

INTRODUCTION

How to Use This Manual

This supplement contains information specifically applicable to the 1988 ACCORD. Refer to following shop manuals for service procedures applicable to this model.

Description	Code No.
ACCORD Maintenance and Repair	62SE300
ACCORD Supplement	62SE320

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

Special Information

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

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

NOTE: Gives helpful information.

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

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

* (Asterisk) marked chapters are not included in this manual.

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HONDA MOTOR CO., LTD.
Service Publication Office

General Info



Special Tools



Specifications

specs

Maintenance



Engine



Cooling



Fuel and
Emission Controls



Transaxle



Steering



Suspension*



Brakes



Body*



Heating and
Air Conditioning



Electrical



Outline of Model Changes

ITEM	87 MODEL						88 MODEL						DESCRIPTION	REF. SECTION	
	KE	KF	KG	KQ	KW	KX	KE	KF	KG	KQ	KS	KW			KX
Carbureted Engine Model, equipped with A20A1 Engine						○								Released in 1987 (KG model were released in 1986)	—
Fuel-Injected Engine Model	A20A3 Engine			○		○								Released in 1987	—
	A20A4 Engine				○									Released in 1987	—
	B20A2 Engine	○	○	○								○		New Release (KW) Released in 1987	—
	B20A8 Engine								○		○		○	New Release	—
Engine	B20A2 Type	○	○	○								○	EXSi	New Release (KW) Release in 1987	—
	B20A8 Type								○	EXSi	○	EXSi	○	New Type Engine	—
Fuel and Emission Control System	A20A1 Engine			○		○	○		○			○	○	Idle Control System does not apply	§ 12
	A20A3 Engine			○		○	○		○			○	○	New System	§ 12
	A20A4 Engine				○									Evaporative Emission Control System added	—
	B20A2 Engine	○	○	○										New System	—
	B20A8 Engine								○		○		○	New System	§ 12
Clutch														New Type	—
Manual Transmission														New Type B2	—
Driveshafts	○	○	○											Intermediate Shaft added	—
Front Brakes														Uses large Front Caliper and Disc	—
Distributor	○	○	○		○	○								Use New Type (for A20A1 and B20A2 Engines)	—
Headlights	○													Added with Dim-Dip Lighting System	—

ITEM	87 MODEL	88 MODEL	DESCRIPTION	REF. SECTION
Front Brakes	Model equipped with 4W-ALB (except KS model)		Use large Front Caliper and Disc	—
Frame shape	ALL		Frame shape near Rear Suspension were changed	—
Combination Meter	ALL		Changed	—
Intake and Exhaust Manifolds		ALL	Changed	§ 9
Water pump		ALL	Changed	§ 10
Secondary Valve Body		Models equipped with 2-1 Timing Valve (F4 Type)	New	§ 15
Power Steering Gear box		Models equipped with Power Steering	Changed of Steering rack bushing B installation	§ 18
ALB		Models equipped with ALB	Adopted 3 channel ALB	§ 20
Heater		ALL	Changed function control and recirculation control motors and control panel switches	§ 22
Air Conditioner		ALL	Changed fitting size on discharge hose	§ 23

General Information

Chassis and Engine Numbers	1-2
Identification Number Locations	1-3
Label Locations	1-4
Lift and Support Points	1-6
Towing	1-9
Preparation of Work	1-10

Chassis and Engine Numbers

Vehicle Identification Number

JHMCA53400C200001

Manufacture, Make and Type of vehicle

JHM: HONDA MOTOR CO., LTD., JAPAN.
HONDA Passenger car

Line/Body and Engine Type

CA4: Accord 1600
CA5: Accord 2000

Transmission and Body Type

3: Manual (3D)
4: Automatic (3D)
5: Manual (4D)
6: Automatic (4D)

Vehicle Grade

2: STD, GL, LX
3: EX
4: EXi
5: EXSi
6: EXR, LXC
7: EXC
8: EXCi
9: EXSCi

Fixed Code

Model Year
0: 1988

Plant

C: Saitama Factory Sayama plant

Serial Number

Engine Serial Number (SOHC Engine)

A20A2-3000001

Engine Type

A20A1: 2000 Carbureted
(with catalytic converter)
A20A2: 2000 Carbureted
(without catalytic converter)
A20A3: 2000 Fuel-Injected
(with catalytic converter)
A20A4: 2000 Fuel-Injected
(without catalytic converter)
A16A1: 1600 Carbureted
(without catalytic converter)

Model Year

3: 1988

Emission Group

0: without catalytic converter (manual)
3: KQ (manual and Automatic)
5: without catalytic converter (Automatic)
9*: with catalytic converter
(manual and Automatic)

Serial Number

9* with Automatic starting 50001.

Transmission Number (Manual)

E2K5-1000001

Transmission Type

E1M5: for A16A1 Engine
E2K5: for A20A (Ex. KX, A20A3)
Engine
E2L5: for KX, A20A3 Engine Only
F2K5: for B20A (Ex. KX, B20A8)
Engine
F2X5: for KX, B20A8 Engine Only

Model Year

1: 1988

Serial Number

Engine Serial Number (DOHC Engine)

B20A2-1000001

Engine Type

B20A2: 2000 DOHC Fuel-Injected
(without Catalytic Converter)
B20A8: 2000 DOHC Fuel-Injected
(with Catalytic Converter)

Model Year

1: 1988 (with Catalytic Converter)
2: 1988 (without Catalytic Converter)

Serial Number

Transmission Number (Automatic)

F4-8000001

Transmission Type

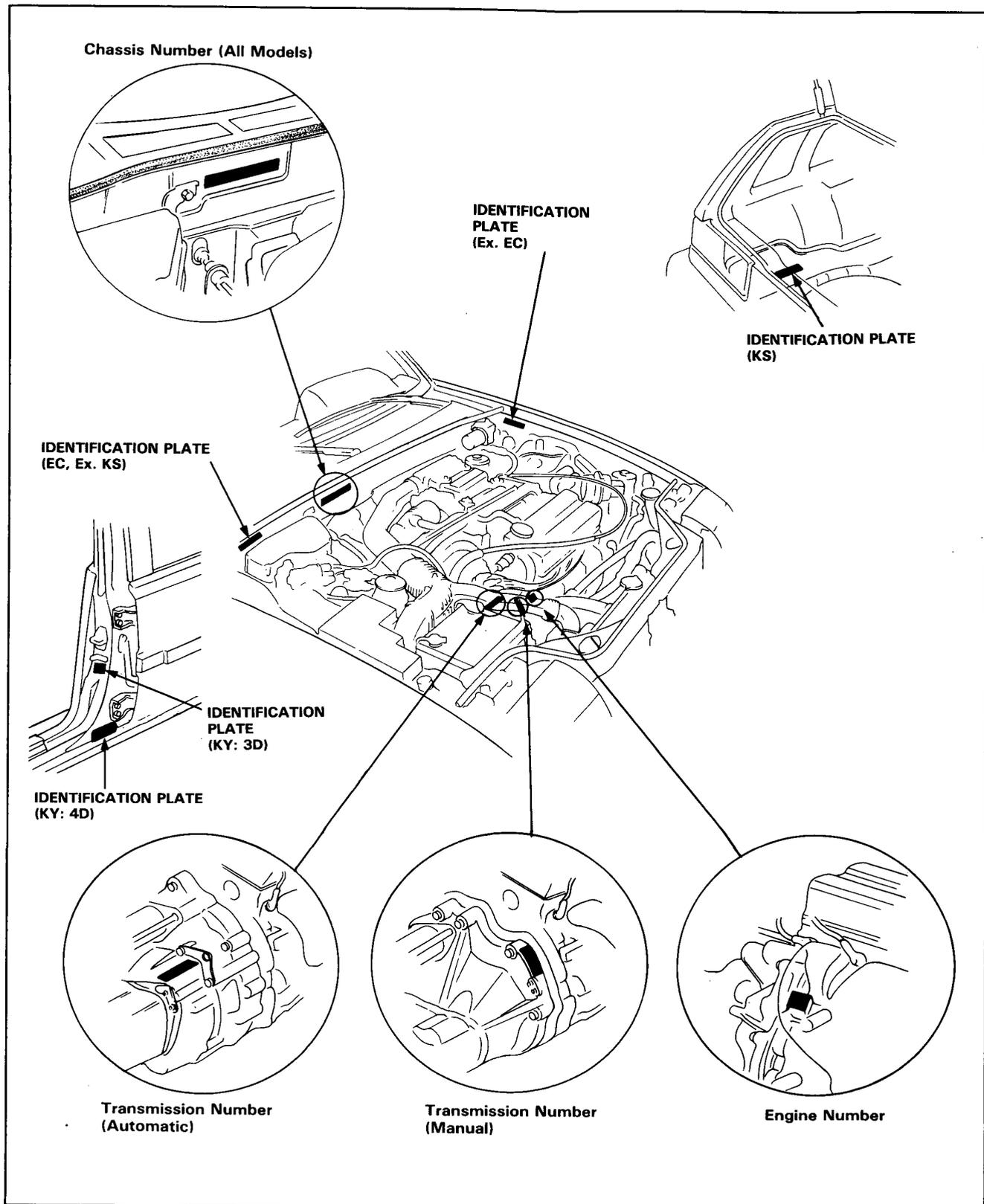
F4: for A20A Engine
C9: for A16A Engine

Model Year

8: 1988

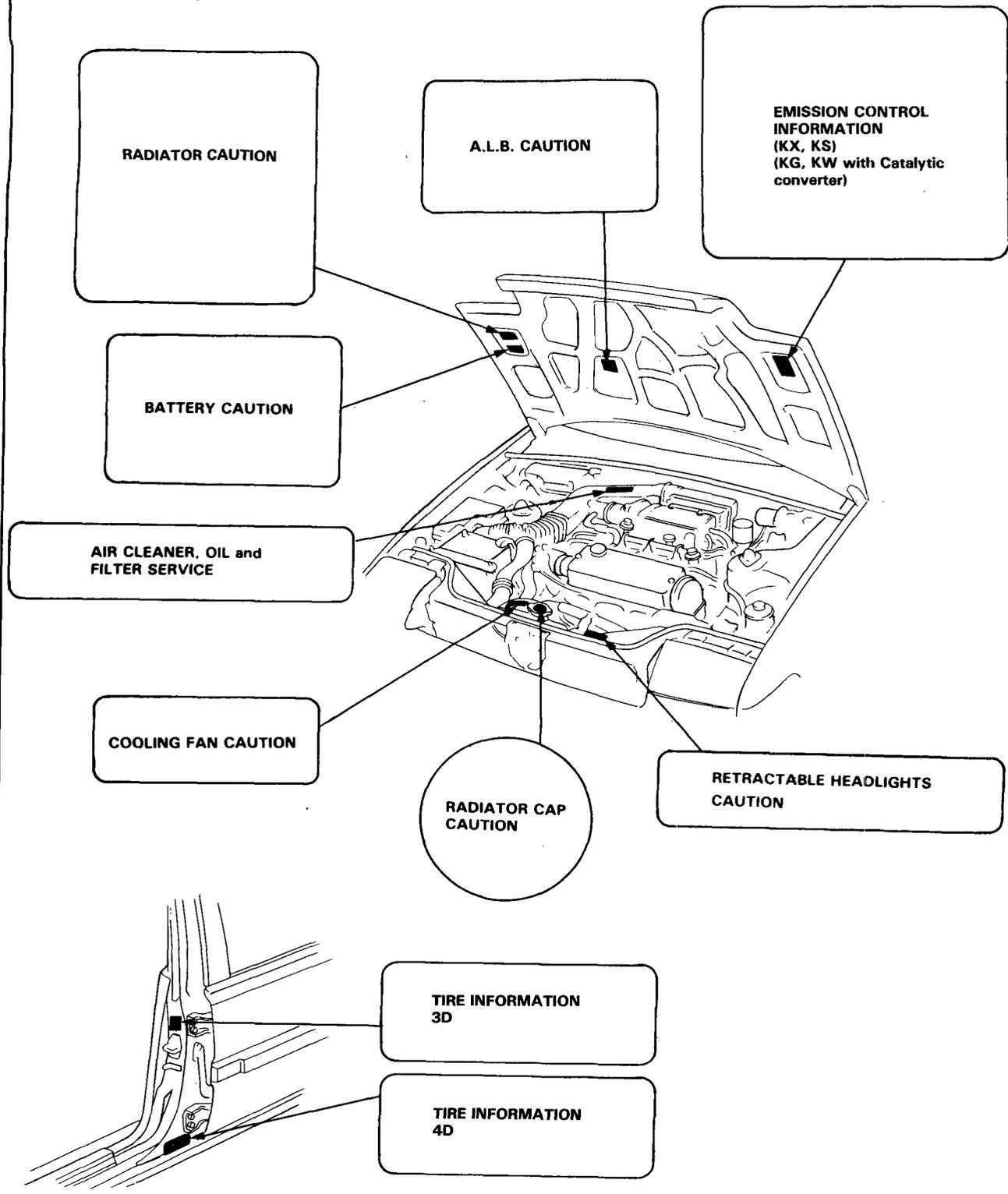
Serial Number

Identification Number Locations



Label Locations

Fuel-Injected Engine:



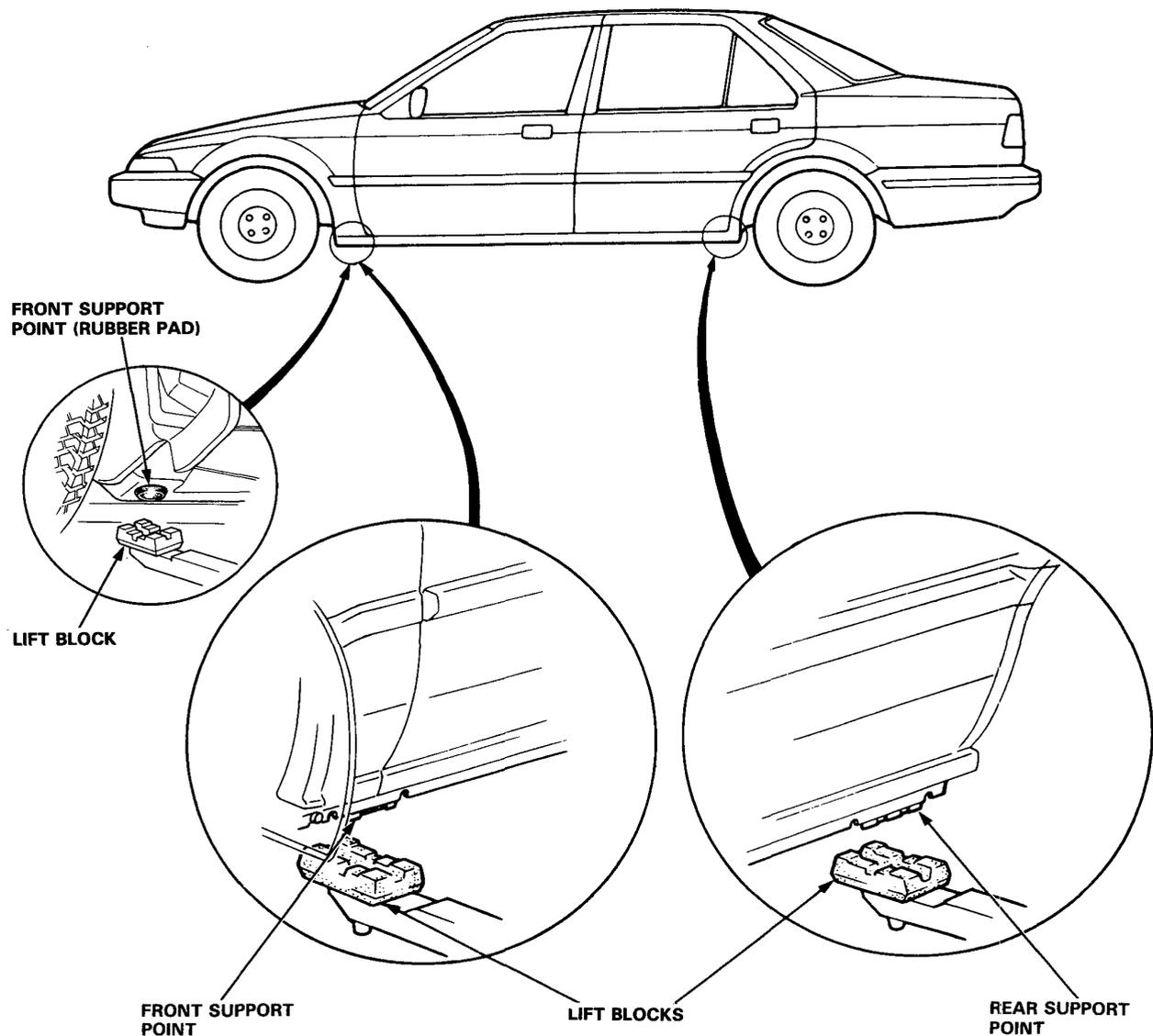
Lift and Support Points

Hoist

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

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

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





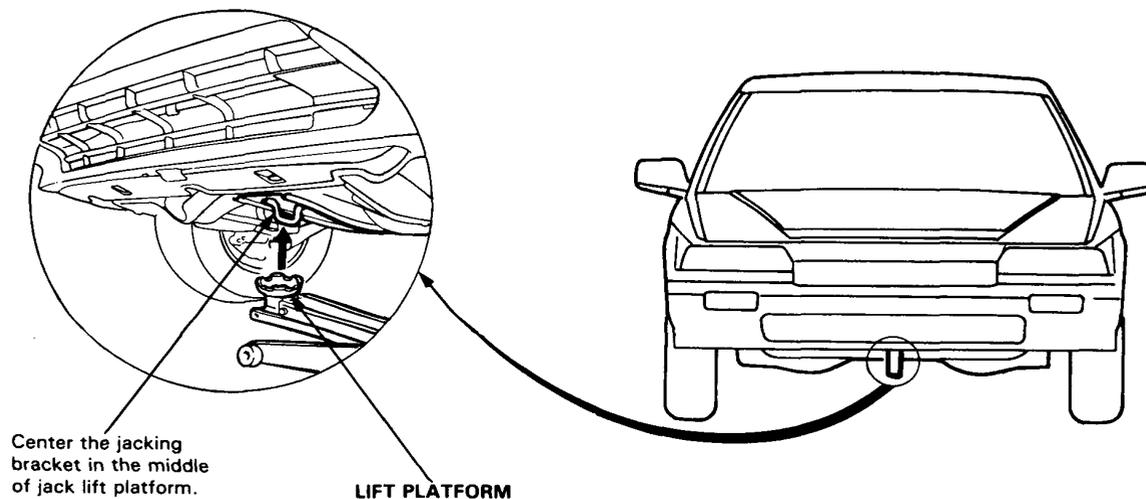
Floor Jack

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

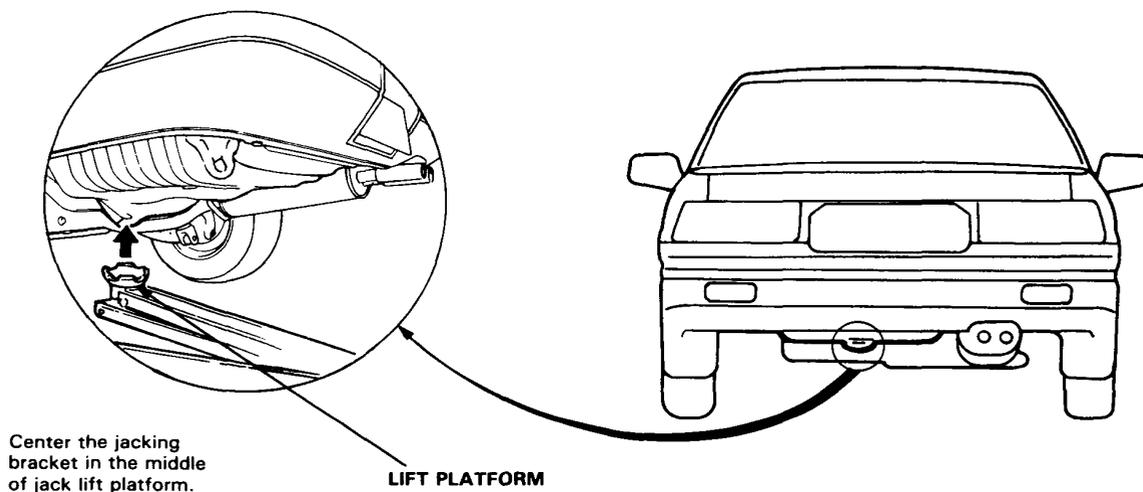
WARNING

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

Front

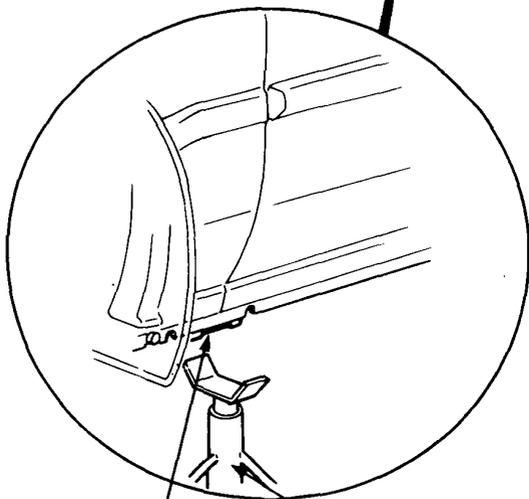
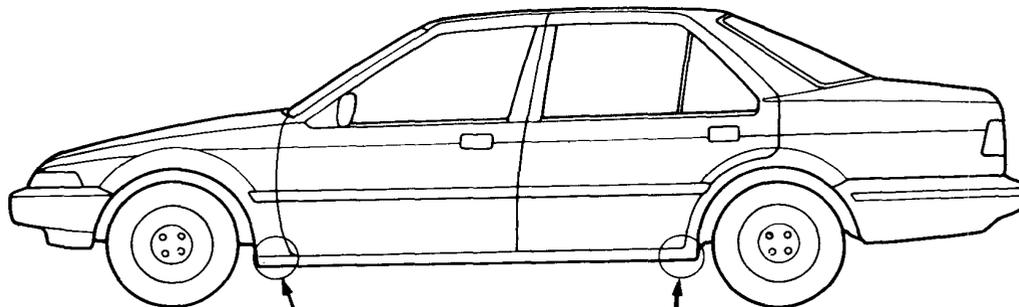


Rear



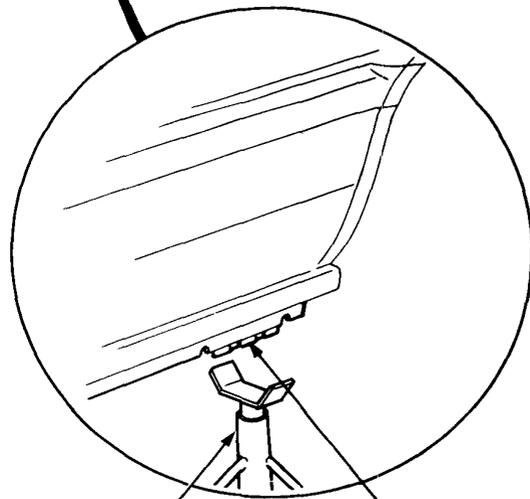
Lift and Support Points (cont'd)

Safety Stands



FRONT SUPPORT POINT

SAFETY STAND



SAFETY STAND

REAR SUPPORT POINT



Towing

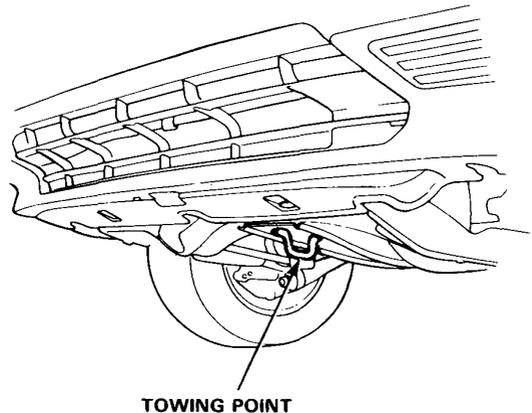
Towing

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 his chains and lift straps to avoid damaging the bumper and the body under it. Do not use the bumpers to lift the car or to support the car's weight while towing. Check local regulations for towing with a chain or frame-mounted tow bar. A chain may be attached to the hook shown in the illustration. Do not attach a tow bar to either bumper.

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

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

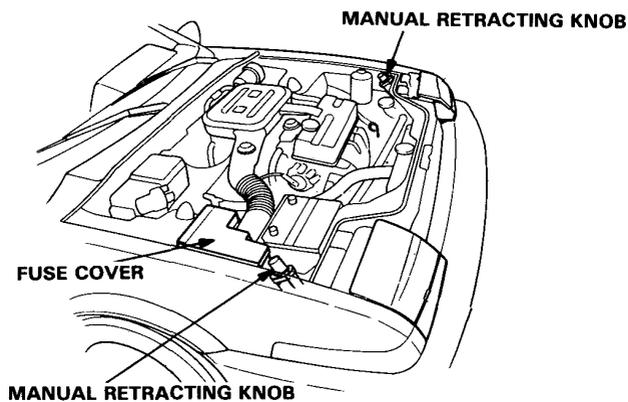
WARNING DO NOT push or tow a car to start it. The forward surge when the engine starts could cause a collision. Also, under some conditions, the catalytic converter (on some types) could be damaged. A car equipped with automatic transmission cannot be started by pushing or towing.



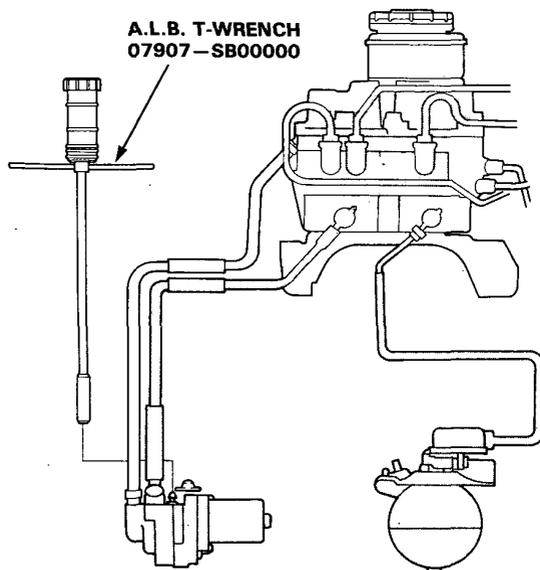
Preparation of Work

Special Caution Items For This Car

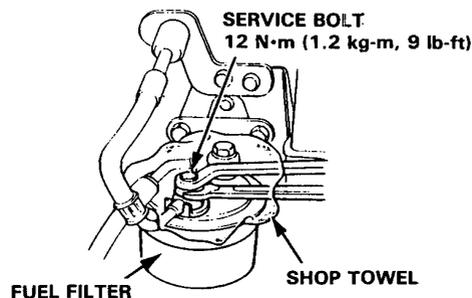
1. Retractable headlights are installed. Before manual raising and lowering, the fuse must be removed. When raising and lowering is executed without removing the fuse, injury may be caused by rapid turning of the manual retracting knob, if the motors accidentally start running.



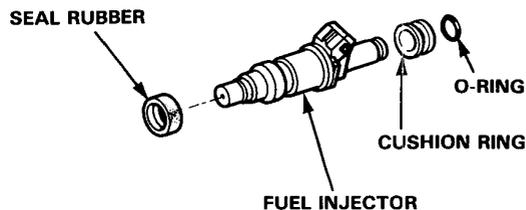
2. For cars equipped with A.L.B., the high-pressure brake fluid must be drained before disassembly of the A.L.B. piping system. When this is not done danger may be caused by brake fluid squirting out under high pressure. For draining of the high-pressure brake fluid, refer to Section 20.



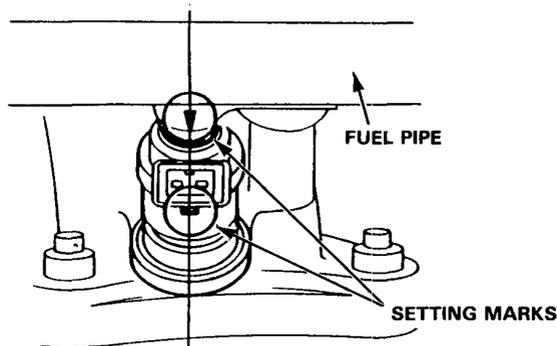
3. Fuel Line Servicing (Fuel-Injected Engine)
 - Relieve fuel pressure by loosening the service bolt provided on the top of the fuel filter before disconnecting a fuel hose or a fuel pipe.



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



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





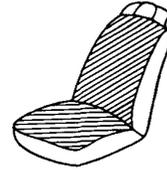
4. Inspection for fuel leakage
 - After assembling fuel line parts, turn ON the ignition switch (do not operate the starter) so that the fuel pump is operated for approximately two seconds and the fuel is pressurized. Repeat this operation two or three times and check whether any fuel leakage has occurred in any of the various points in the fuel line.
5. Installation of an amateur radio for cars equipped with PGM-FI, CRUISE CONTROL and A.L.B. Care has been taken for the PGM-FI, CRUISE CONTROL and A.L.B. control unit (computer) and its wiring to prevent erroneous operation from external interference, but erroneous operation of the computer may be caused by extremely strong radio waves. Attention must be paid to the following items to prevent erroneous operation of the computer.
 - The antenna and the body of the radio must be at least 200 mm (7.9 in.) away from the computer.

The computer locations:

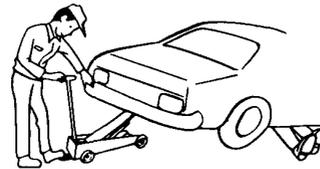
- PGM-FI: Under the left side seat.
 - CRUISE CONTROL: Under the driver's side dashboard.
 - A.L.B. control unit: Under the passenger's side dashboard.
 - Do not lead the antenna feeder and the coaxial cable over a long distance parallel to the car's wiring. When crossing the wiring is required, execute crossing at a right angle.
 - Do not install a radio with a large output (max. 10 W).
6. Apply liquid gasket to the transmission, oil pump cover, right side cover and water outlet. Use HONDA PART NO 08740-99986 as a liquid gasket.
 - Check that the mating surfaces are clean and dry before applying liquid gasket. Degrease the mating surfaces if necessary.
 - Apply liquid gasket evenly, being careful to cover all the mating surface.
 - To prevent leakage of oil, apply liquid gasket to the inner threads of the bolt holes.
 - Do not allow liquid gasket to stand for more than 20 minutes before assembly.
 - Wait at least 30 minutes before filling with the appropriate liquid (engine oil, coolant etc).

CAUTION: Observe all safety precautions and notes while working.

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



2. Work safely and give your work your undivided attention. When either the front or rear wheels are to be raised, block the remaining wheels securely. Communicate as frequently as possible when 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.



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



(cont'd)

Preparation of Work

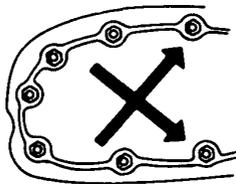
(cont'd)

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

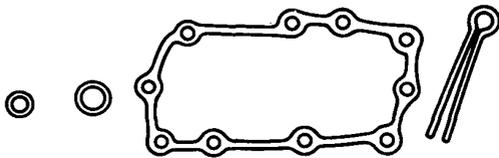


5. Parts must be assembled with the proper torque according to the maintenance standards established.

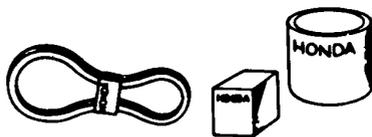
6. When tightening a series bolts or nuts, begin with the center or large diameter bolts and tighten them in crisscross pattern in two or more steps.



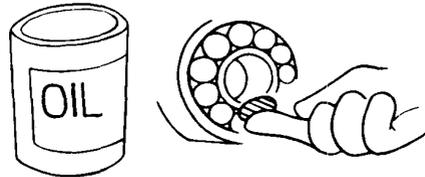
7. Use new packings, gaskets, O-rings and cotter pins whenever reassembling.



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



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



10. Brake fluid and hydraulic components

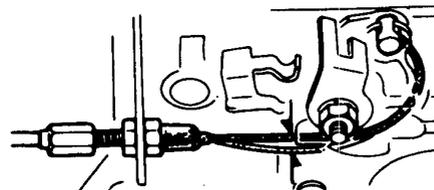
- When replenishing the system, use extreme care to prevent dust and dirt from entering the system.
- Do not mix different brands of fluid as they may not be compatible.
- Do not reuse drained brake fluid.
- Brake fluid can cause damage to painted surfaces. Wipe up spilled fluid at once.
- After disconnecting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



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

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

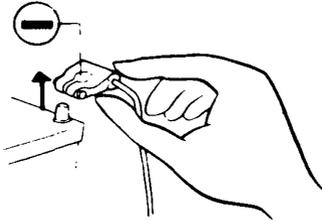
12. Upon assembling, check every part for proper installation and operation.



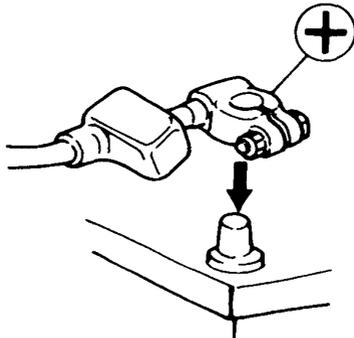


Electrical

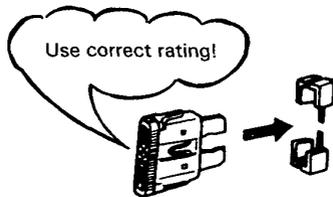
- Before making any repairs on electric wires or parts, disconnect the battery cables from the battery starting with the negative (-) terminal.



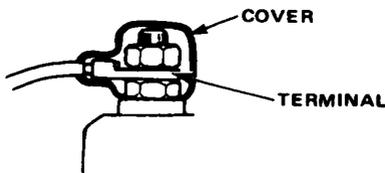
- After making repairs, check each wire or part for proper routing and installation. Also check to see that they are connected properly.
- Always connect the battery positive (+) cable first, then connect the negative (-) cable.



- 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.

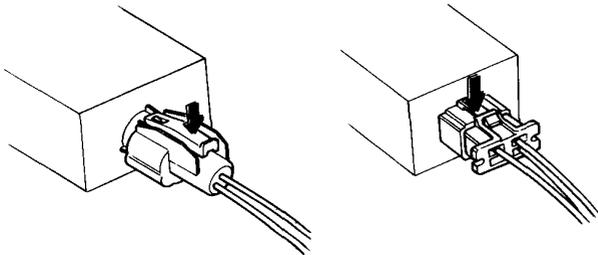
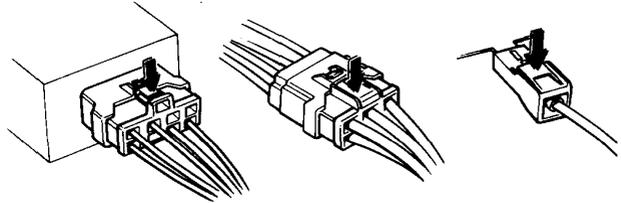


- Be sure to install the terminal cover over the connections after a wire or wire harness has been connected.

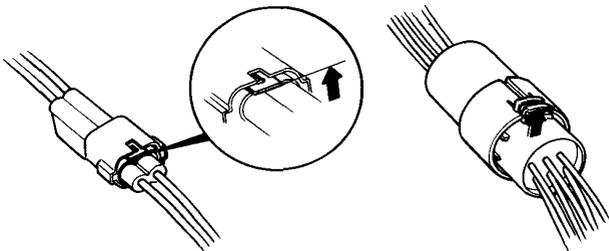


- When removing locking couplers, be sure to disengage the lock before disconnecting.
- Couplers may be of two types, those in which the lock is pressed to remove, and those in which the lock is pulled up to remove. Be sure to ascertain the type of locking device before beginning work. The following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

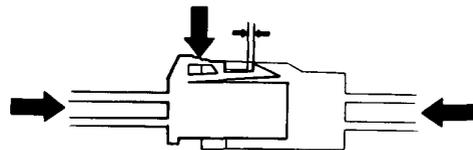
Press to disengage:



Pull up to disengage:



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

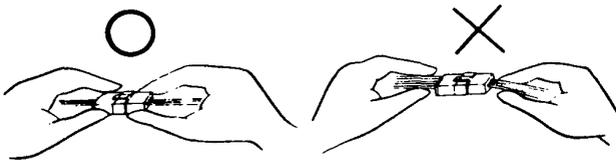


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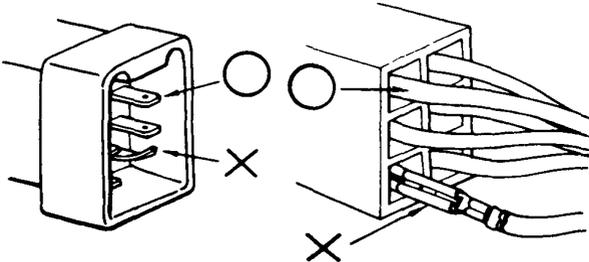
Preparation of Work

Electrical (cont'd)

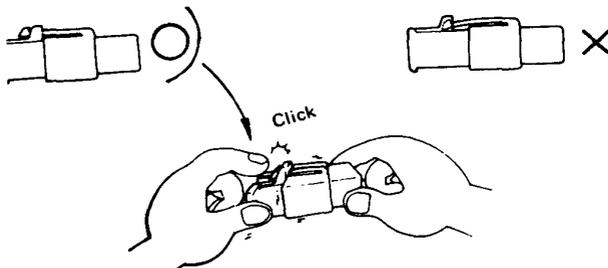
- When disconnecting a coupler, pull it off from the mating coupler by holding on both couplers.
- Never try to disconnect couplers by pulling on their wires.



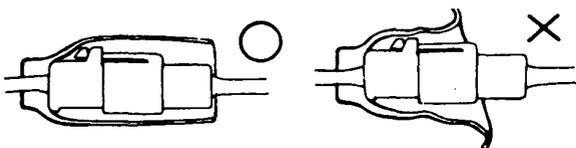
- Before connecting couplers, check to see that the terminals are in place and are not bent or distorted.



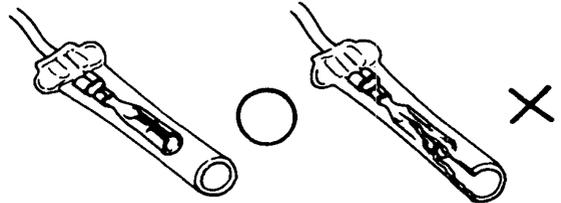
- Insert couplers fully until they will no longer go.
- Some couplers have locking tabs that must be aligned and engaged securely.
- Don't use wire harnesses with a loose wire or coupler.



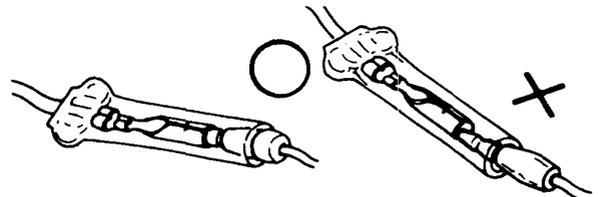
- Place the plastic cover over the mating coupler after reconnecting. Also check that the cover is not distorted.



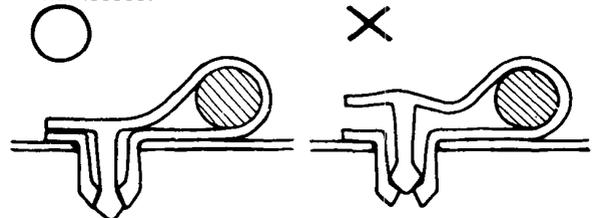
- Before connecting, check each connector cover for damage. Also make sure that the female connector is tight and not loosened from the previous use.



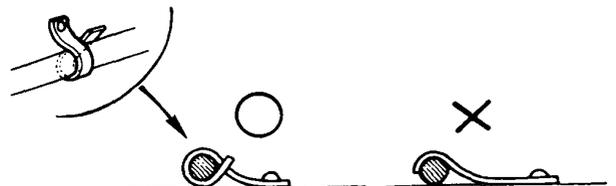
- Insert male connectors into the female connectors fully until they will no longer go.
- Be sure that plastic cover is placed over the connection.
- Position the wires so that the open end of the cover is not facing upward.



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



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

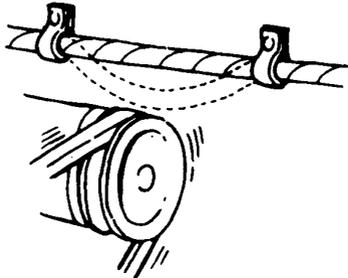


- Do not squeeze wires against the weld when a weld-on clamp is used.

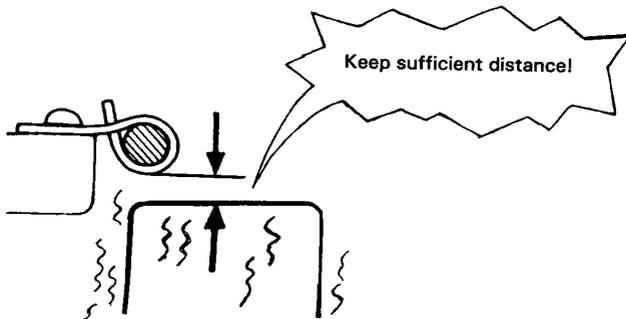




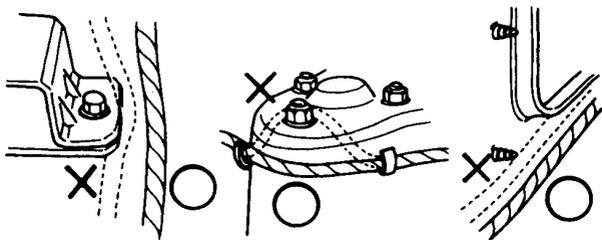
- After clamping, check each harness to be certain that it is not interfering with any moving or sliding parts of the vehicle.
- Keep wire harnesses away from the exhaust pipes and other hot parts.



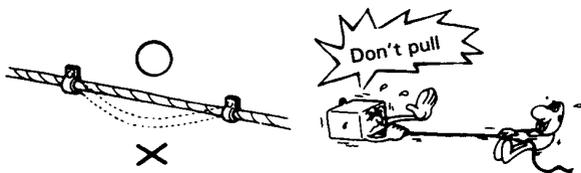
- Always keep a safe distance between wire harnesses and any heated parts.



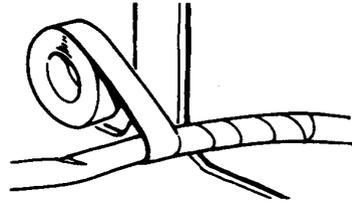
- Do not bring wire harnesses in direct contact with sharp edges or corners.
- Also avoid contact with the projected ends of bolts, screws and other fasteners.



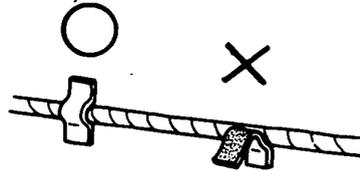
- Route harnesses so they are not pulled taut or excessively slackened.



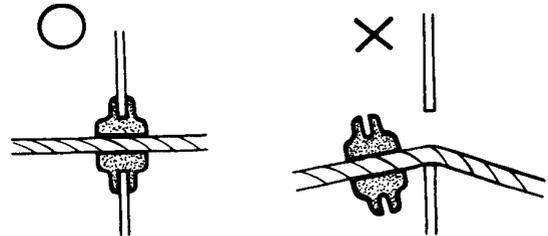
- Protect wires and harnesses with a tape or a tube if they are in contact with a sharp edge or corner.



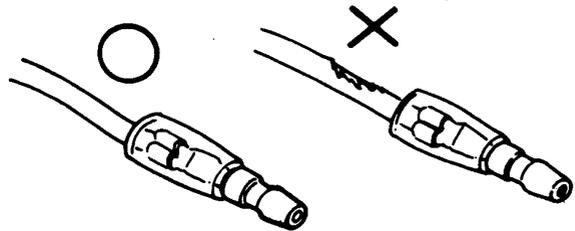
- Clean the attaching surface thoroughly if an adhesive is used. First, wipe with solvent or alcohol if necessary.



- Seat grommets in their grooves properly.



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



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



(cont'd)

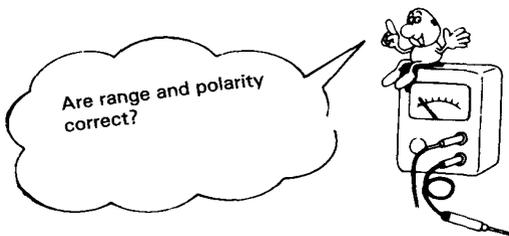
Preparation of Work

Electrical (cont'd)

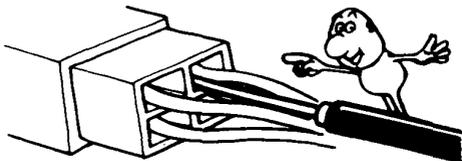
- After routing, check that the wire harnesses are not twisted or kinked.



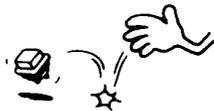
- Wire harnesses should be routed so that they are not pulled taut, slackened excessively, pinched, or interfering with adjacent or surrounding parts in all steering positions.



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



- Do drop parts.



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



Symbol Marks

The following symbols stand for:



:Apply engine oil.



:Apply brake fluid.



:Apply grease.



:Apply Automatic Transmission Fluid.



:Apply Power Steering Fluid.

Abbreviation



A/C	Air Conditioner
ALB	Anti Lock Brake
A/T	Automatic Transmission
ATF	Automatic Transmission Fluid
EACV	Electronic Air Control Valve
ECU	Electronic Control Unit for Fuel-Injection System
EGR	Exhaust Gas Recirculation
Ex.	Except
EX	Exhaust
G	Ground
IG	Ignition
IN	Intake
INT	Intermittent operation
L.	Left Side
LHD	Left Hand Drive
M/T	Manual Transmission
PCV Valve	Positive Crankcase Ventilation Valve
PGM-FI	Programed Fuel Injection
P/S	Power Steering
R.	Right Side
RHD	Right Hand Drive
ST	Starter
TA Sensor	Intake Air Temperature Sensor



Special Tools

Existing Tools (Common with Other Models)	2-2
Optional Tools	2-6

Special Tools

Existing Tools (Common with Other Models)

5. Engine Removal/Installation

No.	Tool Number	Description	Q'ty	Remarks
①	07941-6920002	Ball Joint Remover	1	
②	07966-6340011	Engine Block Hanger	1	

6. Cylinder head/Valve Train

No.	Tool Number	Description	Q'ty	Remarks
①	07743-0020000	Adj. Valve Guide Driver	1	
②	07757-PJ10100	Valve Spring Compressor Attachment	1	Use changed to 07757-0010000 attachment <B20 A Engine>
③	07757-0010000	Valve Spring Compressor	1	
④	07942-SA50000	Valve Guide Driver, 7.0 mm	1	07942-8230000 may also be used.
⑤	07942-6570100	Valve Guide Driver, 6.6 mm	1	07942-6110000 may also be used.
⑥	07947-SB00100	Camshaft Seal Driver	1	
⑦	07984-SA50000	Valve Guide Reamer, 7.0 mm	1	07984-6890100 may also be used.
⑧	07984-6570100	Valve Guide Reamer, 6.6 mm	1	07984-6110000 may also be used.

7. Engine Block

No.	Tool Number	Description	Q'ty	Remarks
①	07749-0010000	Driver	1	07949-6110000 may also be used.
②	07924-PD20002	Ring Gear Holder	1	
③	07947-SB00200	Oil Seal Driver	1	Crankshaft Seal <Carbureted Engine>
④	07948-SB00101	Driver Attachment	1	Crankshaft Seal (Clutch Side)
⑤	07973-SB00100	Piston Base Head	1	
⑥	07973-SB00200	Pilot Collar	1	Not included in base set.
⑦	07973-SB00400	Piston Pin Base Insert	1	Use each with the base set.
⑧	07973-PE00302	Adj. Piston Pin Driver	1	
⑨	07973-6570002	Piston Pin Insert Base Set	1	

8. Engine Lubrication

No.	Tool Number	Description	Q'ty	Remarks
①	07406-0030000	Oil Pressure Gauge Adaptor	1	
②	07746-0010100	Attachment, 32 x 35 mm	1	<A20A and A16A Engines>
③	07746-0010400	Attachment, 52 x 55 mm	1	<B20A Engine>
④	07749-0010000	Driver	1	07949-6110000 may also be used.
⑤	07912-6110001	Oil Filter Socket Wrench	1	

11, 12. Fuel and Emission Controls

No.	Tool Number	Description	Q'ty	Remarks
①	07GAC-SE00200	Fuel Sender Wrench	1	
②	07GAZ-SE00300	R.P.M. Connecting Adaptor	1	
③	07GMJ-ML80100	Test Harness	1	
④	07406-0040001	Fuel Pressure Gauge Set	1	<Fuel-Injected Engine>
④-1	07406-0040100	Pressure Gauge	(1)	Component Tool
④-2	07406-0040201	Hose Assembly	(1)	Component Tool
⑤	07411-0020000	Digital Circuit Tester	1	<Fuel-Injected Engine>
⑥	07614-0050100	Fuel Line Clamp	1	<Carbureted Engine>
⑦	07999-PD6000A	PGM-FI Test Harness	1	<Fuel-Injected Engine>

13. Clutch

No.	Tool Number	Description	Q'ty	Remarks
①	07GAG-PF50100	Clutch Disc Alignment Tool	1	<B20A Engine>
②	07708-0010102	10 mm T-Wrench	1	
③	07924-PD20003	Ring Gear Holder	1	
④	07974-6890101	Clutch Disc Alignment Tool	1	<A20A and A16A Engines>



14. Manual Transmission <B2>

No.	Tool Number	Description	Q'ty	Remarks
①	07936-6890101	Bearing Remover Attachment	1	
②	07744-0010200	Pin Driver, 3.0 mm	1	
③	07744-0010400	Pin Driver, 5.0 mm	1	07944-6110100 may also be used.
④	07746-0010200	Attachment, 37 x 40 mm	1	
⑤	07746-0010400	Attachment, 52 x 55 mm	1	07949-6340200 may also be used.
⑥	07746-0010500	Attachment, 62 x 68 mm	1	
⑦	07749-0010000	Driver	1	07949-6110000 may also be used.
⑧	07936-6340000	Bearing Remover Set	1	

14. Manual Transmission <A1/A2>

No.	Tool Number	Description	Q'ty	Remarks
①	07GAC-PG40100	Transmission Housing Puller	1	07GAC-PF40100 may also be used.
②	07936-6890101	Bearing Remover Attachment	1	
③	07744-0010200	Pin Driver, 3.0 mm	1	
④	07744-0010400	Pin Driver, 5.0 mm	1	07944-6110100 may also be used.
⑤	07746-0010400	Attachment, 52 x 55 mm	1	
⑥	07749-0010000	Driver	1	07949-6110000 may also be used.
⑦	07907-PD10000	Socket Wrench, 30 mm	1	
⑧	07923-6890101	Mainshaft Holder	1	
⑨	07936-6340000	Bearing Remover Set	1	07936-6340000 may also be used.
⑩	07947-6110500	Oil Seal Driver Attachment	1	Differential Oil seal
⑪	07947-6340000	Oil Seal Driver	1	
⑫	07947-6340500	Driver Attachment, E	1	

15. Automatic Transmission

No.	Tool Number	Description	Q'ty	Remarks
①	07GAB-PF50100	Mainshaft Holder, Automatic	1	<F4 Transmission>
②	07GAC-PF40210	Bearing Remover Attachment	1	
③	07GAC-PG40100	Transmission Housing Puller	1	07GAC-PF40100 may also be used.
④	07GAE-PG40000	Clutch Spring Compressor Set	1	} 07960-6890000 may also be used.
④-1	07GAE-PG40100	Compressor Attachment	(1)	
④-2	07GAE-PG40200	Compressor Bolt Assembly	(1)	
④-3	07960-6120100	Compressor Attachment	(1)	
⑤	07960-6890100	Clutch Spring Compressor Attachment	1	
⑥	07406-0020003	Oil Pressure Gauge Set	1	
⑥-1	07406-0020201	Oil Pressure Hose	(3)	Component Tools
⑦	07406-0070000	Low Pressure Gauge	1	
⑧	07936-6890101	Bearing Remover Attachment	1	
⑨	07746-0010500	Attachment, 62 x 68 mm	1	
⑩	07749-0010000	Driver	1	07949-6110000 may also be used.
⑪	07907-PD10000	Socket Wrench, 30 mm	1	07907-6890100 may also be used.
⑫	07923-6890202	Mainshaft Holder	1	<C9 Transmission>
⑬	07936-6340000	Bearing Remover Set	1	
⑭	07947-6110500	Oil Seal Driver Attachment	1	
⑮	07947-6340201	Oil Seal Driver	1	
⑯	07947-6340500	Driver Attachment, E	1	
⑰	07974-6890300	Throttle Cable Adjustment Gauge	1	<Carbureted Engine>
⑱	07998-SA50000	Accelerator Pedal Weight Set	1	
⑱-1	07998-SA50100	Main Pedal Weight (1.0 kg)	(1)	Component Tool
⑱-2	07998-SA50200	Sub Pedal Weight (0.5 kg)	(1)	Component Tool

(cont'd)

Special Tools

Existing Tools (Common with Other Models)

16. Differential

No.	Tool Number	Description	Q'ty	Remarks
①	07746-0030100	Driver	1	07949-6110000 may also be used.
②	07749-0010000	Driver	1	
③	07944-SA00000	Pin Driver, 4.0 mm	1	
④	07947-6110500	Seal Driver Attachment	1	
⑤	07947-6340500	Driver Attachment, E	1	

17. Drivershaft

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

18. Steering

No.	Tool Number	Description	Q'ty	Remarks
①	07746-0010300	Attachment, 42 x 47 mm	1	
②	07916-SA50001	Steering Gearbox Locknut Wrench, 40 mm	1	
③	07941-6920003	Ball Joint Remover	1	
④	07965-6340301	Hub Dis/Assembly Tool, Base A	1	
⑤	07974-SA50800	Ball Joint Boot Clip Installation Guide, B	1	

18. Power Steering

No.	Tool Number	Description	Q'ty	Remarks
①	07GAK-SE00100	P/S Joint Adaptor Set	1	Component tools
①-1	07GAK-SE00110	P/S Pump Joint Adaptor	(1)	
①-2	07GAK-SE00120	P/S Hose Joint Adaptor	(1)	Component Tools
②	07406-0010001	P/S Pressure Gauge Set	1	
②-1	07406-0010101	Bypass Tube Joint	(1)	07725-0010101 may also be used.
②-2	07406-0010200	P/S Pressure Gauge Assy	(1)	
②-3	07406-0010300	Oil Pressure Valve	(1)	
②-4	07406-0010400	Pressure Gauge	(1)	
③	07725-0030000	Universal Holder	1	07949-6110000 may also be used.
④	07746-0010300	Attachment, 42 X 47 mm	1	
⑤	07749-0010000	Driver	1	Component Tools
⑥	07900-SA50000	P/S Seal Replacement Tool Set	1	
⑥-1	07974-SA50100	Piston Seal Ring Guide	(1)	
⑥-2	07974-SA50200	Piston Seal Ring Sizing Tool	(1)	
⑥-3	07974-SA50300	Cylinder End Packing Slider	(1)	
⑥-4	07974-SA50400	End Seal Guide	(1)	
⑥-5	07974-SA50600	Dust Seal Guide	(1)	
⑥-6	07974-SA50900	P/S Tool Set Case	(1)	
⑦	07916-SA50001	Steering Gearbox Locknut Wrench, 40 mm	1	
⑧	07941-6920003	Ball Joint Remover	1	
⑨	07947-6340300	Driver Attachment	1	
⑩	07953-7190000	Collar Driver	1	



19. Suspension

No.	Tool Number	Description	Q'ty	Remarks
①	07GAE—SE00100	Shock Absorber Spring Compressor	1	07949—6110000 may also be used. Component tools
②	07GAF—SE00100	Hub Assembly Pin	1	
③	07GAF—SE00200	Hub Assembly Driver Attachment	1	
④	07GAF—SE00401	Front Hub Driver Base	1	
⑤	07410—0010200	Wheel Alignment Gauge ATT., B	1	
⑥	07746—0010100	Attachment, 32 x 35 mm	1	
⑦	07746—0010400	Attachment, 52 x 55 mm	1	
⑧	07746—0010600	Attachment, 72 x 75 mm	1	
⑨	07749—0010000	Driver	1	
⑩	07941—6920002	Ball Joint Remover	1	
⑪	07965—SB00000	Ball Joint Dis/Assebbly Tool Set	1	
⑪-1	07965—SB00100	Ball Joint Remover/Installer	(1)	
⑪-2	07965—SB00200	Ball Joint Remover Base	(1)	
⑪-3	07965—SB00300	Ball Joint Installer Base	(1)	
⑫	07965—6340301	Front Wheel Bearing Dis/Assembly Tool Base, A	2	
⑬	07965—6920201	Front Hub Dis/Assembly Tool, B	1	
⑭	07974—SA50700	Ball Joint Boot Clip Installation Guide, A	1	
⑮	07974—SA50800	Clip Guide, B	1	

20. Brake

No.	Tool Number	Description	Q'ty	Remarks
①	07GAF—SE00300	Pulser Driver Attachment	1	Short parts of the Brake Booster Set 07504—6340100 07494—611000 may also be used.
②	07GAG—SE00100	Brake Booster Adjustment Gauge	1	
③	07HAJ—SG00300	Frequency Convert Adaptor	1	
④	07HAK—SG00110	Pressure Gauge Joint Pipe	1	
⑤	07504—6340100	Brake Booster Tool Set	1	
⑤-1	07404—5790300	Vacuum Gauge	(1)	
⑤-2	07406—5790200	Oil Pressuer Gauge	(2)	
⑤-3	07410—5790100	Pressure Gauge Attachment, C	(1)	
⑤-4	07410—5790500	Tube joint Attachment, I	(2)	
⑤-5	07510—6340100	Pressuer Gauge Joint Pipe	(2)	
⑤-6	07510—6340300	Vacuum Joint Tube, A	(1)	
⑥	07508—SB00000	A.L.B. Checker	1	
⑦	07749—0010000	Driver	1	
⑧	07907—SB00000	A.L.B. T-Wrench	1	
⑨	07914—SA50001	Snap-ring Pliers	1	
⑩	07921—0010001	Flare Nut Wrengh	1	
⑪	07947—6890300	Driver Attachment, C	1	
⑫	07960—SA50002	Brake Spring Compressor	1	
⑬	07965—5790300	Cup Guide	1	
⑭	07965—6340301	Front Wheel Bearing Dis/Assembly Tool Base, A	2	
⑮	07967—SB00000	Pulser Driver	1	
⑯	07973—SA50000	Rear Caliper Guide	1	

(cont'd)

Special Tools

Existing Tools (Common with Other Models)

21. Body

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

23. Air Conditioner

No.	Tool Number	Description	Q'ty	Remarks
①	07GAB-PJ60100	A/C Clutch Holder	1	07923-PB80001 may also be used.
②	07703-0010200	Torx Bit Driver, T-30	1	
③	07749-0010000	Driver	1	07949-6110000 may also be used.
④	07934-PB80001	A/C Clutch Puller	1	
⑤	07934-SB20000	Shaft Seal Remover	1	
⑥	07947-6340300	Driver Attachment, A	1	

Optional Tools

No.	Tool Number	Description	Q'ty	Remarks
①	07780-0012300	Valve Seat Cutter 30°	1	IN (B20A)
②	07780-0012900	Valve Seat Cutter 30°	1	EX (B20A), IN (A16A, A20A)
③	07780-0012400	Valve Seat Cutter 30°	1	EX (A16A, A20A)
④	07780-0014000	Valve Seat Cutter 60°	1	EX (B20A)
⑤	07780-0014100	Valve Seat Cutter 60°	1	IN (ALL), EX (A16A, A20A)
⑥	07780-0010300	Valve Seat Cutter 45°	1	EX (B20A)
⑦	07780-0010400	Valve Seat Cutter 45°	1	IN (B20A)
⑧	07780-0010500	Valve Seat Cutter 45°	1	EX (A16A, A20A)
⑨	07780-0010800	Valve Seat Cutter 45°	1	IN (A16A, A20A)
⑩	07781-0010201	Valve Seat Cutter Holder, 6.6 mm	1	
⑪	07781-0010301	Valve Seat Cutter Holder, 7.0 mm	1	

Specifications

Standards and Service Limits.....	3-2
Design Specifications.....	3-13
Body Specifications.....	3-21
Frame Repair Chart.....	3-24

Standards and Service Limits

Cylinder Head/Valve Train <Except B20A Engine> -- Section 6

MEASUREMENT		STANDARD (NEW)		SERVICE LIMIT
Compression	300 min ⁻¹ (rpm) and wide-open throttle	Nominal	A20A3, A20A4 Engines (Except KS) Other Engines	1,226 kPa (12.5 kg/cm ² , 178 psi)
		Minimum	A20A3, A20A4 Engines (Except KS) Other Engines	1,176 kPa (12.0 kg/cm ² , 171 psi) 1,030 kPa (10.5 kg/cm ² , 149 psi)
		Maximum variation		980 kPa (10.0 kg/cm ² , 142 psi) 196 kPa (2 kg/cm ² , 28 psi)
Cylinder head	Warpage Height	—		0.05 (0.002) 89.8 (3.54)
Camshaft	End play		0.05–0.15 (0.002–0.006)	0.5 (0.02)
	Oil clearance	No. 1,3 and 5 Journals	0.050–0.089 (0.002–0.004)	0.15 (0.006)
		No. 2 and 4 Journals	0.130–0.169 (0.005–0.007)	0.23 (0.009)
	Runout		0.03 (0.001) max.	0.06 (0.002)
	Cam lobe height			—
		A20A1 (KQ, KG, IN	38.477 (1.5148)	—
		KW, KX) EX	38.353 (1.5100)	—
		A20A1, A20A2 IN	38.541 (1.5174)	—
		EX	38.607 (1.5200)	—
		A20A3 IN	38.731 (1.5248)	—
		EX	38.796 (1.5274)	—
		A20A4 IN	38.858 (1.5300)	—
		EX	38.607 (1.5200)	—
		A16A1 IN	38.157 (1.5029)	—
		EX	37.776 (1.4872)	—
		Other Engines IN	38.541 (1.5174)	—
		EX	38.607 (1.5200)	—
Valve	Valve clearance	IN	0.12–0.17 (0.005–0.007)	—
		EX	0.25–0.30 (0.010–0.012)	—
	Valve stem O.D.	IN	6.58–6.59 (0.2591–0.2594)	6.55 (0.258)
		EX	6.94–6.95 (0.2732–0.2736)	6.91 (0.272)
	Stem-to-guide clearance	IN	0.02–0.05 (0.001–0.002)	0.08 (0.003)
		EX	0.06–0.09 (0.002–0.004)	0.12 (0.005)
	Stem installed height	IN	48.59 (1.913)	49.34 (1.943)
		EX	47.66 (1.876)	48.41 (1.906)
Valve seat	Width	IN and EX	1.25–1.55 (0.049–0.061)	2.0 (0.08)
Valve spring	Free length	IN	48.54 (1.91)	47.54 (1.87)
		EX Inner	42.42 (1.67)	41.42 (1.63)
		Outer	49.07 (1.93)	48.07 (1.89)
	Squareness Inner and Outer		—	1.75 (0.068)
Valve guide	I.D.	IN	6.61–6.63 (0.260–0.261)	6.65 (0.262)
		EX	7.01–7.03 (0.276–0.277)	7.05 (0.278)
Rocker arm	Arm-to-shaft clearance		0.008–0.054 (0.0003–0.0021)	0.08 (0.003)

Cylinder Head/Valve Train <B20A Engine> -- Section 6

MEASUREMENT		STANDARD (NEW)		SERVICE LIMIT
Compression	300 min ⁻¹ (rpm) and wide-open throttle	Nominal		1,226 kPa (12.5 kg/cm ² , 178 psi)
		Minimum		1,030 kPa (10.5 kg/cm ² , 149 psi)
		Maximum variation		196 kPa (2 kg/cm ² , 28 psi)
Cylinder head	Warpage Height	—		0.05 (0.002) 131.8 (5.19)
Camshaft	End play		0.05–0.15 (0.002–0.006)	0.5 (0.02)
	Oil clearance		0.050–0.089 (0.002–0.004)	0.15 (0.006)
	Runout		0.03 (0.001) max.	0.06 (0.002)
	Cam lobe height	IN	37.716 (1.4849)	—
		EX	37.781 (1.4874)	—
Valve	Valve clearance	IN	0.08–0.12 (0.003–0.005)	—
		EX	0.16–0.20 (0.006–0.008)	—
	Valve stem O.D.	IN	6.58–6.59 (0.2591–0.2594)	6.55 (0.258)
		EX	6.55–6.56 (0.2579–0.2583)	6.52 (0.257)
	Stem-to-guide clearance	IN	0.02–0.05 (0.001–0.002)	0.08 (0.003)
		EX	0.05–0.08 (0.002–0.003)	0.11 (0.04)
	Stem installed height	IN and EX	42.75 (1.683)	43.54 (1.714)
Valve seat	Width	IN and EX	1.25–1.55 (0.049–0.061)	2.0 (0.08)
Valve spring	Free length	Inner	43.50 (1.713)	42.50 (1.673)
		Outer	47.45 (1.868)	46.45 (1.829)
	Squareness	Inner and Outer	—	1.6 (0.063)
Valve guide	I.D.	IN and EX	6.61–6.63 (0.260–0.261)	6.65 (0.262)

Engine Block <Except B20A Engine> – Section 7

*A16A1 Engine only Unit: mm (in.)

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Cylinder block	Warpage of deck surface	0.08 (0.003) max.	0.10 (0.004)	
	Bore diameter	A	82.70–82.71 (3.2559–3.2563)	
		B	82.69–82.70 (3.2555–3.2559)	
	Bore taper	A	*80.01–80.02 (3.1500–3.1504)	80.05 (3.1516)
B		*80.00–80.01 (3.1496–3.1500)	80.04 (3.1512)	
	Bore taper	0.007–0.012 (0.0003–0.0005)	0.05 (0.002)	
	Reboring limit	—	0.5 (0.02)	
Piston	Skirt O.D. (At 21 mm (0.83 in.) from bottom of skirt)	A20A1, A20A2 A	82.675–82.685 (3.2549–3.2553)	
		A20A3, A20A4 B	82.665–82.675 (3.2545–3.2549)	
		A16A1 A	*79.98–79.998 (3.1488–3.1495)	79.97 (3.148)
		B	*79.97–79.98 (3.1484–3.1500)	79.96 (3.148)
	Clearance in cylinder	Top	0.02–0.04 (0.0008–0.0016)	0.08 (0.003)
		2nd	0.030–0.060 (0.0012–0.0024)	0.13 (0.005)
	Piston-to-ring clearance	0.030–0.055 (0.0012–0.0022)	0.13 (0.005)	
		*0.02–0.05 (0.0008–0.0020)	0.13 (0.005)	
Piston ring	Ring end gap	Top	0.20–0.35 (0.008–0.014)	0.6 (0.02)
		2nd	0.25–0.40 (0.01–0.016)	0.6 (0.02)
	Oil	A16A1 Engine	0.30–0.45 (0.012–0.018)	0.6 (0.02)
		Others	0.30–0.90 (0.012–0.035)	1.0 (0.04)
		RIKEN TEIKOKU	0.20–0.70 (0.008–0.028)	0.8 (0.03)
Connecting rod	Pin-to-rod interference	0.013–0.032 (0.0005–0.0013)	0.013 (0.0005)	
	Large end bore diameter	Nominal 48 (1.89) *45 (1.77)	—	
	End play installed on crankshaft	0.15–0.30 (0.006–0.012)	0.40 (0.016)	
Crankshaft	Main journal diameter	49.970–49.994 (1.9673–1.9683)	—	
	Taper/out-of-round, main journal	0.005 (0.0002) max.	0.010 (0.0004)	
	Rod journal diameter	44.976–45.000 (1.7707–1.7717)	—	
		*41.976–42.000 (1.6530–1.6535)	—	
	Taper/out-of-round, rod journal	0.005 (0.0002) max.	0.010 (0.0004)	
	Other Engine	0.10–0.35 (0.004–0.014)	0.45 (0.018)	
	End play	0.024 (0.0009) max.	0.04 (0.0016)	
	Runout	—	—	
Bearings	Main bearing-to-journal	No. 1, 2, 4, and 5	0.026–0.055 (0.0010–0.0022)	
	Oil clearance	Journals	0.032–0.061 (0.0013–0.0024)	
		No. 3 Journal	0.020–0.038 (0.0008–0.0015)	
	Rod bearing-to-journal oil clearance	—	0.07 (0.003)	

Engine Block <B20A Engine> – Section 7

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Cylinder block	Warpage of deck surface	0.07 (0.003) max.	0.10 (0.004)	
	Bore diameter	A	81.01–81.02 (3.1894–3.1898)	
		B	81.00–81.01 (3.1890–3.1894)	
	Bore taper	0.007–0.012 (0.0003–0.0005)	0.05 (0.002)	
	Reboring limit	—	0.05 (0.002)	
Piston	Skirt O.D. (At 21 mm (0.83 in.) from bottom of skirt)	A	79.99–81.02 (3.1492–3.1898)	
		B	79.97–81.02 (3.1484–3.1898)	
	Clearance in cylinder	Top	0.02–0.04 (0.0008–0.0016)	0.08 (0.003)
		2nd	0.035–0.060 (0.0014–0.0024)	0.13 (0.005)
	Piston-to-ring clearance	0.030–0.055 (0.0012–0.0022)	0.13 (0.005)	
Piston ring	Ring end gap	Top	0.20–0.35 (0.008–0.014)	0.6 (0.02)
		2nd	0.40–0.55 (0.016–0.022)	0.7 (0.03)
	Oil	RIKEN	0.30–0.90 (0.012–0.035)	1.0 (0.04)
		TEIKOKU	0.20–0.70 (0.008–0.028)	0.8 (0.03)
Connecting rod	Pin-to-rod interference	0.013–0.032 (0.0005–0.0013)	0.013 (0.0005)	
	Large end bore diameter	Nominal 51 (2.01)	—	
	End play installed on crankshaft	0.15–0.30 (0.006–0.012)	0.40 (0.016)	
Crankshaft	Main journal diameter	54.976–55.000 (2.1644–2.1654)	—	
	Taper/out-of-round, main journal	0.005 (0.0002) max.	0.010 (0.0004)	
	Rod journal diameter	47.976–48.000 (1.8888–1.8900)	—	
	Taper/out-of-round, rod journal	0.005 (0.0002) max.	0.010 (0.0004)	
	End play	0.10–0.35 (0.004–0.014)	0.45 (0.018)	
	Runout	0.02 (0.0003) max.	0.030 (0.0012)	
Bearings	Main bearing-to-journal	No. 1, 2, 4, and 5	0.024–0.042 (0.0010–0.0017)	
	Oil clearance	Journals	0.030–0.048 (0.0012–0.0019)	
		No. 3 Journal	0.026–0.044 (0.0010–0.0017)	
	Rod bearing-to-journal oil clearance	—	0.05 (0.002)	

(cont'd)

Standards and Service Limits (cont'd)

Engine Lubrication <Except B20A Engine> – Section 8

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US. qt., Imp. qt.)	4.0 (4.2, 3.5) After engine disassembly 3.5 (3.7, 3.1) After oil change, including oil filter 3.0 (3.2, 2.6) After oil change, without oil filter	
Oil pump	Displacement	40.3 ℓ (10.6 US. gal., 8.9 Imp. gal.)	5,500 min ⁻¹ (rpm)
	Inner-to-outer rotor radial clearance	0.15 (0.006) max.	0.2 (0.008)
	Pump body-to-rotor radial clearance Pump body-to-rotor side clearance	0.10–0.18 (0.004–0.007) 0.30–0.108 (0.001–0.004)	0.2 (0.008) 0.15 (0.006)
Relief valve	Pressure setting 80°C (176°F)	Idle	98 kPa (1.0 kg/cm ² , 14 psi) min.
		3,000 min ⁻¹ (rpm)	373–451 kPa (3.8–4.6 kg/cm ² , 54–65 psi)

Engine Lubrication <B20A Engine> – Section 8

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Engine oil	Capacity ℓ (US. qt., Imp. qt.)	5.0 (5.3, 4.4) After engine disassembly 4.0 (4.2, 3.5) After oil change, including oil filter 3.5 (3.7, 3.1) After oil change, without oil filter	
Oil pump	Displacement	54 ℓ (10.6 US. gal., 8.9 Imp. gal.)	5,000 min ⁻¹ (rpm)
	Inner-to-outer rotor radial clearance	0.04–0.16 (0.002–0.006)	0.2 (0.008)
	Pump body-to-rotor radial clearance Pump body-to-rotor side clearance	0.10–0.19 (0.004–0.007) 0.02–0.071 (0.001–0.003)	0.21 (0.008) 0.12 (0.005)
Relief valve	Pressure setting 80°C (176°F)	Idle	137 kPa (1.4 kg/cm ² , 20 psi) min.
		3,000 min ⁻¹ (rpm)	470–559 kPa (4.8–5.7 kg/cm ² , 67–80 psi)

Cooling – Section 10

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Cooling fan belt	Deflection midway between pulleys/load	6–9 (0.24–0.35) /98N (10 kg, 22 lb) for used belt 5 (0.20) /98N (10 kg, 22 lb) after replacement of belt	
Radiator	Capacity (incl. heater) ℓ (US. Gal., Imp. Gal.)	A20A3, A20A4 Engines A20A1, A20A2 Engines B20A2, B20A8 Engine A16A1 Engine	Manual 6.4 (1.7, 1.4) Automatic 7.0 (1.8, 1.5) Manual 6.3 (1.7, 1.4) Automatic 6.9 (1.8, 1.5) Manual 7.1 (1.9, 1.6) Manual 6.3 (1.7, 1.4) Automatic 6.2 (1.6, 1.4)
	(Includes reservoir tank 0.8 (0.21, 0.18))		
	Pressure cap opening pressure	74–103 kPa (0.75–1.05 kg/cm ² , 11–15 psi)	
Thermostat	Starts to open	Primary: 82°C ±2 (180°F ±3) Secondary: 85°C ±2 (185°F ±3)	86–90°C (187–194°F)
	Full open Valve lift at full open	95°C (203°F) 8 (0.31) max.	100°C (212°F) OPTIONAL 8 (0.31) max.
Water pump	Gear ratio (crankshaft) Capacity: ℓ per min/at min ⁻¹ (rpm)	1.34 124/5,000 (32.7 US. gal./5,000 min ⁻¹ (rpm))	
Cooling fan	Fan-to-core clearance	26.0 (1.02)	
	Thermoswitch "ON" temperature	87°–93°C (188°–199°F)	
	Thermoswitch "OFF" temperature	83°C (181°F) or more (hysteresis 2°C (35°F) or more)	

Fuel and Emissions – Section 11

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Fuel pump (Fuel-injected engine)	Delivery pressure	230–270 kPa (2.35–2.75 kg/cm ² , 33–39 psi)	
	Displacement	230 cc/min in 10 seconds	
	Relief valve opening pressure	441–588 kPa (4.5–6.0 kg/cm ² , 64–85 psi)	
Pressure regulator (Fuel-injected engine)	Pressure	230–270 kPa (2.35–2.75 kg/cm ² , 33–39 psi)	
Fuel pump (Carbureted engine)	Delivery pressure Displacement	17.6–22.5 kPa (0.18–0.23 kg/cm ² , 2.6–3.3 psi) 760 cc at 12V (46 cu. in./12V)	
Fuel Tank	Capacity	60ℓ (15.9 US. Gal., 13.2 Imp. Gal.)	
Fuel injected engine	Fast idle	1,000–1,800 min ⁻¹ (rpm)	
	Idle Speed	with headlights and cooling fan off	Manual A20A3 750 ± 50 min ⁻¹ (rpm) A20A4, B20A2 800 ± 50 min ⁻¹ (rpm)
			Automatic A20A3 750 ± 50 min ⁻¹ (rpm) (in "N" or "P") A20A4 800 ± 50 min ⁻¹ (rpm) KQ: 750 ± 50 min ⁻¹ (rpm)
	Idle CO	A20A3 and A20A4 KQ: 0.1 %	
Carbureted engine	Choke fast idle	A20A1 and A20A2: 2,000–3,000 min ⁻¹ (rpm) A16A1: 1,500–2,500 min ⁻¹ (rpm)	
	Idle Speed	with headlights and cooling fan off	Manual A16A1, A20A2 750 ± 50 min ⁻¹ (rpm) A20A1 800 ± 50 min ⁻¹ (rpm)
			Automatic A16A1, A20A2 700 ± 50 min ⁻¹ (rpm) (in gear) KS: 750 ± 50 min ⁻¹ (rpm) A20A1 730 ± 50 min ⁻¹ (rpm)
	Idle CO	A20A1 and A20A2 KQ: 0.1 %	

Clutch — Section 13

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Clutch pedal	Pedal Height	CARB: 205 (8.1), EFI: 208 (8.2) to floor	—
	Stroke	CARB: 178 (7.0), EFI: 181 (7.1) to carpet	—
	Pedal play	CARB: 138 (5.4), EFI: 143 (5.6)	—
	Disengagement height	15–25 (0.6–1.0) 73 (2.9) min. to floor 49 (1.9) min. to carpet	—
Clutch arm	Release arm adjustment	5.2–6.4 (0.20–0.25)	—
Flywheel	Clutch surface runout	0.05 (0.002) max.	0.15 (0.006)
Clutch plate	Rivet head depth	1.3 (0.05) min.	0.2 (0.008)
	Surface runout	0.8 (0.03) max.	1.0 (0.04)
	Radial play in splines	0.7–2.1 (0.028–0.083)	4.0 (0.16)
	Thickness	8.1–8.8 (0.32–0.35)	5.7 (0.22)
Clutch release bearing holder	I.D.	31.00–31.059 (1.220–1.223)	31.09 (1.224)
	Holder-to-guide sleeve clearance	0.05–0.15 (0.002–0.006)	0.22 (0.009)
Clutch cover	Unevenness of diaphragm spring	0.8 (0.03) max.	1.0 (0.04)

Manual Transmission (A1/A2) — Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US. qt., Imp. qt)	2.4 (2.5, 2.1) at assembly 2.3 (2.4, 2.0) at oil change	
Mainshaft	End play	0.10–0.35 (0.004–0.014)	0.5 (0.02)
	Diameter of needle bearing contact area	28.002–28.015 (1.1024–1.1030)	27.95 (1.100)
	Diameter of third gear contact area	31.984–32.000 (1.2592–1.2598)	31.93 (1.2571)
	Diameter of ball bearing contact area	24.980–24.993 (0.9835–0.9840)	24.93 (0.981)
Mainshaft third and fourth gears	Runout	0.04 (0.0016) max.	0.10 (0.004)
	I.D.	37.009–37.025 (1.4570–1.4577)	37.07 (1.459)
Mainshaft fifth gear	End play	0.03–0.18 (0.0012–0.0071)	0.3 (0.012)
	Thickness	30.42–30.47 (1.1976–1.1996)	30.3 (1.193)
Countershaft	I.D.	37.009–37.025 (1.4570–1.4577)	37.07 (1.459)
	End play	0.03–0.13 (0.0012–0.0051)	0.3 (0.012)
	Thickness	29.92–29.97 (1.1780–1.1799)	29.8 (1.173)
	End play	0.10–0.35 (0.004–0.014)	0.5 (0.02)
Countershaft low gear	Diameter of needle bearing contact area	33.000–33.015 (1.2992–1.2998)	32.95 (1.297)
	Diameter of ball bearing contact area	24.980–24.993 (0.9835–0.9840)	24.93 (0.981)
	Diameter of low gear contact area	33.984–34.000 (1.3380–1.3386)	33.93 (1.336)
	Runout	0.04 (0.0016)	0.10 (0.004)
Countershaft second gear	I.D.	39.008–39.025 (1.5357–1.5364)	39.07 (1.538)
	End play	0.03–0.08 (0.0012–0.0031)	0.18 (0.007)
Spacer collar (Countershaft second gear)	I.D.	43.008–43.025 (1.6932–1.6939)	43.07 (1.696)
	End play	0.03–0.10 (0.0012–0.0039)	0.18 (0.007)
	Thickness	30.42–30.47 (1.1976–1.1996)	30.3 (1.193)
Spacer collar (Mainshaft fourth and fifth gears)	I.D.	30.98–30.99 (1.2197–1.2201)	31.4 (1.236)
	O.D.	37.989–38.000 (1.4956–1.4961)	37.93 (1.493)
	Length	30.53–30.55 (1.2020–1.2028)	30.51 (1.201)
Reverse idler gear	I.D.	25.002–25.012 (0.9843–0.9847)	25.06 (0.987)
	O.D.	31.989–32.000 (1.2594–1.2598)	31.93 (1.257)
	Length	27.03–27.08 (1.0642–1.0661)	27.01 (1.063)
Synchronizer ring	I.D.	17.016–17.043 (0.6699–0.6710)	17.09 (0.673)
	Gear-to-reverse gear shaft clearance	0.032–0.077 (0.0013–0.0030)	0.15 (0.006)
Shift fork	Ring-to-gear clearance (ring pushed against gear)	0.73–1.18 (0.031–0.046)	0.4 (0.016)
	Synchronizer sleeve gear	6.75–6.85 (0.266–0.270)	6.0 (0.24)
Reverse shift fork	Fork-to-synchronizer sleeve clearance	0.35–0.65 (0.014–0.026)	1.0 (0.04)
	End gap	11.8–12.1 (0.46–0.48)	—
	Fork-to-reverse idler gear clearance	0.2–1.0 (0.008–0.039)	1.7 (0.07)
	Groove width	7.05–7.25 (0.278–0.285)	—
Shift arm	Fork-to-fifth/reverse shift shaft clearance	0.05–0.35 (0.002–0.014)	0.5 (0.02)
	Width of groove in shift rod guide	11.8–12.0 (0.46–0.47)	—
	Shift arm-to-shift rod guide clearance	0.05–0.35 (0.002–0.014)	0.8 (0.03)
	Width in shift guide	7.9–8.0 (0.311–0.315)	—
Shift rod guide	Shift arm-to-shift guide clearance	0.1–0.3 (0.004–0.012)	0.6 (0.02)
	I.D.	14.000–14.068 (0.5512–0.5539)	—
	Guide-to-shaft clearance	0.011–0.092 (0.0004–0.0036)	0.15 (0.006)
	O.D.	11.9–12.0 (0.469–0.472)	—
Selector arm	Guide-to-fifth/reverse shift shaft clearance	0.2–0.5 (0.008–0.020)	0.8 (0.03)
	Width	11.9–12.0 (0.469–0.472)	—
	Arm-to-shift rod guide clearance	0.05–0.25 (0.002–0.010)	0.5 (0.02)
	End gap	10.05–10.15 (0.396–0.400)	—
	Arm-to-interlock clearance	0.05–0.25 (0.002–0.010)	0.7 (0.03)
	Arm-to-holder clearance	0.01–0.20 (0.0004–0.0079)	Selection with 5 types of shims

Standards and Service Limits (cont'd)

Manual Transmission<B2>- Section 14

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity ℓ (US. qt., Imp. qt)	1.9 (2.0, 1.7) at assembly 2.0 (2.1, 1.8) at oil change	
Mainshaft	End play Diameter of needle bearing contact area Diameter of third gear contact area Diameter of ball bearing contact area Runout	0.14–0.21 (0.006–0.008) 27.987–28.000 (1.1018–1.1024) 37.984–38.000 (1.4954–1.4961) 27.987–28.000 (1.1018–1.1024) 0.04 (0.0016) max.	Adjust with a shim. 27.94 (1.100) 37.93 (1.493) 27.94 (1.100) 0.10 (0.004)
Mainshaft third and fourth gears	I.D. End play Thickness 3rd 4th	43.009–43.025 (1.6933–1.6939) 0.06–0.21 (0.0024–0.0083) 32.42–32.47 (1.2764–1.2783) 30.92–30.97 (1.2173–1.2193)	43.08 (1.696) 0.3 (0.012) 32.3 (1.272) 30.8 (1.213)
Mainshaft fifth gear	I.D. End play Thickness	43.009–43.025 (1.6933–1.6939) 0.06–0.21 (0.0024–0.0083) 30.42–30.47 (1.1976–1.1996)	43.08 (1.696) 0.3 (0.0012) 30.3 (1.193)
Countershaft	End play Diameter of needle bearing contact area Diameter of ball bearing contact area Diameter of low gear contact area Runout	0.10–0.35 (0.004–0.014) 33.000–33.015 (1.2992–1.2998) 24.987–25.000 (0.9837–0.9843) 33.984–40.000 (1.3380–1.5748) 0.04 (0.0016)	0.5 (0.02) 32.95 (1.297) 24.94 (0.982) 33.93 (1.336) 0.10 (0.004)
Countershaft low gear	I.D. End play	46.009–46.025 (1.8114–1.8120) 0.03–0.08 (0.0012–0.0031)	46.08 (1.814) Adjust with a shim
Countershaft Second gear	I.D. End play Thickness	50.009–50.025 (1.9689–1.9695) 0.03–0.08 (0.0012–0.0031) 32.92–32.97 (1.2961–1.2980)	50.08 (1.972) Adjust with a collar. 32.8 (1.291)
Spacer collar (Countershaft second gear)	I.D. O.D. Length A B	36.48–36.49 (1.4362–1.4366) 43.989–44.000 (1.7318–1.7323) 28.98–29.00 (1.1409–1.1417) 29.03–29.05 (1.1429–1.1437)	36.5 (1.437) 43.94 (1.370) – –
Spacer collar (Mainshaft fourth and fifth gears)	I.D. O.D. Length A B	28.002–28.012 (1.1024–1.1028) 34.989–35.000 (1.3775–1.3780) 55.95–56.05 (2.2028–2.2067) 26.03–26.08 (1.0248–1.0268)	28.06 (1.105) 34.94 (1.376) – –
Reverse Idler gear	I.D. Gear-to-reverse gear shaft clearance	20.016–20.043 (0.7880–0.7891) 0.036–0.084 (0.0014–0.0033)	20.09 (0.791) 0.16 (0.006)
Synchronizer ring	Ring-to-gear clearance (ring pushed against gear)	0.85–1.10 (0.033–0.043)	0.4 (0.016)
Shift fork	Synchronizer sleeve gear Fork-to-synchronizer sleeve 1, 2, 3 and 4th 5th 1, 2, 3 and 4th 5th	7.95–8.05 (0.313–0.317) 5.75–5.85 (0.226–0.230) 0.45–0.65 (0.018–0.026) 0.25–0.45 (0.010–0.018)	– – 1.0 (0.04) 0.8 (0.03)
Reverse shift fork	End gap Fork-to-reverse idler gear clearance Groove width Fork-to-fifth/reverse shift shaft clearance	13.0–13.3 (0.51–0.52) 0.5–1.1 (0.020–0.043) 7.05–7.25 (0.278–0.285) 0.05–0.35 (0.002–0.014)	– 1.8 (0.07) – 0.5 (0.02)
Shift arm	Width of groove in shift rod guide Shift arm-to-shift rod guide clearance Width in shift guide Shift arm-to-shift guide clearance	12.8–13.0 (0.50–0.51) 0.05–0.35 (0.002–0.014) 7.9–8.0 (0.311–0.315) 0.1–0.3 (0.004–0.012)	– 0.8 (0.03) – 0.6 (0.02)
Shift rod guide	I.D. Guide-to-shaft clearance O.D. Guide-to-fifth/reverse shift shaft clearance	14.000–14.068 (0.5512–0.5539) 0.011–0.092 (0.0004–0.0036) 11.9–12.0 (0.469–0.472) 0.2–0.5 (0.008–0.020)	– 0.15 (0.006) – 0.8 (0.03)
Selector arm	Width Arm-to-shift rod guide clearance End gap Arm-to-interlock clearance	11.9–12.0 (0.469–0.472) 0.05–0.25 (0.002–0.010) 9.9–10.0 (0.390–0.394) 0.05–0.20 (0.002–0.008)	– 0.5 (0.02) – 0.45 (0.018)

Automatic Transmission (F4) — Section 15

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Transmission oil	Capacity † (US. qt., Imp.qt)	2.4 (2.5, 2.1) at oil change 5.4 (5.7, 4.8) at assembly	
Hydraulic pressure	Line pressure at 2,000 min ⁻¹ (rpm)	*834–883 kPa (8.5–9.0 kg/cm ² , 121–128 psi) 785–834 kPa (8.0–8.5 kg/cm ² , 114–121 psi)	785 kPa (8.0 kg/cm ² , 114 psi) 736 kPa (7.5 kg/cm ² , 107 psi)
	4th, 3rd, 2nd clutch pressure at 2,000 min ⁻¹ (rpm)	*441–883 kPa (4.5–9.0 kg/cm ² , 64–128 psi) 441–834 kPa (4.5–8.5 kg/cm ² , 64–121 psi)	392 kPa (4.0 kg/cm ² , 57 psi) with lever released 785 kPa (8.0 kg/cm ² , 114 psi) with lever in full throttle position
	1st clutch pressure at 2,000 min ⁻¹ (rpm)	*834–883 kPa (8.5–9.0 kg/cm ² , 121–128 psi) 785–834 kPa (8.0–8.5 kg/cm ² , 114–121 psi)	785 kPa (8.0 kg/cm ² , 114 psi) 736 kPa (7.5 kg/cm ² , 107 psi)
	Governor pressure at 60 km/h	181–191 kPa (1.85–1.95 kg/cm ² , 26–28 psi)	177 kPa (1.80 kg/cm ² , 25.6 psi)
	Throttle pressure A	485–500 kPa (4.95–5.1 kg/cm ² , 70–73 psi)	481 kPa (4.9 kg/cm ² , 69.7 psi)
	Throttle pressure B	834–883 kPa (8.5–9.0 kg/cm ² , 121–123 psi)	785 kPa (8.0 kg/cm ² , 114 psi)
Stall speed	Check with car on level ground	*2,500–2,800 min ⁻¹ (rpm) 2,650–2,950 min ⁻¹ (rpm)	— —
Clutch	Clutch initial clearance	1st 0.65–0.85 (0.026–0.033) 2nd 0.50–0.70 (0.020–0.028) 3rd, 4th 0.40–0.60 (0.016–0.024)	— — —
	Clutch return spring free length	31.0 (1.22)	29.0 (1.14)
	Clutch disc thickness	1.88–2.0 (0.074–0.079)	↑ Until grooves worn out Discoloration ↓ Discoloration
	Clutch plate thickness	1.95–2.05 (0.077–0.081)	
	Clutch end plate thickness	2.05–2.10 (0.081–0.083)	
	Mark 1	2.15–2.20 (0.085–0.087)	
	Mark 2	2.25–2.30 (0.089–0.091)	
	Mark 3	2.35–2.40 (0.093–0.094)	
	Mark 4	2.45–2.50 (0.096–0.098)	
	Mark 5	2.55–2.60 (0.100–0.102)	
Mark 6	2.65–2.70 (0.104–0.106)		
Mark 7	2.75–2.80 (0.108–0.110)		
Mark 8	2.85–2.90 (0.112–0.114)		
Mark 9	2.95–3.00 (0.116–0.118)		
Mark 10			
Transmission	Diameter of needle bearing contact area on main and stator shaft	22.980–22.993 (0.9047–0.9052)	↑ Wear or damage ↓ Wear or damage
	Diameter of needle bearing contact area on mainshaft 2nd gear	35.975–35.991 (1.4163–1.4170)	
	Diameter of needle bearing contact area on mainshaft 4th gear collar	31.975–31.991 (1.2589–1.2595)	
	Diameter of needle bearing contact area on mainshaft 1st gear collar	30.975–30.991 (1.2195–1.2201)	
	Diameter of needle bearing contact area on countershaft (L side)	38.505–38.515 (1.5159–1.5163)	
	Diameter of needle bearing contact area on countershaft 3rd gear	31.975–31.991 (1.2589–1.2595)	
	Diameter of needle bearing contact area on countershaft 4th gear	27.980–27.993 (1.1016–1.1021)	
	Diameter of needle bearing contact area on countershaft reverse gear collar	31.975–31.991 (1.2589–1.2595)	
	Diameter of needle bearing contact area on countershaft L gear collar	31.975–31.991 (1.2589–1.2595)	
	Diameter of needle bearing contact area on reverse idle gear	13.990–14.000 (0.5508–0.5512)	
	Reverse idler shaft holder diameter	14.416–14.434 (0.5676–0.5683)	
	Mainshaft 2nd gear I.D.	41.000–41.016 (1.6142–1.6148)	
	Mainshaft 1st gear I.D.	36.000–36.016 (1.4173–1.4179)	
	Countershaft 4th gear I.D.	33.000–33.016 (1.2992–1.2998)	
	Countershaft 3rd gear I.D.	38.000–38.016 (1.4961–1.4967)	
	Countershaft 2nd gear I.D.	31.000–31.016 (1.2205–1.2211)	
	Countershaft 1st gear I.D.	38.000–38.016 (1.4961–1.4967)	
	Countershaft reverse gear I.D.	38.000–38.016 (1.4961–1.4967)	
	Reverse idle gear I.D.	18.006–18.017 (0.7089–0.7093)	
	Mainshaft 4th gear end play	0.07–0.12 (0.003–0.005)	
	Mainshaft 2nd gear end play	0.07–0.12 (0.003–0.005)	
	Mainshaft 1st gear end play	0.08–0.24 (0.003–0.009)	
	Countershaft 3rd gear end play	0.07–0.12 (0.003–0.005)	
	Countershaft 2nd gear end play	0.07–0.12 (0.003–0.005)	
	Reverse idler gear end play	0.05–0.18 (0.002–0.007)	
	Countershaft reverse gear end play	0.10–0.20 (0.004–0.008)	
	Reverse gear hub O.D.	51.87–51.90 (2.0421–2.0433)	

*Fuel Injected Engine

(cont'd)

Standards and Service Limits (cont'd)

Automatic Transmission (F4) — Section 15

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Transmission (cont'd)	Thrust washer thickness			
	Mainshaft 2nd gear	A 3.97–4.00 (0.156–0.157) B 4.02–4.05 (0.158–0.159) C 4.07–4.10 (0.160–0.161) D 4.12–4.15 (0.162–0.163) E 4.17–4.20 (0.164–0.165) F 4.22–4.25 (0.166–0.167) G 4.27–4.30 (0.168–0.169) H 4.32–4.35 (0.170–0.171) I 4.37–4.40 (0.172–0.173)	— — — — — — — — — —	
	Mainshaft bearing contact area (R side)	2.95–3.05 (0.116–0.120)	Wear or damage	
	Mainshaft 1st gear	2.43–2.50 (0.096–0.098)	Wear or damage	
	Countershaft 3rd gear	A 2.97–3.00 (0.1169–0.1181) B 3.02–3.05 (0.1189–0.1201) C 3.07–3.10 (0.1209–0.1220) D 3.12–3.15 (0.1228–0.1240) E 3.17–3.20 (0.1248–0.1260) F 3.22–3.25 (0.1268–0.1280) G 3.27–3.30 (0.1287–0.1299) H 3.32–3.35 (0.1307–0.1319) I 3.37–3.40 (0.1327–0.1339)	— — — — — — — — — —	
	Countershaft 4th gear collar thickness	A 38.97–39.00 (1.5342–1.5354) B 39.02–39.05 (1.5362–1.5374) C 39.07–39.10 (1.5382–1.5394) D 39.12–39.15 (1.5402–1.5413) E 39.17–39.20 (1.5421–1.5433) F 39.22–39.25 (1.5441–1.5453) G 39.27–39.30 (1.5461–1.5472)	— — — — — — —	
	Thrust washer thickness (mainshaft 1st gear L side)	1.45–1.50 (0.057–0.059)	1.4 (0.055)	
	Mainshaft 1st gear collar length	24.50–24.55 (0.9646–0.9665)	—	
	Mainshaft 1st gear collar flange thickness	2.5–2.6 (0.098–0.102)	Wear or damage	
	Countershaft reverse gear collar length	12.0–12.1 (0.472–0.476)	—	
	Countershaft reverse gear collar flange thickness	2.4–2.6 (0.094–0.102)	Wear or damage	
	Countershaft 1st gear collar length	12.0–12.1 (0.472–0.476)	—	
	Countershaft 1st gear collar flange thickness	2.4–2.6 (0.094–0.102)	Wear or damage	
	Diameter of countershaft one-way clutch contact area	83.339–83.365 (3.2811–3.2821)	Wear or damage	
	Diameter of parking gear one-way clutch contact area	66.685–66.695 (2.6254–2.6258)	Wear or damage	
	Mainshaft feed pipe O.D. (at 20 mm front end)	6.97–6.98 (0.2744–0.2748)	6.95 (0.2736)	
	Countershaft feed pipe O.D. (at 20 mm from end)	7.97–7.98 (0.3138–0.3142)	7.95 (0.31)	
	Mainshaft sealing ring 32 mm Thickness	1.980–1.995 (0.0780–0.0785)	1.8 (0.071)	
	Mainshaft bushing I.D.	6.018–6.030 (0.2369–0.2374)	6.045 (0.238)	
	Mainshaft bushing I.D.	9.000–9.015 (0.3543–0.3549)	9.03 (0.356)	
	Mainshaft sealing ring groove width	2.025–2.060 (0.0797–0.0811)	2.08 (0.082)	
	Regulator valve body	Sealing ring contact area diameter	35.000–35.025 (1.3780–1.3789)	35.05 (1.38)
	Shifting device and parking brake control	Reverse shift fork thickness	5.9–6.0 (0.232–0.236)	5.4 (0.21)
		Parking brake ratchet pawl	—	Wear or other defect
		Parking gear	—	Wear or other defect
		Throttle cam stopper	18.5–18.6 (0.728–0.732)	—
	Servo body	Shift fork shaft bore I.D.	A 14.000–14.005 (0.5512–0.5514) B 14.006–14.010 (0.5514–0.5516) C 14.011–14.015 (0.5516–0.5518)	— — —
Shift fork shaft valve bore I.D.		37.000–37.039 (1.4567–1.4582)	37.045 (1.4585)	
Oil pump gear side clearance		0.03–0.05 (0.0012–0.0020)	0.05 (0.002)	
Valve body	Oil pump gear-to-body clearance	Drive: 0.240–0.265 (0.009–0.010) Driven: 0.125–0.175 (0.005–0.007)	— —	
	Stator camshaft needle bearing bore I.D.	27.000–27.021 (1.0630–1.0638)	Wear or damage	
	Stator camshaft needle bearing contact and O.D.	29.000–29.013 (1.1417–1.1422)	Wear or damage	
	Oil pump driven gear I.D.	14.016–14.034 (0.5518–0.5525)	Wear or damage	
	Oil pump shaft O.D.	13.980–13.990 (0.5504–0.5508)	Wear or damage	

Automatic Transmission (C9) — Section 15

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Transmission oil	Capacity ℓ (US. qt., Imp.qt.)	2.2 (2.3, 1.9) at oil change 5.2 (5.5, 4.6) at assembly		
Hydraulic pressure	Line pressure at 2,000 min ⁻¹ (rpm)	785–834 kPa (8.0–8.5 kg/cm ² , 114–121 psi)	736 kPa (7.5 kg/cm ² , 107 psi)	
	4th, 3rd, 2nd clutch pressure at 2,000 min ⁻¹ (rpm)	412–834 kPa (4.2–8.5 kg/cm ² , 60–121 psi)	392 kPa (4.0 kg/cm ² , 57 psi) with lever released 785 kPa (8.0 kg/cm ² , 114 psi) with lever in full throttle position	
	1st clutch pressure at 2,000 min ⁻¹ (rpm)	785–834 kPa (8.0–8.5 kg/cm ² , 114–121 psi)	736 kPa (7.5 kg/cm ² , 107 psi)	
	Governor pressure at 60 km/h	198–208 kPa (2.02–2.12 kg/cm ² , 29–30 psi)	193 kPa (1.97 kg/cm ² , 28 psi)	
	Throttle pressure A	495–510 kPa (5.05–5.20 kg/cm ² , 72–74 psi)	490 kPa (5.0 kg/cm ² , 71 psi)	
	Throttle pressure B	735–834 kPa (8.0–8.5 kg/cm ² , 114–121 psi)	736 kPa (7.5 kg/cm ² , 107 psi)	
Stall speed	Check with car on level ground	2,600–2,900 min ⁻¹ (rpm)	—	
Clutch	Clutch initial clearance	1st	0.65–0.85 (0.026–0.033)	—
		2nd	0.60–0.80 (0.024–0.031)	—
		3rd, 4th	0.4–0.6 (0.016–0.024)	—
	Clutch return spring free length	1st	31.0 (1.22)	28.5 (1.12)
		2nd–4th	30.5 (1.20)	28.5 (1.12)
	Clutch disc thickness		1.88–2.0 (0.074–0.079)	Until grooves worn out
	Clutch plate thickness		1.95–2.05 (0.077–0.081)	Discoloration
	Clutch end plate thickness	Mark 1	2.3–2.4 (0.091–0.094)	↑ ↓ Discoloration
		Mark 2	2.4–2.5 (0.094–0.098)	
		Mark 3	2.5–2.6 (0.098–0.102)	
Mark 4		2.6–2.7 (0.102–0.106)		
Mark 5		2.7–2.8 (0.106–0.110)		
Mark 6		2.8–2.9 (0.110–0.114)		
Mark 7		2.9–3.0 (0.114–0.118)		
Mark 8	3.0–3.1 (0.118–0.122)			
Mark 9	3.1–3.2 (0.122–0.126)			
Mark 10	3.2–3.3 (0.126–0.130)			
Transmission	Diameter of needle bearing contact area on main and stator shaft	19.980–19.993 (0.7866–0.7871)	↑ Wear or damage ↓ Wear or damage	
	Diameter of needle bearing contact area on mainshaft 2nd gear	35.975–35.991 (1.4163–1.4170)		
	Diameter of needle bearing contact area on mainshaft 4th gear collar	31.975–31.991 (1.2589–1.2595)		
	Diameter of needle bearing contact area on mainshaft 1st gear collar	30.975–30.991 (1.2195–1.2201)		
	Diameter of needle bearing contact area on countershaft (L side)	38.505–38.515 (1.5159–1.5163)		
	Diameter of needle bearing contact area on countershaft 3rd gear	31.975–31.991 (1.2589–1.2595)		
	Diameter of needle bearing contact area on countershaft 4th gear	27.980–27.993 (1.1016–1.1021)		
	Diameter of needle bearing contact area on countershaft reverse gear collar	29.980–29.993 (1.1803–1.1808)		
	Diameter of needle bearing contact area on countershaft L gear collar	29.980–29.993 (1.1803–1.1808)		
	Diameter of needle bearing contact area on reverse idle gear	13.990–14.000 (0.5508–0.5512)		
	Reverse idler shaft holder diameter	14.416–14.434 (0.5676–0.5683)		
	Mainshaft 2nd gear I.D.	41.000–41.016 (1.6142–1.6148)		
	Mainshaft 1st gear I.D.	36.000–36.016 (1.4173–1.4179)		
	Countershaft 4th gear I.D.	33.000–33.016 (1.2992–1.2998)		
	Countershaft 3rd gear I.D.	38.000–38.016 (1.4961–1.4967)		
	Countershaft 2nd gear I.D.	31.000–31.016 (1.2205–1.2211)		
	Countershaft 1st gear I.D.	35.000–35.016 (1.3779–1.3786)		
	Countershaft reverse gear I.D.	36.000–36.016 (1.4173–1.4179)		
	Reverse idle gear I.D.	18.007–18.020 (0.7089–0.7094)		
	Mainshaft 4th gear end play	0.07–0.12 (0.003–0.005)		
	Mainshaft 2nd gear end play	0.07–0.12 (0.003–0.005)		
	Mainshaft 1st gear end play	0.08–0.24 (0.003–0.009)		
	Countershaft 3rd gear end play	0.07–0.12 (0.003–0.005)		
	Countershaft 2nd gear end play	0.07–0.12 (0.003–0.005)		
	Reverse idler gear end play	0.05–0.18 (0.002–0.007)		
	Countershaft reverse gear end play	0.10–0.20 (0.004–0.008)		
Reverse gear hub O.D.	51.87–51.90 (2.0421–2.0433)			

(cont'd)

Standards and Service Limits (cont'd)

Automatic Transmission (C9) — Section 15

	MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT	
Transmission (cont'd)	Thrust washer thickness			
	Mainshaft 2nd gear	A 3.47–3.50 (0.137–0.138) B 3.52–3.55 (0.139–0.140) C 3.57–3.60 (0.141–0.142) D 3.62–3.65 (0.143–0.144) E 3.67–3.70 (0.144–0.146) F 3.72–3.75 (0.146–0.148) G 3.77–3.80 (0.148–0.150) H 3.82–3.85 (0.150–0.152) I 3.87–3.90 (0.152–0.154)	— — — — — — — — — —	
	Mainshaft bearing contact area (R side)	2.95–3.05 (0.116–0.120)	Wear or damage	
	Mainshaft 1st gear	2.43–2.50 (0.096–0.098)	Wear or damage	
	Countershaft 3rd gear	A 2.97–3.00 (0.1169–0.1181) B 3.02–3.05 (0.1189–0.1201) C 3.07–3.10 (0.1209–0.1220) D 3.12–3.15 (0.1228–0.1240) E 3.17–3.20 (0.1248–0.1260) F 3.22–3.25 (0.1268–0.1280) G 3.27–3.30 (0.1287–0.1299) H 3.32–3.35 (0.1307–0.1319) I 3.37–3.40 (0.1327–0.1339)	— — — — — — — — — —	
	Countershaft 4th gear collar thickness	A 38.97–39.00 (1.5342–1.5354) B 39.02–39.05 (1.5362–1.5374) C 39.07–39.10 (1.5382–1.5394) D 39.12–39.15 (1.5402–1.5413) E 39.17–39.20 (1.5421–1.5433) F 39.22–39.25 (1.5441–1.5453) G 39.27–39.30 (1.5461–1.5472)	— — — — — — — —	
	Thrust washer thickness (mainshaft 1st gear L side)	1.45–1.50 (0.057–0.059)	1.4 (0.055)	
	Mainshaft 1st gear collar length	22.50–22.55 (0.886–0.888)	—	
	Mainshaft 1st gear collar flange thickness	2.5–2.6 (0.098–0.102)	Wear or damage	
	Countershaft reverse gear collar length	12.00–12.05 (0.472–0.474)	—	
	Countershaft reverse gear collar flange thickness	2.45–2.55 (0.096–0.100)	Wear or damage	
	Countershaft 1st gear collar length	11.0–11.1 (0.433–0.437)	—	
	Countershaft 1st gear collar flange thickness	2.4–2.6 (0.094–0.102)	Wear or damage	
	Diameter of countershaft one-way clutch contact area	74.414–74.444 (2.9298–2.9309)	Wear or damage	
	Diameter of parking gear one-way clutch contact area	57.755–57.768 (2.2738–2.2743)	Wear or damage	
	Mainshaft feed pipe O.D. (at 20 mm front end)	6.97–6.98 (0.2744–0.2748)	6.95 (0.2736)	
	Countershaft feed pipe O.D. (at 20 mm from end)	7.97–7.98 (0.3138–0.3142)	7.95 (0.31)	
	Mainshaft sealing ring 32 mm Thickness	1.980–1.995 (0.0780–0.0785)	1.8 (0.071)	
	Mainshaft bushing I.D.	6.018–6.030 (0.2369–0.2374)	6.045 (0.238)	
	Mainshaft bushing I.D.	9.000–9.015 (0.3543–0.3549)	9.03 (0.356)	
	Countershaft bushing I.D.	8.000–8.015 (0.3150–0.3156)	8.03 (0.316)	
	Mainshaft sealing ring groove width	2.025–2.060 (0.0797–0.0811)	2.08 (0.082)	
	Regulator valve body	Sealing ring contact area diameter	32.000–32.025 (1.2598–1.2608)	32.05 (1.262)
	Shifting device and parking brake control	Reverse shift fork thickness	5.90–6.00 (0.232–0.236)	5.4 (0.21)
		Parking brake ratchet pawl	—	Wear or other defect
		Parking gear	—	Wear or other defect
		Throttle cam stopper	18.5–18.6 (0.728–0.732)	—
Servo body	Shift fork shaft bore I.D.	A 14.000–14.005 (0.5512–0.5514) B 14.006–14.010 (0.5514–0.5516) C 14.011–14.015 (0.5516–0.5518)	— — —	
	Shift fork shaft valve bore I.D.	37.000–37.039 (1.4567–1.4582)	37.045 (1.4585)	
	Oil pump gear side clearance	0.03–0.05 (0.0012–0.0020)	0.05 (0.002)	
Valve body	Oil pump gear-to-body clearance	Drive: 0.240–0.265 (0.009–0.010) Driven: 0.125–0.175 (0.005–0.007)	— —	
	Stator camshaft needle bearing bore I.D.	24.000–24.021 (0.9449–0.9457)	Wear or damage	
	Stator camshaft needle bearing contact and O.D.	26.000–26.013 (1.0236–1.0241)	Wear or damage	
	Oil pump driven gear I.D.	14.016–14.034 (0.5518–0.5525)	Wear or damage	
	Oil pump shaft O.D.	13.980–13.990 (0.5504–0.5508)	Wear or damage	

Differential — Section 16

		MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Ring gear		Backlash	0.085–0.149 (0.0033–0.0059)	0.2 (0.0079)
Differential carrier		Pinion shaft bore diameter	18.000–18.018 (0.7087–0.7094)	18.1 (0.71)
		Carrier-to-pinion shaft clearance	0.016–0.052 (0.0006–0.0020)	0.1 (0.004)
		Driveshaft bore diameter	28.000–28.021 (1.1024–1.1032) *1 26.000–26.021 (1.0236–1.0244)	— —
		Carrier-to-driveshaft clearance	0.025–0.066 (0.0010–0.0026)	0.12 (0.005)
		Side clearance	0.10–0.20 (0.004–0.008)	0.15 (0.006)
Differential pinion gear		Backlash	0.05–0.15 (0.002–0.006)	Selection with 8 types of washers
		Pinion gear bore diameter	18.041–18.061 (0.7103–0.7111)	—
		Pinion gear-to-pinion shaft clearance	0.057–0.093 (0.0022–0.0037)	0.15 (0.006)

*1 A1 Transmission only

Driveshaft — Section 17

		MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Driveshaft	Right boot	As installed	506.0–510.5 (19.9–20.1)	—
	Left boot	As installed	805.0–809.5 (31.7–31.9)	—
			MT	812.0–816.5 (32.0–32.1)
		AT		—

Steering — Section 18

		MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Steering wheel		Play	10 (0.39) Max.	—
		Steering assist N (kg, lb)	15 (1.5, 3.31) Max 18 (1.8, 3.97) Max	—
Power steering		Pump pressure with valve closed (Oil temp./ speed: 40°C (104°F) min/idle. Do not run for more than 5 seconds) kPa (kg/cm ² , psi)	7845–8826 (80–90, 1138–1280)	—
		Fluid capacity	Reservoir At change	0.5ℓ (0.53 US. qt., 0.44 Imp. qt.) approx 1.7ℓ (1.8 US. qt., 1.5 Imp. qt.)

Suspension — Section 19

		MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Wheel alignment	Camber		Front 0° 00' ± 1°	Rear 0° 00' ± 1°
			0° 31' ± 1°	
			0 ± 2 (0 ± 0.079)	
	Caster		0 ± 3 (0 ± 0.118)	0 ± 2 (0 ± 0.079)
			6° 50'	
Toe-in		0 ± 3 (0 ± 0.118)	0 ± 2 (0 ± 0.079)	
	Kingpin inclination		6° 50'	
Steering angle	R/L	Inside	39° 30'	
			30° 30'	
	Outside	39° 30'		
		30° 30'		
Wheel	Rim runout	Steel	Axial 0–1.0 (0–0.039)	—
		Aluminum	Radial 0–1.0 (0–0.039)	—
		Axial	0–0.7 (0–0.028)	—
		Radial	0–0.07 (0–0.003)	—
Wheel bearing	Front wheel bearing axial play		0–0.05 (0–0.002)	—
	Rear wheel bearing axial play		0–0.05 (0–0.002)	—

Standards and Service Limits (cont'd)

Unit: mm (in.)

Brake — Section 20

		MEASUREMENT	STANDARD (NEW)	SERVICE LIMIT
Parking brake lever		Play in stroke 200N (20 kg, 44 lbs)	To be locked when pulled 7–11 notches	
Foot brake pedal	Pedal Height		LHD: 203 (8.0), RHD: 205 (8.1) from floor	—
	Free play		1–5 (0.04–0.20)	5 (0.20)
Master cylinder	Piston-to-push rod clearance	with ALB	0–0.4 (0.016) 0–0.6 (0–0.024)	—
Brake drum	I.D.		200.0 (7.87)	201.0 (7.91)
Lining	Thickness		4.5 (0.18)	2.0 (0.08)
Disc brake	Disc thickness	Front	19.0 (0.75) *21 (0.83)	17.0 (0.67) *19 (0.75)
		Rear	10.0 (0.39)	8 (0.31)
	Disc runout		—	0.15 (0.006) *0.1 (0.004)
	Disc parallelism		—	0.015 (0.0006)
Pad thickness	Front	9.0 (0.35) *11.5 (0.45)	3.0 (0.12)	
	Rear	8.0 (0.31)	3.0 (0.12)	
Brake booster	Characteristics	Vacuum (mm Hg)	Pedal Pressure kg (lbs)	Line Pressure kPa (kg/cm ² , psi)
				9" Booster
		0	20 (44)	1.177 (12.0, 170.6) min
		300	20 (44)	4.766 (48.6, 691.1) min
	500	20 (44)	7.149 (72.9, 1,036.6) min	

* EXSi model and cars equipped with ALB (Except KS type)

Engine Electrical — Section 24

		MEASUREMENT	STANDARD (NEW)			
Ignition coil	Rated voltage		12 Volts			
	Insulation resistance		10,000 ohms min.			
	Performance: Make sure strong sparks jump across electrodes (3-point tester)					
	Voltage	Camshaft	Secondary Voltage	3-point gap	Condition	
	6 V	75 min ⁻¹ (rpm)	30±4 kV	15–21 mm (0.59–0.83)	At 80°C (176°F)	
	12 V	3,000 min ⁻¹ (rpm)	22±4 kV	13–19 mm (0.51–0.75)		
Ignition wire	Resistance		25,000 ohms max.			
Spark plug	Type	Standard	B20A	BCPR6E-11 (NGK), Q20PR-U11 (ND)		
			Others	BPR5EY-11 (NGK)* ¹ , W16EXR-U11 (ND)* ¹ BCPR6EY-11 (NGK)* ² , W20EXR-U11 (ND)* ²		
	Gap		1.0–1.1 (0.039–0.043)			
Ignition timing	At idling	Carbureted Engine	Manual	20±2° BTDC *24±2° BTDC		
			Automatic (in gear)	15±2° BTDC		
	At idling	Fuel-injected Engine	Manual	15±2° BTDC		
			Automatic (in gear)	15±2° BTDC		
Battery	Lighting capacity (20-hour ratio)		47 Ampere Hours			
	Starting capacity (5-second ratio)		8.4 V minimum at 300 Ampere draw			
Alternator	Output at no-load		14 V at 1,000 rpm max.			
	Output		14 V/65 A at 5,500 rpm max.			
	Coil resistance (rotor)		2.8–3.0 ohms	±0.1 ohms		
	Slip ring O.D.		32.5 (1.28)	32.1 (1.26)		
	Brush length		10.5 (0.41)	5.5 (0.22)		
	Brush spring tension		300–500 g (10.6–18.6 oz)	—		
Starting motor	MEASUREMENT		ND 1.0 kW, 1.4 kW		MITSUBA 1.0 kW, 1.4 kW	
			STANDARD (NEW)	SERVICE LIMIT	STANDARD (NEW)	SERVICE LIMIT
	Mica depth		0.5–0.8 (0.020–0.031)	0.2 (0.008)	0.4–0.5 (0.016–0.020)	0.15 (0.006)
	Commutator runout		0–0.02 (0.0008)	0.05 (0.020)	0–0.02 (0.0008)	0.05 (0.020)
	Commutator O.D.		30.0 (1.18)	29.0 (1.14)	28.0 (1.10)	27.5 (1.08)
	Brush length		12.5–13.5 (0.49–0.53)	8.5 (0.33)	14.3–14.7 (0.56–0.58)	9.3 (0.37)
	Spring pressure (new)		1.75 kg (3.8 lb)	—	2.1 kg (4.6 lb)	—

*1: For cars used unleaded gasoline. *2: For cars used leaded gasoline.

Design Specifications

European Model

	ITEMS	METRIC	ENGLISH	NOTE
DIMENSION	Overall length 3D	4,335 mm	170.6 in	KW: 4,365 mm (171.9 in) KW: 4,565 mm (180.0 in)
	4D	4,535 mm	178.5 in	
	Overall width	1,695 mm	66.7 in	
	Overall height 3D	1,335 mm	52.6 in	
	4D	1,335 mm	52.6 in	
	Wheel base	2,600 mm	102.4 in	
	Thread Front	1,480 mm	58.3 in	
	Rear	1,475 mm	58.1 in	
	Ground clearance	160 mm	6.3 in	
	Seating capacity (F/R)	5 (2/3)		
WEIGHT On cars equipped with sunroof (S/R) ALB or air conditioner (A/C), add S/R: 18 kg (40 lb) ALB: KE 19 kg (42 lb) except KE 14 kg (31 lb) A/C: 22 kg (49 lb) P/S: 12 kg (26.5 lb)	Curb weight (M/T) 3D EX (A20A2)	1,045 kg	2,304 lb	Holland
		1,068 kg*	2,355 lb*	KG, KB
		1,080 kg	2,381 lb	KF, KG, KB
		1,085 kg	2,392 lb	KW
		1,090 kg	2,403 lb	Finland
		1,100 kg	2,425 lb	KE
		1,110 kg	2,447 lb	KS
	EXi (A20A4)	1,065 kg	2,348 lb	Holland
		1,115 kg	2,458 lb	KF
		1,120 kg	2,469 lb	KG, KB, KW
		1,130 kg	2,491 lb	Finland
		1,135 kg	2,502 lb	KS, KE
	EXC (A20A1)	1,088 kg*	2,399 lb*	KG
		1,090 kg	2,403 lb	Holland
		1,100 kg	2,425 lb	KG
		1,105 kg	2,436 lb	Austria
		1,120 kg	2,469 lb	KX
	EXCi (A20A3)	1,115 kg	2,458 lb	Holland
		1,130 kg	2,491 lb	KG
		1,135 kg	2,502 lb	KX, Austria
	4D LX (A16A1)	1,025 kg	2,260 lb	Holland
	LX (A20A2)	1,060 kg	2,337 lb	KG, KB, KW, Finland
		1,045 kg	2,304 lb	Holland
	1,075 kg	2,370 lb	KG, KB	
	1,090 kg	2,403 lb	KW, KS, Finland	
EX (A20A2)	1,065 kg	2,348 lb	Holland	
	1,100 kg	2,425 lb	KG, KB	
	1,110 kg	2,447 lb	KE	
	1,115 kg	2,458 lb	KF, KW, Finland	

*Cars equipped with manual steering.

(cont'd)

Design Specifications (cont'd)

European Model (cont'd)

	ITEMS	METRIC	ENGLISH	NOTE
WEIGHT (cont'd) On cars equipped with sunroof (S/R) ALB or air conditioner (A/C), add S/R: 18 kg (40 lb) ALB: KE 19 kg (42 lb) except KE 14 kg (31 lb) A/C: 22 kg (49 lb) P/S: 12 kg (26.5 lb)	(M/T) 3D EX (A20A2)	1,120 kg	2,469 lb	KS
	EXi (A20A4)	1,085 kg	2,392 lb	Holland
		1,120 kg	2,469 lb	KG, KB
		1,130 kg	2,491 lb	KS
		1,135 kg	2,502 lb	KF
		1,145 kg	2,524 lb	KW, KE, Finland
	LXC (A20A1)	1,100 kg	2,425 lb	Austria
	EXC (A20A1)	1,080 kg	2,381 lb	Holland
		1,115 kg	2,458 lb	KG
		1,135 kg	2,502 lb	KX, Austria
	EXCi (A20A3)	1,110 kg	2,447 lb	Holland
		1,135 kg	2,502 lb	KG
		1,145 kg	2,524 lb	Austria
		1,155 kg	2,546 lb	KX
	EXSi (B20A2)	1,135 kg	2,502 lb	Holland
		1,155 kg	2,546 lb	KG, KB
		1,170 kg	2,579 lb	KF
		1,180 kg	2,601 lb	KW, KE, Finland
	EXCsi (B20A8)	1,140 kg	2,513 lb	Holland
		1,165 kg	2,568 lb	KG
		1,170 kg	2,579 lb	Austria
		1,175 kg	2,590 lb	KX
		1,180 kg	2,601 lb	KS
	(A/T) 3D EX (A20A2)	1,055 kg	2,326 lb	Holland
		1,088 kg*	2,399 lb*	KG, KB
		1,100 kg	2,425 lb	KG, KB, KF
		1,105 kg	2,436 lb	KW
		1,110 kg	2,447 lb	Finland
		1,120 kg	2,469 lb	KE
		1,130 kg	2,491 lb	KS
	EXi (A20A4)	1,138 kg*	2,509 lb*	KG
		1,135 kg	2,502 lb	KF
		1,140 kg	2,513 lb	KG, KB, KW
		1,150 kg	2,535 lb	Finland
		1,155 kg	2,546 lb	KS, KE
	EXC (A20A1)	1,110 kg	2,447 lb	Holland
	1,125 kg	2,480 lb	KG, Austria	
	1,140 kg	2,513 lb	KX	
EXCi (A20A3)	1,135 kg	2,502 lb	Holland	
	1,150 kg	2,535 lb	KG	
	1,155 kg	2,546 lb	KX, Austria	
	1,165 kg	2,568 lb	KS	
(A/T) 4D LX (A16A1)	1,040 kg	2,293 lb	Holland	
	1,070 kg	2,359 lb	KG, KB, KW, Finland	
LX (A20A2)	1,060 kg	2,337 lb	Holland	

*Cars equipped with manual steering.

	ITEMS	METRIC	ENGLISH	NOTE
WEIGHT On cars equipped with Sunroof (S/R) ALB or air conditioner (A/C), add S/R: 18 kg (40 lb) ALB: KE 19 kg (42 lb) except KE 14 kg (31 lb) A/C: 22 kg (49 lb)	(A/T) 4D LX (A20A2)	1,095 kg	2,414 lb	KG, KB
		1,100 kg	2,425 lb	Finland
	EX (A20A2)	1,110 kg	2,447 lb	KW, KS
		1,080 kg	2,381 lb	Holland
		1,120 kg	2,469 lb	KG, KB
		1,130 kg	2,491 lb	KE
		1,135 kg	2,502 lb	KF, KW, Finland
	EXi (A20A4)	1,140 kg	2,513 lb	KS
		1,140 kg	2,513 lb	KG, KB
		1,150 kg	2,535 lb	KS
		1,155 kg	2,546 lb	KF
		1,165 kg	2,568 lb	KW, KE, Finland
	LXC (A20A1)	1,120 kg	2,469 lb	Austria
	EXC (A20A1)	1,100 kg	2,425 lb	Holland
		1,135 kg	2,502 lb	KG
		1,155 kg	2,546 lb	KX, Austria
	EXCi (A20A3)	1,130 kg	2,491 lb	Holland
		1,155 kg	2,546 lb	KG
		1,165 kg	2,568 lb	Austria
		1,170 kg	2,579 lb	KS
	1,175 kg	2,590 lb	KX	
On cars equipped with sunroof (S/R) ALB or air conditioner (A/C), add S/R: 9/9 kg (20/20 lb) ALB: KE 12/7 kg (26/15 lb) except KE 12/2 kg (26/4 lb) A/C: 24/-2kg (53/-4 lb) P/S: 12/0 kg (26.5/0 lb)	Weight Distribution (Fr/Rr) (M/T) 3D EX (A20A2)	643/425 kg*	1,418/937 lb*	KG, KB
		655/425 kg	1,444/937 lb	KF, KG, KB
		660/425 kg	1,455/937 lb	KW
		665/425 kg	1,466/937 lb	Finland
		670/430 kg	1,477/948 lb	KE
		680/430 kg	1,499/948 lb	KS
	EXi (A20A4)	675/440 kg	1,488/970 lb	KF
		680/440 kg	1,499/970 lb	KG, KB, KW
		690/440 kg	1,521/970 lb	Finland
		695/440 kg	1,532/970 lb	KS
	EXC (A20A2)	690/445 kg	1,521/981 lb	KE
		662/425 kg*	1,459/937 lb*	KG
		675/425 kg	1,488/937 lb	KG
		680/425 kg	1,499/937 lb	Austria
		695/425 kg	1,532/937 lb	KX
	EXCi (A20A3)	690/440 kg	1,521/970 lb	KG
		695/440 kg	1,532/970 lb	KX, Austria
	4DLX (A16A1)	630/430 kg	1,388/948 lb	KG, KB, KW, Finland
	LX (A20A2)	645/430 kg	1,421/948 lb	KG, KB

*Cars equipped with manual steering.

(cont'd)

Design Specifications (cond'd)

European Model (cont'd)

	ITEMS	METRIC	ENGLISH	NOTE
WEIGHT (cont'd) On cars equipped with sunroof (S/R) ALB or air conditioner (A/C), add S/R: 9/9 kg (20/20 lb) ALB: KE 12/7 kg (26/15 lb) except KE 12/2 kg (26/4 lb) A/C: 24/-2 kg (53/-4 lb) P/S: 12/0 kg (26.5/0 lb)	(M/T) 4D LX (A20A2)	655/435 kg	1,444/959 lb	KW, Finland
		650/440 kg	1,432/970 lb	KS
	EX (A20A2)	660/440 kg	1,455/970 lb	KG, KB
		665/445 kg	1,466/981 lb	KE
		665/450 kg	1,466/992 lb	KF
		670/445 kg	1,477/981 lb	KW, Finland
		665/455 kg	1,466/1,003 lb	KS
	EXi (A20A4)	670/450 kg	1,477/992 lb	KG, KB
		675/455 kg	1,488/1,003 lb	KS
		675/460 kg	1,488/1,014 lb	KF
		690/455 kg	1,521/1,003 lb	KW, Finland
		685/460 kg	1,510/1,014 lb	KE
	LXC (A20A1)	660/440 kg	1,455/970 lb	Austria
	EXC (A20A1)	675/440 kg	1,488/970 lb	KG
		690/445 kg	1,521/981 lb	KX, Austria
	EXCi (A20A3)	685/450 kg	1,510/992 lb	KG
		690/445 kg	1,521/981 lb	Austria
		700/445 kg	1,543/981 lb	KX
	EXSi (B20A2)	695/460 kg	1,532/1,014 lb	KG, KB
		710/460 kg	1,565/1,014 lb	KF
		710/470 kg	1,565/1,036 lb	KW, KE, Finland
	EXCSi (B20A8)	700/465 kg	1,543/1,025 lb	KG
		705/465 kg	1,554/1,025 lb	Austria
		710/465 kg	1,565/1,025 lb	KX
		710/470 kg	1,565/1,036 lb	KS
	(A/T) 3D EX (A20A2)	663/425 kg*	1,462/937 lb*	KG, KB
		685/425 kg	1,510/937 lb	Finland
		675/425 kg	1,488/937 lb	KG, KB, KF
		680/425 kg	1,499/937 lb	KW
		685/425 kg	1,510/937 lb	Finland
		690/430 kg	1,521/948 lb	KE
		700/430 kg	1,543/948 lb	KS
	EXi (A20A4)	695/440 kg	1,532/970 lb	KF
		700/440 kg	1,543/970 lb	KG, KB, KW
		710/440 kg	1,565/970 lb	Finland
		715/440 kg	1,576/970 lb	KS
		710/445 kg	1,565/981 lb	KE
	EXC (A20A1)	690/425 kg	1,521/937 lb	KG
		700/425 kg	1,543/937 lb	Austria
		715/425 kg	1,576/937 lb	KX
	EXCi (A20A3)	710/440 kg	1,565/970 lb	KG
		715/440 kg	1,576/970 lb	KX, Austria
	725/440 kg	1,598/970 lb	KS	

*Cars equipped with manual steering.

	ITEMS	METRIC	ENGLISH	NOTE
WEIGHT	(A/T) 4D LX (A16A1)	640/430 kg	1,411/948 lb	KG, KB, KW, KS
On cars equipped with sunroof (S/R)	LX (A20A2)	665/430 kg	1,466/948 lb	KG, KB
ALB or air conditioner (A/C), add S/R:		675/435 kg	1,488/959 lb	KW, Finland
9/9 kg (20/20 lb)	EX (A20A2)	670/440 kg	1,477/970 lb	KS
ALB: KE		680/440 kg	1,499/970 lb	KG, KB
12/7 kg (26/15 lb) except KE	EXi (A20A4)	685/445 kg	1,510/981 lb	KE
12/2 kg (26/4 lb)		685/450 kg	1,510/992 lb	KF
A/C: 24/-2 kg (53/-4 lb)	LXC (A20A1)	690/445 kg	1,521/981 lb	KW, Finland
P/S: 12/0 kg (26.5/0 lb)	EXC (A20A1)	685/455 kg	1,510/1,003 lb	KS
		690/450 kg	1,521/992 lb	KG, KB
		695/455 kg	1,532/1,003 lb	KS
		695/460 kg	1,532/1,014 lb	KF
		710/455 kg	1,565/1,003 lb	KW, Finland
		705/460 kg	1,554/1,014 lb	KE
	LXC (A20A1)	680/440 kg	1,499/970 lb	Austria
	EXC (A20A1)	695/440 kg	1,532/970 lb	KG
		710/445 kg	1,565/981 lb	KX, Austria
	EXCi (A20A3)	705/450 kg	1,554/992 lb	KG
		710/455 kg	1,565/1,003 lb	Austria
		715/455 kg	1,576/1,003 lb	KS
		720/455 kg	1,587/1,003 lb	KX
	Max loaded Vehicle M/T	1,590 kg	3,505 lb	
	Weight (ADR) A/T	1,610 kg	3,549 lb	
	Max. permissible 2000	1,660 kg	3,660 lb	
	Weight (EC) 1600	1,580 kg	3,484 lb	

* Cars equipped with manual steering.

(cont'd)

Design Specifications (cont'd)

European Model (cont'd)

		ITEMS	METRIC		ENGLISH		NOTE	
ENGINE (Except B20A)	Type		Water cooled, gasoline fueled, 4-cycle OHC 4 cylinder in-line transverse					
	Cylinder arrangement		80.0 x 79.5 mm				3.15 x 3.13 in	
	Bore and Stroke	1600	82.7 x 91.0 mm		3.25 x 3.58 in			
	Displacement	1600	1,598 cm ³		97.8 cuin			
		2000	1,955 cm ³		119 cuin			
	Compression Ratio	1600	9.0 : 1					
		2000	8.9 : 1 (A20A4: KS) 9.1 : 1 (A20A1) 9.2 : 1 (A20A2)					
	Valve Train		8.8 : 1 (A20A3) 9.4 : 1 (A20A4)					
	Lubrication System		Belt driven, single overhead camshaft					
	Fuel Required	1600	Pressure Fed					
		2000	LEADED REGULAR 91RON OR HIGHER (A16A1)					
			UNLEADED REGULAR 91RON OR HIGHER (A20A1, A20A3)					
			LEADED REGULAR 91RON OR HIGHER (A20A2, A20A4)					
ENGINE (B20A)	Type		Water Cooled 4-cycle D.O.H.C.					
	Cylinder arrangement		4-cylinder in-line, transverse					
	Bore and stroke		81.0 x 95 mm		3.18 x 3.74 in			
	Displacement		1,959 cm ³		120 cuin			
	Compression Ratio		9.5 : 1 (B20A2), 9.4 : 1 (B20A8)					
	Valve Train		Belt driven, double overhead camshaft					
	Lubrication System		Pressure Fed					
	Fuel Required		LEADED PREMIUM 97RON OR HIGHER (B20A2)					
			LEADED PREMIUM 95RON OR HIGHER (B20A8)					
TRANSMISSION	Clutch	A/T	Three element, one stage, two phase					
		M/T	Single dry plate, diaphragm spring					
	Transmission	A/T	Torque converter with lock up clutch					
		M/T	Synchronesh 5 forward speed, 1 reverse					
			A16A, A20A	A16A1	A20A1KS A20A2 A20A3 A20A4	A20A1 A20A2KS A20A4KS	B20A	
			5MT	AT	AT	AT	MT	
	Primary Reduction		1.000	1.000	1.000	1.000	1.000	*1 A20A3 KX
	Gear Ratio	I	3.181	2.421	2.529	2.529	3.166	1.208
		II	1.842	1.560	1.481	1.481*2	1.857*5	A20A3 KX
		III	1.250*1	0.969	1.060	1.030*3	1.259*6	*2 1.428
		IV	0.937	0.729	0.743	0.700*4	0.967	*3 1.060
		V	0.771	—	—	—	0.794	*4 0.743
	Reverse	3.000	1.955	1.904	1.904	3.000	B20A8 KX	
	Final	4.066	3.933	4.066	4.066	4.066	*5 1.772	
	Clutch Facing Area	1600	160 cm ²		24.8 sq. in		*6 1.185	
		2000	176 cm ²		27.3 sq. in			

	ITEMS		METRIC	ENGLISH	NOTE
STEERING SYSTEM	Type	Manual Steering	Rack and Pinion		
		Power Steering	Power assisted Rack and Pinion integral		
	Overall Ratio	Manual Steering	19.4		
		Power Steering	18.1		
	Turns, lock-to-lock	Manual Steering	3.78		
		Power Steering	3.52		
	Steering Wheel Dia.		375 mm	14.76	
	Power Steering Oil Tank Capacity	Reservoir	0.5 ℓ	0.53 US. qt., 0.44 Imp. qt.	
		At change	approx. 1.7 ℓ	1.8 US. qt., 1.5 Imp. qt.	
	Power Steering Oil		Honda Genuine power steering fluid		
SUSPENSION SYSTEM	Type, F		Double Wishbone		
	Type, R		Double Wishbone		
	Shock Absorber F/R		Telescopic hydraulic		
WHEEL ALIGNMENT	Wheel Alignment				
	Camber	Front	0°		
		Rear	0°		
	Caster	Front	0°30'		
	Toe	Front	0 mm	0.0 in.	
		Rear	0 mm	0.0 in.	
BRAKE SYSTEM	Type, F		Self-adjusting power assisted disc brake type		
	Type, R		Drum *1		
	Pad Surface Area (Front)	1.6 ℓ and 2.0 ℓ (EX.EC)	50.0 cm ²	7.8 sq in	*1 Disc for EX 2.0i and cans equipped with Anti-Lock Brake.
		2.0 ℓ (EC)	43.3 cm ²	6.7 sq in	
	Pad/Lining Surface Area (Rear)	1.6 ℓ/2.0 ℓ	21 (disc)/	13.3 (disc)/	
	Effective Disc Dia.		67.2 (drum) cm ²	10.4 (drum) sq in	
Effective Brake Drum I.D.		194/214 mm	7.6/8.4 in		
Parking Brake Type		200 mm	7.9 in	*2 Mechanical to rear disc for equipped with Disc Brake.	
			Mechanical expanding, Rear two wheel brakes*2		
TIRES	F/R		165SR13, 165R13 82S, 185/70R13 85S, 185/65R14 85H, 195/60R14 85H, 195/60VR14 T135/70D15*		
		Spare			* Standard for some types.
ELECTRICAL SYSTEM	Battery		12V—50AH (Cold cranking current —17.7°C [0°F] 410A)		
	Starting Motor		12V—1.0/1.4KW		
	Generator		12V—65AH		
	Fuses		7.5A, 10A, 15A, 20A, 30A		
	Main Fuse		70A, 40A		
	Headlights		12V—60/55W		
	Turn signal lights	Front	12V—21W		
		Rear	12V—21W		
		Side	12V—5W		
	License Plate Lights		12V—5W		
	Back-up Lights		12V—21W		
	Stop Lights		12V—21W		
	Tail Lights		12V—5W		
Rear Fog Light		12V—21W			

Design Specifications (cont'd)

KQ Model

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

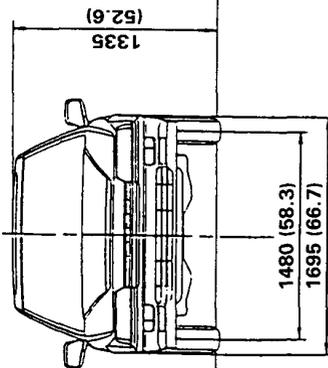
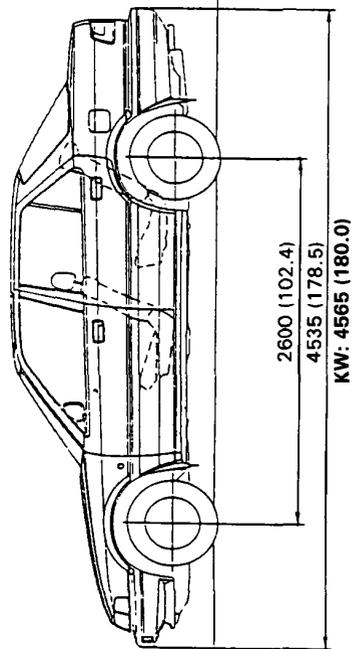
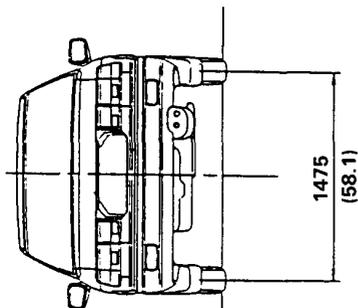
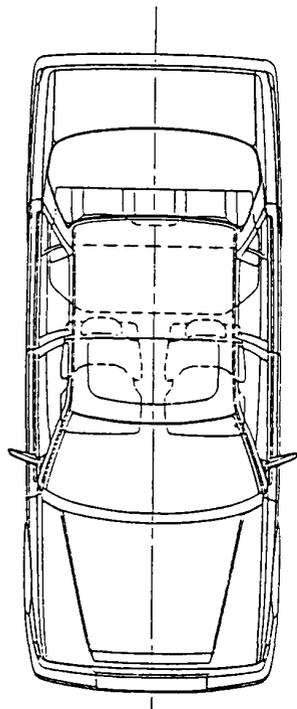
	ITEMS	METRIC	ENGLISH	NOTE
WEIGHT	Curb weight			
	<i>On cars equipped with air conditioner, add 22 kg (49 lb)</i>			
	(M/T) 3D EX (A20A2)	1,129 kg	2,489 lb	
	2.0Si (A20A4)	1,134 kg	2,500 lb	
	4D EX (A20A2)	1,139 kg	2,511 lb	
		1,157 kg	2,551 lb	S/R
	2.0Si (A20A4)	1,148 kg	2,531 lb	
		1,166 kg	2,571 lb	S/R
	(A/T) 3D EX (A20A2)	1,149 kg	2,533 lb	
	2.0Si (A20A4)	1,154 kg	2,544 lb	
	4D EX (A20A2)	1,159 kg	2,555 lb	
		1,177 kg	2,595 lb	S/R
	2.0Si (A20A4)	1,168 kg	2,575 lb	
		1,186 kg	2,615 lb	S/R
	Weight Distribution (F/R)			
<i>On cars equipped with air conditioner, add 24/-2 kg (53/-4 lb)</i>	(M/T) 3D EX (A20A2)	675/454 kg	1,488/1,001 lb	
	2.0Si (A20A4)	681/453 kg	1,501/999 lb	
	4D EX (A20A2)	678/461 kg	1,495/1,016 lb	
		687/470 kg	1,515/1036 lb	S/R
	2.0Si (A20A4)	685/463 kg	1,510/1,021 lb	
		694/472 kg	1,530/1,041 lb	S/R
	(A/T) 3D EX (A20A2)	695/454 kg	1,532/1,001 lb	
	2.0Si (A20A4)	701/453 kg	1,545/999 lb	
	4D EX (A20A2)	698/461 kg	1,539/1,016 lb	
		707/470 kg	1,559/1,036 lb	S/R
	2.0Si (A20A4)	705/463 kg	1,554/1,021 lb	
		714/472 kg	1,574/1,042 lb	S/R
ENGINE	Compression ratio	A20A2 9.1 A20A4 8.8		
TRANSMISSION	Clutch A/T M/T Transmission A/T M/T Primary Reduction Gear Ratio I < >: A/T II III IV V Reverse Final	Three element one stage two phase. Single dry plate, diaphragm spring. Torque Converter with lock up clutch. Synchronesh 5 forward speed. 1 reverse 1.000 3.181 <2.529> 1.842 <1.481> 1.250 <1.060> 0.937 <0.743> 0.771 _____ 3.000 <1.904> 4.066 <4.066>		
TIRES	Tire size F/R EX 2.0Si	185/70 R13 86T 185/70 R13 86H		Optional 185/70 HR13
ELECTRICAL SYSTEM	Starting Motor Battery	12 V-1.0 KW 12 V-40 AH		

S/R: Cars equipped with sunroof.

Body Specifications

4D Sedan

Unit: mm (in.)

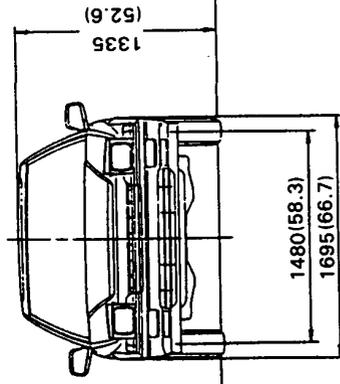
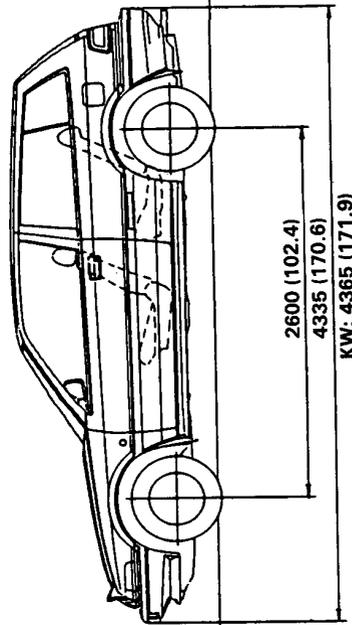
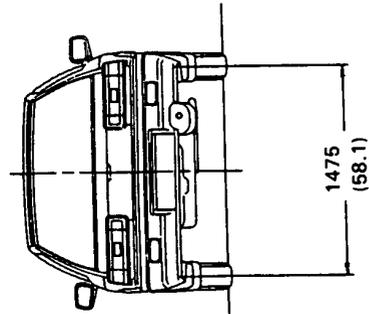
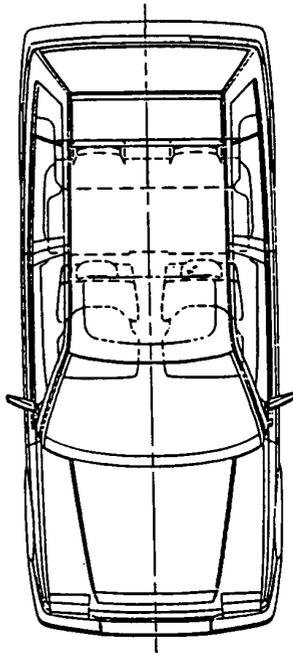


(cont'd)

Body Specifications (cont'd)

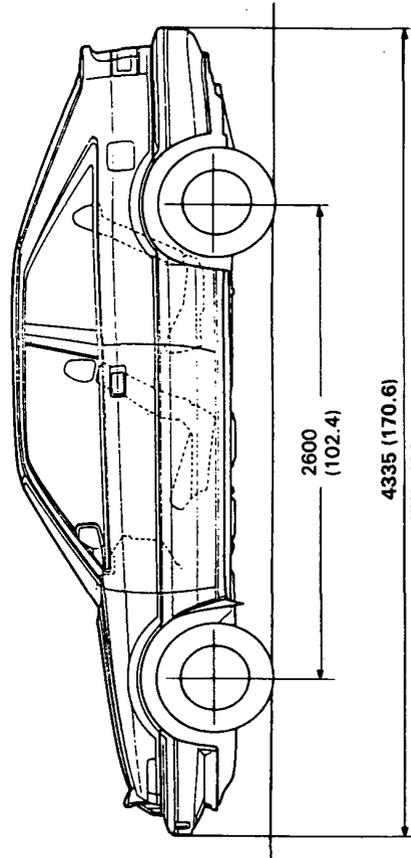
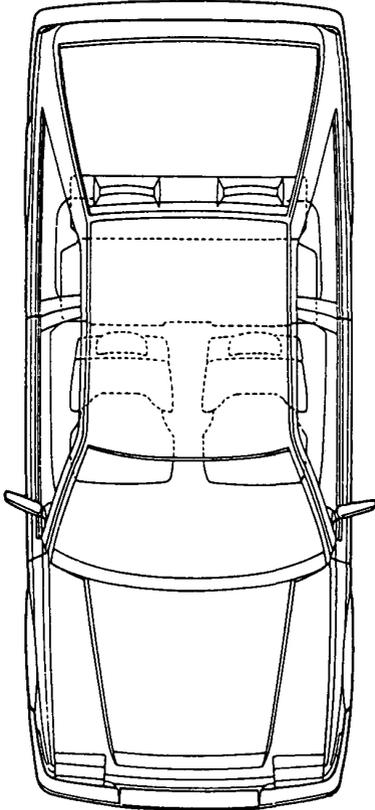
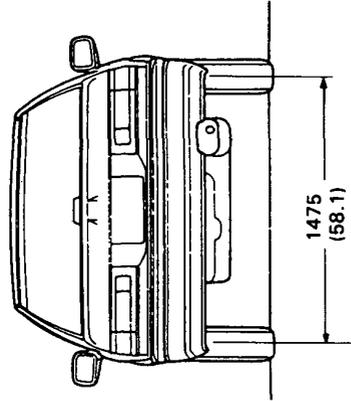
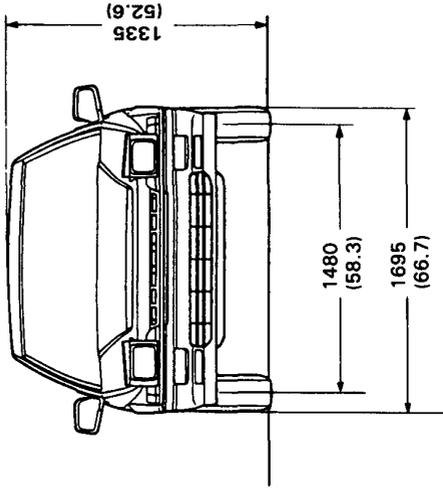
Aerodeck

Unit: mm (in.)



Glass Back

Unit: mm (in.)



Maintenance

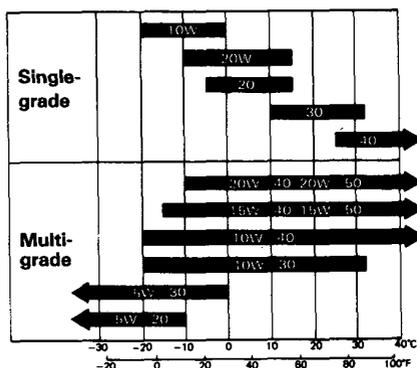
Lubrication Points	4-2
Maintenance Schedule	4-4



Lubrication Points

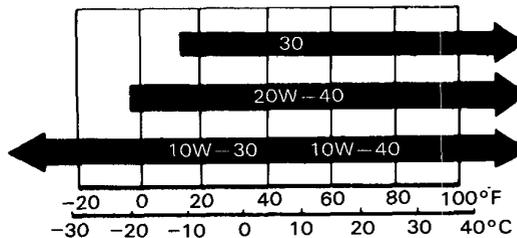
No	LUBRICATION POINTS	LUBRICANT
1	Engine	API Service Grade: SE or SF SAE Viscosity: See chart below
2	Transmission Manual Automatic	API Service Grade: SE or SF SAE30, 10W-30, 10W-40 or 20W-40 grade oil DEXRON® or DEXRON® II Automatic transmission fluid
3	Brake reservoir	Brake fluid DOT 3
4	Steering gearbox (Power)	Honda steering grease P/N 08704-99969
4	Steering gearbox (Manual)	Multipurpose Grease
5	Steering ball joint	
6	Suspension ball joints	
7	Front upper arm	
8	Steering Boot	
9	Shift lever pivot (Manual)	
10	Steering column bushings	
11	Horn contact	
12	Shift rod clevis bushings	
13	Select lever (Automatic)	
14	Pedal linkage	
15	Throttle cable end	
16	Brake master cylinder push rod	
17	Rear caliper	
18	Tailgate hinges (Hatchback)	
19	Trunk hinges (Sedan)	
20	Door hinges upper and lower	
21	Door opening detents	
22	Fuel filler lid	
23	Engine hood hinges	
24	Engine hood latch	
25	Tilt lever	
26	Select lever (Automatic)	
27	Retractable complete	
28	Rear brake shoe linkage	Silicone Grease
29	Caliper	
30	Piston seal Dust seal Caliper pin Piston	
31	Power steering reservoir	Honda power steering fluid P/N 08208-99961

Recommended Engine Oil (SE or SF Grade only)

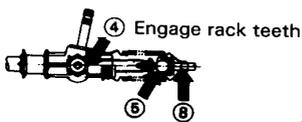


Engine oil viscosity for ambient temperature ranges.

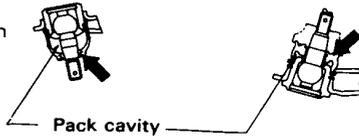
Recommended Manual Transmission Oil



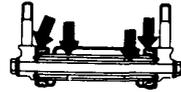
Transmission oil viscosity for ambient temperature ranges.



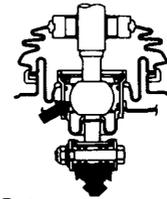
④ STEERING GEARBOX
⑤ STEERING BALL JOINT
⑧ STEERING BOOT



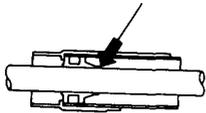
⑥ FRONT SUSPENSION BALL JOINTS
⑥ REAR SUSPENSION BALL JOINTS



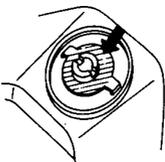
⑦ FRONT UPPER ARM



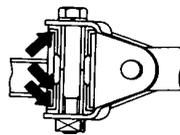
⑨ SHIFT LEVER PIVOT



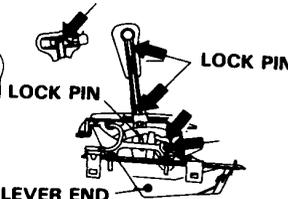
⑩ STEERING COLUMN BUSHING



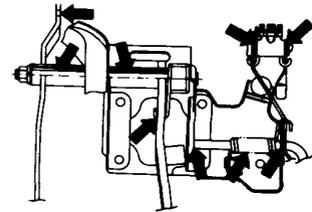
⑪ HORN CONTACT



⑫ SHIFT ROD CLEVIS BUSHINGS



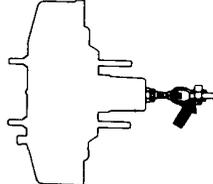
⑬ SELECT LEVER



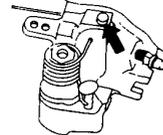
⑭ PEDAL LINKAGE



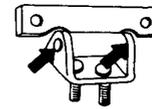
⑮ THROTTLE CABLE END



⑯ BRAKE MASTER CYLINDER PUSH ROD



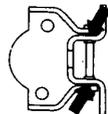
⑰ REAR CALIPER



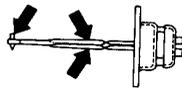
⑱ TAILGATE HINGES



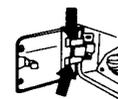
⑲ TRUNK HINGES



⑳ DOOR HINGES



㉑ DOOR OPENING DETENTS



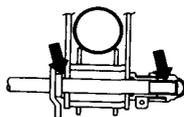
㉒ FUEL FILLER LID



㉓ ENGINE HOOD HINGES



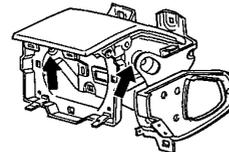
㉔ ENGINE HOOD LATCH



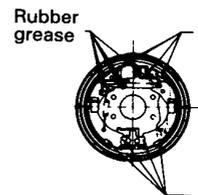
㉕ TILT LEVER



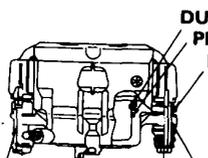
㉖ SELECT LEVER



㉗ RETRACTABLE COMPLETE



㉘ REAR BRAKE DUST COVER



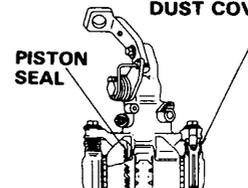
㉙ FRONT CALIPER



㉙ FRONT CALIPER



㉙ FRONT CALIPER



㉚ REAR CALIPER

Maintenance Schedule

SERVICE AT THE INTERVAL OF LISTED KM (MILES) OR MONTHS, WHICHEVER OCCURS FIRST.						
ITEMS	x 1,000 km	20	40	60	80	100
	x 1,000 miles	12	24	36	48	60
	months	12	24	36	48	60
IDLE SPEED AND IDLE CO	I	I	I	I	I	I
VALVE CLEARANCE	I	I	I	I	I	I
ALTERNATOR DRIVE BELT	I	I	I	I	I	I
■ ENGINE OIL AND OIL FILTER	Replace every 10,000 km (6,000 miles) or 6 months					
■ TRANSMISSION OIL		R			R	
■ RADIATOR COOLANT					R*1	
COOLING SYSTEM, HOSES AND CONNECTIONS		I			I	
E.G.R. SYSTEM (For cars using unleaded gasoline)*7						I
SECONDARY AIR SUPPLY SYSTEM (For carburetor type)*2						I
AIR CLEANER ELEMENT*5	R	R	R	R	R	R
AIR CLEANER ELEMENT*6		R			R	
FUEL FILTER (Including aux. filter for carburetor type)			R		R	
INTAKE AIR TEMP. CONTROL SYSTEM (For carburetor type)						I
TANK, FUEL LINE AND CONNECTIONS		I			I	
THROTTLE CONTROL SYSTEM (For carburetor type)		I			I	
CHOKE MECHANISM (For carburetor type)		I			I	
CHOKE OPENER OPERATION (For carburetor type)*3						I
EVAPORATIVE EMISSION CONTROL SYSTEM*4						I
IGNITION TIMING AND CONTROL SYSTEM			I		I	
SPARK PLUGS (For cars using leaded gasoline)	R	R	R	R	R	R
SPARK PLUGS (For cars using unleaded gasoline)			R		R	
DISTRIBUTOR CAP AND ROTOR		I			I	
IGNITION WIRING		I			I	
CRANKCASE EMISSION CONTROL SYSTEM			I		I	
BRAKE HOSES AND LINES (Including ALB hoses and pipes for ALB models)	I	I	I	I	I	I
BRAKE FLUID (including ALB fluid for ALB models)			R		R	
FRONT BRAKE DISCS AND CALIPERS	I	I	I	I	I	I
FRONT BRAKE PADS	Inspect every 10,000 km (6,000 miles) or 6 months					
REAR BRAKE DISCS, CALIPERS AND PADS (For disc type brakes)		I			I	
REAR BRAKE DRUMS, WHEEL CYLINDERS AND LININGS (For drum type brakes)		I			I	
PARKING BRAKE	I	I			I	
CLUTCH RELEASE ARM TRAVEL	I	I	I	I	I	I
EXHAUST PIPE AND MUFFLER	I	I	I	I	I	I
SUSPENSION MOUNTING BOLTS	I	I	I	I	I	I
FRONT WHEEL ALIGNMENT	I	I	I	I	I	I
STEERING OPERATION, TIE ROD ENDS, STEERING GEAR BOX AND BOOTS	I	I	I	I	I	I
ALB HIGH PRESSURE HOSES					R	
ALB OPERATION	I	I			I	
POWER STEERING SYSTEM	I	I	I	I	I	I
POWER STEERING PUMP BELT		I			I	
CATALYTIC CONVERTER HEAT SHIELD (Cars equipped with Catalytic Converter)						I

R—Replace I—Inspect. After inspection, clean, adjust, repair or replace if necessary *1 Thereafter, replace every 2 years or 40,000 km (24,000 miles), whichever comes first.
 ■ REMARK: These service intervals assume routine checking and replenishment has been done, as needed, by the customer.
 *2 Only for cars using unleaded gasoline (KG, KW, KX, KS, KQ).
 *3 Only for 2.0 l model.
 *4 Only for KQ, KY, KX, KS types and for KG, KW types using unleaded gasoline.
 *5 Except KQ type and for European types.
 *6 Only for KQ type and for European types.
 *7 Only for KG, KW, KX, KS, KQ types using carbureted Engine and KG, KW, KX, KS using Fuel-Injected Engine.

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" includes:

- 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 (Only for four wheel disc type brakes)	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
. B C . E .	Power steering system	I	Every 10,000 km (6,000 miles) or 6 months

Intake Manifold/Exhaust System

Intake Manifold	9-2
Exhaust Manifold	9-4



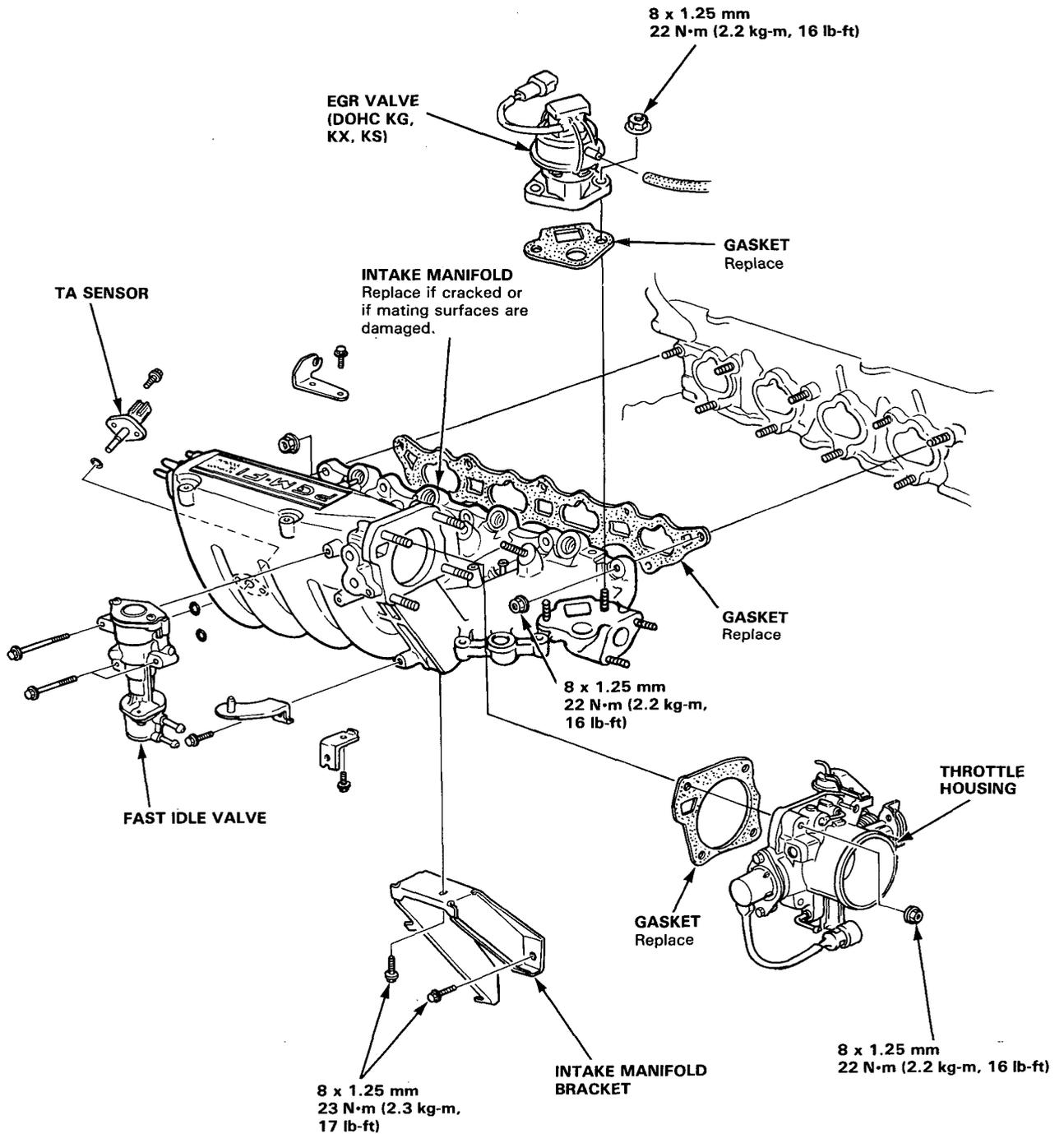
Outline of Model Changes

1. Replacement of the intake manifold have been changed for new application of the Fuel-Injected Engine and the Carbureted Engine.
2. Replacement of the exhaust manifold have been changed for new application of the Fuel-Injected Engine and the Carbureted Engine.

Intake Manifold

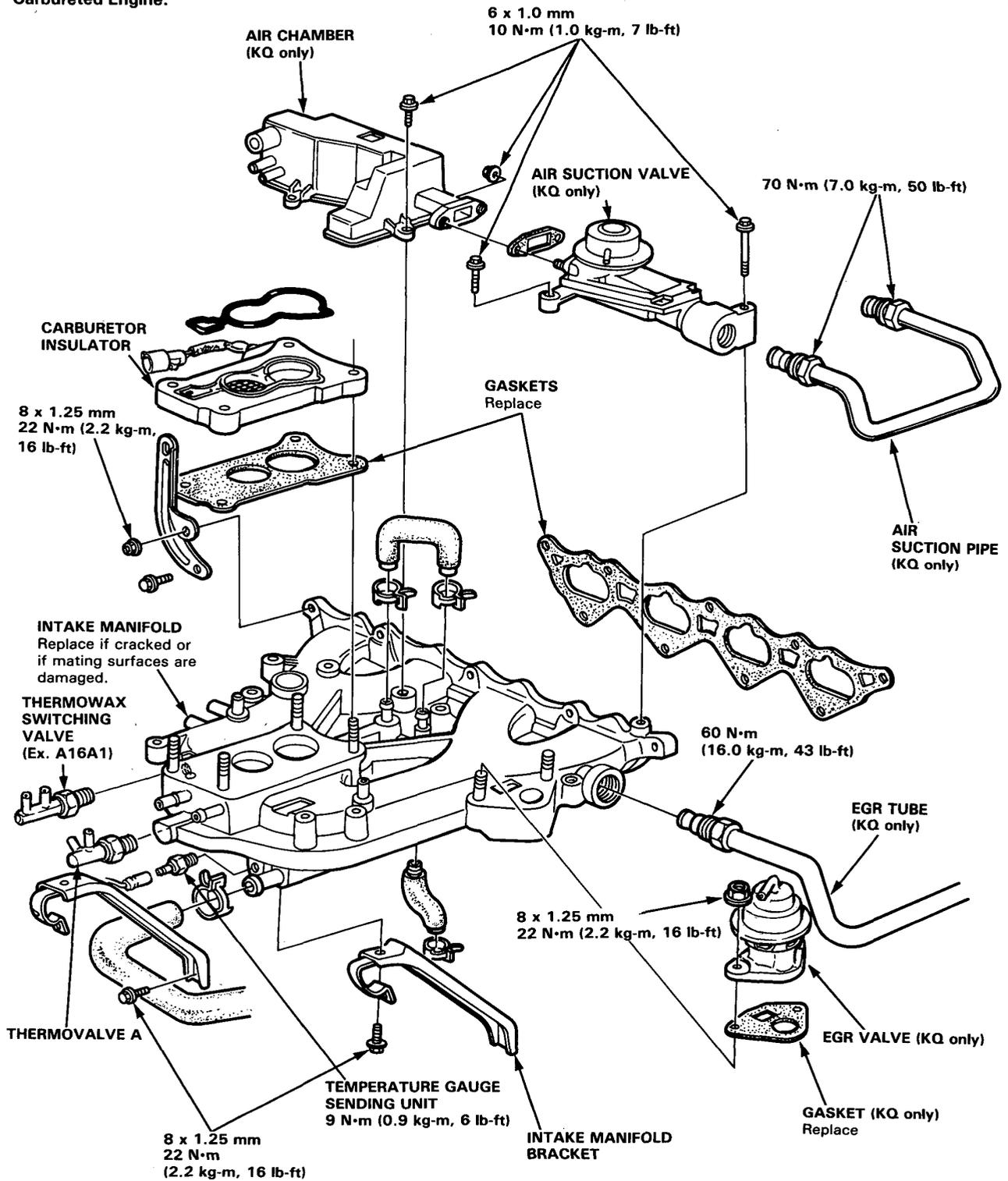
Replacement

Fuel-Injected Engine:





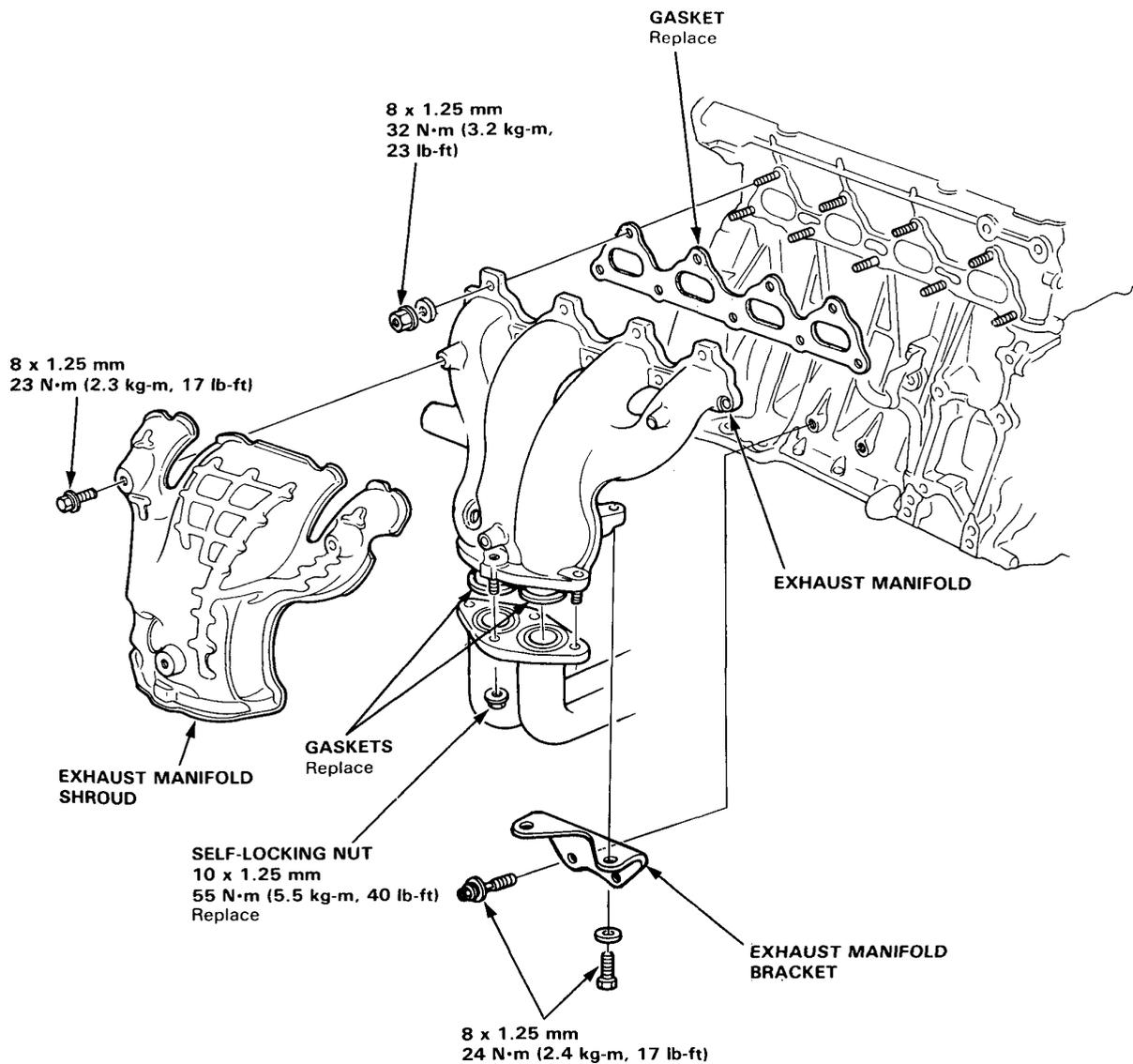
Carbureted Engine:



Exhaust Manifold

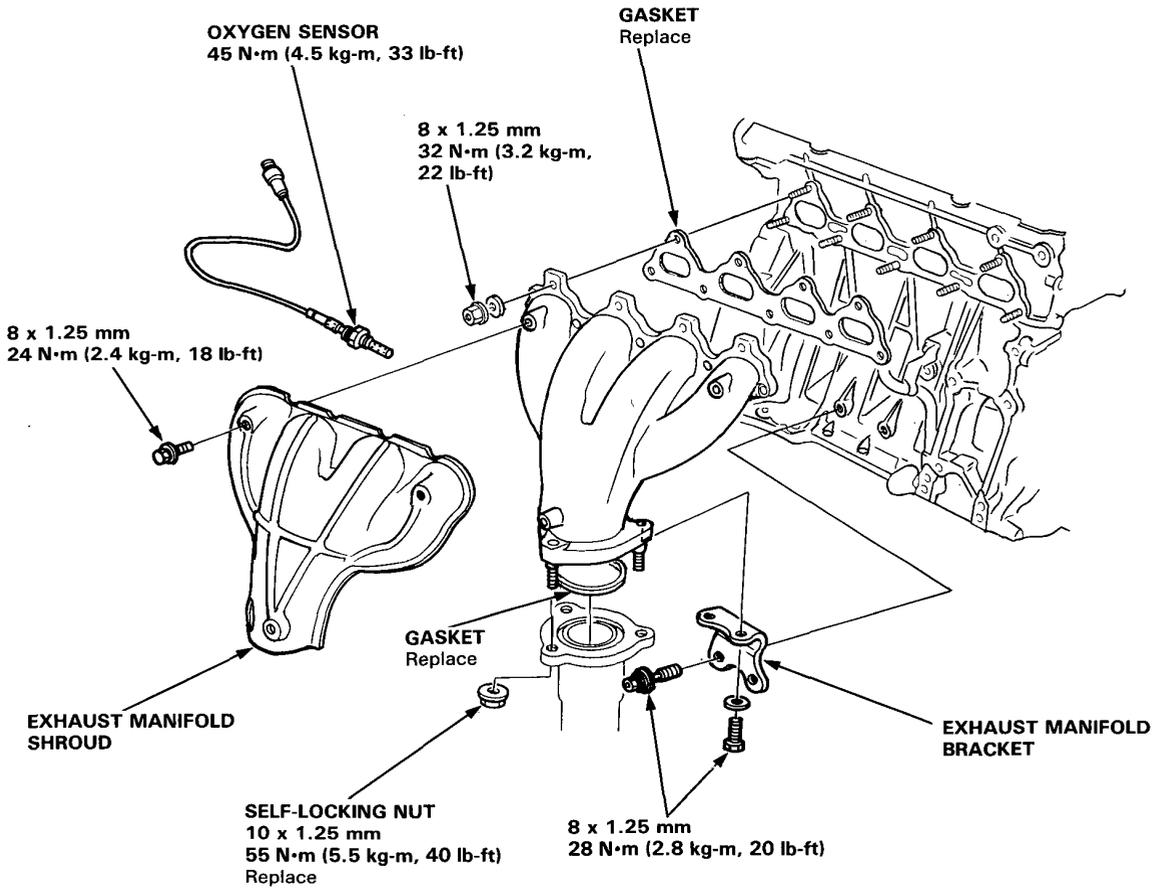
Replacement

B20A2 Engine:





B20A8 Engine:

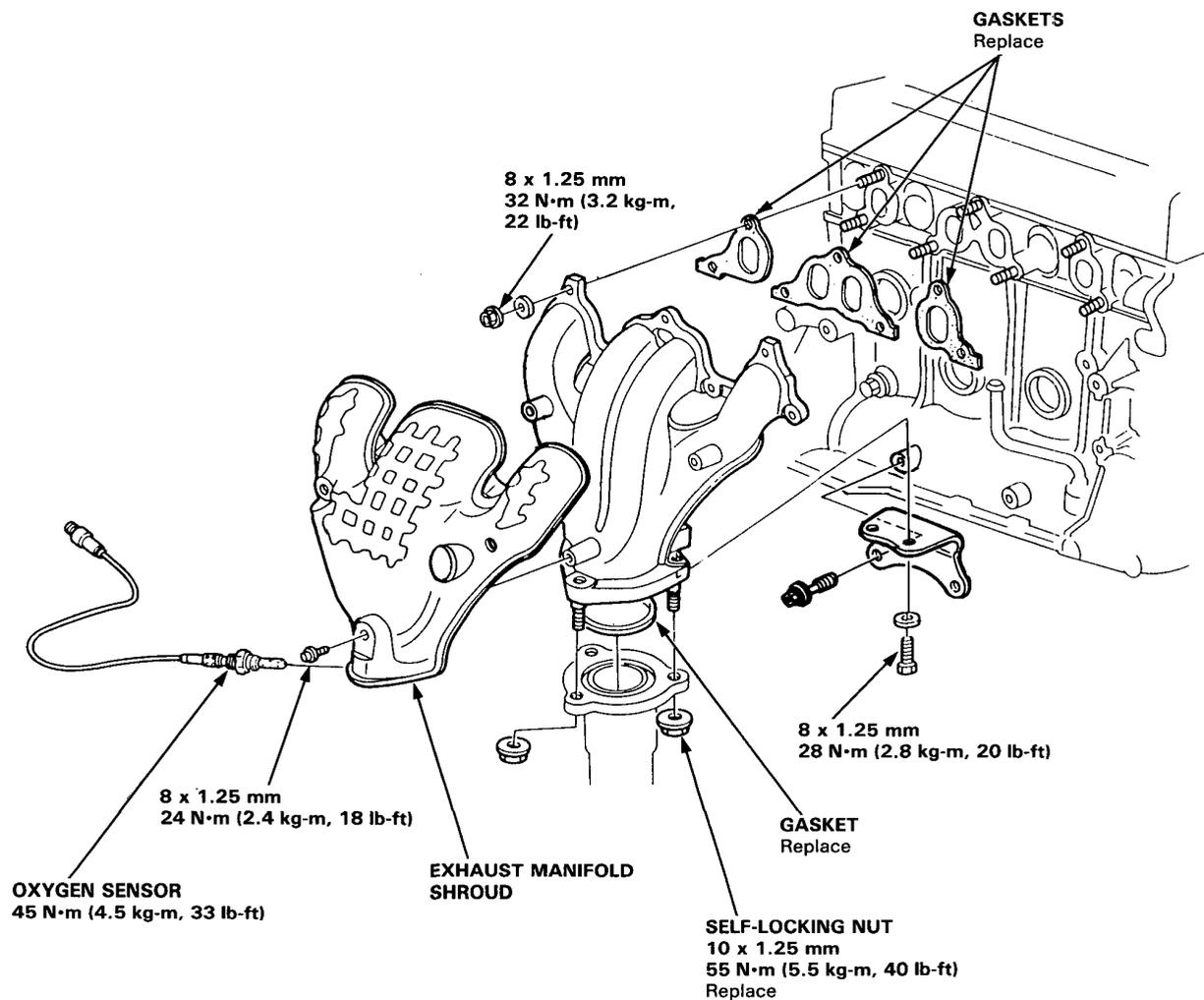


(cont'd)

Exhaust Manifold

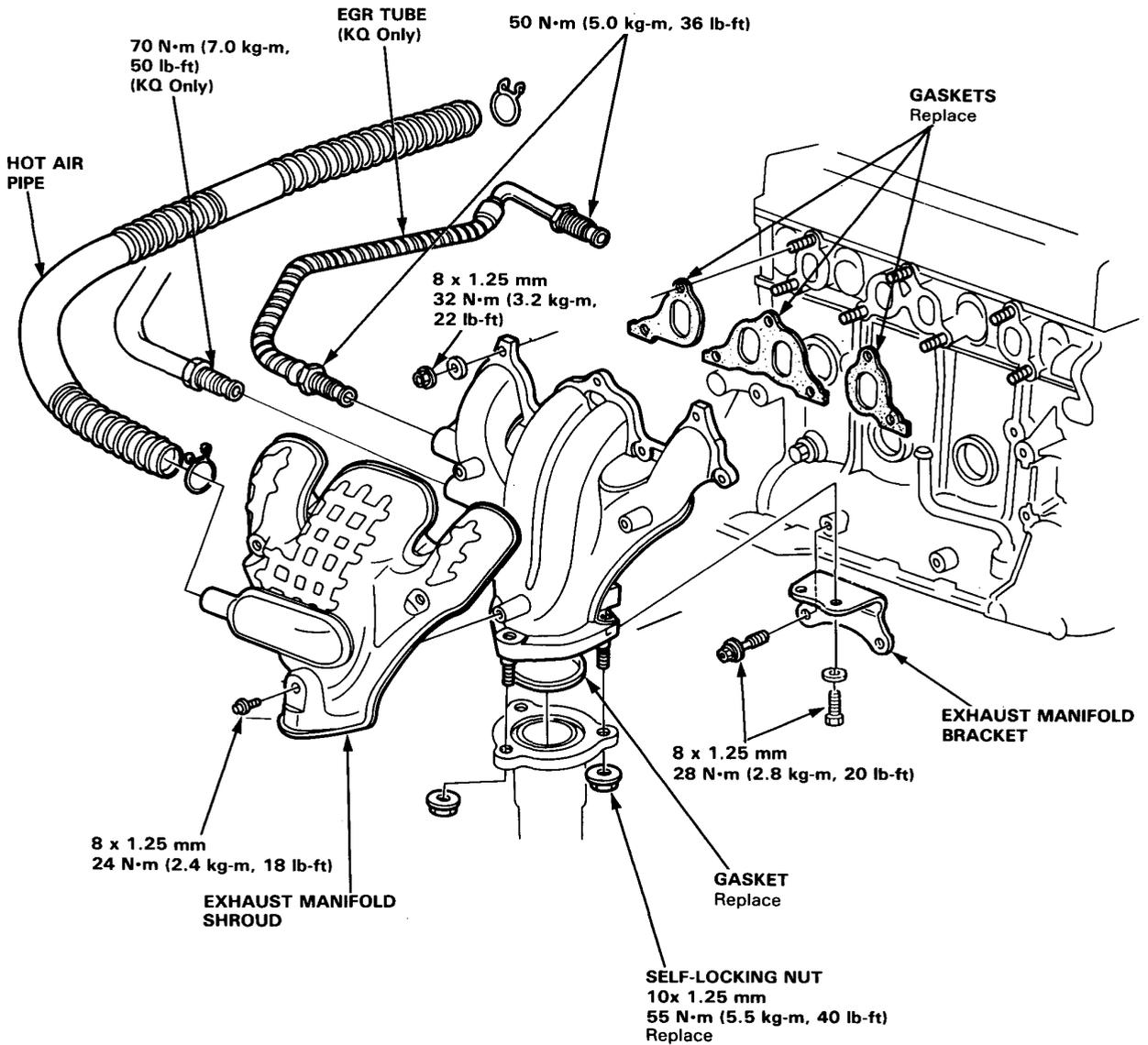
Replacement (cont'd)

A20A4 (KQ) Engine:





A16A1 Engine and A20A2 (KP, KQ, KT) Engine:



Cooling

Water Pump

Replacement 10-2

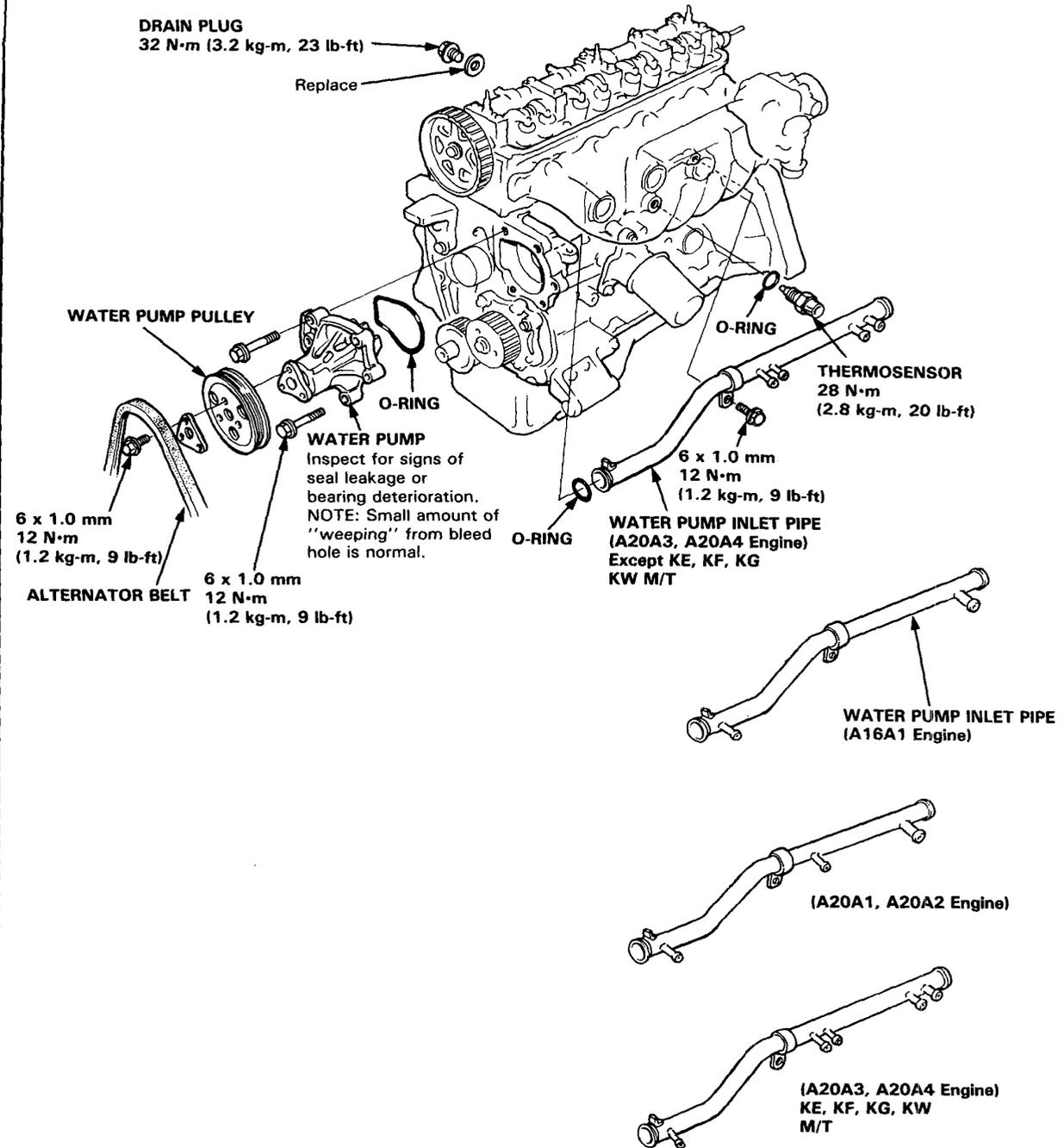


Outline of Model Change

1. Replacement of the water pump have been changed for new application of the Fuel-Injected Engine and the Carbureted Engine.

Water Pump

Replacement



Fuel and Emissions

Fuel-Injected Engine (B20A8, A20A3) . 12-1

Carbureted Engine (A20A1) 12-95



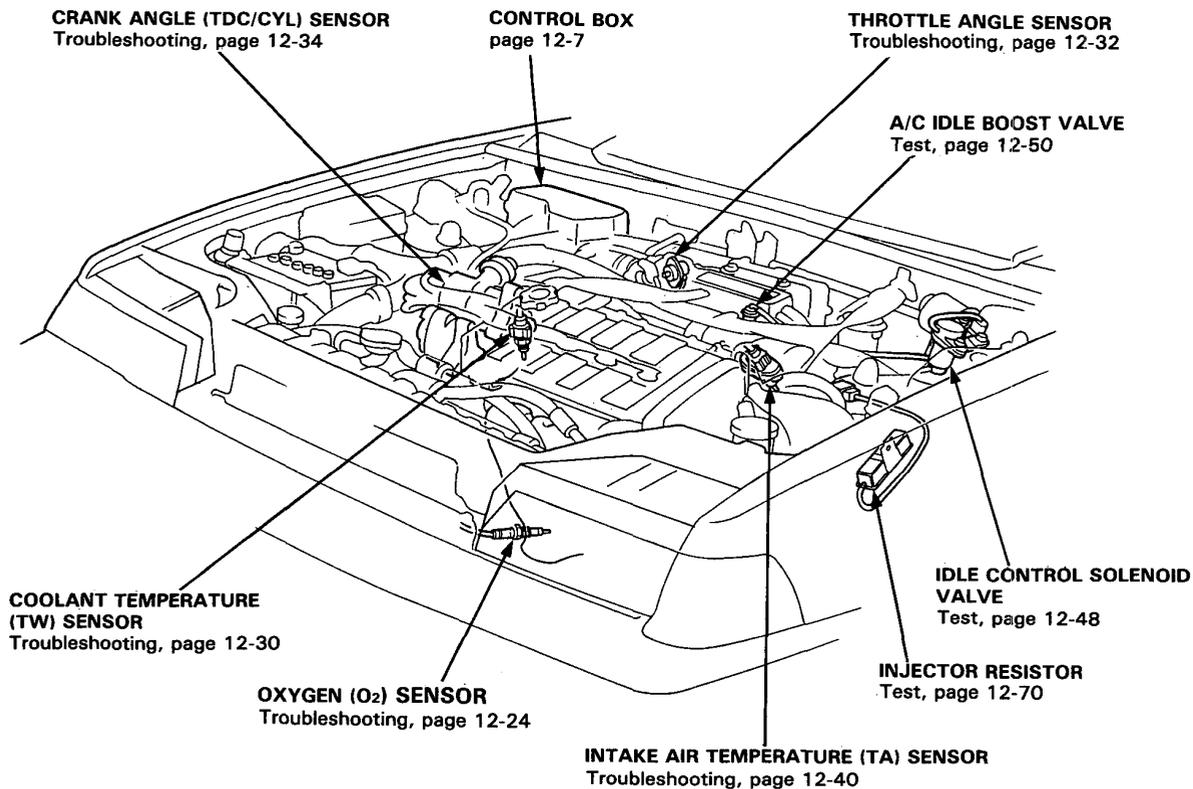
Fuel-Injected Engine (B20A8, A20A3)

Component Locations	12-2	Fuel Supply System	
Vacuum Connections	12-6	Symptom-to-Sub System Chart	12-66
Electrical Connections	12-11	Fuel Pressure Inspection	12-67
Symptom-to-System Chart	12-14	Fuel Pressure Relieving	12-67
Troubleshooting Procedures	12-18	Fuel Injectors	12-68
PGM-FI Control System		Injector Resistor	12-70
Troubleshooting Flow Charts		Pressure Regulator	12-70
Electronic Control Unit	12-21	Fuel Filter	12-71
Oxygen Sensor	12-24	Fuel Pump	12-72
Manifold Absolute Pressure Sensor	12-26	Main Relay	12-73
Coolant Temperature Sensor	12-30	Air Intake System	
Throttle Angle Sensor	12-32	Symptom-to-Sub System Chart	12-75
Crank Angle Sensor	12-34	Throttle Cable	12-76
Intake Air Temperature Sensor	12-40	Throttle Body	12-77
Atmospheric Pressure Sensor	12-42	Dashpot System	12-79
Idle Control System		Secondary Air Supply System (B20A8)	
Symptom-to-Sub System Chart	12-44	System Inspection	12-80
Idle Control Test	12-48	Air Valve Inspection	12-80
A/C Idle Boost Test	12-50	Air Valve Control Solenoid Valve Inspection	12-81
Fast Idle Control Test (A20A3)	12-52	Emission Control System	
A/T Idle Control Test (A20A3)	12-54	Symptom-to-Sub System Chart	12-82
Troubleshooting Flow Charts		Tailpipe Emission	12-83
Starter Signal	12-56	Exhaust Gas Recirculation System	12-84
Alternator FR Signal	12-57	Positive Crankcase Ventilation System	12-92
Air Conditioning Signal	12-59	Evaporative Emission Controls	12-93
Vehicle Speed Signal	12-61		
A/T Shift Position Signal (A20A3) ..	12-62		
Fast Idle Control	12-64		
Idle Speed Inspection/Adjustment	12-65		

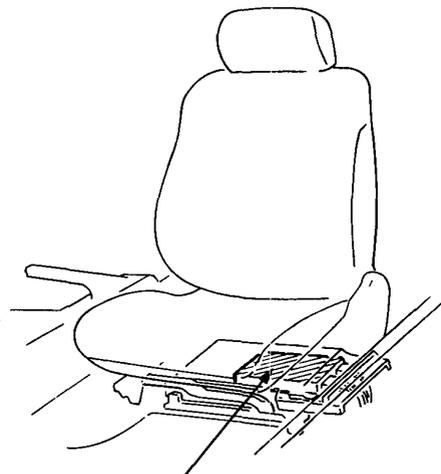
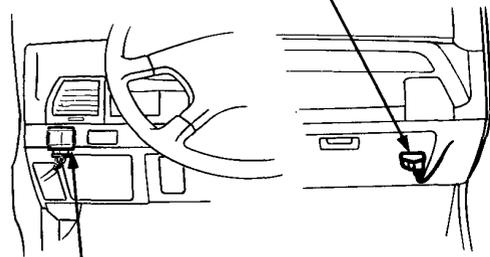


Component Locations

B20A8



ATMOSPHERIC PRESSURE (PA) SENSOR
Troubleshooting, page 12-42



ELECTRONIC CONTROL UNIT (ECU)
Troubleshooting, page 12-21



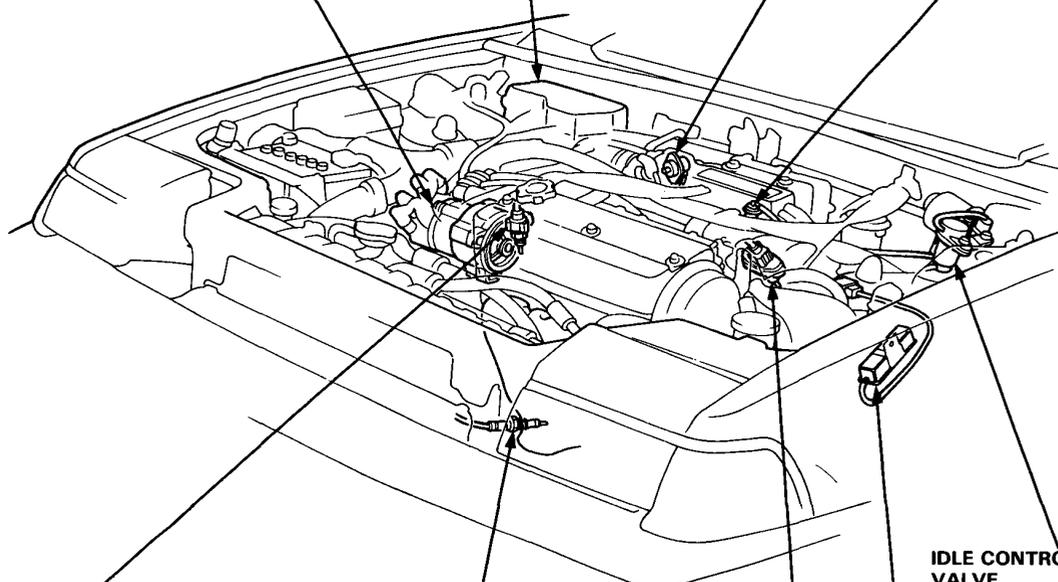
A20A3

CRANK ANGLE (TDC/CYL) SENSOR
Troubleshooting, page 12-34

CONTROL BOX
page 12-9

THROTTLE ANGLE SENSOR
Troubleshooting, page 12-32

A/C IDLE BOOST VALVE
Test, page 12-50



COOLANT TEMPERATURE (TW) SENSOR
Troubleshooting, page 12-30

OXYGEN (O₂) SENSOR
Troubleshooting, page 12-24

IDLE CONTROL SOLENOID VALVE
Test, page 12-48

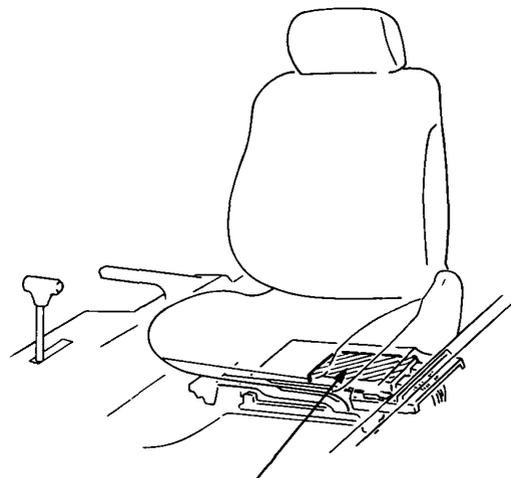
INJECTOR RESISTOR
Test, page 12-70

INTAKE AIR TEMPERATURE (TA) SENSOR
Troubleshooting, page 12-40

ATMOSPHERIC PRESSURE (PA) SENSOR
Troubleshooting, page 12-42

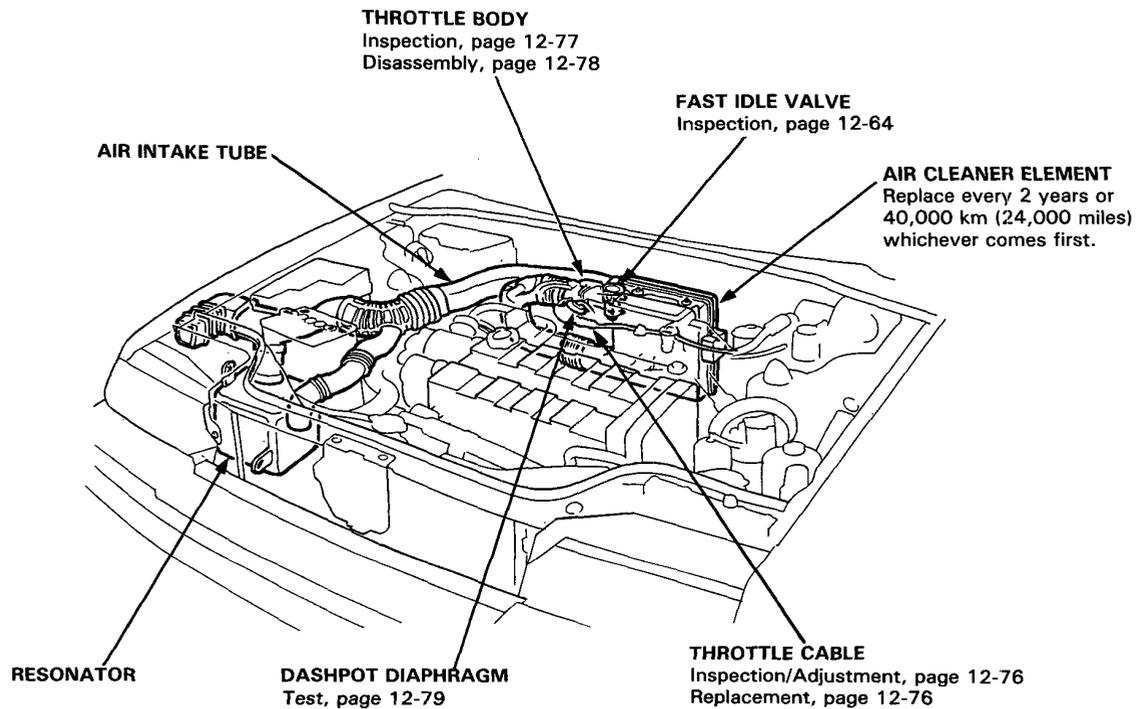


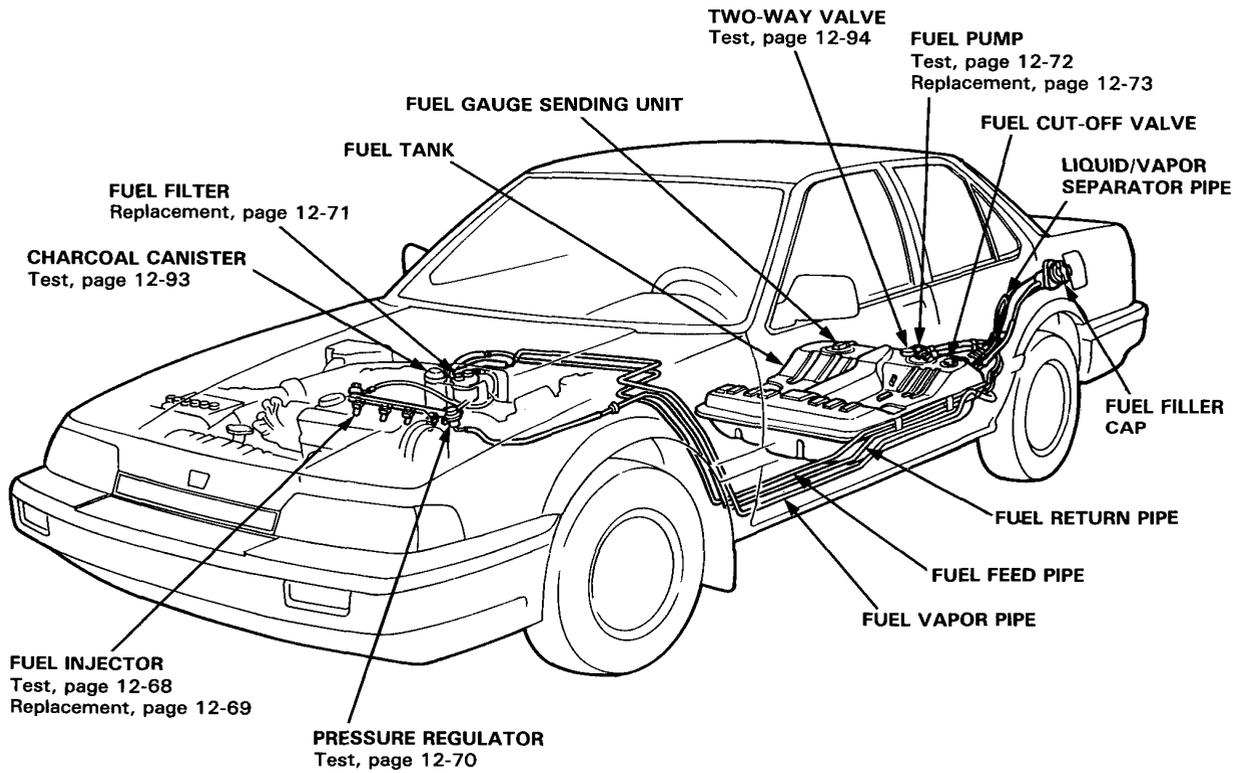
MAIN RELAY
Test, page 12-73



ELECTRONIC CONTROL UNIT (ECU)
Troubleshooting, page 12-21

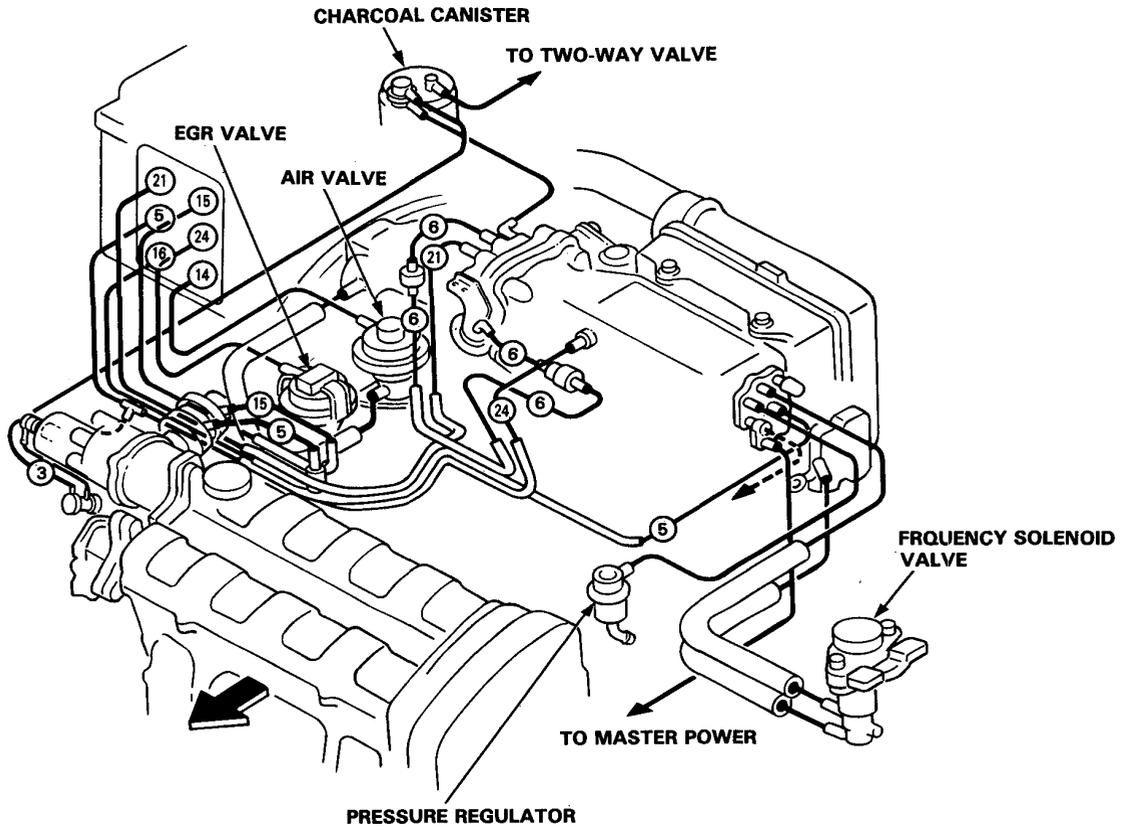
Component Locations





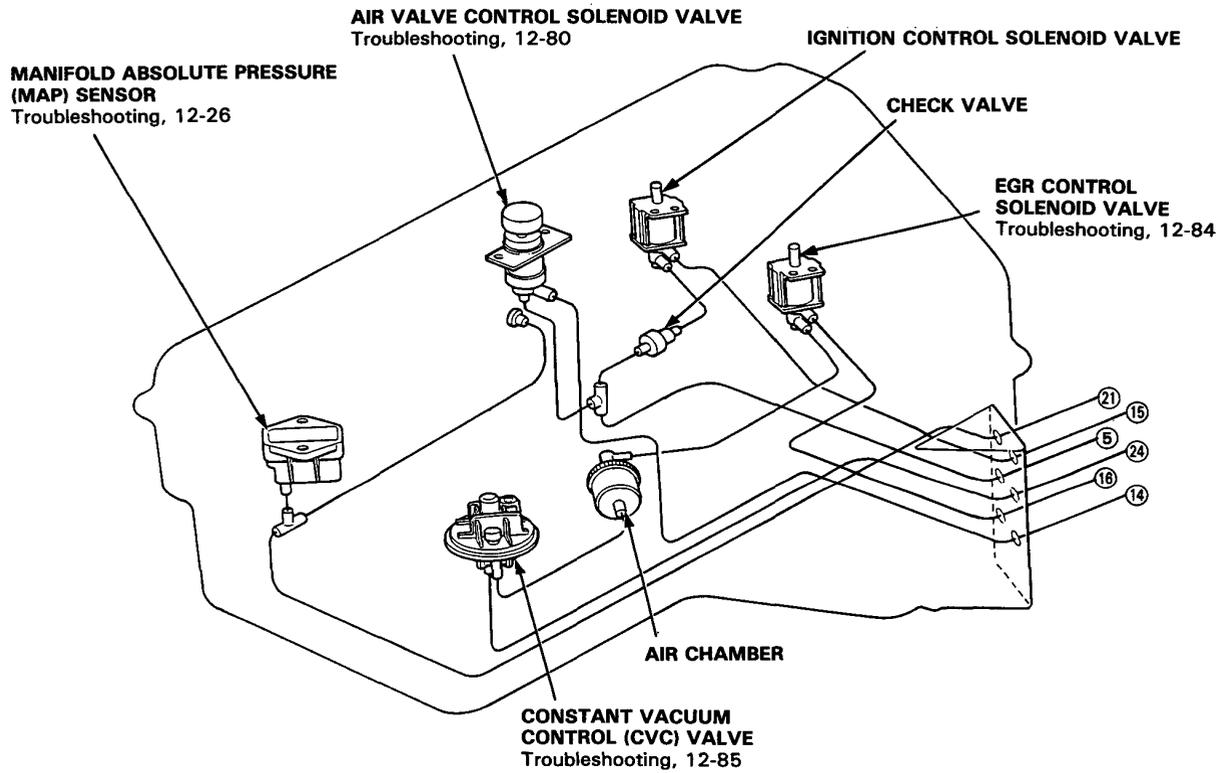
Vacuum Connections

B20A8



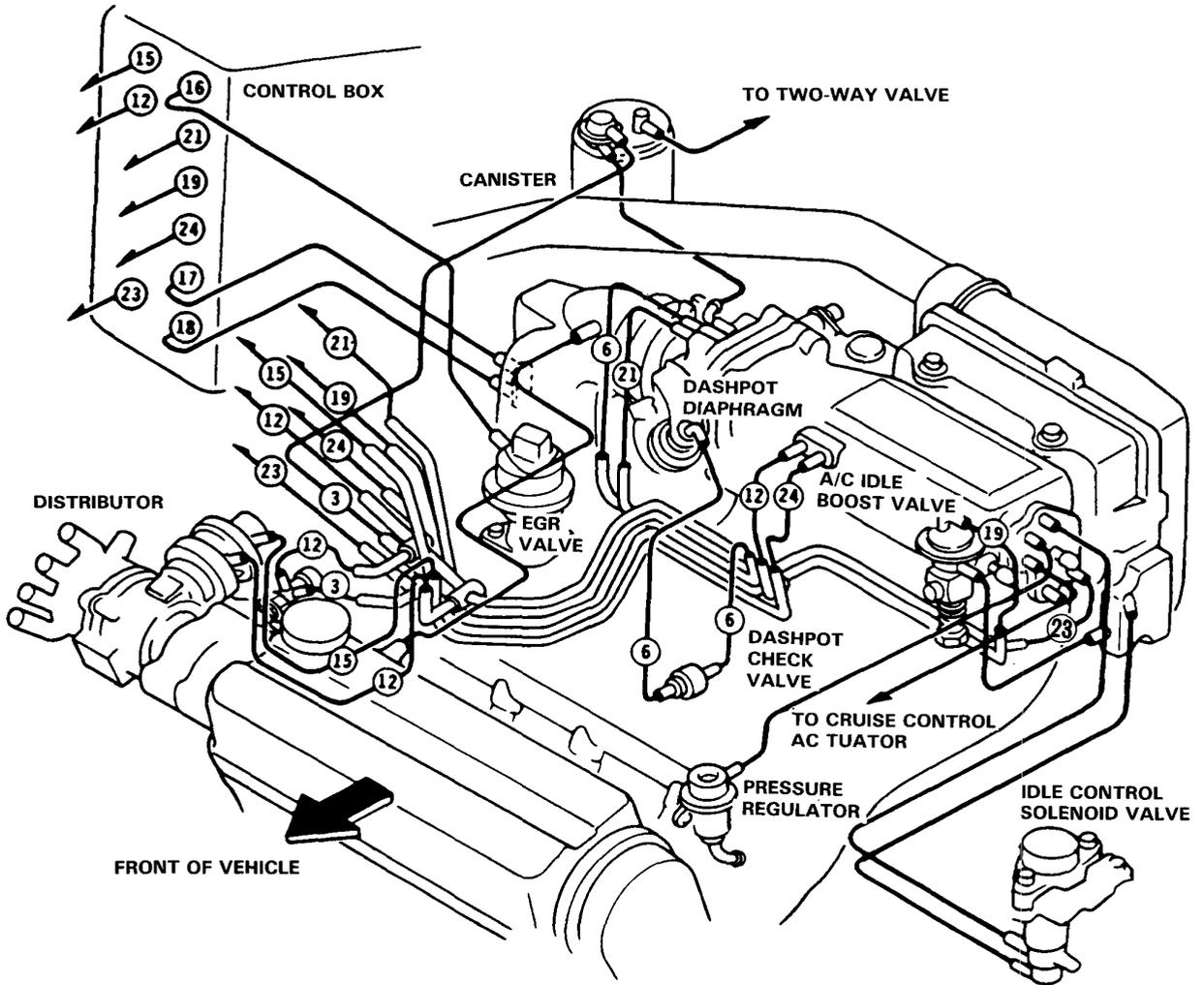


B20A8



Vacuum Connections

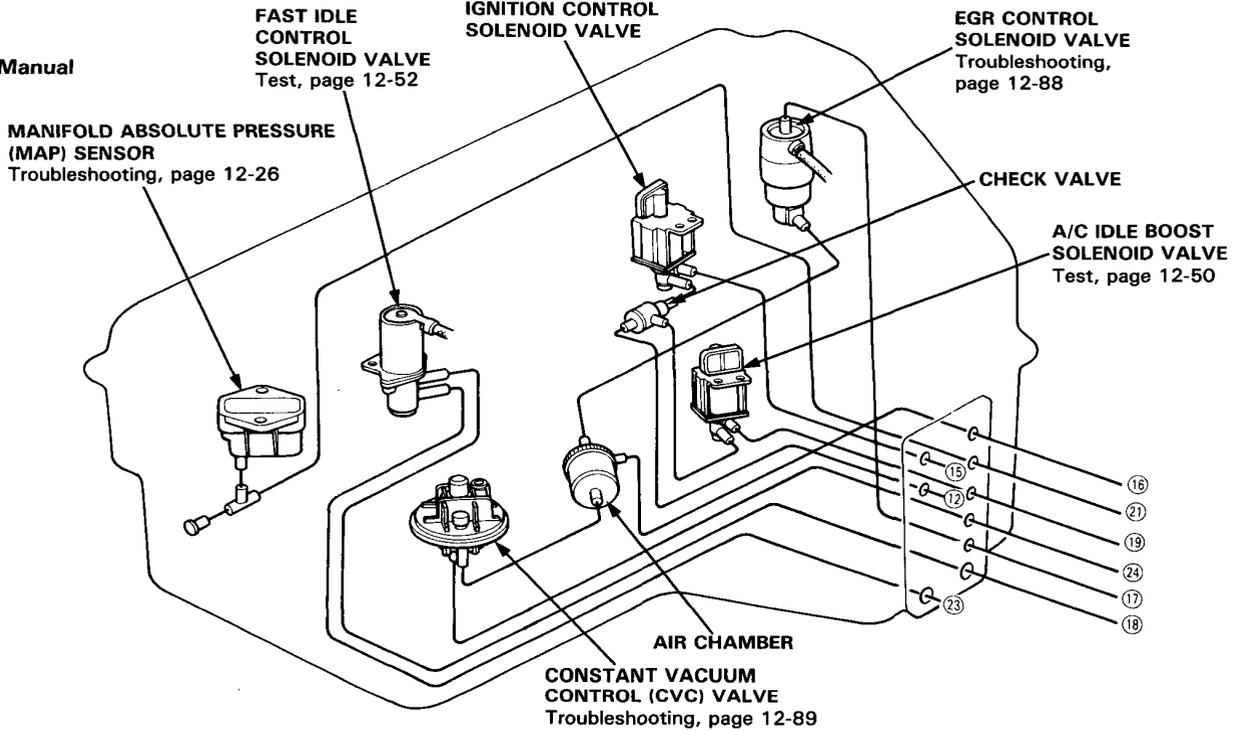
A20A3



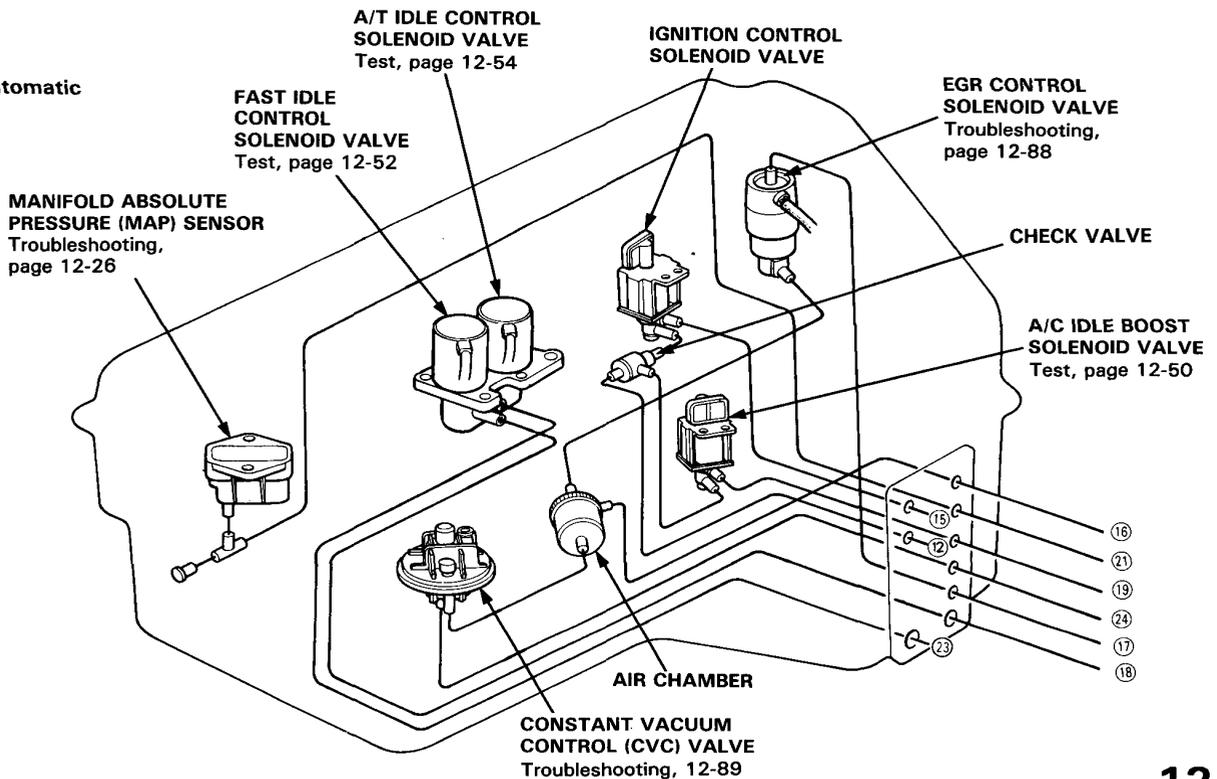


Control Box

Manual

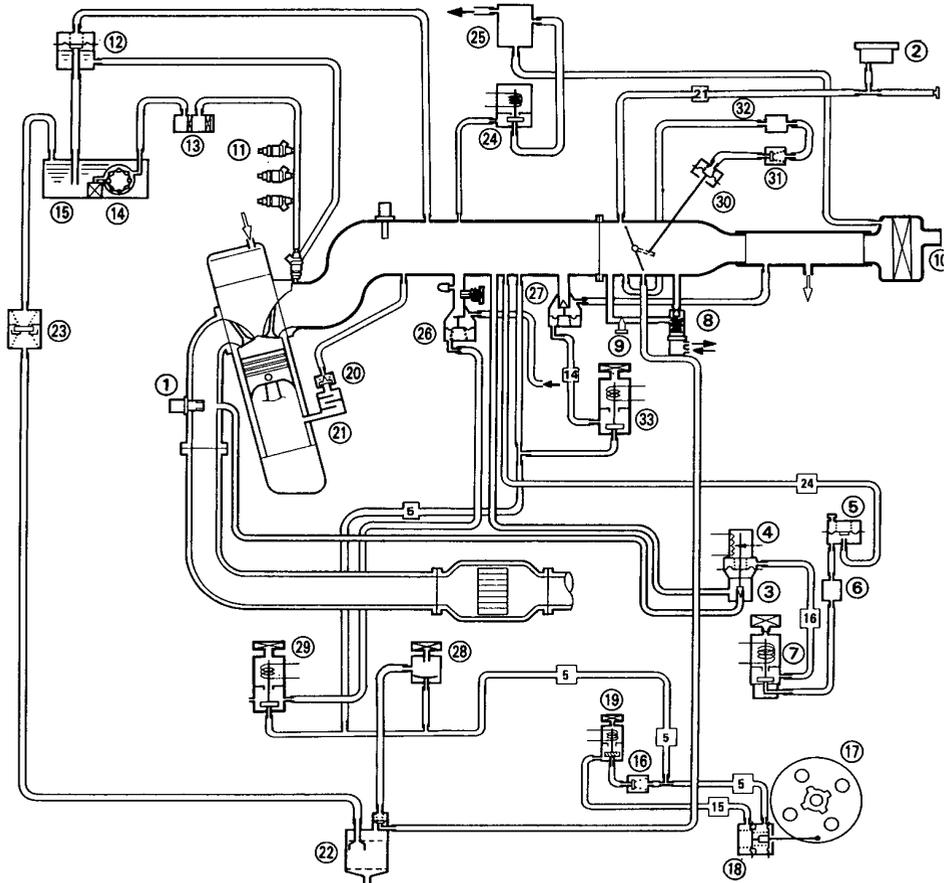


Automatic



Vacuum Connections

B20A8

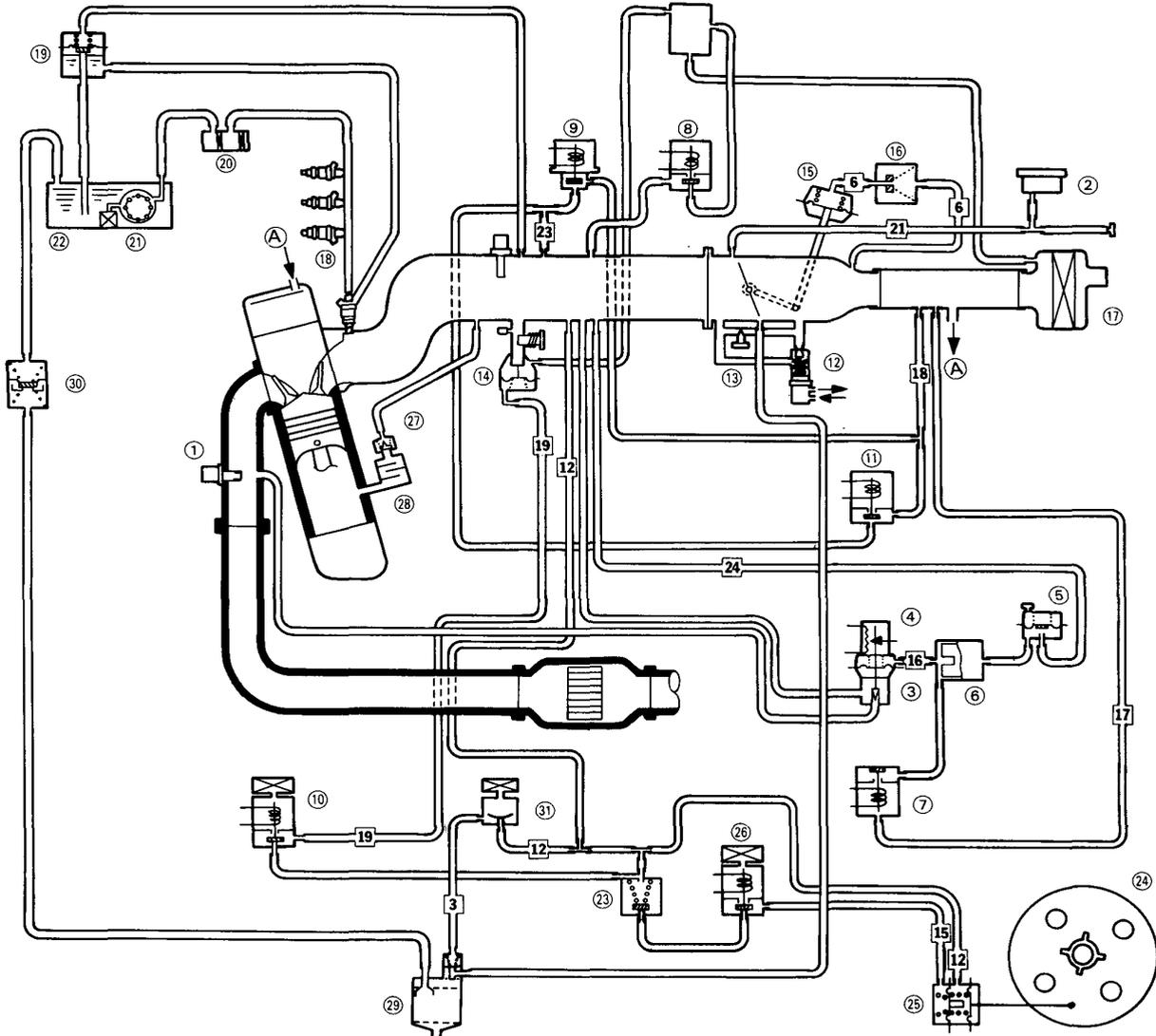


- ① OXYGEN (O₂) SENSOR
- ② MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
- ③ EGR VALVE
- ④ EGR VALVE LIFT SENSOR
- ⑤ CONSTANT VACUUM CONTROL (CVC) VALVE
- ⑥ AIR CHAMBER
- ⑦ EGR CONTROL SOLENOID VALVE
- ⑧ FAST IDLE VALVE
- ⑨ IDLE ADJUSTING SCREW
- ⑩ AIR CLEANER
- ⑪ FUEL INJECTOR
- ⑫ PRESSURE REGULATOR
- ⑬ FUEL FILTER
- ⑭ FUEL PUMP
- ⑮ FUEL TANK
- ⑯ CHECK VALVE
- ⑰ DISTRIBUTOR

- ⑱ VACUUM ADVANCE DIAPHRAGM
- ⑲ IGNITION CONTROL SOLENOID VALVE
- ⑳ PCV VALVE
- ㉑ BREATHER CHAMBER
- ㉒ CHARCOAL CANISTER
- ㉓ TWO-WAY VALVE
- ㉔ IDLE CONTROL SOLENOID VALVE
- ㉕ AIR CHAMBER
- ㉖ A/C IDLE BOOST VALVE
- ㉗ AIR VALVE
- ㉘ THERMO VALVE
- ㉙ A/C IDLE BOOST SOLENOID VALVE
- ㉚ DASHPOT DIAPHRAGM
- ㉛ CHECK VALVE
- ㉜ AIR CHAMBER
- ㉝ AIR VALVE CONTROL SOLENOID VALVE



A20A3

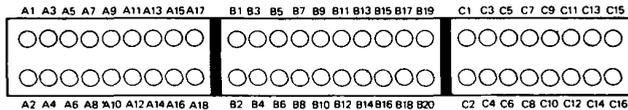
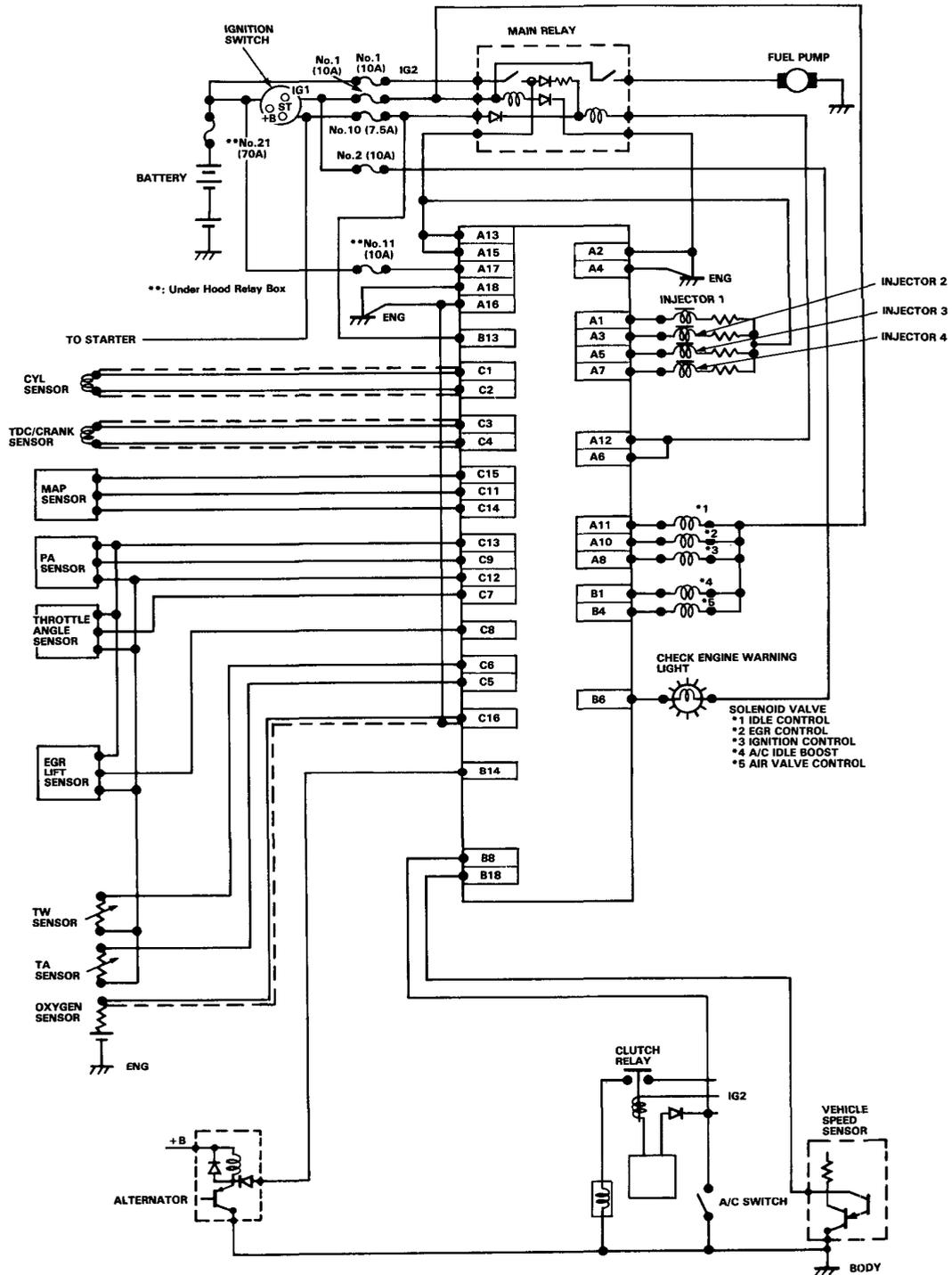


- ① OXYGEN (O₂) SENSOR
- ② MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR
- ③ EGR VALVE
- ④ EGR VALVE LIFT SENSOR
- ⑤ CONSTANT VACUUM CONTROL (CVC) VALVE
- ⑥ AIR CHAMBER
- ⑦ EGR CONTROL SOLENOID VALVE
- ⑧ IDLE CONTROL SOLENOID VALVE
- ⑨ A/T IDLE CONTROL SOLENOID VALVE
- ⑩ A/C IDLE BOOST SOLENOID VALVE
- ⑪ FAST IDLE CONTROL SOLENOID VALVE
- ⑫ FAST IDLE VALVE
- ⑬ IDLE ADJUSTING SCREW
- ⑭ A/C IDLE BOOST VALVE
- ⑮ DASHPOT DIAPHRAGM
- ⑯ DASHPOT CHECK VALVE

- ⑰ AIR CLEANER
- ⑱ FUEL INJECTOR
- ⑲ PRESSURE REGULATOR
- ⑳ FUEL FILTER
- ㉑ FUEL PUMP
- ㉒ FUEL TANK
- ㉓ CHECK VALVE
- ㉔ DISTRIBUTOR
- ㉕ VACUUM ADVANCE DIAPHRAGM
- ㉖ IGNITION CONTROL SOLENOID VALVE
- ㉗ PCV VALVE
- ㉘ BREATHER CHAMBER
- ㉙ CHARCOAL CANISTER
- ㉚ TWO-WAY VALVE
- ㉛ THERMOVALVE

Electrical Connections

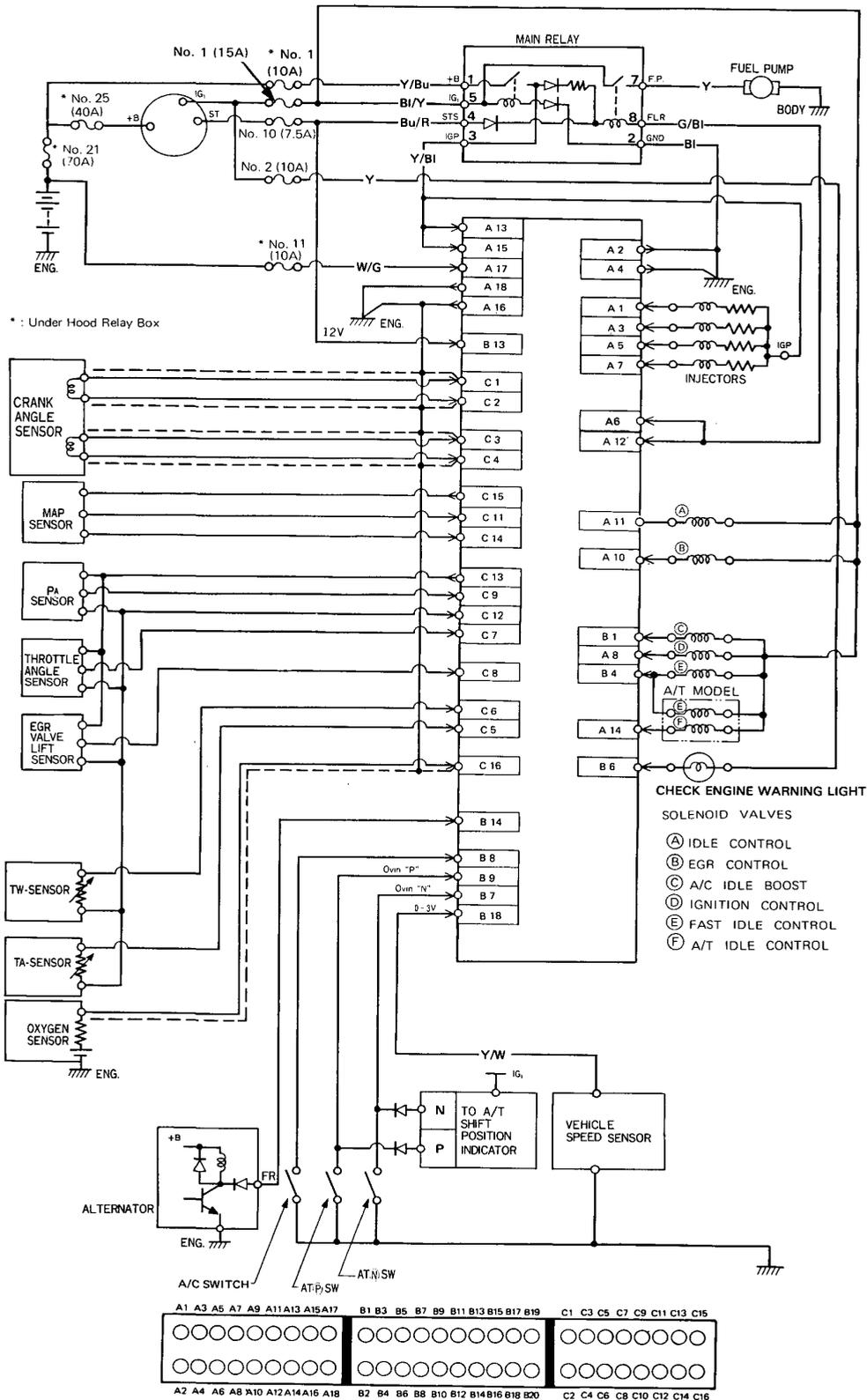
B20A8



TERMINAL LOCATION



A20A3



TERMINAL LOCATION

Symptom-to-System Chart

B20A8

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

PAGE	SYSTEM	PGM-FI					
		ELEC-TRONIC CONTROL UNIT	OXYGEN SENSOR	MANIFOLD ABSOLUTE PRESSURE SENSOR	COOLANT TEMPERATURE SENSOR	THROTTLE ANGLE SENSOR	CRANK ANGLE SENSOR
	SYMPTOM	21, 22	24	26, 28	30	32	34, 36
	CHECK ENGINE WARNING LIGHT TURNS ON	 or 					
	SELF-DIAGNOSIS INDICATOR (LED) BLINKS	① or 	①	③ or ⑤	⑥	⑦	⑧ or ⑨
	ENGINE WON'T START	②					③
	DIFFICULT TO START ENGINE WHEN COLD	BU			①		
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION				②		
	ROUGH IDLE			①			②
	WHEN WARM RPM TOO HIGH		FS	FS	FS	FS	FS
	WHEN WARM RPM TOO LOW						
FREQUENT STALLING	WHILE WARMING UP	BU					
	AFTER WARMING UP	BU					
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	BU	③	②		③	③
	FAILS TEST EMISSION	BU	①				
	LOSS OF POWER	BU		③			

* CODE 2, 4, 11 or exceeds 13: count the number of blinks again. If the indicator is in fact, blinking these codes, substitute a known-good ECU and re-check. If the indication goes away, replace the original ECU.

FS : When the Check engine warning light is on the idle speed will increase due to failsafe operation.

BU : When the Check engine warning light is on with no blinks on the self-diagnosis indicator, the back-up system is in operation.



PGM-FI		IDLE CONTROL	FUEL SUPPLY	AIR INTAKE	SECONDARY AIR SUPPLY SYSTEM	EMISSION CONTROL	
INTAKE AIR TEMPERATURE SENSOR	ATMOSPHERIC PRESSURE SENSOR					EGR CONTROL SYSTEM	OTHER EMISSION CONTROLS
40	42	44	66	75	80	84	82
			①				
③		①					
						②	②
FS	FS	①			②		③
		①		②			
		①				②	
						①	
			①				
							②
			①				②

Symptom-to-System Chart

A20A3

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

PAGE	SYSTEM	PGM-FI					
		ELEC-TRONIC CONTROL UNIT	OXYGEN SENSOR	MANIFOLD ABSOLUTE PRESSURE SENSOR	COOLANT TEMPE-RATURE SENSOR	THROTTLE ANGLE SENSOR	CRANK ANGLE SENSOR
	SYMPTOM	21, 22	24	26, 28	30	32	34, 36
	CHECK ENGINE WARNING LIGHT TURNS ON	 or 					
	SELF-DIAGNOSIS INDICATOR (LED) BLINKS	① or 	①	③ or ⑤	⑥	⑦	⑧ or ⑨
	ENGINE WON'T START	②					③
	DIFFICULT TO START ENGINE WHEN COLD	BU			①		
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION				②		
	ROUGH IDLE			①			②
	WHEN WARM RPM TOO HIGH		FS	FS	FS	FS	FS
	WHEN WARM RPM TOO LOW						
FREQUENT STALLING	WHILE WARMING UP	BU					
	AFTER WARMING UP	BU					
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING	BU	③	②		③	③
	FAILS TEST EMISSION	BU	①				
	LOSS OF POWER	BU		③			

* CODE 2, 4, 11 or exceeds 13: count the number of blinks again. If the indicator is in fact, blinking these codes, substitute a known-good ECU and re-check. If the indication goes away, replace the original ECU.

FS : When the Check engine warning light is on the idle speed will increase due to failsafe operation.

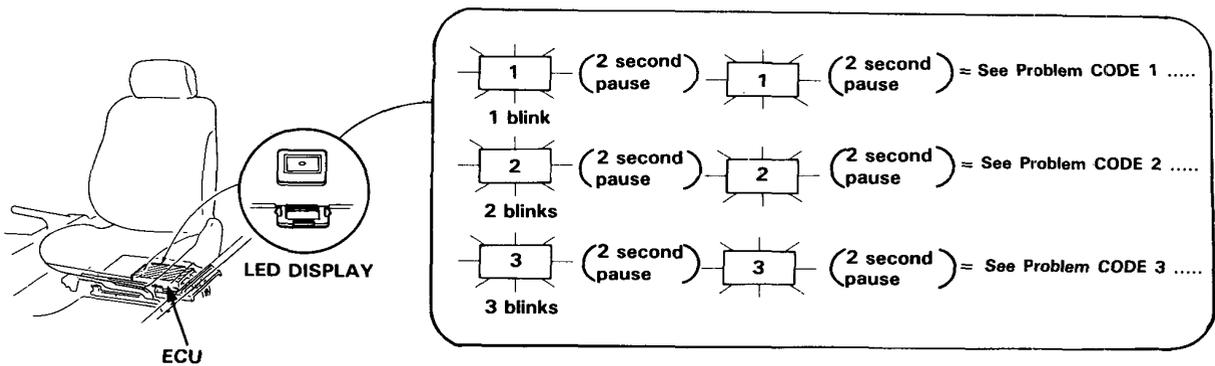
BU : When the Check engine warning light is on with no blinks on the self-diagnosis indicator, the back-up system is in operation.



PGM-FI		IDLE CONTROL	FUEL SUPPLY	AIR INTAKE	EMISSION CONTROL	
INTAKE AIR TEMPERATURE SENSOR	ATMOSPHERIC PRESSURE SENSOR				EGR CONTROL SYSTEM	OTHER EMISSION CONTROLS
40	42	44	66	75	88	82
			①			
③		①				
					②	②
FS	FS	①		②		③
		①		②		
		①			②	
					①	
			①			
						②
			①			②

Troubleshooting Procedures

When the Check engine warning light has been reported on, turn the ignition on, move the front driver's seat to the rear position and observe the LED on the front of the ECU. The LED indicates a system failure code by its blinking frequency.



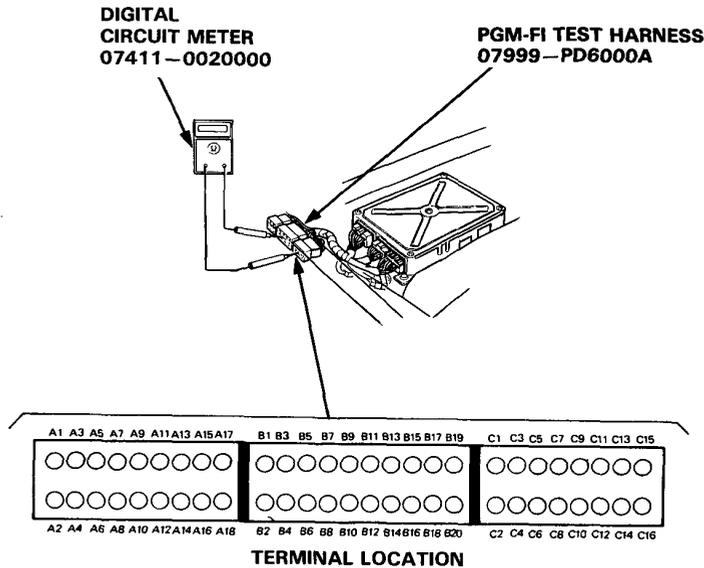
SELF-DIAGNOSIS INDICATOR BLINKS	SYSTEM INDICATED	PAGE
0	ECU	12-21, 22
1	OXYGEN CONTENT	12-24
3	MANIFOLD ABSOLUTE PRESSURE	12-26
5		12-28
6	COOLANT TEMPERATURE	12-30
7	THROTTLE ANGLE	12-32
8	CRANK ANGLE (TDC)	12-34
9	CRANK ANGLE (CYL)	12-36
10	INTAKE AIR TEMPERATURE	12-40
12	EXHAUST GAS RECIRCULATION SYSTEM	12-84, 88
13	ATMOSPHERIC PRESSURE	12-42

CODE 2, 4, 11, or exceeds 13, count the number of blinks again, if the indicator is in fact, blinking these codes, substitute a known-good ECU and re-check. 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.

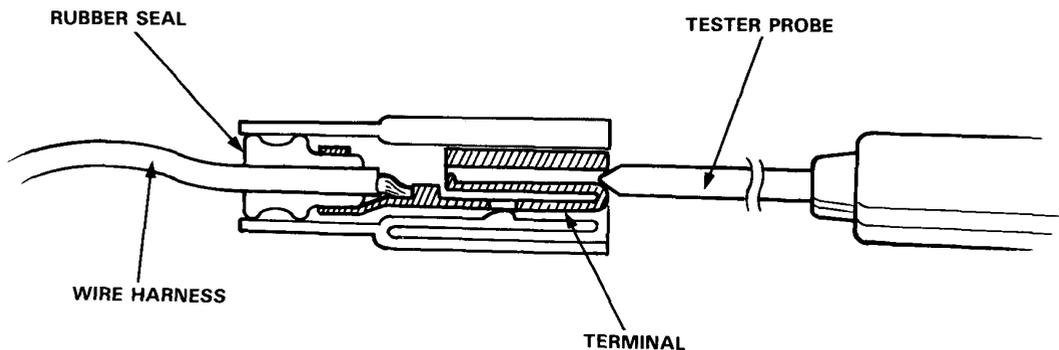


If the inspection for a particular failure code requires the PGM-FI test harness, remove the front driver's seat and connect the PGM-FI test harness and digital circuit meter as shown. Then check the system according to the procedure described for the appropriate code(s) listed on the following pages.



CAUTION :

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



(cont'd)

Troubleshooting Procedures

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

START
(bold type): Describes the conditions or situation to start a troubleshooting flow chart.

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

DECISION Asks you about the result of an action by giving an "answer" and asking did you get the same answer: Yes or No.

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

NOTE:

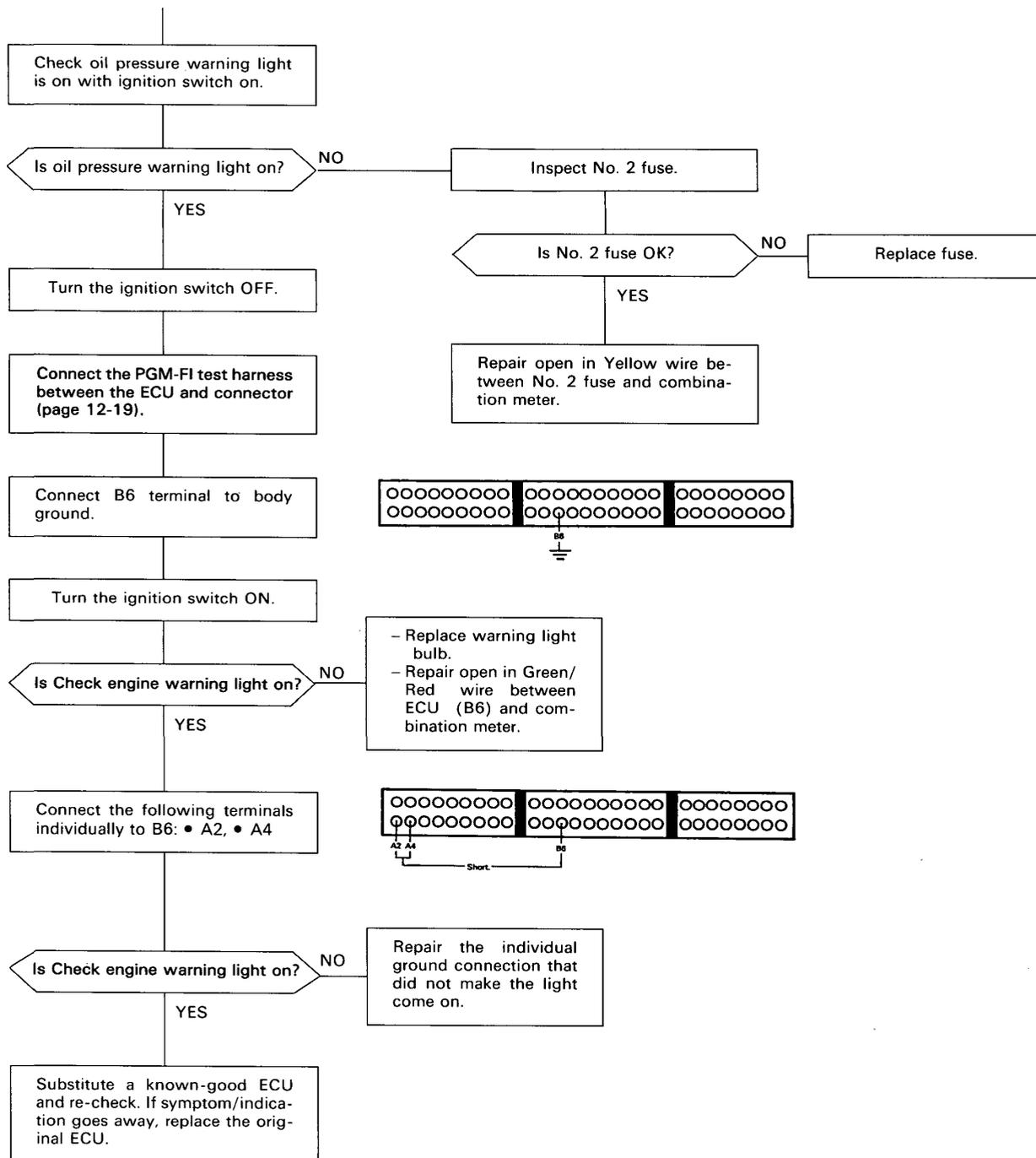
- The term "Intermittent Failure" is used several times in these charts. It simply means a system may have had a failure, but it checks out OK through all your tests. You may need to road test the car to reproduce the failure or if the problem was a loose connection, you may have unknowingly solved it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



PGM-FI Control System

Troubleshooting Flow Chart — ECU

Check engine warning light isn't on for 2 seconds after ignition is first turned on.

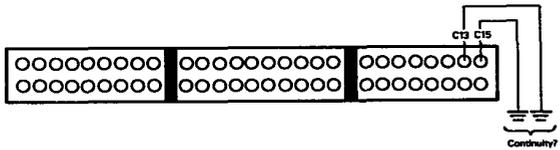
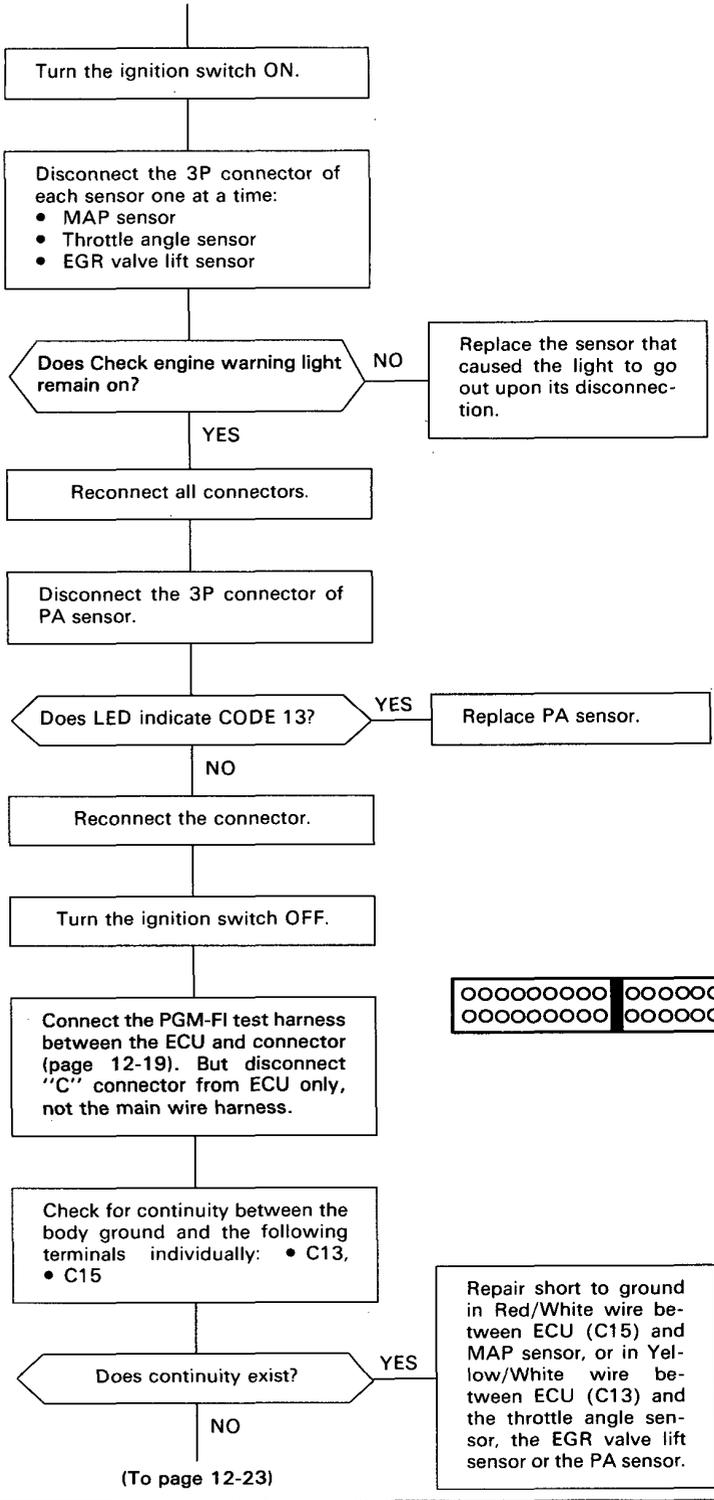


(cont'd)

PGM-FI Control System

Troubleshooting Flow Chart — ECU (cont'd)

- Check engine warning light is on.
- LED doesn't blink.





(From page 12-22)

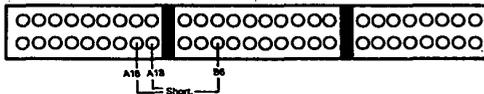
Reconnect "C" connector to ECU and disconnect "B" connector from the ECU only, not the main wire harness.

Turn the ignition switch ON.

Is Check engine warning light on?
YES
NO

Repair short to ground in Green/Red wire between ECU (B6) and combination meter.

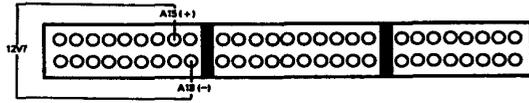
Connect the following terminals individually to B6: • A16, • A18



Is Check engine warning light on?
NO
YES

Repair the individual ground connection that did not make the light come on.

Measure voltage between A15 (+) terminal and A18 (-) terminal.



Is there battery voltage?
NO
YES

- Repair open in Yellow/Black wire between ECU (A15) and main relay.
- Check main relay and wiring connectors at main relay (page 12-73).

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

PGM-FI Control System

Troubleshooting Flow Chart — Oxygen Sensor



- Check engine warning light has been reported on.
- LED indicates CODE 1.

Turn the ignition switch OFF.

Remove No.11 fuse in the underhood relay box for 10 seconds to reset ECU.

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

Hold engine at 1500—2000 rpm for 10 minutes.
NOTE: Do not close throttle completely during this time.

Is Check engine warning light on?

NO

Intermittent failure
(test drive may be necessary).

YES

Inspect fuel pressure at the fuel filter (page 12-71).

Is pressure as specified?

NO

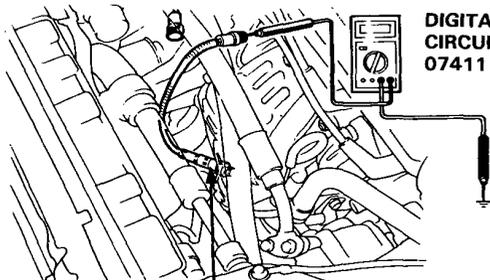
Repair fuel supply system (page 12-66 thru 12-74).

YES

Disconnect engine wire harness from O₂ sensor.

Warm up engine to normal operating temperature again.

(To page 12-25)



DIGITAL
CIRCUIT METER
07411-0020000

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



(From page 12-24)

Measure voltage between the connector terminal and body ground.

Is voltage above 0.6 V at wide open throttle and below 0.4 V at idle?

NO

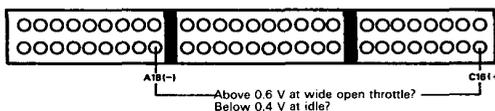
Replace O₂ sensor.

YES

Stop engine.

Connect the PGM-FI test harness between the ECU and connector (page 12-19).

Restart and warm up engine to normal operating temperature.



Measure voltage between C16 (+) and A18 (-) terminals.

Is voltage above 0.6 V at wide open throttle and below 0.4 V at idle?

NO

Repair short or open in White wire between ECU (C16) and O₂ sensor.

YES

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

PGM-FI Control System

Troubleshooting Flow Chart — MAP Sensor



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

Turn the ignition switch OFF.

Remove No.11 fuse in the under-hood relay box for 10 seconds to reset ECU.

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

Is Check engine warning light on?

NO

Intermittent failure
(test drive may be necessary).

YES

Turn the ignition switch OFF.

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

Turn the ignition switch ON.

Measure voltage between Red (+) terminal and Green (-) terminal.

Is there approx. 5 V?

NO

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

Is there approx. 5 V?

YES

Repair open in Green/White wire between ECU (C14) and MAP sensor.

Measure voltage between White (+) terminal and Green (-) terminal.

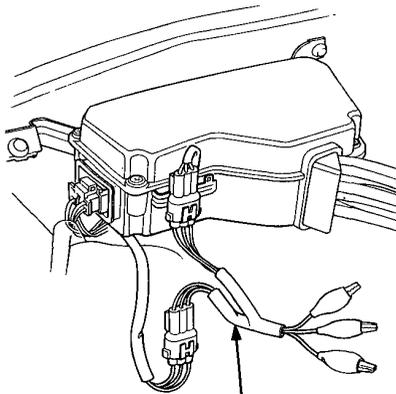
YES

Turn the ignition switch OFF.

(To page 12-27)

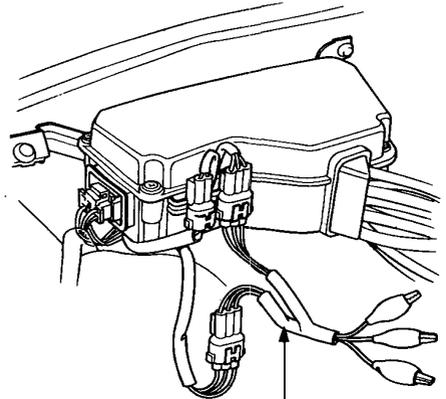
(To page 12-27)

B20A8

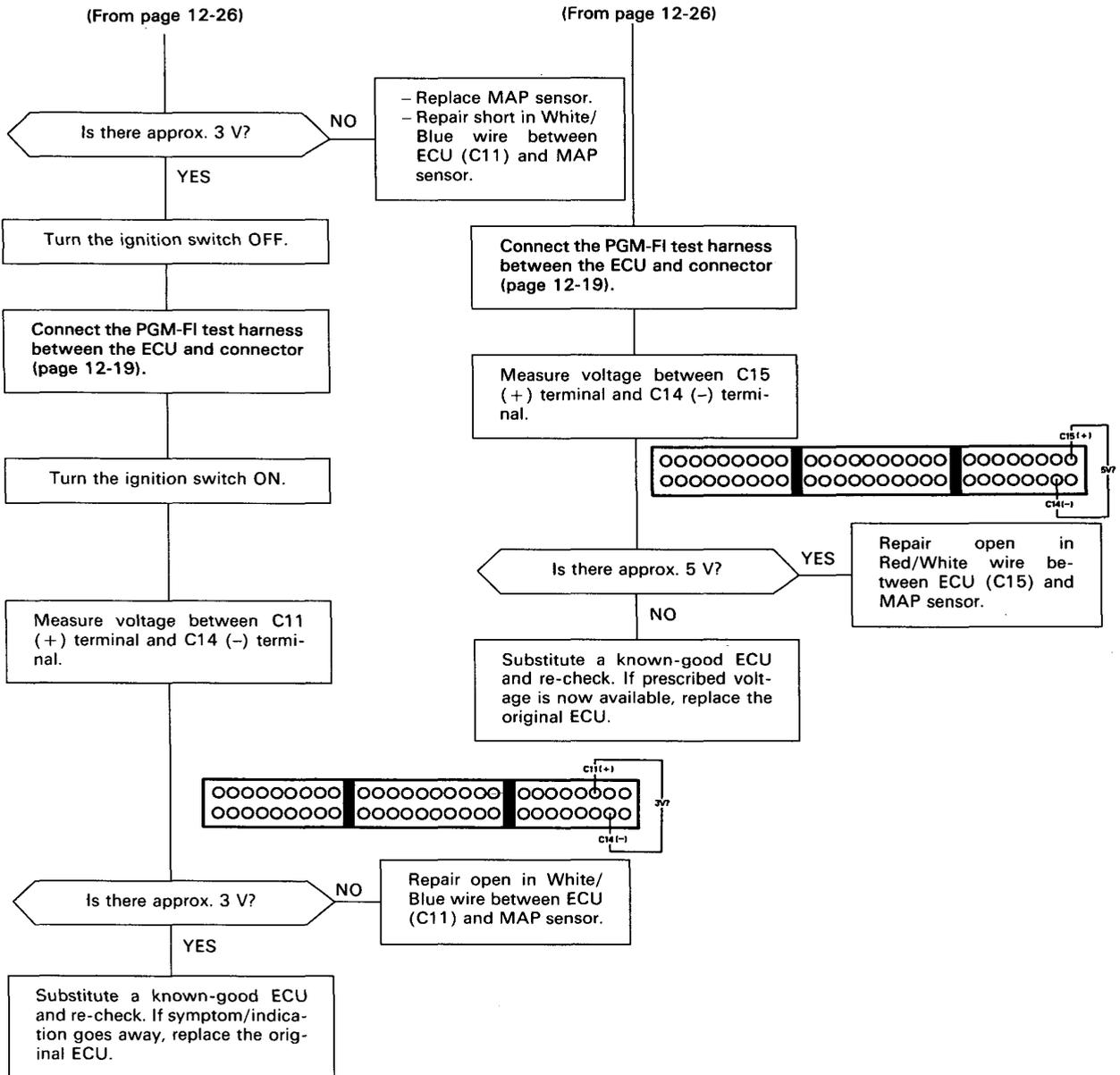


**TEST HARNESS
07GMJ-ML80100**

A20A3



**TEST HARNESS
07GMJ-ML80100**



(cont'd)

PGM-FI Control System

Troubleshooting Flow Chart — MAP Sensor (cont'd)



- Check engine warning light has been reported on.
- LED indicates CODE 5.

Turn the ignition switch OFF.

Remove No. 11 fuse in the underhood relay box for 10 seconds to reset ECU.

Start engine and keep engine rpm at idle.

Is Check engine warning light on?
Does LED indicate CODE 5?

NO

Intermittent failure
(test drive may be necessary).

YES

Stop engine.

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

Start engine.

Is there vacuum?

NO

Repair as necessary.

YES

Connect vacuum pump to #21 hose.

Apply vacuum and check for a leak.

Is vacuum maintained?

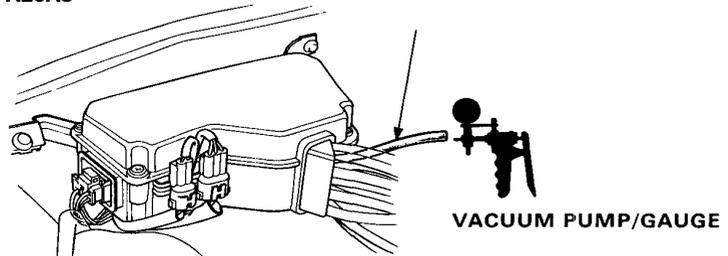
NO

Replace #21 hose.

YES

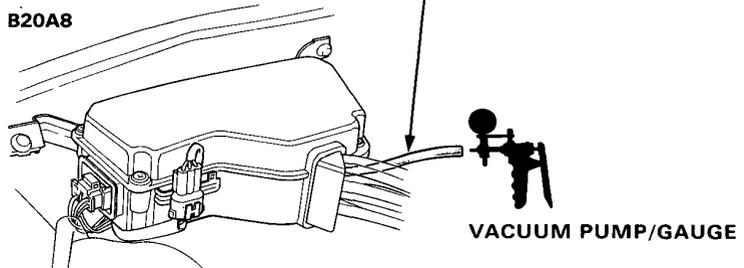
A20A3

#21 HOSE



B20A8

#21 HOSE



(To page 12-29)



(From page 12-28)

Stop engine.

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

Turn the ignition switch ON.

Measure voltage between White (+) terminal and Green (-) terminal.

Is there approx. 3 V?

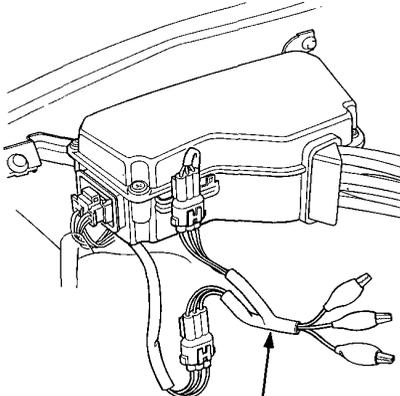
NO

Replace MAP sensor.

YES

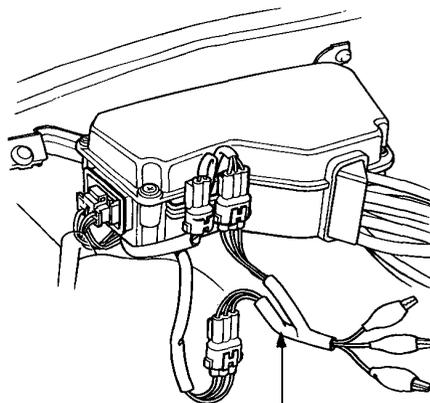
Substitute a known-good ECU and re-check. If symptom/indication goes away, replace the original ECU.

B20A8



**TEST HARNESS
07GMJ-ML80100**

A20A3



**TEST HARNESS
07GMJ-ML80100**

PGM-FI Control System

Troubleshooting Flow Chart — TW Sensor



- Check engine warning light is on.
- LED indicates CODE 6.

Turn the ignition switch OFF.

Remove No.11 fuse in the under-hood relay box for 10 seconds to reset ECU.

Turn the ignition switch ON.

Is Check engine warning light on?

NO

Intermittent failure.
(test drive may be necessary).

YES

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

Disconnect the 2P connector on the TW sensor.

Measure resistance between the 2 terminals on the TW sensor.

Is there 200–400 Ω ?

NO

Replace TW sensor.

YES

Measure voltage between Yellow/Green (+) terminal and body ground.

Is there approx. 5 V?

NO

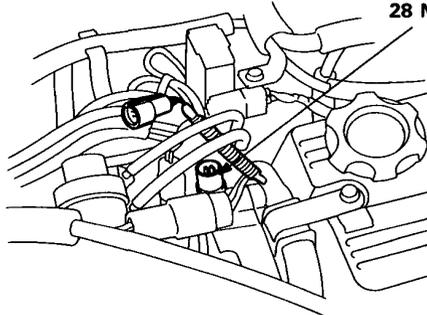
Turn the ignition switch OFF.

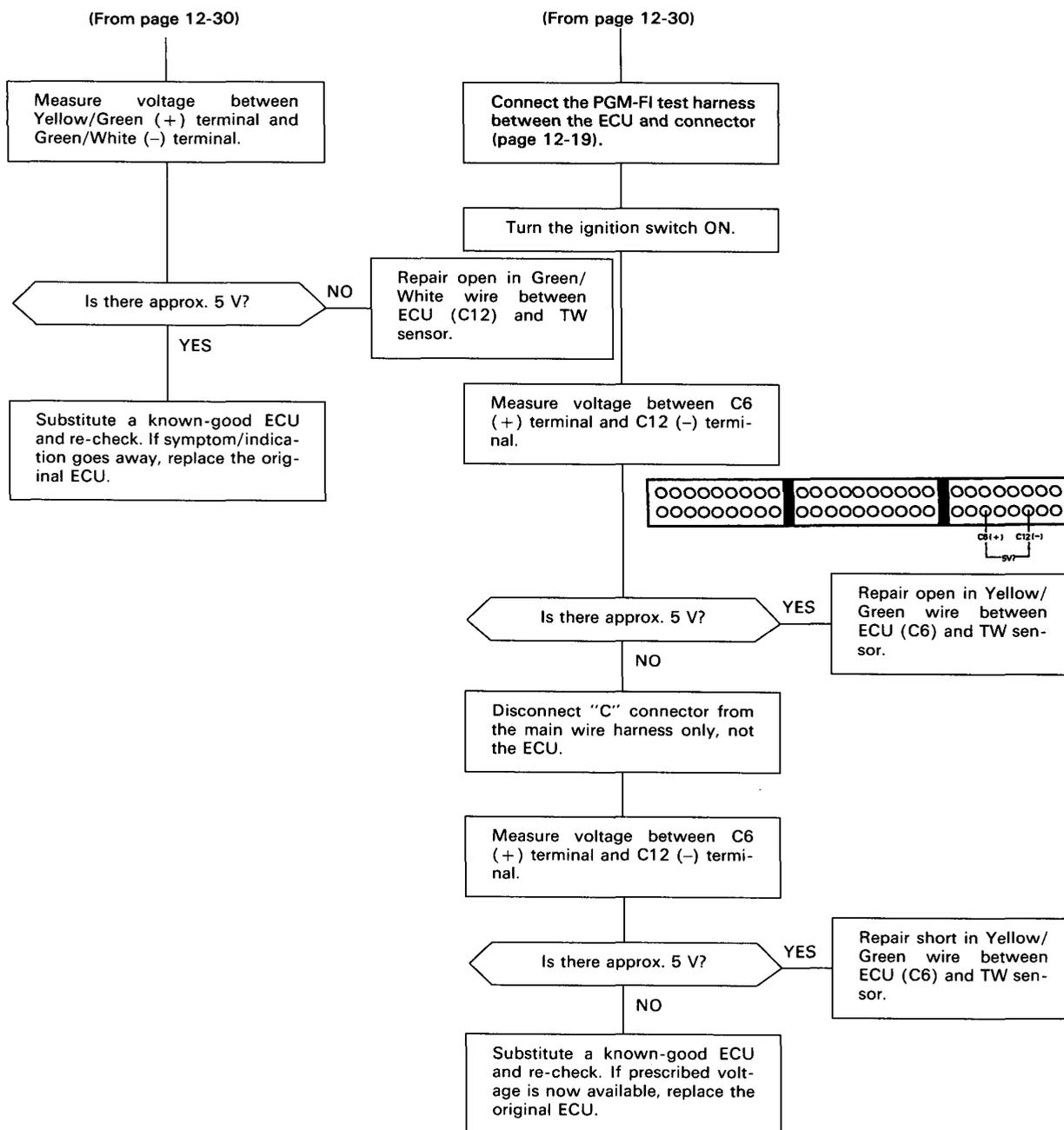
YES

(To page 12-31)

(To page 12-31)

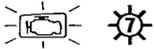
TW SENSOR
28 N·m (2.8 kg-m, 20 lb-ft)



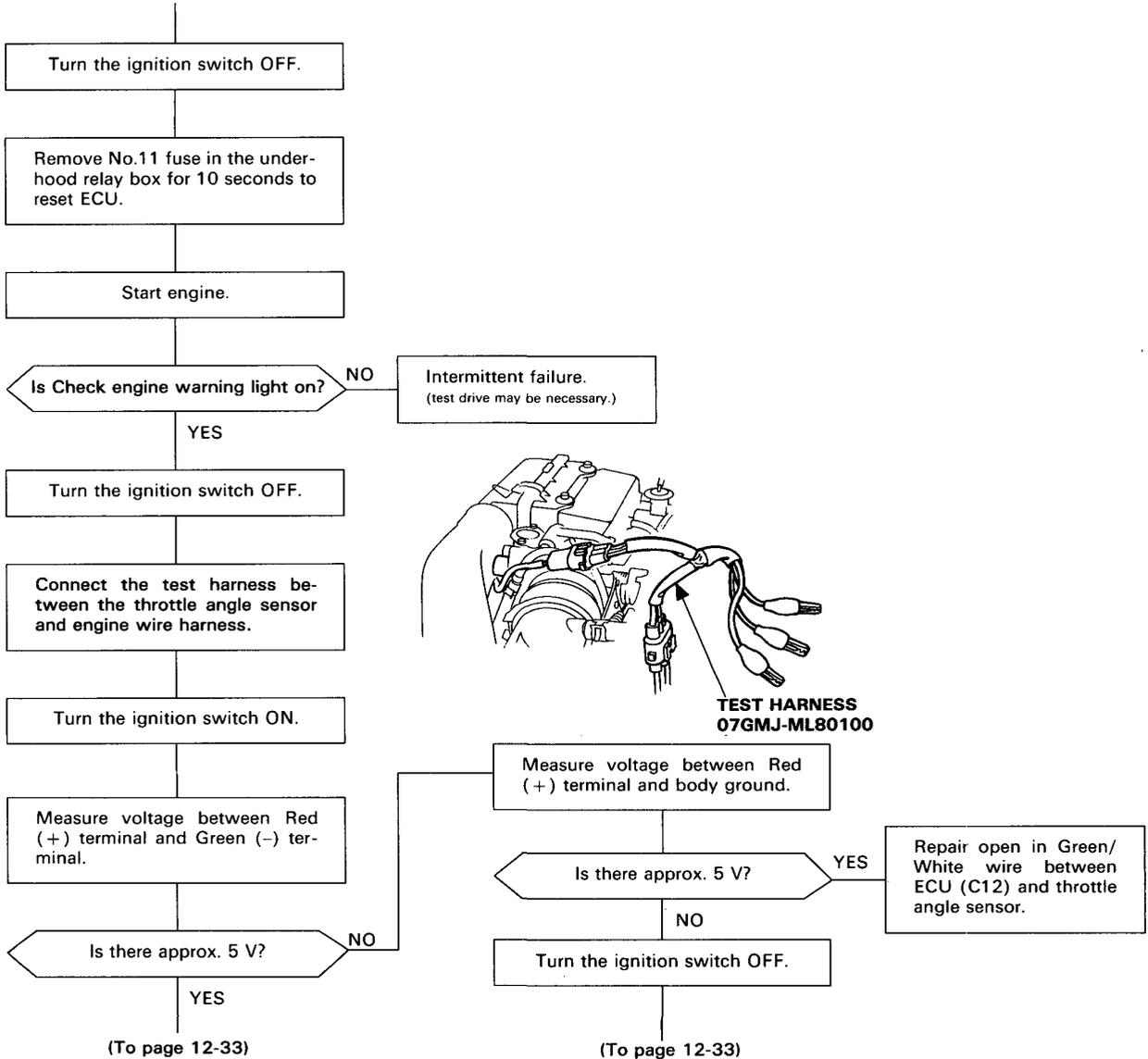


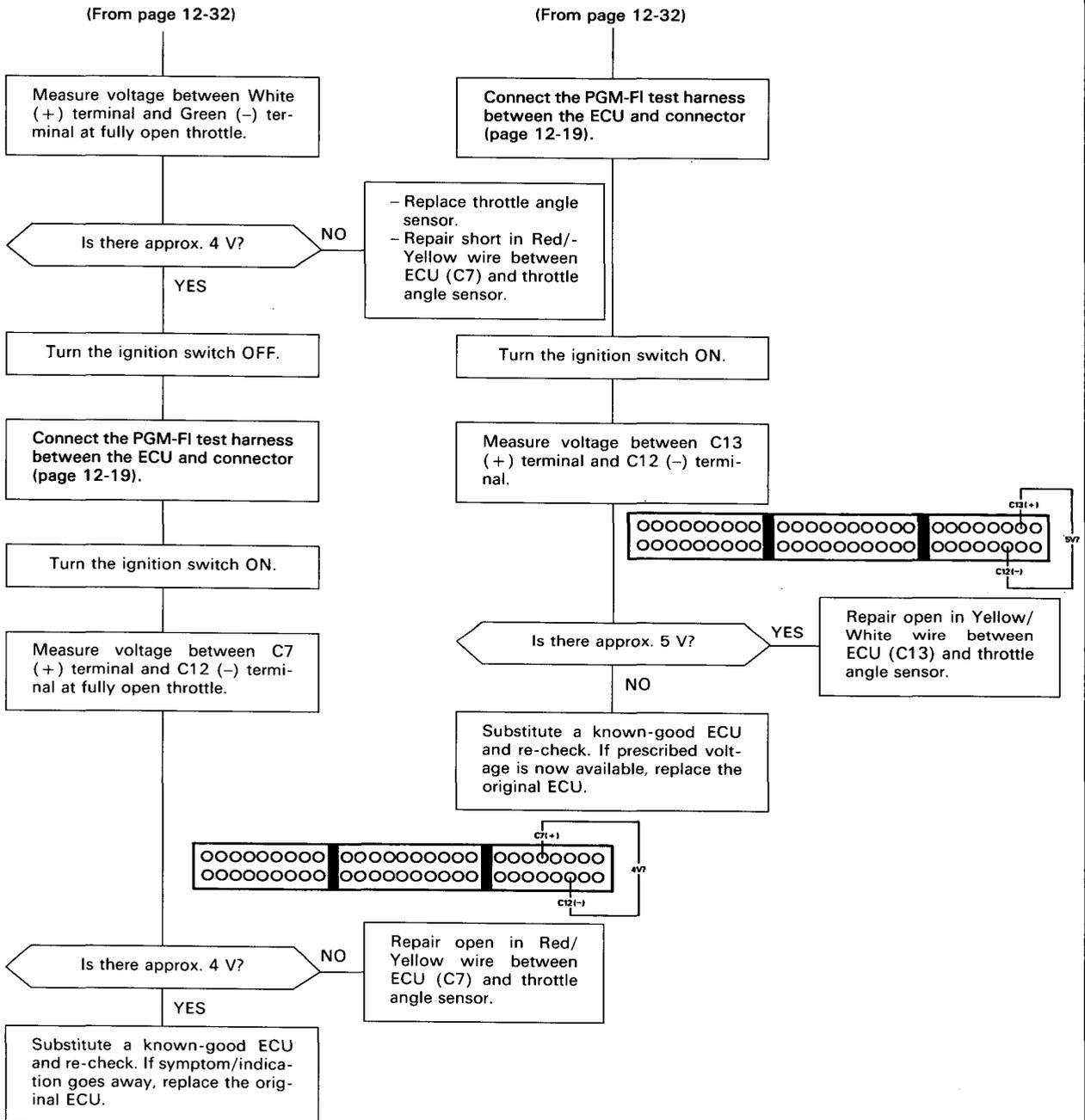
PGM-FI Control System

Troubleshooting Flow Chart — Throttle Angle Sensor



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





PGM-FI Control System

Troubleshooting Flow Chart — Crank Angle Sensor



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

Turn the ignition switch OFF.

Remove No.11 fuse in the underhood relay box for 10 seconds to reset ECU.

Start engine.

Is Check engine warning light on?

NO

Intermittent failure
(test drive may be necessary).

YES

Stop engine.

Disconnect the 4P connector on the crank angle sensor.

Measure resistance between White/Blue terminal and Orange/Blue terminal.

Is there 650—850 Ω ?

NO

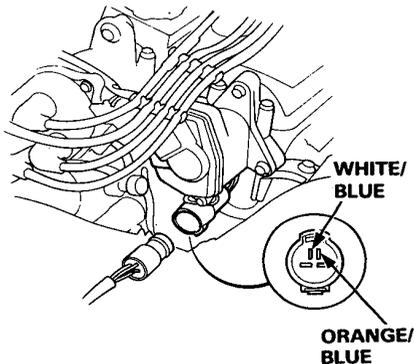
A20A3:
Overhaul crank angle sensor (page 12-37).
B20A8:
Replace crank angle sensor.

YES

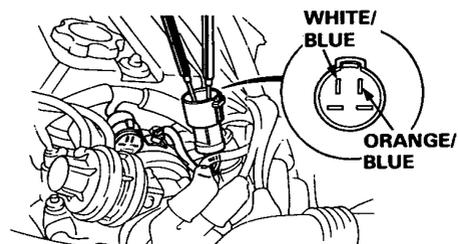
Check for continuity to body ground on White/Blue terminal and Orange/Blue terminal individually.

(To page 12-35)

B20A8

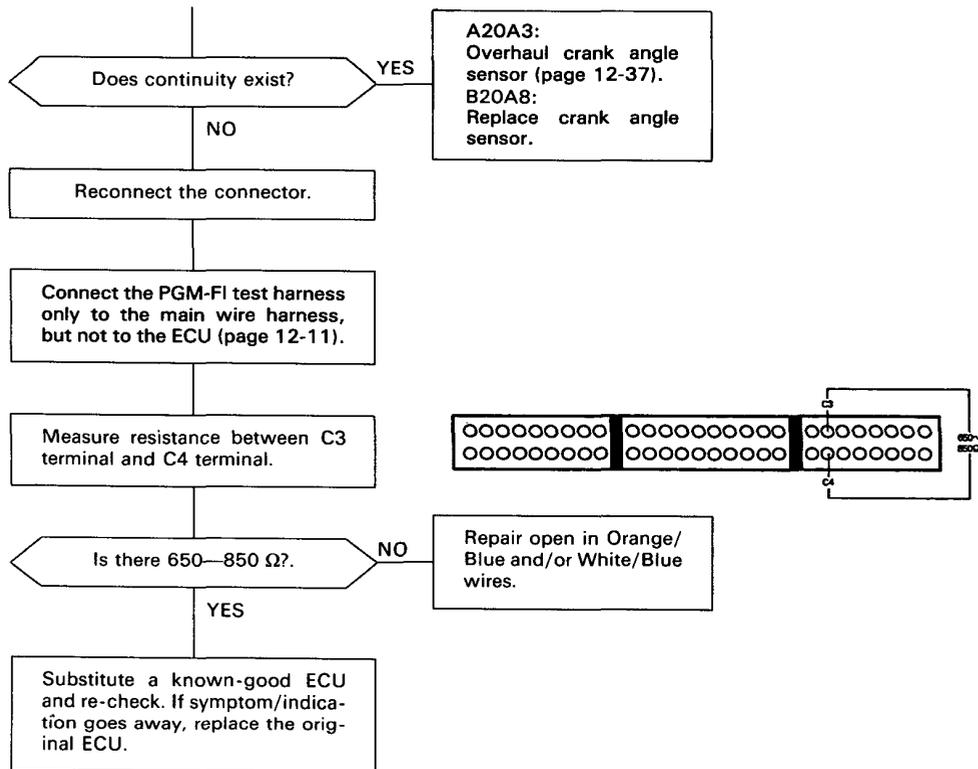


A20A3





(From page 12-34)



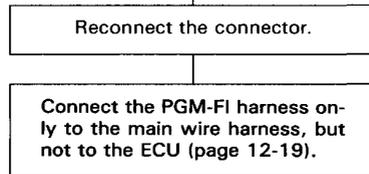
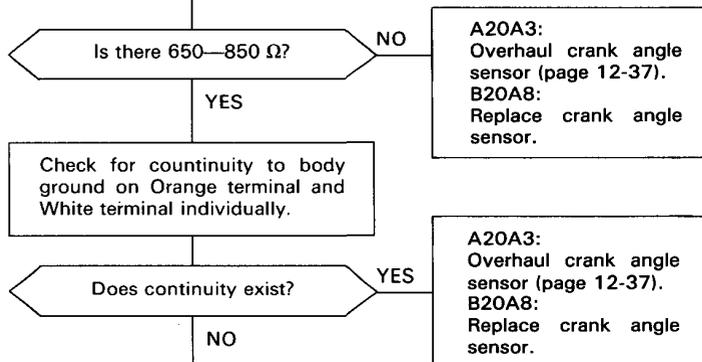
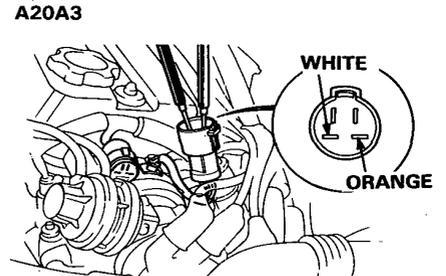
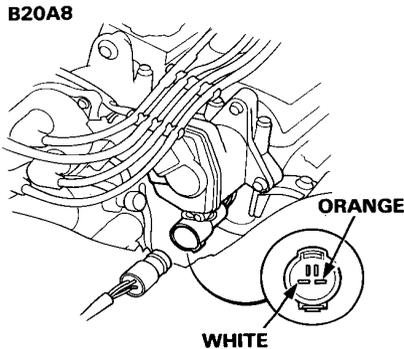
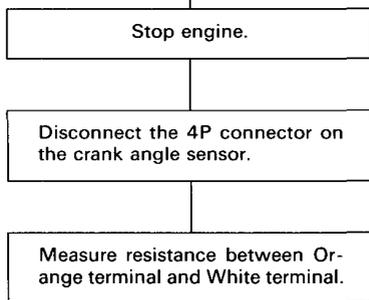
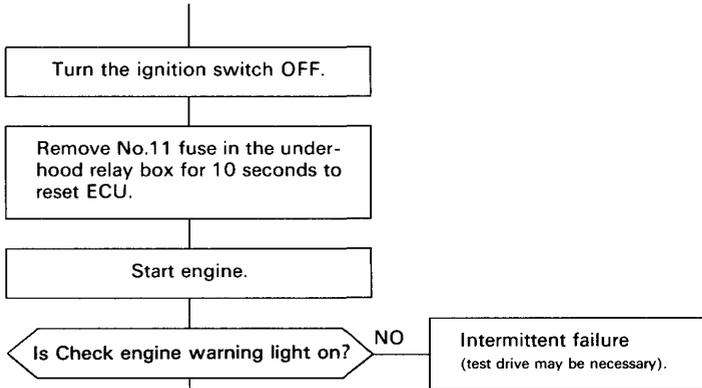
(cont'd)

PGM-FI Control System

Troubleshooting Flow Chart — Crank Angle Sensor (cont'd)



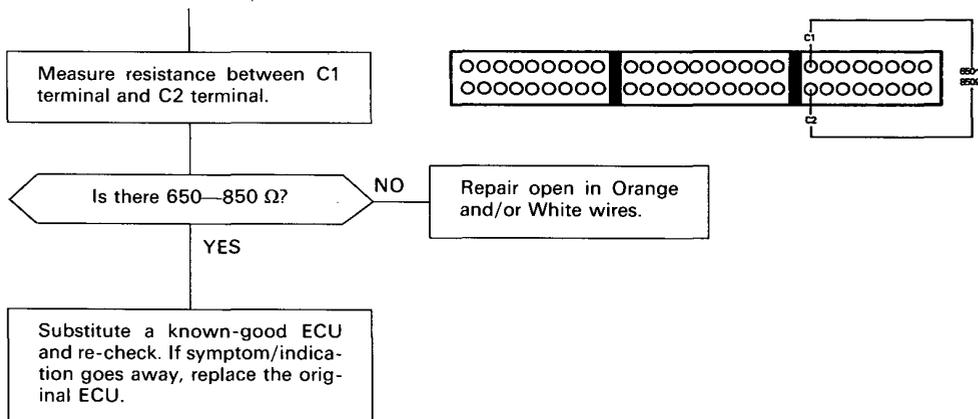
- Check engine warning light has been reported on.
- Led indicates CODE 9.



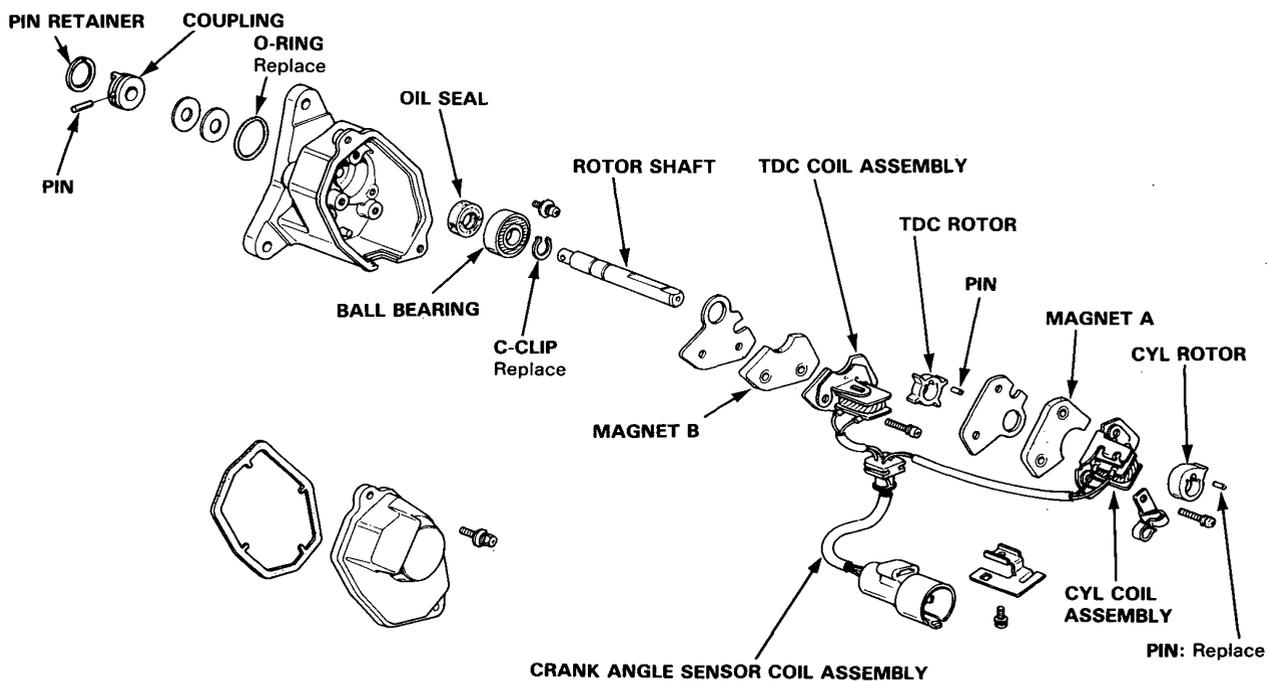
(To page 12-37)



(From page 12-36)



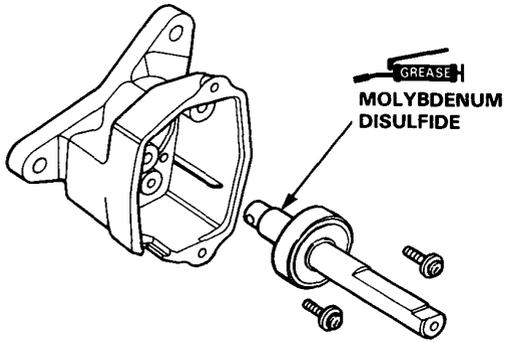
Crank Angle Sensor Disassembly (A20A3)



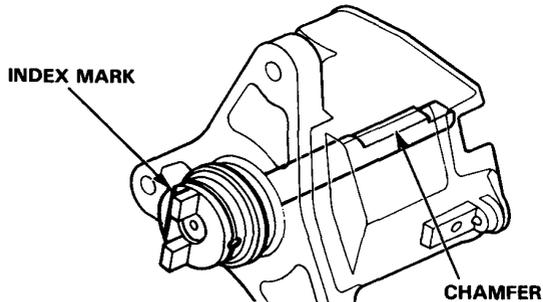
PGM-FI Control System

Crank Angle Sensor Reassembly

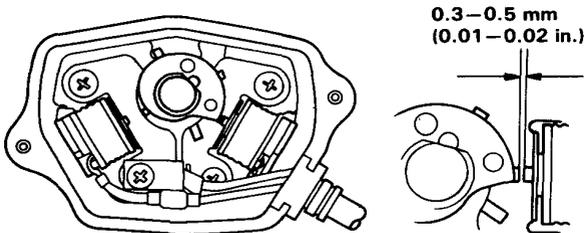
1. Apply a molybdenum disulfide grease to the tip of the rotor shaft, then install it on the sensor housing with 4 mm screws.



2. Install the coupling with its index mark facing in the direction shown, install the pin, and install the pin retainer.

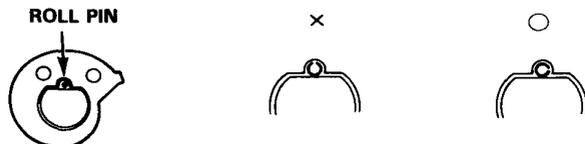


3. Install a new C-clip on the rotor shaft.
4. Install the TDC coil assembly and TDC rotor so that the air gap is 0.3–0.5 mm (0.01–0.02 in.), then install the CYL coil assembly and CYL rotor in the same way.



NOTE:

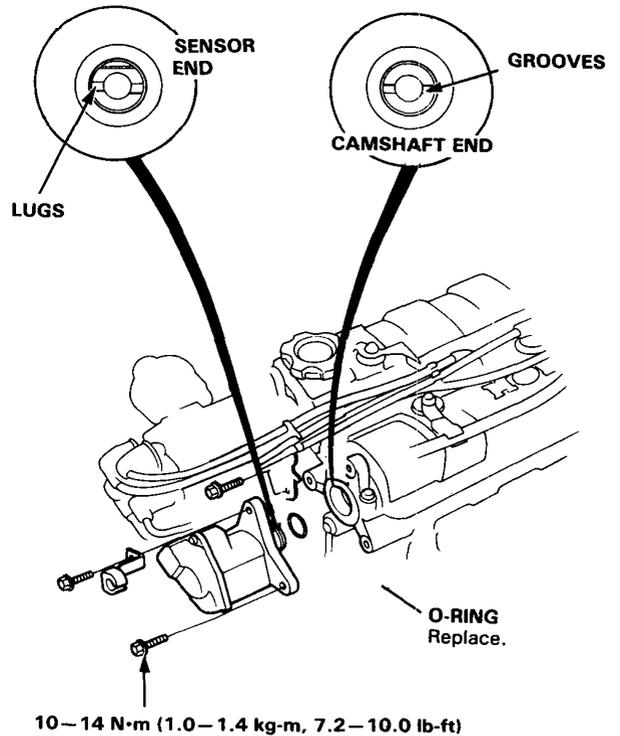
- Install the rotors with the part number facing up.
- Install the roll pin so that it faces as shown below.



Crank Angle Sensor Installation

1. Install a new O-ring on the sensor housing.
2. Slip the sensor into the position.

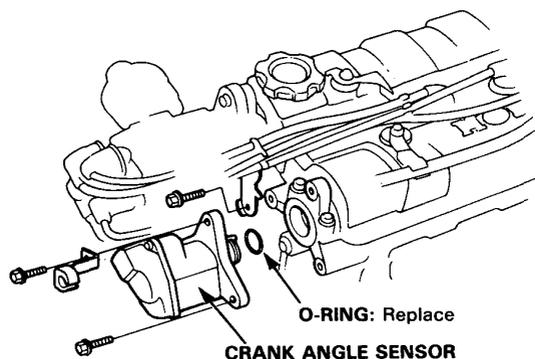
NOTE: The lugs on the end of the sensor and its mating grooves in the camshaft end are both offset to eliminate the possibility of installing the distributor 180° out of time.



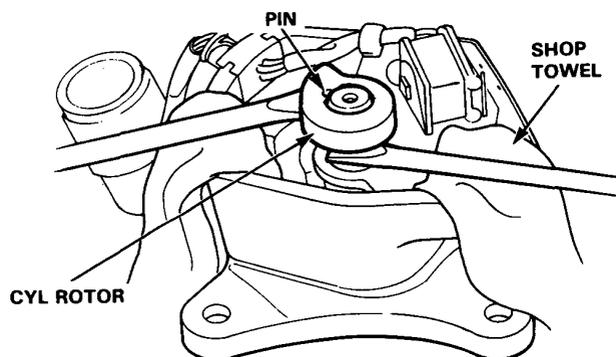


Crank Angle Sensor Disassembly

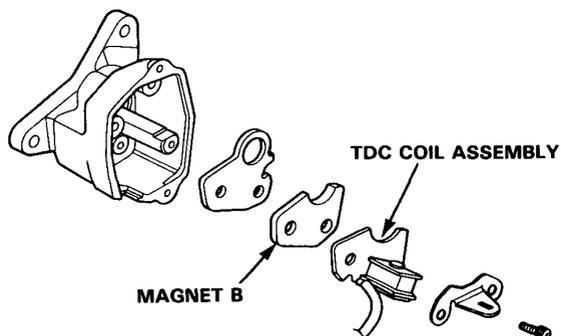
1. Remove the crank angle sensor from the engine.



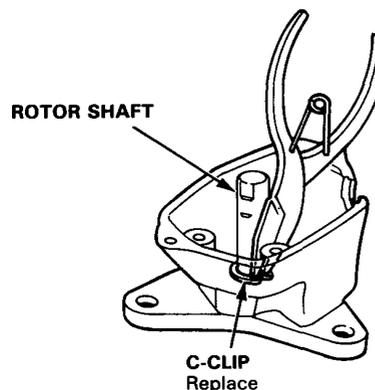
2. Carefully pry up the CYL rotor by using two screwdrivers as shown. Do not damage the CYL rotor.



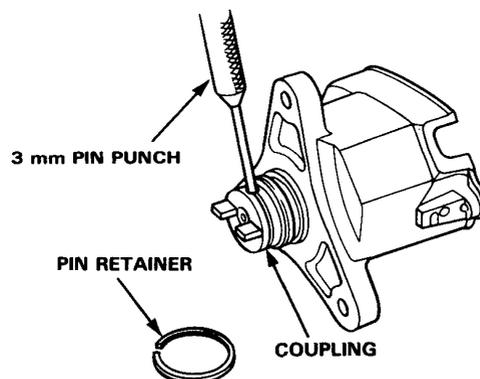
3. Pull the CYL coil assembly and magnet A out from the rotor shaft by removing the screws.
4. Pry up the TDC rotor in the same order of prying up the CYL rotor.
5. Pull the TDC coil assembly and magnet B out from the rotor shaft by removing the screws.



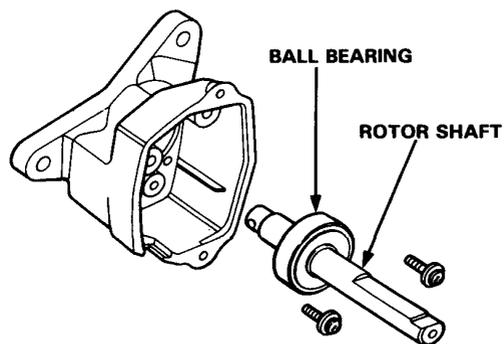
6. Remove the C-clip.



7. Slide off the pin retainer being careful not to stretch it.
8. Separate the coupling from the shaft by removing the roll pin as shown.



9. Remove the ball bearing and rotor shaft as an assembly by removing the screws.



PGM-FI Control System

Troubleshooting Flow Chart — TA Sensor



- Check engine warning light is on.
- LED indicates CODE 10.

Turn the ignition switch OFF.

Remove No.11 fuse in the under-hood relay box for 10 seconds to reset ECU.

Turn the ignition switch ON.

Is Check engine warning light on?

NO
Intermittent failure
(test drive may be necessary).

YES

Disconnect the 2P connector on the TA sensor.

Measure resistance between the 2 terminals on the TA sensor.

Is there 1—4 k Ω ?

NO
Replace TA sensor.

YES

Measure voltage between White/Red (+) terminal and body ground.

Is there approx. 5 V?

NO
Turn the ignition switch OFF.

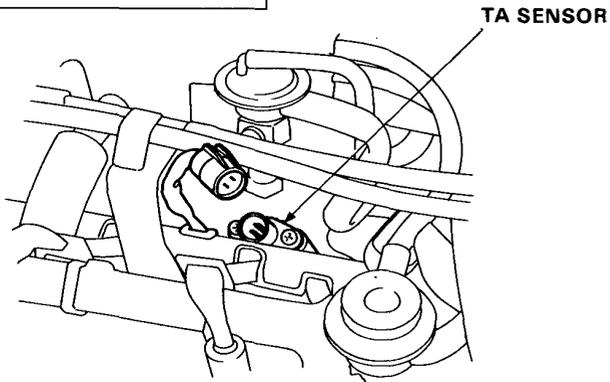
YES

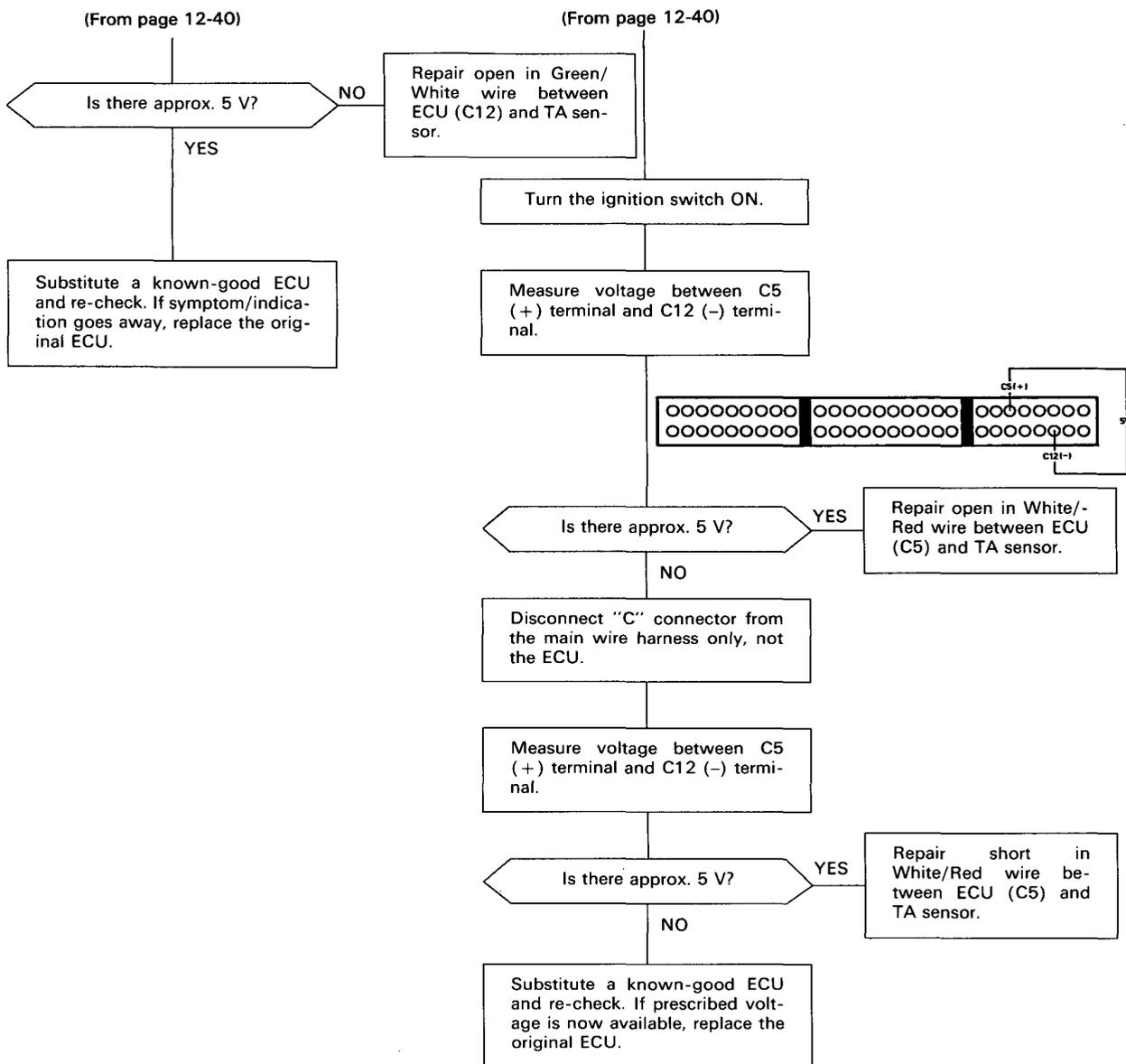
Measure voltage between White/Red (+) terminal and Green/White (-) terminal.

Connect the PGM-FI test harness between the ECU and connector (page 12-19).

(To page 12-41)

(To page 12-41)





PGM-FI Control System

Troubleshooting Flow Chart — PA Sensor



- Check engine warning light is on.
- LED indicates CODE 13.

Turn the ignition switch OFF.

Remove No.11 fuse in the underhood relay box for 10 seconds to reset ECU.

Turn the ignition switch ON.

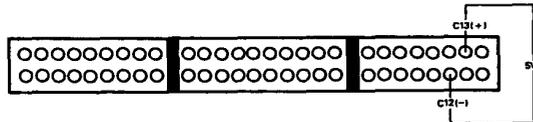
Is Check engine warning light on? **NO** Intermittent failure (test drive may be necessary).

YES
Turn the ignition switch OFF.

Connect the PGM-FI test harness between the ECU and connector (page 12-19).

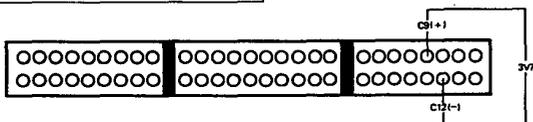
Turn the ignition switch ON.

Measure voltage between C13 (+) terminal and C12 (-) 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
Measure voltage between C9 (+) terminal and C12 (-) terminal.



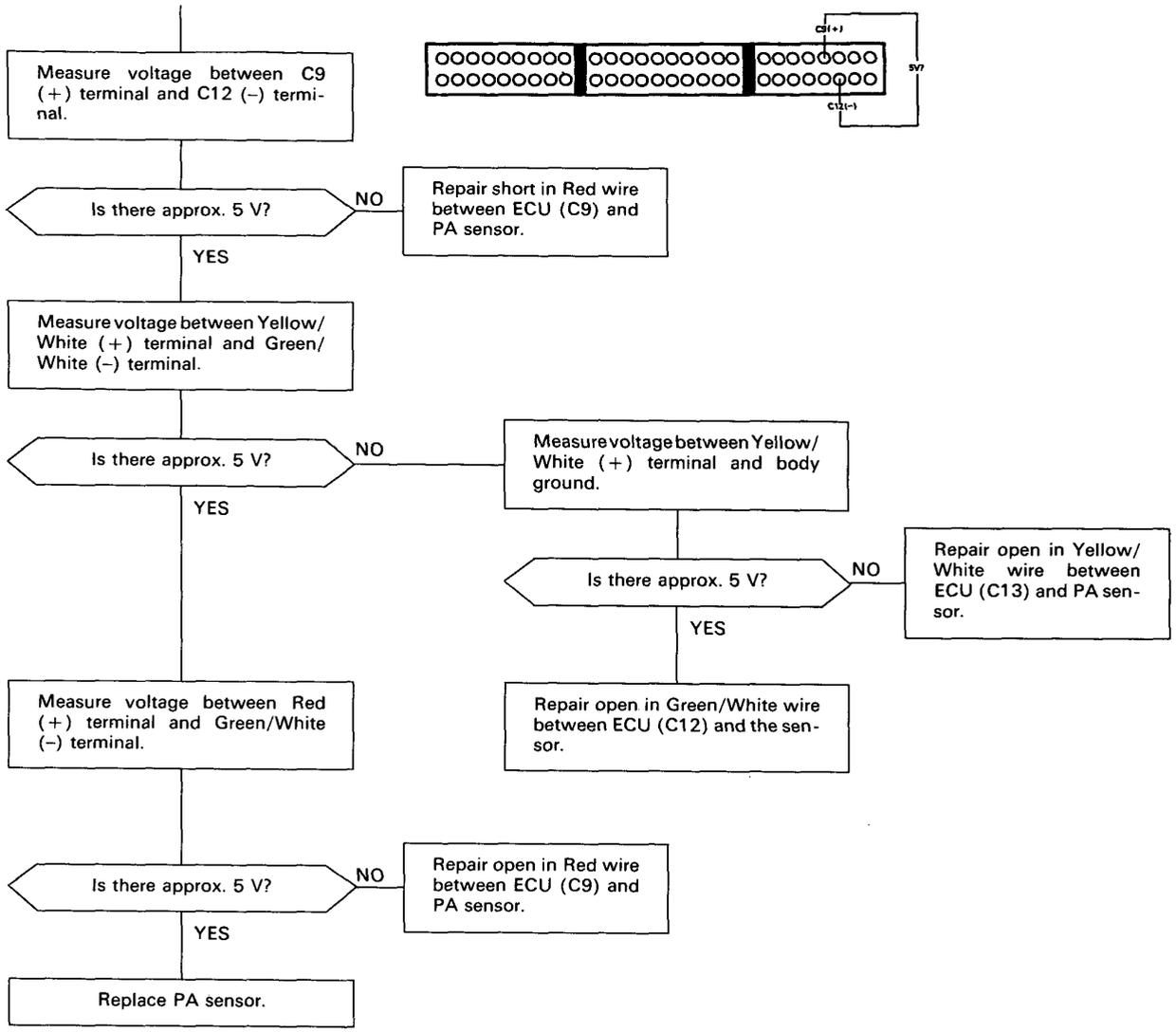
Is there approx. 3 V? **YES** Substitute a known-good ECU and recheck. If symptom/indication goes away, replace the original ECU.

NO
Disconnect the main wire harness from PA sensor.

(To page 12-43)



(From page 12-42)



Idle Control System

Symptom-to-Sub System Chart

B20A8

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

PAGE	SUB SYSTEM	IDLE ADJUSTING SCREW	IDLE CONTROL	A/C IDLE BOOST
		65	48	50
WHEN COLD	Fast idle speed is not as specified [1,200–2,000 min ⁻¹ (rpm)]			
WHEN WARM RPM TOO HIGH	Idle speed is above specified min ⁻¹ (rpm)		③	③
WHEN WARM RPM TOO LOW	Idle speed is below specified min ⁻¹ (rpm)		①	
	Idle speed does not increase after initial start up.		①	
	Idle speed drops when blipping throttle with electrical load			
	Idle speed drops when air conditioner is ON			①

- * — If by-pass passages are blocked, a low idle speed will result.
 — If hoses or by-pass passages are leaking, a high idle speed will result.



STARTER SIGNAL	ALTERNATOR FR SIGNAL	AIR CONDITIONING SIGNAL	VEHICLE SPEED SIGNAL	FAST IDLE VALVE	HOSES AND CONNECTIONS
56	57	59	61	64	*
				①	
				②	①
					②
②					
	①				
		②			

Idle Control System

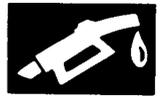
Symptom-to-Sub System Chart

A20A3

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

PAGE	SUB SYSTEM	IDLE ADJUSTING SCREW	IDLE CONTROL	FAST IDLE CONTROL	A/T IDLE CONTROL	A/C IDLE BOOST
	SYMPTOM	65	48	52	54	50
WHEN COLD	Fast idle speed is not as specified (1,200–2,000 min ⁻¹ (rpm))			②		
WHEN WARM RPM TOO HIGH	Idle speed is above specified rpm		③	③	③	③
WHEN WARM RPM TOO LOW	Idle speed is below specified rpm		①			
	Idle speed does not increase after initial start up.		①			
	Idle speed drops when blipping throttle with electrical load					
	On models with automatic transmission, the idle speed drops in gear				①	
	Idle speed drops when air conditioner is ON					①

- * — If by-pass passages are blocked, a low idle speed will result.
 — If hoses or by-pass passages are leaking, a high idle speed will result.

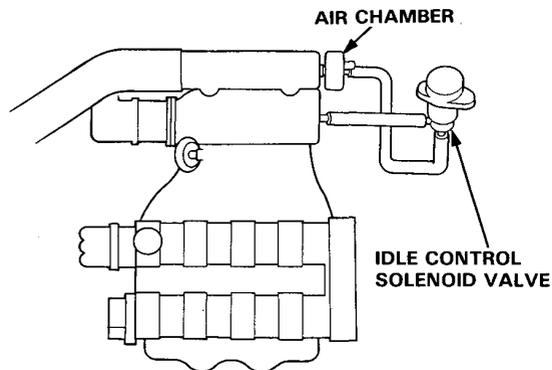


STARTER SIGNAL	ALTERNATOR FR SIGNAL	A/T SHIFT POSITION SIGNAL	AIR CONDITIONING SIGNAL	FAST IDLE VALVE	HOSES AND CONNECTIONS
56	57	62	59	64	*
				①	
				②	①
					②
②					
	①				
		②			
			②		

Idle Control System

Idle Control Test

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

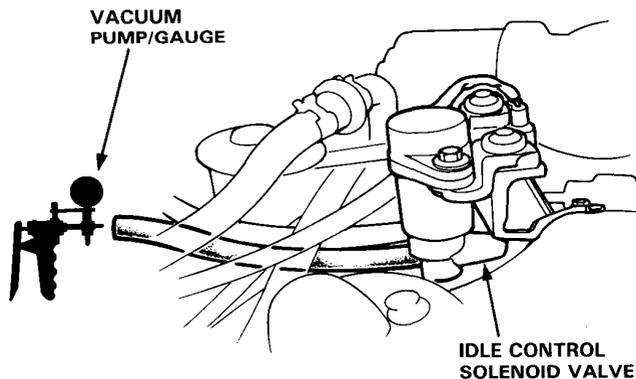


2. Disconnect the lower vacuum hose of the idle control solenoid valve from the air chamber and connect a vacuum gauge to the vacuum hose.

3. Start the engine and check for vacuum.

NOTE: Check within 10 seconds.

There should be vacuum.



- If there is no vacuum, go to solenoid valve test I (page 12-49).

4. Raise engine speed above 1,500 min⁻¹ (rpm).

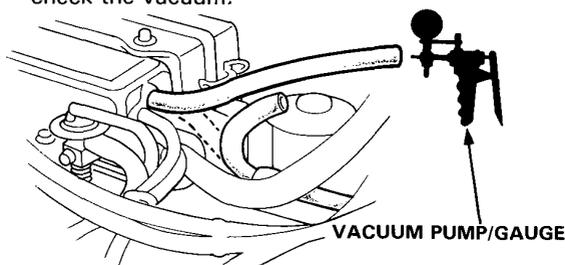
There should be no vacuum.

- If there is vacuum, go to solenoid valve test II (page 12-49).
- If there is no vacuum, the test is complete.



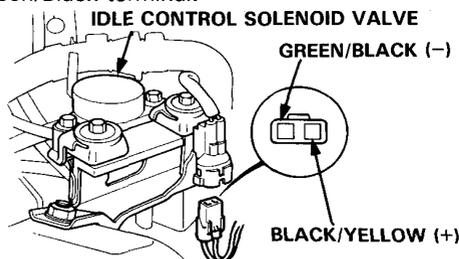
Solenoid Valve Test I:

1. Start the engine and allow to idle.
2. Disconnect the upper vacuum hose of the idle control solenoid valve from the intake manifold and check the vacuum.



- If there is no vacuum, check the vacuum port.

3. Stop the engine.
4. Disconnect the 2P connector on the idle control solenoid valve.
5. Attach the positive probe of the voltmeter to the Black/Yellow terminal and the negative probe to the Green/Black terminal.

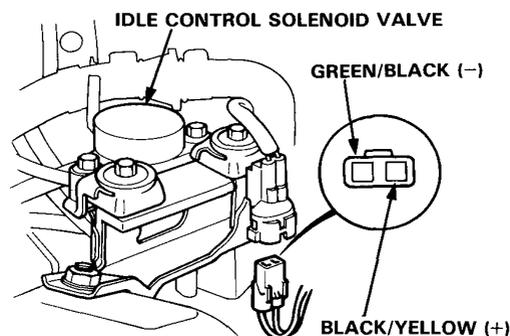


6. Within 10 seconds after restarting the engine, check the voltage at idle.

- If there is voltage, replace the solenoid valve and re-test.
- If there is no voltage, attach the positive probe of the voltmeter to the Black/Yellow terminal of the connector, and the negative probe to body ground. Within 10 seconds after restarting the engine, check the voltage.
 - If there is no voltage, repair the open in the Black/Yellow wire between the solenoid valve and the No.1 fuse.
 - If there is voltage, inspect for an open in the Green/Black wire between the solenoid valve and the ECU. If the wire is OK, see ECU troubleshooting (page 12-21).

Solenoid Valve Test II:

1. Start the engine.
2. Disconnect the 2P connector on the idle control solenoid valve.
3. Attach the positive probe of the voltmeter to the Black/Yellow terminal, and the negative probe to the Green/Black terminal.



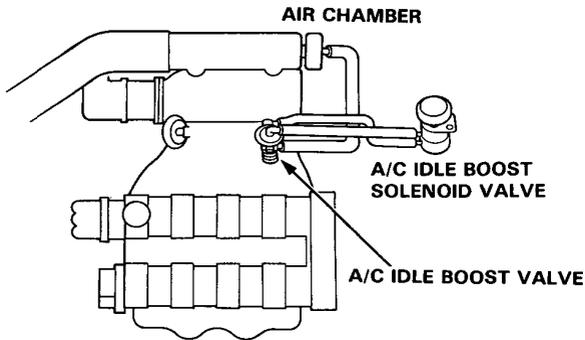
4. Hold engine above 1,500 min⁻¹ (rpm) and check the voltage.

- If there is voltage, inspect for a short in the Green/Black wire between the solenoid valve and the ECU. If the wire is OK, see ECU troubleshooting (page 12-21).
- If there is no voltage, replace the solenoid valve and re-test.

Idle Control System

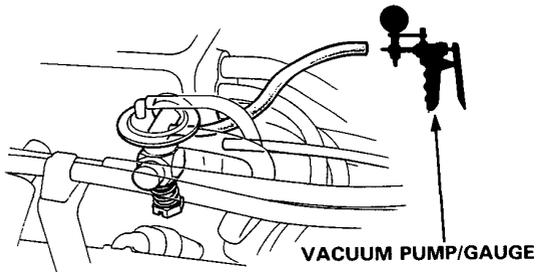
A/C Idle Boost Test

1. Check the vacuum line for improper connection, cracks, blockage or disconnected hoses.

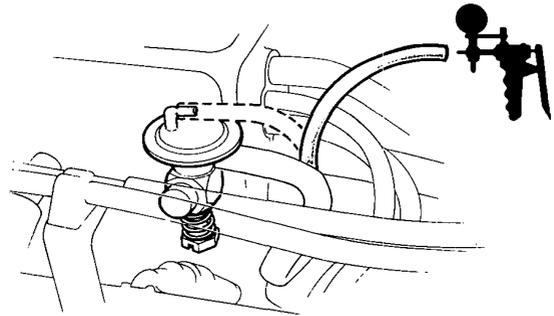


2. Start the engine and allow to idle.
3. Disconnect the vacuum hose between the A/C idle boost valve and the air chamber from the A/C idle boost valve and connect a vacuum gauge to the valve.

There should be no vacuum.



- If there is no vacuum, disconnect the vacuum hose from the A/C idle boost valve and connect the vacuum gauge to the hose.



- If there is no vacuum, replace the A/C idle boost valve and re-test.
 - If there is vacuum, go to solenoid valve test II (page 12-51).
4. Turn the A/C switch and blower switch ON, then check that the compressor and the condenser cooling fan work.

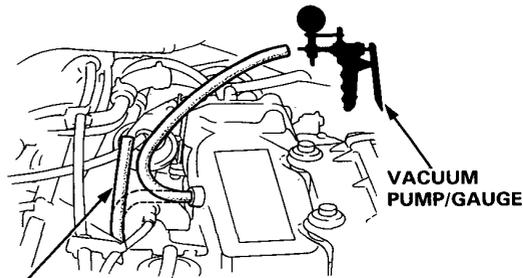
There should be vacuum.

- If there is no vacuum, disconnect the vacuum hose from the A/C idle boost valve and connect the vacuum gauge to the hose.
- If there is vacuum, replace the A/C idle boost valve and re-test.
- If there is no vacuum, go to solenoid valve test I (page 12-51).



Solenoid Valve Test I:

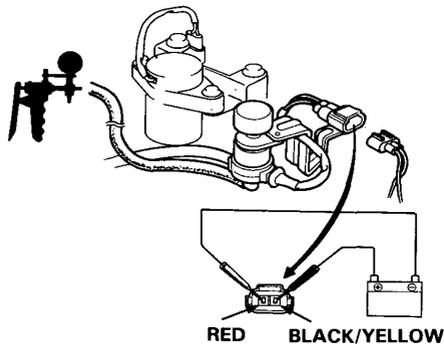
1. Start the engine and allow to idle.
2. Disconnect the #5 vacuum hose from the intake manifold and check the vacuum.



#5 HOSE

- If there is no vacuum, check the vacuum port.

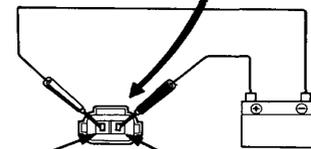
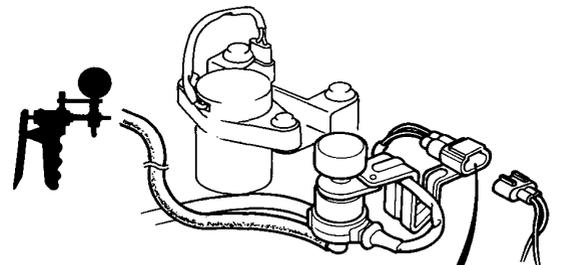
3. Disconnect the 2P connector.
4. Attach the positive probe of the voltmeter to the Black/Yellow terminal, and the negative probe to the Red terminal.



5. Turn the A/C switch and blower switch ON, then check that the compressor and the condenser cooling fan work.
 - If there is voltage, replace the solenoid valve and re-test.
 - If there is no voltage, attach the positive probe of the voltmeter to the Black/Yellow terminal, and the negative probe to body ground. Check for voltage.
 - If there is no voltage, repair the open in the Black/Yellow wire between the solenoid valve and No. 1 fuse.
 - If there is voltage, inspect for an open in the Red wire between the solenoid valve and the ECU. If the wire is OK, see ECU troubleshooting (page 12-21).

Solenoid Valve Test II

1. Start the engine.
2. Disconnect the 2P connector.
3. Attach the positive probe of the voltmeter to the Black/Yellow terminal, and the negative probe to the Red terminal.



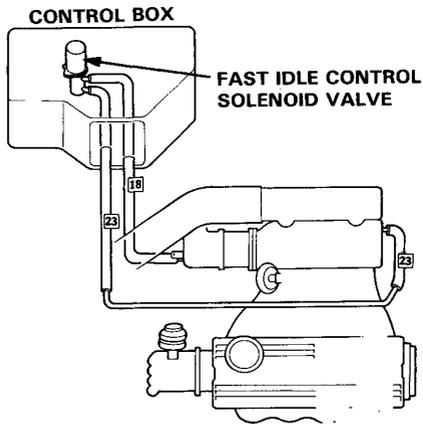
RED BLACK/YELLOW

- If there is voltage, inspect for a short in the Red wire between the solenoid valve and the ECU. If the wire is OK, see ECU troubleshooting (page 12-21).
- If there is no voltage, replace the solenoid valve and re-test.

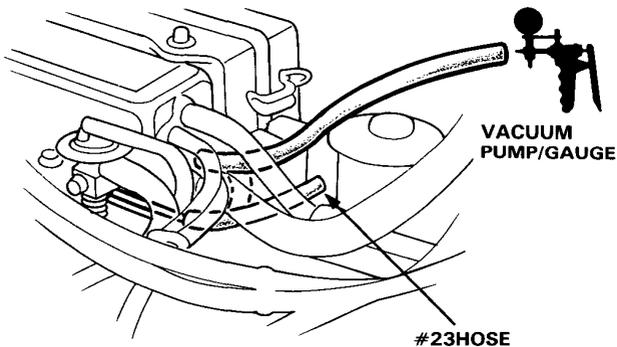
Idle Control System

Fast Idle Control Test (A20A3)

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



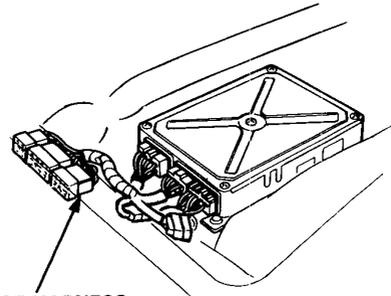
2. Start the engine and allow to idle.
3. Disconnect the #23 vacuum hose from the intake manifold and check the vacuum.



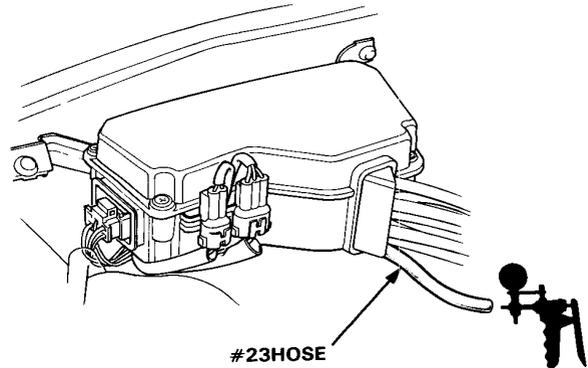
- If there is no vacuum, check the vacuum port.

4. Turn the ignition switch OFF.

5. Connect the PGM-FI test harness "B" connector to the main wire harness only, not the ECU.



6. Disconnect the #23 vacuum hose from the vacuum hose manifold and connect a vacuum pump to the hose.



7. Apply vacuum to the hose.

It should hold vacuum.

- If it does not hold vacuum, replace the solenoid valve and re-test.



8. Turn the ignition switch ON.

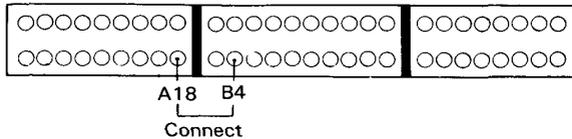
9. Apply vacuum to the hose.

It should hold vacuum.

- If it does not hold vacuum, repair short in Red/Green wire between the solenoid valve and ECU.

NOTE: On cars with automatic transmission, also inspect short in Green wire between the A/T idle control solenoid valve and ECU.

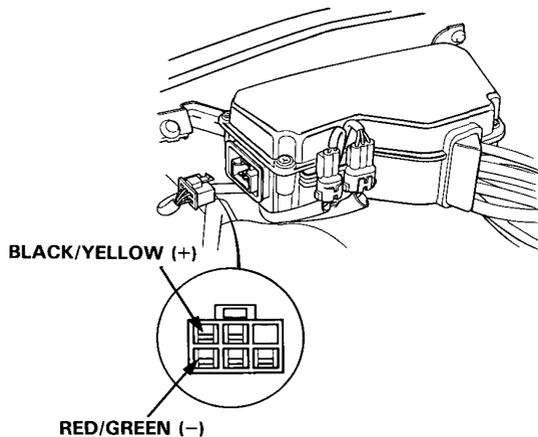
10. Connect B4 terminal to A18 terminal.



11. Apply vacuum to the hose.

It should not hold vacuum.

- If it holds vacuum, turn the ignition switch OFF. Disconnect the 6P connector, then attach the positive probe of the voltmeter to the Black/Yellow terminal, and the negative probe to the Red/Green terminal. Turn the ignition switch ON.



– If there is voltage, replace the solenoid valve and re-test.

– If there is no voltage, attach the positive probe of the voltmeter to the Black/Yellow terminal, and the negative probe to body ground.

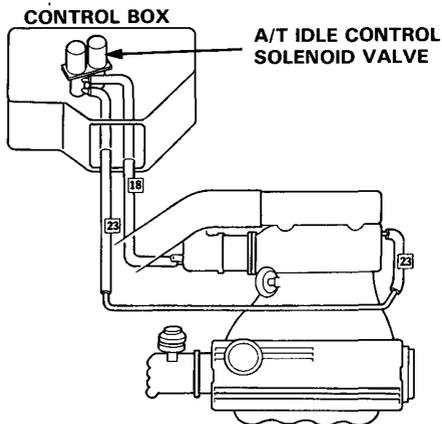
- If there is no voltage, repair the open in the Black/Yellow wire between the solenoid valve and the No.1 fuse.

- If there is voltage, repair the open in the Red/Green wire between the solenoid valve and the ECU.

Idle Control System

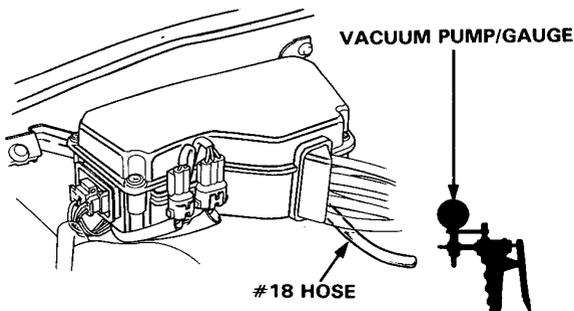
A/T Idle Control Test (A20A3)

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



2. Warm up the engine to normal operating temperature (the cooling fan comes on).
NOTE: Apply parking brake securely.
3. Disconnect the #18 vacuum hose from the air flow tube and connect a vacuum gauge to the hose.

There should be no vacuum.



- If there is vacuum, go to solenoid valve test II (page 12-55).

4. Shift transmission into "D₃" or "D₄".

There should be vacuum.

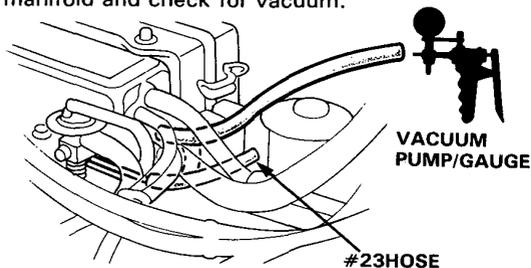
- If there is no vacuum, go to solenoid valve test I (page 12-55).
- If there is vacuum, the test is complete.



Solenoid Valve Test I:

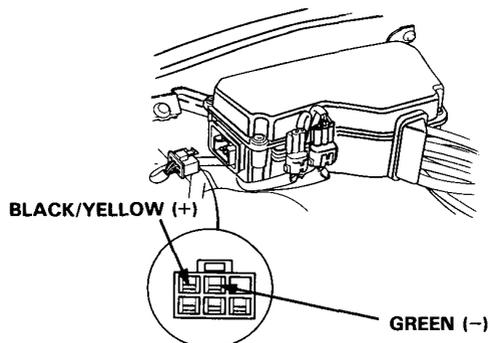
NOTE: Apply parking brake securely.

1. Start the engine and allow to idle.
2. Disconnect #23 vacuum hose from the intake manifold and check for vacuum.



- If there is no vacuum, check the vacuum port.

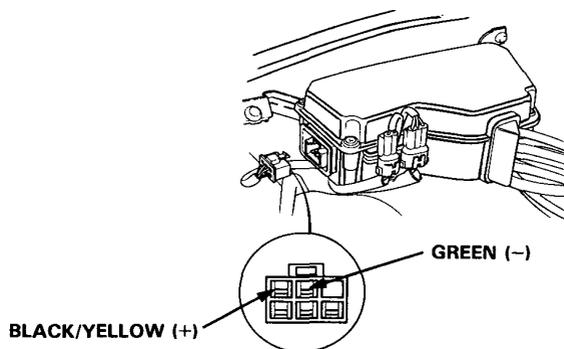
3. Disconnect the 6P connector.
4. Attach the positive probe of the voltmeter to the Black/Yellow terminal, and the negative probe to the Green terminal.



5. Shift transmission into "D₃" or "D₄".
 - If there is voltage, replace the solenoid valve and re-test.
 - If there is no voltage, attach the positive probe of the voltmeter to the Black/Yellow terminal, and the negative probe to body ground. Check for voltage.
 - If there is no voltage, repair the open in the Black/Yellow wire between the solenoid valve and No. 1 fuse.
 - If there is voltage, inspect for an open in the Green wire between the solenoid valve and the ECU.
If the wire is OK, see ECU troubleshooting (page 12-21).

Solenoid Valve Test II:

1. Start the engine.
2. Disconnect the 6P connector.
3. Attach the positive probe of the voltmeter to the Black/Yellow terminal, and the negative probe to the Green terminal.



- If there is voltage, inspect for a short in the Green wire between the solenoid valve and the ECU.
If the wire is OK, see ECU troubleshooting (page 12-21).
- If there is no voltage, replace the solenoid valve and re-test.

Idle Control System

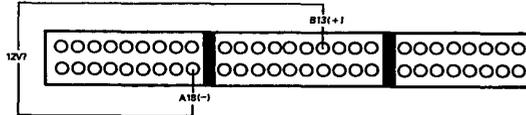
Troubleshooting Flow Chart — Starter Signal

This signals the PGM-FI ECU when the engine is cranking. The ECU controls the idle control solenoid valve to promote easy starting.

Inspection of Starter Switch Signal.

Connect the PGM-FI test harness between the ECU and connector (page 12-19).

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



Is there battery voltage?

NO

Inspect No.10 fuse.

YES

Starter signal is OK.

Is No. 10 fuse OK?

NO

Replace fuse.

YES

Repair open in Blue/Red wire between ECU (B13) and No. 10 fuse.



Troubleshooting Flow Chart — Alternator FR Signal

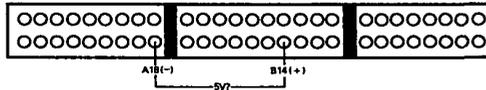
This signals the PGM-FI ECU when the alternator is charging.

Inspection of Alternator FR Signal.

Connect the PGM-FI test harness between the ECU and connector (page 12-19). But 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. 5 V?

NO

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

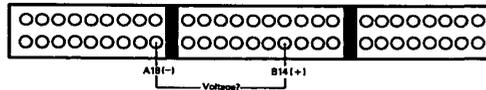
YES

Turn the ignition switch OFF.

Reconnect "B" connector to the main wire harness.

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

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



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

NO

Stop engine.

YES

Alternator FR signal is OK.

(To page 12-58)

(cont'd)

Idle Control System

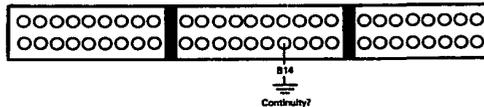
Troubleshooting Flow Chart — Alternator FR Signal (cont'd)

(From page 12-57)

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.



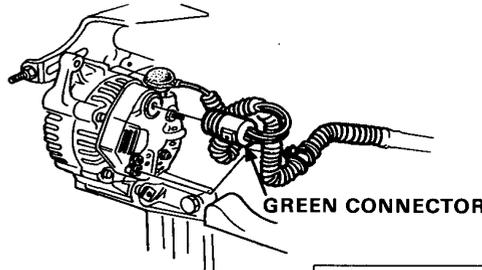
Does continuity exist?

YES

Disconnect Green connector from the alternator.

NO

Disconnect Green connector from the alternator.



Check for continuity between B14 terminal and body ground.

Connect White/Red wire to body ground.

Does continuity exist?

NO

See Alternator Inspection.

YES

Repair short in White/Red wire between ECU (B14) and alternator.

Check for continuity between B14 terminal and body ground.

Does continuity exist?

YES

See Alternator Inspection.

NO

Repair open in White/Red wire between ECU (B14) and alternator.



Troubleshooting Flow Chart — Air Conditioning Signal

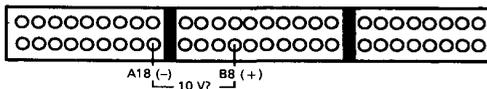
This signals the PGM-FI ECU when there is a demand for cooling from the air conditioning circuits (A/C switch).

Inspection of Air Conditioning Signal.

Connect the PGM-FI test harness between the ECU and connector (page 12-19). But 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. 10 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.

Start engine.

Blower switch ON.

A/C switch ON.

Does A/C operate?

NO

See Air conditioner inspection.

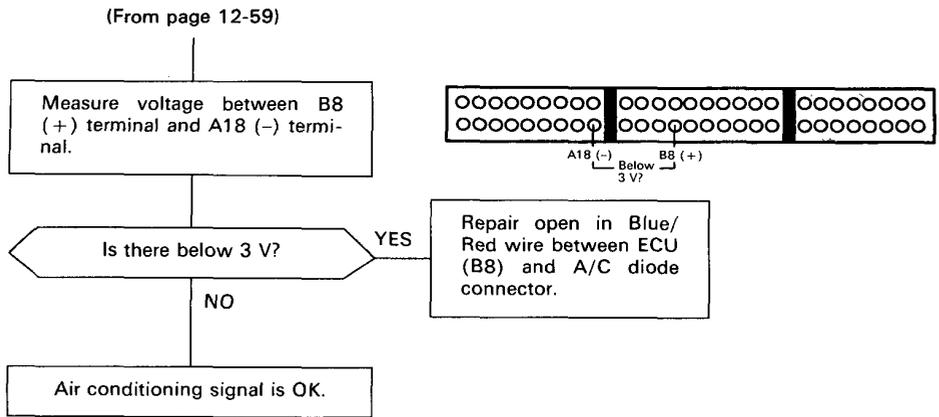
YES

(To page 12-60)

(cont'd)

Idle Control System

Troubleshooting Flow Chart — Air Conditioning Signal (cont'd)





Troubleshooting Flow Chart — Vehicle Speed Signal

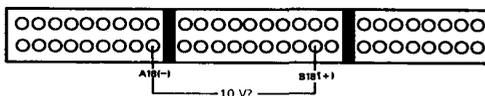
This signals the PGM-FI ECU when the vehicle speed is above 10 mph.

Inspection of Vehicle Speed Signal.

Connect the PGM-FI test harness between the ECU and connector (page 12-19). But disconnect "B" connector from the main wire harness only, not the ECU.

Turn the ignition switch ON.

Measure voltage between B18 (+) terminal and A18 (-) terminal.



Is there approx. 10 V?

NO

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

YES

Turn the ignition switch OFF.

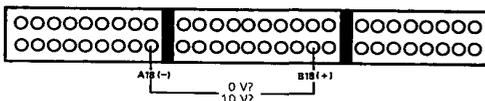
Reconnect "B" connector to the main wire harness.

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.

Start engine, put transmission in 2nd gear, let the clutch out.

Measure voltage between B18 (+) terminal and A18 (-) terminal.



Is there approx. 10 V above 10 mph and below 3 V below 10 mph?

NO

Repair open or short in Yellow wire between ECU (B18) and speed sensor amplifier. If wire is OK, replace the sensor.

YES

Speed vehicle signal is OK.

Idle Control System

Troubleshooting Flow Chart — A/T Shift Position Signal (A20A3)

This signals the PGM-FI ECU when the transmission is in Neutral or Park.

Inspection of A/T Shift Position Signal

Turn the ignition switch ON.

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

Does the indicator light properly?

NO

See A/T shift position Indicator Inspection.

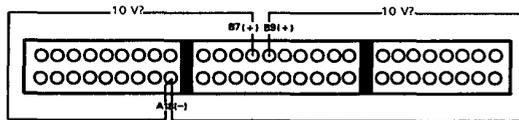
YES

Turn the ignition switch OFF.

Connect the PGM-FI test harness between the ECU and connector (page 12-19). But disconnect "B" connector from the main wire harness only, not the ECU.

Turn the ignition switch ON.

Measure voltage between B7 (+) and B9 (+) terminal individually, and A18 (-) terminal.



Is there approx. 10 V?

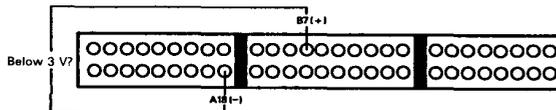
NO

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.

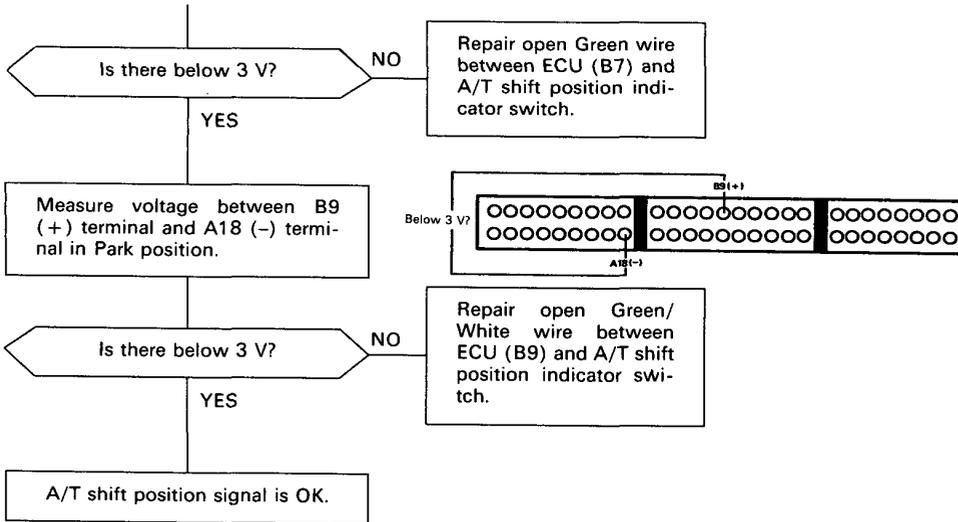
Measure voltage between B7 (+) terminal and A18 (-) terminal in Neutral position.



(To page 12-63)



(From page 12-62)

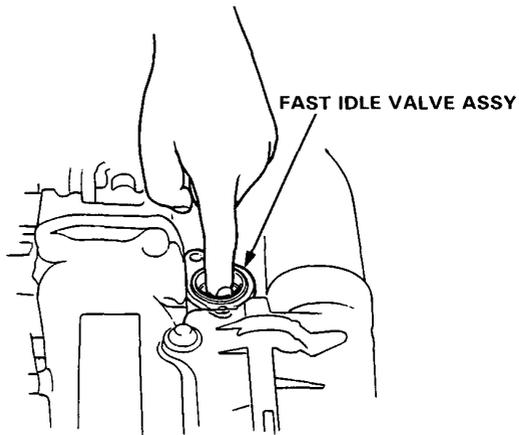


Fast Idle Control

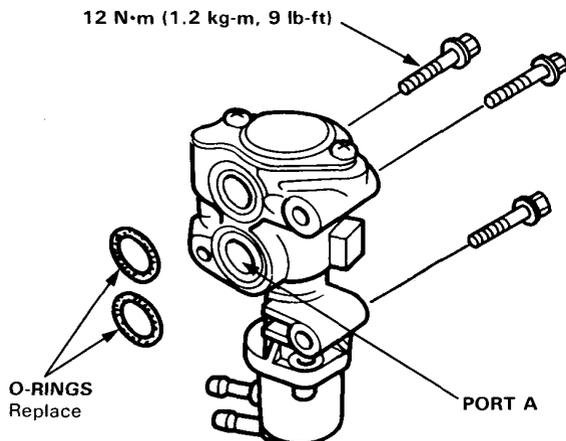
Inspection

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

1. Start the engine.
2. Remove the cover of the fast idle valve.
3. Put your finger on the valve seat area and make sure that there is air flow with the engine cold (coolant temperature below 30°C, 86°F) and idling.



- If not, replace the fast idle valve and re-test.



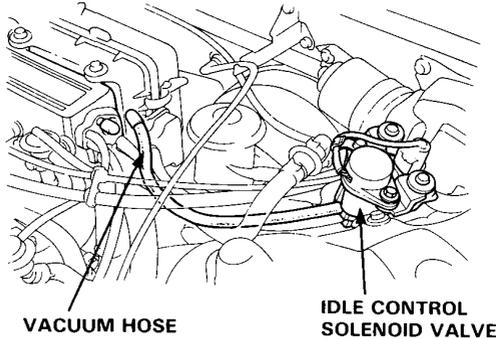
4. Warm up the engine (cooling fan comes on).
5. Check that the valve is completely closed. If not, an air suction sound can be heard in the valve seat area.
 - If any suction is heard, the valve is leaking. Replace the fast idle valve and re-check.

Idle Speed



Inspection/Adjustment

1. Start the engine and warm it up to normal operating temperature (the cooling fan goes on twice).
2. Connect a tachometer.
3. Disconnect the upper vacuum hose of the idle control solenoid valve (between the valve and intake manifold) from the intake manifold.
4. Cap the end of the hose and intake manifold.

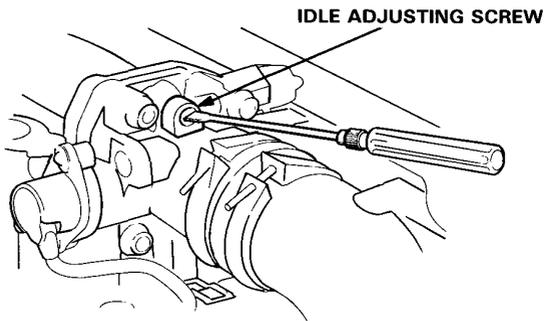


5. Adjust the idle speed with headlights, heater blower, rear window defroster, cooling fan and air conditioner off.

Idle Speed should be:

Manual	750 ± 50 min ⁻¹ (rpm)
Automatic	750 ± 50 min ⁻¹ (rpm) (in "N" or "P")

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

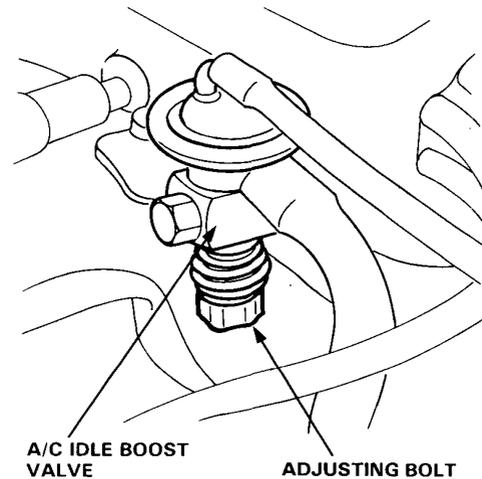


6. Check the idle speed with heater fan switch at HI (right end) and air conditioner on.

Idle Speed should be:

Manual	750 ± 50 min ⁻¹ (rpm)
Automatic	750 ± 50 min ⁻¹ (rpm) (in "N" or "P")

Adjust idle speed, if necessary, by turning the adjusting bolt on the A/C idle boost valve.



7. After adjustment, connect the idle control solenoid valve vacuum hose.
8. On Automatic Transmission model, after adjusting the idle speed, check that it remains within the specified limit when shifted in gear ("D₃" or "D₄").

Idle speed should remain:

750 ± 50 min⁻¹ (rpm) (in "D₃" or "D₄")

9. Check the idle speed with headlights, heater blower, rear window defroster, and cooling fan on but air conditioner off.
It should be the same as normal idle speed.

NOTE: If the idle speed is not within specifications, see Symptom-to-Sub System Chart on page 12-44 and 47.

Fuel Supply System

Symptom-to-Sub System Chart

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

PAGE	SUB SYSTEM	FUEL INJECTORS	INJECTOR RESISTOR	PRESSURE REGULATOR	FUEL FILTER	FUEL PUMP	MAIN RELAY	FUEL TANK	CONTAMINATED FUEL
	SYMPTOM	68	70	71	71	72	73	—	*
	ENGINE WON'T START	②	③		③	①	②		
	MISFIRE	①	②						③
	LOSS OF POWER				①				②

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

Fuel Pressure

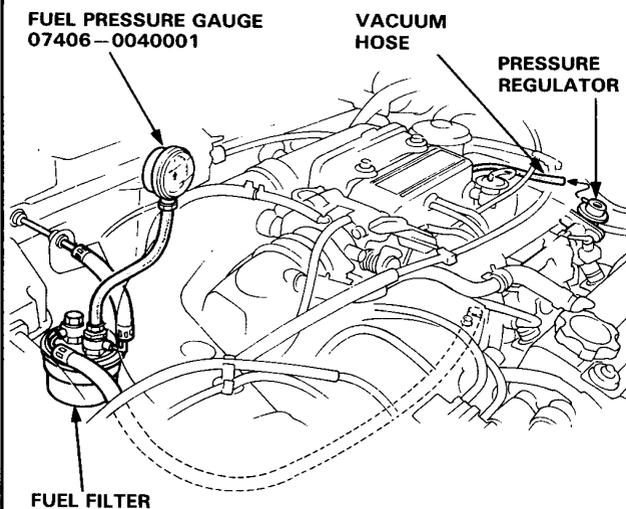


Inspection

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

Pressure should be:

250–279 kPa (2.55–2.85 kg/cm², 36-41 psi)



- If the fuel pressure is not as specified, first check the fuel pump (page 12-72). 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 12-70).
 - If the pressure is lower than specified, inspect for:
 - Clogged fuel filter.
 - Pressure regulator failure (page 12-70).
 - Leakage in the fuel line.

Relieving

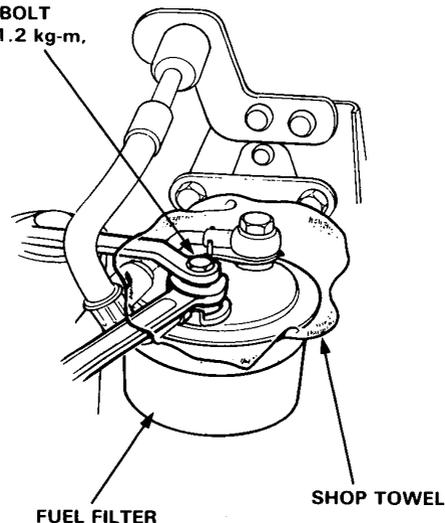
WARNING

- Do not smoke while working on the fuel system. Keep open flames or sparks away from the work area.
- Be sure to relieve fuel pressure while the engine is off.

NOTE: Before disconnecting fuel pipes or hoses, release pressure from the system by loosening the 6 mm service bolt at top of the fuel filter.

1. Disconnect the battery negative cable from the battery negative terminal.
2. Use a box end wrench on the 6 mm service bolt at top of the fuel filter, while holding the special banjo bolt with another wrench.
3. Place a rag or shop towel over the 6 mm service bolt.
4. Slowly loosen the 6 mm service bolt one complete turn.

SERVICE BOLT
12 N·m (1.2 kg·m,
9 lb·ft)



NOTE:

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

Fuel Injectors

Test

NOTE: Check the following items before testing: idle speed, ignition timing and idle CO %

If the engine will run:

1. With the engine idling, disconnect each injector connector individually and inspect the change in the idling speed.
 - If the idle speed drop is almost the same for each cylinder, the injectors are normal.
 - If the idle speed or quality remains the same when you disconnect a particular injector, replace the injector and re-test.
2. Check the clicking sound of each injector by means of a stethoscope when the engine is idling.



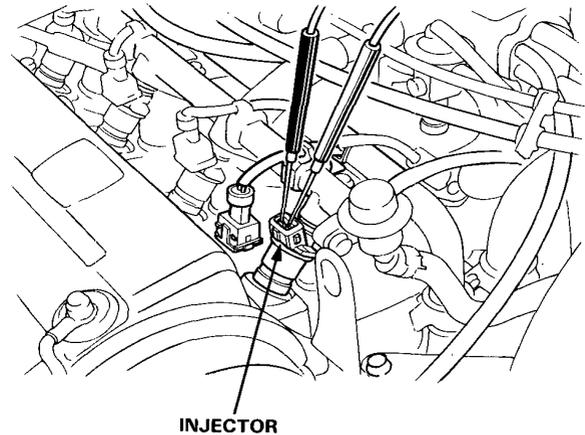
- If any injector fails to make the typical clicking sound, check the sound again after replacing the injector.
- If clicking sound is still absent, check the following:
 - Whether there is any short-circuiting, wire breakage or poor connection in the Yellow/Black wire between the main relay and the resistor.
 - Whether the resistor is open or corroded (page 12-70).
 - Whether there is any short-circuiting, wire breakage or poor connection in the Red/Black wire between the resistor and the injector.
 - Whether there is any short-circuiting, wire breakage or poor connection in the wire between the injector and the ECU.

If all is OK, check the ECU (page 12-18).

If the engine cannot be started:

1. Remove the connector of the injector, and measure the resistance between the 2 terminals of the injector.

Resistance should be: 1.5—2.5 Ω



- If the resistance is not as specified, replace the injector.
- If the resistance is as specified, check the fuel pressure (page 12-67).
 - If the fuel pressure is as specified, check the following:
 - Whether there is any short-circuiting, wire breakage or poor connection in the Yellow/Black wire between the main relay and the resistor.
 - Whether the resistor is open or corroded (page 12-70).
 - Whether there is any short-circuiting, wire breakage, or poor connection in the Red/Black wire between the resistor and the injector.
 - Whether there is any short-circuiting, wire breakage or poor connection in the wire between the injector and the ECU.

If all is OK, check the ECU (page 12-18).



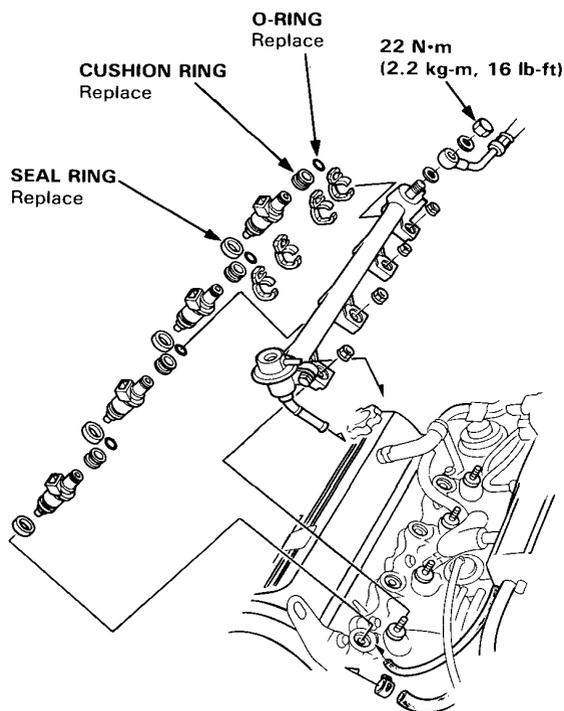
Replacement

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

1. Disconnect the battery negative cable from the battery negative terminal.
2. Relieve fuel pressure (page 12-67).
3. Disconnect the connectors of the injectors.
4. Disconnect the vacuum hose and fuel return hose from the pressure regulator.

NOTE: Place a rag or shop towel over the hose and tube before disconnecting them.

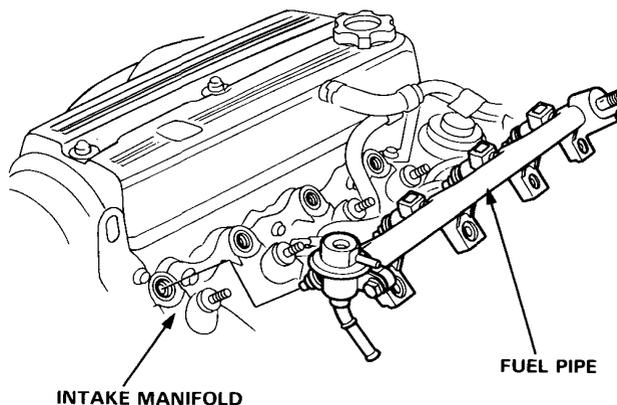
5. Loosen the retainer nuts on the fuel pipe and remove the fuel line.
6. Disconnect the fuel pipe.
7. Remove the injectors from the intake manifold.



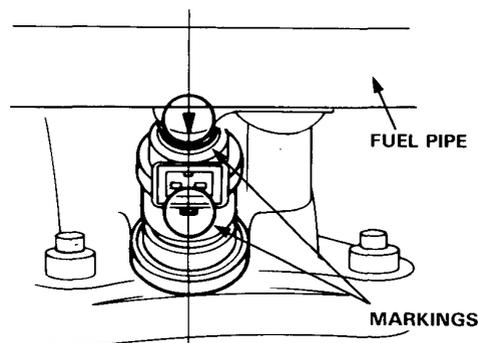
8. Slide new cushion rings onto the injectors.
9. Coat new O-rings with clean engine oil and put them on the injectors.

10. Insert the injectors into the fuel pipe first.
11. Coat new seal rings with clean engine oil and press them into the intake manifold.
12. 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.



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



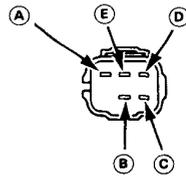
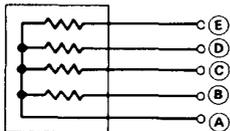
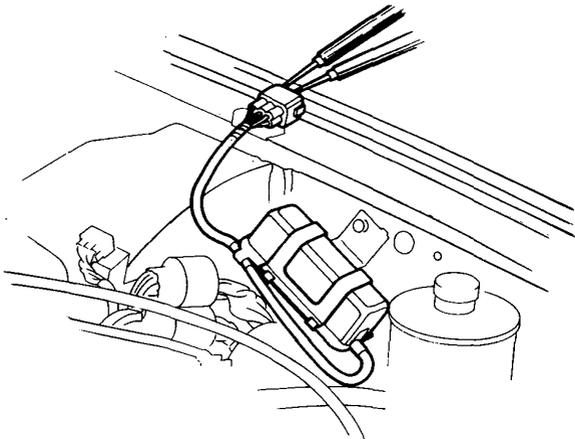
14. Install and tighten the retainer nuts and the fuel line.
15. Connect the vacuum hose and fuel return hose to the pressure regulator.
16. Install the connectors on the injectors.
17. Turn the ignition switch ON but do not operate the starter. After the fuel pump runs for approximately two seconds,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

Injector Resistor

Test

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

Resistance should be: 5–7 Ω



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

Pressure Regulator

Test

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

1. Attach a pressure gauge to the service port of the fuel filter (page 12-67).

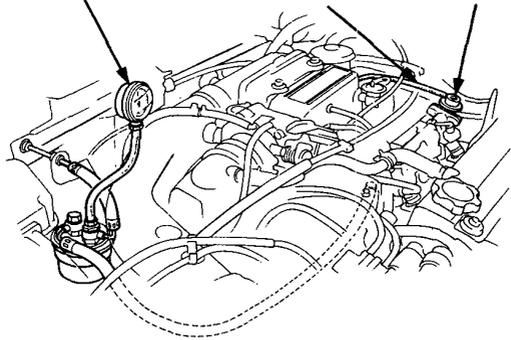
Pressure should be:

250–279 kPa (2.55–2.85 kg/cm², 36–41 psi)

FUEL PRESSURE GAUGE
07406--0040001

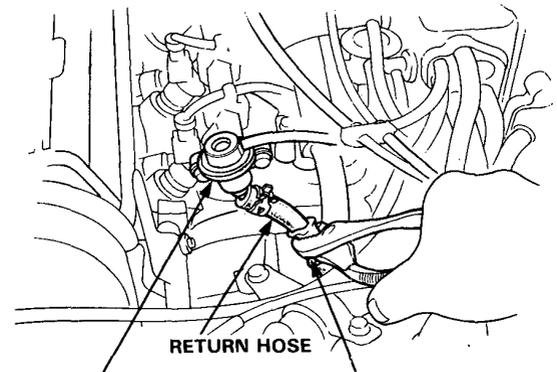
VACUUM
HOSE

PRESSURE
REGULATOR



2. Check that fuel pressure rises by disconnecting the vacuum hose from the regulator.

- If the fuel pressure does not rise, check whether it rises when the return hose is lightly pinched.



PRESSURE REGULATOR

SHOP TOWEL

- If the pressure does not rise, replace the regulator and re-test.

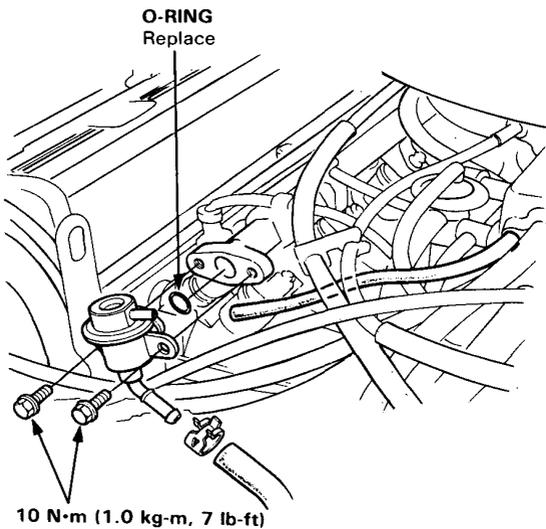


Fuel Filter

Replacement

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

1. Disconnect the negative terminal of the battery.
2. Place a shop towel under the pressure regulator, then relieve fuel pressure (page 12-67).
3. Disconnect the vacuum hose and fuel return hose.
4. Remove the two 6 mm retainer bolts.



NOTE:

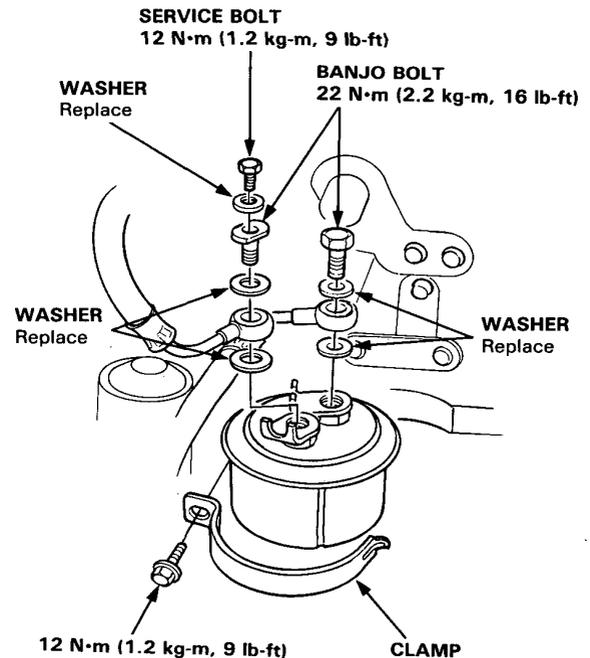
- Replace the O-ring.
- When assembling the regulator, apply clean engine oil to the O-ring and assemble it into its proper position, taking care not to damage the O-ring.

Replacement

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

The filter should be replaced: every 2 years or 24,000 miles (40,000 km) whichever comes first, or whenever the fuel pressure drops below the specified value (250–279 kPa, 2.55–2.85 kg/cm², 36–41 psi with the vacuum pressure hose disconnected) after making sure that the fuel pump and the pressure regulator are OK.

1. Disconnect the battery cable from the negative terminal.
2. Place a shop towel under and around the fuel filter.
3. Relieve fuel pressure (page 12-67).
4. Remove the two 12 mm banjo bolts from the filter.
5. Remove the fuel filter clamp and fuel filter.
6. When assembling, use new washers, as shown.

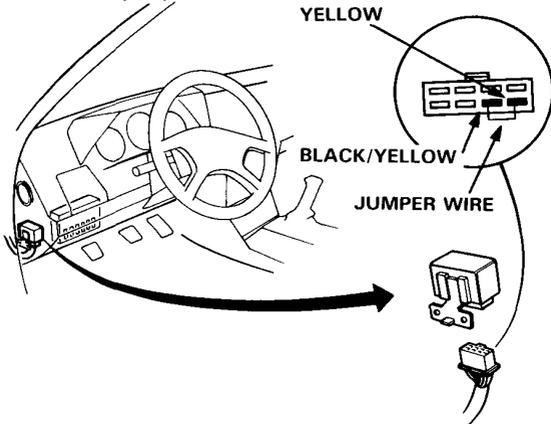


Fuel Pump

Test

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

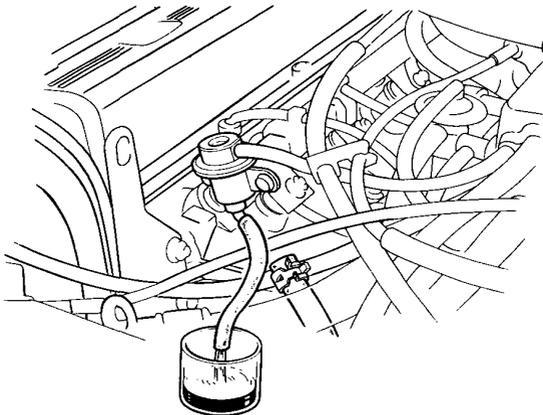
1. With the ignition switch OFF, disconnect the connector from the main relay behind the fuse box.
2. Connect the Yellow wire and Black/Yellow wire with a jumper wire.



3. Relieve fuel pressure as described on page 12-59 then tighten the service bolt.
4. Disconnect the fuel return hose from the regulator.
5. Turn the ignition switch ON for 10 seconds. Then measure the amount of fuel flow.

Amount should be:

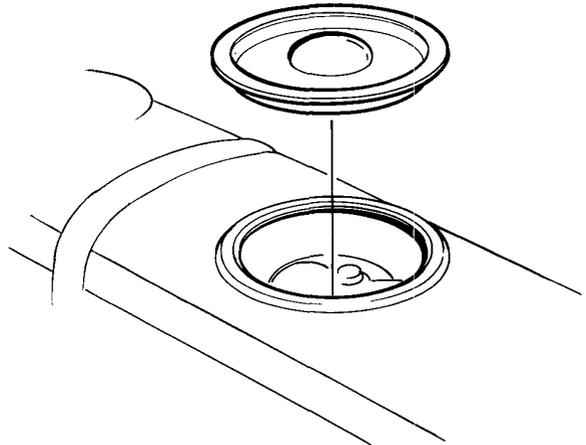
230 cc (7.8 oz) min. in 10 seconds at 12V



- If fuel flow is less than 230 cc (7.8 oz), or there is no fuel flow, check for:
 - Clogged fuel filter.
 - Clogged fuel line.
 - Pressure regulator failure (page 12-71).

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 the fuel filler port to your ear with the fuel filler cap removed. If the pump does not make noise, check as follows:

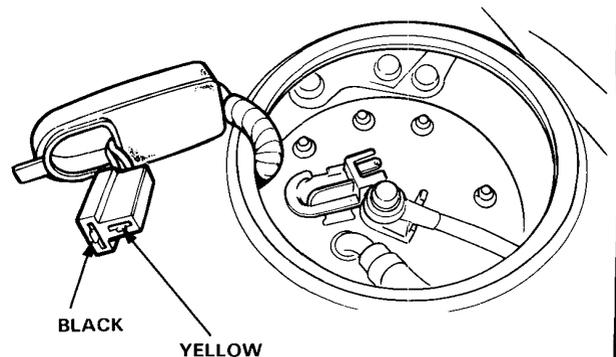
1. Remove the left maintenance access cover in the luggage area.



2. Disconnect the coupler.

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

3. Check that battery voltage is available at the fuel pump connector when the ignition switch is turned ON (Positive probe to the Yellow wire, negative probe to the Black wire).



- If battery voltage is available, replace the fuel pump.
- If there is no voltage, check the main relay and wire harness (page 12-73).

NOTE: When installing the maintenance access cover, make sure the seal is attached to the cover.



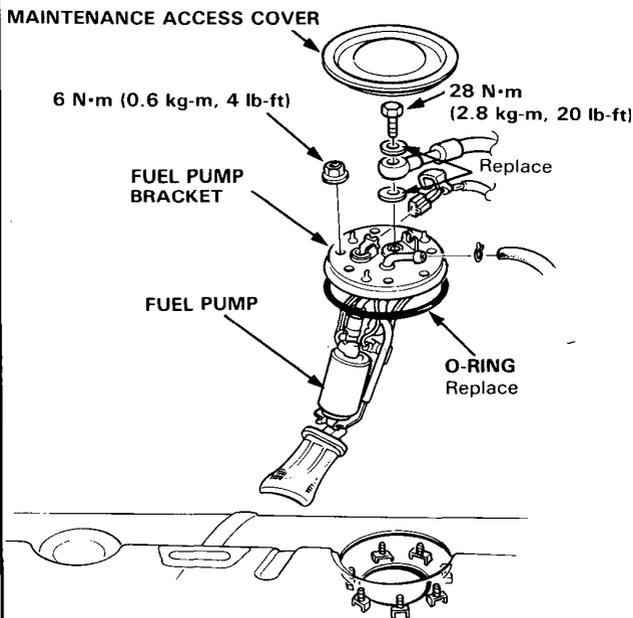
Main Relay

Replacement

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

1. Relieve fuel pressure (page 12-67).
2. Remove the left maintenance access cover in the luggage area.
3. Disconnect the fuel lines and connector.
4. Remove the fuel pump mounting nuts.
5. Remove the fuel pump from the fuel tank. (If it is hard to remove, slightly lower the fuel tank by loosening the fuel tank mounting nuts).

NOTE: When installing the maintenance access cover, make sure the seal is attached to the cover.

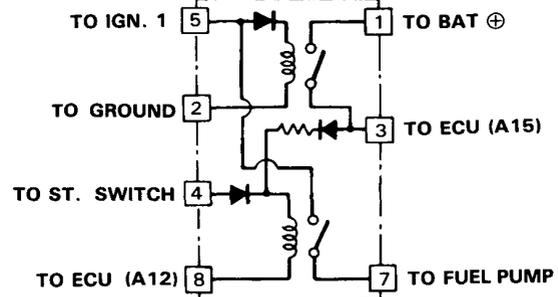
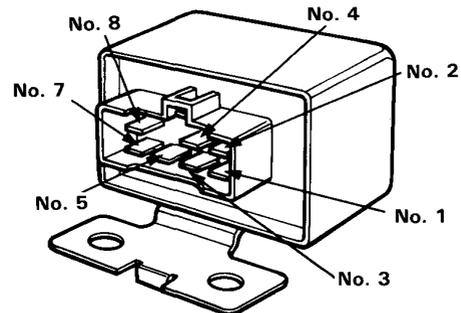


CAUTION: Do not disassemble the pump

Test

1. Remove the main relay, near the under-dash fuse box.
2. Attach the battery positive terminal to the No. 4 terminal and the battery negative terminal to the No. 8 terminal of the main relay. Then check for continuity between the No. 5 terminal and No. 7 terminal of the main relay.

- If there is continuity, go on to step 3.
- If there is no continuity, replace the relay and re-test.



3. Attach the battery positive terminal to the No. 5 terminal and the battery negative terminal to the No. 2 terminal of the main relay. Then check that there is continuity between the No. 1 terminal and No. 3 terminal of the main relay.

- If there is continuity, go on to step 4.
- If there is no continuity, replace the relay and re-test.

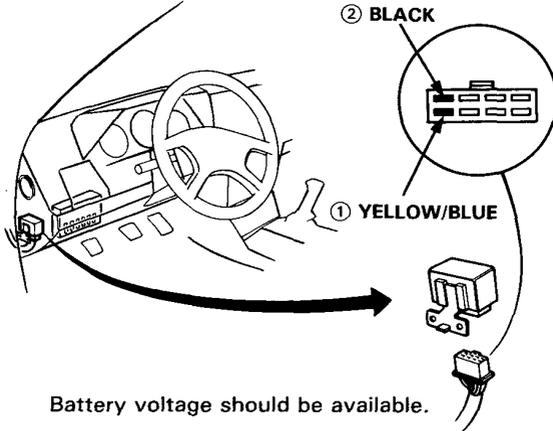
4. Attach the battery positive terminal to the No. 3 terminal and battery negative terminal to the No. 8 terminal of the main relay. Then check that there is continuity between the No. 5 terminal and No. 7 terminal of the main relay.

- If there is continuity, the relay is OK; If the fuel pump still does not work, go to Harness Testing in the next column.
- If there is no continuity, replace the relay and re-test.

Main Relay

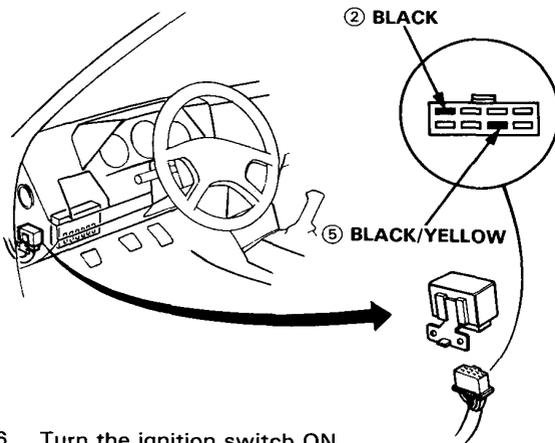
Harness Test

1. Keep the ignition switch in the OFF position.
2. Disconnect the main relay connector.
3. Check for continuity between the Black wire ② in the connector and body ground.
4. Attach the positive probe of voltmeter to the Yellow/Blue wire ① and the negative probe to the Black wire ②.



- If there is no voltage, check the wiring between the battery and the main relay as well as No. 1 fuse (10 A) in the under-hood relay box.

5. Attach the positive probe of voltmeter to the Black/Yellow wire ⑤ and the negative probe to the Black wire ②.

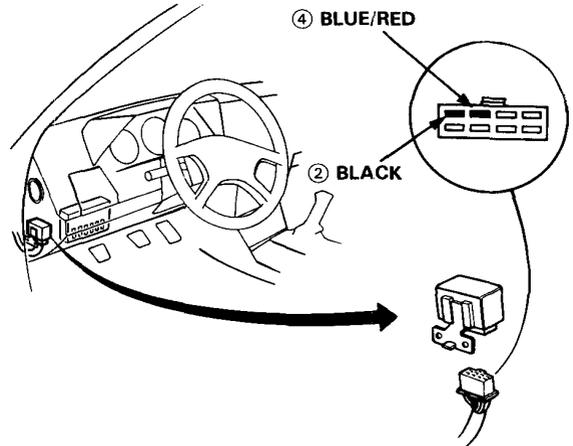


6. Turn the ignition switch ON.

Battery voltage should be available.

- If there is no voltage, check the wiring from the ignition switch and the main relay as well as No. 1 fuse (15 A).

7. Attach the positive probe of voltmeter to the Blue/Red wire ④ and the negative probe to the Black wire ②.

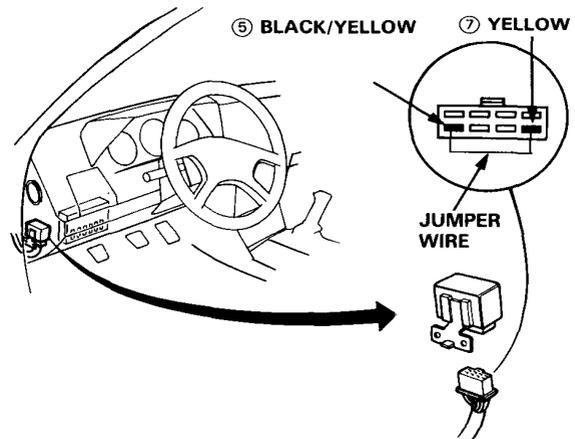


8. Turn the ignition switch to START position.

Battery voltage should be available.

- If there is no voltage, check the wiring between the ignition switch and main relay as well as No. 10 fuse (10 A).

9. Connect a jumper wire between the Black/Yellow wire ⑤ and Yellow wire ⑦.



10. Turn the ignition switch ON.

The fuel pump should work.

- If the fuel pump does not work, check the wiring between the battery and fuel pump, and the wiring from the fuel pump to the ground (Black wire).



Air Intake System

Symptom-to-Sub System Chart

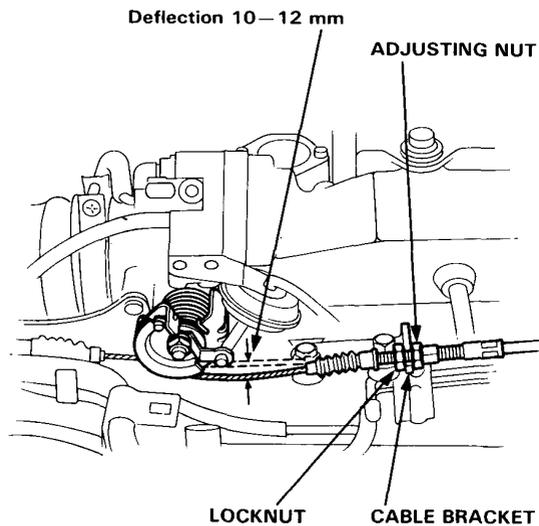
NOTE: Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection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

PAGE	SUB SYSTEM	THROTTLE CABLE	THROTTLE BODY	DASHPOT SYSTEM
		76	77	79
WARM ENGINE	IDLE SPEED OUT OF SPECIFIED RPM (750 ± 50 min ⁻¹ (rpm))	①	②	

Throttle Cable

Inspection/Adjustment

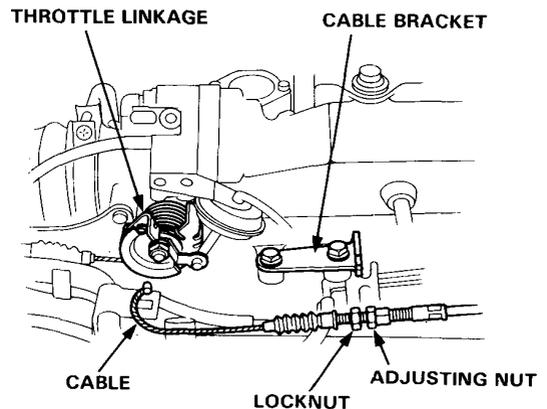
1. Warm up the engine to normal operating temperature (cooling fan comes on).
2. Check that the throttle cable operates smoothly with no binding or sticking. Repair as necessary.
3. Check cable free play at the throttle linkage. Cable deflection should be 10–12 mm (0.39–0.47 in.)



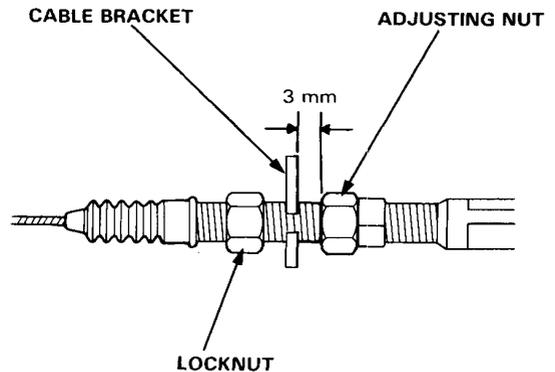
4. If deflection is not within specs, loosen the locknut and turn the adjusting nut until the deflection is as specified.
5. With the cable properly adjusted, check the throttle valve to be sure it opens fully when you push the accelerator pedal to the floor. Also check the throttle valve to be sure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

Replacement

1. Loosen the locknut and remove the throttle cable from the cable bracket.
2. Remove the cable from the throttle linkage.



3. Hold the cable sheath, removing all slack from the cable.
4. Turn the adjusting nut until it is 3 mm away from the cable bracket.
5. Tighten the locknut. The cable deflection should now be 10–12 mm (0.39–0.47 in.). If not, see Inspection/Adjustment.



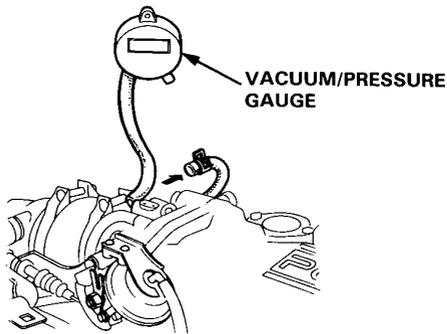
Throttle Body



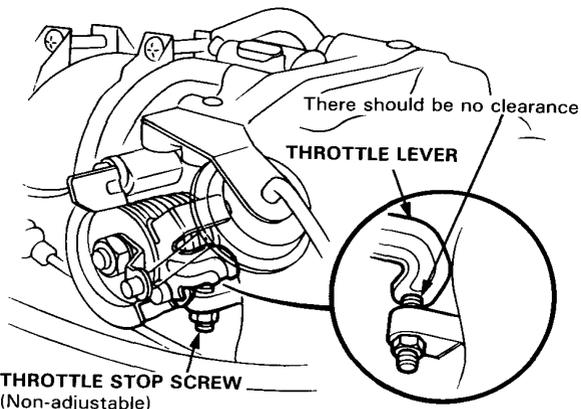
Inspection

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

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



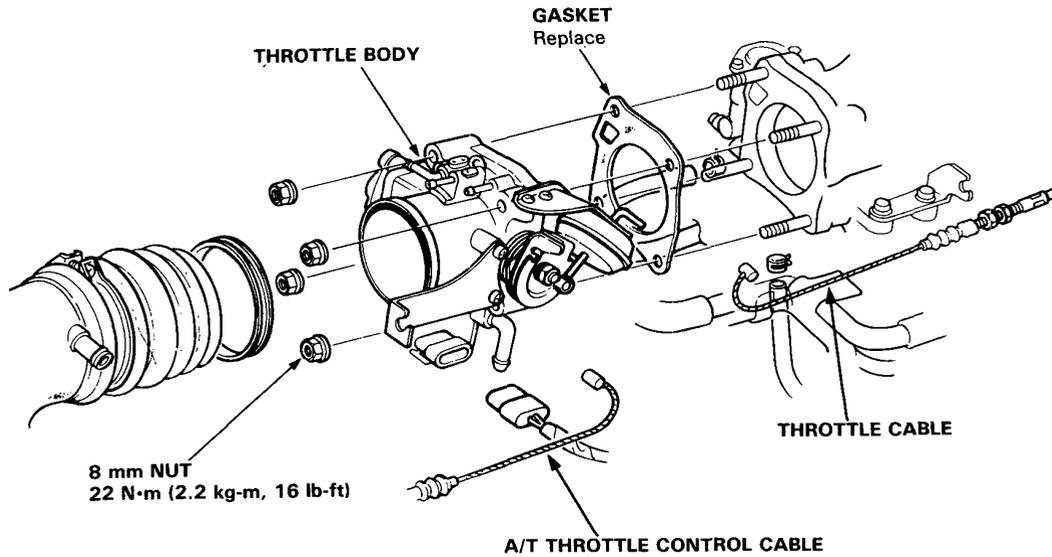
3. Allow the engine to idle and check that the gauge indicates no vacuum.
4. Check that vacuum is indicated on the gauge when the throttle is opened slightly from idle.
 - If the gauge indicates no vacuum, check the canister port. If the canister port is clogged, clean it with carburetor cleaner.
5.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



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

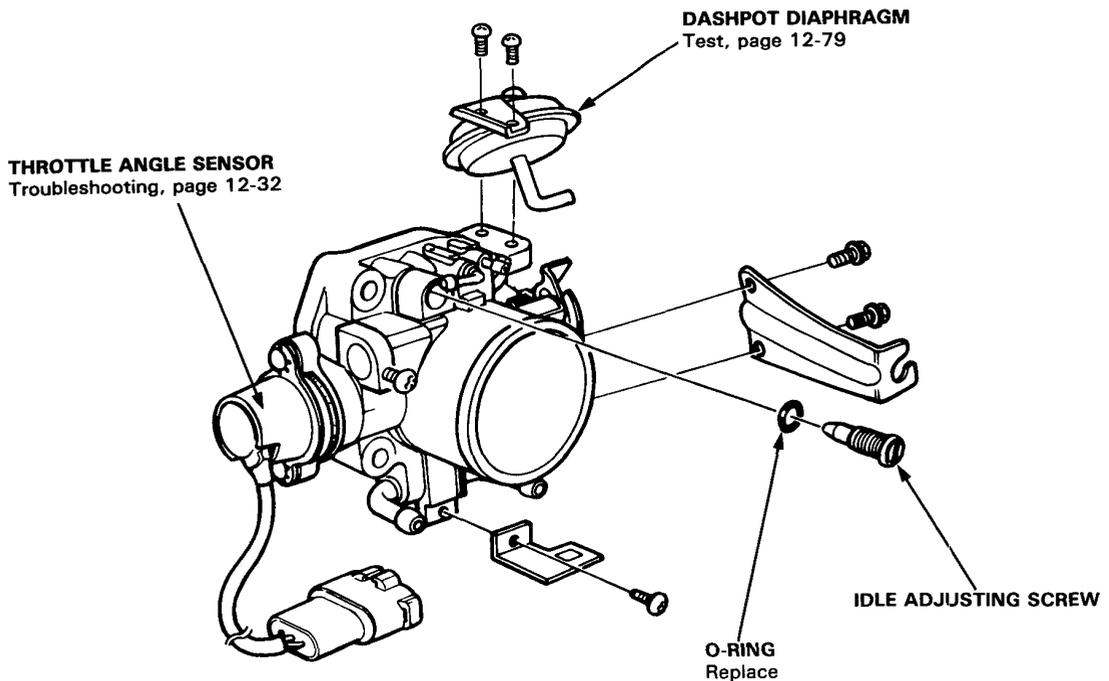
Throttle Body

Disassembly



CAUTION:

- The throttle stop screw is non-adjustable.
- After re-assembly, adjust the throttle cable (page 12-76).

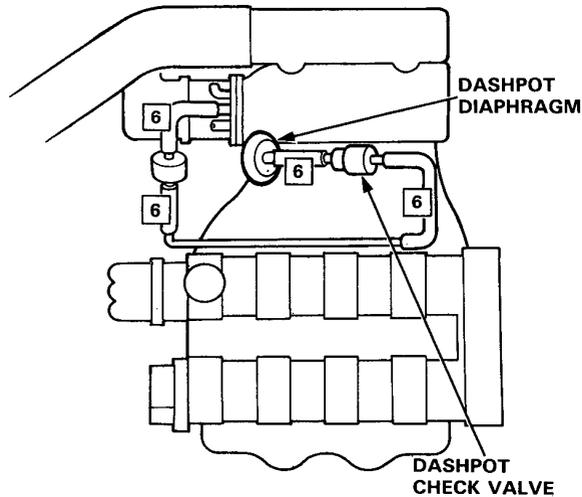


Dashpot System

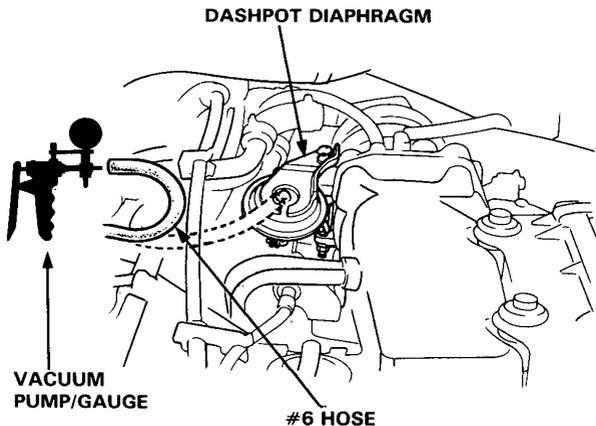


Test

1. Check the vacuum line for leaks, blockage or a disconnected hose.



2. Disconnect #6 vacuum hose from the dashpot diaphragm, and connect a vacuum pump/gauge to the hose.

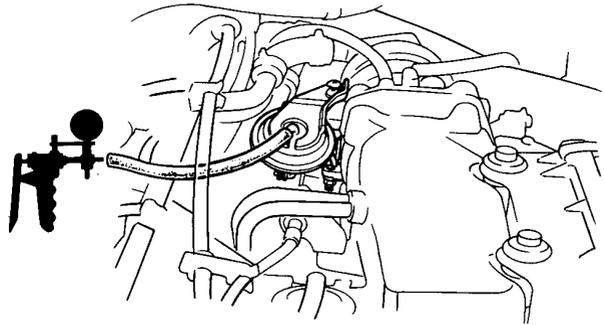


3. Start the engine.
4. Raise engine speed to 3,500 min⁻¹ (rpm). Vacuum should appear on gauge.
 - If no vacuum, check that the vacuum port on the throttle body.

5. Release the throttle.

Vacuum should go out slowly.

- If the vacuum holds or goes out quickly, replace the dashpot check valve and re-test.
6. Connect a vacuum pump to the dashpot diaphragm.



7. Apply vacuum and check that the rod pulls in and vacuum holds.

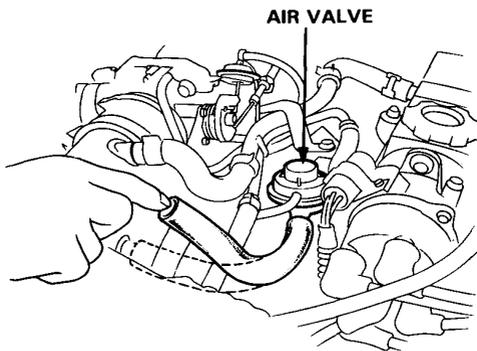
The rod should pull in and vacuum should hold.

- If the vacuum does not hold or the rod does not move, replace the dashpot diaphragm and retest.

Secondary Air Supply System

System Inspection

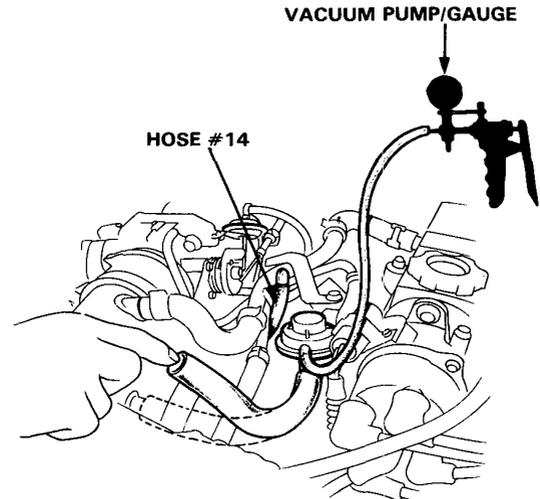
1. Warm up the engine and make sure that the idle speed is steady.
2. Raise the engine speed to around 4,000 min⁻¹ (rpm) and release the accelerator pedal suddenly.
3. Make sure that the vacuum appears in the vacuum hose of the air valve after the accelerator pedal released.



- If no vacuum, check for:
 - each vacuum hose for clog, pinch, or disconnection.
 - air valve.
 - air valve control solenoid valve.

Air Valve Inspection

1. Disconnect the vacuum hose #14 from the air valve and connect a vacuum pump to the valve.
2. Start the engine and make sure that the vacuum appears in the vacuum hose of the air valve while operating the vacuum pump.



3. Make sure that the vacuum disappears in the hose when the vacuum pump is removed.



Air Valve Control Solenoid Valve Inspection

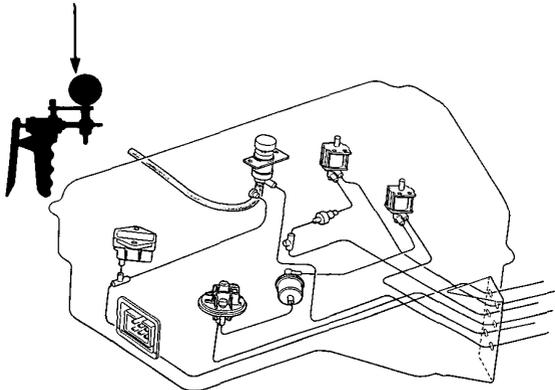
1. Open the control box lid and disconnect the rectangular connector from the control box.
2. Disconnect the lower vacuum hose of the air valve control solenoid valve (between the solenoid valve and the three-way joint) from the joint.

3. Apply vacuum to the hose.

It should hold vacuum.

- If it does not hold vacuum, replace the valve.

VACUUM
PUMP/GAUGE

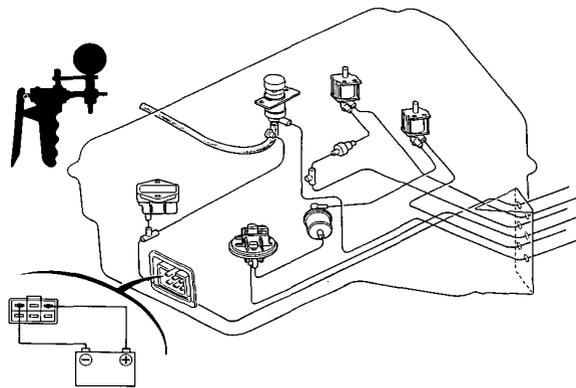


4. Connect the battery positive terminal to the Black/Yellow terminal of the control box coupler, and the negative terminal to the Orange terminal.

5. Apply vacuum to the hose.

It should not hold vacuum.

- If it holds vacuum, replace the valve.



Emission Control System

Symptom-to-Sub System Chart

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

PAGE	SUB SYSTEM	CATALYTIC CONVERTER	EGR SYSTEM	POSITIVE CRANKCASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
		83	84	92	93
	IRREGULAR IDLING		①	②	
	FREQUENT STALLING		①		
	FAILS EMISSION TEST	①	①		②
	IDLE SPEED ABOVE SPECIFIED rpm			①	
	LOSS OF POWER	①	②		



Tailpipe Emission

Inspection

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

1. Start the engine and warm up to normal operating temperature (cooling fan comes on).
2. Connect a tachometer.
3. Check idle speed and adjust the idle speed, if necessary (page 12-65).
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 defroster, cooling fan, and air conditioner off.

CO meter should indicate 0.1% maximum.

Exhaust Gas Recirculation System

Troubleshooting Flow Chart — EGR System (B20A8)



- Check engine warning light has been reported.
- LED indicates CODE 12.

Verify that all connectors between the EGR valve lift sensor and the PGM-FI ECU are securely connected.

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

Disconnect #16 hose from EGR valve.

Connect vacuum pump to EGR valve and apply vacuum.

Does EGR valve hold vacuum?
Did engine stall?

NO

Replace EGR valve.

YES

Disconnect the #24 hose from the intake manifold and connect vacuum gauge to intake manifold.

Restart engine and check for vacuum.

Is there vacuum?

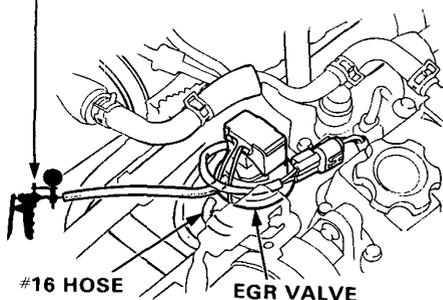
NO

Repair blockage at port or pinch in the #24 hose.

YES

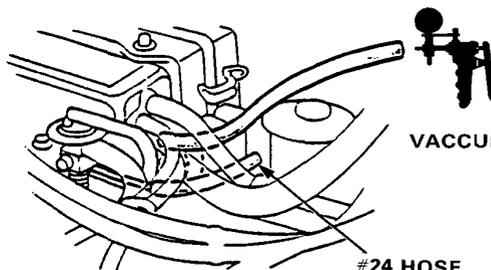
(To page 12-85)

VACUUM PUMP/GAUGE



#16 HOSE

EGR VALVE



VACUUM PUMP/GAUGE

#24 HOSE



(From page 12-84)

Reconnect the #24 hose.

Disconnect the lower EGR control solenoid valve hose and connect vacuum gauge to the hose. Check for vacuum.

Is there vacuum approx. 8"?

NO

Replace CVC valve.

YES

Reconnect the lower EGR control solenoid valve hose.

Is there vacuum below 1.2"?

NO

Check the lower EGR control solenoid hose for blockage or pinch. If hose is OK, replace EGR control solenoid valve.

YES

Disconnect 6P connector on the control box.

Connect the battery positive terminal to the Black/Yellow terminal and the negative terminal to the Red terminal.

Is vacuum approx. 8"?

NO

Replace EGR control solenoid valve.

YES

Measure voltage between Black/Yellow (+) terminal on the main wire harness and body ground.

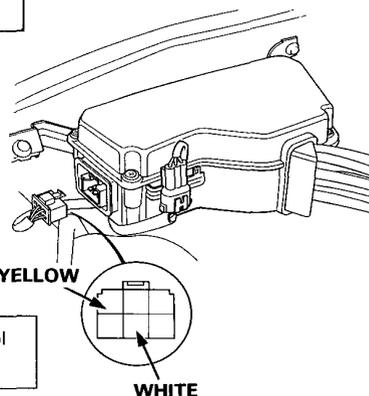
Is there battery voltage?

NO

Repair open in Black/Yellow wire between the solenoid valve and No. 1 fuse.

YES

(To page 12-86)



(cont'd)

Exhaust Gas Recirculation System

Troubleshooting Flow Chart — EGR System (B20A8) (cont'd)

(From page 12-85)

Turn the ignition switch OFF.

Connect the test harness between the EGR valve lift sensor and engine wire harness.

Turn the ignition switch ON.

Measure voltage between Red (+) terminal and Green (-) terminal.

Is there approx. 5 V?

YES

Measure voltage between White (+) terminal and Green (-) terminal.

Is there approx. 1 V?

YES

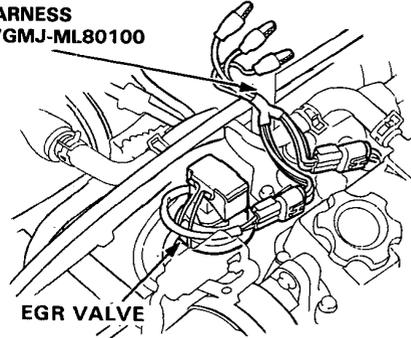
Turn the ignition switch OFF.

Connect the PGM-FI test harness between the ECU and connector (page 12-19).

Turn the ignition switch ON.

(To page 12-87)

TEST HARNESS
07GMJ-ML80100



EGR VALVE

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

Is there approx. 5 V?

YES

Repair open in Green/White wire between ECU (C12) and the sensor.

NO

Turn the ignition switch OFF.

NO

- Replace EGR valve.
- Repair short in Red wire between ECU (A10) and EGR control solenoid valve.

Connect the PGM-FI test harness between the ECU and connector (page 12-19).

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

(To page 12-87)



(From page 12-86)

Measure voltage between C8 (+) terminal and C12 (-) terminal.

Is there approx. 1 V?

YES

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

Measure voltage between A10 (+) terminal and A18 (-) terminal.

Is there battery voltage?

YES

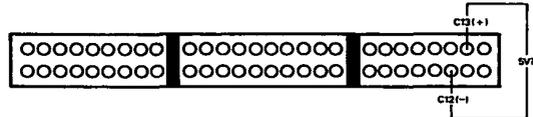
Substitute a known-good ECU and re-check. If symptom/indication goes away, replace the original ECU.

(From page 12-86)

Is there approx. 5 V?

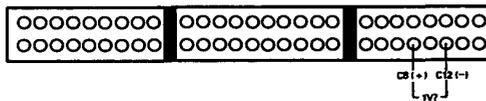
YES

Repair open in Yellow/White wire between ECU (C13) and the sensor.



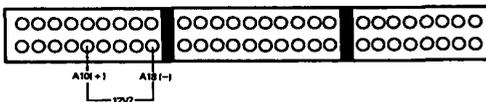
Substitute a known-good ECU and re-check. If prescribed voltage is now available, replace the original ECU.

NO



Repair open in Yellow wire between ECU (C8) and the sensor.

NO



Repair open or short in Red wire between ECU (A10) and EGR control solenoid valve.

NO

Exhaust Gas Recirculation System

Troubleshooting Flow Chart — EGR System (A20A3)



- Check engine warning light has been reported.
- LED indicates CODE 12.

Verify that all connectors between the EGR valve lift sensor and the PGM-FI ECU are securely connected.

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

Disconnect #16 hose from EGR valve.

Connect vacuum pump to EGR valve and apply vacuum.

Does EGR valve hold vacuum?
Did engine stall?

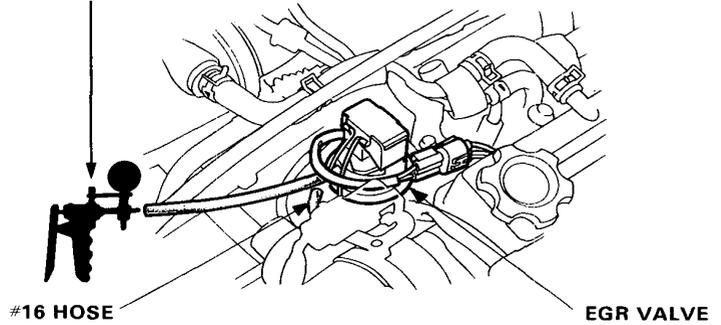
NO

Replace EGR valve.

YES

(To page 12-89)

VACUUM PUMP/GAUGE





(From page 12-88)

Remove #16 hose from EGR valve and substitute a vacuum gauge.

Restart engine and pinch #17 hose.

Is vacuum reading greater than zero?

NO

Stop engine. Disconnect #24 hose from the CVC valve inside the emissions box. Substitute a vacuum gauge. Restart engine.

YES

Is vacuum greater than 6" and less than 10"?

NO

Replace CVC valve.

YES

Release #17 and pinch it again.

Is manifold vacuum available?

NO

Repair blockage in #24 hose or plenum port.

YES

Does vacuum exceed 6" within 1 sec?

NO

Clean orifices in air chamber in emissions box.

YES

Stop engine. Disconnect #24 hose to the CVC valve, disconnect the unnumbered hose from the CVC valve. Attach a vacuum gauge to the open CVC port. Restart engine.

Release #17 hose.

Is vacuum greater than 6" and less than 10"?

NO

Replace CVC valve.

YES

Clean orifices in air chamber in emissions box.

Is vacuum below 1.2"?

NO

Check #17 for blockage; if hose is OK, replace EGR solenoid valve and retest.

YES

Disconnect 2P connector on the control box.

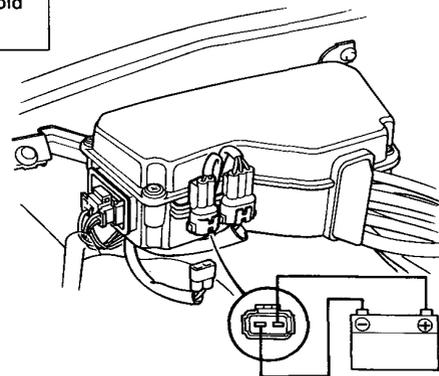
Connect the battery positive terminal to the Black/Yellow terminal and the negative terminal to the Red terminal.

Is vacuum approx. 8"?

NO

Replace EGR control solenoid valve.

YES



(To page 12-90)

(cont'd)

Exhaust Gas Recirculation System

Troubleshooting Flow Chart — EGR System (A20A3) (cont'd)

(From page 12-89)

Measure voltage between Black/
Yellow (+) terminal on the main
wire harness and body ground.

Is there battery voltage?

NO

Repair open in Black/
Yellow wire between
the solenoid valve and
No. 1 fuse.

YES

Turn the ignition switch OFF.

Connect the test harness
between the EGR valve lift sensor
and engine wire harness.

Turn the ignition switch ON.

Measure voltage between Red
(+) terminal and Green (-) ter-
minal.

Is there approx. 5 V?

NO

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

YES

Is there approx. 5 V?

YES

Repair open in Green/
White wire between
ECU (C12) and the
sensor.

NO

Turn the ignition switch OFF.

Measure voltage between White
(+) terminal and Green (-) ter-
minal.

Is there approx. 1 V?

NO

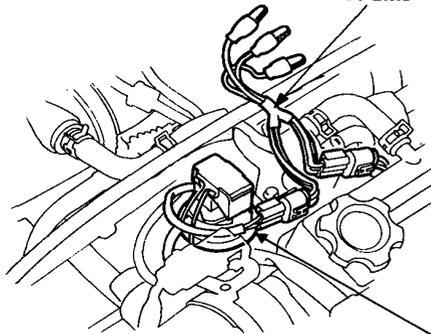
- Replace EGR valve.
- Repair short in Red
wire between ECU
(A10) and EGR con-
trol solenoid valve.

YES

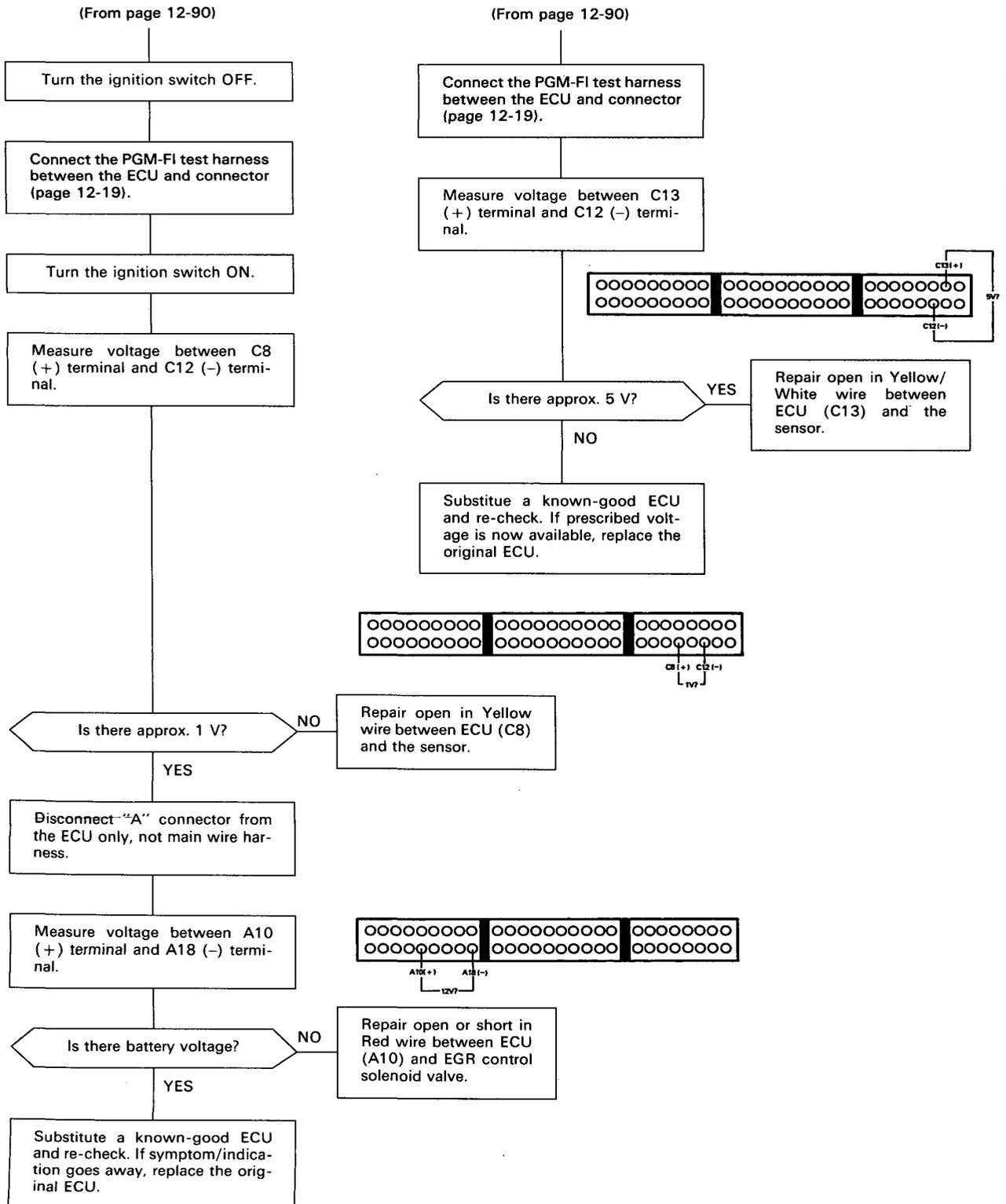
(To page 12-91)

(To page 12-91)

TEST HARNESS
07GMJ-ML80100



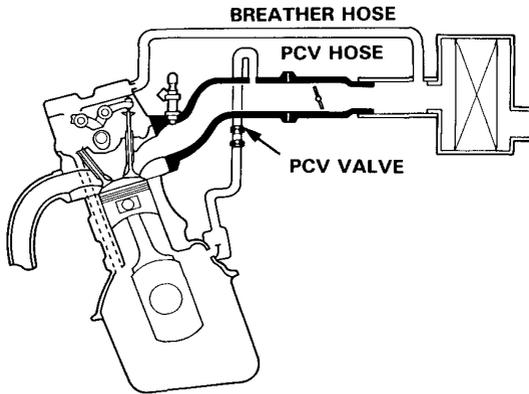
EGR VALVE



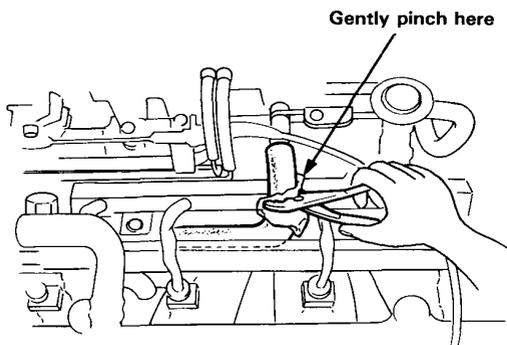
Positive Crankcase Ventilation System

Inspection

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



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



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

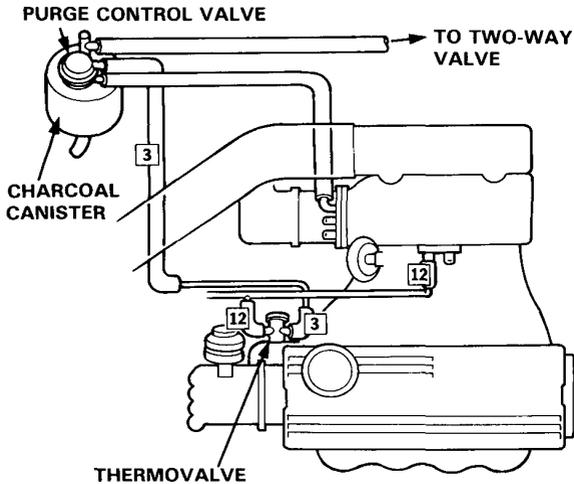
Evaporative Emission Controls



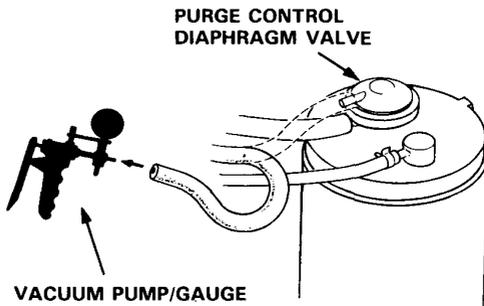
Test

COLD ENGINE

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



2. Disconnect the #3 vacuum hose at the purge control diaphragm valve (on the charcoal canister) and connect a vacuum gauge to the hose.



3. Start the engine and allow to idle.

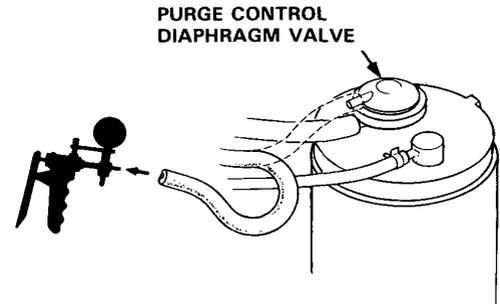
NOTE: Engine coolant temperature must be below 55°C (131°F)

Vacuum should not be available.

- If there is vacuum, replace the thermo valve and re-test.

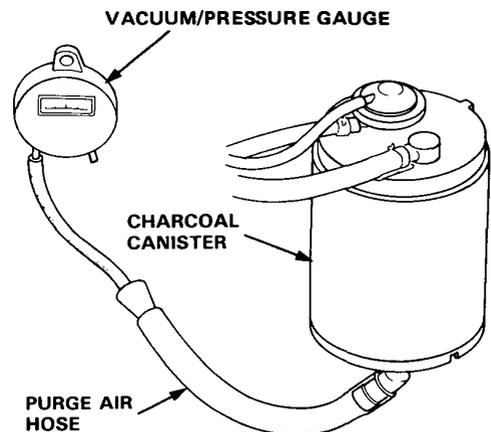
HOT ENGINE

1. Disconnect the #3 vacuum hose at the purge control diaphragm valve (on the charcoal canister) and connect a vacuum gauge to the hose.
2. Warm up the engine to normal operating temperature (cooling fan comes on).



There should be vacuum at idle, once the engine is warm.

- If there is no vacuum, replace the thermo valve and re-test.
3. Disconnect vacuum gauge and reconnect the hose.
 4. Remove fuel filler cap.
 5. Remove canister purge air hose from frame and connect hose to vacuum gauge as shown.



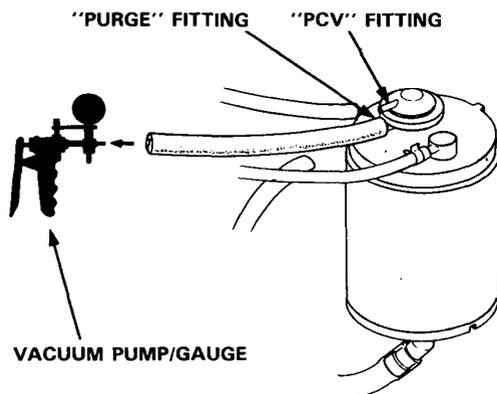
(cont'd)

Evaporative Emission Controls

Test (cont'd)

6. Raise engine speed to $3,500 \text{ min}^{-1}$ (rpm). Vacuum should appear on gauge within 1 minute.
 - If vacuum appears on gauge in 1 minute, remove gauge, test is complete.
 - If no vacuum, disconnect vacuum gauge and re-install fuel filler cap.
7. Remove charcoal canister and check for signs of damage or defects.
 - If defective, replace canister.
8. Stop engine. Disconnect #3 vacuum hose from canister "PCV" fitting. Connect a vacuum pump to canister "purge" fitting as shown, and apply vacuum.

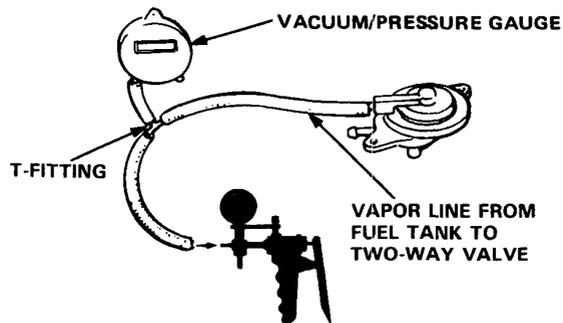
Vacuum should remain steady.



- If vacuum drops, replace canister and re-test.
9. Restart engine. Reconnect hose to canister "PCV" fitting.
- "PURGE" side vacuum should drop to zero.
- If "PURGE" side vacuum does not drop to zero, replace the canister and re-test.

Two-Way Valve

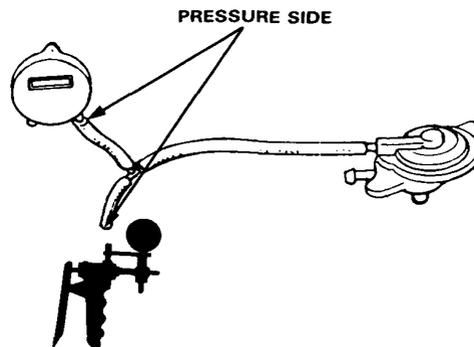
1. Remove the fuel filler cap.
2. Remove vapor line from the fuel tank and connect to T-fitting from vacuum gauge and vacuum pump as shown.



3. Slowly apply vacuum while watching the gauge.

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

- If vacuum stabilizes (valve opens) below 5 mmHg (0.2 in. Hg) or above 15 mmHg (0.6 in. Hg), install new valve and re-test.
4. Move vacuum pump hose from vacuum to pressure fitting, and move vacuum gauge hose from vacuum to pressure side as shown.



5. Slowly pressurize the vapor line while watching the gauge.

Pressure should stabilize at 25 to 55 mmHg (1.0 to 2.2 in. Hg).

- If pressure momentarily stabilizes (valve opens) at 25 to 55 mmHg (1.0 to 2.2 in. Hg), the valve is OK.
- If pressure stabilizes below 25 mmHg (1.0 in. Hg) or above 55 mmHg (2.2 in. Hg), install a new valve and re-test.

Fuel and Emissions (Carbureted Engine)

Component Locations	12-96
Vacuum Connections	12-98
Electrical Connections	12-104
Symptom-to-System Chart	12-105

Carburetor

Symptom-to-Sub System Chart	12-106
Carburetor Assembly	12-108
Idle Speed/Mixture Inspection	12-110
Idle Control System	12-118
Power Valve	12-119
Accelerator Pump	12-120
Float Level Adjustment	12-120
Vacuum Controlled Secondary	12-121
Dashpot System	12-122
System	
Fast Idle Inspection	12-123
Choke Coil Tension and Linkage	12-123
Choke Coil Heater	12-125
Choke Opener	12-126
Fast Idle Unloader	12-128

Fuel Supply System

Symptom-to-Sub System Chart	12-129
Fuel Filters	12-130
Fuel Pump	12-131
Fuel Cut-off Relay	12-132
Fuel Tank	12-133

Air Intake System

Symptom-to-Sub System Chart	12-134
Throttle Cable	12-135
Intake Air Control System	12-137

Emission Control System

Symptom-to-Sub System Chart	12-139
Feedback Control System	12-140
Tailpipe Emissions	12-143
Catalytic Converter	12-143
Air Injection System	12-144
Mixture Control System	12-145

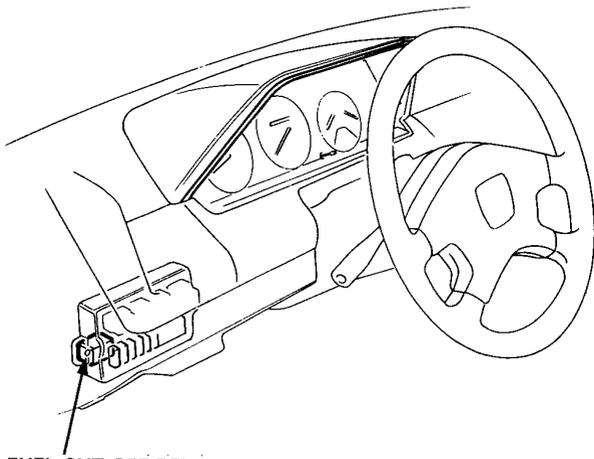
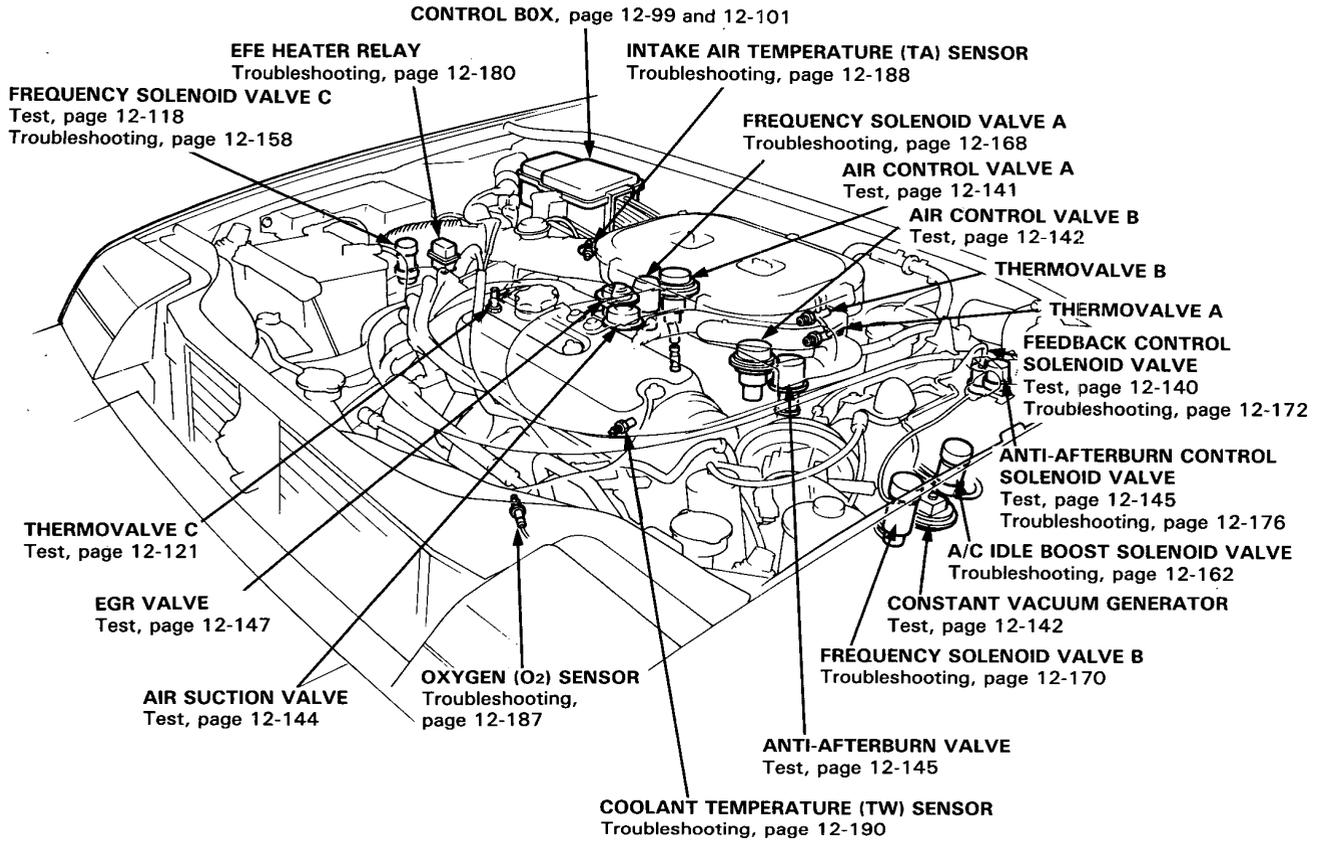
EGR System	12-147
Positive Crankcase Ventilation System	12-149
Evaporative Emission Controls	12-150

Control Unit

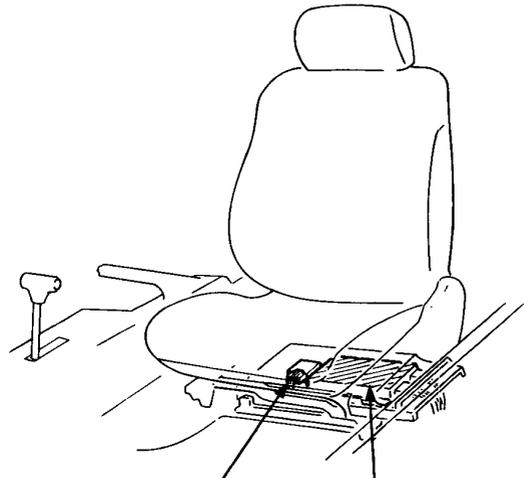
Symptom-to-Sub System Chart	12-155
Input/Output Summary	12-157
Output Troubleshooting	
Frequency Solenoid Valve C	12-158
Idle Boost Solenoid Valve	12-160
A/C Idle Boost Solenoid Valve ...	12-162
Primary Slow Mixture Cut-off Solenoid Valve	12-164
Cranking Leak Solenoid Valve ...	12-166
Frequency Solenoid Valve A	12-168
Frequency Solenoid Valve B	12-170
Feedback Control Solenoid Valve	12-172
Air Suction Control Solenoid Valve	12-174
Anti-afterburn Control Solenoid Valve	12-176
Air Leak Solenoid Valve	12-179
EFE Heater System	12-180
Input Troubleshooting	12-184
Power Sources and Ground	12-185
Starter Signal	12-186
Oxygen Sensor	12-187
Intake Air Temperature Sensor ..	12-188
Coolant Temperature Sensor	12-190
Ignition Coil Signal	12-192
Speed Pulser	12-193
Vacuum Switch A	12-194
Vacuum Switch B	12-196
Vacuum Switch C	12-195
Clutch Switch Signal	12-200
A/T Shift Position Signal	12-202
A/C Switch Signal	12-204



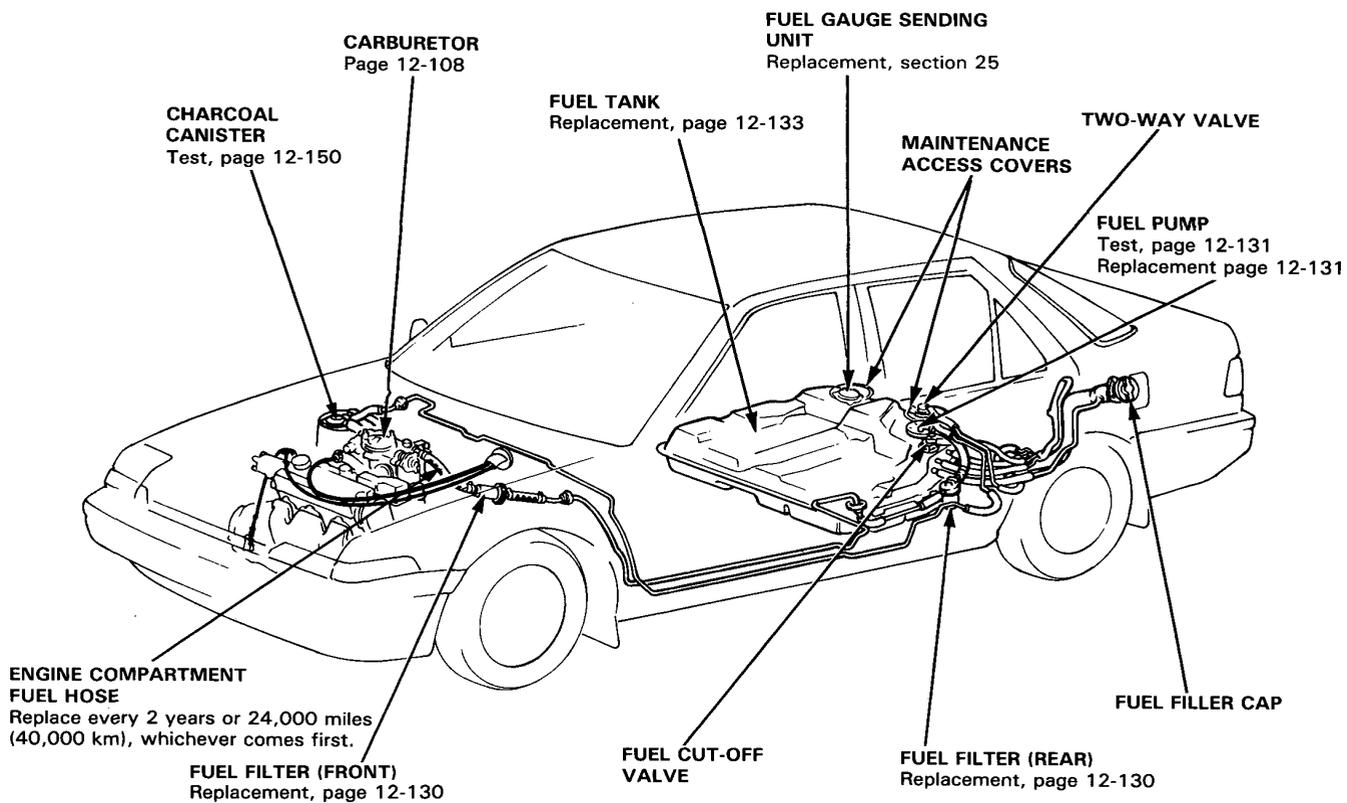
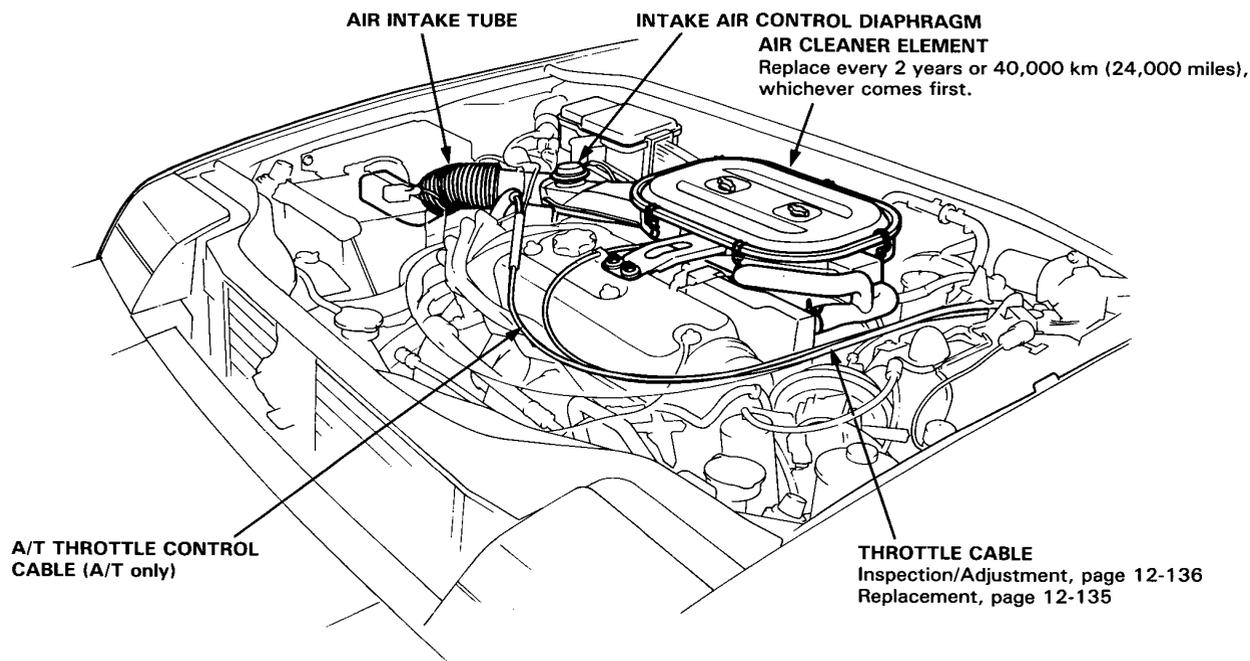
Component Locations



FUEL CUT-OFF RELAY
Test, page 12-132

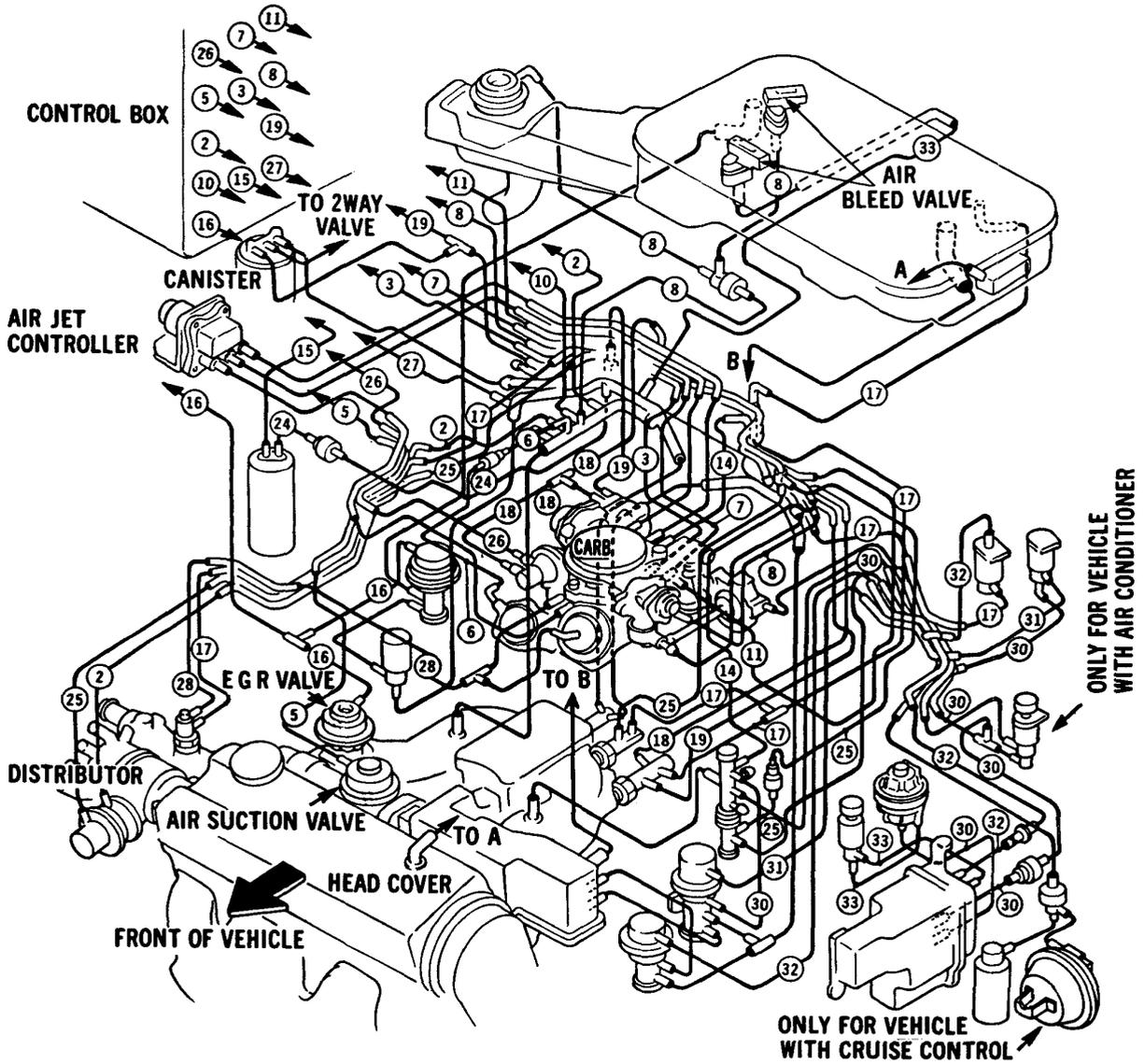


EFE HEATER CONTROL UNIT **EMISSION CONTROL UNIT**
Troubleshooting, page 12-180 Troubleshooting, page 12-155



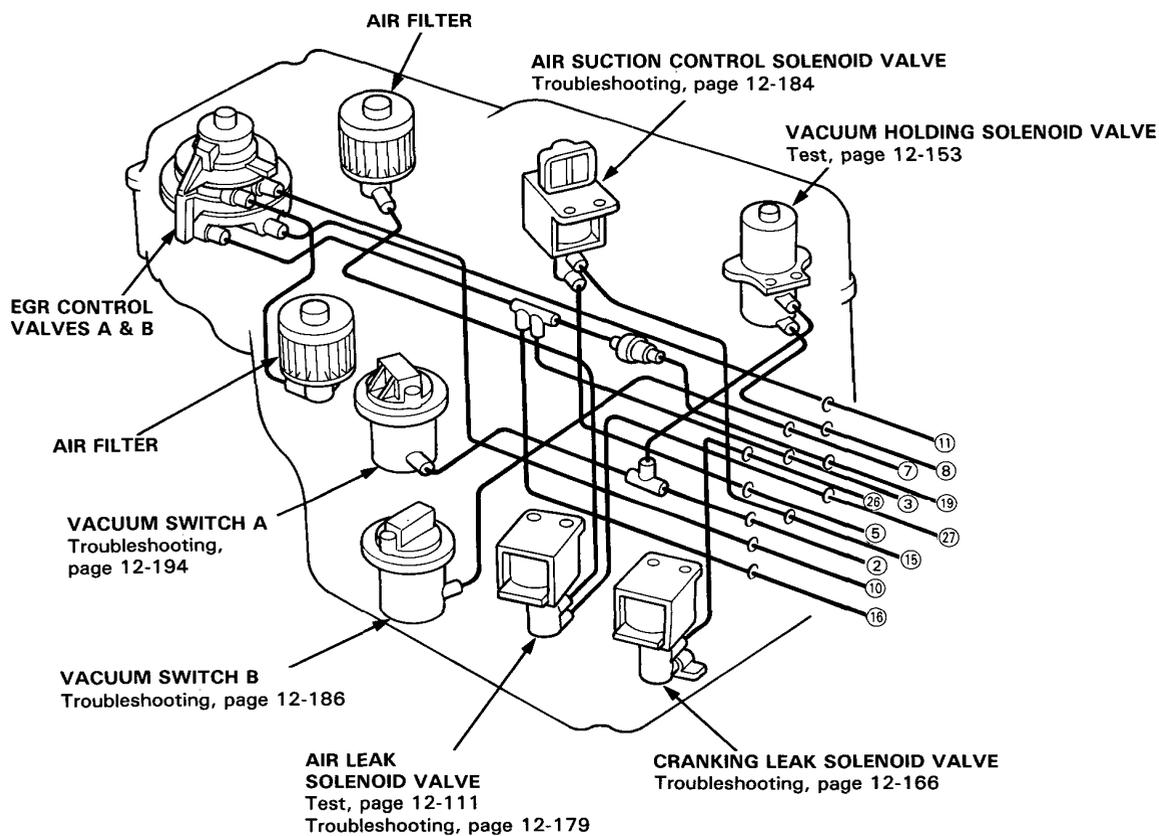
Vacuum Connections

Manual



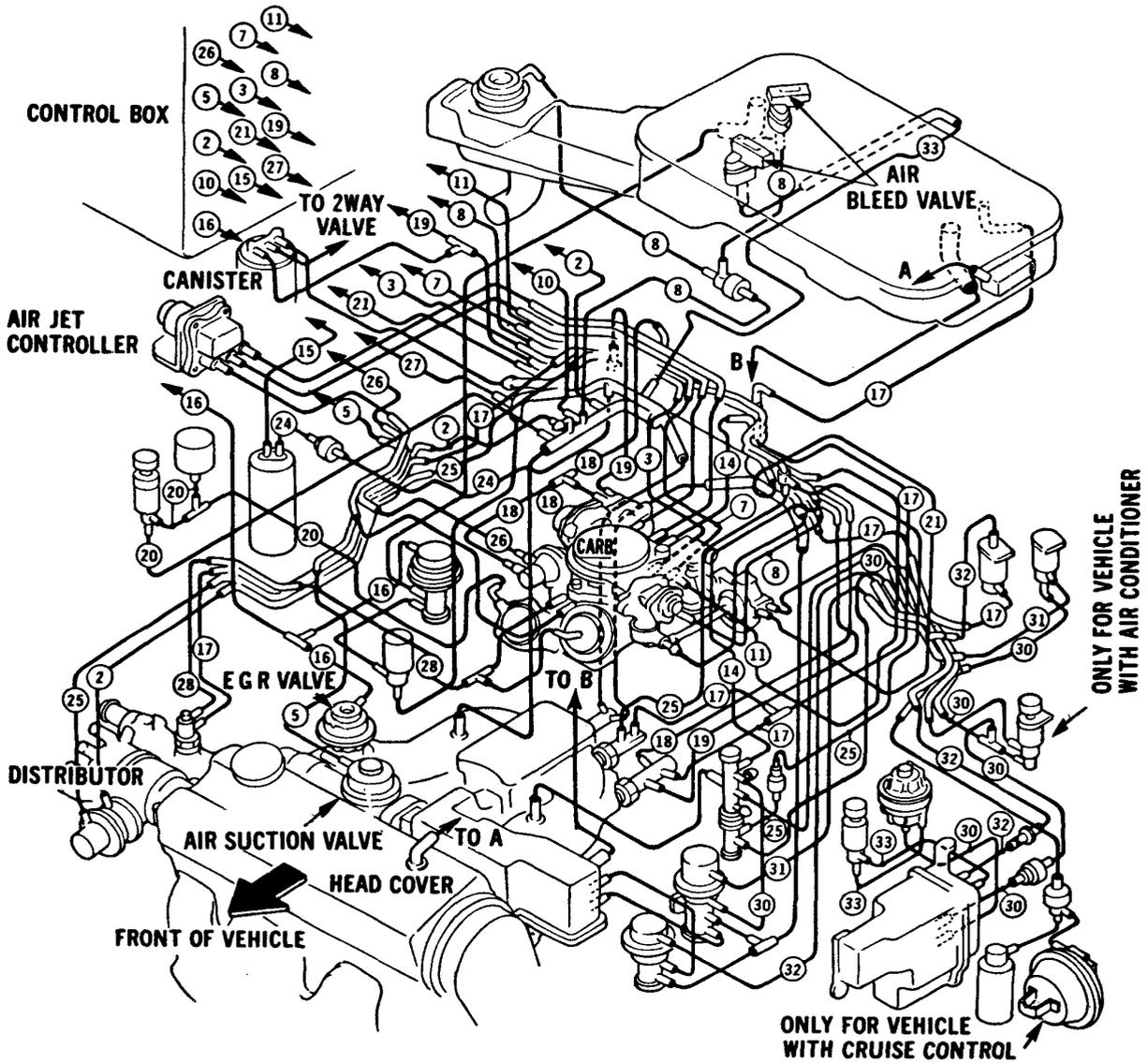


Control Box



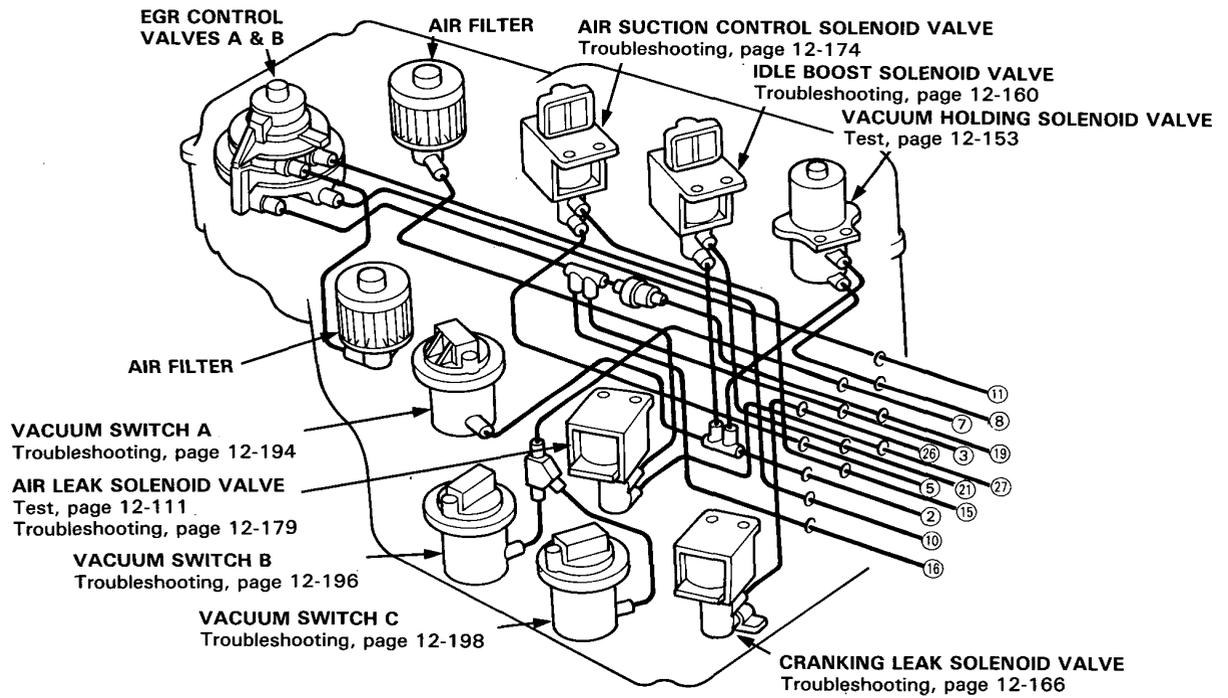
Vacuum Connections

Automatic



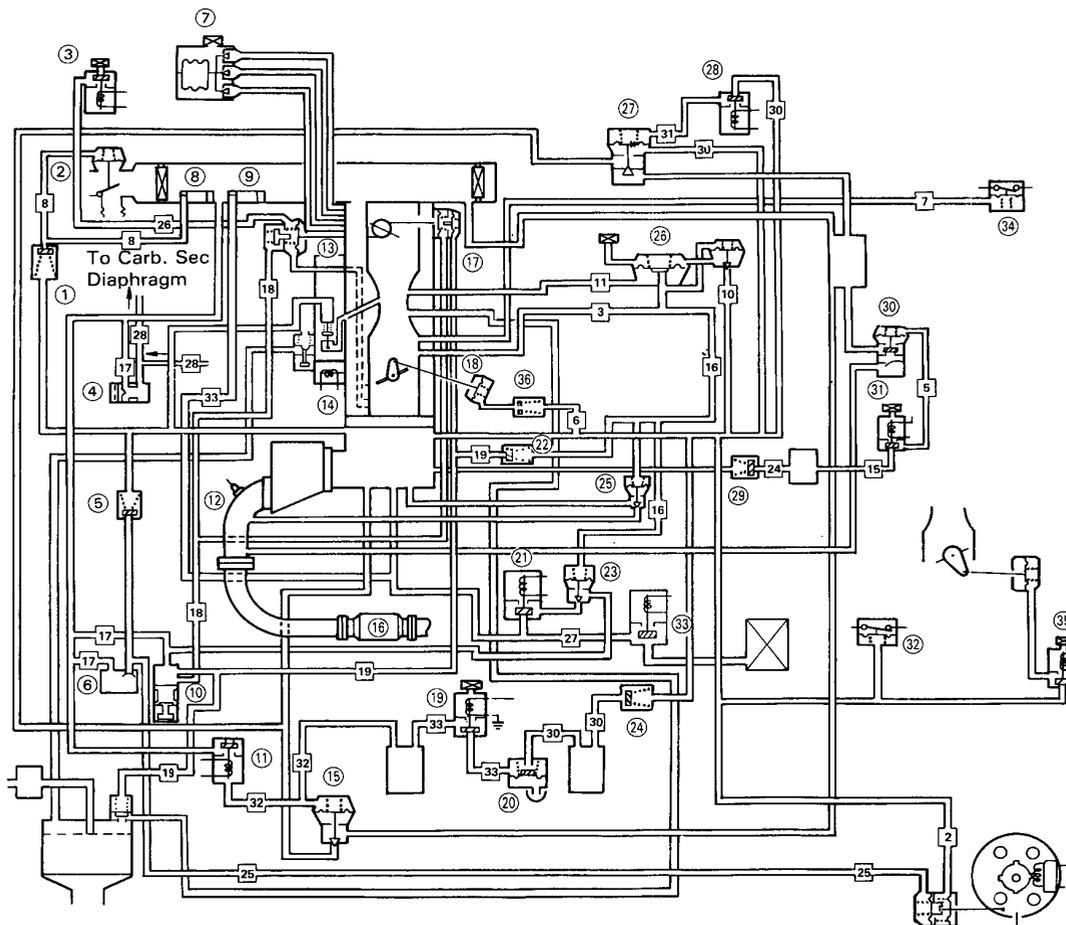


Control Box



Vacuum Connections

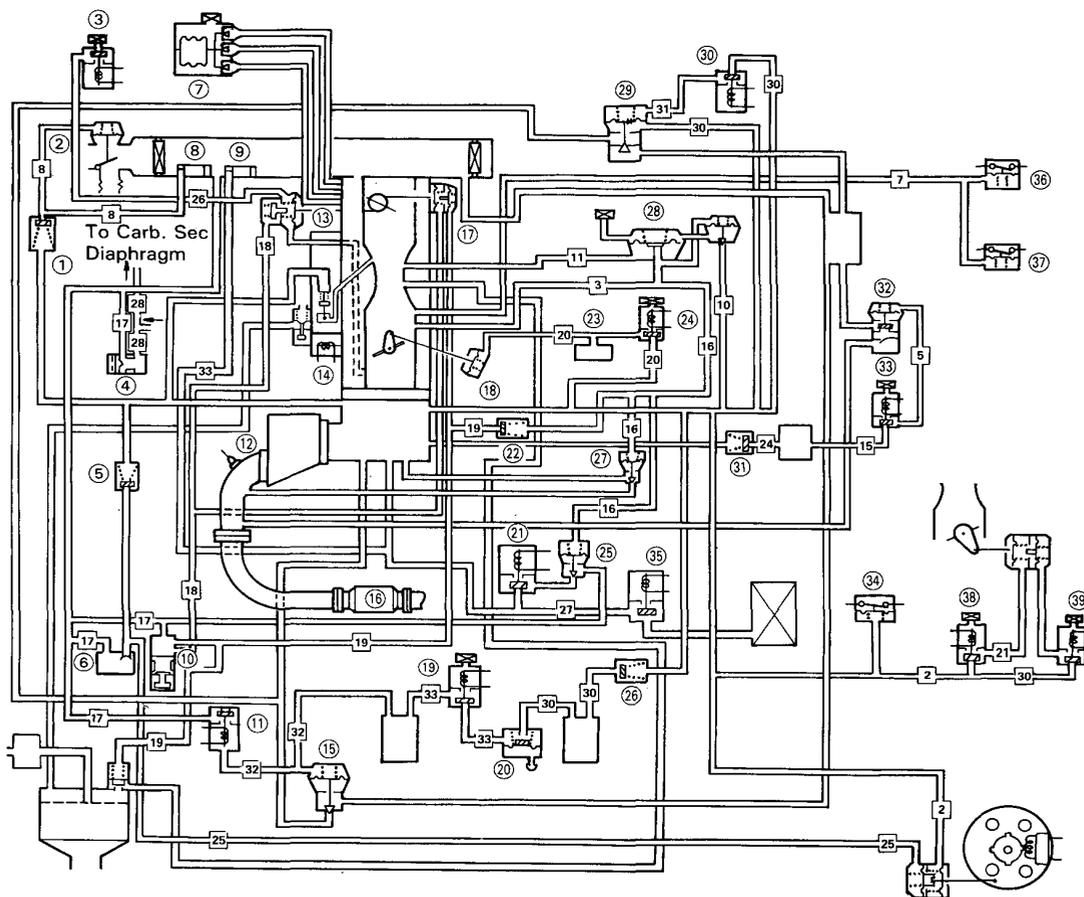
Manual



- | | |
|---|---|
| ① CHECK VALVE (INTAKE AIR TEMP. CONTROL) | ⑱ FREQUENCY SOLENOID VALVE B |
| ② INTAKE AIR CONTROL DIAPHRAGM | ⑳ CV GENERATOR |
| ③ CRANKING LEAK SOLENOID VALVE | ㉑ FREQUENCY SOLENOID VALVE A |
| ④ THERMOVALVE C | ㉒ CHECK VALVE A |
| ⑤ CHECK VALVE E | ㉓ AIR CONTROL VALVE A |
| ⑥ THERMOVALVE B | ㉔ CHECK VALVE B |
| ⑦ AIR JET CONTROLLER | ㉕ EGR VALVE |
| ⑧ AIR BLEED VALVE A | ㉖ EGR CONTROL VALVES A & B |
| ⑨ AIR BLEED VALVE B | ㉗ ANTI-AFTERBURN VALVE |
| ⑩ THERMOVALVE A | ㉘ ANTI-AFTERBURN CONTROL SOLENOID VALVE |
| ⑪ FEEDBACK CONTROL SOLENOID VALVE | ㉙ CHECK VALVE C |
| ⑫ OXYGEN SENSOR | ㉚ AIR SUCTION VALVE |
| ⑬ CHOKE OPENER | ㉛ AIR SUCTION CONTROL SOLENOID VALVE |
| ⑭ PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE | ㉜ VACUUM SWITCH A |
| ⑮ AIR CONTROL VALVE B | ㉝ AIR LEAK SOLENOID VALVE |
| ⑯ CATALYTIC CONVERTER | ㉞ VACUUM SWITCH B |
| ⑰ FAST IDLE UNLOADER | ㉟ A/C IDLE BOOST SOLENOID VALVE |
| ⑱ THROTTLE CONTROLLER | ㊱ DASHPOT CHECK VALVE |

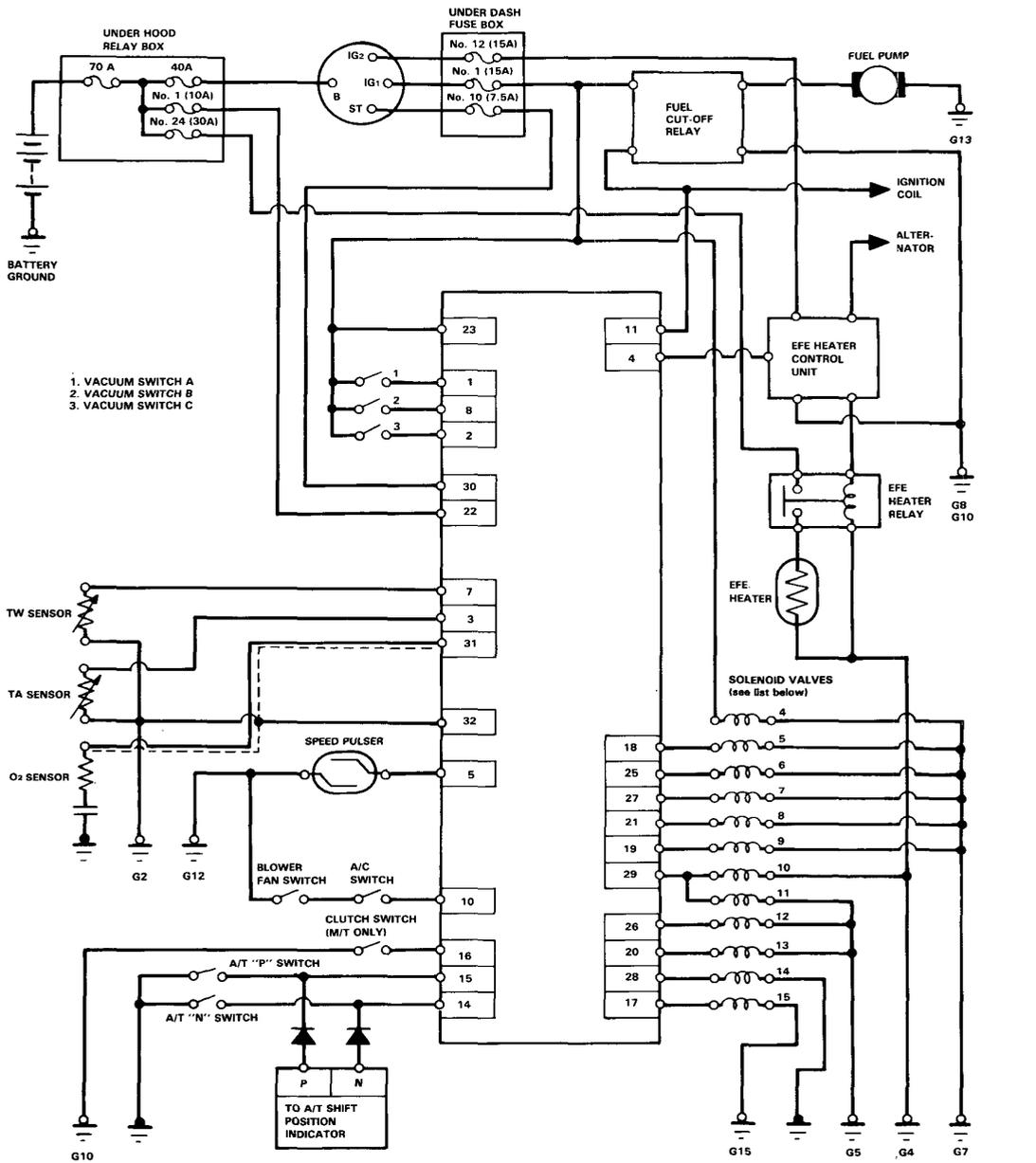


Automatic



- | | |
|---|---|
| ① CHECK VALVE (INTAKE AIR TEMP. CONTROL) | ⑲ FREQUENCY SOLENOID VALVE B |
| ② INTAKE AIR CONTROL DIAPHRAGM | ⑳ CV GENERATOR |
| ③ CRANKING LEAK SOLENOID VALVE | ㉑ FREQUENCY SOLENOID VALVE A |
| ④ THERMOVALVE C | ㉒ CHECK VALVE A |
| ⑤ CHECK VALVE E | ㉓ PULSE RECTIFIER |
| ⑥ THERMOVALVE B | ㉔ FREQUENCY SOLENOID VALVE C |
| ⑦ AIR JET CONTROLLER | ㉕ AIR CONTROL VALVE A |
| ⑧ AIR BLEED VALVE A | ㉖ CHECK VALVE B |
| ⑨ AIR BLEED VALVE B | ㉗ EGR VALVE |
| ⑩ THERMOVALVE A | ㉘ EGR CONTROL VALVES A & B |
| ⑪ FEEDBACK CONTROL SOLENOID VALVE | ㉙ ANTI-AFTERBURN VALVE |
| ⑫ OXYGEN SENSOR | ㉚ ANTI-AFTERBURN CONTROL SOLENOID VALVE |
| ⑬ CHOKE OPENER | ㉛ CHECK VALVE C |
| ⑭ PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE | ㉜ AIR SUCTION VALVE |
| ⑮ AIR CONTROL VALVE B | ㉝ AIR SUCTION CONTROL SOLENOID VALVE |
| ⑯ CATALYTIC CONVERTER | ㉞ VACUUM SWITCH A |
| ⑰ FAST IDLE UNLOADER | ㉟ AIR LEAK SOLENOID VALVE |
| ⑱ THROTTLE CONTROLLER | ㊱ VACUUM SWITCH B |
| ⑳ CV GENERATOR | ㊲ VACUUM SWITCH C |
| | ㊳ IDLE BOOST SOLENOID VALVE |
| | ㊴ A/C IDLE BOOST SOLENOID VALVE |

Electrical Connections



- 1. VACUUM SWITCH A
- 2. VACUUM SWITCH B
- 3. VACUUM SWITCH C

- 4. VACUUM HOLDING SOLENOID VALVE
- 5. AIR LEAK SOLENOID VALVE
- 6. AIR SUCTION CONTROL SOLENOID VALVE
- 7. CRANKING LEAK SOLENOID VALVE
- 8. FREQUENCY SOLENOID VALVE C (A/T ONLY)
- 9. IDLE BOOST SOLENOID VALVE (A/T ONLY)
- 10. FREQUENCY SOLENOID VALVE A
- 11. FREQUENCY SOLENOID VALVE B
- 12. ANTI-AFTERBURN CONTROL SOLENOID VALVE
- 13. FEEDBACK CONTROL SOLENOID VALVE
- 14. PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE
- 15. A/C IDLE BOOST SOLENOID VALVE

23	22	21	X	20	19	18	17
32	31	30	29	28	27	26	25

7	6	5	X	4	3	2	1
16	15	14	13	X	12	11	10

TERMINAL LOCATION

Symptom-to-System Chart



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

PAGE		SYSTEM	CARBURETOR	FUEL SUPPLY	AIR INTAKE	EMISSION CONTROLS	CONTROL UNIT INPUTS AND OUTPUTS
SYMPTOM			106	129	134	139	155
ENGINE WON'T START				①			②
DIFFICULT TO START ENGINE	WHEN COLD		①			②	③
	WHEN WARM		①				②
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION		①			③	②
	WHEN WARM RPM TOO HIGH		①				②
	WHEN WARM RPM TOO LOW		①				②
	ROUGH IDLE/ FLUCTUATION		①			②	②
FREQUENT STALLING	WHILE WARMING UP		①				②
	AFTER WARMING UP		①				②
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING		①	②			
	LOSS OF POWER		③	②	①	②	
	AFTERBURN		②		①	②	③
	HESITATION/ SURGE					②	①
	FAILS EMISSION TEST		②		①	③	③
	SULFUR SMELL		②			①	③

Carburetor

Symptom-to-Sub System Chart

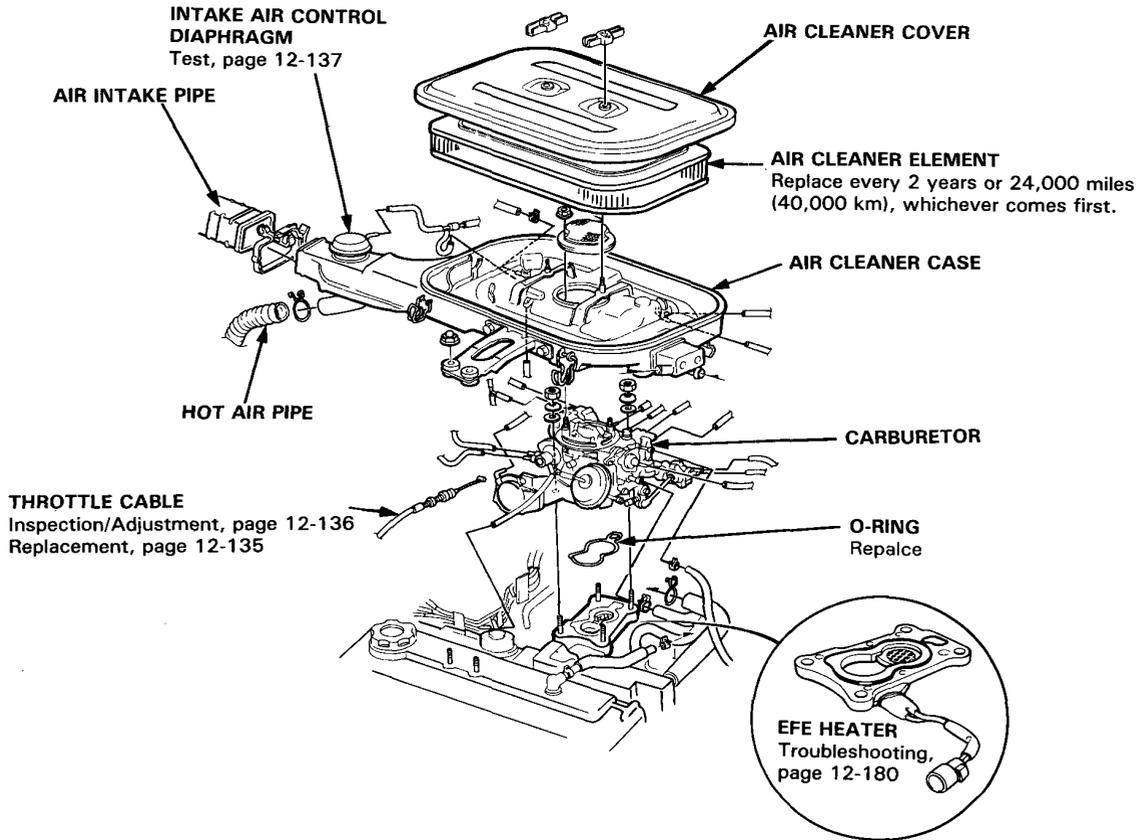
NOTE: Across each row in the chart, the sub systems that could be sources of a symptom are ranked in the order they should be inspected, starting with ①. Find the symptom in the left column, read across to the most likely source, then refer to the page listed at the top of that column. If inspection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

PAGE		SYSTEM	IDLE SPEED/ MIXTURE	AIR JET CONTROLLER	PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE	IDLE CONTROL SYSTEM	POWER VALVE
SYMPTOM							
DIFFICULT TO START ENGINE	WHEN COLD				②		
	WHEN WARM				①	②	
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION				②		
	WHEN WARM RPM TOO HIGH	①				②	
	WHEN WARM RPM TOO LOW	①				②	
	ROUGH IDLE/ FLUCTUATION	①				②	
FREQUENT STALLING	WHILE WARMING UP				①		
	AFTER WARMING UP	①			②		
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING						
	LOSS OF POWER						
	AFTERBURN			②			
	FAILS EMISSION TEST	①					
	SULFUR SMELL	①					



ACCELE- RATOR PUMP	FLOAT LEVEL	HEAT RISER	VACUUM CONTROLLED SECONDARY	DASHPOT SYSTEM	AUTOMATIC CHOKE/ FAST IDLE SYSTEM
120	120	125	121	122	123
③					①
		③			①
					③
		③			②
			②		①
①			①		
				①	
					②

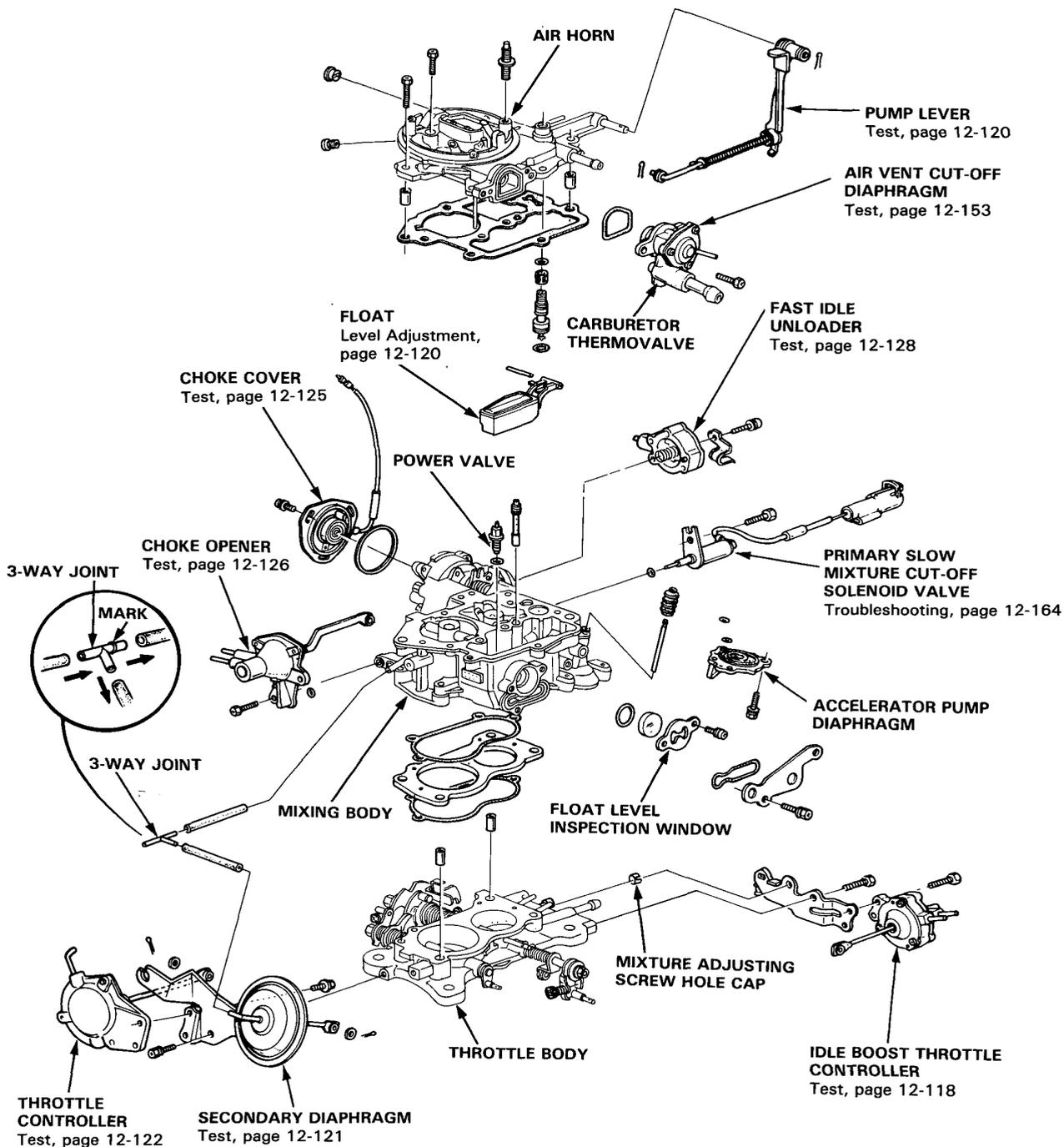
Carburetor



NOTE: Use new gaskets and O-rings whenever re-assembling. Be sure that no foreign material falls on the EFE heater while replacing the air cleaner or servicing around the EFE heater.



NOTE: Be sure that no foreign material gets on the EFE heater when reinstalling the carburetor.



Idle Speed/Mixture

Inspection/Adjustment (KG, KS)

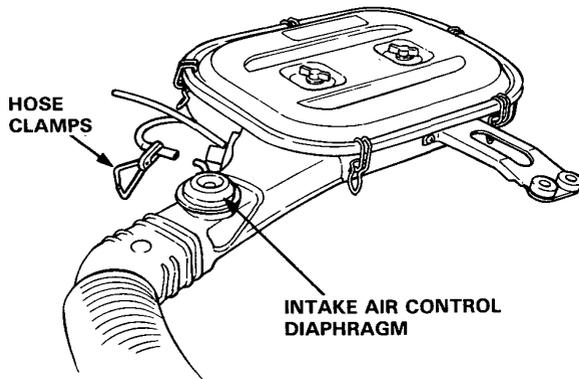
Propane Enrichment Method

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

NOTE: This procedure requires a propane enrichment kit.

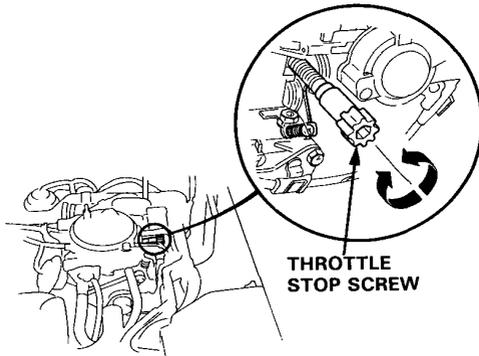
Manual Transmission

1. Start engine and warm up to normal operating temperature; the cooling fan will come on.
2. Remove the vacuum hose from the intake air control diaphragm and clamp the hose end.



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

Idle speed should be: $800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$

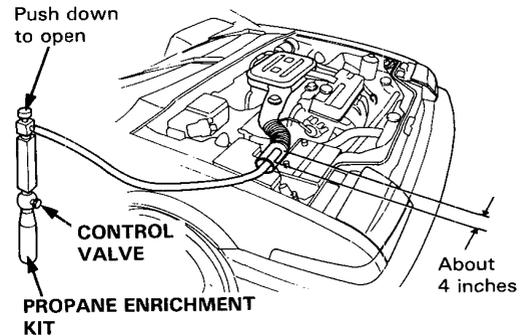


Adjust the idle speed, if necessary, by turning the throttle stop screw.

NOTE: If the idle speed is excessively high, check the dashpot system (page 12-122).

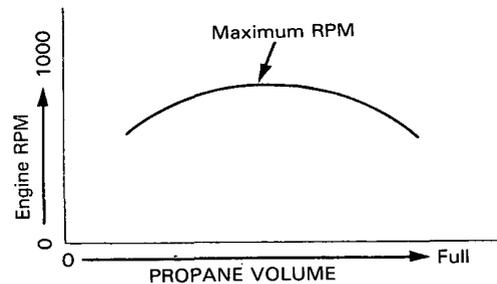
5. Disconnect air cleaner intake tube from air intake duct.
6. Insert the hose of the propane enrichment kit into the intake tube about 4-inches.

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



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

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

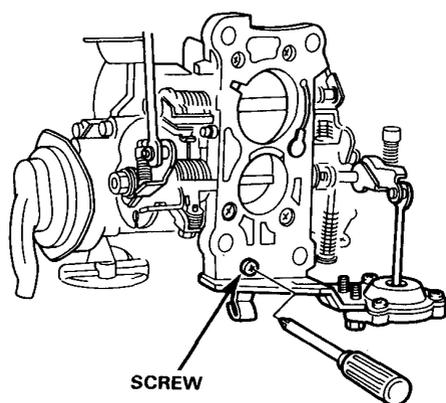


RPM increase should be: $50 \pm 20 \text{ min}^{-1} \text{ (rpm)}$

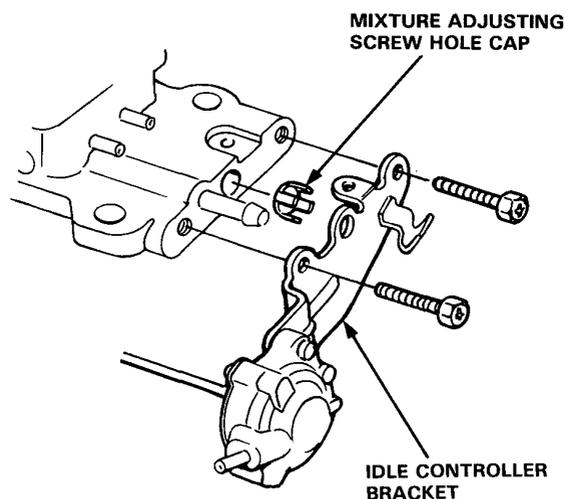
- If engine speed does not increase per specification, mixture is improperly adjusted. Go to step 8.
 - If engine speed increases per specification, go to step 21.
8. Remove the air cleaner and close the propane control valve.
 9. Disconnect the vacuum hose to the fast idle unloader.



10. Pull the throttle cable out of its bracket.
11. Remove the carburetor nuts and the bolt securing the steel vacuum manifold.
12. Lift the carburetor clear of its studs, then tilt it backwards so you can remove the idle controller bracket screws.
13. Remove the idle controller bracket.



14. Remove the mixture adjusting screw hole cap, then reinstall the idle controller bracket.



15. Reinstall the carburetor, but first check the insulator block for damage.
16. Reconnect the vacuum hose to the fast idle unloader.

17. Reinstall the air cleaner.
18. Start engine and warm up to normal operating temperature; the cooling fan will come on.
19. Remove the vacuum hose from intake air control diaphragm and clamp the hose end.
20. Reinstall the propane enrichment kit and recheck maximum propane enriched rpm.

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

21. Close the propane control valve and recheck idle speed.

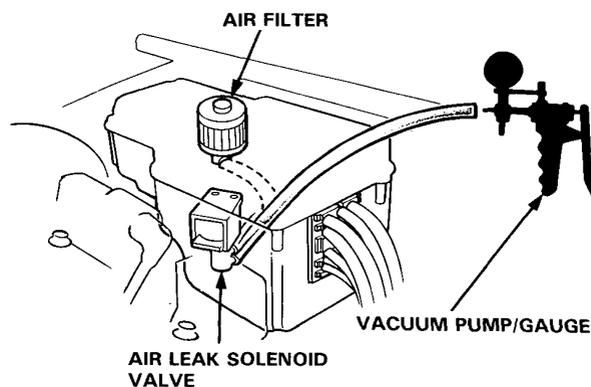
Idle speed should be: $800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$

- If idle speed is as specified (step 4), go to step 22.
- If idle speed is not as specified, adjust by turning throttle stop screw, then repeat steps 20 and 21.

22. If the intake air temperature is above 65°C (149°F), go on to step 23 through 26.

23. Disconnect #5 vacuum hose from the air suction valve and plug the hose.

24. Open the control box lid. Disconnect the lower vacuum hose of the air leak solenoid valve (between the solenoid valve and the air filter) from the air filter and connect a vacuum gauge to the hose.



(cont'd)

Idle Speed/Mixture

Inspection/Adjustment (cont'd)

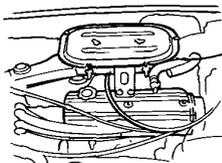
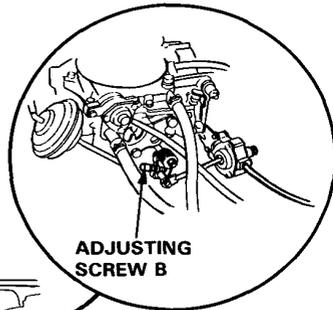
25. With the engine idling, depress the push button on top of propane device, then slowly open the propane control valve and check for vacuum.

There should be vacuum.

- If there is no vacuum, check the air leak solenoid valve (page 12-179).

26. Reconnect all hoses.
27. Check the air bleed valve B (page 12-141)
28. Remove propane enrichment kit and reconnect air cleaner intake tube on the air intake duct.
29. Reinstall the mixture adjusting screw hole cap.
30. If equipped with air conditioner, check the idle speed with the A/C on.

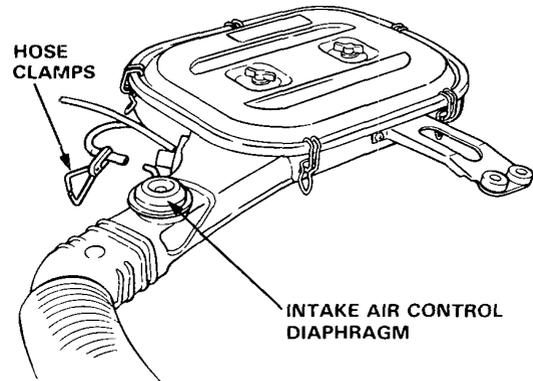
Idle speed should be: $750 \pm 50 \text{ min}^{-1}$ (rpm)



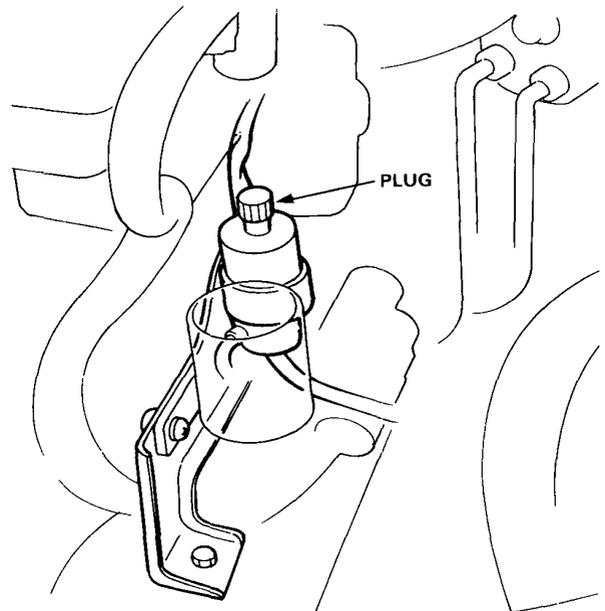
Adjust the idle speed, if necessary, by turning the adjusting screw B.

Automatic Transmission

1. Start engine and warm up to normal operating temperature; the cooling fan will come on.
2. Remove the vacuum hose from the intake air control diaphragm and clamp the hose end.

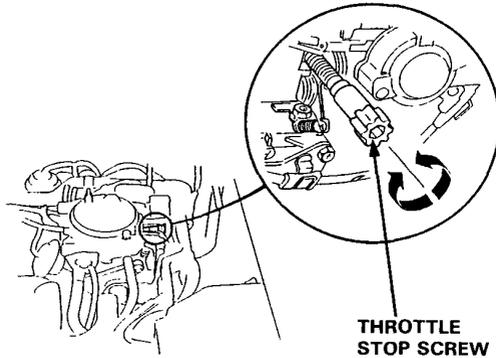


3. Connect tachometer.
4. Remove the air filter from frequency solenoid valve C and plug the opening in the solenoid valve.

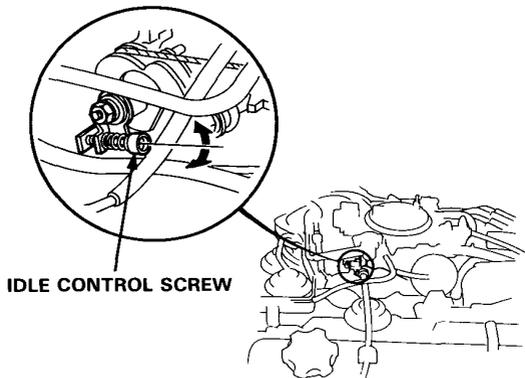




5. With the headlights, heater blower, rear window defogger, cooling fan and air conditioner off, and transmission in "N" or "P", lower the idle speed as much as possible by turning the throttle stop screw.



6. Adjust the idle speed by turning the idle control screw to $630 \pm 50 \text{ min}^{-1}$ (rpm).



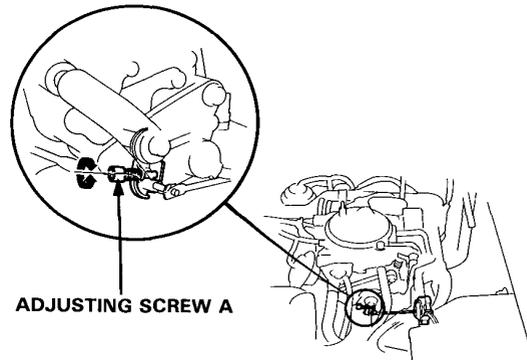
7. Adjust the idle speed by turning the throttle stop screw to $700 \pm 50 \text{ min}^{-1}$ (rpm).

8. With transmission in gear (except "P" or "N"), adjust the idle speed by turning adjusting screw A.

Idle speed should be:

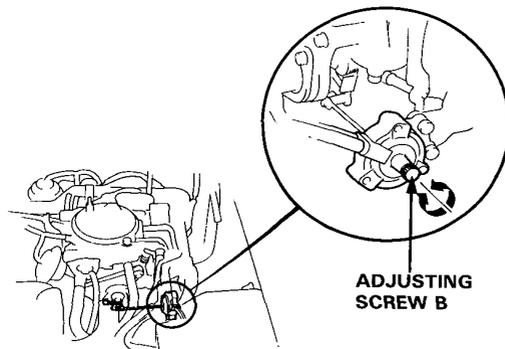
$675 \pm 50 \text{ min}^{-1}$ (rpm) (at high altitude)

$700 \pm 50 \text{ min}^{-1}$ (rpm) (at low altitude)



9. Shift transmission to "N" or "P" position.

10. If equipped with air conditioner, adjust the idle speed by turning adjusting screw B to $700 \pm 50 \text{ min}^{-1}$ (rpm) with A/C on.



11. Stop the engine, remove the inside vacuum hose from the idle boost throttle controller and plug the hose.

(cont'd)

Idle Speed/Mixture

Inspection/Adjustment (cont'd)

12. Check the maximum engine speed by the propane enrichment method (page 12-110, steps 5 through 7).

**RPM increase should be: $30 \pm 10 \text{ min}^{-1} \text{ (rpm)}$
(in gear)**

- If engine speed increases per specification, go to step 13.
- If engine speed does not increase per specification, adjust the enriched speed by turning the mixture screw (page 12-110, steps 8 through 20).

13. Stop engine. Close the propane control valve, remove all plugs, and reconnect all hoses.

14. Restart the engine and recheck idle speed.

NOTE: Raise the engine speed to 2,500 rpm 2 or 3 times in 10 seconds, and then check the idle speed.

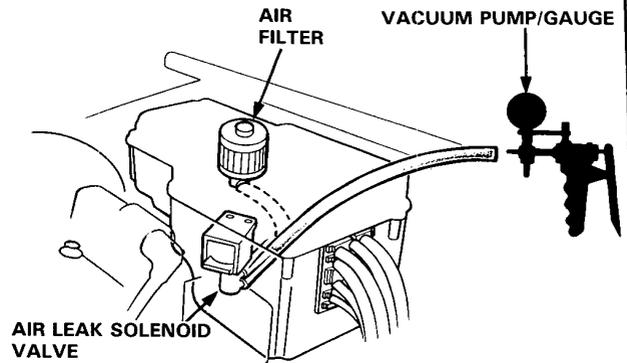
**Idle speed should be: $730 \pm 50 \text{ min}^{-1} \text{ (rpm)}$
(in "N" or "P")**

- If the idle speed is as specified, go to step 16.
- If the idle speed is not as specified, return to steps 4 through 12.

15. If the intake air temperature is above 65°C (149°F), go on to step 17 through 20.

16. Disconnect #5 vacuum hose from the air suction valve and plug the hose.

17. Open the control box lid. Disconnect the lower vacuum hose of the air leak solenoid valve (between the solenoid valve and the air filter) from the air filter and connect a vacuum gauge to the hose.



18. With the engine idling, depress the push button on top of the propane device, then slowly open the propane control valve and check for vacuum.

There should be vacuum.

- If there is no vacuum, check the air leak solenoid valve (page 12-179).

19. Reconnect all hoses.

20. Check the air bleed valve B (page 12-141).

21. Remove propane enrichment kit and reconnect air cleaner intake tube on the air intake duct.

22. Reinstall the mixture adjusting screw hole cap.

23. Recheck the idle speed with the A/T shift lever in gear.

Idle speed should be: $730 \pm 50 \text{ min}^{-1} \text{ (rpm)}$

24. Recheck the idle speed with the A/C on and with the shift lever in "P" or "N" position.

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

25. Recheck the idle speed with the A/C on and in gear.

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

26. If the idle rpm does not reach the specified idle speeds in steps 15 and 24 through 26, inspect the idle control system (page 12-118).



Inspection/Adjustment (KX)

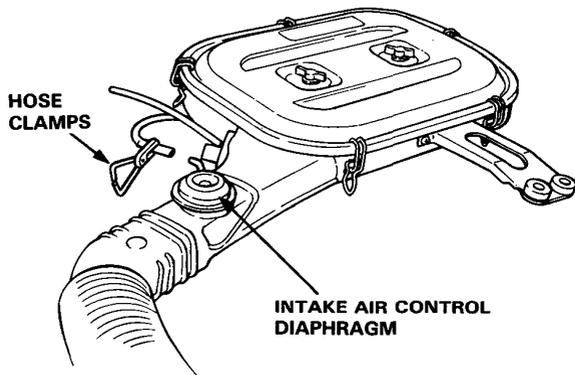
Propane Enrichment Method

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

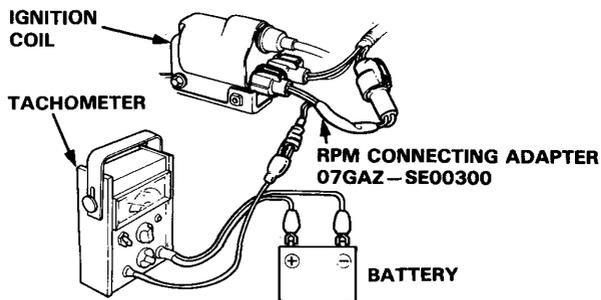
NOTE: This procedure requires a propane enrichment kit.

Manual Transmission

1. Start engine and warm up to normal operating temperature; the cooling fan will come on.
2. Remove the vacuum hose from the intake air control diaphragm and clamp the hose end.

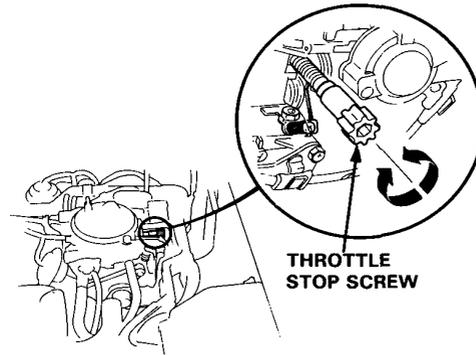


3. Connect tachometer.



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

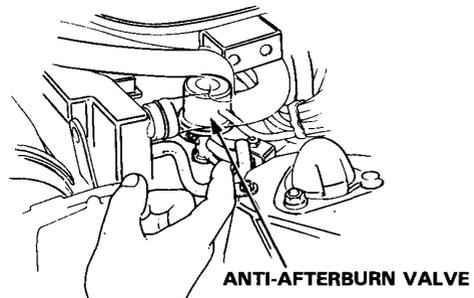
Idle speed should be: $800 \pm 50 \text{ min}^{-1} \text{ (rpm)}$



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

NOTE: If the idle speed is excessively high, check the dashpot system (page 12-122).

5. Disconnect the air suction lower hose at the anti-afterburn valve.

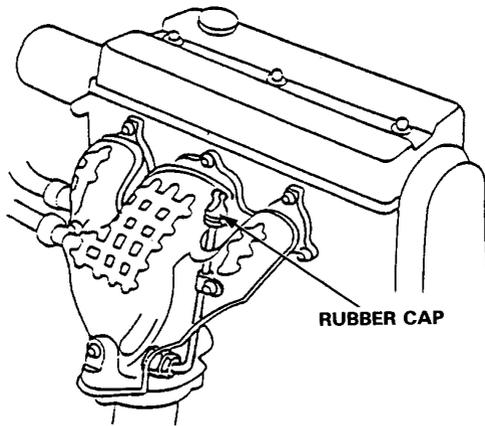


(cont'd)

Idle Speed/Mixture

Inspection/Adjustment (KX) (cont'd)

6. Remove the rubber cap from the gas pipe and set the CO meter.



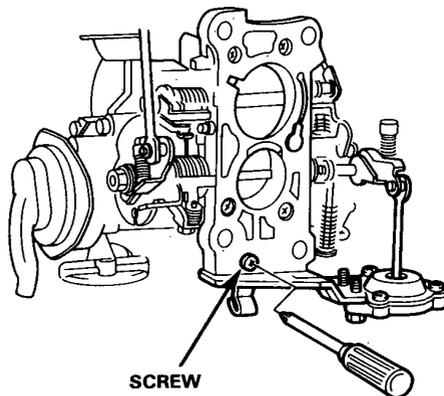
7. Warm up and check the idle CO with the headlights, heater blower, window defogger, cooling fan and air conditioner off. CO meter should indicate 1.0 ± 1.0 % CO. If the idle Co is not within the specification, adjust the following the steps.

8. Disconnect the vacuum hose to the fast idle unloader.

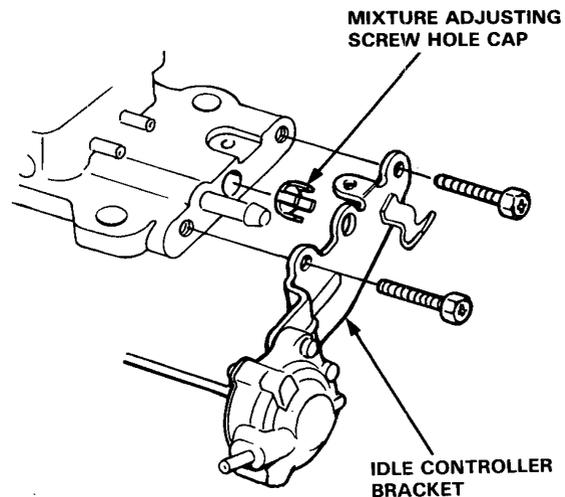
9. Pull the throttle cable out of its bracket.

10. Lift the carburetor cleaner of its studs, then tilt it backwards so you can remove the idle controller bracket screws.

11. Remove the idle controller bracket.



12. Remove the mixture adjusting screw hole cap, then reinstall the idle controller bracket.



13. Reinstall the carburetor, but first check the insulator block for damage.

14. Reconnect the vacuum hose to fast idle unloader.

15. Reinstall the air cleaner.

16. Remove the CO meter and install the rubber cap to the gas pipe.

17. Restart the engine and warm up normal operating temperature (the cooling fan comes on).

18. Remove the rubber cap and set the CO meter.

19. Adjust the mixture screw to the CO meter indicating 1.0 ± 1.0 % CO.

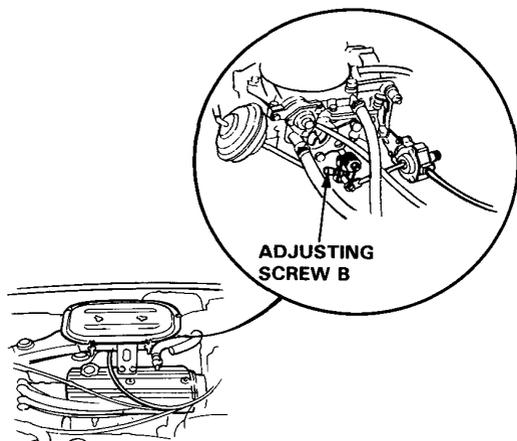
20. Remove the CO meter and install the rubber cap to the gas pipe.

21. Reinstall the mixture adjusting screw hole cap and carburetor.



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

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



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

23. Connect the air suction lower hose at the anti-afterburn valve.
24. Restart the engine and warm up (with $2,000 \text{ min}^{-1}$ (rpm) in no-load condition and the cooling fan comes on).
25. Remove the rubber cap and set the CO meter.
26. Check the CO, HC, CO₂ with the headlights, heater blower, window defogger, cooling fan and air conditioner off (shift position A: automatic)
CO: 0.1–2.0 %
HC: 1,000 ppm Maximum
CO₂: 7 % Minimum
27. Remove the CO meter and install the rubber cap to the gas pipe.
28. Set the CO meter to the tail pipe and check the CO, HC, CO₂.
CO: 0.0–0.1 %
HC: 100 ppm Maximum
CO₂: 7 % Minimum
29. Remove the CO meter.

Idle Control System (A/T only)

Test

1. Check the idle speed with the headlights, heater blower, rear window defogger, cooling fan and air conditioner off, and the shift lever in "P" or "N" position.

Idle speed should be: $730 \pm 50 \text{ min}^{-1}$ (rpm)

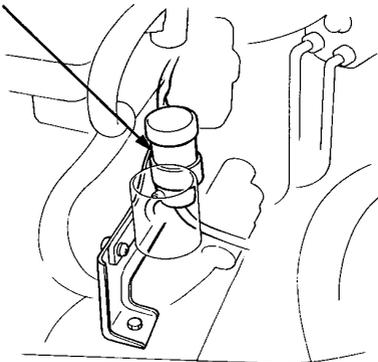
- If the specified idle speed is available, go on to step 4.
- If the specified idle speed is not available, go on to step 2.

2. Check that the frequency solenoid valve C is operating.

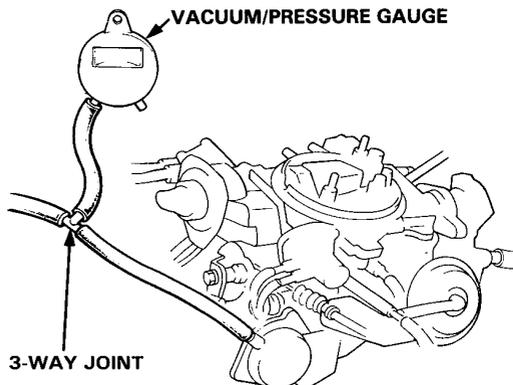
NOTE: It may be easier to determine if the valve is working by placing your hand on it.

The solenoid valve should be clicking on and off continuously.

FREQUENCY SOLENOID VALVE C



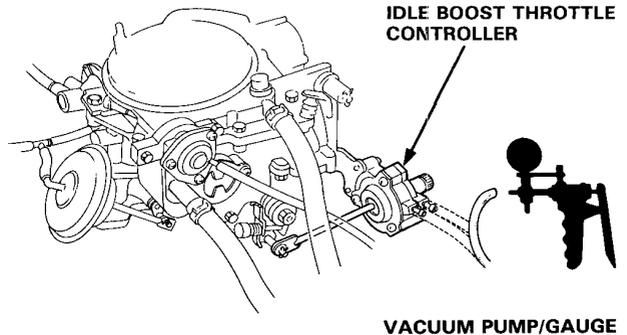
- If the solenoid valve doesn't operate properly, go to output troubleshooting (page 12-158).
- If the solenoid valve operates properly, connect the throttle controller hose to a 3-way joint, with a vacuum gauge in-line, as shown.



- If there is vacuum, go on to step 3.
- If there is no vacuum, check the vacuum hose for proper connection and condition.

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

There should be no vacuum in both hoses.



- If there is no vacuum, replace the throttle controller and retest.
- If there is vacuum at either hose, go to output troubleshooting for idle boost (page 12-160) or A/C idle boost solenoid valve (page 12-162 or 64).

4. Check the idle speed in "D3" or "D4."

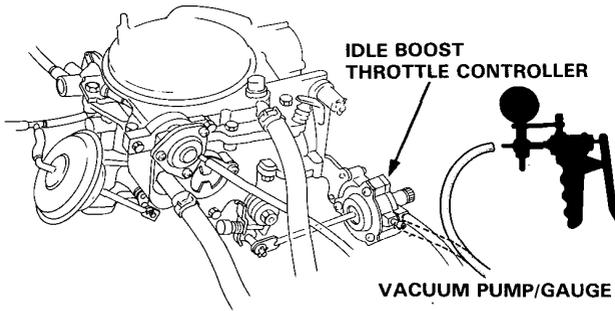
Idle speed should be: $730 \pm 50 \text{ min}^{-1}$ (rpm)

- If the specified idle speed is not available, disconnect the inner vacuum hose on the idle boost throttle controller and check for vacuum.



Power Valve

Test

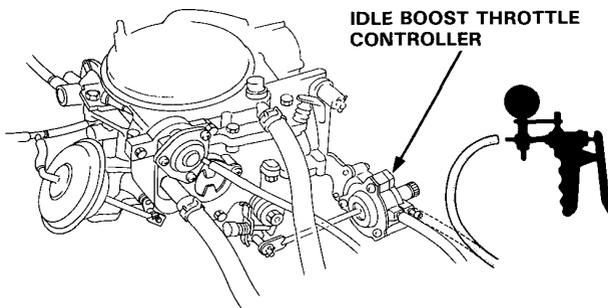


- If there is vacuum, first check the throttle valve for smooth operation, then replace the idle boost throttle controller and recheck.
- If there is no vacuum, go to output troubleshooting (page 12-160).

5. Check the idle speed with the transmission set to "N" or "P," and the air conditioner ON. No other load on the engine at this time.

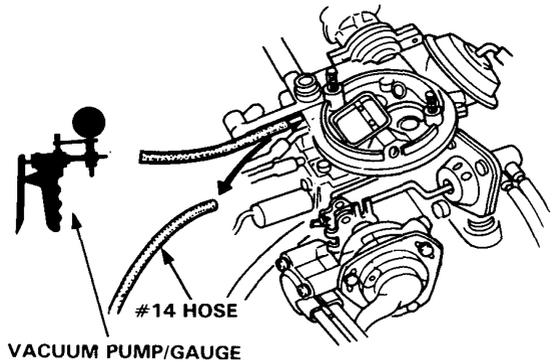
Idle speed should be: $750 \pm 50 \text{ min}^{-1}$ (rpm)

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



- If there is vacuum in each hose, replace the idle boost throttle controller and recheck.
- If there is no vacuum only at the inside hose, go to output troubleshooting (page 12-160).
- If there is no vacuum only at the outside hose, go to output troubleshooting (page 12-162).

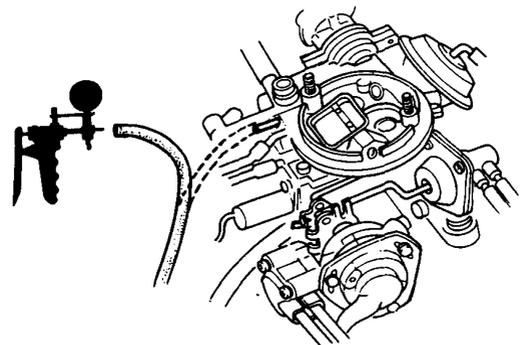
1. Disconnect the #14 vacuum hose from the power valve and connect a vacuum pump to the valve. Apply vacuum and listen for a clicking noise from the power valve.



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

2. Start the engine and wait for it to warm up.

3. Disconnect the #14 vacuum hose from the power valve and connect a vacuum gauge to the hose. Check that there is vacuum at idling.

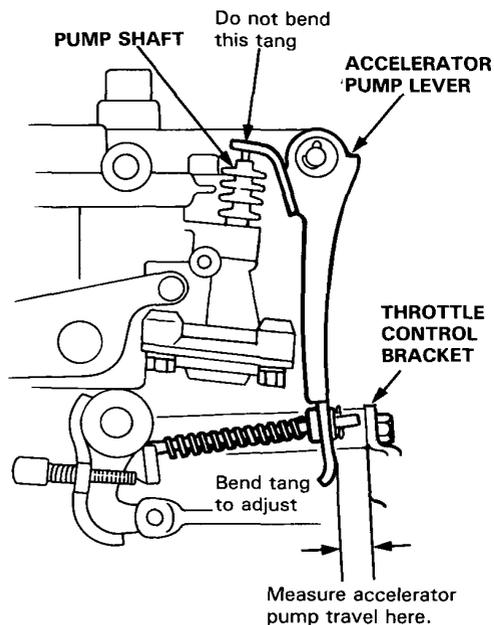


- If there is no vacuum, check the vacuum hose for disconnection, tears and clogging.

Accelerator Pump

Inspection

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



2. To check linkage travel, measure gap between bottom end of pump lever (tang) and stop as shown.

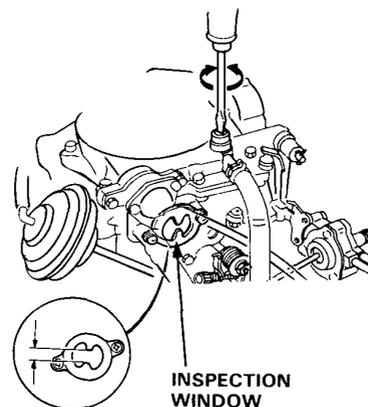
Limits: 11.5 to 12.0 mm (29/64" to 31/64")

Float Level

Adjustment

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

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



4. If the fuel level is not centered, adjust it by slowly turning the adjusting screw.
5. Paint the adjustment screw with white paint after adjustment.

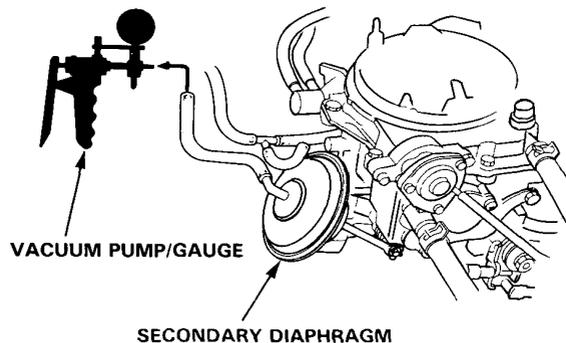
NOTE: Do not turn the adjusting screw more than 1/8-turn every 15-seconds.

Vacuum Controlled Secondary



Test

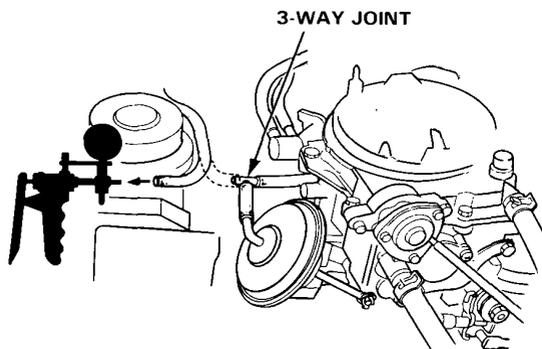
1. Disconnect the secondary diaphragm vacuum hose and attach a spare piece of hose between the diaphragm and a vacuum pump.
2. Open the throttle valve fully and apply a vacuum. Check that the diaphragm rod moves as vacuum is applied and that the vacuum then remains steady.



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

3. With the engine cold [water temperature below 50°C (122°F)] disconnect the vacuum hose from the 3-way joint, connect a vacuum pump and apply a vacuum.

Vacuum should not hold.



- If vacuum holds, first make sure the hose is not clogged, then replace thermostatic valve C.

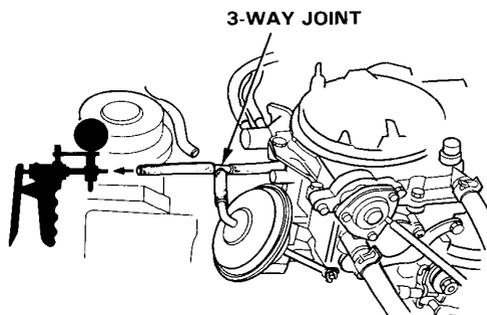
4. After the engine has warmed up, disconnect the vacuum hose from the 3-way joint, connect a vacuum pump, and apply vacuum.

Vacuum should remain steady.

- If it does not remain steady, check the hose for proper connection and condition and replace thermostatic valve C.

5. Disconnect the vacuum hose from the 3-way joint and connect to a vacuum pump/gauge. Apply a vacuum.

It should not hold vacuum.



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

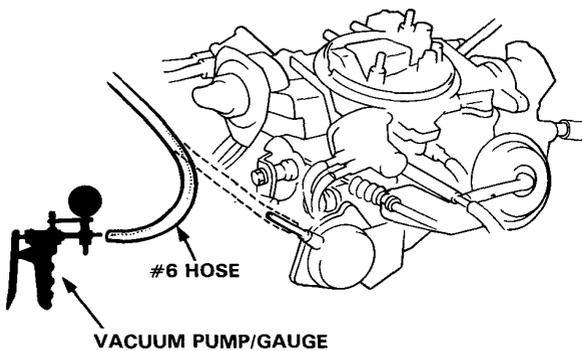
Dashpot System (M/T only)

Test

HOT ENGINE

NOTE: If the dashpot diaphragm in the throttle controller is damaged or vacuum to the dashpot diaphragm is blocked or leaks, correct idle speed can not be obtained. The idle speed will be excessively high after warming up the engine.

1. Connect a tachometer, start the engine and allow it to reach normal operating temperature (the cooling fan comes on).
2. Check that the idle speed is not excessively high.
 - If the idle speed is within specification, go on to step 3.
 - If the idle speed is excessively high, disconnect #6 vacuum hose from the throttle controller and check for vacuum at the hose.

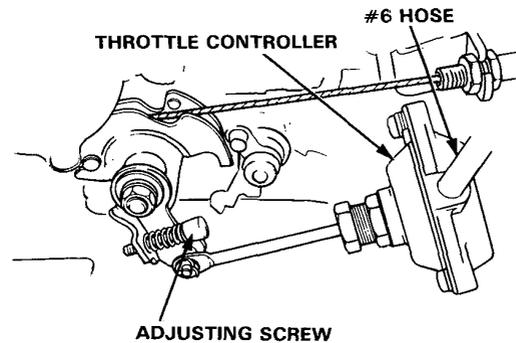


- If there is no vacuum, check #6 vacuum line for leaks or blockage. Repair, clean or replace as necessary and retest.
- If there is vacuum, replace the throttle controller and retest.

3. With the engine idling, disconnect #6 vacuum hose from the throttle controller.

Engine speed should rise to $1700 \pm 300 \text{ min}^{-1}$ (rpm).

- If the rpm is not within $1700 \pm 300 \text{ min}^{-1}$ (rpm), adjust by turning the adjusting screw.



- If the rpm does not change, check the throttle controller linkage for free movement. If there is no problem, replace the throttle controller and retest.

Fast Idle

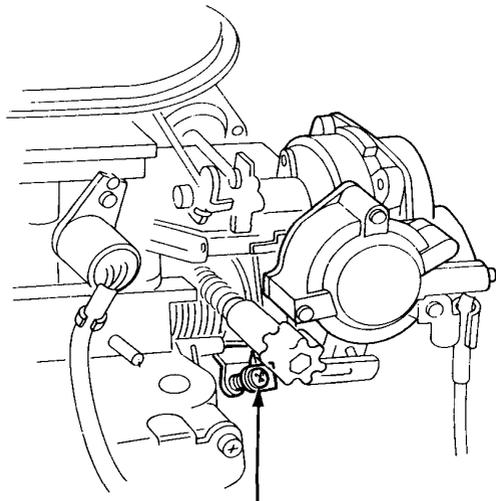
Inspection/Adjustment

HOT ENGINE

1. Start the engine and warm it up to normal operating temperature (the cooling fan comes on).
2. Stop the engine and connect a tachometer to it.
3. Disconnect and plug the inside vacuum hose of the fast idle unloader.
4. To engage the fast idle cam, open and close the throttle fully while holding the choke valve closed.
5. Restart the engine.

Fast idle should be: $2500 \pm 500 \text{ min}^{-1}$ (rpm)

- If not OK, reset the fast idle speed by turning the screw shown.



FAST IDLE ADJUSTING SCREW

Choke Coil Tension and Linkage



Inspection

COLD ENGINE

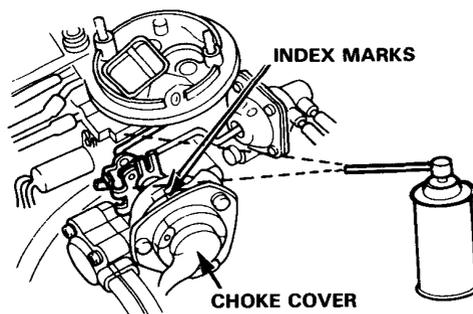
1. Remove the air cleaner.
2. Open and close the throttle fully to let the choke close.

The choke valve should close completely.

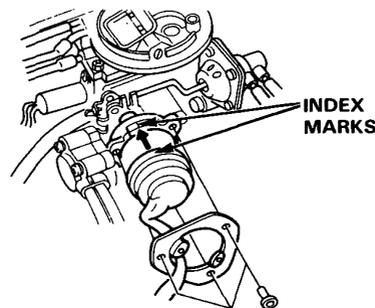
NOTE: Above about 28°C (82°F) the choke will not close completely, but should still close to less than 3 mm (1/8 in.).

- If the choke closes properly, go on to the fast idle unloader test on page 12-128.
- If the choke does not close properly, spray its linkage with carburetor cleaner, and check the linkage for signs of mechanical binding (use a spray can with an extension on the nozzle to reach the linkage).

CAUTION: Carburetor cleaner is very caustic; always wear safety goggles or a face shield when spraying.



- If the choke still does not close properly, remove the choke cover (page 12-125) and inspect the linkage for free movement. Repair or replace parts as necessary. Then reinstall the cover and adjust it so the index marks line up, and retest.
- If the choke still does not close properly, replace the cover. (page 12-125).



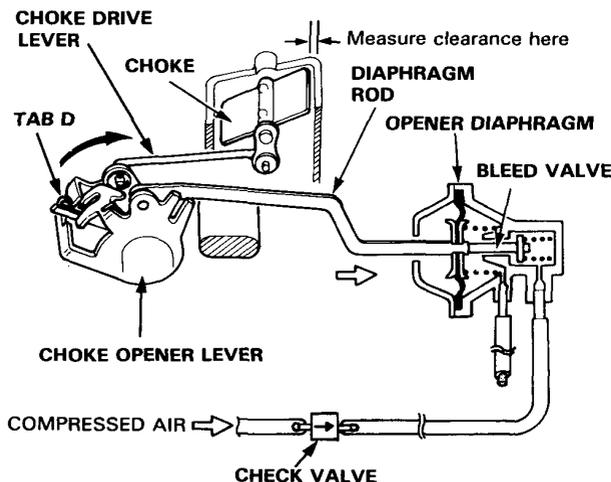
Choke Coil Tension and Linkage

Check/Adjustment

NOTE:

- This check is not necessary unless the linkage has been bent, choke opener has been replaced, or the car has poor cold starting.
- This check can be made with the engine HOT or COLD.

1. Remove the choke cover (page 12-125).
2. While holding the choke valve closed, open and close the throttle fully to engage the choke and fast idle linkage.
3. Disconnect the choke opener hose from the steel vacuum manifold, and attach a check valve to it as shown. Then pressurize the choke opener with low pressure compressed air, 103–586 kPa (15–85 psi) is OK, to hold the bleed valve in it closed.



4. Gently push the choke opener lever towards the opener until it stops (until you feel the opener rod seat against the pressurized bleed valve), then pull the choke drive lever down against the opener lever (to take all free play out of the linkage), and measure the clearance between the choke blade and casting:

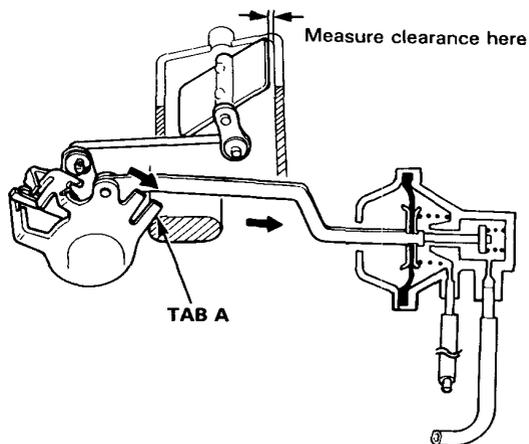
1st Stage Clearance

M/T: 1.54 ± 0.07 mm (0.061 ± 0.003 in.)

A/T: 1.46 ± 0.07 mm (0.057 ± 0.003 in.)

Adjust clearance by bending Tab D.

5. Remove the check valve, and reconnect the choke opener hose.
6. Hold both levers together, then push them toward the diaphragm again until they stop (Tab A on the opener lever seats against the carburetor), and measure the clearance at the choke valve.



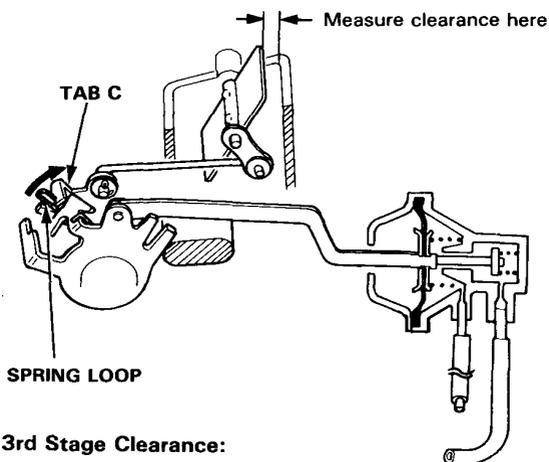
2nd Stage clearance:

M/T and CAL A/T: 3.28 ± 0.09 mm
(0.129 ± 0.004 in.)

49 ST and HI ALT A/T: 3.54 ± 0.09 mm
(0.139 ± 0.004 in.)

Adjust clearance by bending Tab A.

7. While still holding opener lever Tab A against its seat, release the choke drive lever, and measure the clearance at the choke valve (Tab C on the drive lever should stay seated against the spring loop; if not, repeat step 2 and recheck):



3rd Stage Clearance:

5.25 ± 0.20 mm (0.207 ± 0.008 in.)

Choke Coil Heater



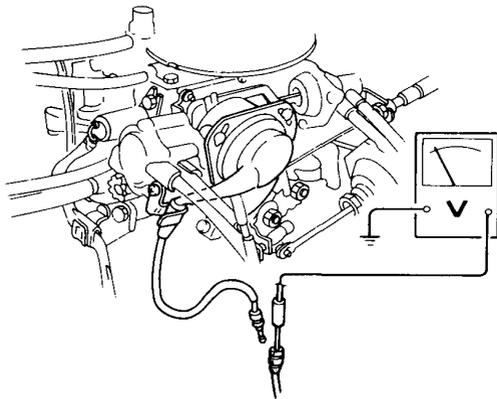
Test

COLD ENGINE

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

- If it does, go on to the fast idle unloader test on page 12-128.
- If it doesn't, inspect the linkage, and clean or repair it as necessary (page 12-123).
- If the choke still does not open all the way, disconnect the white/blue choke cover wire from the engine compartment wire harness and check for voltage.

There should be battery voltage with the engine running.



- If the voltmeter reads 0 volts, check for an open circuit in the white/blue wire between the choke cover connector and voltage regulator connector, then check the alternator (section 24).

Replacement

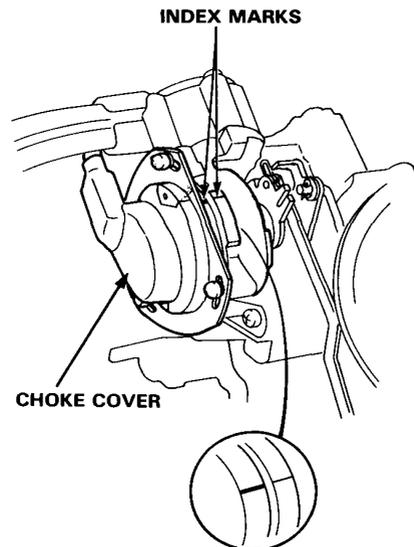
Removal:

1. Remove the air cleaner.
2. Using a 5/32" or 4.1 mm diameter drill, drill out the rivets and remove the choke cover.

CAUTION: Cover the carburetor with a clean shop rag to prevent chips from falling into the carburetor throat.

Installation:

1. Reinstall the cover and adjust it so that index marks align, then secure it with rivets.
2. Reinstall the air cleaner.



Choke Opener

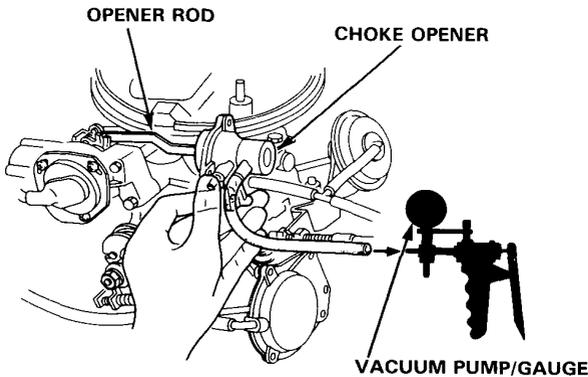
Test

COLD ENGINE

1. Disconnect the choke heater wire.
2. Open and close the throttle fully to let the choke close.
3. Start the engine.

The choke valve should partially open.

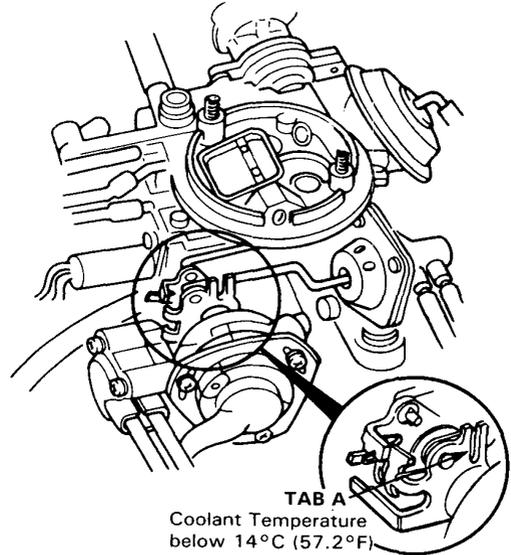
- If the choke partially opens, go on to step 4 or step 5, depending on coolant temperature.
- If the choke does not open partially, check the linkage for free movement, repair as necessary, and retest.
- If the choke valve still does not open partially, check the choke opener diaphragm: Remove its two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



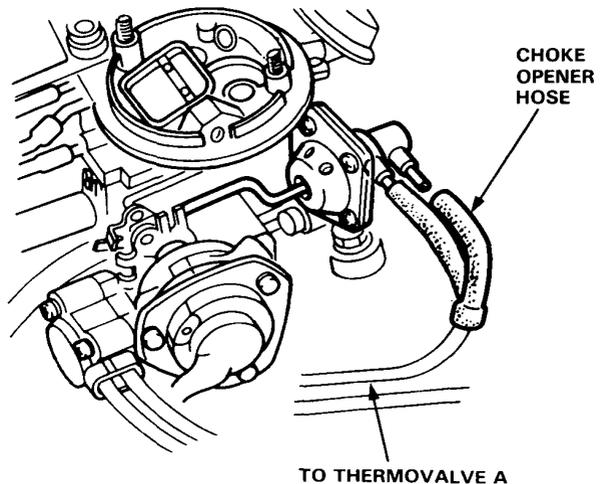
- If the rod will not stay in, replace the opener.
- If the rod stays in, check the vacuum port in the carburetor for blockage. If it is clean, go on to step 6.

NOTE: After replacing or reinstalling the choke opener, retest it, then adjust it if necessary (page 12-124).

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



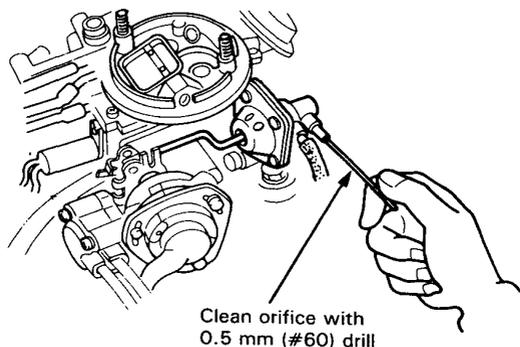
- If Tab A is not seated, go on to step 5.
- If Tab A is seated, disconnect the choke opener hose #18 from upper fitting.



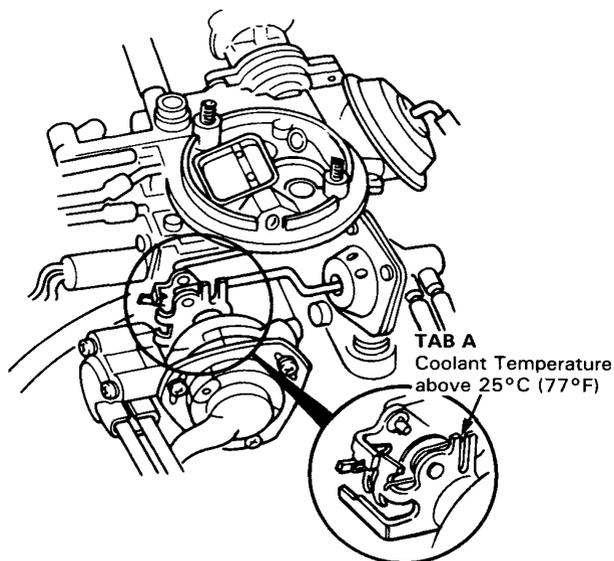
- If Tab A comes off its seat, check #18 line thermostatic valve A for blockage and check that the thermostatic valve is open.



- If Tab A does not come off its seat, press down on the choke opener lever until it does; if it won't stay off, clean out the choke opener fitting with a 0.5 mm (#60) drill bit, then retest.



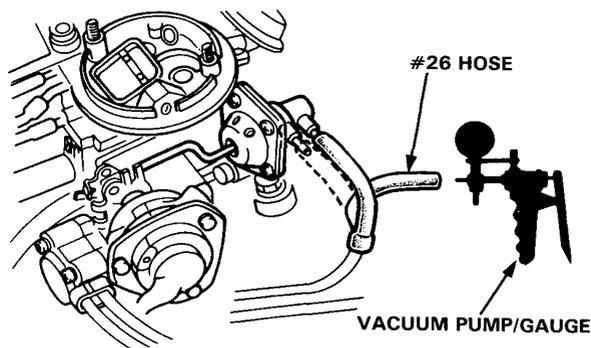
- If Tab A still does not come off its seat, replace the choke opener.
5. If coolant temperature is above about 25°C (77°F), Tab A on the choke opener lever should be seated against the carburetor.



- If Tab A is seated, reconnect the choke heater wires, then go on to the step 6.
- If Tab A is not seated, check line #18 for leaks and check that thermostatic valve A is closed.

6. Disconnect #26 vacuum hose from the choke opener and connect a vacuum pump to the hose, and apply vacuum.

Vacuum should remain steady.



- If vacuum drops, go to output troubleshooting (page 12-166).
7. Turn the ignition switch to the START position.
NOTE: Coolant temperature, must be below 40°C (104°F)

Vacuum should not remain.

- If vacuum remains, go to output troubleshooting. (page 12-166).

Fast Idle Unloader

Test

COLD ENGINE

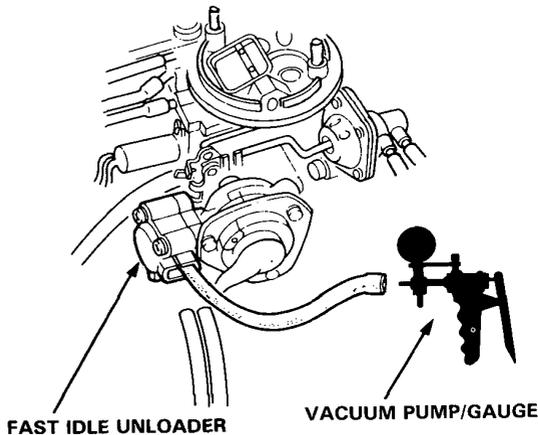
1. Disconnect the two hoses from the fast idle unloader.
2. Open and close the throttle fully to engage the fast idle cam.
3. Start the engine.

The engine should run at fast idle.

- If the engine runs at fast idle, go on to step 4.
- If the engine does not run at fast idle, remove the choke cover (page 12-125) and check the operation of the fast idle cam.

4. Connect a vacuum pump to the inside fitting of the unloader and apply vacuum.

The fast idle speed should drop



- If idle speed drops, go on to right column for hot engine inspection.
- If idle speed does not drop, check the unloader for leaks, blockage or damaged diaphragm. Remove the choke cover and check the unloader rod for free movement. Repair or replace as necessary.

5. Reconnect the hoses.

HOT ENGINE

When the engine warms up, its speed should drop below 1,400 min^{-1} (rpm) as the unloader pulls the internal choke linkage off the fast idle cam.

- If fast idle drops below 1,400 min^{-1} (rpm), go on to the fast idle check on page 12-123.

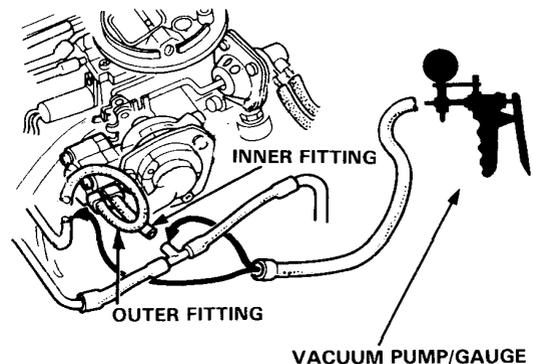
- If fast idle does not drop below 1,400 rpm, disconnect the two unloader hoses, and check that vacuum is present.

— If vacuum is present, check the unloader for leaks or blockage. Remove the choke cover, and check the unloader rod for free movement. Repair or replace parts as necessary, and retest.

— If there is no vacuum at the inner fitting, check for vacuum at the choke opener (page 12-126) and ther-mo- valve A.

— If there is no vacuum at the outer fitting, check ther-mo- valve A.

— Repair or replace as necessary.



Fuel Supply System



Symptom-to-Sub System Chart

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

PAGE		SYSTEM	FUEL FILTERS	FUEL PUMP	FUEL CUT-OFF RELAY	FUEL TANK	CONTAMINATED FUEL
SYMPTOM			130	131	132	133	*
ENGINE WON'T START			③	①	②		
POOR PERFORMANCE	MISFIRE OR ROUGH RUNNING		②				①
	LOSS OF POWER		①				②

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

Fuel Filters

Replacement

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

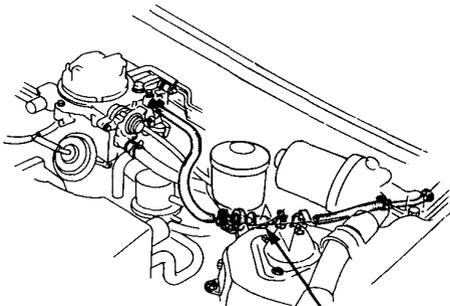
WARNING Do not smoke while working on the fuel system. Keep open flame away from work area.

Front

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

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

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



FUEL FILTER

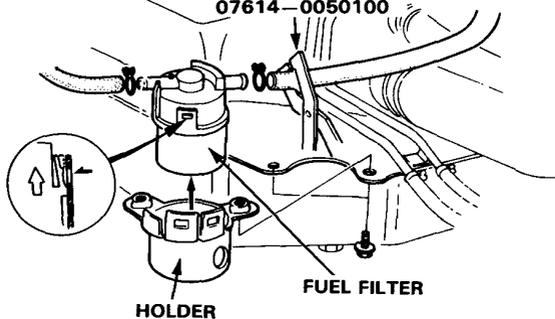
Rear

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

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

4. Install in the reverse order of removal.

FUEL LINE CLAMP
07614-0050100

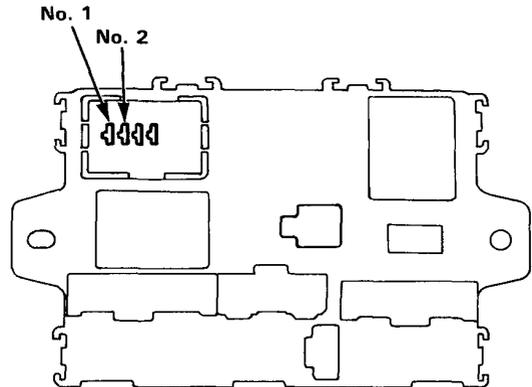


Test

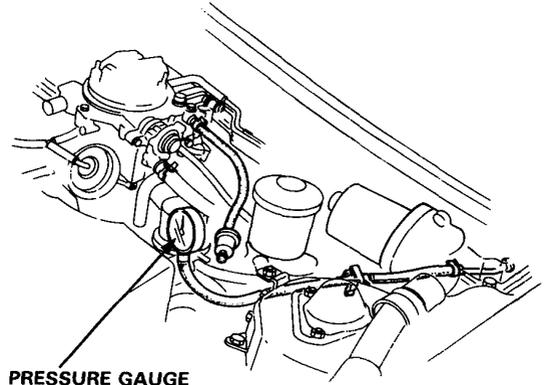
WARNING Do not smoke during the test. Keep any open flame away from your work area.

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

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



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



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

Pressure should be 17.7–22.6 kPa (2.6–3.3 psi).

- If gauge shows at least 17.7 kPa (2.6 psi) go on to step 5.
- If gauge shows less than 17.7 kPa (2.6 psi), replace pump and retest.



Fuel Pump

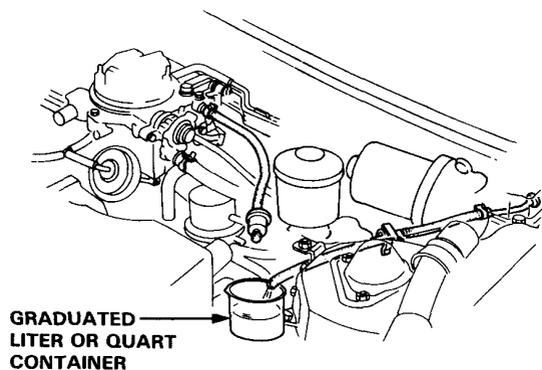
Replacement

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

Fuel flow should be more than 760 cc (25.7 oz.) in 60 seconds.

- If fuel flow is 760 cc (25.7 oz.), or more in 60 seconds, reconnect cut-off relay and fuel hose.
- If fuel flow is less than 760 cc (25.7 oz.), replace the fuel pump and retest.

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



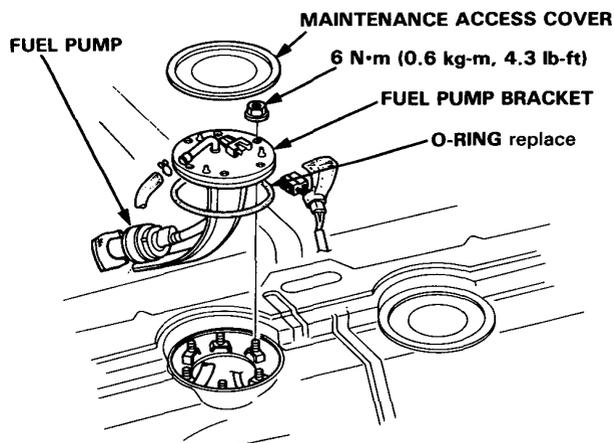
WARNING Do not smoke while working on fuel system. Keep open flames away from your work area.

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

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

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

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



Fuel Cut-off Relay

Test

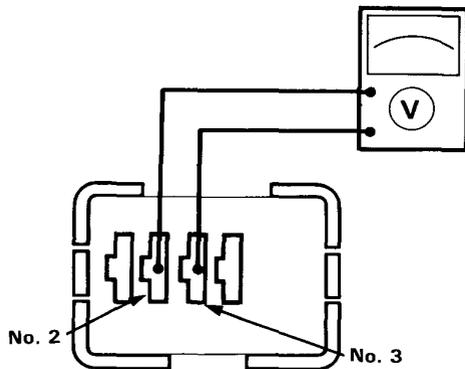
1. With the ignition switch off, remove the dashboard under cover, and pull down the fuse box/relay panel.
2. Remove the fuel cut-off relay.
3. Check for continuity between the No.3 terminal and body ground.

Continuity should exist.

- If there is no continuity, check the Black wire.

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

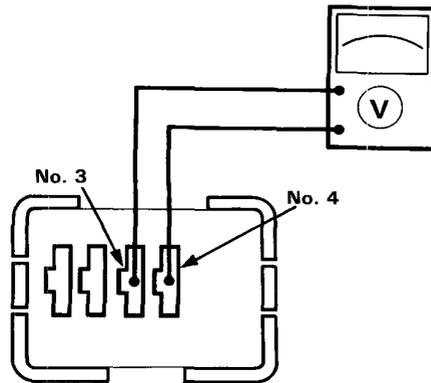
Battery voltage should be available.



- If there is no voltage, check the Black/Yellow wire from the ignition switch and fuel cut-off relay as well as No.1 fuse (15 A).

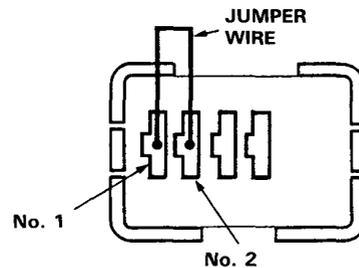
5. Turn the ignition switch OFF. Attach the positive probe of the voltmeter to the No.4 terminal and the negative probe to the No.3 terminal. Then turn the ignition switch ON.

Battery voltage should be available.



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

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



7. Turn the ignition switch ON.

The fuel pump should run.

- If the fuel pump does not run, check the Yellow wire between the fuel pump and fuel cut-off relay, and check the Black wire from the fuel pump to ground.

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

Fuel Tank



Replacement

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

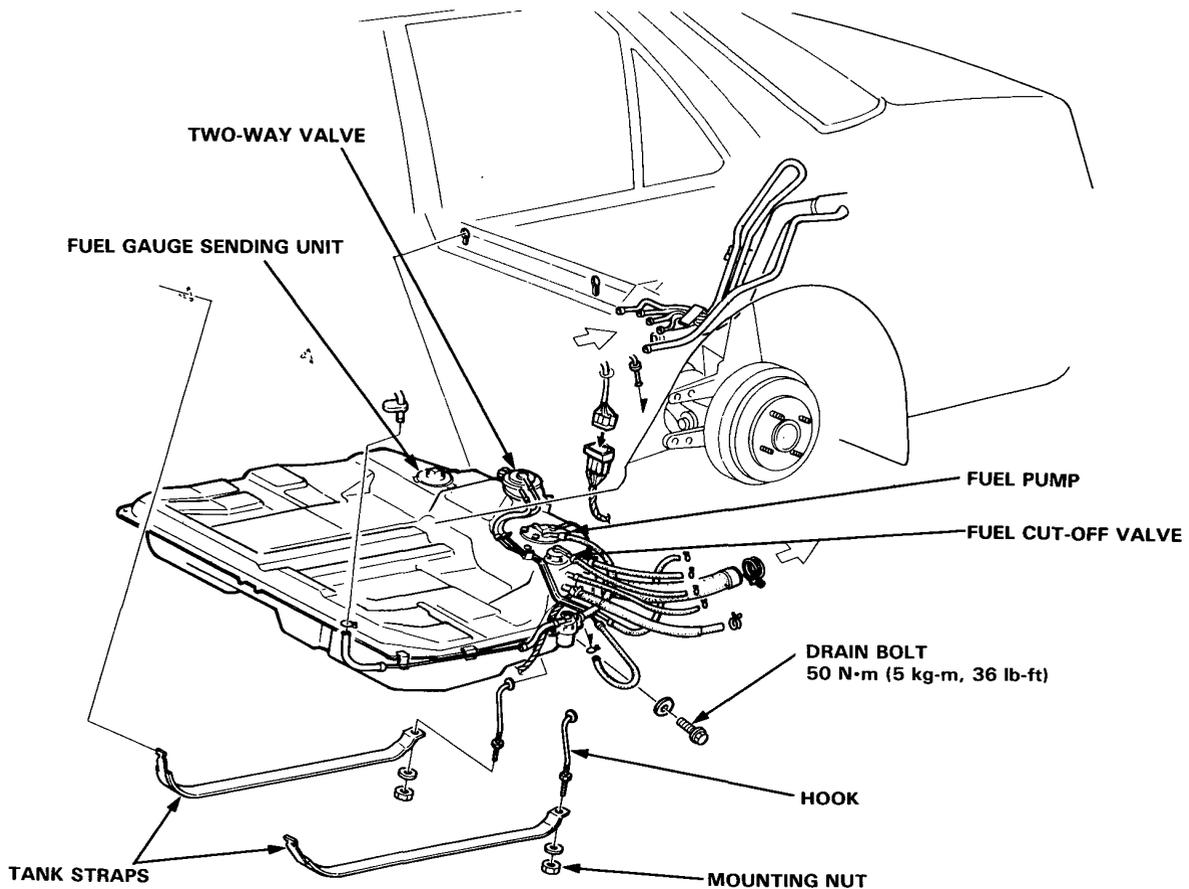
1. Block front wheels. Jack up the rear of the car and support with jackstands.
2. Remove the drain bolt and drain the fuel into an approved container.
3. Disconnect the fuel gauge sending unit connectors.
4. Disconnect the hoses.

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

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

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

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



Air Intake System

Symptom-to-Sub System Chart

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

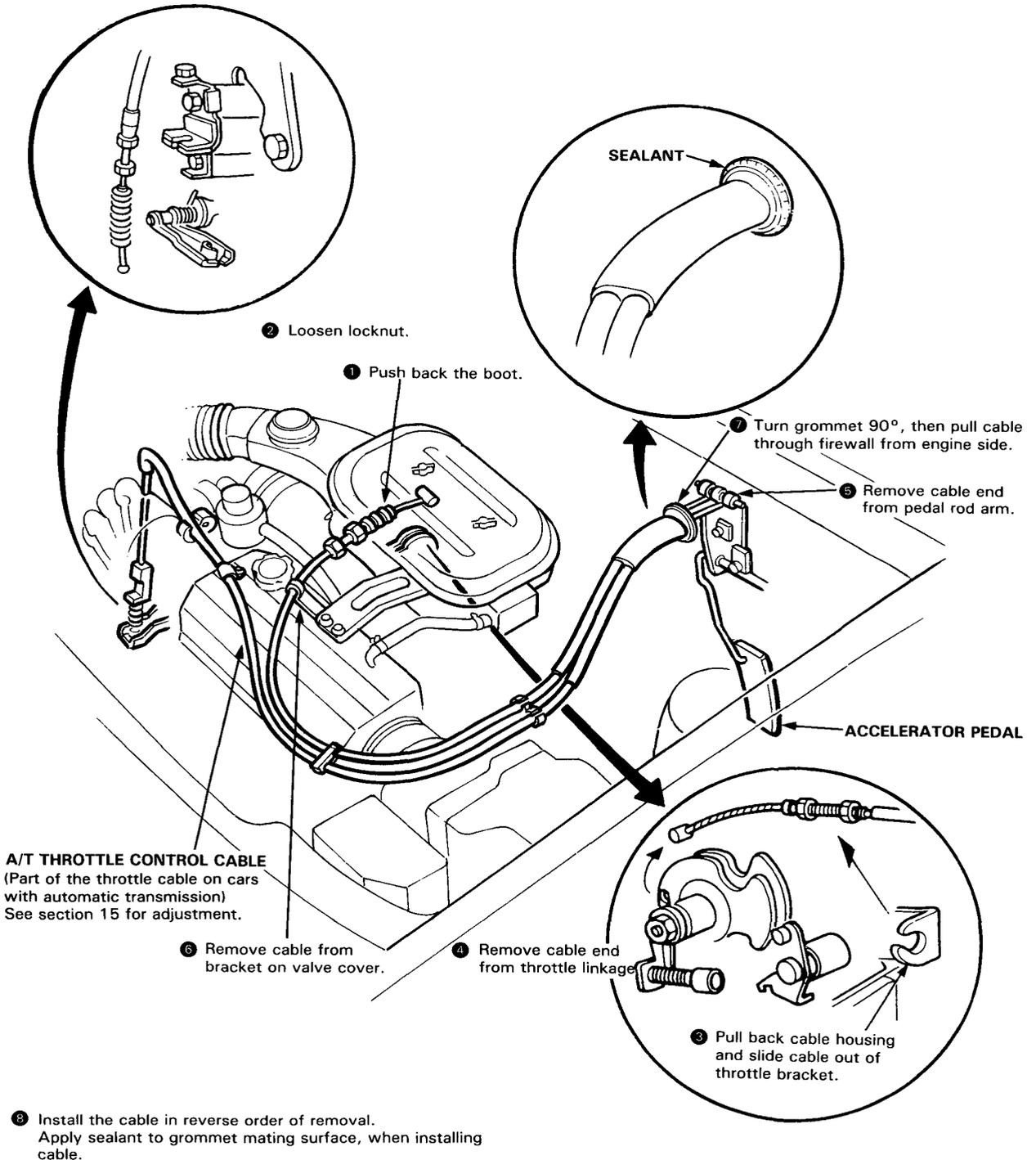
PAGE	SYSTEM	THROTTLE CABLE	AIR INTAKE CONTROL
		135	137
			①
			①
			①

Throttle Cable



Replacement

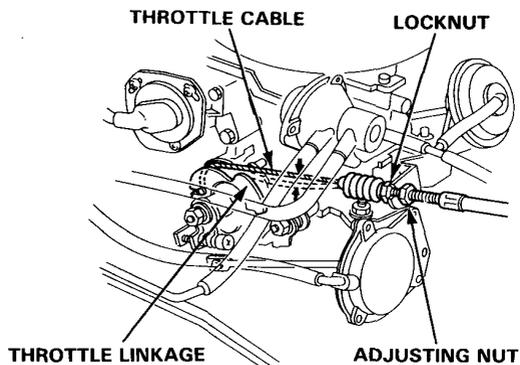
NOTE: Detach parts in the numbered sequence shown.



Throttle Cable

Inspection/Adjustment

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

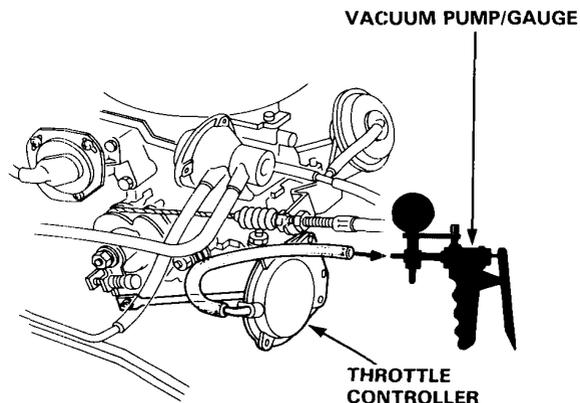


4. If deflection is not within specs, loosen locknut and turn adjusting nut until you can deflect cable as specified. Then tighten locknut.
5. With cable properly adjusted, check throttle valve to be sure it opens fully when you push accelerator pedal to the floor.

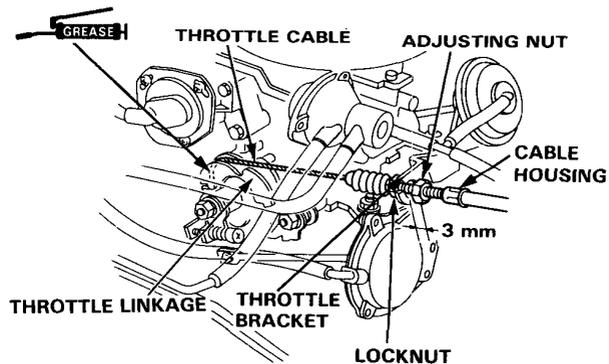
CAUTION: Check throttle valve to be sure it returns to idle position whenever you release accelerator.

Installation

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



2. Fully open the throttle and choke valves, then close the throttle valve. Now, release the choke valve; the throttle linkage will be off the fast idle cam.
3. Install the throttle cable in the throttle linkage.



4. Turn the adjusting nut until it is 3 mm (1/8 in.) away from the cable bracket. Tighten the locknut.
5. Disconnect the vacuum pump and reconnect the throttle controller hose.
6. On models with automatic transmission, adjust the throttle control cable. See section 15.

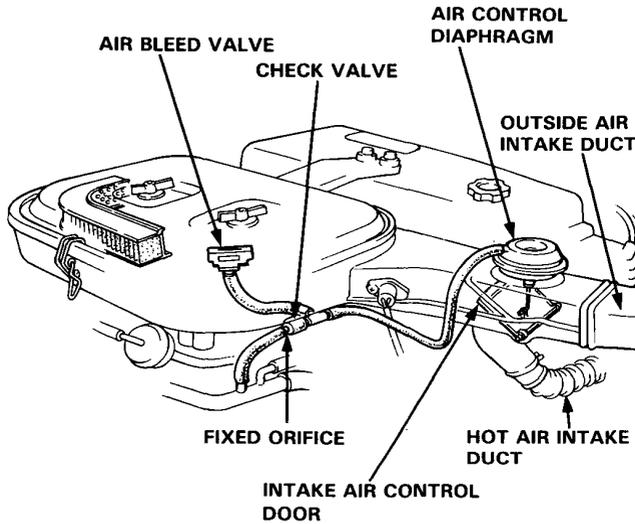
Intake Air Control System



Test

COLD ENGINE

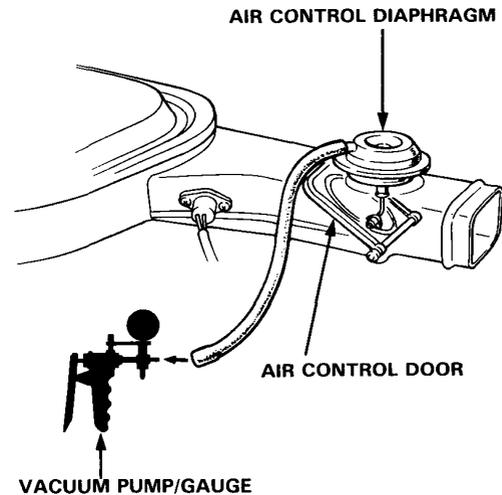
1. Disconnect the air intake duct.
2. With the engine cold, start the engine and let it run for about 5 seconds and stop. The air control door should rise on start-up and remain fully open for at least 3 seconds after stopping the engine.



- If the door rises, the intake air control is OK, reconnect the air intake duct. If performing the inspection on intake air controls only, go on to page 12-138 for hot engine inspection.
- If the door does not rise, check to see if the door is binding. If the door is not binding but fails to rise, or it rises but fails to stay up for 3 seconds after the cold cranking test, go to step 3.

3. Disconnect and plug the hose leading to the air bleed valve.
4. Crank the engine for approximately 5 seconds.
 - If the air control door does not rise or stay open for at least 3 seconds, proceed to step 5.
 - If the door rises and stays up for at least 3 seconds, replace the air bleed valve and retest (step 2).
5. Disconnect the vacuum hose from the air control diaphragm, connect a vacuum pump to the diaphragm inlet pipe and apply vacuum.

The air control door should rise and stay up.



- If the door stays up, replace the check valve and retest.
 - If the door does not rise or stay up, replace the air control diaphragm and retest.
6. Reconnect the air intake duct.

(cont'd)

Intake Air Control System

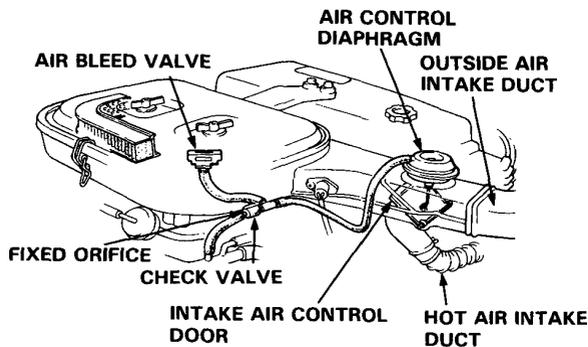
Test (cont'd)

HOT ENGINE

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

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

The air control door should be down.



- If the control door has dropped down to fully close the hot air intake duct: stop the engine and reconnect the air intake duct. Test is complete.
 - If the control door has not dropped to the fully closed position, go on to step 2.
2. Disconnect the vacuum hose from the air control diaphragm.
 - If the control door now closes, replace the air bleed valve and retest.
 - If the control door does not close, correct whatever is causing the door to bind, and/or replace the air control diaphragm. Retest.
 3. Stop the engine and reconnect the air intake duct. Test is complete.

Emission Control System



Symptom-to-Sub System Chart

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

PAGE	SYSTEM	FEEDBACK CONTROL SYSTEM	CATALYTIC CONVERTER	AIR INJECTION SYSTEM	MIXTURE CONTROL SYSTEM	EGR SYSTEM	POSITIVE CRANK-CASE VENTILATION SYSTEM	EVAPORATIVE EMISSION CONTROLS
SYMPTOM		140	143	144	145	147	149	151
DIFFICULT TO START ENGINE WHEN COLD					①	②		③
WHEN COLD FAST IDEL OUT OF SPECIFICATION						①		
POOR PERFORMANCE	LOSS OF POWER					②		①
	AFTERBURN				①			
	HESITATION/SURGE					①		
	FAILS EMISSION TEST	①	③	②				
	SULFUR SMELL	①	②	①				

Feedback Control System

Test

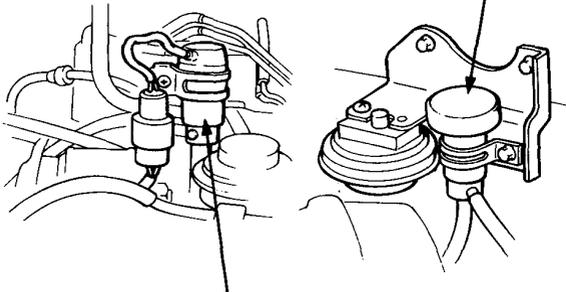
HOT ENGINE

1. Disconnect #14 hose from the power valve and install a plug in the hose.
2. Start the engine and check that the frequency solenoid valves A and B are operating while running the engine at approx. 2,500 min⁻¹ (rpm).

The frequency solenoid valves should go on and off continuously (a continuous clicking noise should be heard).

NOTE: It may be easier to determine if the valves are working by placing your hand on each valve individually.

FREQUENCY SOLENOID VALVE B



FREQUENCY SOLENOID VALVE A

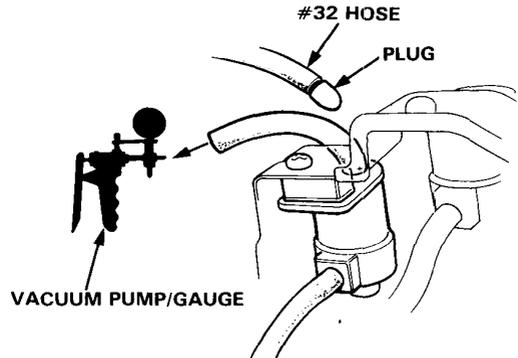
- If both solenoid valves operate properly, go on to step 3.
 - If either solenoid valve A or B does not operate properly, replace it and retest.
 - If both solenoid valves do not operate properly, go to output troubleshooting (page 12-168 and 170).
3. Connect #14 hose to the power valve. With the air conditioner off, if so equipped, check that frequency solenoid valves A and B are not operating while idling the engine.

The solenoid valves should not operate.

- If the solenoid valves operate, go to input troubleshooting (page 12-184).

Feedback Control Solenoid Valve

1. Disconnect #32 hose from feedback control solenoid valve and plug the end of the hose.
2. Connect a vacuum pump/gauge as shown.



3. Start the engine and apply vacuum to the valve.

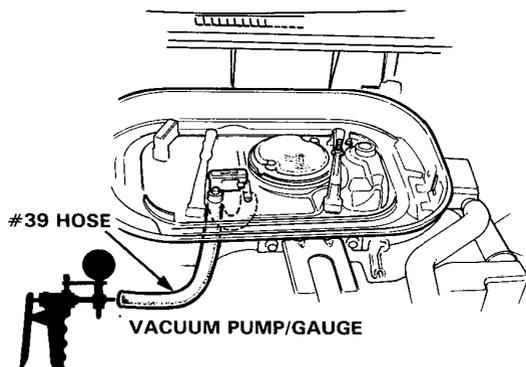
It should not hold vacuum.

- If it does not hold vacuum, go on to step 4.
 - If it holds vacuum, go to output troubleshooting (page 12-172).
4. Raise speed to 2,500 min⁻¹ (rpm) and apply vacuum to the valve.
- It should hold vacuum.
- If it does not hold vacuum, go to output troubleshooting (page 12-172).



Air Bleed Valve B

1. Disconnect #39 hose from the vacuum hose manifold and connect a vacuum pump to the hose.



2. Apply vacuum to the hose.

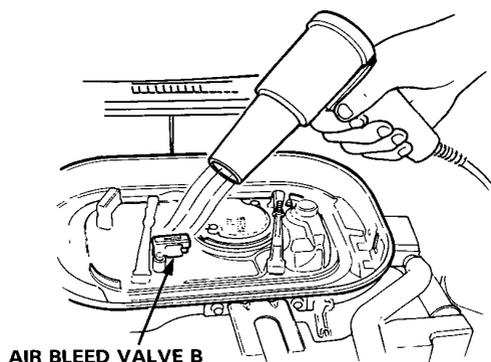
It should hold vacuum.

- If it does not hold vacuum, replace the air bleed valve B and retest.

3. Warm the air bleed valve B with a dryer and apply vacuum to the hose.

It should not hold vacuum.

NOTE: Air bleed valve B opens at 65°C (149°F)

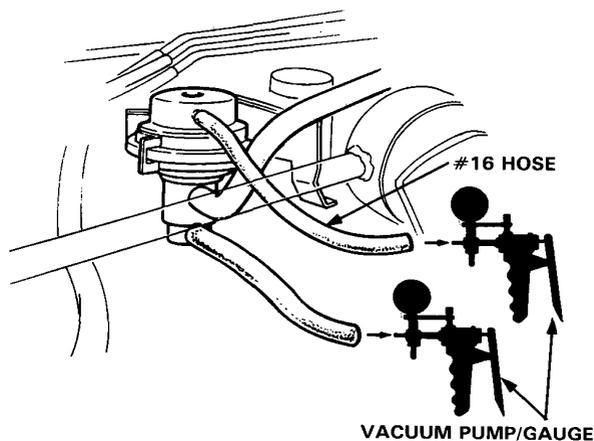


- If it holds vacuum, replace the air bleed valve B and retest.

Air Control Valve A

1. Disconnect #16 hose from air control valve A and connect a vacuum pump to the hose.
2. Disconnect the lower hose from air control valve A, connect a vacuum pump to the hose. Apply vacuum to the valve.

It should have a restricted leak.



3. Now apply vacuum with the vacuum pump attached to #16 hose.

The lower hose should not hold vacuum at all (unrestricted leak).

If the valve fails either check, replace it.

(cont'd)

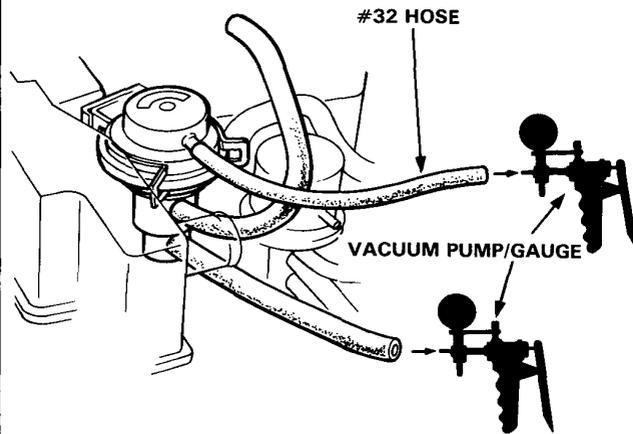
Feedback Control System

Test (cont'd)

Air Control Valve B

1. Disconnect #32 hose from air control valve B and connect a vacuum pump to the hose.
2. Disconnect the lower hose from air control valve B, connect a vacuum pump to the hose. Apply vacuum to the valve.

It should hold vacuum.



3. Now apply vacuum with the vacuum pump attached to #32 hose.

Vacuum should now release at the lower hose.

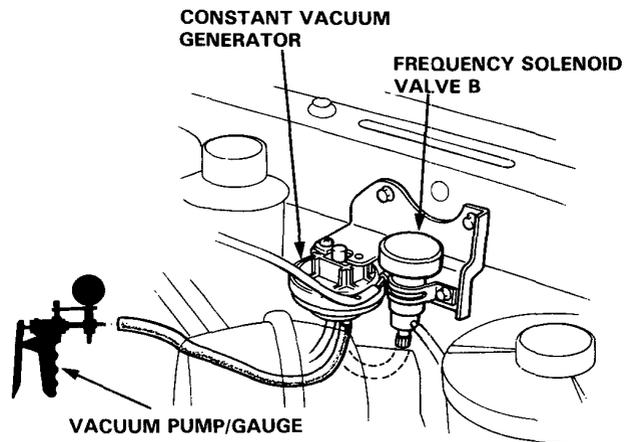
If the valve fails either check, replace it.

Constant Vacuum Generator

1. Disconnect #33 hose from frequency solenoid valve B and connect a vacuum gauge to the hose.
2. Start the engine, allow it to idle, then check for vacuum.

Vacuum should stabilize at;

180–280 mmHg 7.1–11.0 in. Hg



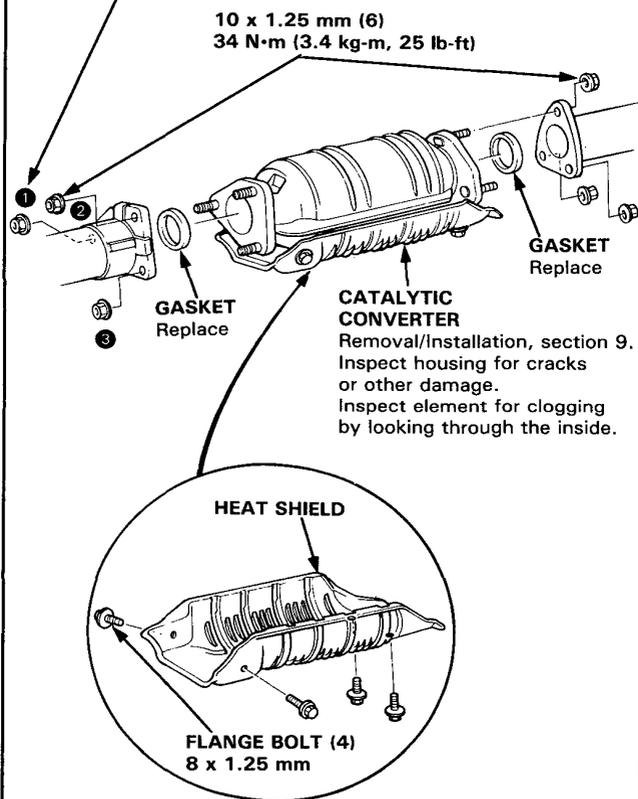
- If the vacuum stabilizes within the specified vacuum, the constant vacuum generator is OK. Reconnect the hose to frequency solenoid valve B.
- If the vacuum does not stabilize, or stabilizes outside the specified vacuum range, replace the constant vacuum generator.

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

NOTE: Tighten each nut in the sequence shown below.



Tailpipe Emissions



Inspection

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

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

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

CO meter should indicate 0.1% maximum.

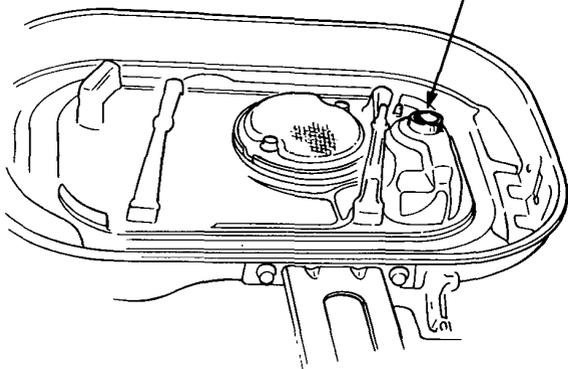
Air Injection System

Test

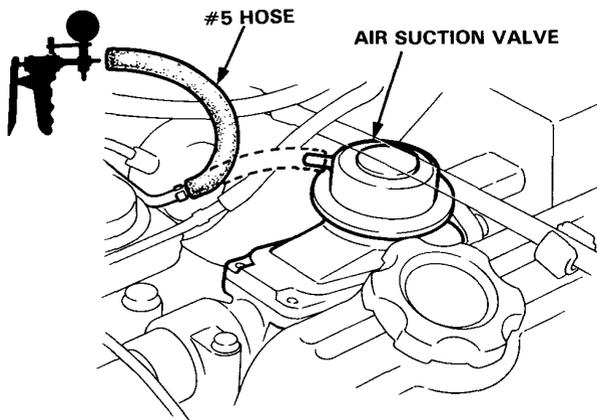
HOT ENGINE

1. Remove the air cleaner cover and filter.
2. Start the engine and check for air suction noise (bubbling noise) from the air suction port at idle. Bubbling noise should be heard.

AIR SUCTION PORT



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



- If there is vacuum, replace the air suction valve and retest.
- If there is no vacuum, reconnect #5 hose and go to output troubleshooting (page 12-174).

4. Raise the engine speed above 2,000 min⁻¹ (rpm).

There should be no bubbling noise.

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

— If there is vacuum, go to output troubleshooting (page 12-174).

— If there is no vacuum, replace the air suction valve and retest.

Mixture Control System



Test

COLD ENGINE

1. Disconnect the air suction lower hose at the anti-afterburn valve.
2. Check for vacuum at idle.

There should be no vacuum.



ANTI-AFTERBURN VALVE

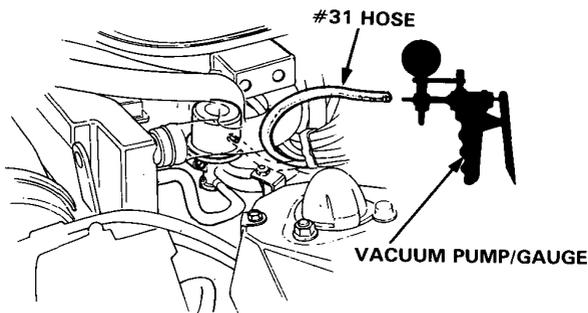
- If there is vacuum, replace the anti-afterburn valve and retest.

3. Quickly raise engine speed to 3,500 min⁻¹ (rpm) and close the throttle suddenly.

There should be no vacuum.

- If there is vacuum, disconnect #31 vacuum hose at the anti-afterburn valve and check for vacuum at #31 hose.

There should be no vacuum.

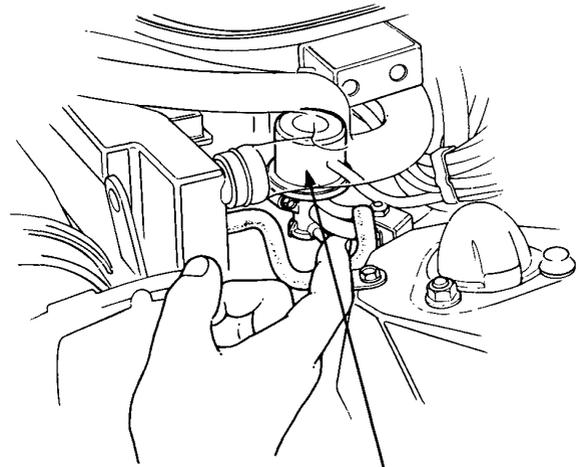


VACUUM PUMP/GAUGE

- If there is no vacuum, replace the anti-afterburn valve and retest.
- If there is vacuum, go to output troubleshooting (page 12-176).

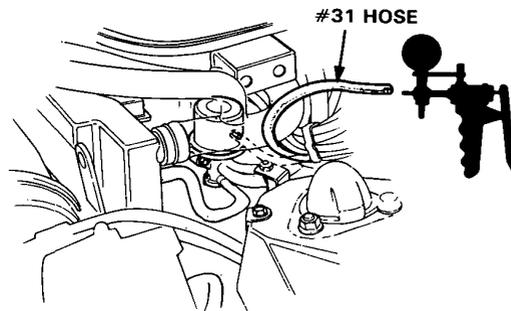
4. Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.
5. Place the shift or selector lever in second or 2 position and accelerate, then suddenly release the throttle and check for vacuum during deceleration above 15 mph.

There should be vacuum.



ANTI-AFTERBURN VALVE

- If there is vacuum, go on to page 12-146 for hot engine inspection.
- If no vacuum, disconnect #31 vacuum hose at the anti-afterburn valve and check for vacuum at #31 hose above 15 mph.



#31 HOSE

- If there is no vacuum, replace the anti-afterburn valve and retest.
- If there is vacuum, go to output troubleshooting (page 12-176).

(cont'd)

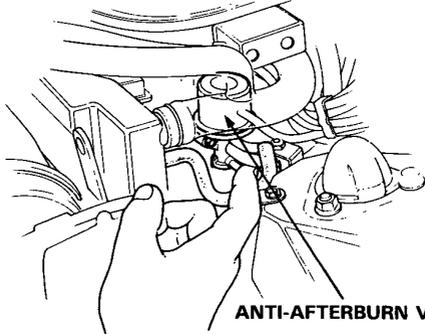
Mixture Control System

Test (cont'd)

HOT ENGINE

1. Disconnect the air suction lower hose at the anti-afterburn valve.
2. Start the engine and quickly raise engine speed to 3,500 min⁻¹ (rpm) and close the throttle suddenly.

There should be vacuum.



- If no vacuum, go to output troubleshooting (page 12-176).

EGR System

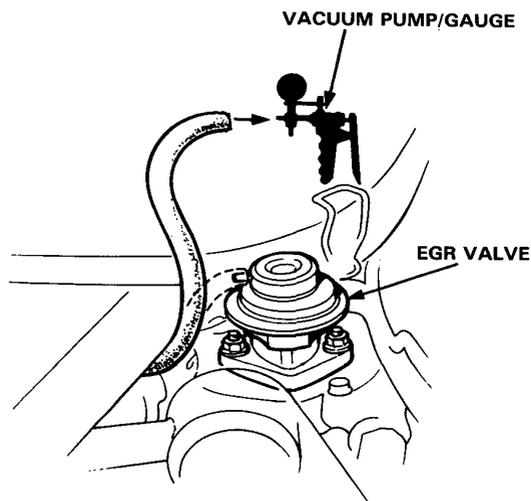


Test

COLD ENGINE

NOTE: The engine coolant temperature must be below the thermostatic valve A set temperature (55°C, 131°F).

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



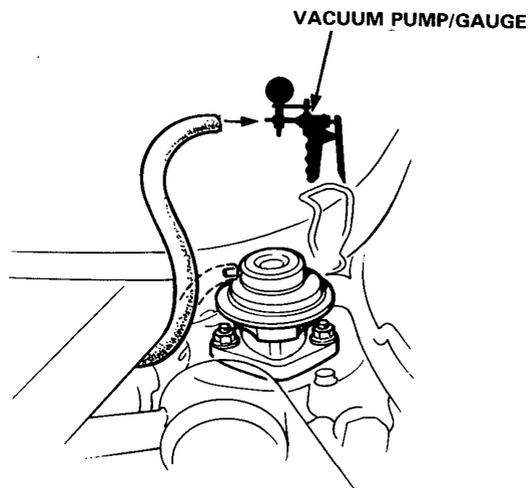
2. Start the engine and raise the engine speed to 3,000 min⁻¹ (rpm).

Vacuum should not be available.

- If vacuum is not available, go on to the hot engine inspection (right column).
- If vacuum is available, replace thermostatic valve A and retest.

HOT ENGINE

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



2. Start the engine and wait for the cooling fan to come on.
3. Remove the control box from the firewall by removing the two bolts, then remove the control box cover by removing the four screws.

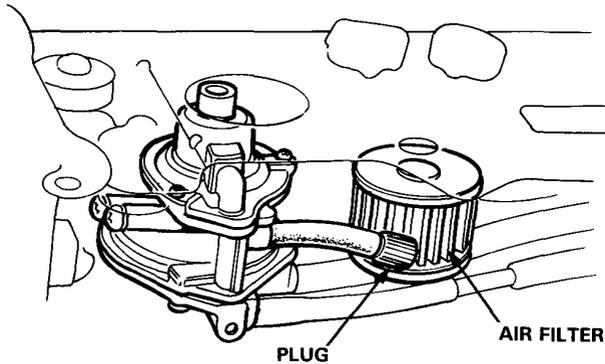
Vacuum should be as shown below:

	Condition	Vacuum at EGR hose
1	Idle	No
2	3,000 min ⁻¹ (rpm)	Yes, 2–6'' Hg
3	3,000 min ⁻¹ (rpm) with blocked vacuum bleed (shown next column)	Less than 2'' Hg
4	Rapid acceleration	Yes, 2–6'' Hg
5	Deceleration	No

(cont'd)

EGR System

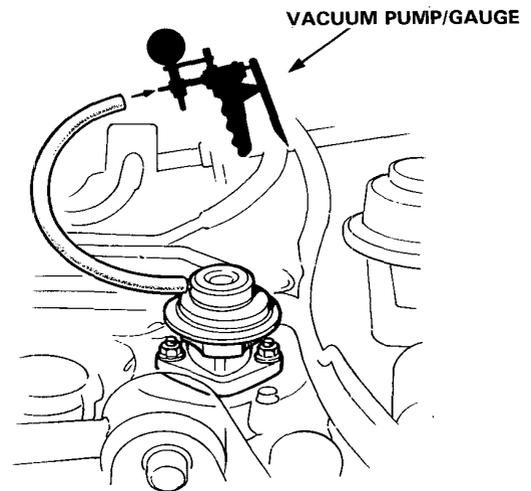
Test (cont'd)



- If vacuum is available at idle (condition 1) check the vacuum hoses for proper routing and connections, then check for correct idle speed and idle mixture, and make adjustment as necessary.
- If there is no vacuum in conditions 2 and 4, check the thermovalve A.
Disconnect the #18 vacuum hose from the thermovalve A. Check for vacuum at the #18 hose.
 - If there is no vacuum, check the routing for the #18 vacuum hose and repair or replace as necessary.
 - If there is vacuum, replace the thermovalve A and retest.
- If vacuum is more than 2" Hg in condition 3, replace the EGR control valve and check the vacuum hoses for proper routing and connections.

EGR Valve

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



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

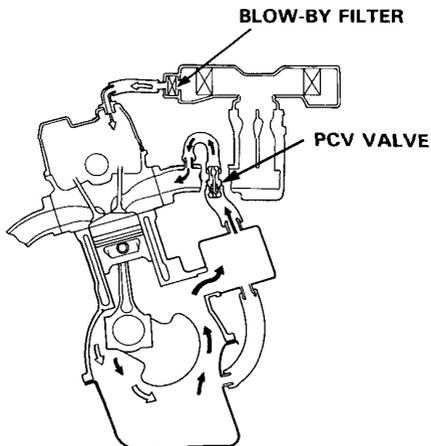
Positive Crankcase Ventilation System



Test

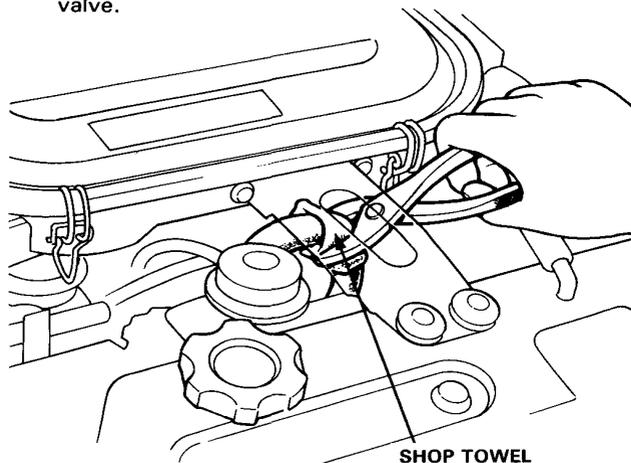
PCV Valve

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



2. Start the engine and allow it to idle.
3. Lightly pinch the breather hose between the PCV valve and intake manifold, with your fingers or pliers.

There should be a clicking sound from the PCV valve.

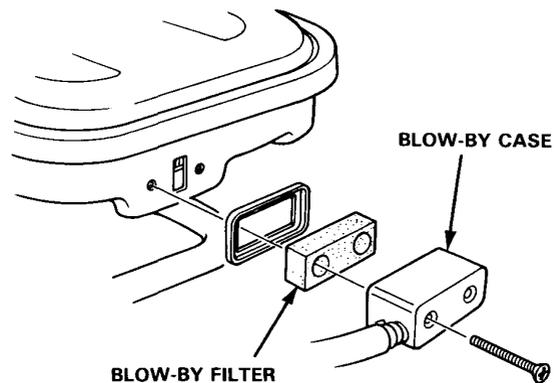


- If no sound is heard, replace the PCV valve and retest.

Blow-by Filter

Inspect the condition of the blow-by filter.

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



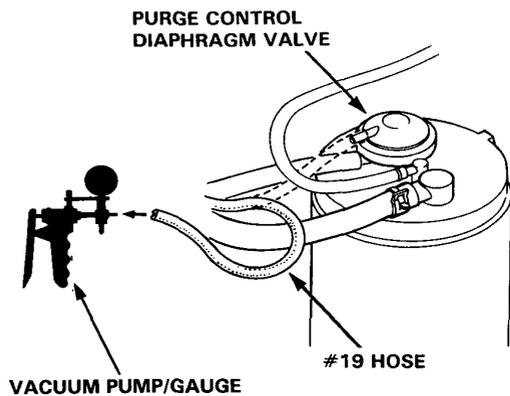
Evaporative Emission Controls

Test

COLD ENGINE

NOTE: Engine coolant temperature must be below thermostatic valve A set temperature (55°C, 131°F).

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



2. Start the engine and allow to idle.

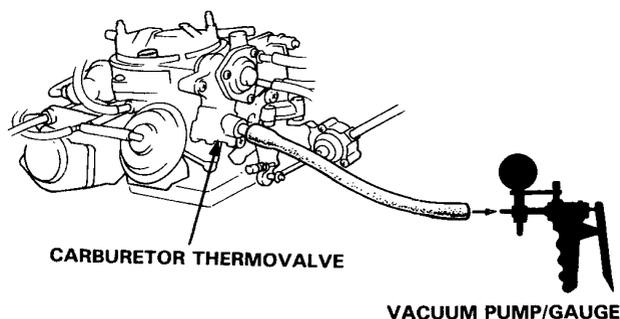
Vacuum should not be available.

- If there is no vacuum, disconnect the vacuum gauge and reconnect hose.
- If there is vacuum, replace thermostatic valve A and re-test.

Carburetor Thermostatic Valve

NOTE: Carburetor temperature must be below the carburetor thermostatic valve set temperature (30°C, 86°F).

1. Disconnect the hose at the carburetor thermostatic valve and connect a vacuum pump to the thermostatic valve.



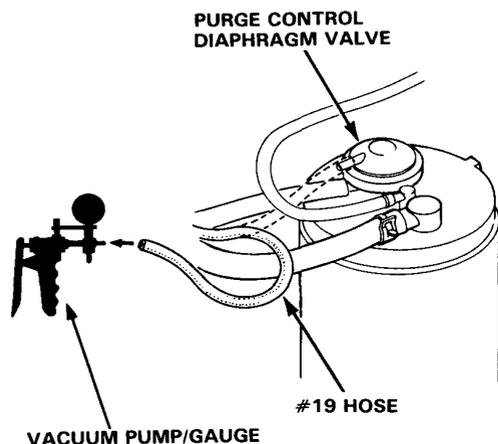
2. Apply 200 mmHg (7.8 inHg) vacuum to the thermostatic valve. Vacuum should remain steady.

- If vacuum remains steady, the carburetor thermostatic valve is working properly. Remove the vacuum pump and reconnect the hose; test is complete.
- If vacuum does not remain steady, replace the carburetor thermostatic valve and re-test.



HOT ENGINE

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



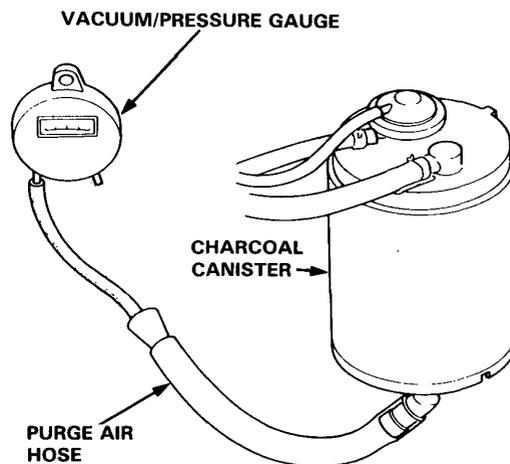
2. Wait for the engine to warm up.

There should be vacuum at idle, once engine is warm.

- If vacuum is available, go on to step 3.
- If no vacuum, disconnect #18 vacuum hose at the thermostatic valve A and check for vacuum at the #18 hose.
- If there is no vacuum, check the routing for the #18 vacuum hose and repair or replace as necessary.
- If there is vacuum, replace the thermostatic valve A and retest.

3. Disconnect the vacuum pump/gauge and re-connect hose.

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



6. Raise engine speed to 3,500 min⁻¹ (rpm).

Vacuum should appear on the gauge within 1 minute.

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

7. Remove the charcoal canister and check for signs of damage.
If damaged, replace the canister.
If OK, go on to step 8.

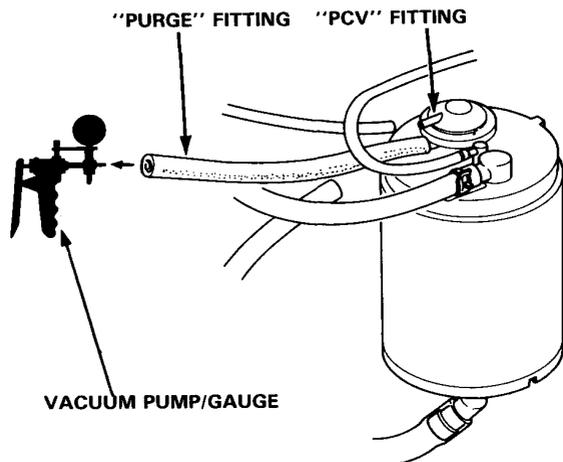
(cont'd)

Evaporative Emission Controls

Test (cont'd)

8. Stop the engine. Disconnect the hose from the canister PCV fitting. Connect a vacuum pump to the canister PURGE fitting as shown, and apply vacuum.

Vacuum should remain steady.



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

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

PURGE side vacuum should drop to zero.

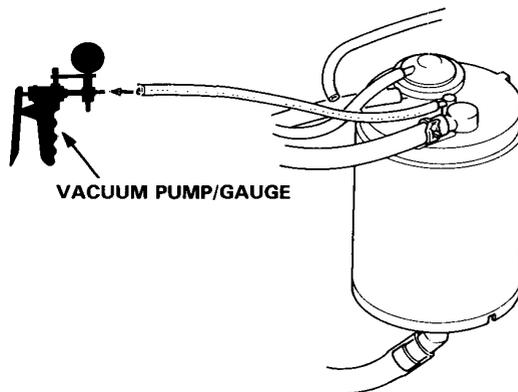
- If PURGE side vacuum does not drop to zero, replace the canister and retest.
- If PURGE side vacuum drops to zero, connect a vacuum pump to canister the PCV fitting, and apply vacuum.

Vacuum should remain steady.

- If vacuum remains steady, disconnect the vacuum pump. Recheck thermovalve A operation on the previous page.
- If vacuum drops, replace the canister and retest.

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

There should not be any vacuum.



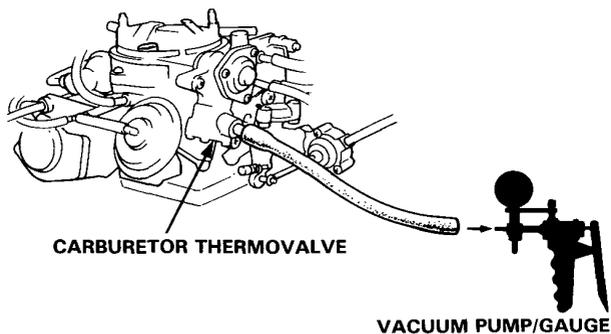
- If no vacuum, reinstall fuel filler cap and canister; test is complete.
- If there is vacuum, replace canister and retest.



Carburetor Thermovalve

NOTE: Carburetor temperature must be above the carburetor thermovalve set temperature (40°C, 104°F).

1. Disconnect the hose at the carburetor thermovalve and connect a vacuum pump to the thermovalve.



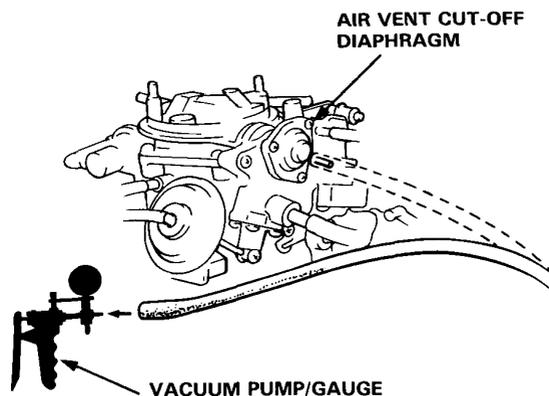
2. Apply vacuum to the thermovalve.

The valve should not hold vacuum.

- If vacuum does not hold, the thermovalve is OK. Reconnect the hose to the valve.
- If vacuum is held, replace the thermovalve and retest.

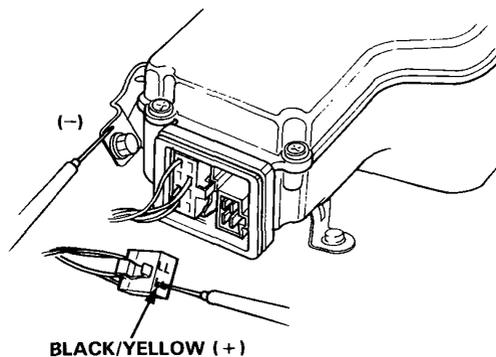
Air Vent Cut-Off Diaphragm

1. Disconnect the hose at the air vent cut-off diaphragm and install a vacuum pump to the hose.



2. Apply vacuum. Vacuum should not be hold.
3. Turn ignition switch on.
4. Apply vacuum. Vacuum should remain steady.

- If vacuum holds go on to step 5.
- If vacuum does not hold, check for leaks in hose connections. If vacuum is still does not hold, check for voltage at vacuum holding solenoid valve.



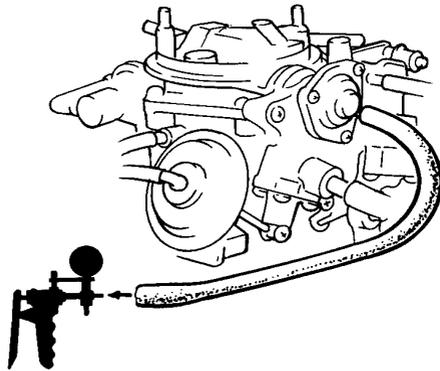
- If there is voltage, replace vacuum holding solenoid valve and retest.
- If no voltage, check the wiring (Black/Yellow).

(cont'd)

Evaporative Emission Controls

Test (cont'd)

5. Start engine allow to idle and check for vacuum. Vacuum should be available.
 - If vacuum is available, go to step 6.
 - If vacuum is not available, check for blockage in hose. If vacuum is still not available, replace vacuum holding solenoid valve and retest.
6. Turn ignition off. Vacuum should drop to zero.
7. Disconnect the vacuum pump from vacuum holding solenoid valve hose and connect to air vent cut-off diaphragm. Apply a vacuum.



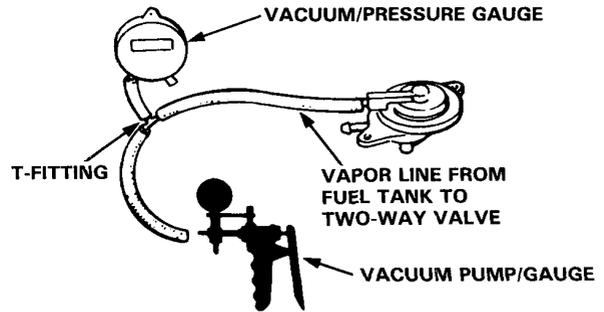
VACUUM PUMP/GAUGE

Vacuum should remain steady.

- If vacuum remains stable, diaphragm is OK.
 - If vacuum decreases, replace diaphragm and retest.
8. Remove the vacuum pump and reconnect hose between the air vent cut-off diaphragm and the vacuum holding solenoid valve.

Two-Way Valve

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

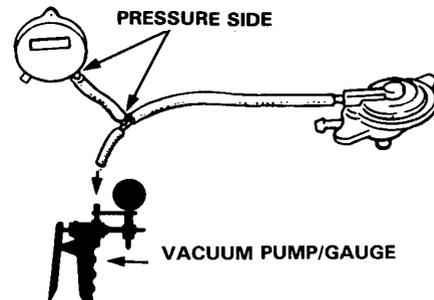


3. Slowly apply vacuum while watching the gauge.

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

- If vacuum stabilizes (valve opens) below 5 mmHg (0.2 in. Hg) or above 15 mmHg (0.6 in. Hg), install new valve and retest.

4. Move vacuum pump hose from vacuum to pressure fitting, and move vacuum gauge hose from vacuum to pressure side as shown.



5. Slowly pressurize the vapor line while watching the gauge.

Pressure should stabilize at 25 to 55 mmHg (1.0 to 2.2 in. Hg).

- If pressure momentarily stabilizes (valve opens) at 25 to 55 mmHg (1.0 to 2.2 in. Hg), the valve is OK.
- If pressure stabilizes below 25 mmHg (1.0 in. Hg) or above 55 mmHg (2.2 in. Hg), install a new valve and retest.

Control Unit



Symptom-to-Sub System Chart

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

PAGE		OUTPUT	FREQUENCY SOLENOID VALVE C	IDLE BOOST SOLENOID VALVE	A/C IDLE BOOST SOLENOID VALVE	PRIMARY SLOW MIXTURE CUT-OFF SOLENOID VALVE	CRANKING LEAK SOLENOID VALVE
SYMPTOM			158	160	162	164	166
ENGINE WON'T START	WHEN COLD					②	①
	WHEN WARM					①	
DIFFICULT TO START ENGINE	WHEN COLD					①	①
	WHEN WARM		①			①	
IRREGULAR IDLING	WHEN COLD FAST IDLE OUT OF SPECIFICATION			①		①	
	WHEN WARM RPM TOO HIGH		①	①	①		
	WHEN WARM RPM TOO LOW		①	①	①		
	ROUGH IDLE/ FLUCTUATION		①				
FREQUENT STALLING	WHILE WARMING UP					①	
	AFTER WARMING UP			②	②	①	
POOR PERFORMANCE	AFTERBURN						
	HESITATION/ SURGE						
	FAILS EMISSION TEST						
	SULFUR SMELL						

(cont'd)

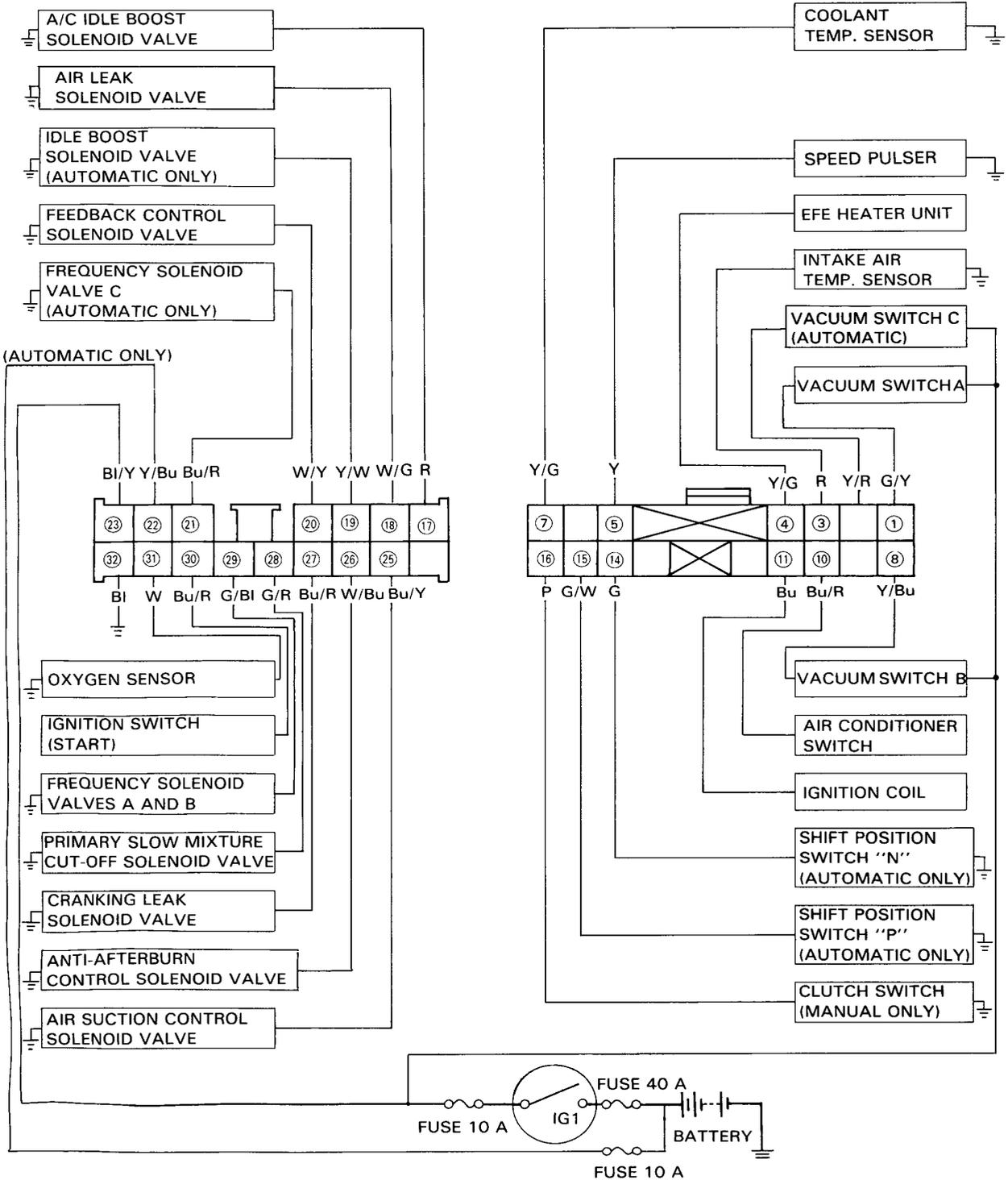
Control Unit

Symptom-to-Sub System Chart (cont'd)

FREQUENCY SOLENOID VALVE A	FREQUENCY SOLENOID VALVE B	FEEDBACK CONTROL SOLENOID VALVE	AIR LEAK SOLENOID VALVE	AIR SUCTION CONTROL SOLENOID VALVE	ANTI-AFTERBURN CONTROL SOLENOID VALVE	EFE HEATER SYSTEM
168	170	172	179	174	176	180
					①	①
					①	
					①	
①	①					
②	②	②	②	①		
②	②	②	②	①		



Output/Input Summary



Control Unit Output Troubleshooting

Frequency Solenoid Valve C (A/T Only)

The frequency solenoid valve C is energized when the engine speed is above or below 730 min^{-1} (rpm) and the coolant temperature is above 60°C (140°F). It controls the vacuum to the throttle controller.

Inspection of Frequency Solenoid Valve C

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

Disconnect the upper vacuum hose of the solenoid valve from the 3-way joint.

Disconnect the 2P connector near the solenoid valve.

Apply vacuum.

Does solenoid valve hold vacuum?

NO
Replace the solenoid valve.

YES

Connect a vacuum gauge to the upper vacuum hose.

Connect the battery positive terminal to the Blue/Red terminal of the 2P connector and the battery negative terminal to the Black terminal.

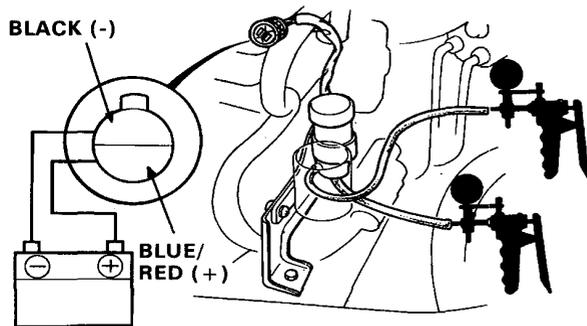
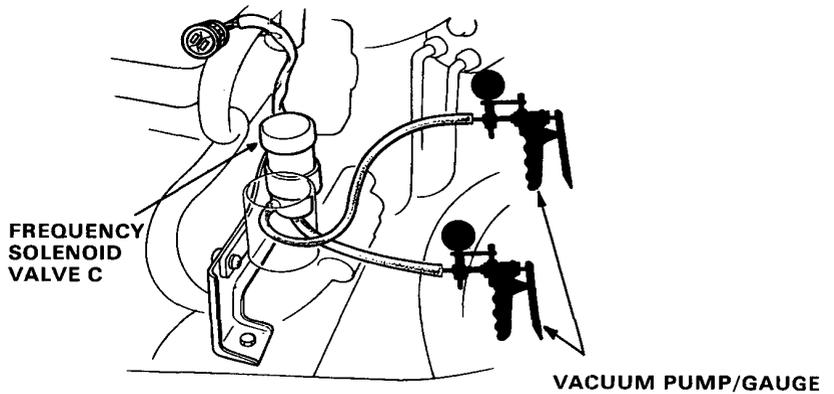
Apply vacuum.

Is vacuum indicated on the gauge?

NO
Replace the solenoid valve.

YES

(To page 12-159)





(From page 12-158)

Disconnect the battery terminals from the 2P connector.

Is vacuum indicated on the gauge?

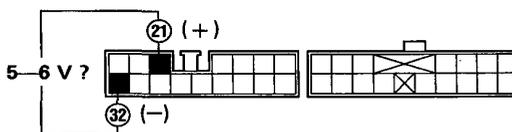
YES

Replace the solenoid valve.

NO

Reconnect vacuum hose and 2P connector.

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



Measure voltage between ① (Blue/Red +) terminal and ② (Black -) terminal of the control unit.

Is there 5-6 volts?

NO

Go to Input Troubleshooting (page 12-184).

YES

Inspect open in Blue/Red wire between control unit ① and solenoid valve, and Black wire between the solenoid valve and G7.

Control Unit Output Troubleshooting

Idle Boost Solenoid Valve (A/T Only)

The idle boost solenoid valve is energized when the transmission is in gear or the engine is cold, applying vacuum to the inner diaphragm of the idle boost throttle controller to increase rpm when there is load on the engine.

Inspection of Idle Boost Solenoid Valve

Open the control box.

Disconnect the lower vacuum hose of the solenoid valve from the 4 way joint and connect a vacuum pump.

Disconnect #21 vacuum hose of the solenoid valve from the vacuum hose manifold and connect a vacuum gauge.

Start engine.

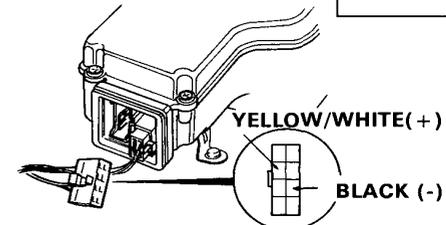
Apply vacuum.

Is vacuum indicated on the gauge?

NO

Disconnect the 8P connector on the control box.

Measure voltage between Yellow/White (+) terminal and Black (-) terminal on the main wire harness.

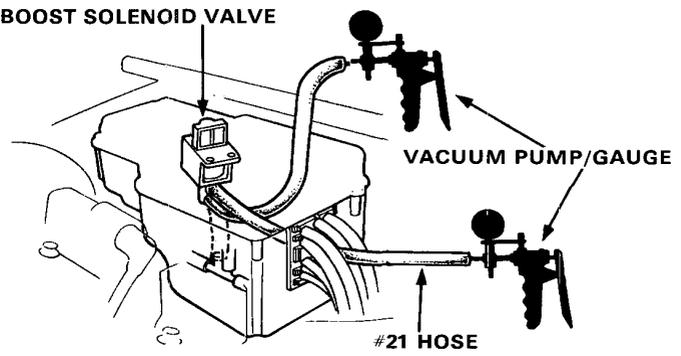


Warm up engine to normal operating temperature (cooling fan comes on).

Apply vacuum in Neutral or Park position.

(To page 12-161)

IDLE BOOST SOLENOID VALVE



NOTE: The engine coolant temperature must be below 70°C (158°F)

Is there battery voltage?

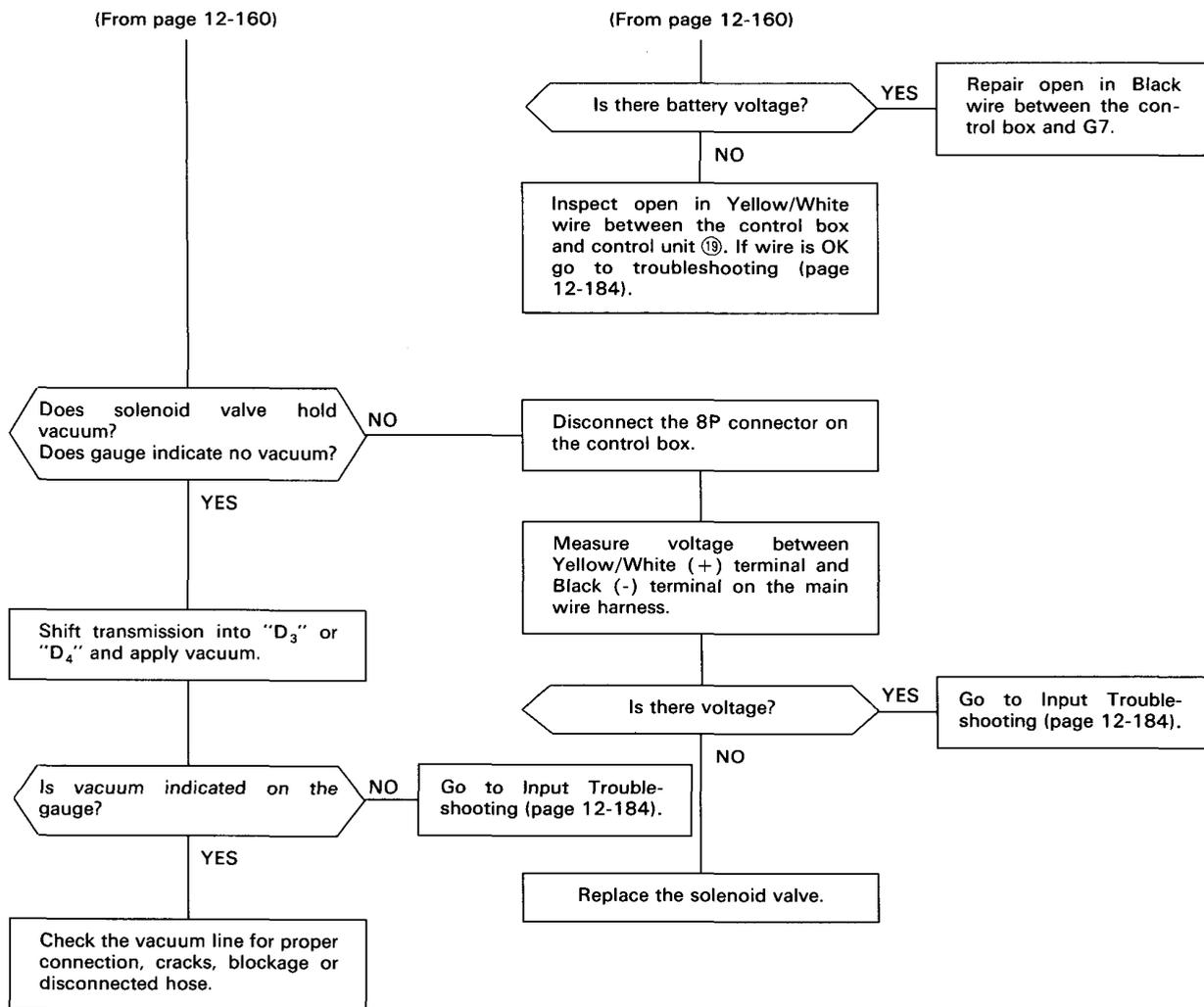
YES

Replace the solenoid valve.

NO

Measure voltage between Yellow/White (+) terminal and body ground.

(To page 12-161)



Control Unit Output Troubleshooting

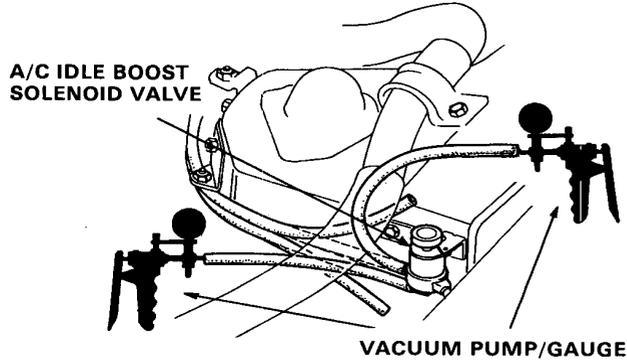
A/C Idle Boost Solenoid Valve

The A/C idle boost solenoid valve is energized when the A/C compressor is energized, applying vacuum to the outer diaphragm of the idle boost throttle controller. This increases the idle speed when the A/C compressor is on.

Inspection of A/C Idle Boost Solenoid Valve

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

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



Start engine.

Apply vacuum.

Does solenoid valve hold vacuum?

NO

Disconnect the 2P connector near the solenoid valve.

Measure voltage between Red (+) terminal and Black (-) terminal on the A/C wire harness.

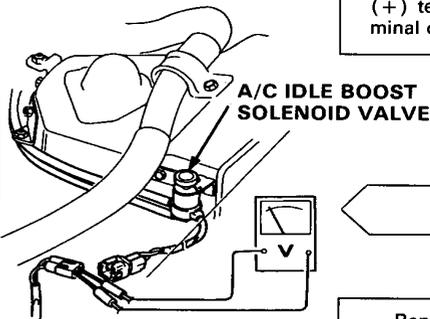
Is there voltage?

YES

Go to Input Troubleshooting (page 12-184).

NO

Replace the solenoid valve.



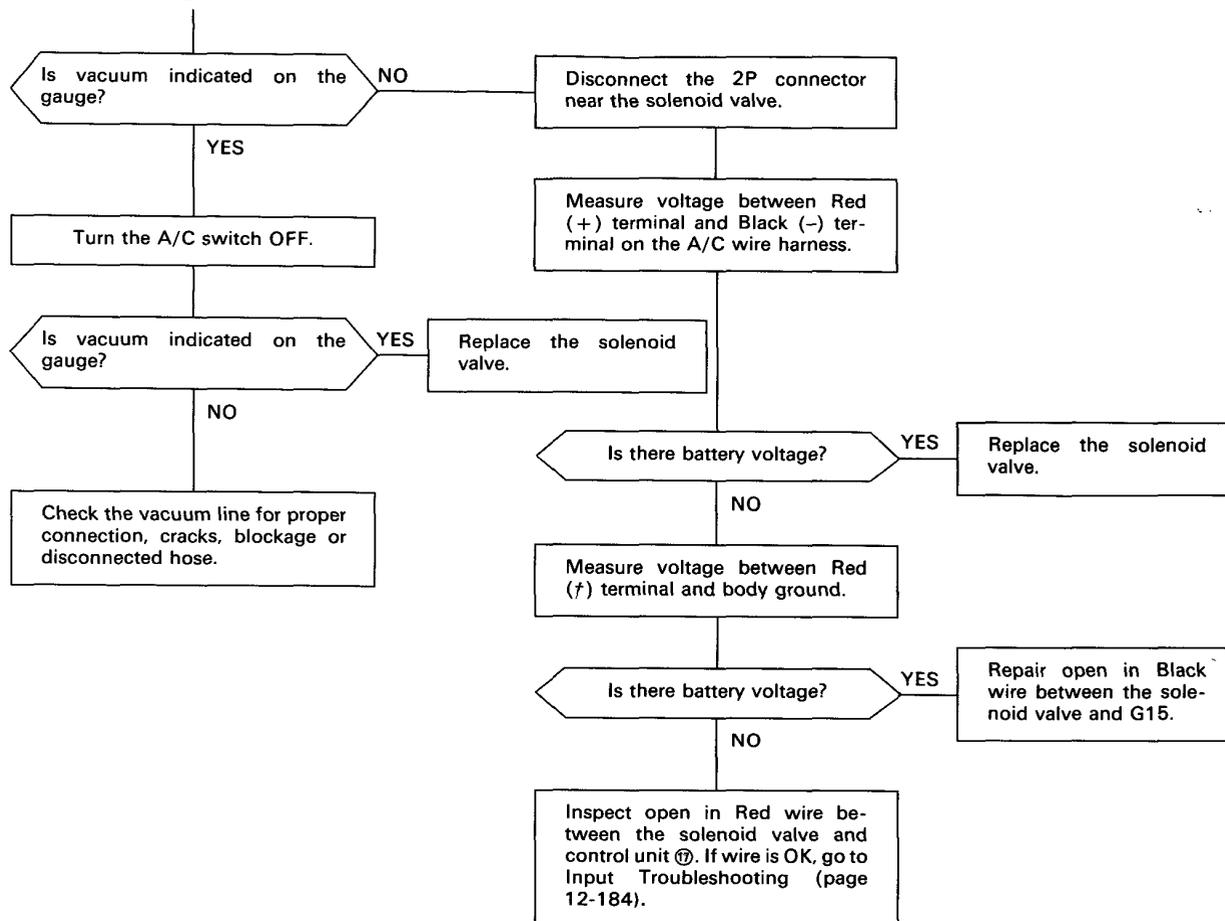
Turn the A/C switch ON.

Apply vacuum.

(To page 12-163)



(From page 12-162)



Control Unit Output Troubleshooting

Primary Slow Mixture Cut-off Solenoid Valve

Inspection of Primary Slow Mixture Cut-off Solenoid Valve

Place a clean towel around the solenoid valve, to soak up any gasoline, then loosen the screws and remove the solenoid valve.

Ground the valve as far from the carburetor as possible.

Turn the ignition switch ON.

Does the solenoid valve retract? **NO**

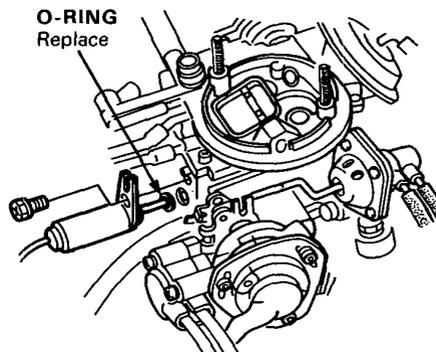
YES

Reinstall the solenoid valve.

(To page 12-165)

WARNING

- Wipe up any spilled gasoline before testing.
- If cut-off valve is removed for testing, be sure you ground it to prevent sparking or fire when the key is turned on.



Turn the ignition switch OFF.

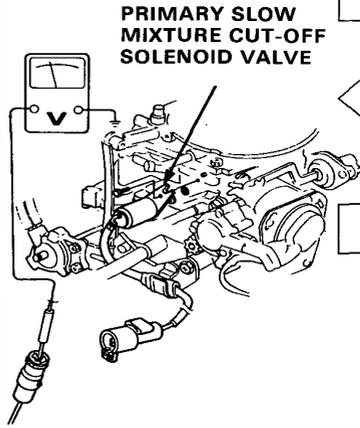
Disconnect the 2P connector near the solenoid valve.

(To page 12-165)



(From page 12-164)

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



(From page 12-164)

Turn the ignition switch ON.

Measure voltage between Green/Red (+) and body ground on the engine wire harness.

Is there battery voltage?

NO

Inspect open in Green/Red wire between the solenoid valve and control unit Ⓢ. If wire is OK, go to Input Troubleshooting (page 12-184).

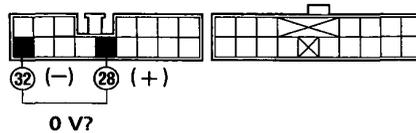
YES

Replace the solenoid valve.

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

Place the transmission in second or 2 position and accelerate.

Suddenly release the throttle and measure voltage between Ⓢ (Green/Red +) terminal and Ⓢ (Black -) terminal of the control unit during deceleration above 12.5 mph.



Is there voltage?

YES

Go to Input Troubleshooting (page 12-184).

NO

Solenoid valve is OK.

Control Unit Output Troubleshooting

Cranking Leak Solenoid Valve

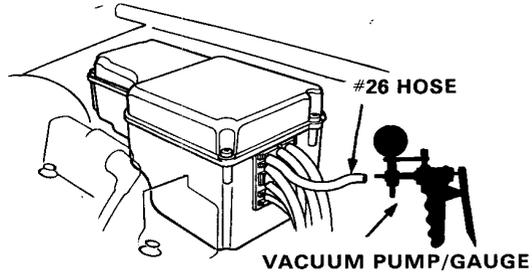
The cranking leak solenoid valve bleeds vacuum from choke opener during cranking.

Inspection of Cranking Leak Solenoid Valve

Disconnect #26 vacuum hose from the vacuum hose manifold.

Connect vacuum pump and apply vacuum.

Turn the ignition switch to the START position.



NOTE: The engine coolant temperature must be below 40 °C (104 °F)

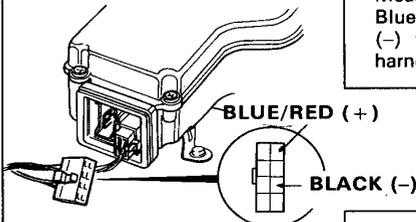
Does vacuum remain steady? YES

Turn the ignition switch OFF.

NO

Disconnect the 8P connector on the control box.

Measure voltage between Blue/Red (+) terminal and Black (-) terminal on the main wire harness.



Turn the ignition switch to the START position.

Is there battery voltage? YES

Replace the solenoid valve.

NO

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

Is there battery voltage? YES

Repair open in Black wire between the control box and G7.

NO

Inspect open in Blue/Red wire between the control box and control unit ⊗. If wire is OK, go to Input Troubleshooting (page 12-184).

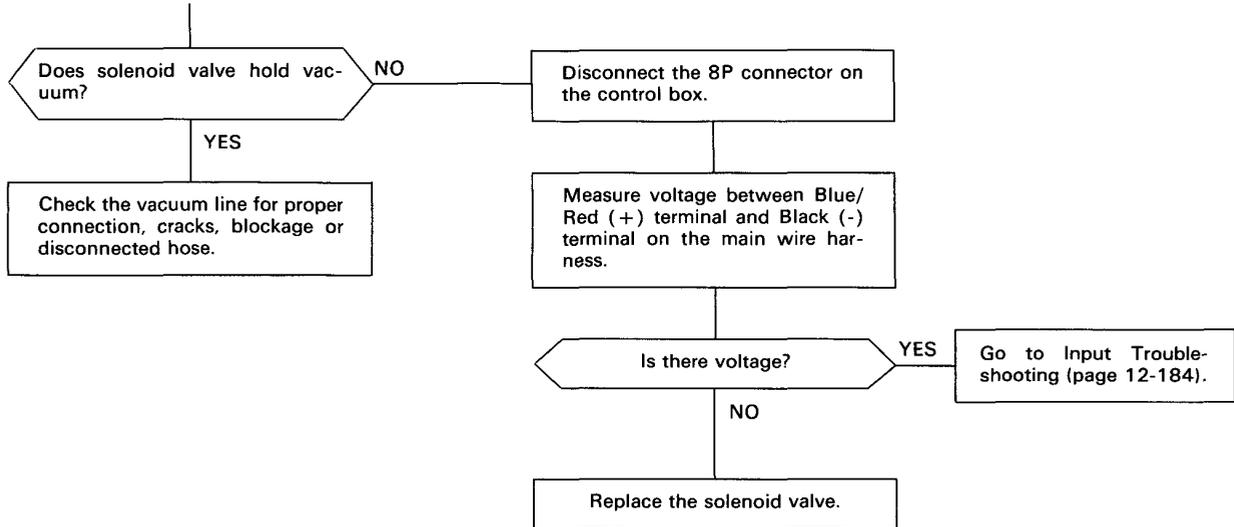
Start engine and warm up to normal operating temperature (cooling fan comes on).

Apply vacuum

(To page 12-167)



(From page 12-166)



Control Unit Output Troubleshooting

Frequency Solenoid Valve A

The frequency solenoid valve A, a part of the M-system, gets signals from the oxygen sensor through the control unit and opens air control valve A whenever the air-fuel mixture is richer than stoichiometric.

Inspection of Frequency Solenoid Valve A

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

Disconnect the upper vacuum hose of the solenoid valve from the air control valve A.

Disconnect the 2P connector near the solenoid valve.

Apply vacuum.

Does solenoid valve hold vacuum?

NO

Replace the solenoid valve.

YES

Connect the battery positive terminal to the Green/Black terminal of the 2P connector and battery negative terminal to the Black terminal.

Apply vacuum

Does solenoid valve hold vacuum?

YES

Replace the solenoid valve.

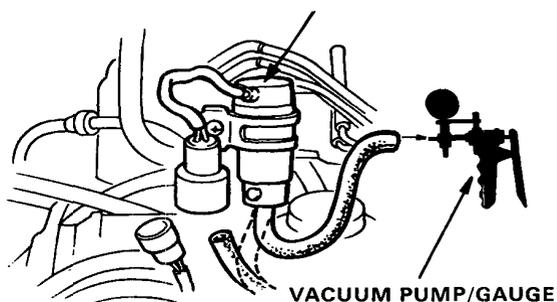
NO

Disconnect the battery terminals from the 2P connector.

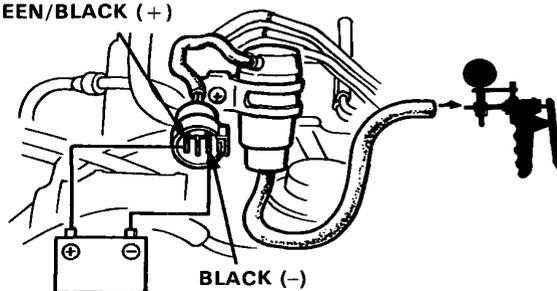
Reconnect vacuum hose.

(To page 12-169)

FREQUENCY SOLENOID VALVE A



GREEN/BLACK (+)



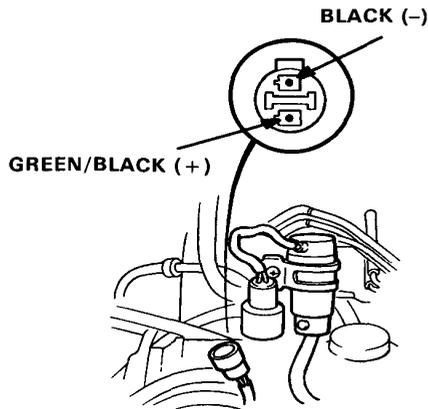
BLACK (-)



(From page 12-168)

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

Measure voltage between Green/Black (+) terminal and Black (-) terminal on the main wire harness while running engine at approx. 2,500 rpm.



Is there 0 and 12 volts alternately?

YES

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

NO

Measure voltage between Green/Black (+) terminal and body ground while running engine at approx. 2,500 min⁻¹ (rpm).

Is there 0 and 12 volts alternately?

YES

Repair open in Black wire between the solenoid valve and G4.

NO

Inspect open in Green/Black wire between the solenoid valve and control unit . If wire is OK, go to Input Troubleshooting (page 12-184).

Control Unit Output Troubleshooting

Frequency Solenoid Valve B

The frequency solenoid valve B, a part of the X-system, gets signals from the control unit to open air control valve B when there is a rich air-fuel mixture.

Inspection of Frequency Solenoid Valve B

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

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

Disconnect the 2P connector near the solenoid valve.

Apply vacuum.

Does solenoid valve hold vacuum?

NO

Replace the solenoid valve.

YES

Connect the battery positive terminal to the Green/Black terminal of the 2P connector of the solenoid valve and battery negative terminal to the Black terminal.

Apply vacuum.

Is vacuum indicated on the gauge?

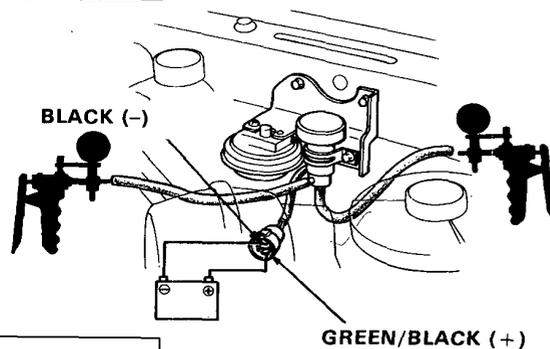
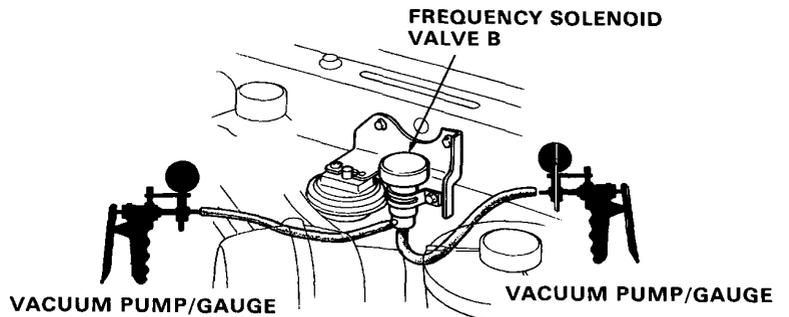
NO

Replace the solenoid valve.

YES

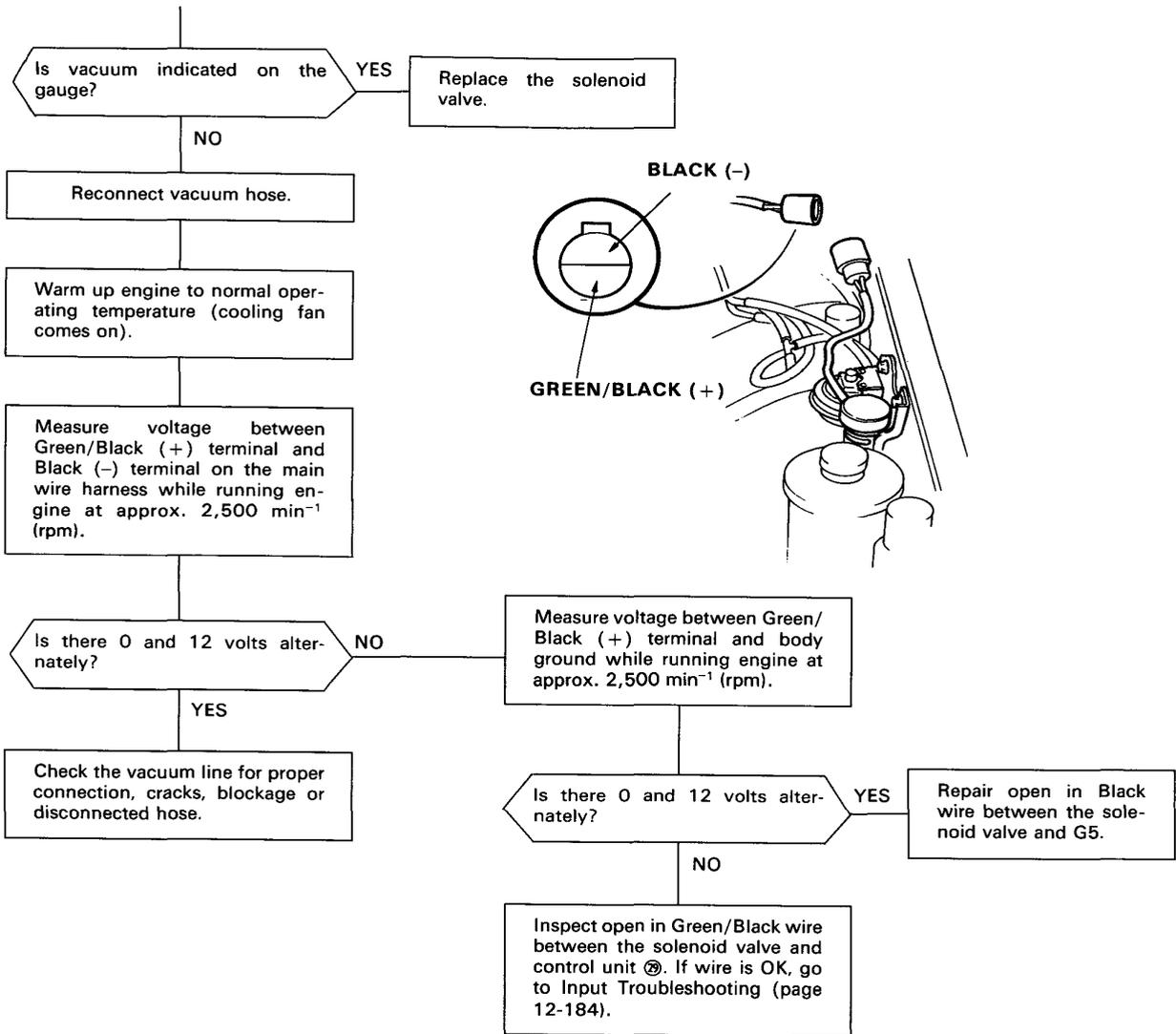
Disconnect the battery terminals, from the 2P connector.

(To page 12-171)





(From page 12-170)



Control Unit Output Troubleshooting

Feedback Control Solenoid Valve

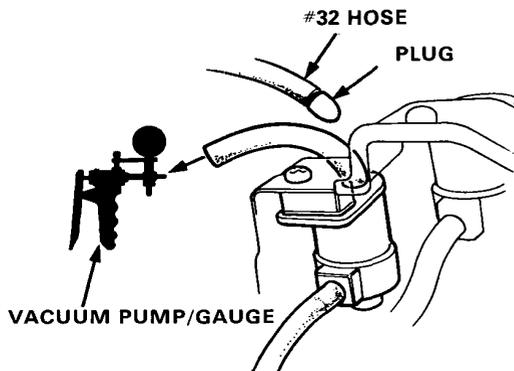
The feedback control system is designed to provide a stoichiometric air-fuel ratio, allowing the three-way catalyst's performance to give a simultaneous reduction of hydrocarbons, carbon monoxide and oxides of nitrogen. The feedback control solenoid valve is provided to stop feedback operation at low engine speed such as at engine idling.

Inspection of Feedback Control Solenoid Valve

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

Plug the end of #32 hose.

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

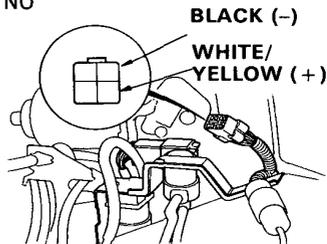


Does solenoid valve hold vacuum?

YES

Disconnect the 4P connector near the solenoid valve.

NO



Measure voltage between White/Yellow (+) terminal and Black (-) terminal on the main wire harness.

Is there voltage?

YES

Go to Input Troubleshooting (page 12-184).

NO

Replace the solenoid valve.

Raise the engine speed to 2,500 min⁻¹ (rpm) and apply vacuum.

Does the solenoid valve hold vacuum?

NO

Disconnect the 4P connector near the solenoid valve.

YES

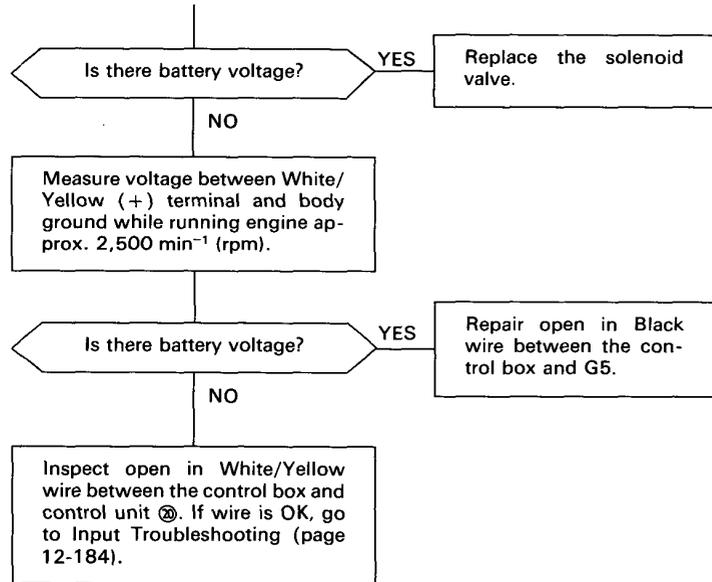
Check the vacuum line for proper connection, cracks, blockage or disconnected hose.

Measure voltage between White/Yellow (+) terminal and Black (-) terminal on the main wire harness while running engine at approx. 2,500 min⁻¹ (rpm).

(To page 12-173)



(From page 12-172)



Control Unit Output Troubleshooting

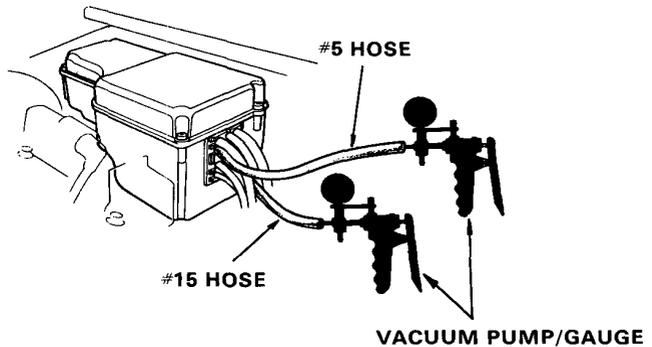
Air Suction Control Solenoid Valve

When the air suction control solenoid valve is activated, manifold vacuum raises the diaphragm valve of the air suction valve and fresh air from the air cleaner is induced to the exhaust manifold through the reed valve of the air suction valve by pulsation of the exhaust gas.

Inspection of Air Suction Control Solenoid Valve

Disconnect the #15 vacuum hose of the solenoid valve from the accumulator and connect a vacuum pump.

Disconnect the #15 vacuum hose of the solenoid valve from the vacuum hose manifold and connect a vacuum gauge.



Apply vacuum.

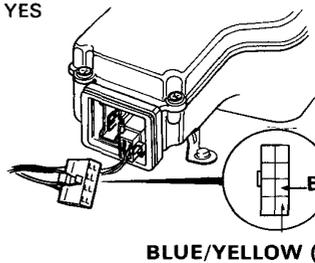
Does the solenoid valve hold vacuum? **NO** → Replace the solenoid valve.

YES

Warm up engine to normal operating temperature (cooling fan comes on) and apply vacuum at idle

Is vacuum indicated on the gauge? **NO** → Disconnect the 8P connector on the control box.

YES



Disconnect the 8P connector on the control box.

Measure voltage between Blue/Yellow (+) terminal and Black (-) terminal on the main wire harness.

Is there battery voltage? **YES** → Replace the solenoid valve.

NO

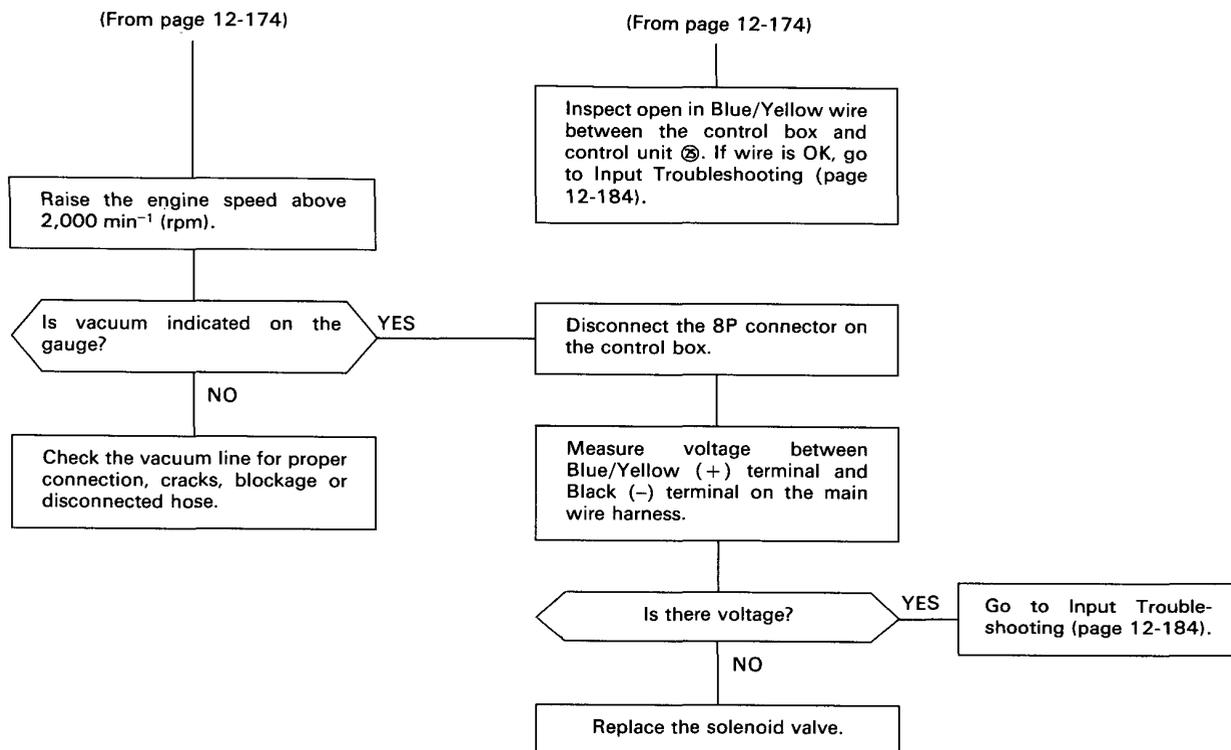
Measure voltage between Blue/Yellow (+) terminal and body ground.

Is there battery voltage? **YES** → Repair open in Black wire between the control box and G7.

NO

(To page 12-175)

(To page 12-175)



Control Unit Output Troubleshooting

Anti- afterburn Control Solenoid Valve

The anti-afterburn control solenoid valve is provided to control the operation of the anti-afterburn valve by introducing vacuum to the diaphragm holding the valve closed. The anti-afterburn valve senses intake manifold vacuum changes during gear shifting or deceleration, and supplies fresh air to the intake manifold in order to prevent the escape of unburned fuel.

Inspection of Anti-afterburn Control Solenoid Valve

Disconnect #31 vacuum hose of the solenoid valve from vacuum hose manifold.

Disconnect #30 vacuum hose of the solenoid valve from vacuum hose manifold and connect a vacuum pump

Start the engine and apply vacuum.

NOTE: The engine coolant Temperature must be below 70° C (158° F)

Does the solenoid valve hold vacuum?

YES

Stop engine.

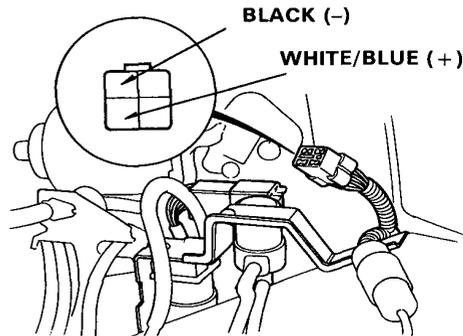
NO

Stop engine.

Disconnect 4P connector near the solenoid valve.

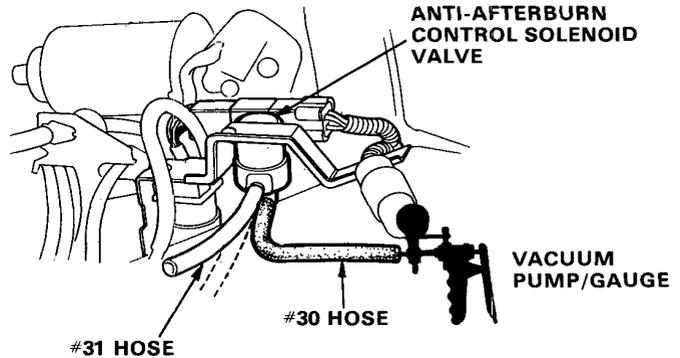
Block rear wheels and set the parking brake. Jack up the front of the car and support with safety stands.

Start engine.



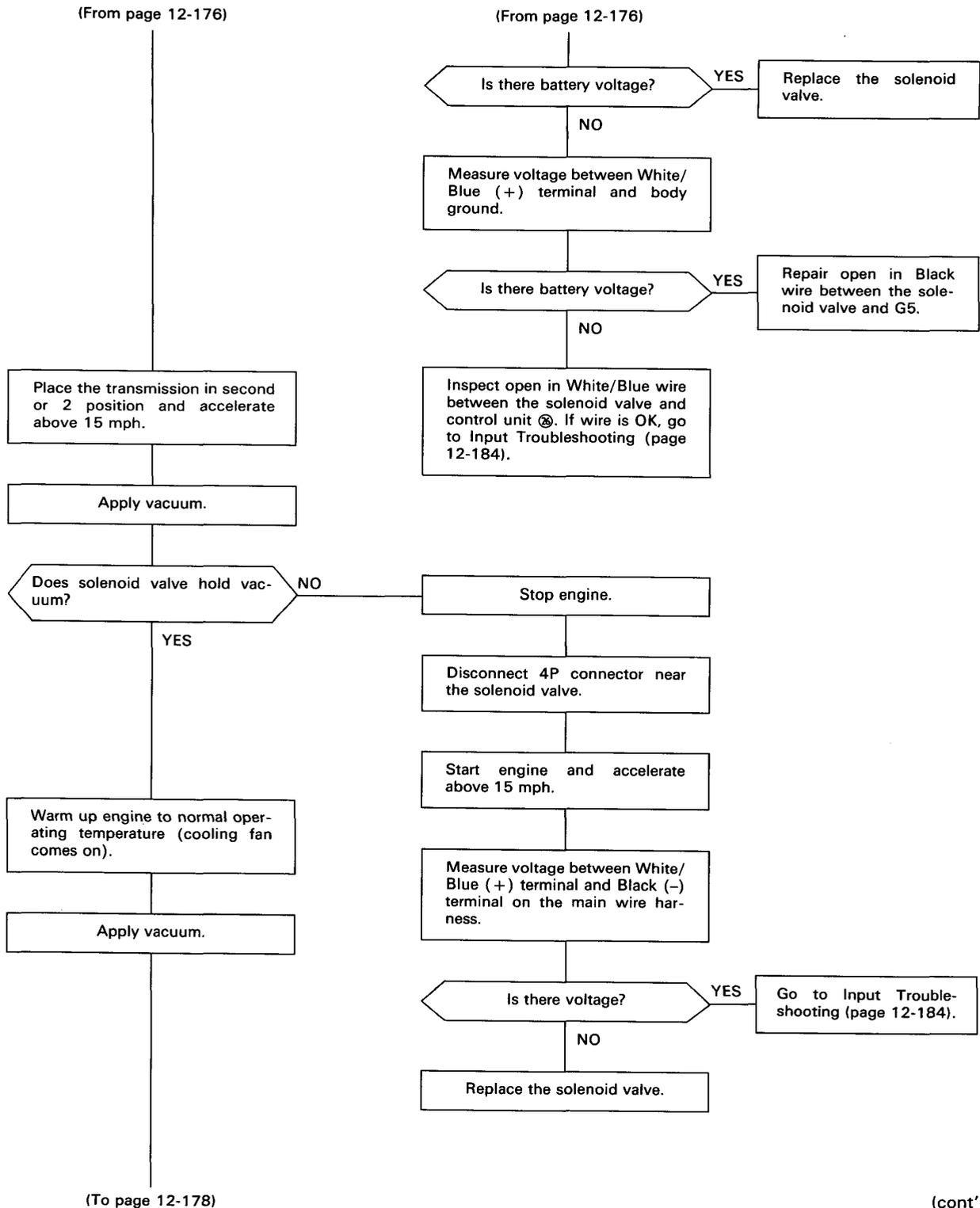
Start engine.

Measure voltage between White/Blue (+) terminal and Black (-) terminal on the main wire harness.



(To page 12-177)

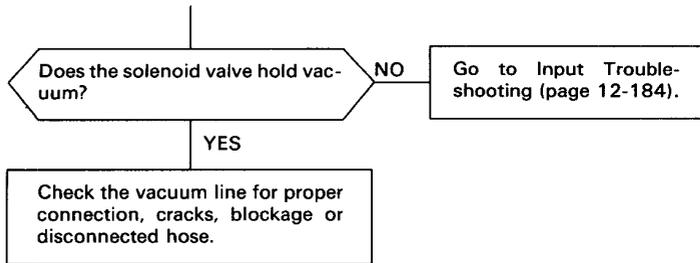
(To page 12-177)



Control Unit Output Troubleshooting

Anti-afterburn Control Solenoid Valve (cont'd)

(From page 12-177)





Air Leak Solenoid Valve

The air leak solenoid valve supplies additional air to the intake manifold. The solenoid valve opens when the engine is running at idle with high intake air temperature. The solenoid valve operates to decrease idle emissions when the air injection to the exhaust manifold is cut off.

Inspection of Air Leak Solenoid Valve

Disconnect #27 vacuum hose from the vacuum hose manifold and connect a vacuum pump.

Disconnect the 8P connector on the control box.

Apply vacuum.

Does the solenoid valve hold vacuum? **NO** Replace the solenoid valve.

YES

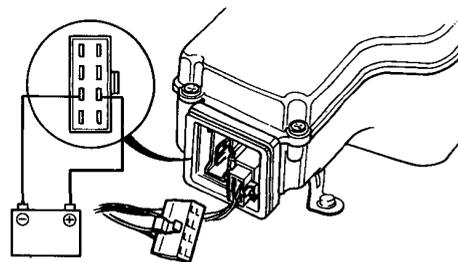
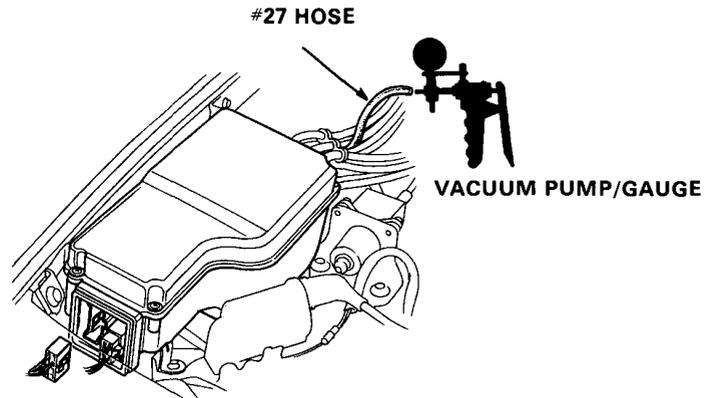
Connect the battery positive terminal to the Gray terminal of the 8P connector and the battery negative terminal to the Black terminal.

Apply vacuum.

Does the solenoid valve hold vacuum? **NO** Replace the solenoid valve.

YES

Inspect open in White/Green between the control box and control unit @, and Black wire between the control box and G7. If wire is OK, go to Input Troubleshooting (page 12-184).



Control Unit Output Troubleshooting

EFE (Early Fuel Evaporator) System

Inspection of EFE (Early Fuel Evaporator) System

Disconnect the 2P connector near the carburetor.

Measure resistance between White terminal and Black terminal on the EFE heater.

Does continuity exist?

NO

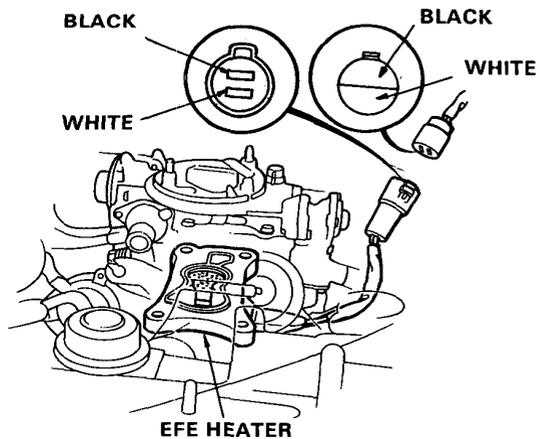
Replace the EFE heater.

YES

Start engine.

Measure voltage between White (+) terminal and Black (-) terminal on the engine wire harness.

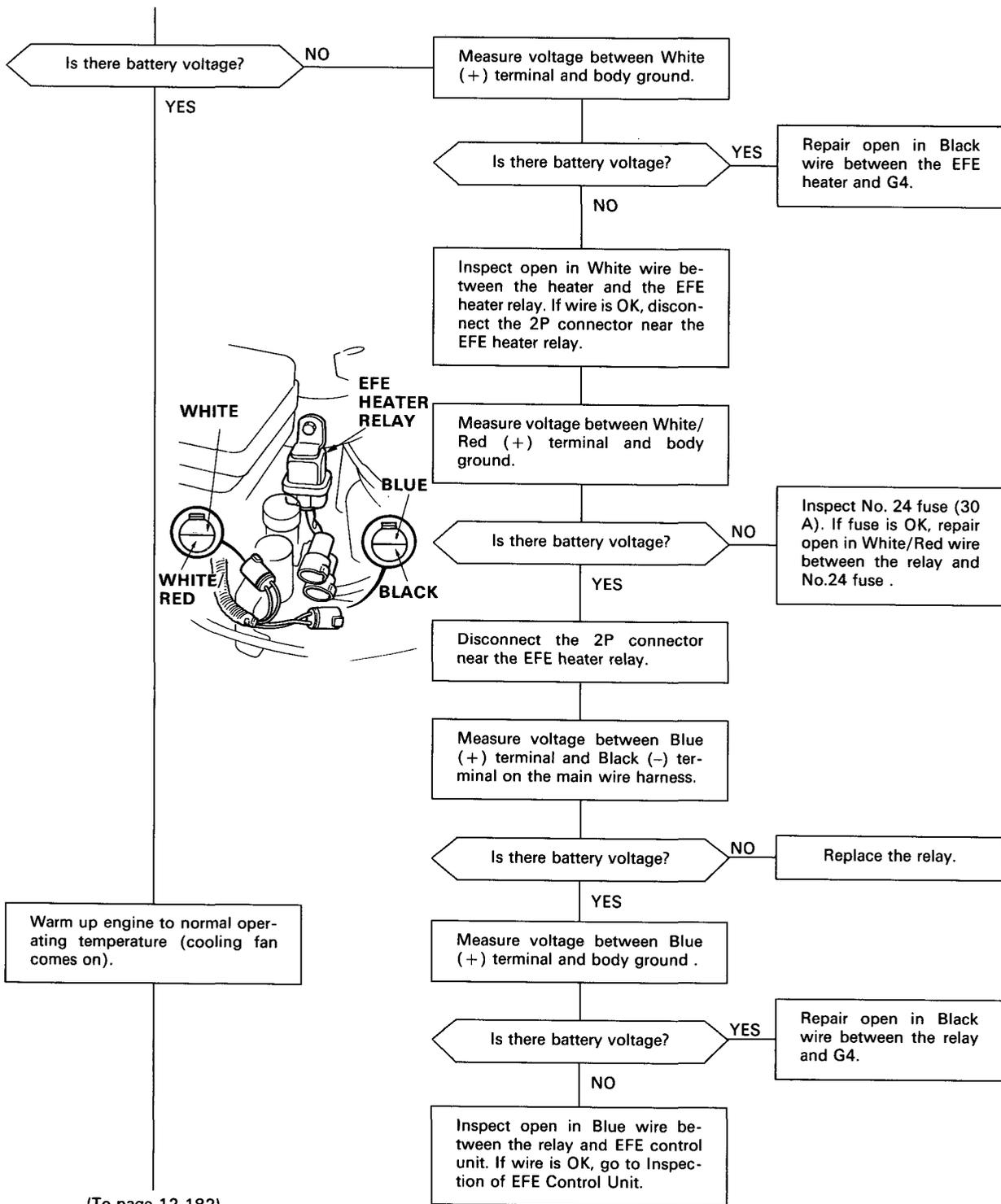
(To page 12-181)



NOTE: The engine coolant temperature must be below 60°C (140°F)



(From page 12-180)



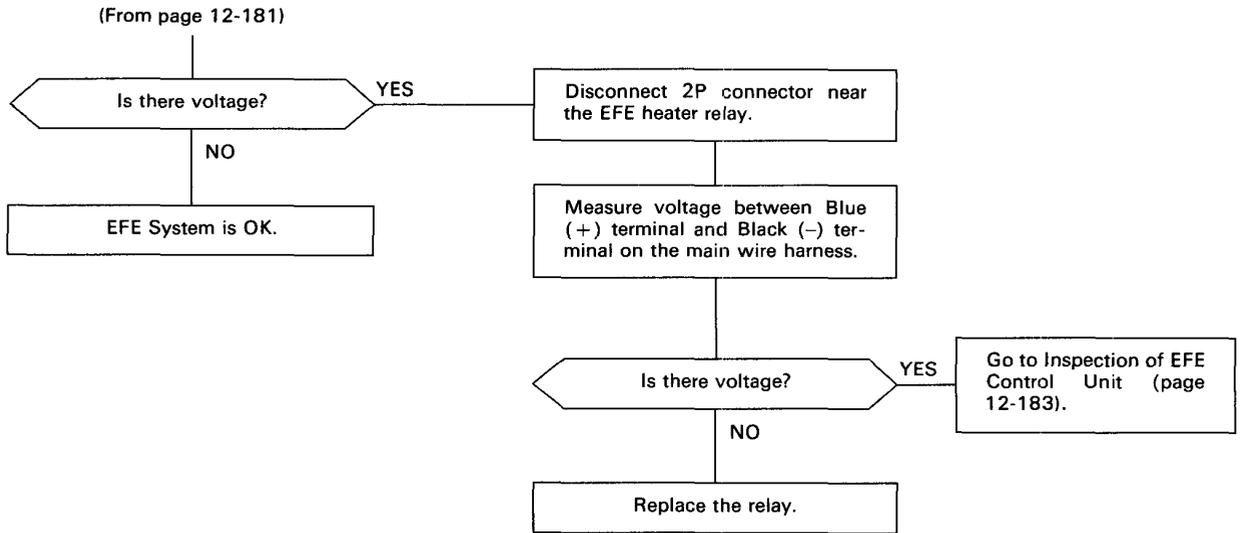
Warm up engine to normal operating temperature (cooling fan comes on).

(To page 12-182)

(cont'd)

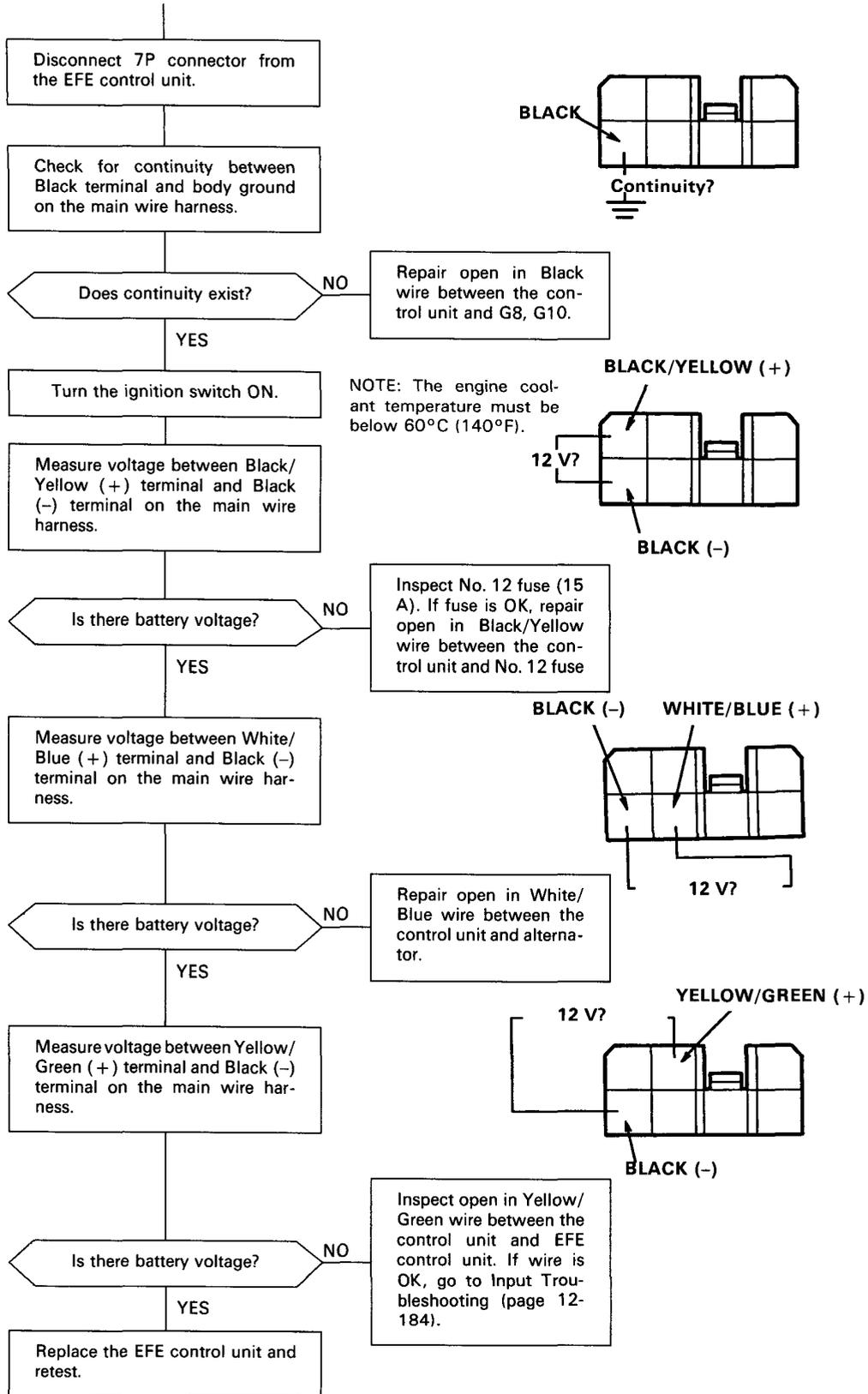
Control Unit Output Troubleshooting

EFE (Early Fuel Evaporator) System (cont'd)





Inspection of EFE Control Unit



Control Unit Input Troubleshooting

If there is no voltage from the control unit when there should be voltage or if there is voltage from the unit when there shouldn't be voltage, inspect as follows and if no defects can be found, replace the control unit and re-test.

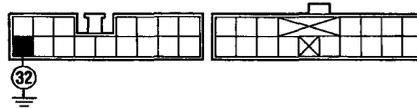
PROBLEMATIC CIRCUIT	REFER TO CHECK:		CHECK
To frequency solenoid valves A and B (29 Green/Black)	M/T	1,4,6,7,8,10,11,12,13	<ol style="list-style-type: none"> 1. Inspect the power source (IG 1) and ground (page 12-185). 2. Inspect the power source (Bat) (page 12-185). 3. Inspect the starter signal (page 12-186). 4. Inspect the ignition coil signal (page 12-192). 5. Inspect the A/T shift position signal (page 12-202). 6. Inspect the clutch switch signal (page 12-200). 7. Inspect vacuum switch A (page 12-194). 8. Inspect vacuum switch B (page 12-196). 9. Inspect vacuum switch C (page 12-198). 10. Inspect the speed pulser (page 12-193). 11. Inspect the coolant temperature (TW) sensor (page 12-190). 12. Inspect the intake air temperature (TA) sensor (page 12-188). 13. Inspect the oxygen (O2) sensor (page 12-187). 14. Inspect the A/C switch signal (page 12-204).
	A/T	1,4,5,7,8,10,11,12,13	
To feedback control solenoid valve (20 White/Yellow)	M/T	1,4,6,8,11	
	A/T	1,4,5,8,9,11	
To frequency solenoid valve C (A/T only) (21 Blue/Red)	1,2,4,5,10,11,14		
To idle boost solenoid valve (A/T only) (19 Yellow/White)	1,4,5,7,10,11,14		
To air suction control solenoid valve (25 Blue/Yellow)	M/T	1,4,7,8,10,11,12	
	A/T	1,4,7,9,10,11,12	
To anti-afterburn control solenoid valve (26 White/Blue)	M/T	1,10,11	
	A/T	1,5,11	
To cranking leak solenoid valve (27 Blue/Red)	1,3,4,10,11,12		
To primary slow mixture cut-off solenoid valve (28 Green/Red)	M/T	1,4,6,7,8,10,11	
	A/T	1,4,5,7,8,10,11	
A/C idle boost solenoid valve (17 Red)	1,4,7,10,11,14		
To EFE heater unit (4 Yellow/Green)	1,11		



Power Sources and Ground

Inspection of Power Source (IG1) and Ground

Check for continuity between the body ground and ② (Black) terminal.



Does continuity exist?

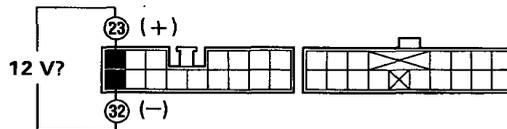
NO

Repair open in Black wire between G2 and control unit ②.

YES

Turn the ignition switch ON.

Measure voltage between ② (Black/Yellow +) terminal and ③ (Black-) terminal



Is there battery voltage?

NO

Inspect No.1 (15A) fuse.

YES

Power source (IG1) and ground are OK.

Is No.1 fuse OK?

NO

Replace fuse.

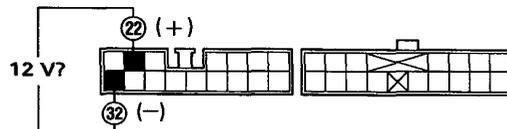
YES

Repair open in Black/Yellow wire between No.1 fuse and control unit ②.

Inspection of Power Source (Bat)

Turn the ignition switch OFF.

Measure voltage between ② (Yellow/Blue +) terminal and ③ (Black-) terminal.



Is there battery voltage?

NO

Inspect No.1 (10A) fuse in the under hood relay box.

YES

Power source (Bat) is OK.

Is No.1 fuse OK?

NO

Replace fuse.

YES

Repair open in Yellow/Blue wire between No.1 fuse and control unit ②.

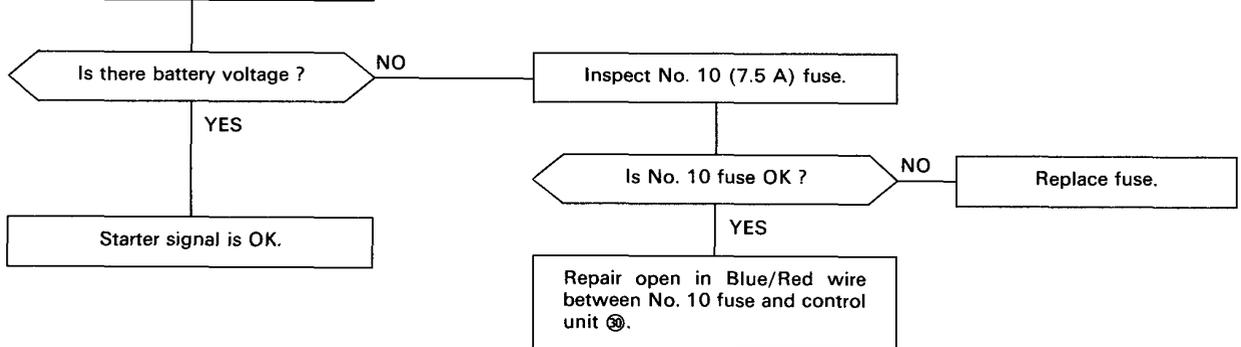
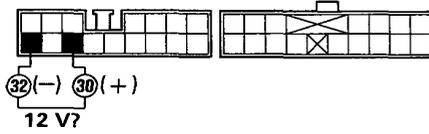
Control Unit Input Troubleshooting

Starter Signal

This signals the control unit when the engine is cranking.

Inspection of Starter Signal

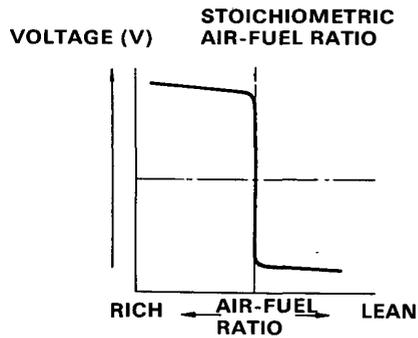
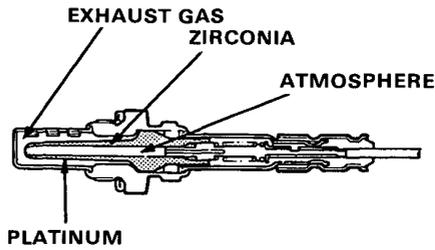
Measure voltage between ③ (Blue/Red +) terminal and ② (Black -) terminal with the ignition switch in the START position.





Oxygen Sensor

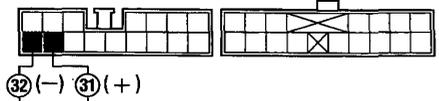
The oxygen (O_2) sensor detects the content in the exhaust gas and inputs the control unit.



Inspection of O_2 Sensor

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

Measure voltage between ③ (White+) terminal and ② (Black-) terminal.



Above 0.6 V during wide open throttle acceleration?
Below 0.4 V during closed throttle deceleration from 5000 min^{-1} (rpm)?

Is voltage above 0.6 V during wide open throttle acceleration?
Is voltage below 0.4 V during closed throttle deceleration from 5000 rpm?

NO

Disconnect main wire harness from O_2 sensor.

YES

O_2 sensor is OK.

Measure voltage between the connector terminal and body ground.

Is voltage above 0.6 V during wide open throttle acceleration?
Is voltage below 0.4 V during closed throttle deceleration from 5000 rpm?

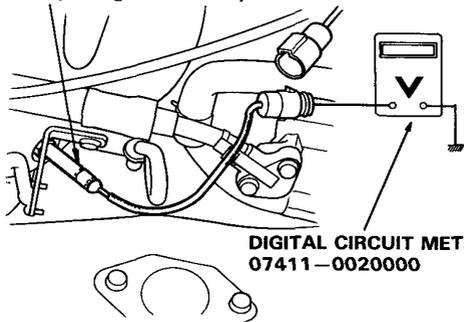
NO

Replace O_2 sensor.

YES

Repair open or short in White wire between O_2 sensor and control unit ③

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

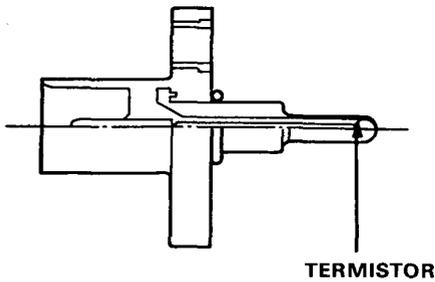


DIGITAL CIRCUIT METER
07411-0020000

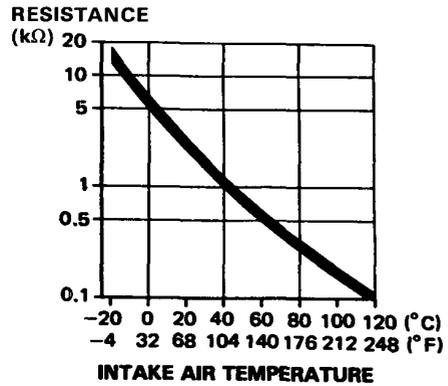
Control Unit Input Troubleshooting

TA Sensor

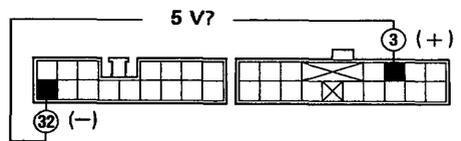
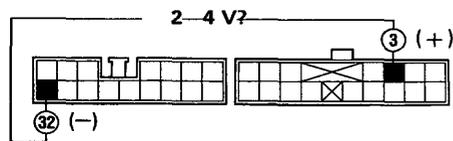
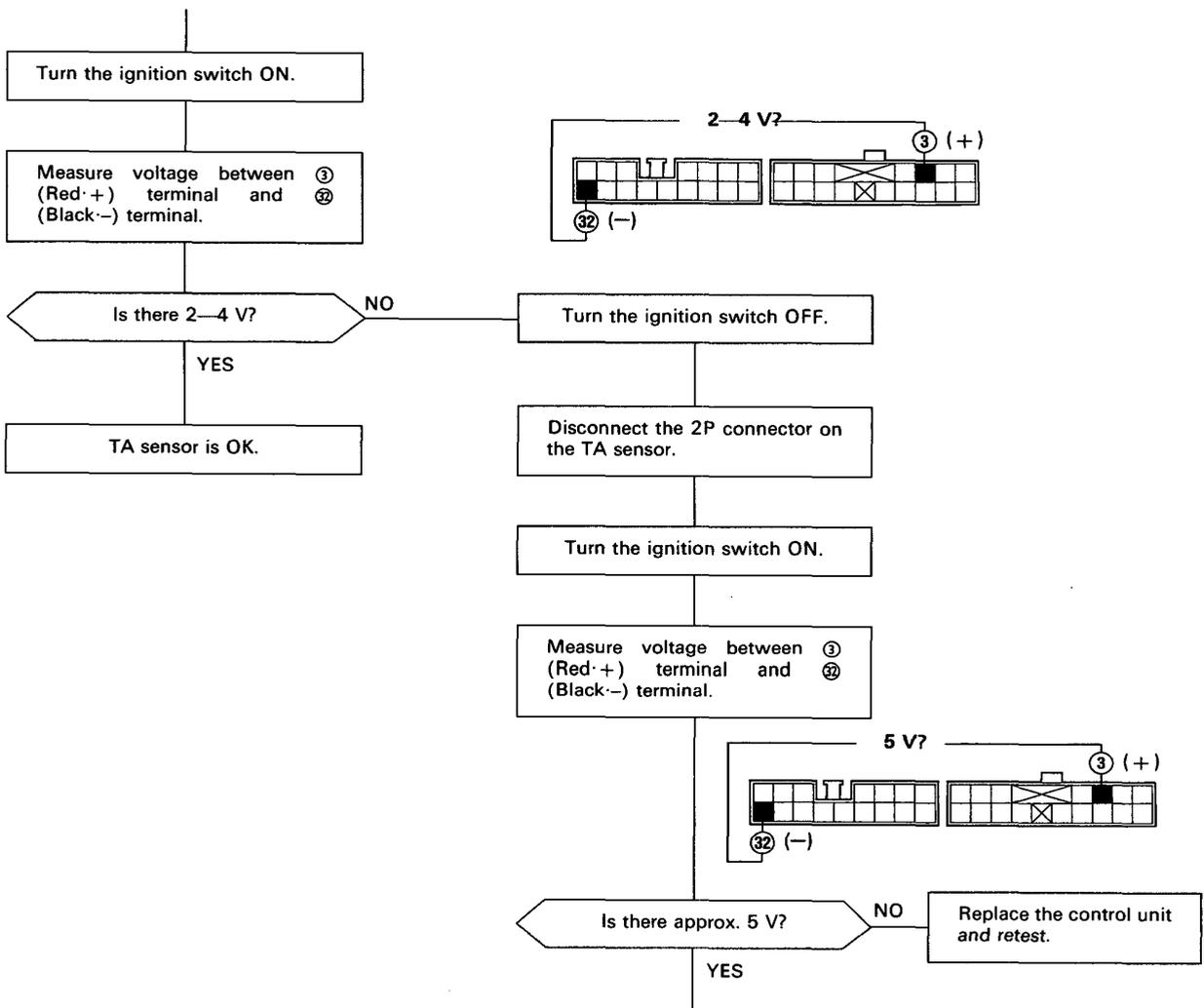
The intake air temperature (TA) sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the intake air temperature increases as shown below.



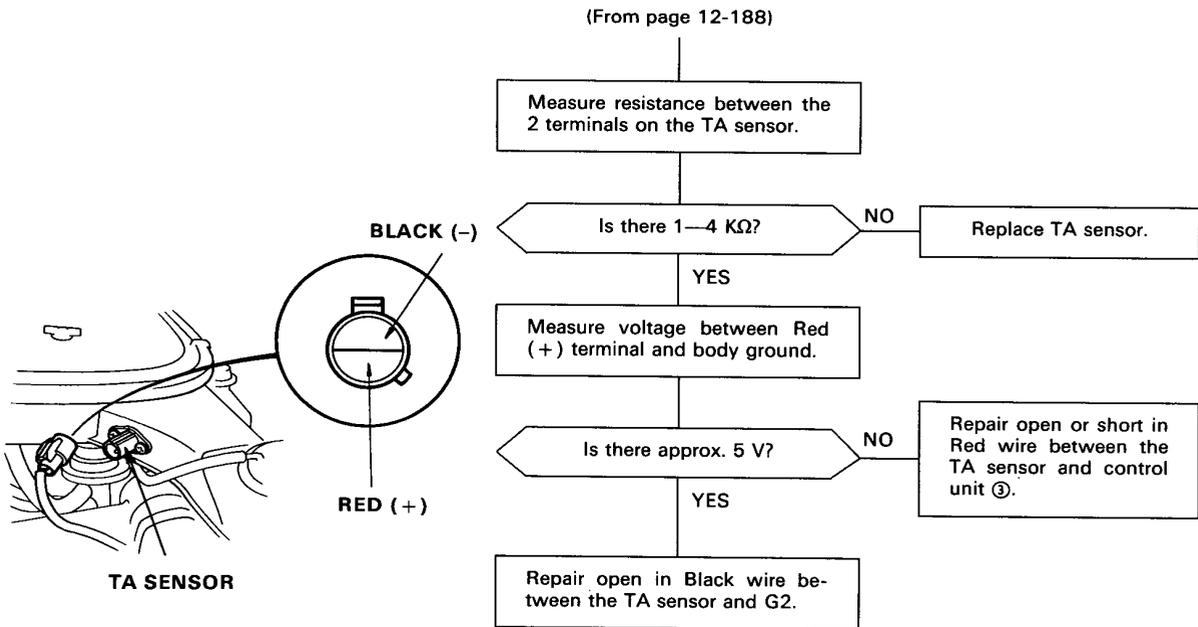
TERMISTOR



Inspection of TA Sensor



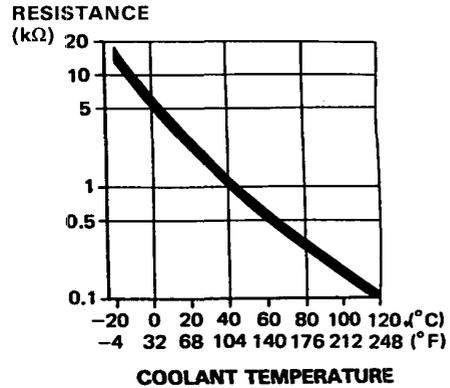
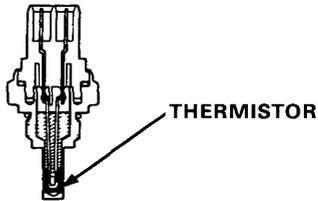
(To page 12-189)



Control Unit Input Troubleshooting

TW Sensor

The coolant temperature (TW) sensor is a temperature dependant resistor (thermistor). The resistance of the thermistor decreases as the coolant temperature increases as shown below.



Inspection of TW Sensor

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

Measure voltage between ⑦ (Yellow/Green+) terminal and ⑩ (Black-) terminal.

Is there approx. 1 V?

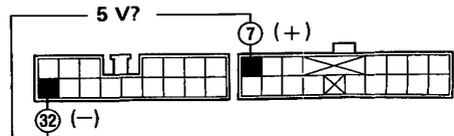
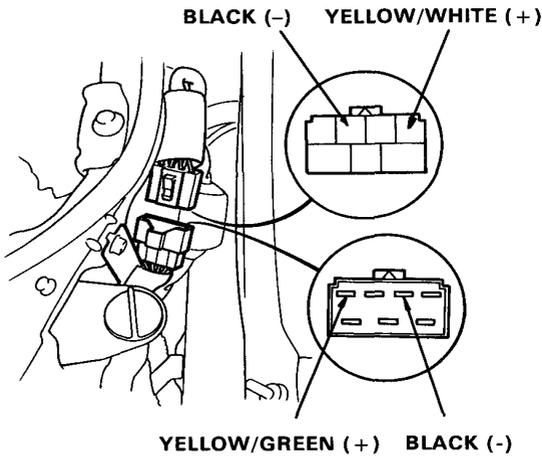
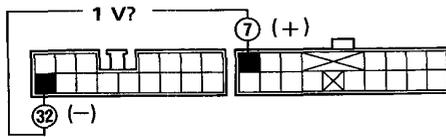
YES
TW sensor is OK.

NO
Turn the ignition switch OFF.

Disconnect the 7P connector at the right front engine compartment.

Turn the ignition switch ON.

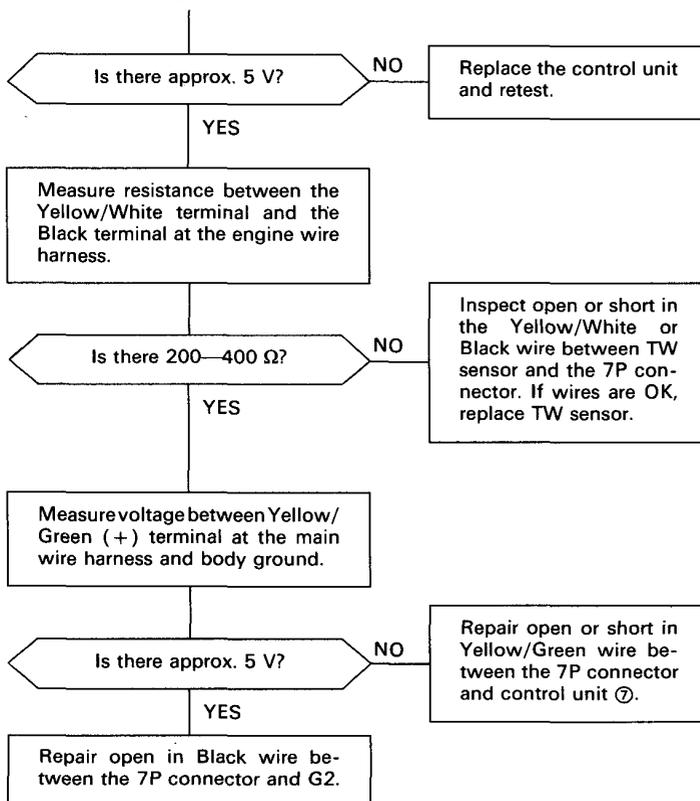
Measure voltage between ⑦ (Yellow/Green+) terminal and ⑩ (Black-) terminal.



(To page 12-191)



(From page 12-190)



Control Unit Input Troubleshooting

Ignition Coil Signal

This signal allows the control unit to monitor the engine rpm.

Inspection of Ignition Coil Signal

Turn the ignition switch ON.

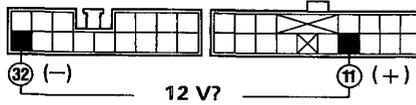
Measure voltage between ① (Blue+) terminal and ② (Black-) terminal.

Is there battery voltage?

NO

YES

Ignition coil signal is OK.



Inspect open in Blue wire between the ignition coil and control unit ①. If wire is OK, check the ignition coil (section 24).



Speed Pulsar

The signal generated by the speed pulsar produces 4 pulses for each revolution of the speedometer cable.

Inspection of Speed Pulsar

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

Drive vehicle and operate cruise control.

Does cruise control operate properly?

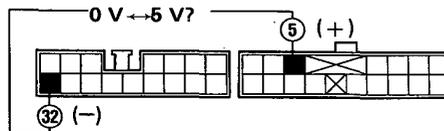
NO

See cruise control speed pulsar inspection (section 25)

YES

Turn the ignition switch ON.

Slowly rotate the left front wheel and measure voltage between ⑤ (Yellow +) terminal and ⑩ (Black -) terminal.



Does voltage pulse 0 V and 5 V?

NO

Turn the ignition switch OFF.

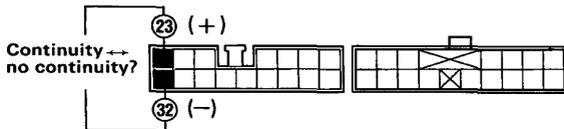
YES

Speed pulsar is OK.

Disconnect the connectors from the control unit.

Turn the ignition switch ON.

Slowly rotate left front wheel and check for continuity between ⑩ (Black/Yellow +) terminal and ⑩ (Black -) terminal.



Is there continuity or no continuity alternately?

NO

Repair open or short in Yellow wire between the combination meter and control unit ⑤.

YES

Replace the control unit and reset.

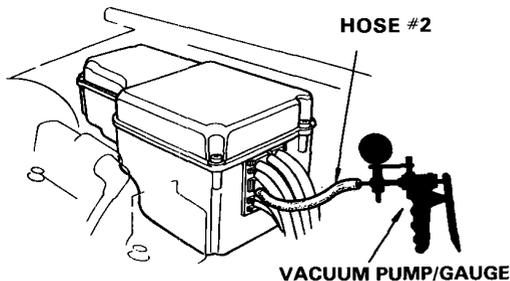
Control Unit Input Troubleshooting

Vacuum Switch A

The vacuum switch A signals the control unit when the vacuum level is below 3.1" (80 mmHg).

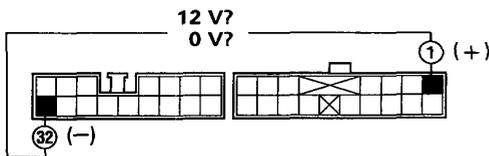
Inspection of Vacuum Switch A

Disconnect the #2 vacuum hose from the vacuum hose manifold and connect a vacuum pump to the hose.



Turn the ignition switch ON.

Measure voltage between ① (Green/Yellow +) terminal and ② (Black -) terminal.



Is there battery voltage?

NO

Turn the ignition switch OFF.

Disconnect 4P connector on the control box.

Turn the ignition switch ON.

Measure voltage between Black/Yellow (+) terminal and Green/Yellow (-) terminal on the main wire harness.

Apply vacuum above 3.1 (80 mmHg).

Measure voltage between ① (Green/Yellow +) terminal and ② (Black -) terminal.

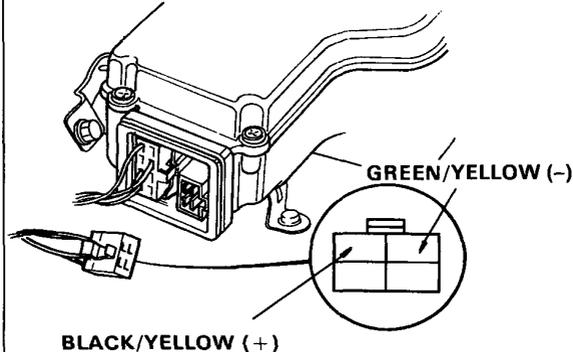
Is there voltage?

YES

Replace vacuum switch A.

NO

Vacuum switch A is OK.



Is there battery voltage?

YES

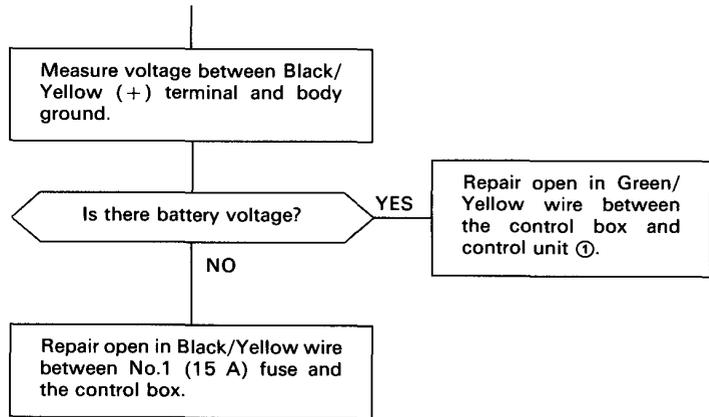
Replace vacuum switch A.

NO

(To page 12-195)



(From page 12-194)



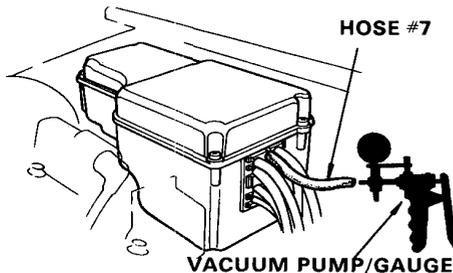
Control Unit Input Troubleshooting

Vacuum Switch B

The vacuum switch B signals the control unit when the vacuum level is below 1.2 (30 mmHg).

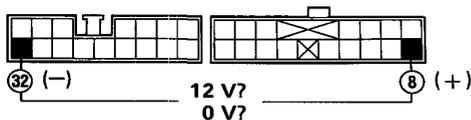
Inspection of Vacuum Switch B

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



Turn the ignition switch ON.

Measure voltage between ⑧ (Yellow/Blue +) terminal and ⑫ (Black -) terminal.



Is there battery voltage?

NO Turn the ignition switch OFF.

YES

Apply vacuum above 1.2 (30 mmHg.)

Measure voltage between ⑧ (Yellow/Blue +) terminal and ⑫ (Black -) terminal.

Disconnect 4P connector on the control box.

Turn the ignition switch ON.

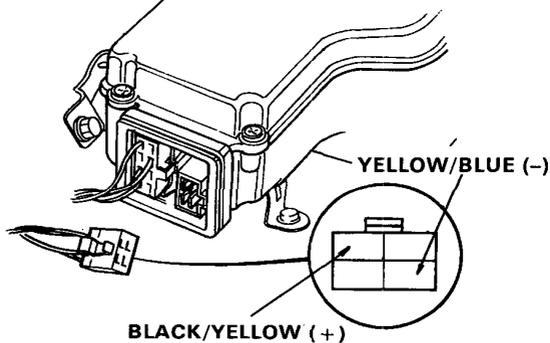
Measure voltage between Black/Yellow (+) terminal and Yellow/Blue (-) terminal on the main wire harness.

Is there voltage?

YES Replace vacuum switch B.

NO

Vacuum switch B is OK.



Is there battery voltage?

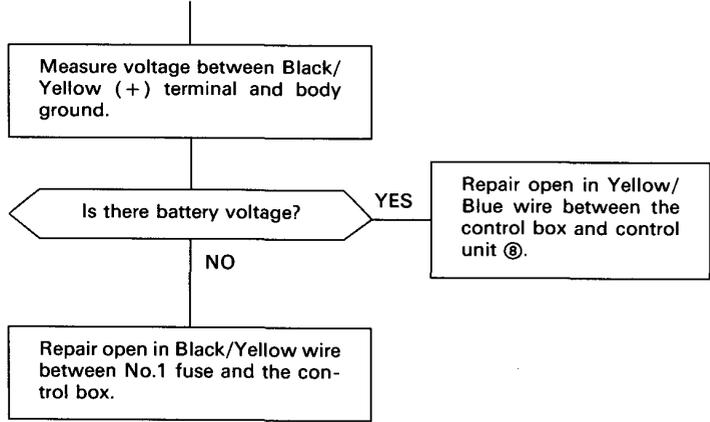
YES Replace vacuum switch B.

NO

(To page 12-197)



(From page 12-196)



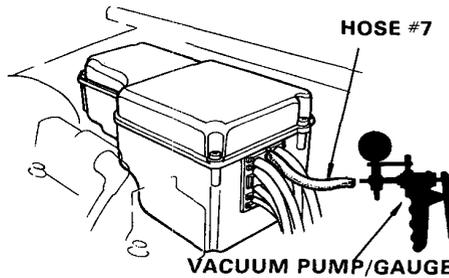
Control Unit Input Troubleshooting

Vacuum Switch C

The vacuum switch C signals the control unit when the vacuum level is below 2.4 in. Hg (60 mmHg).

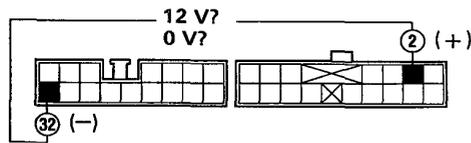
Inspection of Vacuum Switch C

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



Turn the ignition switch ON.

Measure voltage between ② (Yellow/Red +) terminal and ③ (Black-) terminal.



Is there battery voltage?

NO

Turn ignition switch OFF.

YES

Disconnect 4P connector on the control box.

Apply vacuum above 2.4 in. Hg (60 mmHg).

Turn the ignition switch ON.

Measure voltage between ② (Yellow/Red +) terminal and ③ (Black-) terminal.

Measure voltage between Black/Yellow (+) terminal and Yellow/Red (-) terminal on the main wire harness.

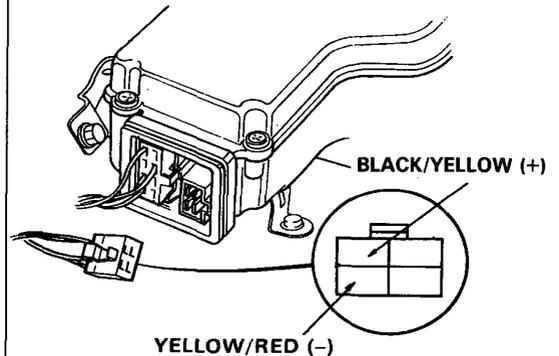
Is there voltage?

YES

Replace vacuum switch C.

NO

Vacuum switch C is OK.



Is there battery voltage?

YES

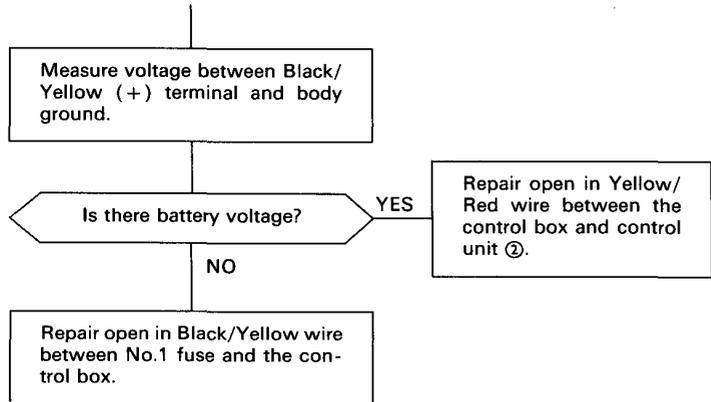
Replace vacuum switch C.

NO

(To page 12-199)



(From page 12-198)



Control Unit Input Troubleshooting

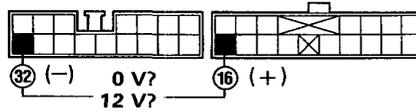
Clutch Switch Signal

This signals the control unit when the clutch is engaged.

Inspection of Clutch Switch Signal

Turn the ignition switch ON.

Measure voltage between ⑩ (Pink+) terminal and ⑳ (Black-) terminal.



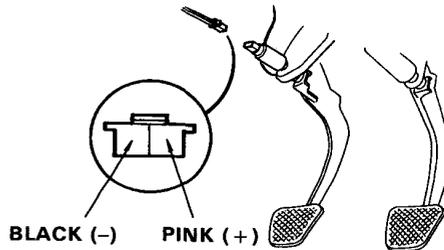
Is there below 3 V?

NO

Turn the ignition switch OFF.

Disconnect the 2P connector on the clutch switch.

Check for continuity between the 2 terminals on the clutch switch.



Does continuity exist?

YES

Replace the clutch switch.

NO

Turn the ignition switch ON.

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

Is there battery voltage?

NO

Repair open in Pink wire between the clutch switch and control unit ⑩.

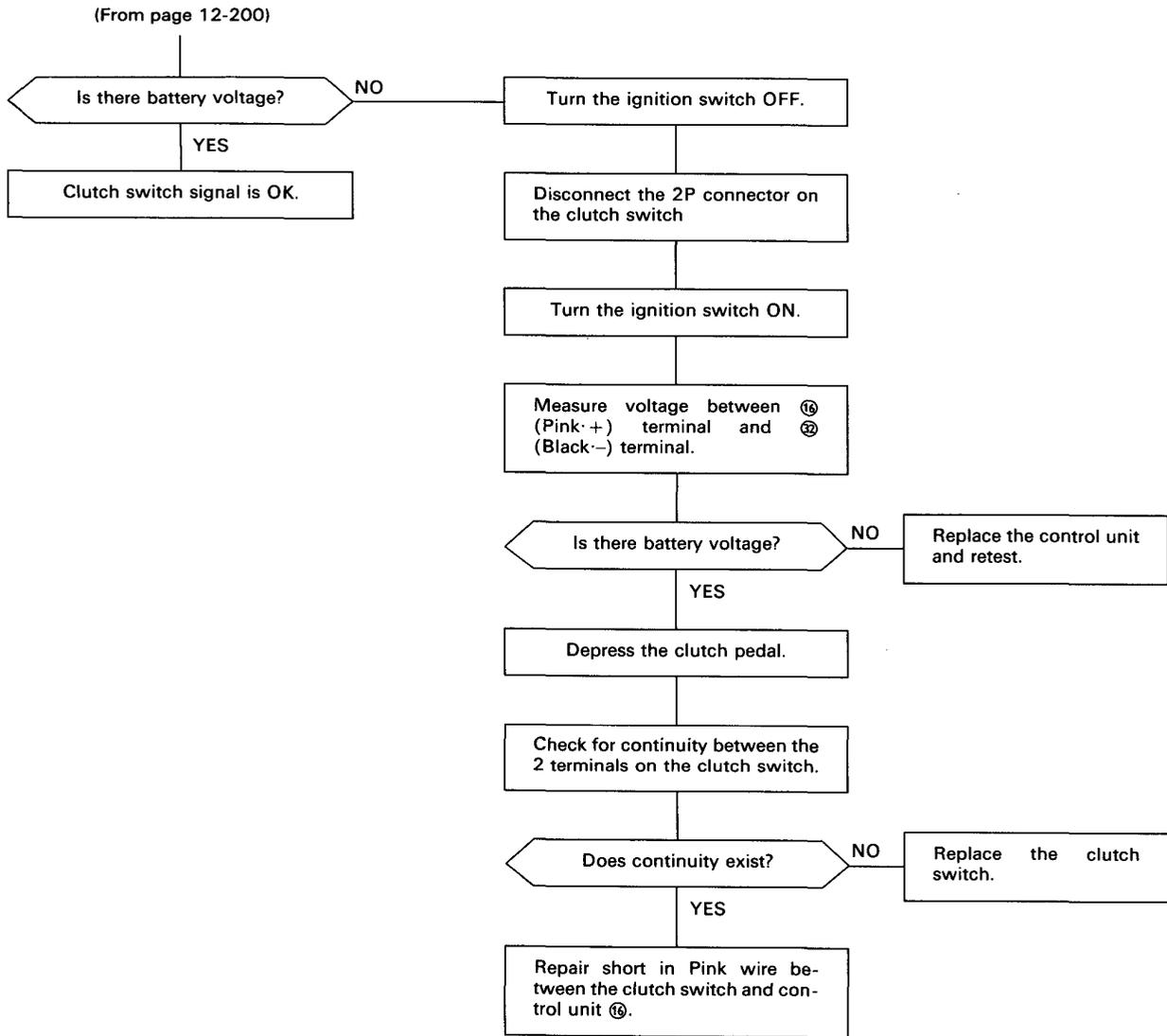
YES

Repair open in Black wire between the clutch switch and G10.

Depress the clutch pedal.

Measure voltage between ⑩ (Pink+) terminal and ⑳ (Black-) terminal.

(To page 12-201)



Control Unit Input Troubleshooting

A/T Shift Position Signal

This signals the control unit when the transmission is in Neutral or Park.

Inspection of A/T Shift Position Signal

Turn the ignition switch ON.

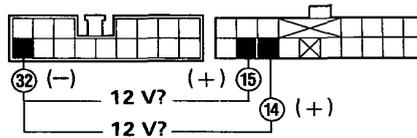
Observe the A/T shift indicator and select each position separately.

Does the indicator light properly?

NO See A/T shift position Indicator inspection.

YES

Measure voltage between ③② (Black · -) terminal and, individually: ⑭ (Green · +), and ⑮ (Green/White · +) terminals, in gear (except Neutral or Park).



Is there battery voltage?

NO Turn the ignition switch OFF.

YES

Disconnect the connectors from the control unit.

Check for continuity between ③② (Black) and, individually: ⑭ (Green), and ⑮ (Green/White) terminals.

Does continuity exist?

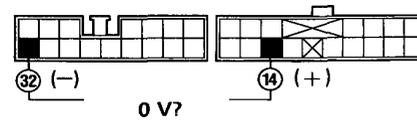
YES Repair short in Green or Green/White wire between the A/T shift position indicator switch and control unit ⑭ or ⑮.

NO

Replace the control unit.

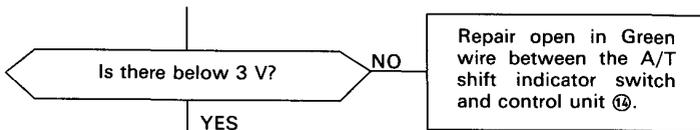
Measure voltage between ⑭ (Green · +) terminal and ③② (Black · -) terminal in Neutral position.

(To page 12-203)

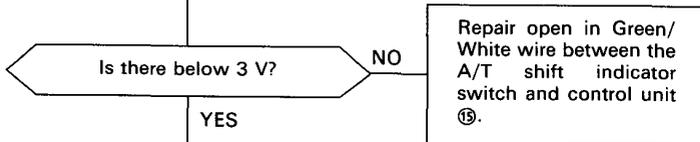
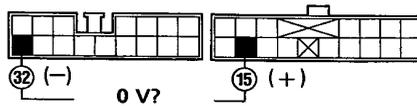




(From page 12-202)



Measure voltage between ⑮ (Green/White +) terminal and ⑳ (Black-) terminal in Park position.



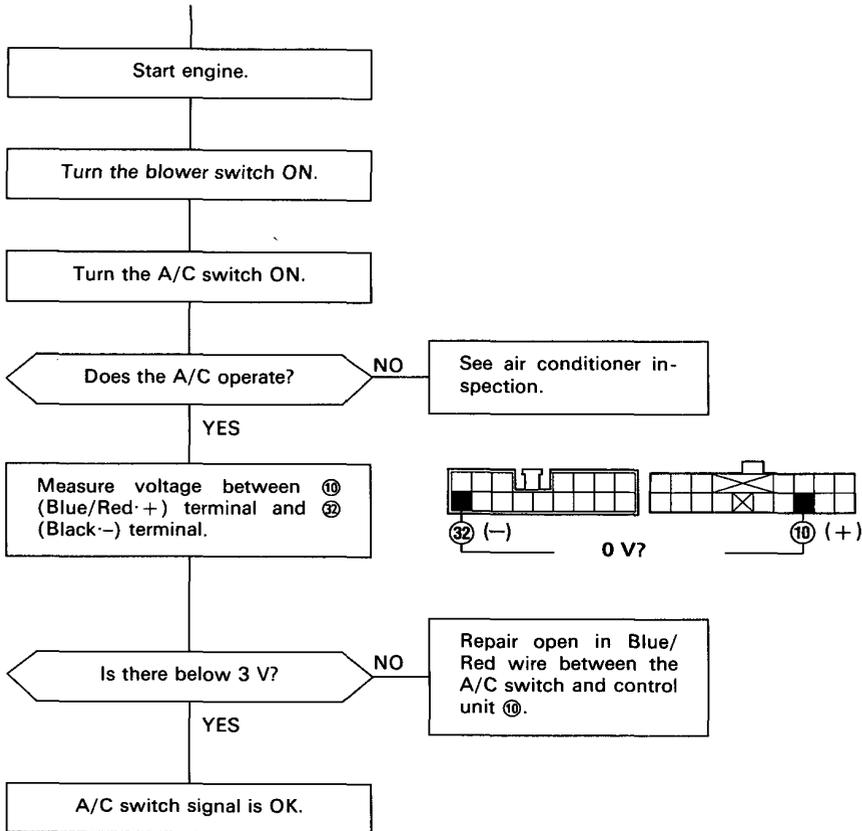
A/T shift position signal is OK.

Control Unit Input Troubleshooting

A/C Switch Signal

This signals the control unit when there is demand for the air conditioning circuits (A/C switch).

Inspection of A/C Switch Signal



Automatic Transmission (F4 type)

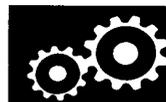
Secondary Valve Body

Disassembly/Inspection

Reassembly 15-2

Parking Gear

Removal/Installation 15-3

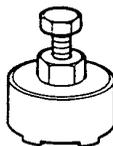


Outline of Model Changes

- The secondary valve body is newly equipped with 2-1 TIMING VALVE. Change in the service procedure are discribed

Special Tool

Ref. No.	Tool Number	Description	Q'ty	Remarks
①	07HAF-PK40100	Gear Installer	1	



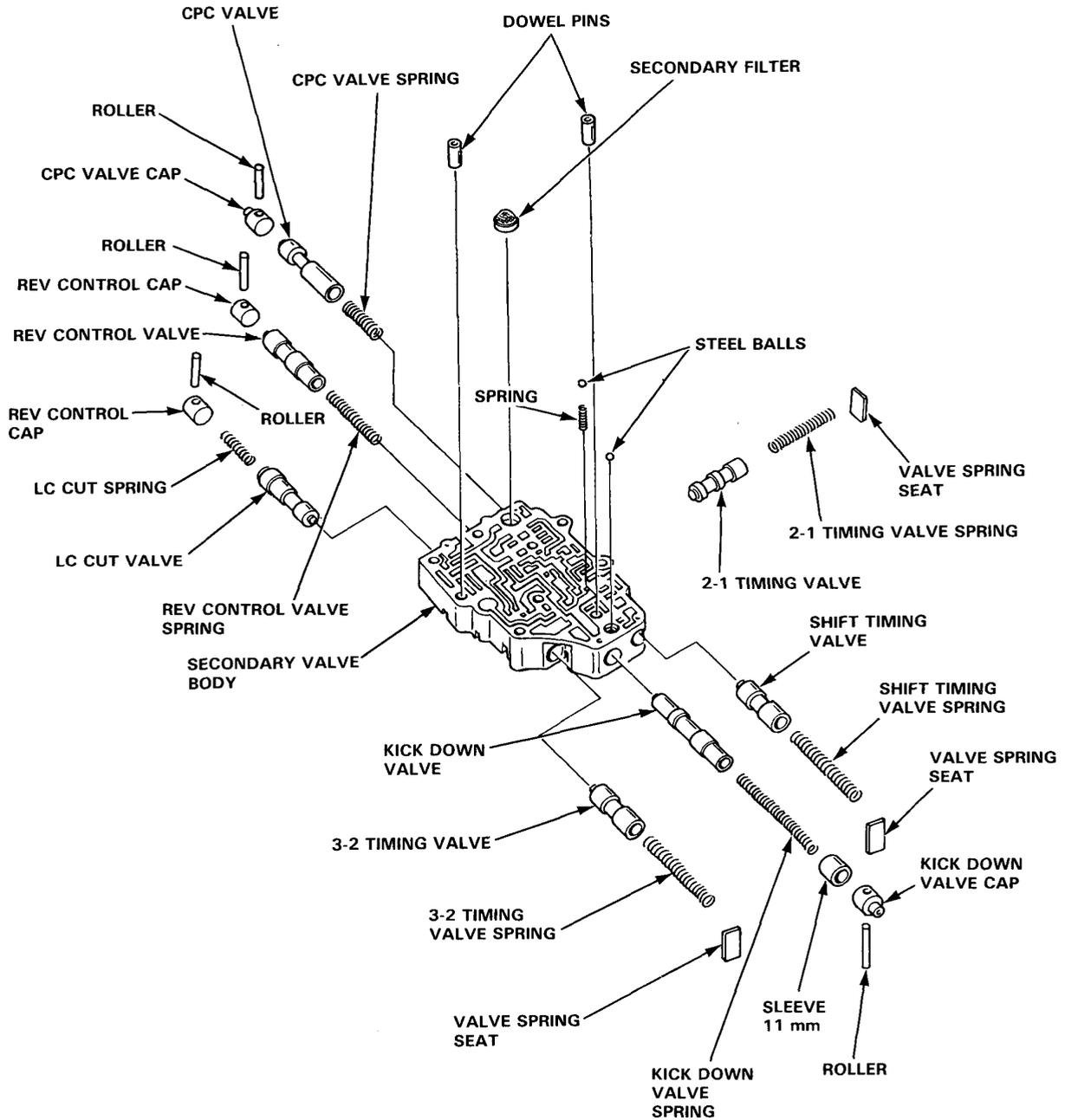
①

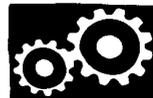
Secondary Valve Body

Disassembly/Inspection/Reassembly

NOTE:

- Clean all parts thoroughly in solvent or carburetor cleaner, and dry with compressed air. Blow out all passages.
- Check all valves for free movement. If any fail to slide freely.



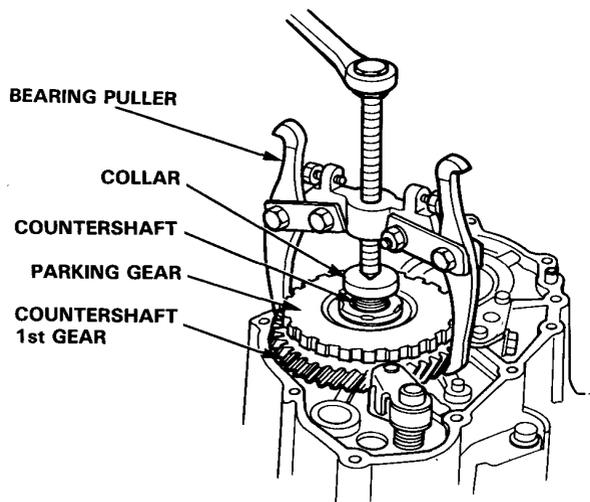


Parking Gear

Removal/Installation

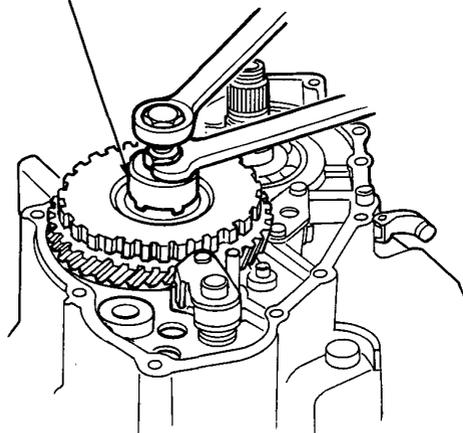
1. Remove the parking gear and countershaft 1st gear as a unit with the bearing puller.

NOTE: Install the collar on the countershaft to prevent it from damage.



2. Install the parking gear and countershaft 1st gear on the countershaft with the parking gear installer. Loosely install a new lock nut on the countershaft.

GEAR INSTALLER
07HAF-PK40100



Power Steering

Gearbox

Inspection 18-2

Cylinder End Seal Replacement 18-3



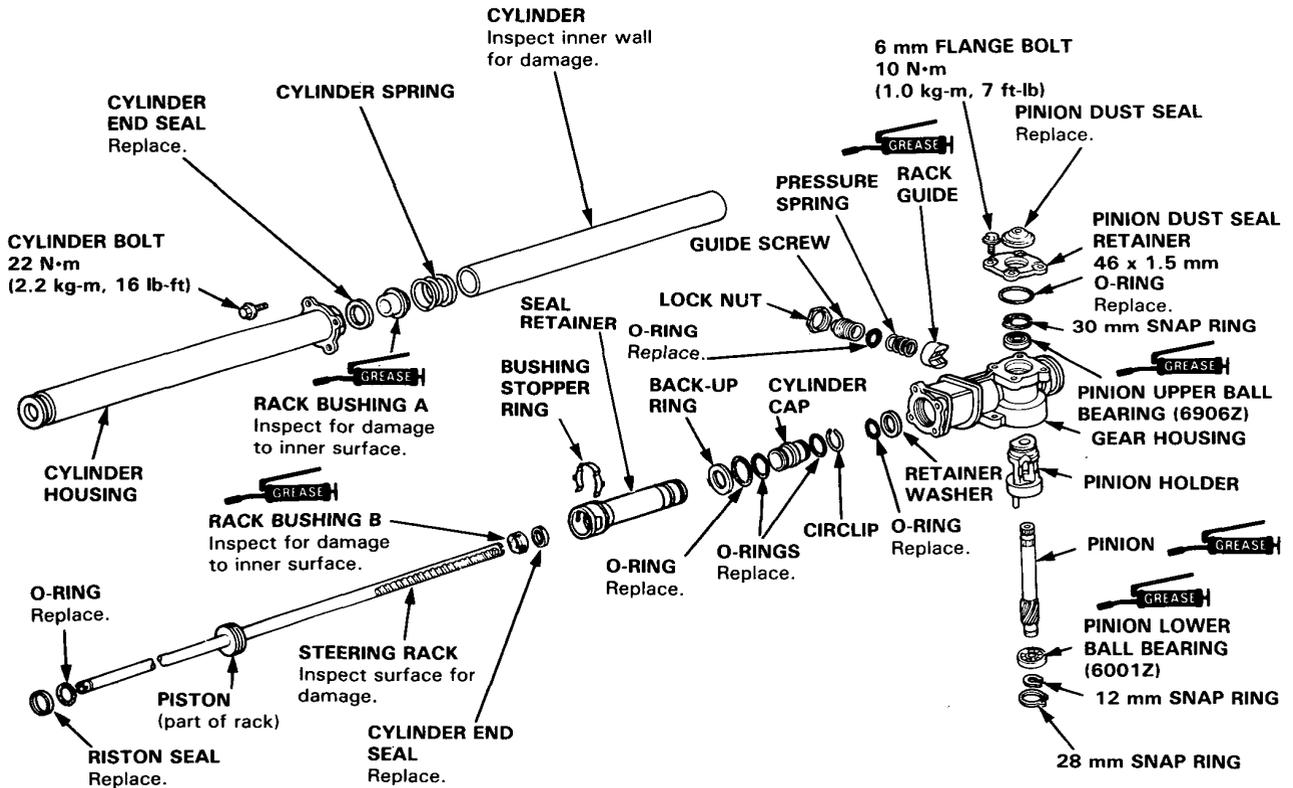
Outline of Model Changes

Due to the revision of the steering rack bushing installation B, the cylinder end seal replacement is included in this section.

Gearbox

Inspection

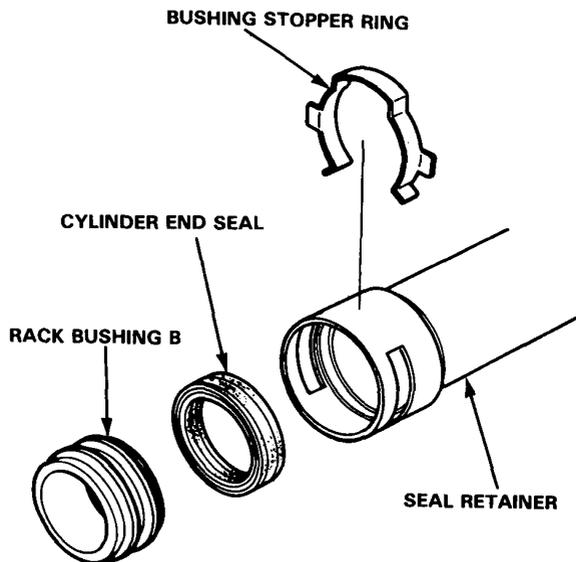
- Before disassembling the gearbox, wash it off with solvent and a brush.
- Thoroughly clean all disassembled parts.
- Always replace O-rings and seals.
- Replace parts with damaged sliding surfaces.
- Do not dip seals and O-rings in solvent; coat O-rings with grease, and make sure they stay in position during reassembly.
-  STEERING GREASE Honda parts number 08740-99969



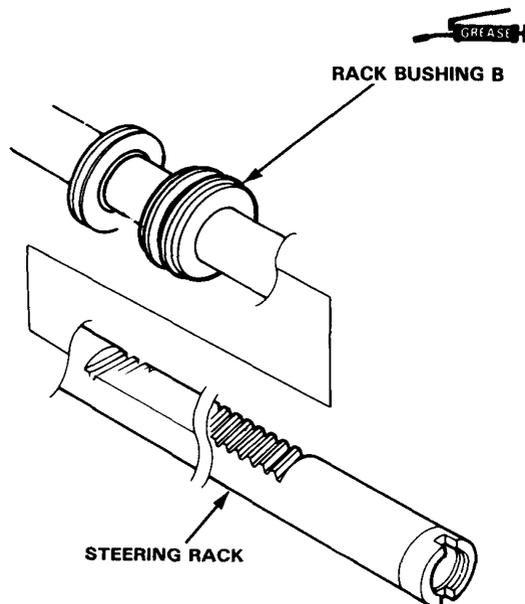


Cylinder End Seal Replacement

1. Remove the bushing stopper ring from the seal retainer.
2. Remove the cylinder end seal.

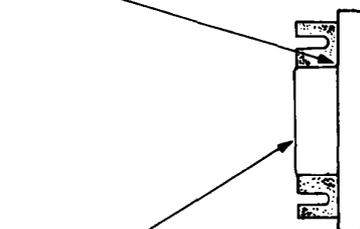


3. Grease the sliding surface of the steering rack bushing B, and install the bushing on the steering rack with the groove of the bushing facing the steering piston.



4. Grease the sliding surface of the new cylinder end seal, and the cylinder end seal slider, then set the seal on the seal slider with its grooved side facing opposite the slider.

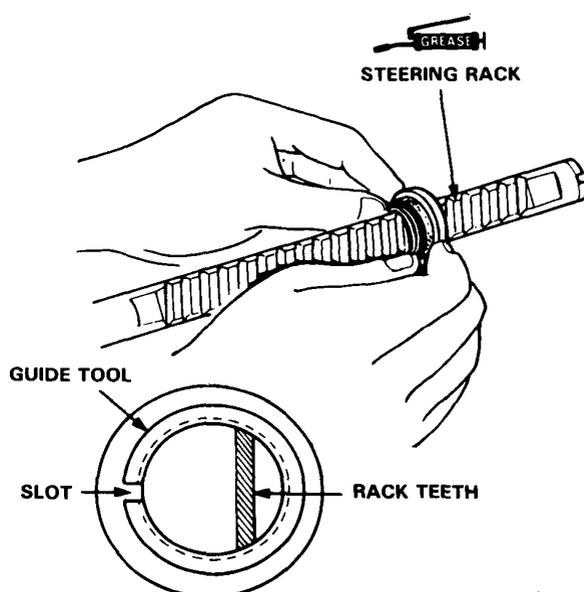
Install end seal with its grooved side facing opposite seal slider.



CYLINDER END SEAL SLIDER
07974-SA50300

5. Grease the steering rack, and install the cylinder end seal.

CAUTION: Make sure the rack teeth do not face the slot in the guide tool.

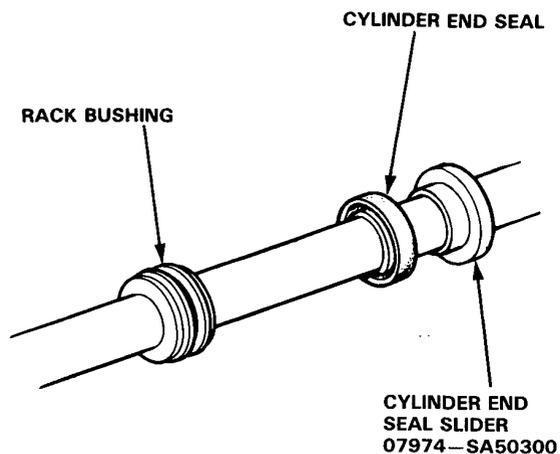


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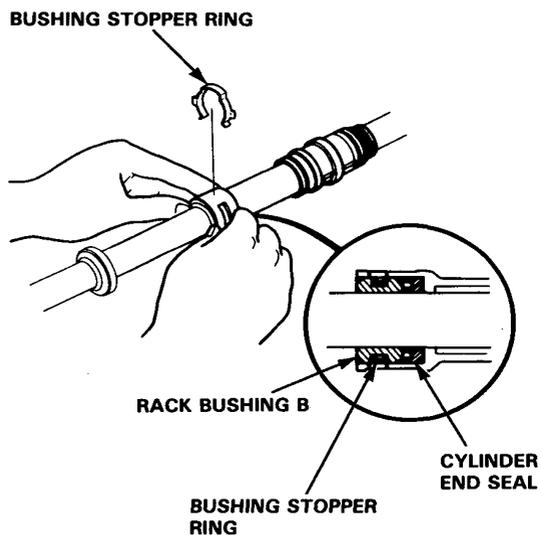
Gearbox

Cylinder End Seal Replacement (cont'd)

6. Remove the guide tool from the cylinder end seal, then separate the ends of the tool and remove it from the rack.



7. Push the steering bushing B toward the seal retainer by hand until the cylinder end seal seated in the retainer. Fit the seal stopper ring in the groove of the seal retainer securely.



Brakes (ALB)

Special Tools	20-2	Hydraulic System	
Technical Features		Index	20-40
Outline	20-3	Relieving Accumulator/	
Speed Sensor	20-4	Line Pressure	20-41
Control Unit	20-5	Master Cylinder	
Modulator Unit	20-6	Index/Inspection	20-42
Acuumlator	20-7	Disassembly	20-43
Power Unit	20-8	Reassembly	20-44
ALB Warning Light	20-8	Modulator	
Operation	20-9	Index/Inspection	20-46
Circuit Diagram	20-14	Solenoid	
Illustrated Index	20-16	Removal	20-47
ALB Checker Function Test	20-17	Reassembly	20-47
Troubleshooting		Piston	
ALB Warning Light	20-19	Removal	20-48
Symptom-to-System Chart	20-21	Installation	20-49
Flow Chart	20-23	Bleeding	20-50
Brake Booster Test	20-39	Control Unit	20-51



ALB

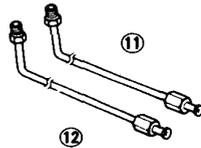
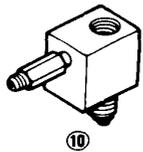
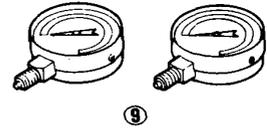
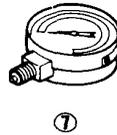
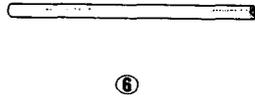
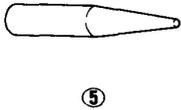
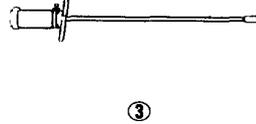
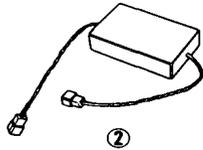
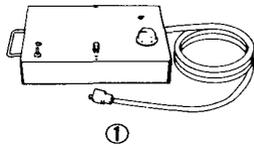
Outline of Model Changes

Due to the adoption of 3 channel (Front left and right and rear) standalone ALB, technical features, troubleshootings and service of the modulator-related parts are included in this section.

Special Tools

Special Tools

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



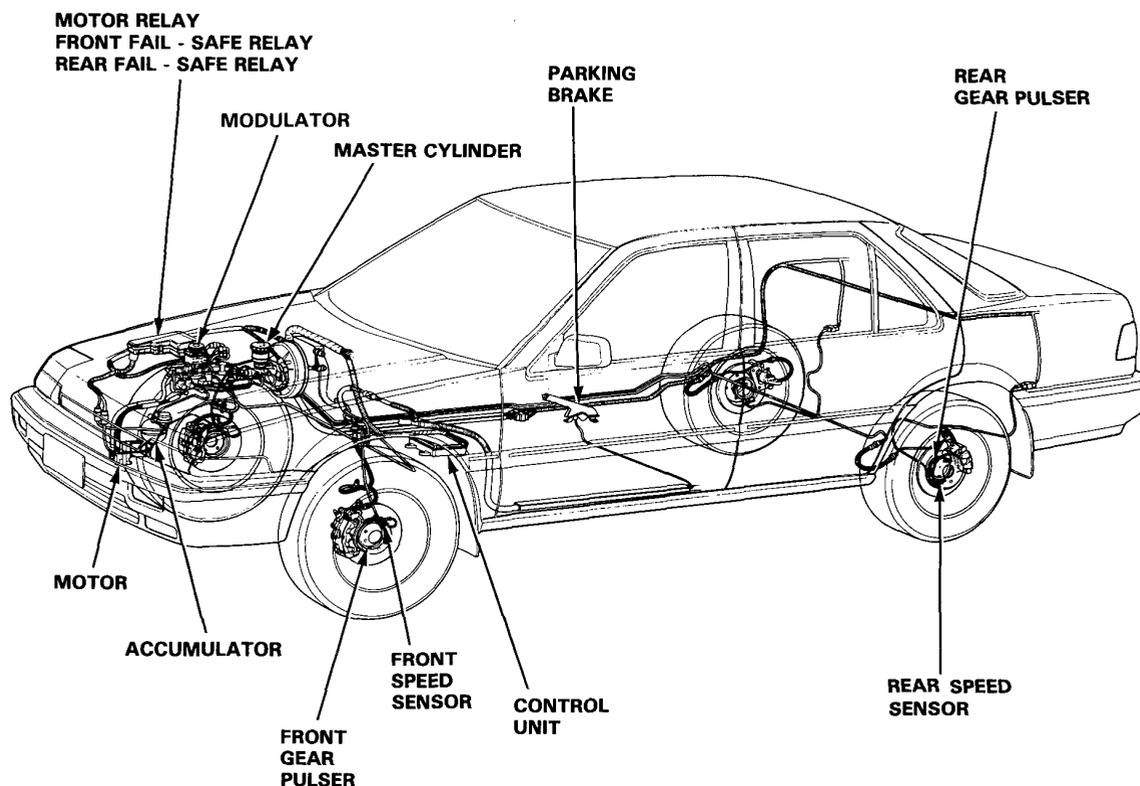
Technical Features

Outline

When operating the brakes hard during running, the wheels sometimes lock before the vehicle stops. Loss of stability will result if the rear wheels lock. Maneuverability will be impaired in the case of the front wheel locking. To prevent wheel from locking it is necessary to instantly reduce the pressure in the caliper when the wheel is about to be locked. The pressure must be restored immediately after the possibility of locking is over. The ALB is a system for preventing the wheel from locking by automatically repeating application and relieving of brake pressures.

Features

- Stable braking performances are obtained regardless of road surfaces and loading conditions.
- Maneuverability is assured by preventing the wheel from locking.
- When the ALB system works, kickbacks on the brake pedal occur, allowing the driver to perceive the road surface conditions.
- With the fail-safe function incorporated, the braking performance or vehicle stability will not be impaired much even if the ALB system fails.



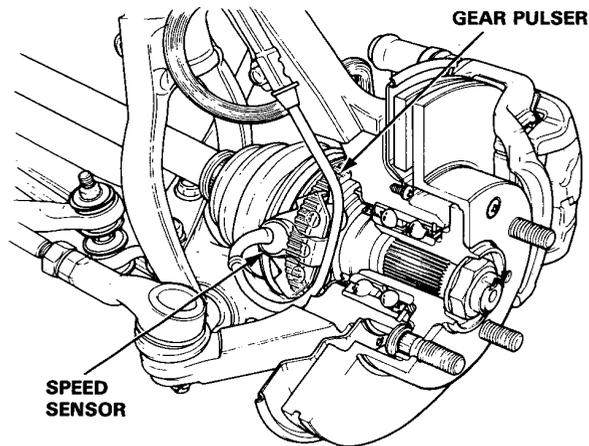
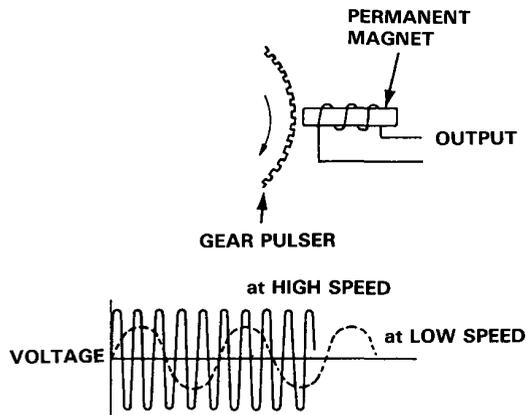
Construction

The ALB system consists of the following components: gear pulsers attached to the rotating part of each wheel; speed sensors for generating pulse signals in proportion to the rotation of the gear pulser; a control unit which computes signals from speed sensors and switches to control the ALB system; a modulator, which is operated by electric currents from the control unit, for regulating the hydraulic pressure to each caliper; an accumulator for storing high pressure fluid; a pressure switch for detecting the pressure in the accumulator and sending signals to the control unit; a power unit for feeding high pressure liquid to the accumulator by a pump; a motor relay for the power unit motor; a fail safe relay for stopping the operation of the solenoid valve when the fail safe system is operating, a warning lamp and others.

Technical Features

Speed Sensor

The speed sensor is a contactless type and it detects the rotating speeds of a wheel. It is composed of a permanent magnet and coil. When the gear pulsers attached to the rotatory parts of each wheel (front wheel: outboard joint of the driveshaft, rear: hub bearing unit) turn, the magnetic flux around the coil in the speed sensor alternates, generating voltages with frequency in proportion to wheel rotating speed. These pulses are inputted into the control unit and the control unit identifies the wheel speeds.



Control Unit

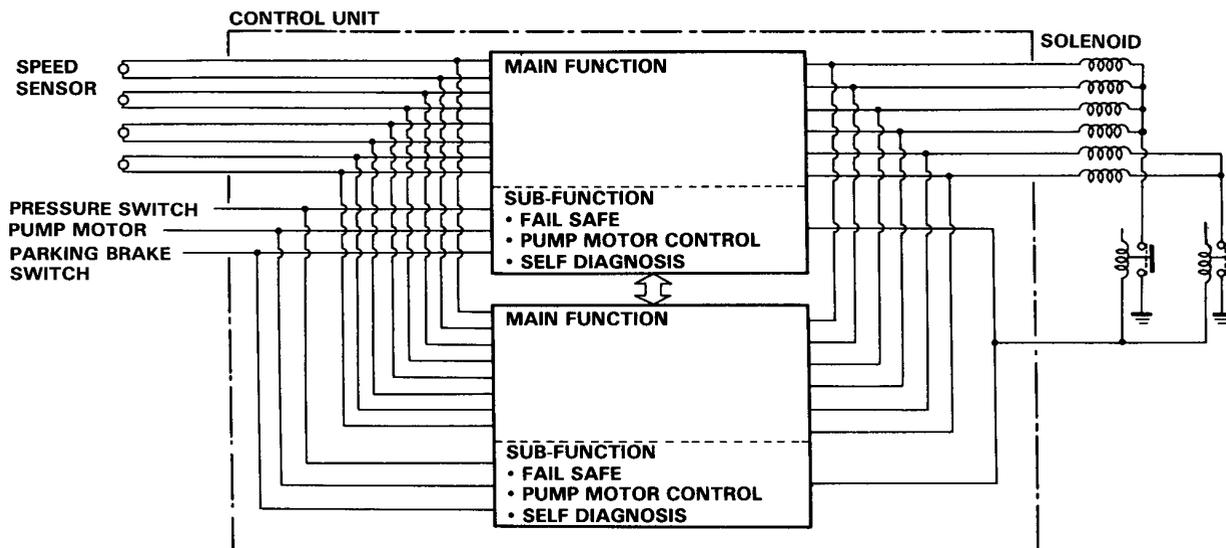
The control unit has the main function for commanding the ALB operations and the sub-function for pump motor control, self-diagnosis, etc.

(1) Main-function

By computing output signals from speed sensors, the control unit operates the solenoid valves in the modulator in order to control the ALB operations. The HONDA ALB system controls the front brakes independently. The rear brakes are controlled simultaneously. Either one of two rear wheels turning slower than the other is given priority to initiate ALB function. This method is termed "low select".

(2) Sub-function

The sub-function includes pump motor controls, self-diagnosis, etc. necessary to support the functions for ALB operations.



1. Self-Diagnosing Function

Since the ALB system reduces the brake pressure automatically regardless of the driver's intention, a failure in an ALB system would impair the braking performance or the ALB function. In order to prevent this, a self-diagnosing function is provided in the control unit as a sub-function.

Except when the vehicle speed is below 10 km/h, the self-diagnosing circuit monitors the main functions by sending signals at one second intervals. When abnormality is detected by the self-diagnosis, the ALB warning light is instantly turned on. If something abnormal happens to the solenoid valve, the ALB warning light is also lit. Even when the ALB warning light is lit, the main brake functions normally but the ALB system does not operate.

2. Fail-Safe Function

When abnormality is detected in the control system by the self-diagnosis, the solenoid operations are suspended by turning off the relay (fail safe relay) which disconnects the ground lines of all the solenoid valves to inhibit ALB operations. Under these conditions, the braking system functions just as an ordinary one, maintaining the necessary braking function. When the ALB warning light is turned on, it means the fail-safe is functioning.

Technical Features

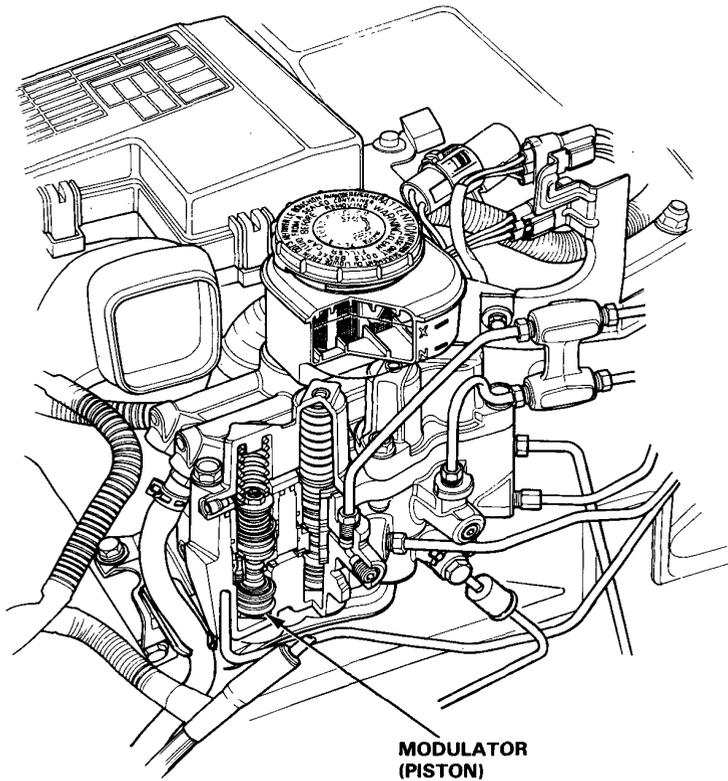
Modulator Unit

Modulators for each wheel and solenoid valves are integrated in the modulator unit.

The modulators for front and rear brakes are of independent construction and they are positioned vertically for improved maintainability. The modulators for rear brakes are provided with a PCV function (Proportioning Control Valve) in order to prevent the rear wheel from locking when the ALB is malfunctioning or the ALB is not activated.

The solenoid valve features quick response (5 ms or less).

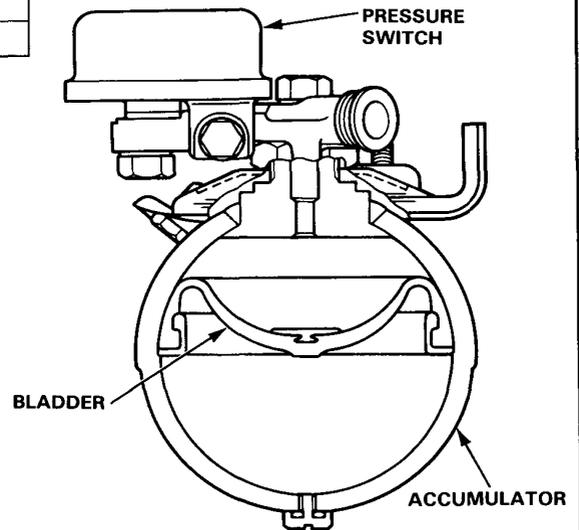
The inlet and outlet valves are integrated in the solenoid valve unit. There are three solenoid valves provided, each one for the front-right wheel, for the front-left wheel and for the rear wheels.



Accumulator

The accumulator is a pneumatic type which accumulates high pressure brake fluid fed from the pump incorporated in the power unit. When the ALB operates, the accumulator feeds high pressure brake fluid to the modulator valve via the inlet side of the solenoid valve.

Maximum Operating Pressure	230 kg/cm ²
Filled Gas	Nitrogen Gas
Charging Pressure	121 kg/cm (0°C)
Volume	290 cm ³



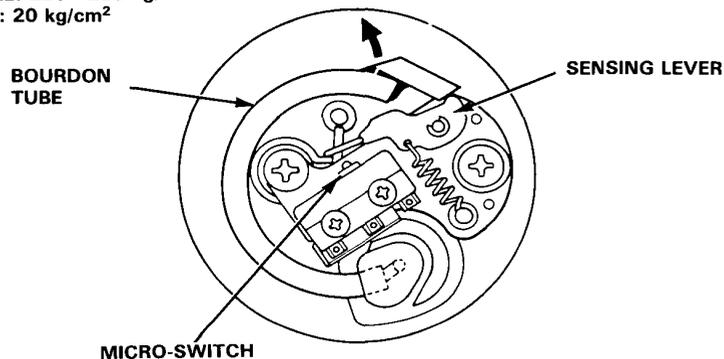
Pressure Switch

The pressure switch monitors the pressure accumulation (pressure from the pump) in the accumulator and is turned off when the pressure becomes lower than a prescribed level. When the pressure switch is turned off, the switching signal is sent to the control unit. Upon receiving the signal, the control unit activates the pump motor relay to operate the motor. If the pressure doesn't reach the prescribed value, the ALB warning lamp is turned on.

Operation

When the pressure in the accumulator rises, the Bourdon tube in the pressure switch deforms outwards. When the free end of the Bourdon tube moves more than the prescribed amount, the micro switch is activated by the force of the spring attached to the sensing lever. When the pressure in the accumulator decreases due to ALB operations, the Bourdon tube moves in the direction opposite to the one described above, and the micro-switch is eventually turned off. Upon receiving this signal, the control unit activates the motor relay to operate the motor.

ON PRESSURE: 220–223 kg/cm²
HYSTERESIS: 20 kg/cm²



Technical Features

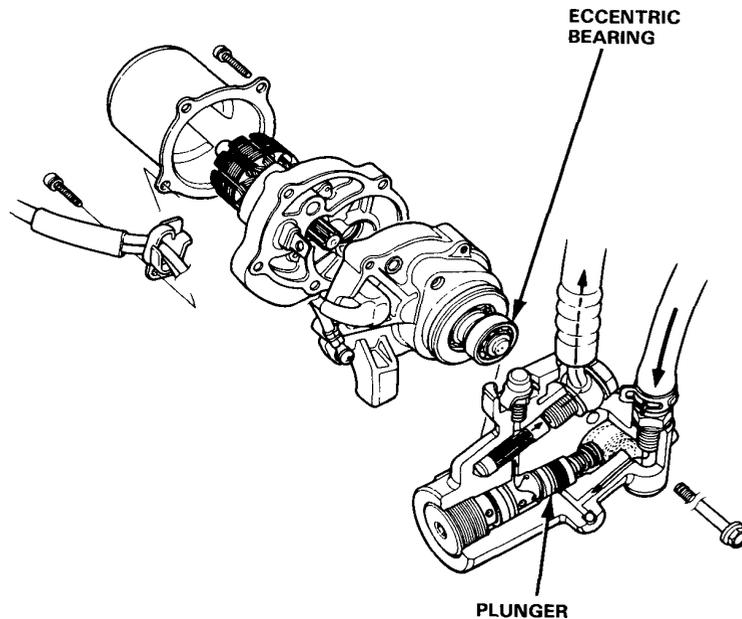
Power Unit

The power unit consists of a motor and a plunger pump. Since an eccentric bearing is positioned on the end of the motor shaft, the rotation of the motor provides the reciprocating motion of the plunger. The brake fluid is thus pressurized and fed to the accumulator.

As the motor rotates more and the pressure in the accumulator exceeds the prescribed level, the pressure switch is turned on. Approx. 3 seconds after receiving the ON- signal, the control unit stops the motor relay operation. In this state, the pressure in the accumulator reaches 230 kg/cm².

If the pressure doesn't reach the prescribed value after the motor has continuously operated for 120 seconds or more, the control unit stops the motor and activates the ALB warning light.

Output	200W
Plunger Diameter	6 φ
Plunger Stroke	5.8 mm
Discharge Rate	170 cm ³ /min. (at 200 kg/cm ²)



ALB Warning Light

This warning system turns on the ALB warning light when one or more of the below described abnormalities is detected.

- When the operating time of the motor in the power unit exceeds 120 seconds.
- When vehicle running time exceeds 30 seconds without releasing the parking braking brake lever.
- When one of the rear wheels is locked during running.
- When absence of speed signals from anyone of the four speed sensors is detected.
- When the activation time of all solenoids exceeds a given time or an open circuit is detected in the solenoid system.
- When solenoid output is not detected in the simulated ALB operation carried out during running at speed of 10 km/h or more.

To check the bulb of the warning light, the light is activated when the ignition switch is turned on. It is turned off after the engine is started if there is no abnormality in the system.

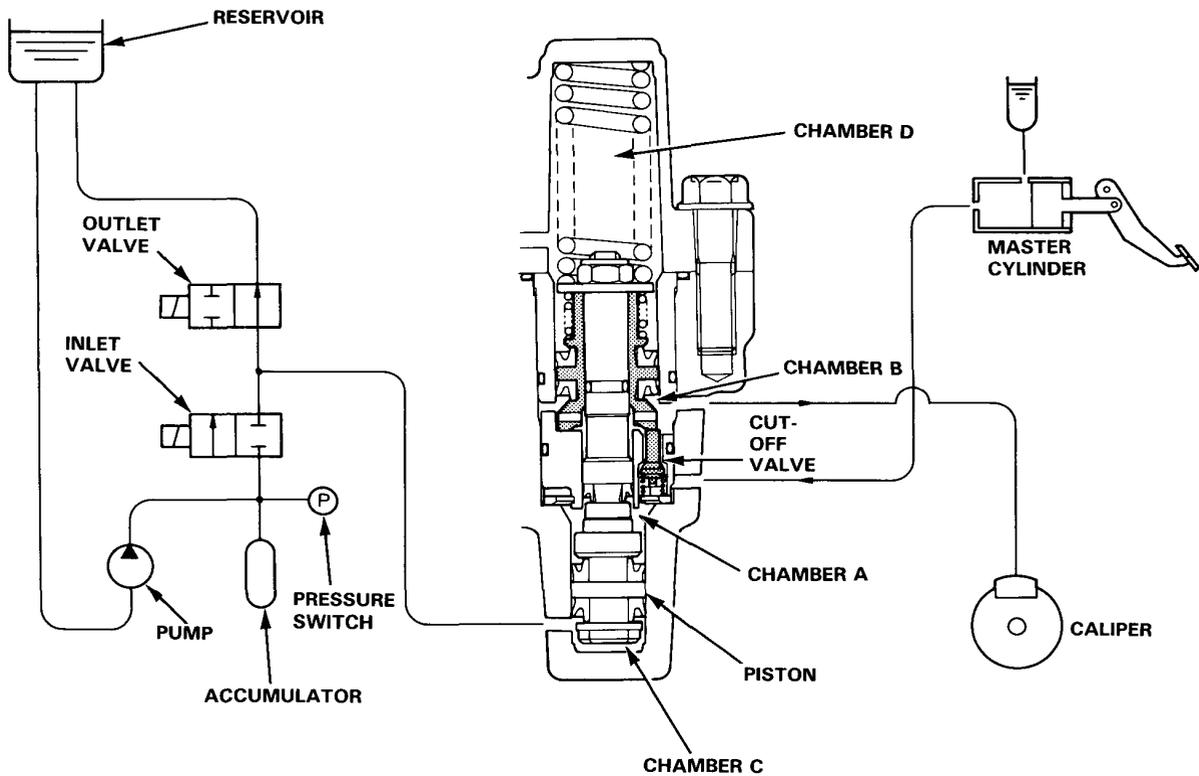
Technical Features

Operation

Ordinary Braking Function

In ordinary brake operations, the cut-off out valve in the modulator is open to transmit the hydraulic pressure from the master cylinder to the brake calipers via the chamber A and the chamber B.

The chamber C is connected to the reservoir through the outlet valve which is normally open. It is also connected to the hydraulic pressure source (pump, accumulator, pressure switch, etc.) via the inlet valve which is normally closed. The chamber D serves as an air chamber. Under these conditions, the pressures of the chambers C and D are maintained at about the atmospheric pressure, permitting regular braking operations.



(cont'd)

Technical Features

Operation (cont'd)

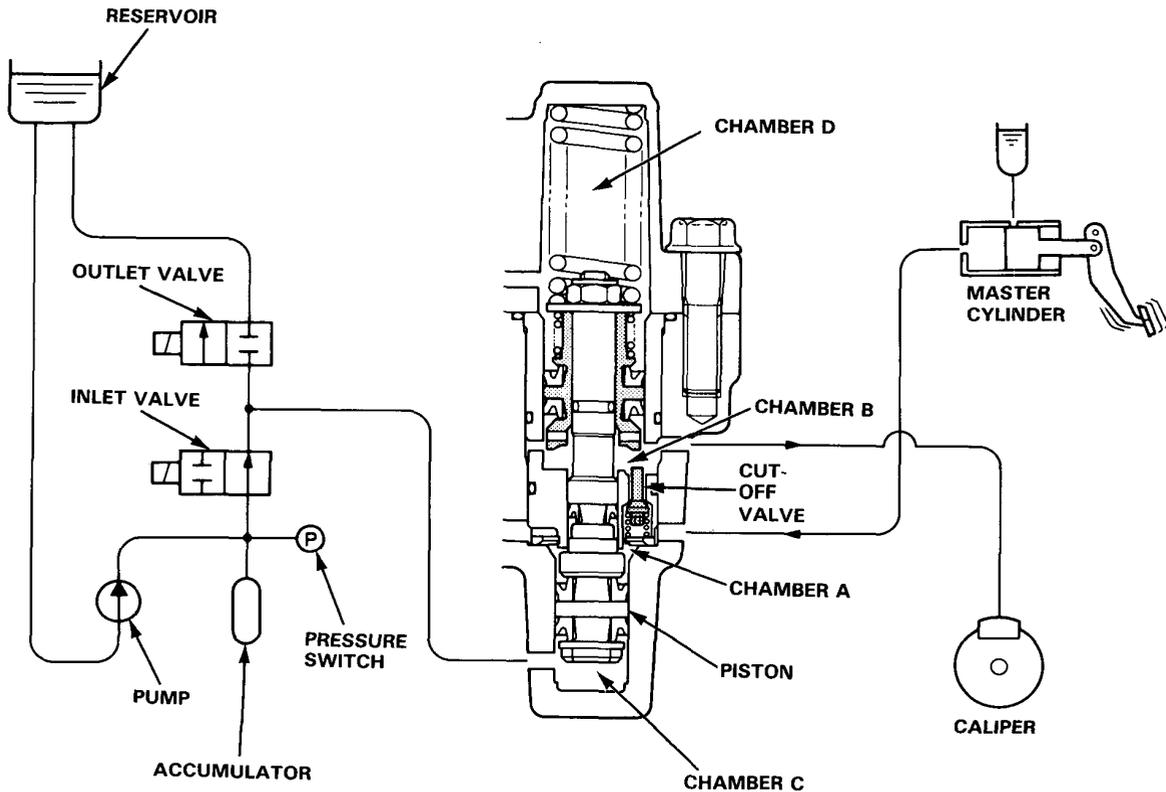
If brake inputs (force exerted on brake pedal) are excessively large and a possibility of wheel locking occurs, the control unit operates the solenoid valve, closing the outlet valve and opening the inlet valve. As a result, the high pressure is directed into chamber C, the piston is pushed upward, causing the slide piston to move upward and the cut-off valve to close.

As the cut-off valve closes, the flow from the master cylinder to the caliper is interrupted, the volume of the chamber B, which is connected to the caliper, increases, and the fluid pressure in the caliper declines.

When both of the two valves, inlet and outlet, are closed (this means when only the outlet valve is activated) the pressure in the caliper is maintained constant.

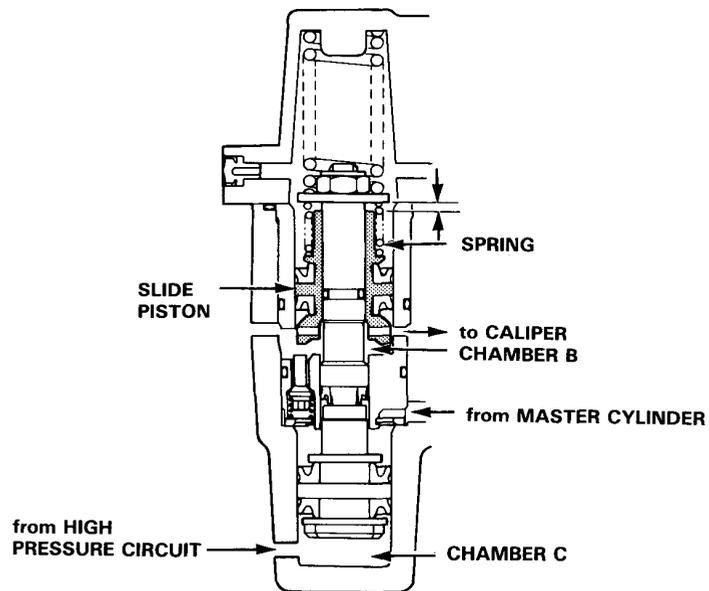
When the possibility of wheel locking ceases, it is necessary to restore the pressure in the caliper. The solenoid valve is therefore turned off (outlet valve: open, inlet valve closed).

Process	Caliper Pressure	Outlet Valve		Inlet Valve	
		Electric Power	Hydraulic Circuit	Electric Power	Hydraulic Circuit
Caliper pressure declining	→	ON	Close	ON	Open
Caliper pressure constant	→	ON	Close	OFF	Close
Caliper pressure increasing	→	OFF	Open	OFF	Close



Slide Piston Function

When the car is used under such condition as the tires bounce hard on rough roads or on gravel roads, the ALB may function excessively, causing an excessively large volume of brake fluid to flow into the chamber C. As this occurs, the piston is moved excessively, resulting in an abnormal loss of pressure in the chamber B. In order to overcome this problem, the slide piston is kept in a proper position by the spring force to avoid the pressure in the chamber B to become negative.



(cont'd)

Technical Features

Operation (cont'd)

Kickback

When ALB is functioning, the piston moves upward, the volume of the chamber B increases, and the fluid pressure on the caliper side is reduced. At the same time, the volume of the chamber A is reduced and the brake fluid is returned to the master cylinder. When the brake fluid is pushed back to the master cylinder, the driver can feel the functioning of the ALB because the brake pedal is kicked back.

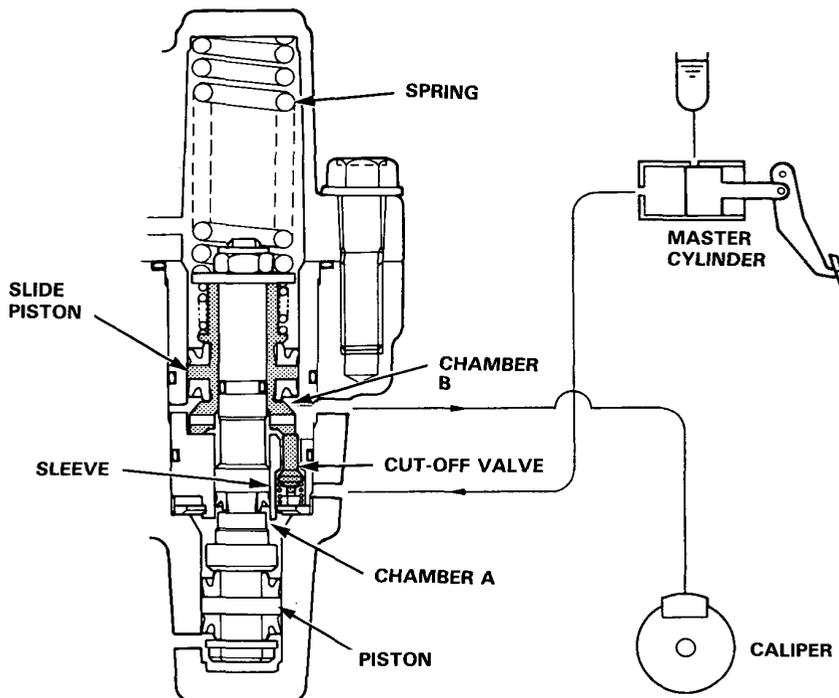
PCV (Proportioning Control Valve) Function

In the modulator for the rear wheels, the diameters of the piston and the slide piston are distinctly different. Provide by this construction is a PCV (Proportioning Control Valve) function for preventing the rear wheel from locking when an emergency braking is performed.

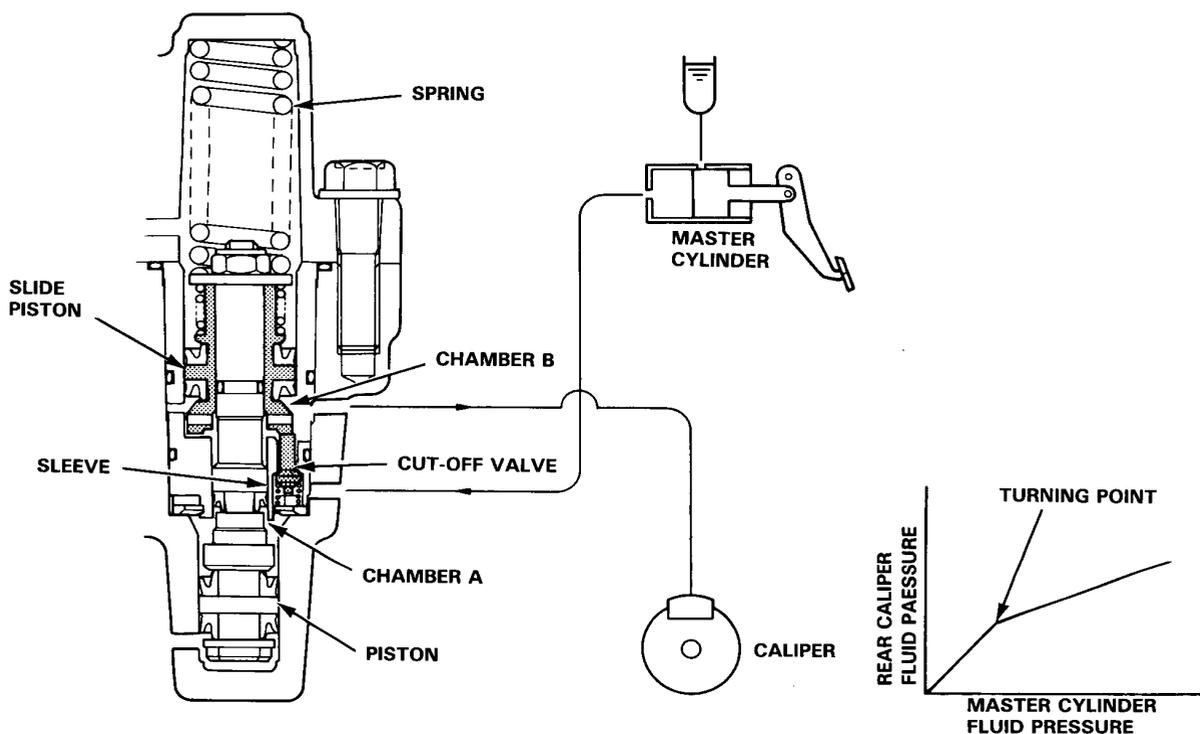
(1) Before the Turning Point

1) When the fluid pressure from the master cylinder is below the turning point, the cut-off valve is always pushed downward by the force of spring via the slide piston.

Under these conditions, there is a gap between the cut-off valve shoulder and the sleeve. The chamber A and the chamber B are therefore connected through the gap. The pressure from the master cylinder flows into the rear calipers through the chamber A and the chamber B.



- 2) When the fluid pressure from the master cylinder reaches the turning point, the force on the slide piston overcomes the force of spring, causing the slide piston to travel upward. The cut-off valve, previously being in contact with the bottom of the slide piston, then moves upward and the cut-off valve shoulder hits the sleeve, blocking the fluid passages (the fluid pressure at this point is called the turning point).



- (2) After the turning point

As the fluid pressure from the master cylinder further increases, the pressure in the chamber A becomes higher, causing a force to push down the large diameter portion of the piston. Consequently, the slide piston comes down, the cut-off valve is pushed downward by the bottom of the slide piston, allowing the chambers A and B to connect through each other momentarily. As this occurs, pressure in the chamber B increases, the slide piston is pushed upward, the cut-off valve goes up, and the connection between the chamber A and the chamber B is blocked again. As described above, when the pressure in the master cylinder is above the turning point, the slide piston reduces the pressure in the rear caliper to the prescribed pressure by repeating these processes.

Let the terms be as follows:

F = Set load of spring

A_1 = Sectional area of cylinder at the slide piston

A_2 = Sectional area of cylinder measured at the large diameter portion of the piston

A_3 = Sectional area of cylinder measured at the small diameter portion of the piston

A_4 = Sectional area of the cut out valve sealing part

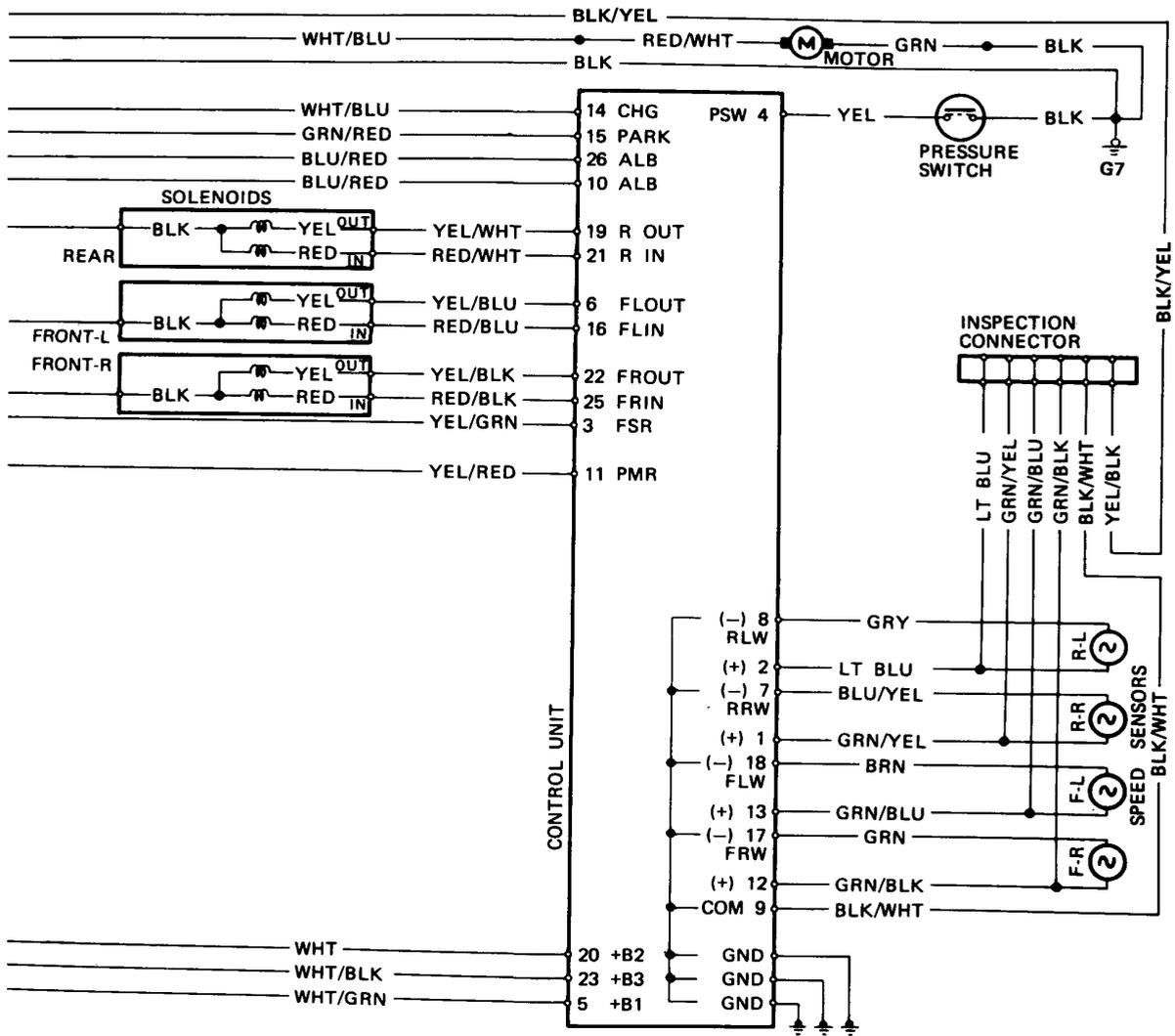
P_0 = Input fluid pressure from the master cylinder

At the turning point,

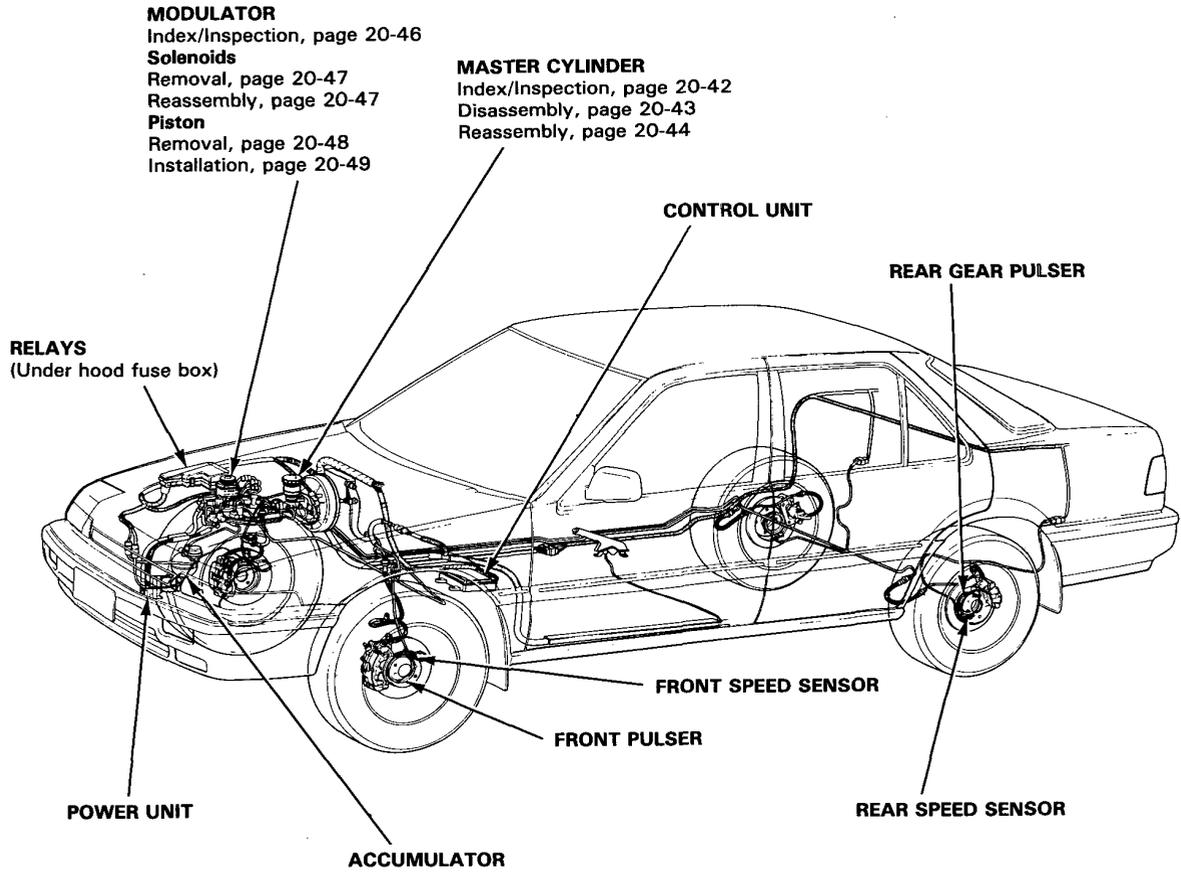
$$P_0 = F / (A_1 - A_2)$$

Since then, the reduction rate of pressure S in relation to an increase in P_0 is expressed by;

$$S = (A_2 - A_3 - A_4) / (A_1 - A_3 - A_4)$$



Illustrated Index



ALB Checker



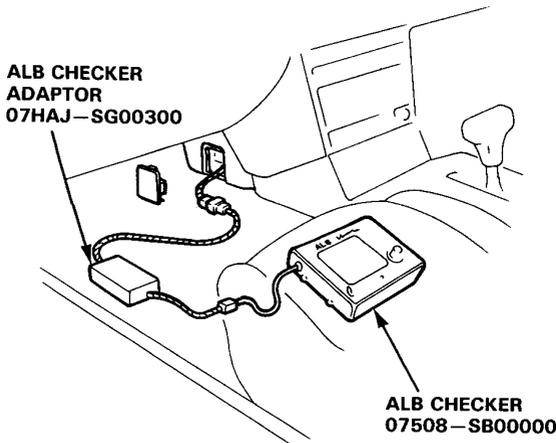
Function Test

NOTE:

- The ALB checker is designed to confirm proper operation of the ALB system by simulating each system function and operating condition. Before using the checker, confirm that the dash **ALB** warning light is not indicating some other problem with the system. The light should go on when the ignition is first turned on and then go off and stay off two seconds after the engine is started.
- The checker should be used through all modes, 1 to 6, to confirm proper operation of the system, in any one of the following situations:
 - After replacing any ALB system component.
 - After replacing or bleeding the system fluid.
 - After any body or suspension repair that may have affected the sensors or their wiring.
 - As part of P.D.I.

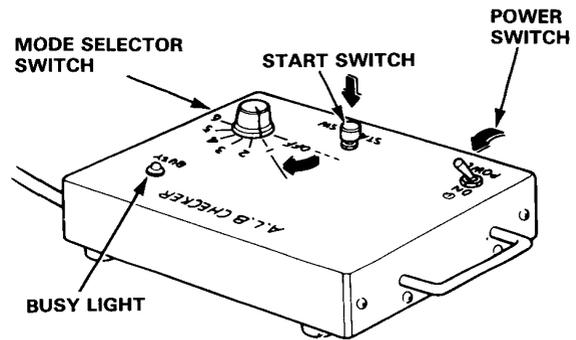
WARNING Disconnect the ALB checker before driving the car. A collision can result from a reduction, or complete loss, of braking ability causing severe personal injury or death.

1. With the ignition switch off, disconnect the 6-P inspection connector from the connector cover on the right side of the front console and connect the 6-P inspection connector to the ALB checker and adaptor.

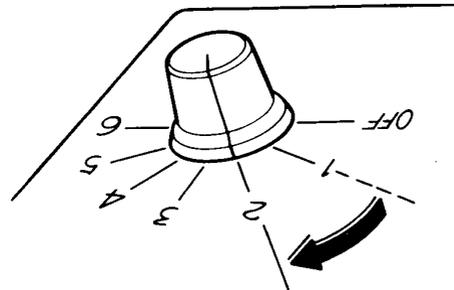


NOTE: Place the vehicle on level ground with the wheels blocked, put the transmission in neutral for manual transmission models, and in P for Automatic transmission models.

2. Start the engine and release the parking brake,
3. Operate the ALB checker as follows,
 - (1) Turn the Power Switch ON.
 - (2) Turn the Mode Selector switch to "1."
 - (3) Push the Start Test switch:
 - The Busy light should come ON.
 - The dash **ALB** warning light should not come ON (If it comes on, follow the troubleshooting on page 20-19).



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



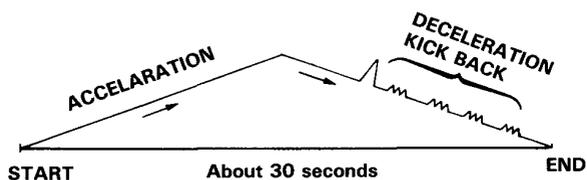
(cont'd)

ALB Checker

Function Test (cont'd)

5. Depress the brake pedal and push the Start Test switch.
The dash ALB warning light should not go on while the Busy light is ON. There should be kickback on the brake pedal. If not as described, go to troubleshooting, page 20-19.

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



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

Mode 1:

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

Mode 2:

Sends the driving signal of each wheel, then sends the lock signal of the rear 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 kick back.

Mode 6:

Sends the driving signal of each wheel, then sends the lock signal of both front wheels to the control unit. There should be strong kickback.

NOTE: If little or no kickback is felt from the brake pedal in modes 2-6, repeat the function test of modes 1-6 several times before beginning to troubleshoot other parts of the system.

Inspection points:

1. The **ALB** warning light goes ON in mode 1.
 - Check the wiring. If there is good condition, the control unit is faulty.
 - If **ALB** warning light goes on 120 seconds later but the power unit stops, refer to page 20-23.
2. There are no kickback in modes 2 through 6.
 - Faulty pressure switch (remains ON)
 - Shorted wires
 - Faulty or disconnected power unit coupler
 - Faulty power unit relay
3. Weak kickback in modes 2 through 6.
 - Bleed high pressure circuits.
4. Power unit stops in mode 1 but it does not stop and there are no kickback in modes 2 through 6.
 - Brake fluid leakage
 - Bleed power unit
 - Clogged power unit outlet
 - Clogged or deteriorated power unit hose

Troubleshooting

ALB Warning Light

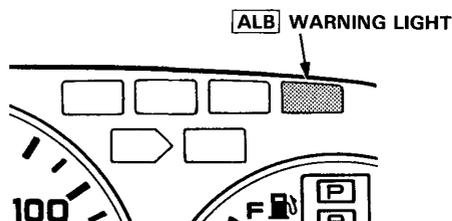
Temporary Driving Conditions:

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

NOTE: Problem codes explained on page 20-21 and 20-22.

- The tire(s) adhesion is lost due to excessive cornering speed.
Problem codes: 4-4, 4-8, 4-12.
- The vehicle loses traction when starting from a stuck condition on a muddy, snowy, or sandy road.
Problem code: 5.
- When the parking brake is applied for more than 30 seconds while the vehicle is being driven.
Problem code: 2.
- The vehicle is driven on extremely rough road.

The ALB system is OK, if the **ALB** warning light goes off after the engine is restarted.



2. If you receive a customer's report that the **ALB** warning light sometimes comes on, check the System using the ALB checker to confirm whether there is any trouble in the system.
See page 20-17.
3. The **ALB** warning light will come on and the LED (see page 20-18) will display a problem code when there is insufficient battery voltage to the control unit. An example would be when the battery is so weak that the car must be Jump-started. After the battery is sufficiently recharged, the **ALB** warning light will work normally after the engine is stopped and restarted.

However, after recharging the battery, the LED problem code must be cleared from the control unit's memory by disconnecting the ALB 2 fuse for at least 3 seconds.

Warning Light Circuit:

1. The **ALB** warning light does not go on when the ignition switch is turned on. Check the following items. If they are OK, check the control unit connectors. If not loose or disconnected, install a known-good control unit and recheck:
 - Blown warning bulb.
 - Open circuit in YEL lead between No.2 fuse and combination meter.
 - Open circuit BLU/RED lead between combination meter and control unit.
 - Loose component grounding of the control unit to the body.
2. The **ALB** warning light remains ON or after the engine is started, however the LED on the control unit does not blink any code or sub-code, check for the following:
 - Loose or poor connection of the wire harness at the control unit.
 - Faulty ALB 2 fuse.
 - Open circuit in WHT lead between ALB 2 fuse and control unit.
 - Open circuit in YEL/BLK lead between fuse No.17 and fail safe relay(s).
 - Open or short circuit in the YEL/GRN lead between fail safe relay(s).
 - Short circuit in BLU/RED lead between combination meter and control unit.
 - Open circuit in WHT/BLU lead between alternator and control unit.
 - Check the relay (BLK/YEL and BLK wires side) or BLK/YEL wire.

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

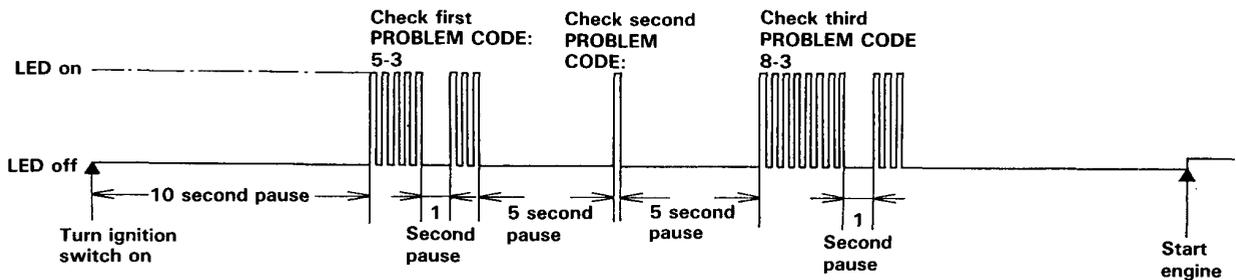
(cont'd)

Troubleshooting

ALB 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 ALB warning light comes on.
3. Restart the engine and check the ALB warning light.
 - There is no problem in the ALB system, if the ALB warning light goes off.
 - Go to step 4, if the ALB warning light remains on.
4. Stop the engine.
5. Remove the inspection hole lid on the right of the front console.
6. Turn the ignition switch on, but do not start the engine.
7. Record the blinking frequency of the LED on the control unit. The blinking frequency indicates the problem code.



NOTE:

- The control unit can indicate three problem codes (one, two or three problems).
- If the LED does not light, see Troubleshooting of Warning Light Circuit page 20-19, except alternator signal (WHT/BLU).
- If you miscount the blinking frequency, turn the ignition switch off, then turn on to blink the LED again.
- The LED lights faintly after starting the engine as the control unit uses the LED circuit to intercommunicate between its internal computers.
- After the repair is completed, disconnect the ALB 2 fuse for at least 3 seconds to erase the control unit's memory. Then turn the ignition key on again and recheck.
- The memory is erased if the connector is disconnected from the control unit or the control unit is removed from the body.



Symptom-to-System Chart

PROBLEM CODE		PROBLEMATIC COMPONENT/ SYSTEM	AFFECTED				See page	OTHER COMPONENT	See page
MAIN CODE	SUB CODE		FRONT RIGHT	FRONT LEFT	REAR RIGHT	REAR LEFT			
1	-	Hydraulic Controlled Component	-	-	-	-	20-23	-ALB fuse -Motor relay -Pressure Switch -Accumulator -Modulator	Function Test
2	-	Parking brake switch-related problem	-	-	-	-	20-26	Brake fluid level switch [BRAKE] light	
3	1	Front fail safe relay	-	-	-	-	(Function Test)		
	2	Rear fail safe relay	-	-	-	-			
3	13	Pulser (s)	○				—		
	14			○					
	15				○	○			
4	4	Speed sensor(s)			○		20-27	Modulator	
	8					○			
	12				○	○			
5 or 6 or 7	1	Speed sensor	○				20-28		
	2			○					
	4				○				
	8					○			
8	1	Front solenoid related problem (Open)	IN				20-29		
	2		OUT						
	3		BOTH						
	4			IN					
	8			OUT					
	12		BOTH						
	15	Front fail safe relay	BOTH	BOTH			20-30	Solenoids misconnected	

(cont'd)

Troubleshooting

Symptom-to-system Chart (cont'd)

PROBLEM CODE		PROBLEMATIC COMPONENT/ SYSTEM	AFFECTED			See page	OTHER COMPONENT	See page
MAIN CODE	SUB CODE		FRONT RIGHT	FRONT LEFT	REAR			
9	—	Solenoid related problem (Open)			IN	20-32	Rear speed sensors	20-28
10	—				OUT			
11	—				BOTH	20-33	Rear fail safe relay	Function Test
11	3		BOTH		BOTH	—		
	12			BOTH	BOTH			
	15		BOTH	BOTH	BOTH			
12	1	Solenoid related problem (Short)	IN			20-35	ALB 3 fuse	
	2		OUT					
	3		BOTH			20-36		
	4	Power supply problem		IN		20-35	ALB 1 fuse	
	8			OUT				
	12			BOTH		20-37		
	15		BOTH	BOTH		—		
13	—	Solenoid related problem (Short)			IN	20-38	ALB 3 fuse	
14	—				OUT			
15	—				BOTH	—		
15	3		BOTH		BOTH			
	12			BOTH	BOTH			
	LED stays ON:		BOTH	BOTH	BOTH			

NOTE: The control unit can display a number of sub-codes other than those listed. Such sub-codes indicate unlikely combinations of multiple component failures, or more likely, a problem in a wire or connector common to a group of components. To troubleshoot, refer to the procedures for other sub-codes with the same main code.

Flow Chart

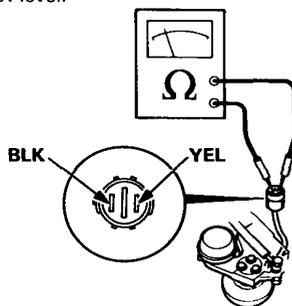
Problem Code 1: Hydraulic Controlled Components.

NOTE: The LED does not blink when the following failures occur.

- The contact points of the motor relay remain closed (The motor runs continuously even after the ignition key is removed).
- YEL/RED lead is shorted or the control unit is internally shorted (The motor stops when the ignition switch is turned off).

Pre test steps:

- Check ALB (40A) Fuse.
- Check all brake system hoses and pipes (low and high pressure) for signs of leaking, bending or kinking.
- Check reservoir fluid level, and if necessary, fill to the MAX level.



Disconnect the pressure switch connector and check the continuity between BLK and YEL terminals.

Is there continuity?

YES

NO

Bleed high pressure fluid from the maintenance bleeder with the ALB T-wrench. See page 20-41.

Check the continuity of pressure switch between BLK and YEL terminals.

Is there continuity?

YES

Faulty pressure switch (closed).

NO

Reconnect the pressure switch connector.

Bleed high pressure fluid from the maintenance bleeder with the ALB T-wrench (see page 20-41). Jack up the front of car and support with safety stands, then run the engine in gear above 6 mph (10 km/h).

WARNING Block rear wheels before jacking up front of car.

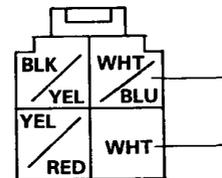
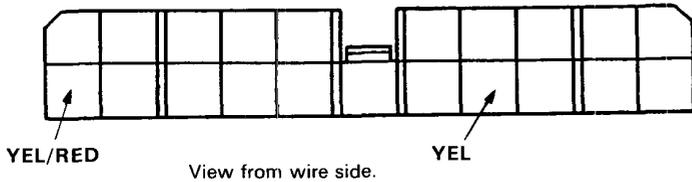
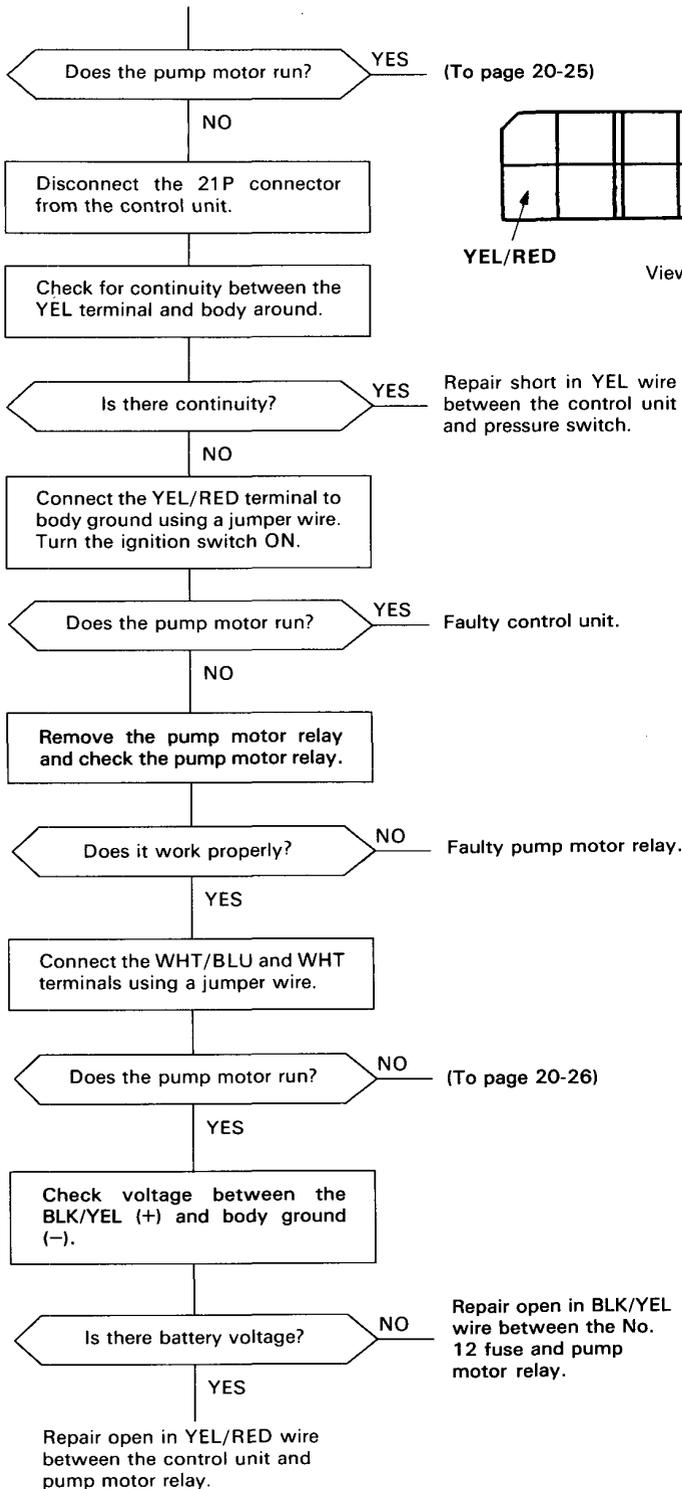
(To page 20-24)

(cont'd)

Troubleshooting

Flow Chart (cont'd)

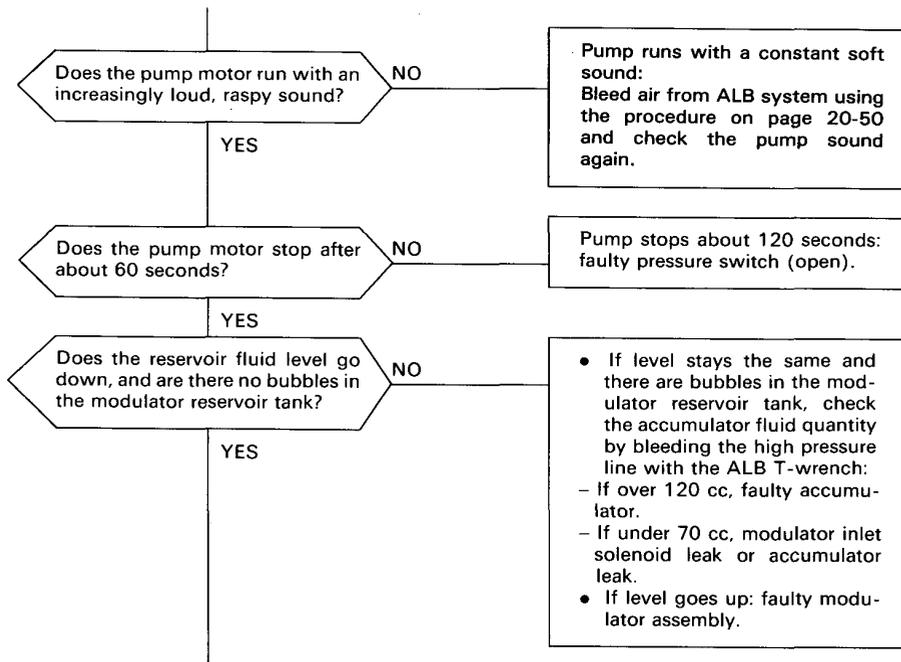
(From page 20-23)



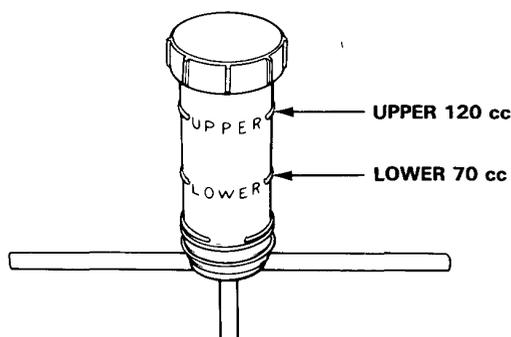
View from terminal side.

CAUTION: If the motor runs disconnect the jumper wire immediately.

(From page 20-24)



System is OK; recheck pump motor, to confirm no intermittent problem.

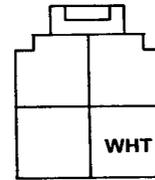
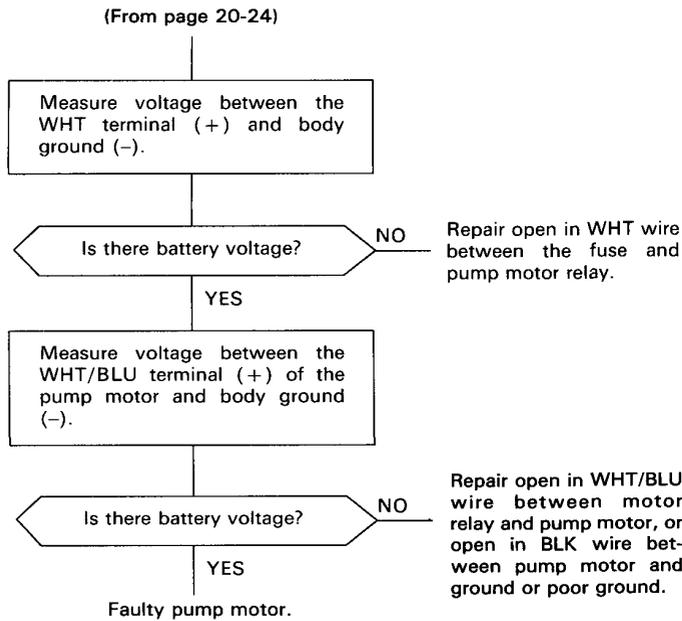


NOTE: The fluid enters the reservoir under pressure; wait 1 or 2 minutes for air bubbles to disappear and level to stabilize.

(cont'd)

Troubleshooting

Flow Chart (cont'd)



View from terminal side.



View from terminal side.

Problem code2: Parking Brake Switch Related Problem

If the parking brake has been released, the following items are possible causes. If they are OK, check the control unit connectors for good connection. If not loose or disconnected, substitute a known-good control unit and recheck.

NOTE: Before Troubleshooting Problem Code 2, remove the ALB 2 fuse for three seconds to clear the control unit's memory, then test drive the car.

If the **ALB** warning light and LED stay off, the probability is that the car was driving with the parking brake applied.

- The parking brake is applied for more than 30 seconds while driving.
- The brake fluid level in the master cylinder is too low.
- GRN/RED lead is shorted between the **BRAKE** warning light and parking brake switch.
- GRN/RED lead is shorted between the **BRAKE** warning light and brake fluid level switch.
- The **BRAKE** warning light is blown.
- GRN/RED has an open between the **BRAKE** warning light and parking brake.
- GRN/RED has an open between the parking brake switch and control unit.

Problem code 4-4 to 4-12: Rear Speed Sensor

Disconnect wire harness from speed sensor.

Check for resistance between sensor terminals.

Is there 500 — 1,000 Ω? **NO**

Faulty speed sensor.

YES

Disconnect the 21P connector from the control unit.

Check the sensor wire for continuity between the control unit and each speed sensor:
 BLU/YEL: Rear Right Negative
 GRY: Rear Left Negative
 GRN/YEL: Rear Right Positive
 LT BLU: Rear Left Positive

Is there continuity? **NO**

Repair open in the sensor wire:
 BLU/YEL: Rear Right Negative
 GRY: Rear Left Negative
 GRN/YEL: Rear Right Positive
 LT BLU: Rear Left Positive

YES

Reconnect the 21P connector to the control unit and 2P connectors to the speed sensors.

Connect ALB checker to inspection connector.

Check ALB function in MODE 2 and 3.

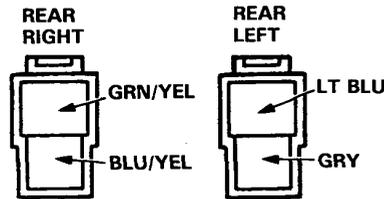
Does it work properly? **NO**

Faulty modulator.

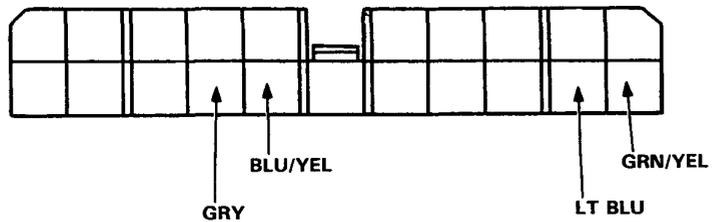
YES

Faulty control unit.

SENSOR SIDE CONNECTOR



View from terminal side.



View from wire side.

(cont'd)

Troubleshooting

Flow Chart (cont'd)

Problem Code 5-1 to 7-8: Speed Sensor

Disconnect wire harness from speed sensor.

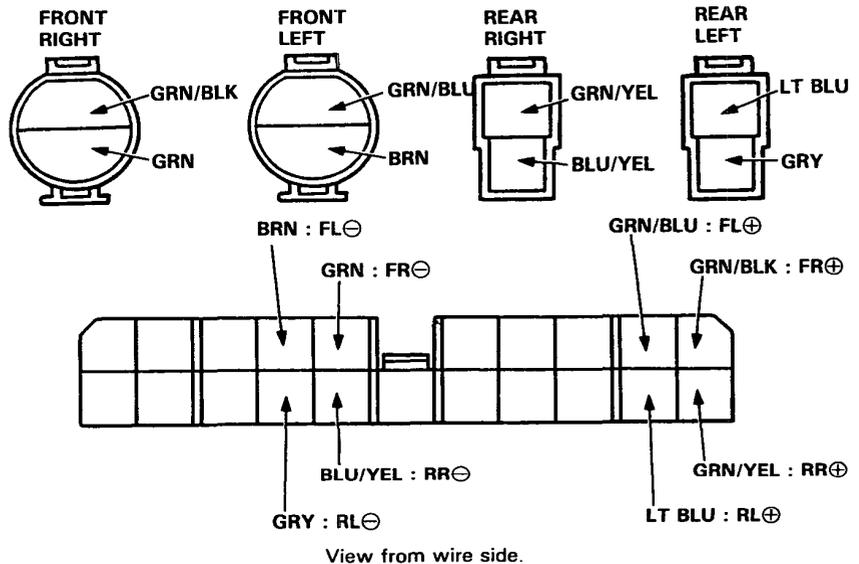
Check for resistance between sensor terminals.

Is there 500—1000 Ω ? **NO** — Faulty speed sensor.

YES

Disconnect the 21P connector from the control unit.

Check the each wires for continuity between the sensor and control unit:
 GRN/BLK: Front Right Positive
 GRN/BLU: Front Left Positive
 GRN/YEL: Rear Right Positive
 LT BLU: Rear Left Positive
 GRN: Front Right Negative
 BRN: Front Left Negative
 BLU/YEL: Rear Right Negative
 GRY: Rear Left Negative



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

YES

Check pulser air gap.

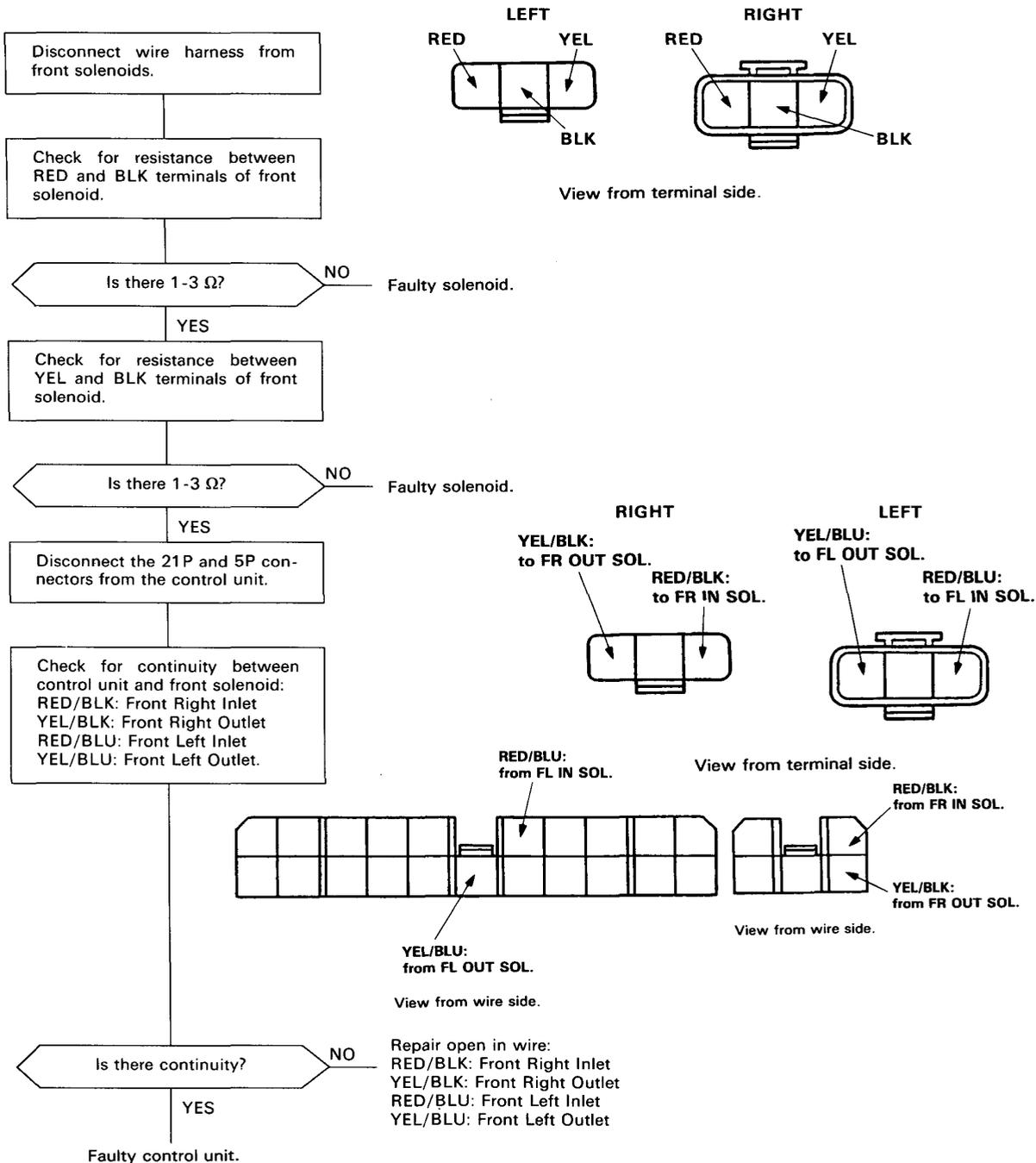
Is the air gap OK? **NO** — Repair air gap or replace the pulser rotor and/or speed sensor

YES

Faulty control unit.

Problem Code 8-1 to 8-12: Front Solenoid Related Problem

NOTE: Problem Code 8-2 or 8-8, also perform troubleshooting of Problem Code 5-1 to 7-8 (page 20-28).



(cont'd)

Troubleshooting

Flow Chart (cont'd)

Problem 8-15: Front Fail Safe Relay Circuit

Remove front fail safe relay.

Check relay function.

Does it work properly?

NO Faulty front fail safe relay.

YES

Check for continuity between BLK lead and body ground.

Is there continuity?

NO Repair open in BLK wire between the fail safe relay and ground or poor ground.

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. 12 fuse.

YES

Turn ignition switch OFF.

Disconnect the 3P connectors from the front solenoids.

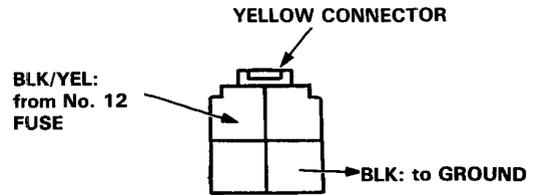
Check for continuity in BRN/BLK lead between fail safe relay and solenoids.

Is there continuity?

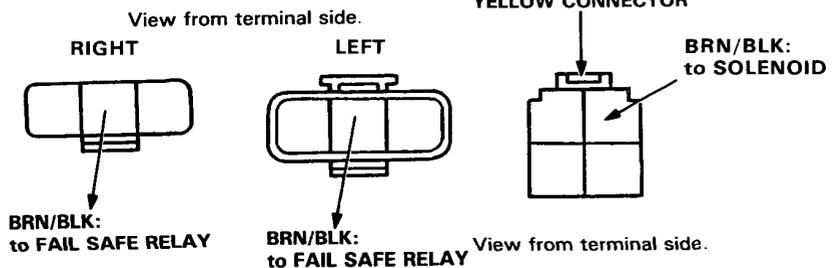
NO Repair open in BRN/BLK wire between the solenoids and fail safe relay.

YES

(To page 20-31)



View from terminal side.



(From page 20-30)

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 21P and 5P connectors from the control unit.

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

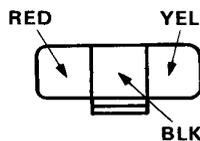
Is there continuity? NO

Repair open in wire:
 RED/BLK: Front Right Inlet
 YEL/BLK: Front Right Outlet
 RED/BLU: Front Left Inlet
 YEL/BLU: Front Left Outlet

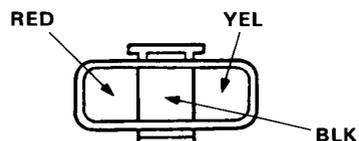
YES

Faulty control unit.

LEFT



RIGHT



View from terminal side.

RIGHT

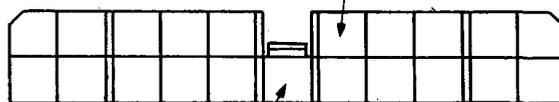


LEFT



View from terminal side.

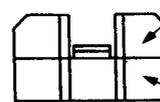
RED/BLU:
from FL IN SOL.



YEL/BLU:
from FL OUT SOL.

View from wire side.

RED/BLK:
from FR IN SOL.



YEL/BLK:
from FR OUT SOL.

View from wire side.

(cont'd)

Troubleshooting

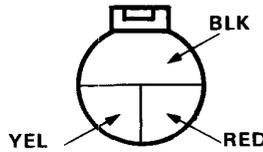
Flow Chart (cont'd)

Problem Code 9 or 10: Rear Solenoid Related Problem

NOTE: Problem Code 10, also perform troubleshooting of Problem Code 5-1 to 7-8 (page 20-28).

Disconnect wire harness from rear solenoid.

Check for resistance between RED and BLK terminals of rear solenoid.



View from terminal side.

Is there 1-3 Ω ? **NO**

Faulty solenoid.

YES

Check for resistance between YEL and BLK terminals of rear solenoid.

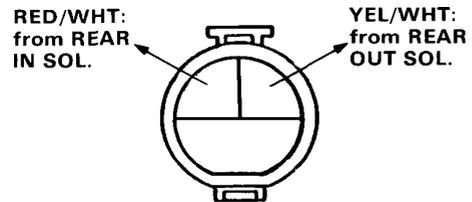
Is there 1-3 Ω ? **NO**

Faulty solenoid.

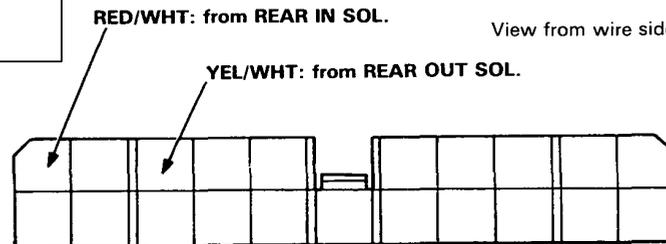
YES

Disconnect the 21P connector from the control unit.

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



View from wire side.



View from wire side.

Is there continuity? **NO**

Repair open in the wire between the rear solenoid and control unit
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

YES

Faulty control unit.

Problem Code 11: Rear Fail Safe Relay Circuit

NOTE: Also perform Troubleshooting of Problem Code 9 or 10 (page 20-32).

Remove rear fail safe relay.

Check relay function.

Does it work properly?

NO Faulty fail safe relay.

YES

Check for continuity between BLK lead of wire harness and body ground.

Is there continuity?

NO Repair open in BLK wire between the relay and ground or poor ground.

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. 12 fuse.

YES

Turn ignition switch off.

Disconnect the 3P connector (PNK) from the rear solenoid.

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

Is there continuity?

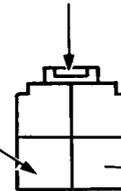
NO Repair open in BLU/BLK wire between the relay and solenoid.

YES

(To page 20-34)

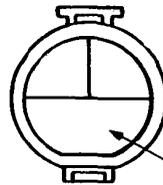
PINK CONNECTOR

BLK/YEL:
from No. 12 FUSE

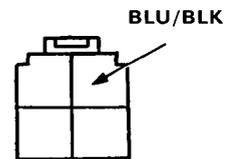


BLK: to GROUND

View from terminal side.



BLU/BLK



View from terminal side.

(cont'd)

Troubleshooting

Flow Chart (cont'd)

(From page 20-33)

Disconnect the 21P connector from the control unit.

Check for continuity in YEL/GRN lead between fail safe relay and control unit.

Is there continuity? **NO**

Repair open in YEL/GRN wire between the relay and control unit.

YES

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

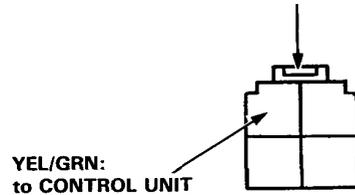
Is there continuity? **NO**

Repair open in wire between the solenoid and control unit.
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

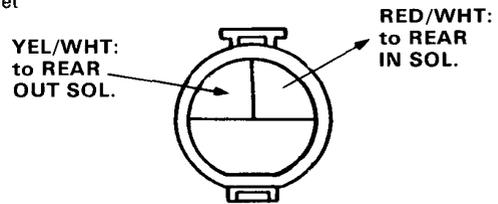
YES

Faulty control unit.

PINK CONNECTOR



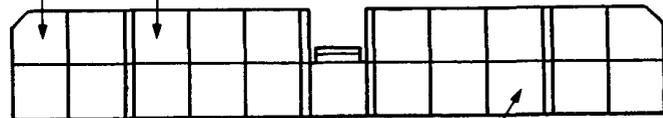
View from terminal side.



View from terminal side.

RED/WHT: from REAR IN SOL.

YEL/WHT: from REAR OUT SOL.



YEL/GRN: from FAIL SAFE RELAY

View from wire side.

Problem Code 12-1, 12-2, 12-4 or 12-8: Front Solenoid

Disconnect wire harness from front solenoids.

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

Is there 1-3 Ω ? **NO**

Faulty solenoid.

YES

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

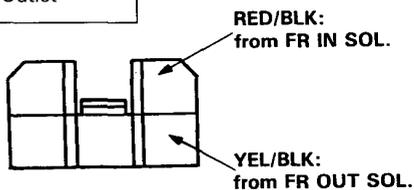
Is there 1-3 Ω ? **NO**

Faulty solenoid.

YES

Disconnect the 21P and 5P connectors from the control unit.

Check for continuity between wire harness and body ground.
 RED/BLK: front Right Inlet
 YEL/BLK: Front Right Outlet
 RED/BLU: Front Left Inlet
 YEL/BLU: Front Left Outlet



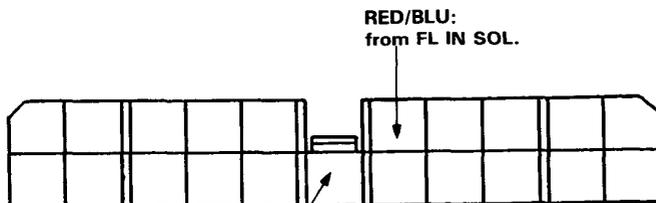
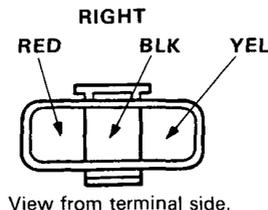
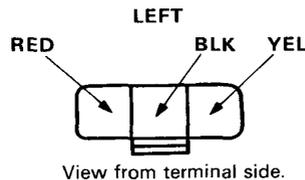
View from wire side.

Is there continuity? **YES**

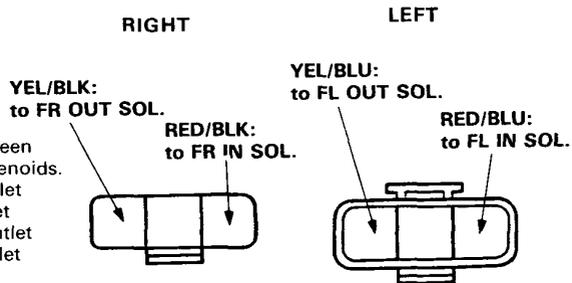
Repair short in wire between control unit and front solenoids.
 RED/BLK: Front Right Inlet
 RED/BLU: Front Left Inlet
 YEL/BLK: Front Right Outlet
 YEL/BLU: Front Left Outlet

NO

Faulty control unit.



View from wire side.



View from terminal side.

(cont'd)

Troubleshooting

Flow Chart (cont'd)

Problem Code 12-3: Front Right Solenoid and/or Power Supply

Check ALB 3 fuse.

Is the fuse OK? **NO** Replace the ALB 3 fuse.

YES

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.

Disconnect the 5P connector from the control unit.

Check for voltage between WHT/BLK lead (+) and body ground (-).

Is battery voltage available? **NO** Repair open in WHT/BLK wire between the ALB 3 fuse and control unit.

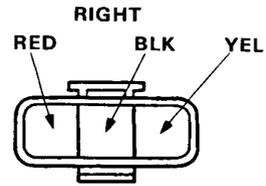
YES

Check for continuity between wire harness and body ground.
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet

Is there continuity? **YES** Repair short in wire
RED/BLK: Front Right Inlet
YEL/BLK: Front Right Outlet

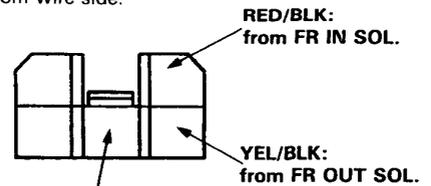
NO

Faulty control unit.



View from terminal side.

View from wire side.



WHT/BLK:
from ALB 3 FUSE

Problem Code 12-12: Front Left Solenoid and/or Power Supply Problem

Check ALB 1 fuse.

Is the fuse OK? **NO** — Replace the fuse.

YES

Disconnect wire harness from front solenoid.

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

Is there 1—3 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 21P connector from the control unit.

Check for voltage between WHT/GRN lead (+) and body ground (-).

Is battery voltage available? **NO** — Repair open in WHT/GRN wire between the ALB 1 fuse and control unit.

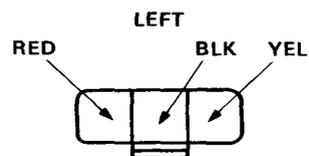
YES

Check for continuity between wire harness and body ground.
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

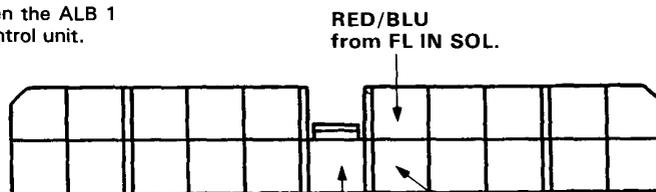
Is there continuity? **YES** — Repair short in wire between the control unit and solenoid.
RED/BLU: Front Left Inlet
YEL/BLU: Front Left Outlet

NO

Faulty control unit.



View from terminal side.



View from wire side.

WHT/GRN: from ALB 1 FUSE
YEL/BLU: from FL OUT SOL.

(cont'd)

Troubleshooting

Flow Chart (cont'd)

Problem Code 13 or 14: Rear Solenoid Related Problem

Disconnect wire harness from rear solenoid.

Check for resistance between RED and BLK terminals of rear solenoid.

Is there 1—3 Ω ? **NO** Faulty solenoid.

YES

Check for resistance between YEL and BLK terminals of rear solenoid.

Is there 1—3 Ω ? **NO** Faulty solenoid.

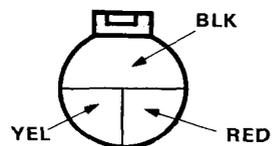
YES

Disconnect the 21P connector from the control unit.

Check for continuity between wire harness and body ground.
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

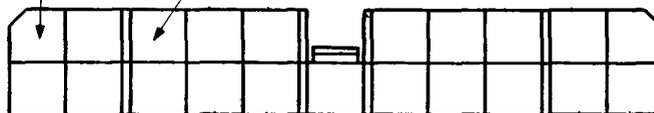
Is there continuity? **YES** Repair short in wire between the solenoid and control unit.
RED/WHT: Rear Inlet
YEL/WHT: Rear Outlet

NO Faulty control unit.



View from Terminal side.

RED/WHT: from REAR IN SOL.
YEL/WHT: from REAR OUT SOL.



View from wire side.

Brake Booster



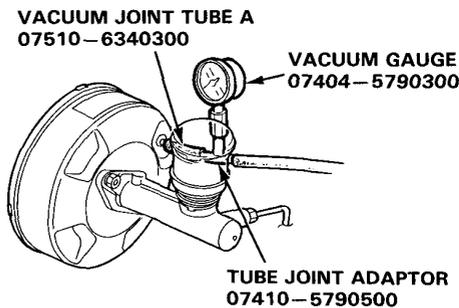
Test

Leak Test

1. Install the Brake Power Kit (07504-6340100) as shown.
2. Start the engine, adjust the engine speed with the accelerator pedal so that the vacuum gauge readings show 300-500 mmHg (11.8-19.7 inHg), then stop the engine.
3. Read the vacuum gauge.

If the vacuum readings decreases 20 mmHg (0.8 inHg) or more after 30 seconds, check following parts for leaks.

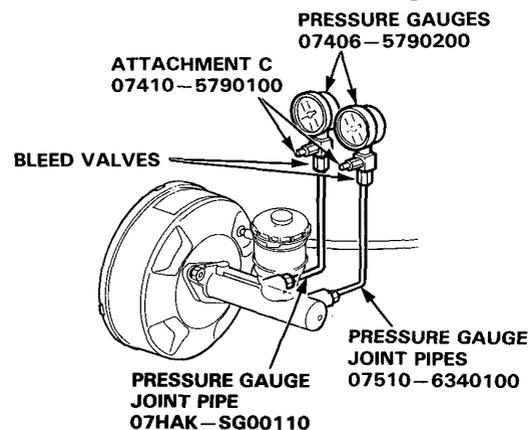
- Check valve
- Vacuum hose
- Seals
- Diaphragm
- Master cylinder O-ring and cup



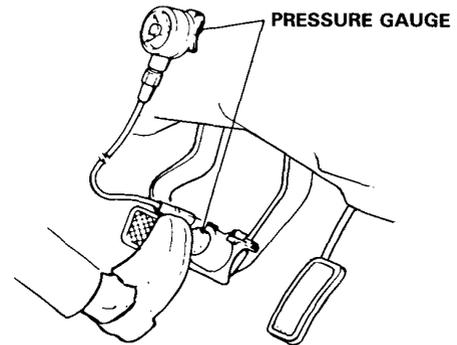
Function Test

1. Install the vacuum gauge as same the leak test.
2. Connect the oil pressure gauges to the master cylinder using the attachments as shown.
3. Bleed air through the valves.

CAUTION: Avoid spilling brake fluid on painted, plastic or rubber parts as it may damage the finish.



4. Start the engine.
5. Depress the brake pedal with a 200 N (20 kg, 44 lbs) of pressure. The following pressures should be observed at the pressure gauges in each vacuum.

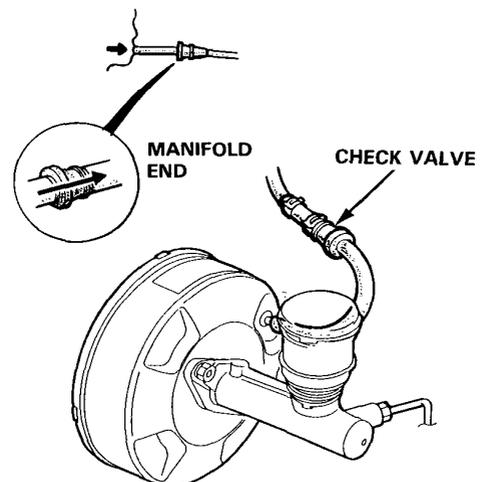


Vacuum mmHg	Line pressure kPa (kg/cm ² , psi)
0	1,176 (12.0, 171)
300	4,763 (48.6, 691)
500	7,144 (72.9, 1,036)

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.

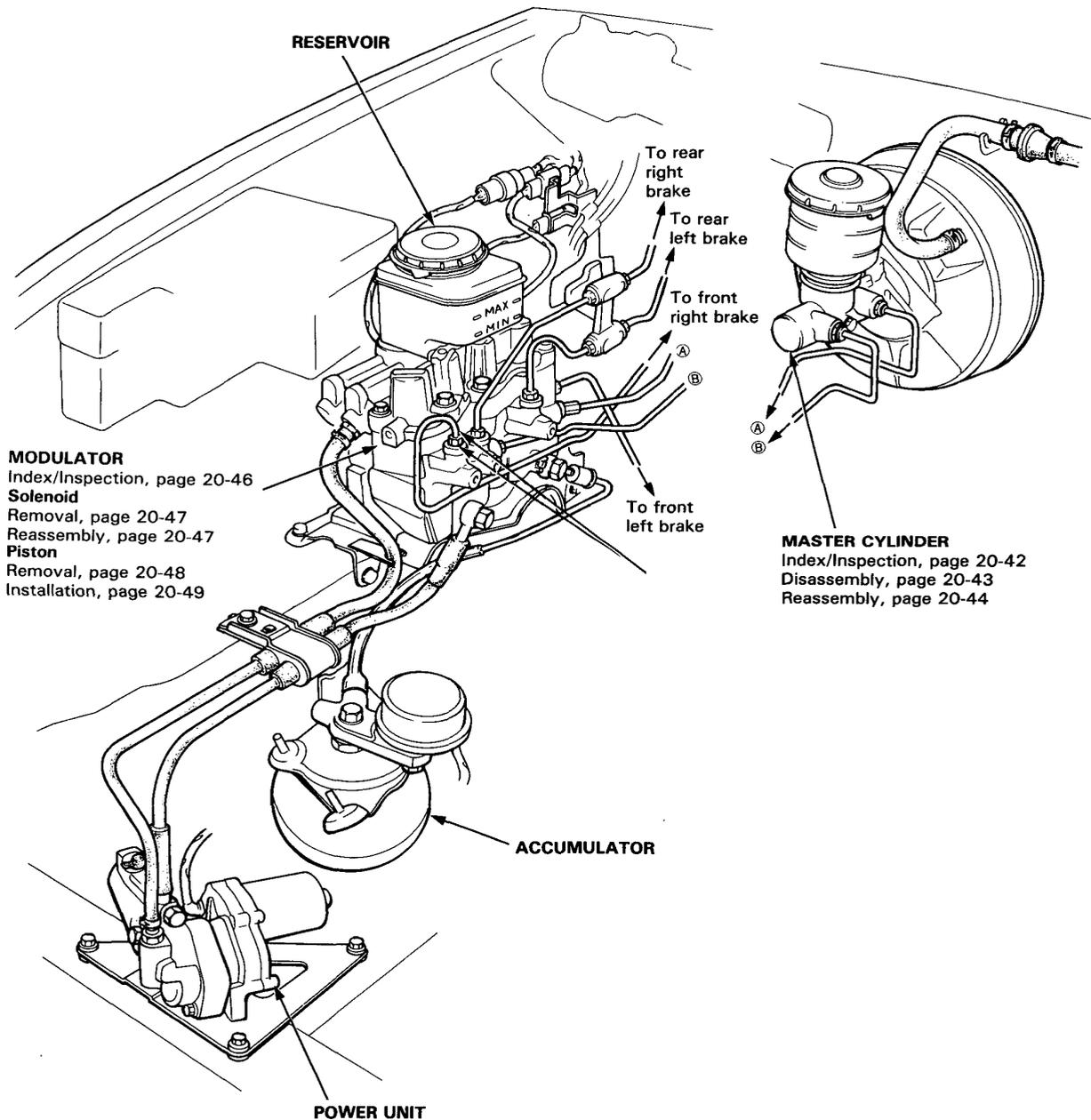


Hydraulic System

Index

CAUTION:

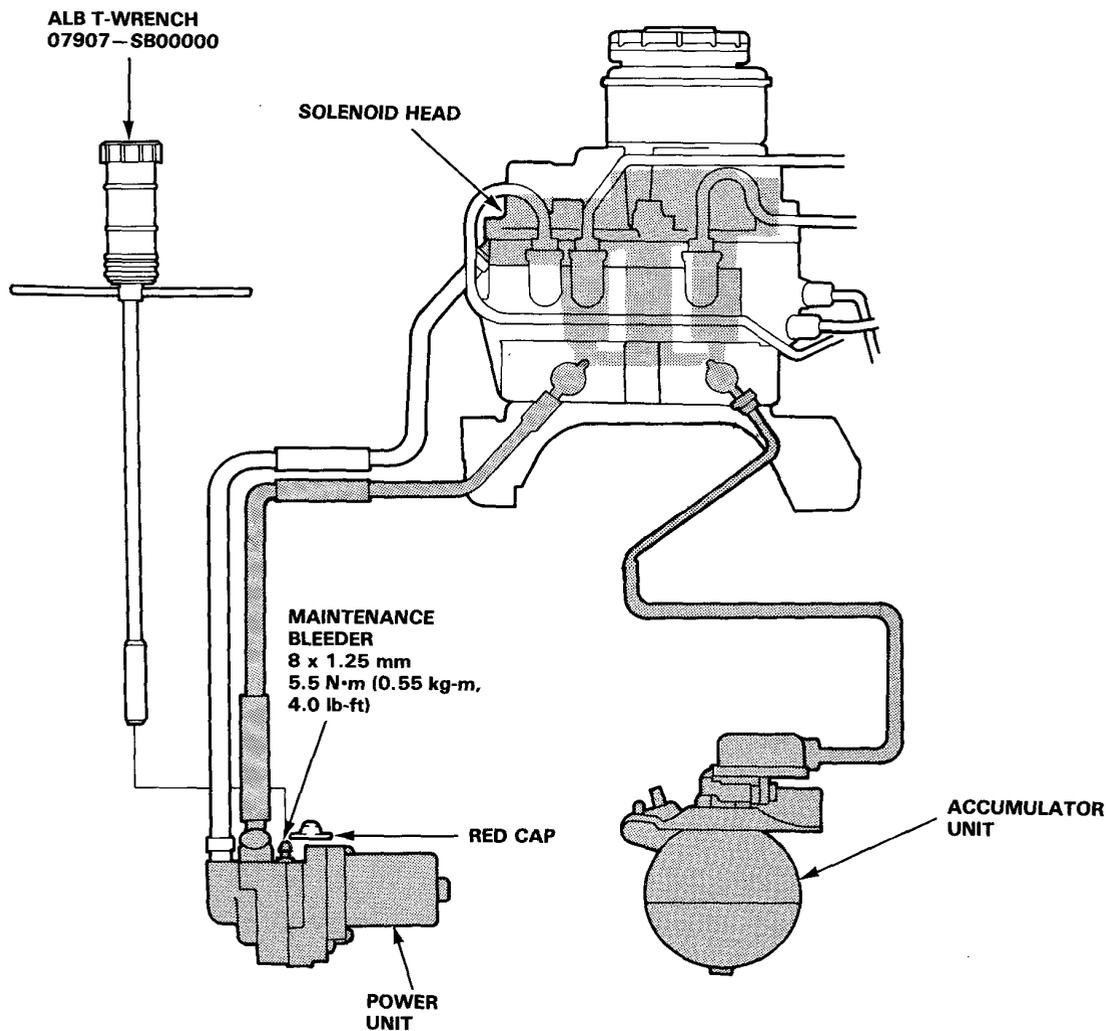
- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- The flare nuts should be tightened to 15 N-m (1.5 kg-m, 11 lb-ft).
- The brake pipes and modulator fittings are color coded.



Relieving Accumulator/Line Pressure

WARNING USE the ALB T-WRENCH before disassembling the parts shaded in the illustration.

1. Drain the brake fluid from the master cylinder and modulator reservoir thoroughly.
2. Remove the red cap from the bleeder on the top of the power unit.
3. Install the ALB T-WRENCH on the bleeder screw and turn it out slowly 90° to collect high pressure fluid into the reservoir. Turn the T-WRENCH out one complete turn to drain the brake fluid thoroughly.
4. Retighten the bleeder screw and discard the fluid.
5. Reinstall the red cap.

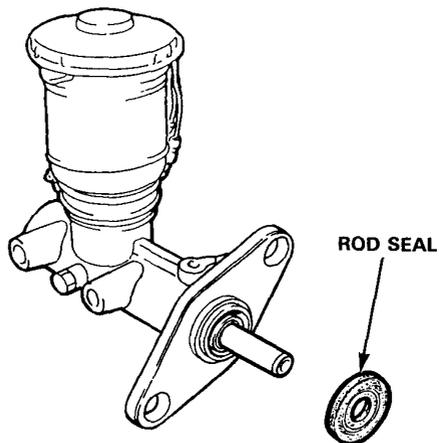


Disassembly

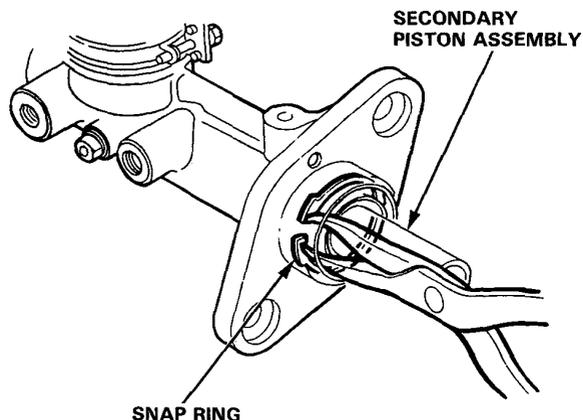
CAUTION:

- Do not spill brake fluid on the car; it may damage the paint; if brake fluid does contact the paint, wash it off immediately with water.
- To prevent spills, cover the hose joints with rags or shop towels.
- Clean all parts in brake fluid and air dry; blow out all passages with compressed air.
- Use only new clean brake fluid.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not bend or damage the brake pipes when disconnecting.

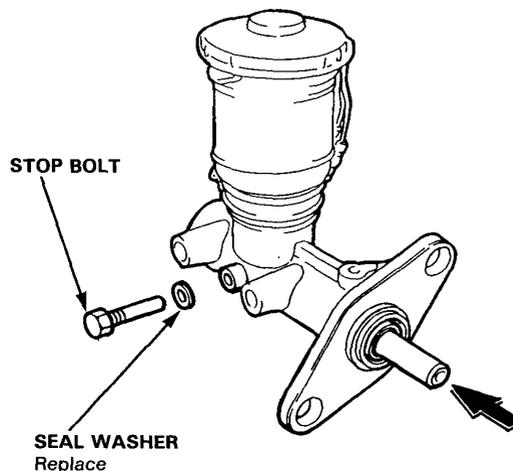
1. Remove the rod seal.



2. Press the secondary piston assembly in, then remove the snap ring.



3. Remove the stop bolt while pushing the secondary piston assembly.



4. Remove the piston guide assembly, secondary piston assembly and primary piston assembly.

NOTE: If the primary piston assembly is difficult to remove, apply compressed air from the primary piston side outlet.

CAUTION:

Place a shop rag over the master cylinder to prevent the primary piston from becoming a projectile.

5. Clean each component in brake fluid.

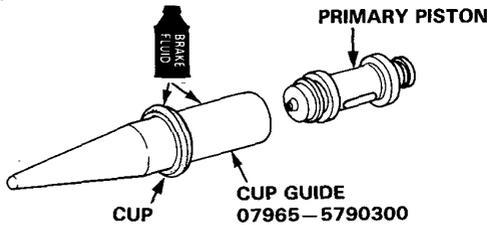
Master Cylinder

Reassembly

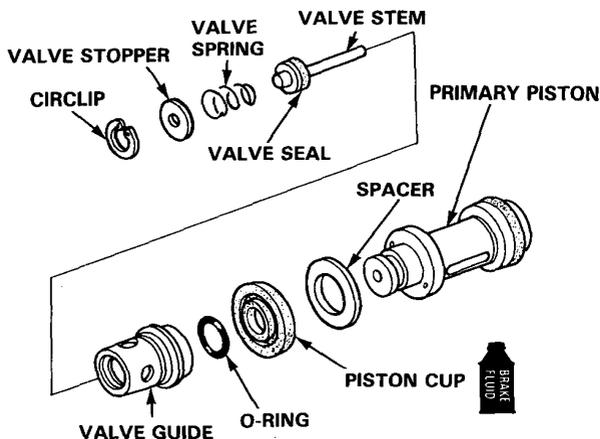
CAUTION:

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

1. Coat the Cup Guide (special tool) with brake fluid, install the cup over the Cup Guide, then slide the cup onto the primary piston.

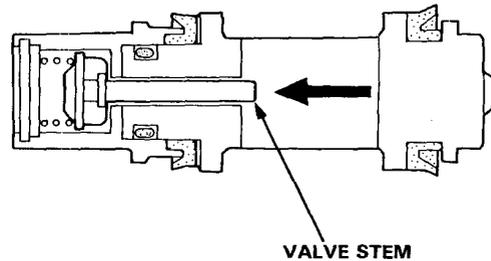


2. Install the spacer, piston cup and O-ring to the primary piston.
3. Install the valve seal on the valve stem with its flat face toward the front.
4. Install the valve stem, valve spring and valve stopper in the valve guide and secure them with the circlip.



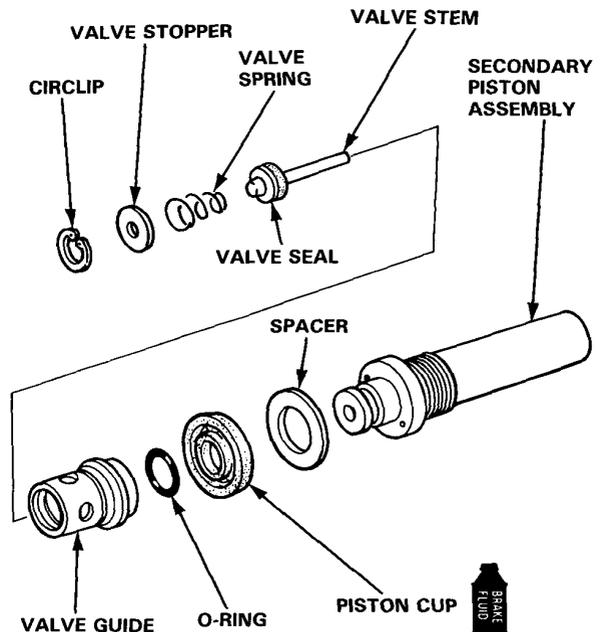
5. Install the valve guide to the primary piston.

PRIMARY PISTON ASSEMBLY

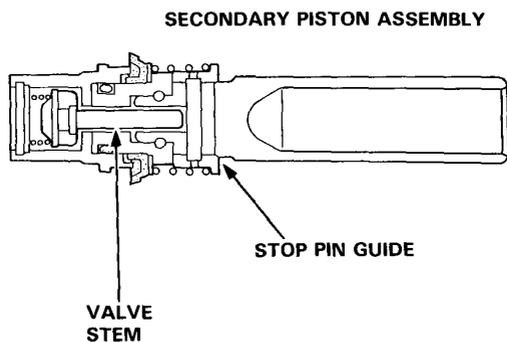


NOTE: Reaching through the primary piston stop bolt hole, lightly press on the valve stem to see if it moves smoothly.

6. Install the spacer, piston cup and O-ring on the secondary piston sub-assembly.
7. Install the valve seal on the valve stem with its flat face toward the front.
8. Install the valve stem, valve spring and valve stopper on the valve guide and secure with circlip.



7. Install the valve guide to the secondary piston assembly.



NOTE: Lightly press the stop pin guide to see if the valve stem moves smoothly.

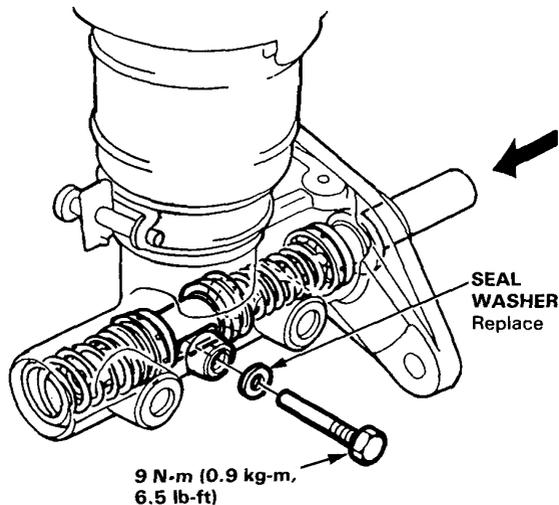
8. Assemble the primary piston assembly, secondary piston assembly and piston guide assembly in the master cylinder body.

NOTE: Install the primary piston with the slot on the cylinder facing the stop bolt hole side.

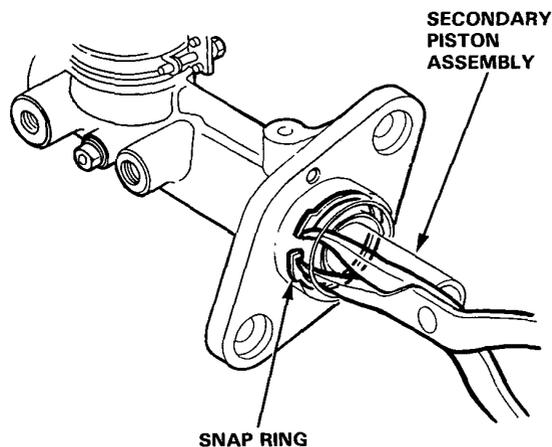
9. Push the secondary piston in until the slot aligns with the stop bolt hole, then install and tighten the stop bolt.

CAUTION:

- Replace the stop bolt seal washer with a new one whenever disassembled.
- Apply brake fluid to the inner wall of the cylinder and piston cups, being careful that they are not turned inside out during installation.

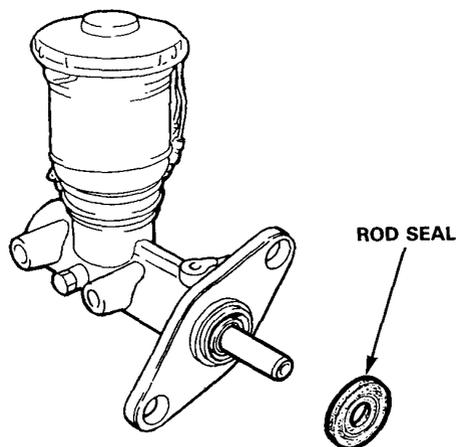


10. Press the secondary piston in and install the snap ring.



CAUTION: Avoid damaging the sliding surface of the secondary piston when installing the snap ring.

11. Install the rod seal.



CAUTION: Make sure that there is no interference between the brake pipes and other parts when installing.

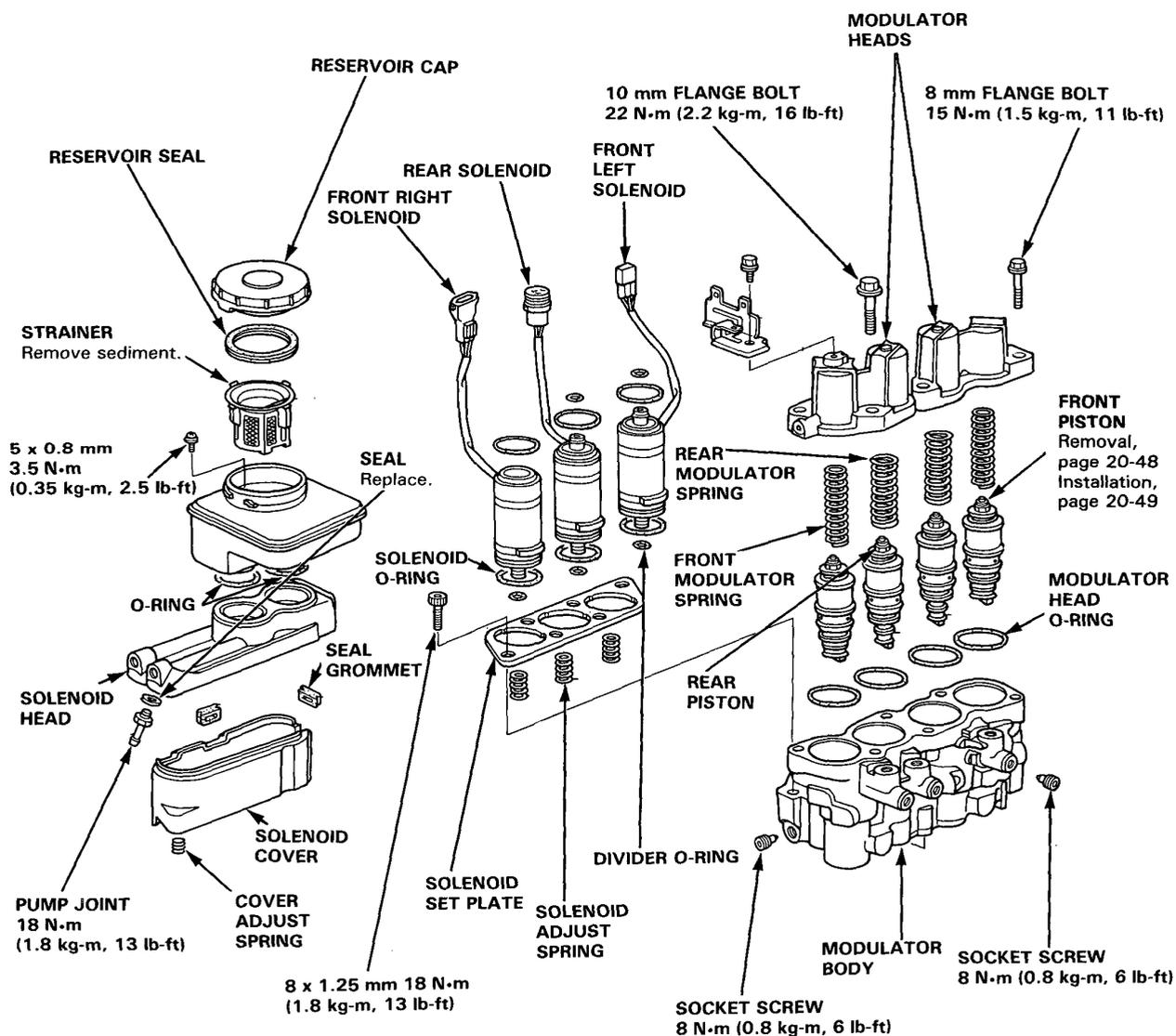
Modulator

Index/Inspection

CAUTION:

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

- Before reassembling, check that all parts are free of dust and other foreign particles.
- Replace parts with new ones whenever specified to do so.
- Make sure no dirt or other foreign matter is allowed to contaminate the brake fluid.
- Do not mix different brands of brake fluid as they may not be compatible.
- Do not reuse the drained fluid.
- Replace all rubber parts with new ones whenever the modulator is disassembled.

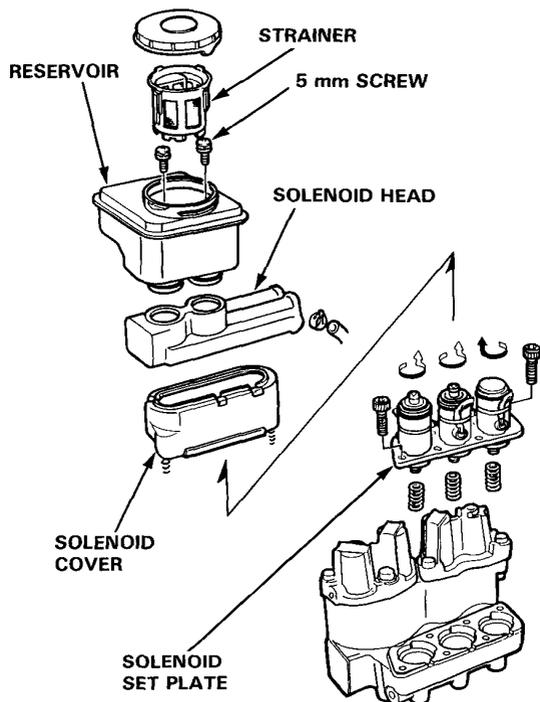


Solenoid

Removal

1. Drain the brake fluid from the modulator tank.
2. Drain the high pressure brake hose (page 20-41).
3. Disconnect the inlet hose.
4. Remove the reservoir strainer.
5. Remove the 5 mm screws and remove the reservoir.
6. Screw the 6 mm bolt into the threaded hole in the center of the solenoid head, raise the solenoid head parallel to the ground and remove it.
7. Remove the solenoid cover.
8. Remove the hexagonal socket screws and loosen the solenoid set plate.
9. Turn the solenoid valves several times until they move freely and turn the solenoid valves 1/2 turn to align their projection with the cutout in the set plate. Remove the solenoid valves together with the set plate.

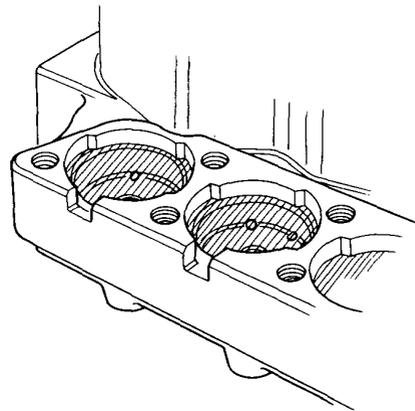
CAUTION: The solenoid valves are delicate parts. Be careful not to drop them.



Reassembly

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

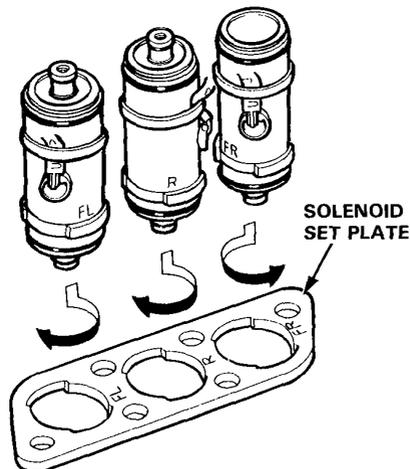
NOTE: On solenoid valve assembly, place shop rags over the solenoid valve and under the modulator valve to prevent the brake fluid from spilling on the valve.



2. Coat the O-ring with the clean brake fluid and install the O-ring onto the solenoid valve.
3. Install the solenoid valves on the set plate.

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

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

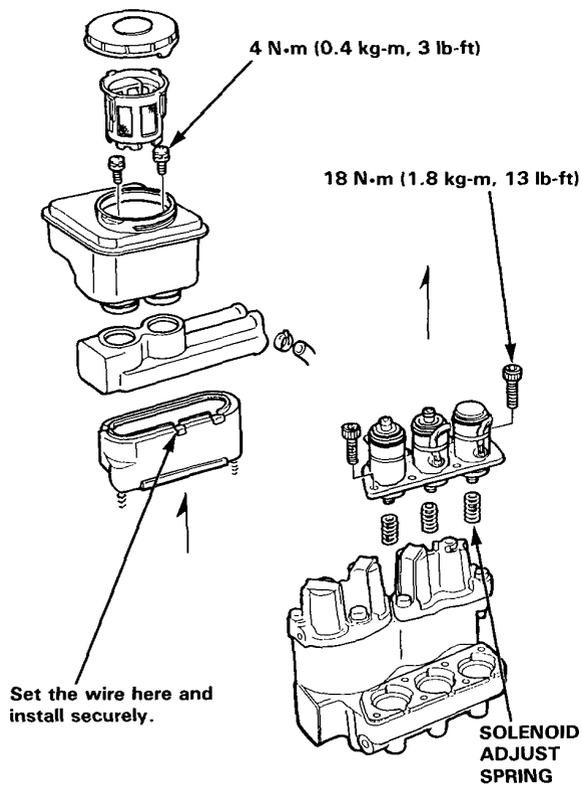


(cont'd)

Solenoid

Reassembly (cont'd)

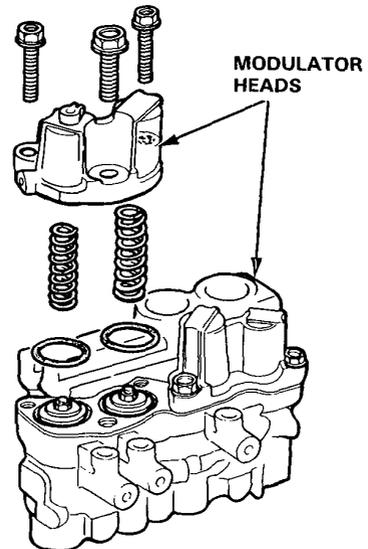
4. Install the solenoid adjust springs on the modulator body.
5. Install the solenoid valves and set plate and secure with the hexagonal socket screws.
6. Install the solenoid cover and solenoid head.
7. Install the reservoir tank.
8. Install the tank filter.
9. Connect the low pressure hose.



Piston

Removal

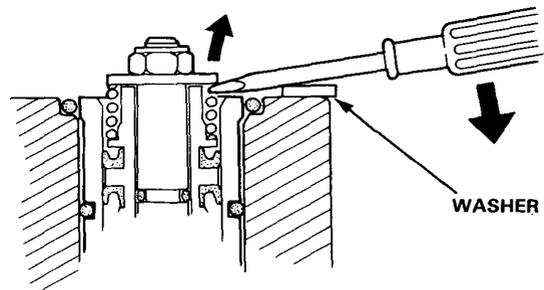
1. Remove the modulator heads.



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

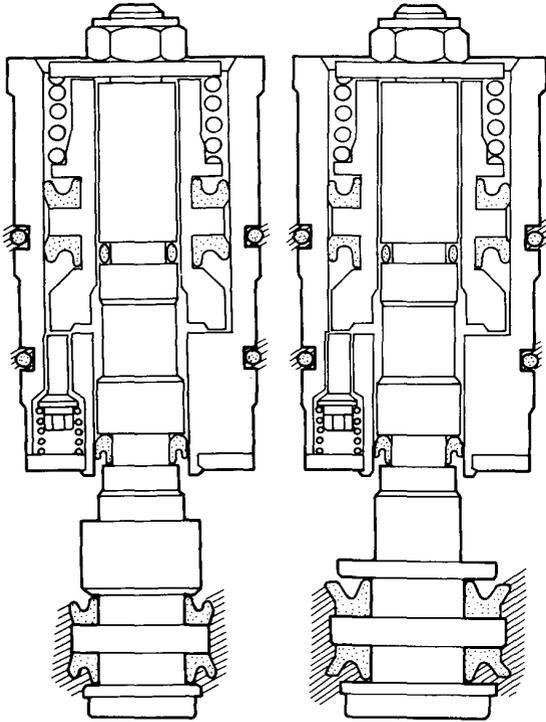
CAUTION:

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

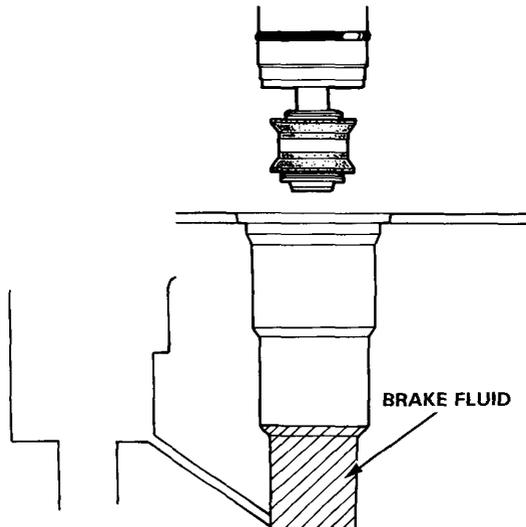


Installation

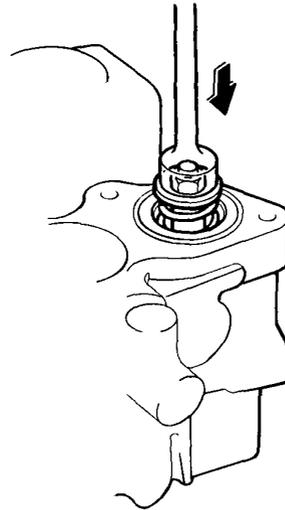
1. Apply rubber grease to the shaded sections of the piston assembly, shown in the drawing below.



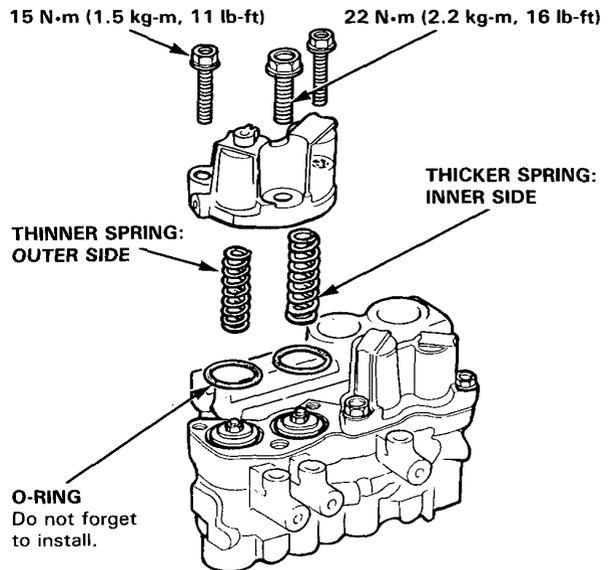
2. Adjust so that the brake fluid flows into the piston mounting hole in the modulator body.



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.



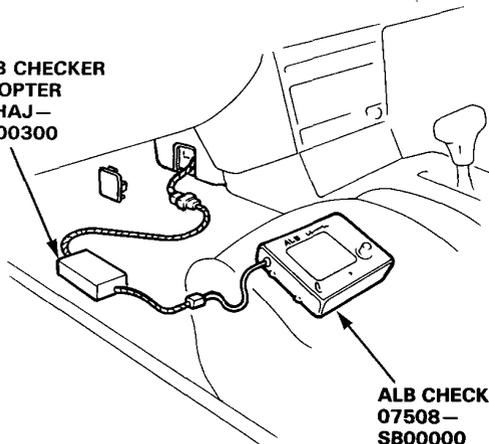
Bleeding

Air Bleeding with ALB Checker

NOTE: Do not depress the brake pedal while using the ALB checker to bleed air from the system.

1. Fill the modulator reservoir with brake fluid up to the MAX level.
2. Disconnect the 6P coupler (PNK) from the cover mounted in front of the console and connect it to the ALB checker.

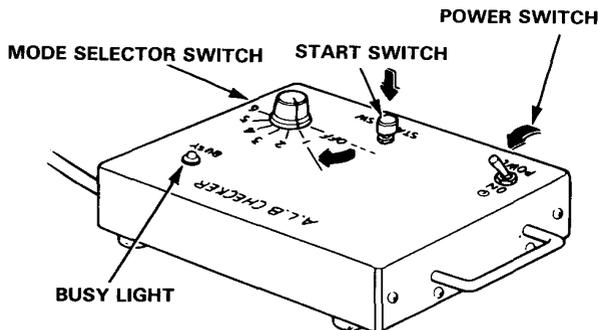
ALB CHECKER
ADOPTER
07HAJ—
SG00300



ALB CHECKER
07508—
SB00000

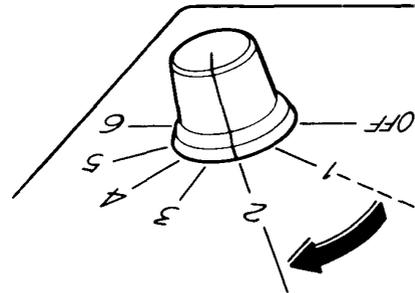
CAUTION: Place the car on level ground with the wheels blocked. Shift the transmission to P or Neutral.

3. Start the engine.
4. Release the parking brake.
5. Turn the power switch of ALB checker ON.

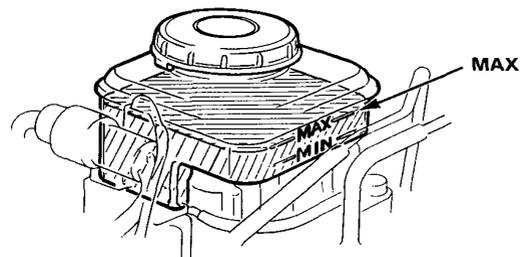


6. Turn the mode selector switch to 1.
7. Press the start switch.
8. Make sure that the motor runs.
9. Wait for the motor to stop.

10. Turn the mode switch to 2.



11. Press the start switch.
12. Brake fluid in the reservoir will bubble briskly for 20 seconds after the switch is pressed. Wait for 4 to 5 minutes until the brake fluid stops bubbling.
13. Turn the mode switch to 6.
14. Repeat steps 11 and 12.
15. Repeat steps 10 through 14 two or three times.
16. Fill the reservoir with brake fluid up to the MAX level.



17. Install the cap.
18. Check the ALB function in all modes (page 20-17). There should be kickback in modes 2 through 6.

CAUTION: If the kickback is weak, re-bleed air from the system.

Control Unit

Replacement

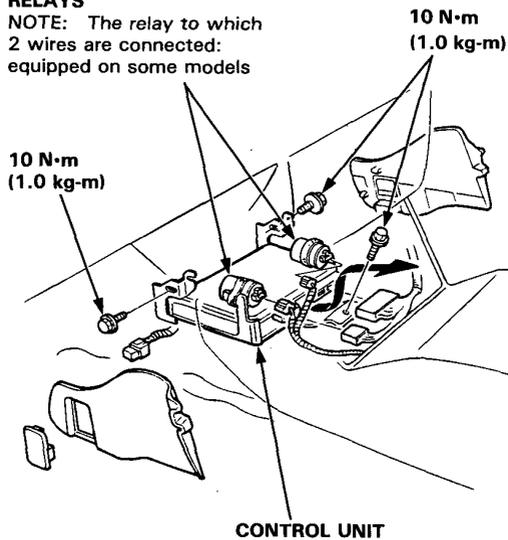
1. Remove the center console and covers (section 20).
2. Remove the control unit attaching bolts, then remove the control unit.

CAUTION:

- If the control unit attaching bolts are removed, the control unit's memory is cleared.
- Handle the control unit with care.

RELAYS

NOTE: The relay to which 2 wires are connected: equipped on some models



Installation is the reverse order of removal.

NOTE: Check the **ALB** warning light function by turning the ignition switch ON.

Heater

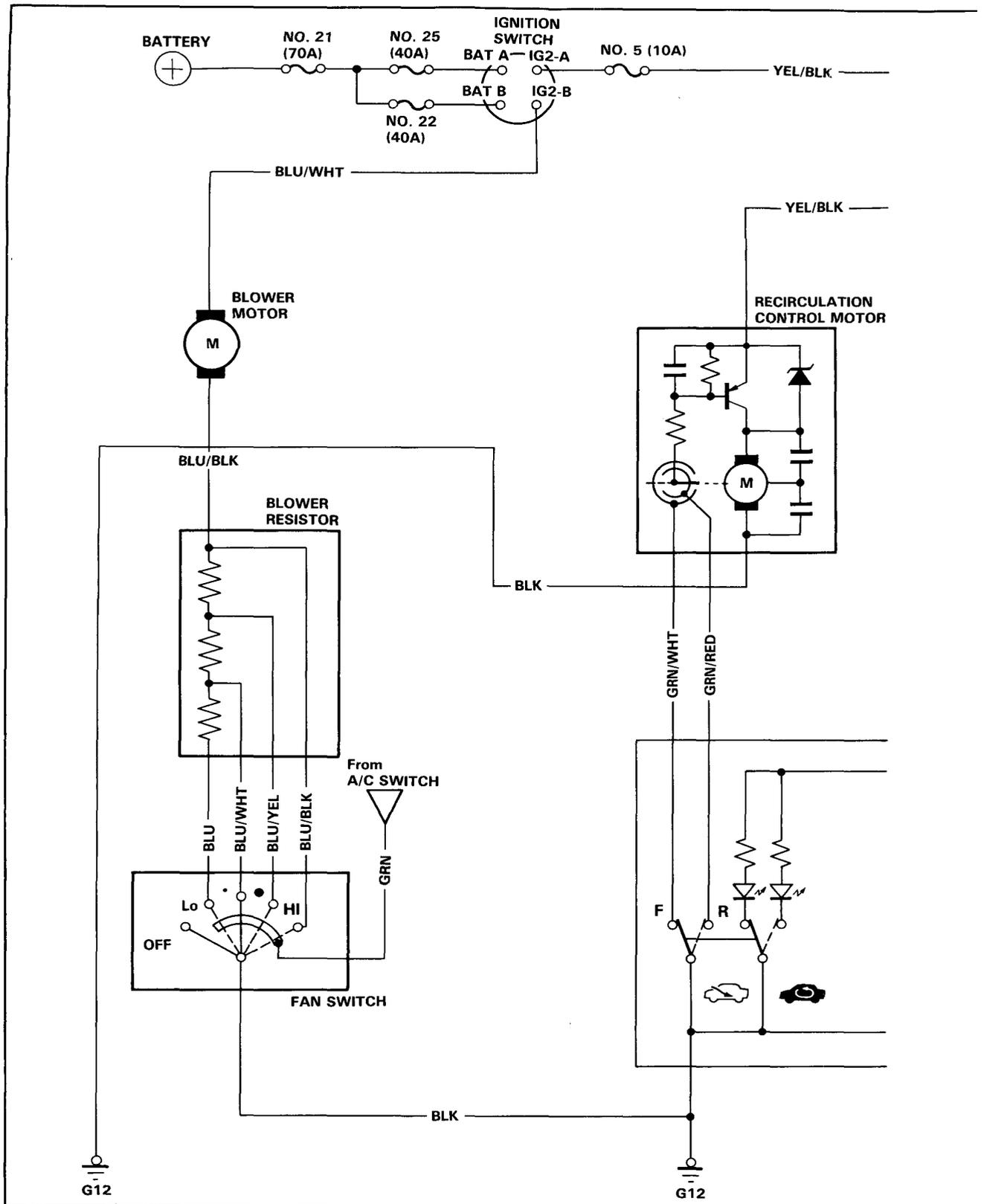
Circuit Diagram	22-2
Troubleshooting	
Symptom Chart	22-4
Flow Chart	22-5
Test	
Control Panel Switches	22-12
Function Control Motor	22-13
Recirculation Control Motor	22-13

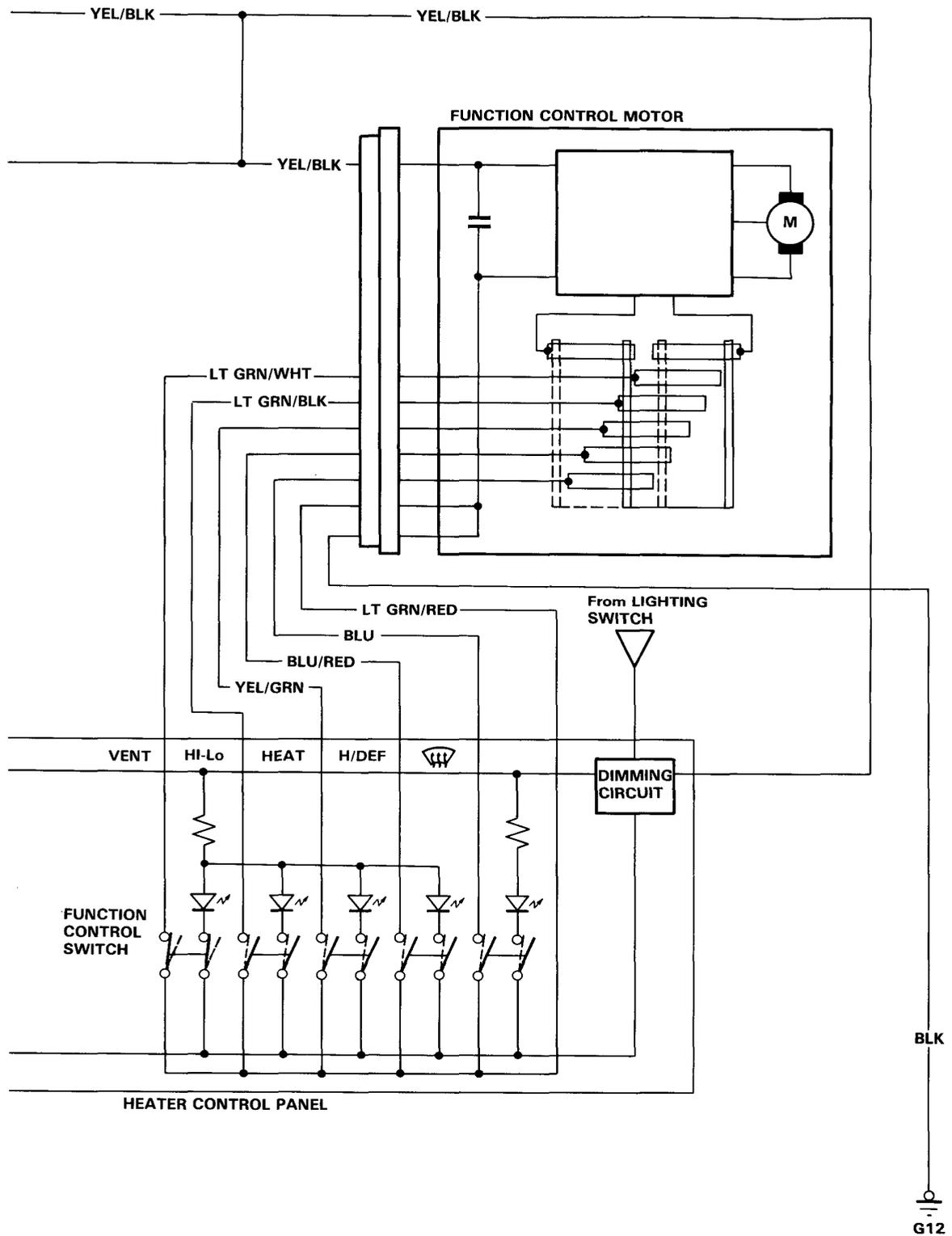
Outline of Model Changes

Function control motor, recirculation control motor and control panel switches have changed.



Circuit Diagram

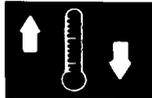




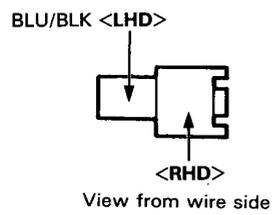
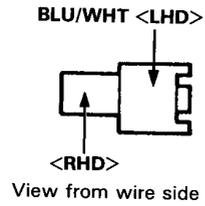
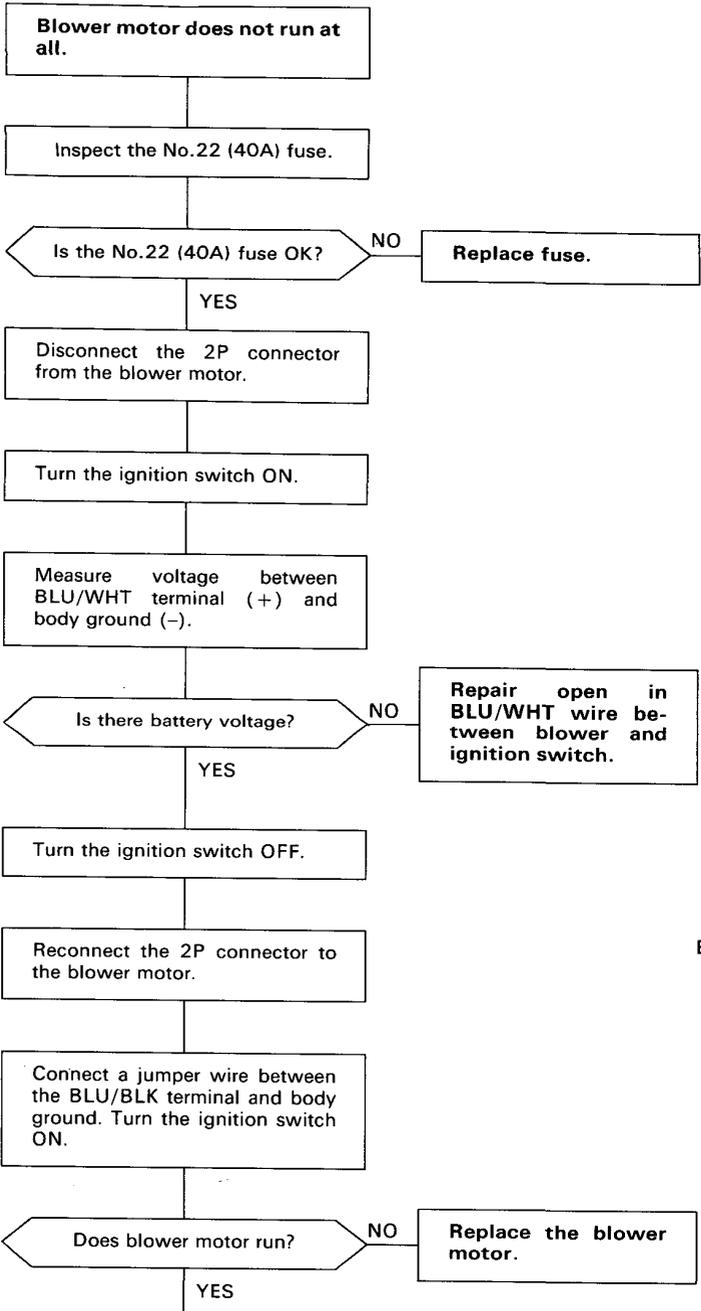
Troubleshooting

Symptom Chart

SYMPTOM		REMEDY
No hot air flow	Blower motor does not run	See flow chart (page 22-5)
	Blower motor runs	Check following: <ul style="list-style-type: none"> • Clogged heater duct • Clogged blower outlet • Clogged heater valve • Faulty air mix door • Air mix cable out of adjustment • Faulty thermostat (section 10)
Hot air flow is low	Blower speed does not change	See flow chart (page 22-7)
	Blower runs properly	Check following: <ul style="list-style-type: none"> • Clogged heater duct • Clogged blower outlet • Incorrect door position
Function does not change	Function control motor does not run	See flow chart (page 22-10)
	Function control motor runs	Check the heater door linkage and cable adjustments.
Recirculation door does not change	Recirculation motor does not run	See flow chart (page 22-8)
	Recirculation motor runs	Check the door linkage then see flow chart (page 22-8)



Flow Chart — Blower



(To page 21-6)

(cont'd)

Troubleshooting

Flow Chart — Blower (cont'd)

(From page 21-5)

Turn the ignition switch OFF.

Remove the jumper wire.

Disconnect the 6P connector from the fan switch.

Connect the jumper wire between the BLU/BLK terminal and body ground.

Turn the ignition switch ON.

Does the blower motor run?

NO
Repair open in BLU/BLK wire between blower and fan switch.

YES

Turn the ignition switch OFF.

Remove the jumper wire.

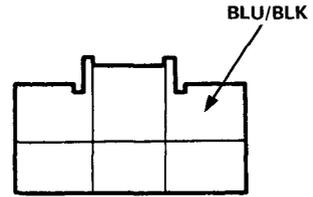
Inspect the fan switch. †

Is the fan switch OK?

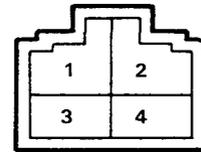
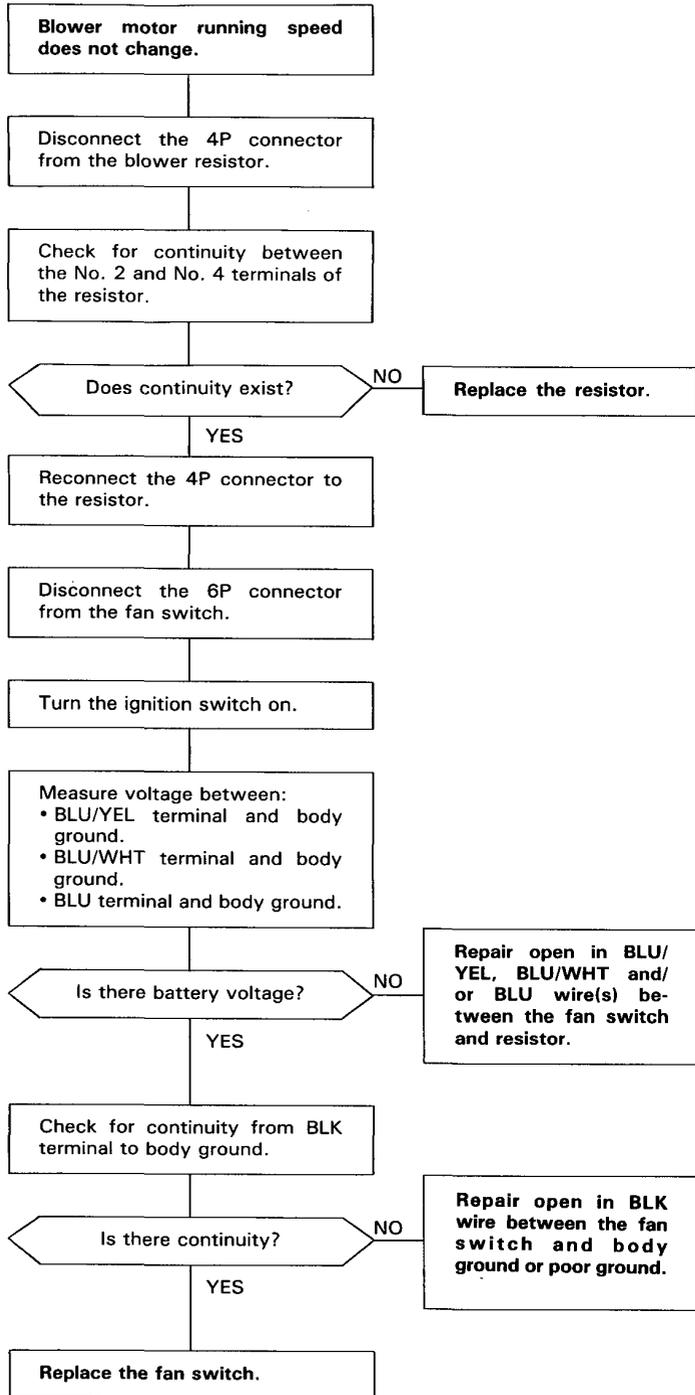
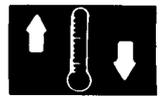
NO
Replace the fan switch.

YES

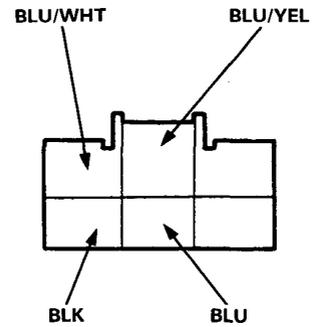
Repair open in BLK wire between the fan switch and body ground or poor ground.



View from wire side



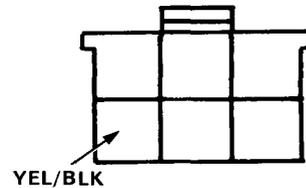
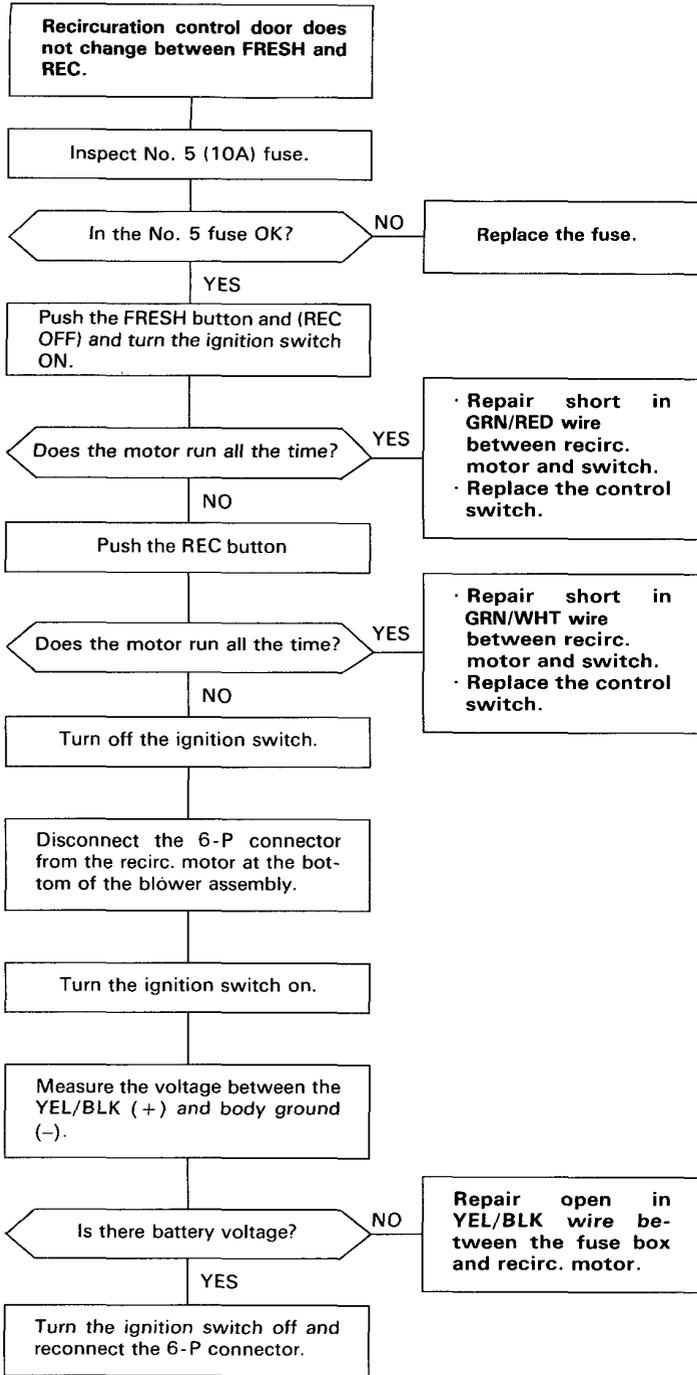
View from terminal side



View from wire side

Troubleshooting

Flow Chart — Recirculation Control



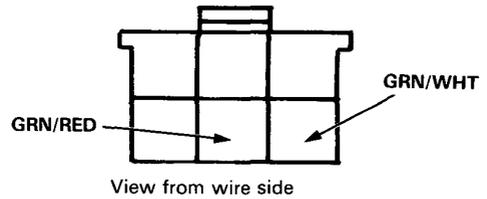
View from wire side

(To page 21-9)



(From page 21-8)

Connect the GRN/WHT and GRN/RED terminals to the body ground using a jumper wire. Turn the ignition switch on.



Does the motor run all the time?

NO

Turn the ignition switch off and check for continuity between the BLK terminal and body ground.

Is there continuity?

NO

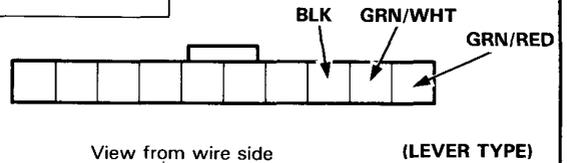
Repair open in BLK wire between the blower and G12 or poor ground.

YES

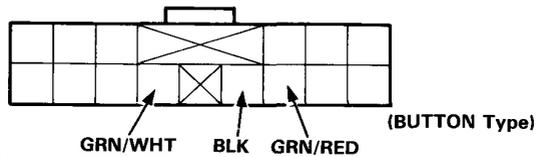
Replace the recirculation control motor.

YES

Turn the ignition switch OFF. Remove the heater control panel and disconnect the 14-P connector.



Connect the GRN/WHT and GRN/RED terminals to BLK terminal using a jumper wire.



Does the motor run all the time?

YES

Replace the heater control panel.

NO

Check for continuity between the BLK terminal and body ground.

Is there continuity?

NO

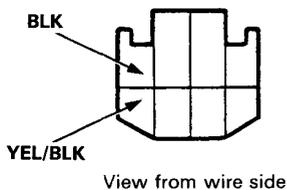
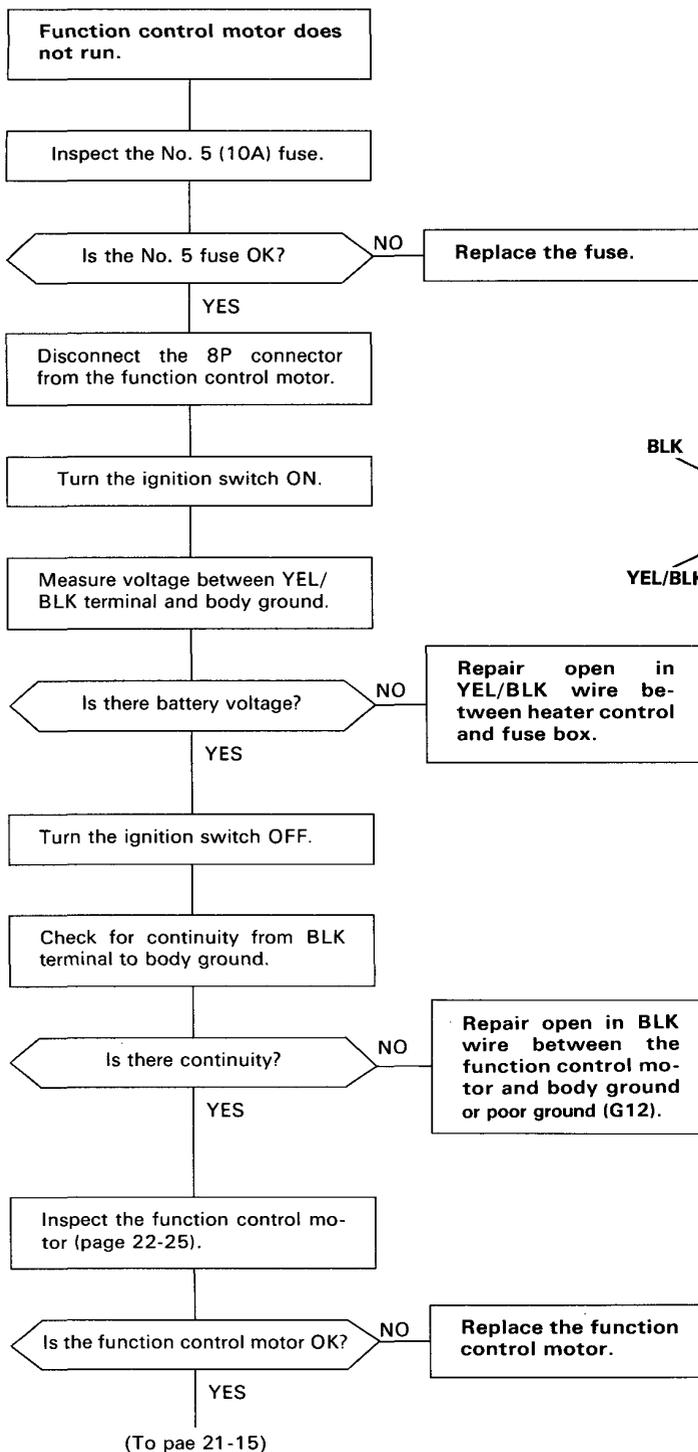
Repair the poor ground or open in BLK wire between the heater control panel and body ground.

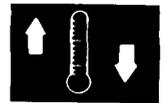
YES

Repair open in GRN/WHT or GRN/RED between the heater control panel and blower.

Troubleshooting

Flow Chart — Function Control





(From page 21-14)

Disconnect the 14P connector from the heater control panel.

Check for continuity at each wire (LT GRN/RED, LT GRN/BLK, LT GRN/WHT, YEL/GRN, BLU/RED, BLU) between the 8P and 14P connectors.

Does continuity exist?

NO

Repair open wire.

YES

Check for continuity from each wire (LT GRN/RED, LT GRN/BLK, LT GRN/WHT, YEL/GRN, BLU/RED, BLU) to body ground.

Is there continuity?

YES

Repair short to body ground in wire.

NO

Check for continuity between BLK terminal to body ground.

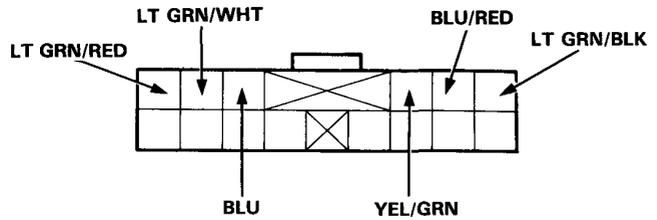
Is there continuity?

NO

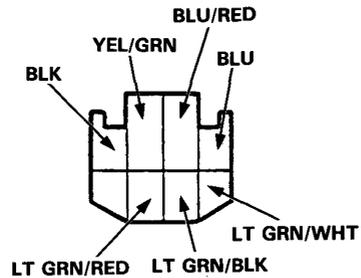
Repair open in BLK wire or poor ground

YES

Replace the heater control panel.

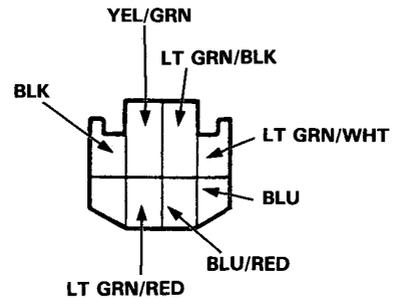


View from wire side



View from wire side <LHD>

NOTE: If any of the wires are shorted to ground, the function control motor will not change positions.



View from wire side <RHD>

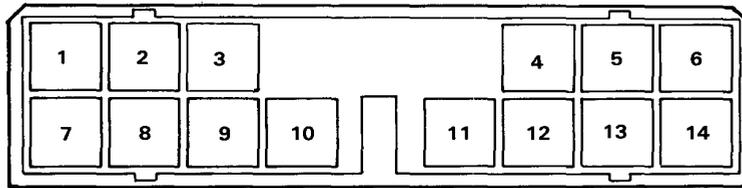
Test

Control Panel Switches (Button Type)

FRESH/REC Switch

Check for continuity between the terminals, as shown in the chart:

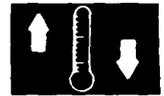
Terminal / Position	12	11	10
REC	○	○	
FRESH		○	○



Function Switch

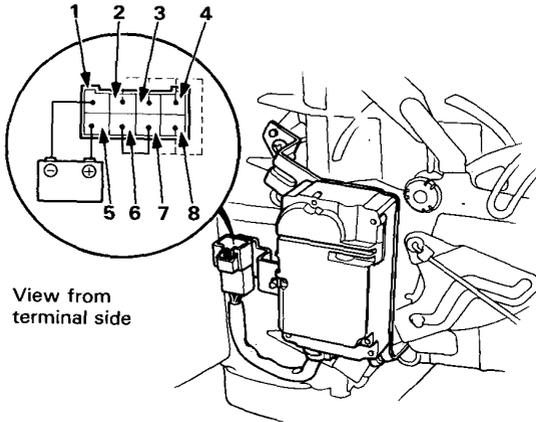
Check for continuity between the terminals, as shown in the chart:

Terminal / Position	1	2	3	4	5	6
VENT	○	○				
HI-LO	○		○			
HEAT	○			○		
H/DEF	○				○	
DEF	○					○



Function Control Motor

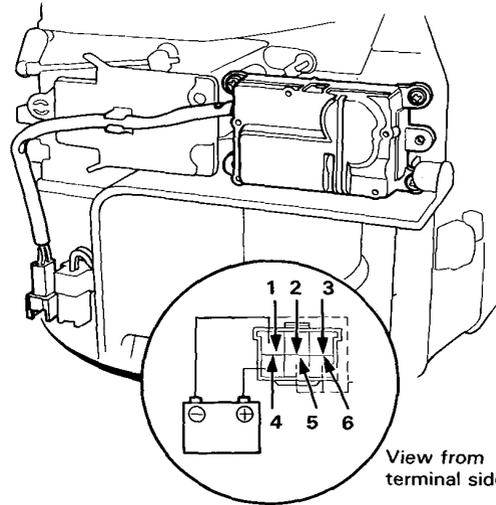
1. Connect the battery positive terminal to the 5 terminal of the function control motor and negative to the 1 terminal.
 2. Using jumper wire short the 6 terminal to the 8, 7, 2, 3 and 4 terminals to follow the order.
- The motor should run each time the short circuit is made.



View from terminal side

Recirculation Control Motor

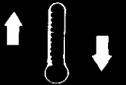
1. Connect the battery positive to the 4 terminal of the recirculation control motor connector and negative to 1 terminal.
 2. Using a jumper wire connect the 1 terminal and 5 or 6 terminal.
- From the recirculation door REC position, the motor should turn with the 1 terminal connected to 4 terminal.
 - From the door FRESH position, the motor should turn with the 1 terminal connected to 5 terminal.
4. The motor automatically stops after half turn with the jumper wire connected.



View from terminal side

Air Conditioner

'88 A/C High Side Adaptor 23-2



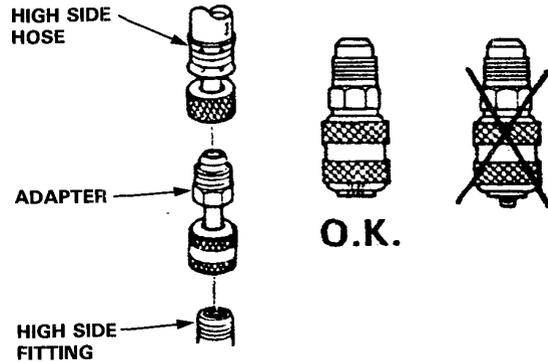
'88 A/C high side adaptor

The A/C high side charging fitting size is being changed on all '88 models.

The fitting's O.D. will be reduced from 7/16" to 3/8" to prevent you from accidentally connecting the low side hose to the high side fitting.

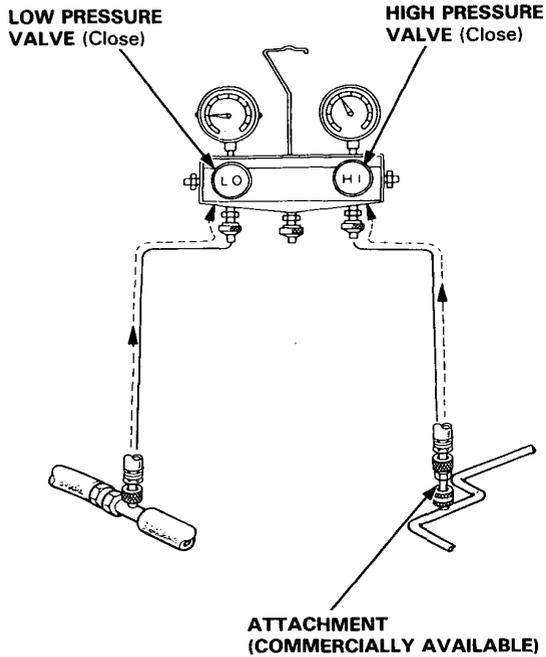
Consequently, you'll need an adaptor for the existing hose on your charging station.

Use the adaptor with the short depressor; there is the possibility that the long depressor may allow the adaptor to leak.



NOTE: Set the attachment to the gauge hose at high pressure side first, then install the gauge set as shown. When disconnecting the gauge hose at high pressure side, remove the attachment from the high pressure charging valve.

Pressure Test



Discharging

