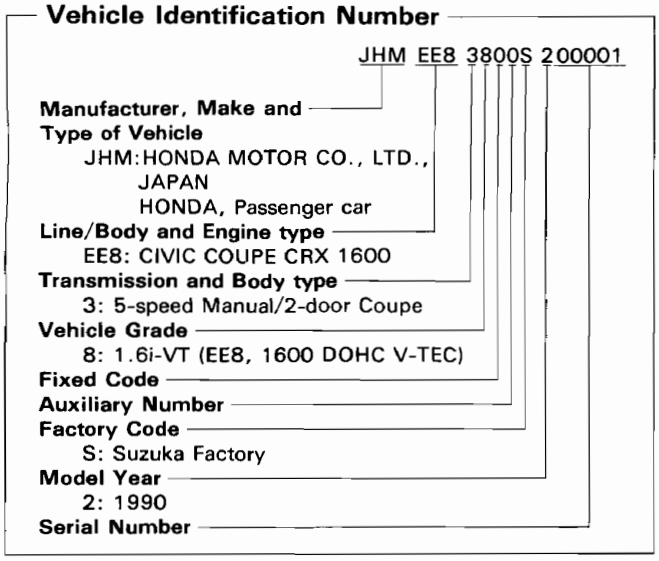
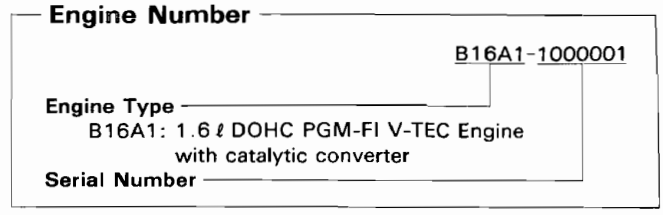
Chassis and Engine Numbers

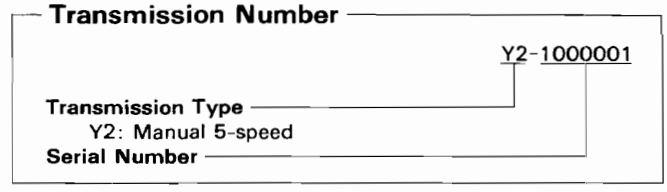
Vehicle Identification Number



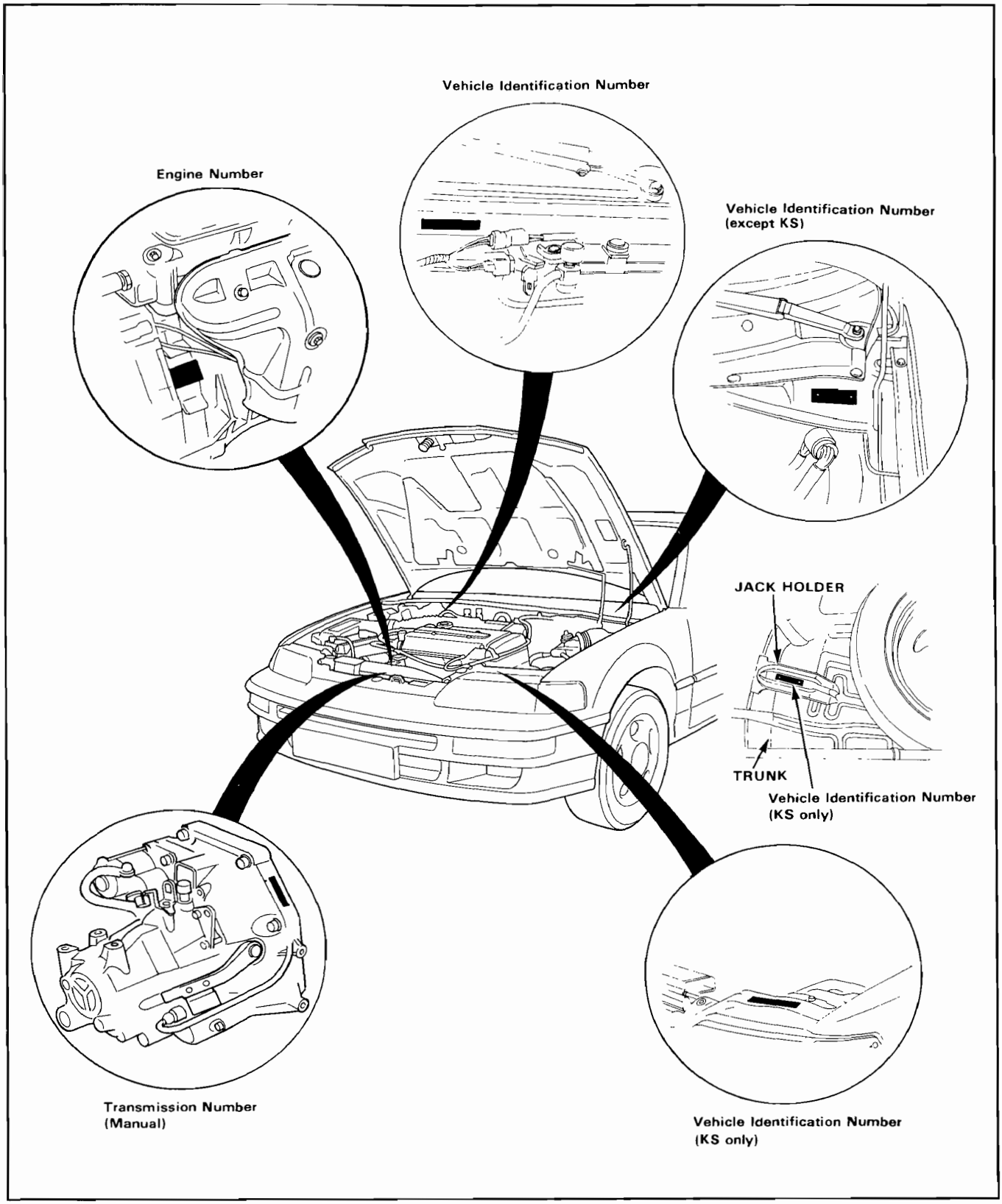
Engine Number



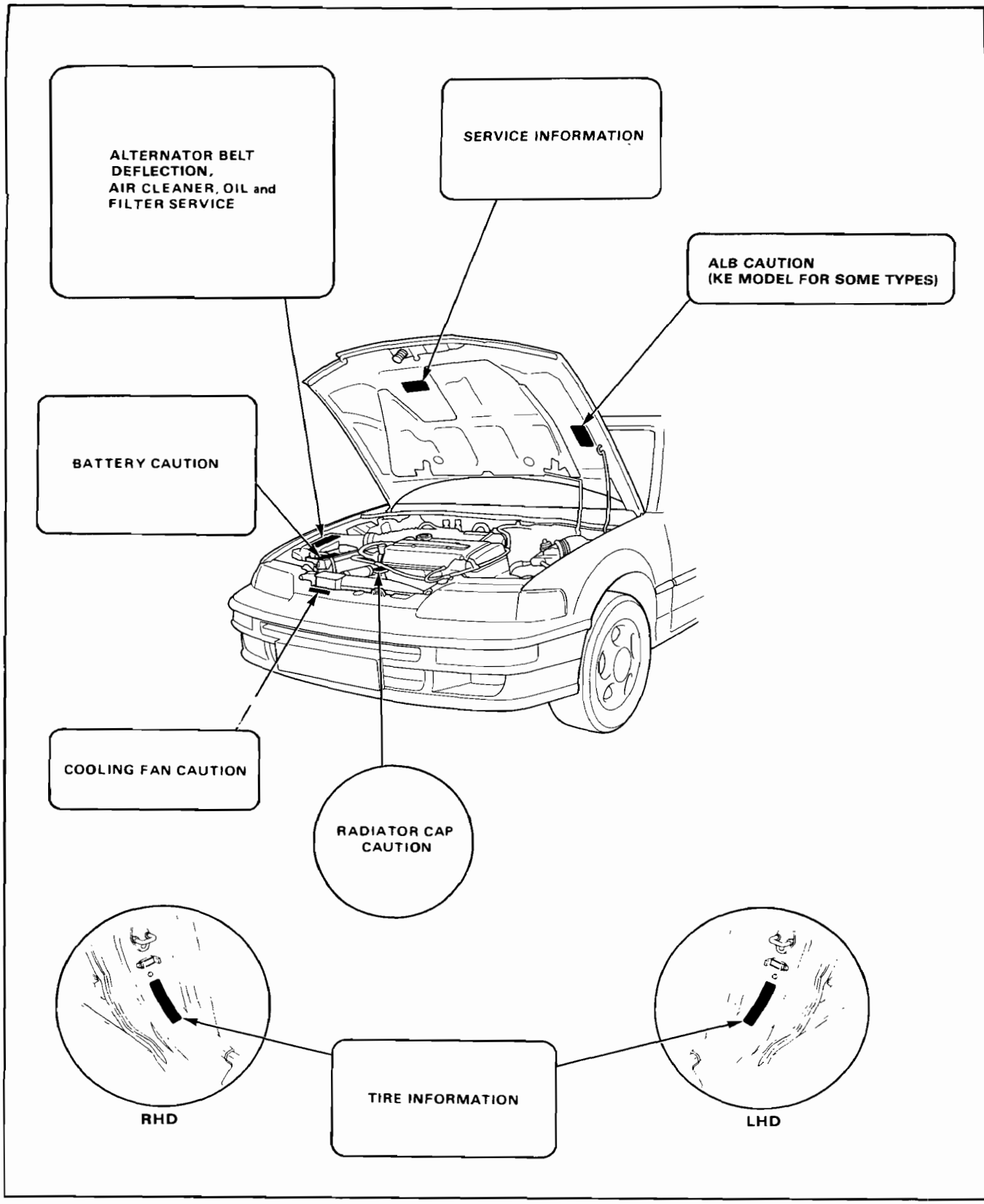
Transmission Number



Identification Number Locations



Label Locations



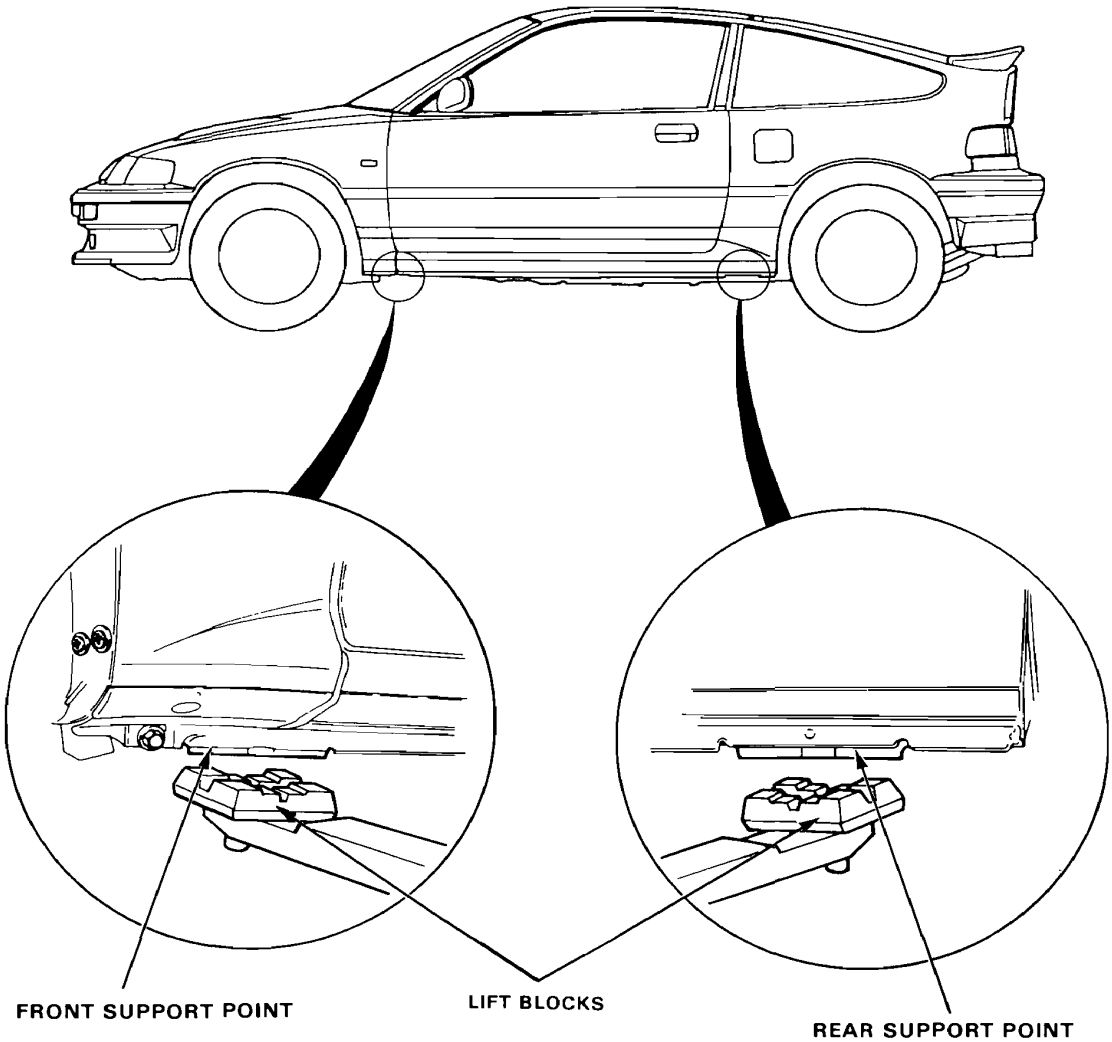
Lift and Support Points

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 hatch are to be removed, place additional weight in the luggage area 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 distribution.



(cont'd)

Lift and Support Points (cont'd)

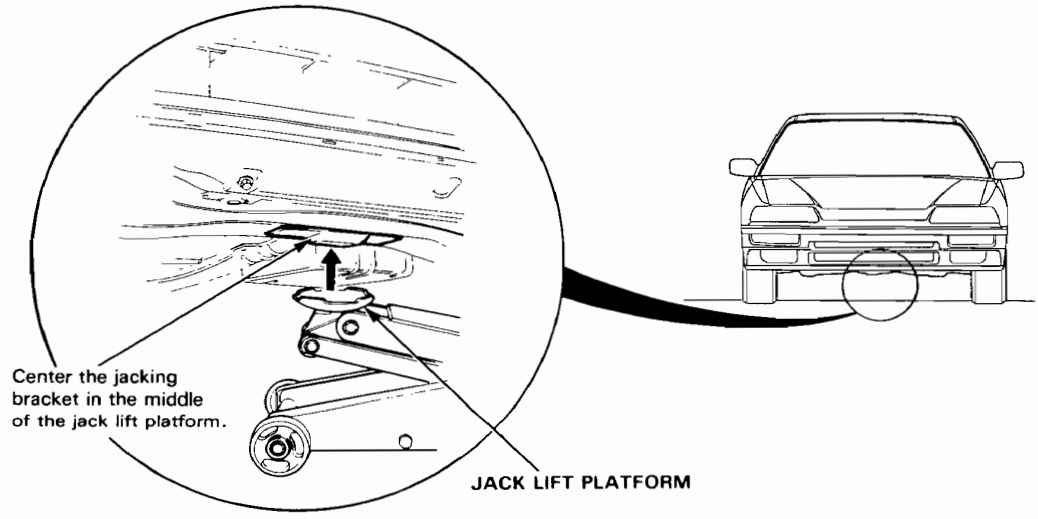
Floor Jack

1. Set the parking brake and block the wheels that are not being lifted.
2. When lifting the rear of the car, put the gearshift lever in reverse.
3. Raise the car high enough to insert the safety stands.
4. Adjust and place the safety stands as shown on page 1-7 so the car will be approximately level, then lower the car onto the stands.

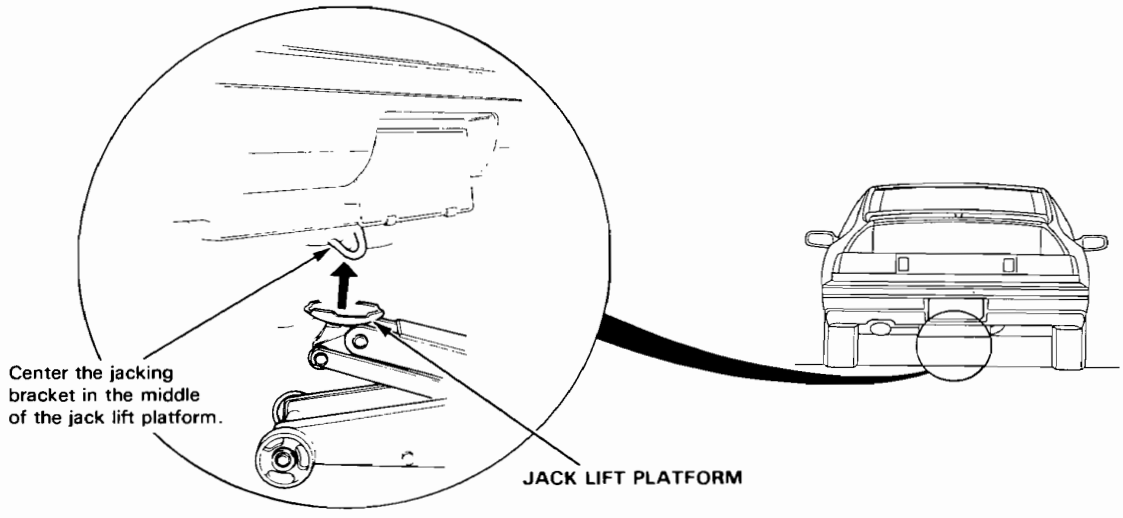
⚠ WARNING

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

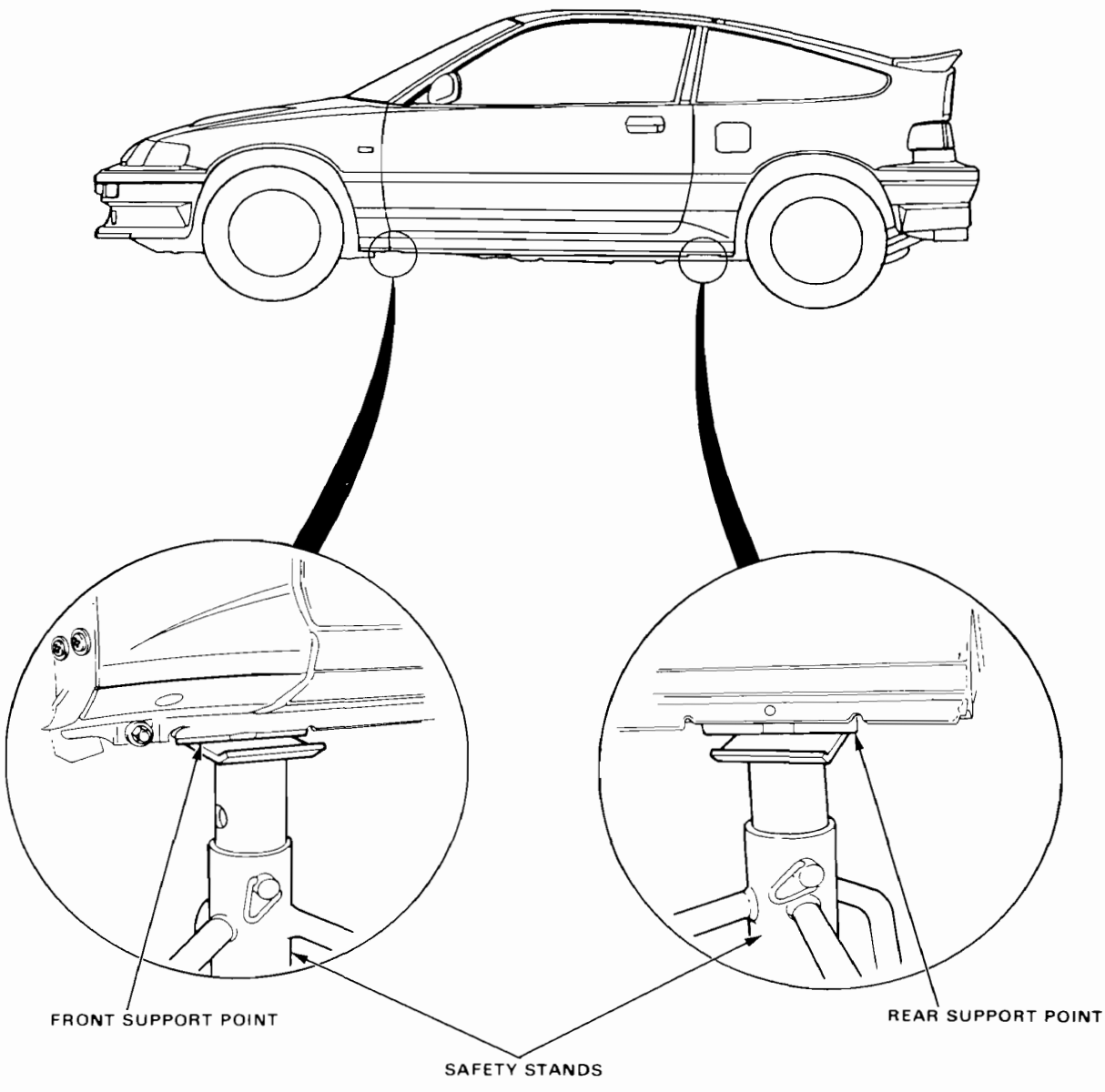
Front



Rear



Safety Stands

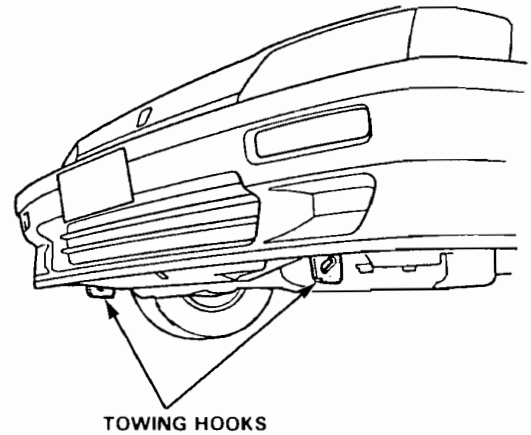


Towing

If possible, always tow the car with the front wheels off the ground. 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. Check local regulations for towing. A rope may be attached to the hook shown in the illustration. Do not attach a tow bar to either bumper.

⚠WARNING Do not push or tow a car to start it. The forward surge when the engine starts could cause a collision. Also, under some conditions, the catalytic converter could be damaged.
If the car is to be towed with the front wheels on the ground, observe the following precautions:
Shift the transmission to Neutral and turn the ignition key to the "I" position.

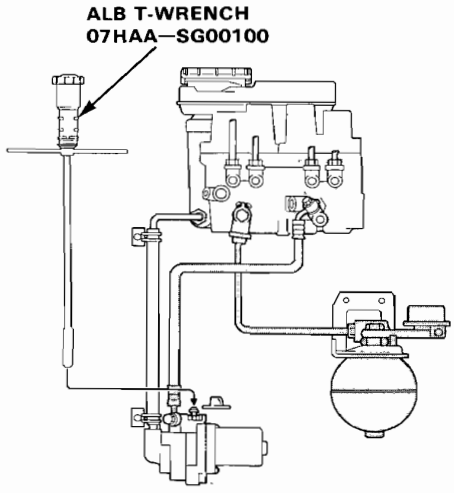
CAUTION: Do not exceed 55 km/h (35 mph) or tow for distances of more than 80 km (50 miles).



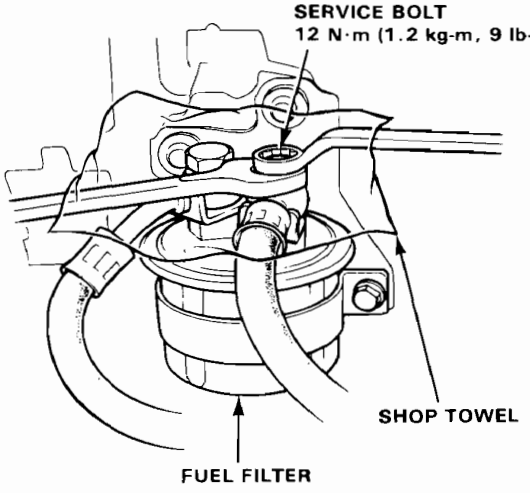
TOWING HOOKS

Special Caution Items For This Car

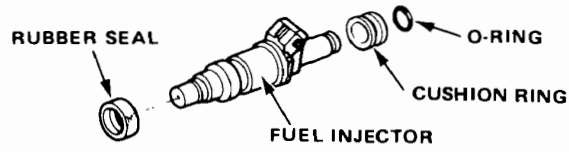
1. ALB piping system servicing (KE model for some types)
   - Disassemble the ALB piping system after relieve the high-pressured brake fluid.
   - Otherwise, the high-pressured brake fluid will burst out and it is very dangerous.
   - See section 13 how to relieve the highpressured brake fluid.



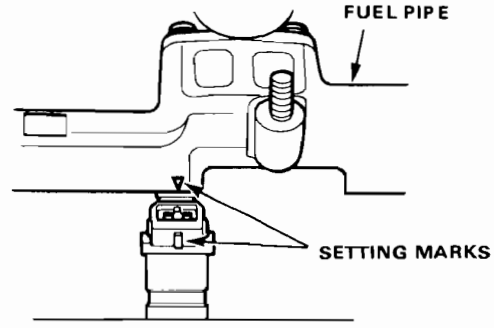
2. Fuel Line Servicing
   - Relieve fuel pressure by loosening the service bolt provided on the top of the fuel filter before disconnecting a fuel hose or a fuel pipe.



   - 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 alcoholbased 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 connector. The center line of the connector should align with the setting mark on the injector holder.



3. 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.

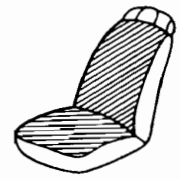
(cont'd)

Special Caution Items For This Car (cont'd)

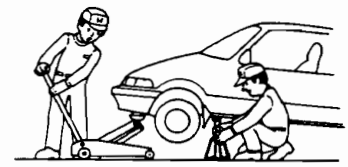
4. Installation of an amateur radio for cars equipped with PGM-FI and ALB.
   Care has been taken for the PGM-FI control unit and its wiring to prevent erroneous operation from external interference, but erroneous operation of the control unit may be caused by extremely strong radio waves. Attention must be paid to the following items to prevent erroneous operation of the control unit.
   - The antenna and the body of the radio must be at least 200 mm (7.9 in.) away from the control unit.
   - PGM-FI control unit location: Passenger's side front lower panel.
   - ALB control unit location: Laggage area Light side panel.
   - Do not lead the antenna feeder and the coaxial cable over a long distance parallel to the car's wiring. When crossing with the wiring is required, execute crossing at a right angle.
   - Do not install a radio with a large output (max. 10W).
5. Apply liquid gasket to the transmission, oil pump cover, right side cover and water outlet. Use HONDA genuine liquid gasket Part No. OY740-99986.
   - 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. Instead reapply liquid gasket after removing the old residue.
   - After assembly, wait at least 30 minutes before filling the appropriate liquid (engine oil, coolant and other similar fluid).

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.



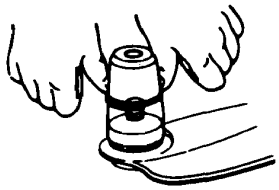
2. Work safely and give your work your undivided attention. When either the front or rear wheels are to be raised, block the remaining wheels securely. Communicate at frequently as possible when work involves two or more workers. Do not run the engine unless the shop or working area is well ventilated.



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.

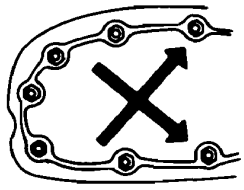
4. Mark or place all removed parts in order in a parts rack so they can be reassembled in their original places.

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

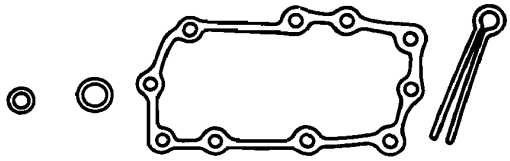


6. Parts must be assembled with the proper torque according to the maintenance standards established.

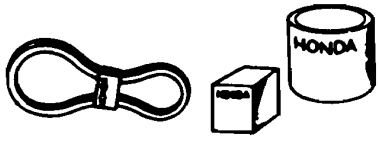
7. When tightening a series of bolts or nuts, begin with the center or large diameter bolts and tighten them in crisscross pattern in two or more steps.



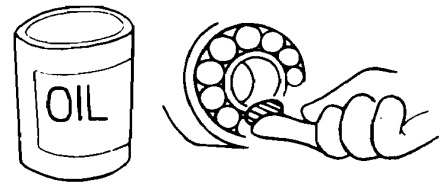
8. Use new packings, gaskets, O-rings and cotter pins whenever reassembling.



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.

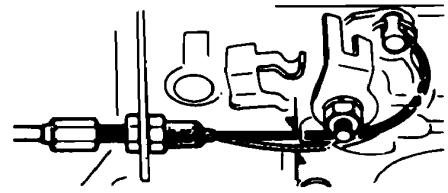


11. Brake fluid and hydraulic components
    - When replenishing the system, use extreme care to prevent dust and dirt from entering the system.
    - Do not mix different brands of fluid as they may not be compatible.
    - Do not reuse drained brake fluid.
    - Because blake fluid can cause damage to painted and resin surfaces, care shoud be taken not to spill it on such materials. If spilled accidentally, quickly rince it with water or warm water from painted or resin surfaces.
    - After disconnecting brake hoses or pipes, be sure to plug the openings to prevent loss of brake fluid.
    - Clean all disassembled parts only in clean BRAKE FLUID. Blow open all holes and passages with compressed air.

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

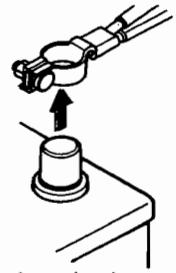
12. Avoid oil or grease getting on rubber parts and tubes, unless specified.

13. Upon assembling, check every part for proper installation and operation.

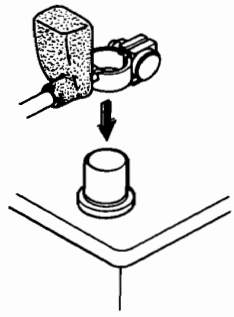


Electrical

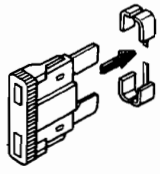
- Before making any repairs on electric wires or parts, disconnect the battery cables from the battery starting with the negative (−) terminal.



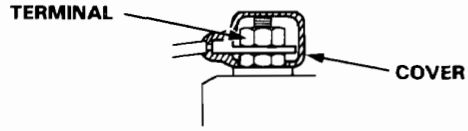
- After making repairs, check each wire or part for proper routing and installation. Also check to see that they are connected properly.
- Always connect the battery positive (+) cable first, then connect the negative (−) cable.



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

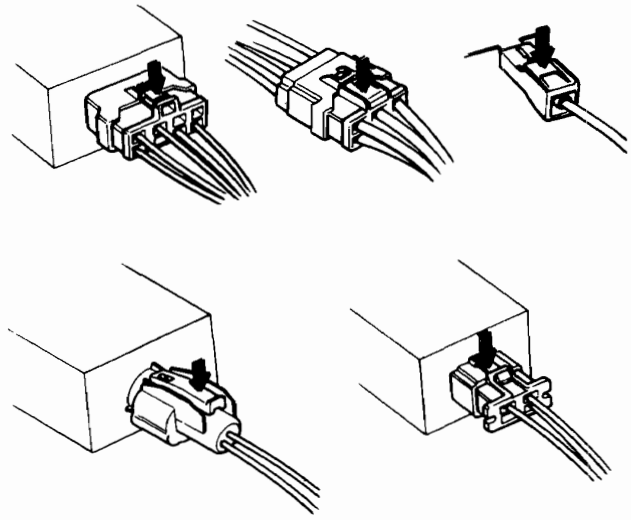


- Be sure to install the terminal cover over the connections after a wire or wire harness has been connected.

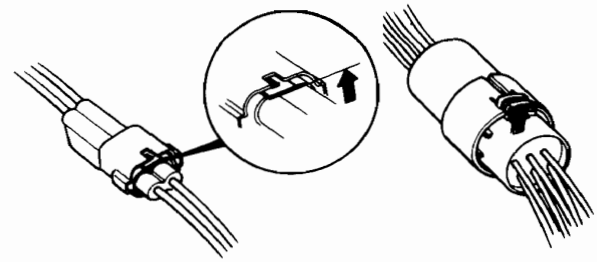


- As to locking connectors, be sure to disengage the lock before disconnecting.
- Conventional connectors may be of two types, those in which the lock is pressed to remove, and those in which the lock is pulled up to remove. Be sure to ascertain the type of locking device before beginning work. The following is a depiction of the means of disconnecting various typical connectors.

Press to disengage:



Pull up to disengage:

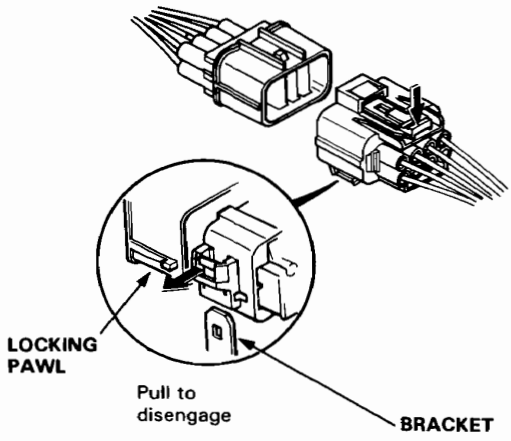


When new type connectors are used, connection and disconnection of them should be done paying attention to the following precautions.

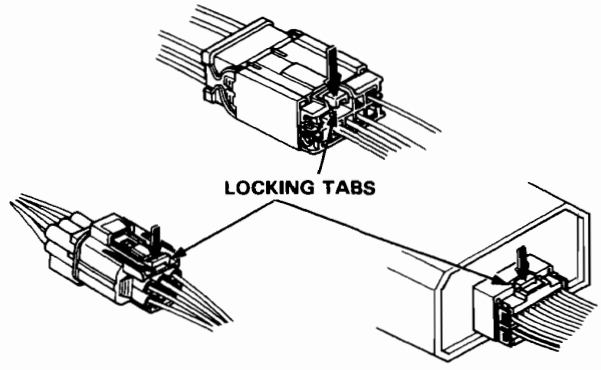
- Because all the connectors except terminal of 1-P are equipped with push-down type locks, unlock them first before disconnecting the connectors.

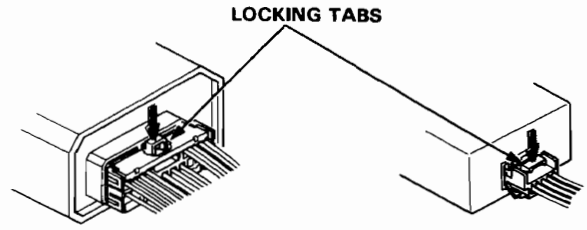
- On the connectors installed on the bracket a pull type lock is equipped between the bracket and the connector.
  Some connectors of this type can not be disconnected unless they are removed from their brackets. When disconnecting, check their shapes.

- On the bracket mounted connector with dual locks, remove the connector from the bracket before disconnecting.



- Push the locking tab to disconnect.

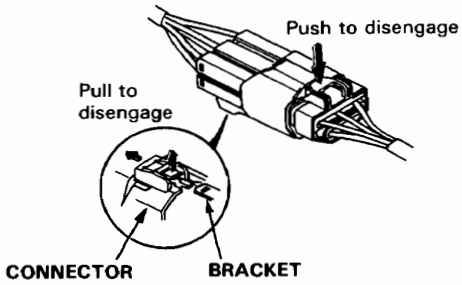




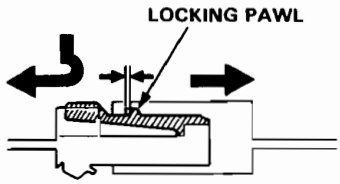
(cont'd)

Electrical (cont'd)

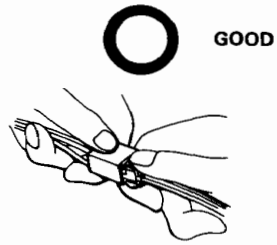
- Pull the locking tab to remove the connector from the bracket.

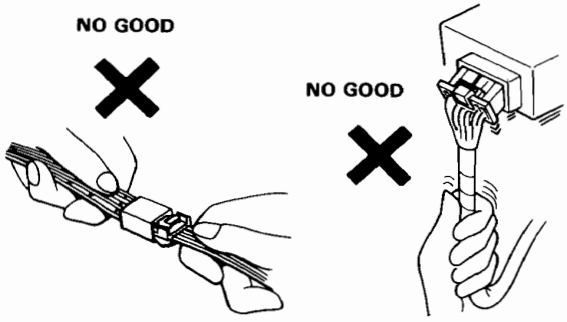


- When disconnecting locks, first press in the connector tightly (to provide clearance to the locking device), then operate the tab fully and remove the connector in the designated manner.

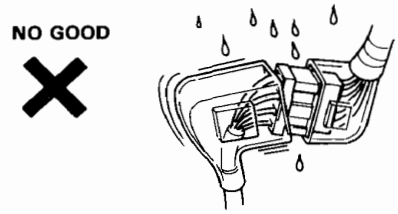


- When disconnecting a connector, pull it off from the mating connector by holding on both connectors.
- Never try to disconnect connectors by pulling on their wires.

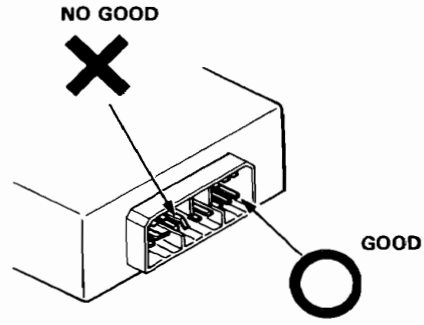




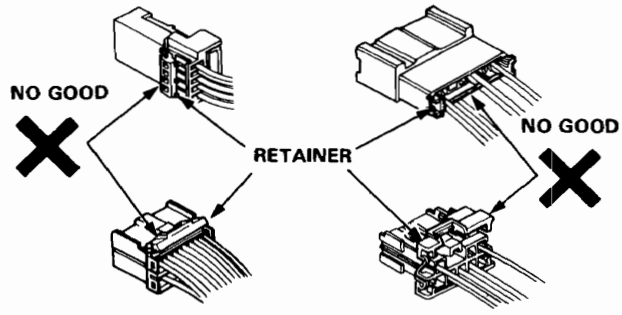
- Place the plastic cover over the mating connector after reconnecting. Also check that the cover is not distorted.



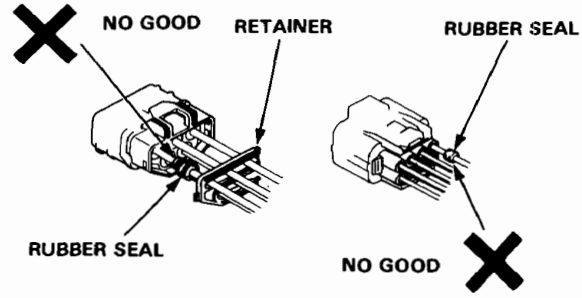
- Before connecting connectors, check to see that the terminals are in place and not bent or distorted.

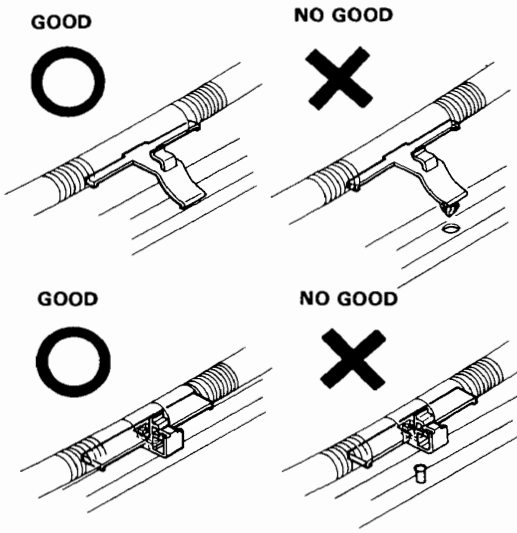


- Check for loose retainer and rubber seals.
  The illustration shows examples of terminal and seal abnormality.

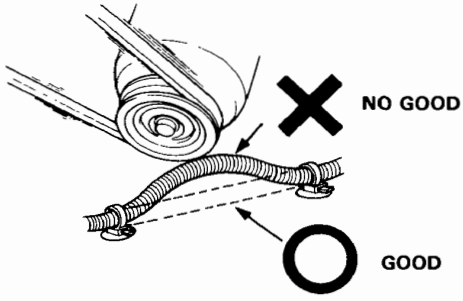


- Example of waterproof connector:

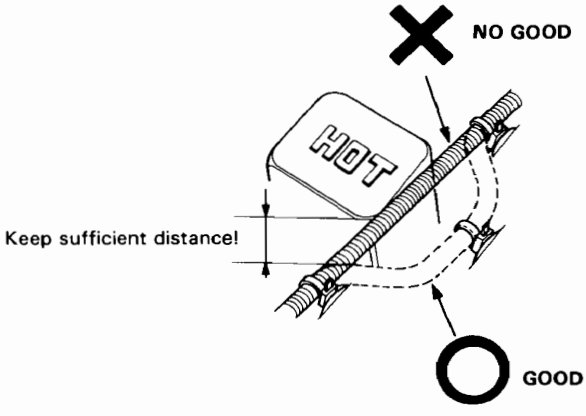




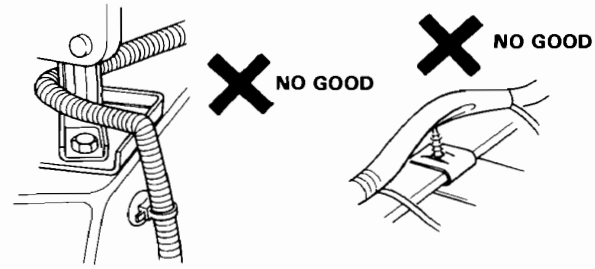
- After clamping, check each harness to be certain that it is not interfering with any moving or sliding parts of the vehicle.
- Keep wire harnesses away from the exhaust pipes and other hot parts.



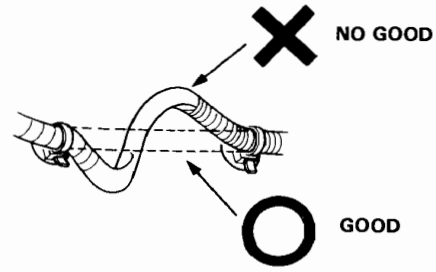
- Always keep a safe distance between wire harnesses and any heated parts.



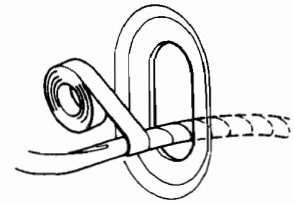
- Do not bring wire harnesses in direct contact with sharp edges or corners.
- Also avoid contact with the projected ends of bolts, screws and other fasteners.



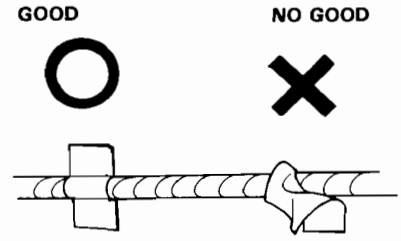
- Route harnesses so they are not pulled taut or slackened excessively.



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



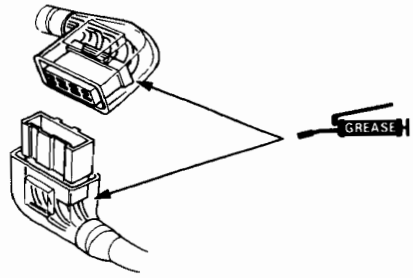
- Clean the attaching surface thoroughly if an adhesive is used. First, wipe with solvent or alcohol if necessary.



(cont'd)

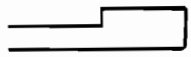
Electrical (cont'd)

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

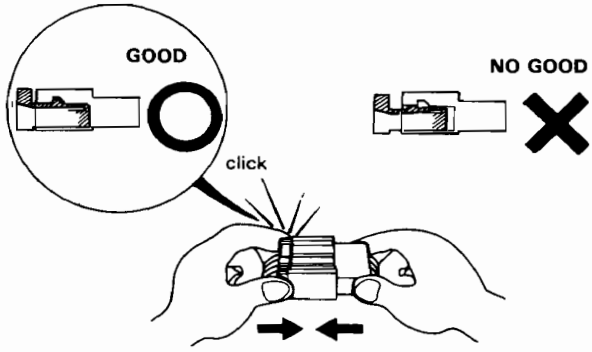


- Insert the connector tightly and make sure it is securely locked.
- Check all the wire harnesses are connected.
- There are two types of locking tab: one that you have to push and the other you should not touch when connecting the connector. Check the shape of the locking tab before connecting.
- The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

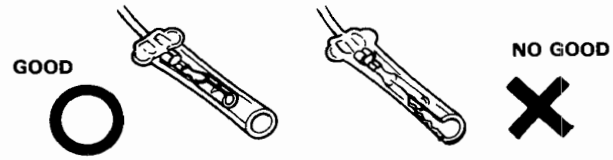
- The locking tab with an angle end should be pushed when connecting.



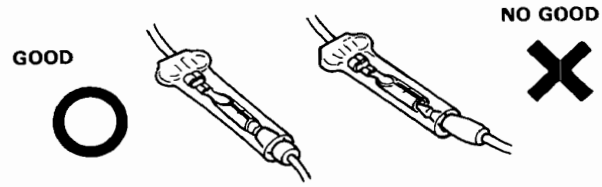
- Insert connectors fully until they will no longer go.
- The connectors must be aligned and engaged securely.
- Do not use wire harnesses with a loose wire or connector.



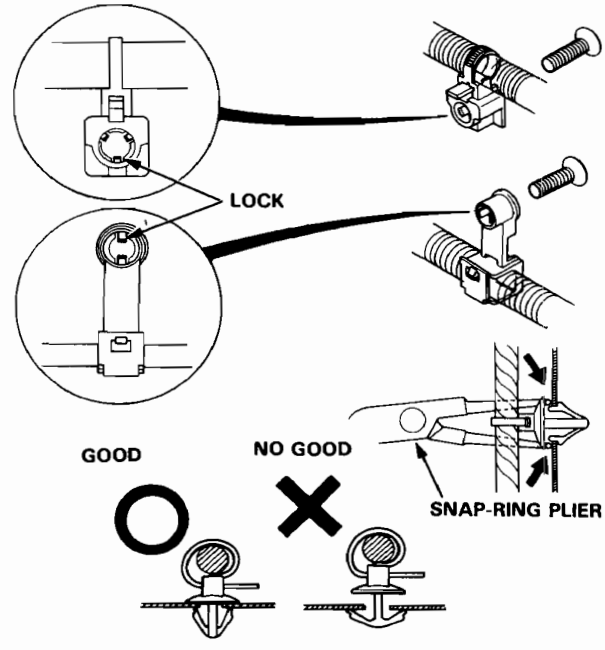
- Before connecting, check each connector cover for damage. Also make sure that the female connector is tight and not loosened from the previous use.



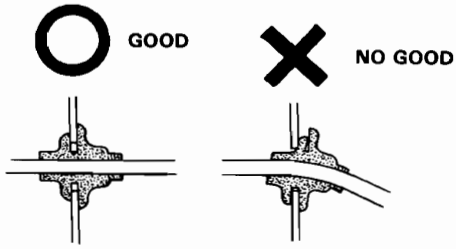
- Insert male connectors into the female connectors fully until they will no longer go.
- Be sure that plastic cover is placed over the connection.
- Position the wires so that the open end of the cover faces down.



- 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.

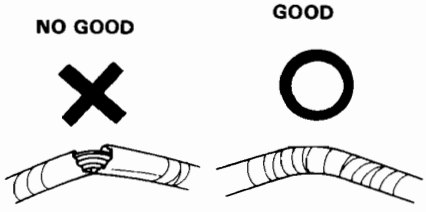


- Seat grommets in their grooves properly.

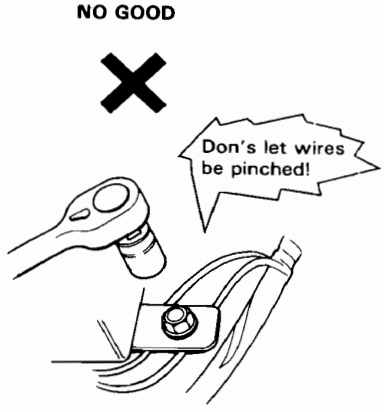


- Do not damage the insulation when connecting a wire.

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



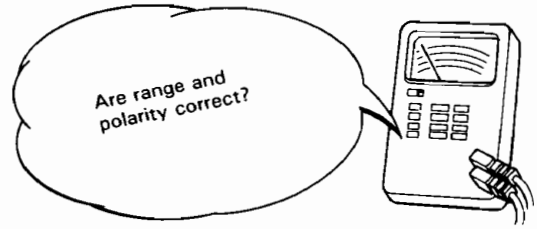
- After installing parts, make sure that wire harnesses are not pinched.



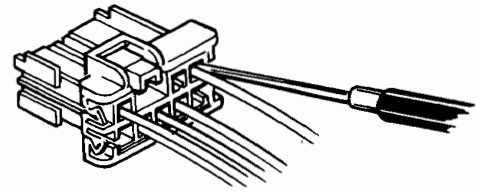
- After routing, check that the wire harnesses are not twisted or kinked.

- 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.

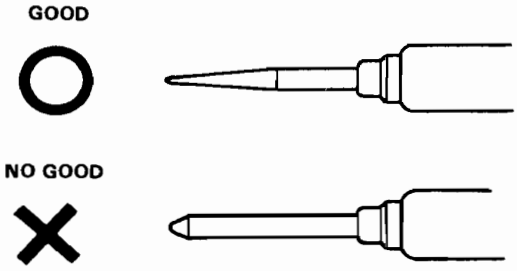
- When using the Service Tester, follow the manufacturer's instructions and those described in the Shop Manual.



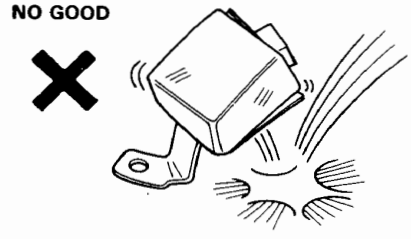
- Always insert the probe of the tester from the wire harness side (except waterproof connector).



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



- Do not drop parts.



Symbol Marks

The following symbols stand for:

:Apply engine oil.

:Apply brake fluid.

:Apply grease.


:Apply or check vacuum.

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

Abbreviation

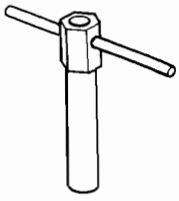
A/C	Air Conditioner
ALB	3-channel Anti Lock Brake
Assy	Assembly
ATT	Attachment
B or BAT	Battery
CATA	Catalytic Converter
EACV	Electronic Air Control Valve
ECU	PGM-FI Electronic Control Unit
EX	Exhaust
GND	Ground
IG	Ignition
IN	Intake
INT	Intermittent
L.	Left
LHD	Left Hand Drive
PCV	Positive Crankcase Ventilation
PGM-FI	Programmed Fuel-Injection
R.	Right
RHD	Right Hand Drive
SW	Switch
SOL. V	Solenoid Valve
TDC	Top Dead Center
V-TEC	HONDA Variable Valve Timing and Lift Electronic Control System

Special Tools

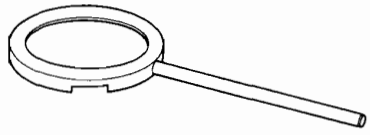
New For This Model

Ref. No.	Tool Number	Description	Q'ty	Remarks	Ref. Section
①	07LAA—PR30100	Tappet Adjusting Wrench	1		5
②	07LAB—SK70100	A/C Clutch Holder	1		15
③	07LAF—PR30100	Pilot Collar	1		—*1
④	07LAF—PR30210	Clutch Alignment Shaft	1		7
⑤	07LAJ—PR30100	Valve Inspection Set	1		5
⑥	07LAJ—PR30200	Air Stopper	1		5
⑦	07LAK—PR30100	Gauge Joint Adaptor	1		5

*1 Reference to the Shop Manual B16A ENGINE MAINTENANCE AND REPAIR (62PR300).



①



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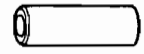

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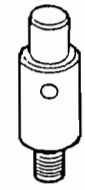

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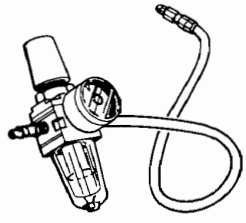

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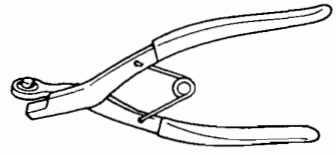

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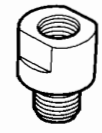


⑦

Existing Tools (Common with Other Models)

5. Engine

Number	Tool Number	Description	Q'ty	Remarks
①	07GAF—PH60300	Piston Pin Base Insert	1	
②	07HAD—PJ70200	Stem Seal Driver	1	
③	07HAF—PL20102	Piston Base Head	1	
④	07HAH—PJ70100	Valve Guide Reamer, 5.5 mm	1	
⑤	07JAB—0010000	Crank Pulley Holder Set	1	
⑤-1	07JAA—0010200	Socket Wrench 19 mm	(1)	
⑤-2	07JAB—0010400	Handle	(1)	
⑥	07JAB—0010400	Pulley Holder Attachment HEX 50 mm	1	
⑦	07JAZ—SH20100	R.P.M. Connecting Adaptor	1	
⑧	07JGG—0010100	Belt Tension Gauge	1	
⑨	07KAK—SJ40100	Engine Tilt Hanger Set	1	
⑩*	07LAA—PR30100	Tappet Adjusting Wrench	1	
⑪*	07LAF—PR30100	Pilot Collar	1	
⑫*	07LAJ—PR30100	Valve Inspection Set	1	
⑬*	07LAJ—PR30200	Air Stopper	1	
⑭*	07LAK—PR30100	Gauge Joint Adaptor	1	to be used with ⑯
⑮	07406—0030000	Oil Pressure Gauge Attachment	1	
⑯	07406—0070000	Low Pressure Gauge	1	to be used with ⑭
⑰	07742—0010100	Valve Guide Remover, 5.5 mm	1	
⑱	07744—0010400	Pin Driver, 5.0 mm	2	Use to set the camshaft
⑲	07744—0010600	Pin Driver, 8.0 mm	1	07944-6110200 may also be used
⑳	07746—0010400	Attachment, 52 x 55 mm	1	
㉑	07749—0010000	Driver	1	07949-6110000 may also be used
㉒	07757—PJ10200	Valve Spring Compressor Attachment	1	
㉓	07757—0010001	Valve Spring Compressor	1	07957-3290001 may also be used
㉔	07912—6110001	Oil Filter Socket	1	
㉕	07924—PD20003	Ring Gear Holder	1	07924-PD20002 may also be used
㉖	07942—8920000	Valve Guide Driver, 5.0 mm	1	
㉗	07948—SB00101	Oil Seal Driver Attachment	1	
㉘	07973—PE00310	Piston Pin Driver Shaft	1	
㉙	07973—PE00320	Piston Pin Driver Head	1	
㉚	07973—6570500	Piston Base	1	
㉛	07973—6570600	Piston Base Spring	1	
㉜	07999—PD6000A	PGM-FI Test Harness	1	

* New Tools

6. Fuel and Emissions

Number	Tool Number	Description	Q'ty	Remarks
①	07JAZ—SH20100	R.P.M. Connecting adaptor	1	
②	07406—0040001	Fuel Pressure Gauge Set	1	
②-1	07406—0040100	Pressure Gauge	(1)	┐ Component tools
②-2	07406—0040201	Hose Assy	(1)	┘
③	07411—0020000	Digital Circuit Tester	1	
④	07999—PD6000A	PGM-FI Test Harness	1	

Existing Tools (Common with Other Models)

7. Clutch

Number	Tool Number	Description	Q'ty	Remarks
①	07LAF—PR30200	Clutch Alignment Tool	1	
①-1*	07LAF—PR30210	Clutch Alignment Shaft	1	
①-2	07JAF—PM7011A	Clutch Alignment Disc	1	
①-3	07936—3710100	Handle	1	
②	07749—0010000	Driver	1	
③	07746—0010100	Attachment, 32 x 35 mm	1	
④	07924—PD20003	Ring Gear Holder	1	

*New Tool

8. Manual Transmisshon (Y2)

Number	Tool Number	Description	Q'ty	Remarks
①	07GAD—PG40100	Oil Seal Driver	1	
②	07GAJ—PG20102	Mainshaft Thrust Clearance Inspection Tool	1	
②-1	07GAJ—PG20110	Mainshaft Holder	1	
②-2	07GAJ—PG20130	Base	1	
③	07JAC—PH80000	Adjustable Bearing Remover Set	1	
③-1	07JAC—PH80100	Bearing Remover Attachment	1	
③-2	07JAC—PH80200	Remover Handle Assembly	1	
③-3	07741—0010201	Remover Weight	1	
④	07744—0010400	Pin Driver, 5.0 mm	1	
⑤	07744—0010600	Pin Driver, 8.0 mm	1	
⑥	07746—0010200	Attachment, 37 x 40 mm	1	
⑦	07746—0010400	Attachment, 52 x 55 mm	1	
⑧	07746—0030100	Driver	1	
⑨	07746—0041100	Pilot Driver, 28 x 12 mm	1	
⑪	07749—0010000	Driver	1	
⑫	07947—SD90200	Oil Seal Driver Attachment	1	
⑬	07979—PJ40001	Magnet Stand Base	1	

10. Driveshaft

Number	Tool Number	Description	Q'ty	Remarks
①	07GAF—SD40700	Hub Dis/Assembly Base	2	
②	07JAD—SH30100	Oil Seal Driver Attachment	1	
③	07JAD—PG40100	Oil Seal Driver Attachment	1	
④	07JAF—SH20400	Support Base Attachment	1	
⑤	07746—0010300	Attachment, 42 x 47 mm	1	
⑥	07746—0010400	Attachment, 52 x 55 mm	1	
⑦	07746—0030100	Driver, 40 mm I.D.	1	
⑧	07746—0040800	Pilot, 35 mm	1	
⑨	07749—0010000	Driver	1	
⑩	07965—SD90100	Support Base	1	

11. Manual Steering

Number	Tool Number	Description	Q'ty	Remarks
①	07916—SA50001	Steering Gearbox Lock Nut Wrench	1	07916-6920100 may also be used.
②	07941—6920003	Ball Joint Remover	1	
③	07974—SA50800	Ball Joint Boot Clip Guide B	1	

12. Suspension

Number	Tool Number	Description	Q'ty	Remarks
①	07GAE—SE00101	Shock Absorber Spring Compressor	1	07GAE-SE00100 may also be used.
②	07GAF—SE00200	Hub Assembly Driver Attachment	1	
③	07GAF—SE00401	Front Hub Driver Base	1	
④	07HGK—0010100	Wheel Alignment Gauge Attachment	1	
⑤	07JAF—SH20110	Hub Dis/Assembly Pilot, 38 mm	1	
⑥	07JAF—SH20120	Hub Dis/Assembly Shaft 22.4 x 25.4 mm	1	
⑦	07JAF—SH20200	Ball Joint Remover Base	1	
⑧	07746—0010400	Attachment, 52 x 55 mm	1	
⑨	07746—0010600	Attachment, 72 x 75 mm	1	
⑩	07749—0010000	Driver	1	
⑪	07941—6920003	Ball Joint Remover	1	
⑫	07947—6340000	Oil Seal Driver	1	
⑬	07965—SA70100	Hub Dis/Assembly Tool A	1	
⑭	07965—SB00100	Ball Joint Remover/Installer	1	
⑮	07965—SB00200	Ball Joint Installer Base	1	
⑯	07965—6340301	Hub Dis/Assembly Base	1	
⑰	07965—6920201	Hub Dis/Assembly Base	1	
⑱	07965—6920500	Dis/Assembly Tool E	1	
⑲	07974—SA50700	Ball Joint Boot Clip Guide A	1	
⑳	07974—SA50800	Ball Joint Boot Clip Guide B	1	

Existing Tools (Common with Other Models)

13. Brakes

Number	Tool Number	Description	Q'ty	Remarks
①	07HAA—SG00100	ALB T-wrench	1	
②	07HAE—SG00100	Brake Spring Compressor	1	
③	07HAJ—SG00602	ALB Checker	1	
	or			
	07508—SB00000	ALB Checker	1	
	—07HAJ—SG00400	Adaptor	1	
④	07HAK—SG00110	Pressure Gauge Joint Pipe	1	
⑤	07JAG—SD40100	Pushrod Adjustment Gauge	1	
⑥	07404—5790300	Vacuum Gauge	1	
⑦	07406—5790200	Pressure Gauge	2	
⑧	07410—5790100	Pressure Gauge Attachment C	2	
⑨	07410—5790500	Tube Joint Adaptor	1	
⑩	07510—6340101	Pressure Gauge Joint Pipe	1	
⑪	07510—6340300	Vacuum Joint Tube A	1	
	or 07510—6340400	Vacuum Joint Tube B	1	
⑫	07749—0010000	Driver	1	07949-6110000 may also be used.
⑬	07914—SA50001	Snap Ring Pliers	1	
⑭	07921—0010001	Flare Nut Wrench	1	
⑮	07947—6890300	Driver Attachment C	1	

15. Heater and Air Conditioner

Number	Tool Number	Description	Q'ty	Remarks
①	07JGG—0010100	Belt Tension Gauge	1	
②	07LAB—SK70100	A/C Clutch Holder	1	

16. Electrical

Number	Tool Number	Description	Q'ty	Remarks
①	07JGG—0010100	Belt Tension Gauge	1	
②	07920—SB20000	Fuel Sender Wrench	1	

Standards and Service Limits

5. Engine/Cylinder Head, Valve Train

Unit: mm (in.)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Compression	250 min^{-1} (rpm) and wide-open throttle	Nominal	—	1,275 kPa (13.0 kg/cm^2, 185 psi)
		Minimum	—	932 kPa (9.5 kg/cm^2, 135 psi)
		Maximum variation	—	196 kPa (2 kg/cm^2, 28 psi)
Cylinder head	Warpage		—	0.05 (0.002)
	Height		141.95—142.05 (5.589—5.593)	—
Camshaft	*End play*		0.05—0.15 (0.002—0.006)	0.5 (0.02)
	Oil clearance		0.050—0.089 (0.002—0.004)	0.15 (0.006)
	Runout		0—0.015 (0—0.0006)	0.03 (0.0012)
	Cam lobe height	IN Primary	33.088 (1.3027)	—
		Mid	36.267 (1.4278)	—
		Secondary	34.987 (1.3774)	—
		EX Primary	32.785 (1.2907)	—
		Mid	35.720 (1.4063)	—
		Secondary	34.691 (1.3658)	—
Valve	Valve clearance	IN	0.15—0.19 (0.0059—0.0075)	—
		EX	0.17—0.21 (0.0067—0.0083)	—
	Valve stem O.D.	IN	5.475—5.485 (0.2156—0.2159)	5.445 (0.2144)
		EX	5.450—5.460 (0.2146—0.2150)	5.420 (0.2134)
	Stem-to-guide clearance	IN	0.035—0.045 (0.0014—0.0018)	0.075 (0.0030)
		EX	0.050—0.080 (0.0020—0.0031)	0.120 (0.0047)
Valve seat	Width	IN and EX	1.25—1.55 (0.049—0.061)	2.0 (0.08)
	Stem installed height	IN	37.465—37.935 (1.4750—1.4935)	38.185 (1.5033)
		EX	37.165—37.635 (1.4632—1.4817)	37.885 (1.4915)
Valve spring	Free length	IN Outer	40.70 (1.6024)*1 40.71 (1.6028)*2	39.61 (1.5594)
		Inner	36.70 (1.4449)*1 36.74 (1.4465)*2	35.69 (1.4051)
		EX	41.65 (1.6400)*1 41.64 (1.6394)*2	40.63 (1.5596)
Valve guide	I.D.	IN and EX	5.51—5.53 (0.2169—0.2177)	5.53 (0.2177)
	Installed height	IN and EX	12.55—13.05 (0.4941—0.5138)	13.30 (0.5236)
Rocker arm	Arm-to-shaft clearance	In and EX	0.025—0.052 (0.0010—0.0020)	0.080 (0.0031)

*1: NIPPON HATSUJO made
*2: CHUO HATSUJO made

Unit: mm (in.)

5. Engine/Engine Block

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Cylinder block	Warpage of deck surface		0.05 (0.0020)	0.10 (0.004)
	Bore diameter	X	81.000—81.020 (3.1890—3.1898)	81.070 (3.1917)
		Y	81.000—81.015 (3.1890—3.1896)	
	Bore taper		—	0.05 (0.002)
	Reboring limit		—	0.25 (0.01)
Piston	Skirt O.D. At 16 mm (0.63 in) from bottom of skirt		80.98—80.99 (3.1882—3.1886)	80.97 (3.1879)
	Clearance in cylinder		0.01—0.04 (0.0004—0.0016)	0.05 (0.002)
	Ring groove width	Top	1.030—1.040 (0.0406—0.0409)	1.060 (0.0417)
		2nd	1.230—1.240 (0.0484—0.0488)	1.260 (0.0496)
		Oil	2.805—2.820 (0.1104—0.1110)	2.840 (0.1118)
Piston ring	Piston-to-ring clearance	Top	0.045—0.070 (0.0018—0.0028)	0.130 (0.0051)
		2nd	0.045—0.070 (0.0018—0.0028)*1	0.130 (0.0051)
			0.040—0.065 (0.0015—0.0026)*2	
	Ring end gap	Top	0.20—0.35 (0.0079—0.0138)	0.60 (0.0236)
		2nd	0.40—0.55 (0.0157—0.0217)	0.70 (0.0276)
		Oil	0.20—0.45 (0.0079—0.0177)*1	0.80 (0.0315)
			0.20—0.50 (0.0079—0.0197)*2	
Piston pin	Diameter		20.994—21.000 (0.8265—0.8268)	—
	Pin-to-piston clearance		0.010—0.022 (0.0004—0.0009)	—
Connecting rod	Pin-to-rod interference		0.013—0.032 (0.0005—0.0013)	—
	Small end bore diameter		20.968—20.981 (0.8255—0.8260)	—
	Large end bore diameter	Nominal	48.0 (1.89)	—
	End play installed on crankshaft		0.15—0.30 (0.0059—0.0118)	0.40 (0.0157)
Crankshaft	Main journal diameter			
	No. 1, 2, 4 and 5 journals		54.976—55.000 (2.1644—2.1654)	—
	No. 3 journal		54.970—54.994 (2.1642—2.1651)	—
	Rod journal diameter		44.976—45.000 (1.7707—1.7717)	—
	Journal taper		0.005 (0.00020) max.	—
	Journal out of round		0.004 (0.00016) max.	0.006 (0.0002)
	End play		0.10—0.35 (0.0039—0.0138)	0.045 (0.0018)
	Ranout		0.020 (0.0008) max.	0.030 (0.0012)
Bearing	Main bearing-to-journal oil clearance			
	No. 1, 2, 4 and 5 journals		0.024—0.042 (0.0009—0.0017)	0.050 (0.0020)
	No. 3 journal		0.030—0.048 (0.0012—0.0019)	0.060 (0.0024)
	Rod bearing-to-journal oil clearance		0.032—0.050 (0.0013—0.0020)	0.060 (0.0024)

*1: TEIKOKU PISTON RING made
*2: RIKEN made

Standards and Service Limits

5. Engine/Engine Lubrication

Unit: mm (in.)

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US qt, Imp qt)		4.8 (5.1, 4.2) For engine disassembly 4.0 (4.2, 3.6) For oil change, including oil filter	
Oil pump	Displacement ℓ (US gal, Imp gal)/min@min^{-1} (rpm)		71 (1.87, 1.56)@7,600	
	Inner-to-outer rotor radial clearance Pump body-to-rotor radial clearance Pump body-to-rotor side clearance		0.04—0.16 (0.0016—0.0063) 0.10—0.19 (0.0039—0.0075) 0.02—0.07 (0.0008—0.0026)	0.2 (0.0079) 0.2 (0.0079) 0.15 (0.0059)
Relief valve	Pressure seting 80 °C (176 °F) kPa (kg/cm^2, psi)	Idle	69 (0.7, 10) min.	
		3,000 min^{-1}(rpm)	343 (3.5, 50) min.	

5. Engine/Cooling

	MEASUREMENT	STANDARD (NEW)
Radiator coolant	Capacity ℓ (US qt, Imp qt) (Includes reservoir tank 0.4 (0.42, 0.35))	5.7 (6.0, 5.0) For engine disassembly 4.7 (5.0, 4.1) For coolant change
Radiator cap	Pressure cap opening pressure kPa (kg/cm^2, psi)	74—103 (0.75—1.05, 11—15)
Thrermostat	Starts to open °C (°F) Full open °C (°F) Valve lift at full open	76—80 (169—176) 90 (194) 8 (0.31) min.
Water pump	Capacity: ℓ (US gal, Imp gal)/min @ min^{-1} (rpm)	140 (37.0, 30.8) @7,600
Cooling fan	Thermoswitch "ON" temperature °C (°F) Thermoswitch "OFF" temperature °C (°F)	91.5—94.5 (196—202) 88—91 (190—196)

Unit: mm (in.)

6. Fuel and Emission

	MEASUREMENT	STANDARD (NEW)
Fuel pump	Delivery pressure kPa (kg/cm^2, psi) Displacement cm^3 (oz) Relief valve opening pressure kPa (kg/cm^2, psi)	250 (2.55, 36) 230 (7.8) in 10 seconds at 12 V. 441—588 (4.5—6.0, 64—85)
Pressure regulator	Pressure kpa (kg/cm^2, psi)	245—255 (2.5—2.6, 36—37)
Fuel tank	Capacity ℓ (US gal, Imp gal)	45 (11.9, 9.9)
Fast idle	min^{-1} (rpm)	1.600—2,000
Idel speed	with headlights and cooling fan off min^{-1} (rpm)	750±50
Idle CO	%	0.1 max.

7. Clutch

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal height to floor	LHD	210 (8.27)	—
		RHD	205 (8.07)	—
	Stroke	LHD	142—147 (5.59—5.79)	—
		RHD	137—142 (5.39—5.59)	—
	Pedal free play		15—20 (0.59—0.79)	—
	Disengagement height to floor	LHD	70 (2.76) min	—
		RHD	65 (2.56) min	—
Clutch release arm	Free play at arm		3.0—4.0 (0.12—0.16)	—
Flywheel	Clutch surface runout		0.05 (0.002) max.	0.15 (0.006)
Clutch disc	Rivet head depth		1.3 (0.05) min.	0.2 (0.008)
	Surface runout		0.8 (0.03) max.	1.0 (0.04)
	Radial play in spline at circumference (200ϕ)		0.2—0.6 (0.008—0.024)	3.4 (0.134)
	Thickness		8.1—8.8 (0.32—0.35)	5.7 (0.224)
Clutch release bearing holder	I.D.		31.00—31.15 (1.220—1.226)	31.2 (1.228)
	Holder-to-guide sleeve clearance		0.05—0.23 (0.002—0.009)	0.30 (0.012)
Clutch cover	Uneveness of diaphragm spring		0.8 (0.03) max.	1.0 (0.04)
	Warpage of pressure plate		0.03 (0.001)	0.15 (0.006)

Standards and Service Limits

8. Manual Transmission

Unit: mm (in.)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US qt, Imp qt)	2.1 (2.2, 1.8) For oil change 2.2 (2.3, 1.9) For disassembly	— —
Mainshaft	End play Diameter of ball bearing contact area (clutch case side) Diameter of third gear contact area Diameter of ball bearing contact area (transmission case side) Runout	0.11—0.18 (0.0043—0.0071) 27.977—27.990 (1.1015—1.1020) 31.984—32.000 (1.2592—1.2598) 21.987—22.000 (0.8656—0.8661) 0.02 (0.0008) max.	Adjust with a shim 27.930 (1.0996) 31.930 (1.2571) 21.940 (0.8638) 0.05 (0.0020)
Mainshaft third and fourth gears	I.D. End play Thickness 3rd 4th	37.009—37.025 (1.4570—1.4577) 0.06—0.21 (0.0024—0.0083) 31.92—31.97 (1.2567—1.2587) 31.42—31.47 (1.2370—1.2390)	37.08 (1.4598) 0.30 (0.0118) 31.85 (1.2539) 31.35 (1.2342)
Mainshaft fifth gears	I.D. End play Thickness	37.009—37.025 (1.4570—1.4577) 0.06—0.21 (0.0024—0.0083) 29.42—29.47 (1.1583—1.1602)	37.08 (1.4598) 0.30 (0.0118) 29.35 (1.1555)
Countershaft	Diameter of needle bearing contact area Diameter of ball bearing contact area Diameter of low gear contact area Runout	33.000—33.015 (1.2992—1.2998) 24.987—25.000 (0.9837—0.9843) 36.984—37.000 (1.4561—1.4567) 0.02 (0.0008) max.	32.95 (1.2972) 24.94 (0.9819) 36.93 (1.4539) 0.05 (0.0020)
Countershaft low gear	I.D. End play (when torqued properly)	42.009—42.025 (1.6539—1.6545) 0.04—0.12 (0.0016—0.0047)	42.08 (1.6567) Adjust with a shim
Countershaft Second gear	I.D. End play (when torqued properly) Thickness	47.009—47.025 (1.8507—1.8514) 0.05—0.12 (0.0020—0.0047) 32.42—32.47 (1.2764—1.2783)	47.08 (1.8535) Adjust with a collar 32.35 (1.2736)
Spacer collar (countershaft second gear)	I.D. O.D. Length A B	34.995—35.005 (1.3778—1.3781) 41.989—42.000 (1.6531—1.6535) 32.56—32.58 (1.2819—1.2827) 32.59—32.61 (1.2831—1.2839)	35.015 (1.3785) 41.94 (1.6512) } Adjust with a collar
Spacer collar (mainshaft fourth and fifth gears)	I.D. O.D.  Length A B	25.002—25.012 (0.9843—0.9847) 31.989—32.000 (1.2594—1.2598) 57.95—58.05 (2.2815—2.2854) 27.03—27.08 (1.0642—1.0661)	25.06 (0.9866) 31.94 (1.2575) — —
Reverse idler gear	I.D. Gear-to-reverse gear shaft clearance	20.016—20.036 (0.7880—0.7888) 0.036—0.077 (0.0014—0.0030)	— 0.14 (0.0055)
Synchro ring	Ring-to-gear clearance (ring pushed against gear)	0.85—1.10 (0.0335—0.0433)	0.40 (0.0157)
Shift fork	Shift fork finger thickness Fork-to-synchro sleeve clearance	7.40—7.50 (0.2913—0.2953) 0.45—0.65 (0.0177—0.0256)	— 1.0 (0.0394)
Reverse shift fork	Shift fork paul groove width Fork-to-reverse idler gear clearance "L" groove width Reverse side Fifth gear side Fork-to-shaft clearance Reverse side Fifth gear side	13.00—13.30 (0.5118—0.5236) 0.5—1.1 (0.0197—0.0433) 7.05—7.25 (0.2776—0.2854) 7.40—7.70 (0.2913—0.3031) 0.05—0.35 (0.0020—0.0138) 0.40—0.80 (0.0157—0.0315)	— 1.8 (0.0709) — — 0.5 (0.0197) 1.0 (0.0394)
Shift rod guide	Groove width of shift arm contact area Shift rod guide-to-shift arm clearance	12.05—12.15 (0.4744—0.4783) 0.05—0.35 (0.0020—0.0138)	— 0.80 (0.0315)
Shift guide	Groove width of shift arm contact area Shift guide-to-shift arm clearance I.D. Shift guide-to-shift fork clearance	8.10—8.20 (0.3189—0.3228) 0.10—0.30 (0.0039—0.0118) 14.000—14.068 (0.5512—0.5539) 0.20—0.50 (0.0079—0.0197)	— 0.60 (0.0236) — 0.80 (0.0315)

Unit: mm (in.)

8. Manual Transmission (cont'd)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Shift guide	Groove width of shift arm contact area	8.10—8.20 (0.3189—0.3228)	—
	Shift guide-to-shift arm contact area clearance	0.10—0.30 (0.0039—0.0118)	0.60 (0.0236)
	I.D.	14.000—14.068 (0.5512—0.5539)	—
	Shift guide to shaft clearance	0.011—0.092 (0.0004—0.0036)	0.15 (0.0059)
	Diameter of shift fork contact area	11.90—12.00 (0.4685—0.4724)	—
	Shift guide-to-shift fork clearance	0.20—0.50 (0.0079—0.0197)	0.80 (0.0315)
Selector arm	Diameter of shift rod guide contact area	11.90—12.00 (0.4685—0.4724)	—
	Selector arm-to-shift rod guide clearance	0.05—0.25 (0.0020—0.0098)	0.50 (0.0197)
	Gloove width of contact area	10.05—10.15 (0.3957—0.3996)	—
	Selector arm-to-interlock clearance	0.05—0.25 (0.0020—0.0098)	0.50 (0.0197)
Ring gear	Backlash	0.085—0.142 (0.0033—0.0056)	0.20 (0.0079)
Differential carrier	Pinion shaft bore diamater	18.000—18.016 (0.7087—0.7093)	—
	Carrier-to-pinion shaft clearance	0.017—0.045 (0.0007—0.0018)	0.10 (0.0039)
	Driveshaft bore diameter	28.000—28.021 (1.1024—1.1032)	—
	Carrier-to-driveshaft clearance	0.020—0.062 (0.0008—0.0024)	0.12 (0.0047)
	Carrier-to-intermediate shaft clearance	0.050—0.087 (0.0020—0.0034)	0.14 (0.0055)
Differential pinion gear	Backlash	0.05—0.15 (0.0020—0.0059)	Adjust with a washer.
	Pinion gear bore diameter	18.042—18.066 (0.7103—0.7113)	—
	Pinion gear-to-pinion shaft clearance	0.059—0.095 (0.0023—0.0037)	0.15 (0.0059)

11. Steering

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Steering wheel	Play	10 (0.39) max.	—
Gear box	Pinion starting torque N·m (kg-m, lb-ft)	0.39—1.37 (0.04—0.14, 0.29—1.01)	
	Angle of rack-guide-screw loosened from locked position	10—15	
Rack end	Pivoting resistance N·m (kg-m, lb-ft)	0.49—1.96 (0.05—0.20, 0.36—1.45)	

Standards and Service Limits

Unit: mm (in.)

12. Suspension

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Wheel alignment	Toe-in		Front: 0±2 (0±0.08); Rear: 2^{+2}_{-1} ($0.08^{+0.08}_{-0.04}$)	
	Camber		0°00'±1°	−0°30'±1°
	Caster		3°00'±1°	
	Side slip		0±3 (0±0.12)	
	Turning angle (max.)	Inward wheel	38°00'±2°	
		Outward wheel	30°00'±2°	
Wheel	Rim runout	Steel	0—1.0 (0—0.039)	2.0 (0.08)
		Aluminum	0—0.7 (0—0.028)	1.5 (0.06)
Wheel bearing	End play	Front	0	0.05
		Rear	0	0.05

13. Brake

	MEASUREMENT		STANDARD (NEW)	SERVICE LIMIT
Parking brake lever	Play in stroke 200 N (20 kg, 44 lbs)		To be locked when pulled 6—10 notches	—
Foot brake pedal	Pedal height	RHD	161 (6.3) from floor	—
		LHD	153 (6.0) from floor	—
	Free play		1—5 (0.04—0.20)	5 (0.20)
Master cylinder	Piston-to-push rod clearance		0—0.4 (0—0.016)	—
Brake disc	Disc thickness	Front	21.0 (0.83)	19.0 (0.75)
		Rear	10.0 (0.39)	8.0 (0.32)
	Disc runout	Front	—	0.1 (0.004)
		Rear	—	0.15 (0.006)
	Disc parallelism		—	0.015 (0.0006)
	Pad thickness	Front	11.0 (0.43)	1.6 (0.06)
		Rear	8.0 (0.32)	1.6 (0.06)
Brake booster	Characteristics	Vacuum (mm Hg)	Pedal Pressure N (kg, lb)	Line Pressure kPa (kg/cm², psi)
		0	196 (20, 44)	990 (10.1, 143) min.
		300	196 (20, 44)	4,560 (46.5, 661) min.
		500	196 (20, 44)	6,933 (70.7, 1,005) min.

15. Air Conditioner

	MEASUREMENT		STANDARD (NEW)
Air conditioner system	Lubricant capacity cc (US oz, Imp oz)	Condenser	10 (0.34, 0.28)
		Evaporator	30 (1.00, 0.84)
		Line or hose	10 (0.34, 0.28)
		Reservoir	10 (0.34, 0.28)
Compressor	Lubricant capacity cc (US oz, Imp oz)		60—100 (2.03—3.38, 1.69—2.82)
	Stator coil resistance at 20 °C (68 °F) Ω		3.4—3.8
	Pulley-to-pressure plate clearance		0.35—0.65 (0.014—0.026)
Compressor belt	Deflection between pulleys with 98 N (10 kg, 22 lb)		7.0—9.0 (0.28—0.35) with used belt 4.5—6.5 (0.18—0.26) with new belt
	Belt tension between pulleys N (kg, lb) (measured with belt tension gauge)		343—490 (35—50, 77—110) with used belt 539—735 (55—75, 121—165) with new belt

Unit: mm (in.)

16. Electrical

	MEASUREMENT	STANDARD (NEW)		
Ignition coil	Rated voltage V	12		
	Primary winding resistance Ω	0.63—0.77		
	Secondary winding resistance Ω	9.760—14.640		
Ignition wire	Resistance Ω	25,000 max.		
Spark plug	Type	Makes	Normal	Option
		NGK	BKR6E—N11	BKR7E—N11
		ND	K20PR—L11	K22PR—L11
	Gap	1.0—1.1 (0.039—0.043)		
Ignition timing	At idling	15° ±2° (Red) BTDC		
Battery	Lighting capacity (20-hour ratio) AH Starting capacity (5-second ratio)	47 8.6 V min. at 300 Ampere draw		
Altermator belt	Deflection between pulleys with 98 N (10 kg, 22 lb) Belt tension between pulleys N (kg, lb) (measure with belt tension gauge)	8.5—10.5 (0.33—0.41) with used belt 5.5—7.5 (0.22-0.30) with new belt 343—490 (35—50, 77—110) with used belt 588—785 (60—80, 132—176) with new belt		
Alternator	Output	13.5 V/70 A		
	MEASUREMENT	STANDARD (NEW)		SERVICE LIMIT
	Coil resistance (rotor) Ω	2.9		—
	Slip ring O.D.	14.4 (0.57)		14.0 (0.55)
	Brush lenght	10.5 (0.41)		1.5 (0.06)
	Brush spring tension (new) g (oz)	330 (11.64)		—
Starting motor		MITSUBA 1.4 kW		
	MEASUREMENT	STANDARD (NEW)		SERVICE LIMIT
	Mica depth	0.4—0.5 (0.016—0.020)		0.15 (0.006)
	Commutator	0—0.02 (0.0008)		0.05 (0.002)
	Commutator O.D.	28.0—28.1 (1.10—1.11)		27.5 (1.08)
	Brush length	15.8—16.2 (0.62—0.64)		10.0 (0.39)
	Brush spring sension (new) N (kg, lb)	15.7—17.7 (1.6—1.8, 3.5—4.0)		—

Design Specifications

	ITEMS	METRIC	ENGLISH	NOTES
DIMENSIONS	Overall Length	3,800 mm	149.6 in.	KF, KX
		3,815 mm	150.2 in.	KG, KE, KS
		3,825 mm	150.6 in.	KS (Finland)
	Overall Width	1,675 mm	65.9 in.	
	Overall Height	1,270 mm	50.0 in.	
	Wheelbase	2,300 mm	90.6 in.	
	Track, Front/Rear	1,440/1,445 mm	56.7/56.9 in.	
	Ground Clearance	150 mm	5.9 in.	
	Seating Capacity	2		KG (Austria), KS (Sweden)
		4		KE, KF, KG, KS, KX
	Overhang, Front/Rear	805/695 mm	31.7/27.4 in.	KF, KX
		820/695 mm	32.3/27.4 in.	KG, KE, KS
	with registration plateguard	830/695 mm	32.7/27.4 in.	KS (Finland) Including bumper
WEIGHTS	Engine Weight (Wet)	140 kg	309 lb.	
	Curb Weight			
		1,010 kg	2,227 lb.	KG
		1,015 kg	2,238 lb.	KE, KX, KS, KF
	Weight Distribution (Front/Rear)	635/375 kg	1,400/827 lb.	KG
		635/380 kg	1,400/838 lb.	KE, KX, KS, KF
	Max, Parmissible Weight (EC)	1,470 kg	3,241 lb.	except KS (Sweden)
		1,380 kg	3,042 lb.	KS (Sweden)
ENGINE	Type	Water cooled 4-stroke D.O.H.C. V-TEC		
	Cylinder Arrangement	4-cylinder in-line, transverse		
	Bore and Stroke	81.0 x 77.4 mm	3.19 x 3.05 in.	
	Displacement	1,595 cm^3 (cc)	97.3 cu. in.	
	Compression Ratio	10.2 : 1		
	Valve Train	4 valves per cylinder, double overhead camshafts		
	Lubricathon System	Forced and wet sump.		
	Fuel Required	Unleaded gasoline with 95 R.O.N. or higher		

(cont'd)

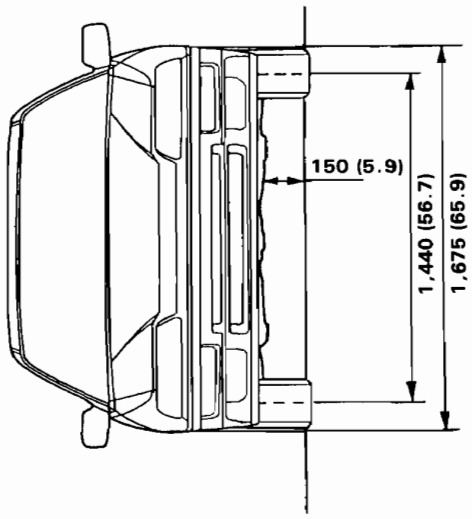
	ITEMS	METRIC	ENGLISH	NOTES
STARTER	Type	Gear reduction		
	Normal Output	1.4 kW		
	Normal Voltage	12 V		
	Hour Rating	30 seconds		
	Direction of Rotation	Clockwise as viewed from gear end		
	Weight 1.4 kW MITSUBA	3.7 kg	8.2 lb	
TRANSMISSION	Clutch	Single plate dry, diaphragm spring		
	Clutch Facing Area	203 cm^2	31.5 sq in	
	Transmission Type	5-speed forward, synchromesh, 1 reverse,		
	Primary Reduction	1.000		
	Gear Ratio 1st	3.250		
	2nd	2.052		
	3rd	1.416		
	4th	1.103		
	5th	0.870		
	Reverse	3.000		
	Final Reduction	Single helical gear, 4.133		
AIR CONDITIONER	Cooling Capacity	4.300 Kcal/h	17.062 BTU/h	
	Conditions:			
	Compressor Revolution Speed	1,800 min^{-1} (rpm)		
	Outside Air Temperature	27.0 °C	81 °F	
	Outside Air Gumidity	50 %		
	Condenser Air Temperature	35 °C	95 °F	
	Condenrer Air Velocity	4.5 m/sec.	14.8 ft/sec.	
	Blower Capacity	440 m^3/h	15,118 cu. ft/h	
	Compressor (NIPPON DENSO) Type	Swash-plate type		
	Number of Cylinders	10		
	Displacement	155.3 cc/rev.	9.47 cu. in./rev	
	Max. Speed	min^{-1} (rpm)		
	Lubricant Capacity	80 cc	2.25 oz (imp)	
	Receiver Dryer With Desiccant	Includes fusible rafety plug.		
	Condenser	Corrugated fin type		
	Evaporator	Corrugated fin type		
	Blower Type	Sirocco fan		
	Motor Input	170 W (12 V)		
	Speed Control	4 speed		
	Max. Capacity	390 m^3/h	13,773 cu. ft/h	
	Temp. Control	Air-mix type		

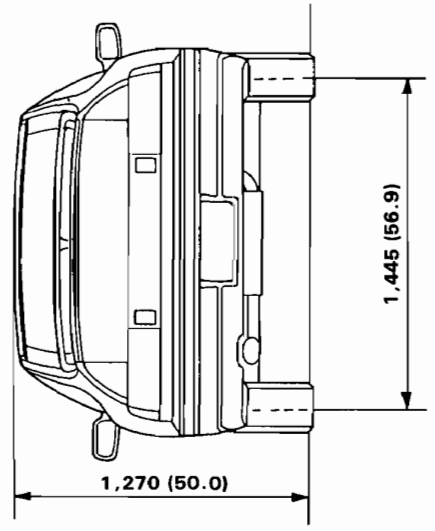
Design Specifications

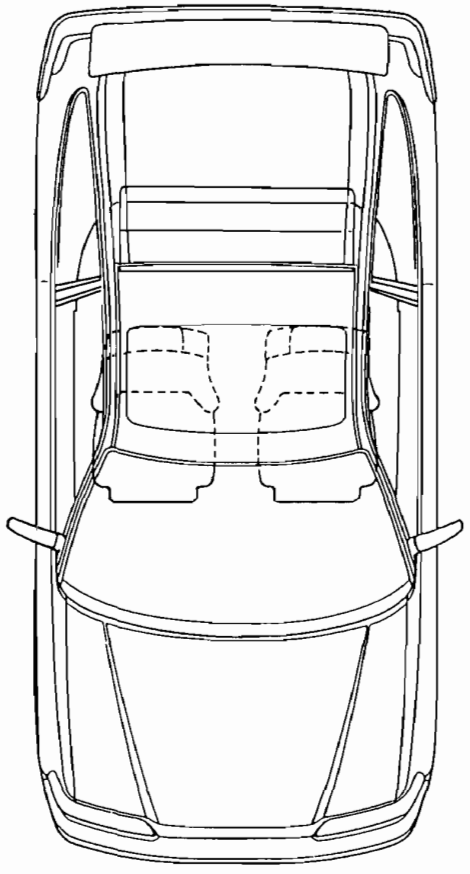
	ITEMS		METRIC	ENGLISH	NOTES
AIR COND-TIONER (cont'd)	Comp. Clutch	Type	Dry, single plate, V-belt		
		Power Consumption	40 W max. 12 V		
	Refrigerant	Type	R-12		
		Quantity	0.9±0.05 kg	1.98±0.11 lb	
STEERING SYSTEM	Type		Rack and pinion		
	Overall Ratio		21.6 (19.6—22.3) : 1		(Variable ratio)
	Turns, Lock-to-lock		4.1		
	Steering Wheel Diameter		372 mm	14.6 in.	
SUSPENSION SYSTEM	Type	Front/Rear	Independent with double wishbone, coil springs with stabilizer		
	Shock Absorber	Front	Telescopic, nitrogen gas-filled		
		Rear	Telescopic, nitrogen gas-filled		
WHEEL ALIGNMENT	Wheel Alignment				
	Camber	Front	0°00′±1°		
		Rear	−0°30′±1°		
	Caster	Front	2°59′±1°		
	Toe-in	Front	0±2 mm	0±0.08 in.	
		Rear	2^{+2}_{-1} mm	$0.08^{+0.08}_{-0.04}$ in.	
BRAKE SYSTEM	Type	Front	Power assisted self-adjusting ventilated discs		
		Rear	Power assisted self-adjusting discs		
	Lining Surface Area	Front	50 mm^2	7.75 sq. in.	
		Rear	21 mm^2	3.26 sq. in.	
	Effective Disc Diameter	Front	214 mm	8.43 in.	
		Rear	208 mm	8.19 in.	
	Brake Drum ID				
	Parking Brake Kind and Type		Mechanically actuating, rear two-wheel disc brakes		
TIRES	Front/Rear		195/60R14 85V		
	Spare		T135/70 D15		
ELECTRICAL	Battery		12 V—47 AH		
	Starter		12 V—1.4 kW		
	Alternator		12 V—70 amps		
	Fuses	In the dash fuse box	19 A, 15 A, 20 A, 30 A		
		In the main fuse box	10 A, 15 A, 20 A, 50 A, 60 A		
	Headlights High/Low		12 V—60/55 W		
	Front Turn Signal Lights		12 V—21 W		
	Rear Turn Signal Lights		12 V—21 W		
	Side Turn Signal Lights		12 V—5 W		
	Stop/Taillights		12 V—21/5 W		
	Back-up Lights		12 V—21 W		
	License Plate Lights		12 V—5 W		
	Gauge Lights		12 V—3.4 W, 3.0 W, 1.4 W		
	Indicator Lights		12 V—1.4 W		
	Warning Lights		12 V—5 W		
	Dome Light		12 V—5 W		
	Trunk Light		12 V—3.4 W		
	Illumination and Pilot Lights		12 V—1.4 W		
			0.91 W, 0.84 W, LED		
	Heater Illumination Lights		12 V—1.4 W		

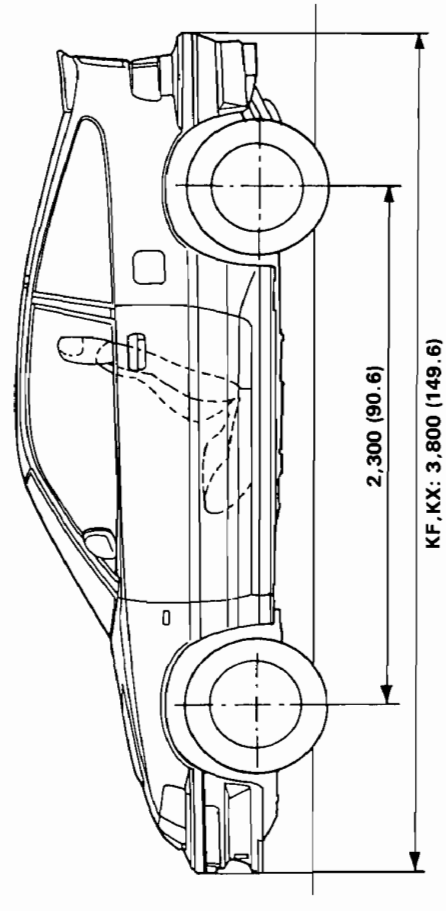
Body Specifications

Unit: mm (in.)

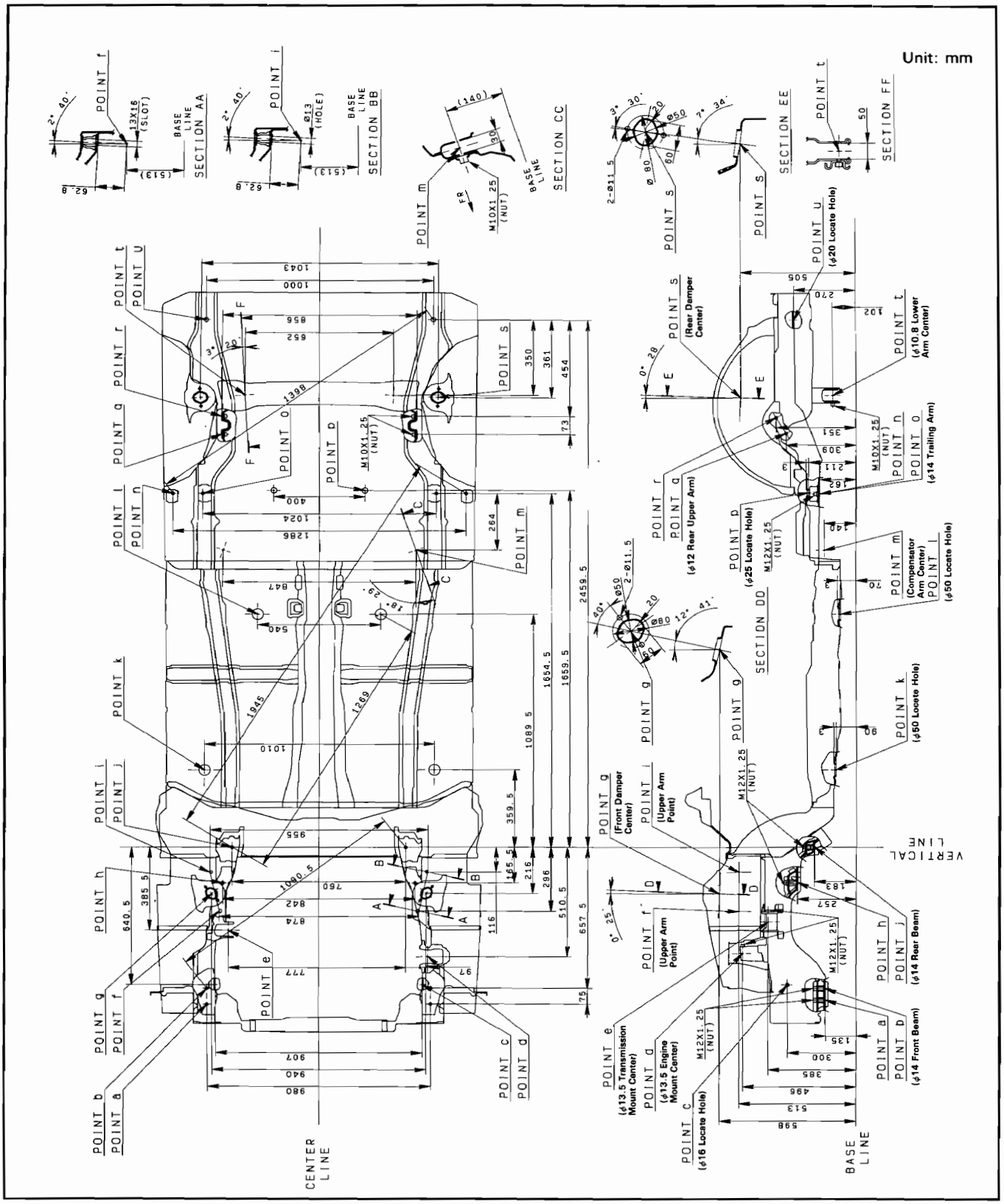








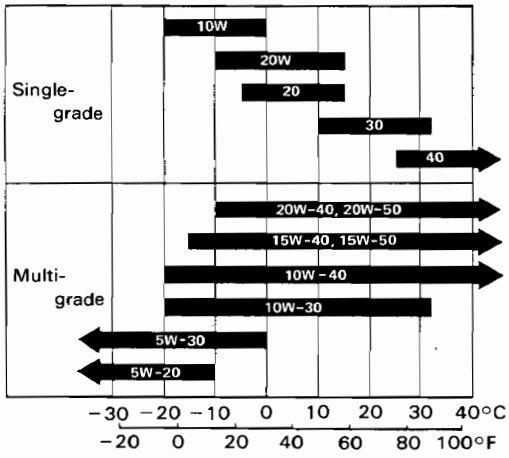
Frame Repair Chart



Lubrication Points

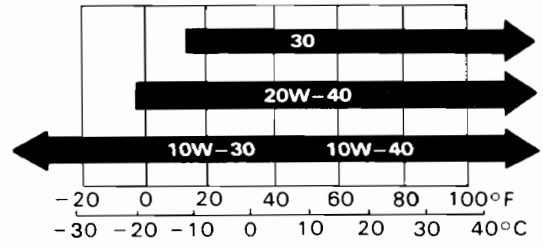
No.	LUBRICATION POINTS		LUBRICANT
1	Engine		API Service Grade: SE, SF or SG 10W—30 SAE Viscosity: See chart below
2	Transmission	Manual	API Service Grade: SE or SF SAE Viscosity: See chart below
3	Brake line (ALB line for ALB models)		Brake fluid DOT 3 or DOT 4
4	Shift lever pivot		Silicone grease with molybdenum disulfide
5 6 7 8 9 10 11 12 13 14 15 16 17 18	Tilt steering Steering ball joints Suspension ball joints Steering boots Steering gearbox Steering column bushings Pedal linkage Brake master cylinder push rod Tailgate hinges Door hinges upper and lower Door opening detents Fuel filler lid Engine hood hinges Engine hood latch		Multi- purpose Grease
19	Caliper	Piston seal Dust seal Caliper pin Piston	Silicone Grease

Recommended Engine Oil
(SE, SF or SG Grade 10W—30 only)



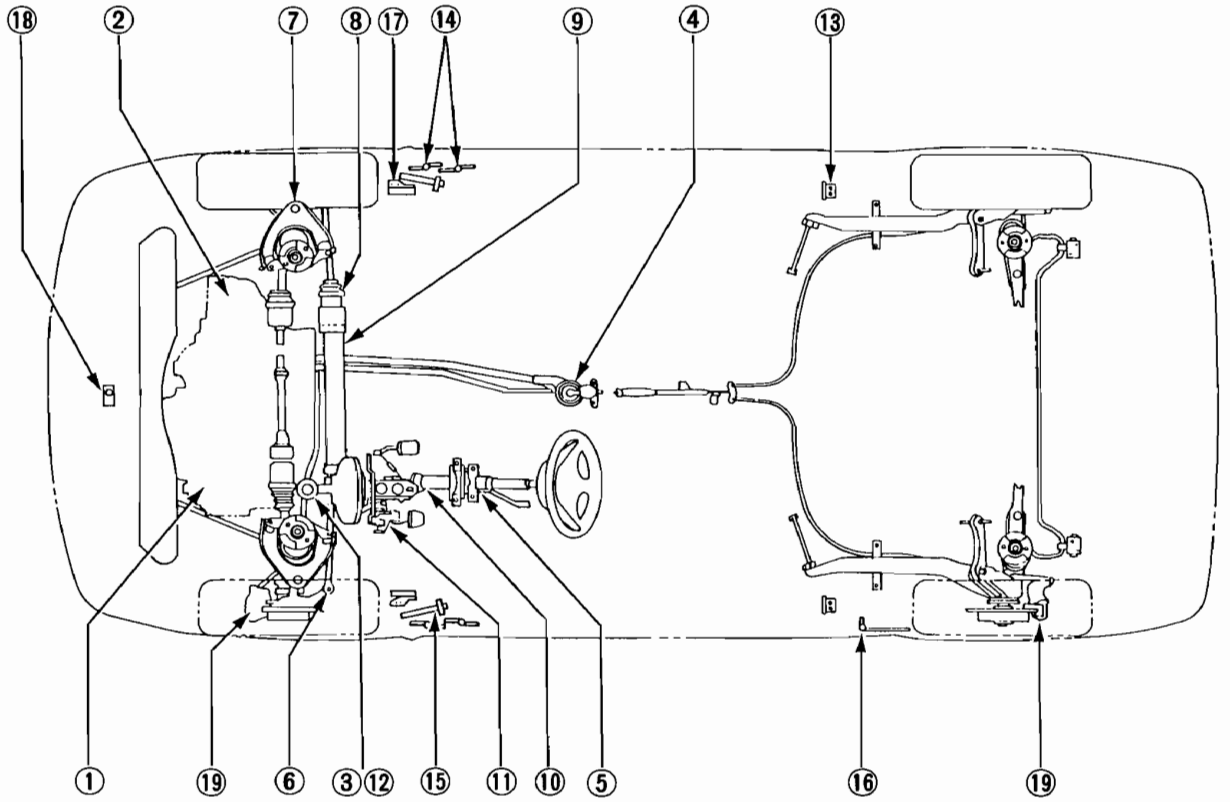
Engine oil viscosity for
ambient temperature ranges

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.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Maintenance Schedule

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
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
Rocker arms			I		I	
Alternator drive belt			I		I	
Timing 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	
Air cleaner element (Viscous type)			R		R	
Fuel filter			R		R	
Tank, fuel line and connections			I		I	
Evaporative emission control system						I
Ignition timing and control system*3			I		I	
Ignition timing and control system*4						I
Spark plugs			R*2		R*2	
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

■: 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 model
*4 KS, KX model

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 KE ALB models)		I	I	I	I	I
Brake fluid (Including ALB fluid for KE 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			I		I	
Parking brake		I	I		I	
Clutch release arm travel		I	I	I	I	I
Exhaust pipe and muffler		I	I	I	I	I
Suspension mounting bolts		I	I	I	I	I
Front wheel alignment		I	I	I	I	I
Steering operation, tie rod ends, steering gear box and boots		I	I		I	
ALB high pressure hose (for KE ALB models)					R	
ALB operation (for KE ALB models)		I	I		I	
Catalytic converter heat shield					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.

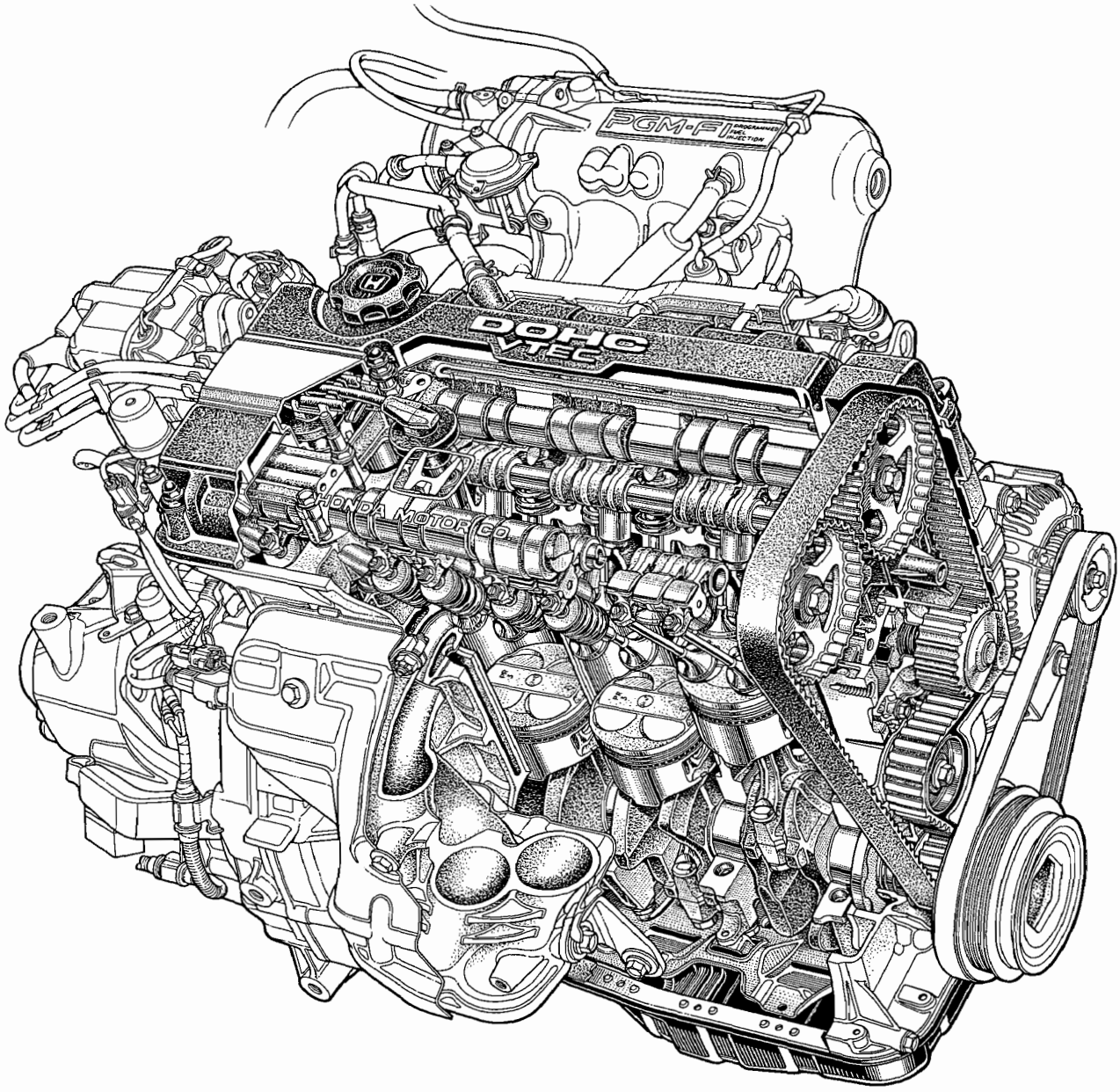
Condition	Maintenance item	Maintenance operation	Interval
A B • • • F	Engine oil and oil filter	R	Every 5,000 km (3,000 miles) or 3 months
• • • • • F	Transmission oil	R	Every 20,000 km (12,000 miles) or 12 months
A B • D E F	Front brake discs and calipers	I	Every 10,000 km (6,000 miles) or 6 months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

Outline

Description

The engine is a B16A (1,595 cc MPI-Multi Point Injection) in-line 4-cylinder water-cooled, DOHC 2-cam/16-valve, center plug type with pentroof combustion chambers. The engine incorporates a new mechanism called the Honda Variable Valve Timing and Lift Electronic Control System (V-TEC). This is the world's first mechanism allowing, simultaneously changes of both the timing and the degree of lift of the engine intake and exhaust valves.



Features:

- The crankshaft is made by forging, and the main shaft is supported at five points.
- The cylinder head is made of aluminum alloy, a center plug type pentroof shaped combustion chamber is used, and the 4-valve system uses 2 inlet valves and 2 exhaust valves.
- The system is of the DOHC type, uses swing arm type rocker arms and is driven by a timing belt. Belt tension is adjustable.
- The V-TEC type engine has three rocker arms at each intake and exhaust side per cylinder.
- The cylinder block is made of aluminum alloy and uses cast iron sleeves.
- The electronic fuel injection system is of the sequential injection type and injects fuel into all four cylinders, the throttle body is of the one-barrel side draft type.
- The ignition system is of the fully transistorized, contactless type. The spark advance device is of the electronic type.
- The air cleaner is placed at the right front portion of the engine compartment and equipped with a resonator.
- The radiator is of a corrugated type, and the cooling fan is electromotive.

Major Specifications:

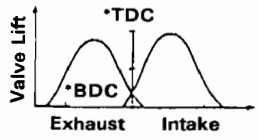
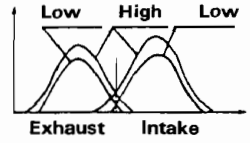
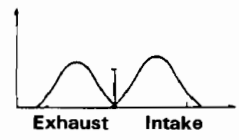
Items \ Area code			KE, KG, KF, KX
Engine	Engine Code		B16A
	Transmission type		5-speed Manual
	Type		Water-cooled 4-stroke DOHC in-line 4-cylinder transversely mounted
	Fuel supply system		PGM-FI
	Bore x Stroke		81.0 x 77.4 mm (3.19 x 3.05 in)
	Compression ratio		10.2 : 1
	Displacement		1,595 cm^3 (97cu-in)
	Fuel required		95 RON (unleaded)
Electrical	Battery		55B24R
	Starter motor		1.4 kW
	A.C.G.		70 A (MAX)
Service data	Engine oil capacity		4.8 ℓ (5.1 US qt, 4.2 Imp qt) for engine disassembly 4.0 ℓ (4.2 US qt, 3.5 Imp qt) for oil change
	Red zone		8,000 min^{-1} (rpm)
	Idle speed		750 min^{-1} (rpm)
	Spark plug	NGK	BKR6E-N11
		ND	K20PR-L11

Cylinder Head

Variable Valve Timing and Lift Electronic Control System

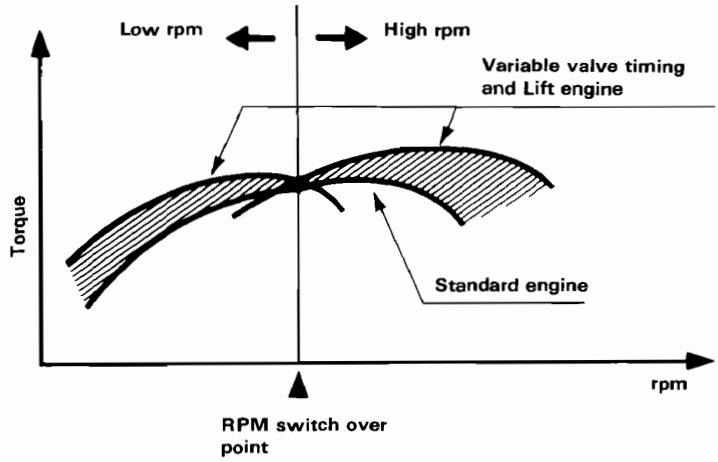
In general, it would be ideal if the high rpm performance of a racing engine and the low rpm performance of a standard passenger car engine could be combined in a single engine. This would result in a maximum performance engine with a wide power band. Two of the major differences between racing engine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

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

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

*TDC = Top Dead Center *BDC = Bottom Dead Center
○ = Optimum P

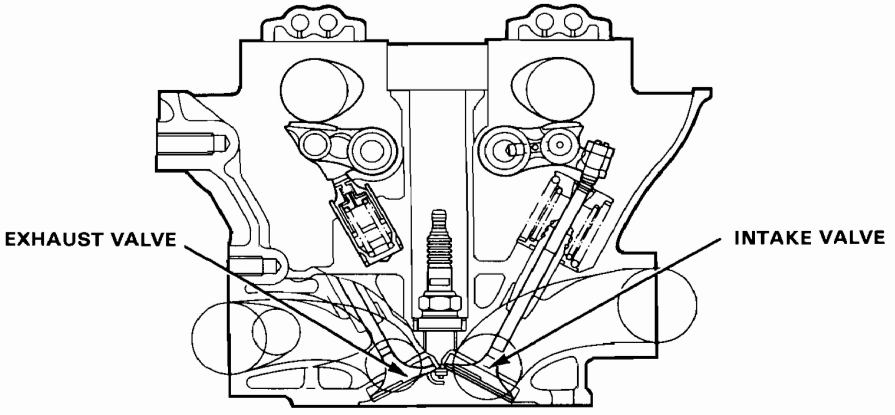
The engine is equipped with two valve timing and lift setting which change according to driving conditions.

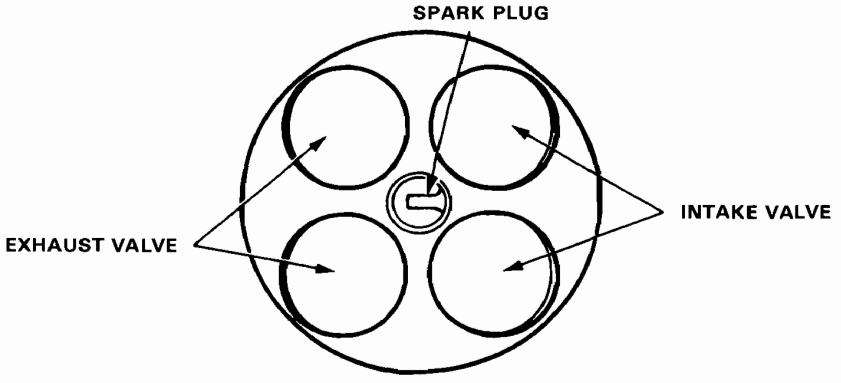


Cam/Valve Mechanism

Cylinder Head :
The cylinder head is a light-weight aluminum alloy one-piece cast head with an excellent heat transmission property. The head is mounted one the cylinder block with a gasket placed between.

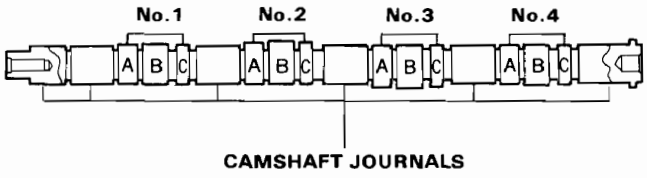
Combustion Chamber :
The combustion chamber is a compact center-plug type of pentroof design. Two intake valves and two exhaust valves are positioned to permit cross-flow ventilation. This, together with optimum engine specifications, including ideal values for best ignition timing, compression ratio, and valve timing result in high intake and exhaust efficiency and improved combustion efficiency.





Camshaft

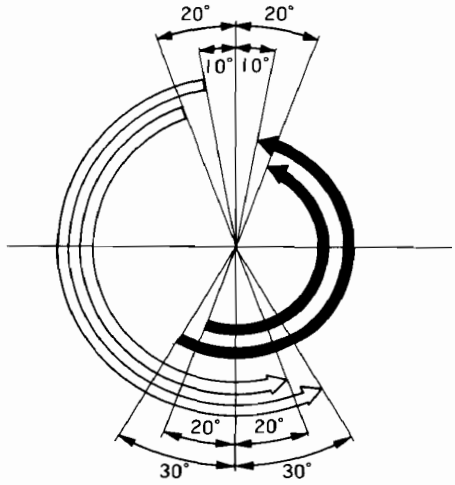
The camshaft is a cast piece. By improving dimensional accuracy, it became possible to achieve minimum space between cams, thus allowing a more campact cylinder head. Main bearings are supported on six journals with forced lubrication. On the left end of each camshaft is a driven pulley. On the right end of the intake camshaft a distributor mounted, and on the exhaust camshaft a spool valve is attached to effect switching between valve lift and timing. The exhaust and intake cycles require a total of 24 cams to open and close the valves.



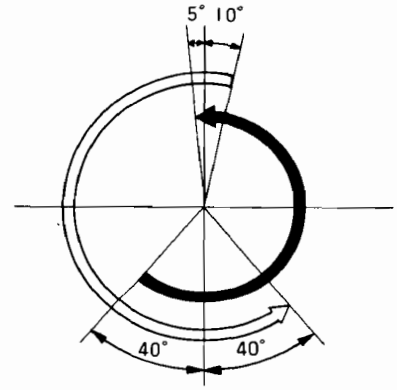
CAMSHAFT JOURNALS

	EX	IN
A	Secondary	Primary
B	Mid	Mid
C	Primary	Secondary

Top dead center



Low-speed valve timing



High-speed valve timing

Bottom dead center

⇦ : Intake valve open
← : Exhaust valve open

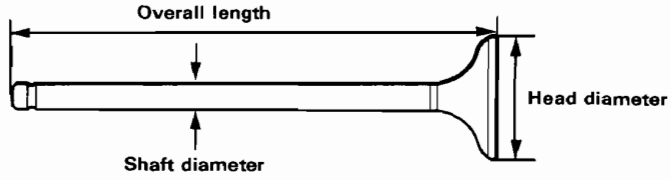
Valves

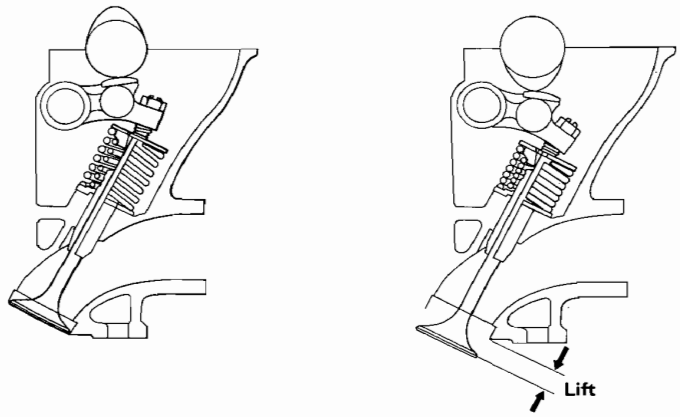
The valves are open and closed by rocker arms driven by the camshaft. The rocker arm lever ratio is set to the optimum value, keeping cam lift to the minimum while increasing valve lift, thus improving intake/exhaust efficiency.

Valve specifications unit: mm (in)

ITEM \ VALVE	INTAKE	EXHAUST
HEAD DIAMETER	ϕ33 (1.30)	ϕ28 (1.10)
SHAFT DIAMETER	5.5 (0.22)	5.5 (0.22)
OVERALL LENGTH	102.35 (4.03)	102.55 (4.04)
VALVE LIFT	8.0/5.0/*10.4 (0.31/0.20/*0.41)	7.5/4.5/*9.4 (0.30/0.18/*0.37)

*indicates high-speed valve

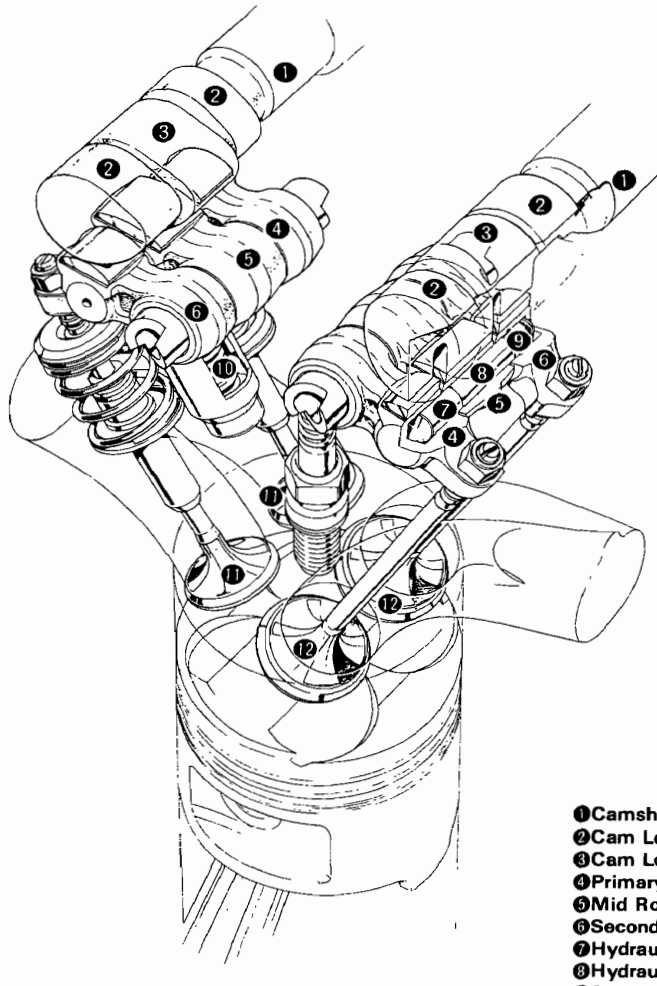




V-TEC System

System Configuration

In the Honda Variable Vable Timing and Lift Electronic Control System, the four valves per cylinder mechanism is equipped with a third rocker arm (the mid rocker arm) and a third cam lobe on both the intake and exhaust sides. Further hydraulic pistons are built into the mid rocker arm and the primary and secodary rocker arms to engage and disengage them. Each of the three cam lobes on the intake side and on the exhaust side are unique. The center cam lobes are for high rpm operation, while the primary and secondary lobes are for low rpm operation. The mid rocker arm is also equipped with a supplementary spring with a lost-motion function for reducing the amount of arm play in the low speed range, and make valve movement smoother in the high speed range.

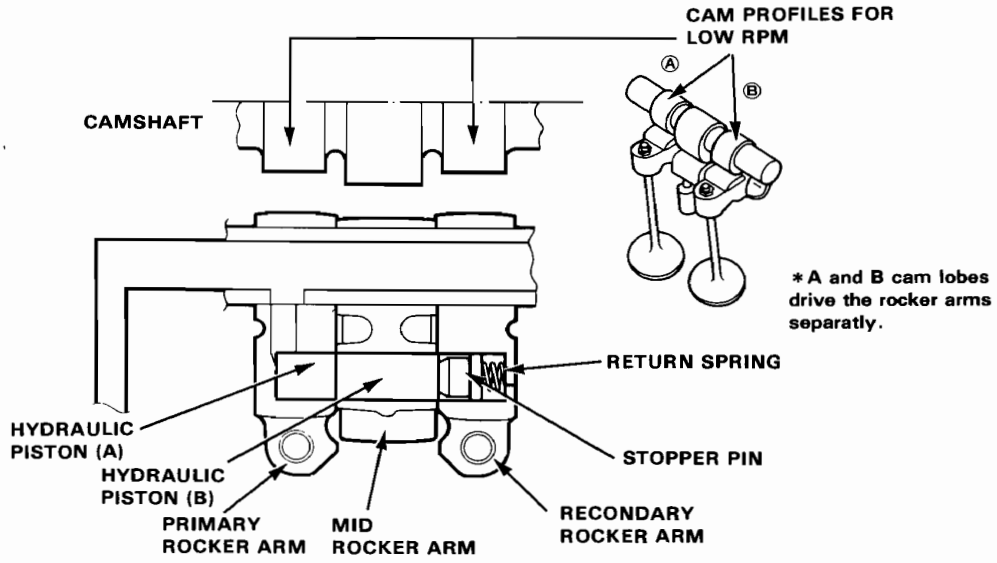


❶Camshaft
❷Cam Lobes For Low Rpm
❸Cam Lobes For High Rpm
❹Primary Rocker Arm
❺Mid Rocker Arm
❻Secondary
❼Hydraulic Piston A
❽Hydraulic Piston B
❾Stopper Pin
❿Lost-motion Spring
⓫Exhaust Valve
⓬Intake Valve

Mechanism

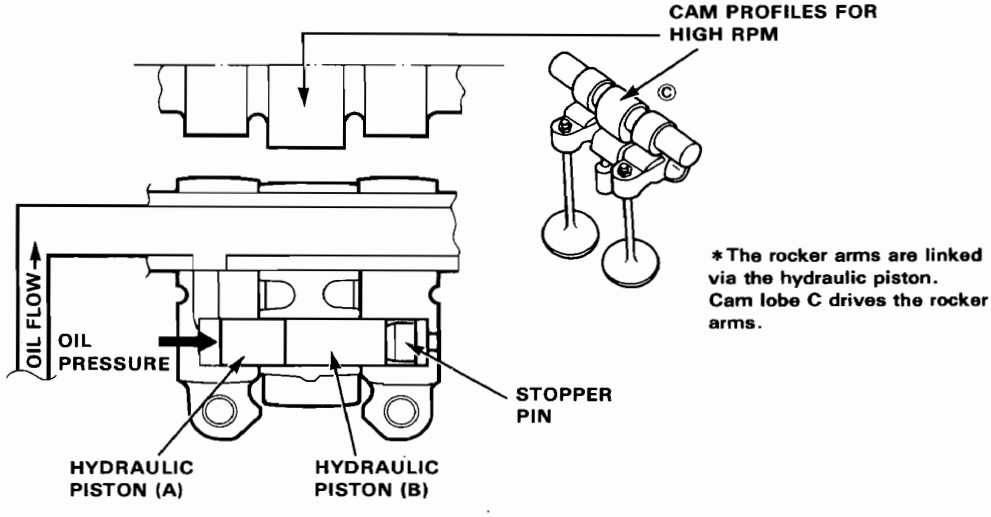
At Low rpm
As shown, the primary and secondary rocker arms locatdd on both sides ard not connected to the mid rocker arms but are driven separately by cam lobes A and B at different timing and lift. It should be noted that although the mid rocker arm is connected to the center cam lobe with the lost-motion spring, it is irrelevant to the opening and closing of the valves in the low rpm range.

At Low rpm



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

At High rpm



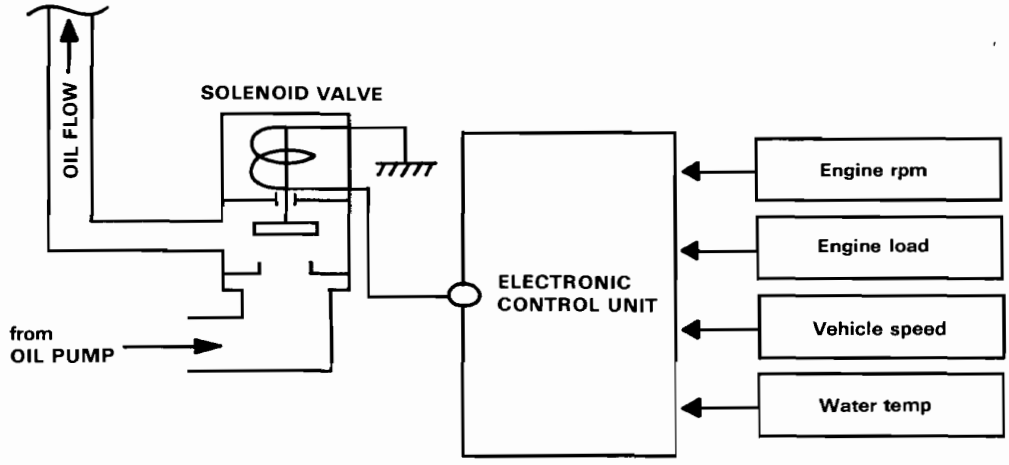
V-TEC System

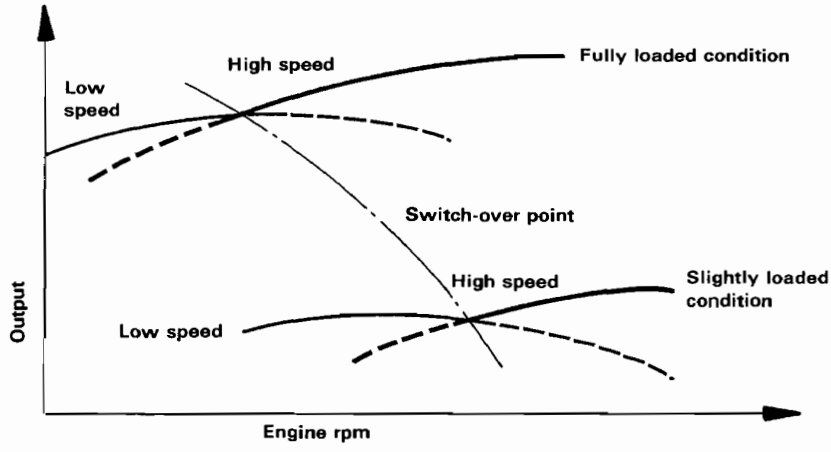
Control System

The control system for this mechanism, as shown below, constantly monitors the changes in engine status such as load, rpm and vehicle speed. This information is transmitted to the Electronic Control System Unit for precise control to assrure smooth operation under any condition.

Valve Timing Change Conditions
Engine RPM : over 5,300 rpm
Vehicle Speed : over 30 km/h
Water Temperature : over 60 °C

Control System

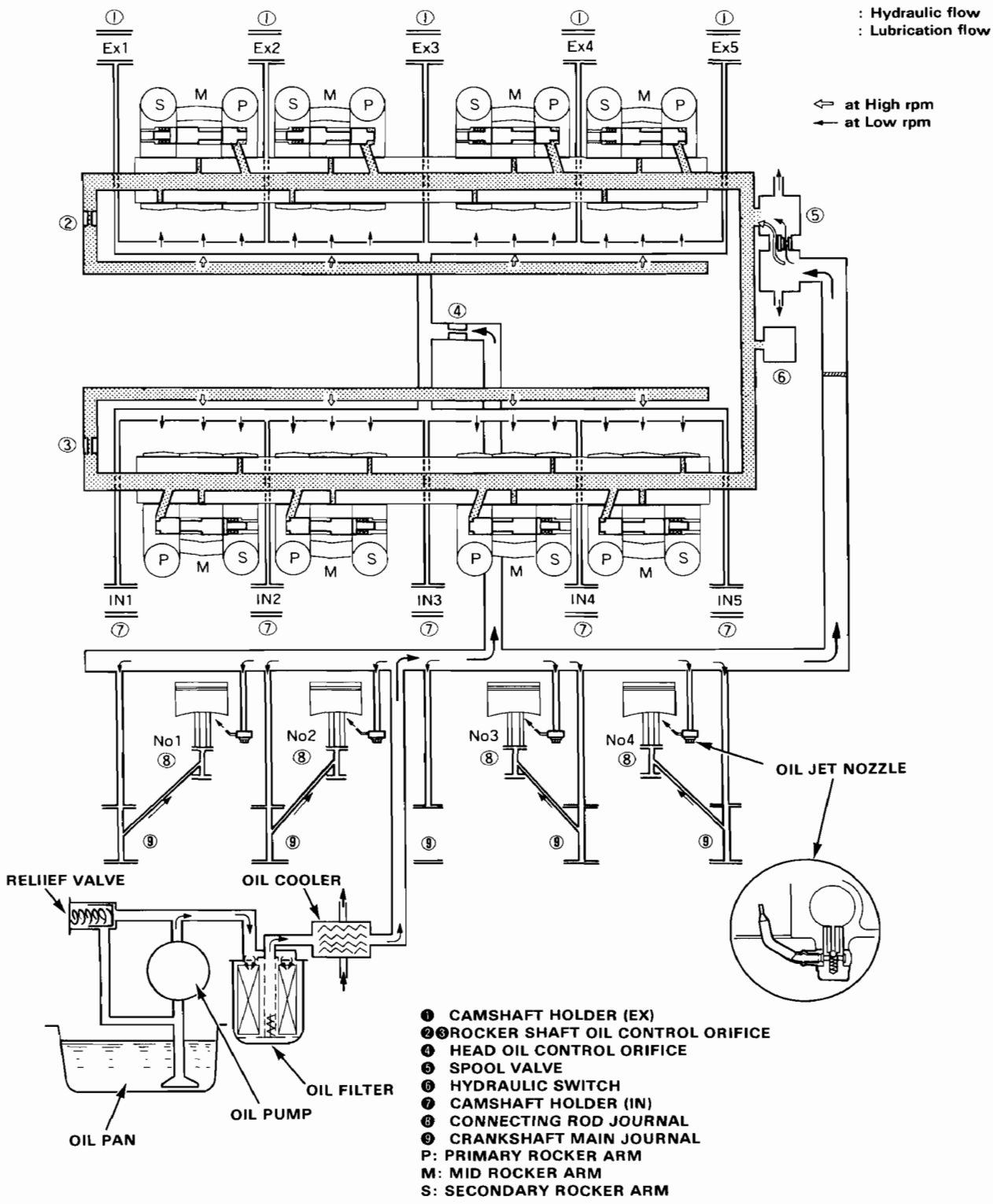




The above graph shows changes in the switch-over point in relation to engine rpm and load.

Lubrication System

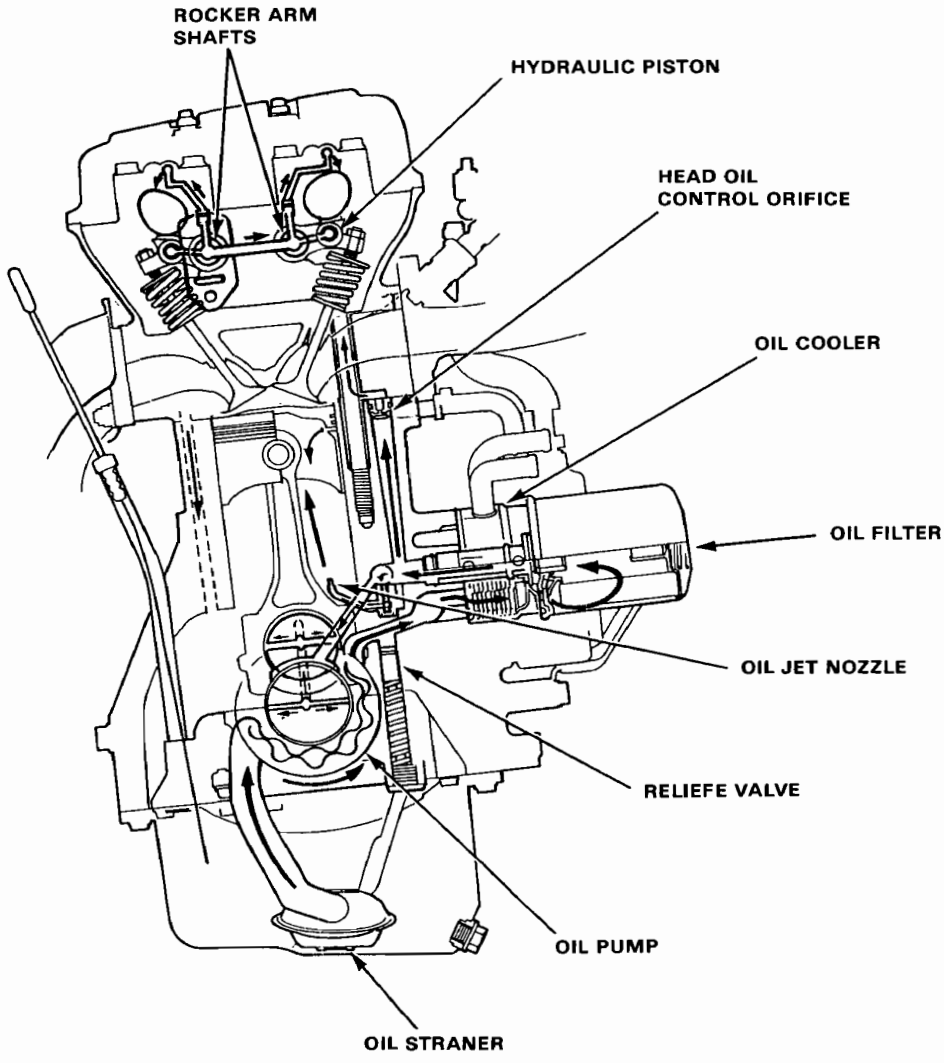
Oil Flow



Lubrication System

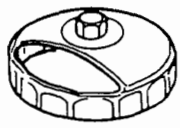
Oil Passage

The lubrication system is a full filtration circulation type. The oil pump is directly linked to the crankshaft; oil collected in the oil pump is passed through the oil strainer, after which pressure is regulated by the pump relief valve. It is then filtered through the oil filter and pumped to the cylinder block and cylinder head. A baffle plate is provided inside the oil pan; the baffle plate helps minimize the chance that changes in oil level produced inside the pan while driving will effect the amount of oil. Jet nozzles on the cylinder block provide lubrication to the pistons and cylinder walls.

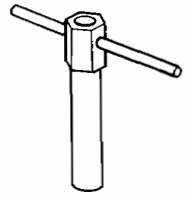


Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07912—6110001	Oil Filter Socket	1	
②	07LAA—PR30100	Tappet Adjusting Wreuch	1	New tool
③	07LAJ—PR30100	Valve Inspection Set	1	New tool
④	07LAJ—PR30200	Air Stopper	1	New tool
⑤	07999—PD6000A	PGM-FI Test Harness	1	
⑥	07JAZ—SH20100	RPM Connecting Adapter	1	
⑦	07406—0070000	Low Pressure Gauge	1	
⑧	07LAK—PR30100	Gauge Joint Adaptor	1	New tool



①



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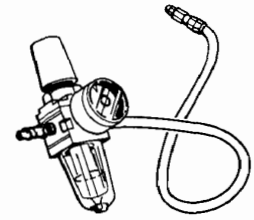

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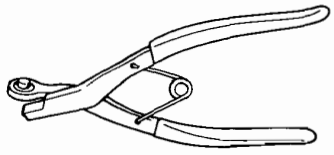

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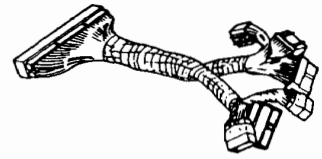
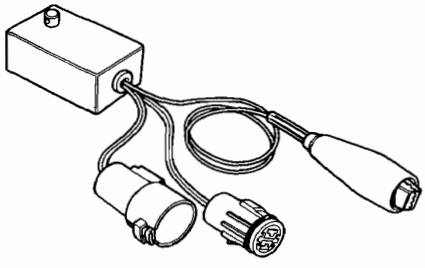


⑤



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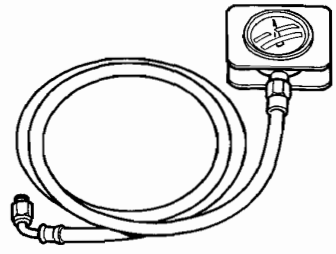

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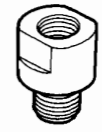
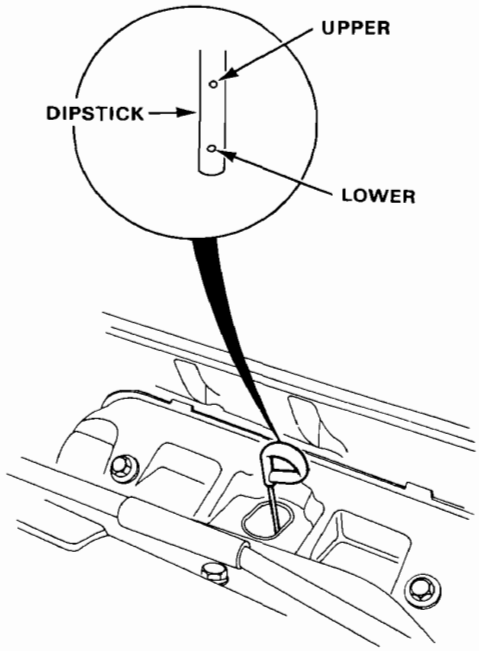


⑧

Engine Oil Level Inspection

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

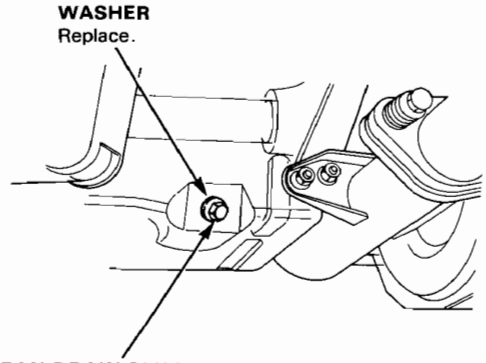
CAUTION: *Insert the dipstick carefully to avoid bending it.*



Engine Oil Replacement

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

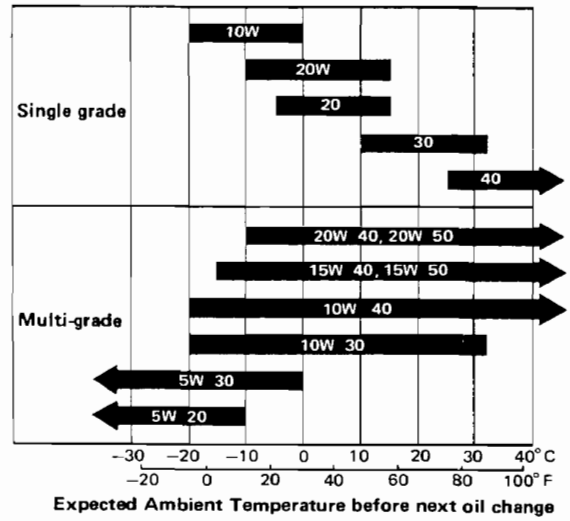
   NOTE: Remove the filler cap to speed draining.



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

Capacity	4.8 ℓ (5.1 US qt, 4.2 Imp qt) for engine disassembly 4.0 ℓ (4.2 US qt, 3.5 Imp qt) for oil change
Change	Every 10,000 km (6,000 miles) or 6 months, which ever comes first.

Recommended Engine Oil
(SE, SF or SG Grade 10W-30 only)



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

Oil Filter Replacement

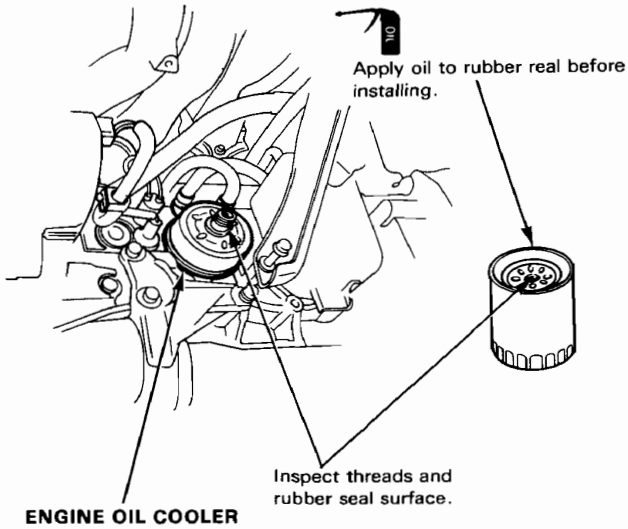
⚠WARNING After the engine has been run, the exhaust pipes will be hot; be careful when working around the exhaust mainfold.

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: Engine Oil and the filter should be changed together 10,000 km (6,000 miles) or 6 months, which ever comes first.

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

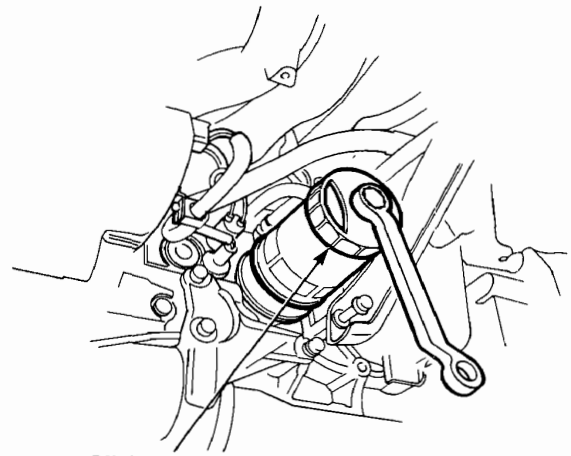
   NOTE: Use only filters with a built-in bypass system.



3. Install the oil filter by hand.
4. After the rubber seal 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.

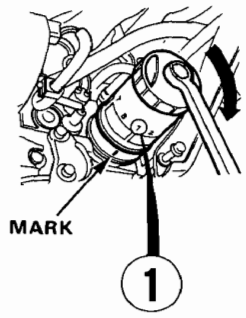


Eight numbers (1 to 8) are printed on the surface of the filter.

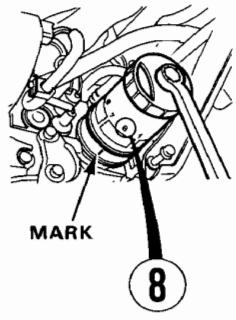
The following explains the procedure for tightening filters using these numbers.

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 aligns with the marked point.



Number when rubber seal is seated.



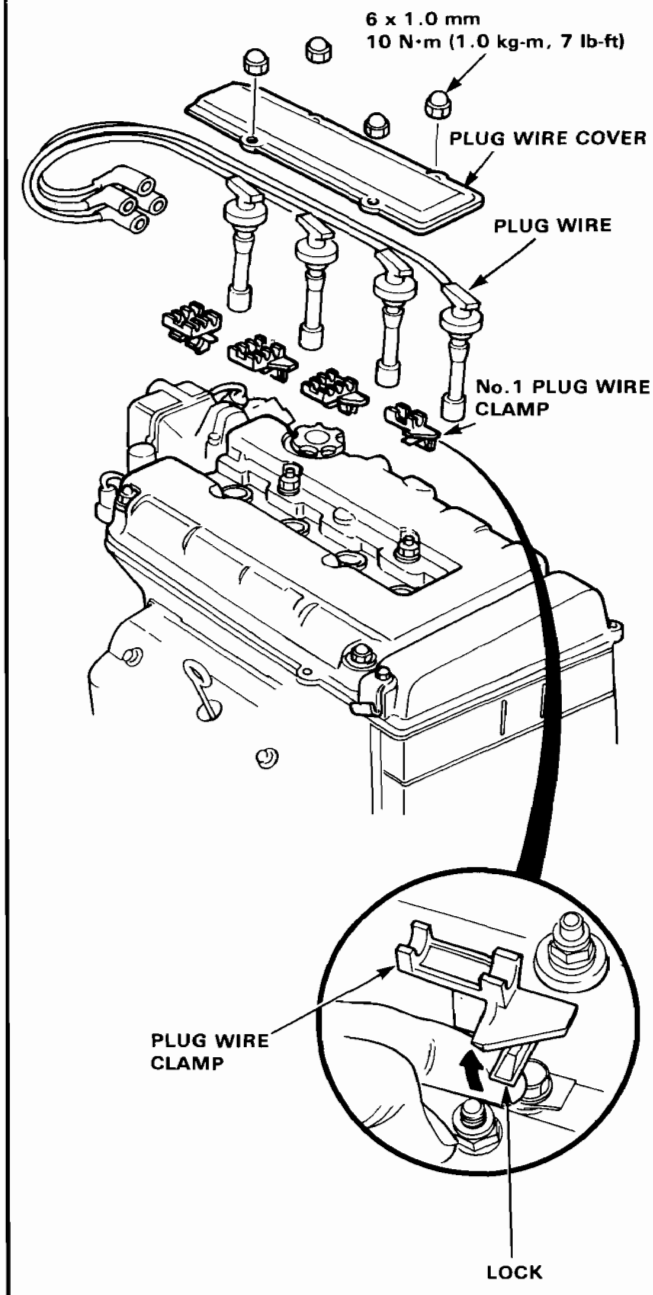
Number after tightening.

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.

Spark Plug Inspection

1. Remove the plug wire cover and the plug wires.
2. Remove the plug wire clamps while pulling up on the lock.



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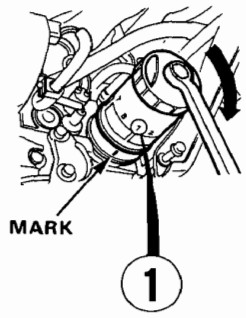
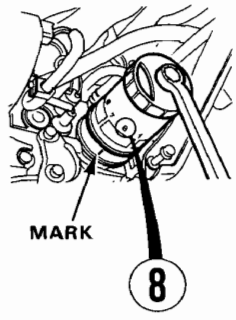


Number when rubber seal is seated.



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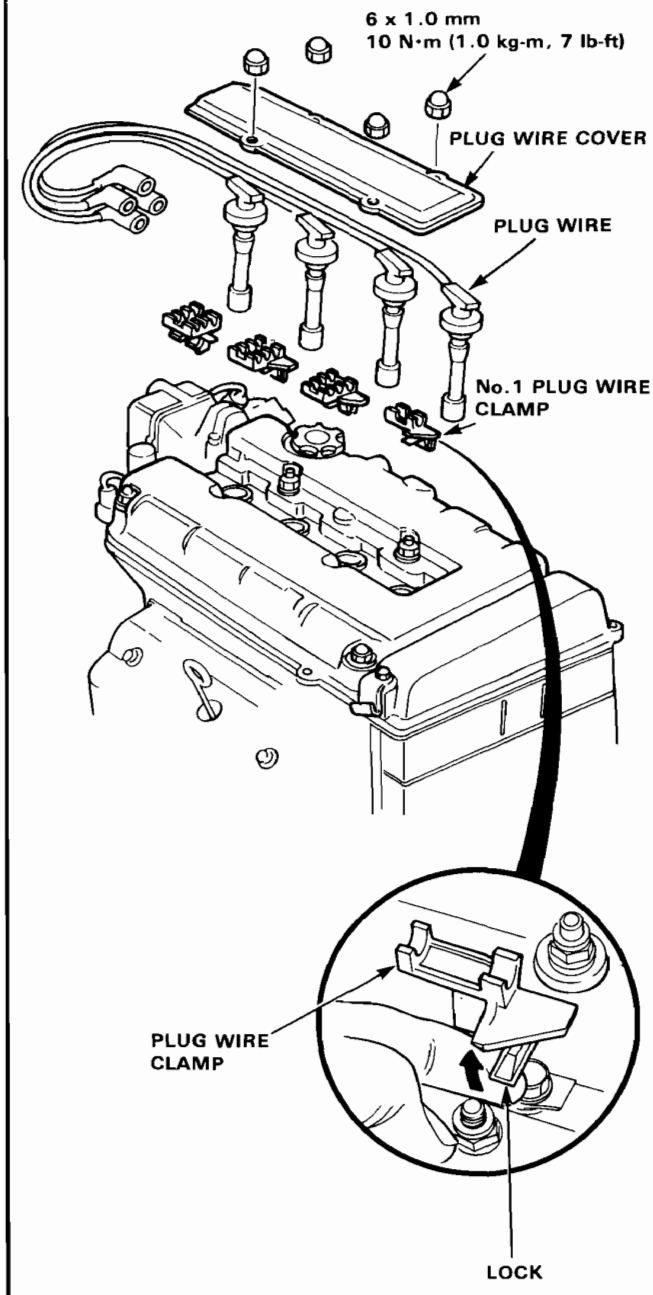

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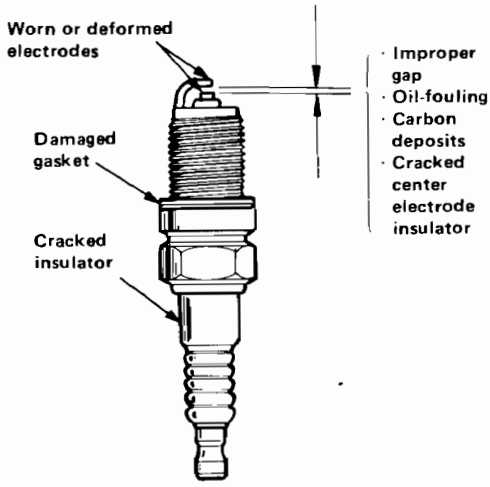
Spark Plug Inspection (cont'd)

3. Inspect the electrodes and ceramic insulator for:



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

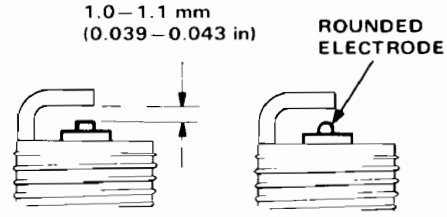
Fouled plug may be caused by:
- Rich fuel mixture
- Retarded ignition timing
- Oil in combustion chamber
- Incorrect spark plug gap
- Plug heat range too low
- Excessive idling/low speed running
- Clogged air cleaner element
- Deteriorated ignition coil or ignition wires

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

Spark Plug:

CAUTION: Use specified plugs only.

NGK	BKR6E-N11 (standard) BKR7E-N11
ND	K20PR-L11 (standard) K22PR-L11



5. Adjust the gap with a suitable gapping tool.

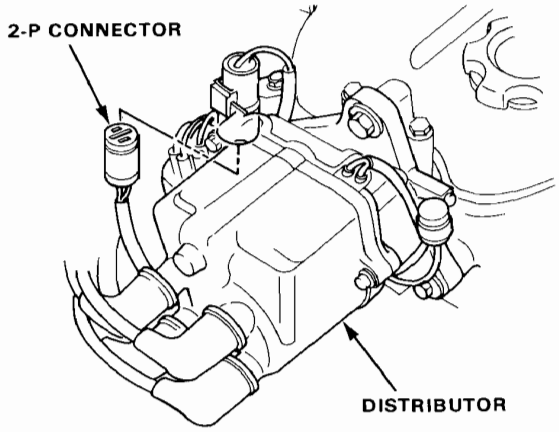
   Electrode Gap: 1.0–1.1 mm (0.039–0.043 in)

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

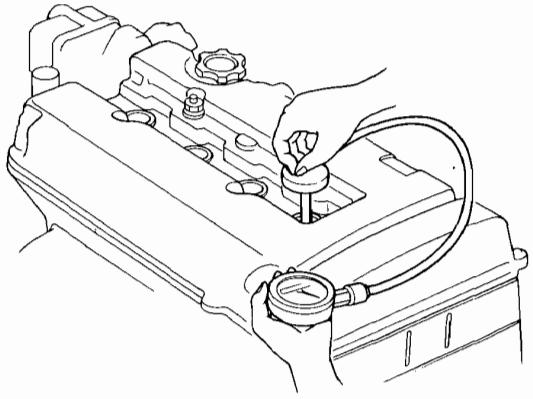
   NOTE: Apply a small quantity of anti-seize compound to the plug threads before installing.

Compression Pressure Inspection

1. Before inspection, run the engine until it warms up (radiator fan comes on).
2. Remove the plug wires (page 5-17).
3. Disconnect spark plugs (4).
4. Disconnect the 2-P connector (ignition coil primary lead) from the distributor.



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



Compression pressure:
Standard (new): 1,275 kPa (13.0 kg/cm², 185 psi) at 250 min⁻¹ (rpm)
Limit: 932 kPa (9.5 kg/cm², 135 psi) at 250 min⁻¹ (rpm)
Difference between cylinders: 169 kPa (2.0 kg/cm², 28 psi)

NOTE: Use a full charged battery.

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

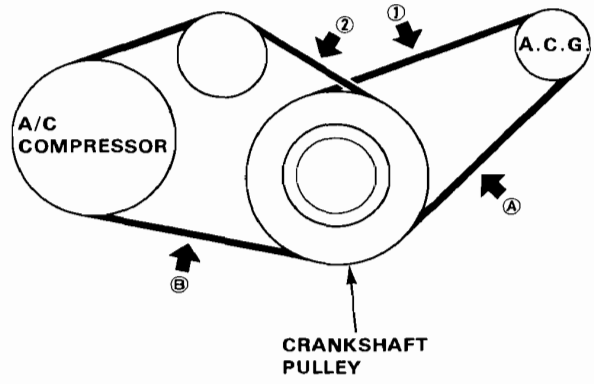
Drive Belts Inspection

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

	Used Belt	New Belt
①Alternator Belt	8.5—10.5 mm (0.33—0.41 in.)	5.5—7.5 mm (0.22—0.30 in.)
②A/C Compressor Belt	7.0—9.0 mm (0.28—0.35 in.)	4.5—6.5 mm (0.18—0.26 in.)

Measure with the belt tension gauge:

	Used Belt	New Belt
ⒶAlternator Belt	343—490 N (35—50 kg, 77—110 lb)	588—785 N (60—80 kg, 132—176 lb)
ⒷA/C Compressor Belt	343—490 N (35—50 kg, 77—110 lb)	539—735 N (55—75 kg, 121—165 lb)

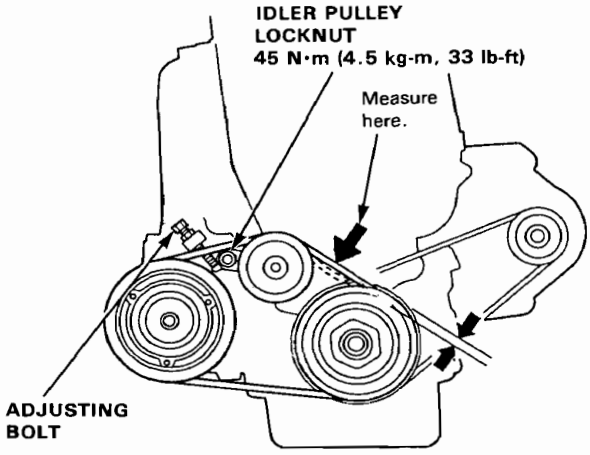


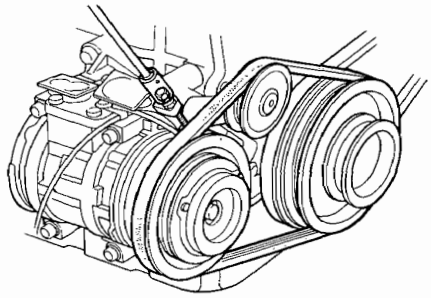
A/C Compressor Belt Adjustment

NOTE: If there are cracks or any damage evident on the belt, replace it with a new one.

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

   Deflection: 7.0—9.0 mm (0.28—0.35 in.)
   NOTE: On a brand-new belt, the delflection should be 4.5—6.5 mm (0.18—0.26 in.) when first measured.

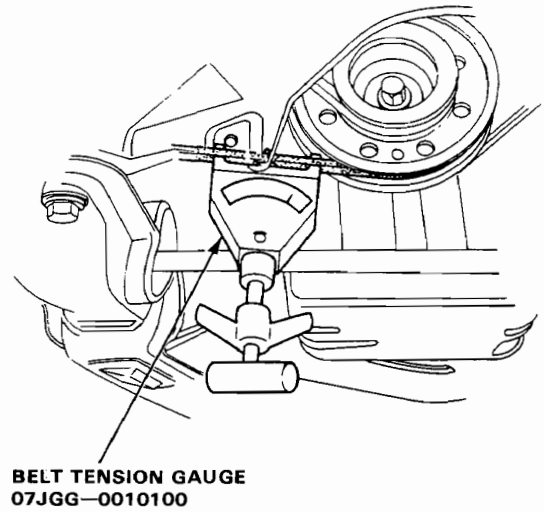




Measure with the belt tension gauge:
Attach the belt tension gauge to the belt and measure the tension of the belt.

Tension: 343—490 IN (35—50 kg, 77—110 lb)

NOTE:
- On a brand-new belt, the tension should be 539—735 N (55—75 kg, 121—165 lb) when first measured.
- See the instruction for the belt tension gauge.

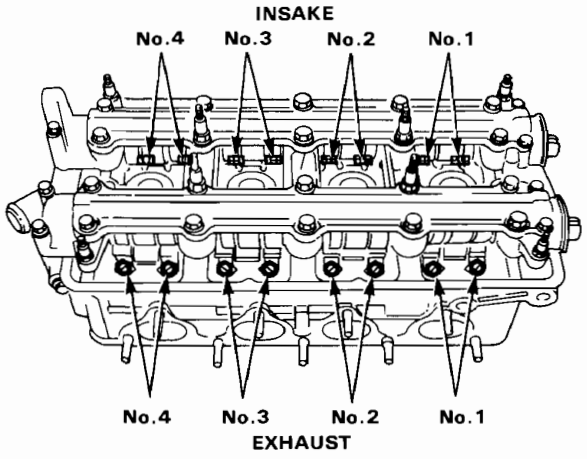


2. Loosen the idler pulley locknut.
3. Turn the adjusting bolt to get the proper belt tension, then retighten the bolt.
4. Recheck the defection of the belt.

Valve Clearance Adjustment

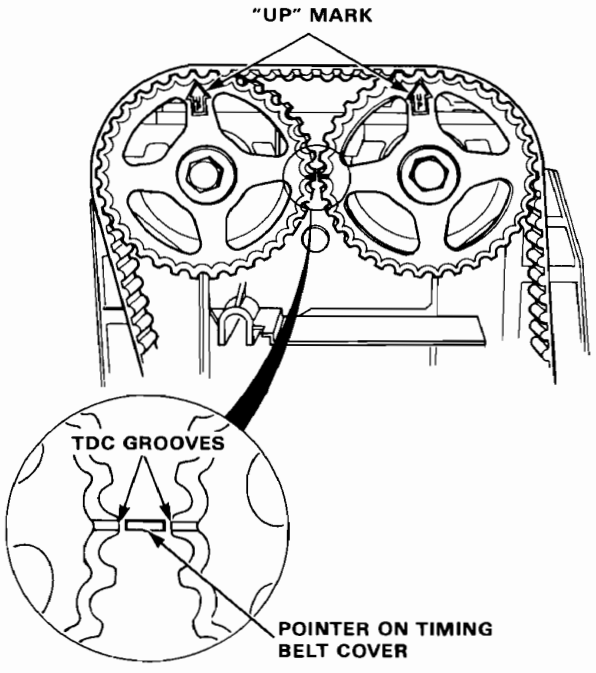
NOTE:
- Valves should be adjusted when the cylinder head temperature is less than 38 °C (100 °F).
  Adjustment is the same for both intake and exhaust valves.
- If the pulley bolt loosens while turning the crank, retorque it to 120 N·m (12.0 kg-m, 87 lb-ft).

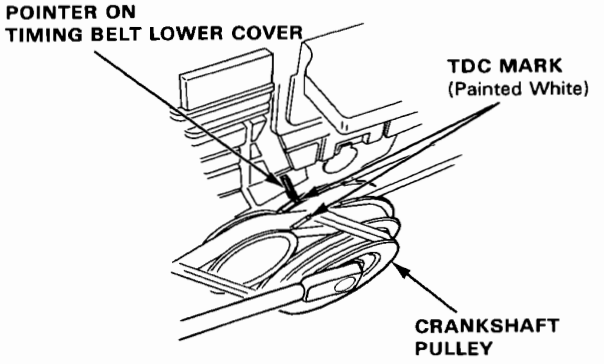
1. Remove valve cover.



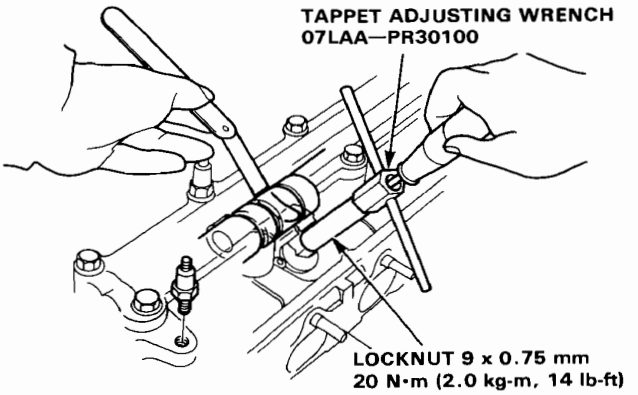
2. Set the No.1 piston at TDC. "UP" mark on the pulley should be at the top, and the TDC grooves on the pulley should align with the pointer on timing belt back cover. TDC grooves (painted white) on the crankshaft pulley should align with pointer on the timing belt lower cover.

Number 1 Piston at TDC





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



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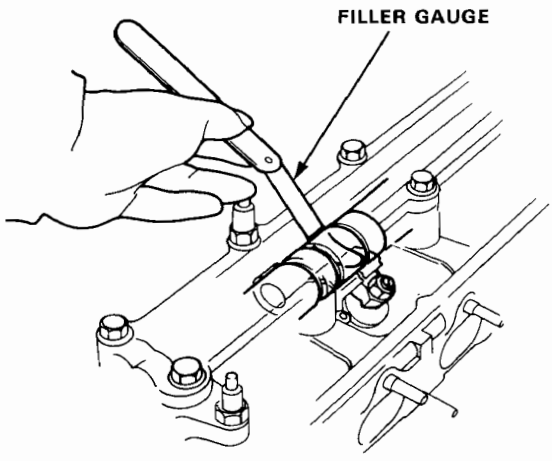
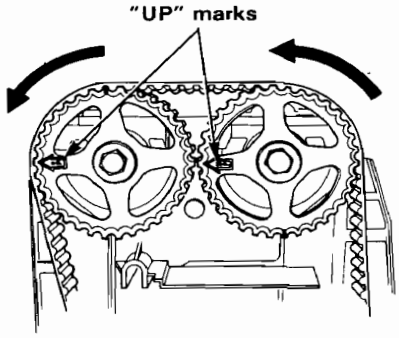
Valve Clearance Adjustment (cont'd)

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



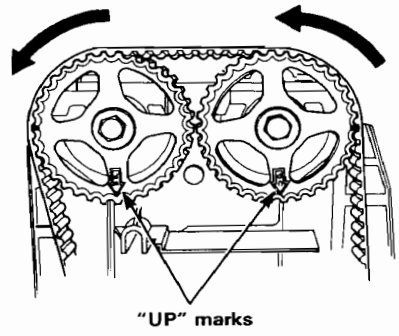
6. Rotate the crankshaft 180° counterclockwise (campulley turns 90°). The "UP" mark should be on the exhaust side. Adjust valve on No.3 cylinder.

Number 3 piston at TDC



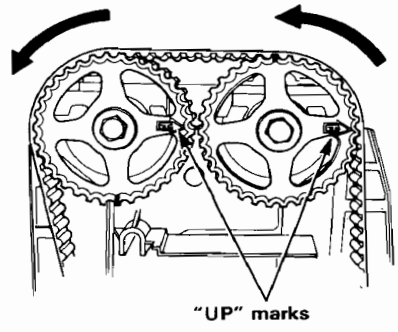
7. Rotate the crankshaft 180° counterclockwise to bring No.4 piston to TDC. Both TDC grooves are once again visible. Adjust valves on No.4 cylinder.

Number. 4 piston at TDC



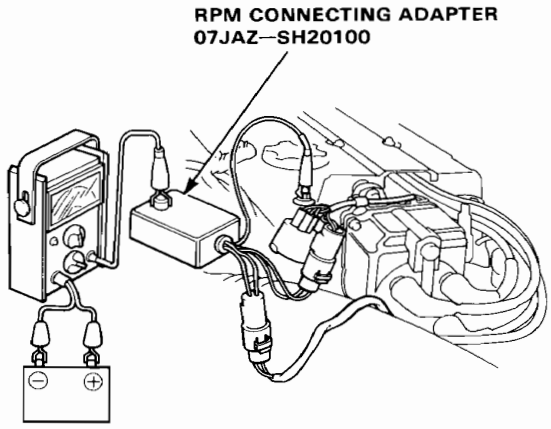
8. Rotate the crankshaft 180° counterclockwise to bring No.2 piston TDC. The "UP" mark should be on the intake side. Adjust valves on No.2 cylinder.

Number 2 piston at TDC.

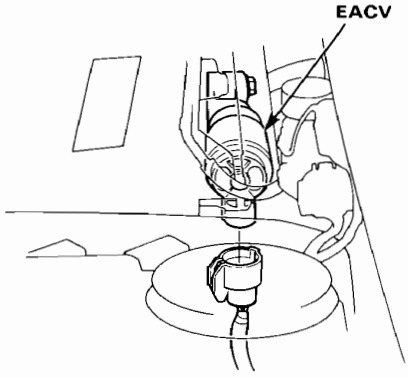


Idle Speed Inspection/Adjustment

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



3. Disconnect the 2P connector from the EACV.

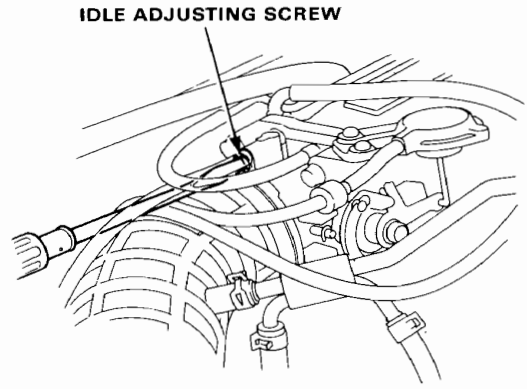


4. Check idling in no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating.

   Idle speed should be: 650±50 min^{-1} (rpm)

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

   NOTE: If the idle speed is excessively high, check the throttle control system (page 6-78).



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

   Idle speed should be: 750±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: 780±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: 810±50 min^{-1} (rpm)

   NOTE: If the idle speed is not within specifications, see System Troubleshooting Guide on page 6-45.

Tailpipe Emission Inspection

Inspection

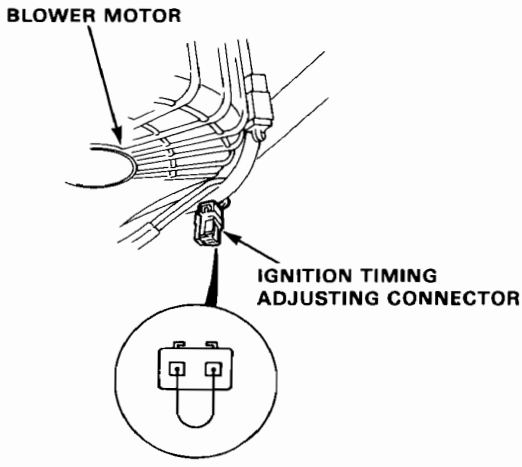
⚠WARNING Do not smoke during this procedure. Keep any open flame away from your work area.

1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
2. Connect a tachometer.
3. Check idle speed and adjust the idle speed, if necessary (page 6-59).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

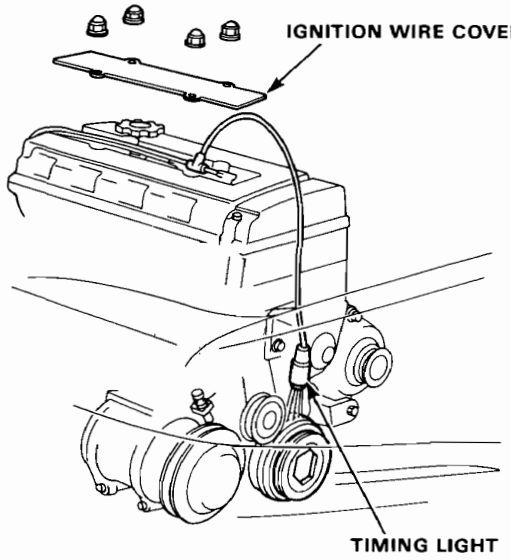
   CO meter should indicate 0.1 % maximum.

Ignition Timing Inspection and Setting

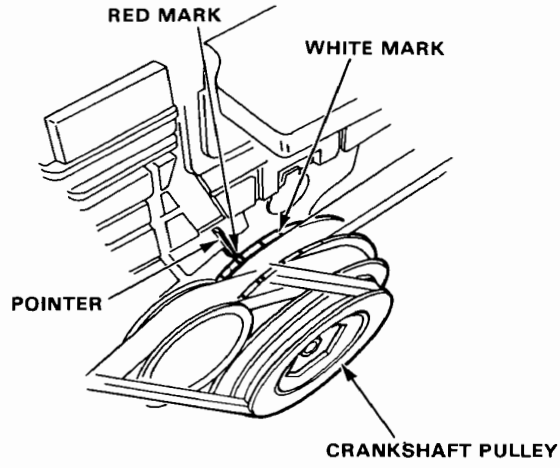
1. Start the engine and allow it to warm up (cooling fan comes on).
2. Connect the BRN and GRN/WHT terminals of the ignition timing adjusting connector (BLU) with a jumper wire.
   NOTE: L.H. drive type shown, R.H. drive type is symmetrical to L.H. drive type.



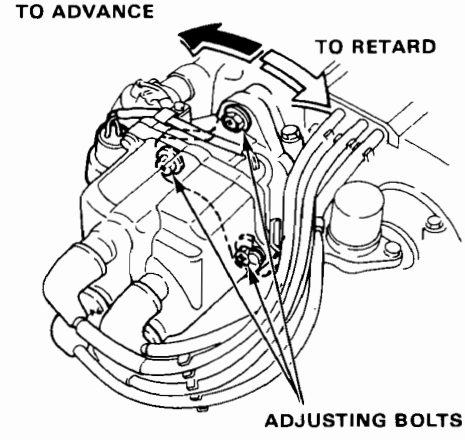
3. Remove the ignition wire cover. Then connect a timing light to the No. 1 ignition wire; while the engine idles, point the light toward the pointer on the timing belt cover.
   NOTE: Do not damage the cover when removing the nuts.



4. Adjust ignition timing, if necessary, to the following specifications:
   Ignition Timing:
   15° ± 2° BTDC (RED) at 750 ± 50 min^{-1} (rpm) in neutral



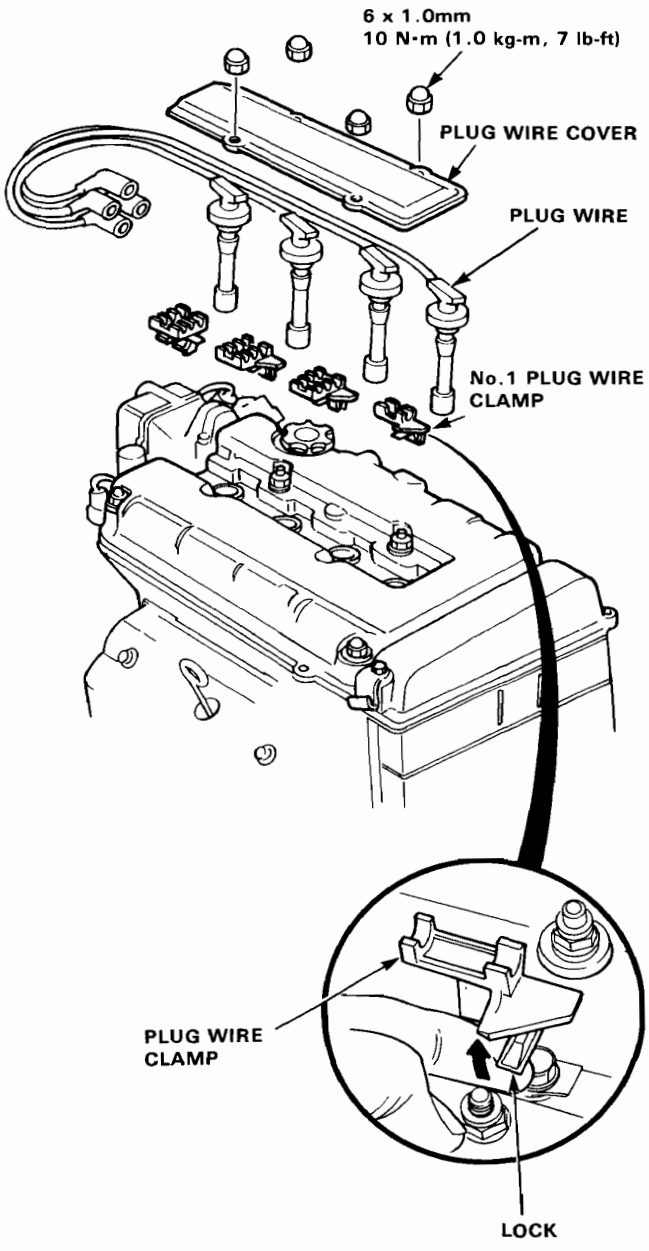
5. Adjust as necessary by loosening the distributor adjusting bolts, and turn the distributor housing counter clockwise to advance the timing, or clockwise to retard the timing.



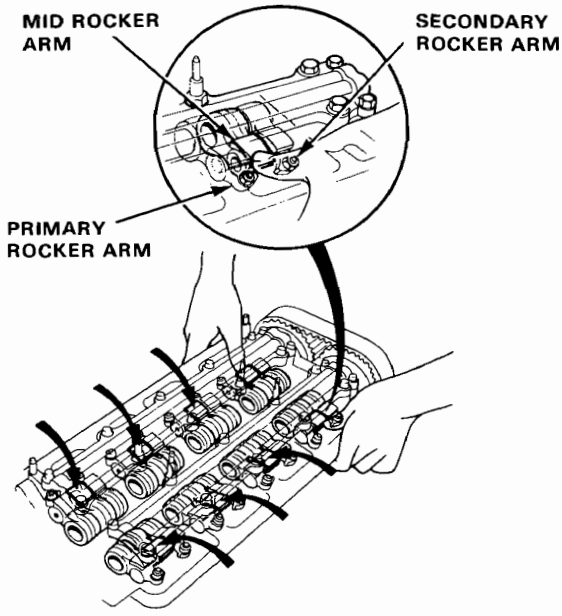
6. Tighten the adjusting bolts recheck the timing.
7. Remove the jumper wire from the ignition timing adjusting connector (BLU).

Manual Inspection of Rocker Arms

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



4. Remove the valve cover.
5. Push the mid rocker arm on the No.1 cylinder manualy.
6. Check that the mid rocker arm moves independently of the primary and secondary rocker arms.



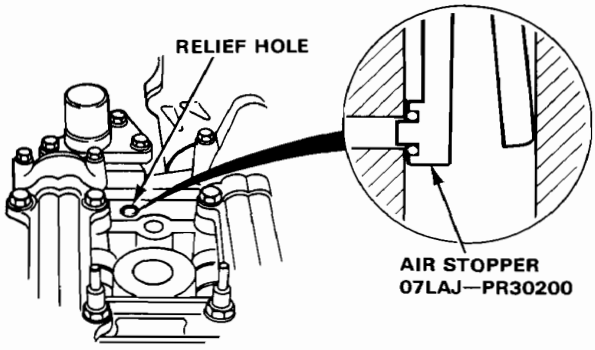
7. Check the mid rocker arm of each cylinder at TDC.
   - If the mid rocker arm does not move, remove the mid primary and secondary rocker arms as an assembly and check that the pistons in the mid and primary rocker arms move smoothly.
   - Replace the rocker arms as an assembly if there is any abnormality.

Rocker Arm Inspection Using Special Tools

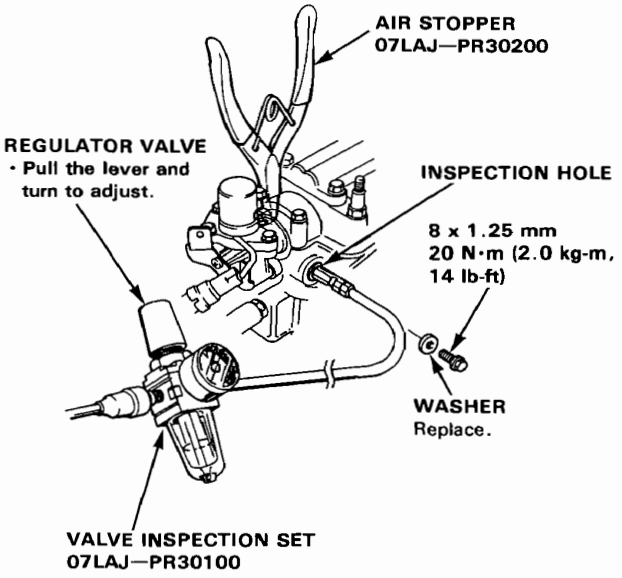
CAUTION:

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

1. Remove the valve cover.
2. Plug the relief hole with the special tool (Air Stopper).



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



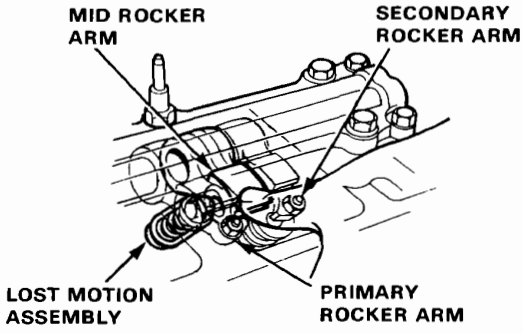
(cont'd)

Rocker Arm Inspection Using Special Tools (cont'd)

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

   Specified Air Pressure:
   245 kPa (2.5 kg/cm², 36 psi)
   —490 kPa (5.0 kg/cm², 71 psi)

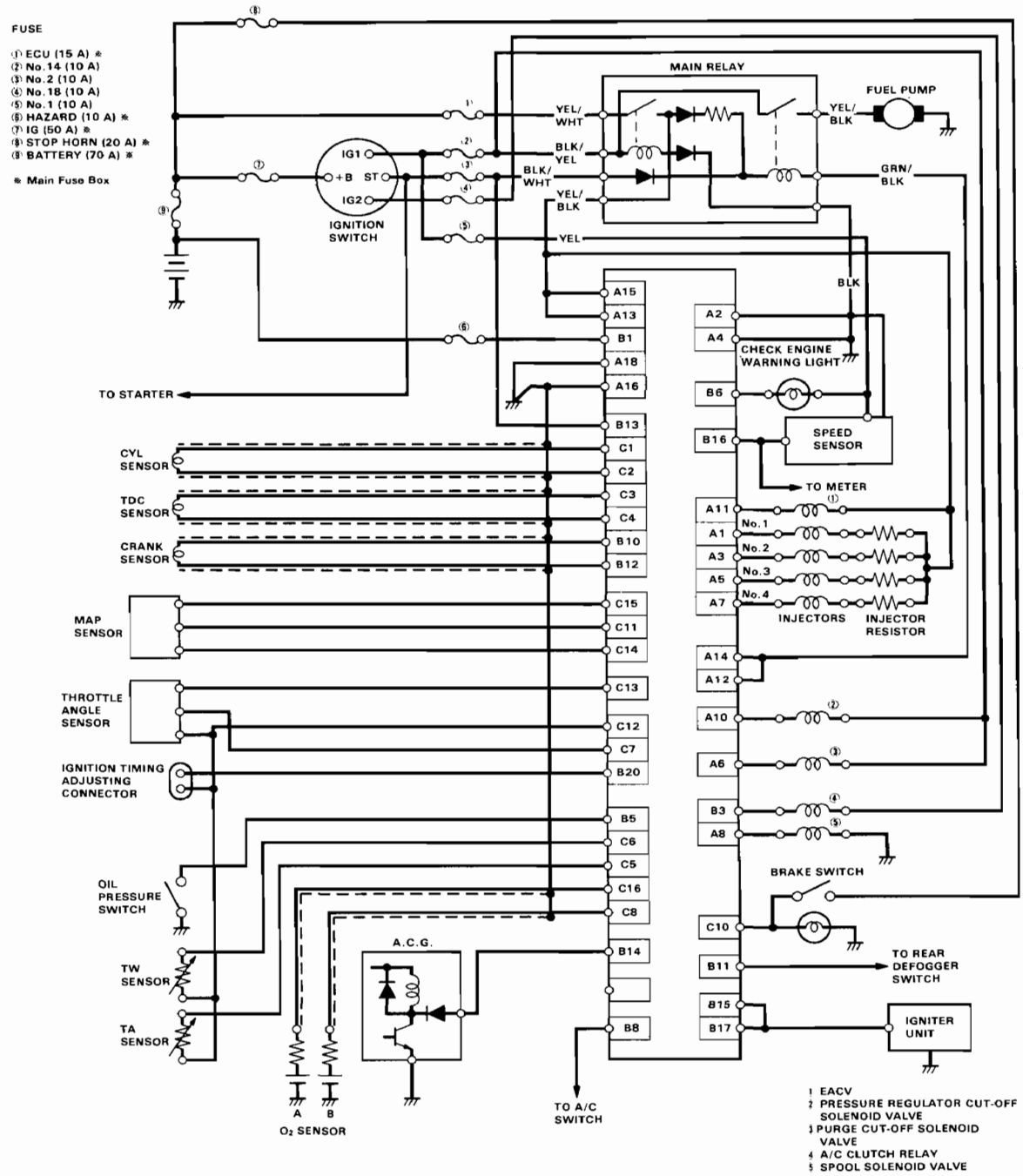
5. Make sure that the primary and secondary rocker arms are mechanically connected by pistons and that the mid rocker arms do not move when pushed manually.



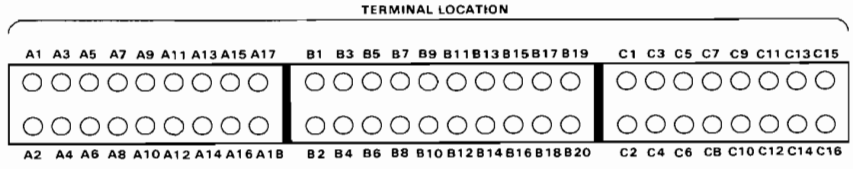
   - If the mid rocker arms indenpendently of the primary and secondary rocker arms, replace the rocker arms as a set.

6. Remove the special tools.
7. Check for smooth operation of the lost motion assembly. It is compressed slightly when the mid rocker arm is lightly pushed and compressed deeply when the mid rocker arm is strongly pushed.
   - Replace the lost motion assembly if it does not move smoothly.
8. After inspection, check that the ECU does not come on.

Electrical Connections (V-TEC)



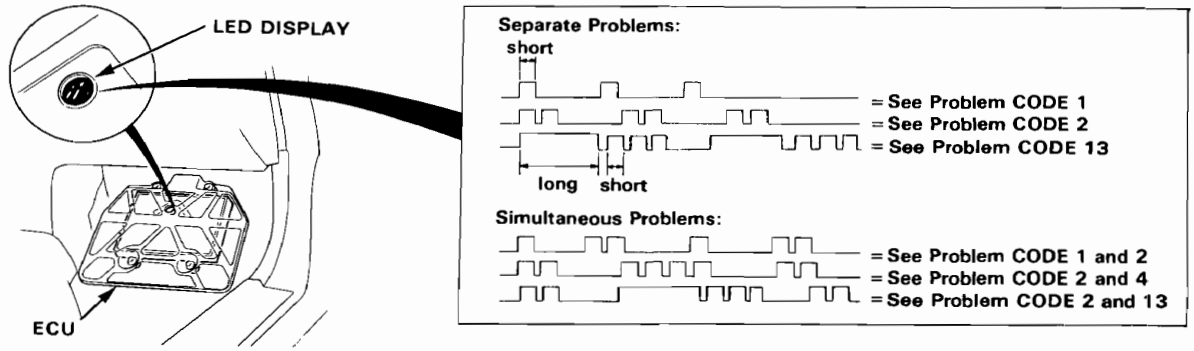
TERMINAL LOCATION



Troubleshooting —— 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 44 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.

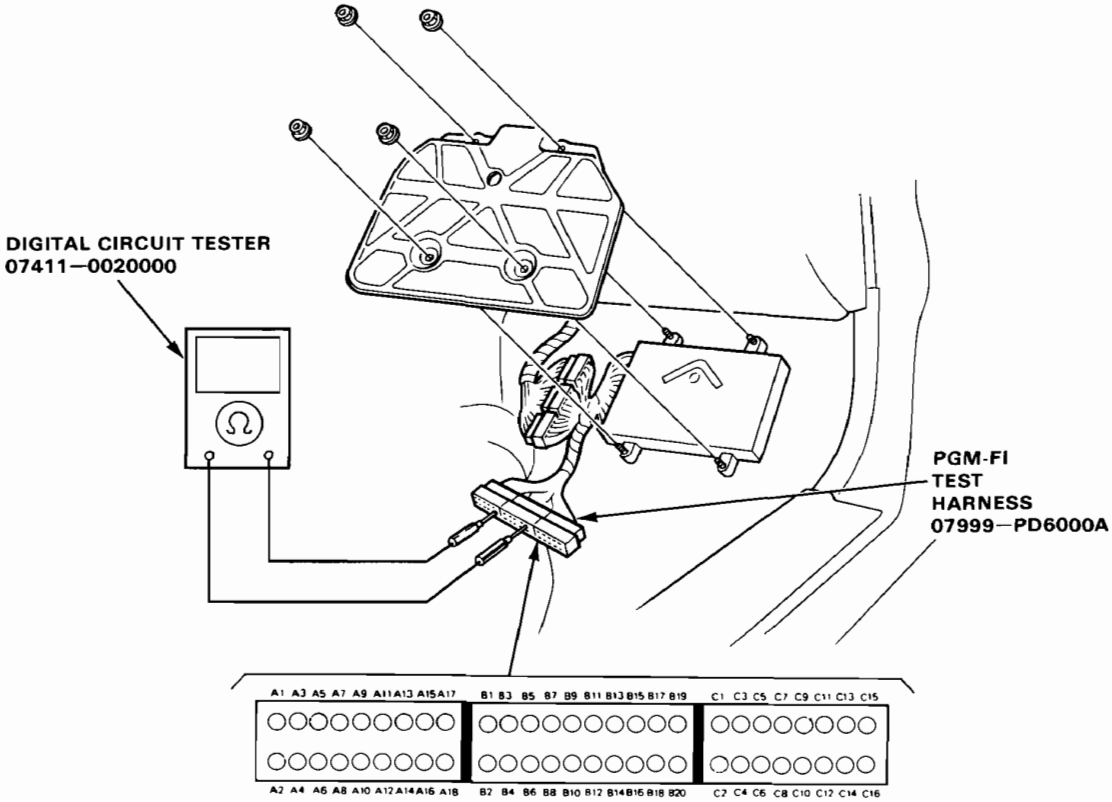
NOTE: Information on this page is for LH and RH models.



SELF-DIAGNOSIS INDICATOR BLINKS	SYSTEM INDICATED	PAGE
0	ECU	6-15
1, 2	OXYGEN CONTENT	6-18
3	MANIFOLD ABSOLUTE PRESSURE	6-22
5		6-26
4	CRANK ANGLE	6-28
6	COOLANT TEMPERATURE	6-34
7	THROTTLE ANGLE	6-36
8	TDC POSITION	6-30
9	No.1 CYLINDER POSITION	6-32
10	INTAKE AIR TEMPERATURE	6-38
13	ATMOSPHERIC PRESSURE	6-40
14	ELECTRONIC AIR CONTROL	6-47
15	IGNITION OUTPUT SIGNAL	6-42
17	VEHICLE SPEED SENSOR	6-44
21	SPOOL SOLENOID VALVE	5-32
22	OIL PRESSURE SWITCH	5-34
43, 44	FUEL SUPPLY SYSTEM (KX, KS, KG)	6-20

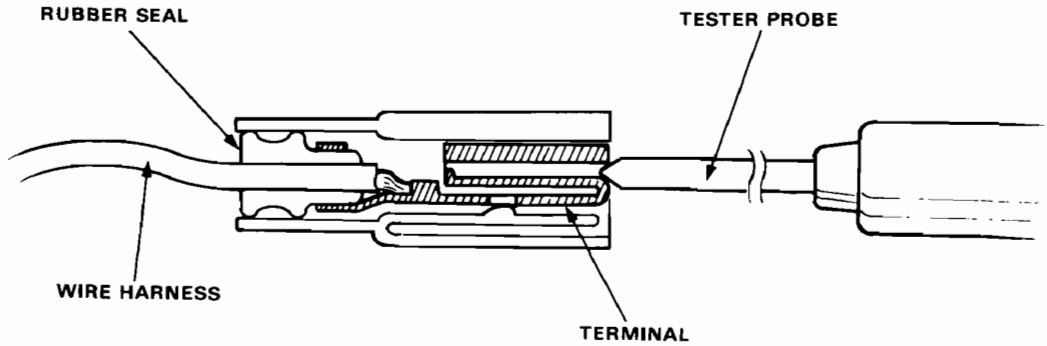
If codes other than those listed above are indicated, count the number of blinks again. If the indicator is in fact blinking unusual codes, substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.
The Check Engine warning light and ECU LED may come on, indicating a system problem, when, in fact, there is a poor or intermittent electrical connection. First, check the electrical connections, clean or repair connections if necessary.
If the Check Engine warning light is on and LED stays on, replace the ECU.

If the inspection for a particular failure code requires the PGM-FI 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 PGM-FI test harness. Then check the system according to the procedure described for the appropriate code(s) listed on the following pages.
NOTE: Information on this page is for LH and RH models.



TERMINAL LOCATION

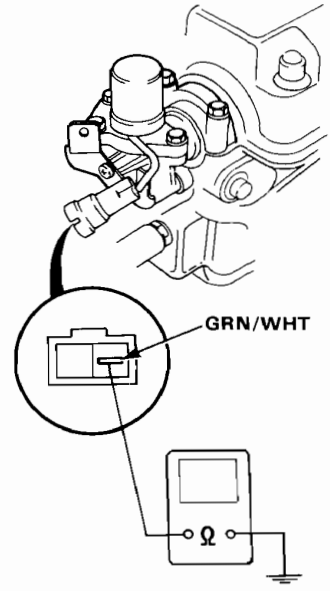
CAUTION:
- **Puncturing the insulation on a wire can cause poor or intermittent electrical connections.**
- **For testing at connectors other than the PGM-FI test harness, bring the tester probe into contact with the terminal from the connector side of wire harness connectors in the engine compartment.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



Troubleshooting Flowchart —— Spool Valve

(21) Self-diagnosis LED indicates code 21: A problem in the Spool Valve circuit.

Disconnect the 2P connector from the spool valve.



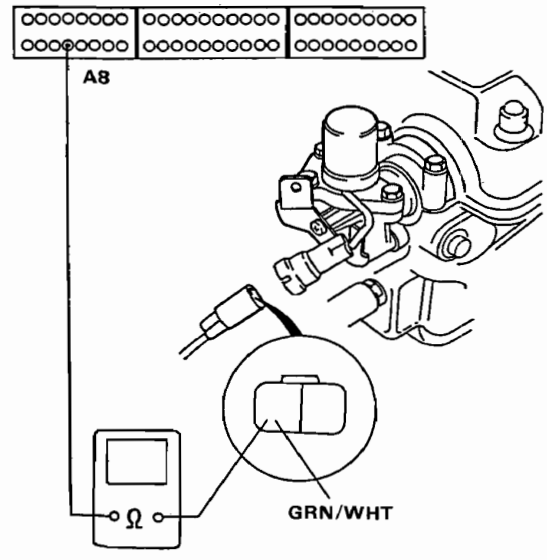
Check for continuity between GRN/WHT terminal and body ground.

Is there 14—30 Ω ?

NO → **Replace the spool solenoid valve.**

YES

Connect the ECU test harness.



Check for continuity between GRN/WHT terminal and A8 terminal.

Does continuity exist ?

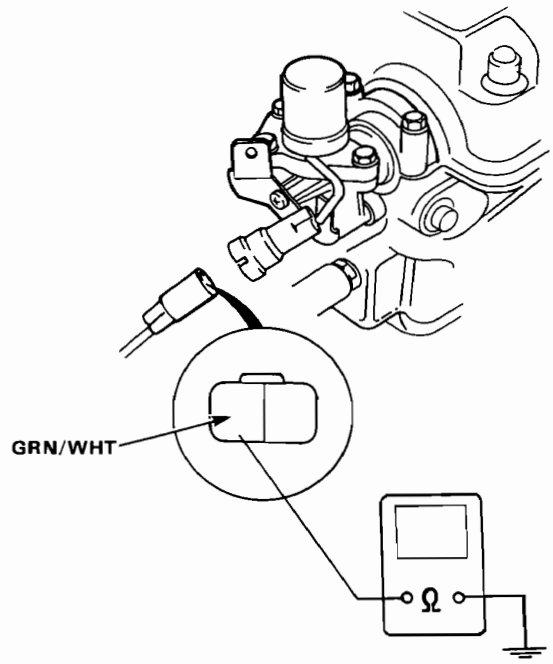
NO → **Repair open in GRN/WHT wire between ECU and spool valve connector.**

YES

(To page 5-33)

(From page 5-32)

Check for continuity between GRN/WHT terminal (harness side) and body ground.



Does continuity exist ?

YES → **Repair short in GRN/WHT wire between ECU and spool valve connector.**

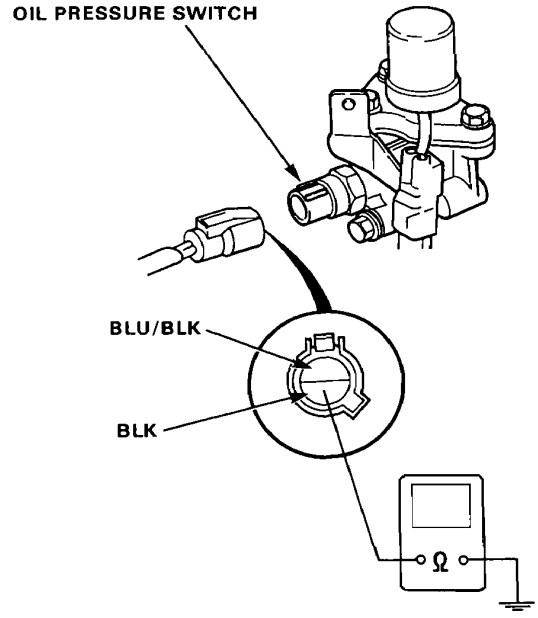
NO

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

Troubleshooting Flowchart —— Oil Pressure Switch

(22) Self-diagnosis LED indicates code 22: A problem Oil Pressure Switch circuit.

Disconnect the 2P connector from the oil pressure switch.

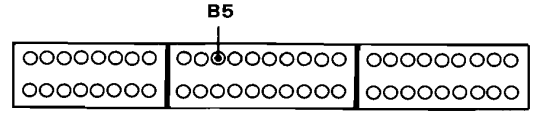


Check for continuity between BLK terminal and body ground.

Does continuity exist ?

NO → **Repair open in BLK wire between 2P connector and body ground.**

YES



Connect the ECU test harness.

Check for continuity between BLU/BLK terminal and B5 terminal.

Does continuity exist ?

NO → **Repair open in BLU/BLK wire between ECU and 2P connector.**

YES

(To page 5-35)

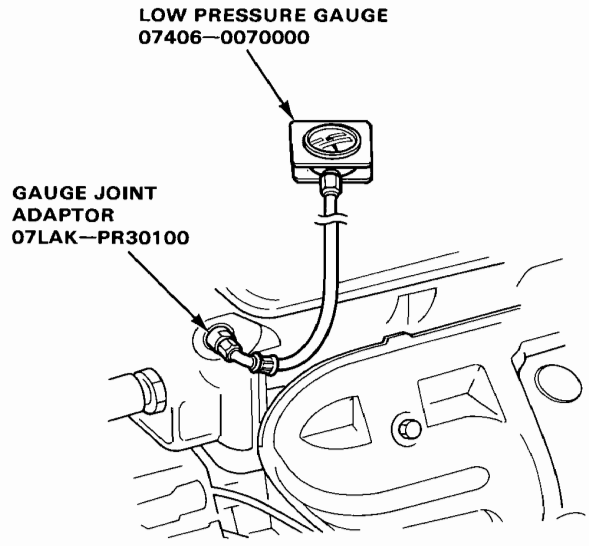
(From page 5-34)

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

Connect a tachometer (page 5-23).

Start the engine and warm it up to normal operating temperature.

Check oil pressure at engine speeds of 1,000 min $^{-1}$ (rpm), 3,000 min $^{-1}$ (rpm) and 5,000 min^{-1} (rpm).



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

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

NO → **Inspect the spool valve.**

YES

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

Does continuity exist ?

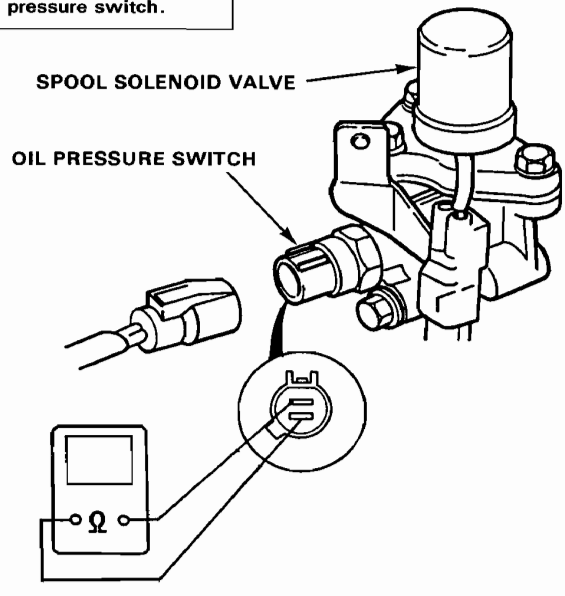
NO → **Replace oil pressure switch.**

YES

Disconnect the 2P connector from the spool solenoid valve.

Attach the battery positive terminal to the GRN/WHT terminal.

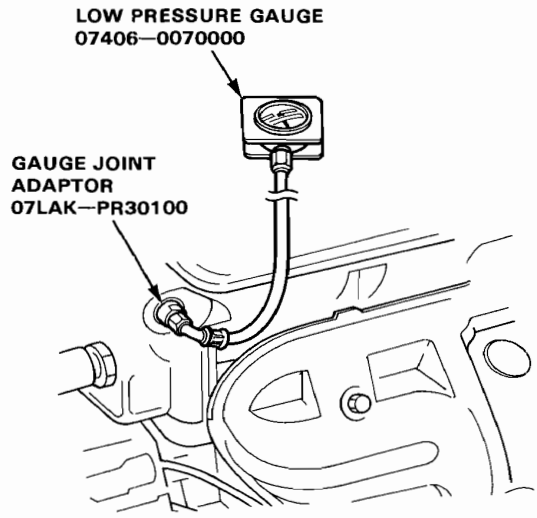
(To pae 5-36)



Troubleshooting Flowchart —— Oil Pressure Switch (cont'd)

(From page 5-35)

Start the engine and check oil pressure at engine speeds of 5,000 min^{-1} (rpm).



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

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

NO → **Inspect the spool valve.**

YES

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

Does continuity exist ?

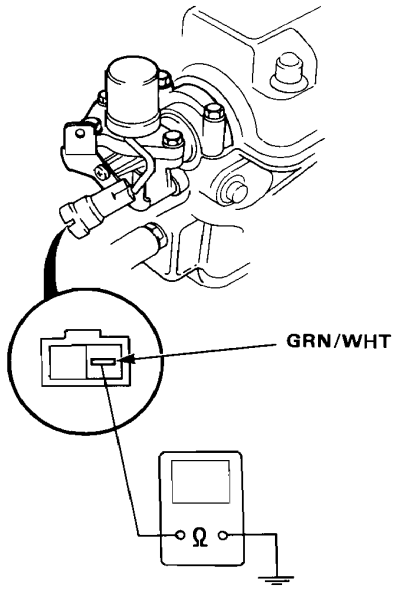
NO → **Replace oil pressure switch.**

YES

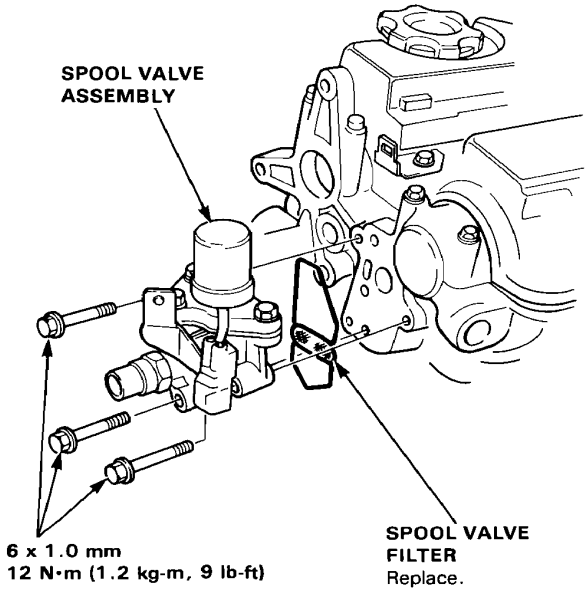
Substitute a known-good ECU and recheck. If symptom/indication goes away replace the original ECU.

Spool Valve Inspection

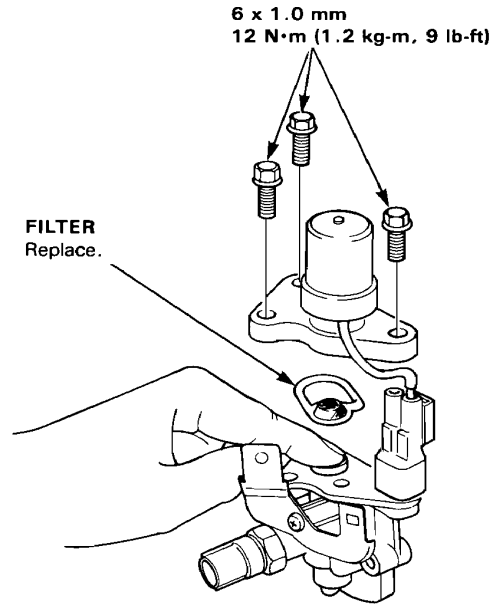
1. Disconnect the 2P connector from the spool solenoid valve.
2. Measure resistance between the GRN/WHT terminal and body ground.
   Resistance: approx 14-30 ohms



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



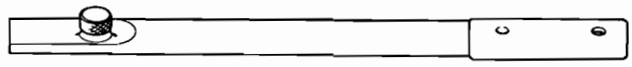
4. If filters are normal, push the spool valve with the finger and check its movement.
   - If spool valve is normal, check the engine oil pressure.



Special Tools

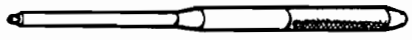
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07JAB—0010000	Crank Pulley Holder Set	1	
①-1	07JAA—0010200	Socket Wrench 19 mm	1	
①-2	07JAB—0010200	Handle	1	
②	07JAB—0010400	Pulley Holder Attachment HEX 50 mm	1	
③	07744—0010400	Pin Driver, 5.0 mm	2	

①-1



①-2

②

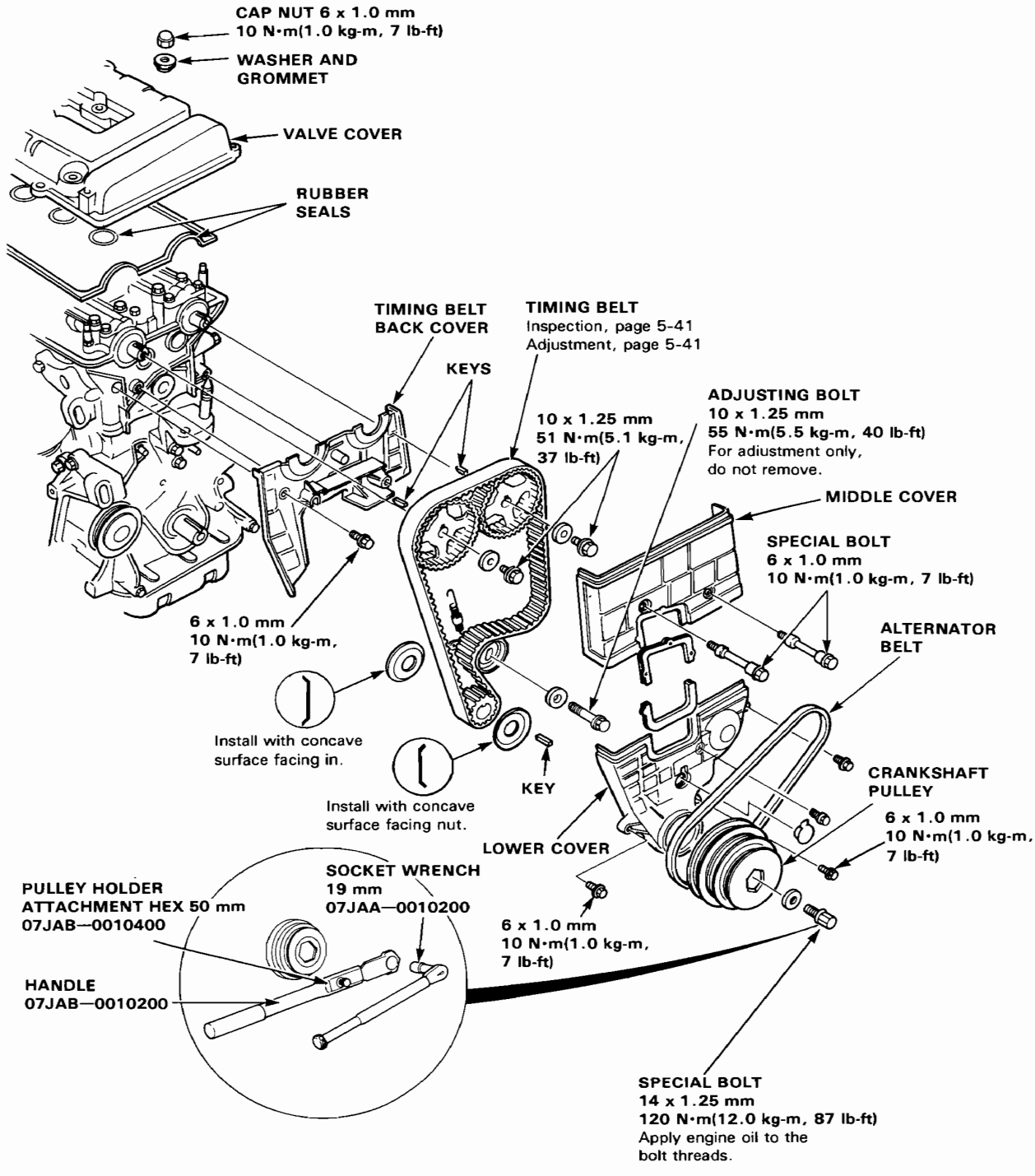


③

Timing Belt

Illustrated Index

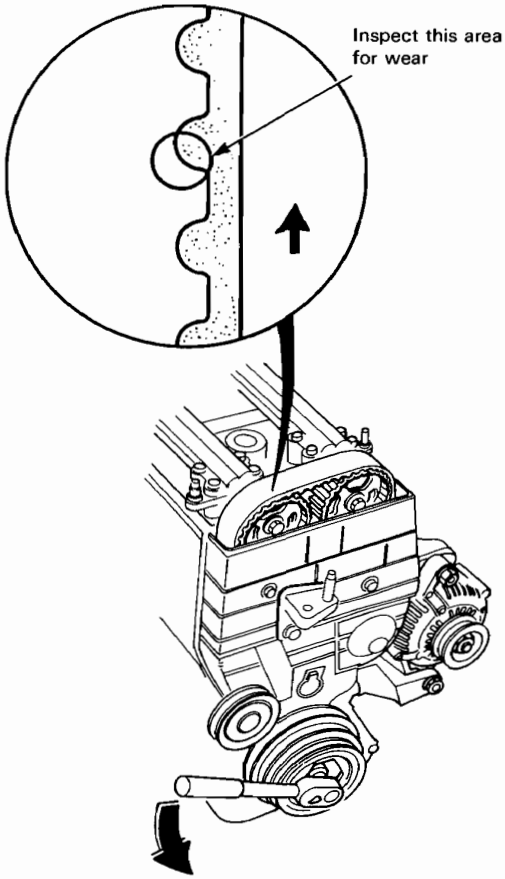
NOTE:
- Refer to page 5-45 for positioning crank and pulley before installing belt.
- Refer to base manual for altermator belt adjustment.
- Refer to page 5-20 for A/C compressor belt adjustment.
- Mark direction of rotation before removing.



Timing Belt

Inspection

1. Remove the ignition wire cover and the ignition wire (page 5-17).
2. Remove the valve cover (page 5-41).
3. Inspect the thming belt for crack and soaking.
   NOTE:
   - Replace the belt if oil soaked.
   - Remove any oil sorvent that gets on the belt.



Rotate pulley and
inspect belt

4. If the pulley bolt loosens while turning the crank, retorque it to 120 N·m(12.0 kg-m, 87 lb-ft).

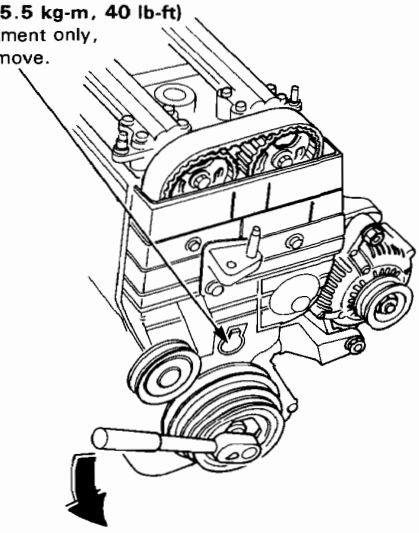
Tension Adjustment

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.

1. Remove the ignition wire cover and the ignithon wire (page 5-17).
2. Remove the valve cover (page 5-41).
3. Set the No.1 piston at TDC (page 5-45).
3. Loosen the adjusting bolt.

ADJUSTING BOLT
10 x 1.25 mm
55 N·m (5.5 kg-m, 40 lb-ft)
For adjustment only,
do not remove.



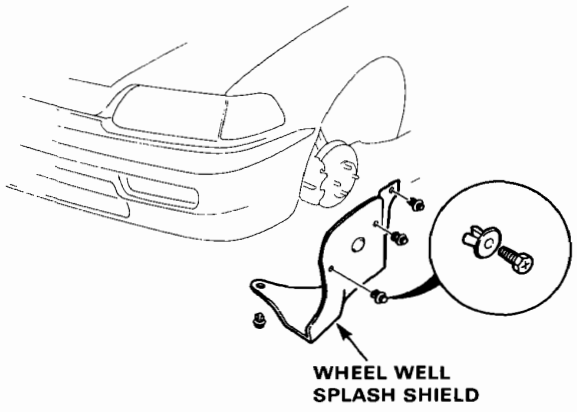
Direction of
rotation.

5. Rotate the crankshaft countercrockwise 3-teeth on the crankshaft pulley to create tension on the timing belt.
6. Tighten the adjusting bolt.
7. If the pulley bolt loosens while turning the crank, retorque it to 120 N·m(12.0 kg-m, 87 lb-ft).

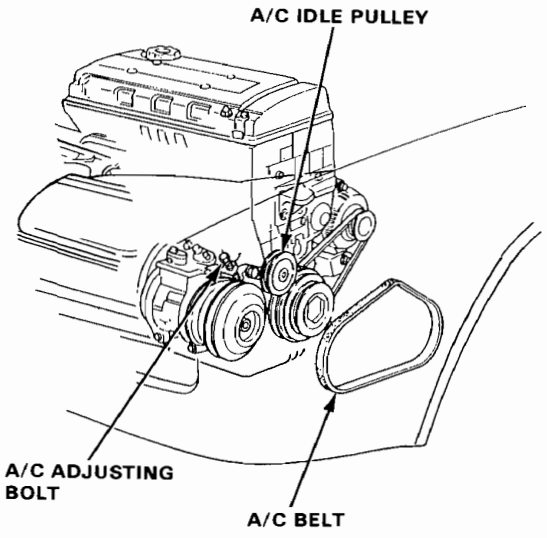
Replacement

NOTE:
- Set the No.1 piston at TDC (page 5-45) before remove the timing belt.
- Inspect the water pump (page 5-77) after remove the timing belt.

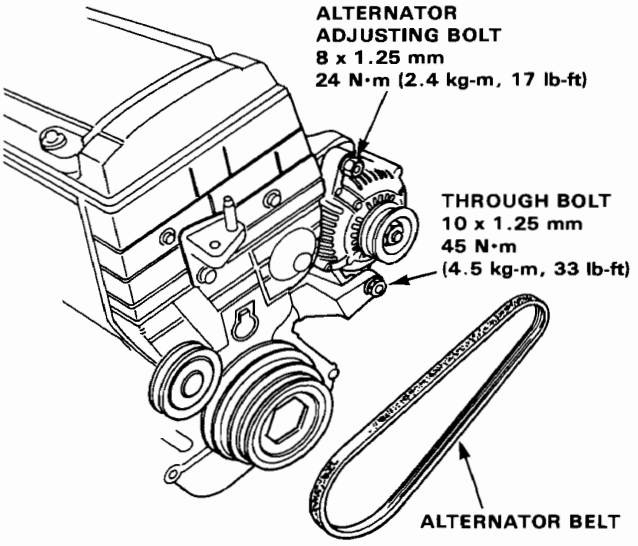
1. Remove the wheel well splash shield.



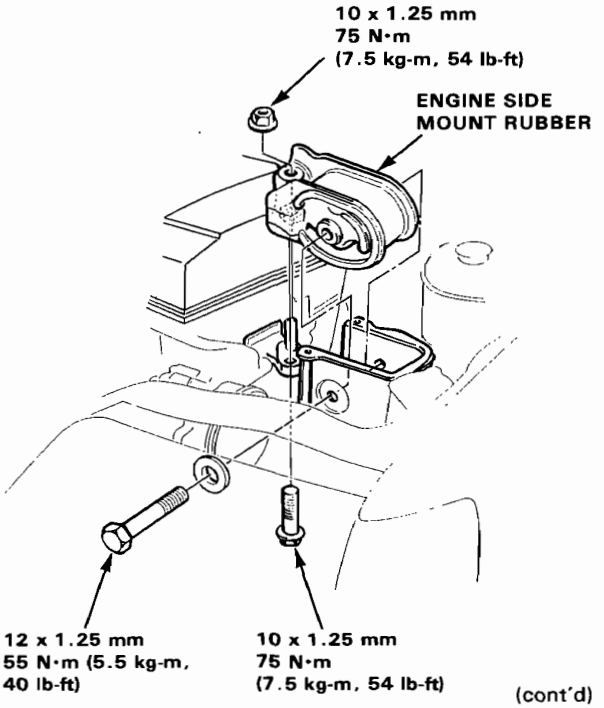
2. Loosen the air conditioner (A/C) adjusting bolt and idel pulley bolt, then remove the A/C belt.



3. Loosen the alternator adjusting bolt and through bolt, then remove the belt.



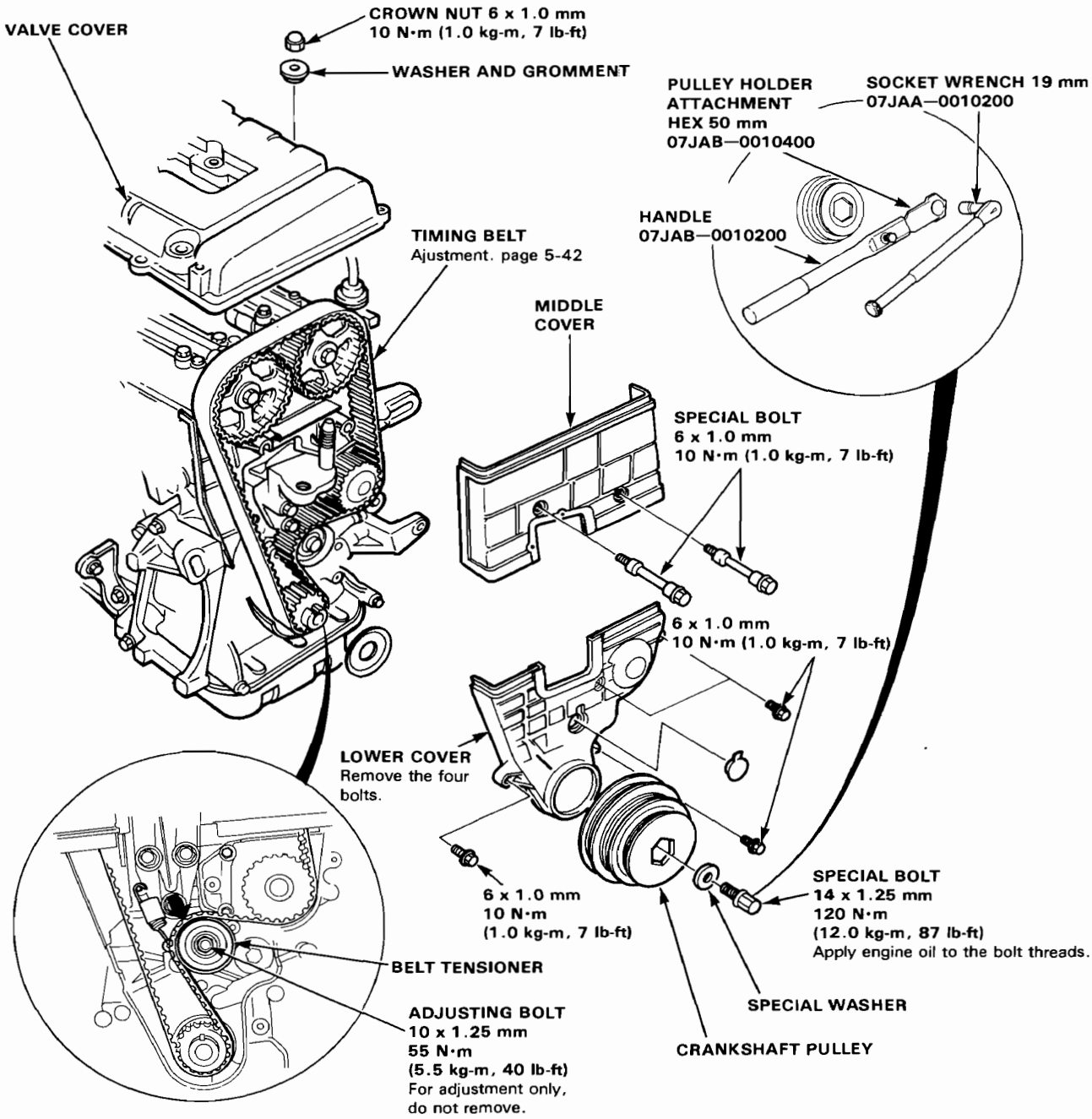
4. After installation, adjust the tension of each belt.
   - See base manual for alternator belt tension adjustment.
   - See page 5-20 for A/C compressor belt tension adjustment.
5. Remove the engine support bolts and nut, then remove the side mount rubber.



(cont'd)

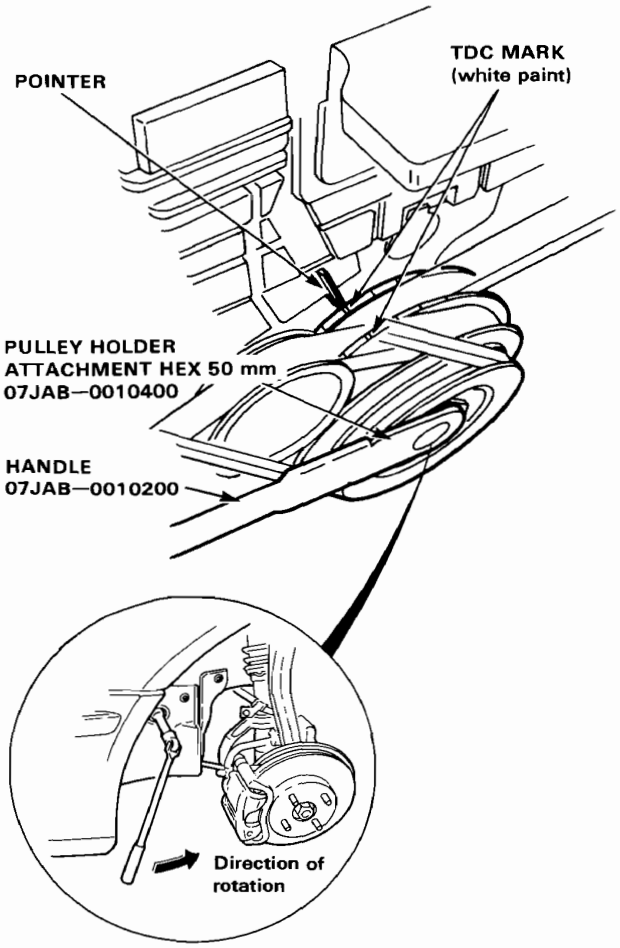
Replacement (cont'd)

6. Remove the ignition wire cover and ignition wire (page 5-17).
7. Remove the valve cover.
8. Remove the timing belt middle cover.
9. Remove the crankshaft pulley with the special tools.
10. Remove the timing belt lower cover.
11. Loosen the adjusting bolt, them remove the timing belt.
12. Install in the reverse order of removal; adjust the valve timing (page 5-45).
13. Carry out timing belt tension adjustment (page 5-42).



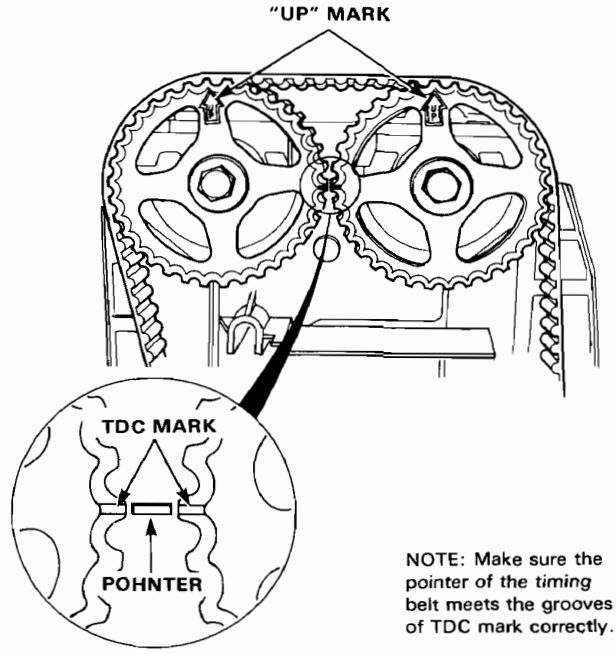
Positioning Crankshaft Before Installing Timing Belt

1. Remove the ignition wire cover and ignition wire (page 5-17).
2. Remove the valve cover (page 5-41).
3. Rosate the crankshaft with special tools, then set the No.1 piston at TDC.



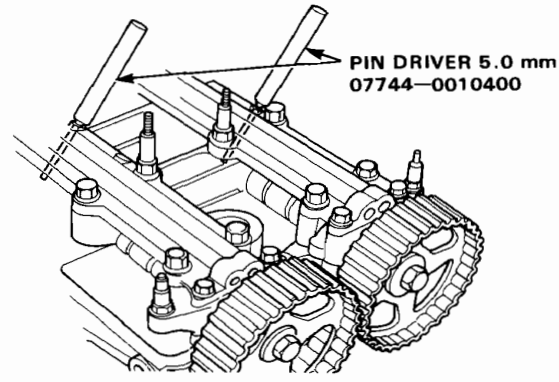
NOTE: If the pully bolt loosens while turning the crank, retorque it to 120 N·m(12.0 kg-m, 87 lb-ft).

4. Make sure that the camshaft pulleys are at the compression top dead center of the No.1 piston.



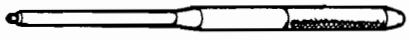
NOTE: Make sure the pointer of the timing belt meets the grooves of TDC mark correctly.

5. If the camshaft pulleys are not positioned at the compression top dead center of the No.1 piston, remove the timing belt and adjust the position in following procedure, then reinstall the timing belt.
   - Refer to page 5-43 for removal and reinstallation of the timing belt.
   - Bring the "UP" marks of the camshaft pulleys to the top, and adjust the pointer of the timing belt back cover to the groove of the TDC mark on the pulleys.
   - Adjust the holes on the camshaft holder to the camshaft holes, insert pin driver of 5.0 diameter and fix them as the top dead center.
   - Remove the pin-drivers after the belt has been reinstalled.

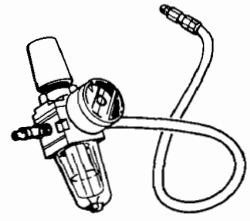


Special Tools

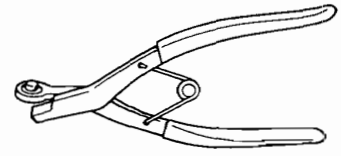
Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07944—0010400	Pin Driver 5.0 mm	2	
②	07LAJ—PR30100	Valve Inspection Set	1	New tool
③	07LAJ—PR30200	Air Stopper	1	New tool



①



②

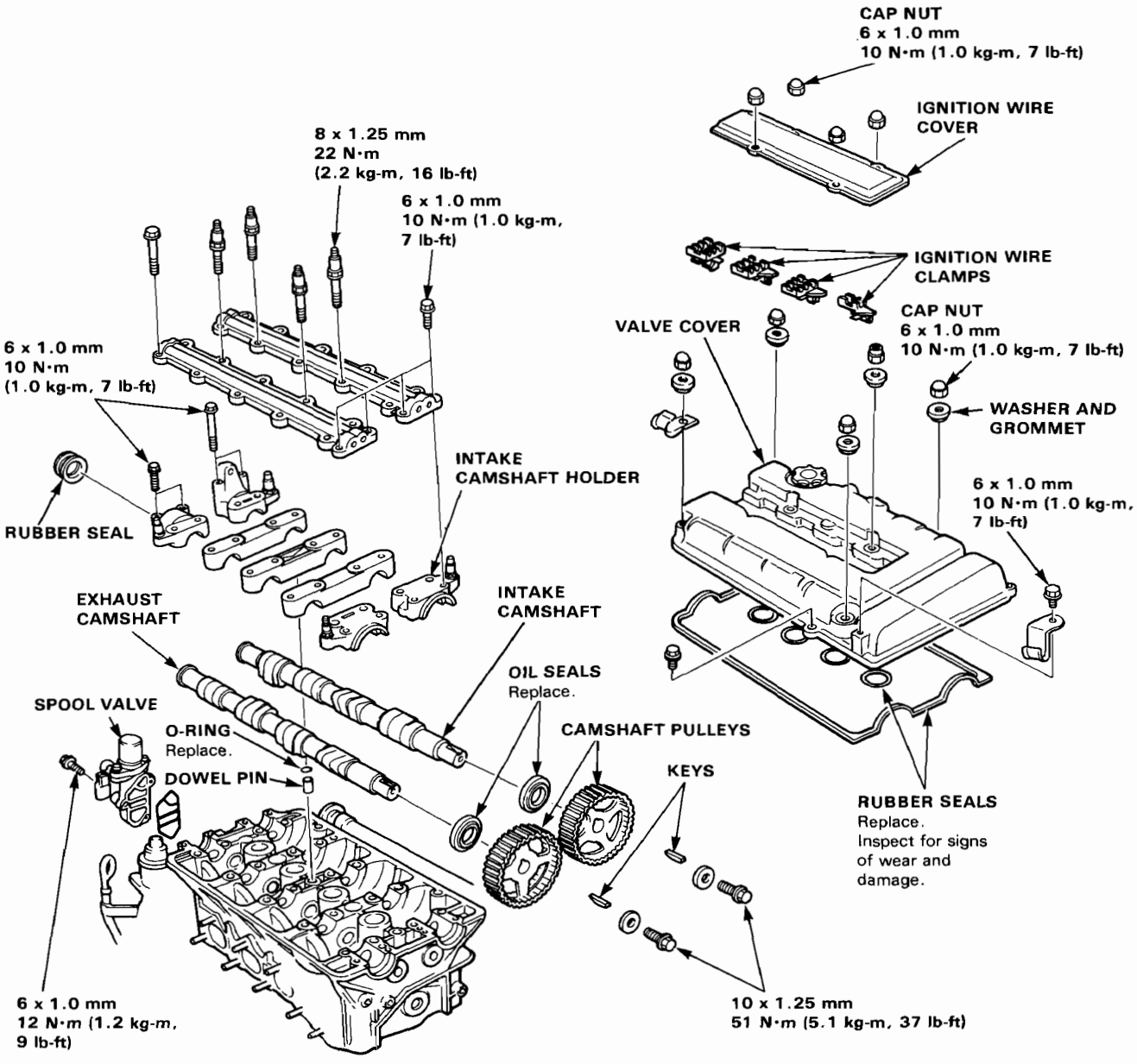


③

Cylinder Head

Removal (engine removal not required)

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



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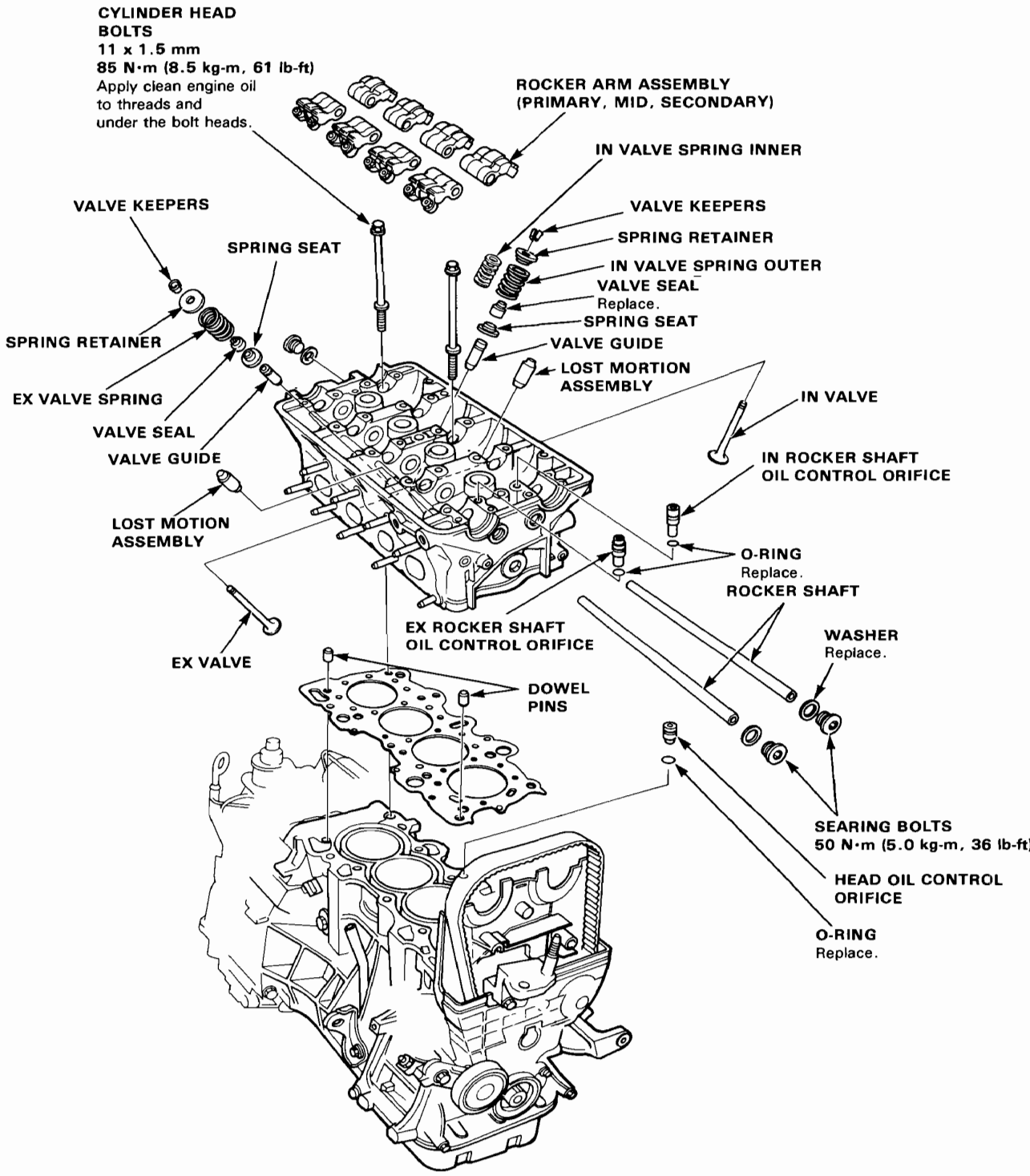
Removal (engine removal not required) (cont'd)



⚠WARNING

- **Make sure jacks and safety stands are placed properly (See Section 1).**
- **Apply parking brake and block rear wheels, so car will not roll off stands and fall on you while working under it.**

CAUTION:

- **Use fender covers to avoid damaging painted surfaces.**
- **To avoid damaging the cylinder head, wait until the coolant temperature drops below 38 °C (100 °F) before loosening the retaining bolts.**

NOTE:

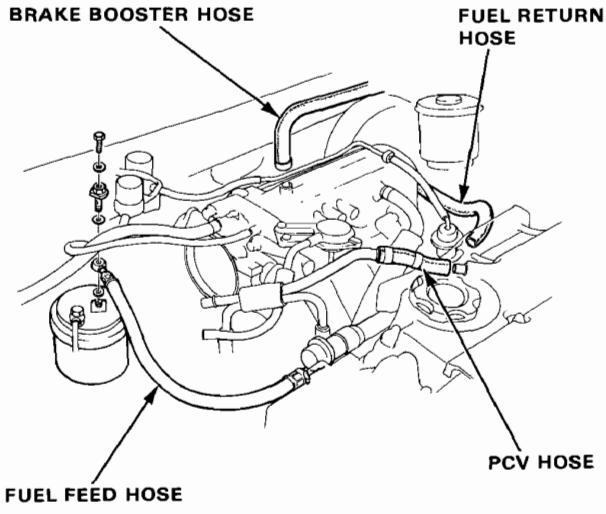
- Inspect the timing belt before removing the cylinder head.
- Turn the crankshaft pulley so that the No. 1 cylinder is at top-dead-center.
- Mark all emissions hoses before disconnecting them.

1. Disconnect the negative terminal from the battery.
2. Drain the coolant system.
3. Relieve fuel pressure (See Section 6).
4. Disconnect the fuel feeder hose and fuel return hose.

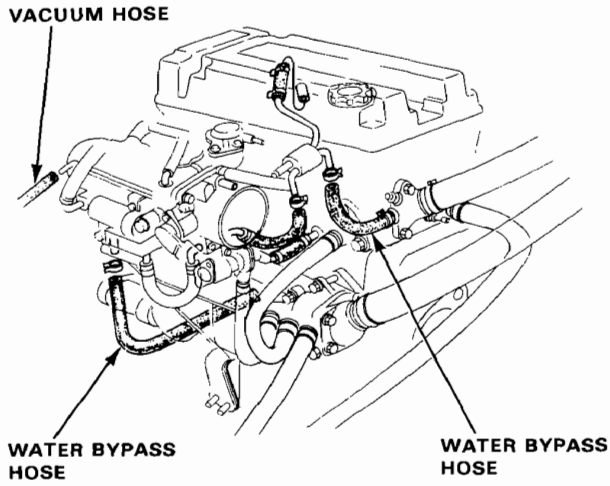
⚠WARNING

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

5. Remove the brake booster vacuum hose.
6. Disconnect the PCV hose.

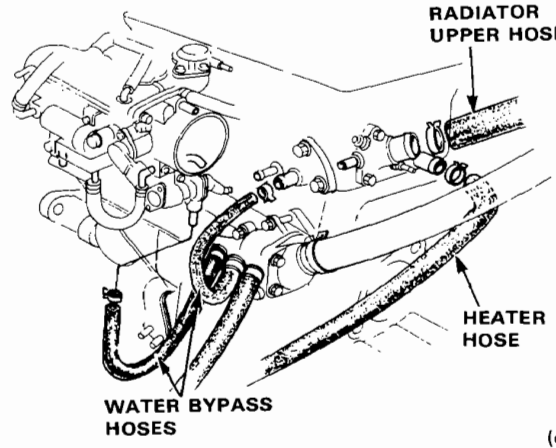


7. Disconnect the breather tube and air intake hose.
8. Disconnect the vacuum hose from the intake manifold.
9. Disconnect the charcoal canister hose.
10. Disconnect the water bypass hose.
11. Disconnect the engine wire connectors and clamps from the cylinder head, throttle body, and IN/EX manifolds.
    - Ignition coil connector (from distributor)
    - EACV connector
    - Engine ground wire
    - Thermounit connector
    - Coolant temperatuer sensor connector



    - Intake air pressure sensor connector
    - Throttle angle sensor connector
    - Injection connector
    - TDC/CRANK sensor connector

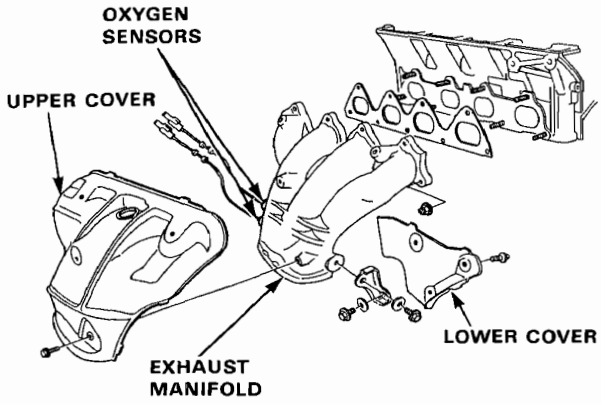
12. Disconnect the radiator upper hose at the engine.
13. Remove the heater hose.



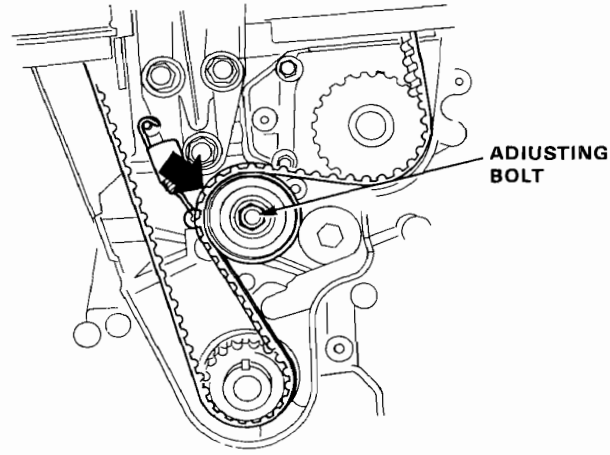
(cont'd)

Removal (engine removal not required) (cont'd)

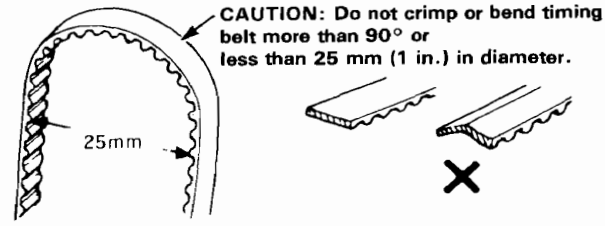
14. Remove the front left wheel and tire.
15. Remove the left splash shield.
16. Remove the mounting bolts of the intake manifold bracket.
    CAUTION:
    - **Remove the oxygen sensors before disconnecting the exhaust manifold and the exhaust pipe A.**
    - **Do not use air wrench or hummer for disconnecting the exhaust manifold and the exhaust pipe A, if the oxygen sensors are not to be removed.**
17. Remove the exhaust manifold upper cover.
18. Remove the exhaust manifold bracket.
19. Remove the self-lock nut of the exhaust pipe A.
20. Remove the exhaust manifold.



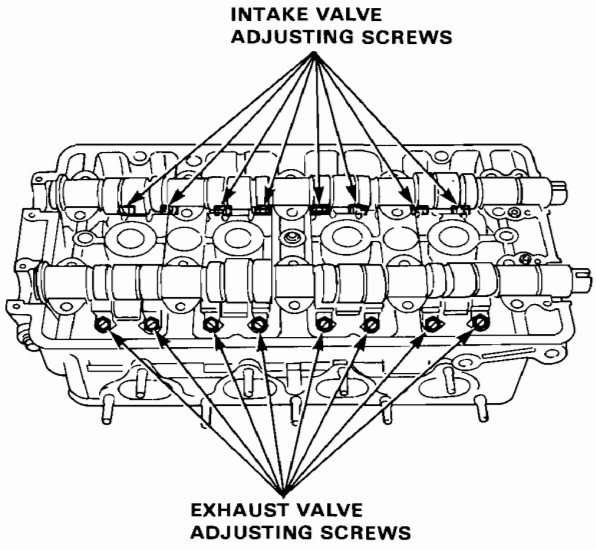
21. Remove the ignition wire cover and ignition wire.
22. Remove the valve cover.
23. Remove the timing belt middle cover.
24. Loosen the timing belt adjusting bolt, releasing the timing belt, and fix the bolt.



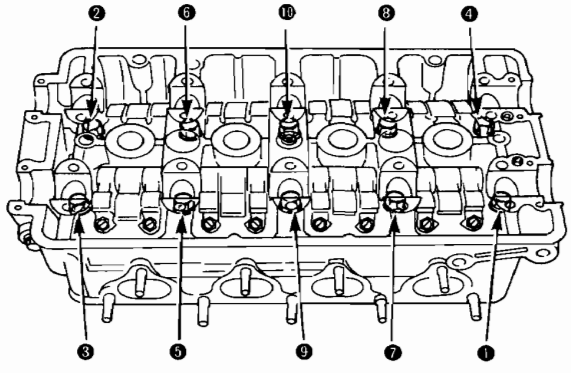
25. Remove the timing belt from the camshaft pulleys.



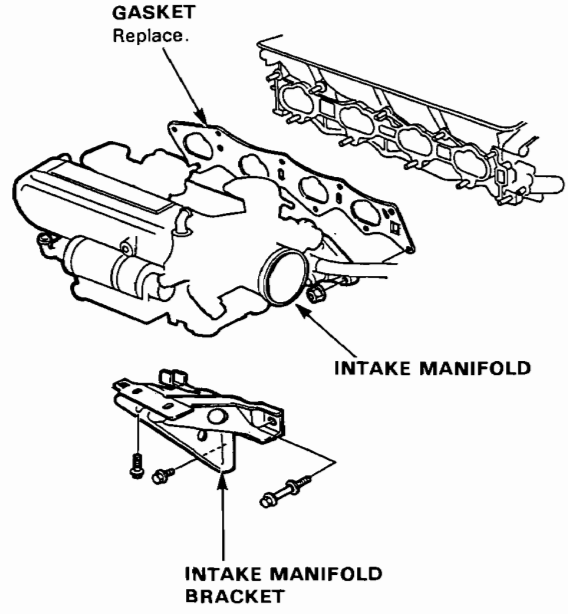
26. Loosen the valve adjusting screws.
27. Remove the camshaft holders, then remove the camshafts.
    NOTE: Loosen the camshaft holder bolts a criss-cross pattarn in 2 or 3 steps, bigining with the outer bolts.



28. Loosen the cylinder head bolts, then remove the cylinder head.
    NOTE: Loosen the bolts a criss-cross pattern in 2 or 3 steps, biginning with the outer nuts.



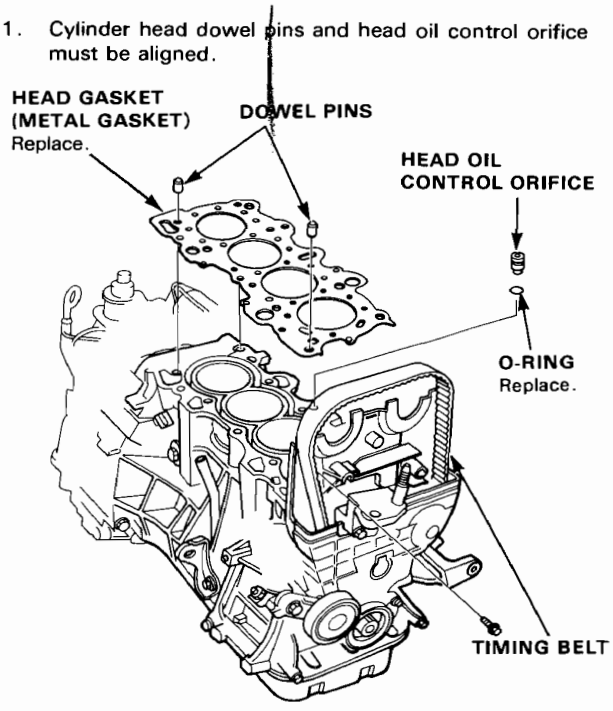
29. Remove the intake manifold from the cylinder head.



Installation

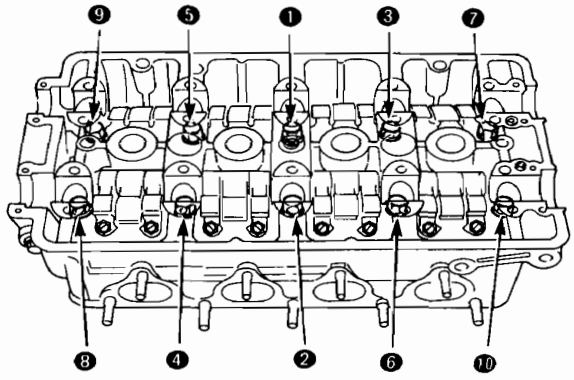
Install the cylinder head in reverse order of removal:
NOTE:
- Always use a new head gasket.
- Cylinder head and engine block surface must be clean.
- "UP" mark on timing belt pulley should be at the top.
- Turn the crankshaft so that No.1 is at TDC (page 5-45).

1. Cylinder head dowel pins and head oil control orifice must be aligned.

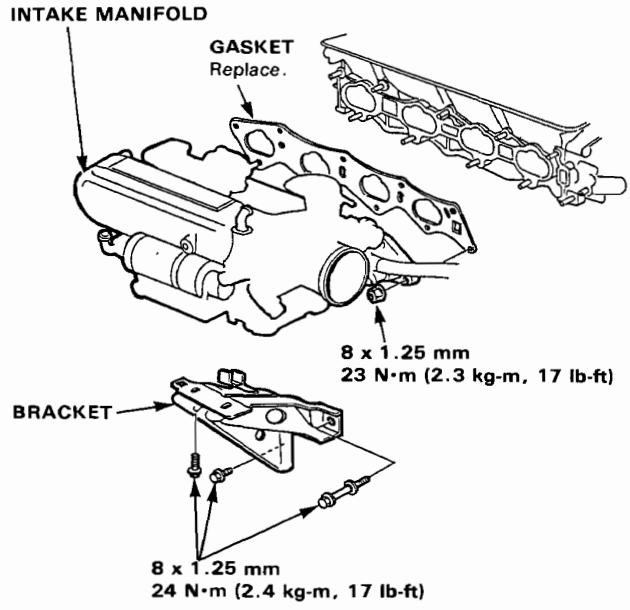


2. Tighten cylinder head bolts in two steps. In the first step tighten all bolts, in sequence, to about 30 N·m (3.0 kg-m, 22 lb-ft); in the final step tighten, in same sequence, to 85 N·m (8.5 kg-m, 61 lb-ft)
NOTE: Apply engine oil to the cylinder head bolts and the washers.

CYLINDER HEAD BOLTS TORQUE SEQUENCE

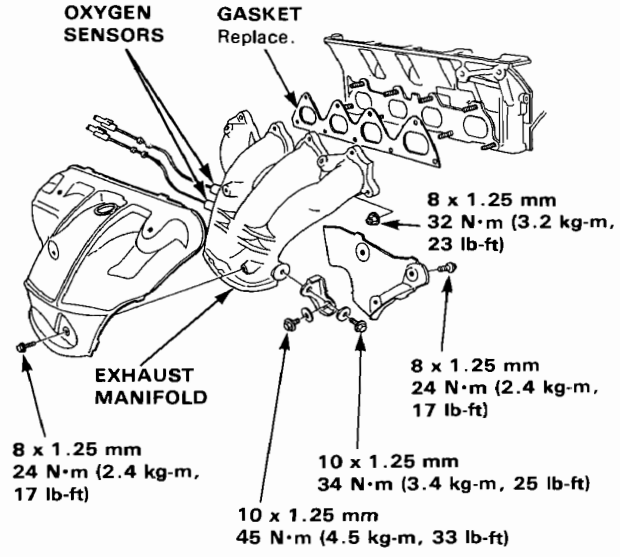


3. Install the intake manifold and tighten the nuts in a criss-cross pattern in two or three steps, beginning with the inner nuts.



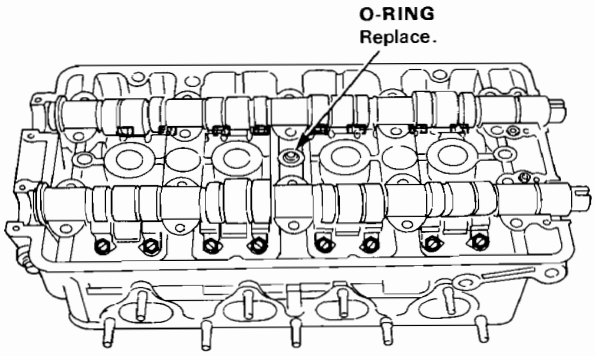
4. Install the exhaust manifold and tighten the new self-locking nuts in a criss-cross pattern in two or three steps, beginning with a inner nuts.

CAUTION:
- **Install the oxygen sensors after connecting the exhaust manifold and the exhaust pipe A.**
- **Do not use air wrench for tightening self-locking nuts of exhaust pipe A, if the oxygen sensors are not to be removed.**

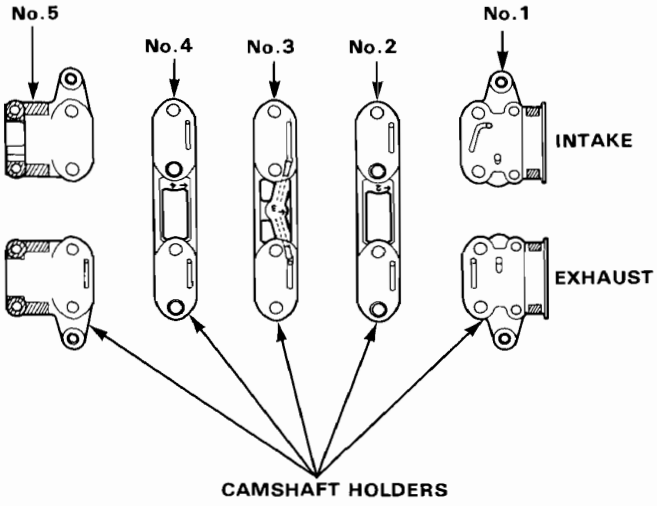


5. Install the camshafts and the camshaft seals with the open side (spring) facing in.

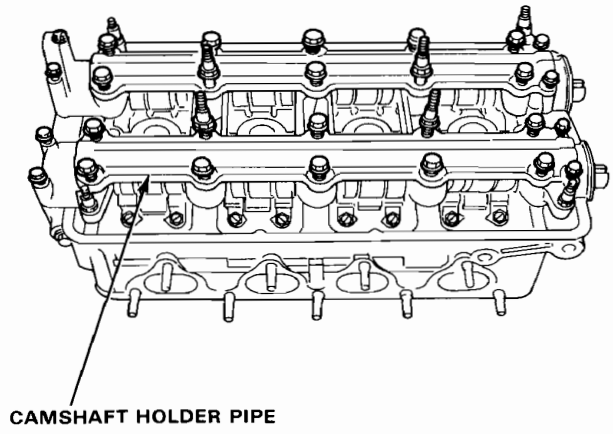
CAUTION:
- **Make sure that the keyways on the camshafts are facing up. (NO.1 cylinder TDC).**
- **Valve locknuts should be loosened and adjust screws backed off before installation.**
- **Replace the rocker arms in these original positions.**
- **Set the O-ring and dowel pin to the center of No.3 camshaft holder.**
- **Seal housing surface should be dry.**
- **Apply a light coat of oil to camshaft and inner lip of seal.**



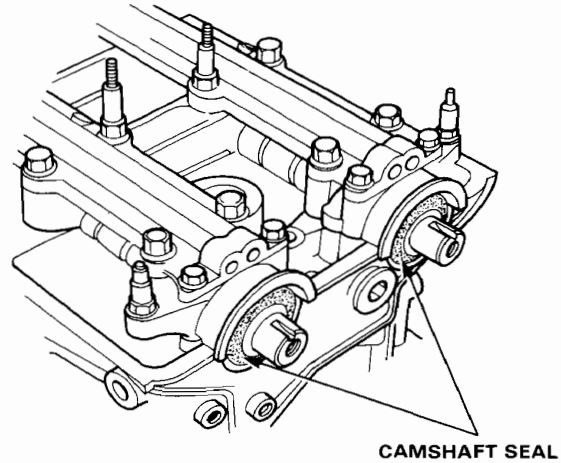
6. Apply liquid gasket to the head mating surfaces of the No.1 and No.5 camshaft holders, then install them, along with the No.2, 3 and 4.
—Apply liquid gasket to the shaded areas.



7. Set the camshaft folders and camshaft holder pipes, then tighten temporaly the bolts.



8. *Press the camshaft seals securely.*

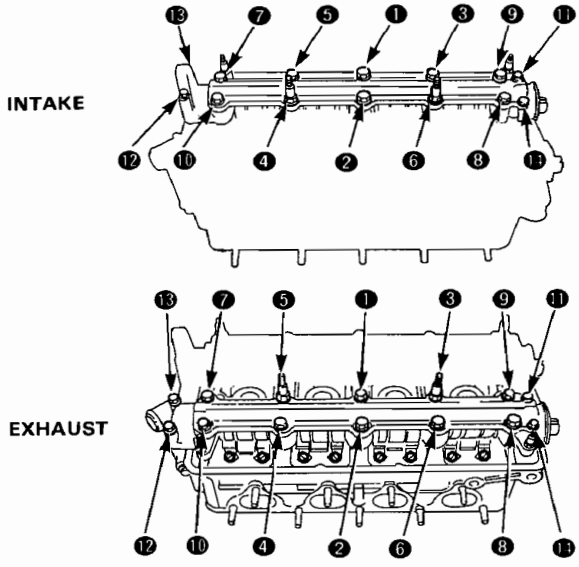


(cont'd)

Installation (cont'd)

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

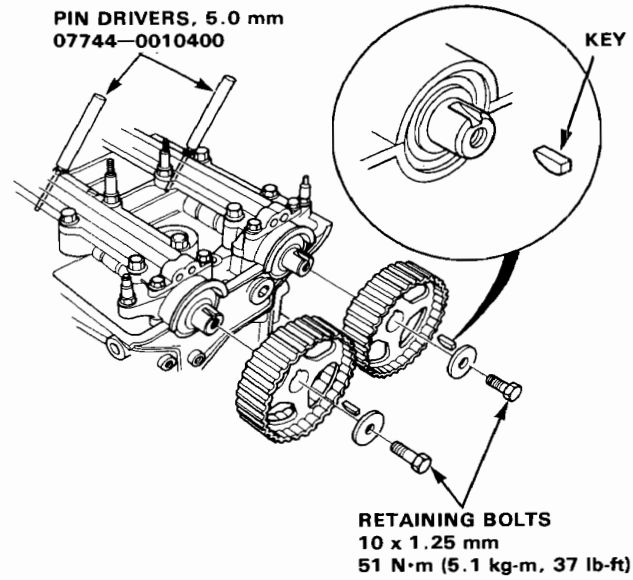
CAMSHAFT HOLDER BOLT TORQUE SEQUENCE



❶~❿: 8 x 1.25 mm
22 N·m (2.2 kg-m, 16 lb-ft)
⓫~⓭: 6 x 1.0 mm
11 N·m (1.1 kg-m, , 8 lb-ft)

10. Install keys into grooves in camshafts.
11. Push camshaft pulleys onto camshafts, then tighten retaining bolts to torque shown.

NOTE: To set the No.1 piston at TDC, align the hole on the camshaft with the hole in the No.1 camshaft holders and drive 5.0 mm pin drivers into the holes.



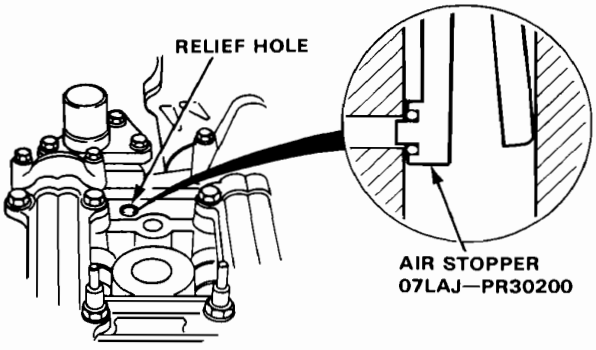
12. Adjust the valve timing (page 5-45).
13. Adjust the valve clearance (page 5-21).
14. Inspect the rocker arms using special tools (page 5-57).
15. After installation, check that all hoses and connectors are installed correctly.

NOTE: Refer to Shop Manual "B16A ENGINE Maintenance and Repair (code No. 62PR300)" for overhall of cylinder head.

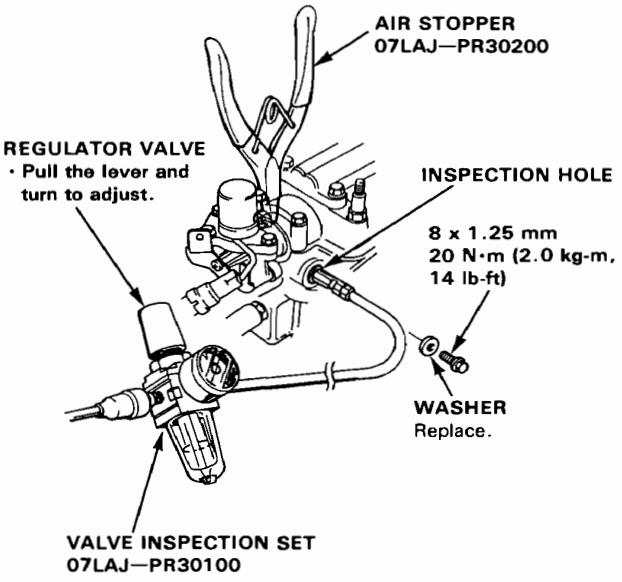
Inspection Using Special Tools

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

1. Remove the valve cover.
2. Plug the relief hole with the special tool (Air Stopper).



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



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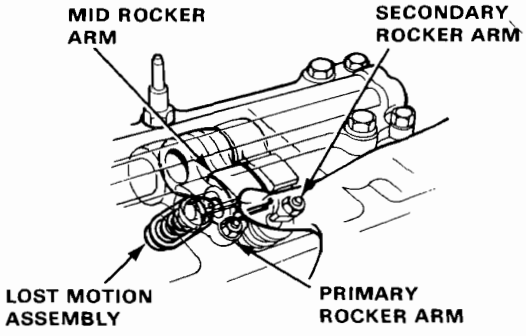
Inspection Using Special Tools (cont'd)

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

   Specified Air Pressure:
   245 kPa (2.5 kg/cm², 36 psi)
   —490 kPa (5.0 kg/cm², 71 psi)

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

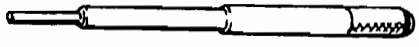


   - If the mid rocker arms indenpendently of the primary and secondary rocker arms, replace the rocker arms as a set.

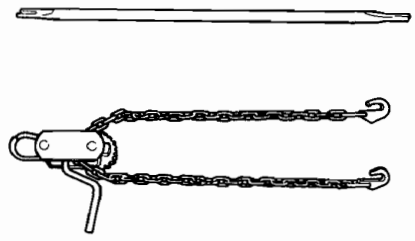
6. Remove the special tools.
7. Check for smooth operation of the lost motion assembly. It is compressed slightly when the mid rocker arm is lightly pushed and compressed deeply when the mid rocker arm is strongly pushed.
   - Replace the lost motion assembly if it does not move smoothly.
8. After inspection, check that the ECU does not come on.

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07744—0010600	Pin Driver 8.0 mm	1	07944—6110200 may also be used
②	07KAK—SJ40100	Engine Tilt Hanger Set	1	



①



②

⚠WARNING

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

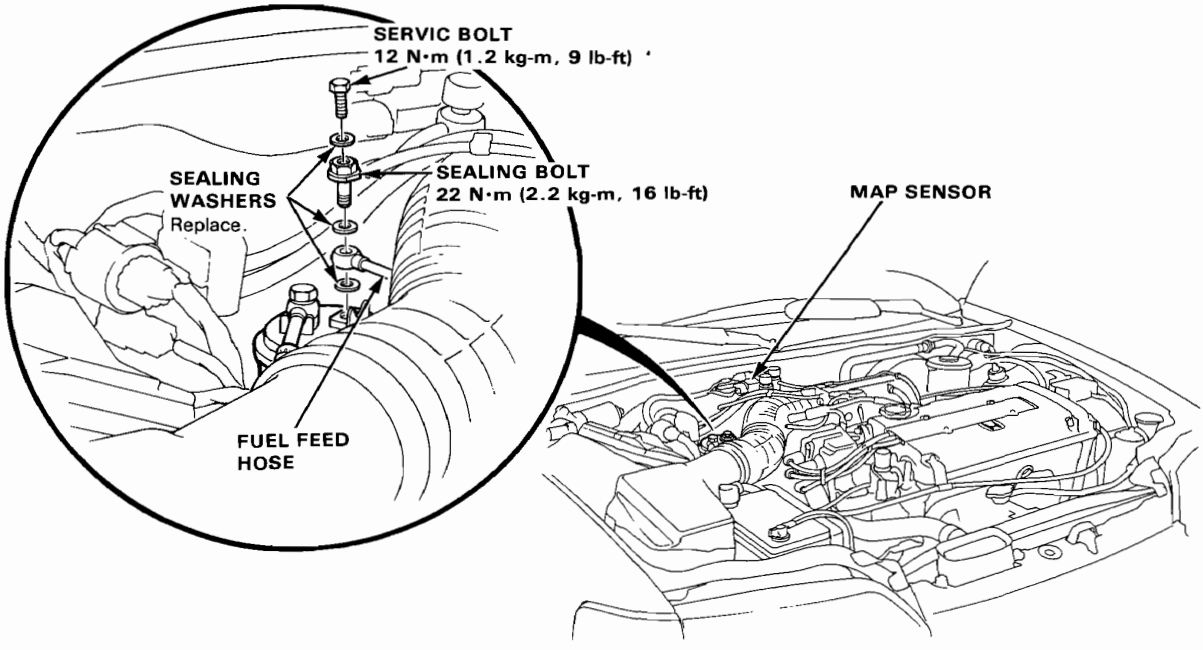
CAUTION:

- **Use fender covers to avoid damaging painted surfaces.**
- **Remove the wiring slowly while holding the connector portion to avoid disconnecting.**
- **Mount the wiring or tubes to avoid mis-connection. Also, be sure that they do not contact other cords or tubes or interference with other parts.**

1. Disconnect the battery negathve 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.
2. Fix the engine hood in a vertical position.
   - Do not remove the hood.
3. Drain the engine oil. Remove the oil filler cap to speed draining. Reinstall the drain plug using a new washer.
4. Drain the coolant from the radiator into a clean pan so it may be reused. Remove the radiator cap to speed draining.

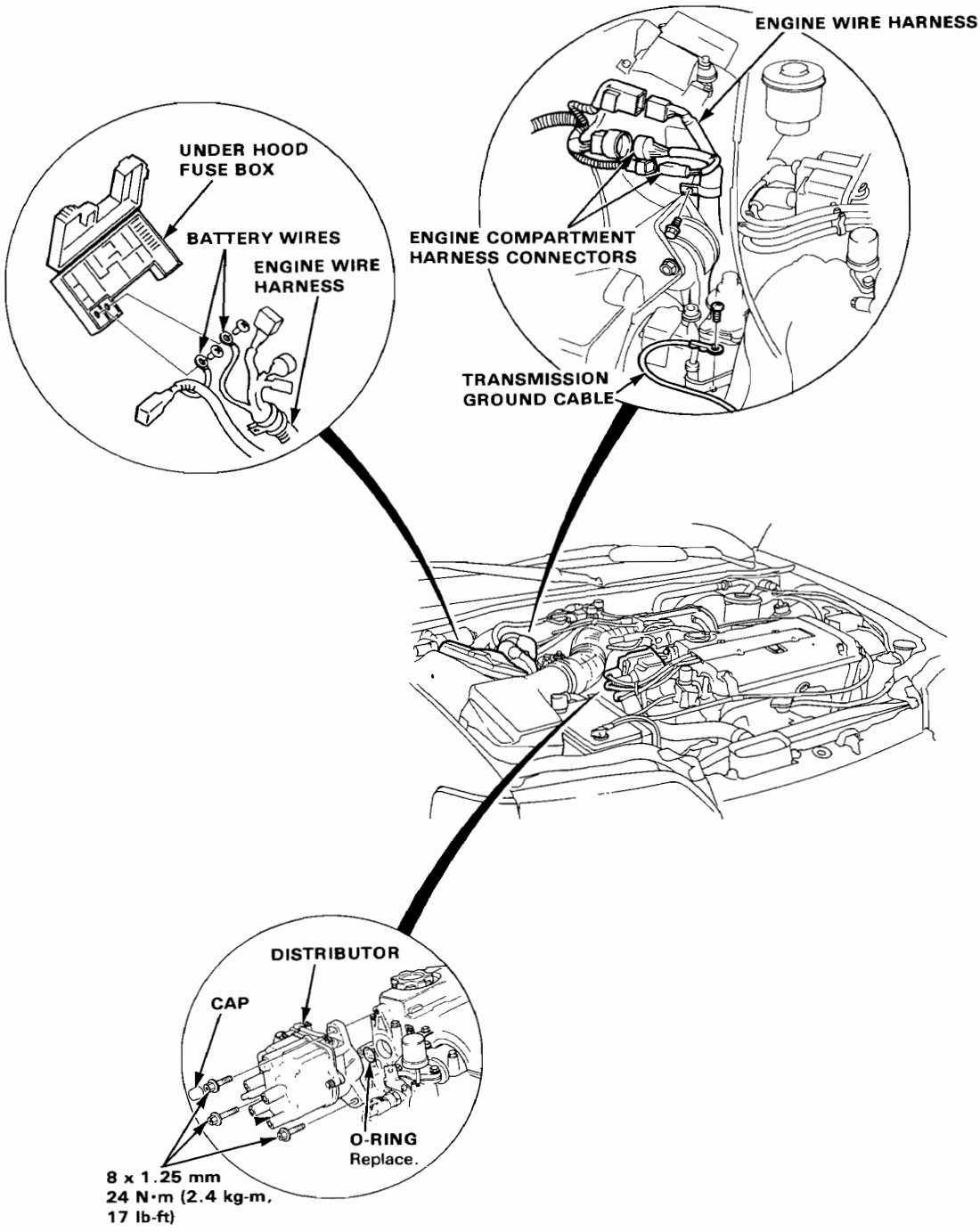
   ⚠WARNING Use care when removing the radiator cap to avoid scalding by hot coolant or steam.
5. Remove the transmission under cover.
6. Drain transmission oil. Use a 3/8" drive socket wrench to remove the drain plug. Remove the oil filler plug or dipstick to speed draining. Reinstall the drain plug using a new washer.
7. Remove the air intake duct and air cleaner case.
8. Remove the battery base.
9. Relieve fuel pressure by slowly loosening the service bolt on the fuel pipe about one turn.

   ⚠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.**
10. Remove the fuel feed hose.
11. Disconnect the charcoal canister hose from throttle body.
12. Disconnect the MAP sewsor vaccum hose.

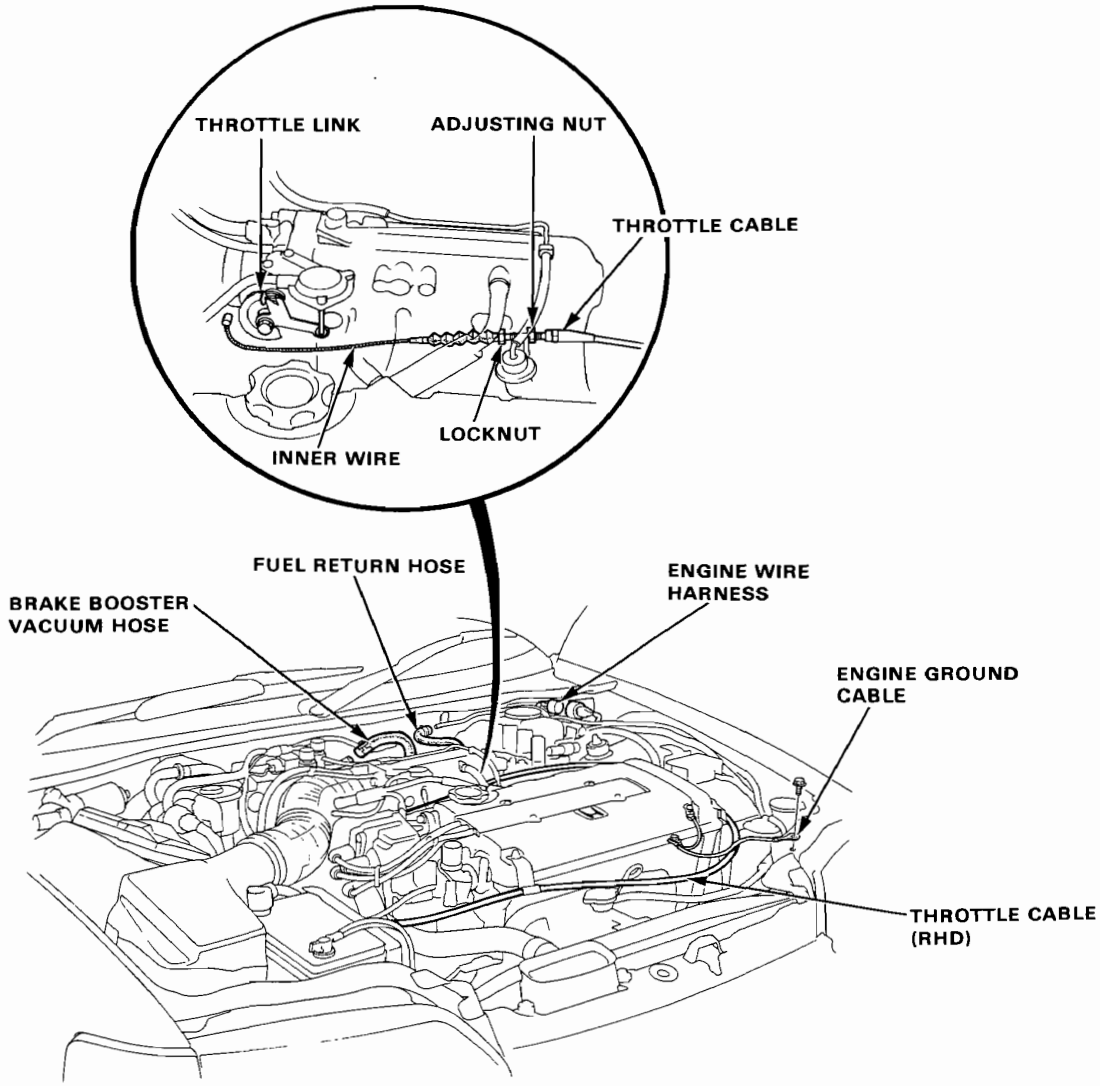


(cont'd)

13. Disconnect the three engine compartment harness connectors, then remove the battery wires from the under hood fuse box.
14. Remove the transmission ground cable.
15. Remove the cap and bolts, then remove distributor from the cylinder head.
    NOTE: Adjust the ignition timing, when installing the distributor.

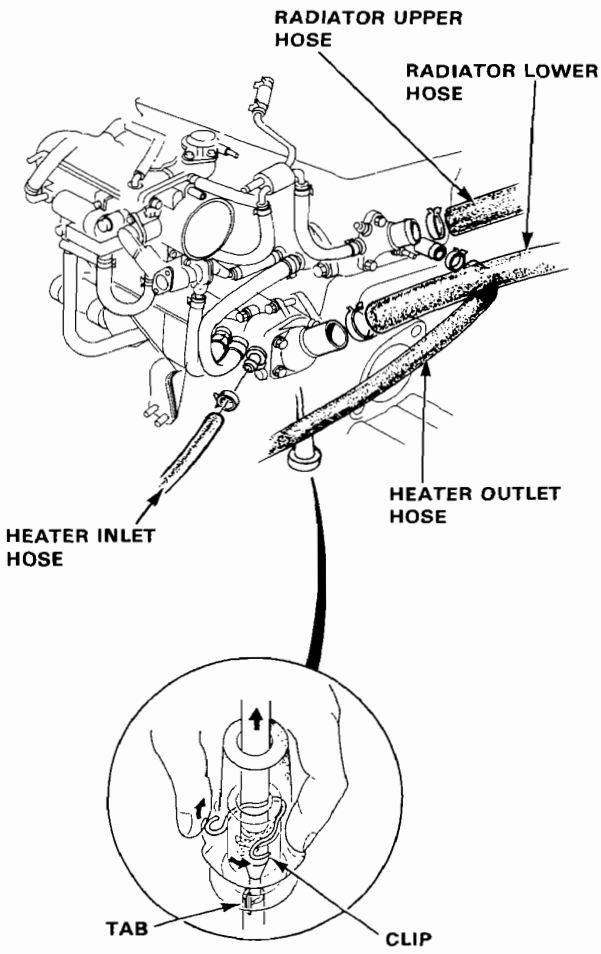


16. Remove the throttle cable by loosening the locknut, then slip the cable end out of the throttle bracket and throttle linkage.
    NOTE: Take care not to bend the cable when removing it. Do not use pliers to remove the cable from the linkage. Always replace a kinked cable with a new one.
17. Remove the fuel return hose.
18. Remove the brake booster vacuum hose from the intake manifold.
19. Disconnect the two engine wire harness connectors from main wire harness at the left side of the engine compartment.
20. Remove the engine ground wire from the front upper bulkhead.



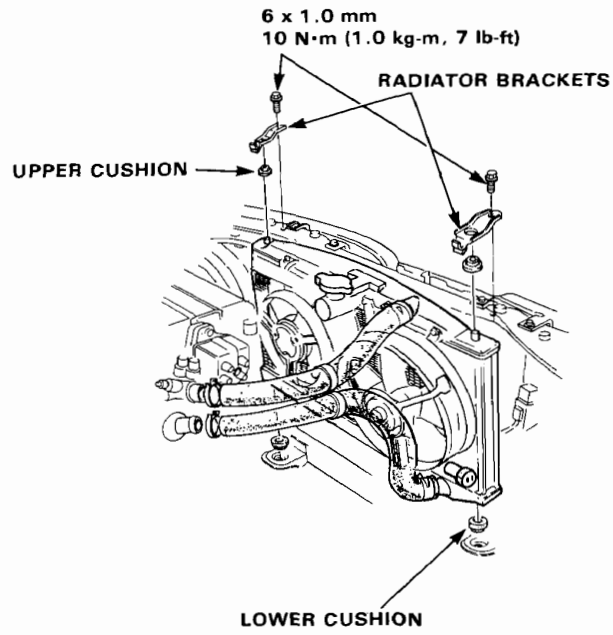
(cont'd)

21. Remove the radiator upper hose and the heater inlet hose from cylinder head, then remove the radiator lower hose and the heater outlet hose from thermstat housing.
22. Remove the speedometer cable.
    CAUTION: Do not remove the holder because the speedometer gear may fall into the transmission housing.



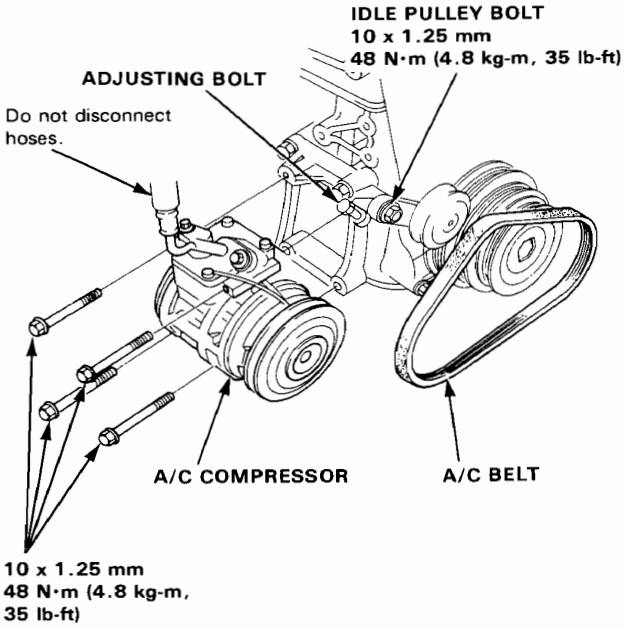
During Installation:
- Align tab on cable end with slot in holder.
- Install clip so bent leg is on groove side. After installing, pull speedometer cable to make sure it is secure.

23. Remove the radiator.



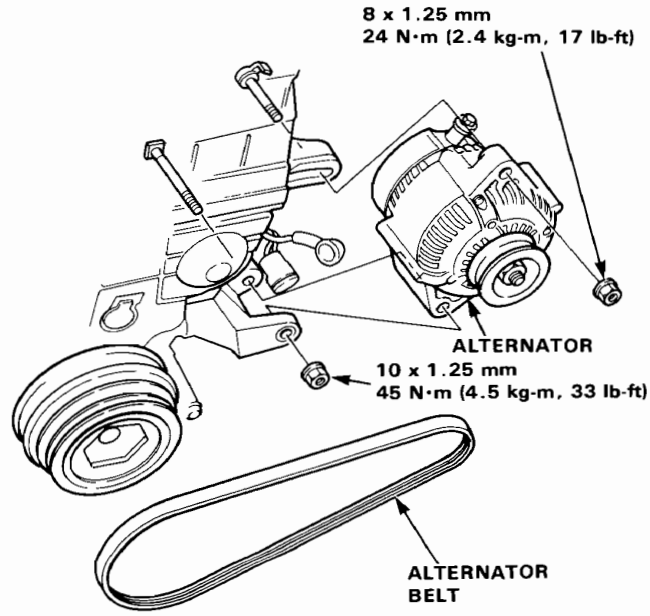
Air conditioner equipped cars:

24. Loosen the belt adjusting bolt and the idle pulley bolt, then remove the A/C belt.
25. Remove the compressor mount bolts, then lift the compressor out of the bracket with hoses attached, and wire it up to the front beam.
    NOTE: The compressor can be moved without discharging the air conditioner system.



26. Remove the alternator: (LHD and RHD with ALB only)

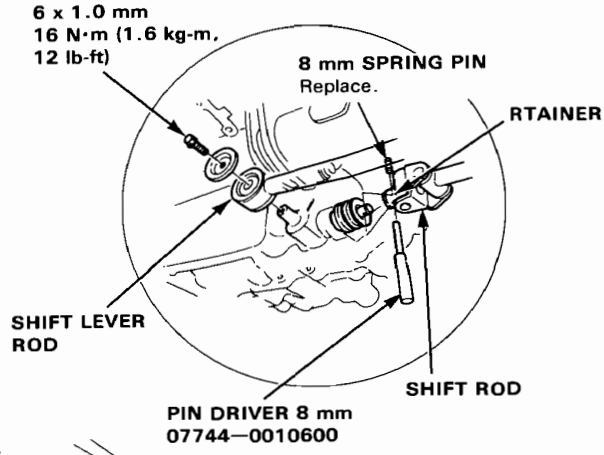
- Disconnect the alternator wire harness connectors.
- Remove the adjust bolt and remove the belt.
- Remove the belt alternator mount bolt and remove the alternator.

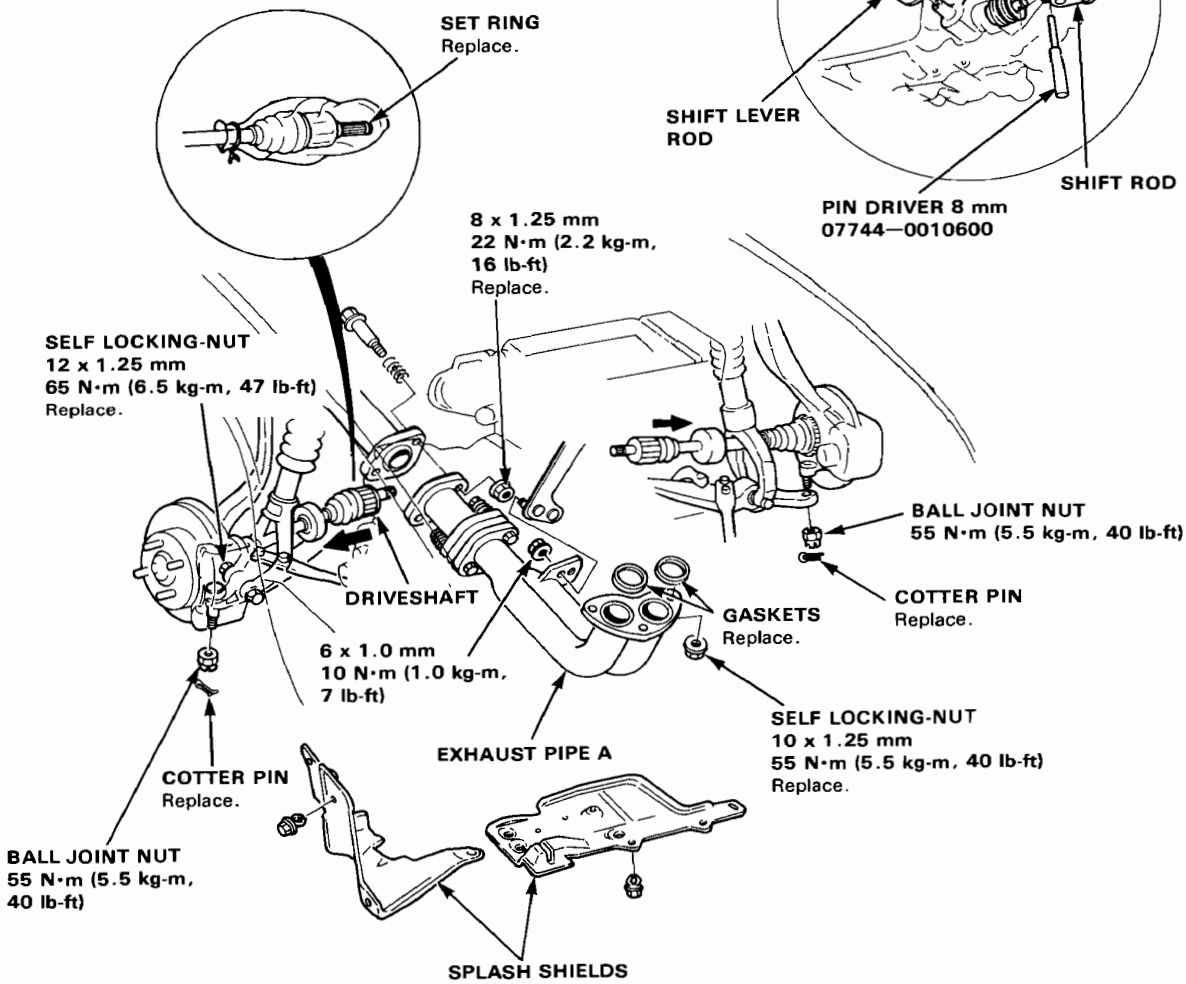


(cont'd)

27. Remove the splash shields.
28. Remove the exhaust pipe A self-locking nuts and bracket mounting bolts.
    CAUTION:
    - **Remove the oxygen sensors before disconnecting the exhaust manifold and the exhaust pipe A.**
    - **Do not use air wrench or hummer for disconnecting the exhaust manifond and the exhaust pipe A, if the oxygen sensors are not to be removed.**
29. Remove the ball joints from the tie-rod ends and suspension lower arms.
30. Remove the driveshafts.
31. Remove the clutch cable adjusting nut.
    NOTE: On assembly. check the cable adjustment (Section 7).
32. Remove the shift rod and the shift lever rod.
    NOTE: On assembly, slide the retainer back into place after driving in the spring pin.

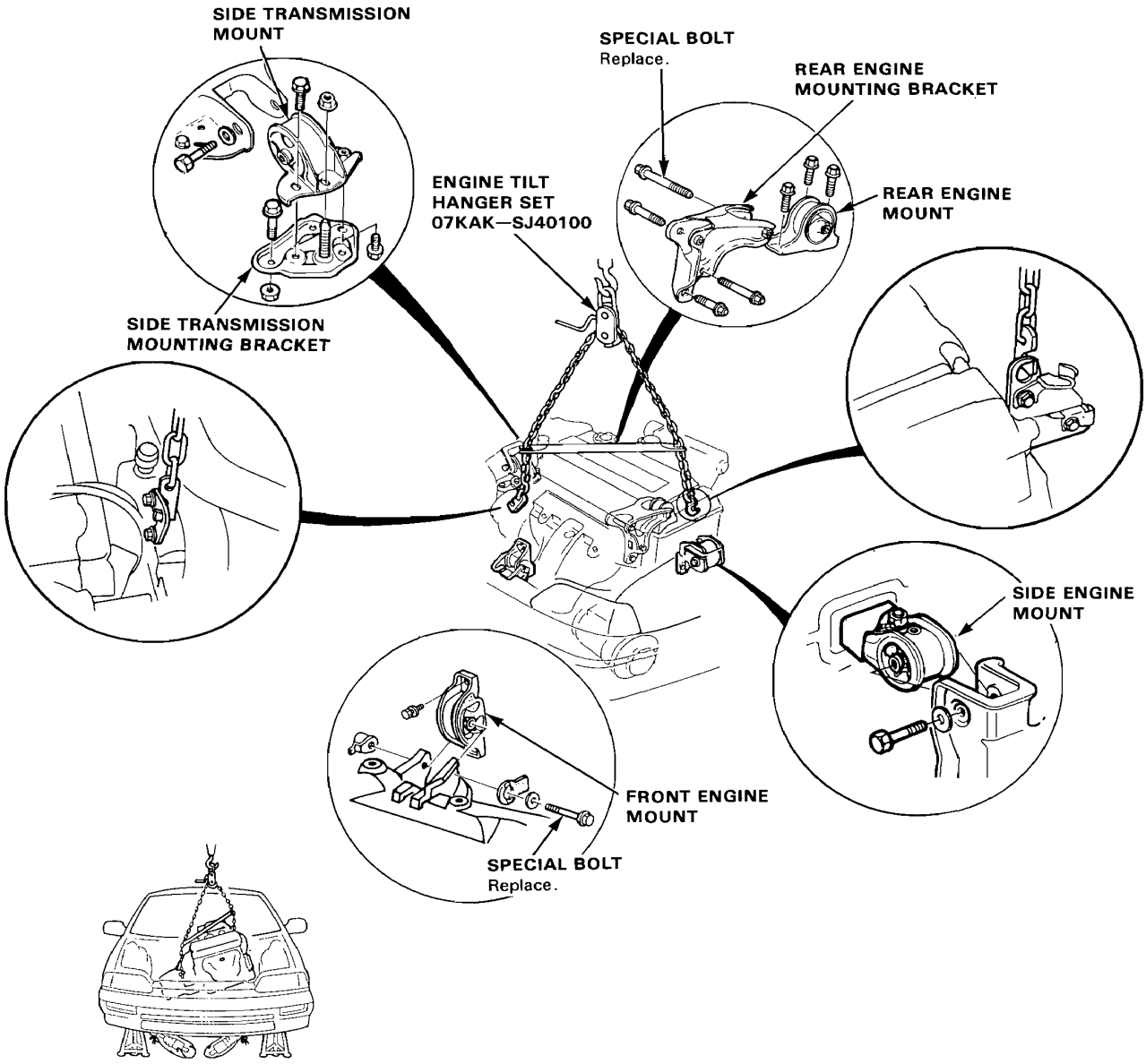
NOTE: Coat all precision finished surfaces with clean engine oil or grease. Tie plastic bags over the driveshaft ends.





⚠WARNING Do not get under the engine when hoisting the engine.

33. Attach a special tool set to the engine. Raise the hoist to remove all slack from the chain.
34. Remove the rear engine mount, mounting bracket and mounting bolt.
35. Remove the front engine mount and mounting bolt.
36. Remove the side transmission mount, mounting bracket and mounting bolt.
37. Remove the side engine mounting bolt.
38. Check that the engine/transaxle is completely free of vacuum hoses, fuel and coolant hoses, and electric wires.
39. Slowly raise the engine approximately 6"
    Check once again that all hoses and wires have been disconnected from the engine/transaxle.
40. Raise the engine/transaxle all the way and remove it from the car.



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

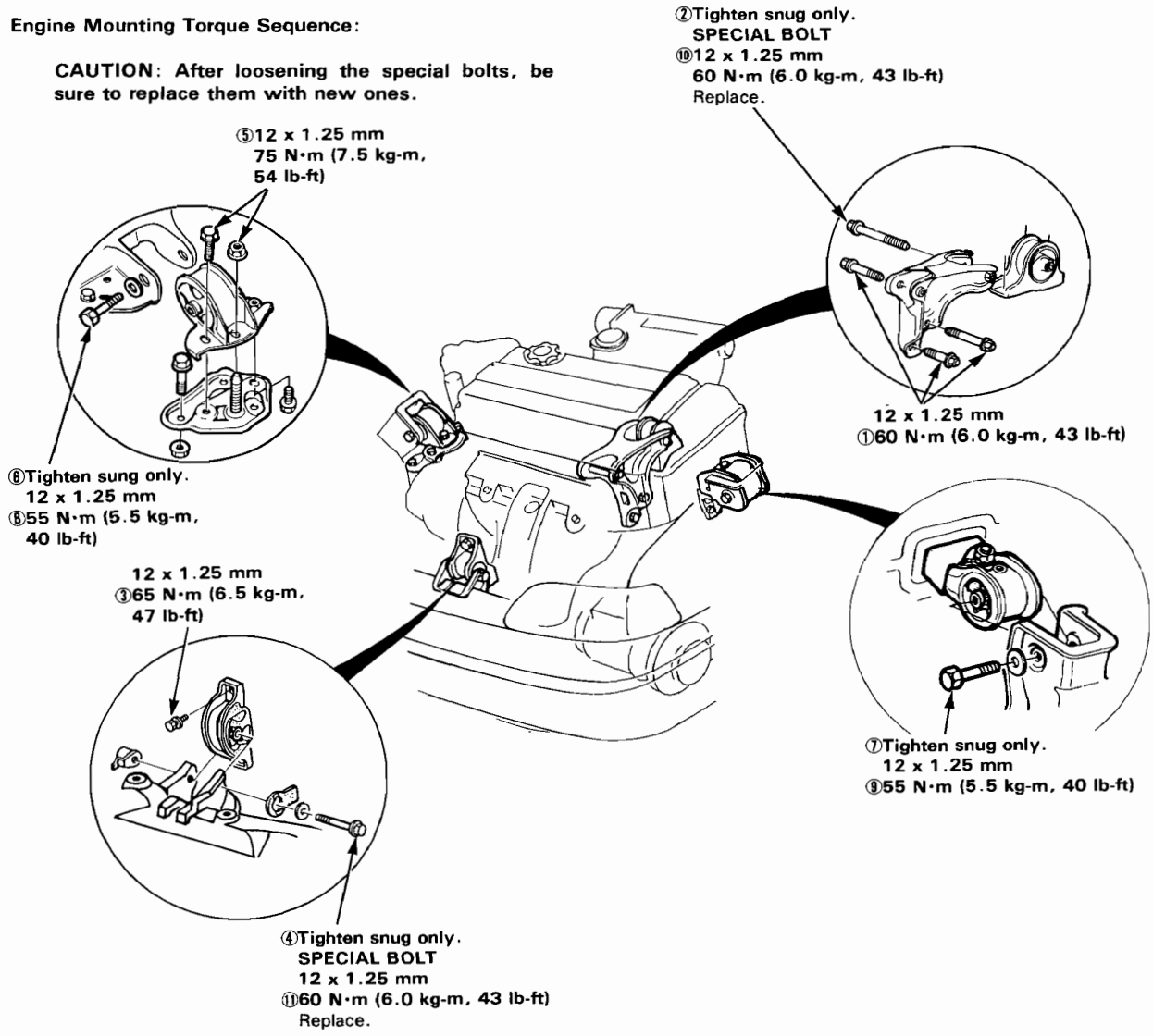
    CAUTION: Failure to tighten the bolts in the proper sequence can cause excessive noise and vibration. and reduce bushing life: check that the bushings are not twisted or offset.
    - Check that the spring clip on the end of each driveshaft clicks into place.

    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 tension.

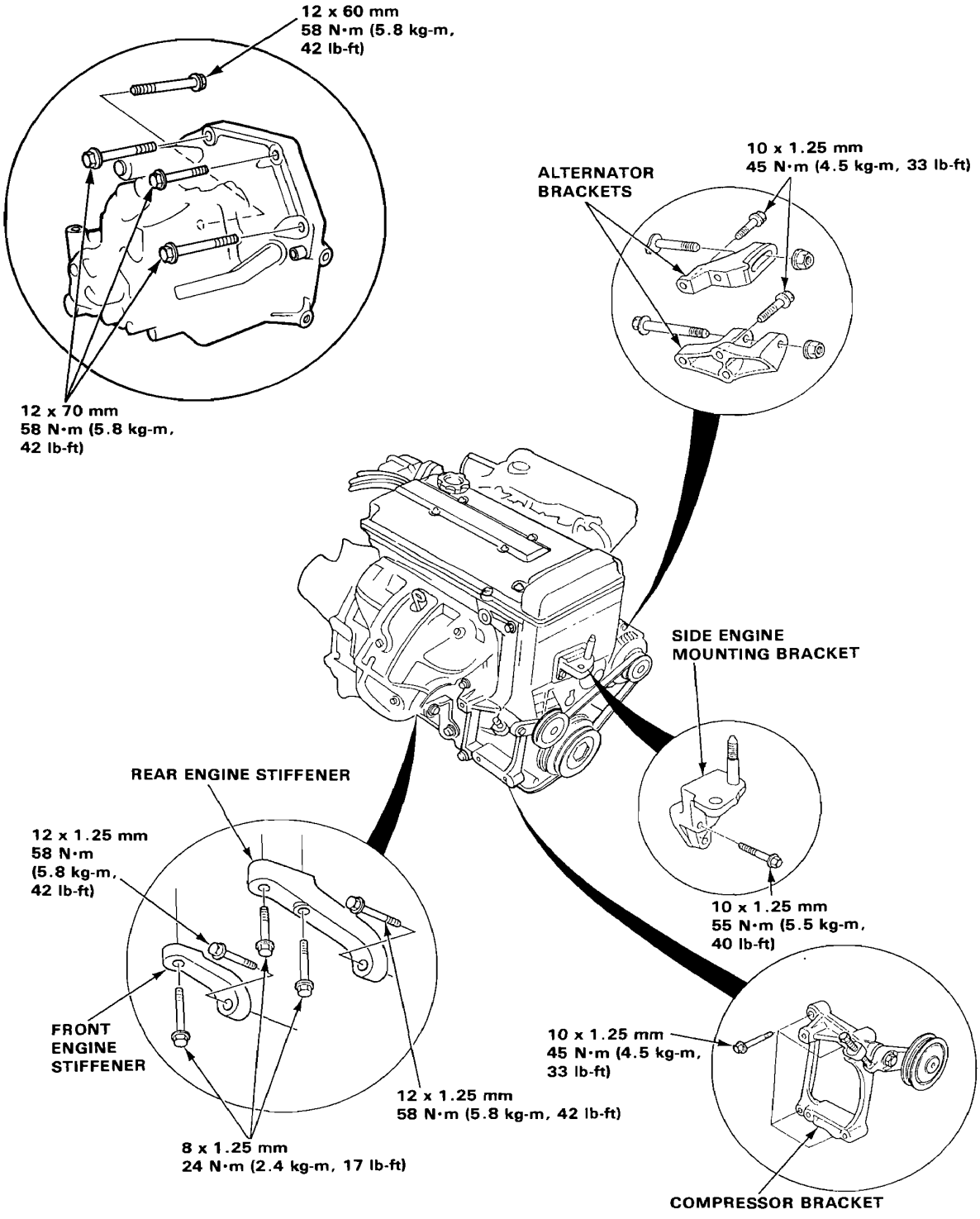
Engine Mounting Torque Sequence:

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 alternator belt.
- 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.



Additional Torque Value Specifications:
NOTE: For manifold replacement, refer to page 5-54.

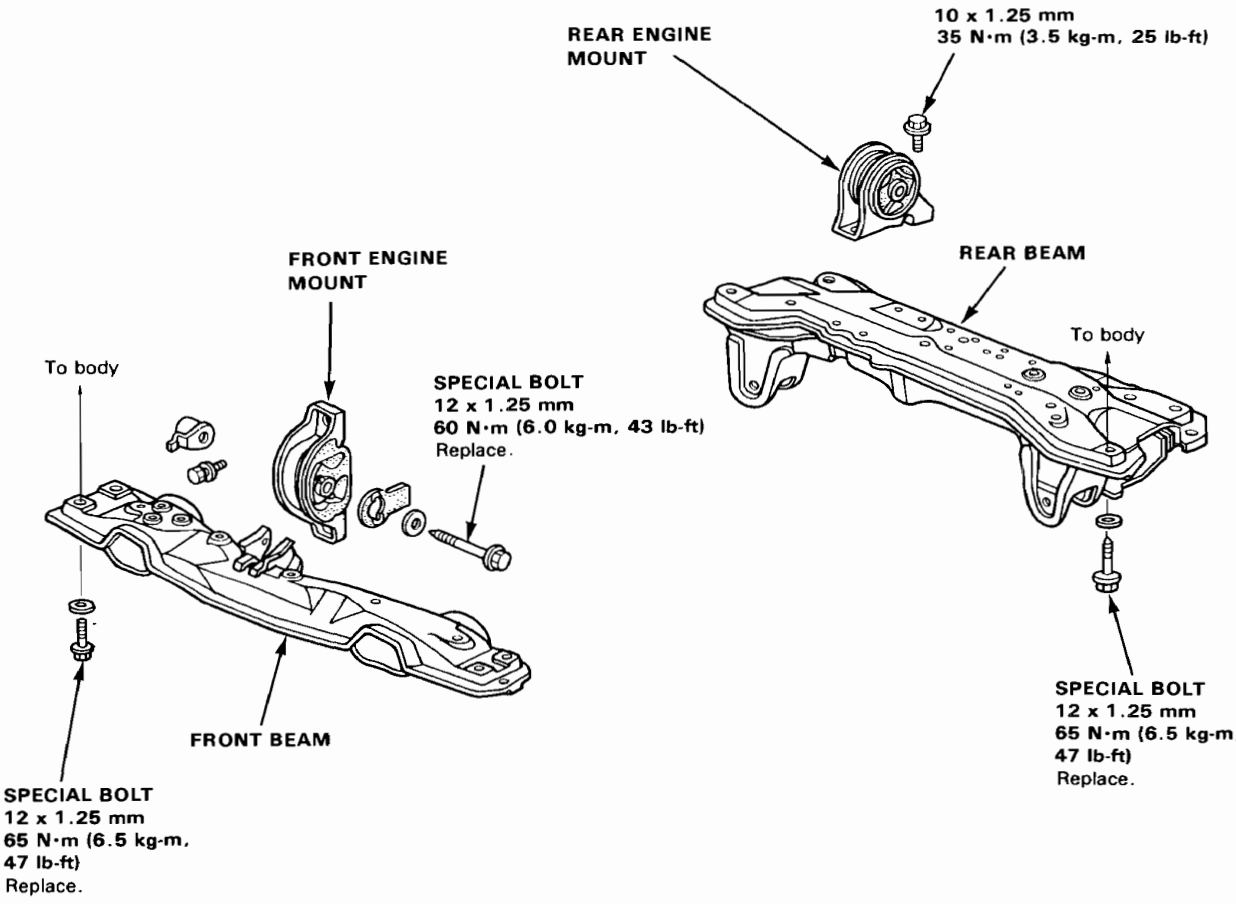


(cont'd)

(cont'd)

Subframe Torque Value Specifications:

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



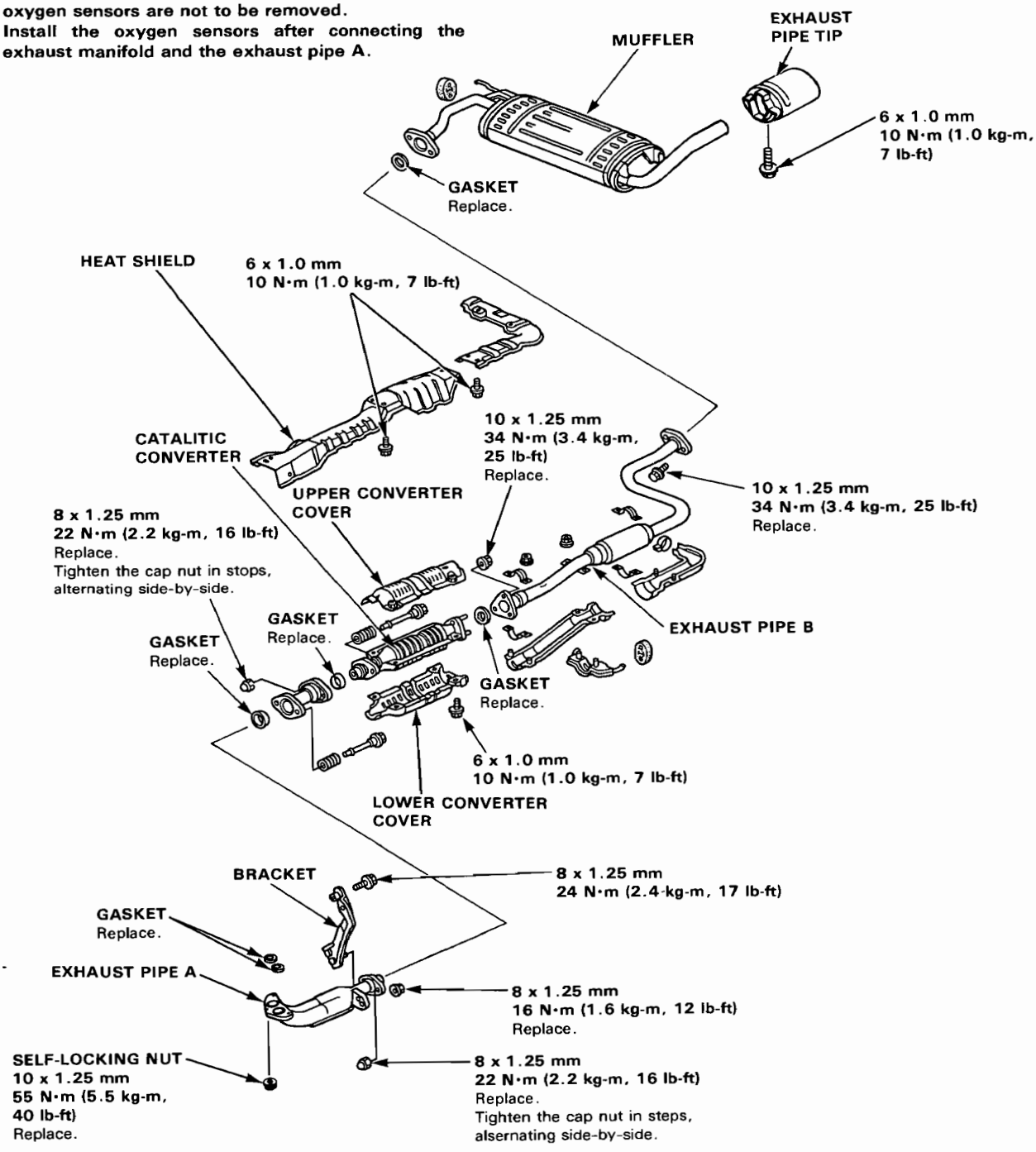
Exhaust Pipe and Muffler

Replacement

CAUTION:

- **Remove the oxygen sensors (on the exhaust manifold) before disconnecting the exhaust mainfold and the exhaust pipe A.**
- **Do not use air wrench or hammer for disconnecting the exhaust manifold and the exhaust pipe A, if the oxygen sensors are not to be removed.**
- **Install the oxygen sensors after connecting the exhaust manifold and the exhaust pipe A.**
- **Do not use air wrench for tightening self-locking nuts of the exhaust pipe A, if the oxygen sensors are not to be removed.**

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



Radiator

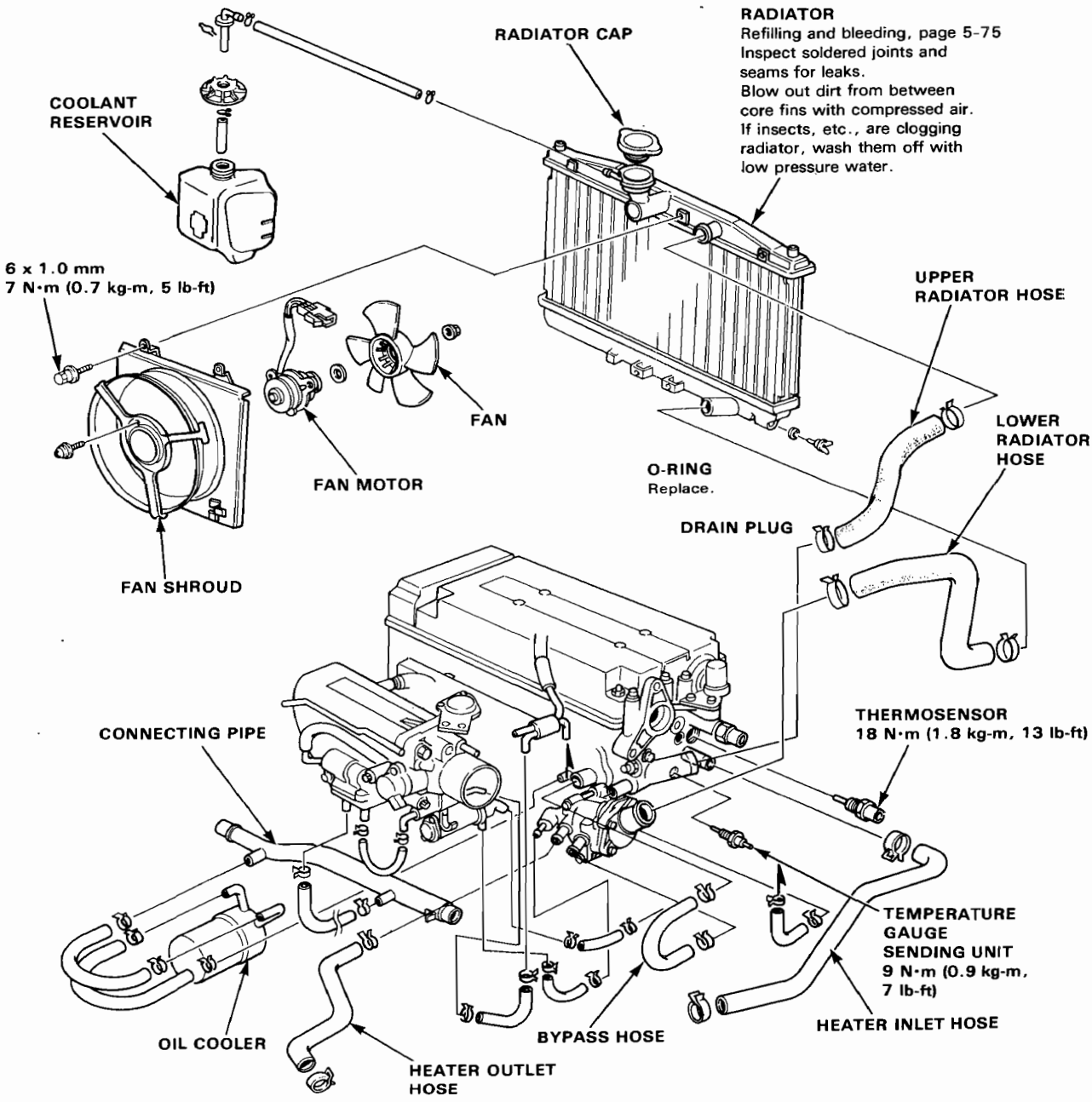
Illustrated Index

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

Total Cooling System Capacity (Including reservoir)
5.7 ℓ (6.0 US qt, 5.0 Imp qt)
Refilling Capacity
4.7 ℓ (5.0 US qt, 4.1 Imp qt)
Heater Capacity, 0.6 ℓ (0.6 US qt, 0.5 Imp qt)
Reservoir Capacity 0.4 ℓ (0.4 US qt, 0.4 Imp qt)

CAUTION: When supplying coolant, be sure to shut he 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.

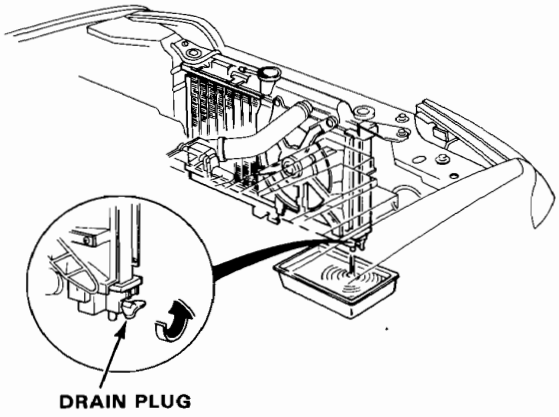
NOTE:
- Check all cooling system hoses for damage, leaks or deterioration and replace if necessary.
- Check all hose clamps and retighten if necessary.
- Use new O-rings when reassembling.



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 lever or control 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 and heater.

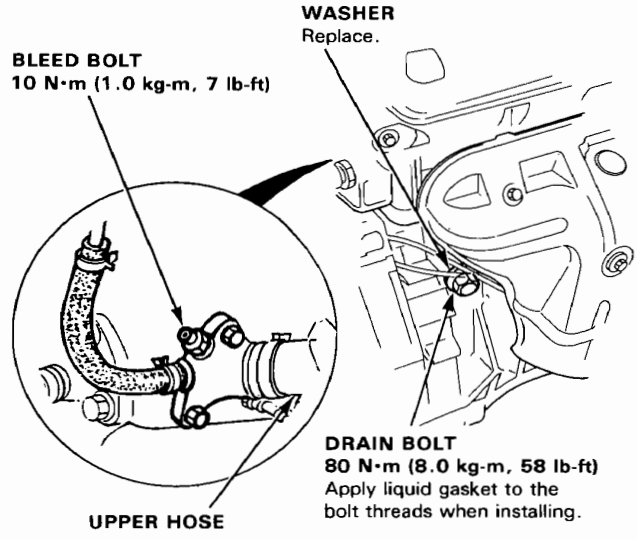


5. Apply liquid gasket to the drain bolt threads, then reinstall the bolt with a new washer and tighten it securely.
6. Tighten the radiator drain plug securely.
7. Remove, drain and reinstall the reservoir. Fill the tank halfway to the MAX mark with water, then up to the MAX mark with coolant.
8. Mix 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 (0.4 ℓ (0.4 US qt, 0.4 Imp qt)).
4.7 ℓ (5.0 US qt, 4.1 Imp qt).

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

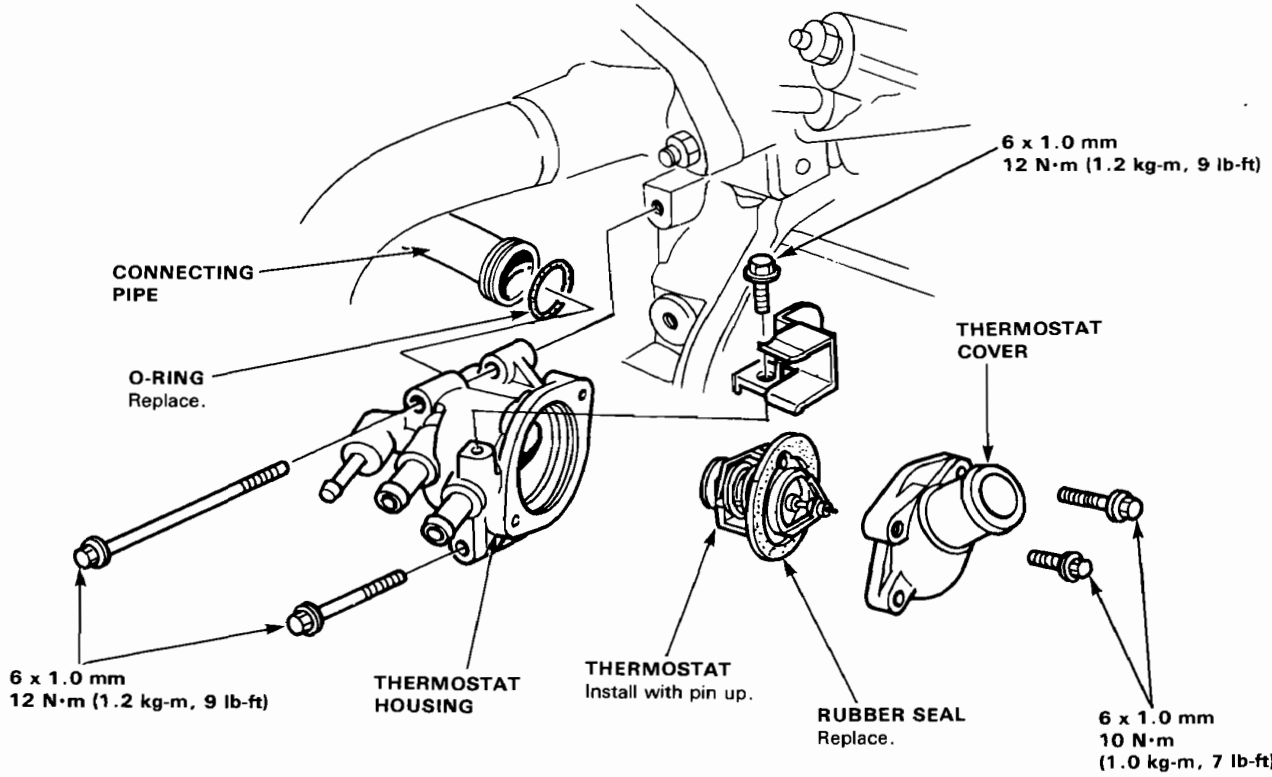


10. With the radiator cap off, start the engine and let it run until warmed up (fan goes on at least twice). Then, if necessary, add more coolant mix to bring the level back up to the bottom of the filler neck.
11. Put the radiator cap on, tihen run the engine again and check for leaks.

Thermostat

Replacement

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

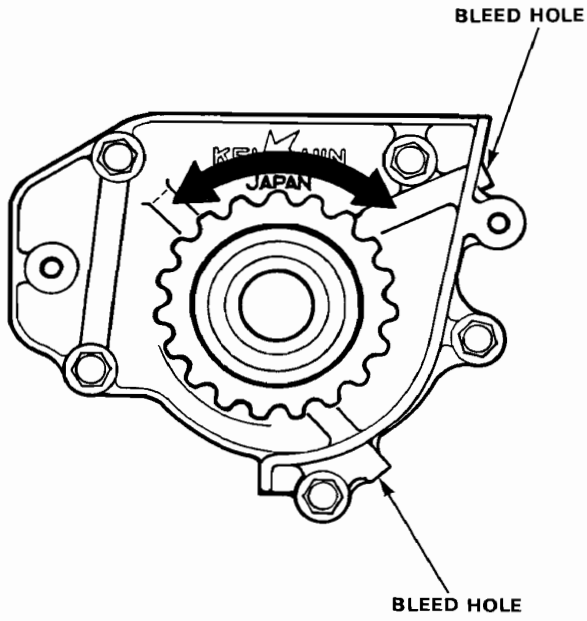


Water Pump

Inspection

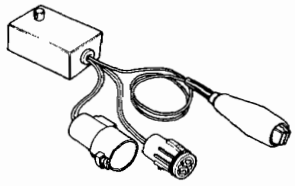
1. Remove the timing belt (page 5-43).
2. Check the water pump pulley turn freely.
3. Check the signs of seal leakage.

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



Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07JAZ—SH20100	R.P.M. Connecting Adaptor	1	
②	07406—0040001	Fuel Pressure Gauge Set	1	
②-1	07406—0040100	Pressure Gauge	(1)	Component Tools
②-2	07406—0040201	Hose Assembly	(1)	
③	07411—0020000	Digital Circuit Tester	1	
④	07999—PD6000A	PGM-FI Test Harness	1	



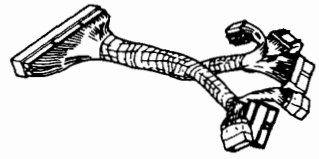
①

②

②-1

②-2

③

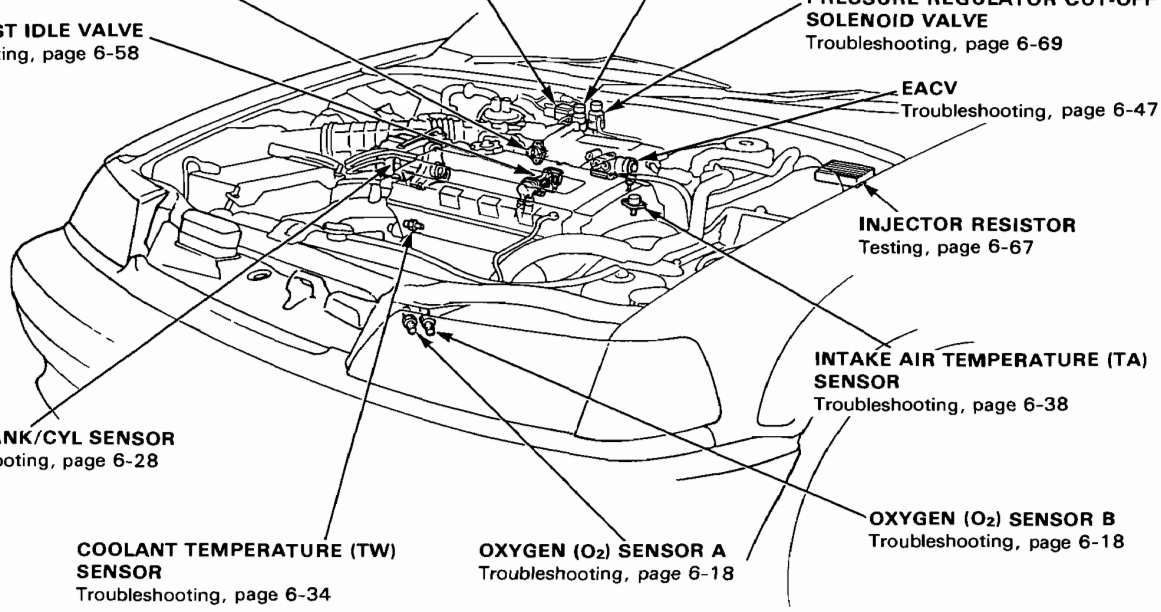


④

Component Locations

Index

[LH]



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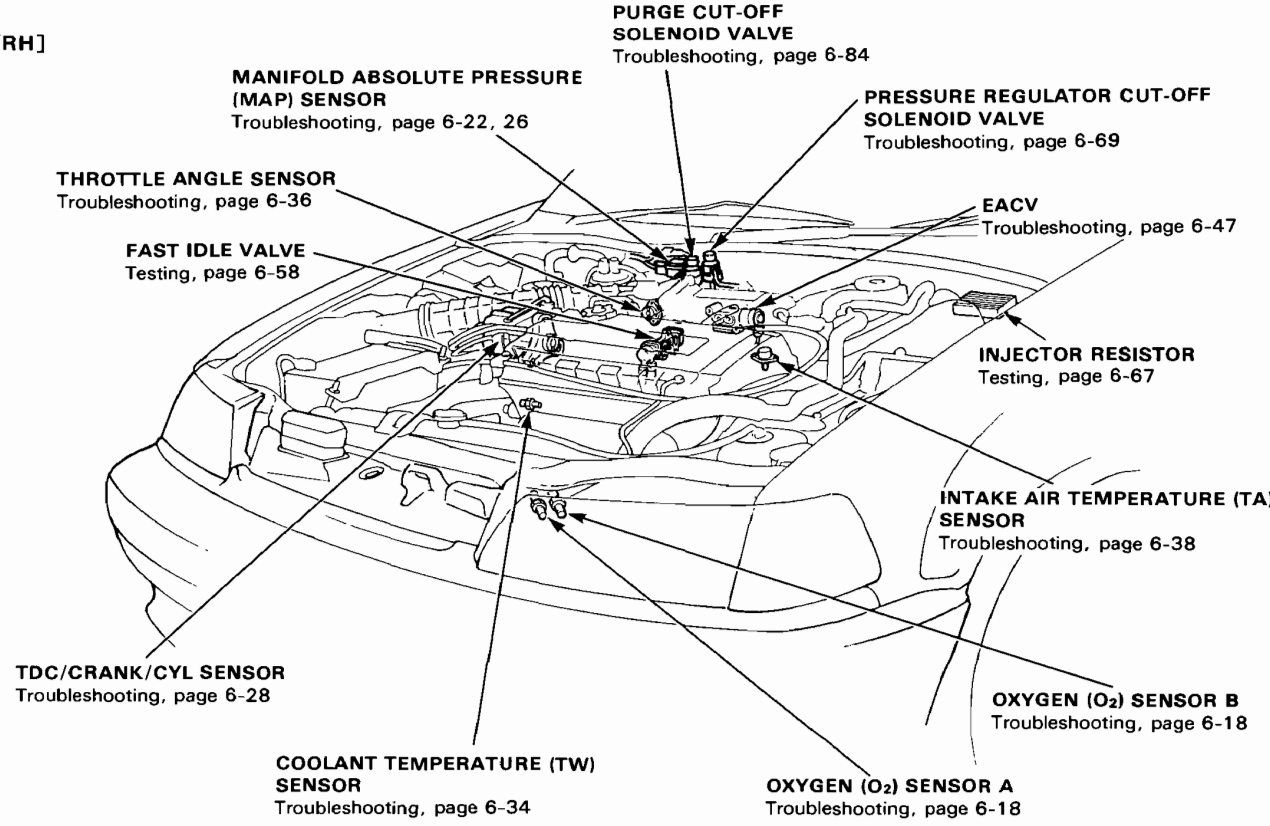
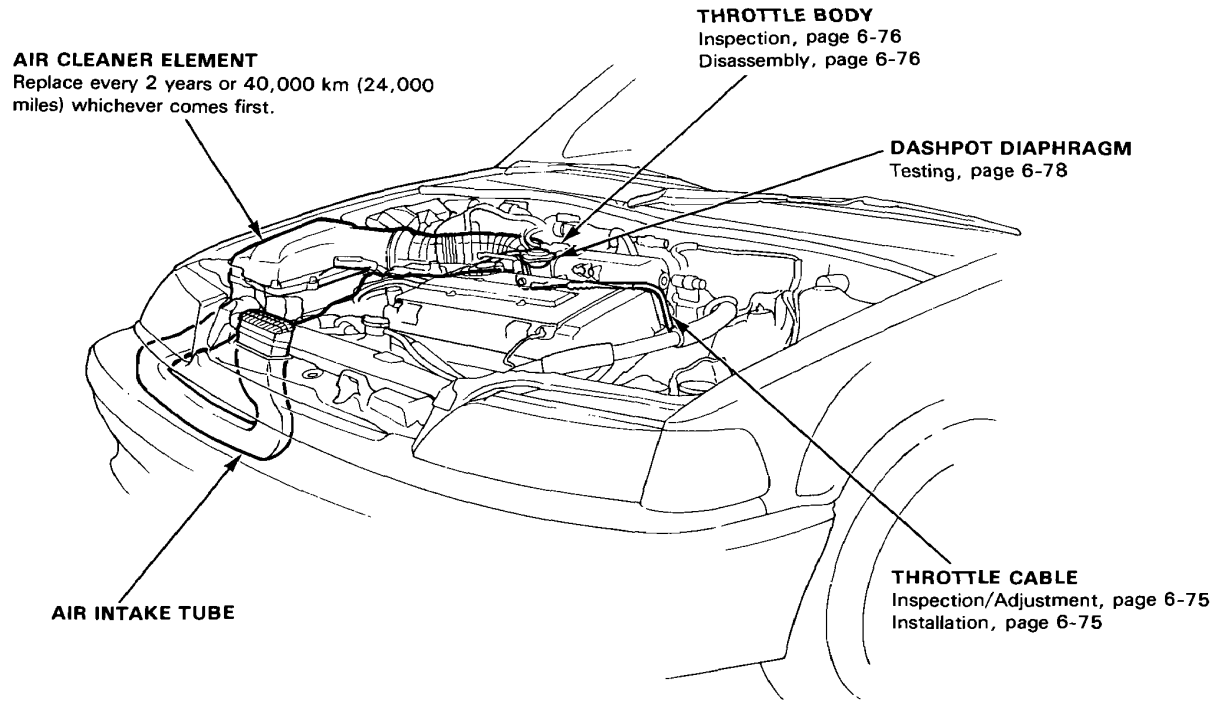


Component Locations

Index

[LH]



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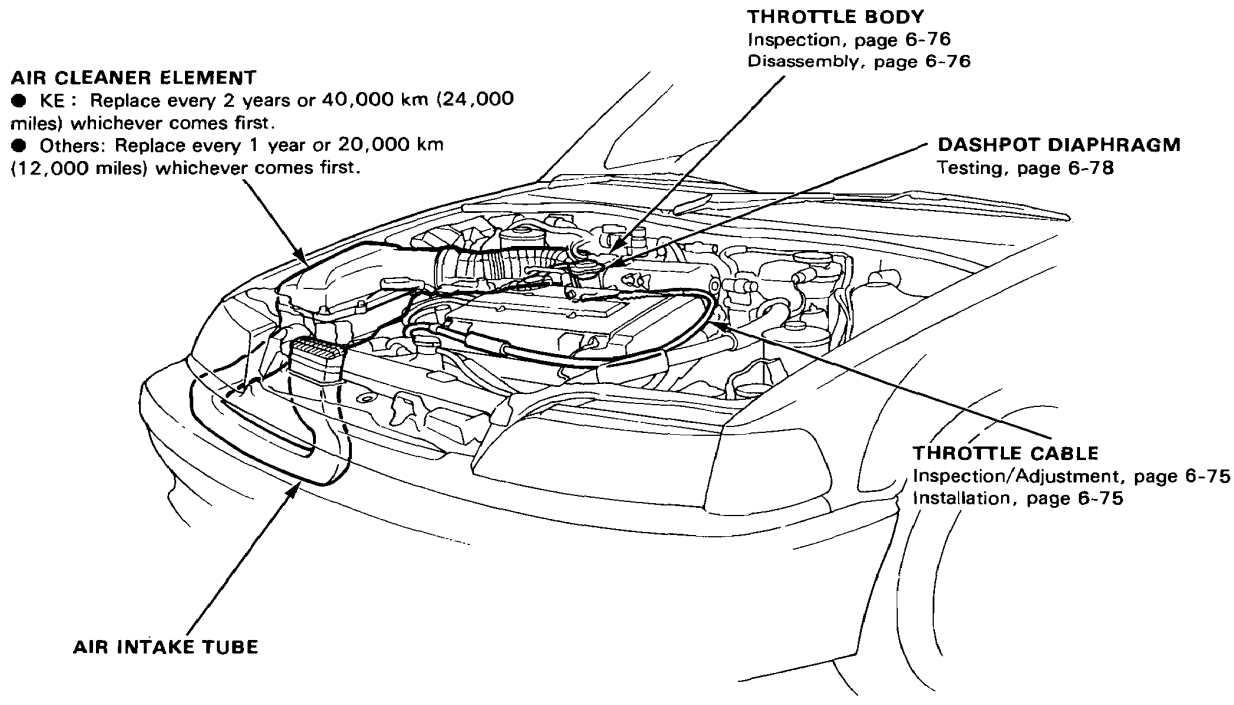

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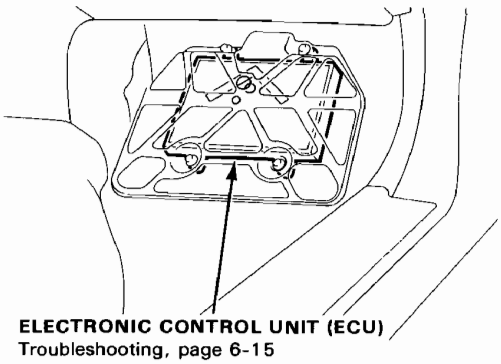
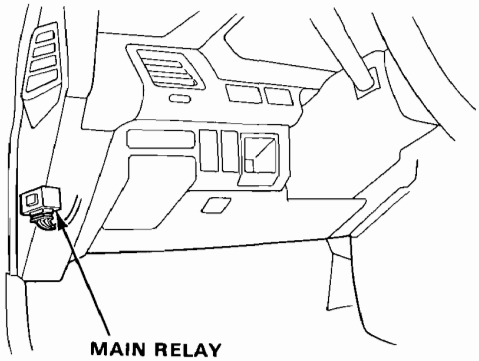
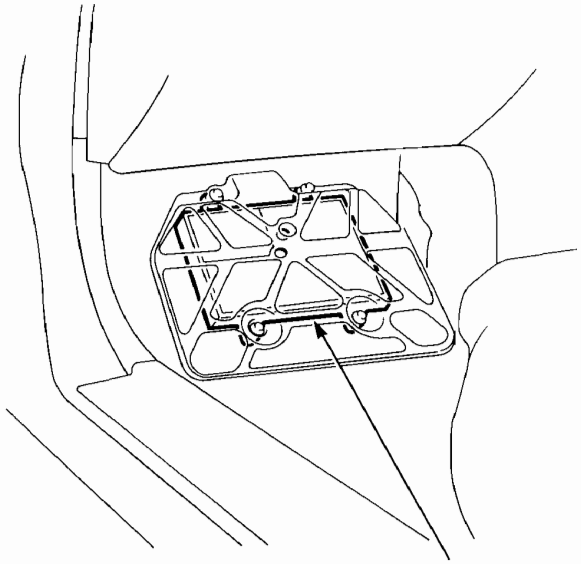


ELECTRONIC CONTROL UNIT (ECU)
Troubleshooting, page 6-15

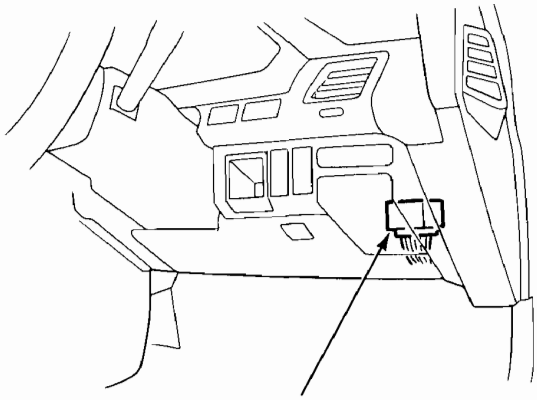


MAIN RELAY

[RH]



ELECTRONIC CONTROL UNIT (ECU)
Troubleshooting, page 6-15

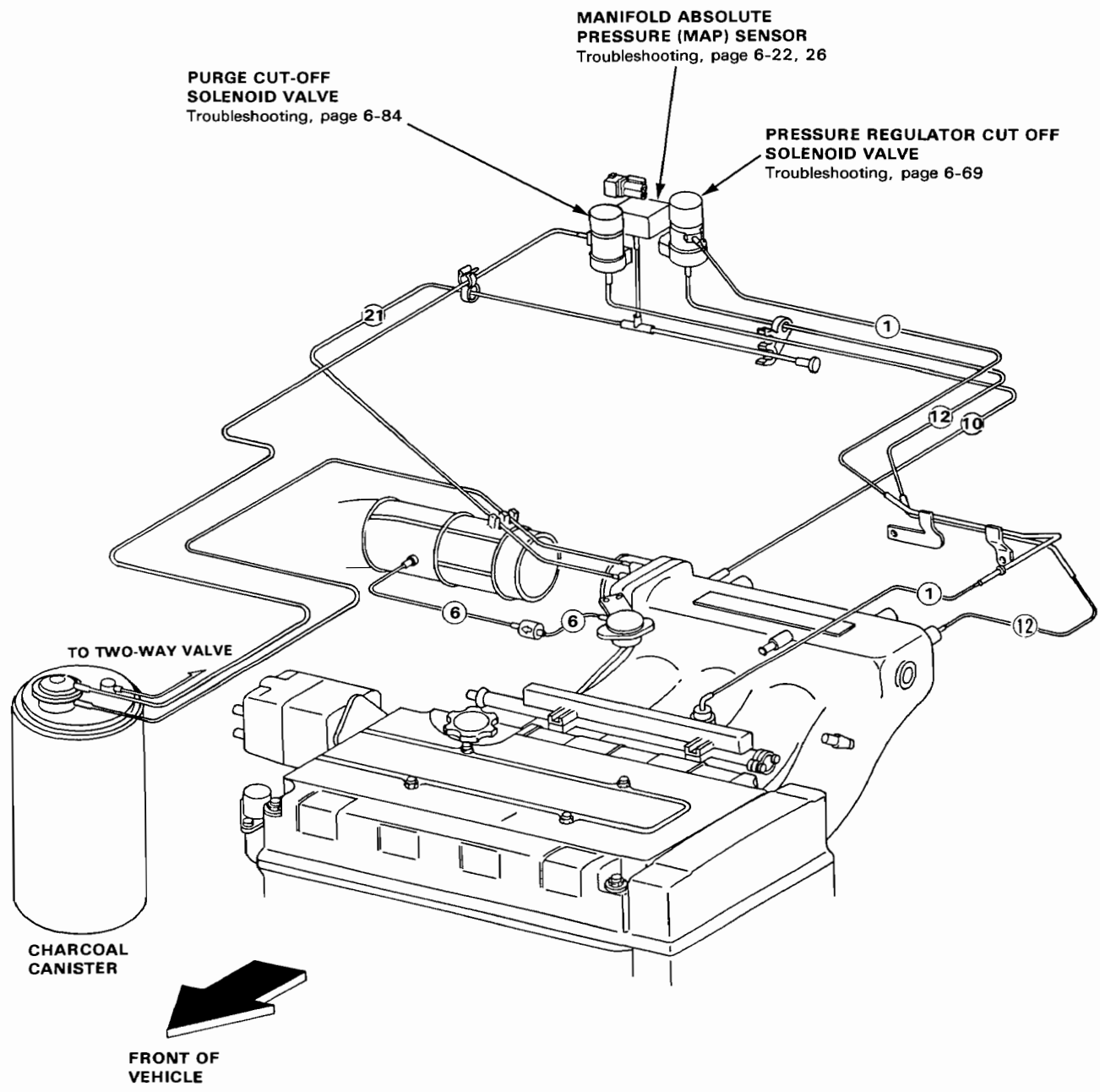


MAIN RELAY

System Description

Vacuum Connections

[LH]



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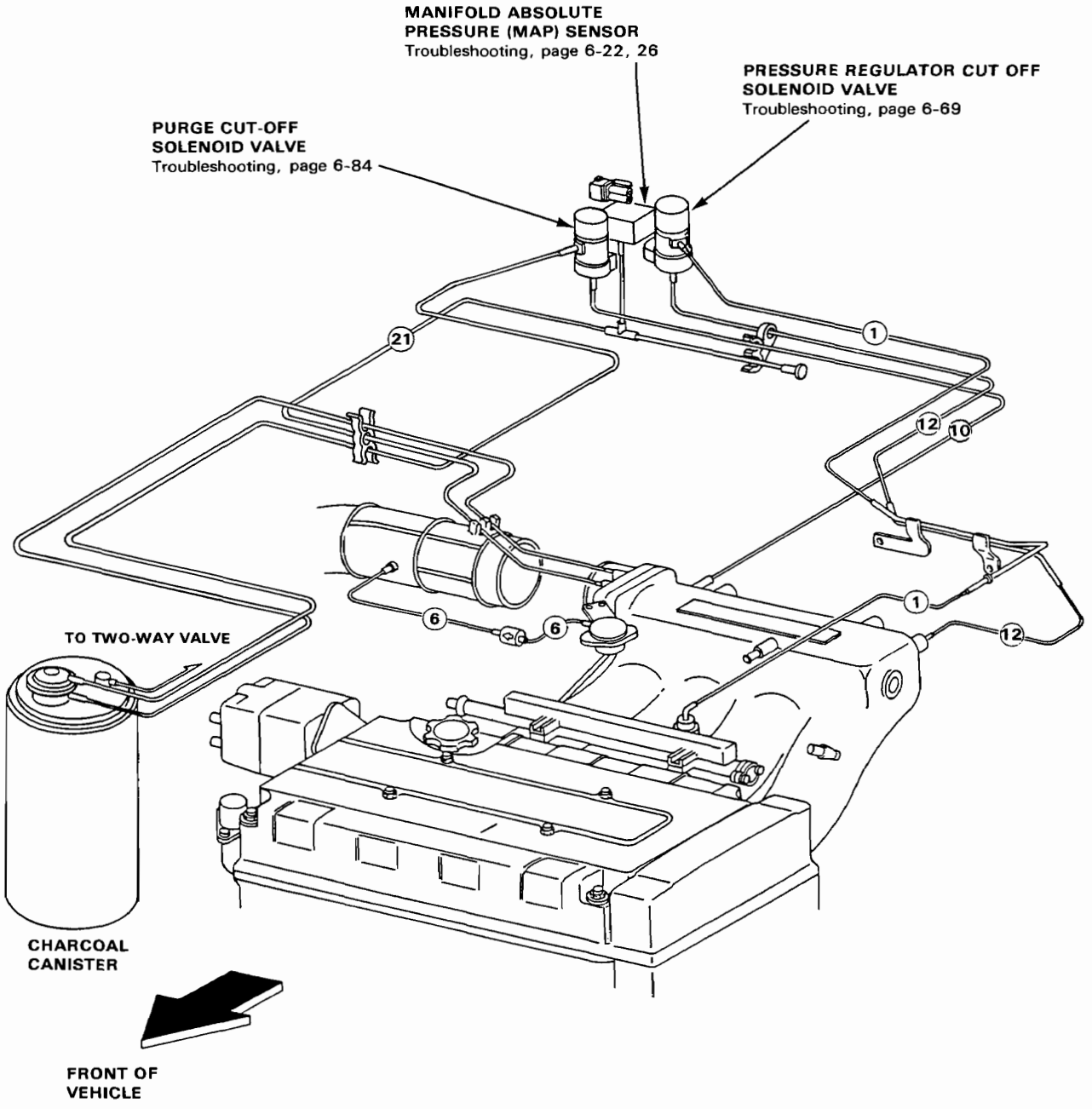
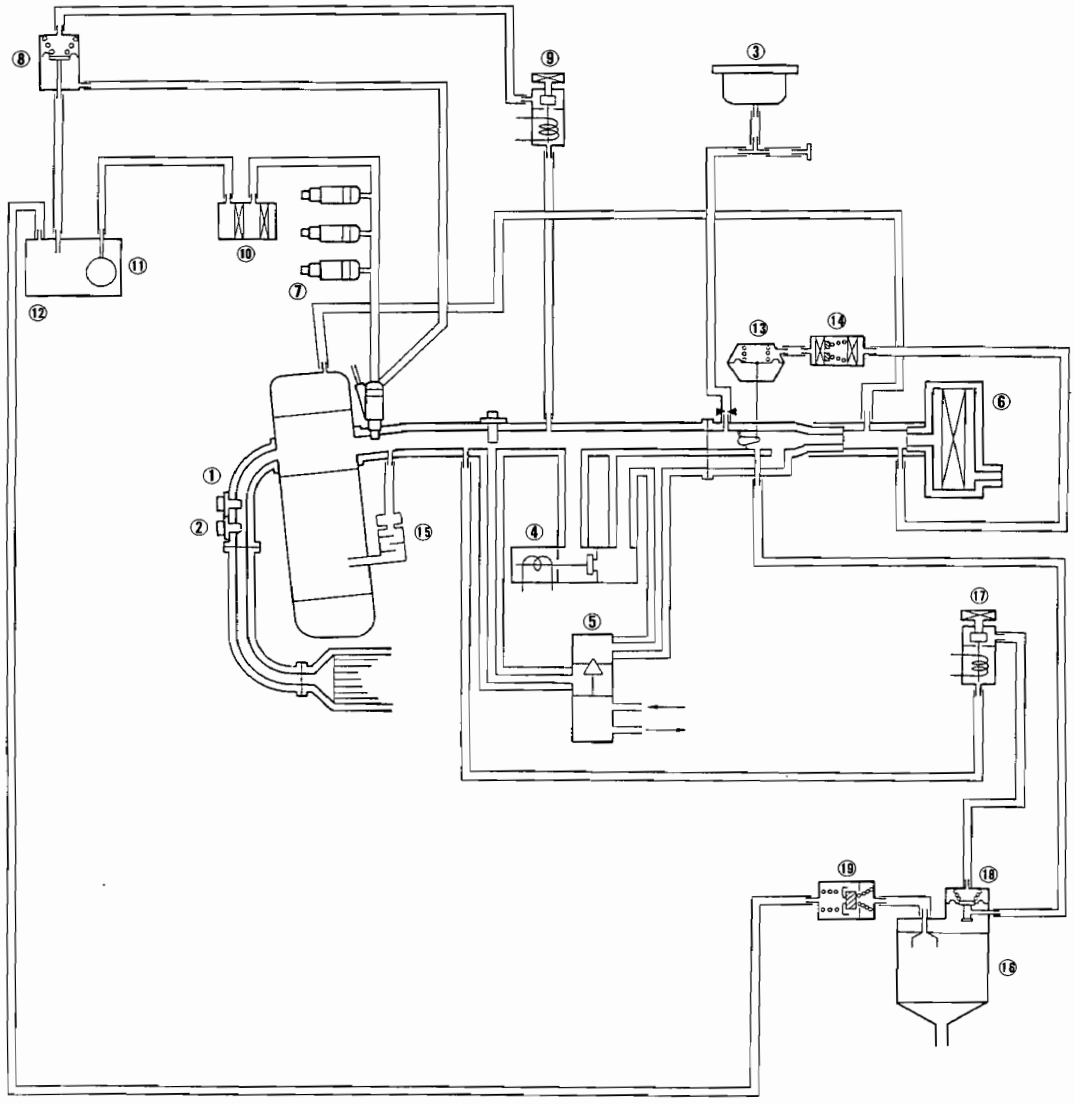

MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
Troubleshooting, page 6-22, 26
PRESSURE REGULATOR CUT OFF SOLENOID VALVE
Troubleshooting, page 6-69
PURGE CUT-OFF SOLENOID VALVE
Troubleshooting, page 6-84
21
1
12
10
6
6
1
12
TO TWO-WAY VALVE
CHARCOAL CANISTER
FRONT OF VEHICLE

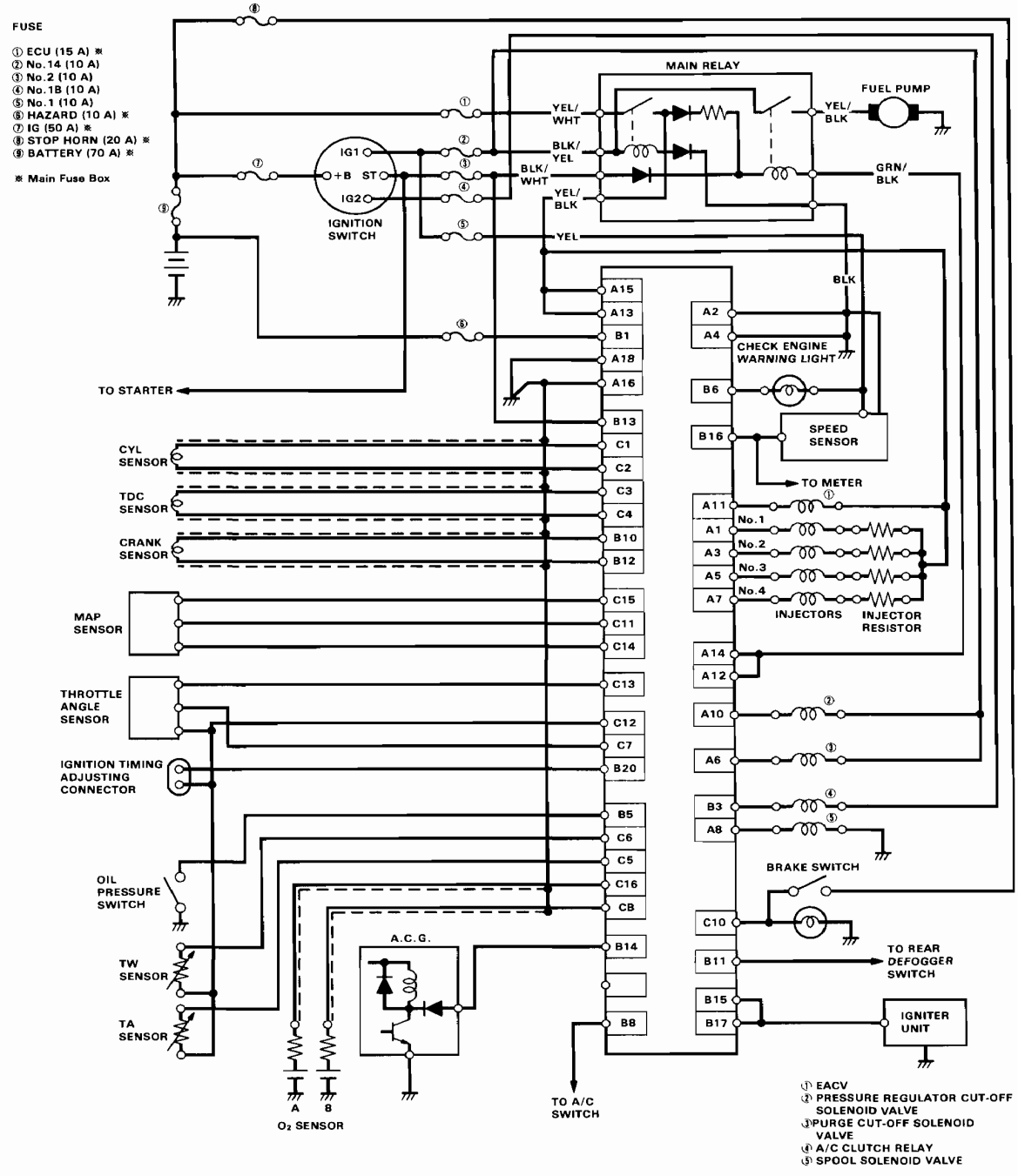
System Description

Vacuum Connections

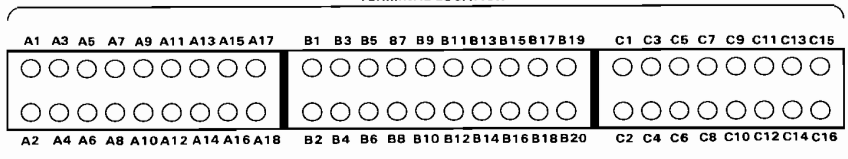


① OXYGEN (O_2) SENSOR A
② OXYGEN (O_2) SENSOR B
③ MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
④ ELECTRONIC AIR CONTROL VALVE (EACV)
⑤ FAST IDLE VALVE
⑥ AIR CLEANER
⑦ FUEL INJECTOR
⑧ PRESSURE REGULATOR
⑨ PRESSURE REGULATOR CUT-OFF SOLENOID VALVE
⑩ FUEL FILTER
⑪ FUEL PUMP
⑫ FUEL TANK
⑬ DASHPOT DIAPHRAGM
⑭ DASHPOT CHECK VALVE
⑮ PCV VALVE
⑯ CHARCOAL CANISTER
⑰ PURGE CUT-OFF SOLENOID VALVE
⑱ PURGE CONTROL DIAPHRAGM VALVE
⑲ TWO-WAY VALVE

Electrical Connections



TERMINAL LOCATION



Troubleshooting

Troubleshooting Guide

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

PAGE / SYSTEM / SYMPTOM		PGM-FI						
		ECU	OXYGEN SENSOR	MANIFOLD ABSOLUTE PRESSURE SENSOR	TDC/CRANK/CYL SENSOR	COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR	INTAKE AIR TEMPERATURE SENSOR
		15	18, 20	22, 26	28,30, 32	34	36	38
CHECK ENGINE WARNING LIGHT TURNS ON		□ or ⊏□						
SELF-DIAGNOSIS INDICATOR (LED) BLINKS		⓪ or ✻	① or ② or ㊸※※ or ㊹※※	③ or ⑤	④ or ⑧ or ⑨	⑥	⑦	⑩
ENGINE WON'T START		③						
DIFFICULT TO START ENGINE WHEN COLD		(BU)		③		①		
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPEC	(BU)				③		
	ROUGH IDLE	(BU)		③				
	WHEN WARM ENGINE SPEED TOO HIGH	(BU)						
	WHEN WARM ENGINE SPEED TOO LOW	(BU)						
FREQUENT STALLING	WHILE WARMING UP	(BU)						
	AFTER WARMING UP	(BU)						
POOR PERFORM-ANCE	MISFIRE OR ROUGH RUNNING	(BU)						
	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.

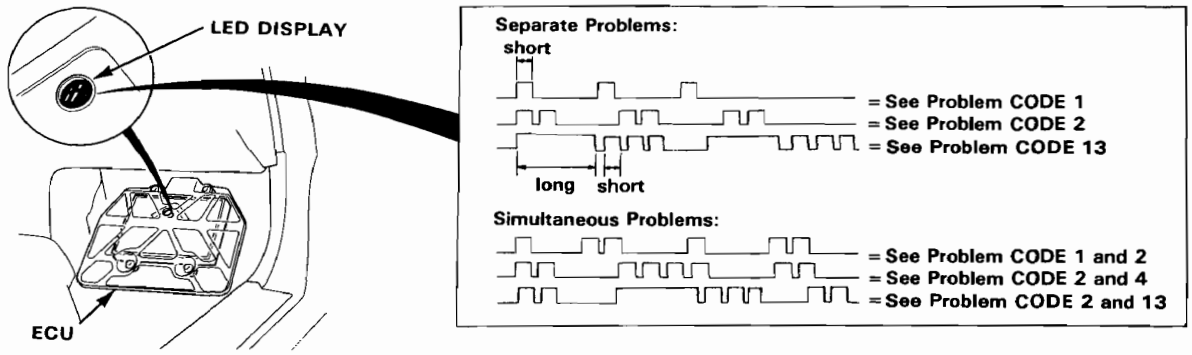
※※;KX, KS, KG only

PGM-FI			IDLE CONTROL		VALVE TIMMING CONTROL				
ATMO-SPHERIC PRESSURE SENSOR	IGNITION OUTPUT SIGNAL	VEHICLE SPEED SENSOR	ELEC-TRONIC AIR CONTROL VALVE	OTHER IDLE CONTROLS	SPOOL SOLENOID VALVE	OIL PRESSURE SWITCH	FUEL SUPPLY	AIR INTAKE	EMISSION CONTROL
40	42	44	47	45	5-32	5-34	60	74	80
									
⑬	⑮	⑰	⑭		㉑	㉒			
							①		
				②					
			①	②					
			①				②		
			②	①					
			①				②		
			①	②			③		
			①	②			③		
			②				①		
							①		
							①		

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 44 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.

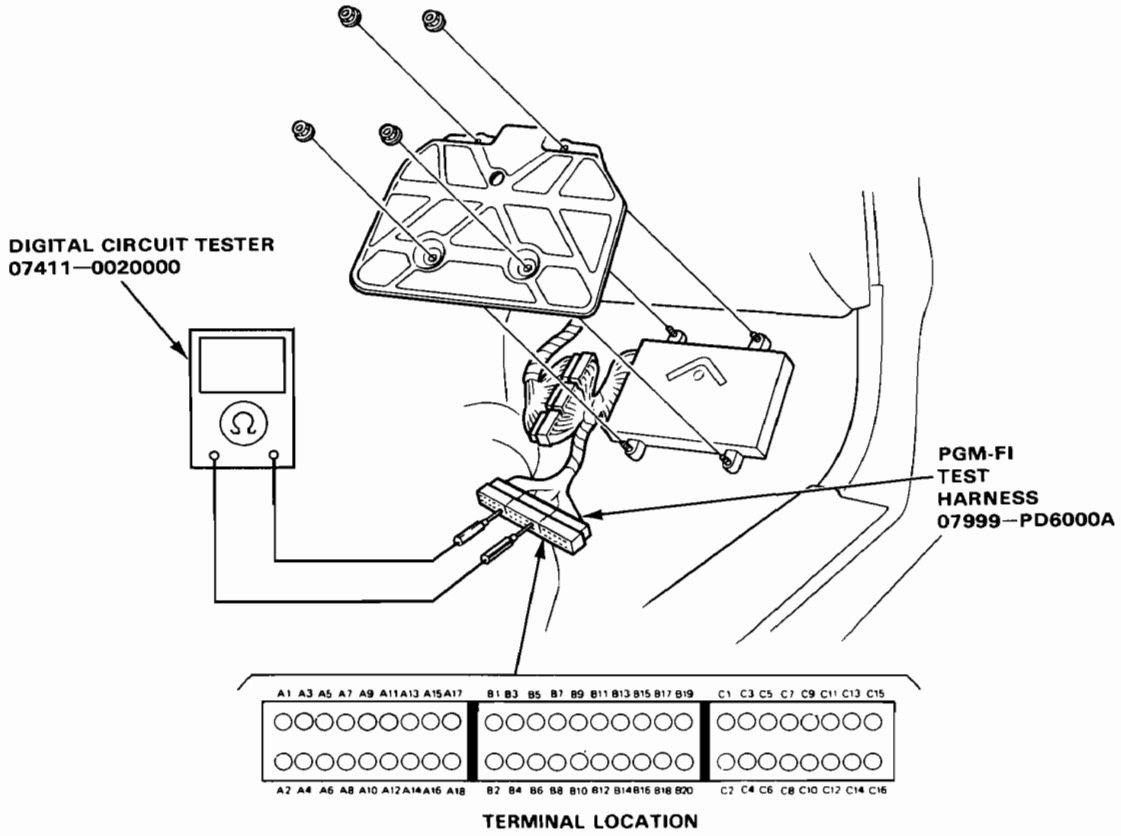
NOTE: Information on this page is for LH and RH models.



SELF-DIAGNOSIS INDICATOR BLINKS	SYSTEM INDICATED	PAGE
0	ECU	6-15
1, 2	OXYGEN CONTENT	6-18
3	MANIFOLD ABSOLUTE PRESSURE	6-22
5		6-26
4	CRANK ANGLE	6-28
6	COOLANT TEMPERATURE	6-34
7	THROTTLE ANGLE	6-36
8	TDC POSITION	6-30
9	No.1 CYLINDER POSITION	6-32
10	INTAKE AIR TEMPERATURE	6-38
13	ATMOSPHERIC PRESSURE	6-40
14	ELECTRONIC AIR CONTROL	6-47
15	IGNITION OUTPUT SIGNAL	6-42
17	VEHICLE SPEED SENSOR	6-44
21	SPOOL SOLENOID VALVE	5-32
22	OIL PRESSURE SWITCH	5-34
43, 44	FUEL SUPPLY SYSTEM (KX, KS, KG)	6-20

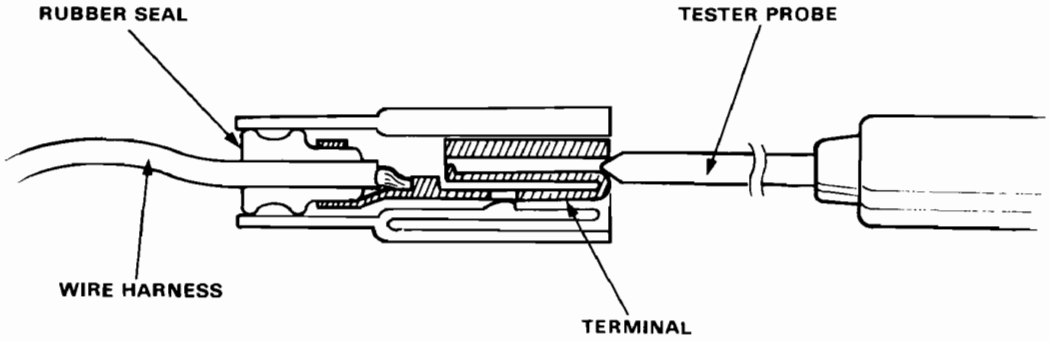
If codes other than those listed above are indicated, count the number of blinks again. If the indicator is in fact blinking unusual codes, substitute a known-good ECU and recheck. If the indication goes away, replace the original ECU.
The Check Engine warning light and ECU LED may come on, indicating a system problem, when, in fact, there is a poor or intermittent electrical connection. First, check the electrical connections, clean or repair connections if necessary.
If the Check Engine warning light is on and LED stays on, replace the ECU.

If the inspection for a particular failure code requires the PGM-FI 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 PGM-FI test harness. Then check the system according to the procedure described for the appropriate code(s) listed on the following pages.
NOTE: Information on this page is for LH and RH models.



TERMINAL LOCATION

CAUTION:
- **Puncturing the insulation on a wire can cause poor or intermittent electrical connections.**
- **For testing at connectors other than the PGM-FI 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 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. 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. 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 PGM-FI test 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.

Is No. 1 fuse OK ?

NO → **Replace fuse.**

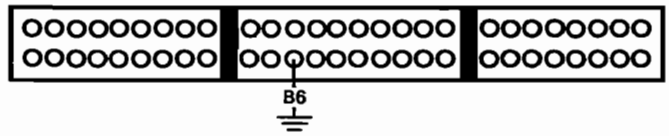
YES → **Repair open in YEL wire between No. 1 fuse and combination meter.**

YES

Turn the ignition switch OFF.

Connect the PGM-FI test harness between the ECU and connector (page 6-13).

Connect B6 terminal to body ground.

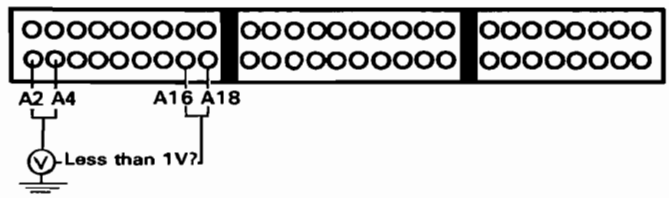


Turn the ignition switch ON.

Is Check Engine warning light on ?

NO →
- **Replace warning light bulb.**
- **Repair open in GRN/ORN wire between ECU (B6) and combination meter.**

YES



Measure voltage between body ground and the following terminals individually to: ●A2, ●A4, ●A16, ●A18

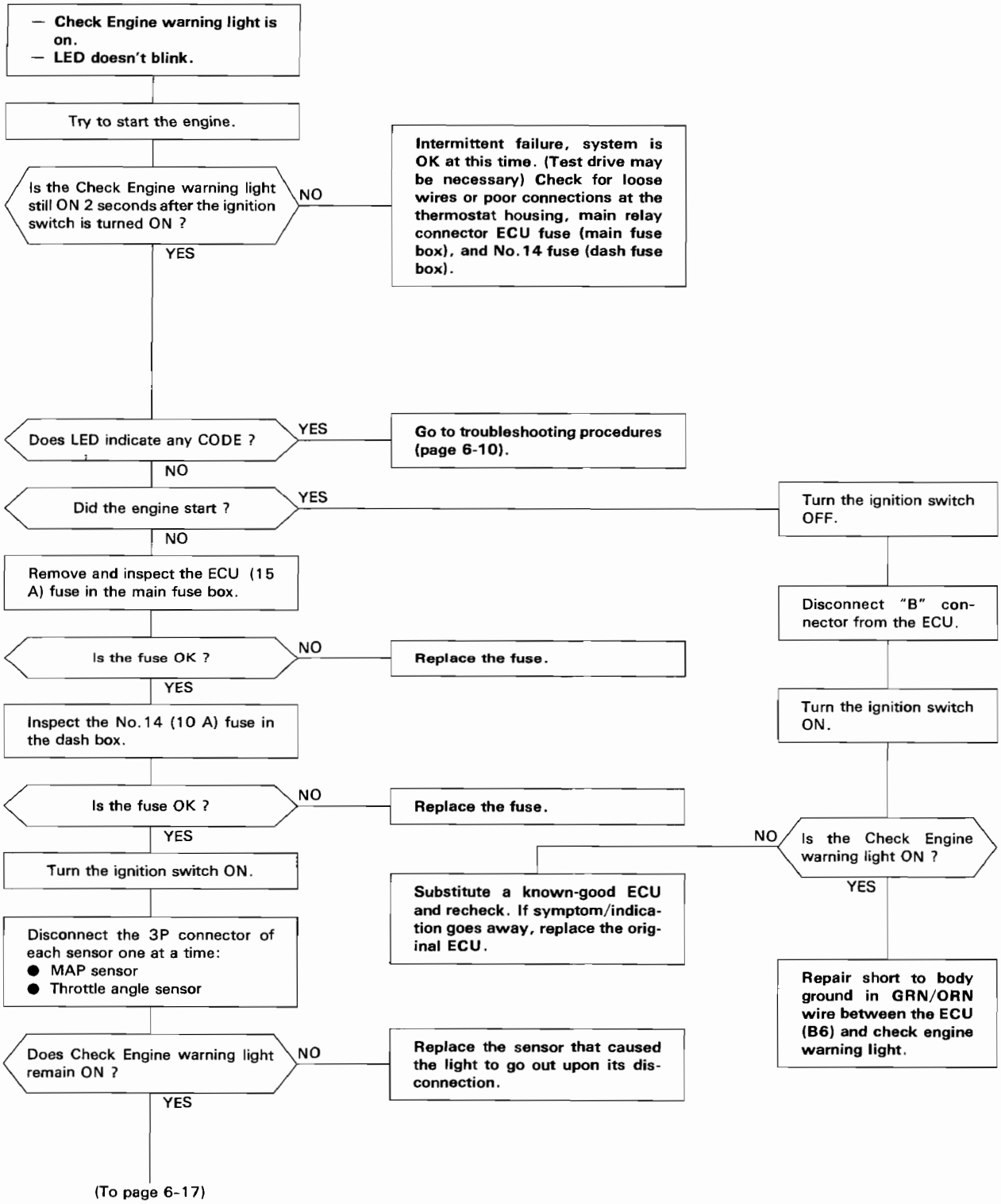
Is there less than 1V?

NO → **Repair open in wire between ECU and thermostat housing (G101) that had more than 1V.**

YES

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

Troubleshooting Flowchart —— ECU (cont'd)

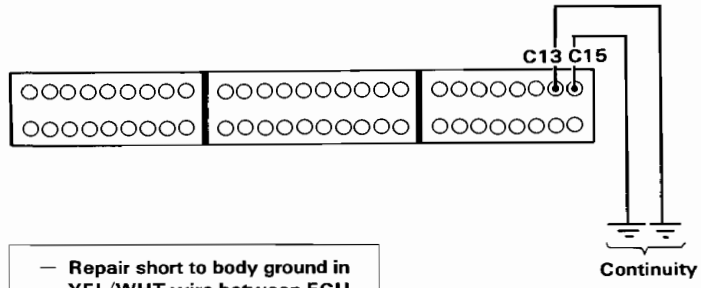


(From page 6-16)

Turn the ignition switch OFF.

Connect the PGM-FI test harness (page 6-13). But disconnect the "C" connector from the ECU only, not the main wire harness.

Check for continuity between body ground and the following terminals: C13, C15.



Does continuity exist ?

YES

- **Repair short to body ground in YEL/WHT wire between ECU (C13) and throttle angle sensor.**
- **Repair short to body ground in YEL/RED wire between ECU (C15) and MAP sensor.**

NO

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

Turn the ignition switch ON.

Individually connect the following terminal to Body Ground. A16 · A18

Is the Check Engine warning light still ON after 2 seconds ?

NO

- **Repair open in BLK/RED wire between ECU (A18) and G101.**
- **Repair open in BRN/BLK wire between ECU (A16) and G101.**

YES

Measure voltage between A18 (−) and the following: A13 (+) and A15 (+).

Is there battery voltage ?

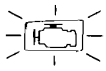
NO

- **Repair open in YEL/BLK wire between ECU (A13, A15) and main relay.**
- **Check main relay and wiring connectors at main relay.**

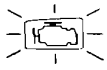
YES

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

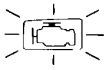
Troubleshooting Flowchart —— Oxygen Sensor



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



② Self-diagnosis LED blinks twice: A problem in the Oxygen (O_2) Sensor B circuit.



① or ②

— Check Engine warning light has been reported on.
— LED indicates CODE 1 (O_2 sensor A) or CODE 2 (O_2 sensor B).

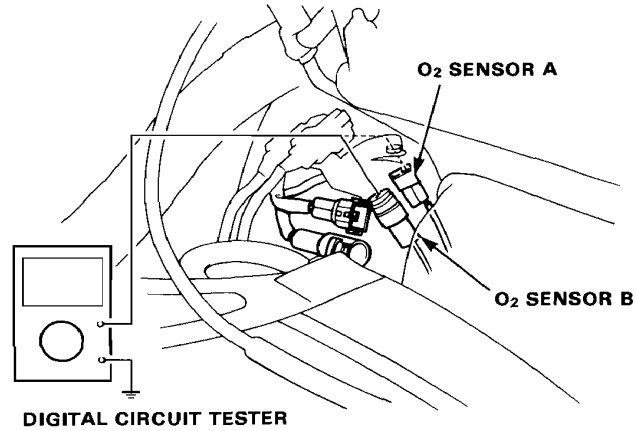
Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Disconnect engine wire harness from indicated O_2 sensor.

Warm up engine to normal operating temperature (cooling fan comes on), then open the throttle wide open then close it.

Measure voltage between the connector terminal and body ground.



DIGITAL CIRCUIT TESTER
07411—0020000

(To page 6-19)

(From page 6-18)

Is voltage above 0.6 V during wide open acceleration ? Is voltage below 0.4 V during closed throttle deceleration from 5,000 min^{-1} (rpm) ?

NO → **Replace O_2 sensor.**

YES

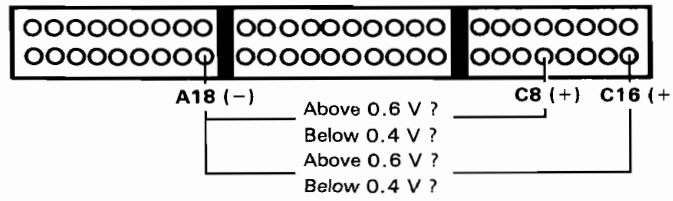
Stop engine.

Reconnect the O_2 sensor connector to engine wire harness.

Connect the PGM-FI test harness between the ECU and connector (page 6-13).

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

Measure voltage between:
- O_2 sensor A
  C16 (+) and A18 (−) terminals
- O_2 sensor B
  C8 (+) and A18 (−) terminals



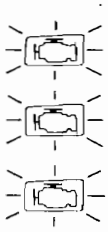
Is voltage above 0.6 V during wide open acceleration ? Is voltage below 0.4 V during closed throttle deceleration from 5,000 min^{-1} (rpm) ?

NO → **Repair wire between ECU and O_2 sensor for short or open:**
- **O_2 sensor A WHT wire to C16.**
- **O_2 sensor B RED/BLU, ORN wire to C8.**

YES

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

Troubleshooting Flowchart — Fuel Supply System (KX, KS, KG)



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

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

(43) or (44)

NOTE: If 43 or 44 code is accompanied by poor driveability, go to page 6-60, Fuel Supply System.

— Check Engine warning light has been reported on.
— LED indicates CODE 43 (O_2 sensor A) or CODE 44 (O_2 sensor B).
— or continued from CODE 1 (O_2 sensor A) or CODE 2 (O_2 sensor B).

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

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

Hold engine at 3,000 min^{-1} (rpm) for 2 minutes.

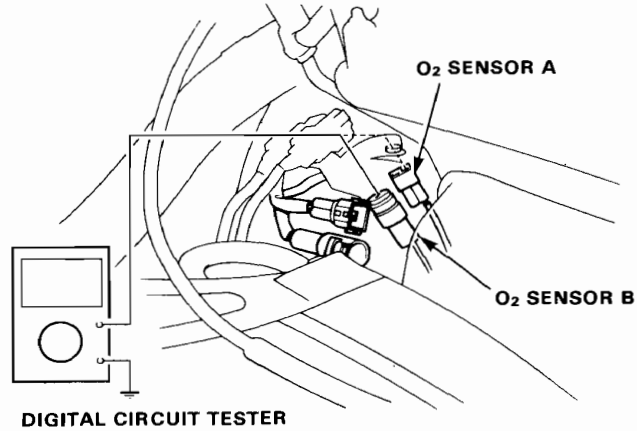
Is the Check Engine warning light on and does LED indicate CODE 43 or 44 ?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at O_2 sensor A or B C210 (round connector located at right shock tower), and ECU.

YES

Disconnect the O_2 sensor connector and measure voltage between the O_2 sensor connector and body ground.

(To page 6-21)



DIGITAL CIRCUIT TESTER
07411—0020000

(From page 6-20)

Is voltage above 0.6 V during wide open acceleration ? Is voltage below 0.4 V during closed throttle deceleration from 5,000 min^{-1} (rpm) ?

NO → **Replace O_2 sensor.**

YES

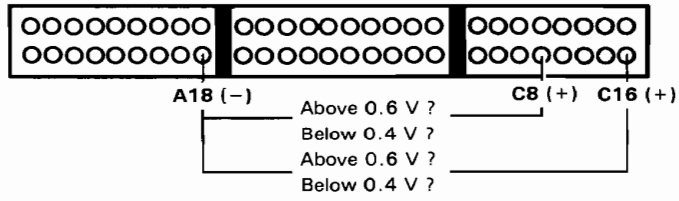
Stop engine.

Reconnect the O_2 sensor connector to engine wire harness.

Connect the PGM-FI test harness between the ECU and connector (page 6-13).

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

Measure voltage between:
- O_2 sensor A
  C16 (+) and A18 (−) terminals
- O_2 sensor B
  C8 (+) and A18 (−) terminals



Is voltage above 0.6 V during wide open acceleration ? Is voltage below 0.4 V during closed throttle deceleration from 5,000 min^{-1} (rpm) ?

NO → **Repair wire between ECU and O_2 sensor for short or open:**
- **O_2 sensor A WHT wire to C16.**
- **O_2 sensor B RED/BLU, ORN wire to C8.**

YES

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

Troubleshooting Flowchart — MAP Sensor

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

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

- **Engine is warm and running.**
- **Check Engine warning light is on.**
- **LED indicates CODE 3.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse 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.**

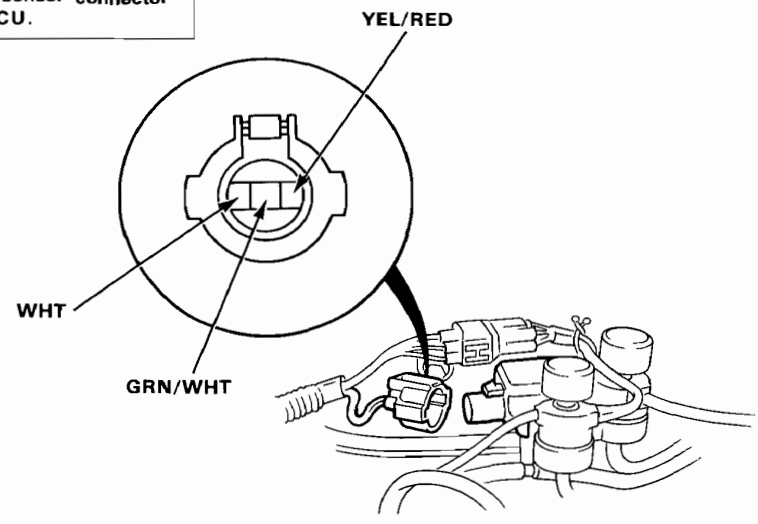
YES

Turn the ignition switch OFF.

Disconnect the 3P connector from the MAP sensor.

Turn the ignition switch ON.

(To page 6-23)



(From page 6-22)

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

Is there approx. 5V?

YES

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

NO

Repair open in YEL/RED wire between ECU (C15) and MAP sensor.
If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

Is there approx. 5V?

NO

Repair open in GRN/WHT wire between ECU (C14) 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

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

Is there approx. 5V?

NO

Repair open or short in WHT wire between ECU (C11) 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 PGM-FI test harness between the ECU and connector (page 6-13).

Turn the ignition switch ON.

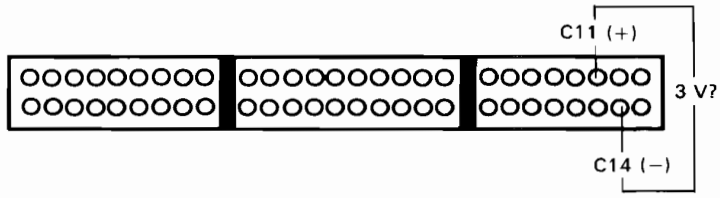
(To page 6-24)

(cont'd)

Troubleshooting Flowchart — MAP Sensor (cont'd)

(From page 6-23)

Measure voltage between C11 (+) terminal and C14 (–) 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 HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start the engine.

Is Check Engine warning light on and does LED indicate CODE 5?

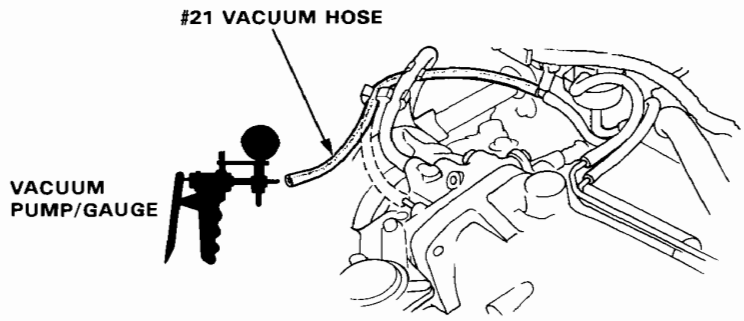
NO

- **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.

Connect vacuum pump to #21 hose and apply vacuum.



Does it hold vacuum?

NO

Connect a vacuum pump to the MAP sensor and apply vacuum.

Does it hold vacuum?

NO

Replace MAP sensor.

YES

Replace #21 hose.

YES

Disconnect # 21 hose from the throttle body and connect a T-fitting from a vacuum gauge between the throttle body and MAP sensor.

(To page 6-27)

(From page 6-26)

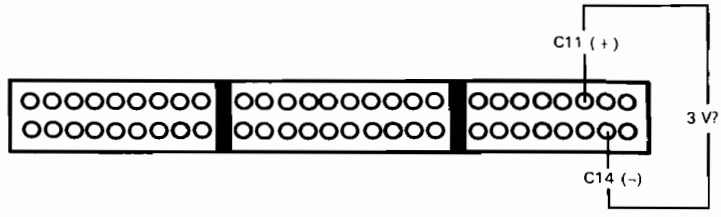
Start engine.

Is there manifold vacuum? NO → **–Remove restriction from throttle body. –Replace throttle body.**

YES

Stop engine.

Connect the PGM-FI test harness between the ECU and connector (page 6-13).



Turn the ignition switch ON.

Measure voltage between C11 (+) terminal and C14 (–) terminal.

Is there approx. 3 V ? NO → **Replace the MAP sensor.**

YES

Start the engine and allow it to idle.

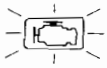
Is there approx. 1 V? NO → **Replace MAP sensor.**

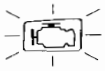
YES

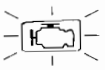
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

Troubleshooting Flowchart — TDC/CRANK/CYL Sensors


④ Self-diagnosis LED indicator blinks four times: A problem in the circuit of the CRANK Sensor.


⑧ Self-diagnosis LED indicator blinks eight times: A problem in the circuit of the TDC Sensor.


⑨ Self-diagnosis LED indicator blinks nine times: 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 HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start engine.

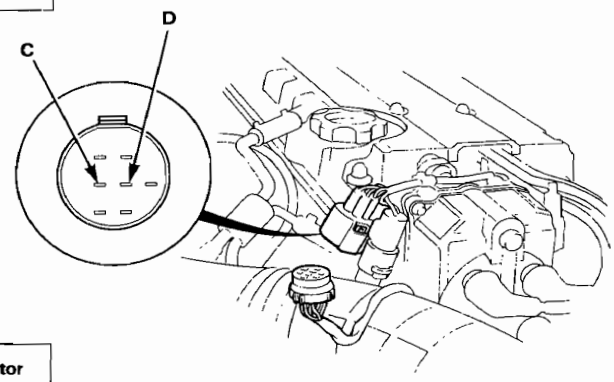
Is Check Engine warning light on and does LED indicate CODE 4?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at the distributor connector and C210 (round connector located at the right shock tower).

YES

Stop engine.

Disconnect the 8P connector from the TDC/CRANK/CYL sensor.



Measure resistance between C terminal and D terminal.

Is there 350—700 Ω ?

NO → **Replace the distributor assembly (section 16).**

YES

(To page 6-29)

(From page 6-28)

Check for continuity to body ground on C terminal and D terminal individually.

Does continuity exist ?

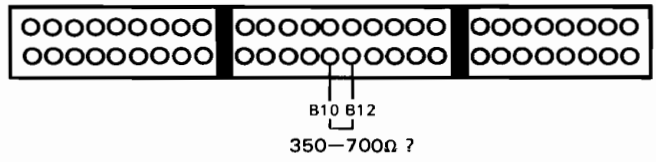
YES → **Replace the distributor assembly (section 16).**

NO

Reconnect the connector.

Connect the PGM-FI test harness only to the main wire harness, not to the ECU (page 6-13).

Measure resistance between B10 terminal and B12 terminal.



Is there 350—700 Ω ?

NO → **Repair open in ORN and/or WHT wires.**

YES

Check for continuity to body ground on B10 terminal.

Does continuity exist?

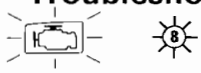
YES → **Repair short in ORN wire between ECU (B10) and distributor connector.**

NO

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

(cont'd)

Troubleshooting Flowchart — TDC/CRANK/CYL Sensors (cont'd)



- **Check Engine warning light has been reported on.**
- **LED indicates CODE 8.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start engine.

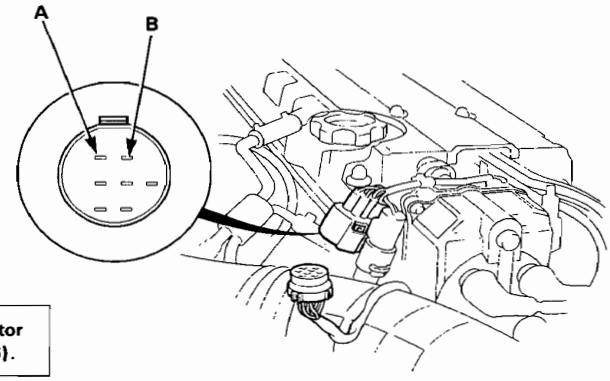
Is Check Engine warning light on and does LED indicate CODE 8?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connections or loose wires at distributor connector and C210 (round connector located at the right shock tower).**

YES

Stop engine.

Disconnect the 8P connector from the TDC/CRANK/CYL sensor.



Measure resistance between A terminal and B terminal.

Is there 350—700 Ω ?

NO → **Replace the distributor assembly (section 16).**

YES

Check for continuity to body ground on A terminal and B terminal individually.

Does continuity exist ?

YES → **Replace the distributor assembly (section 16).**

NO

Reconnect the connector.

(To page 6-31)

(From page 6-30)

Connect the PGM-FI test harness only to the main wire harness, not to the ECU (page 6-13).

Measure resistance between C3 terminal and C4 terminal.

Is there 350—700 Ω ?

NO → **Repair open in ORN/BLU and/or WHT/BLU wires.**

YES

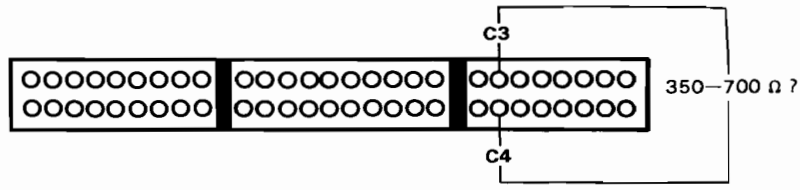
Check for continuity to body ground on C3 terminal.

Does continuity exist?

YES → **Repair short in ORN/BLU wire between ECU (C3) and distributor connector.**

NO

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



(cont'd)

Troubleshooting Flowchart — TDC/CRANK/CYL Sensors (cont'd)

- Check Engine warning light has been reported on.
- LED indicates CODE 9.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start engine.

Is Check Engine warning light on and does LED indicate CODE 9?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary). Check for poor connection or loose wires at the distributor connector and C210 (round connector located at the right shock tower).**

YES

Stop engine.

Disconnect the 8P connector from the TDC/CRANK/CYL sensor.

Measure resistance between F terminal and G terminal.

Is there 350—700 Ω ?

NO → **Replace the distributor assembly (section 16).**

YES

Check for continuity to body ground on F terminal and G terminal individually.

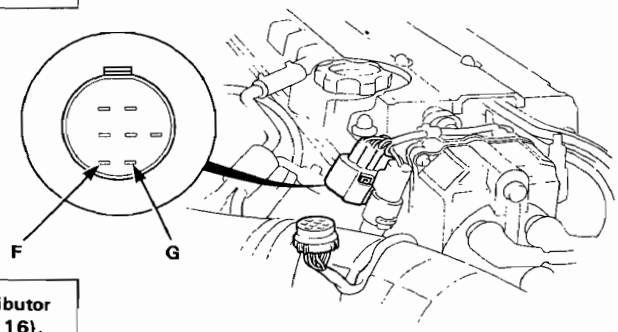
Does continuity exist ?

YES → **Replace the distributor assembly (section 16).**

NO

Reconnect the connector.

(To page 6-33)



(From page 6-32)

Connect the PGM-FI test harness only to the main wire harness, not to the ECU (page 6-13).

Measure resistance between C1 terminal and C2 terminal.

Is there 350—700 Ω ?

NO → **Repair open in BLU/GRN and/or BLU/YEL wires.**

YES

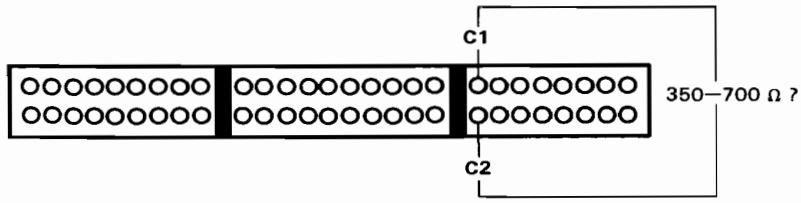
Check for continuity to body ground on C1 terminal.

Does continuity exist?

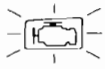
YES → **Repair short in BLU/GRN wire between ECU (C1) and distributor connector.**

NO

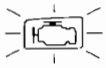
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.



Troubleshooting Flowchart —— TW Sensor



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



– Check Engine warning light is on.
– LED indicates CODE 6.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Turn the ignition switch ON.

Is Check Engine warning light on and does LED indicate CODE 6?

NO → **Intermittent failure, system is OK at this time (test drive may be necessary).**
Check for poor connections or loose wires at TW sensor, C210 and C212 (round connector and square connector located at the right shock tower).

YES

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

Turn the ignition switch OFF.

Disconnect the 2P connector from the TW sensor.

Measure resistance between the 2 terminals on the TW sensor.

Is there 200—400 Ω ?

NO → **Replace TW sensor.**

YES

Turn the ignition switch ON.

(To page 6-35)

(From page 6-34)

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

Is there approx. 5V ?

NO

Repair open or short in RED/WHT wire between ECU (C6) and TW sensor.
If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace original ECU.

YES

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

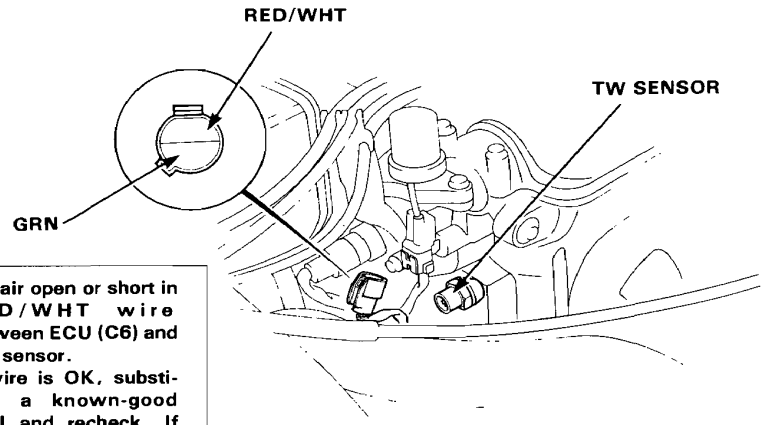
Is there approx. 5V ?

NO

Repair open in GRN, GRN/WHT wire between ECU (C12) and TW sensor.

YES

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



Troubleshooting Flowchart — Throttle Angle Sensor

Self-diagnosis LED indicator blinks seven times: Most likely a problem in the Throttle Angle Sensor circuit.

- **Engine is running.**
- **Check Engine warning light is on.**
- **LED indicates CODE 7.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box 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, C210 (round connector located at the right shock tower) and C313 (round connector located at the left shock tower).

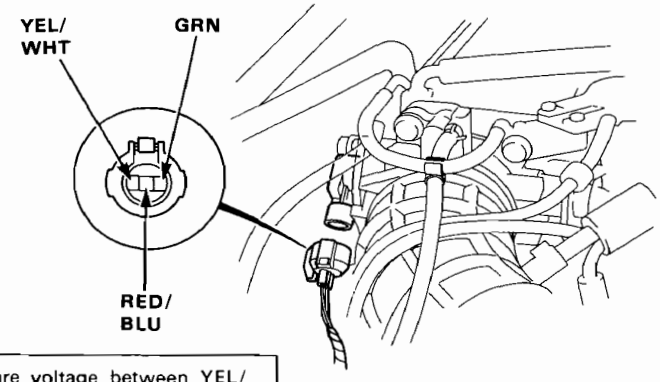
YES

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 (−) terminal.



Is there approx. 5V ?

NO → Measure voltage between YEL/WHT (+) terminal and body ground.

YES

(To page 6-37)

(To page 6-37)

(From page 6-36)

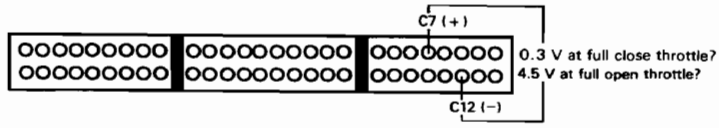
Turn the ignition switch OFF.

Reconnect the 3P connector.

Connect the PGM-FI test harness between the ECU and connector (page 6-13).

Turn the ignition switch ON.

Measure voltage between C7(+) terminal and C12(–) terminal.



Is voltage approx. 0.3 V at full close throttle, and approx. 4.5 V at full open throttle ?
NOTE: There should be a smooth transmission from 0.3 V to 4.5 V as the throttle is depressed.

NO

- **Replace throttle angle sensor.**
- **Repair open or short in RED/BLU wire between ECU (C7) and throttle angle sensor.**

YES

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

(From page 6-36)

Is there approx. 5V ?

YES

Repair open in GRN, GRN/WHT wire between ECU (C12) and throttle angle sensor.

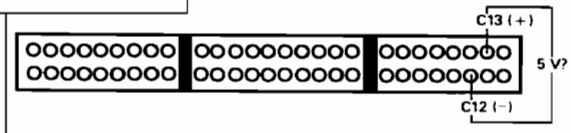
NO

Turn the ignition switch OFF.

Connect the PGM-FI test harness between the ECU and connector (page 6-13).

Turn the ignition switch ON.

Measure voltage between C13 (+) terminal and C12 (–) terminal.



Is there approx. 5V ?

YES

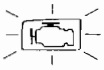
Repair open in YEL/WHT wire between ECU(C13) and throttle angle sensor.

NO

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

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 is on.
– LED indicates CODE 10.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse 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, C210 and C212 (round connector and square connector located at right shock tower).**

YES

Turn the ignition switch OFF.

Disconnect the 2P connector from the TA sensor.

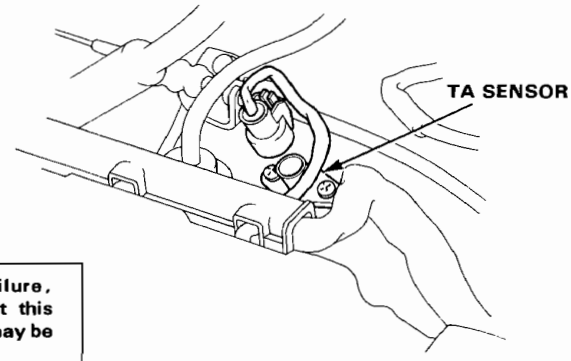
Measure resistance between the 2 terminals on the TA sensor.

Is there 1–4 kΩ ?

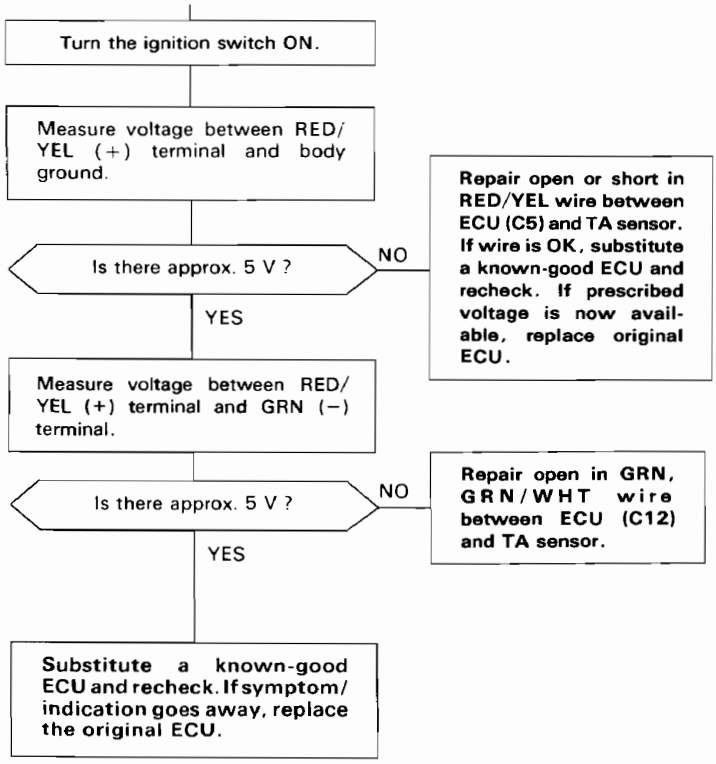
NO → **Replace TA sensor.**

YES

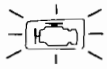
(To page 6-39)



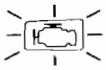
(From page 6-38)



Troubleshooting Flowchart — PA Sensor



(13) Self-diagnosis LED indicates code 13: A problem in the Atmospheric Pressure (PA) Sensor.



(13)

–Check Engine warning light has been reported on.
–LED indicates CODE 13.

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse 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/indication 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 is on.**
- **LED indicates CODE 15.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Start engine.

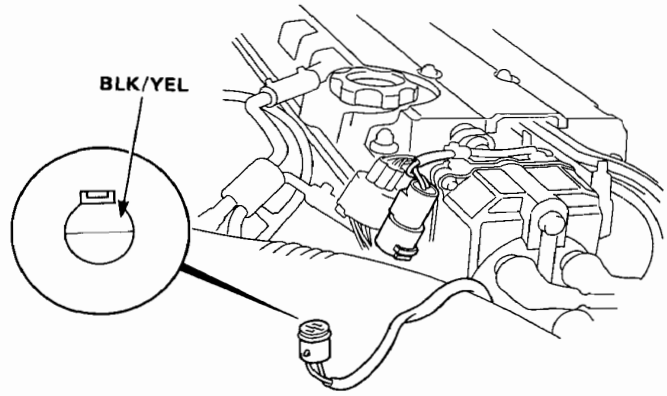
Is Check Engine warning light on and does LED indicate CODE 15?

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 and C212 (square connector located at the right shock tower).**

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 6-43)

(From page 6-42)

Connect the PGM-FI test harness between the ECU and connector (page 6-13).

Turn the ignition switch ON.

Measure voltage individually between B15 (+), B17 (+) terminals and A18 (-) terminal.

Is there approx. 10 V?

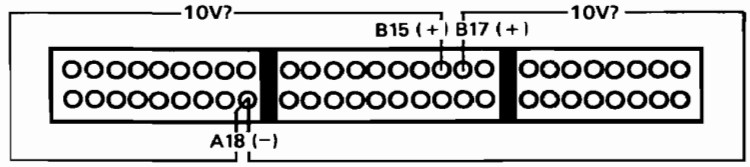
NO

- **Replace the igniter unit.**
- **Repair open or short WHT wires between distributor and ECU (B15 or B17).**

NOTE: If the WHT wire was shorted, the ignitor may be damaged.

YES

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



Troubleshooting Flowchart — Vehicle Speed Sensor

Self-diagnosis LED indicates code 17: A problem in the Vehicle Speed Sensor circuit.

- **Check Engine warning light is on.**
- **LED indicates CODE 17.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Road test necessary.
In 2nd gear accelerate to 3,500 min^{-1} (rpm) and 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 at C405 and C710.**

YES

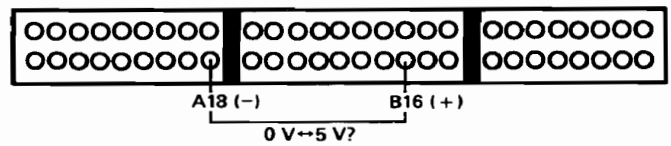
Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.

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

Connect the PGM-FI test harness between the ECU and connector (page 6-13).

Turn the ignition switch ON.

Slowly rotate left front wheel and measure voltage between B16 (+) terminal and A18 (–) terminal.



Does voltage pulse 0V and 5V ?

NO →
- **Repair open or short in YEL/RED wire between ECU (B16) 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.

Idle Control System

System Troubleshooting Guide

NOTE:

- Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows the system is OK, try the next system ②, etc.
- If the idle speed is out of specification and LED does not blink CODE 14, go to inspection described on page 6-46.

PAGE / SUB SYSTEM / SYMPTOM		IDLE ADJUSTING SCREW	EACV	AIR CONDITIONING SIGNAL	ALTERNATOR FR SIGNAL	BRAKE SWITCH SIGNAL	STARTER SWITCH SIGNAL	REAR DEFOGGER SWITCH SIGNAL	FAST IDLE VALVE	HOSES AND CONNECTIONS
		59	47	50	52	54	56	57	58	*
DIFFICULT TO START ENGINE WHEN COLD		③	②						①	
WHEN COLD FAST IDLE OUT OF SPEC (1,000—2,000 min^{-1} (rpm))		③	②						①	
ROUGH IDLE			②							①
WHEN WARM ENGINE SPEED TOO HIGH		③	①						②	
WHEN WARM ENGINE SPEED TOO LOW	Idle speed is below specified engine speed (no load)	②	①		③					
	Idle speed does not increase after initial start up.		①				②			
	Idle speeds drops when air conditioner in ON		②	①						
	Idle speed fluctuates with electrical local	③	②		①					
FREQUENT STALLING	WHILE WARMING UP		①							
	AFTER WARMING UP	②	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 6-59)
   - Air conditioning signal (page 6-50)
   - Alternator FR signal (page 6-52)
   - Brake switch signal (page 6-54)
   - Starter switch signal (page 6-56)
   - Rear defogger switch signal (page 6-57)
   - Fast idle valve (page 6-58)
   - Hoses and connections
   - EACV and its mounting O-rings

2. If the above items are normal, substitute a known-good EACV and readjust the idle speed (page 6-59).

   ● If the idle speed still cannot be adjusted to specification (and LED does 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 is on.**
- **LED indicates CODE 14.**

Turn the ignition switch OFF.

Remove HAZARD fuse in the main fuse 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 and at C313 (round connector located at left shock tower).**

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.**

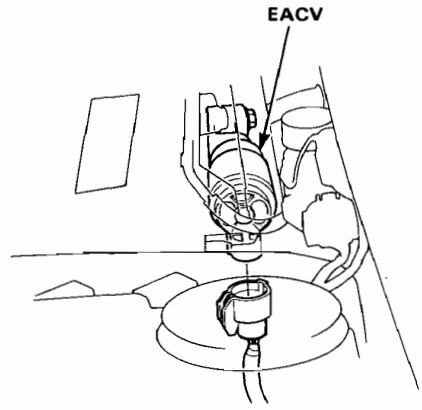
YES

Check for continuity to body ground on each terminal on the EACV.

Does continuity exist ?

YES → **Replace EACV.**

(To page 6-48)



(cont'd)

Troubleshooting Flowchart — EACV (cont'd)

(From page 6-47)

NO

Turn the ignition switch ON.

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

Is there battery voltage ?

YES

Disconnect the "A" connector from the ECU.

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

Is there battery voltage ?

YES

Repair short in BLU/YEL wire between ECU (A11) and EACV.

NO

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

NO

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

Is there battery voltage ?

NO

Repair open in BLK/YEL, YEL/BLK wire between the EACV and main relay.

YES

Turn the ignition switch OFF.

Reconnect the 2P connector to EACV.

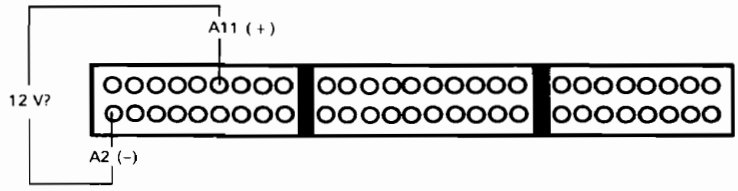
Connect the PGM-FI test harness "A" connector to the main wire harness only, not the ECU (page 6-13).

Turn the ignition switch ON.

(To page 6-49)

(From page 6-48)

Measure voltage between A11 (+) terminal and A2 (–) terminal.

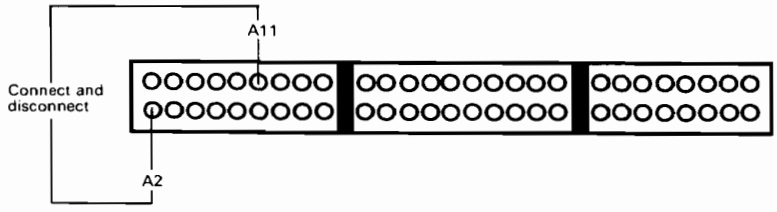


Is there battery voltage ?

NO → **Repair open in BLU/YEL wire between ECU (A11) and EACV.**

YES

Connect and disconnect A11 terminal to A2 terminal.



Does EACV click when the connector is connected and disconnected ?

NO → **Replace EACV.**

YES

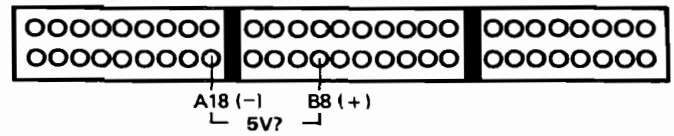
Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

Troubleshooting Flowchart — Air Conditioning Signal

Inspection of Air Conditioning Signal.

Connect the PGM-FI test harness between the ECU and connector (page 6-13). Disconnect "B" connector from the main wire harness only, not the ECU.

Turn the ignition switch ON.



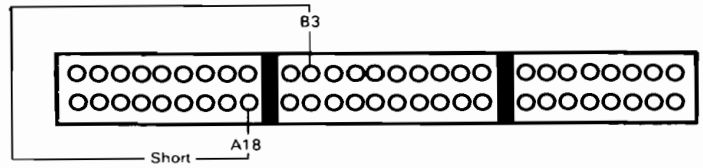
Measure voltage between B8 (+) terminal and A18 (–) terminal.

Is there approx. 5 V ?

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

YES

Reconnect "B" connector to the main wire harness.

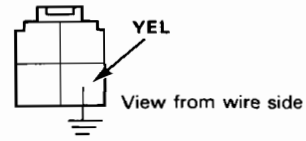


Momentarily connect B3 terminal to A18 terminal several times.

Is there a clicking noise from the A/C compressor clutch?

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

YES



Start engine.

Blower switch ON.

(To page 6-51)

Is there a clicking noise from the A/C compressor clutch?

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

YES

Repair open in YEL wire between ECU (B3) and A/C clutch relay.

(From page 6-50)

A/C switch ON.

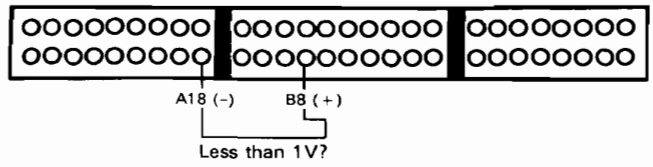
Does A/C operate ?

NO

YES

Air conditioning signal is OK.

Measure voltage between B8 (+) terminal and A18 (–) terminal.



Is voltage less than 1V?

NO

YES

Repair open in BLU/RED wire between ECU (B8) and A/C switch.

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

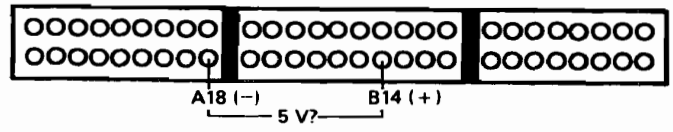
Troubleshooting Flowchart — Alternator FR Signal

Inspection of Alternator FR signal.

Connect the PGM-FI test harness between the ECU and connector (page 6-13). Disconnect "B" connector from the main wire harness only, not the ECU.

Turn the ignition switch ON.

Measure voltage between B14 (+) terminal and A18 (–) terminal.



Is there approx. 5V ?

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

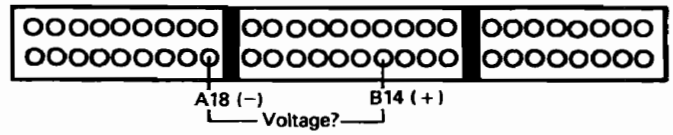
YES

Turn the ignition switch OFF.

Reconnect "B" connector to the main wire harness.

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

Measure voltage between B14 (+) terminal and A18 (–) terminal.



Does the voltage decrease when headlights and rear defogger are turned on ?

NO → Stop engine.

YES

Alternator FR signal is OK.

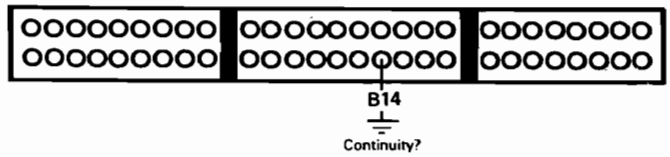
(To page 6-53)

(From page 6-52)

Disconnect "B" connector from ECU only, not the main wire harness.

Disconnect the negative battery cable from the battery.

Check for continuity between B14 terminal and body ground.



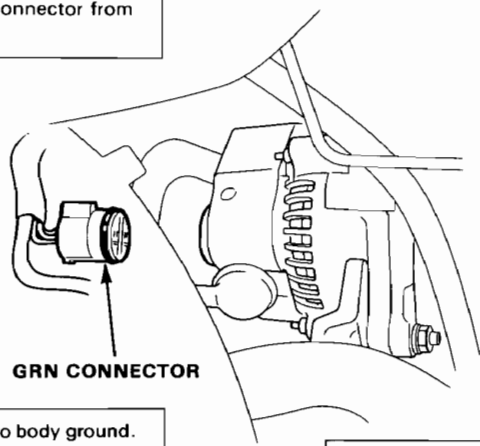
Does continuity exist ?

YES

Disconnect GRN connector from the alternator.

NO

Disconnect GRN connector from the alternator.



Connect BLU wire to body ground.

Check for continuity between B14 terminal and body ground.

Does continuity exist ?

YES

NO

Repair open in BLU wire between ECU (B14) and alternator.

See Alternator Inspection (section 16).

Check for continuity between B14 terminal and body ground.

Does continuity exist ?

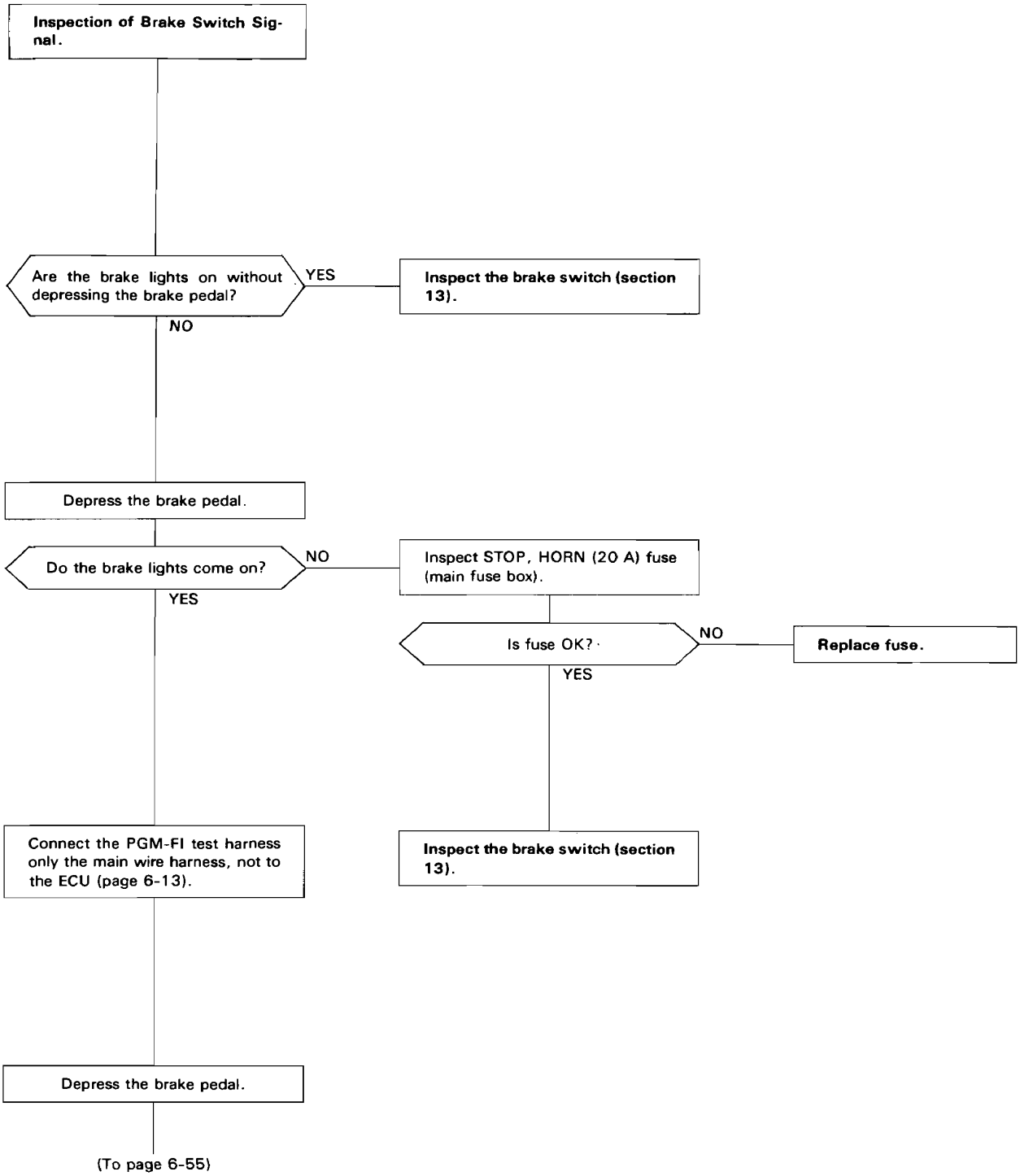
NO

YES

See Alternator Inspection (section 16).

Repair short in BLU wire between ECU (B14) and alternator.

Troubleshooting Flowchart — Brake Switch Signal



(From page 6-54)

Measure voltage between C10 (+) terminal and A18 (−) terminal.

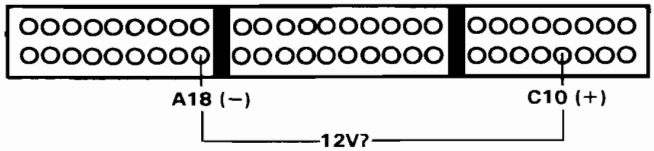
Is there battery voltage?

NO

Repair open in GRN/WHT wire between the brake switch and ECU (C10).

YES

Brake switch signal is OK.



Troubleshooting Flowchart — Starter Switch Signal

Inspection of Starter Switch Signal.

Connect the PGM-FI test harness between the ECU and connector (page 6-13).

Measure voltage between B13 (+) terminal and A18 (–) terminal with ignition switch in the start position.

Is there battery voltage ?

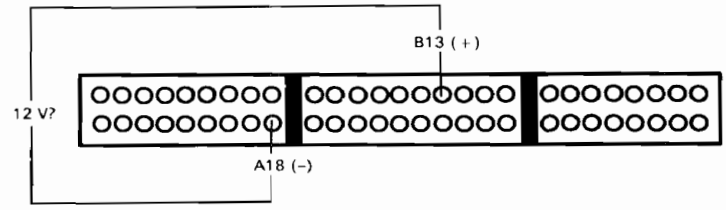
NO → Inspect No.2 fuse.

Is No.2 fuse OK ?

NO → **Replace fuse.**

YES → **Repair open in BLU/WHT wire between ECU (B13) and No.2 fuse.**

YES → **Starter switch signal is OK.**



Troubleshooting Flowchart — Rear Defogger Switch Signal

Inspection of Rear Defogger Switch Signal.

Start the engine.

Rear defogger switch ON.

Does rear defogger operate ?

NO → **Inspect the rear defogger (section 16).**

YES

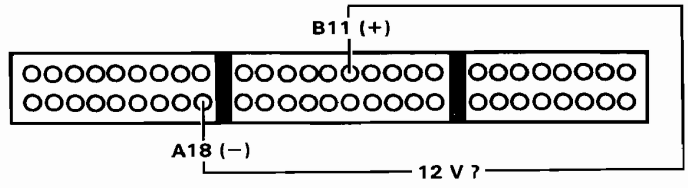
Turn the ignition switch OFF.

Connect the PGM-FI test harness only the main wire harness, not to the ECU (page 6-13).

Start the engine.

Rear defogger switch ON.

Measur voltage between B11 (+) terminal and A18 (−) terminal.



Is there battery voltage ?

NO → **Repair open BLK/GRN wire between the rear defogger switch and ECU (B11).**

YES

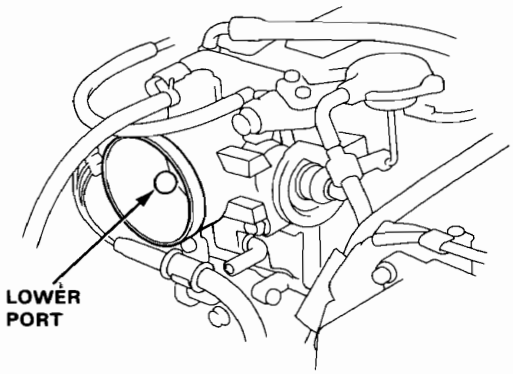
Rear defogger switch signal is OK.

Idle Control System

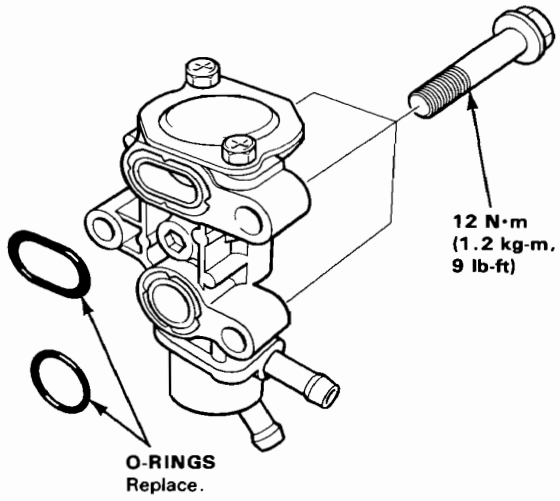
Fast Idle Valve

Inspection
NOTE: The fast idle valve is factory adjusted; it should not be disassembled.

1. Remove the intake air duct from the throttle body.
2. Start the engine and allow it to idle.
3. Put your finger over the lower port in throttle body and make sure that there is air flow with the engine cold (coolant temperature below 30°C, 86°F).



- If there is air flow, go to step 4.
- If not, replace the fast idle valve and retest.

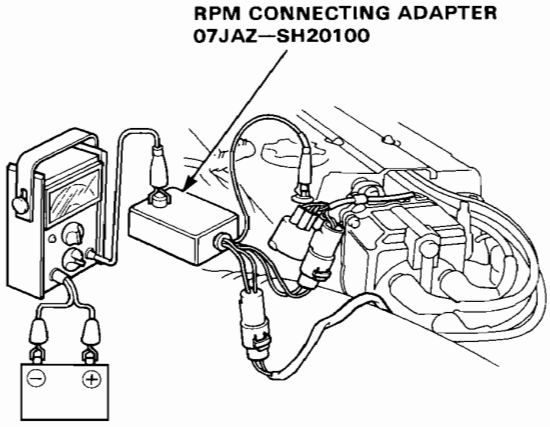


4. Warm up the engine (cooling fan comes on).
5. Check that there is nor air flow at the lower port and nothe any change in idle speed.
   - If the idle speed is lower with the port covered, replace the fast idle valve and retest.
   - If the idle speed remains the same, the fast idle valve is OK.

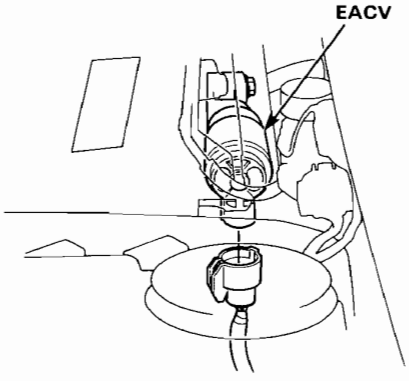
Idle Speed Setting

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.

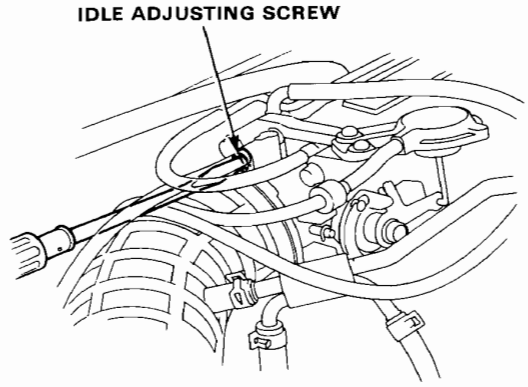


4. Check idling in no-load conditions in which the headlights, blower fan, rear defogger, cooling fan, and air conditioner are not operating.

   Idle speed should be: 650±50 min^{-1} (rpm)

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

   NOTE: If the idle speed is excessively high, check the throttle control system (page 6-78).



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

   Idle speed should be: 750±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: 780±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: 810±50 min^{-1} (rpm)

   NOTE: If the idle speed is not within specifications, see System Troubleshooting Guide on page 6-45.

Fuel Supply System

System Troubleshooting Guide

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

SYMPTOM \ SUB SYSTEM		FUEL INJECTOR	INJECTOR RESISTOR	PRESSURE REGULATOR (PRESSURE REGULATOR CUT-OFF SOLENOID VALVE)	FUEL FILTER	FUEL PUMP	MAIN RELAY	CONTAMINATED FUEL
PAGE		62	67	68	71	72	—	*
ENGINE WON'T START			③		③	①	②	
DIFFICULT TO START ENGINE WHEN COLD OR HOT		③		③ (WHEN HOT)	②	①		
ROUGH IDLE		①		②				③
FREQUENT STALLING	WHILE WARMING UP	①			②			
	AFTER WARMING UP	①			③	②		
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	①		②				③
	FAILS EMISSION TEST	①		②				
	LOSS OF POWER				①	③		②

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

Fuel Pressure

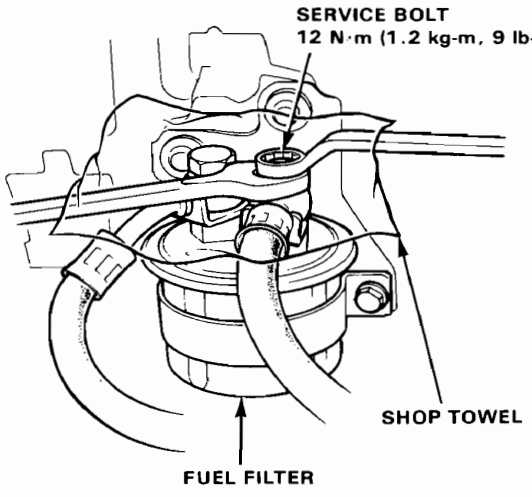
Relieving

⚠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 top of the fuel filter.

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 top of the fuel filter, while holding the special banjo bolt with another wrench.
4. Place a rag or shop towel over the 6 mm service bolt.
5. Slowly loosen the 6 mm service bolt one complete turn.

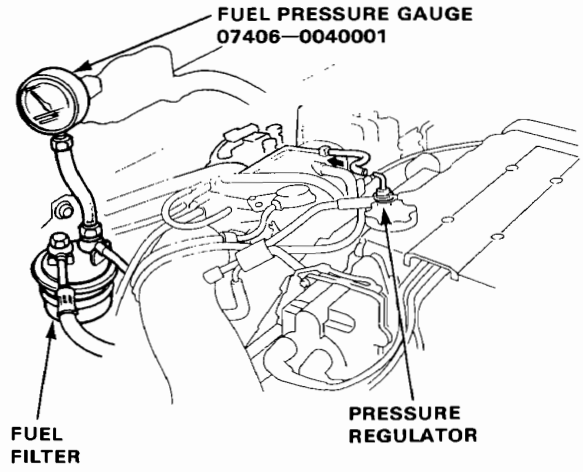


NOTE:
- A fuel pressure gauge can be attached at the 6 mm service bolt hole.
- Always replace the washer between the service bolt and the special banjo bolt, whenever the service bolt is loosened to relieve fuel pressure.
- Replace all washers whenever the bolts are removed to disassemble parts.

Inspection

1. Relieve fuel pressure.
2. Remove the service bolt on the top of the fuel filter while holding the banjo bolt with another wrench and attach the fuel pressure gauge.
3. Start the engine. Measure the fuel pressure with the engine idling and vacuum hose of the pressure regulator disconnected.

Pressure should be:
240—279 kPa (2.45—2.85 kg/cm^2, 35-41 psi)



- If the fuel pressure is not as specified, first check the fuel pump (page 6-72), 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 6-68).
— If the pressure is lower than specified, inspect for:
  · Clogged fuel filter.
  · Pressure regulator failure (page 6-68).
  · Leakage in the fuel line.

Fuel Injectors

Fuel injectors Troubleshooting Flowchart

Inspection of Fuel Injector.

Turn the ignition switch OFF.

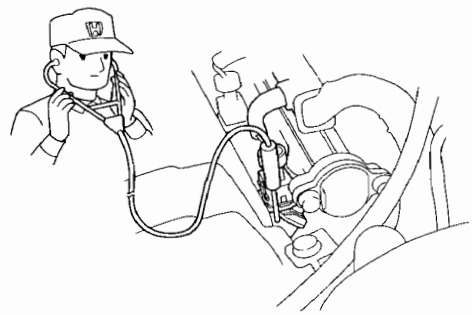
Remove HAZARD fuse in the main fuse box for 10 seconds to reset ECU.

Turn the ignition switch to START position.

Does the engine start ?

NO

YES



Check the clicking sound of each injector by means of a stethoscope when the engine is idling.

Do the injectors click ?

YES

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

NO

(To page 6-63)

(To page 6-63)

(From page 6-62)

Turn the ignition switch OFF.

Disconnect the 2P connector from the injector that does not click.

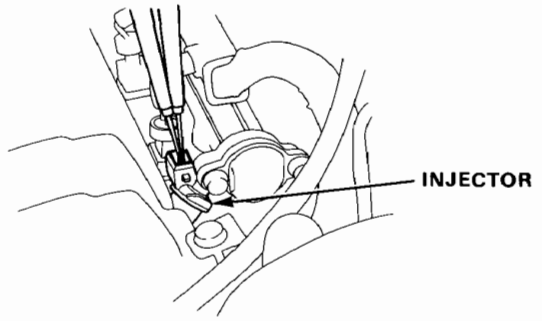
Measure resistance between the 2 terminals of the injector.

(From page 6-62)

Turn the ignition switch OFF.

Disconnect the 2P connector from each injector.

Measure resistance between the 2 terminals of the injector.

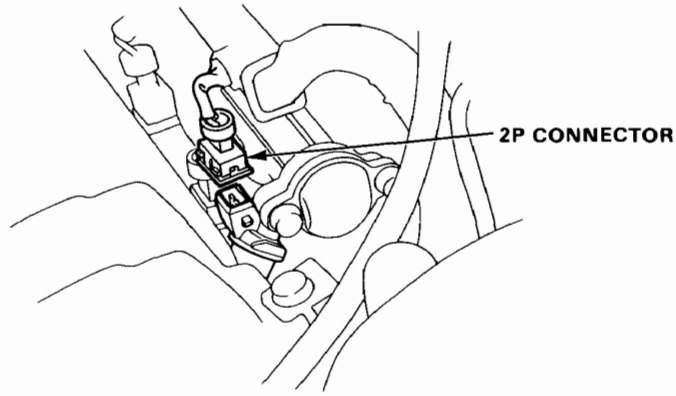


Is there 1.5—2.5Ω ? NO → **Replace the injector.**

YES

Turn the ignition switch ON.

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



(To page 6-64)

(cont'd)

Fuel Injectors (cont'd)

(From page 6-63)

Is there battery voltage ?

NO

Turn the ignition switch OFF.

Disconnect 6P connector on the injector resistor.

Turn the ignition switch ON.

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

Is there battery voltage ?

NO

Repair open in the YEL/BLK wire between the injector resistor and the main relay.

YES

—Replace the injector resistor.
—Repair open RED/BLK wire between 2P connector and resistor.

YES

Reconnect the 2P connector to the injector.

Turn the ignition switch OFF.

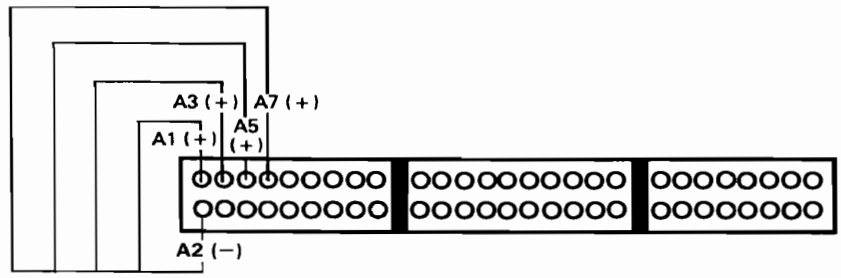
Connect the PGM-FI test harness between the ECU and connector (page 6-13).

Turn the ignition switch ON.

(To page 6-65)

(From page 6-64)

Measure voltage between A2 (–) terminal and following terminals,
- No.1 injector: A1 (+) terminal.
- No.2 injector: A3 (+) terminal.
- No.3 injector: A5 (+) terminal.
- No.4 injector: A7 (+) terminal.



Is there battery voltage ?

NO → **Repair open in the wire between the ECU (A1, A3, A5 or A7) and the injector.**

YES

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

(cont'd)

Fuel Injectors (cont'd)

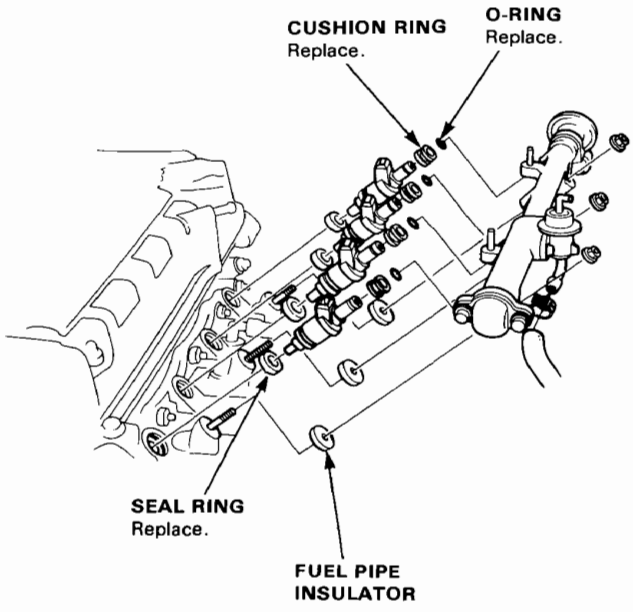
Replacement

⚠WARNING Do not smoke during the work. Keep open flames away from your work area.

1. Relieve fuel pressure (page 6-61).
2. Disconnect the connectors from the injectors.
3. Disconnect the vacuum hose and fuel return hose from the pressure regulator.

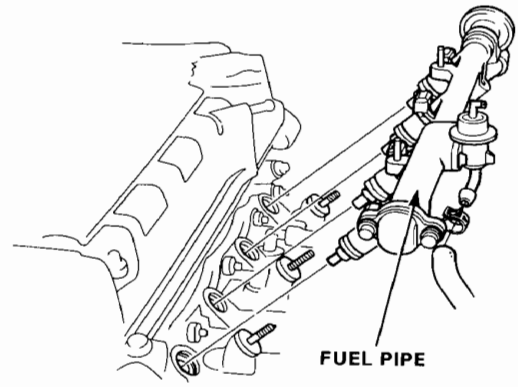
   NOTE: Place a rag or shop towel over the hoses before disconnecting them.

4. Loosen the retainer nuts on the fuel pipe and harness holder.
5. Disconnect the fuel pipe.
6. Remove the injectors from the intake manifold.

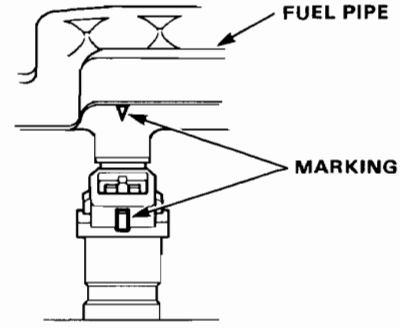


7. Slide new cushion rings onto the injectors.
8. Coat new O-rings with clean engine oil and put them on the injectors.
9. Insert the injectors into the fuel pipe first.
10. Coat new seal rings with clean engine oil and press them into the intake manifold.
11. Install the injectors and fuel pipe assembly in the manifold.

    CAUTION: To prevent damage to the O-ring, install the injectors in the fuel pipe first, then install them in the intake manifold.



12. Align the center line on the connector with the mark on the fuel pipe.



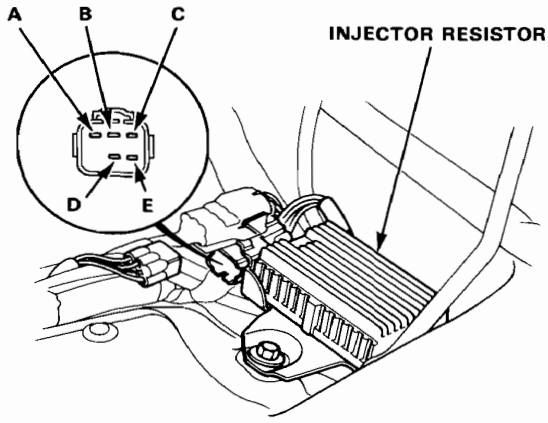
13. Install and tighten the retainer nuts.
14. Connect the vacuum hose and fuel return hose to the pressure regulator.
15. Install the connectors on the injectors.
16. Turn the ignition switch ON but do not operate the starter. After the fuel pump runs for approximately two seconds, the fuel pressure in the fuel line rises. Repeat this two or three times, then check whether there is any fuel leakage.

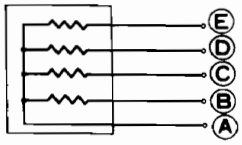
Injector Resistor

Testing

1. Disconnect the resistor connector.
2. Check for resistance between each of the resistor terminals (E, D, C and B) and the power terminal (A).

   Resistance should be: 5—7 Ω





- Replace the resistor with a new one if any of the resistances are outside of the specification.

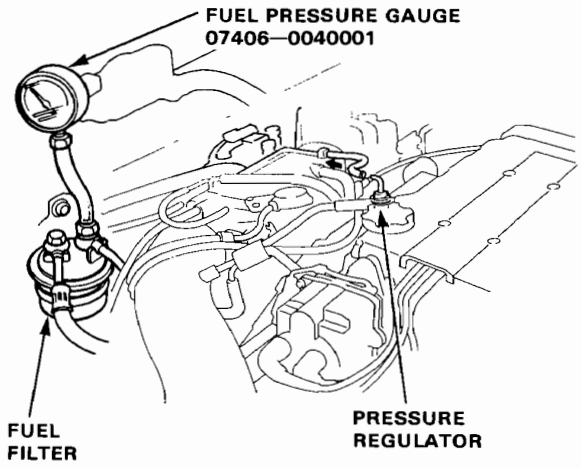
Pressure Regulator

Testing

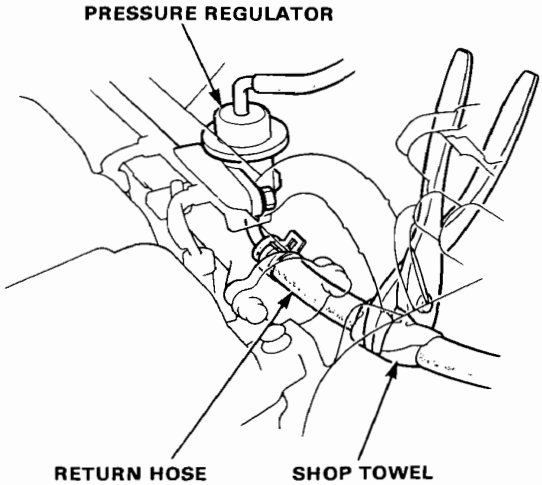
⚠WARNING Do not smoke during the test. Keep open flames away from your work area.

1. Attach a pressure gauge to the service port of the fuel filter (page 6-61).

   Pressure should be:
   240–279 kpa (2.45–2.85 kg/cm², 35–41 psi)
   (with the regulator vacuum hose disconnected)



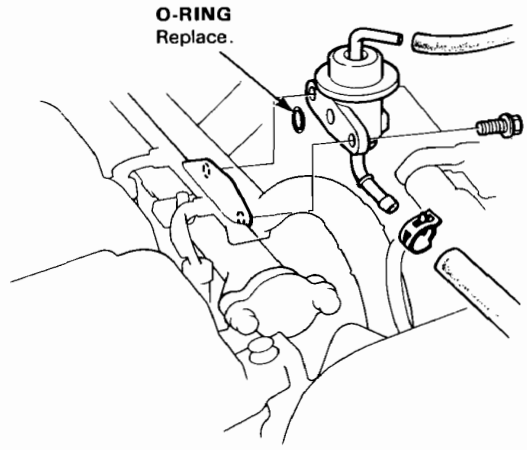
2. Reconnect the vacuum hose to the pressure regulator.
3. Check that the fuel pressure rises when the vacuum hose from the regulator is disconnected again.
   - If the fuel pressure did not rise, replace the regulator and retest.



Replacement

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

1. Place a shop towel under pressure regulator, then relieve fuel pressure (page 6-61).
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.

Pressure Regulator Cut-off Solenoid valve Troubleshooting Flowchart

Inspection of Pressure Regulator Cut-off Solenoid Valve.

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

Disconnect the #1 vacuum hose from the pressure regulator and connect a vacuum gauge to the hose.

Is there manifold vacuum ?

NO → Disconnect the 4P connector from the solenoid valve

Is there vacuum ?

NO → **Check the #1 and #12 vacuum hose. If hoses are OK, replace the solenoid valve.**

YES → **Repair short to ground in GRN wire between ECU (A10) and 4P connector. If wire is OK, substitute a known-good ECU and recheck. If symptom goes away, replace the original ECU.**

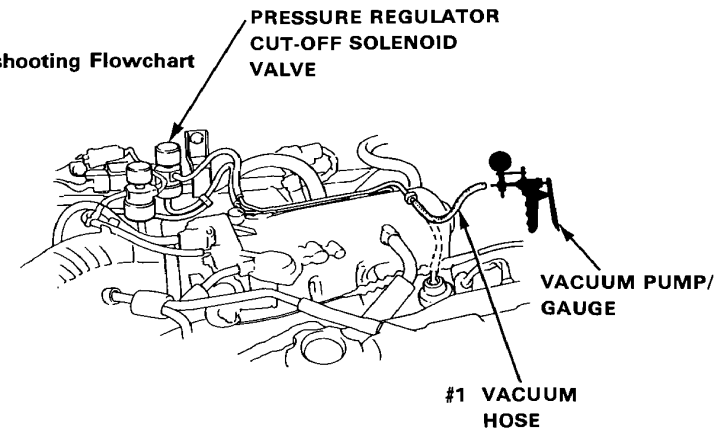
YES

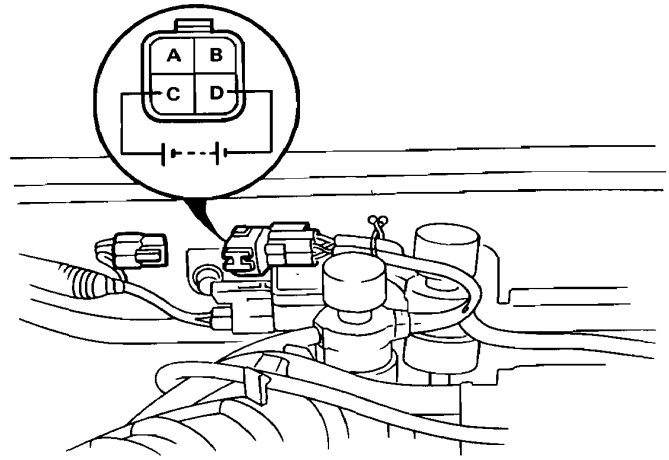
Turn the ignition switch OFF.

Disconnect the 4P connector from the solenoid valve.

Connect battery positive to terminal C and battery negative to terminal D of the solenoid valve.

Start the engine and allow it to idle.





(To page 6-70)

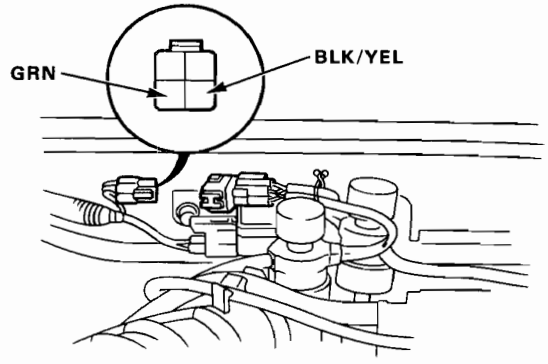
(cont'd)

Pressure Regulator (cont'd)

(From page 6-69)

Is there manifold vacuum ?
- YES → Replace the solenoid valve.
- NO ↓

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



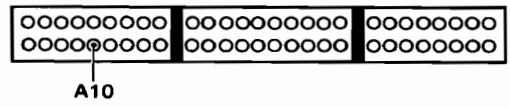
Is there battery voltage ?
- NO → Repair in BLK/YEL wire between No. 14 fuse and 4P connector.
- YES ↓

Turn the ignition switch OFF.

Reconnect the 4P connector to the solenoid valve.

Connect the PGM-FI test harness between the ECU and connector (page 6-13).

Start the engine and allow it to idle.



Connect A10 terminal to body ground with a jumper wire.

Is there manifold vacuum ?
- YES → Repair open in GRN wire between ECU (A10) and the 4P connector.
- NO ↓

Pressure Regulator Cut-Off Solenoid Valve is OK.

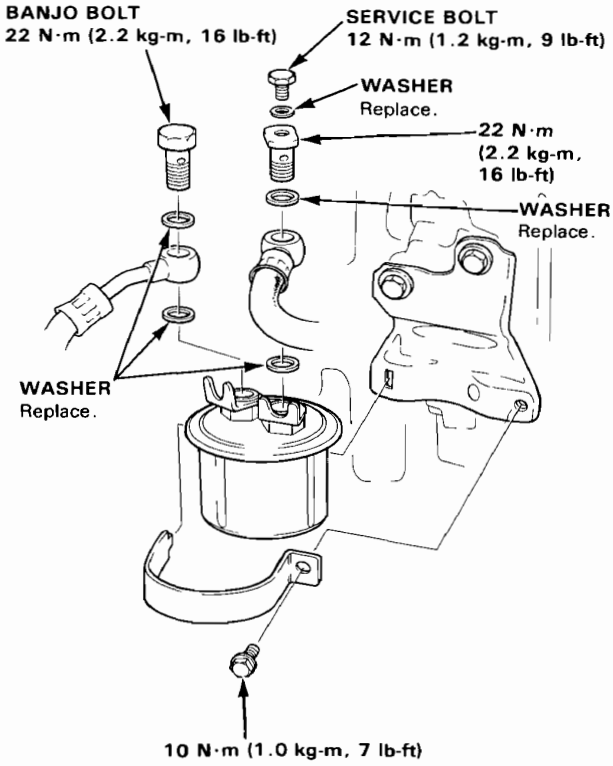
Fuel Filter

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, 2.25—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 6-61).
3. Remove the 12 mm banjo bolts and the fuel feed pipe from the filter.
4. Remove the fuel filter clamp and fuel filter.
5. When assembling, use new washers, as shown.



Fuel Pump

Testing

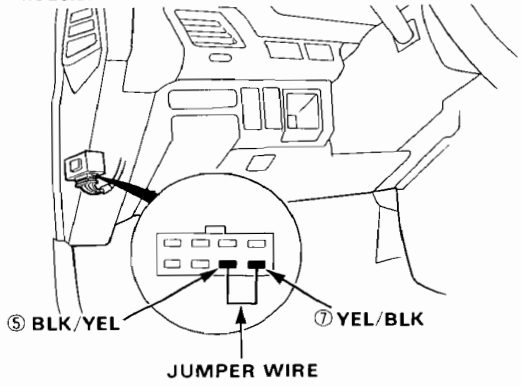
⚠WARNING Do not smoke during the test. Keep open flame away from your work area.

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:

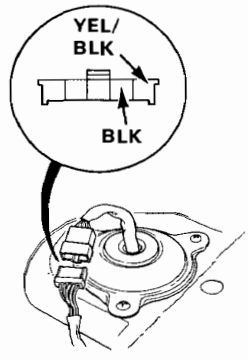
1. Remove the rear seat.
2. Disconnect the 5P connector.

   CAUTION: Be sure to turn the ignition switch OFF before disconnecting the wires.

3. Connect the BLK/YEL ⑤ wire and YEL/BLK ⑦ wire with a jumper wire.
   NOTE: Information on this page is for LH and RH models.



4. Check that battery voltage is available at the fuel pump connector when the ignition switch is turned ON (positive probe to the YEL/BLK wire, negative probe to the BLK wire).

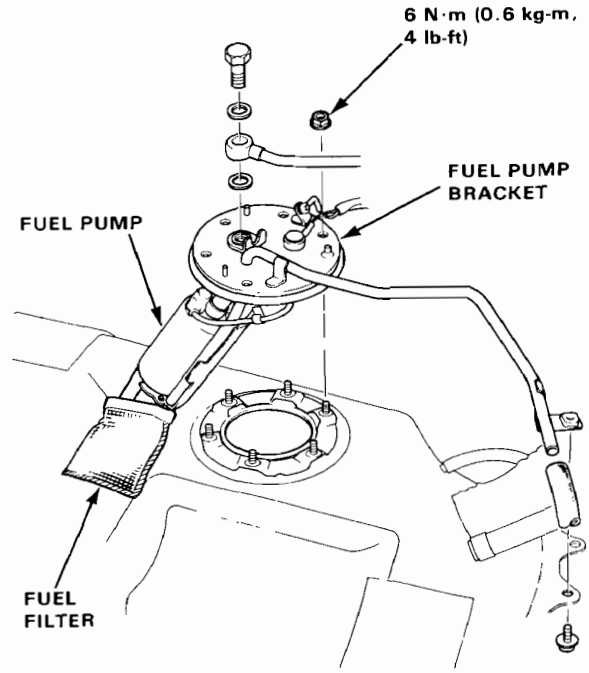


- If battery voltage is available, replace the fuel pump.
- If there is no voltage, check the main relay and wire harness.

Replacement

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

1. Remove the fuel tank (page 6-73).
2. Remove the fuel pump mounting nuts.
3. Remove the fuel pump from the fuel tank.

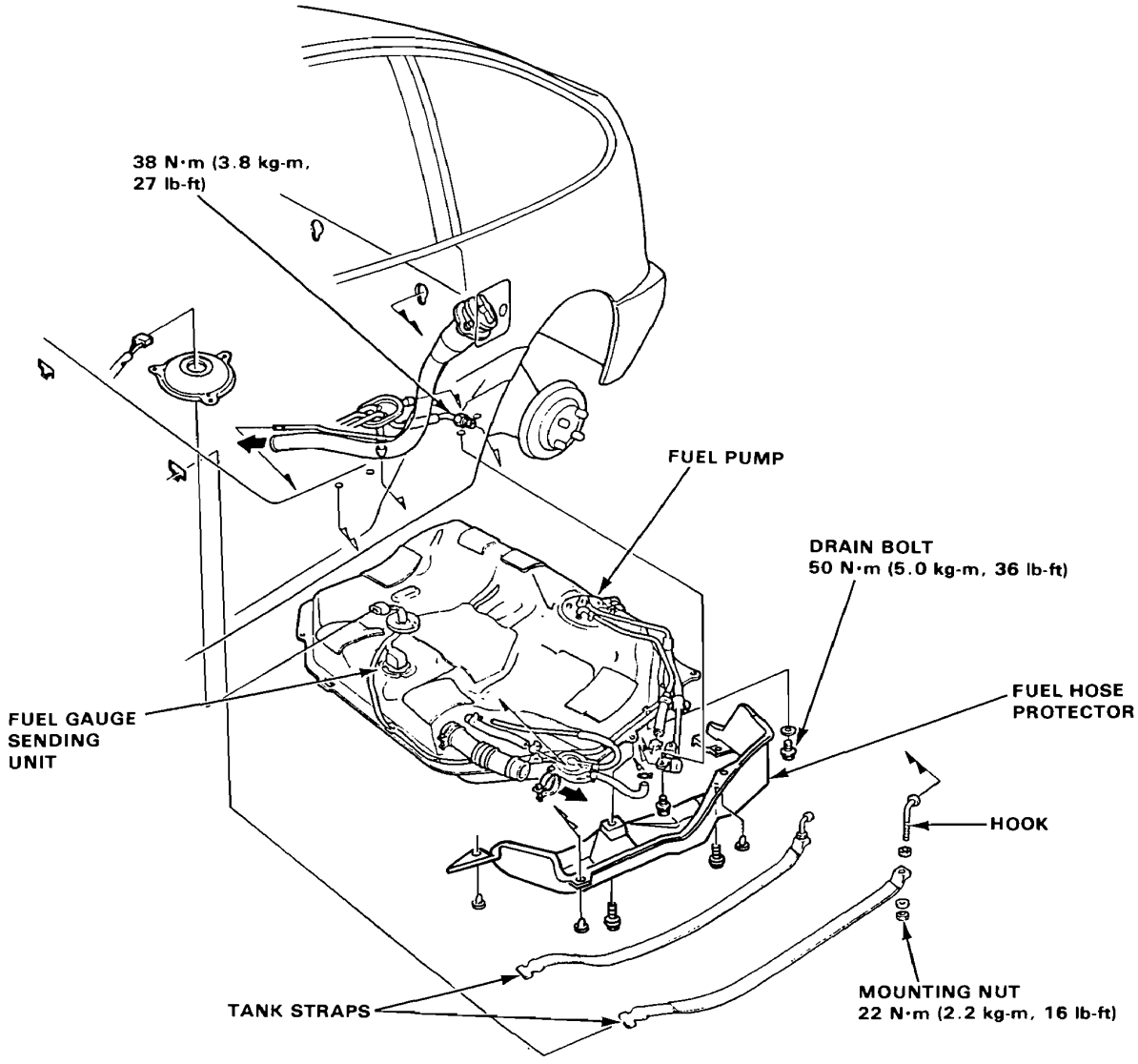


Fuel Tank

Replacement

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

1. Block front wheels. Jack up the rear of the car and support with jackstands.
2. Remove the drain bolt and drain the fuel into an approved container.
3. Remove the rear seat and disconnect the 5P connector.
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 hoses thoroughly before reconnecting them.**
6. Place a jack, or other support, under the tank.
7. Remove the strap nuts and let the straps fall free.
8. Remove the fuel tank.
   NOTE: The tank may 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.



Air Intake System

System Troubleshooting Guide

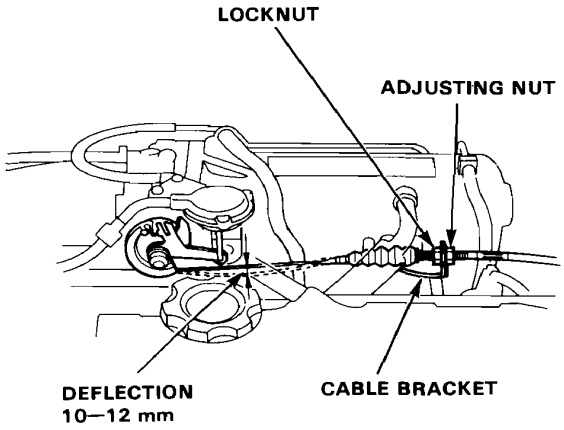
NOTE: Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection shows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

PAGE / SUB SYSTEM / SYMPTOM	THROTTLE CABLE	THROTTLE BODY	THROTTLE CONTROL SYSTEM
	75	76	78
WHEN COLD FAST IDLE OUT OF SPEC	③	②	①
WHEN WARM ENGINE SPEED TOO HIGH	③	②	①
WHEN WARM ENGINE SPEED TOO LOW		①	
FREQUENT STALLING WHILE WARMING UP		①	
LOSS OF POWER	①	②	

Throttle Cable

Inspection/Adjustment

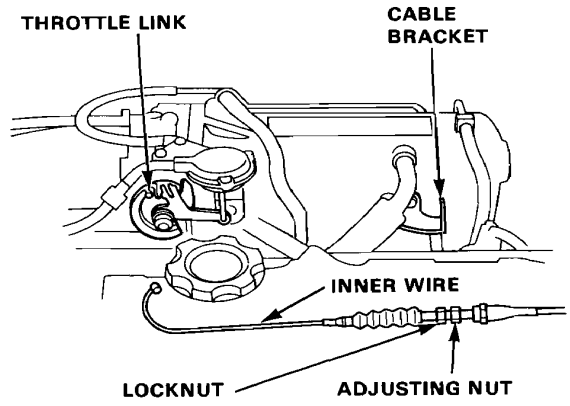
1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Check cable free play at the throttle linkage. Cable deflection should be 10—12 mm (0.39—0.47 in.)



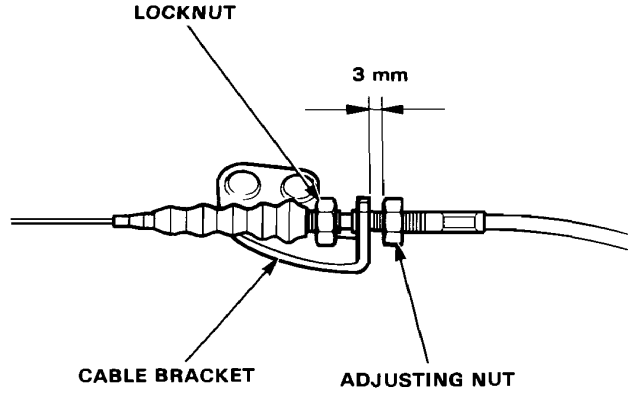
4. If deflection is not within specs, loosen the locknut and turn the adjusting nut until the deflection is as specified.
5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure it returns to the idle position whenever you release the accelerator.

Installation

1. Fully open the throttle valve, then install the throttle cable in the throttle linkage and install the cable housing in the cable bracket.
2. Warm up the engine to normal operating temperature (the cooling fan comes on).



3. Hold the cable sheath, removing all slack from the cable.
4. Turn the adjusting nut until it is 3 mm away from the cable bracket.
5. Tighten the locknut. The cable deflection should now be 10—12 mm. If not, see Inspection/Adjustment.



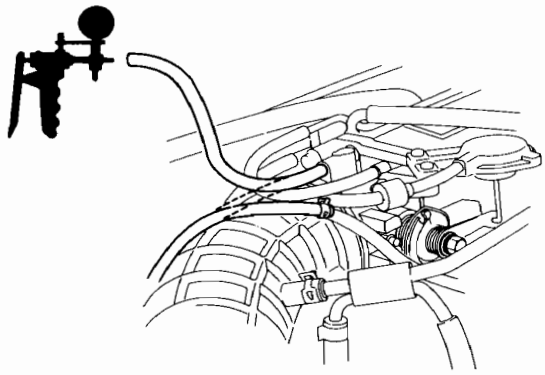
Throttle Body

Inspection

CAUTION: Do not adjust the throttle stop screw since it can not be reset except at the factory.

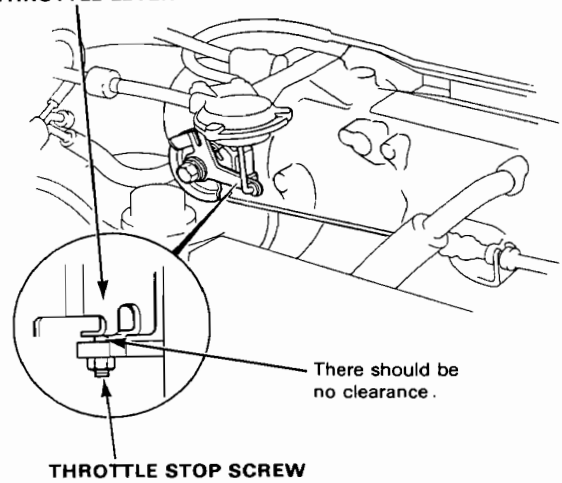
1. Start the engine and allow to reach normal operating temperature (cooling fan comes on).
2. Disconnect the vacuum hose (to the canister) from the top of the throttle body; connect a vacuum gauge to the throttle body.

VACUUM PUMP/GAUGE



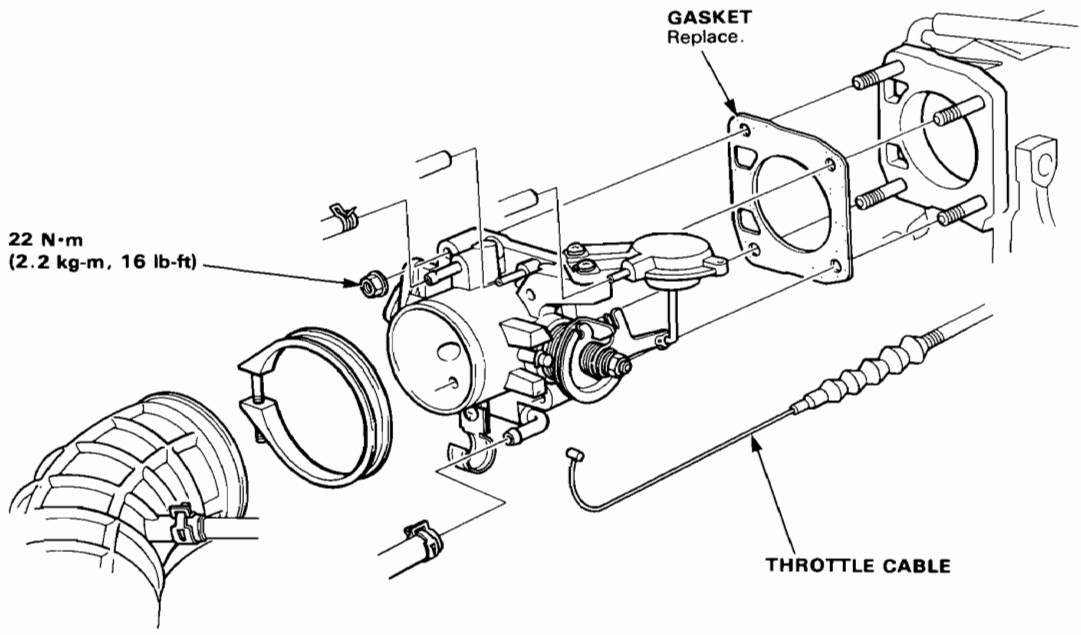
3. Allow the engine to idle and check that the gauge indicates no vacuum.
   - If there is vacuum, check the throttle control system (page 6-78).
4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.
   - If the gauge indicates no vacuum, check the throttle body port. If the throttle body port is clogged, clean it with carburetor cleaner.
5. Stop the engine and check that the throttle cable operates smoothly without binding or sticking.
   - If there are any abnormalities in the above steps, check for:
     - Excessive wear or play in the throttle valve shaft.
     - Sticky or binding throttle lever at full close position.
     - Clearance between throttle stop screw and throttle lever at full close position.

THROTTLE LEVER

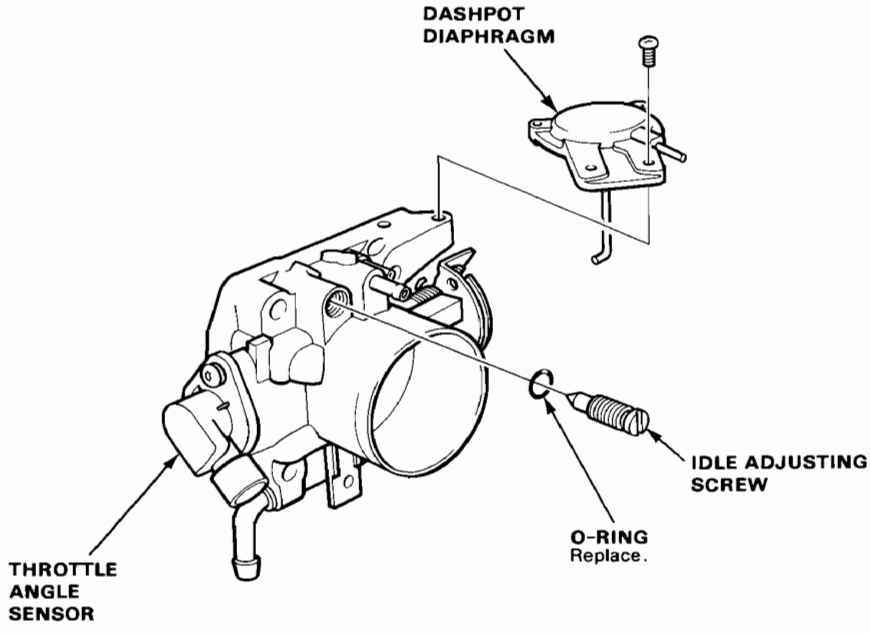


Replace the throttle body if there is excessive play in the throttle valve shaft or if the shaft is binding or sticking.

Disassembly



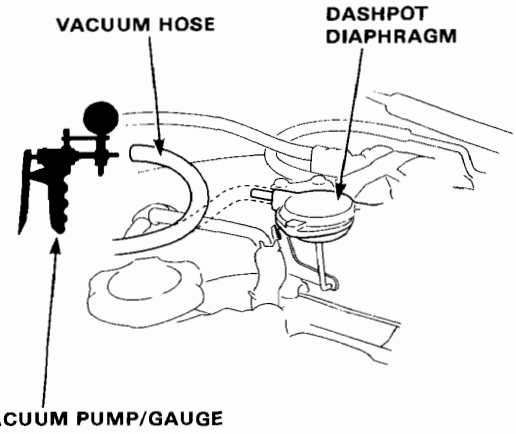
CAUTION:
- The throttle stop screw in non-adjustable.
- After reassembly, adjust the throttle cable (page 6-75).



Throttle Control System

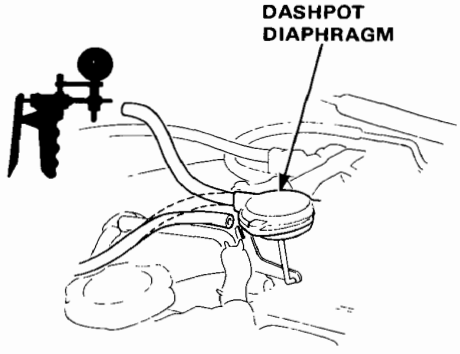
Testing

1. Disconnect vacuum hose from the dashpot diaphragm, and connect vacuum pump to the hose.



2. Apply vacuum and check that vacuum rises, then bleeds off to zero.
   - If the vacuum holds or does not rise, the bleed off, replace the dashpot check valve and retest.

3. Connect a vacuum pump to the dashpot diaphragm.



4. Apply the vacuum and check that the rod pulls in and vacuum holds.
   - If the vacuum does not hold or the rod does not move, replace the dashpot diaphragm, and retest.

Emission Control System

System Troubleshooting Guide

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

PAGE / SUB SYSTEM / SYMPTOM		CATALYTIC CONVERTER	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
		82	83	84
ROUGH IDLE			①	
POOR PERFORMANCE	FAILS EMISSION TEST	①		②
	LOSS OF POWER	①		

Tailpipe Emission

Inspection

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

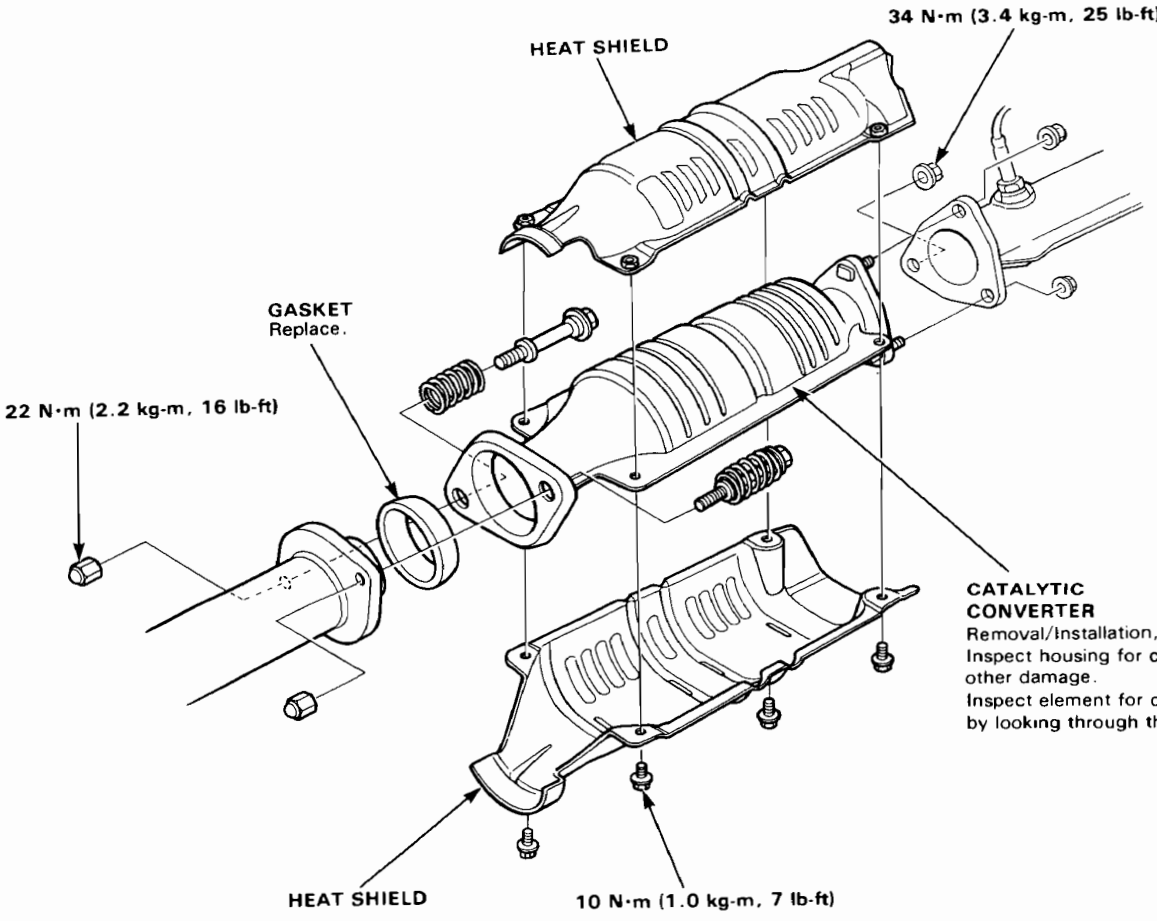
1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
2. Connect a tachometer.
3. Check idle speed and adjust the idle speed, if necessary (page 6-59).
4. Warm up and calibrate the CO meter according to the meter manufacturer's instructions.
5. Check idle CO with the headlights, heater blower, rear window defogger, cooling fan, and air conditioner off.

   CO meter should indicate 0.1 % maximum.

Catalytic Converter

Inspection

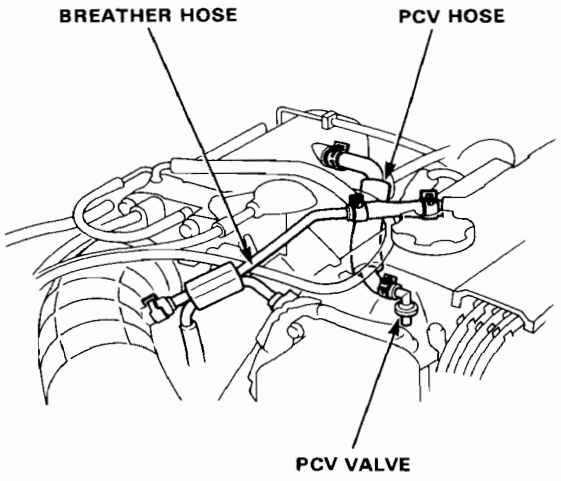
If excessive exhaust system back-pressure is suspected, remove the catalytic converter from the car and make a visual check for plugging, melting or cracking of the catalyst. Replace the catalytic converter if any of the visible area is damaged or plugged.



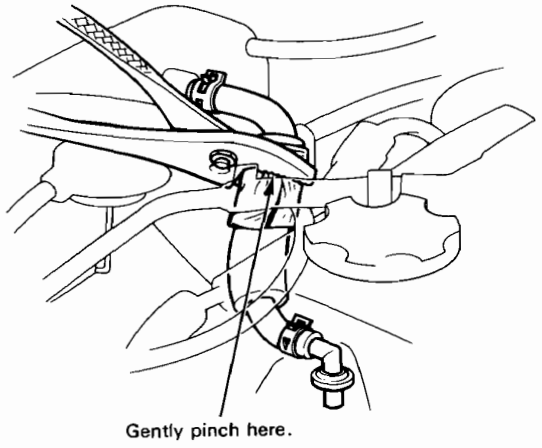
Positive Crankcase Ventilation System

Inspection

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



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



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

Evaporative Emission Controls

Troubleshooting Flowchart

Inspection of Evaporative Emission Controls

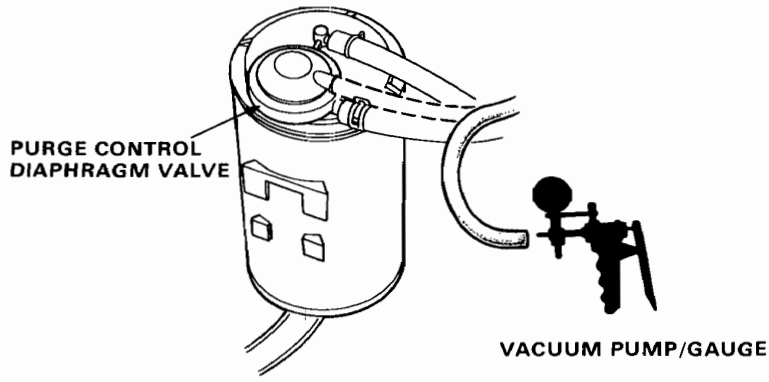
Disconnect #7 vacuum hose from the purge control diaphragm valve (on the charcoal canister) and connect a vacuum gauge to the hose.

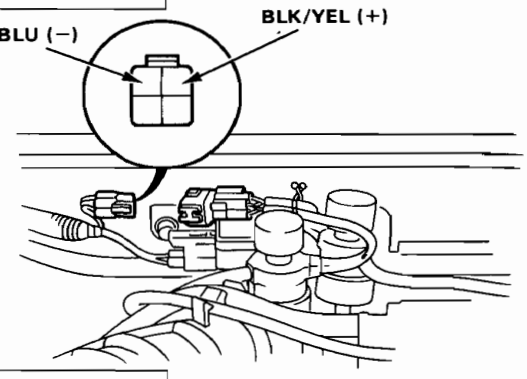
Start the engine and allow to idle.
NOTE: Engine coolant temperature must be below 80 °C (176°F).

Is there vacuum ?

YES → Disconnect the 4P connector.

NO





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

Is there battery voltage ?

YES → **Inspect #7 vacuum hose routing.**
If OK, replace purge cut-off solenoid valve.

NO

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

(To page 6-85)

(To page 6-85)

(From page 6-84)

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

Check for vacuum at #7 vacuum hose 5 seconds after starting the engine.

Is there manifold vacuum? NO

YES

Reconnect the hose.

Remove fuel filler cap.

(To page 6-86)

(From page 6-84)

Is there battery voltage ? NO

Repair open in BLK/YEL wire between No. 14 fuse and the 4P connector.

YES

Inspect BLU wire for a short to body ground between ECU (A6) and the connector.
If wire is OK, substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

Disconnect the 4P connector.

Is there manifold vacuum? NO

Inspect #7 vacuum hose routing.
If OK, purge cut-off solenoid valve.

YES

Inspect for an open in BLU wire between ECU (A6) and the connector.
If wire is OK, substitute a known-good ECU and recheck. If prescribed voltage is now available, replace the original ECU.

(cont'd)

Evaporative Emission Controls (cont'd)

(From page 6-85)

Connect a vacuum gauge to canister purge air hose.

Start the engine and raise speed to 3,500 min^{-1} (rpm).

Does vacuum appear on gauge within 1 minute ?

NO

YES

See two-way valve test to complete.
Evaporative emission control are OK.

Connect a vacuum gauge to the canister purge hose and raise the engine speed to 3,500 min^{-1} (rpm).

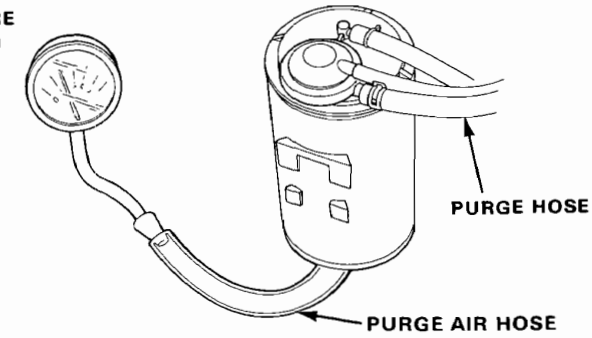
Does vacuum appear on the gauge within 1 minute ?

NO

Inspect the purge hose. If hose is OK, replace the throttle body.

YES

Replace the canister.

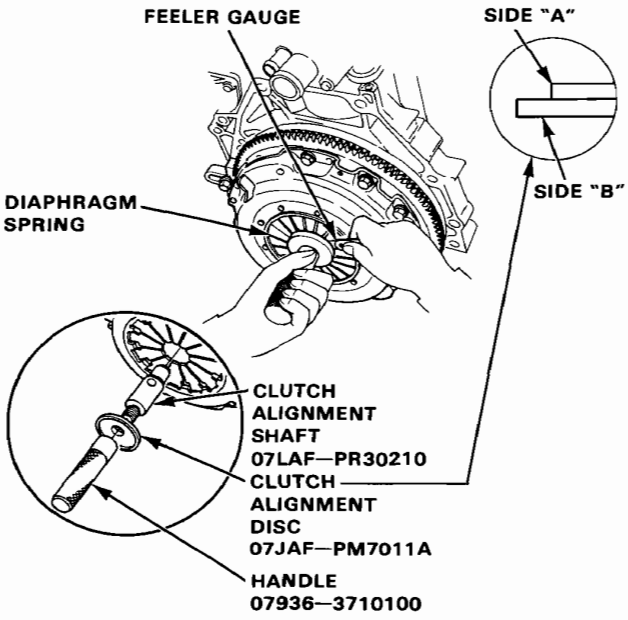


Pressure Plate

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 a feeler gauge.

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

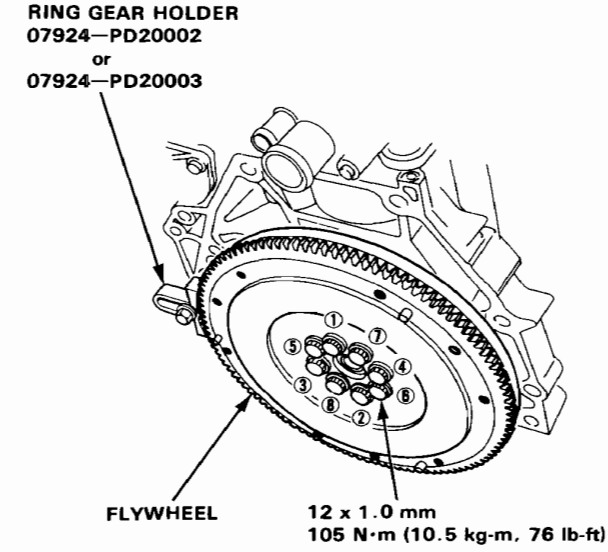


Clutch Assembly

Installation

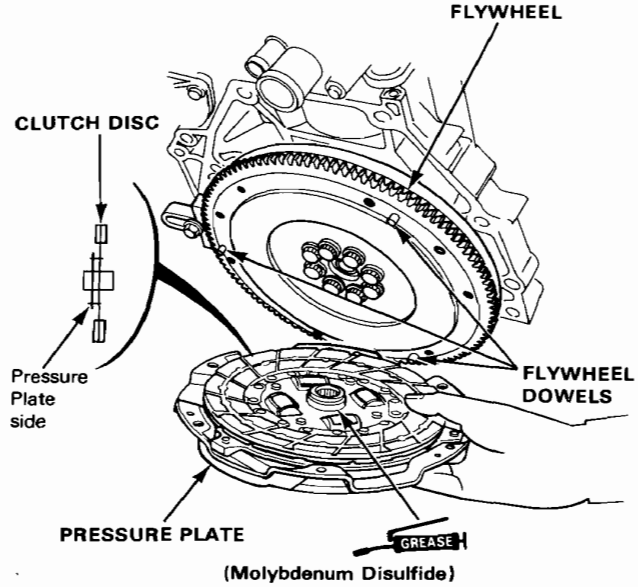
1. Align the hole in the flywheel with the crankshaft dowel pin and install the flywheel. Install the bolts only finger tight.

2. Install the special tool, then torque the flywheel bolts in a crisscross pattern, as shown.



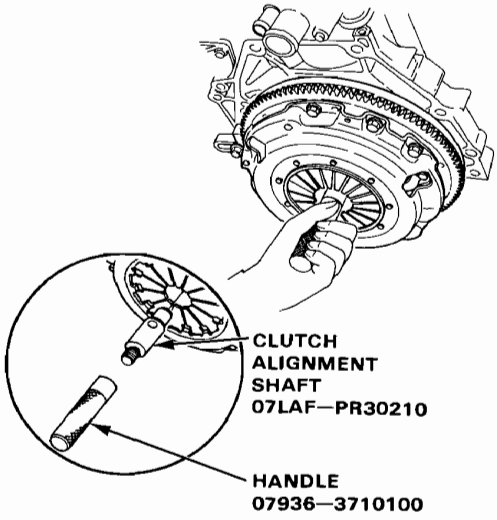
3. Install the clutch disc and pressure plate by aligning the flywheel dowels with dowel holes in the pressure plate.

   NOTE: Apply molybdenum disulfide grease to the spline of the clutch disc.

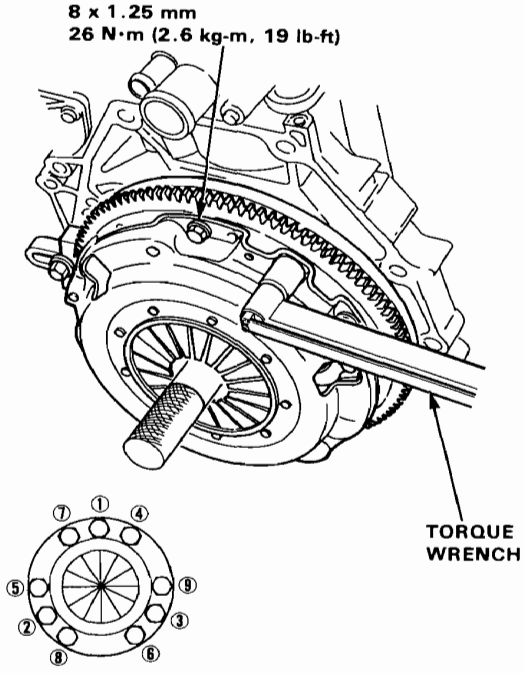


4. Install the attaching bolts finger tight.

5. Insert the special tool into the splined hole in the clutch disc.



6. Torque the bolts in a crisscross pattern as shown. Tighten them two turns at a time to prevent warping the diaphragm spring.



7. Remove the special tools.

Y1 (V-TEC)

The structure of new type Y1 manual transmission. Therefor regarding way of disassembling or maintenance, the only different points from those of the precedent model have been reported in the manual. In addition to the above, we recommend to you the already published manual "No. 62PS100 FOR MAINTENANCE OF MODEL S1 MANUAL TRANSMISSION" for reference. As a result of a modification newly made on the shift fork, its steel bowl has been changed to a type that disassembly is not practicable.

Special Tool

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07744—0010400	Pin Driver, 5.0 mm	1	

①

Transmission

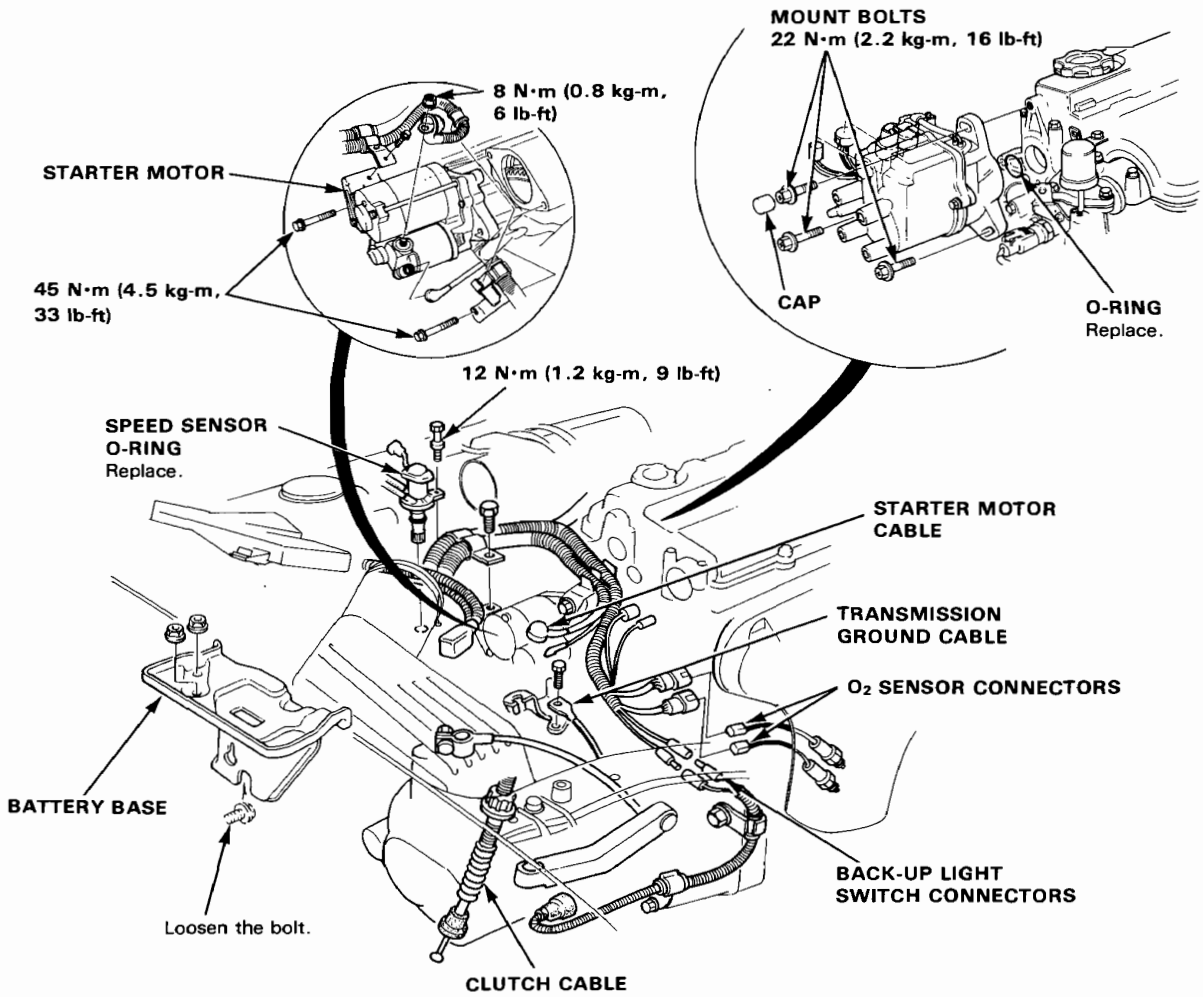
Removal/Installation

⚠WARNING

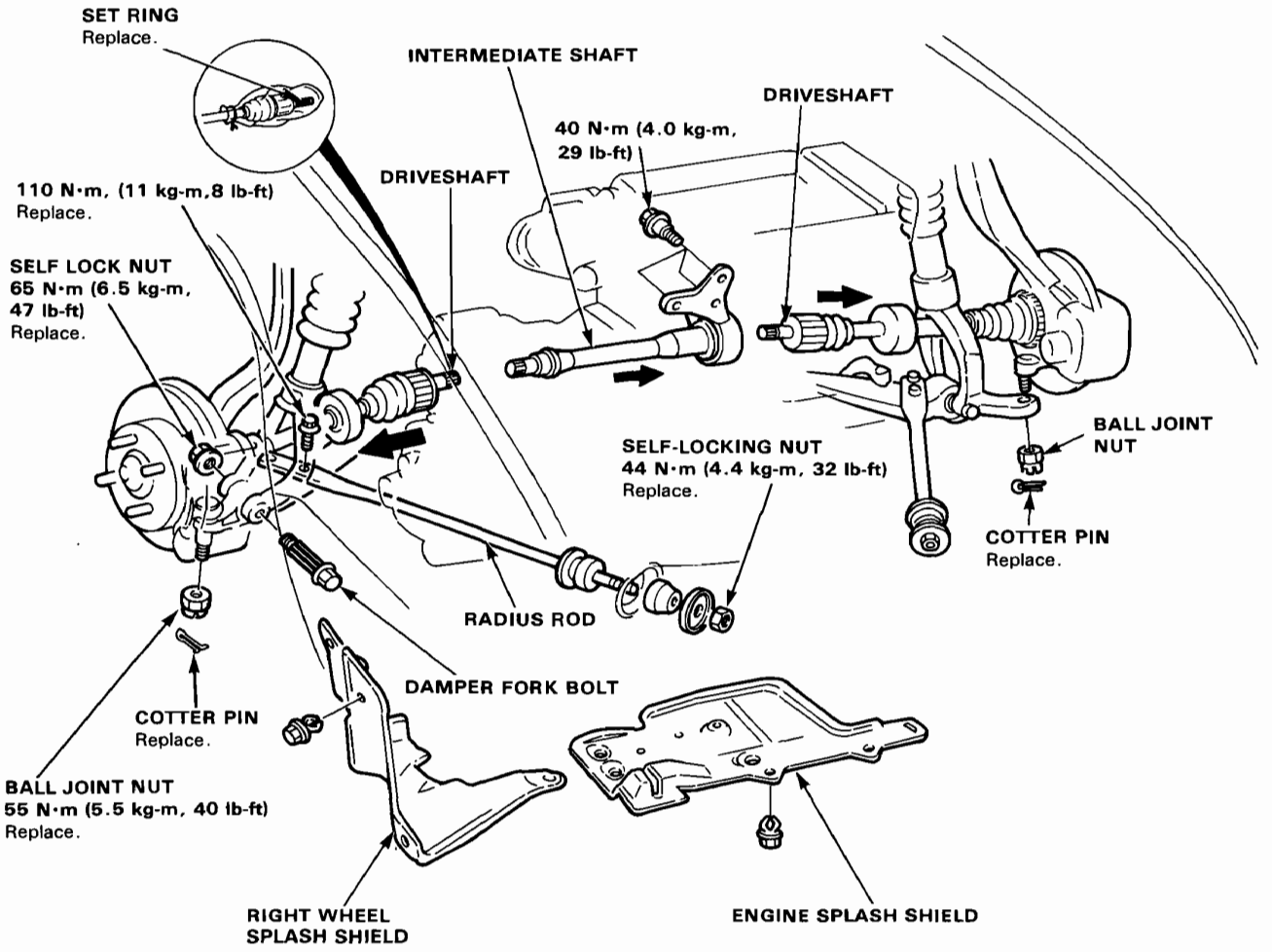
- **Make sure jacks and safety stands are placed properly (See section 1), and hoist brackets are attached to correct positions on the engine (See section 5).**
- **Apply parking brake and block rear wheels, so car will not roll off stands and fall on you while working under it.**

CAUTION: Use fender covers to avoid damaging painted surfaces.

1. Disconnect the battery negative (−) and positive (+) cables from the battery.
2. Remove the 2 nuts and loosen the bolt located at the side of the battery base.
3. Remove the battery base.
4. Remove the intake hose.
5. Disconnect the transmission ground cable.
6. Disconnect the cluch cable at the release arm and cable stay.
7. Disconnect the back-up light switch connector.
8. Remove the O_2 sensor connector from the holder, then disconnect the O_2 sensor connector.
9. Remove the speed sensor.
10. Disconnect the starter motor cable, then remove the cable holder.
11. Remove the bolts attaching the startor motor, and remove the starter motor.
12. Disconnect the distributor connectors and remove the distributor mount bolts, then remove the distributor from the cylinder head.

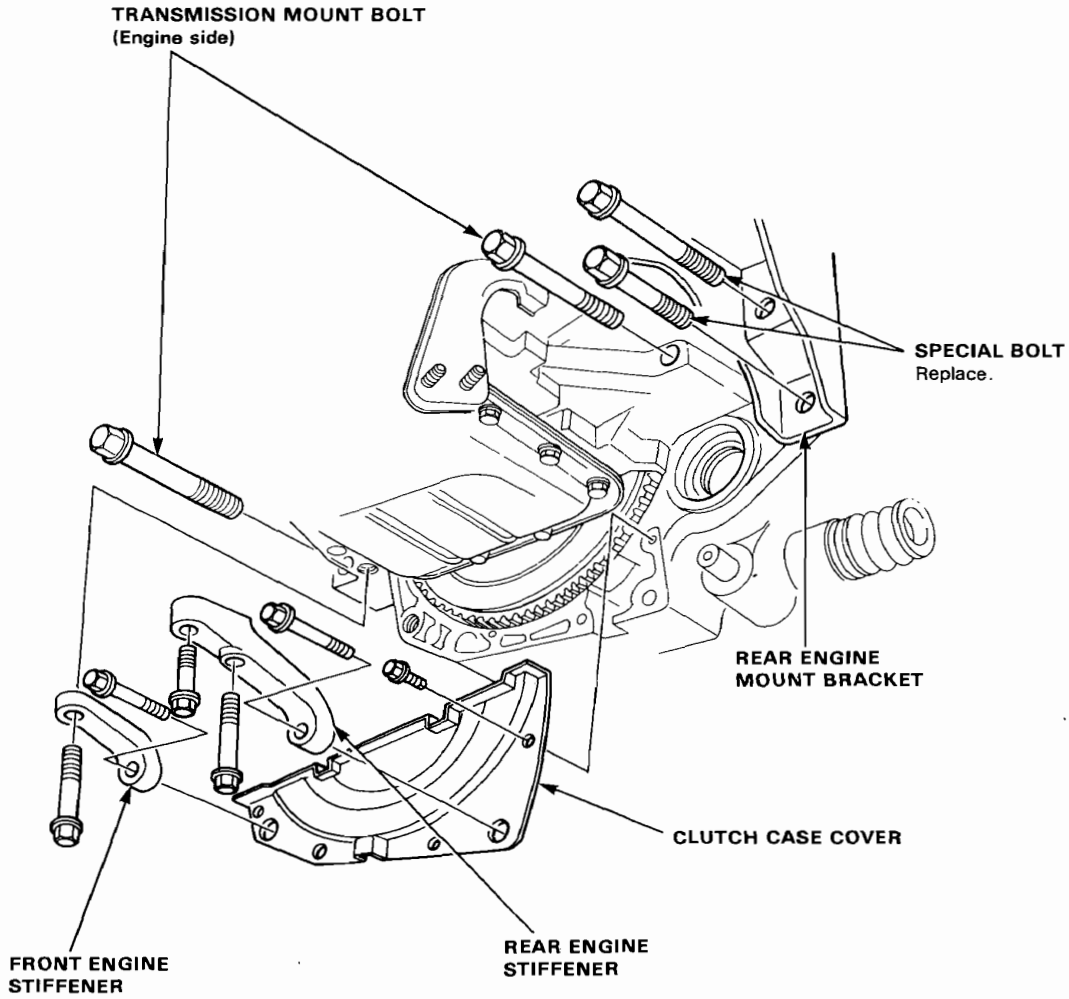


13. Drain transmission oil. Use a socket wrench to remove the drain plug. Remove the oil filler plug to speed draining.
    Reinstall the drain plug with a new washer.
14. Remove the engine splash shield and the right wheel splash shield.
15. Remove the cotter pin and lower arm ball joint nut, separate the ball joint and lower arm (See section 12).
16. Remove the self locknut, and remove the damper fork bolt.
17. Remove the nut and bolts. the remove the right radius rod.
18. Remove the right driveshaft (See section 10).
19. Remove the left driveshaft (See section 10).
20. Remove the intermediate shaft (See section 10).
21. Remove the torque rod and shift rod from the clutch housing.

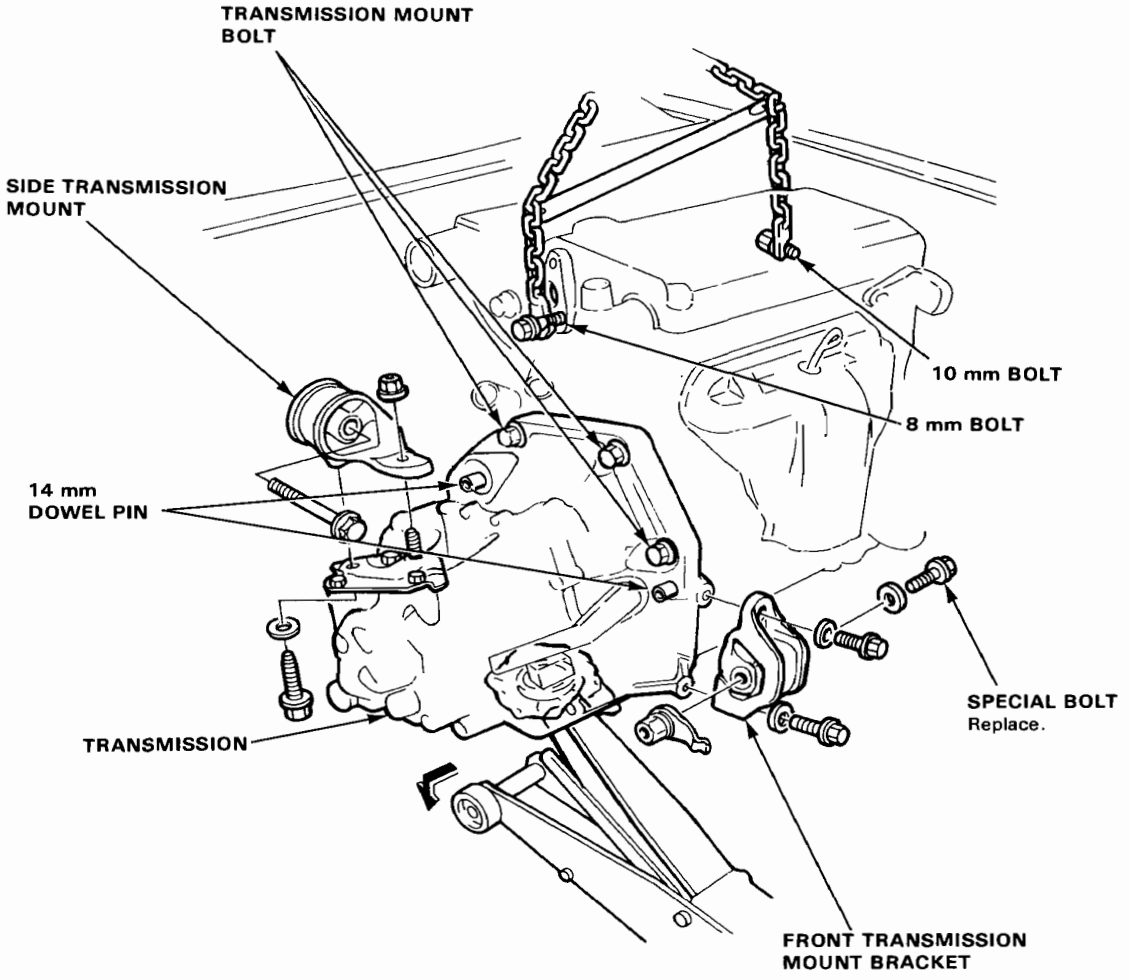


Removal/Installation

22. Remove the front engine stiffener and rear engine stiffener.
23. Remove the clutch case cover.
24. Remove the 2 transmission mount bolts.
25. Remove the 2 transmission mount bolts from the rear engine mount bracket.
26. Remove the bolt of under the side transmission mount.



27. Remove the front transmission mount bracket.
28. Install the bolt at he cylinder head and attach a hoist chain to the bolt and the other end to the engine hanger plate, then lift the engine slightly to unload the mounts.
29. Place a jack under the transmission and raise transmission just enough to take the weight off the mounts.
30. Remove the bolts and nut, then remove the side transmission mount.
31. Remove the 3 transmission mount bolts.
32. Pull the transmission away from the engine until it clears the 14 mm dowel pins.
33. Separate the mainshaft from the clutch pressure plate and remove the transmission by lowering the jack.



Removal/Installation

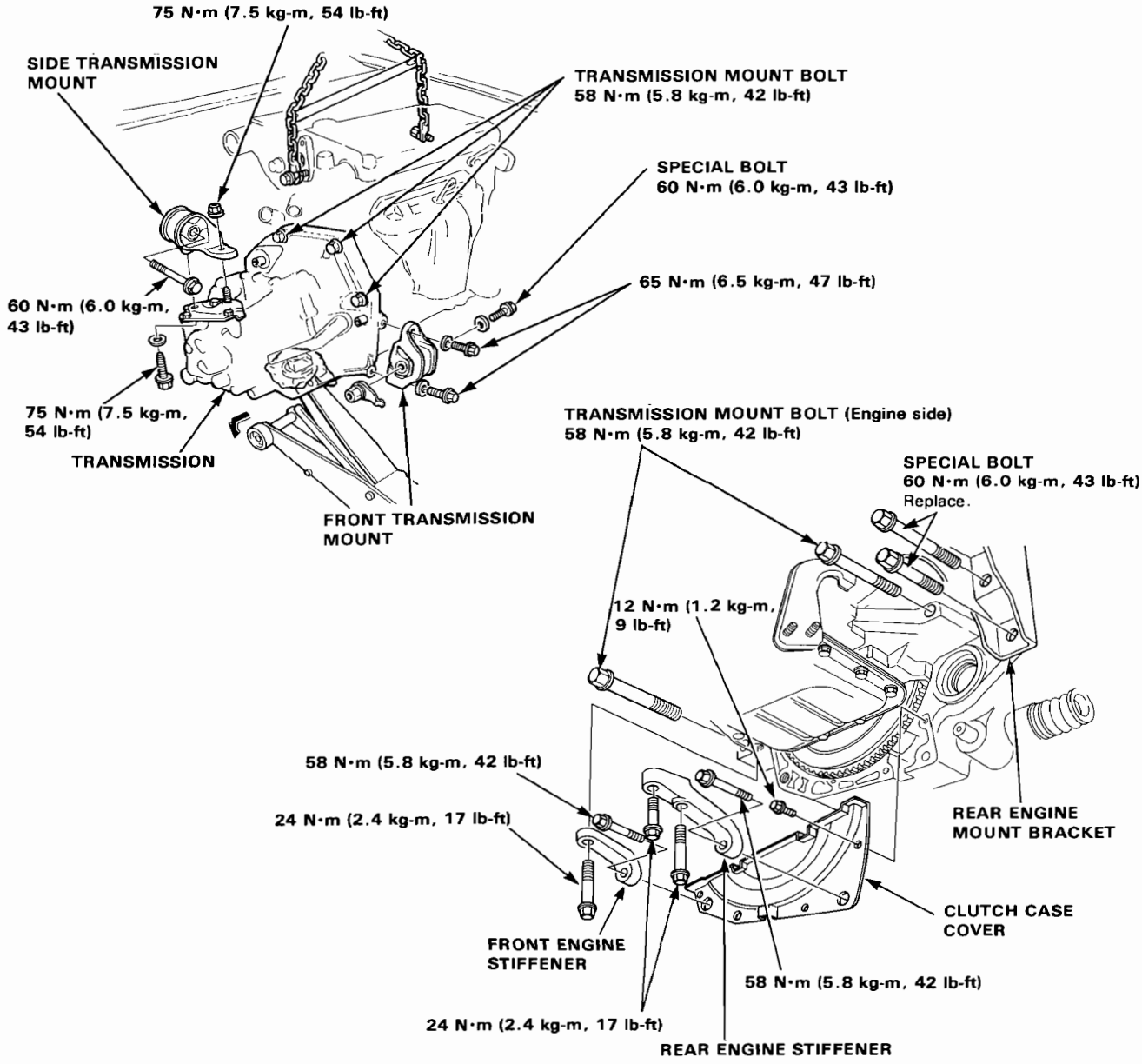
Install the engine in the reverse order of removal.

After the engine is in place:

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

CAUTION: Use new spring clips on installation.

- Check the clutch free play.
- Check the ignition timing (See section 16).
- Check the transmission for smooth operation.

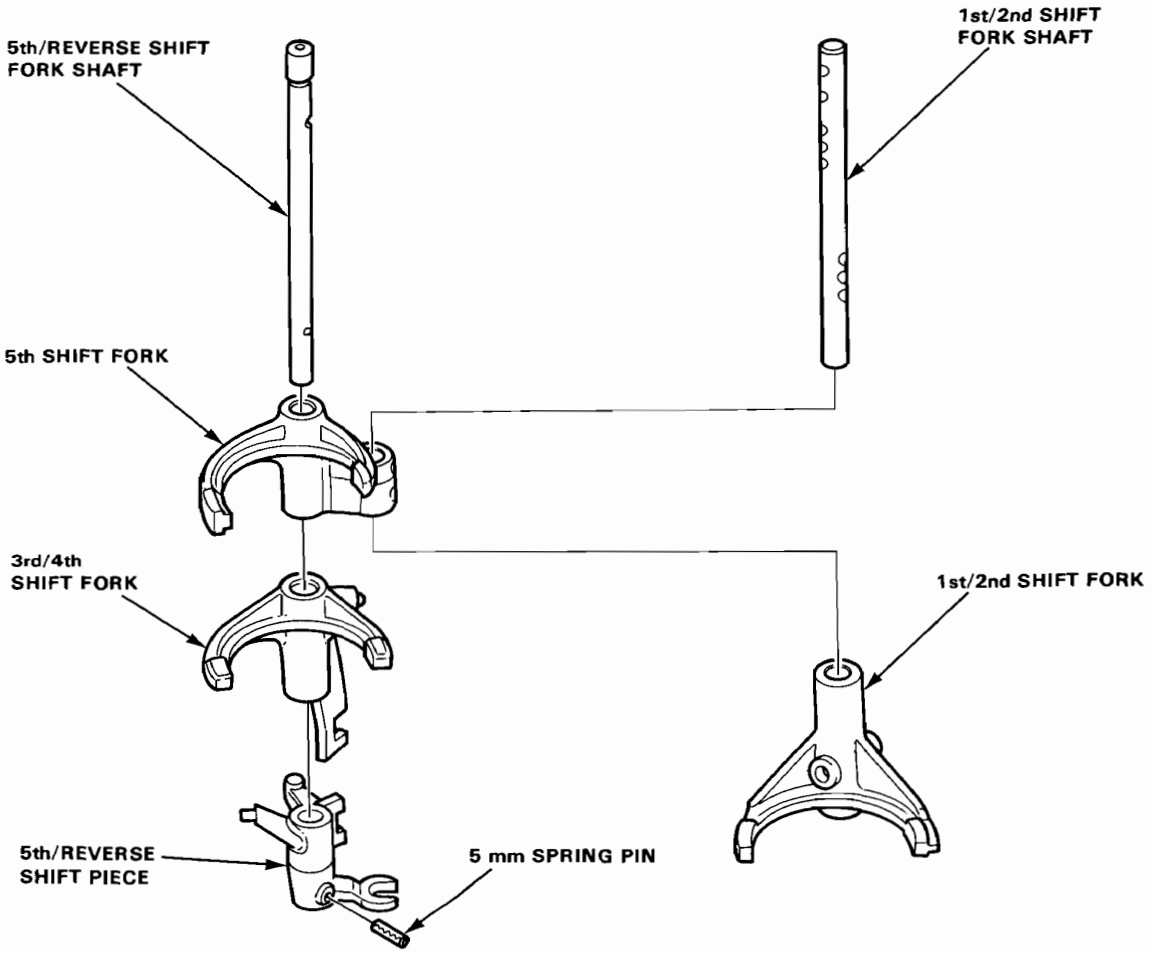


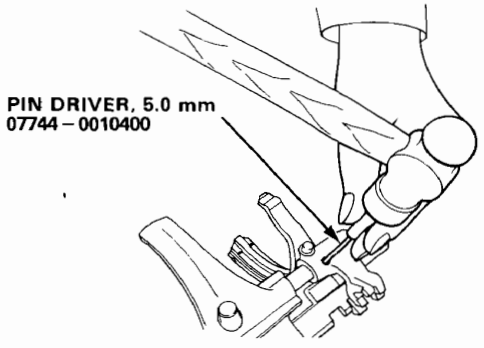
Shift Fork Shaft Assembly

Disassembly/Reassembly

NOTE: When assembling, install the shift fork shaft with its detents facing the hole where the balls are inserted.

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





L3 (2WD)

Outline of Model Change

- The shift fork has been changed.

Special Tool

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07744–0010400	Pin Driver, 5.0 mm	1	

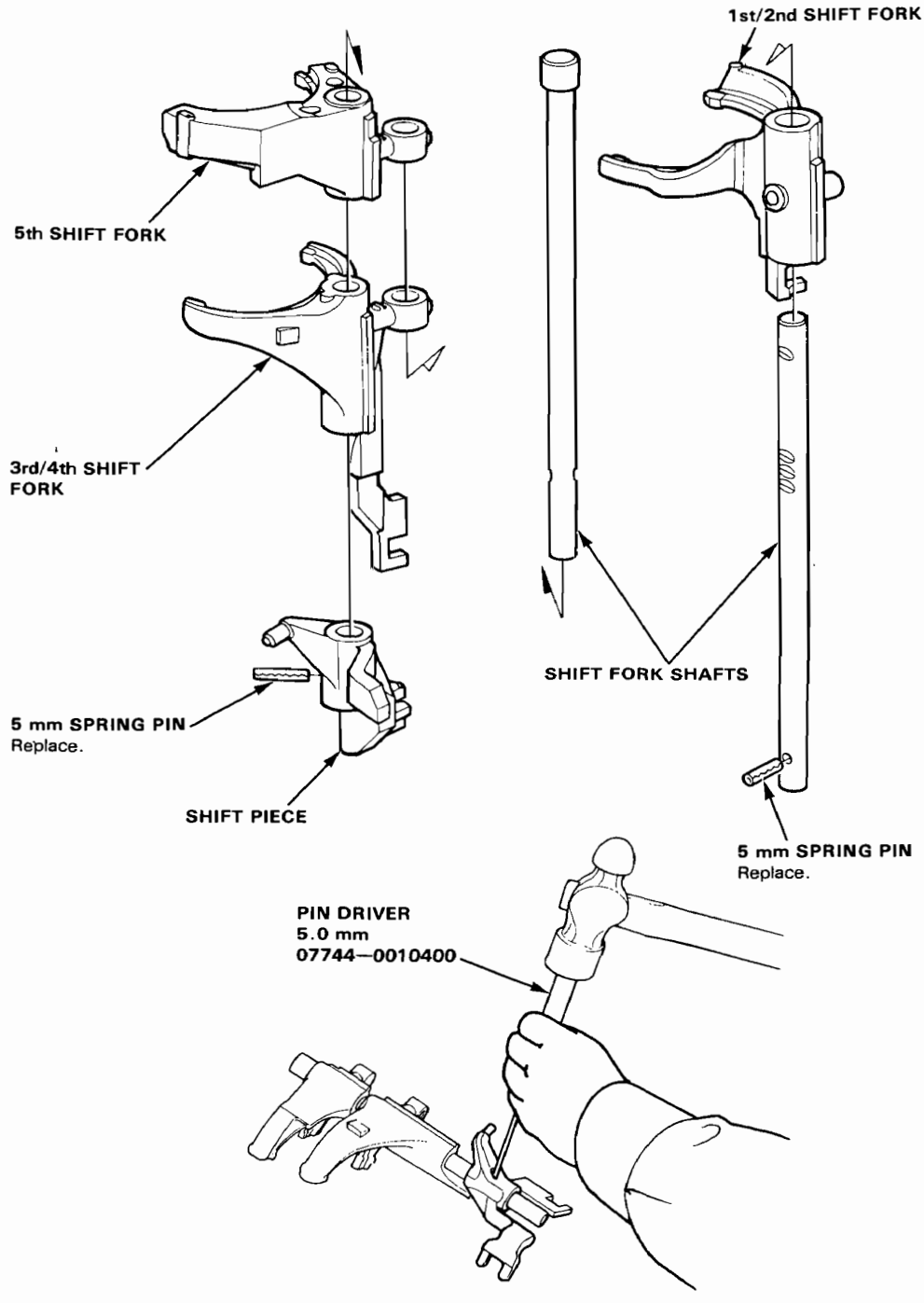
①

Shift Fork Shaft Assembly

Disassembly/Reassembly

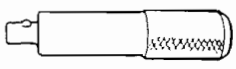
NOTE: When assembling, install the shift fork shaft with its detents facing the hole where the balls are inserted.

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



Special Tools

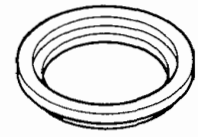
Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07749—0010000	Driver	1	
②	07746—0040800	Pilot, 35 mm	1	
③	07746—0010300	Attachment, 42 x 47 mm	1	
④	07746—0010400	Attachment, 52 x 57 mm	1	
⑤	07JAF—SH20400	Support Base Attachment	1	
⑥	07965—SD90100	Support Base	1	
⑦	07GAF—SD40700	Hub Dis/Assembly Base	2	
⑧	07JAD—SH30100	Oil Seal Driver Attachment	1	
⑨	07746—0030100	Driver, 40 mm I.D.	1	
⑩	07JAD—PG40100	Oil Seal Driver Attachment	1	



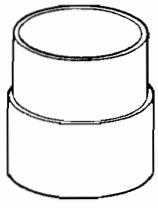
①

②

③ ④



⑤



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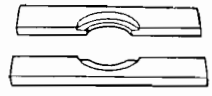
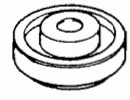
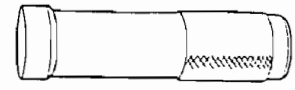


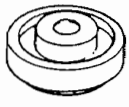
⑦



⑧



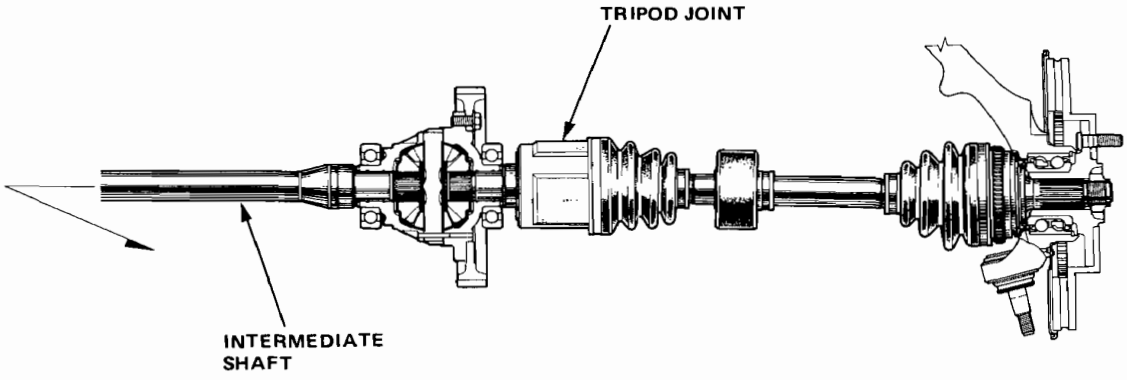
⑨

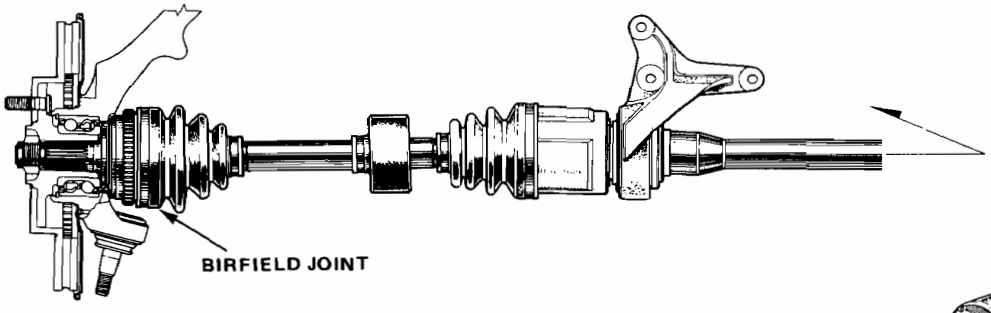


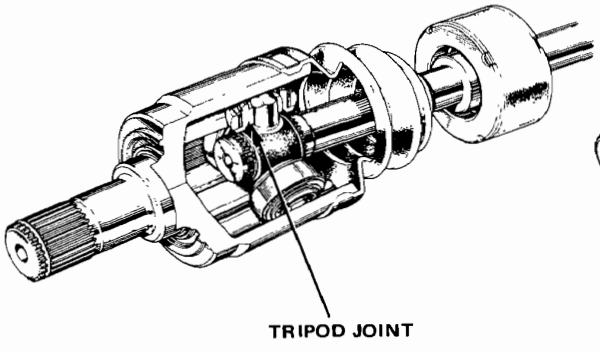
⑩

Driveshafts

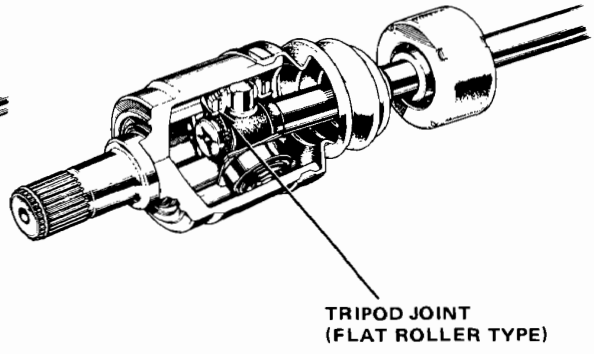
At both ends of the driveshaft, constant velocity joints ensure power transmission are used. At the outboard side, a Birfield joint is used and, at the inboard side, a tripod joint incorporating a spherical bushing and needle bearing inside the roller to considerably reduce slide resistance when loaded with torque.
An intermediate shaft is used between the differential unit and the left-hand driveshaft to allow right- and left-hand driveshafts of the same length. Since the left end of the intermediate shaft is at the same level as the differential unit, the joint angles of the right and left wheels are the same and noise and vibration are reduced as well as less torque steer is generated.*1)
Flat roller, a roller with flat rolling surface provided with a guide, is used as the tripod joint roller of the V-TEC engine model. To reduce the vibration and rolling to the sides when the car is started and accelerated, it regulates the rotating direction of the roller and restricts the tilt to the sliding direction.







Other Engine Type



V-TEC Engine Type

* Torque Steer: Refers to the steering pull to one side when the car under power.

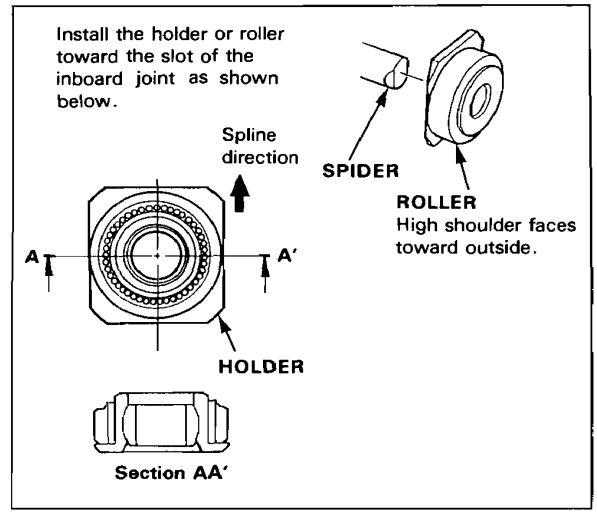
Disassembly/Inspection

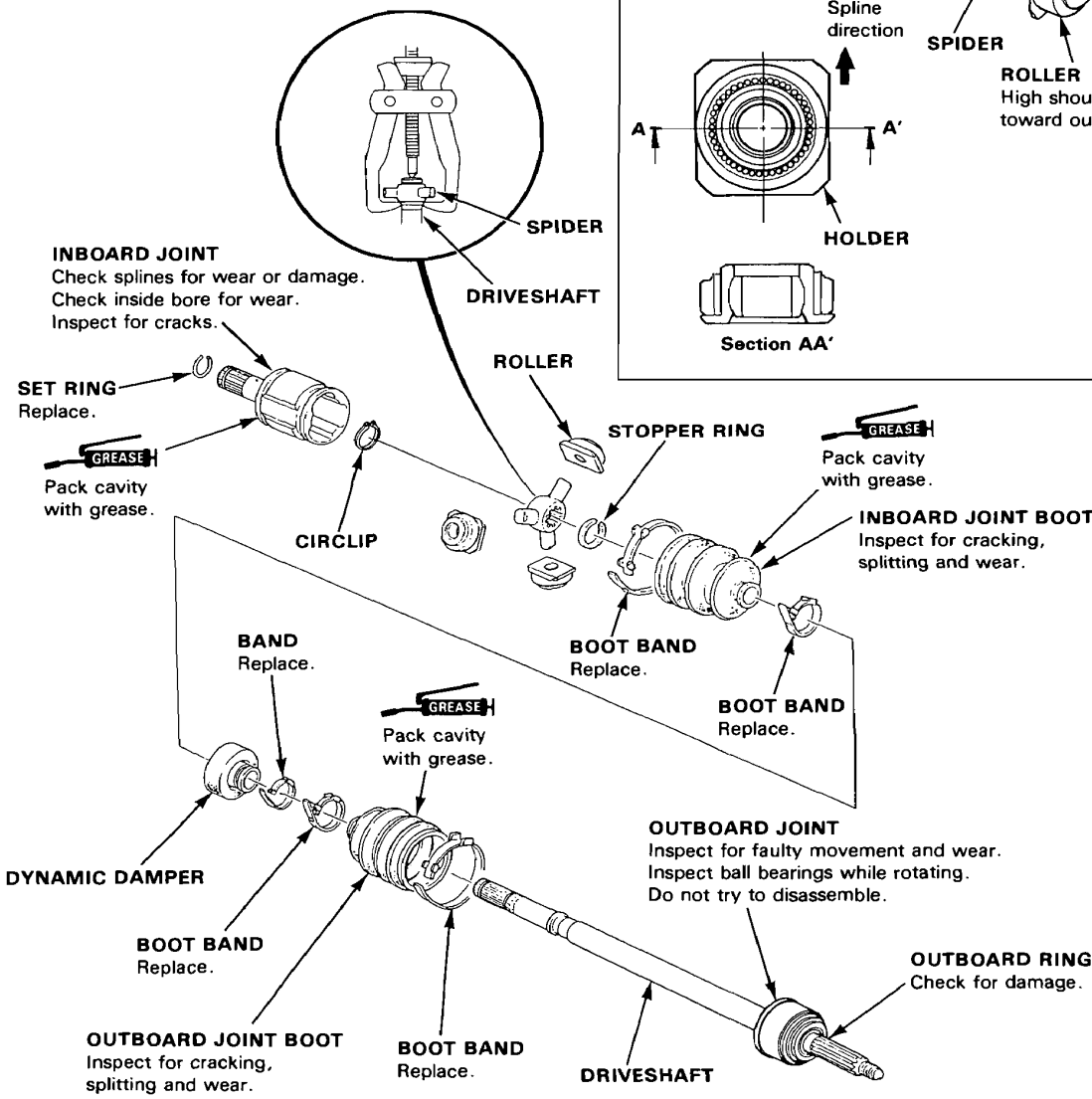
NOTE:
- Mark the rollers and roller grooves during disassembly to ensure proper positioning *during* reassembly.
- Before disassembly, mark the spider and driveshaft so they can be reinstalled in their original positions.
- The inboard joint must be removed to replace the boots.

GREASE Thoroughly pack the inboard joint and both joint boots with high quality molybdenum disulfide grease when reassembling.

Grease Quantity:

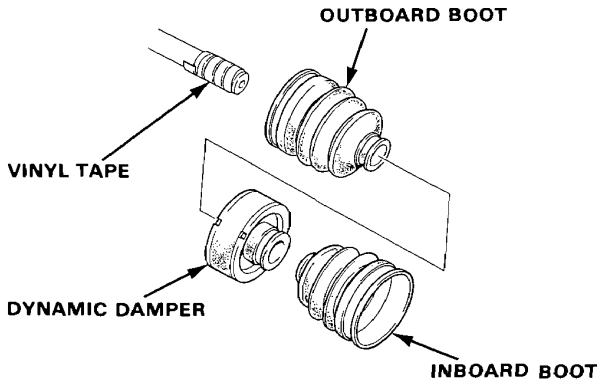
Inboard Joint	120~130 g
Outboard Joint	90~100 g



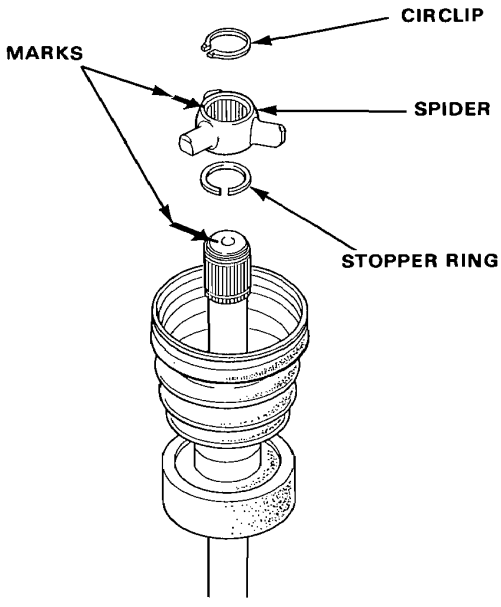


Reassembly

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.

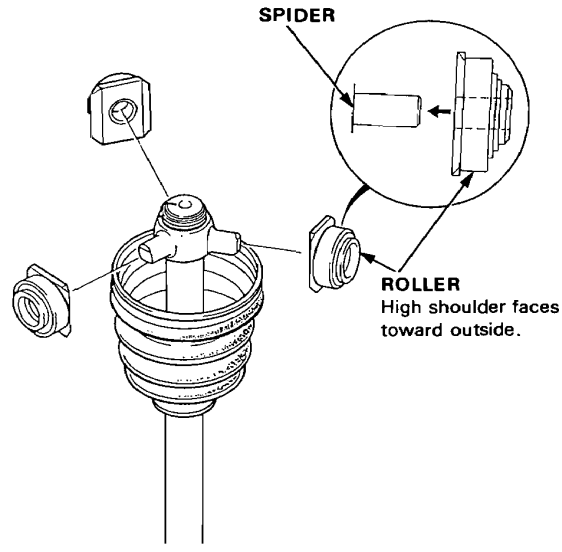


3. Install the stopper ring onto the driveshaft groove.
4. Install the spider on the driveshaft by aligning the marks on the spider and end of the driveshaft.
5. Fit the circlip onto the driveshaft groove.



6. 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.**

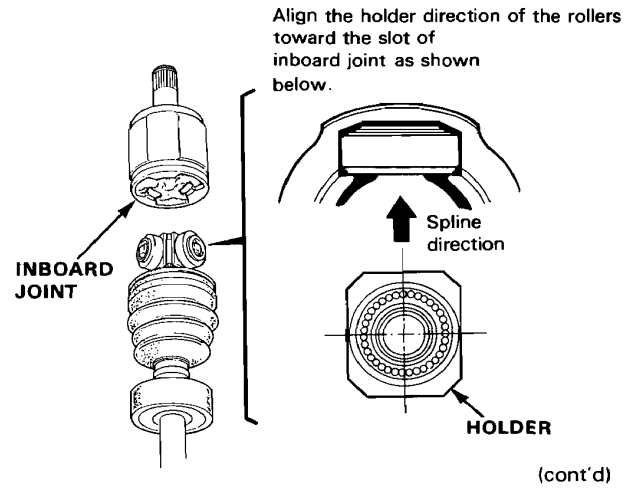


7. Pack the inboard joint with molybdenum disulfide grease.

Grease Quantity: 120~130g

8. Fit the inboard joint onto the driveshaft.

CAUTION: Hold the driveshaft assmbly so the inboard joint points up, to prevent it from falling off.

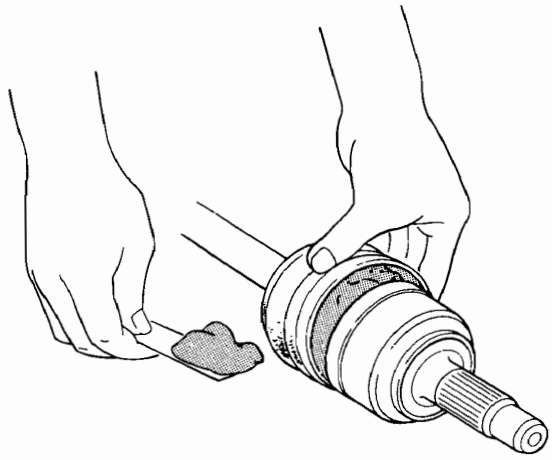


(cont'd)

Reassembly (cont'd)

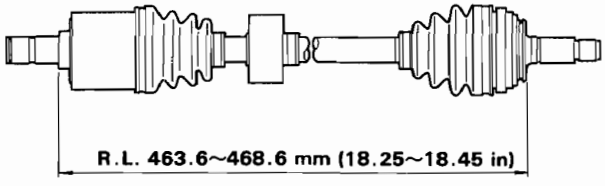
9. Pack the outboard joint boot with molybdenum disulfide grease.

   Grease Quantity: 90~100g

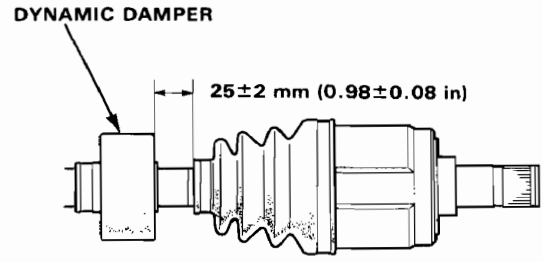


10. Adjust the length of the driveshafts to the figure below, then adjust the boots to halfway between full compression and extension.

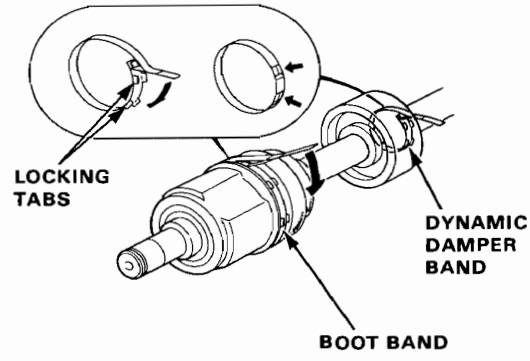
    NOTE: The ends of boots seat in the groove of the driveshaft and joint.



11. Position the dynamic damper as shown below.



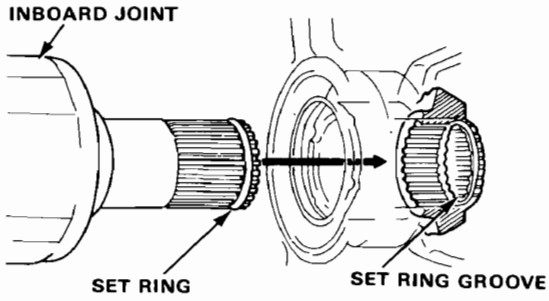
12. Install new boot bands on the boot and bend both sets of locking tabs.
13. Lightly tap on the doubled-over portions to reduce their height.
14. Install a new dynamic damper band and bend down both sets of locking tabs.
15. Lightly tap on the doubled-over portion to reduce its height.



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.**

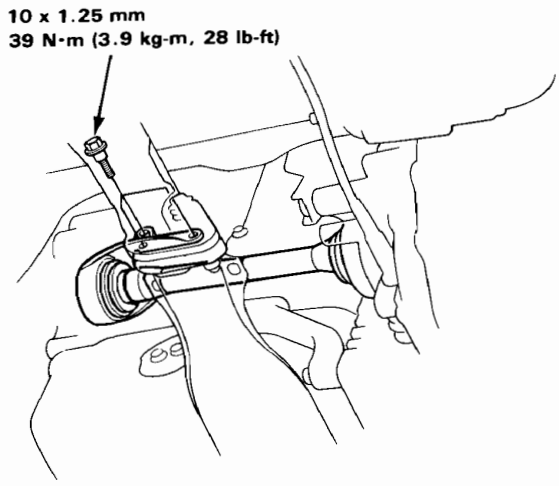


18. Refill the transmission.

Intermediate Shaft

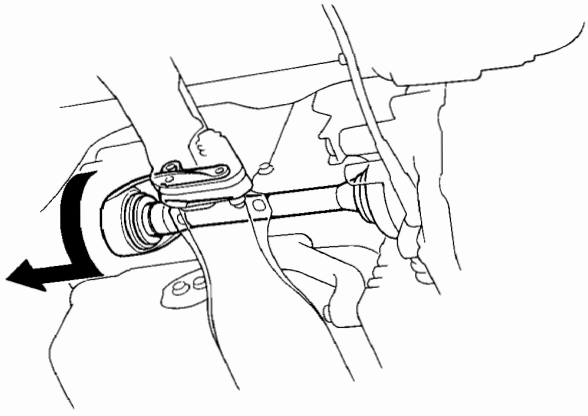
Replacement

1. Drain oil from the transmission.
2. Remove the three 10 mm bolts.



3. Lower the bearing support close to the steering gearbox and remove the intermediate shaft from the differential.

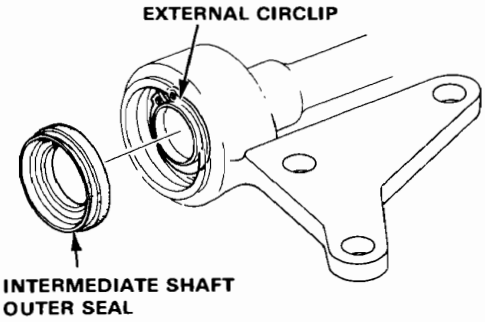
CAUTION: To prevent damage to the differential oil seal, hold the intermediate shaft horizontal until it is clear of the differential.



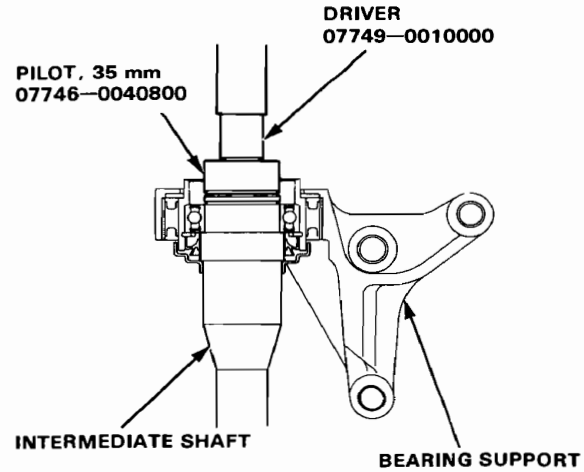
Installation is the reverse order of removal.

Disassembly

1. Remove the intermediate shaft outer seal.
2. Remove the external circlip.

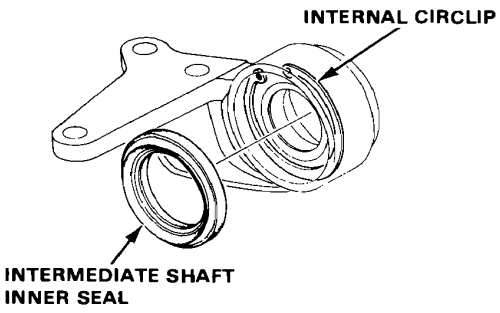


3. Remove the intermediate shaft.
NOTE: The shaft can be hammered out using the driver and pilot, it the bearing support is clamped in a soft-jawed vise.

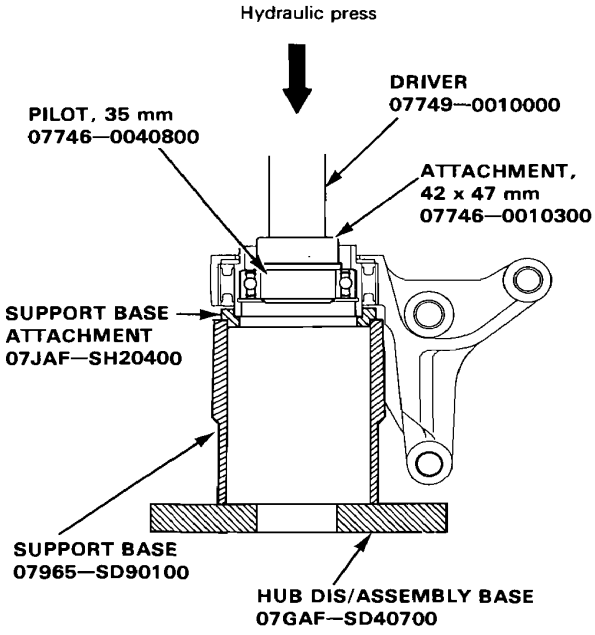


The bearing support is clamped in a soft-jawed vise.

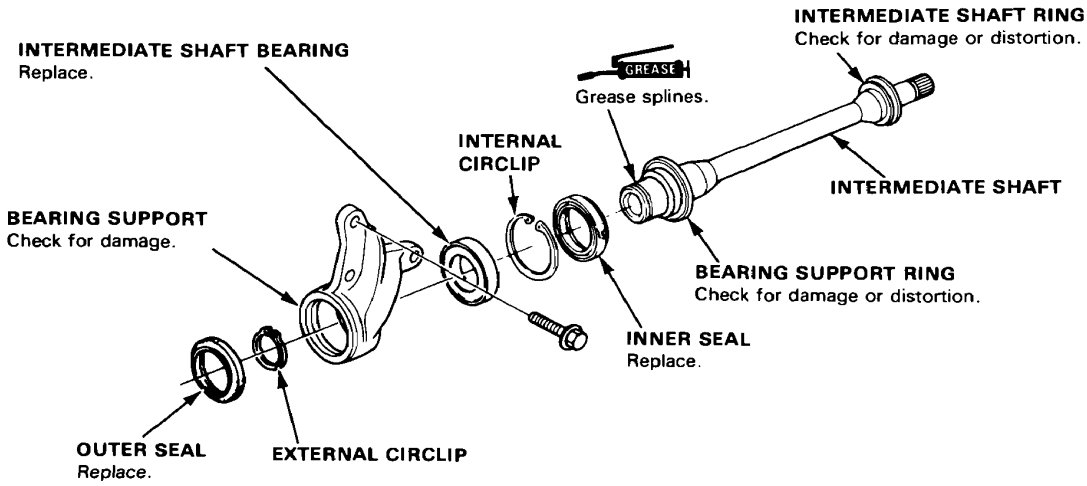
4. Remove the intermediate shaft inner seal.
5. Remove the internal circlip.



6. Press the intermediate shaft bearing out of the bearing support.

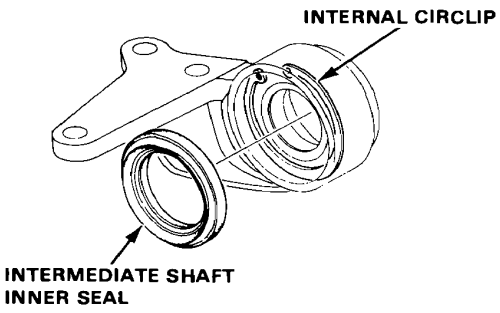


Index/Inspection

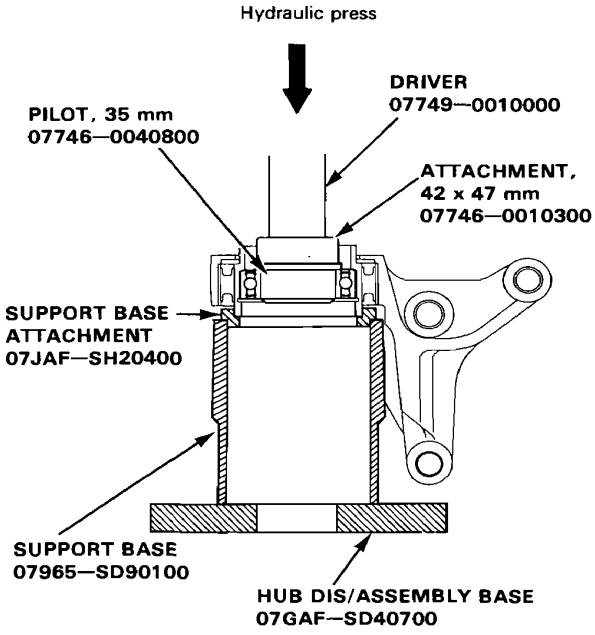


CAUTION: Be careful not to damage the rubber on the bearing support during installation.

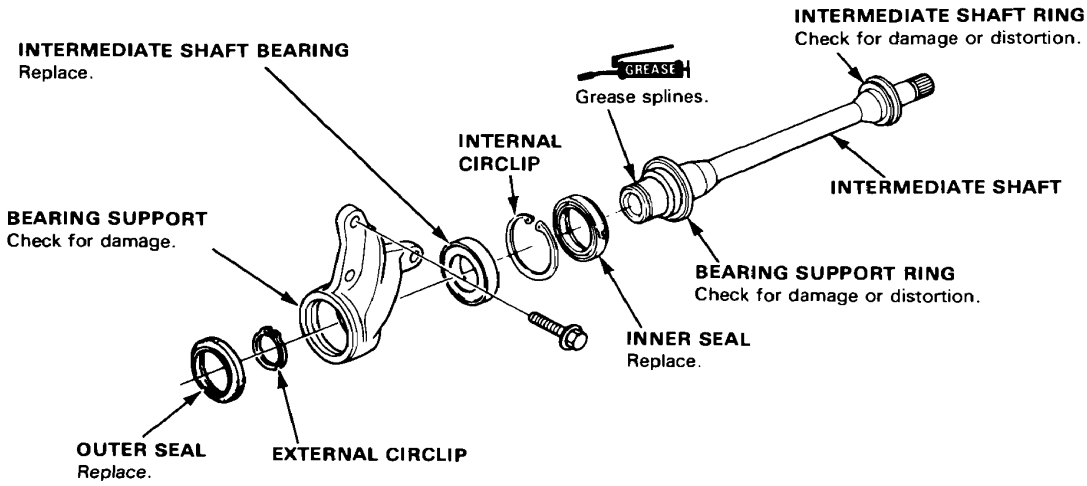
4. Remove the intermediate shaft inner seal.
5. Remove the internal circlip.



6. Press the intermediate shaft bearing out of the bearing support.



Index/Inspection

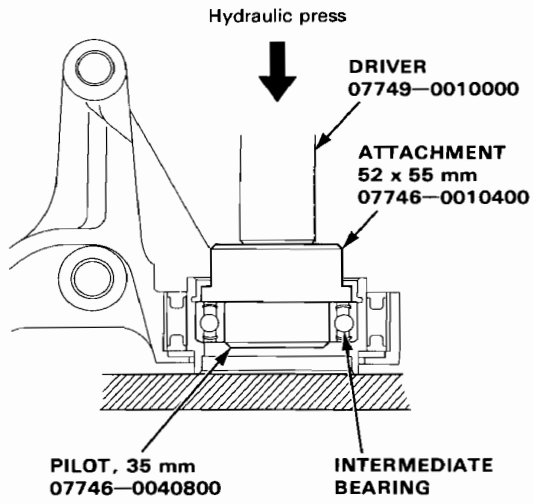


CAUTION: Be careful not to damage the rubber on the bearing support during installation.

Intermediate Shaft

Reassembly

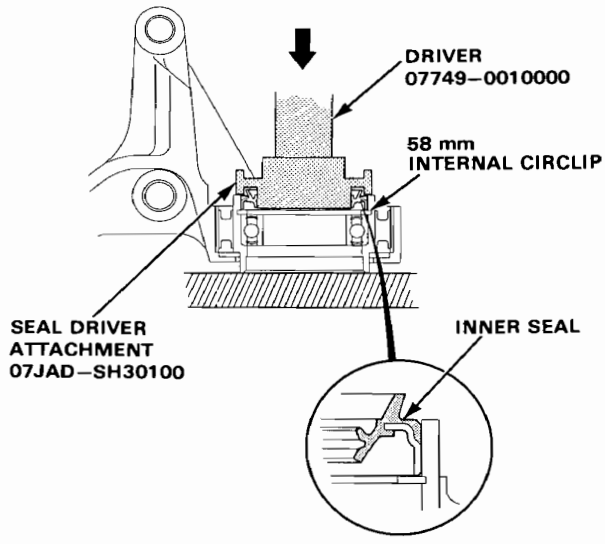
1. Press the intermediate shaft bearing into the bearing support using the special tools.



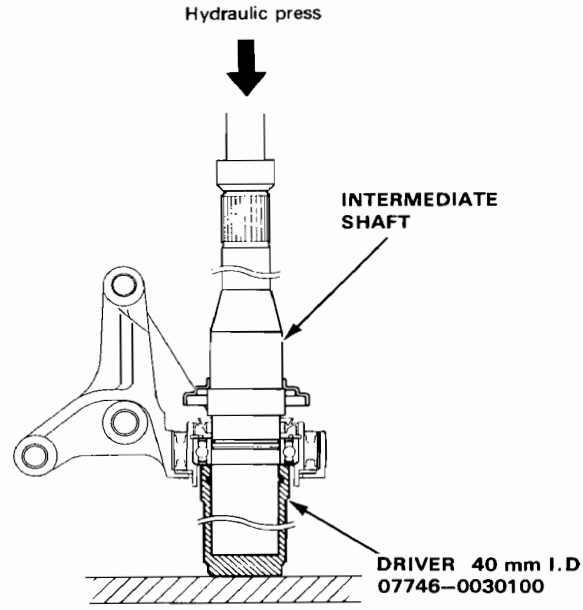
2. Seat the 58 mm internal circlip in the groove of the bearing support.

   CAUTION: Install the circlip with the tapered end facing out.

3. Drive the intermediate shaft inner seal into the bearing support using the special tools.



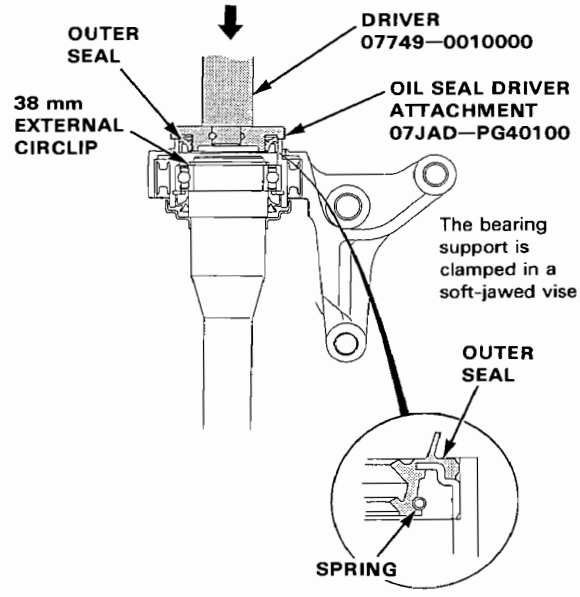
4. Press the intermediate shaft into the shaft bearing.



5. Seat the 38 mm external circlip in the groove of the intermediate shaft.

   CAUTION: Install the circlip with the tapered end facing out.

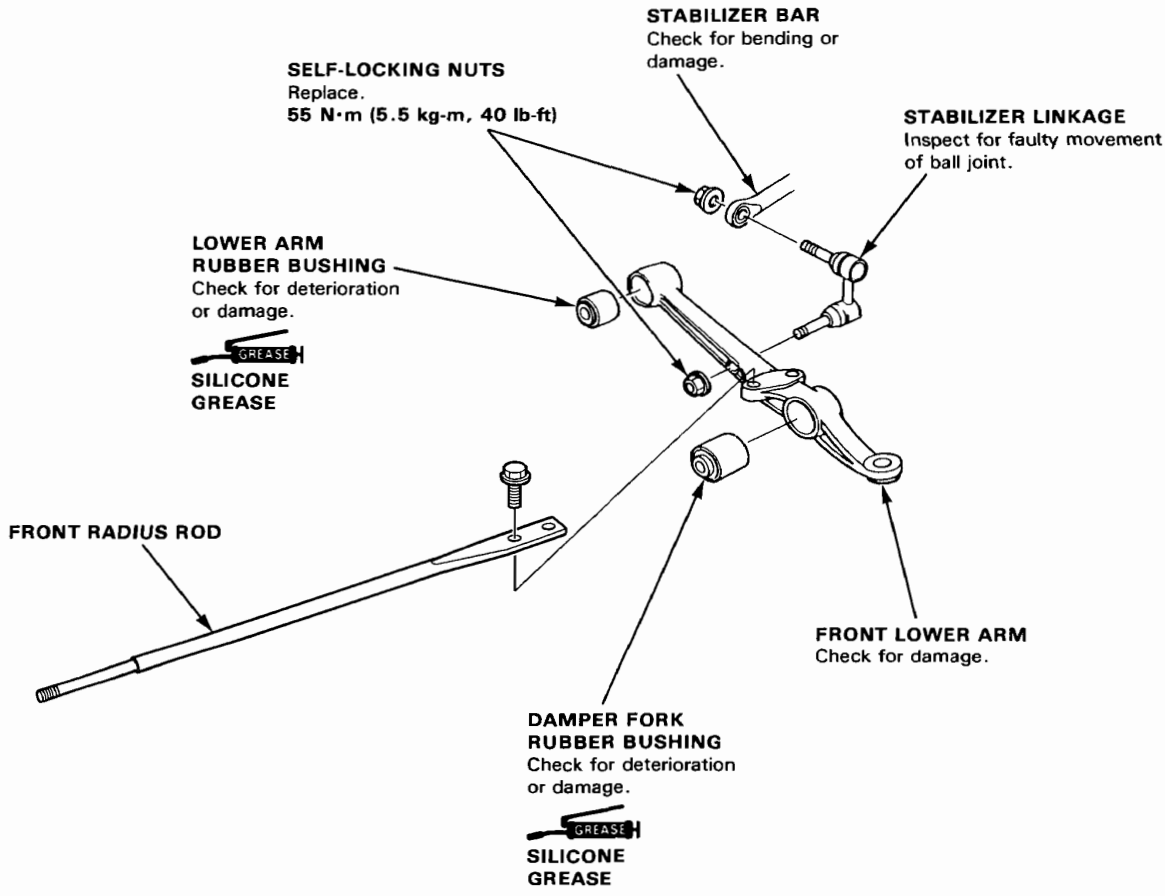
6. Drive the outer seal into the bearing support using the special tools.



Front Suspension

Illustrated Index

Overall Suspension
CAUTION: Replace the self-locking nuts after removal.
NOTE: Wipe off the grease before tightening the nut at the ball joint.

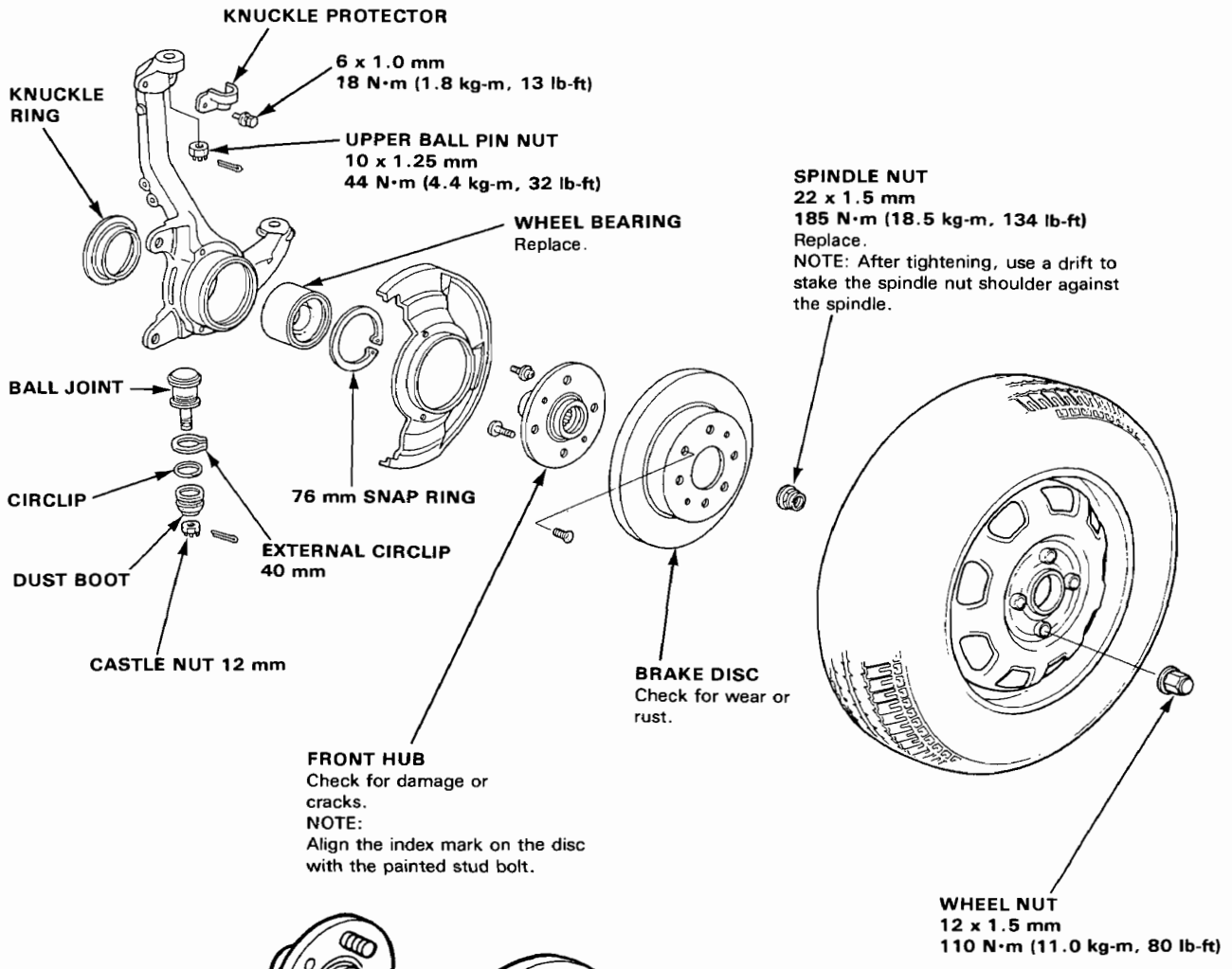


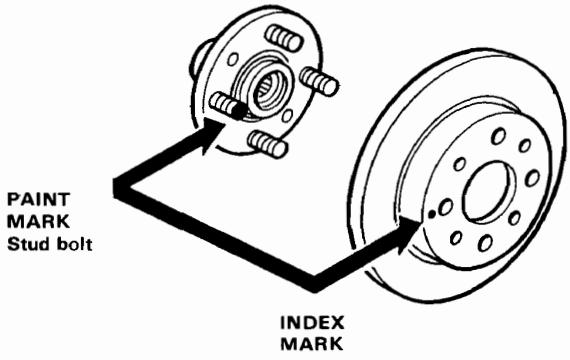
CAUTION: The vehicle should be on the ground before any bolts or nuts connected to rubber mounts or bushings are tightened.

Knuckle/Hub

NOTE:

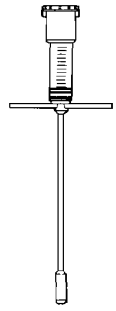
- Use only genuine Honda aluminum wheel weights. Non-genuine aluminum wheel weights may corrode and damage aluminum wheel.
- Remove the center cap by prying it out with a flat screwdriver. Avoid damage to the cap by not allowing it to fall during removal. Use a rag at the point you are going to pry, because aluminum alloy wheels can be easily damaged.





Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07HAA—SG00100	ALB T-Wrench	1	
②	07HAJ—SG00602	ALB Checker	1	
	or			
	07508—SB00000	ALB Checker	1	
	07HAJ—SG00400	Adaptor	1	
③	07JAG—SD40100	Pushrod Adjustment Gauge	1	
④	07404—5790300	Vacuum Gauge	1	
⑤	07410—5790500	Tube Joint Adaptor	1	
⑥	07406—5790200	Pressure Gauges	2	
⑦	07410—5790100	Pressure Gauge Attachment C	2	
⑧	07510—6340101	Pressure Gauge Joint Pipe	1	
⑨	07HAK—SG00110	Pressure Gauge Joint Pipe	1	
⑩	07510—6340300	Vacuum joint tube A	1	
	or			
	07510—6340400	Vacuum joint tube B	1	



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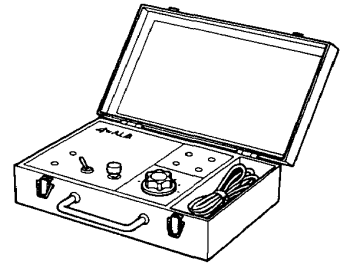

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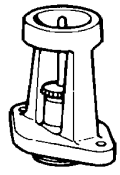

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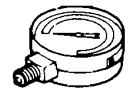

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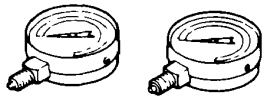
⑤



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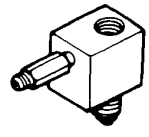

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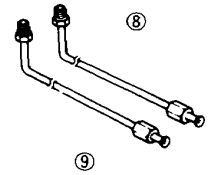

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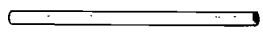
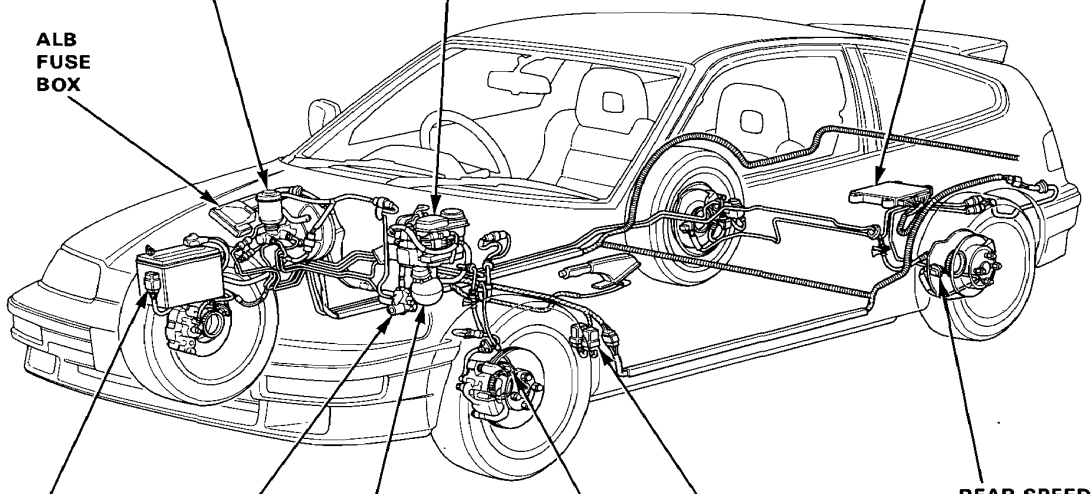


⑩

Illustrated Index

⚠WARNING **The accumlator contains high pressure nitrogen gas, do not puncture expose to flame or attempt to disassemble the accumlator or it may explode; severe personal injury may result.**



MODULATOR
Index/Inspection, 13-27

MASTER CYLINDER
Overhaul/Inspection, 13-38

CONTROL UNIT
Replacement, 13-46

ALB FUSE BOX

REAR SPEED SENSOR
Inspection/Replacement, page 13-47

POWER UNIT
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FAIL SAFE RELAY
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FRONT SPEED SENSOR
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MOTOR RELAY
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ACCUMULATOR UNIT
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Description

General/Features/Construction

General

In a conventional brake system, if the brake pedal is depressed excessively, the wheels can lock before the vehicle comes to a stop. In such a case, the stability of the vehicle is reduced if the rear wheels are locked, and maneuverabily of the vehicle is reduced if the front wheels are locked, creating an extremely unstable condition.

The Anti-Lock Brake (ALB) system modulates the pressure of the brake fluid applied to each caliper, thereby preventing the locking of the wheels, whenever the wheels are likely to be locked due to excessive braking. It then restores normal hydraulic pressure when there is no longer any possibility of wheel locking.

Features

- Increased braking stability can be achieved regardless of changing driving conditions.
- The maneuverability of the vehicle is improved as the system prevents the front wheels from locking.
- When the ALB goes into action, kick-back is felt on the brake pedal.
- The ALB system is equipped with a self-diagnosis function. When an abnormality is detected, the dash warning light comes on and the LED display on the control unit blinks. The location of the system's trouble can be diagnosed from the frequency of the LED display blinks.
- This system has individual control of the front wheels and common control ("select low") for the rear wheels."Select Low" means that the rear wheel that would lock first (the one with the lowest resistance to lock-up) determines ALB activation for both rear wheels.

Construction

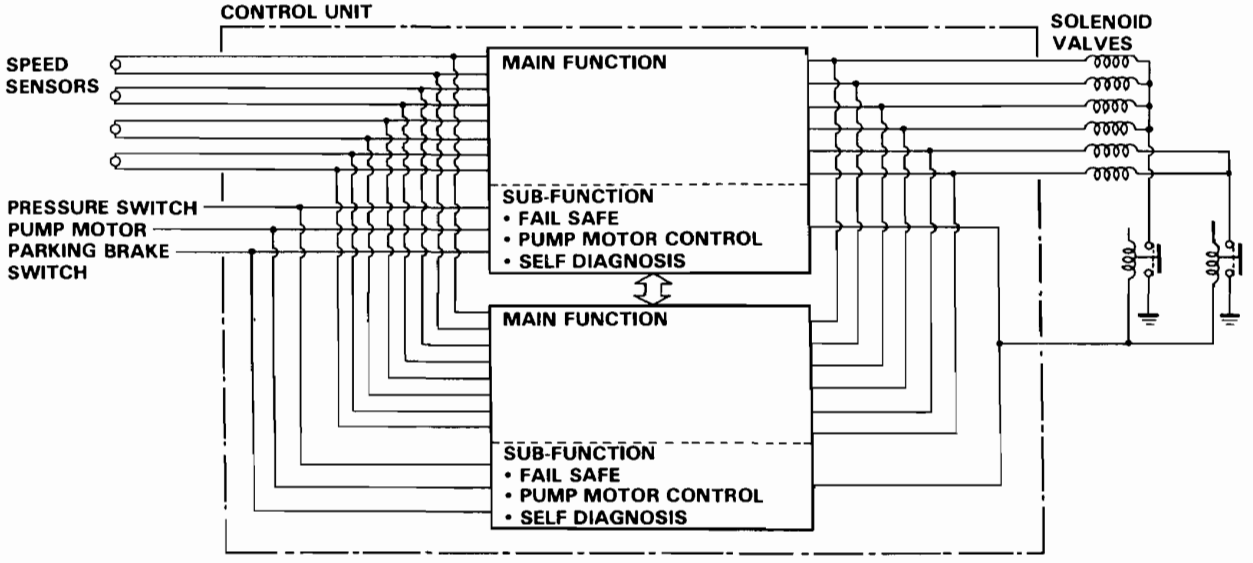
In addition to the conventional braking sysem, the ALB system is composed of: gear pulsers attched to the rotating part of individual wheels; speed sensors, which generate pulse signals in correspondence to the revolution of the gear pulsers; control unit, which controls the working of the ALB system by performing calculations based on the signals from the individual speed sensors and the individual switches; modulator unit, which adjusts the hydraulic pressure applied to each caliper on the basis of the signals received from the control unit; an accumlator, in which high-pressure brake fluid is stored; a pressure switch, which detects the pressure in the accumlator and transmits signals to the control unit; a power unit, which supplies the high-pressure working fluid to the accumlator by means of a pump; a motor relay for driving the power unit; a fail-safe relay, which cuts off the solenoid valve ground circuit when the fail-safe device is at work; and, a dash warning light.

Control Unit

Costruction

The control unit consists of a main function section, which controls the operation of ALB system, and sub-function, which controls the pump motor and "self-diagnosis."

1. Main Function
   The main function section of the control unit performs calculations on the basis of the signals from each speed sensor and controls the operation of the ALB system by putting into action the solenoid valves in the modulator unit for each front brake for the two rear brakes.
2. Sub Function
   The sub-function section gives driving signals to the pump motor and also gives "self-diagnosis" signals, necessary for backing up the ALB system.



Self-Diagnostic Function

Since the ALB system modulates the braking pressure when a wheel is about to lock, regardless of the driver's intention, the system operation and the braking power will be impaired if there is a malfunction in the system. To prevent this possibility, at speeds above 10 km/h (6 mph), the self diagnosis function, monitors the main system functions. When an abnormality is detected, the dash warning light goes on.

There is also a check mode of the self-diagnosis system itself: when the ignition switch is first turned on, the dash warning light comes on and stays on for a few seconds after the engine starts, to signify that the self-diagnosis system is functional.

(cont'd)

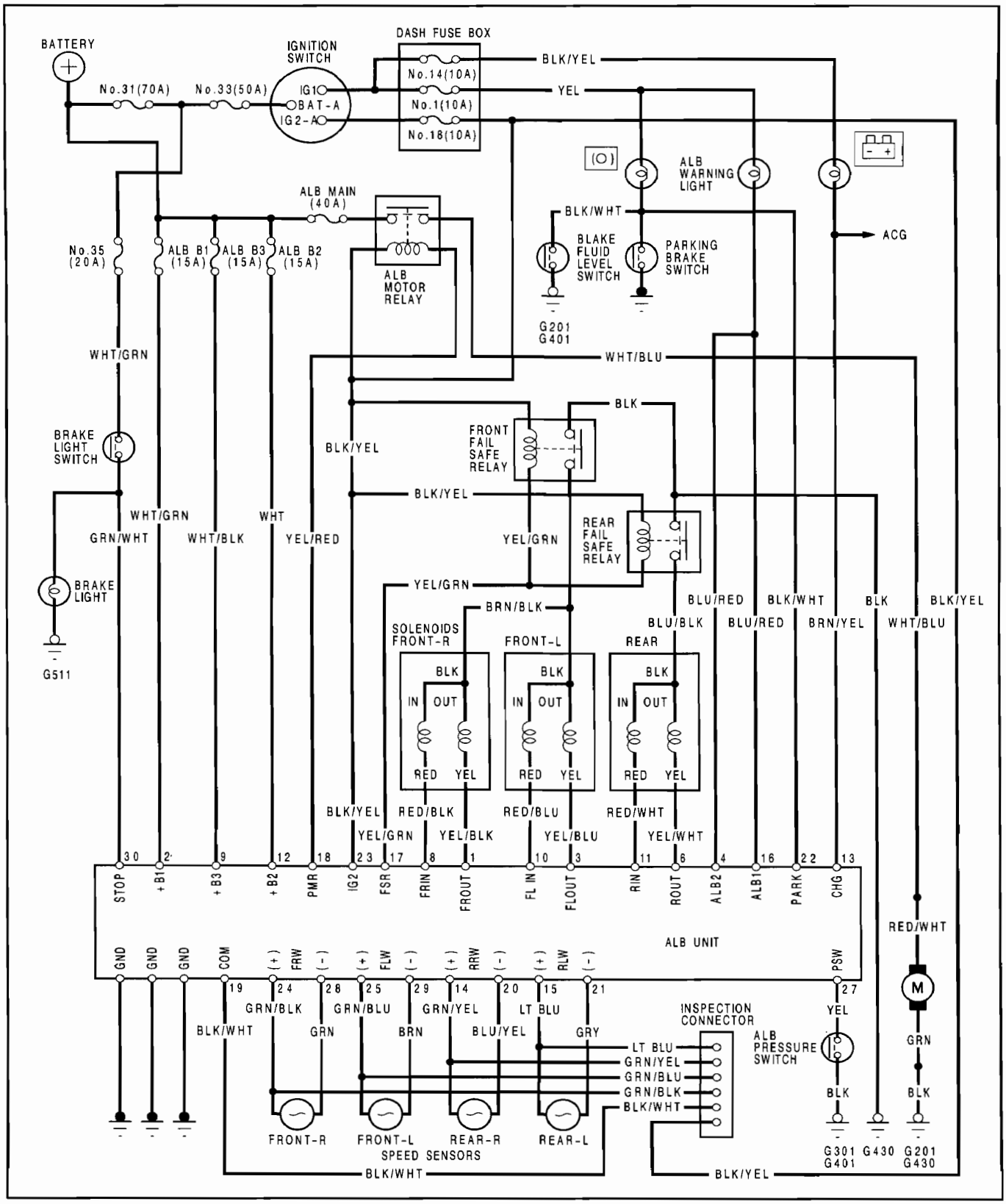
Description

Control Unit (cont'd)

Fail-Safe Function
If an abnormality is detected, the control unit turns off the fail-safe relays and motor relay. In this condition the ALB system is prevented from functioning, yet the basic system continues to operate normally.

The Dash Warning Light Comes On
1. When the fluid pressure pump runs more than 120 seconds.
2. When the parking brake is applied for more than 30 seconds while the vehicle is being driven.
3. When the rear wheel(s) is (are) locked more than a specified time.
4. When the wheel rotation signal is not transmitted due to faulty wire or senser.
5. When the operation time of the solenoid valve(s) exceeds a predetermined valve and the control unit finds an open in the solenoid circuit.
6. When the output signals from both main functions in the control unit are not transmitted to the solenoid valves(s).

Circuit Diagram



ALB Checker

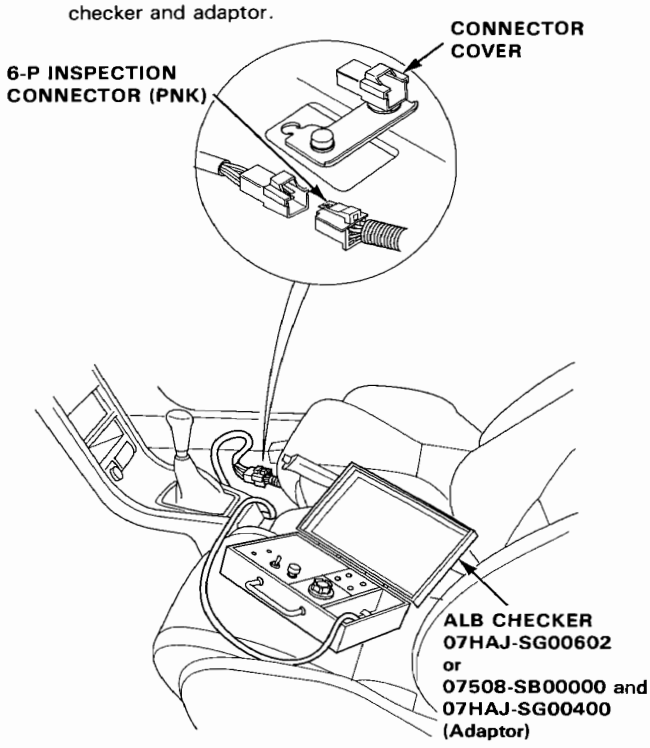
Function Test

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.
- The checker should be used through all modes, 1 to 6, to confirm proper operation of the system, in any one of the following situations:

—After replacing any ALB system component.
—After replacing or bleeding the system fluid.
—After any body or suspension repair that may have affected the sensors or their wiring.
—As art of P.D.I.

⚠WARNING Be sure to disconnect the 4w A.L.B checker before driving the vehicle. If you drive the vehicle with the checker left connected, the ALB may operate when it is not otherwise supposed to.

1. With the ignition switch off, disconnect the 6-P inspection connector (PNK) from the connector cover on the floor of the under the driver's seat.
   Connect the 6-P inspection connector to the ALB checker and adaptor.

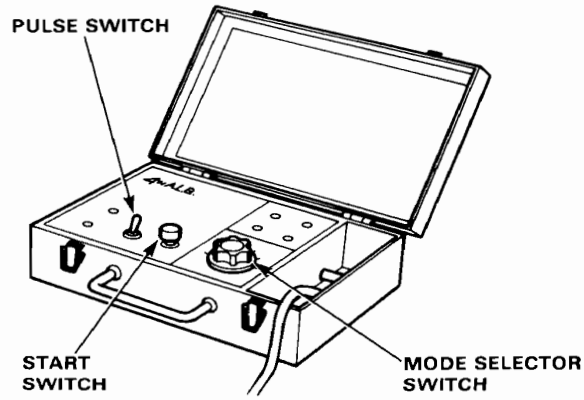


NOTE: The adaptor 07HAJ-SG00400 is not necessary when using of the checker 07HAJ-SG00602.

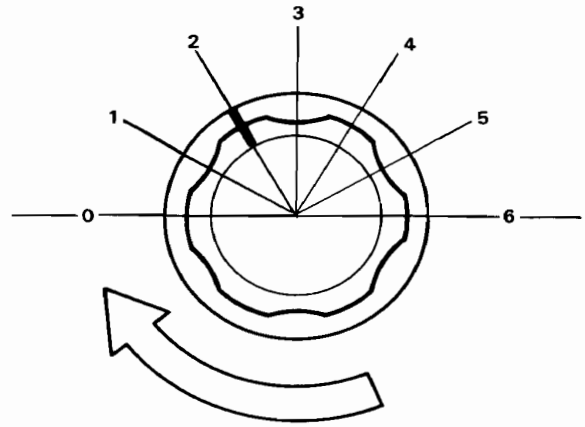
NOTE: Place the vehicle on level ground with the wheels blocked, put the transmission in neutral for manual transmission models, and in P for Automatic transmission models.

2. Start the engine and release the parking brake.

3. Operate the ALB checker as follows,
   (1) For ALB checker 07508-SB00000, turn the power switch ON.
   For ALB checker 07HAJ-SG00602, select the pulse switch to "50 pulse" side.
   (2) Turn the Mode Selector switch to "1."
   (3) Push the Start Test switch:
   —The Busy light should come ON.
   —The dash ALB warning light should not come ON (if it comes on, follow the troubleshooting on page 13 -14)

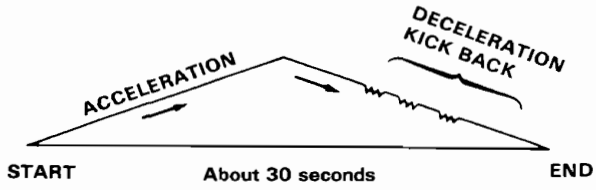


4. Turn the Mode Selector Switch futher to "2".



5. Depress the brake pedal and push the Start Test switch.
   The dash ALB warning light should not go on while the Busy light is ON. There should be kickback on the brake pedal. If not as described, go to trouble-shooting, page 13-11.

   NOTE: The operation sequence simulated by Modes 2, 3, 4 , 5 and 6.



6. Turn the Mode Selector switch to 3, 4 and 5.
   Perform stop 5 for each of the test mode positions.

Mode 1:
Sends the simulated driving signal 0 km/h (0mph) → 180km/h (112.5mph) → 0km/h (0 mph) of each wheel to the control unit to check the control unit self diagnosis circuit. There should be no kickback.

Mode 2:
Sends the driving signal of each wheel, then sends the lock signal of the rear left wheel to the control unit. There should be kickback.

Mode 3:
Sends the driving signal of each wheel, then sends the lock signal of the rear right wheel to the control unit. There should be kickback.

Mode 4:
Sends the driving signal of each wheel, then sends the lock signal of the front left wheel to the control unit. There should be kickback.

Mode 5:
Sends the driving signal of each wheel, then sends the lock signal of the front right wheel to the control unit. There should be kickback.

NOTE: If litte 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.

Inspection points:

1. The [ALB] warning light goes ON in mode 1.
   - Check the wiring. If there is good condition, the control unit is faulty.

   If [ALB] warning light goes on 120 seconds later but the power unit stops, refer to page 13-14.

2. There are no kickback in modes 2 through 5.
   - Faulty pressure switch (remains ON)
   - Shorted wires
   - Faulty or disconnected power unit coupler
   - Faulty power unit realy

3. Weak kickback in modes 2 through 5.
   - Bleed high pressure circuits.

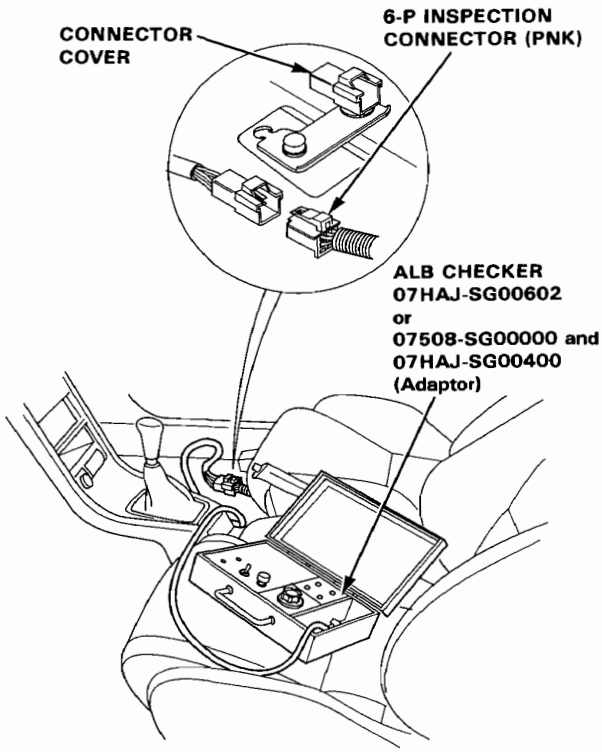
4. Power unit stops in mode 1 but it does not stop and there are no kickback in modes 2 through 5.
   - Brake fuid leakage
   - Bleed power unit
   - Clogged power unit outlet
   - Clogged or deteriorated power unit hose

ALB Checker

Wheel Sensor Signal Confirmation

NOTE: Use the ALB checker (mode 0) to confirm proper wheel sensor operation.

1. Concent the 6-P inspection concenctor (PNK) of under the driver's seat to the ALB checker.

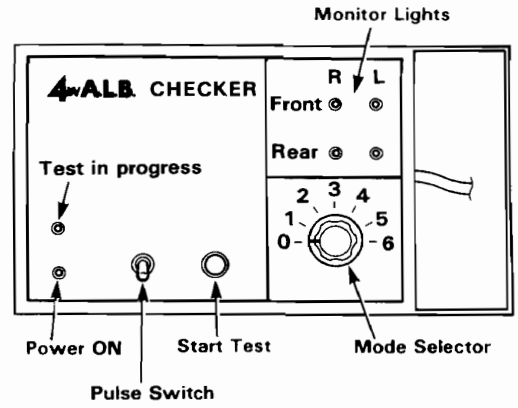


NOTE: The adaptor 07HAJ-SG00400 is not necessary when using of the checker 07HAJ-SG00602.

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 rotares.

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 posible 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

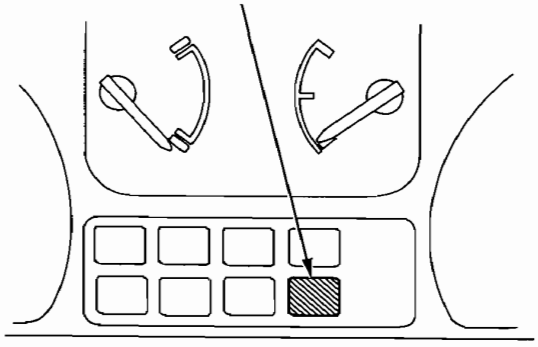
1. The dash warning light will come on and the control unit memorizes the problem under certain conditions.

   NOTE: Problem codes explained on page 13-13.

   - 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 restared.

DASH WARNING 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 13-8.

3. The dash warning light will come on and the LED will display a problem code when there is insufficient battery voltage to the control unit. Anexample 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 (10 A)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 conection 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 BLK/YEL lead between fuse No. 18 (10 A) and fail safe relay(s).
   - Open or short circuit in the YEL/GRN lead between control units.
   - Short circuit in BLU/RED or BLK/WHT lead between combination meter and control unit.
   - Open circuit in BRN/YEL lead between alternator and control unit.

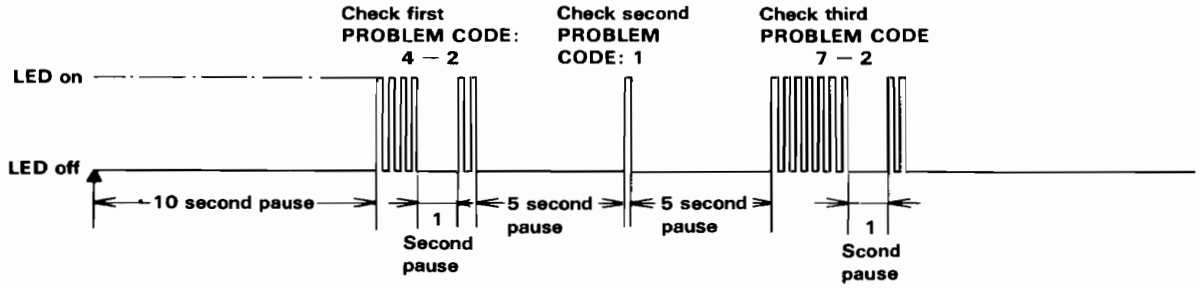
If the problem is not found substitute a known-good control unit and recheck whether the warning light remains ON.

(cont'd)

Dash Warning Light (cont'd)

Comes on and remains on while running:

1. Stop the engine.
2. Turn the ignition switch on and make sure that the dash warning light comes on.
3. Restart the engine and check the dash warning light.
   - There is no problem in the ALB system, if the dash warning light goes off.
   - Go step 4, if the dash warning light remains on.
4. Stop the engine.
5. Remove the control unit cover.
6. Turn the ignition switch on, but do not start the engine.
7. Record the blinking frequency of the LED on the control unit. The blinking frequency indicates the problem code.



NOTE:
- The control unit can indicate up to three problem codes.
- If the LED does not light, see Troubleshooting of warning light Circuit page 13-11.
- If you miscount the blinking frequency, turn the ingition switch off, then turn on to blink the LED again.
- After the repair is completed, disconnect the ALB B2 fuse for at least 3 seconds to erase the control unit's memory. Then turn the ignition key on again and recheck.
- The memory of problem code is erased if the connector is disconnected from the control unit or the control unit is removed from the body.

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	—	—	—	—	13-14	—ALB fuse —Motor realey —Pressure Switch —Accumulator —Modulator	13-46
2	—	Parking brake switch-related problem	—	—	—	—	13-17	Brake fluid level switch BRAKE light	
3	1	Pulser(s)	○				13-47		
	2			○					
	4				○	○			
4	1	Speed sensor	○				13-18		
	2			○					
	4				○				
	8					○			
5	—	Speed sensor(s)			○	○	13-19	—Modulator	
5	4				○				
	8					○			
6	—	Fail safe relay	—	—	—	—	13-20 (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)	○				13-24	ALB B3 fuse	
	2			○				ALB B1 fuse	
	4				○	○		—Rear fail safe relay —Pressure Switch —Motor relay	

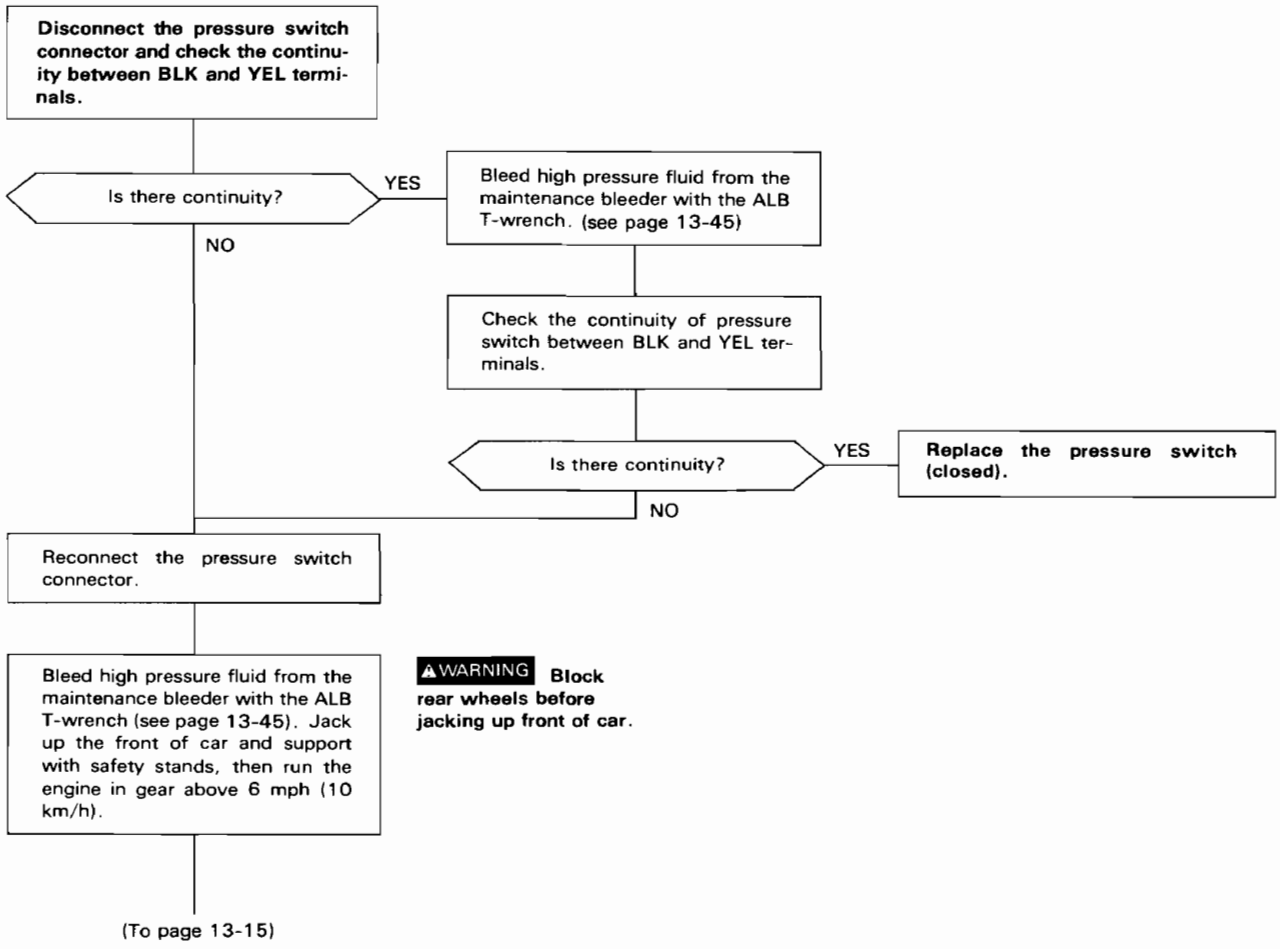
NOTE: In the event of simultaneous speed sensor or solenoid problems (codes 4 or 7), the control unit will only indicate the higher number sub-code.

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 Main (40 A) 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.



(From page 13-14)

Does the pump motor run?
- YES → (To page 13-16)
- 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 13-46)

Connect the WHT/RED and WHT/BLU terminals using a jumper wire.

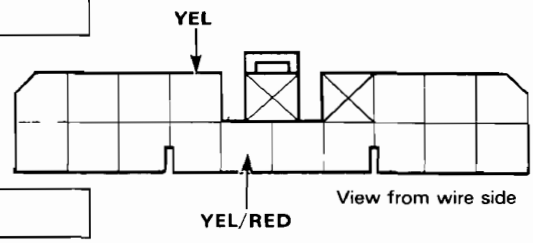
Does the pump motor run?
- NO → (To page 13-17)
- YES

Check voltage between the pump motor relay motor side (+) terminal and body ground (−).

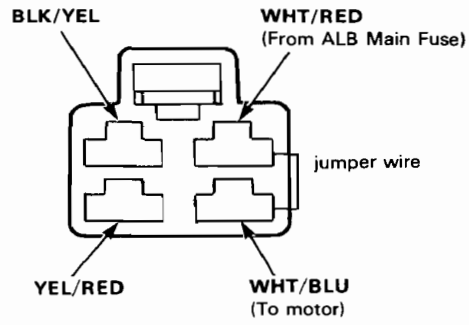
Is there battery voltage?
- NO → **Repair open in BLK / YEL wire between the No.18 (10A) fuse and pomp motor relay.**
- YES

Repair open in YEL/RED wire between the control unit and pump motor relay.

<CONTROL UNIT: 18P CONNECTOR>



<PUMP MOTOR RELAY CONNECTOR>



View from terminal side

Flowchart(cont'd)

(From page 13-15)

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 13-45 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).

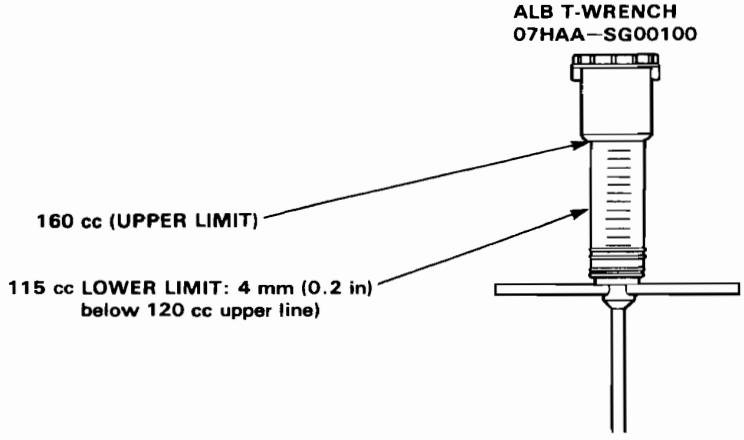
YES

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 ALB 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 miniutes for air bubbles to disappear and level to stabilize.

(From page 13-15)

Measure voltage between the WHT/BLU terminal (+) of the pump motor and body ground (−).

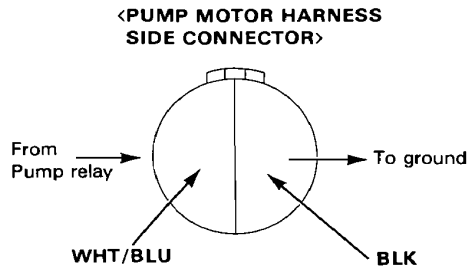
Is there battery voltage ?

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.



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 rechceck.

NOTE: Before Troubleshooting Problem Code 2, remove the ALB B2 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.
- BLK/WHT lead is shorted between the BRAKE warning light and parking brake switch.
- BLK/WHT lead is shorted between the BRAKE warning light and brake fluid level switch.
- The BRAKE warning light is blown.
- BLK/WHT has an open between the BRAKE warning light and parking brake.
- BLK/WHT has an open between the parking brake switch and control unit.

(cont'd)

Flowchart (cont'd)

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 500-1,000Ω? — NO → **Faulty speed sensor.**

YES

Disconnect the 18P connector from the control unit.

Check each wire for continuty 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

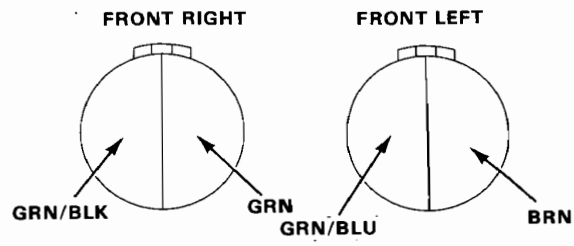
Is there continuity? — NO → **Repair open in sensor wire:**

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

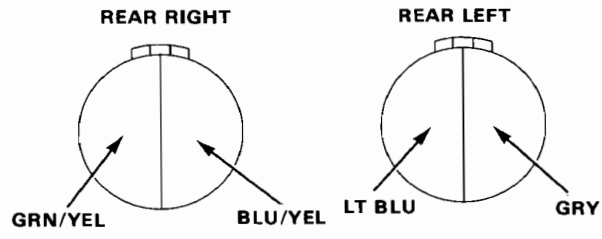
Faulty control unit

‹SENSOR SIDE CONNECTOR›



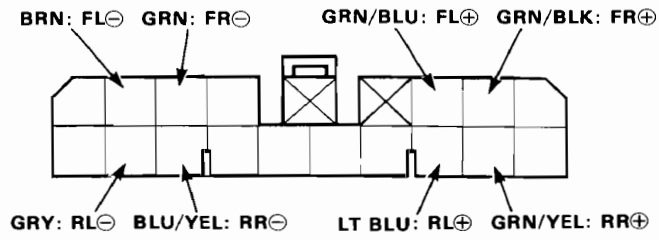
View from terminal side

‹SENSOR SIDE CONNECTOR›



View from terminal side

‹CONTROL UNIT 18P CONNECTOR›



View from wire side

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—1000 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

Reconnect the 18P connector to the control unit and connectors to the speed sensors.

Connect ALB checker to inspection connector.

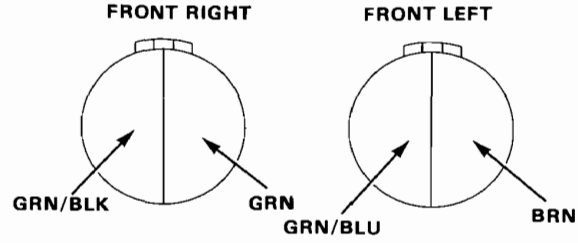
Check ALB function in MODE 2 and 3.

Does it work properly? — NO → **Faulty modulator.**

YES

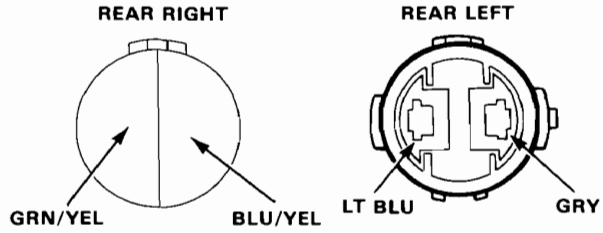
- **Incorrect the air gap (page 13-47)**
- **Faulty control unit.**

‹SENSOR SIDE CONNECTOR›

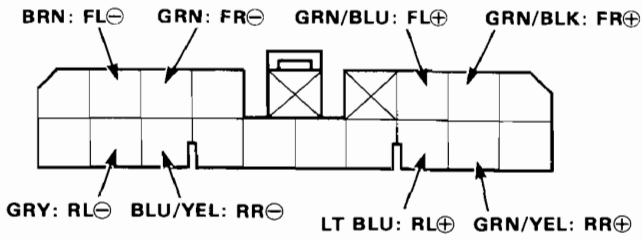


View from terminal side

‹SENSOR SIDE CONNECTOR›



‹CONTROL UNIT 18P CONNECTOR›



View from wire side

Flowchart (cont'd)

Problem Code 6-1: Front Fail Safe Relay Circuit

Remove front fail safe relay

Check relay function (page 13-46)

Does it work properly? — NO → **Faulty the front fail safe relay.**

YES

Check for continuity between BLK lead of relay connector and body ground.

Is there conitinuity? — 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 BLK / YEL lead (+) and body ground (−).

Is battery voltage available? — NO → **Repair open in BLK/YEL wire between the fail safe relay and No. 18 fuse (10 A).**

YES

Turn ignition switch OFF.

Disconnect the 3P connectors from the front solenoids.

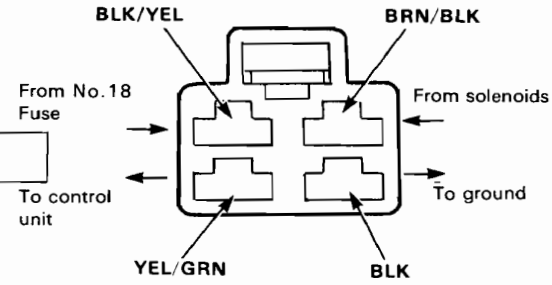
Check for continuity in BRN/BLK lead between fail safe relay and solenoids.

Is there continuity? — NO → **Repair open in BRN/BLK wire between the solenoids and fail safe relay.**

YES

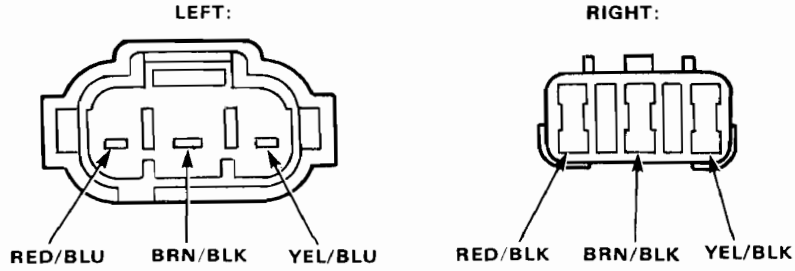
(To page 13-21)

<FRONT FAIL SAFE RELAY CONNECTOR HARNESS SIDE>



View from terminal side

<FRONT SOLENOIDS CONNECTOR HARNESS SIDE>



View from terminal side

(From page 13-20)

Check for resistance between RED and BLK terminals of front solenoids.

Is there 1-3 Ω? NO → **Faulty solenoid.**

YES

Check for resistance between YEL and BLK terminals of front solenoids.

Is there 1-3 Ω? NO → **Faulty solenoid.**

YES

Disconnect the 12P connector from the control unit.

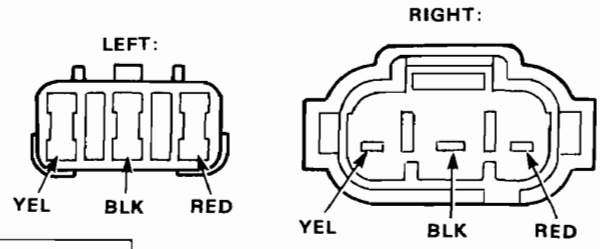
Check for continuity between control unit and front solenoid.
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet.

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

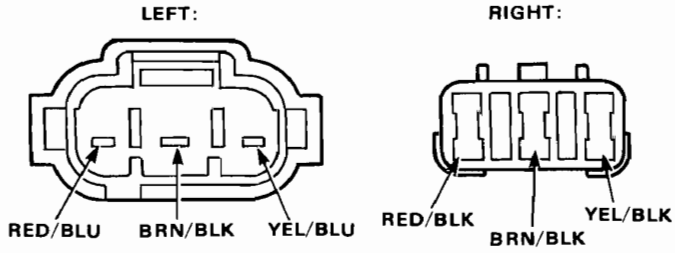
- **Faulty control unit.**
- **Incorrect air gap (page 13-47)**

‹FRONT SOLENOID CONNECTOR›



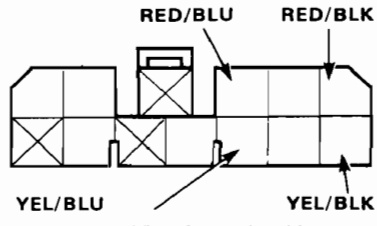
View from terminal side

‹FRONT SOLENOIDS CONNECTOR HARNESS SIDE›



View from terminal side

‹CONTROL UNIT 12P CONNECTOR›



View from wire side.

Flowchart(cont'd)

Problem Code 6-4: Rear Fail Safe Relay Circuit

Remove rear fail safe relay.

Check relay function (page 13-46)

Does it work properly? NO → **Faulty relay.**

YES

Check for continuity between BLK lead of relay connector 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 BLK/YEL lead (+) of wire harness and body ground (−).

Is battery voltage available? NO → **Repair open in BLK/YEL wire between the relay and No. 18 (10 A) fuse.**

YES

Turn ignition switch off.

Disconnect the 3P connector from the rear solenoid.

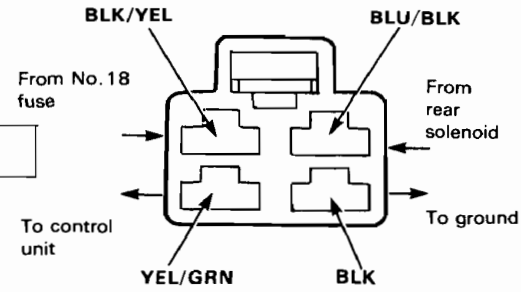
Check for continuity in BLU/BLK lead between fail safe relay and solenoid.

Is there continuity? NO → **Repair open in BLU/BLK wire between the relay and solenoid.**

YES

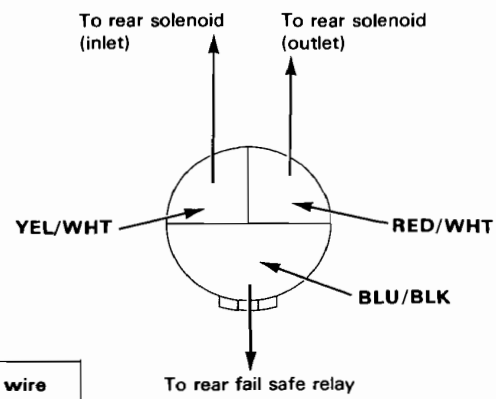
(To page 13-23)

<REAR FAIL SAFE RELAY CONNECTOR HARNESS SIDE>



View from terminal side

<REAR SOLENOID CONNECTOR HARNESS SIDE>



View from terminal side

(From page 13-22)

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

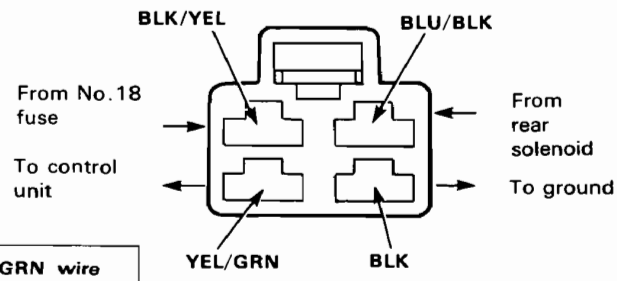
Check for continuity between control unit and rear solenoid.
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

Is there continuity: NO → **Repair open in wire between the solenoid and control unit:**
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet.

YES

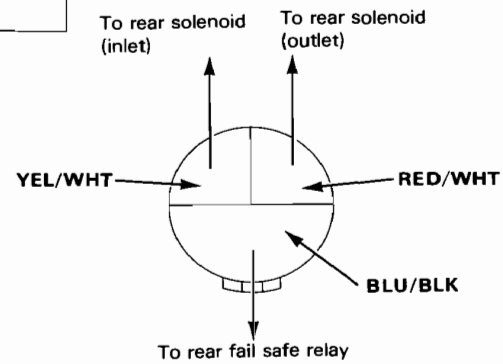
Faulty control unit.

‹REAR FAIL SAFE RELAY CONNECTOR HARNESS SIDE›



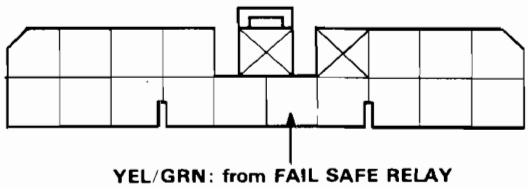
View from terminal side

‹REAR SOLENOID CONNECTOR HARNESS SIDE›

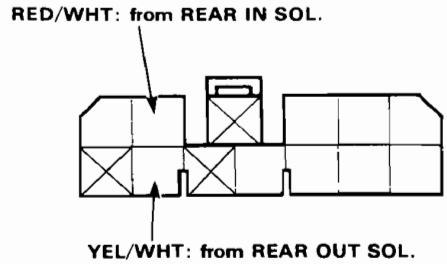


View from terminal side

‹CONTROL UNIT 18P CONNECTOR›



‹CONTROL UNIT 12P CONNECTOR›



View from wire side

Flowchart (cont'd)

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

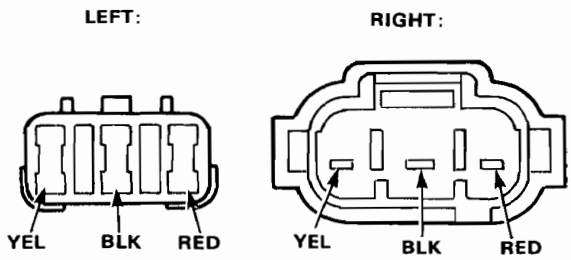
Check for continuity between control unit and body ground.
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

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

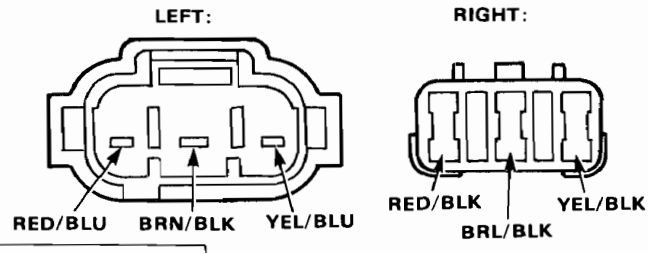
- **Faulty control unit.**
- **Incorrect air gap (page 13-47)**

‹FRONT SOLENOID CONNECTOR›



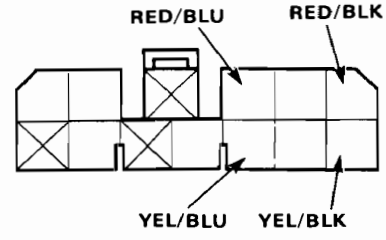
View from terminal side

‹FRONT SOLENOIDS CONNECTOR HARNESS SIDE›



View from terminal side

‹CONTROL UNIT 12P CONNECTOR›



Problem Code 7-4: Rear Solenoid Related Problem

Disconnect wire harness from rear solenoids

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

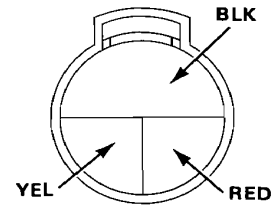
Check for countinuity between control unit and body ground.
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

Is there continuity? — YES → **Repair short in wire:**
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

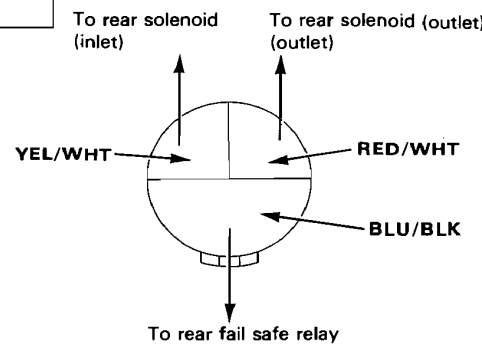
NO

Faulty control unit.

‹REAR SOLENOID CONNECTOR›

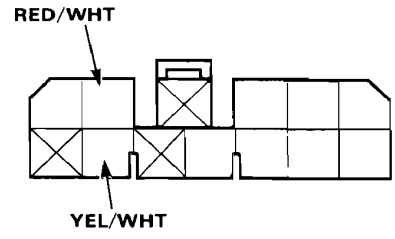


‹REAR SOLENOID CONNECTOR HARNESS SIDE›



View from terminal side

‹CONTROL UNIT 12P CONNECTOR›



View from wire side.

Index/Relieving Accumulator/Line Pressure

⚠WARNING Use the ALB T-Wrench befroe disassembling the parts shaded in the illustration.

1. Drain the brake fluid from the master cyinder and modulator reservoir thoroughly.
2. Remove the red cap from the bleeder on the top fo the power nuit.
3. Install the special tool on the bleeder screw and turn it out slowly 90° to collect high pressure fluid into reservoir. Turn the special tool out one complete turn to drain the brake fluid thoroughly.
4. Retighten the bleeder screw and discard the fluid.
5. Reinstall the red cap.

NOTE: The flare nuts should be tightened to 19 N·m (1.9 kg-m, 14 lb-ft).

BRAKE BOOSTER
Test, page 13-42
Pushrod adjustment, page 13-43
Pushrod clearance adjustment, page 13-43
MASTER CYLINDER
Overhaul/Inspection, page 13-38
Disassembly, page 13-39
Reassembly, page 13-40

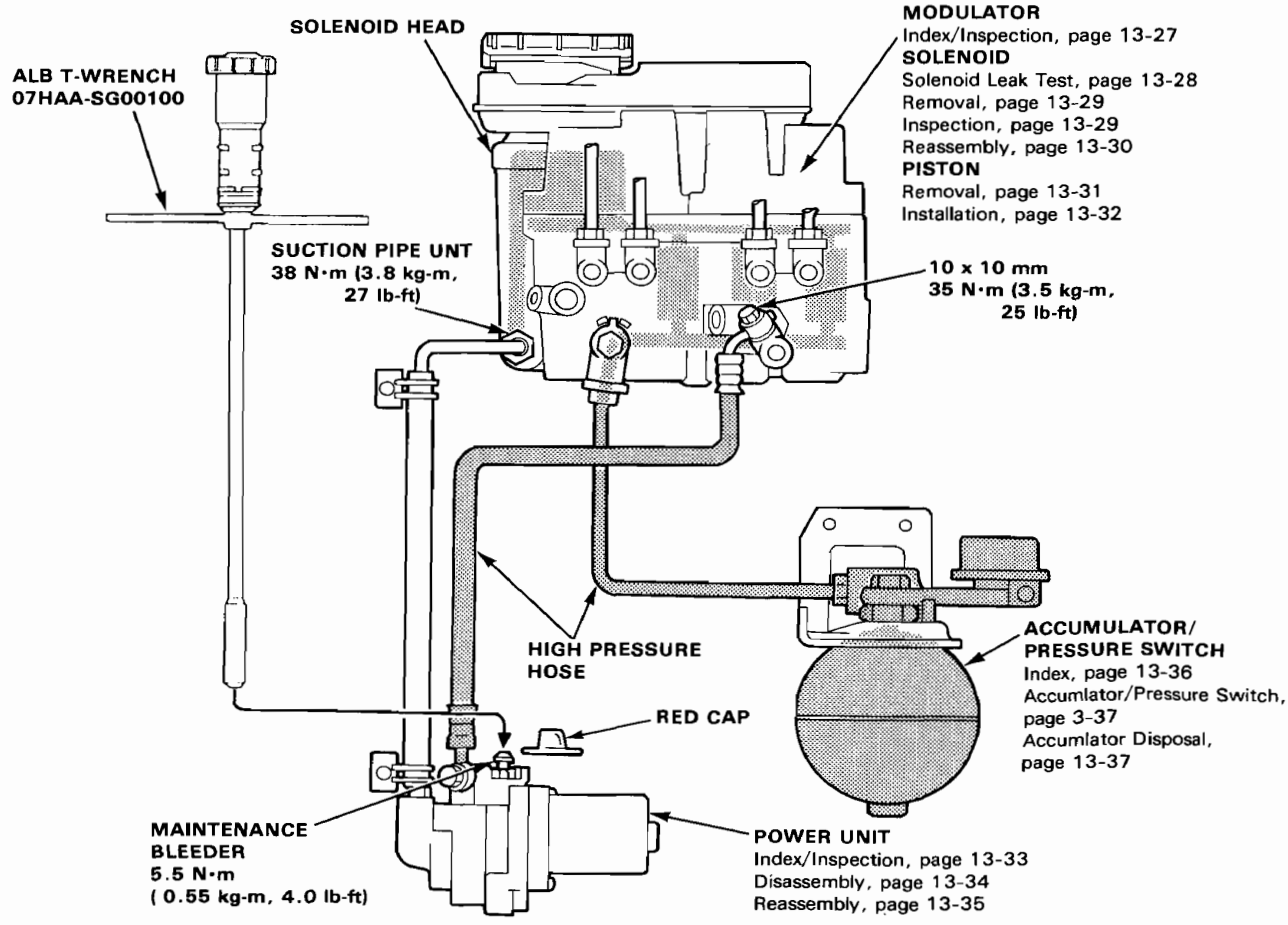
CAUTION: Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.

Brake Fluid Draining

1. Draining brake fluid from modulator tank: The brake fluid may be sucked out through the top of the modulator tank with a syringe. It may also be drained through the pump joint after disconnecting the pump hose.
2. Draining brake fluid from master cylinder: Loosen the bleed screw and pump the brake pedal to drain the brake fluid from the master cylinder.

⚠WARNING

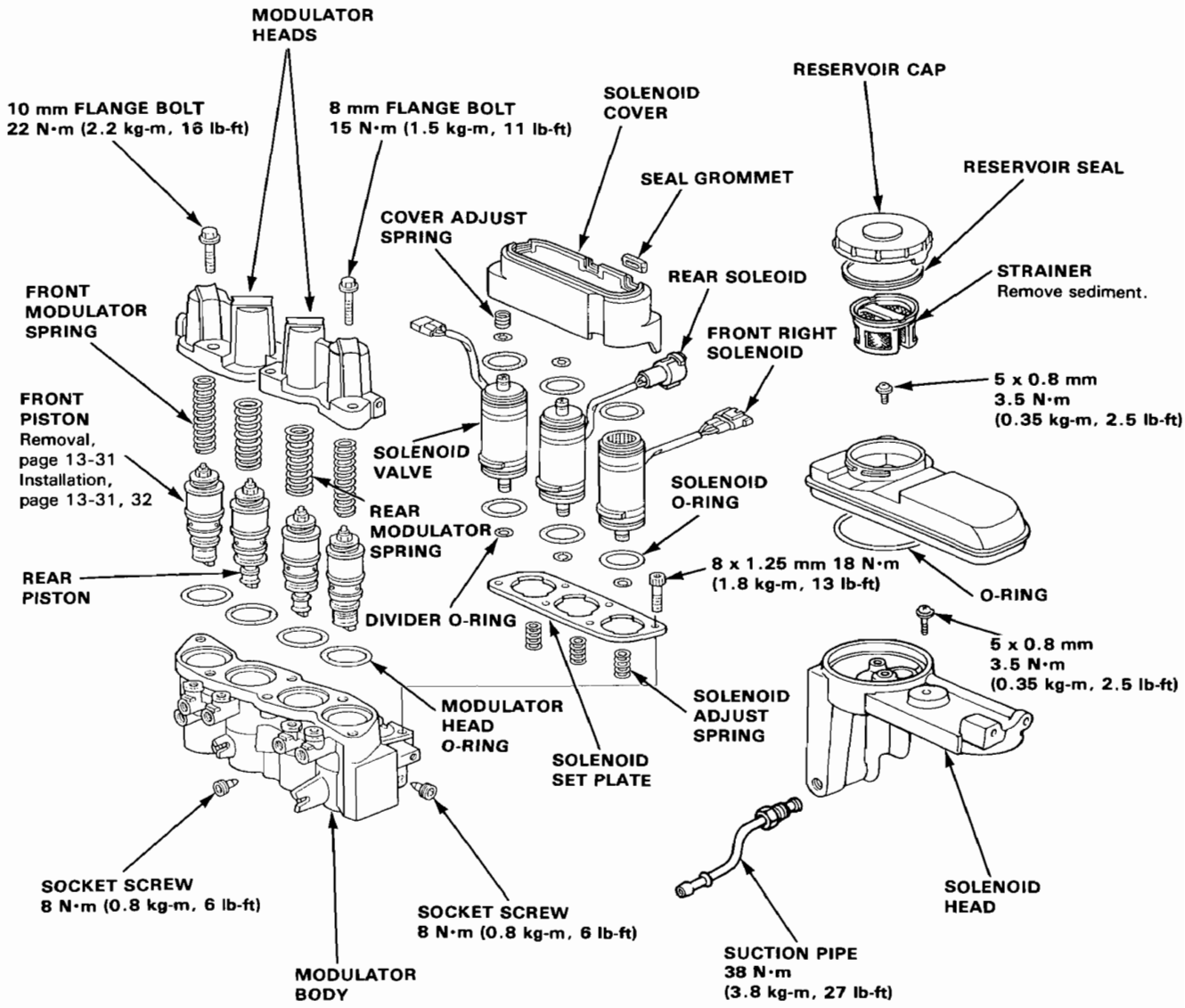
- **High pressure fluid will squirt out if the tube shaded is removed or the solenoid head 8 mm and 10 mm bolts are loosened.**
- **To drain high pressure brake fluid, follow the procedure under Relieving of High Pressure Brake Fluid on this page.**



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 DOT3 or DOT4 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.



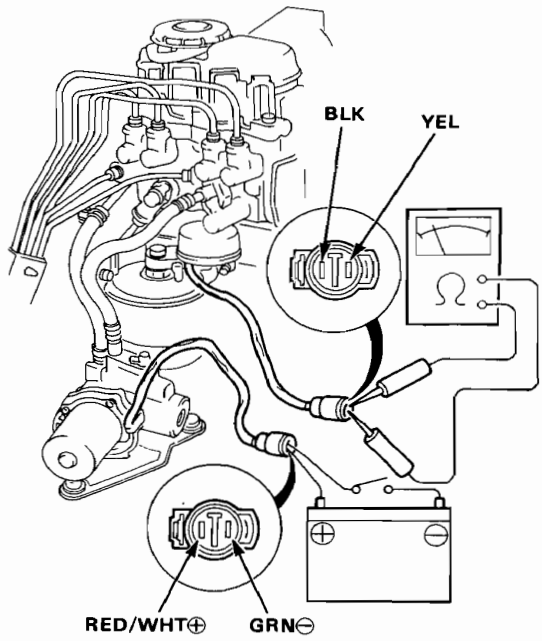
Solenoid

Solenoid Leak Test

1. Connect circuit tester (Ω range) between the BLK and YEL terminels of the accumulator pressure switch connector.

2. Attach the positive (+) lead of a fully charged 12 V 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.

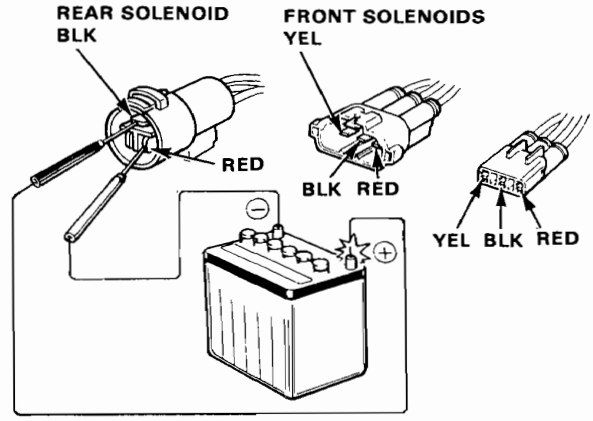
3. Turn the switch on to allow sufficient pressure to build up within the accumulator and check for continuity with the circuit tester. If the circuit tester shows continuity (pressure switch turned on), run the power unit for 4 seconds more, then turn the switch off.



Check for continuity 1 minute after switch was turned off.

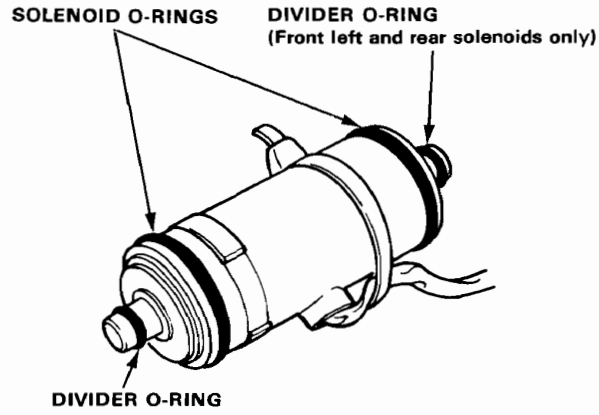
No continuity·····Leaky solenoid (if the pipe joint is tight) or faulty divider O-ring

4. Apply 12 V across the BLK and RED terminals of the solenoid connector momentarily.



NOTE: Modulator reservoir may overflow.

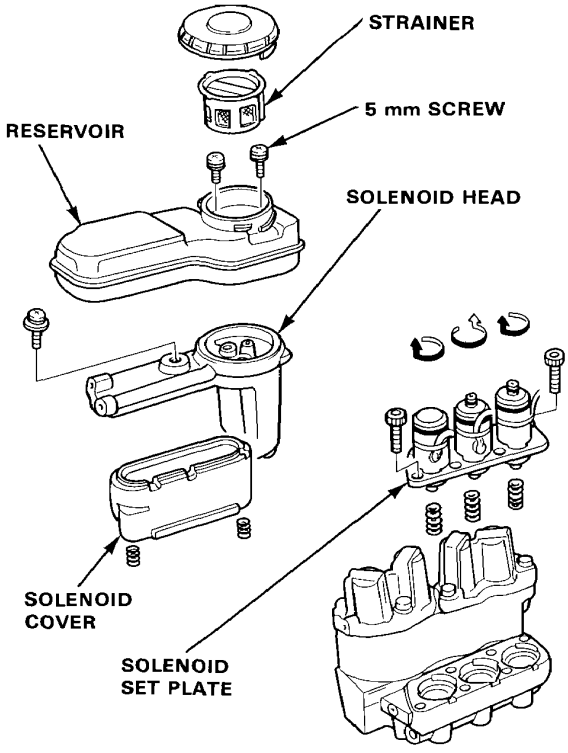
- Check if the solenoid hisses or squeaks. Replace the modulator if the solenoid hisses or squeaks.
- Make sure that the solenoid does not hiss or squeak after it has clicked into position. Replace the modulator if the solenoid hisses or squeaks.
- Check the pressure switch for continuity within one 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 13-26).
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, reaine the solenoid head parallel to the ground and remove it.
7. Remove the solenoid cover.
8. Remove the hexagonal socket screws and loosen the solenoid set plate.
9. Turn the solenoid valves several times until they move freely and turn the solenoid valves 1/2 turn to align their projection with the cutout in the set plate. Remove the solenoid valves together with the set plate.

   CAUTION: The solenoid valves are delicate parts. Be careful not to drop them.



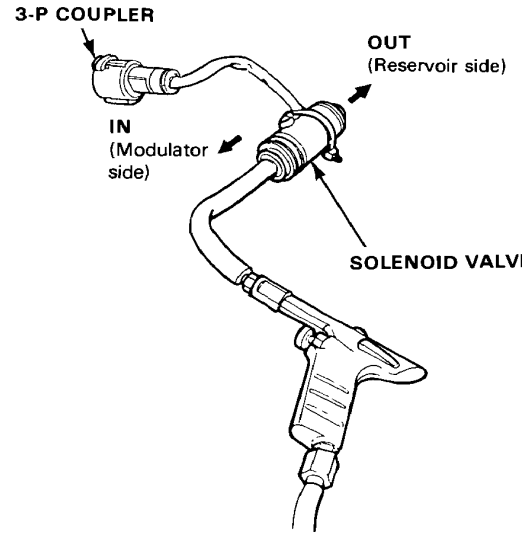
Inspection

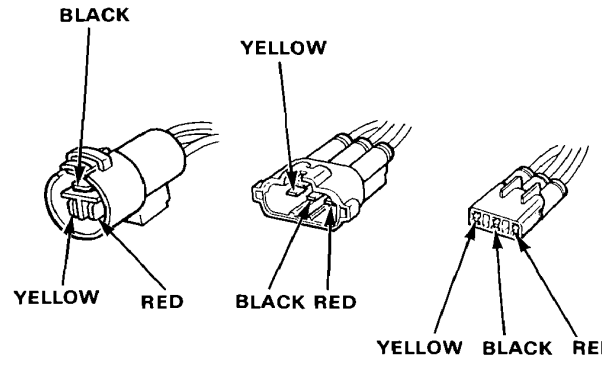
1. Connect a tube to the inlet of the solenoid valve. Apply compressed air to the solenoid valve through the tube.
2. Check the solenoid valve for proper operation by connecting a 12 V fully charged battery to the 3-P coupler terminals:

   Voltage not applied: There should be no air flow.

   BLK — RED: There should be air flow through IN and OUT.

   Black-Red and Black-Yellow : There should be air flow through IN.



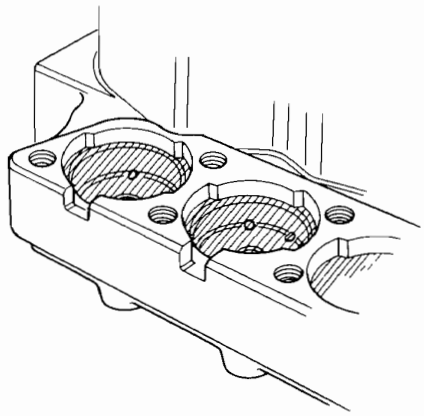


Solenoid

Reassembly

1. Fill the modulator body with brake fluid up to the step in the solenoid mounting hole.

   NOTE: On solenoid valve assembly, place shop rags over the solenoid valve and under the modulator valve to prevent the brake fluid from spilling on the valve.

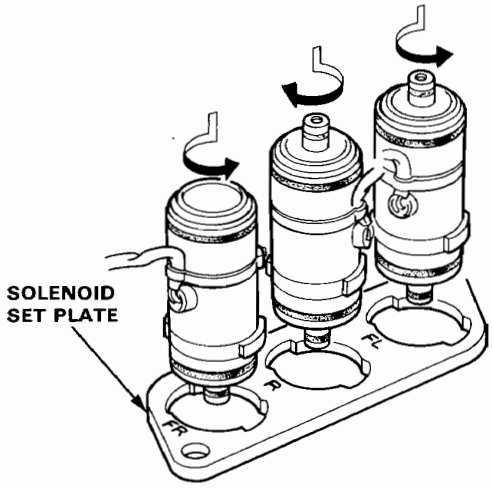


2. Coat the O-ring with the clean brake fluid and install the O-ring onto the solenoid valve.

3. Install the solenoid valves on the set plate.

   ⚠WARNING Each solenoid valve and set plate are marked for correct installation. If the solenoid valves are interchanged, the system will not work properly. Refer to the marks and be sure to install them in correct positions.

   - Align the projection on the solenoid valve with the cutout in the set plate and turn the valve 1/2 turn. The solenoid wire should face rearward.



4. Install the solenoid adjust springs on the modulator body.

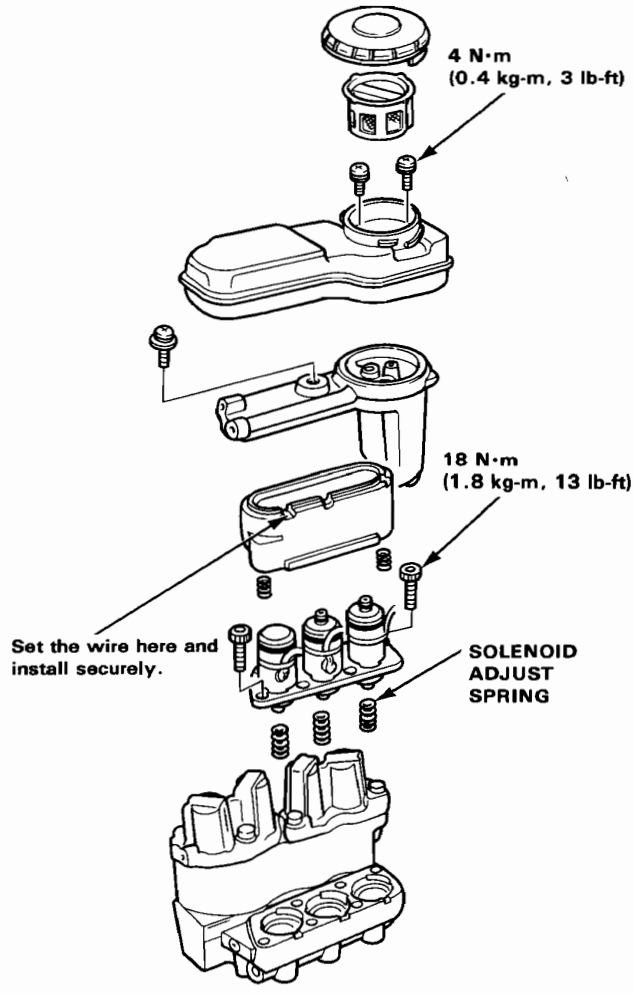
5. Install the solenoid valves and set plate and secure with the hexagonal socket screws.

6. Install the solenoid cover and solenoid head.

7. Install the reservoir tank.

8. Install the tank filter.

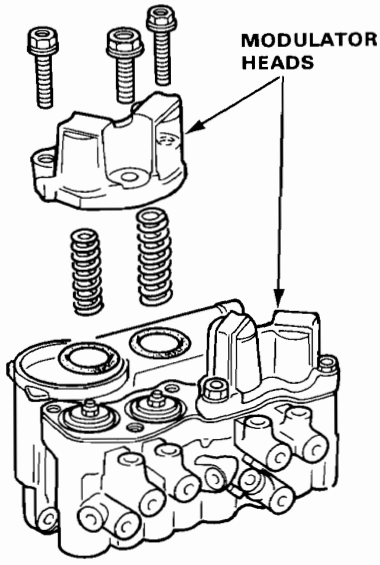
9. Connect the low pressure hose.



Piston

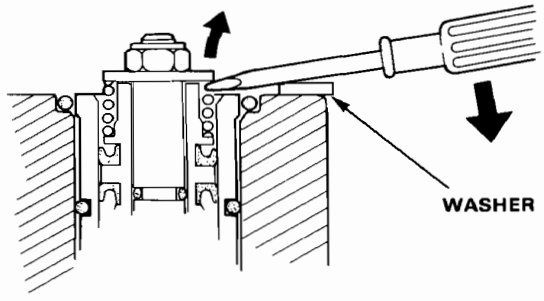
Removal

1. Remove the modulator heads.



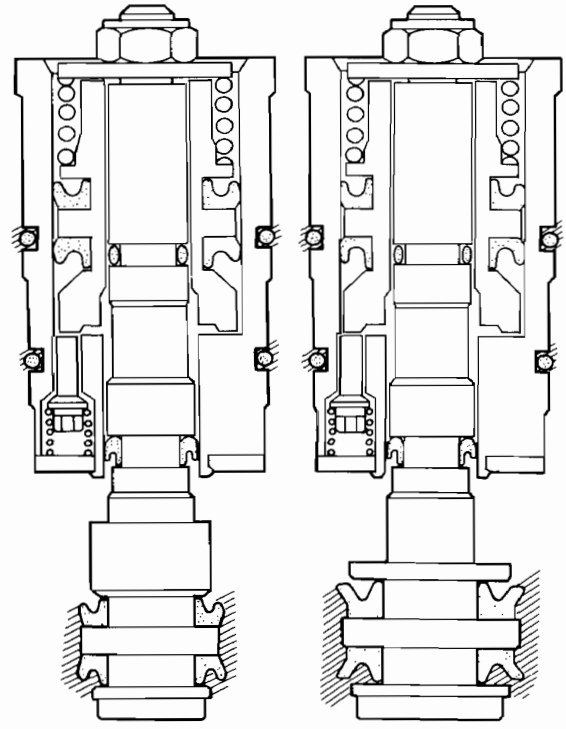
2. Insert the driver into the spring, pry off the piston assembly until it lifts up slightly and pull out the lock nut with a pair of pliers.

CAUTION:
- **Set the washer between the driver and modulator body to prevent damage to the body.**
- **Be careful not to damage the piston sleeve.**

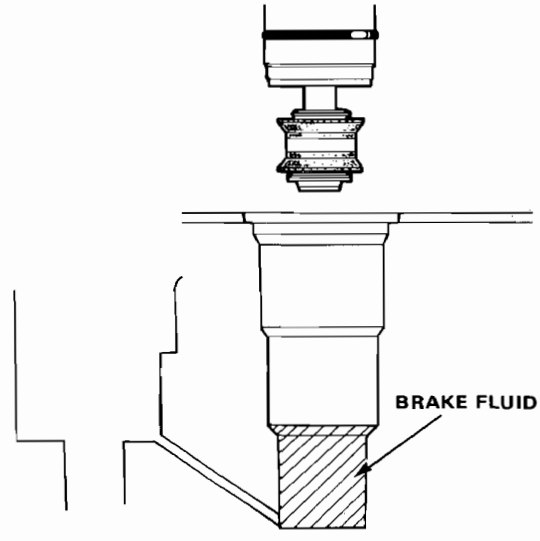


Installation

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.

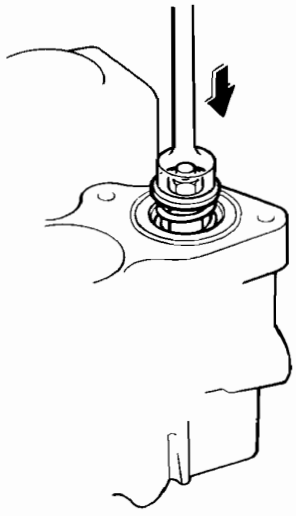


(cont'd)

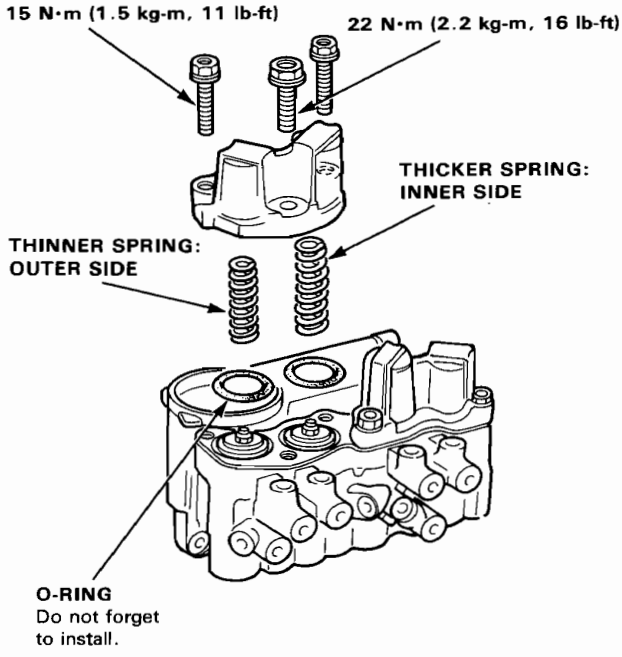
Piston

Installation (cont'd)

3. Set the piston assembly in the piston mounting hole in the modulator body and push down on the piston.
4. Push on the piston about 5 times until no bubbles come out of the solenoid side.



5. Install the modulator springs.
6. Install the solenoid heads with care not to pinch the O-rings.

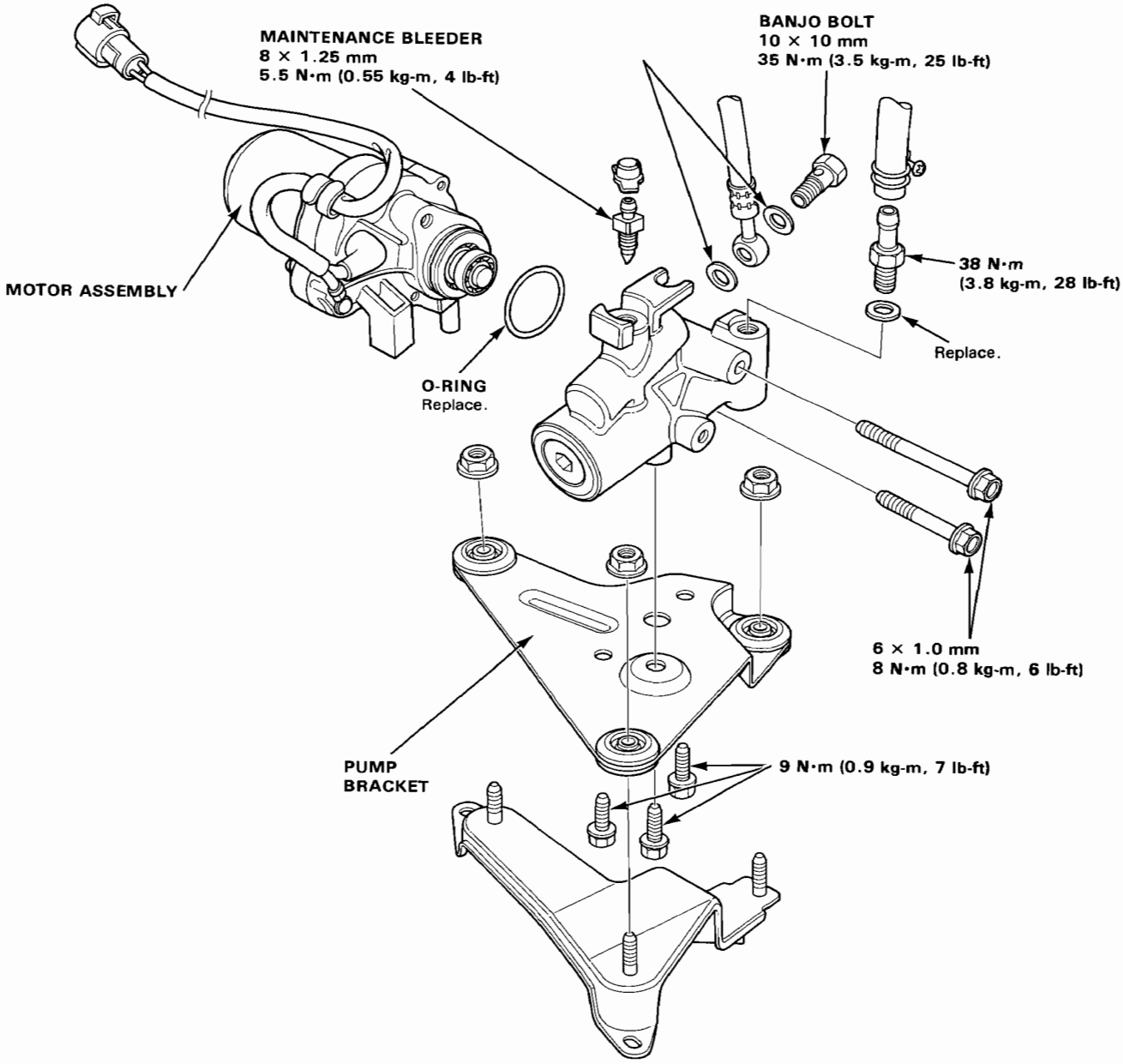


Power Unit

Index/Inspection

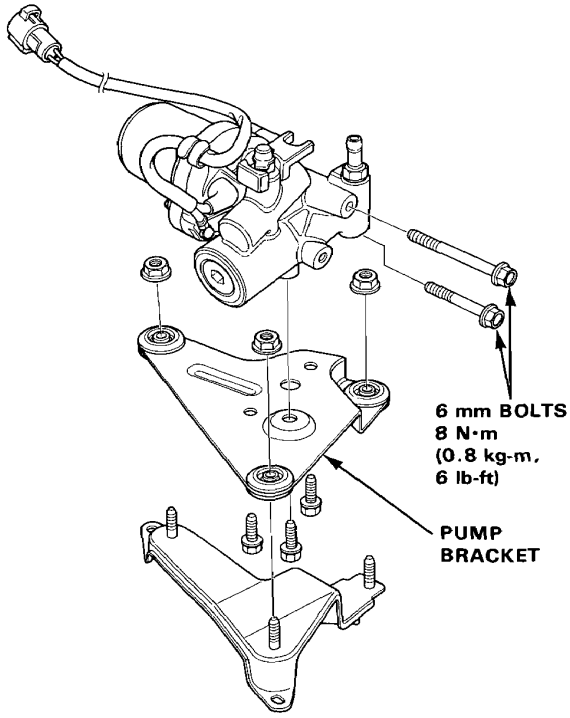
CAUTION:

- Do not attempt to disassemble the power unit parts except for those shown exploded in this illustration.
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid.

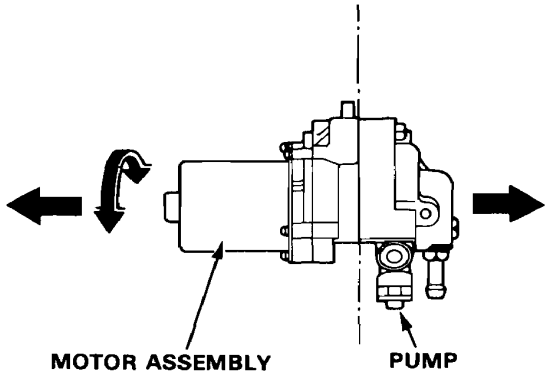


Disassembly

1. Remove the pump bracket.
2. Remove the 6 mm bolts attaching the pump to the pump motor.

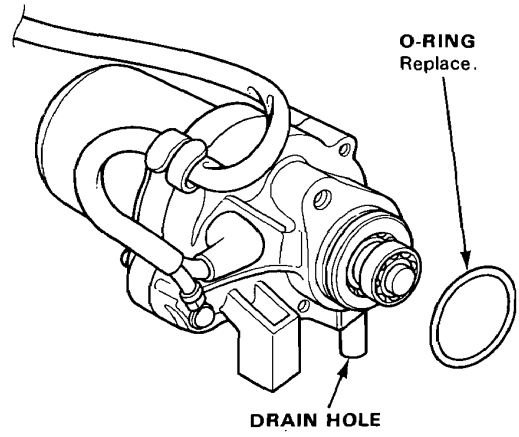


3. Separate the motor from the pump while rotaing the pump right and left.



NOTE: About 10 cc(0.6cu-in)of brake fluid will flow out when the motor is removed from the pump.

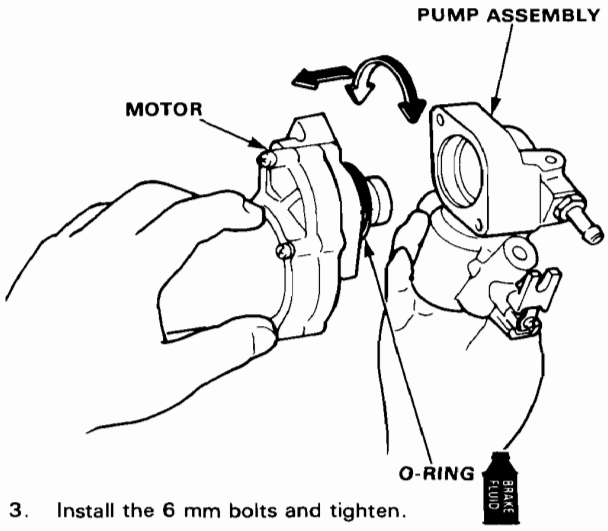
4. Wash the motor with clean brake fluid only on the exposed end and blow dry with compressed air.



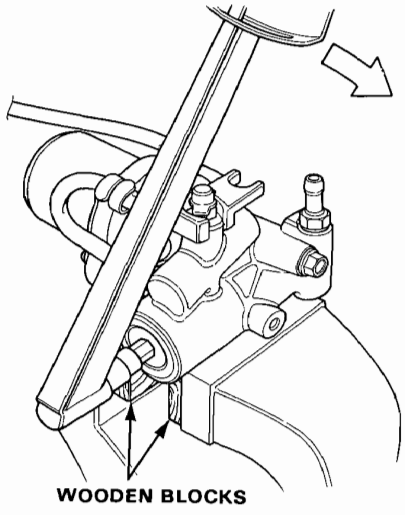
NOTE: Do not wash or dip the motor in brake fluid. Also be careful not to allow oil or water to enter the inside through the water drain hole.

Reassembly

1. Install a new O-ring on the pump motor.
2. Coat the O-ring with clean brake fluid and install the pump assembly on the motor while rotating it right and left by hand.

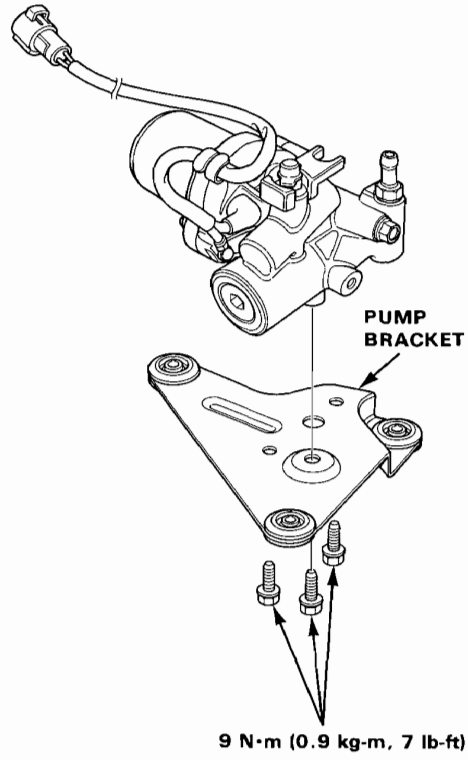


3. Install the 6 mm bolts and tighten.
4. Place the motor in a vise as shown and tighten the outlet plug.



NOTE: Clamp the pump in a vise only as shown adove.

9. Install the pump bracket.



Accumulator Unit

Index

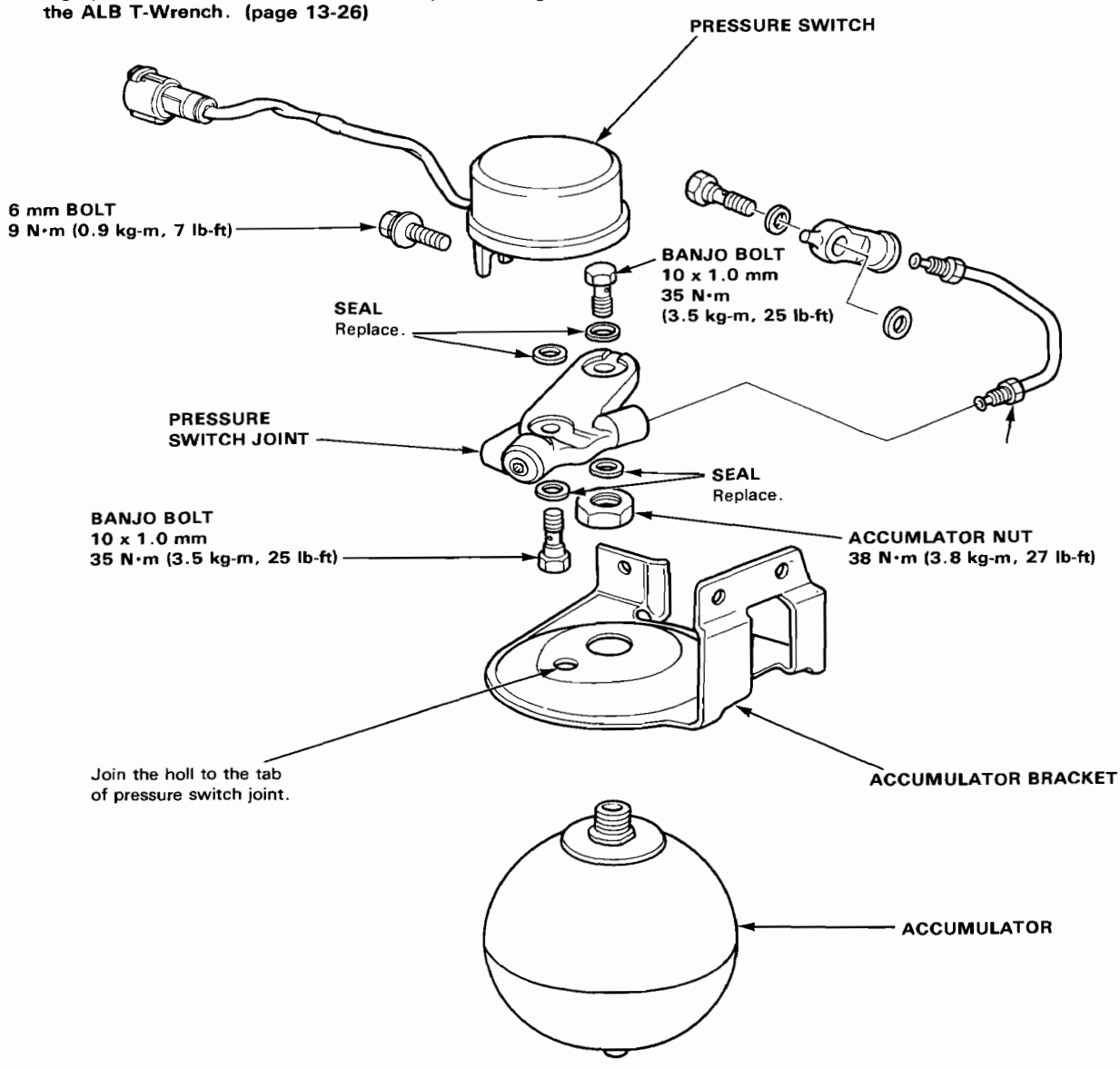
CAUTION:
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.

- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Before disassembly, the accumulator unit bleed the high pressure brake fluid out from the system using the ALB T-Wrench. (page 13-26)

- 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:
- Replace O-ring with new one whenever disassembled.

⚠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.

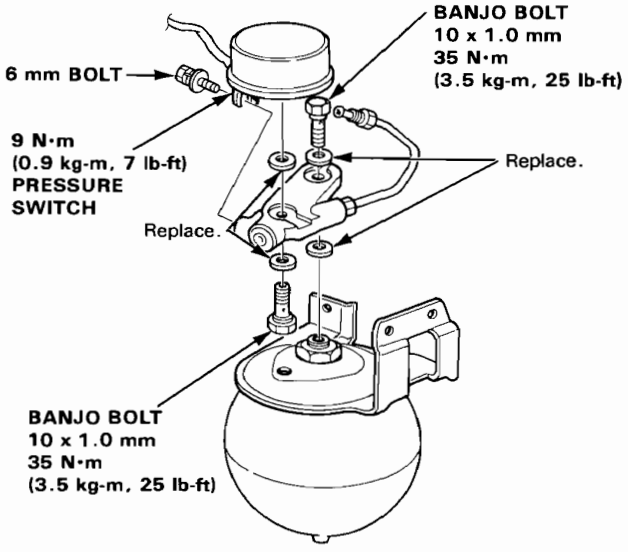


Accumulator

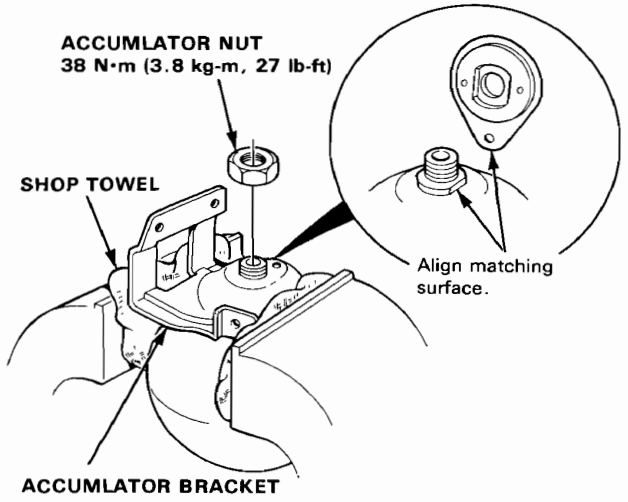
Accumlator/Pressure Switch

⚠WARNING **Drain the high pressure brake fluid from the power unit (see page 13-26).**

1. Remove the oil bolt, then remove the accumulator from the pressure switch joint.
2. Remove the pressure switch as shown.



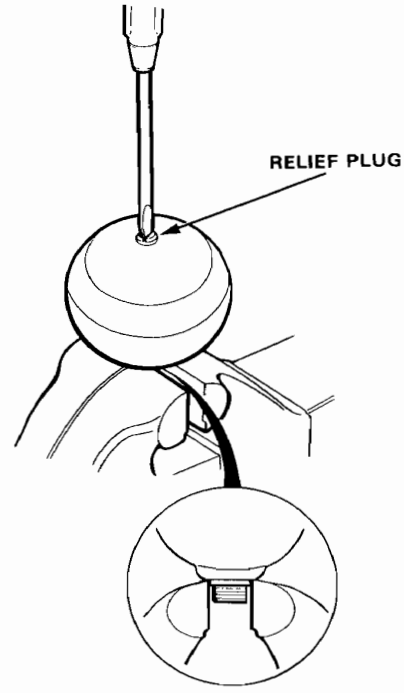
3. Remove the accumlator nut as shown.



Accumulator Disposal

⚠WARNING **The accumbllator contains high pressure nitrogen gas. Do not puncture, expose to the flame, or attempt to disasserble the accumulator or it may explode and severe personal injury may result.**

1. Secure the accumulator in a vise so that the relief plug points straight up.
2. Slowly turn the plug 3-1/2 turns and then wait 3 minutes for all pressure to escape.
3. Remove the plug completely and dispose of the accumulator unit.



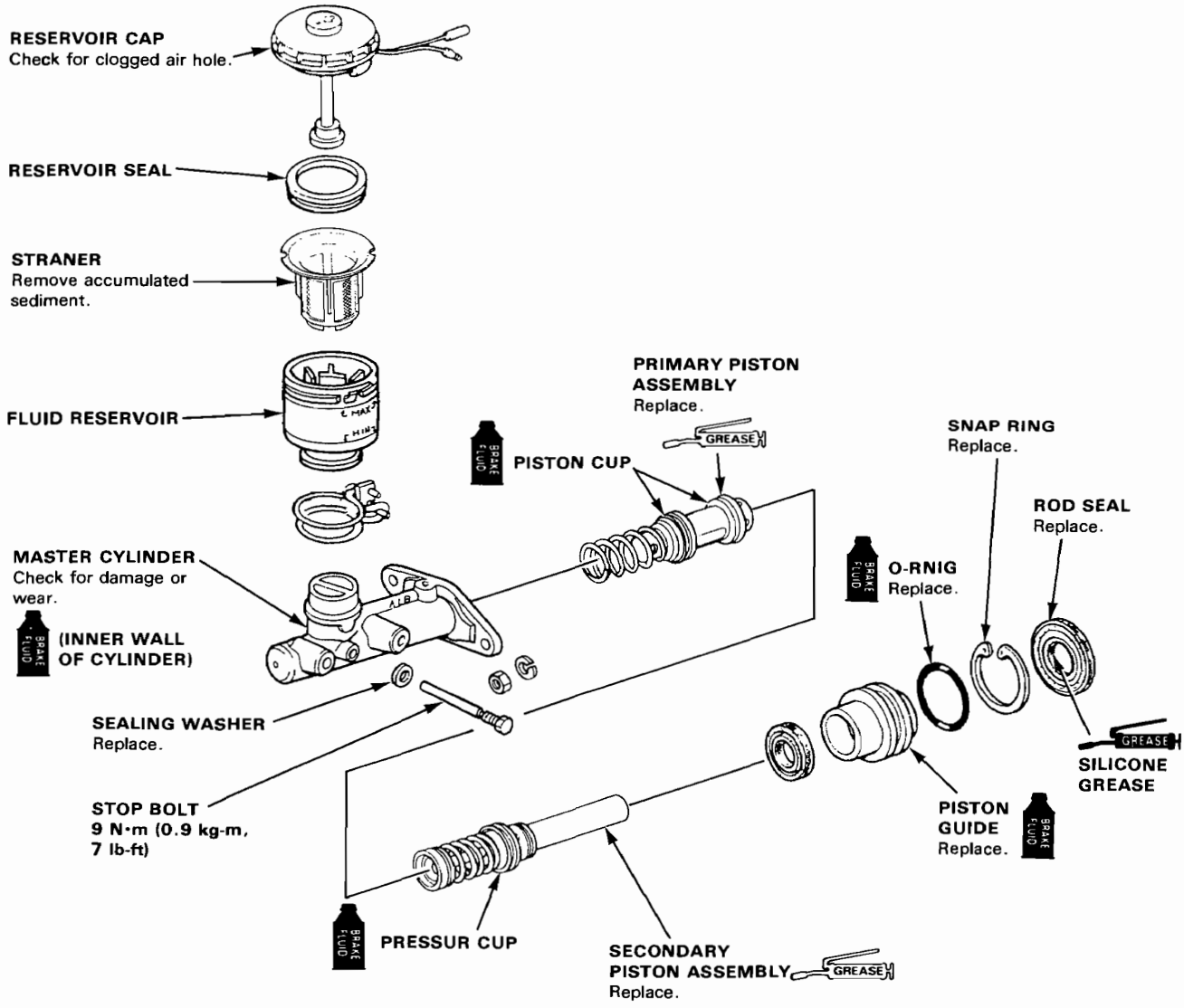
Master Cylinder

Overhaul/Inspection

CAUTION:
- **Avoid spilling brake fluid on painted surfaces as severe damage can result. Wipe up spilled fluid at onece and rinse well with 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 in damaged or worn. Do not hone or attempt to refinish the bore.**

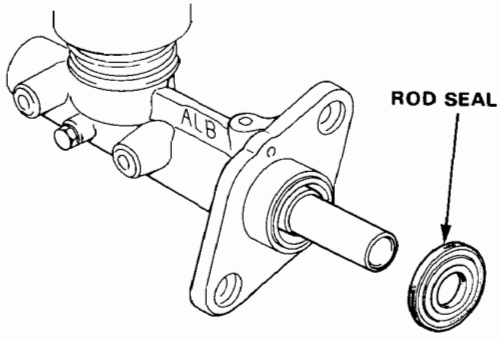
NOTE:
- Wash all removed parts in brake fluid and blow dry with compressed air. Blow open all passages and fluid ports.
- Replace all rubber parts with new ones whenever the cylinder is disassembled.
- To prevent damage, liberally apply clean brake fluid to the piston cups before installation.
- Do not attempt to refinish master cylinder bore. Replace if pitted or worn.



Disassembly

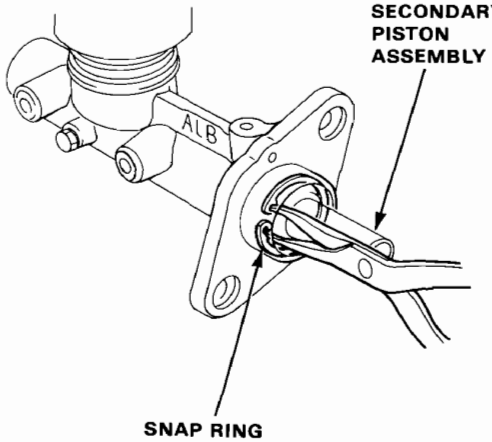
CAUTION:
- **Avoid pilling fluid on painted, plastic or rubber parts as it may damage the finish.**
- **Plug the end of the brake hose with a shop rag to prevent brake fluid from flowing out of the brake hose after disconnecting.**
- **Use only new clean DOT 3 or DOT 4 brake fluid.**
- **Clean all parts 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.

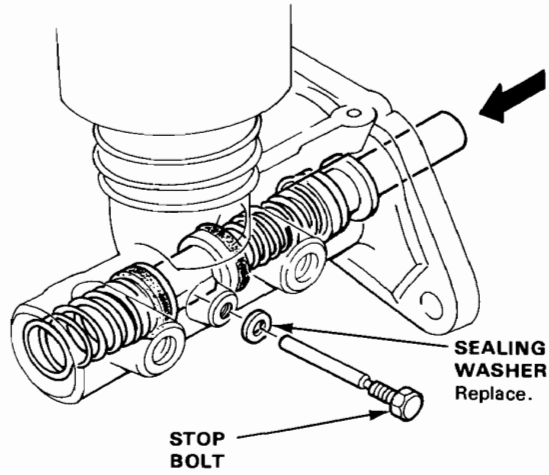


2. Push the secondary piston assembly, then remove the snap ring.

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 pimary 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.**

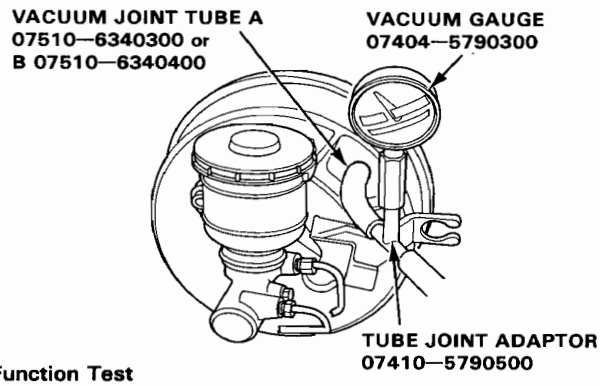
Brake Booster

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.

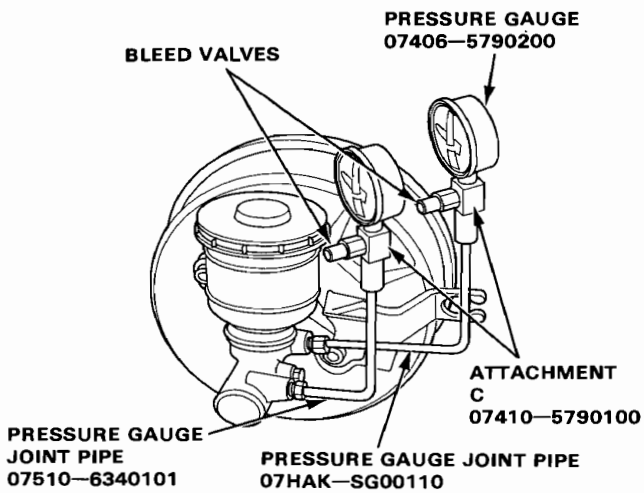
   If the vacuum readings decreases 20 mmHg (0.8 inHg) or more after 30 seconds, check following parts for leaks.
   - Check valve
   - Vacuum hose
   - Seals
   - Master cylinder O-ring and cup
   - Diaphragm



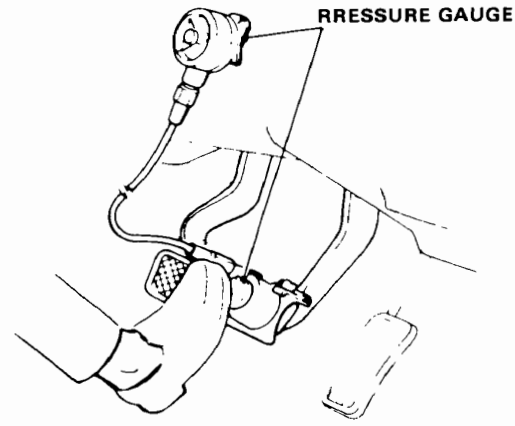
Function Test

1. Install the vacuum gauge as same the leak test.
2. Connect the oil pressure gauges to the master cylinder using the attachments as shown.
3. Bleed air through the valves.

   CAUTION: Avoid spilling brake fluid on painted, plastic or rubber parts as it may damage the finish.



4. Start the engine.
5. Depress the brake pedal with a 200 N (20 kg, 44 lbs) of pressure. The following pressures should be observed at the pressure gauges in each vacuum.

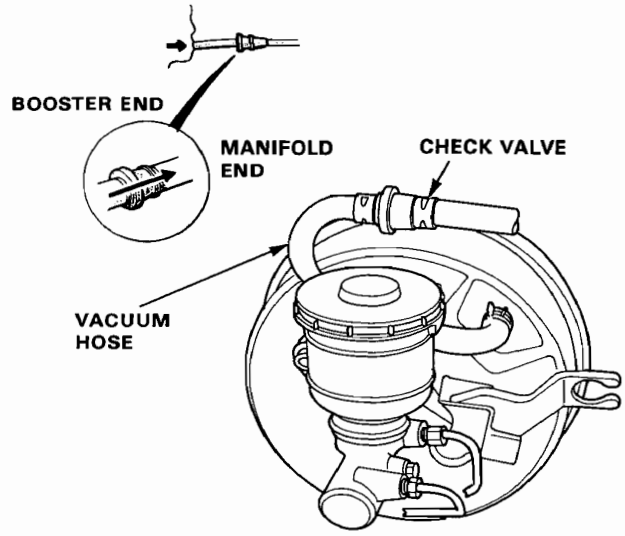


Vacuum mmHg	Line pressure kPa (kg/cm², psi)
0	900 (10.1, 143) min.
300	4,560 (45.5, 661) min.
500	6,933 (70.7, 1,005) min.

6. Inspect the master cylinder pistons and cups in the readings do not fall within the limits shown above.

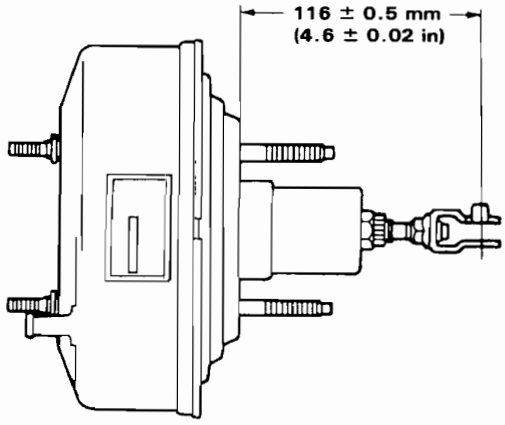
Check Valve Test

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

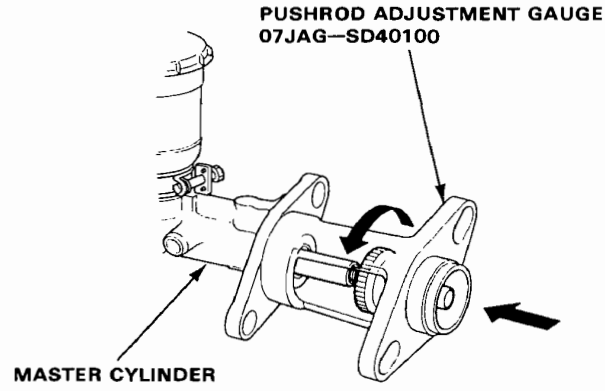
Install the locknut and pushrod yoke on the pushrod, and adjust the pushrod length as shown.



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.

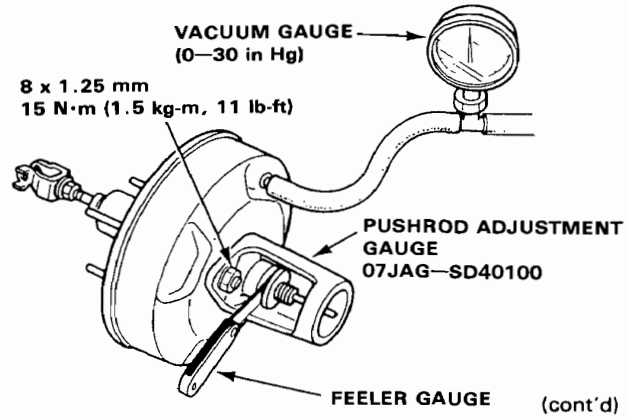
1. Using the special tool, adjust bolt so the top of it is flush with end of master cylinder piston.



2. Install the master cylinder rod seal on the brake booster.
3. Without disturbing the adjusting bolt's position, put the special tool upside down on the booster.
4. Install the master cylinder nuts and tighten to the specified torque.
5. 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.
6. With a feeler gauge, measure the clearance between the gauge body and the adjusting nut.

   CLEARANCE: 0—0.4 mm (0—0.016 in)

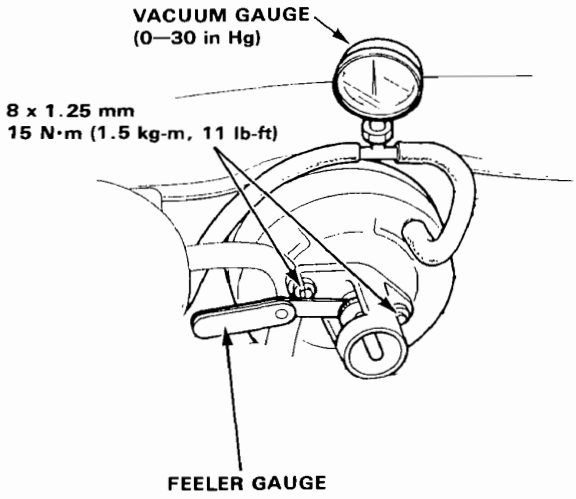
   • Inspection with the booster off the car.



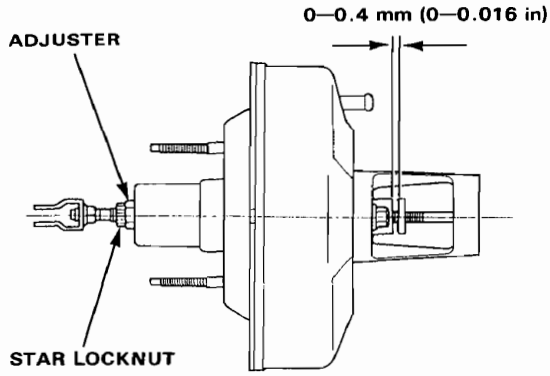
(cont'd)

Pushrod Clearance Adjustment (cont'd)

- Inspection with the booster on the car.



7. If clearance is incorrect, loosen the star locknut and turn the adjuster in or out to adjust. Hold the clevis while adjusting.
8. 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.

9. After adjustment, loosen the clevis end pushrod locknut and turn the pushrod to obtain the correct pedal height.

   PEDAL HEIGHT FROM FLOOR: 161 mm (6.3 in)
   (with floor mat removed)
   The pedal should have
   1—5 mm free play.

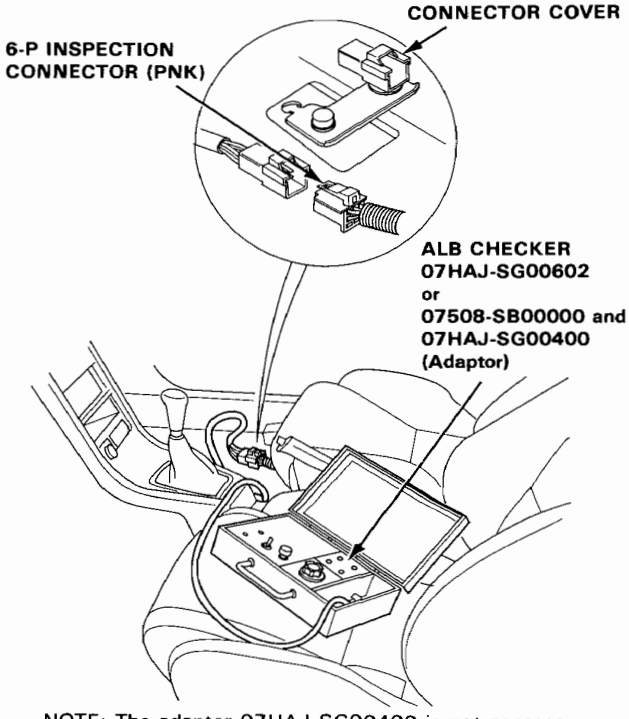
10. Check the brake light switch operation.

Air Bleeding With ALB Checker

NOTE: Do not depress the pedal during air bleeding. Or the bleeding may be affected.

1. Disconnect the 6-P inspection connector under the driver's seat and connect the inspection connector to the ALB checker.

   CAUTION: Place the vehicle on level ground with the wheels blocked. Put the transmission in neutral for manual transmission models, and in P for automatic transmisson models.

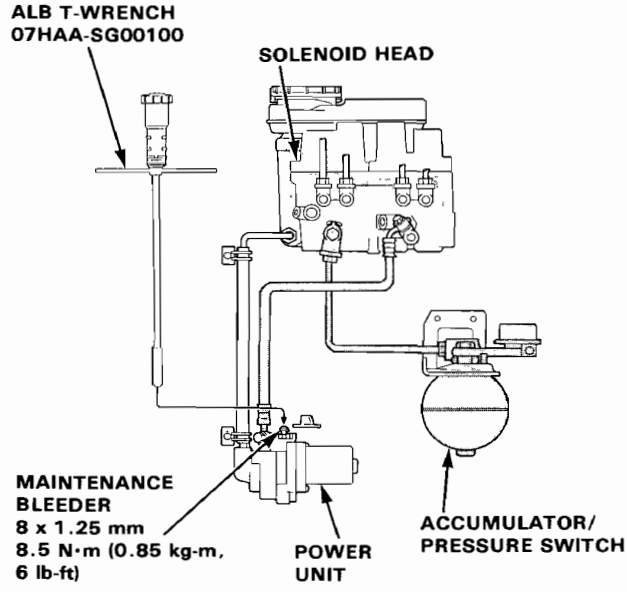


   NOTE: The adaptor 07HAJ-SG00400 is not necessary when using of the checker 07HAJ-SG00602.

2. Fill the modulator reservoir to the MAX level.

   NOTE: Do not reuse aerated brake fluid that has been bled from the power unit.

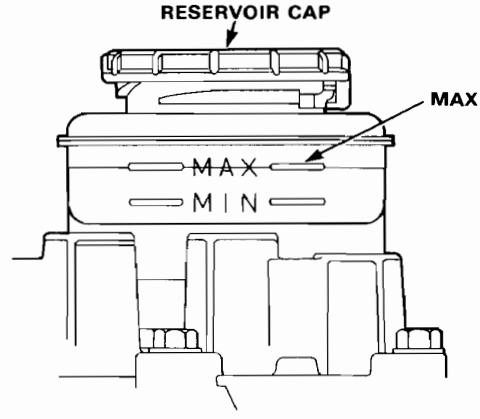
3. Bleed high pressure fluid from the maintenance bleeder with the special tool.



4. Start the engine and release the parking brake.

5. Turn the Mode Selector to 6, depress the brake pedal firmly and press the Start Test button.
   There should be at least two strong kickbacks.
   If not, repeat steps 2 through 5, as necessary.

6. Fill the modulator reservoir up to the MAX level.



7. Install the reservoir cap.

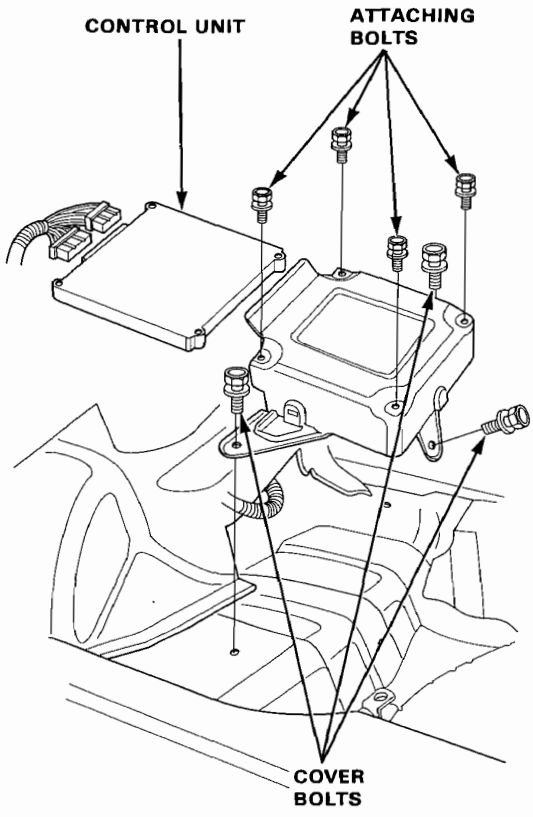
8. Check the ALB function in all modes by using the ALB checker.

   CAUTION: If the kickback is weak, re-bleed air from the system.

Control Unit Replacement

Remove the control unit cover and 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.

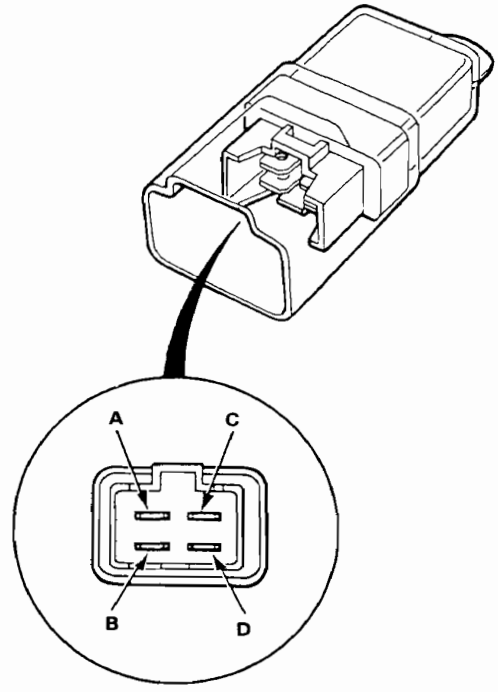
Fail Safe Relays/Motor Relay Inspection

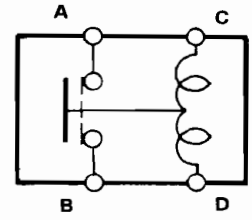
1. Check for continuity between terminals A and B.

   There should be no continuity.

2. Connect a 12 V battery across teminals C and D.

   There should be continuity between terminals A and B.

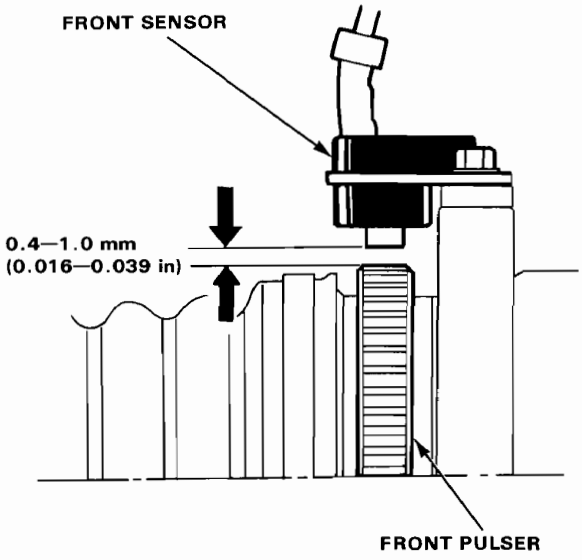




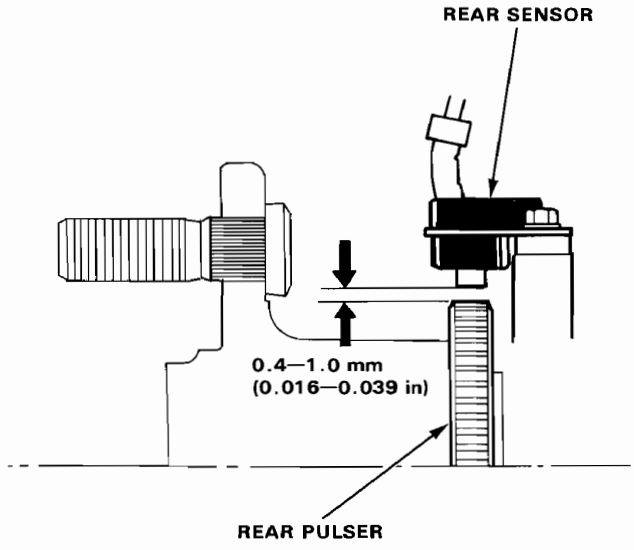
Inspection/Replacement

1. Check the pulser for chipped or damaged teeth.

Front



Rear



2. Measure air gap between the sensor and pulser all the way around while rotating the driveshaft by hand.

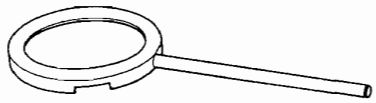
   STANDARD: 0.4—1.0 mm (0.016—0.039 in)

   CAUTION: If the gap exceeds 1.0 mm (0.039 in.), the probability is a distorted knuckle which should be replaced.

   NOTE:
   - Be careful when installing the sensors to avoid twisting the wires.
   - After sensor replacement, confirm proper operation (page 13-10).

Special Tools

Ref. No.	Tool Number	Description	Q'ty	Page Reference
①	07LAB—SK70100	A/C CLUTCH HOLDER	1	15-12
②	07JGG—0010100	ND TENSION GAUGE	1	15-10



①

②

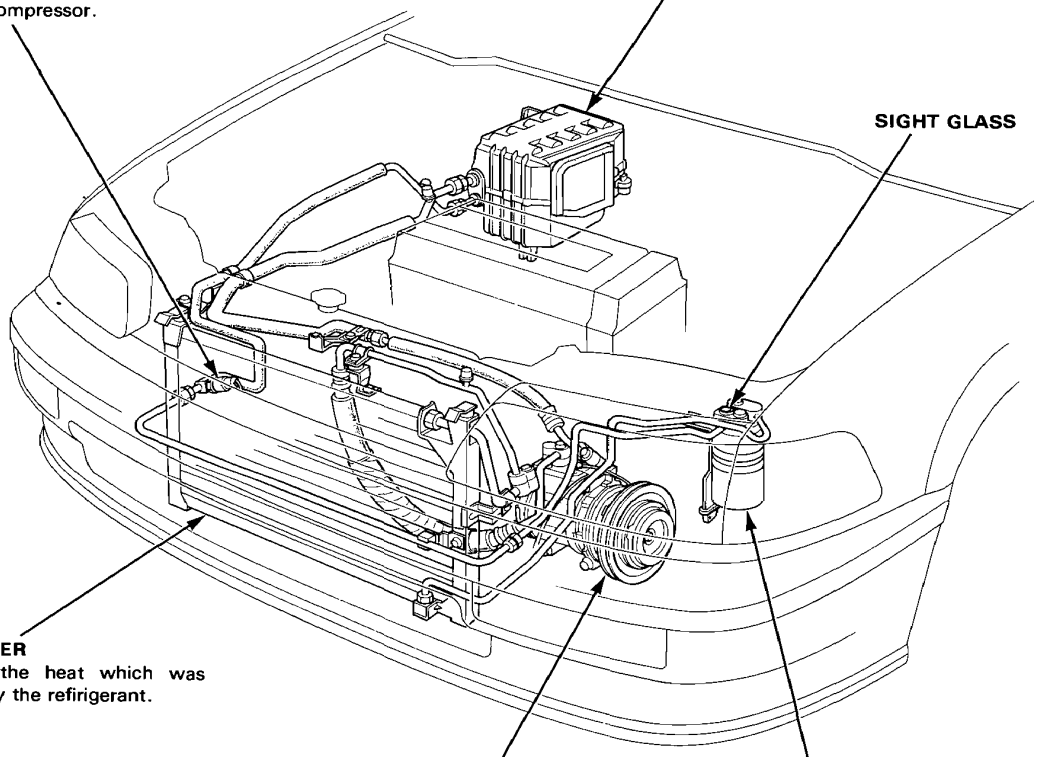
Air Conditioner

Illustrated Index

<LHD>

DUAL PRESSURE SWITCH
When the refrigerant pressure is below 215 kPa (33 psi) due to refrigerant leakage or above 2350 kPa (340 psi)due to the coolant blockage the dual pressure switch opens the circuit to the A/C control unit and stops the air conditioner to protect the compressor.

EVAPORATOR
As refrigerant circulates, heat is absorbed from the surrounding passenger compartment air.



SIGHT GLASS

CONDENSER
Dissipates the heat which was absorbed by the refirigerant.

RECEIVER AND FILTER/DRYER
Serves as a reservoir which filters and removes moisture from the refrigerant.

COMPRESSOR
Compresses the refrigerant and then forces it through the condenser.

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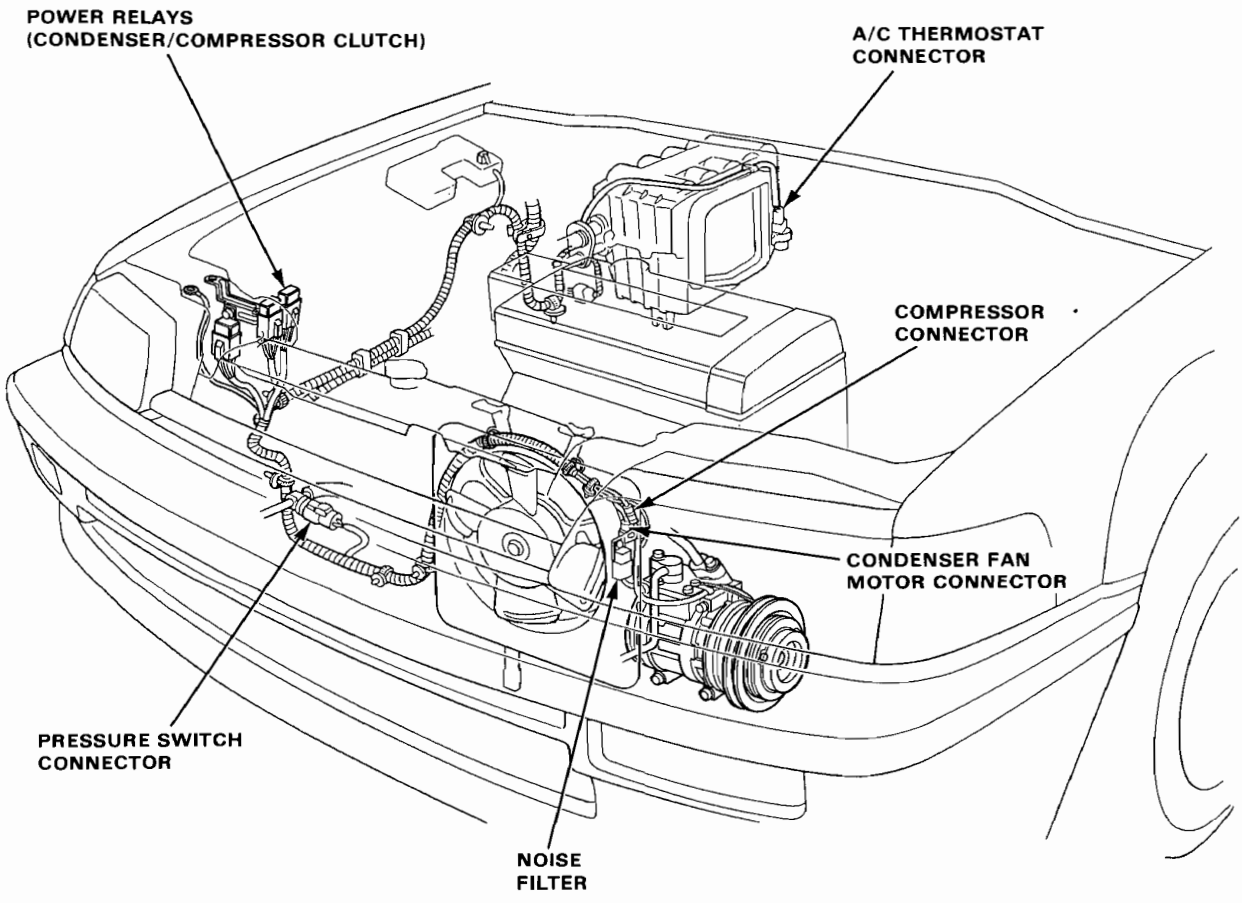
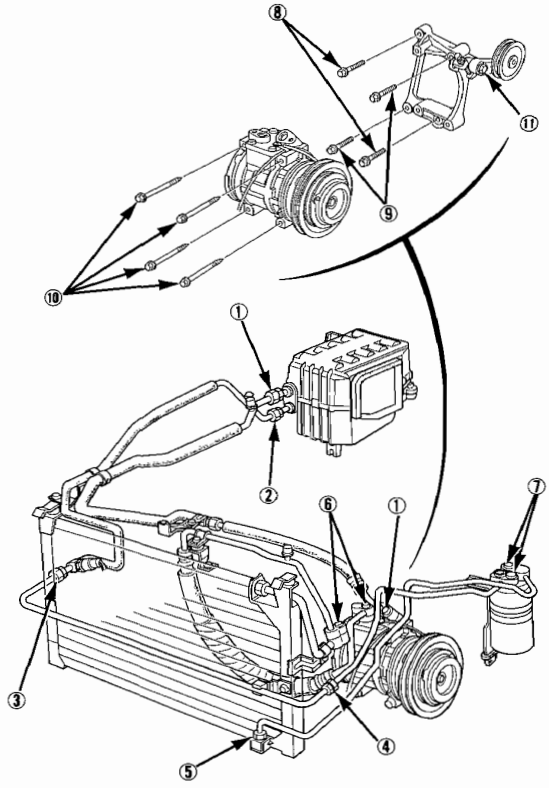

POWER RELAYS
(CONDENSER/COMPRESSOR CLUTCH)
A/C THERMOSTAT
CONNECTOR
COMPRESSOR
CONNECTOR
CONDENSER FAN
MOTOR CONNECTOR
PRESSURE SWITCH
CONNECTOR
NOISE
FILTER

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 ..... 30 cc (1 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 80 cc (2 2/3 fl oz), and drain the calculated volume of oil from the new compressor: 80 cc (2 2/3 fl oz) — Volume of removed compressor = Draining volume.

7. Torque specifications

①Suction hose evaporator side and compressor side	24N·m (2.4 kg-m, 17 lb-ft)
②Receiver pipe C evaporator side	17 N·m (1.7 kg-m, 12 lb-ft)
③Receiver pipe C to Receiver pipe B	17 N·m (1.7 kg-m, 12 lb-ft)
④Receiver pipe B to Receiver pipe A	17 N·m (1.7 kg-m, 12 lb-ft)
⑤Condenser pipe to Condenser	10 N·m (1.0 kg-m, 7 lb-ft)
⑥Discharge hose condenser side and compressor side	24 N·m (2.4 kg-m, 17 lb-ft)
⑦Receiver tank	10 N·m (1.0 kg-m, 7 lb-ft)
⑧Compressor bracket mounting bolts (10 x 45)	48 N·m (4.8 kg-m, 35 lb-ft)
⑨Compressor bracket mounting bolts (10 x 55)	48 N·m (4.8 kg-m, 35 lb-ft)
⑩Compressor mounting bolts	25 N·m (2.5 kg-m, 18 lb-ft)
⑪Idle pulley stay bolt	48 N·m (4.8 kg-m, 35 lb-ft)



⚠WARNING

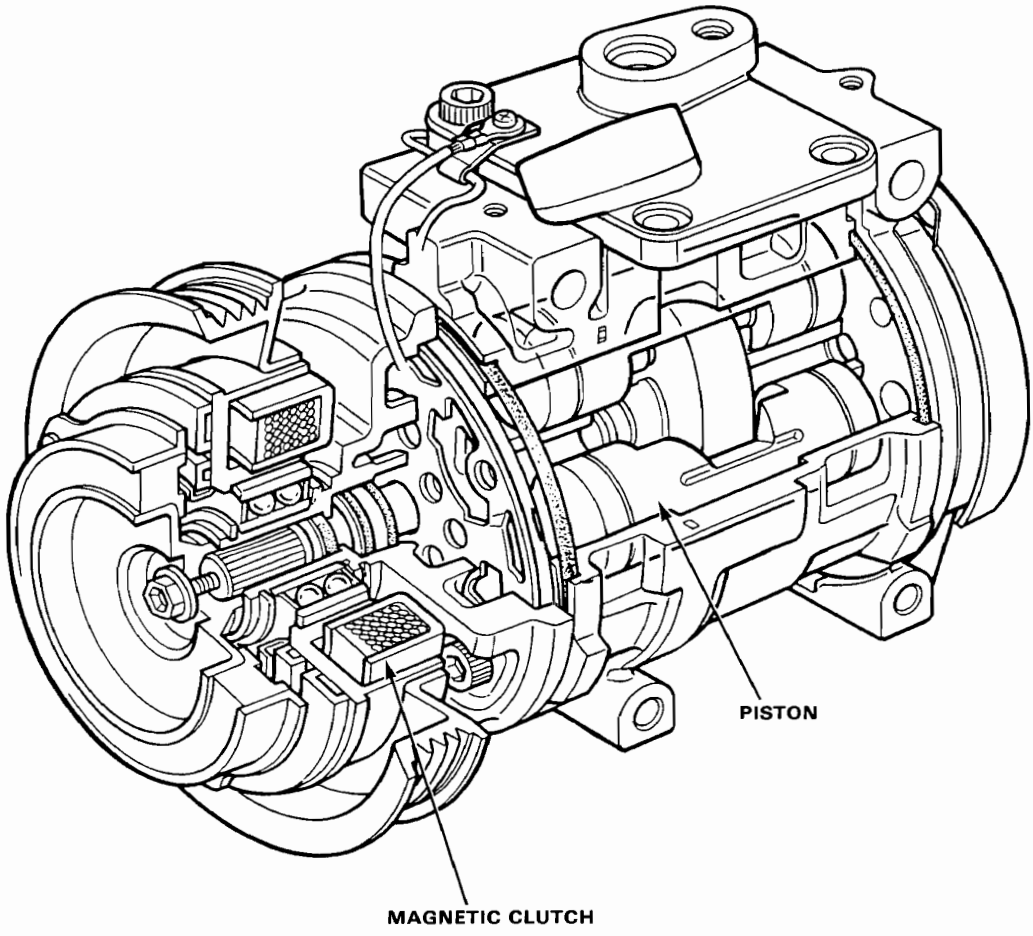
When handling refrigerant (R-12):

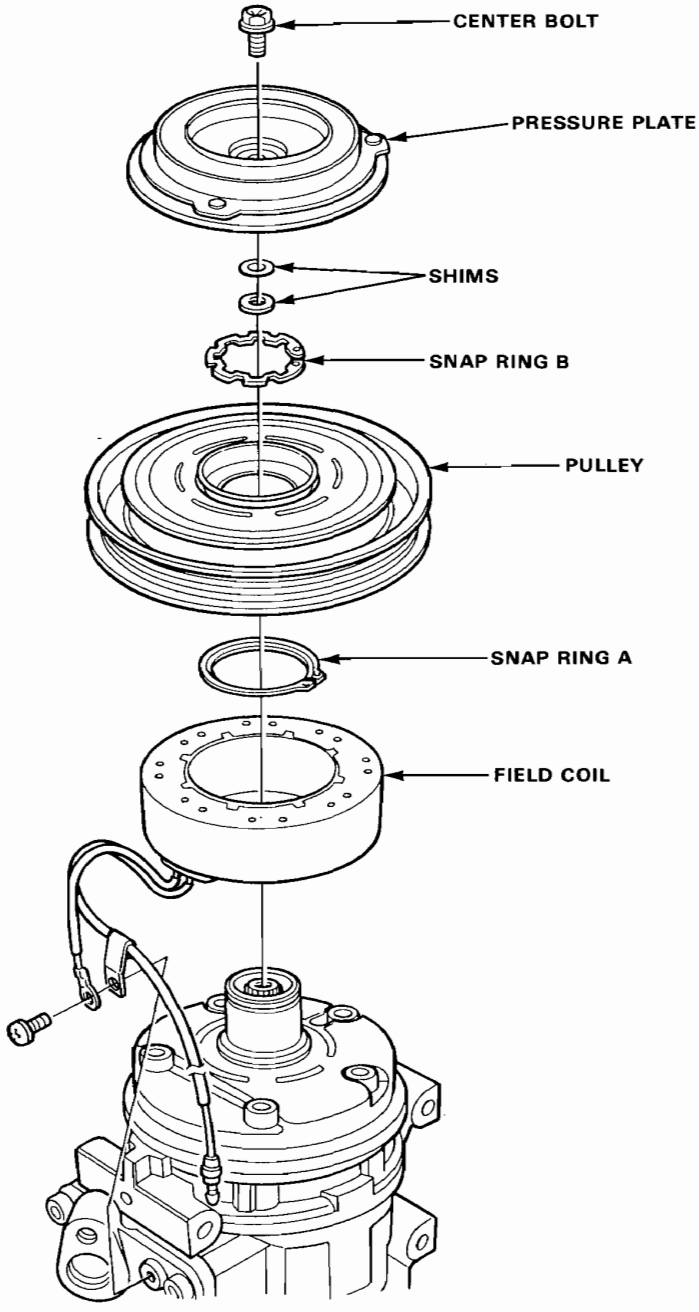
- **Always wear eye protection.**
- **Do not let refrigerant get on your skin or in your eyes. If it does:**
  - **—Do not rub your eyes or skin.**
  - **—Splash large quantities of cool water in your eyes or on your skin.**
  - **—Rush to a physician or hospital for immediate treatment. Do not attempt to treat it yourself.**
- **Keep refrigerant containers (cans of R-12) stored below 40°C (100°F).**
- **Do not handle or discharge refrigerant in an enclosed area near an open flame; it may ignite and produce a poisonous gas.**
- **The ozone is a fragile layer surrounding the earth which acts as a shield against the sun's ultraviolet radiation. Chlorine from chemicals called Chlorofluorocarbons (CFCs) destroy the ozone in the stratosphere. Automotive air conditioning systems currently use Chlorofluorocarbons as the refrigerant. Auto air conditioning service equipment has been developed to minimize the release of CFCs to the atmosphere. All service procedures should be performed using this equipment and the manufactures instructions.**

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.




CENTER BOLT
PRESSURE PLATE
SHIMS
SNAP RING B
PULLEY
SNAP RING A
FIELD COIL

Compressor

Troubleshooting

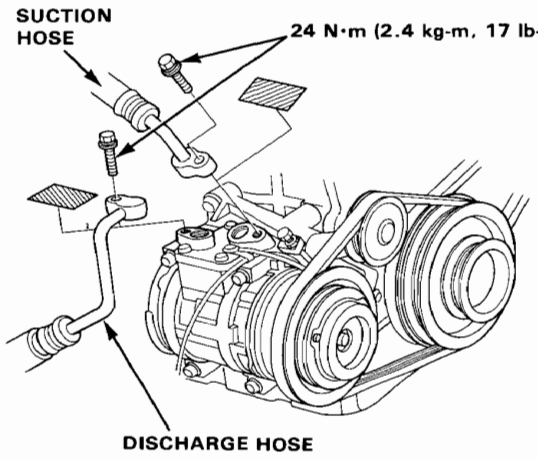
NOTE: Performance Test on page 15-13.

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
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as required
	Reduced or no air flow through condenser.	· Clogged condenser or radiater 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 leaks · Charge system
	High and low pressures are balanced soon after stopping compressor	· Faulty compressor discharge or inlet valve	Replace compressor
	Outlet of expansion valve is not frosted, low pressure gauge indicates vacuum	· Faulty expansion valve	Repair or Replace
Suction (low) pressure abnormally low	Excessive bubbles in sight glass; condenser is not hot Expansion valve is not frosted and low pressure line is not cold. Low pressure gauge indicates vacuum.	Insufficient refrigerant · Frozen expansion valve · Faulty expansion valve	Check for leaks. Charge as required. Replace expansion valve
	Discharge temperature is low and the air flow from vents is restricted	Frozen evaporator	Run the fan with compressor off then check the thermostat and capillary tube.
	Expansion valve frosted	Clogged expansion valve	Clean or Replace
	Receiver dryer is cool (should be warm during operation)	Clogged receiver dryer	Replace
Suction pressure abnormally high	Low pressure hose and check joint are cooler than around evaporator	· 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 pressures abnormally high	Reduced air flow through condenser	· Clogged condenser or radiator fins · Condenser or radiator fan not working properly	· Clean condenser and radiator · Check voltage and fan rpm
	No bubbles in sight glass when condenser is cooled by water	Excessive refrigerant in system	Discharge refrigerant as necessary.
Suction and discharge pressure abnormally low	Low pressure hose and metal end areas are cooler than evaporator	Clogged or kinked low pressure hose parts	Repair or Replace
	Temperature around expansion valve is too low compared with that around receiver dryer.	Clogged high pressure line	Repair or Replace
Refrigerant leaks	Compressor bolt(s) are dirty	Leaking around bolt(s)	Replace compressor
	Compressor gasket is wet with oil	Gasket leaking	Replace compressor

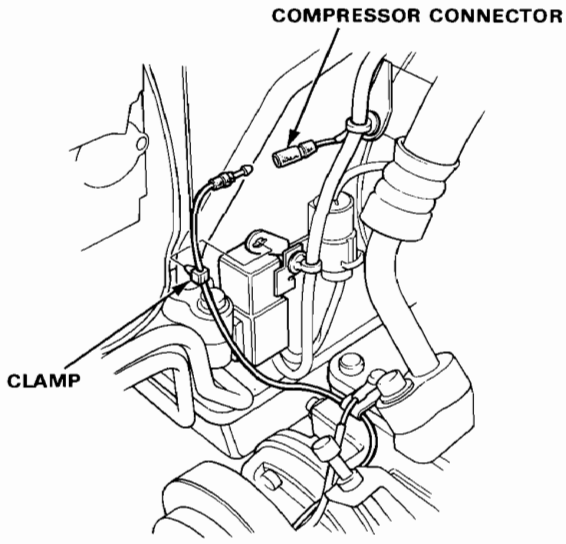
Replacement

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.
3. Disconnect the suction and discharge hoses from the compressor.

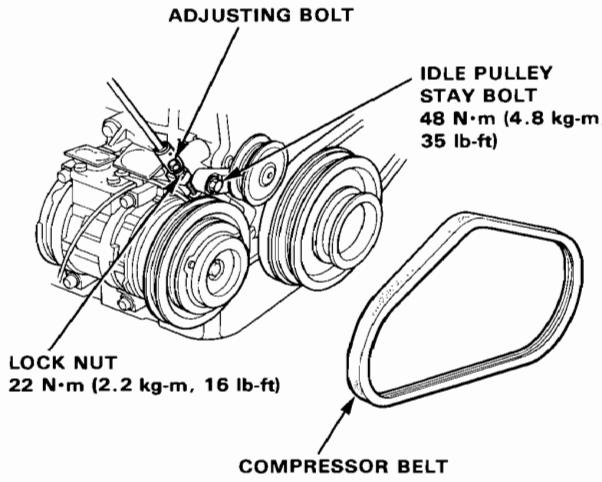
   CAUTION:
   Cap the open fittings immediately to keep moisture and dirt out of the system.



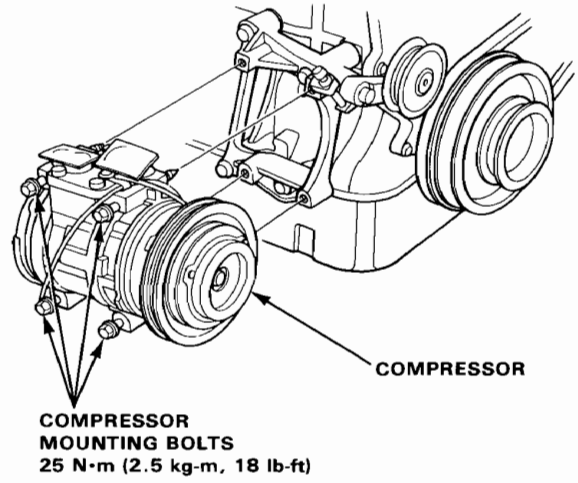
4. Disconnect the compressor connector and the clamp.



5. Loosen the idle pulley stay bolt. Loosen the lock nut and adjusting bolt, then remove the compressor belt.



6. Remove the compressor mounting bolts (4) and compressor. Rest the compressor on the front beam.

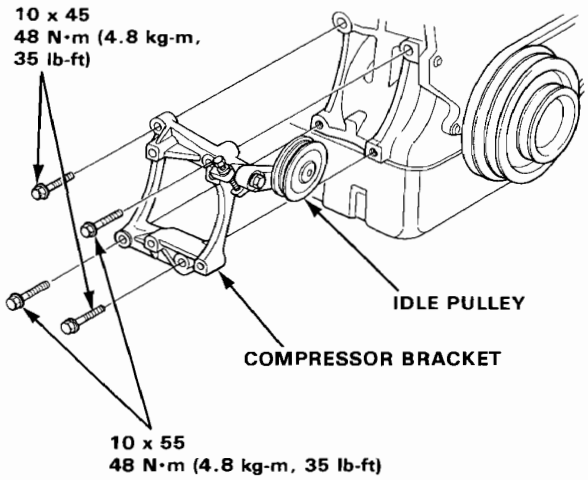


(cont'd)

Compressor

Replacement (cont'd)

7. Remove the mounting bolts (4) and compressor *bracket with idle* pulley.

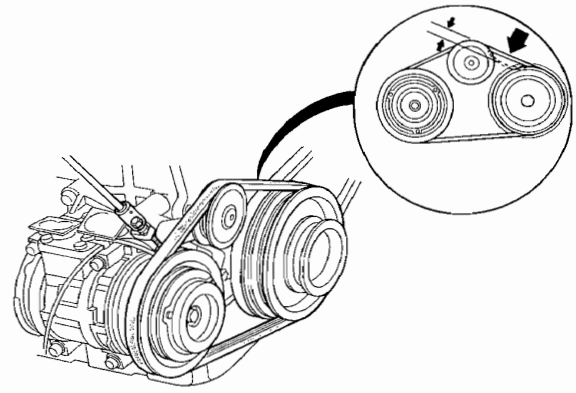


8. Remove the compressor.

9. Install in the reverse order of removal and:
   - If a new compressor is installed, calculate the amount of refrigerant to be drained through the suction fitting on the compressor:
     80 cc (2 2/3 fl oz,) minus contents of old compressor, equals amount to drain from new compressor.
   - Adjust the compressor belt.

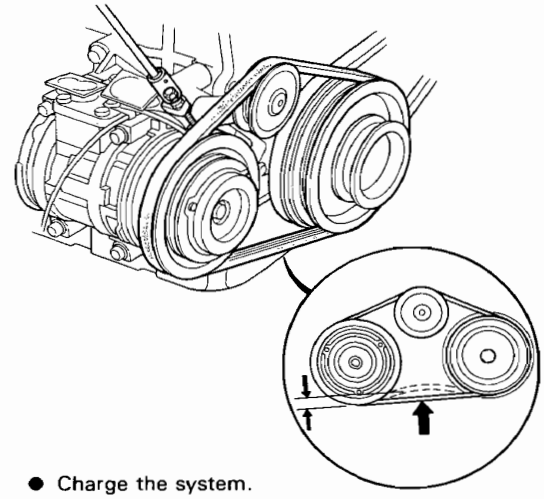
①Measure the deflection when 98 N (10 kg, 22 lb) force is applied between the pulleys.

Belt tension	
New belt	Used belt
4.5—6.5 mm (0.18—0.26 in)	7.0—9.0 mm (0.28—0.35 in)



②When using ND tension gauge;

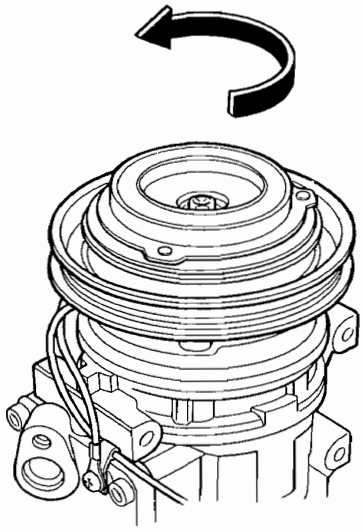
Belt tension	
New belt	Used belt
539—735 N (55—75 kg, 121—165 lb)	343—490 N (35—50 kg, 77—110 lb)



   - Charge the system.
   - Test the performance.

Clutch Inspection

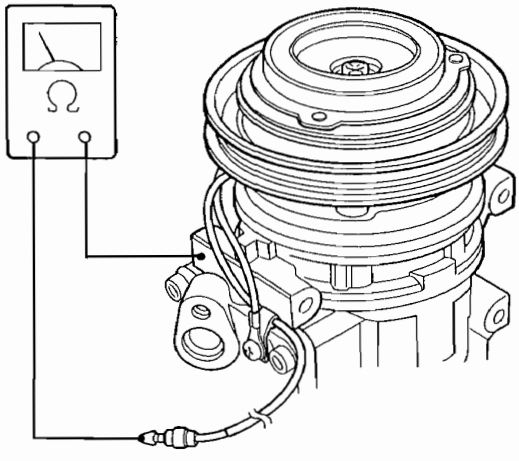
- Check pulley bearing play and drag by rotating the pulley by hand. Replace the pulley with a new one if it is noisy or has excessive play/drag.



- Check resistance of the field coil:

  Field Coil Resistance: 3.6±0.2 ohm at 20°C (68°C)

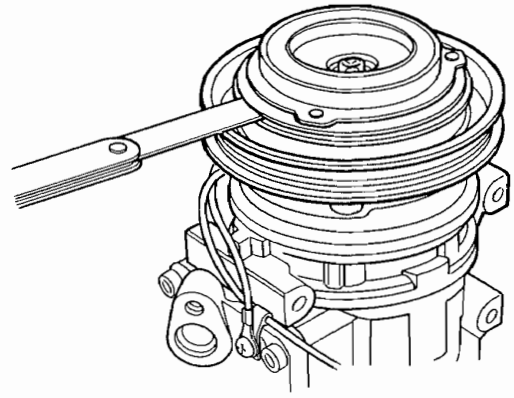
  If resistance is not within specifications, replace the coil.

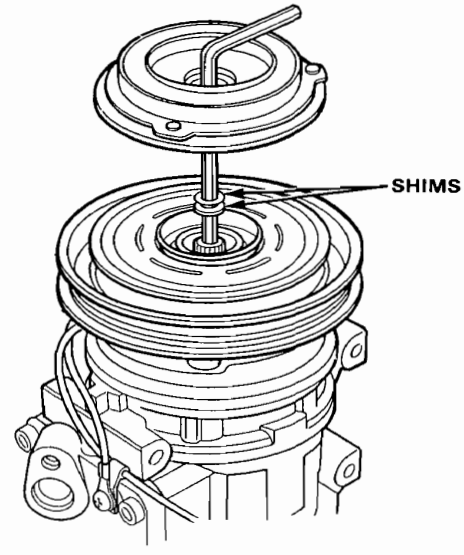


- Measure the clearance between the pulley and pressure plate all the way around. If the clearance is not within specified limits, the pressure plate must be removed and shims added or removed as required.

  CLEARANCE: 0.5±0.15 (0.020±0.006 in.)

  NOTE: The shims are available in six sizes: 0.1 mm, 1.0 mm, 1.25 mm, 1.5 mm, 1.75 mm and 2.0 mm of thickness.

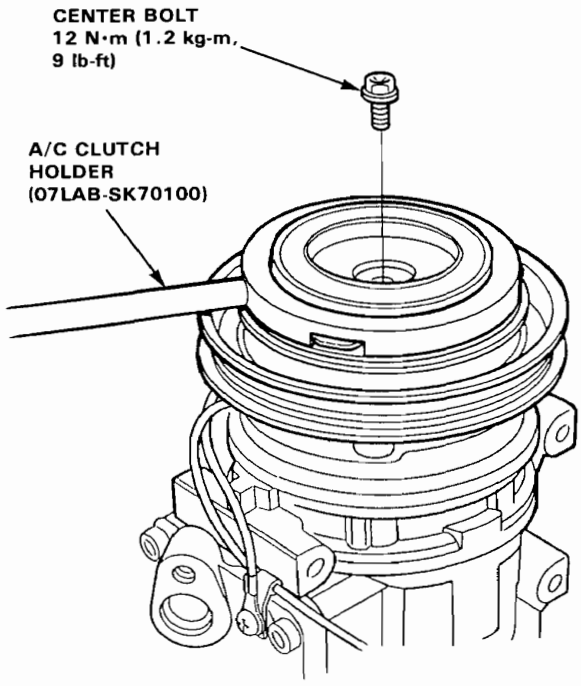




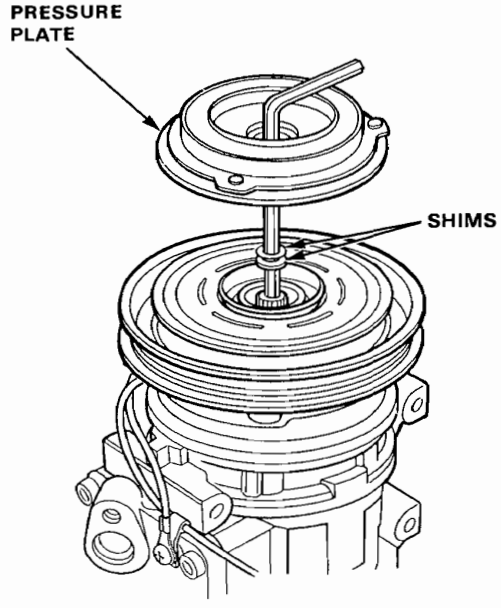
Compressor

Clutch Overhaul

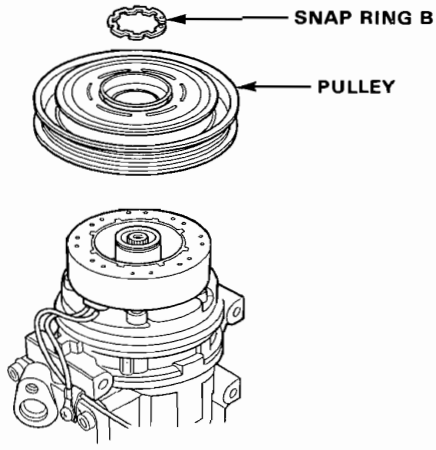
1. Remove the center bolt.



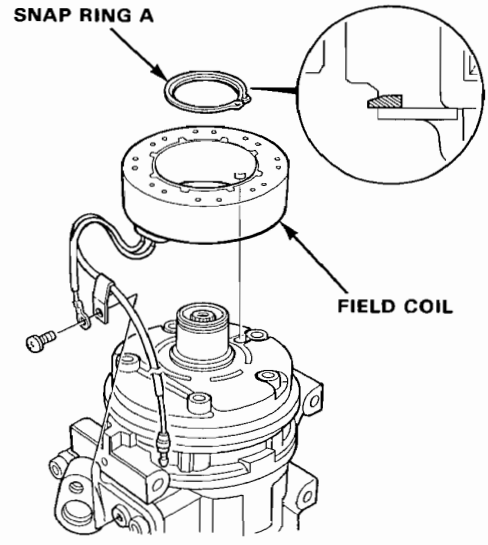
2. Remove the pressure plate and shim(s) taking care not to lose the shims.



3. Use circlip pliers to remove the snap ring B, then remove the pulley.



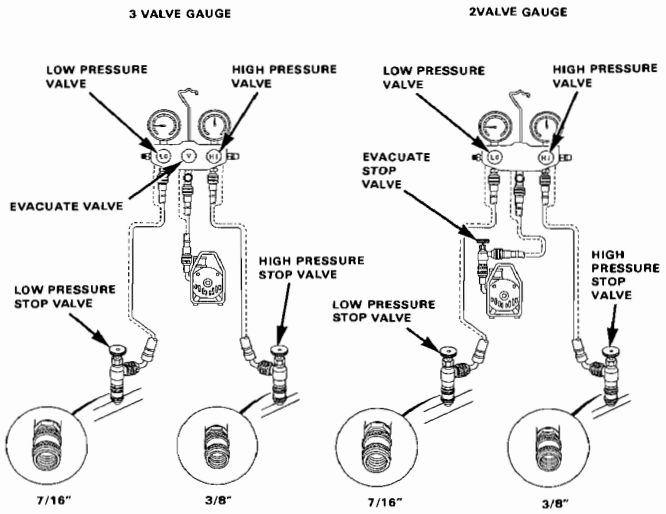
4. Remove the snap ring A and the field coil.

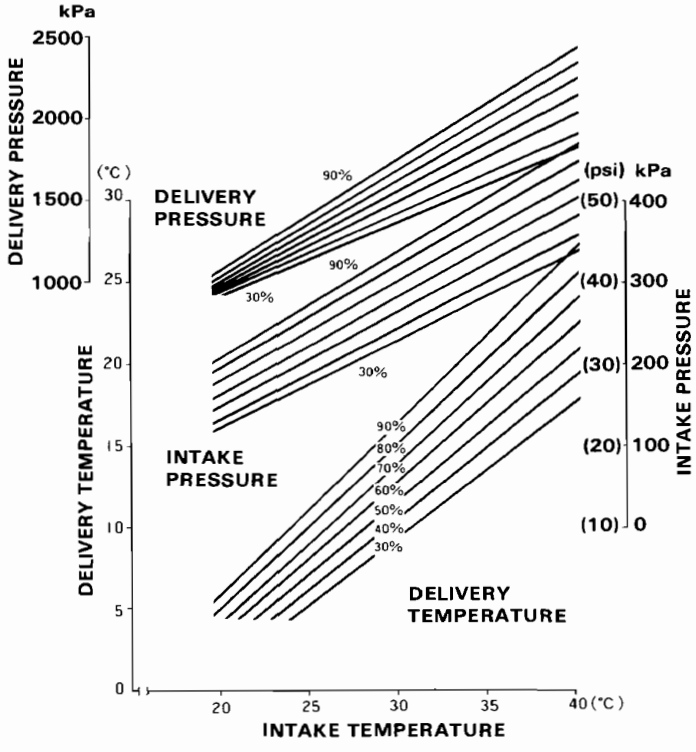


5. Install in the reverse order of removal and:
   - Install the field coil with the wire side facing up (see above).
   - Clean the pulley and compressor sliding surfaces with non-petroleum solvent.
   - Check the pulley bearings for excessive play.
   - Make sure the circlip is fitted to the groove properly.
   - Apply locking agent to the thread of the center bolt and tighten it securely.
   - Make sure that the pulley turns smoothly.

The performance test will help determine if the air conditioning system is operating within specifications.

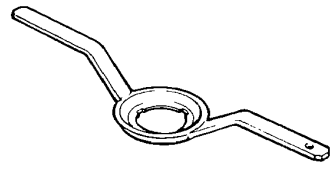
1. Attach the gauge and pump as shown, connecting the center charging hose to the pump inlet. To purge air from the hose loosen both charging hoses fitting at the stop valves, until they hiss for a few seconds, then tighten them again.
2. Start the pump, then open both gauge valves and the evacuate valve (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.
   - Temperature control switch: **COLD**
     Mode switch:
     Recirculation control switch:
   - 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.





Special Tools

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07920—SB20000	Fuel Sender Wrench	1	

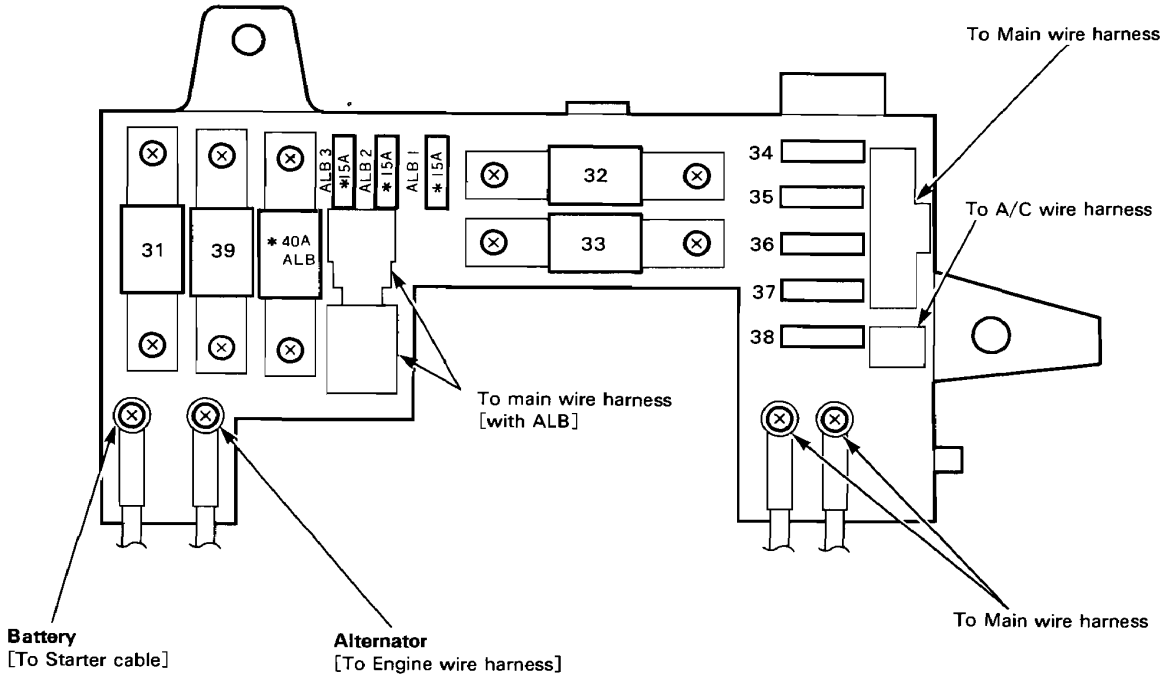


①

Fuses

Main Fuse Box

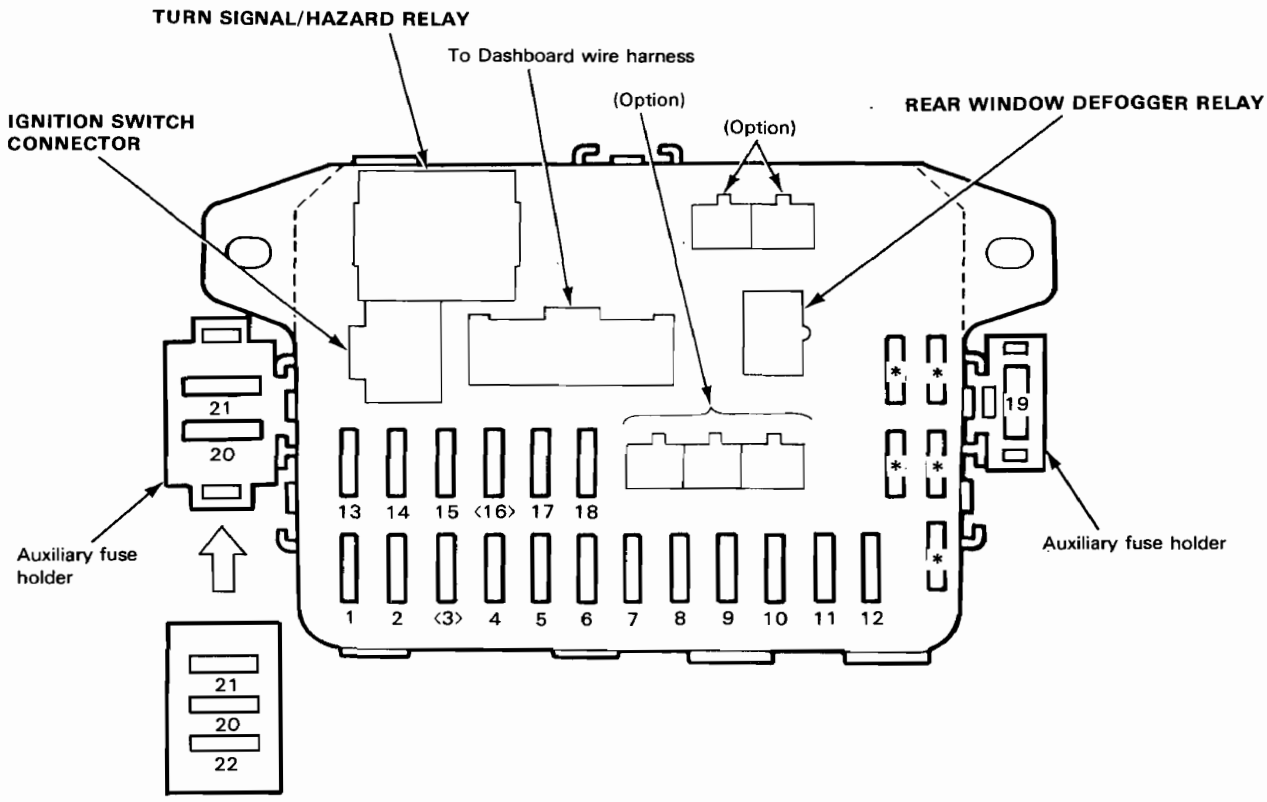
NOTE: Main fuse box is located right side, engine compartment.



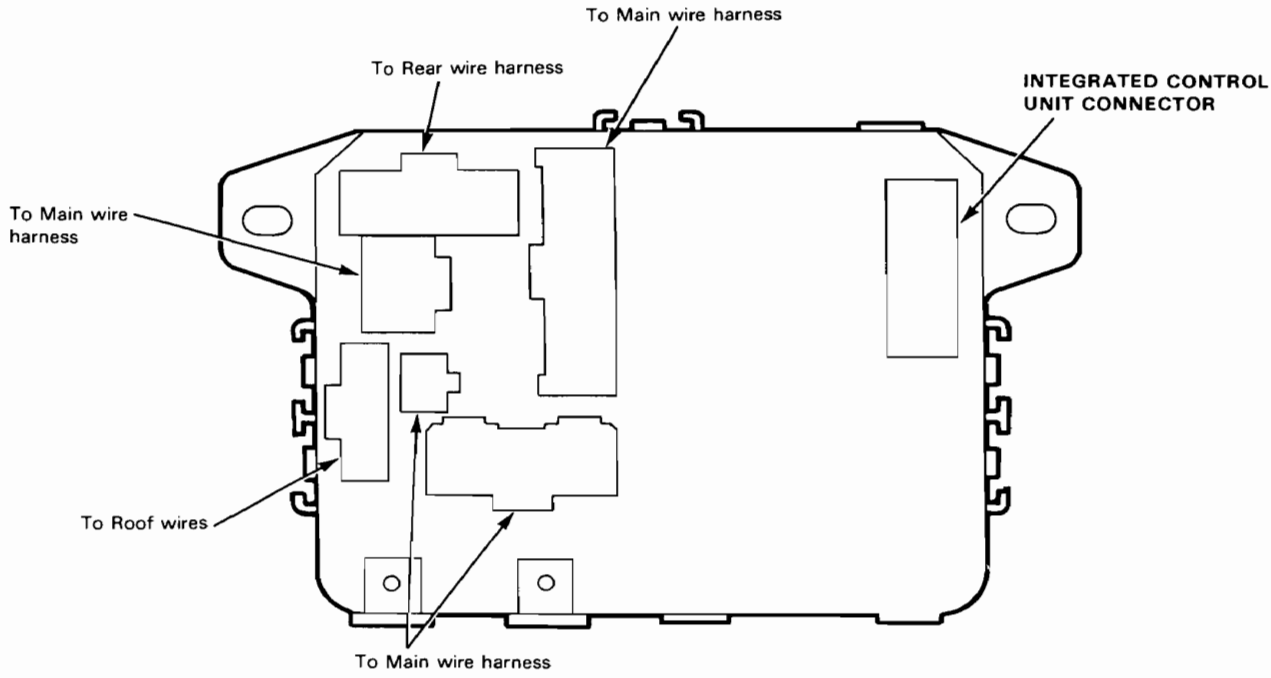
Fuses

Dash Fuse box (LHD)

NOTE: Dash fuse box is located left side, under dash.



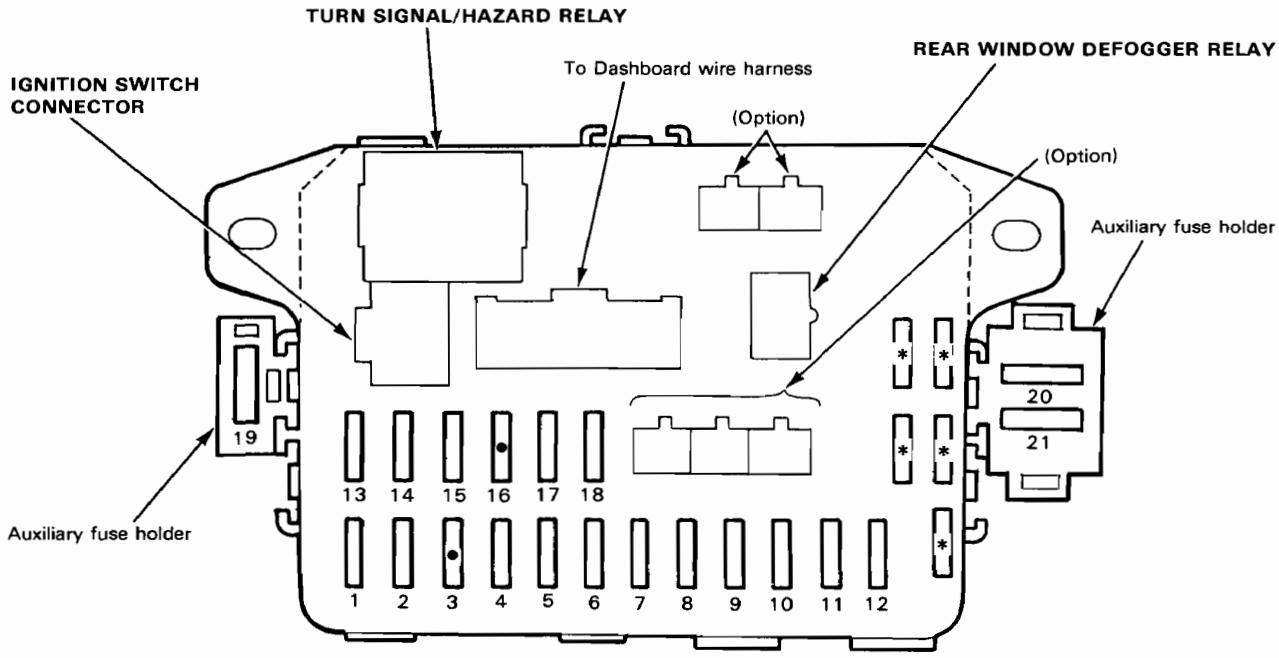
* : SPARE FUSE
< > : KS model only
No.19(30 A)FUSE : Blower motor
No.20(20 A)FUSE : Front passenger's power window
No.21(20 A)FUSE : Driver's power window
No.22(15 A)FUSE : Seat heaters-KS model


To Main wire harness
To Rear wire harness
INTEGRATED CONTROL UNIT CONNECTOR
To Main wire harness
To Roof wires
To Main wire harness

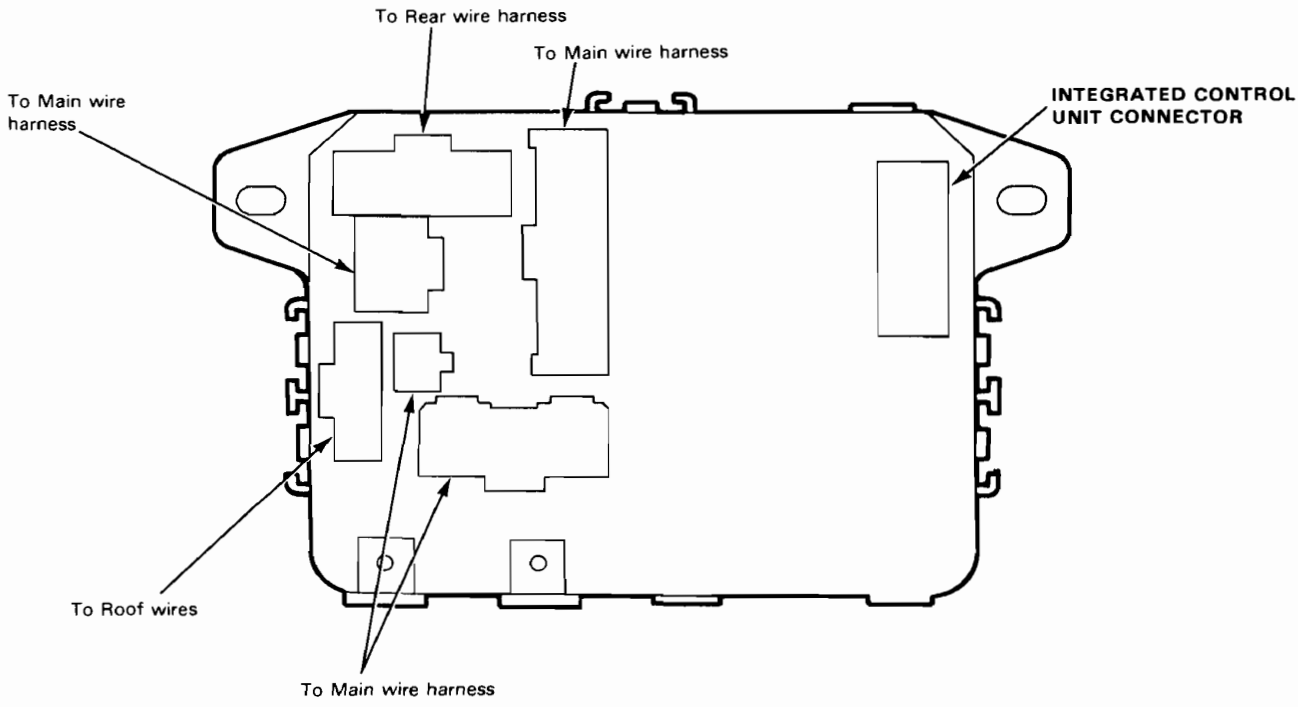
Fuses

Dash Fuse Box (RHD)

NOTE: Dash fuse box is located right side, under dash.

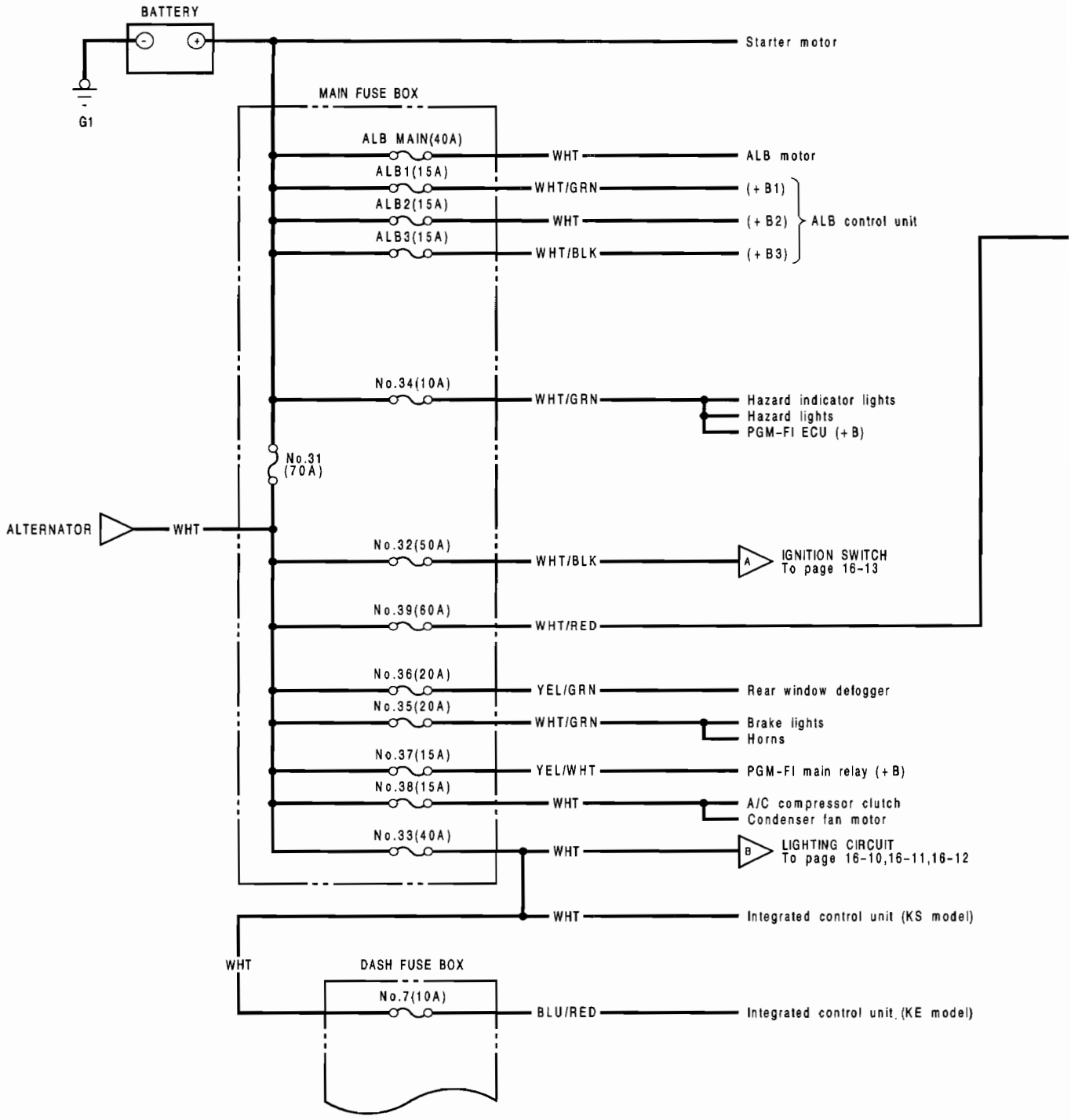


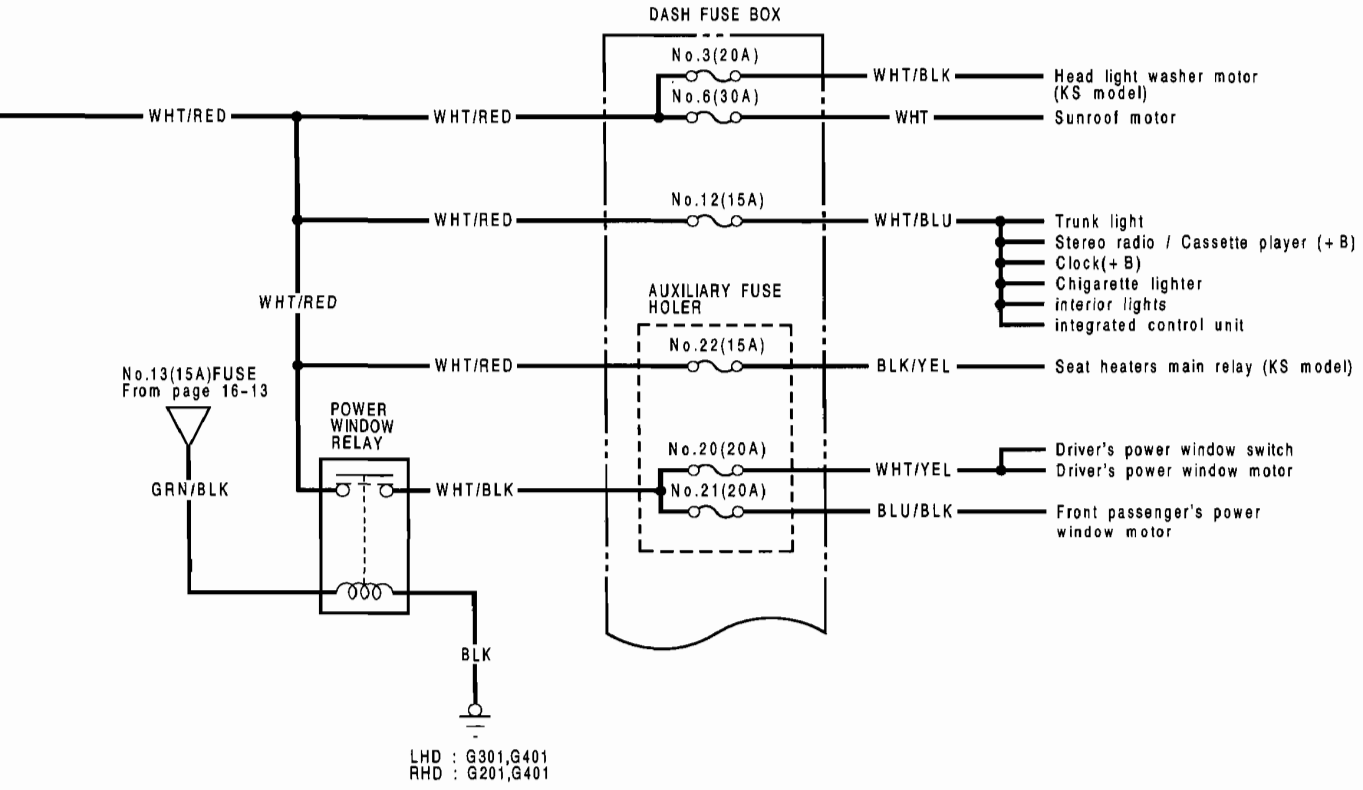
*: SPAER FUSE
●: Not used
No.19(30 A)FUSE : Blower motor
No.20(20 A)FUSE : Driver's power window
No.21(20 A)FUSE : Front passenger's power window


To Rear wire harness
To Main wire harness
To Main wire harness
INTEGRATED CONTROL UNIT CONNECTOR
To Roof wires
To Main wire harness

Power Distribution

Circuit Identification

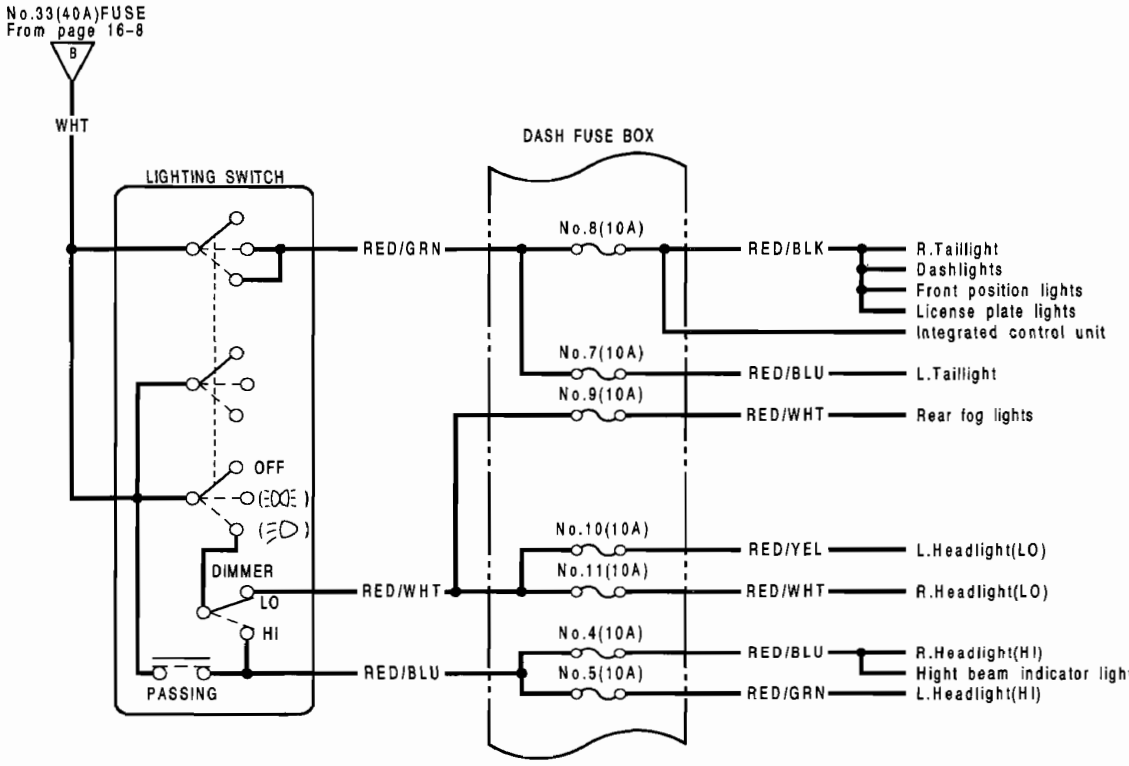



DASH FUSE BOX
No.3(20A)
No.6(30A)
WHT/BLK
Head light washer motor (KS model)
WHT
Sunroof motor
WHT/RED
WHT/RED
No.12(15A)
WHT/BLU
Trunk light
Stereo radio / Cassette player (+B)
Clock(+B)
Chigarette lighter
interior lights
integrated control unit
WHT/RED
AUXILIARY FUSE HOLER
No.22(15A)
No.13(15A)FUSE
From page 16-13
WHT/RED
BLK/YEL
Seat heaters main relay (KS model)
POWER WINDOW RELAY
No.20(20A)
WHT/YEL
Driver's power window switch
Driver's power window motor
GRN/BLK
WHT/BLK
No.21(20A)
BLU/BLK
Front passenger's power window motor
BLK
LHD : G301,G401
RHD : G201,G401

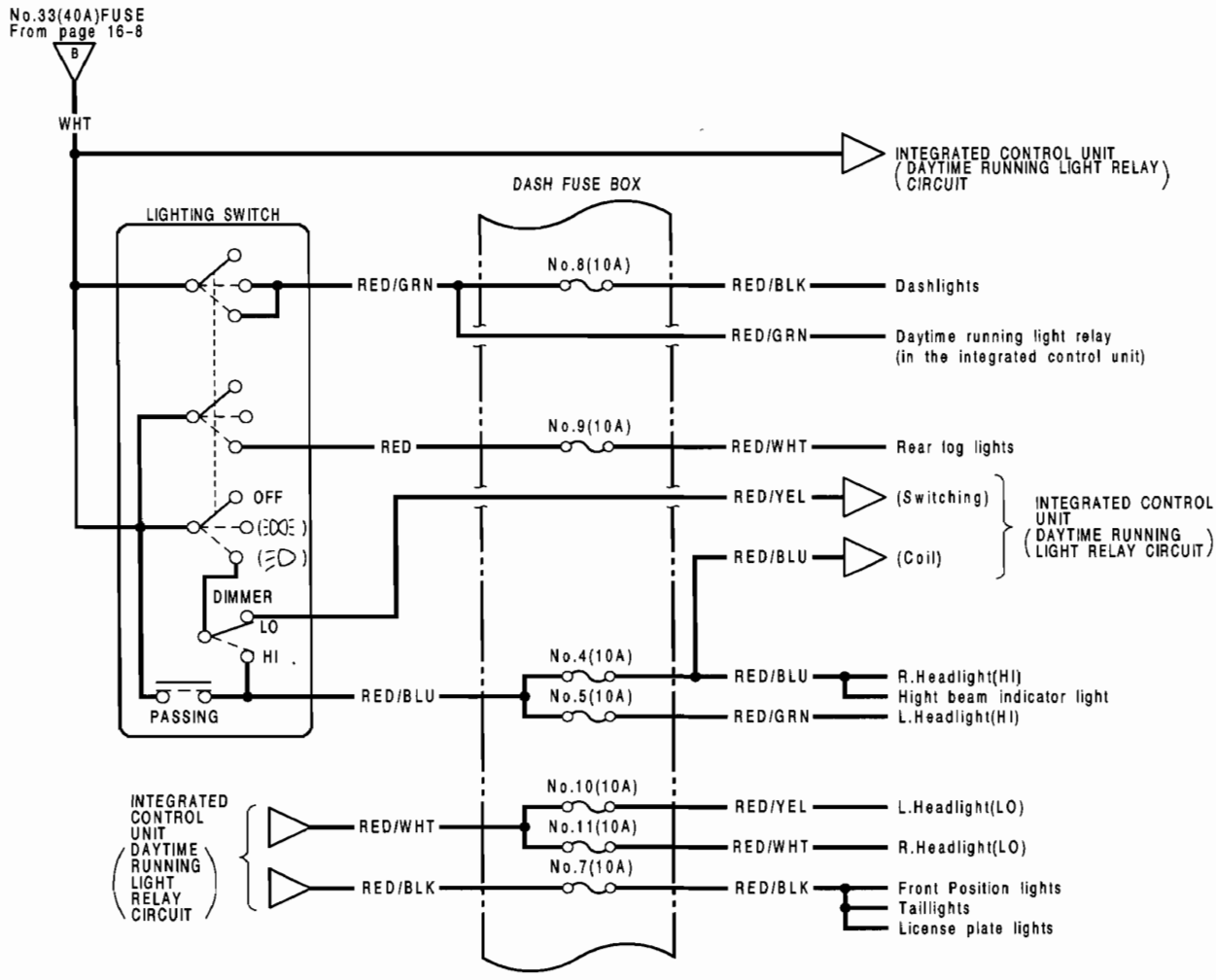
(cont'd)

Circuit Identification (cont'd)

Except KE ,KS model



KS model:

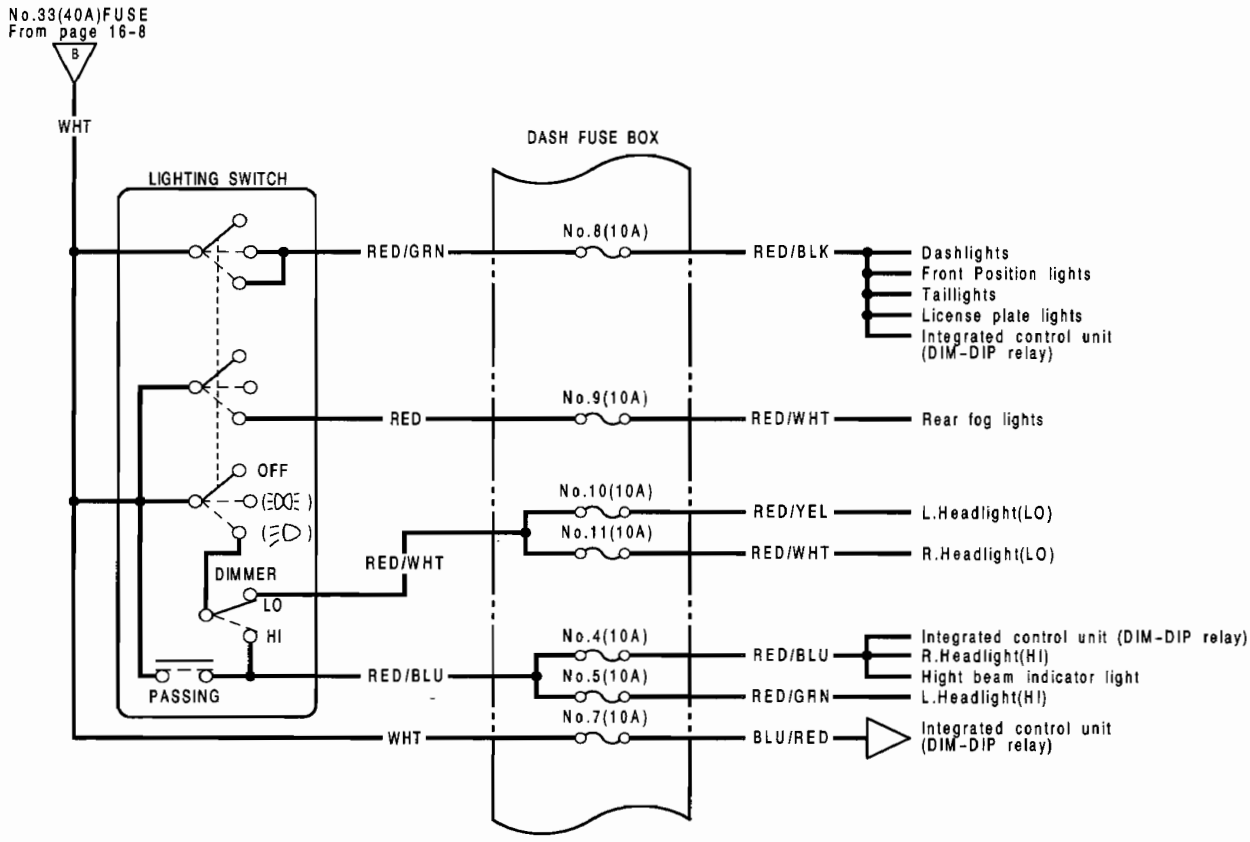


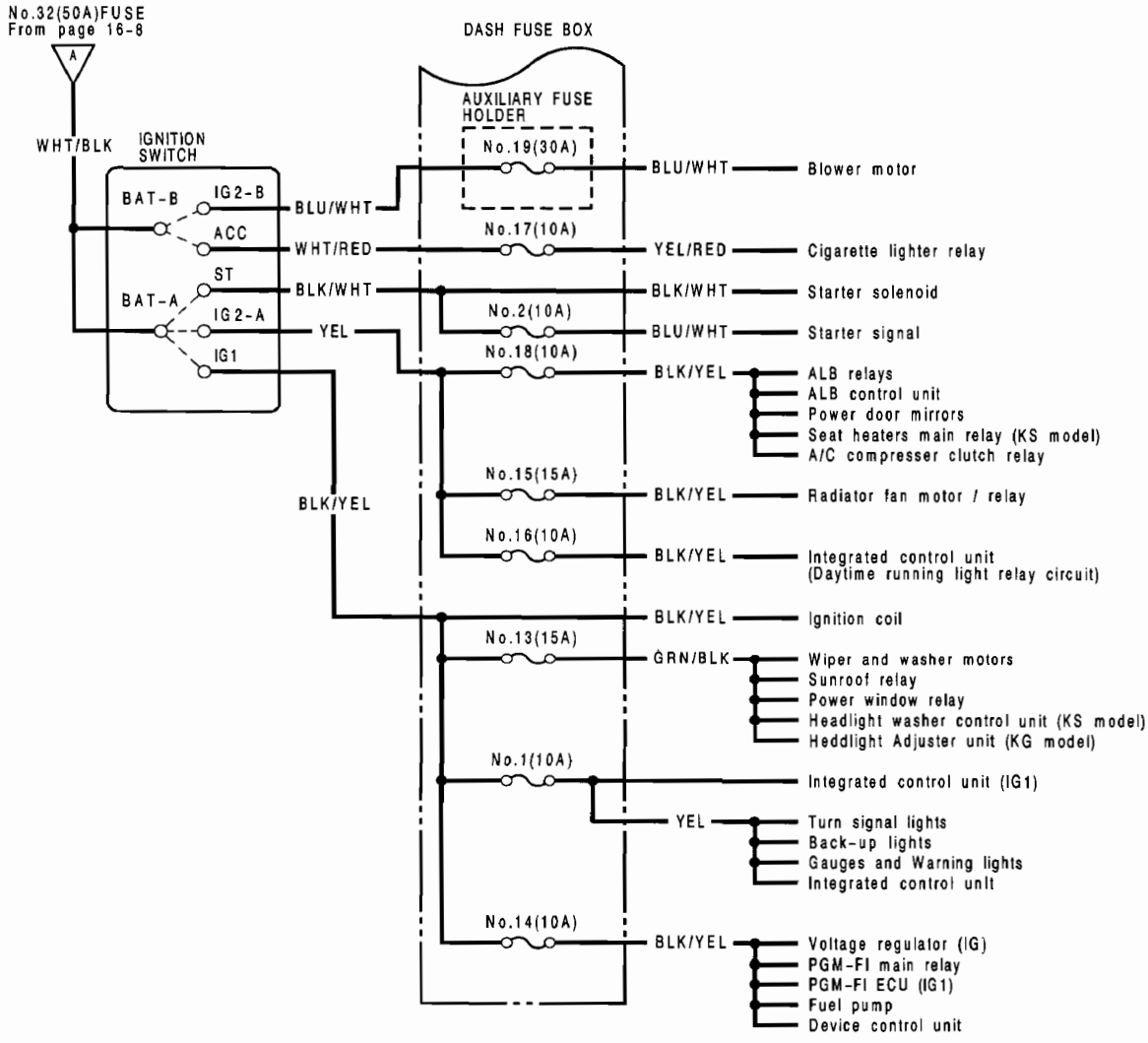
(cont'd)

Power Distribution

Circuit Identification (cont'd)

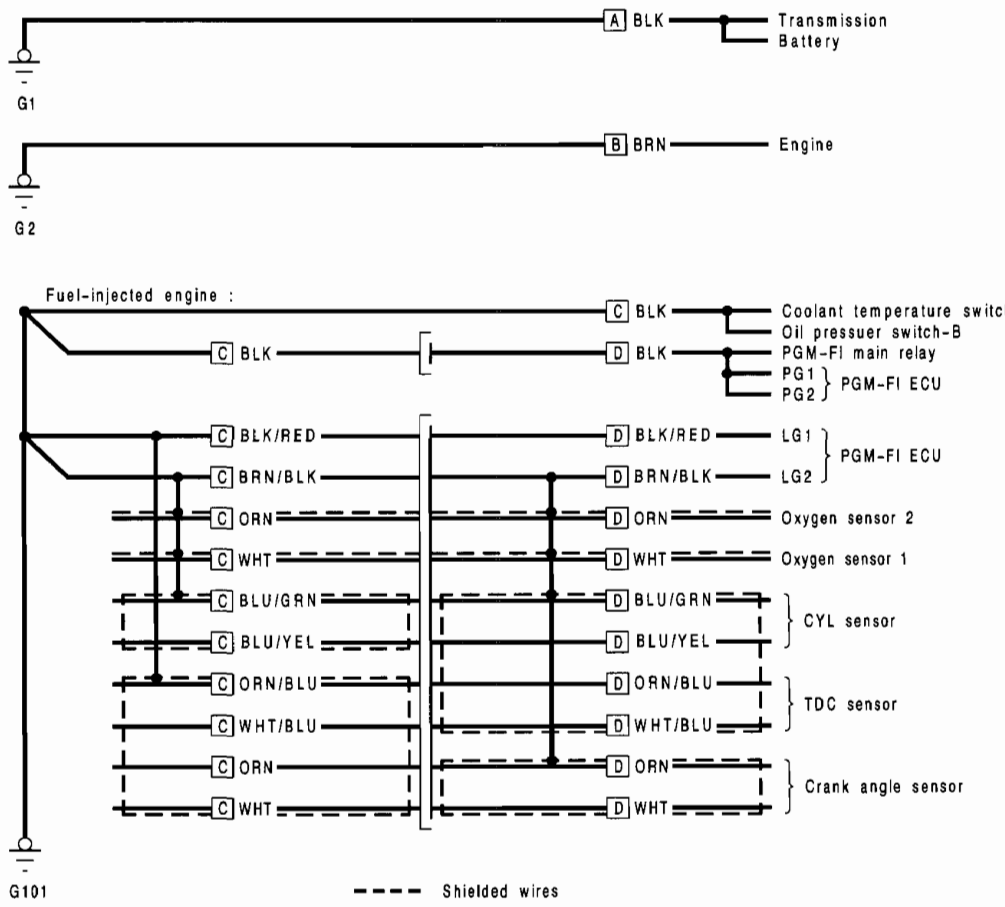
KE model




No.32(50A)FUSE
From page 16-8
A
WHT/BLK
IGNITION SWITCH
BAT-B
IG2-B
ACC
ST
BAT-A
IG2-A
IG1
DASH FUSE BOX
AUXILIARY FUSE HOLDER
No.19(30A)
BLU/WHT
Blower motor
No.17(10A)
WHT/RED
YEL/RED
Cigarette lighter relay
BLK/WHT
BLK/WHT
Starter solenoid
No.2(10A)
YEL
BLU/WHT
Starter signal
No.18(10A)
BLK/YEL
ALB relays
ALB control unit
Power door mirrors
Seat heaters main relay (KS model)
A/C compresser clutch relay
No.15(15A)
BLK/YEL
Radiator fan motor / relay
No.16(10A)
BLK/YEL
Integrated control unit
(Daytime running light relay circuit)
BLK/YEL
Ignition coil
No.13(15A)
GRN/BLK
Wiper and washer motors
Sunroof relay
Power window relay
Headlight washer control unit (KS model)
Heddlight Adjuster unit (KG model)
No.1(10A)
Integrated control unit (IG1)
YEL
Turn signal lights
Back-up lights
Gauges and Warning lights
Integrated control unit
No.14(10A)
BLK/YEL
Voltage regulator (IG)
PGM-FI main relay
PGM-FI ECU (IG1)
Fuel pump
Device control unit

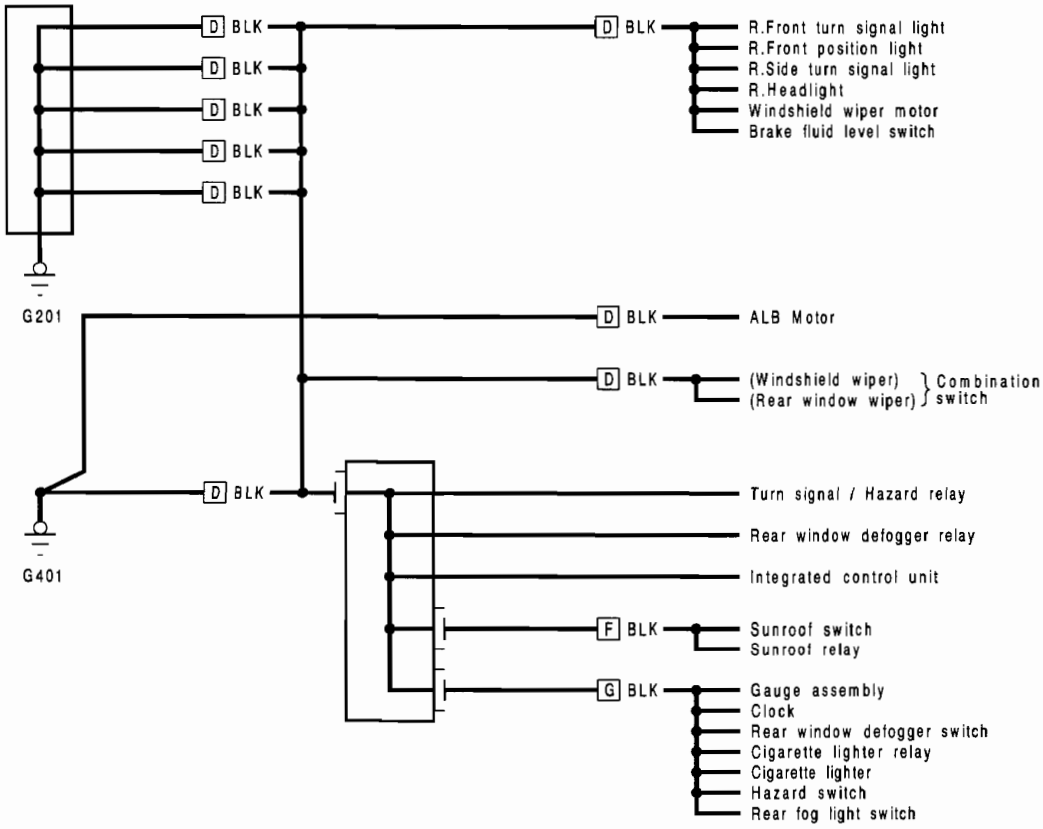
Ground Distribution

Circuit Identification



A : Battery ground wire
B : Engin ground wire
C : Engine wire harness
D : Main wire harness

RHD :



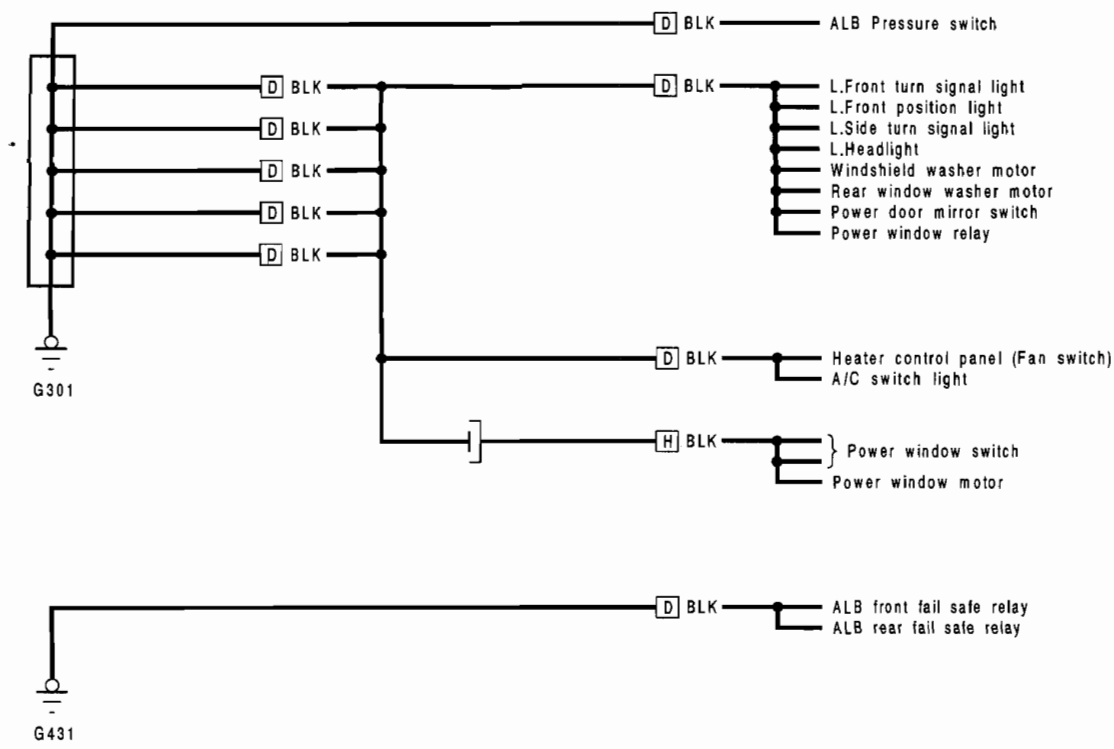
C : Engine wire harness
D : Main wire harness
E : Front Passenger's door wire harness
F : Roof wires
G : Dashboard wire harness
J : Rear wire harness

(cont'd)

Ground Distribution

Circuit Identification (cont'd)

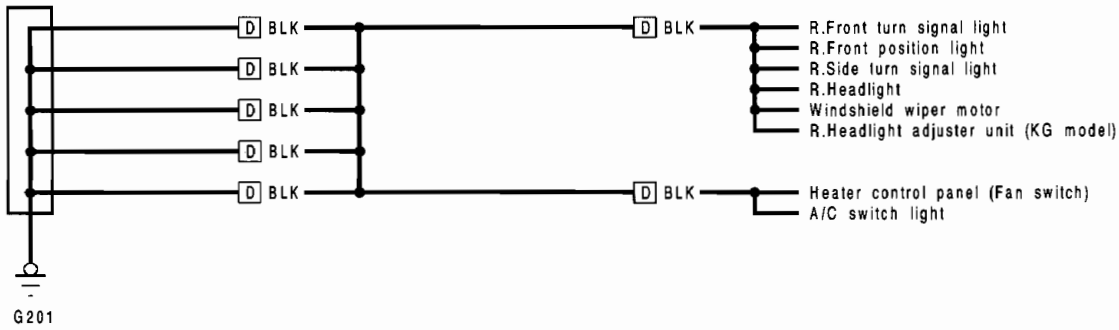
RHD :



(Located left side, on the kick panel)

D : Main wire harness
H : Driver's door wire harness

LHD :



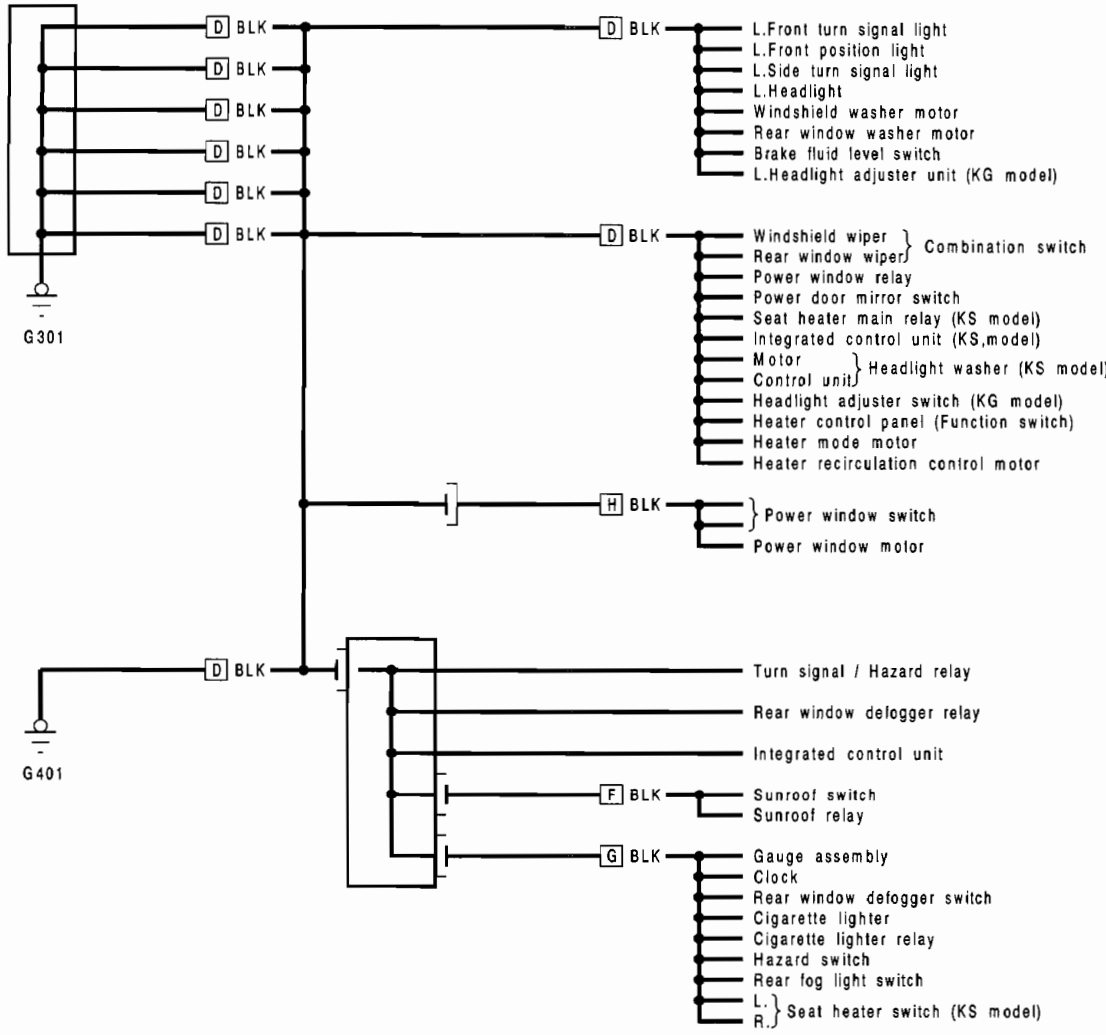
D : Main wire harness

(cont'd)

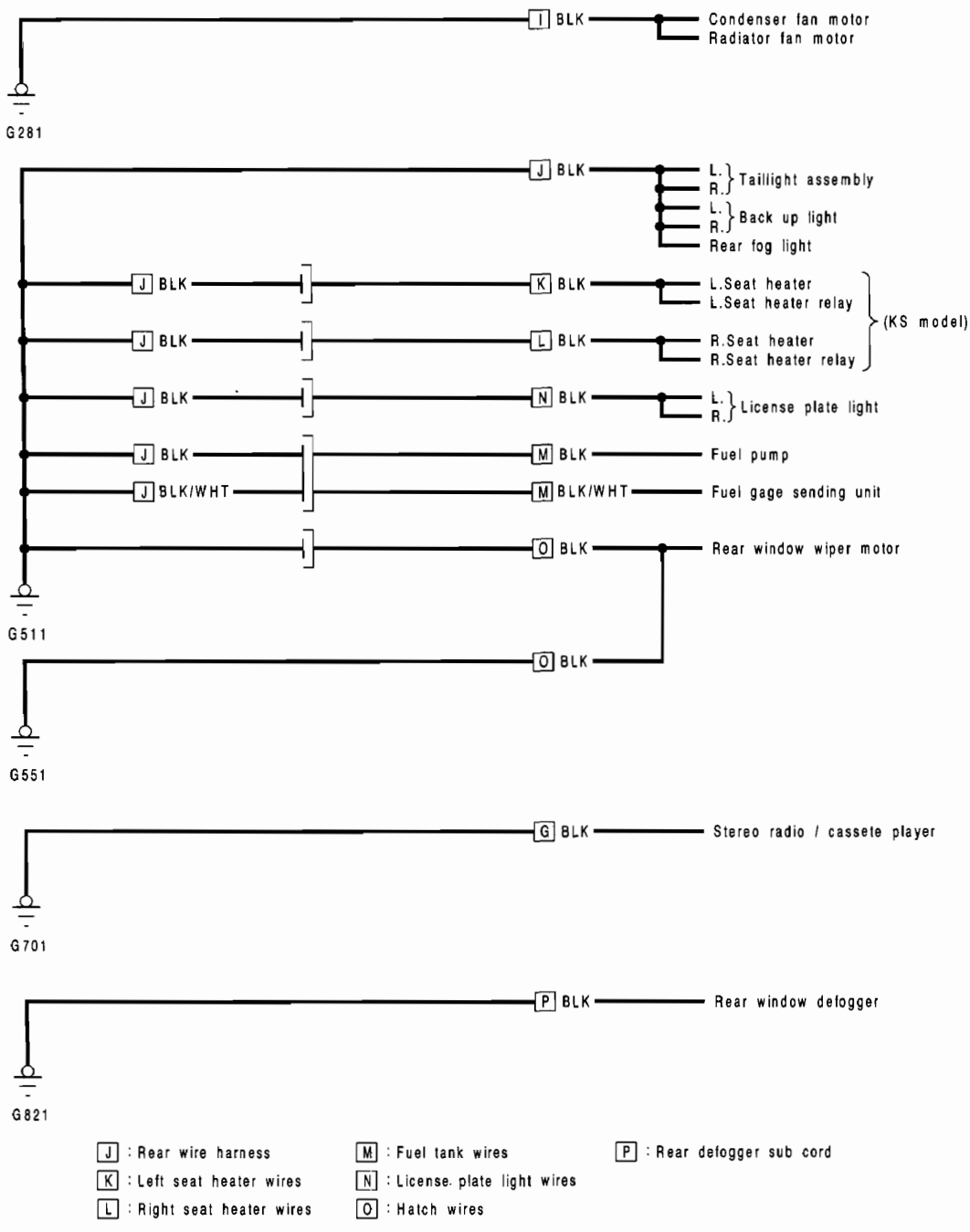
Ground Distribution

Circuit Identification (cont'd)

LHD :

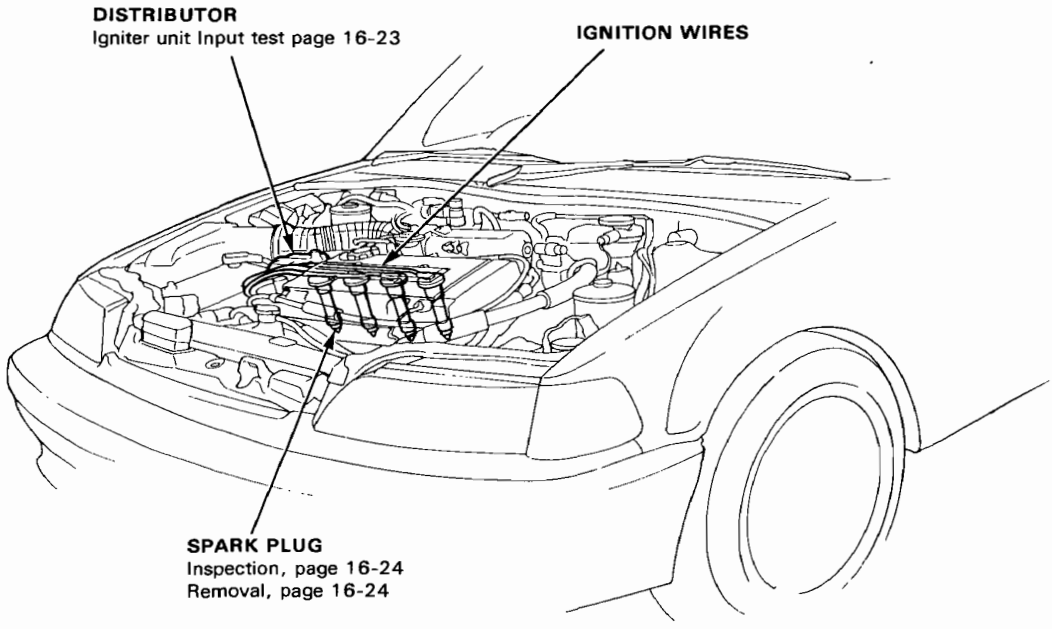


D : Main wire harness
F : Roof wires
G : Dashboard wire harness
H : Driver's door wire harness

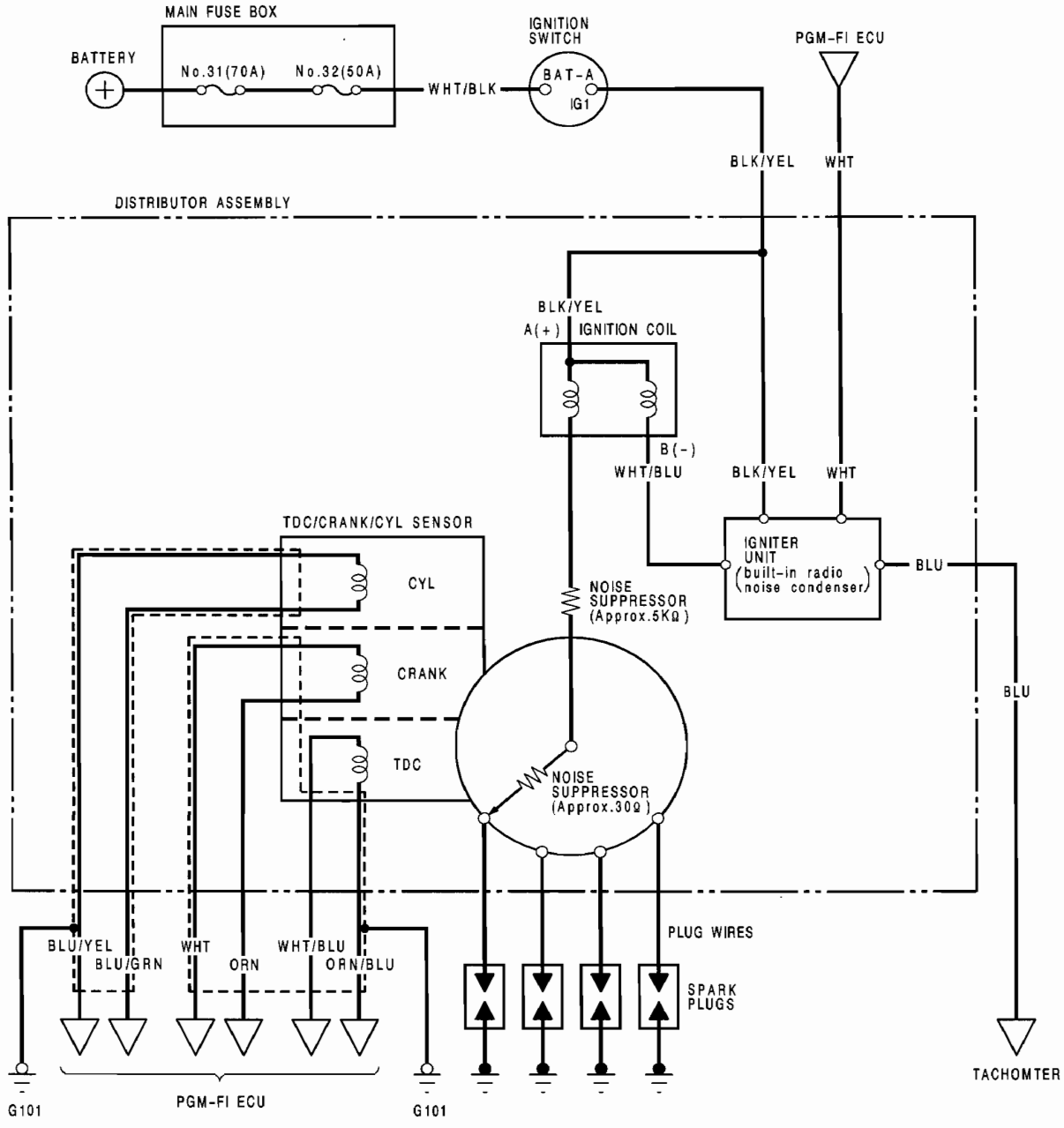

I BLK
Condenser fan motor
Radiator fan motor
G281
J BLK
L.
R.
Taillight assembly
L.
R.
Back up light
Rear fog light
J BLK
K BLK
L.Seat heater
L.Seat heater relay
(KS model)
J BLK
L BLK
R.Seat heater
R.Seat heater relay
J BLK
N BLK
L.
R.
License plate light
J BLK
M BLK
Fuel pump
J BLK/WHT
M BLK/WHT
Fuel gage sending unit
O BLK
Rear window wiper motor
G511
O BLK
G551
G BLK
Stereo radio / cassete player
G701
P BLK
Rear window defogger
G821
J : Rear wire harness
K : Left seat heater wires
L : Right seat heater wires
M : Fuel tank wires
N : License plate light wires
O : Hatch wires
P : Rear defogger sub cord

Component Location Index

IGNITION TIMING CONTROL SYSTEM
Inspection and Setting, page 16-22

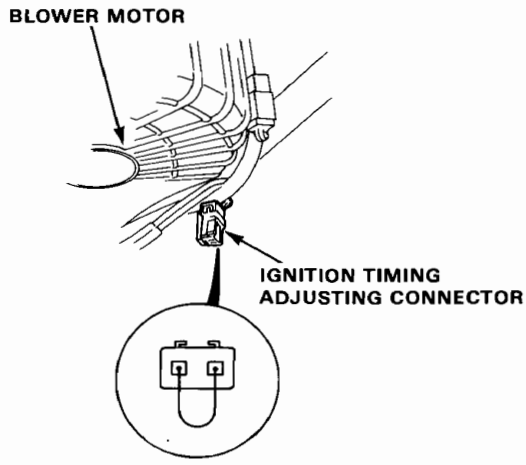


Circuit Diagram

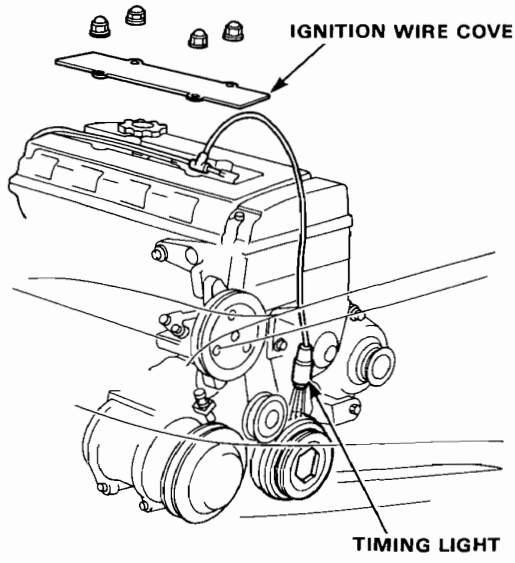


Ignition Timing Inspection and Setting

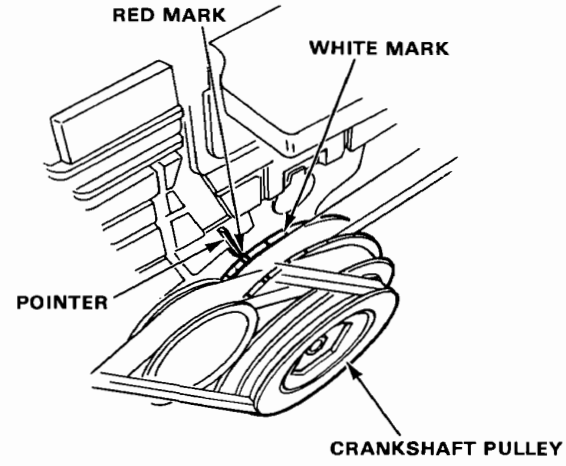
1. Start the engine and allow it to warm up (cooling fan comes on).
2. Connect the BRN and GRN/WHT terminals of the ignition timing adjusting connector (BLU) with a jumper wire.
   NOTE: L.H. drive type shown, R.H. drive type is symmetrical to L.H. drive type.



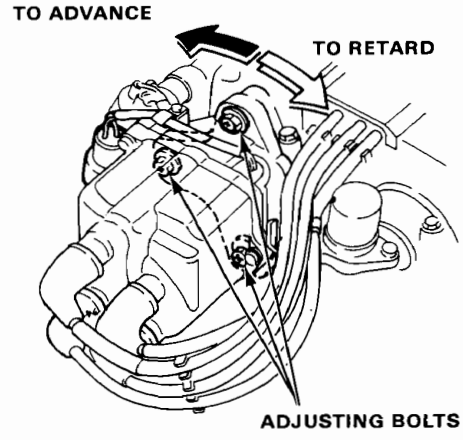
3. Remove the ignition wire cover. Then connect a timing light to the No. 1 ignition wire; while the engine idles, point the light toward the pointer on the timing belt cover.
   NOTE: Do not damage the cover when removing the nuts.



4. Adjust ignition timing, if necessary, to the following specifications:
   Ignition Timing:
   15° ± 2° BTDC (RED) at 750 ± 50 min^{-1} (rpm) in neutral



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

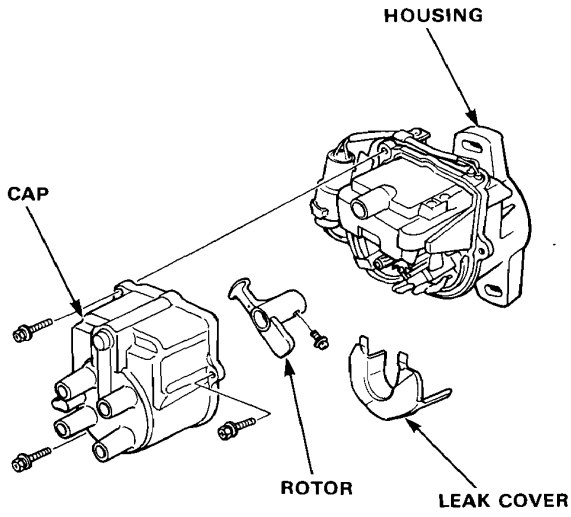


6. Tighten the adjusting bolts recheck the timing.
7. Remove the jumper wire from the ignition timing adjusting connector (BLU).

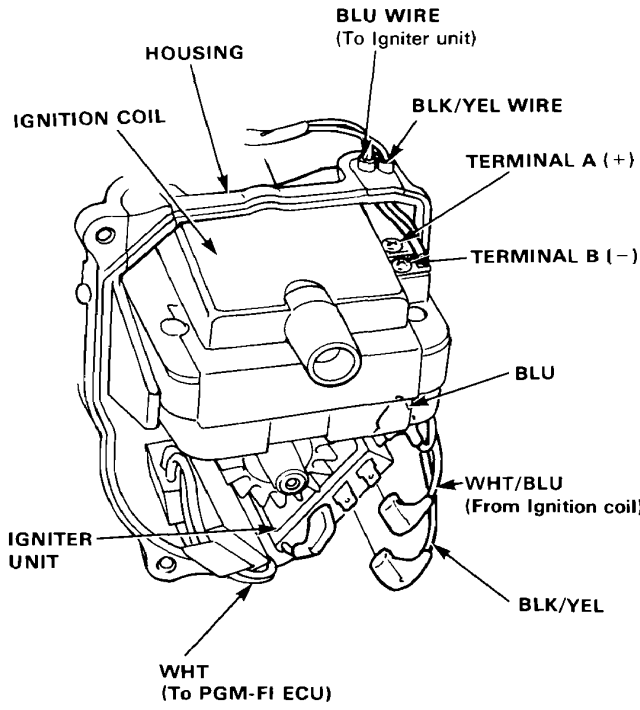
Igniter Unit Input Test

NOTE:
- See section 6 when the selt-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.
2. Remove the roter and reak cover.



3. With the ignition switch on, there should be battery voltage between the terminal (+) and body ground.
   - If there is battery voltage, go to step4.
   - If there is no voltage, check for;
     - An open in the WHT wire or BLK/YEL wire.
     - Disconnected terminals.
4. Disconnect the BLK/YEL wire from the igniter unit. There should be battery voltage between the BLK/YEL (+) wire and body ground.
   - If there is battery voltage, go to step 5.
   - If there is no voltage, check for an open in the BLK/YEL wire between the ignition coil and igniter unit.

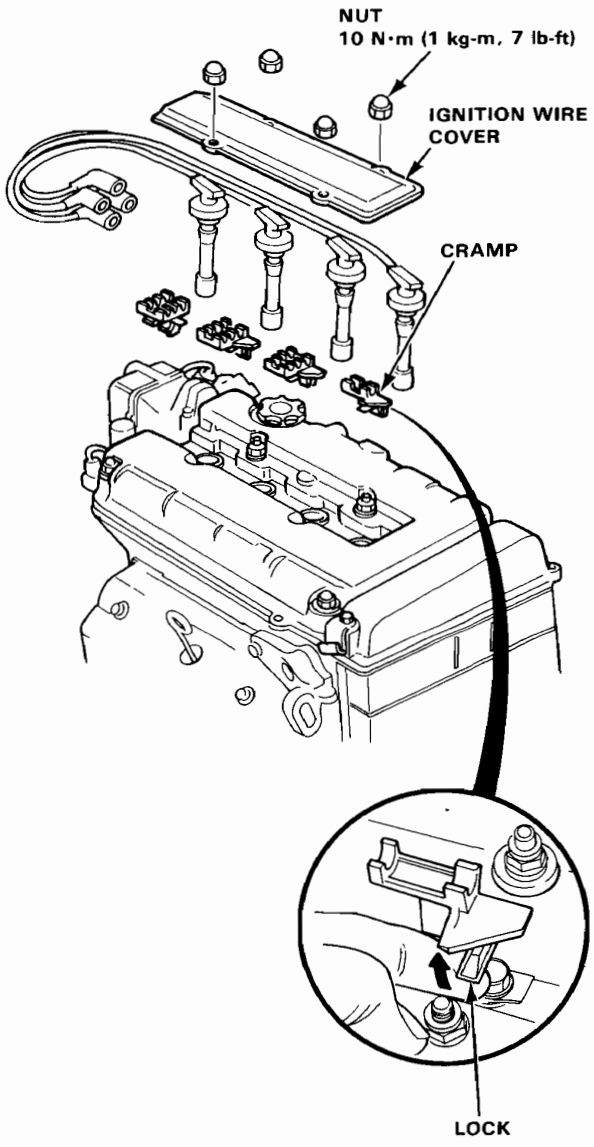


5. Disconnect the WHT/BLU wire from the Igniter unit. There should be battery voltage between the WHT/BLU (+) wire and body ground.
   - If there is battery voltage, go to step 6.
   - If there is no voltage, check for;
     - Ignition coil test.
     - An open in the WHT/BLU wire between the ignition coil and igniter unit.
     - Disconnected terminals.
6. Check for continuity between the igniter body and distributor housing.
7. If all tests ok, yet the system still fails to work, replace the igniter unit assembly.

Spark Plug Removal

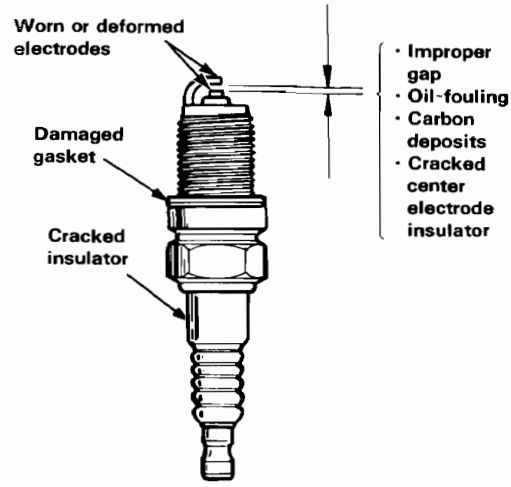
NOTE: Do not damage the cover when removing the nuts.

1. Remove the Ignition wire cover, then remove the ignition wire and cramp from the cylinder head.
2. Remove the spark plug.



Spark Plug Inspection

1. Inspect the electrodes and ceramic insulator for :



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

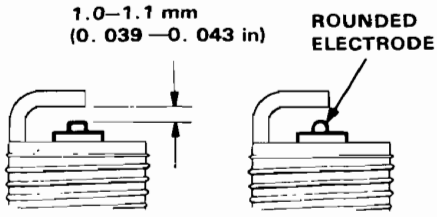
Fouled plug may be caused by :
- Rich fuel mixture
- Retarded ignition timing
- Oil in combustion chamber
- Incorrect spark plug gap
- Plug heat range too low
- Excessive idling/low speed running
- Clogged air cleaner element
- Deteriorated ignition coil or ignition wires

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

Spark Plug :

Standard
BKR6E-N11 (NGK)
K20PR-L11 (ND)

Optional
BKR7E-N11 (NGK)
K22PR-L11 (ND)



3. Adjust the gap with a suitable gapping tool.

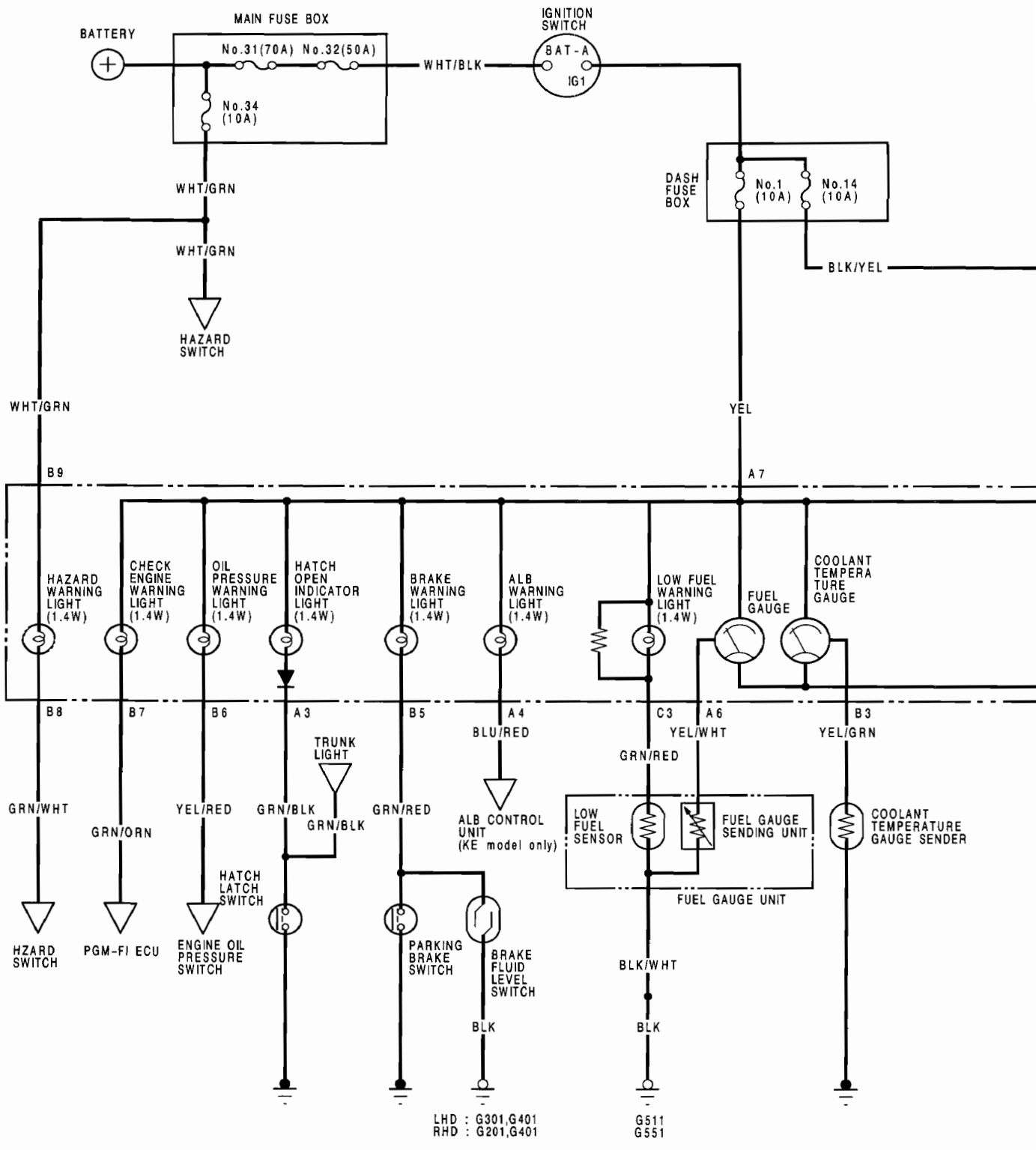
Electrode Gap: 1.0—1.1 mm (0.039—0.043 in)

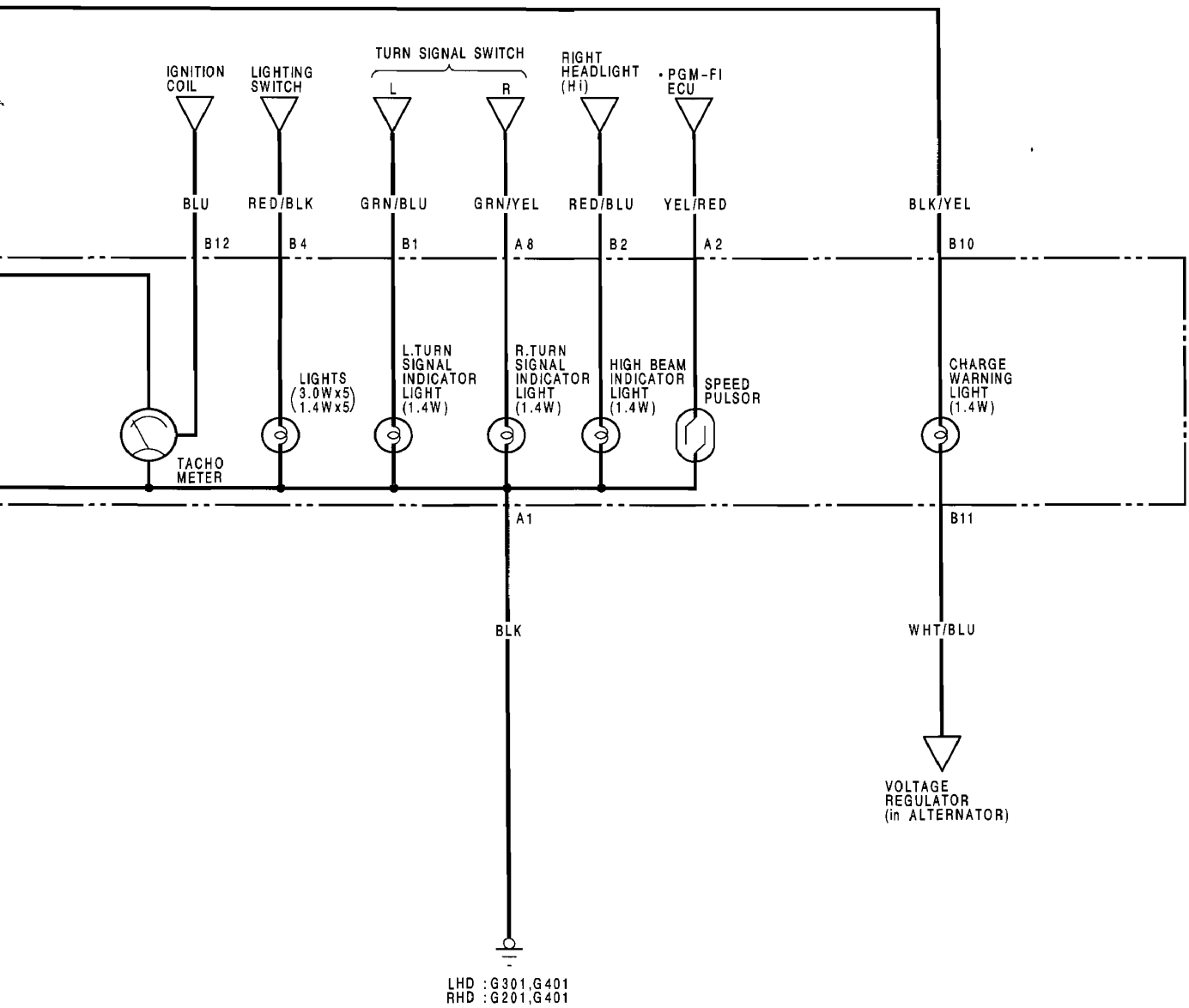
4. Screw the plugs into the cylinder head finger tight, then torque them to 18 N·m (1.8 kg-m, 13 lb-ft) .

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

Gauge Assembly

Circuit Diagram

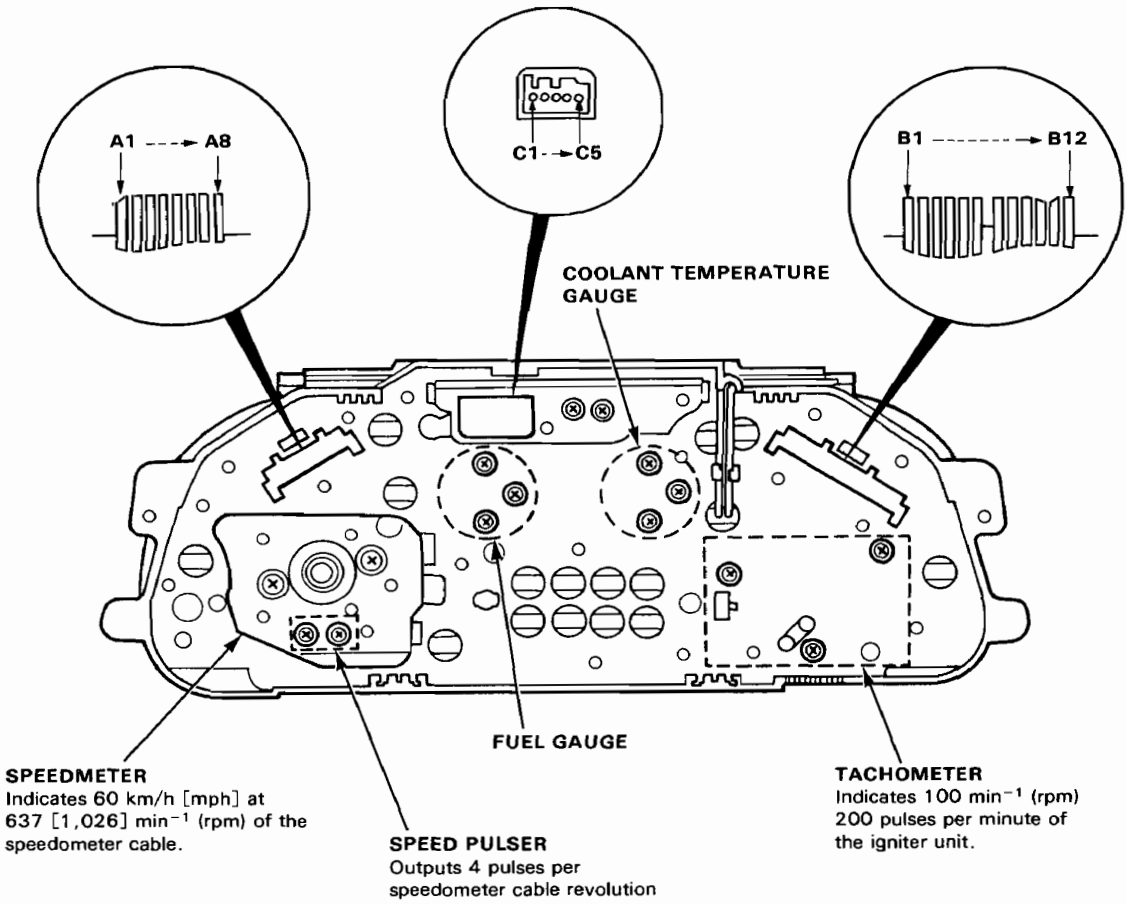



IGNITION COIL
LIGHTING SWITCH
TURN SIGNAL SWITCH
L
R
RIGHT HEADLIGHT (Hi)
PGM-FI ECU
BLU
RED/BLK
GRN/BLU
GRN/YEL
RED/BLU
YEL/RED
BLK/YEL
B12
B4
B1
A8
B2
A2
B10
TACHO METER
LIGHTS (3.0Wx5) (1.4Wx5)
L.TURN SIGNAL INDICATOR LIGHT (1.4W)
R.TURN SIGNAL INDICATOR LIGHT (1.4W)
HIGH BEAM INDICATOR LIGHT (1.4W)
SPEED PULSOR
CHARGE WARNING LIGHT (1.4W)
A1
B11
BLK
WHT/BLU
VOLTAGE REGULATOR (in ALTERNATOR)
LHD : G301, G401
RHD : G201, G401

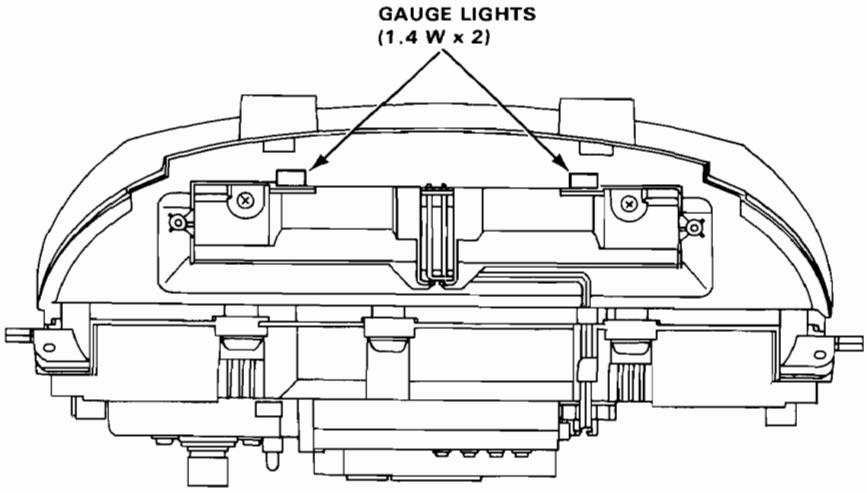
Gauge Assembly

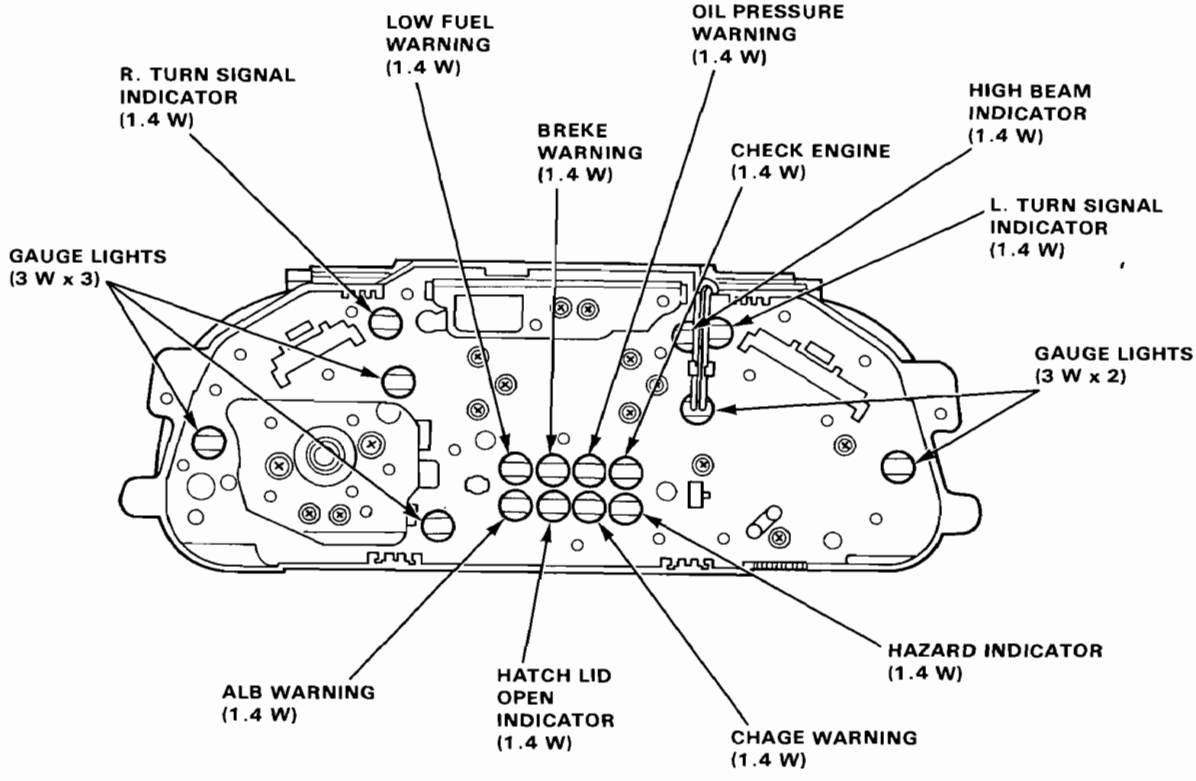
Gauge/Indcator Location Index

· Gauge Assembly
Disassembly, page 16-30



Bulb Locations



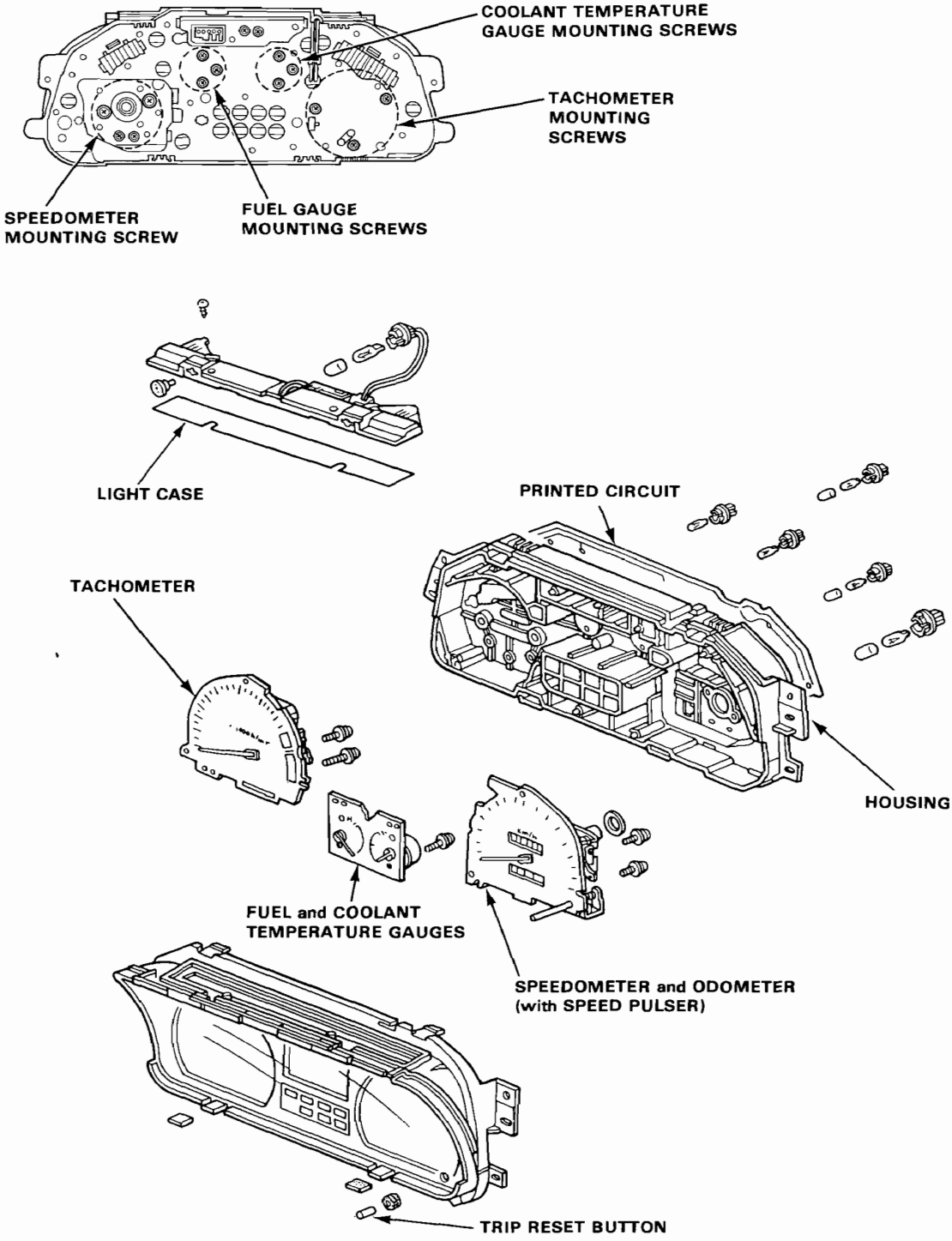


Gauge Assembly

Disassembly

NOTE:

- Handle the terminals and printed circuits carefully to avoid damaging them.
- Gauge assembly manufactured by Nippon Seiki is show below.



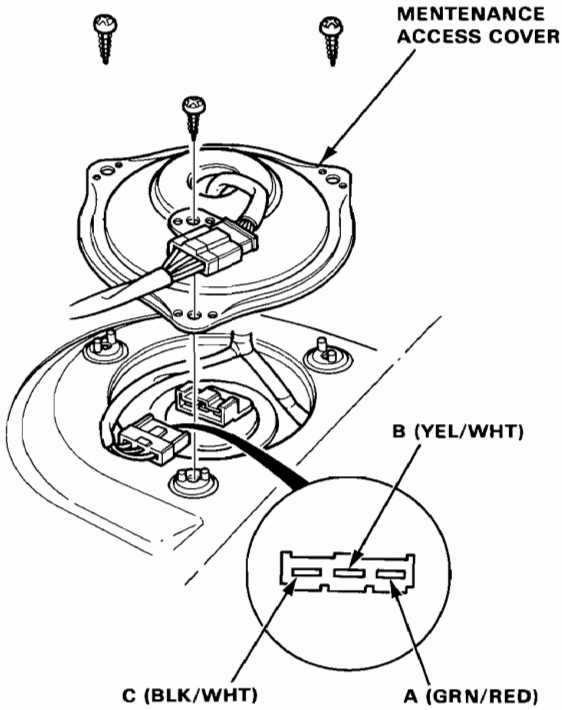
Fuel Gauge

Gauge Test

NOTE:
- Refer to page 16-26 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 rear seat, then remove the maintenance access cover.

2. Disconnect the 3-P connector from the fuel gauge sending unit.



View from wire side

3. Connect the voltmeter positive probe to the B (YEL/WHT) terminal and the negative probe to the C (BLK/WHT) terminal. Then turn the ignition switch ON. There should be between 5 and 8 V.

   - If the voltage is as specified, go to step 4.

   - If the voltage is not as specified, check for:
     — An open in the YEL/WHT or BLK/WHT wire.
     — Poor ground (G 511, G 551).
     — Defective fuel gauge assembly.

4. Turn the ignition switch OFF. Attach a jumper wire between the B (YEL/WHT) and C (BLK/WHT) terminals.

5. 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, heuce 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.

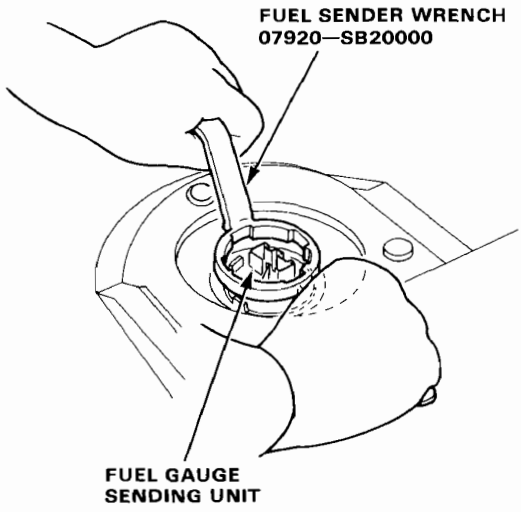
- Inspect the fuel gauge sending unit if the gauge is OK.

Fuel Gauge

Sending Unit Test

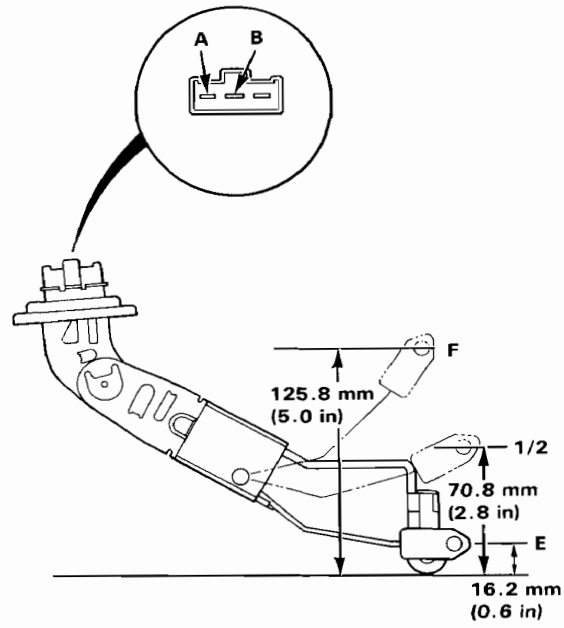
⚠WARNING Do not smoke while working on fuel system. Keep open flame away from work area.

1. Remove the rear seat, them remove the maintenance access cover.
2. Check that the ignition switch OFF, then disconnect the 3-P connector from the fuel gauge sending unit.
3. Remove the fuel gauge sending unit.



4. Measure the resistance between the A and B terminals at E (EMPTY), 1/2 (HALF FULL) and F (FULL) by moving the float.

Float Position	E	1/2	F
Resistance (Ω)	105—109	27.5—37.5	2—5



5. If unable to obtain the above readings, replace the fuel gauge sending unit.

Low Fuel Warning System

Warning Light Test

NOTE: Refer to page 16-26 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.

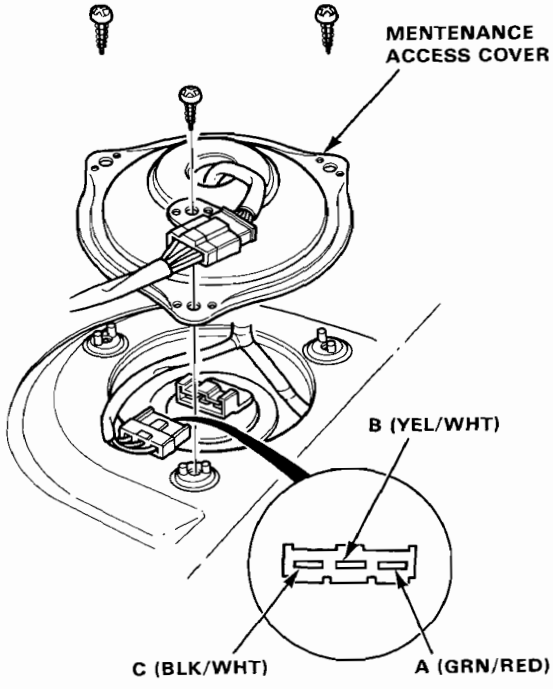
2. Drain fuel tank into an approved container. Then install the drain bolt with a new washer.

3. Add less than 6.5 ℓ (1.7 U.S. Gal, 1.4 Imp. Gal) of fuel and turn the ignition switch on. The low fuel warning light should come on within 3 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 3 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/WHT) 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.



View from wire side