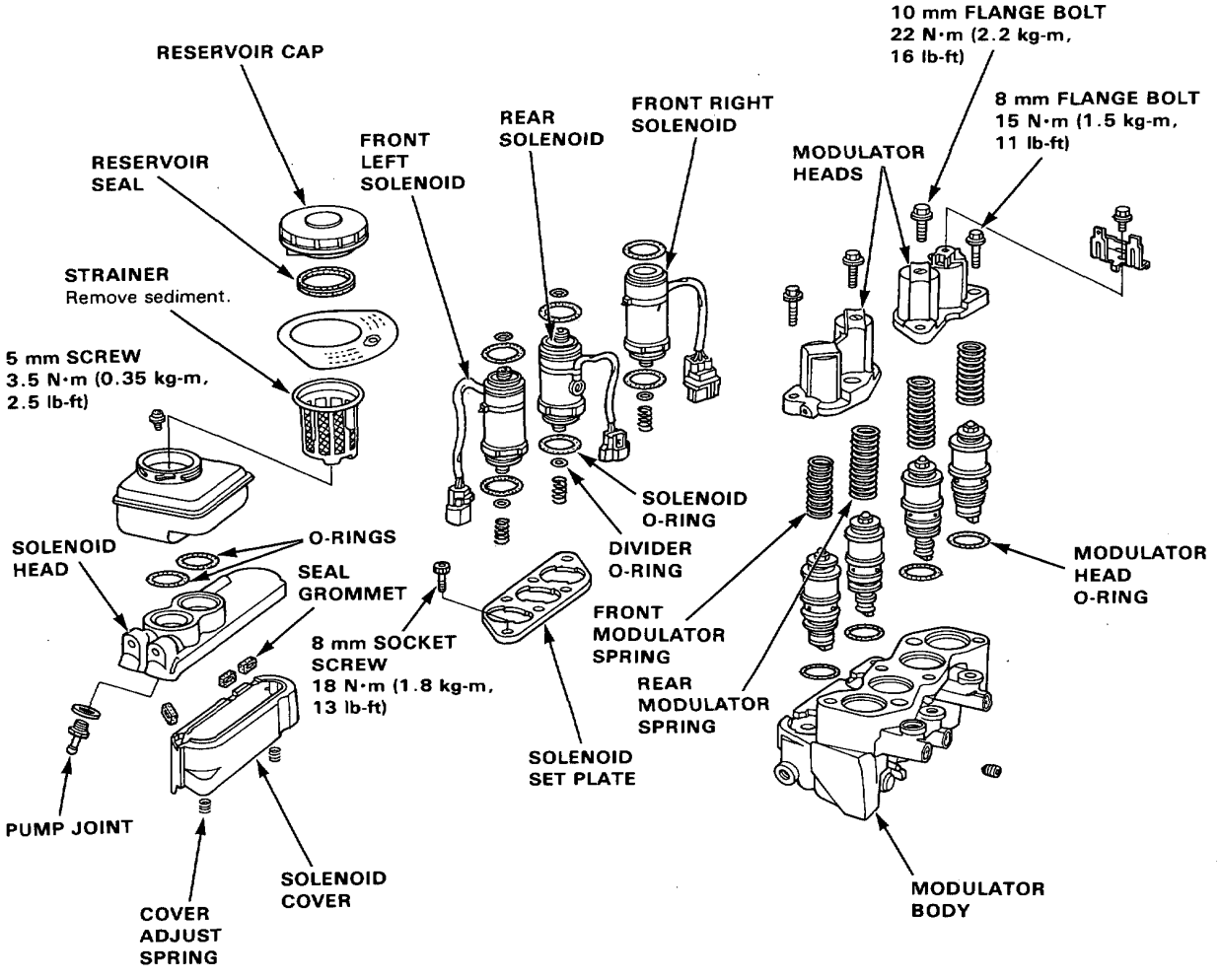
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- The brake pipes and modulator pipe fittings are color coded.



Modulator

Index/Inspection

CAUTION:
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Use only new DOT 3 or DOT 4 clean brake fluid.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid.
- Replace all rubber parts with new ones whenever the modulator is disassembled.



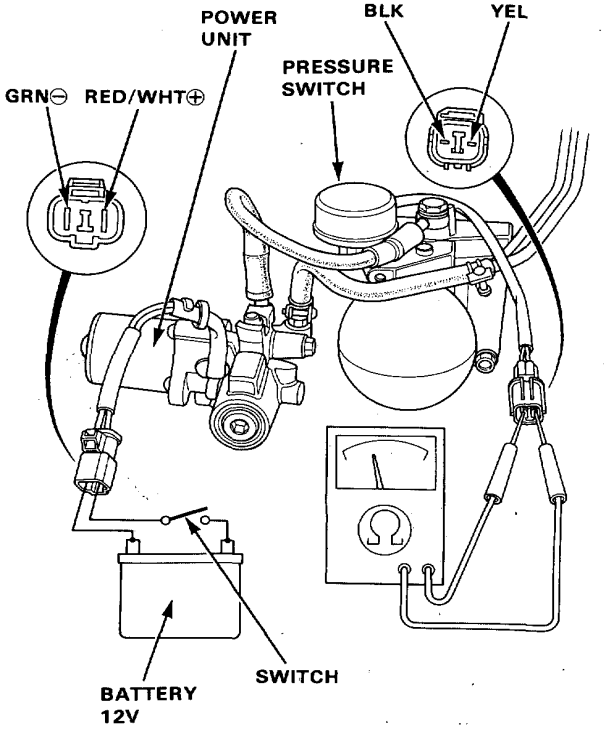
Solenoid

Solenoid Leak Test

1. Connect circuit tester (Ω range) between the BLK and YEL terminals of the accumulator pressure switch connector.

2. Attach the positive (+) lead of a fully charged 12V battery to the RED/WHT terminal of the power unit motor connector and negative (−) lead to the GRN terminal, and install a switch between as shown.

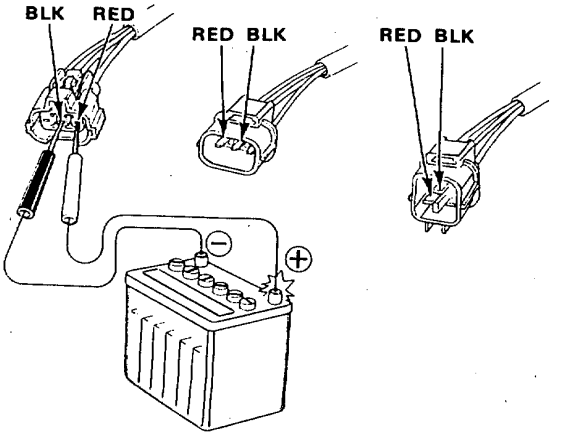
3. Turn the switch on to allow sufficient pressure to build up within the accumulator and check for continuity with the circuit tester. If the circuit tester shows continuity (pressure switch turned on), run the power unit for 4 seconds more, then turn the switch off.



Check for continuity 1 minute after switch was turned off.
No continuity: Leaky solenoid (if the pipe joint is tight) or faulty divider O-ring.

4. Apply 12 V across the BLK and RED terminals of the solenoid connector momentarily.

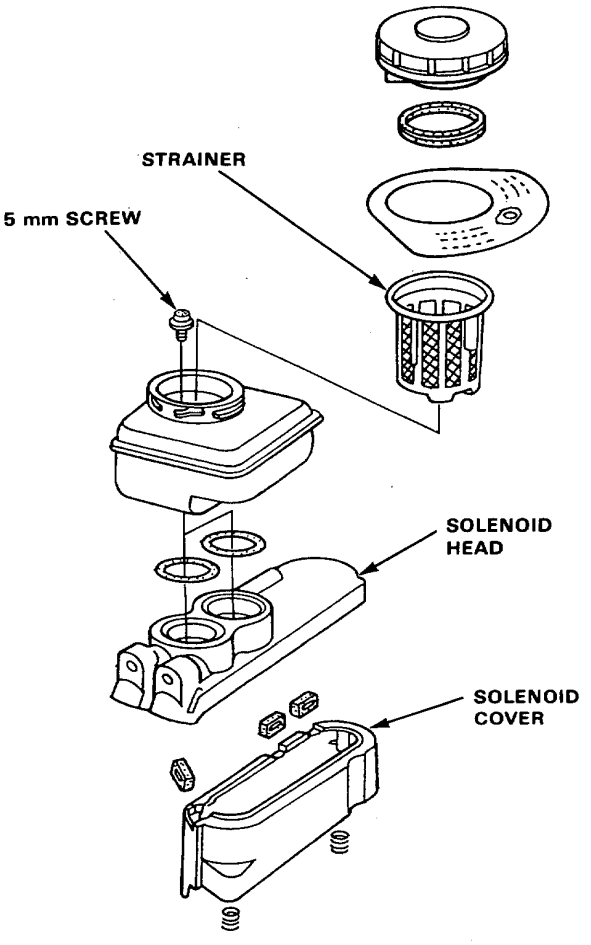
NOTE: Modulator reservoir may overflow.



- Check if the solenoid hisses or squeaks. Replace the modulator if the solenoid hisses or squeaks.
- Make sure that the solenoid does not hiss or squeak after it has clicked into position. Replace the modulator if the solenoid 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.

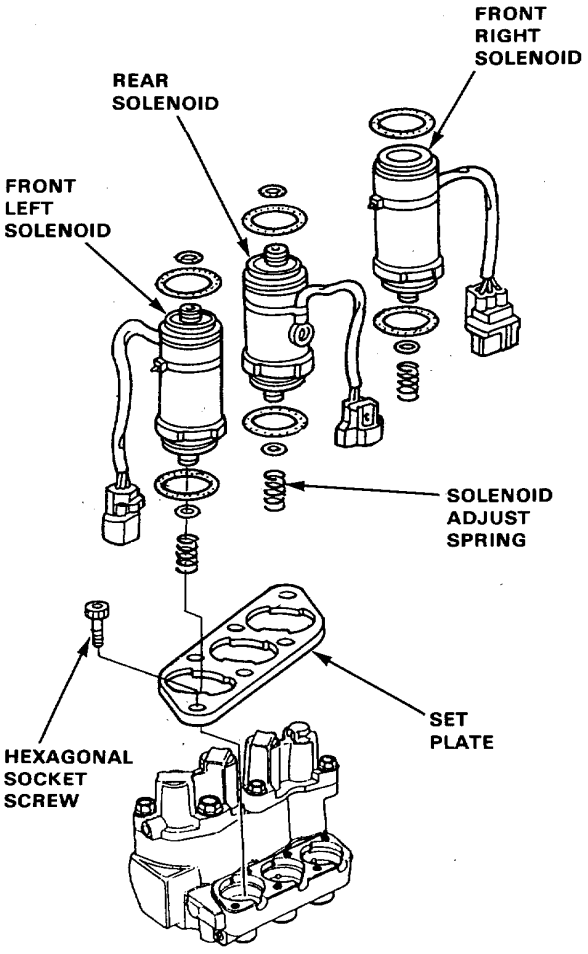
Removal

1. Drain the brake fluid from the modulator tank.
2. Drain the high pressure brake hose (page 13-64).
3. Disconnect the inlet hose.
4. Remove the reservoir strainer.
5. Remove the 5 mm screws and remove the reservoir.
6. Screw the 6 mm bolt into the threaded hole in the center of the solenoid head, reaise the solenoid head parallel to the ground and remove it.
7. Remove the solenoid cover.



8. Remove the hexagonal socket screws and loosen the solenoid set plate.
9. Turn the solenoid valves several times until they move freely and turn the solenoid valves 1/2 turn to align their projection with the cutout in the set plate.
   Remove the solenoid valves together with the set plate.

CAUTION: The solenoid valves are delicate parts. Be careful not to drop them.



Solenoid

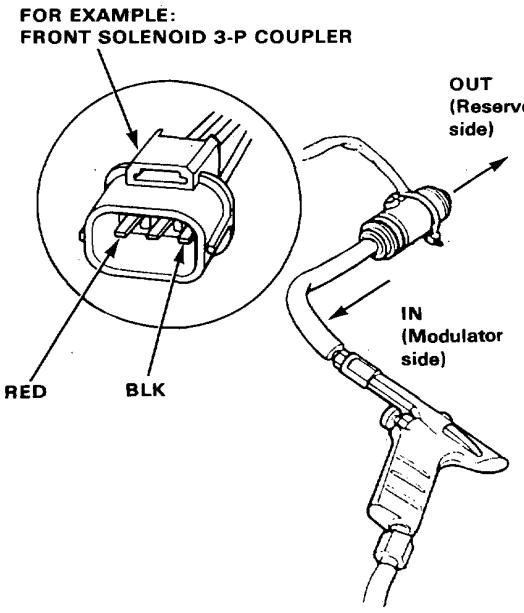
Inspection

1. Connect a tube to the inlet of the solenoid valve. Apply compressed air to the solenoid valve through the tube.
2. Check the solenoid valve for proper operation by connecting a 12 V fully charged battery to the 3-P coupler terminals:

   Voltage not applied: There should be no air flow.

   Black — Red: There should be air flow through IN and OUT.

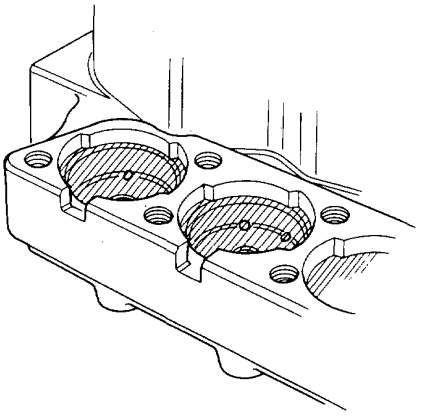
   Black — Yellow: There should be air flow through IN.



Installation

1. Fill the modulator body with brake fluid up to the step in the solenoid mounting hole.

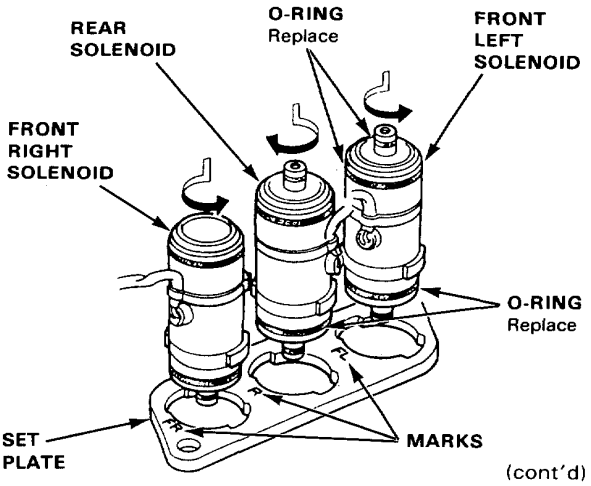
   NOTE: On solenoid valve assembly, place shop rags over the solenoid valve and under the modulator valve to prevent the brake fluid from spilling on the valve.



2. Coat the O-ring with the clean brake fluid and install the O-ring onto the solenoid valve.
3. Install the solenoid valves on the set plate.

   ⚠WARNING Each solenoid valve and set plate are marked for correct installation. If the solenoid valves are interchanged, the system will not work properly. Refer to the marks and be sure to install them in correct positions.

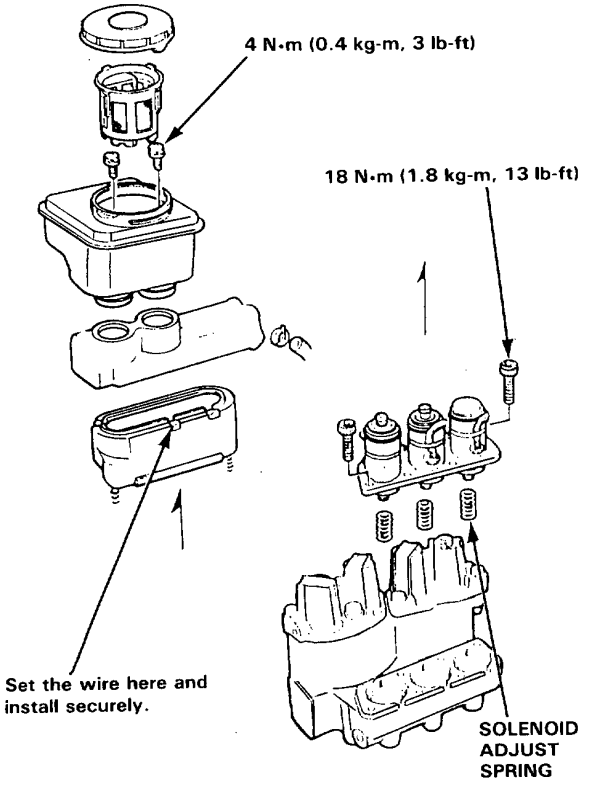
   - Align the projection on the solenoid valve with the cutout in the set plate and turn the valve 1/2 turn. The solenoid wire should face rearward.



(cont'd)

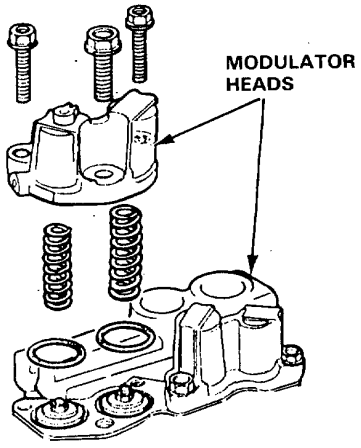
Piston

4. Install the solenoid adjust springs on the modulator body.
5. Install the solenoid valves and set plate and secure with the hexagonal socket screws.
6. Install the solenoid cover and solenoid head.
7. Install the reservoir tank.
8. Install the tank filter.
9. Connect the low pressure hose.



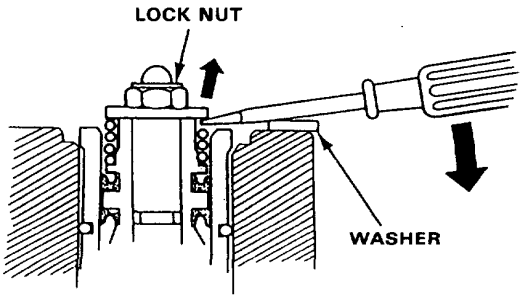
Removal

1. Remove the modulator heads.



2. Insert the driver into the spring, pry off the piston assembly until it lifts up slightly and pull out the lock nut with a pair of pliers.

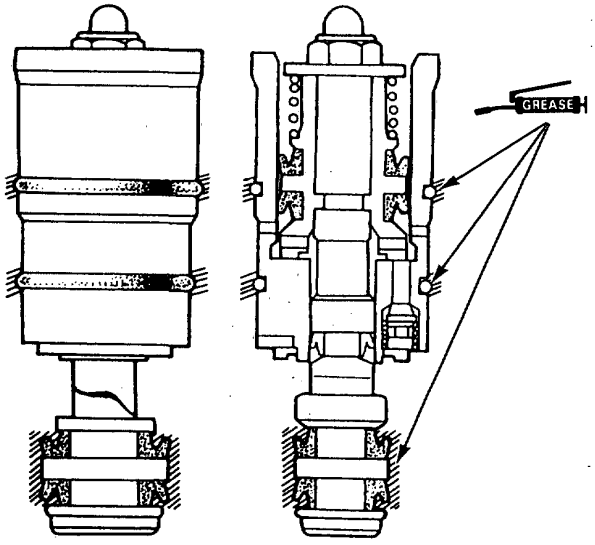
CAUTION:
- **Set the washer between the driver and modulator body to prevent damage to the body.**
- **Be careful not to damage the piston sleeve.**



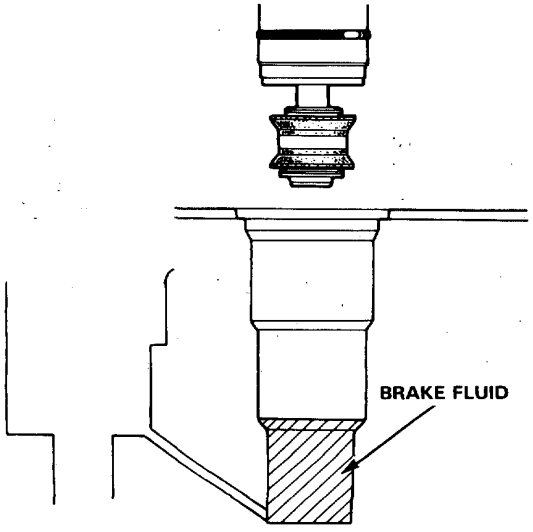
Piston

Installation

1. Apply rubber grease to the shaded sections of the piston assembly, shown in the drawing below.

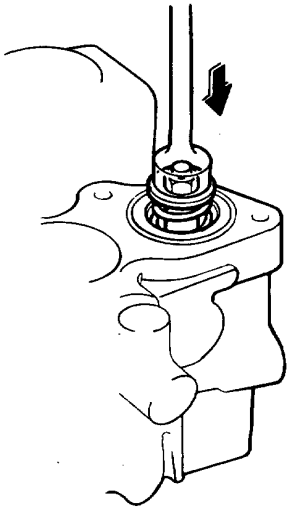


2. Adjust so that the brake fluid flows into the piston mounting hole in the modulator body.



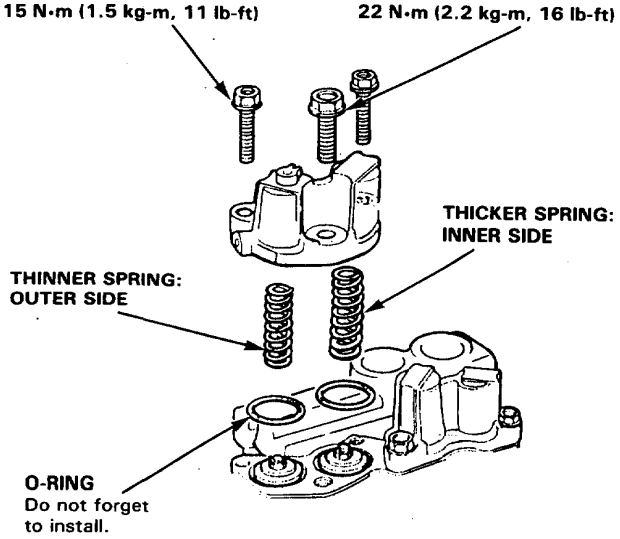
3. Set the piston assembly in the piston mounting hole in the modulator body and push down on the piston.

4. Push on the piston about 5 times until no bubbles come out of the solenoid side.



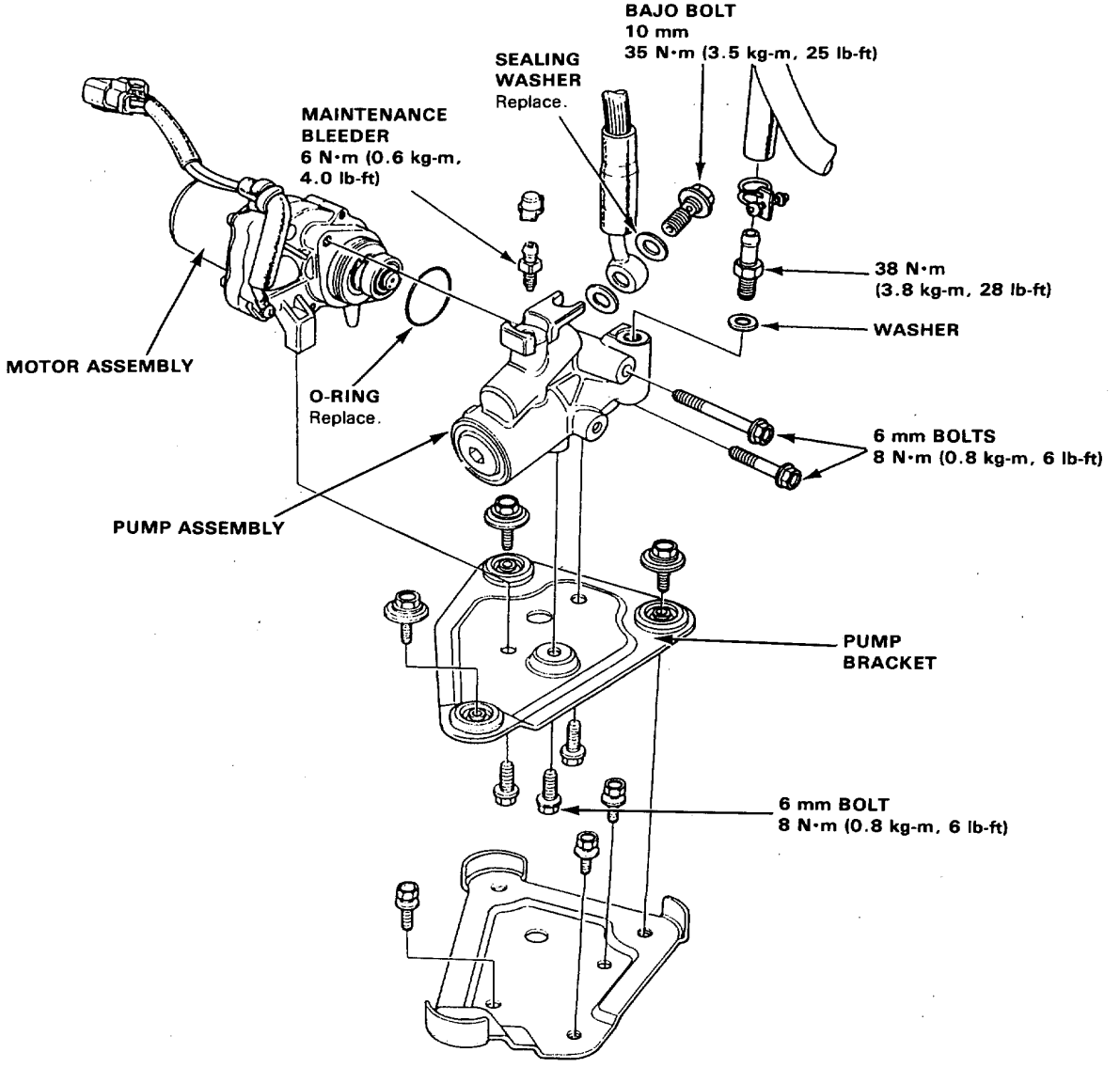
5. Install the modulator springs.

6. Install the solenoid heads with care not to pinch the O-rings.



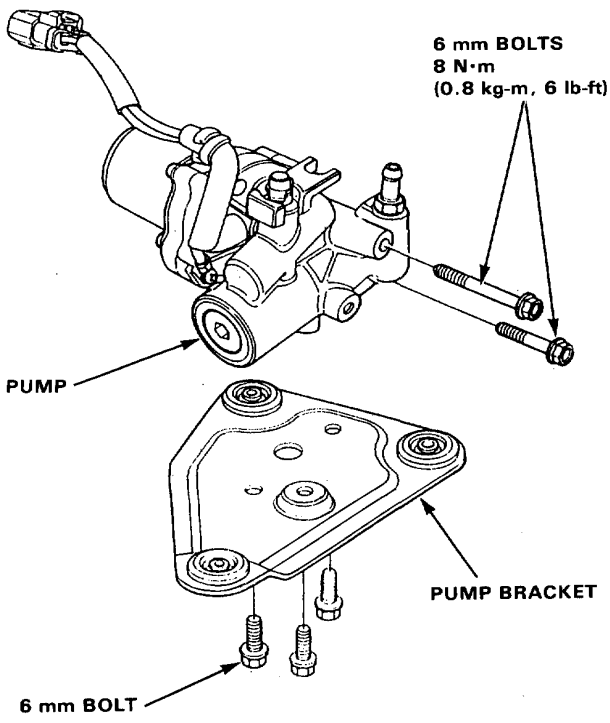
Index/Inspection

CAUTION:
- Do not attempt to disasemble the power unit parts except for those shown exploded in this illustration.
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid.

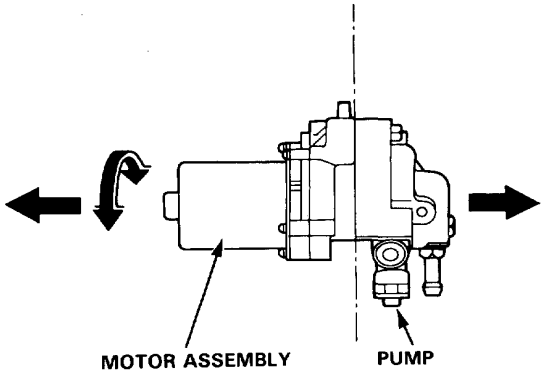


Disassembly/Reassembly

1. Remove the pump bracket.
2. Remove the 6 mm bolts attaching the pump to the pump motor.

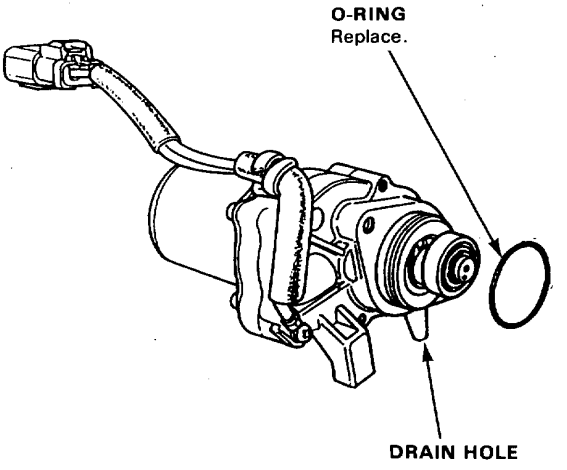


3. Separate the motor from the pump while rotating the pump right and left.



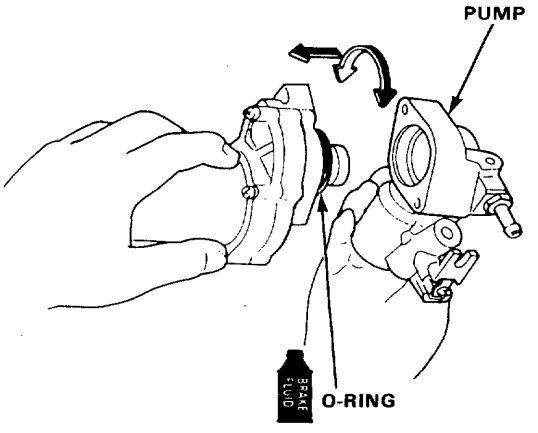
NOTE: About 10 cc (0.6 cu-in) of brake fluid will flow out when the motor is removed from the pump.

4. Wash the motor with clean brake fluid only on the exposed end and blow dry with compressed air.



NOTE: Do not wash or dip the motor in brake fluid. Also be careful not to allow oil or water to enter the inside through the water drain hole.

5. Install a new O-ring on the pump motor.
6. Coat the O-ring with clean brake fluid and install the pump on the motor while rotating it right and left by hand.

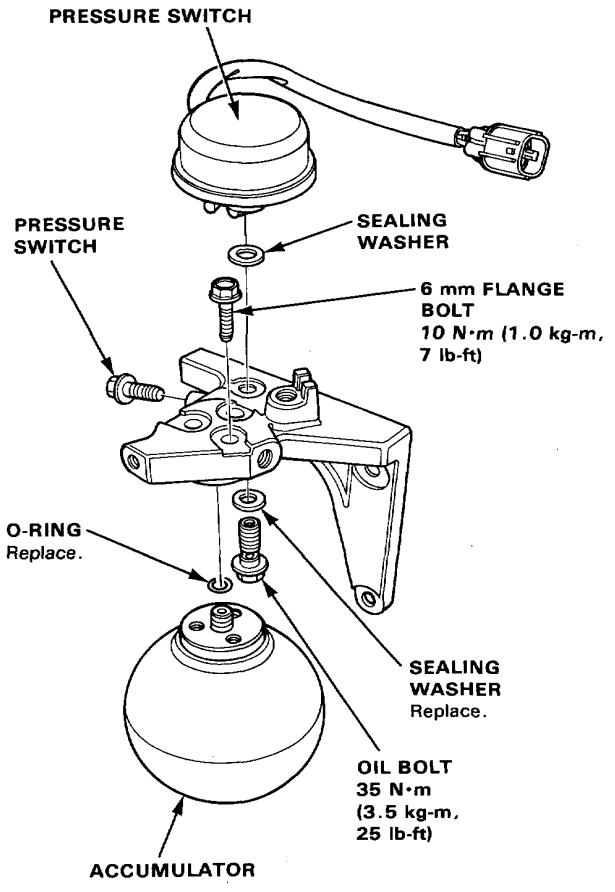


7. Install and tighten the 6 mm bolts.
8. Install the removed parts in the reverse order of removal.

Accumulator Unit

Accumulator/Pressure Switch

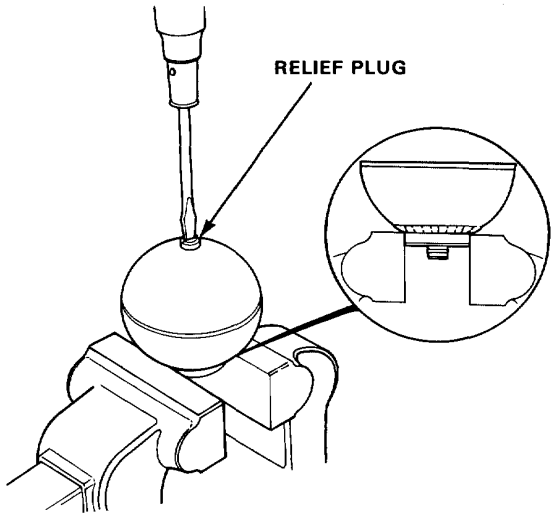
1. Drain the high pressure brake fluid from the power unit (see page 13-64).
2. Remove three 6 mm flange bolts, then remove the accumulator from the accumulator bracket.
3. Remove the pressure switch bolt and oil bolt then remove the pressure switch from the bracket.



Accumulator Disposal

⚠WARNING The accumulator contains high pressure nitrogen gas, do not puncture expose to flame or attempt to disassemble the accumulator or it may explode; severe personal injury may result.

1. Secure the accumulator in a vice so that the relief plug points straight up.
2. Slowly turn the plug 3-1/2 turns and then wait 3 minutes for all pressure to escape.
3. Remove the plug completely and dispose of the accumulator unit.



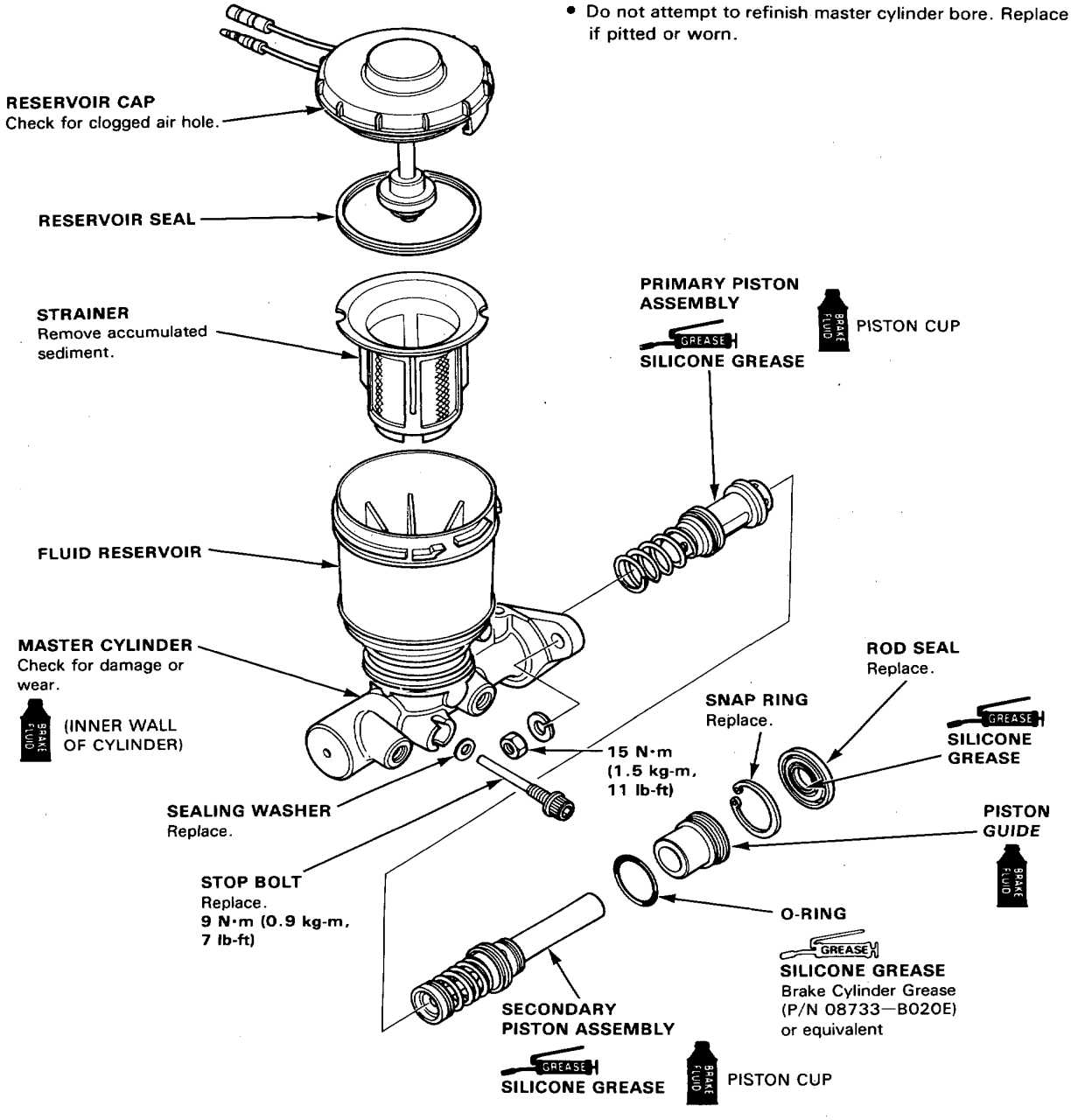
Master Cylinder

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.
- BRAKE FLUID This symbol represents brake fluid. Use only DOT 3 or 4 brake fluid.
- GREASE Use only HONDA Brake Cylinder Grease (P/N 08733—B020E) or equivalent.

- Carefully inspect the bore of the master cylinder for pits, scratches or scoring.
- Replace the master cylinder if the bore is damaged or worn. Do not hone or attempt to refinish the bore.

NOTE:
- Wash all removed parts in brake fluid and blow dry with compressed air. Blow open all passages and fluid ports.
- Replace all rubber parts with new ones whenever the cylinder is disassembled.
- To prevent damage, liberally apply clean brake fluid to the piston cups before installation.
- Do not attempt to refinish master cylinder bore. Replace if pitted or worn.

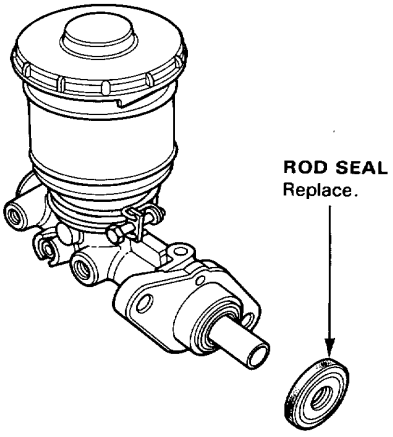


Master Cylinder

Disassembly

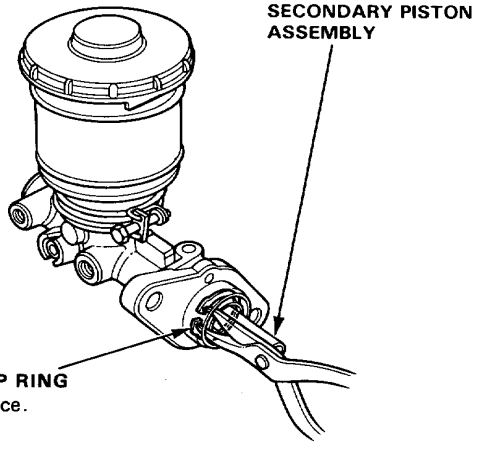
CAUTION:
- **Avoid spilling fluid on painted, plastic or rubber parts as it may damage the finish.**
- **Plug the end of the brake hose with a shop rag to prevent brake fluid from flowing out of the brake hose after disconnecting.**
- **Use only new clean DOT 3 or DOT 4 brake fluid.**
- **Clean all parts thoroughly with brake fluid. Blow out all passages with compressed air.**
- **Do not allow foreign matter to enter the system.**
- **Be careful not to bend or damage the brake pipe when removing the master cylinder.**

1. Remove the rod seal.

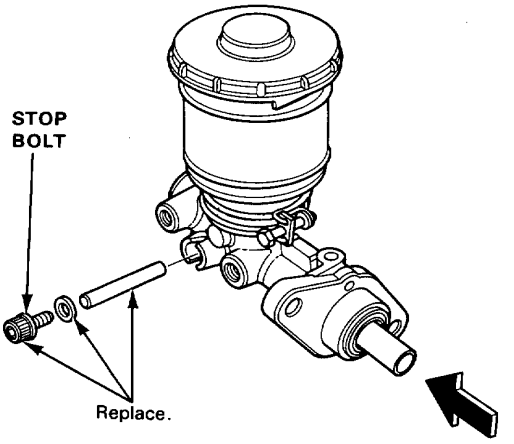


2. Push the secondary piston assembly, then remove the snap ring.

CAUTION: Avoid damaging the master cylinder wall.



3. Remove the stop bolt while pushing in the secondary piston assembly.



4. Remove the piston guide, secondary piston assembly and primary piston assembly.

NOTE: If the primary piston assembly is difficult to remove, apply compressed air from the primary piston side outlet.

CAUTION:
- **Do not use high pressure air or bring the nozzle too close to the inlet.**
- **Place a shop rag over the master cylinder to prevent the primary piston from becoming a projectile.**

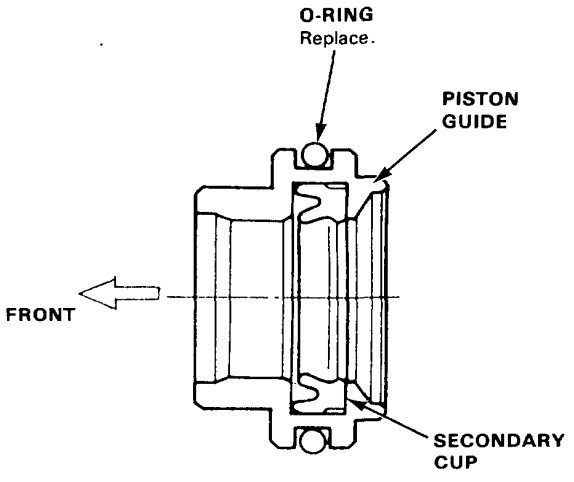
Reassembly

CAUTION:
- **Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.**
- **To prevent spills, cover the hose joints with rags or shop towels.**
- **Clean all parts in brake fluid and air dry; blow out all passages with compressed air.**
- **Use only new clean DOT3 or DOT4 brake fluid.**
- **Before reassembling, check that all parts are free of dust and other foreign particles.**
- **Replace parts with new ones whenever specified to do so.**
- **Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.**
- **Do not mix different brands of brake fluid as they may not be compatible.**
- **Do not reuse the drained fluid.**

1. Lubricate the new piston parts with brake fluid.

2. Install the new O-ring and secondary cup onto the piston guide.

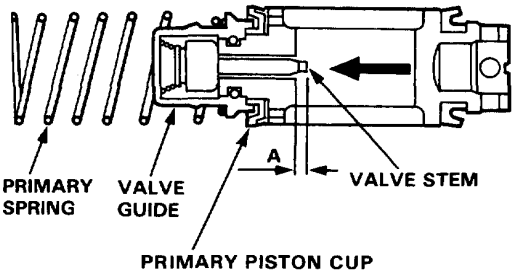
PISTON GUIDE ASSEMBLY



NOTE: Replace the secondary cup and piston guide as a set if necessary.

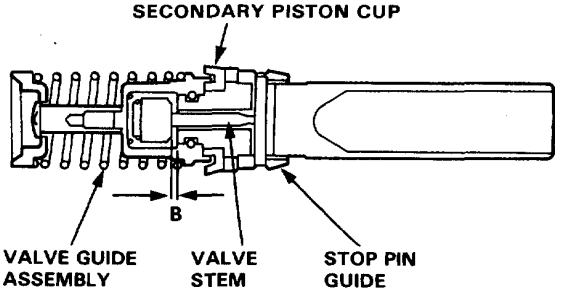
3. Make sure that the primary piston assembly and secondary piston assembly are in good condition.

PRIMARY PISTON ASSEMBLY



NOTE:
- Reaching through the primary piston stop bolt hole, lightly press on the valve stem to see if it moves smoothly.
- Make sure that the dimension A is 1.85—2.45 mm.

SECONDARY PISTON ASSEMBLY



NOTE:
- Confirm that the dimension B is 0.9—1.5 mm while pushing the stop pin guide forward on the piston sub-assembly.
- Lightly press the stop pin guide to see if the valve stem moves smoothly.

(cont'd)

Master Cylinder

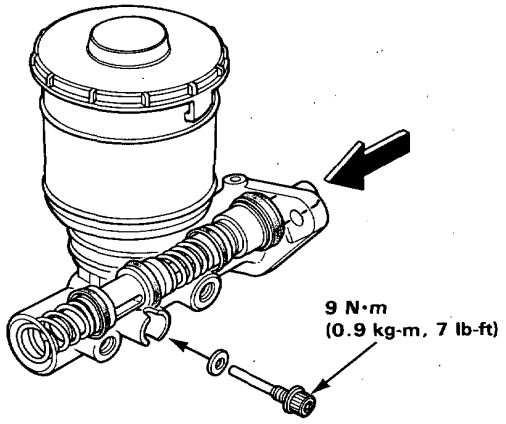
Reassembly (cont'd)

4. Assemble the primary piston assembly, secondary piston assembly and piston guide assembly in the master cylinder body.

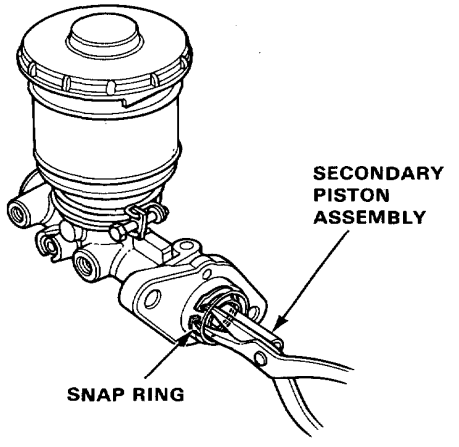
   NOTE: Install the primary piston with the slot on the cylinder facing the stop bolt hole side.

5. Push the secondary piston in until slot aligns with the stop bolt hole, then install and tighten the stop bolt.

   CAUTION:
   - **Replace the stop bolt seal with a new one whenever disassembled.**
   - **Apply brake fluid to the inner wall of the cylinder and piston cups, being careful that they are not turned inside out during installation.**

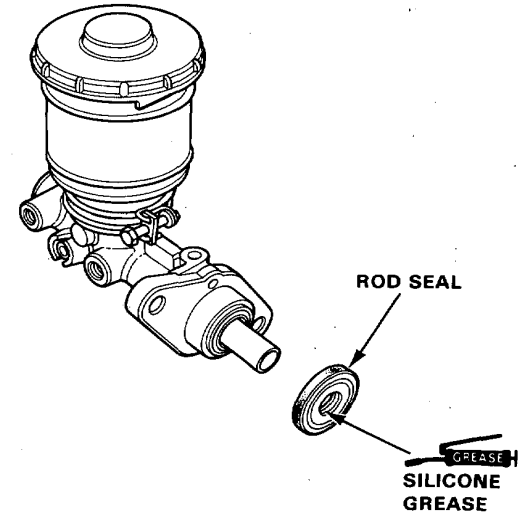


6. Press the secondary piston in and install the snap ring.



CAUTION: Avoid damaging the sliding surface of the secondary piston when installing the snap ring.

7. Install the rod seal.

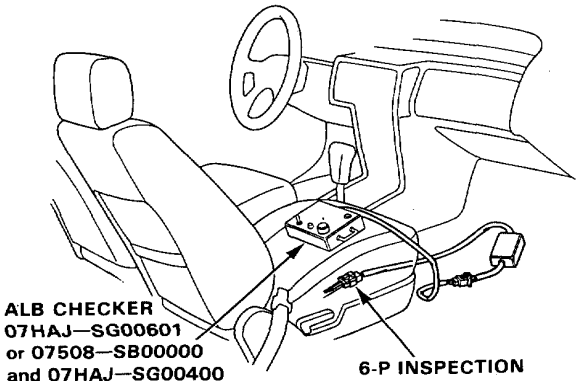


CAUTION:
- **Make sure that there is no interference between the brake pipes and other parts when installing.**
- **Adjust the pushrod length and clearance (page 13-17 and 18).**

Air Bleeding With ALB Checker

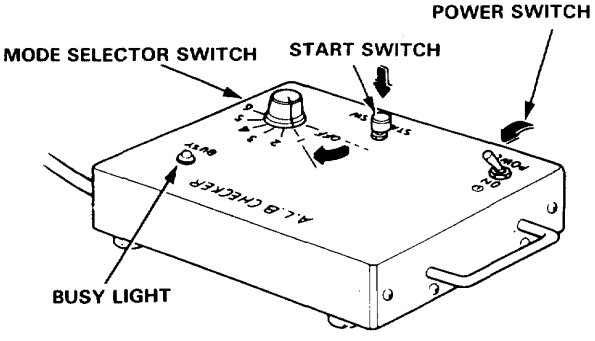
NOTE:
- Set the Pulse Selector switch to 50 when using ALB checker 07HAJ—SG00601.
- Do not depress the brake pedal during air bleeding. Or the air bleeding may be affected.

1. Fill the modulator reservoir with brake fluid up to the MAX level.
2. Disconnect the 6P coupler (PNK) from the cover mounted in front of the console and connect it to the ALB checker.

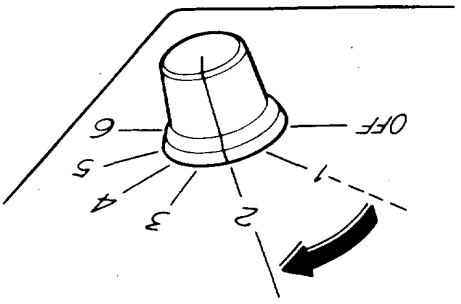


CAUTION: Place the car on level ground with the wheels blocked. Shift the transmission to P or Nutral.

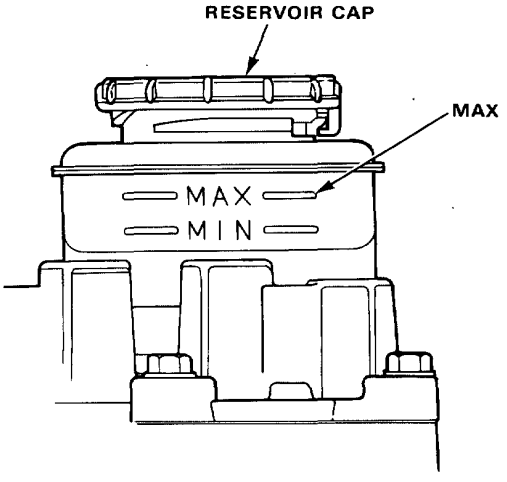
3. Start the engine.
4. Release the parking brake.
5. Turn the power switch of ALB checker ON.



6. Turn the mode selector switch to 1.
7. Press the start switch.
8. Make sure that the motor runs.
9. Wait for the motor to stop.
10. Turn the mode switch to 2.



11. Press the start switch.
12. Brake fluid in the reservoir will bubble briskly for 20 seconds after the switch is pressed. Wait for 4 to 5 minutes until the brake fluid stops bubbling.
13. Turn the mode switch to 6.
14. Repeat steps 11 and 12.
15. Repeat steps 10 through 14 two or three times.
16. Fill the reservoir with brake fluid up to the MAX level.



17. Install the cap.
18. Check the ALB function in all modes (page 13-45). There should be kickback in modes 2 through 5.

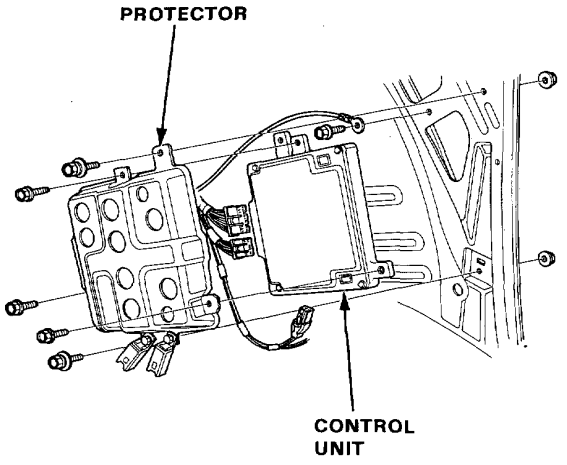
CAUTION: If the kickback is weak, re-bleed air from the system.

Control Unit Replacement

Remove the control unit attaching bolts, then remove the control unit.

CAUTION:

- **If the control unit attaching bolts are removed, the control unit's memory is cleared.**
- **Handle the control unit with care.**



Installation is the reverse order of removal.

NOTE: Check the dash warning light function by turning the ignition switch ON.

Fail Safe Relays/Motor Relay Inspection

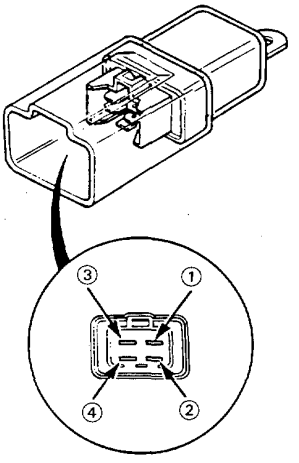
1. Check for continuity between terminals ③ and ④.

   There should be no continuity.

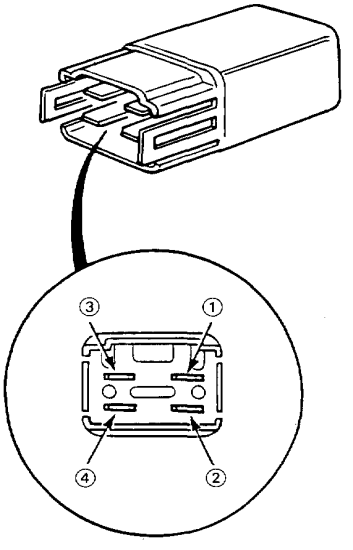
2. Connect a 12V battery across teminals ① and ②.

   There should be continuity between terminals ③ and ④.

Fail Safe Relays



Motor Relay



Wiring Diagrams

Index

Air Conditioner 17
Anti-Lock Brake System (ALB) 14
Automatic Transmission Control System 14
Battery 1
Blower Controls 17
Charging System 1
Cigarette Lighter 10
Clock 10
Cooling Fan Control 16
Cruise Control System 12
Defogger, Rear Window 11
Door Lock, Power 12
Fuel and Emissions 16
Gauges 2
Headlight Adjuster System 4
Horns 4
Ignition Switch 1
Ignition System 1
Indicators
- Cruise Control Indicator 2
- Trunk Open Indicator 2
- High Beam Indicator 2
- Shift Lever Position Indicator 4
- Turn Signal Indicator 2

Integrated Control Unit 5
Lights, Exterior
- Back-up Lights 10
- Brake Lights 3
- Hazard Lights 2
- Headlights 6
- License Plate Lights 6
- Marker Lights 6
- Taillights 6

Lights, Interior
- Courtesy Lights 3
- Dashlight Brightness Control 6
- Dome Lights 3
- Glove Box Light 6
- Trunk Light 6

Vanity Mirror Light 6
Lighting System 6
Mirror, Power 6
Seat, Power 13
Starting System 1
Stereo Sound System 10
Sunroof 11
Turn Signal / Hazard Flasher System 13
Warning System
- ALB Warning 2
- Brake Warning 2
- Charge Warning 2
- Check Engine Warning 2
- Hazard Warning 2
- Light-on Warning 5
- Oil Pressure Warning 2

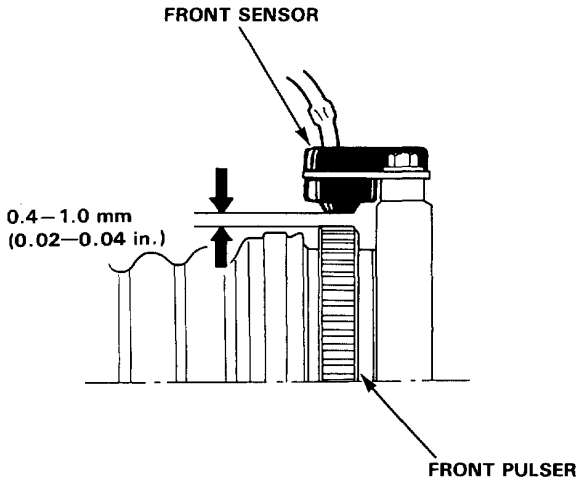
Washers
- Windshield 13
- Headlight Washer 13

Windows, Power 7
Wipers
- Windshield 7

Inspection

Front

1. Check the pulser for chipped or damaged teeth.



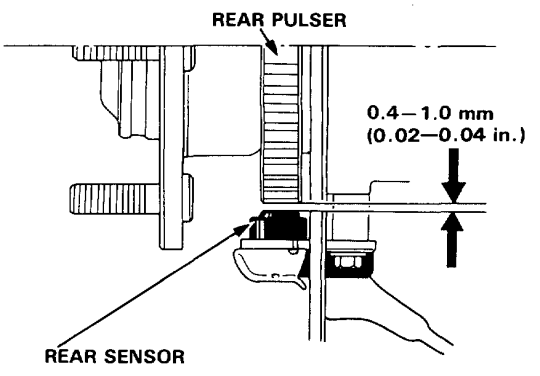
2. Measure air gap between the sensor and pulser all the way around while rotating the driveshaft by hand.

STANDARD: 0.4—1.0 mm (0.02—0.04 in.)

NOTE: If the gap exceeds 1.0 mm (0.04 in.), the probability is a distorted knuckle which should be replaced.

Rear

1. Check the rear pulser for chipped or damaged teeth.



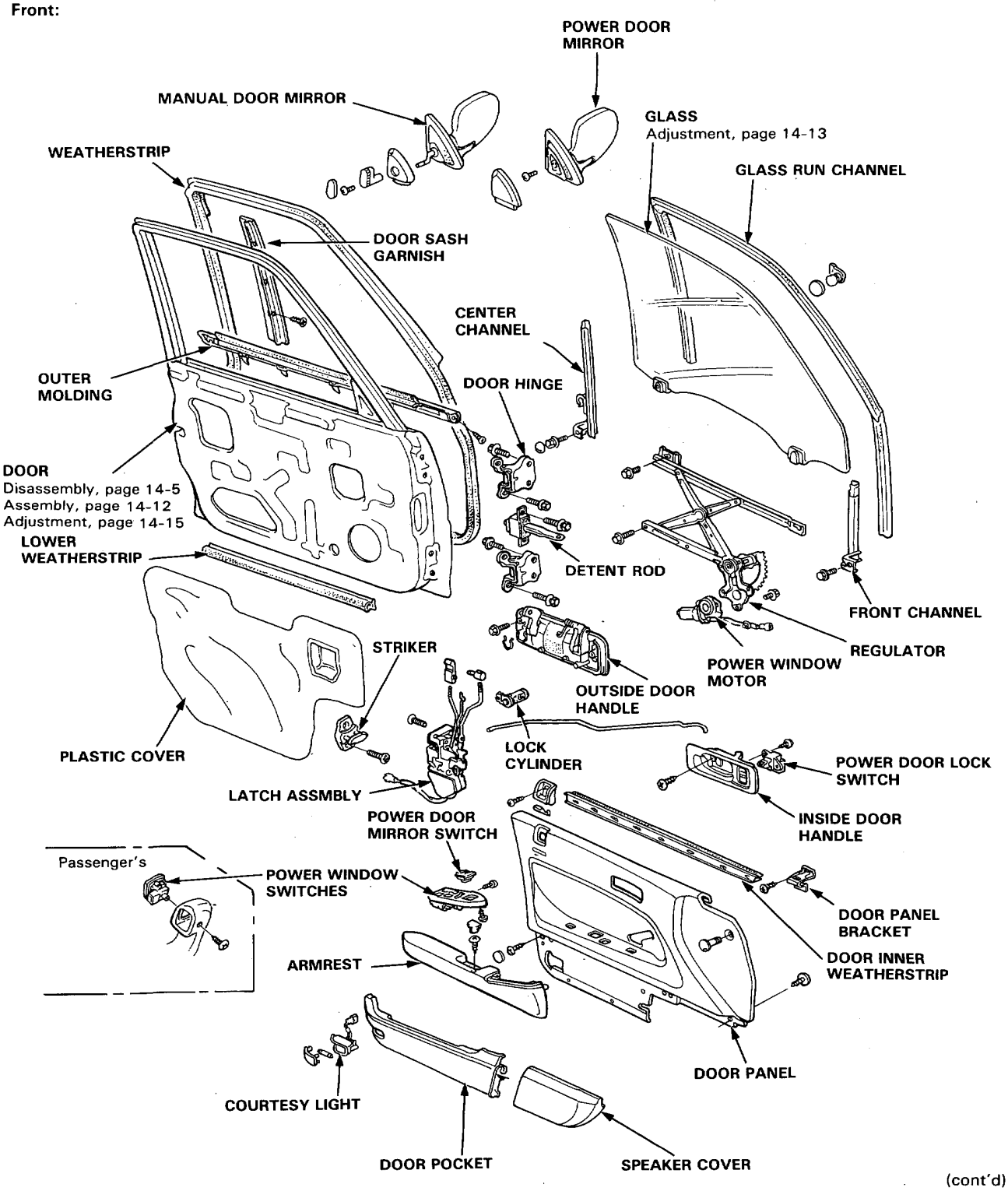
2. Measure the air gap between the sensor and pulser all the way around while rotating the hub bearing unit by hand.

Standard: 0.4—1.0 mm (0.02—0.04 in.)

NOTE: If the gap exceeds 1.0 mm (0.04 in.), the probability is a distorted knuckle which should be replaced.

Index

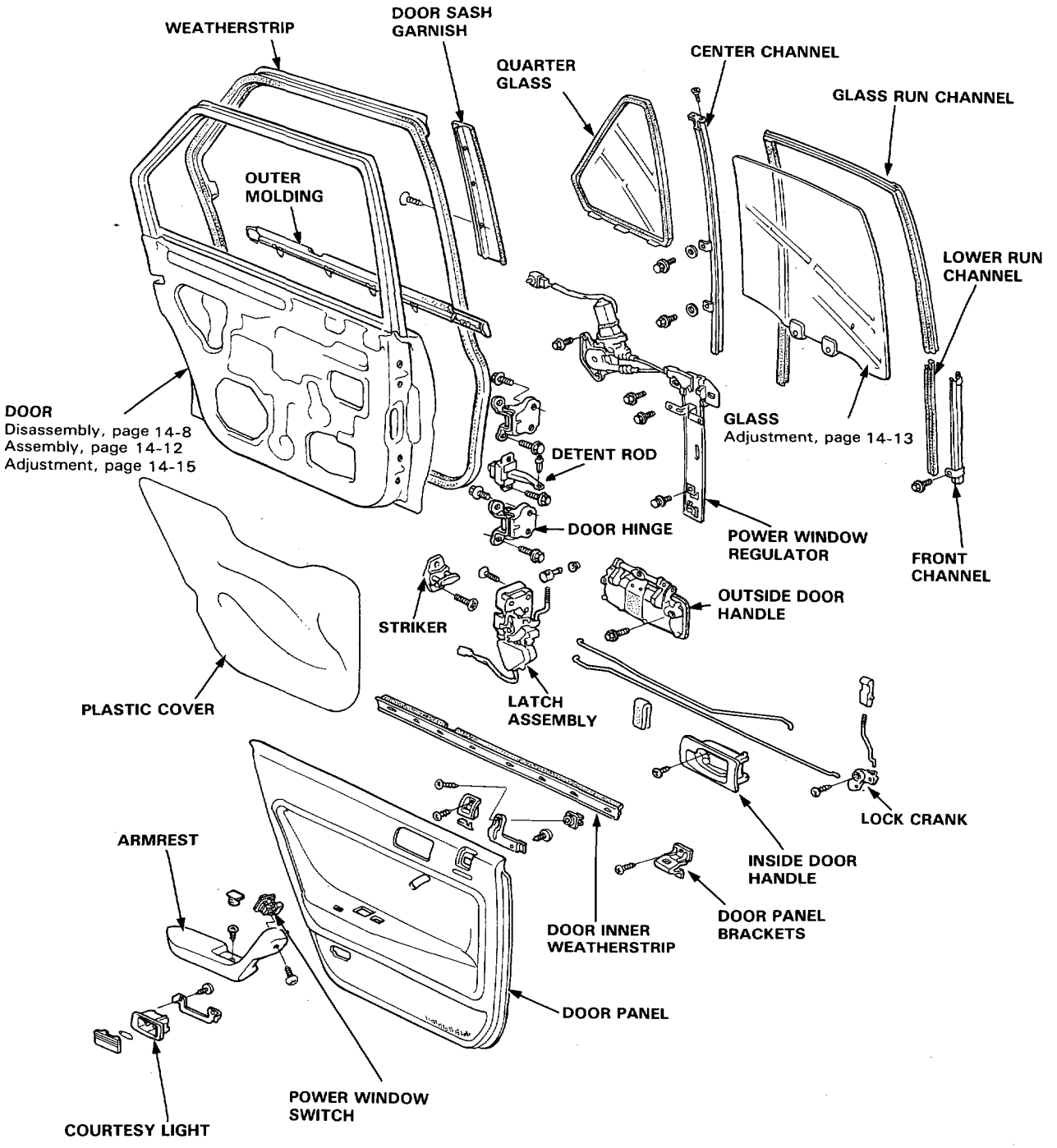
Front:



(cont'd)

Index (cont'd)

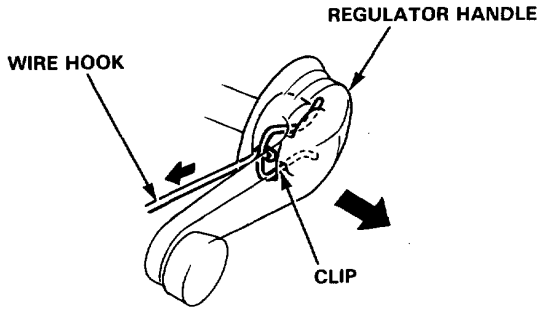
Rear:



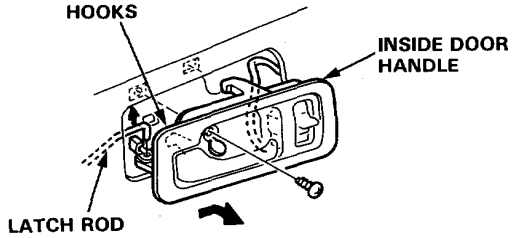
Disassembly

Front:

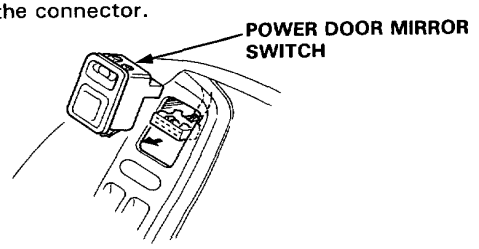
1. If applicable, remove the regulator handle by pulling the clip out with a wire hook.



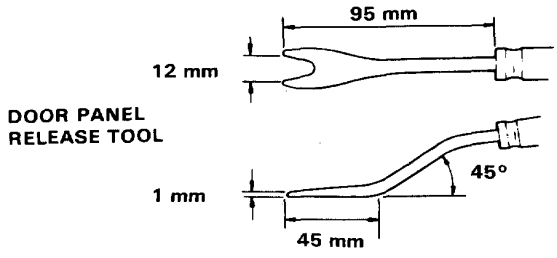
2. Remove the mounting screw, then pull the inside door handle out half-way and disconnect the latch rod and power door lock connector.



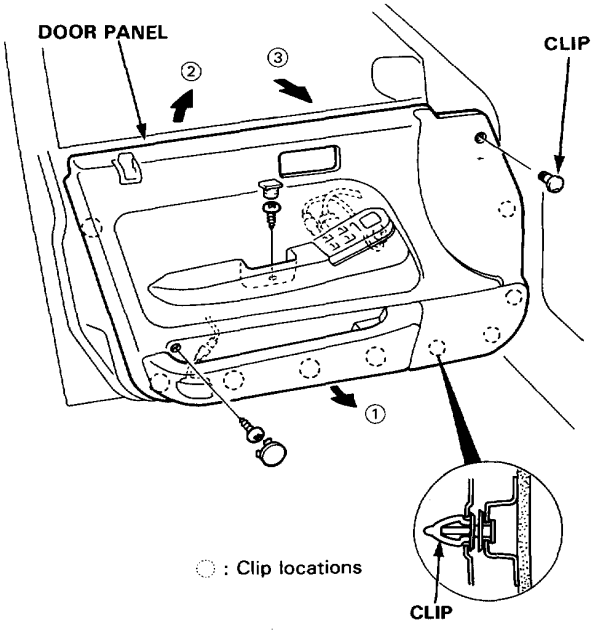
3. Remove the power door mirror switch and disconnect the connector.



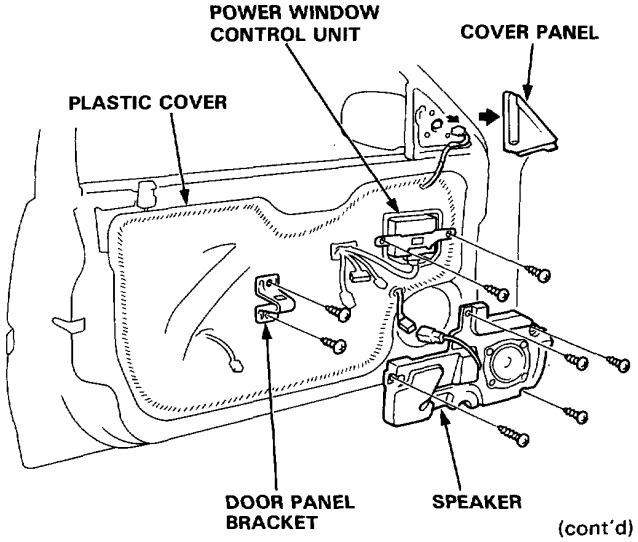
NOTE: Remove the panel with as little bending as possible to avoid creasing or breaking it.



4. Remove the 2 door panel screws, then pry apart the door panel clips. Lift the door panel straight up off the sill, and disconnect the power window and courtesy light wires.



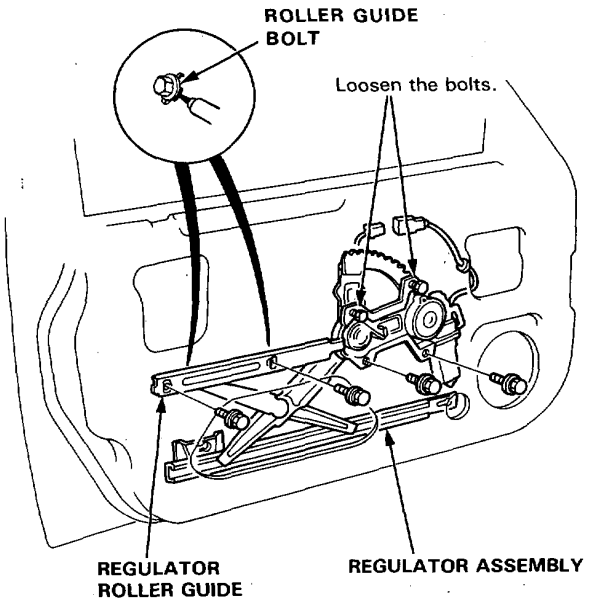
5. Remove the power window control unit, door panel bracket, speaker and cover panel.
6. Carefully remove the plastic cover.



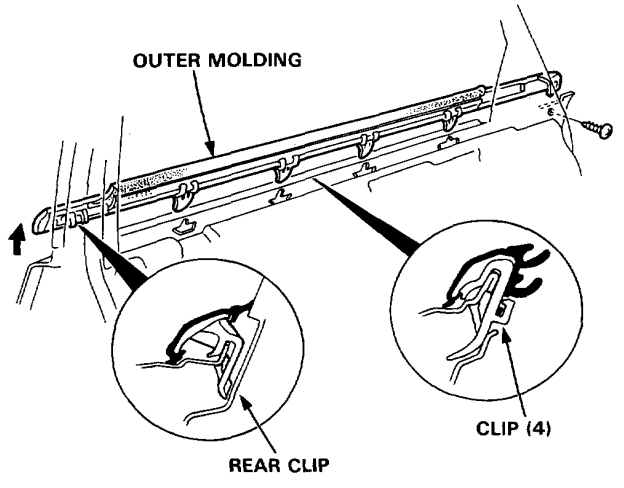
(cont'd)

15. Remove the 4 mounting bolts and loosen the 2 motor bolts, then take out the regulator assembly through the center hole in the door.

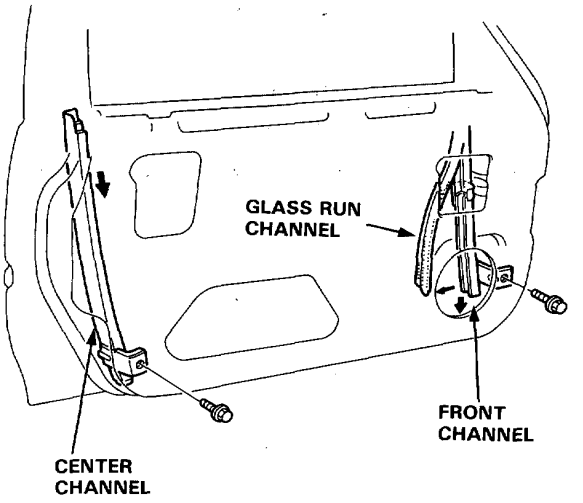
NOTE: Scribe a line around the roller guide mounting bolt to show the original adjustment.



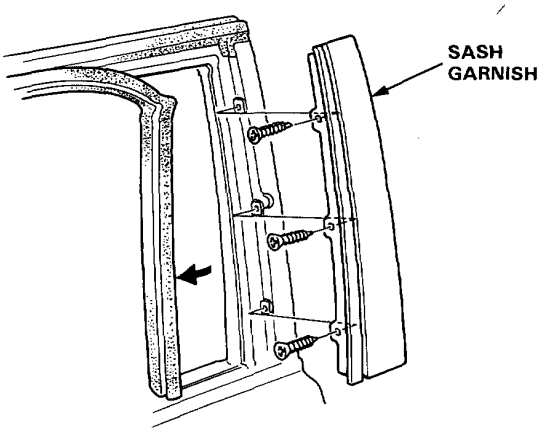
16. Remove the screw and, starting at the rear, pry the molding up, detach the clips, then remove the outer molding.



17. Remove the mounting bolts, then remove the front and center channels.



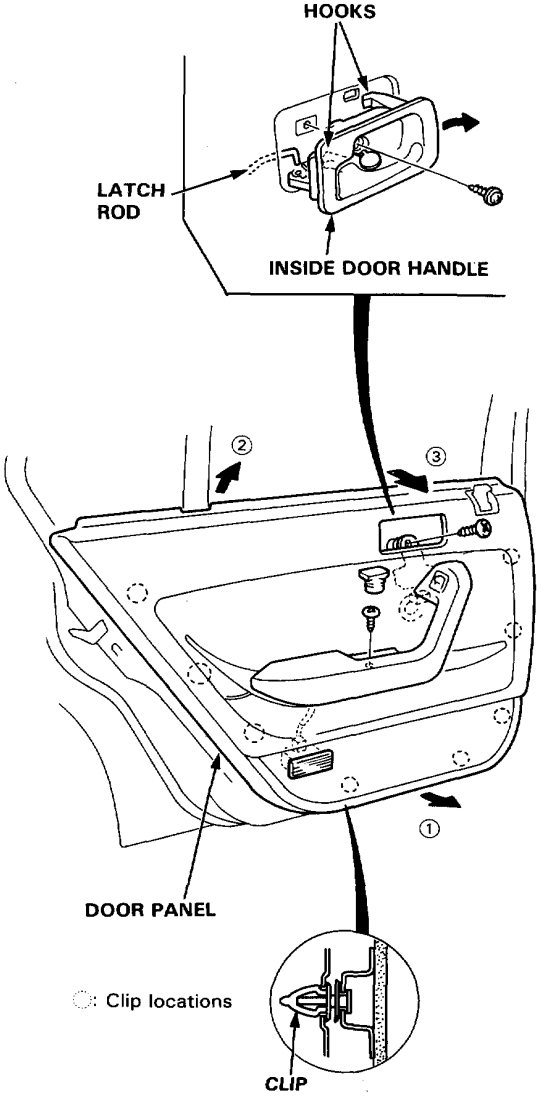
18. Peel off the glass run channel and remove the mounting screws, then remove the door sash garnish by hand.



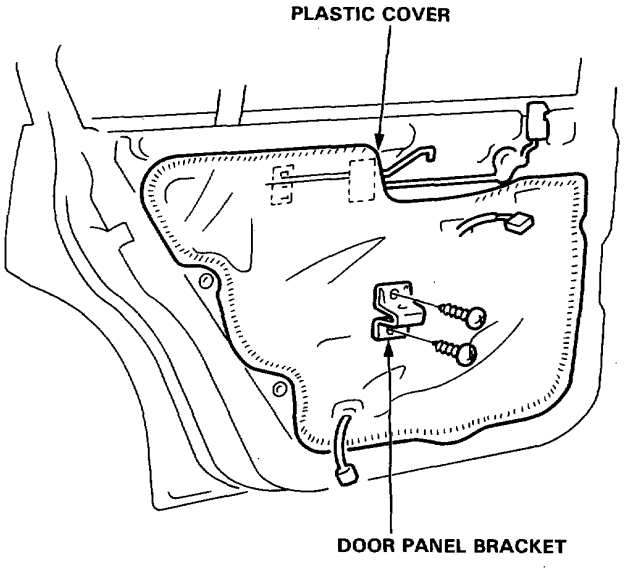
Disassembly

Rear:

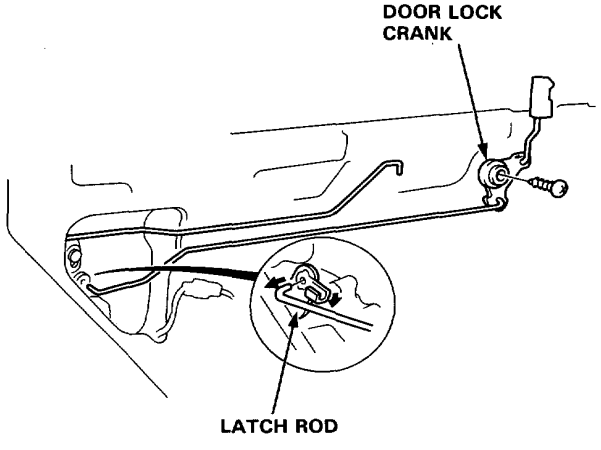
1. If applicable, remove the regulator handle by pulling the clip out with a wire hook (page 14-5).
2. Remove the inside door handle and disconnect the latch rod.
3. Remove the screws and detach the clips attaching the door panel. (See door panel release tool, page 14-5).
4. Disconnect the power window and courtesy light harnesses.



5. Remove the door panel bracket and carefully remove the plastic cover.



6. Remove the screw attaching the door lock crank. Disconnect the latch rod from the latch side.

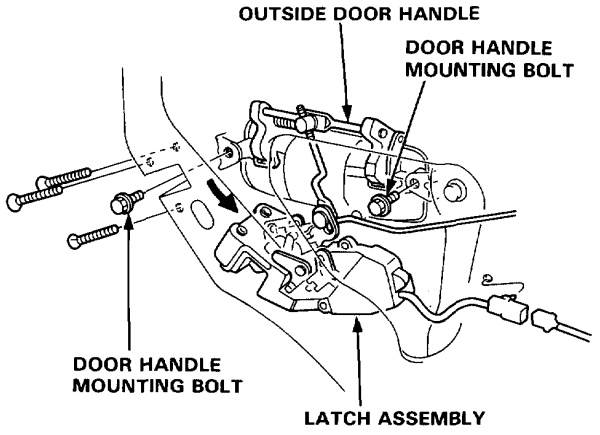


7. Reconnect the window switch or use a 12V battery to operate the window regulator.

8. Roll up the window fully.

9. Use protective tape around the edge of the door handle to prevent scratching the paint.
   Remove the 3 mounting screws, then slide the latch assembly down.

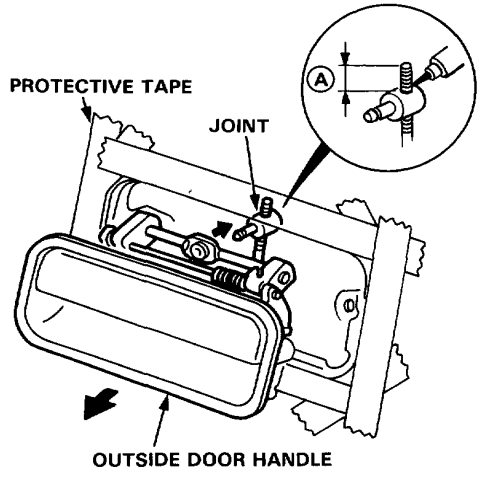
10. Remove the outside door handle mounting bolts.



NOTE: Take care not to bend the latch rods.

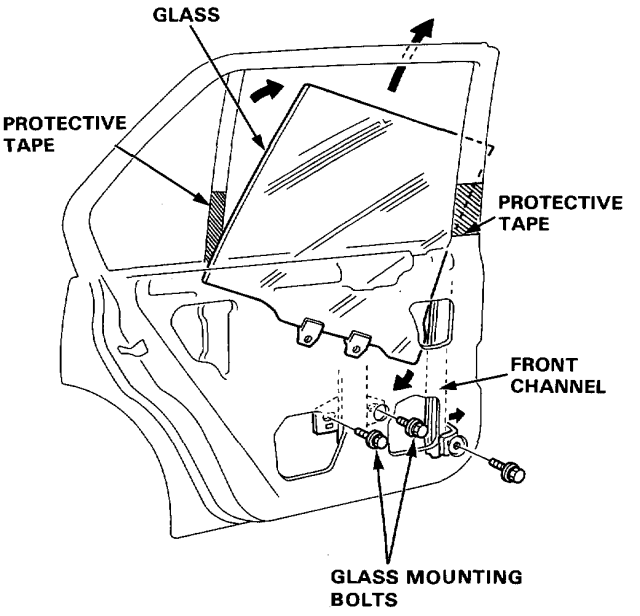
11. Pull the outside door handle out, and pry the joint off the handle with a flat tip screwdriver. Remove the handle from the rod.

    NOTE: To ease reassembly, note the location Ⓐ of the rod on the joint before disconnecting it.



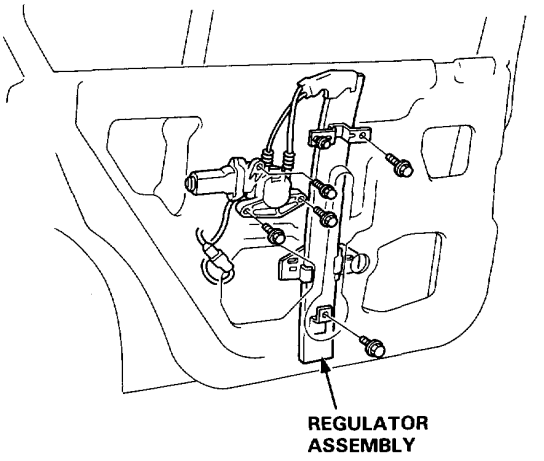
12. Pull the latch assembly out through the hole in the door panel.

13. Carefully lower the window until you can see its mounting bolts.
    Use protective tape on the lower door sash garnish and center channel as shown.
    Remove the lower bolt from the front channel and slide the channel forward.



14. Remove the mounting bolts and pull the glass out through the window slot.

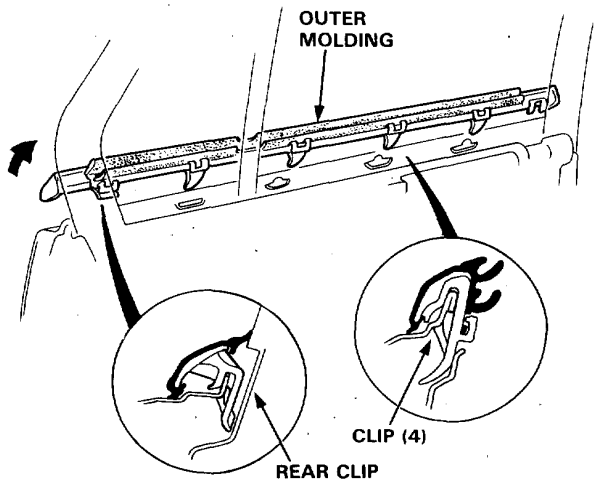
15. Remove the 5 regulator mounting bolts and loosen the upper bolt, then take out the regulator assembly through the hole in the door.



(cont'd)

Disassembly (cont'd)

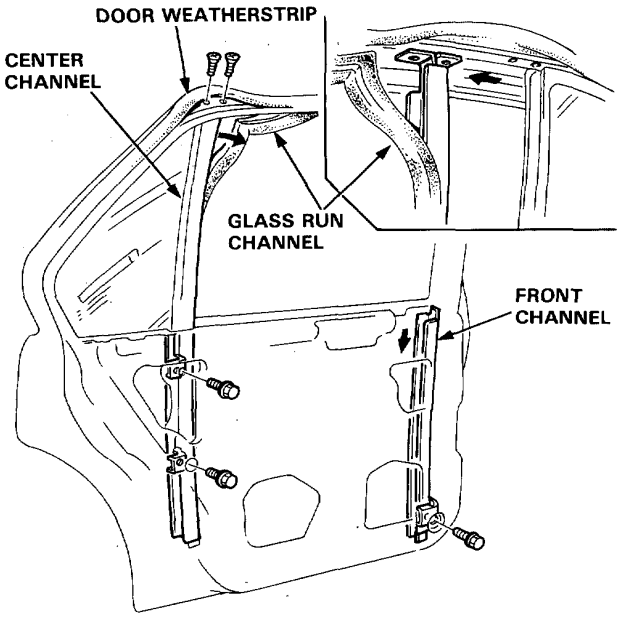
16. Starting at the rear, pry the molding up and detach the clips, then remove the outer molding.



17. Peel off the door weatherstrip and remove the center channel upper mounting screws.

18. Remove the lower mounting bolts and glass run channel, then remove the center channel.

19. Remove the front channel.

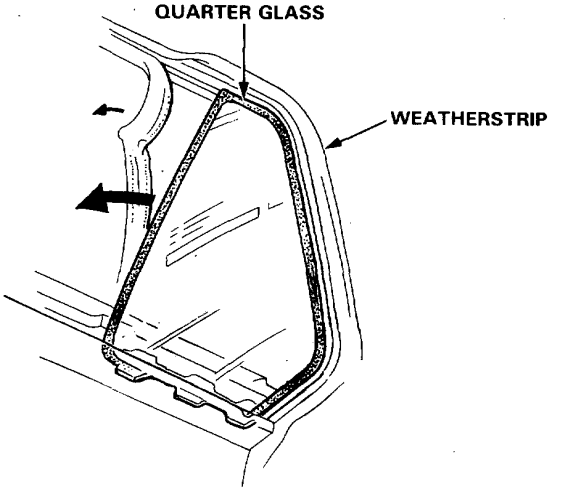


NOTE: When installing the center channel, make sure there is no gap between center channel and quarter glass.

20. Peel off the door weatherstrip.

21. Remove the quarter glass from the door sash.

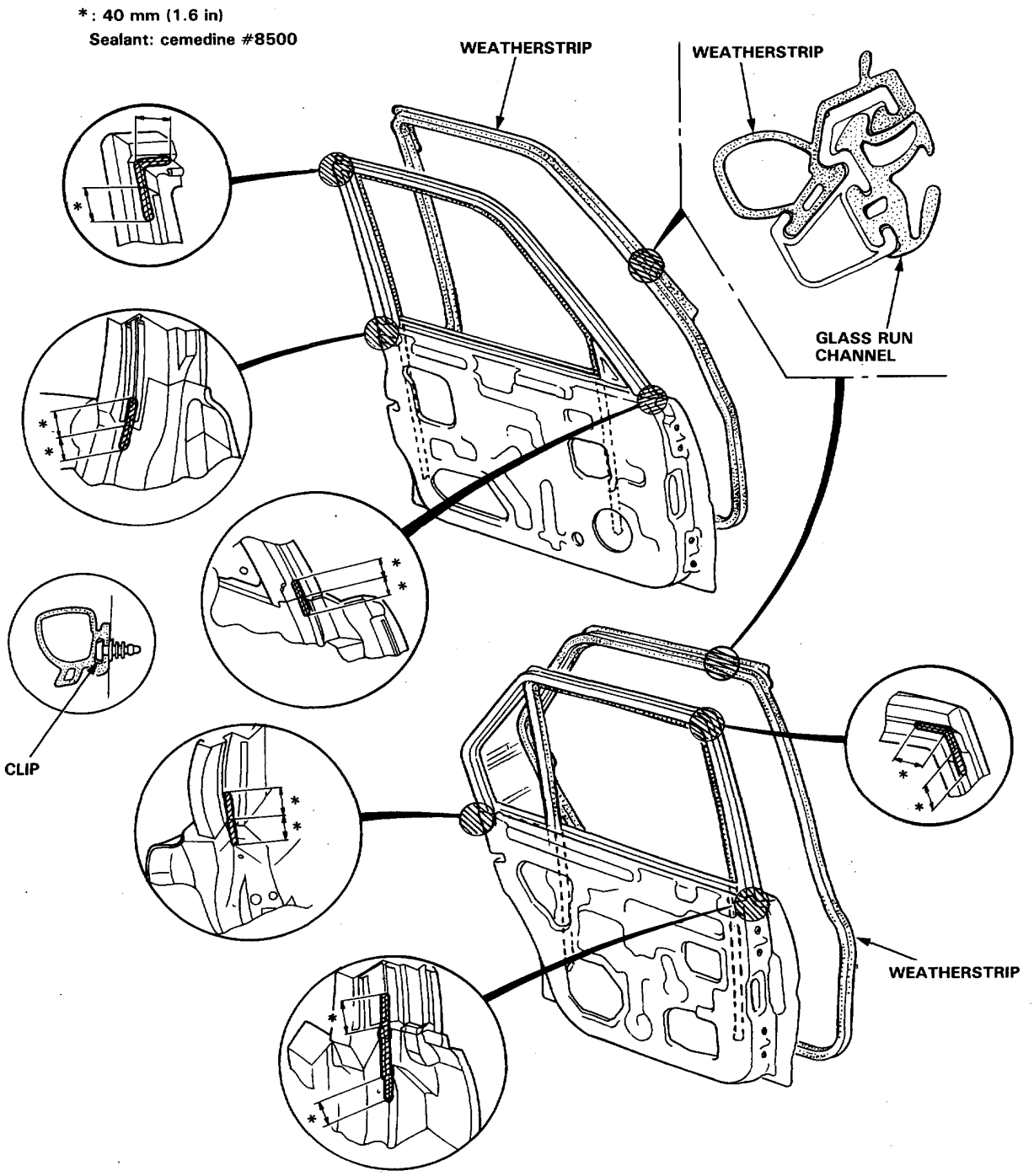
NOTE: Take care not to scratch or score the glass and molding.



22. Remove the rear door sash garnish in the same way as the front door sash garnish (page 14-7).

Weatherstrip Replacement

NOTE: Before installing the weatherstrip, apply clear sealant to the shadowed areas of the door as shown.

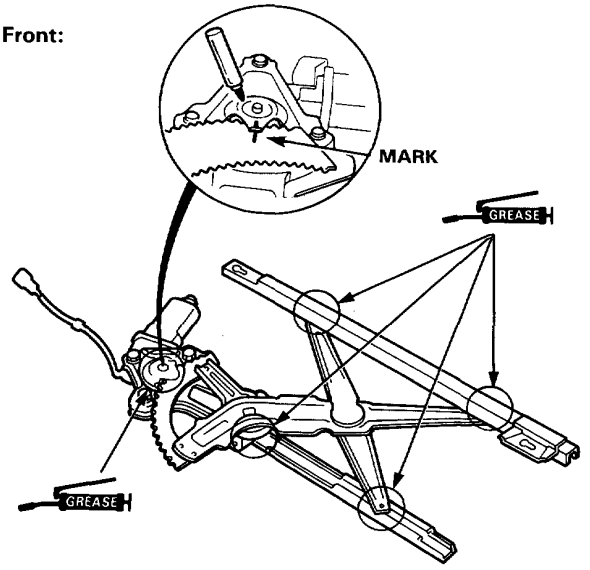


Assembly

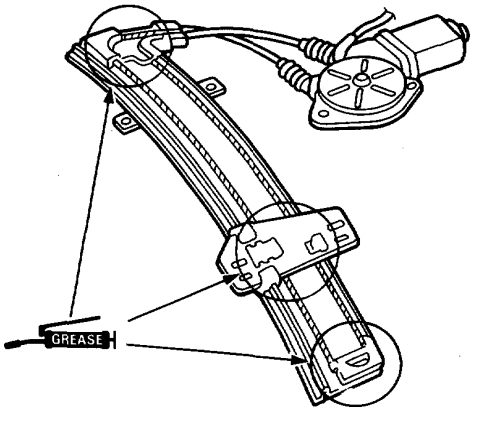
Assemble the door in the reverse order of disassembly, and also:

1. Grease all the sliding surfaces of the window regulator where shown.
2. Before removing the motor, make the location by marking line across the sector gear and regulator, and install using the three mounting bolts. Move the window regulator to the original position by connecting a 12V battery to the motor (See section 16).

Front:

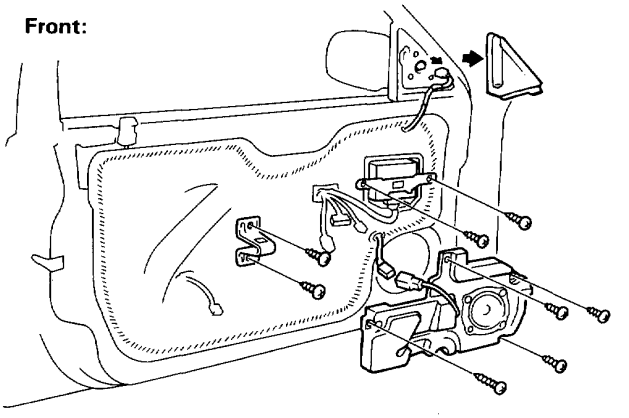


Rear:

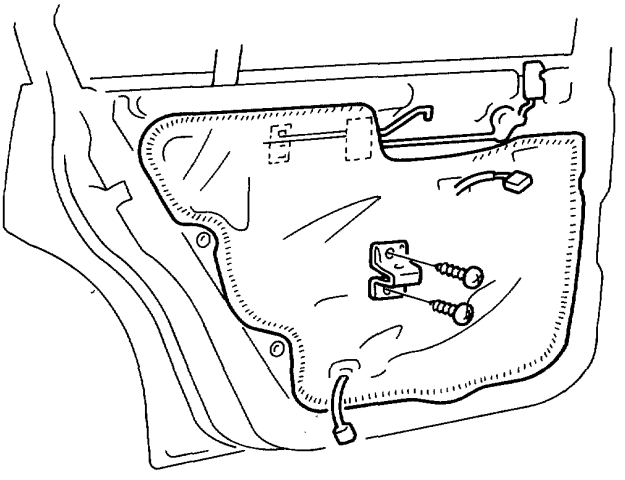


3. Roll the glass up and down to see if it moves freely without binding. Also make sure that there is no clearance between the glass and glass run channel when the glass is closed. Adjust the position of the door glass as necessary (page 14-13).
4. Fix the wire harness correctly on the door.
5. When reinstalling the plastic cover, apply adhesive along the edge where necessary to maintain a continuous seal and prevent air/water leaks.

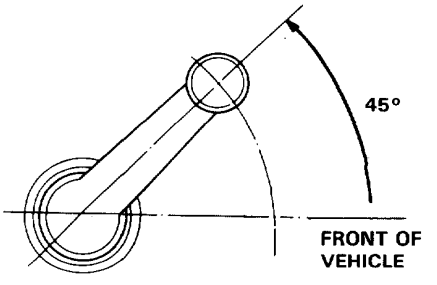
Front:



Rear:



6. Install the regulator handle so it points forward and up at a 45 degree angle with the window closed.



Glass Adjustment

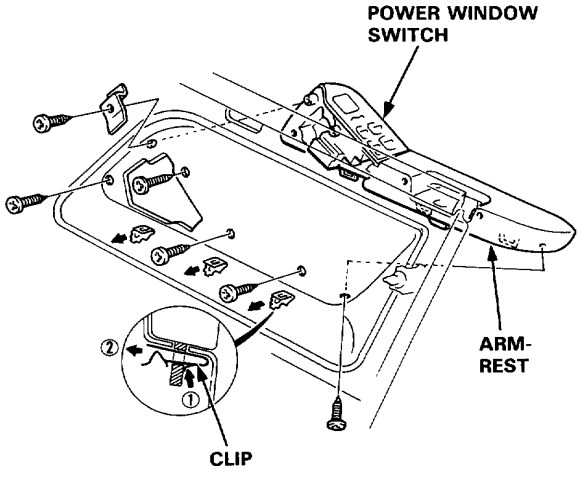
NOTE:
- Place the vehicle on a firm, level surface when adjusting door fit.
- Check the weatherstrip and glass run channel for damage or deterioration and replace if necessary.

1. Remove the door panel and peel off the plastic cover (pages 14-5, 8).

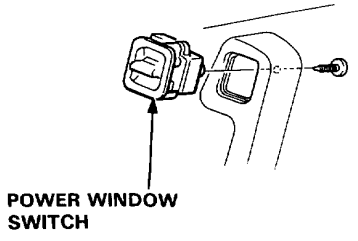
2. Install the regulator handle on the door regulator.

(Power Window Model)

Driver's:
Remove the power window switch from the armrest.



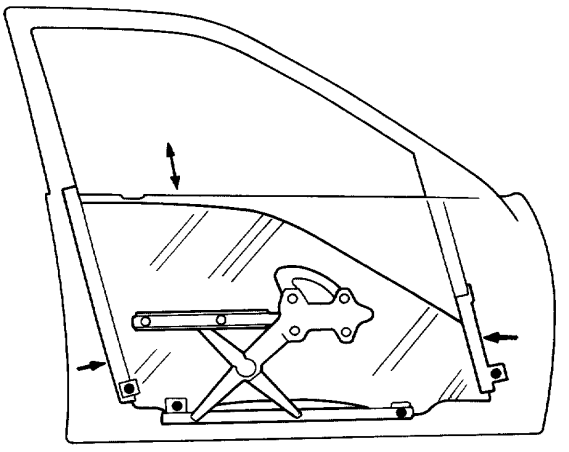
Passenger's/Rear door:
Remove the power window switch from the armrest.



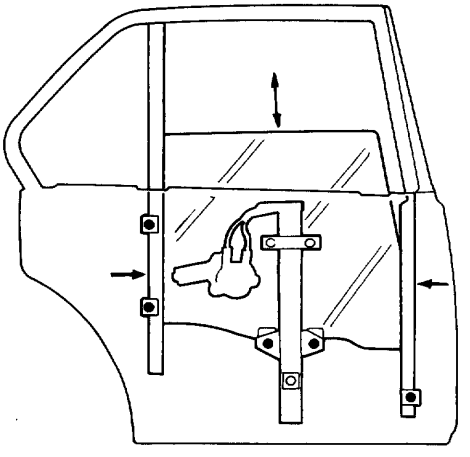
3. Connect the power window switch to the door harness.

4. To adjust glass fit in the door, raise the glass as far up as possible and hold it against the door sash. Then tighten the roller guide bolts or motor mounting bolts.
Check the smooth movement of door glass.

Front:



Rear:



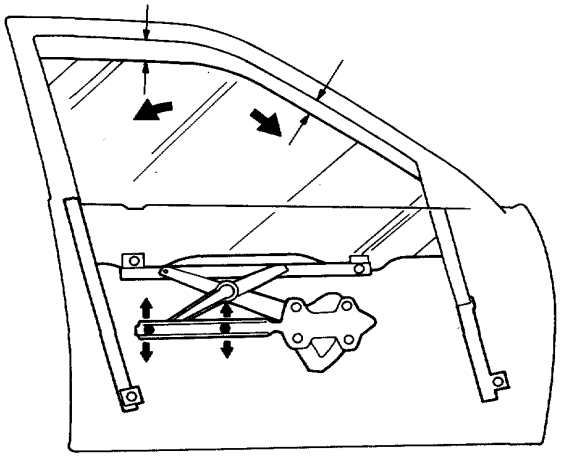
(cont'd)

Glass Adjustment (cont'd)

5. Lower the window until there is a small gap between the door glass and the glass run channel.

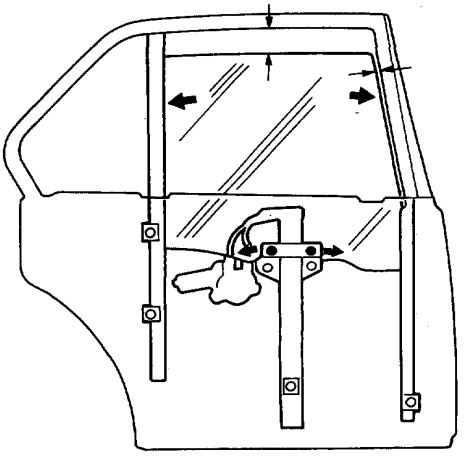
6. Loosen the roller guide bolts and adjust the window glass so it is parallel with the glass run channel.

Front:



Rear:

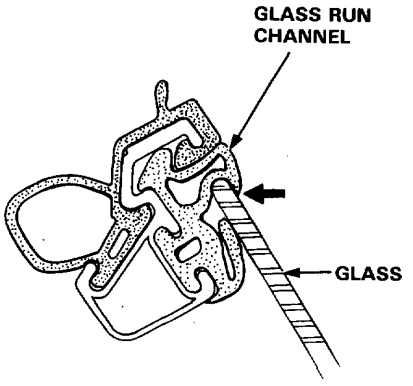
NOTE: Loosen the upper regulator mounting bolts and adjust the window glass.



7. Raise the window glass fully and check gap.

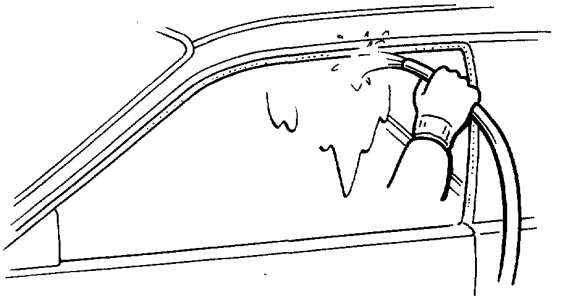
8. Perform the operation test.

NOTE: Check that the glass run channel is not pinched by the glass.



9. With the door and glass closed fully, check for water leaks.

NOTE: Do not use high pressure water.



10. Install the door harness.

11. Attach the plastic cover, and install the door panel.

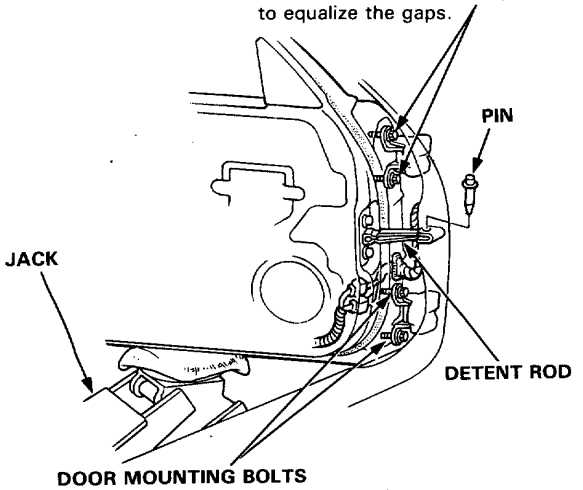
12. Check for air leaks.

Door Position Adjustment

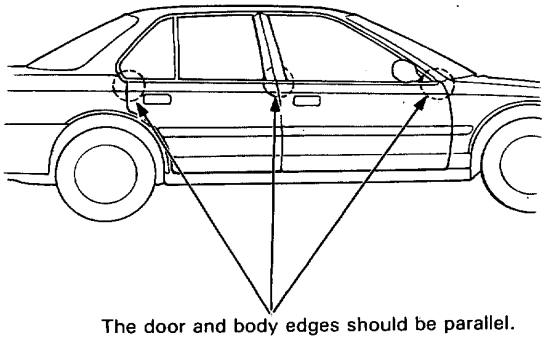
After installing the door, check for a flush fit with the body, then check for equal gap between the front and rear, and top and bottom door edges and the body. The door and body edges should also be parallel. Adjust at the hinges as shown.

CAUTION: Place a shop towel on the jack to prevent damage to the door when the hinge bolts are loosened for adjustment.

HINGE MOUNTING BOLTS
Loosen the bolts, and move the door BACKWARD or FORWARD, UP or DOWN as necessary to equalize the gaps.



DOOR MOUNTING BOLTS
Loosen the bolts slightly to move the door IN or OUT until it's flush with the body. If necessary, you can install a shim behind one hinge to make the door edges PARALLEL with the body.



The door and body edges should be parallel.

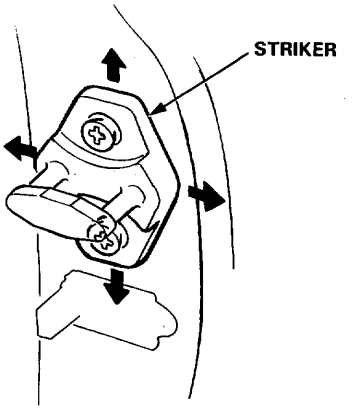
NOTE: Check that the water and air leaks.

Door Striker Adjustment

Make sure the door latches securely without slamming. If it needs adjustment:

1. Draw a line around the striker plate for reference.
2. Loosen the striker screws and move the striker IN or OUT to make the latch fit tighter or looser. Move the striker UP or DOWN to align it with the latch opening. Then lightly tighten the screws and recheck.

   NOTE: Do not tap the striker with an iron hammer to adjust the position.



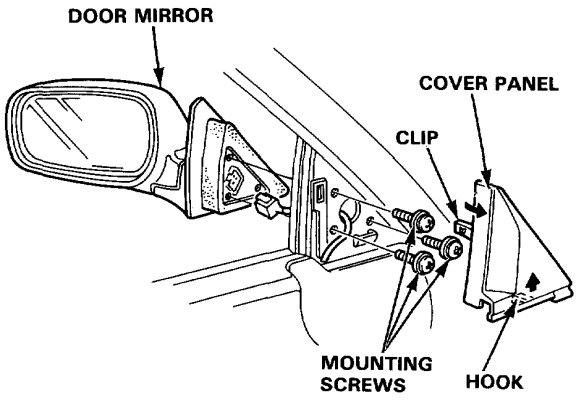
   NOTE: Hold the outside handle out and push the door against the body to be sure the striker allows a flush fit.
3. If the door latches properly, tighten the screws and recheck.

   NOTE: Replace the striker if a crack is seen on any parts of the resin.

Power Door Mirror

Removal

1. Pry out the cover panel with a flat tip screwdriver, then remove the cover panel.
   Disconnect the power mirror connector.
2. Remove the mirror mounting screws while holding the mirror.

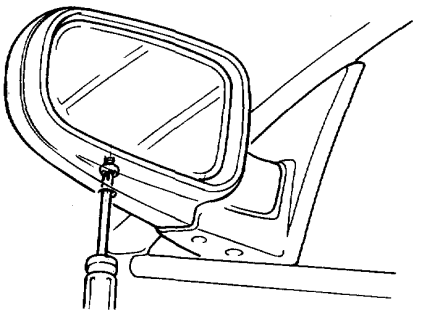


3. Install the door mirror in the reverse order of removal.
4. With the door and door glass closed fully, check for water and air leaks.

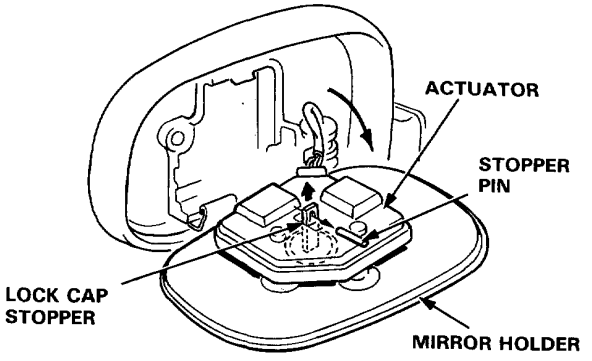
   NOTE: Do not use high pressure water.

Mirror Glass Replacement

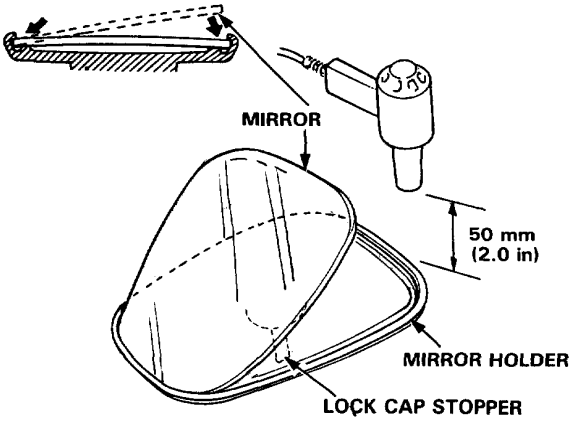
1. Insert a screwdriver in the mirror through the service hole, and loosen the actuator retaining screw.



2. Pull the actuator out from the mirror housing.
3. Pull the lock cap stopper and remove the stopper pin, then separate the actuator and mirror holder.



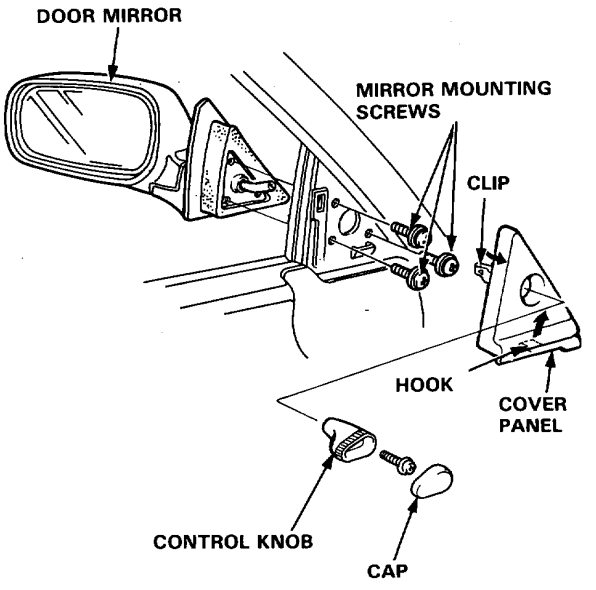
4. Heat the edge of the glass with a low powered heat gun for several minutes, then remove the glass.
5. Install the glass in the mirror case, narrow end first.



Manual Door Mirror

Removal

1. Remove the cap and the screw, then remove the control knob.
2. Remove the cover panel.
3. Remove the mirror mounting screws while holding the mirror.

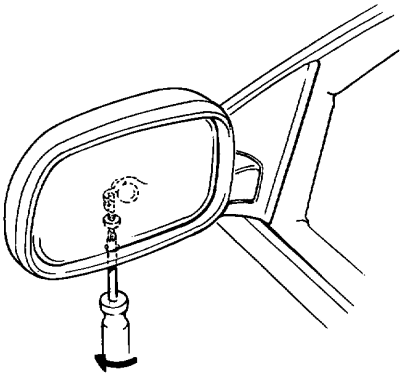


4. Install the door mirror in the reverse order of removal.
5. With the door and door glass closed fully, check for water and air leaks.

   NOTE: Do not use high pressure water.

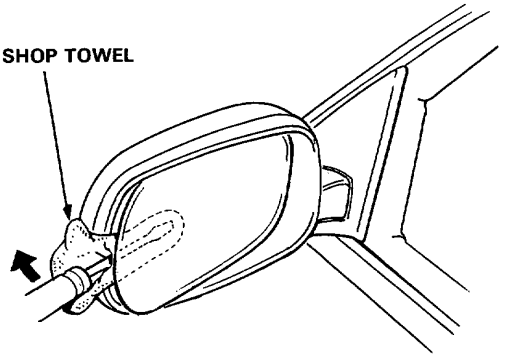
Mirror Glass Replacement

1. Insert a screwdriver in the mirror through the service hole and loosen the glass retaining screw.

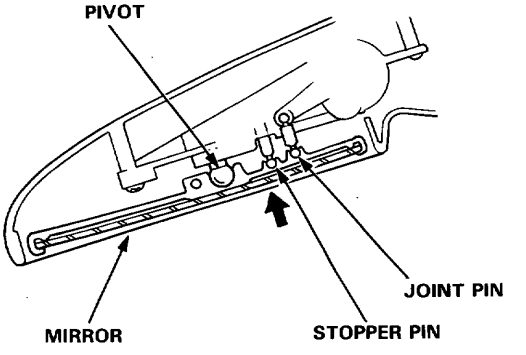


2. Carefully pry out the mirror with a flat tip screwdriver as shown.

   CAUTION: To prevent damage to the mirror, wrap the end of the screwdriver with a shop towel.

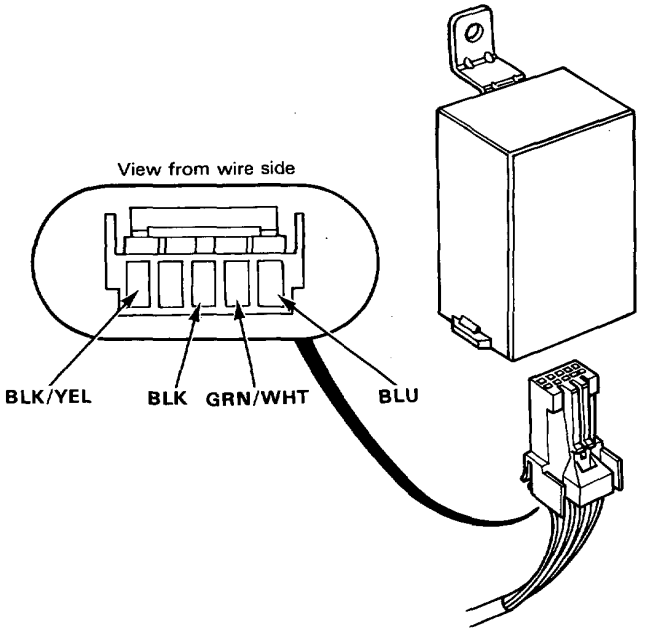


3. Install the mirror in the reverse order of removal and also apply grease to the location indicated by the arrow.



Control Unit Input Test

NOTE: Check the No.2 (15 A) fuse before input test.
Disconnect the 5-P connector from the control unit.
Make the following input test at the harness pins.



No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, G402). · An open in the wire.
2	BLK/YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	· An open in the wire.
3	GRN/WHT	Ignition switch ON.	Check for voltage ground: should be battery voltage.	· Faulty solenoid valve. · An open in the wire.
4	BLU	Start the engine.	Check for voltage ground: should be battery voltage.	· Faulty ignition system. · An open in the wire.

● Replace the control unit if the mount is not defective and no defects are found in the above input tests.

Wiring Diagrams

Index

Air Conditioner 17
Anti-Lock Brake System (ALB) 14
Automatic Transmission Control System 14
Battery 1
Blower Controls 17
Charging System 1
Cigarette Lighter 10
Clock 10
Cooling Fan Control 16
Cruise Control System 12
Defogger, Rear Window 11
Door Lock, Power 12
Fuel and Emissions 16
Gauges 2
Headlight Adjuster System 4
Horns 4
Ignition Switch 1
Ignition System 1
Indicators
- Cruise Control Indicator 2
- Trunk Open Indicator 2
- High Beam Indicator 2
- Shift Lever Position Indicator 4
- Turn Signal Indicator 2

Integrated Control Unit 5
Lights, Exterior
- Back-up Lights 10
- Brake Lights 3
- Hazard Lights 2
- Headlights 6
- License Plate Lights 6
- Marker Lights 6
- Taillights 6

Lights, Interior
- Courtesy Lights 3
- Dashlight Brightness Control 6
- Dome Lights 3
- Glove Box Light 6
- Trunk Light 6

Vanity Mirror Light 6
Lighting System 6
Mirror, Power 6
Seat, Power 13
Starting System 1
Stereo Sound System 10
Sunroof 11
Turn Signal / Hazard Flasher System 13
Warning System
- ALB Warning 2
- Brake Warning 2
- Charge Warning 2
- Check Engine Warning 2
- Hazard Warning 2
- Light-on Warning 5
- Oil Pressure Warning 2

Washers
- Windshield 13
- Headlight Washer 13

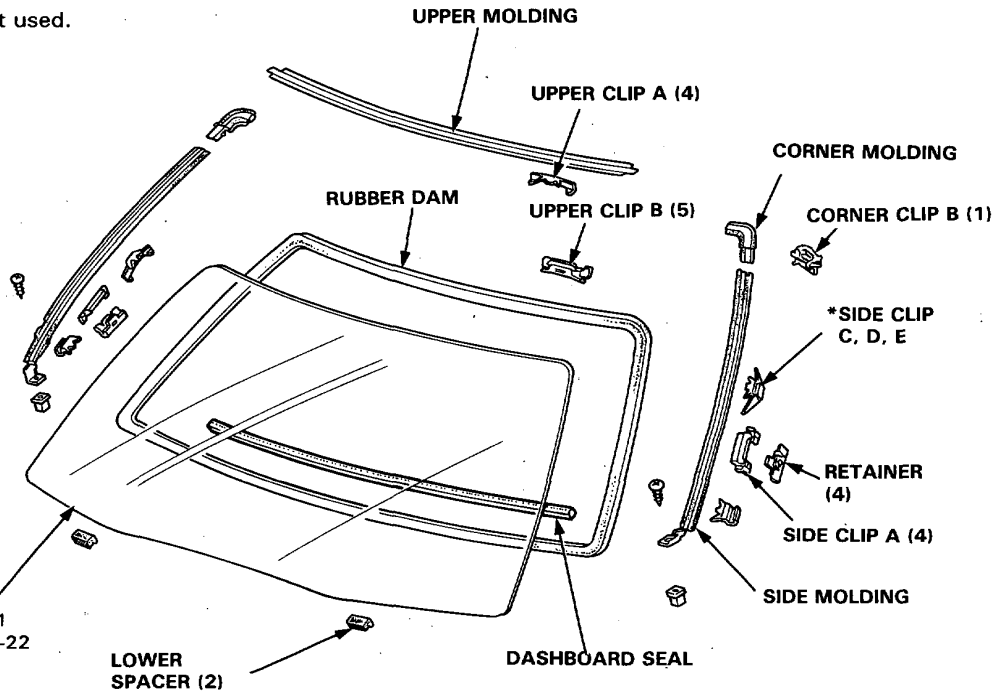
Windows, Power 7
Wipers
- Windshield 7

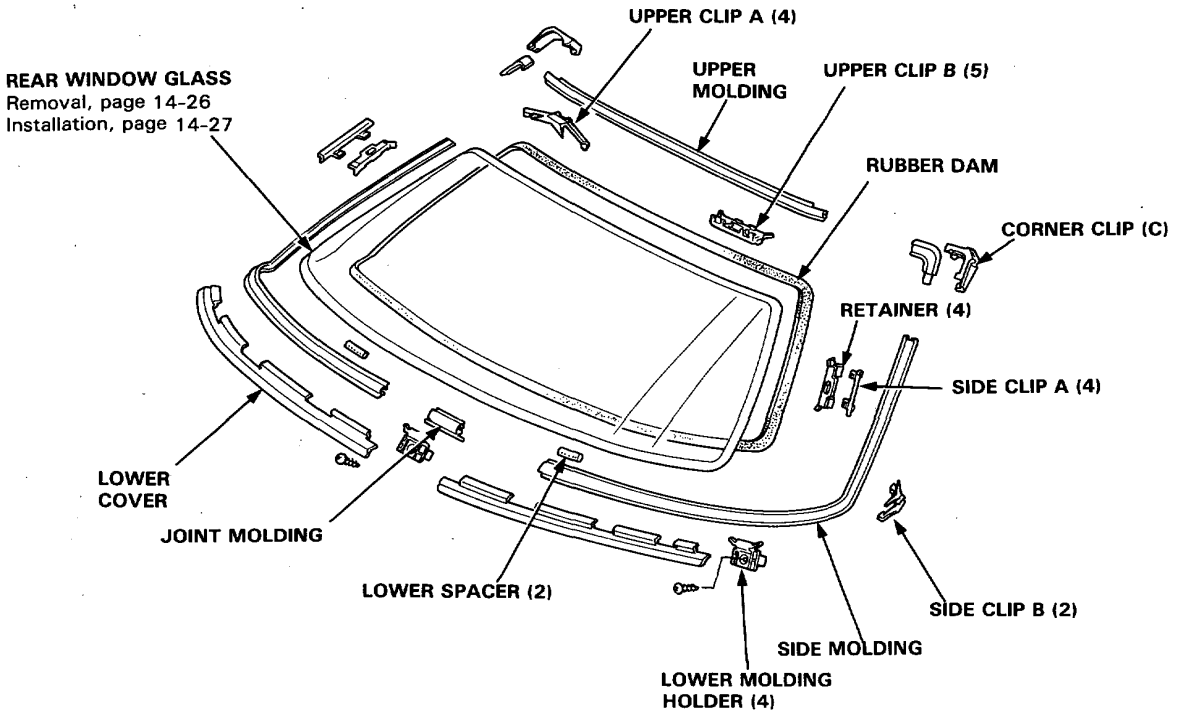
Windshield, Rear Window

Index

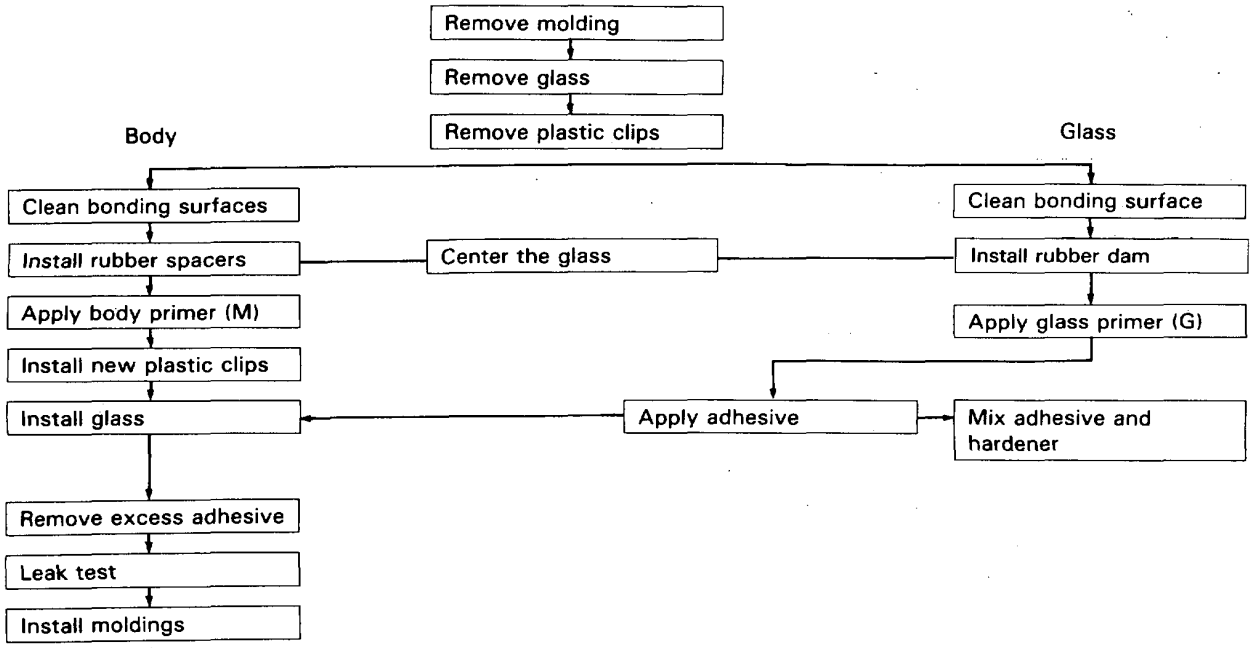
( ): Quantity of part used.

* SIDE CLIP Color:
C: Gray
D: White
E: Red





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

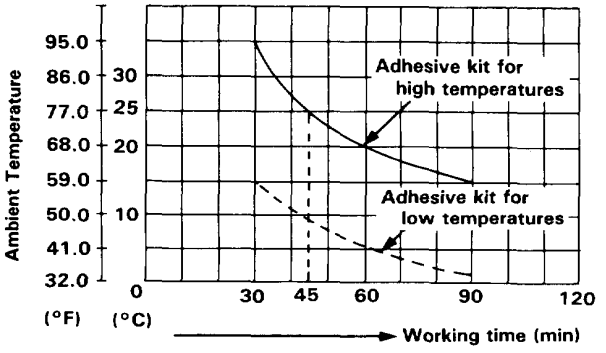
Tool/Material	Remarks
Glass or steel plate	To mix adhesive and hardener on
Putty knife	To mix adhesive and remove excess
Caulking gun	To apply bead of adhesive to windshield
Suction cups	To install windshield
Knife	To scrape bonding surface around window opening
Awl	To make hole through existing adhesive for piano wire
Two wood sticks	To hold piano wire
Toluene or alcohol	To clean bonding surfaces

Windshield, Rear Window

Workable Time

Adhesive workable time varies widely according to temperature, so choose the correct adhesive kit for the temperature range you will be working in.
After mixing and applying adhesive, you should install the windshield within the time shown on the chart.

For example, when the ambient temperature is 25°C (77°F), the glass should be installed within 45 minutes using the high temperature type adhesive.
Kit part numbers and contents are listed on the page before.



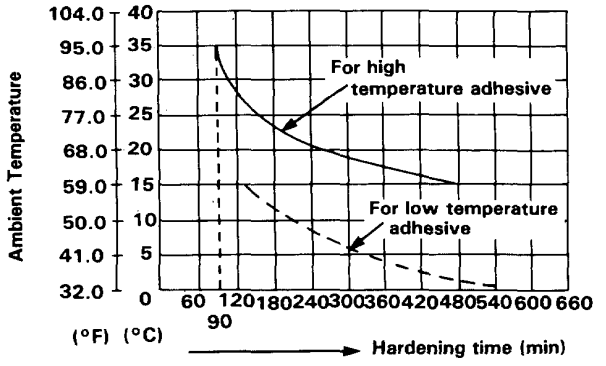
Notes

- Both kits have two types of adhesive primer: one for the body (metal), and one for glass.
- Always use new genuine Honda adhesive, or equivalent.
- Do not use the adhesive if 6 months have elapsed since date of manufacture.
- Store adhesive in a cool, dry place.
- Open only immediately before you are going to use it.

Hardening Time

Hardening time can be shortened by heating with infrared light.

For example, the adhesive will start to harden within 270 minutes mixing at 20°C (63°F). If however, it is heated to 35°C (95°F), it will start to harden within 90 minutes.



Broken Glass Removal

Remove as much broken glass as possible with a vacuum cleaner.
Blow out the glass in the heater and behind the dashboard with low pressure compressed air:

⚠WARNING Wear eye protection while using the air gun.

1. Set the temperature control lever to COLD.
2. Push the HEAT button on the function panel.
3. Make sure the recirculation button is out (OFF).
4. Blow compressed air through the defroster center vent outlet.
5. Remove the blower duct, and remove any glass from the air mix chamber.
6. Remove the any glass from the top of the vent/defrost door.
7. Remove any glass from top and bottom of carpet and seats with a vacuum cleaner.

NOTE: It is recommended to remove the seats to shake off any glass (page 14-40).

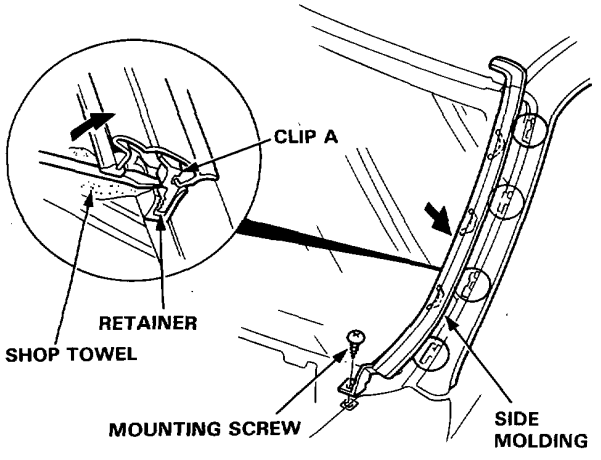
Windshield

Removal

CAUTION:
- **Wear gloves to remove and install the glass.**
- **Use seat covers to avoid damaging surface.**

1. To remove the windshield, first remove the:
   - Rearview mirror (page 14-49).
   - Sun visors and holders.
   - Front pillar trim (page 14-38).
   - Front wiper and air scoop.

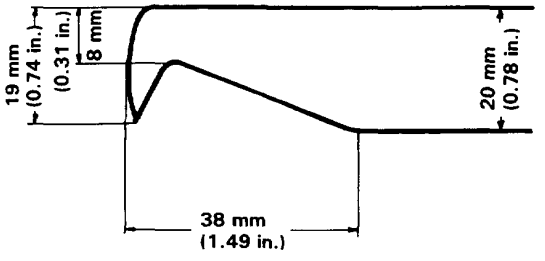
2. Detach the clip A from the retainer, then remove the side molding with corner molding as shown.



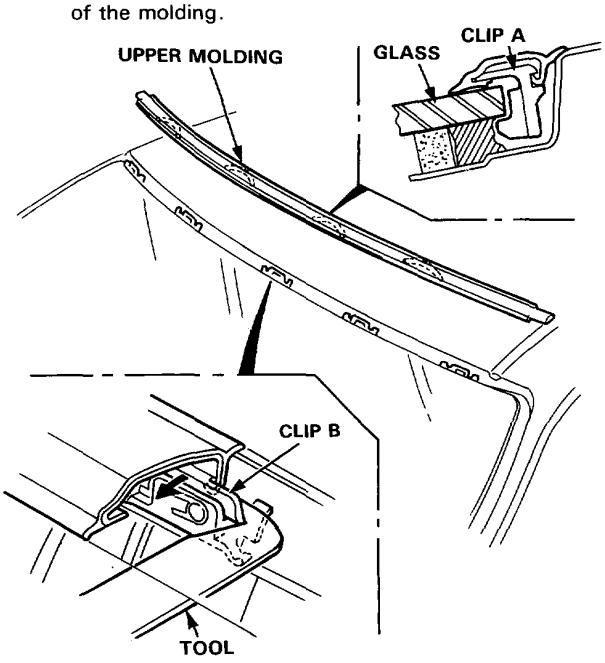
NOTE: You will need a molding clip release tool to remove some moldings. If necessary, make one that has the dimensions shown.

Molding Clip Release Tool

Thickness: 2 mm (0.08 in.), pointed at the end.



3. Raise the upper molding slightly away from the windshield at the locations where the molding clips are used, then fit the end of the molding clip release tool at each clip, and pull it toward you until the clip is clear of the molding.

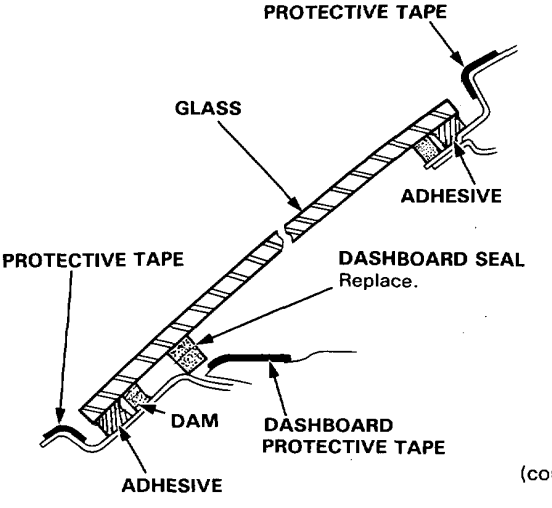


4. Remove the other clips and retainers from the body.

5. Lower the front of the headliner.

   CAUTION: Take care not to bend the headliner excessively.

6. Apply protective tape along the edge of the dashboard and body next to the glass as shown.

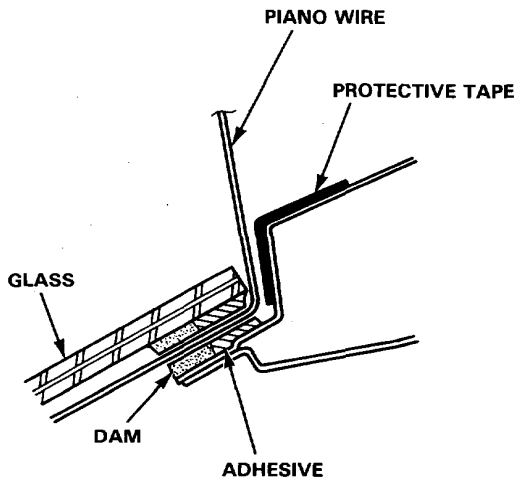


(cont'd)

Windshield

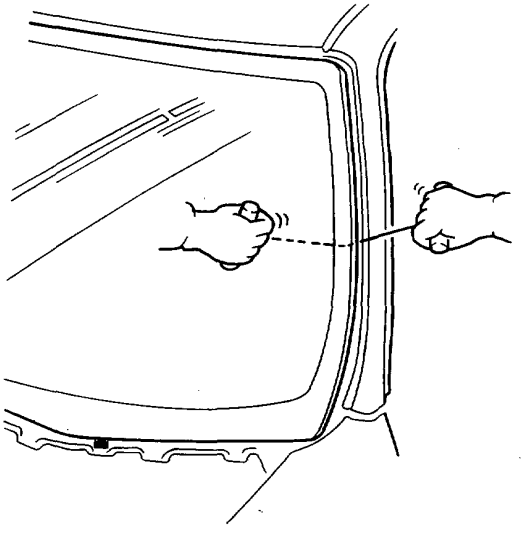
Removal (cont'd)

7. Using an awl, make a hole thrugh the windshield adhesive from inside the car. Push piano wire through the hole and wrap each end around a piece of wood.



8. 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.



9. Cut the rubber spacers away from the body with a knife; they are cemented in place.

NOTE: Replace the rubber spacers with new ones whenever the windshield has been removed.

Installation

1. Scrape the old adhesive smooth with a knife, to a thickness of about 2 mm (0.08 in.) on the bonding surface around the entire windshield flange.

NOTE:
- Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
- Remove all traces of the rubber spacer material from the body.
- Mask off surrounding surfaces before painting.

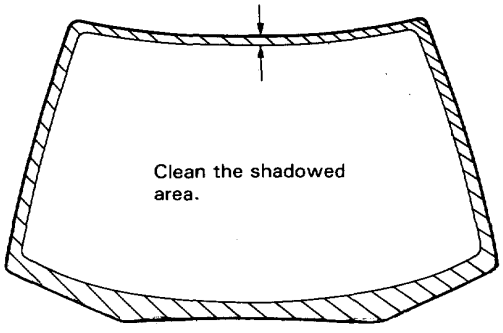
2. Clean the body bonding surface with a sponge dampened in alcohol.

NOTE: After cleaning, keep oil, grease or water from getting on the surface.

3. If the old glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

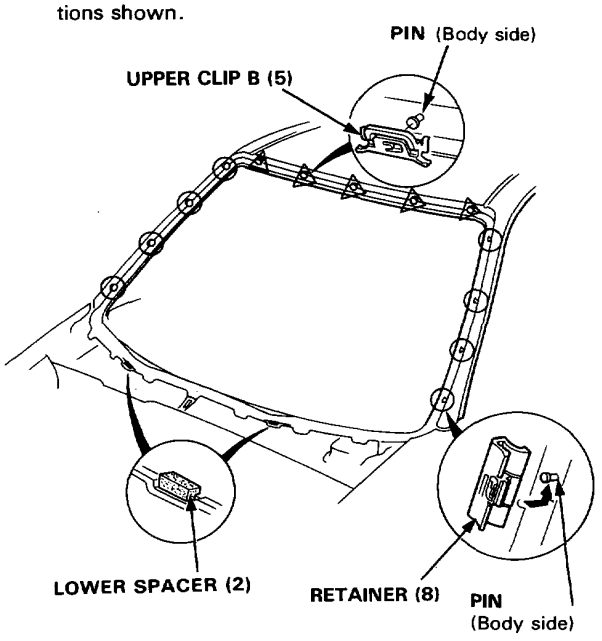
NOTE: Make sure the bonding surface is kept free of water, oil and grease.

CAUTION: Avoid setting the glass on its edges; small chips may later develop into cracks.



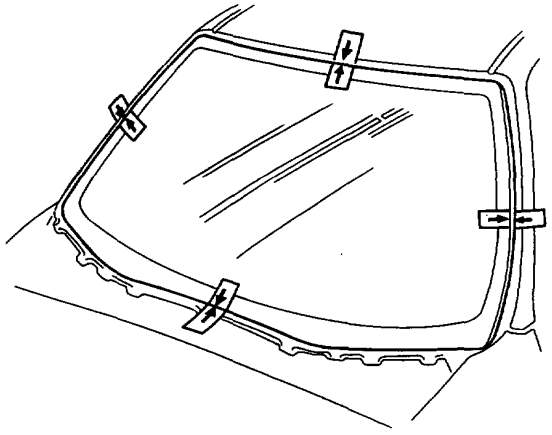
4. Install the molding clips and retainers as shown.

5. Peel the backing off each spacer, then install the spacers by pressing them firmly into place at the locations shown.



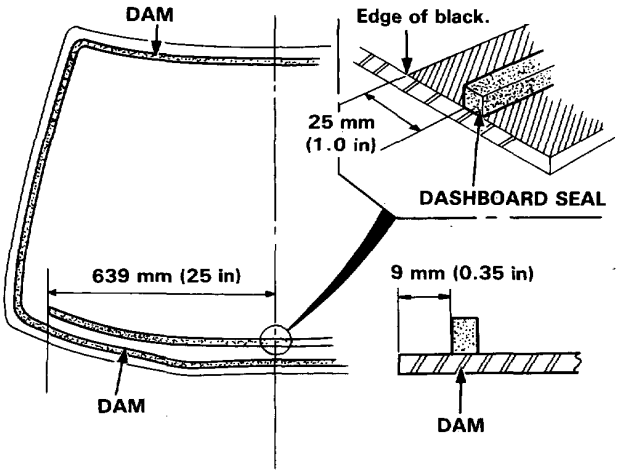
6. Set the windshield upright on the lower spacers, then center it is the opening. Mark the location by marking lines across the glass and body with a grease pencil at the four points shown.

ALIGNMENT MARKS



7. Glue the dashboard seal and rubber dam to the inside face of the windshield as shown to contain the adhesive during installation.

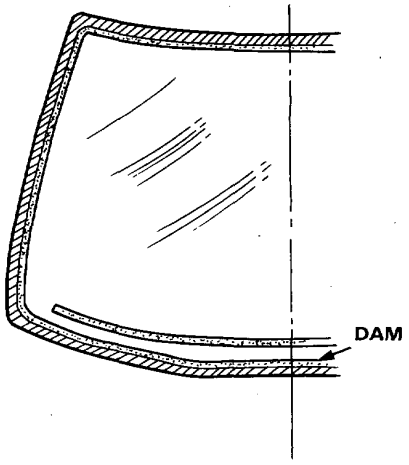
NOTE: Be careful not to touch the glass where adhesive will be applied.



8. With a sponge, apply a light coat of glass primer around the edge of the glass as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:
- Do not apply body primer to the glass, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the glass properly, causing a leak after the windshield is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

: Apply glass primer here.



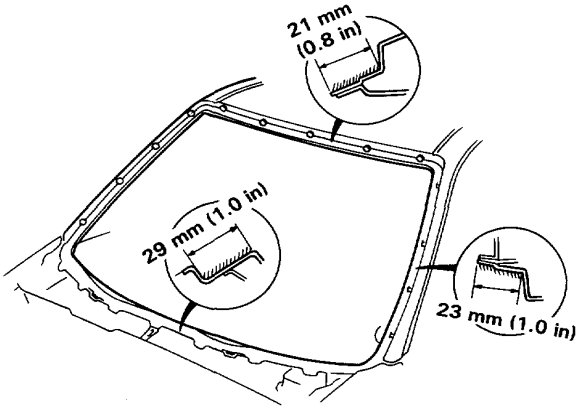
(cont'd)

Installation (cont'd)

9. With a sponge, apply a light coat of body primer to the original adhesive remaining around the window opening flange. The glass should be installed 10 minutes after you apply the primer.

   NOTE:
   - Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
   - Never touch the primed surfaces with your hands.
   - Mask off the dashboard before painting the flange.

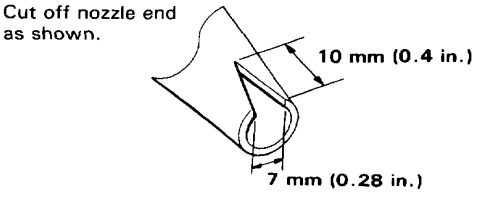
   : **Apply body primer here**



10. Thoroughly mix all the adhesive and hardener together on a glass or metal plate with a putty knife.

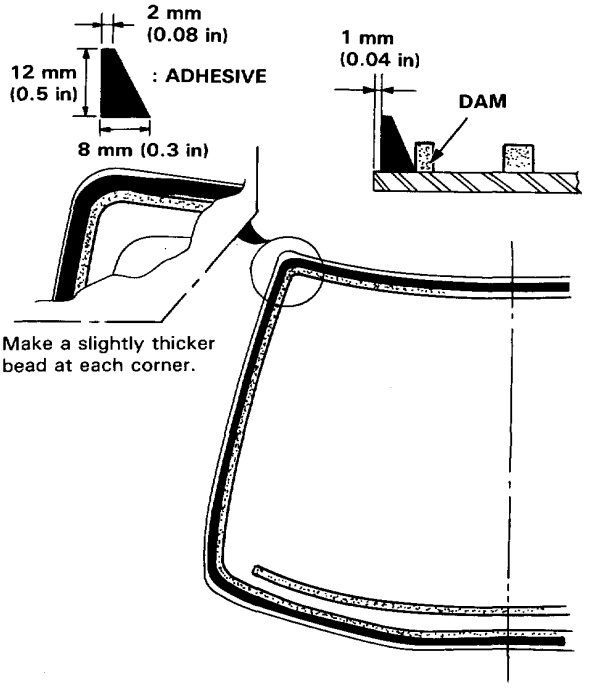
    NOTE:
    - Clean the plate with a sponge and alcohol before mixing.
    - Follow the instructions that come with the adhesive.

11. Before filling a cartridge, cut off the end of the nozzle at the angle shown.



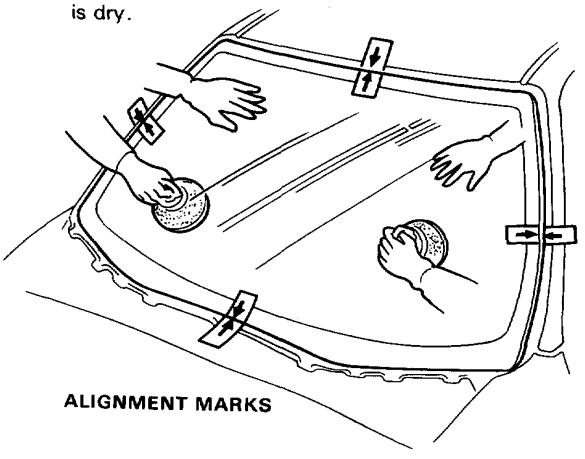
12. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun and run a bead of adhesive around the edge of the glass as shown.

    NOTE: Apply the adhesive within 30 minutes after applying the glass primer.



13. Use suction cups to hold the glass over the opening, align it with the marks made in step 6 and set it down on the adhesive. Lightly push on the glass until its edge it fully seated on the adhesive all the way around.

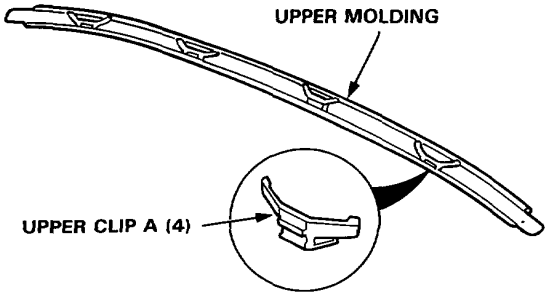
    NOTE: Do not close or open the doors until adhesive is dry.



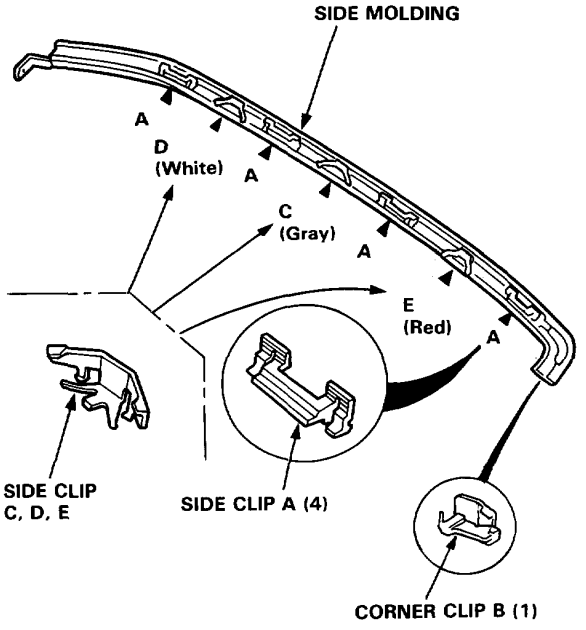
14. Scrape or wipe the excess adhesive off with a putty knife or gauze.

    NOTE: Wipe with a soft shop towel dampened with alcohol to remove adhesive from a painted surface or glass.

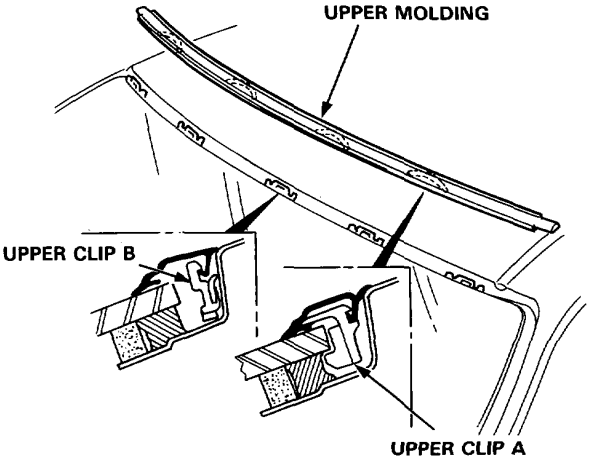
15. Install the clips on the side molding and upper molding.



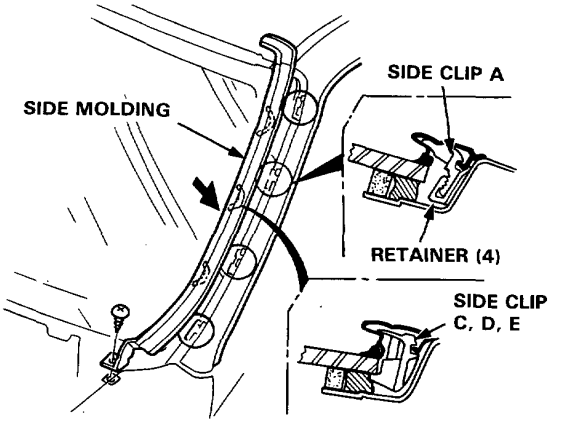
NOTE: Check the proper application of side clips C, D, E.



16. Install the upper molding.



17. Install the front side molding.



18. After the adhesive is dry, spray water over the glass and check for leaks. Mark leaking areas and let the glass dry, then seal with sealant.

    NOTE: Let the car stand for at least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.

19. Reassemble all removed parts.

    NOTE: Install the rearview mirror rubber damper after the adhesive has dryed thoroughly.

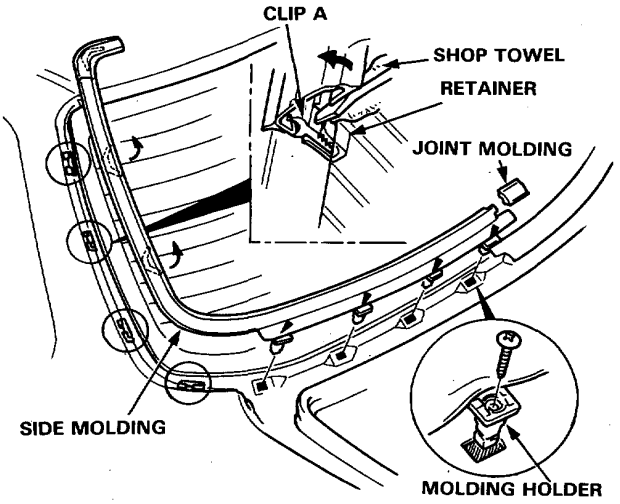
Rear Window

Removal

CAUTION:
- **Wear gloves to remove and install the glass.**
- **Do not damage the defroster grid lines.**

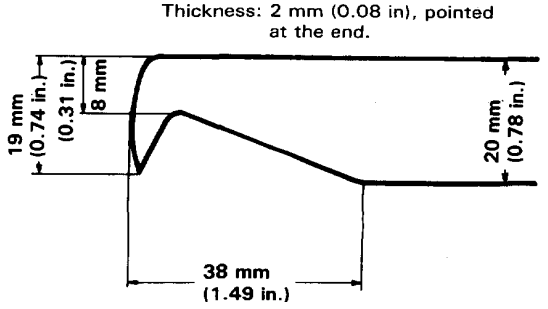
1. To remove the rear glass, first remove:
   - Rear shelf (page 14-38).
   - Rear pillar trim panel (page 14-38).
2. Disconnect the defroster leads, and remove their holders.

   NOTE: Avoid scratching or scoring the glass with the cutter blade.
3. Remove the screws and detach the clips, then remove the side molding.

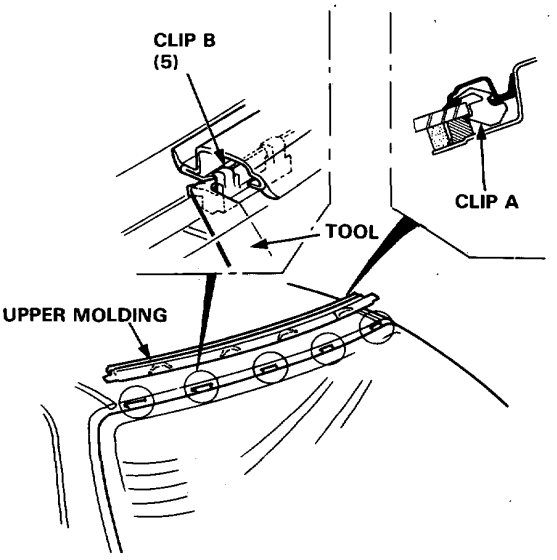


NOTE: You will need a molding clip release tool to remove some moldings. If necessary, make one that has the dimensions shown:

Molding Clip Release Tool

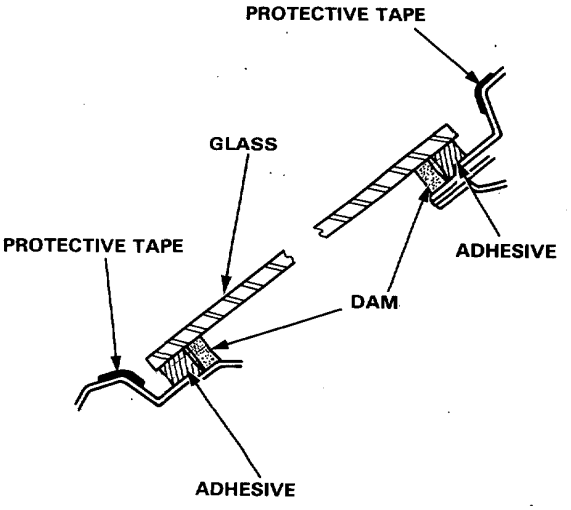


4. Detach the clips and remove the upper molding with a molding clip release tool.



5. Remove the other clips and retainers from the body.
6. Lower the rear of the headliner.

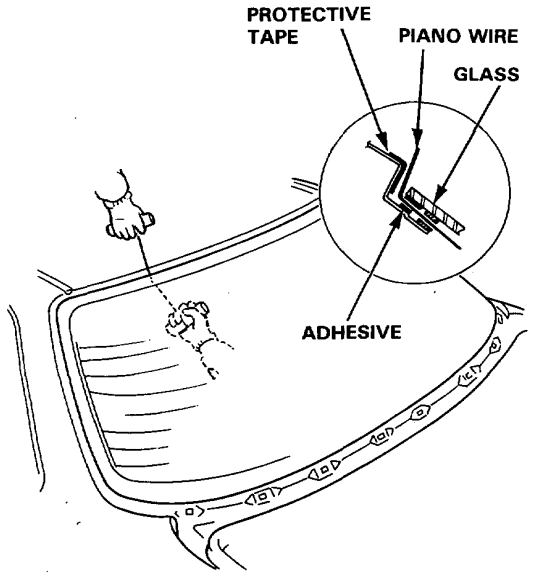
   CAUTION: Take care not to bend the headliner excessively.
7. Apply protective tape along the edge of the body next to the glass as shown.



8. Using an awl, make a hole through the glass adhesive from inside the car. Push piano wire through the hole and wrap each end around a piece of wood.

9. With a helper on the outside, pull the wire back and forth in a sawing motion and carefully cut through the adhesive around the entire glass.

CAUTION: Hold the piano wire as close to the glass as possible to prevent damage to the body.



10. Cut the rubber spacers away from the body with a knife: they are cemented in place.

NOTE: Replace the rubber spacers with new ones whenever the windshield has been removed.

Installation

1. Scrape the old adhesive smooth with a knife, to a thickness of about 2 mm (0.08 in.) on the bonding surface around the entire glass flange.

NOTE:
- Do not scrape down to the painted surface of the body; damaged paint will interfere with proper bonding.
- Remove all traces of the rubber spacer material from the body.
- Mask off surrounding surfaces before applying primer.

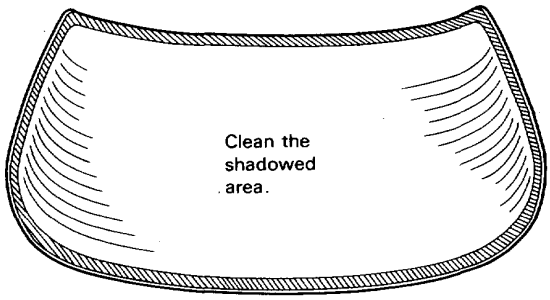
2. Clean the body bonding surface with a sponge dampened in alcohol.

NOTE: After cleaning, keep oil, grease or water from getting on the surface.

3. If the old glass is to be reinstalled, use a putty knife to scrape off all traces of old adhesive, then clean the glass surface with alcohol where new adhesive is to be applied.

NOTE: Make sure the bonding surface is kept free of water, oil and grease.

CAUTION: Avoid setting the glass on its edges; small chips may later develop into cracks.

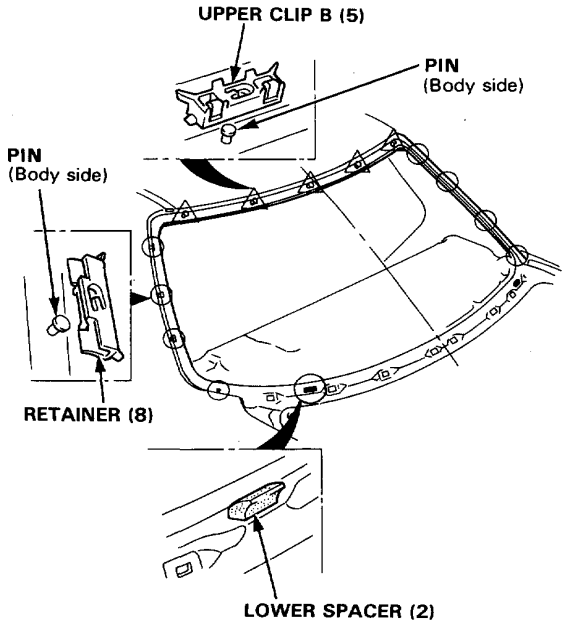


(cont'd)

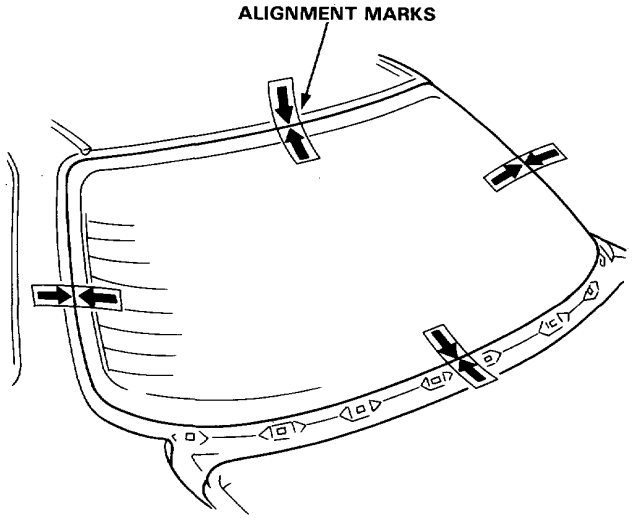
Installation (cont'd)

4. Install the molding clips and retainers as shown.

5. Peel the backing off each spacer, then install the spacers by pressing them firmly into place at the locations shown.

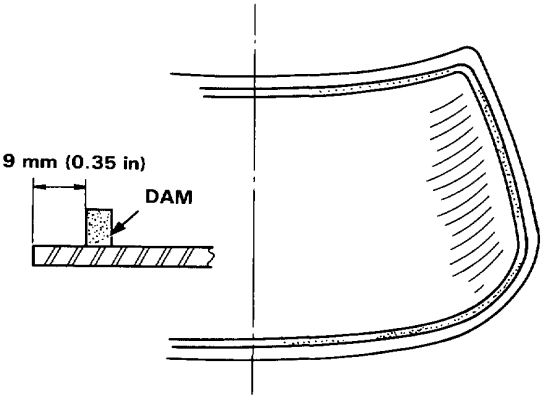


6. Set the glass upright on the lower spacers, then center it in the opening. Mark the location by marking lines across the glass and body with a grease pencil at the four points shown.



7. Glue the rubber dams to the inside face of the glass as shown to contain the adhesive during installation.

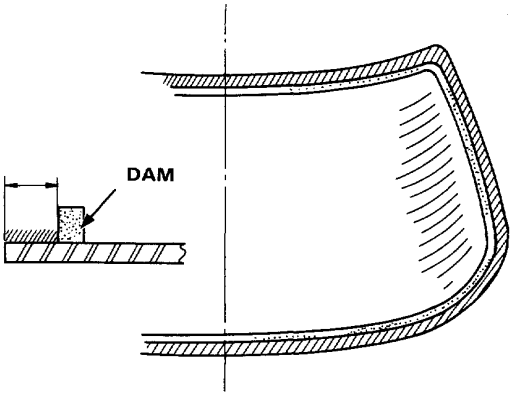
NOTE: Be careful not to touch the glass where adhesive will be applied.



8. With a sponge, apply a light coat of glass primer around the edge of the glass as shown, then lightly wipe it off with gauze or cheesecloth.

NOTE:
- Do not apply body primer to the glass, and do not get body and glass primer sponges mixed up.
- Never touch the primed surfaces with your hands. If you do, the adhesive may not bond to the glass properly, causing a leak after the glass is installed.
- Keep water, dust, and abrasive materials away from the primed surface.

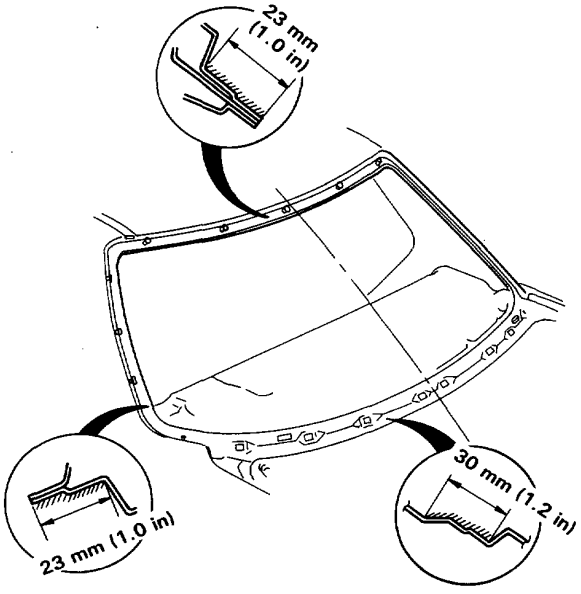
: **Apply glass primer here.**



9. With a sponge, apply a light coat of body primer to the original adhesive remaining around the window opening flange.

NOTE:
- Do not apply glass primer to the body, and be careful not to mix up glass and body primer sponges.
- Never touch the primed surfaces with your hands.

▨ : **Apply body primer here.**

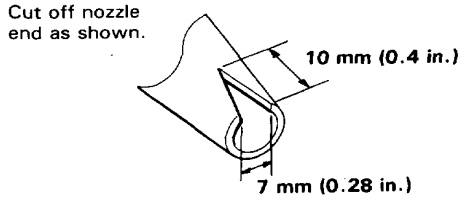


10. Thoroughly mix the adhesive and hardener together on a glass or metal plate with a putty knife.

NOTE: Clean the plate with a sponge and alcohol before mixing.

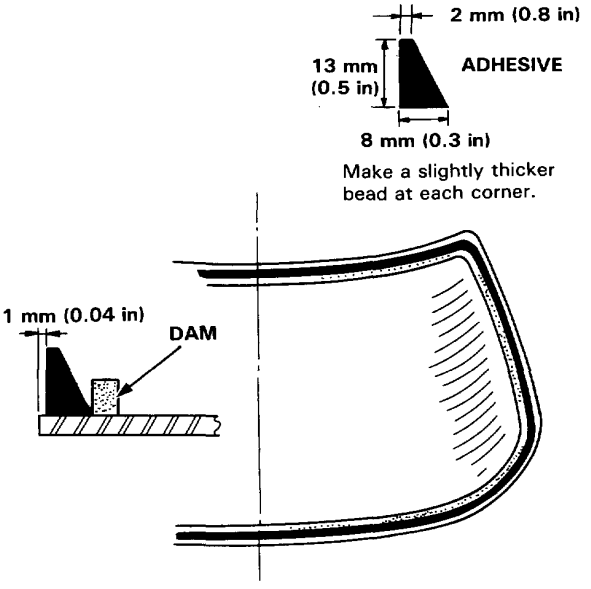
11. Follow the instructions that came with the adhesive.

12. Before filling a cartridge, cut off the end of the nozzle at the angle shown.



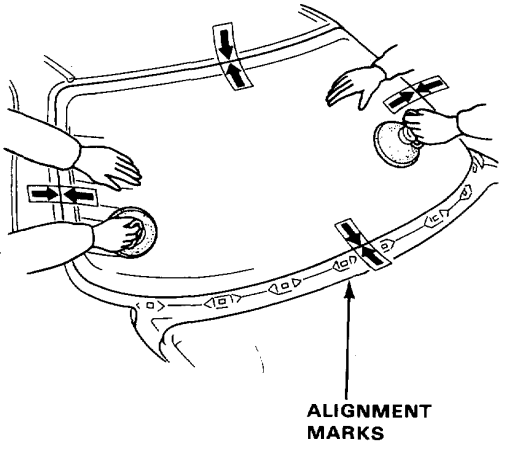
13. Pack adhesive into the cartridge without air pockets to ensure continuous delivery. Put the cartridge in a caulking gun and run a bead of adhesive around the edge of the glass as shown.

NOTE: Apply the adhesive within 30 minutes after applying the glass primer.



14. Use suction cups to hold the glass over the opening, align it with the marks made in step 6 and set it down on the adhesive. Lightly push on the glass until its edges are fully seated on the adhesive all the way around.

NOTE: Do not close or open the doors until adhesive is dry.



(cont'd)

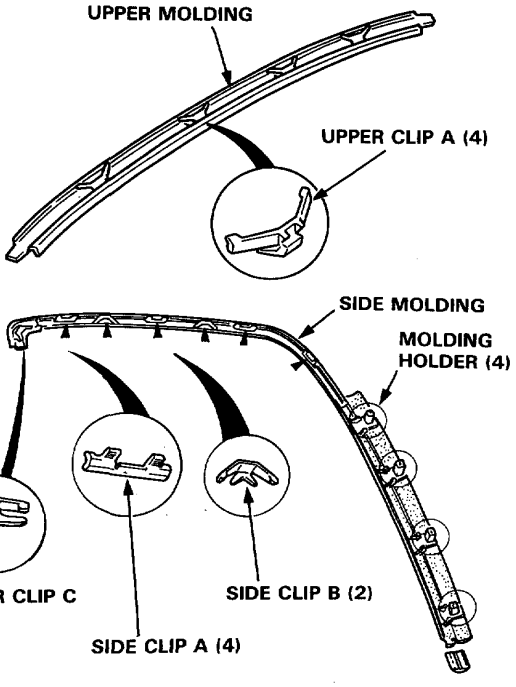
Rear Window

Installation (cont'd)

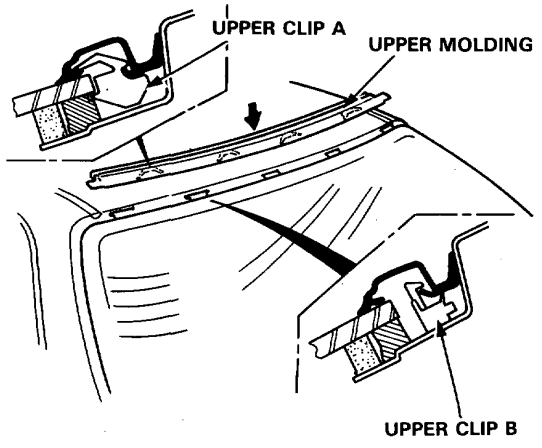
15. Scrape or wipe the excess adhesive off with a putty knife or gauze.

    NOTE: Use a soft shop towel dampened with alcohol or unleaded gasoline to remove adhesive from a painted surface or glass.

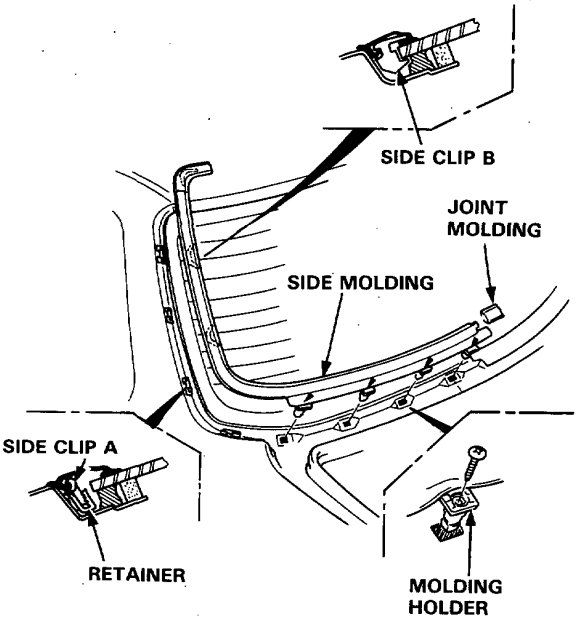
16. Install the clips on the upper molding and side molding.



17. Install the upper molding.



18. Install the side moldings.



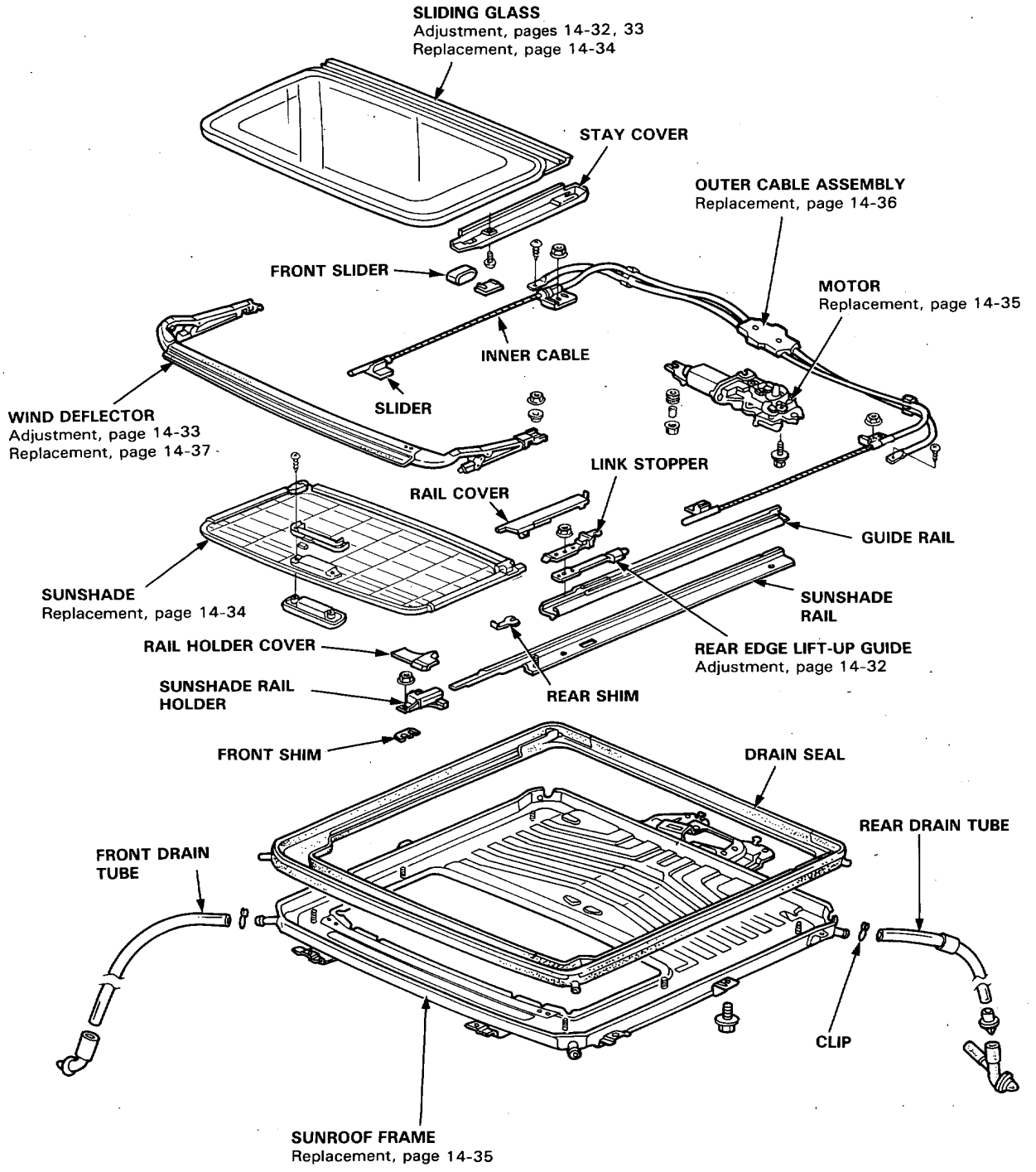
19. After the adhesive is dry, spray water over the glass and check for leaks. Mark leaking areas and let the glass dry, then seal with sealant.

    NOTE: Let the car stand for at least 4 hours after glass installation. If the car has to be used within the first 4 hours, it must be driven slowly.

20. Fix the headliner back into position then install:

    - Rear pillar trim panel.
    - Rear shelf.

Index


SLIDING GLASS
Adjustment, pages 14-32, 33
Replacement, page 14-34
STAY COVER
OUTER CABLE ASSEMBLY
Replacement, page 14-36
FRONT SLIDER
MOTOR
Replacement, page 14-35
INNER CABLE
SLIDER
WIND DEFLECTOR
Adjustment, page 14-33
Replacement, page 14-37
LINK STOPPER
RAIL COVER
GUIDE RAIL
SUNSHADE
Replacement, page 14-34
SUNSHADE RAIL
RAIL HOLDER COVER
REAR EDGE LIFT-UP GUIDE
Adjustment, page 14-32
SUNSHADE RAIL HOLDER
REAR SHIM
FRONT SHIM
DRAIN SEAL
REAR DRAIN TUBE
FRONT DRAIN TUBE
CLIP
SUNROOF FRAME
Replacement, page 14-35

Sunroof

Troubleshooting

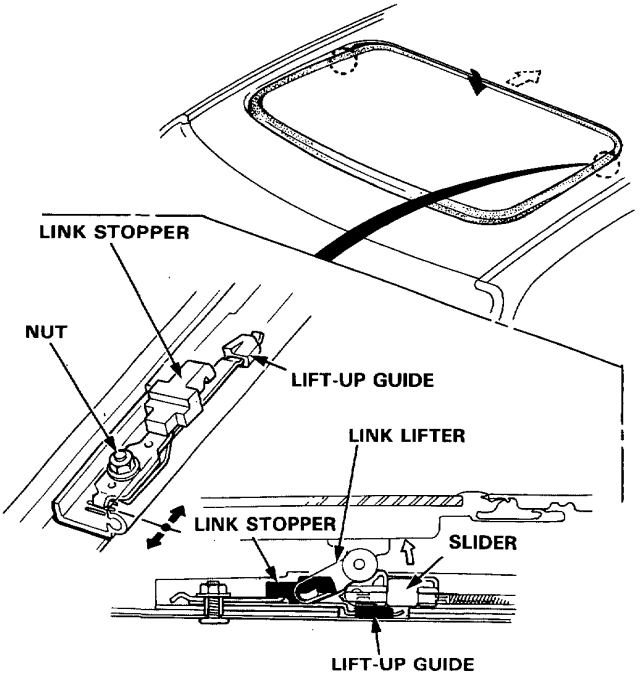
Symptom	Probable Cause
Water leak	1. Clogged drain tube. 2. Gap between glass weatherstrip and roof panel. 3. Defective or improperly installed glass weatherstrip. 4. Gap between drain seal and roof panel.
Wind leak, noise	1. Excessive clearance between glass weatherstrip and roof panel.
Deflector noise	1. Improper clearance between deflector seal and frame seal. 2. Insufficient deflector extension. 3. Deformed deflector.
Motor noise	1. Loose motor. 2. Worn gear or bearing. 3. Outer cable deformed.
Sliding glass does not move, but motor turns	1. Clutch out of adjustment. 2. Foreign matter stuck between guide rail and slider. 3. Inner cable loose. 4. Outer cable not attached properly.
Sliding glass does not move and motor does not turn (Sliding glass can be moved with sunroof wrench)	1. Blown fuse. 2. Faulty switch. 3. Battery run down. 4. Defective motor. 5. Wrong operation of relay.

Rear Edge Closing Adjustment

Open the glass about a foot, then close it to check where rear edge begins to rise. If it rises too soon and seats too tightly against the roof panel, or too late and does not seat tightly enough, adjust it.

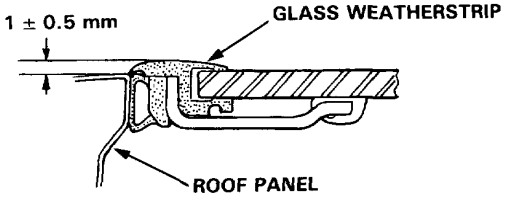
1. Open the glass fully.
2. Remove the rail covers from both sides, and loosen the lift-up guide nuts.
3. Move the lift-up guides and link stopper forward or backward, then tighten nuts and recheck roof closing.

   The guides have pitches of 1.5 mm (0.06 in) each and can be adjusted 2 pitches forward or backward.
4. If necessary, lower the rear of the headliner and remove the motor, then adjust the inner cables (location of sliders) until they are parallel.



Glass Height Adjustment

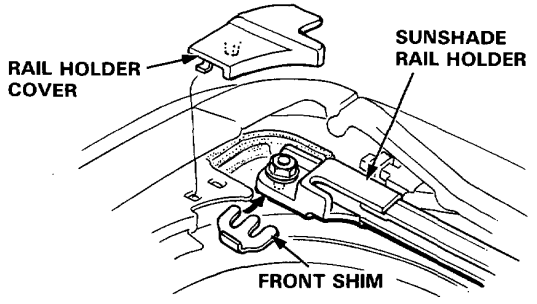
Roof panel should be even with the glass weatherstrip, to within 1 ± 0.5 mm (0.04 ± 0.02 in) all the way around.
If not, open the glass fully, and:



Front:

1. Pry out the rail holder cover and loosen the mounting nut.
2. Install shims between sunroof frame and sunshade rail holder.

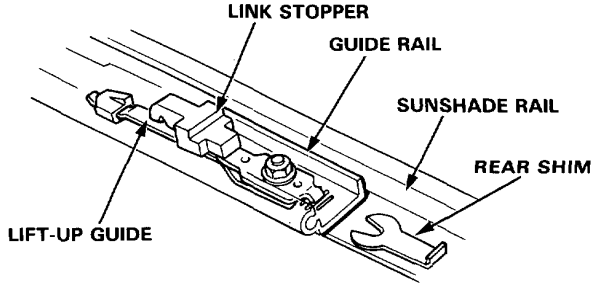
FRONT: Shim thickness Max. 2 mm (0.08 in)



Rear:

1. Remove the rail cover and loosen the lift-up guide mounting nut.
2. Install shims between guide rail and sunshade rail.

REAR: Shim thickness Max. 2 mm (0.08 in)



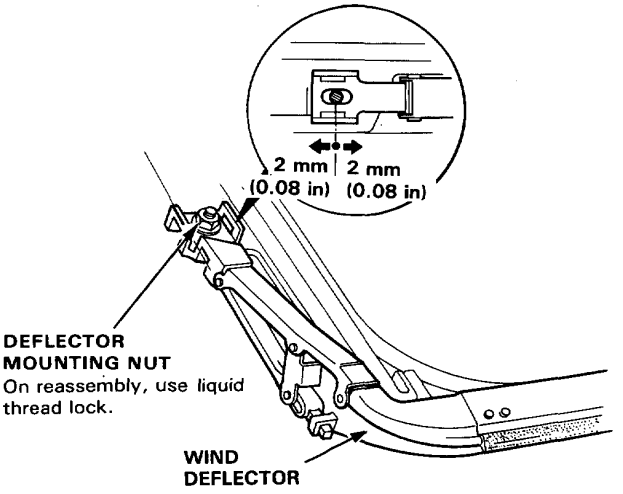
3. Repeat on opposite side if necessary.
4. Side-to-side fit of glass weatherstrip can be adjusted by loosening the sunroof frame mounting bolts and moving the frame (page 14-35).

Wind Deflector Adjustment

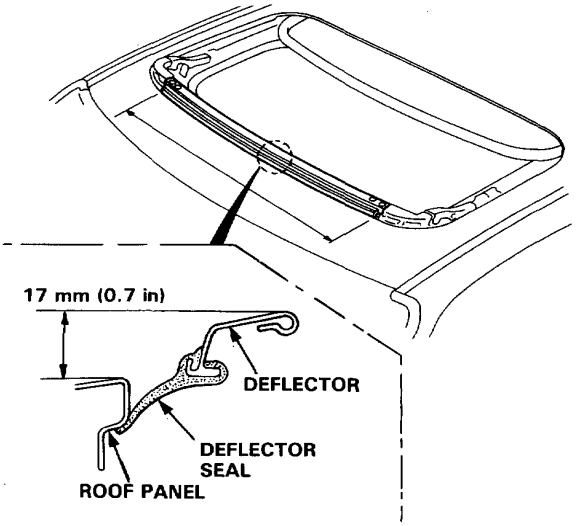
NOTE: A gap between deflector seal and roof panel will cause wind noise when driving at high speed with the sunroof open.

1. Open the sunroof and pry the rail covers off both sides.
2. Loosen the deflector mounting nuts.

   NOTE: Wind deflector can be adjusted 2 mm (0.08 in) forward or backward.



3. Adjust the deflector forward or backward so the edge of its seal touches the roof panel evenly. The deflector seal should touch the roof panel across entire front edge.

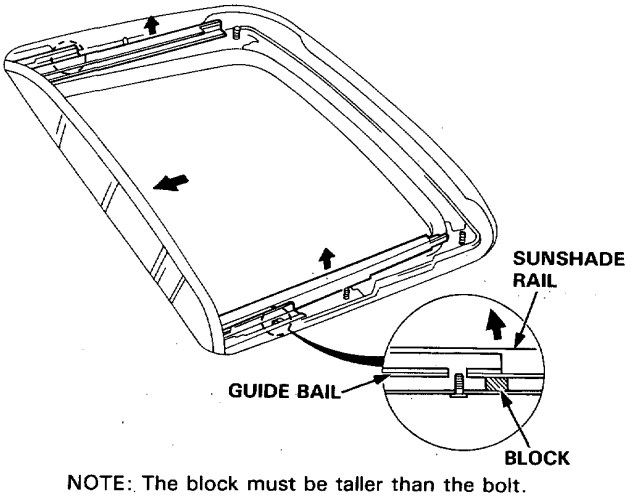


NOTE: The height of the deflector arm when open cannot be adjusted. If damaged or deformed, replace it (page 14-37).

Sunroof

Glass and Sunshade Replacement

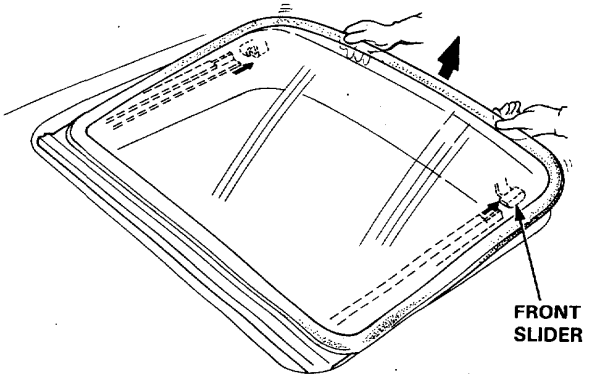
1. Open the glass fully.
2. To remove the glass, first remove:
   - Rail holder cover
   - Rail cover
   - Sunshade rail holder
   - Wind deflector
   - Link stopper
   - Lift-up guide
3. Lift the sunshade rail with guide rail and insert a spacer such as a wooden block in order to avoid interference between the sunshade rail and bolt when removing the sunshade.



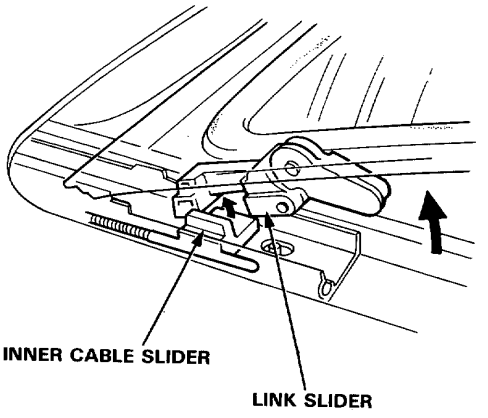
NOTE: The block must be taller than the bolt.

4. Slide the glass forward by sunroof wrench, then remove the front sliders from sunshade rails.

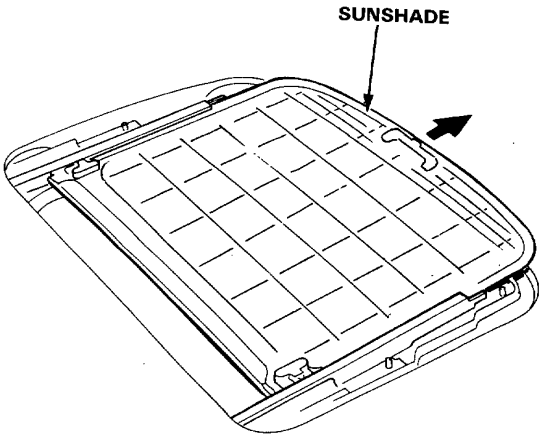
   NOTE: Do not scratch the roof panel with the front sliders.



5. Remove the link slider from the inner cable slider by lifting the glass, then remove the glass.



6. Slide the sunshade forward, then remove the sunshade.



7. Install the glass and sunshade in the reverse order of removal

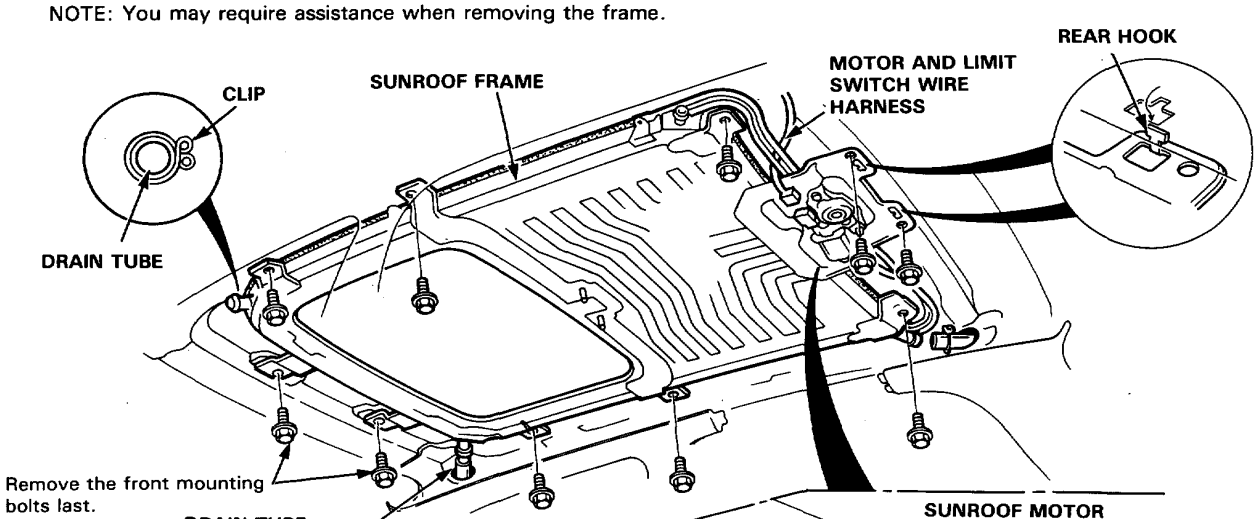
   NOTE:
   - Take care not pinch the drain seal in the sunshade rail.
   - Check for water and air leaks.

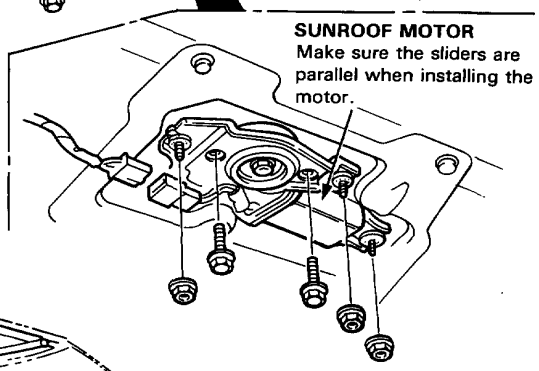
Motor, Drain Tube and Frame Replacement

CAUTION: Be careful not to damage the seats, dashboard and other interior trim.

1. Remove the glass (page 14-34) and the headliner (page 14-39).
2. Disconnect the motor wire harness. Remove the clips securing the dome light wire harness.
3. Remove the sunroof motor by removing the two bolts and three nuts.
4. Disconnect the drain tubes.
5. Remove the ten mounting bolts from the frame, and remove the frame from the car.

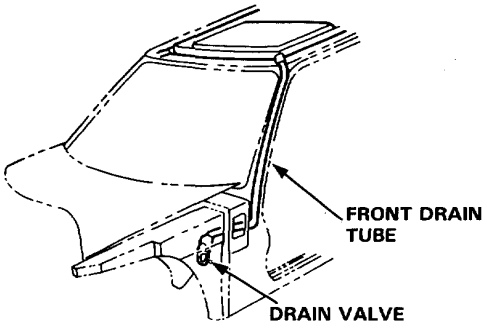
   NOTE: You may require assistance when removing the frame.

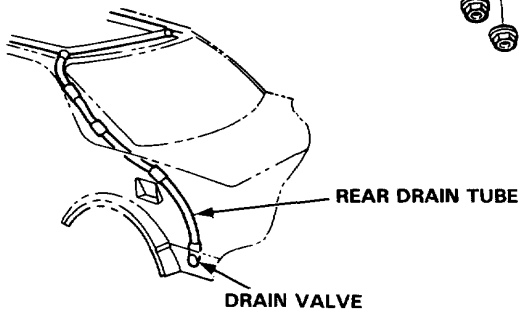




6. Pull the drain tubes out the front and rear pillars.

   NOTE: Before pulling out the drain tube, tie a string to the end of it so it can be reinstalled.





7. To install, insert the frame's rear hooks into the body holes, then install parts in the reverse order of removal.

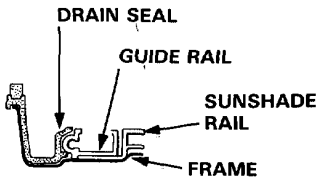
   NOTE:
   - Insert over 10 mm of the drain tube onto the nozzle.
   - Install the tube clips with the ends facing the side to ease installation of the headliner.
   - Check the drain seal assembly.
   - Check for water and air leaks.

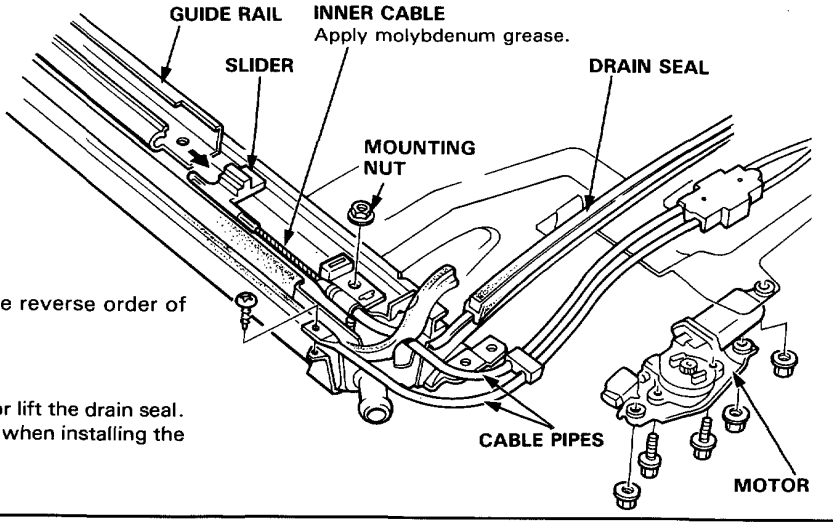
Sunroof

Guide Rails/Cable Replacement

1. With sunroof out of the car, remove the sunroof motor from the frame (page 14-35).
2. Remove the guide rail mounting nuts and lift off the guide rails, then remove the cables with sliders attached.
3. If necessary, remove the sunshade rail and frame seal from the sunroof frame.

   NOTE: Take care not to bend the cable pipes and guide rails.



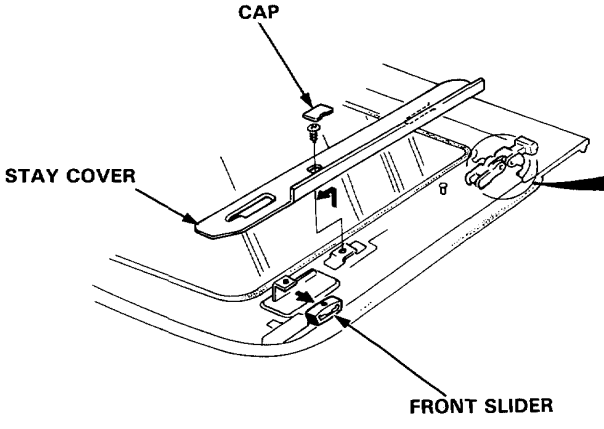


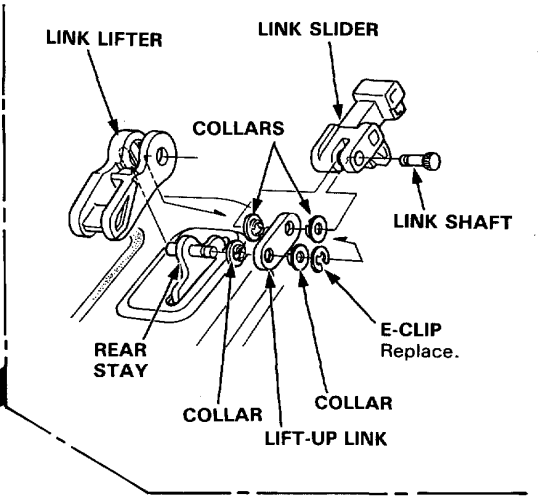
Install the guide rails and cables in the reverse order of removal.

NOTE:
- Take care not to damage, twist or lift the drain seal.
- Make sure the sliders are parallel when installing the motor.

Link Slider/Lift-up Link Disassembly

1. Remove the sliding glass (page 14-34).
2. Pull the front slider from the front stay.
3. Remove the link lifter, then remove the E-clip.
4. Remove the lift-up link from the rear stay. Strike the link shaft out, then separate the lift-up link and link slider.





5. Assemble the slider and lift-up link in the reverse order of removal.

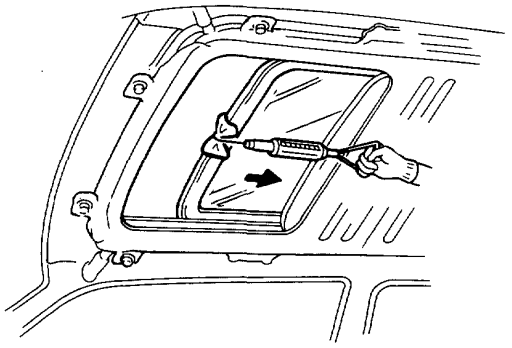
NOTE:
- Damaged parts should be replaced.
- Apply the grease to the sliding portion.

Closing Drag Check (Motor Removed)

Before installing the sunroof motor, measure effort required to open sliding glass using a spring scale as shown.

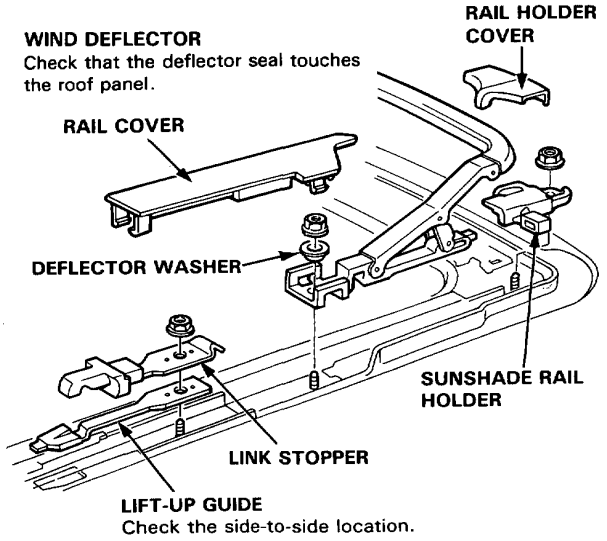
CAUTION: When using the spring scale, protect the leading edge of the sunroof with a shop towel.

If load is over 98 N (10 kg, 22 lb), check side clearance and glass height adjustment (page 14-33).



Lift-Up Guide/Wind Deflector Replacement

Mounting nuts torque: 9 N·m (0.9 kg-m, 6.5 lb-ft)

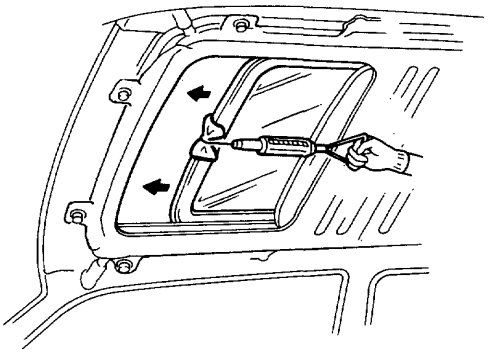


Closing Force Check (Motor Installed)

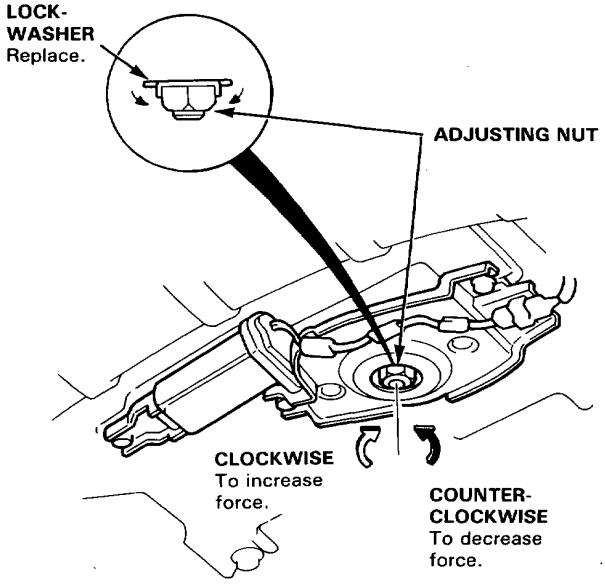
1. After installing all removed parts, have a helper hold the switch to close the sliding glass while you measure force required to stop it. Attach spring scale as shown. Read force as soon as glass stops moving, then immediately release the switch and spring scale.

   CAUTION: When using the spring scale, protect the leading edge of the sunroof with a shop towel.

   Closing Force: 196—245 N (20—30 kg, 44—55 lb)



2. If force is not within specification, install a new lockwasher, adjust the tension by turning the sunroof motor clutch adjusting nut, and bend the lockwasher against the adjusting nut.

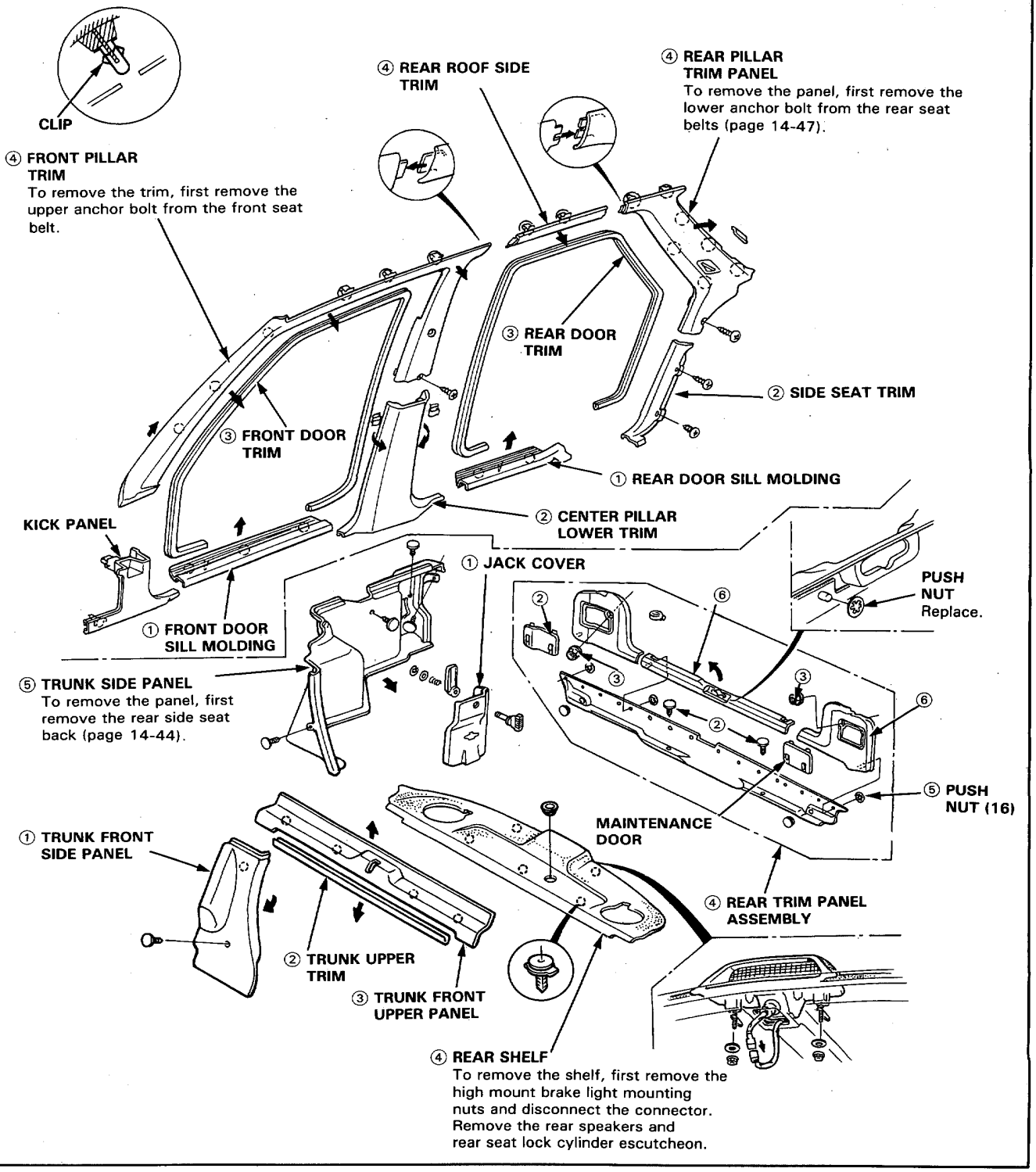


Interior Trim

Replacement

Disassemble in numbered sequence.

◌: Clip locations

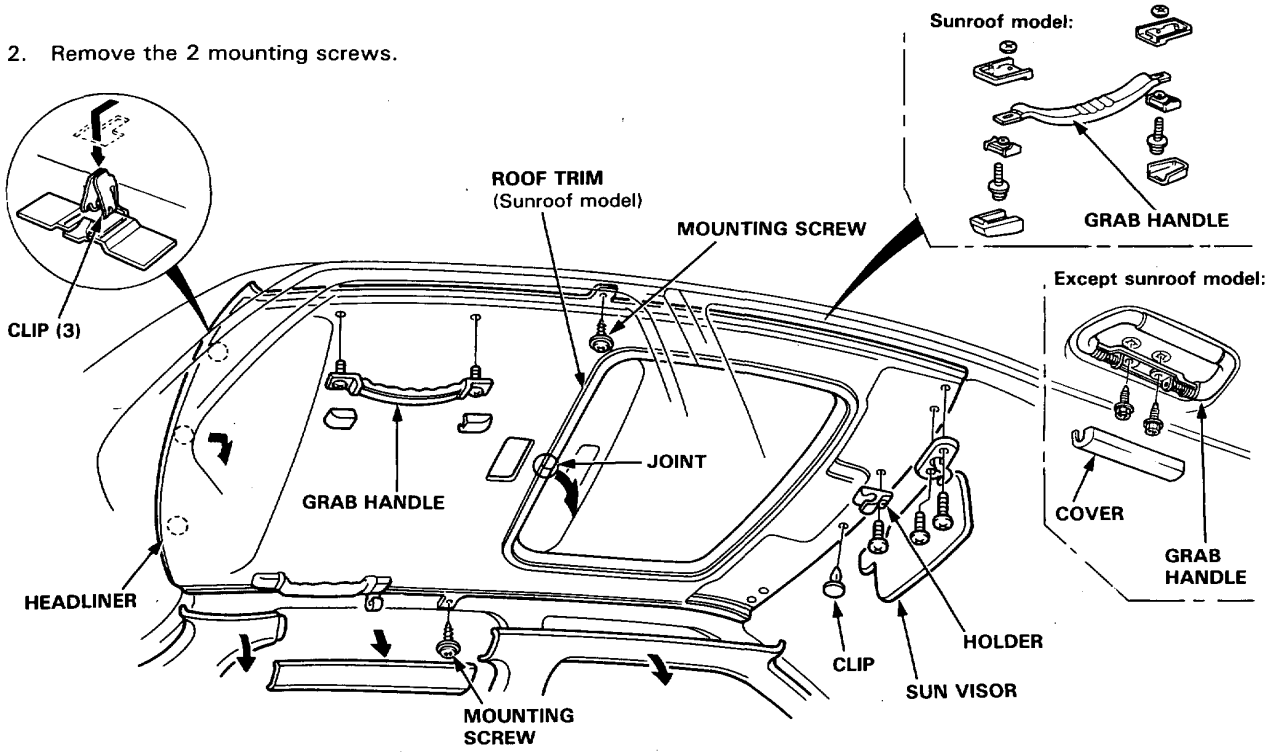


Headliner

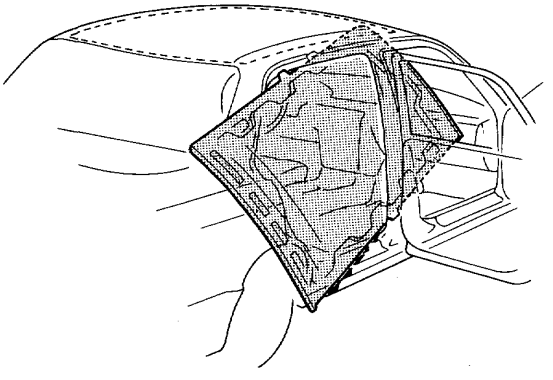
Replacement

1. Remove:
   - Sun visors and holders.
   - Dome light.
   - Rearview mirror assembly (page 14-49).
   - Front pillar trims (page 14-38).
   - Rear pillar trim panels (page 14-38).
   - Roof trim (Sunroof model).
   - Grab handles.
   - Rear roof side trim (page 14-38).
   - Rear seat (pages 14-44, 45)
   - Front seat (Passenger's).
   - Recline down the front seat back rearward (Driver's).

2. Remove the 2 mounting screws.



3. Remove the front and rear clips, then remove the headliner.



4. Remove the headliner from behind the front passenger's seat door opening.

   NOTE:
   - Take care not to bend the headliner.
   - Keep water away from the headliner.
   - Be careful not to damage the seats, dashboard and other interior trim.

5. Install the headliner in the reverse order of removal.

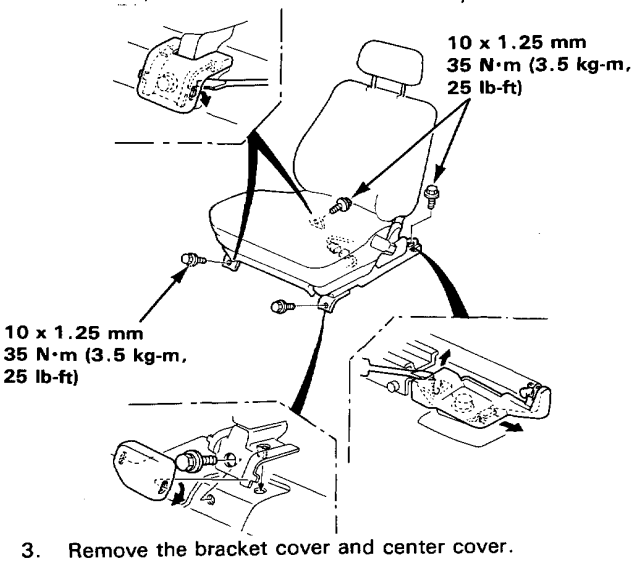
   NOTE:
   - When installing the headliner inside the passenger cabin, be careful not to fold or bend it. Also, be careful not to scratch the body.
   - Check that the two sides of the headliner are securely attached to the trim.
   - When installing the roof trim, install the joint towards the rear (Sunroof model).

Front Seat

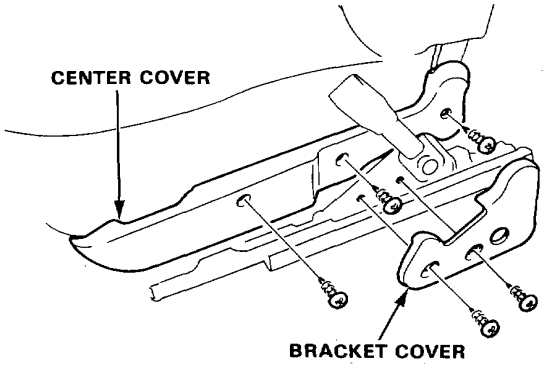
Replacement

NOTE: Take care not to scratch or score the seat covers and body.

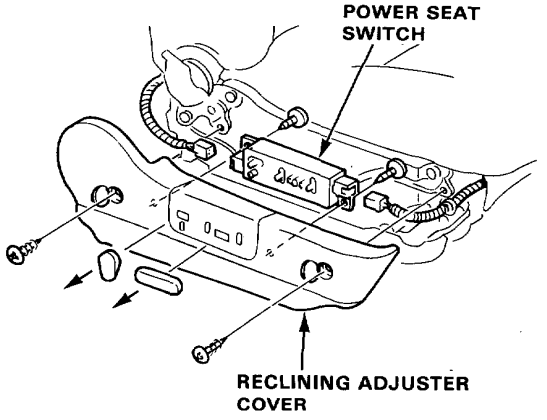
1. Remove the seat track end covers as shown.
2. Remove the mounting bolts and disconnect the connectors, then remove the seat assembly.



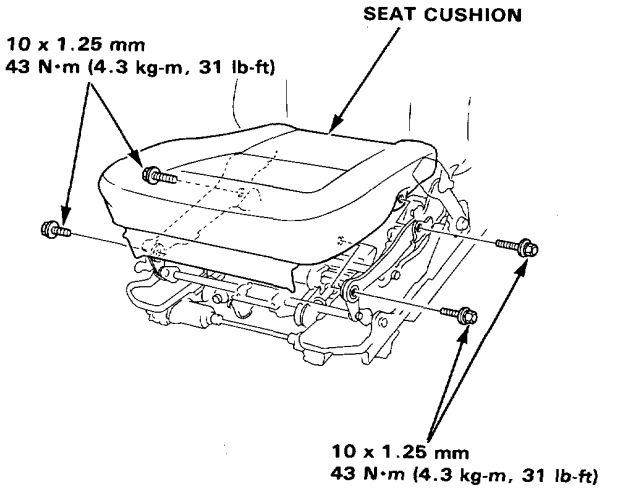
3. Remove the bracket cover and center cover.



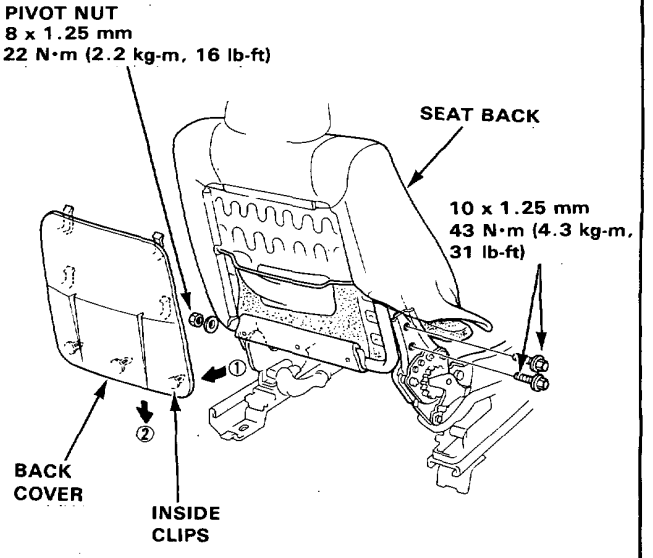
4. Remove the reclining adjuster cover and power seat switch.



5. Remove the mounting bolts, then remove the seat cushion.



6. Remove the seat back cover.
7. Turn over the seat cover and remove the 2 mounting bolts.
8. Remove the pivot nut, then remove the seat back.

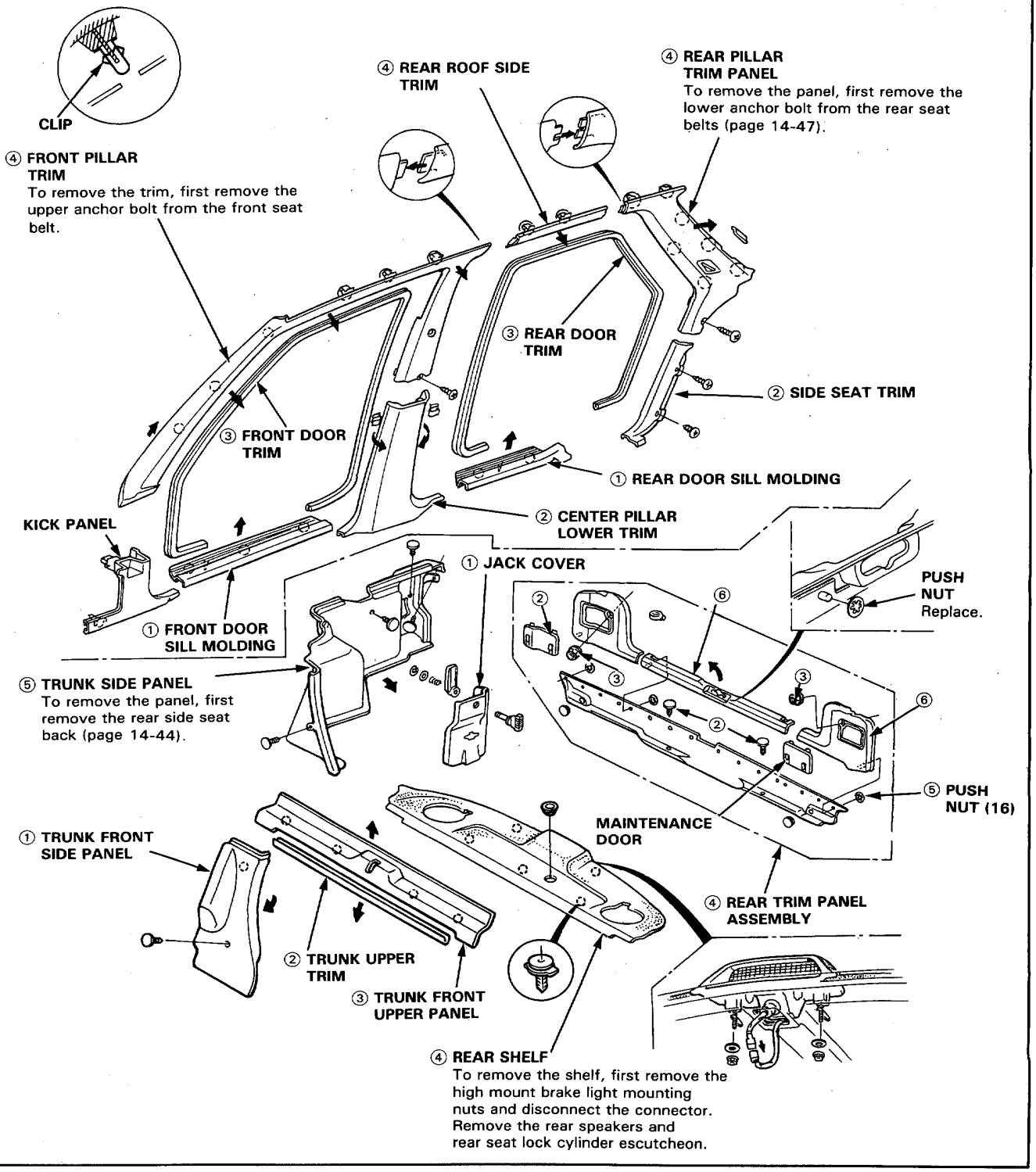


Interior Trim

Replacement

Disassemble in numbered sequence.

◌: Clip locations

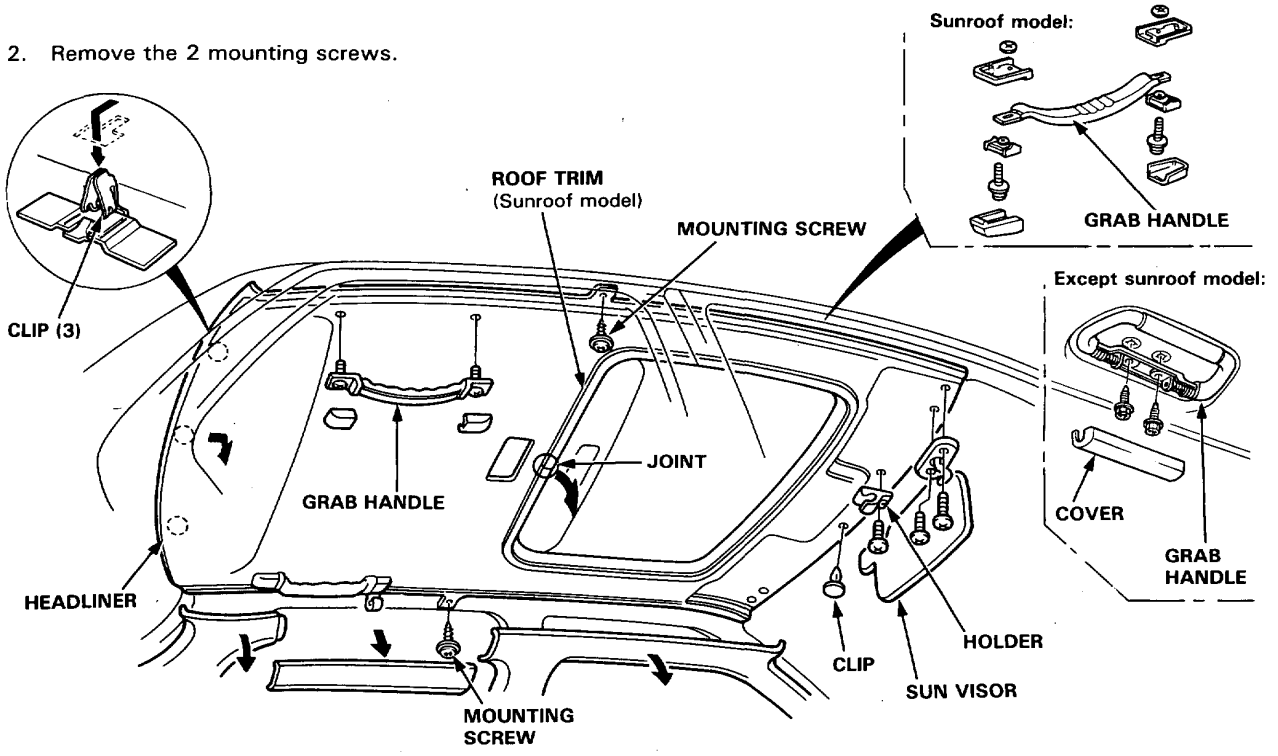


Headliner

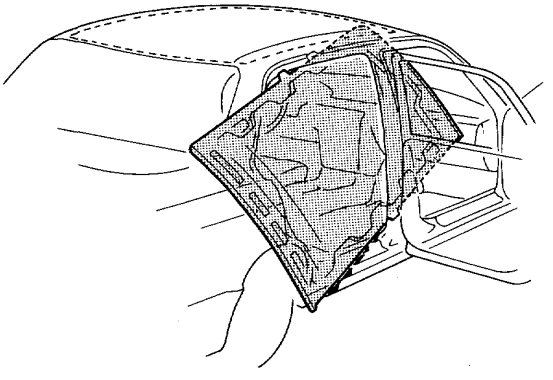
Replacement

1. Remove:
   - Sun visors and holders.
   - Dome light.
   - Rearview mirror assembly (page 14-49).
   - Front pillar trims (page 14-38).
   - Rear pillar trim panels (page 14-38).
   - Roof trim (Sunroof model).
   - Grab handles.
   - Rear roof side trim (page 14-38).
   - Rear seat (pages 14-44, 45)
   - Front seat (Passenger's).
   - Recline down the front seat back rearward (Driver's).

2. Remove the 2 mounting screws.



3. Remove the front and rear clips, then remove the headliner.



4. Remove the headliner from behind the front passenger's seat door opening.

   NOTE:
   - Take care not to bend the headliner.
   - Keep water away from the headliner.
   - Be careful not to damage the seats, dashboard and other interior trim.

5. Install the headliner in the reverse order of removal.

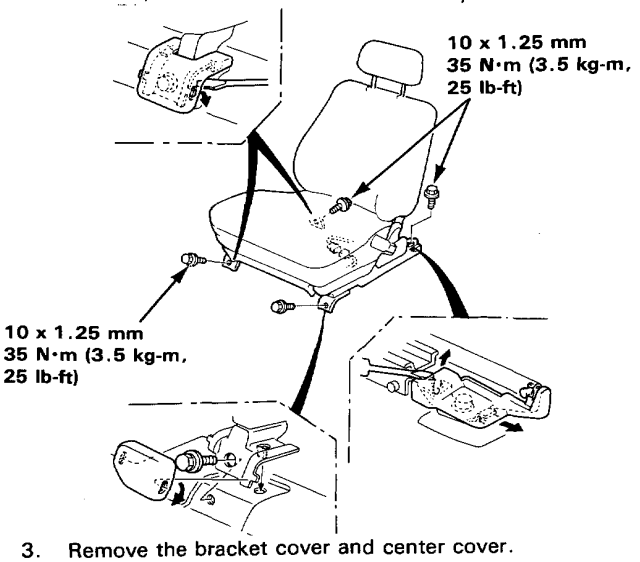
   NOTE:
   - When installing the headliner inside the passenger cabin, be careful not to fold or bend it. Also, be careful not to scratch the body.
   - Check that the two sides of the headliner are securely attached to the trim.
   - When installing the roof trim, install the joint towards the rear (Sunroof model).

Front Seat

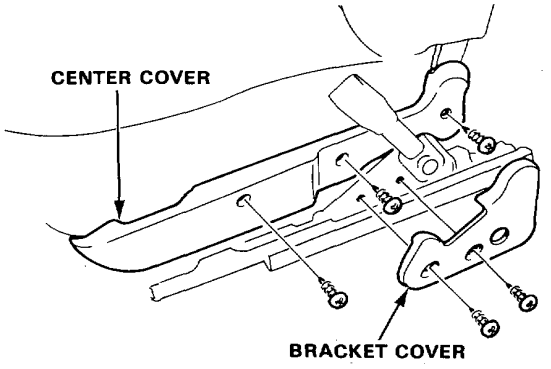
Replacement

NOTE: Take care not to scratch or score the seat covers and body.

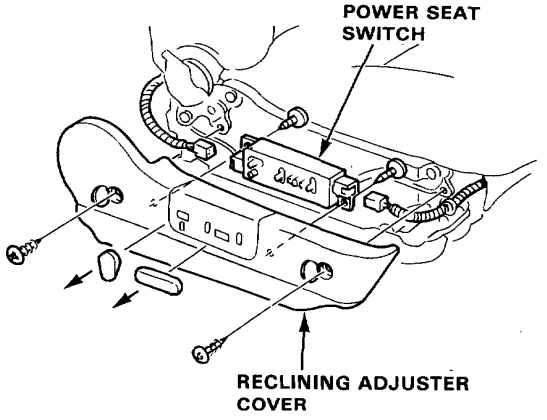
1. Remove the seat track end covers as shown.
2. Remove the mounting bolts and disconnect the connectors, then remove the seat assembly.



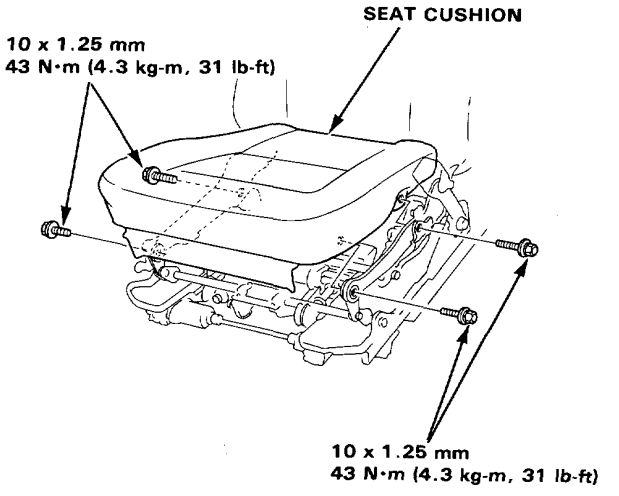
3. Remove the bracket cover and center cover.



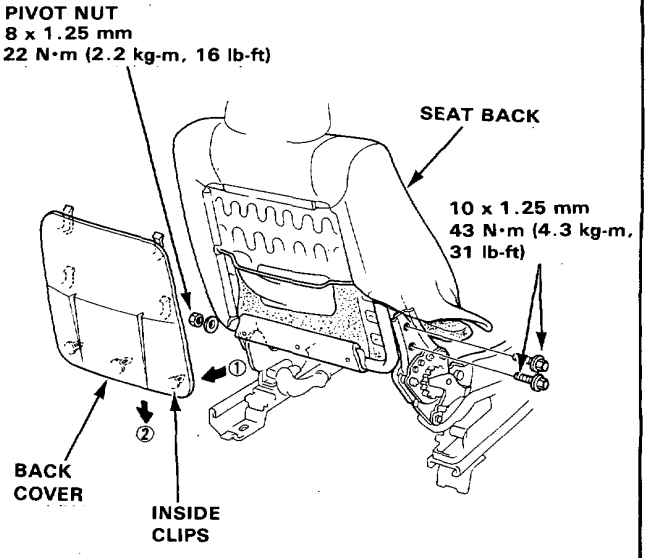
4. Remove the reclining adjuster cover and power seat switch.



5. Remove the mounting bolts, then remove the seat cushion.



6. Remove the seat back cover.
7. Turn over the seat cover and remove the 2 mounting bolts.
8. Remove the pivot nut, then remove the seat back.

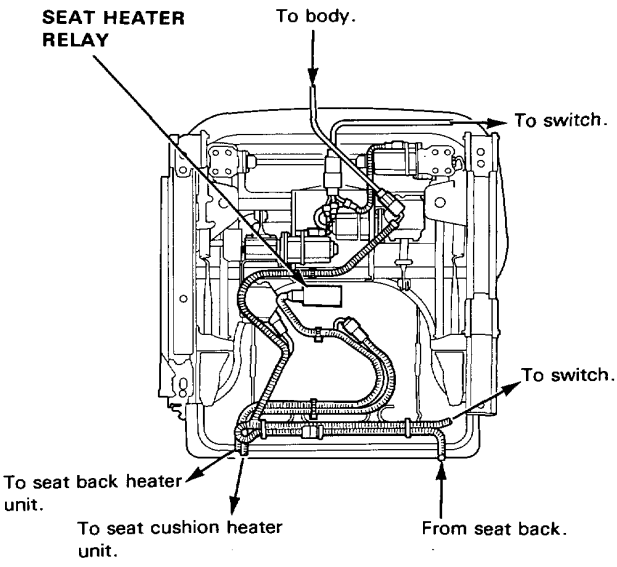


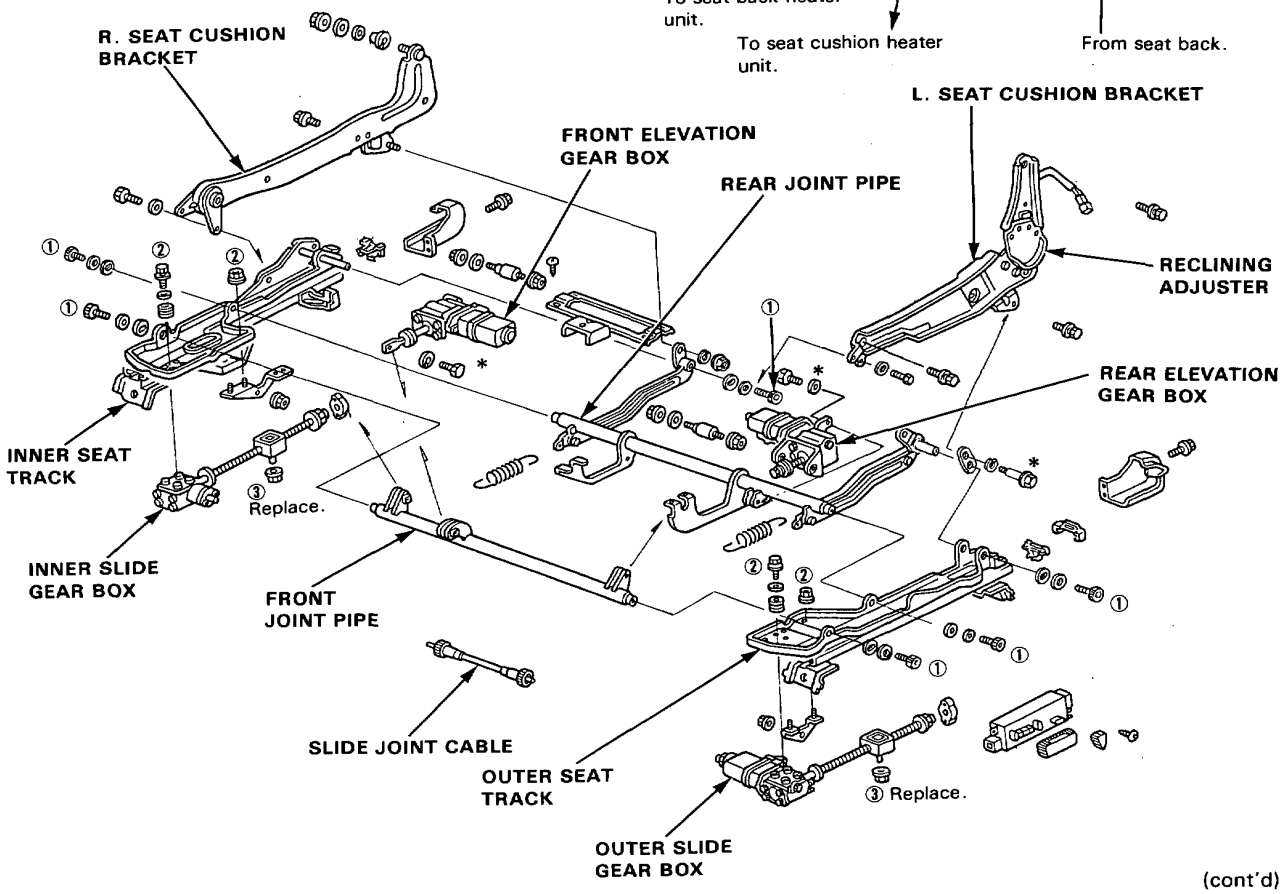
Seat Device Disassembly

Full power adjusted type:
NOTE:
- Before installing the seat, make sure there are no twists or pinch in the seat wires.
- Grease the moving surface.

Bolts torque:
① 20 N·m (2.0 kg-m, 14 lb-ft)
② 5 N·m (0.5 kg-m, 3.6 lb-ft)
③ 9 N·m (0.9 kg-m, 6.5 lb-ft)

NOTE: *On reassembly, use liquid thread lock.



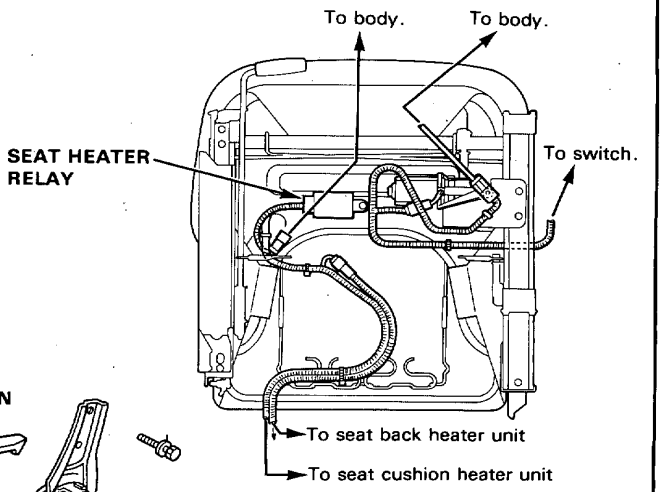


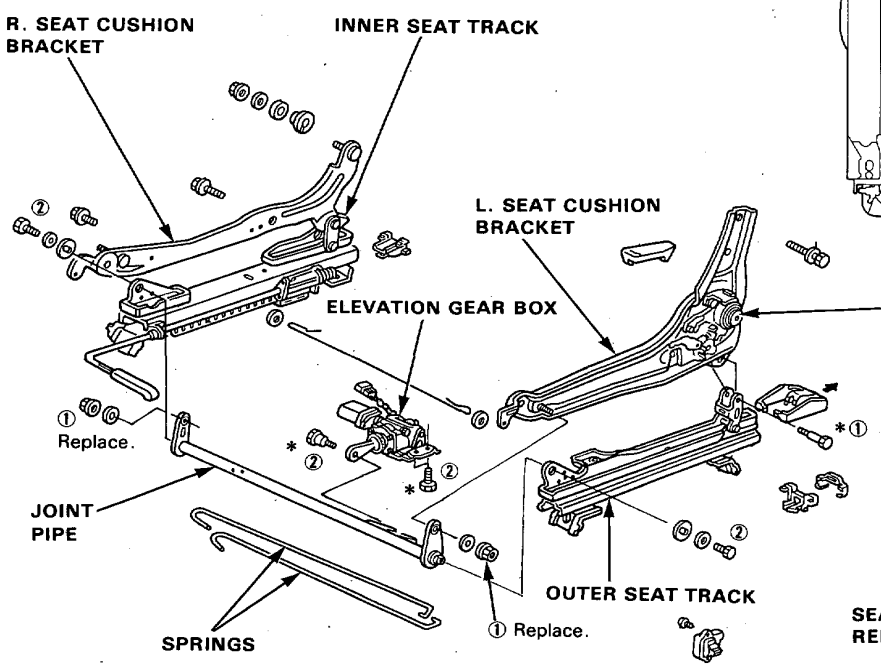
(cont'd)

Seat Device Disassembly (cont'd)

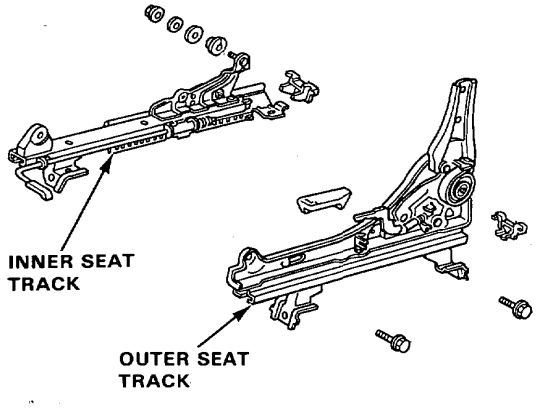
Height power adjusted type:
NOTE:
- Before installing the seat, make sure there are no twists or pinch in the seat wires.
- Grease the moving surfaces.

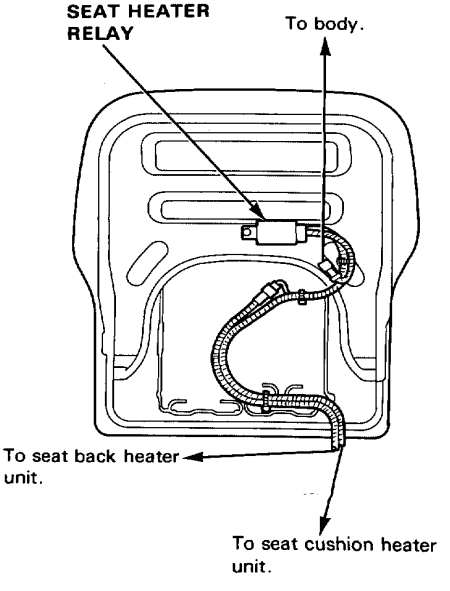
Bolts torque:
① 5.0 N·m (0.5 kg-m, 3.6 lb-ft)
② 12 N·m (1.2 kg-m, 9 lb-ft)
NOTE: *On reassembly, use liquid thread lock.





Manual adjusted type:





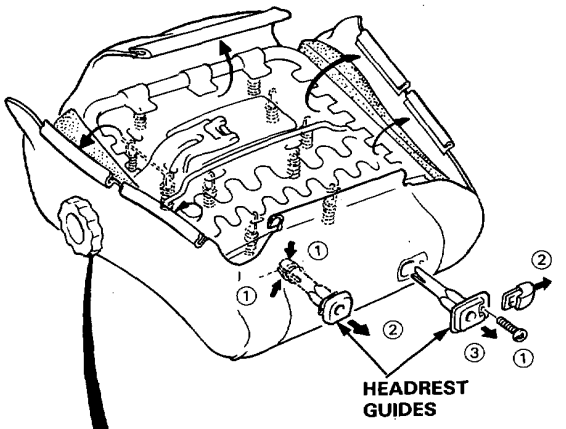
Cover Replacement

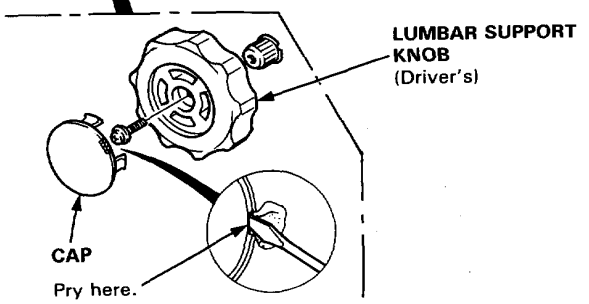
CAUTION: Wear gloves to remove and install the seat cover.

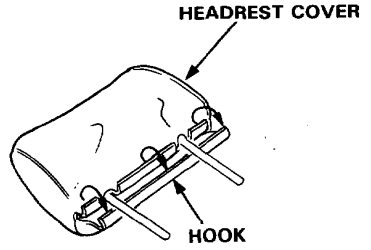
NOTE: Take care not to open the seams or damage the cover.

Seat back cover removal.

1. Remove the seat back from the seat track and reclining adjuster (page 14-40).
2. Remove the lumbar support knob.
3. Turn over the seat cover by releasing all the hooks and inside springs.
4. Remove the headrest guides, then remove the seat cover.

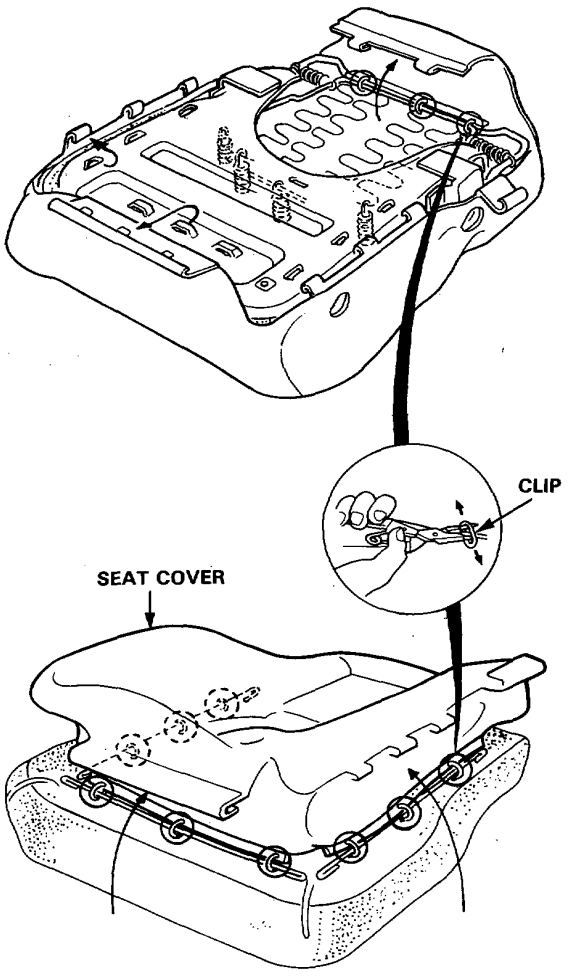






Seat cushion cover removal.

1. Remove the seat cushoin from the seat tracks (page 14-40).
2. Remove all hooks, clips and inside springs from under the seat cushion, then turn over the seat cover.
3. Turn up the edge of the trim cover all the way around, then release the clips of the cushion.



NOTE: To prevent wrinkles when installing a seat cover, make sure the material is stretched evenly over the frame before securing all the clips.

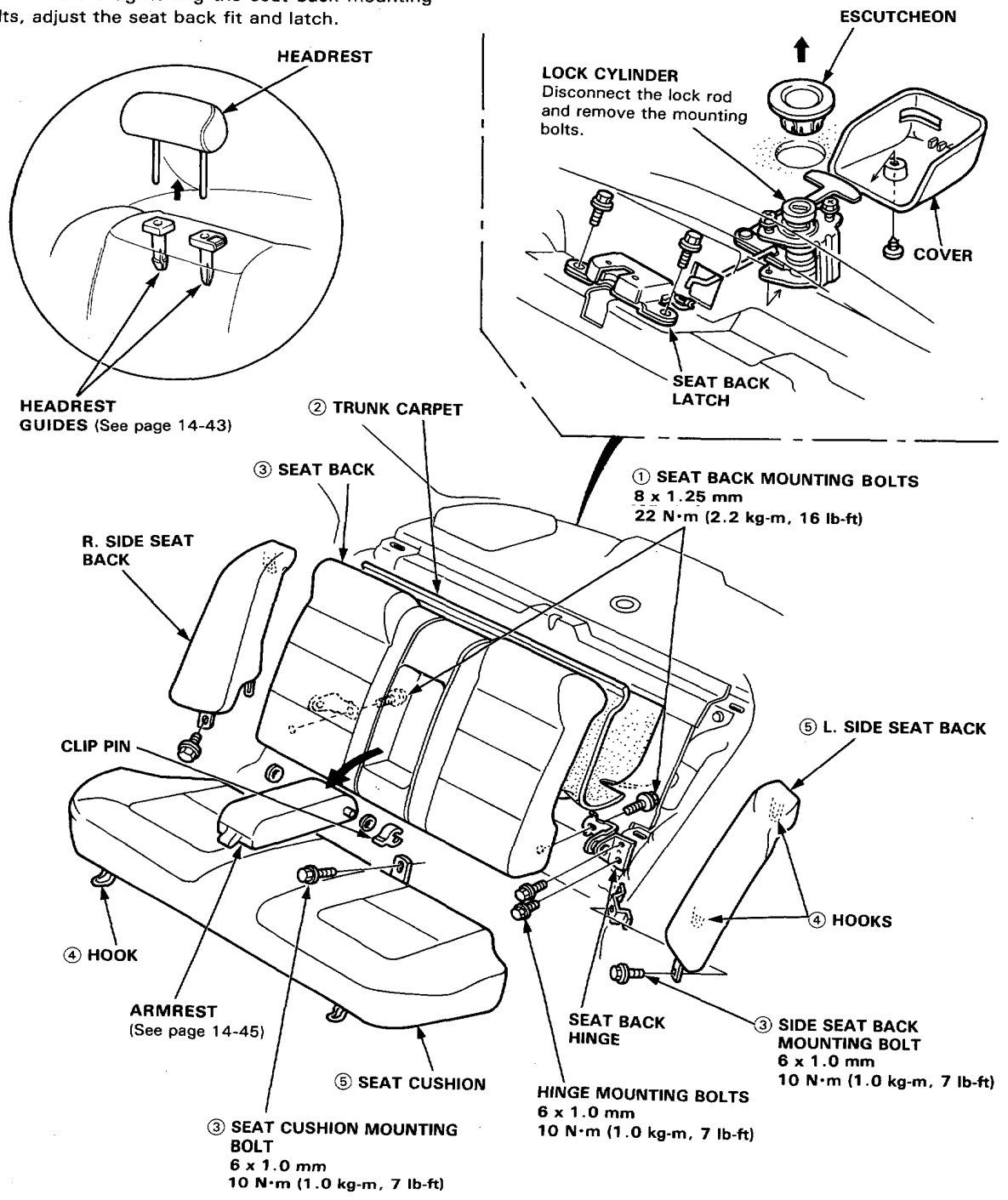
Rear Seats

Replacement

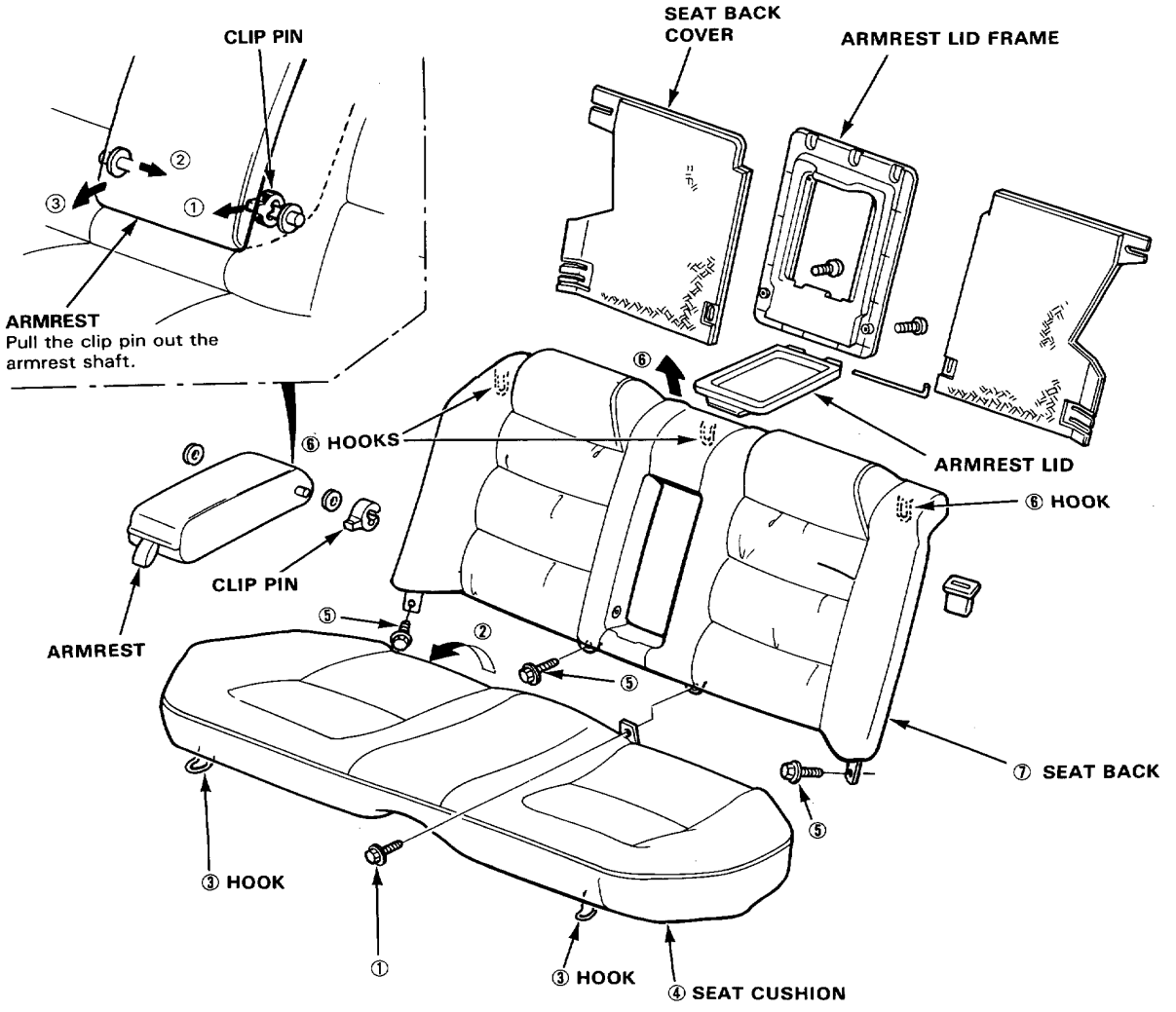
Disassemble in numbered sequence.

Folded down type:

NOTE: Before tightening the seat back mounting bolts, adjust the seat back fit and latch.



Disassemble in numbered sequence.
Standard/Armrest through type:

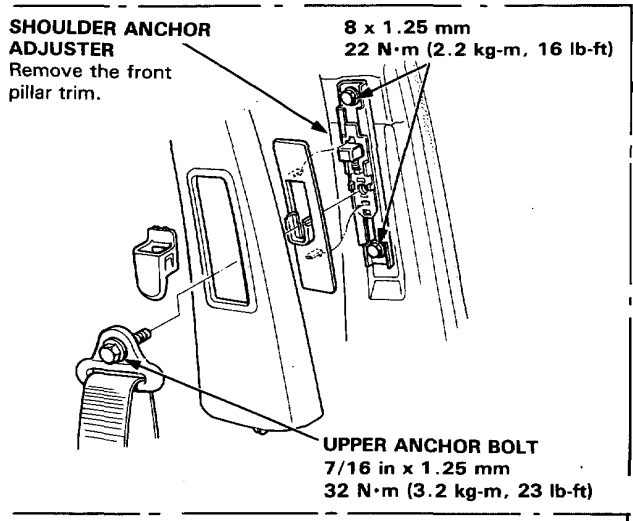


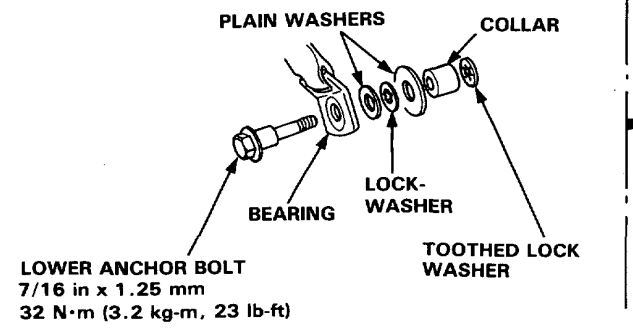
Front Seat Belts

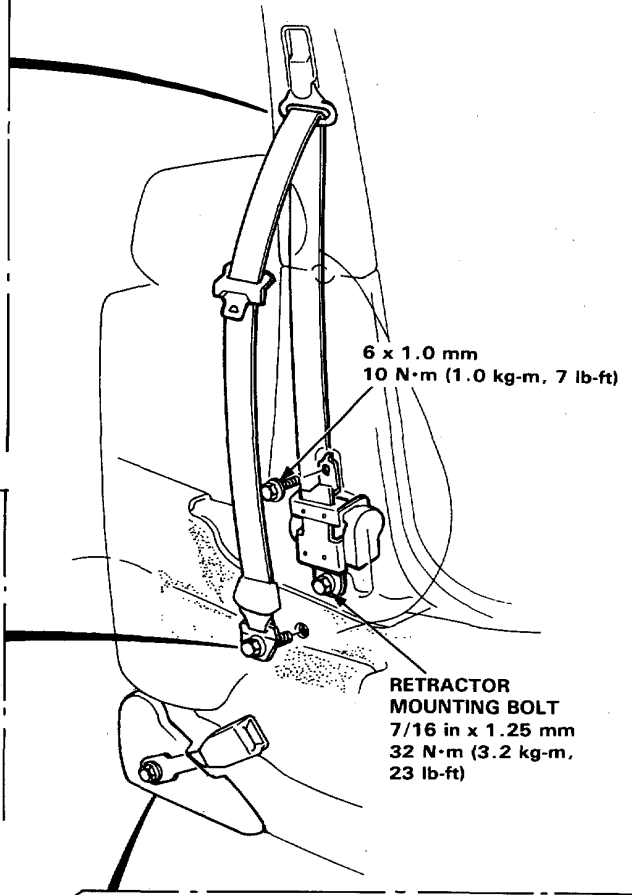
Replacement

CAUTION: Check the seat belts for damage and repalce them if necessary. Be careful not to damage them during removal and installation.

1. Remove the center pillar lower trim.
2. Remove the upper anchor bolt, lower anchor bolt and retractor bolt with a 17 mm socket or box-end wrench.
3. Remove the front seat, then remove the bolt and the center anchor.

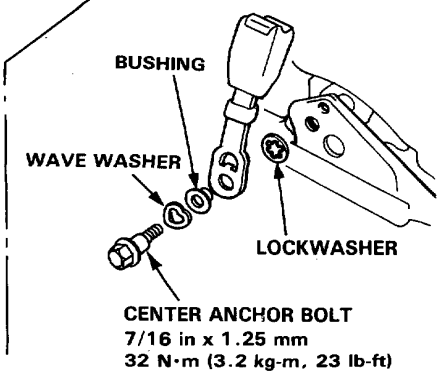






4. Check that the retractor locking mechanism functions as described on page 14-48.
5. Install the front seat belts in the reverse order of removal.

NOTE:
- Make sure you assemble the washers and collars on the upper and lower anchor bolts as shown.
- Before attaching the center pillar lower trim, make sure there are no twists or kinks in the belts.

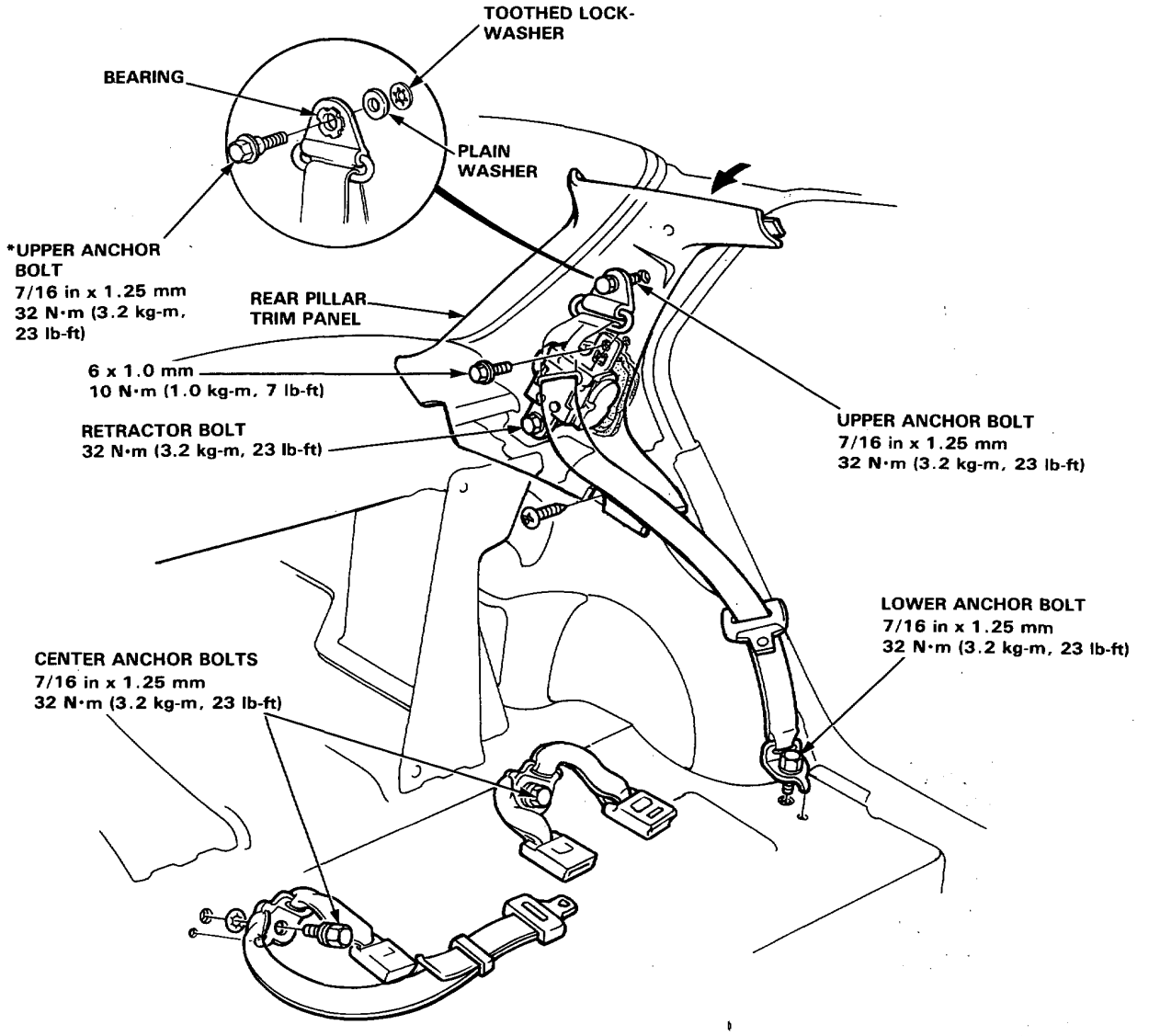


Rear Seat Belts

Replacement

CAUTION: Check the seat belts for damage and replace them if necessary. Be careful not to damage them during removal and installation.

1. Remove the rear seat (pages 14-44, 45).
2. Remove the rear pillar trim panel.
3. Remove the upper anchor bolt, the lower anchor bolt and retractor bolt with a 17 mm socket or box-end wrench.



4. Check that the retractor locking mechanism functions as described on page 14-48.
5. Install the seat belt in the reverse order of removal.

NOTE:

- Before attaching the rear pillar trim panel and rear seat, make sure there are no twists in the belt.
- * On reassembly, replace the upper anchor bolt and use liquid thread lock.

Seat Belts

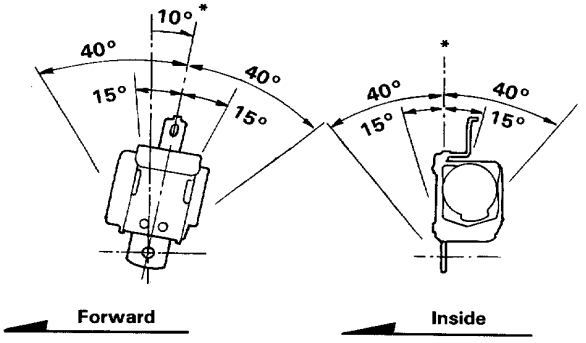
Inspection

Retractor Inspection

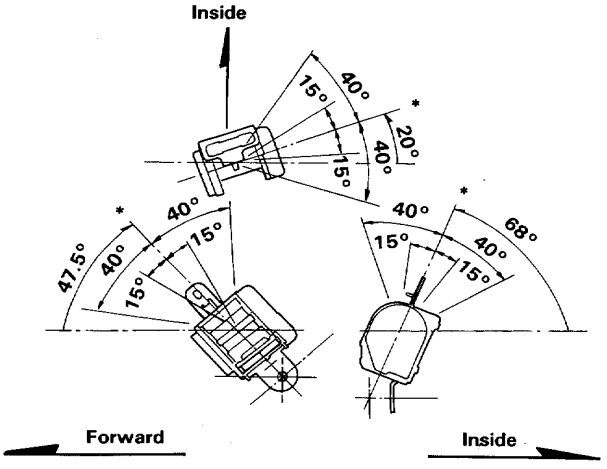
1. With the retractor installed, check that the belt can be pulled out freely.
2. Make sure that the belt does not lock when the retractor is leaned slowly up to 15° from the mounted position. The belt should lock when the retractor is leaned over 40°

   CAUTION: Do not attempt to disassemble the retractor. *: Mounted Position.

Front:



Rear:



3. Replace the belt with a new one if there is any abnormality.

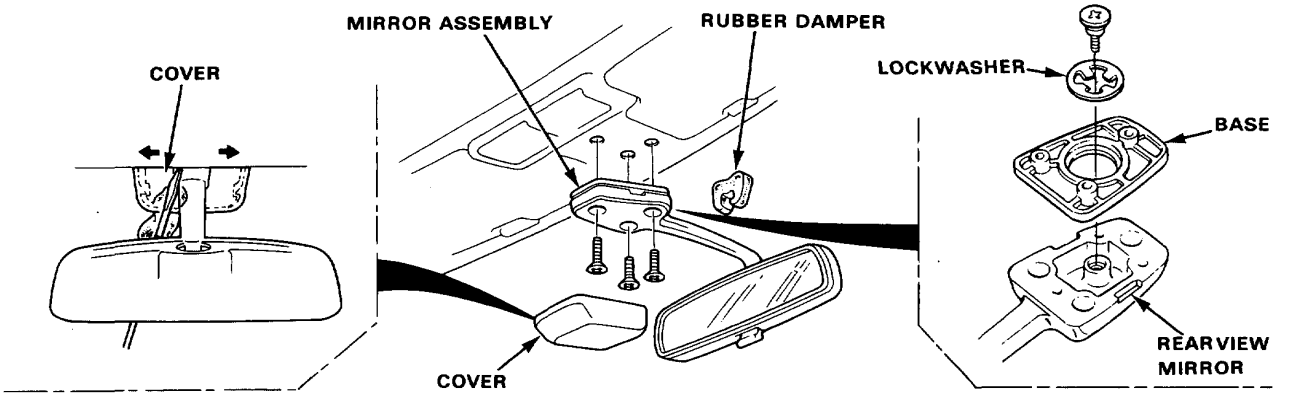
On-the-Car Belt Inspection

1. Check that the belt is not twisted or caught on anything.
2. After installing the anchors, check for free movement on its retaining bolt. If necessary, remove the bolt and check that the washers and other parts are not damaged or improperly installed.
3. Check the belts for damage or discoloration. Clean with a shop towel if necessary.
   CAUTION: Use only soap and water to clean.
4. Check that the belt does not lock when pulled out slowly. The belt is designed to lock only during a sudden stop or impact.
5. Make sure that the belt will retract automatically when released.
6. Replace the belt with a new one if there is any abnormality.

Rearview Mirror / Console

Rearview Mirror Replacement

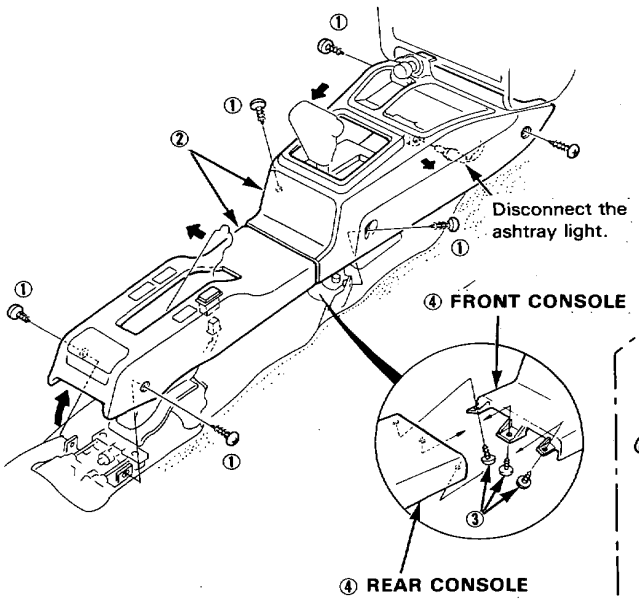
1. Remove the rubber damper.
2. Pry the cover off using the end of a flat tip screwdriver.
3. Remove the 3 mounting screws from the mirror base, then remove the mirror assembly.
4. Remove the base from the bracket by removing the screw.



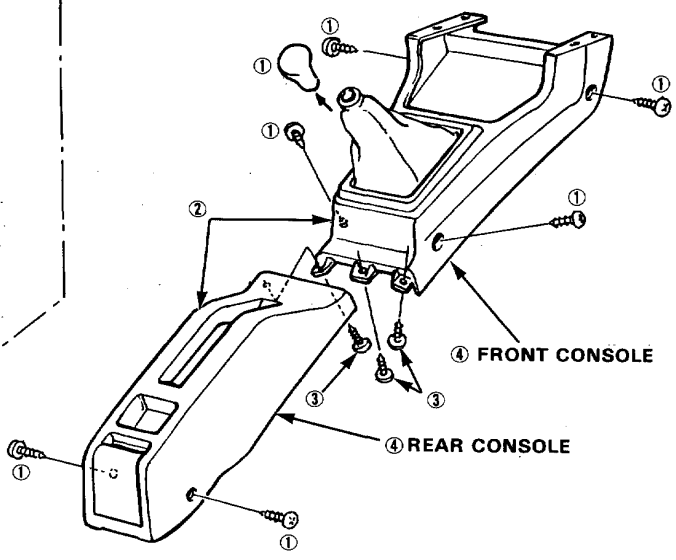
Console Replacement

Disassemble in numbered sequence.

4WS:



2WS:

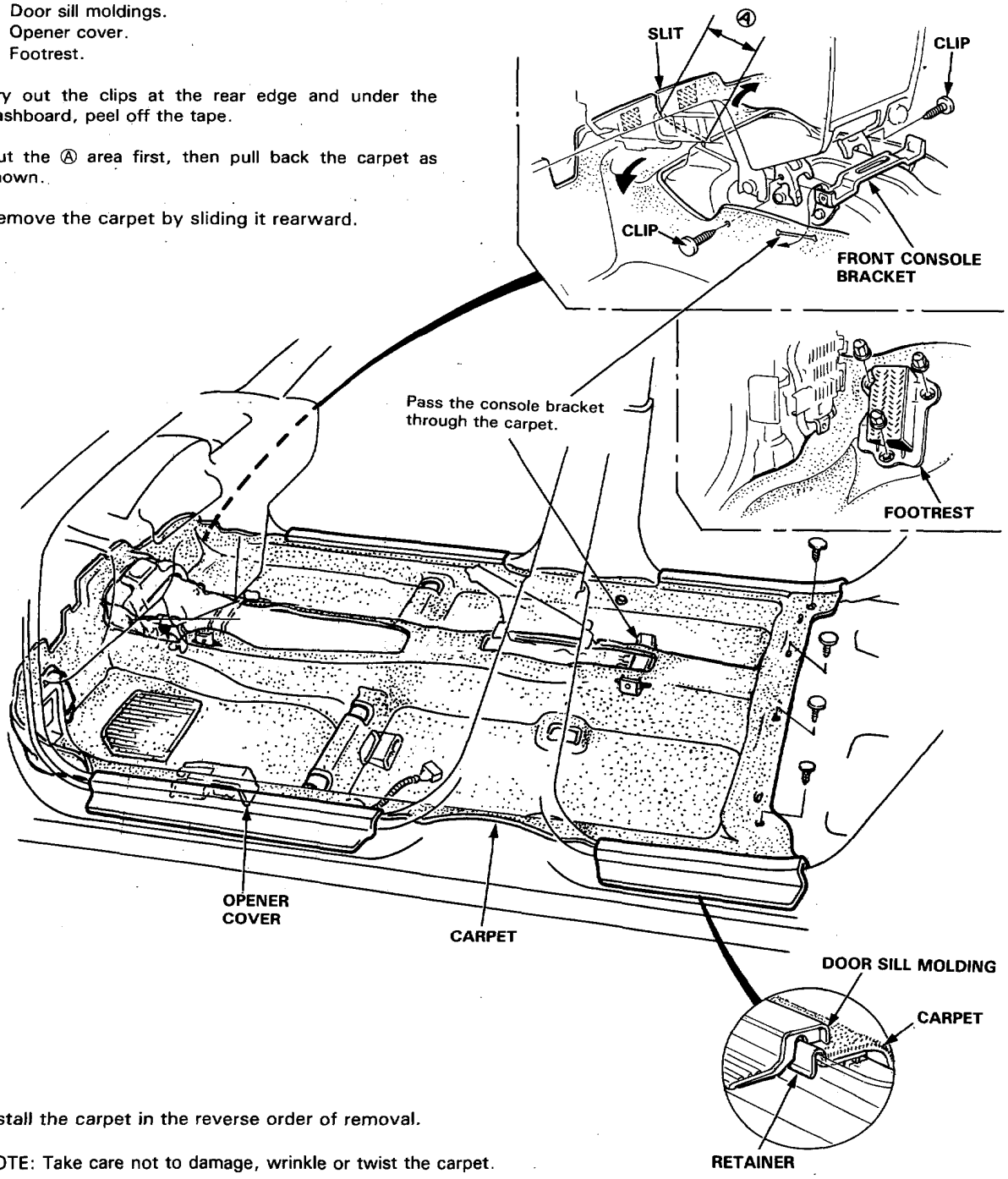


NOTE:
- Remove the front and rear consoles as an assembly.
- Lift up the parking brake lever.
- For manual transmission models, remove the shift lever knob.

Carpet/Door Sill Moldings

Replacement

1. Remove:
   - Front seats and rear seat cushion.
   - Front seat belt lower anchor bolts (page 14-46).
   - Center console.
   - Right and left kick panels.
   - Door sill moldings.
   - Opener cover.
   - Footrest.
2. Pry out the clips at the rear edge and under the dashboard, peel off the tape.
3. Cut the Ⓐ area first, then pull back the carpet as shown.
4. Remove the carpet by sliding it rearward.



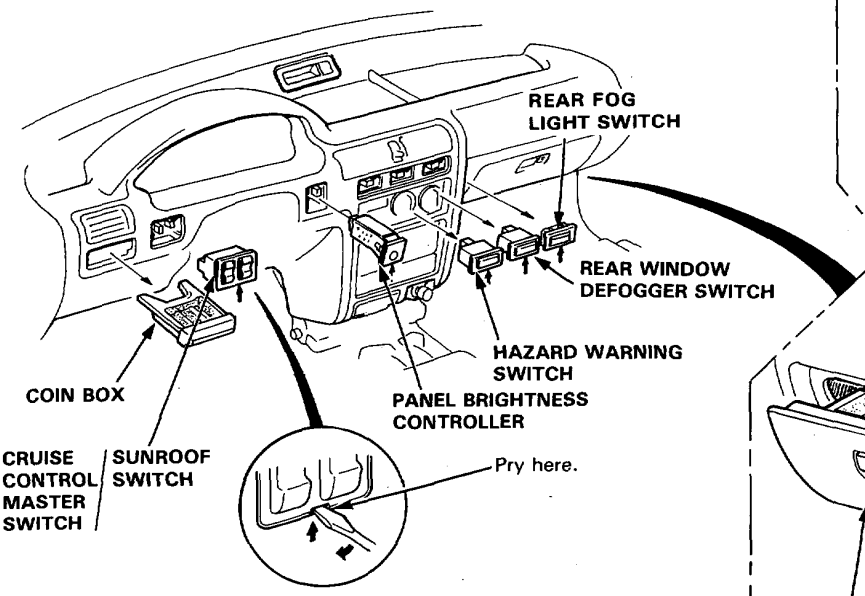
5. Install the carpet in the reverse order of removal.

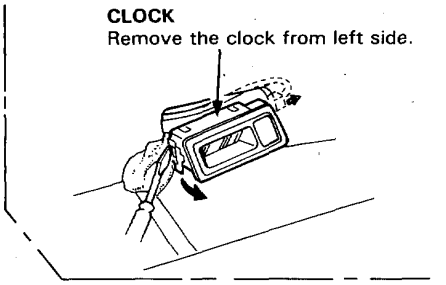
   NOTE: Take care not to damage, wrinkle or twist the carpet.

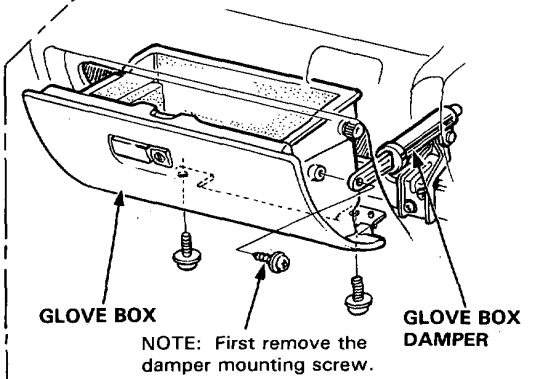
Dashboard

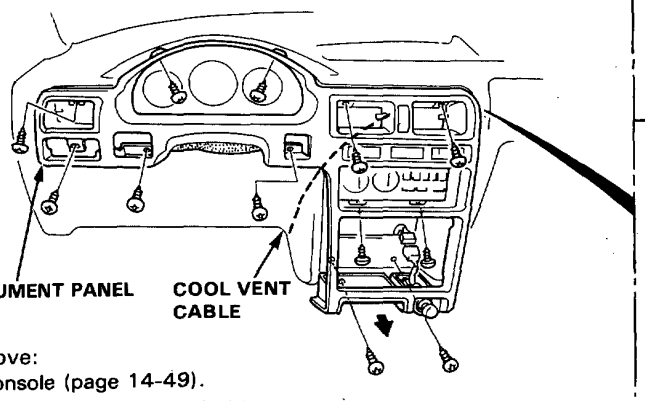
Component Removal/Installation

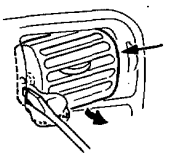
NOTE: Take care not to scratch or score the dashboard and instrument panel.

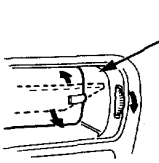




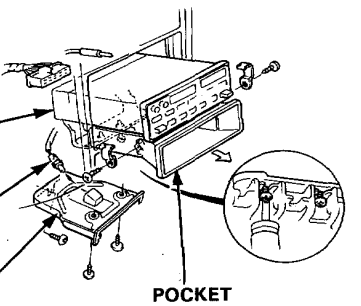








1. Remove:
   - Console (page 14-49).
   - Ashtray and ashtray holder
   - Stereo cassete/radio
   - Coin box, cruise control master switch · sunroof switch and panel brightness controller.
   - Side and Center air vents.
   - Disconnect the cool vent cable (See section 15).
2. Remove the 12 mounting screws and disconnect the connectors.
3. Carefully pull out the instrument panel from the dashboard.



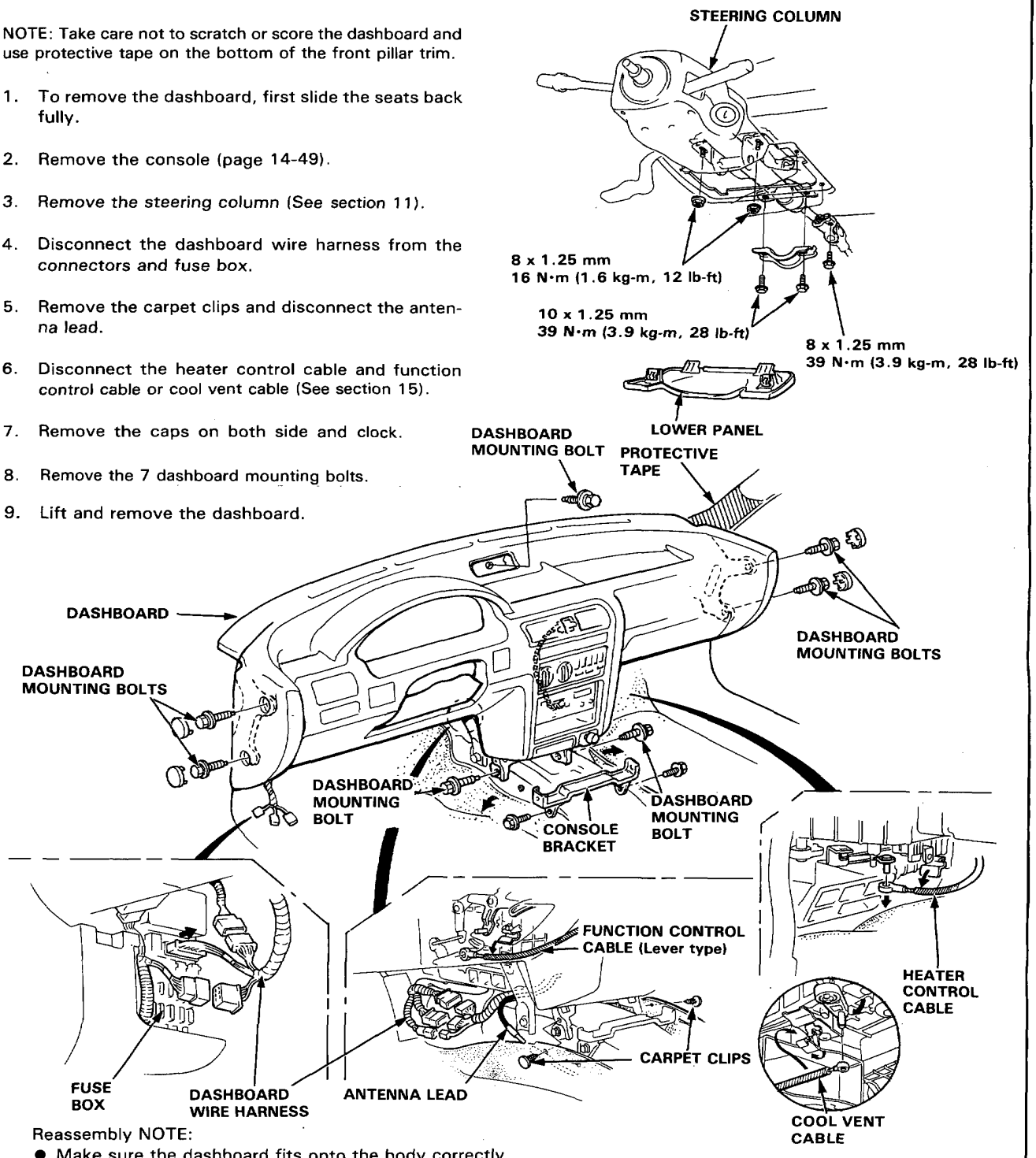
STEREO CASSETTE/RADIO
Remove the console, ashtray and ashtray holder.
Loosen the 2 screws from underneath and disconnect the wire harness (antenna lead), then pull the stereo cassette/radio out half-way and separate the pocket.

Dashboard

Replacement

NOTE: Take care not to scratch or score the dashboard and use protective tape on the bottom of the front pillar trim.

1. To remove the dashboard, first slide the seats back fully.
2. Remove the console (page 14-49).
3. Remove the steering column (See section 11).
4. Disconnect the dashboard wire harness from the connectors and fuse box.
5. Remove the carpet clips and disconnect the antenna lead.
6. Disconnect the heater control cable and function control cable or cool vent cable (See section 15).
7. Remove the caps on both side and clock.
8. Remove the 7 dashboard mounting bolts.
9. Lift and remove the dashboard.



Reassembly NOTE:

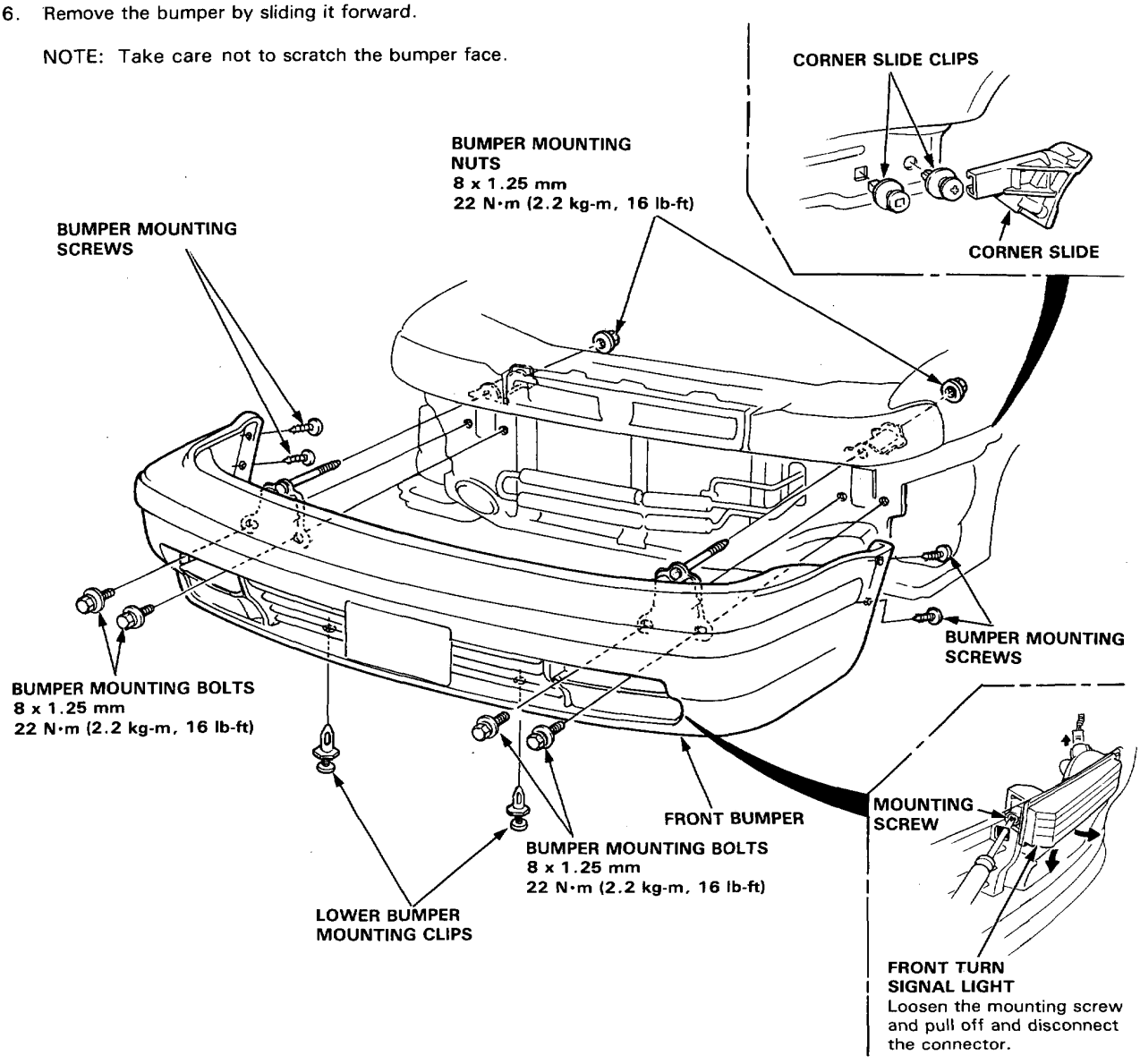
- Make sure the dashboard fits onto the body correctly.
- Before tightening the dashboard bolts, make sure the dashboard wires are not pinched, and that the dashboard is not interfering with the heater control and function cables.

Front Bumper

Replacement

1. Open the hood, then remove the bumper mounting nuts.
2. Remove the front turn signal lights.
3. Remove the 2 bumper mounting screws on each side at the corner edge of the bumper.
4. Remove the 2 lower bumper mounting clips and the 4 bumper mounting bolts.
5. Disconnect the headlight washer hose.
6. Remove the bumper by sliding it forward.

   NOTE: Take care not to scratch the bumper face.



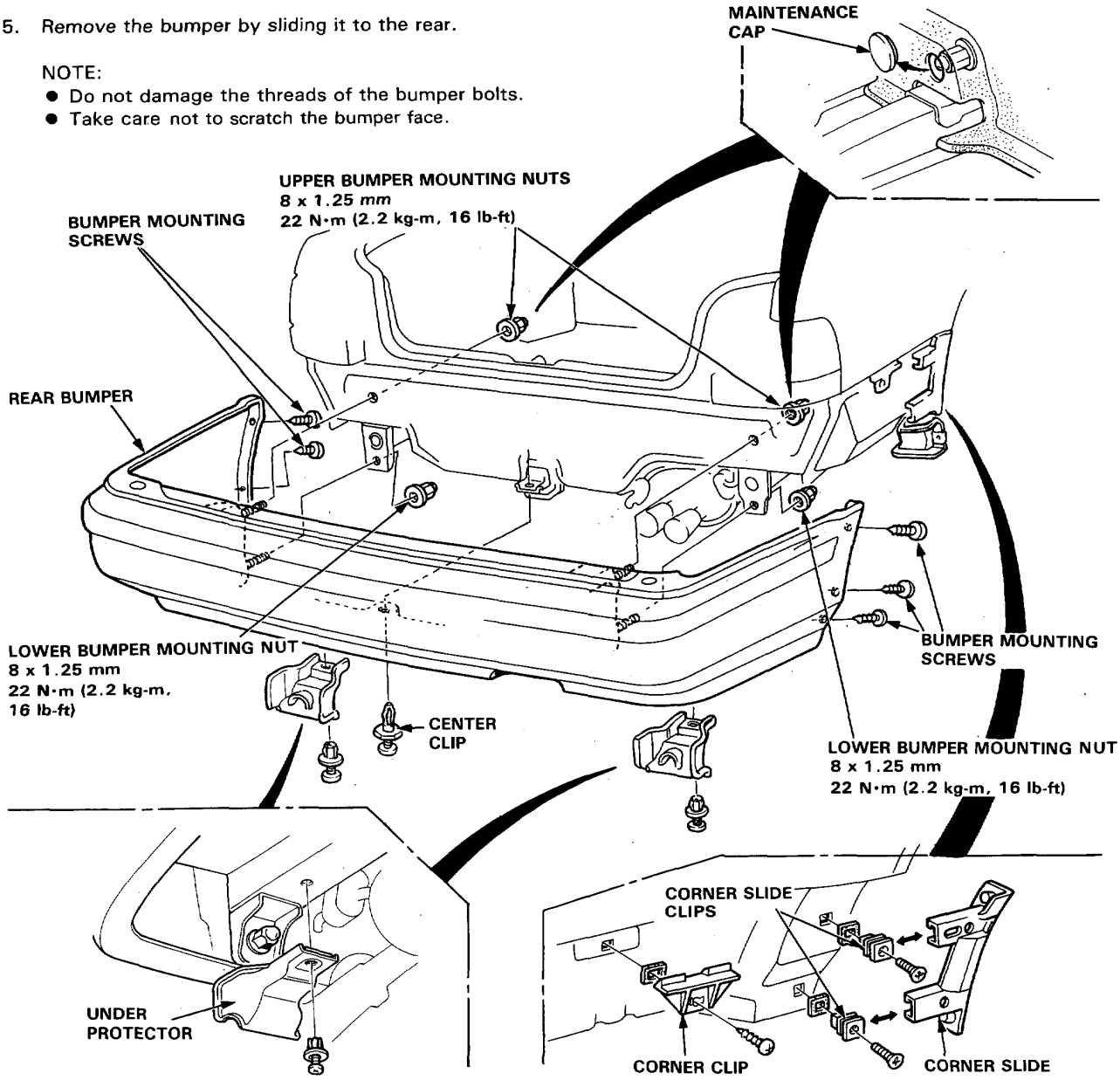
7. Install parts in the reverse order of removal.

Rear Bumper

Replacement

1. Open the trunk lid and pry off the maintenance caps, then remove the 2 upper bumper mounting nuts from the trunk area.
2. Remove the 2 mud guard screws and 2 bumper mounting screws on each side at the corner edge of the bumper.
3. Remove the clips, then remove the under protectors on each side from under the trunk floor.
4. Remove the 2 lower bumper mounting nuts and center clip from under the trunk floor.
5. Remove the bumper by sliding it to the rear.

   NOTE:
   - Do not damage the threads of the bumper bolts.
   - Take care not to scratch the bumper face.

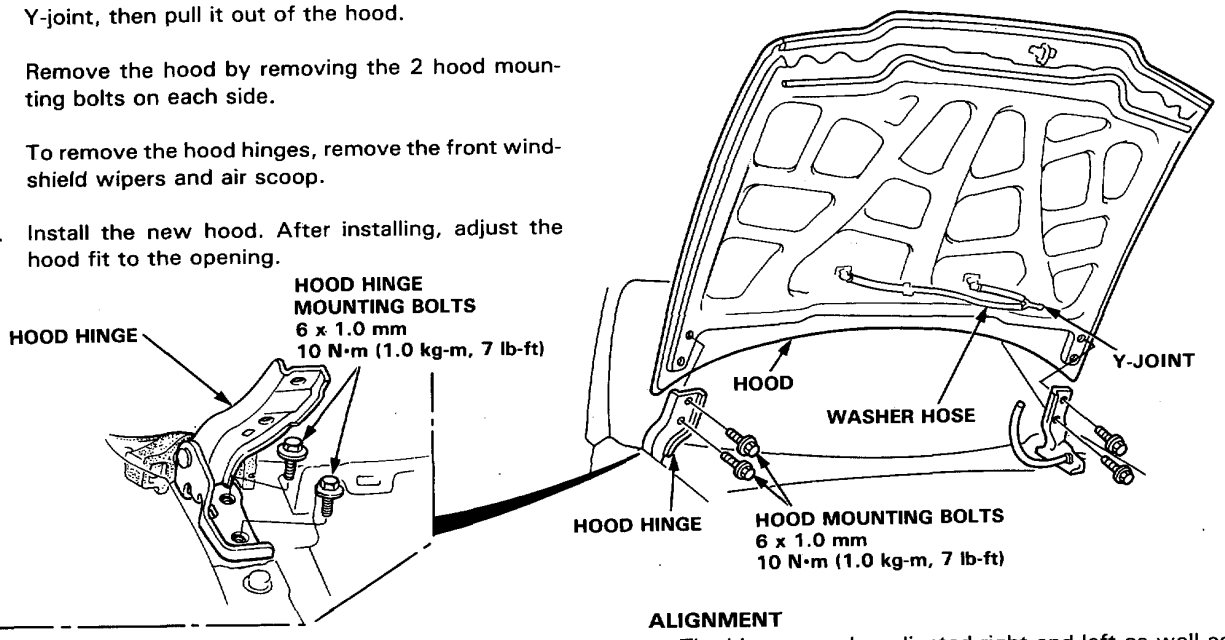


6. Install parts in the reverse order of removal. se order of removal.

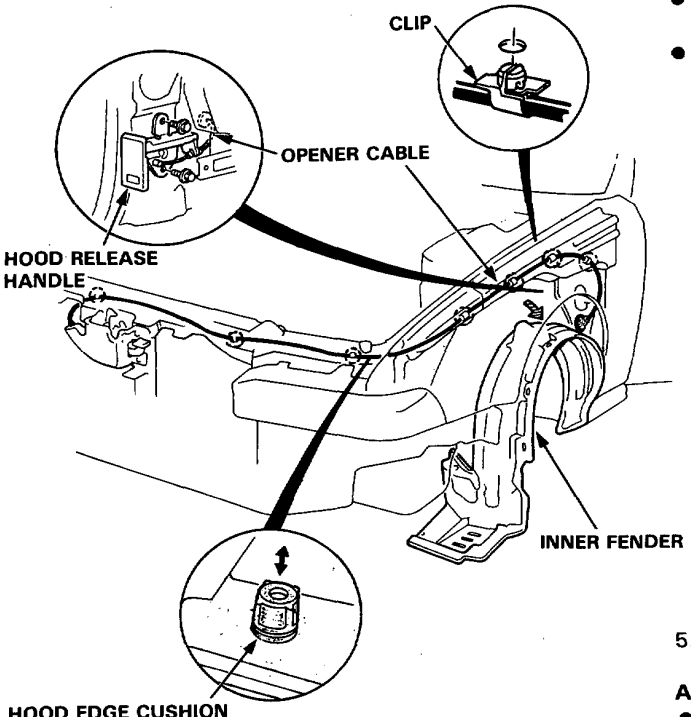
Hood

Replacement/Adjustment

1. Disconnect the windshield washer hose at the Y-joint, then pull it out of the hood.
2. Remove the hood by removing the 2 hood mounting bolts on each side.
3. To remove the hood hinges, remove the front windshield wipers and air scoop.
4. Install the new hood. After installing, adjust the hood fit to the opening.

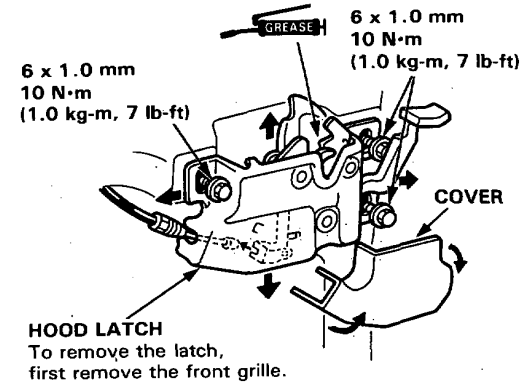


NOTE: Before pulling out the opener cable, tie a string to the cable so you can pull it back in later.



HOOD EDGE CUSHION
Turn as necessary, to make the hood fit flush with the body at front and side edges.

ALIGNMENT
- The hinges can be adjusted right and left as well as fore and aft by using the elongated holes.
- The hinges should be shimmed to adjust the height of the hood at the rear edge.
- Adjust the hood latch to obtain the proper height at the forward edge.



HOOD LATCH
To remove the latch, first remove the front grille.

5. After installing, adjust the hood fit to the opening.

ALIGNMENT:
- Move the latch up or down or right or left as necessary to equalize the gap between the hood and the body.

Trunk Lid

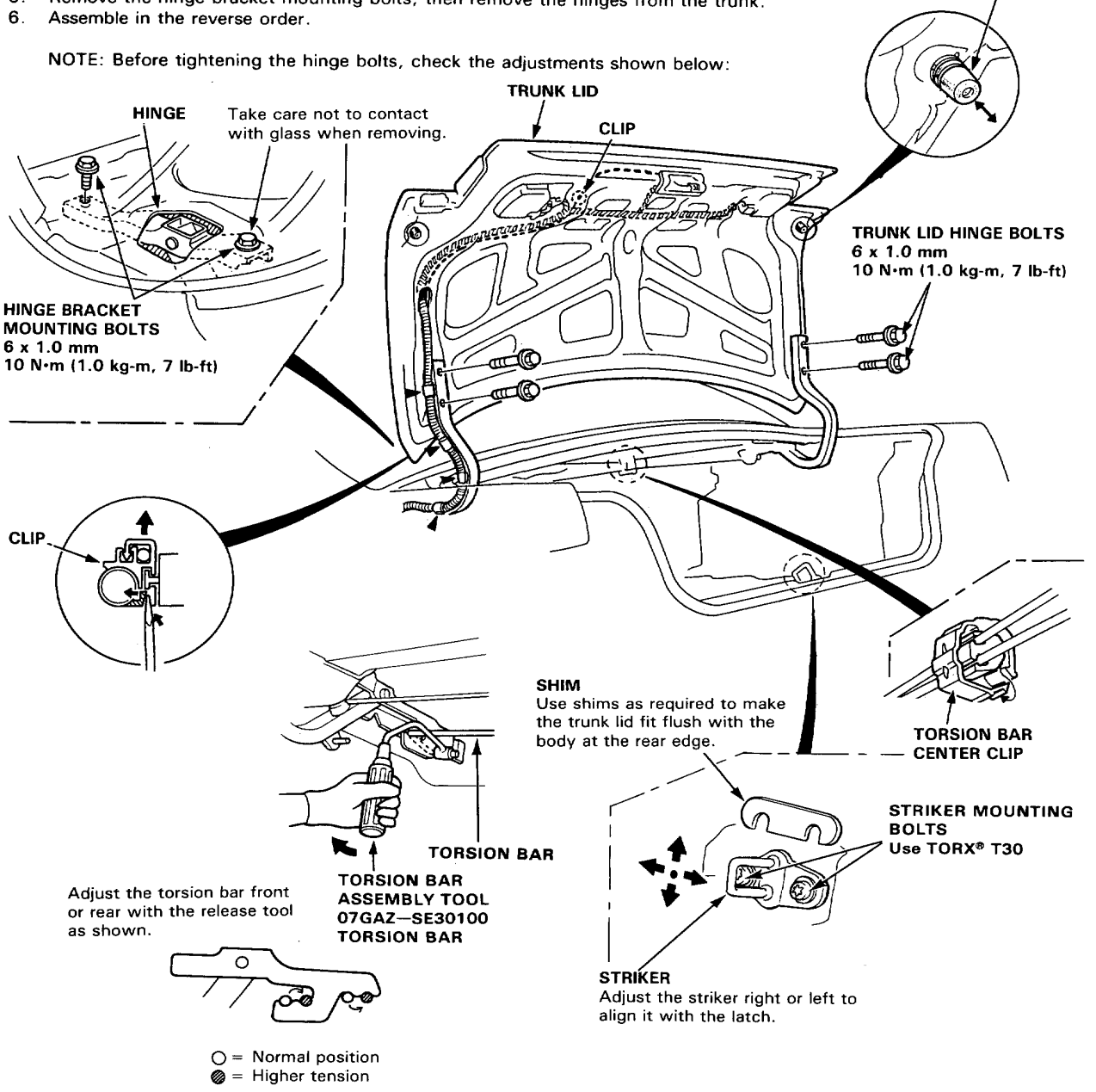
Replacement/Adjustment

1. Pull the harness and trunk lid opener cable out of the trunk lid.

   NOTE: Before pulling out the wire harness, tie a string to the end of it so you can pull it back in when the trunk lid is reinstalled.

2. Remove the trunk lid hinge bolts, then lift off the lid.
3. Remove the torsion bar using a assembly tool.
4. Remove the rear shelf.
5. Remove the hinge bracket mounting bolts, then remove the hinges from the trunk.
6. Assemble in the reverse order.

   NOTE: Before tightening the hinge bolts, check the adjustments shown below:



Wiring Diagrams

Index

Air Conditioner 17
Anti-Lock Brake System (ALB) 14
Automatic Transmission Control System 14
Battery 1
Blower Controls 17
Charging System 1
Cigarette Lighter 10
Clock 10
Cooling Fan Control 16
Cruise Control System 12
Defogger, Rear Window 11
Door Lock, Power 12
Fuel and Emissions 16
Gauges 2
Headlight Adjuster System 4
Horns 4
Ignition Switch 1
Ignition System 1
Indicators
- Cruise Control Indicator 2
- Trunk Open Indicator 2
- High Beam Indicator 2
- Shift Lever Position Indicator 4
- Turn Signal Indicator 2

Integrated Control Unit 5
Lights, Exterior
- Back-up Lights 10
- Brake Lights 3
- Hazard Lights 2
- Headlights 6
- License Plate Lights 6
- Marker Lights 6
- Taillights 6

Lights, Interior
- Courtesy Lights 3
- Dashlight Brightness Control 6
- Dome Lights 3
- Glove Box Light 6
- Trunk Light 6

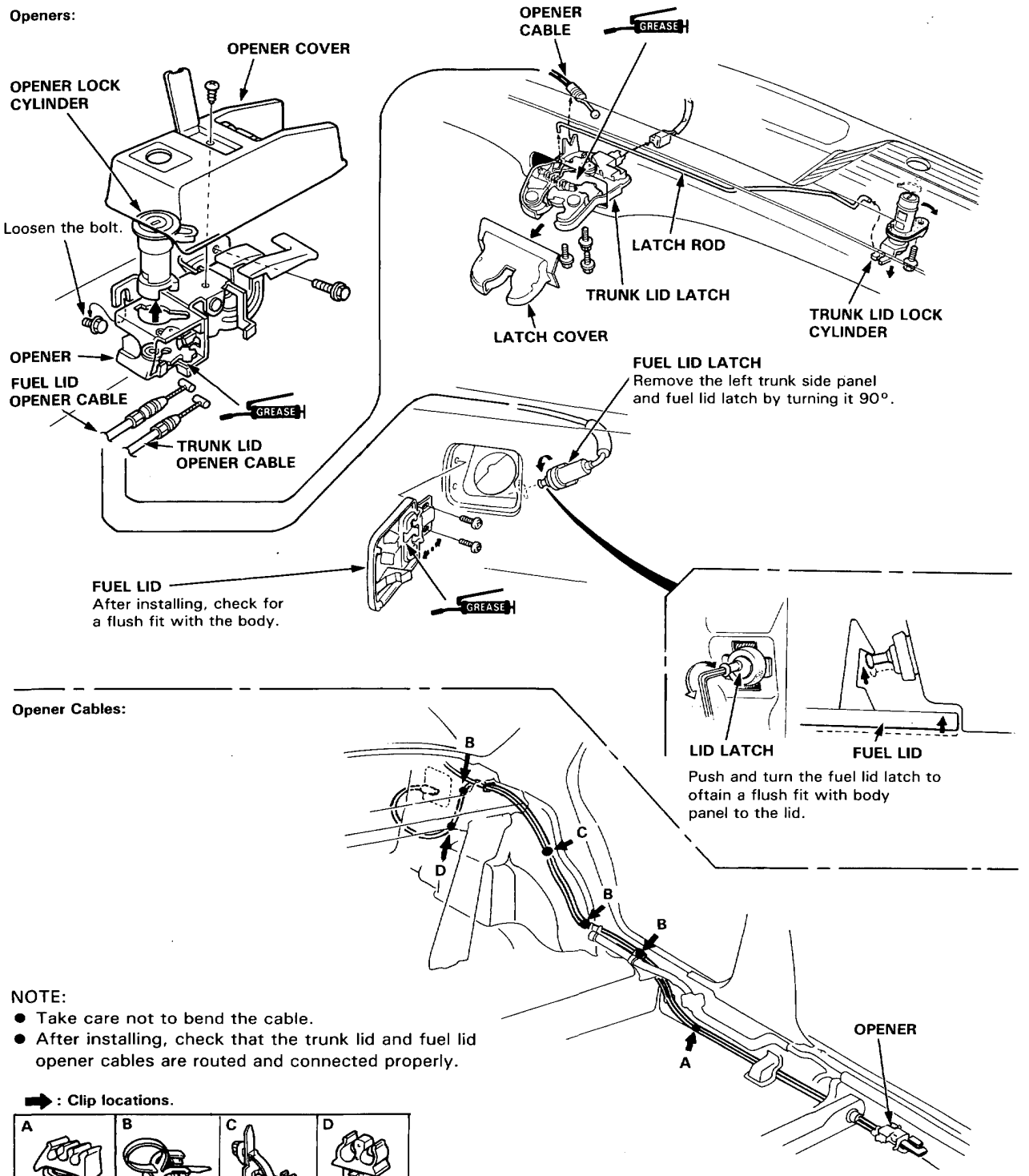
Vanity Mirror Light 6
Lighting System 6
Mirror, Power 6
Seat, Power 13
Starting System 1
Stereo Sound System 10
Sunroof 11
Turn Signal / Hazard Flasher System 13
Warning System
- ALB Warning 2
- Brake Warning 2
- Charge Warning 2
- Check Engine Warning 2
- Hazard Warning 2
- Light-on Warning 5
- Oil Pressure Warning 2

Washers
- Windshield 13
- Headlight Washer 13

Windows, Power 7
Wipers
- Windshield 7

Opener/Latch

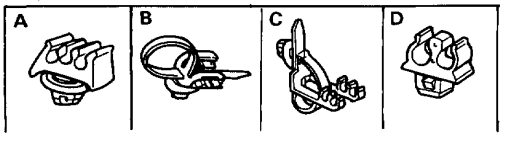
Replacement



NOTE:

- Take care not to bend the cable.
- After installing, check that the trunk lid and fuel lid opener cables are routed and connected properly.

➡ : Clip locations.



Wiring Diagrams

Index

Air Conditioner 17
Anti-Lock Brake System (ALB) 14
Automatic Transmission Control System 14
Battery 1
Blower Controls 17
Charging System 1
Cigarette Lighter 10
Clock 10
Cooling Fan Control 16
Cruise Control System 12
Defogger, Rear Window 11
Door Lock, Power 12
Fuel and Emissions 16
Gauges 2
Headlight Adjuster System 4
Horns 4
Ignition Switch 1
Ignition System 1
Indicators
- Cruise Control Indicator 2
- Trunk Open Indicator 2
- High Beam Indicator 2
- Shift Lever Position Indicator 4
- Turn Signal Indicator 2

Integrated Control Unit 5
Lights, Exterior
- Back-up Lights 10
- Brake Lights 3
- Hazard Lights 2
- Headlights 6
- License Plate Lights 6
- Marker Lights 6
- Taillights 6

Lights, Interior
- Courtesy Lights 3
- Dashlight Brightness Control 6
- Dome Lights 3
- Glove Box Light 6
- Trunk Light 6

Vanity Mirror Light 6
Lighting System 6
Mirror, Power 6
Seat, Power 13
Starting System 1
Stereo Sound System 10
Sunroof 11
Turn Signal / Hazard Flasher System 13
Warning System
- ALB Warning 2
- Brake Warning 2
- Charge Warning 2
- Check Engine Warning 2
- Hazard Warning 2
- Light-on Warning 5
- Oil Pressure Warning 2

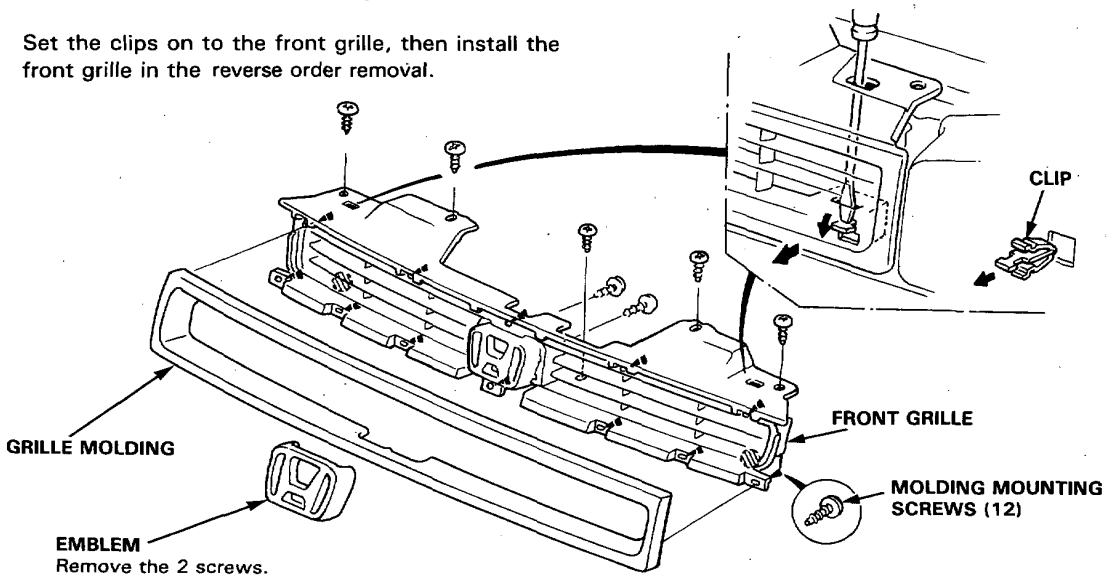
Washers
- Windshield 13
- Headlight Washer 13

Windows, Power 7
Wipers
- Windshield 7

Front Grille/Side Sill Panel

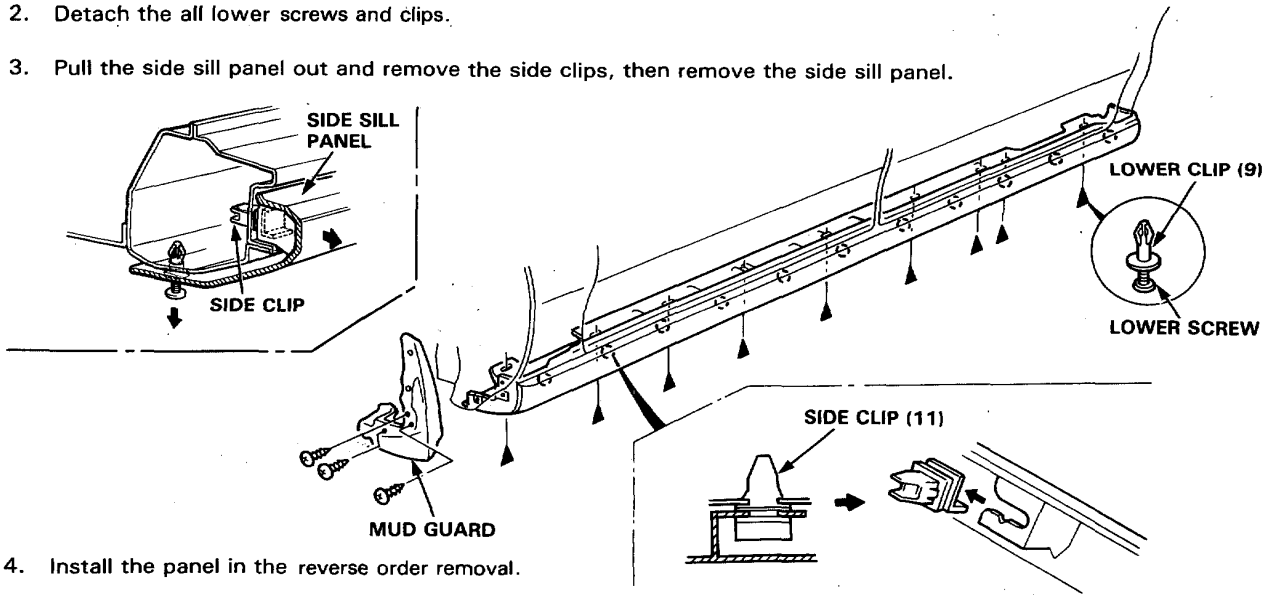
Front Grille Replacement

1. Remove the 5 screws.
2. *Push the clips on each side with a flat tip screwdriver* as shown, then remove the front grille.
3. Set the clips on to the front grille, then install the front grille in the reverse order removal.



Side Sill Panel Replacement

1. Remove the mud guard.
2. Detach the all lower screws and clips.
3. Pull the side sill panel out and remove the side clips, then remove the side sill panel.

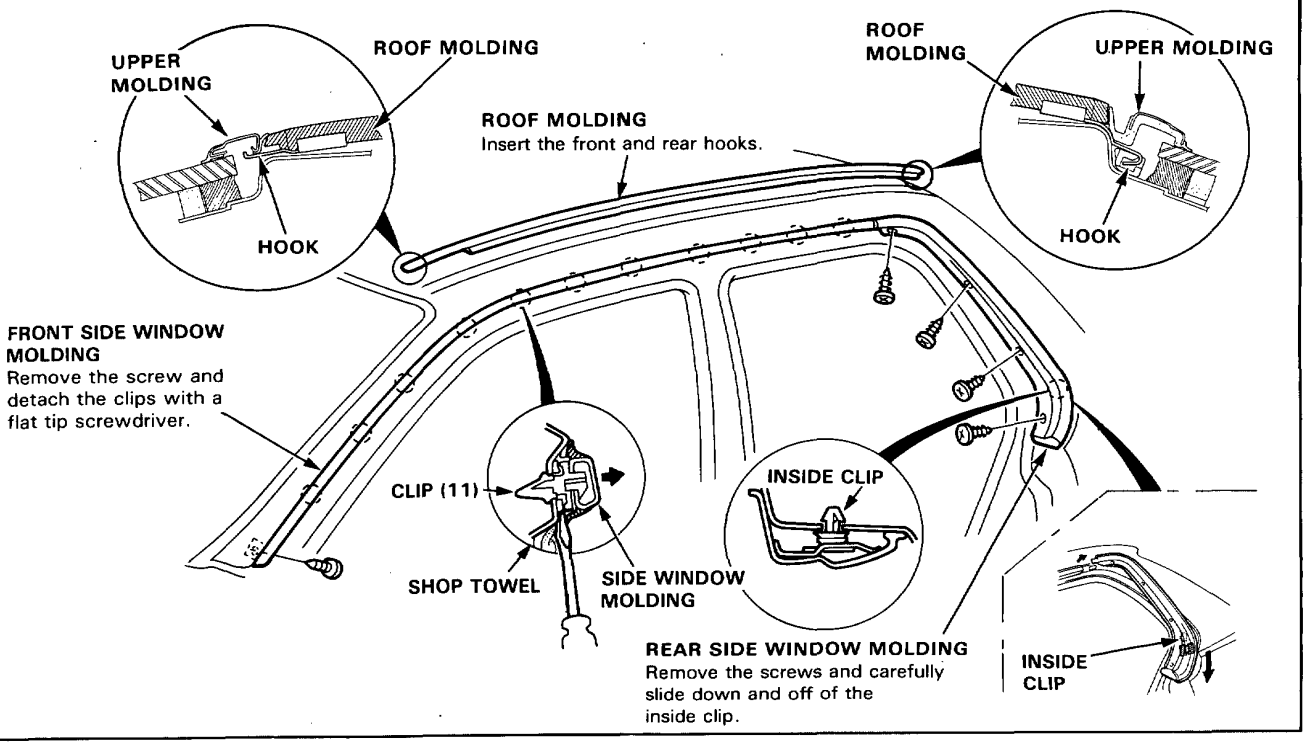


4. Install the panel in the reverse order removal.

NOTE: If necessary, replace any damaged clips.

Roof Molding/Side Moldings

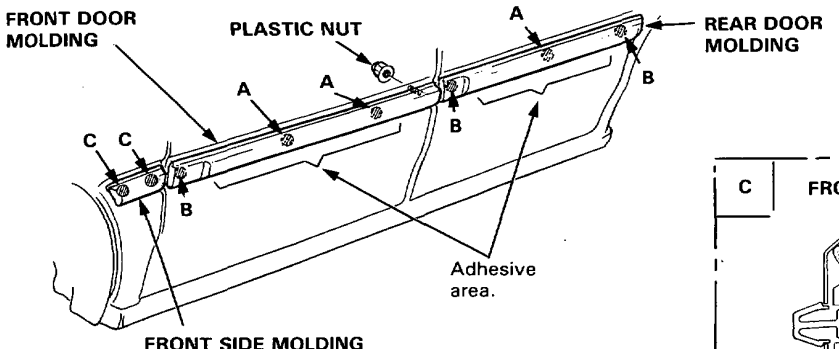
Roof Molding/Side Window Moldings Replacement

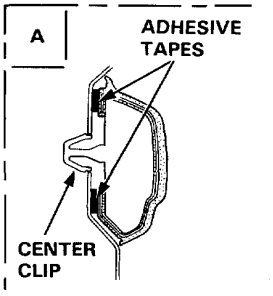


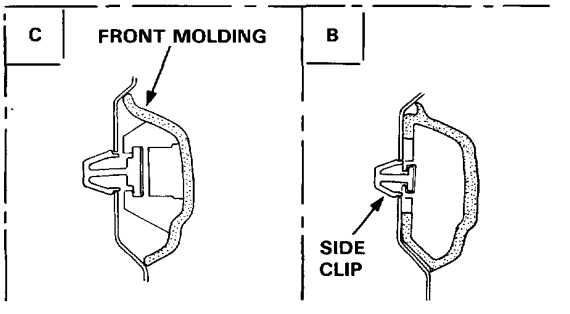
Side Moldings Replacement

1. Remove the door panel and turn over the plastic cover.
2. Remove the plastic nut and detach the center clips from inside of the door.
3. Peel off the molding and detach the side clips, then remove the door moldings.

   NOTE: Before reassembling, clean the body bonding surface with a sponge dampened in alcohol.



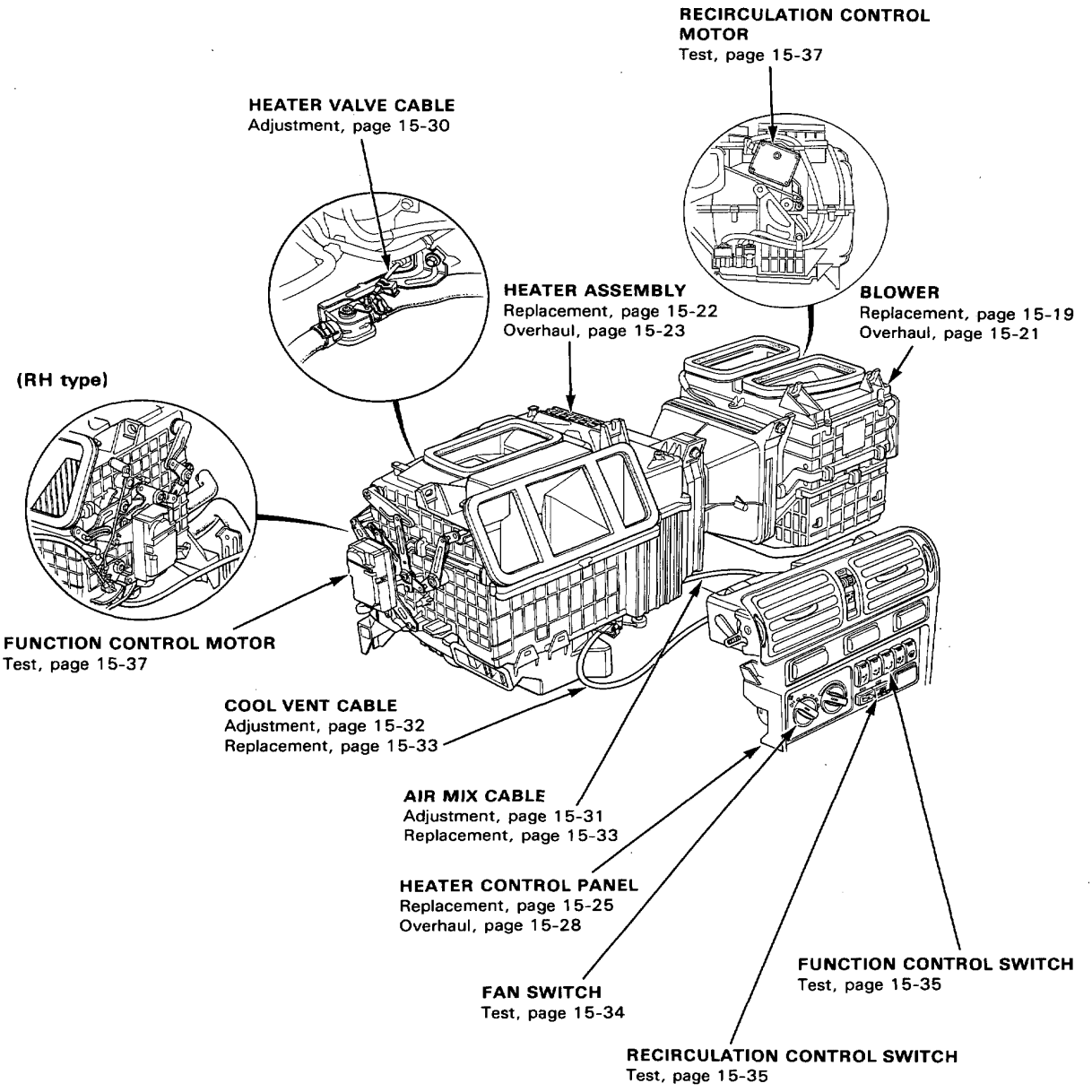




Heater

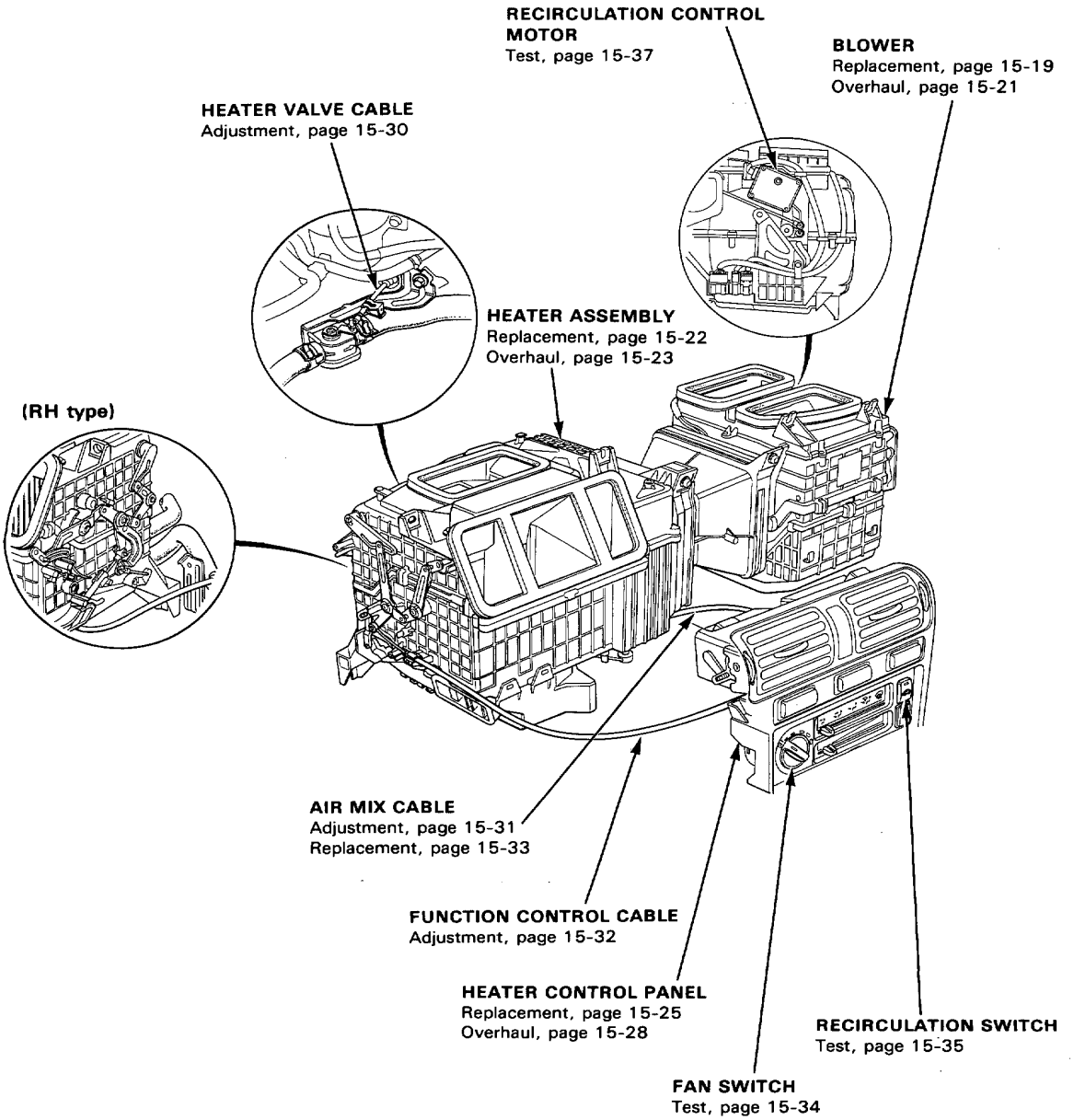
Illustrated Index

(Button type)



NOTE: LH Drive shown, RH Drive is similar.

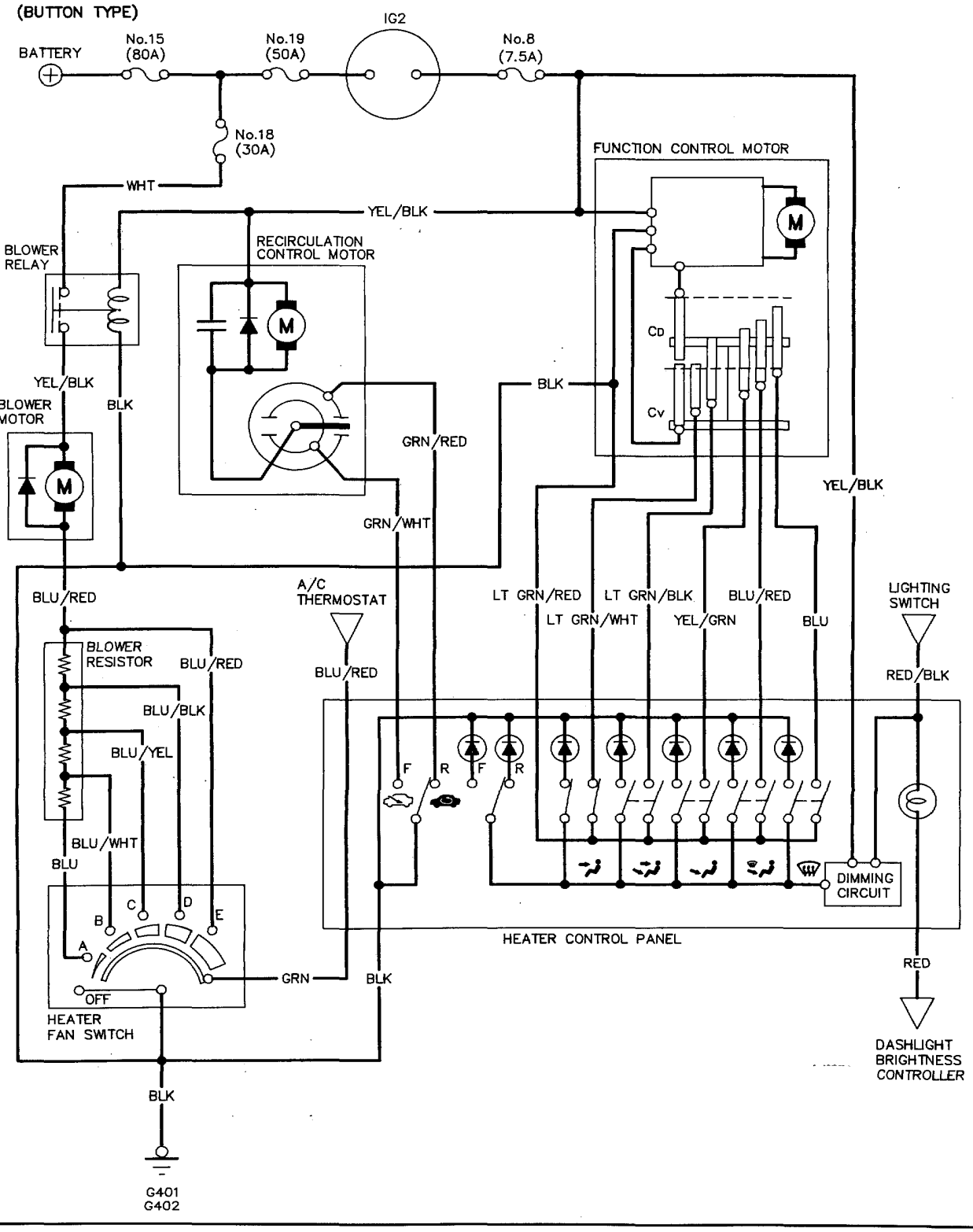
(Lever type)



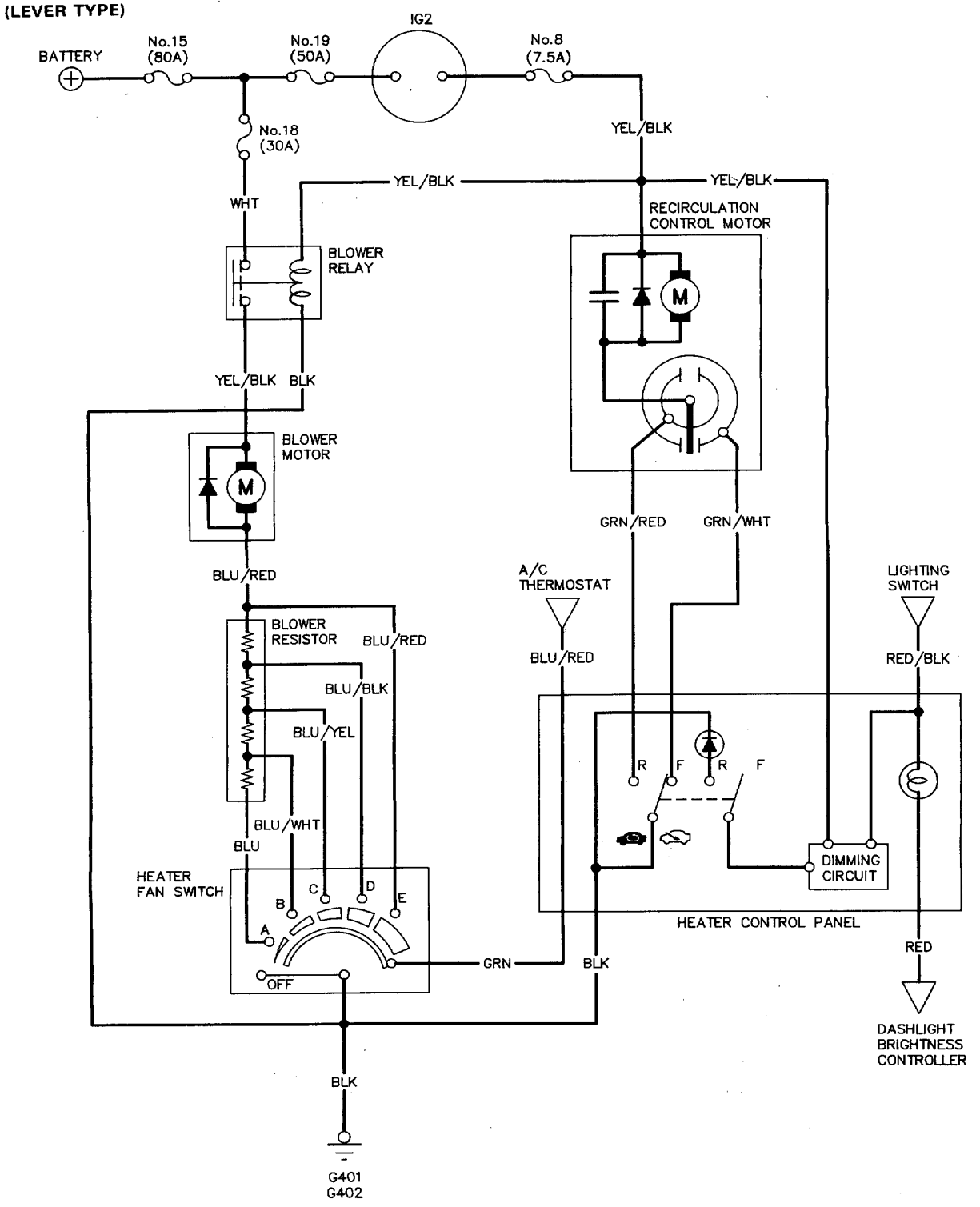
NOTE: LH Drive shown, RH Drive is similar.

Heater

Circuit Diagram



(LEVER TYPE)


IG2
BATTERY
No.15 (80A)
No.19 (50A)
No.8 (7.5A)
No.18 (30A)
YEL/BLK
YEL/BLK
YEL/BLK
WHT
RECIRCULATION CONTROL MOTOR
BLOWER RELAY
M
YEL/BLK
BLK
BLOWER MOTOR
M
GRN/RED
GRN/WHT
BLU/RED
A/C THERMOSTAT
LIGHTING SWITCH
BLOWER RESISTOR
BLU/RED
BLU/RED
BLU/BLK
BLU/YEL
RED/BLK
R
F
R
F
BLU/WHT
BLU
DIMMING CIRCUIT
HEATER FAN SWITCH
B
C
D
E
A
OFF
GRN
BLK
HEATER CONTROL PANEL
RED
DASHLIGHT BRIGHTNESS CONTROLLER
BLK
G401
G402

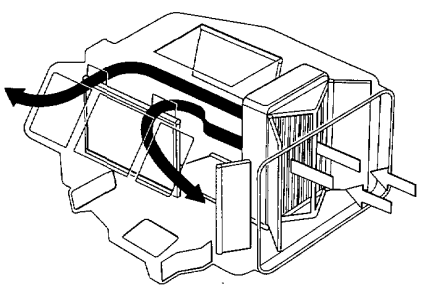
Heater Door Position

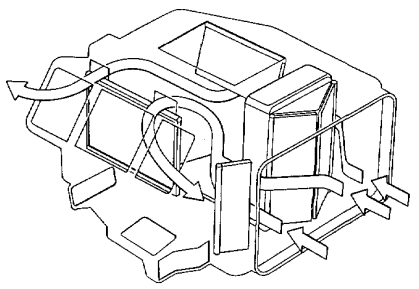
(LH Type)

- Always blowing air in every mode.

HOT

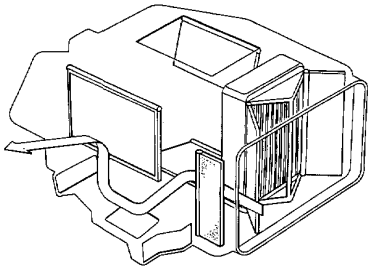
COLD

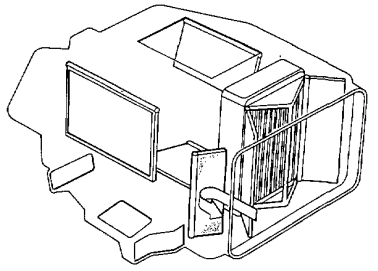




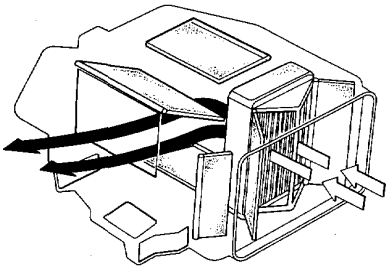


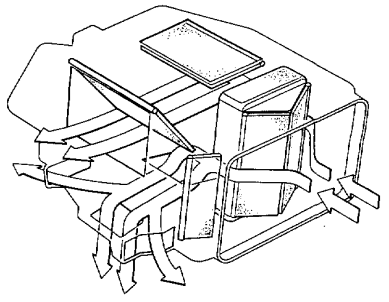
(COOL VENT)

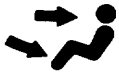


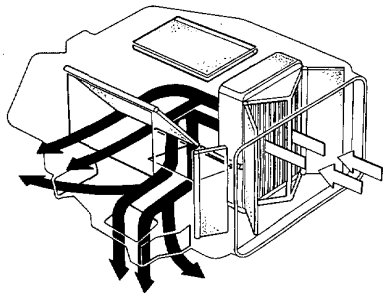


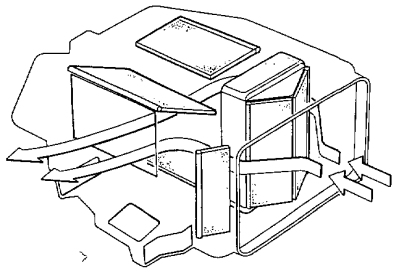




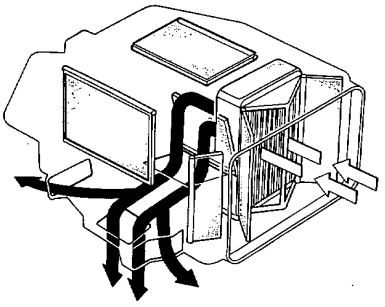


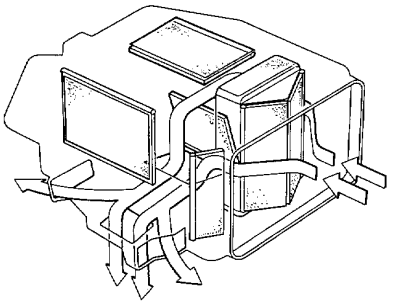




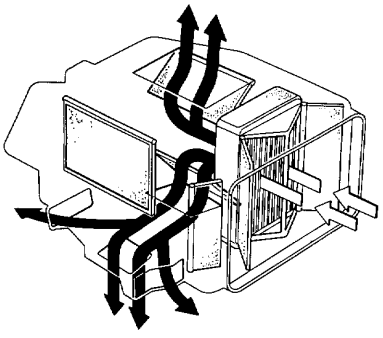


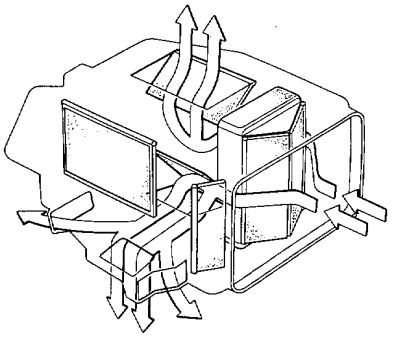




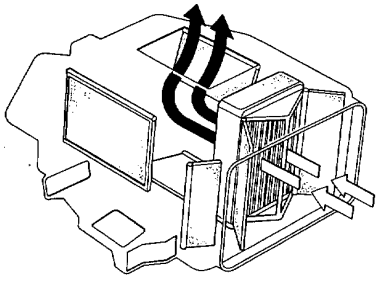


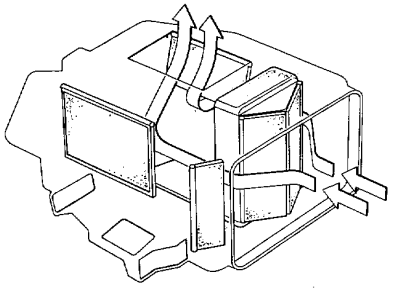












(cont'd)

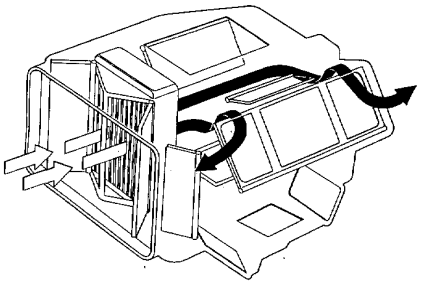
Heater Door Position (cont'd)

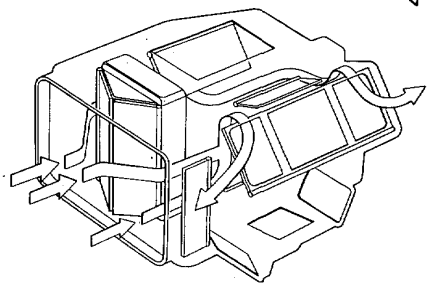
(RH type)

- Always blowing air in every mode.

HOT

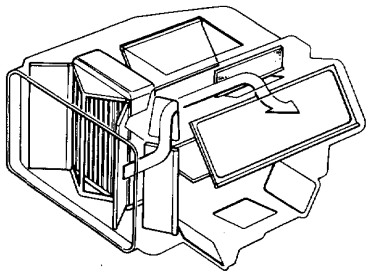
COLD

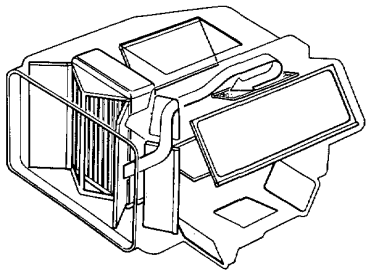




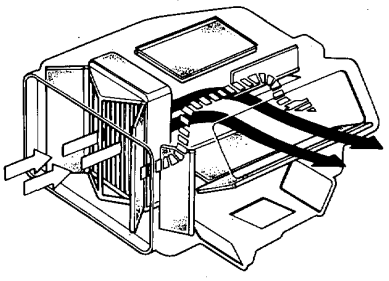


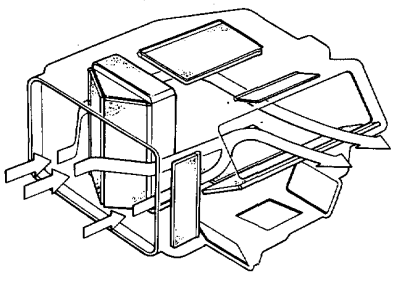
(COOL VENT)



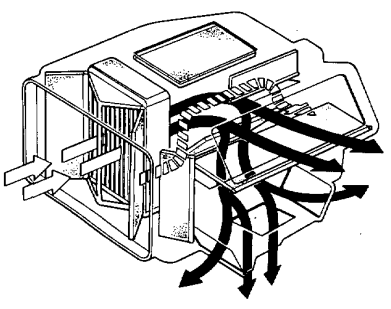


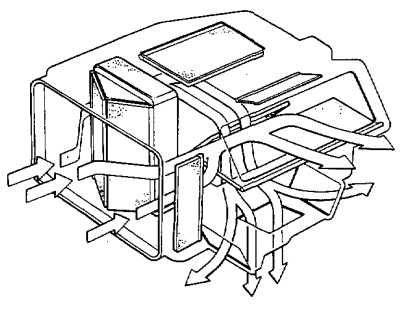




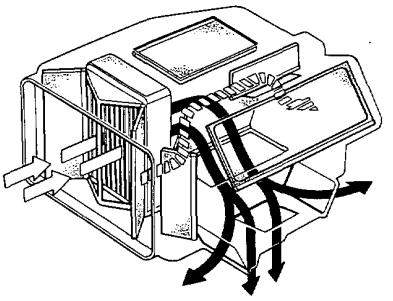


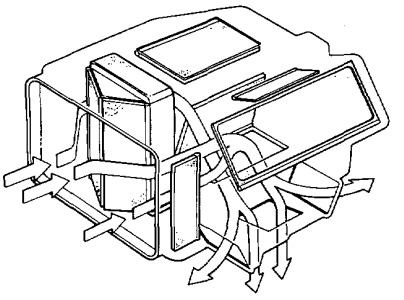




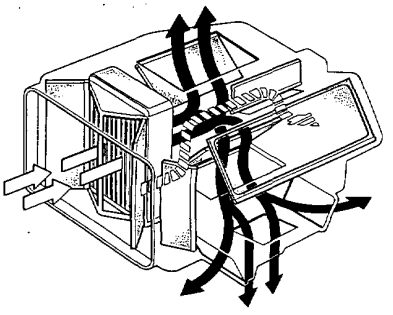


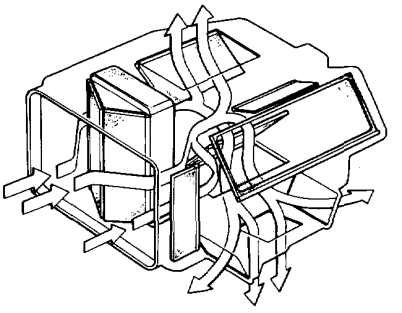




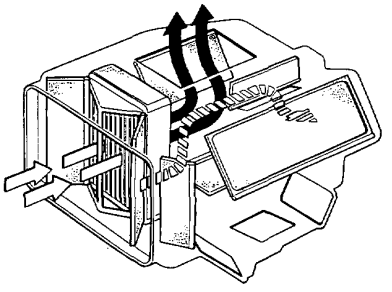


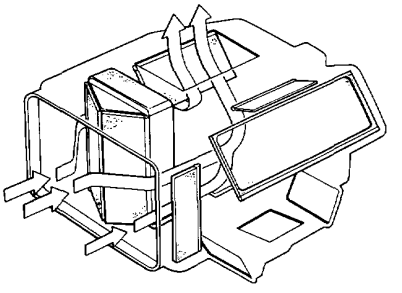












Troubleshooting

Symptom Chart

SYMPTOM			REMEDY
No hot air flow		Blower motor does not run	Perform the flowchart (page 15-12)
		Blower motor runs	Check following: · Clogged heater duct · Clogged blower outlet · Clogged heater valve · Faulty air mix door · Air mix cable adjustment · Faulty thermostat
Hot air flow is low		Blower speed does not change	Perform flowchart (page 15-11)
		Blower runs properly	Check following: · Clogged heater duct · Clogged blower outlet · Incorrect door position
Function does not change	Button Type	Function control motor does not run	Perform flowchart (page 15-15)
		Function control motor runs	Check the heater door linkage and the heater assembly.
	Lever Type		· Check the heater door linkage and the heater assembly. · Check the function cable adjustment.
Recirculation door does not change		Recirculation motor does not run	Perform flowchart (page 15-17)
		Recirculation motor runs	Check the door linkage and the blower.

Troubleshooting Flowchart-Blower

Blower motor runs, but one or more speeds are inoperative.

Disconnect the 5-P connector from the blower resister.

Check the resistance between the No.1 and No.5 terminals of the resister.

Is there about 2.7 Ω ?

NO → **Replace the resister**

YES

Reconnect the 5-P connector to the resister.

Disconnect the 8-P connector from the fan switch.

Turn the ignition switch on.

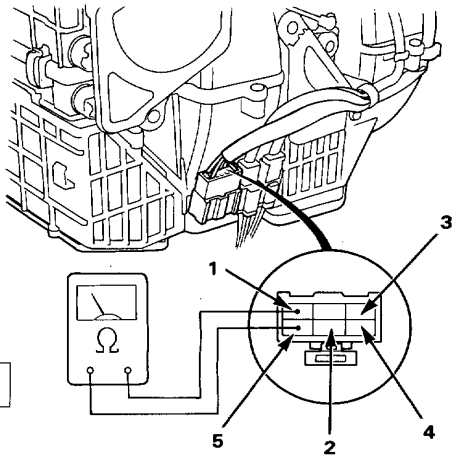
Measure the voltage between:
- BLU terminal and body ground.
- BLU/WHT terminal and body ground.
- BLU/YEL terminal and body ground.
- BLU/BLK terminal and body ground.
- BLU/RED terminal and body ground.

Is there battery voltage ?

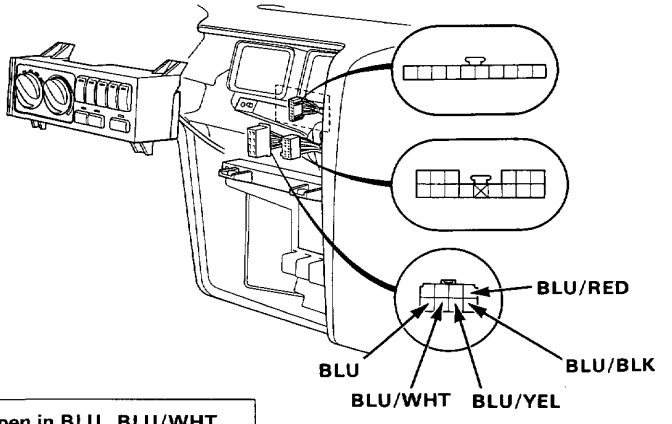
NO → **Repair open in BLU, BLU/WHT, BLU/YEL, BLU/BLK or BLU/RED wire (s) between the fan switch and resister.**

YES

Replace the fan switch.



View from wire side



View from wire side

Troubleshooting Flowchart- Blower

NOTE: Check for a blown No.18 (30 A), No.8 (7.5 A) fuse.

Blower motor does not run at all.

Disconnect the 2-P connector from the blower motor.

Turn the ignition switch ON.

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

Is there battery voltage ? — NO — To page 15-13B

YES

Inspect the blower motor.

Is the blower motor OK ? — NO — **Replace the blower motor**

YES

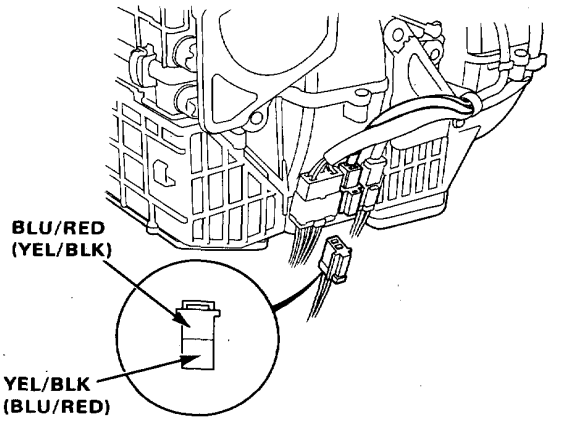
Turn the ignition switch OFF.

Reconnect the 2-P connector to the blower motor.

Disconnect the 8-P connector from the heater fan switch.

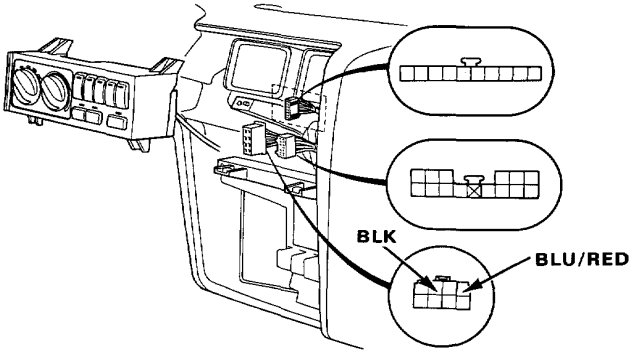
Measure the voltage between BLU/RED terminal (+) and body ground (−).

To page 15-13 A



View from wire side
( ): **RH TYPE**

NOTE: Connect the battery positive to the YEL/BLK terminal and negative to the BLU/RED terminal and check that the blower motor runs.



View from wire side

From page 15-12 A

Turn the ignition switch ON.

Is there battery voltage ? NO → **Repair open in BLU/RED wire between blower and fan switch.**

YES

Turn the ignition switch OFF.

Inspect the fan switch (page 15-34).

Is the fan switch OK ? NO → **Replace the fan switch**

YES

Repair open in BLK wire between the fan switch and body ground or poor ground (G401, 402).

From page 15-12 B

Turn the ignition switch OFF.

Disconnect the blower relay from the fuse box.

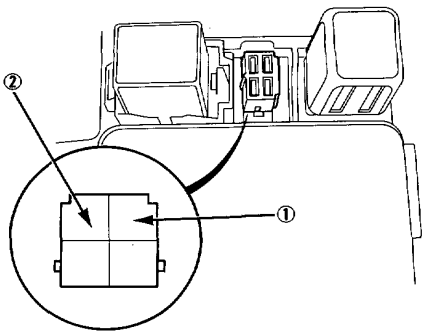
Inspect the blower relay. (page 15-34).

Is the blower relay OK ? NO → **Replace the blower relay**

YES

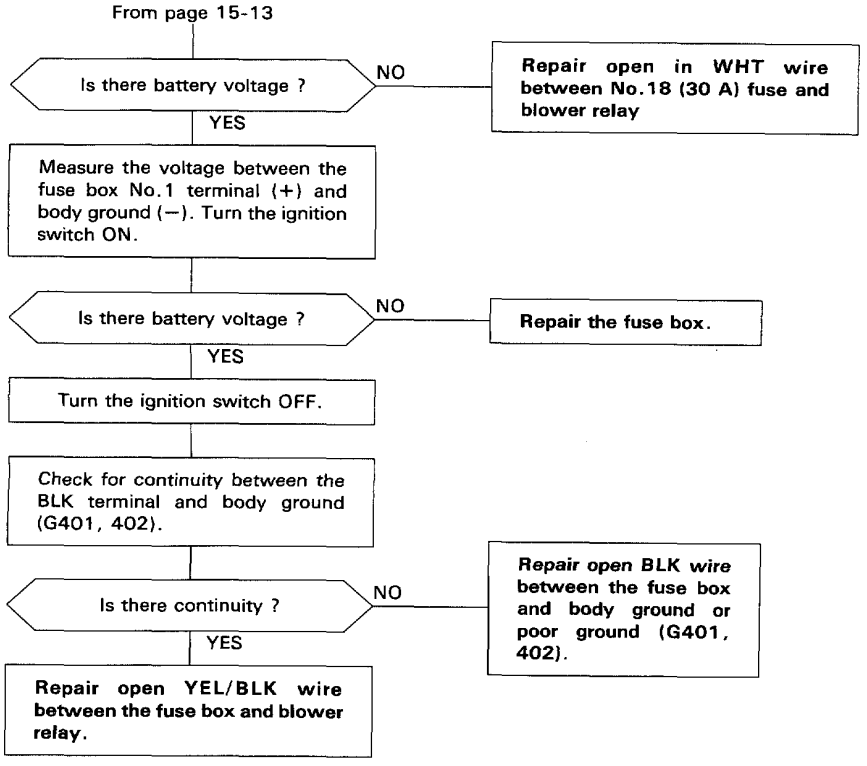
Measure the voltage between the fuse box No.1 terminal (+) and body ground (−).

To page 15-14



(cont'd)

Troubleshooting Flowchart-Blower (cont'd)



Troubleshooting Flowchart — Function Control

NOTE: Check the following • blown No.8 (7.5 A) fuse
• sticking function link and function doors

Function control motor does not run.

Disconnect the 8-P connector from the function control motor.

Turn the ignition switch ON.

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

Is there battery voltage ?

NO → **Repair open in YEL/BLK wire between the function control motor and fuse box.**

YES

Check for continuity from BLK terminal to body ground.

Is there continuity ?

NO → **Repair open in BLK wire between the function control motor and body ground or poor ground (G401, 402)**

YES

Turn the ignition switch OFF.

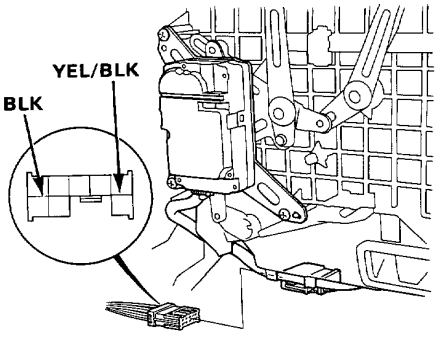
Inspect the function control motor (page 15-37).

Is the function control motor OK ?

NO → **Replace the function control motor.**

YES

To page 15-16



View from wire side

(cont'd)

Troubleshooting Flowchart — Function Control (cont'd)

From page 15-15

Reconnect the 8-P connector to the function control motor.

Disconnect the 14-P connector from the heater control panel.

Check for continuity between BLK, LT GRN/RED terminals and body ground.

Is there continuity ?

NO → **Repair open in BLK, LT GRN/RED wire or poor ground (G401, 402).**

YES

Turn the ignition switch ON.

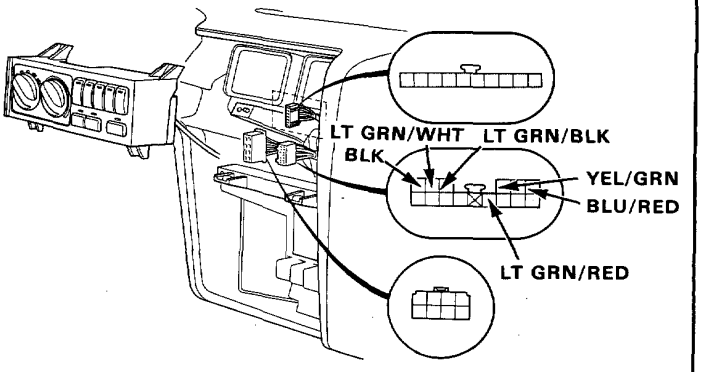
Connect each wire LT GRN/WHT, LT GRN/BLK, YEL/GRN, BLU/RED, BLU to body ground.

Does the function control motor run normally ?

NO → **Repair open in wire (LT GRN/WHT, LT GRN/BLK, YEL/GRN, BLU/LED, BLU) between the function control motor and heater control panel.**

YES

Replace the heater control switch.



View from wire side

NOTE: If the function control motor is in the vent position, it will not run when the LT GRN/WHT wire is grounded. In this case, ground the LT GRN/WHT wire again after grounding the other wires.

Troubleshooting Flowchart — Recirculation Control

NOTE : Check following; • Sticking blower side link and recirc door
• Blown No.8 (7.5 A) fuse

Recirculation control door does not change between FRESH and REC, or continues to run.

Push the REC button and turn the ignition switch ON.

Does the motor run all the time ?

YES → **• Repair short in GRN/RED wire between recirc. motor and fan switch.**
• Replace the control switch

NO

Push the FRESH button and turn the ignition switch ON.

Does the motor run all the time ?

YES → **• Repair short in GRN/WHT wire between recirc. motor and fan switch.**
• Replace the control switch

NO

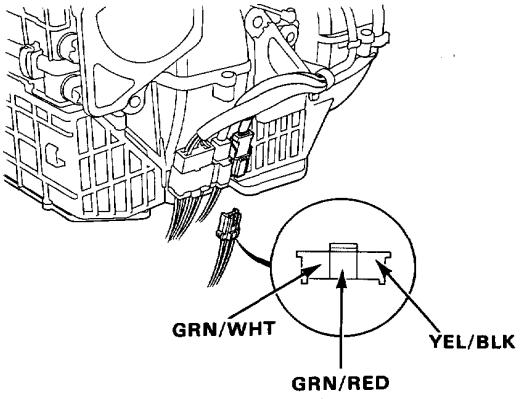
Turn the ignition switch OFF.

Disconnect the 3-P connector from the recirc. motor at the bottom of the blower assembly.

Turn the ignition switch ON.

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

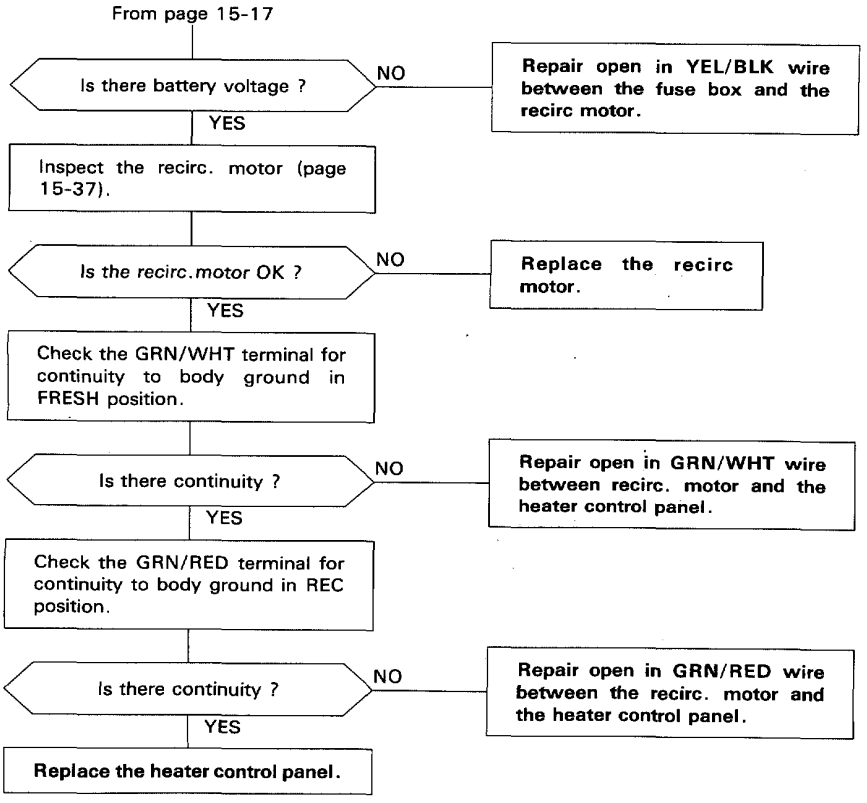
To page 15-18



View from wire side

(cont'd)

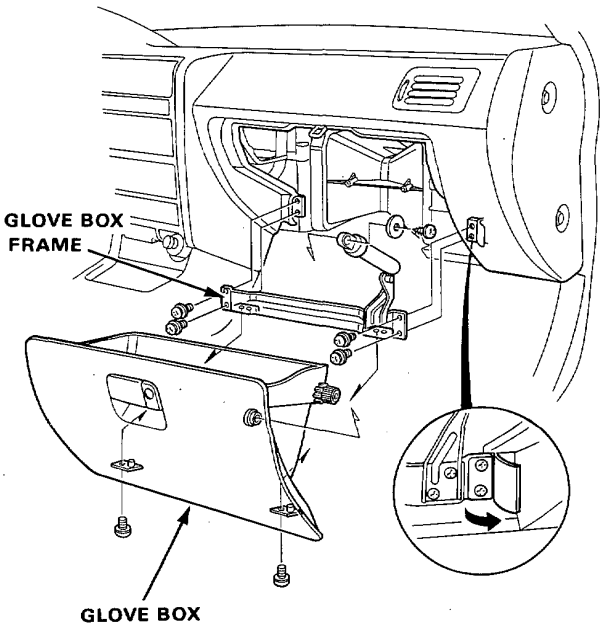
Troubleshooting Flowchart — Recirculation Control (cont'd)



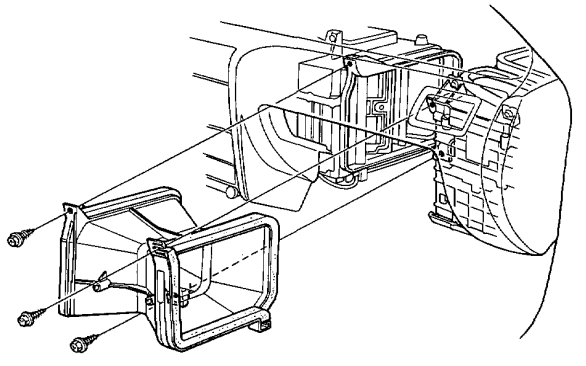
Blower

Replacement

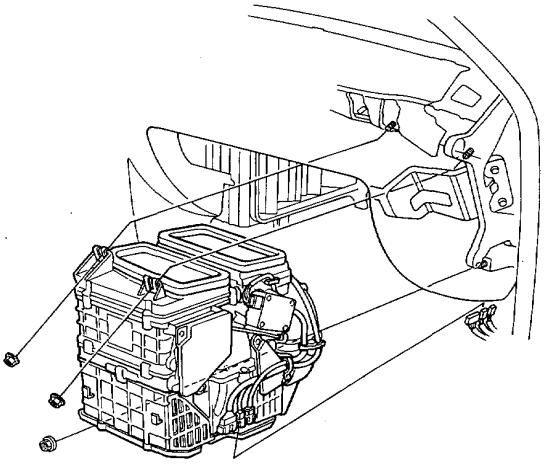
1. Remove the glove box.
2. Remove the glove box frame.



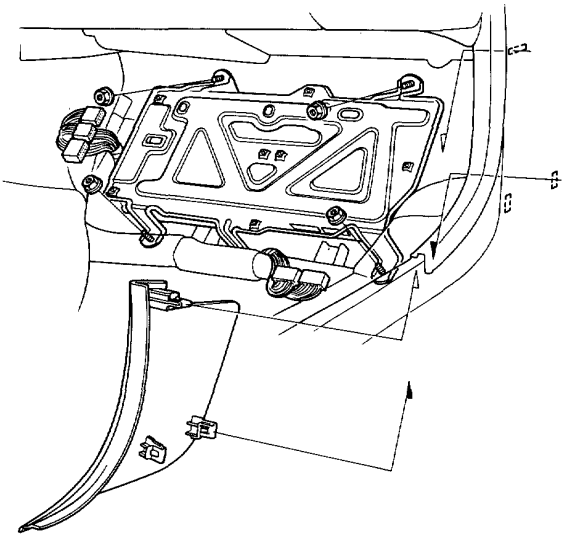
3. (Without A/C)
   Remove the self-tapping screws (2) and remove the heater duct.



4. (Without A/C)
   Remove the blower mounting nuts (3).
   Disconnect the connectors from the blower motor, resister and recirculation control motor, then remove the blower.



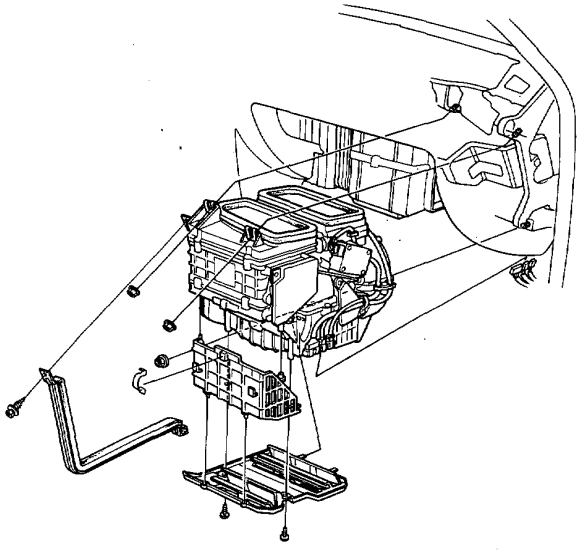
5. (With A/C)
   Turn over the carpet and remove the side cover.
   Remove the control unit bracket mounting nuts (4).
   Disconnect the connectors (5) and remove the control unit bracket.



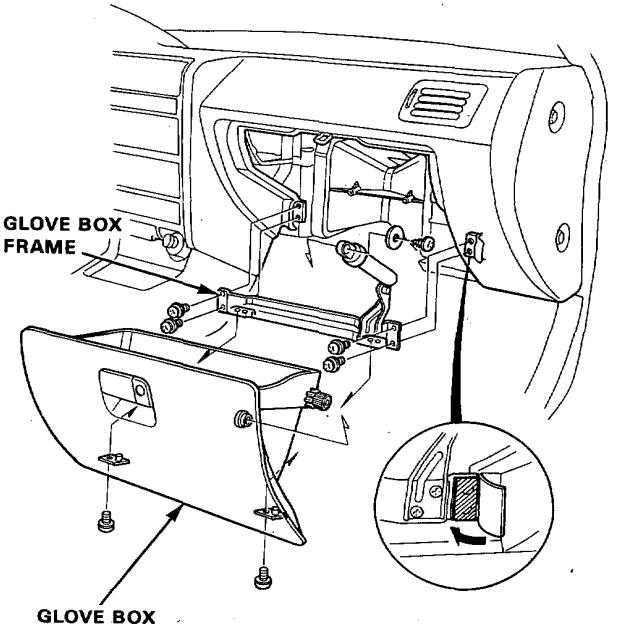
(cont'd)

Replacement (cont'd)

6. (With A/C)
   Remove the A/C bands (2) and remove the blower under cover.
   NOTE: Be careful not to break the tabs while removing the blower under cover.
   Remove the blower as in step 4.



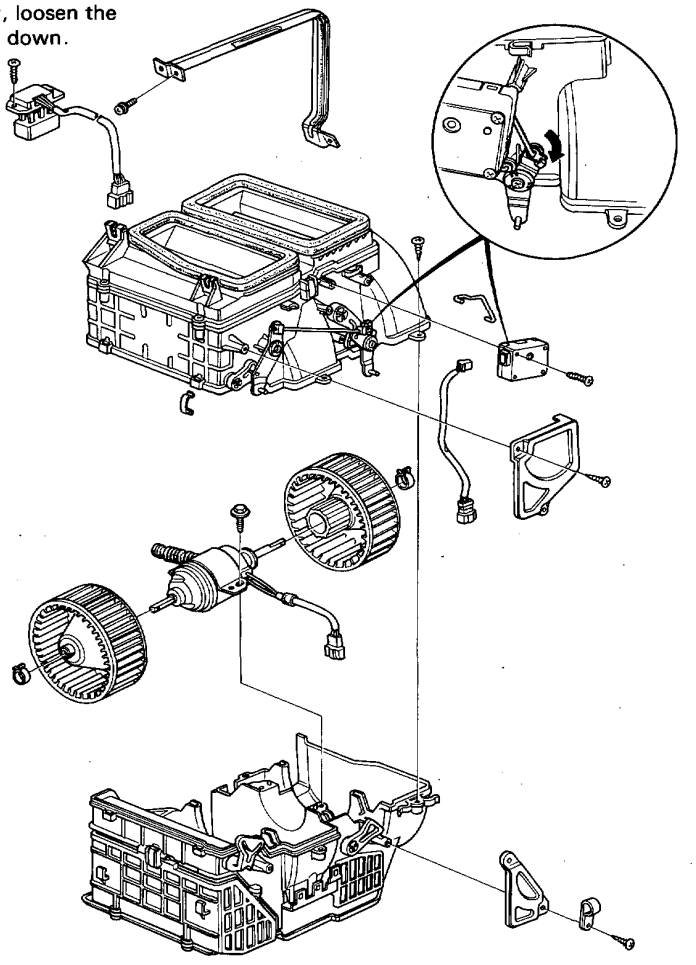
7. Install the blower in the reverse order of removal and make sure there is no air leakage.
   NOTE: When installing the glove box frame, the face which covers the dashboard is installed with double-sided adhesive tape.



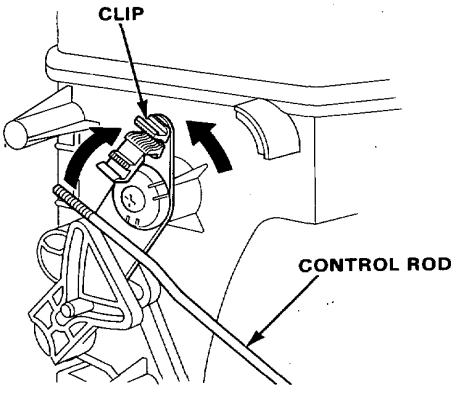
Overhaul

NOTE:

- Before reassembly, make sure that the air door and linkage moves smoothly without binding.
- When reattaching the actuator, make sure its positioning will not allow the air door to be pulled too far. Attach the actuator and all linkage, then apply battery voltage and watch the door movement. If necessary, loosen the holding screw and move the actuator up or down.



To adjust the control rod:
Connect the recirc. control motor connector to the cabin wire harness and turn the FRE/REC switch to "REC". Hold the air door closed, then connect the control rod to the clip on the arm.



Heater Assembly

Replacement

1. When the engine is cool, drain the coolant from the radiator (Section 5).

⚠WARNING

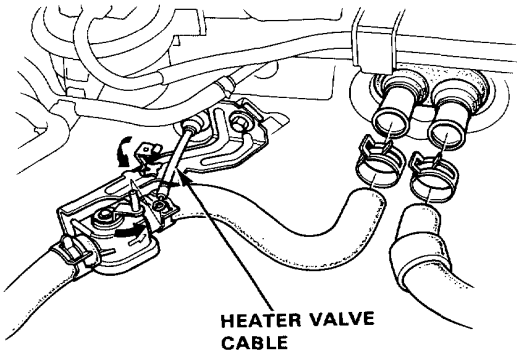
- **Do not remove the radiator cap when the engine is hot; the coolant is under pressure and could severely scald you.**
- **Keep hands away from the radiator fan. The fan may start automatically without warning and run for up to 30 minutes, even after the engine is turned off.**

CAUTION: Radiator coolant will damage paint. Quickly rinse any spilled coolant from painted surfaces.

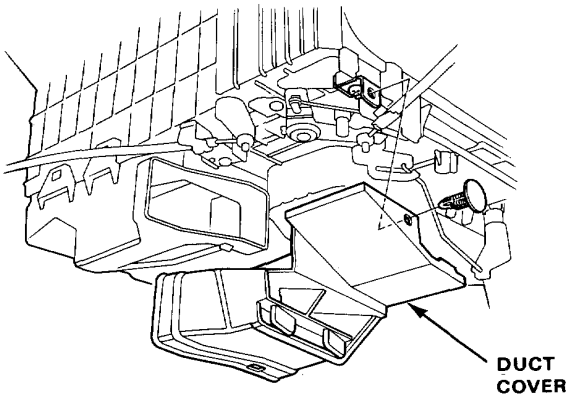
2. Disconnect the heater hoses at the heater.

NOTE: Coolant will run out when the hoses are disconnected, drain it into a clean drip pan.

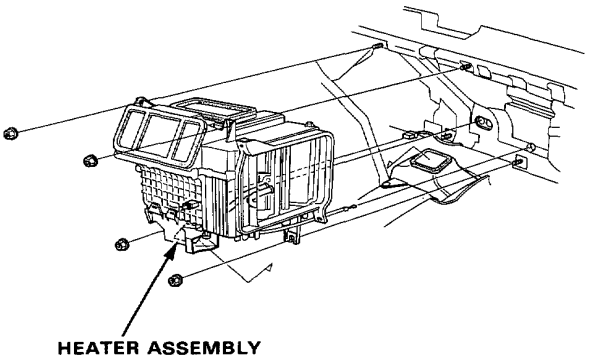
3. Disconnect the heater valve cable from the heater valve.



4. Remove the duct cover.



5. Remove the dashboard (Section 14).
6. Remove the heater duct.
7. Remove the heater mounting nuts (4), then remove the heater assembly.



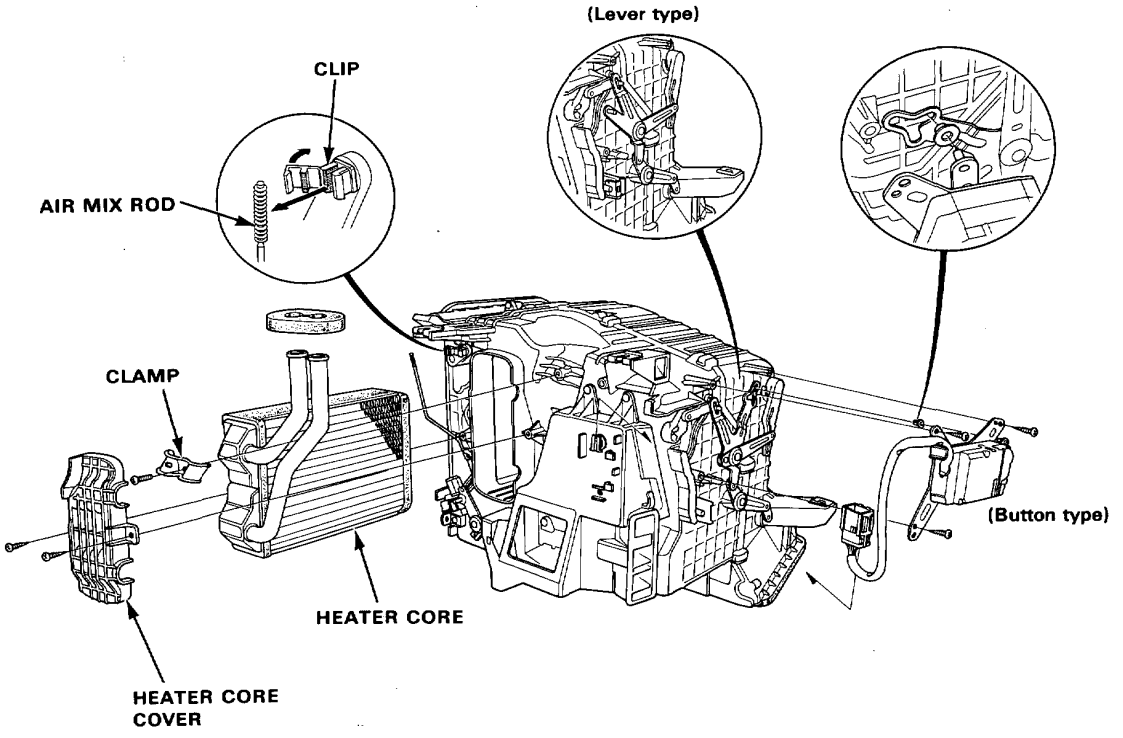
8. *Install in the reverse order of removal and:*
   - Apply sealant to the grommets.
   - Do not interchange the inlet and outlet hoses. Make sure that the hose clamps are secure.
   - Loosen the bleed bolt on the engine and refill the radiator and reservoir tank with the proper coolant mixture.
     Tighten the bleed bolt when all the trapped air has escaped and coolant begins to flow from it.
   - Connect all cables and make sure they are properly adjusted (page 15-30).

Overhaul

1. Remove the heater assembly.
2. Remove the air mix rod from the clip.
3. Remove the self-tapping screws (2) and heater core cover.
4. Remove the self-tapping screw and clamp.
5. Pull out the heater core from the heater housing.
6. Install the heater in the reverse order of removal.

FUNCTION CONTROL MOTOR (Button type only)

- When installing the function control motor, be careful when connecting the link.
- Try the function control motor in every mode for two minutes, and make sure the motor operates correctly in each mode.



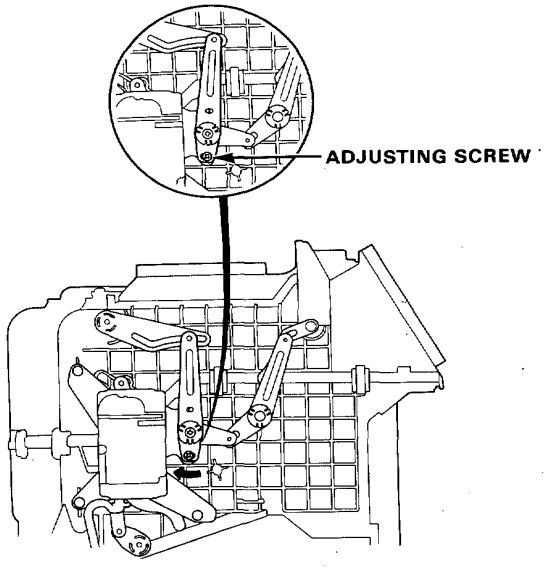
Adjustment

1. Heater linkage: page 15-24
2. Air mix rod: page 15-31
3. Function control cable (lever type only): page 15-32

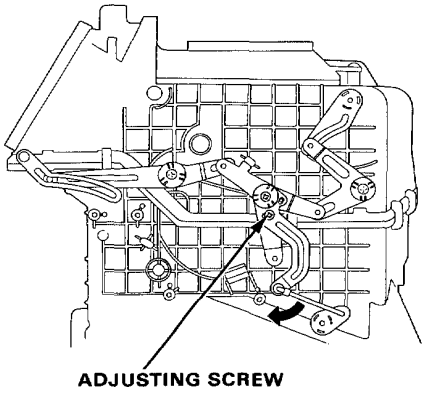
Heater Assembly

Heater Linkage Adjustment

(LH)
(Button Type)
(DEF door adjustment)
Set the heater control switch on HEAT, to adjust for DEF leak (shut~20 %).
1. Loosen the adjusting screw.
2. Adjust the heater linkage as shown.
3. Tighten the adjusting screw.

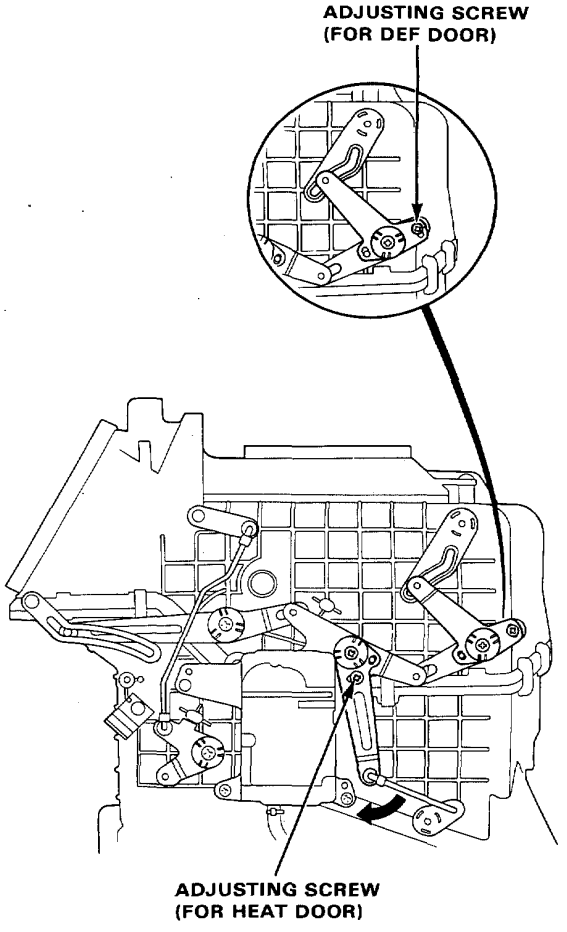


(RH)
(Lever Type)
(HEAT *door* adjustment)
When HEAT door is closed, air should not leak from the HEAT door.
1. Loosen the adjusting screw.
2. Adjust the heater linkage.
3. Tighten the adjusting screw.



(RH)
(Button Type)
(DEF door adjustment)
Set the heater control switch on HEAT, to adjust for DEF leak (shut~20 %).
1. Loosen the adjusting screw.
2. Adjust the heater linkage as shown.
3. Tighten the adjusting screw.

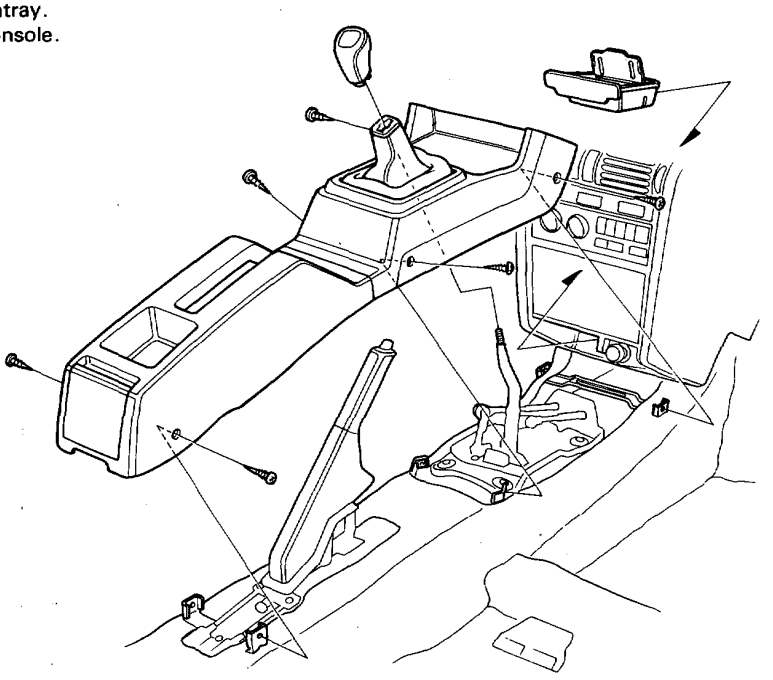
(HEAT door adjustment)
When HEAT door is closed, air should not leak from the HEAT door.
1. Loosen the adjusting screw.
2. Adjusting the heater linkage.
3. Tighten the adjusting screw.



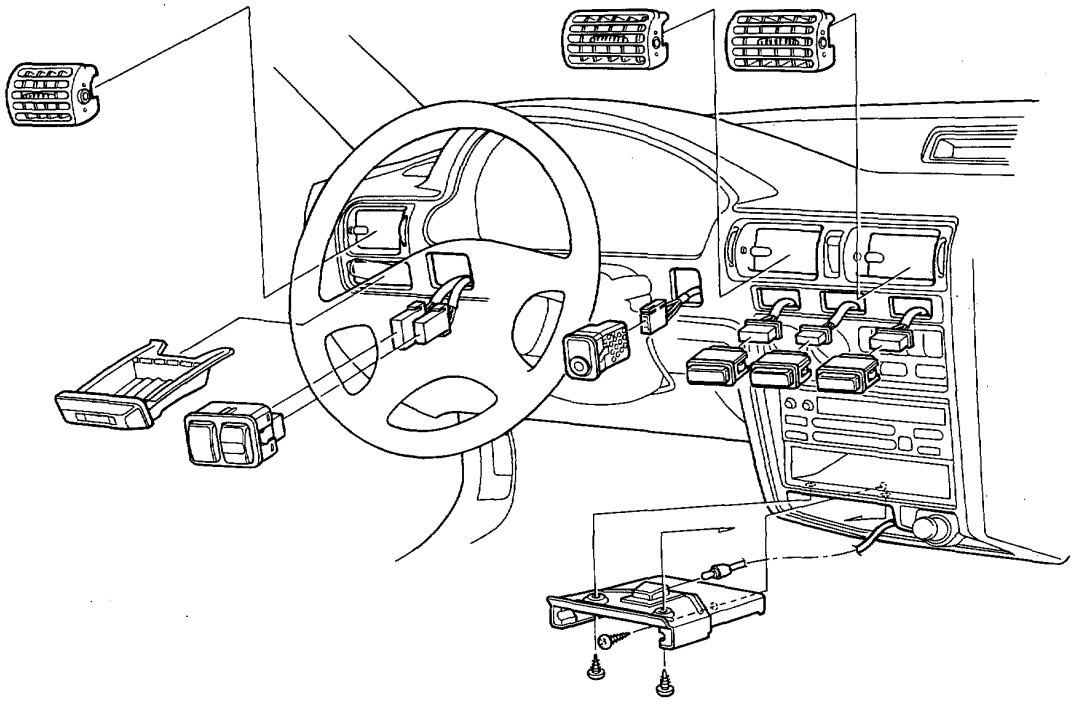
Heater Control Panel

Replacement

1. Remove the ashtray.
   Remove the console.



2. Remove the switches, coin box, air vent, and ashtray lighting bracket.

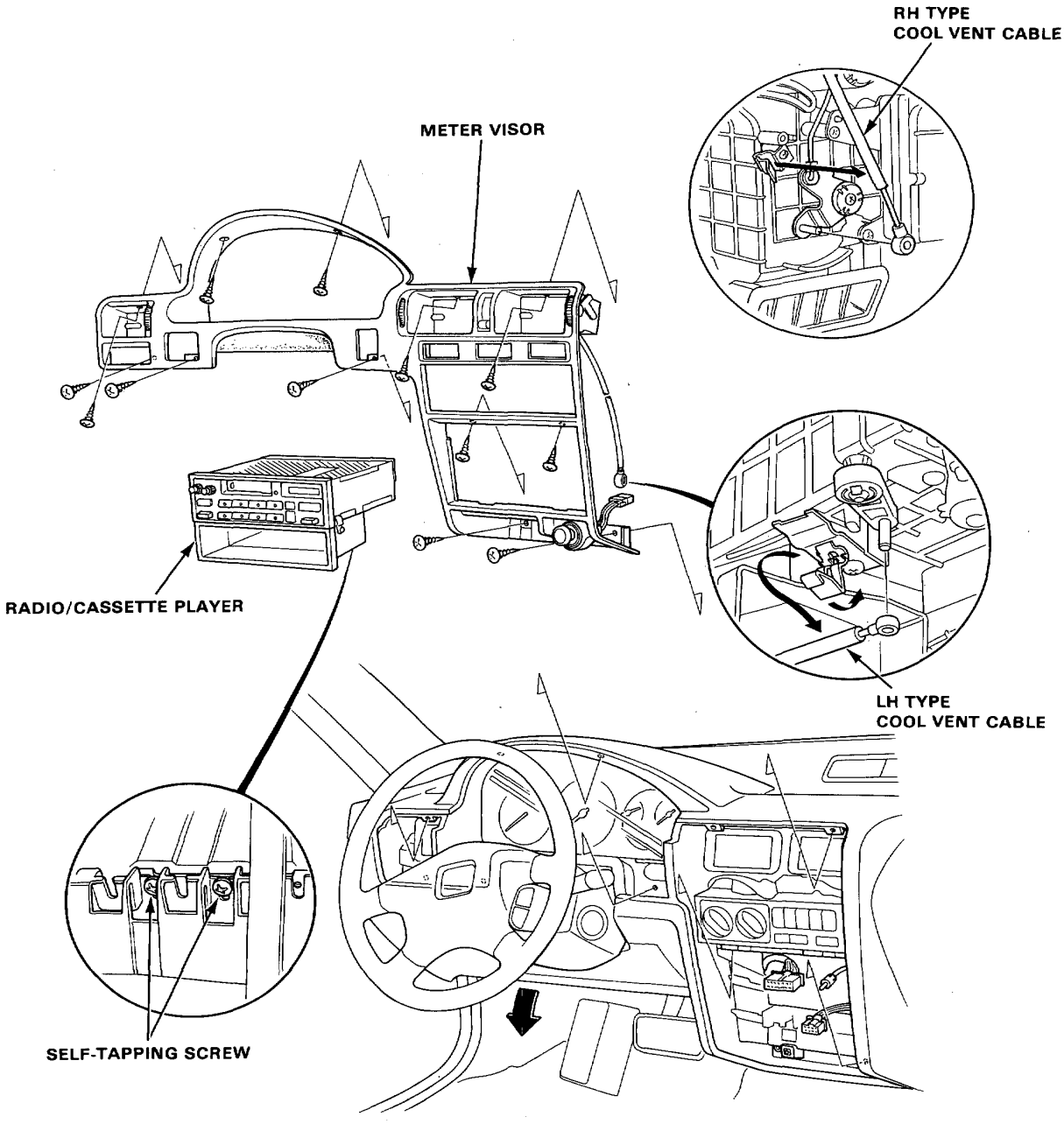


(cont'd)

Heater Control Panel

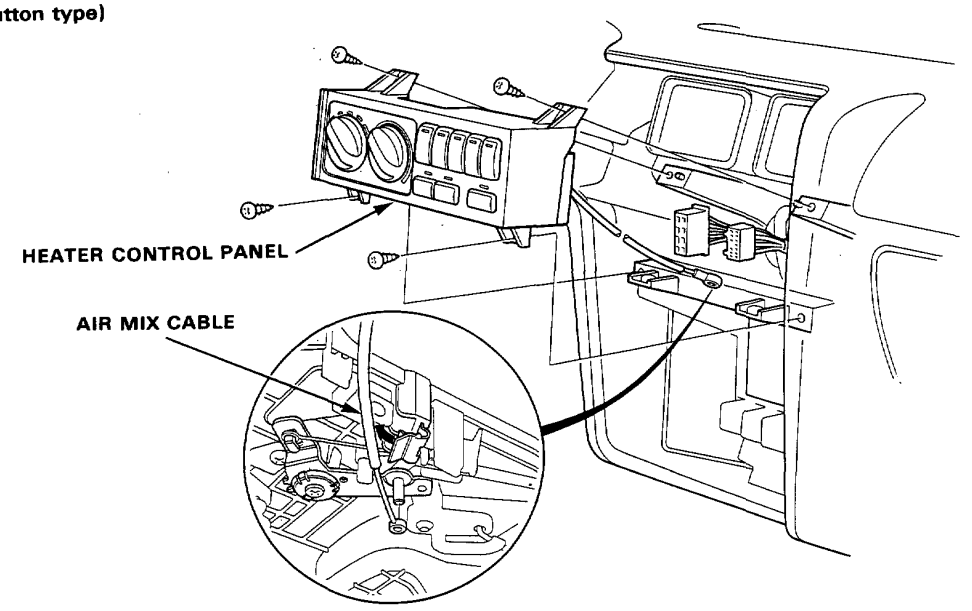
Replacement (cont'd)

3. Remove the radio/cassette player and the meter visor. If a heater control panel is button type, release the cool vent cable from heater unit side.
   NOTE: ● Loosen the self-tapping screws under the radio, and remove the radio/cassette player.
   ● Tilt the steering column down, then remove the meter visor.

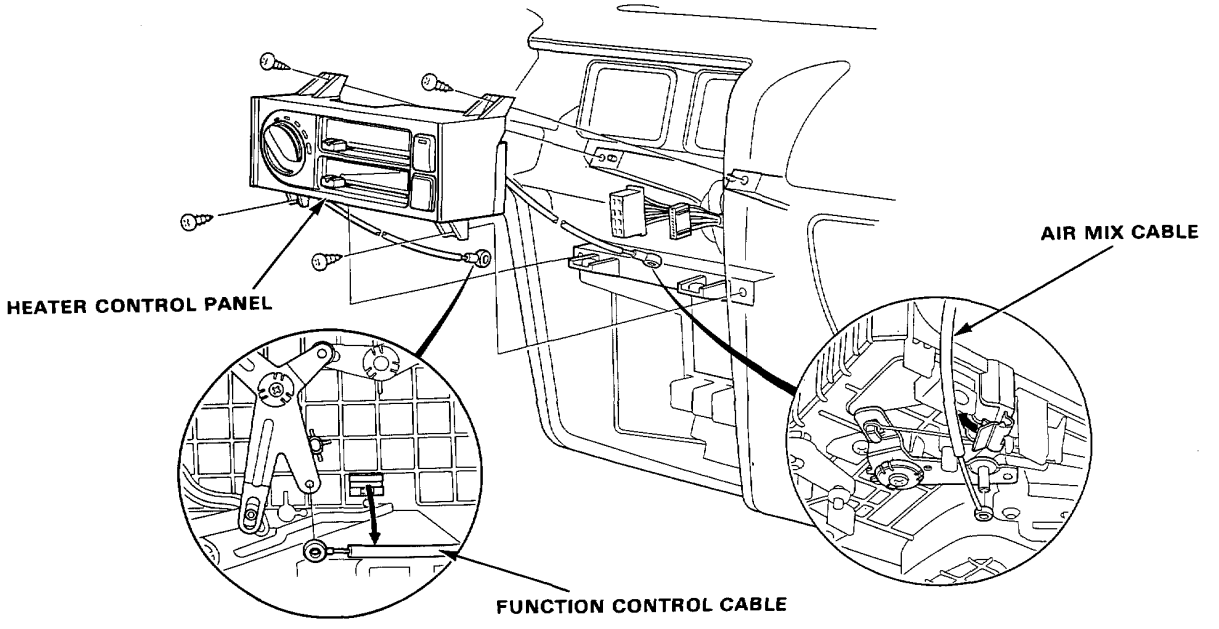


4. Disconnect the cables at the heater assembly.
5. Remove the self-tapping screws(4), pull out the heater control panel, disconnect the wire harness connectors, then remove the heater control panel.

(Button type)



(Lever type)

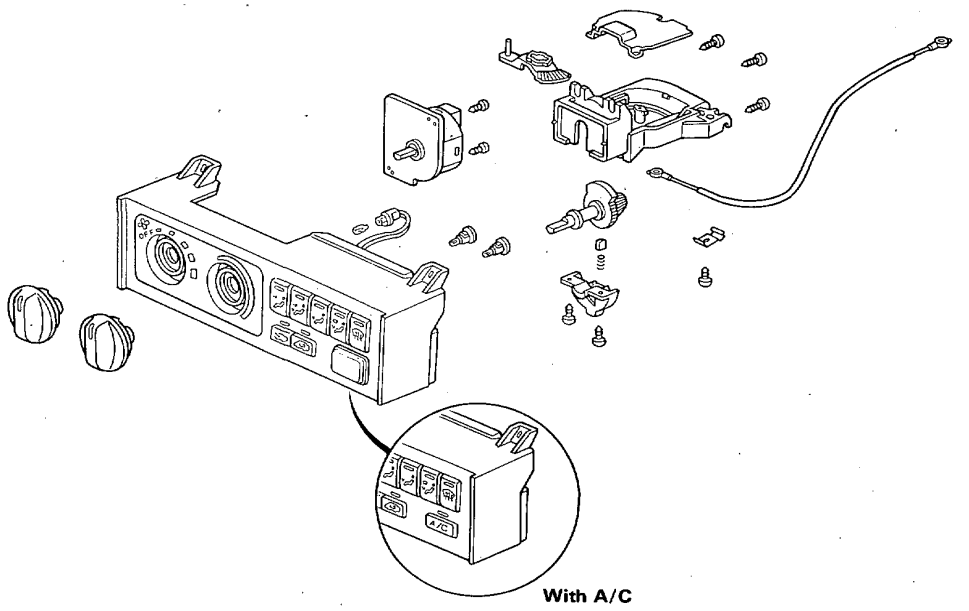


6. Install in the reverse order of removal, reconnect the cables, making sure they are properly adjusted (page 15-31, 32).

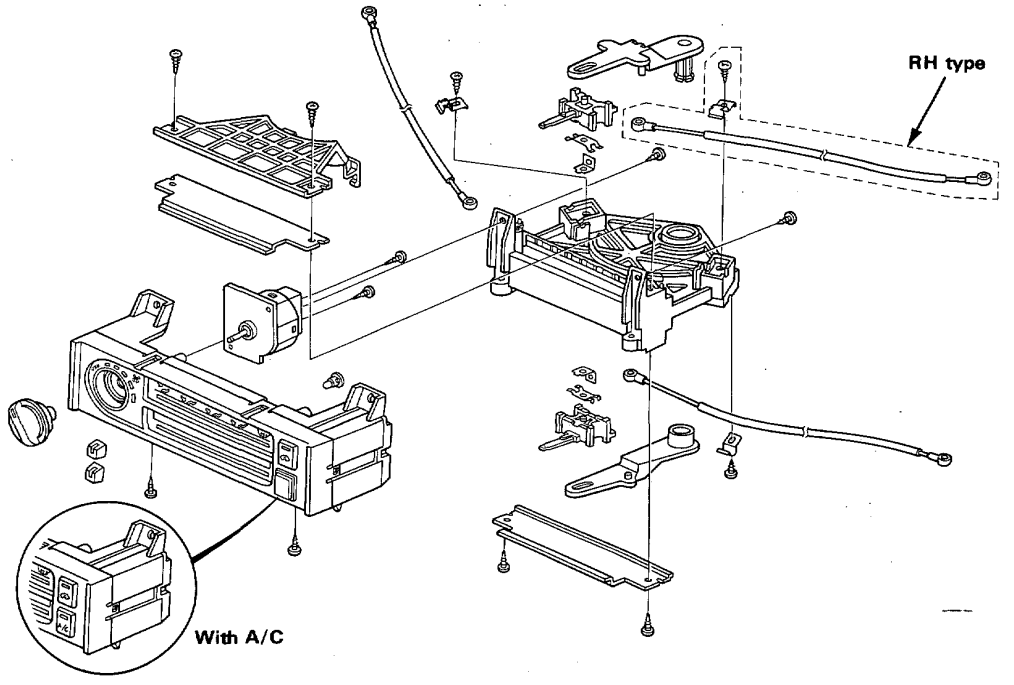
Heater Control Panel

Overhaul

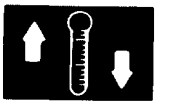
(Button type)



(Lever type)



● Cable replacement (page 15-33)

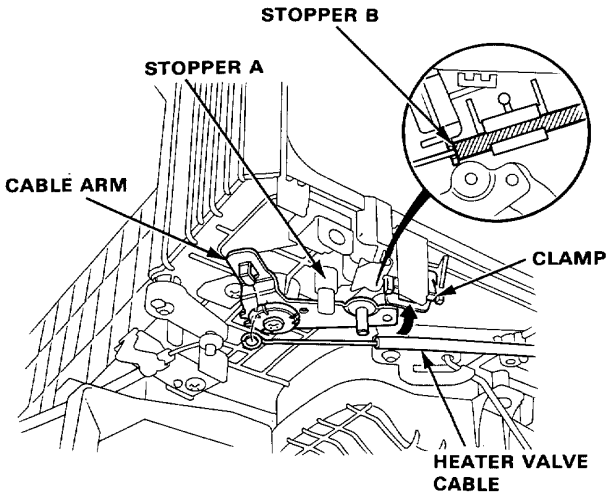


Heater Control Cables

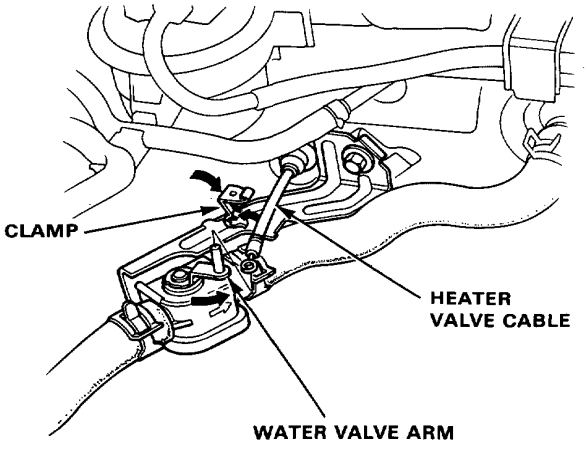
Heater Valve Cable Adjustment

(LH)

1. Remove the air mix cable.
2. Turn the cable arm to the stopper A and connect the end of the cable to the arm.
3. Gently slide the cable outer housing back from the end enough to take up any slack in the cable, but not enough to make the temperature control dial (lever) move, then snap the cable housing into the clamp.
   - Hold the end of the cable housing to the cable stopper B.



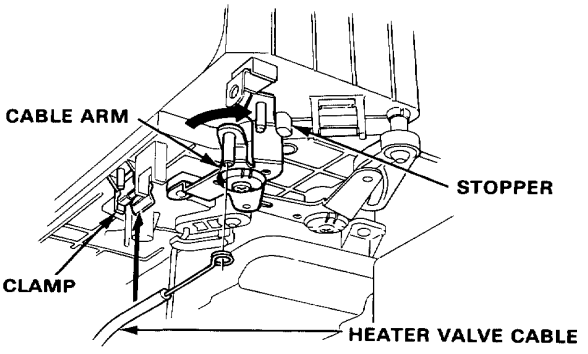
4. Turn the water valve arm to SHUT and connect the end of the cable to the arm.
5. Gently slide the cable outer housing back from the end enough to take up any slack in the cable, but not enough to make the temperature control dial (lever) move, then snap the cable housing into the clamp.



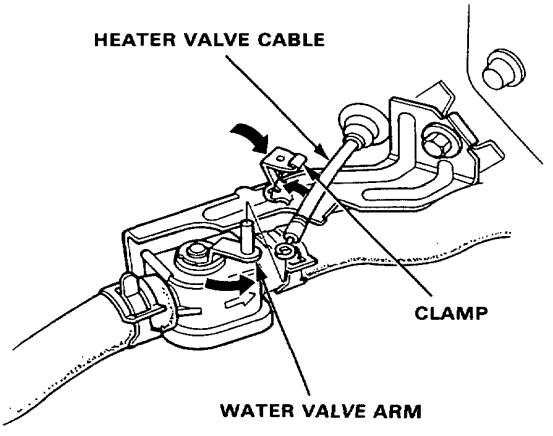
(RH)

NOTE: Before adjusting the heater valve cable, air mix cable should be adjusted.

1. Set the temperature control dial (lever) on COOL.
2. Turn the cable arm to the stopper and connect the end of the cable to the arm.
3. Gently slide the cable outer housing back from the end enough to take up any slack in the cable, but not enough to make the temperature control dial (lever) move, then snap the cable housing into the clamp.



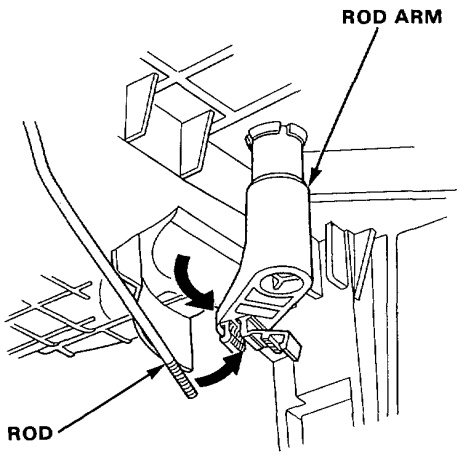
4. Turn the water valve arm to SHUT and connect the end of the cable to the arm.
5. Gently slide the cable outer housing back from the end enough to take up any slack in the cable, but not enough to make the temperature control dial (lever) move, then snap the cable housing into the clamp.



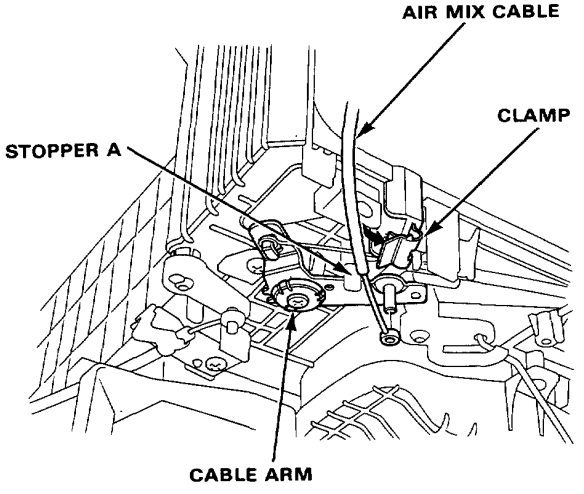
Air Mix Rod, Air Mix Cable Adjustment

(LH)

1. Set the temperature control dial (lever) on COOL.
2. Turn the rod arm to the engine compartment side, then connect the rod to clip.



3. Turn the cable arm to the stopper A and connect the end of the cable to the arm.
4. Gently slide the cable outer housing back from the end enough to take up any slack in the cable, but not enough to make the temperature control dial (lever) move, then snap the cable housing into the clamp.

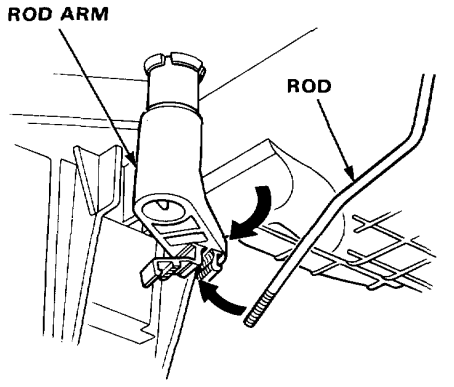


5. After adjusting of air mix rod and cable, set the temperature control dial (lever) on HOT, blow warm air from the heater unit, then set it on COOL and blow cool air from it.

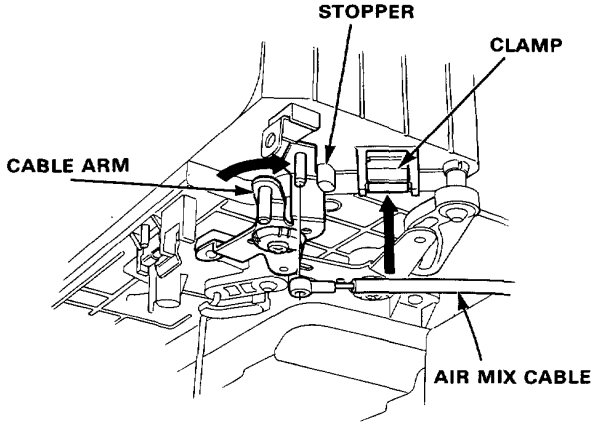
   NOTE: Air mix cable should be adjusted if the heater valve cable has been disconnected.

(RH)

1. Set the temperature control dial (lever) on COOL.
2. Remove the heater control cable.
3. Turn the rod arm to the engine compartment side, then connect the rod to clip.



4. Turn the cable arm to the stopper and connect the end of the cable to the arm.
5. Gently slide the cable outer housing back from the end enough to take up any slack in the cable, but not enough to make the temperature control dial (lever) move, then snap the cable housing into the clamp.



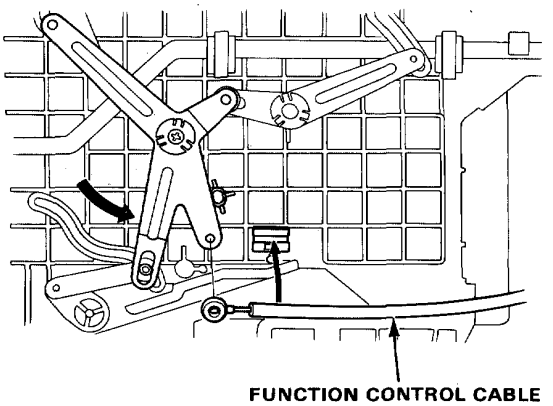
6. Install the heater control cable and adjust it.

Heater Control Cables

Function Control Cable Adjustment

(Lever type only)

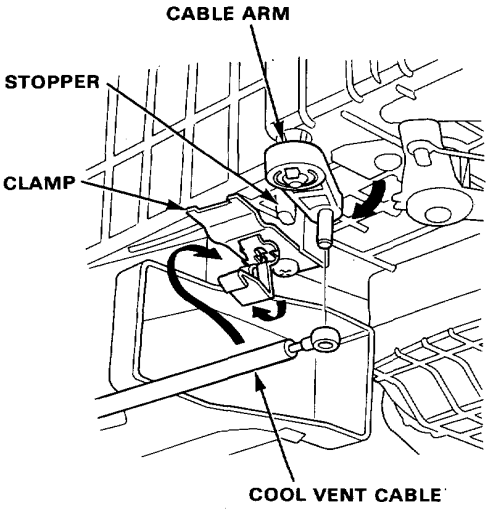
1. Slide the function control lever to .
2. Turn the function control arm to the front and connect the end of the cable to the arm.
3. Gently slide the cable housing back from the end enough to take up any slack in the cable, but not enough to make the temperature control lever move, then hold the cable housing and snap it in the clamp.



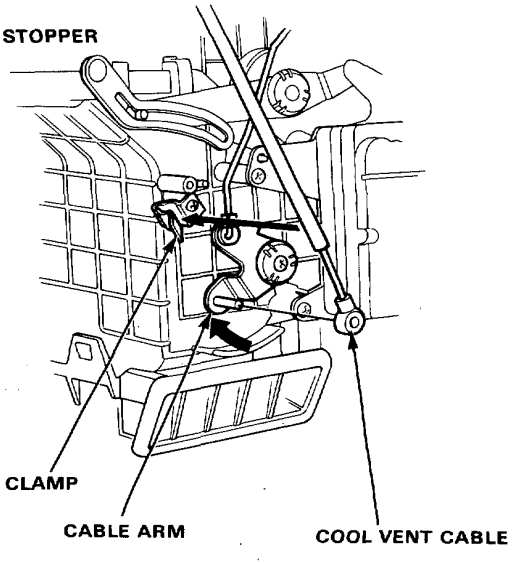
Cool Vent Adjustment

1. Set the cool vent lever on SHUT.
2. Turn the cable arm to the stopper and connect the end of the cable to the arm.
3. Gently slide the cable outer housing back from the end enough to take up any slack in the cable, but not enough to make the temperature control lever move, then snap the cable housing into the clamp.

(LH)



(RH)

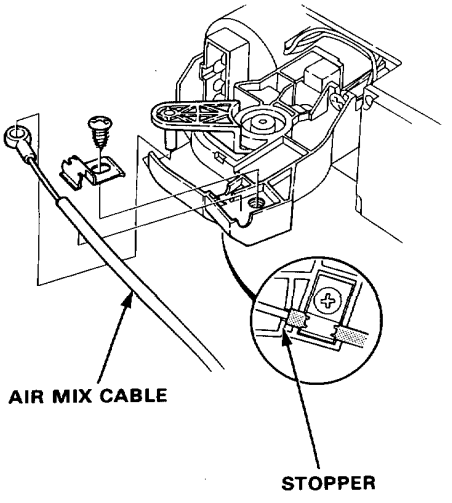


Cable Replacement

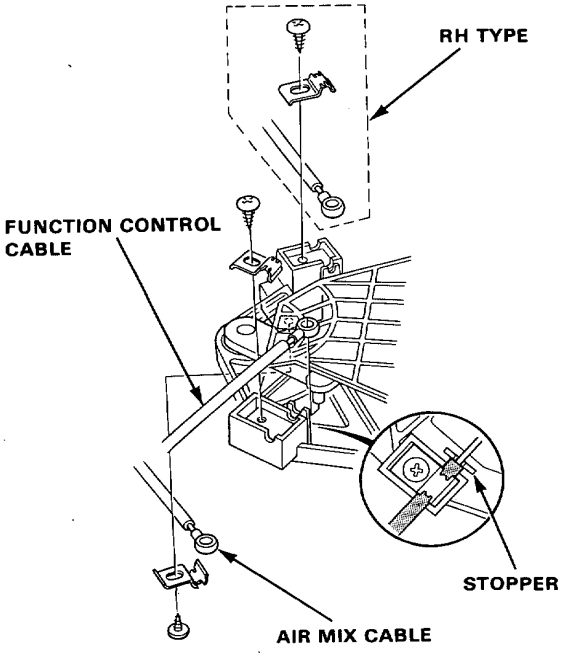
1. Remove the self-tapping screw.
2. Remove the cable.
3. Install the new cable.
   NOTE:
   - Hold the end of the cable to the stopper.
   - After installing and adjusting the cable, make sure that the dial or lever move smoothly without binding.

(AIR MIX CABLE, FUNCTION CONTROL CABLE)

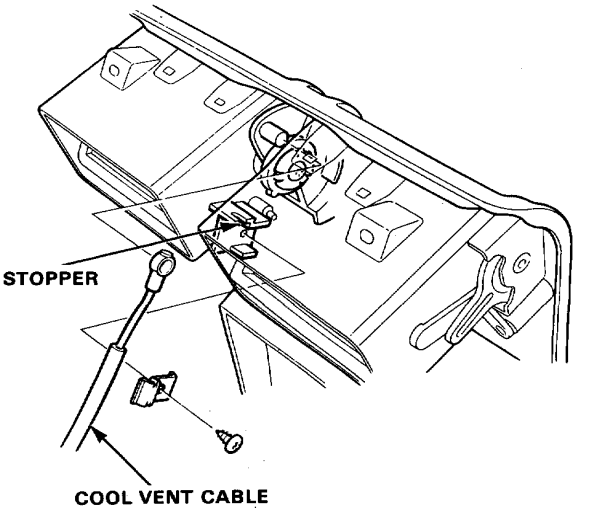
(Button type)



(Lever type)



(COOL VENT CABLE)



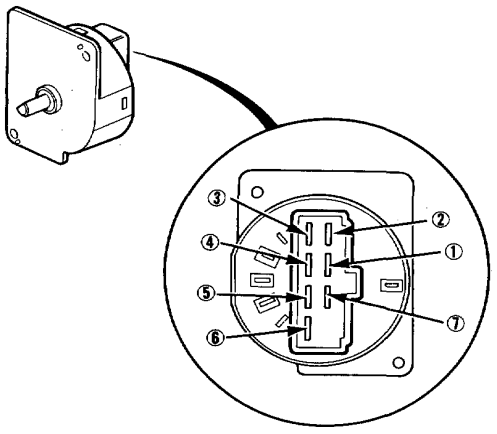
Test

Fan Switch

1. Disconnect the 8-P connector from the fan switch.
2. Check for continuity between the terminals of the fan switch according to the table below.

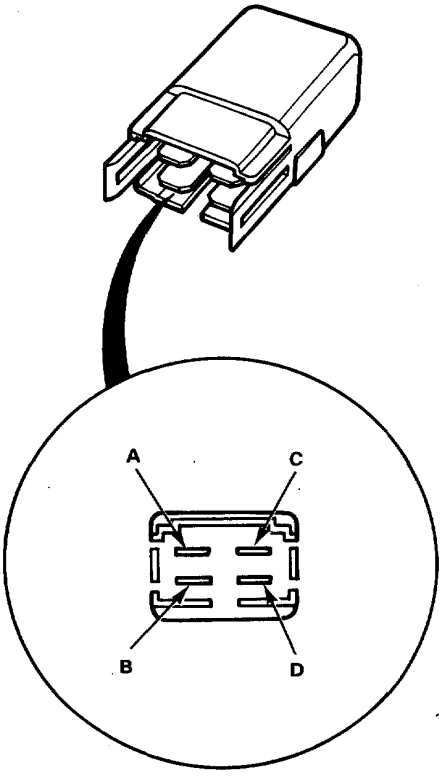
SWITCH CONNECTION

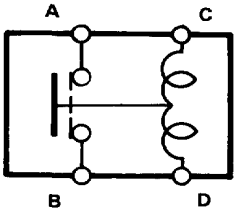
Terminal / Position	①	②	③	④	⑤	⑥	⑦
OFF							
A	○	○	○				
B	○	○		○			
C	○	○			○		
D	○	○				○	
E	○	○					○



Relay

1. Remove the relay from the dash fuse box.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.



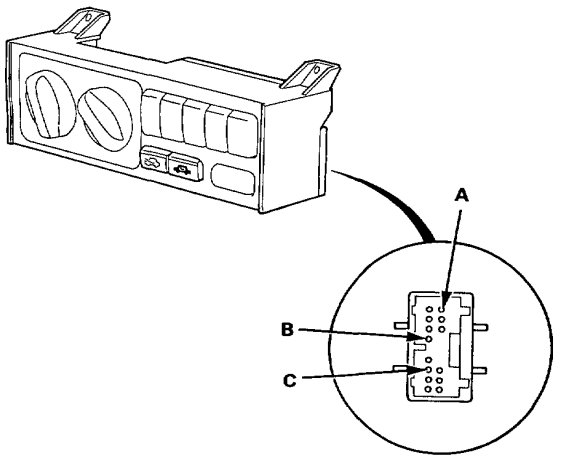


Recirculation Control Switch

1. Disconnect the (button type: 14-P, lever type: 10-P) connector from the heater control switch.
2. Check for continuity between the terminals of the heater control switch according to the table below.

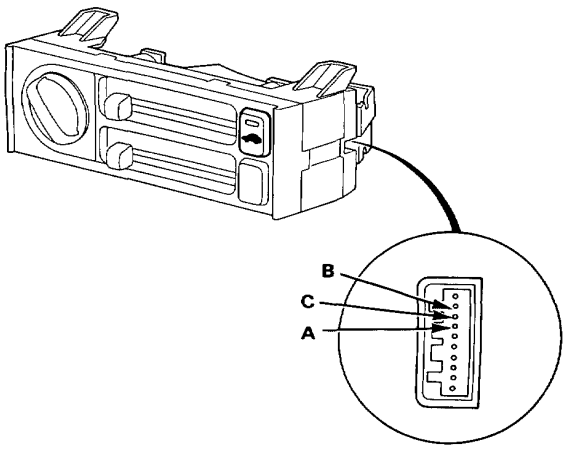
(Button type)

Position \ Terminal	C	B	A
		○	○
	○		○



(Lever type)

Position \ Terminal	C	B	A
(OFF)		○	○
(ON)	○		○

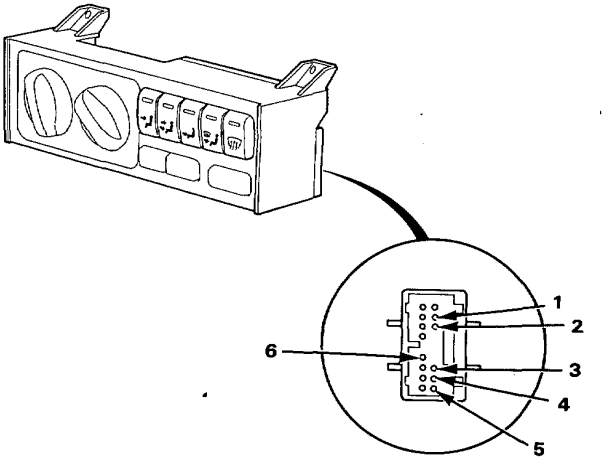


Function Control Switch

(Button type only)

1. Disconnect the 14-P connector from the heater control switch.
2. Check for continuity between the terminals of the heater control switch according to the table below.

Position \ Terminal	5	4	3	2	1	6
					○	○
				○		○
			○			○
		○				○
	○					○



Test

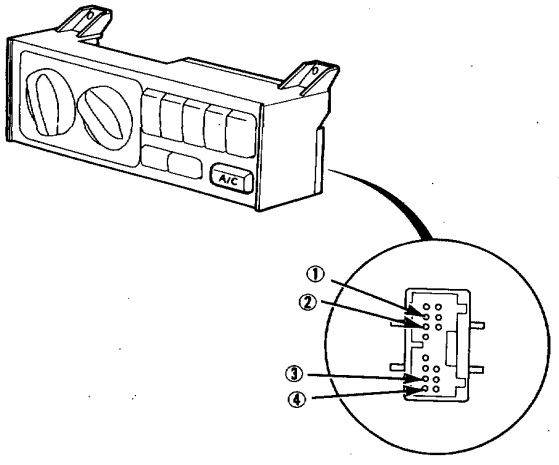
A/C Switch

(Type for with A/C only)

1. Disconnect the (button type: 14-P, lever type: 10-P) connector from the heater control switch.
2. Check for continuity between the terminals of the heater control switch according to the table below.

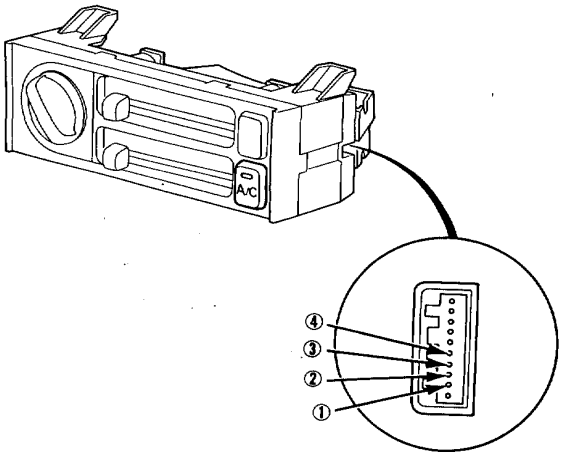
(Button type)

Terminal / Position	①	②	③	④
OFF			○—○	
ON	○—○		○—○	



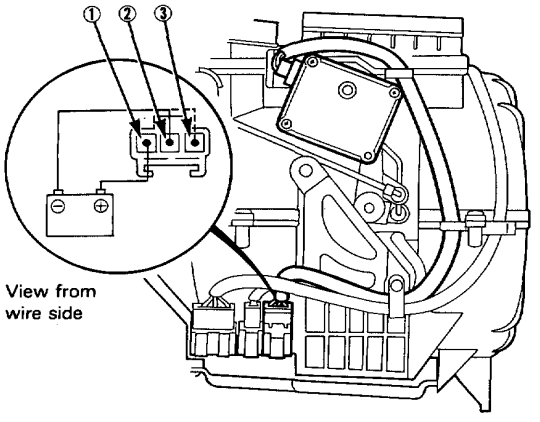
(Lever type)

Terminal / Position	①	②	③	④
OFF	○—○			
ON	○—○		○—○	



Recirculation Control Motor

1. Connect the battery positive to the ① terminal of the recirculation control motor connector and negative to ② and ③ terminals; the recirc. motor move smoothly.
2. Disconnect the battery negative from 2 or 3; the recirc. motor should stop at FRESH or REC.
   CAUTION: Never connect the battery in the opposite direction.
   NOTE:
   - Don't cycle the recirc. motor for a long time.
   - After adjusting the recirc. control rod, check the recirc. motor on FRESH or REC for two minutes to make sure it operates properly.



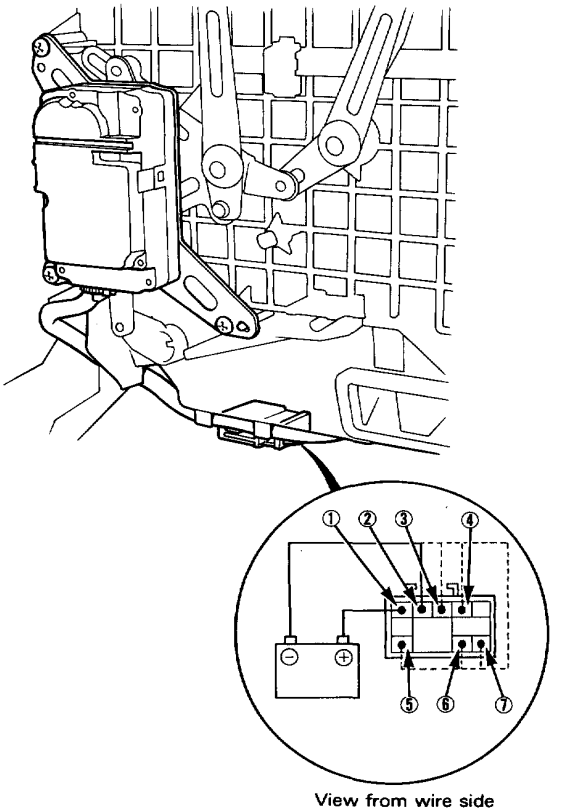
View from wire side

Function Control Motor

(Button type only)

1. Connect the battery positive terminal to the ① terminal of the function control motor and negative to the ② terminal.
2. Using jumper wire short the ② terminal individually to the ③, ④, ⑤, ⑥ and ⑦ terminals to follow the order.
   - The motor should run each time the short circuit is made.

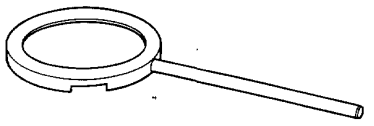
   NOTE: If the function control motor does not run when you short the first terminal, short that terminal again after shorting the other terminals.



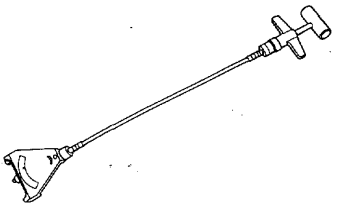
View from wire side

Special Tools

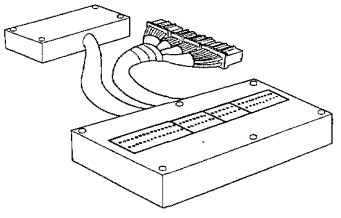
Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07LAB—SK70100	A/C Clutch Holder	1	15-76
②		ND Tension Gauge	1	15-64, 65
③	07LAJ—PT30100	ECU Test Harness	1	15-58



①

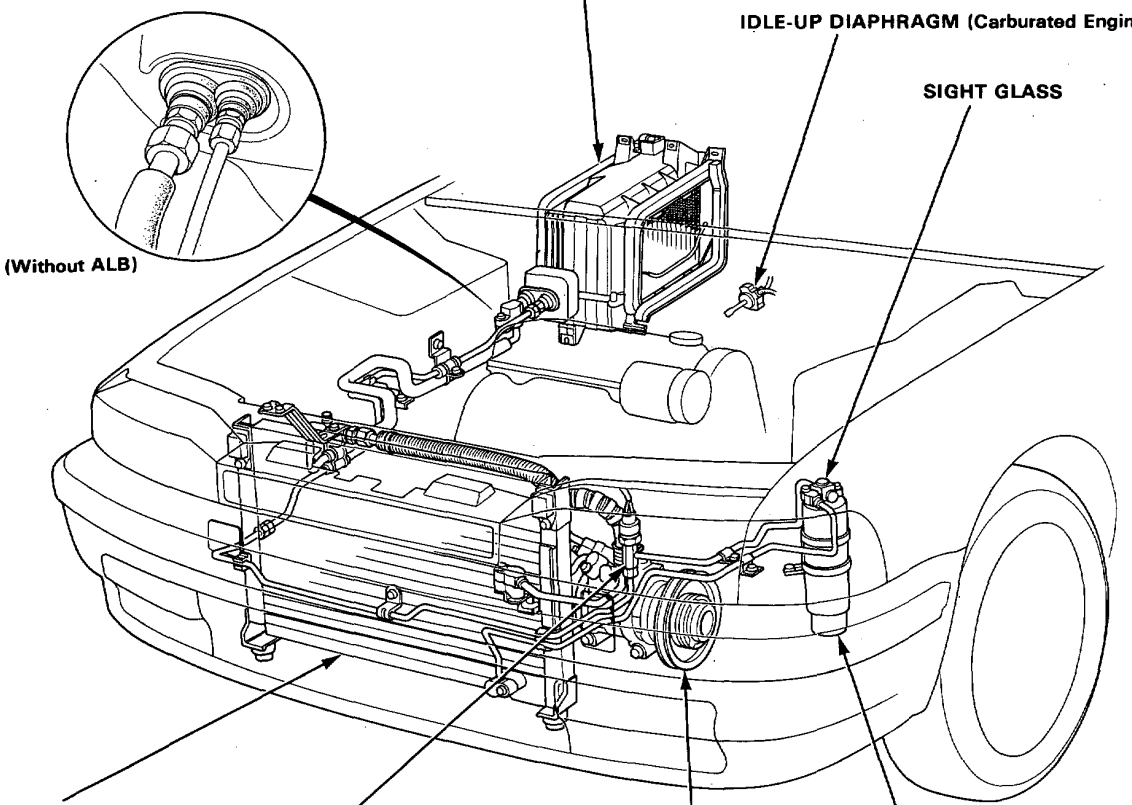


②



③

Illustrated Index



EVAPORATOR
As refrigerant circulates, heat is absorbed from the surrounding passenger compartment air.
Replacement, page 15-67
Overhaul, page 15-68

IDLE-UP DIAPHRAGM (Carburated Engine only)

SIGHT GLASS

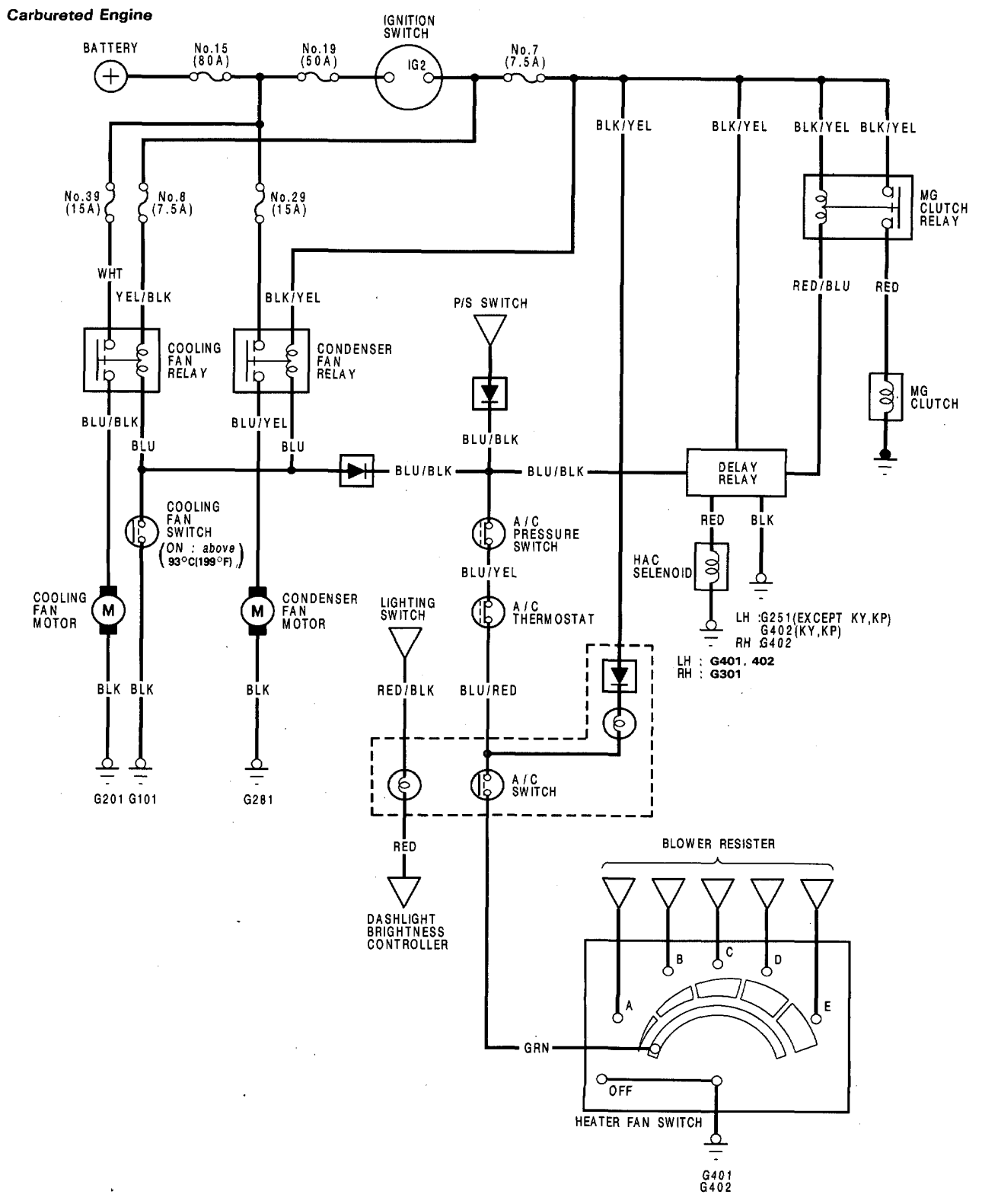
CONDENSER
Dissipates the heat which was absorbed by the refrigerant.
Replacement, page 15-69

DUAL PRESSURE SWITCH
When the refrigerant pressure is below 265 kPa (38 psi) due to refrigerant leakage or above 1667 kPa (242psi) due to coolant blockage the dual pressure switch opens the circuit to the A/C control unit and stops the air conditioner to protect the compressor.

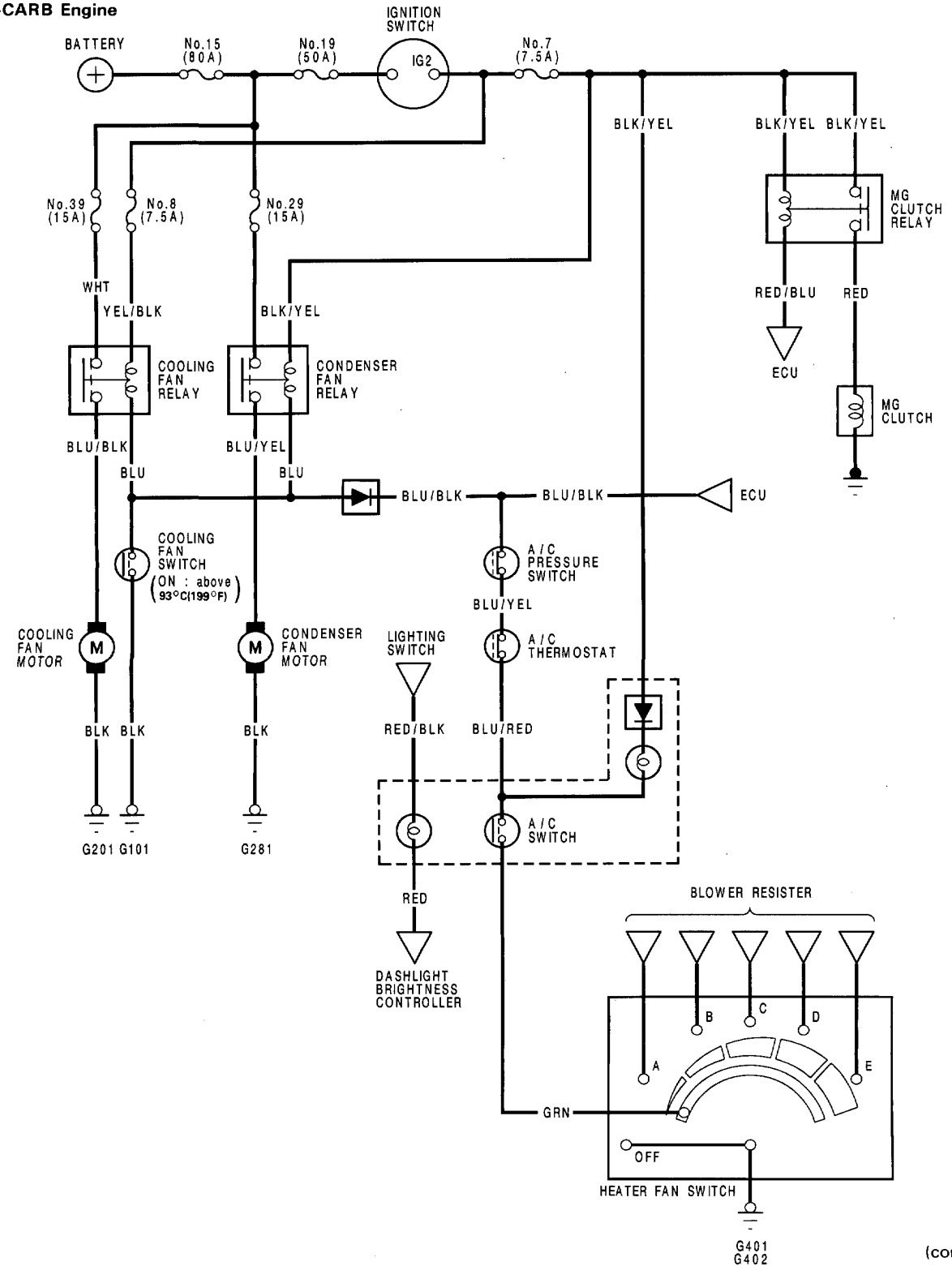
COMPRESSOR (NIPPONDENSO)
Compresses the refrigerant and then forces it through the condenser.

RECEIVER AND FILTER/DRYER
Serves as a reservoir which filters and removes moisture from the refrigerant.

Circuit Diagram

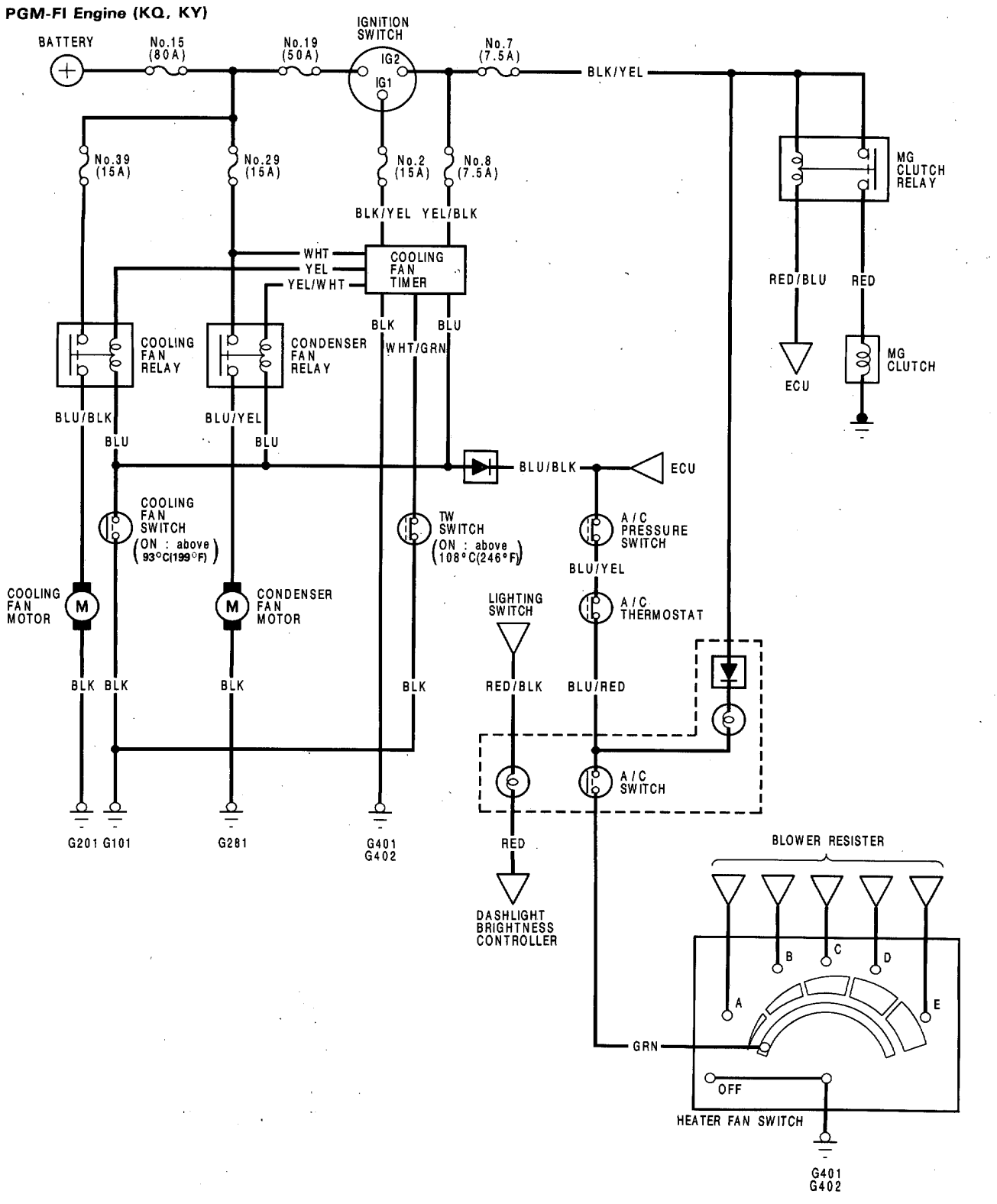


PGM-CARB Engine

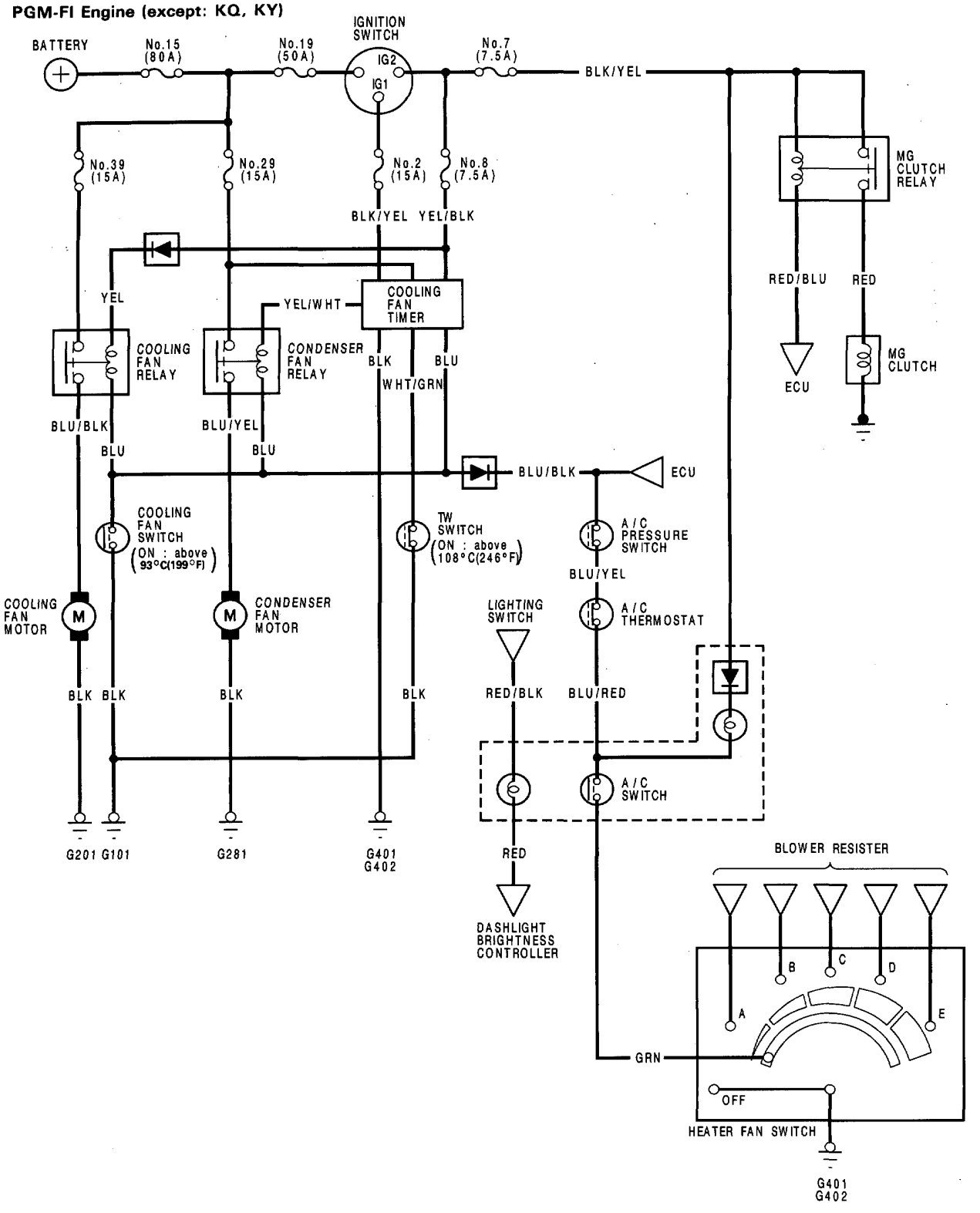


(cont'd)

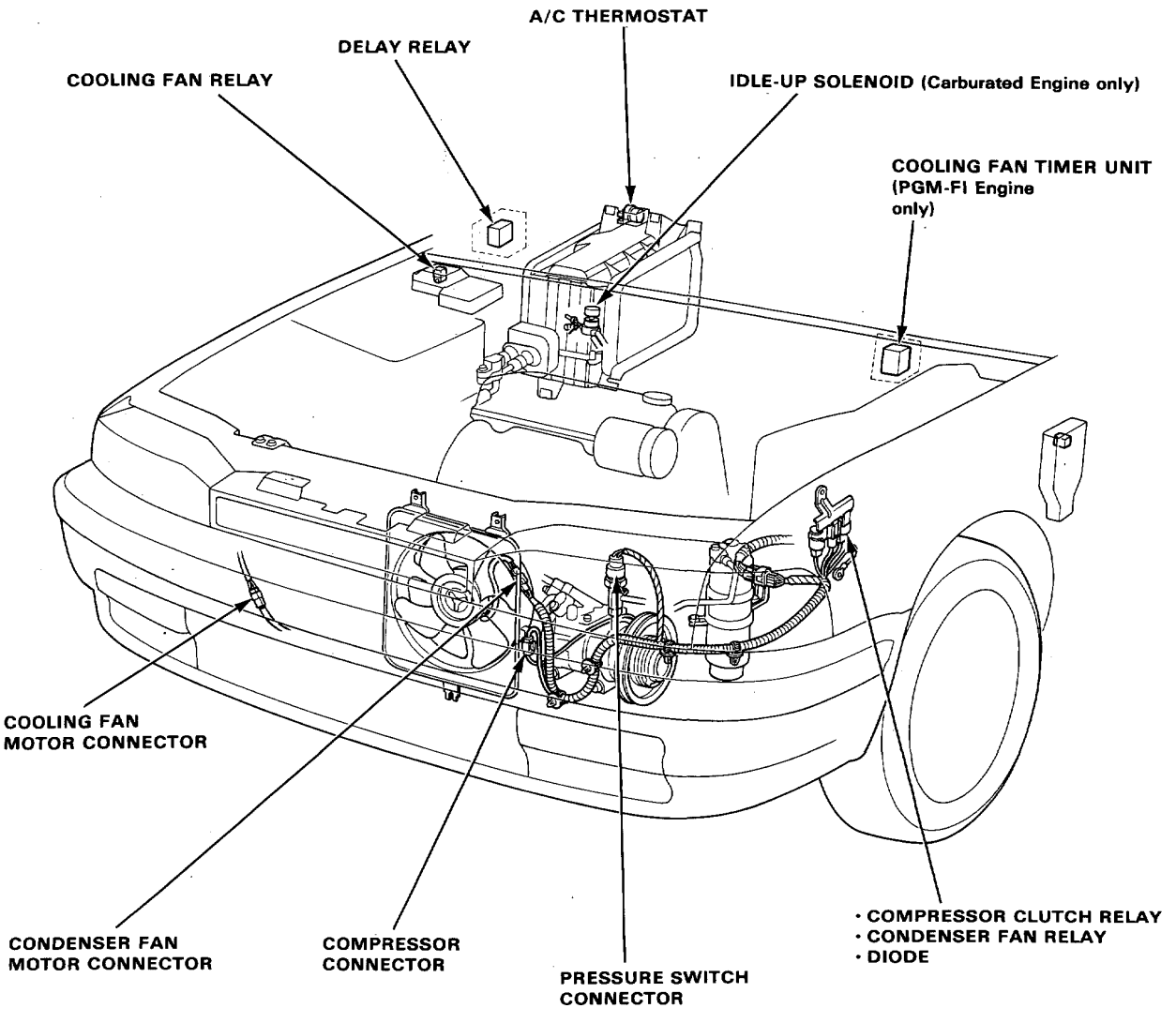
Circuit Diagram (cont'd)



PGM-FI Engine (except: KQ, KY)



Wire Harness Routing



Symptom Chart

NOTE:
- Any abnormality must be corrected before continuing the test.
- Because of the precise measurements needed, use a voltmeter and ammeter when testing.

SYMPTOM	REMEDY
Cooling fan does not operate at all.	See flowchart (page 15-48)
Water temperature is too high when A/C system is not in use.	Check following: Faulty radiator fan switch Open BLK wire from the radiator fan switch to body ground or poor ground (G101)
Condenser fan does not operate at all.	See flowchart (page 15-51)
Both fans do not operate at all.	Check following: Faulty diode Open BLU/BLK wire from the diode to pressure switch
A/C system does not come on. Compressor and both cooling fans do not come on.	See flowchart (page 15-53)
Compressor does not come on. Both fans operate normally.	See flowchart (page 15-57)

COOLING FAN TIMER UNIT INPUTS TEST →15-61
PRESSURE TEST →15-85

Troubleshooting Flowchart — Cooling Fan

NOTE: Check for blown No.2 (15 A), No.39 (15 A), No.8 (7.5 A) fuse

Cooling fan does not operate at all.

↓

Disconnect the cooling fan relay from the relay box.

↓

Connect a fused jumper from ② terminal to ④ terminal.

↓

Does cooling fan operate ? — YES → To page 15-49

↓ NO

Connect voltmeter between ② terminal (+) and body ground (−).

↓

Is battery voltage present ? — NO → **Repair open WHT wire between No.39 (15 A) fuse and cooling fan relay.**

↓ YES

Disconnect the cooling fan motor connector.

↓

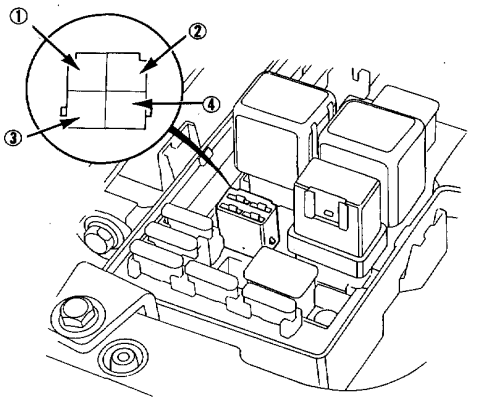
Connect the voltmeter between BLU/BLK wire (+) BLK wire (−).

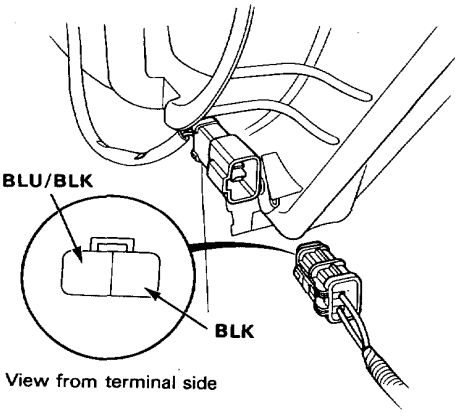
↓

Is battery voltage present ? — NO → **Replace the cooling fan motor.**

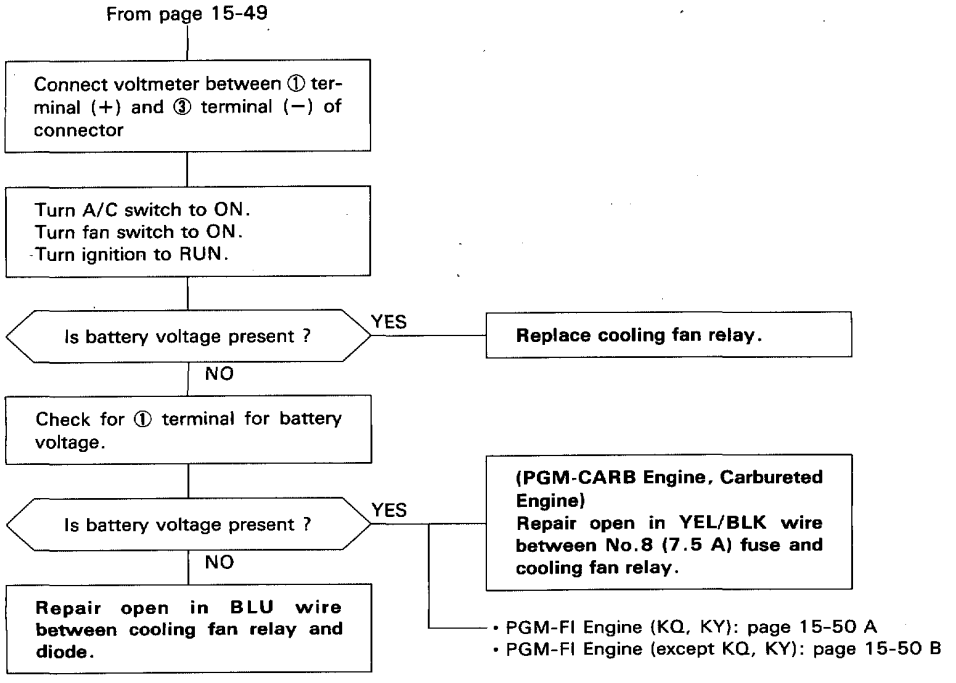
↓ YES

Repair open BLK wire between cooling fan motor and body ground or poor ground (G201).



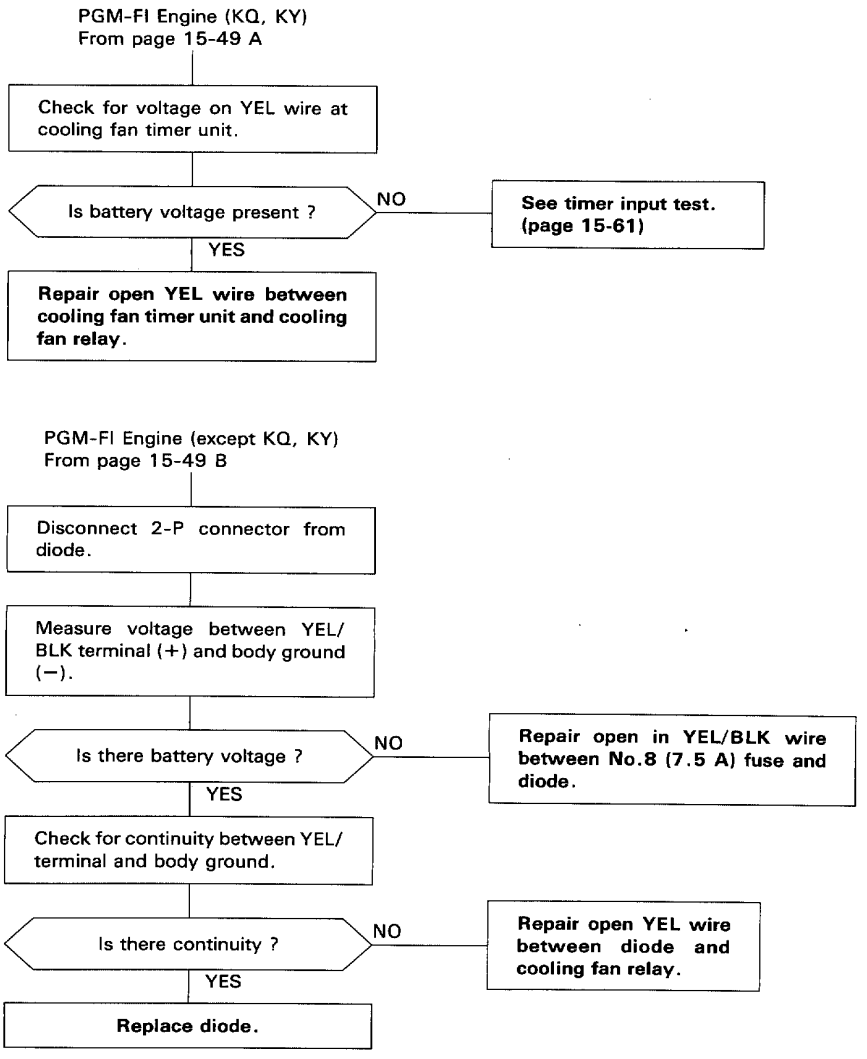


View from terminal side


From page 15-49
Connect voltmeter between ① terminal (+) and ③ terminal (−) of connector
Turn A/C switch to ON.
Turn fan switch to ON.
Turn ignition to RUN.
Is battery voltage present ?
YES
Replace cooling fan relay.
NO
Check for ① terminal for battery voltage.
Is battery voltage present ?
YES
(PGM-CARB Engine, Carbureted Engine)
Repair open in YEL/BLK wire between No.8 (7.5 A) fuse and cooling fan relay.
NO
Repair open in BLU wire between cooling fan relay and diode.
• PGM-FI Engine (KQ, KY): page 15-50 A
• PGM-FI Engine (except KQ, KY): page 15-50 B

(cont'd)

Troubleshooting Flowchart — Cooling Fan (cont'd)



Troubleshooting Flowchart — Condenser Fan

NOTE: Check for blown No.2 (15 A), No.29 (15 A), No.7 (7.5 A), No.8 (7.5 A) fuse

Condenser fan does not operate at all.

Disconnect the condenser fan relay connector.

Connect a fused jumper from WHT wire to BLU/GRN wire.

Does condenser fan operate ? NO → To page 15-52 A

YES

Connect voltmeter between wire (PGM-FI Engine: YEL/WHT, PGM-CARB Engine, Carbureted Engine: BLK/YEL) (+) and BLU wire (−).

Turn A/C switch to ON.
Turn fan switch to ON.
Turn ignition to RUN.

Is battery to voltage present ? YES → **Replace condenser fan Relay.**

NO

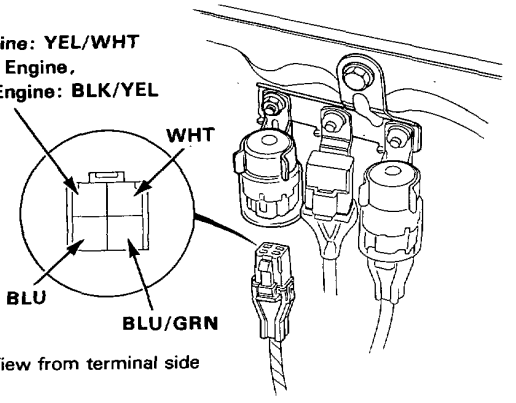
Connect voltmeter between PGM-FI Engine: YEL/WHT, PGM-CARB, Carbureted Engine: BLK/YEL wire (+) and body ground (−).

Is battery voltage present ? NO → **(PGM-CARB Engine, Carbureted Engine) Repair BLK/YEL wire**

YES

Check BLU wire, or A/C diode for an open.

• PGM-FI Engine: page 15-52 B



View from terminal side

(cont'd)

Troubleshooting Flowchart — A/C System

A/C System does not come on.

Turn ignition OFF.

Disconnect the 2-P connector from the pressure switch.

Turn the heater fan, A/C switch ON and start the engine.

Connect a jumper wire between the BLU/BLK terminal and body ground.

Do both fans and the compressor run ?

NO → **Repair open in BLU/BLK wire between pressure switch and diodes.**

YES

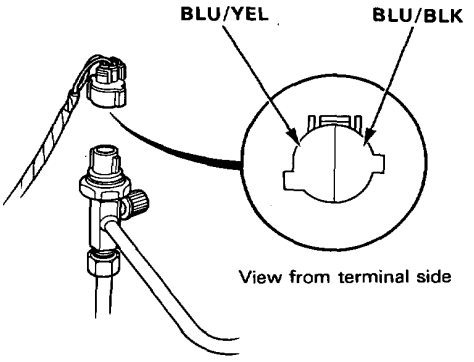
Connect a jumper wire between the BLU/BLK and BLU/YEL terminals.

Do both fans and the compressor run ?

YES → **Check refrigerant pressure. If pressure good, replace A/C pressure switch.**

NO

NOTE: A/C compressor clutch will not come on without the engine running.



View from terminal side

To page 15-54

(cont'd)

Troubleshooting Flowchart — A/C System (cont'd)

(From page 15-53)

Reconnect the 2-P connector to the pressure switch.

Disconnect the 2-P connector from the thermostat switch.

Connect a jumper wire between the BLU/YEL terminal and body ground.

Do both fans and the compressor run ?

NO → **Repair open in BLU/YEL wire between pressure and thermostat switches.**

YES

Connect a jumper wire between the BLU/YEL and BLU/RED terminals.

Do both fans and the compressor run ?

YES → **Check evaporator temperature. If temperature is above 41 °F, replace A/C thermostat.**

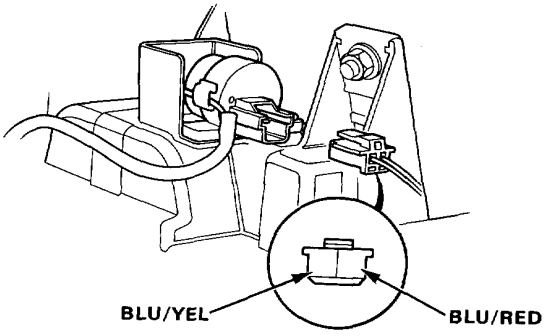
NO

Turn the ignition switch OFF.

Reconnect the 2-P connector to the thermostat switch.

Disconnect the connector (Button type: 14-P, lever type: 10-P) from the heater control panel.

(To page 15-55)



View from wire side

(From page 15-54)

Connect a jumper wire between the BLU/RED terminal and body ground.

Start the engine.

Do both fans and the compressor run ?

NO → **Repair open in BLU/RED wire between the thermostat and A/C switch.**

YES

Connect a jumper wire between the BLU/RED and GRN terminals.

Do both fans and the compressor run ?

YES → **Inspect the A/C switch. (page 15-36)**

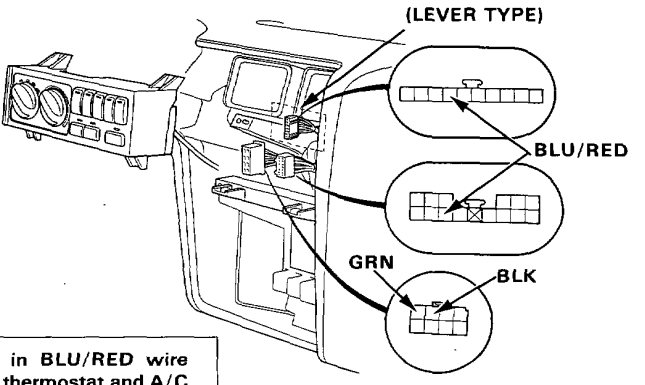
NO

Reconnect the connector (button type: 14-P, lever type 10-P) to the heater control panel and turn A/C switch ON.

Disconnect the 8-P connector from the fan switch.

Connect a jumper wire between the GRN terminal and body ground.

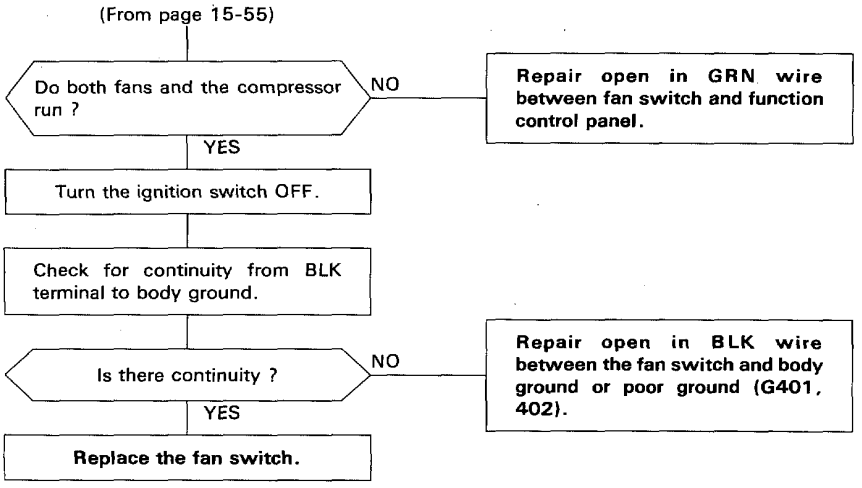
(To page 15-56)



View from wire side

(cont'd)

Troubleshooting Flowchart — A/C System (cont'd)



Troubleshooting Flowchart — Compressor

NOTE: Check for blown No.7 (7.5 A) fuse

Compressor does not come on.

Disconnect the 4-P connector from the compressor clutch relay.

Measure voltage between the BLK/YEL 1 terminal (+) and body ground.

Turn the ignition switch on.

Is there battery voltage ?

NO — **Repair open in BLK/YEL wire between the No.7 (7.5 A) and compressor clutch relay.**

YES

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

Is there battery voltage ?

NO — **Repair open in BLK/YEL wire between the No.7 (7.5 A) and compressor clutch relay.**

YES

Connect the jumper wire between the BLK/YEL 1 terminal and RED terminal.

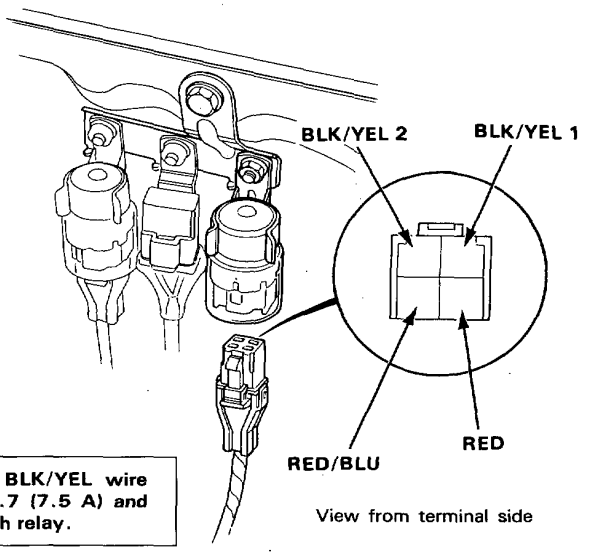
Does the compressor clutch engage ?

NO — Turn the ignition OFF and Reconnect the 4-P connector to the compressor clutch relay.

YES

PGM-FI, PGM-CARB Engine: To page 15-58
Carbureted Engine: To page 15-59

(To page 15-60)



View from terminal side

(cont'd)

Troubleshooting Flowchart — Compressor (cont'd)

<PGM-FI, PGM-CARB Engine>

(From page 15-57)

Turn the ignition switch OFF and reconnect 4-P connector to the compressor clutch relay.

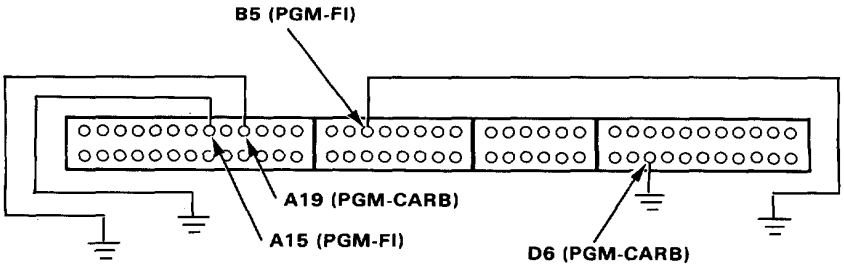
Turn the ignition switch ON, and connect a jumper wire between RED/BLU terminal and body ground.

Does the compressor clutch engage ?

NO → **Replace the compressor clutch relay.**

YES

Turn the ignition switch OFF and disconnect PGM-FI, PGM-CARB ECU connector and connect the PGM-FI ECU test harness.



Turn the ignition switch ON and connect a jumper wire between A15 (PGM-FI) or A19 (PGM-CARB) terminal and body ground.

Does the compressor clutch engage ?

NO → **Repair open in RED/BLU wire between the compressor clutch relay and ECU.**

YES

Disconnect a jumper wire and connect a jumper wire between B5 (PGM-FI) or D6 (PGM-CARB) terminal and body ground.

Does the compressor clutch engage ?

NO → **Repair open in BLU/BLK wire between A/C pressure switch and ECU.**

YES

Substitute a Known- good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

<Carbureted Engine>

(From page 15-57)

Turn the ignition switch OFF and reconnect 4-P connector to the compressor clutch relay.

Turn the ignition switch ON, and connect a jumper wire between RED/BLU terminal and body ground.

Does the compressor clutch engage ?

NO → **Replace the compressor clutch relay.**

YES

Disconnect 6-P connector from the delay control unit.

Connect a jumper wire between RED/BLU terminal and body ground.

Does the compressor clutch engage ?

NO → **Repair open in RED/BLU wire between compressor relay and delay control unit.**

YES

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

Is there battery voltage ?

NO → **Repair open in BLK/YEL wire between the No.7 (7.5 A) fuse and delay control unit.**

YES

Check the continuity between BLK terminal and body ground.

Is there continuity ?

NO → **Repair open in BLK wire between delay control unit and body ground or poor ground.**

YES

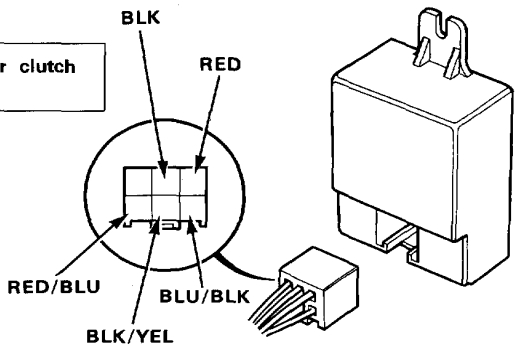
Check the continuity BLU/BLK terminal between delay control unit and body ground. Then A/C, heater fan switches ON.

Is there continuity ?

NO → **Repair open in BLU/BLK wire between delay control unit and body ground.**

YES

Faulty delay control unit.



View from wire side

(cont'd)

Troubleshooting Flowchart — Compressor (cont'd)

(From page 15-57)

Disconnect the RED terminal from compressor and turn the ignition switch on.

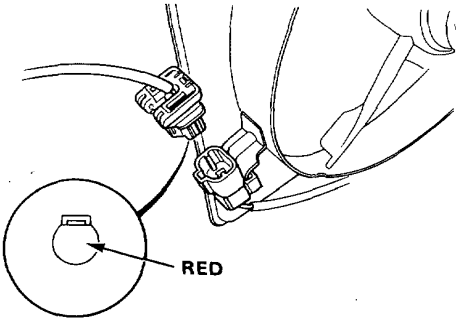
Measure voltage between the RED terminal (+) and body ground.

Is there battery voltage ?

NO → **Repair open in RED wire between the compressor clutch relay and compressor clutch connector.**

YES

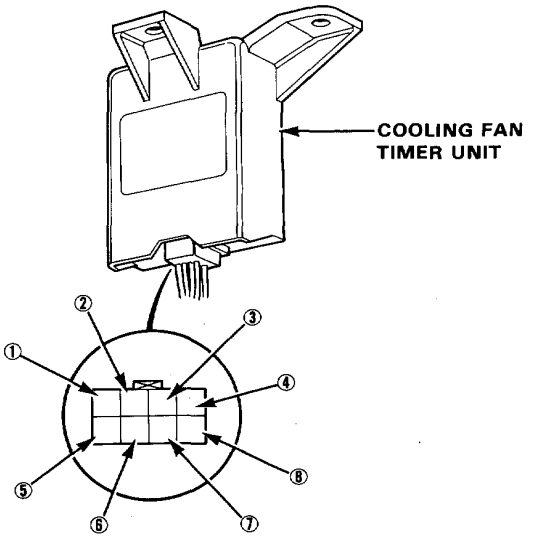
Replace the compressor clutch.



View from terminal side

Cooling Fan Timer Unit Input Tests

NOTE:
Perform the following tests with the cooling fan timer *connected and the ignition switch ON.*
Correct any abnormality before continuing.



WIRE POSITION	TEST CONDITION	DESIRED RESULTS	CORRECTIVE ACTION IF DESIRED RESULTS ARE NOT OBTAINED
④BLK	Check for continuity to body ground.	Should have continuity.	Repair open to body ground.
⑥WHT	Check for battery voltage	Should have battery voltage.	Check No.29 fuse, if OK repair open in WHT wire.
⑦BLK/YEL	Check for battery voltage (Ignition switch-ON)		Check No.2 fuse, if OK repair open in BLK/YEL wire.
②YEL/BLK	Check for battery voltage (Ignition switch-ON)		Check No.8 fuse, if OK repair open in YEL/BLK wire.
①YEL/WHT	Check for battery voltage.		Replace cooling fan timer unit.
③YEL	Check for battery voltage.		Replace cooling fan timer unit.
⑧BLU	Connect to body ground.	Condenser fan and cooling fan should come on.	Check for open in BLU between cooling fan timer and condenser fan relay or cooling fan relay. If OK, check for open YEL/WHT between cooling fan timer and condenser fan relay or YEL between cooling fan timer and cooling fan relay. If OK, test condenser fan relay or cooling fan relay.
⑤WHT/GRN	Check for voltage.	Approx 11V (water-temperature below 108 °C)	Faulty water temp switch, short to body ground or faulty cooling fan timer unit.

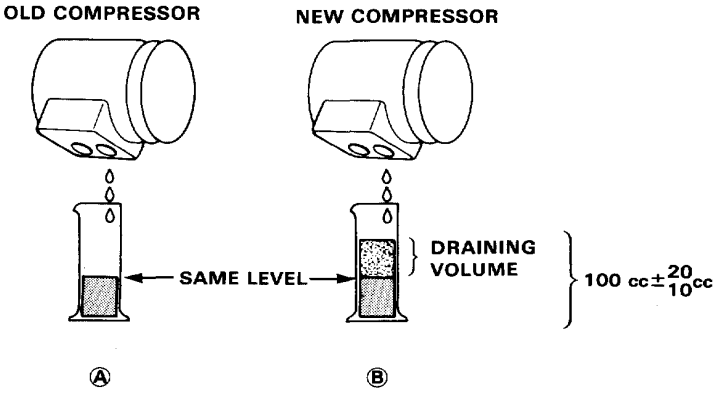
⚠WARNING When handling refrigerant (R-12):

- 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.

CAUTION:

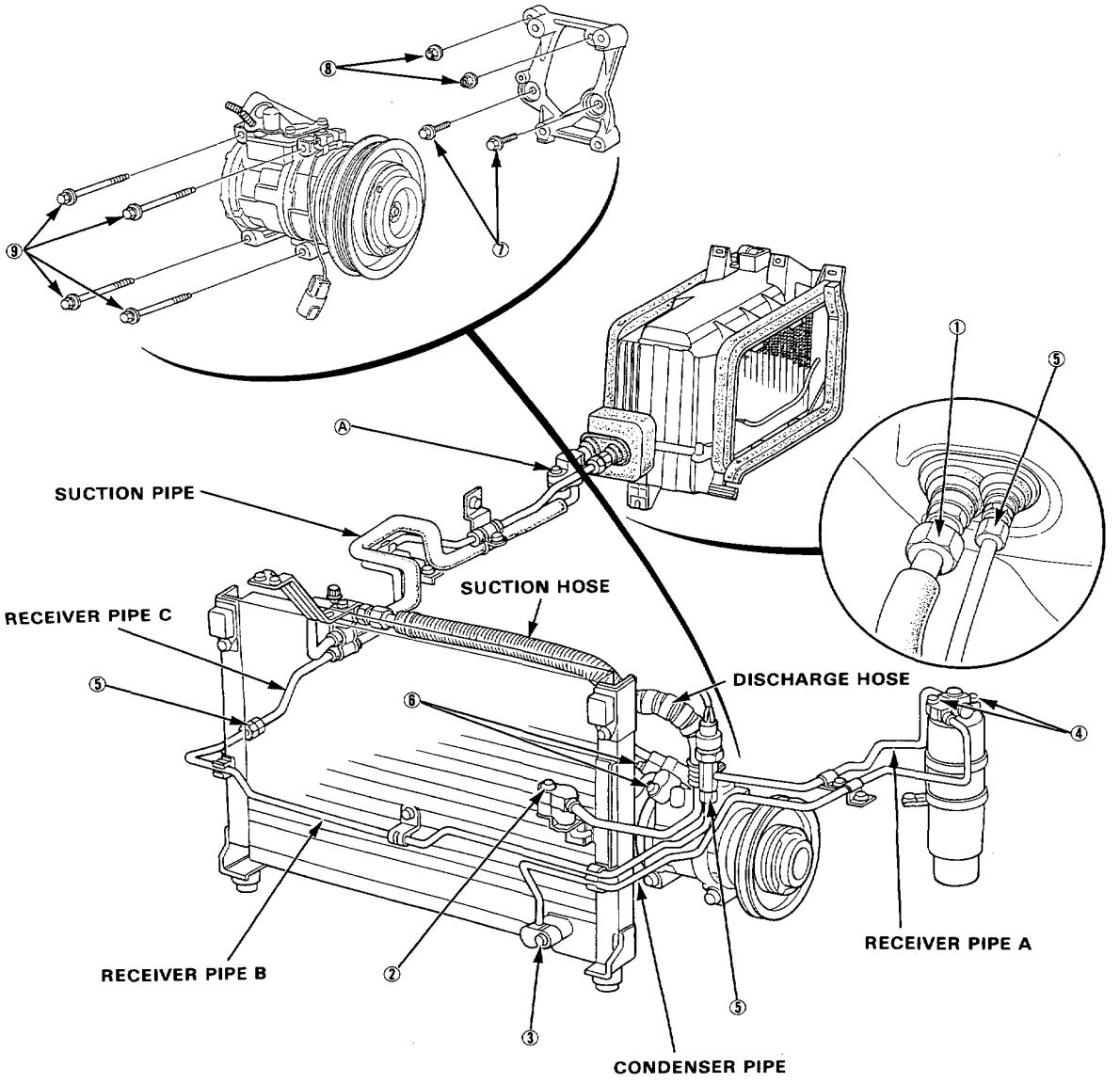
1. Always disconnect the negative cable from the battery whenever replacing air conditioner parts.
2. Keep moisture and dust out of the system. When disconnecting any lines, plug or cap the fittings immediately; don't remove the caps or plugs until just before the lines are reconnected.
3. Before connecting any hose or line, apply a few drops of refrigerant oil to the seat of the O-ring or flare nut.
4. When tightening or loosening a fitting, use a second wrench to support the matching fitting.
5. When discharging the system, don't let refrigerant escape too fast; it will draw the compressor oil out of the system.
6. Add refrigerant oil after replacing the following parts;

Condenser	10 cc (1/3 fl oz)
Evaporator	25 cc (5/6 fl oz)
Line or hose	10 cc (1/3 fl oz)
Receiver	10 cc (1/3 fl oz)
Compressor	On compressor replacement, subtract the volume of oil drained from the removed compressor from 100 cc (3 1/3 fl oz), and drain the calculated volume of oil from the new compressor: 100 cc (3 1/3 fl oz)-Volume of removed compressor=Draining volume.



7. Before charging the system, it is necessary to evacuate the system.
8. - Chage the system with the correct quantity of refrigerant exactly.
   - Avoid discharging with the refrigerant unnecessarily.
   - When using an auto gas charger, operate it according to the manufacturer's instructions.
9. Check that the cooling fan motor runs when turning the A/C switch and fan switch ON.

10. Torque Specifications.



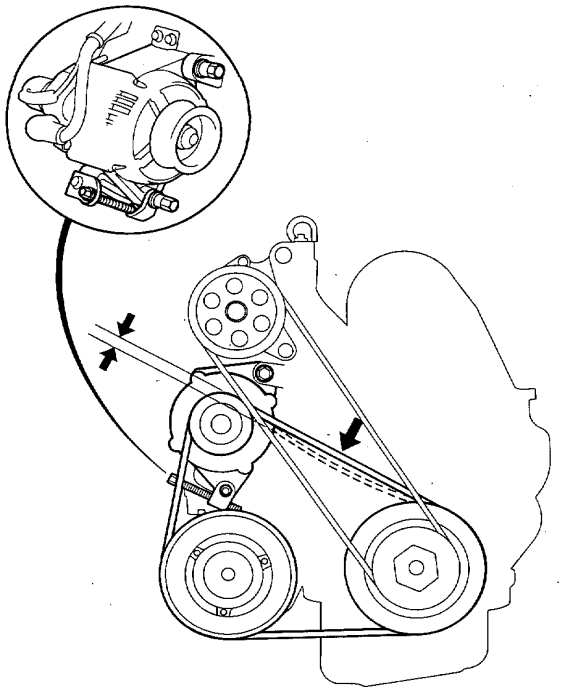
① Suction hose (evaporator side)	32 N·m (3.2 kg-m, 23 lb-ft) 〔Ⓐ with ALB 30 N·m (3.0 kg-m, 22 lb-ft)〕
② Discharge hose to condenser	22 N·m (2.3 kg-m, 16 lb-ft)
③ Condenser pipe to condenser	22 N·m (2.3 kg-m, 16 lb-ft)
④ Receiver tank	17 N·m (1.7 kg-m, 12 lb-ft)
⑤ Receiver pipe A, B. C (both side)	17 N·m (1.7 kg-m, 12 lb-ft)
⑥ Compressor hose mounting bolts	30 N·m (3.0 kg-m, 22 lb-ft)
⑦ Compressor bracket mounting bolts (10 x 35)	50 N·m (5.0 kg-m, 36 lb-ft)
⑧ Compressor bracket mounting nut (8 mm)	50 N·m (5.0 kg-m, 36 lb-ft)
⑨ Compressor mounting bolts (8 x 94)	25 N·m (2.5 kg-m, 18 lb-ft)

BelT Tension

Compressor Belt

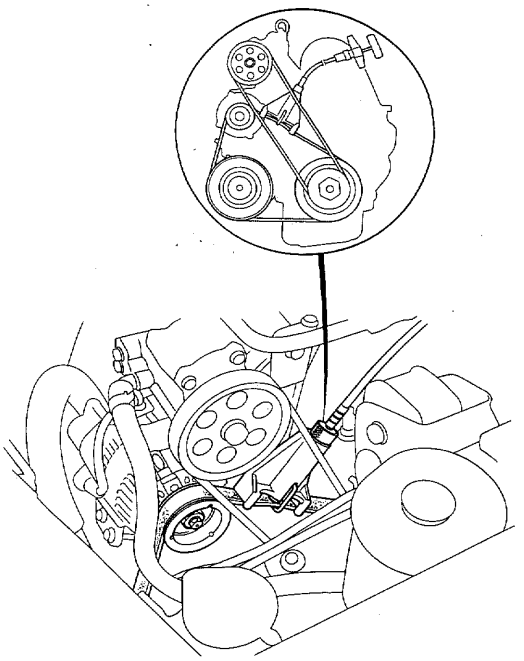
- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
  NOTE: Check for belt damage. if necessary, replace the belt.

Belt tension	[mm/10 kg]
New belt	Used belt
8.5~11	10~12



Using ND tension gauge:

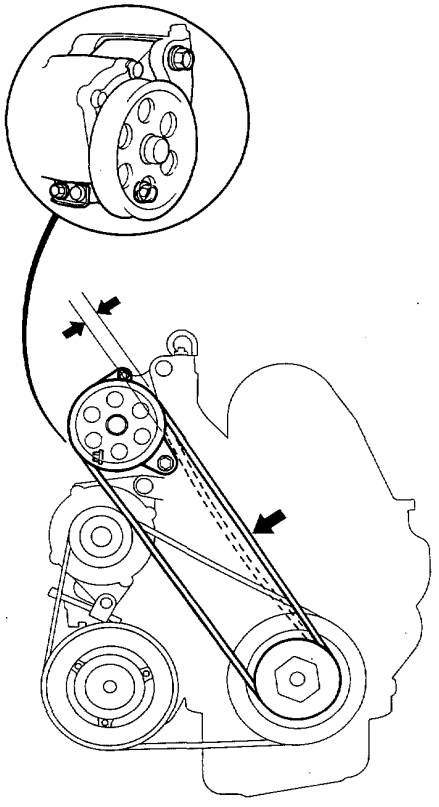
Belt tension	[kg]
New belt	Used belt
95~115	45~60



Power Steering Belt

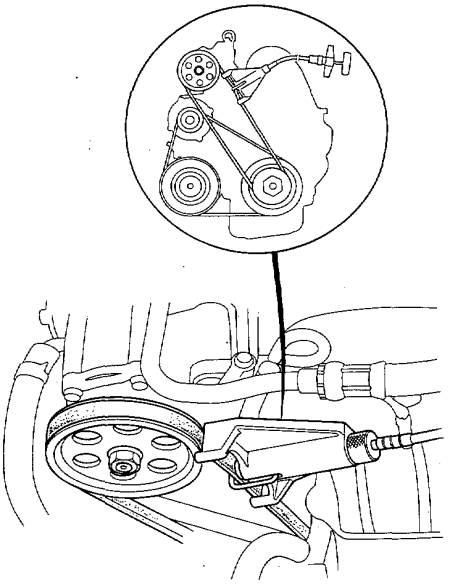
- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
  NOTE: Check for belt damage. if necessary, replace the belt.

Belt tension	[mm/10 kg]
New belt	Used belt
9.5~11.5	12.5~16



Using ND tension gauge:

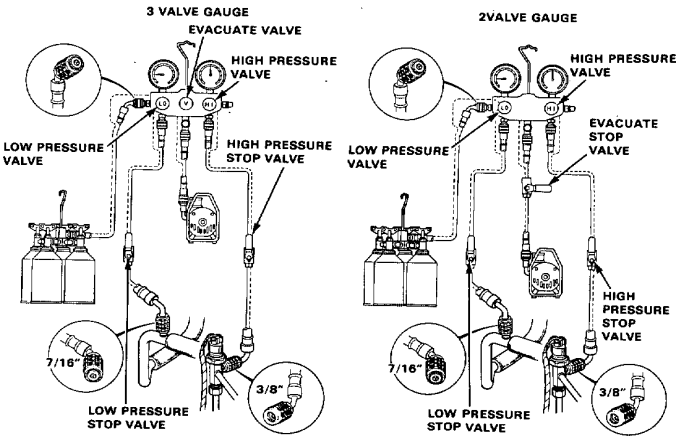
Belt tension	[kg]
New belt	Used belt
70~90	35~50

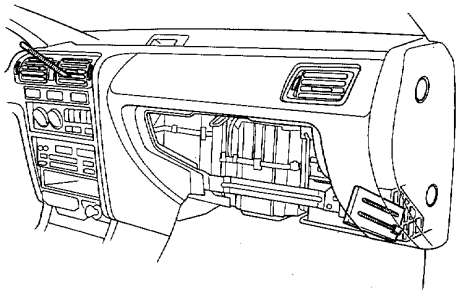


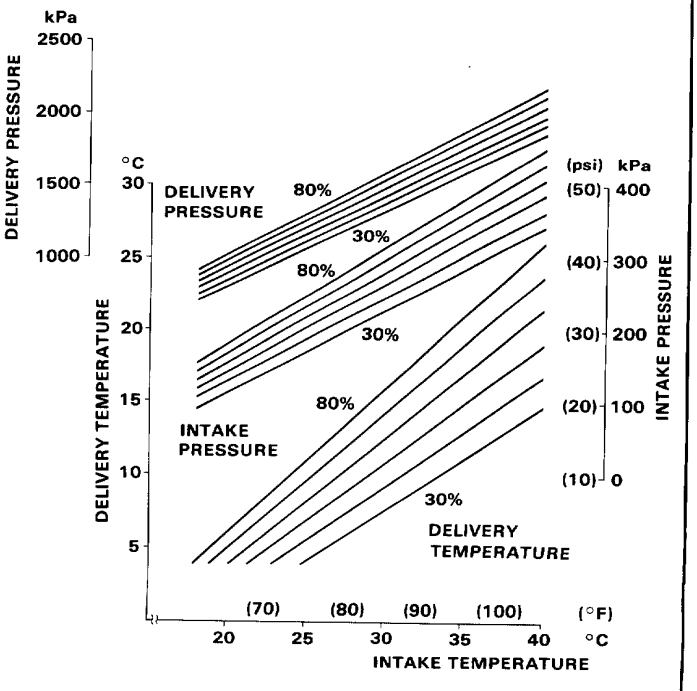
Performance Test

The performance test will help determine if the air conditioning system is operating within specifications.

1. Attach the gauge and pump as shown, connecting the center charging hose to the pump inlet. To purge air from the hose loosen both charging hoses fitting at the stop valves, until they hiss for a few seconds, then tighten them again.
2. Start the pump, then open both gauge valves and the evacuate valve (2 valve gauge: evacuate stop valve). The low gauge should indicate above 700 mmHg (27in-Hg), then run the pump about 1 minute.
3. Close both valves and the evacuate valve (2 valve gauge: evacuate stop valve) and stop the pump. Open both stop valves.
4. Insert a thermometer in the vent outlet. Determine the relative humidity and ambient air temperature by a portable weather station or calling the local weather station.
5. Test conditions:
   - Avoid direct sunlight.
   - Open engine hood.
   - Open front doors.
   - (button type)
     Set the temperature control dial to COLD and push and buttons.
     (lever type)
     Slide the temperature control lever to COLD and the function control lever to and push buttons.
   - Turn the fan switch to MAX.
   - Turn the A/C switch ON.
   - Run the engine at 1,500 RPM.
   - No driver or passengers in vehicle.
6. After running the air conditioning for 10 minutes under the above test conditions, read the delivery temperature from the thermometer in the dash vent and the high and low system pressure from the A/C gauges.
7. To complete the charts:
   - Mark the delivery temperature along the vertical line.
   - Mark the intake temperature (ambient air temperature) along the bottom line.
   - Draw a line straight up from the air temperature to the humidity.
   - Mark a point one line above and one line below the humidity level. (10 % above and 10 % below the humidity level)
   - From each point, draw a horizontal line across to the delivery temperature.
   - The delivery temperature should fall between the two lines.
   - Complete the low side pressure test and high side pressure test in the same way.
   - Any measurements outside the line may indicate the need for further inspection.



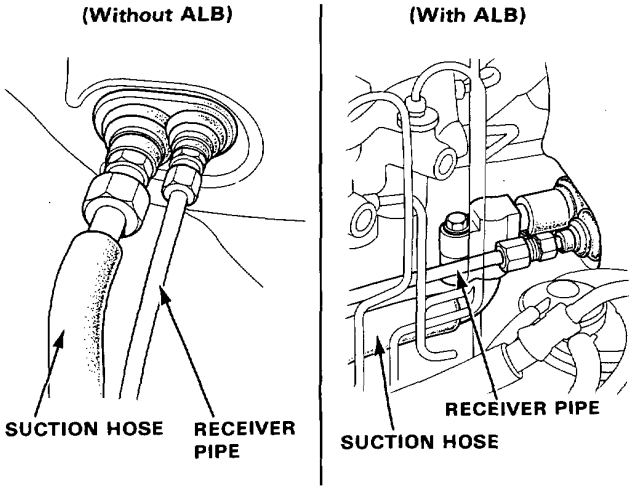




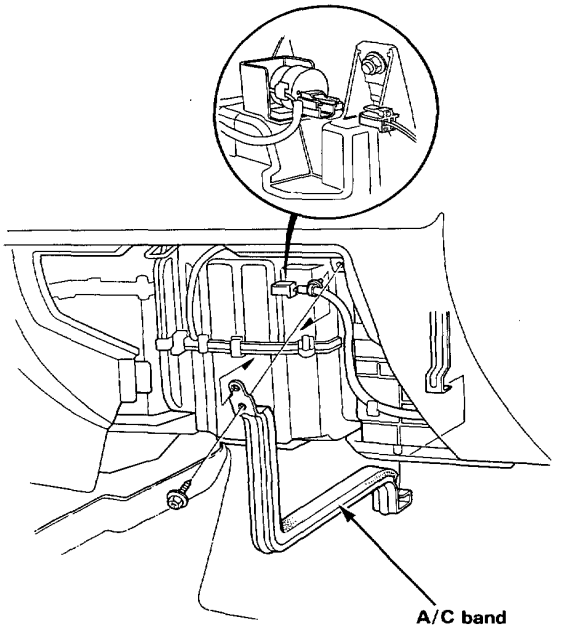
Evaporator

Replacement

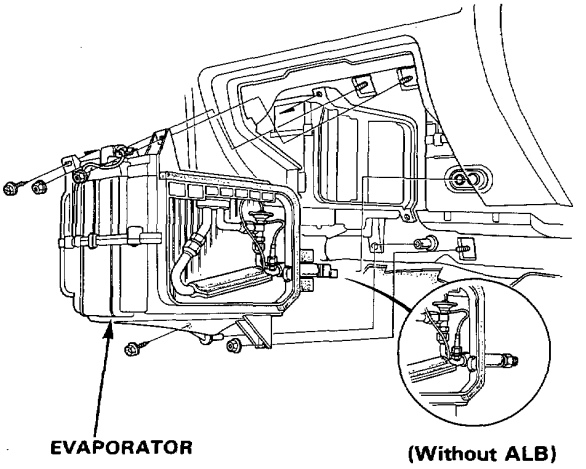
1. Disconnect the battery negative terminal.
2. Discharge the refrigerant (page 15-80).
3. Disconnect the receiver line and suction hose from the evaporator.
   CAUTION: Cap the open fittings immediately to keep moisture out of the system.



4. Remove the glove box and the glove box frame. (page 15-19)
5. Remove the self-tapping screw (3) and A/C band, then disconnect the connector from the thermostat.



6. Remove the nuts, then remove the evaporator.



7. Install in the reverse order of remove, and:
   - Apply a sealant to the grommets.
   - Make sure that there is no air leakage.
   - Charge the system (page 15-81) and test performance (page 15-66).

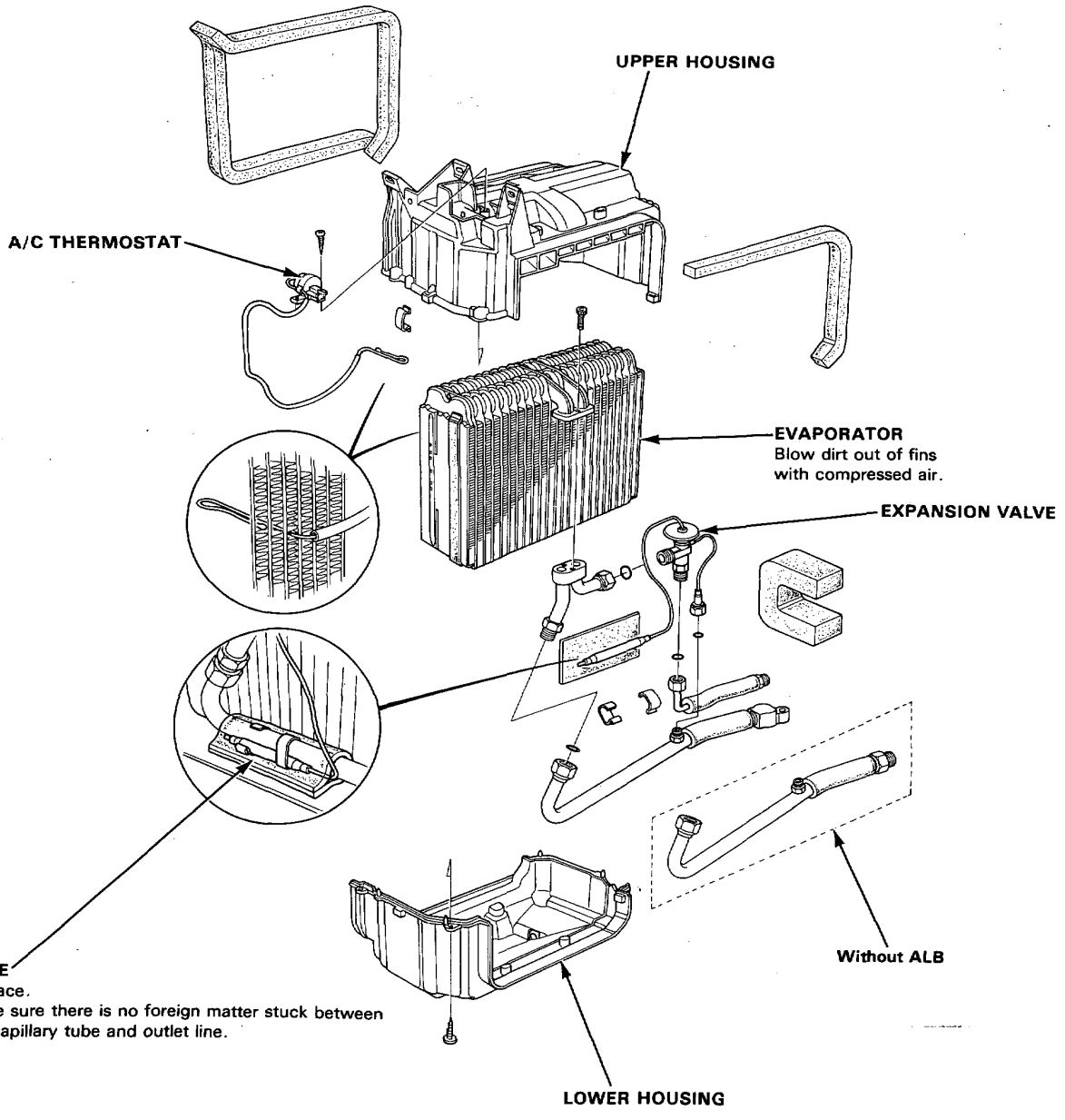
Evaporator

Overhaul

1. Pull out the evaporator sensor from the evaporator fins.
2. Remove the self-tapping screws and clips from the housing.
3. Carefully separate the housings and remove the evaporator covers.
4. Remove the expansion valve if necessary.

Assemble the evaporator in the reverse order of disassembly, and:

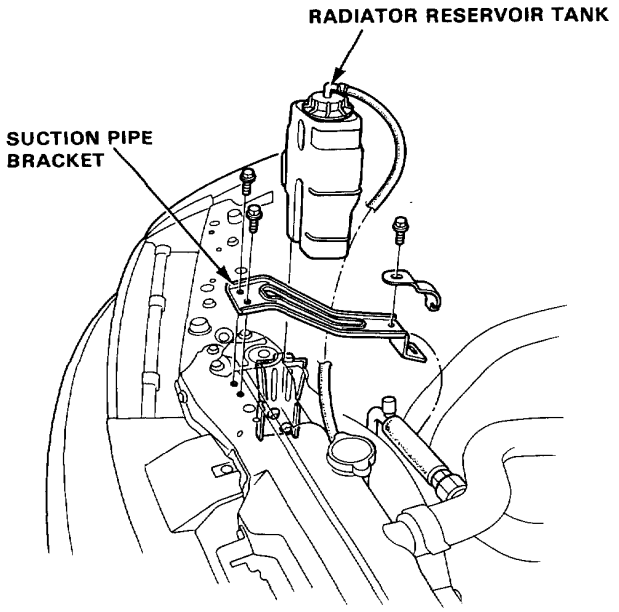
- Install the expansion valve capillary tube against the suction line, and wrap it with tape.
- Reinstall the evaporator sensor in its original location.



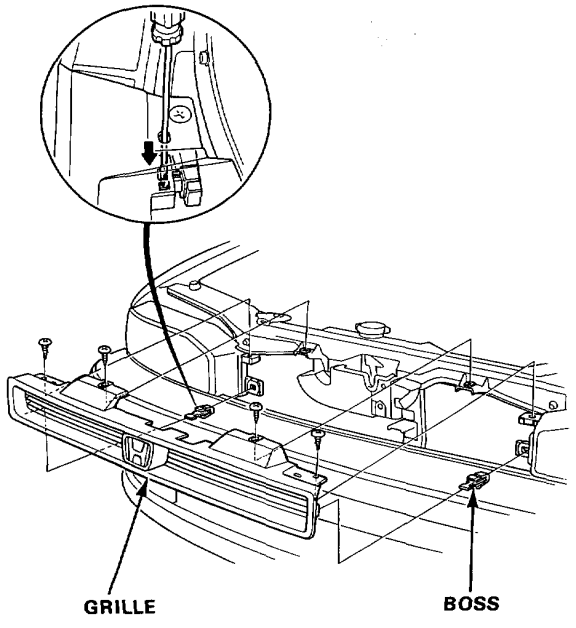
Condenser

Replacement

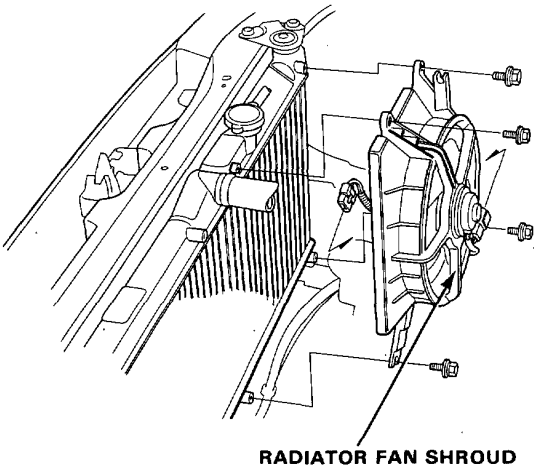
1. Discharge the refrigerant (page 15-80).
2. Temporarily remove the radiator reservoir tank and intake tube, then remove the suction pipe bracket.



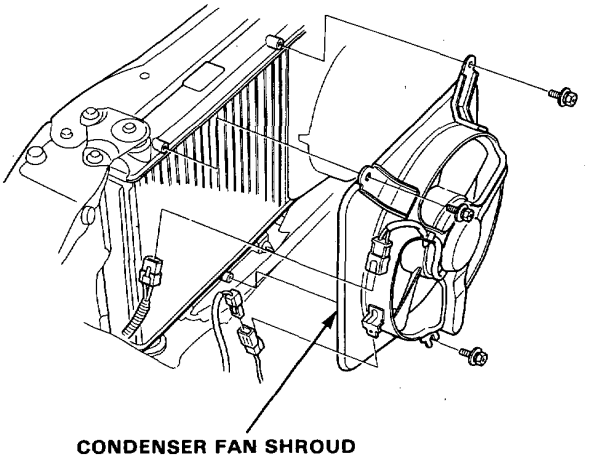
3. Remove the front grille.
   NOTE: Remove the boss as shown.



4. Disconnect the connector from the radiator fan motor, remove the mounting bolts (4) and remove the radiator fan shroud.
   CAUTION: Do not damage the radiator fins when removing the fan shroud.



5. Disconnect the connector from the condenser fan motor and remove the connector from the compressor. Remove the mounting bolts (3) and remove the condenser fan shroud.
   CAUTION: Do not damage the radiator fins when removing the fan shroud.

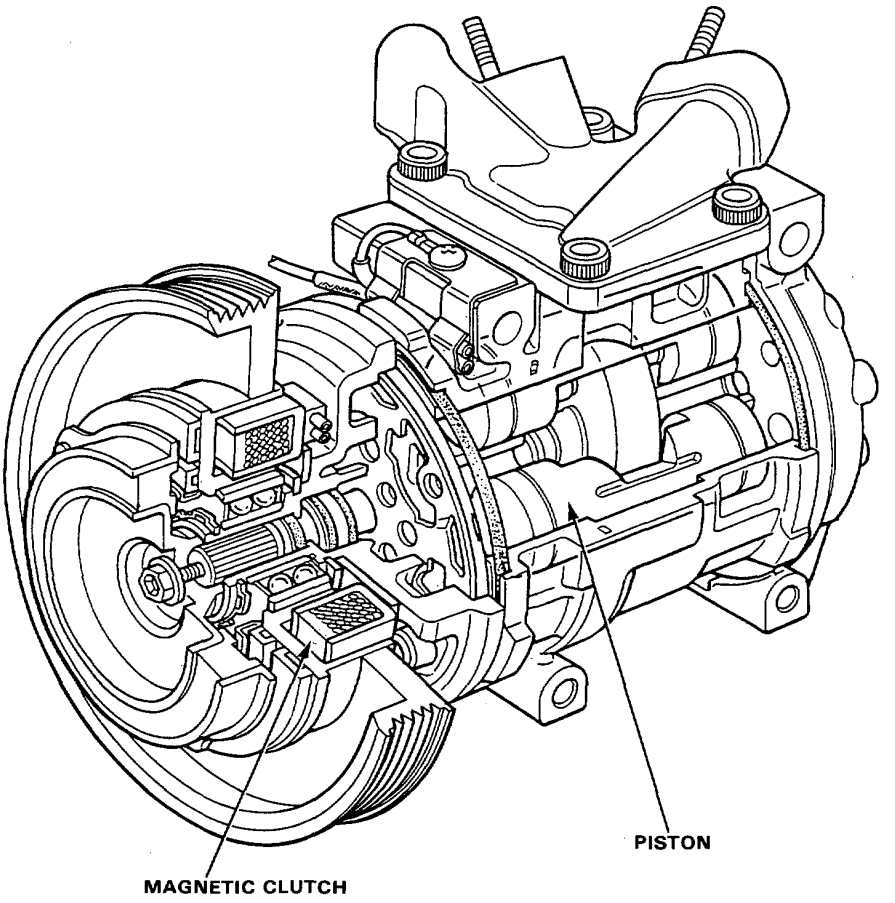


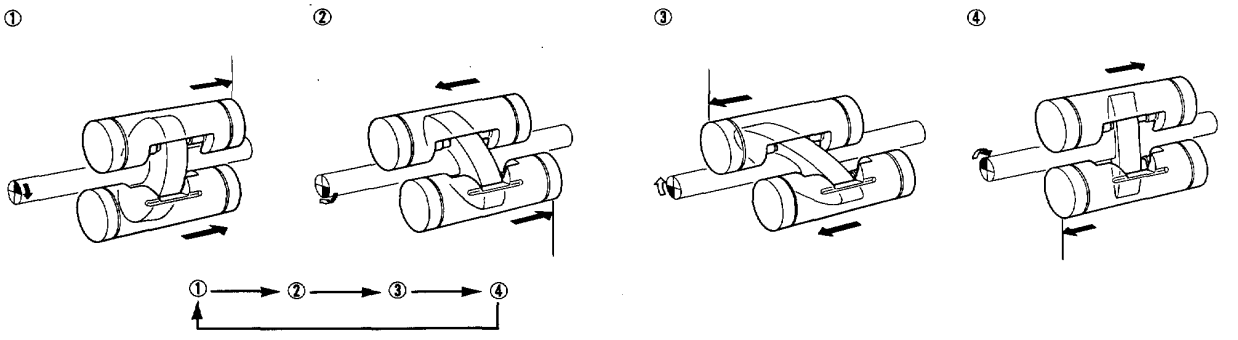
(cont'd)

Compressor (Nippondenso)

Description

This compressor is a piston type. A revolving inclined disc drives the surrounding 10 reciprocating pistons. As the inclined disc revolves, it pushes the pistons, protected by a ceramic shoe, thus compressing the refrigerant.

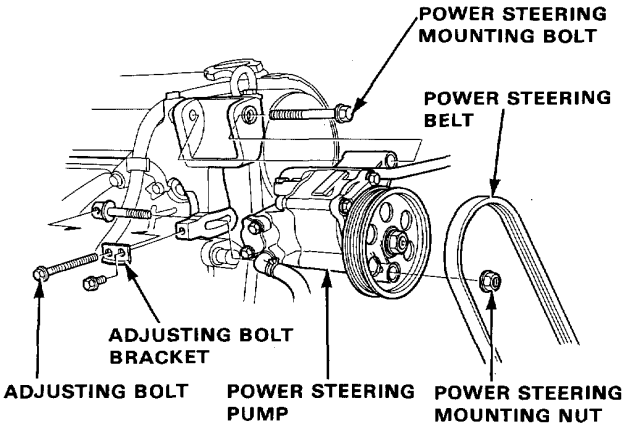




Compressor

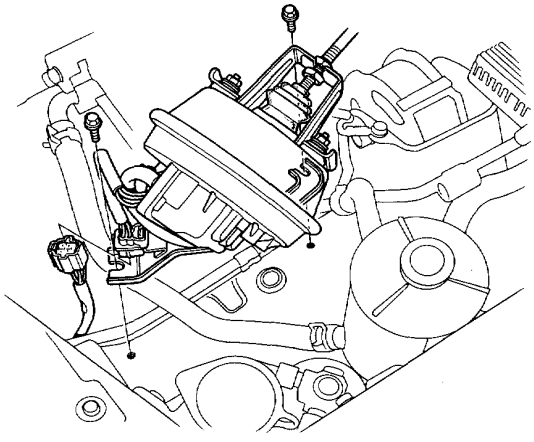
Replacement

1. If the compressor is marginally operable, run the engine at idle speed and turn on the air conditioner fan a few minutes, then shut the engine off and disconnect the battery negative terminal.
2. Discharge the refrigerant very slowly from the system (page 15-80).
3. Remove:
   - power steering mounting bolt and nut
   - adjusting bolt
   - adjusting bolt bracket
   - power steering belt
   - power steering pump

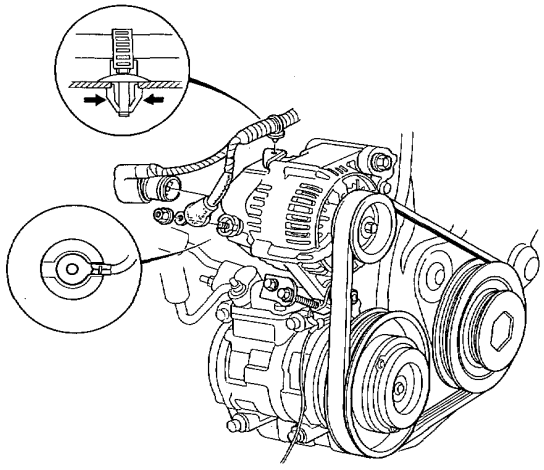


(With cruise control)

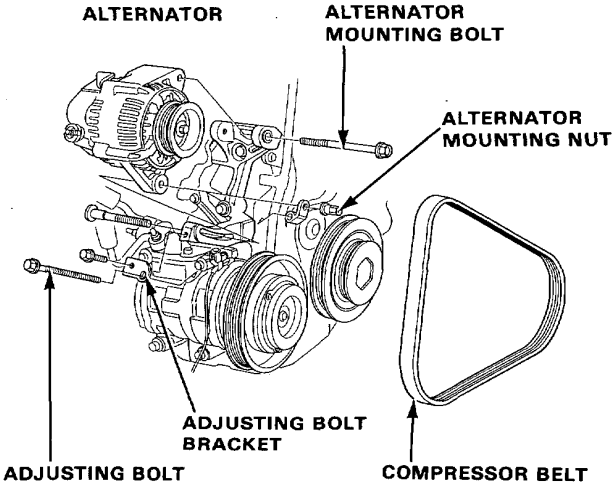
4. Remove the auto cruise actuator mounting bolts (2), disconnect the connector (1) and remove the auto cruise actuator.



5. Remove the alternator harness clamp and disconnect the alternator harness.



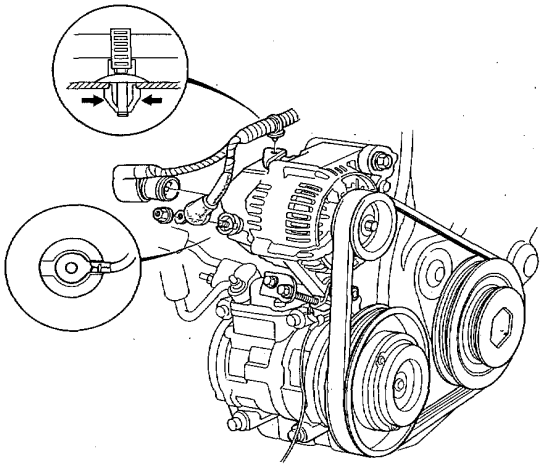
6. Remove:
   - alternator mounting bolt and nut
   - adjusting bolt
   - adjusting bolt bracket
   - compressor belt
   - alternator



Compressor

Replacement (cont'd)

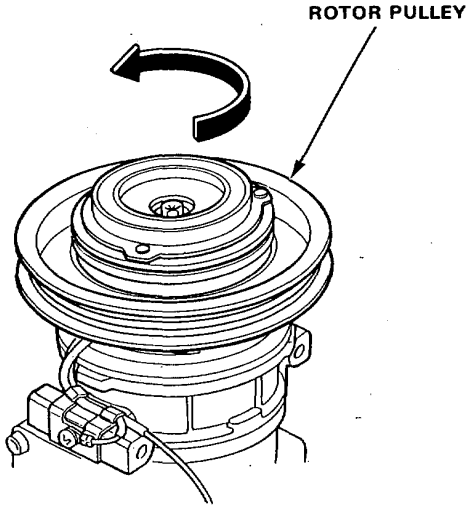
11. Install in the reverse order of removal and:
    - If a new compressor is installed, calculate the refrigerant oil as below and drain through the suction fitting on the compressor:
      100 cc(3 1/3 fl oz) minus contents of old compressor, equals amount to drain from new compressor.
    - Do not damage the radiator fins when install the compressor.
    - Be careful to connect the alternator harness as shown.



- Adjust the belt (page 15-64)
- Charge the system (page 15-81)
- Test the performance (page 15-66)

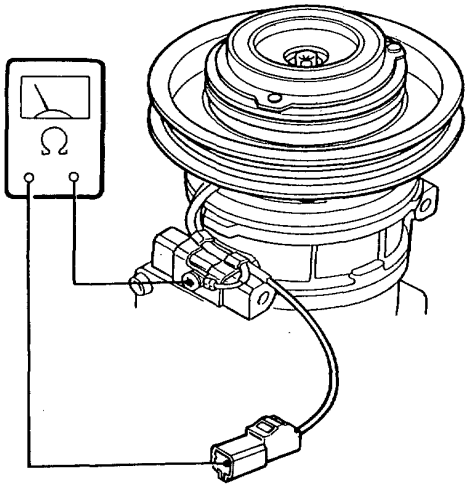
Clutch Inspection

- *Check pulley bearing play and drag* by rotating the pulley by hand. Replace the pulley with a new one if it is noisy or has excessive play/drag.



- Check resistance of the field coil:
  Field Coil Resistance: 3.6 ± 0.2 ohm at 20 °C) (68 °F)

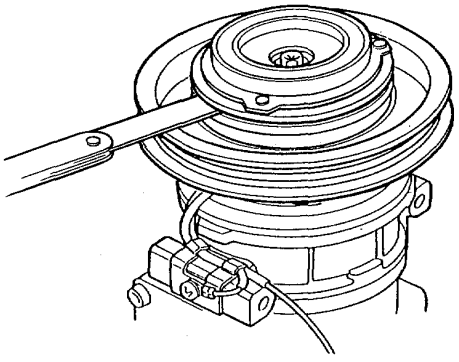
If resistance is not within specifications, replace the coil.

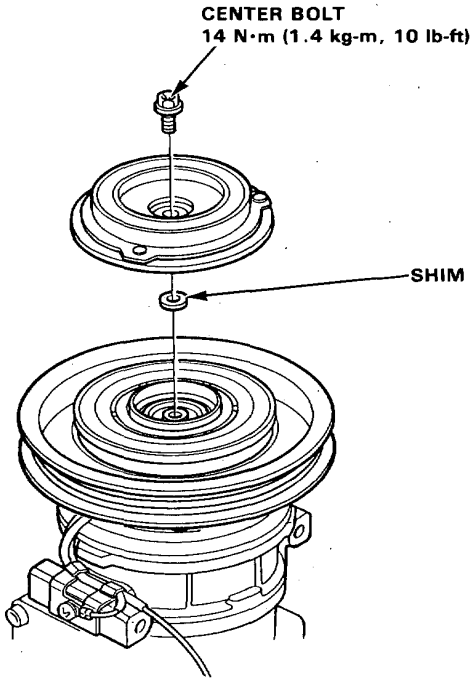


- Measure the clearance between the pulley and pressure plate all the way around. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as requited.

CLEARANCE: 0.5±0.15 (0.020±0.006 in.)

NOTE: The shims are available in three sizes: 0.1 mm, 0.2 mm and 0.5 mm of thickness.



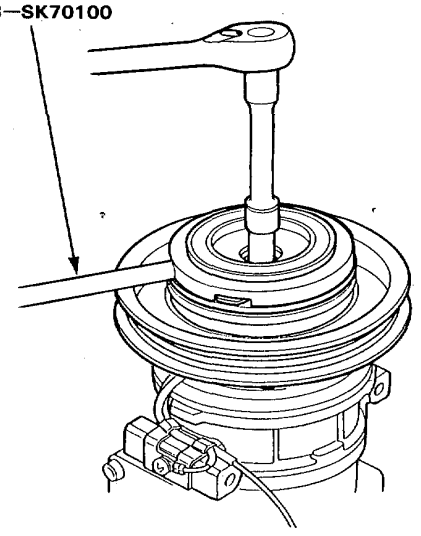


Compressor

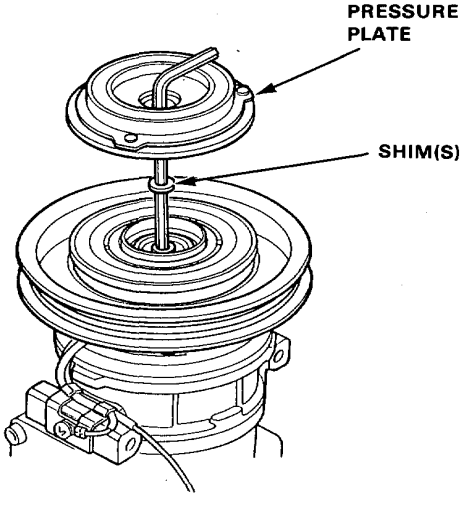
Clutch Overhaul

1. Remove the center bolt.

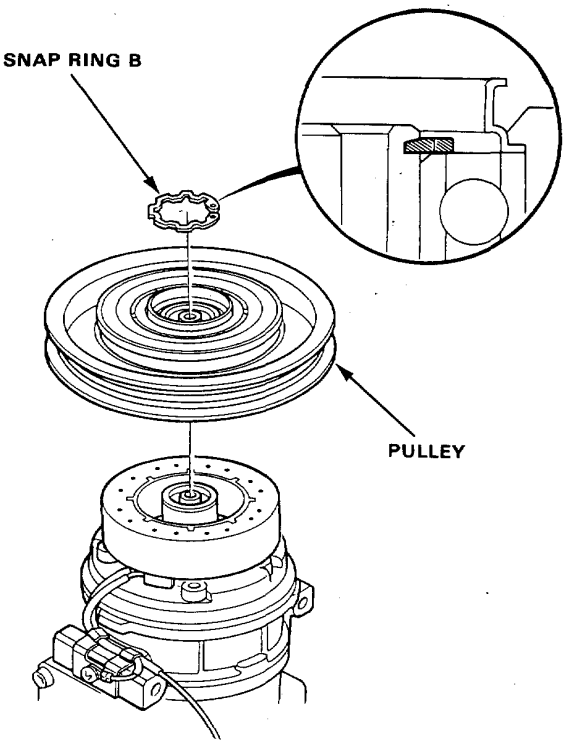
SPECIAL TOOL
07LAB—SK70100



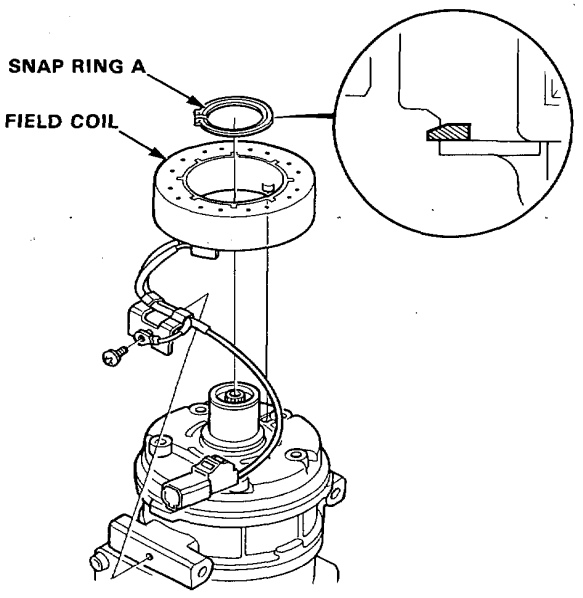
2. Remove the pressure plate and shim(s) taking care not to lose the shims.



3. Use circlip pliers to remove the snap ring B, then remove the pulley.



4. Remove the snap ring A and the field coil.



5. Install in the reverse order of removal and:
   - *Install the field coil with the wire side facing up (see above).*
   - Clean the pulley and compressor sliding surfaces with *non-petroleum solvent.*
   - Check the pulley bearings for excessive play.
   - Make sure the circlip is fitted to the groove properly.
   - Apply locking agent to the thread of the center bolt and tighten it securely.
   - Make sure that the pulley turns smoothly.

Test

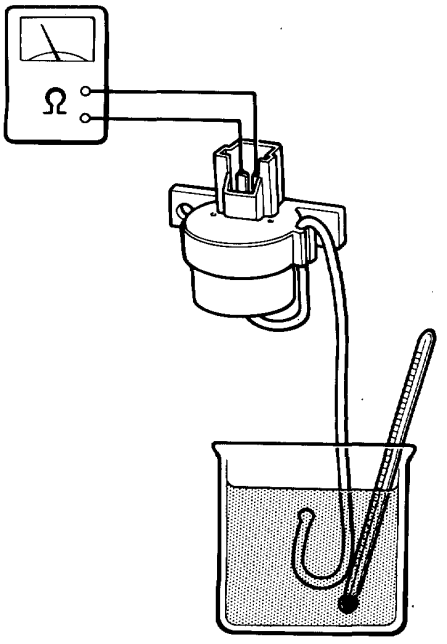
A/C Thermostat

Dip the evaporator sensor into a pan filled with ice water, and check for continuity between the terminals.

Cut off 1.5——0.5 °C (35—33 °F)

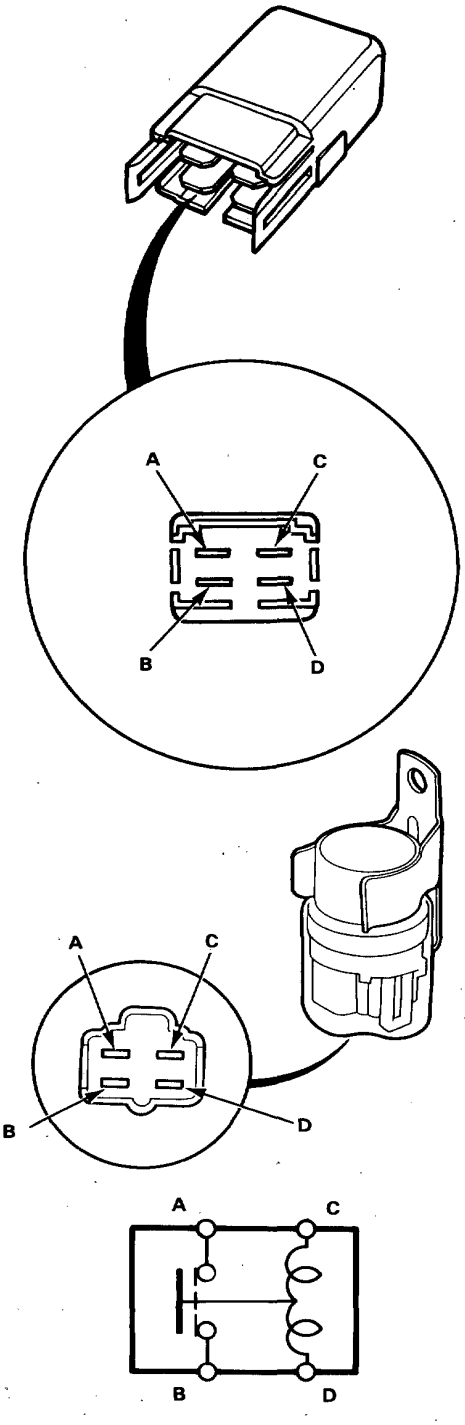
Cut in 2.5—5 °C (36—41 °F)

If cut off or cut in temperature is too low or too high, replace the A/C thermostat.



Relay

There should be continuity between the A and B terminals when the battery is connected to the C and D terminals. There should be no continuity when the battery is disconnected.

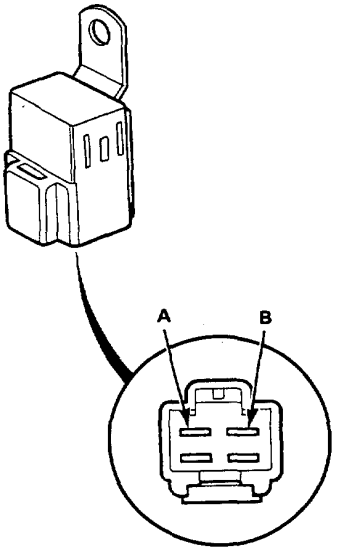


Test

Diode

NOTE: The diodes are designed to pass current in one direction and block current in opposite direction. Most ohmmeters, unless equipped with a diode tester, should not be used to test diodes.

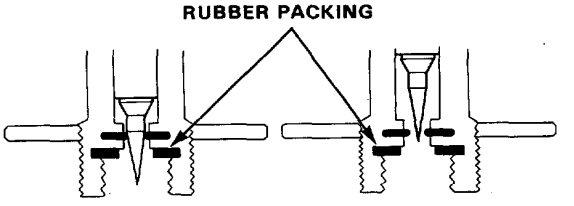
Check for continuity in both directions between A and B terminals. There should be continuity in only one direction.



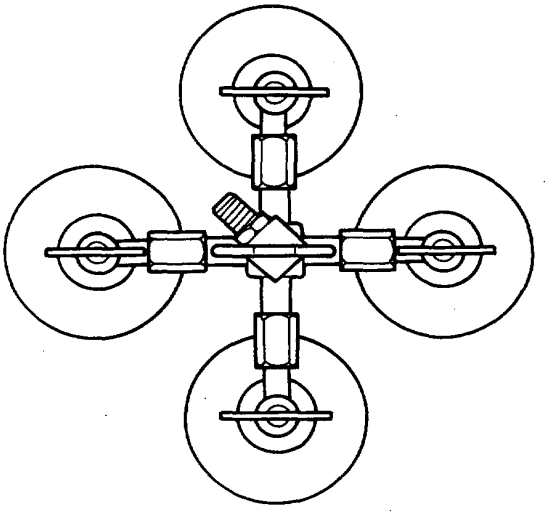


Refrigerant Can Attachment

1. Loosen the opener.
   NOTE: Check for a rubber packing on the can-joint.



2. Attach a refrigerant can to a can-joint.
   NOTE: If attaching three cans to a four can, can-joint, attach an empty can to the fourth joint.



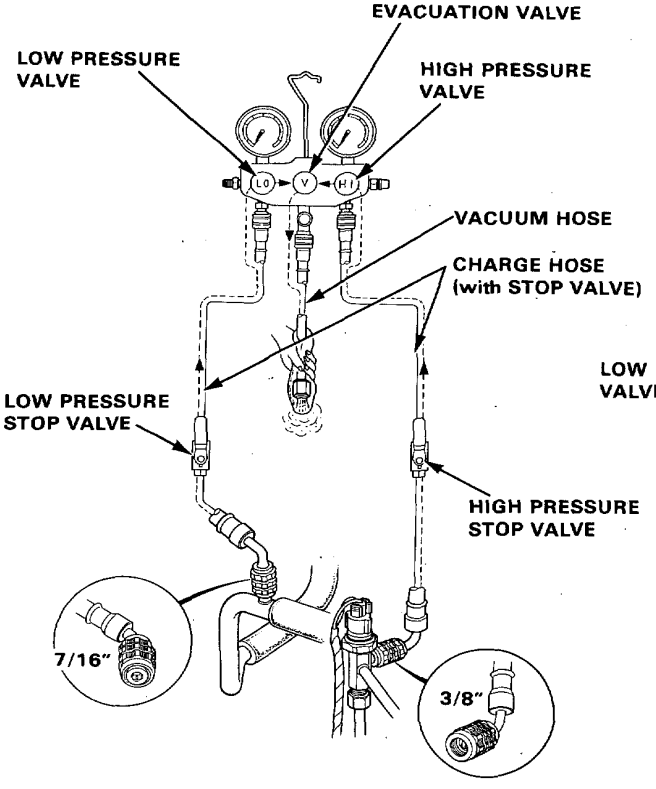
Discharge Procedure

⚠WARNING

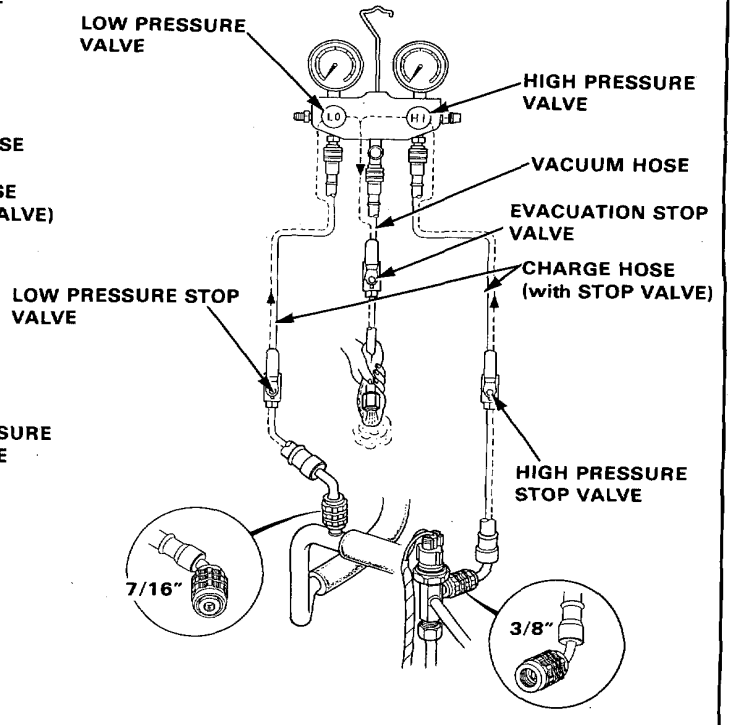
- **Keep away from open flames. The refrigerant, although nonflammable, will produce a poisonous gas if burned.**
- **Work in a well-ventilated area. Refrigerant evaporates quickly, and can force all the air out of a small enclosed area.**

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. Open the both stop valves and the evacuation valve (2 valve gauge: evacuate stop valve).
4. 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 rengerant.
   CAUTION: If refrigerant is allowed to escape too fast, compressor oil will be drawn out of the system.
5. After the high pressure gauge reading has dropped below 1000 kPa (142 psi), open the low side valve to discharge both high and low sides of the system.
6. Note the gauge reading and, as system pressure drops, gradually open both high and low side valves fully until both gauges indicate 0 kPa (0 psi).

(3 valve gauge)



(2 valve gauge)

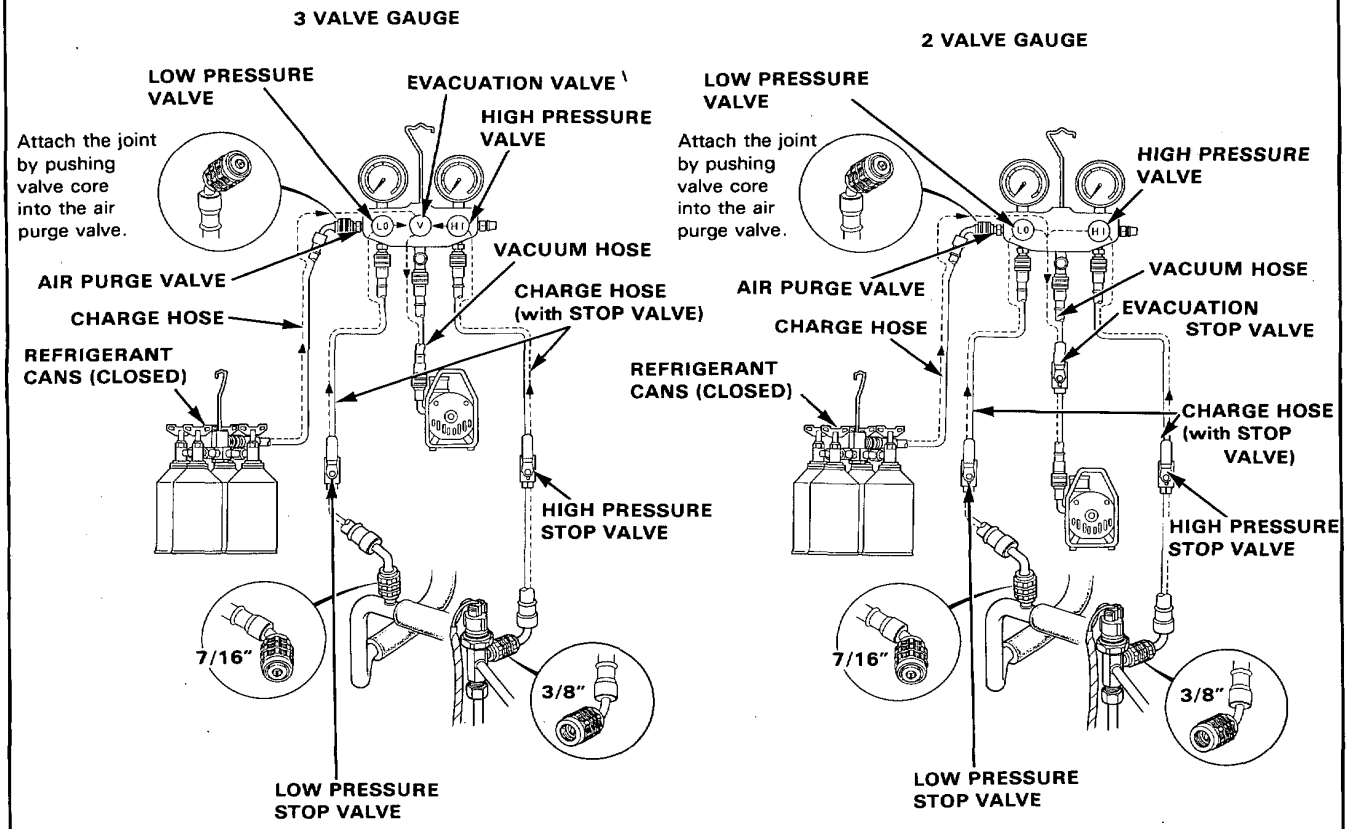


System Charging

System Evacuation

The following are the procedures to be adhered to when servicing air conditioners to reduce the amount of Fron R-12 into the atmoshpere.

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. Connect a gauge, pump and refrigerant containers (cans of R-12) as shown.
   NOTE: Do *not* open the cans.
3. Start the pump, then open the both pressure valves, both pressure stop valves and evacuation valve (2 valve gauge: evacuation stop valve). Run the pump for *about* 15 minutes. Close the both pressure valves and evacuation valve (2 valve gauge: evacuation stop valve) and stop the pump. The low gauge should indicate above 700mmHg (27 in-Hg) and remain steady with the valves closed.
   NOTE: If low pressure does not reach more than 700 mmHg (27 in-Hg) in 15 minutes, there is probably a leak in the system. Check for leaks, and repair (see Leak Test).
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.



System Charging

Leak Test

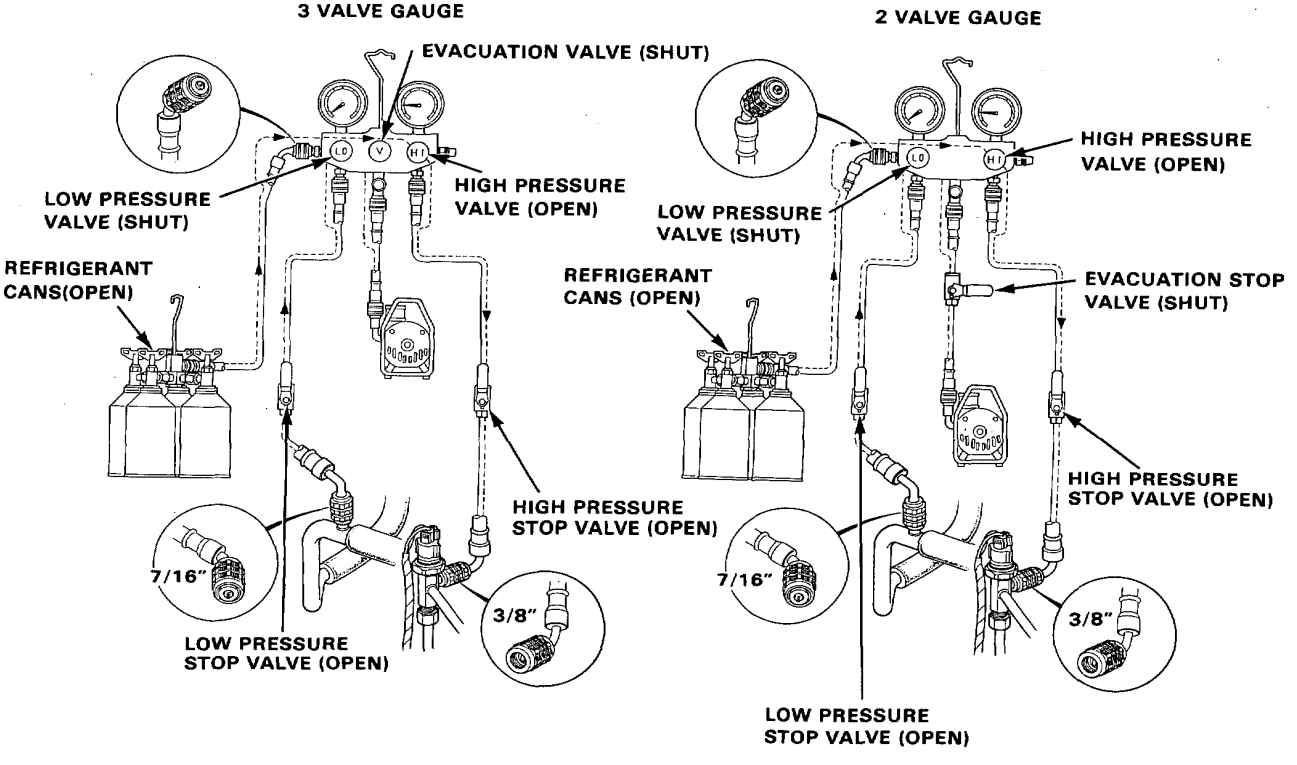
The following are the procedures to be adhered to when servicing air conditioners to reduce the amount of Fron R-12 into the atmoshpere.

⚠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.**

NOTE: Check for leaks after evacuation.

1. Close the evacuation valve (2 valve gauge; evacuation stop valve).
2. Open the cans.
3. Open high pressure valve to charge the system to about 100 kPa (14 psi), then close the supply valve. NOTE: Close the low pressure valve.
4. Check the system for leaks using a leak detector. NOTE: Particularly check for leaks around the compressor, condenser, and receiver-dryer.
5. If you find any leaks, tighten the joint nuts and bolts to the specified torque.
6. Recheck the system for leaks using a leak detector.
7. If you find leaks that require the system to be opened (to repair or replace hoses, fittings, etc.), release any charge in the system according to the Discharge Procedure on page 15-80.
8. After checking and repairing leaks, the system must be evacuated (see System Evacuation on page 15-81).



Charging Procedures

The following are the procedures to be adhered to when servicing air conditioners to reduce the amount of Fron R-12 into the atmoshpere.

⚠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.**

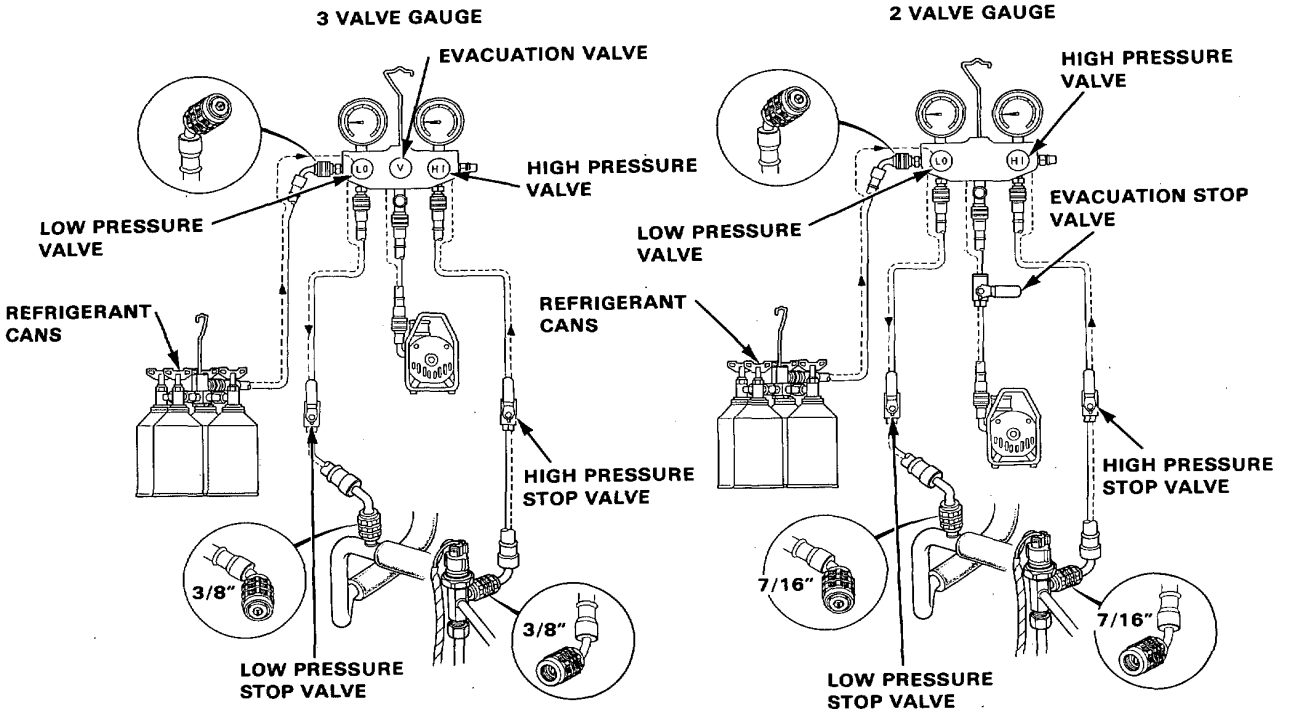
CAUTION: Do not overcharge the system; the compressor will be damaged.

1. After leak test, check that the high pressure valve is closed and start the engine.
   NOTE: Run the engine below 1500 rpm.
2. Open the front door.
   Turn the A/C switch on.
   Turn the air mix dial (lever) to COOL.
   Turn function control switch (lever) on .
   Turn the heater fan switch on "E" (MAX).
3. Open the low pressure valve and charge with refrigerant.

⚠WARNING

- **Do not open the high gauge valve.**
- **Do not turn the cans upside down.**

4. Charge the system with refrigerant capacity.
   Refrigerant capacity: 900—950 g (32-34 oz)
5. When fully charged, close the low pressure valve and the refrigerant cans. Check the system.
6. Close the high pressure stop valve.
7. Open the low pressure valve and gradually open the high pressure valve. When both pressure gauge are the same, close the low pressure stop valve and stop the engine.
8. Disconnect the charge hose quickly.
9. Check the system for leaks using a leak detector.
   NOTE: Particularly check for leaks around the compressor, condenser, and receiver-dryer.



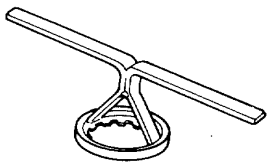
Pressure Test

NOTE: Performance Test on page 15-66.

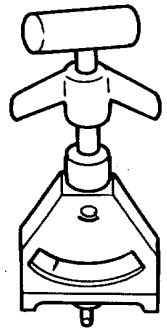
TEST RESULTS	RELATED SYMPTOMS	PROBABLE CAUSE	REMEDY
Discharge (high) pressure abnormally high	After stopping compressor, pressure drops to about 196 kPa (28 psi) quickly, and then falls gradually.	Air in system	Evacuate system: then recharge Evacuation: page 15-81 Recharging: 15-83
	No bubbles in sight glass when condenser is cooled by water.	Excessive refrigerant in system	Discharge refrigerant as necessary
	Reduced or no air flow through condenser.	· Clogged condenser or radiator fins · Condenser or radiator fan not working properly	· Clean · Check voltage and fan rpm
	Line to condenser is excessively hot.	Restricted flow of refrigerant in system	Expansion valve
Discharge pressure abnormally low	Excessive bubbles in sight glass: condenser is not hot	Insufficient refrigerant in system	· Check for leak · Charge system
	High and low pressures are balanced soon after stopping compressor	· Faulty compressor discharge or inlet valve · Faulty compressor seal	Replace compressor
	Outlet of expansion valve is not frosted. low pressure gauge indicates vacuum	· Faulty expansion valve	Replace
Suction (low) pressure abnormally low	Excessive bubbles in sight glass: condenser is not hot	Insufficient refrigerant	Check for leaks. Charge as required.
	Expansion valve is not frosted and low pressure line is not cold. Low pressure gauge indicates vacuum.	· Frozen expansion valve · Faulty expansion valve	Replace expansion valve
	Discharge temperature is low and the air flow from vents is restricted	Frozen evaporator	Run the fan with compressor off then check the thermostat and capillary tube.
	Expansion valve frosted	Clogged expansion valve	Clean or Replace
	Receive dryer is cool (should be warm during operation)	Clogged receiver dryer	Replace
Suction pressure abnormally high	Low pressure hose and check joint are cooler than around evaporator.	· Expansion valve open too long · Loose expansion valve	Repair or Replace
	Suction pressure is lowered when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as necessary
	High and low pressure are equalized as soon as the compressor is stopped	· Faulty gasket · Faulty high pressure valve · Foreign particle stuck in high pressure valve	Replace compressor
Suction and discharge pressure abnormally high	Reduced air flow through condenser	· Clogged condenser or radiator fins · Condenser or radiator fan not working properly	· Clean condenser and radiator · Check voltage and fan rpm
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as necessary
Suction and discharge pressure abnormally low	Low pressure hose and metal end areas are cooler than evaporator	Clogged or kinked low pressure hose parts	Repair or Replace
	Temperature around expansion valve is too low compared with that around receiver-dryer	Clogged high pressure line	Repair or Replace
Refrigerant leaks	Compressor clutch is dirty	Compressor shaft seal leaking	Replace compressor
	Compressor bolt(s) are dirty	Leaking around bolt(s)	Tighten bolt(s) or replace compressor
	Compressor gasket is wet with oil	Gasket leaking	Replace compressor

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07GAC—SE00200	Fuel Sender Wrench	1	16–127
②	07JGG—0010100	Belt Tension Gauge	1	16–101, 102



①



②

Troubleshooting Precautions

Before Troubleshooting

- Check the main fuse and the fuse box.
- Check the battery for damage, state of charge, and clean and tight connections.
- Check the alternator belt tension.

CAUTION:

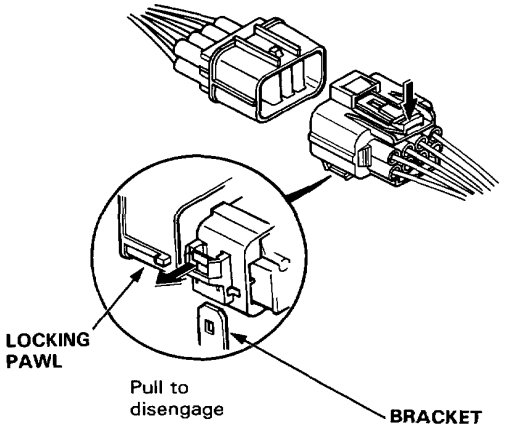
- **Do not quick-charge a battery unless the battery ground cable has been disconnected, or you will damage the alternator diodes.**
- **Do not attempt to crank the engine with the battery ground cable connected incompletely or you will severely damage the wiring.**

While You're Working

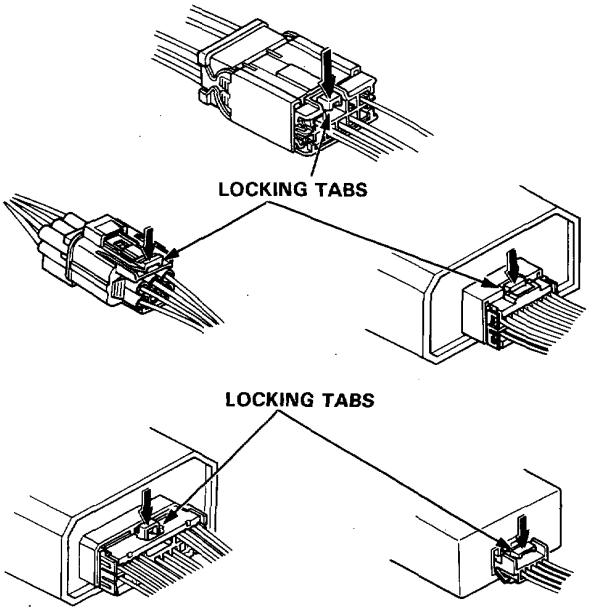
- Make sure connectors are clean, and have no loose pins or receptacles.
- Make sure multiple pin connectors are packed with grease (except watertight connectors).

Since new type connectors are used, connection and disconnection of them should be done paying attention to the following precautions.

- Because all the connectors except terminal of 1-P are equipped with push-down type locks, unlock them first before disconnecting the connectors.
- On the connectors installed on the bracket a pull type lock is equipped between the bracket and the connector.
  Some connectors of this type can not be disconnected unless they are removed from their brackets. When disconnecting, check their shapes.
- On the bracket mounted connector with dual locks, remove the connector from the bracket before disconnecting.



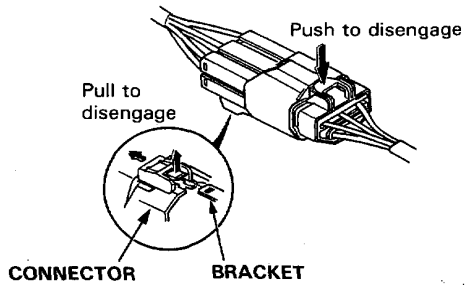
- Push the locking tab to disconnect.



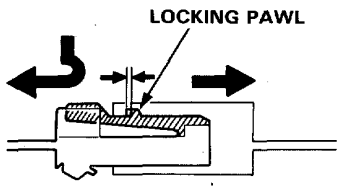
(cont'd)

Troubleshooting Precautions (cont'd)

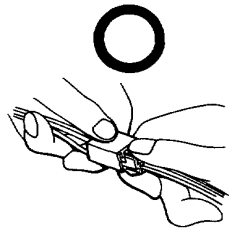
- Pull the locking tab to remove the connector from the bracket.

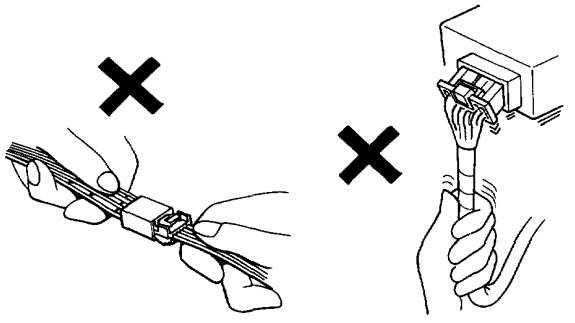


- When disconnecting locks, first press in the connector tightly (to provide clearance to the locking device), then operate the tab fully and remove the connector in the designated manner.

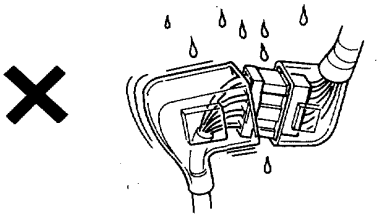


- When disconnecting a connector, pull it off from the mating connector by holding on both connectors.
- Never try to disconnect connectors by pulling on their wires.

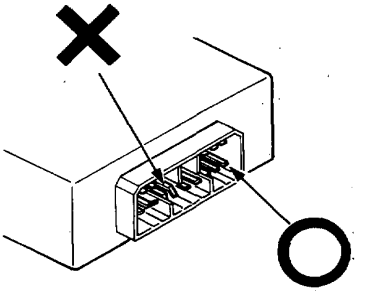




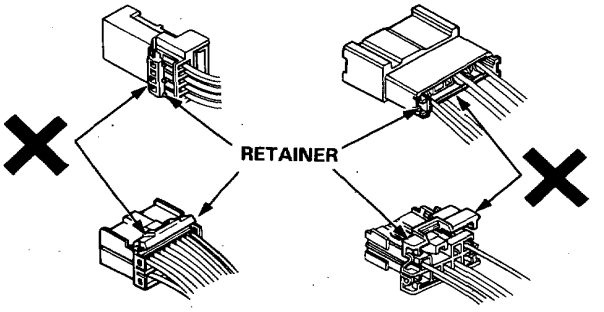
- Place the plastic cover over the mating connector after reconnecting. Also check that the cover is not distorted.



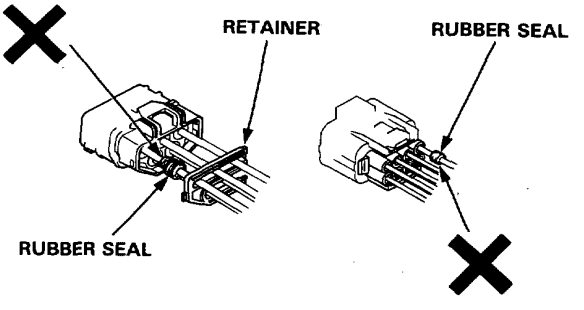
- Before connecting connectors, check to see that the terminals are in place and not bent or distorted.



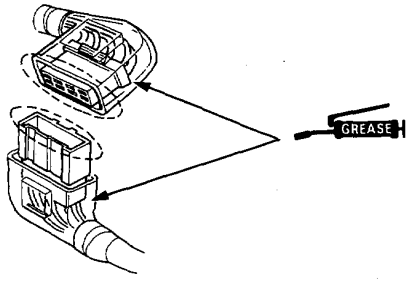
- Check for loose retainer and rubber seals.
  The illustration shows examples of terminal and seal abnormality.



- Example of waterproof connector:



- For the connector which uses insulation grease, clean the connector then apply grease if the grease is insufficient or contaminated.



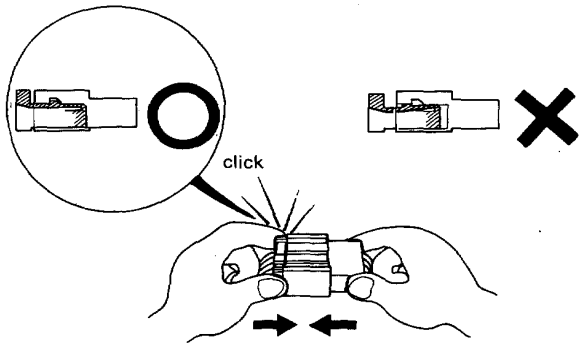
- Insert the connector tightly and make sure it is securely locked.
- Check all the wire harnesses are connected.
- There are two types of locking tab: one that you have to push and the other you should not touch when connecting the connector. Check the shape of the locking tab before connecting.
- The locking tab having a taper end should not be touched when connecting.



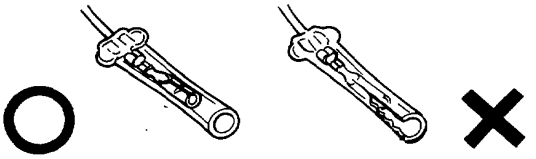
- The locking tab with an angle end should be pushed when connecting.



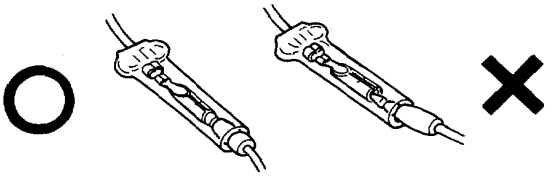
- Insert connectors fully until they will no longer go.
- The connectors must be aligned and engaged securely.
- Do not use wire harnesses with a loose wire or connector.



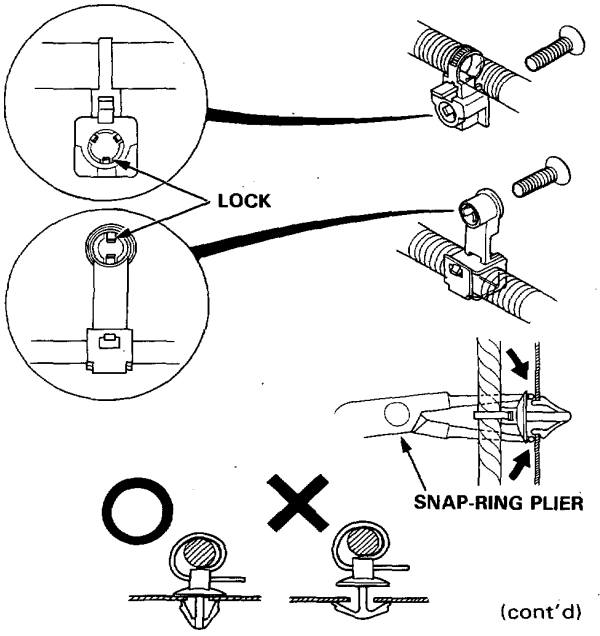
- Before connecting, check each connector cover for damage. Also make sure that the female connector is tight and not loosened from the previous use.



- Insert male connectors into the female connectors fully until they will no longer go.
- Be sure that plastic cover is placed over the connection.
- Position the wires so that the open end of the cover faces down.

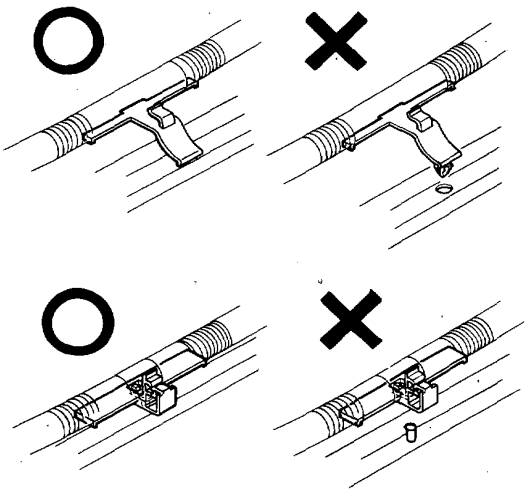


- Secure wires and wire harness to the frame with their respective wire bands at the designated locations.
  Position the wiring in the bands so that only the insulated surfaces contact the wires or harnesses.
- Remove with care not to damage the lock.

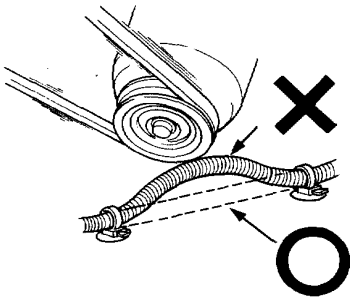


(cont'd)

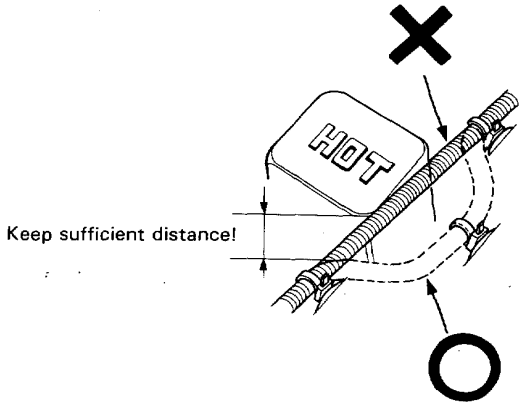
Troubleshooting Precautions (cont'd)



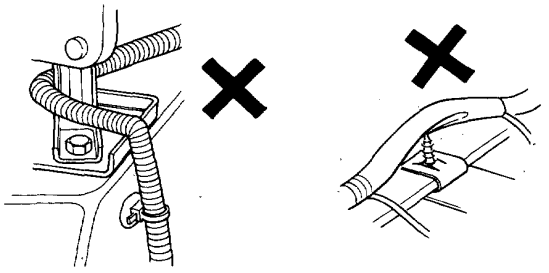
- After clamping, check each harness to be certain that it is not interfering with any moving or sliding parts of the vehicle.
- Keep wire harnesses away from the exhaust pipes and other hot parts.



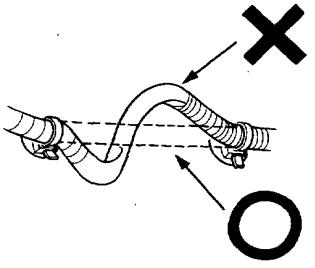
- Always keep a safe distance between wire harnesses and any heated parts.



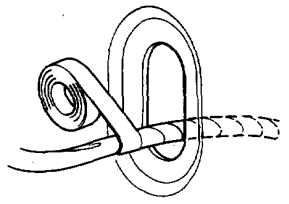
- Do not bring wire harnesses in direct contact with sharp edges or corners.
- Also avoid contact with the projected ends of bolts, screws and other fasteners.



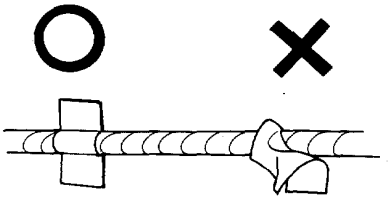
- Route harnesses so they are not pulled taut or slackened excessively.



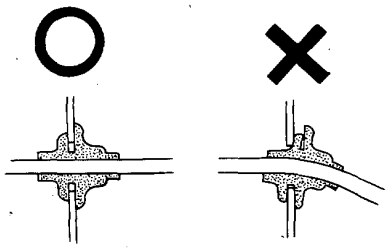
- Protect wires and harnesses with a tape or a tube if they are in contact with a sharp edge or corner.



- Clean the attaching surface thoroughly if an adhesive is used. First, wipe with solvent or alcohol if necessary.

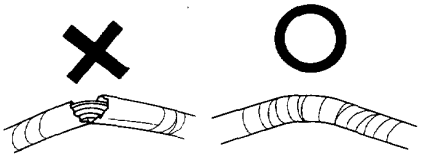


- Seat grommets in their grooves properly.

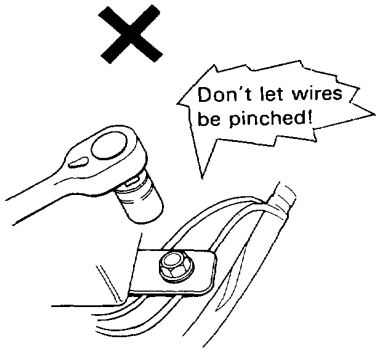


- Do not damage the insulation when connecting a wire.

- Do not use wires or harnesses with a broken insulation.
  Repair by wrapping with protective tape or replace with new ones if necessary.



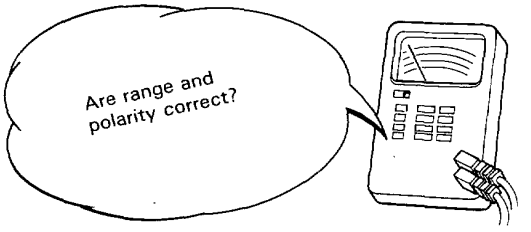
- After installing parts, make sure that wire harnesses are not pinched.



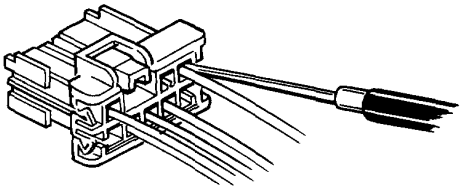
- After routing, check that the wire harnesses are not twisted or kinked.

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

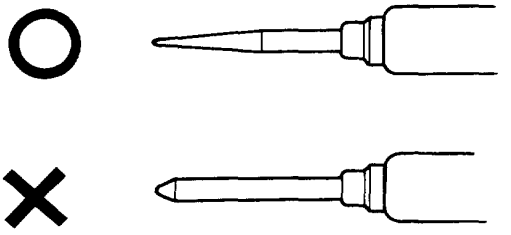
- When using the Service Tester, follow the manufacturer's instructions and those described in the Shop Manual.



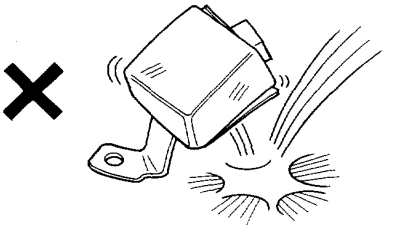
- Always insert the probe of the tester from the wire harness side (except waterproof connector).



- Make sure to use the probe with a tapered tip.



- Do not drop parts.



Five-Step Troubleshooting

1. **Verify The Complaint**

   Turn on all the components in the problem circuit to check the accuracy of the customer complaint. Note the symptoms. Do not begin disassembly or testing until you have narrowed down the problem area.

2. **Analyze The Schematic**

   Look up the schematic for the problem circuit. Determine how the circuit is supposed to work by tracing the current paths from the power feed through the circuit components to ground. If several circuits fail at the same time, the fuse or ground is a likely cause.

   Based on the symptoms and your understanding of the circuit operation, identify one or more possible causes of the problem.

3. **Isolate The Problem By Testing The Circuit**

   Make circuit tests to check the diagnosis you made in step 2. Keep in mind that a logical, simple procedure is the key to efficient troubleshooting. Test for the most likely cause of failure first. Try to make tests at points that are easily accessible.

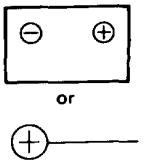
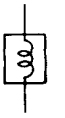
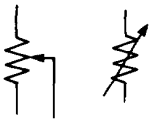
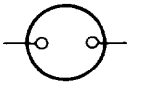
4. **Fix The Problem**

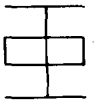
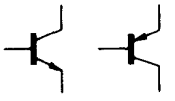
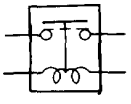
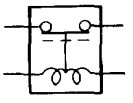
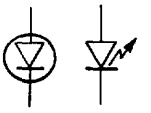
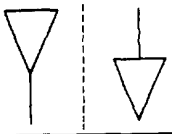
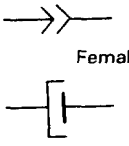
   Once the specific problem is identified, make the repair. Be sure to use proper tools and safe procedures.

5. **Make Sure The Circuit Works**

   Turn on all components in the repaired circuit in all modes to make sure you've fixed the entire problem. If the problem was a blown fuse, be sure to test all of the circuits on that fuse. Make sure no new problems turn up and the original problem does not recur.

Schematic Symbols

BATTERY	GROUND		FUSE	COIL, SOLENOID	CIGARETTE LIGHTER
	Ground terminal 	Component ground 			
RESISTOR	VARIABLE RESISTOR	THERMISTOR	IGNITION SWITCH	BULB	HEATER
					
MOTOR	PUMP	CIRCUIT BREAKER	HORN	DIODE	SPEAKER, BUZZER
					

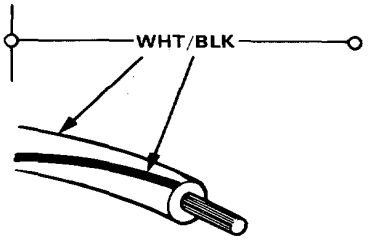
ANTENNA		TRANSISTOR (Tr)
Mast 	Window 	
RELAY (In normal condition)		CONDENSER
Normal open relay 	Normal closed relay 	
SWITCH (In normal condition)		LUMINOUS DIODE (LED)
Normal open switch 	Normal closed switch 	
CONNECTION	CONNECTOR	REED SWITCH
Input Output 	Male Female 	

Wire Color Codes

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

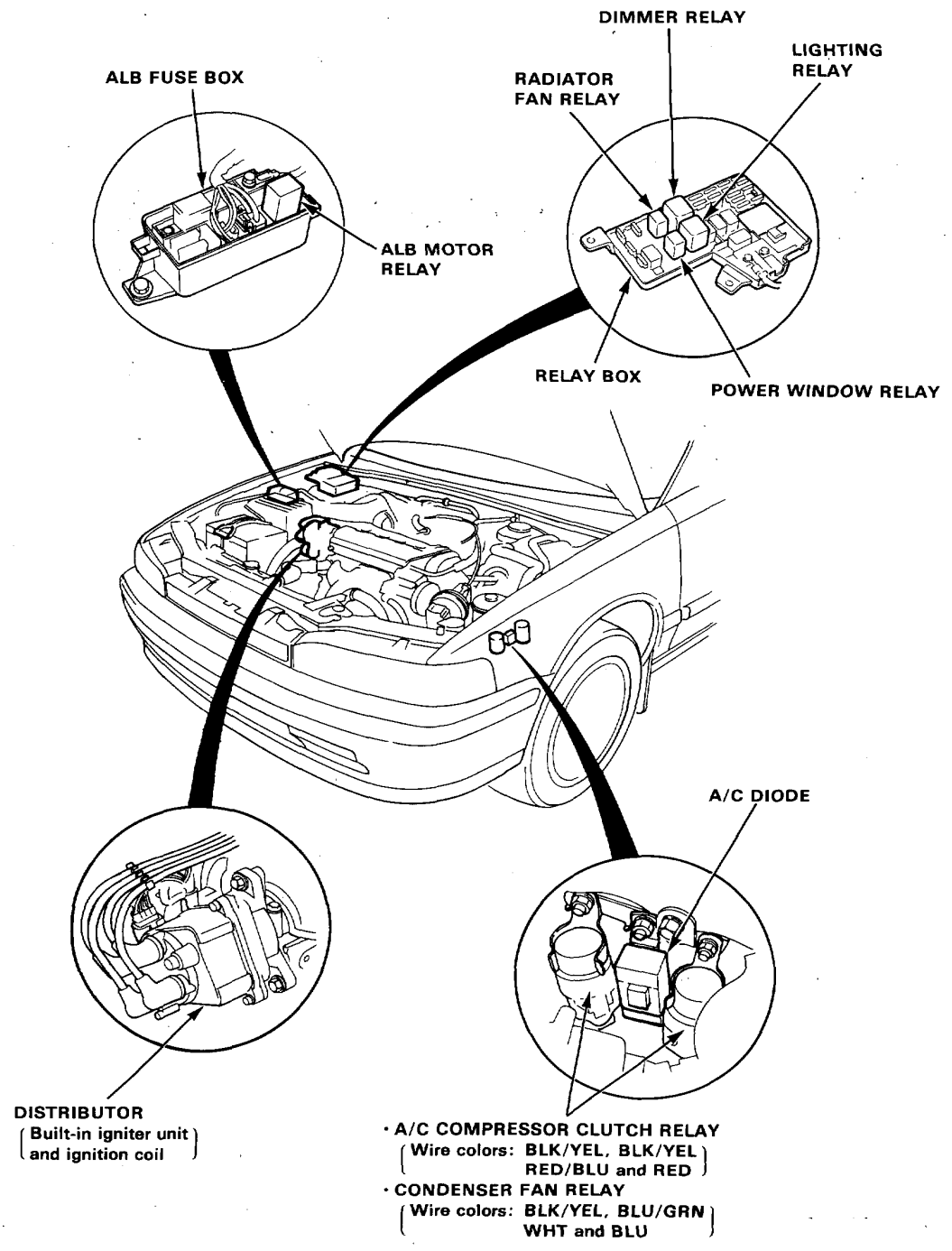
WHT.....White
YEL .....Yellow
BLK .....Black
BLU .....Blue
GRN .....Green
RED .....Red
ORN .....Orange
PNK .....Pink
BRN .....Brown
GRY .....Gray
LT BLU ...Light Blue
LT GRN ...Light Green

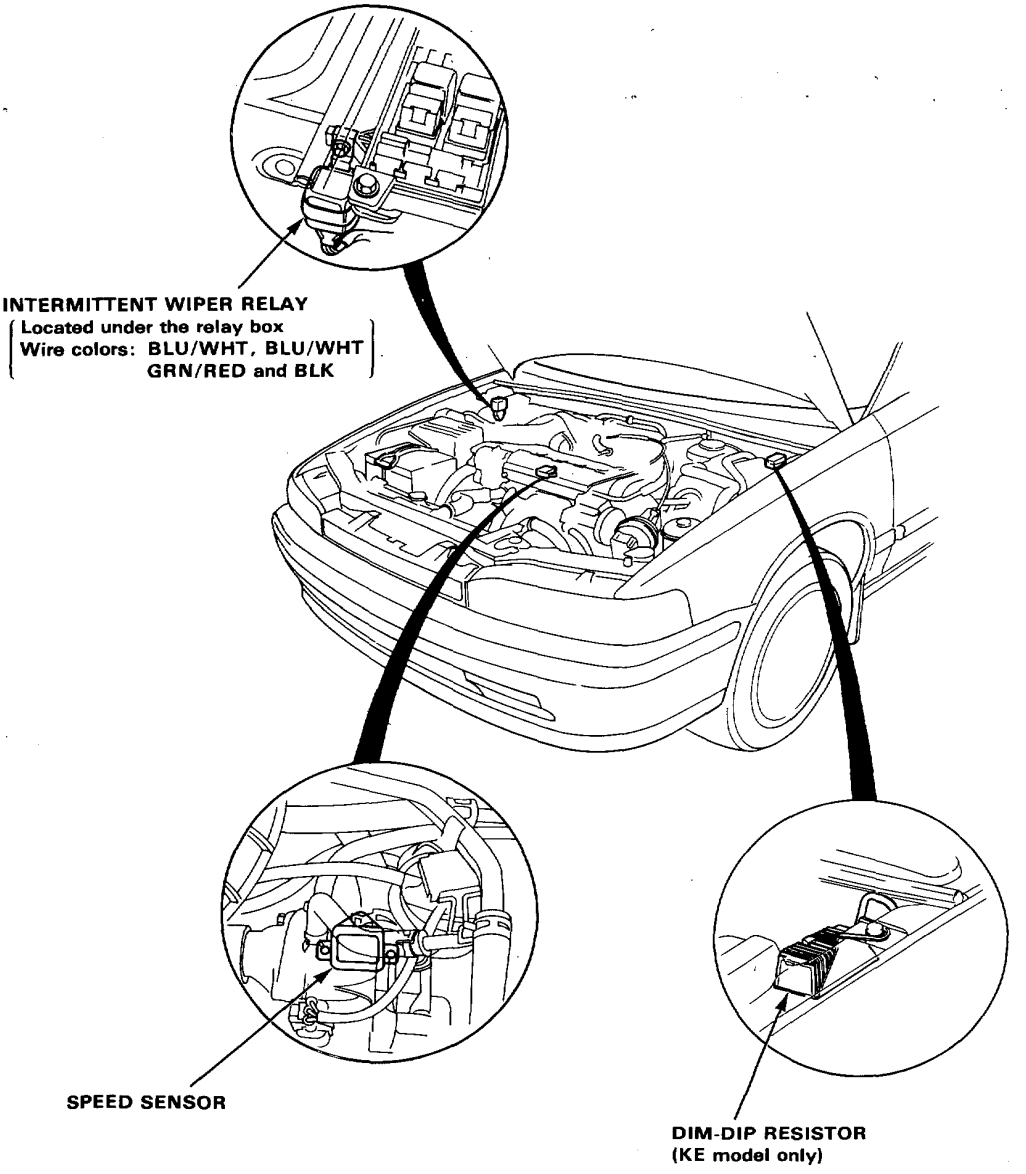
Wire insulator has one color or one color with another color stripe. The second color is the stripe.



Relays and Control Unit Locations

Engine Compartment

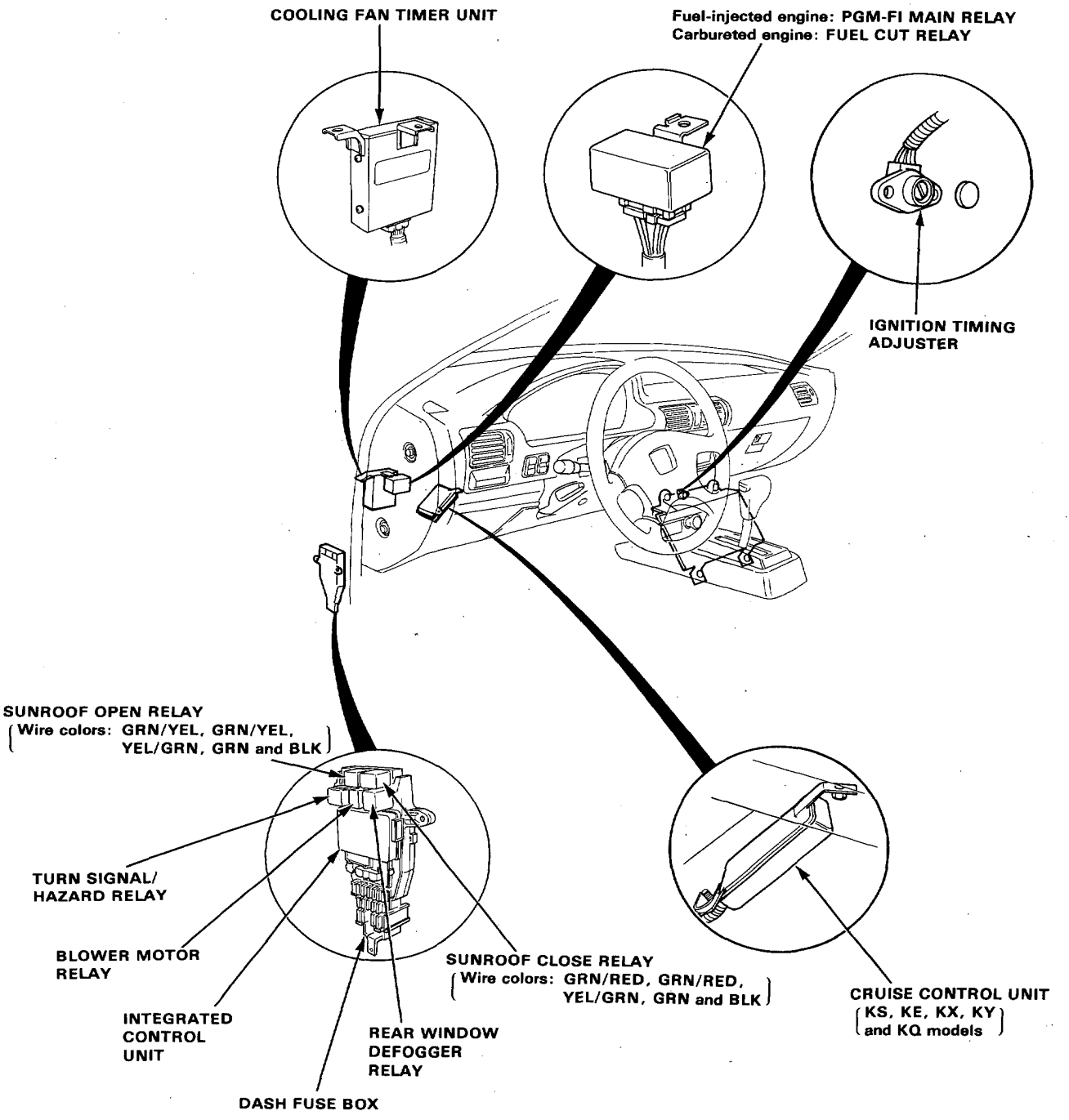


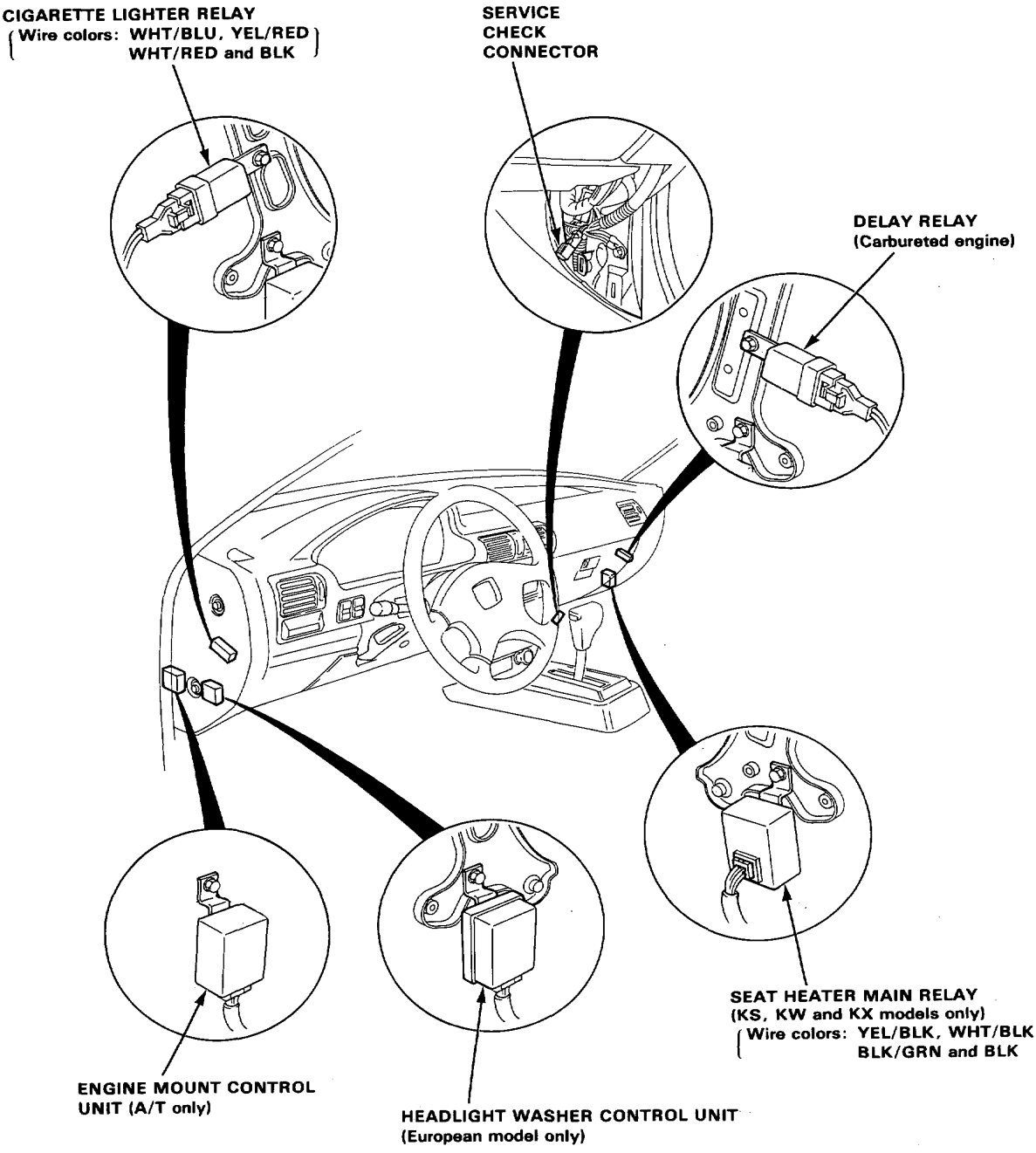

INTERMITTENT WIPER RELAY
Located under the relay box
Wire colors: BLU/WHT, BLU/WHT
GRN/RED and BLK
SPEED SENSOR
DIM-DIP RESISTOR
(KE model only)

Relays and Control Unit Locations

Dashboard

NOTE: RHD type is symmetrical to LHD type.

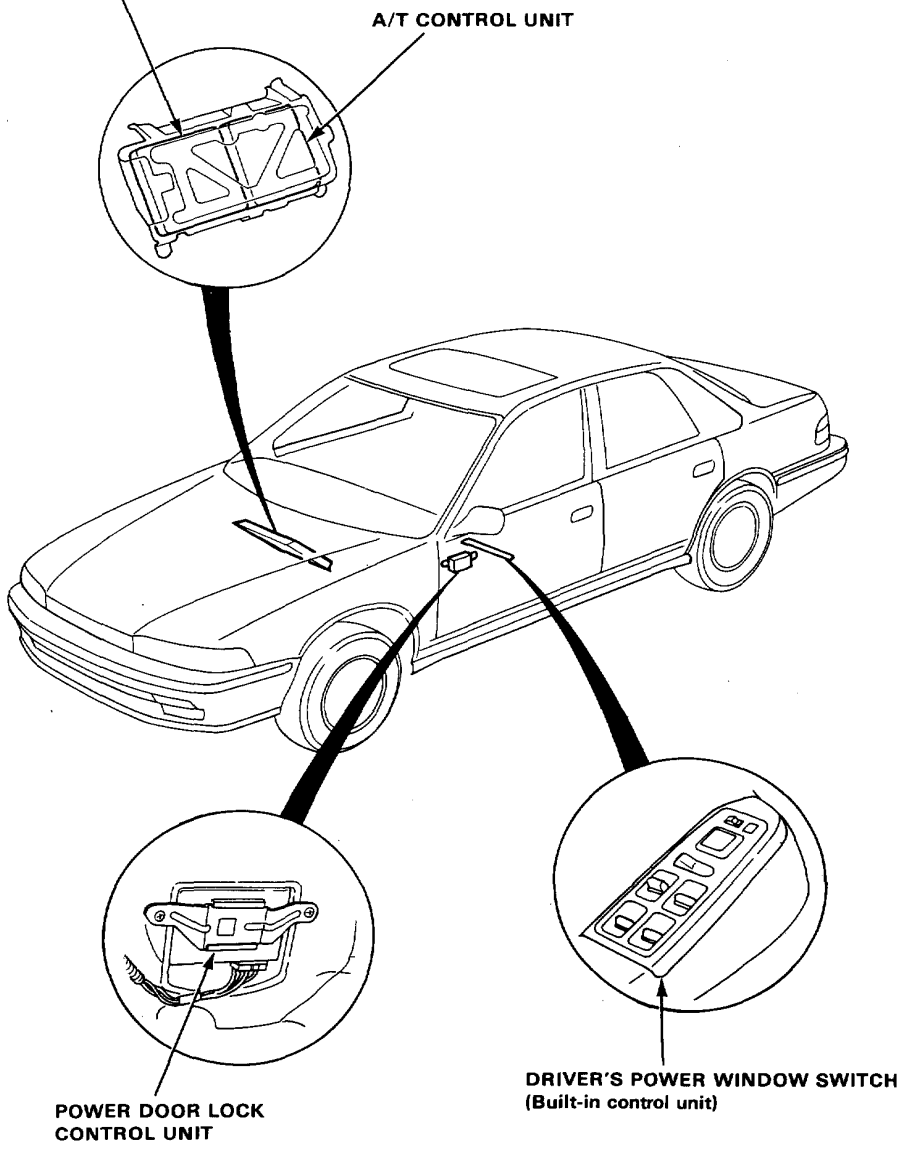


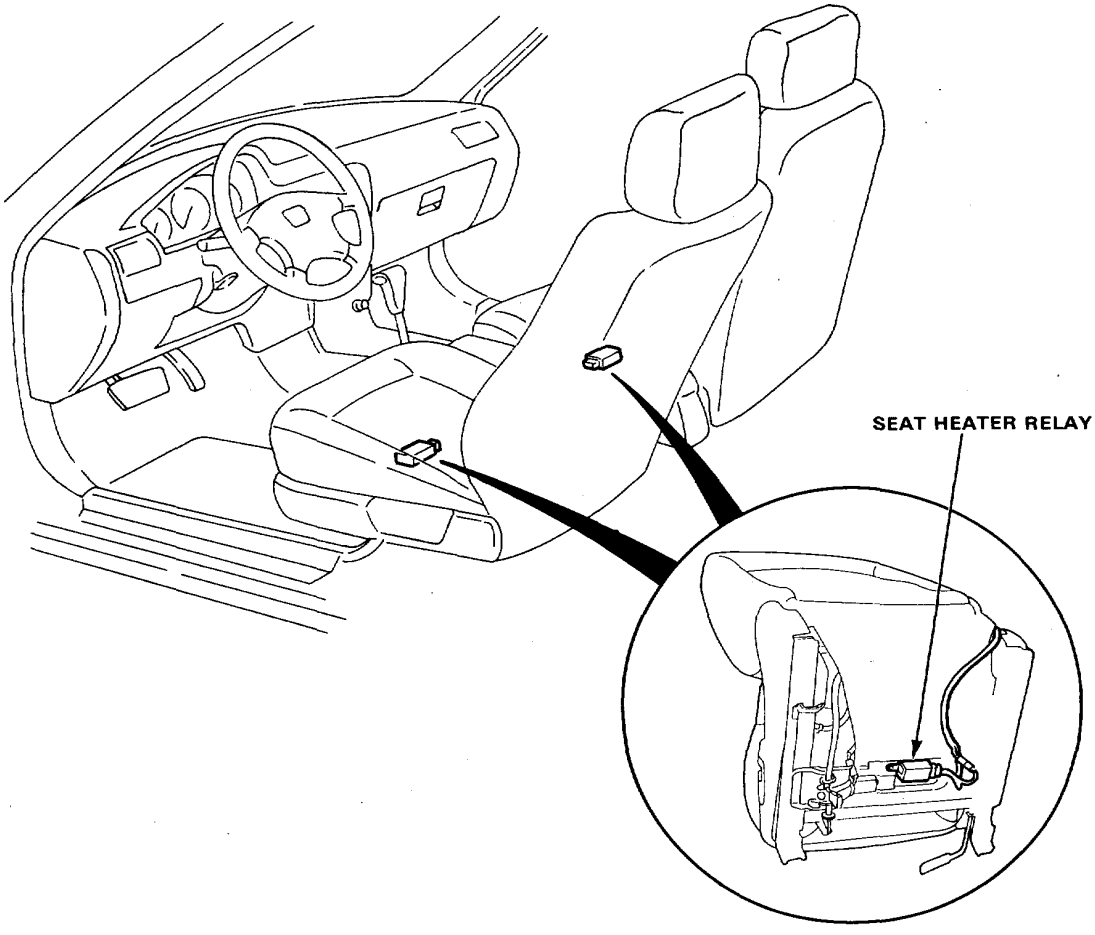

CIGARETTE LIGHTER RELAY
(Wire colors: WHT/BLU, YEL/RED
WHT/RED and BLK)
SERVICE
CHECK
CONNECTOR
DELAY RELAY
(Carbureted engine)
SEAT HEATER MAIN RELAY
(KS, KW and KX models only)
(Wire colors: YEL/BLK, WHT/BLK
BLK/GRN and BLK)
ENGINE MOUNT CONTROL
UNIT (A/T only)
HEADLIGHT WASHER CONTROL UNIT
(European model only)

Relays and Control Unit Locations

Floor and Door

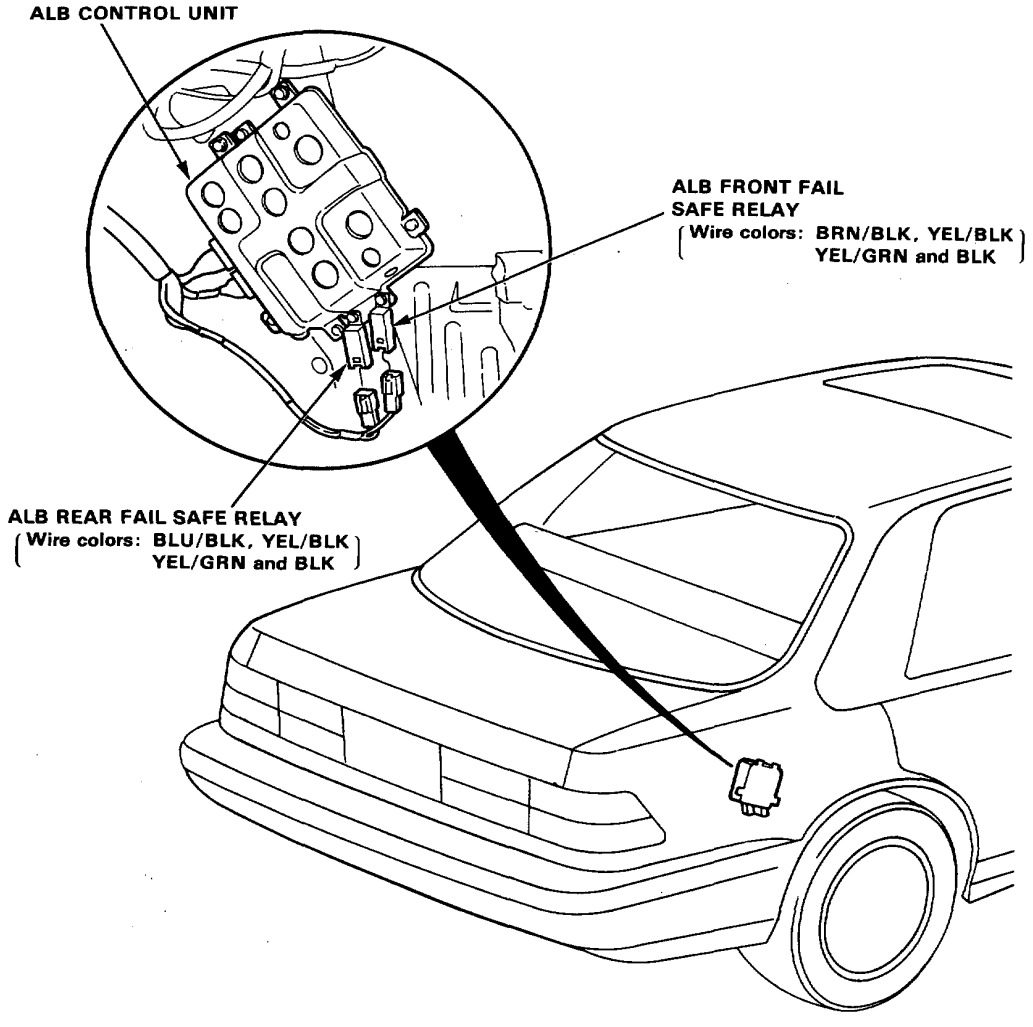
NOTE: RHD type is symmetrical to LHD type.
Fuel-injected engine: PGM-FI ECU
Carbureted engine: PGM-CARB. CONTROL UNIT (Except KP and KT models)




SEAT HEATER RELAY

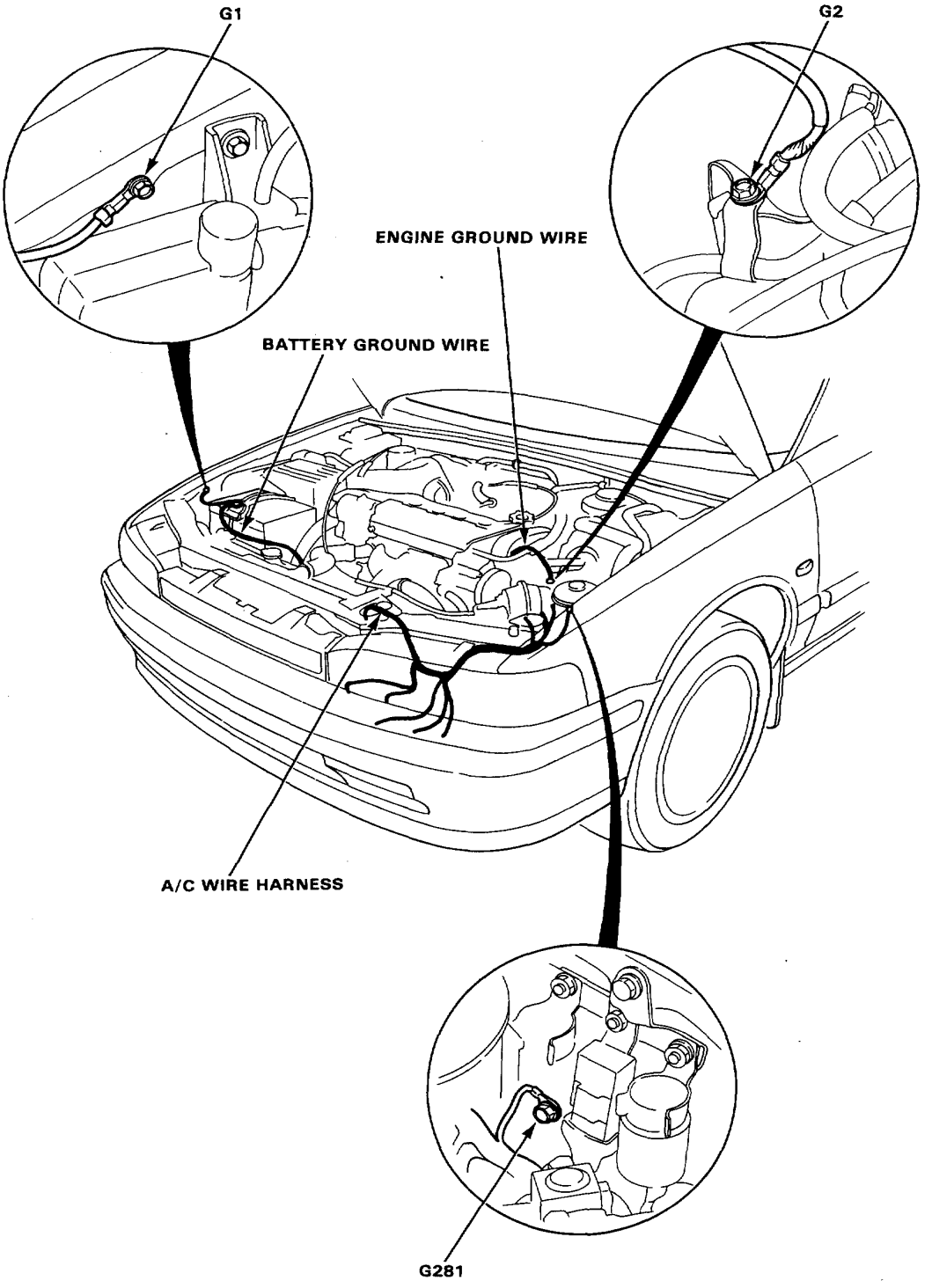
Relays and Control Unit Locations

Trunk



Wire Harness and Ground Locations

Engine Compartment

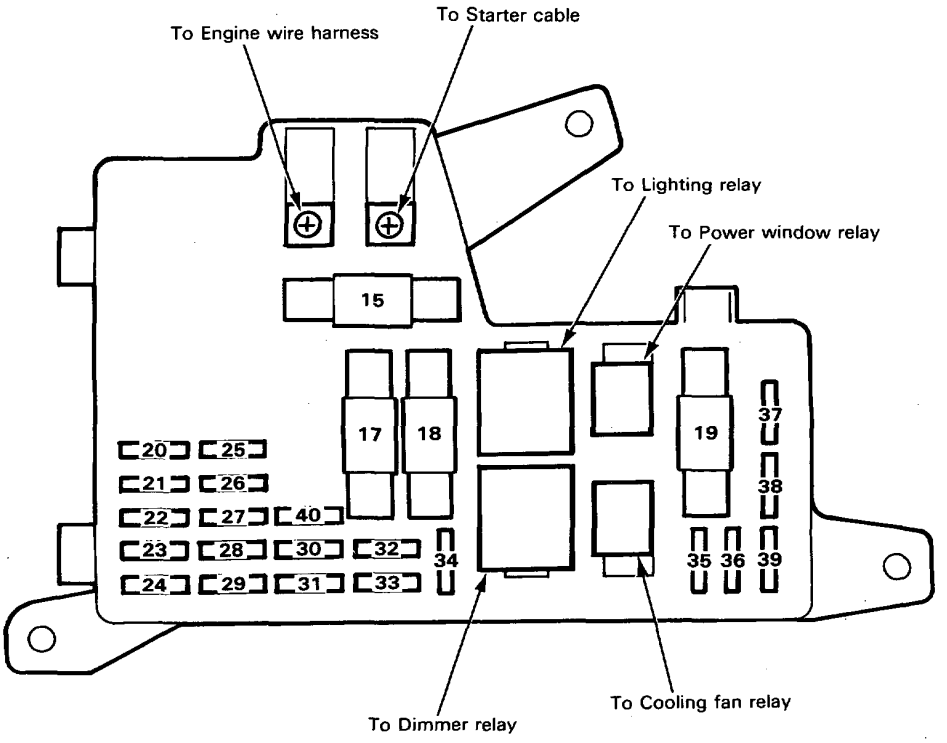


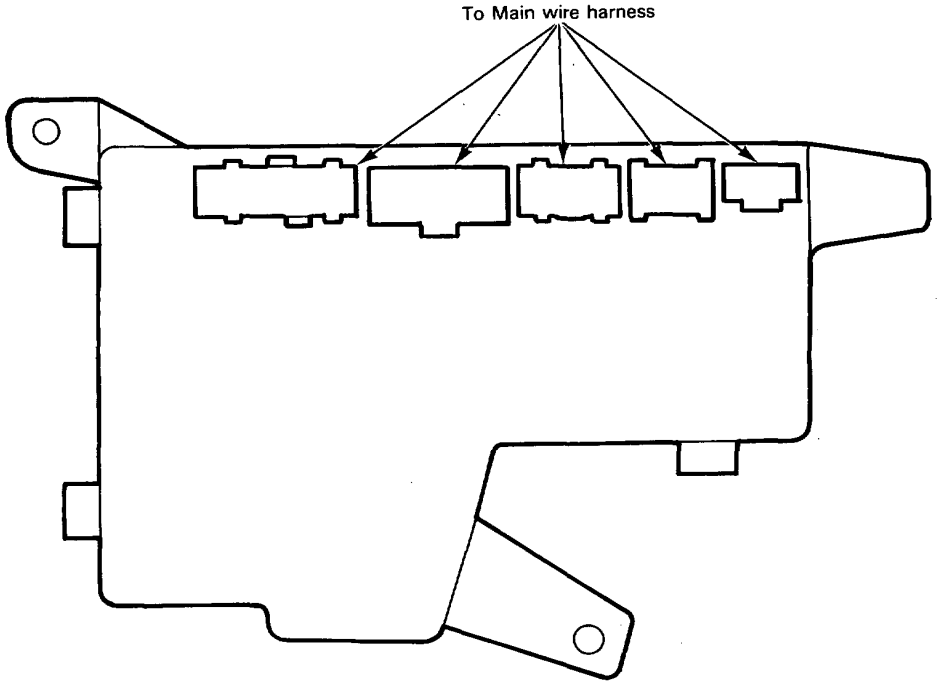
(cont'd)

Fuses

Relay box

NOTE: Relay box is located right side, engine compartment.

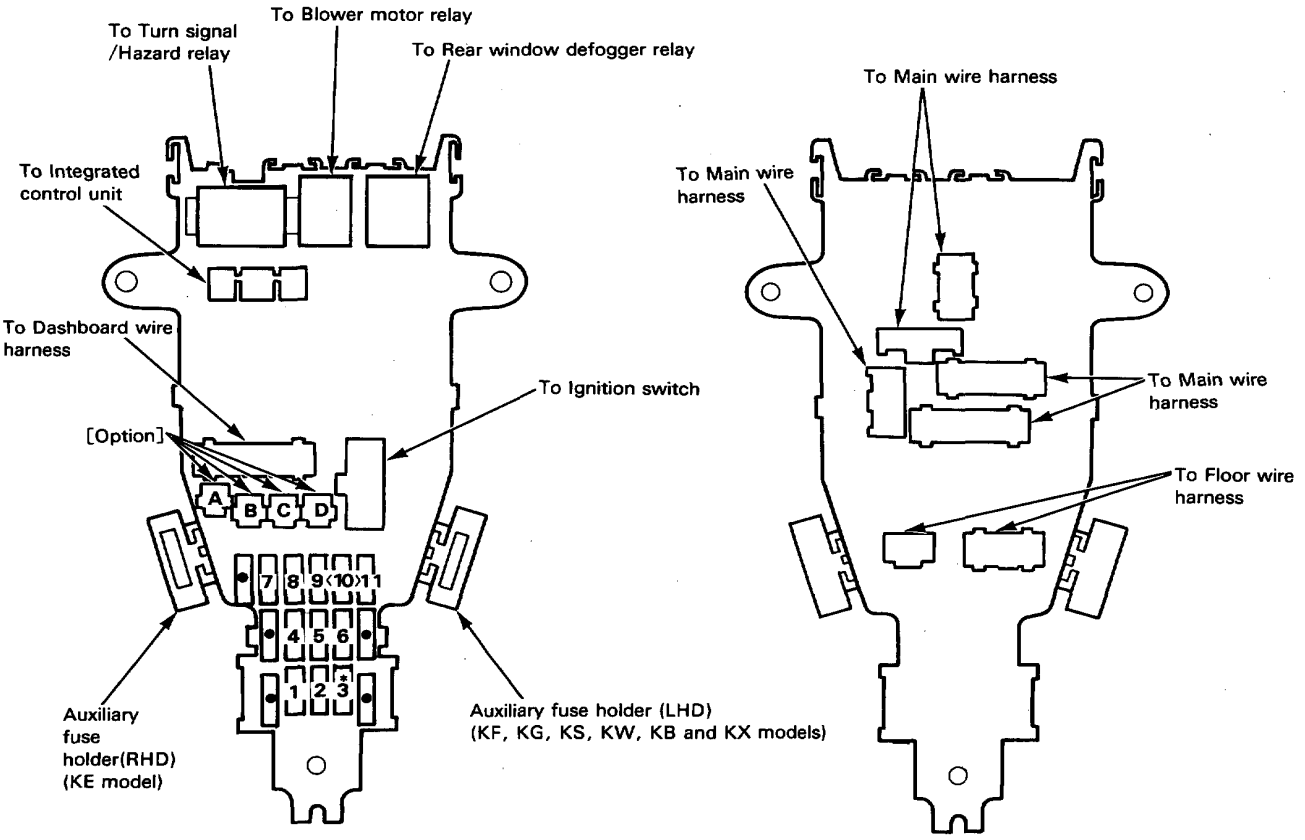




Fuses

Dash Fuse Box

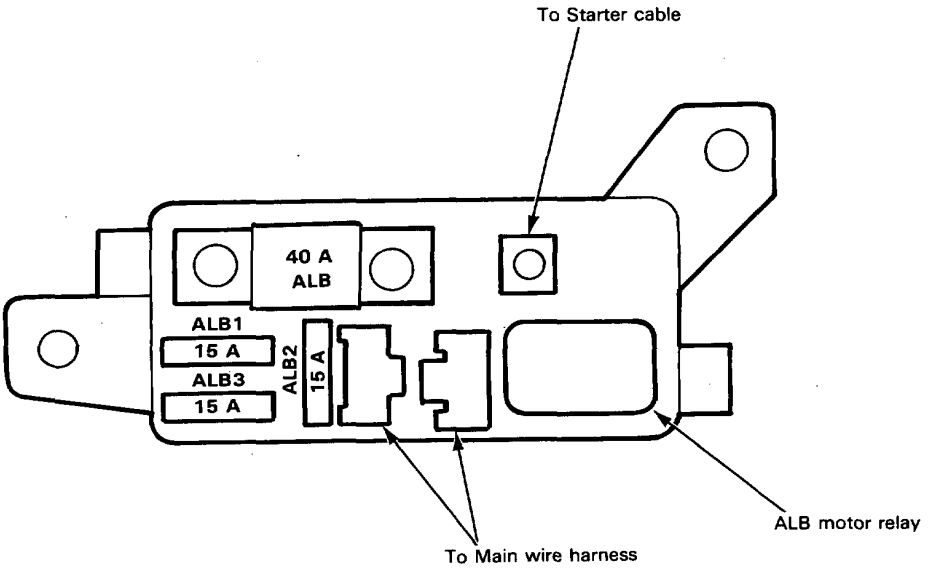
NOTE: Dash fuse box is located behind left kick panel (LHD) or right kick panel (RHD).



● :Spare fuse
* :Not used
<>:KS, KW and KE models only

ALB Fuse Box

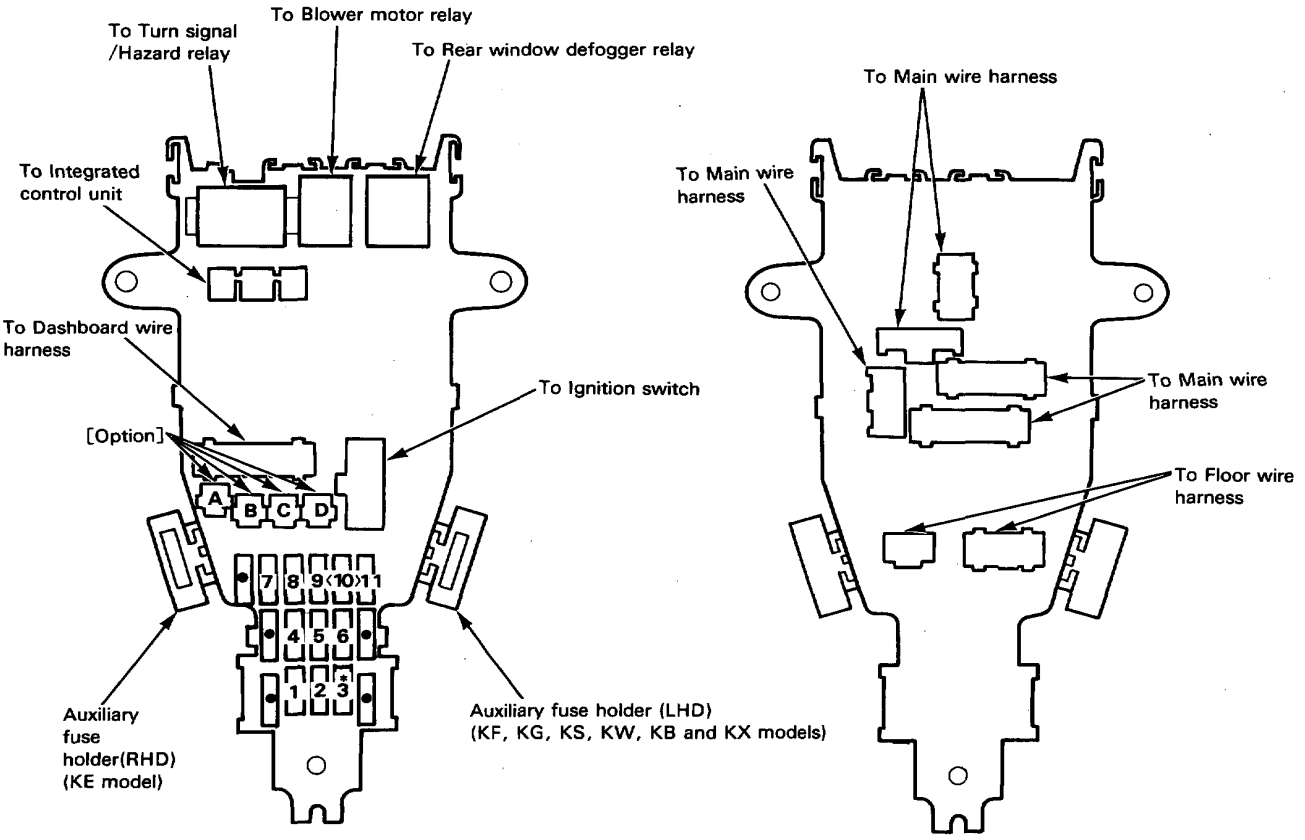
NOTE: ALB fuse box is located right side, engine compartment.



Fuses

Dash Fuse Box

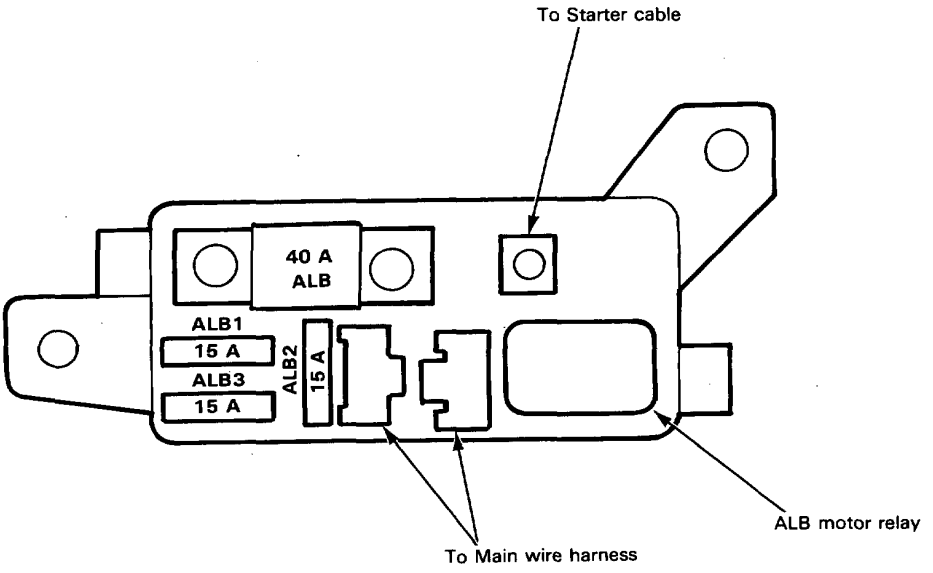
NOTE: Dash fuse box is located behind left kick panel (LHD) or right kick panel (RHD).



● :Spare fuse
* :Not used
<>:KS, KW and KE models only

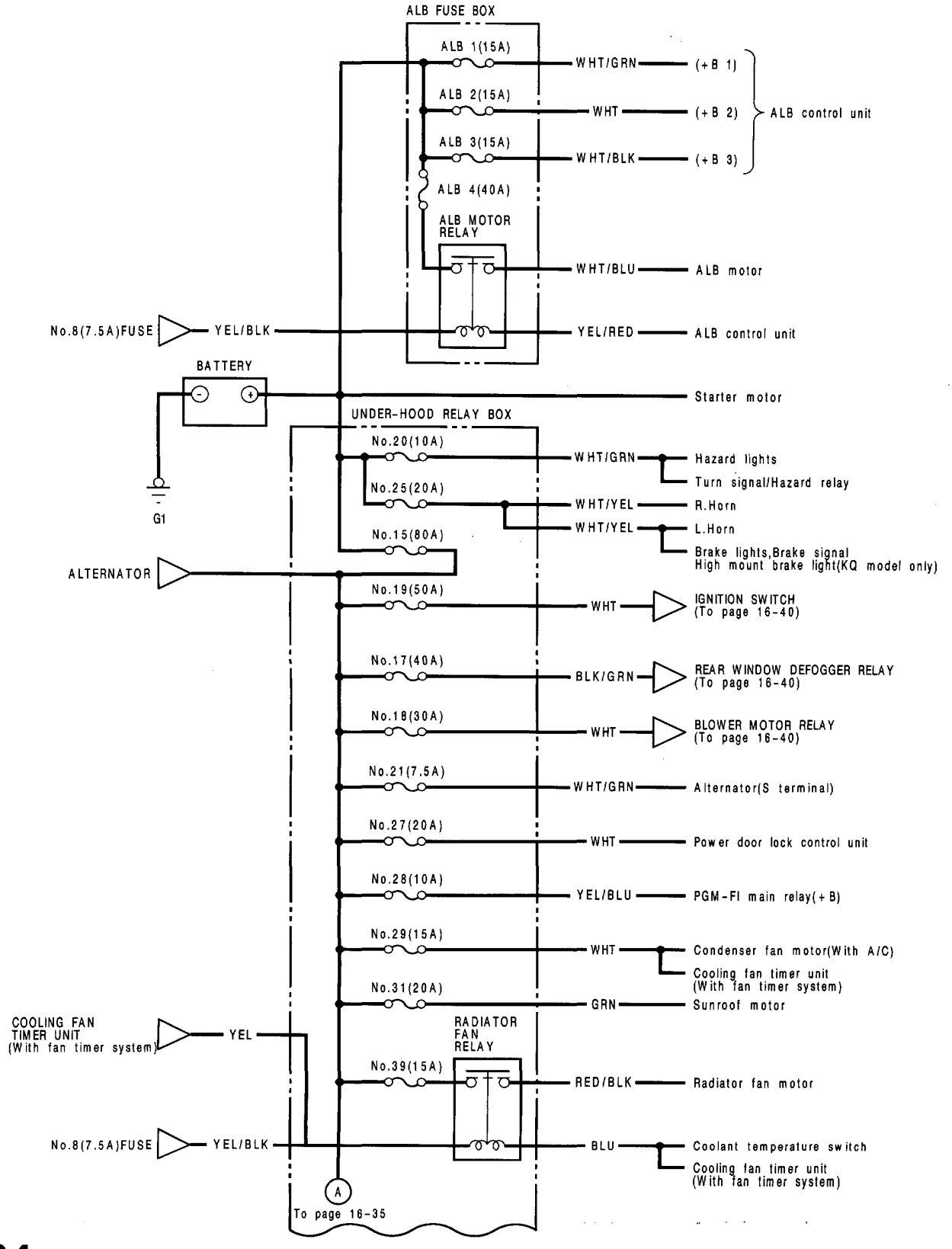
ALB Fuse Box

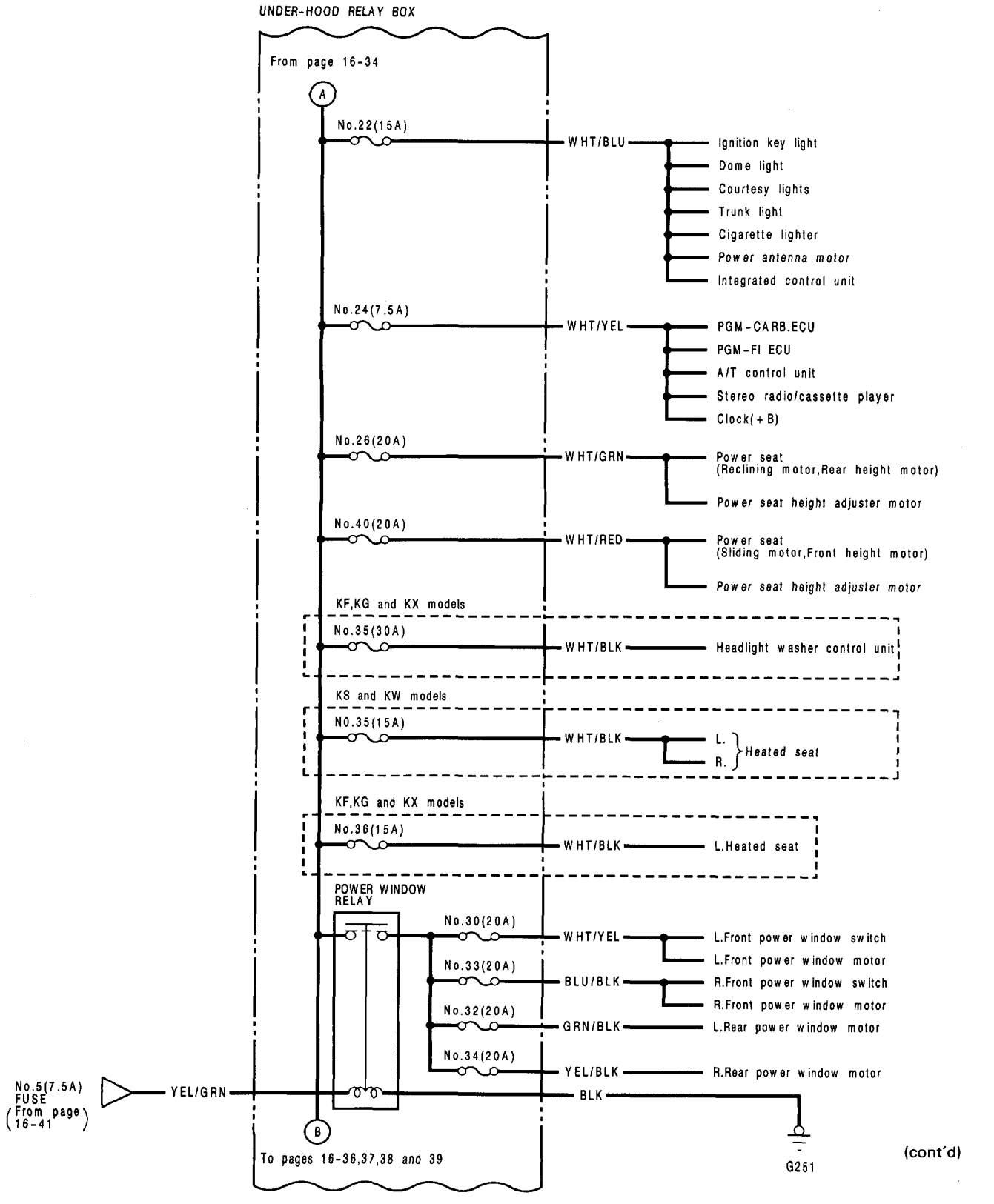
NOTE: ALB fuse box is located right side, engine compartment.



Power Distribution

Circuit Identification



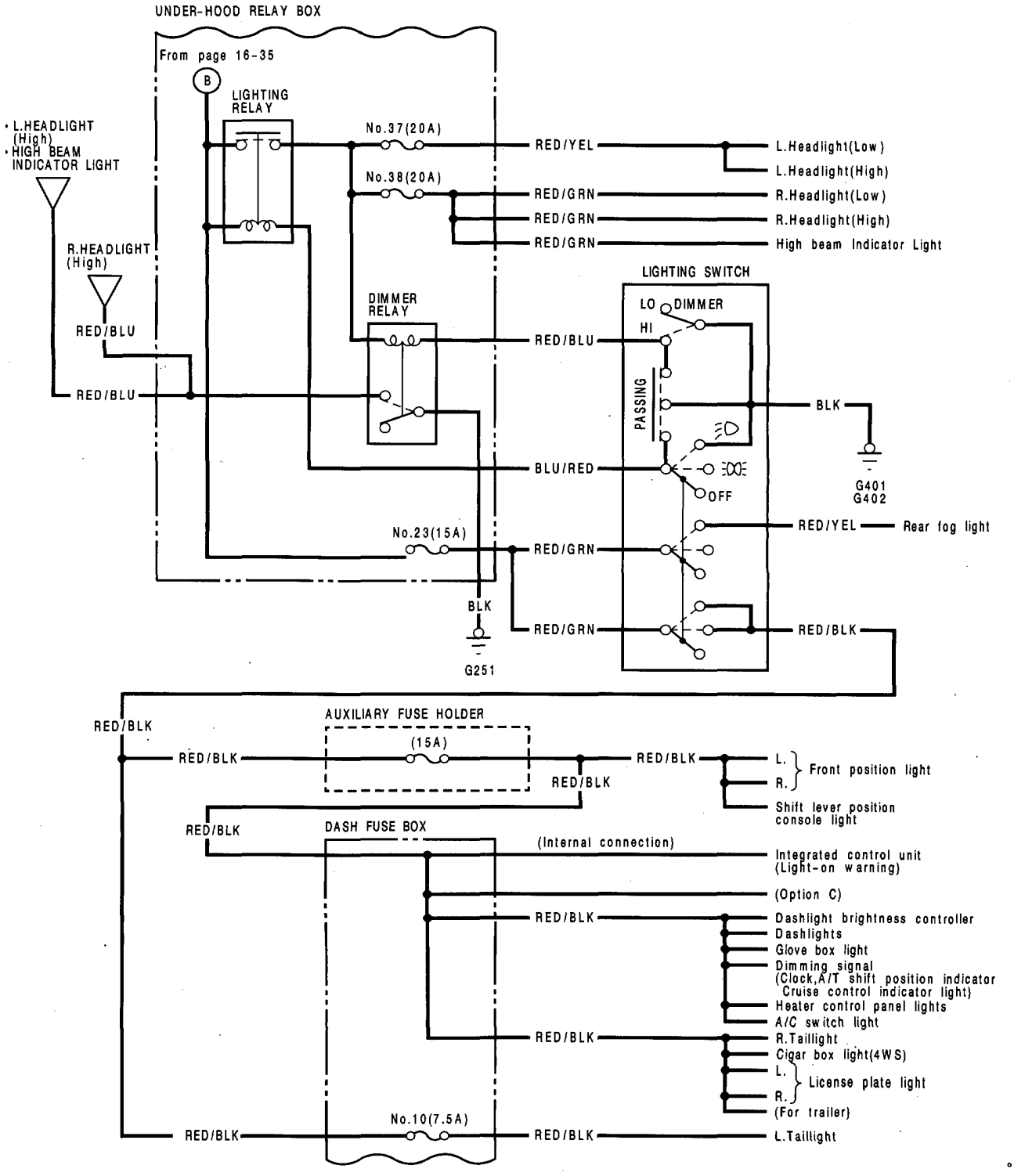

UNDER-HOOD RELAY BOX
From page 16-34
A
No.22(15A)
WHT/BLU
Ignition key light
Dome light
Courtesy lights
Trunk light
Cigarette lighter
Power antenna motor
Integrated control unit
No.24(7.5A)
WHT/YEL
PGM-CARB.ECU
PGM-FI ECU
A/T control unit
Stereo radio/cassette player
Clock(+B)
No.26(20A)
WHT/GRN
Power seat
(Reclining motor,Rear height motor)
Power seat height adjuster motor
No.40(20A)
WHT/RED
Power seat
(Sliding motor,Front height motor)
Power seat height adjuster motor
KF,KG and KX models
No.35(30A)
WHT/BLK
Headlight washer control unit
KS and KW models
NO.35(15A)
WHT/BLK
L.
R.
Heated seat
KF,KG and KX models
No.36(15A)
WHT/BLK
L.Heated seat
POWER WINDOW
RELAY
No.30(20A)
WHT/YEL
L.Front power window switch
L.Front power window motor
No.33(20A)
BLU/BLK
R.Front power window switch
R.Front power window motor
No.32(20A)
GRN/BLK
L.Rear power window motor
No.34(20A)
YEL/BLK
R.Rear power window motor
No.5(7.5A)
FUSE
(From page 16-41)
YEL/GRN
BLK
G251
B
To pages 16-36,37,38 and 39

(cont'd)

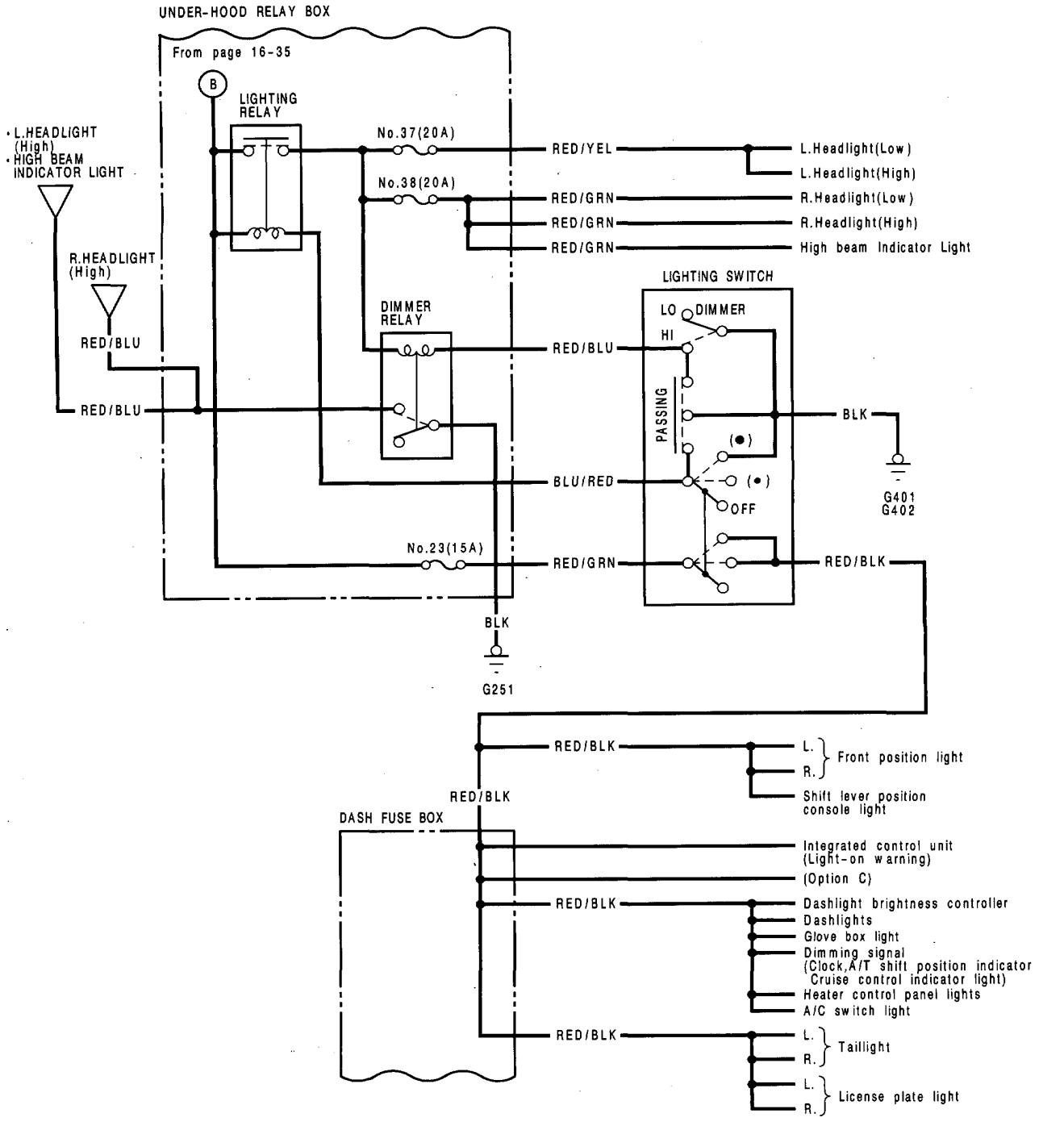
Power Distribution

Circuit Identification (cont'd)

KF, KG, KB and KX models:



KY, KQ, KP and KT models:

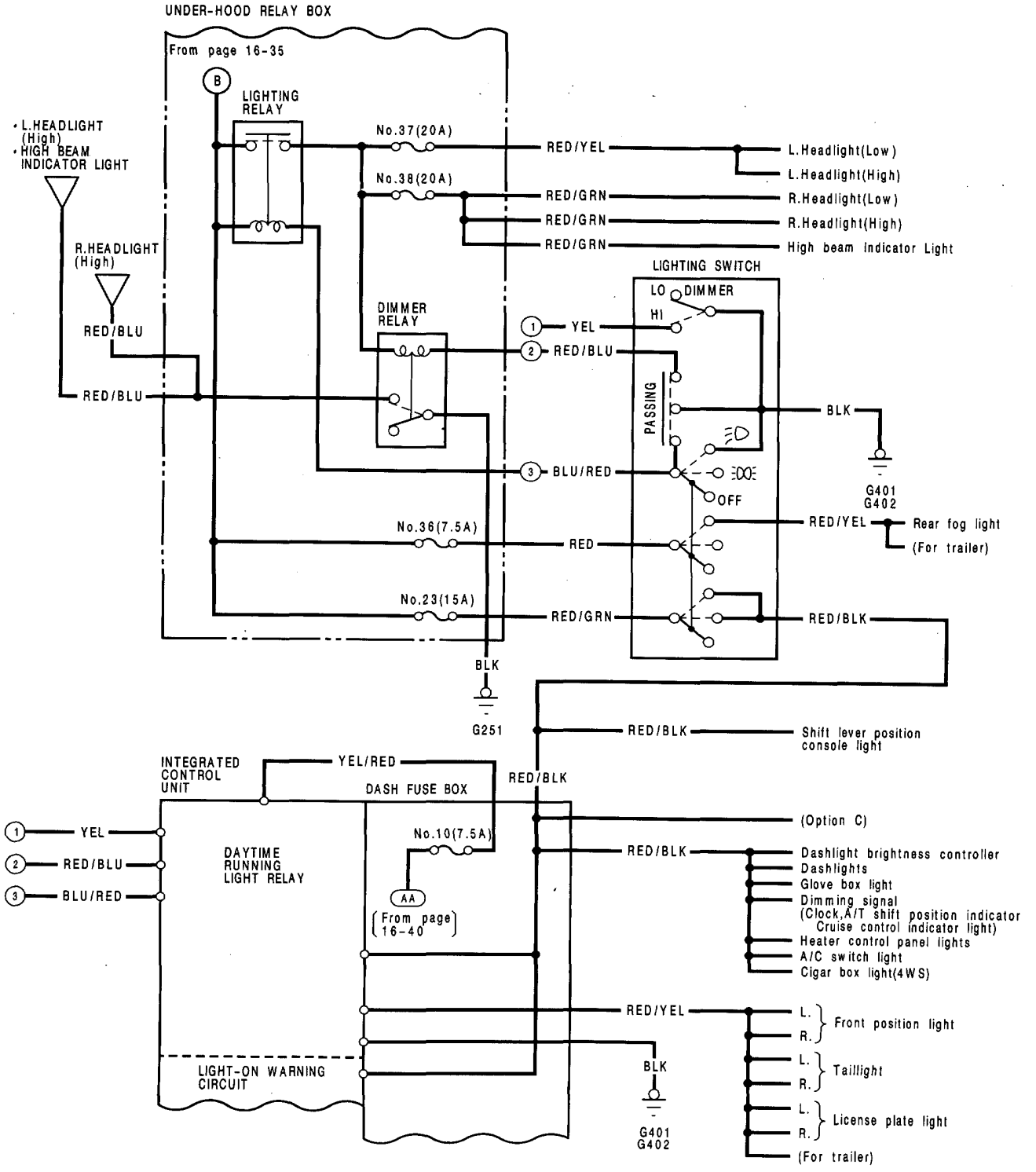


(cont'd)

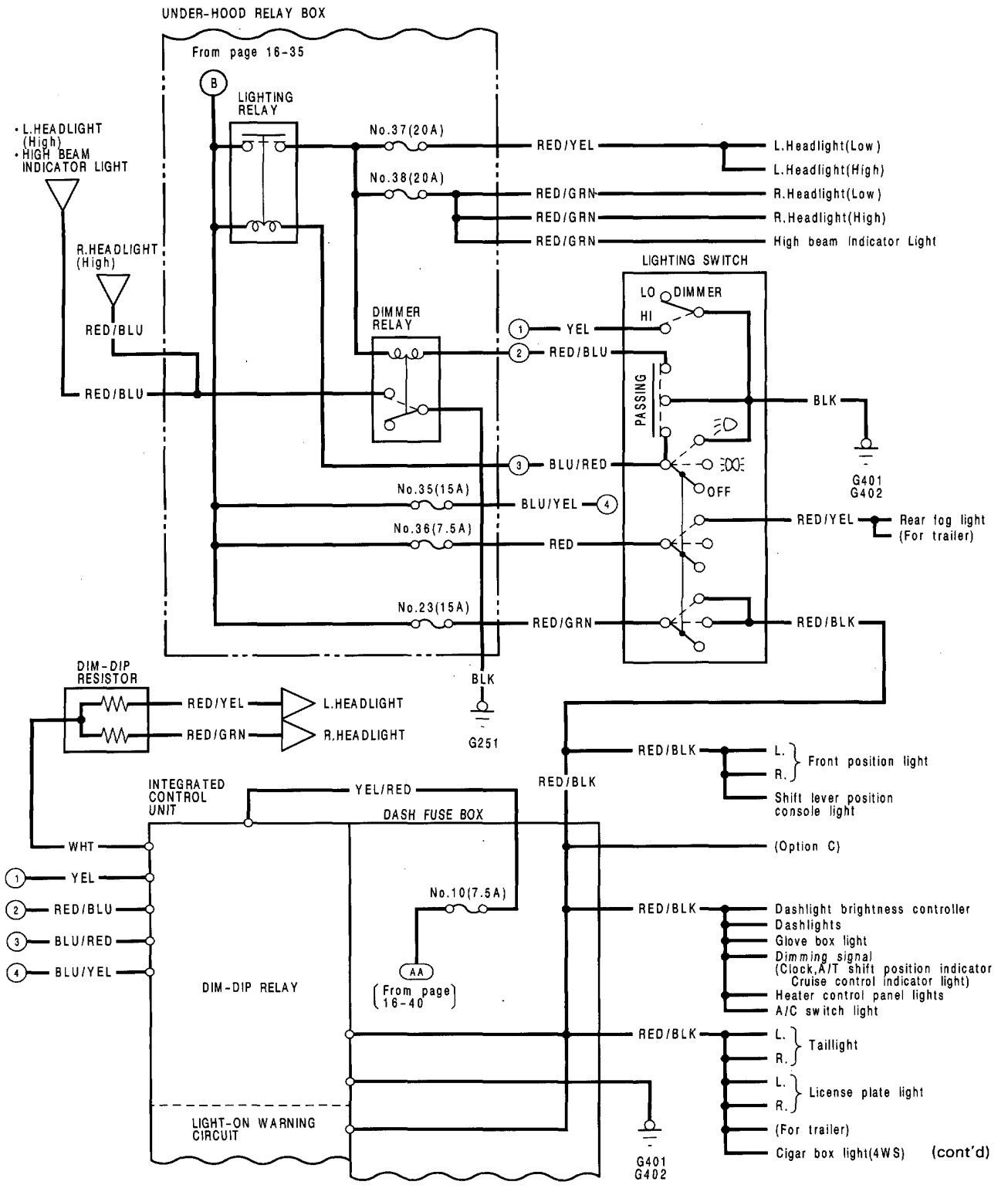
Power Distribution

Circuit Identification (cont'd)

With Daytime Light:



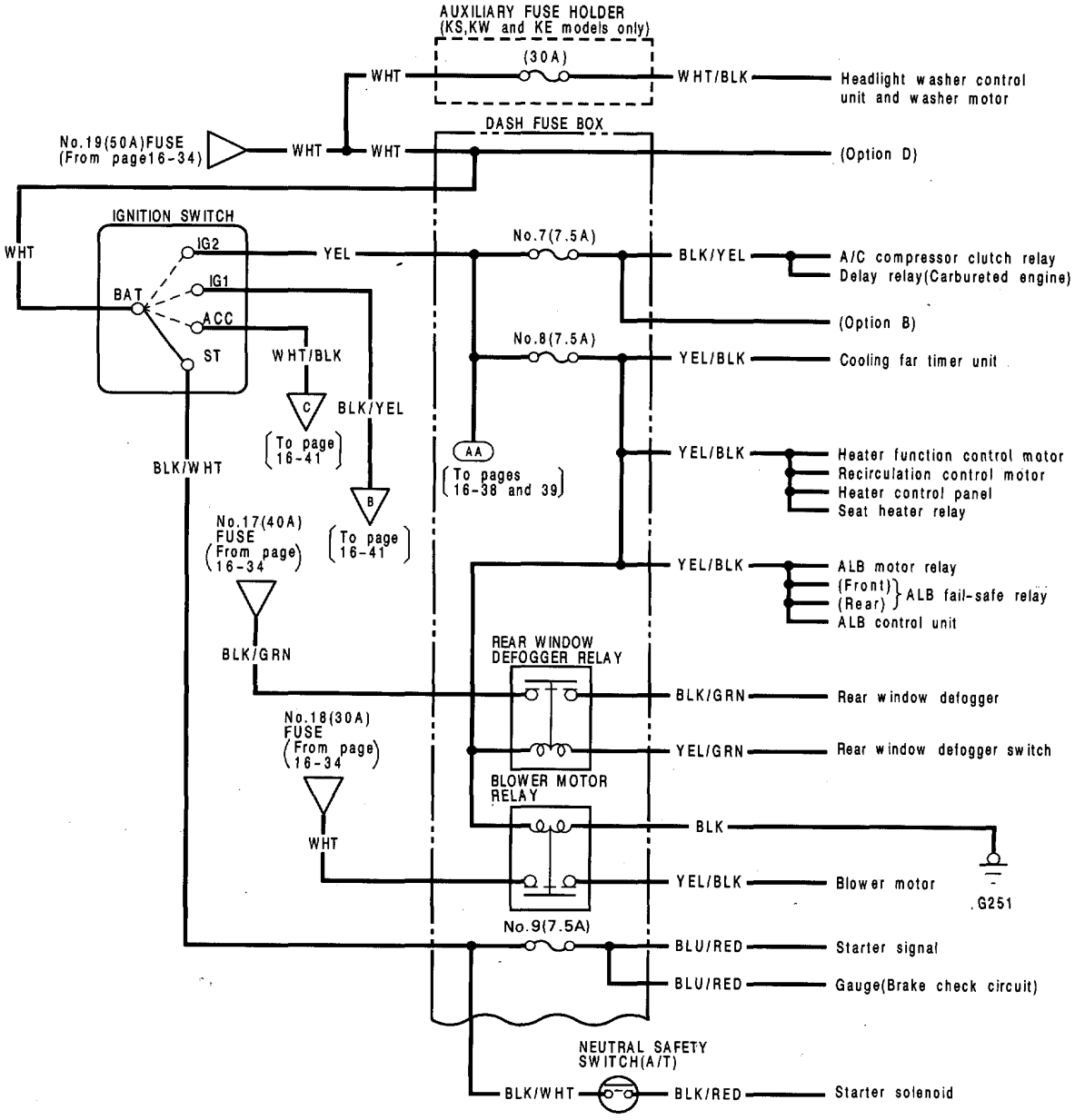
With Dim-Dip Light:

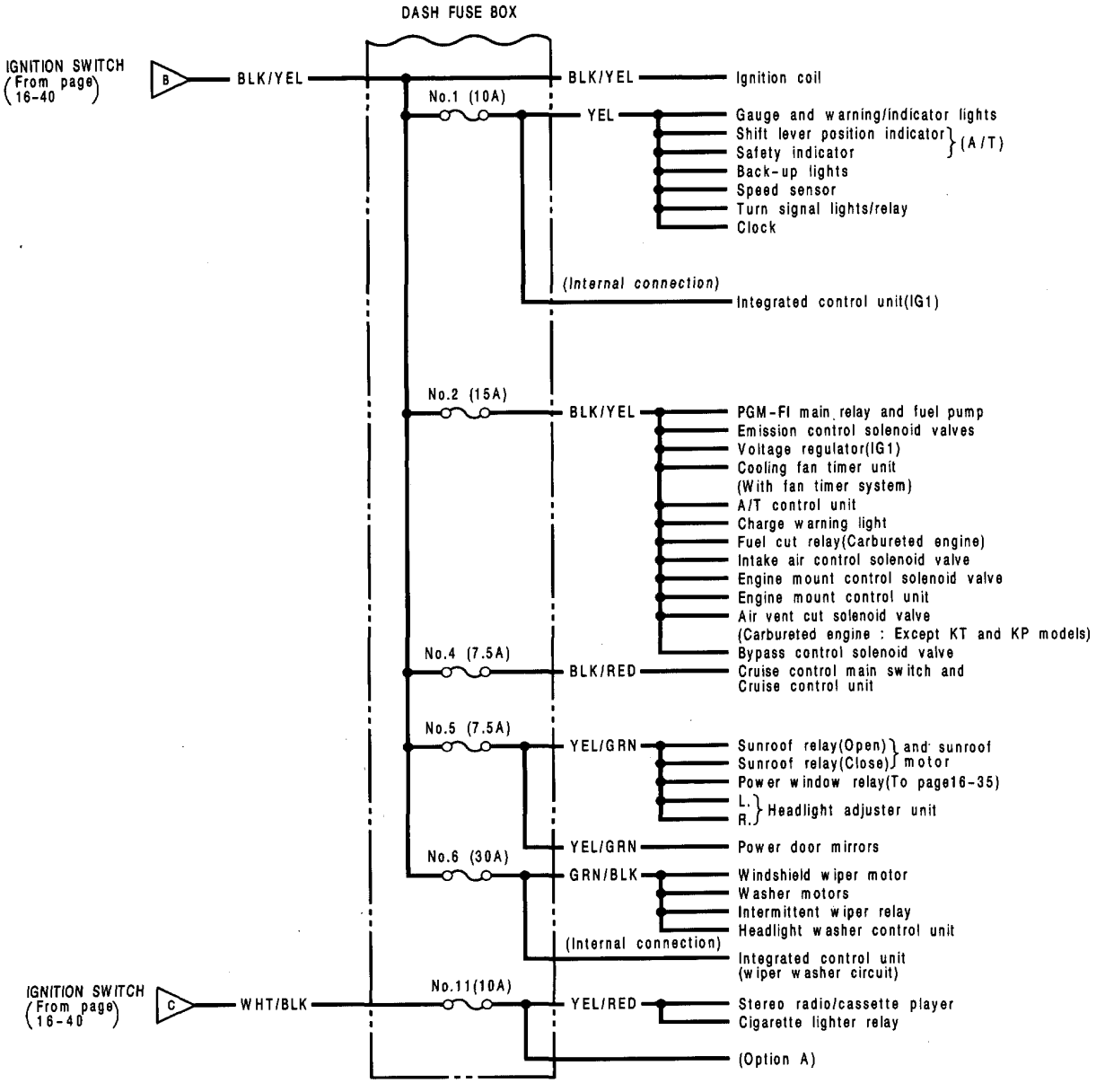


(cont'd)

Power Distribution

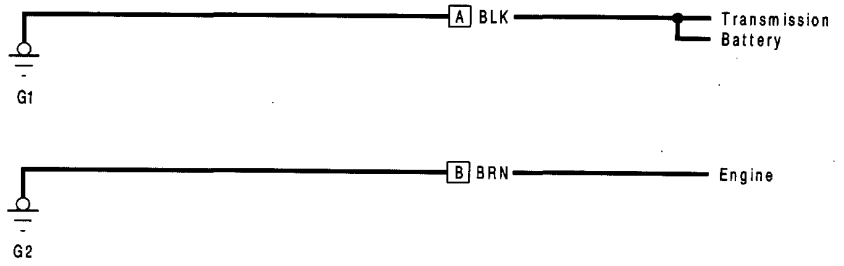
Circuit Identification (cont'd)



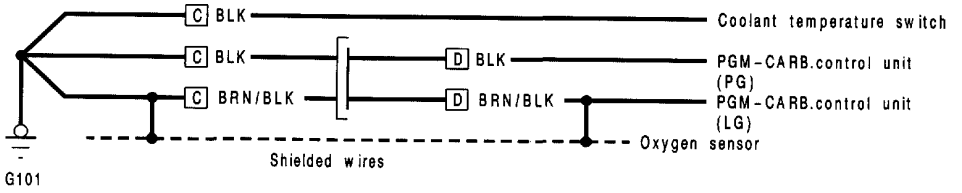

DASH FUSE BOX
IGNITION SWITCH (From page 16-40)
B
BLK/YEL
BLK/YEL
Ignition coil
No.1 (10A)
YEL
Gauge and warning/indicator lights
Shift lever position indicator } (A/T)
Safety indicator
Back-up lights
Speed sensor
Turn signal lights/relay
Clock
(Internal connection)
Integrated control unit(IG1)
No.2 (15A)
BLK/YEL
PGM-FI main relay and fuel pump
Emission control solenoid valves
Voltage regulator(IG1)
Cooling fan timer unit
(With fan timer system)
A/T control unit
Charge warning light
Fuel cut relay(Carbureted engine)
Intake air control solenoid valve
Engine mount control solenoid valve
Engine mount control unit
Air vent cut solenoid valve
(Carbureted engine : Except KT and KP models)
Bypass control solenoid valve
No.4 (7.5A)
BLK/RED
Cruise control main switch and
Cruise control unit
No.5 (7.5A)
YEL/GRN
Sunroof relay(Open) } and sunroof
Sunroof relay(Close) } motor
Power window relay(To page16-35)
L. } Headlight adjuster unit
R.
YEL/GRN
Power door mirrors
No.6 (30A)
GRN/BLK
Windshield wiper motor
Washer motors
Intermittent wiper relay
Headlight washer control unit
(Internal connection)
Integrated control unit
(wiper washer circuit)
IGNITION SWITCH (From page 16-40)
C
WHT/BLK
No.11(10A)
YEL/RED
Stereo radio/cassette player
Cigarette lighter relay
(Option A)

Ground Distribution

Circuit Identification

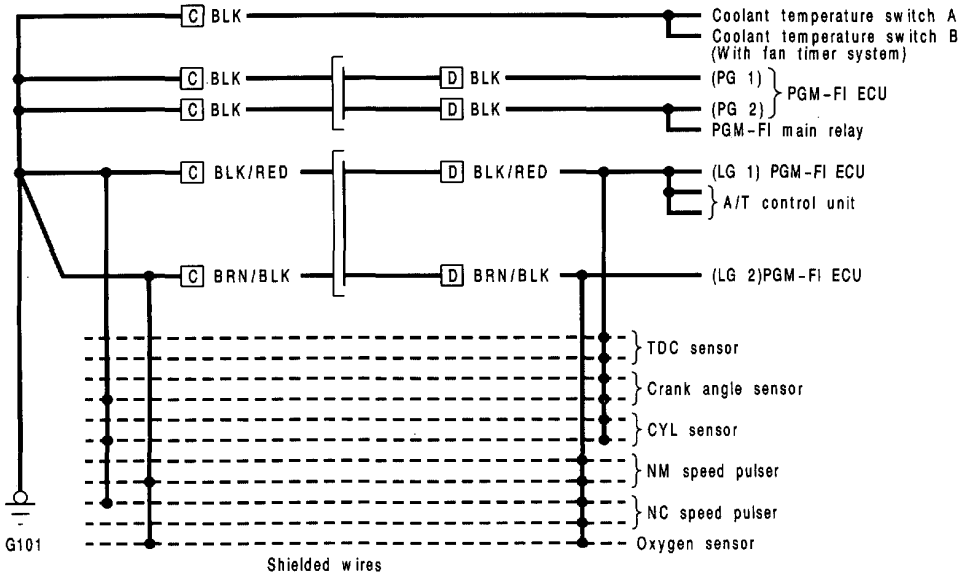


Carbureted Engine:



A : Battery ground wire
B : Engine ground wire
C : Engine wire harness
D : Main wire harness

Fuel-Injected Engine:



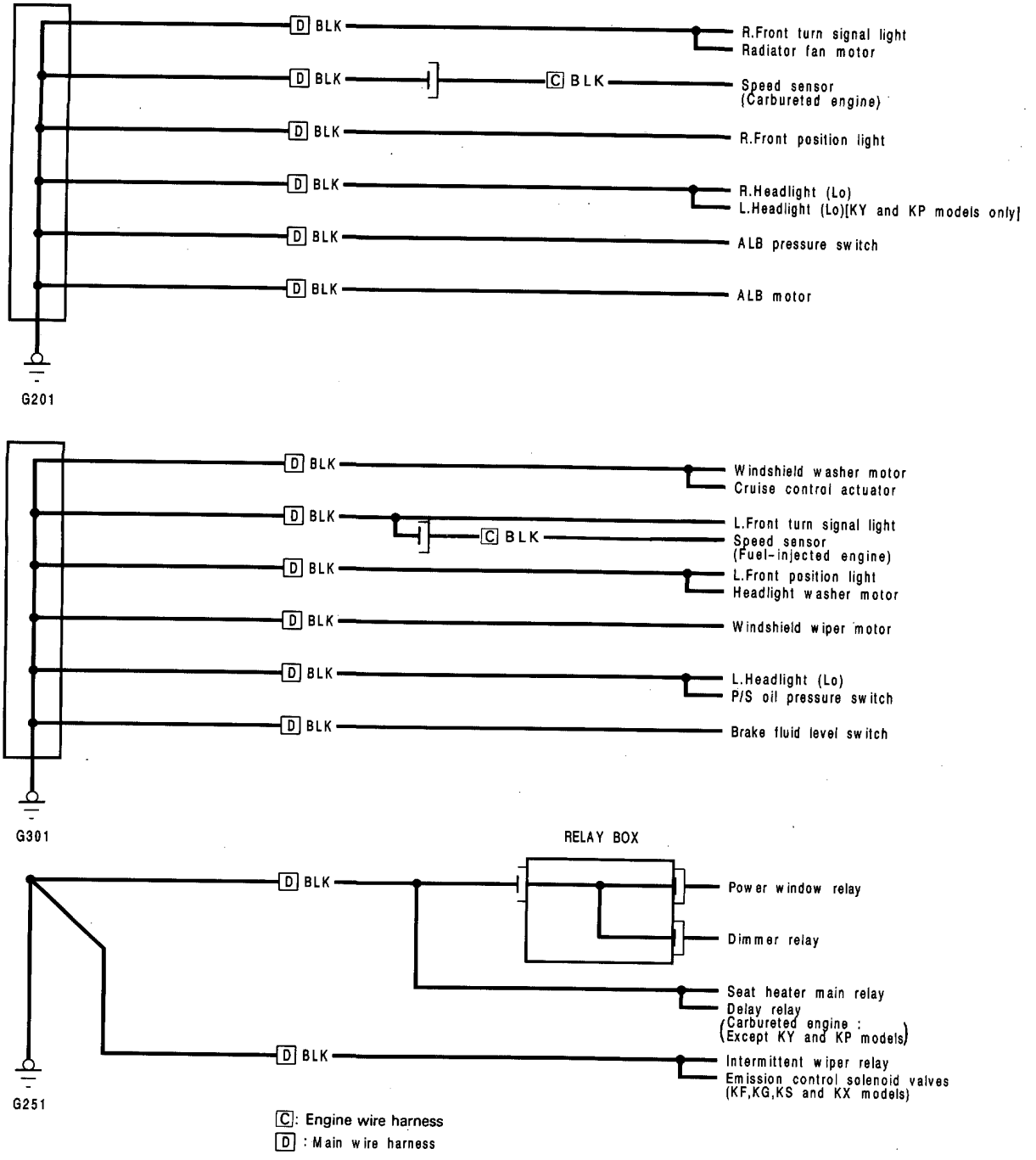
C : Engine wire harness
D : Main wire harness

(cont'd)

Ground Distribution

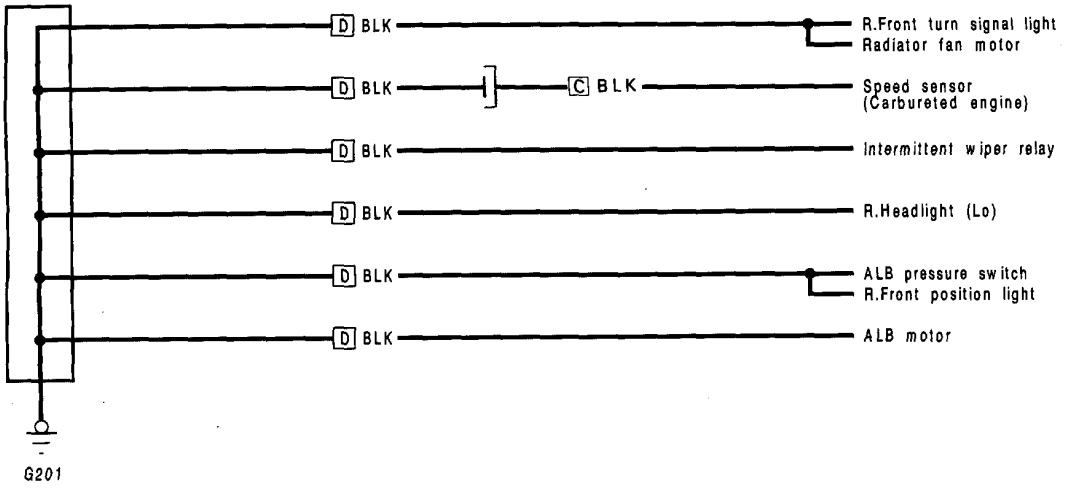
Circuit Identification (LHD)

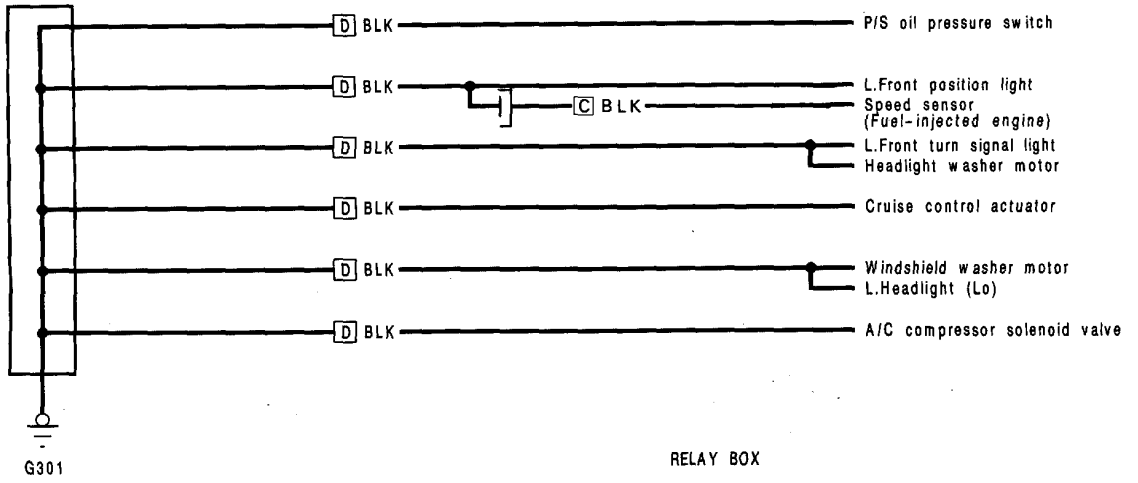
NOTE: See page 16-19 for illustrated ground locations.

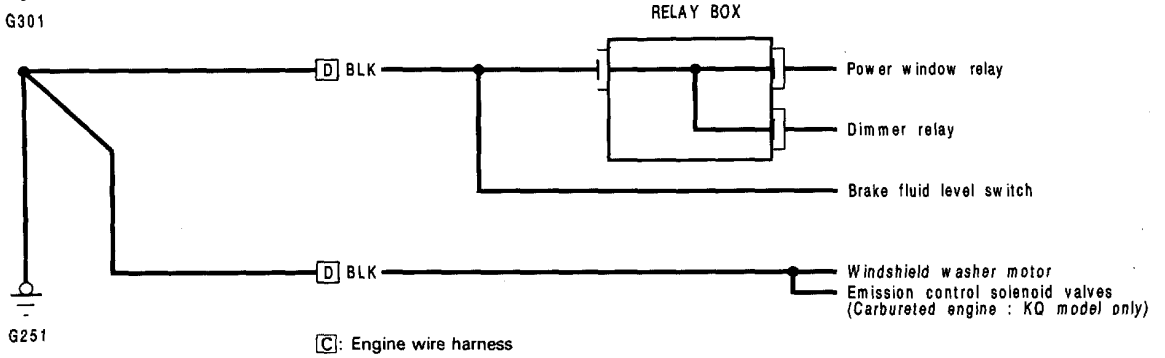


(RHD)

NOTE: See page 16-19 for illustrated ground locations.







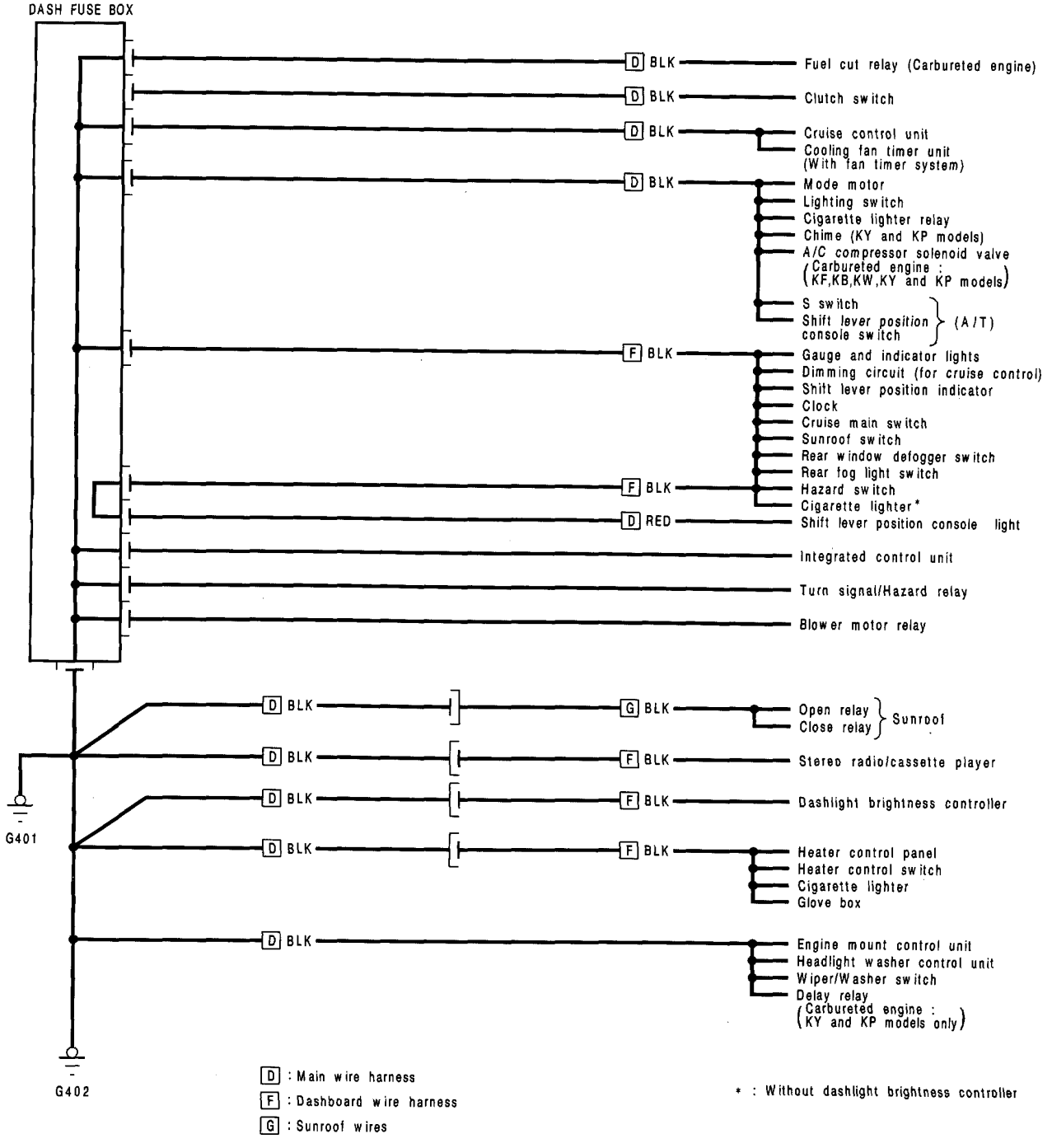
C: Engine wire harness
D : Main wire harness

(cont'd)

Ground Distribution

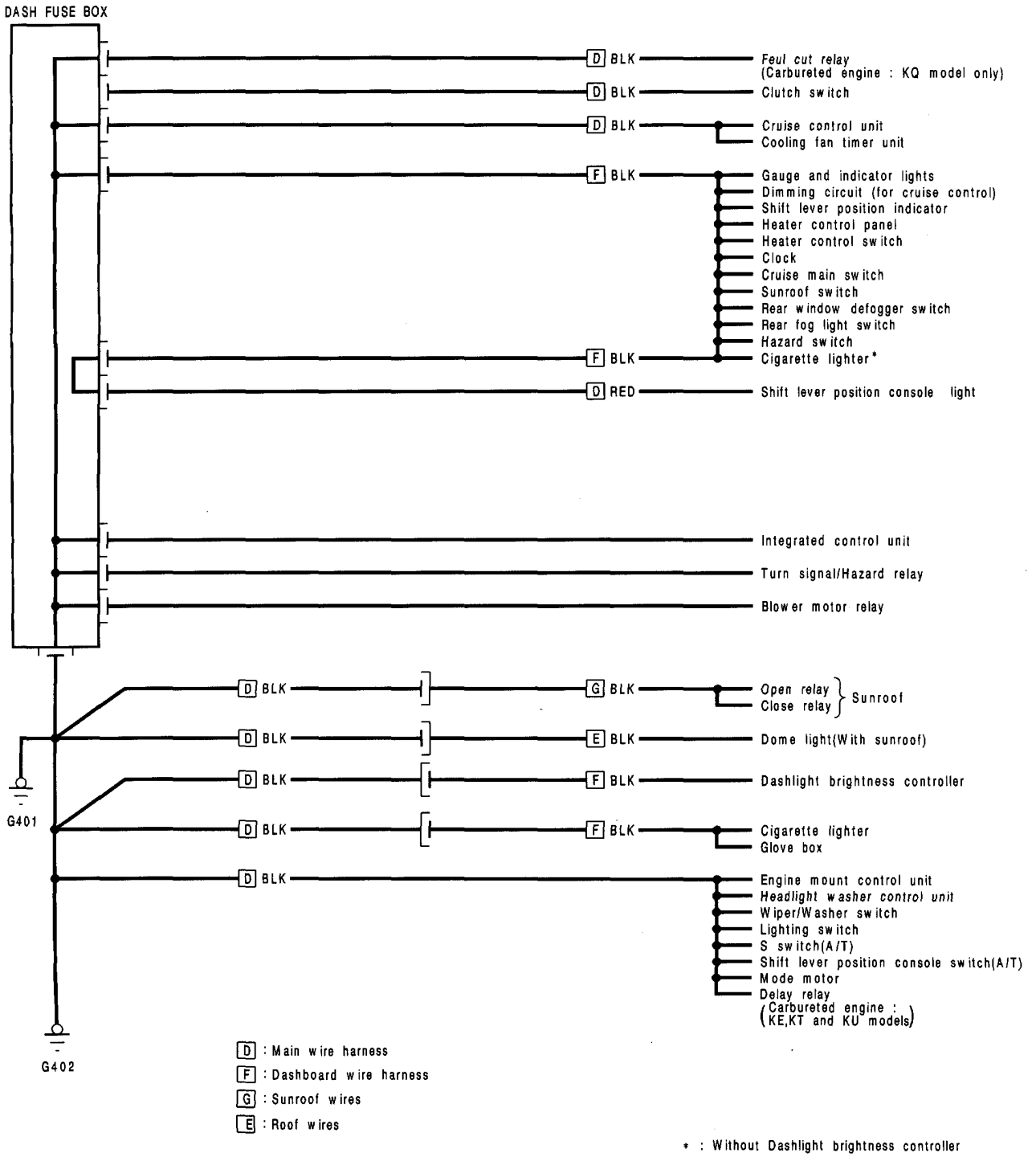
Circuit Identification (LHD)

NOTE: See page 16-20 for illustrated ground locations.



(RHD)

NOTE: See page 16-21 for illustrated ground locations.

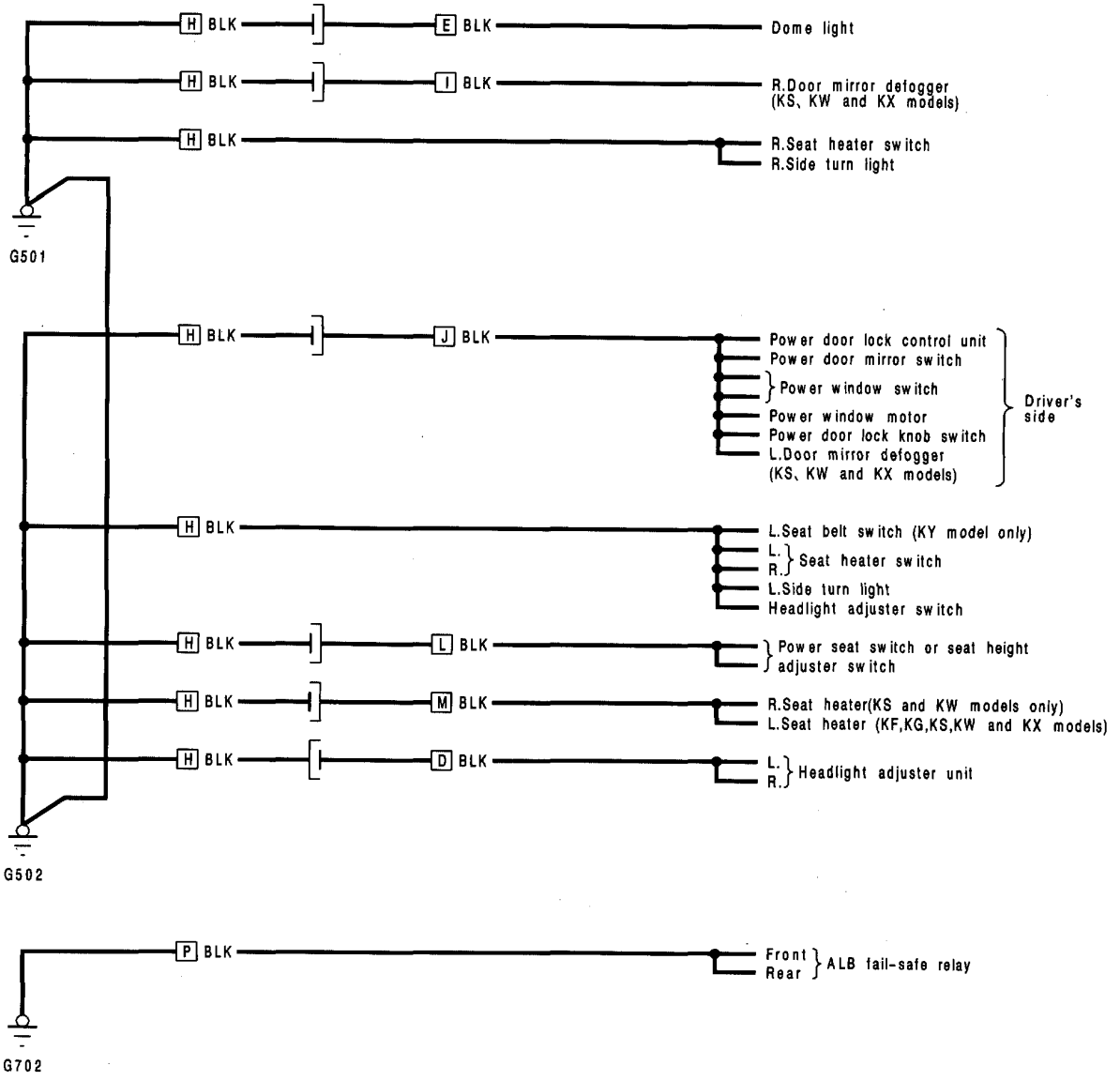


(cont'd)

Ground Distribution

Circuit Identification (LHD)

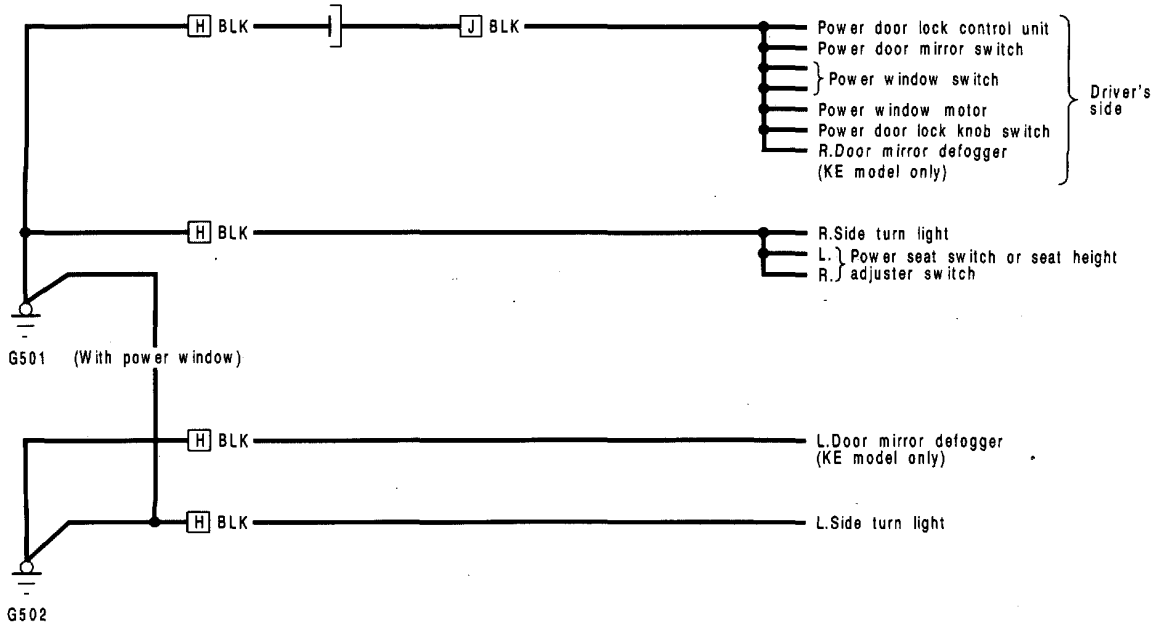
NOTE: See page 16-22 for illustrated ground locations.



D : Main wire harness
E : Roof wires
H : Floor wire harness
I : Right front door wire harness
J : Driver door wire harness
L : Power seat wires
M : Seat heater wires
P : Rear wire harness

(RHD)

NOTE: See page 16-23 for illustrated ground locations.

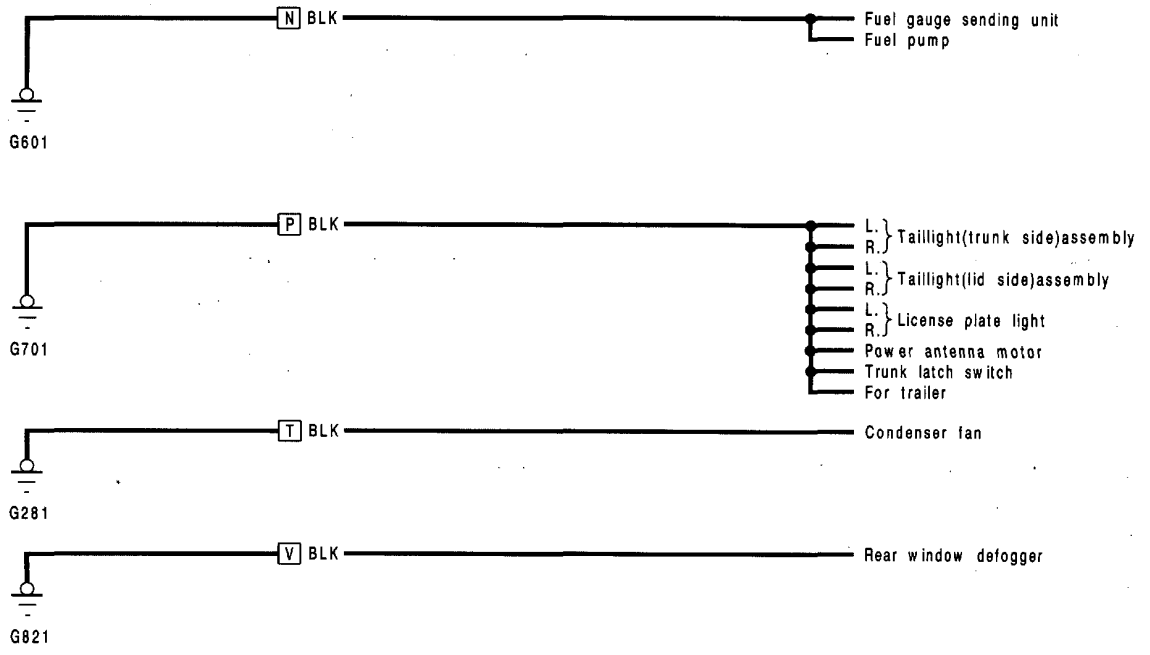


H : Floor wire harness
J : Driver door wire harness

Ground Distribution

Circuit Identification (LHD)

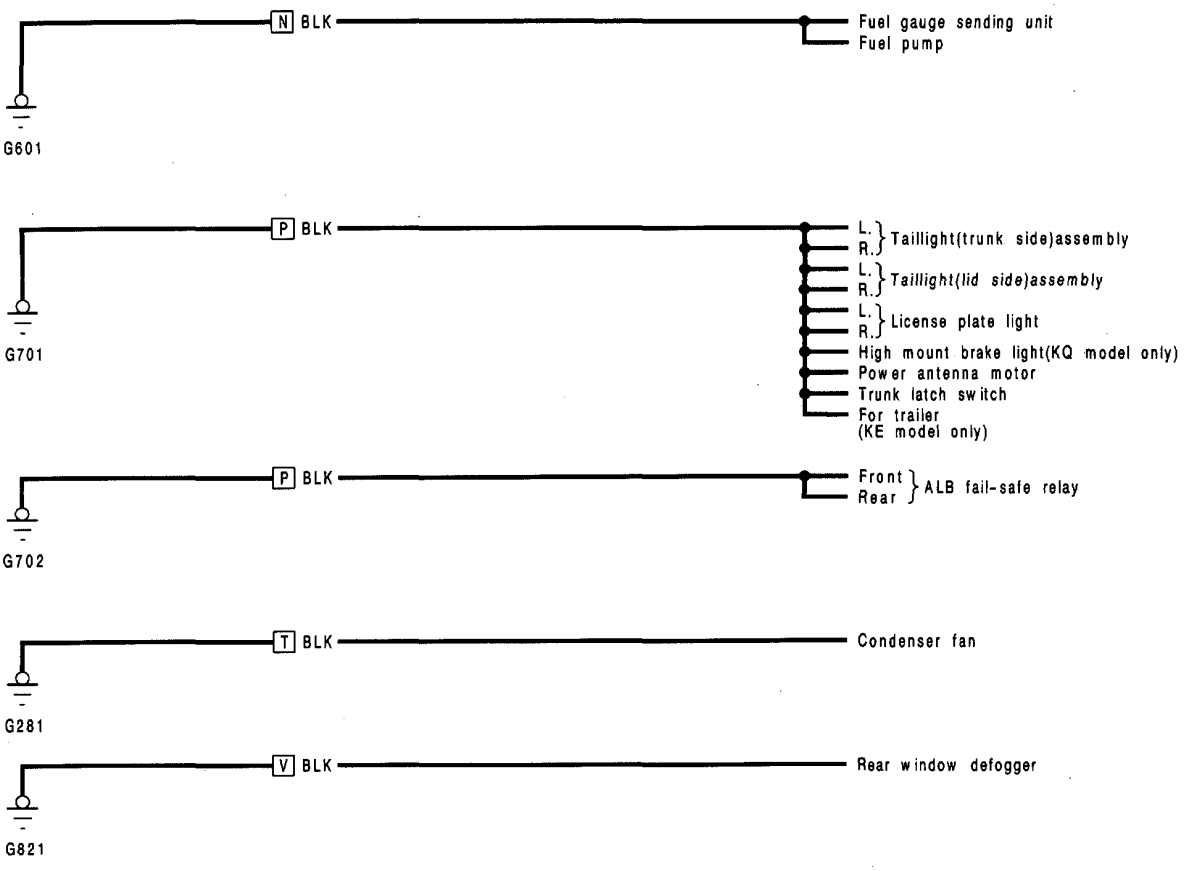
NOTE: See pages 16-17, 26 and 30 for illustrated ground locations.



N : Fuel tank wires
P : Rear wire harness
T : A/C wire harness
V : Defogger ground wire

(RHD)

NOTE: See pages 16-17, 27 and 30 for illustrated ground locations.



N : Fuel tank wires
P : Rear wire harness
T : A/C wire harness
V : Defogger ground wire

Battery

Test

NOTE: To get accurate results, the temperature of the electrolyte must be between 15 and 38°C (59 and 100°F) before testing.

Test Equipment Required:

- Battery tester with:
  Voltmeter with 0–18 V scale, Ammeter with 0–100 A and 0–500 A scales, and a carbon pile with 0–300 W.
- 12 V Battery Charger:
  Fast charge capability of 50 A and slow charge capability of 5 A.

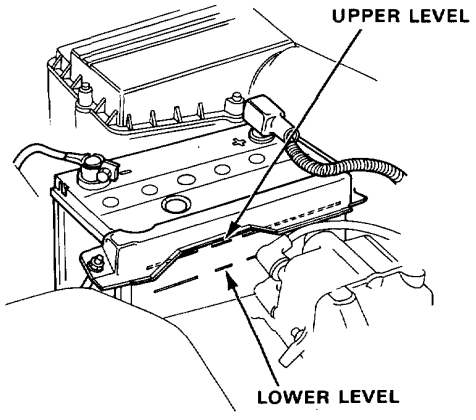
Test Procedure:

⚠WARNING Keep sparks, flames and cigarettes away while charging battery.

CAUTION: Battery electrolyte is a sulfuric acid solution.

- If it spills on painted surfaces, clothing, or skin, rinse it off with water immediately to minimize the damage.
- Always wear safety goggles or a face shield when servicing a battery.

1. Check for damage: If the case is cracked or the posts are loose, replace the battery.
2. Check the battery electrolyte level:
   Check the electrolyte level in each cell.
   If it's low, add distilled water until the electrolyte rises to the UPPER mark.



3. Test battery load capacity by connecting a battery tester, and applying a load of 3 times the battery ampere hour rating.
   When the load has been applied for exactly 15 seconds, the battery voltage reading should stay above 9.6 V.

- If the reading stays above 9.6 V, the battery is OK; clean its terminals and case, and reinstall it.
- If the reading is between 6.5 and 9.6 V, fast charge the battery by connecting a battery charger, for 3 minutes at an initial rate of 40 amps.

CAUTION: Amperage will drop as voltage increases; do not increase the amperage to compensate or you may damage the battery.

Watch the battery voltage during the entire 3 minutes; the highest reading should stay below 15.5 V.

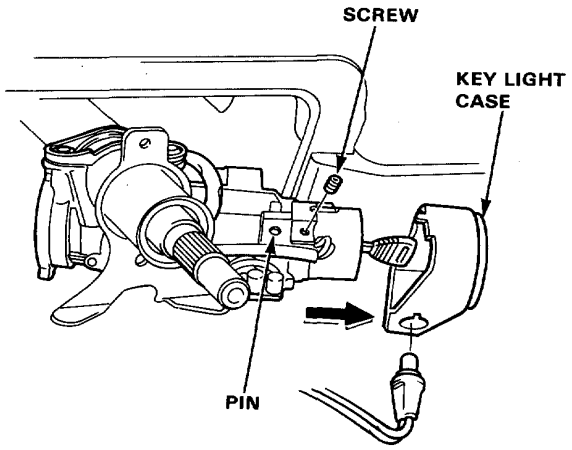
- If the reading stays below 15.5 V, the battery is OK; clean its terminals and case, and reinstall it.
- If the reading exceeds 15.5 V any time during the 3 minutes of fast charge, the battery is no good; replace it.

- If the reading drops below 6.5 V, slow charge the battery by connecting a battery and charge, at 5 amps for no more than 24 hours, (or until the indicator shows full charge, or the specific gravity of the electrolyte is at least 1.250).
  Then test load capacity again.
  - If the voltage stays above 9.6 V, the battery is OK; clean its terminals and case, and reinstall it.
  - If the voltage still drops below 6.5 V, the battery is no good; replace it.

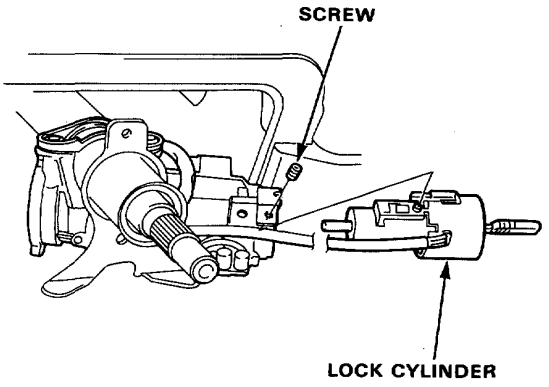
Ignition Switch

Lock Cylinder Replacement

1. Remove the steering wheel, then remove the steering column covers.
2. Remove the bulb/socket from the key light case by turning the socket 45°, then remove the screw and the key light case from the lock body.
3. Turn the ignition key to "I."
4. Push the pin in and remove the lock cylinder from the lock body.



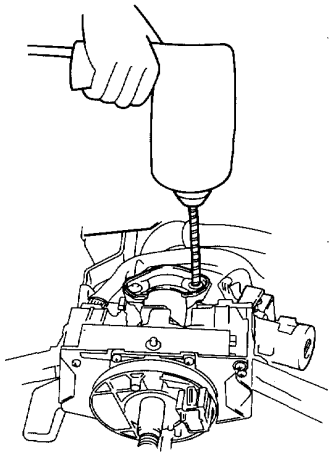
5. Turn the key to "0" and align the lock cylinder with the lock body.
6. Turn the key almost to "I" and insert the lock cylinder until the pin touches the body.
7. Turn the key to the "I", push the pin and insert the lock cylinder into the lock body until the pin clicks into place.



Steering Lock Replacement

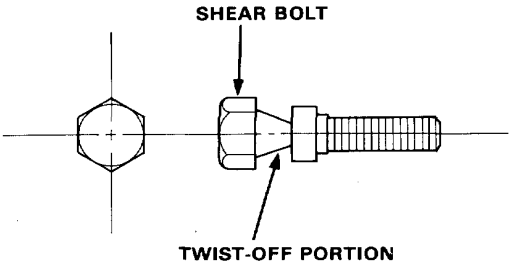
1. *Remove the steering wheel, then remove the steering* column covers.
2. Remove the instrument panel and the gauge assembly (see page 16-120).
3. Center punch each of the 2 shear bolts and drill their heads off with a 3/16 in. drill bit.

   CAUTION Do not damage the switch body when removing the shear heads.
4. Remove the shear bolts from the switch body.

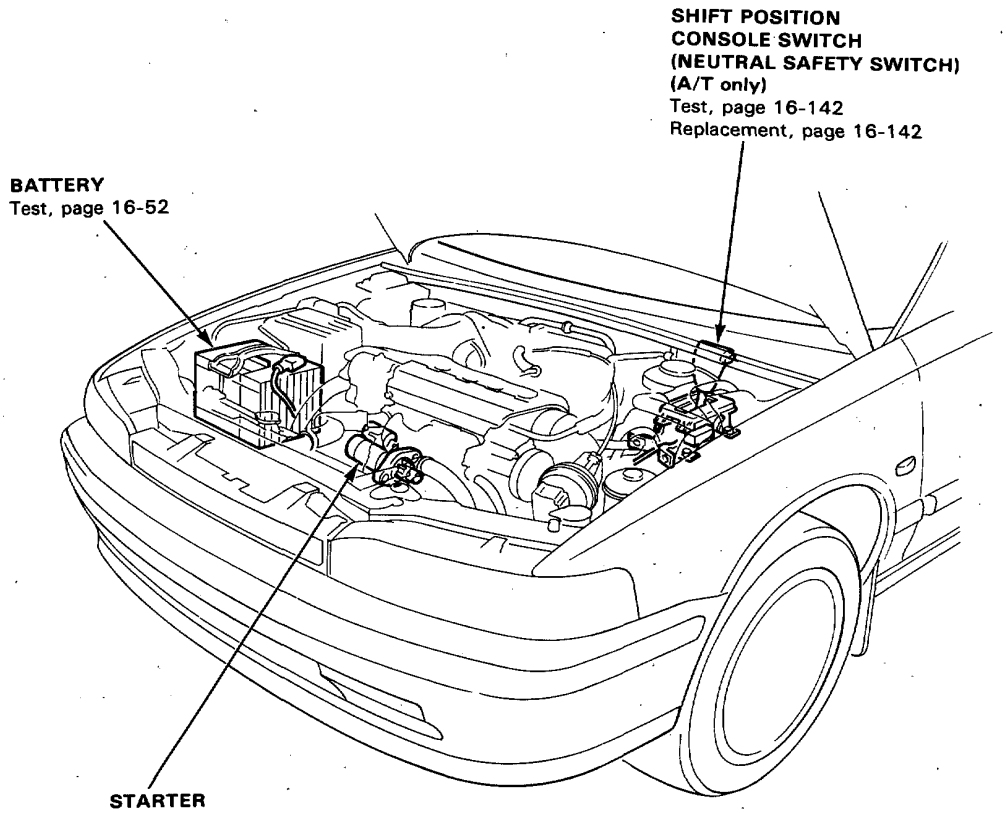


5. Install the new ignition switch without the key inserted.
6. Loosely tighten the new shear bolts.

   NOTE: Make sure the projection on the ignition switch is aligned with the hole in the steering column.
7. Insert the ignition key and check for proper operation of the steering wheel lock and that ignition key turns freely.
8. Tighten the shear bolts until the hex heads twist off.

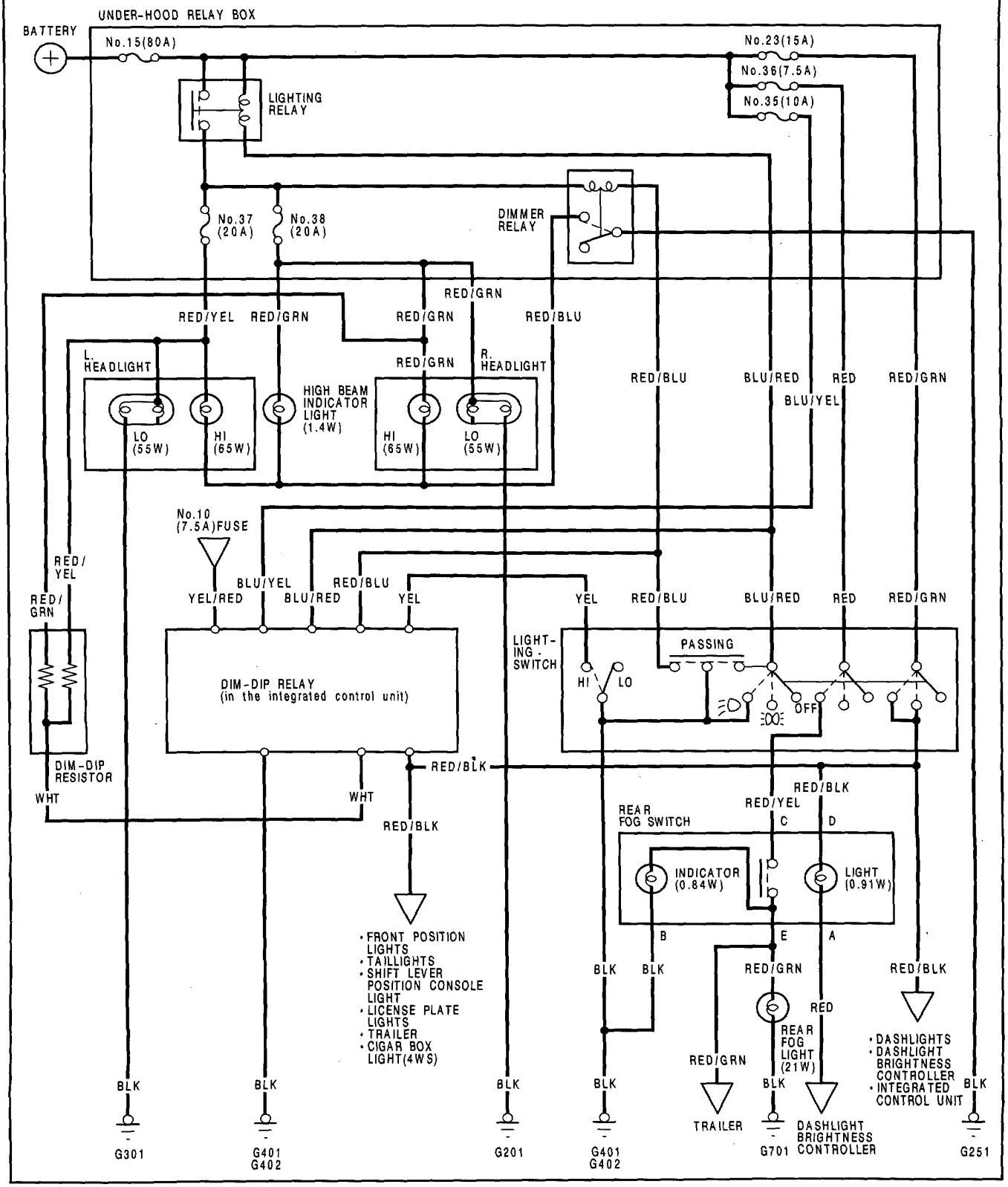


Component Location Index



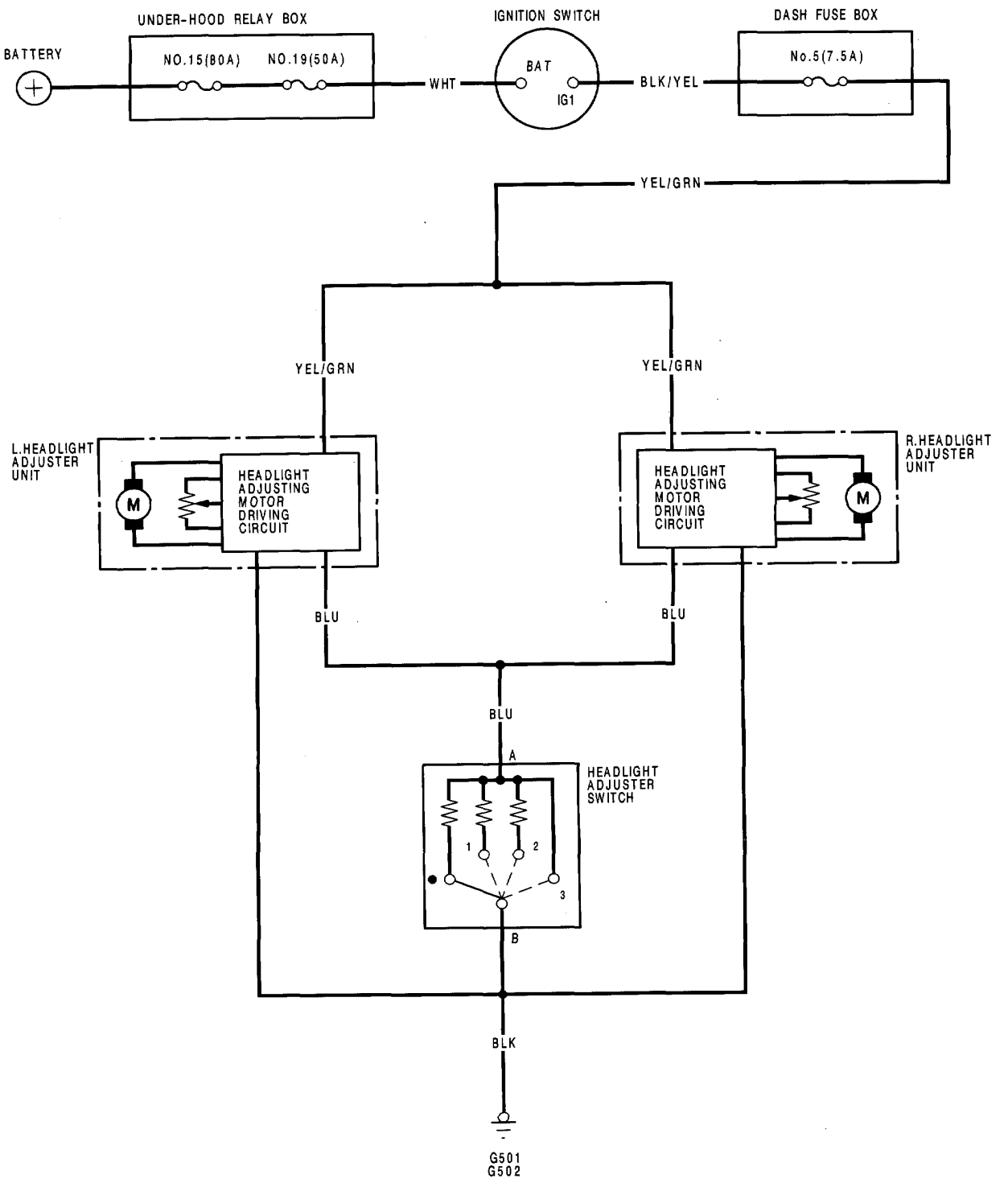
Lighting System

Circuit Diagram (With Dim-Dip Headlight)



Circuit Diagram (KG model only)

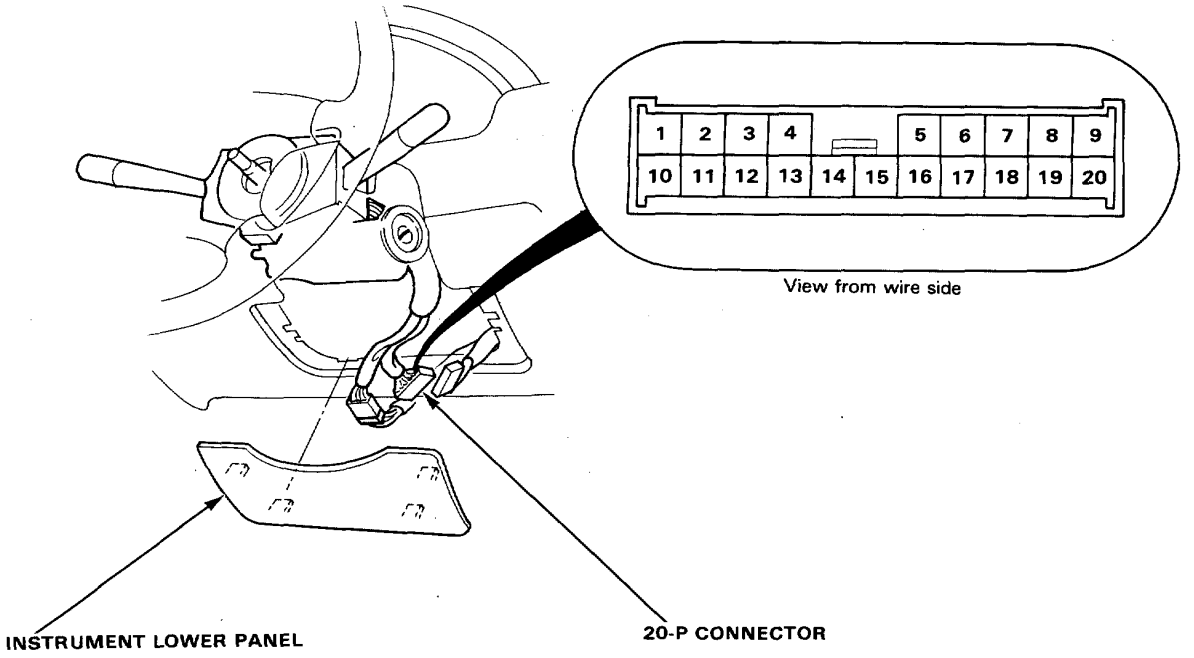
Headlight Adjuster :



Lighting System

Lighting/Turn Signal Switch Test

1. Remove the instrument lower panel.
2. Disconnect the 20-P connector from the main wire harness.
3. Check for continuity between the terminals in each switch position according to the tables.



Lighting/Dimmer/Passing Switch (Except KS, KW and KE models)

Position \ Terminal			5	6	17	18	20
Lighting switch	OFF						
	(•) or ≡D≡			○			○
	(●) or ≡D	LOW	○			○	
		HIGH	○		○	○	
Passing switch		OFF					
		ON	○		○	○	

Turn Signal Switch

Position \ Terminal	7	8	9
R	○		○
NEUTRAL			
L		○	○

Lighting/Dimmer/Passing Switch (KS, KW and KE models only)

Position \ Terminal		5	6	17	18	19	20
Lighting switch	OFF						
	≡DC≡		○				○
	LOW	○			○		
	HIGH	○			○	○	
Passing switch	OFF						
	ON	○		○	○		

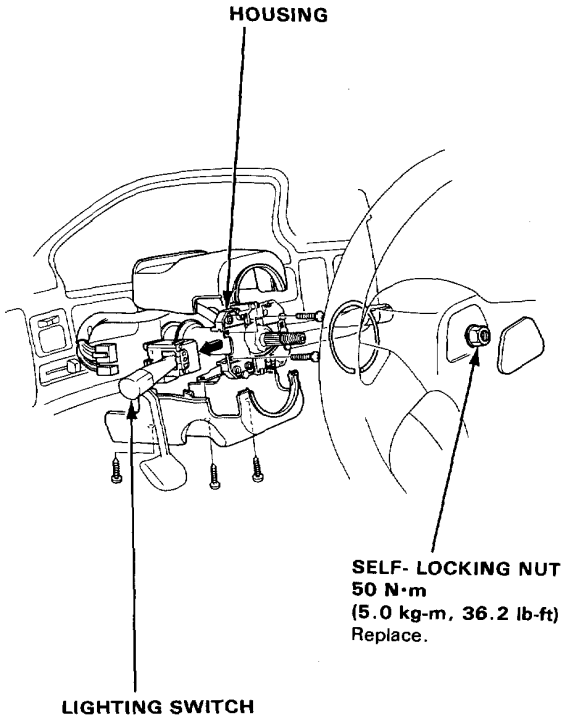
Turn Signal Switch

Position \ Terminal	7	8	9
R	○		○
NEUTRAL			
L		○	○

Lighting Switch Replacement

1. Remove the steering wheel and the steering column cover.
2. Disconnect the 12-P connector.
3. Remove the 2 screws and slide the lighting switch out of the housing as shown.

NOTE: Be careful not to damage the steering wheel cover. On cars with cruise control, remove the lighting switch after removing the slip ring (see page 16-262).

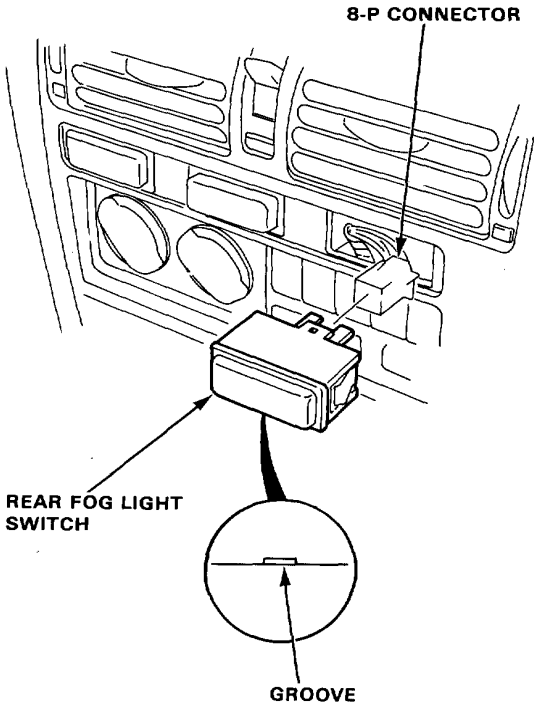


Rear Fog Light Switch Removal

1. Carefully pry out the rear fog light switch from the instrument panel.

   NOTE: Be careful not to damage the switch or instrument panel when prying out the switch.

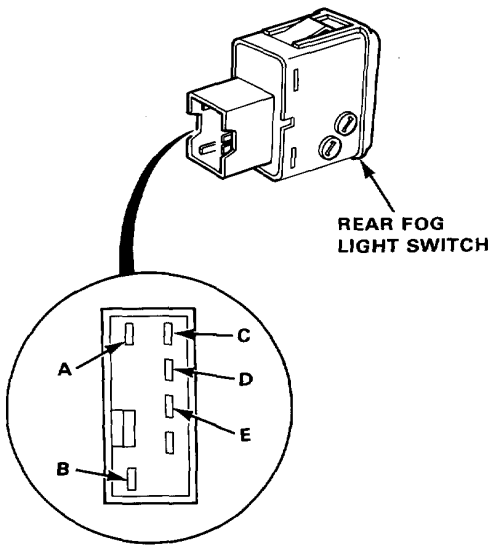
2. Disconnect the 8-P connector from the switch.

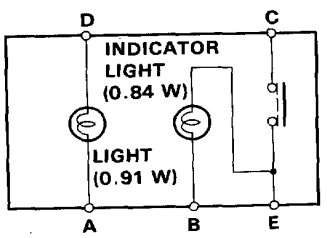


Rear Fog Light Switch Test

1. Remove the instrument panel (See page 16-120).
2. Remove the fog light switch.
3. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal	A	B		C		D	E
OFF	○	○	⊙	⊙	○	○	○
ON	○	○	⊙	⊙	○	○	○

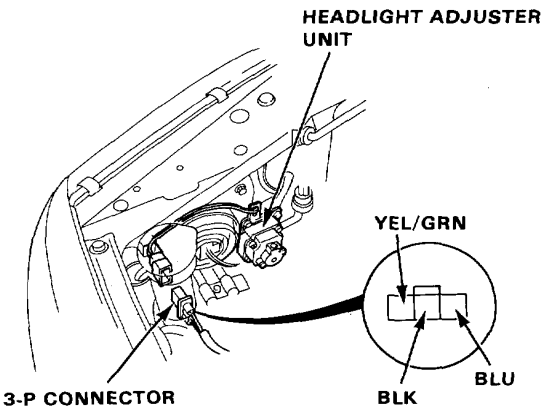




Headlight Adjuster Unit Input Test (KG model only)

NOTE: Check for blown No.5 (7.5 A) fuse in the dash fuse box before input test.

1. Disconnect the 3-P connectors for the R and L headlight adjuster units.



2. Check for continuity between the BLK terminal and body ground.
   There should be continuity.
   - If there is no continuity, check for
     —An open in the BLK wire.
     —Poor ground (G 502).
   - If there is continuity, go to step 3.
3. Check for voltage between the YEL/GRN terminal and body ground with the ignition switch ON.
   There should be battery voltage.
   - If there is no voltage, check for an open in the YEL/GRN wire.
   - If there is battery voltage, go to step 4.
4. Using an ohmmeter, measure resistance between the BLU terminal and body ground in "0" position of headlight adjuster switch. There should be approximately 715Ω.
   - If resistance is not within specification, check for
     —An open in the BLU wire.
     —Faulty headlight adjuster switch.
   - If resistance is within specification, go to step 5.
5. If all tests are normal, but the headlight adjuster unit does not operate. Check for frozen, stuck or improperly installed the headlight adjuster unit. If mechanical check is OK, replace the headlight adjuster unit.

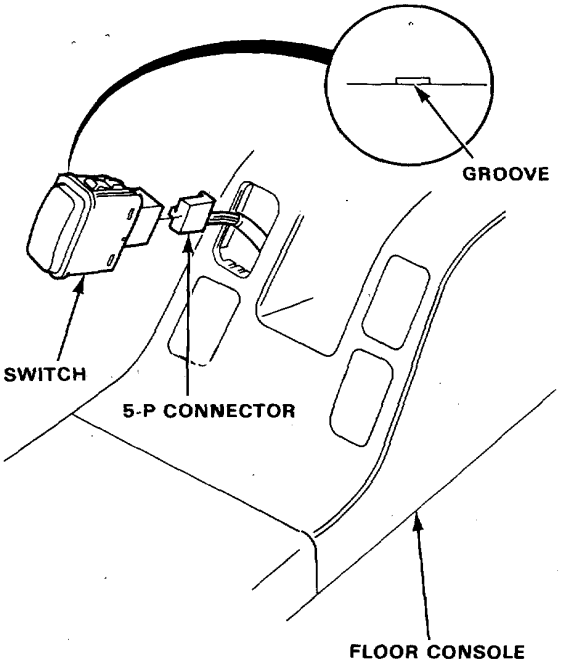
   NOTE: Check for connection of 3-P connectors after test. For example, malfunction of headlight adjuster is occurred by improper connection of one side.

Headlight Adjuster Switch Removal (KG model only)

1. Carefully pry out the headlight adjuster switch from the floor console.

   NOTE: Be careful not to damage the switch or floor console when prying out the switch.

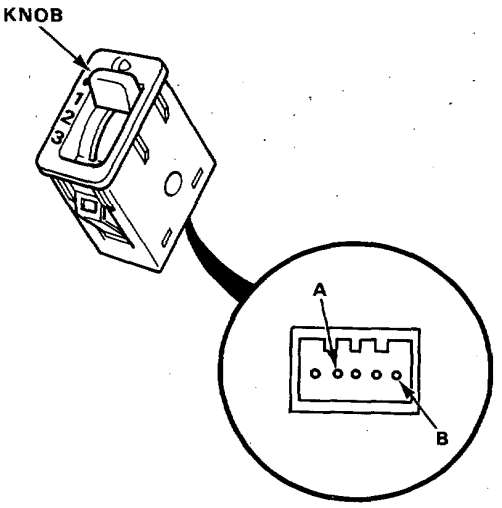
2. Disconnect the 5-P connector from the switch.



Headlight Adjuster Switch Test (KG model only)

1. Remove the switch from the floor console.

2. Measure the resistance between the A and B terminals at ●, 1, 2 and 3 positions by moving the knob. Replace the switch if the resistance is not within specifications.



Knob Position	●	1	2	3
Resistance (Ω)	715	310	160	0

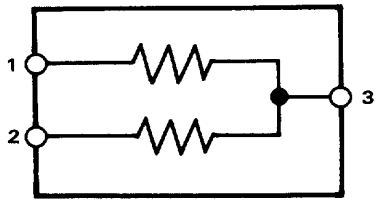
Dim-Dip Resistor Test

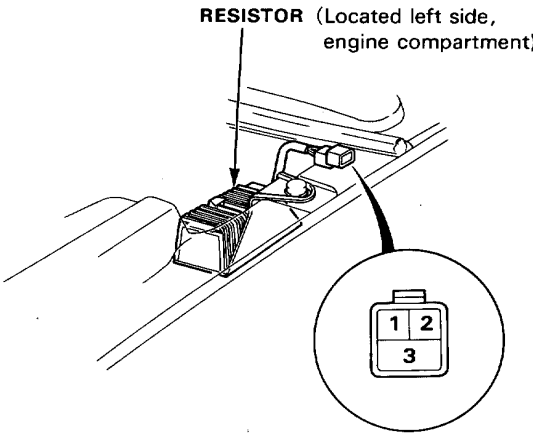
CAUTION: Dim-Dip resistor becomes very hot in use of Dim-Dip headlights; do not touch it or the attaching hard-ware immediately after they have been turned off.

1. Disconnect the 3-P connector from the resistor.
2. Using an ohmmeter, measure resistance between the terminals. Replace the resistor if the resistance is not within specifications.

   NOTE: Resistance will vary with the resistor temperature; specifications are at 20°C (70°F).

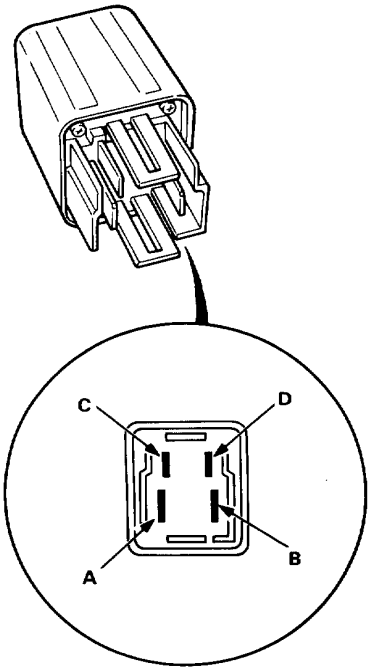
   L. Headlight Resistance
   (between the 1 and 3 terminals):
   1.9—2.1 ohms
   R. Headlight Resistance
   (between the 2 and 3 terminals):
   1.9—2.1 ohms

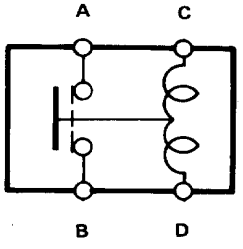




Lighting Relay Test

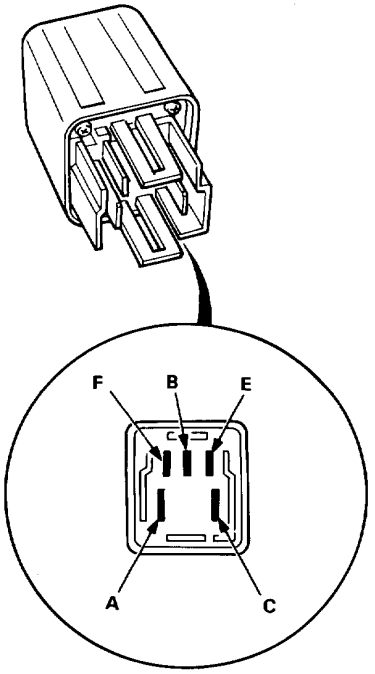
1. Remove the lighting relay in the under-hood relay box.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.

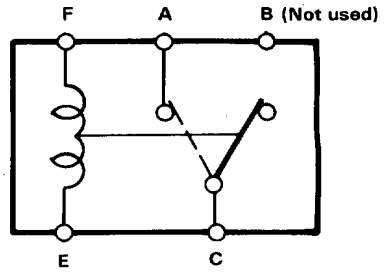




Dimmer Relay Test

1. Remove the dimmer relay in the under-hood relay box.
2. There should be continuity between the A and C terminals when the battery is connected to the E and F terminals.
   There should be no continuity when the battery is disconnected.

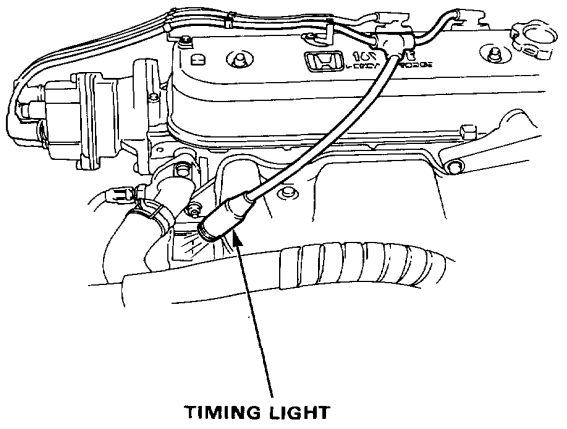




Ignition Timing Inspection and Setting (Fuel-Injected Engine, cont'd)

<Except KG, KS, KX and KQ models>

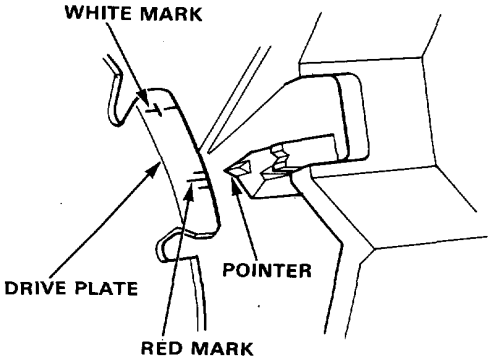
1. Start the engine and allow it to warm up (cooling fan comes on).
2. Connect a timing light to the engine; while the engine idles, point the light toward the pointer on the flywheel (for M/T), or on the drive plate (for A/T).



3. Inspection ignition timing at idle.

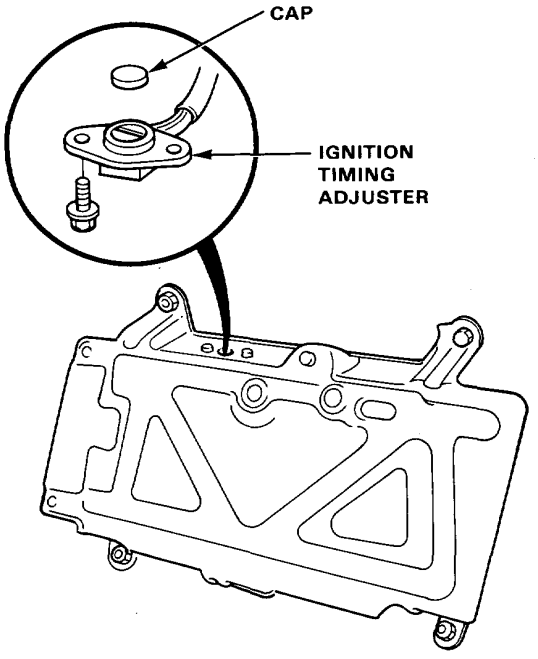
   Ignition Timing:
   15±2° BTDC (RED) at 800 ± 50 min^{-1} (rpm) in neutral

NOTE: The illustration shows A/T.

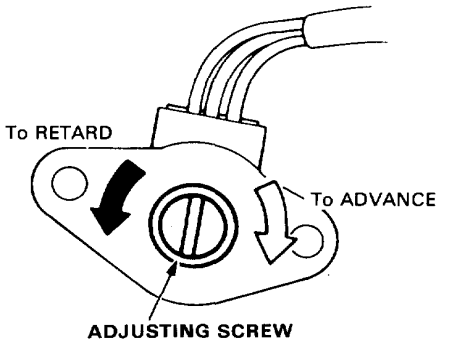


4. Adjust ignition timing, if necessary, by turning the adjusting screw on the ignition timing adjuster in the control box.

5. Remove the cap from the ignition timing adjuster.



6. Adjust as necessary by turning the adjusting screw on the adjuster; turn the adjusting screw counterclockwise to retard the timing, or clockwise to advance the timing.

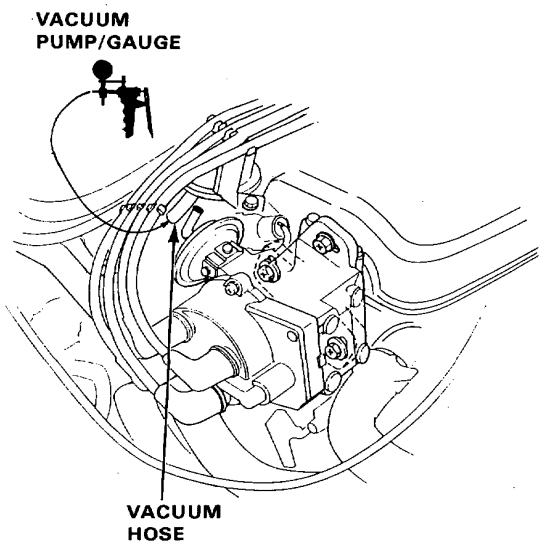


7. After adjusting, reinstall the cap to the ignition timing adjuster.

Ignition Timing Inspection and Setting (Carbureted Engine)

<KP, KT, KU and KY (A/T) models>

1. Disconnect the vacuum hose from the vacuum advance diaphragm, then connect the vacuum pump/gauge to the vacuum hose.



2. Start the engine.

   KP and KT models: Let it idle.
   KY (A/T) model: Hold the engine at 4,000 min^{-1} (rpm).

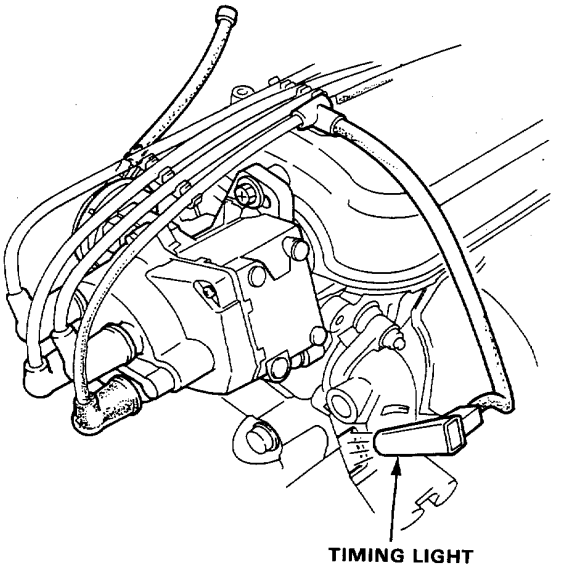
3. Check the vacuum hose for vacuum.
   The vacuum hose should have vacuum.

   - If the vacuum hose has no vacuum, check the vacuum hose of proper connection, cracks, blockage or disconnected hose.

4. Connect the vacuum hose to the vacuum advance diaphragm and allow the engine to warm up (cooling fan comes on).

5. Disconnect the vacuum hose from the vacuum advance diaphragm and plug them.

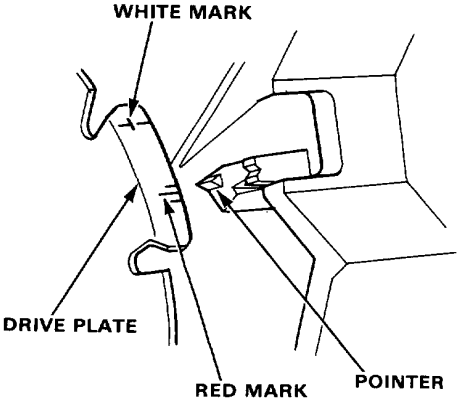
6. Connect a timing light to the engine; while the engine idles, point the light toward the pointer on the flywheel (for M/T), or on the drive plate (for A/T).



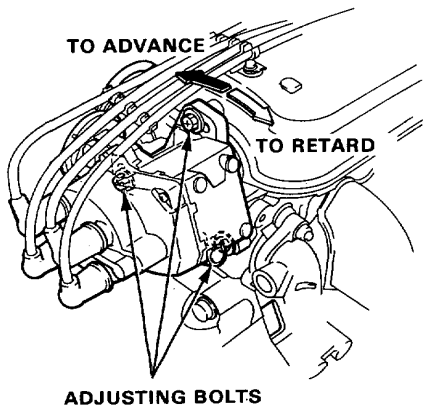
7. Read initial timing when timing mark (white) is aligned to the pointer.

   Initial Timing: 0° TDC
   - **Manual Transmission [at 800 ± 50 min^{-1} (rpm) in neutral]**
   - **Automatic Transmission [at 750 ± 50 min^{-1} (rpm) in gear]**

NOTE: The illustration shows A/T.



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



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

10. Connect the vacuum hose to the vacuum advance diaphragm and inspect ignition timing at idle.

Ignition Timing
M/T: 15° ± 2° BTDC (Red)
A/T: 10° ± 2° BTDC (Red)
- **Manual Transmission [at 800 ± 50 min^{-1} (rpm) in neutral]**
- **Automatic Transmission [at 750 ± 50 min^{-1} (rpm) in gear]**

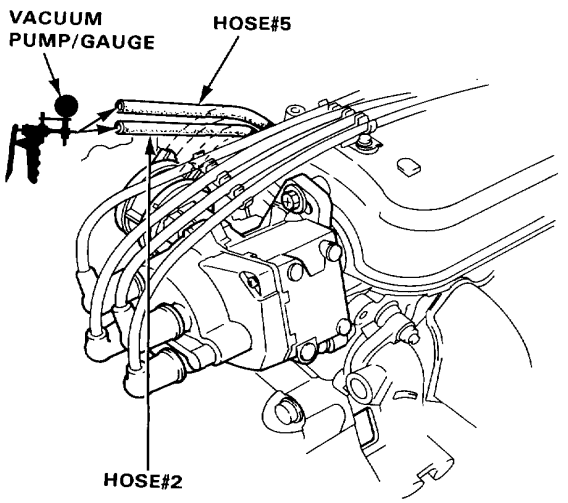
If advance is not as specified, check the vacuum advance diaphragm and distributor advance mechanism.

(cont'd)

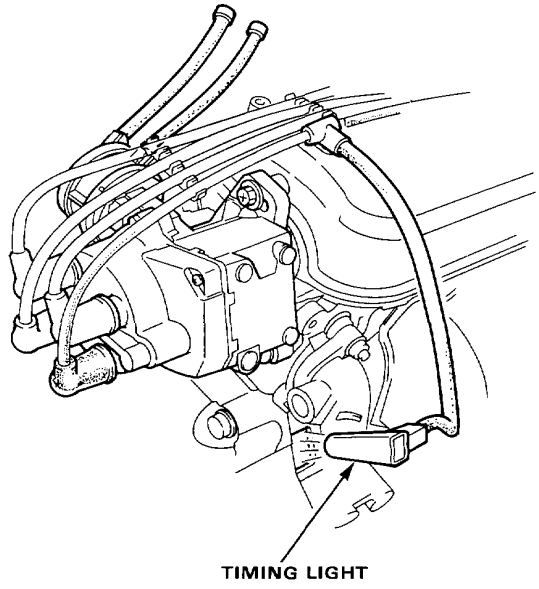
Ignition Timing Inspection and Setting (Carbureted Engine)

<Except KP, KT and KY (A/T) models>

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



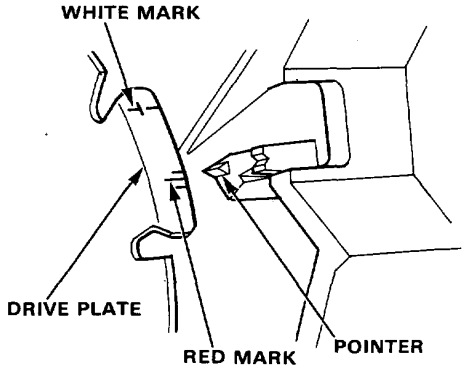
2. Start the engine and let it idle.
3. When the engine is cool, coolant temperature is below 55°C (131°F).
   Check each hose for vacuum. The #2 and #5 hoses should have vacuum.
   - If the #2 hose has no vacuum, check the #2 hose of proper connection, cracks, blockage or disconnected hose.
   - If the #5 hose has no vacuum, check the #5 and connected hoses for proper connections, cracks, blockage or disconnected hoses, and the check valve is not clogged.
     If the #5 and connected hoses, and the check valve have no problem, recheck the #5 hose for vacuum.
4. Connect the vacuum hoses to the vacuum advance diaphragm and allow the engine to warm up. (cooling fan comes on).
5. Disconnect the #5 hose from the vacuum advance diaphragm and connect the vacuum pump/gauge to the #5 hose.
6. Check the #5 hose for vacuum.
   The #5 hose should have no vacuum.
7. Disconnect the vacuum hoses from the vacuum advance diaphragm and plug them.
8. Connect a timing light to the engine; while the engine idles, point the light toward the pointer on the flywheel (for M/T), or on the drive plate (for A/T).



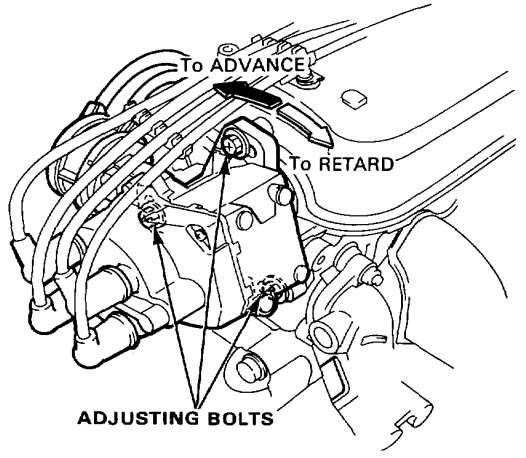
9. Read initial timing when timing mark (white) is aligned to the pointer.

Initial Timing
All models: 0° BTDC
- **Manual Transmission [at 800 ± 50 min^{-1} (rpm) in neutral]**
- **Automatic Transmission [at 750 ± 50 min^{-1} (rpm) in gear]**

NOTE: The illustration shows A/T.



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



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

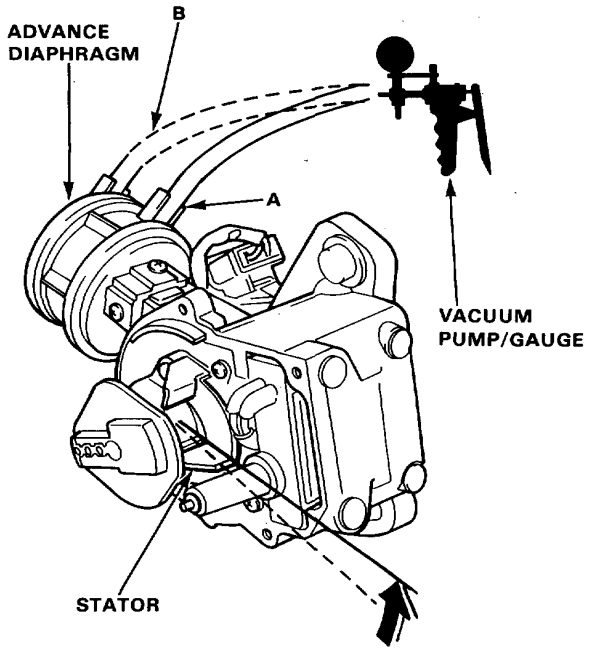
Connect the vacuum hose to the vacuum advance diaphragm and inspect ignition timing at idle.

Ignition Timing
M/T: 15° ± 2° BTDC
A/T: 10° ± 2° BTDC (Except KQ, KX, KS and KG models)
15° ± 2° BTDC (KQ, KX, KS and KG models)
- **Manual Transmission [at 800 ± 50 min^{-1} (rpm) in neutral]**
- **Automatic Transmission [at 750 ± 50 min^{-1} (rpm) in gear]**

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

Advance Diaphragm Inspection

1. Remove the distributor cap and vacuum hoses from the advance diaphragm.
2. Connect a vacuum pump/gauge to the advance diaphragm A (inside port).

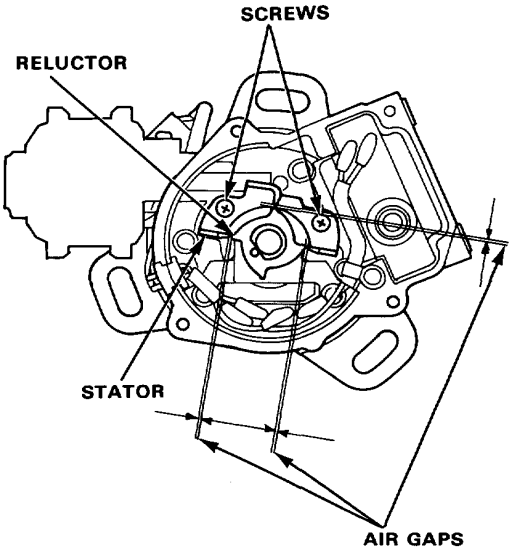


3. When vacuum (more than 500 mm Hg, 20 in. Hg) is applied to the diaphragm, the stator should turn counterclockwise and stay. If the stator does not turn or stay, replace the diaphragm.

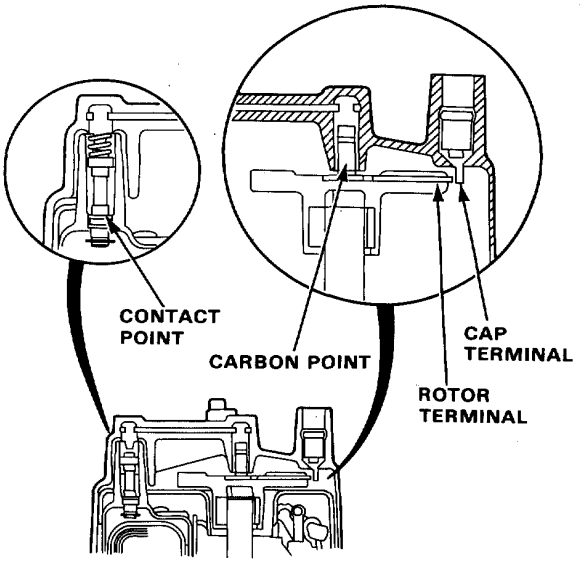
   When vacuum is released, the stator should return. If the stator does not return, repair or replace as necessary.
4. Repeat the step 2—3 for the advance diaphragm B (outside port).

Top End Inspection

1. Check to be sure that the air gaps are equal (carbureted engine only).
2. If necessary, back off the screws and move the stator as required to adjust.

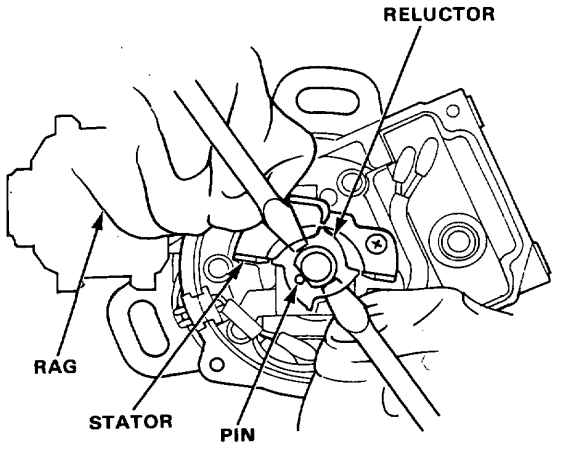


3. Check for rough or pitted rotor and cap terminals.
4. Scrape or file off the carbon deposits. Smooth the rotor terminal with an oil stone or #600 sandpaper if rough.
5. Check the distributor cap for cracks, wear and damages. If necessary, clean or replace it.



Reluctor Replacement (Carbureted Engine)

1. Carefully *pry up* the reluctor by using two screwdrivers as shown. Do not damage the reluctor and stator.

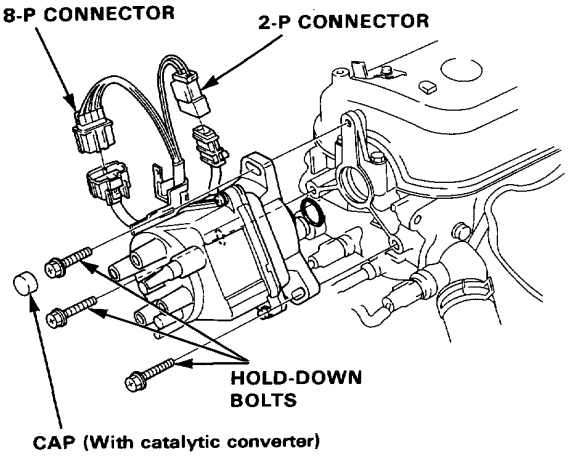


2. When installing the reluctor, be sure to drive in the pin with its gap away from the shaft.

   NOTE: The number or letter manufacturing code on the reluctor must always face up.

Distributor Removal (Fuel-Injected Engine)

1. Disconnect the 2-P and 8-P connectors from the distributor.
2. Disconnect the spark plug wires from the distributor cap.

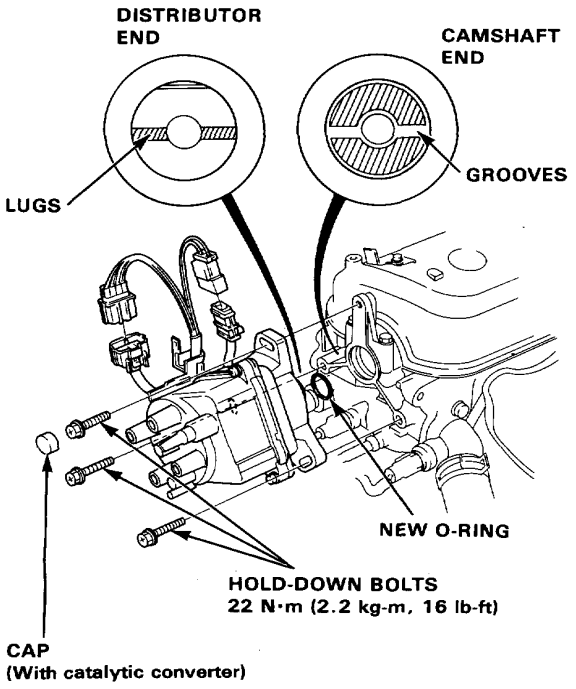


3. Remove the distributor hold-down bolts, then remove the distributor from the cylinder head.

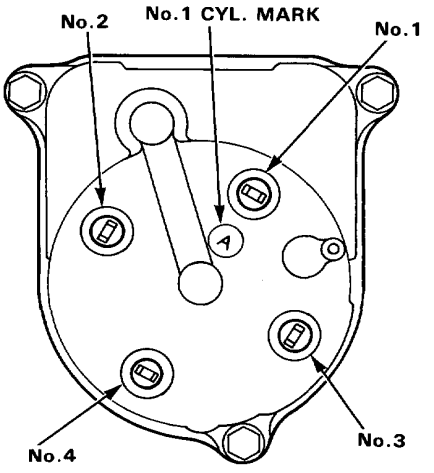
Distributor Installation (Fuel-Injected Engine)

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

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



3. Install the hold-down bolts and tighten temporarily.
4. Connect the 2-P and 8-P connectors to the distributor.
5. Connect the spark plug wires as shown.

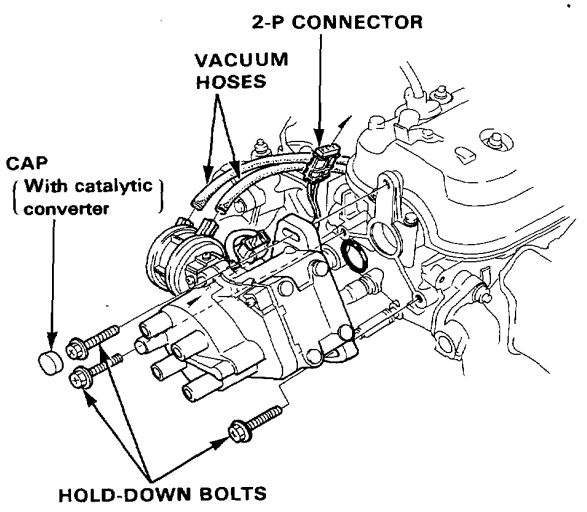


6. Set the timing with a timing light as shown on page 16-71.
7. After adjusting, tighten the hold-down bolts, then install the cap (with catalytic converter) on the bolt.

Distributor Removal/Installation (Carbureted Engine)

Removal:

1. Disconnect the 2-P connector from the distributor.
2. Disconnect the spark plug wires from the distributor cap.
3. Disconnect the vacuum hoses from the advance diaphragm.

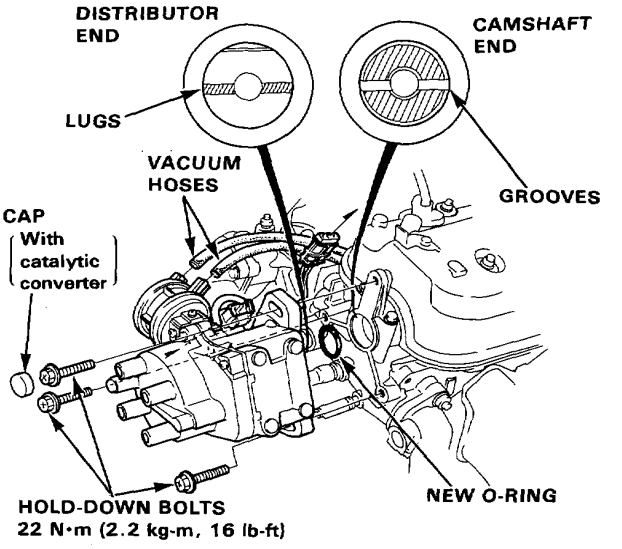


4. Remove the distributor hold-down bolts, then remove the distributor from the cylinder head.

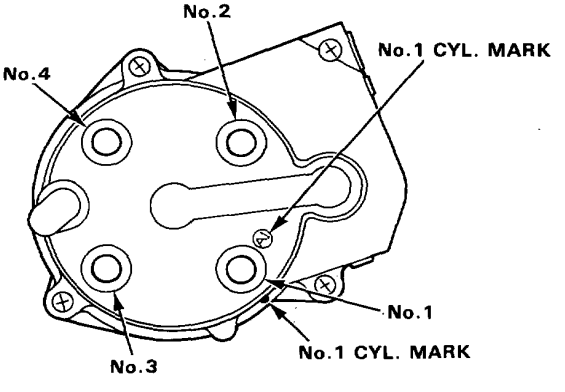
Installation:

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

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

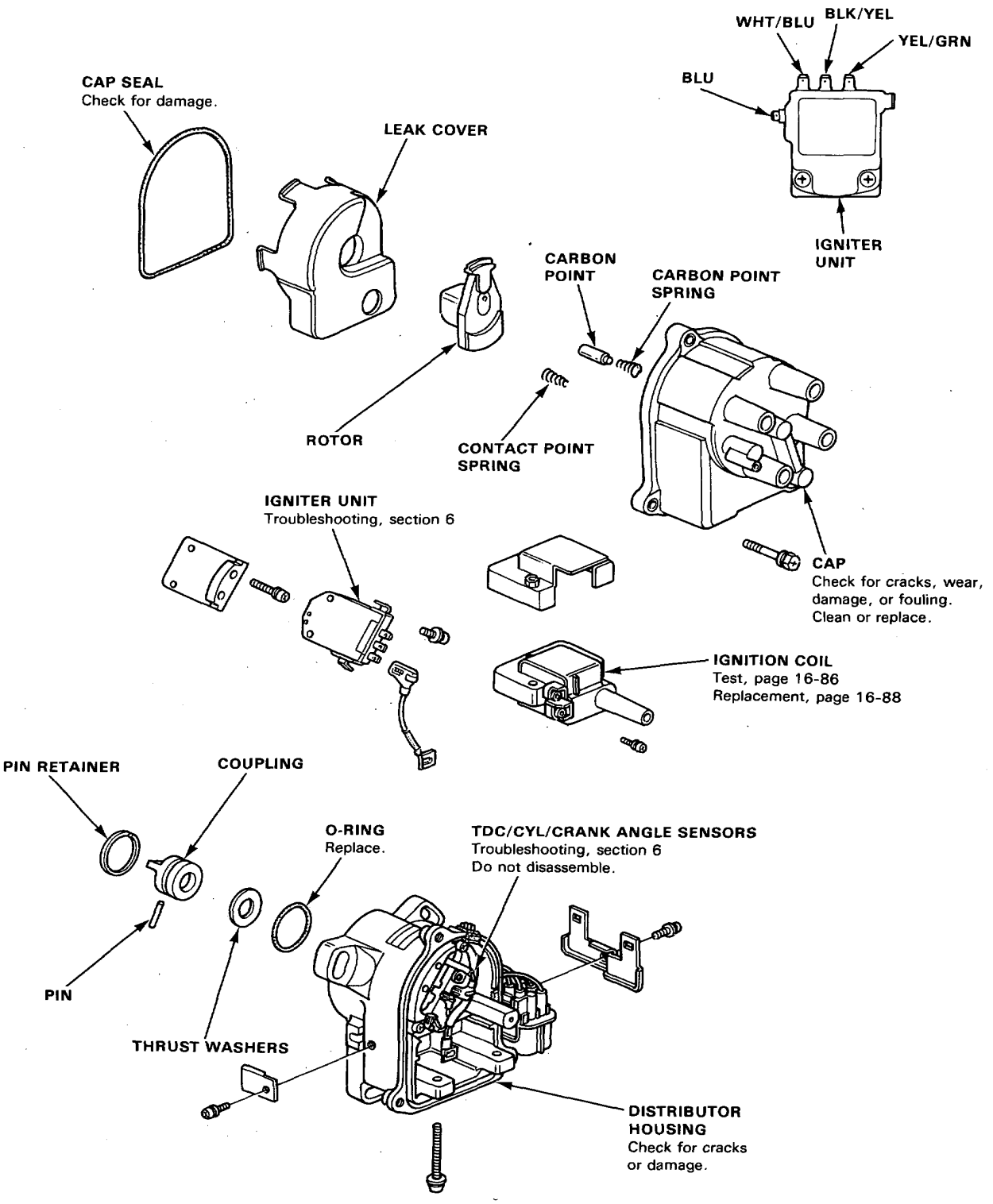


3. Install the hold-down bolts and tighten temporarily.
4. Connect the 2-P connector to the distributor and the vacuum hoses to the advance diaphragm.
5. Connect the spark plug wires as shown.

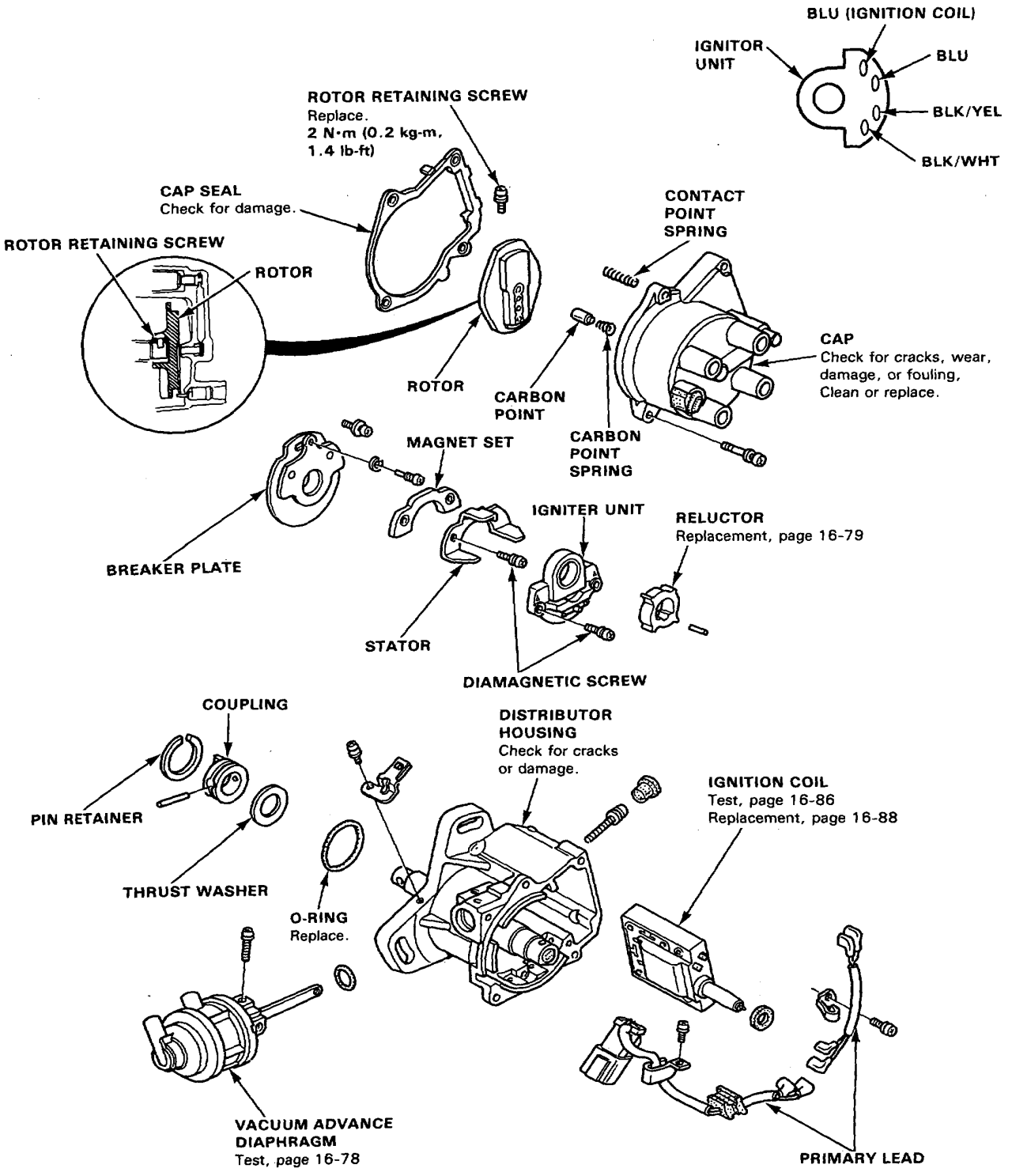


6. Set the timing with a timing light as shown on page 16-74.
7. After adjusting, tighten the hold-down bolts, then install the cap (with catalytic converter) on the bolt.

Distributor Overhaul (Fuel-Injected Engine)



NOTE: After installing the reluctor, adjust the air gaps between the stator and reluctor (see page 16-79).

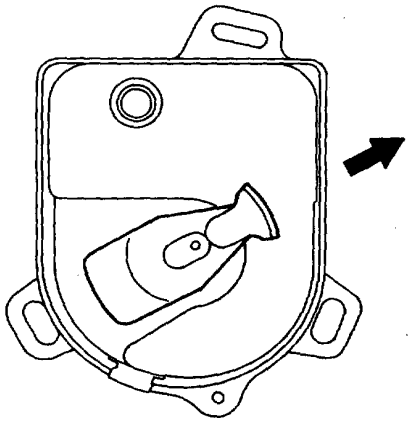


Distributor Reassembly

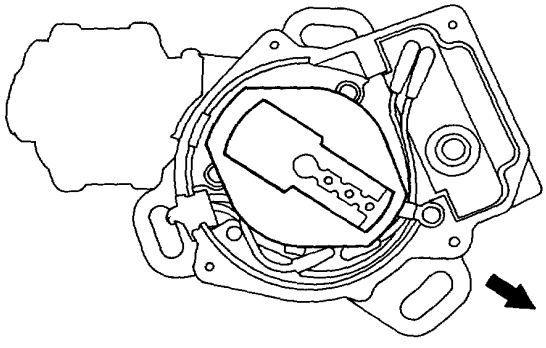
Reassemble the distributor in the reverse order of disassembly.

1. Install the rotor, then turn it so that it faces in the direction shown (toward the No.1 cylinder).

Fuel-injected engine:

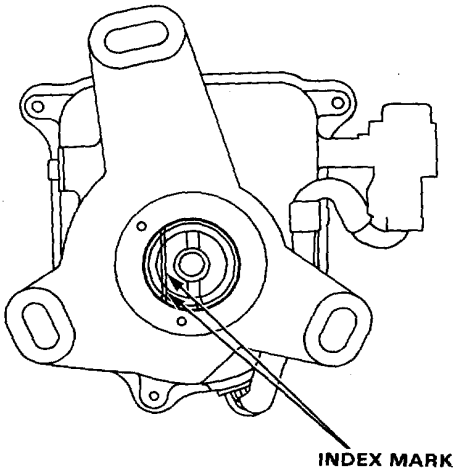


Carbureted engine:

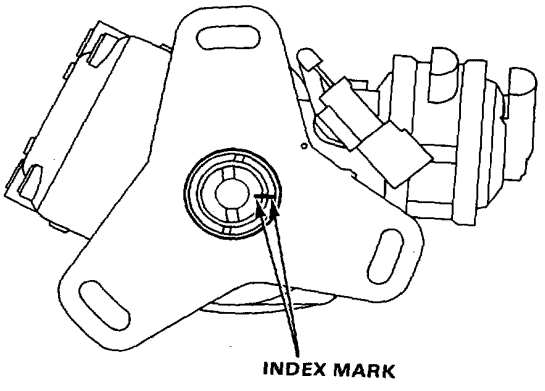


2. Set the thrust washer and coupling on the shaft.
3. Check that the rotor is still pointing toward the No.1 cylinder, then align the index mark on the housing with the index mark on the coupling.

Fuel-injected engine:



Carbureted engine:



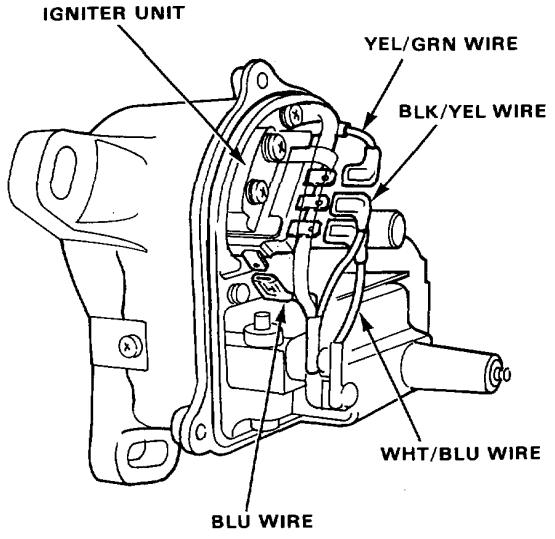
Igniter Unit Input Test

Fuel-injected engine:

NOTE:

- See section 6 when the self-diagnostic indicator blinks.
- Perform an input test for the igniter unit after finishing the fundamental tests for the ignition system and fuel emission system.
- The tachometer should operate normally.

1. Remove the distributor cap, the rotor and the leak cover.
2. Disconnect the BLK/YEL, WHT/BLU, YEL/GRN and BLU wires from the igniter unit.

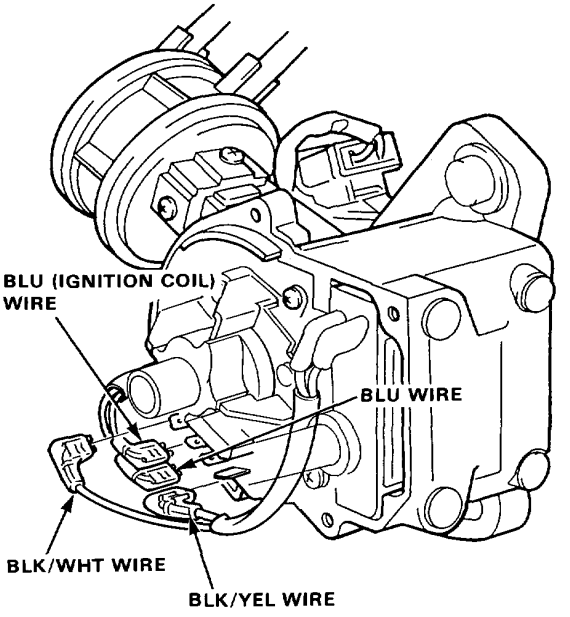


3. Turn the ignition switch ON. Check the voltage between the BLK/YEL wire and the body ground. There should be battery voltage.
   - If there is no battery voltage, check the BLK/YEL wire across the ignition switch and the igniter unit.
   - If there is battery voltage, go to step 4.
4. Turn the ignition switch ON. Check the voltage between the WHT/BLU wire and the body ground. There should be battery voltage.
   - If there is no battery voltage, check the following.
     - Ignition coil.
     - WHT/BLU wire between the ignition coil and the igniter unit.
   - If there is battery voltage, go to step 5.
5. Check the YEL/WHT wire between the PGM-FI ECU and the igniter unit.
6. Check the BLU wire between the tachometer and the igniter unit.
7. If all tests are normal, replace the igniter unit.

Carbureted engine:

NOTE: The tachometer should operate normally.

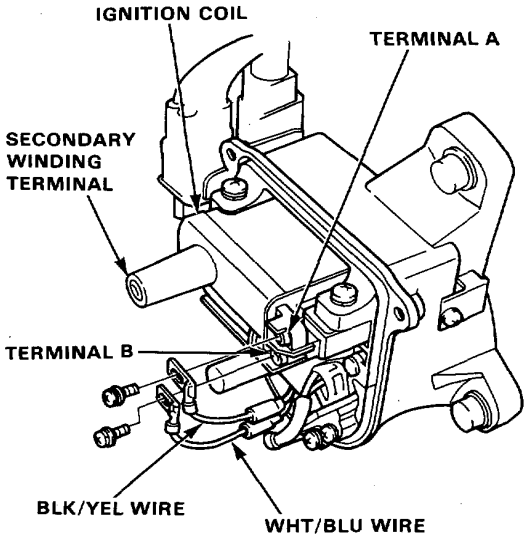
1. Remove the distributor cap and the rotor.
2. Disconnect the BLK/YEL, BLK/WHT, BLU and BLU (ignition coil) wires from the igniter unit.



3. Turn the ignition switch ON. Check the voltage between the BLK/YEL wire and the body ground. There should be battery voltage.
   - If there is no battery voltage, check the BLK/YEL wire across the ignition switch and the igniter unit.
   - If there is battery voltage, go to step 4.
4. Check the BLK/WHT and the BLU wires between the ignition coil and the igniter unit.
5. Check the BLU wire between the tachometer and the igniter unit.
6. If all tests are normal, replace the igniter unit.

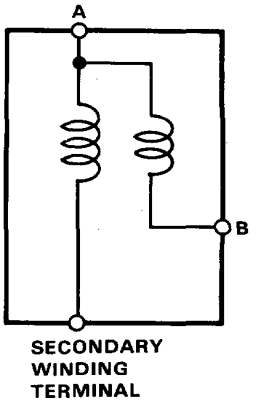
Ignition Coil Test (Fuel-Injected Engine)

1. With the ignition switch OFF, remove the distributor cap.
2. Remove the 2 screws to disconnect the BLK/YEL and WHT/BLU wires from the terminals A and B respectively.

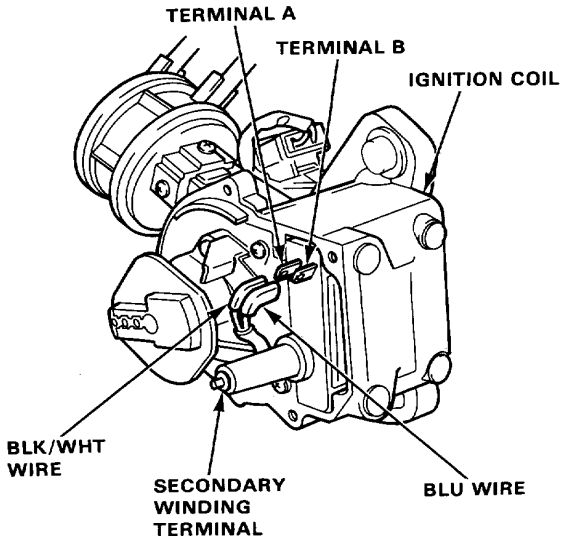


3. Using an ohmmeter, measure resistance between the terminals. Replace the coil if the resistance is not within specifications.
NOTE: Resistance will vary with the coil temperature; specifications are at 20°C (70°F)

Primary Winding Resistance (between the A and B terminals): 0.6—0.8 ohms
Secondary Winding Resistance (between the A and secondary winding terminals): 12,880—19,320 ohms

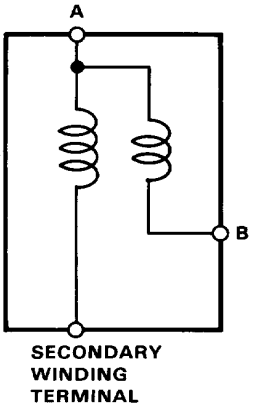


1. With the ignition switch OFF, remove the distributor cap.
2. Disconnect the BLK/WHT and BLU wires from the terminals A and B respectively.



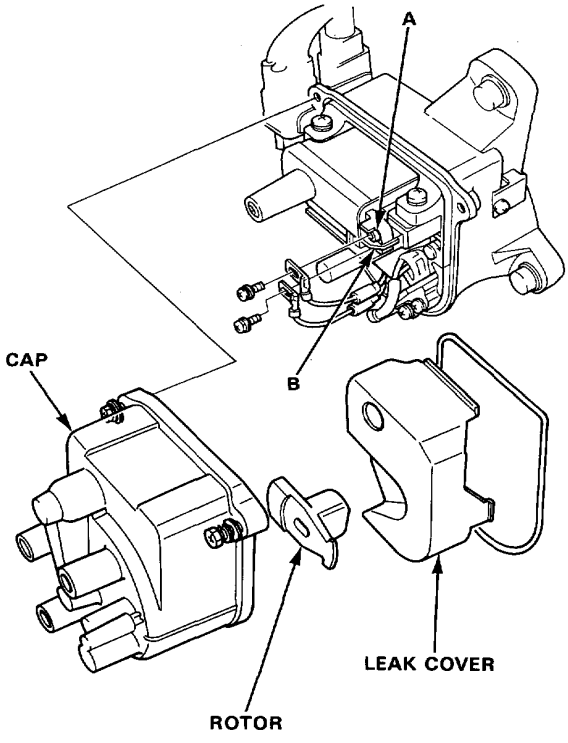
3. Using an ohmmeter, measure resistance between the terminals. Replace the coil if the resistance is not within specifications.
NOTE: Resistance will vary with the coil temperature; specifications are at 20°C (70°F)

Primary Winding Resistance (between the A and B terminals): 0.5—0.7 ohms
Secondary Winding Resistance (between the A and secondary winding terminals): 14,400—21,600 ohms

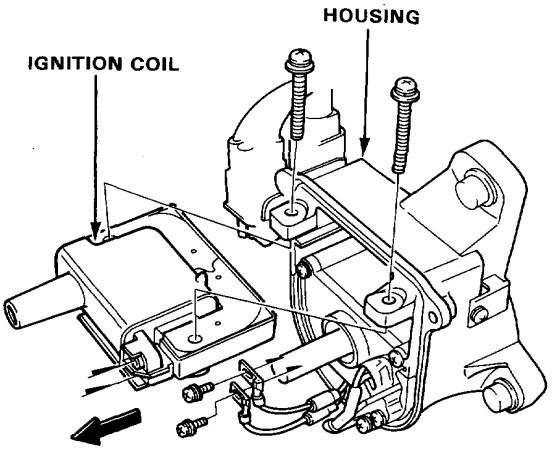


Ignition Coil Replacement (Fuel-Injected Engine)

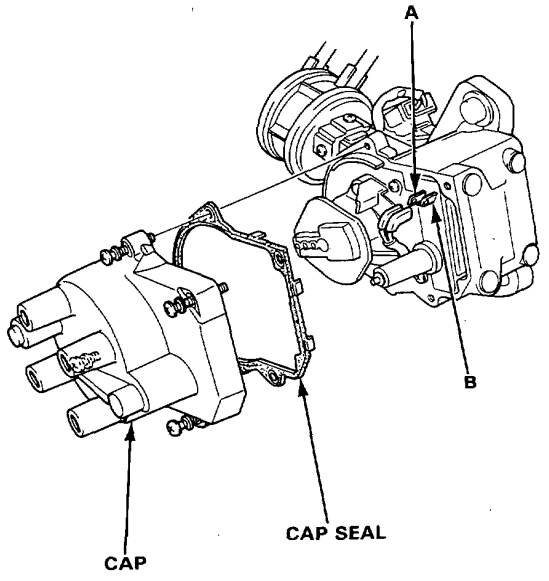
1. With ignition switch OFF, remove the distributor cap, rotor, and cap seal, then remove the leak cover.
2. Remove the 2 screws to disconnect the BLK/YEL and WHT/BLU wires from the terminals A and B respectively.



3. Remove the 2 screws and slide the ignition coil out of the distributor housing.

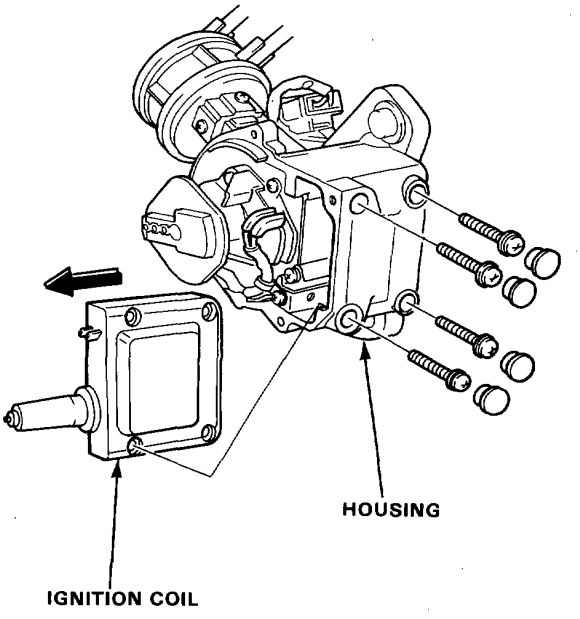


1. With ignition switch OFF, remove the distributor cap and cap seal.
2. Disconnect the BLK/WHT and BLU wires from the terminals A and B respectively.



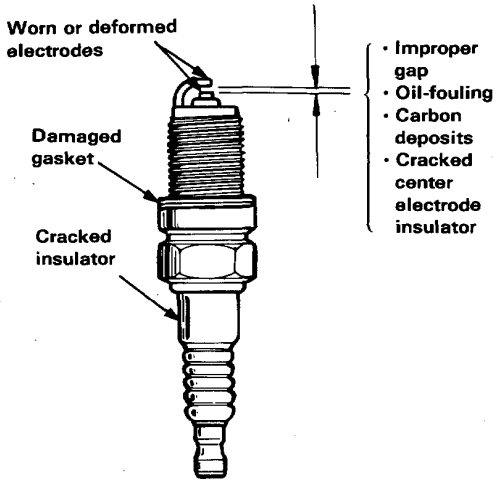
3. Remove the rubber caps from the distributor housing.
4. Remove the 4 screws and slide the ignition coil out of the distributor housing.

NOTE:
- Replace the rubber caps if they are worn out.
- Installing the rubber caps, apply silicon grease to them.
- Make sure that the wires are clamped and apart from a stator, etc.



Spark Plug Inspection

1. Inspect the electrodes and ceramic insulator for:



Burned or worn electrodes may be caused by:
- Advanced ignition timing
- Loose spark plug
- Plug heat range too low
- Insufficient cooling

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

2. Replace the plug if the center electrode is rounded as shown below:
NOTE:
- Do not use spark plugs other than those listed below, because those plugs are a new type (ISO standard).
- These marks are sealed on the air cleaner cover.



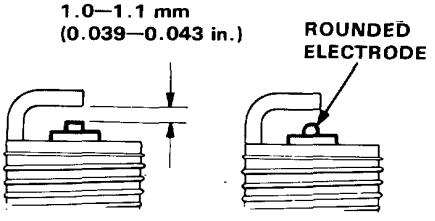
Spark Plug:
Except KP and KT models

	Standard	Optional
NGK	ZFR6F-11	ZFR5F-11* ZFR7F-11
ND	KJ20CR-L11	KJ16CR-L11* KJ22CR-L11

*: Except KF, KG, KS, KW, KE and KX models

KP and KT models

	Standard	Optional
NGK	ZFR5F-11	ZFR6F-11
ND	KJ16CR-L11	KJ20CR-L11



3. Adjust the gap with a suitable gapping tool.

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

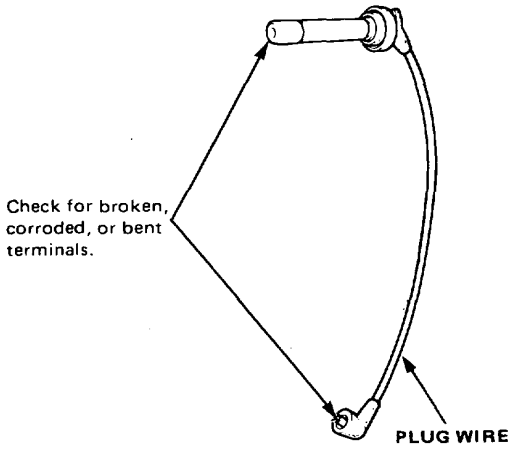
4. Screw the plugs into the cylinder head finger tight, then torque them to 18 N·m (1.8 kg-m, 13 lb-ft).

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

Ignition Wire Inspection and Test

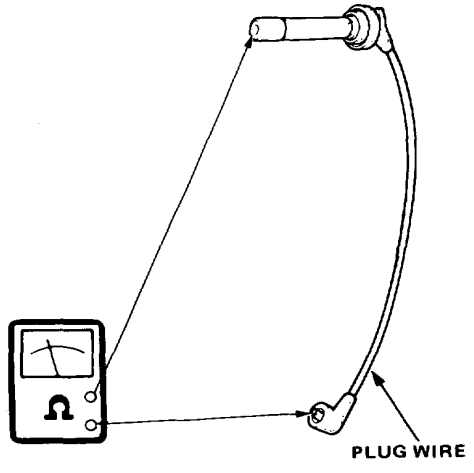
CAUTION: Carefully remove the ignition wires by pulling on the rubber boots. Do not bend the wire or the conductor may be broken.

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



2. Connect ohmmeter probes and measure resistance.

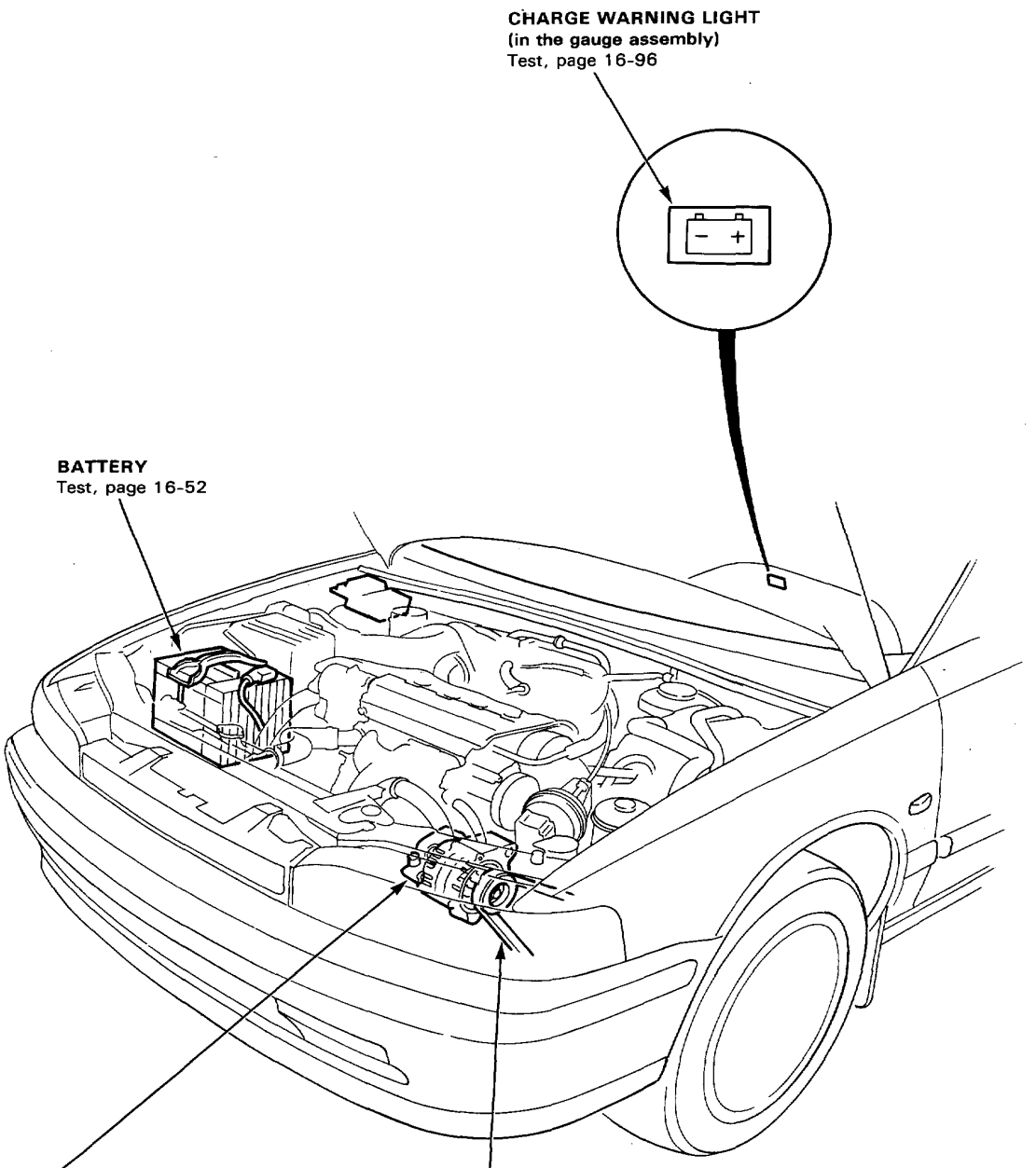
   Ignition Wire Resistance:
   25,000 ohms max. at 20°C (70°F)



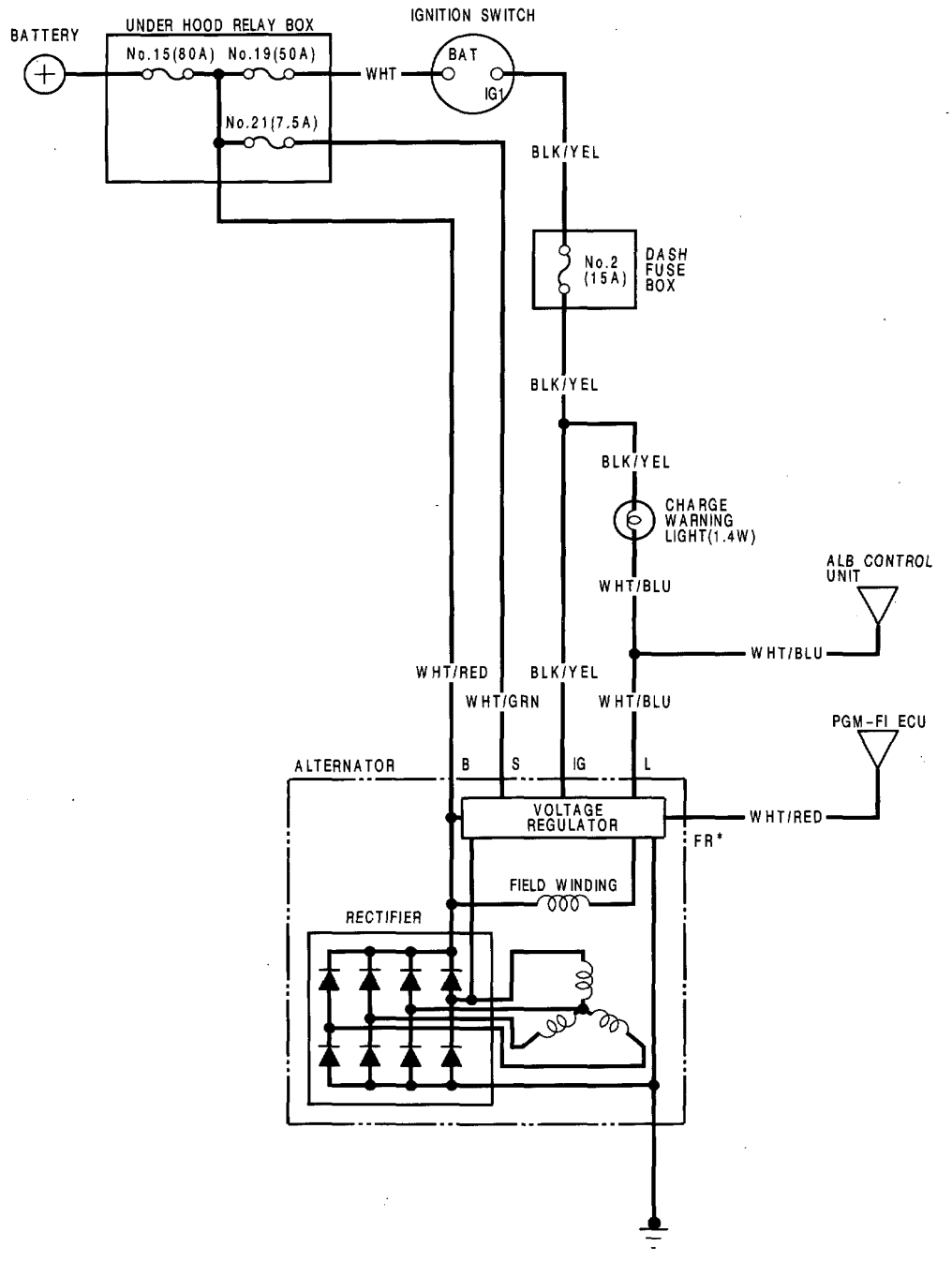
3. If resistance exceeds 25,000 ohms, replace the ignition wire.

Charging System

Component Location Index



Circuit Diagram



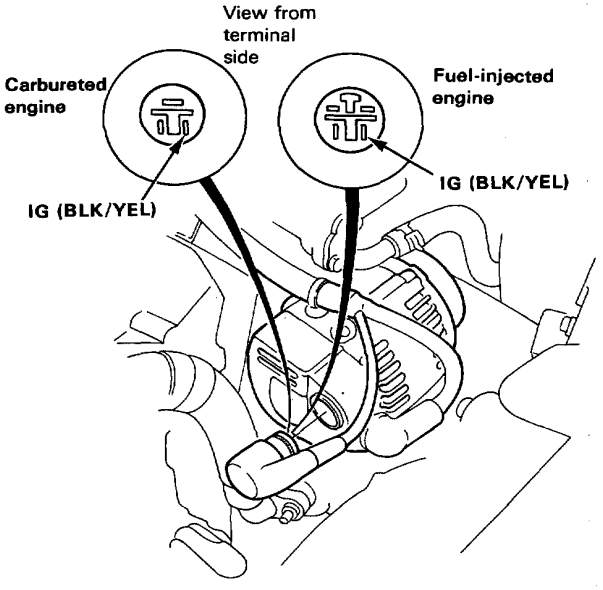
FR* : PGM-FI only

Charging System

Alternator and Regulator Test

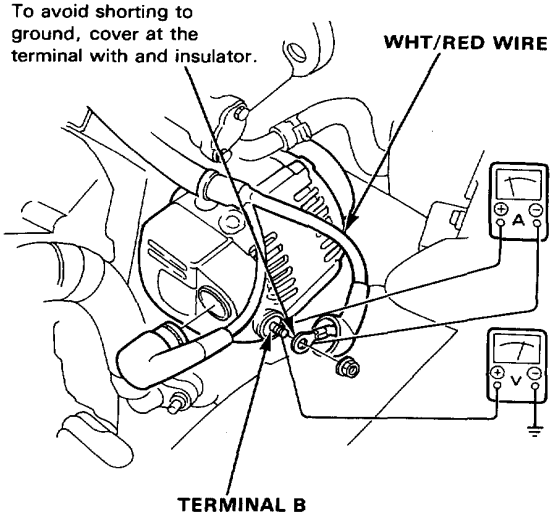
1. First make sure you have a good battery, and that the alternator belt, and connections at the alternator and main fuses are good. Next, check the No.2 (15 A) fuse in the dash fuse box. (If blown, the charge warning light will come on even if the system is working properly)

2. Disconnect the alternator connector from the alternator.
   With the ignition switch on, there should be battery voltage between the IG (BLK/YEL) terminal and body ground.



- If there is no voltage, check for an open in the BLK/YEL wire between the dash fuse box and voltage regulator.
- If there is battery voltage, go to step 3.

3. If these check OK, connect a voltmeter between the alternator terminal B and body ground, and an ammeter (100 amp capacity or higher) between the alternator terminal B and the WHT/RED wire as shown. (An inductive pick up can be used instead of disconnecting the WHT/RED wire.)

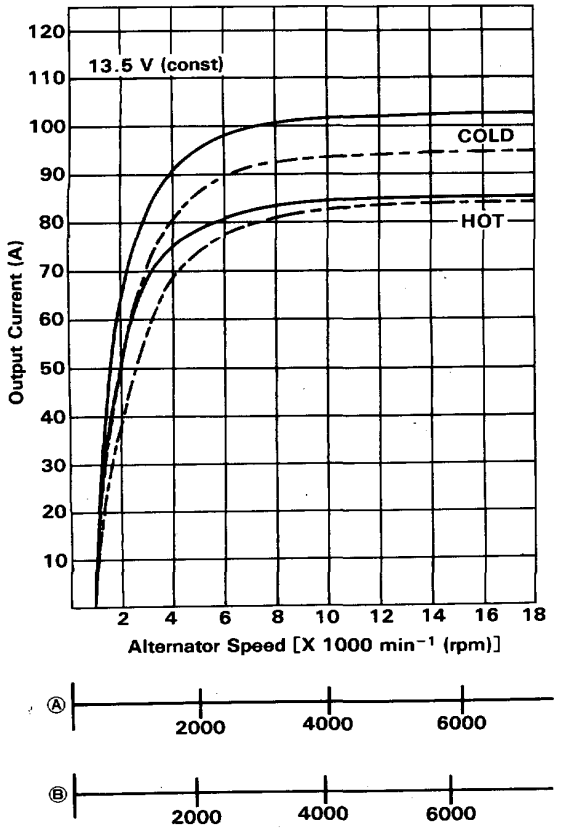


4. Start the engine, and turn on the headlights, blower motor, rear window defogger, etc.

   NOTE: If voltage stays above 13.5 V, apply electrical load more to lower the voltage to less than 13.5 V. If the voltage exceeds 16 V, stop the engine and replace the voltage regulator.

5. Compare the readings to the chart below. If no output or below specification, go to step 7. If output is within specification, go to step 6.

NOTE: Subtract 5 to 10 amperes from the maximum reading due to engine operation.



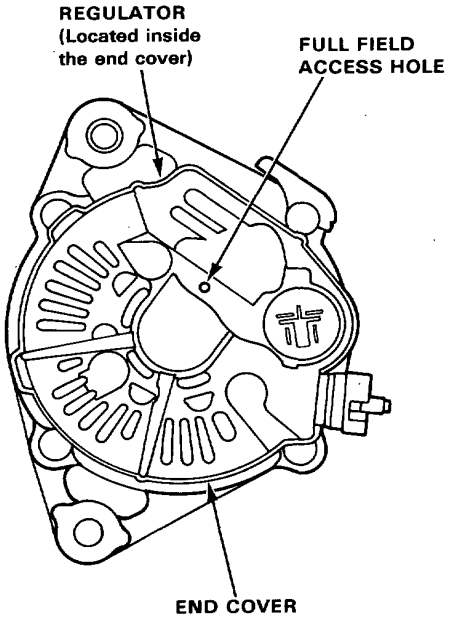
Engine Speed [min⁻¹ (rpm)]
Ⓐ ——— : Fuel-injected engine (All models)
Carbureted engine (KS, KW and KY models)
Ⓑ – – – : Carbureted engine (Except KS, KW and KY models)

6. Turn off all loads in step 4, then measure the alternator output voltage at 1,500 min⁻¹ (rpm).

- If the voltage is between 13.9 V and 15.1 V, the alternator and regulator are OK.
  If the charge warning light is still on, see Charge Warning Light Test.

7. Perform a full-field test: Insert a short screwdriver into the full field access hole at the back of the alternator. While grounding the screwdriver and check amperage reading.

CAUTION: The voltage will rise quickly when the alternator is full fielded. Do not allow the voltage to exceed 18 volts or damage to the electrical system may result.

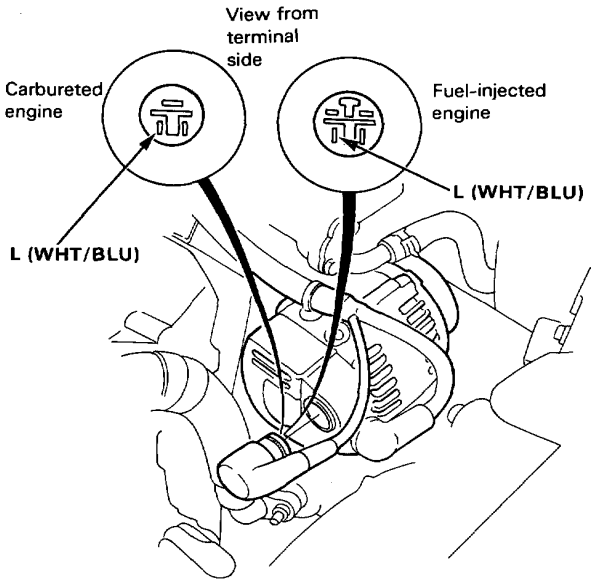


- If the amperage is not within specification, replace the alternator.
- If the amperage is within specification, replace the voltage regulator.

Charge Warning Light Test

NOTE: Before testing, check the wire harness connection, alternator belt tension and No.2 (15 A) fuse in the dash fuse box.

1. Turn the ignition switch on. The charge warning light should come on.
   If it does not come on, unplug the alternator connector and short the pin of the L (WHT/BLU) terminal to ground.

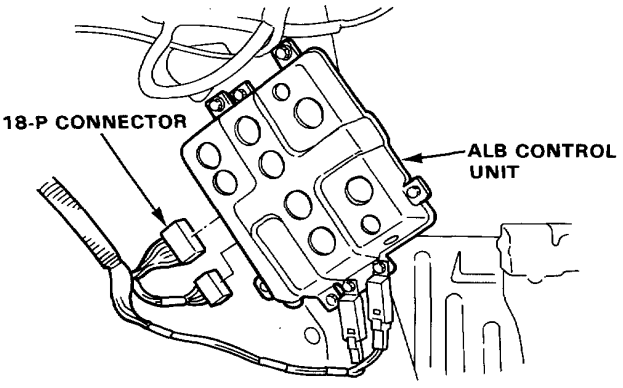


- If the warning light still does not come on, check for:
  - Bad bulb.
  - An open in the WHT/BLU wire between the warning light and voltage regulator.
  - An open in the BLK/YEL wire between the warning light and the dash fuse box, or the dash fuse box and the ignition switch.
- If the light comes on, check the alternator and regulator (see page 16-94).

2. Start the engine and let it idle. The charge warning light should go off.
   If it stays on this time, check the alternator and regulator (see page 16-94).
   If the system is charging, proceed as follows.

3. Without ALB: There is a short to ground in the WHT/BLU wire between the warning light and the dash fuse box, or the dash fuse box and the voltage regulator.
   With ALB: Go to step 4

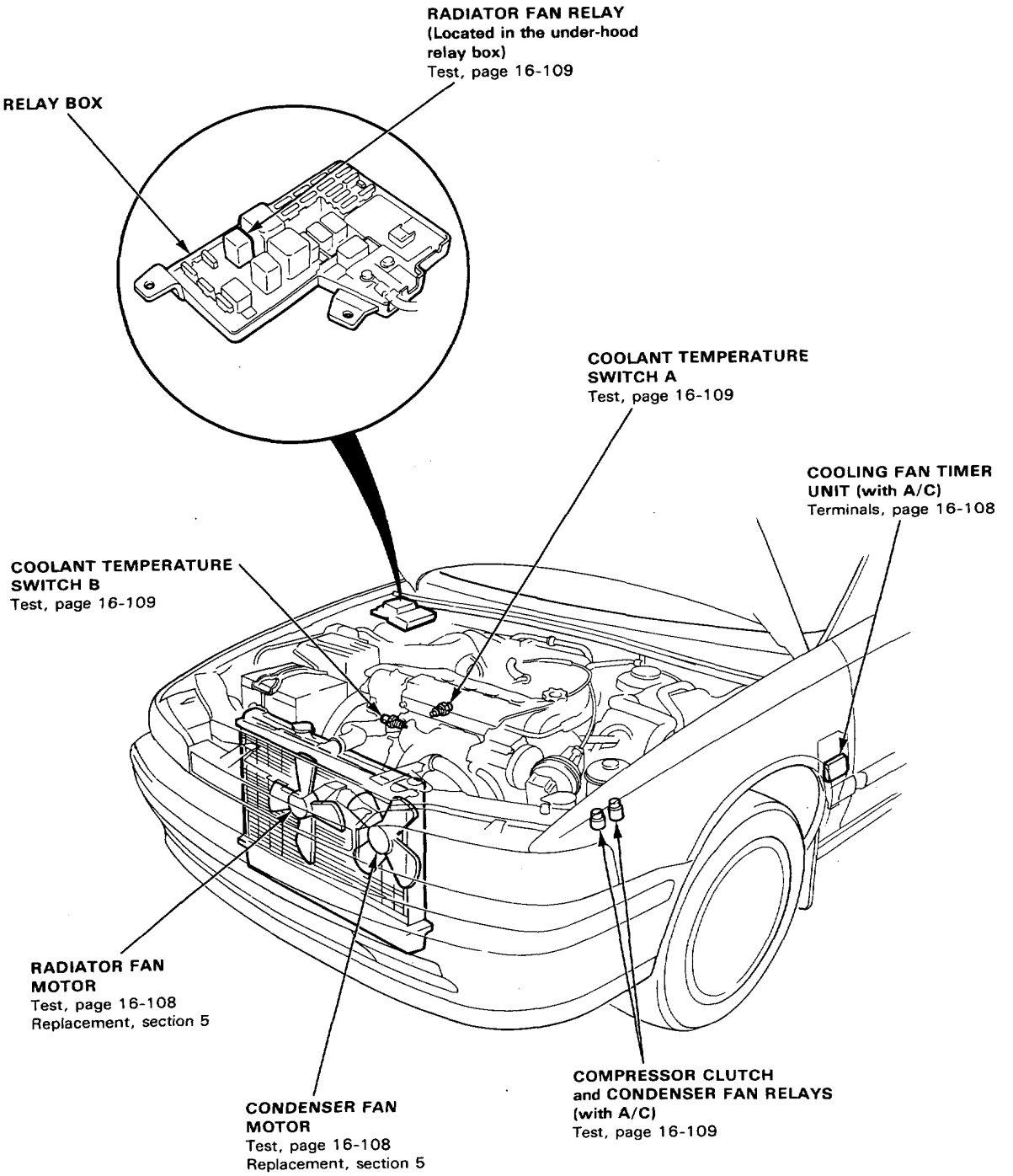
4. Unplug the alternator connector, then remove the right trunk trim panel.
   Disconnect the 18-P connector from the ALB control unit.
   With the ignition switch ON, the charge warning light should go off.



- If the light goes off, there is a short in the ALB control unit.
- If the light does not go off, there is a short to ground in the WHT/BLU wire between the ALB control unit and the dash fuse box, or the dash fuse box and the voltage regulator.

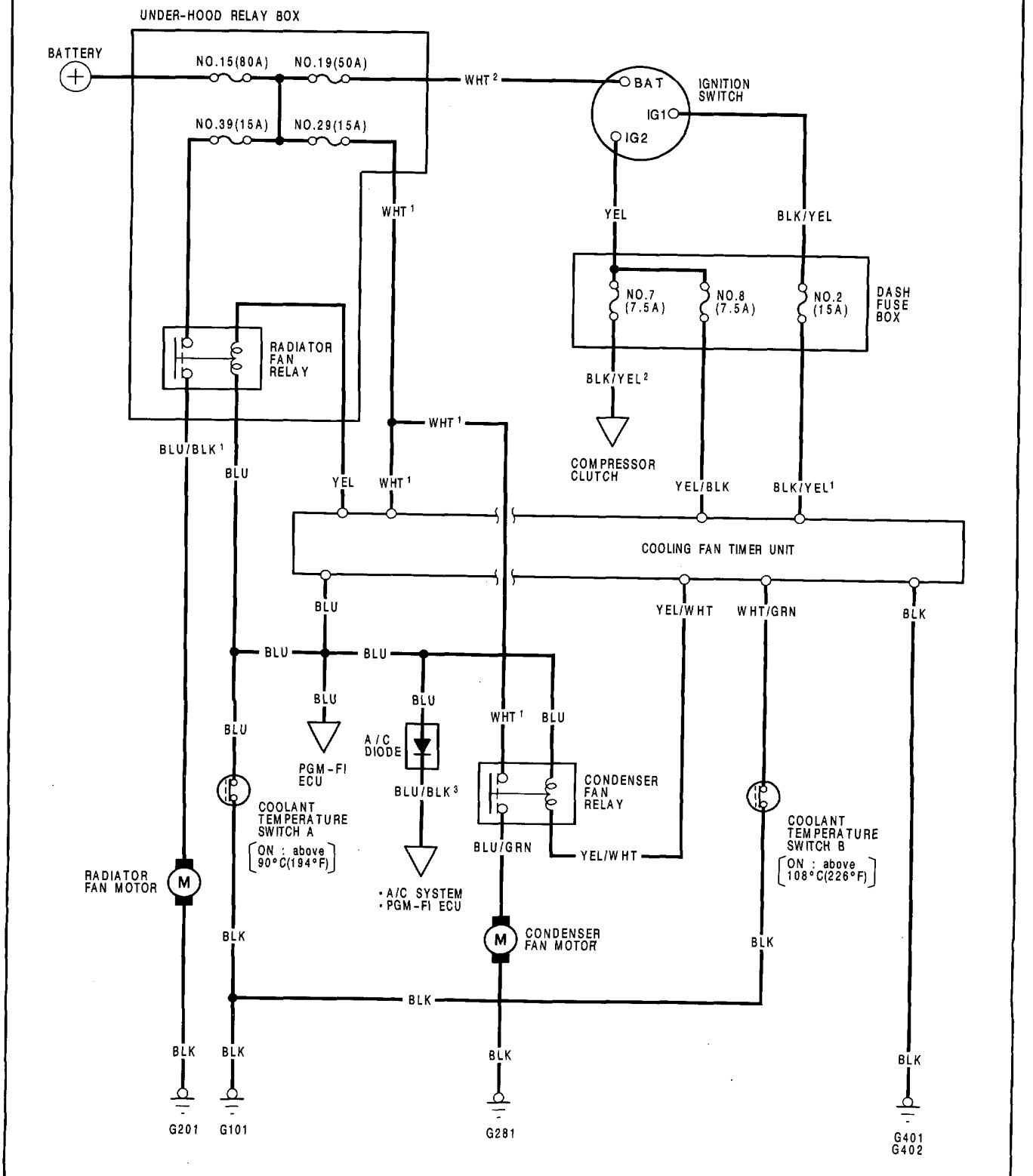
Cooling Fan Control

Component Location Index

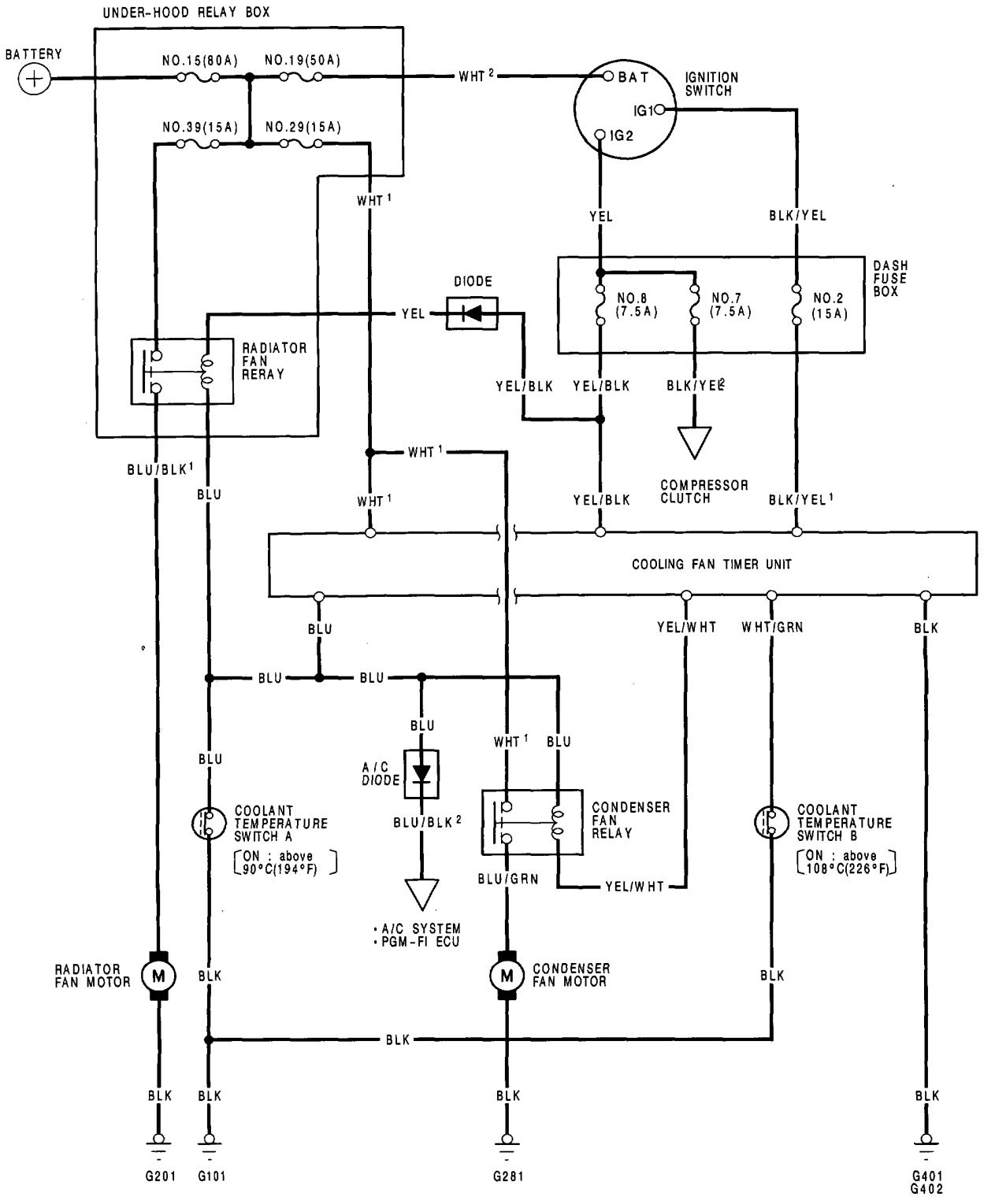


Cooling Fan Control

Circuit Diagram (KY and KQ models)



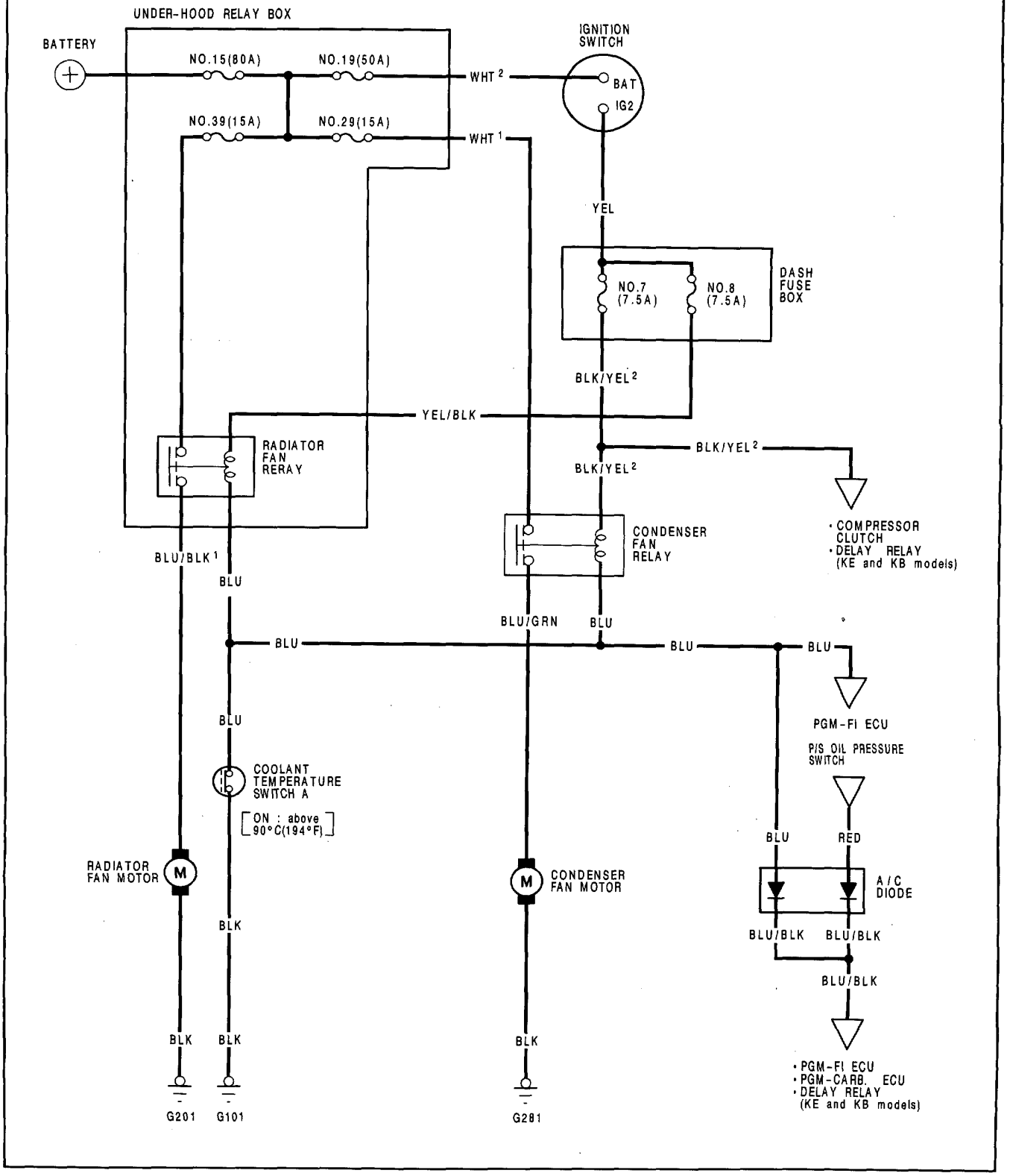
Circuit Diagram (Except KY and KQ models: With Fan Timer System)



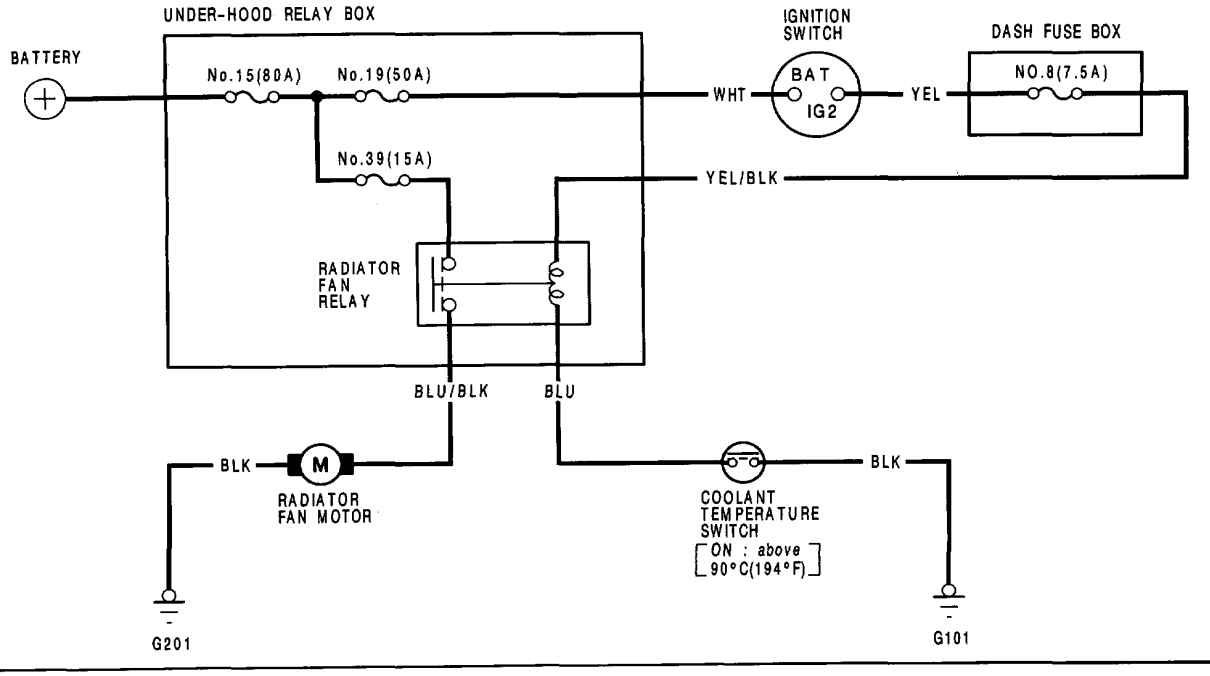
(cont'd)

Cooling Fan Control

Circuit Diagram (Except KY and KQ models: Without Fan Timer System)



Circuit Diagram (Without A/C)



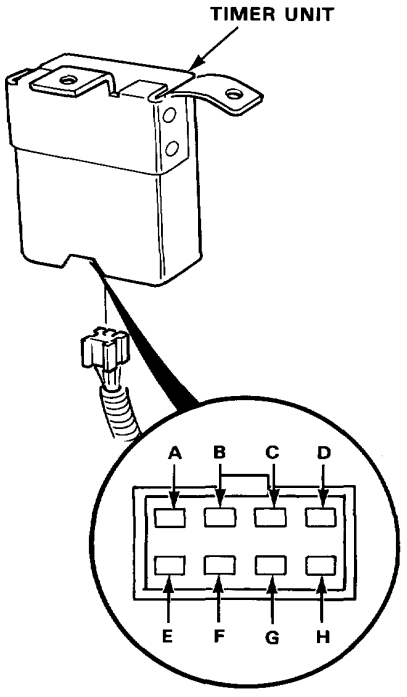
Troubleshooting (With A/C)

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No.29 (15 A) or No.39 (15 A) fuse (in the under-hood relay box)	Radiator fan or condenser fan relay	Radiator fan or condenser fan motor	A/C diode	Blown No.2 (15 A) fuse (in the dash fuse box)	Coolant temperature switch A	Faulty cooling fan timer unit	Coolant temperature switch B	A/C system	Poor ground	Open circuit in wires or loose or disconnected terminals
Only one fan operates (with engine and A/C ON).		1	2	3	4						G401 G402	BLU, BLU/BLK[1], BLU/BLK[2] BLU/BLK[3], BLU/YEL, YEL/BLK, YEL/WHT, BLU/GRN, YEL or WHT[1]
Fans do not rotate.	Under all conditions.					1	2	3			G101	YEL/BLK, YEL or BLU
	A/C ON									1		
Fan timer unit fails to function properly.								2	1		G401 G402	WHT[1], WHT/GRN or YEL/WHT

Cooling Fan Control

Timer Unit Terminals (With fan timer system)



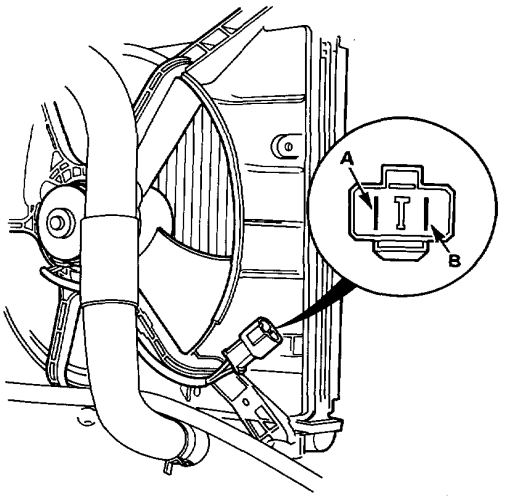
Terminal	Wire	Destination
A	YEL*1	Radiator fan relay ⊕
	YEL/WHT*2	Condenser fan relay ⊖
B	YEL/BLK	Power supply (For condenser fan relay by way of timer unit with ignition switch ON)
C	WHT/YEL*1	Condenser fan relay ⊖
	*2	(Not used)
D	BLK	Ground
E	WHT/GRN	Coolant temperature switch B
F	WHT	Constant power (For condenser fan relay by way of timer unit)
G	BLK/YEL	IG1 (Timer reset signal)
H	BLU	Condenser fan relay ⊕

*1: KY and KQ models
*2: Except KY and KQ models

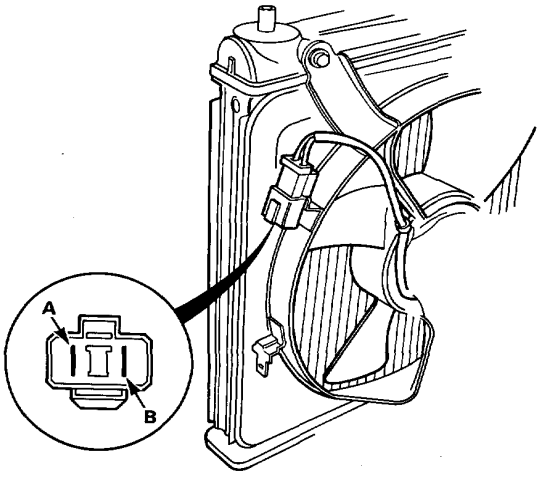
Fan Motor Test

1. Disconnect the 2-P connector from the fan motor.
2. Test motor operation by connecting battery positive to the A terminal, and negative to the B terminal.
3. If the motor fails to run smoothly, replace it.

Radiator Fan Motor:



Condenser Fan Motor:

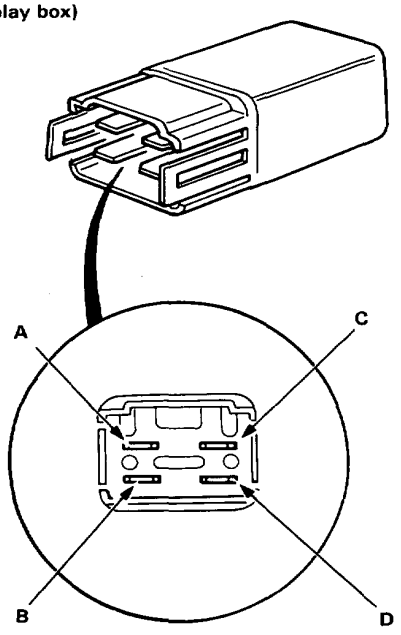


Relay Test

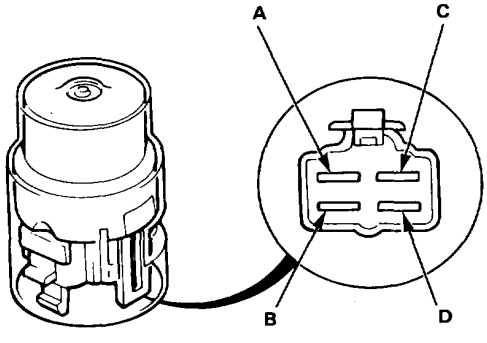
There should be continuity between the A and B terminals when the battery is connected to the C and D terminals. There should be no continuity when the battery is disconnected.

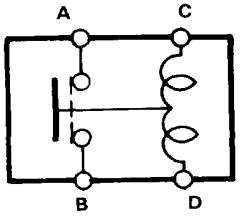
NOTE: Test procedures are same for all relays.

RADIATOR FAN RELAY
(in the relay box)



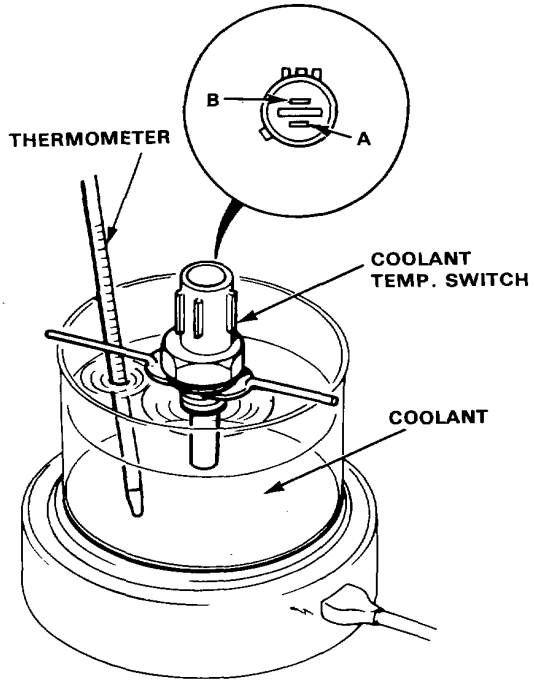
CONDENSER FAN RELAY (With A/C)





Coolant Temperature Switch Test

1. Remove the coolant temperature switch A form the termostat housing or the switch B from the water outlet cover.
2. Suspend the coolant temperature switch in a container of coolant as shown.

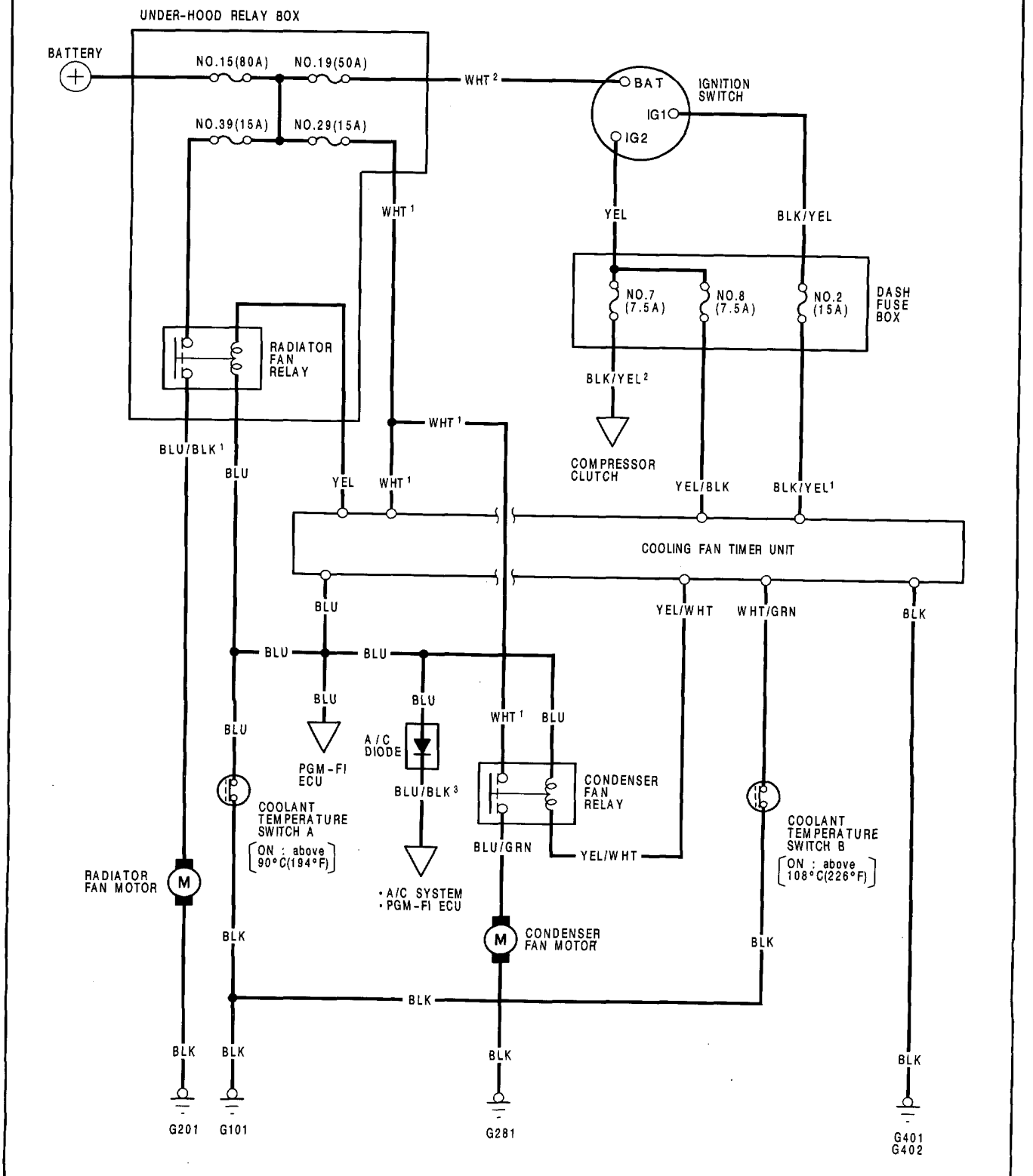


3. Heat the coolant and check coolant temperature with a thermometer.
4. Measure the resistance between the A and B terminals according to the table.

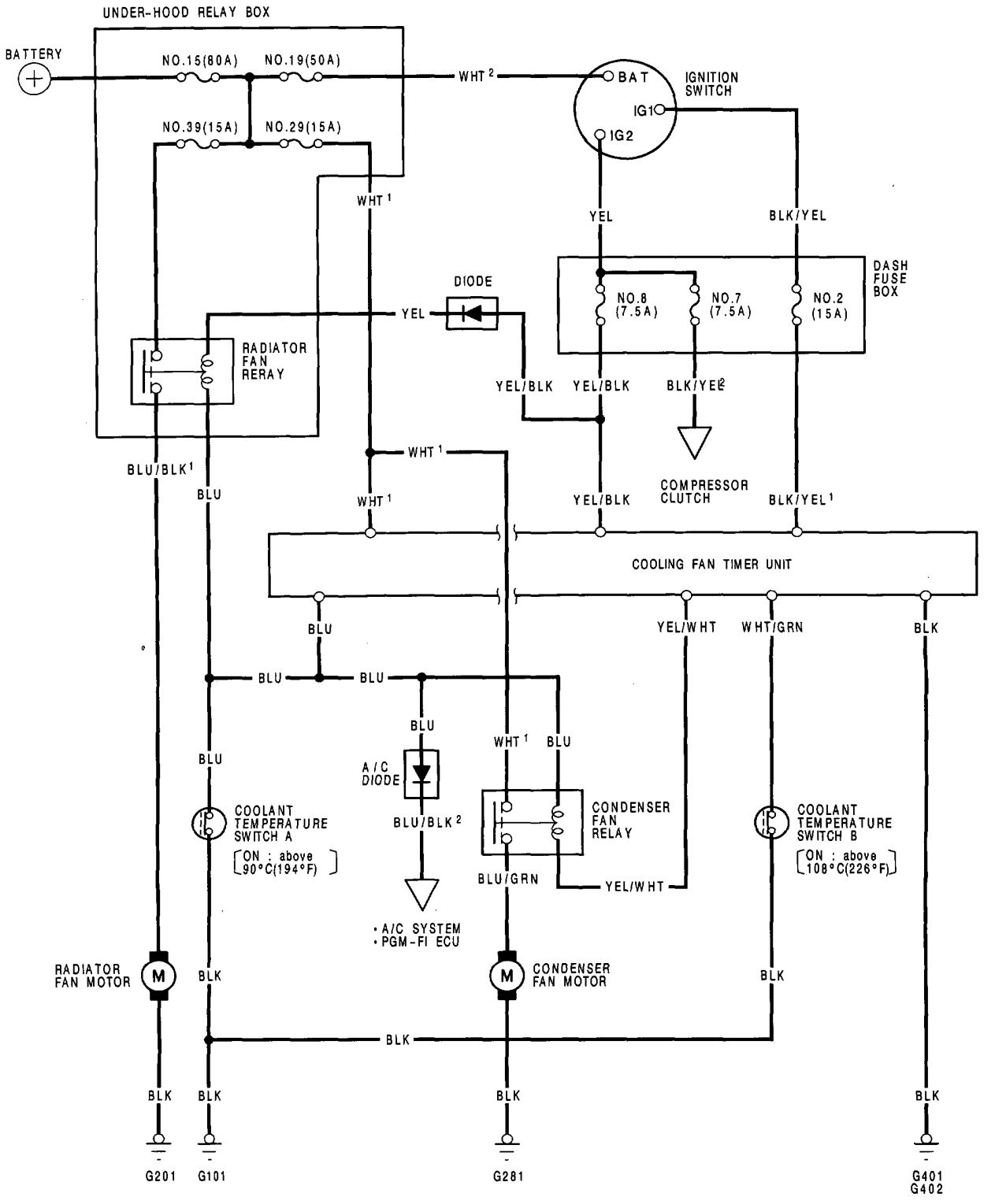
Temperature \ Terminal			A	B
Switch A	Above	87—93°C (189—199°F)	○	○
	Below	80—91°C (176—196°F)		
Switch B	Above	105—111°C (221—232°F)	○	○
	Below	98—109°C (208—228°F)		

Cooling Fan Control

Circuit Diagram (KY and KQ models)



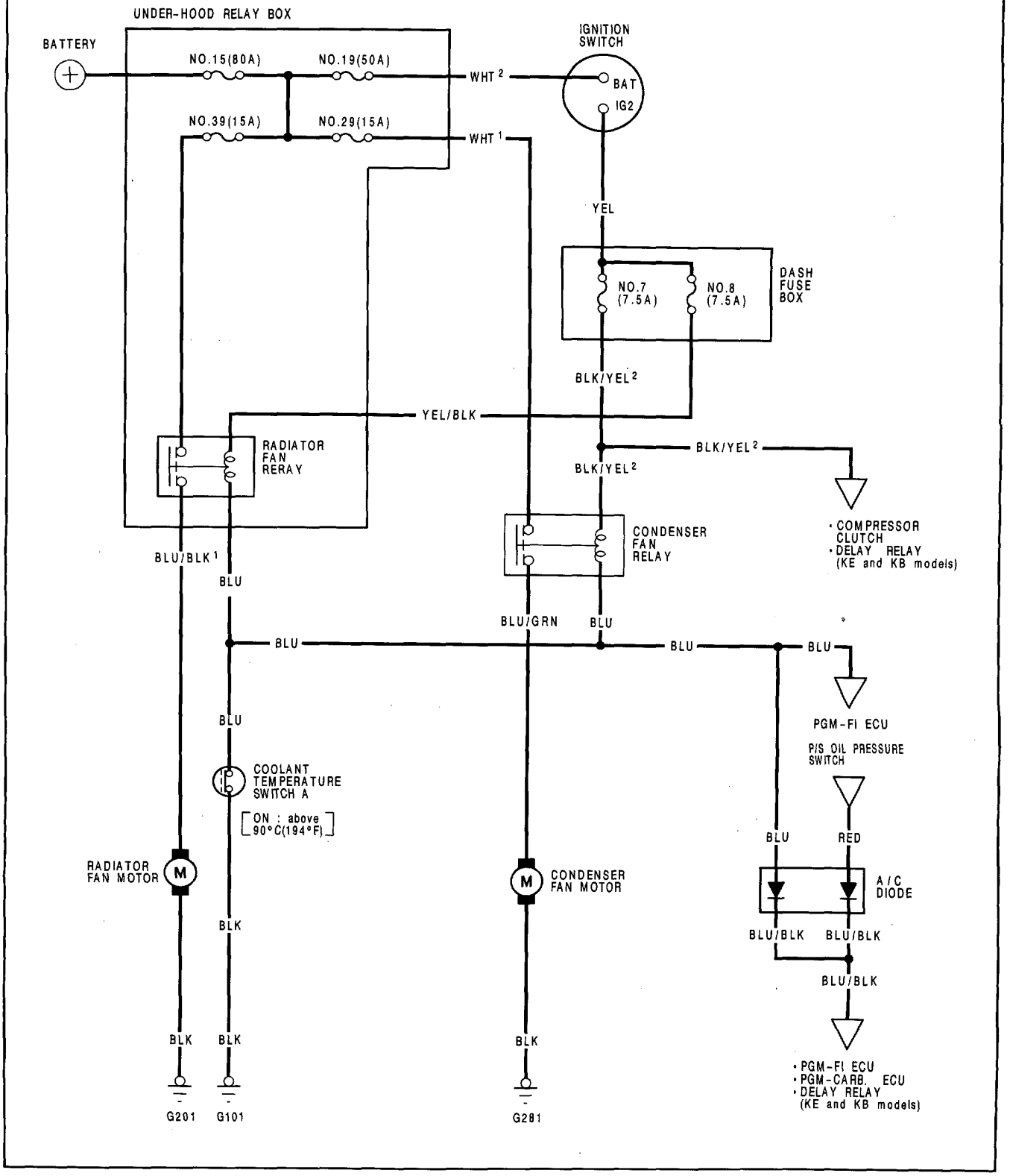
Circuit Diagram (Except KY and KQ models: With Fan Timer System)



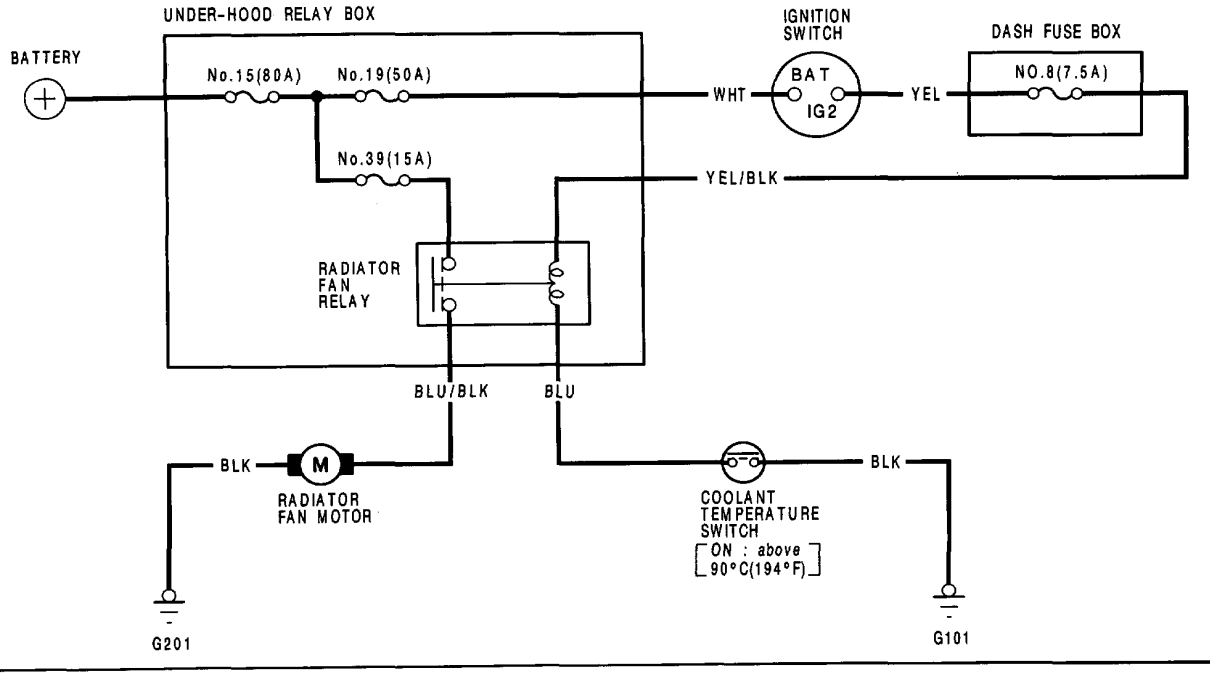
(cont'd)

Cooling Fan Control

Circuit Diagram (Except KY and KQ models: Without Fan Timer System)



Circuit Diagram (Without A/C)



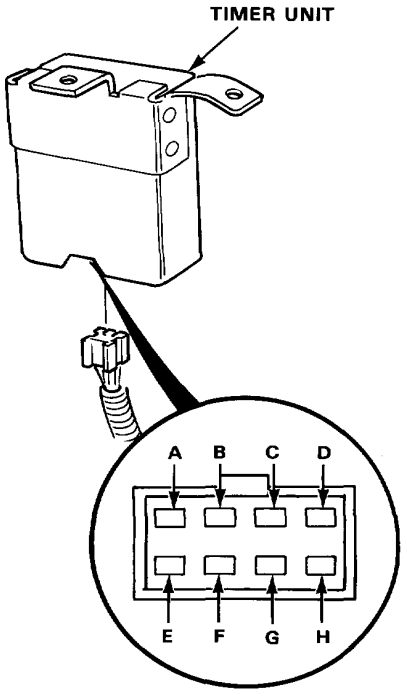
Troubleshooting (With A/C)

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		Blown No.29 (15 A) or No.39 (15 A) fuse (in the under-hood relay box)	Radiator fan or condenser fan relay	Radiator fan or condenser fan motor	A/C diode	Blown No.2 (15 A) fuse (in the dash fuse box)	Coolant temperature switch A	Faulty cooling fan timer unit	Coolant temperature switch B	A/C system	Poor ground	Open circuit in wires or loose or disconnected terminals
Only one fan operates (with engine and A/C ON).		1	2	3	4						G401 G402	BLU, BLU/BLK[1], BLU/BLK[2] BLU/BLK[3], BLU/YEL, YEL/BLK, YEL/WHT, BLU/GRN, YEL or WHT[1]
Fans do not rotate.	Under all conditions.					1	2	3			G101	YEL/BLK, YEL or BLU
	A/C ON									1		
Fan timer unit fails to function properly.								2	1		G401 G402	WHT[1], WHT/GRN or YEL/WHT

Cooling Fan Control

Timer Unit Terminals (With fan timer system)



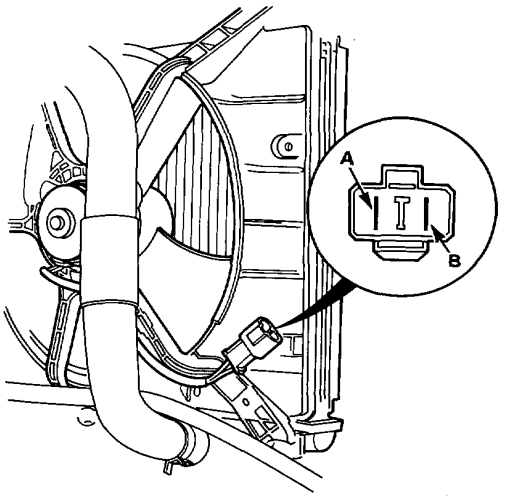
Terminal	Wire	Destination
A	YEL*1	Radiator fan relay ⊕
	YEL/WHT*2	Condenser fan relay ⊖
B	YEL/BLK	Power supply (For condenser fan relay by way of timer unit with ignition switch ON)
C	WHT/YEL*1	Condenser fan relay ⊖
	*2	(Not used)
D	BLK	Ground
E	WHT/GRN	Coolant temperature switch B
F	WHT	Constant power (For condenser fan relay by way of timer unit)
G	BLK/YEL	IG1 (Timer reset signal)
H	BLU	Condenser fan relay ⊕

*1: KY and KQ models
*2: Except KY and KQ models

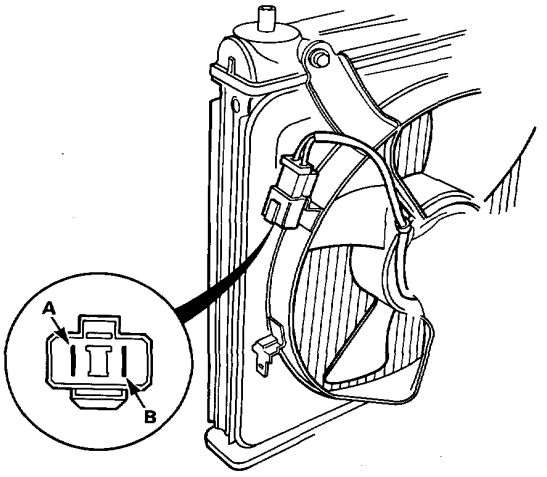
Fan Motor Test

1. Disconnect the 2-P connector from the fan motor.
2. Test motor operation by connecting battery positive to the A terminal, and negative to the B terminal.
3. If the motor fails to run smoothly, replace it.

Radiator Fan Motor:



Condenser Fan Motor:

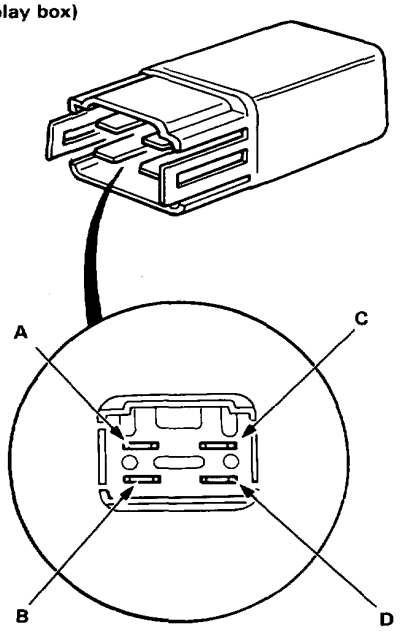


Relay Test

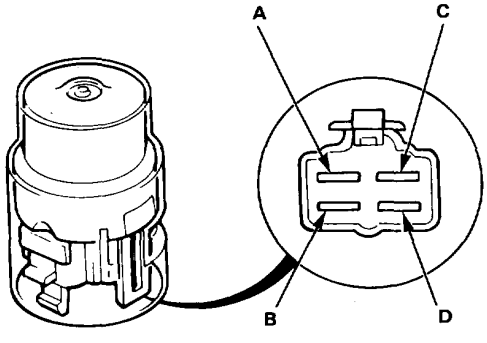
There should be continuity between the A and B terminals when the battery is connected to the C and D terminals. There should be no continuity when the battery is disconnected.

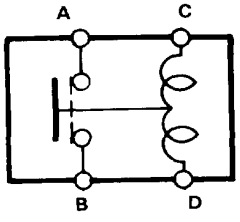
NOTE: Test procedures are same for all relays.

RADIATOR FAN RELAY
(in the relay box)



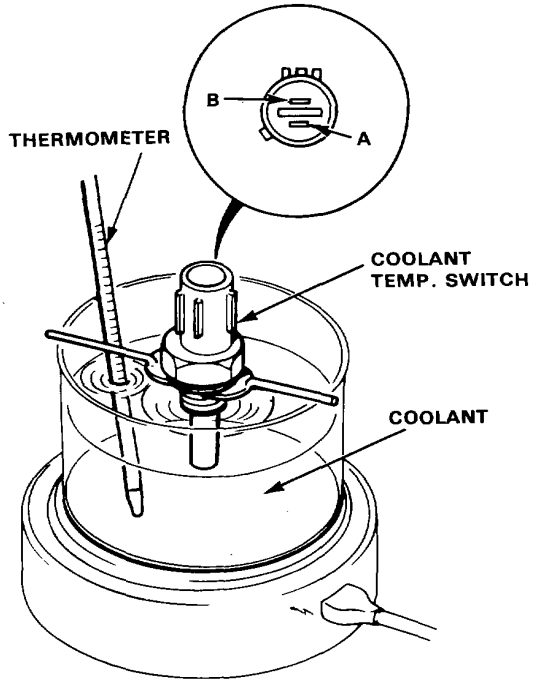
CONDENSER FAN RELAY (With A/C)





Coolant Temperature Switch Test

1. Remove the coolant temperature switch A form the termostat housing or the switch B from the water outlet cover.
2. Suspend the coolant temperature switch in a container of coolant as shown.

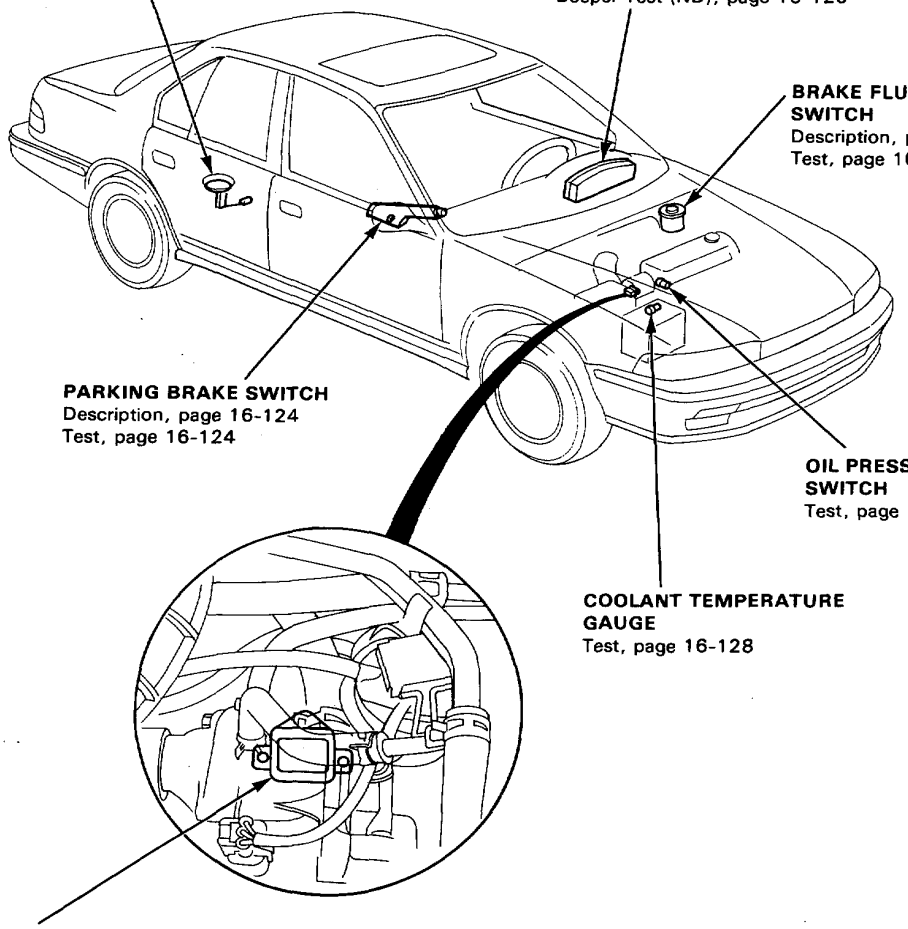


3. Heat the coolant and check coolant temperature with a thermometer.
4. Measure the resistance between the A and B terminals according to the table.

Temperature \ Terminal			A	B
Switch A	Above	87—93°C (189—199°F)	○	○
	Below	80—91°C (176—196°F)		
Switch B	Above	105—111°C (221—232°F)	○	○
	Below	98—109°C (208—228°F)		

Gauge Assembly

Component Location Index



FUEL SENDER UNIT
Test, page 16-126
Replacement, page 16-127

GAUGE ASSEMBLY
Gauge Location Index, page 16-111
Bulb Location, page 16-104
Disassembly, page 16-118
Removal, page 16-120
Beeper Test (ND), page 16-120

BRAKE FLUID LEVEL SWITCH
Description, page 16-124
Test, page 16-124

PARKING BRAKE SWITCH
Description, page 16-124
Test, page 16-124

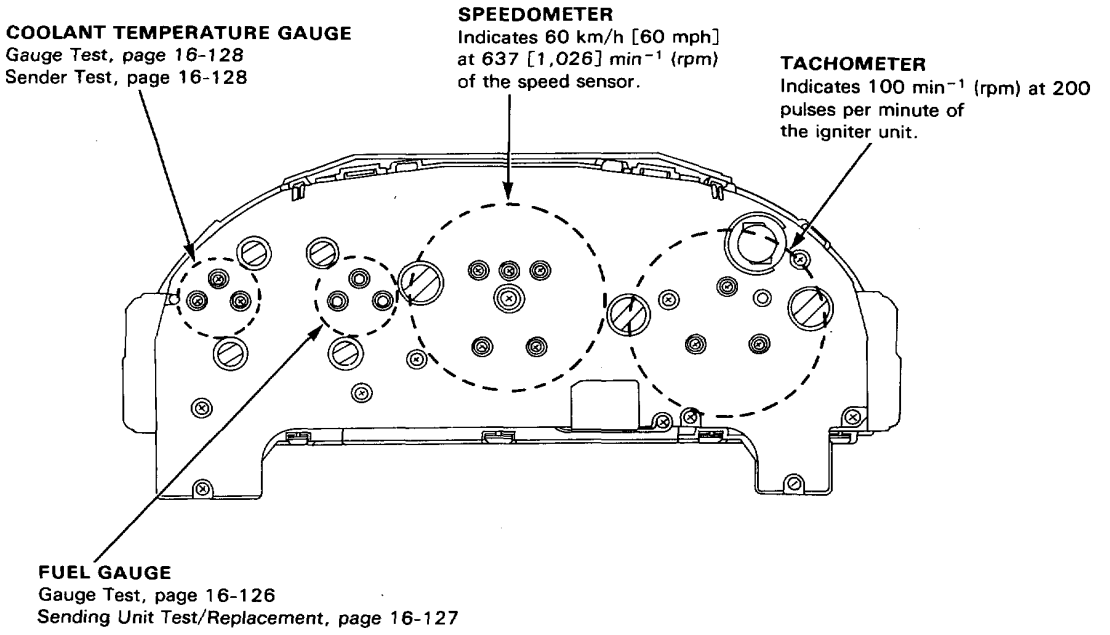
OIL PRESSURE SWITCH
Test, page 16-125

COOLANT TEMPERATURE GAUGE
Test, page 16-128

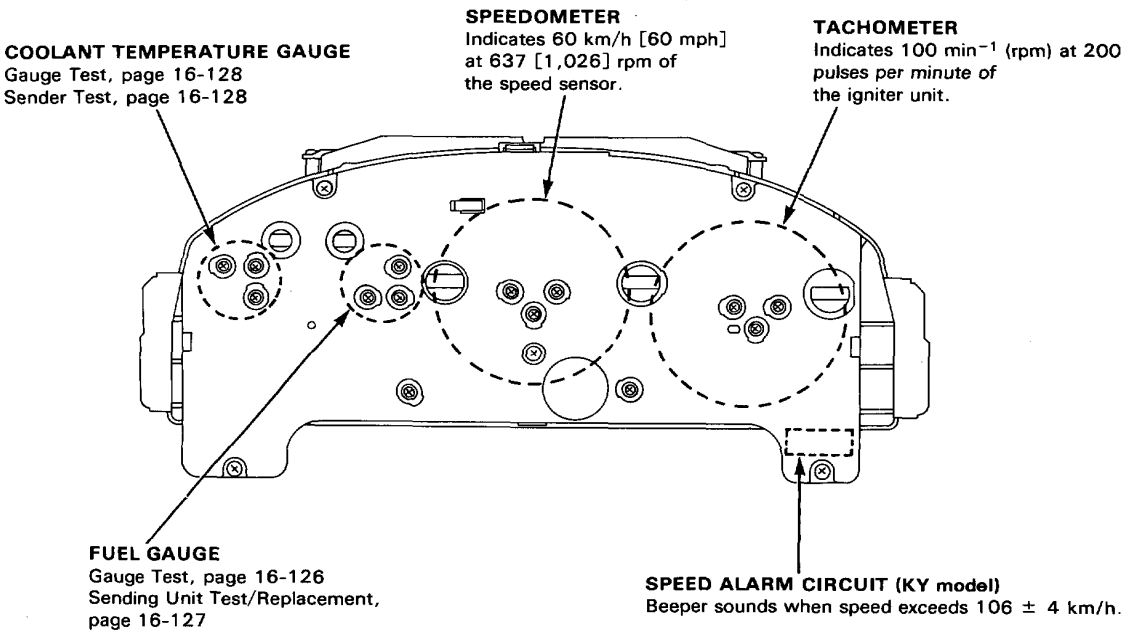
SPEED SENSOR
(Located under the thermostat housing)
Input Test, page 16-122
Replacement, page 16-123
Troubleshooting, page 16-121

Gauge Location Index

ND:

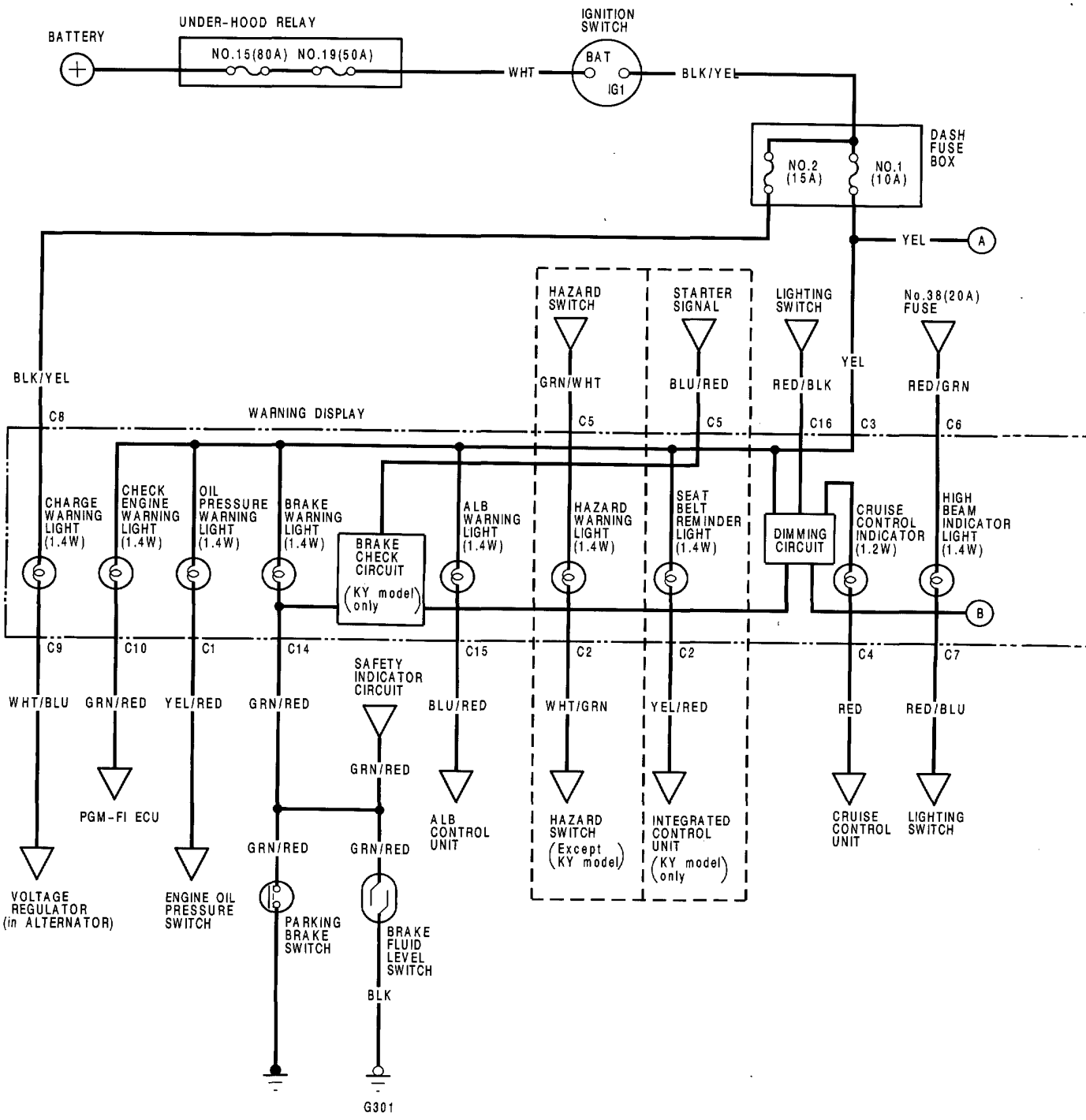


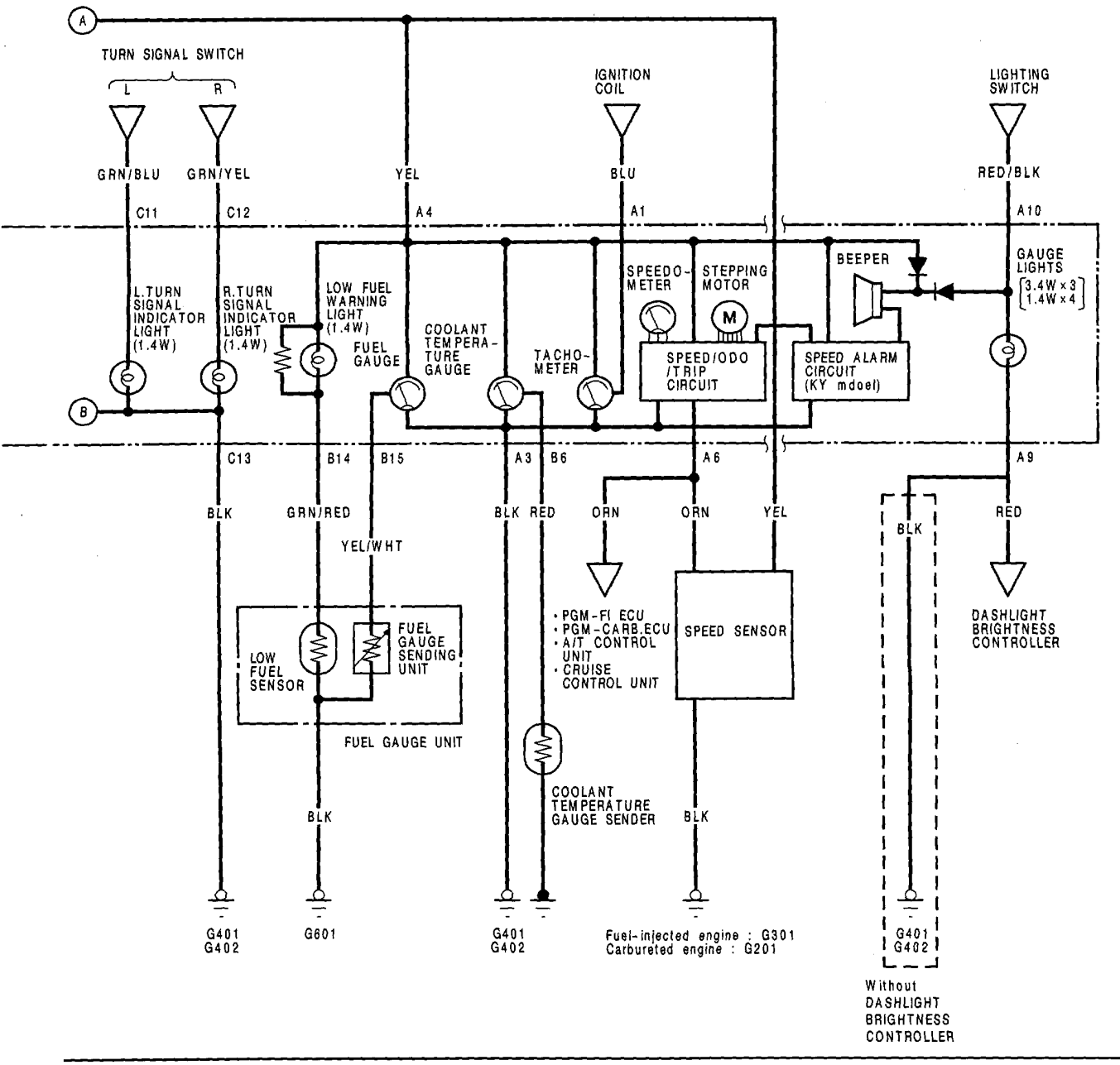
NS:



Gauge Assembly

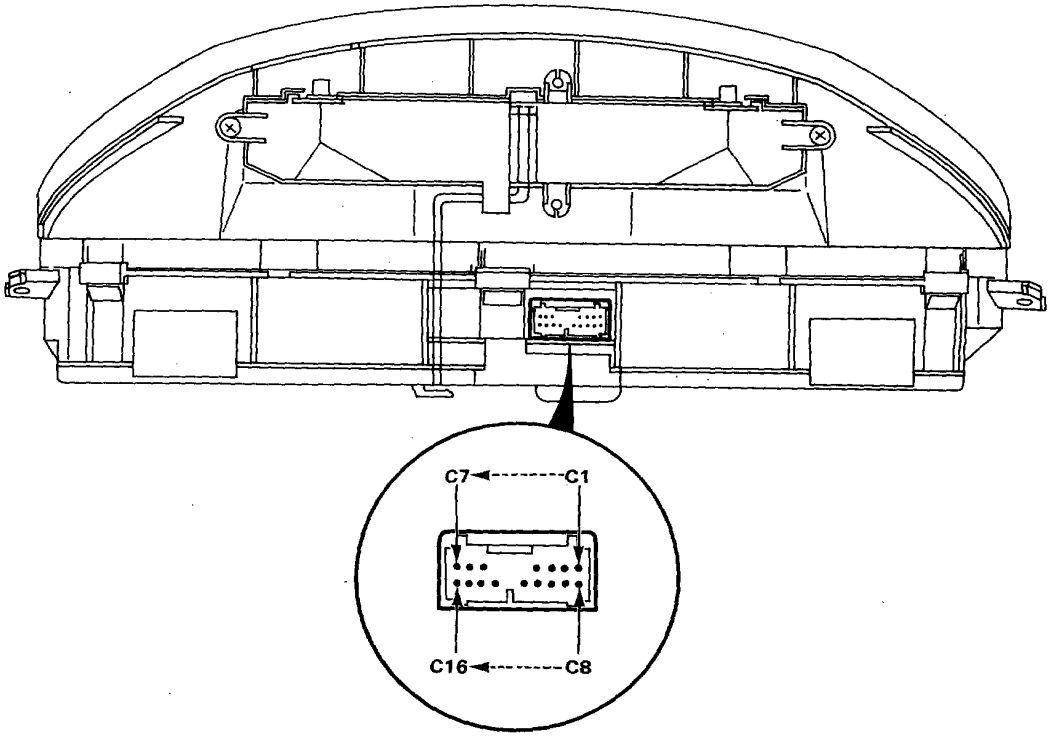
Circuit Diagram

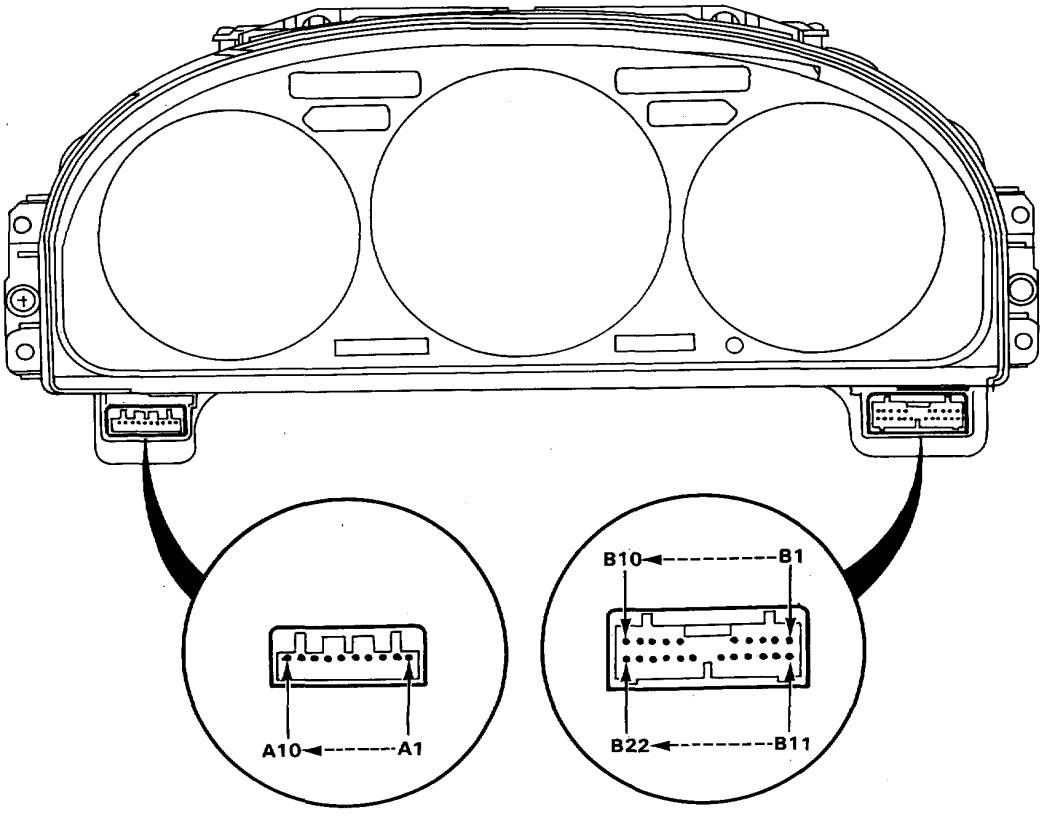



A
TURN SIGNAL SWITCH
L
R
GRN/BLU
GRN/YEL
C11
C12
L.TURN SIGNAL INDICATOR LIGHT (1.4W)
R.TURN SIGNAL INDICATOR LIGHT (1.4W)
B
C13
BLK
LOW FUEL WARNING LIGHT (1.4W)
FUEL GAUGE
B14
GRN/RED
B15
YEL/WHT
LOW FUEL SENSOR
FUEL GAUGE SENDING UNIT
FUEL GAUGE UNIT
BLK
G401
G402
G601
YEL
A4
COOLANT TEMPERATURE GAUGE
TACHOMETER
A3
B6
BLK
RED
COOLANT TEMPERATURE GAUGE SENDER
G401
G402
IGNITION COIL
BLU
A1
SPEEDOMETER
STEPPING MOTOR
M
SPEEDO/ODO/TRIP CIRCUIT
SPEED ALARM CIRCUIT (KY model)
BEEPER
A6
ORN
ORN
YEL
• PGM-FI ECU
• PGM-CARB.ECU
• A/T CONTROL UNIT
• CRUISE CONTROL UNIT
SPEED SENSOR
BLK
Fuel-injected engine : G301
Carbureted engine : G201
LIGHTING SWITCH
RED/BLK
A10
GAUGE LIGHTS (3.4W x 3 1.4W x 4)
A9
RED
DASHLIGHT BRIGHTNESS CONTROLLER
BLK
G401
G402
Without DASHLIGHT BRIGHTNESS CONTROLLER

Gauge Assembly

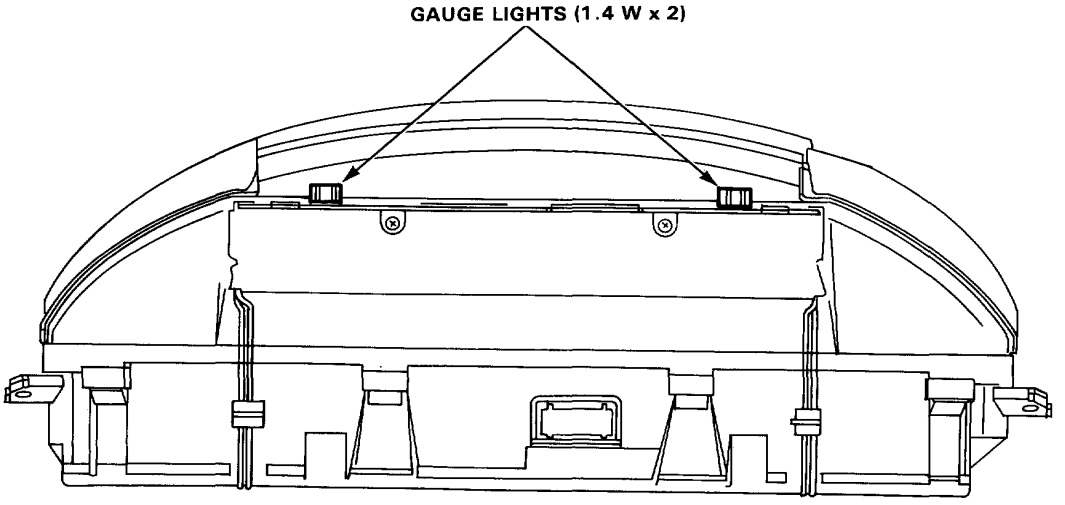
Terminal Locations

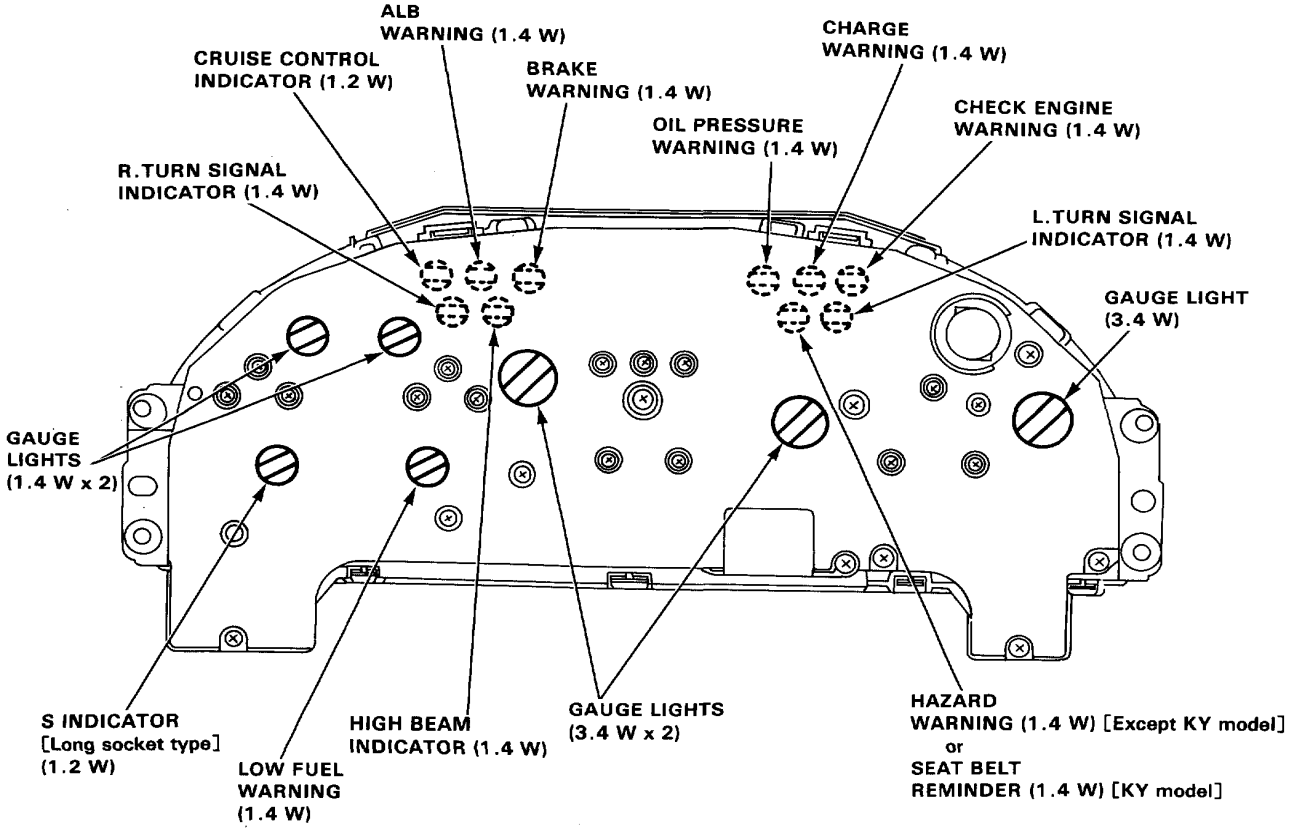


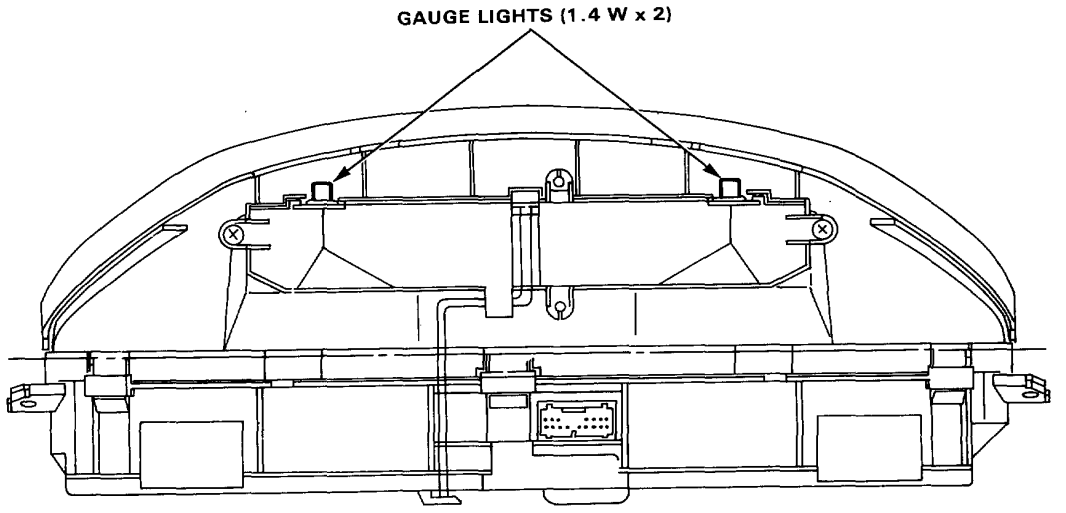

B10
B1
A10
A1
B22
B11

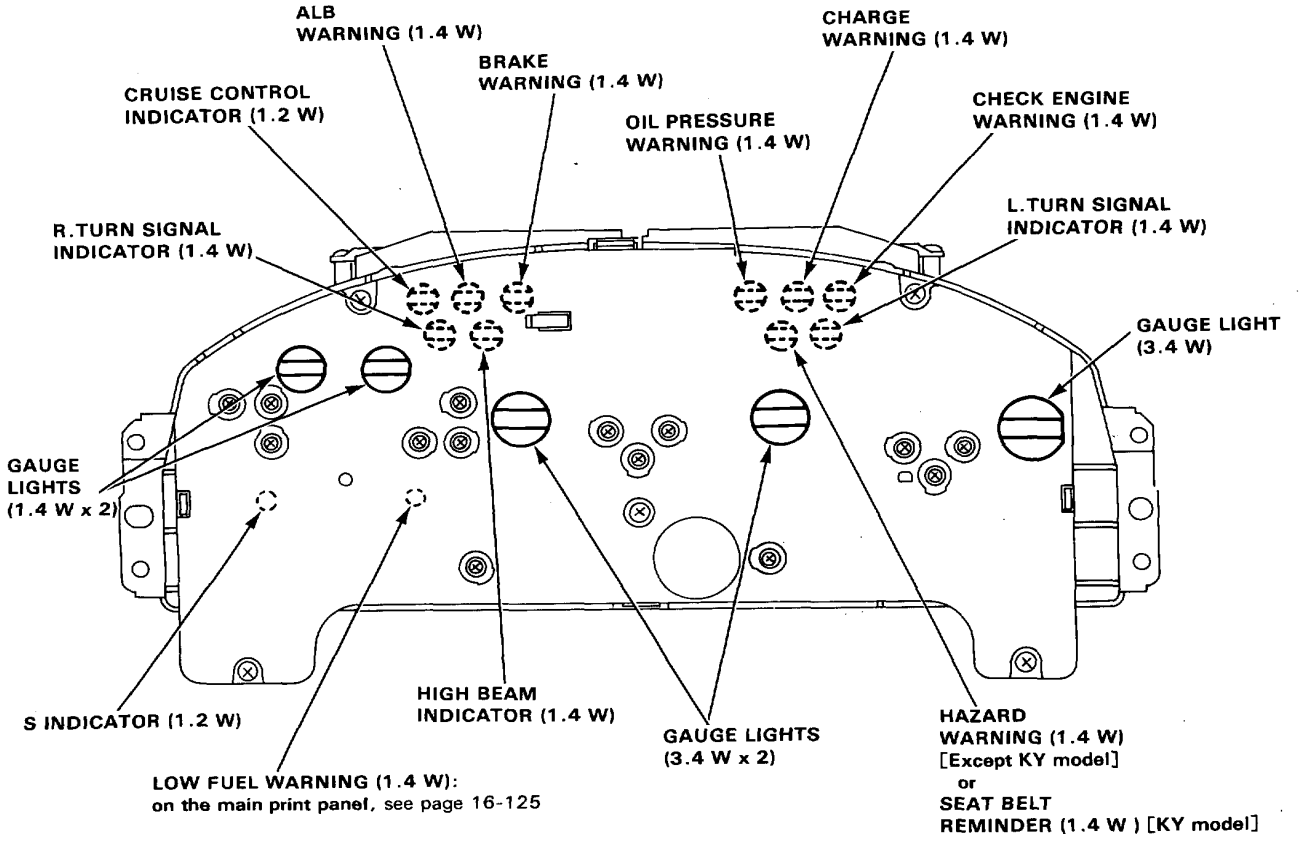
Gauge Assembly

Bulb Locations (ND)





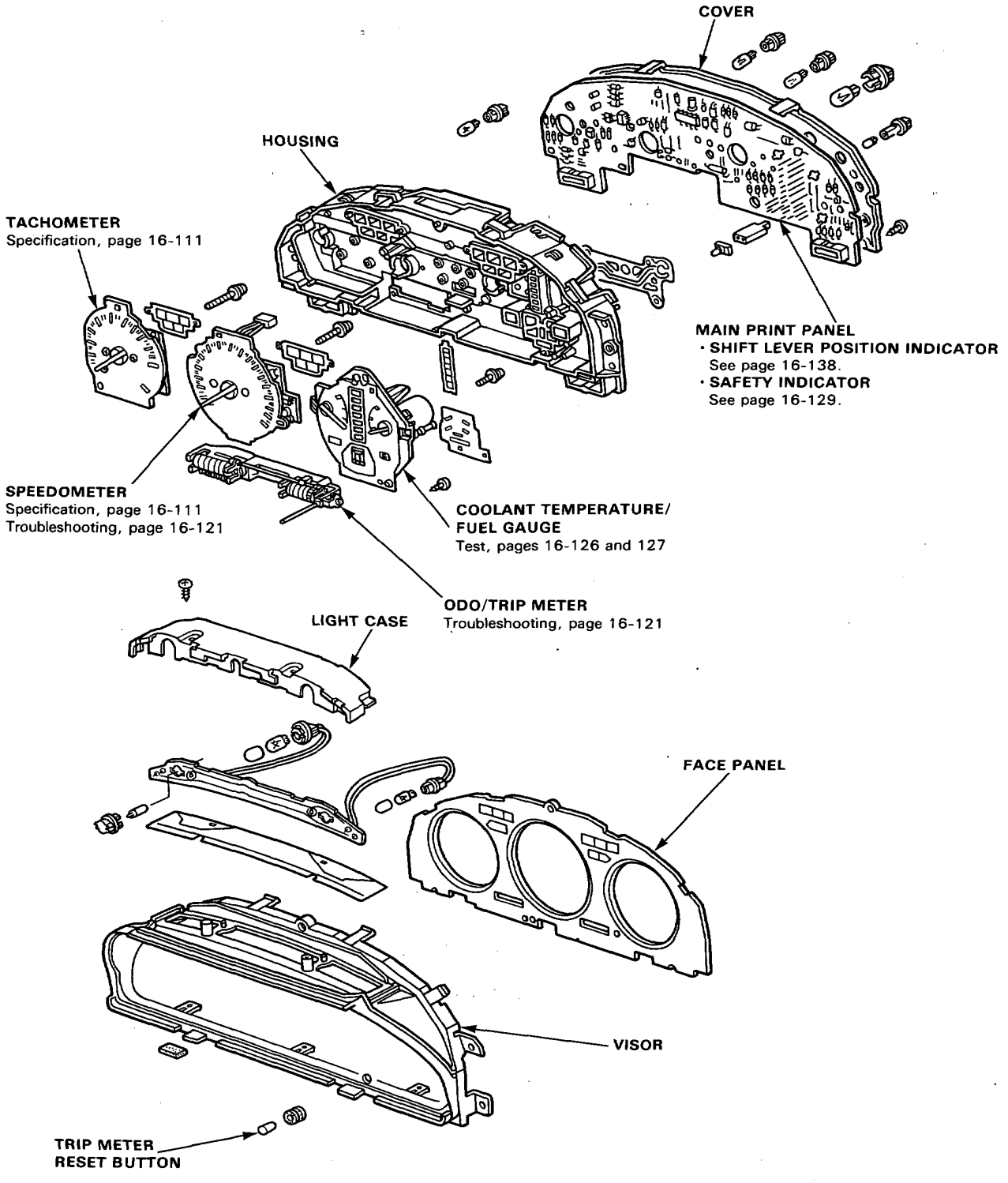

GAUGE LIGHTS (1.4 W x 2)


ALB
WARNING (1.4 W)
BRAKE
WARNING (1.4 W)
CHARGE
WARNING (1.4 W)
CRUISE CONTROL
INDICATOR (1.2 W)
OIL PRESSURE
WARNING (1.4 W)
CHECK ENGINE
WARNING (1.4 W)
R.TURN SIGNAL
INDICATOR (1.4 W)
L.TURN SIGNAL
INDICATOR (1.4 W)
GAUGE LIGHT
(3.4 W)
GAUGE
LIGHTS
(1.4 W x 2)
S INDICATOR (1.2 W)
HIGH BEAM
INDICATOR (1.4 W)
GAUGE LIGHTS
(3.4 W x 2)
HAZARD
WARNING (1.4 W)
[Except KY model]
or
SEAT BELT
REMINDER (1.4 W) [KY model]
LOW FUEL WARNING (1.4 W):
on the main print panel, see page 16-125

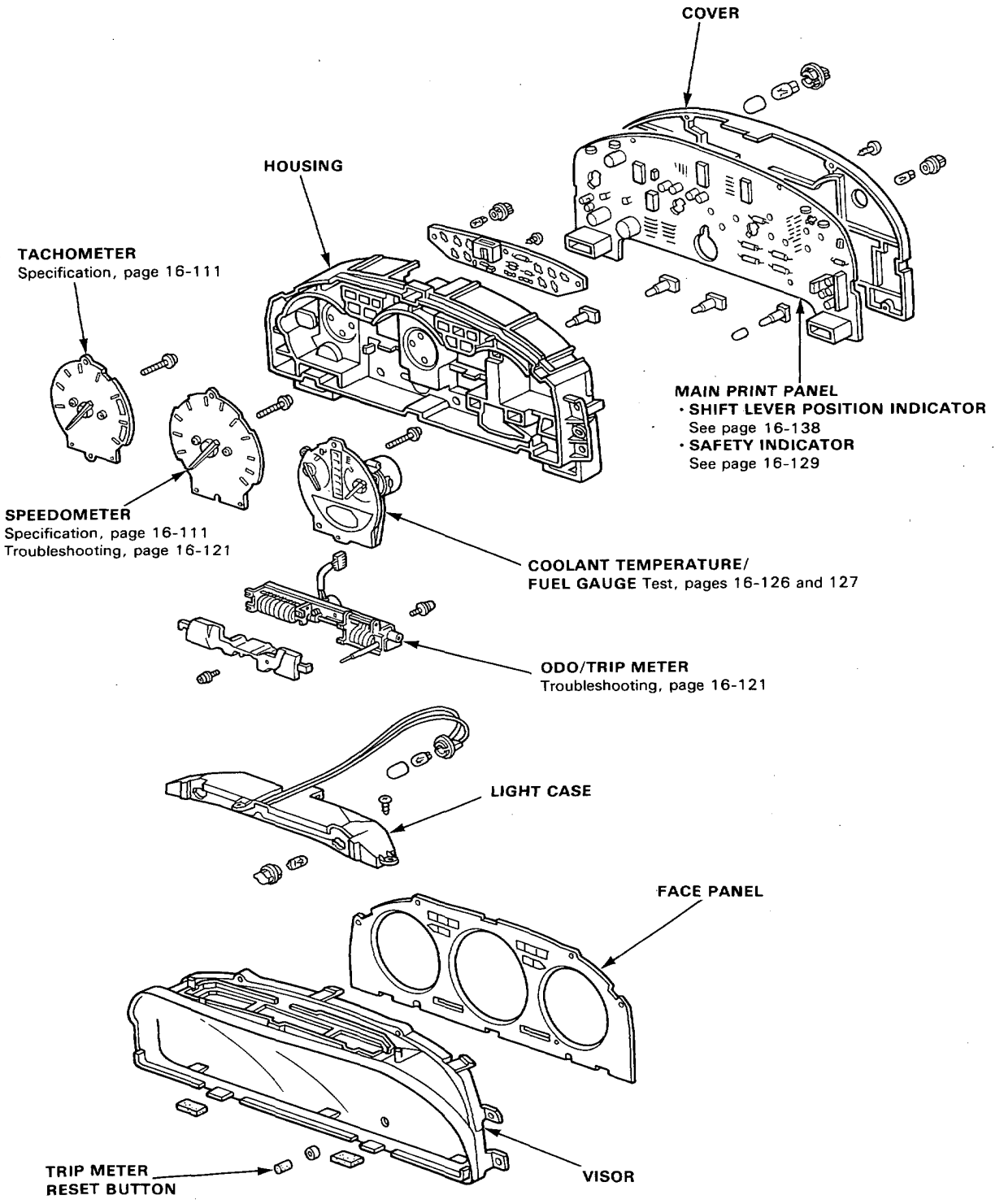
Gauge Assembly

Disassembly (ND)

NOTE: Handle the terminals and printed circuits carefully to avoid damaging them.



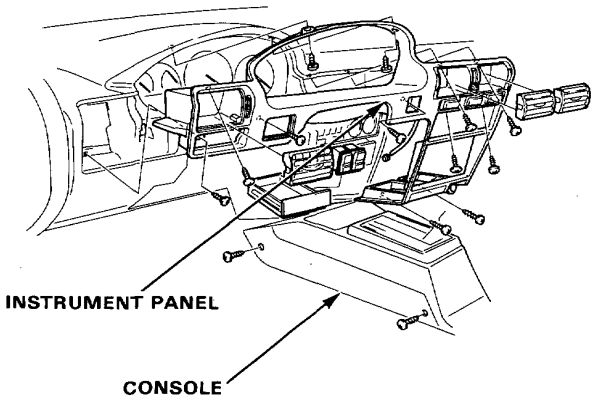
(NS)


COVER
HOUSING
TACHOMETER
Specification, page 16-111
MAIN PRINT PANEL
· SHIFT LEVER POSITION INDICATOR
See page 16-138
· SAFETY INDICATOR
See page 16-129
SPEEDOMETER
Specification, page 16-111
Troubleshooting, page 16-121
COOLANT TEMPERATURE/
FUEL GAUGE Test, pages 16-126 and 127
ODO/TRIP METER
Troubleshooting, page 16-121
LIGHT CASE
FACE PANEL
TRIP METER
RESET BUTTON
VISOR

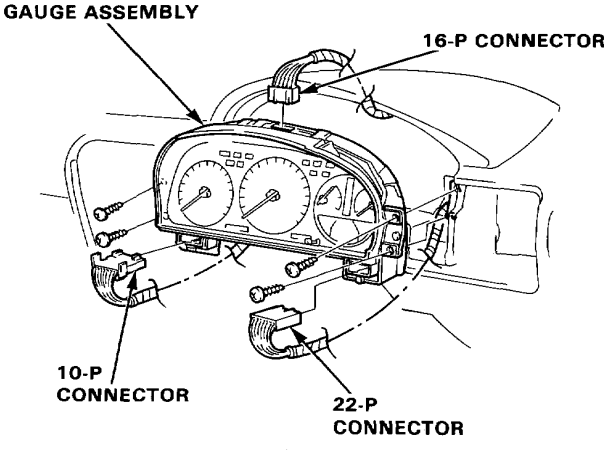
Gauge Assembly

Removal

1. Remove the console and the instrument panel from the dashboard, then disconnect each switch connector.

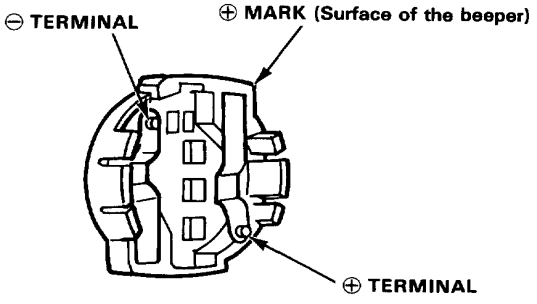


2. Remove the 4 screws and the gauge assembly, then disconnect 10-P, 16-P and 22-P connectors.



Beeper Test (ND)

1. Remove the beeper from the gauge assembly.
2. Test the beeper operation by connecting the battery positive to the ⊕ terminal (⊕ mark), and negative to the ⊖ terminal.



3. If the beeper fails to operate, replace it.

Speed/Odo/Trip meter Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom	Blown No.1 (10 A) fuse (in the dash fuse box)	ND		NS		Speed sensor input test	Speed sensor is not installed correctly	Poor ground	Open circuit in wires or loose or disconnected terminals
		Speedometer	Odo/trip meter	Main print panel	Odo/trip meter				
Speedometer does not operate.		1		1					ORN
Speedometer operates, but deflection error is great.		2		2			1		
Odo/trip meter does not operate.			1		1				
Speedometer and odo/trip meter do not operate.	1	3		3			2	G401 G402	YEL or ORN

NOTE:

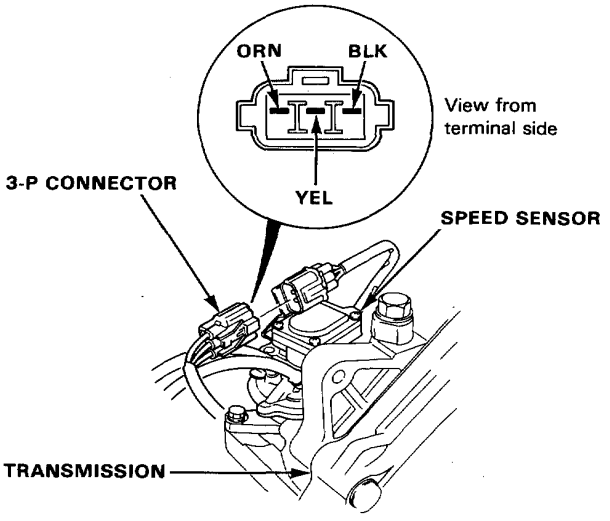
- NS speedometer circuit is built in the main print panel assembly.
- Replace all of the main print panel, the tachometer, the speedometer and the odo/trip meter as a set if one of the above parts is defective.

Gauge Assembly

Speed Sensor Input Test

NOTE: Check the No.1 (10 A) fuse in the dash fuse box before testing.

1. Disconnect the 3-P connector from the speed sensor.



2. Check for continuity between the BLK terminal and body ground.
   There should be continuity.
   - If there is no continuity, check for:
     - An open in the BLK wire.
     - Poor ground { Fuel-injected engine: G301 / Carbureted engine: G201 }
   - If there is continuity, go to step 3.

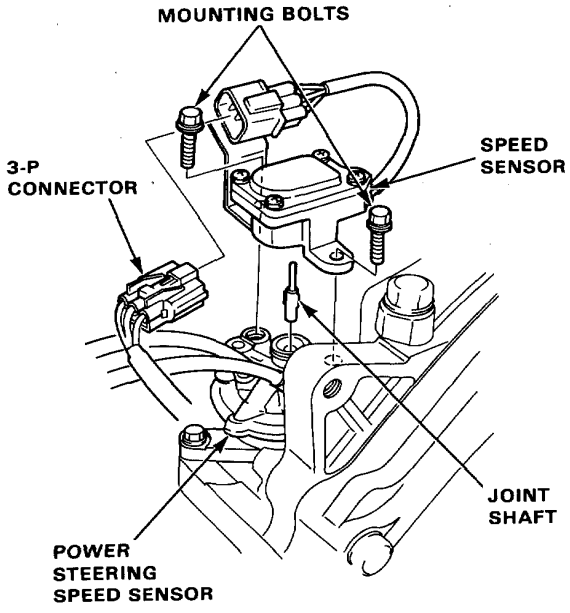
3. Check for voltage between the YEL terminal and body ground with the ignition switch ON.
   There should be battery voltage.
   - If there is no voltage, check for an open in the YEL wire.
   - If there is battery voltage, go to step 4.

4. Check for voltage between the ORN terminal and body ground with the ignition switch ON.
   There should be approximately 5 V.
   - If there is no voltage, check for:
     - A6 terminal of gauge assembly (see page 16-115).
     - An open in the ORN wire.
   - If there is approximately 5 V, go to step 5.

5. If all continuity and voltage tests are normal, but the speedometer and the odo/trip meter do not operate, replace the speed sensor.

Replacement

1. Disconnect the 3-P connector from the speed sensor.
2. Remove the mounting bolts and the speed sensor from the power steering speed sensor.



3. Install in the reverse order of removal.

   NOTE: Be careful not to loose the joint shaft, for it is a tiny part.

Brake Warning System

Description

NOTE: Refer to page 16-112 for wiring description of the circuit check system.

Description:
The brake warning light goes on if the parking brake is applied, if the brake fluid level is low, and as a circuit test while cranking the engine.

Parking Brake:
With the ignition switch in "Run"or "Start", and the parking brake switch closed, the brake warning light operates to remind the driver that the parking brake is applied.

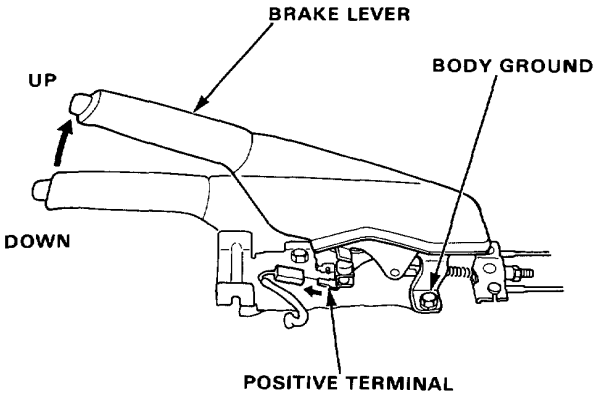
Brake Fluid Level:
With the ignition switch in "Run"or"Start", and the brake fluid level switch closed, the brake warning light operates to warn the driver of low brake fluid level in the brake master cylinder.

NOTE: Low fluid level indicates brake wear or system leaks; check brake pad wear before adding fluid.

Circuit Check: KY model only
With the ignition switch in "Start", voltage is applied through the No.9 (7.5A) fuse in the dash fuse box to the circuit check built into the integrated control unit. The circuit check transistor is on, and current flows through the No.1 (10A) fuse in the dash fuse box, the brake warning light and the circuit transistor to ground. The brake warning light operates. This operation tests the brake warning circuit and bulb.

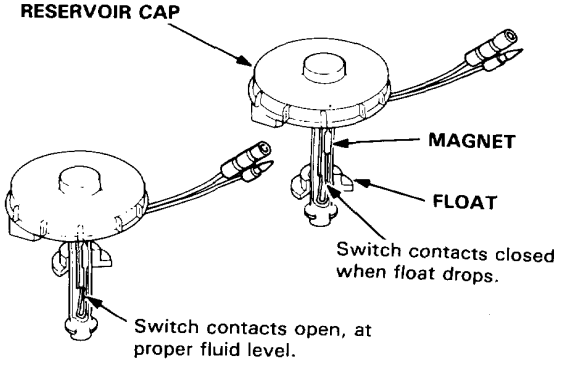
Parking Brake Switch Test

1. Remove the center console and disconnect the connector from the switch.
2. There should be continuity between the positive terminal and body ground with the brake lever up.
   There should be no continuity with the brake lever down.



Brake Fluid Level Switch Test

1. Remove the reservoir cap. Check that the float moves up and down freely.
   Replace the reservoir cap assembly if the float does not move freely.
2. Check for continuity between the terminals with the float up and down.
   There should be continuity with the float down and no continuity with the float up.
   Replace the reservoir cap assembly if necessary.



Low Fuel Warning System

Warning Light Test

NOTE: Refer to page 16-112 for wiring description of the low fuel warning circuit.

1. Park car on level ground.

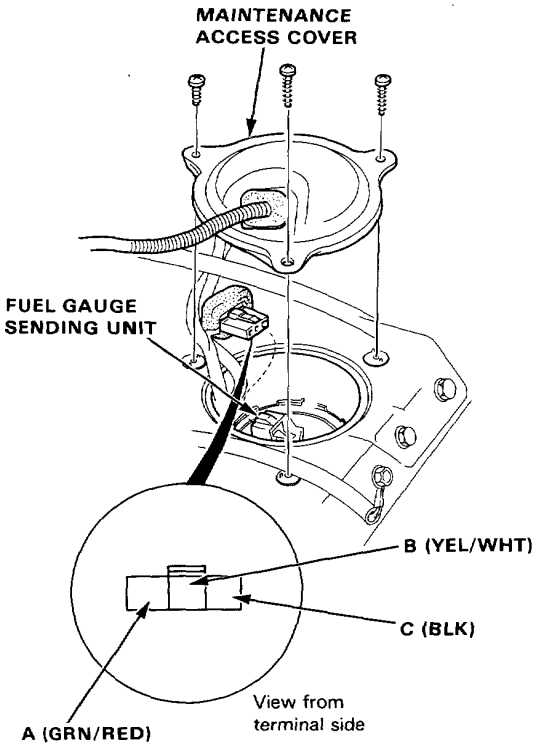
   ⚠WARNING Do not smoke while working on fuel system. Keep open flame away from work area. Drain fuel only into an approved container.

2. Drain fuel tank into an approved container. Then install the drain bolt with a new washer.

3. Add less than 8.6 ℓ (2.2 U.S. Gal, 1.8 Imp. Gal) of fuel and turn the ignition switch on. The low fuel warning light should come on within 4 minutes.

4. Then add one more gallon of fuel [approx. 4 ℓ (1.1 U.S. Gal, 0.9 Imp. Gal)]. The light should go out within 4 minutes.

   - If the warning light did not come on in step 3, remove the maintenance access cover and disconnect the 3-P connector from the fuel gauge sending unit. Connect the A (GRN/RED) terminal to the C (BLK) terminal with a jumper wire.
     - If the light comes on, the problem is either the sending unit or its ground.
     - If the light does not come on, the problem is an open in the GRN/RED wire to the gauge assembly, no power to the gauge or bad bulb.



Oil Pressure Warning System

Description

NOTE: Refer to page 16-112 for wiring description of the oil pressure warning circuit.

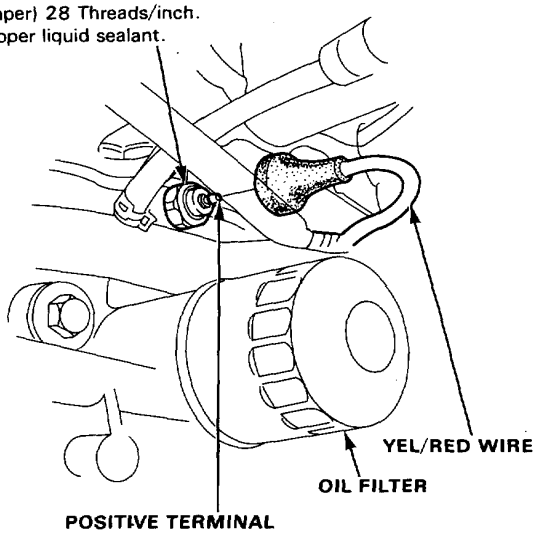
With the engine running and normal oil pressure, the oil pressure switch is open and the oil pressure warning light does not operate. If engine oil pressure falls below 24.5 kpa (0.25 kg/cm², 3.6 psi), the oil pressure switch is closed, current flows through the oil pressure warning light and the oil pressure switch to ground, and the oil pressure light goes on.

Oil Pressure Switch Test

1. Disconnect the YEL/RED wire from the oil pressure switch.

2. There should be continuity between the positive terminal and the engine(ground) with the engine stopped. There should be no continuity when the engine runs.

OIL PRESSURE SWITCH
18 N·m (1.8 kg-m, 13 lb-ft)
1/8 in. BSP (British Standard Pipe Taper) 28 Threads/inch.
Use proper liquid sealant.



3. If the switch fails to operate, check the engine oil level, then inspect the oil pump and pressure if the oil level is correct (see section 5).

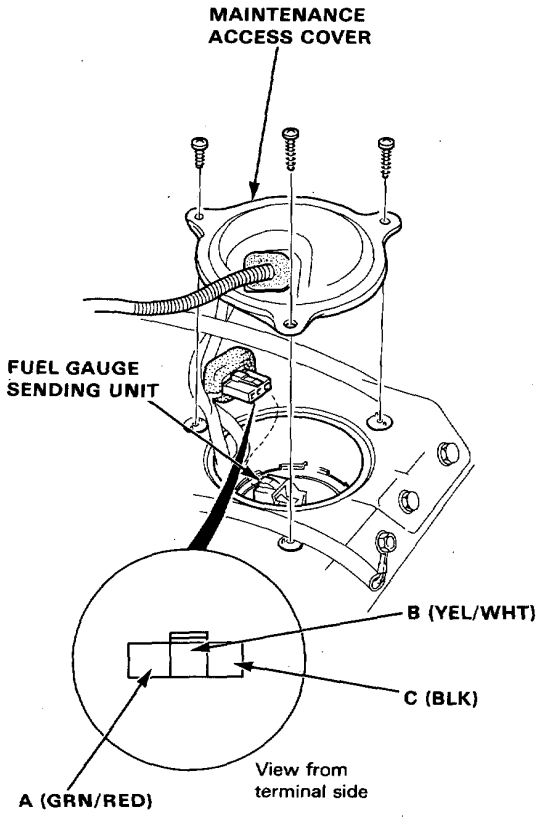
Fuel Gauge

Gauge Test

NOTE:
- Refer to page 16-112 for wiring description of the fuel gauge circuit.
- Check the No.1 (10 A) fuse in the dash fuse box before testing.

1. Remove the maintenance access cover.

2. Disconnect the 3-P connector from the fuel gauge sending unit.



3. Connect the voltmeter positive probe to the B (YEL/WHT) terminal and the negative probe to the C (BLK) terminal, then turn the ignition switch ON.
   There should be between 5 and 8V.

   - If the voltage is as specified, go to step 4.

   - If the voltage is not as specified, check for:
     - An open in the YEL, YEL/WHT or BLK wire.
     - Poor ground (G401).

4. Turn the ignition switch OFF. Attach a jumper wire between the B (YEL/WHT) and C (BLK) terminals.

   Turn the ignition switch ON.
   Check that the pointer of the fuel gauge starts moving toward"F"mark.

   CAUTION: Turn the ignition switch OFF before the pointer reaches "F"mark on the gauge dial. Failure to turn the ignition switch OFF before the pointer reaches the "F"mark may cause damage to the fuel gauge.

   NOTE: The fuel gauge is a bobbin (cross coil) type, hence the fuel level is continuously indicated even when the ignition switch is OFF, and the pointer moves more slowly than that of a bimetal type.

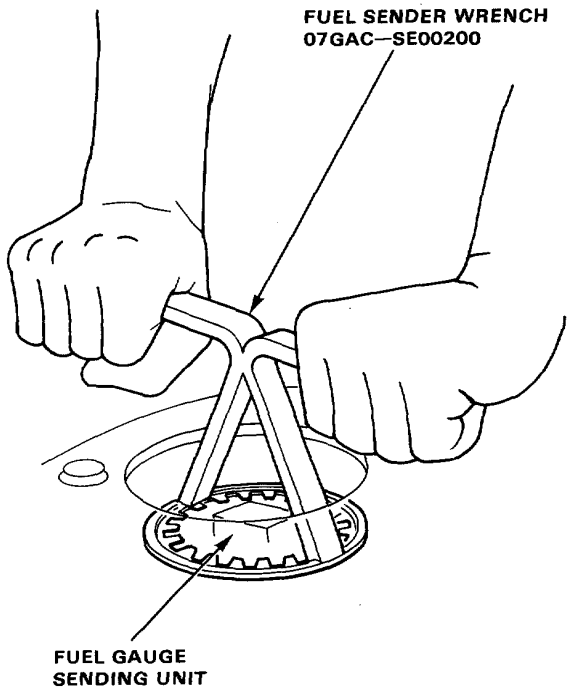
   - If the pointer of the fuel gauge does not swing at all, replace the gauge.

   - Inspect the fuel gauge sending unit if the gauge is OK.

Sending Unit Test/Replacement

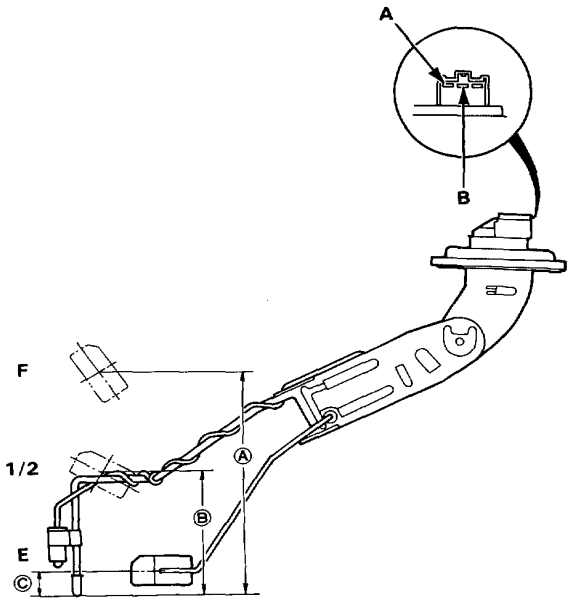
⚠ WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

1. Remove the maintenance access cover.
2. With the ignition switch OFF, disconnect the 3-P connector from the fuel gauge sending unit.
3. Remove the fuel gauge sending unit.



4. Measure resistance between the A and B terminals at E (EMPTY), 1/2 (HALF FULL) and F (FULL) by moving the float.

Float Position	E	1/2	F
Resistance (Ω)	105-110	25.5-39.5	2-5



Float Position	Ⓐ	Ⓑ	Ⓒ
With 4WS	121.5 mm (4.8 in)	70.0 mm (2.8 in)	17.0 mm (0.7 in)
Without 4WS	146.0 mm (5.7 in)	80.0 mm (3.1 in)	17.0 mm (0.7 in)

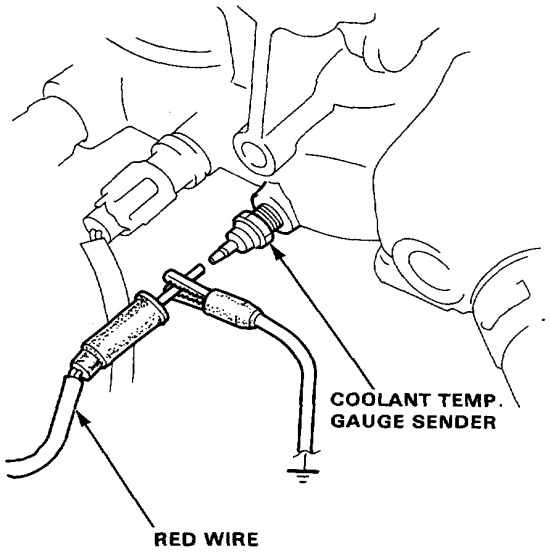
5. If unable to obtain the above readings, replace the fuel gauge sending unit.

Coolant Temperature Gauge

Gauge Test

NOTE:
- Refer to page 16-112 for wiring description of the coolant temperature gauge circuit.
- Check the No.1 (10 A) fuse in the dash fuse box before testing.

1. Make sure the ignition switch is OFF, then disconnect the RED wire from the coolant temperature gauge sender and ground it with a jumper wire.



2. Turn the ignition switch ON.
   Check that the pointer of the coolant temperature gauge starts moving toward "H" mark.

   CAUTION: Turn the ignition switch OFF before the pointer reaches "H" mark on the gauge dial. Failure to turn the ignition OFF quickly enough may cause damage to the gauge.

   - If the pointer of the gauge does not swing at all, check for an open in the YEL or RED wire.

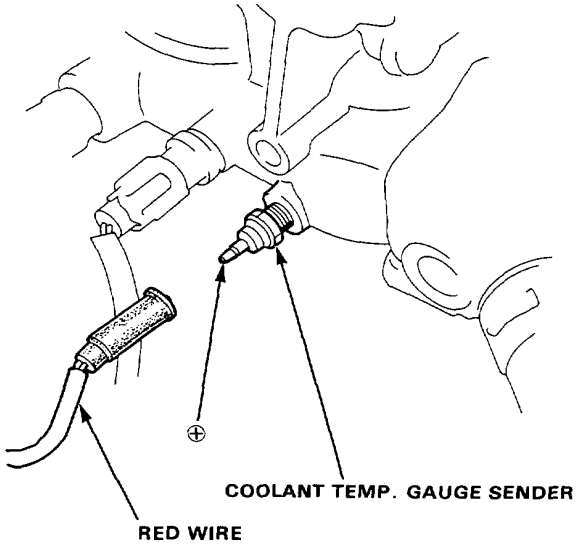
     Replace the coolant temperature gauge if the fuse and wiring are normal.

   - Inspect the gauge sender if the gauge is OK.

Sender Test

1. Disconnect the RED wire from the sender.

2. With the engine cold, use an ohmmeter to measure resistance between the positive terminal and the engine (ground).



3. Check the temperature of the coolant.

4. Run the engine and measure the change in resistance with the engine at operating temperature (cooling fan comes on).

Temperature	56°C (133°F) ["C" mark]	85°C (185°F) – 100°C (212°F)
Resistance (Ω)	142	49 – 32

5. If obtained readings are substantially different from specifications above, replace the gauge sender.

Low Fuel Warning System

Warning Light Test

NOTE: Refer to page 16-112 for wiring description of the low fuel warning circuit.

1. Park car on level ground.

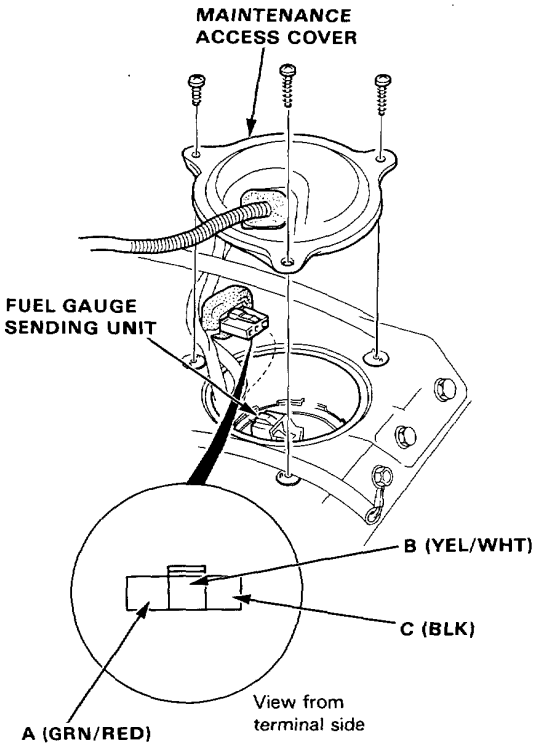
   ⚠WARNING Do not smoke while working on fuel system. Keep open flame away from work area. Drain fuel only into an approved container.

2. Drain fuel tank into an approved container. Then install the drain bolt with a new washer.

3. Add less than 8.6 ℓ (2.2 U.S. Gal, 1.8 Imp. Gal) of fuel and turn the ignition switch on. The low fuel warning light should come on within 4 minutes.

4. Then add one more gallon of fuel [approx. 4 ℓ (1.1 U.S. Gal, 0.9 Imp. Gal)]. The light should go out within 4 minutes.

   - If the warning light did not come on in step 3, remove the maintenance access cover and disconnect the 3-P connector from the fuel gauge sending unit. Connect the A (GRN/RED) terminal to the C (BLK) terminal with a jumper wire.
     - If the light comes on, the problem is either the sending unit or its ground.
     - If the light does not come on, the problem is an open in the GRN/RED wire to the gauge assembly, no power to the gauge or bad bulb.



Oil Pressure Warning System

Description

NOTE: Refer to page 16-112 for wiring description of the oil pressure warning circuit.

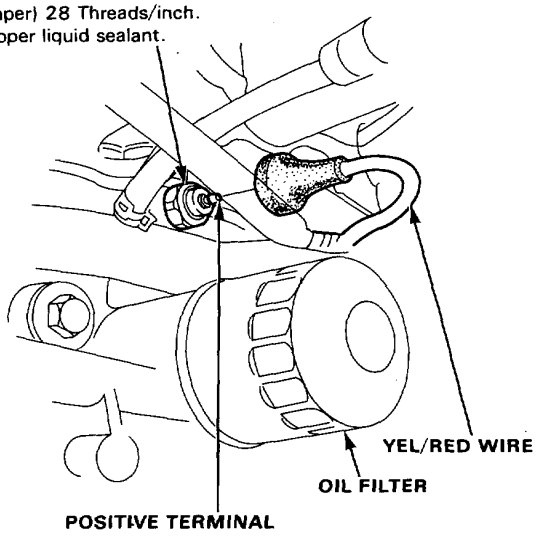
With the engine running and normal oil pressure, the oil pressure switch is open and the oil pressure warning light does not operate. If engine oil pressure falls below 24.5 kpa (0.25 kg/cm², 3.6 psi), the oil pressure switch is closed, current flows through the oil pressure warning light and the oil pressure switch to ground, and the oil pressure light goes on.

Oil Pressure Switch Test

1. Disconnect the YEL/RED wire from the oil pressure switch.

2. There should be continuity between the positive terminal and the engine(ground) with the engine stopped. There should be no continuity when the engine runs.

OIL PRESSURE SWITCH
18 N·m (1.8 kg-m, 13 lb-ft)
1/8 in. BSP (British Standard Pipe Taper) 28 Threads/inch.
Use proper liquid sealant.



3. If the switch fails to operate, check the engine oil level, then inspect the oil pump and pressure if the oil level is correct (see section 5).

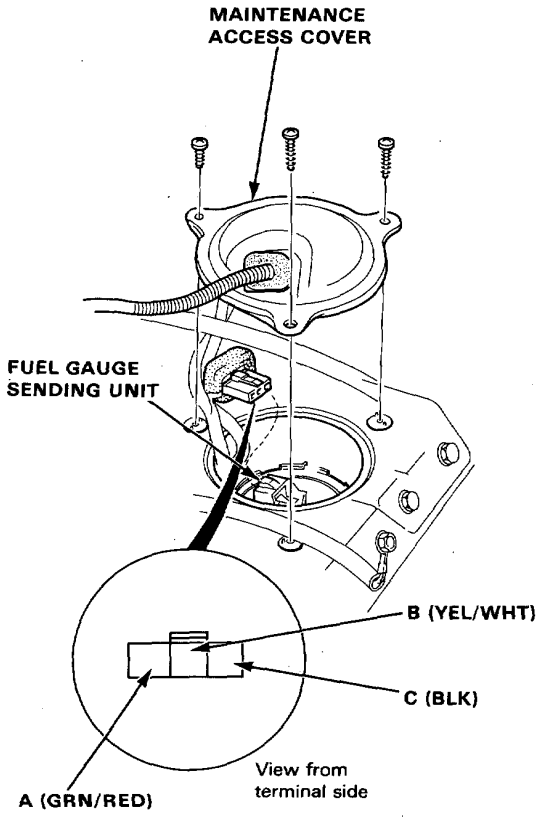
Fuel Gauge

Gauge Test

NOTE:
- Refer to page 16-112 for wiring description of the fuel gauge circuit.
- Check the No.1 (10 A) fuse in the dash fuse box before testing.

1. Remove the maintenance access cover.

2. Disconnect the 3-P connector from the fuel gauge sending unit.



3. Connect the voltmeter positive probe to the B (YEL/WHT) terminal and the negative probe to the C (BLK) terminal, then turn the ignition switch ON.
   There should be between 5 and 8V.

   - If the voltage is as specified, go to step 4.

   - If the voltage is not as specified, check for:
     - An open in the YEL, YEL/WHT or BLK wire.
     - Poor ground (G401).

4. Turn the ignition switch OFF. Attach a jumper wire between the B (YEL/WHT) and C (BLK) terminals.

   Turn the ignition switch ON.
   Check that the pointer of the fuel gauge starts moving toward"F"mark.

   CAUTION: Turn the ignition switch OFF before the pointer reaches "F"mark on the gauge dial. Failure to turn the ignition switch OFF before the pointer reaches the "F"mark may cause damage to the fuel gauge.

   NOTE: The fuel gauge is a bobbin (cross coil) type, hence the fuel level is continuously indicated even when the ignition switch is OFF, and the pointer moves more slowly than that of a bimetal type.

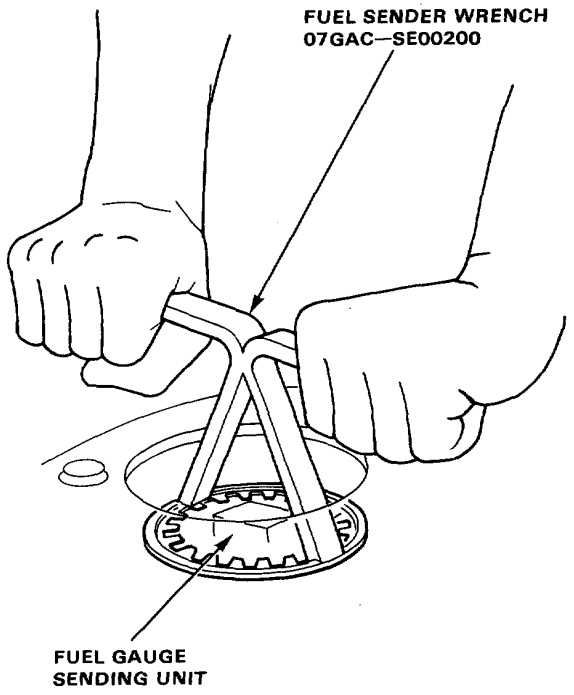
   - If the pointer of the fuel gauge does not swing at all, replace the gauge.

   - Inspect the fuel gauge sending unit if the gauge is OK.

Sending Unit Test/Replacement

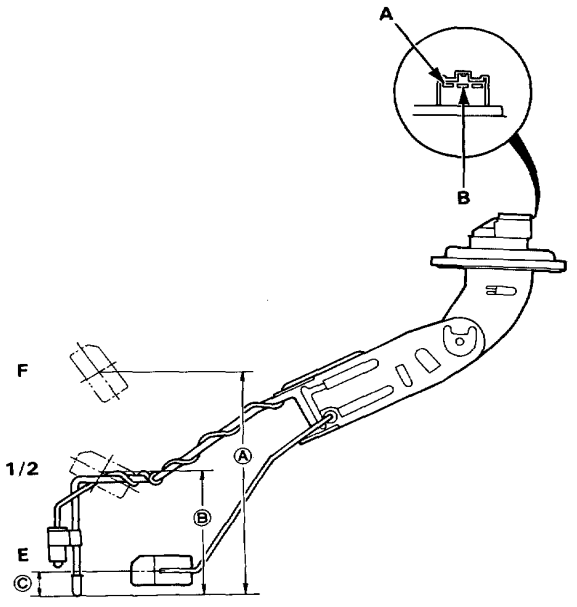
⚠ WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

1. Remove the maintenance access cover.
2. With the ignition switch OFF, disconnect the 3-P connector from the fuel gauge sending unit.
3. Remove the fuel gauge sending unit.



4. Measure resistance between the A and B terminals at E (EMPTY), 1/2 (HALF FULL) and F (FULL) by moving the float.

Float Position	E	1/2	F
Resistance (Ω)	105-110	25.5-39.5	2-5



Float Position	Ⓐ	Ⓑ	Ⓒ
With 4WS	121.5 mm (4.8 in)	70.0 mm (2.8 in)	17.0 mm (0.7 in)
Without 4WS	146.0 mm (5.7 in)	80.0 mm (3.1 in)	17.0 mm (0.7 in)

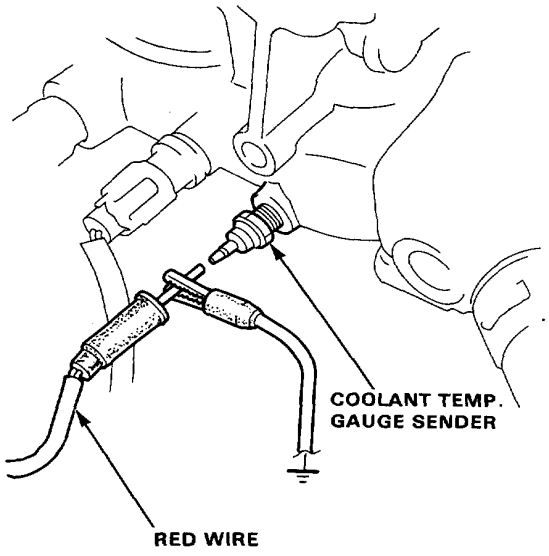
5. If unable to obtain the above readings, replace the fuel gauge sending unit.

Coolant Temperature Gauge

Gauge Test

NOTE:
- Refer to page 16-112 for wiring description of the coolant temperature gauge circuit.
- Check the No.1 (10 A) fuse in the dash fuse box before testing.

1. Make sure the ignition switch is OFF, then disconnect the RED wire from the coolant temperature gauge sender and ground it with a jumper wire.



2. Turn the ignition switch ON.
   Check that the pointer of the coolant temperature gauge starts moving toward "H" mark.

   CAUTION: Turn the ignition switch OFF before the pointer reaches "H" mark on the gauge dial. Failure to turn the ignition OFF quickly enough may cause damage to the gauge.

   - If the pointer of the gauge does not swing at all, check for an open in the YEL or RED wire.

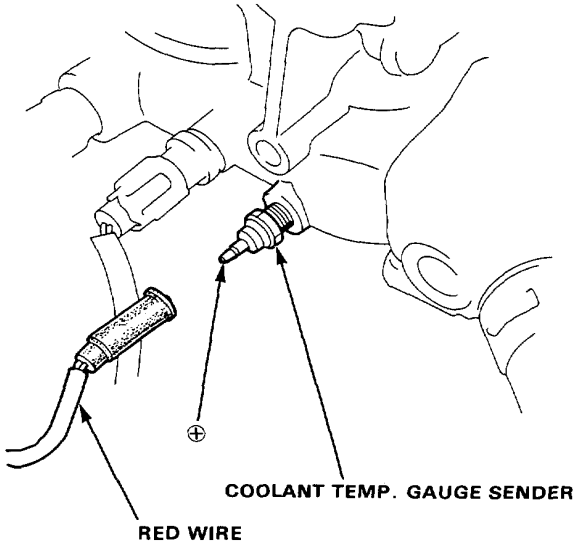
     Replace the coolant temperature gauge if the fuse and wiring are normal.

   - Inspect the gauge sender if the gauge is OK.

Sender Test

1. Disconnect the RED wire from the sender.

2. With the engine cold, use an ohmmeter to measure resistance between the positive terminal and the engine (ground).



3. Check the temperature of the coolant.

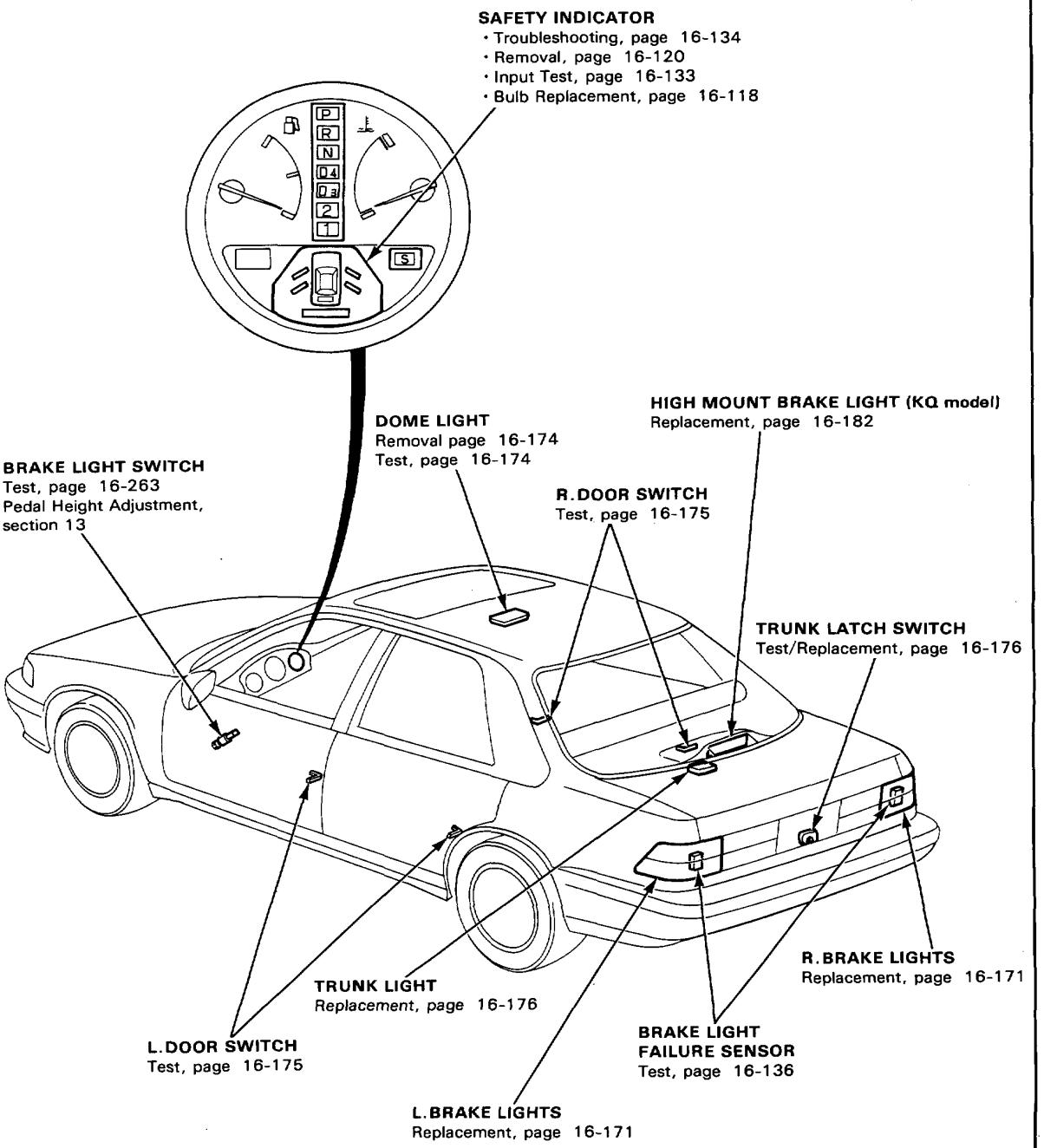
4. Run the engine and measure the change in resistance with the engine at operating temperature (cooling fan comes on).

Temperature	56°C (133°F) ["C" mark]	85°C (185°F) – 100°C (212°F)
Resistance (Ω)	142	49 – 32

5. If obtained readings are substantially different from specifications above, replace the gauge sender.

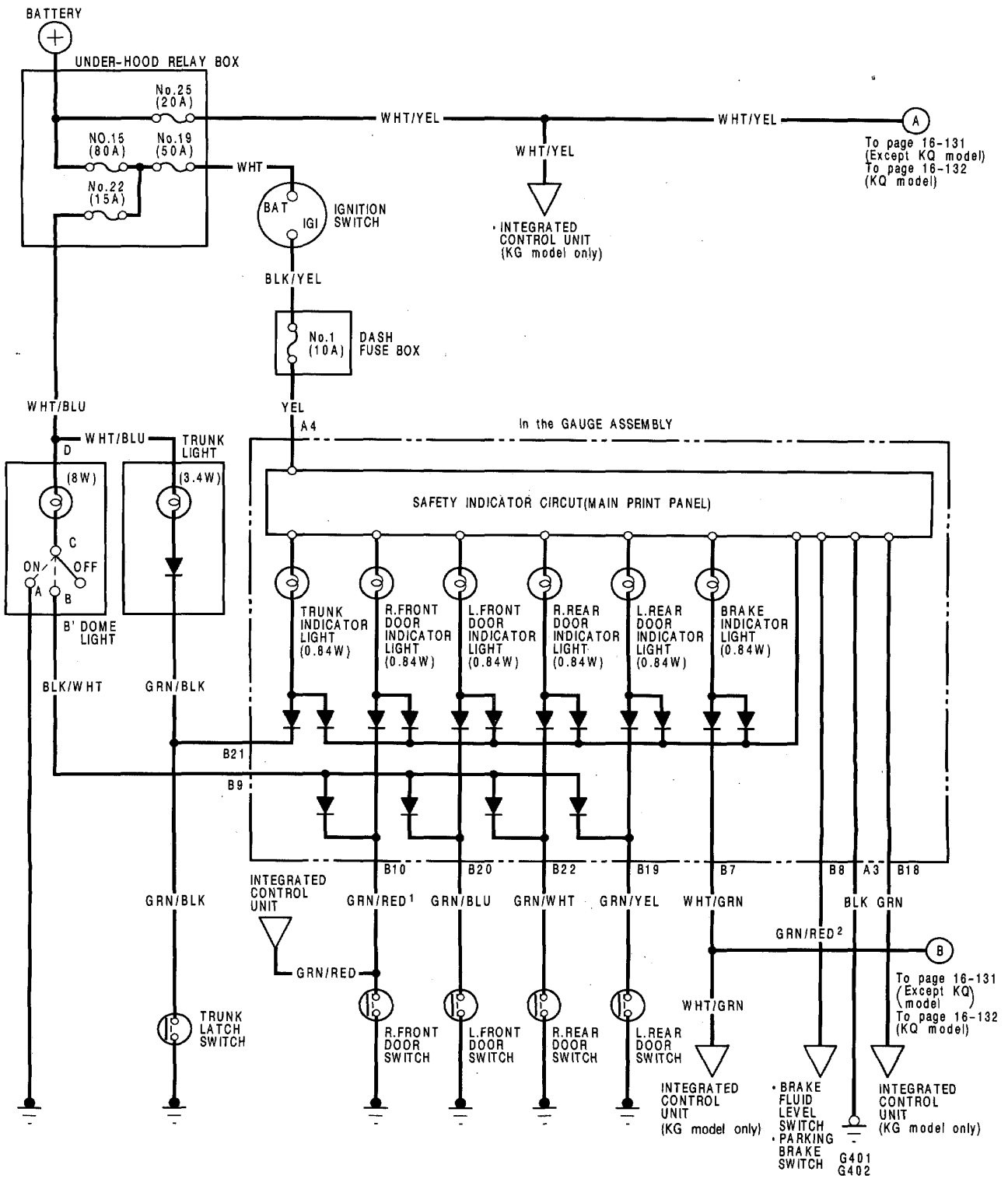
Safety Indicator

Component Location Index



Safety Indicator

Circuit Diagram



Except KQ model:

Description

Safety Indicator Warning System:

The warning lights are used to indicate when the trunk lid or a door is not fully closed, or when a brake light is faulty. The warning lights will remain ON for about 2 seconds after the ignition switch has been turned ON to show that the system circuit is functioning.

Brake Light Bulb Failure Warning:

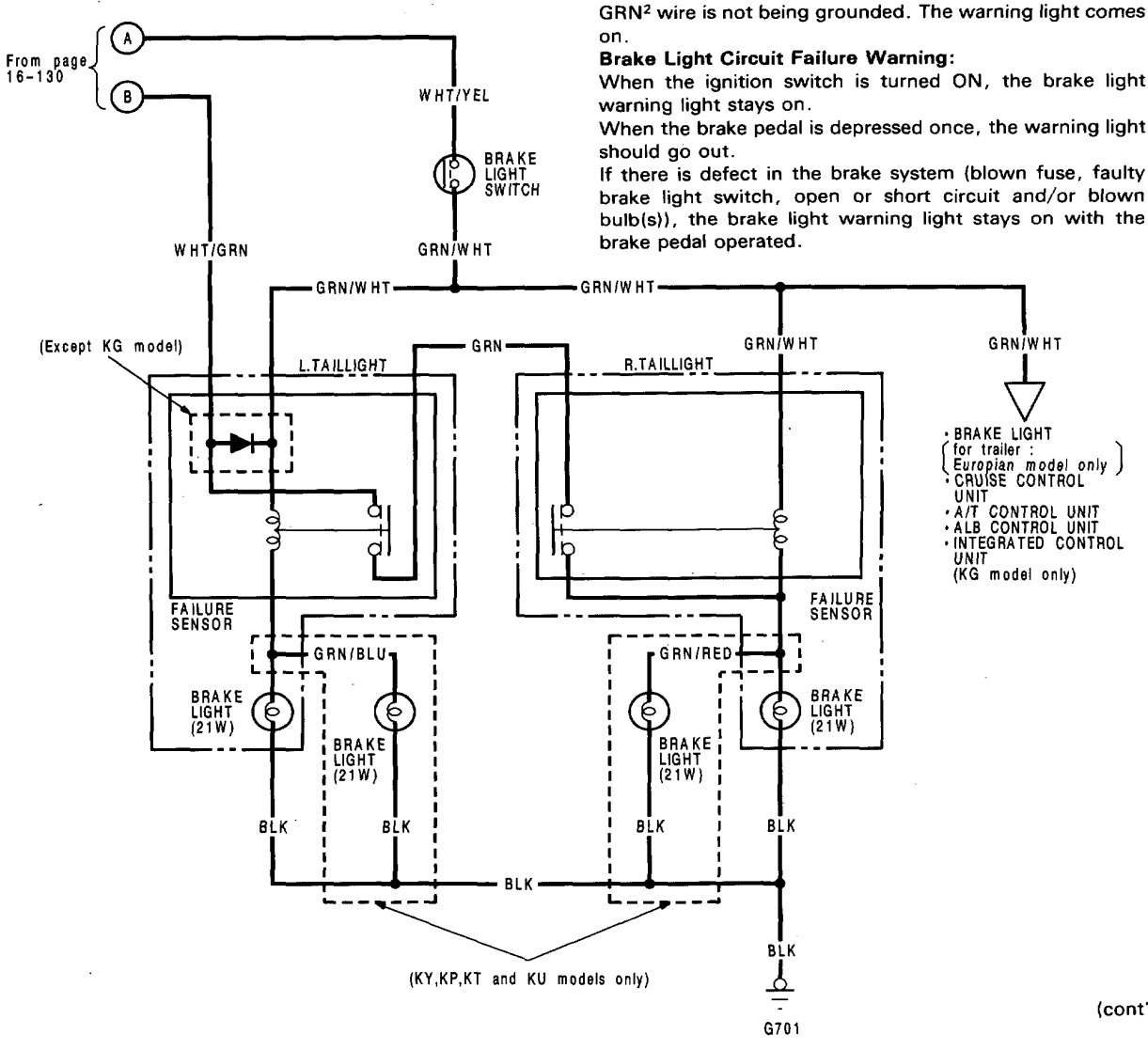
If all brake light bulbs are OK, the warning light stays off because the WHT/GRN² wire is constantly being grounded by the two brake light failure sensors connected in series. With the brakes off, the ground is provided through the diode, the failure sensor relay coils and bulb filaments to ground. With the brake lights on, all 2 relays, (1 in the left sensor, 1 in the right) connected in series, supply ground. If any of the 2 bulbs or either of L. brake lights and R. brake lights are not working, the chain is broken and the WHT/GRN² wire is not being grounded. The warning light comes on.

Brake Light Circuit Failure Warning:

When the ignition switch is turned ON, the brake light warning light stays on.

When the brake pedal is depressed once, the warning light should go out.

If there is defect in the brake system (blown fuse, faulty brake light switch, open or short circuit and/or blown bulb(s)), the brake light warning light stays on with the brake pedal operated.

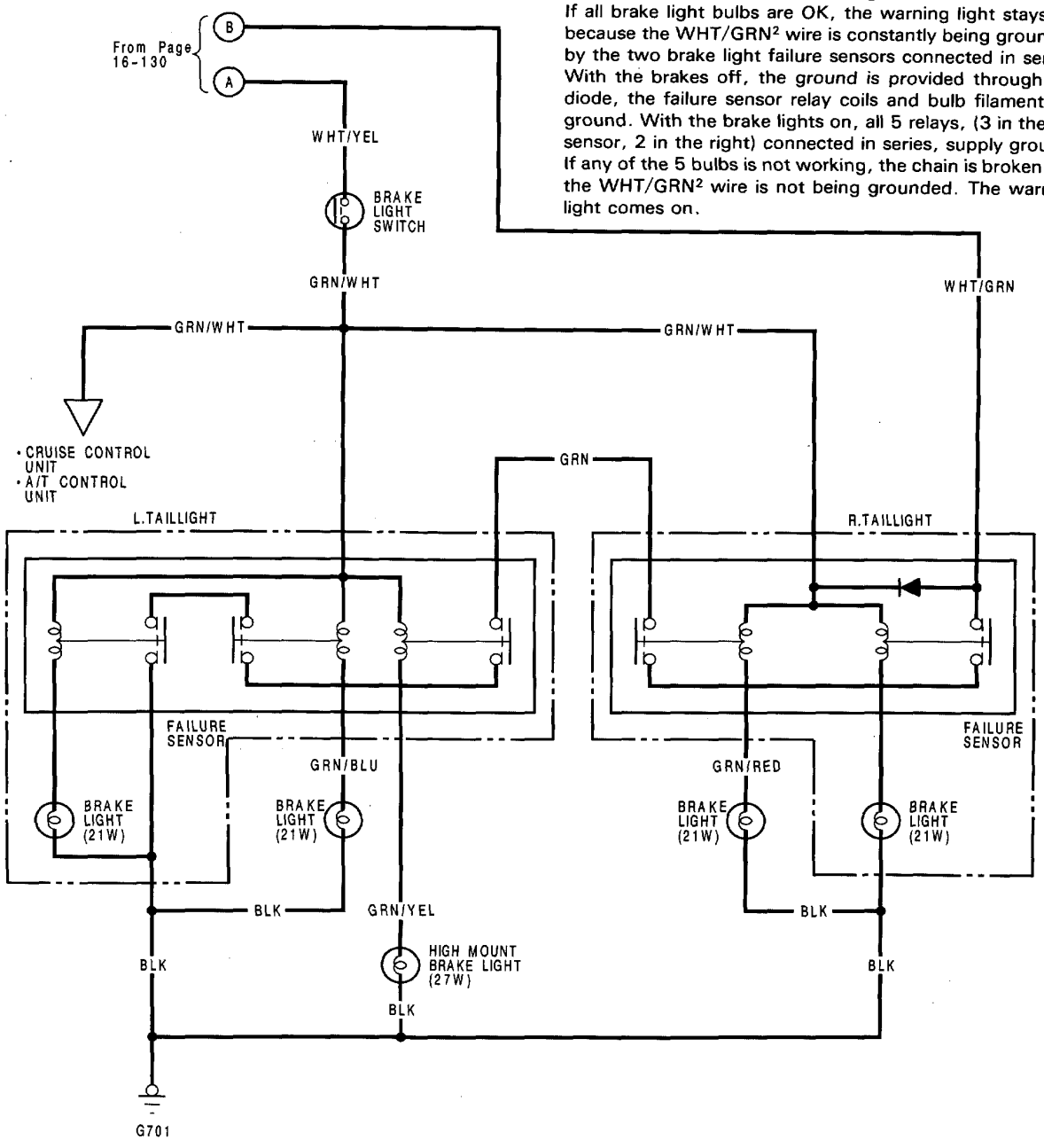


(cont'd)

Safety Indicator

Circuit Diagram (cont'd)

KQ model:



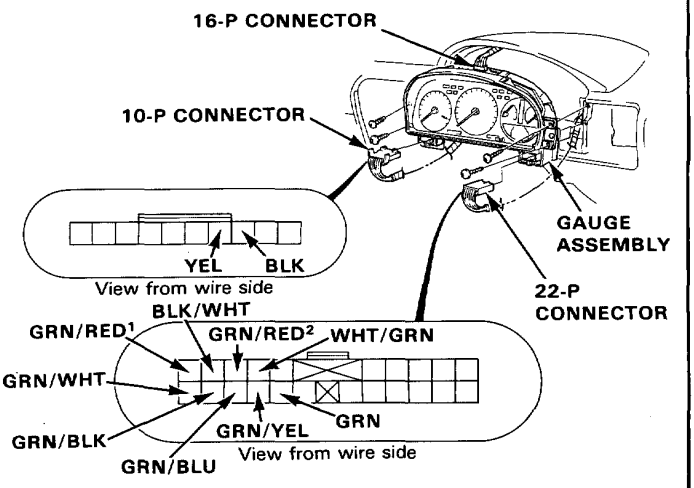
Description

Safety Indicator Warning System:
The warning lights are used to indicate when the trunk lid or a door is not fully closed, or when a brake light is faulty. The warning lights will remain ON for about 2 seconds after the ignition switch has been turned ON to show that the system circuit is functioning.

Brake Light Bulb Failure Warning:
If all brake light bulbs are OK, the warning light stays off because the WHT/GRN^2 wire is constantly being grounded by the two brake light failure sensors connected in series. With the brakes off, the ground is provided through the diode, the failure sensor relay coils and bulb filaments to ground. With the brake lights on, all 5 relays, (3 in the left sensor, 2 in the right) connected in series, supply ground. If any of the 5 bulbs is not working, the chain is broken and the WHT/GRN^2 wire is not being grounded. The warning light comes on.

Indicator Input Test

Remove the gauge assembly from the dashboard to disconnect the 10-P, 16-P and 22-P connectors from the indicator.
Make the following input tests at the harness pins.
If all tests prove OK, yet the indicator still fails to work, replace the main print panel, the tachometer, the speedometer and the odo/trip meter as a set.



No.	Wire	Test condition	Test: *desired result*	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, G402) · An open in the wire.
2	YEL	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.1 (10 A) fuse. · An open in the wire.
3	WHT	Brake pedal pushed.	Check for continuity to ground: should be continuity with the pedal pushed.	· Blown No. 25 (20 A) fuse. · Faulty brake light switch. · Blown brake light bulbs. · Faulty brake light failure sensors. · Poor ground (G701). · An open in the WHT/GRN or GRN/WHT wire.
4	GRN/BLK	Trunk lid opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No.22 (15 A) fuse.	· Faulty trunk latch switch. · An open in the wire.
5	GRN/RED1	Right front door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove the No. 22 (15 A) fuse.	· An open in the wire. · Faulty door switch. · Poor installation of the switch.
	GRN/BLU	Left front door opened.		
	GRN/WHT	Right rear door opened.		
	GRN/YEL	Left rear door opened.		
6	BLK/WHT	Dome light switch in MIDDLE position.	Attach to ground: Dome light should come on.	· Blown No.22 (15 A) fuse. · Faulty dome light. · An open in the WHT/BLU or BLK/WHT wire.
7	GRN/RED2	Ignition switch ON.	Attach to ground: Brake light warning in the safety indicator should come on.	· Faulty safety indicator circuit. · Blown bulb. · An open in the wire.

KG model only:

8	GRN	With brake pedal released, ignition switch OFF to ON.	Check for continuity in both directions between the GRN and BLK terminals: should be continuity in only one direction as the ignition switch is turned ON, then no continuity in both directions with brake pedal pushed.	· Faulty brake light circuit failure sensor.

Safety Indicator

Troubleshooting

NOTE:
- The numbers in the table show the troubleshooting sequence.
- Make sure that the dome light bulb and the trunk light bulb are not blown up.

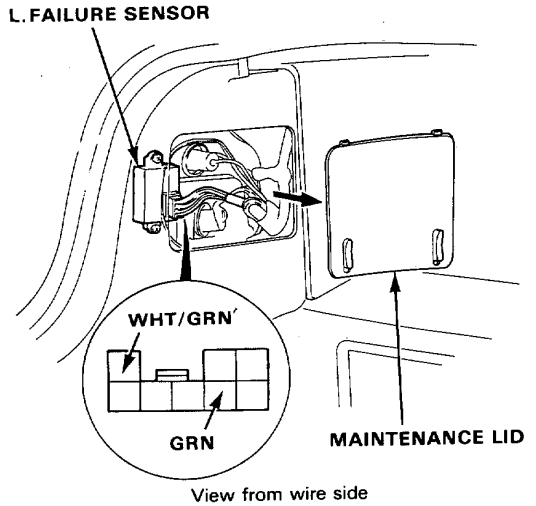
Symptom / Items to be inspected	Blown fuse: No.22 (15 A)	Blown fuse: No.1 (10 A)	Safety indicator circuit (main print panel)	Blown indicator bulb	Brake light failure sensor	Door switch	Trunk latch switch	Brake light switch	Poor ground	Open circuit in wires or loose or disconnected terminals
No indicators operate.		1	2						G401 G402	YEL
Warning lights fail to come on when ignition switch is turned to ON.			1	2						
The indicator lights do not turn on or some indicator lights do not turn off.			1	2						
Trunk warning light not lit with trunk lid opened			2	3			1			GRN/BLK
Door warning lights not lit with doors opened.			2	3		1				GRN/RED[1] GRN/BLU GRN/WHT GRN/YEL
Brake warning light not lit with blown brake light bulb.			2		1					GRN WHT/GRN GRN/RED[2]
Brake warning light remains on with good brake light bulbs.			2					1		GRN WHT/GRN GRN/RED[2]
Dome light not operated with door opened (When switch position is in MIDDLE)	1		3			2				

Brake Light Failure Sensor Test (Except KQ model)

1. First make sure the brake lights come on when the brake pedal is pressed.

   - If none of the brake lights come on, check the brake light circuit (see page 16-180).
   - If one of the brake lights does not come on, check whether the bulb is blown. If the bulb is OK, go to step 2.
   - If all the brake lights come on, go to step 2.

2. Open the trunk lid and the maintenance lid of the left taillight. Make sure the BRAKE LAMP of the safety indicator does not come on when the WHT/GRN terminal of the 8-P connector is grounded and the ignition switch is turned OFF to ON.



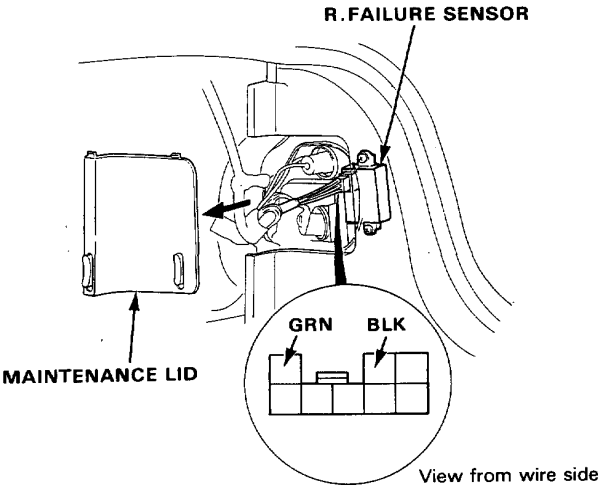
View from wire side

   - If the BRAKE LAMP comes on, check for an open in the WHT/GRN wire between the safety indicator and the left failure sensor and whether the safety indicator circuit (main print panel) has a problem.
   - If the BRAKE LAMP does not come on, go to step 3.

3. Make sure the BRAKE LAMP does not come on when the ignition switch is turned OFF to ON with the GRN terminal of the 8-P connector grounded and the brake pedal pressed.

   - If the BRAKE LAMP comes on, replace the left failure sensor.
   - If the BRAKE LAMP does not come on, go to step 4.

4. Open the maintenance lid of the right taillight. Make sure the BRAKE LAMP does not come on when the ignition switch is turned OFF to ON with the GRN terminal of the 8-P connector grounded and the brake pedal pressed.



View from wire side

   - If the BRAKE LAMP comes on, there is an open in the GRN wire between the left failure sensor and the right failure sensor.
   - If the BRAKE LAMP does not come on, go to step 5.

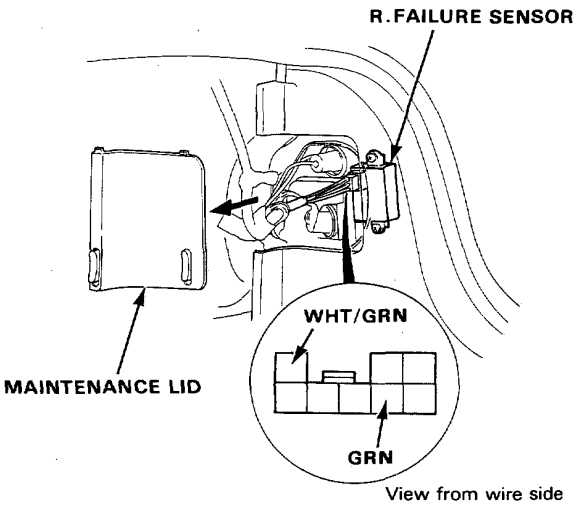
5. Make sure the BRAKE LAMP does not come on when the ignition switch is turned OFF to ON with the BLK terminal of the 8-P connector grounded and the brake pedal pressed.

   - If the BRAKE LAMP comes on, replace the right failure sensor.
   - If the BRAKE LAMP does not come on, check for an open in the BLK wire between the right failure sensor and ground, and check whether the G701 terminal is poor.

Safety Indicator

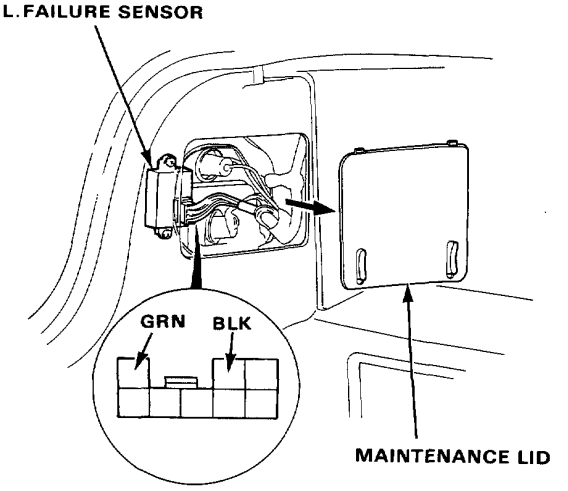
Brake Light Failure Sensor Test (KQ model)

1. First make sure the brake lights come on when the brake pedal is pressed.
   - If none of the brake lights come on, check the brake light circuit (see page 16-181).
   - If one of the brake lights does not come on, check whether the bulb is blown. If the bulb is OK, go to step 2.
   - If all the brake lights come on, go to step 2.
2. Open the trunk lid and the maintenance lid of the right taillight. Make sure the BRAKE LAMP of the safety indicator does not come on when the WHT/GRN terminal of the 8-P connector is grounded and the ignition switch is turned OFF to ON.



View from wire side

   - If the BRAKE LAMP comes on, check for an open in the WHT/GRN wire between the safety indicator and the right failure sensor and whether the safety indicator circuit (main print panel) has a problem.
   - If the BRAKE LAMP does not come on, go to step 3.
3. Make sure the BRAKE LAMP does not come on when the ignition switch is turned OFF to ON with the GRN terminal of the 8-P connector grounded and the brake pedal pressed.
   - If the BRAKE LAMP comes on, replace the right failure sensor.
   - If the BRAKE LAMP does not come on, go to step 4.
4. Open the maintenance lid of the left taillight. Make sure the BRAKE LAMP does not come on when the ignition switch is turned OFF to ON with the GRN terminal of the 8-P connector grounded and the brake pedal pressed.



View from wire side

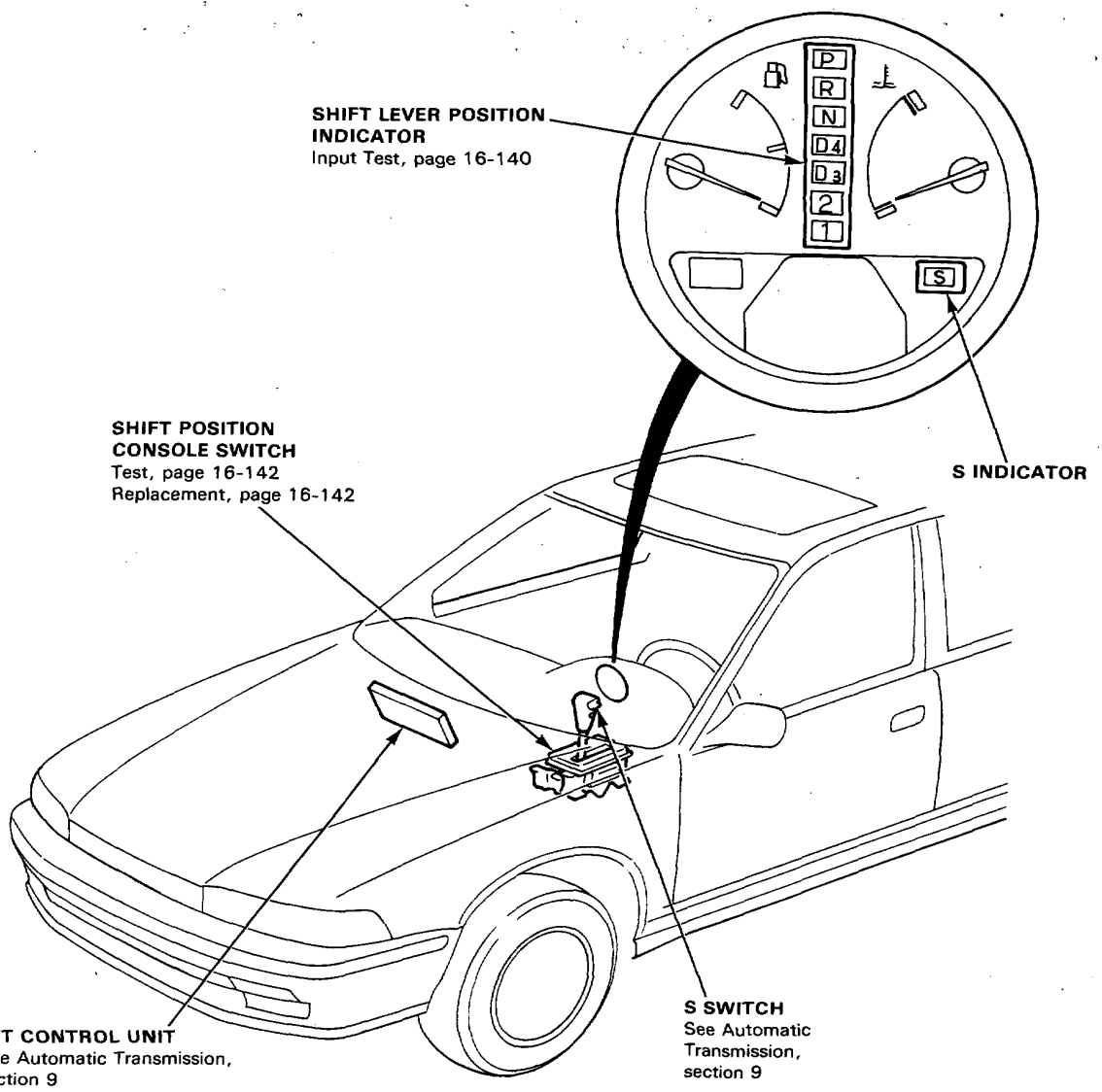
- If the BRAKE LAMP comes on, there is an open in the GRN wire between the left failure sensor and the right failure sensor.
- If the BRAKE LAMP does not come on, go to step 5.

5. Make sure the BRAKE LAMP does not come on when the ignition switch is turned OFF to ON with the BLK terminal of the 8-P connector grounded and the brake pedal pressed.
   - If the BRAKE LAMP comes on, replace the left failure sensor.
   - If the BRAKE LAMP does not come on, check for an open in the BLK wire between the left failure sensor and ground, and check whether the G701 terminal is poor.

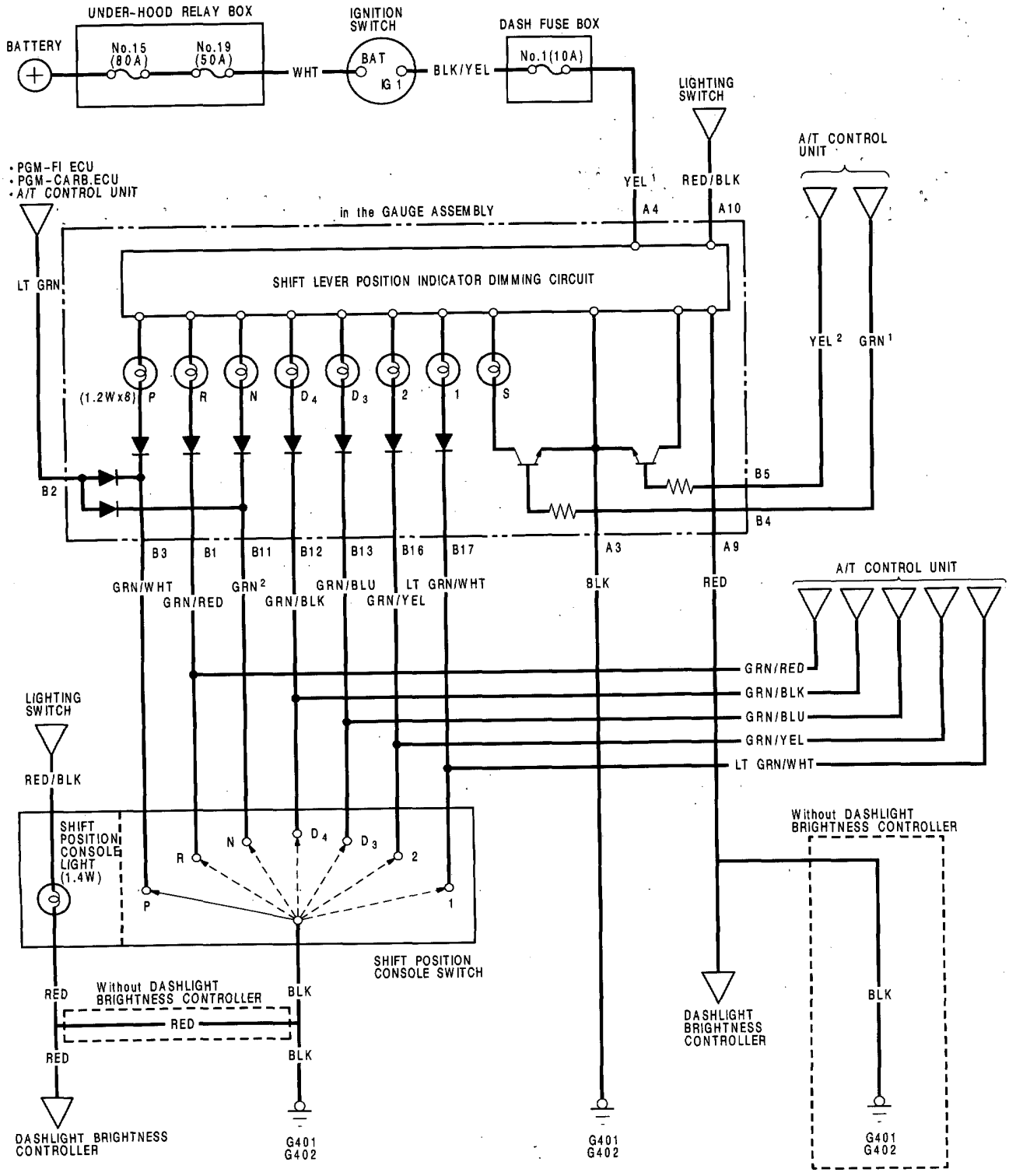
Shift Lever Position Indicator

Component Location Index

- **GAUGE ASSEMBLY**
  Removal, page 16-120
  Disassembly, page 16-118
- **A/T CONTROL SYSTEM**
  See Automatic Transmission, section 9.



Circuit Diagram

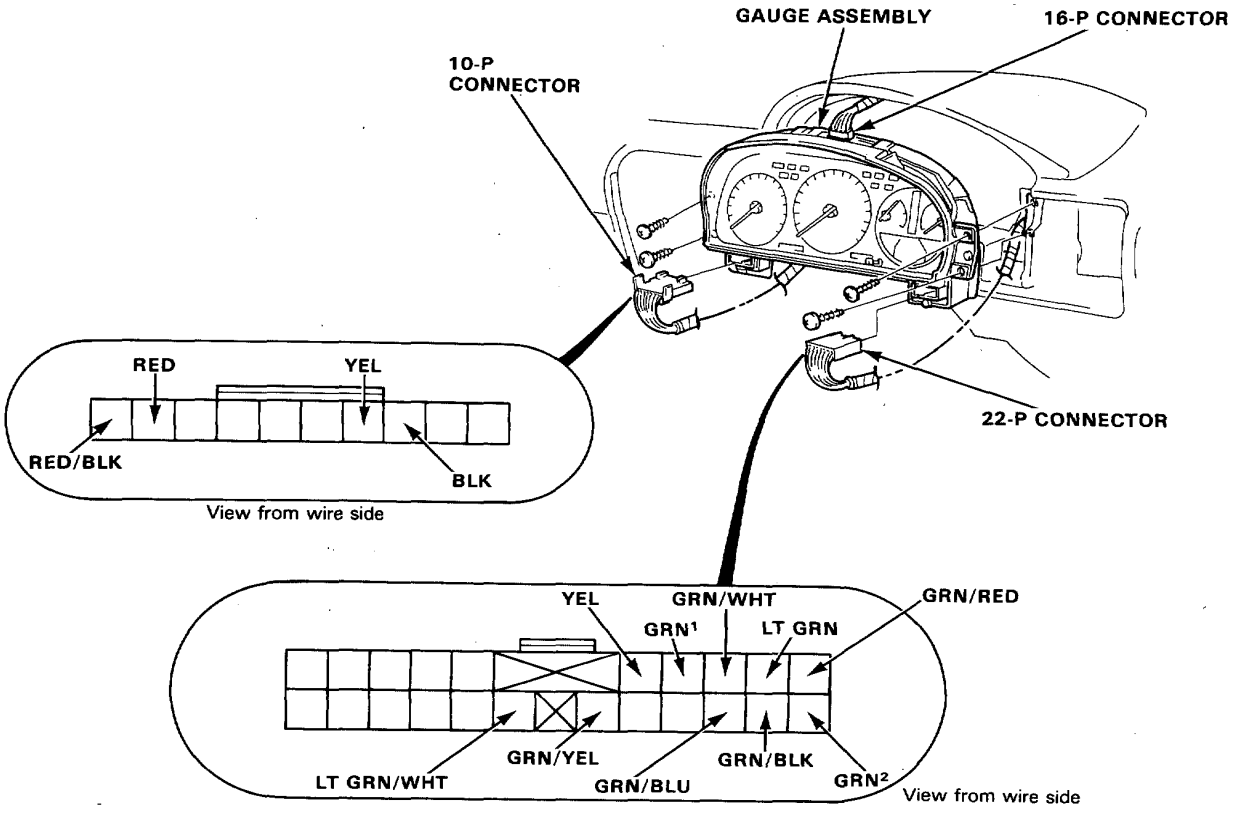


Shift Lever Position Indicator

Indicator Input Test

Remove the gauge assembly from the dashboad and disconnect the 10-P, 16-P and 22-P connectors from the gauge assembly. Make the following input tests at the harness pins. If all tests prove OK, yet the indicator still fails to work, replace the main print panel, the tachometer, the speedometer and the odo/trip meter as a set.

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example GRN[1] and GRN[2] are not the same).



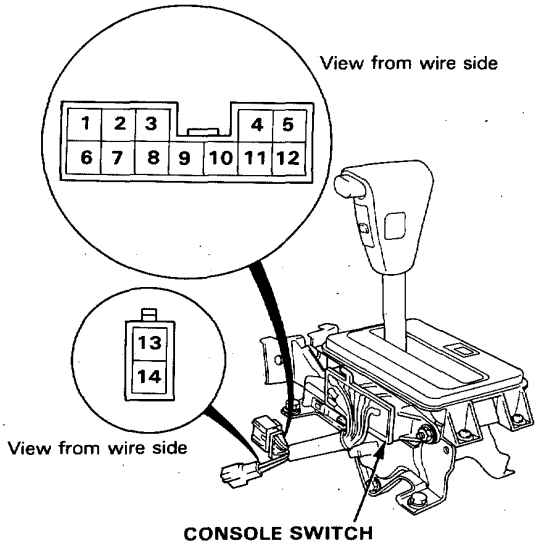
No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, G402) · An open in the wire.
2	YEL[1]	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.1 (10 A) fuse. · An open in the wire.
3	GRN/WHT	Shift lever position in P.	Check for continuity to ground: should be continuity.	· Faulty shift position console switch · Poor ground (G401, G402) · An open in the wire.
	GRN/RED	Shift lever position in R.		
	GRN[2]	Shift lever position in N.		
	GRN/BLK	Shift lever position in D_4		
	GRN/BLU	Shift lever position in D_3		
	GRN/YEL	Shift lever position in 2.		
	LTGRN/WHT	Shift lever position in 1.		
4	RED/BLK and RED	Lighting switch ON and dashlight brightness control knob on full bright.	Check for voltage between RED/BLK and RED terminals: should be battery voltage.	· Faulty dashlight brightness control system. · An open in the wire.
5	GRN[1]	Ignition switch ON, shift lever position in D_3 or D_4 and S switch ON.	Check for voltage to ground: should be about 5 V.	· Faulty S switch. · Faulty shift position console switch. · Faulty A/T control system. · An open in the wire.
6	YEL[2]	Ignition switch ON, shift lever position in D_3 or D_4 and S switch ON.	Check for voltage to ground: should be battery voltage.	· Faulty S switch. · Faulty shift position console switch · Faulty A/T control system. · An open in the wire.
7	LT GRN	Ignition switch ON.	Check for voltage to ground: should be about 5 V.	· Faulty PGM-FI ECU. · Faulty PGM-CARB. ECU. · An open in the wire.

Shift Lever Position Indicator

Shift Position Console Switch Test

1. Remove the console, then disconnect the 12-P and 2-P connectors from the console switch.
2. Check for continuity between the terminals in each position according to the table.

   NOTE:
   - Move the lever back and forth without touching the push button at each position, and check for continuity within a range of free play of the shift lever.
   - If no continuity within a range of free play, adjust the installation position of console switch.



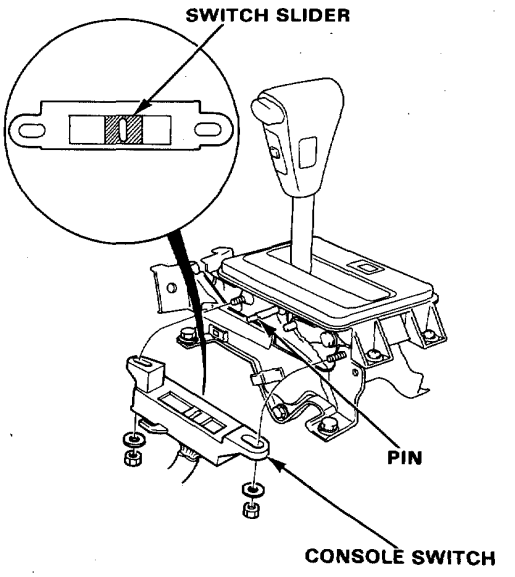
Shift Position Console Switch

Terminal / Position	8	1	2	3	4	5	6	7	11
1	○	—			○				
2	○	—		○		○			
D_3	○	—	○	—	—	○			
D_4	○	○	—	—	—	○			
N	○	—	—	—	—	—	○		
R	○	—	—	—	—	—	—	○	
P	○	—	—	—	—	—	—	—	○

	Back-up Light Switch		Neutral Safety Switch	
Terminal / Position	9	10	13	14
1				
2				
D_3				
D_4				
N			○	○
R	○	○		
P			○	○

Shift Position Console Switch Replacement

1. Remove the console, then disconnect the 12-P and 2-P connectors from the console switch.
2. Remove the 2 console switch mounting bolts.



3. Position the switch slider to "Neutral" as shown above.
4. Shift the select lever to "Neutral", then slip the console switch into position.
5. Attach the switch with the 2 bolts.
6. Test the console switch with P and N position of shift lever (see page 16-142).

   NOTE: The engine should start when the shift lever is in the N position in the range of free play.
7. Connect the 12-P and 2-P connectors, clamp the harness and install the console.

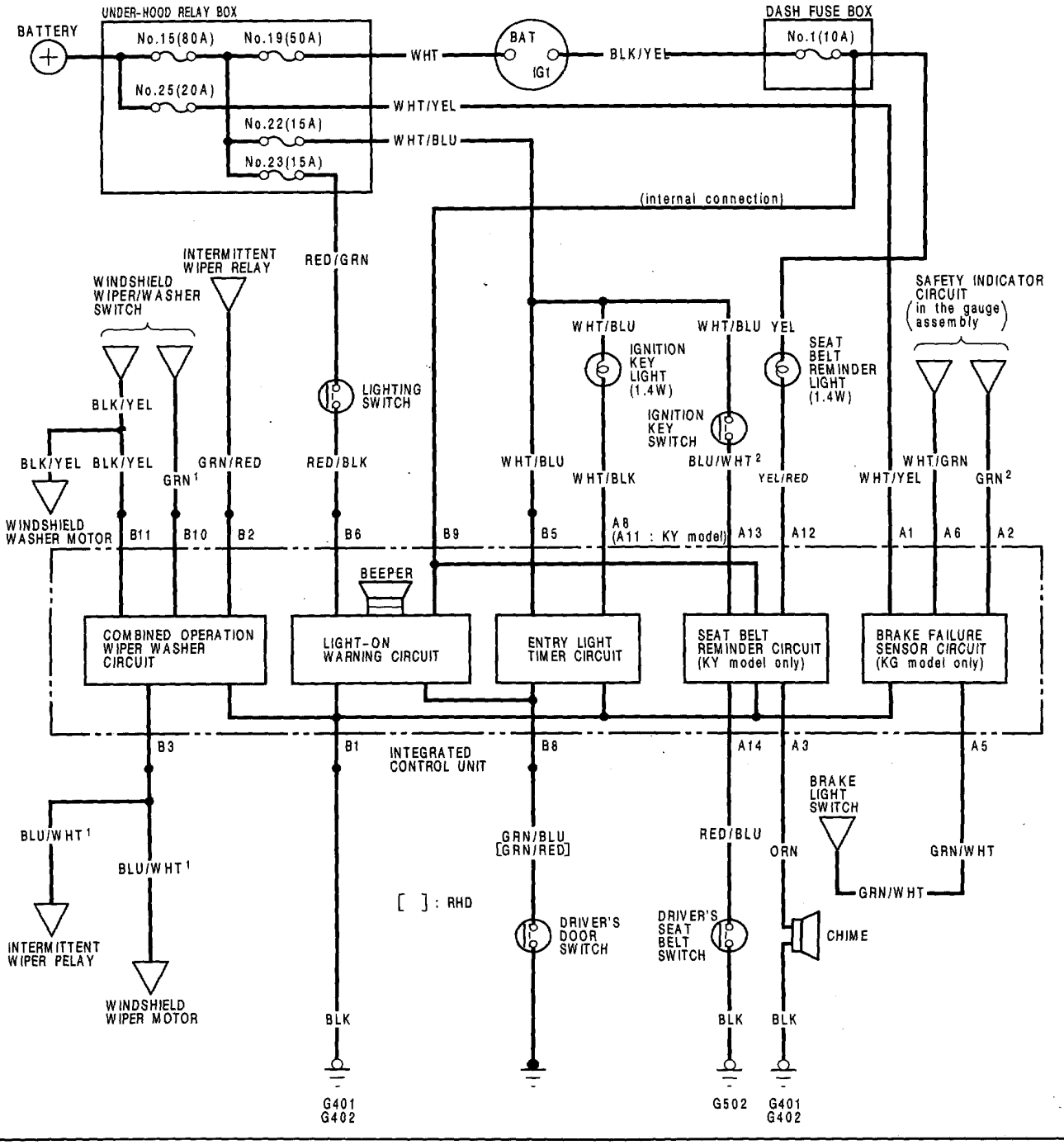
Integrated Control Unit

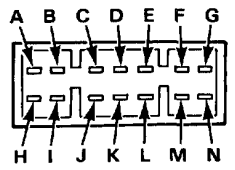
Circuit Diagram (Without Daytime and Dim-Dip Light)

Description:

A multi-function control unit located on the driver's side kick panel, integrates the functions of the combined operation with wiper/washer circuit, light-on warning circuit, entry light timer circuit, seat belt reminder circuit (KY model only) and brake light circuit (KG model only) onto one circuit board sharing common circuit functions.

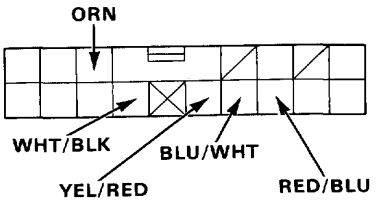
NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example GRN[1] and GRN[2] are not the same).





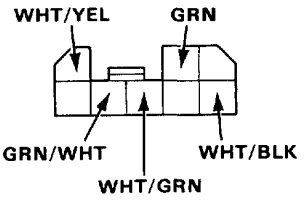
View from terminal side

KQ and KY models:



View from wire side

Except KQ and KY models:



View from wire side

Wiper System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	H	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, G402)
2	C	Ignition switch ON and wiper switch INT.	Check for voltage to ground: should be battery voltage.	· Blown No.6 (30 A) fuse. · Faulty wiper switch. · An open in the wire.
3	D	Ignition switch ON and washer switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.6 (30 A) fuse. · Faulty washer switch. · An open in the wire.
4	I	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.6 (30 A) fuse. · An open in the wire.
5	J	Wiper switch LO.	Check for continuity to ground: should be continuity.	· Faulty wiper switch. · An open in the wire. · Poor ground (G401, G402).

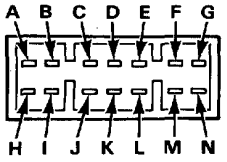
Light-on Warning System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	H	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, G402)
2	M	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.23 (15 A) fuse. · Faulty lighting switch. · An open in the wire.
3	B	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.1 (10 A) fuse. · Faulty dash fuse box.
4	A	Driver's door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No.1 (10 A) fuse.	· Faulty driver's door switch. · An open in the wire.

(cont'd)

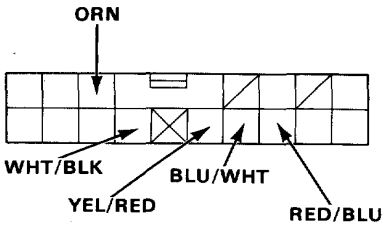
Integrated Control Unit

Input Test (Without Daytime and Dim-Dip Light, cont'd)



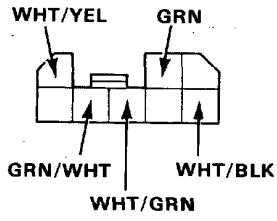
View from terminal side

KQ and KY models:



View from wire side

Except KQ and KY models:



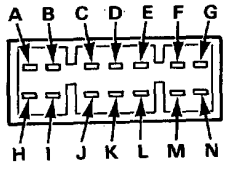
View from wire side

Entry Light Timer System:

No.	Terminal or Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	H	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, G402) · An open in the wire.
2	L	Under all conditions.	Check for voltage to ground: should be battery voltage.	· Blown No.22 (15 A) fuse. · An open in the wire.
3	WHT/BLK	Under all conditions.	Check ignition key light operation: connect the WHT/BLK terminal to the H terminal.	· Blown bulb · An open in the wire.
4	A	Driver's door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No.1 (10 A) fuse.	· Faulty driver's door switch. · An open in the wire.

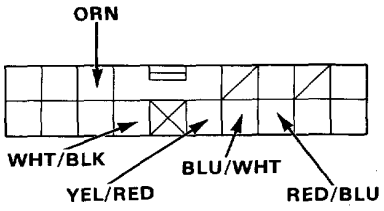
Seat Belt Reminder System (KY model only):

No.	Terminal or Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	H	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, G402) · An open in the wire.
2	YEL/RED	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.1 (10 A) fuse. · An open in the wire.
3	BLU/WHT	Ignition switch turned form "II" to "O" position.	Check for voltage to ground: should be battery voltage.	· Faulty ignition key switch. · An open in the wire.
4	RED/BLU	Driver's seat belt is not buckled.	Check for continuity to ground: should be continuity.	· Faulty seat belt switch. · Poor ground (G502). · An open in the wire.
5	ORN	Ignition switch ON and connect the B terminal to the ORN terminal.	Check chime operation: Chime should activate each time the battery is connected.	· Faulty chime. · An open in the wire.



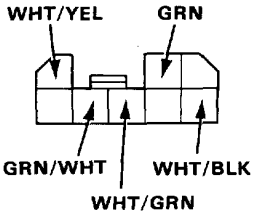
View from terminal side

KQ and KY models:



View from wire side

Except KQ and KY models:



View from wire side

Brake Light System (KG model only):

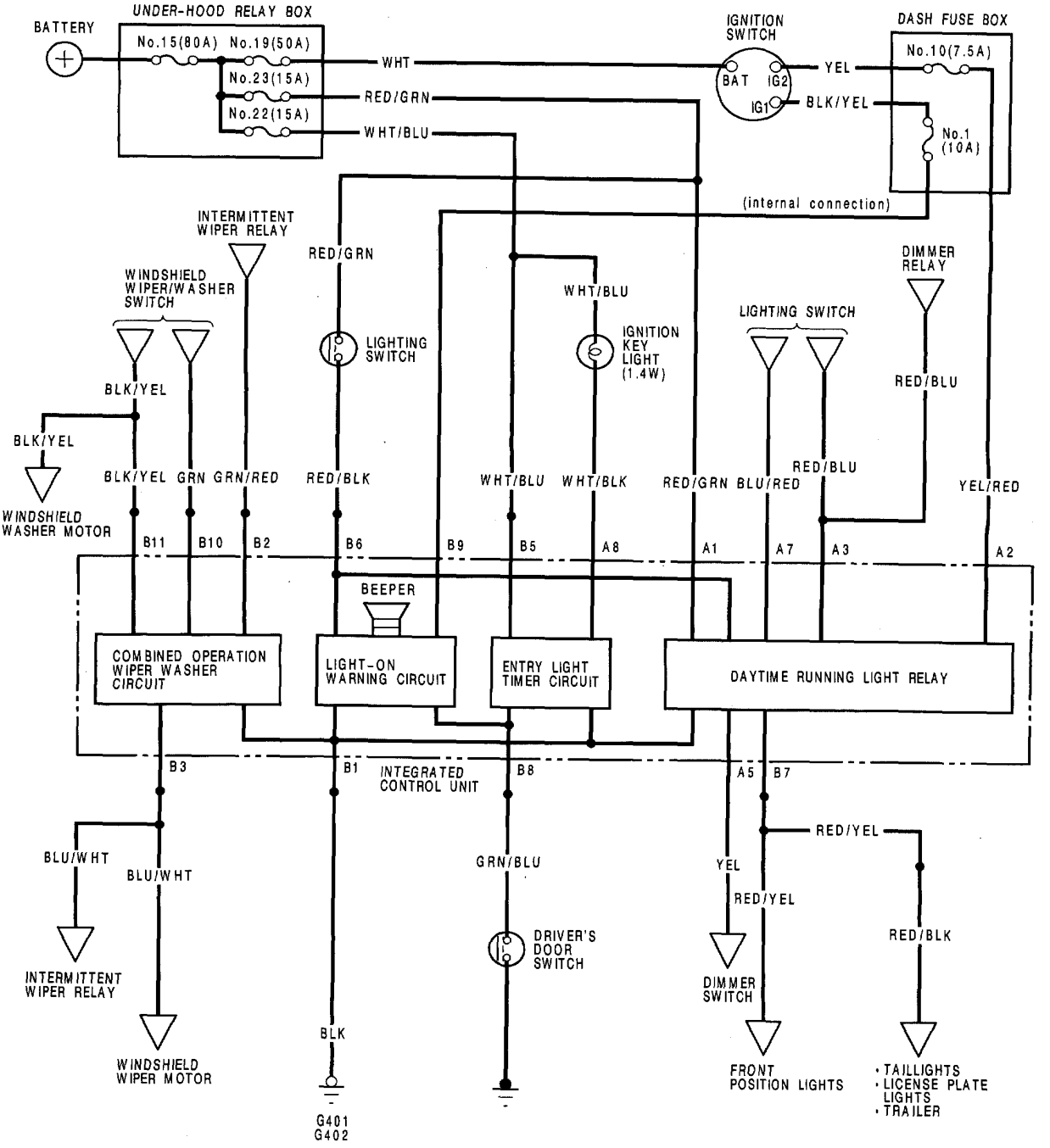
No.	Terminal or Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	H	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, G402) · An open in the wire.
2	WHT/YEL	Under all conditions.	Check for voltage to ground: should be battery voltage.	· Blown No.25 (20 A) fuse. · An open in the wire.
3	WHT/GRN	Brake pedal pushed.	Check for continuity to ground: should be continuity	· Faulty failure sensor. · An open in the wire. · Poor ground (G701)
4	GRN	Ignition switch ON.	Attach to ground: Brake indicator light in the safety indicator should come on.	· Faulty safety indicator (in the gauge assembly). · An open in the wire.
5	GRN/WHT	Brake pedal pushed.	Check for voltage to ground: should be battery voltage.	· Faulty brake light switch. · An open in the wire.
		Brake pedal released.	Check for continuity to ground: should be continuity.	· Poor ground (G701) · An open in the wire.

Integrated Control Unit

Circuit Diagram (With Daytime Light)

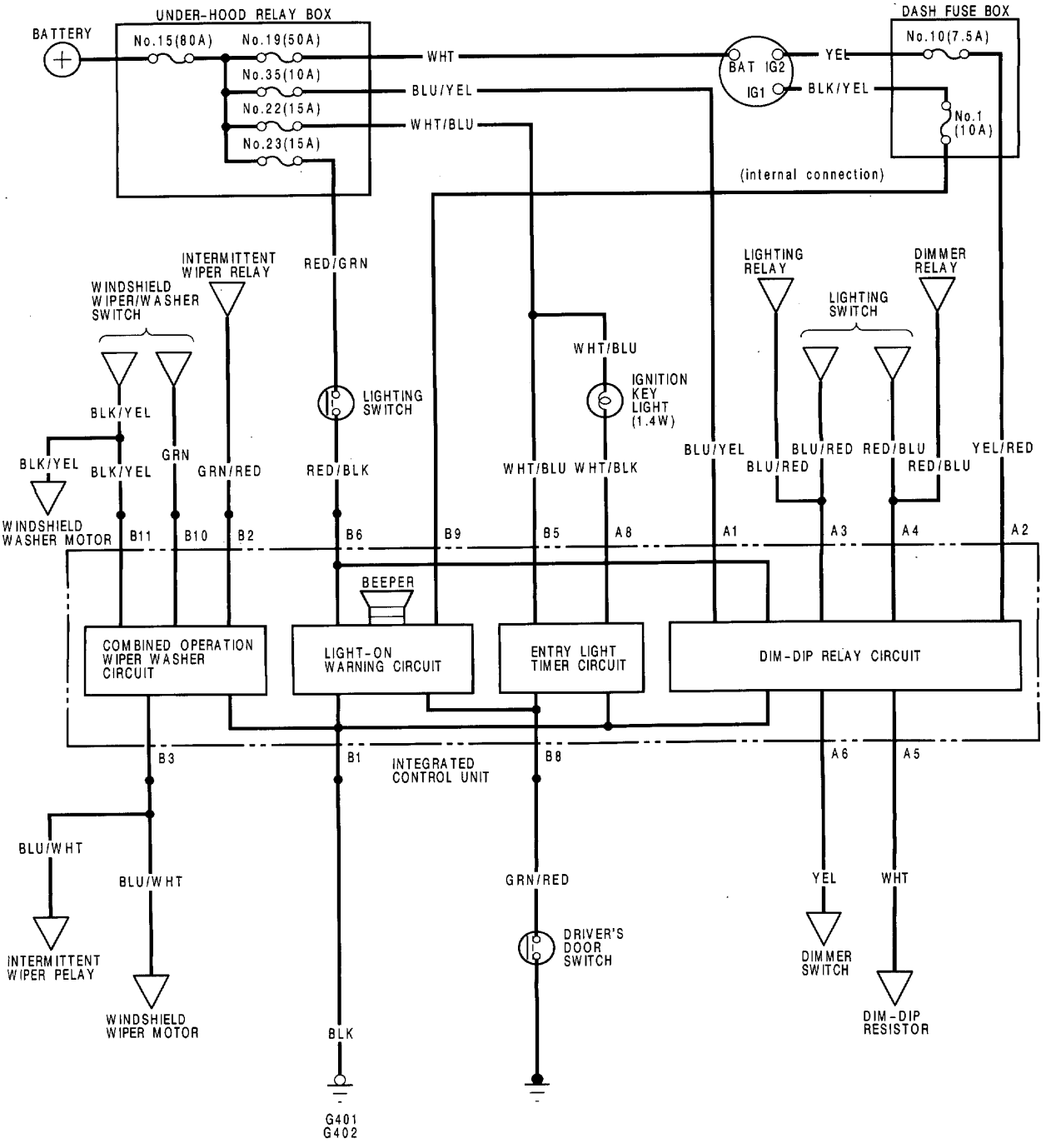
Description:
A multi-function control unit located on the left side kick panel, integrates the functions of the combined operation with wiper/washer circuit, light-on warning circuit, entry light timer circuit and daytime running light relay onto one circuit board, sharing common circuit functions.

NOTE: Several different wires have the same color. They have been given a number suffix to distinguish them (for example RED/BLK[1] and RED/BLK[2] are not the same).



(With Dim-Dip Light)

Description:
A multi-function control unit located on the right side kick panel, integrates the functions of the combined operation with wiper/washer circuit, light-on warning circuit, entry light timer circuit and dim-dip relay circuit onto one circuit board, sharing common circuit functions.



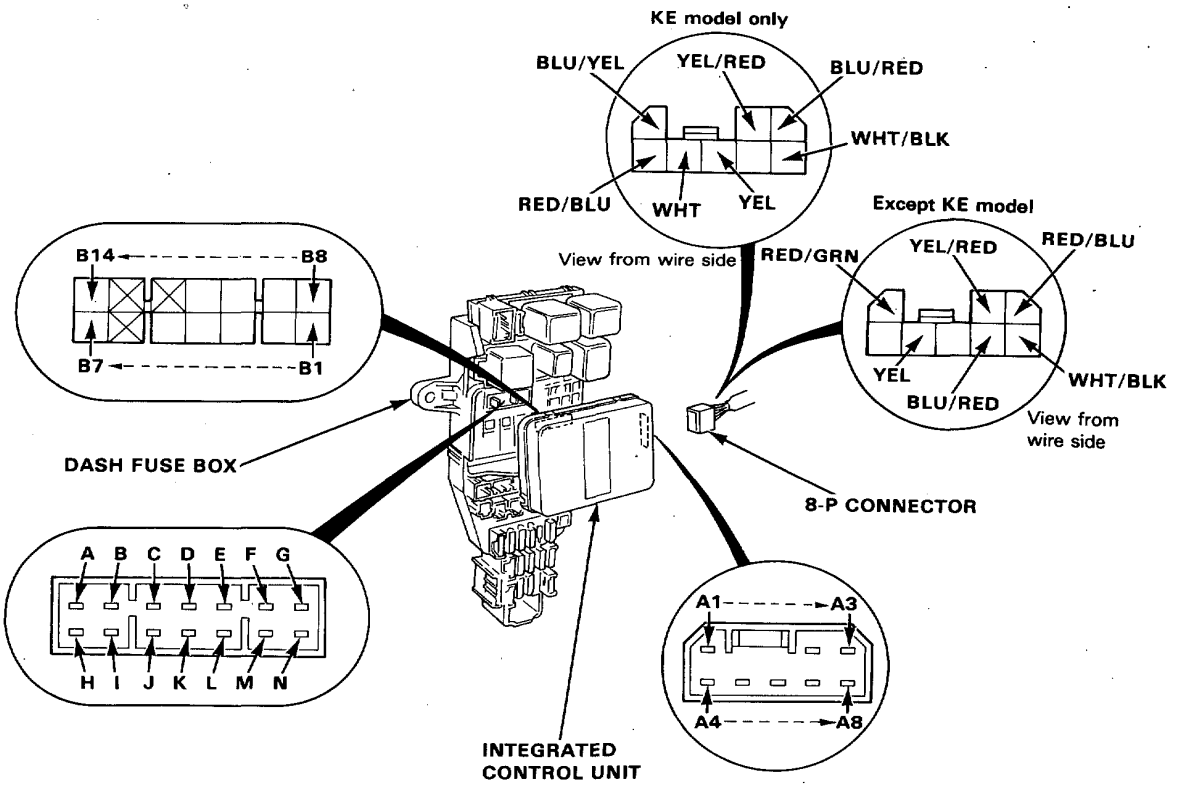
Integrated Control Unit

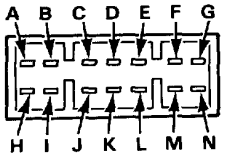
Input Test (With Daytime and Dim-Dip Light)

Remove the driver's side kick panel cover then disconnect the 8-P connector from the integrated control unit. Remove the integrated control unit from the dash fuse box.

Make the following input tests at the harness pins. If all tests prove OK, yet the system still fails to work, replace the control unit.

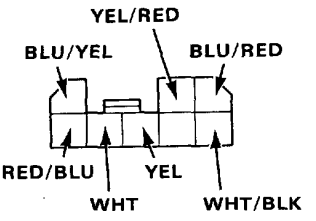
NOTE: Do not disconnect all of the connectors on the dash fuse box except the integrated control unit.





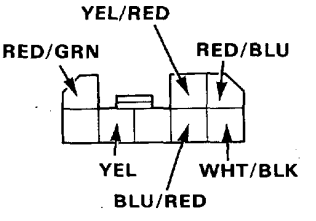
View from terminal side

KE model:



View from wire side

Except KE model:



View from wire side

Wiper System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	H	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, G402)
2	C	Ignition switch ON and wiper switch INT.	Check for voltage to ground: should be battery voltage.	· Blown No.6 (30 A) fuse. · Faulty wiper switch. · An open in the wire.
3	D	Ignition switch ON and washer switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.6 (30 A) fuse. · Faulty washer switch. · An open in the wire.
4	I	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.6 (30 A) fuse. · An open in the wire.
5	J	Wiper switch LO.	Check for continuity to ground: should be continuity.	· Faulty wiper switch. · An open in the wire. · Poor ground (G401, G402).

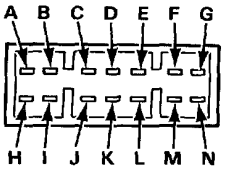
Light-on Warning System:

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	H	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, G402)
2	M	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.23 (15 A) fuse. · Faulty lighting switch. · An open in the wire.
3	B	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.1 (10 A) fuse. · Faulty dash fuse box.
4	A	Driver's door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No.1 (10 A) fuse.	· Faulty driver's door switch. · An open in the wire.

(cont'd)

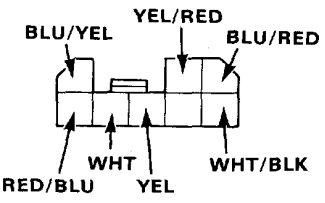
Integrated Control Unit

Input Test (With Daytime and Dim-Dip Light, cont'd)



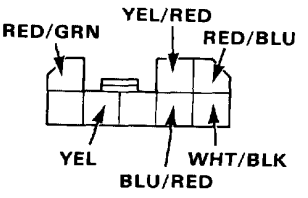
View from terminal side

KE model:



View from wire side

Except KE model:



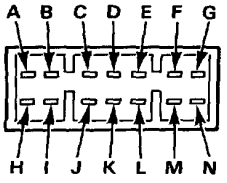
View from wire side

Entry Light Timer System:

No.	Terminal or Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	H	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, G402) · An open in the wire.
2	L	Under all conditions.	Check for voltage to ground: should be battery voltage.	· Blown No.22 (15 A) fuse. · An open in the wire.
3	WHT/BLK	Under all conditions	Check ignition key light operation: connect the WHT/BLK terminal to the H terminal.	· Blown bulb. · An open in the wire.
4	A	Driver's door opened.	Check for continuity to ground: should be continuity. NOTE: Before testing, remove No.1 (10 A) fuse.	· Faulty driver's door switch. · An open in the wire.

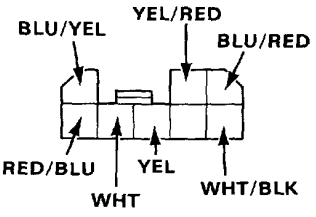
Daytime Running Light System (Except KE model):

No.	Terminal or Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	H	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, 402) · An open in the wire.
2	RED/GRN	Under all conditions.	Check for voltage to ground: should be battery voltage.	· Blown No.23 (15 A) fuse. · An open in the wire.
3	BLU/RED and M	Lighting switch ⇨	Check for voltage to ground: should be battery voltage.	· Faulty lighting switch. · Faulty lighting relay. · Faulty dimmer relay. · An open in the wire.
4	RED/BLU	Passing switch ON.	Check for voltage to ground: should be battery voltage.	· Faulty lighting switch. · Faulty lighting relay. · An open in the wire.
5	YEL/RED	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.10 (7.5 A) fuse. · Fault dash fuse box. · An open in the wire.
6	N	Connect the RED/GRN terminal to the N terminal.	Front position lights, taillights and license plate lights should come on.	· Blown bulbs. · An open in the wire.
7	YEL	Dimmer switch HI.	Check for continuity to ground: should be continuity.	· Faulty lighting switch. · Poor ground (G251).



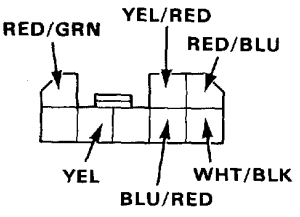
View from terminal side

KE model:



View from wire side

Except KE model:



View from wire side

Dim-Dip Headlight System (KE model):

No.	Terminal or Wire	Test condition	Test: *desired result*	Possible cause (if result is not obtained)
1	H	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, G402) · An open in the wire.
2	BLU/YEL	Under all conditions.	Check for voltage to ground: should be battery voltage.	· Blown No.35 (10 A) fuse. · An open in the wire.
3	YEL/RED	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.10 (7.5 A) fuse. · Faulty dash fuse box. · An open in the wire.
4	BLU/RED and M	Lighting switch	Check for voltage to ground: should be battery voltage.	· Faulty lighting switch. · Faulty lighting relay. · Faulty dimmer relay. · An open in the wire.
5	WHT	Lighting switch	Check for voltage to ground: should be battery voltage.	· Faulty Dim-Dip resistor. · Blown No.37 (20 A) fuse. · Blown No.38 (20 A) fuse. · Faulty lighting relay. · An open in the wire.
6	RED/BLU	Passing switch ON.	Check for voltage to ground: should be battery voltage.	· Faulty lighting switch. · Faulty lighting relay. · An open in the wire.
7	YEL	Dimmer switch HI.	Check for continuity to ground: should be continuity.	· Faulty lighting switch. · Poor ground (G251)

Light-on Warning System

Description

NOTE: Refer to page 16-143, 16-148 or 16-149 for wiring description of the light-on warning circuit, and page 16-145 or 16-151 for the input test of the warning circuit.

When the light on, voltage is applied to the warning circuit on the integrated control unit.
When you open the driver's door, the warning circuit senses ground through closed door switch.
With voltage at the "B6" terminal, ground at the "B8" terminal, the beeper is activated to remind the driver to turn off the lights.

Entry Light Timer System

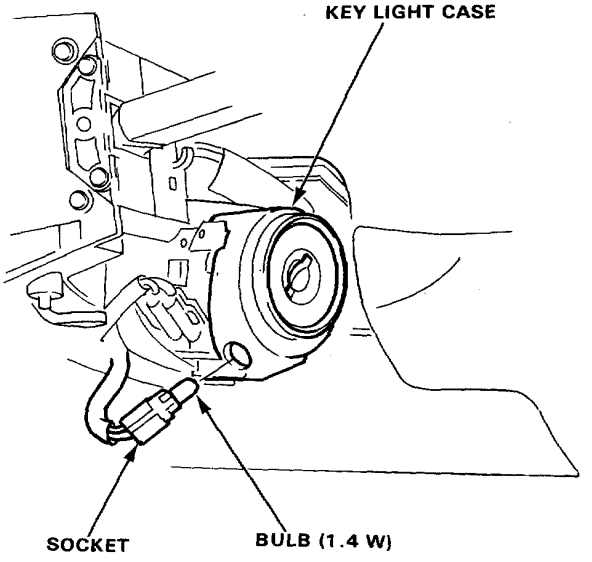
Description

NOTE: Refer to page 16-143, 16-148 or 16-149 for wiring description of the entry light timer circuit, and page 16-146 or 16-152 for the input test of the timer circuit.

If the driver's door has been opened, the ignition key light goes on and stays on for about 8 seconds after the driver's door is closed.

Ignition Key Light Replacement

1. Remove the steering wheel and the steering column covers.
2. Remove the bulb/socket from the key light case by turning the socket 45°.



- Door switch test: See page 16-175.

Seat Belt Reminder System (KY model only)

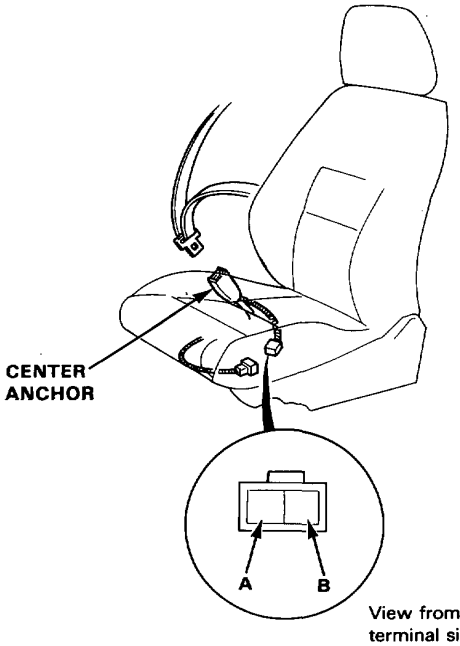
Description

NOTE: Refer to page 16-112 for wiring description of the seat belt reminder circuit.

With the ignition switch in "Run" or "Start", voltage is applied to the reminder of the integrated control unit. When you unbuckle the driver's seat belt, the reminder circuit senses ground at the "A14" terminal. With voltage at the "B9" terminal and ground at the "B1" terminal, the seat belt reminder chime sounds and the timer contacts close and open. This causes the seat belt reminder light to flash on and off. After 5 seconds the chime stops and the contacts remain open.

Seat Belt Switch Test

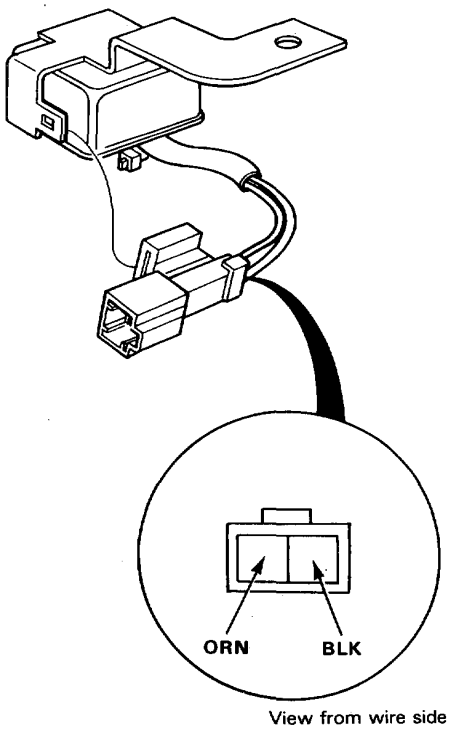
1. Slide the driver's seat forward until the seat belt center anchor bolt is accessible, to disconnect the 2-P connector from the seat belt switch.
2. There should be continuity between the A and B terminals when the driver's seat belt is not buckled.
   There should be no continuity when the driver's seat belt is buckled.



View from terminal side

Chime Test

1. Remove the left side kick panel and disconnect the 2-P connector from the main wire harness.
2. Test chime operation by connecting battery positive to the ORN terminal, and negative to the BLK terminal, and cycling the power on-off repeatedly.
3. If the chime fails to sound every time power is cycled, replace it.

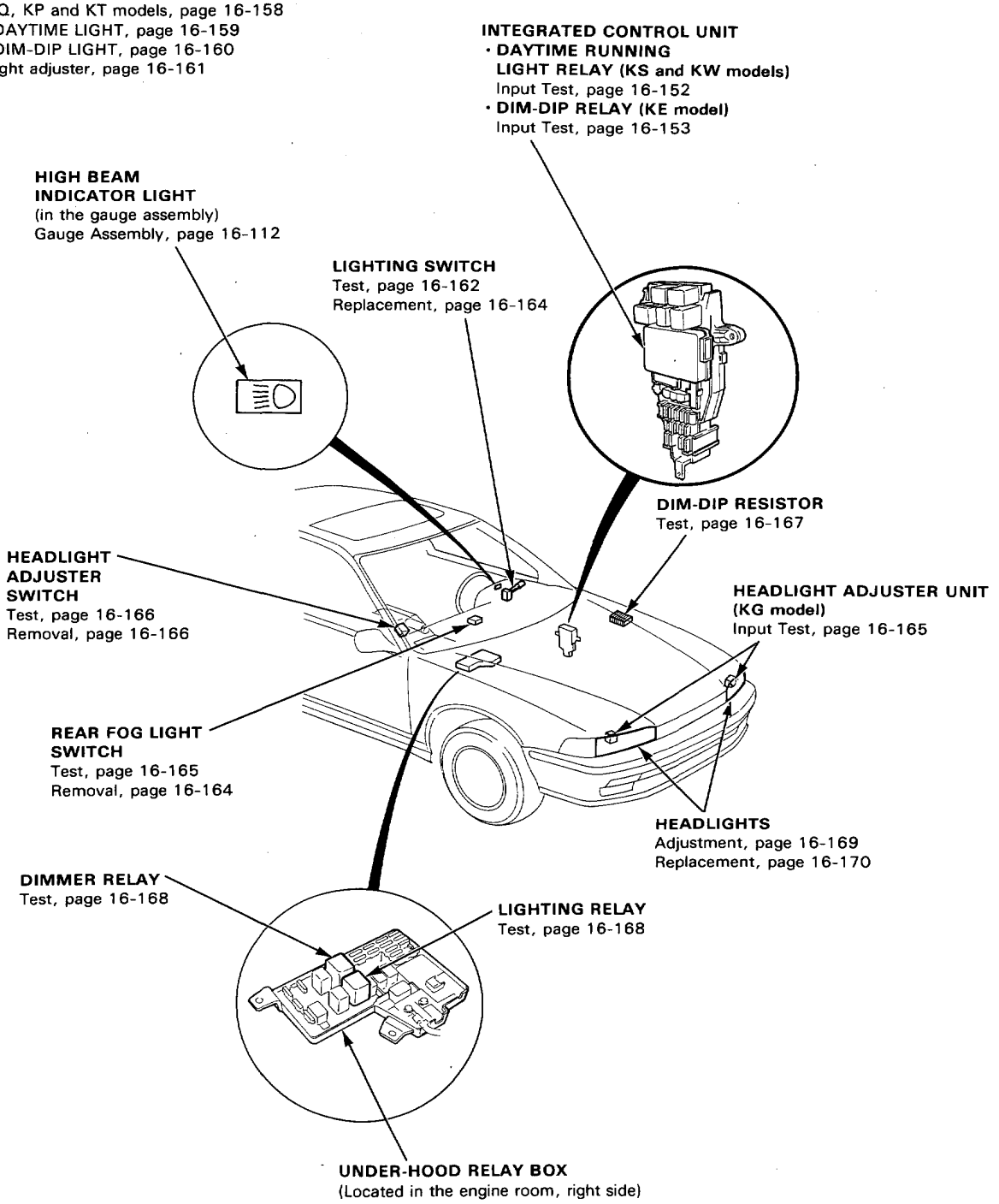


View from wire side

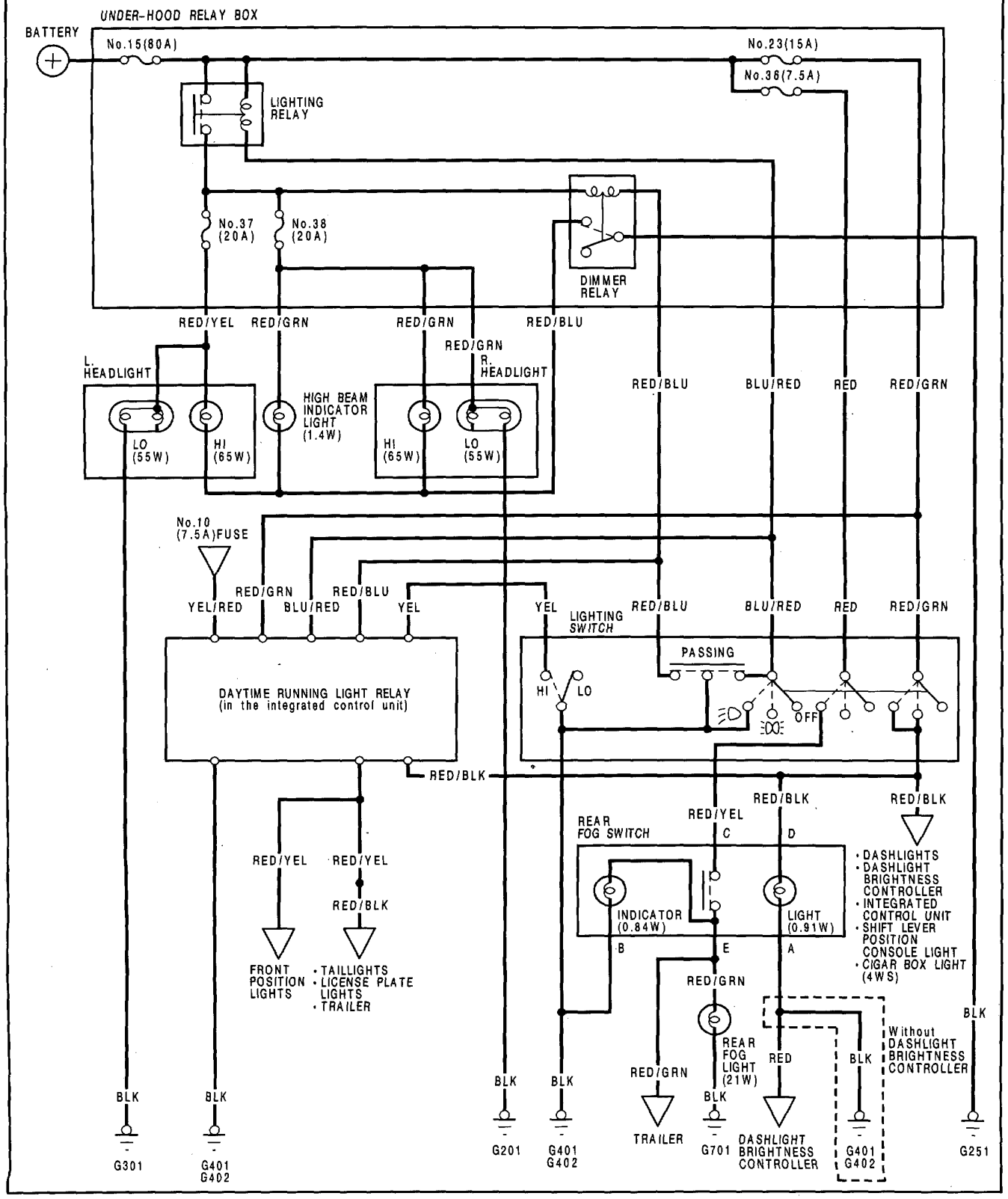
Lighting System

Component Location Index

● **CIRCUIT DIAGRAM**
- KF, KG, KB and KX models, page 16-157
- KY, KQ, KP and KT models, page 16-158
- With DAYTIME LIGHT, page 16-159
- With DIM-DIP LIGHT, page 16-160
- Headlight adjuster, page 16-161



Circuit Diagram (With Daytime Light)



Headlights

Adjustment

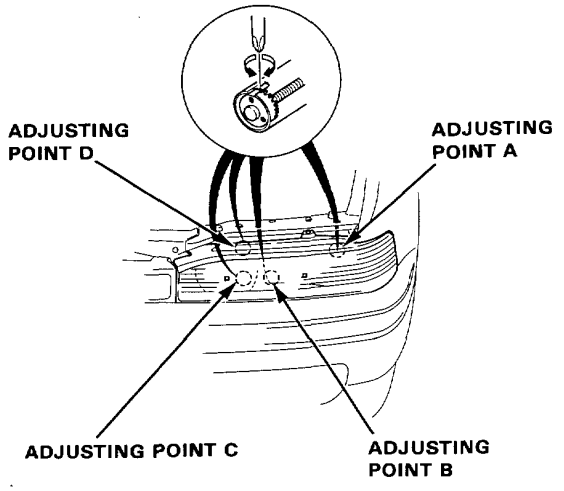
Outside Headlight Adjustment:
Adjust the points A and B.

KG model only:

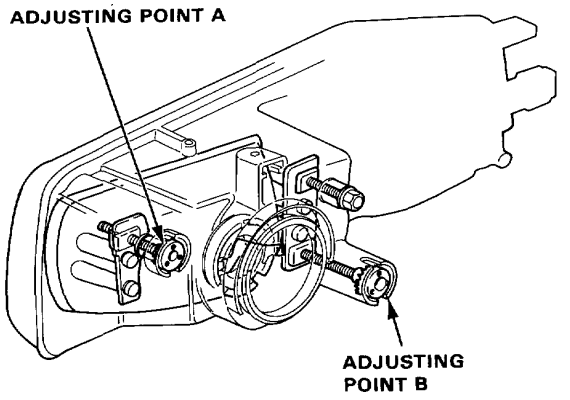
1. Adjust the outside headlight with "O" position of headlight adjuster switch.
2. Check the dip of beam in each position of the headlight adjuster switch, after outside headlight adjustment.

Inside Headlight Adjustment:
Adjust the points C and D.

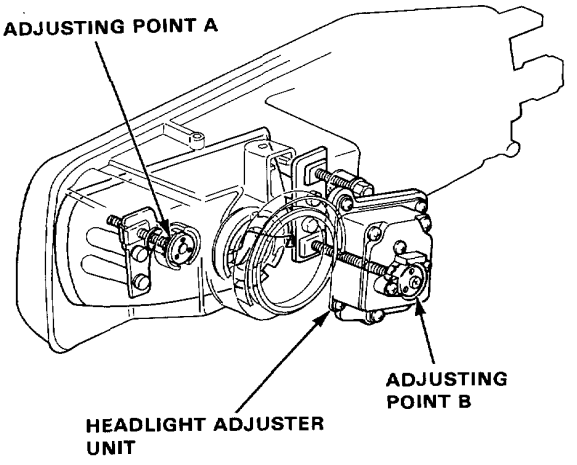
NOTE: Adjust the headlights to local requirements.



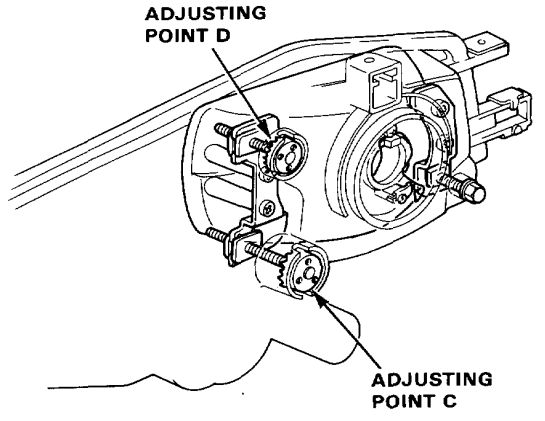
Outside headlight:
(Except KG model)



(KG model only)



Inside headlight:



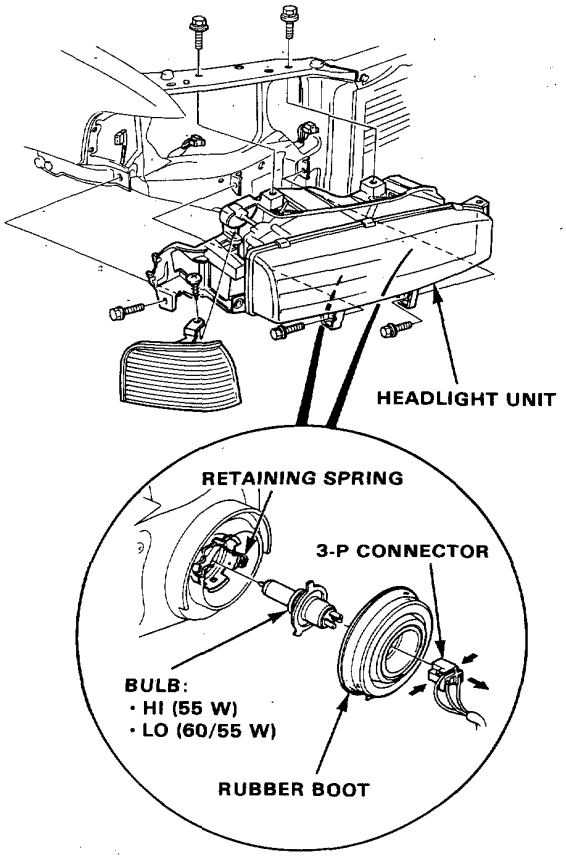
Headlights

Replacement

CAUTION:

- **Halogen headlights can become very hot in use; do not touch them or the attaching hardware immediately after they have been turned off.**
- **Do not try to replace or clean the headlights with the lights on.**

1. Disconnect the 3-P connectors from behind the unit. Before disconnecting right side connector, remove the battery and coolant reservoir.
2. Remove the rubber boot from behind the light by pulling the tab.
3. Unhook the retaining spring and remove the bulb.
4. Remove the screw and front position light, then disconnect the 2-P connector.
5. Remove the front grille and front bumper.
6. Remove the 5 mount bolts, then remove the unit.
7. After installing the unit, adjust the headlights to local requirements.

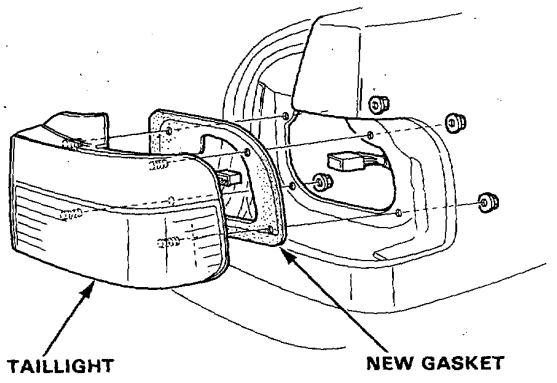


Taillights

Replacement

Trunk side:

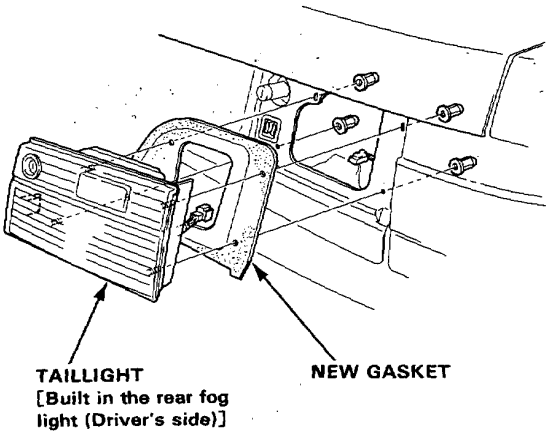
1. Open the trunk lid and remove the trunk panel.
2. Disconnect the 8-P connector from the trunkside taillight.
3. Remove the 4 mount nuts and the taillight.



4. Inspect the gasket; replace if it is distorted or overly compressed.
5. Make sure that there is no water leakage in the taillights, after installing the taillights.

Lid side:

1. Open the trunk lid and remove the trunk panel.
2. Disconnect the 4-P connector from the lidside taillight [Built in the rear fog light (Driver's side)].
3. Remove the 4 mount nuts and the lidside taillight.

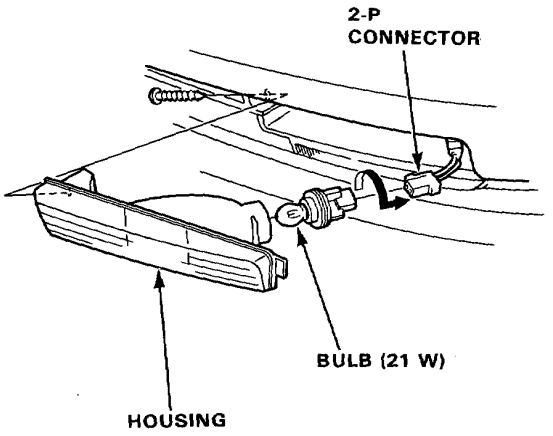


4. Inspect the gasket; replace if it is distorted or overly compressed.
5. Make sure that there is no water leakage in the taillights, after installing the taillights.

Front Turn Signal Lights

Replacement

1. Remove the screw and the front turn signal light, then disconnect the 2-P connector.

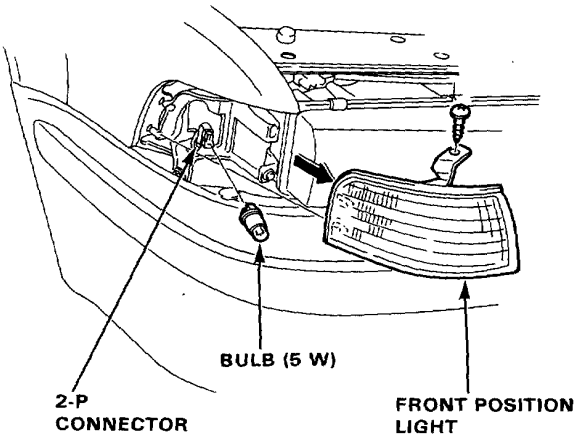


2. Turn the bulb 45° counterclockwise to remove it from the housing.

Front Position Lights

Replacement

1. Remove the screw and pull out the front position light from the stay, then disconnect the 2-P connector.

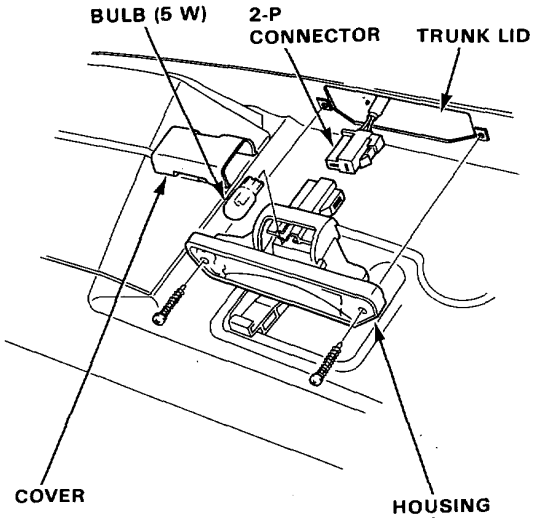


2. Turn the bulb 45° counterclockwise to remove it from the front position light.

License Plate Lights

Replacement

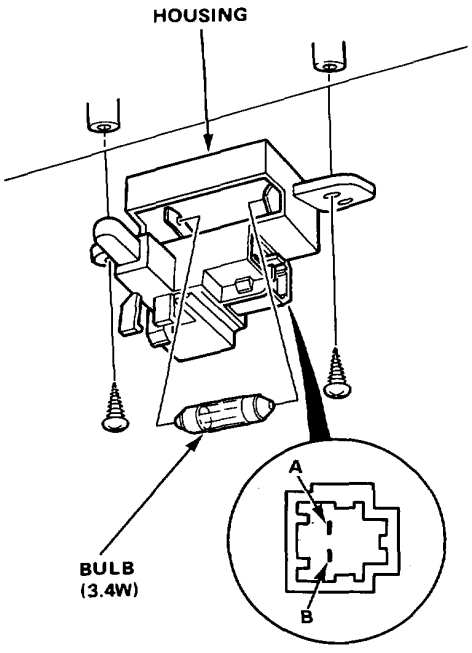
1. Remove the 2 screws from the trunk lid and disconnect the 2-P connector, then remove the license plate light.
2. Remove the cover from the license plate light, then remove it from the housing.

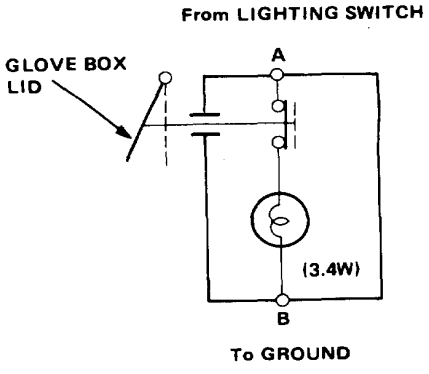


Glove Box Light

Test

1. Open the glove box.
2. Disconnect the 2-P connector from the light.
3. There should be continuity between the A and B terminals with a bulb installed.

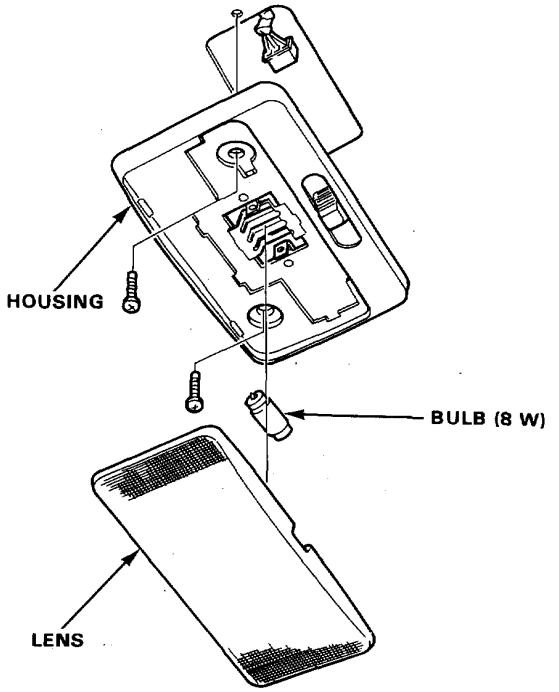




Dome Light

Test

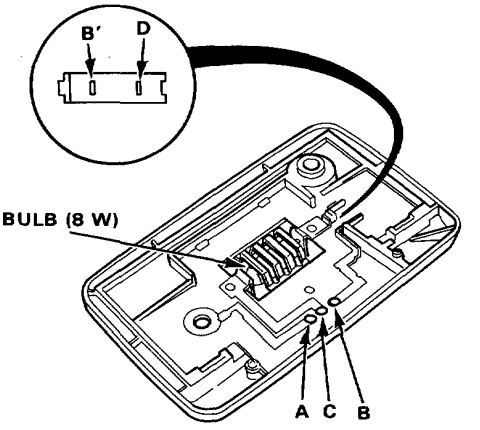
1. Turn the light switch OFF.
2. Pry off the lens.
3. Remove the nuts or screws and the housing.
4. Disconnect the 3-P connector from the housing.



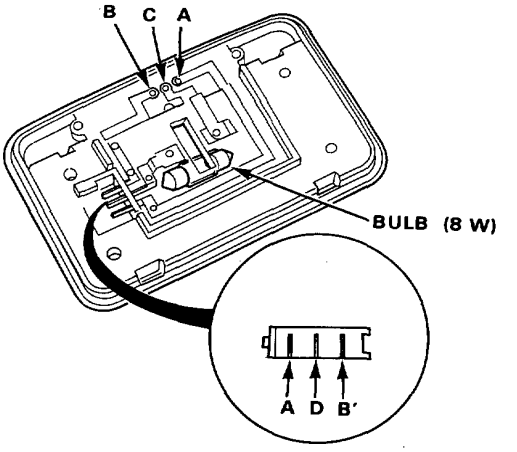
5. Remove the dome light.
6. Check for continuity between the terminals in each switch position according to the table.

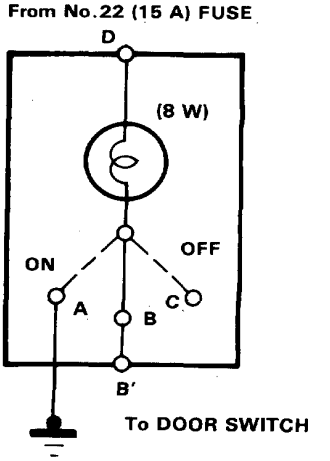
Terminal / Position	A	B or B'	C		D
OFF			○	○	○
MIDDLE		○		○	○
ON	○			○	○

With Sunroof:



Without Sunroof:





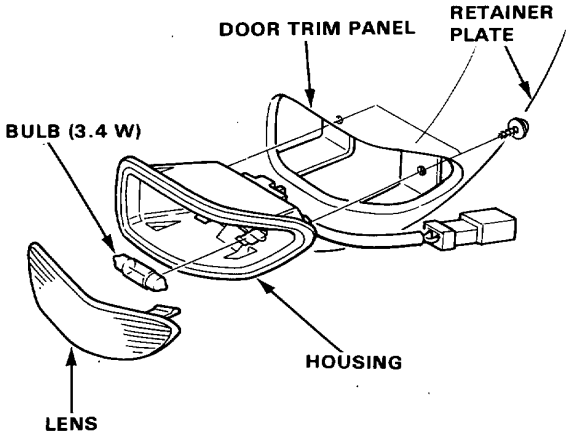
with Sunroof: RHD: G401, G402
LHD: G501, G502
without Sunroof: At MOUNTING NUT

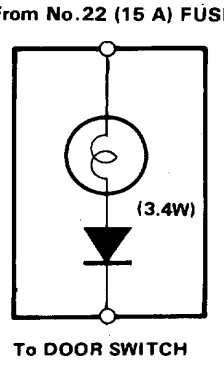
Courtesy Lights and Door Switches

Courtesy Light Replacement

NOTE: The bulb or lens alone can be replaced without having to remove the door trim panel.

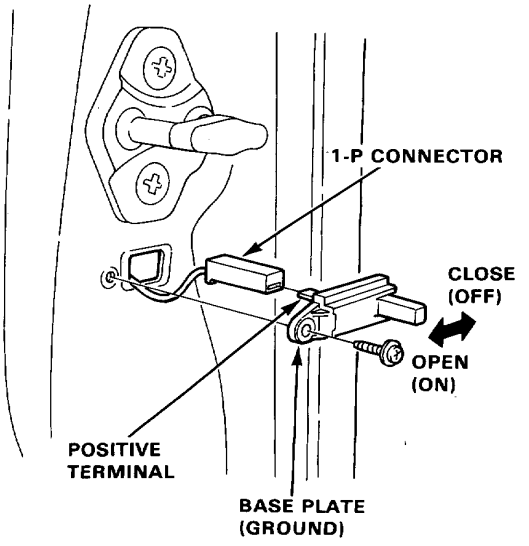
1. Remove the door trim panel.
2. Remove the 2 screws and the retainer plate to remove the light from the door trim panel.





Door Switch Test

1. Open the door.
2. Remove the screw and pull out the door switch.
3. Disconnect the 1-P CONNECTOR from the switch.

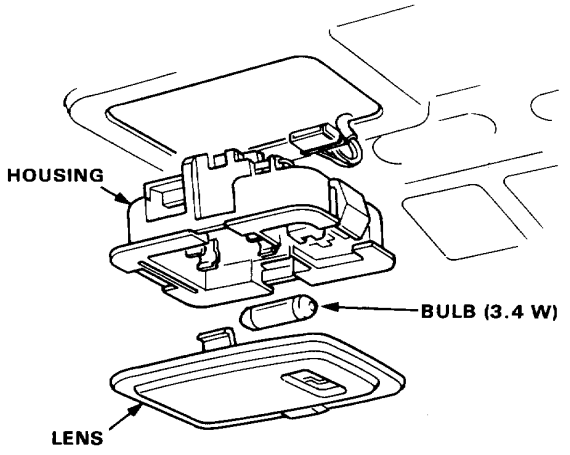


4. There should be continuity between the positive terminal and base plate (ground) with the switch released (door opened).
   There should be no continuity with the switch pushed (door closed).

Trunk Light and Latch Switch

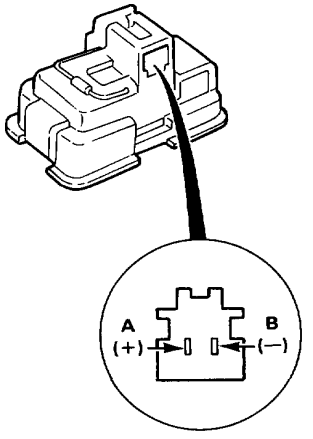
Trunk Light Replacement/Test

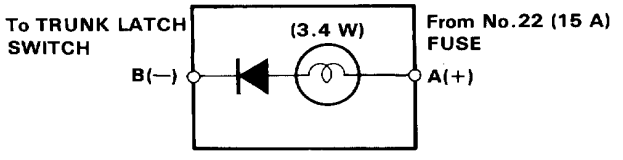
1. Pry off the trunk light lens from the housing.
2. Pry off the light assembly.
3. Disconnect the 3-P connector from the housing.



4. Make sure that the bulb is in good condition. Check for continuity between the A(+) and B(—) terminals.

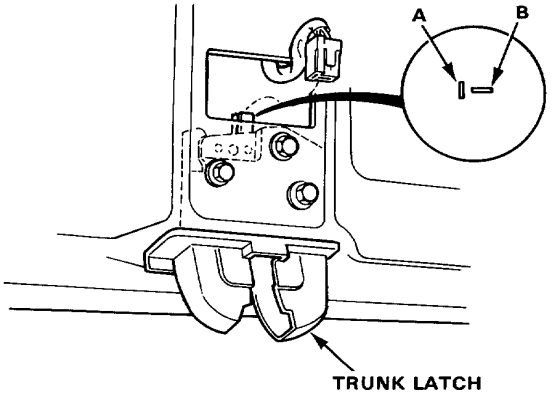
   NOTE: Do not connect the tester probes in the wrong polarity because there is a diode inside the trunk light.



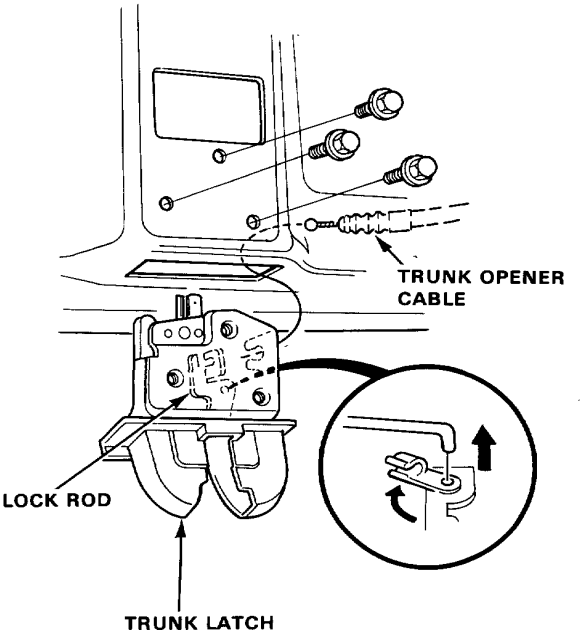


Latch Switch Test/Replacement

1. Open the trunk lid and disconnect the 2-P connector from the trunk latch.
2. There should be continuity between the A and B terminals.

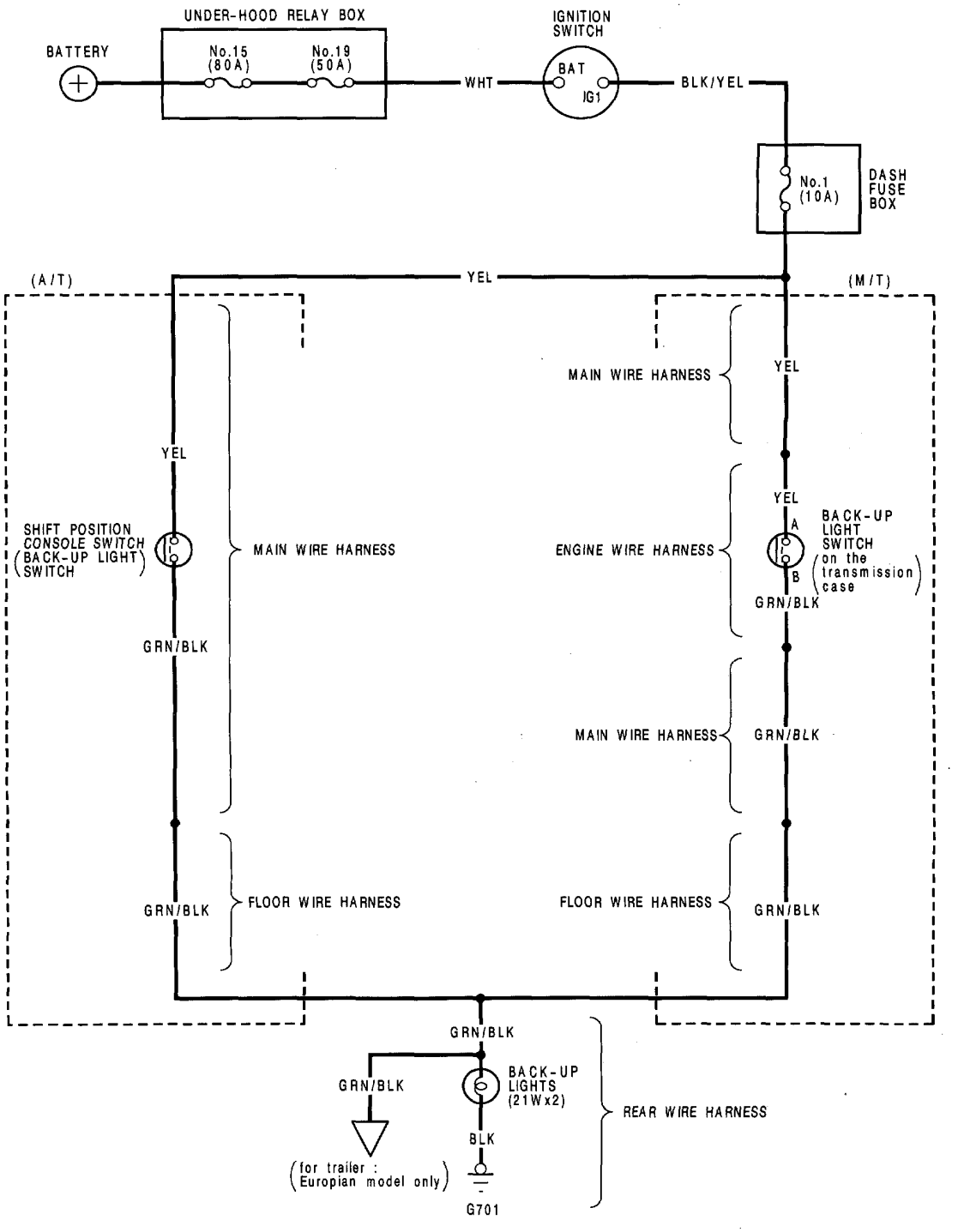


3. If necessary,remove the 3 bolts to pull out the latch from the trunk lid, then disconnect the lock rod from the latch.
4. Disconnect the trunk opener cable from the latch.



Back-up Lights

Circuit Diagram

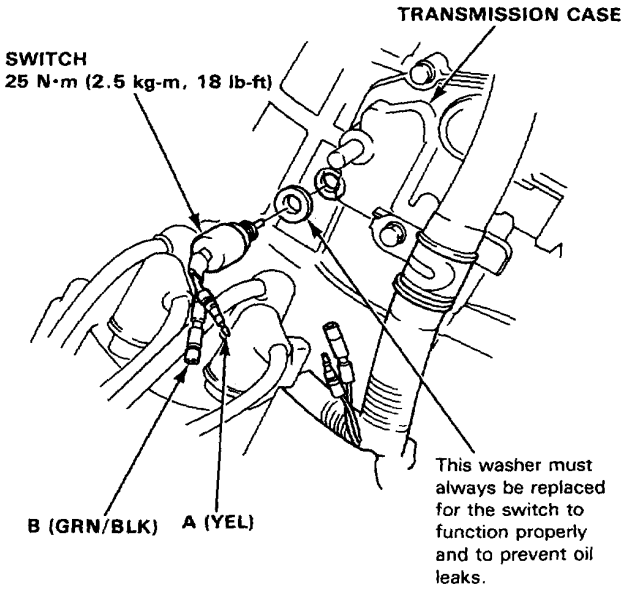


Test

Manual Transmission:

NOTE: Check the No.1 (10 A) fuse in the dash fuse box before testing.

1. Test back-up light switch by placing the select lever in reverse and turning the ignition switch to ON.
2. If the back-up lights do not go on, check the back-up light bulbs in the taillight assembly.
3. If the fuse and bulbs are OK, disconnect the connectors from the back-up light switch.

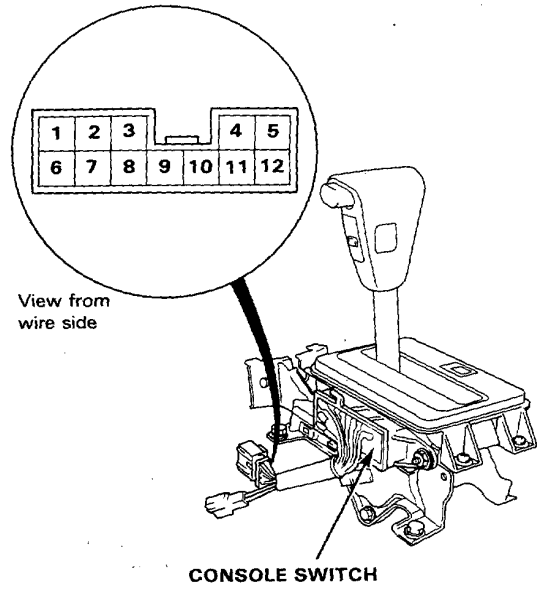


4. Check for continuity between the A and B wires with the switch installed to the transmission case. There should be continuity as the select lever engages "R".
   - If no continuity, replace the switch.
   - If there is continuity, but the back-up lights do not go on:
     - Poor ground (G701)
     - An open in the YEL or GRN/BLK wire.

Automatic Transmission:

NOTE: Check the No.1 (10 A) fuse in the dash fuse box before testing.

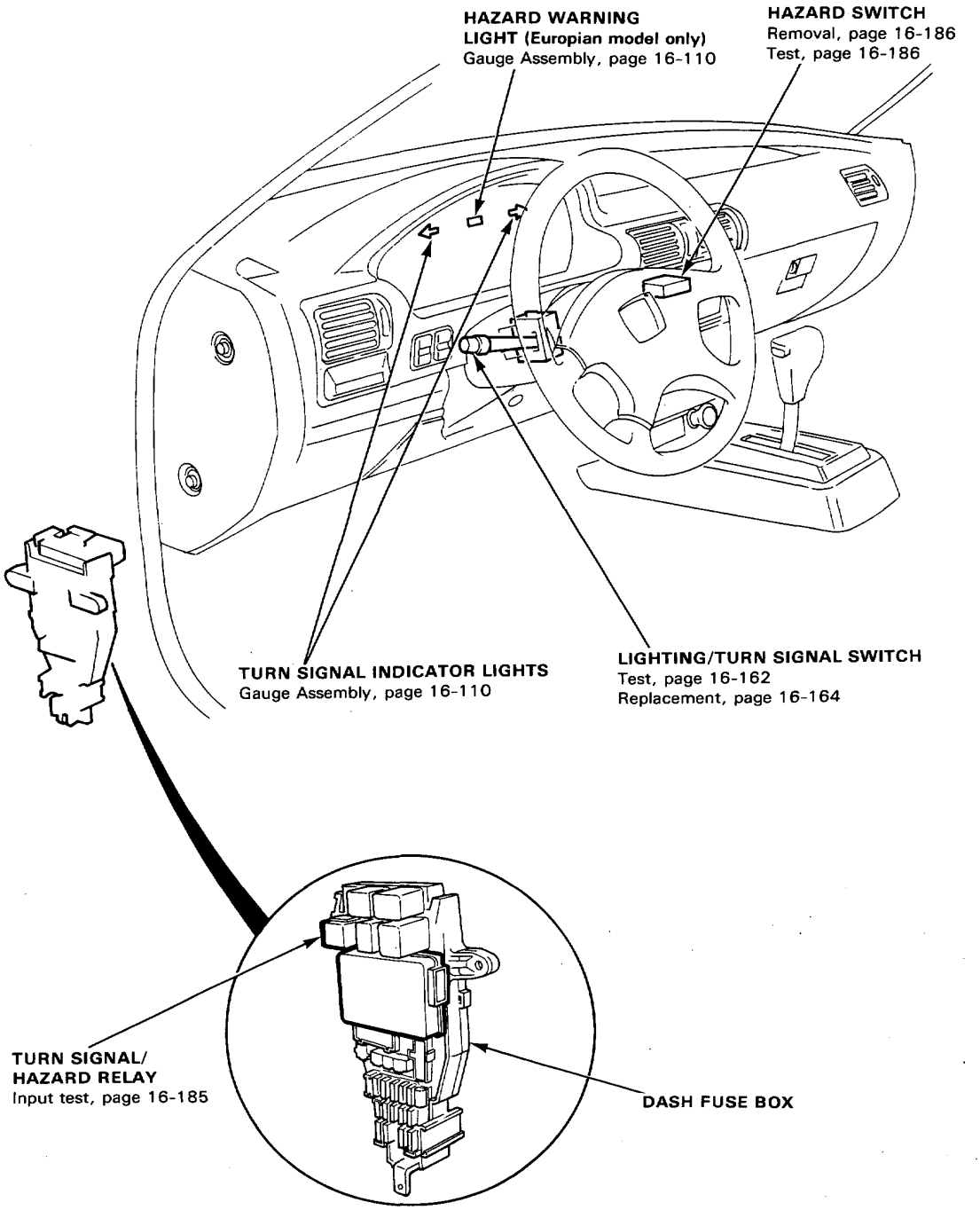
1. Test back-up light switch by shifting the select lever to "R" and turning the ignition switch ON.
2. If the back-up lights do not go on, check the back-up light bulbs in the taillight assembly.
3. If the fuse and bulbs are OK, remove the center console, then disconnect the 12-P connector from the shift position console switch (back-up light switch).



4. Check for continuity between No.2 and No.3 terminals. Move the lever back and forth without touching the push button at the "R" position, and check for continuity within a range of free play of the shift lever.
   - If there is no continuity within the range of free play, adjust the installation position of console switch (see page 16-142).
   - If there is continuity, but the back-up lights do not go on:
     - Poor ground (G701)
     - An open in the YEL or GRN/BLK wire.

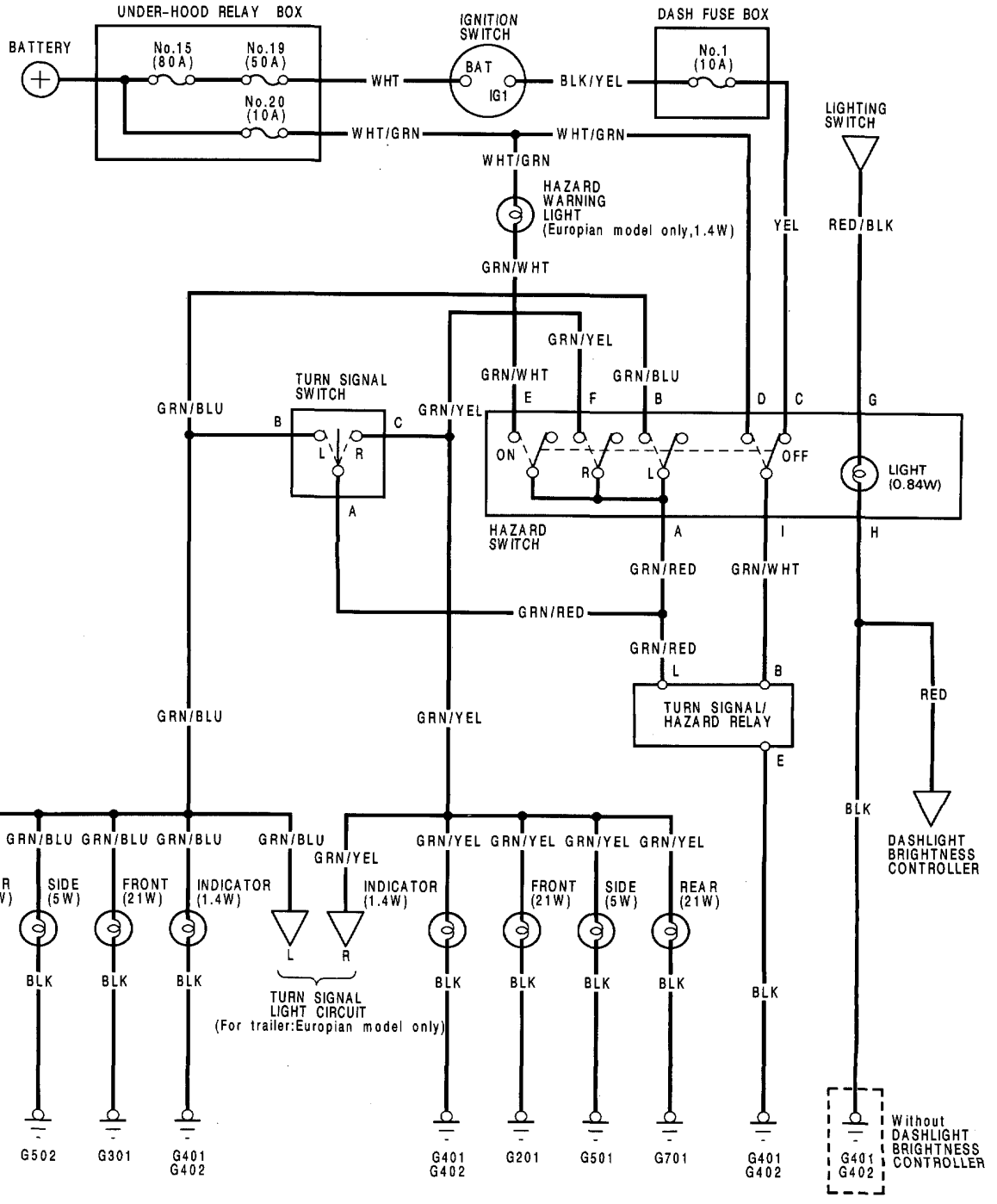
Turn Signal/Hazard Flasher System

Component Location Index



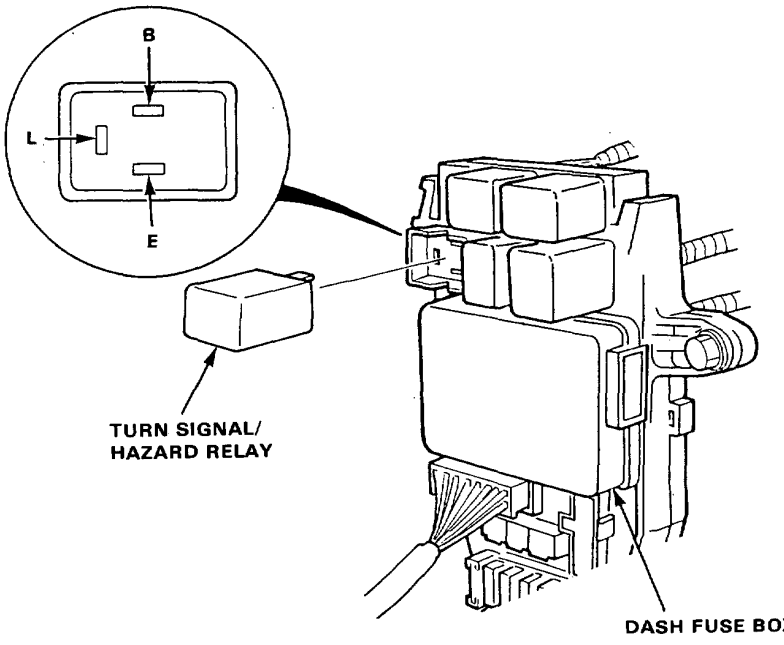
Turn Signal/Hazard Flasher System

Circuit Diagram



Turn Signal/Hazard Relay Input Test

Remove the turn signal/hazard relay from the dash fuse box.
Make the following input tests at the relay holder pins.
If all tests prove OK, but the relay fails to work, replace the turn signal/hazard relay.

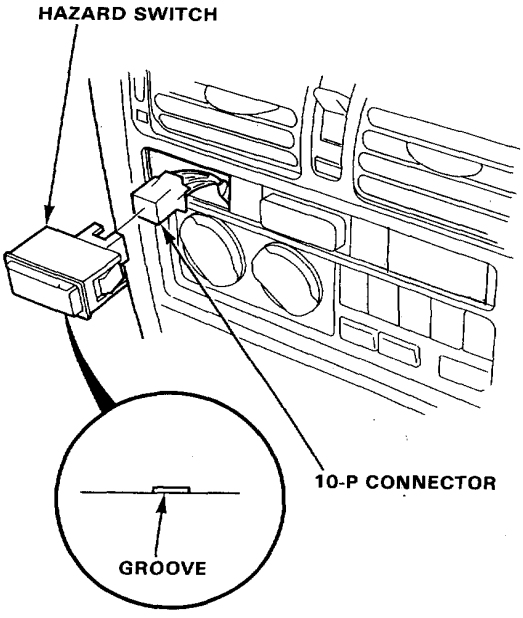


No.	Terminal	Test condition	Test: *desired result*	Possible cause (if result is not obtained)
1	E	Under all conditions.	Check for continuity to ground: *should be continuity.*	· Poor ground (G401, G402) · An open in the BLK wire.
2	B	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.1 (10 A) fuse. · An open in the YEL or GRN/WHT wire. · Faulty hazard switch.
3	B and L	Hazard switch ON and connect the B terminal to the L terminal.	*Hazard lights should come on.*	· Blown No.20 (10 A) fuse. · Blown bulb. · Poor ground (G201, G301, G401, G402, G501, G502, G701) · Faulty hazard switch. · An open in the WHT/GRN, GRN/RED, GRN/YEL or GRN/BLU wire.
		Ignition switch ON and turn signal switch in R or L and connect the B terminal to the L terminal.	R or L side turn lights should come on.	· Faulty turn signal switch.

Turn Signal/Hazard Flasher System

Hazard Switch Removal

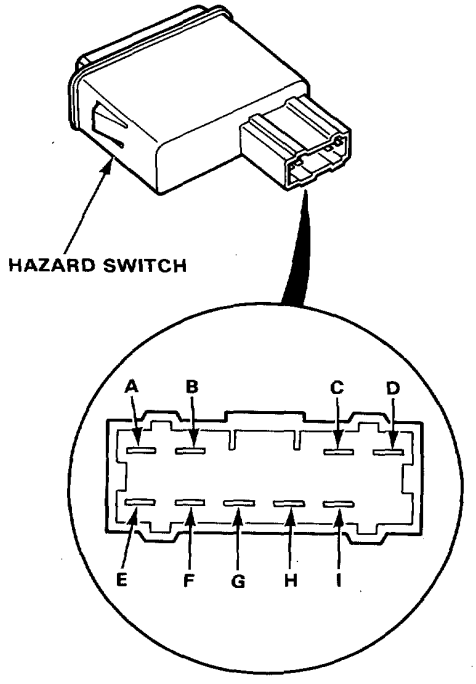
1. Carefully pry out the hazard switch from the instrument panel.
   NOTE: Be careful not to damage the switch or the instrument panel when prying out the switch.
2. Disconnect the 10-P connector from the switch.

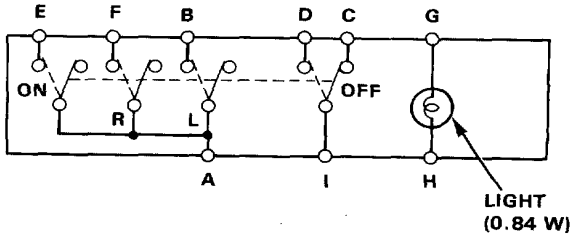


Hazard Switch Test

1. Pry out the hazard switch from the instrument panel.
2. Check for continuity between the terminals in each switch position according to the table.

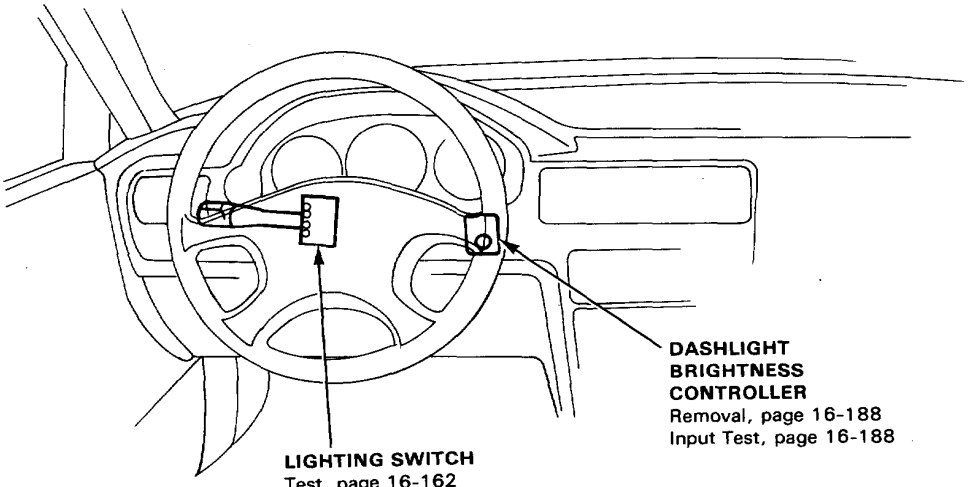
Position \ Terminal	A	B	C	D	E	F	G	H	I
OFF			○				○	○	○
ON	○	○		○	○	○	○		○





Dashlight Brightness Control

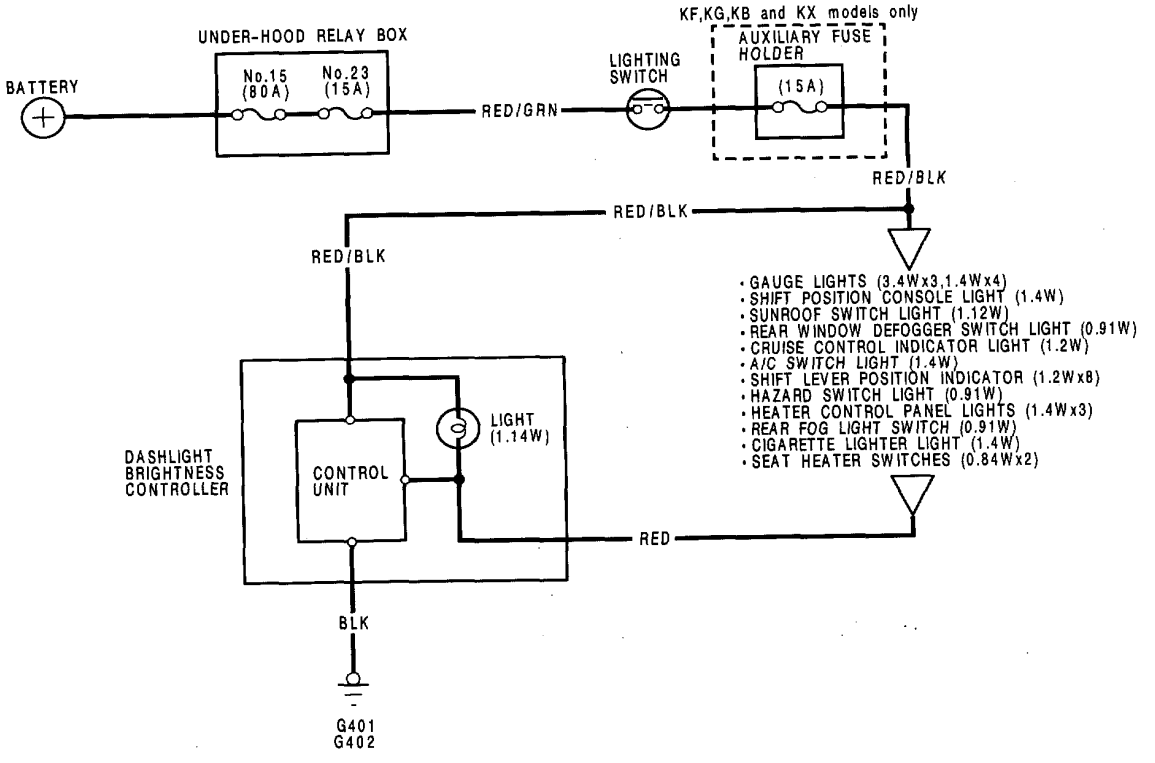
Component Location Index



DASHLIGHT BRIGHTNESS CONTROLLER
Removal, page 16-188
Input Test, page 16-188

LIGHTING SWITCH
Test, page 16-162
Replacement, page 16-164

Circuit Diagram



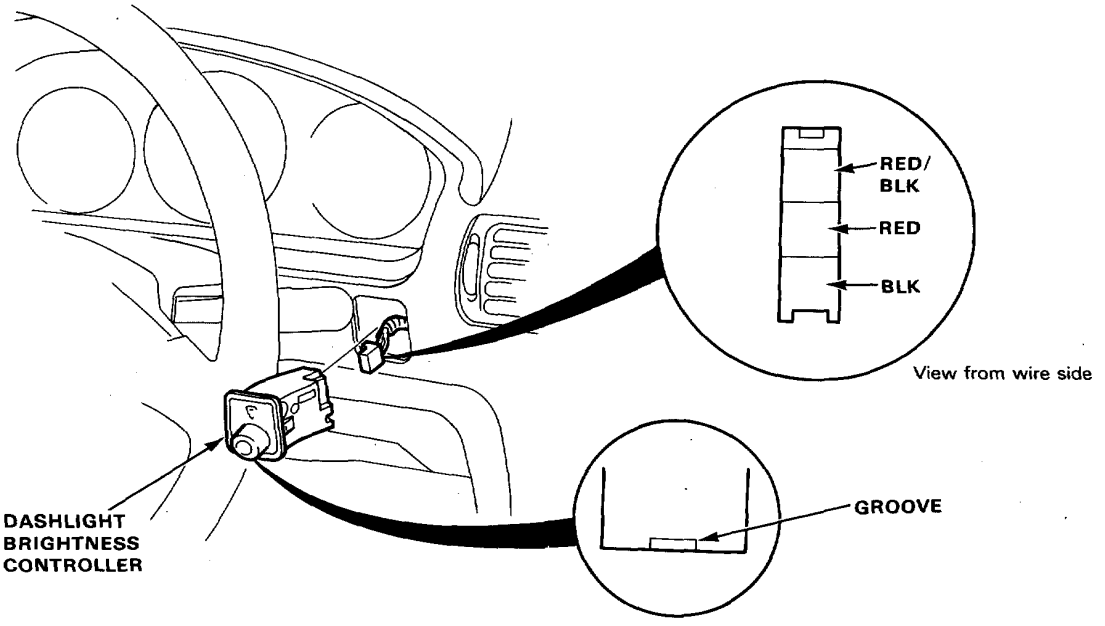
Dashlight Brightness Control

Controller Input Test

NOTE: The control unit is built in the dashlight brightness controller.

Pry out the switch from the instrument panel, then disconnect the 3-P connector from the controller.
Make the following input tests at the harness pins. If all tests prove OK, yet the dashlights still cannot be controlled, check the connector for good connection. If OK, then replace the controller.

NOTE: Be careful not to damage the switch or the instrument panel when prying out the switch.

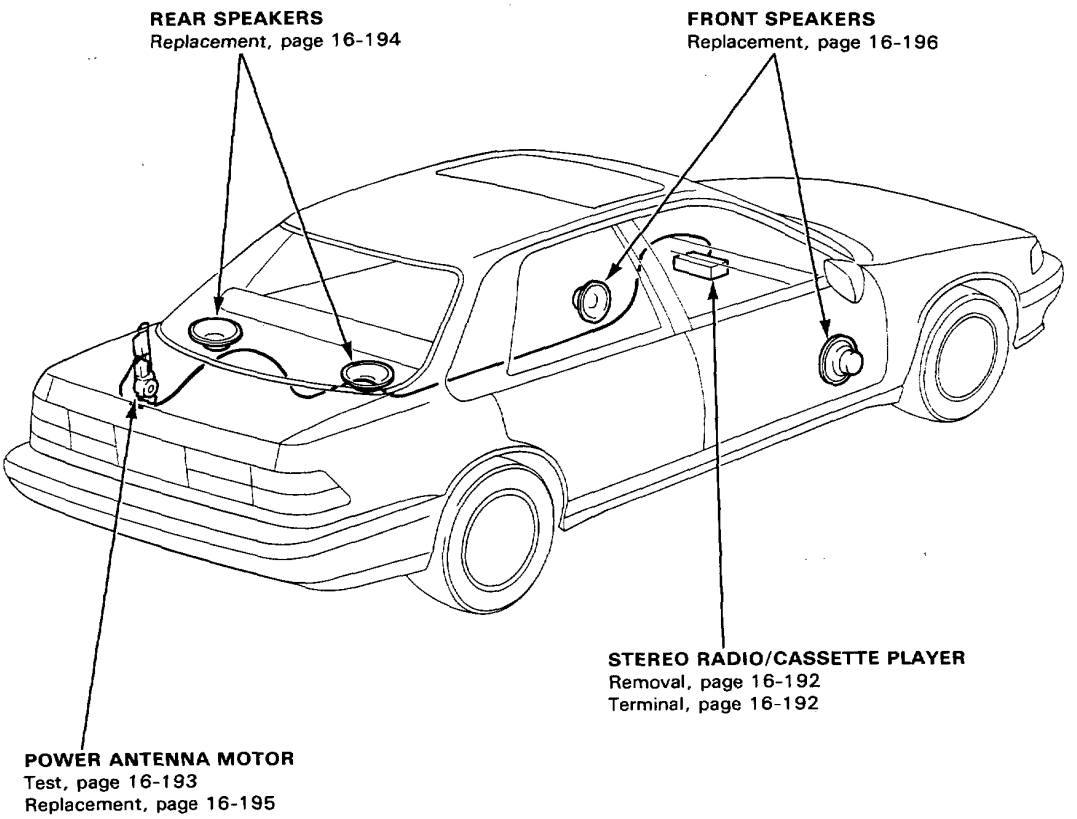


No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, G402) · An open in the wire.
2	RED/BLK	Lighting switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.23 (15 A) fuse. · Blown auxiliary fuse (15 A)*. · Faulty lighting switch. · An open in the wire.
3	RED	Lighting switch ON.	Attach to ground: Dashlights should come on full bright.	· An open in the RED/BLK or RED wire.

NOTE: If the fuse blows, the BLK and the RED/BLK wires are connected.
* : KF, KG, KB and KX models only

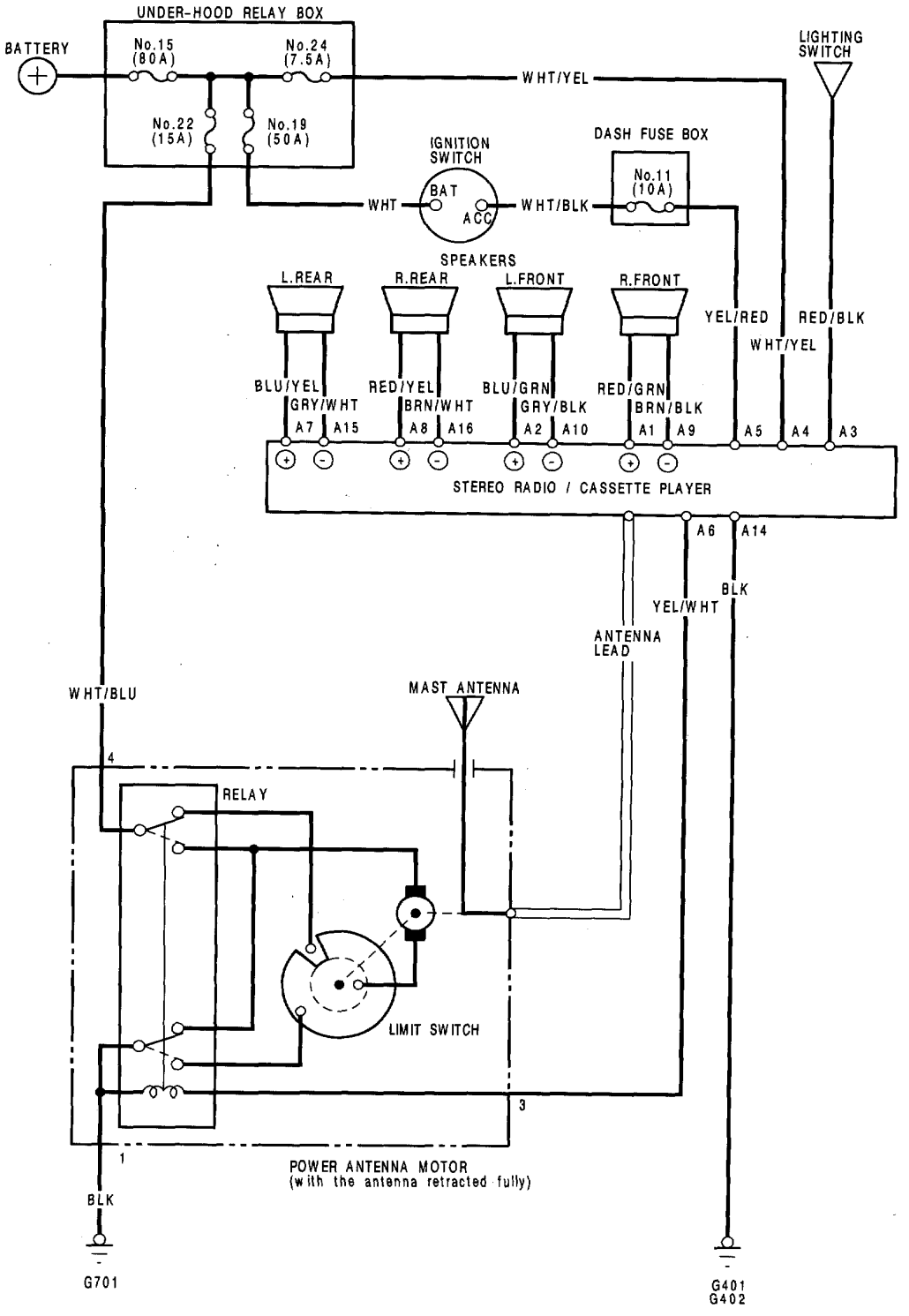
Stereo Sound System

Component Location Index

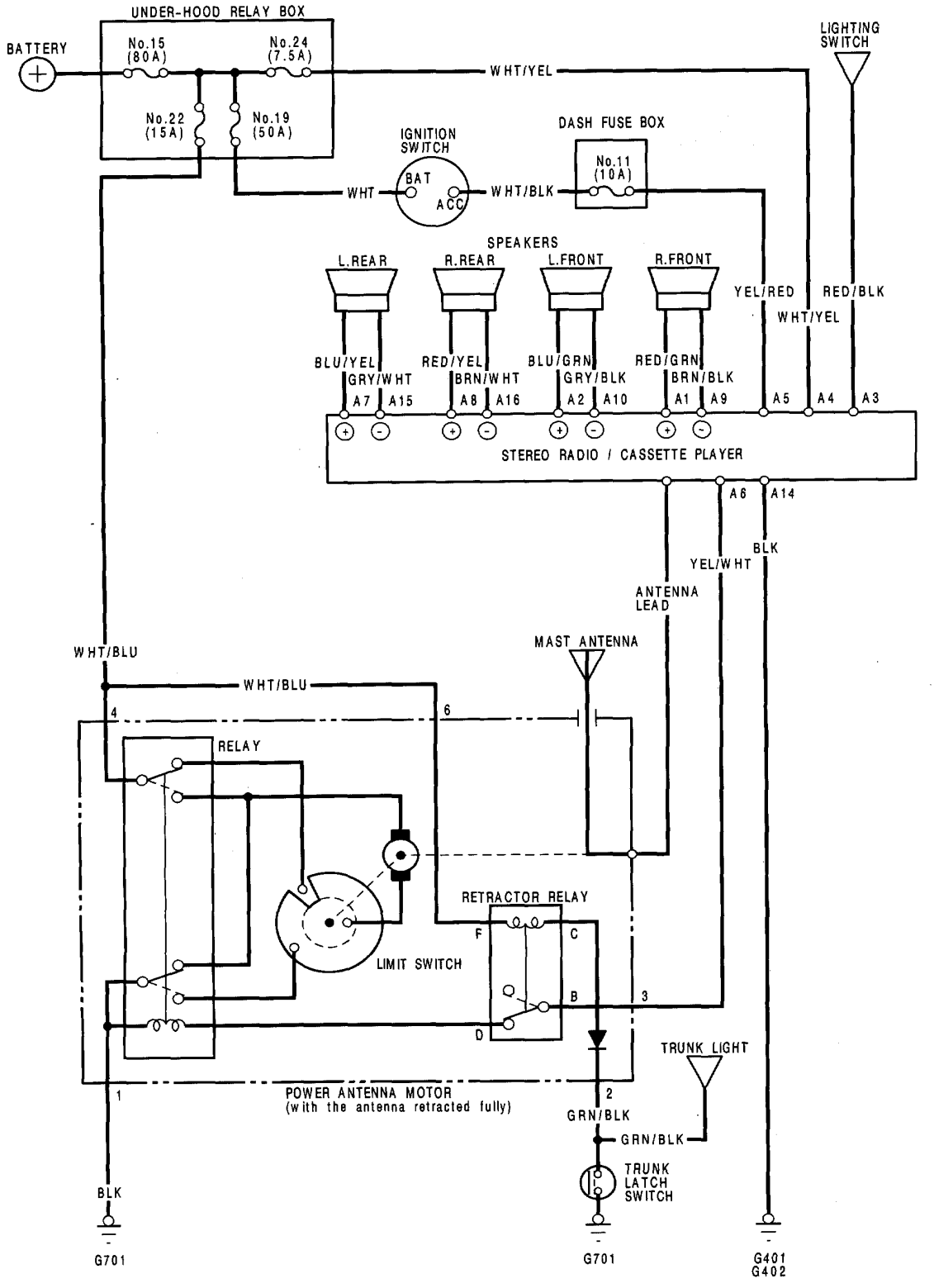


Stereo Sound System

Circuit Diagram (Except KE model)



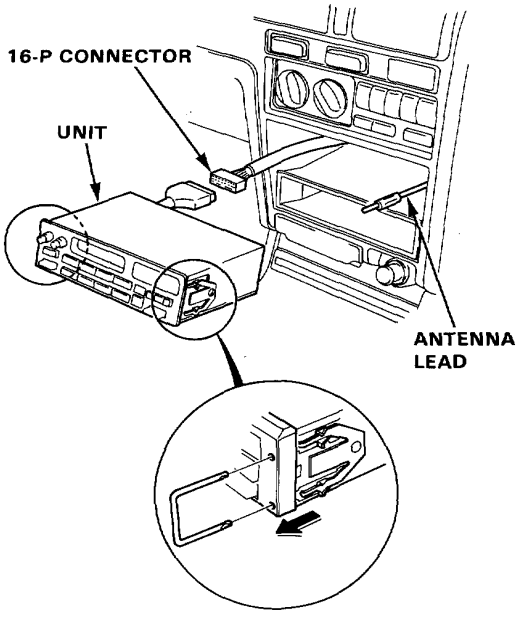
Circuit Diagram (KE model only)



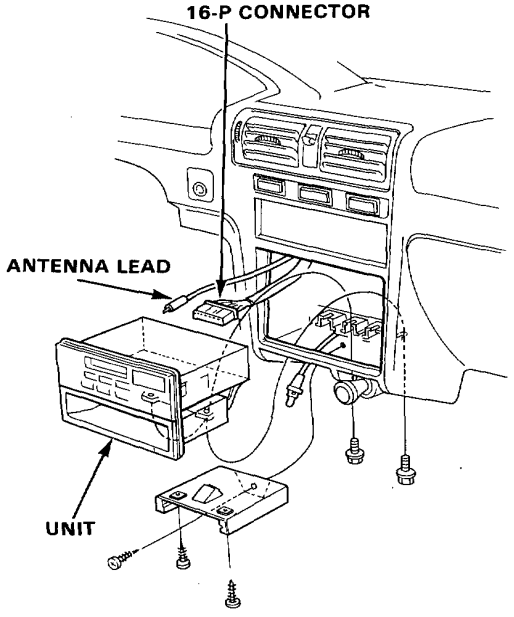
Stereo Sound System

Unit Removal

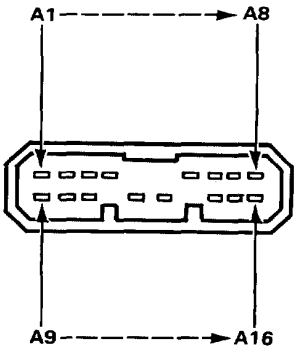
A-Type:
Remove the needle remover to pull out the unit.



B-Type:
1. Remove the floor console.
2. Remove the 3 screws and ashtray.
3. Loosen the 3 screws and pull out the unit.
4. Disconnect the 16-P connector and antenna lead, then remove the unit.



Unit Terminals



Terminal (Wire color)	Destination
A1 (RED/GRN)	Right front speaker ⊕
A2 (BLU/GRN)	Left front speaker ⊕
A3 (RED/BLK)	Light-on signal
A4 (WHT/YEL)	Constant power (Tuning memory)
A5 (YEL/RED)	ACC (Main stereo power supply)
A6 (YEL/WHT)	Radio switched power (To antenna)
A7 (BLU/YEL)	Left rear speaker ⊕
A8 (RED/YEL)	Right rear speaker ⊕
A9 (BRN/BLK)	Right front speaker ⊖
A10 (GRY/BLK)	Left front speaker ⊖
A11 (—)	(Not used)
A12 (—)	(Not used)
A13 (—)	(Not used)
A14 (BLK)	Ground (G401, G402)
A15 (GRY/WHT)	Left rear speaker ⊖
A16 (BRN/WHT)	Right rear speaker ⊖

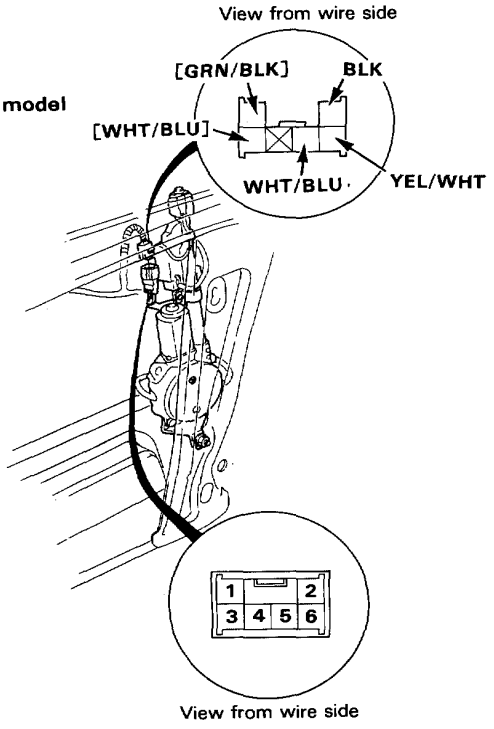
Power Antenna Motor Test

1. Remove the trunk side trim panel.
2. Disconnect the 6-P connector from the motor and remove the connector from its clamp.
3. First check power to the motor at the harness pins: There should be battery voltage between the WHT/BLU (+) and BLK (−) terminals all the time. There should be battery voltage between the YEL/WHT (+) and BLK (−) terminals only with the ignition and radio switched ON.
4. Test motor operation:

   FULL EXTEND: Connect battery positive to the No.3 and No.4 terminals and negative to the No.1 terminal.

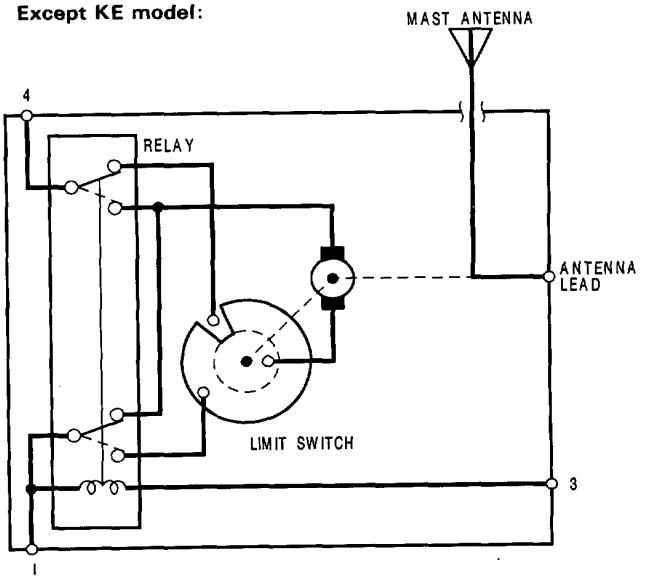
   RETRACTED: **Except KE model:**
   Then disconnect battery positive from the No.3 terminal.
   KE model only:
   Short the No.2 terminal to the No.1 terminal, then connect battery positive to the No.6 terminal and negative to the No.1 terminal.

[ ]: KE model

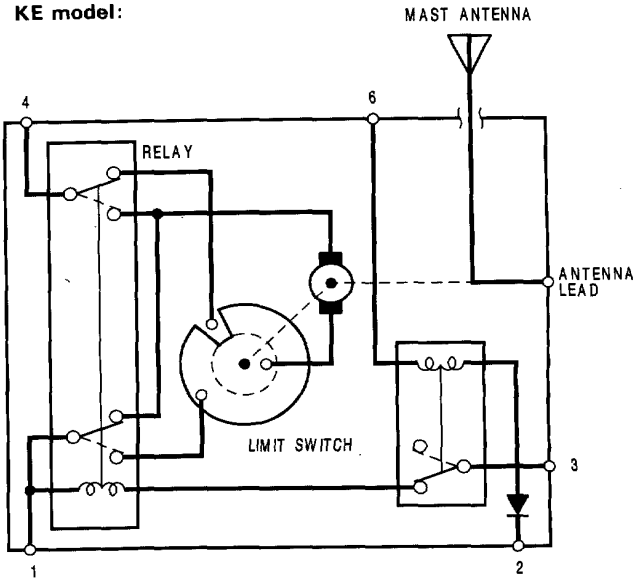


5. If the motor fails to operate properly, replace it.

Except KE model:

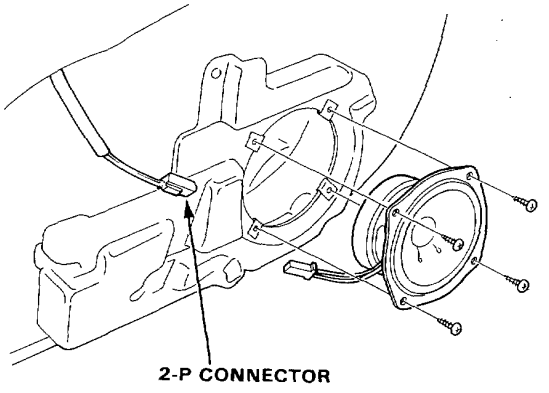


KE model:



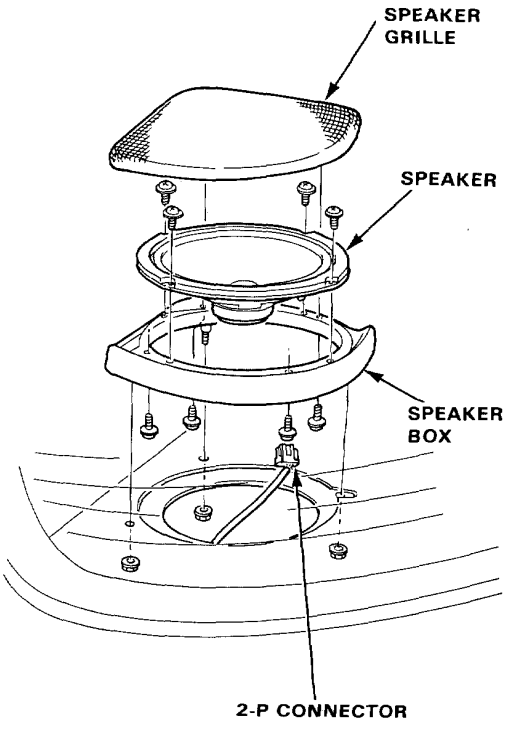
Front Speaker Replacement

1. Remove the speaker grille from the door trim panel.
2. Remove the screws, then disconnect the wires or 2-P connector from the speaker.



Rear Speaker Replacement

1. Open the trunk lid, then remove the 3 nuts.
2. Disconnect the 2-P connector from the speaker assembly.
3. Remove the speaker grille and speaker from the speaker box.

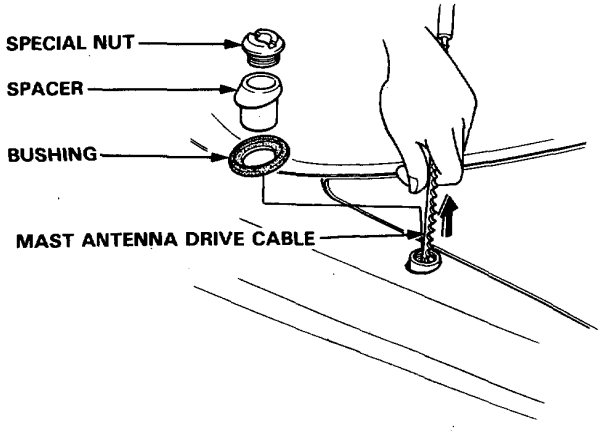


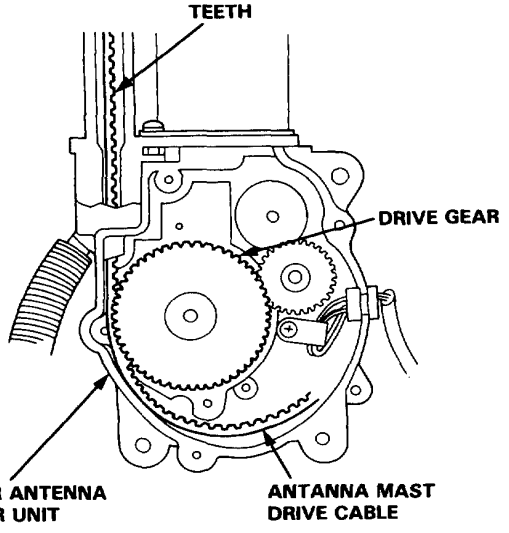
Mast Antenna Replacement

Removal

NOTE: The antenna mast alone can be replaced without having to remove the power antenna motor unit.

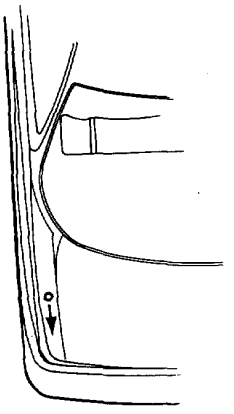
1. Remove the special nut, spacer and bushing.
2. Carefully withdraw the antenna mast while extending it by turning the radio switch "ON".





Installation

1. Carefully direct the teeth of antenna mast drive cable as shown, and insert the drive cable into the antenna housing.

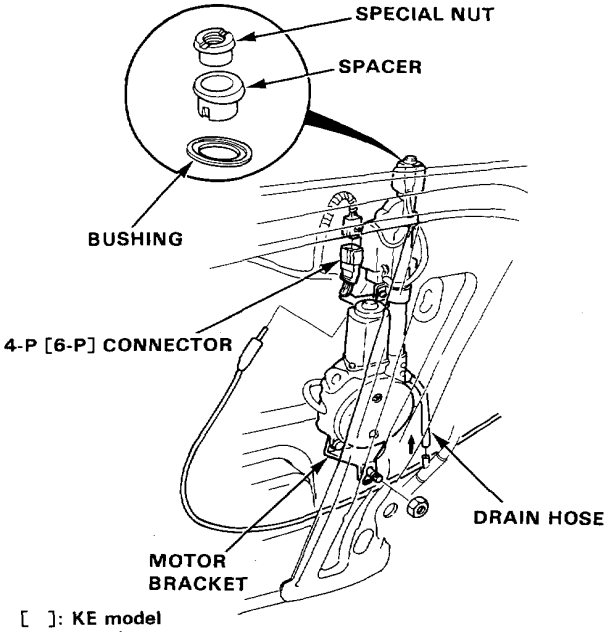


Direction of the teeth.

2. Check for engagement of the cable teeth to the drive gear; by carefully moving the cable up and down.
3. Turn the radio switch "OFF", and let the motor pull the drive cable inside the antenna housing.
4. Insert the antenna mast into the antenna housing, and install the bushing and spacer, tighten the special nut.
5. Check that the mast antenna retracts and extends fully when the radio switch is turned ON and OFF repeatedly.

Power Antenna Motor Replacement

1. Remove the trunk side trim panel.
2. Disconnect the 4-P [6-P] connector and antenna lead from the motor, then remove the special nut and mounting nuts to take out the motor with the mast antenna.



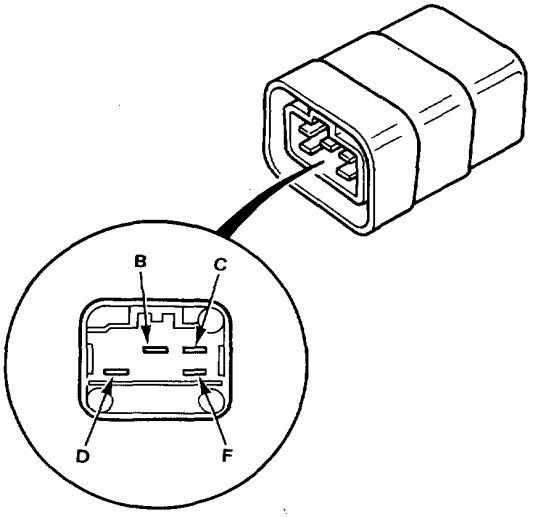
[ ]: KE model

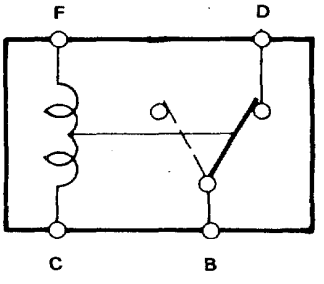
3. Install in the reverse order of removal.

NOTE: Tighten the special nut, and then tighten mounting nuts to motor bracket.

Retractor Relay Test

1. Remove the relay from the motor antenna.
2. There should be no continuity between the B and D terminals when the battery is connected to the C and F terminals.
   There should be continuity when the battery is disconnected.





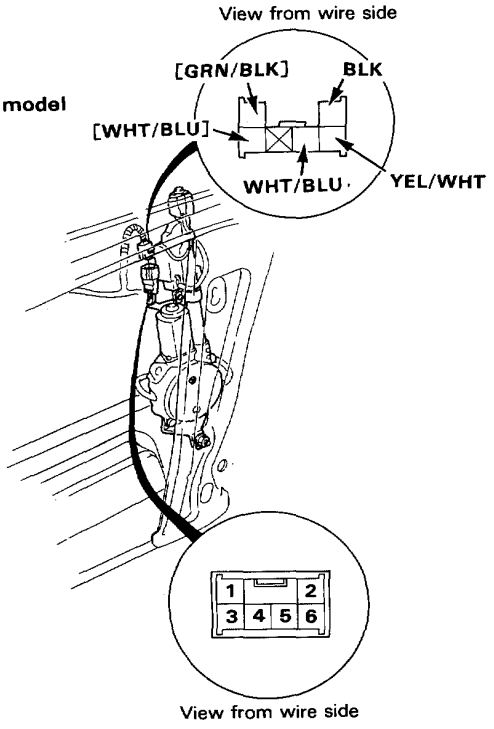
Power Antenna Motor Test

1. Remove the trunk side trim panel.
2. Disconnect the 6-P connector from the motor and remove the connector from its clamp.
3. First check power to the motor at the harness pins: There should be battery voltage between the WHT/BLU (+) and BLK (−) terminals all the time. There should be battery voltage between the YEL/WHT (+) and BLK (−) terminals only with the ignition and radio switched ON.
4. Test motor operation:

   FULL EXTEND: Connect battery positive to the No.3 and No.4 terminals and negative to the No.1 terminal.

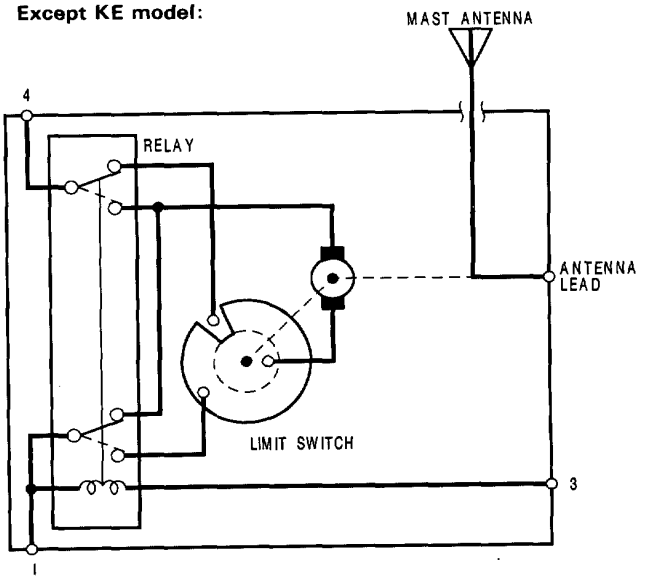
   RETRACTED: **Except KE model:**
   Then disconnect battery positive from the No.3 terminal.
   KE model only:
   Short the No.2 terminal to the No.1 terminal, then connect battery positive to the No.6 terminal and negative to the No.1 terminal.

[ ]: KE model

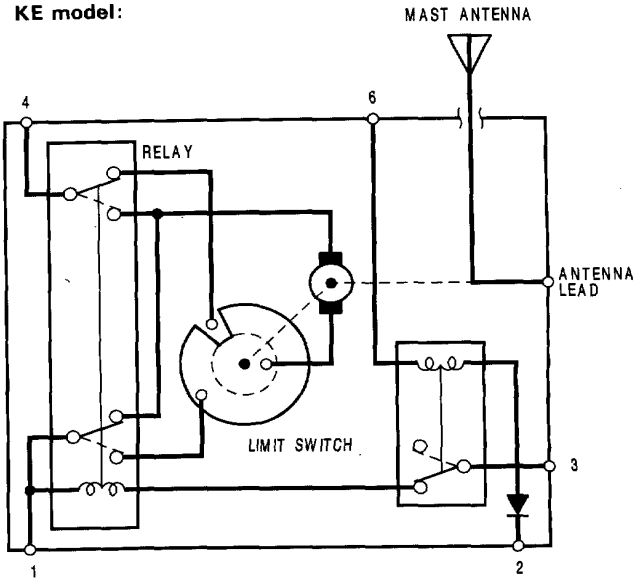


5. If the motor fails to operate properly, replace it.

Except KE model:



KE model:

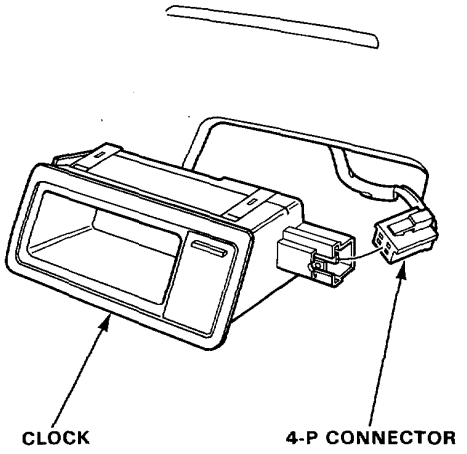


Clock

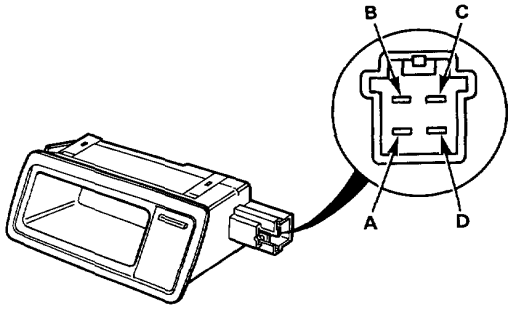
Removal

1. Pry out the clock from the dashboard, then disconnect the 4-P connector.

   NOTE: Be careful not to damage the clock or the dashboard when prying out the clock.



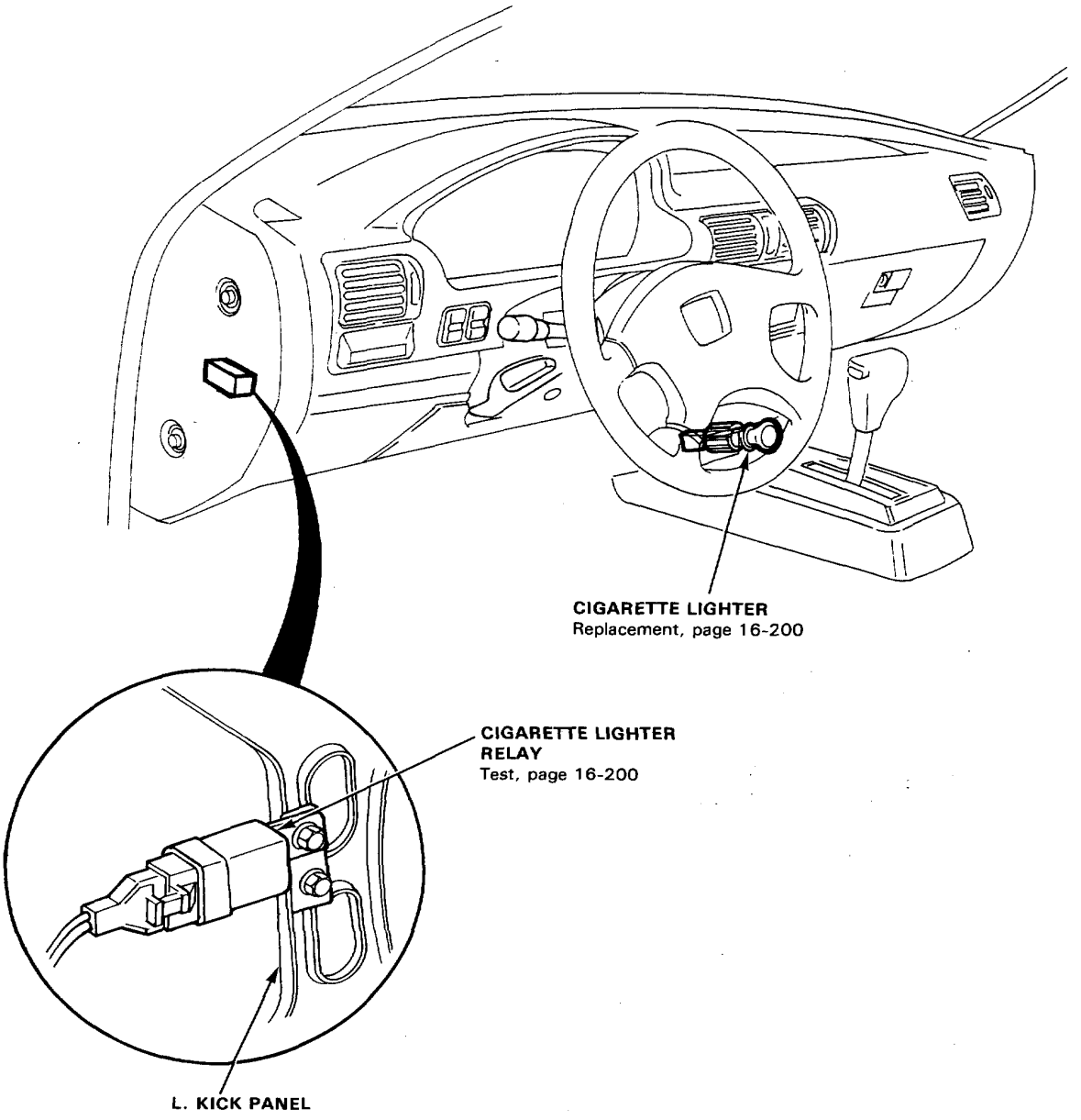
Terminals:



Terminal	Wire	Destination
A	RED/BLK	Light-on signal
B	BLK	Ground
C	YEL	IG1 (Main clock power supply)
D	WHT/YEL	Constant power (Time memory)

Cigarette Lighter

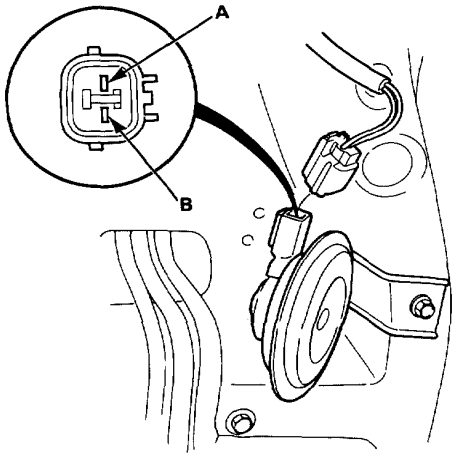
Component Location Index



Horns

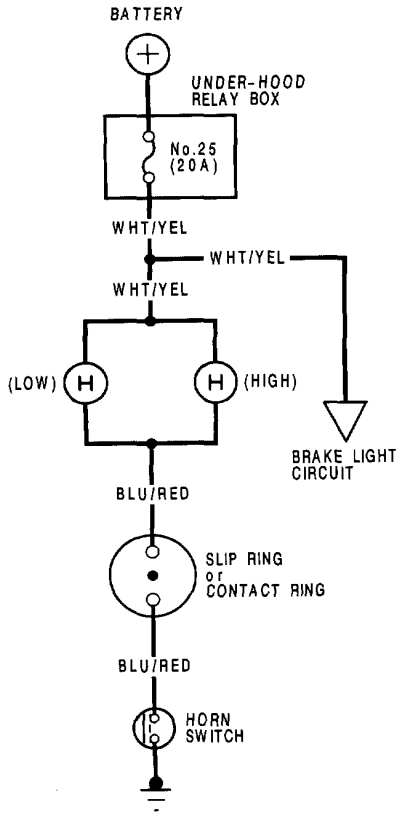
Test

1. Remove the front bumper.
2. Disconnect the 2-P connector from the horn.
3. Test the horn by connecting battery voltage to the A and B terminals. The horn should sound.
4. If the horn fails to sound, replace it.



Horn Circuit:

- Slip Ring Test, see page 16-262.

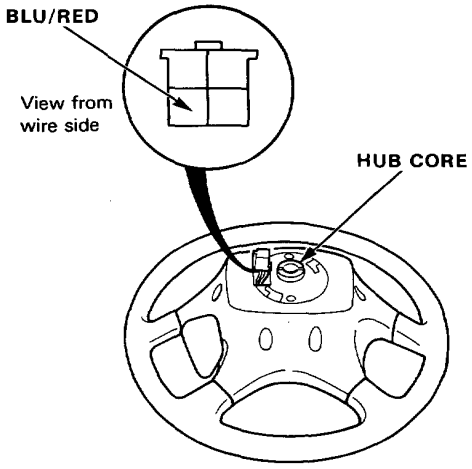


Switch Test

1. Remove the steering wheel, then turn it over.
2. Check for continuity between the hub core and the contact ring, or the hub core and the BLU/RED lead for cars equipped with cruise control, according to the table.

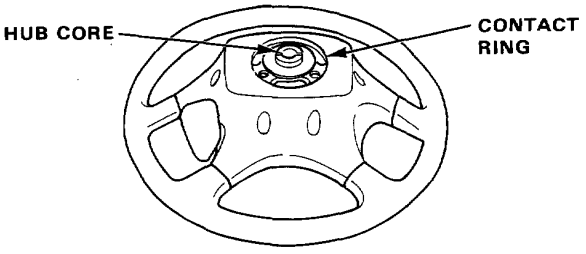
With Cruise Control:

Terminal / Position	HUB CORE	BLU/RED
PRESS	○———	———○
FREE		



Without Cruise Control:

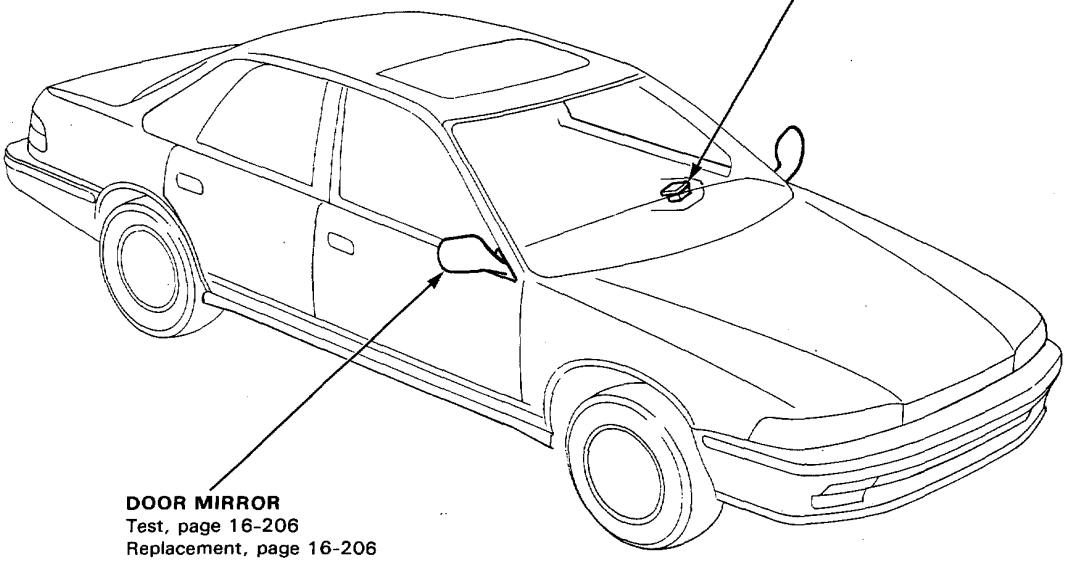
Terminal / Position	HUB CORE	CONTACT RING
PRESS	○———	———○
FREE		



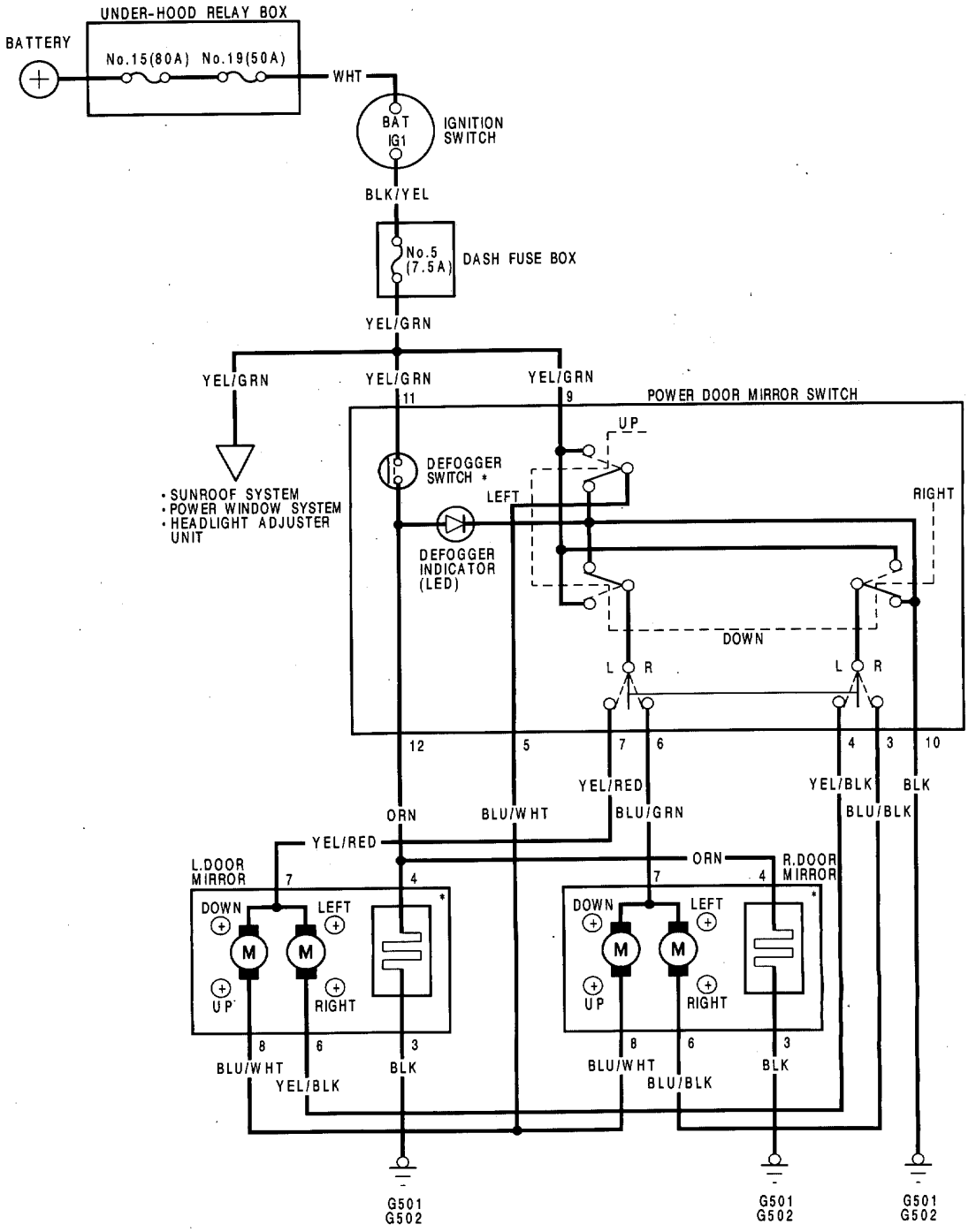
3. If OK, reinstall the steering wheel, then test the combination switch.

Power Door Mirrors

Component Location Index



Circuit Diagram



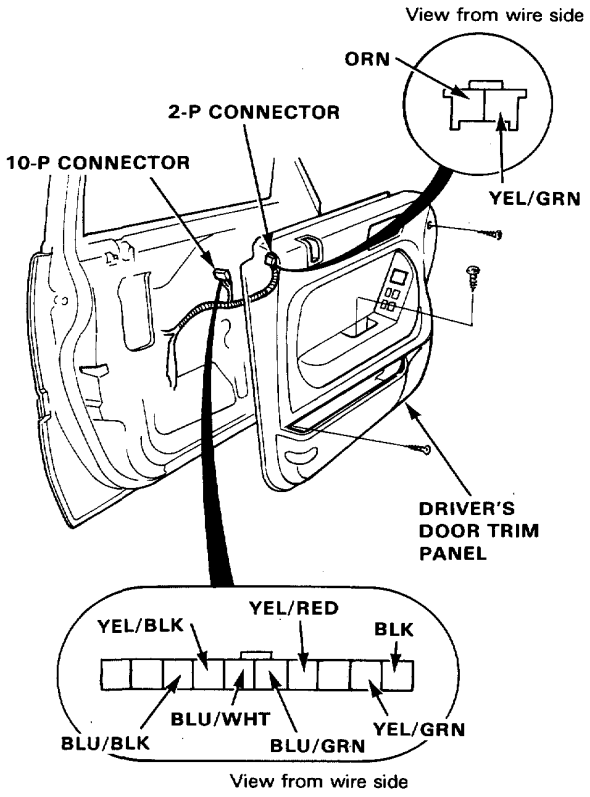
* : KS,KW,KE and KX models

Power Door Mirrors

Function Test

NOTE: Before testing, remove the driver's door trim panel, then disconnect all of the connectors from the door trim panel.

KS, KW, KE and KX models:



Mirror Test

NOTE: Check the No.5 (7.5 A) fuse in the dash fuse box before testing.

One or both inoperative:

1. Check for voltage between the YEL/GRN terminal and body ground with the ignition switch ON.
   There should be battery voltage.
   - If there is no voltage, check for an open in the YEL/GRN wire.
   - If there is battery voltage, go to step 2.
2. Check for continuity between the BLK terminal and body ground.
   There should be continuity.
   - If there is no continuity, check for
     — An open in the BLK wire.
     — Poor ground (G501, G502).

Left inoperative:

Connect the YEL/GRN terminal to the YEL/RED terminal and the BLU/WHT (or YEL/BLK) terminal to the body ground with jumper wires.
The left mirror should tilt down (or swing left) when the ignition switch is turned ON.

- If the mirror does not tilt down (or does not swing left), remove the left door trim panel and check for open in the BLU/WHT (or YEL/BLK) wire between the left door mirror and switch.
  If the wire is OK, check the left door mirror.
- If the mirror neither tilts down nor swings left, repair the YEL/RED wire.
- If the mirror operates properly, check the mirror switch.

Right inoperative:

Connect the YEL/GRN terminal to the BLU/GRN terminal and the BLU/WHT (or BLU/BLK) terminal to the body ground with jumper wires.
The right mirror should tilt down (or swing left) when the ignition switch is turned ON.

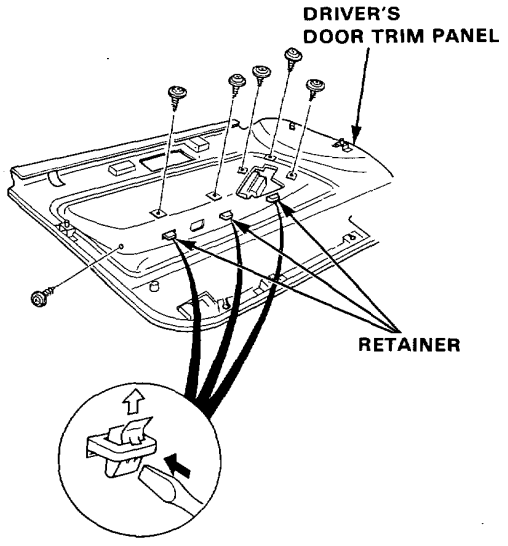
- If the mirror does not tilt down (or does not swing left), remove the right door trim panel and check for open in the BLU/WHT (or BLU/BLK) wire between the right door mirror and the switch.
  If the wire is OK, check the right door mirror.
- If the mirror neither tilts down nor swings left, repair the BLU/GRN wire.
- If the mirror operates properly, check the mirror switch.

Defogger Test
(KS, KW, KE and KX models)

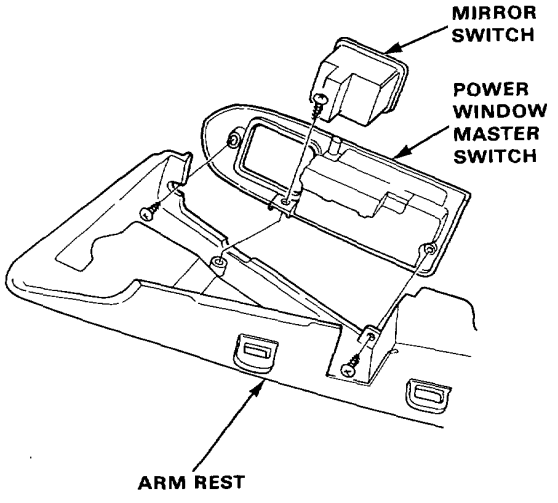
1. Check for voltage between the YEL/GRN terminal of the 2-P connector and body ground with the ignition switch ON.
   There should be battery voltage.
   - If there is no voltage, check for open in the YEL/GRN wire between the dash fuse box and the defogger switch.
   - If there is battery voltage, go to step 2.
2. Connect the YEL/GRN terminal of the 2-P connector to the ORN terminal with a jumper wire.
   Both the right and left mirrors should gradually warm up when the ignition switch is turned ON.
   - If neither warm up, repair the ORN wire.
   - If only one fails to warm up, check its mirror defogger element (see page 16-205).
   - If both warm up, check the switch.

Switch Removal

1. Remove the driver's door trim panel, then disconnect all of the connectors from the door trim panel.
2. Remove the arm rest from the door trim panel by removing the retainer and the screws.



3. Remove the power window master switch from the arm rest by removing three screws.
4. Push out the switch from the reverse side of the power window master switch.



Switch Test

1. Remove the power door mirror switch from the power window master switch.
2. Check for continuity between the terminals in each switch position according to the table.

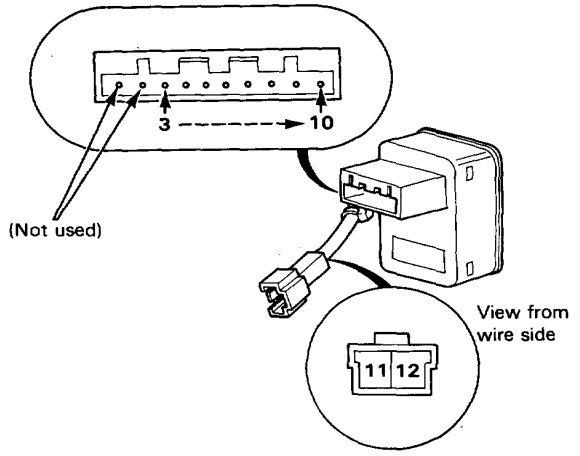
Mirror Switch

	Position \ Terminal	3	4	5	6	7	9	10
R	OFF	○		○	○			○
	UP			○			○	
	DOWN	○			○		○	
	LEFT			○	○		○	
	RIGHT	○					○	
L	OFF		○	○		○		○
	UP			○			○	
	DOWN		○			○	○	
	LEFT			○		○	○	
	RIGHT		○				○	

Defogger Switch
(KS, KW, KE and KX models)

Position \ Terminal	11	12		10
OFF		○	(H)	○
ON	○	○	(H)	○

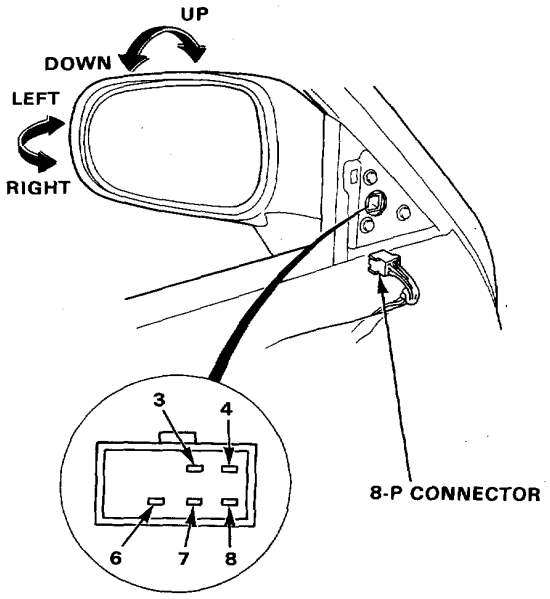
(Internal connection)



Power Door Mirrors

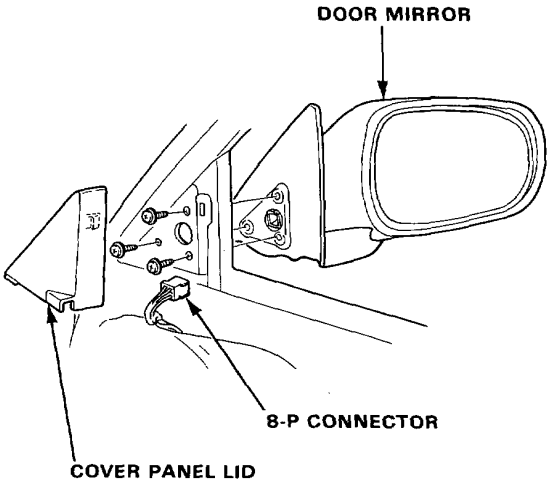
Door Mirror Test

1. Carefully pry out the cover panel lid, then disconnect the 8-P connector from the mirror.
2. Test actuator operation:
   - TILT UP: Connect battery positive to the No.8 terminal and negative to the No.7 terminal.
   - TILT DOWN: Connect battery positive to the No.7 terminal and negative to the No.8 terminal.
   - SWING LEFT: Connect battery positive to the No.7 terminal and negative to the No.6 terminal.
   - SWING RIGHT: Connect battery positive to the No.6 terminal and negative to the No.7 terminal.
3. If the mirror fails to operate properly, replace it.



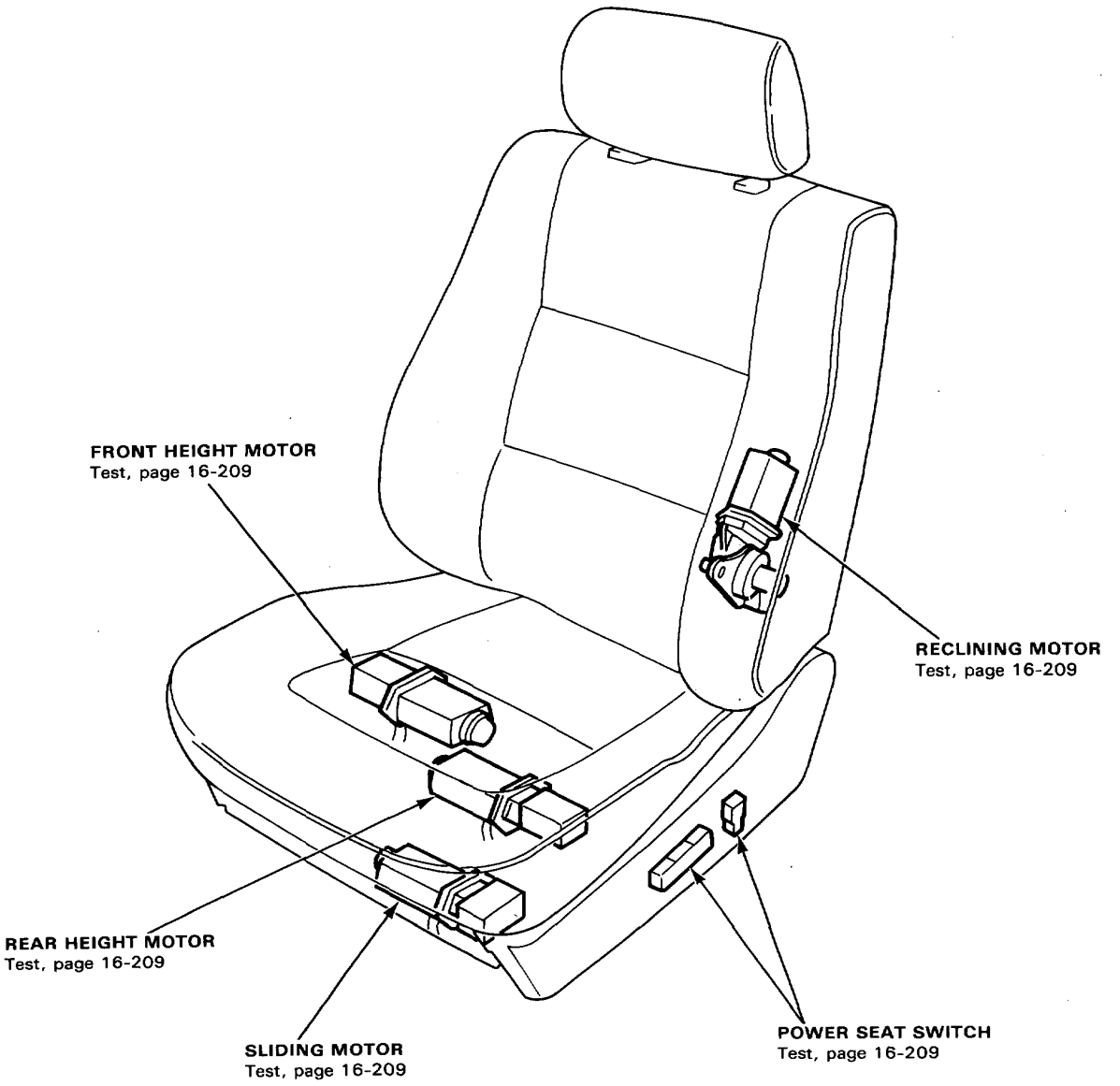
Door Mirror Replacement

1. Carefully pry out the cover panel lid.
2. Disconnect the 8-P connector from the mirror.
3. While holding the mirror with one hand, remove its mount screws with the other.



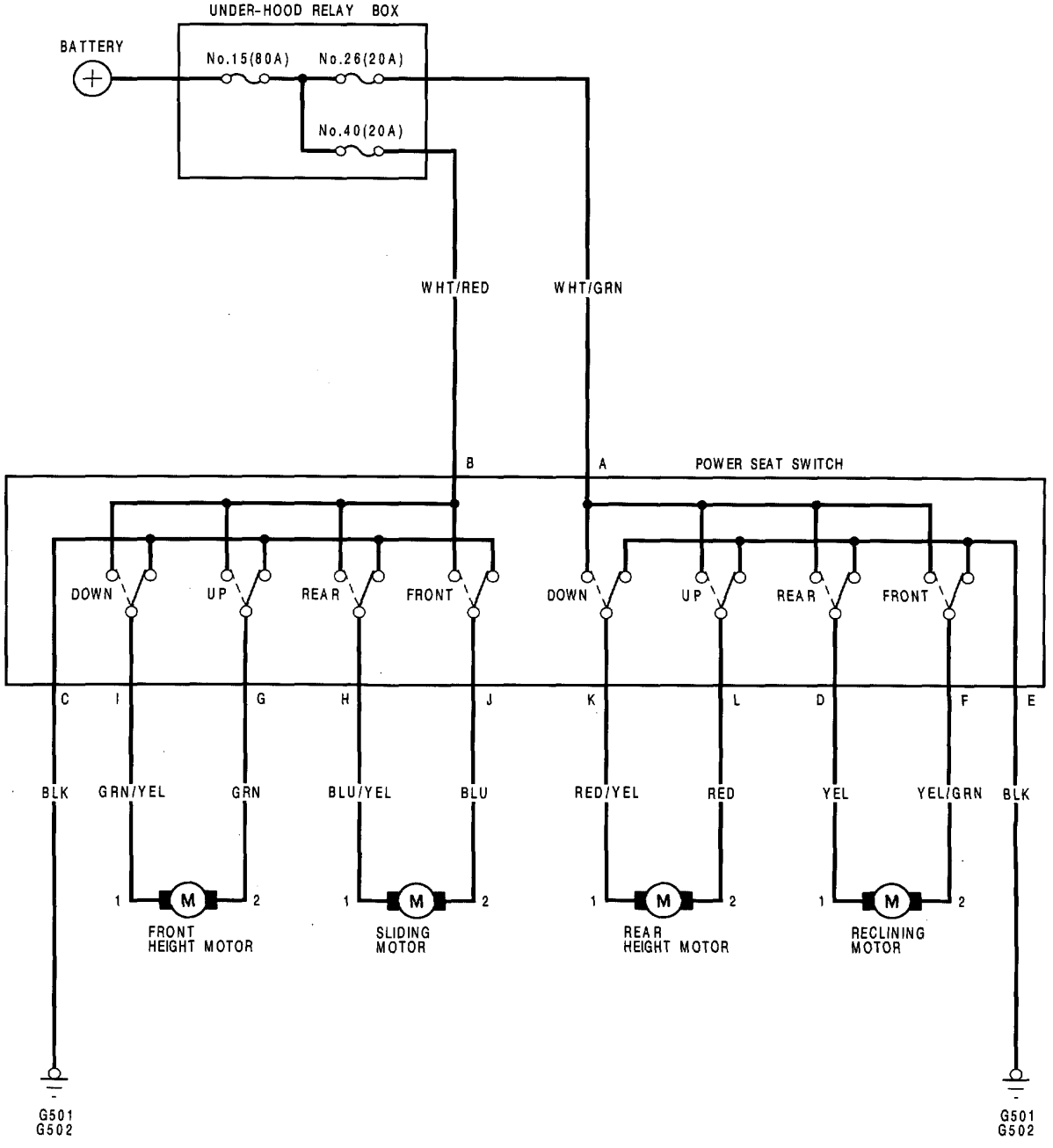
Power Seat

Component Location Index



Power Seat

Circuit Diagram

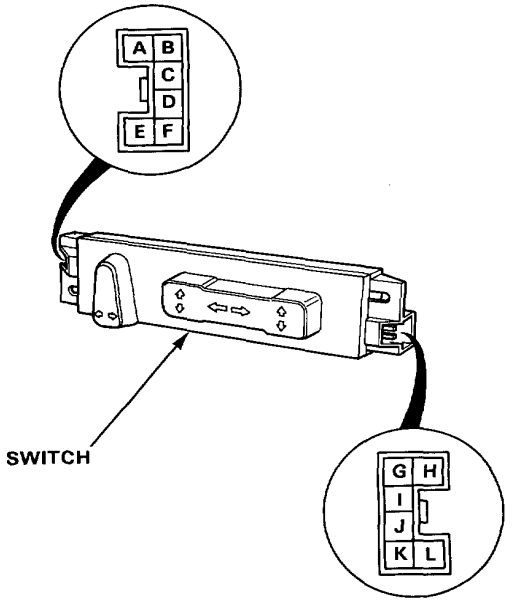


Switch Test

CAUTION: Be careful not to damage the seats, the *interior* trims or the body.

1. Remove the driver's seat, then disconnect the 6-P connectors.
2. Check for *continuity between the terminals in each* switch position according to the table.

Position \ Terminal		A	B	C	D	E	F	G	H	I	J	K	L
SLIDING SWITCH	FOR-WARD		○								○		
	BACK-WARD		○						○				
RECLIN-ING SWITCH	FOR-WARD	○					○						
	BACK-WARD	○			○								
FRONT HEIGHT SWITCH	UP		○					○					
	DOWN		○							○			
REAR HEIGHT SWITCH	UP	○											○
	DOWN	○										○	

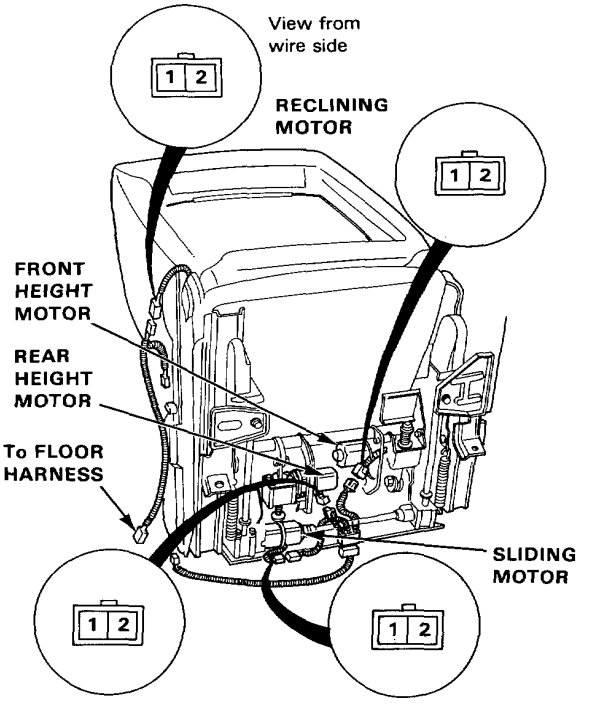


Motor Test

CAUTION: Be careful not to damage the seats, the interior trims or the body.

1. Remove the driver's seat, then disconnect the 2-P connector from the motor.
2. Test motor operation by connecting battery voltage to the No.1 and No.2 terminals.
   Test the motor in each direction by switching the leads from the battery.

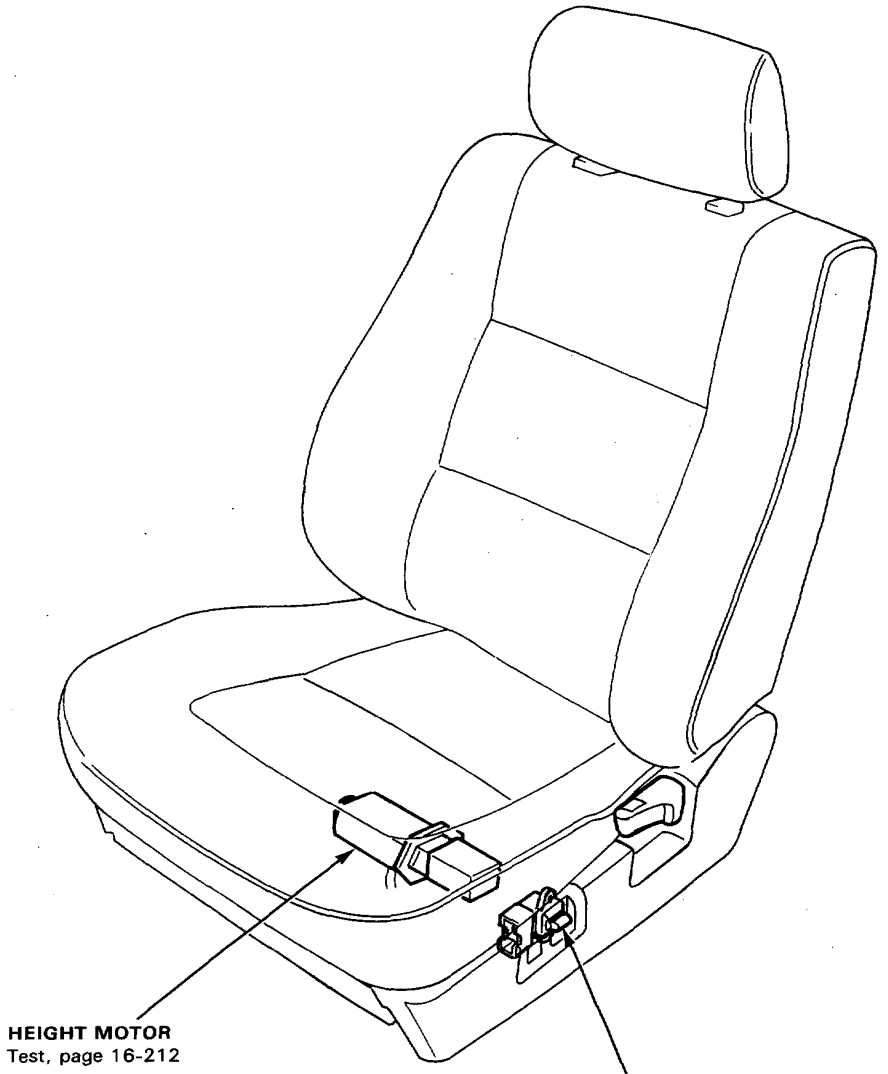
CAUTION: When a motor stops running, disconnect a battery terminal immediately.



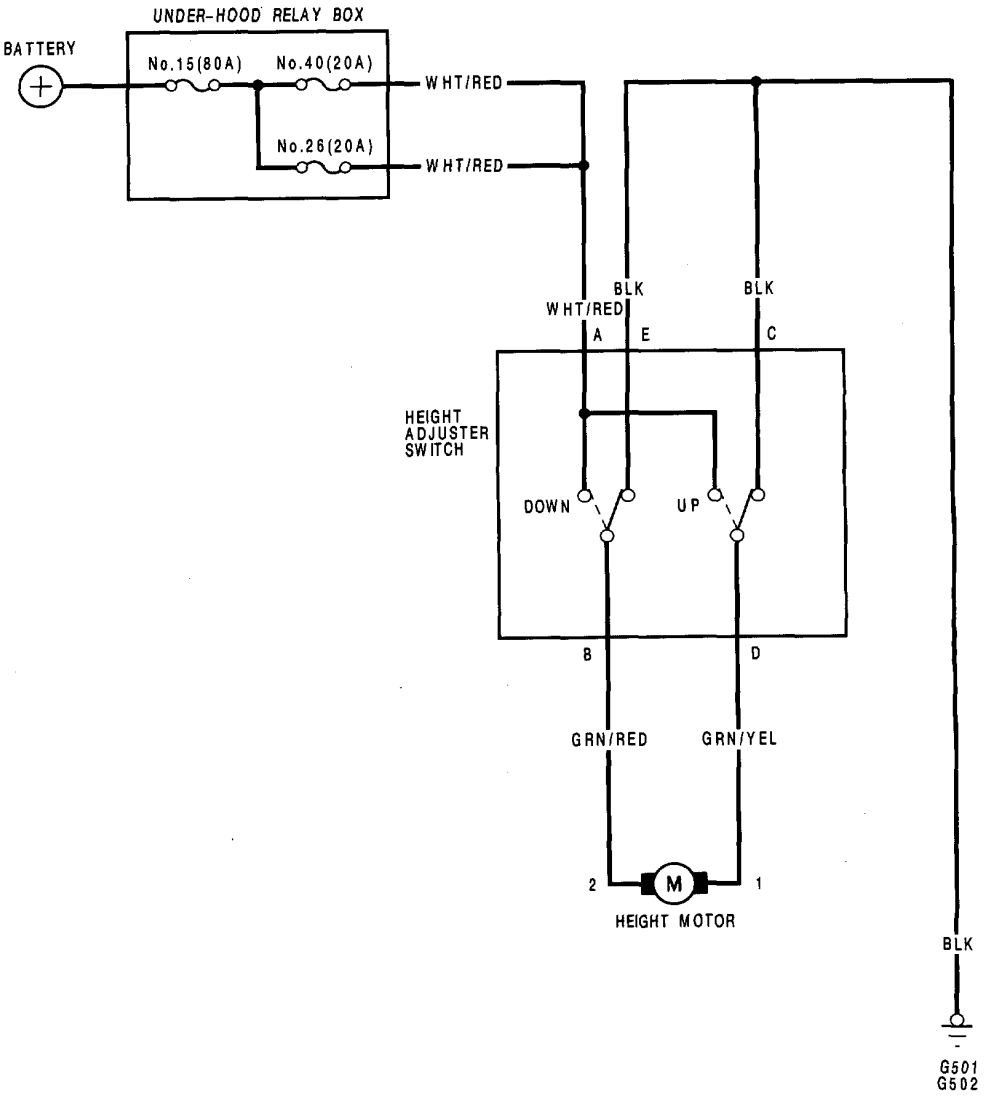
View from wire side

Power Seat (Height Adjuster)

Component Location Index



Circuit Diagram



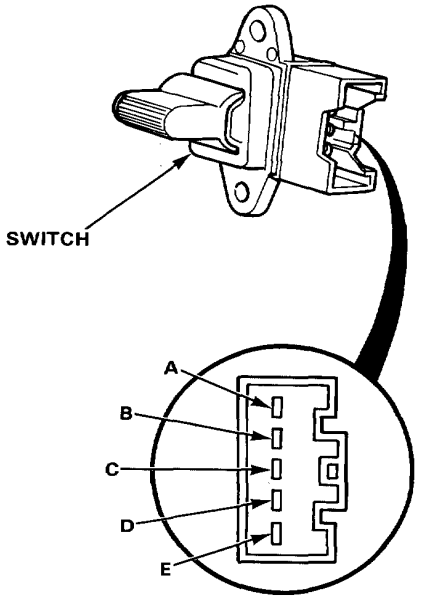
Power Seat (Height Adjuster)

Switch Test

CAUTION: Be careful not to damage the seats, the interior trims or the body.

1. Remove the driver's seat, then disconnect the 5-P connector from the switch.
2. Check for continuity between the terminals in each switch position according to the table.

Position \ Terminal		A	B	C	D	E
SWITCH	UP	○			○	
	DOWN	○	○			

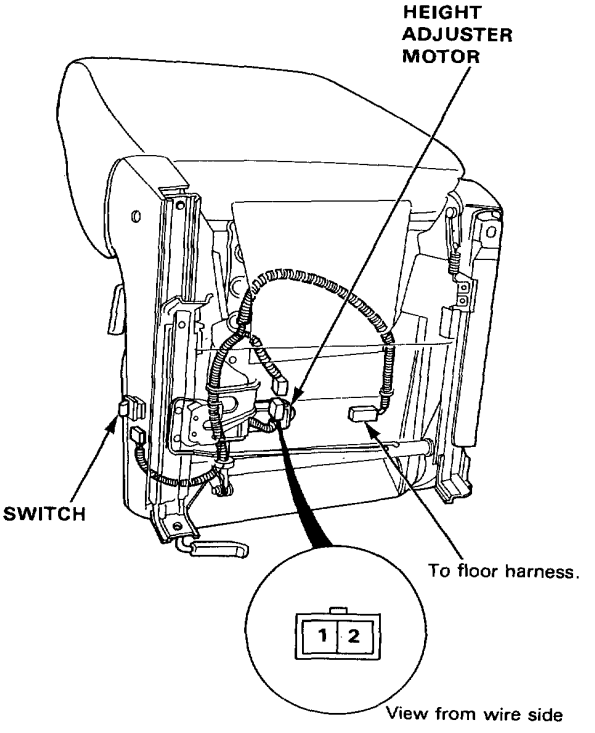


Motor Test

CAUTION: Be careful not to damage the seats, the interior trims or the body.

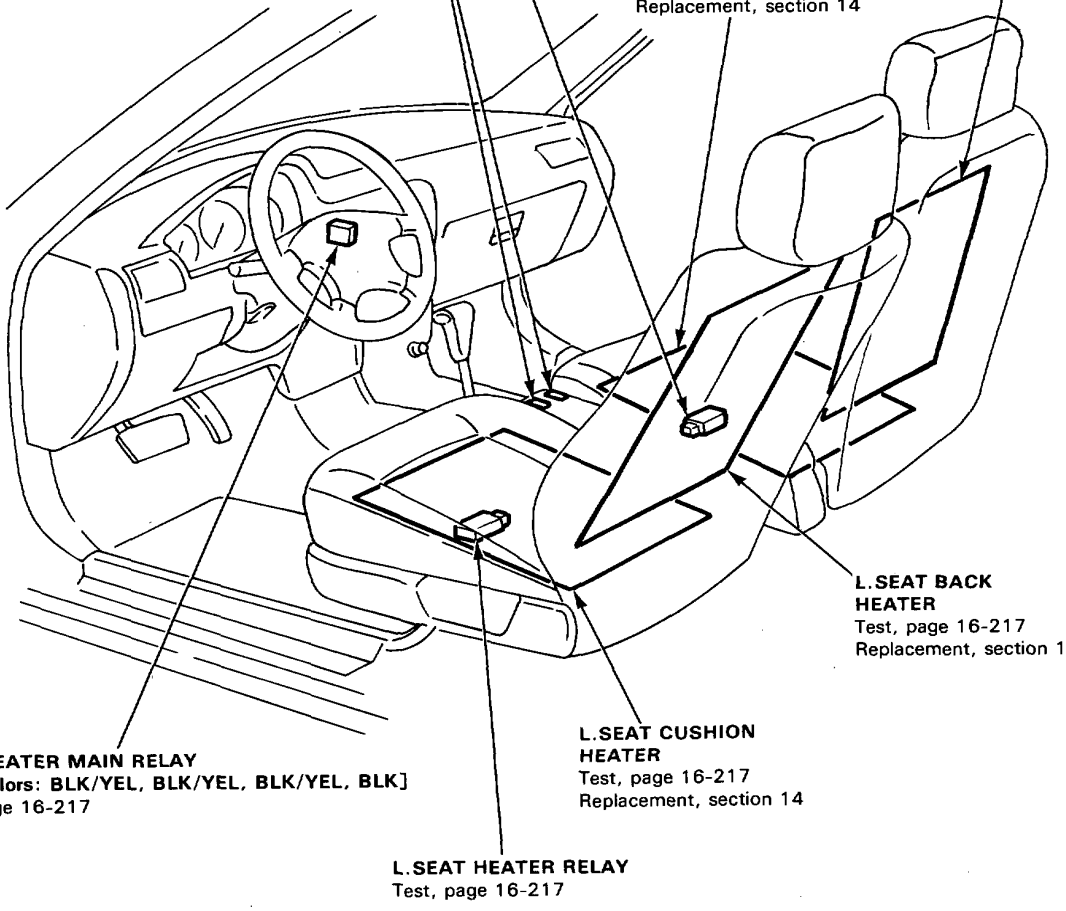
1. Remove the driver's seat, then disconnect the 2-P connector from the motor.
2. Test motor operation by connecting battery voltage to the No.1 and No.2 terminals.
   Test the motor in each direction by switching the leads from the battery.

CAUTION: When a motor stops running, disconnect a battery terminal immediately.



Seat Heaters

Component Location Index

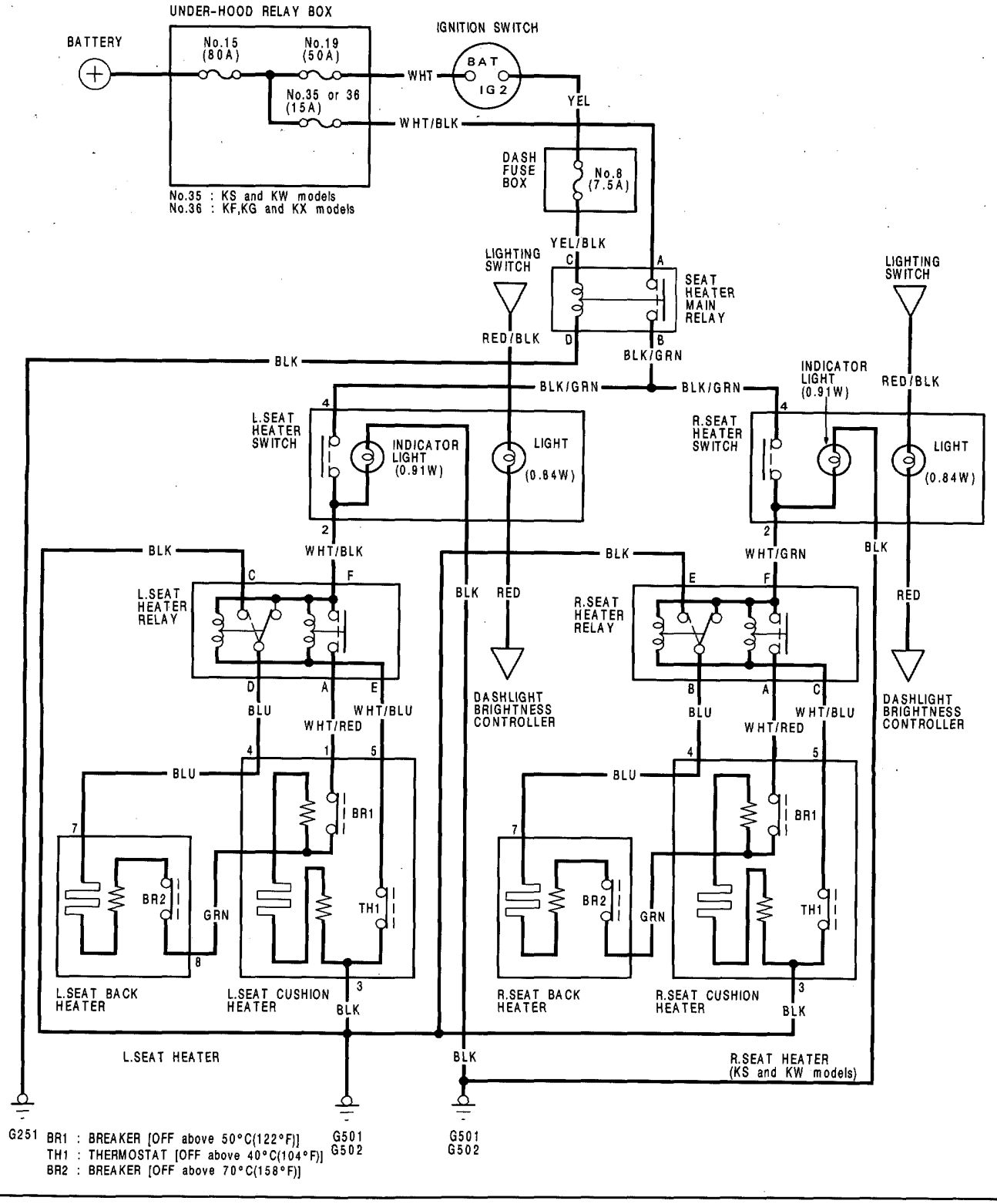


Description

Two heaters are provided in each front seat; one in the seat cushion and one in the seat back. In normal use, temperature is automatically controlled by the thermostat [OFF above 40°C (104°F)] built in each seat cushion heater. In emergency case, the breaker 1 [OFF above 50°C (122°F)] and the breaker 2 [OFF above 70°C (158°F)] cut off the circuit to prevent abnormal temperature rise.

Seat Heaters

Circuit Diagram



Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

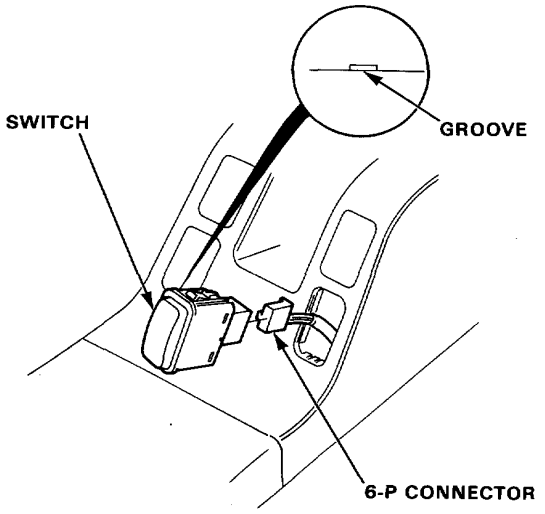
Symptom \ Item to be inspected		Blown No.35 (15 A) or No.36 (15 A) fuses (in the under-hood relay box)	Blown No.8 (7.5 A) fuse (in the dash fuse box)	Blown indicator light bulb	Seat heater switch	Seat heater	Seat heater relay input	Poor ground	Open circuit in wires or loose or disconnected terminals
Seat heaters operate, but indicator light does not go on.				1				G501 G502	
Seat heaters do not operate and indicator light does not go on.		1			2			G251 G501 G502	YEL/BLK, WHT/BLK
Seat heaters do not operate, but indicator light goes on.	Left and Right seat						1	G501 G502	WHT/BLK, WHT/GRN, BLU, WHT/RED, WHT/BLU
Seat cushion heater or seat back heater does not operate, but indicator light goes on.						1			

No.35 (15 A): KS and KW models
No.36 (15 A): KF, KG and KX models

Seat Heaters

Switch Removal

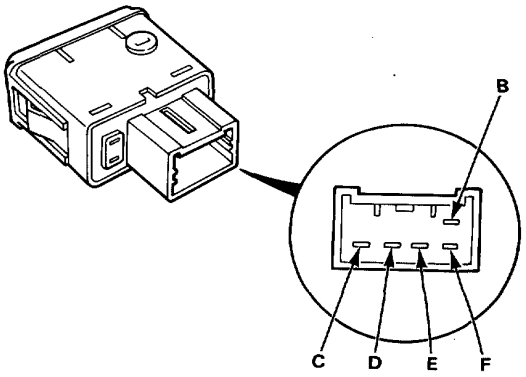
1. Pry out the switch from the floor console.
2. Disconnect the 6-P connector to remove the switch.

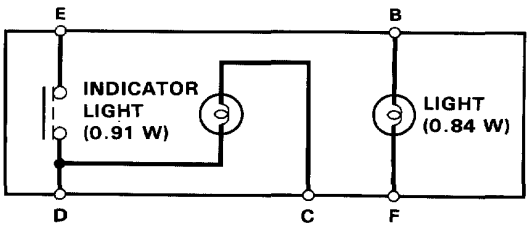


Switch Test

1. Pry out the seat heater switch from the floor console.
2. Check for continuity between the terminals according to the table.

Terminal / Position	C		D	E	B		F
ON	○	⌒	○	○	○	⌒	○
OFF	○	⌒	○		○	⌒	○

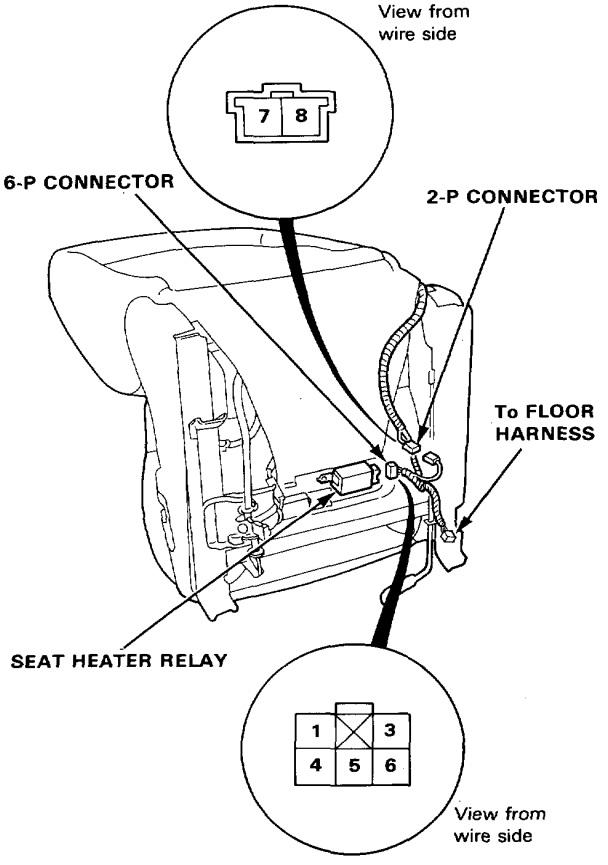




Heater Test

1. Disconnect the 6-P connector and 2-P connector as shown below.

   NOTE: Left front seat is shown. Right front seat is similar.



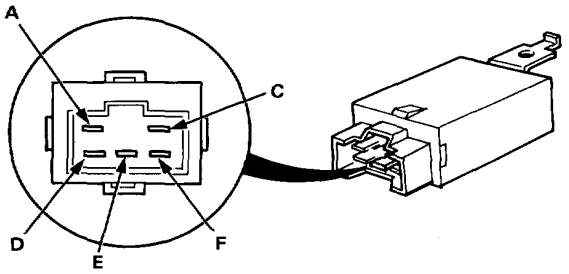
2. Check for continuity between the No.1 and No.5 terminals; between the No.7 and No.8 terminals (R x 10^3 scale)
   There should be continuity.

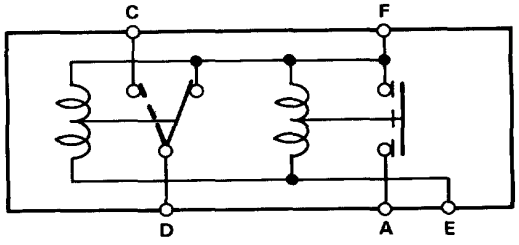
Relay Test

Heater relay:

1. Remove the driver's seat, then remove the relay from the bottom of the seat.

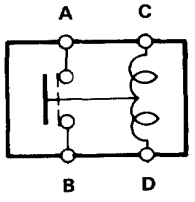
2. There should be continuity between the F and A; between C and D terminals when the battery is connected across the F and E terminals.
   There should be continuity between the F and D terminals when the battery is disconnected.

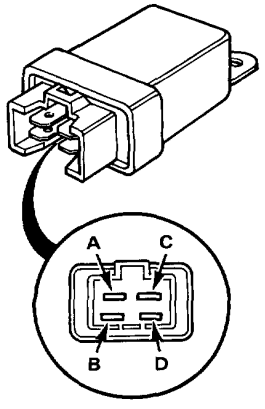




Main relay:

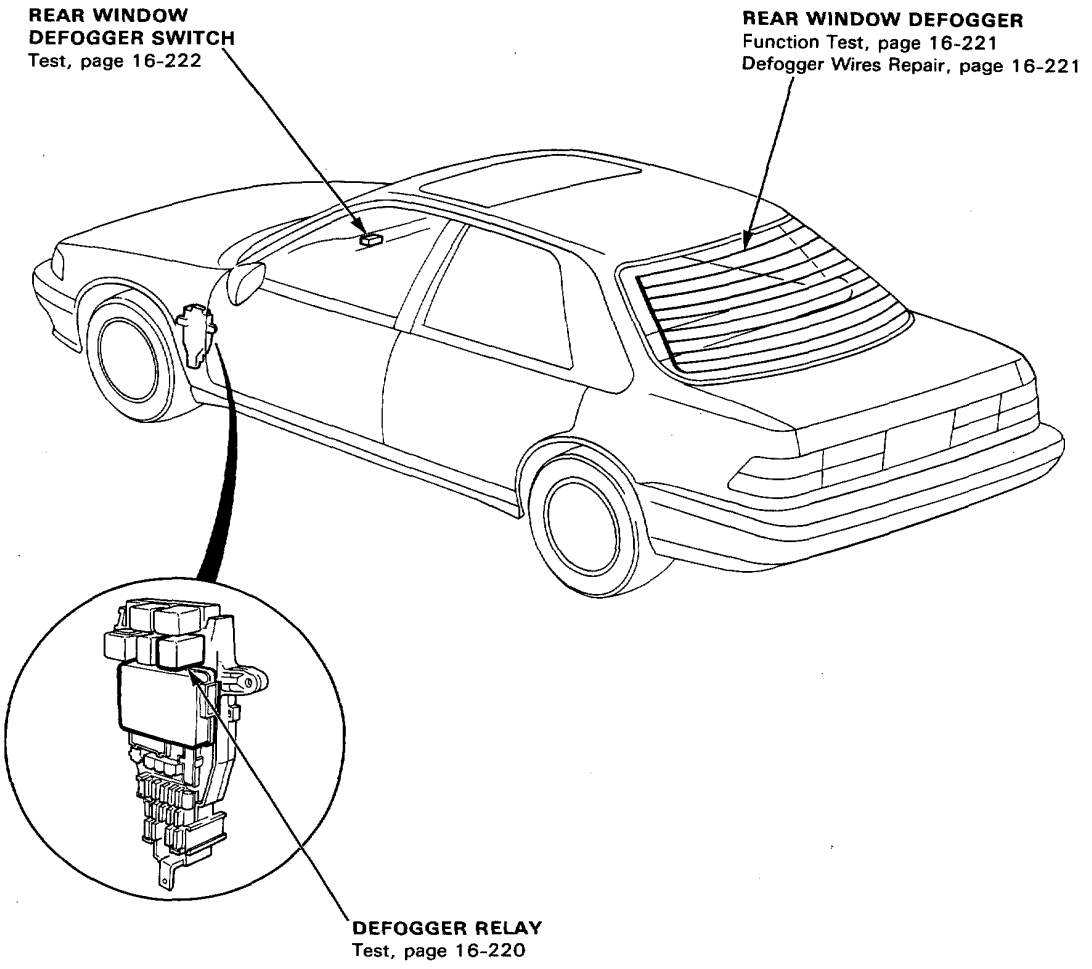
There should be continuity between the A and B terminals when the battery is connected across the C and D terminals.
There should be no continuity when the battery is disconnected.



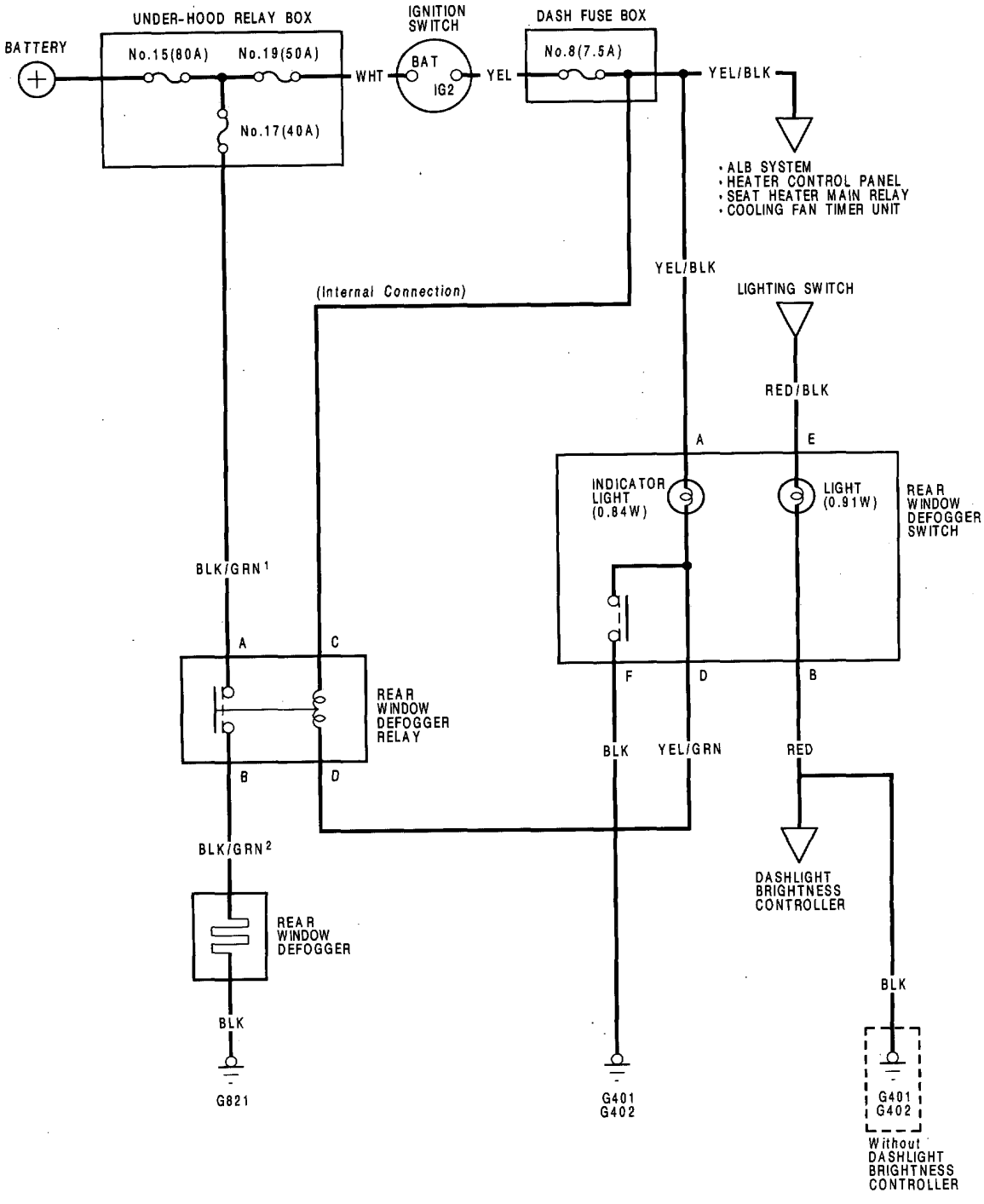


Rear Window Defogger

Component Location Index



Circuit Diagram



Rear Window Defogger

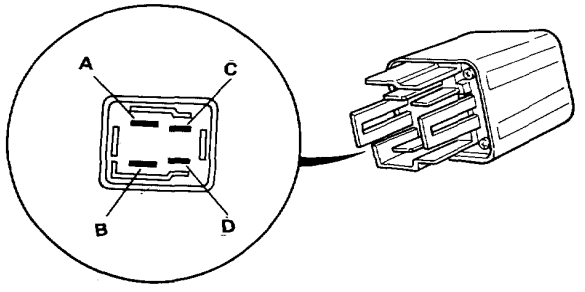
Troubleshooting

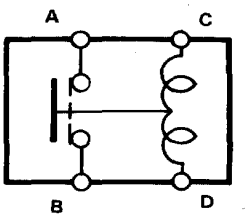
NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom	Blown indicator light bulb	Blown No.8 (7.5 A) fuse (in the dash fuse box)	Blown No.17 (40 A) fuse (in the under-hood box)	Defogger switch	Function test	Defogger relay	Broken defogger wire	Poor ground	Open circuit in wires or loose or disconnected terminals
Defogger operates, but indicator light does not go on.	1								
Defogger does not operate and indicator light does not go on.		1		2				G401 G402	YEL/BLK or BLK
Defogger does not operate, but indicator light goes on.			1		2	3	4	G821	BLK/GRN[1]

Relay Test

1. Remove the relay from the dash fuse box.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals. There should be no continuity when the battery is disconnected.

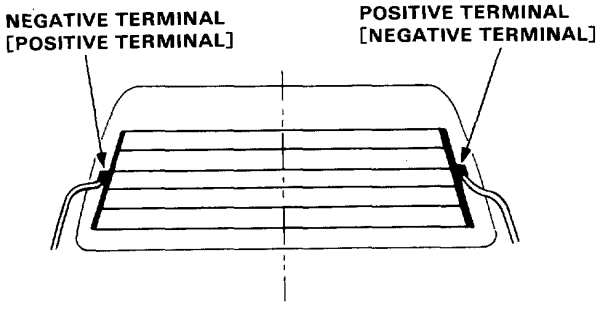




Function Test

CAUTION: Be careful not to scratch or damage the defogger wires with the tester probe end.

1. Check for voltage between the positive terminal and body ground with the ignition switch and the defogger switch ON.
   There should be battery voltage.
   - If there is no voltage, check for:
     — Faulty defogger relay.
     — An open in the BLK/GRN[1] or BLK/GRN[2] wire.
   - If there is battery voltage, go to step 2.



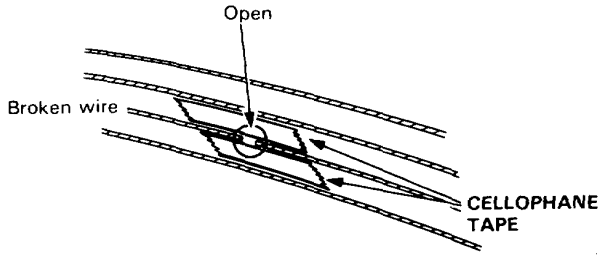
[ ]: **RHD**

2. Check for continuity between the negative terminal and body ground.
   If no continuity, check for open in the defogger ground wire.
3. Connect the voltmeter positive probe to the center of each defogger wire, and the negative probe to the negative terminal.
   There should be approximately 6 V with the ignition switch and the defogger switch ON.
   - If the voltage is as specified, the defogger wire is OK.
   - If there is battery voltage, the defogger wire is broken in the negative side of the center.
   - If there is no voltage the defogger wire is broken in the positive side of the center.

Defogger Wire Repair

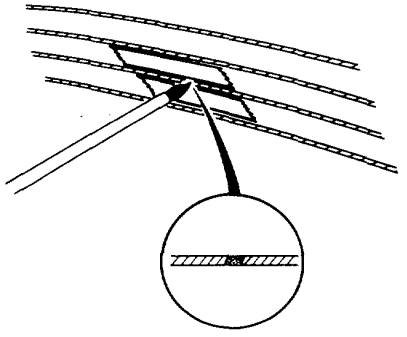
NOTE: Repair section must be no longer than one inch.

1. Lightly scour area around the break with the fine steel wool, then clean with alcohol.
2. Carefully mask broken portion of the defogger wire with cellophane tape.



3. Using a small brush, apply heavy coat of silver conductive paint extending about 1/8 in. on both sides of the break. Allow 30 minutes to dry.

   NOTE: Thoroughly mix paint before use.

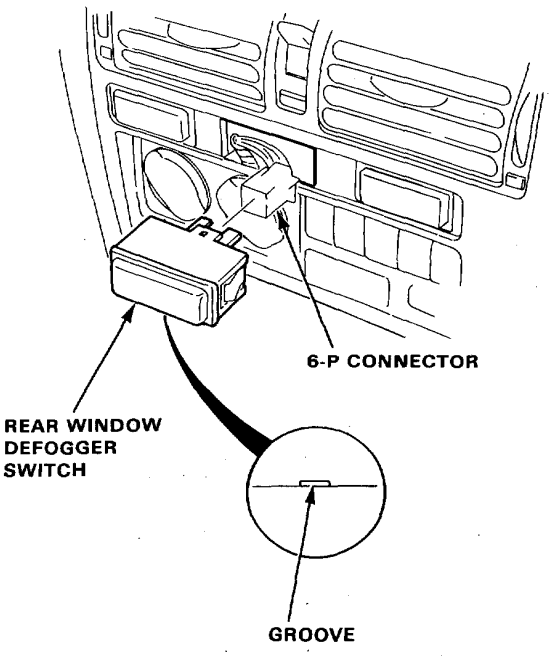


4. Check for proper operation with a voltmeter (approximately 6 V at the mid-point).
5. Apply a second coat of paint in the same manner. Dry 3 hours before removing tape.

Rear Window Defogger

Rear Window Defogger Switch Removal

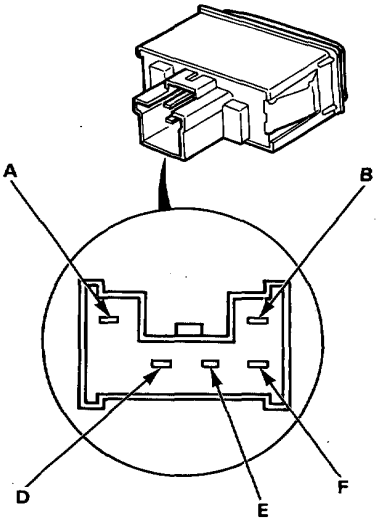
1. Carefully pry out the rear window defogger switch from the instrument panel.
   NOTE: Be careful not to damage the switch or the instrument panel when prying out the switch.
2. Disconnect the 6-P connector from the switch.

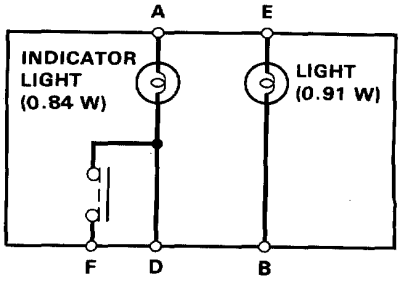


Switch Test

1. Pry the switch from the instrument panel.
2. Check for continuity between the terminals according to the table.

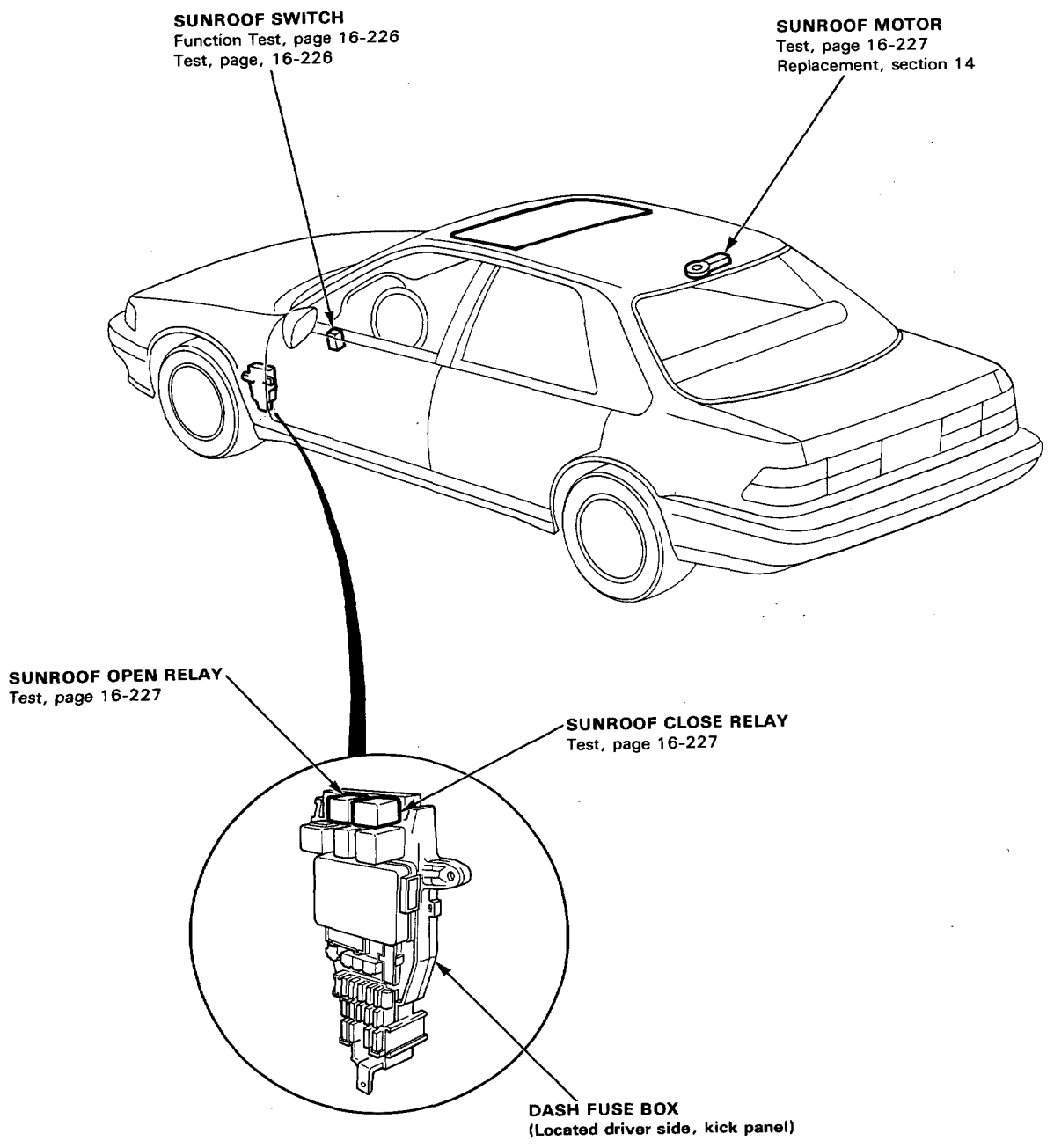
Terminal / Position	A		D	F	B		E
PUSHED	○	○	○	○			
					○	○	○
RELEASED	○		○				





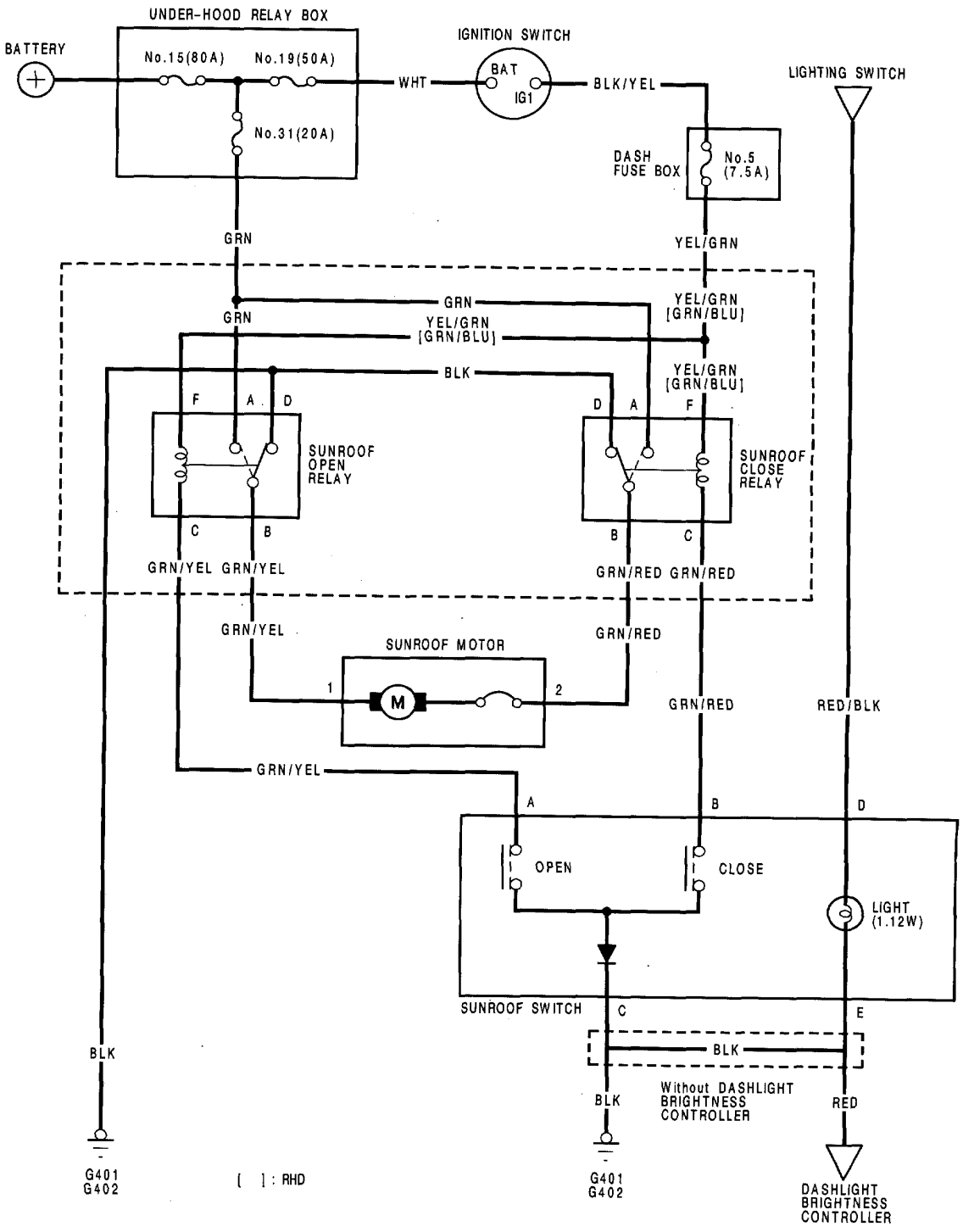
Sunroof

Component Location Index



Sunroof

Circuit Diagram



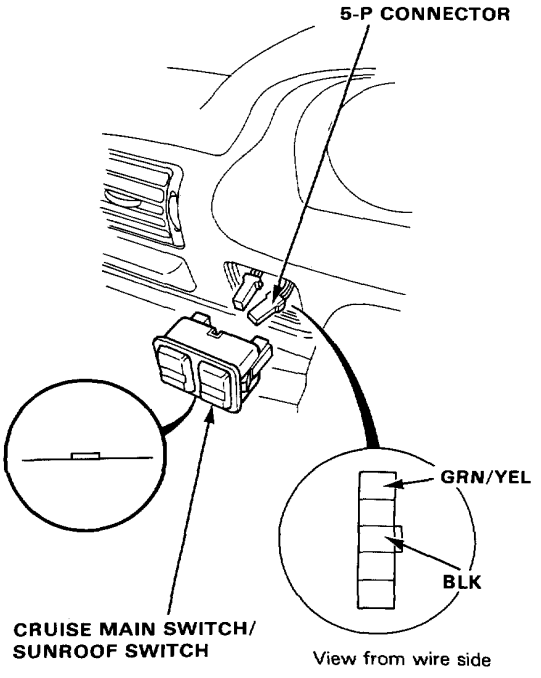
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom		Item to be inspected: Clutch out of adjustment, foreign matter stuck between guide rail and sunroof, or outer cable not attached properly.	Blown No.19 (50 A) fuse (in the under-hood relay box)	Blown No.5 (7.5 A) fuse (in the dash fuse box)	Function Test	Open relay	Close relay	Sunroof motor	Sunroof switch	Poor ground	Open circuit in wires or loose or disconnected terminals
Sunroof does not move, but motor turns.		1									
Sunroof does not move and motor does not turn (sunroof can be moved with sunroof wrench).	With all switches		1	2	3			5	4	G401 G402	GRN, YEL/GRN GRN/YEL, or GRN/RED
	With OPEN switch.					1	2		3		GRN/YEL
	With CLOSE switch.					2	1		3		GRN/RED

Sunroof

Function Test

1. Carefully pry out the cruise main switch/sunroof switch from the instrument panel.
   NOTE: Be careful not to damage the switch or the instrument panel when prying out the switch.
2. Disconnect the 5-P and 6-P connectors from the switches.
3. Connect the GRN/YEL terminal to the BLK terminal with a jumper wire.
   The sunroof should open when the ignition switch is turned ON.
   - If the sunroof opens, check the switch.
   - If not, connect the GRN/YEL terminal to body ground.
     - If the sunroof opens, check for open in the BLK wire, and check whether the G401 and G402 terminals are poor.
     - If not, remove the headliner and check the motor.

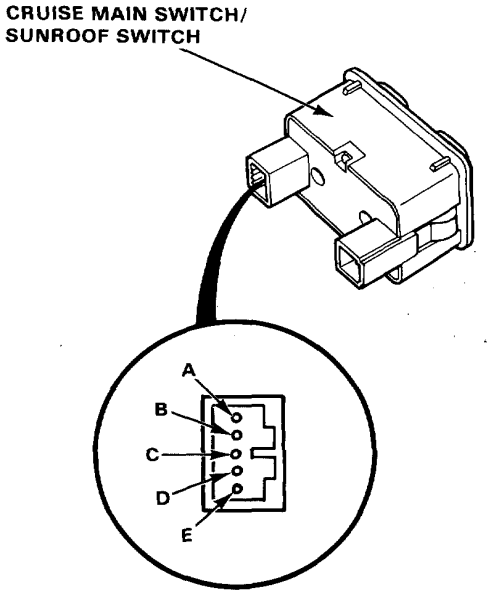


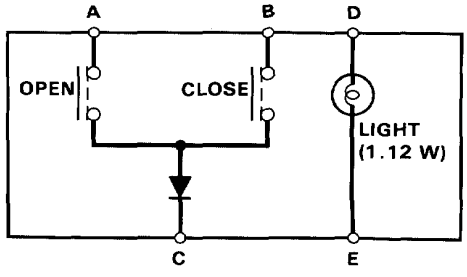
View from wire side

Switch Test

1. Remove the switches from the instrument panel.
2. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	A	B		C	D		E
OFF							
OPEN	○		▶	○	○	⊖	○
CLOSE		○					

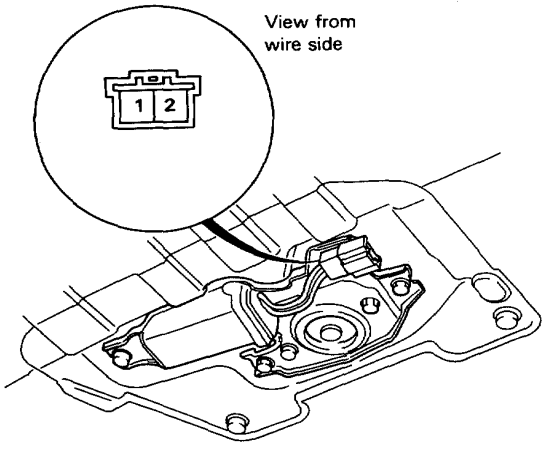




Motor Test

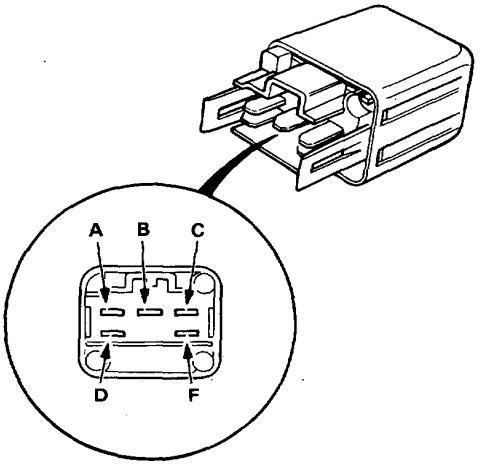
1. Remove the headliner.
2. Disconnect the 2-P connector from the sunroof motor.
3. Test motor operation by connecting battery to the No.1 and No.2 terminals. Test the motor in each direction, by switching the leads from the battery.
4. If the motor does not run, replace it.

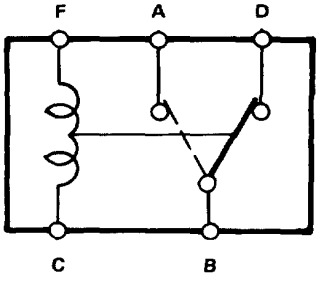
   NOTE: See Closing Force Check in section 14 for motor clutch test.



Relay Test

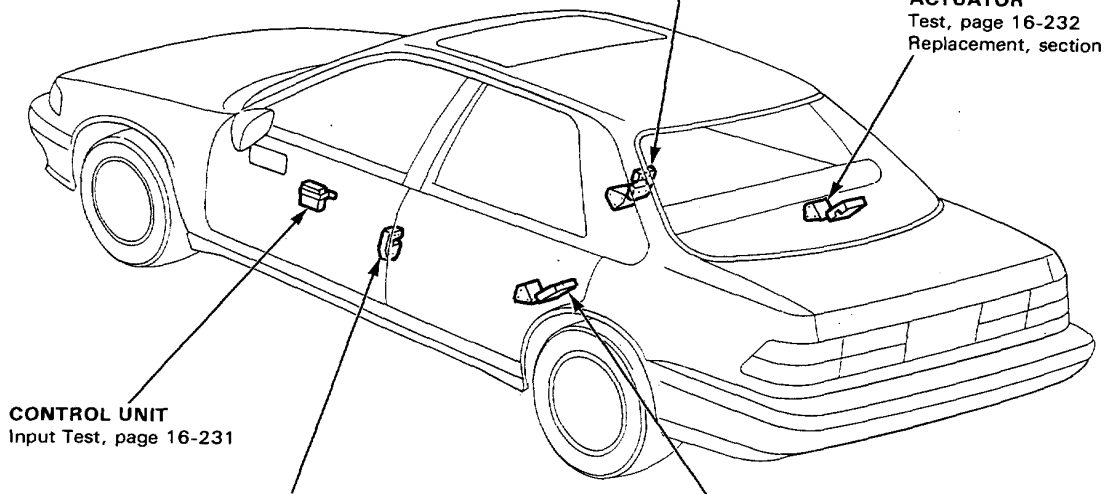
1. Remove the sunroof relays on the dash fuse box.
2. There should be continuity between the A and B terminals when the battery is connected to the F and C terminals.
   There should be continuity between the B and D terminals when the battery is disconnected.





Power Door Locks

Component Location Index



R.FRONT DOOR LOCK ACTUATOR
Test, page 16-232
Replacement, section 14

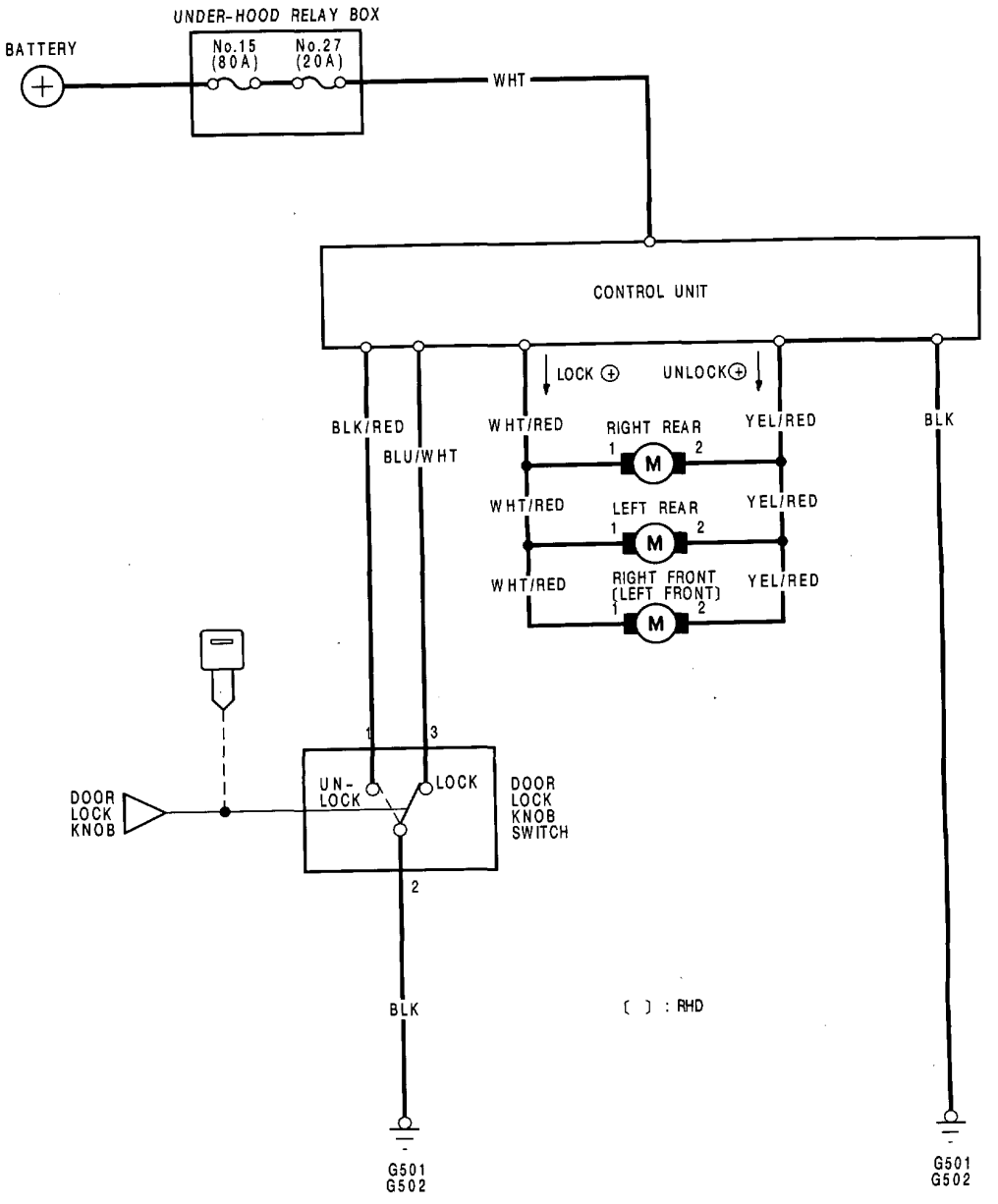
R.REAR DOOR LOCK ACTUATOR
Test, page 16-232
Replacement, section 14

CONTROL UNIT
Input Test, page 16-231

DRIVER'S DOOR LOCK KNOB SWITCH
Test, page 16-232
Replacement, section 14

L.REAR DOOR LOCK ACTUATOR
Test, page 16-232
Replacement, section 14

Circuit Diagram



Power Door Locks

Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

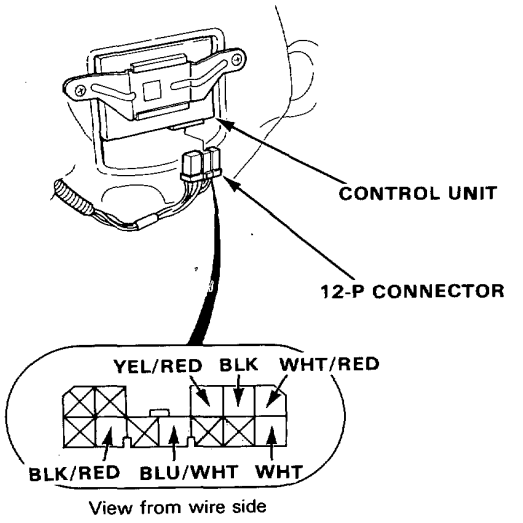
Symptom / Item to be inspected		Blown No.27 (20 A) fuse (in the under-hood relay box)	Door lock knob switch	Control unit input	Passenger door actuators	Disconnected or obstructed door lock rod/linkage	Poor ground	Open circuit in wires or loose or disconnected terminals
Power door lock system does not operate at all.		1		2			G501 G502	WHT
Doors do not lock or unlock with driver's door lock knob switch.	All passenger doors.	1	2	3		4	G501 G502	BLU/WHT, YEL/RED, WHT/RED or BLK/RED
	One or more passenger door.				1			YEL/RED or WHT/RED

CAUTION: To prevent damage to the motor, apply battery voltage momentarily.

Control Unit Input Test

Remove L.door trim panel, then disconnect the 12-P connector from the control unit.
Make the following input test at the harness pins.

NOTE: Recheck the connections between the 12-P connector and the control unit, then replace the control unit if all input tests prove OK.



View from wire side

No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground G501, G502 • An open in the wire.
2	WHT	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown No.27 (20 A) fuse. • An open in the wire.
3	BLU/WHT	Driver's door lock knob in LOCK.	Check for continuity to ground: should be continuity.	• Faulty door lock knob switch. • Poor ground (G501, G502). • An open in the wire.
4	BLK/RED	Driver's door lock knob in UNLOCK.	Check for continuity to ground: should be continuity.	• Faulty door lock knob switch. • Poor ground (G501, G502). • An open in the wire.
5	YEL/RED and WHT/RED	Connect the WHT terminal to the WHT/RED terminal, and the YEL/RED terminal to the BLK terminal momentarily.	Check door lock operation: Passenger doors should lock as the battery in connected momentarily.	• Faulty actuators. • An open in the wire.
		Connect the WHT terminal to the YEL/RED terminal, and the WHT/RED terminal to the BLK terminal momentarily.	Check door lock operation: Passenger doors should unlock as the battery is connected momentarily.	

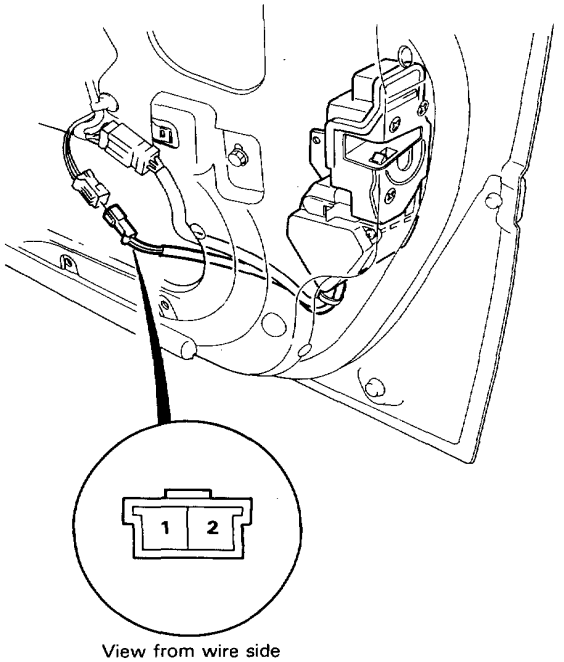
CAUTION: To prevent damage to the motor, apply battery voltage momentarily.

Power Door Locks

Passenger's Door Actuator Test

1. Remove the door trim panel.
2. Disconnect the 2-P connector from the actuator.
3. Test actuator operation by connecting battery voltage to the WHT/RED and YEL/RED terminals.
   Test the actuator in each direction by switching the leads from the battery.

   CAUTION: To prevent damage to the motor, apply battery voltage momentarily.



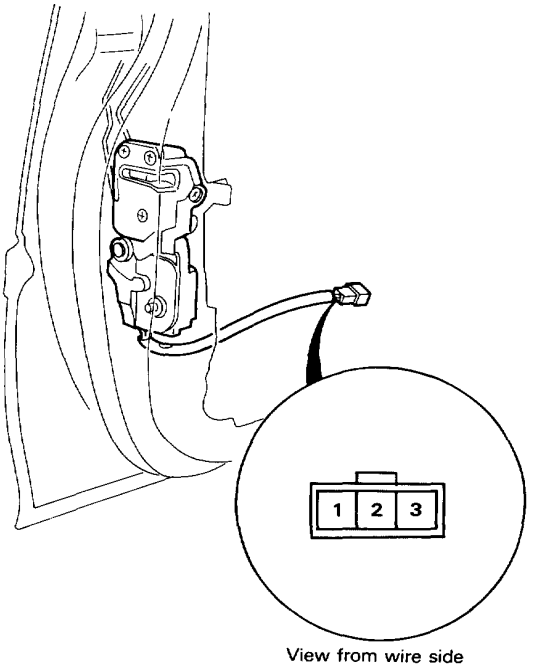
View from wire side

4. If the actuator fails to operate properly, replace it.

Door Lock Knob Switch Test

1. Remove the driver's door trim panel.
2. Disconnect the 3-P connector from the switch.
3. Check for continuity between the terminals in each switch position according to the table.

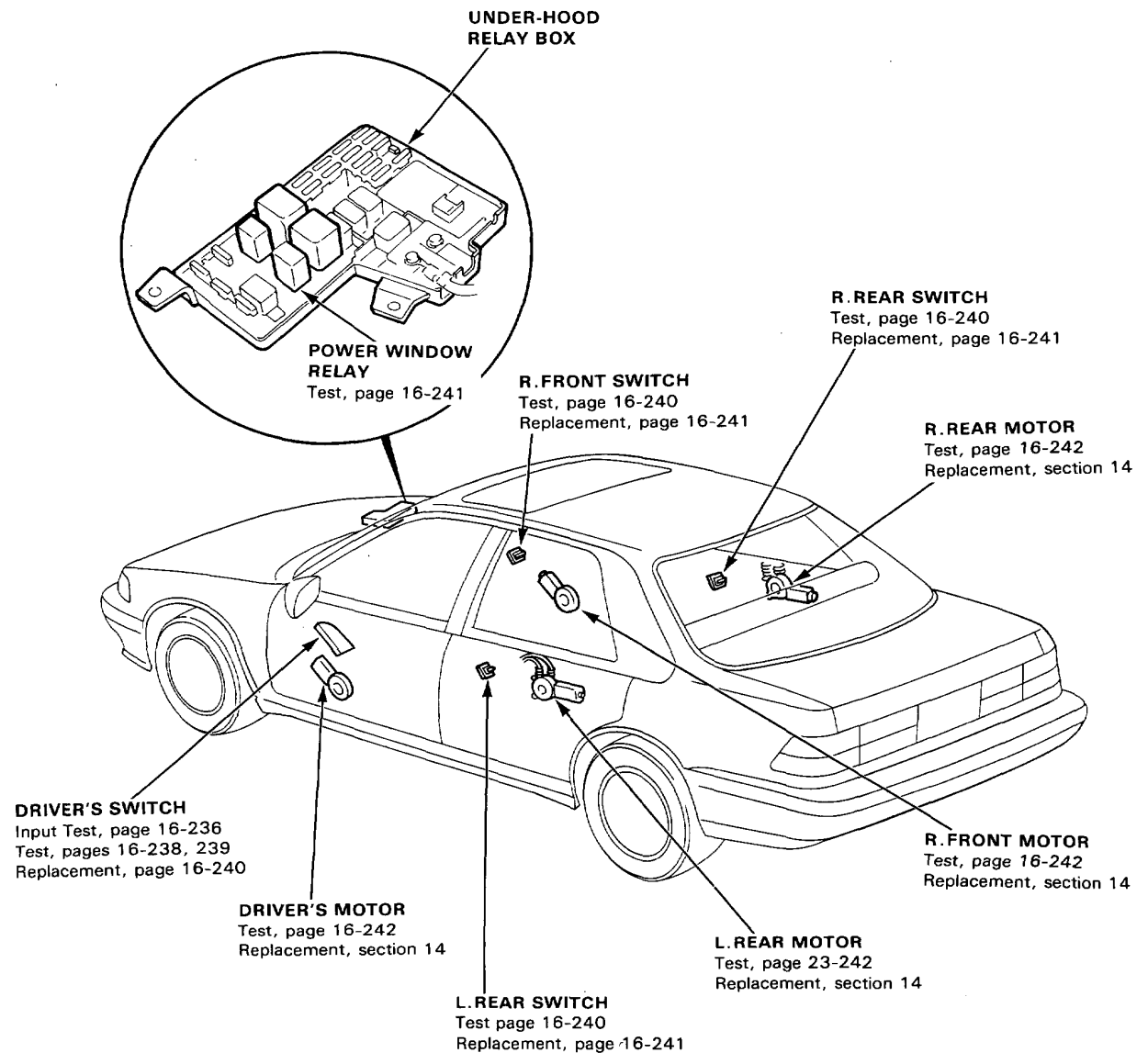
Position \ Terminal	1	2	3
UNLOCK	○	○	
LOCK		○	○



View from wire side

Power Window

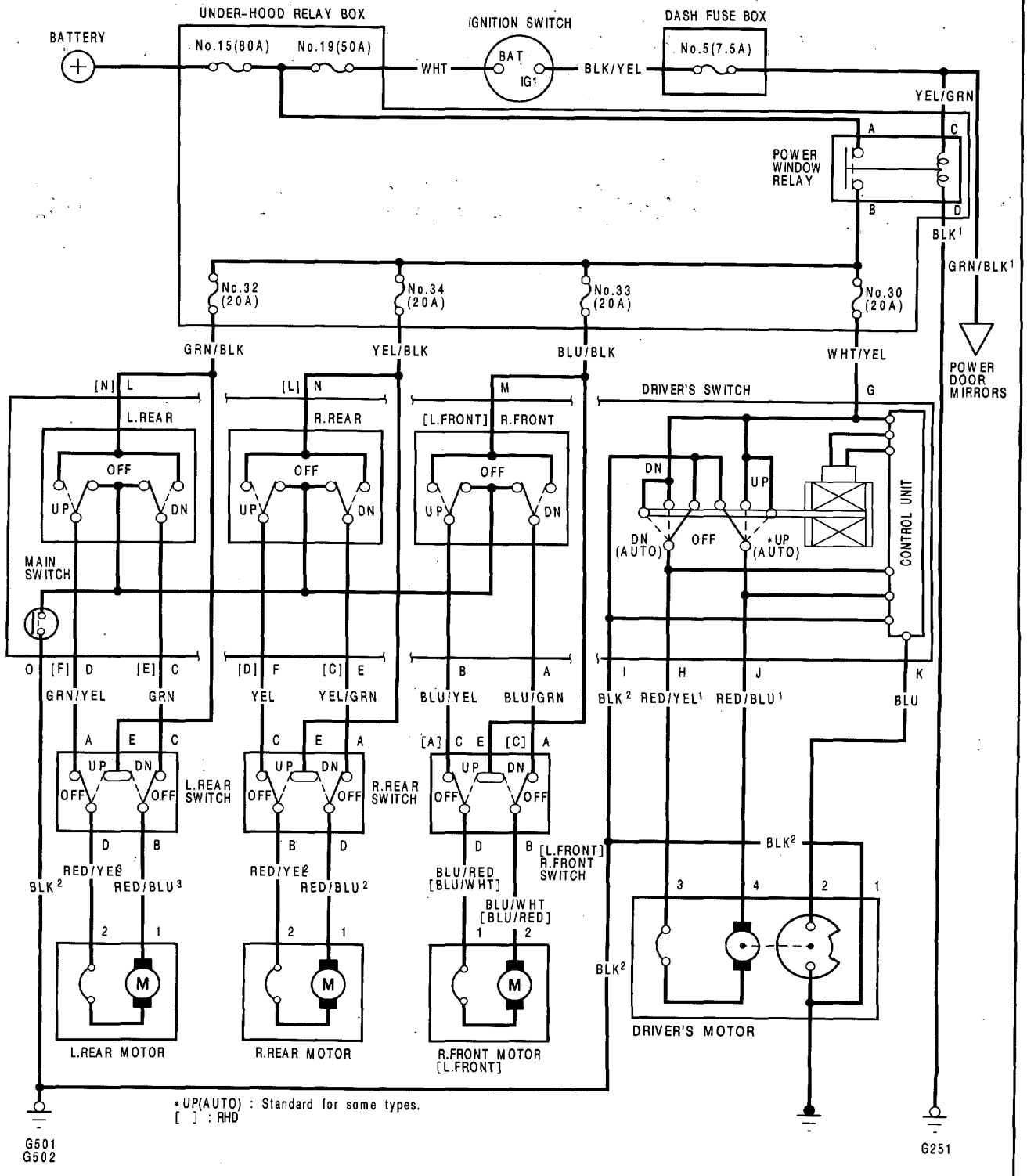
Component Location Index



Power Windows

Circuit Diagram

NOTE :
• Several different wires have the same color. They have been given a number suffix to distinguish them (for exampl RED/BLU and RED/BLU are not the same
• "DN" in the switch circuit denotes DOWN.



Troubleshooting

NOTE: The numbers in the table show the troubleshooting sequence.

Symptom \ Item to be inspected		State of charge and clean and tight connections of battery	Blown No.5 (7.5 A) fuse (in the dash fuse box)	Power window relay	Blown No.30 (20 A) fuse in the dash fuse box	Blown No.33 (20A) fuse in the dash fuse box	Blown No.34 (20 A) fuse in the dash fuse box	Blown No.32 (20 A) fuse in the dash fuse box	Driver's door switch	Passenger switch	Driver's motor	Pulser (in driver's motor)	Passenger's motor	Window regulator	Driver's door switch input	Poor ground	Open circuit in wires or loose or disconnected terminals
All windows do not operate.		1	2	3												G251	BLK/YEL, YEL/GRN
Driver's window does not operate.					1						2			3	4		WHT/YEL
Driver's window does not operate in AUTO.									1			2			3		BLU
Passenger windows do not operate.	Right front [Left]					1			2	3			4	5			BLU/BLK
	Left rear							1	2	3			4	5			GRN/BLK
	Right rear						1		2	3			4	5			YEL/BLK

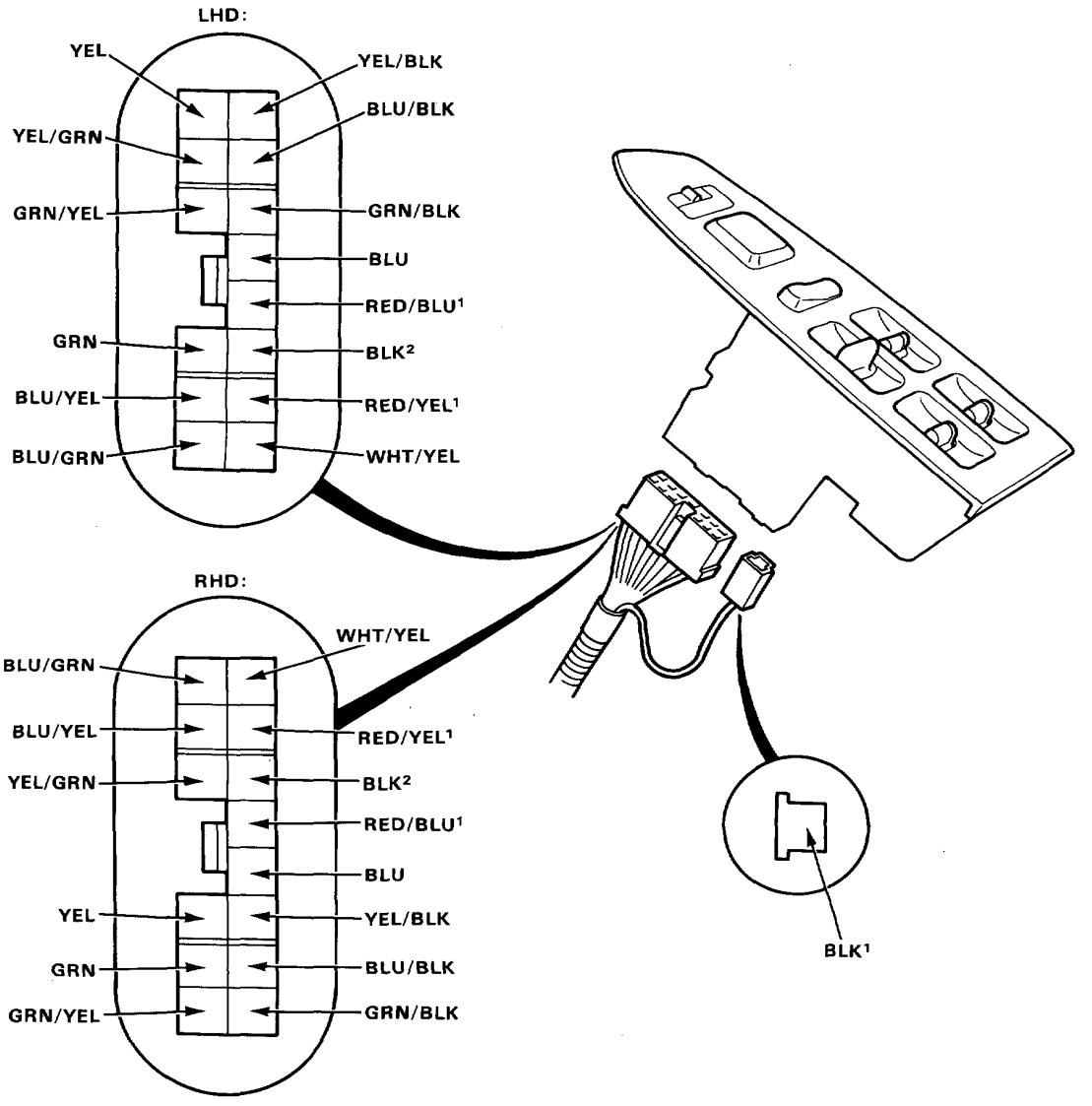
[ ] : RHD

Driver's Switch Input Test

NOTE: The control unit is built into the driver's switch, and only controls driver's door window operation.

Remove the driver's door trim panel and disconnect the 14-P and 1-P connectors from the driver's switch. Make the following input tests at the harness pins.

NOTE: Recheck the connections between the 10-P or 14-P and 1-P connectors, and the driver's switch, then replace the driver's switch if all input tests prove OK.



No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK[2]	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G501, G502) • An open in the wire.
2	WHT/YEL BLU/BLK YEL/BLK GRN/BLK	Ignition switch ON.	Check for voltage to ground: should be battery voltage .	• Blown No.30, 32, 33 or 34 (20 A) fuse. • Faulty power window relay. • An open in the wire.
3	RED/BLU[1] and RED/YEL[1]	Connect the WHT/YEL terminal to the RED/BLU[1] terminal, and the RED/YEL terminal to the BLK[2] terminal, then ignition switch ON.	Check the driver's motor operation: should run.	• Faulty driver's motor. • An open in the wire.
4	BLU/YEL and BLU/GRN	Connect the BLU/BLK terminal to the BLU/YEL terminal, and the BLU/GRN terminal to the BLK[2] terminal, then ignition switch ON.	Check the right front motor operation: should run.	• Faulty R.front [L.front] motor. • Faulty R.front [L.front] switch. • An open in the wire.
5	YEL and YEL/GRN	Connect the YEL/BLK terminal to the YEL terminal, and the YEL/GRN terminal to the BLK terminal, then ignition switch ON.	Check the right rear motor operation: should run.	• Faulty R. rear motor. • Faulty R. rear switch. • An open in the wire.
6	GRN/YEL and GRN	Connect the GRN/BLK terminal to the GRN/YEL terminal, and the GRN terminal to the BLK terminal, then ignition switch ON.	Check the left rear motor operation: should run.	• Faulty L. rear motor. • Faulty L. rear switch. • An open in the wire.
7	BLU and BLK[2]	Connect the WHT/YEL terminal to the RED/YEL[1] terminal, and the BLK[2] terminal to the RED/BLU[1] terminal, then ignition Switch ON.	Check for resistance between the BLU and BLK[2] terminals: should indicate between 20-50 ohms as the driver's motor runs.	• Faulty pulser. • Faulty driver's motor. • An open in the wire

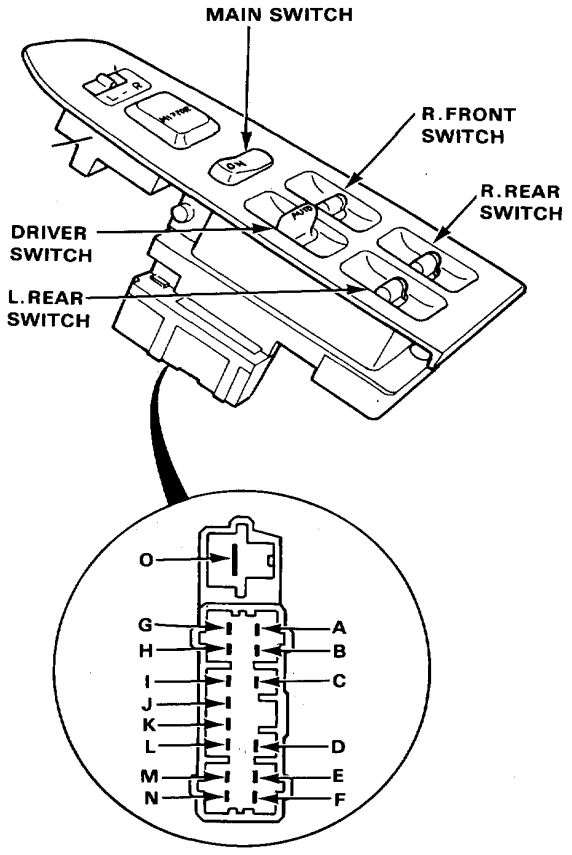
[ ] : RHD

Power Windows

Driver's Switch Test

LHD:

1. Remove the switch from the arm rest.
2. Check for continuity between the terminals in each switch position according to the tables.



DRIVER'S SWITCH

Position \ Terminal	G	H	I	J
OFF		○	○	○
UP	○			○
DOWN	○	○		
DOWN (AUTO)	○	○		

R.FRONT SWITCH

Position	Main Switch \ Terminal	A	B	M	O
OFF	ON	○	○		○
	OFF	○	○		
UP	ON		○	○	
	OFF		○	○	
DOWN	ON	○		○	
	OFF	○		○	

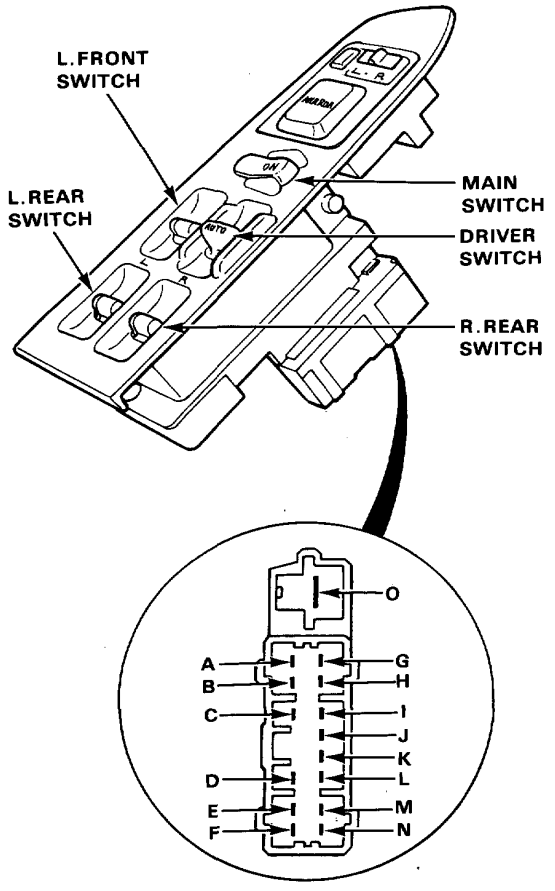
R.REAR SWITCH

Position	Main Switch \ Terminal	E	F	N	O
OFF	ON	○	○		○
	OFF	○	○		
UP	ON		○	○	
	OFF		○	○	
DOWN	ON	○		○	
	OFF	○		○	

L.REAR SWITCH

Position	Main Switch \ Terminal	C	D	L	O
OFF	ON	○	○		○
	OFF	○	○		
UP	ON		○	○	
	OFF		○	○	
DOWN	ON	○		○	
	OFF	○		○	

RHD:



DRIVER'S SWITCH

Position \ Terminal	G	H	I	J
OFF		○	○	○
UP (AUTO)	○			○
UP	○			○
DOWN	○	○		
DOWN (AUTO)	○	○		

L.FRONT SWITCH

Position	Main Switch \ Terminal	A	B	M	O
OFF	ON	○	○		○
	OFF	○	○		
UP	ON		○	○	
	OFF		○	○	
DOWN	ON	○		○	
	OFF	○		○	

R.REAR SWITCH

Position	Main Switch \ Terminal	C	D	L	O
OFF	ON	○	○		○
	OFF	○	○		
UP	ON		○	○	
	OFF		○	○	
DOWN	ON	○		○	
	OFF	○		○	

L.REAR SWITCH

Position	Main Switch \ Terminal	E	F	N	O
OFF	ON	○	○		○
	OFF	○	○		
UP	ON		○	○	
	OFF		○	○	
DOWN	ON	○		○	
	OFF	○		○	

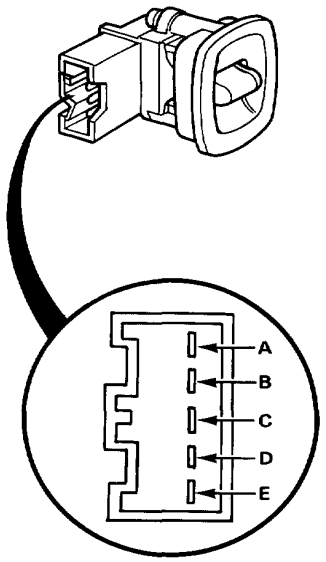
Power Windows

Passenger's Switch Test

1. Remove the switch from the arm rest, then disconnect the 5-P connector.
2. Check for continuity between the terminals in each switch position according to the table.

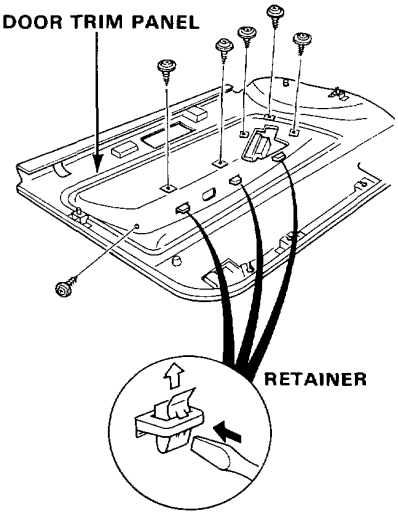
   NOTE: Right [Left] front switch is shown. Rear switches are similar.
   [ ]: **RHD**

Position \ Terminal	A	B	C	D	E
UP	○			○	
		○			○
OFF	○			○	
			○		
DOWN				○	○
		○	○		

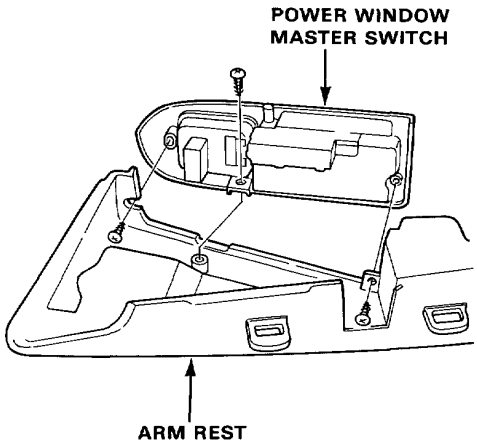


Driver's Switch Replacement

1. Remove the driver's door trim panel, then disconnect all of the connectors from the driver's door trim panel.
2. Remove the arm rest from the driver's door trim panel by removing the retainer and the screws.

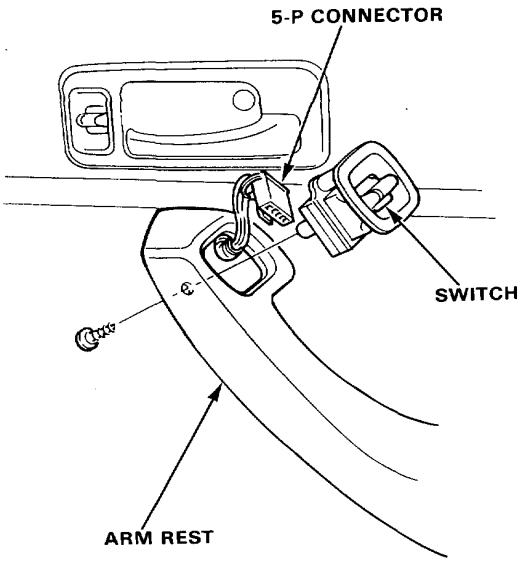


3. Remove the power window master switch from the arm rest by removing three screws.



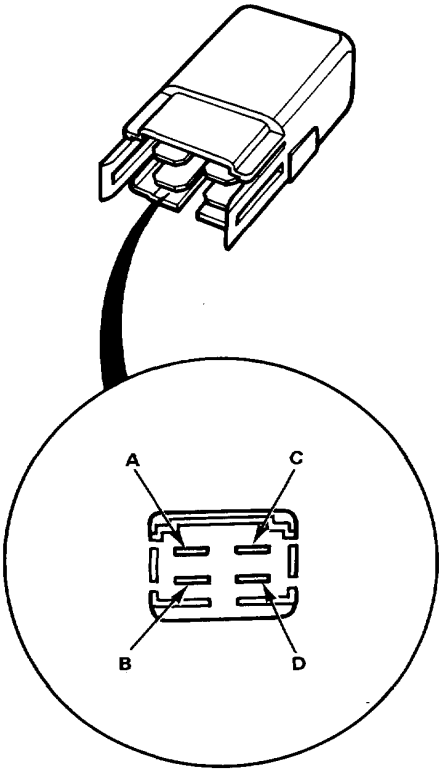
Passenger's Switch Replacement

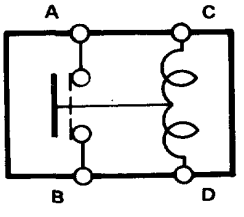
1. Remove the switch from the arm rest by removing the 1 mounting screw, then disconnect the 5-P connector from the switch.



Relay Test

1. Remove the relay from the under-hood relay box.
2. There should be continuity between the A and B terminals when the battery is connected to the C and D terminals.
   There should be no continuity when the battery is disconnected.



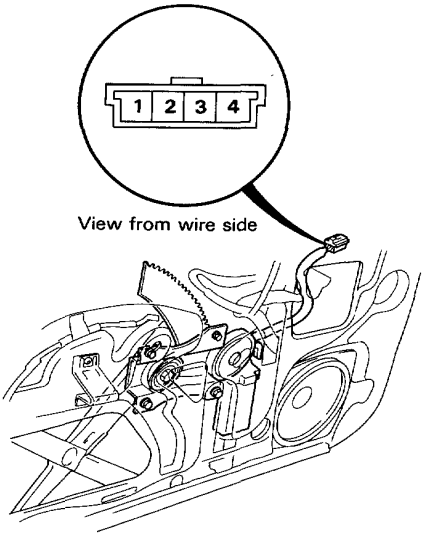


Power Windows

Driver's Motor Test

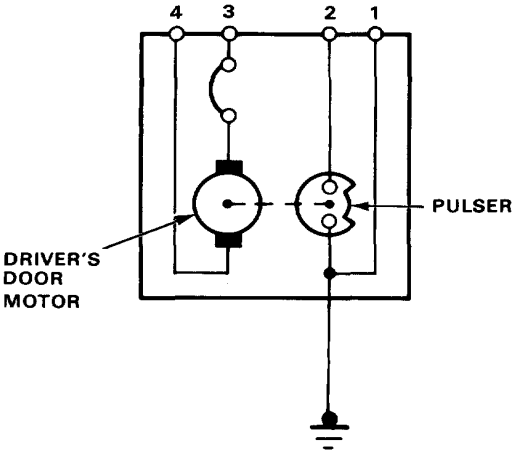
Motor Test:

1. Remove the door trim panel.
2. Disconnect the 4-P connector from the door wire harness.
3. Test motor operation by connecting battery voltage to the No.3 and No.4 terminals.
   Test the motor in each direction, by switching the leads from the battery.
4. If the motor does not run, replace it.



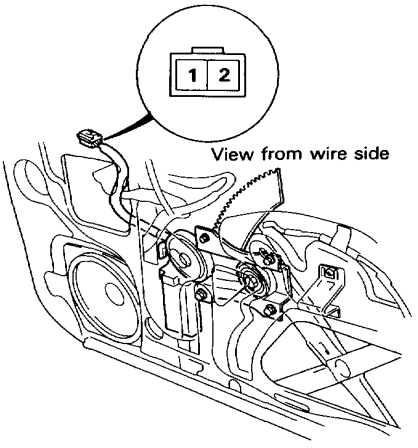
Pulser Test:

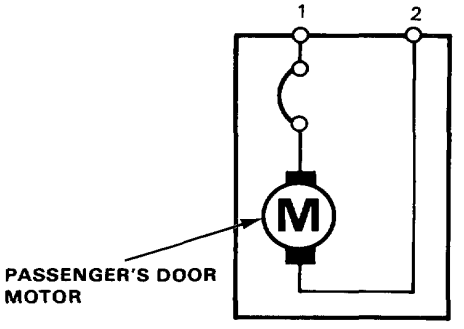
Measure resistance between the No.1 and No.2 terminals when running the motor by connecting battery voltage to the No3 and No.4 terminals.
Ohmmeter should indicate between 20-50 ohms as the motor runs.



Passenger's Motor Test

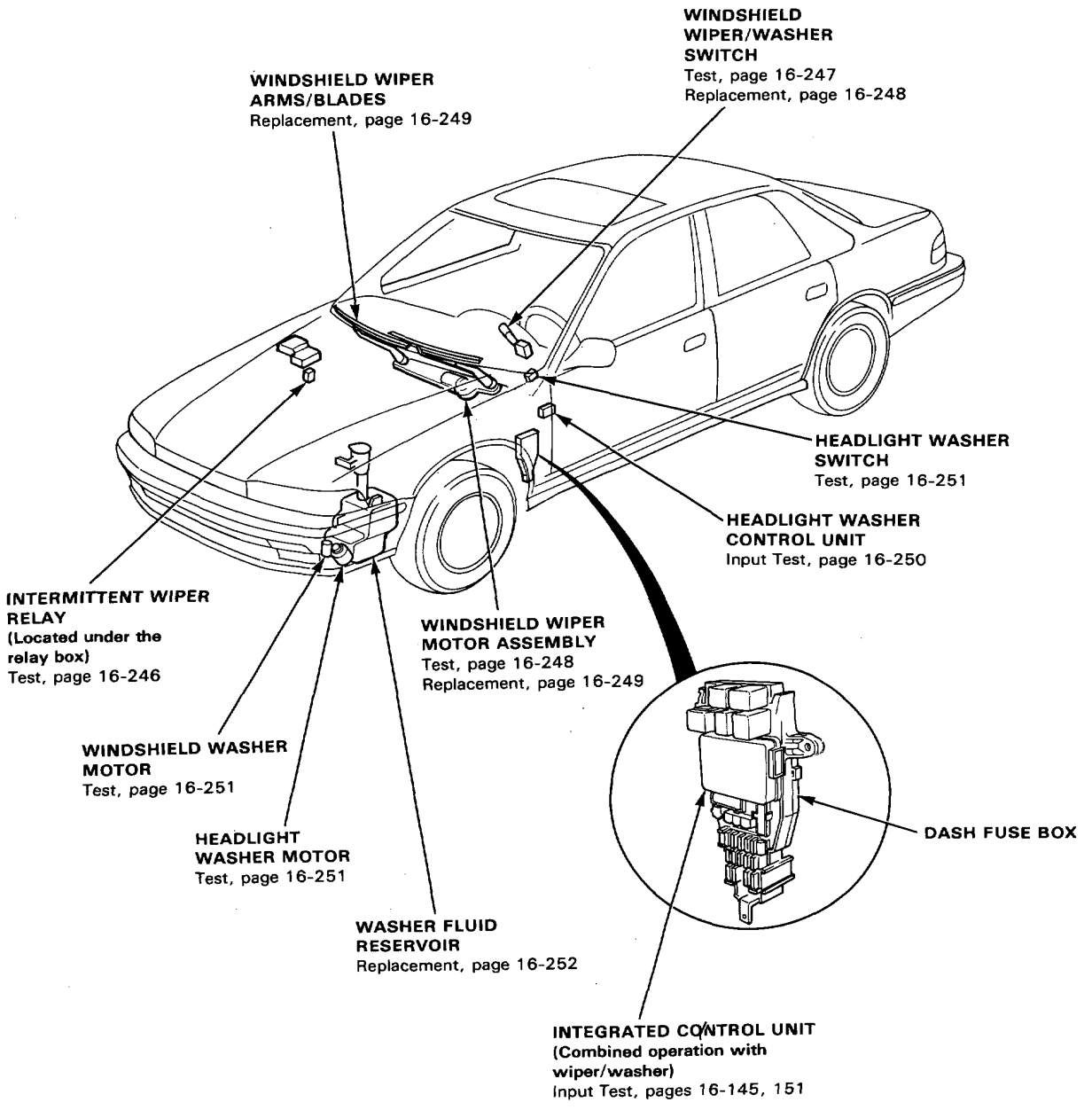
1. Remove the door trim panel.
2. Disconnect the 2-P connector from the motor.
3. Test motor operation by applying battery voltage to the No.1 and No.2 terminals.
   Test the motor in each direction, by switching the leads from the battery.
4. If the motor does not run, replace it.





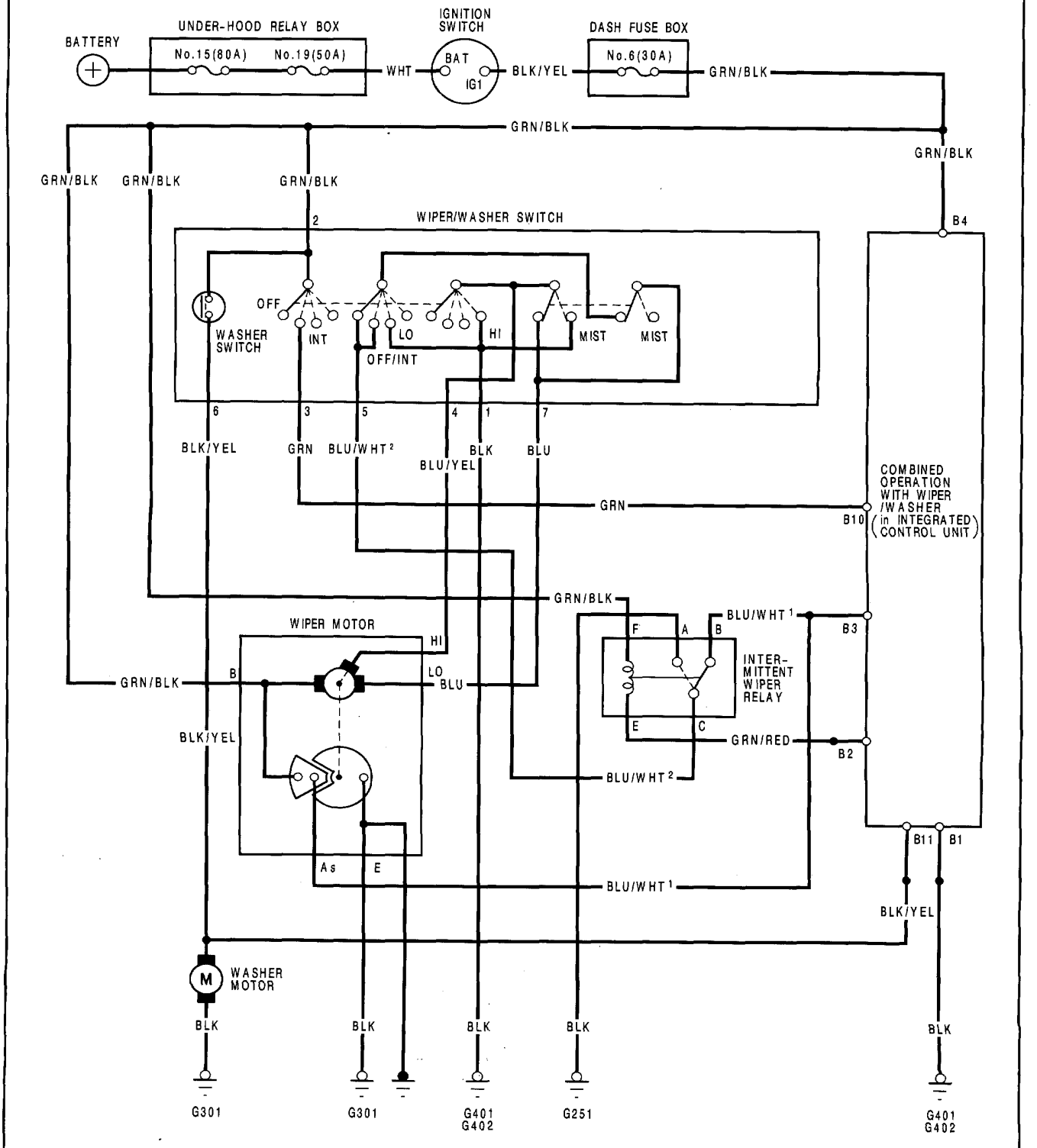
Component Location Index

- Troubleshooting 16-246

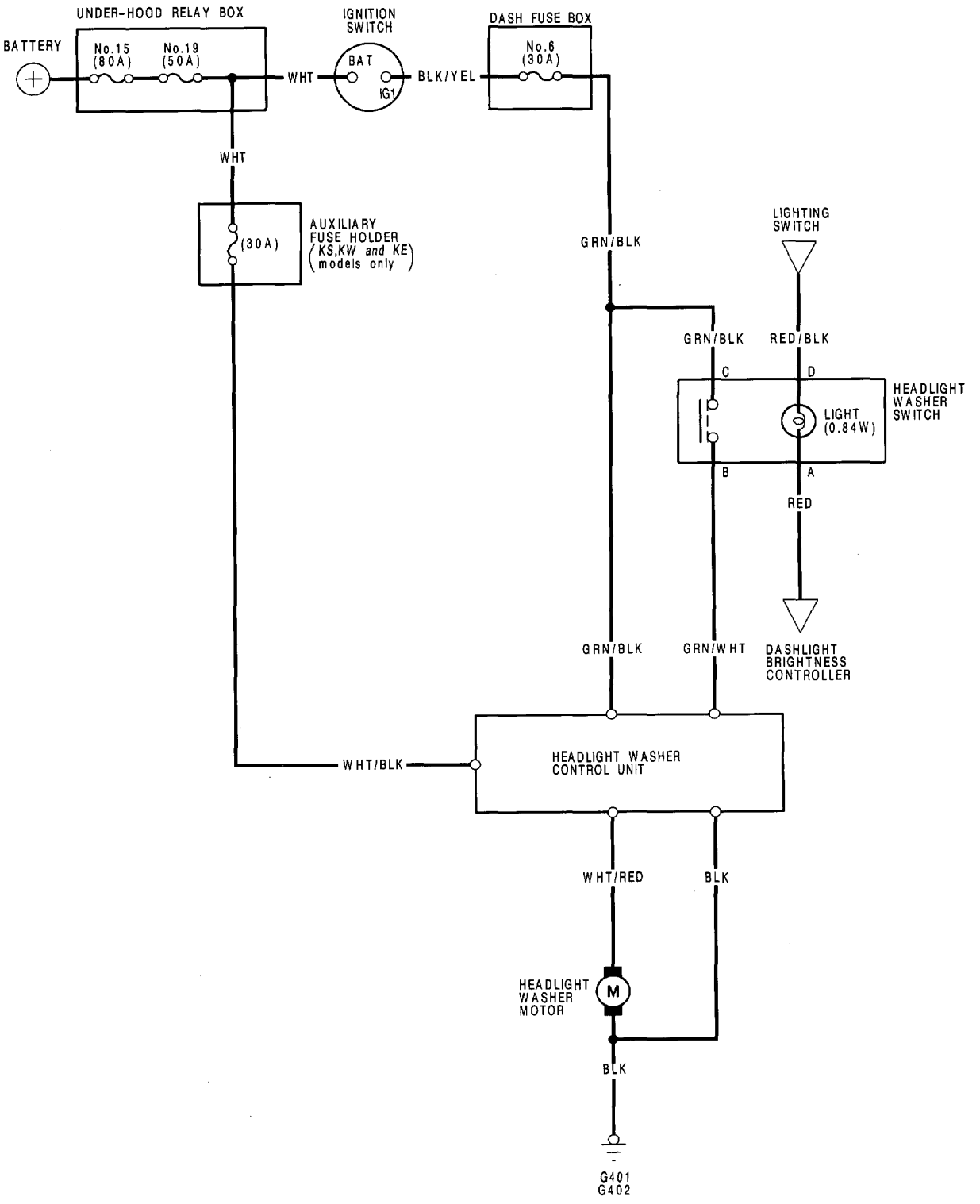


Wipers/Washers

Circuit Diagram



Circuit Diagram (Headlight Washer)



Wipers/Washers

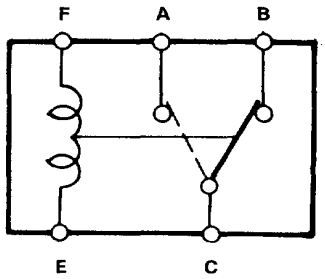
Troubleshooting

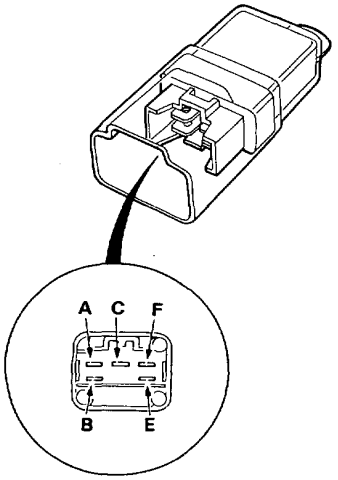
NOTE: The numbers in the table show the troubleshooting sequence.

Symptom		Blown No.6 (30 A) fuse (in the dash fuse box)	Wiper switch	Mist switch	Wiper motor assembly	Washer switch	Washer motor	Intermittent wiper relay	Combined operation with washer (in the integrated control unit)	Insufficient washer fluid in reservoir	Disconnected blocked washer hose or clogged outlet	Disconnected wiper linkages	Poor Ground	Open circuit in wires or loose or disconnected terminals
Wipers do not operate	In all positions	1	4		2							3	G301	GRN/BLK
	In INT		1					2						ORN, BLU/WHT[1]
	In LO or HI		1		2									BLU/YEL, BLU
	In MIST			1										
Blades do not return to park position when wipers are turned OFF.			2		1									BLU/WHT[1]
Erratic intermittent cycle or wipers do not operate intermittently.								1						GRN/BLK, GRN BLU/WHT[1], GRN/RED
Little or no washer fluid is pumped.						4	3			1	2		G301	BLK/YEL
Wipers do not operate simultaneously with washer.														BLK/YEL

Intermittent Wiper Relay Test

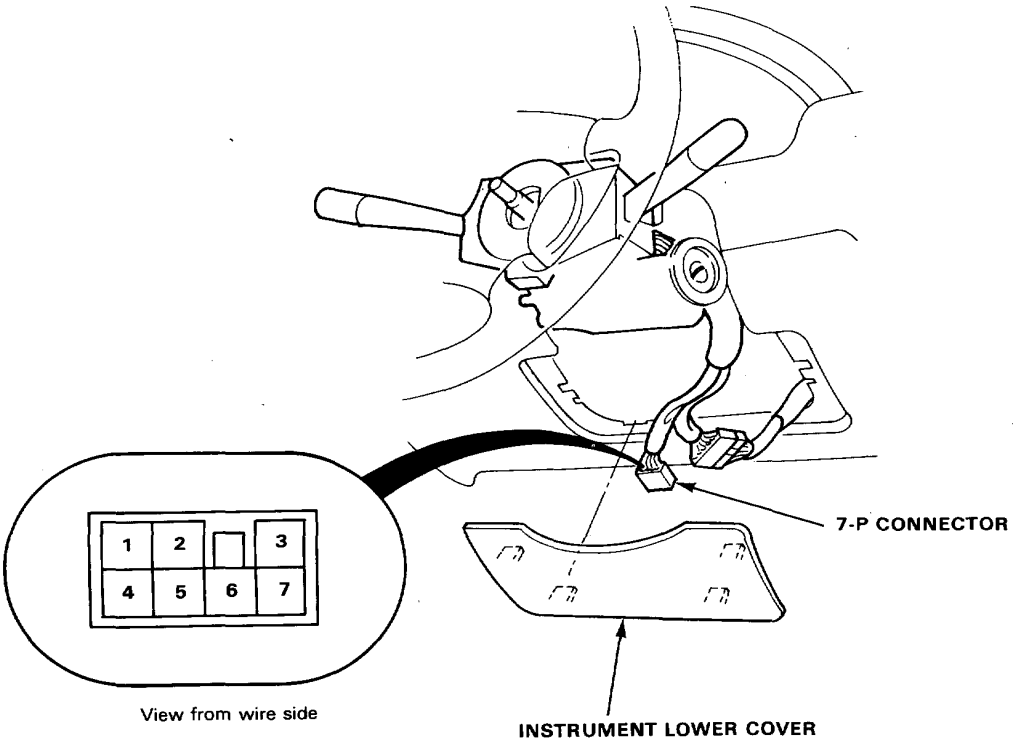
1. Remove the intermittent wiper relay.
2. There should be continuity between the A and C terminals when the battery is connected to the E and F terminals.
   There should be continuity between the B and C terminals when the battery is disconnected.





Wiper/Washer Switch Test

1. Remove the instrument lower panel.
2. Disconnect the 7-P connector of wiper washer switch from the main wire harness.
3. Check for continuity between the terminal in each switch position according to the table.

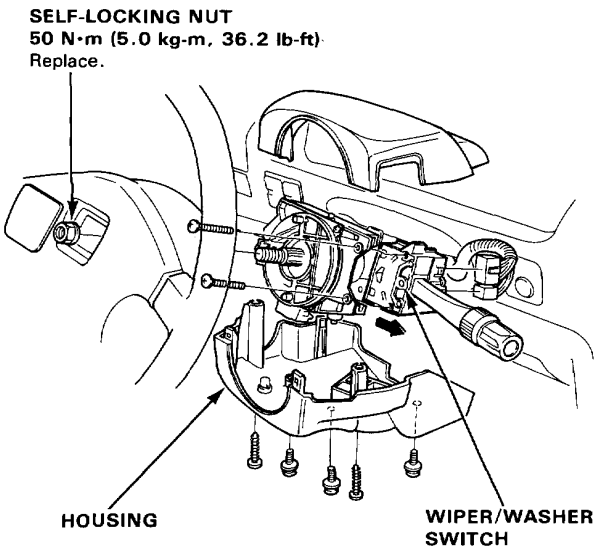


Position \ Terminal	1	2	3	4	5	6	7
OFF					○		○
INT		○	○				
					○		○
Lo	○						○
Hi	○			○			
Mist switch "ON"	○			○			
Washer switch "ON"		○				○	

Wiper/Washer Switch Replacement

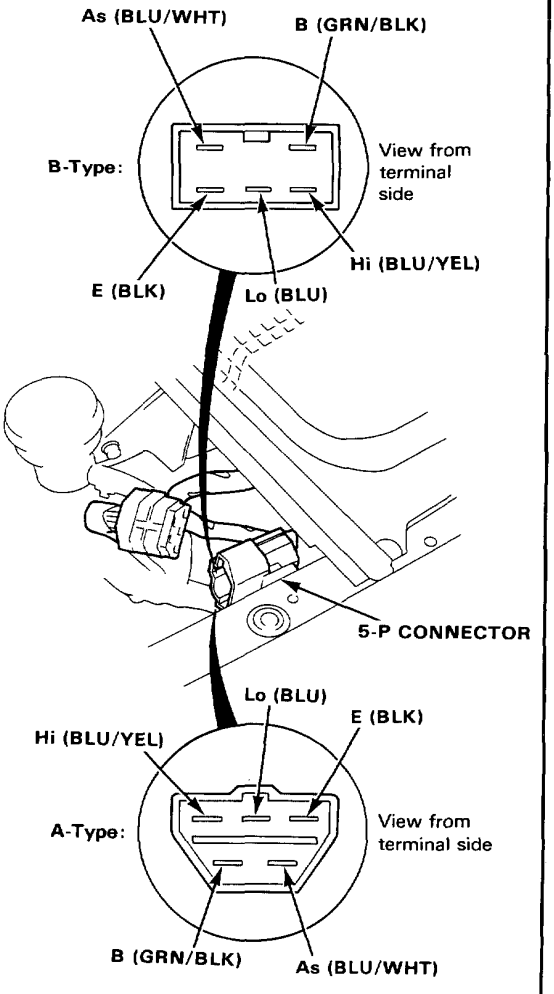
1. Remove the steering wheel.
2. Remove the lower and upper covers from the steering column.
3. Disconnect the 8-P and 2-P connectors from the wiper/washer switch.
4. Remove the 2 screws and slide the wiper/washer switch out of the housing as shown.

NOTE:
- Be careful not to damage the steering wheel cover.
- If equipped with cruise control, remove the wiper/washer switch after removing the slip ring (see page 16-262).



Windshield Wiper Motor Test

1. Disconnect the 5-P connector of the wiper motor assembly.
2. Test motor operation:
   LOW SPEED: Connect battery positive to the B (GRN/BLK) terminal and negative to the Lo (BLU) terminal.
   HIGH SPEED: Connect battery positive to the B (GRN/BLK) terminal and negative to the Hi (BLU/YEL) terminal.
3. If the motor fails to run smoothly, replace it.

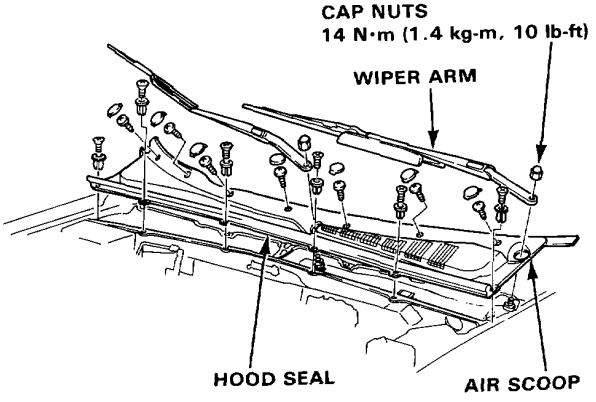


Windshield Wiper Motor Replacement

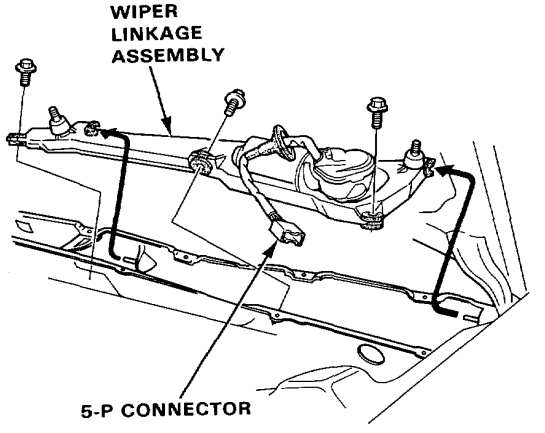
1. Open the hood and remove the cap nuts and the wiper arms

   NOTE: Carefully remove the wiper arms so that the wiper arms do not touch the hood.

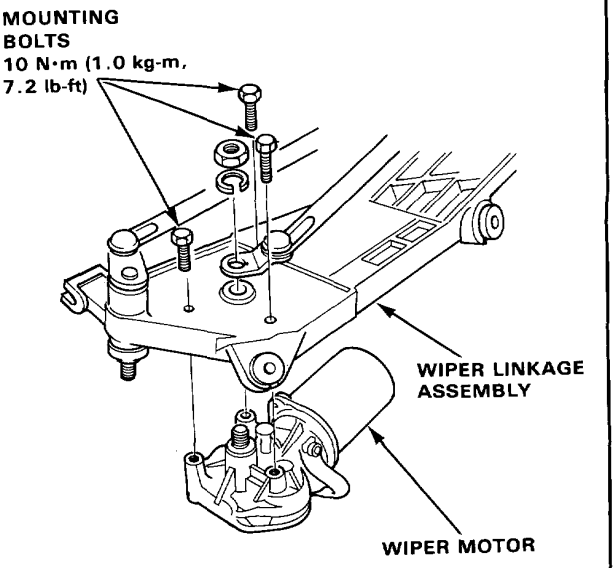
2. Remove the hood seal and air scoop by prying off the trim clips and removing the screws.



3. Disconnect the 5-P connector from the wiper motor assembly, then remove the 3 mounting bolts and the wiper linkage assembly.



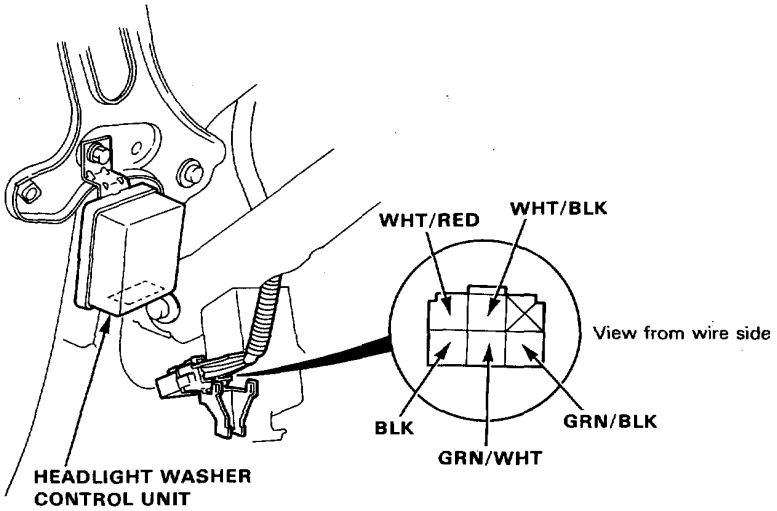
4. Remove the 3 mounting bolts and 1 nut from the wiper linkage assembly to remove the wiper motor assembly.



5. Install the wiper motor assembly in the reverse order of removal.

Headlight Washer Control Unit Input Test

Disconnect the 6-P connector from the control unit, located at left kick panel.
Make the following input tests at the harness pins.
If all tests prove OK, yet the system still fails to work, replace the control unit.



No.	Terminal	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	• Poor ground (G401, G402). • An open in the wire.
2	* WHT/BLK	Under all conditions.	Check for voltage to ground: should be battery voltage.	• Blown 30 A fuse in auxiliary fuse holder. • An open in the wire.
3	GRN/WHT	Ignition switch ON and headlight washer switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No.6 (30 A) fuse. • Faulty headlight washer switch • An open in the wire.
4	WHT/RED	Connect the WHT terminal to the WHT/RED terminal.	Check the headlight washer motor operation: should run.	• Faulty headlight washer motor. • Poor ground (G401, G402). • An open in the wire.
5	GRN/BLK	Ignition switch ON.	Check for voltage to ground: should be battery voltage.	• Blown No.6 (30 A) fuse. • An open in the wire.

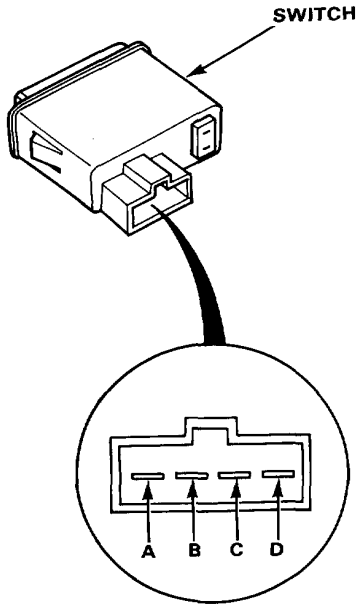
*: KS, KW and KE models only

Headlight Washer Switch Test

1. Pry out the switch from the floor console, then disconnect the 4-P connector from the switch.
2. Check for continuity between the terminals according to the table.

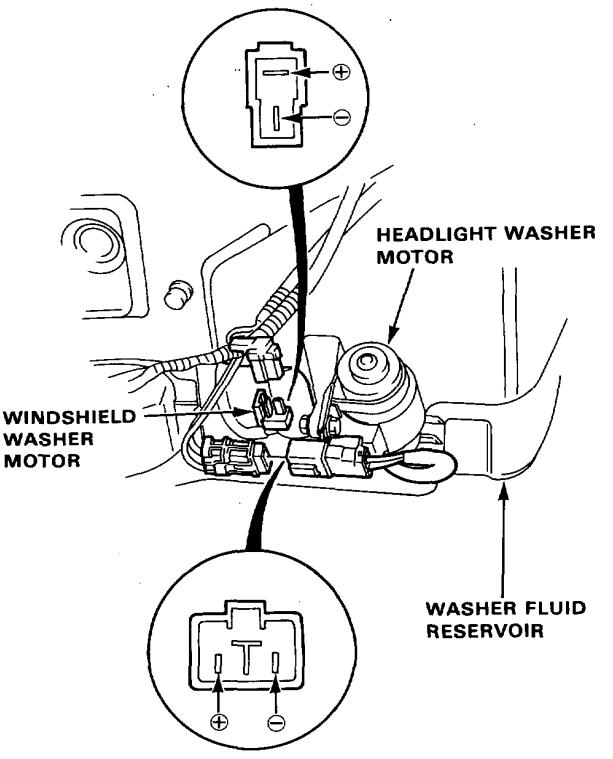
   NOTE: Be careful not to damage the switch or the instrument panel when prying out the switch.

Position \ Terminal	B	C	A		D
OFF					
ON	○	○			



Washer Motor Test

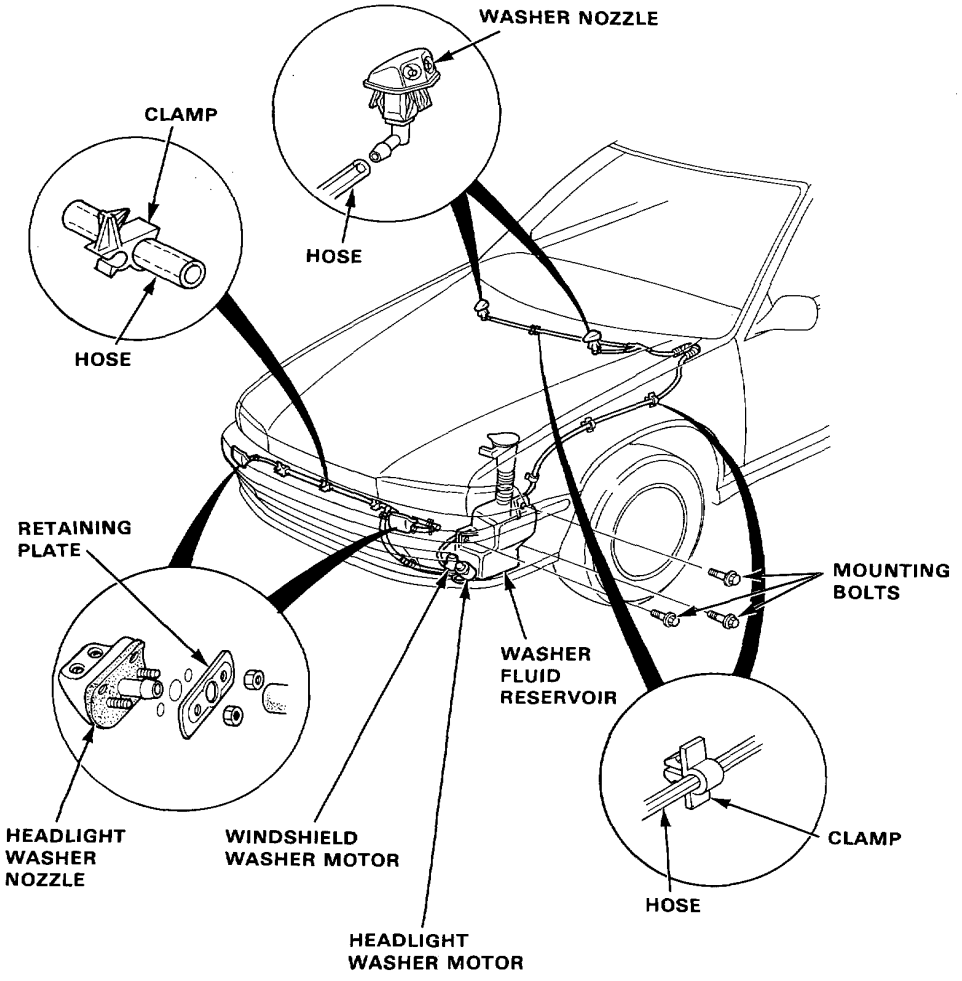
1. Remove the front bumper and disconnect the 2-P connector from the washer motor.
2. Test washer motor operation by connecting battery positive to the ⊕ terminal and negative to the ⊖ terminal.



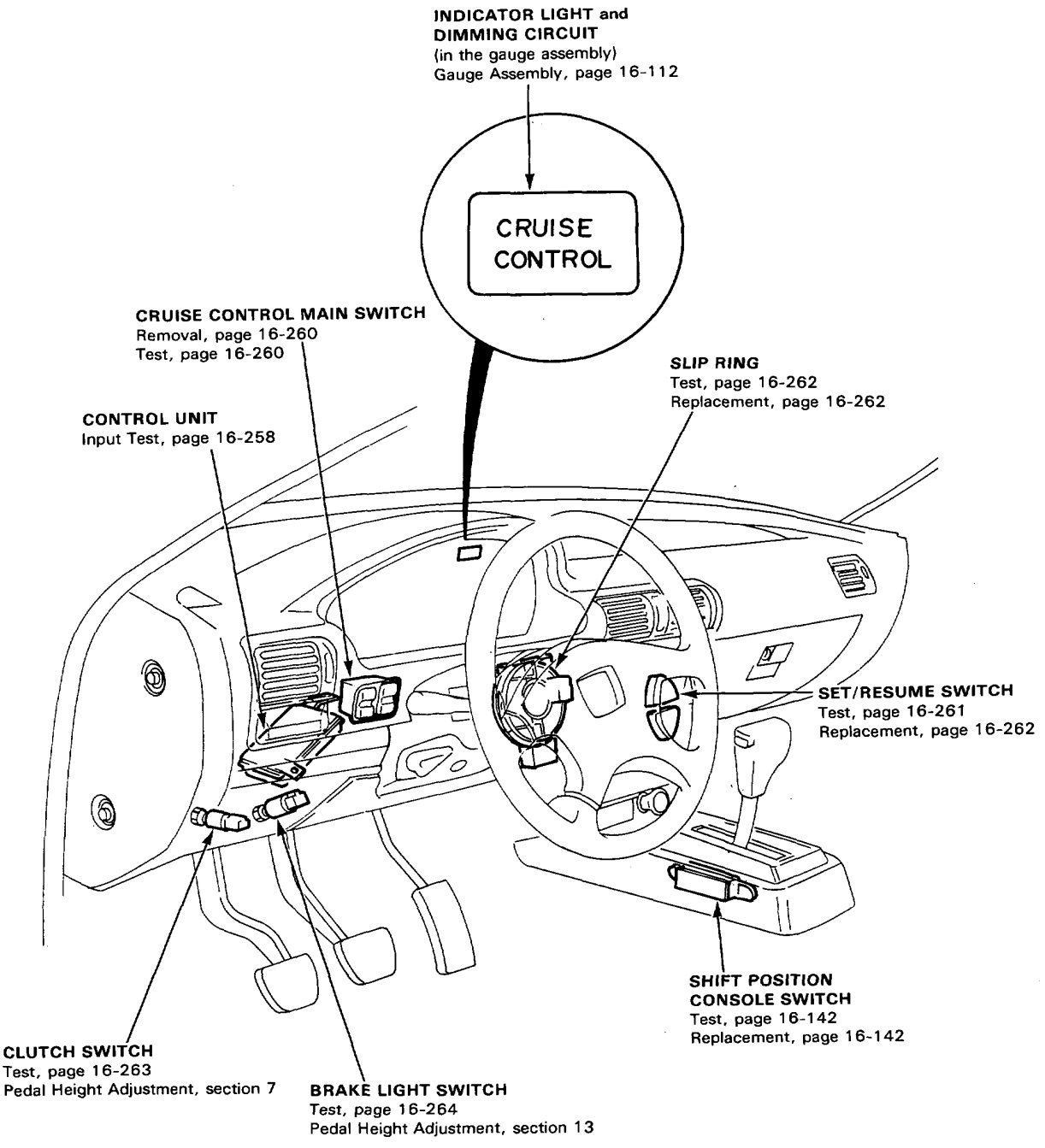
Washer Replacement

1. Remove the bumper, then remove the washer reservoir by removing the 3 mounting bolts.
2. Disconnect the hoses and the 2-P connectors from the windshield and the headlight washer motors.
3. Remove the washer nozzles.

NOTE:
- Clamp the hose in the left front fender.
- Take care not to pinch hoses during reinstallation.
- Install the grommets firmly.
- After installation, adjust the washer nozzles.

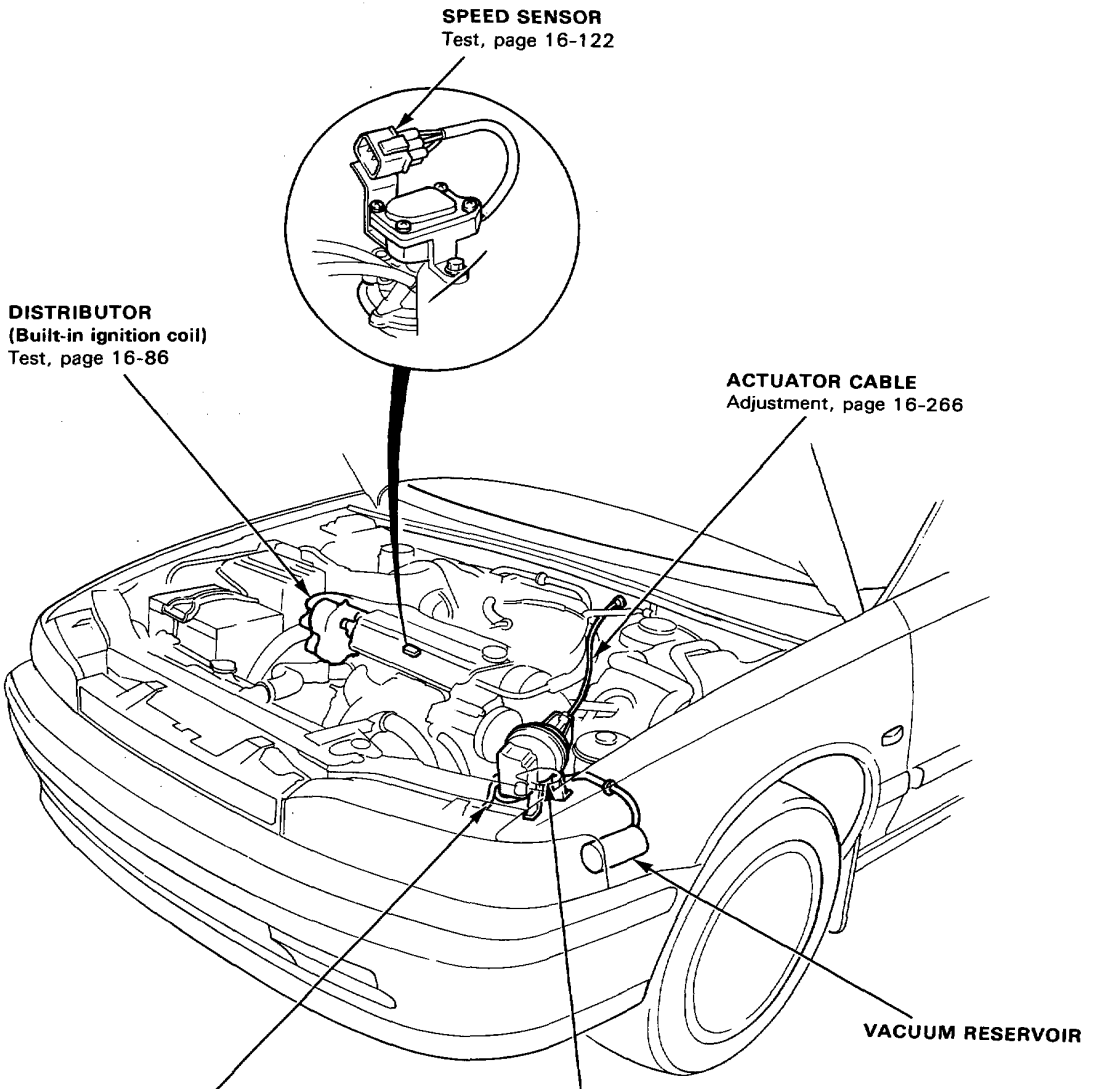


Component Location Index



Cruise Control

Component Location Index



Description

The cruise control system uses mechanical, electrical and vacuum operated devices to maintain vehicle speed at a setting selected by the driver.

System Description:
The cruise control unit receives command signals from the cruise control main switch and the cruise control SET/RESUME switch. It receives information about operating conditions from the brake switch, the ignition coil, the speed sensor, the clutch switch (with manual transmission), or the shift position switch (with automatic transmission). The cruise control unit sends operational signals to the devices that regulate the throttle position. The throttle position maintains the selected vehicle speed. Essentially, the control unit compares the actual speed of the vehicle to the selected speed.
Then, the control unit uses the result of that comparison to open or close the throttle.

The brake switch releases the system's control of the throttle at the instant the driver depresses the brake pedal. The switch sends an electronic signal to the control unit when the brake pedal is depressed; the control unit responds by allowing the throttle to close. The clutch switch (manual transmission) or the shift position switch (automatic transmission), sends a disengage signal input to the control unit that also allows the throttle to close.

System Operation:
The cruise control system will set and automatically maintain any speed above 40 kph (25 mph). To set, make sure that the main switch is in the "On" position. After reaching the desired speed, press the SET switch. The cruise control unit will receive a set signal input and, in turn, will actuate the cruise control actuator.

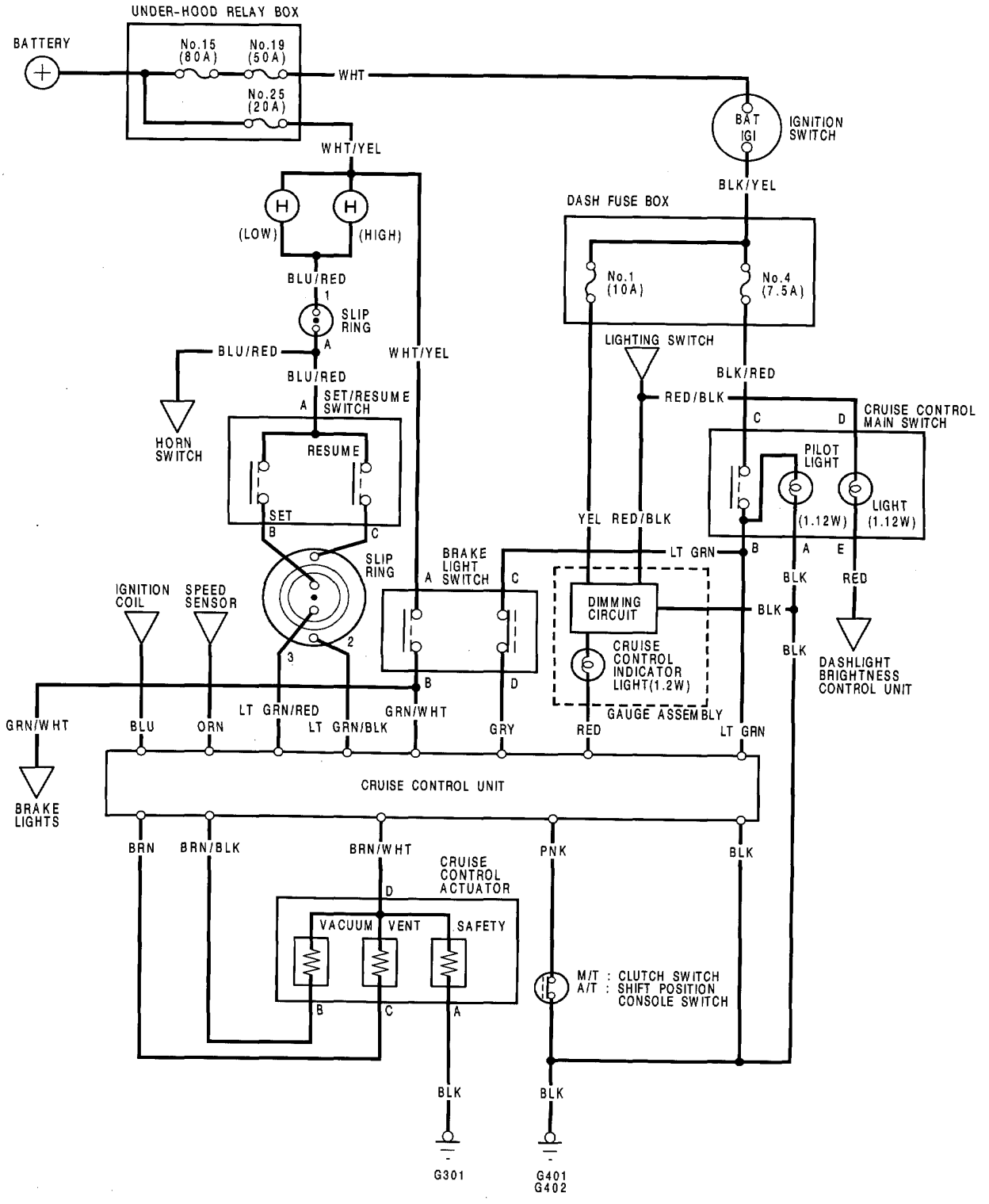
When the SET switch is depressed and the cruise control system is on, the "cruise control" indicator on the warning display will light up.

You can cancel the cruise control system by pushing the main switch to "Off". This removes power to the control unit and erases the set speed from memory. If the system is disengaged temporarily by the brake switch, clutch switch, or shift position switch, press the RESUME switch. With the RESUME switch depressed and the set memory retained, the vehicle automatically returns to the previous set speed.

For gradual acceleration without depressing the accelerator pedal, push the RESUME switch and hold it there until the desired speed is reached. This will send an acceleration signal input to the control unit. When the switch is released, the system will be reprogrammed for the new speed. For gradual deceleration without depressing the brake pedal, push the SET switch and hold it there until the desired speed is reached. This will send a deceleration signal input to the control unit causing the vehicle to coast until the desired speed is reached. When the desired speed is reached, release the SET switch. This will reprogram the system for the new speed.

Cruise Control

Circuit Diagram



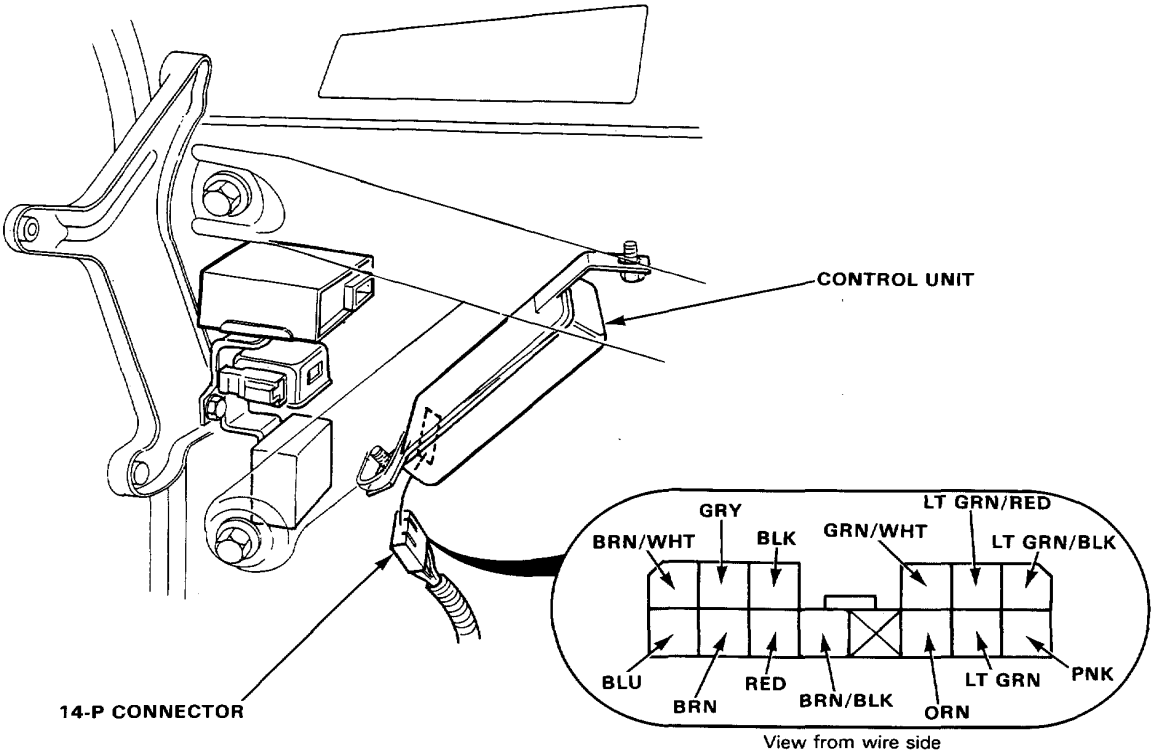
NOTE: The numbers in the table show the troubleshooting sequence.

Item to be inspected / Symptom	Blown No.4 (7.5 A) fuse (in the dash fuse box)	Main switch	Indicator light and its dimming circuit (in the gauge assembly)	SET/RESUME switch	Actuator cable free play	Actuator	Disconnected, clogged or restricted vacuum lines/stuck check valve/ leaky vacuum reservoir	Clutch switch and mounting (M/T)	Shift position console switch (A/T)	Blown No.25 (20 A) fuse (in the under-hood relay box)	Brake light switch	Control unit input	Poor ground	Open circuit in wires or loose or disconnected terminals
Cruise control can't be set.	1	2										3	G301,G401 G402	LT GRN or BLK/RED
Cruise control can be set, but indicator light does not go on.			1											RED or YEL
Cruise speed noticeably higher or lower than what was set.												1		
Excessive overshooting and/or undershooting when trying to set speed.					1	2						3		
Steady speed not held even on a flat road with cruise control set.					1	3	2					4		
Car does not decelerate or accelerate accordingly when SET or RESUME button is pushed.				1								2		
Set speed not cancelled when clutch pedal is pushed. (M/T)								1				2		
Set speed not cancelled when shift lever is moved to N. (A/T)									1			2		
Set speed not cancelled when brake pedal is pushed.										1	2	3		
Set speed not resumed when RESUME button is pushed (with main switch on, but set speed temporarily cancelled).				1								2		

Control Unit Input Test

Disconnect the 14-P connector from the control unit, located under instrument panel.
Make the following input test at the harness pins.

NOTE: Recheck the connections between the 14-P connector and the control unit, then replace the control unit if all input tests prove OK.



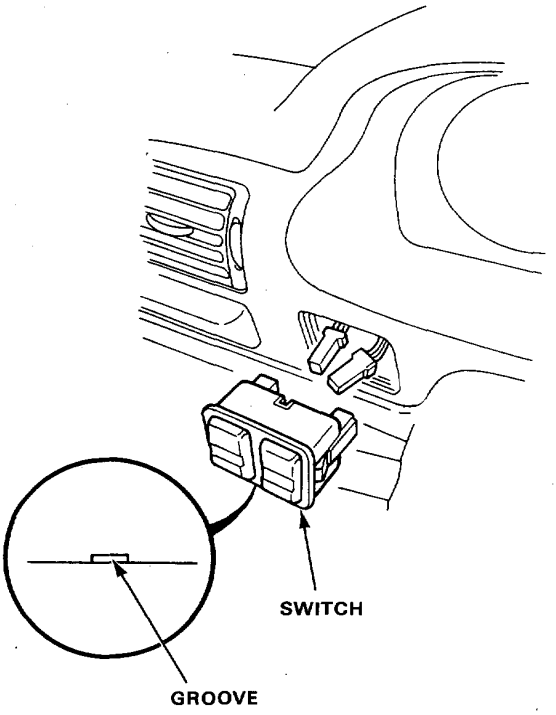
View from wire side

No.	Wire	Test condition	Test: desired result	Possible cause (if result is not obtained)
1	BLK	Under all conditions.	Check for continuity to ground: should be continuity.	· Poor ground (G401, G402). · An open in the wire.
2	LT GRN	Ignition switch ON and main switch ON.	Check for voltage to ground: should be battery voltage.	· Blown No.4 (7.5 A) fuse. · Faulty main switch. · An open in the LT GRN or BLK/RED wire.
3	LT GRN/BLK	RESUME button pushed.	Ground each terminal: Horns should sound as the switch is pushed.	· Blown No.25 (20 A) fuse. · Faulty SET/RESUME switch. · Faulty slip ring. · An open in the WHT/YEL, BLU/RED, LT GRN/BLK or LT GRN/RED wire.
4	LT GRN/RED	SET button pushed.		
5	PNK	M/T: Clutch pedal pushed. A/T: Shift lever in 2, D_3 or D_4	Check for continuity to ground: should be continuity.	· Faulty or misadjusted clutch switch (M/T). · Faulty shift position console switch (A/T). · Poor ground (G401, G402) · An open in the wire.
6	BLU	Start the engine.	Check for voltage to ground: should be battery voltage.	· Faulty ignition system. · An open in the wire.
7	ORN	Ignition switch ON and main switch ON. Raise the front of the car and rotate one wheel slowly.	Check for voltage between the LT GRN ⊕ and ORN ⊖ terminals: should be 0—5—0—5 V repeatedly.	· Faulty speed sensor. · An open in the wire.
8	GRY	Ignition switch ON, main switch ON and brake pedal pushed, then released.	Check for voltage to ground: should be 0 V with the pedal pushed and battery voltage with the pedal released.	· Faulty brake light switch · An open in the GRY or LT GRN wire.
9	GRN/WHT	Brake pedal pushed, then released.	Check for voltage to ground: should be battery voltage with the pedal pushed, and 0 V with the pedal released.	· Faulty brake light switch. · An open in the wire.
10	RED	Ignition switch ON.	Attach to ground: Indicator light in the gauge assembly comes on.	· Blown bulb. · Blown No.1 (10 A) fuse. · Faulty dimming circuit in the gauge assembly. · An open in the wire.
11	BRN	Under all conditions.	Check for resistance to ground: should be 80—120 Ω.	· Faulty actuator solenoid. · Open or short in the wire.
12	BRN/BLK	Under all conditions.	Check for resistance to ground: should be 70—110 Ω.	
13	BRN/WHT	Under all conditions.	Check for resistance to ground: should be 40—60 Ω.	

Cruise Control Main/Sunroof Switch Removal

1. Pry out the switch from the instrument panel.
2. Disconnect the 6-P and the 5-P connectors from the switch.

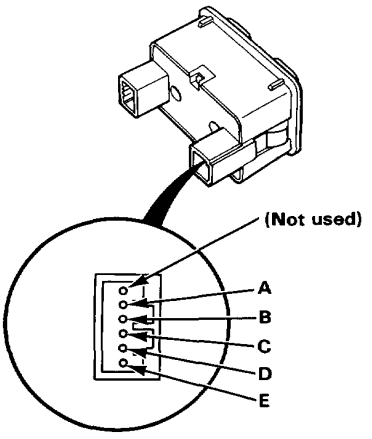
   NOTE: Be careful not to damage the switch or the instrument panel when prying out the switch.

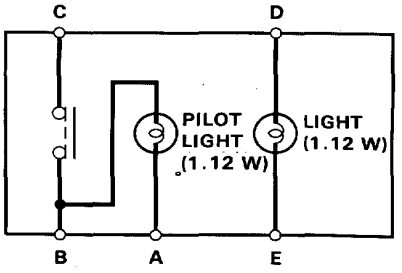


Cruise Control Main Switch Test

1. Remove the switch from the instrument panel.
2. Check for continuity between the terminals in each switch position according to the table.

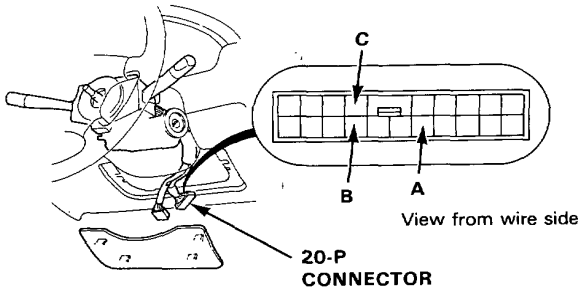
Terminal / Position	A		B	C	D		E
OFF	○	⌒	○		○	⌒	○
ON	○	⌒	○	○	○	⌒	○





SET/RESUME Switch Test

1. Remove the dashboard lower panel.
2. Disconnect the 20-P connector from the main wire harness.

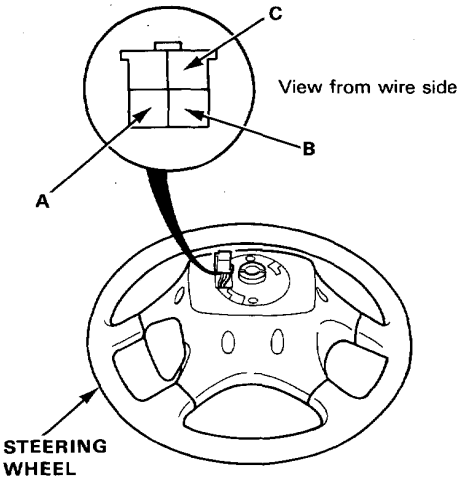


3. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	A	B	C
OFF			
SET (ON)	○	○	
RESUME (ON)	○		○

- If all of the continuity check is OK, the SET/RESUME switch is OK.
- If there is no continuity in one or some switch positions, go to step 4.

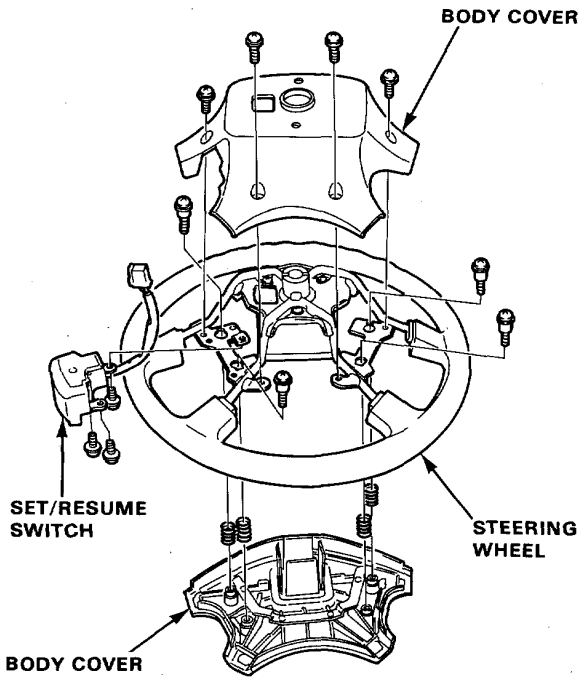
4. Remove the steering wheel and repeat step 3, but this time test at the 4-P connector of the steering wheel.



- If there is no continuity in one or some switch positions, repair the SET/RESUME switch.
- If all of the continuity check is OK, check the slip ring (page 16-262).

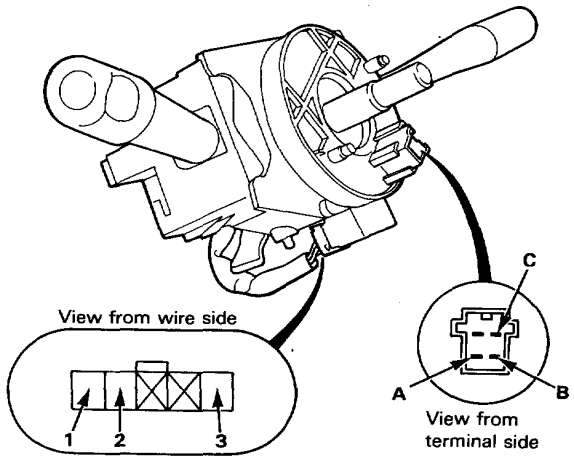
SET/RESUME Switch Replacement

1. Remove the steering wheel.
2. Remove the body covers.
3. Remove the 3 screws and the SET/RESUME switch from the steering wheel.

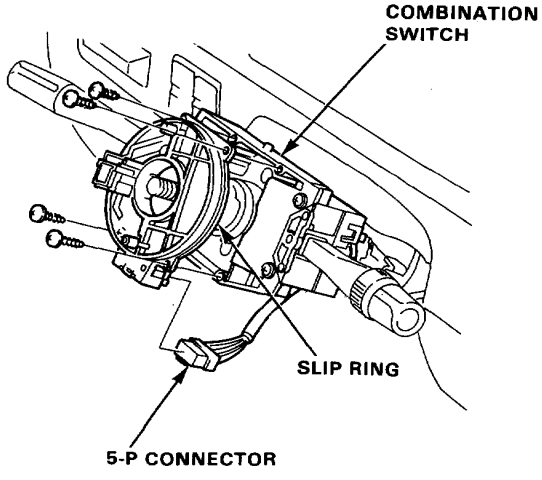


Slip Ring Test/Replacement

1. Remove the steering column lower cover.
2. There should be continuity between the No.3 and A terminals, the No.2 and B terminals, and the No.1 and C terminals, as you turn the slip ring.



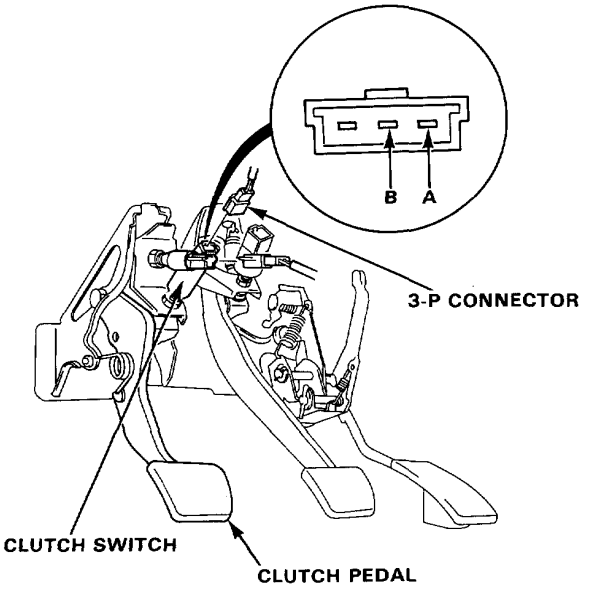
3. If necessary, remove the steering column upper cover and the 4 screws to replace the slip ring.



Clutch Switch Test

1. Disconnect the 3-P connector from the switch.
2. Check for continuity between the terminals according to the table.

Terminal / Clutch Pedal	A	B
RELEASED	○	○
PUSHED		

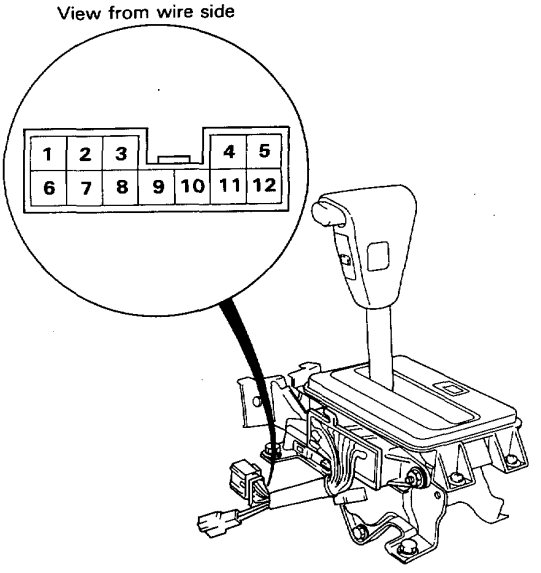


3. If necessary, replace the switch or adjust pedal height (see section 7).

Shift Position Console Switch Test

1. Remove the front console, then disconnect the 12-P connector from the console switch.
2. Check for continuity between the terminals in each switch position according to the table.

Terminal / Position	5	8
1		
2	○	○
D_3	○	○
D_4	○	○
N		
R		
P		

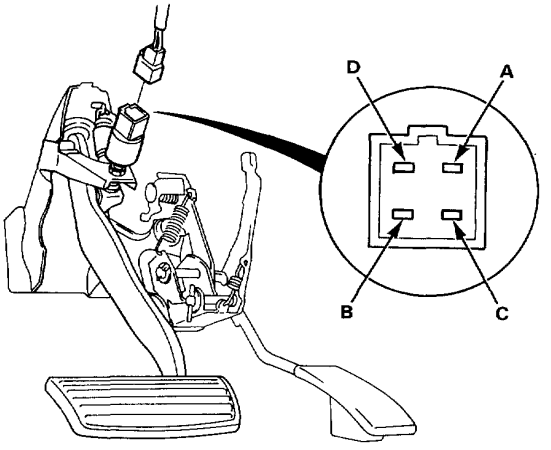


3. If necessary, replace the switch (see page 16-142).

Brake Light Switch Test

1. Disconnect the 4-P connector from the switch.
2. Check for continuity between the terminals according to the table.

Terminal / Brake Pedal	A	B	C	D
PUSHED	○——	——○		
RELEASED			○——	——○



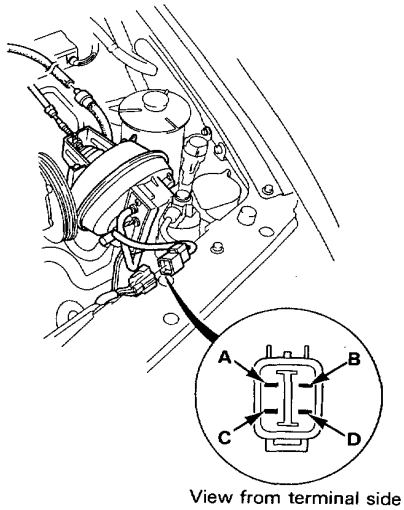
3. If necessary, replace the switch or adjust pedal height (see section 13).

Actuator Solenoid Test

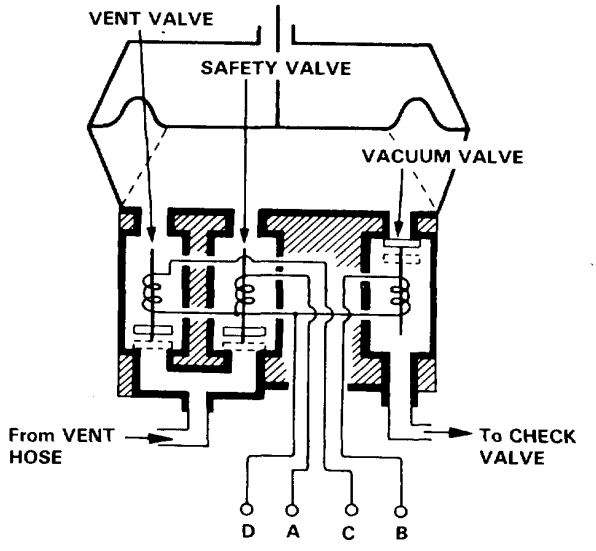
1. Disconnect the 4-P connector from the actuator.
2. Measure resistance between the terminals.

Resistance
VACUUM SOLENOID (between B and D):
30—50Ω
VENT SOLENOID (between C and D):
40—60Ω
SAFETY SOLENOID (between A and D):
40—60Ω

NOTE: Resistance will vary slightly with temperature; specified resistance is at 20°C (70°F).

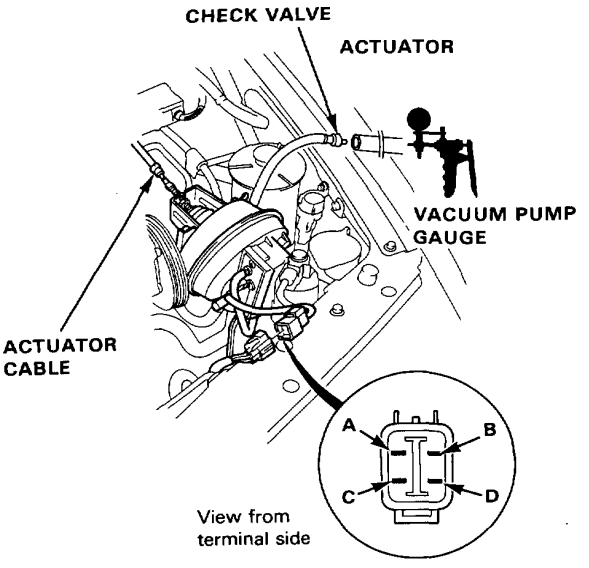


View from terminal side

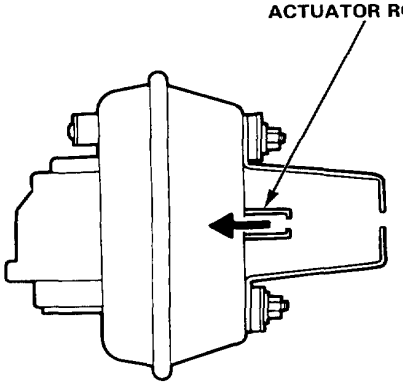


Actuator Test

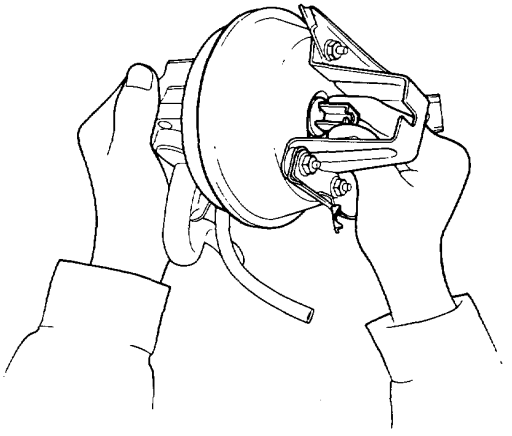
1. Disconnect the actuator cable from the actuator rod and the 4-P connector.
2. Connect battery positive to the D terminal and negative to the A, B and C terminals.
3. Connect a vacuum pump to the check valve. Then apply vacuum to the actuator.



4. The actuator rod should pull in completely. If the rod pulls in only part-way or not at all, check for a leaking vacuum line or defective solenoid.



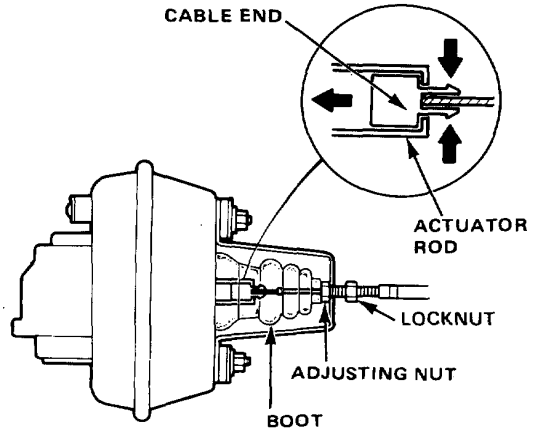
5. With voltage and vacuum still applied, try to pull the actuator rod out by hand. You should not be able to pull it. If you can, it is defective.



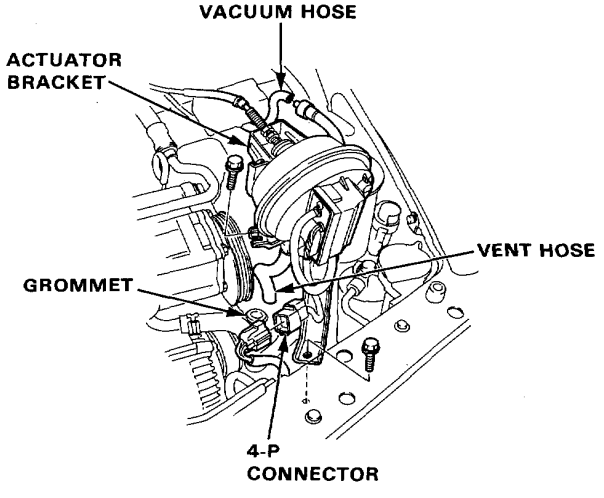
6. Disconnect battery negative from the C terminal. The actuator rod should return. If the actuator rod does not return, and the vent hose and filter are free, the solenoid valve assembly is defective.
7. Repeat steps 2-6, but this time disconnect battery negative from the A terminal. The actuator rod should return. If it does not return, and the vent hose and filter are free, the solenoid valve assembly is defective.
8. If the solenoid valve assembly is replaced, be sure to use new O-rings at each solenoid.

Actuator/Cable Replacement

1. Pull back the boot and loosen the locknut, then disconnect the cable from the bracket.
2. Disconnect the cable end from the actuator rod.



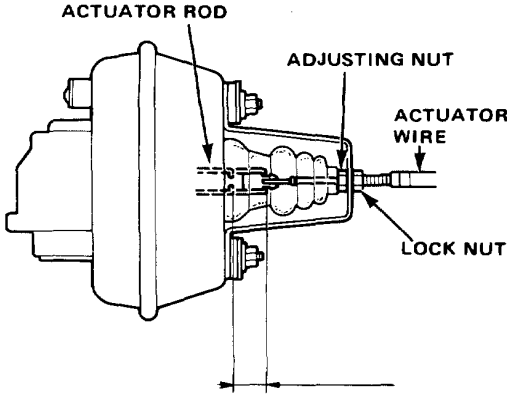
3. Disconnect the 4-P connector from the actuator.
4. Pull the vent hose from the grommet.
5. Disconnect the vacuum hose from the check valve.
6. Remove the 2 mount bolts and the actuator with the bracket and reservoir.



7. If necessary, disconnect the cable end from the linkage over the accelerator pedal, then turn the grommet 90° in the firewall and remove the cable.
8. Install in the reverse order of removal, and adjust free-play at actuator rod after connecting the cable (see next column).

Actuator Cable Adjustment

1. Check that the actuator cable operates smoothly with no binding or sticking.
2. Start the engine.
3. Measure the amount of movement of the actuator rod until the cable pulls on the accelerator lever (engine speed starts to increase). Free play should be 11 ± 1.5 mm (0.43 ± 0.06 in).



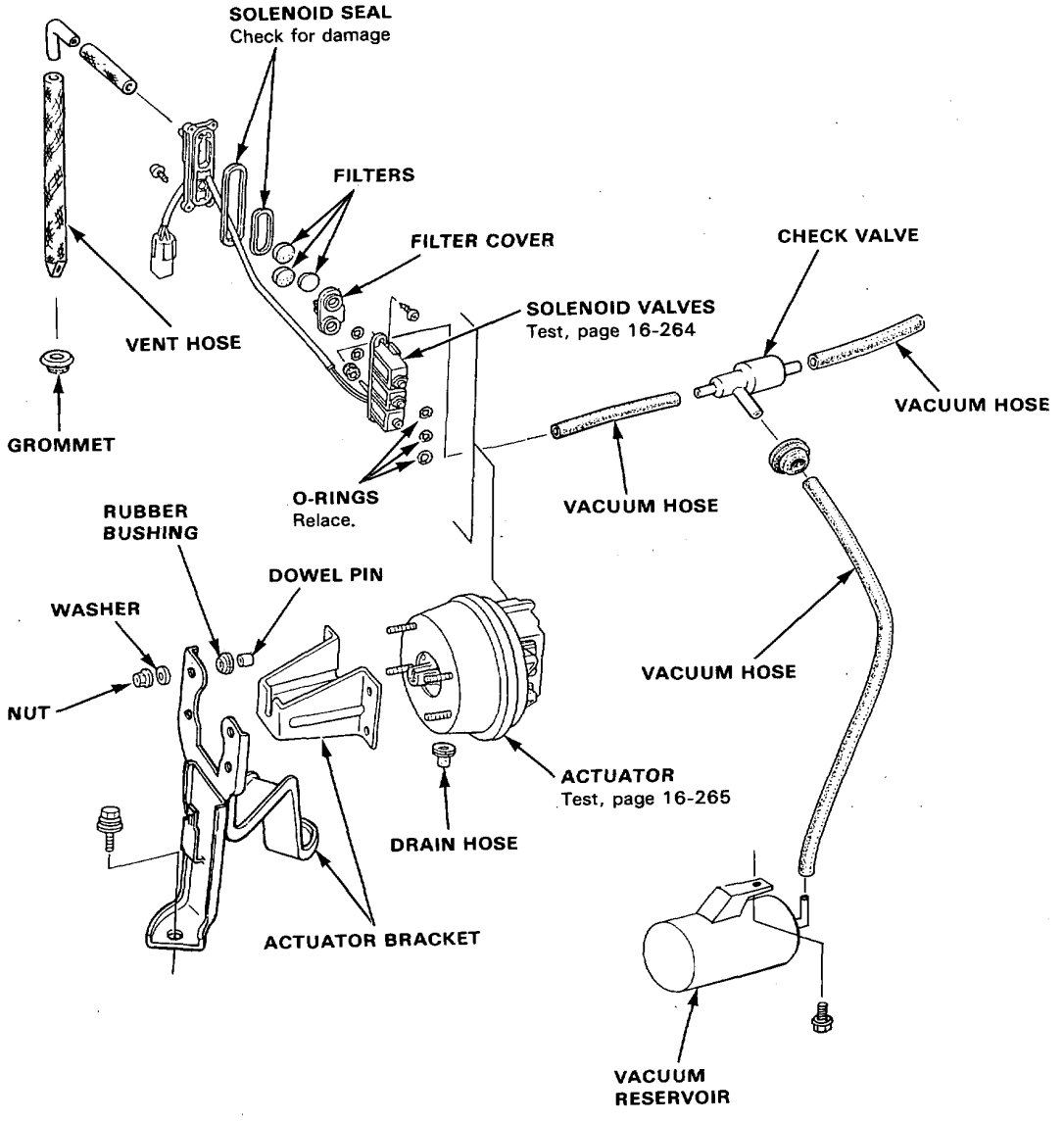
LOCKNUT FREE PLAY: 11 ± 1.5 mm (0.43 ± 0.06 in)

4. If free play is not within specs, loosen the locknut and turn the adjusting nut as required.

   NOTE: If necessary, check the throttle cable free Play (see section 6), then recheck the actuator rod free play.

5. Retighten the locknut and recheck the free play.

Actuator Disassembly



Wiring Diagrams

Index

Air Conditioner 17
Anti-Lock Brake System (ALB) 14
Automatic Transmission Control System 14
Battery 1
Blower Controls 17
Charging System 1
Cigarette Lighter 10
Clock 10
Cooling Fan Control 16
Cruise Control System 12
Defogger, Rear Window 11
Door Lock, Power 12
Fuel and Emissions 16
Gauges 2
Headlight Adjuster System 4
Horns 4
Ignition Switch 1
Ignition System 1
Indicators
- Cruise Control Indicator 2
- Trunk Open Indicator 2
- High Beam Indicator 2
- Shift Lever Position Indicator 4
- Turn Signal Indicator 2

Integrated Control Unit 5
Lights, Exterior
- Back-up Lights 10
- Brake Lights 3
- Hazard Lights 2
- Headlights 6
- License Plate Lights 6
- Marker Lights 6
- Taillights 6

Lights, Interior
- Courtesy Lights 3
- Dashlight Brightness Control 6
- Dome Lights 3
- Glove Box Light 6
- Trunk Light 6

Vanity Mirror Light 6
Lighting System 6
Mirror, Power 6
Seat, Power 13
Starting System 1
Stereo Sound System 10
Sunroof 11
Turn Signal / Hazard Flasher System 13
Warning System
- ALB Warning 2
- Brake Warning 2
- Charge Warning 2
- Check Engine Warning 2
- Hazard Warning 2
- Light-on Warning 5
- Oil Pressure Warning 2

Washers
- Windshield 13
- Headlight Washer 13

Windows, Power 7
Wipers
- Windshield 7

INTRODUCTION

How to Use This Manual

This manual contains service information for the ACCORD. Separate volumes are published regarding vehicle construction, engine, and transmission; the applicable reference manuals are listed below.
This manual is divided into sections. This first page of each section is marked with a black tab that lines up with one of the thumb index tabs on next page. You can quickly find the first page of each section without looking through a full table of contents. The symbols printed at the top corner of each page can also be used as a quick reference system.

Each section includes:

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

Reference Manuals

Description	Code No.	Remarks	Date Published
ACCORD Construction and Function	62SM410		Sept. 1989
F18A/F20A/F22A ENGINE Maintenance and Repair	62PT400	1.8 ℓ Carbureted Engine 2.0 ℓ Carbureted Engine 2.0 ℓ Fuel-Injected Engine 2.2 ℓ Fuel-Injected Engine	Sept. 1989
H2 MANUAL TRANSMISSION Maintenance and Repair	62PX500	5-speed	Sept. 1989
PX4B AUTOMATIC TRANSMISSION Maintenance and Repair	62PX400	4-speed with lock-up	Sept. 1989

Special Information

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

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

NOTE: Gives helpful information.

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

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

First Edition 10/89 1266 Pages
All Rights Reserved

HONDA MOTOR CO., LTD.
Service Publication Office

Chassis and Engine Numbers

Vehicle Identification Number (1.8 ℓ Carbureted Engine)

JHM CB1 5 2 0 0 C 0 00001

Manufacturer Code and Vehicle Type
JHM: HONDA MOTOR CO., LTD., JAPAN. HONDA Passenger Car
Body and Engine Type
CB1: ACCORD 1.8 ℓ
Door and Transmission Type
5 : 4-door, 5-speed Manual
Vehicle Grade
2 : LX (KB)
3 : EX (KB)
Fixed Code
Auxiliary Number
Factory Code
C: Sayama Factory in Japan
Model Year
0: 1990
Serial Number

Vehicle Identification Number (2.0 ℓ Carbureted Engine)

JHM CB3 5 2 0 0 C 0 00001

Manufacturer Code and Vehicle Type
JHM: HONDA MOTOR CO., LTD., JAPAN. HONDA Passenger Car
Body and Engine Type
CB3: ACCORD 2.0 ℓ
Door and Transmission Type
5 : 4-door, 5-speed Manual
6 : 4-door, 4 speed Automatic
Vehicle Grade
2 : DX, F20A2 (KG, KS)
F20A3 (KW)
: LX, F20A2 (KQ)
F20A3 (KP, KT, KU, KY)
3 : EX, F20A2 with CATA (KG, KX, KS)
F20A2 without CATA (KF, KE)
F20A3 (KB, KW, KP, KT, KU, KY)
F20A6 (KG)
: EX with ALB,
F20A2 with CATA (KG, KS)
F20A2 without CATA (KF)
F20A3 (KB)
Fixed Code
Auxiliary Number
Factory Code
C : Sayama Factory in Japan
Model Year
0 : 1990
Serial Number

Vehicle Identification Number (2.0 ℓ Fuel-Injected Engine)

JHM CB3 5 4 0 0 C 0 00001

Manufacturer Code and Vehicle Type
JHM: HONDA MOTOR CO., LTD., JAPAN. HONDA Passenger Car
Body and Engine Type
CB3: ACCORD 2.0 ℓ
Door and Transmission Type
5 : 4-door, 5-speed Manual
6 : 4-door, 4-speed Automatic
Vehicle Grade
4 : 2.0i, F20A4 with CATA (KG, KS)
F20A4 without CATA (KF, KE)
F20A5 (KB, KW)
2.0i with ALB,
F20A4 with CATA (KG, KX, KS)
F20A4 without CATA (KF, KE)
F20A5 (KB, KW)
EXi, F20A5 (KU)
EXi with ALB, F20A5(KU)
Fixed Code
Auxiliary Number
Factory Code
C : Sayama Factory in Japan
Model Year
0 : 1990
Serial Number

Vehicle Identification Number (2.2 ℓ Fuel-Injected Engine)

JHM CB7 5 5 0 0 C 0 00001

Manufacturer Code and Vehicle Type
JHM: HONDA MOTOR CO., LTD., JAPAN HONDA Passenger Car
Body and Engine Type
CB7: ACCORD 2.2 ℓ
Door and Transmission Type
5 : 4-door, 5-speed Manual
6 : 4-door, 4-speed Automatic
Vehicle Grade
5 : 2.2i, F22A3 with CATA (KF, KG, KX, KS, KE)
EXi, F22A2 (KY)
F22A5 with CATA (KQ)
Fixed Code
Auxiliary Number
Factory Code
C : Sayama Factory in Japan
Model Year
0 : 1990
Serial Number

Engine Number (DX: European, LX: General and EX: KG 90 ps)

F18A2 - 10 00001

Engine Type
- F18A2 : 1.8 ℓ SOHC Carbureted Leaded gasoline: KB
- F20A2 : 2.0 ℓ SOHC Carbureted Unleaded gasoline with CATA : KG/KS (DX), KQ (LX)
- F20A3 : 2.0 ℓ SOHC Carbureted Leaded gasoline: KW (DX), KP/KT/KU/KY (LX)
- F20A6 : 2.0 ℓ SOHC Carbureted (90ps) Unleaded gasoline with CATA : KG (EX 90ps)

Transmission Type
- 10: 5-speed manual
- 15: 4-speed automatic

Serial Number

Engine Number (EX except KG 90 ps)

F20A2 - 10 00001

Engine Type
- F20A2 : 2.0 ℓ SOHC Carbureted Unleaded gasoline with CATA : KG, KX, KS
  2.0 ℓ SOHC Carbureted Unleaded gasoline without CATA : KF, KE
- F20A3 : 2.0 ℓ SOHC Carbureted Leaded gasoline :KB, KW, KP, KT, KU, KY

Transmission Type
- 10: 5-speed manual
- 15: 4-speed automatic

Serial Number

Engine Number (2.0i: European and EXi: KU)

F20A4 - 10 00001

Engine Type
- F20A4 : 2.0 ℓ SOHC Fuel-Injected Unleaded gasoline with CATA : KG, KX, KS
  2.0 ℓ SOHC Fuel-Injected Unleaded gasoline without CATA: KF, KE
- F20A5 : 2.0 ℓ SOHC Fuel-Injected Leaded gasoline: KB, KW, KU

Transmission Type
- 10: 5-speed manual
- 15: 4-speed automatic

Serial Number

Engine Number (2.2i: European)

F22A3 - 10 00001

Engine Type
- F22A3 : 2.2 ℓ SOHC Fuel-Injected Unleaded gasoline with CATA

Transmission Type
- 10: 5-speed manual
- 15: 4-speed automatic

Serial Number

Engine Number (EXi: KQ, KY)

F22A2 - 1000001

Engine Type
- F22A2 : 2.2 ℓ SOHC Fuel-Injected Leaded gasoline: KY
- F22A5 : 2.2 ℓ SOHC Fuel-Injected Unleaded gasoline with CATA : KQ

Serial Number

Manual Transmission Number

H2A5 - 1000001

Transmission Type
- H2C4: 2.0 ℓ Fuel-Injected and 2.2 ℓ Fuel-Injected except KQ
- H2S8: 1.8 ℓ and 2.0 ℓ Carbureted
- H2U5: 2.2 ℓ Fuel-Injected: KQ

Serial Number

Automatic Transmission Number

PX4B - 1000001

Transmission Type

Serial Number