SUZUKI

SH410

SERVICE MANUAL

SUZUKI
Caring for Customers

Part No. 99500M70F00-01E
MAR 1994 (ENG)

FOREWORD

This manual contains procedures for diagnosis, maintenance, adjustments, minor service operations, replacement of components (Service) and for disassembly and assembly of major components (Unit Repair-Overhaul).

Applicable model: SH410

The contents are classified into sections each of which is given a section number as indicated in the Table of Contents on next page. And on the first page of each individual section is an index of that section.
This manual should be kept in a handy place for ready reference of the service work. Strict observance of the so specified items will enable one to obtain the full performance of the vehicle.

When replacing parts or servicing by disassembling, it is recommended to use SUZUKI genuine parts, tools and service materials (lubricant, sealants, etc.) as specified in each description.

All information, illustrations and specifications contained in this literature are based on the latest product information available at the time of publication approval. And used as the main subject of description is the vehicle of standard specifications among others. Therefore, note that illustrations may differ from the vehicle being actually serviced. The right is reserved to make changes at any time without notice.

SUZUKI MOTOR CORPORATION
TECHNICAL DEPARTMENT
AUTOMOBILE SERVICE DIVISION

© COPYRIGHT SUZUKI MOTOR CORPORATION 1992

SECTION 0A

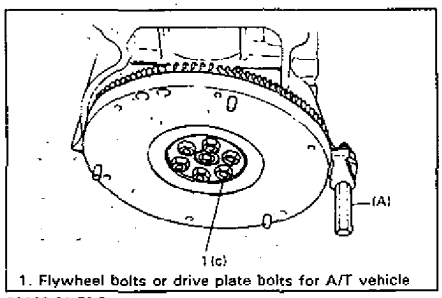
GENERAL INFORMATION

CONTENTS

64B40-0A-1-1

HOW TO USE THIS MANUAL

1. There is a table of contents for the whole manual on the first page of this manual, whereby you can easily find the section that offers the information you need. Also, there is a table of contents on the first page of each section, where the main items in that section are listed.
2. Each section of this manual has its own pagination. It is indicated at the top of each page along with the Section name.
3. The special tool usage and torque specification are given as shown in figure below.



1. Flywheel bolts or drive plate bolts for A/T vehicle

60A20-6A-72-5

6. Install oil pump. Refer to Item "Oil pump" for installation of oil pump.
7. Install flywheel (M/T vehicle) or drive plate (A/T vehicle). Using special tool, lock flywheel or drive plate, and tighten flywheel or drive plate bolts to specification.

Special Tool
(A): 09924-17810

Tightening Torque
(c): 68—72 N·m (6.8—7.2 kg-m, 49.5—52.0 lb-ft)

64B40-0A-1-2

4. A number of abbreviations are used in the text. For their full explanations, refer to **"ABBREVIATIONS USED IN THIS MANUAL"** of this section.
5. The SI, metric and foot-pound systems are used as units in this manual.
6. DIAGNOSIS and CORRECTION are included in each section as necessary.
7. At the end of each section, there are descriptions of SPECIAL TOOLS, REQUIRED SERVICE MATERIALS and RECOMMENDED TORQUE SPECIFICATIONS that should be used for the servicing work described in that section.

70F00-0A-2-1

ABBREVIATIONS USED IN THIS MANUAL

A

ATDC	: After Top Dead Center
API	: American Petroleum Institute
ATF	: Automatic Transmission Fluid
ALR	: Automatic Locking Retractor
AC	: Alternating Current
A/T	: Automatic Transmission
A/C	: Air Conditioning
A/C SV Valve	: Air Conditioning Solenoid Vacuum Valve (A/C Vacuum Switching Valve, A/C VSV)
ABDC	: After Bottom Dead Center
A/F	: Air Fuel Mixture Ratio
A-ELR	: Automatic-Emergency Locking Retractor

B

B+	: Battery Positive Voltage
BTDC	: Before Top Dead Center
BBDC	: Before Bottom Dead Center

C

CMP Sensor	: Camshaft Position Sensor (Crank Angle Sensor, CAS)
CO	: Carbon Monoxide
CPP Switch	: Clutch Pedal Position Switch (Clutch Switch, Clutch Start Switch)
CPU	: Central Processing Unit
CRS	: Child Restraint System

D

DC	: Direct Current
DLC	: Data Link Connector (Assembly Line Diag. Link, ALDL, Serial Data Link, SDL)
DOHC	: Double Over Head Camshaft
DOJ	: Double Offset Joint
DRL	: Daytime Running Light
DTC	: Diagnostic Trouble Code (Diagnostic Code)

E

ECM	: Engine Control Module
ECT Sensor	: Engine Coolant Temperature Sensor (Water Temp. Sensor, WTS)
EGR	: Exhaust Gas Recirculation
EGR Modulator	: EGR Vacuum Modulator
EGR SV Valve	: EGR Solenoid Vacuum Valve (EGR Vacuum Switching Valve, EGR VSV)
EGRT Sensor	: EGR Temperature Sensor (Recirculated Exhaust Gas Temp. Sensor, REGTS)
ELR	: Emergency Locking Retractor
ESA	: Electronic Spark Advance
EVAP	: Evaporative Emission
EVAP Canister	: Evaporative Emission Canister (Chacoal Canister)
EVAP SP Valve	: EVAP Solenoid Purge Valve
EVAP TVV	: EVAP Thermal Vacuum Valve (Bimetal Vacuum Switching Valve, BVSV)

64B40-0A-2-2

F

- FIA Valve : Fast Idle Air Valve (Air Valve)
- 4WD : 4 Wheel Drive

G

- GEN : Generator
- GND : Ground

H

- HC : Hydrocarbons
- HO2S : Heated Oxygen Sensor

I

- IAC Valve : Idle Air Control Valve (Idle Speed Control Solenoid Valve, ISC Solenoid Valve)
- IAT Sensor : Intake Air Temperature Sensor (Air temperature Sensor, ATS)
- IG : Ignition
- ISA Screw : Idle Speed Adjusting Screw

L

- LH : Left Hand

M

- MAF Sensor : Mass Air Flow Sensor (Air Flow Sensor, AFS, Air Flow Meter, AFM)
- MAP Sensor : Manifold Absolute Pressure Sensor (Pressure Sensor, PS)
- Max : Maximum
- MFI : Multiport Fuel Injection (Multipoint Fuel Injection)
- Min : Minimum
- MIL : Malfunction Indicator Lamp (''CHECK ENGINE'' Light)
- M/T : Manual Transmission

N

- NOx : Nitrogen Oxides

O

- OBD : On-Board Diagnostic System (Self-Diagnosis Function)
- OHC : Over Head Camshaft
- O2S : Oxygen Sensor

P

- P/S : Power Steering
- PSP Switch : Power Steering Pressure Switch (P/S Pressure Switch)
- PCV : Positive Crankcase Ventilation

64B40-0A-3-1

R

- RFC Relay : Radiator Fan Control Relay (Radiator Fan Motor Relay)
- RH : Right Hand

S

- SAE : Society of Automotive Engineers
- SFI : Sequential Multiport Fuel Injection
- SOHC : Single Over Head Camshaft
- SV Valve : Solenoid Vacuum Valve

T

- TBI : Throttle Body Fuel Injection (Single-Point Fuel Injection, SPI)
- TCC : Torque Converter Clutch
- TCM : Transmission Control Module (A/T Controller, A/T Control Module)
- TO SV Valve : Throttle Opener Solenoid Vacuum Valve (Throttle Opener Vacuum Switching Valve)
- TP Sensor : Throttle Position Sensor
- TPC Valve : Tank Pressure Control Valve (2-Way Check Valve)
- TVV : Thermal Vacuum Valve (Thermal Vacuum Switching Valve, TVSV, Bimetal Vacuum Switching Valve, BVSV)
- TWC : Three Way Catalytic Converter (Three Way Catalyst)
- 2WD : 2 Wheel Drive

V

- VIN : Vehicle Identification Number
- VSS : Vehicle Speed Sensor

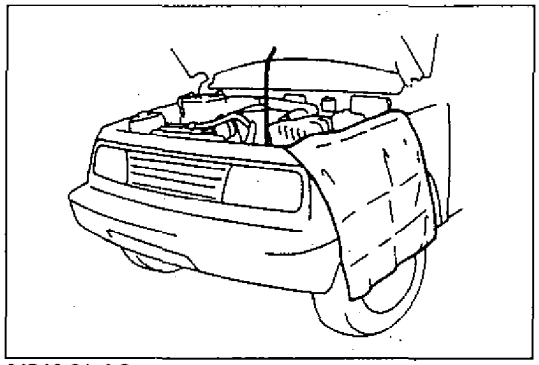
GENERAL PRECAUTIONS

The WARNING and CAUTION below describe some general precautions that you should observe when servicing a vehicle. These general precautions apply to many of the service procedures described in this manual, and they will not necessarily be repeated with each procedure to which they apply.

WARNING:

- **Whenever raising a vehicle for service, be sure to follow the instructions under "VEHICLE LIFTING POINTS" on SECTION 0A.**
- **When it is necessary to do service work with the engine running, make sure that the parking brake is set fully and the transmission is in Neutral (for manual transmission vehicles) or Park (for automatic transmission vehicles), Keep hands, hair, clothing, tools, etc. away from the fan and belts when the engine is running.**
- **When it is necessary to run the engine indoors, make sure that the exhaust gas is forced outdoors.**
- **Do not perform service work in areas where combustible materials can come in contact with a hot exhaust system. When working with toxic or flammable materials (such as gasoline and refrigerant), make sure that the area you work in is well-ventilated.**
- **To avoid getting burned, keep away from hot metal parts such as the radiator, exhaust manifold, tailpipe, muffler, etc.**

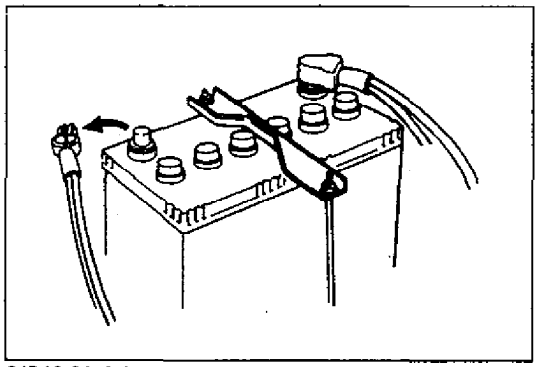
64B40-0A-4-1



64B40-0A-4-3

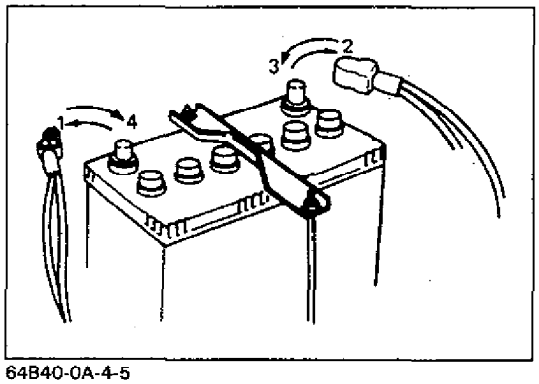
CAUTION:

- **Before starting any service work, cover fenders, seats and any other parts that are likely to get scratched or stained during servicing. Also, be aware that what you wear (e.g, buttons) may cause damage to the vehicle's finish.**



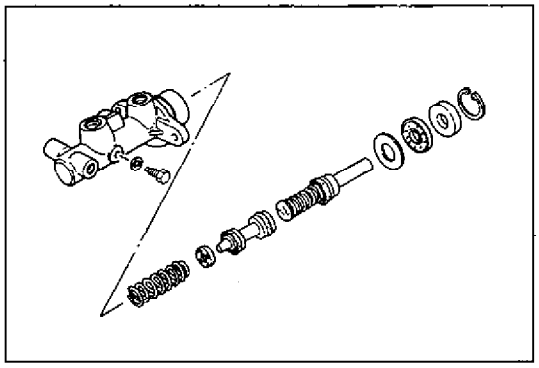
64B40-0A-4-4

- **When performing service to electrical parts that does not require use of battery power, disconnect the negative cable of the battery.**



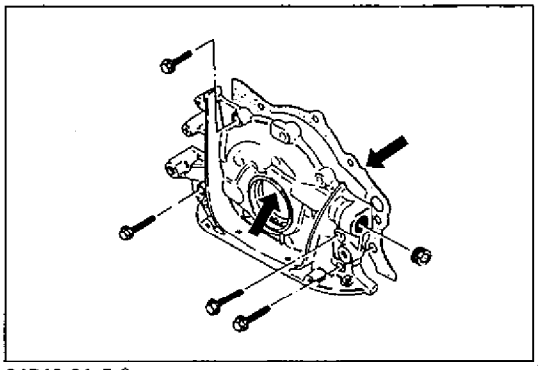
64B40-0A-4-5

- **When removing the battery, be sure to disconnect the negative cable first and then the positive cable. When reconnecting the battery, connect the positive cable first and then the negative cable, and replace the terminal covers.**



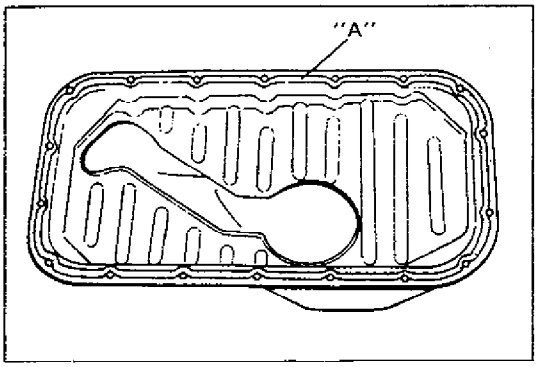
64B40-0A-5-1

- When removing parts that are to be reused, be sure to keep them arranged in an orderly manner so that they may be reinstalled in the proper order and position.



64B40-0A-5-2

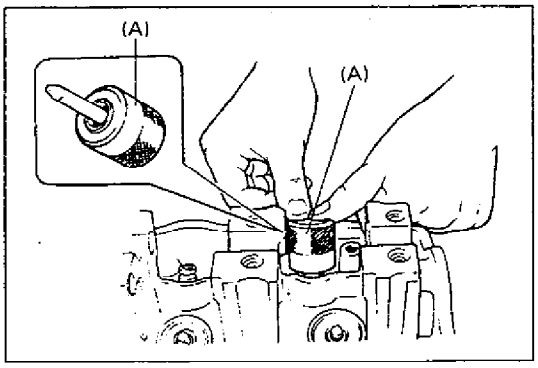
- Whenever you use oil seals, gaskets, packing, O-rings, locking washers, split pins, self-locking nuts, and certain other parts as specified, be sure to use new ones. Also, before installing new gaskets, packing, etc., be sure to remove any residual material from the mating surfaces.



64B40-0A-5-3

- Make sure that all parts used in reassembly are perfectly clean.
- When use of a certain type of lubricant, bond or sealant is specified, be sure to use the specified type.

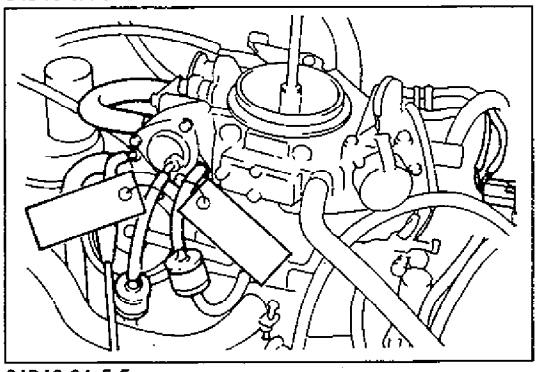
  "A": Sealant 99000-31150



64B40-0A-5-4

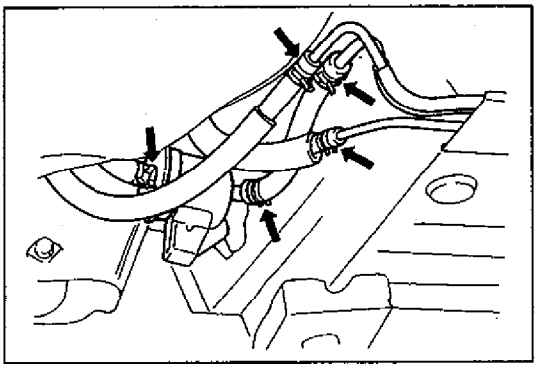
- Be sure to use special tools when instructed.

  Special Tool
  (A): 09917-98210



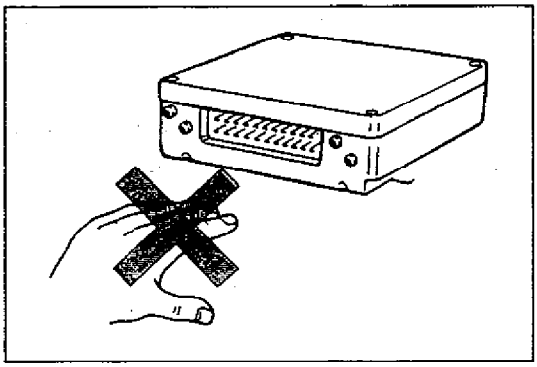
64B40-0A-5-5

- When disconnecting vacuum hoses, attach a tag describing the correct installation positions so that the hoses can be reinstalled correctly.



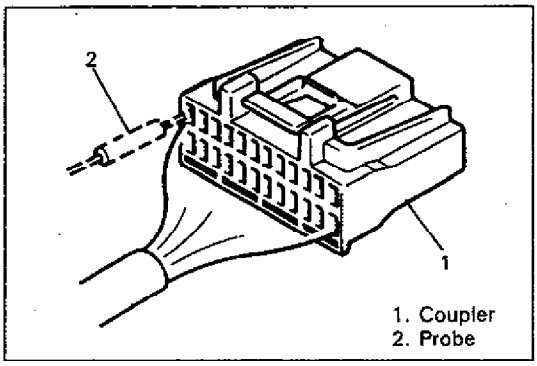
70F00-0A-6-1

- After servicing fuel, oil, coolant, vacuum, exhaust or brake systems, check all lines related to the system for leaks.



70F00-0A-6-2

- Be careful not to touch the electrical terminals of parts which use microcomputers (e.g. engine control module, electronic control unit). The static electricity from your body can damage these parts.



64B40-0A-6-3

- When taking measurements at electrical connectors using a tester probe, be sure to insert the probe from the wire harness side (backside) of the connector.

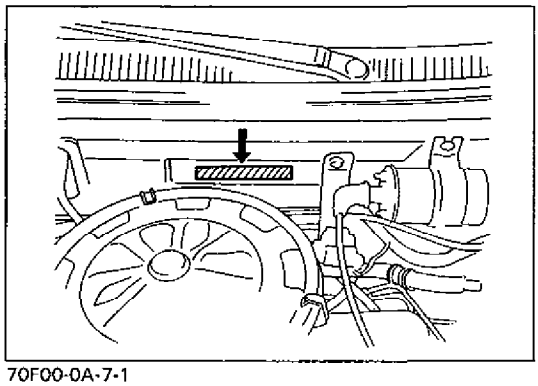
- For vehicles equipped with a catalytic converter, be careful not to let a large amount of unburned gasoline enter the converter or it can be damaged. Conduct a spark jump test only when necessary, make it as short as possible, and do not open the throttle. Conduct engine compression checks within the shortest possible time. Avoid situations which can result in engine misfire (e.g. starting the engine when the fuel tank is nearly empty).
- For vehicles equipped with fuel injection systems, never disconnect the fuel line between the fuel pump and injector without first releasing the fuel pressure, or fuel can be sprayed out under pressure.

64B40-0A-6-4

IDENTIFICATION INFORMATION

BODY NUMBER

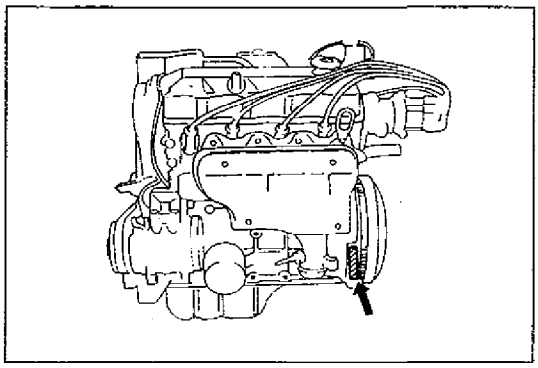
The vehicle identification number is on the dash panel in the engine room.



70F00-0A-7-1

ENGINE IDENTIFICATION NUMBER

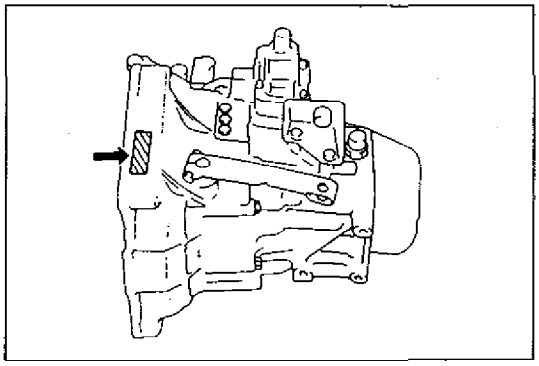
The number is punched on the cylinder block.



70F00-0A-7-2

TRANSMISSION IDENTIFICATION NUMBER

The number is located on the transmission case.



70F00-0A-7-3

METRIC INFORMATION

METRIC FASTENERS

Most of the fasteners used for this vehicle are metric. When replacing any fasteners, it is most important that replacement fasteners be the correct diameter, thread pitch and strength.

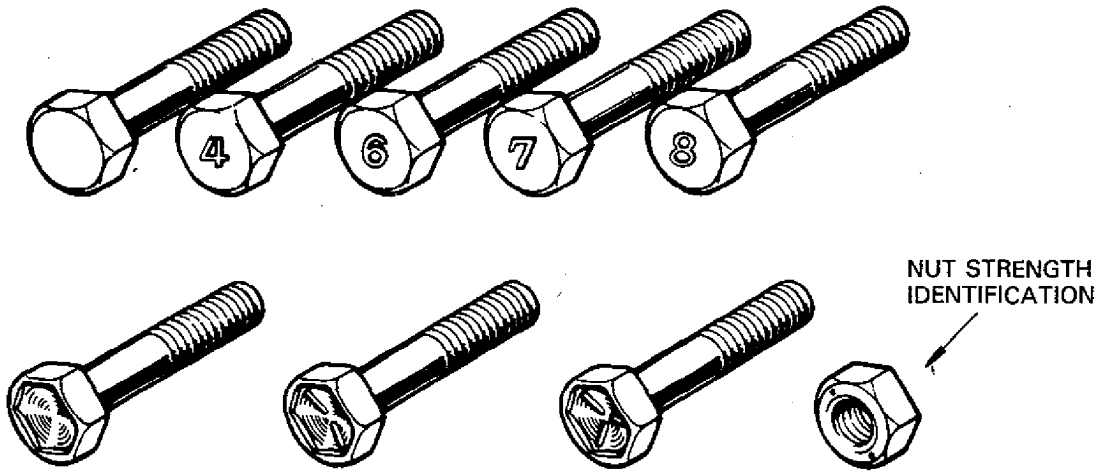
64B40-0A-8-1

FASTENER STRENGTH IDENTIFICATION

Most commonly used metric fastener strength property classes are 4T, 7T and radial line with the class identification embossed on the head of each bolt. Some metric nuts will be marked with punch mark strength identification on the nut face. Figure shows the different strength markings.

When replacing metric fasteners, be careful to use bolts and nuts of the same strength or greater than the original fasteners (the same number marking or higher). It is likewise important to select replacement fasteners of the correct size. Correct replacement bolts and nuts are available through the parts division.

64B40-0A-8-2



METRIC BOLTS—IDENTIFICATION CLASS NUMBERS OR MARKS CORRESPOND TO BOLT STRENGTH—INCREASING NUMBERS REPRESENT INCREASING STRENGTH.

64B40-0A-8-3

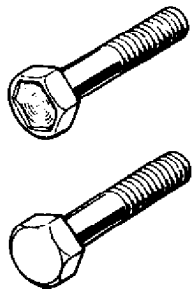
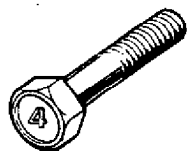
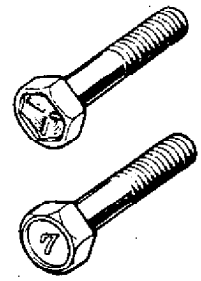
STANDARD TIGHTENING TORQUE

Each fastener should be tightened to the torque specified in each section of this manual. If no description or specification is provided, refer to the following tightening torque chart for the applicable torque for each fastener. When a fastener of greater strength than the original one is used, however, use the torque specified for the original fastener.

NOTE:

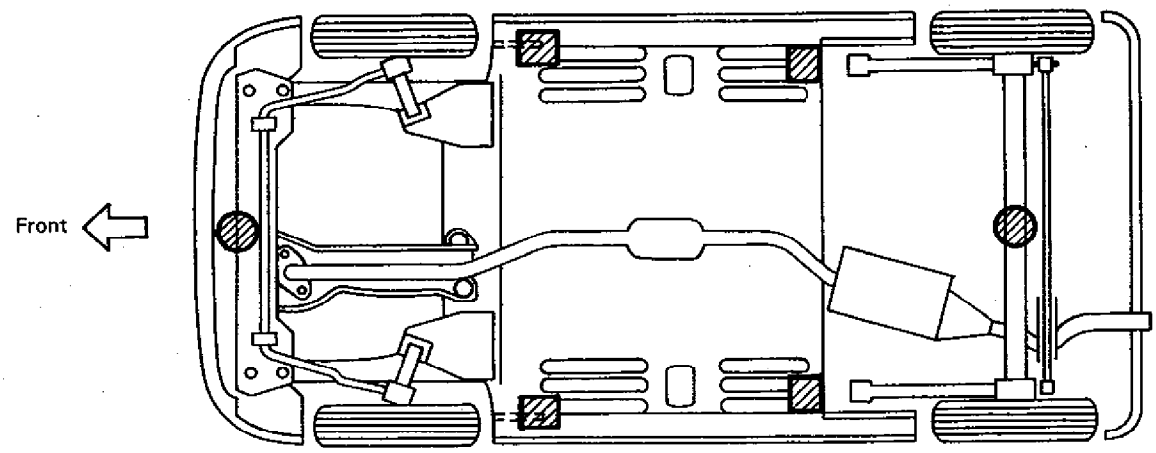
- **For the flanged bolt and nut, add 10% to the tightening torque given in the chart below.**
- **The chart below is applicable only where the fastened parts are made of steel or light alloy.**

Tightening torque chart

STRENGTH / THREAD DIAMETER (mm)	 Conventional bolt		 "4T" bolt		 "7T" bolt	
	N·m	kg-m	lb-ft	N·m	kg-m	lb-ft
4	1–2	0.1–0.2	0.8–1.0	1.5–3.0	0.15–0.30	1.5–2.0
5	2–4	0.2–0.4	1.5–3.0	3–6	0.3–0.6	2.5–4.0
6	4–7	0.4–0.7	3.0–5.0	8–12	0.8–1.2	6.0–8.5
8	10–16	1.0–1.6	7.5–11.5	18–28	1.8–2.8	13.5–20.0
10	22–35	2.2–3.5	16.0–25.0	40–60	4.0–6.0	29.0–43.0
12	35–55	3.5–5.5	25.5–39.5	70–100	7.0–10.0	51.0–72.0
14	50–80	5.0–8.0	36.5–57.5	110–160	11.0–16.0	80.0–115.5
16	80–130	8.0–13.0	58.0–94.0	170–250	17.0–25.0	123.0–180.5
18	130–190	13.0–19.0	94.5–137.0	200–280	20.0–28.0	145.0–202.5

64B40-0A-9-1

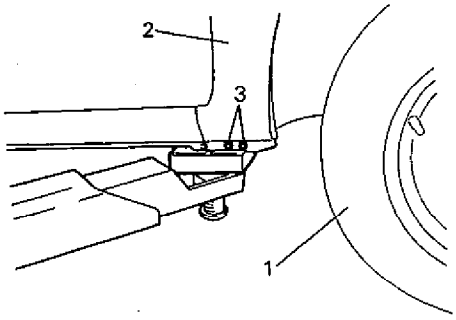
VEHICLE LIFTING POINTS



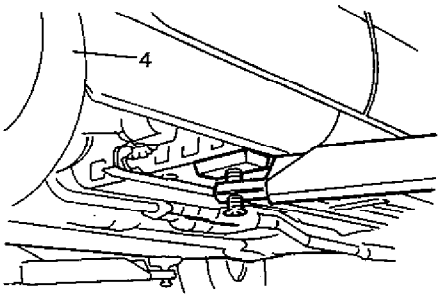
▨ : Support position for frame contact hoist and safety stand
● : Floor jack position

70F00-0A-10-1

When using frame contact hoist:



1. Front right tire
2. Front fender right panel
3. Bolts
4. Rear left tire

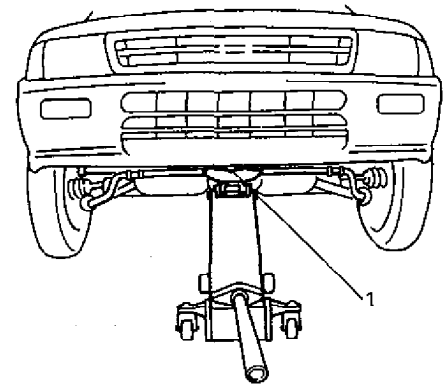


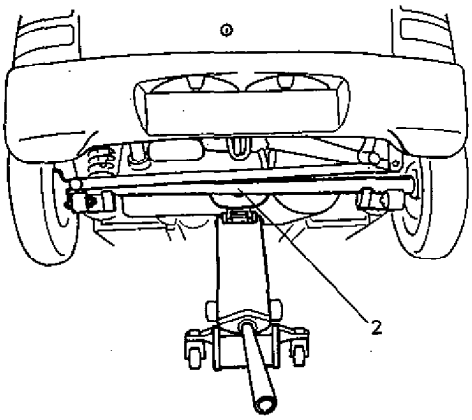
70F00-0A-10-3

WARNING:

- **Before applying hoist to underbody, always take vehicle balance throughout service into consideration. vehicle balance on hoist may change depending of what part to be removed.**
- **Before lifting up the vehicle, check to be sure that end of hoist arm is not in contact with brake pipe, fuel pipe, bracket or any other part.**
- **When using frame contact hoist, apply hoist as shown in figure (right and left at the same position). Lift up the vehicle till 4 tires are a little off the ground and make sure that the car will not fall off by trying to move vehicle body in both ways. Work can be started only after this confirmation.**
- **Make absolutely sure to lock hoist after vehicle is hoisted up.**

When using floor jack:





1. Front crossmember
2. Rear axle

70F00-0A-11-1

In raising front or rear vehicle end off the floor by jacking, be sure to put the jack against the center portion of the front crossmember or rear axle.

To perform service with either front or rear vehicle end jacked up, be sure to place safety stands under body so that body is securely supported. And then check to ensure that body does not slide on safety stands and the vehicle is held stable for safety's sake.

WARNING:

- **Never apply jack against lateral rod, or it may get deformed.**
- **If the vehicle to be jacked up only at the front or rear end, be sure to block the wheels on ground in order to ensure safety.**
  After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on the vehicle raised on jack alone.

SECTION 0B

MAINTENANCE AND LUBRICATION (FUEL INJECTION MODEL)

CONTENTS

70F00-0B-1-1

MAINTENANCE SCHEDULE

NORMAL CONDITION SCHEDULE

Interval: This interval should be judged by odometer reading or months, whichever comes first.	This table includes services as scheduled up to 80,000 km (48,000 miles) mileage. Beyond 80,000 km (48,000 miles), carry out the same services at the same intervals respectively.								
	Km (x 1,000)	10	20	30	40	50	60	70	80
	Miles (x 1,000)	6	12	18	24	30	36	42	48
	Months	6	12	18	24	30	36	42	48
1. ENGINE									
1-1. Water pump belt (tension, damage)		—	—	—	I	—	—	—	R
1-2. Valve lash (clearance)		—	I	—	I	—	I	—	I
1-3. Camshaft timing belt		Inspect at 50,000 km (30,000 miles) and 150,000 km (90,000 miles). Replace every 100,000 km (60,000 miles).							
1-4. Engine oil and Engine oil filter	API Grade SE, SF, SG or SH	R	R	R	R	R	R	R	R
1-5. Cooling system, hoses and connections (leakage, damage)		—	I	—	I	—	I	—	I
1-6. Engine coolant		—	—	—	R	—	—	—	R
1-7. Exhaust pipes and mountings (leakage, damage, tightness)		—	I	—	I	—	I	—	I
1-8. Wiring harness and connections		—	—	—	I	—	—	—	I
2. IGNITION SYSTEM									
2-1. Spark plugs		—	I	—	R	—	I	—	R
2-2. Distributor cap and rotor (crack, wear)		—	—	—	I	—	—	—	I
2-3. Ignition wiring		—	—	—	—	—	—	—	R
3. FUEL SYSTEM									
3-1. Air cleaner filter element	Paved-road	—	—	—	R	—	—	—	R
	Dusty condition	Refer to "Severe Driving Condition "schedule.							
3-2. Fuel tank, cap & lines (Deterioration, leakage, damage)		—	—	—	I	—	—	—	I
		Replace fuel tank cap every 100,000 km (60,000 miles) or 60 months.							
3-3. Fuel filter		—	—	—	—	—	—	—	R
3-4. Engine idle speed		—	I	—	I	—	I	—	I
4. EMISSION CONTROL SYSTEM									
4-1. PCV (Positive Crankcase Ventilation) Valve		Inspect every 100,000 km (60,000 miles) or 60 months.							
4-2. EVAP canister		Inspect every 100,000 km (60,000 miles) or 60 months.							
5. BRAKE									
5-1. Brake discs and pads (thickness, wear, damage) Brake drums and shoes (wear, damage)		I	—	I	—	I	—	I	—
5-2. Brake hoses and pipes (leakage, damage, clamp)		I	—	I	—	I	—	I	—
5-3. Brake fluid		—	I	—	R	—	I	—	R
5-4. Brake lever and cable (damage, stroke, operation)		I	—	I	—	I	—	I	—
5-5. Brake pedal		—	I	—	I	—	I	—	I

70F00-0B-2-1

Interval: This interval should be judged by odometer reading or months, whichever comes first.	This table includes services as scheduled up to 80,000 km (48,000 miles) mileage. Beyond 80,000 km (48,000 miles), carry out the same services at the same intervals respectively.							
	Km (x 1,000)	10	20	30	40	50	60	70	80
	Miles (x 1,000)	6	12	18	24	30	36	42	48
	Months	6	12	18	24	30	36	42	48
6. CHASSIS AND BODY									
6-1. Clutch (For manual transmission) pedal free travel		I	I	I	I	I	I	I	I
6-2. Tires/wheel discs (wear, damage, rotation)		I	I	I	I	I	I	I	I
6-3. Drive axle boots (breakage, damage)		I	I	I	I	I	I	I	I
6-4. Suspension system (Tightness, damage, rattle, breakage)		I	I	I	I	I	I	I	I
6-5. Steering system (tightness, damage, breakage, rattle)		I	I	I	I	I	I	I	I
6-6. Transmission oil (Manual) (leakage, level)		I	R	I	R	I	R	I	R
6-7. Door hinges & Gear shift control lever/shaft		I	I	I	I	I	I	I	I

NOTES:
"R": Replace or change
"I" : Inspect and correct or replace if necessary

70F00-0B-3-1

MAINTENANCE RECOMMENDED UNDER SEVERE DRIVING CONDITIONS

If the vehicle is usually used under the conditions corresponding to any severe condition code given below, it is recommended that applicable maintenance operation be pereformed at the particular interval as given in the chart below.

Severe condition code

A—Repeated short trips
B—Driving on rough and/or muddy roads
C—Driving on dusty roads
D—Driving in extremely cold weather and/or salted roads
E—Repeated short trips in extremely cold weather
F—Leaded fuel use (Carburetor model only)

Severe Condition Code	Maintenance	Maintenance Operation	Maintenance Interval
A — C D E —	Engine oil and oil filter	R	Every 5,000 km (3,000 miles) or 3 months
— — — — — F	Spark plugs	R	Every 10,000 km (6,000 miles) or 6 months
— — C — — —	Air cleaner filter element *1	I	Every 2,500 km (1,500 miles)
		R	Every 40,000 km (24,000 miles) or 24 months
— — — D — —	Fuel tank, cap and lines	I	Every 20,000 km (12,000 miles) or 12 months
A B C — E —	Brake discs and pads Brake drums and shoes	I	Every 10,000 km (6,000 miles) or 6 months
A B — D E —	Brake hoses and pipes	I	Every 10,000 km (6,000 miles) or 6 months
— B C D — —	Wheel bearings	I	Every 20,000 km (12,000 miles) or 12 months

**1 Inspect or replace more frequently if the vehicle is used under dusty conditions.*

NOTES:
"R": Replace or change *"I": Inspect and correct or replace if necessary*

70F00-0B-4-1

MAINTENANCE SERVICE

ENGINE

ITEM 1-1
Water Pump Belt

Inspection

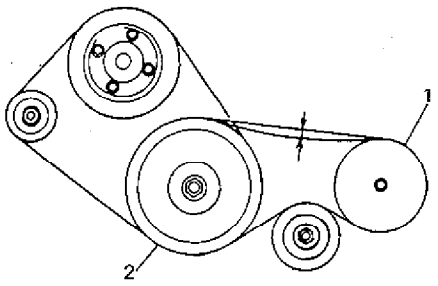
WARNING:
Disconnect negative cable at battery before checking and adjusting belt tension.

1) Inspect belt for cracks, cuts, deformation, wear and cleanliness. Replace, if necessary.
2) Check pump belt for tension and adjust it as necessary. Refer to SECTION 6B for its procedure.

Replacement

Replace belt. Refer to SECTION 6B for replacement procedure of pump belt.

70F00-0B-5-1



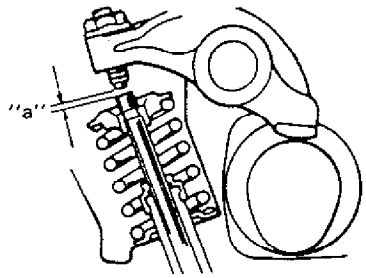
1. A/C compressor pulley 2. Crankshaft pulley

A/C Compressor Drive Belt Inspection (If equipped)

Inspect belt for wear, deterioration and tension.

A/C compressor drive belt tension:
5—10 mm (0.20—0.39 in.) deflection under 10 kg or 22 lb pressure

70F00-0B-5-3



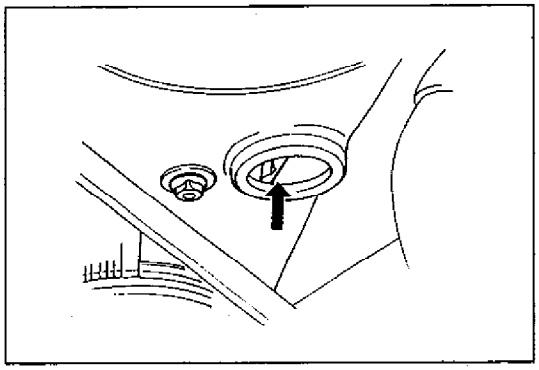
70F00-0B-5-4

ITEM 1-2
Valve Lash Inspection

1) Remove cylinder head cover.
2) Inspect intake and exhaust valve lash and adjust as necessary.
   Refer to SECTION 6A for valve lash inspection and adjustment procedures.

		When cold (Coolant temperature is 15—25°C or 59—77°F)	When hot (Coolant temperature is 60—68°C or 140—154°F)
Valve lash (gap "a") specification	Intake	0.13—0.17 mm (0.0051-0.0067 in)	0.23—0.27 mm (0.009-0.0106 in)
	Exhaust	0.15—0.19 mm (0.0059—0.0075 in)	0.25—0.29 mm (0.0098—0.0114 in)

3) Install cylinder head cover and tighten bolts to specification.



70F00-0B-6-1

ITEM 1-3
Camshaft Timing Belt

Inspection

1) Remove check hole plug from timing belt outside cover.
2) Inspect timing belt for wear, crack, deterioration, oil stains and fluid stains using a light and mirror as required. Replace it as necessary.
3) Install plug to timing belt outside cover.

Replacement

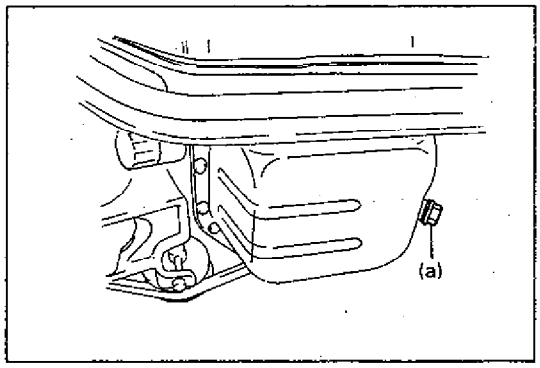
Replace timing belt with new one referring to SECTION 6A.

70F00-0B-6-2

ITEM 1-4
Engine Oil and Filter Change

Before draining engine oil, check engine for oil leakage. If any evidence of leakage is found, make sure to correct defective part before proceeding to the following work.

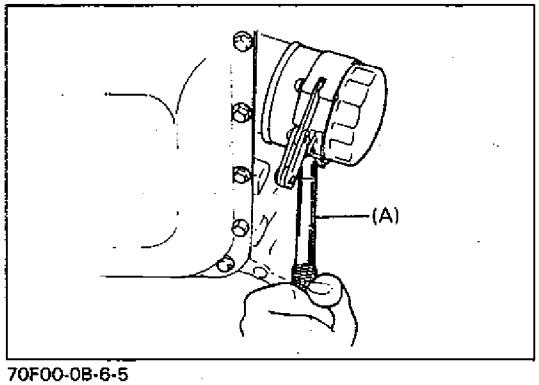
70F00-0B-6-3



70F00-0B-6-4

1) Drain engine oil by removing drain plug.
2) After draining oil, wipe drain plug clean. Reinstall drain plug, and tighten it securely as specified below.

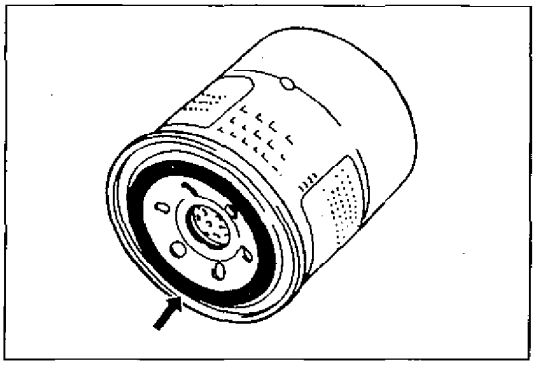
Tightening Torque
(a): 30—40 N·m (3.0—4.0 kg-m, 22.0—28.5 lb-ft)



70F00-0B-6-5

3) Loosen oil filter by using oil filter wrench (special tool).

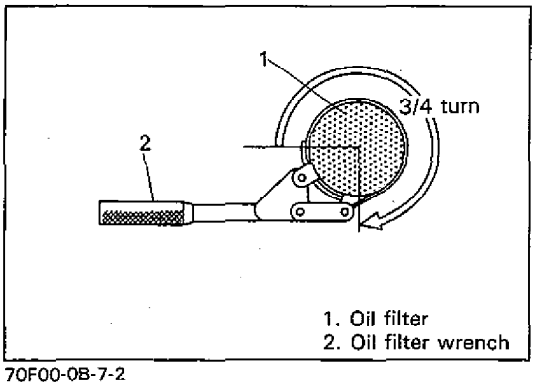
Special Tool
(A): 09915-47310



70F00-0B-7-1

4) Apply engine oil to oil filter "O" ring.
5) Screw new filter on oil filter stand by hand until filter "O" ring contacts mounting surface.

CAUTION:
To tighten oil filter properly, it is important to accurately identify the position at which filter "O" ring first contacts mounting surface.



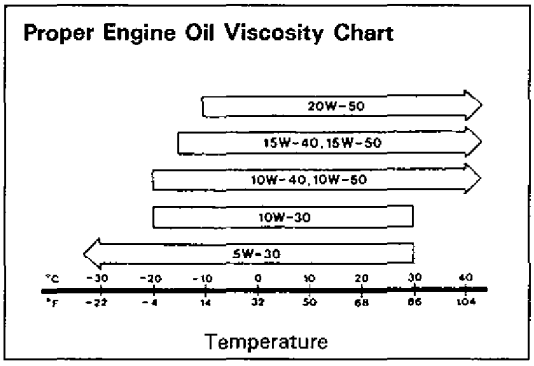
1. Oil filter
2. Oil filter wrench

70F00-0B-7-2

6) Tighten filter 3/4 turn from the point of contact with mounting surface using an oil filter wrench.

Special Tool
(A): 09915-47310

Tightening Torque
(a): 12—16 N·m (1.2—1.6 kg-m, 8.5—11.5 lb-ft)



70F00-0B-7-3

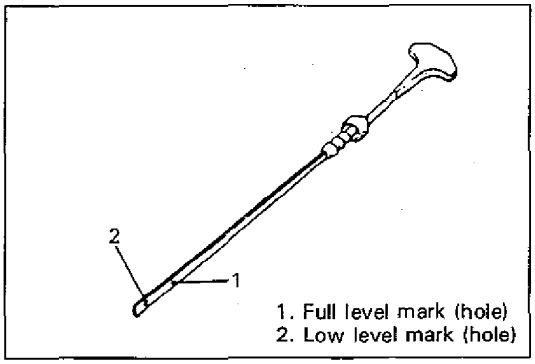
7) Replenish oil until oil level is brought to FULL level mark on dipstick. (about 4.2 liters or 8.9/7.4 US/Imp pt.). Filler inlet is atop the cylinder head cover.
It is recommended to use engine oil of SE, SF, SG or SH class.
Select the appropriate oil viscosity according to the chart at the left.

Engine oil capacity

Oil pan capacity	about 3.1 liters (6.5/5.5 US/Imp pt.)
Oil filter capacity	about 0.2 liters (0.4/0.3 US/Imp pt.)
Others	about 0.3 liters (0.6/0.5 US/Imp pt.)
Total	about 3.6 liters (7.5/6.3 US/Imp pt.)

NOTE:
Engine oil capacity is specified as left table.
However, note that amount of oil required when actually changing oil may somewhat differ from data in left table depending on various conditions (temperature, viscosity, etc.).

70F00-0B-7-4



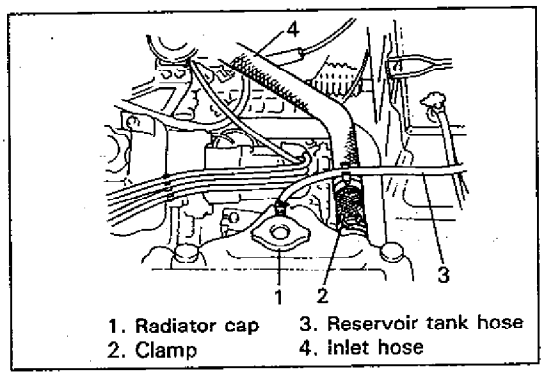
1. Full level mark (hole)
2. Low level mark (hole)

70F00-0B-7-5

8) Start engine and run it for three minutes. Stop it and wait another three minutes before checking oil level. Add oil, as necessary, to bring oil level to FULL level mark on dipstick.

NOTE:
Steps 1)—7) outlined above must be performed with ENGINE NOT RUNNING. For step 8), be sure to have adequate ventilation while engine is running.

9) Check oil filter and drain plug for oil leakage.



1. Radiator cap
2. Clamp
3. Reservoir tank hose
4. Inlet hose

70F00-0B-8-1

ITEM 1-5
Cooling System, Hoses and Connections Inspection

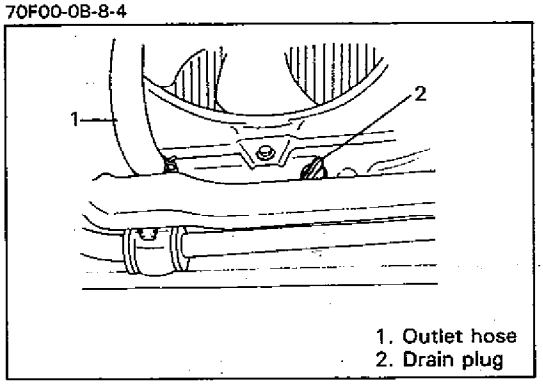
1) Visually inspect cooling system hoses for any evidence of leakage and cracks. Examine them for damage, and check connection clamps for tightness.
2) Replace all hoses which show evidence of leakage, cracks or other damage. Replace all clamps which cannot maintain proper tightness.
3) Clean frontal area of radiator core.
4) Test system and radiator cap for proper pressure holding capacity, 0.9 kg/cm² (12.8 psi)
   If replacement cap is needed, use a cap designed for cooling system of this vehicle.
5) Check coolant level and concentration.
   Add if necessary.
   Refer to COOLANT LEVEL of SECTION 6B for procedure of level check.

70F00-0B-8-2

ITEM 1-6
Engine Coolant Change

WARNING:
To help avoid danger of being burned, do not remove radiator cap while engine and radiator are still hot. Scalding fluid and steam can be blown out under pressure if cap is taken off too soon.

70F00-0B-8-4

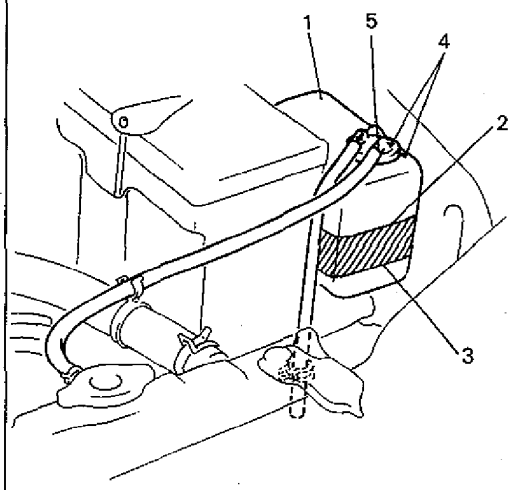


1. Outlet hose
2. Drain plug

70F00-0B-8-5

1) Remove radiator cap when engine is cool.
2) Loosen radiator drain plug to drain coolant.
3) Remove reservoir tank, and drain.
4) Tighten plug securely. Also reinstall reservoir tank.
5) Fill radiator with specified amount of coolant, and run engine for 2 or 3 minutes at idle. This drives out any air which may still be trapped within cooling system. STOP ENGINE. Add coolant as necessary until coolant level reaches filler throat of radiator. Reinstall radiator cap.

NOTE:
When installing reservoir tank cap, align arrow marks on tank and cap.



1. Reservoir tank
2. FULL level mark
3. LOW level mark
4. Arrow mark
5. Long pipe

70F00-0B-9-1

6) Add coolant to reservoir tank so that its level aligns with Full mark. Then, reinstall cap aligning arrow marks on tank and cap.

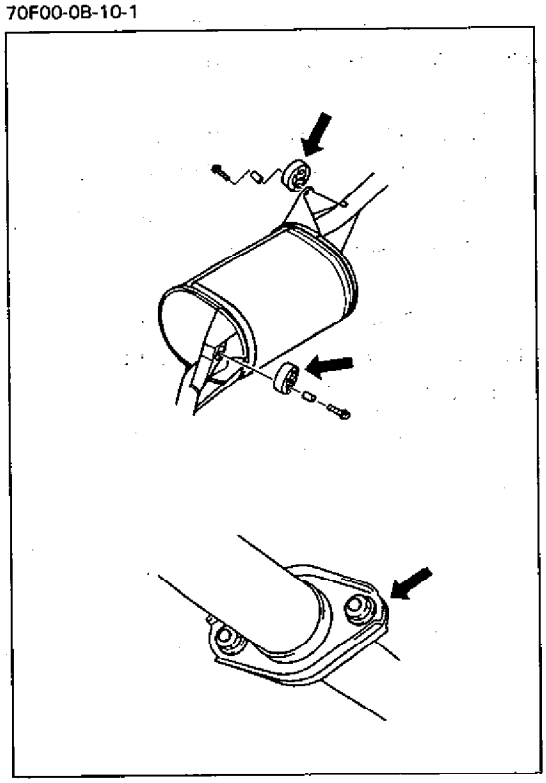
CAUTION:
When changing engine coolant, use mixture of 50% water and 50% ethylene-glycol base coolant (Anti-Freeze/Anti-corrosion coolant) for the market where ambient temperature falls lower than −16°C (3°F) in winter and mixture of 70% water and 30% ethylene-glycol base coolant for the market where ambient temperature doesn't fall lower than −16°C (3°F).
Even in a market where no freezing temperature is anticipated, mixture of 70% water and 30% ethylne-glycol base coolant should be used for the purpose of corrosion protection and lubrication.

Check to make sure that radiator-to-reservoir tank hose is connected to long pipe of tank cap. Connection to wrong pipe will cause engine overheating.

ITEM 1-7
Exhaust Pipes and Mountings Inspection

WARNING:
To avoid danger of being burned, do not touch exhaust system when it is still hot.
Any service on exhaust system should be performed when it is cool.

70F00-0B-10-1



70F00-0B-10-2

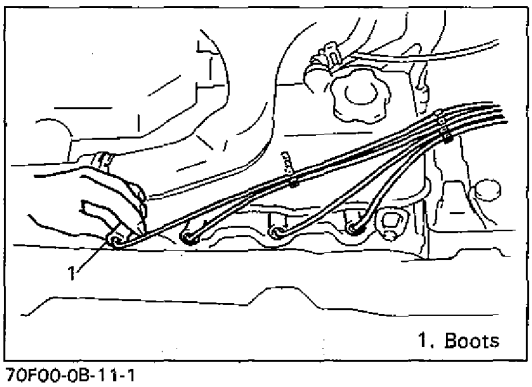
When carrying out periodic maintenance or vehicle is raised for other service, check exhaust system as follows:

- Check rubber mountings for damage and deterioration.
- Check muffler and pipe for leakage, loose connections, dents, and damages.
  If bolts or nuts are loose, tighten them to specification. Refer to SECTION 6K for torque specification of bolts and nuts.
- Check nearby body areas for damaged, missing or mispositioned parts, open seams, holes, loose connections or other defects which could permit exhaust fumes to seep into vehicle.
- Make sure that exhaust system components have enough clearance from underbody to avoid overheating and possible damage to floor carpet.
- Any defects should be fixed at once.

ITEM 1-8
Wiring Harness and Connections Inspection

1) Visually inspect all wires in engine compartment for evidence of breakage.
   Inspect condition of insulation (cracks). All clips and clamps should have solid connections to wires.
2) Replace any wires in a deteriorated or otherwise defective condition.

70F00-0B-10-4



1. Boots

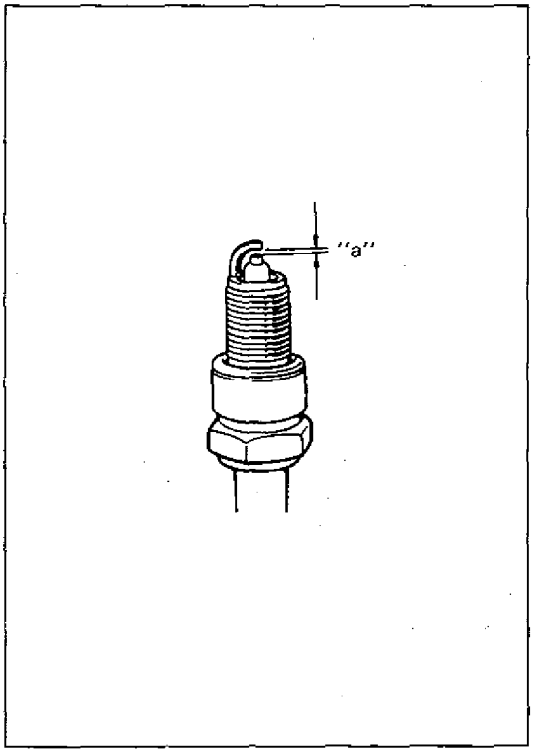
70F00-0B-11-1

IGNITION SYSTEM

ITEM 2-1

Spark Plugs Inspection and Replacement

1) Dust off cylinder head around spark plugs.
2) Disconnect high-tension cords at spark plugs.
   To avoid inside damage of cords, DO NOT pull on cords for disconnection. Pull on boots.



70F00-0B-11-2

3) Using a spark plug wrench, remove spark plugs.
4) Inspect them for electrode wear, carbon deposits and insulator damage.

   Air gap "a": 0.7—0.8 mm (0.028—0.031 in.)

   If any abnormality is found, adjust air gap, clean with spark plug cleaner or replace them with specified new plugs.

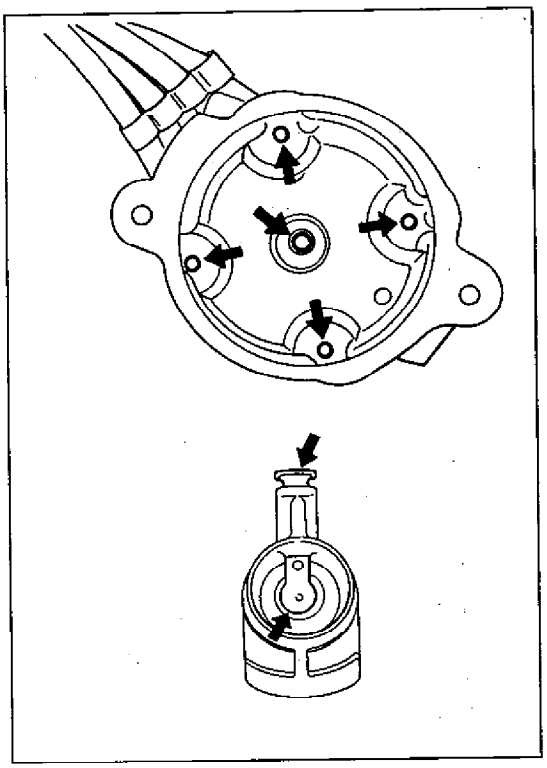
   Spark plug type: NGK BP5EY or BPR5EY

   There are two types of spark plugs for this vehicle, one without R included in its code and the other with R. Which one is used depends on countries. Look at the label attached to the vehicle. If originally equipped plug was with R included in its code, replacement plug should have R in its code, too.

5) Install spark plugs. Tighten plugs to specification.

   Tightening Torque for spark plug:
   20—30 N·m (2.0—3.0 kg-m, 14.5—21.5 lb-ft)

6) Connect high-tension cords to spark plugs. DO NOT push cords for connection. Push boots.



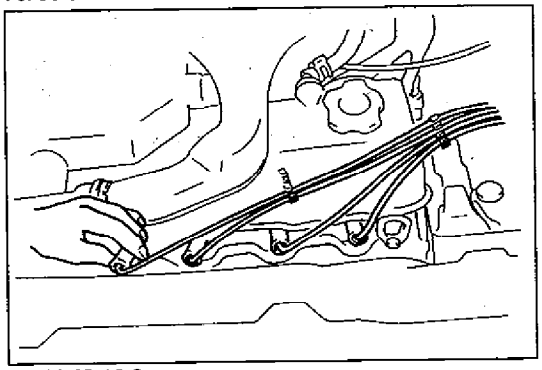
70F00-0B-12-1

ITEM 2-2

Distributor Cap and Rotor Inspection

1) Inspect distributor cap and rubber caps for cracks.
2) Inspect center electrode and terminals for wear.
3) Inspect rotor for cracks, and its electrode for wear.
4) Repair or replace as necessary any component which is found to be in malcondition as described above.

NOTE:
Dust and stains found within distributor can be cleaned by using a dry, soft cloth.



70F00-0B-12-3

ITEM 2-3

Ignition Wiring (High-Tension Cord) Replacement

1) Disconnect high-tension cords from spark plugs, ignition coil and distributor.
2) Connect new high-tension cords and clamp them securely. DO NOT push cords for connection. Push boots. Refer to SECTION 6F for high-tension cords distribution.

FUEL SYSTEM

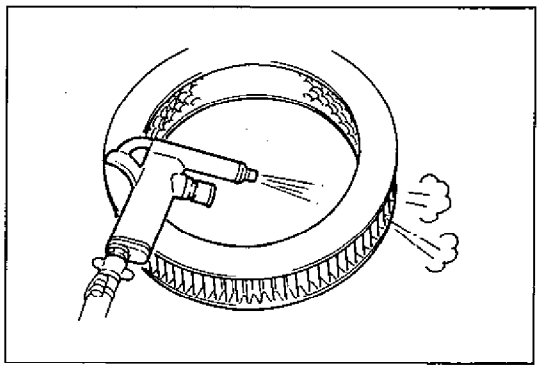
ITEM 3-1

Air Cleaner Element Replacement

NOTE:
Replace more often under dusty conditions. Ask your dealer for proper replacement interval for your driving conditions.

Replace air cleaner element with new one according to procedure described in SECTION 6A.

64B40-0B-9-1

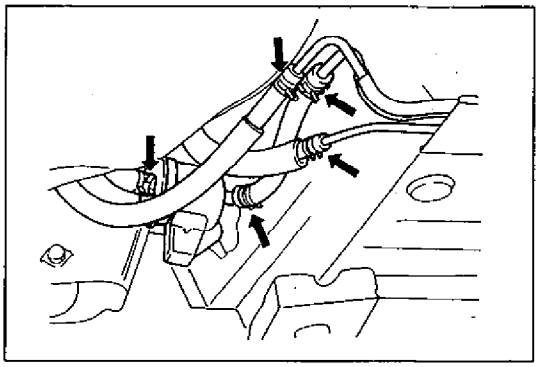


70F00-0B-13-2

Air Cleaner Element Inspection

1) Visually check that air cleaner element is not excessively dirty, damaged or oily.
2) Clean element with compressed air from inside of element.

NOTE:
If vehicle is used in dusty area, clean every 2,500 km (1,500 miles) or more frequently.

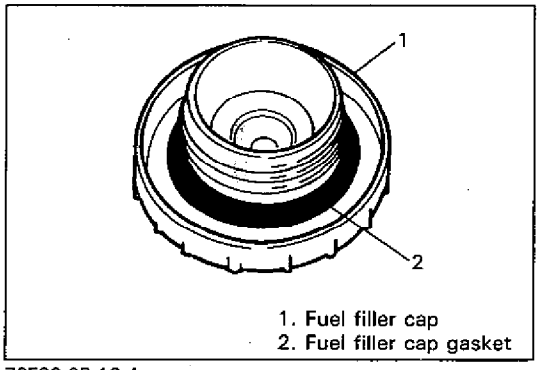


70F00-0B-13-3

ITEM 3-2

Fuel Tank, Cap Gasket and Fuel Lines Inspection

- Check fuel tank, fuel filler cap and fuel lines for loose connection, deterioration or damage which could cause leakage.
  Make sure all clamps are secure.
- Replace any damaged or deteriorated parts.
  There should be no sign of fuel leakage or moisture at any fuel connection.



1. Fuel filler cap
2. Fuel filler cap gasket

70F00-0B-13-4

- Check fuel filler cap gasket for an even filler neck imprint or any damage.

Fuel Tank Cap Replacement

Replace it with new one.

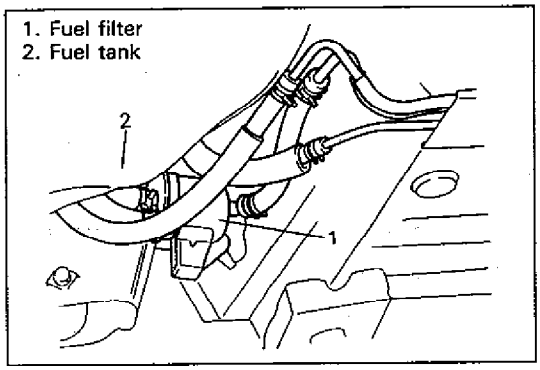
CAUTION:
Be sure to use a new specified cap. Failure to use correct cap can result in critical malfunction of system.

ITEM 3-3

Fuel Filter Replacement

> **WARNING:**
> **This work must be performed in a well ventilated area and away from any open flames (such as gas hot water heaters).**

70F00-0B-14-1



70F00-0B-14-2

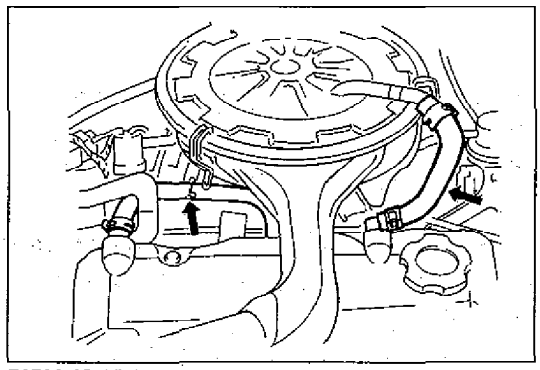
Fuel filter is located in front of fuel tank, inside the left-hand side of body.
Replace fuel filter with new one periodically, referring to SECTION 6C for removal and installation.

ITEM 3-4

Engine Idle Speed Inspection

Check idle speed, and adjust it as necessary.
Refer to ON-VEHICLE SERVICE of SECTION 6E for procedures to check and adjust idle speed.

70F00-0B-14-3



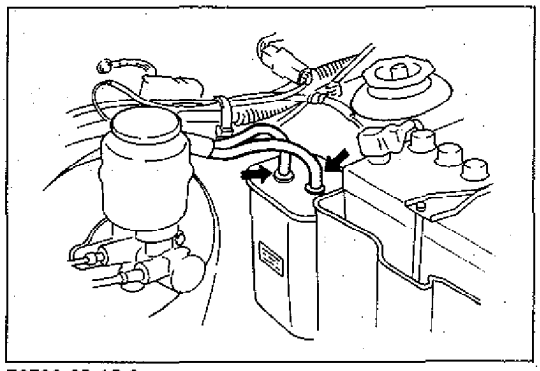
70F00-0B-15-1

EMISSION CONTROL SYSTEM

ITEM 4-1

PCV (Positive Crankcase Ventilation) Valve Inspection

Check breather hose and PCV hose for leaks, cracks or clog, and PCV valve for stick or clog. Refer to ON-VEHICLE SERVICE of SECTION 6J for PCV valve checking procedure.

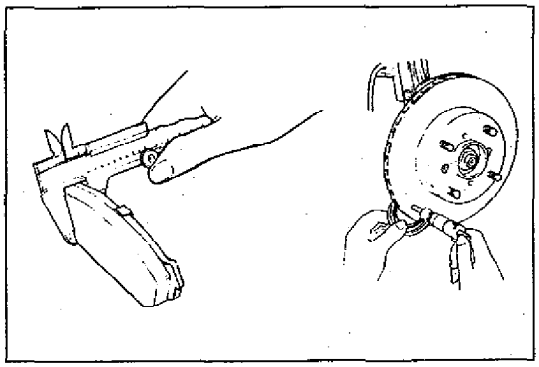


70F00-0B-15-2

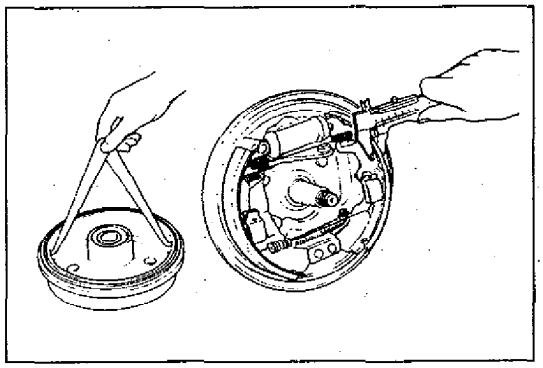
ITEM 4-2

EVAP Canister Inspection

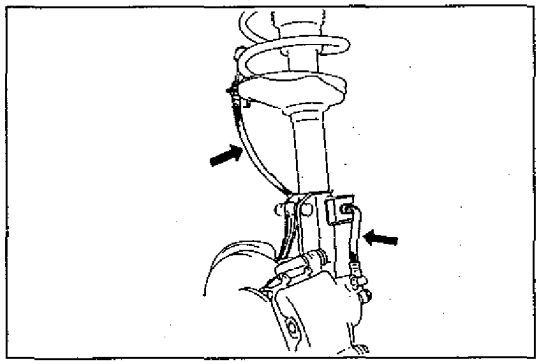
- Inspect each hose for pinholes, cracks or damage. Also check to ensure that each joint is securely connected. Any part found defective must be corrected or replaced.
- Check EVAP canister. Refer to ON-VEHICLE SERVICE of SECTION 6E for procedures to check EVAP canister.



70F00-0B-16-1



70F00-0B-16-2



70F00-0B-16-3

BRAKE

ITEM 5-1

Brake Discs, Pads, Brake Drums and Shoes Inspection

Brake discs and pads

1) Remove wheel and caliper but don't disconnect brake hose from caliper.
2) Check front disc brake pads and discs for excessive wear, damage and deflection. Replace parts as necessary. For details, refer to SECTION 5.
   Be sure to torque caliper pin bolts to specification.

Brake drums and shoes

1) Remove wheel and brake drum.
2) Check rear brake drums and brake linings for excessive wear and damage, while wheels and drums are removed. At the same time, check wheel cylinders for leaks. Replace these parts as necessary.
   For details, refer to SECTION 5.

ITEM 5-2

Brake Hoses and Pipes Inspection

Check brake hoses and pipes for proper hookup, leaks, cracks, chafing and other damage.
Replace any of these parts as necessary.

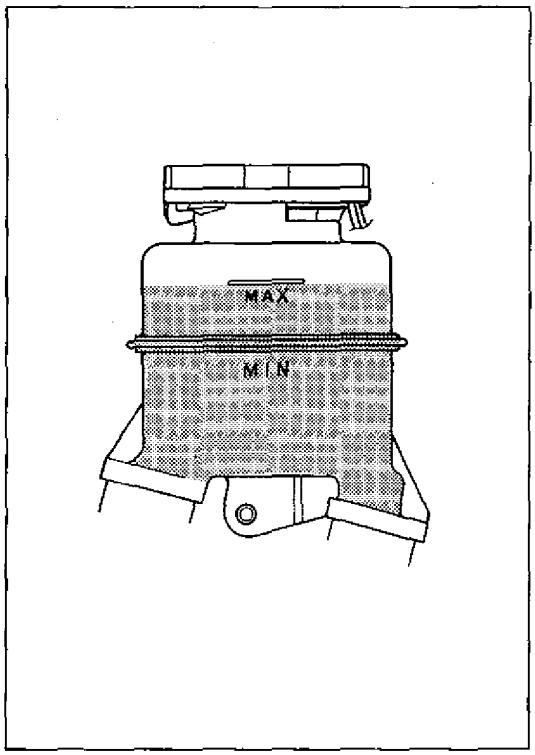
CAUTION:
After replacing any brake pipe or hose, be sure to carry out air purge operation.

ITEM 5-3

Brake Fluid Inspection and Change

Inspection

1) Check around master cylinder and reservoir for fluid leakage.
   If found leaky, correct.



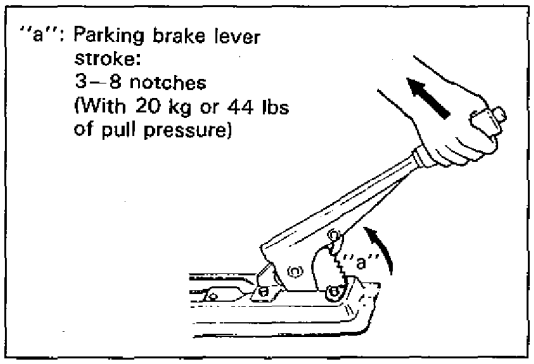
70F00-0B-17-1

2) Check fluid level.
If fluid level is lower than the minimum level of reservoir, refilling is necessary. Fill reservoir with specified brake fluid indicated on reservoir tank cap.
For the details, refer to ON-VEHICLE SERVICE of SECTION 5.

CAUTION:
Since brake system of this vehicle is factory-filled with glycol-base brake fluid, do not use or mix different type of fluid when refilling system; otherwise serious damage will occur. Do not use old or used brake fluid, or one taken from unsealed container.

Change
Change brake fluid as follows.
Drain existing fluid from brake system completely, fill system with above recommended fluid and carry out air purge operation.
For air purging procedure, refer to SECTION 5.

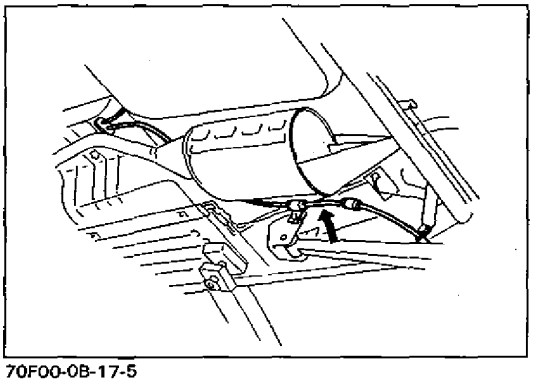
60A50-0B-22-4S



70F00-0B-17-4

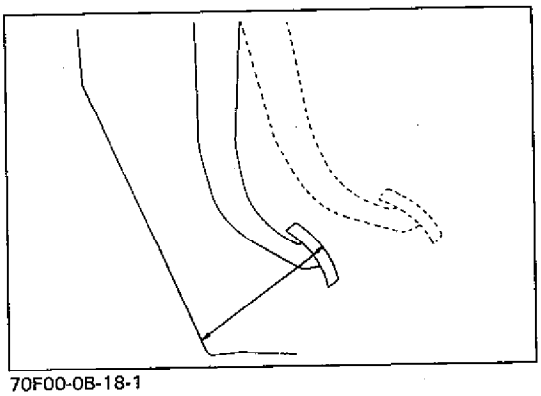
ITEM 5-4

Brake Lever and Cable Inspection
Parking brake lever
1) Check tooth tip of each notch for damage or wear. If any damage or wear is found, replace parking lever.
2) Check parking brake lever for proper operation and stroke, and adjust it if necessary.
For checking and adjusting procedures, refer to PARKING BRAKE INSPECTION AND ADJUSTMENT of SECTION 5.



70F00-0B-17-5

Parking brake cable
Inspect brake cable for damage and smooth movement. Replace cable if it is in deteriorated condition.


70F00-0B-18-1

ITEM 5-5

Brake Pedal Inspection

Check brake pedal travel.

Brake pedal-to-wall clearance: Over 90 mm (3.55 in.)

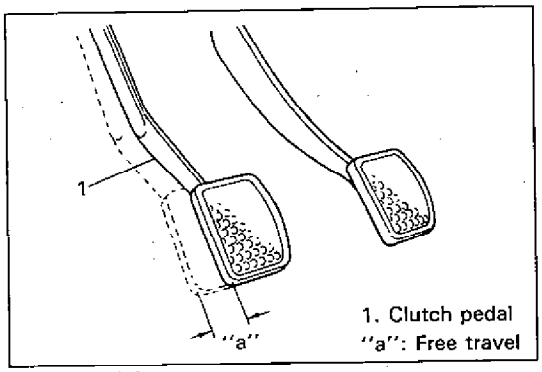
For checking procedure, refer to PEDAL TRAVEL CHECK of SECTION 5.

CHASSIS AND BODY

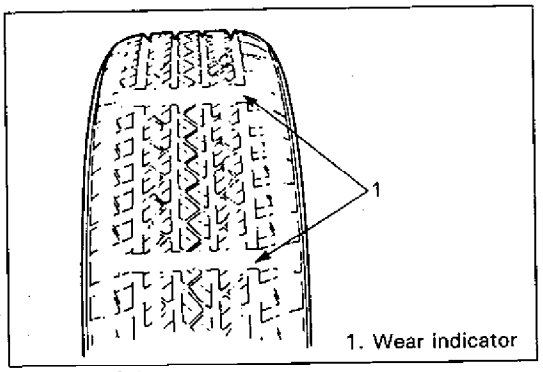
ITEM 6-1

Clutch Pedal Free Travel Inspection

Check clutch pedal free travel. Refer to SECTION 7C for procedure to check and adjust it.



70F00-0B-18-3



70F00-0B-18-4

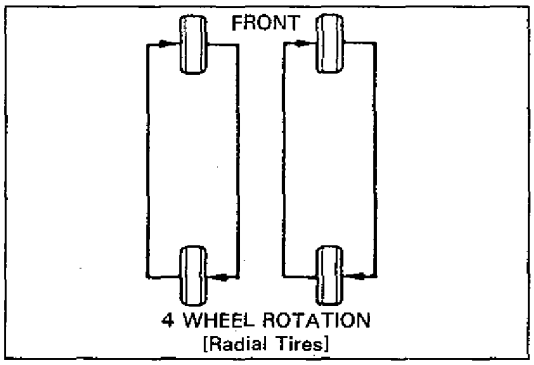
ITEM 6-2

Tire/Wheel Disc Inspection and Tire Rotation

1) Check tires for uneven or excessive wear, or damage. If defective, replace.
   Refer to SECTION 3 for details.
2) Inspect each wheel disc for dents, distortion and cracks. A disc in badly damaged condition must be replaced.
3) Check inflating pressure of each tire and adjust pressure to specification as necessary.
   Refer to SECTION 3F for details.

NOTE:

- **Tire inflation pressure should be checked when tires are cool.**
- **Specified tire inflation pressure should be found on tire placard or in owner's manual which came with the vehicle.**



70F00-0B-19-1

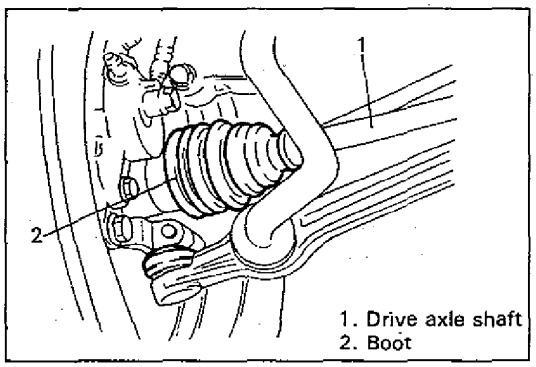
3) Rotate tires.
For details, refer to SECTION 3F.

ITEM 6-2'

Wheel Bearing Inspection

1) Check front wheel bearing for wear, damage, abnormal noise or rattles. For details, refer to FRONT SUSPENSION INSPECTION of SECTION 3D.
2) Check rear wheel bearing for wear, damage abnormal noise or rattle. For details, refer to WHEEL BEARING INSPECTION of SECTION 3E.

70F00-0B-19-2

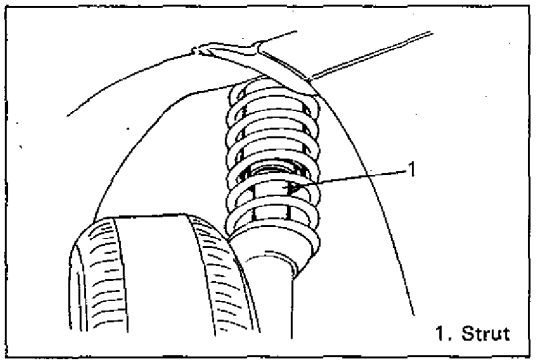


70F00-0B-19-3

ITEM 6-3

Drive Axle Boot Inspection

Check drive axle boots (wheel side and differential side) for leakage, detachment, tear or any other damage.
Replace boot as necessary.

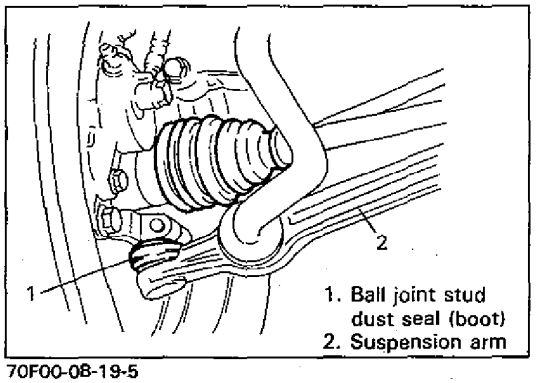


70F00-0B-19-4

ITEM 6-4

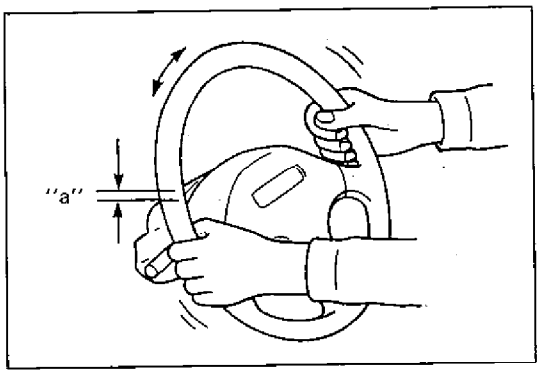
Suspension System Inspection

- Inspect front strut and rear shock absorber for evidence of oil leakage, dents or any other damage on sleeves; and inspect anchor ends for deterioration.
  Replace defective parts, if any.



70F00-0B-19-5

- Check front and rear suspension systems for damaged, loose or missing parts; also for parts showing signs of wear or lack of lubrication.
  Repair or replace defective parts, if any.
- Check front suspension arm ball joint stud dust seals for leakage, detachment, tear or any other damage.
  Replace defective boot, if any.



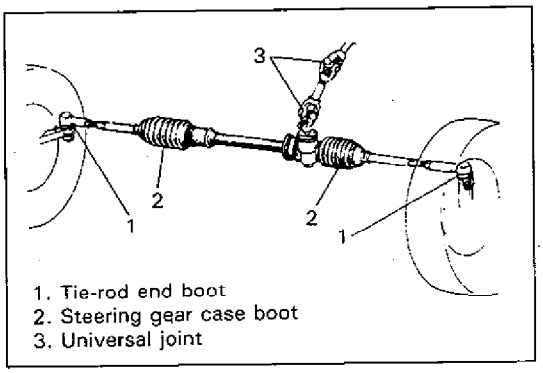
70F00-0B-20-1

ITEM 6-5

Steering System Inspection

1) Check steering wheel for play and rattle, holding vehicle straight on ground.

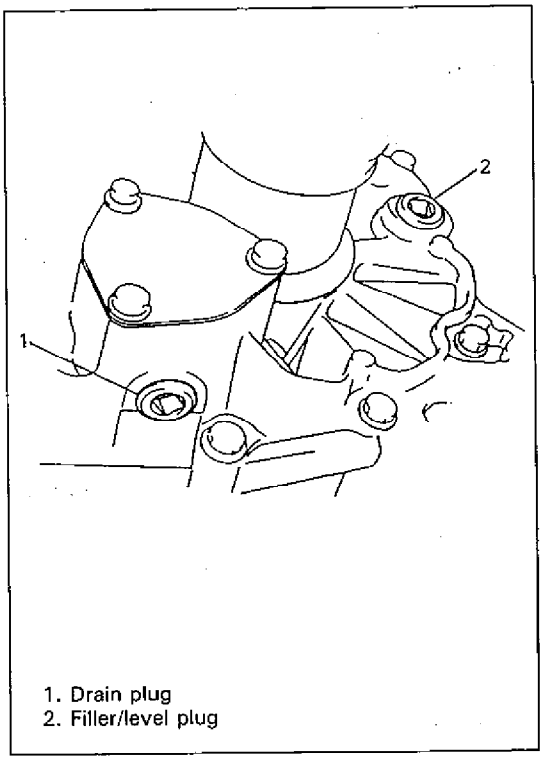
Steering wheel play "a": 0—30 mm (0—1.2 in.)



1. Tie-rod end boot
2. Steering gear case boot
3. Universal joint

64B40-0B-14-1

2) Check steering linkage for looseness and damage. Repair or replace defective parts, if any.
3) Check boots of steering linkage and steering gear case for damage (leaks, detachment, tear, etc.). If damage is found, replace defective boot with new one.
4) Check universal joints of steering shaft for rattle and damage. If rattle or damage is found, replace defective part with a new one.



1. Drain plug
2. Filler/level plug

70F00-0B-20-3

ITEM 6-6

Manual Transmission Oil Inspection and Change

[Inspection]

1) Inspect transmission case for evidence of oil leakage. Repair leaky point if any.
2) Make sure that vehicle is placed level for oil level check.
3) Remove level plug of transmission.
4) Check oil level.
   Oil level can be checked roughly by means of filler/level plug hole. That is, if oil flows out of level plug hole or if oil level is found up to hole when level plug is removed, oil is properly filled.
   If oil is found insufficient, pour specified oil up to level hole. For specified oil, refer to description of oil change under ON-VEHICLE SERVICE in SECTION 7A.

[Change]

1) Place the vehicle level and drain oil by removing drain plug.
2) Apply sealant to drain plug and tighten drain plug to specified torque.
3) Pour specified oil up to level hole.
4) Tighten filler plug to specified torque.
   For recommended oil, its amount and tightening torque data, refer to ON-VEHICLE SERVICE of SECTION 7A.

ITEM 6-7

Door Hinges, Gear Shift Control Lever and Shaft Inspection

Check that doors and gear shift control lever move smoothly without abnormal noise.

If defective, lubricate as follows.

Wipe off dirt of door hinges and apply a thin coat of engine oil. Open and close door several times to insure that oil has worked in effectively.

Lubricate lever seat and shaft bushings with water resistant chassis grease.

70F00-0B-21-1

FINAL INSPECTION

BODY PARTS OPERATION

Hood Latch

Check that hood opens and closes smoothly and properly. Also check that it locks securely when closed.

Doors

Check that each door opens and closes smoothly and locks securely when closed.

Seats

Check that seat slides smoothly and locks securely at any position. Also check that reclining mechanism of front seat back allows it to be locked at any angle.

ROAD TEST

Carry out road test in safe place.

> **WARNING:**
> **When carrying out following road tests, select a safe place where no man or no running vehicle is seen so as to prevent any accident.**

Engine Start

Check engine start for readiness.

Clutch (For Manual transmission)

Check for the following.

- Clutch is completely released when depressing clutch pedal,
- No slipping clutch occurs when releasing pedal and accelerating,
- Clutch itself is free from any abnormal condition.

Gearshift or Selector Lever (Transmission)

Check gear shift or selector lever for smooth shifting to all positions and for good performance of transmission in any position.

Brake

[Foot brake]

Check the following when depressing brake pedal while driving;

- that brake works properly,
- that it is free from noise,
- and that braking force is applied equally on all wheels.

[Parking brake]

Check to ensure that parking brake is fully effective when the vehicle is stopped on the slope and brake lever is pulled all the way.

Steering

- Check to ensure that steering wheel is free from instability, or abnormally heavy feeling while driving.
- Check that the vehicle does not wander or pull to one side.

Engine

- Check that engine responds readily at all speeds.
- Check that engine is free from abnormal noise and abnormal vibration.

Body, Wheels and Power Transmitting System

Check that body, wheels and power transmitting system are free from abnormal noise and abnormal vibration or any other abnormal condition.

Meters and Gauge

Check that speedometer, odometer, fuel meter, temperature gauge, etc. are operating accurately.

Lights

Check that all lights operate properly.

Seat Belt

Inspect belt system including webbing, buckles, latch plates, retractors and anchors.
Check that seat belt is securely locked.

> **WARNING:**
> **For this test, select a safe place without any running vehicle so as to prevent any accident. And again make sure that no man or no other vehicle is seen in front or behind and use great care to the surroundings when carrying out the test.**

OWNER INSPECTIONS AND SERVICES

Litsted below are items which should be checked and serviced by either the owner himself or a qualified technician daily or periodically to help ensure safety and dependability of each vehicle. Should any problem occur, contact nearby dealer or a qualified technician for proper service advice.
For the safety of the driver himself and others, be sure to inspect any safety-related parts that could have been damaged in any accident and take corrective measures for whatever in need of repair before using vehicle again.

BEFORE OPERATING YOUR VEHICLE

[OUTSIDE VEHICLE]

Fluid Leak Check
Check for fuel, coolant, oil or other fluid leakage by looking at surface beneath vehicle after it has been parked for a while. Water dripping from air conditioning system after use is normal. If gasoline fume of fluid is noted at any time, investigate its cause and correct it at once.

Door Operation
Check that all doors including back door operate smoothly, and that all doors close and all latches lock securely.

Tire, Wheel and Wheel Nut Inspection
- Check pressuer as shown on tire placard (including spare tire). Pressure should be checked when tires are "cold".
- Check tire for cuts, damage or excessive wear.
- Check wheel nuts for looseness of for missing nuts. If necessary, tighten them.

[INSIDE VEHICLE]

Seat Adjuster Operation
- Move seat back and forth and check that seat adjuster operates smoothly and locks properly and securely.
- Check that seat back can be reclined smoothly and locked securely at any angle.

64B40-0B-17-1

Warning Light, Buzzer and Tone Operation
Check all warning lights, buzzer and interior indicator lights for operation. For details, refer to Owner's Manual.

Glass, Mirror, Light and/or Reflector Condition
Check each glass, mirror, light and reflector for breakage, scratch, dirt or any other damage which could reduce driver's view or visibility or cause injury. Replace, clean or repair promptly, if necessary.

Rear View Mirror and Sun Visor Operation
Check that friction joints hold mirrors and sun visors in place.

Seat Belts Condition and Operation
Check belt system including webbing, buckles, latch plates, retractors, guide loops and anchors for proper operation, damage and/or wear.

Light Operation
check license plate lights, headlights, small lights, tail lights, brake lights, turn signals, back-up lights, instrument panel lights and interior lights, hazard warning flashers and other lights.
Have headlight aim checked at once if beams seem improperly aimed.

Clutch Pedal Free Travel Check
- Check free travel and adjust as necessary.
- Check pedal for smooth operation.

Accelerator Pedal Operation
Check that pedal operates smoothly without getting caught or interfered by and other part.

Exhaust System Check
Check for leakage, cracks or loose supports.

Brake Pedal Check
- Check pedal for smooth operation.
- Check pedal travel (pedal-to-wall clearance). For checking procedure, refer to PEDAL TRAVEL CHECK of SECTION 5.
- Check brake booster function.

Parking Brake Lever Travel Check
Check that lever has proper travel.

[UNDER HOOD]

Engine Hood Latch Operation

Check that hood closes firmly. Check for damaged, loose or missing parts that might prevent tight latching. Make sure secondary latch keeps hood from opening all the way when primary latch is released.

Engine Oil Level Check

Check engine oil on the dipstick with the engine turned off and add if necessary.
See your Owner's Manual.

NOTE:
A large loss in this system may indicate a problem. Have it inspected and repaired at once.

Engine Coolant Level and Condition

When engine is cool, check coolant level in reservoir tank and add if necessary.
Inspect coolant and replace if dirty or rusty.
A normal coolant level should be between "FULL" and "LOW" marks on reservoir tank.
See Owner's Manual.

NOTE:
A large loss in this system may indicate a problem. Have it inspected and repaired at once.

Windshield Washer Fluid Level Check

Check washer fluid level in tank and add if necessary.

Brake Master Cylinder Fluid Level Check

Check reservoir tank fluid level in accordance with Owner's Manual and keep at proper level.

NOTE:
A large loss in this system may indicate a problem. Have it inspected and repaired at once.

Battery Electrolyte Level Check

Check that the electrolyte level of all battery cells is between the upper and lower level lines on the case.

Engine Drive Belt(s) Inspection

Inspect all belts for tension, cracks, fraying and wear.
Adjust or replace as needed.

70F00-0B-24-1

WHILE OPERATING YOUR VEHICLE

Horn Operation

Check to make sure that horn works when its button is pushed at its any part.

Windshield Wiper and Washer Operation

Check wipers and washer for proper operation. Also check spray direction of washer fluid.
Check wiper blades for wear or cracks whenever they fail to wipe clean. If necessary, replace.

Windshield Defroster

Periodically check that air comes out from defroster outlet when operating heater or air conditioning.
Set blower switch to "HI" position for this check.

Steering System Operation

Be alert for any changes in steering action. An inspection or service is needed when: the steering wheel is harder to turn or has too much free play, or if there are strange sounds when turning.

Brake System Operation

Be alert to abnormal noise, increase in brake pedal travel or repeated pull to one side when braking.
When any of such conditions is noted, check brake system. If brake warning light stays on or keeps flashing, there may be some trouble in brake system.
Also, test parking brake by pulling parking brake lever.

Exhaust System Operation

Be alert for any changes in the sound of the exhaust system or any smell of fumes. These are signs the system may be leaking or overheating. Have it check and/or repaired at once.

Tire and Wheel Operation

Be alert to vibration of the steering wheel or seat at normal highway speeds. This may mean a wheel balance is needed. Also, a pull right or left on a straight, level road may shown the need for a tire pressure adjustment or wheel alignement.

RECOMMENDED FLUIDS AND LUBRICANTS

Engine oil	SE, SF or SG (Refer to page 0B-7)
Engine coolant (Ethylene glycol base coolant)	"Antifreeze/Anticorrosion coolant"
Brake fluid	DOT3 or SAE J1703
Manual transmission oil	See oil chart on SECTION 7A
Gear shift control lever and shaft	Water resistance chassis grease (SUZUKI SUPER GREASE A 99000-25010)
Door hinges	Engine oil
Hood latch assembly	Engine oil
Key lock cylinder	Spray lubricant

70F00-0B-25-1

SECTION 0B1

MAINTENANCE AND LUBRICATION (CARBURETOR MODEL)

0B1

CONTENTS

70F00-0B1-1-1

MAINTENANCE SCHEDULE

NORMAL CONDITION SCHEDULE

Interval: This interval should be judged by odometer reading or months, whichever comes first.	This table includes services as scheduled up to 80,000 km (48,000 miles) mileage. Beyond 80,000 km (48,000 miles), carry out the same services at the same intervals respectively.							
	Km (x 1,000)	10	20	30	40	50	60	70	80
	Miles (x 1,000)	6	12	18	24	30	36	42	48
	Months	6	12	18	24	30	36	42	48
1. ENGINE									
1-1. Water pump belt (tension, damage)		—	—	—	I	—	—	—	R
1-2. Valve lash (clearance)		—	I	—	I	—	I	—	I
1-3. Camshaft timing belt		Replace every 100,000 km (60,000 miles).							
1-4. Engine oil and Engine oil filter	API Grade SE, SF or SG	R	R	R	R	R	R	R	R
1-5. Cooling system, hoses and connections (leakage, damage)		—	I	—	I	—	I	—	I
1-6. Engine coolant		—	—	—	R	—	—	—	R
1-7. Exhaust pipes and mountings (leakage, damage, tightness)		—	I	—	I	—	I	—	I
1-8. Wiring harness and connections		—	—	—	I	—	—	—	I
2. IGNITION SYSTEM									
2-1. Spark plugs	When unleaded fuel is used	—	I	—	R	—	I	—	R
	When leaded fuel is used	Refer to "Severe Driving Condition" Schedule.							
2-2. Distributor cap and rotor (crack, wear)		—	—	—	I	—	—	—	I
2-3. Ignition wiring		—	—	—	I	—	—	—	R
2-4. Ignition timing		—	—	—	I	—	—	—	I
2-5. Distributor advancer		—	—	—	I	—	—	—	I
3. FUEL SYSTEM									
3-1. Air cleaner filter element	Paved-road	—	—	—	R	—	—	—	R
	Dusty condition	Refer to "Severe Driving Condition "schedule.							
3-2. Fuel tank, cap & lines (Deterioration, leakage, damage)		—	—	—	I	—	—	—	I
		Replace fuel tank cap every 100,000 km (60,000 miles) or 60 months.							
3-3. Fuel filter		—	—	—	*R	—	—	—	R
3-4. Carburetor choke system		—	—	—	I	—	—	—	I
3-5. Engine idle speed & idle mixture		(I)	I	—	I	—	I	—	I
4. EMISSION CONTROL SYSTEM									
4-1. PCV (Positive Crankcase Ventilation) Valve		—	—	—	I	—	—	—	I
4-2. EVAP canister (if equipped)		—	—	—	—	—	—	—	I
4-3. Fuel cut system		—	—	—	I	—	—	—	I
5. BRAKE									
5-1. Brake discs and pads (thickness, wear, damage) Brake drums and shoes (wear, damage)		I	—	I	—	I	—	I	—
5-2. Brake hoses and pipes (leakage, damage, clamp)		I	—	I	—	I	—	I	—
5-3. Brake fluid		—	I	—	R	—	I	—	R
5-4. Brake lever and cable (damage, stroke, operation)		I	—	I	—	I	—	I	—
5-5. Brake pedal		—	I	—	I	—	I	—	I

NOTES:

- *"R": Replace or change*
- *"I" : Inspect and correct or replace if necessary*
- *Item 3-3 *R is a recommended maintenance item.*
- *Item 3-5 (I) is applicable only to the 10,000 km inspection.*

Interval: This interval should be judged by odometer reading or months, whichever comes first.	This table includes services as scheduled up to 80,000 km (48,000 miles) mileage. Beyond 80,000 km (48,000 miles), carry out the same services at the same intervals respectively.							
	Km (x 1,000)	10	20	30	40	50	60	70	80
	Miles (x 1,000)	6	12	18	24	30	36	42	48
	Months	6	12	18	24	30	36	42	48
6. CHASSIS AND BODY									
6-1. Clutch (For manual transmission) pedal free travel		I	I	I	I	I	I	I	I
6-2. Tires/wheel discs (wear, damage, rotation)		I	I	I	I	I	I	I	I
6-3. Drive axle boots (breakage, damage)		I	I	I	I	I	I	I	I
6-4. Suspension system (Tightness, damage, rattle, breakage)		I	I	I	I	I	I	I	I
6-5. Steering system (tightness, damage, breakage, rattle)		I	I	I	I	I	I	I	I
6-6. Transmission oil (Manual) (leakage, level)		I	R	I	R	I	R	I	R
6-7. Door hinges & Gear shift control lever/shaft		I	I	I	I	I	I	I	I

NOTES:
"R": Replace or change
"I" : Inspect and correct or replace if necessary

70F00-0B1-3-1

MAINTENANCE RECOMMENDED UNDER SEVERE DRIVING CONDITIONS

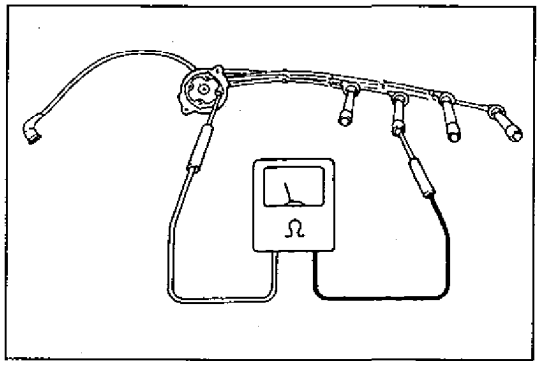
Refer to SECTION 0B.

70F00-0B1-3-2

MAINTENANCE SERVICE

For maintenance service procedure of any item not found in this section, refer to SECTION 0B.

70F00-0B1-4-1



70F00-0B1-4-2

IGNITION SYSTEM

ITEM 2-3

Ignition Wiring (High-Tension Cord)

Inspection

1) Inspect high-tension cords for cracks and check that their connections are secure.
2) Measure resistance of high-tension cords.

   High-tension cord resistance: 10—22 kΩ/m (3.0—6.7 kΩ/ft)

3) Replace high-tension cords that show evidence of deterioration.

   NOTE:
   Check to make sure that each of the high-tension cord terminals and connections is secure and fully inserted into its mating component. Any burnt fitting must be replaced.

Replacement

Refer to SECTION 0B.

70F00-0B1-4-3

ITEM 2-4

Ignition Timing Inspection

Check to make sure that ignition timing is set properly. If out of specification, adjust it.
Refer to SECTION 6F for inspection and adjustment procedure.

70F00-0B1-4-4

ITEM 2-5

Distributor Advancer Inspection

Check centrifugal and vacuum advancers for proper operation. Refer to SECTION 6F for checking procedure.

FUEL SYSTEM

ITEM 3-4

Carburetor Choke System Inspection

1) Remove air cleaner case, and lubricate rotating parts.
2) Check choke system for proper operation, referring to ON-VEHICLE SERVICE of SECTION 6D.

70F00-0B1-5-1

ITEM 3-5

Engine Idle Speed and Idle Mixture Inspection

Check idle speed and idle mixture, and adjust them as necessary. Refer to ON-VEHICLE SERVICE of SECTION 6D for procedures to check and adjust idle speed/idle mixture.

70F00-0B1-5-2

EMISSION CONTROL SYSTEM

ITEM 4-3

Fuel Cut System Inspection

Check fuel cut system. Refer to ON-VEHICLE SERVICE of SECTION 6D for checking procedures.

SECTION 1A

HEATER AND VENTILATION

1A

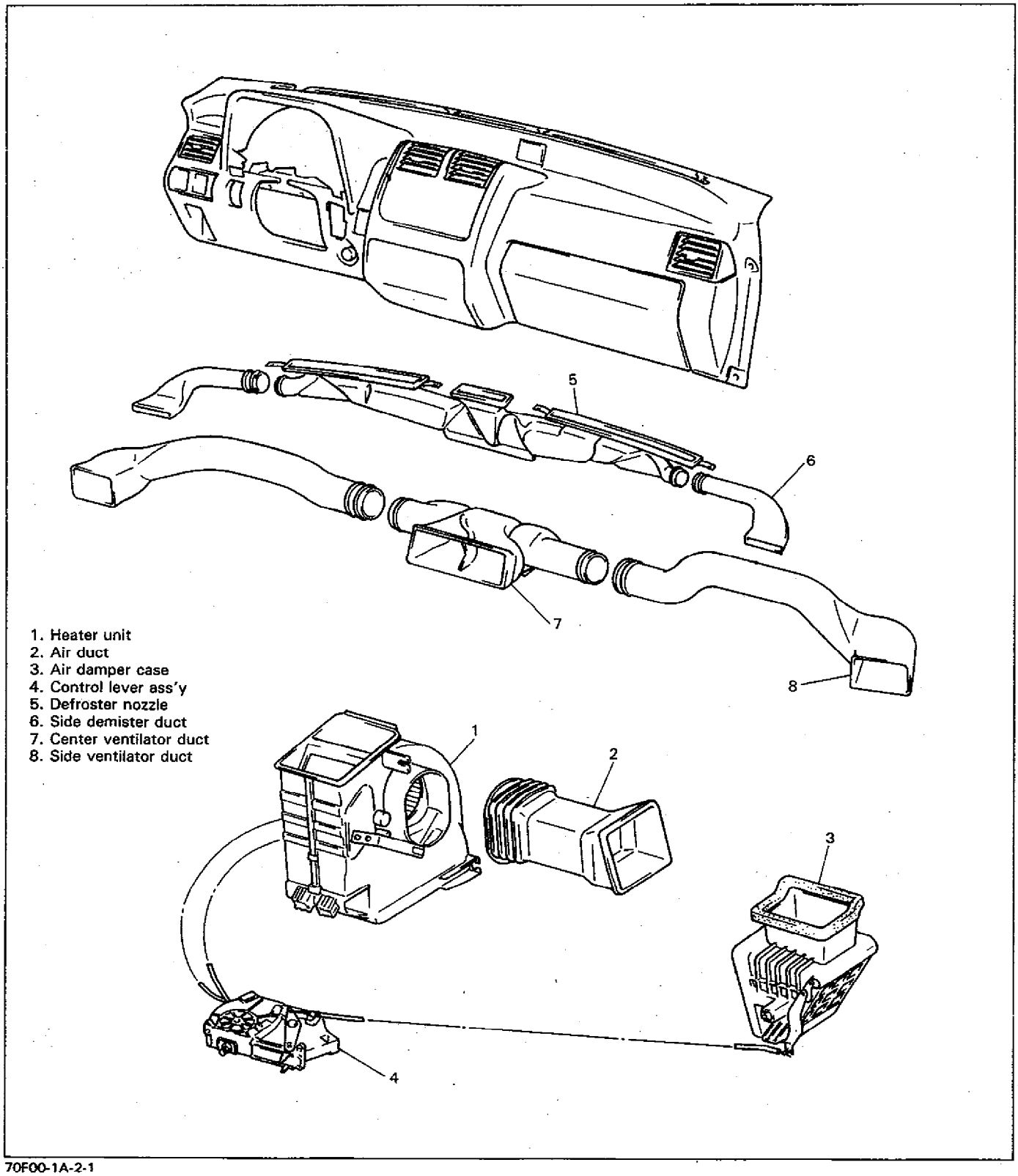
CONTENTS

70F00-1A-1-1

GENERAL DESCRIPTION

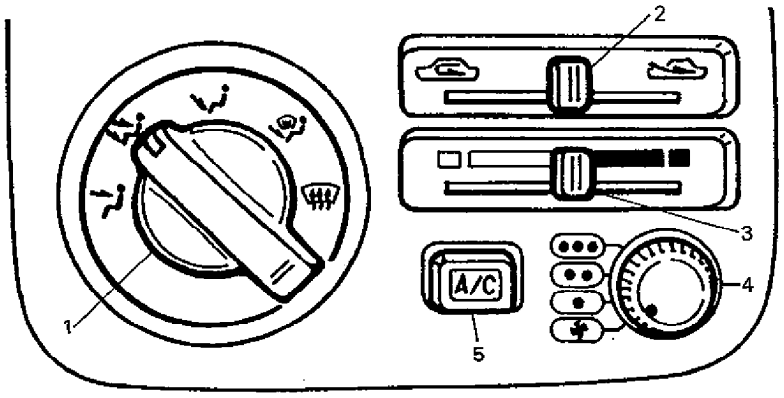
HEATER

The heater and ventilation of this vehicle consist of such main components as control levers, blower motor, heater core and air ducts. The blower motor runs on electricity to send air inside. In the heater core, the coolant warmed by the engine keeps circulating. Each control lever controls the blower motor speed, temperature and operation of the dampers in the heater unit so that the air is delivered where necessary.



HEATER CONTROL OPERATION

The heater and ventilation provide temperature control, ventilation and defrosting functions. Their operation is controlled by selecting the positions of the control selector on the instrument panel. Each selector position and function of heater and ventilation are as given below.



1. Air control knob
2. Fresh and Recirculation (F/R) control lever
3. Temperature control lever
4. Fan switch
5. A/C switch (if equipped)

Air control knob.

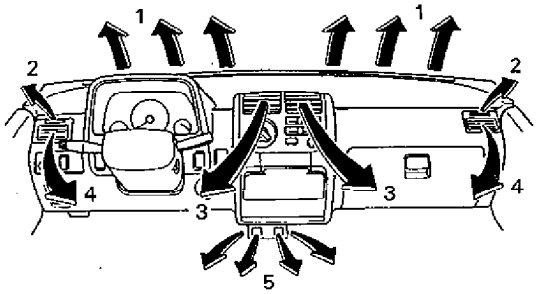
	VENTILATION	Air flows from center and side outlets
	BI-LEVEL	Air flows from center, side and floor outlets
	HEAT	Air flows from floor outlet
	HEAT/ DEFROSTER	Air flows from floor outlet, front defroster and side demister outlets
	DEFROSTER	Air flows from front defroster and side demister outlet

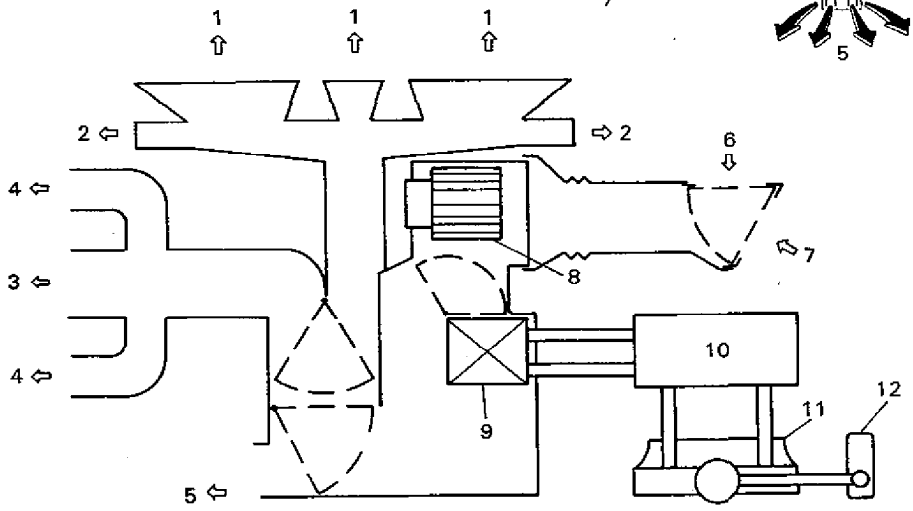
F/R control lever.

	RECIRCULATION
	FRESH AIR

Temperature control lever.

COOL
HOT





1. Front defroster
2. Side demister
3. Center outlet
4. Side outlet
5. Floor outlet
6. Fresh air
7. Recycle air
8. Blower motor
9. Heater core
10. Engine
11. Radiator
12. Reserve tank

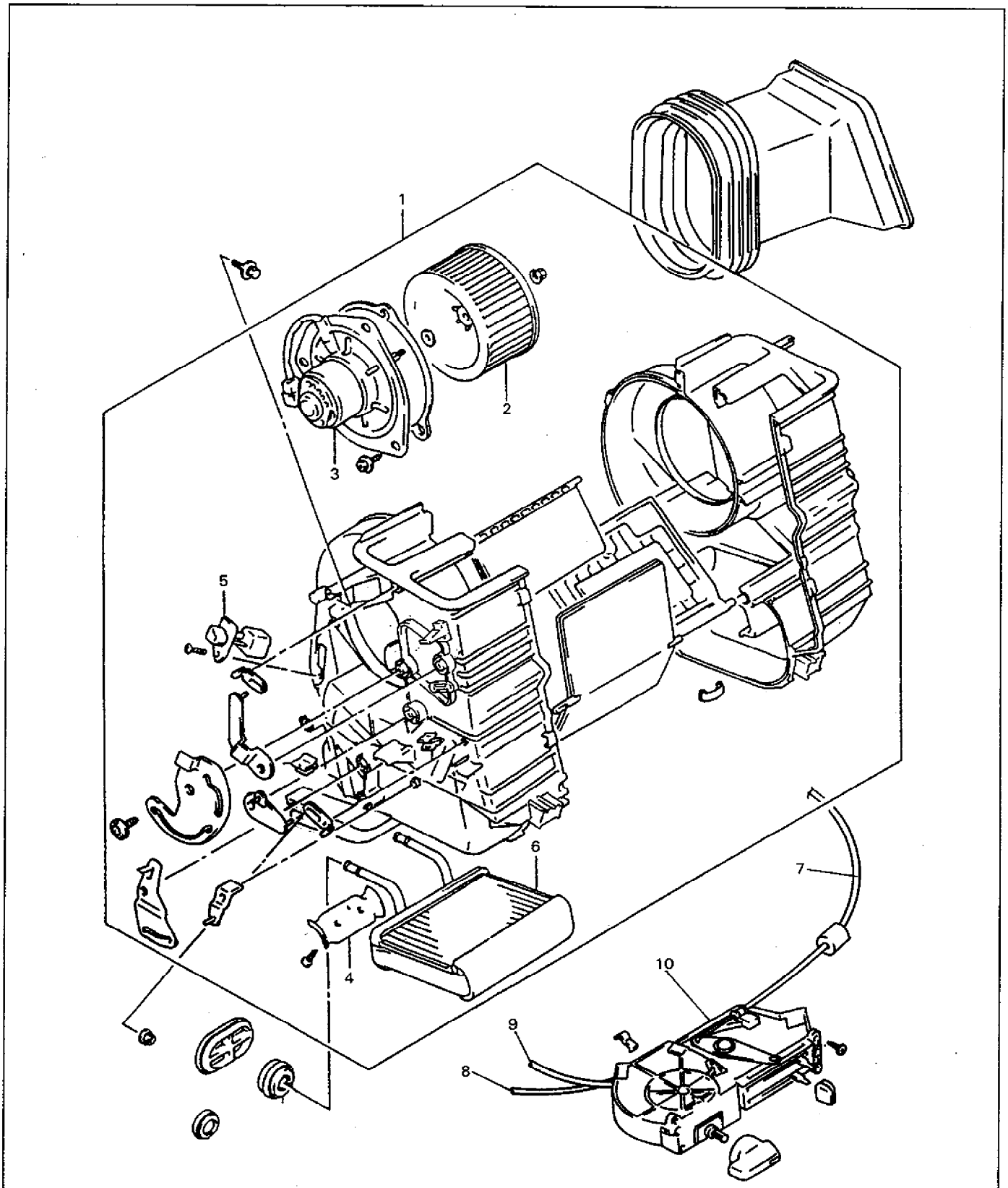
DIAGNOSIS

Trouble	Possible cause	Remedy
Heater blower won't work even when its switch is ON.	Blower fuse blown	Replace fuse to check for short.
	Heater registor faulty	Check continuity.
	Blower motor faulty	Replace motor.
	Wiring or grounding faulty	Repair as necessary.
Incorrect temperature output	Control cables broken or binding	Check cables.
	Control cable not connected properly	Connect cable properly.
	Air damper broken	Repair damper.
	Air ducts clogged	Repair air ducts.
	Heater radiator leaking or clogged	Replace radiator.
	Heater hoses leaking or clogged	Replace hoses.

70F00-1A-4-2

ON-VEHICLE SERVICE

HEATER UNIT

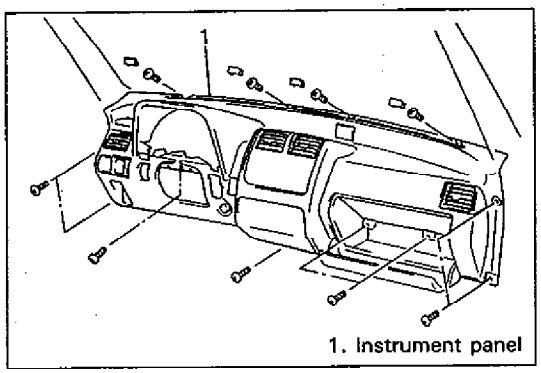


1. Heater unit
2. Blower fan
3. Blower motor
4. Pipe clamp
5. Heater resistor
6. Heater core
7. Fresh air control cable
8. Temperature control cable
9. Air control cable
10. Heater control lever ass'y

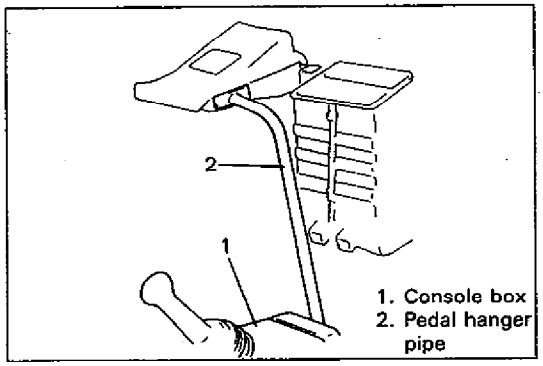
REMOVAL

1) Disconnect battery (—) leadwire, drain coolant and disconnect 2 water hoses from heater unit.
2) Remove instrument panel as follows.
   ① Disconnect wires and cables from heater unit and air damper case.
   ② Remove steering column unit and steering joint upper bolt. (Refer to SECTION 3C.)
   ③ Disconnect speedometer cable from transmission.
   ④ Remove engine hood opener.
   ⑤ Remove instrument panel together with speedometer ass'y.

70F00-1A-6-1

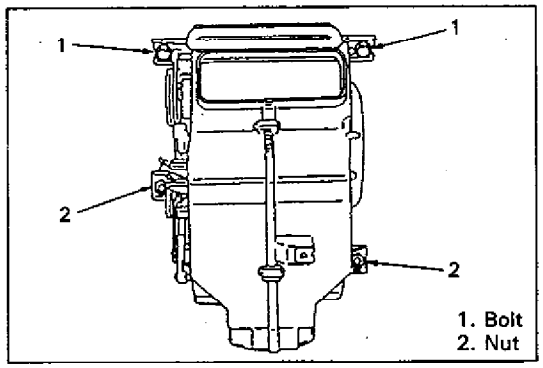


70F00-1A-6-2



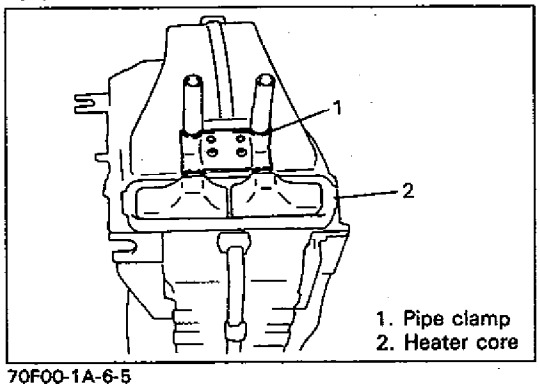
3) Remove console box.
4) Remove pedal hanger pipe.

70F00-1A-6-3



5) Remove heater unit.

70F00-1A-6-4



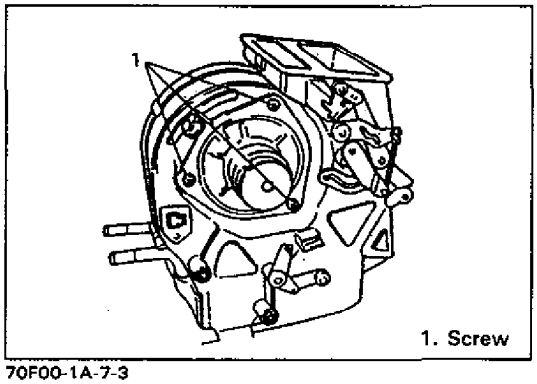
6) Remove pipe clamp.
7) Pull out heater core from unit.

70F00-1A-6-5

INSTALLATION
Install heater unit by reversing removal procedure, noting the following items.
1) Adjust control cables. (Refer to p. 1A-9)
2) Fill coolant to radiator.

NOTE:
- **When installing each part, be careful not to catch any cable or wiring harness.**
- **When installing steering shaft to steering shaft joint, set front wheels (right and left) in the straight ahead state and check to make sure that steering wheel is also in that state.**
- **When fastening steering column ass'y to vehicle body, start with lower nuts on column and then upper nuts. Be sure to tighten them to specified torque. (Refer to SECTION 3C.)**

70F00-1A-7-1



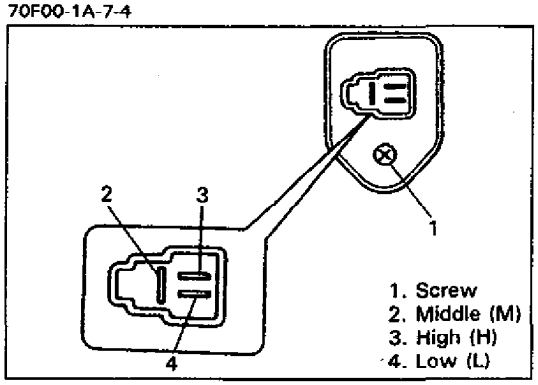
70F00-1A-7-3

HEATER BLOWER MOTOR

REMOVAL
1) Disconnect battery (—) leadwire.
2) Disconnect blower motor and resistor leadwires at couplers.
3) Remove blower motor mounting screw.
4) Remove blower fan from blower motor (LH drive vehicle only).
5) Remove blower motor.

INSTALLATION
Reverse removal procedure for installation.

70F00-1A-7-4



70F00-1A-7-5

HEATER RESISTOR

INSPECTION
Check heater resistor for each terminal-to-terminal continuity. If there is no continuity, replace heater resistor.

Terminal-toterminal	Resistor (Ω)
H —M	1.09
H —L	3.95
M—L	2.86

HEATER BLOWER SWITCH

REMOVAL

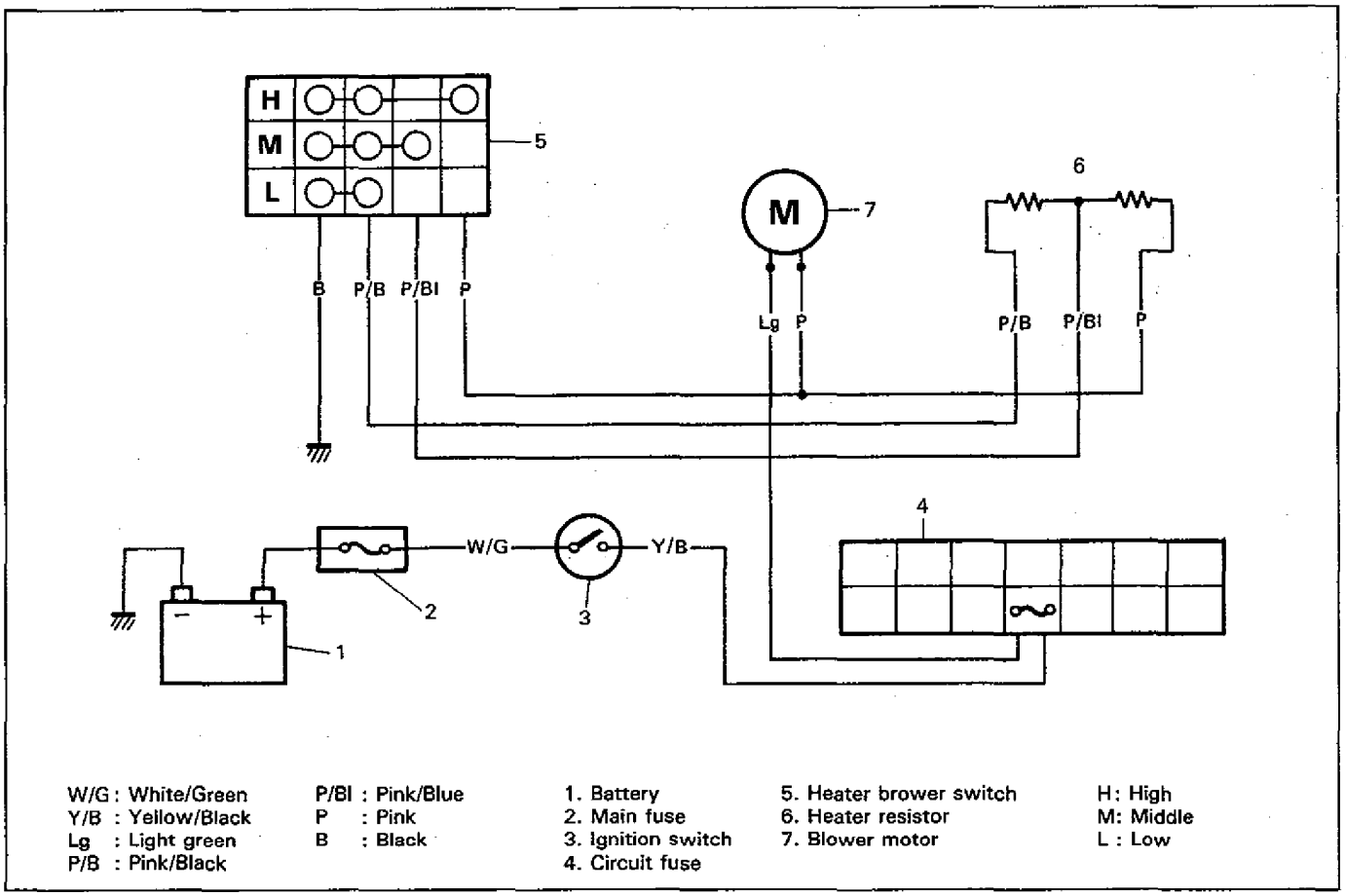
1) Remove ashtray and ashtray upper plate.
2) Remove control lever knobs and control panel garnish.
3) Remove control panel.
4) Disconnect leadwire of blower switch at coupler.

70F00-1A-8-1

INSPECTION

Heater blower switch is connected between battery and blower motor, through fuse and resistor as shown below.

Check switch for each terminal-to-terminal continuity. If there is no continuity, replace heater blower switch.



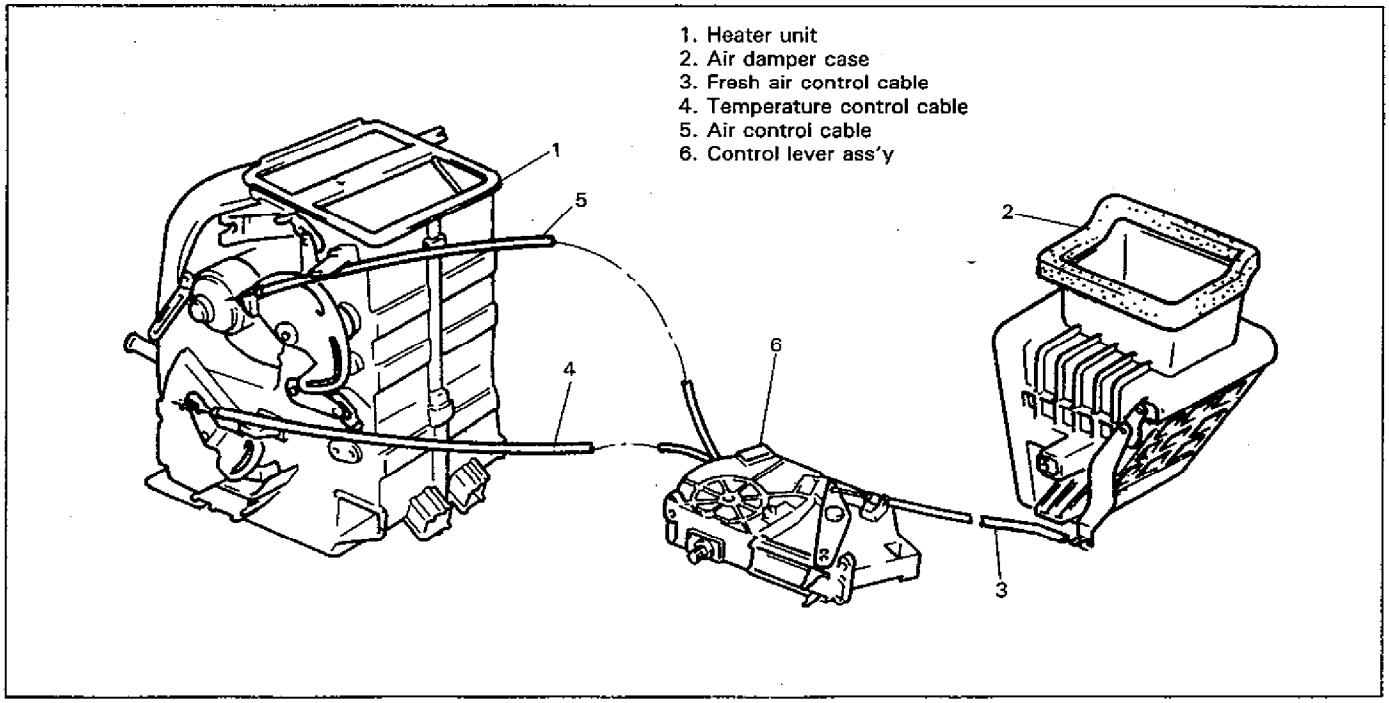
70F00-1A-8-2

INSTALLATION

Install in the reverse order of removal.

64B40-1A-6-3

HEATER CONTROL CABLES

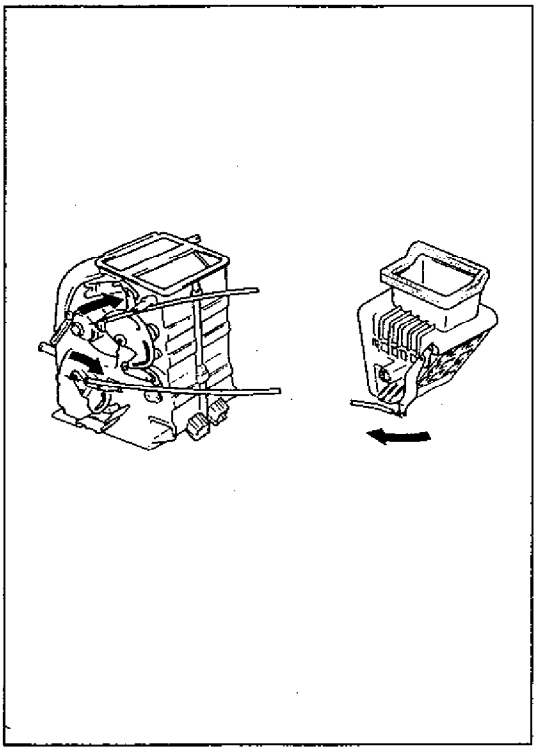


70F00-1A-9-1

REMOVAL

1) Remove ashtray and ashtray upper plate.
2) Remove control lever knobs and control panel garnish.
3) Remove control panel.
4) Disconnect leadwire from blower motor switch at coupler.
5) Disconnect control cables from air damper case and heater unit.
6) Remove control lever ass'y.
7) Disconnect control cables from control lever.

70F00-1A-9-3



70F00-1A-9-4

INSTALLATION

Install control cables by reversing removal procedure, noting the following point.

After installing control cables to control levers, move control levers to such position as to pull cables fully, then connect and clamp control cables to heater unit and air damper case levers as shown.

NOTE:

After installing control cables, be sure that control knobs move smoothly and stop at proper position.

SECTION 1B

AIR CONDITIONING (OPTIONAL)

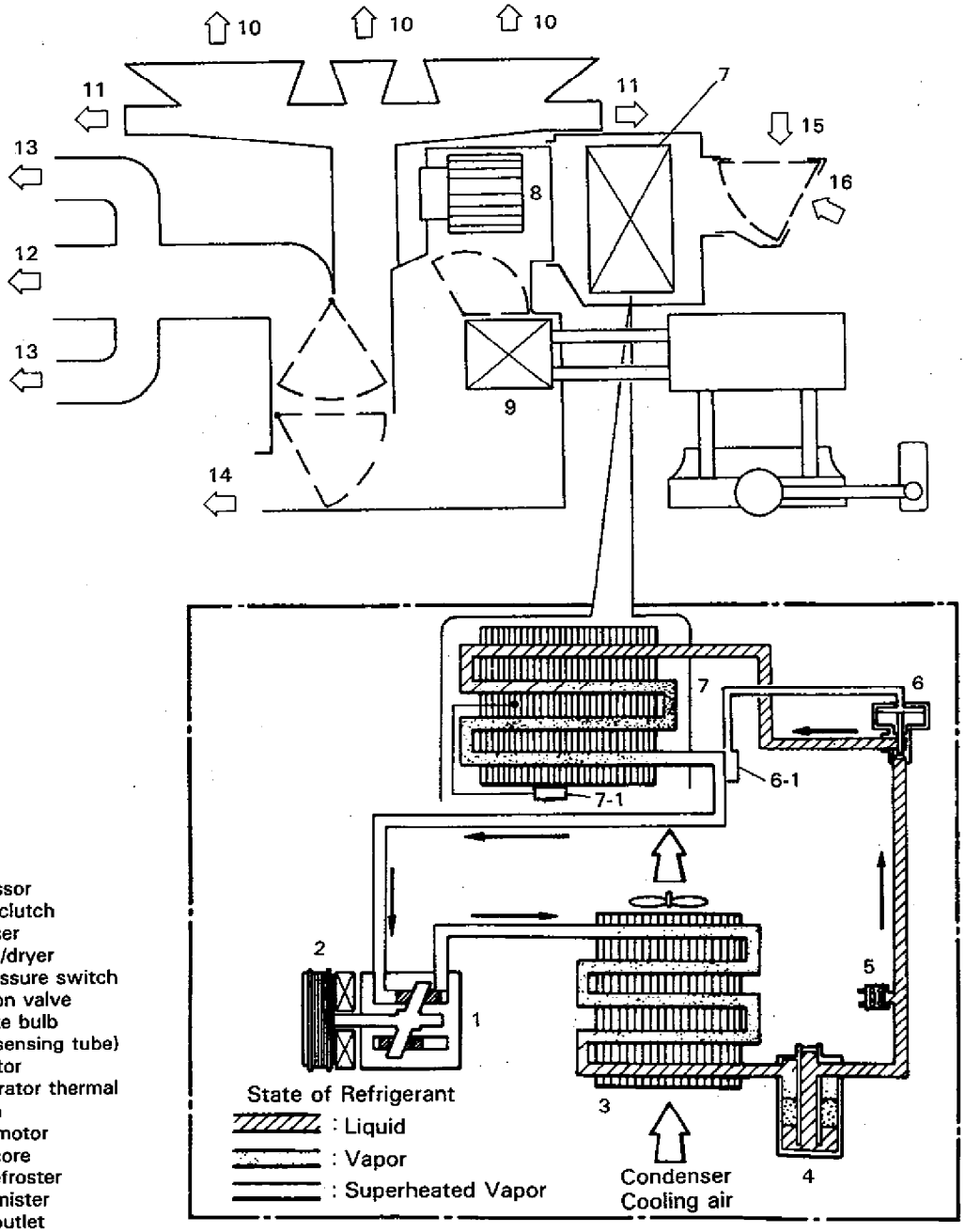
NOTE:
The refrigerant used for this model varies depending on specifications (either Refrigerant-134a or Refrigerant-12).
If the vehicle is equipped with an air conditioning whose compressor has "R143a" indicated on the back, Refrigerant-134a is used. Otherwise, Refrigerant-12 is used. Be sure to check which refrigerant is used before any service work including inspection and maintenance.

CONTENTS

70F00-1B-1-1

GENERAL DESCRIPTION

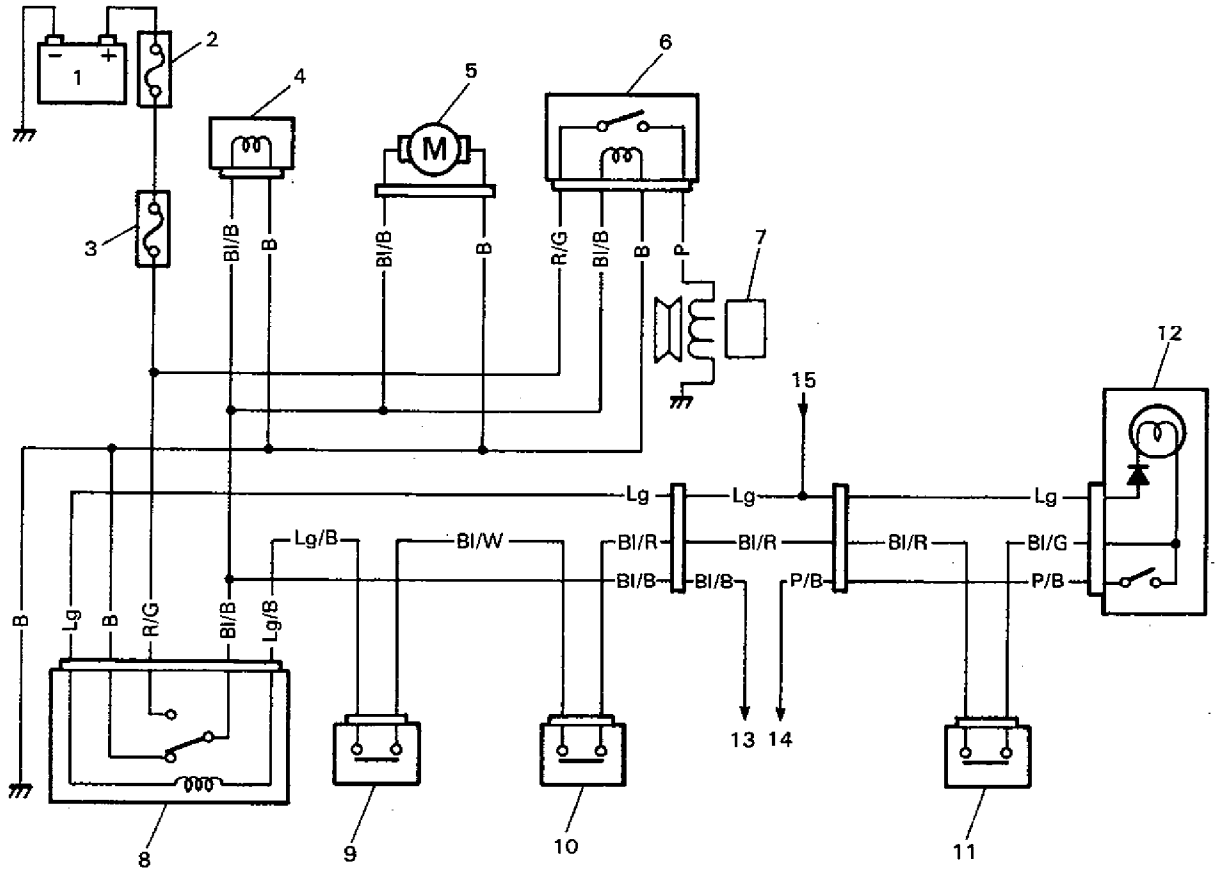
MAJOR COMPONENTS AND REFRIGERANT FLOW OF AIR CONDITIONING SYSTEM



1. Compressor
2. Magnet clutch
3. Condenser
4. Receiver/dryer
5. Dual pressure switch
6. Expansion valve
6-1. Remote bulb (heat sensing tube)
7. Evaporator
7-1. Evaporator thermal switch
8. Blower motor
9. Heater core
10. Front defroster
11. Side demister
12. Center outlet
13. Side outlet
14. Floor outlet
15. Outside air
16. Inside air

70F00-1B-2-2

WIRING DIAGRAM



1. Battery
2. Fusible link
3. Fuse
4. A/C SV valve
5. Condenser fan motor
6. Compressor relay
7. Compressor magnetic clutch
8. A/C relay
9. Coolant (water) temp. switch
10. Dual pressure switch
11. Evaporator thermal switch
12. A/C switch
13. To ECM (Fuel Injection model only)
14. To fan switch
15. From ignition switch

FUNCTION OF EACH CONTROL COMPONENT

COMPRESSOR RELAY

A relay to operate the compressor magnetic clutch. The magnetic clutch continues operation as long as the air conditioner is under operation.

70F00-1B-4-1

MAGNETIC CLUTCH

A device used, with the engine running, for operating the air conditioner only when needed, and controlled by the A/C relay and compressor relay.

70F00-1B-4-2

EVAPORATOR THERMAL SWITCH

When the evaporative temperature of a refrigerant drops to 1°C (34°F) or below, the evaporator fins get stuck with frost or ice, reducing the airflow, lowering the cooling capacity. The thermal switch is used to prevent this frosting or icing.

70F00-1B-4-3

COOLANT (WATER) TEMP SWITCH

A switch to stop compressor operation when the coolant temperature in coolant inlet pipe exceeds 104°C (219°F).

70F00-1B-4-4

DUAL PRESSURE SWITCH

A control switch to stop the compressor operation when the cycling refrigerant is dropped in pressure due to its leakage, lack of refrigerant or has reached too high a level.

The switch is installed in the high pressure line behind the receiver dryer.

64B40-1B-6-5

AIR CONDITIONING SOLENOID VACUUM VALVE (A/C SV VALVE)

At a zone of close-to-idling, low revolution speeds as used while driving through congested urban districts, parking or doing the like, or at the idle speed, the engine output is so small that any attempt to operate the compressor under the above condition applies unreasonable load to the engine, causing its overheating or stalling.

For Fuel Injection model, SV valve is a device to open or shut the air passage to intake manifold. For carburetor model, SV valve is a device to open or shut the air passage to A/C idle-up actuator. The SV valve opens and closes according to the signal from A/C relay. And the engine speed rises a little higher than the specified idle speed.

70F00-1B-4-6

A/C RELAY

A/C relay controls operation of the SV valve, compressor relay and condenser fan motor according to the signals from the switches which detect the state of the engine and driving conditions.

Main system control functions are as follows (at A/C switch ON).

- Idle speed control (idle-up).
- Magnetic clutch delay control: 0.4 second delay after SV valve on.
- A/C ON—OFF control:

—Dual Pressure Switch

High refrigerant pressure:

	R134a	R12
OFF	above 32 kg/cm² (455 psi)	above 27 kg/cm² (388 psi)
ON	below 26 kg/cm² (369 psi)	below 21 kg/cm² (299 psi)

Low refrigerant pressure:

	R134a	R12
OFF	below 2.0 kg/cm² (28.4 psi)	below 2.1 kg/cm² (29.9 psi)
ON	above 2.3 kg/cm² (32.7 psi)	above 2.4 kg/cm² (34.1 psi)

—Coolant (Water) Temp. Switch

Engine Coolant temperature (in coolant inlet pipe)

above 104°C (219°F) ..... OFF

below 101°C (213°F) ..... ON

—Evaporater Thermal Switch

Evaporative temperature

below 1°C (33°F) ..... OFF

above 4.5°C (40°F) ..... ON

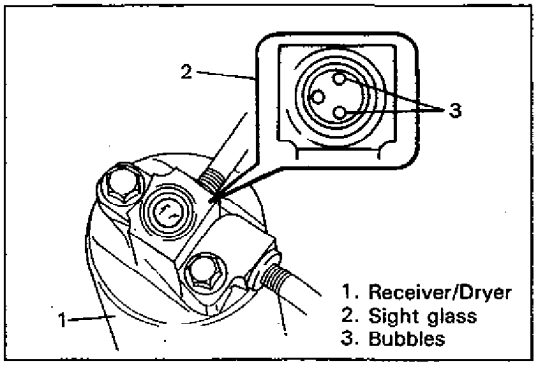
70F00-1B-4-7

DIAGNOSIS

TROUBLE DIAGNOSIS

Trouble	Possible cause	Remedy
No cooling or warm air.	Magnetic clutch does not engage properly	
	a) Fuse blown	Replace fuse and check for short.
	b) Magnetic clutch faulty	Check clutch.
	c) A/C switch faulty	Check switch.
	d) Thermal switch faulty	Check thermal switch.
	e) Dual pressure switch faulty	Check switch.
	f) Wiring or grounding faulty	Repair as necessary.
	g) No refrigerant	Check A/C circuit.
	h) A/C relay faulty	Replace A/C relay.
	Compressor is not rotating properly	
	a) Drive belt loose or broken	Tighten or replace drive belt.
	b) Compressor faulty	Check compressor.
	Blower inoperative	Check blower.
	Expansion valve faulty	Check expansion valve.
	Leak in system	Check system for leaks.
	Receiver/dryer having blown fusible plug or clogged screw	Check receiver/dryer.
Cool air comes out only intermittently.	Magnetic clutch slipping	Check magnetic clutch.
	A/C relay faulty	Replace A/C relay.
	Expansion valve faulty	Check expansion valve.
	Wiring connection faulty	Repair as necessary.
	Excessive moisture in system	Evacuate and charge system.
Cool air comes out only at high speeds.	Condenser clogged	Check condenser.
	Drive belt slipping	Check or replace drive belt.
	Compressor faulty	Check compressor.
	Insufficient or excessive charge of refrigerant	Check charge of refrigerant.
	Air in system	Evacuate and charge system.
Insufficient cooling.	Condenser clogged	Check condenser.
	Drive belt slipping	Check or replace drive belt.
	Magnetic clutch faulty	Check magnetic clutch.
	Compressor faulty	Check compressor.
	Expansion valve faulty	Check expansion valve.
	Thermister faulty	Check thermister.
	Insufficient or excessive charge of refrigerant	Check charge of refrigerant.
	Air or excessive compressor oil existing in system	Evacuate and charge system.
	Receiver/dryer clogged	Check receiver/dryer.
Insufficient velocity of cooled air.	Evaporator clogged or frosted	Check evaporator.
	Air leaking from cooling unit or air duct	Repair as necessary.
	Air inlet blocked	Repair as necessary.
	Blower motor faulty	Replace blower motor.

70F00-1B-5-1



70F00-1B-6-1

CHECKING CHARGED STATE OF REFRIGERANT

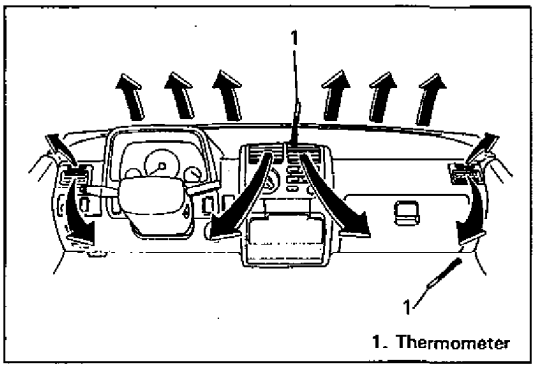
The following procedure can be used for quickly checking whether the A/C system has a proper charge of refrigerant or not.

Run engine at fast idle, and operate A/C at its max. cooling capacity for a few minutes. Then, look at the sight glass on receiver/dryer to check charge of refrigerant.

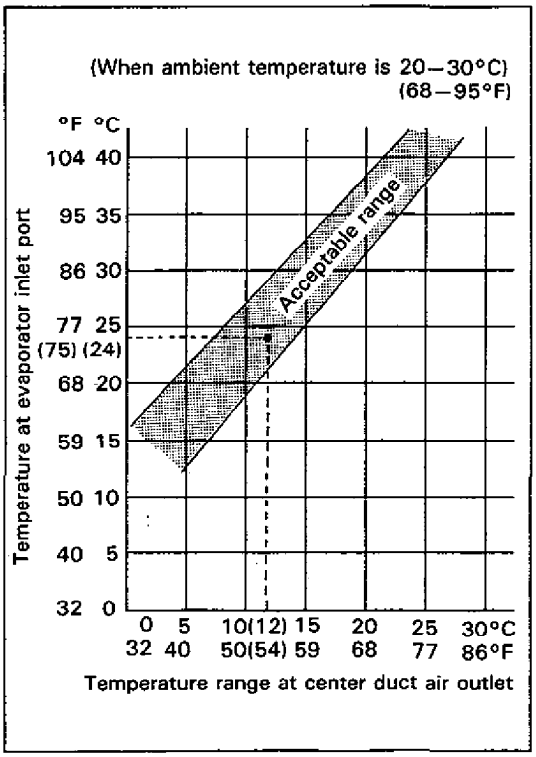
Use the following table when checking charged state of refrigerant and correct it as necessary.

Item No.	Symptom	Charge of refrigerant	Remedy
1	Bubbles observed in sight glass	Insufficient charge of refrigerant in system	Check system for leaks with a leak tester.
2	No bubbles observed in sight glass	No or insufficient charge of refrigerant in system	Refer to the items 3 and 4.
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty system	Evacuate and charge system and then check it for leaks with a leak tester.
4	Noticeable temperature difference between compressor inlet and outlet	Proper or too much charge of refrigerant in system	Refer to the items 5 and 6.
5	When A/C is turned OFF, refrigerant in sight glass clears immediately and remains clear	Too much charge of refrigerant in system	Recover refrigerant, evacuate air and charge proper amount of refrigerant.
6	When A/C is turned OFF, refrigerant in sight glass once produces bubbles and then clears	Proper charge of refrigerant in system	NO CORRECTION NEEDED BECAUSE CHARGE OF REFRIGERANT IS NORMAL.

70F00-1B-6-2



70F00-1B-7-1

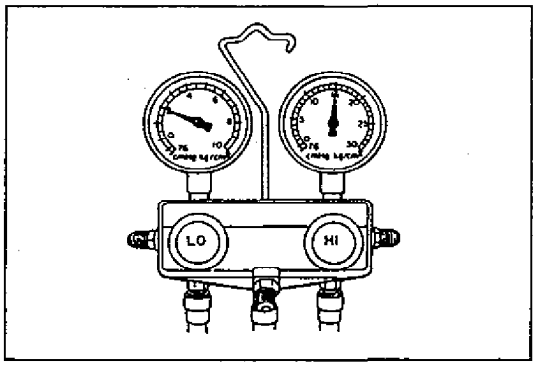


70F00-1B-7-2

PERFORMANCE TEST

1) Warm up engine to normal operating temperature.
2) Check that ambient temperature is 20—35°C (68—95°F).
3) Operate air conditioning, and set blower switch at "HI", temperature lever at "COOL", fresh/recirculation control lever at "RECIRCULATION".
4) Keep all windows and doors open.
5) Insert at dry bulb thermometers in center duct air outlet and evaporator inlet port, and measure each temperature.
6) Check inlet port temperature-to-outlet port temperature relationship using graph at the left.

   For example, if evaporator inlet port temperature is 24°C (75°F) and center duct air outlet temperature is 12°C (54°F), their crossing point is within acceptable range as shown in graph at the left.
   In this case, cooling performance is satisfactory and proper.
7) If cooling is not efficient enough, check charged state of refrigerant through sight glass of receiver dryer and perform pressure test using manifold gauge.



70F00-1B-8-1

PRESSURE TEST USING MANIFOLD GAUGE

1) Connect high and low side charging hose of manifold gauge to hose fittings of compressor.
2) Warm up engine to normal operating temperature.
3) Turn A/C ON, check to be sure that idle speed is within specification below.

   Idle speed with A/C ON: 1,000±50 r/min.

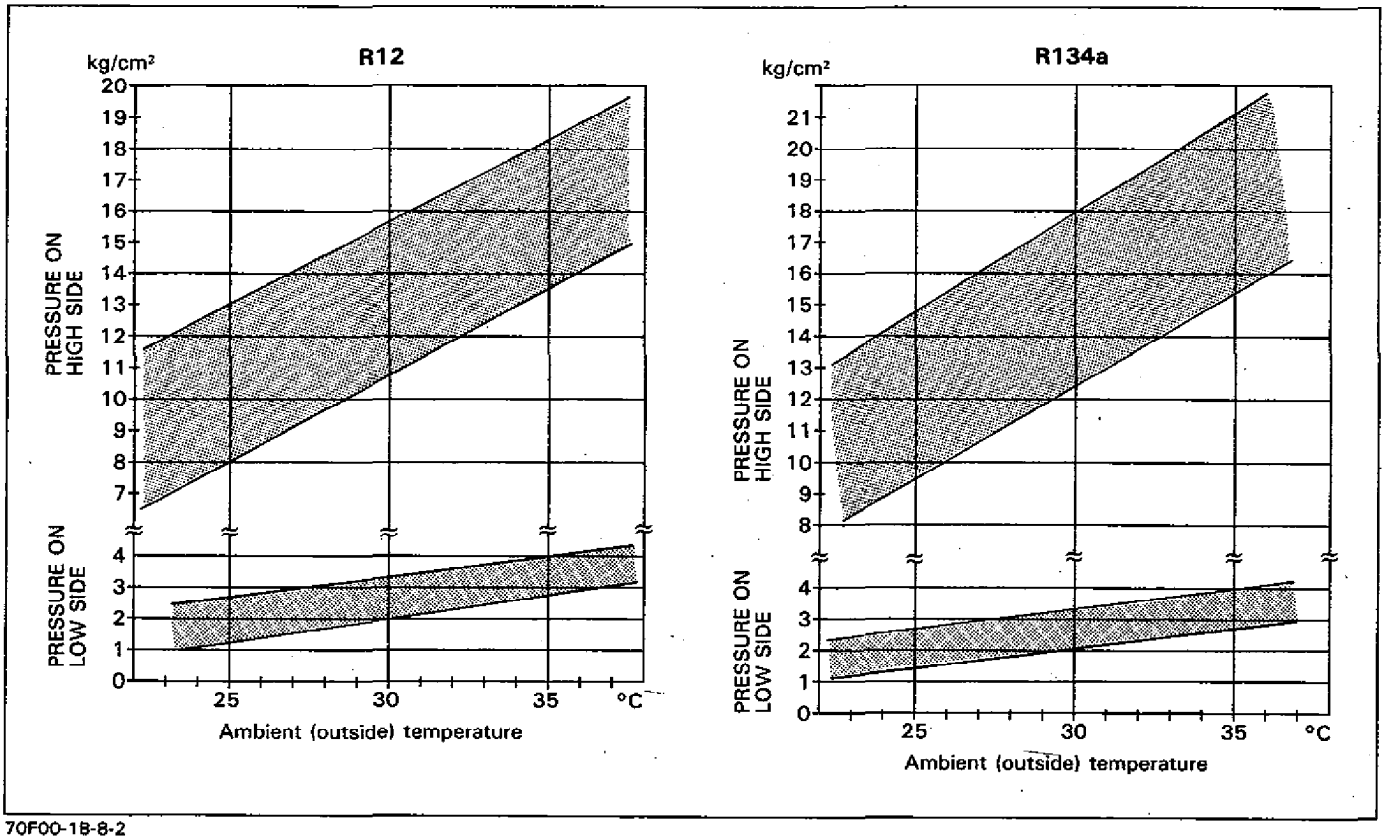
4) Set blower switch at "HI" and temperature lever at "COOL".
5) Check for each pressure of low side and high side if it is within shaded range of following graph.

NOTE:
Pressure registered on gauge varies with ambient temperature. Therefore, use following graphs when determining if pressures are normal or not.

Example:

Gauges should read as follows when ambient temperature is 30°C	
Pressure on high pressure side (HI):	12.5—18.0 kg/cm² (R134a) 10.5—15.5 kg/cm² (R12)
Pressure on low pressure side (LO):	2—3.5 kg/cm² (R134a) 2—3.5 kg/cm² (R12)

If each gauge reading is out of specified pressure, correct defective part referring to following table.



70F00-1B-8-2

GAUGE READINGS (PRESSURES)		CONDITION	POSSIBLE CAUSE	REMEDY
PRESSURE IS LOW AT BOTH LOW AND HIGH SIDES OR AT EITHER SIDE ONLY	Pressure low at both low and high pressure but not as low as to indicate negative pressure.	• Insufficient cooling • Bubbles observed in sight glass	Insufficient refrigerant	1. Check for leakage and repair if necessary. 2. Add refrigerant until bubbles disappear.
	Low pressure side indicates or gradually becomes to indicate negative pressure.	• No cooling • Temperature difference exists between in side pipe and out side pipe of defective part	Clogged refrigerant passage (Refrigerant does not circulate.)	Check and clean or replace such parts as receiver, expansion valve, etc. which is possibly clogged.
	Normal value is indicated at the beginning of A/C operation but low pressure side gauge indicates negative pressure after some time.	Cooling effective at the beginning of A/C operation but not after some time	Expansion valve frozen due to entry of moisture into refrigeration system	1. Replace receiver and check expansion valve. 2. Remove moisture in system through repeatedly evacuating air.
	Pressure at low pressure side sometimes becomes a vacuum and sometimes normal.	Periodically cools and then fails to cool	Moisture present in refrigeration system	
	Pressure too high at low pressure side, pressure too low at high pressure side.	No cooling	Insufficient compression	Repair or replace compressor.
PRESSURE TOO HIGH AT BOTH LOW AND HIGH PRESSURE SIDES	Pressure too high at both low and high pressure sides.	• Insufficient cooling	• Refrigerant overcharged	1. Check charged state (amount) of refrigerant. 2. If refrigerant is overcharged, recover refrigerant, evacuate air and charge proper amount of refrigerant.
			• Insufficient cooling of condenser	1. Clean and repair condenser fins. 2. Check fan motor operation.
		• Insufficient cooling • Low pressure side piping is not cold even when touched • Bubbles observed in sight glass	• Air has entered refrigeration system	Recover refrigerant, evacuate air and charge purified refrigerant.
		• Insufficient cooling • Frost or large amount of dew on piping at low pressure side	• Heat sensing tube of expansion valve improperly mounted, or expansion valve defective (valve opens too wide)	1. Check heat sensing tube installation condition. 2. Check expansion valve and replace if defective.

ON-VEHICLE SERVICE

NOTE

When servicing air conditioning system, the following rules must be observed.

CAUTION:
There is no interchangeability between Refrigerant-134a and Refrigerant-12 or between their compressor oils. As use of wrong refrigerant or compressor oil can cause gas leakage from seals, seisure in the compressor, etc., be sure to use correct refrigerant and compressor oil for the air conditioning system of each vehicle.

REFRIGERANT RECOVERY

When discharging refrigerant out of A/C system, always recover it by using refrigerant recovery and recycling equipment. Discharging refrigerant R-12 into atmosphere would cause adverse effect to environments.

NOTE:
When handling recovery and recycling equipment, be sure to follow the instruction manual for the equipment.

WIRING:

1) Disconnect battery negative terminal to prevent any short circuit.
2) Connect wire connectors securely.
3) When routing a wire harness through a panel hole, previously insert a rubber bushing into the hole for its protection.
4) Use a vinyl tape or original clamps to connect air conditioning wire harness to main wire harness.
5) If original harness has been disconnected or removed while servicing, return it to a proper position.
6) During their installation, be careful not to pinch original clamps and A/C wire harness.
7) When adding lead wires to wire harness by soldering, use those lead wires which share the same diameter and tape each connection.
8) Keep wire harness away from any components moving or subjected to high temperature.
9) Keep connecting portions away from fuel lines.
10) Make sure that wire harness makes no contact to a sharp edge or corner.

70F00-1B-10-1

REFRIGERANT LINES:

1) Never use heat for bending pipes.
   When bending a pipe, try to make a bend as slight as possible.
2) Keep internal parts of A/C free from moisture and dust.
   When disconnecting any line from system, install a blind plug or cap to fitting of such line immediately.
3) When connecting hoses and pipes to each other respectively, previously apply a few drops of refrigerating oil to seats of coupling nuts and O-ring.
4) When tightening or loosening a fitting, use two wrenches, one for turn and the other for support.
5) Reciver/dryer inlet fitting must be connected to the pipe from condenser outlet fitting.
6) Tighten flare nuts and connecting bolts according to specified torque described in next page.
7) Route drain hose so that drained water does not make any contact to car components.

70F00-1B-10-2

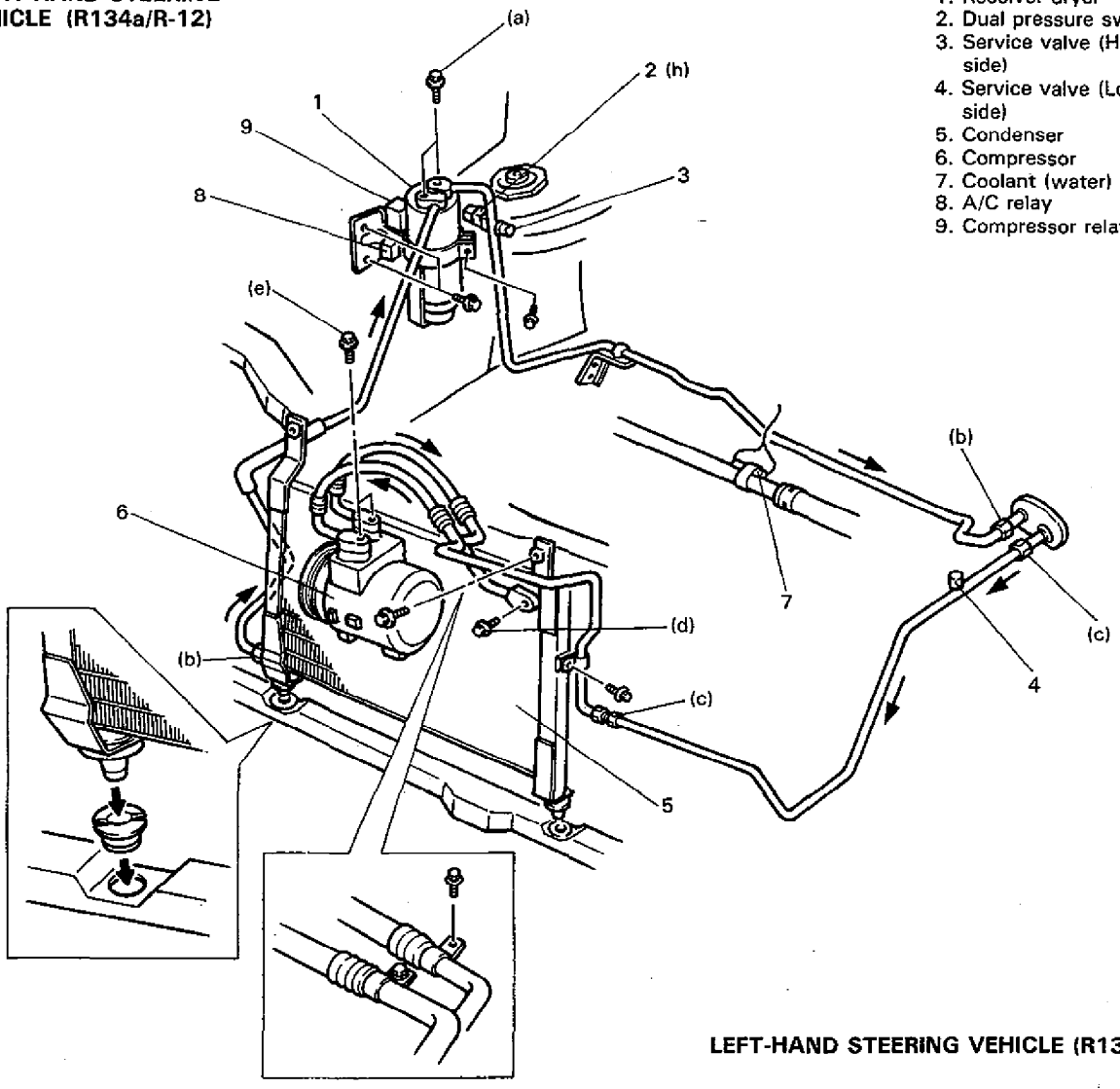
HANDLING REFRIGERANT-134a (or 12)

1) When handling refrigerant, alway wear goggles to protect your eyes.
2) Avoid you direct contact to liquid refrigerant.
3) Do not heat refrigerant container higher than 40°C (100°F).
4) Do not discharge refrigerant into atmosphere.
5) Do not allow liquid refrigerant to touch bright metals. Refrigerant combined with moisture is corrosive and will tarnish surfaces of bright metals including chrome.
6) After recovering refrigerant from system, the amount of compressor oil removed must be measured and the same amount added to the system.

WARNING:
Should Refrigerant-134a (12) strike your eye(s), consult a doctor immediately.
- **DO NOT USE YOUR HAND TO RUB AFFECTED EYE(S). Instead, use quantities of fresh cold water to splash it over affected area to thus gradually raise its temperature above the freezing point.**
- **Obtain proper treatment as soon as possible from a doctor or eye specialist. Should liquid R-134a (12) get on your skin, such affected part should be treated in the same manner as when skin is frostbitten or frozen.**

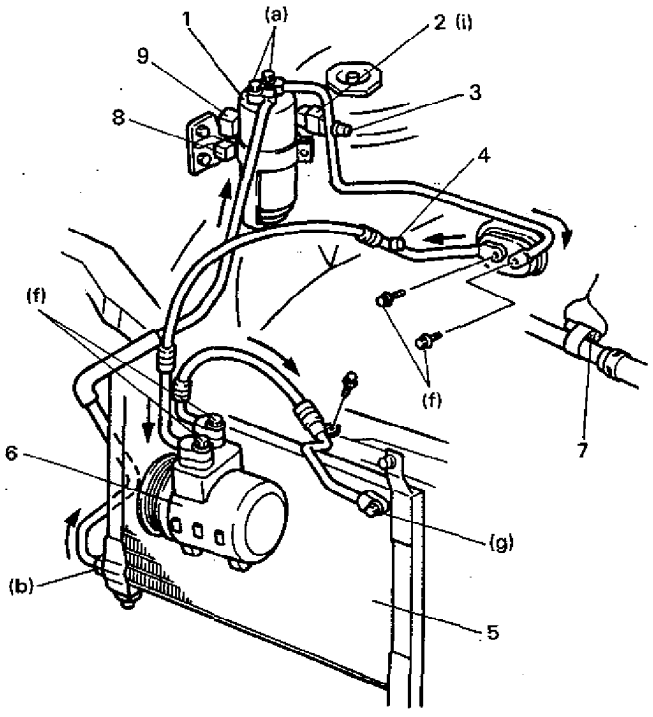
70F00-1B-10-3

RIGHT-HAND STEERING VEHICLE (R134a/R-12)

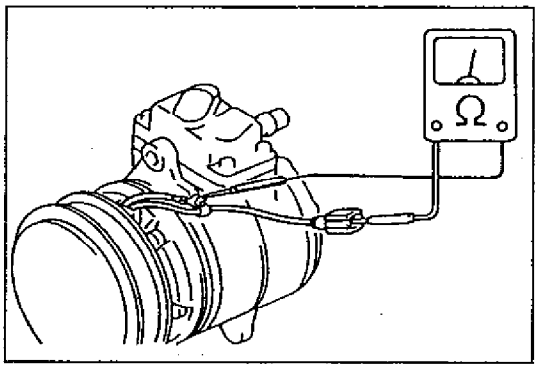


1. Receiver dryer
2. Dual pressure switch
3. Service valve (High pressure side)
4. Service valve (Low pressure side)
5. Condenser
6. Compressor
7. Coolant (water) temp. switch
8. A/C relay
9. Compressor relay

LEFT-HAND STEERING VEHICLE (R134a)



Tightening torque
(a): 5.5 N·m (0.55 kg-m, 4.0 lb-ft)
(b): 14.0 N·m (1.4 kg-m, 10.5 lb-ft)
(c): 33.0 N·m (3.3 kg-m, 24.0 lb-ft)
(d): R134a, M6
10.0 N·m (1.0 kg-m, 7.5 lb-ft)
R12, M8
18.5 N·m (1.85 kg-m, 13.5 lb-ft)
(e): R134a, M6
12.0 N·m (1.2 kg-m, 9.0 lb-ft)
R12, M8
25.0 N·m (2.5 kg-m, 18.5 lb-ft)
(f) : 12.0 N·m (1.2 kg-m, 9.0 lb-ft)
(g): 10.0 N·m (1.0 kg-m, 7.5 lb-ft)
(h): R134a, 11.0 N·m (1.1 kg-m, 8.0 lb-ft)
R12, 10.0 N·m (1.0 kg-m, 7.5 lb-ft)
(i) : 11.0 N·m (1.1 kg-m, 8.0 lb-ft)



70F00-1B-12-1

COMPRESSOR

INSPECTION

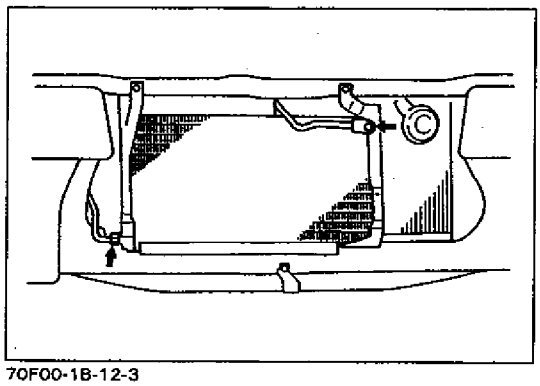
1) Inspect pressure plate and rotor for signs of oil.
2) Check clutch bearings for noise and grease leakage.
3) Using an ohmmeter, measure resistance of stator coil between clutch lead wire and ground.
   If measured resistance is not within tolerance, replace coil.

   Standard resistance: 3.2 ± 0.2 Ω

REMOVAL

1) Run engine at idle with air conditioning on for ten minutes.
2) Disconnect battery negative terminal.
3) Remove front grille.
4) Remove front bumper.
5) Recover refrigerant from refrigeration system using recovery and recycling equipment.
6) Disconnect clutch stator lead wire from A/C wire harness.
7) Disconnect condenser fan lead wire at coupler.

70F00-1B-12-2

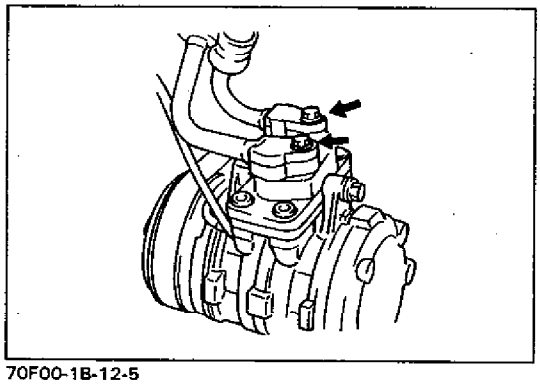

70F00-1B-12-3

8) Remove compressor delivery hose from condenser inlet fittings.
9) Disconnect condenser outlet pipe from condenser outlet fittings.

   NOTE:
   As soon as the above hose and pipe disconnected, cap opened fittings so that moisture and dust do not enter condenser.

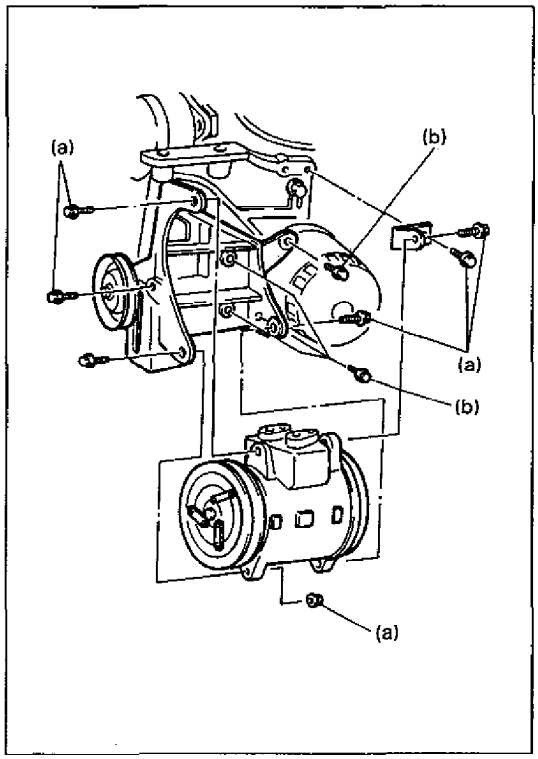
10) Remove condenser attaching bolts.
11) Remove condenser together with fan.

70F00-1B-12-4


70F00-1B-12-5

12) Disconnect suction and discharge flexible hoses from compressor.

    NOTE:
    Cap open fittings immediately to keep moisture out of system.



70F00-1B-13-1

13) Loosen compressor drive belt, then remove compressor mounting bolts.
14) Remove compressor with clutch assembly from its mounts.

INSTALLATION

1) Reverse removal procedure to install compressor.
When installing new compressor, take out extra amount of oil which is 40 cc (1.35/1.41 US/Imp. oz) from new compressor.

Tightening Torque
(a): 30 N·m (3.0 kg-m, 21.5 lb-ft)
(b): 50 N·m (5.0 kg-m, 36.0 lb-ft)

2) Evacuate air from A/C system, charge A/C system with refrigerant and check from gas leakage.

Amount of refrigerant: 500—600 g (1.1—1.3 lb)

CONDENSER

INSPECTION

Check a) condenser fins for blockage, b) condenser fittings for leakage, and c) condenser fins for damage. Clogged condenser fins should be washed with water, and should be dried with compressed air.

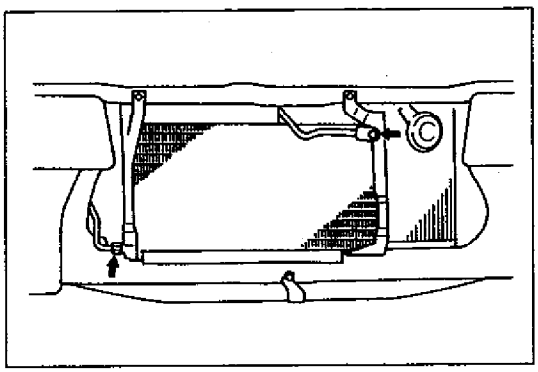
NOTE:
Be careful not to damage condenser fins. If any condenser fins are bent, straighten them using a screwdriver or pair of pliers. If any leakage is found from fitting or tube, repair or replace condenser.

70F00-1B-13-3

REMOVAL

1) Recover refrigerant from refrigeration system using recovery and recycling equipment.
2) Remove front grille.
3) Remove front bumper.
4) Disconnect condenser fan lead wire at coupler.

70F00-1B-13-5



70F00-1B-14-1

5) Remove compressor delivery hose from condenser inlet fittings.
6) Disconnect condenser outlet pipe from condenser outlet fittings.

NOTE:
As soon as the above hose and pipe disconnected, cap opened fittings so that moisture and dust do not enter condenser.

7) Remove condenser attaching bolts.
8) Remove condenser together with fan.

NOTE:
Be carefull not to damage fins of condenser.

9) Remove cooling fan from condenser.

70F00-1B-14-2

INSTALLATION
1) Reverse removal procedure to install condenser. When replacing condenser, add 10—20 cc (0.34/0.35—0.68/0.70 US/Imp. oz) of refrigerating oil from compressor suction-side.
2) Evacuate air from A/C system, charge A/C system with refrigerant and check gas leakage.

Amount of refrigerant: 500—600 g (1.1—1.3 lb)

70F00-1B-14-3

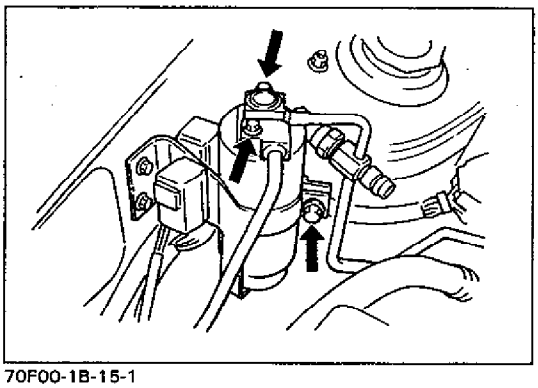
RECEIVER DRYER

Use a leak tester to check for leakage around sight glass, fusible plug and fittings.

70F00-1B-14-4

REMOVAL
1) Recover refrigerant from refrigeration system using recovery and recycling equipment.

70F00-1B-14-5



70F00-1B-15-1

2) Disconnect liquid line pipes from receiver dryer inlet an outlet fittings.
3) Remove receiver dryer from its holder.

INSTALLATION

1) Reverse removal procedure to install receiver dryer, add 10 cc (0.34/0.35 US/Imp. oz) of refrigerating oil from compressor suction-side.
   Blind plugs of receiver dryer should not be removed until just before receiver dryer is installed.
2) Evacuate air from A/C system, charge A/C system with refrigerant and check gas leakage.

   Amount of refrigerant: 500—600 g (1.1—1.3 lb)

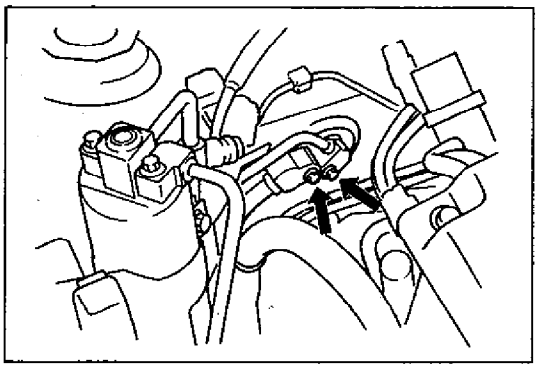
70F00-1B-15-2

EVAPORATOR (COOLING UNIT)

REMOVAL

1) Disconnect battery (ground) terminal.
2) Recover refrigerant from refrigeration system using recovery and recycling equipment.
3) Remove following parts.
   a. Glove box door and upper panel from instrument panel.
   b. Air dumper case from evaporator unit.
   c. Heater to evaporator connecting stay from evaporator unit.

70F00-1B-15-3

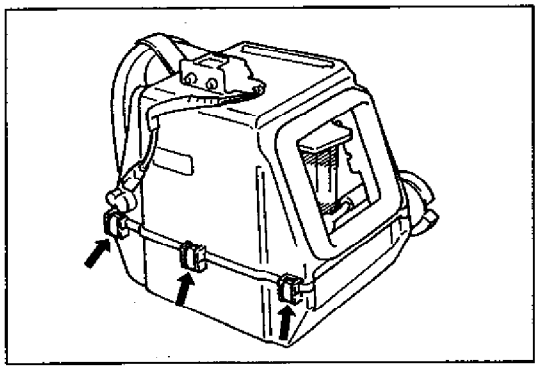


70F00-1B-15-4

4) Disconnect compressor suction hose and receiver dryer outlet pipe from evaporator unit (cooling unit) fittings at engine room.

   NOTE:
   As soon as above hose and pipe are disconnected, be sure to cap opened fittings so that moisture and dust do not enter cooling unit.

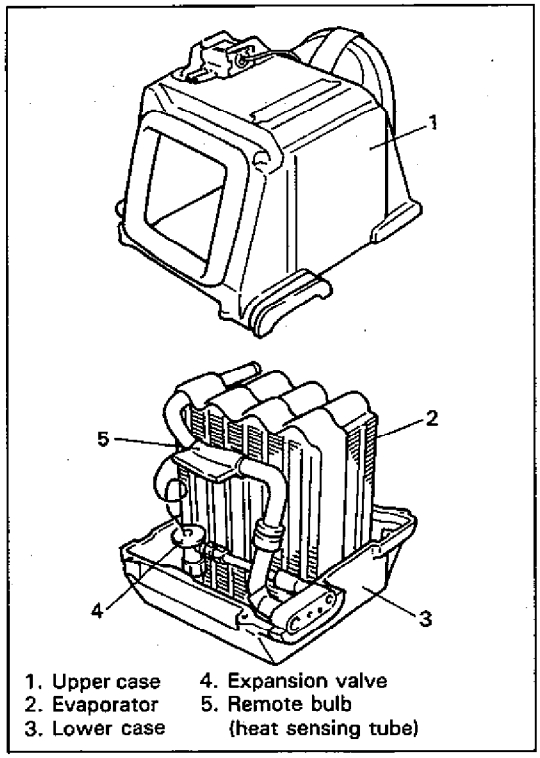
5) Remove its attaching bolts to remove evaporator unit.



70F00-1B-16-1

DISASSEMBLY

1) Detach clamps and screws to separate evaporator upper and lower cases from each other. (left figure.)
2) Pull out thermister of evaporator thermal switch from between evaporator fins.



1. Upper case
2. Evaporator
3. Lower case
4. Expansion valve
5. Remote bulb (heat sensing tube)

70F00-1B-16-2

3) Take out evaporator from upper and lower cases.
4) Detach following components from evaporator.
   a. Pipe.
   b. Expansion valve.

INSPECTION

1) Check evaporator fins for blockage. If found clogged, use compressed air to clean fins.

   NOTE:
   Do not use water for cleaning evaporator.

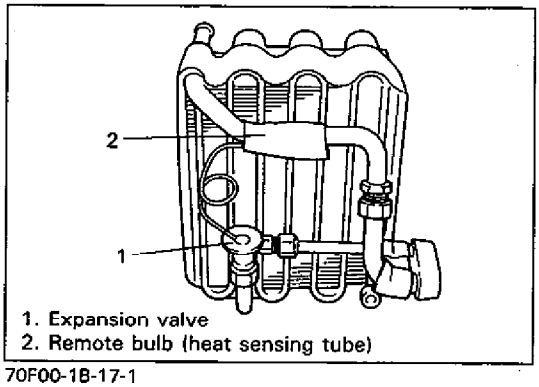
2) Check inlet and outlet fittings for crack or scratches. Repair as required.

70F00-1B-16-4

INSTALLATION

1) Reverse removal and disassembly procedure to install evaporator, add 20 cc (0.68/0.70 US/Imp. oz) of refrigerating oil from compressor suction-side.
2) Evacuate air from A/C system, charge A/C system with refrigerant and check gas leakage.

   Amount of refrigerant: 500—600 g (1.1—1.3 lb)



1. Expansion valve
2. Remote bulb (heat sensing tube)

70F00-1B-17-1

EXPANSION VALVE

REMOVAL

Refer to Removal and Disassembly of evaporator (cooling unit) described in previous page.

INSTALLATION

1) Reverse removal procedure to install expansion valve.
2) Evacuate air from A/C system, charge A/C system with refrigerant and check for gas leakage.

Amount of refrigerant: 500—600 g (1.1—1.3 lb)

70F00-1B-17-2

REFRIGERANT LINE

INSPECTION

1) Use leak tester to check hoses and pipes for any gas leakage.
2) Check to see if each hose or pipe has any loose clamps. Retighten or replace loosened clamp as required.

70F00-1B-17-3

REMOVAL

1) Recover refrigerant by using recovery and recycling equipment. Be sure to follow the instruction manual for the equipment. The amount of compressor oil removed must be measured and the same amount added to the system.
2) Replace defective hose or pipe.

NOTE:
As soon as hose or pipe is disconnected, be sure to cap opened fitting from which it is disconnected to prevent moisture and dust from entry.

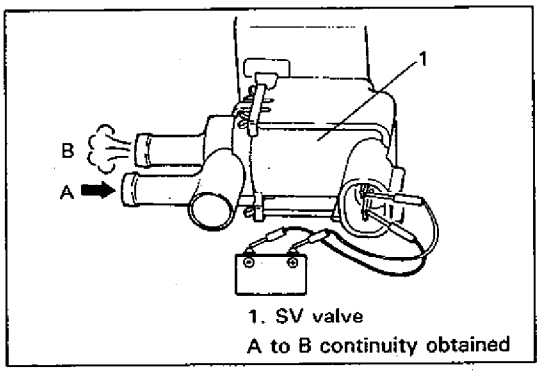
70F00-1B-17-4

INSTALLATION

1) Reverse removal procedure to install refrigerant line. Be sure to tighten flare nuts and connecting bolts to specified torque.
2) Evacuate air from A/C system, charge A/C system with refrigerant and check for gas leakage.

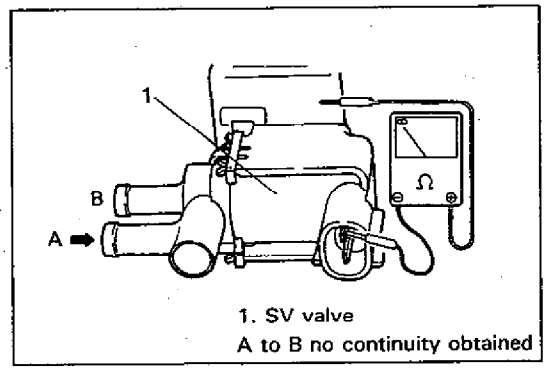
Amount of refrigerant: 500—600 g (1.1—1.3 lb)

70F00-1B-17-5



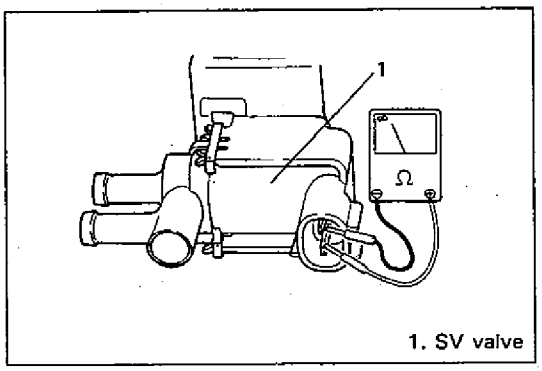
1. SV valve
A to B continuity obtained

70F00-1B-18-1



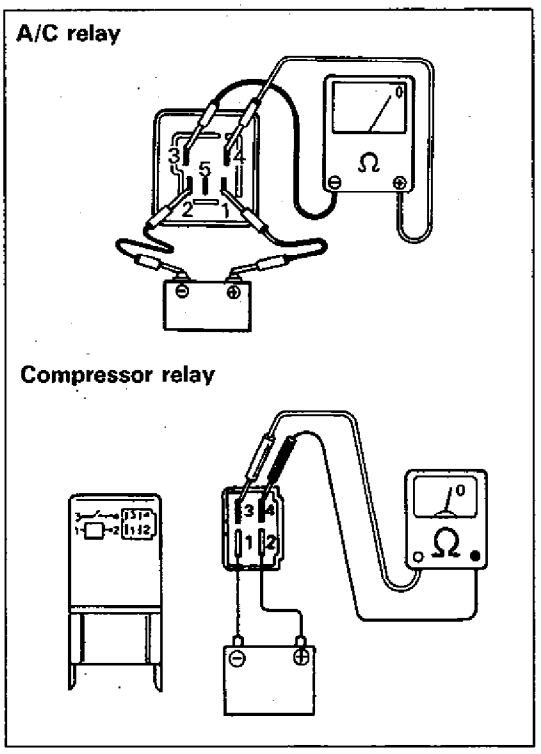
1. SV valve
A to B no continuity obtained

70F00-1B-18-2



1. SV valve

70F00-1B-18-3



70F00-1B-18-4

AIR CONDITIONING SOLENOID VACUUM VALVE (A/C SV VALVE)

INSPECTION

1) Disconnect vacuum hose and connector from SV valve.
2) Check SV valve for proper vacuum circuit continuity.

3) Check SV valve for short circuit.
   No continuity should exist between each terminal and SV valve body.

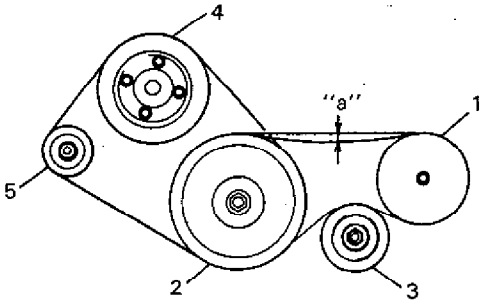
4) Check SV valve for open circuit.
   Measure resistance between two terminals of SV valve.

Specified Resistance
For fuel injection model: 30—34 Ω
For carburetor model : 37—44 Ω

A/C RELAY AND COMPRESSOR RELAY

INSPECTION

1) Disconnect the battery (—) cable.
2) Disconnect its connector to remove relay out of position.
3) Wire as shown to check whether continuity is obtained between terminals 3 and 4.
   If found defective with no continuity, replace relay.



1. A/C compressor pulley
2. Crankshaft pulley
3. Tension pulley
4. Water pump pulley
5. Generator

70F00-1B-19-1

DRIVE BELT

INSPECTION

1) Check belt for wear and crack, and replace it as required.
2) Check belt tension by measuring how much it deflects when pushed at intermediate point between A/C compressor pulley and crank pulley with about 10 kg (22 lb) force.

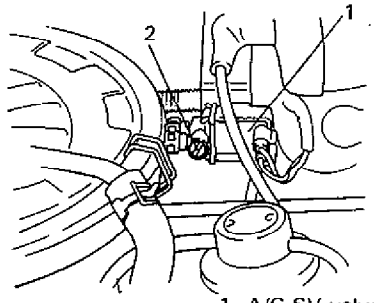
Deflection of A/C belt
"a": 5—10 mm (0.20—0.39 in.)

IDLE SPEED ADJUSTMENT WITH A/C ON

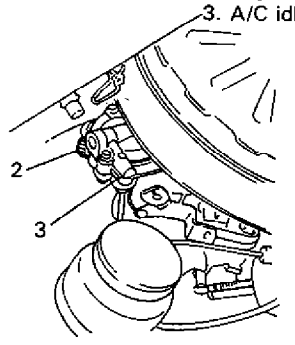
1) Start engine and warm it up to normal operating temperature.
2) Run engine at 2000 r/min. for 60 seconds to warm it up completely and let it slow down to idle speed.
3) After warming up, check to be sure that the idle speed is within specification. If idle speed is out of specification, adjust it by turning the idle speed adjusting screw. Refer to SECTION 6E (6D).

70F00-1B-19-3

For Fuel injection model



For Carburetor model



1. A/C SV valve
2. Adjusting screw
3. A/C idle-up actuator

70F00-1B-19-4

4) Turn A/C ON, check to be sure that the idle speed is within specification below.

Idle speed with A/C ON: 1000±50 r/min

If idle speed is out of specification, adjust by turning the adjusting screw of A/C SV valve (A/C idle-up actuator).

SECTION 2

BUMPERS AND SHEET METAL

CONTENTS

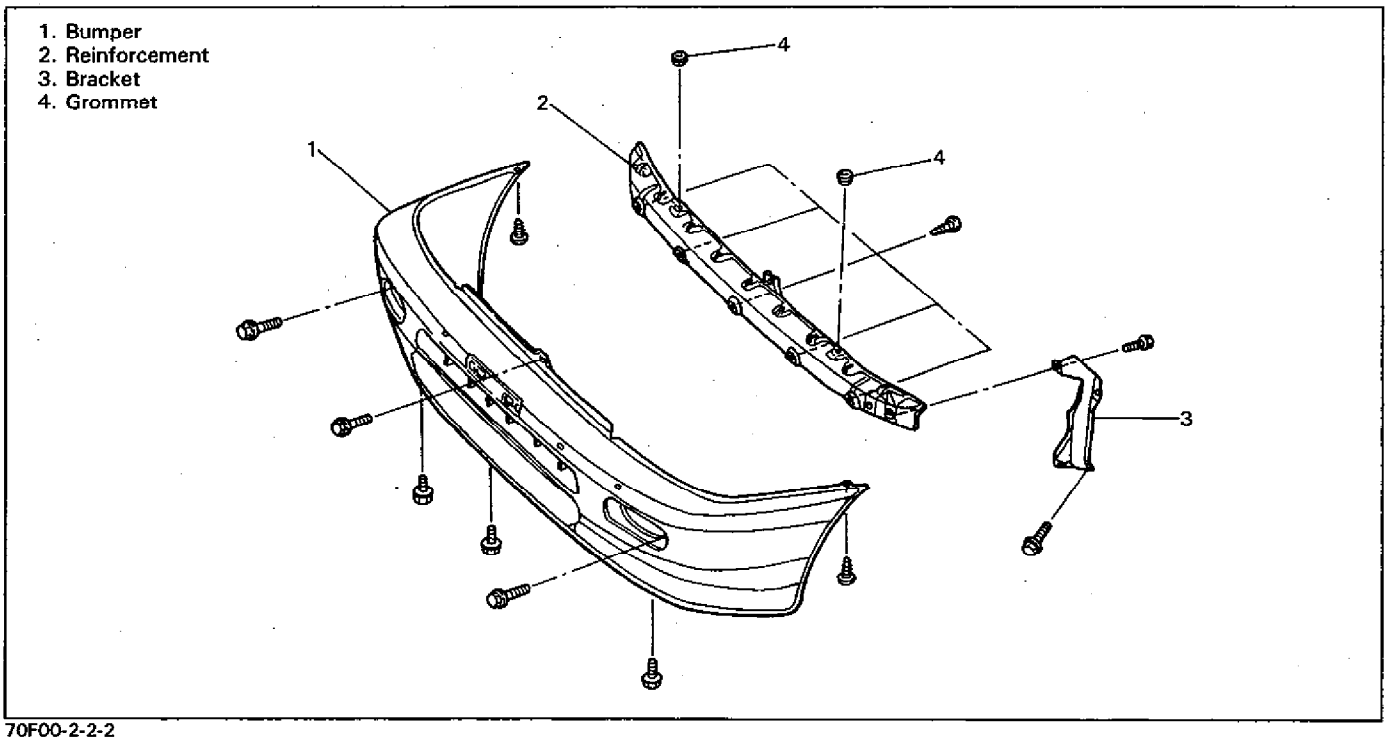
70F00-2-1-1

BUMPERS

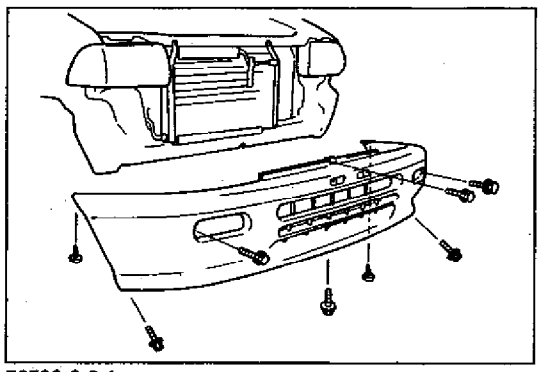
NOTE:
Fasteners are important attaching parts in that they could affect the performance of vital components and systems, and/or could result in major repair expense. They must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary.
Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of these parts.

64B40-2-2-1

FRONT BUMPER



70F00-2-2-2



70F00-2-2-4

REMOVAL

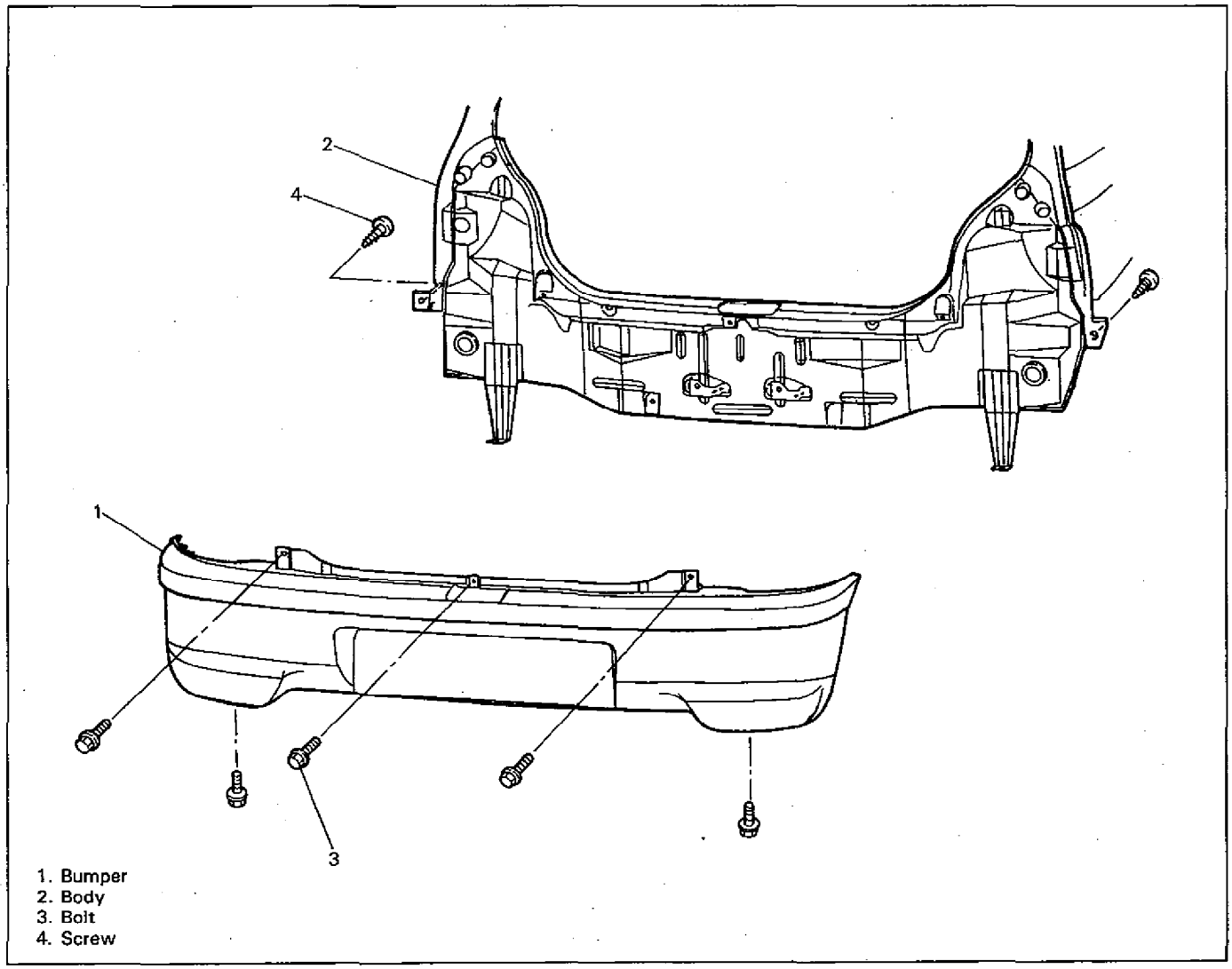
1) Remove front grille.
2) Remove front turn signal lamps.
3) Remove bumper with reinforcement and bracket from body.
4) Separate bumper from reinforcement and bracket.

INSTALLATION

1) Install removed parts in reverse order of removal.

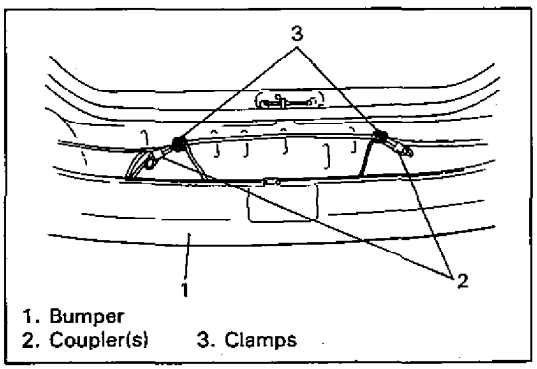
70F00-2-2-5

REAR BUMPER



1. Bumper
2. Body
3. Bolt
4. Screw

70F00-2-3-1



1. Bumper
2. Coupler(s)
3. Clamps

70F00-2-3-4

REMOVAL

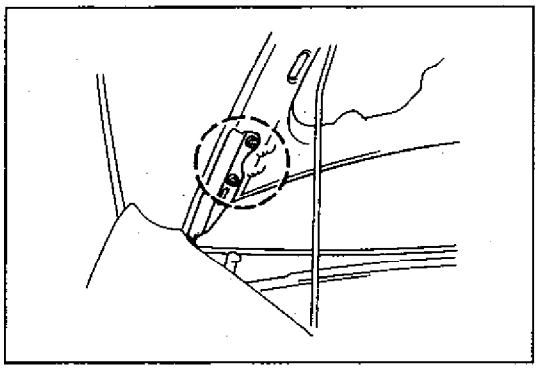
1) Remove bumper fixing bolts and screws as shown in above figure.
2) Disconnect coupler(s) of licence plate light and rear fog light (if equipped), and then remove bumper from body.

INSTALLATION

Reverse removal procedure for installation.

NOTE:

Be sure to fix wire harness with clamps securely.



70F00-2-4-1

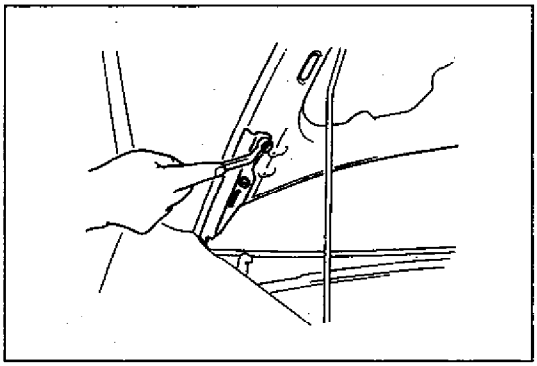
HOOD

REMOVAL

Remove four mounting bolts to detach hood.

INSTALLATION

Install hood and adjust it as necessary.

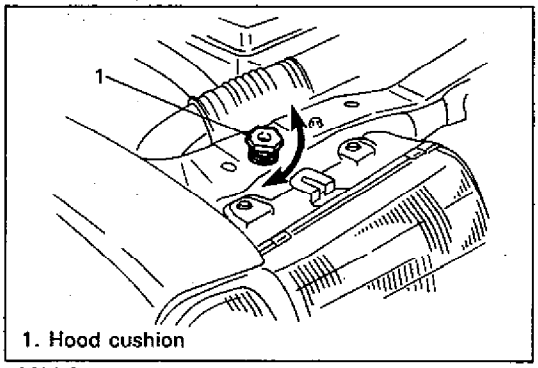


70F00-2-4-2

ADJUSTMENT

Fore-and-aft and right-and-left adjustment

Slacken four mounting bolts for adjustment.

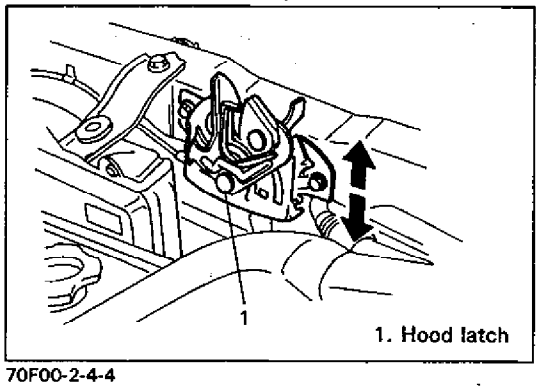


1. Hood cushion

70F00-2-4-3

Vertical adjustment

If only one side (right or left) of hood is not level with front fender, make it level by tightening or loosening hood cushion.



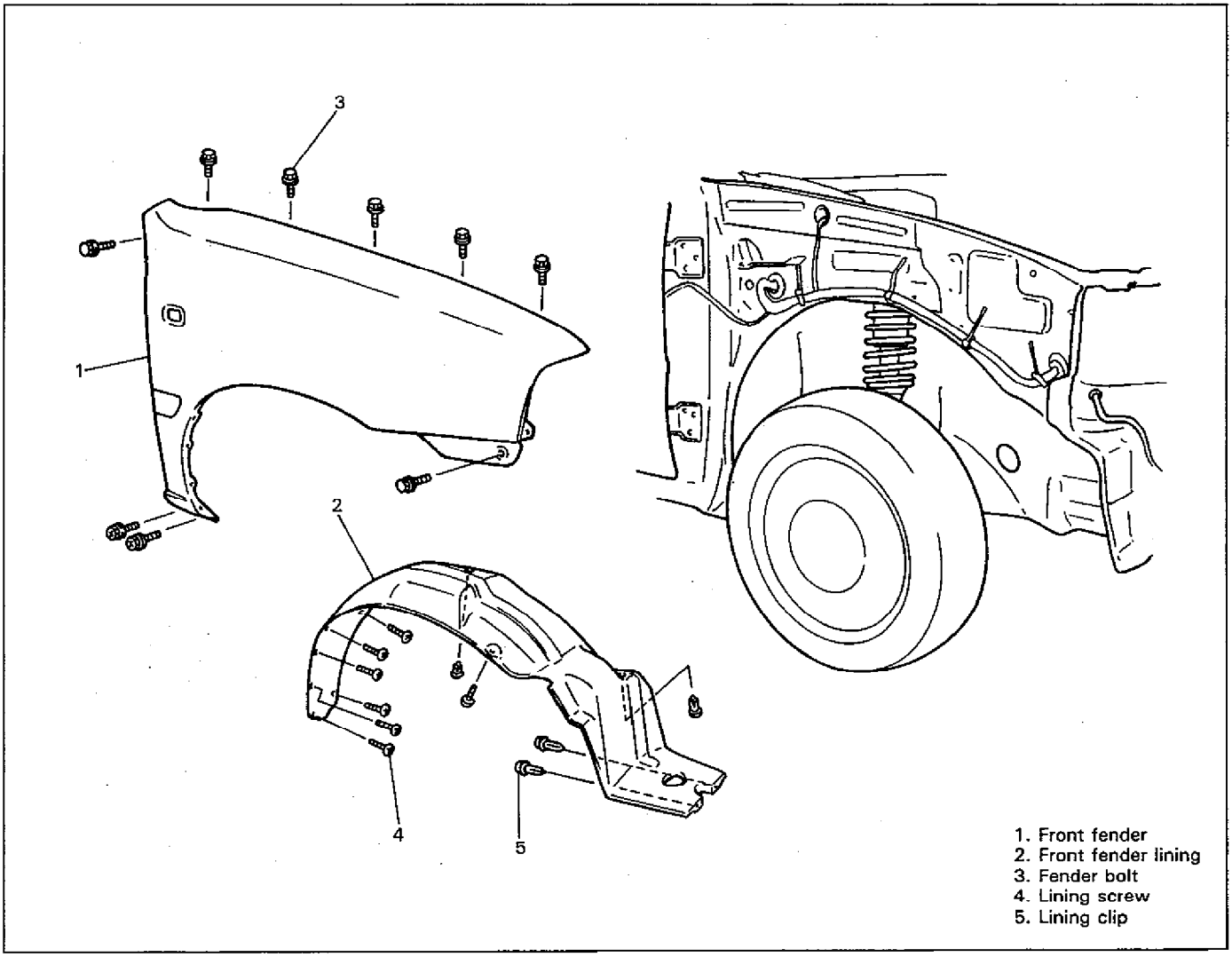
1. Hood latch

70F00-2-4-4

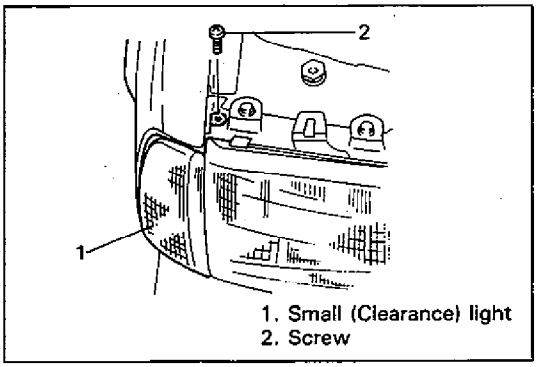
Hood lock adjustment

Adjust latch position by loosening latch bolts as necessary.

FRONT FENDER



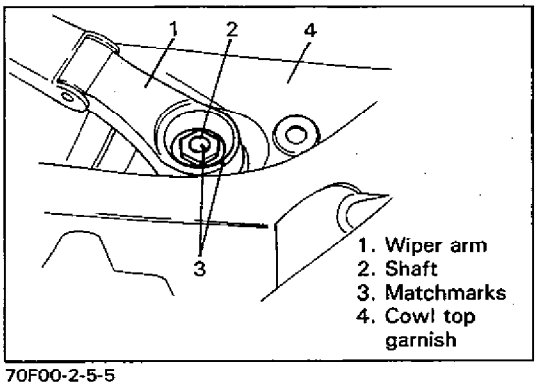
70F00-2-5-1



70F00-2-5-4

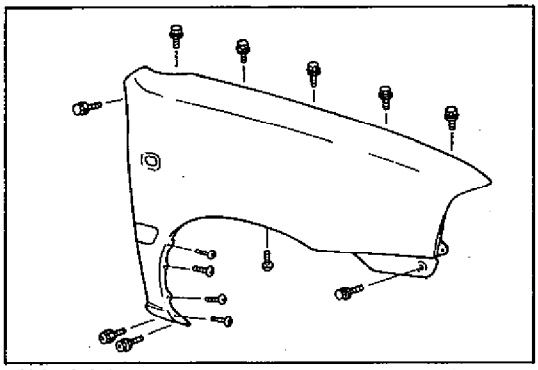
REMOVAL

1) Remove front bumper with reinforcement and bracket from body.
2) Remove small (clearance) light.



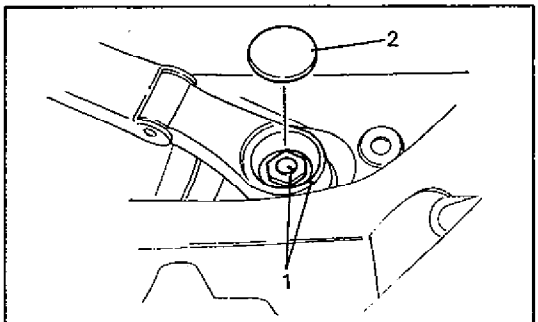
70F00-2-5-5

3) Place matchmarks on both wiper arm and shaft, and then remove wiper arms (right & left).
4) Remove cowl top garnish.



70F00-2-6-1

5) Remove fender fixing bolts and screws.
6) Detach fender from body and then remove side turn signal light from fender.



1. Matchmarks 2. Cap

70F00-2-6-2

INSTALLATION

Reverse removal procedure for installation noting the following.

- When installing wiper arm to shaft, align matchmarks on shaft and arm.
- Be sure to install cap on wiper arm securely.

SECTION 3

STEERING, SUSPENSION, WHEELS AND TIRES

3

CONTENTS

70F00-3-1-1

GENERAL DESCRIPTION

Since the problems in steering, suspension, wheels and tires involve several systems, they must all be considered when diagnosing a complaint. To avoid using the wrong symptom, always road test the vehicle first. Proceed with the following preliminary inspection and correct any defects which are found.

1) Inspect tires for proper pressure and uneven wear.
2) Raise vehicle on a hoist and inspect front and rear suspension and rack and pinion for loose or damaged parts.
3) Spin front wheels. Inspect for out-of-round tires, out-of-balance tires, bent rims, loosen and/or rough wheel bearings.

GENERAL DIAGNOSIS CHART A

Condition	Possible Cause	Correction
Vehicle Pulls (Leads)	1. Mismatched or uneven tires.	Replace tire.
	2. Tires not adequately inflated.	Adjust tire pressure.
	3. Broken or sagging springs.	Replace spring.
	4. Radial tire lateral force.	Replace tire.
	5. Disturbed front end alignment.	Check and adjust front end alignment.
	6. Disturbed rear wheel alignment.	Check and adjust rear wheel alignment.
	7. Brake dragging in one road wheel.	Repair brake system.
	8. Loose, bent or broken front or rear suspension parts.	Tighten or replace suspension parts.

70F00-3-1-2

GENERAL DIAGNOSIS CHART B

Condition	Possible Cause	Correction
Abnormal or Excessive Tire Wear	1. Sagging or broken spring.	Replace spring.
	2. Tire out of balance.	Adjust balance or replace tire.
	3. Disturbed front or rear end alignment.	Check and adjust front end alignment.
	4. Faulty strut (shock absorber).	Replace strut.
	5. Hard driving.	Replace tire.
	6. Overloaded vehicle.	Replace tire.
	7. Not rotating tire.	Replace or rotate tire.
	8. Worn or loose road wheel bearing.	Replace wheel bearing.
	9. Wobbly wheel or tire.	Replace wheel or tire.
	10. Tires not adequately inflated.	Adjust tire pressure.
Wheel Tramp	1. Blister or bump on tire.	Replace tire.
	2. Improper strut (shock absorber) action.	Replace strut.
Shimmy, Shake or Vibration	1. Tire or wheel out of balance.	Balance wheels or replace tire and/or wheel.
	2. Loosen wheel bearings.	Replace wheel bearing.
	3. Worn tie rod ends.	Replace tie rod end.
	4. Worn lower ball joints.	Replace front suspension arm.
	5. Excessive wheel runout.	Repair or replace wheel and/or tire.
	6. Blister or bump on tire.	Replace tire.
	7. Excessively loaded radial runout of tire/wheel assembly.	Replace tire or wheel.
	8. Disturbed front end alignment.	Check and adjust front end alignment.
	9. Loose or worn steering linkage.	Tighten or replace steering linkage.
	10. Loose steering gear case bolts.	Tighten case bolts.
Hard Steering	1. Bind in tie rod end ball studs or lower ball joints.	Replace tie rod end or front suspension arm.
	2. Disturbed front end alignment.	Check and adjust front end alignment.
	3. Rack and pinion out of adjustment.	Check and adjust rack & pinion torque.
	4. Tire not adequately inflated.	Inflate tires to proper pressure.
	5. Bind in steering column.	Repair or replace.

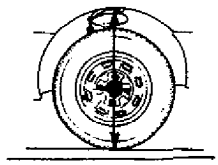
70F00-3-2-1

GENERAL DIAGNOSIS CHART C

Condition	Possible Cause	Correction
Too Much Play In Steering	1. Wheel bearings worn.	Replace.
	2. Rack and pinion attachments loose.	Tighten or repair.
	3. Rack and pinion out of adjustment.	Check and adjust rack & pinion torque.
	4. Worn steering shaft joints.	Replace joint.
	5. Worn tie rod ends or tie rod inside ball joints.	Replace tie rod end or tie rod.
	6. Worn lower ball joints.	Replace front suspension control arm.
Poor Returnability	1. Bind in tie rod end ball studs.	Replace tie rod end.
	2. Bind in ball joints.	Replace.
	3. Bind in steering column.	Repair or replace.
	4. Poorly lubricated rack and pinion.	Check, repair or lubricate rack & pinion.
	5. Disturbed front end alignment.	Check and adjust front end alignment.
	6. Rack and pinion out of adjustment.	Check and adjust rack & pinion torque.
	7. Tires not adequately inflated.	Adjust tire pressure.
Rack and Pinion Noise (Rattle or Chuckle)	1. Rack and pinion attachments loose.	Tighten steering gear case mounting bolts.
	2. Worn rack bush.	Replace.
	3. Rack and pinion out of adjustment.	Check and adjust rack & pinion torque.
Abnormal Noise, Front End	1. Worn, sticky or loose tie rod ends, lower ball joints, tie rod inside ball joints or drive shaft joints.	Replace tie rod end, suspension arm, tie rod or drive shaft joint.
	2. Damaged struts or mountings.	Repair or replace.
	3. Worn suspension arm bushings.	Replace.
	4. Loose stabilizer bar.	Tighten bolts or nuts, replace bushes.
	5. Loose wheel nuts.	Tighten wheel nuts.
	6. Loose suspension bolts or nuts.	Tighten suspension bolts or nuts.
	7. Broken or otherwise damaged wheel bearings.	Replace.
	8. Broken suspension springs.	Replace.
	9. Poorly lubricated or worn strut bearings.	Lubricate or replace strut bearing.

70F00-3-3-1

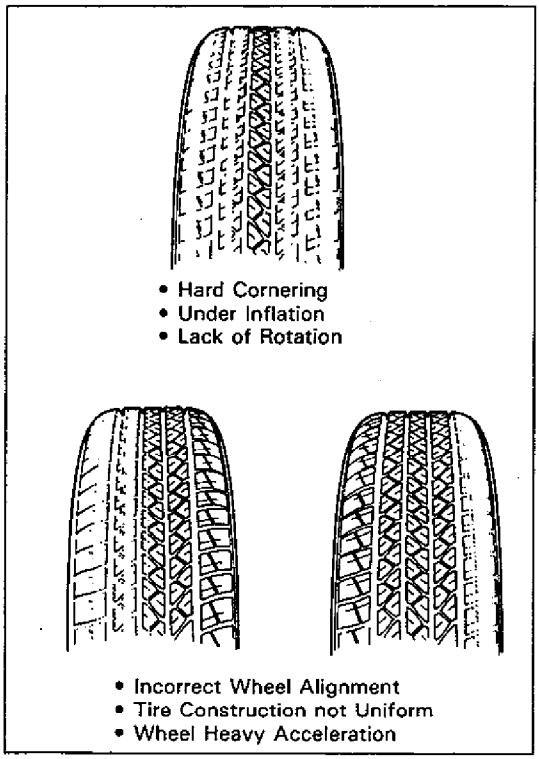
GENERAL DIAGNOSIS CHART D

Condition	Possible Cause	Correction
Wander Or Poor Steering Stability	1. Mismatched or uneven tires.	Replace or inflate tires to proper pressure.
	2. Loosen ball joints and tie rod ends.	Replace suspension arm or tie rod end.
	3. Faulty struts or mounting.	Replace strut or repair mounting.
	4. Loose stabilizer bar.	Tighten or replace stabilizer bar or bush.
	5. Broken or sagging springs.	Replace spring.
	6. Rack and pinion out of adjustment.	Check and adjust rack and pinion torque.
	7. Front end alignment.	Check and adjust front end alignment.
Erratic Steering When Braking	1. Worn wheel bearings.	Replace.
	2. Broken or sagging springs.	Replace coil spring.
	3. Wheel tires are inflated unequally.	Inflate tires to proper pressure.
	4. Disturbed front end alignment.	Check and adjust front end alignment.
	5. Brakes not working in unison.	Refer to Section 5.
Low Or Uneven Trim Height Right-to-left trim height (H) difference should be within 15 mm (0.6 in) with curb weight.  *Same with rear side.	1. Broken or sagging springs.	Replace.
	2. Over loaded.	Check loading.
	3. Incorrect springs.	Replace.
Ride Too Soft	1. Faulty struts (shock absorber).	Replace strut.
Suspension Bottoms	1. Overloaded.	Check loading.
	2. Faulty struts (shock absorber).	Replace strut.
	3. Incorrect broken or sagging springs.	Replace.

70F00-3-4-1

GENERAL DIAGNOSIS CHART E		
Condition	**Possible Cause**	**Correction**
Body Leans Or Sways In Corners	1. Loose stabilizer bar.	Tighten stabilizer bar bolts or nuts, or replace bushes or joint.
	2. Faulty struts (shock absorbers) or mounting.	Replace strut or tighten mounting.
	3. Broken or sagging springs.	Replace.
	4. Overloaded.	Check loading.
Cupped Tires	1. Front struts defective.	Replace.
	2. Worn wheel bearings.	Replace.
	3. Excessive tire or wheel run-out.	Replace tire or wheel disc.
	4. Worn ball joints.	Replace front suspension arm.
	5. Tire out of balance.	Adjust tire balance.

64B40-3-5-1



64B40-3-6-1

TIRE DIAGNOSIS

IRREGULAR AND/OR PREMATURE WEAR

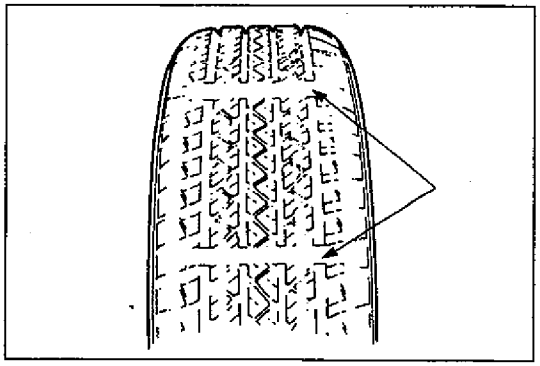
Irregular and premature wear has many causes. Some of them are: incorrect inflation pressures, lack of tire rotation, driving habits, improper alignment.

If the following conditions are noted, rotation is necessary:

1. Front tire wear is different from rear.
2. Uneven wear exists across the tread of any tire.
3. Front tire wear is unequal between the right and left.
4. Rear tire wear is unequal between the right and left.
5. There is cupping, flat spotting, etc.

A wheel alignment check is necessary if following conditions are noted:

1. Front tire wear is unequal between the right and left.
2. Wear is uneven across the tread of any front tire.
3. Front tire treads have scuffed appearance with "feather" edges on one side of tread ribs or blocks.

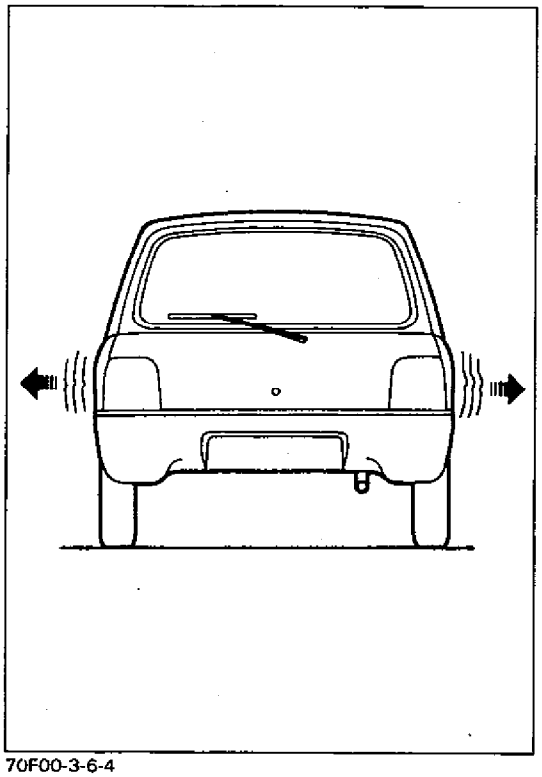


70F00-3-6-3

WEAR INDICATORS

Original equipment tires have built-in tread wear indicators to show when they need replacement.

These indicators will appear as 10 mm (0.39 inch) wide bands when the tire tread depth becomes 1.6 mm (0.063 inch). When the indicators appear in 3 or more grooves at 6 locations, tire replacement is recommended.



70F00-3-6-4

RADIAL TIRE WADDLE

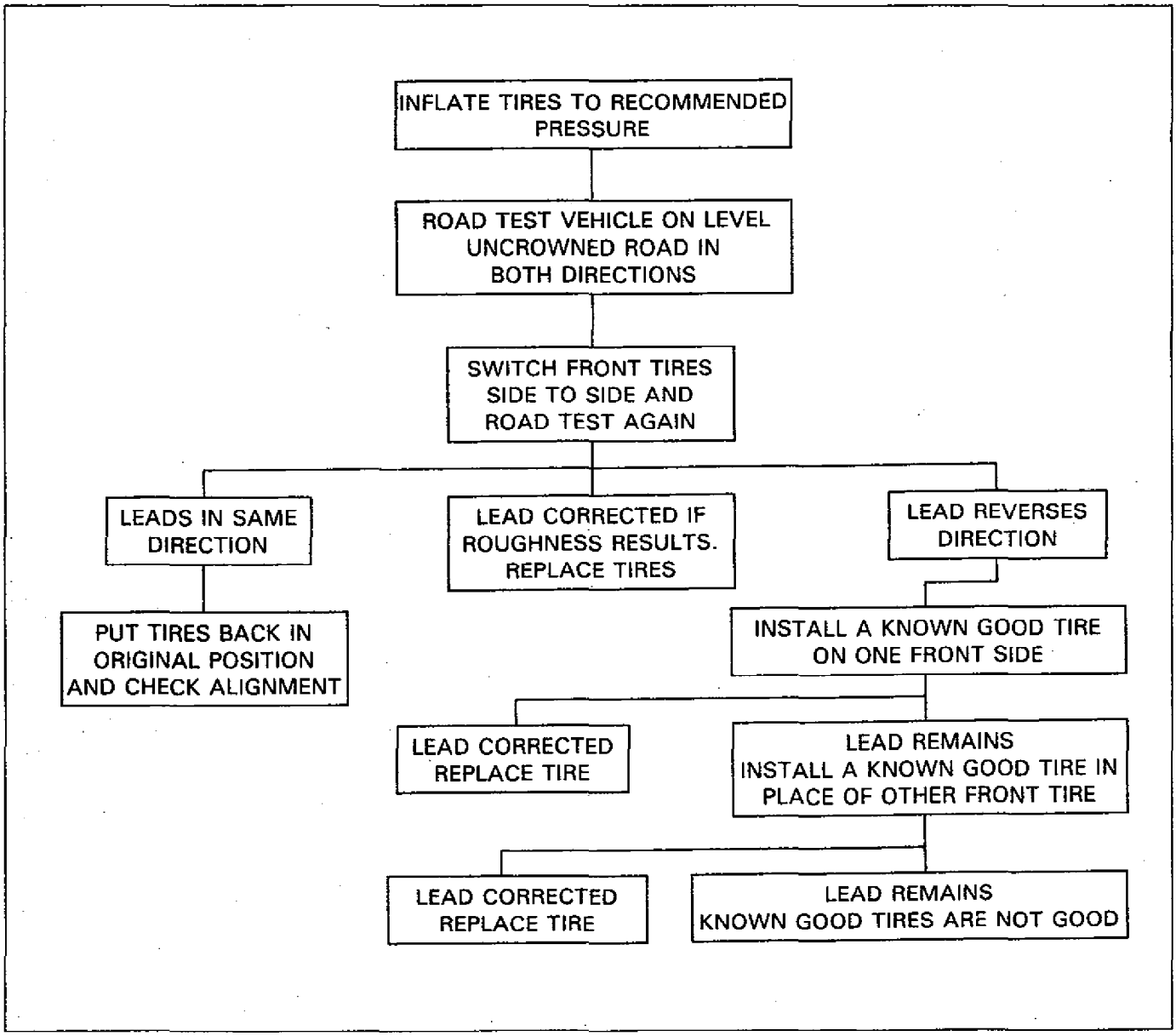
Waddle is side to side movement at the front and/or rear of the vehicle. It is caused by the steel belt not being straight within the tire. It is most noticeable at a low speed, 5 to 30 mph.

It is possible to locate the faulty tire by road testing the vehicle. If it is on the rear, the rear end of the vehicle shakes from side to side or "waddles". To the driver in his seat, it feels as though someone is pushing on the side of vehicle.

If the faulty tire is on the front, waddling is more visual. The front sheet metal appears to be moving back and forth and the driver feels as though he is at the pivot point in vehicle. Waddle can be quickly diagnosed by using Tire Problem Detector (TPD) and following the equipment manufacture's recommendations.

If TPD is not available, an alternative method of substituting known good tire/wheel assemblies can be used as follows, although it takes a longer time.

1. Ride vehicle to determine whether the front or rear waddles.
2. Install tires and wheels that are known to be good (on similar vehicle) in place of those on waddling end of vehicle. If waddling end cannot be identified, substitute rear ones.
3. Road test again. If improvement is noted, reinstall originals one at a time till waddle causal tire is found. If no improvement is noted, install known good tires in place of all four. Then reinstall originals in the same manner as above.



70F00-3-7-1

RADIAL TIRE LEAD

"Lead" is the deviation of the vehicle from a straight path on a level rod even with no pressure on the steering wheel.
Lead is usually caused by:
1) Incorrect alignment.
2) Uneven brake adjustment.
3) Tire construction.

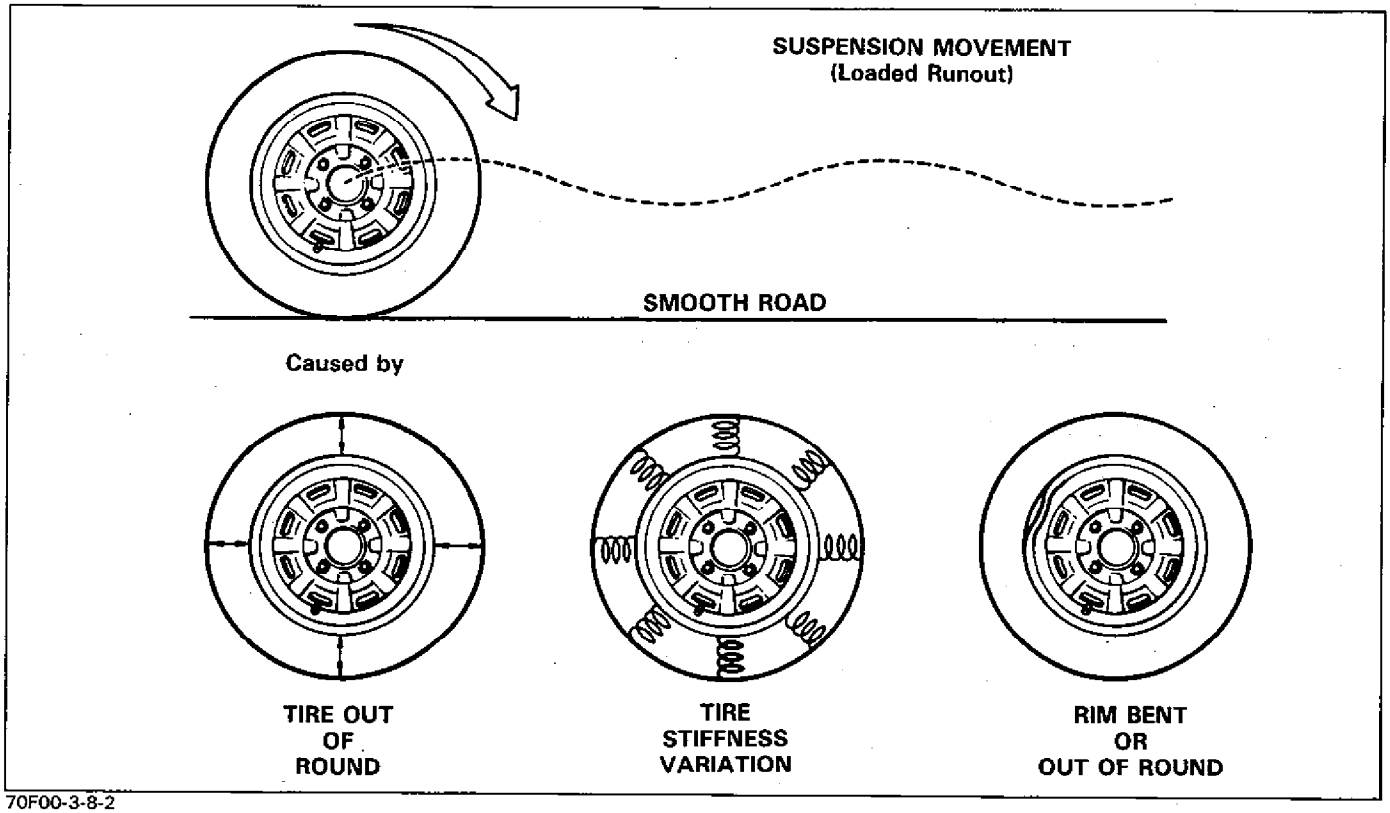
The way in which a tire is built can produce lead in a vehicle. An example of this is placement of the belt. Off center belts on radial tires can cause the tire to develop a side force while rolling straight down the road. If one side of the tire has a little larger diameter than the other, the tire will tend to roll to one side. This will develop a side force which can produce vehicle lead.
The procedure in above figure (Lead Diagnosis) should be used to make sure that front alignment is not mistaken for tire lead.
1) Part of the lead diagnosis procedure is different from the proper tire rotation pattern currently in the owner and service manuals. If a medium to high mileage tire is moved to the other side of the vehicle, be sure to check that ride roughness has not developped.
2) Rear tires will not cause lead.

70F00-3-8-1

VIBRATION DIAGNOSIS

Wheel unbalance causes most of the highway speed vibration problems. If a vibration remains after dynamic balancing, its possible causes are as follows.
1) Tire runout.
2) Wheel runout.
3) Tire stiffness variation.

Measuring tire and/or wheel free runout will uncover only part of the problem. All three causes, known as loaded ratial runout, must be checked by using a Tire Problem Detector (TPD). If TPD is not available, alternative method of substituting known good tire and wheel assemblies on the problem vehicle can be used, although it takes a longer time.



70F00-3-8-2

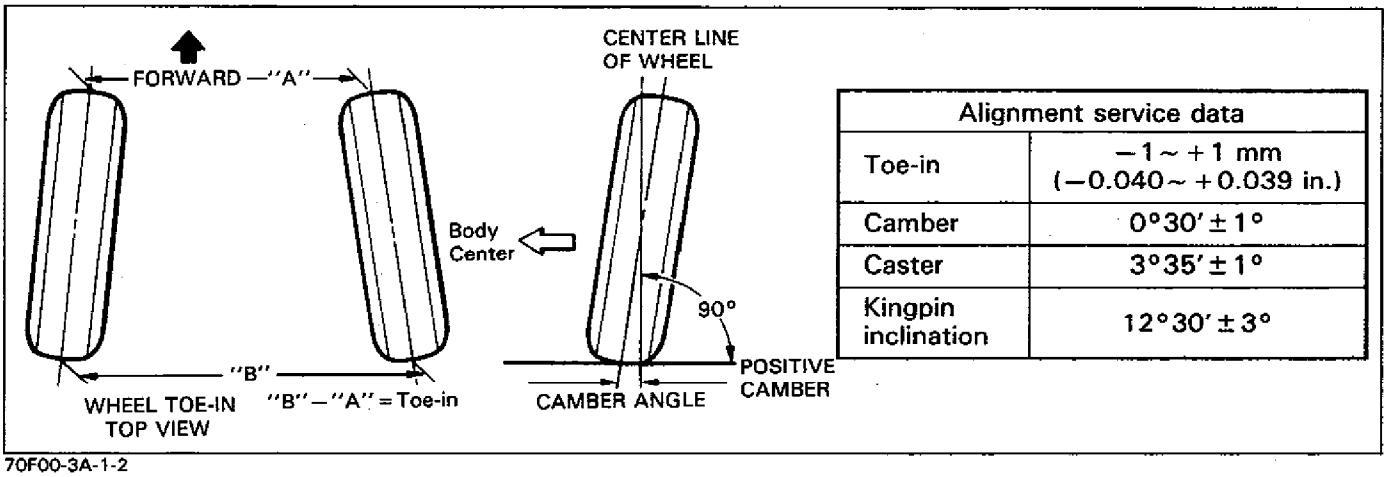
SECTION 3A

FRONT END ALIGNMENT

CONTENTS

3A

GENERAL DESCRIPTION



Alignment service data	
Toe-in	−1 ~ +1 mm (−0.040 ~ +0.039 in.)
Camber	0°30′ ± 1°
Caster	3°35′ ± 1°
Kingpin inclination	12°30′ ± 3°

70F00-3A-1-2

Front alignment refers to the angular relationship between the front wheels, the front suspension attaching parts and the ground. Generally, the only adjustment required for front alignment is toe setting. Camber and caster can't be adjusted. Therefore, should camber or caster be out of specification due to the damage caused by hazardous road conditions or collision, whether the damage is in body or in suspension should be determined. If the body is damaged, it should be repaired and if suspension is damaged, it should be replaced.

64B40-3A-1-3

TOE SETTING

Toe is the turning in or out of the front wheels. The purpose of a toe specification is to ensure parallel rolling of the front wheels (Excessive toe-in or toe-out may increase tire wear).
Amount of toe can be obtained by subtracting "A" from "B" as shown in above figure and therefore is given in mm (in.).

64B40-3A-1-4

CAMBER

Camber is the tilting of the front wheels from the vertical, as viewed from the front of the vehicle. When the wheels tilt outward at the top, the camber is positive. When the wheels tilt inward at the top, the camber is negative. The amount of tilt is measured in degrees.

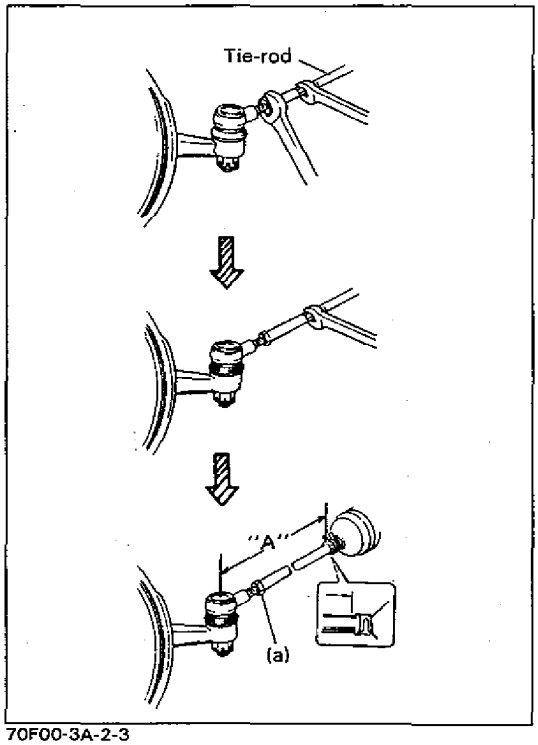
64B40-3A-1-5

PRELIMINARY CHECKS PRIOR TO ADJUSTING FRONT ALIGNMENT

Steering and vibration complaints are not always the result of improper alignment. An additional item to be checked is the possibility of tire lead due to worn or improperly manufactured tires. "Lead" is the deviation of the vehicle from a straight path on a level road without hand pressure on the steering wheel. Section 3 of this manual contains a procedure for determining the presence of a tire lead problem. Before making any adjustment affecting toe setting, the following checks and inspections should be made to ensure correctness of alignment readings and alignment adjustments:

1) Check all tires for proper inflation pressures and approximately the same tread wear.
2) Check for loose of ball joints. Check tie rod ends; if excessive looseness is noted, it must be corrected before adjusting.
3) Check for run-out of wheels and tires.
4) Check vehicle trim heights; if out of limits and a correction is to be made, it must be made before adjusting toe.
5) Check for loose of suspension arms.
6) Check for loose or missing stabilizer bar attachments.
7) Consideration must be given to excess loads, such as tool boxes. If this excess load is normally carried in vehicle, it should remain in vehicle during alignment checks.
8) Consider condition of equipment being used to check alignment and follow manufacturer's instructions.
9) Regardless of equipment used to check alignment, vehicle must be on a level surface both fore and aft and transversely.

64B40-3A-2-1



70F00-3A-2-3

TOE ADJUSTMENT

Toe is adjusted by changing the tie rod length. Loosen right and left tie rod end lock nuts first and then rotate right and left tie rods by the same amount to align toe-in to specification. In this adjustment, right and left tie rods should become equal in length ("A" in left figure).

Before rotating tie rods, apply grease between tie rods and rack boots so that boots won't be twisted.

After adjustment, tighten lock nuts to specified torque and make sure that rack boots are not twisted.

Tightening Torque

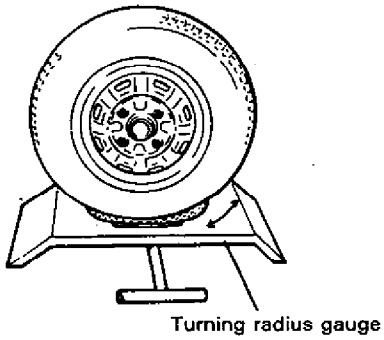
(a): 35—55 N·m (3.5—5.5 kg-m, 25.5—39.5 lb-ft)

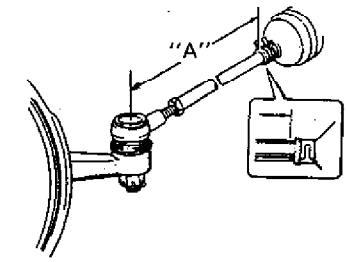
CAMBER AND CASTER ADJUSTMENT

Should camber or caster be found out of specifications upon inspection, locate its cause first. If it is in damaged, loose, bent, dented or worn suspension parts, they should be replaced. If it is in vehicle body, repair it so as to attain specifications.

To prevent possible incorrect reading of camber or caster, vehicle front end must be moved up and down a few times before inspection.

64B40-3A-2-5





70F00-3A-3-1

STEERING ANGLE

When tie rod or tie rod end was replaced, check toe and then also steering angle with turning radius gauge.
If steering angle is not correct, check if right and left tie rods are equal in length ("A" in left figure).

NOTE:
If tie rod lengths were changed to adjust steering angle, reinspect toe-in.

Steering angle inside : 36°
outside : 32°

Reference Information:
Side slip:
For inspecting front wheel side slip with side slip tester:

Side slip limit : Less than 3 mm/m
(Less than 0.118 in/3.3 ft)

If side slip exceeds above limit, toe-in or front wheel alignment may not be correct.

64B40-3A-3-3

SECTION 3B

MANUAL RACK AND PINION

NOTE:
All steering gear fasteners are important attaching parts in that they could affect the performance of vital parts and systems, and/or could result in major repair expense. They must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part of lesser quality or substitue design. Torque values must be used as specified during reassembly to assure proper retention of these parts.

64B40-3B-1-1

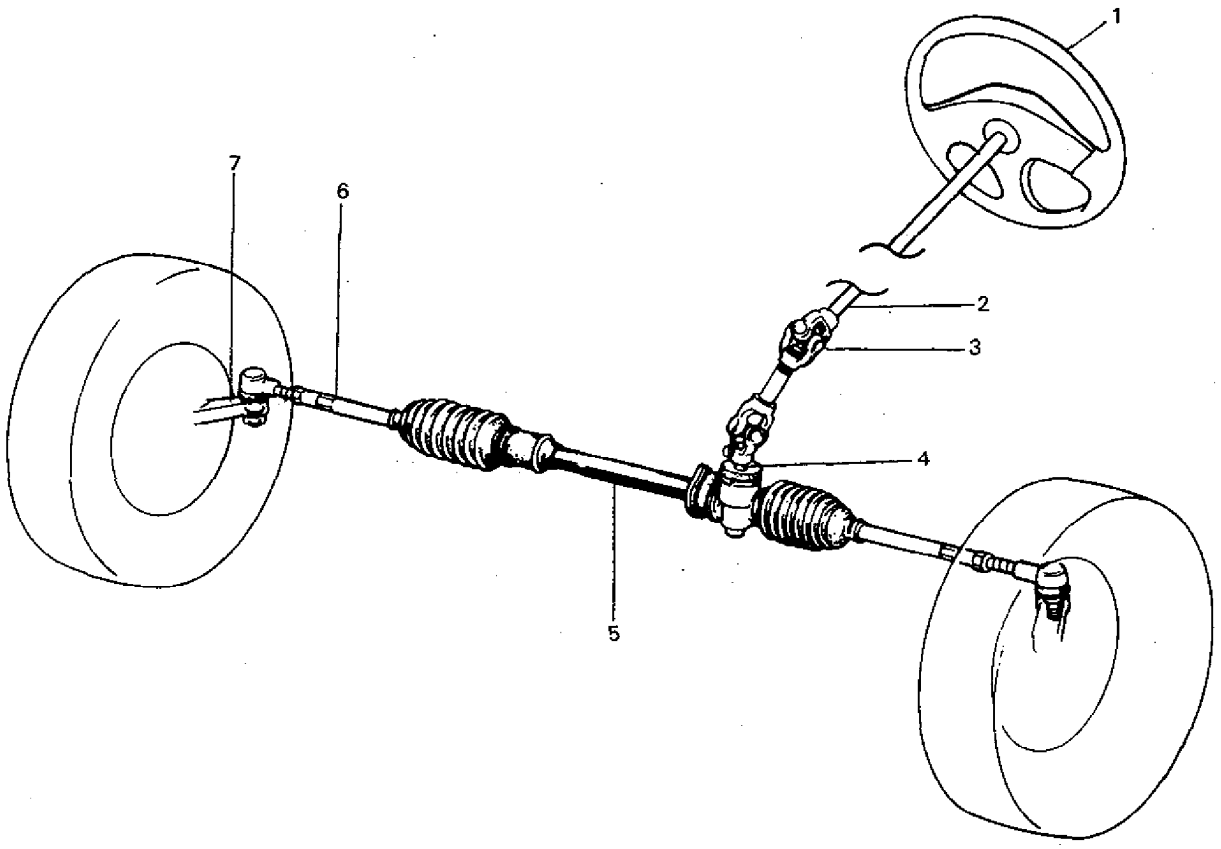
CONTENTS

64B40-3B-1-2

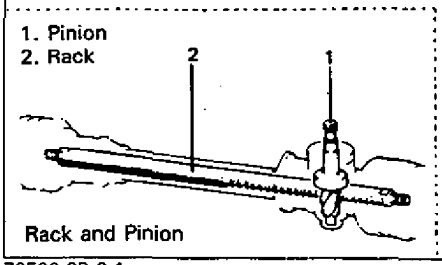
GENERAL DESCRIPTION

The rack and pinion steering system consists of two main components, the rack and the pinion. When the steering wheel is turned, the motion is transmitted to the steering shaft, shaft joint and then to the pinion.
Since the pinion teeth mesh with teeth on rack, the motion is further transferred to the rack and changed to linear motion. The force is then transmitted through the tie rods to the steering knuckles which turn wheels.

NOTE:
Although the figure below shows only the left-hand steering vehicle, the same work procedure and data apply to the right-hand steering vehicle.



1. Steering wheel
2. Steering shaft
3. Steering shaft joint
4. Steering pinion
5. Steering gear case
6. Tie rod
7. Steering knuckle



Rack and Pinion

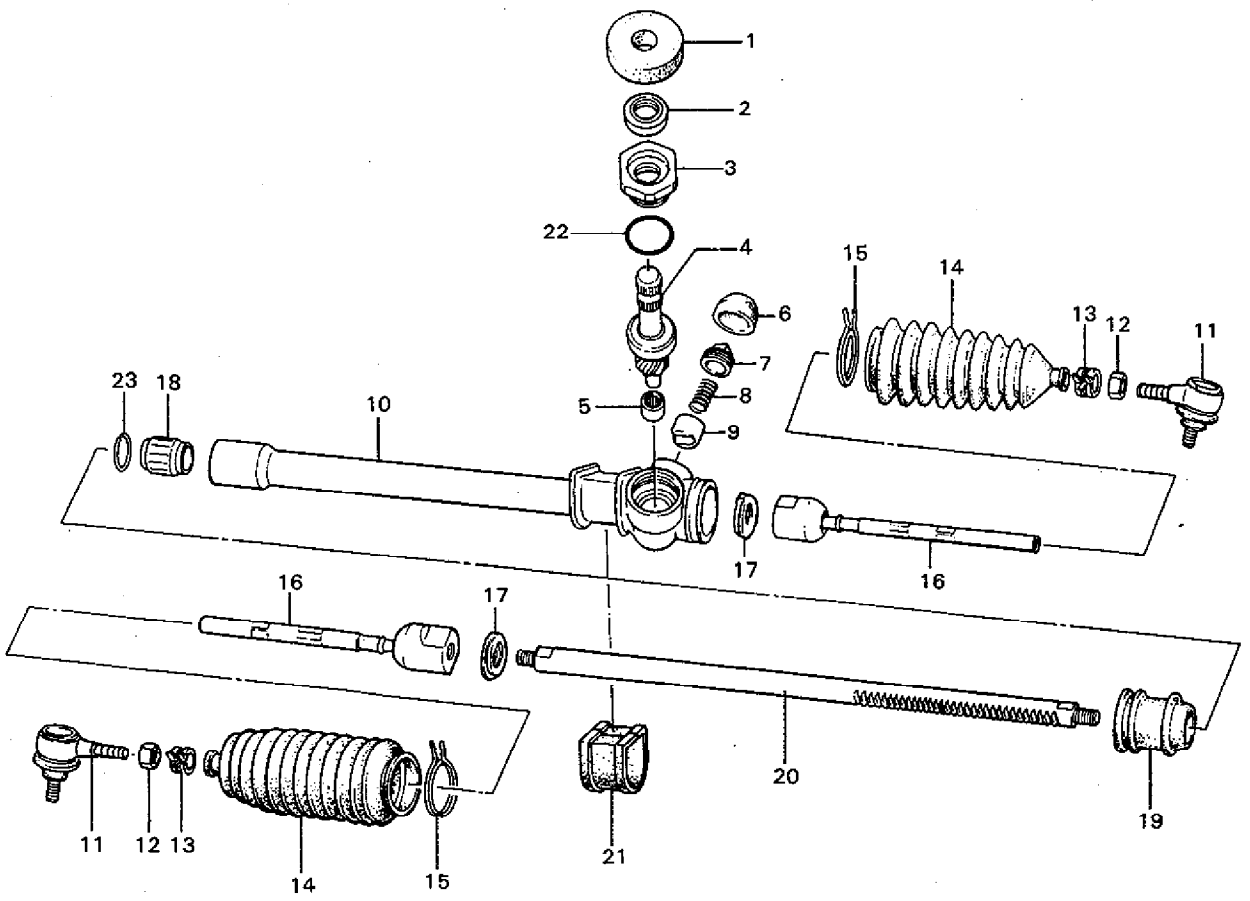
70F00-3B-2-1

ON-VEHICLE SERVICE

LUBRICATION

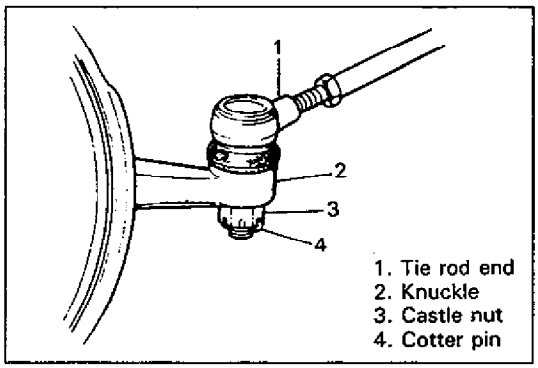
When inner parts of the steering gear case were disassembled, they should be washed clean before reassembly. It is recommended to use the grease as given at the right where grease application is indicated in the text.

*SUZUKI SUPER GREASE (E) 99000-25050, or Lithium grease (applicable for −40°C ~ 130°C or 104°F ~ 266°F)



1. Steering gear case packing
2. Steering gear case oil seal
3. Pinion bearing plug
4. Steering pinion
5. Steering pinion needle bearing
6. Rack damper screw cap
7. Rack damper screw
8. Rack plunger spring
9. Steering rack plunger
10. Steering rack housing & gear case
11. Tie-rod end
12. Tie-rod end lock nut
13. Rack boot clip
14. Boot
15. Wire
16. Steering tie-rod
17. Tie-rod lock washer
18. Steering rack bushing
19. Steering rack side mount
20. Steering rack
21. Steering pinion side mount
22. Gear case seal
23. Snap ring

70F00-3B-3-1

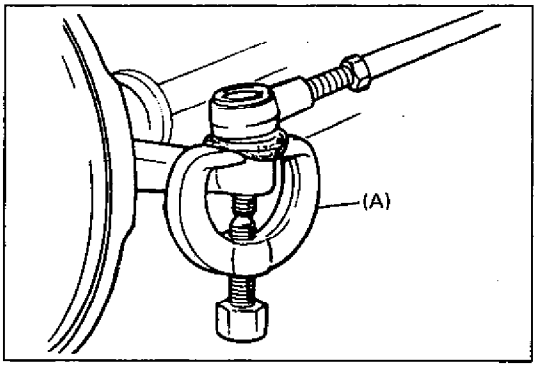


70F00-3B-4-1

1. REMOVE AND INSTALL TIE ROD END

REMOVAL

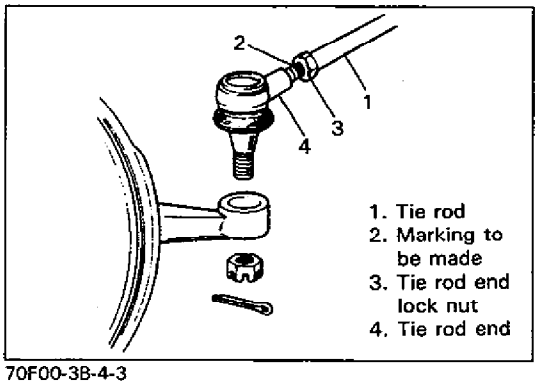
1) Hoist vehicle and remove wheel.
2) Remove cotter pin and tie rod end castle nut from steering knuckle.



70F00-3B-4-2

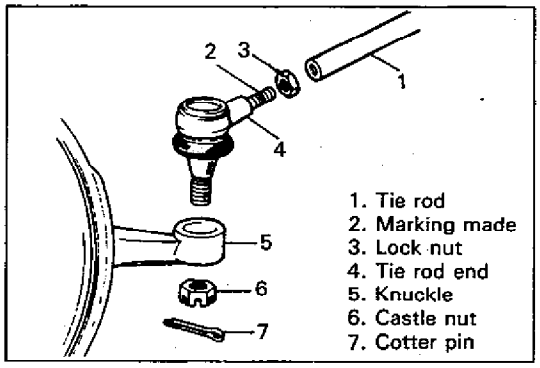
3) Disconnect tie rod end from knuckle, using special tool.

Special Tool
(A): 09913-65210



70F00-3B-4-3

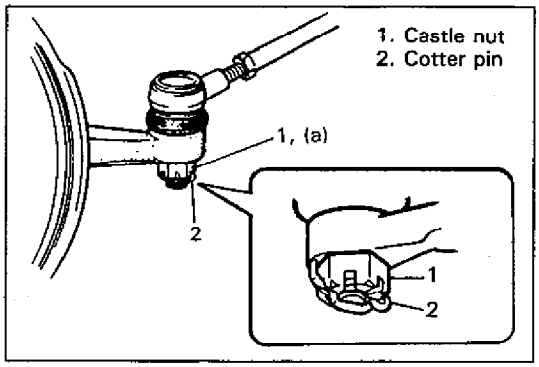
4) For ease of adjustment after installation, make marking of tie rod end lock nut position on tie rod end thread. Then loosen lock nut and remove tie rod end from tie rod.



70F00-3B-5-1

INSTALLATION

1) Install tie rod end lock nut and tie rod end to tie rod. Align lock nut with mark on tie rod thread

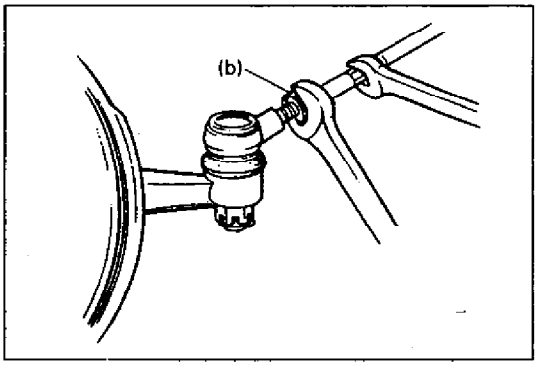


70F00-3B-5-2

2) Connect tie rod end to knuckle. Tighten castle nut until holes for cotter pin are aligned, but only within specified torque.

Tightening Torque
(a): 30—55 N·m (3.0—5.5 kg-m, 22.0—39.5 lb-ft)

3) Bend cotter pin as shown.



70F00-3B-5-3

4) Inspect for proper toe (Refer to FRONT END ALIGNMENT).
5) After confirming proper toe, tighten tie rod end lock nut to specified torque.

Tightening Torque
(b): 35—55 N·m (3.5—5.5 kg-m, 25.5—39.5 lb-ft)

6) Tighten wheel to specified torque and lower hoist.

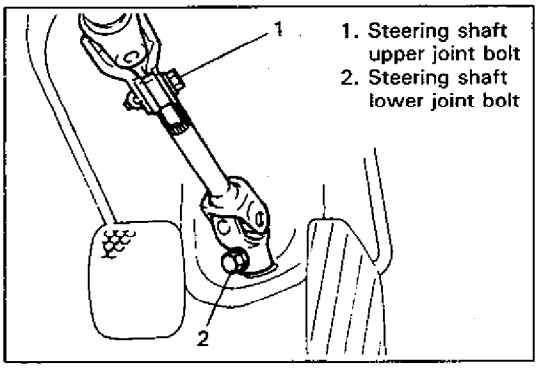
Tightening Torque for wheel nuts:
(a): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

2. REMOVE AND INSTALL MANUAL RACK AND PINION ASSEMBLY (STEERING GEAR CASE)

REMOVAL

1) Slide driver's seat as far back as possible.
2) Pull off front part of floor mat on driver's side and remove steering shaft joint cover.

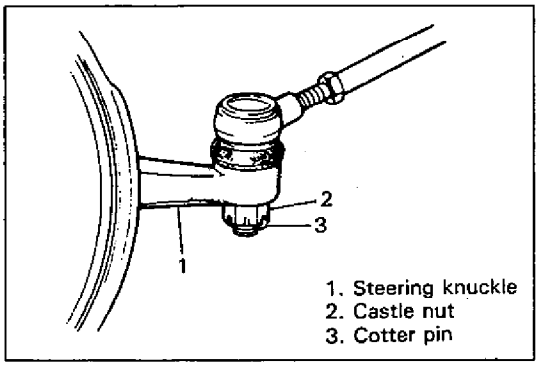
64B40-3B-6-1



1. Steering shaft upper joint bolt
2. Steering shaft lower joint bolt

64B40-3B-6-2

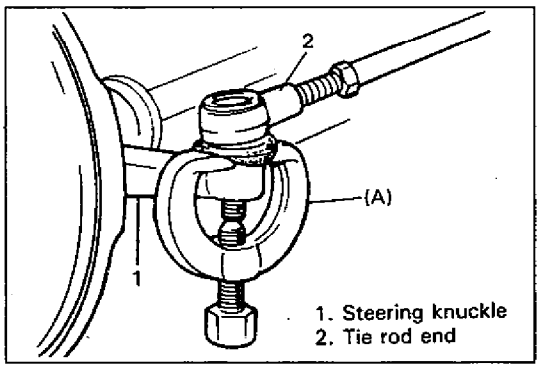
3) For ease of installation, loosen steering shaft upper joint bolt but don't remove.
4) Remove steerinig shaft lower joint bolt and disconnect lower joint from pinion.



1. Steering knuckle
2. Castle nut
3. Cotter pin

70F00-3B-6-3

5) Hoist vehicle and remove both wheels.
6) Remove cotter pins and tie rod castle nuts from both knuckles.

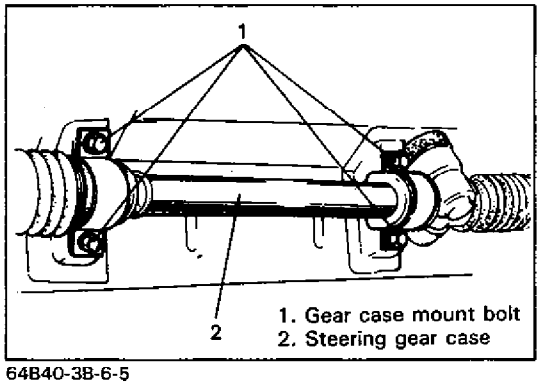


1. Steering knuckle
2. Tie rod end

70F00-3B-6-4

7) Disconnect both tie rod ends from knuckles, using special tool.

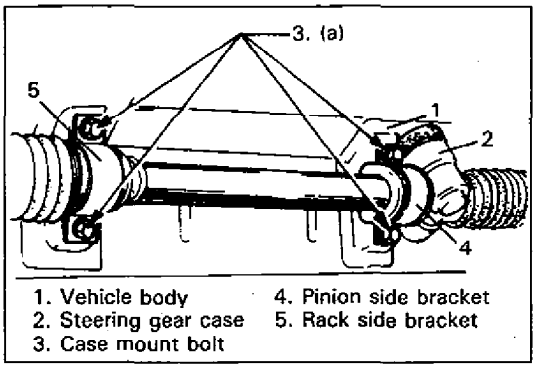
Special Tool
(A): 09913-65210



1. Gear case mount bolt
2. Steering gear case

64B40-3B-6-5

8) Remove steering gear case mount bolts, gear case brackets and then gear case.



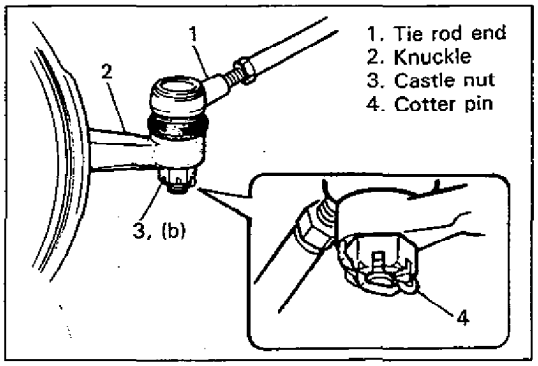
1. Vehicle body
2. Steering gear case
3. Case mount bolt
4. Pinion side bracket
5. Rack side bracket

70F00-3B-7-1

INSTALLATION

1) Mount steering gear case to body and tighten gear case mount bolts to specified torque.

Tightening Torque
(a): 20—30 N·m (2.0—3.0 kg-m, 14.5—21.5 lb-ft)

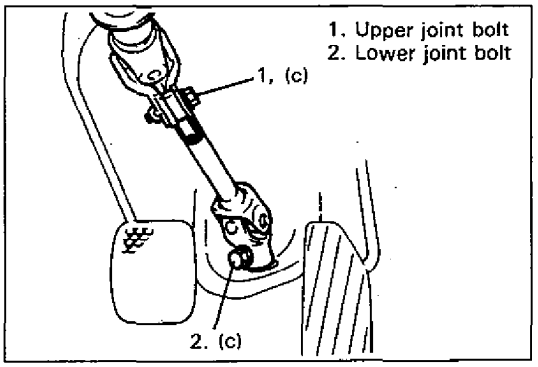


1. Tie rod end
2. Knuckle
3. Castle nut
4. Cotter pin

70F00-3B-7-2

2) Install tie rod ends to knuckles (R & L). Tighten each castle nut until holes for cotter pin align but within specified torque and then bend cotter pin as shown.

Tightening Torque
(b): 30—55 N·m (3.0—5.5 kg-m, 22.0—39.5 lb-ft)

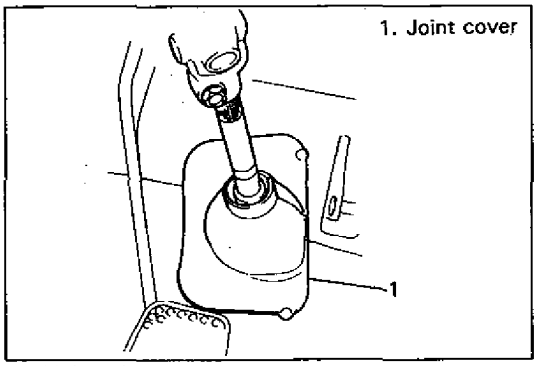


1. Upper joint bolt
2. Lower joint bolt

70F00-3B-7-3

3) Be sure that steering wheel and brake discs (R & L) are all straightahead driving state and then insert steering lower joint into steering pinion shaft.
4) Tighten steering shaft joint bolts to specified torque (Lower side first and then upper side).

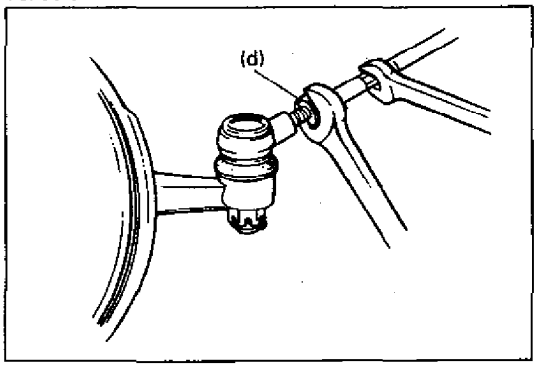
Tightening Torque
(c): 20—30 N·m (2.0—3.0 kg-m, 14.5—21.5 lb-ft)



70F00-3B-7-4

5) Reinstall cover removed previously to steering shaft joint.
6) Put back floor mat as it was.
7) Install both wheels and tighten wheel nuts to specified torque.

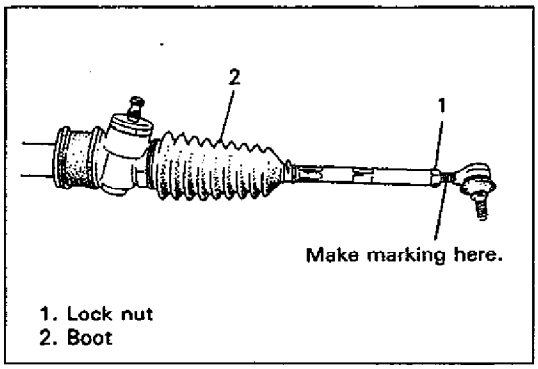
Tightening Torque for wheel nuts:
70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)



70F00-3B-7-5

8) Lower hoist.
9) Check toe setting. Adjust as required (Refer to FRONT END ALIGNMENT).
10) Tighten both tie rod end lock nuts to specified torque.

Tightening Torque
(d): 35—55 N·m (3.5—5.5 kg-m, 25.5—39.5 lb-ft)



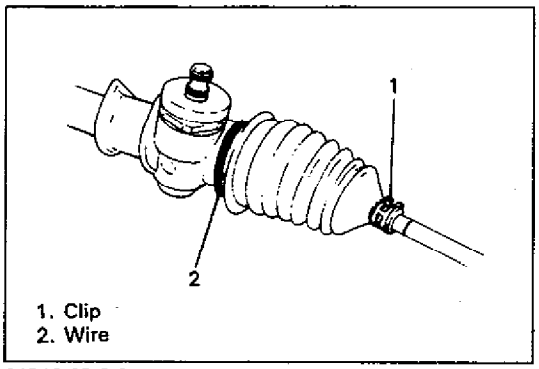
1. Lock nut
2. Boot

70F00-3B-8-1

3. REMOVE AND INSTALL RACK BOOT/TIE ROD

REMOVAL

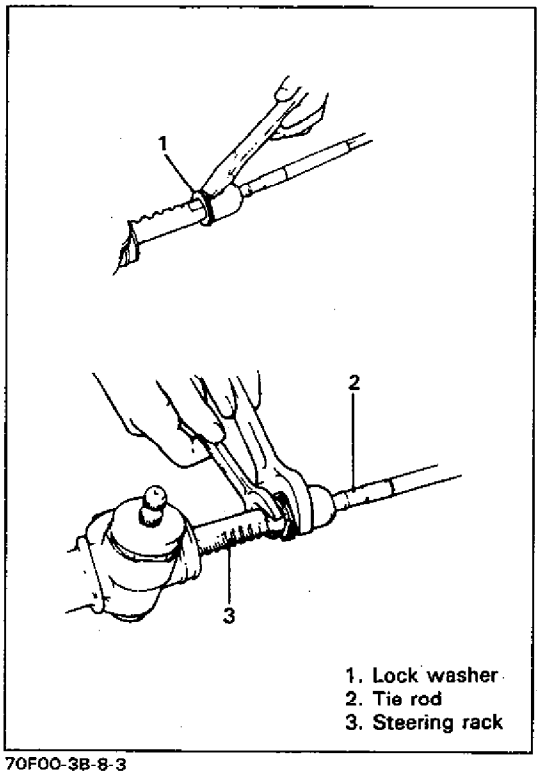
1) Remove steering gear case by performing Steps 1)—8) in Item 2 REMOVAL of this section.
2) For ease of adjustment after installation, make marking of tie rod end lock nut position of tie rod end thread.



1. Clip
2. Wire

64B40-3B-8-2

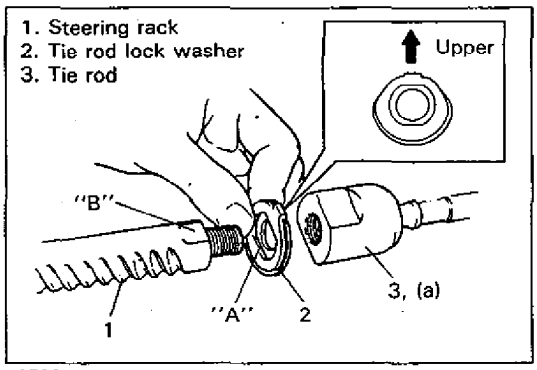
3) Loosen tie rod end lock nut and remove tie rod end.
4) Remove boot wire and clip.



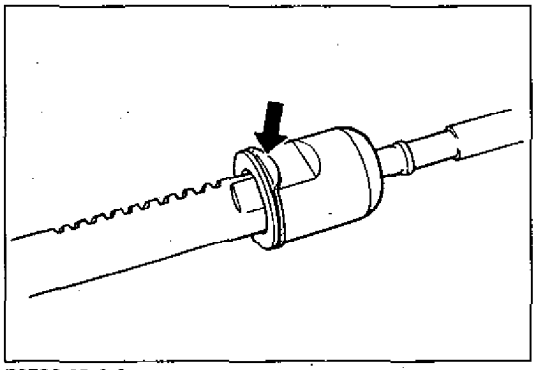
1. Lock washer
2. Tie rod
3. Steering rack

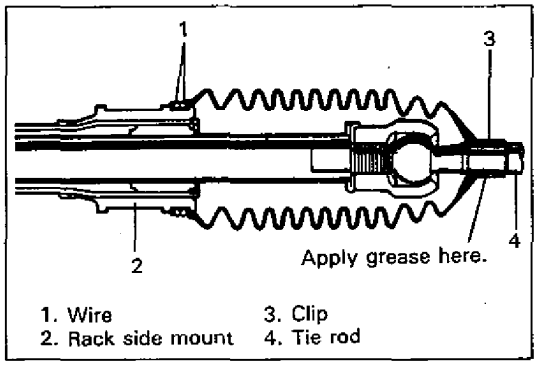
70F00-3B-8-3

5) Remove boot from tie rod.
6) Unbend bent part of tie rod lock washer and remove tie rod from rack.

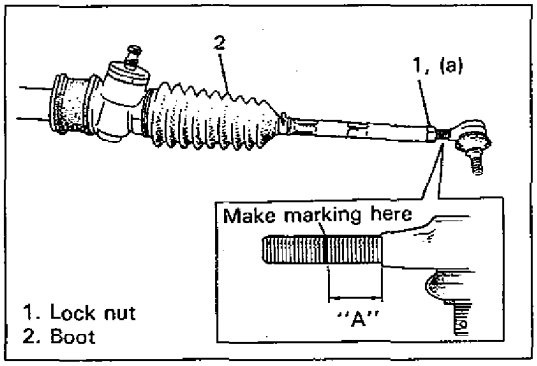


70F00-3B-9-1


70F00-3B-9-2



64B40-3B-9-3



70F00-3B-9-4

INSTALLATION

1) Install tie rod lock washer and tie rod to rack. Align straight part "A" of washer with flat part "B" of rack.

NOTE:
For correct installation of tie rod lock washer, refer to figure at left.

2) Tighten tie rod inside ball nut to specified torque.

Tightening Torque
(a): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

3) Bend lock washer to tie rod side as shown.

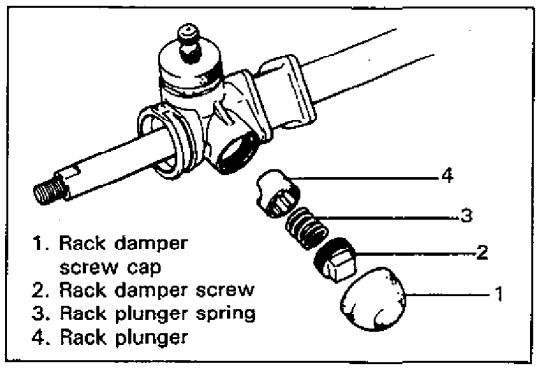
4) Position boot properly in grooves of gear case and tie rod and clamp it with wire and clip.
Wire should be new and should go around twice and be tightened with its both ends twisted together. The twisted ends should be bent in the circumferential direction. After this, check to ensure that boot is free from twist and dent.

5) Install tie rod end lock nut and tie rod end to tie rod. Position lock nut to marking made in removal.

NOTE:
When tie rod end was replaced, measure length "A" on removed tie rod end and use it on new replacement tie rod end so as to position lock nut properly.

Tightening Torque
(a): 35—55 N·m (3.5—5.5 kg-m, 25.5—39.5 lb-ft)

6) For installation procedures following the above, use Steps 1)—10), INSTALLATION of STEERING GEAR CASE on p. 3B-7.



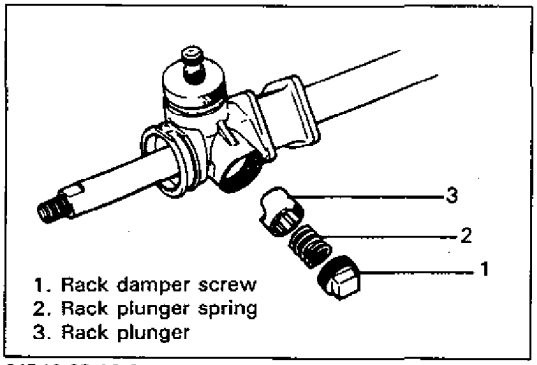
1. Rack damper screw cap
2. Rack damper screw
3. Rack plunger spring
4. Rack plunger

64B40-3B-10-1

4. REMOVE AND INSTALL STEERING RACK PLUNGER

REMOVAL

1) Remove rack boots and tie rods.
2) Remove parts as shown.

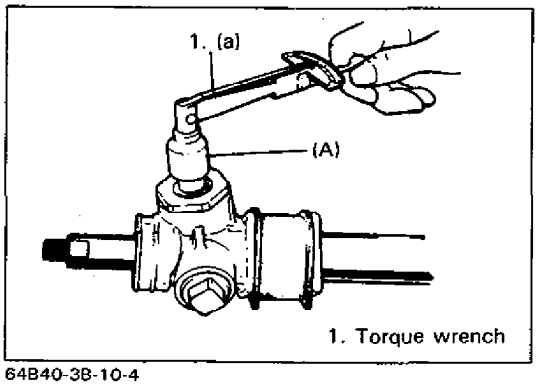


1. Rack damper screw
2. Rack plunger spring
3. Rack plunger

64B40-3B-10-3

INSTALLATION

1) Apply grease lightly to sliding part of plunger against rack.
2) Install parts as shown.



64B40-3B-10-4

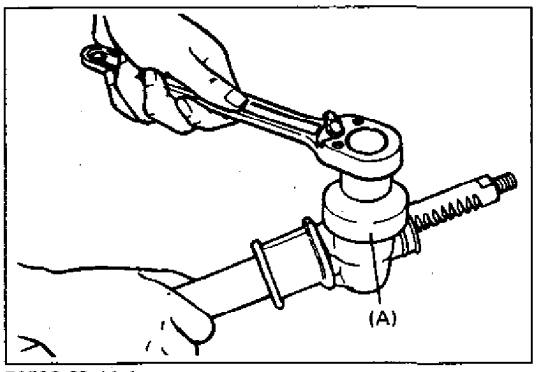
3) After tightening rack damper screw to the tightest point, turn it back by 0—90° and check for rotation torque of pinion.

Special Tool
(A): 09944-18211

Rotation Torquer of pinion
(a): 0.8—1.3 N·m (0.08—0.13 kg-m, 0.58—0.94 lb-ft)

Also, check if rack as a whole moves smoothly.

4) After adjustment, put rack damper screw cap as deeply as possible.



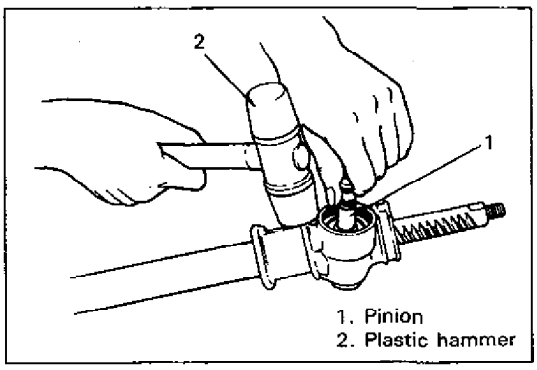
70F00-3B-11-1

5. REMOVE AND INSTALL STEERING PINION

REMOVAL

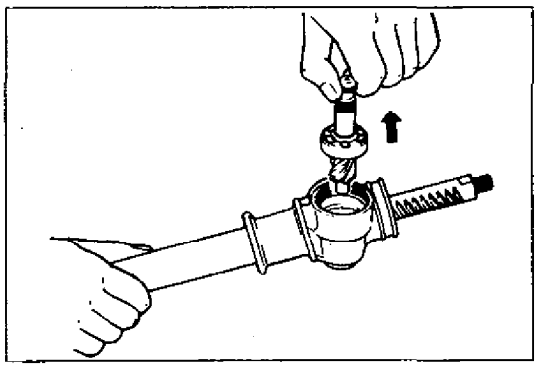
1) Remove rack plunger as shown in Item 4.
2) Remove gear case packing.
3) Remove bearing plug with special tool.

Special Tool (43 mm socket)
(A): 09944-28211

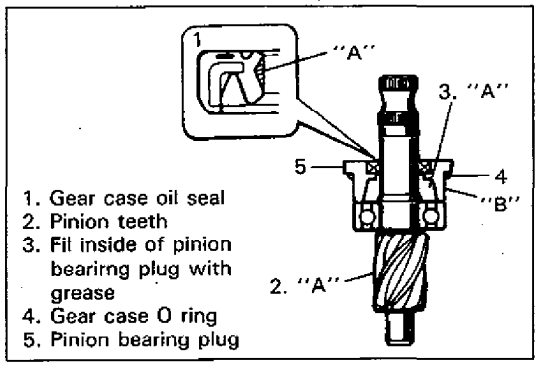


64B40-3B-11-2

4) Tap on position as shown with plastic hammer to separate pinion assembly from housing.


64B40-3B-11-3

5) Remove pinion assembly.



70F00-3B-11-4

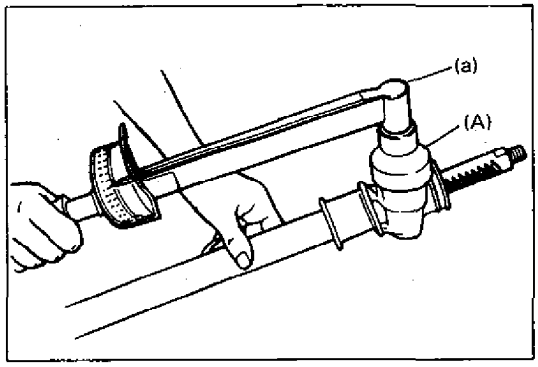
INSTALLATION

1) Apply grease to all around pinion teeth, pinion needle bearing and gear case oil seal lip.

"A": Grease 99000-25050

2) Install pinion assembly and after applying lock cement to pinion bearing plug thread as shown.

"B": Lock Cement 99000-32050



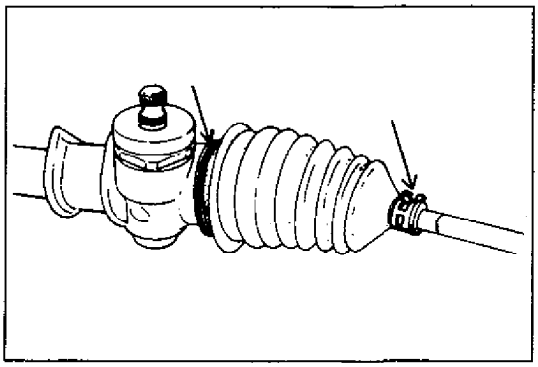
70F00-3B-11-5

3) Tighten pinion bearing plug to specified torque.

Tightening Torque
(a): 80—110 N·m (8.0—11.0 kg-m, 58.0—79.5 lb-ft)

Special Tool (43 mm socket)
(A): 09944-28211

4) Install gear case packing.
5) Install rack plunger as described in Item 4.

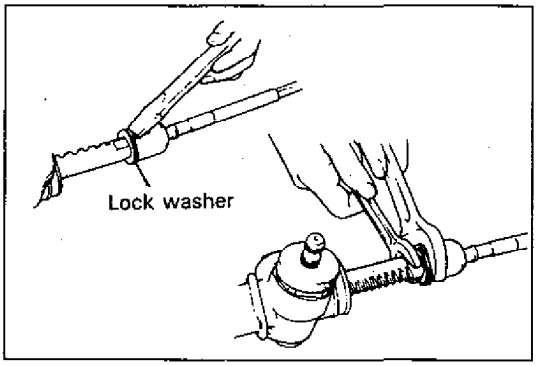


64B40-3B-12-1

6. REMOVE AND INSTALL STEERING RACK

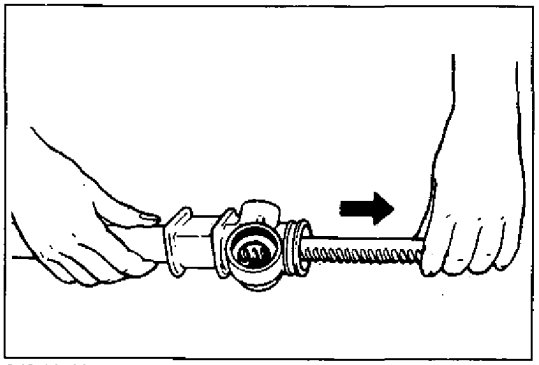
REMOVAL

1) Remove steering gear case.
2) Remove boot wires and clips.
3) Move both boots toward tie rod end.



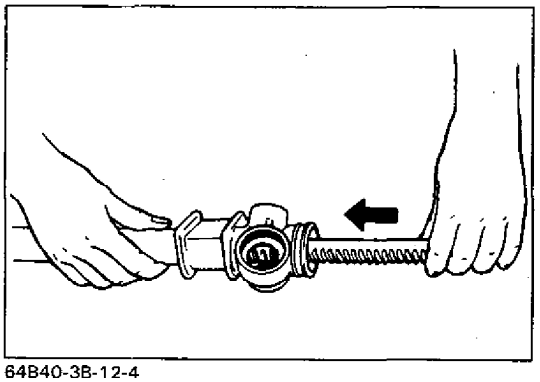
70F00-3B-12-2

4) Unbend bent part of tie rod lock washers and remove tie rods from right and left sides of steering rack.
5) Mark left and right tie rods accordingly.
6) Remove rack plunger and pinion asssembly from gear case by performing Steps 1)—5) in Item 5 STEERING PINION REMOVAL of this section.



64B40-3B-12-3

7) Remove rack from gear case. Direction for rack removal is as shown.



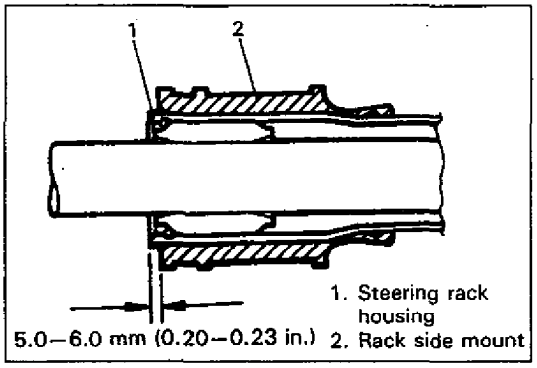
64B40-3B-12-4

INSTALLATION

1) Apply grease to entire teeth surface of rack and its periphery.
2) Slide rack into steering gear case in the direction as shown.

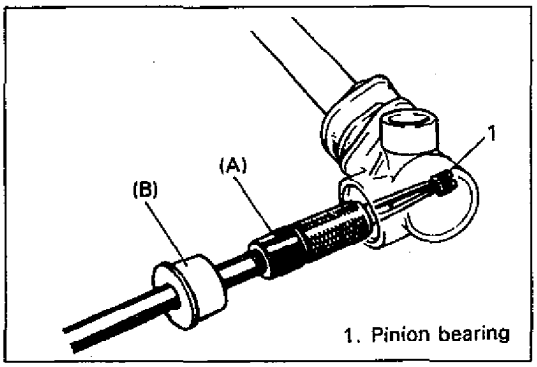
> **CAUTION:**
> **Inside of steering rack bushing is coated with special coating. As it is damageable, be very careful not to cause damage to it when inserting rack into steering gear case.**

3) Install pinion assembly to gear case by performing Steps 1)—4) in Item 5 STEERING PINION INSTALLATION of this section.
4) Perform Step 1)—4) in Item 4 STEERING RACK PLUNGER INSTALLATION of this section.

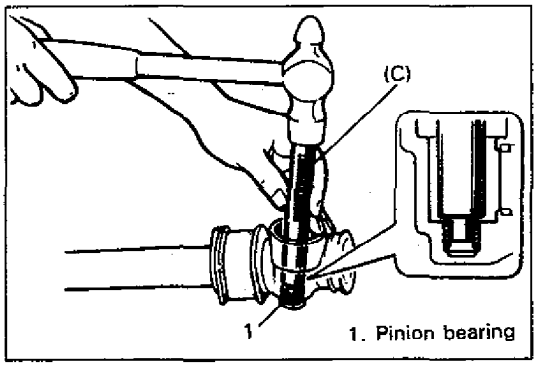


70F00-3B-13-1

5) Before installing boot to steering rack housing, make sure that rack side mount is positioned as shown. Install tie rods to rack by performing Steps 1)—6) in Item 3 RACK BOOT/TIE ROD INSTALLATION of this section.



70F00-3B-13-3



70F00-3B-13-4

7. REMOVE AND INSTALL PINION BEARING

REMOVAL

1) Remove rack from steering gear case, referring to Item 6 STEERING RACK REMOVAL of this section.
2) Pull out pinion bearing from gear case with special tools as shown.

Special Tools
(A): 09921-20200
(B): 09930-30102

INSTALLATION

1) Apply grease to rollers of pinion bearing.
2) Press-fit pinion bearing into gear case with special tool as shown.
   After press-fitting, make sure that bearing rollers are installed properly.

Special Tool
(C): 09943-88211

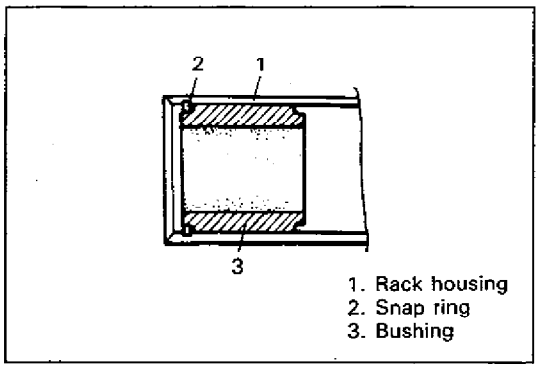
3) Follow Steps 1)—5) in Item 6 STEERING RACK INSTALLATION of this section to complete installation.

8. REMOVE AND INSTALL RACK BUSHING

REMOVAL

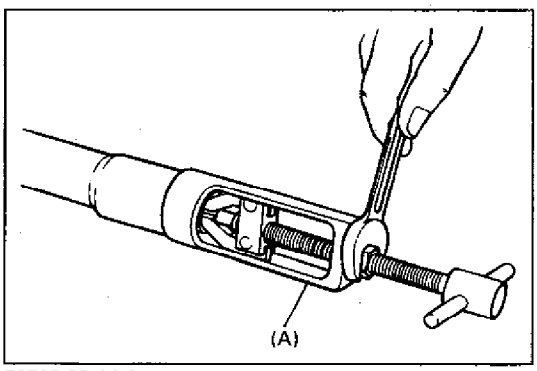
NOTE:
When removing rack bushing, be careful not to pull out bushing by holding gear case in a vise. Or housing (pipe) may come off gear case. For this work, be sure to use the below specified special tool.

64B40-3B-14-1



1) Remove rack from steering gear case, referring to Item 6 STEERING RACK REMOVAL of this section.
2) Remove snap ring.

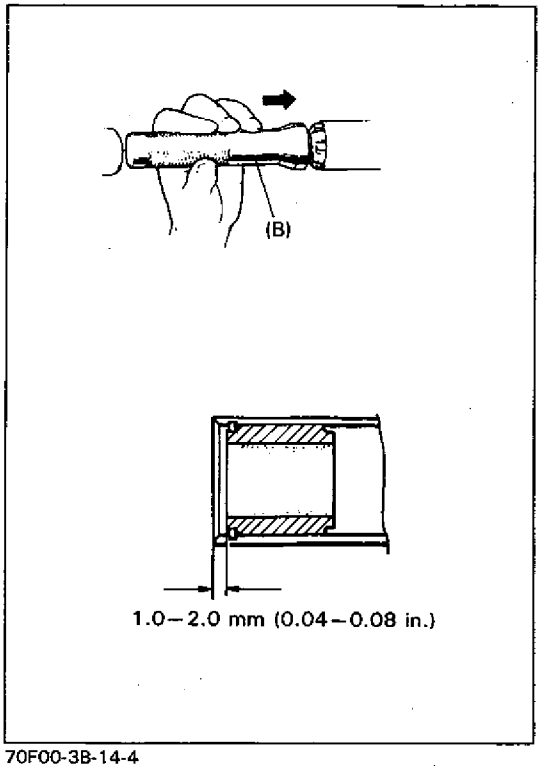
64B40-3B-14-2



3) Pull out bushing from rack housing with special tool as shown.

Special Tool
(A): 09944-48210

70F00-3B-14-3



70F00-3B-14-4

INSTALLATION

1) Apply grease lightly to entire inner surface of bushing.
2) Press-fit bushing as far into rack housing as shown by using special tool.

> **CAUTION:**
> **Inside of bushing is coated with special coating. As it is damageable, be sure to use special tool and special care not to cause damage to inside of bushing when press-fitting it.**

Special Tool
(B): 09943-78210

3) Install snap ring.
4) Follow Steps 1)–5) in Item 6 STEERING RACK INSTALLATION of this section to complete installation.

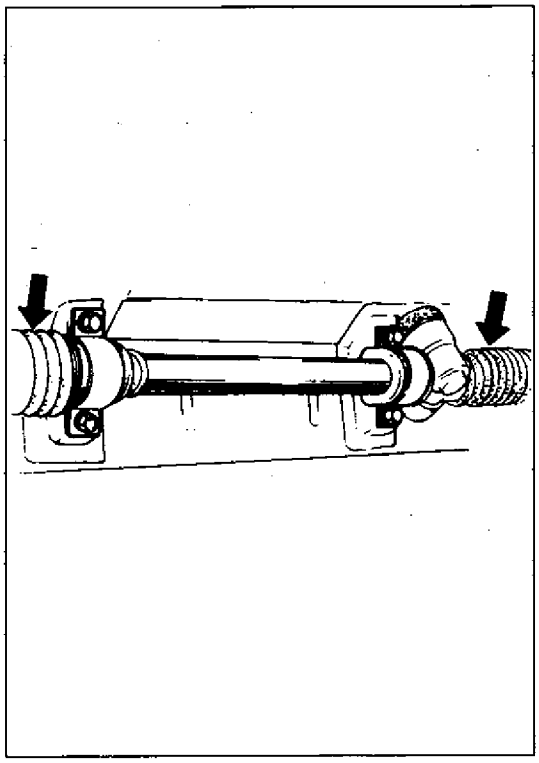
RACK AND PINION INSPECTION

STEERING RACK BOOT

Hoist vehicle.

Inspect each boot for tear. A torn boot allows entry of dust and water which can cause wear to steering rack and pinion to produce noise as well as rust to result in malfunction of steering system.
If even a small tear is noted, replace with new one.

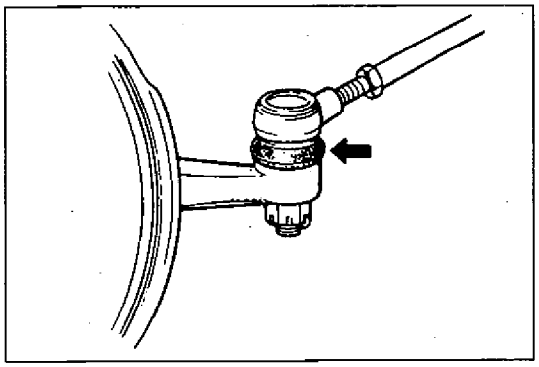
Boots should be visually inspected for any damage and tear during every periodical inspection at specified intervals and whenever vehicle is hoisted for any other purpose.



64B40-3B-15-1

TIE ROD END BOOTS

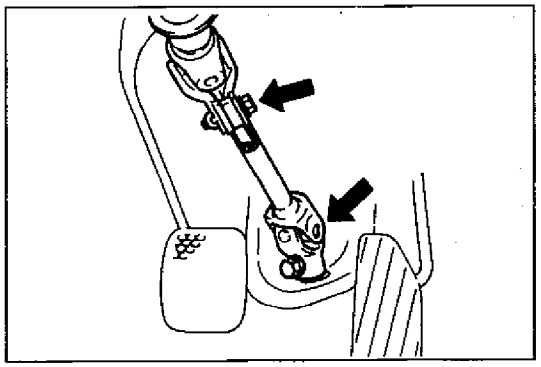
Inspect each boot for tear. If even a small tear is noted, replace with new one.



70F00-3B-15-3

STEERING SHAFT JOINT

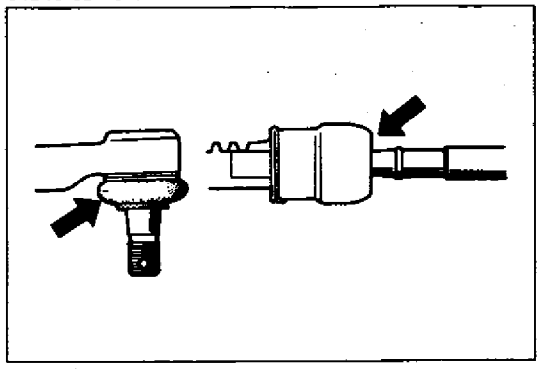
Check shaft joint for wear, breakage and other damage and replace if any defect exists.



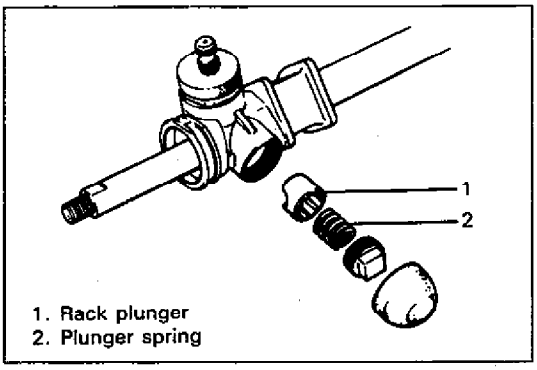
64B40-3B-15-4

TIE ROD END

1) Inspect for play in ball joint.
2) Inspect for plaly in rack end ball joint.
   In either case, if found defective, replace.



70F00-3B-15-5

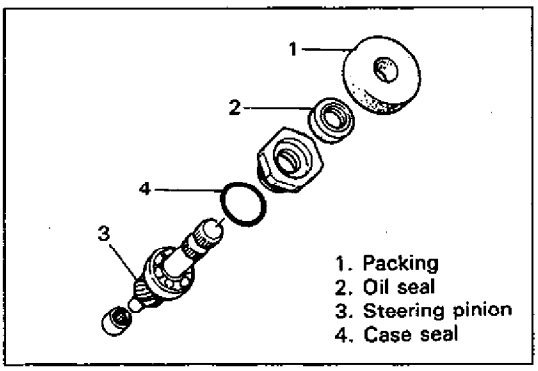


1. Rack plunger
2. Plunger spring

64B40-3B-16-1

RACK PLUNGER

1) Inspect rack plunger for wear or damage.
2) Inspect rack plunger spring for deterioration.
   In either case, if found defective, replace.



1. Packing
2. Oil seal
3. Steering pinion
4. Case seal

64B40-3B-16-2

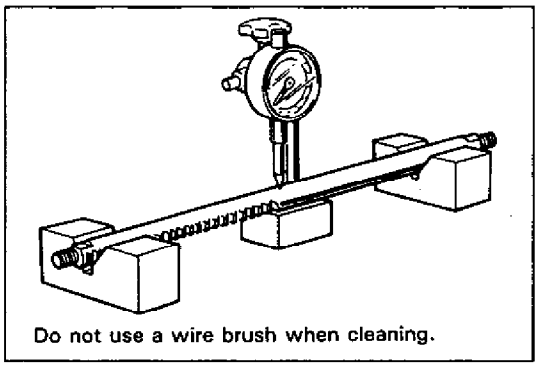
STEERING PINION

1) Inspect pinion teeth surface for wear or damage.
2) Inspect oil seal for damage.
3) Inspect gear case packing for damage.
   Replace any part found defective.

STEERING PINION BEARING

Check rotation condition of bearing and inspect for wear.
If found defective, replace.

64B40-3B-16-3



Do not use a wire brush when cleaning.

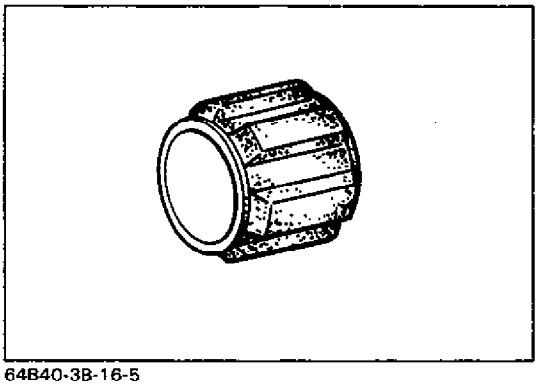
70F00-3B-16-4

STEERING RACK

Inspect for deflection, teeth wear, or damage, back surface wear or damage.

Limit of rack deflection: 0.35 mm (0.013 in.)

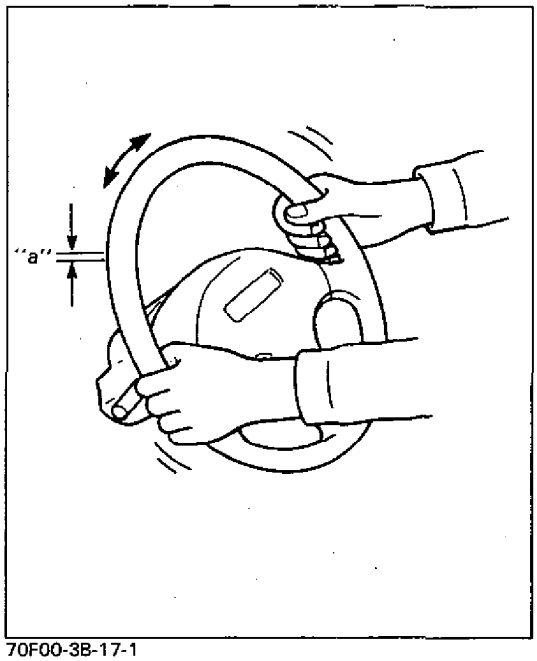
If deflection exceeds limit, replace rack.



64B40-3B-16-5

STEERING RACK BUSHING

Inspect rack bushing for wear or damage.
If found defective, replace.



70F00-3B-17-1

STEERING WHEEL

Check steering wheel for play and rattle, holding vehicle in straight forward condition on the ground.

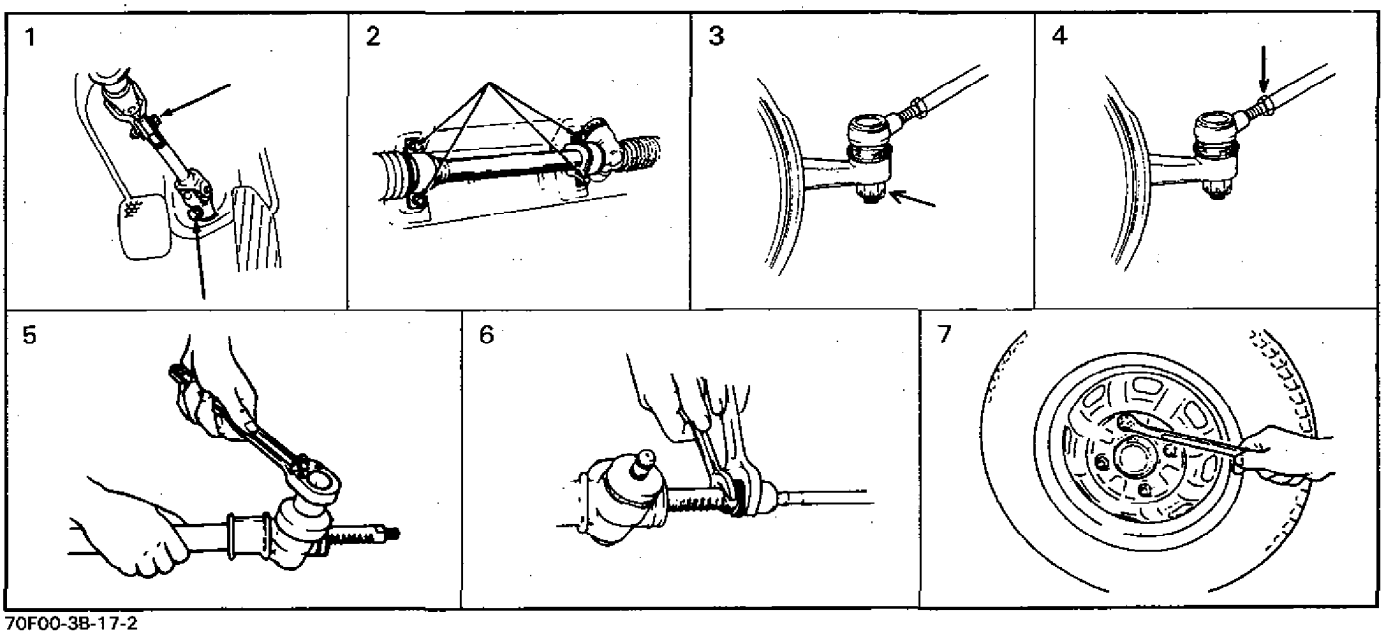
Steering wheel play "a": 0—30 mm (0—1.2 in.)

If steering wheel play is not within specification, inspect as follows and replace if found defective.

- Tie-rod end ball stud for wear (ball stud should move when more than 2 kg-cm torque is applied.)
- Lower ball joint for wear
- Steering shaft joint for wear
- Steering pinion or rack gear for wear or breakage
- Each part for looseness

RECOMMENDED TORQUE SPECIFICATIONS

Fastening parts	Tightening torque		
	N·m	kg-m	lb-ft
1. Steering shaft joint bolts	20—30	2.0—3.0	14.5—21.5
2. Steering gear case bolts	20—30	2.0—3.0	14.5—21.5
3. Tie-rod end castle nuts	30—55	3.0—5.5	22.0—39.5
4. Tie-rod end lock nuts	35—55	3.5—5.5	25.5—39.5
5. Steering pinion bearing plug	80—110	8.0—11.0	58.0—79.5
6. Tie-rod	70—100	7.0—10.0	51.0—72.0
7. Wheel nut	70—100	7.0—10.0	51.0—72.0



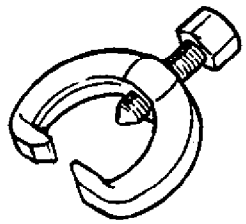
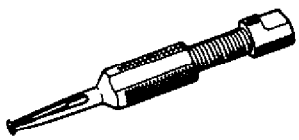
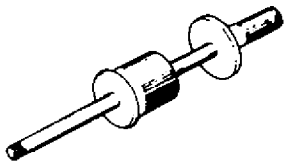
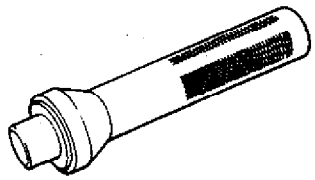
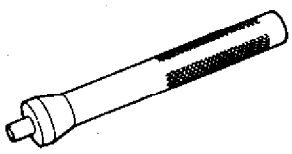
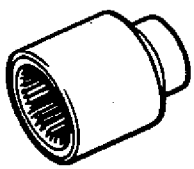
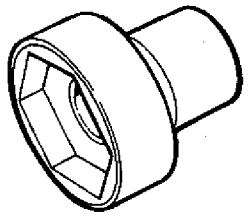
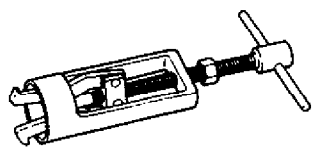
70F00-3B-17-2

REQUIRED SERVICE MATERIAL

MATERIAL	RECOMMENDED SUZUKI PRODUCT	USE
Lithium Grease (Should be applicable for −40°C ~ 130°C)	SUZUKI SUPER GREASE (E) (99000-25050)	• Sliding part of rack against steering housing (All around rack plunger, rack bushing and rack) • Sliding part against steering pinion (Oil seal lip, needle bearing) • Steering rack and pinion gear teeth • Filled into pinion bearing cap • Contacting parts of tie-rod and rack side boots • Rack end ball joint
Lock cement	SUZUKI LOCK SUPER (99000-32050)	• Pinion bearing plug thread

70F00-3B-18-1

SPECIAL TOOLS

 09913-65210 Tie-rod end remover	 09921-20200 Pinion bearing remover	 09930-30102 Sliding shaft	 09943-78210 Rack bush installer
 09943-88211 Pinion bearing installer	 09944-18211 Pinion torque checking socket	 09944-28211 43 mm Socket (Pinion bearing plug remover)	 09944-48210 Rack bush remover

64B40-3B-18-2

SECTION 3C

STEERING WHEEL AND COLUMN

NOTE:
All steering wheel and column fasteners are important parts in that they could affect the performance of vital parts and systems, and/or could result in major repair expense. They must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part of lesser quality of substitute design. Torque values must be used as specified during reassembly to assure proper retention of this part.

64B40-3C-1-1

CONTENTS

70F00-3C-1-2

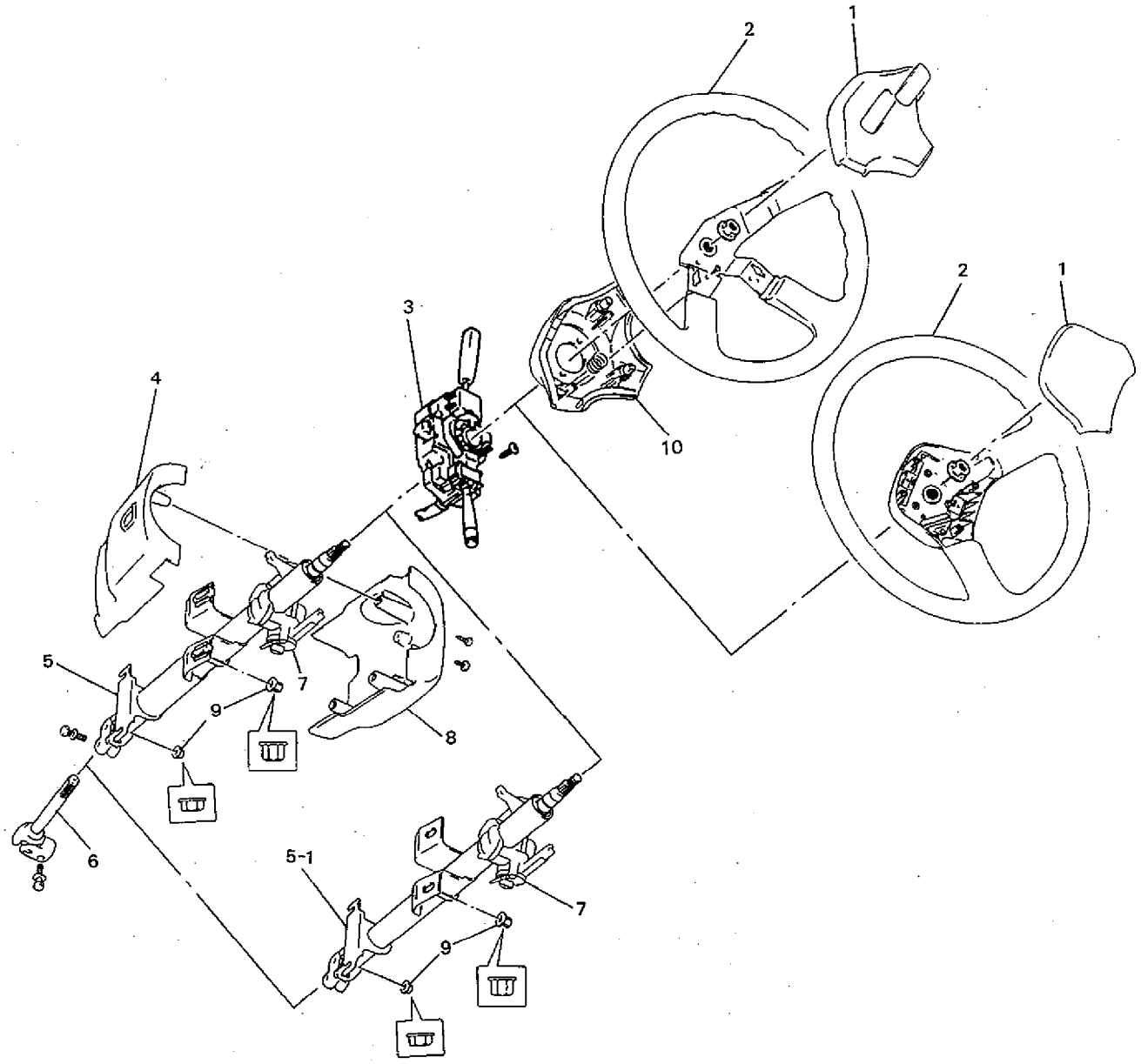
GENERAL DESCRIPTION

There are two types of steering column for this vehicle. They are double tube type and single tube type. Which type to be used veries with countries. Illustrations show double tube type only, but the same removal and installation procedures are used for single tube type.

Both types of column may be easily removed and installed. For installation, it is important that only the specified screws, bolts, and nuts be used as designated and that they are tightened to the specified torque.

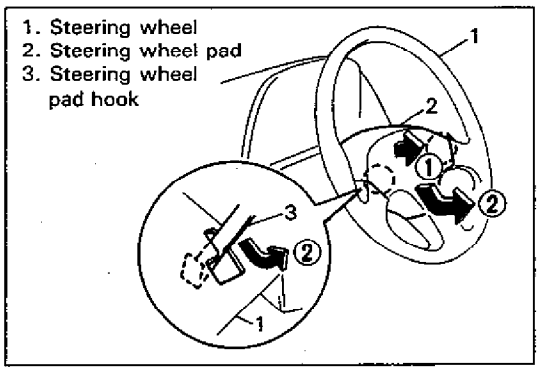
When the column assembly is removed from the vehicle, special care must be taken in handling it. Use of a steering wheel puller other than the one recommended in this manual or a sharp blow on the end of the steering shaft, leaning on the assembly, or dropping the assembly could shear the plastic shear pins which maintain column length.

70F00-3C-1-3

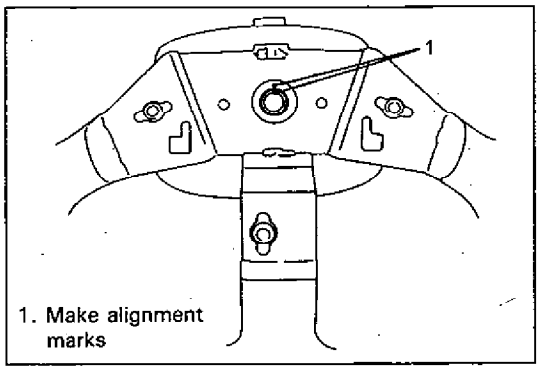


1. Steering wheel pad
2. Steering wheel
3. Combination switch assembly
4. Steering column upper cover
5. Steering column assembly (Double tube type)
5-1. Steering column assembly (Single tube type)
6. Steering shaft lower joint
7. Steering lock assembly
8. Steering column lower cover
9. Steering column mounting nut
10. Steering wheel lower cover

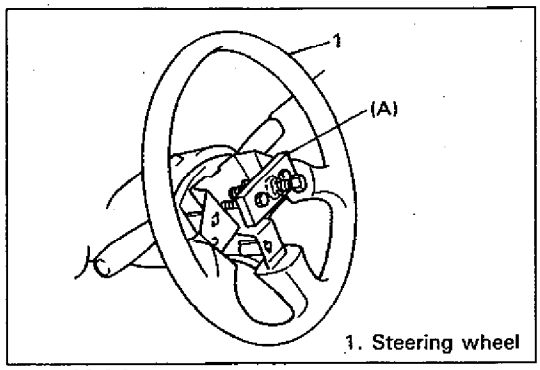
NOTE:
Use of steering column mounting nuts is different between key cylinder side and lower joint side. Refer to above figure for proper installation.



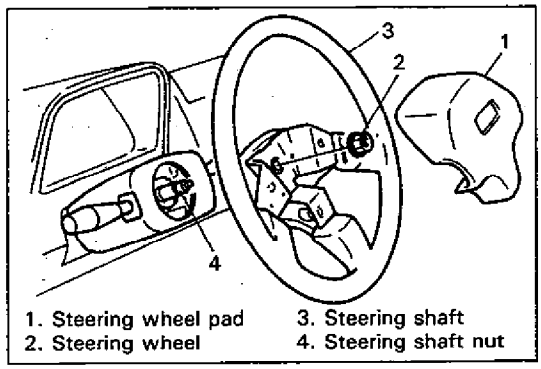
70F00-3C-3-1



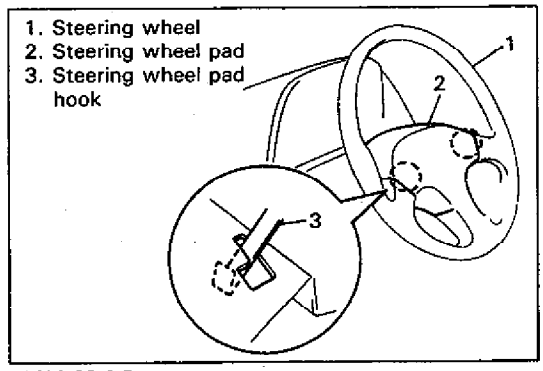
70F00-3C-3-2



70F00-3C-3-3



70F00-3C-3-4



70F00-3C-3-5

ON-VEHICLE SERVICE

1. REMOVE AND INSTALL STEERING WHEEL

REMOVAL

1) Disconnect negative battery cable.
2-1) **For 2 spoke type:**
Remove pad by pulling it upward.
2-2) **For 3 spoke type:**
Pull pad upward and after move to arrow direction ② as shown in figure at left.
3) Remove steering shaft nut.
4) Make alignment marks on steering wheel and shaft for a guide during reinstallation.
5) Remove steering wheel with special tool.

Special Tool
(A): 09944-36010 or 09944-36011

INSTALLATION

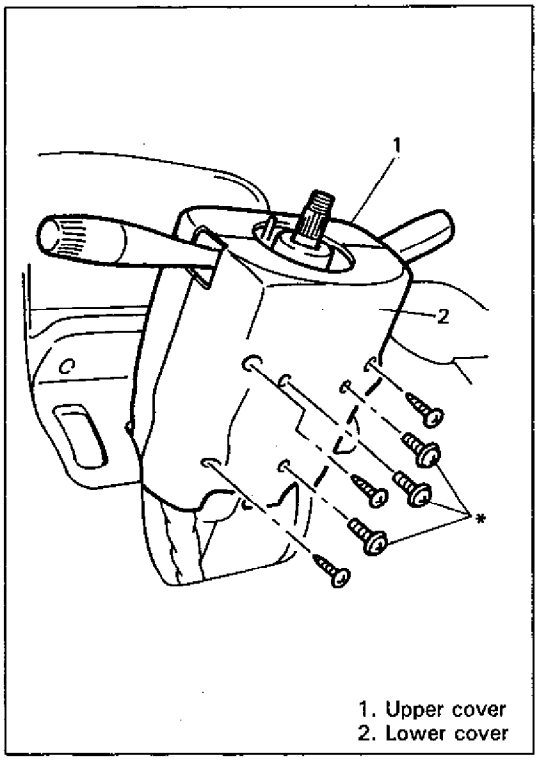
1) Install steering wheel onto shaft, aligning alignment marks on them.
2) Torque steering shaft nut to specification as given below.

Tightening Torque
(a): 25—40 N·m (2.5—4.0 kg-m, 18.5—28.5 lb-ft)

3) Connect horn wire to steering wheel and then install pad.

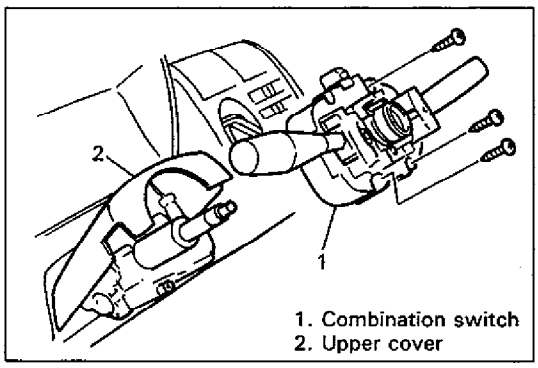
NOTE:
For 3 spoke type steering wheel pad correct installation, use care for relation in position between hook of steering wheel pad and hole of steering wheel.

4) Connect battery negative cable.



1. Upper cover
2. Lower cover

70F00-3C-4-1



1. Combination switch
2. Upper cover

70F00-3C-4-3

2. REMOVE AND INSTALL COMBINATION SWITCH

REMOVAL

1) Disconnect negative battery cable.
2) Before removing this switch, remove steering wheel. Refer to STEERING WHEEL REMOVAL.
3) Remove column lower cover.

NOTE:
Marked with * are standard screws.
The rest are tapping screws.

4) Disconnect lead wire from combination switch at coupler.
5) Remove wire band.
6) Remove combination switch assembly with upper cover from steering column.

INSTALLATION

1) Install combination switch as shown in left figure.
2) Connect lead wire from this switch at coupler.
3) Install wire band.
4) Install column lower cover.

NOTE:
When tightening torque lower cover and upper cover, be careful so that combination switch lead wire is not caught between covers.

5) Install steering wheel. Refer to step 1) through 4) under STEERING WHEEL INSTALLATION.

3. REMOVE AND INSTALL STEERING COLUMN

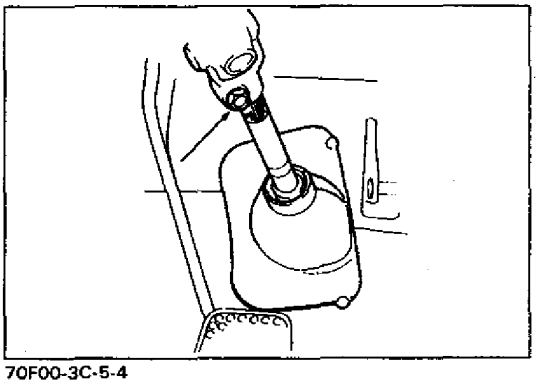
NOTE:
Once the steering column is removed from the vehicle, the column is extremely susceptible to damage. Dropping the column assembly on its end could collapse the steering shaft or loosen the plastic shear pins which maintain column length. Leaning on the column assembly could cause the jacket to bend or deform. Any of the above damage could impair the column's collapsible design. If it is necessary to remove the steering wheel, use steering wheel remover. Under no condition should the end of the shaft be hammered upon as hammering could loosen the plastic shear pins which maintain column length.

64B40-3C-5-3

REMOVAL

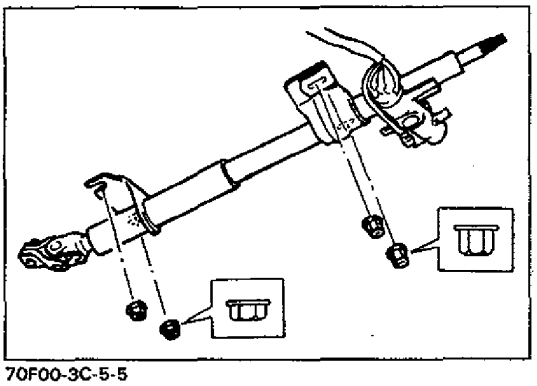
1) Disconnect negative battery cable.
2) Remove steering wheel. Refer to STEERING WHEEL REMOVAL.
3) Remove combination switch. Refer to Steps 3 through 6 under COMBINATION SWITCH REMOVAL.
4) Disconnect lead wires from ignition switch and ignition key warning switch (if equipped) at coupler.

70F00-3C-5-3



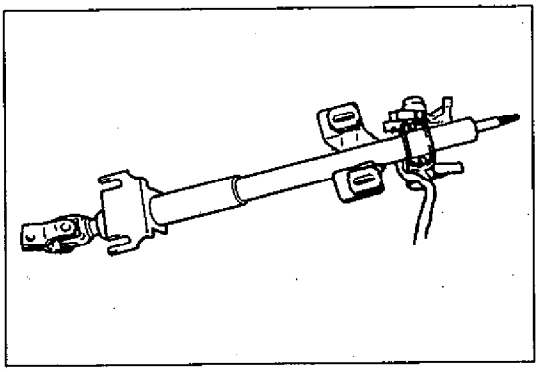
5) Remove steering shaft joint upper side bolt.

70F00-3C-5-4



6) Remove steering column mount nuts.

70F00-3C-5-5



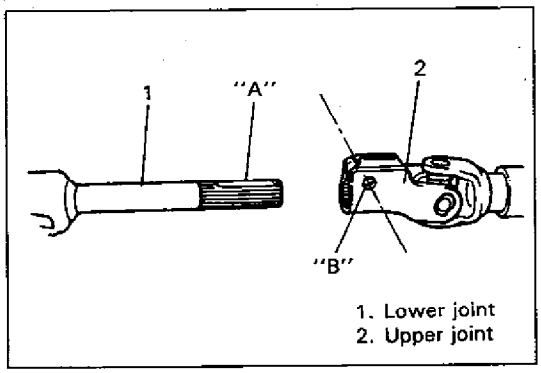
70F00-3C-6-1

7) Remove steering column assembly.

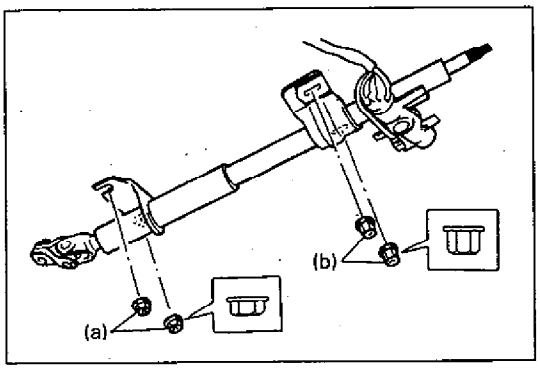
NOTE:
Don't disassemble steering column assembly into column and shaft. If steering column or shaft is found defective, replace as an assembly.

INSTALLATION

1) Align flat part "A" of lower joint shaft with bolt hole "B" of upper side joint as shown. Then insert upper side joint into lower joint shaft.



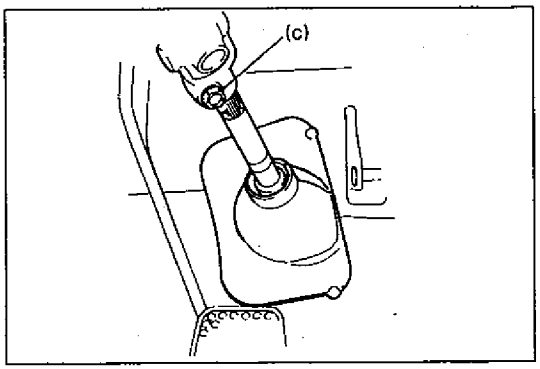
70F00-3C-6-2



70F00-3C-6-3

2) Install steering column assembly to lower and upper brackets. Torque steering column nuts to specifications as given below.
   - Tighten nuts (a) first to specified torque.
   - Then tighten nuts (b) to specified torque.

Tightening Torque
(a): 11—17 N·m (1.1—1.7 kg-m, 8.0—12.0 lb-ft)
(b): 11—17 N·m (1.1—1.7 kg-m, 8.0—12.0 lb-ft)



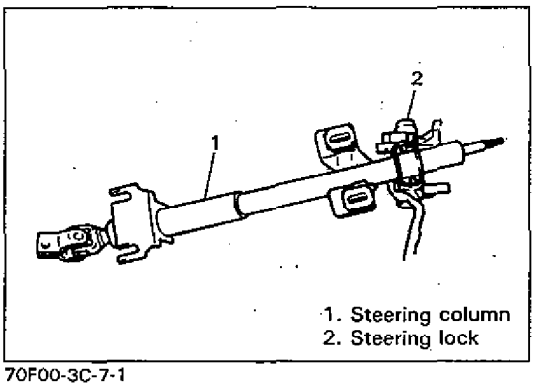
70F00-3C-6-4

3) Install bolt to steering shaft upper joint and tighten it to specified torque.

NOTE:
After tightening column nuts, bolt (c) should be tightened.

Tightening Torque
(c): 20—30 N·m (2.0—3.0 kg-m, 14.5—21.5 lb-ft)

4) Connect lead wires from ignition switch and ignition key warning switch (if equipped) at coupler.
5) Install combination switch. Refer to Steps 1 through 4 under COMBINATION SWITCH INSTALLATION.
6) Install steering wheel. Refer to Steps 1 through 4 under STEERING WHEEL INSTALLATION.



1. Steering column
2. Steering lock

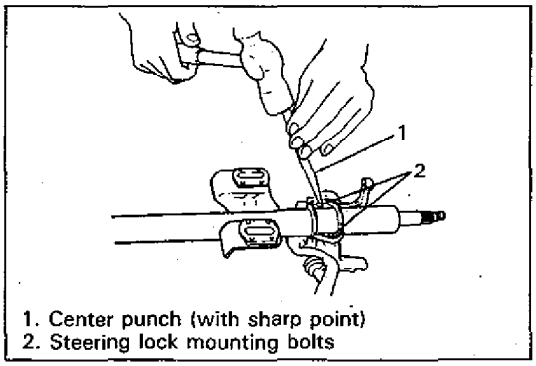
70F00-3C-7-1

4. REMOVE AND INSTALL STEERING LOCK

(Applicable to vehicle equipped with steering lock.)

REMOVAL

1) Remove steering column. Refer to STEERING COLUMN REMOVAL.



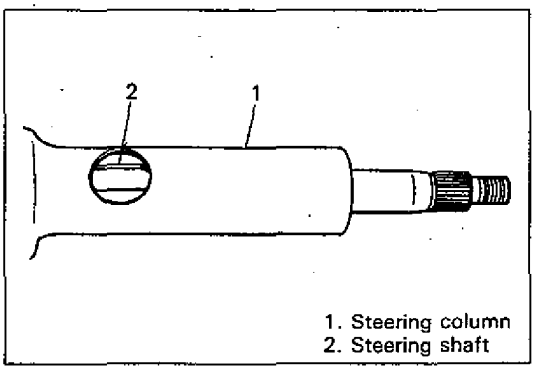
1. Center punch (with sharp point)
2. Steering lock mounting bolts

70F00-3C-7-2

2) Using center punch as shown, loosen and remove steering lock mounting bolts. Use care not to damage aluminum part of steering lock body with center punch.
3) Turn ignition key to "ACC" or "ON" position and remove steering lock assembly from steering column.

INSTALLATION

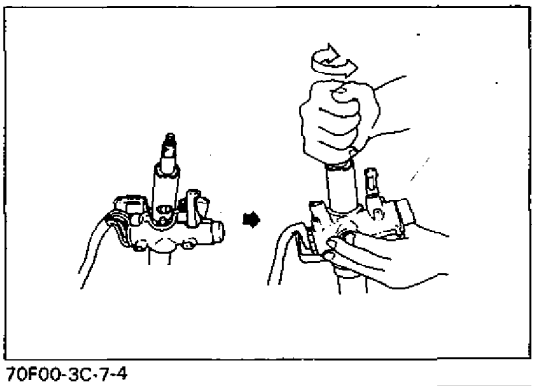
1) Position oblong hole of steering shaft in the center of hole in column.



1. Steering column
2. Steering shaft

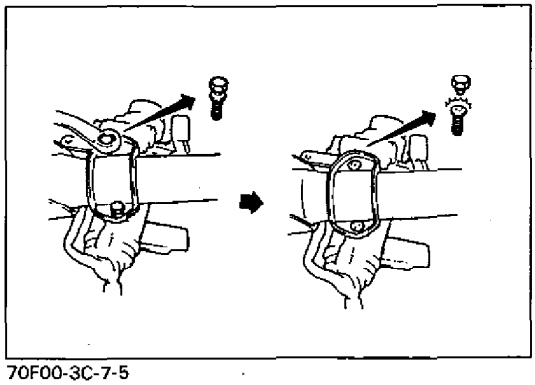
70F00-3C-7-3

2) Turn ignition key to "ACC" or "ON" position and install steering lock assembly onto column.
3) Now turn ignition key to "LOCK" position and pull it out.
4) Align hub on lock with oblong hole of steering shaft and rotate shaft to assure that steering shaft is locked.

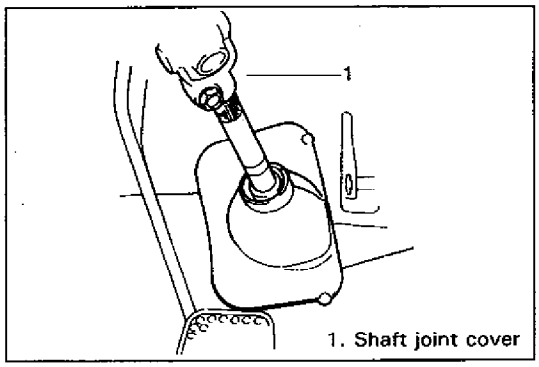


70F00-3C-7-4

5) Tighten two new bolts until head of each bolt is broken off.
6) Turn ignition key to "ACC" or "ON" position and check to be sure that steering shaft rotates smoothly. Also check for lock operation.
7) Install steering column. Refer to Steps 1) through 8) under STEERING COLUMN INSTALLATION.



70F00-3C-7-5

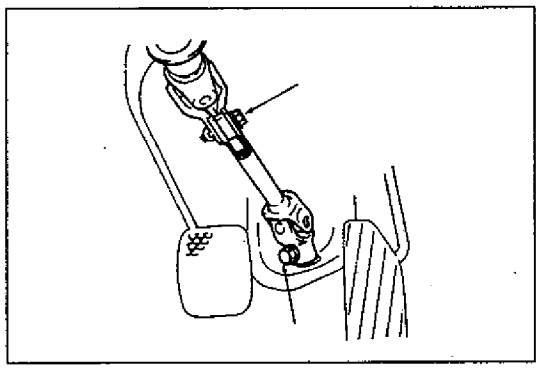


70F00-3C-8-1

5. REMOVE AND INSTALL STEERING SHAFT LOWER JOINT

REMOVAL

1) Set front wheels in straightforward state and remove steering shaft joint cover.

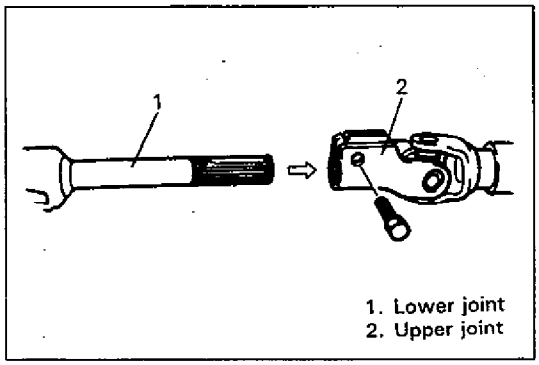


70F00-3C-8-2

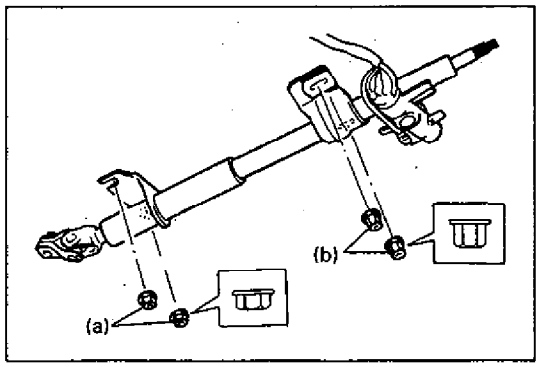
2) Remove steering shaft joint bolts.
3) Remove steering shaft lower joint.
   If it's hard to remove, loosen steering column mounting nuts a little.

INSTALLATION

1) Align flat part of lower joint shaft with bolt hole of upper joint as shown. Then insert lower joint shaft into upper joint.
2) Be sure that front wheels and steering wheel are in straightforward state and insert lower joint into steering pinion shaft.



64B40-3C-9-2



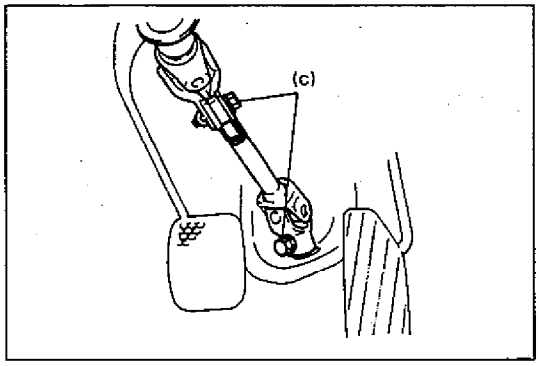
70F00-3C-8-4

3) If steering column nuts were loosened in removal, torque lower nuts to specification first.

Tightening Torque for lower nuts
(a): 11—17 N·m (1.1—1.7 kg-m, 8.0—12.0 lb-ft)

And then torque upper nuts to specification.

Tightening Torque for upper nuts
(b):11—17 N·m (1.1—1.7 kg-m, 8.0—12.0 lb-ft)



64B40-3C-9-4

4) Torque steering shaft joint bolts to specification.

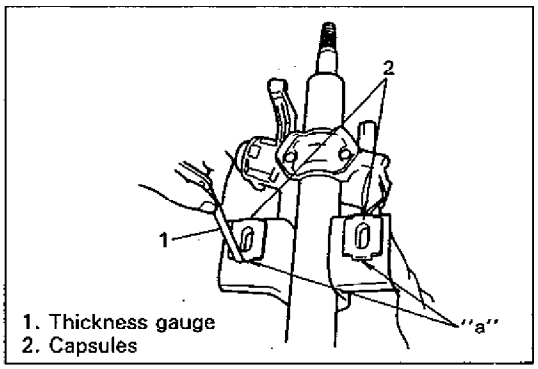
Tightening Torque
(c): 20—30 N·m (2.0—3.0 kg-m, 14.5—21.5 lb-ft)

5) Install steering shaft joint cover.

6. CHECKING STEERING COLUMN FOR ACCIDENT DAMAGE

NOTE:
Vehicles involved in accidents resulting in body damage or where the steering column has been impacted may also have a damaged or misaligned steering column.
In such a case, following Step 1) through 5) should be performed for double tube type steering column and 3) through 5) for single tube type steering column.

70F00-3C-9-1



1. Thickness gauge
2. Capsules

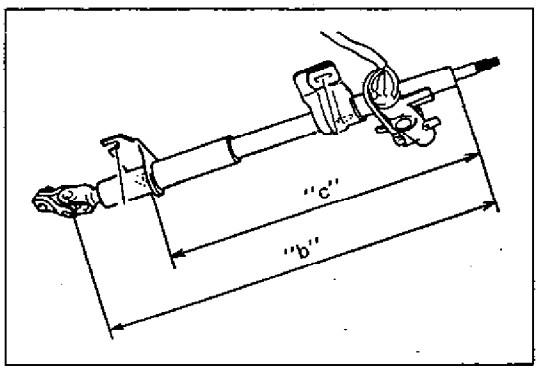
CHECKING PROCEDURE

1) Check capsuled on steering column bracket; all should be contacting the bottom of slots.
If not, steering column assembly should be replaced. Use thickness gauge for convenience.

Clearance "a": 0 mm (0 in.)

NOTE:
Each capsule should be contacting the bottom of the slot. If not, replace column assembly.

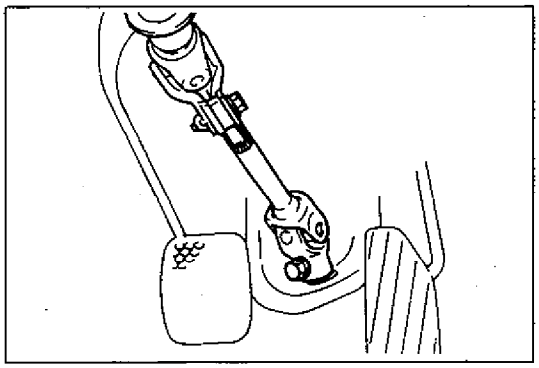
70F00-3C-9-2



2) Take each measurement "b" and "c" as shown. If it is shorter than specified length, replace column assembly with new one.

Length "b": 468—470 mm (18.43—18.50 in.)
Length "c": 386.5—389.5 mm (15.22—15.33 in.)

70F00-3C-9-3

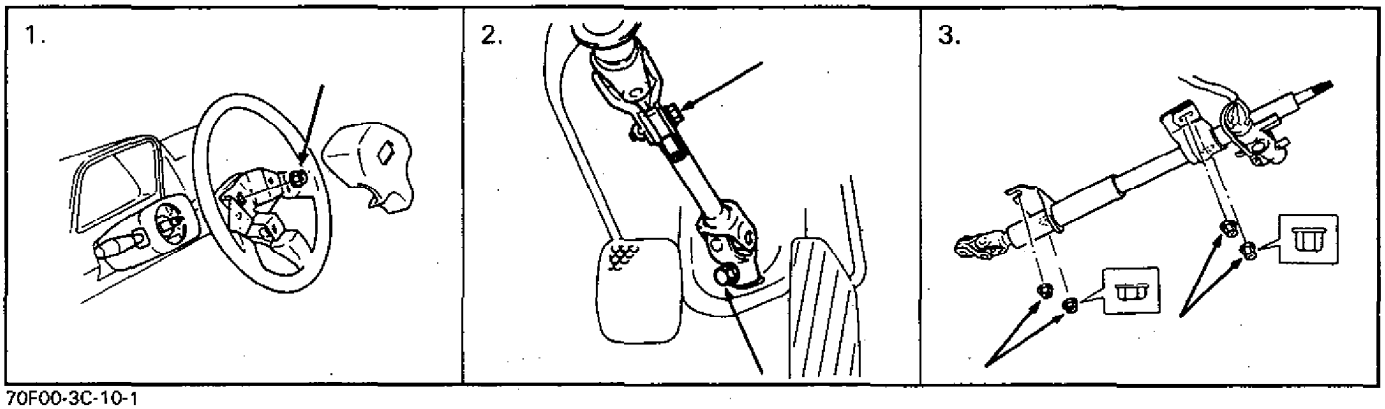


64B40-3C-10-4

3) Check steering shaft joints and shaft for any damages such as crack, breakage, malfunction or excessive play. If anything is found faulty, replace as joint assembly.
4) Check steering shaft for smooth rotation. If found defective, replace as column assembly.
5) Check steering shaft and column for bend, cracks or deformation. If found defective, replace.

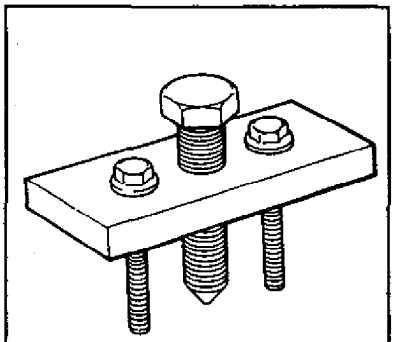
RECOMMENDED TORQUE SPECIFICATIONS

Fastening parts	Tightening torque		
	N·m	kg-m	lb-ft
1. Steering shaft nut	25–40	2.5–4.0	18.5–28.5
2. Steering shaft joint bolts	20–30	2.0–3.0	14.5–21.5
3. Steering column nuts	11–17	1.1–1.7	8.0–12.0



70F00-3C-10-1

SPECIAL TOOL



09944-36010 or
09944-36011
Steering wheel remover

64B40-3C-11-2

SECTION 3D

FRONT SUSPENSION

NOTE:

- **All front suspension fasteners are an important attaching part in that it could affect the performance of vital parts and systems, and/or could result in major repair expense. They must be replaced with one of the same part number or with an equivalent part if replacement becomes nacessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of this part.**
- **Never attempt to heat, quench or straighten any front suspension part. Replace it with a new part or damage to the part may result.**

64B40-3D-1-1

CONTENTS

70F00-3D-1-2

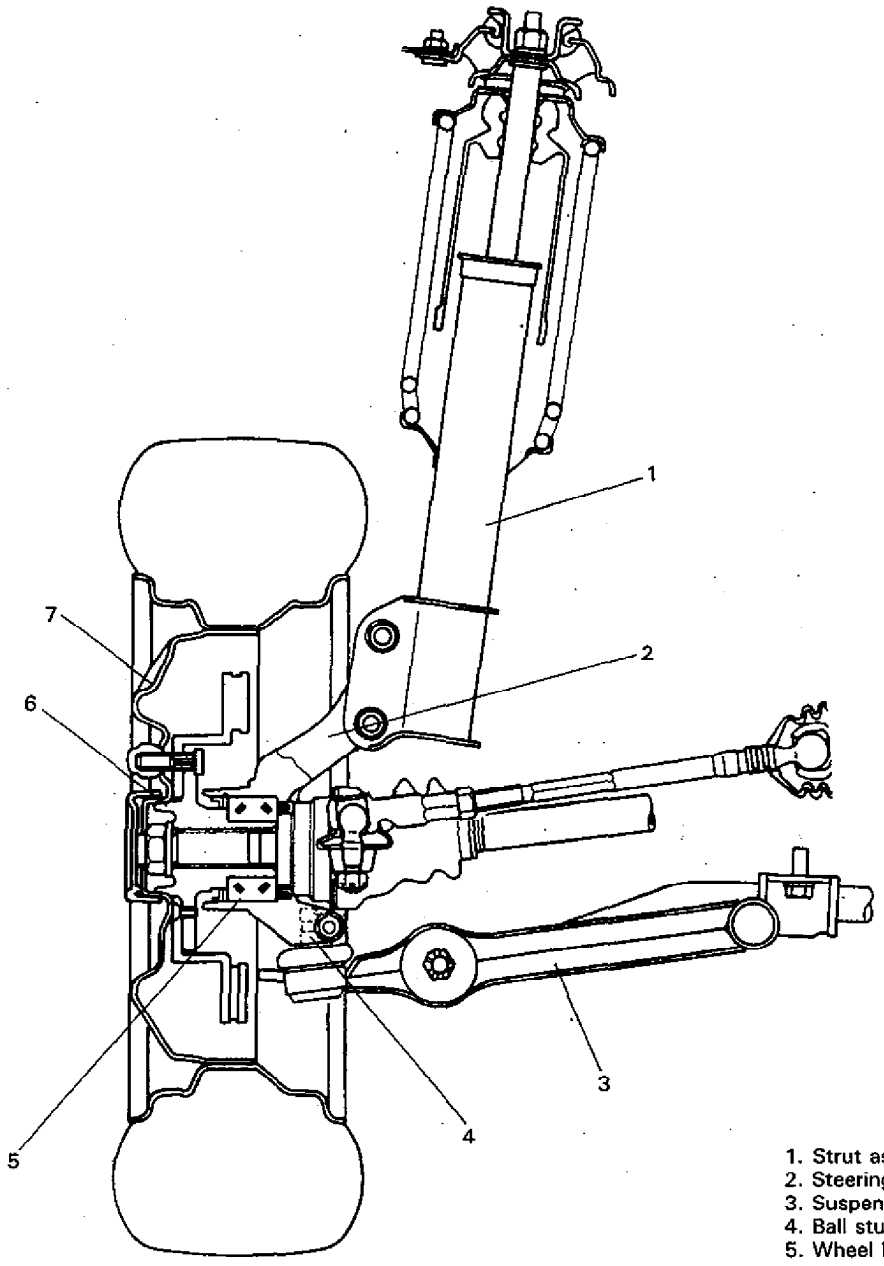
GENERAL DESCRIPTION

The front suspension is the strut type independent suspension. The upper end of a strut is anchored to the vehicle body by a strut support. The strut and strut support are isolated by a rubber mount. A strut bearing is also installed a little lower to the rubber mount.

The lower end of the strut is connected to the upper end of a steering knuckle and lower end of knuckle is attached to the stud of a ball joint which is incorporated in a unit with a suspension control arm. And connected to this steering knuckle is the tie-rod end.

Thus, movement of the steering wheel is transmitted to the tie-rod end and then to the knuckle, eventually causing the wheel-and-tire to move. In this operation, with the movement of the knuckle, the strut also rotates by means of the strut bearing and lower ball joint.

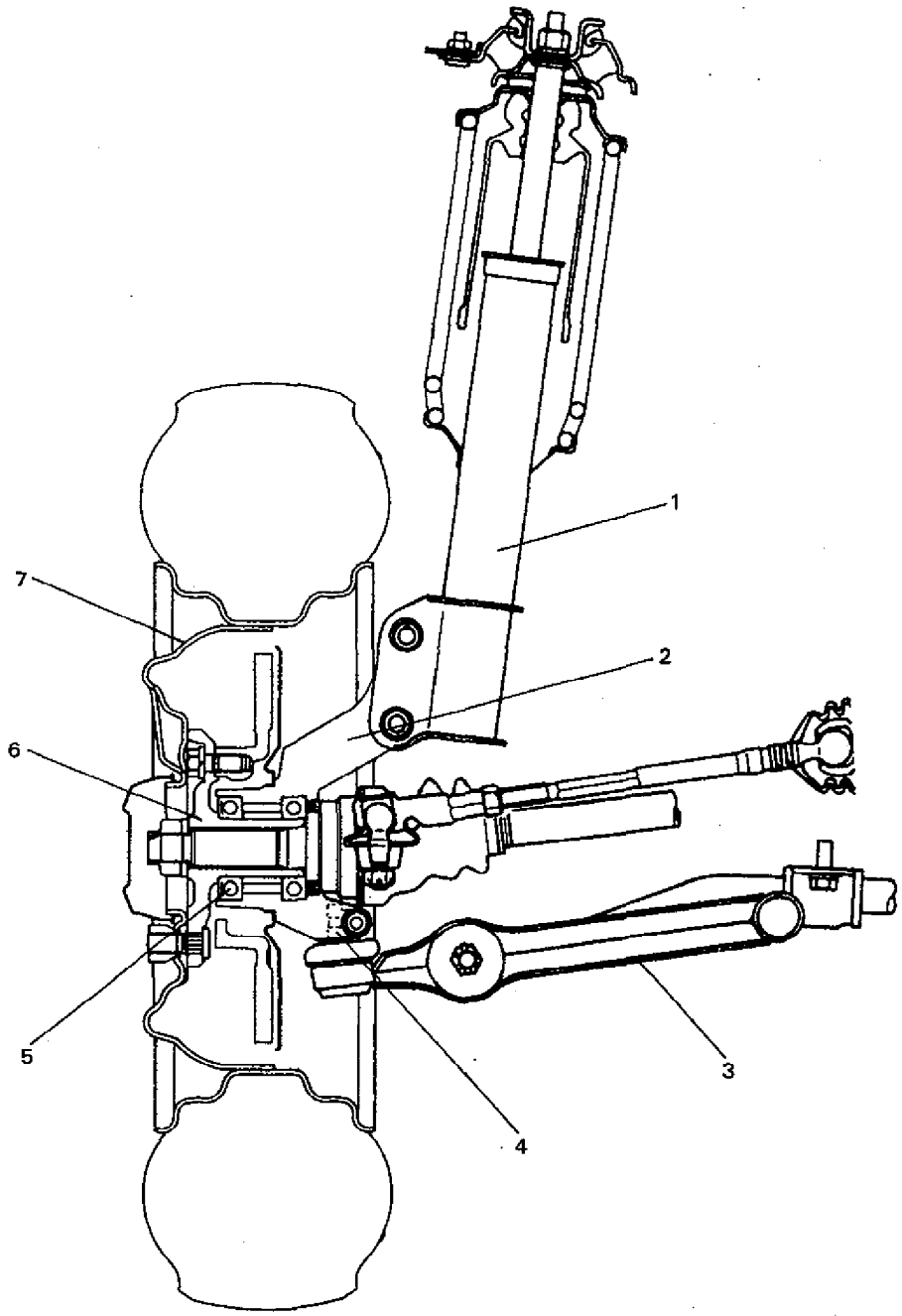
For ventilated disc brake model



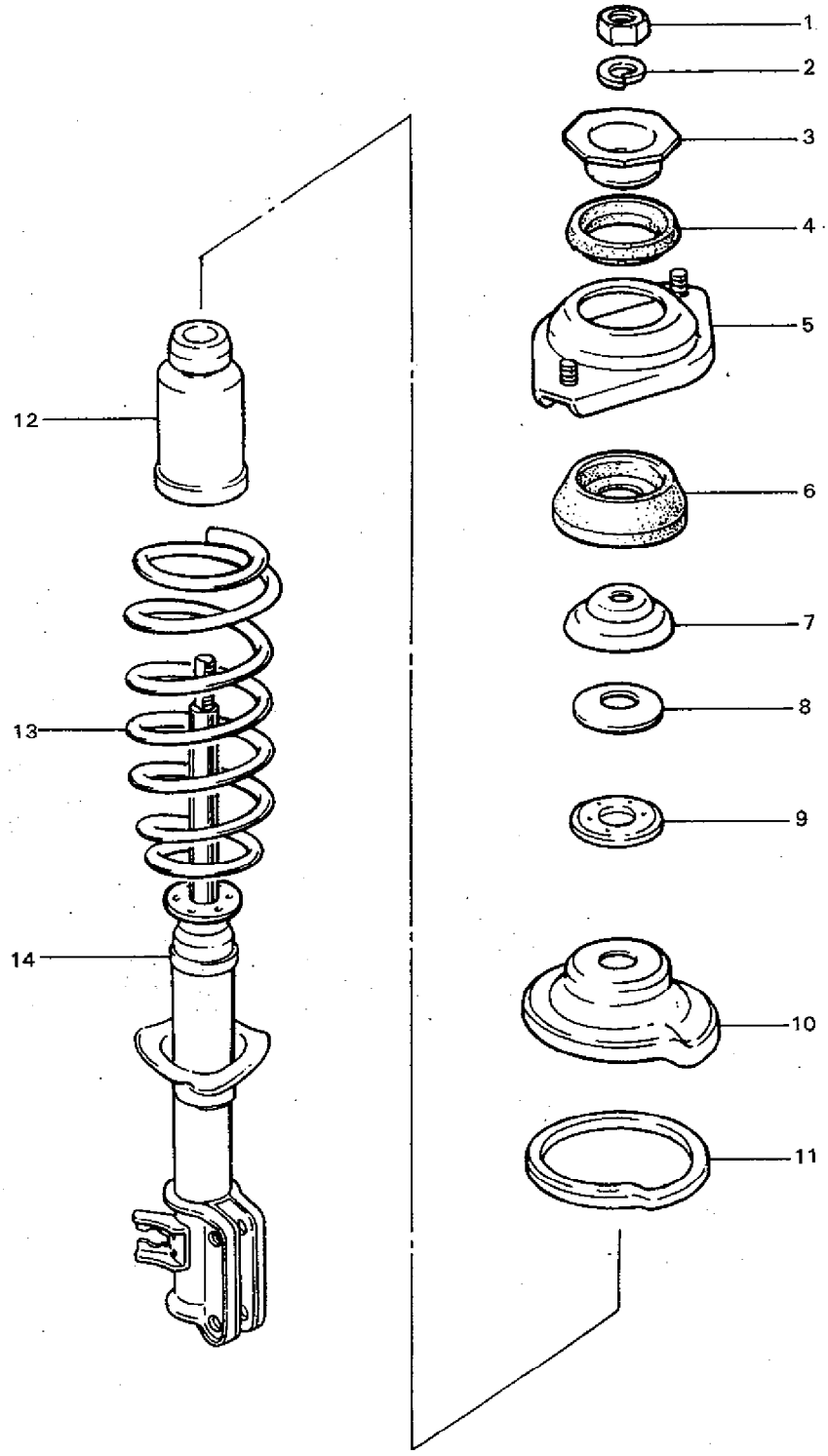
1. Strut assembly
2. Steering knuckle
3. Suspension control arm
4. Ball stud
5. Wheel bearing
6. Front wheel hub
7. Wheel

70F00-3D-2-1

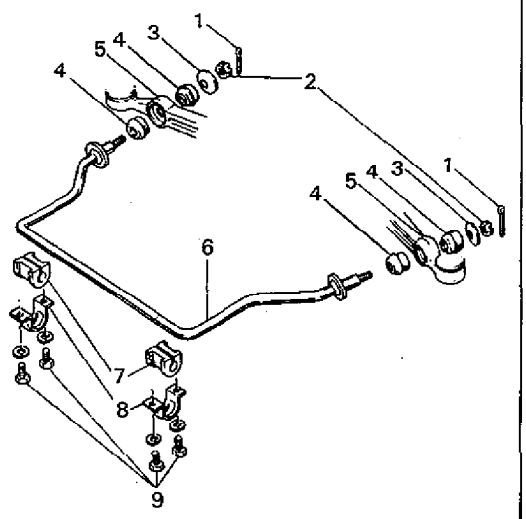
For solid disc brake model



1. Strut assembly
2. Steering knuckle
3. Suspension control arm
4. Ball stud
5. Wheel bearing
6. Front wheel hub
7. Wheel



1. Strut nut
2. Strut lock washer
3. Strut inner support
4. Strut rebound stopper
5. Strut support
6. Strut mount
7. Strut mount seat
8. Strut bearing seat
9. Strut bearing
10. Spring upper seat
11. Strut spring seat
12. Bump stopper
13. Coil spring
14. Strut assembly



1. Cotter pin
2. Castle nut
3. Stabilizer bar washer
4. Stabilizer bar bushing
5. Suspension control arm
6. Stabilizer bar
7. Mount bushing
8. Mount bush bracket
9. Mount bracket bolt

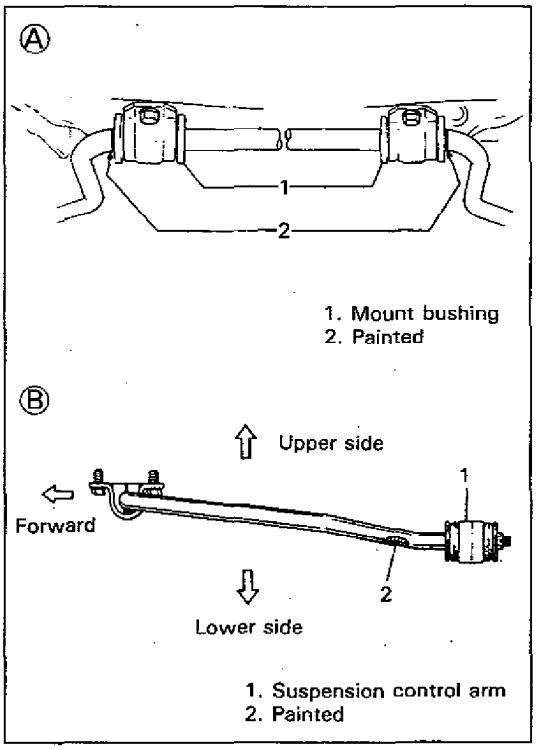
70F00-3D-5-1

ON-VEHICLE SERVICE

1. REMOVE AND INSTALL STABILIZER BAR AND/OR BUSHINGS

REMOVAL

1) Hoist vehicle and allow the front suspension control arms to hang free.
2) Remove left and right front wheels.
3) Remove stabilizer bar mount bushing bracket bolts.
4) Remove stabilizer bar from front suspension control arms (right & left) as shown.



Ⓐ
1. Mount bushing
2. Painted

Ⓑ
1. Suspension control arm
2. Painted

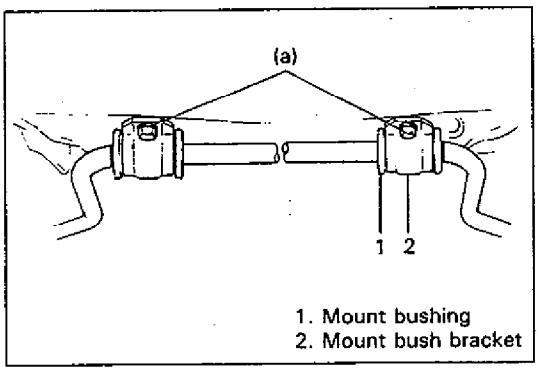
70F00-3D-5-4

INSTALLATION

1) When installing stabilizer, loosely assemble all components while insuring that stabilizer is centered, side-to-side. Refer to figure Ⓐ for its check.
   For correct installation in vertical direction, Refer to figure Ⓑ.

NOTE:

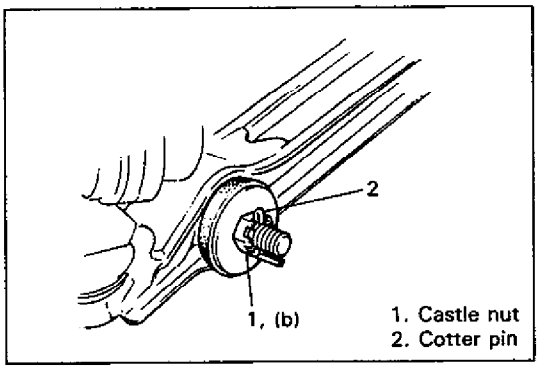
- **For correct installation of stabilizer bar, side-to-side, be sure that color paint on stabilizer bar aligns with mount bushing, both right and left, as shown in figure Ⓐ.**
- **Install painted side to suspension control arm on the left.**
- **Bring the oblong hole drilled side of bracket to the rear.**



70F00-3D-6-1

1) Tighten stabilizer bar mount bushing bracket bolts to specified torque.

Tightening Torque
(a): 30—55 N·m (3.0—5.5 kg-m, 22.0—39.5 lb-ft)

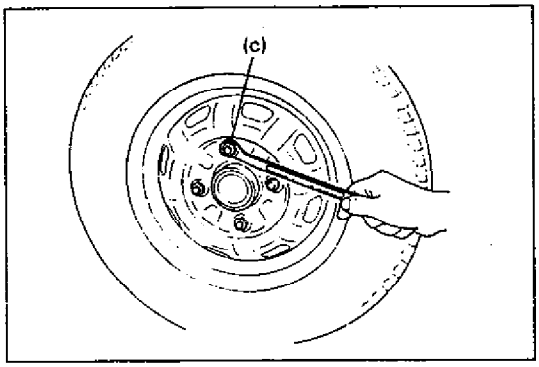


70F00-3D-6-2

3) After tightening castle nut to specified torque, be sure to bend cotter pin as shown.

Tightening Torque
(b): 40—90 N·m (4.0—9.0 kg-m, 29.0—65.0 lb-ft)

NOTE:
Removed cotter pin should be replaced with new one.

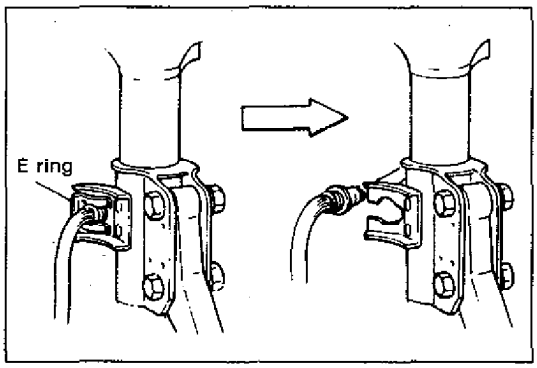


70F00-3D-6-3

4) Install wheel and tighten wheel nuts to specified torque.

Tightening Torque
(c): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

5) Lower hoist
6) Check toe setting and adjust as required.
Refer to WHEEL ALIGNMENT (SECTION 3A)

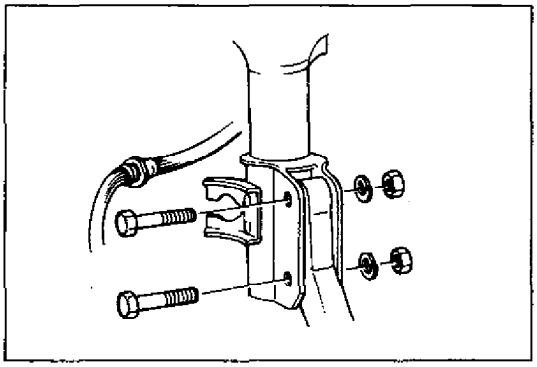


70F00-3D-7-1

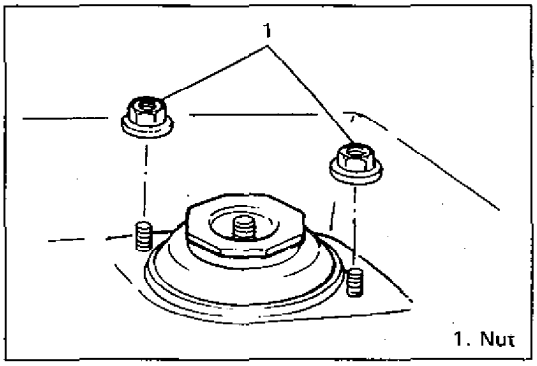
2. REMOVE AND INSTALL STRUT DAMPER ASSEMBLY

REMOVAL

1) Hoist vehicle, allowing front suspension to hang free.
2) Remove wheel.
3) Remove E ring securing brake flexible hose and take brake flexible hose off strut bracket as shown.

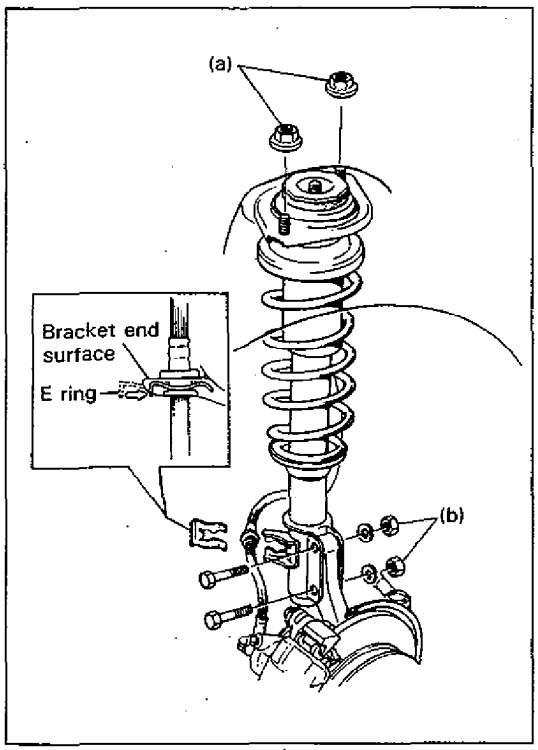

64B40-3D-5-2

4) Remove strut bracket bolts.



70F00-3D-7-3

5) Remove strut support nuts.
   Hold strut by hand so that it will not fall off.
6) Remove strut assembly.



70F00-3D-7-4

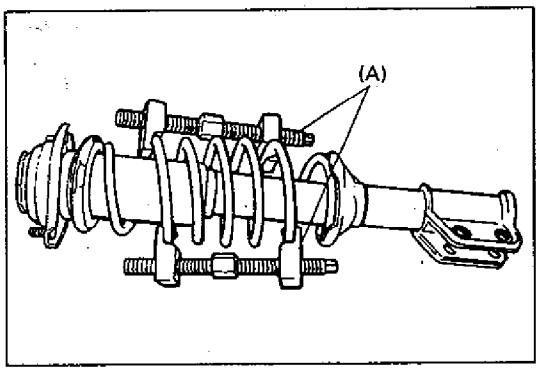
INSTALLATION

1) Install strut by reversing REMOVAL Steps 1)—6). Insert bolts in such a direction as shown.
2) Torque all fasteners to specification.

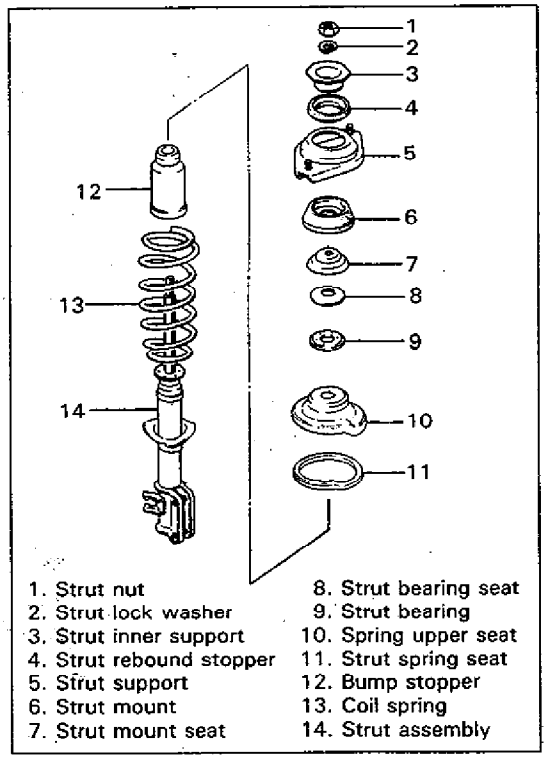
Tightening Torque

(a): 18—28 N·m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)
(b): 70—90 N·m (7.0—9.0 kg-m, 51.0—65.0 lb-ft)

NOTE:
Don't twist brake hose when installing it.
Install E ring as far as it fits to bracket as shown.

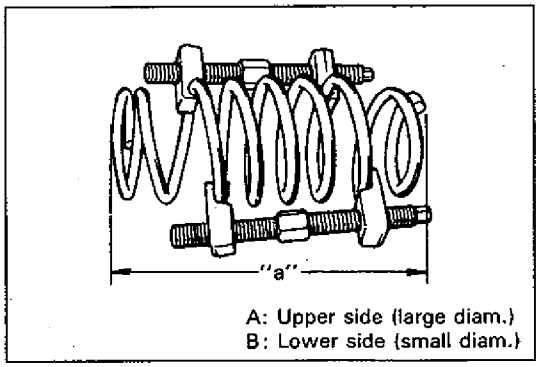


70F00-3D-8-1



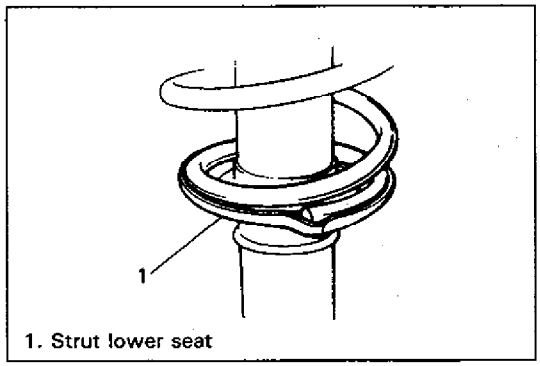
1. Strut nut
2. Strut lock washer
3. Strut inner support
4. Strut rebound stopper
5. Strut support
6. Strut mount
7. Strut mount seat
8. Strut bearing seat
9. Strut bearing
10. Spring upper seat
11. Strut spring seat
12. Bump stopper
13. Coil spring
14. Strut assembly

70F00-3D-8-2



A: Upper side (large diam.)
B: Lower side (small diam.)

70F00-3D-8-4



1. Strut lower seat

70F00-3D-8-5

3. DISASSEMBLY AND ASSEMBLY STRUT DAMPER

DISASSEMBLY

1) With special tool placed to spring as shown, turn special tool bolts alternately until spring tension is released. Whether it is released or not can be known by whether strut turns lightly while strut spring is held stationary.

Special Tool
(A): 09940-71430

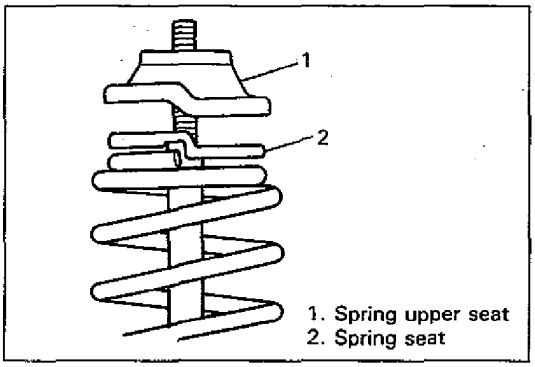
2) While keeping spring compressed with special tool as shown above, remove strut nut and then disassemble parts.

ASSEMBLY

1) Compress spring with special tool until total length becomes about 230 mm (9.06 in.) as shown.

Length "a": 230 mm (9.06 in.)

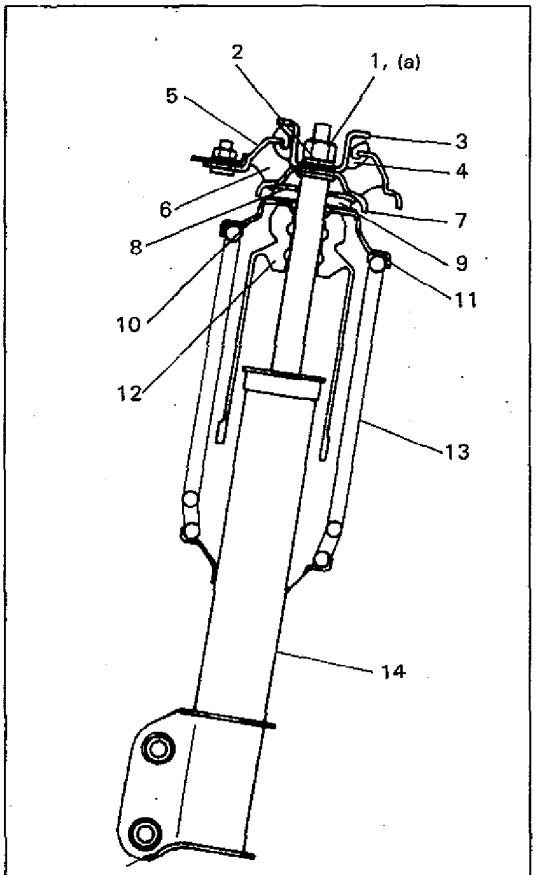
2) Mate spring end with stepped part of lower seat as shown.
3) Install bump stopper onto strut rod. For installing direction, refer to above figure in DISASSEMBLY.
4) Pull strut rod as far up as possible and use care not to allow it to retract into strut.



1. Spring upper seat
2. Spring seat

70F00-3D-9-1

5) Install spring seat, mating stepped part of seat with spring upper end as shown. And then similarly install spring upper seat on seat.

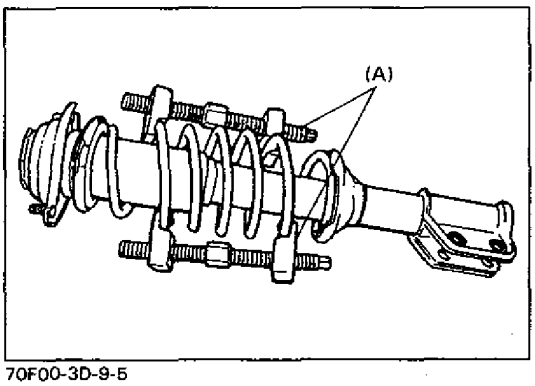


1. Strut nut
2. Strut lock washer
3. Strut inner support
4. Strut rebound stopper
5. Strut support
6. Strut mount
7. Strut mount seat
8. Strut bearing seat
9. Strut bearing
10. Spring upper seat
11. Strut spring seat
12. Bump stopper
13. Coil spring
14. Strut assembly

70F00-3D-9-2

6) Clean strut bearing and install it on spring upper seat. For installing direction, refer to figure at left.
7) Wash bearing seat and install it as shown.
8) On bearing seat, install mount seat, strut mount, support-and-rebound stopper and inner support in this sequence. Be careful for installing directions. Tighten strut nut to specified torque and then apply water-proof coating (paint or lacquer) all around nut and strut rod screw part.

Tightening Torque
(a): 40—60 N·m (4.0—6.0 kg-m, 29.0—43.0 lb-ft)

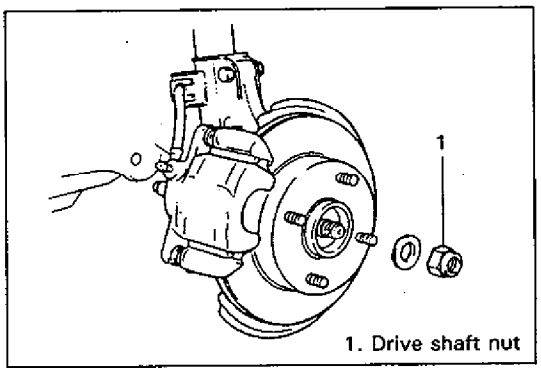


70F00-3D-9-5

9) Loosen and remove special tool compressing coil spring. While loosening special tool, recheck that stepped part of spring seat and spring end are in place to each other as described in foregoing Steps 2) and 5).

Special Tool
(A): 09940-71430

10) Install strut to vehicle body. Refer to STRUT DAMPER INSTALLATION of this section.



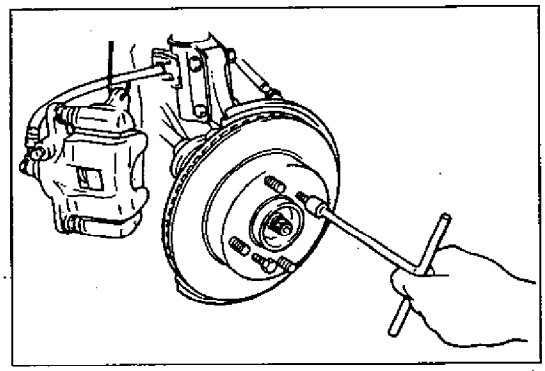
70F00-3D-10-1

4. REMOVE AND INSTALL WHEEL HUB, WHEEL STUD/WHEEL BEARING OUTSIDE INNER RACE

[For ventilated disc brake model]

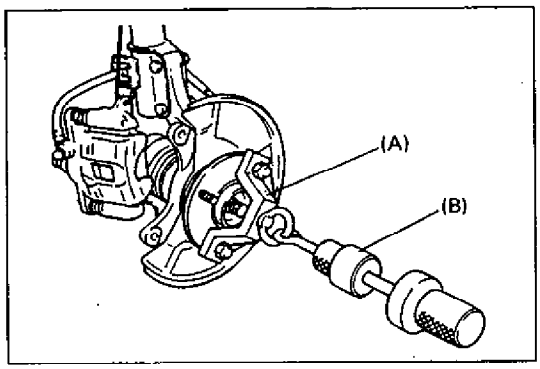
REMOVAL

1) Hoist vehicle and remove wheel.
2) Uncalk drive shaft nut.
3) Depress foot brake pedal and hold it there. Remove drive shaft nut.



70F00-3D-10-2

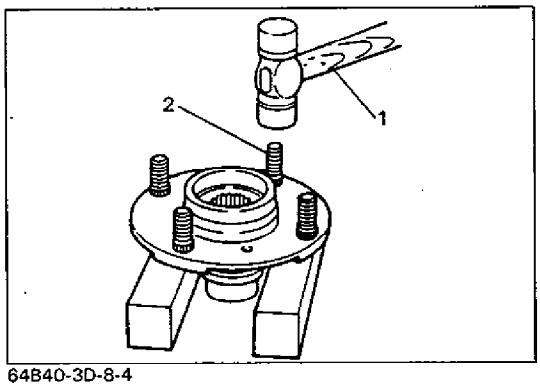
4) Remove caliper carrier bolts.
5) Remove caliper with carrier.
6) Remove disc screws.
7) Pull brake disc off by using two 8 mm bolts.



70F00-3D-10-3

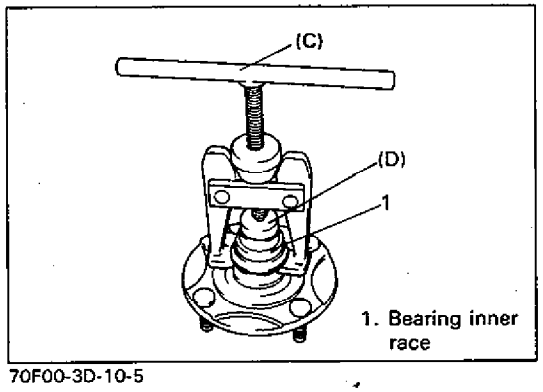
8) Pull out wheel hub with special tools.

Special Tool
(A): 09943-17911
(B): 09942-15510



64B40-3D-8-4

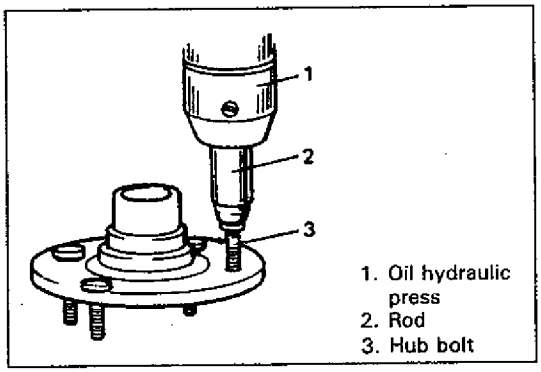
9) Remove hub bolts.



70F00-3D-10-5

10) Remove wheel bearing inner race.

Special Tool
(C): 09913-61110
(D): 09925-88210

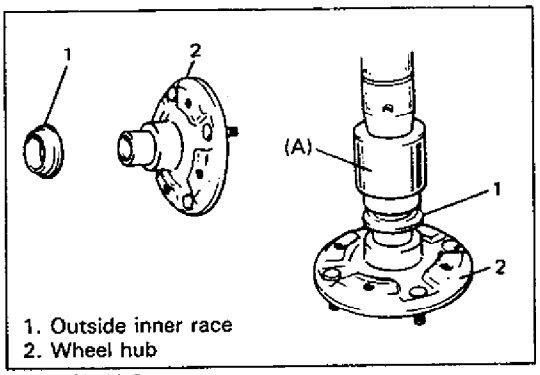


64B40-3D-9-1

INSTALLATION

Install Hub Bolts

Insert new stud in hub hole. Rotate stud slowly to assure serrations are aligned with those made by original bolt.

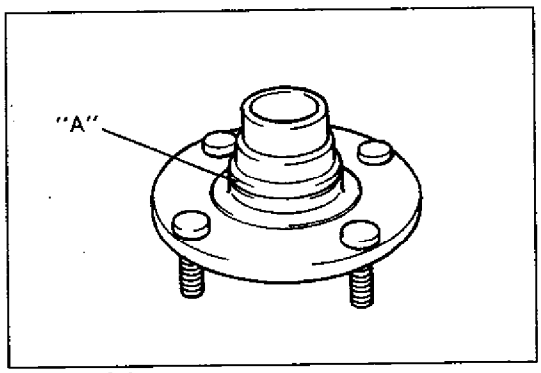


70F00-3D-11-2

1) Install outside inner race to wheel hub using special tool. Installing direction is as shown.

Special Tool
(A): 09940-53111

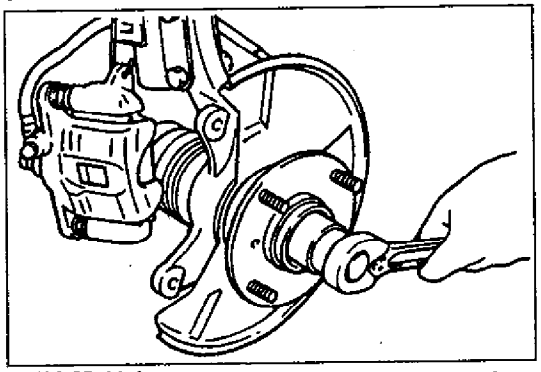
NOTE:
When replacing bearing, inner race or outer race, be sure to replace them with new ones as a set.



64B40-3D-9-4

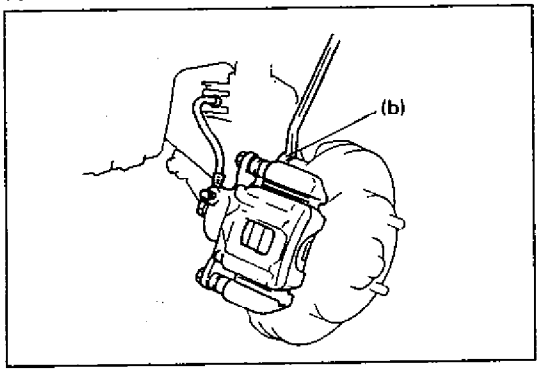
2) Apply grease to outside bearing, outside inner race and oil seal lip.

"A": Grease 99000-25010


70F00-3D-11-4

3) Install wheel hub to knuckle by tightening drive shaft nut. Don't tap wheel hub.
4) Install brake disc by tightening disc screws to specified torque.

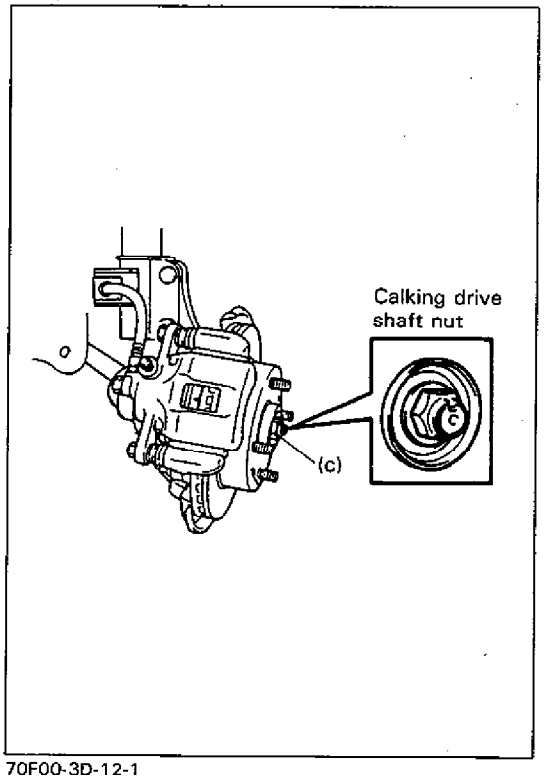
Disc screw Tightening Torque:
6—9 N·m (0.6—0.9 kg-m, 4.5—6.5 lb-ft)



70F00-3D-11-5

5) Install brake caliper/caliper carrier.
6) Tighten caliper carrier bolts to specified torque.

Tightening Torque
(b): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

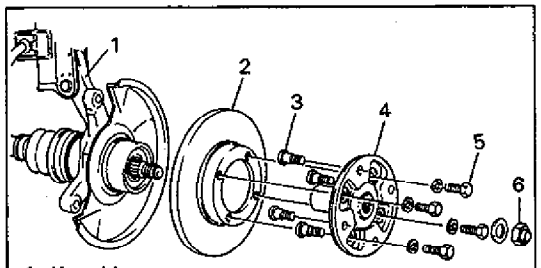


70F00-3D-12-1

7) Depress foot brake pedal and hold it there.
   Tighten new drive shaft nut to specified torque.

   Tightening Torque
   (c): 150—200 N·m (15.0—20.0 kg-m, 108.5—144.5 lb-ft)

8) Calk drive shaft nut as shown.
9) Install wheel and lower hoist.



1. Knuckle
2. Brake disc
3. Hub bolt
4. Wheel hub
6. Brake disc bolt
6. Drive shaft nut

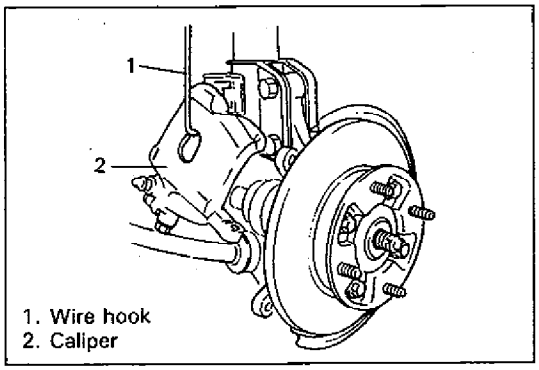
70F00-3D-13-1

4-1. REMOVE AND INSTALL WHEEL HUB/ WHEEL STUD

[For solid disc brake model]

REMOVAL

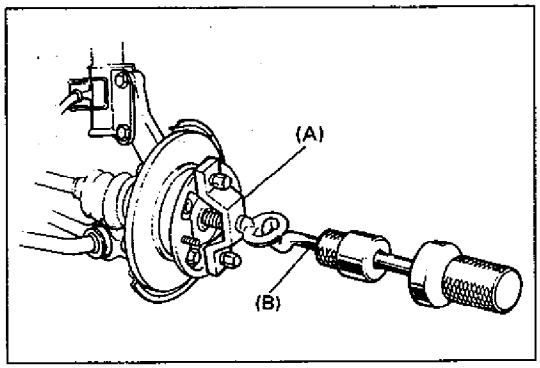
1) Hoist vehicle and remove wheel.
2) Uncalk drive shaft nut.
3) Depress foot brake pedal and hold it there.
   Remove drive shaft nut and then loosen brake disc bolts but don't remove them.
4) Remove caliper carrier bolts.



1. Wire hook
2. Caliper

70F00-3D-13-2

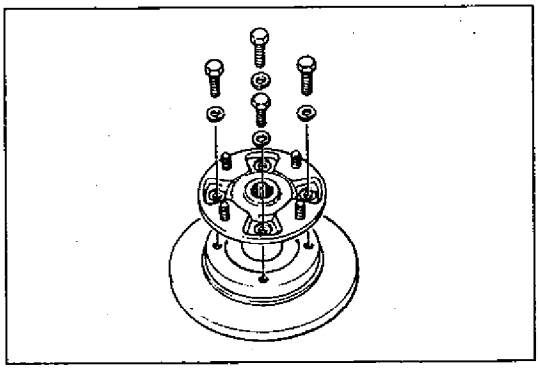
5) Remove caliper assembly from disc and suspend it with wire hook.



70F00-3D-13-3

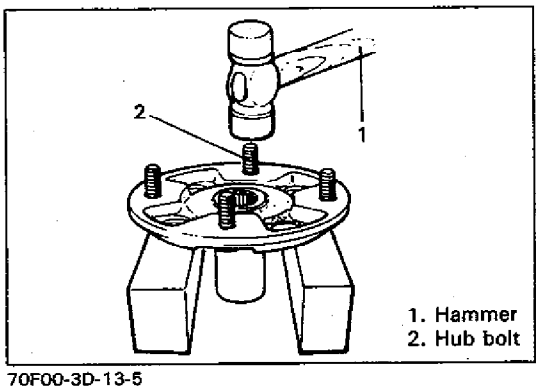
6) Pull out wheel hub with special tools.

Special Tool
(A): 09943-17910
(B): 09942-15510



70F00-3D-13-4

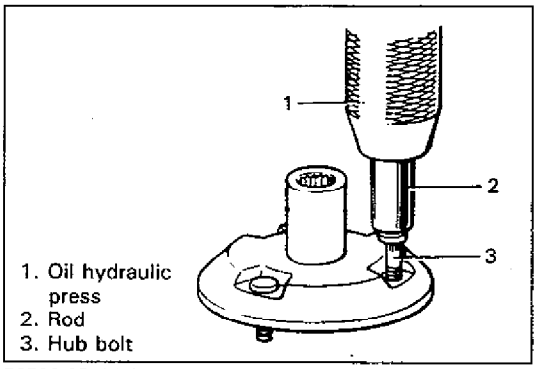
7) Remove disc from wheel hub.



1. Hammer
2. Hub bolt

70F00-3D-13-5

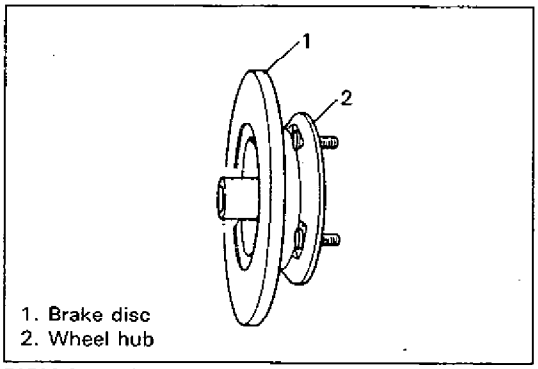
8) Remove hub bolts.



70F00-3D-14-1

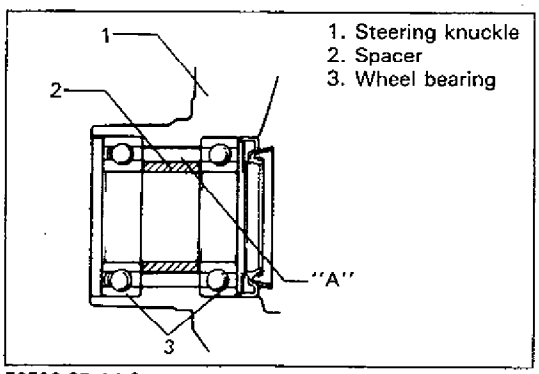
INSTALLATION

1) Insert new stud in hub hole. Rotate stud slowly to assure the serrations are aligned with those made by original bolt.



70F00-3D-14-2

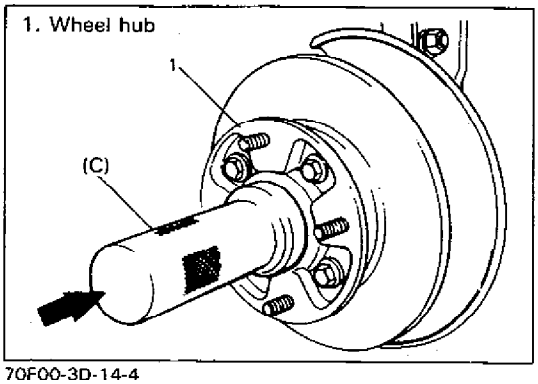
2) Install brake disc to wheel hub. Tighten disc bolts only lightly.



70F00-3D-14-3

3) Visually check to ensure that bore in wheel bearing spacer which is mounted between wheel bearings in steering knuckle is aligned with inner bores of two bearings as shown. If they are offset, align them by moving spacer.

"A": Grease 99000-25010

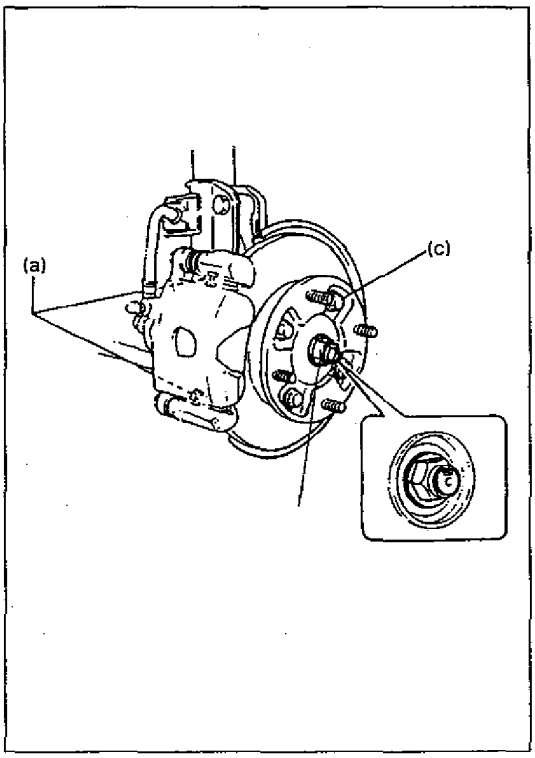


70F00-3D-14-4

4) Install wheel hub to knuckle as follows.
First, while rotating hub, tap it lightly with a plastic hammer. This is to prevent hub from being installed at an angle. After confirming that hub is free from deflection, drive it in with special tool.

Special Tool
(c): 09913-85210

5) Install pad and caliper.



70F00-3D-15-1

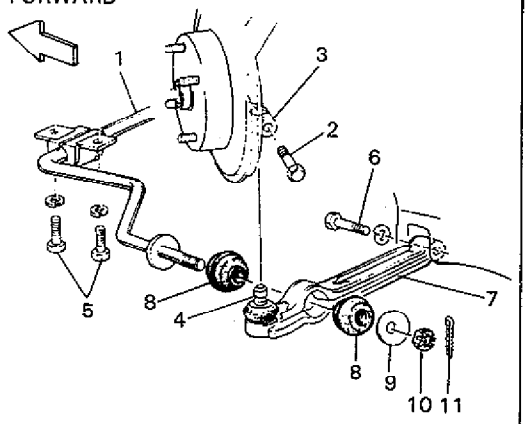
6) Tighten caliper carrier bolts to specified torque.

Tightening Torque
(a): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

7) Depress foot brake pedal and hold it there.
Tighten new drive shaft nut and brake disc bolts to specified torque.

Tightening Torque
(b): 150—200 N·m (15.0—20.0 lb-ft, 108.5—144.5 lb-ft)
(c): 40—60 N·m (4.0—6.0 kg-m, 29.0—43.0 lb-ft)

8) Calk drive shaft nut as shown.
9) Install wheel and lower hoist.



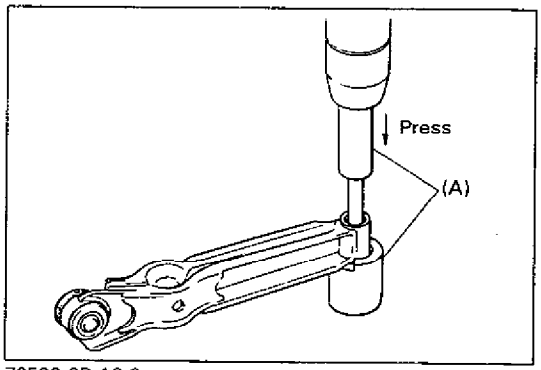
1. Stabilizer bar
2. Ball stud bolt
3. Knuckle
4. Ball stud
5. Stabilizer bar mount bracket bolt
6. Control arm bolt
7. Suspension control arm
8. Stabilizer bar bushing
9. Washer
10. Castle nut
11. Cotter pin

70F00-3D-16-1

5. REMOVE AND INSTALL SUSPENSION ARM/BUSHING

REMOVAL

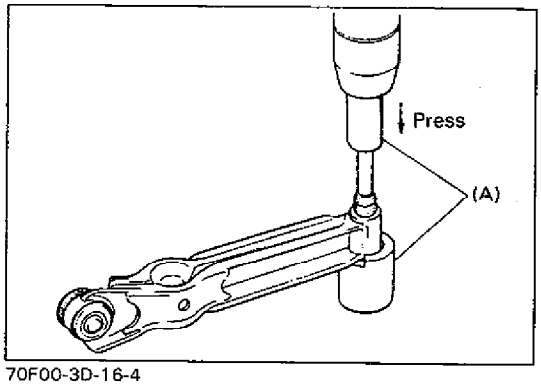
1) Hoist vehicle and remove wheel.
2) Remove stabilizer bar cotter pin, castle nut, washer and bushing.
3) Remove stabilizer bar mount bracket (right & left) bolts.
4) Remove ball stud bolt.
5) Remove control arm bolt.
6) Remove control arm.



70F00-3D-16-3

7) Remove bushing.
   Pull out bushing with special tool and oil hydraulic press as shown.

   Special Tool
   (A): 09943-77910



70F00-3D-16-4

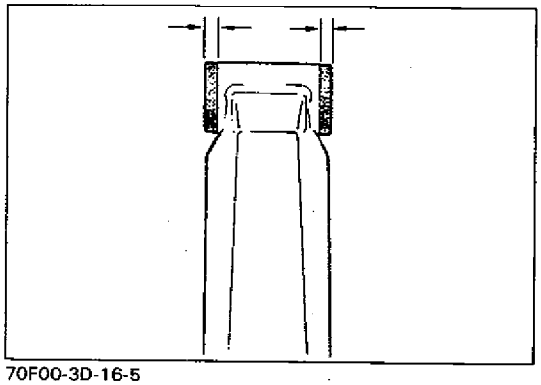
INSTALLATION

1) Install bushing.

   Special Tool
   (A): 09943-77910

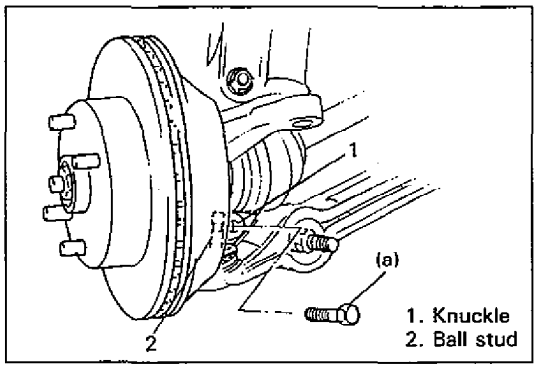
   NOTE:

   - **Before installing bushing, apply soap water on its circumference to facilitate installation.**



70F00-3D-16-5

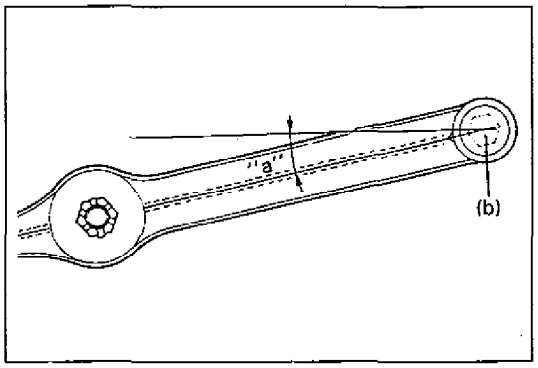
- **When installed, bush should be equal on the right and left of arm as shown.**



70F00-3D-17-1

2) Install ball stud to knuckle. Align ball stud groove with knuckle bolt hole as shown.
Then drive in ball stud bolt from the direction as shown.
Tighten ball stud bolt to specified torque.

Tightening Torque
(a): 45—65 N·m (4.5—6.5 kg-m, 33.0—47.0 lb-ft)

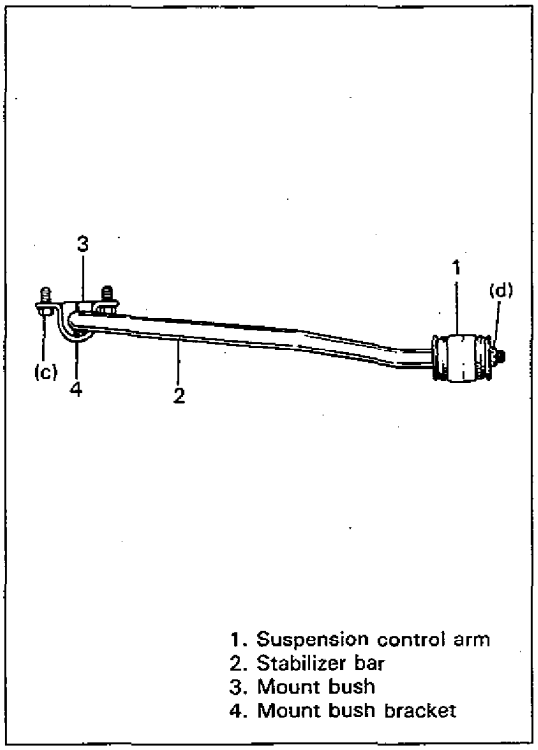


70F00-3D-17-2

3) Install control arm to vehicle body and tighten control arm bolt to specified torque at the position where control arm is installed at angle "a" as shown below.

"a": Angle 10° ± 5°

Tightening Torque
(b): 50—70 N·m (5.0—7.0 kg-m, 36.5—50.5 lb-ft)



70F00-3D-17-3

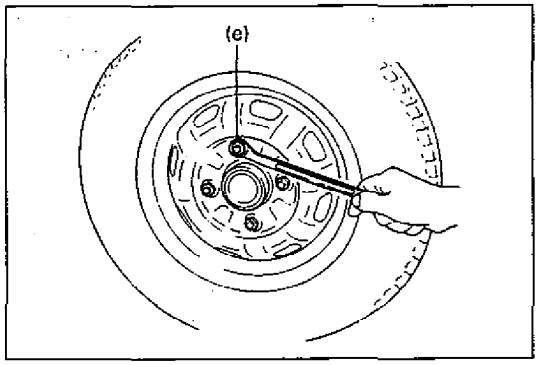
4) Install stabilizer bar to control arm and then bushing, washer and nut to stabilizer bar.
Tighten nut to the extent to be turned by hand.
5) Tighten stabilizer bar mount bracket bolts to specified torque. Before tightening, check if stabilizer bar is properly centered, side-to-side, refer to STABILIZER BAR on page 3D-5.

Tightening Torque
(c): 30—55 N·m (3.0—5.5 kg-m, 22.0—39.5 lb-ft)

6) Tighten castle nut to specified torque.

Tightening Torque
(d): 40—90 N·m (4.0—9.0 kg-m, 29.0—65.0 lb-ft)

7) Install cotter pin.

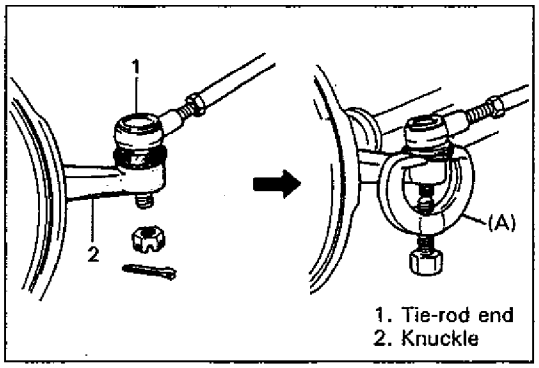


70F00-3D-17-5

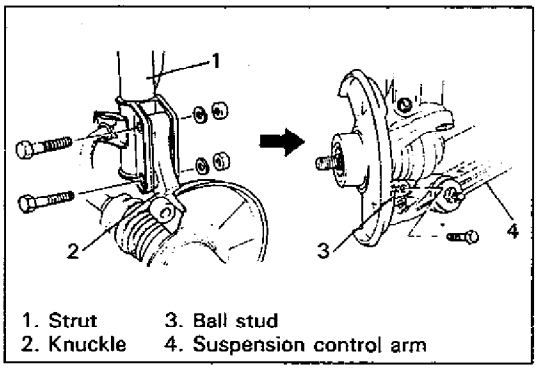
8) Install wheel and tighten wheel nuts to specified torque.

Tightening Torque
(e): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

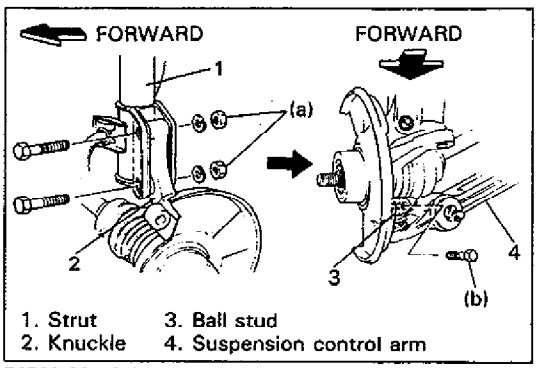
9) Lower hoist.
10) Check toe setting, adjust as required.



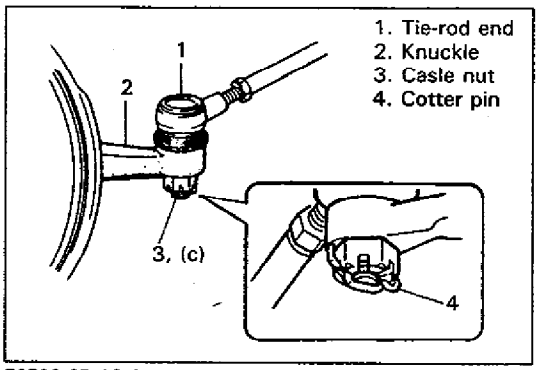
70F00-3D-18-1



70F00-3D-18-2



70F00-3D-18-3



70F00-3D-18-4

6. REMOVE AND INSTALL KNUCKLE/BEARING

[For ventilated disc brake model]

REMOVAL

1) Hoist vehicle and remove wheel.
2) Remove wheel hub. Refer to Steps 2)—8) in Item 4 of WHEEL HUB REMOVAL of this section.
3) Disconnect tie-rod end from knuckle with special tool.

   Special Tool
   (A): 09913-65210

4) Remove strut bracket bolts from strut bracket and then ball stud bolt.
5) Remove knuckle.

INSTALLATION

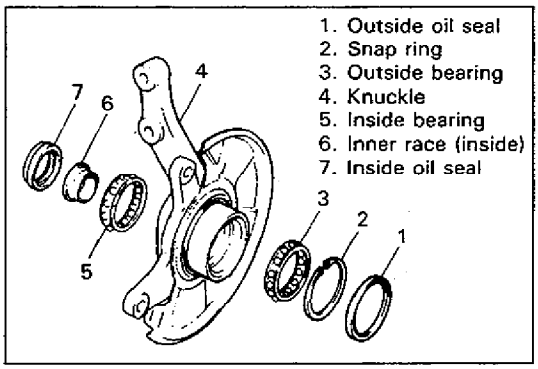
1) Install knuckle to ball stud on suspension arm and strut bracket. Installing direction of each bolt is as shown. Align knuckle bolt hole with ball stud groove as shown and install ball stud bolt. Tighten each bolt and nuts to specified torque.

   Tightening Torque
   (a): 70—90 N·m (7.0—9.0 kg-m, 51.0—65.0 lb-ft)
   (b): 45—65 N·m (4.5—6.5 kg-m, 33.0—47.0 lb-ft)

2) Connect tie-rod end to knuckle and tighten tie-rod end castle nut to specified torque.
   Install cotter pin.

   Tightening Torque
   (c): 30—55 N·m (3.0—5.5 kg-m, 22.0—39.5 lb-ft)

3) For installation procedures following the above, refer to Steps 1)—9) in Item 4, WHEEL HUB INSTALLATION on this section.

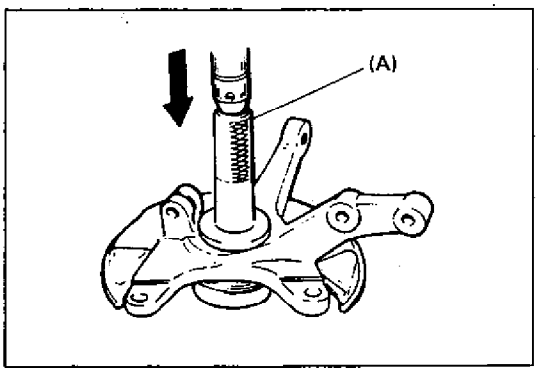


70F00-3D-19-1

REMOVE OIL SEALS, SNAP RING AND WHEEL BEARING

Once bearing outer race is removed, bearing set (outer race, bearings and inner races) should be replaced with new one.

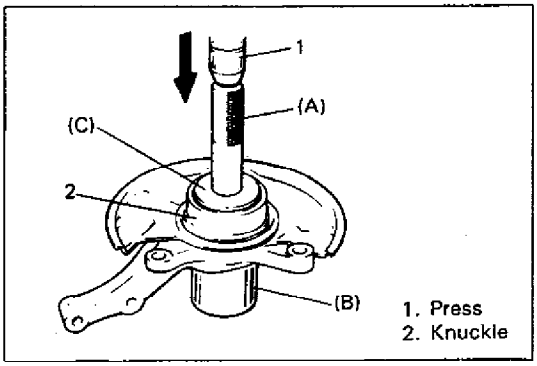
- Remove outside oil seal, snap ring, outside bearing, inside oil seal, inside inner race and inside bearing in that order.



70F00-3D-19-2

- Remove bearing outer race using special tool and hydraulic press.

Special Tool
(A): 09913-75520



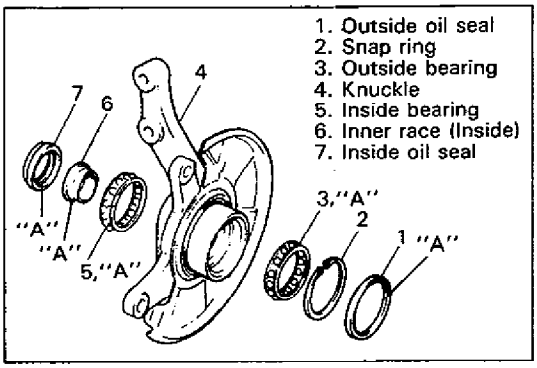
70F00-3D-19-3

INSTALL OIL SEALS, SNAP RING AND WHEEL BEARING

When replacing bearing, inner race or outer race, be sure to replace them with new ones as a set.

- Press-fit bearing outer race using special tools.

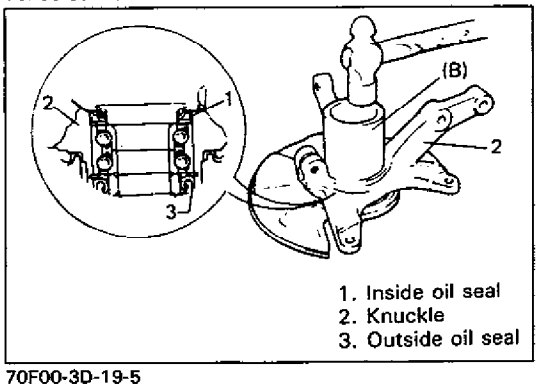
Special Tool
(A): 09924-74510
(B): 09944-78210
(C): 09944-68210



70F00-3D-19-4

- After greasing (lithic grease) bearing outer race, bearings, inner race and oil seal lips, install them.

"A": Grease 99000-25010



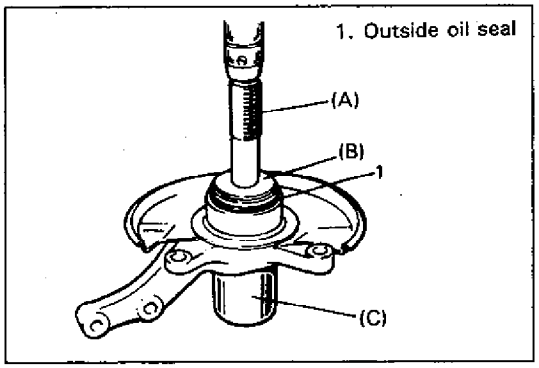
70F00-3D-19-5

Inside Oil Seal

Drive in Oil seal until seal is flush with stopped surface of knuckle by using special tool.

NOTE:
When driving in oil seal, be careful not to deform or tilt it or not to cause damage to rubber part.

Special Tool
(B): 09944-78210



70F00-3D-20-1

Outside Oil Seal

Drive in oil seal until its end contacts snap ring using special tools. As for its installing direction, refer to left figure.

Special Tool
(A): 09924-74510
(B): 09944-78210
(C): 09944-68210

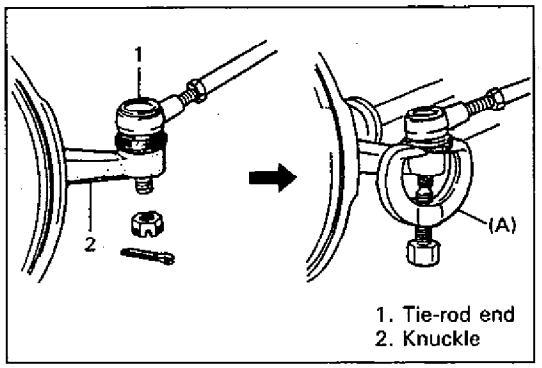
6-1 REMOVE AND INSTALL KNUCKLE/BEARING

[For solid disc brake model]

REMOVAL

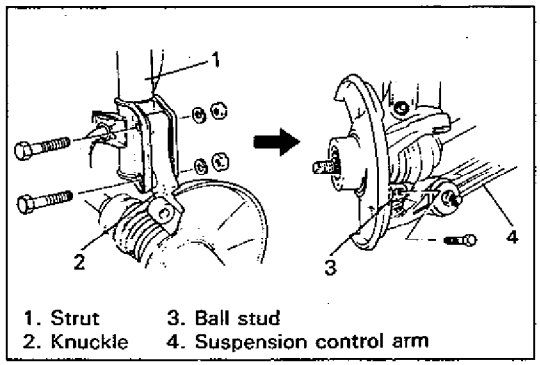
1) Hoist vehicle and remove wheel.
2) Remove wheel hub. Refer to Steps 2)—6) in Items 4-1 of WHEEL HUB REMOVAL of this section.
3) Disconnect tie-rod end from knuckle with special tool.

Special Tool
(A): 09913-65210



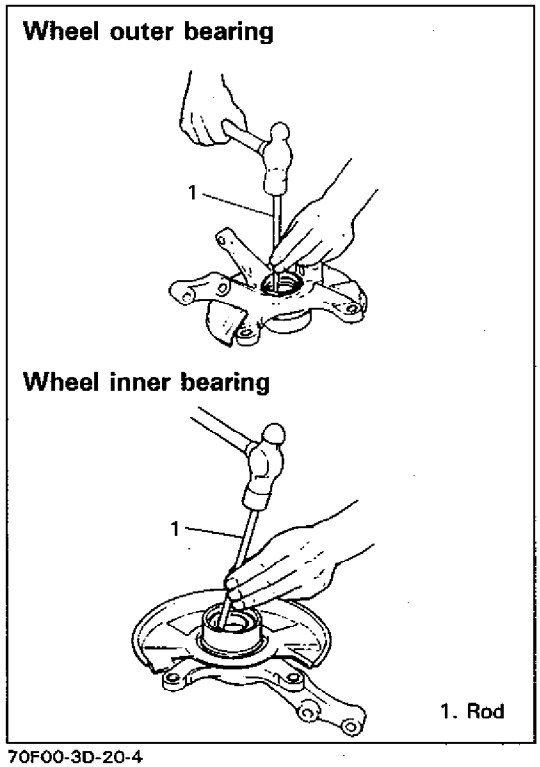
70F00-3D-20-2

4) Remove strut bracket bolts from strut bracket and then ball stud bolt.

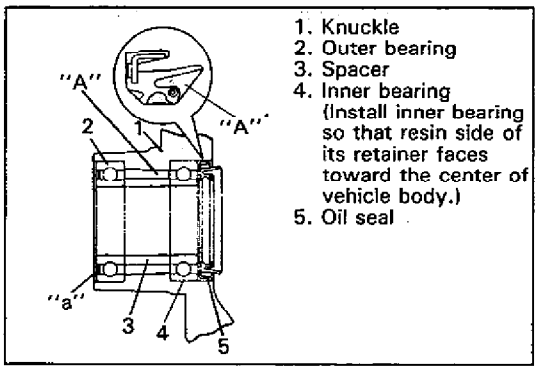


70F00-3D-20-3

5) Remove knuckle.
6) Remove oil seal.
7) Remove wheel bearings (outer and inner).



70F00-3D-20-4



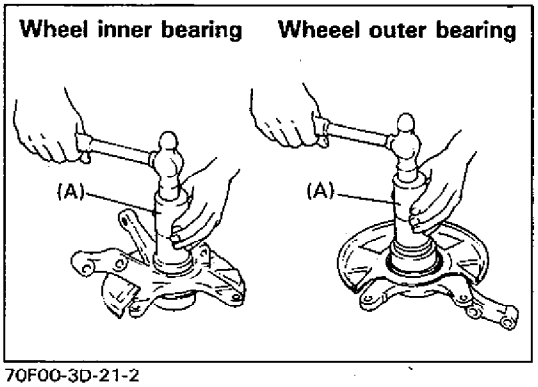
70F00-3D-21-1

INSTALLATION

1) Before installing wheel bearings, apply wheel bearing lithic grease to balls and oil seal lips of wheel bearings. Also fill it in the clearance outside spacer (shown as "A" in figure) with 40% amount of the clearance capacity.

"A": Grease 99000-25010

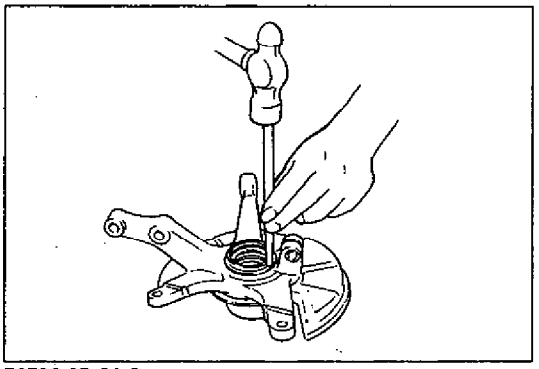
Sealed Side Facing "a":
Install outer bearing with its sealed side facing outside.



70F00-3D-21-2

2) Install wheel bearings (outer and inner).

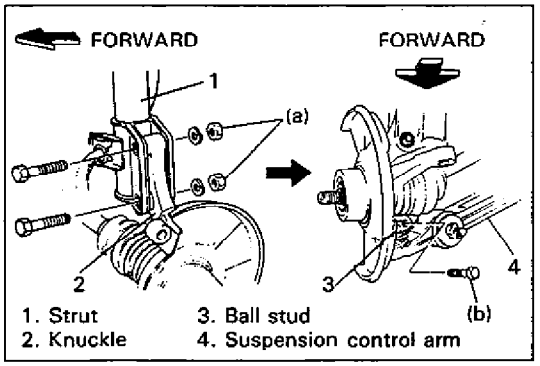
Special Tool
(A): 09913-85210



70F00-3D-21-3

3) Drive in oil seal until its end contacts bearing by tapping lightly around it evenly with a flat end rod or the like.

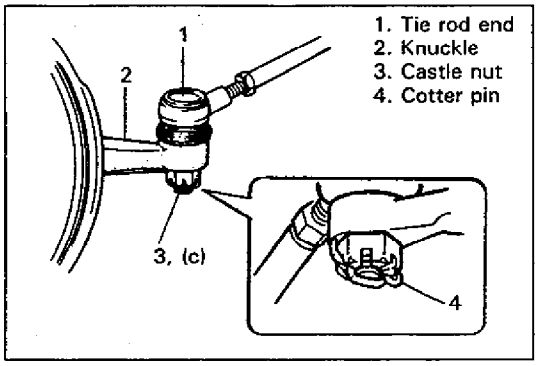
NOTE:
When driving in oil seal, be careful not to deform or tilt it or not to cause damage to rubber part.



70F00-3D-21-4

4) Install knuckle to ball stud on control arm and strut bracket. Installing direction of each bolt is as shown. Align knuckle bolt hole with ball stud groove as shown and install ball stud bolt.

Tightening Torque
(a): 70—90 N·m (7.0—9.0 kg-m, 51.0—65.0 lb-ft)
(b): 45—65 N·m (4.5—6.5 kg-m, 33.0—47.0 lb-ft)

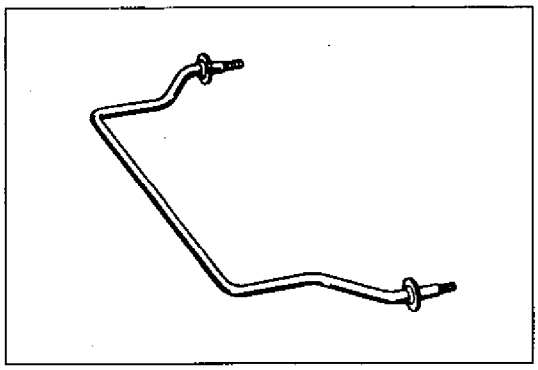


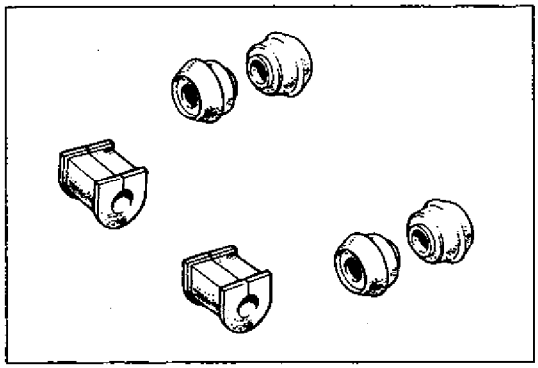
70F00-3D-21-5

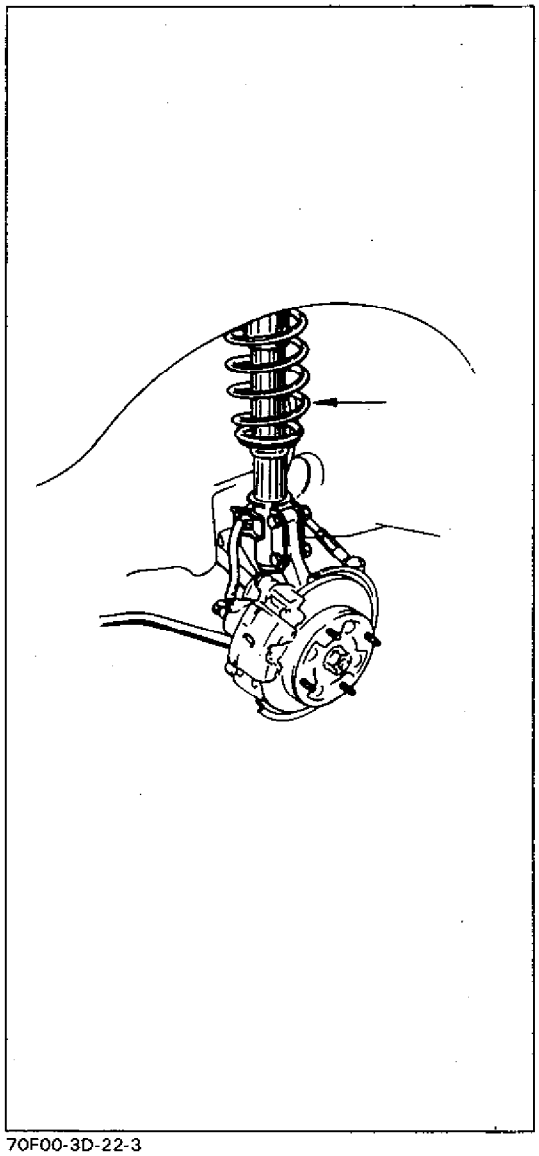
5) Connect tie rod end to knuckle and tighten tie rod end castle nut to specified torque.
Install cotter pin.

Tightening Torque
(c): 30—55 N·m (3.0—5.5 kg-m, 22.0—39.5 lb-ft)

6) For installation procedures following the above, refer to Steps 3)—9) in Item 4-1 of WHEEL HUB INSTALLATION of this section.


70F00-3D-22-1


70F00-3D-22-2


70F00-3D-22-3

7. FRONT SUSPENSION INSPECTION

STABILIZER BAR AND/OR BUSHING

Bar

Inspect for damage or deformation. If defective, replace.

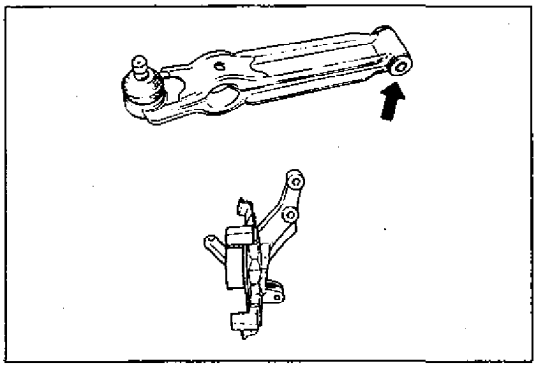
Bushing

Inspect for damage, wear or deterioration. If defective, replace.

STRUT DAMPER

1) Inspect strut for oil leakage. If strut is found faulty, replace it as an assembly unit, because it can not be disassembled.
2) Strut function check
   Check and adjust tire pressures as specified. Bounce vehicle body three or four times continuously by pushing front end on the side with strut to be checked. Apply the same amount of force at each push and note strut resistance both when pushed and reboundinig.
   Also, note how many times vehicle body rebounds before coming to stop after hands are off. Do the same for strut on the other side.
   Compare strut resistance and number of rebound on the right with those on the left. And they must be equal in both. With proper strut, vehicle body should come to stop the moment hands are off or after only one or two small rebounds If struts are suspected, compare them with known good vehicle or strut.
3) Inspect for damage or deformation.
4) Inspect bearing for wear, abnormal noise or gripping.
5) Inspect for cracks or deformation in the spring seat.
6) Inspect for deterioration of the bump stopper.
7) Inspect rebound stopper and strut mount for wear, cracks or deformation.

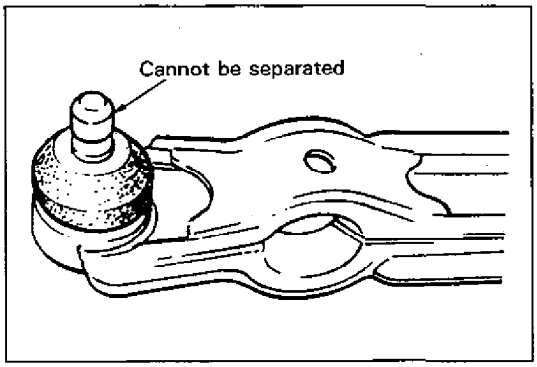
Replace any parts found defective in steps 2)—7).



70F00-3D-23-1

SUSPENSION CONTROL ARM/KNUCKLE ARM
Inspect for cracks, deformation or damage.

SUSPENSION CONTROL ARM BUSHING
Inspect for damage, wear or deterioration.

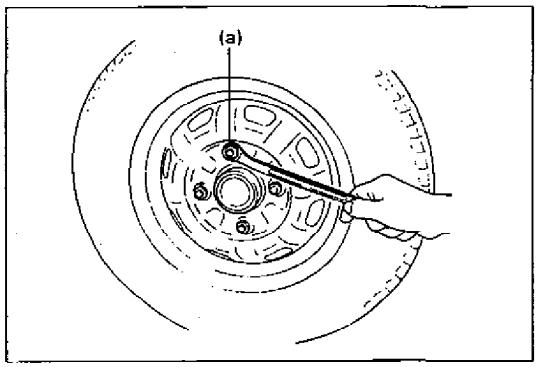


70F00-3D-23-2

SUSPENSION CONTROL ARM JOINT
1) Check for smooth rotation.
2) Inspect ball stud for damage.
3) Inspect dust cover for damage.

NOTE:
Suspension arm and arm joint cannot be separated.

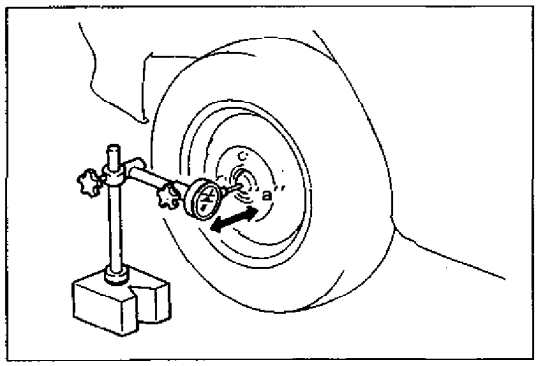
If there is any damage to either, control arm assembly must be replaced as a complete unit.



70F00-3D-23-3

WHEEL DISC, NUT & BEARING
1) Inspect each wheel disc for dents, distortion and cracks. A disc in badly damaged condition must be replaced.
2) Check wheel nuts for tightness and, as necessary retighten them to specification.

Tightening Torque
(a): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

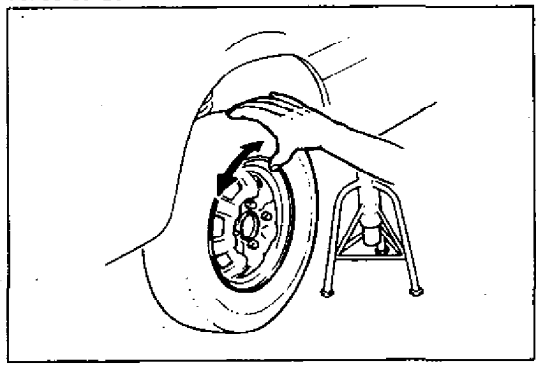


70F00-3D-23-4

3) Check wheel bearing for wear. When measuring thrust play, apply a dial gauge to wheel hub center after removing wheel center cap from wheel disc.

Thrust play limit "a": 0.4 mm (0.016 in.)

When measurement exceeds limit, replace bearing.

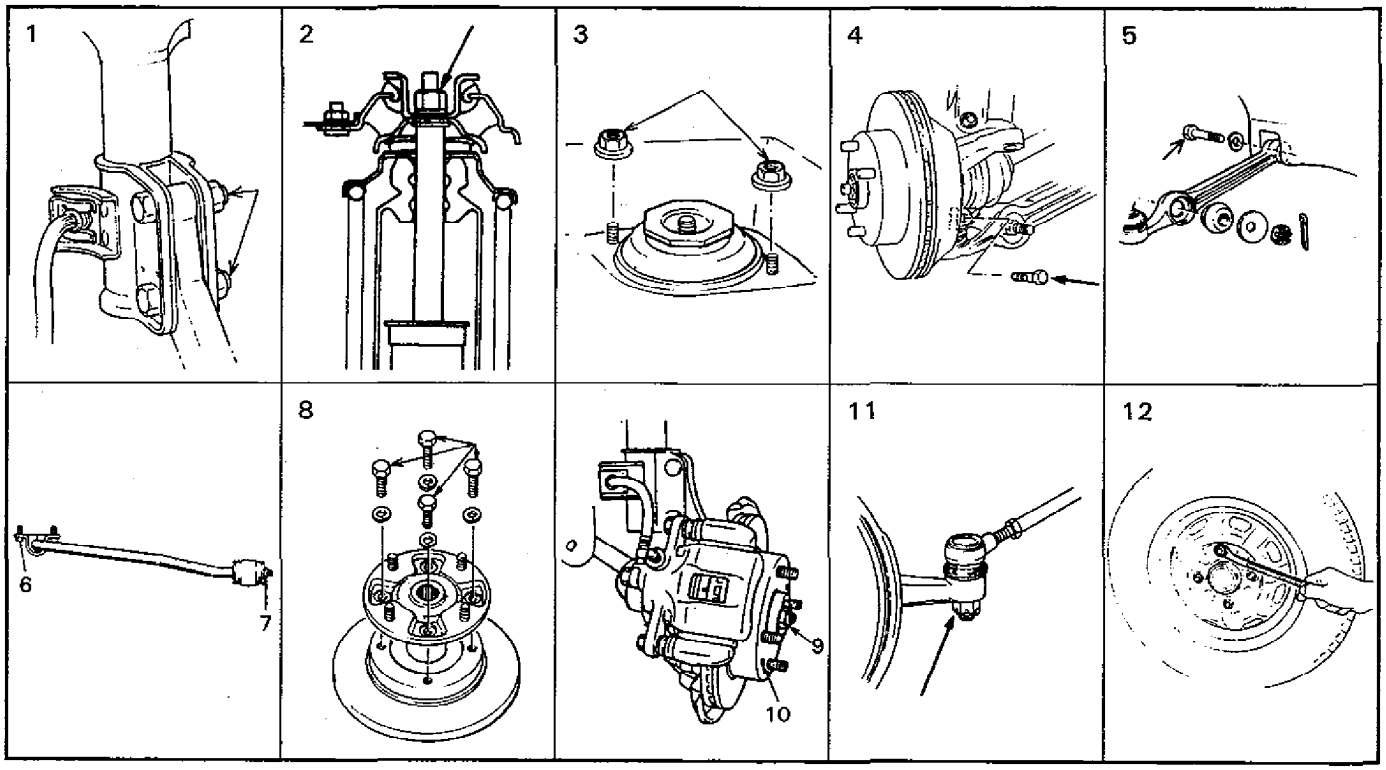


70F00-3D-23-5

4) By rotating wheel actually, check wheel bearing for noise and smooth rotation. If defective, replace bearing.

RECOMMENDED TORQUE SPECIFICATIONS

Fastening parts	Tightening torque		
	N·m	kg-m	lb-ft
1. Strut bracket nut	70–90	7.0–9.0	51.0–65.0
2. Strut nut	40–60	4.0–6.0	29.0–43.0
3. Strut support nut	18–28	1.8–2.8	13.5–20.0
4. Ball stud bolt	45–65	4.5–6.5	33.0–47.0
5. Suspension control arm bolt	50–70	5.0–7.0	36.5–50.5
6. Stabilizer bar mount bracket bolt	30–55	3.0–5.5	22.0–39.5
7. Stabilizer bar castle nut	40–90	4.0–9.0	29.0–65.0
8. Brake disc bolt (For solid disc brake model)	40–60	4.0–6.0	29.0–43.0
9. Drive shaft nut	150–200	15.0–20.0	108.5–144.5
10. Brake disc screw (For ventilated disc brake model)	6–9	0.6–0.9	4.5–6.5
11. Tie rod end castle nut	30–55	3.0–5.5	22.0–39.5
12. Wheel nut	70–100	7.0–10.0	51.0–72.0



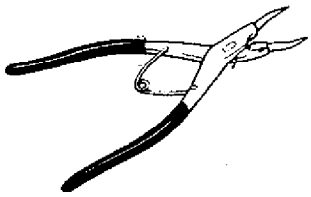
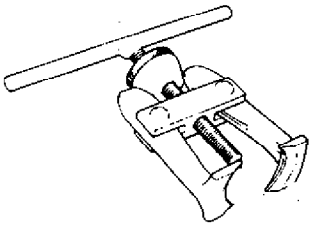
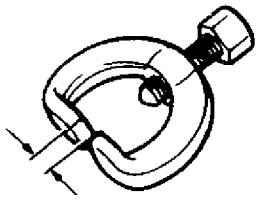
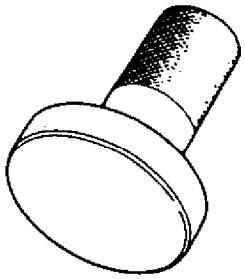
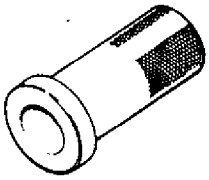
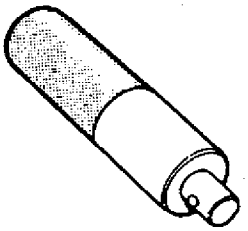
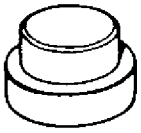
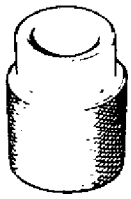
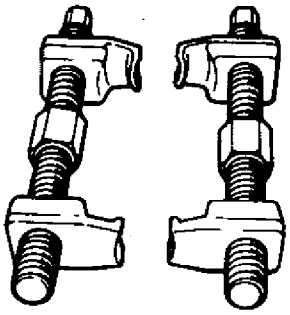
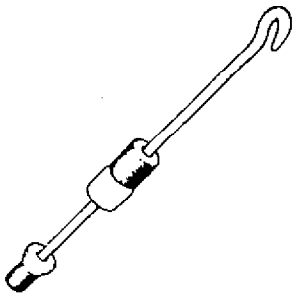
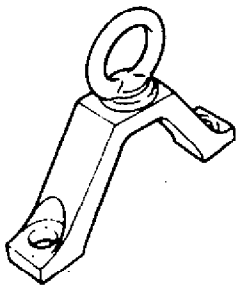
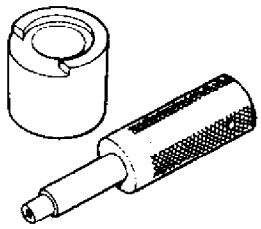
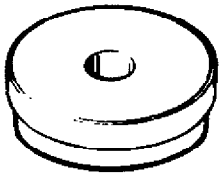
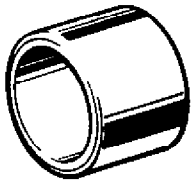
70F00-3D-24-1

REQUIRED SERVICE MATERIALS

MATERIALS	RECOMMENDED SUZUKI PRODUCT	USE
Lithic wheel bearing grease	SUZUKI SUPER GREASE (A) (99000-25010)	Wheel bearing, wheel bearing oil seal lip

70F00-3D-24-2

SPECIAL TOOLS

 09900-06108 Snap ring pliers (closing type)	 09913-61110 Bearing puller	 09913-65210 Tie-rod end remover	 09913-75520 Bearing installer
 09913-85210 Wheel hub installer	 09924-74510 Bearing installer handle	 09925-88210 Bearing puller attachment	 09940-53111 Bearing installer
 09940-71430 Spring compressor	 09942-15510 Sliding hammer	 09943-17911 Front wheel hub remover (Brake drum remover)	 09943-77910 Control bush remover
 09944-68210 Bearing & oil seal installer	 09944-78210 Bearing installer support		

SECTION 3E

REAR SUSPENSION

NOTE:

- **All suspension fasteners are an important attaching part in that it could affect the performance of vital parts and systems, and/or could result in major repair expense. They must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of this part.**
- **Never attempt to heat, quench or straighten any suspension part. Replace it with a new part, or damage to the part may result.**

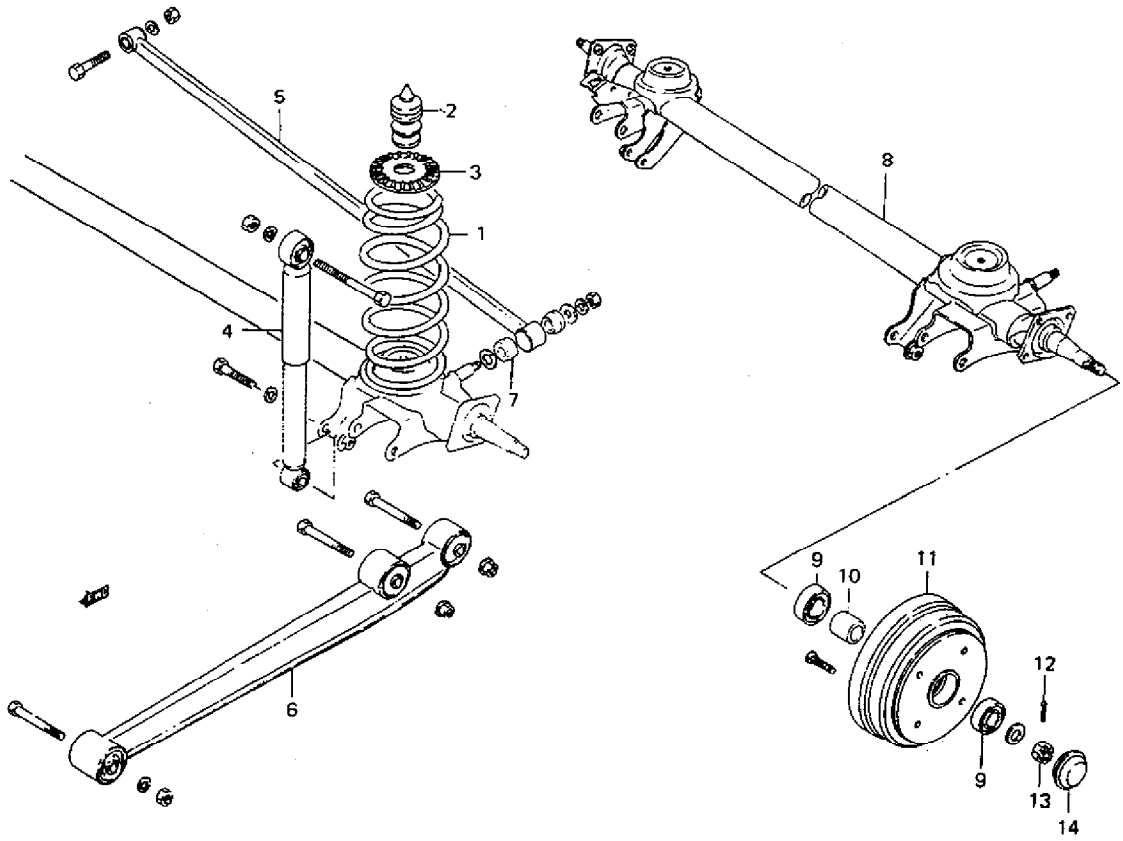
70F00-3E-1-1

CONTENTS

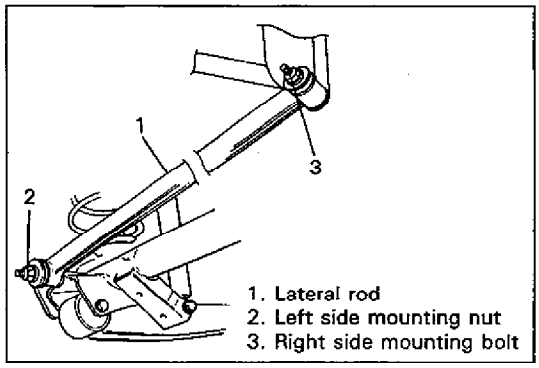
70F00-3E-1-2

GENERAL DESCRIPTION

Rear suspension is Isolated Trailing Link (I.T.L.) type which consists of coil springs, rear axle, shock absorbers, lateral rod and trailing arms.
The lateral rod is installed to the body and axle by using bushes so as to prevent axle movement in the lateral direction.
The trailing arms which are connected with the axle are installed to the body by using a bush so that axle moves up and down with the bush as its supporting point.
The shock absorber is installed between the body and axle to absorb up-and-down movement of the vehicle body.



1. Rear coil spring
2. Rear bump stopper
3. Rear spring upper seat
4. Rear shock absorber
5. Lateral rod
6. Trailing arm
7. Bush
8. Rear axle
9. Bearing
10. Spacer
11. Brake drum
12. Cotter pin
13. Castle nut
14. Spindle cap



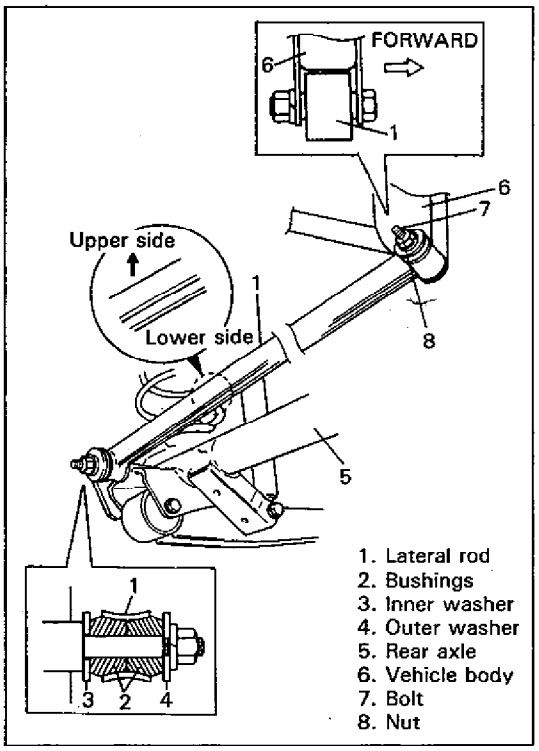
70F00-3E-3-1

ON-VEHICLE SERVICE

LATERAL ROD

REMOVAL

1) Hoist vehicle.
2) Remove lateral rod mounting nuts.
3) Remove lateral rod.



70F00-3E-3-3

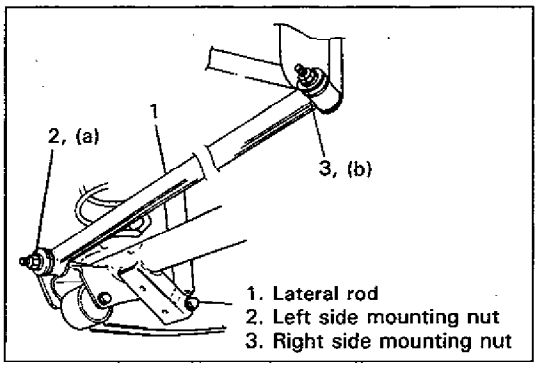
INSTALLATION

1) Install lateral rod to rear axle.

NOTE:
- **Nut should not be tightened.**
- **For correct installation of bushings and washers, refer to figure at left.**

2) Install lateral rod to vehicle body, refer to figure for proper installing direction of bolt.

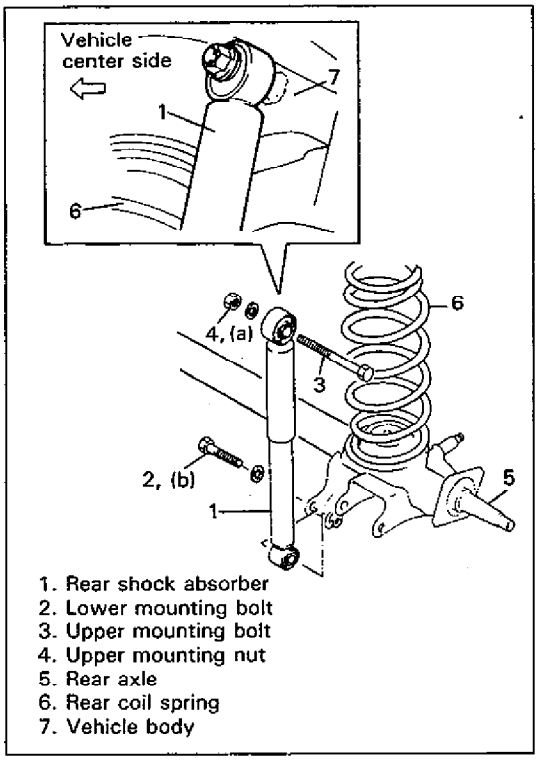
NOTE:
Nut should not be tightened.



70F00-3E-3-5

3) Lower hoist.
4) Tighten control rod mounting nuts to specified torque. It is the most desirable to have vehicle off hoist and in non-loaded condition when tightening them.

Tightening Torque
(a): 35—55 N·m (3.5—5.5 kg-m, 25.5—39.5 lb-ft)
(b): 45—70 N·m (4.5—7.0 kg-m, 33.0—50.5 lb-ft)



1. Rear shock absorber
2. Lower mounting bolt
3. Upper mounting bolt
4. Upper mounting nut
5. Rear axle
6. Rear coil spring
7. Vehicle body

70F00-3E-4-1

REAR SHOCK ABSORBER

REMOVAL

1) Hoist vehicle.
2) Support rear axle by using floor jack to prevent it from lowering.
3) Remove lower mounting bolt.
4) Remove upper mounting bolt and nut. Then remove shock absorber.

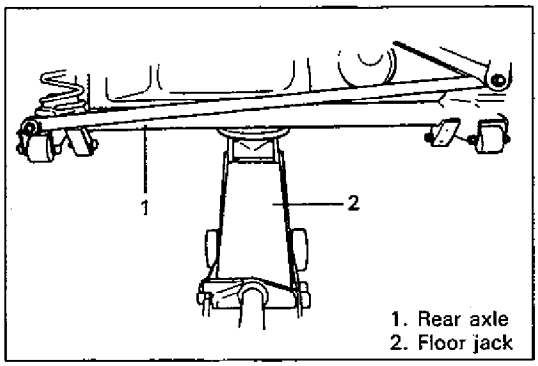
INSTALLATION

1) Install shock absorber, referring to left figure.

NOTE:
Nut and bolt should not be tightened.

2) Remove floor jack from rrear axle and lower hoist.
3) Tighten bolts to specified torque.

Tightening Torque
(a): 45—70 N·m (4.5—7.0 kg-m, 33.0—50.5 lb-ft)



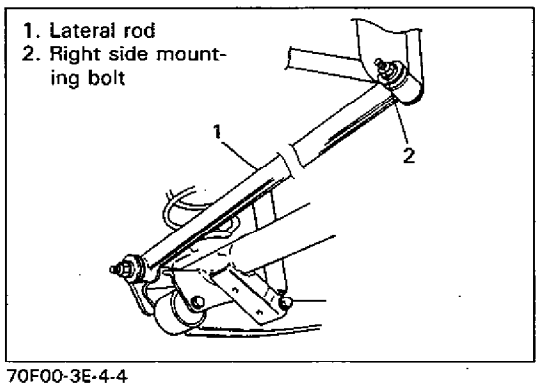
1. Rear axle
2. Floor jack

70F00-3E-4-3

COIL SPRING

REMOVAL

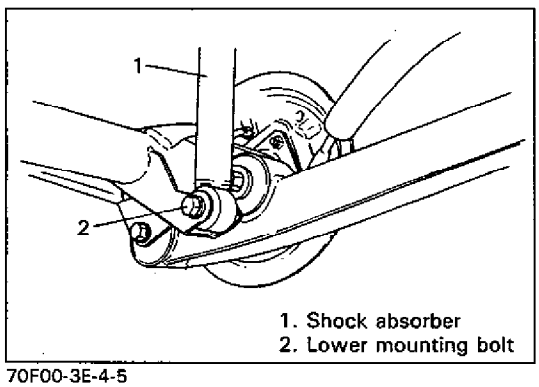
1) Hoist vehicle and remove rear wheel(s).
2) Support rear axle by using floor jack to prevent it from lowering.



1. Lateral rod
2. Right side mounting bolt

70F00-3E-4-4

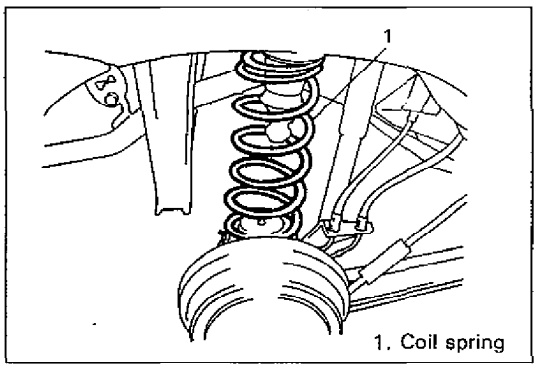
3) Remove lateral rod right side mounting bolt and nut.



1. Shock absorber
2. Lower mounting bolt

70F00-3E-4-5

4) Remove shock absorber lower mounting bolt.

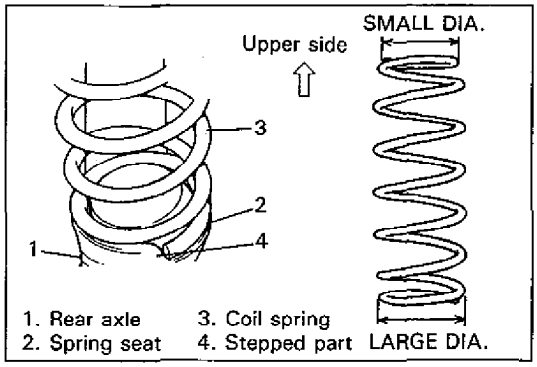


70F00-3E-5-1

5) Lower rear axle gradually as far down as where coil spring can be removed.

CAUTION:
Be careful not to let rear axle down too much. It may cause damage to brake flexible hose.

6) Remove coil spring.

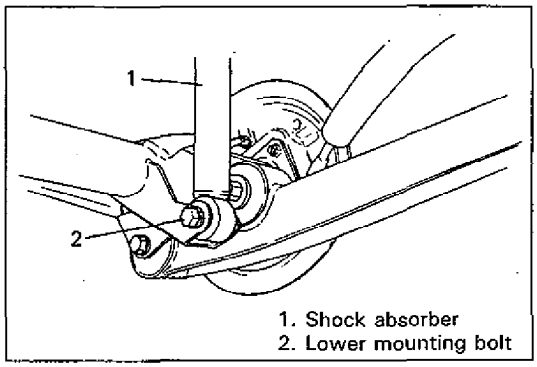


70F00-3E-5-2

INSTALLATION

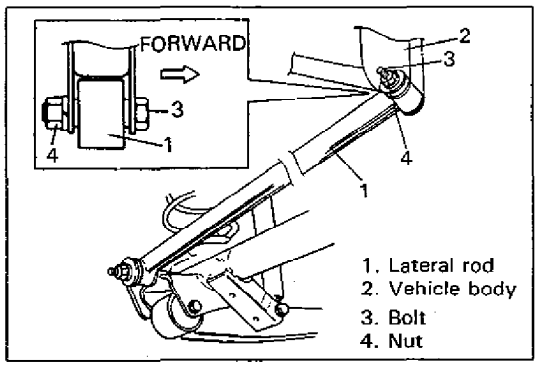
1) Install coil spring on spring seat of rear axle as shown in figure and then raise rear axle.

NOTE:
When seating coil spring, mate spring end with stepped part of rear axle spring seat as shown.



70F00-3E-5-3

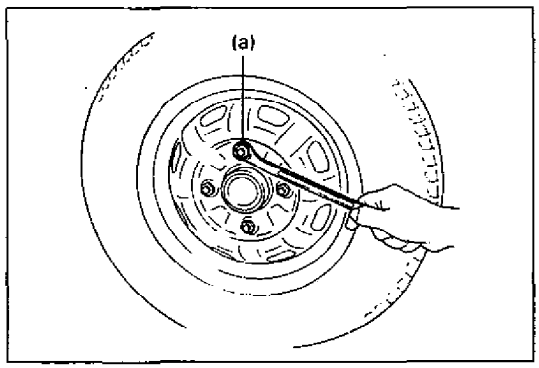
2) Install shock absorber lower mounting bolt.
3) Remove floor jack from rear axle.



70F00-3E-5-4

4) Install lateral rod to vehicle body, refer to figure for proper installing dicrection of bolt.

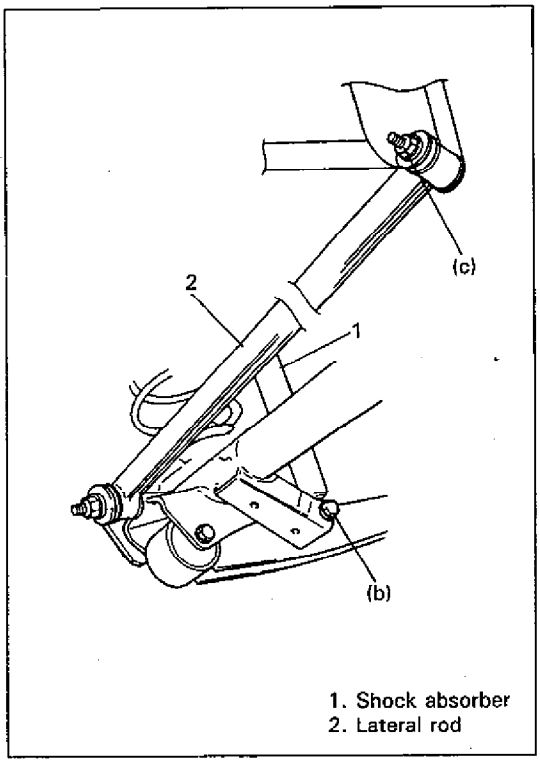
NOTE:
Nut should not be tightened.



70F00-3E-5-5

5) Install wheel and tighten wheel nuts to specified torque.

Tightening Torque
(a): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

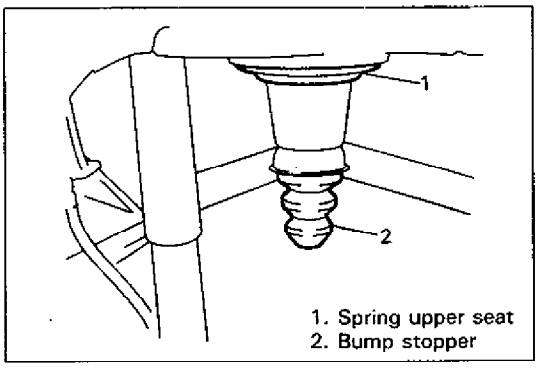


1. Shock absorber
2. Lateral rod

70F00-3E-6-1

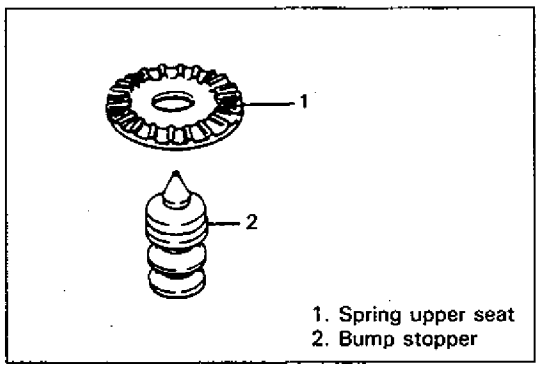
6) Lower hoist and vehicle in non-loaded condition, tighten absorber lower mounting bolt and lateral rod right mounting nuts to specified torque.

Tightening Torque
(b): 45—70 N·m (4.5—7.0 kg-m, 33.0—50.5 lb-ft)
(c): 45—70 N·m (4.5—7.0 kg-m, 33.0—50.5 lb-ft)



1. Spring upper seat
2. Bump stopper

70F00-3E-6-4



1. Spring upper seat
2. Bump stopper

70F00-3E-6-5

BUMP STOPPER AND SPRING UPPER SEAT

REMOVAL

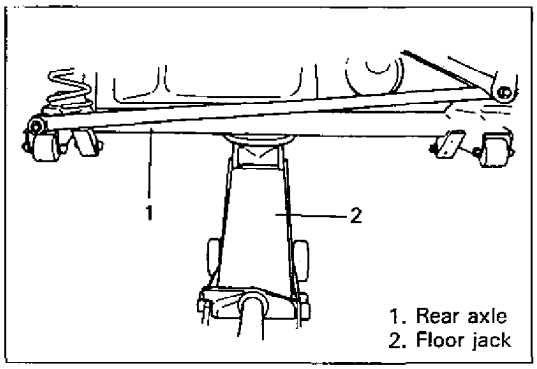
1) Remove coil spring. For details, refer to steps 1) to 6) of SHOCK ABSORBER AND COIL SPRING REMOVAL.
2) Remove spring upper seat.
3) Remove bump stopper.

INSTALLATION

1) Install bump stopper.

NOTE:
- **Before installing bushing, apply soap water on it.**
- **For proper installing direction of spring upper seat, refer to figure at left.**

2) Install spring upper seat.
3) Install coil spring. For details, refer to steps 2) to 6) of SHOCK ABSORBER AND COIL SPRING INSTALLATION.



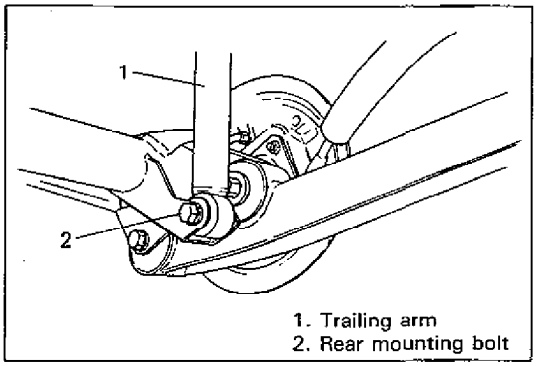
70F00-3E-7-1

TRAILING ARM

REMOVAL

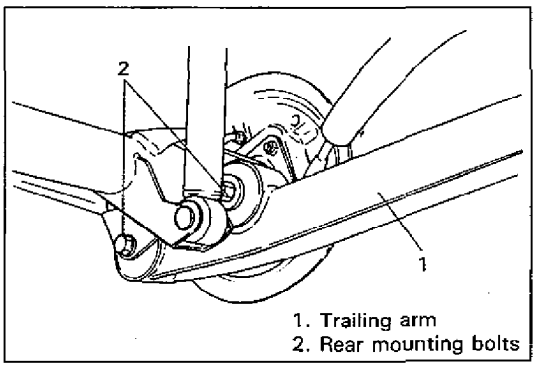
1) Hoist vehicle and remove rear wheel.
2) Support rear axle by using floor jack.

CAUTION:
Never apply floor jack against lateral rod as it may get deformed.



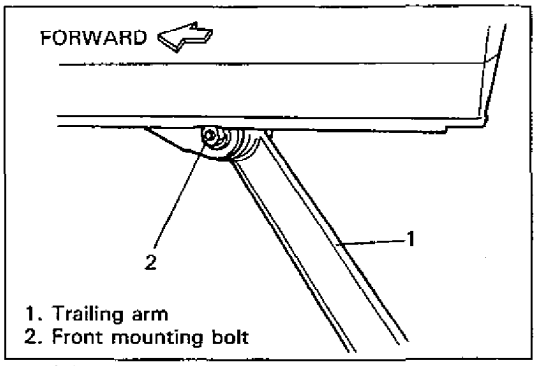
70F00-3E-7-2

3) Remove shock absorber lower mounting bolt.



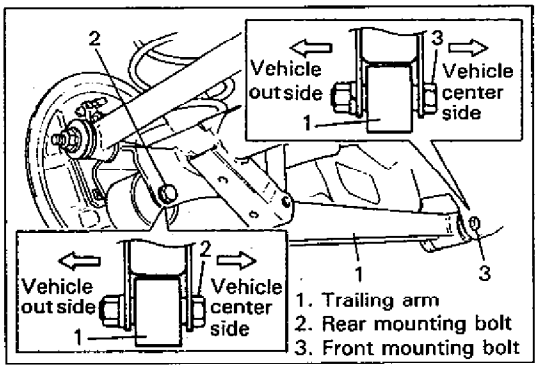
70F00-3E-7-3

4) Remove trailing arm rear mounting bolts.



70F00-3E-7-4

5) Remove trailing arm front mounting bolt and then remove trailing arm.

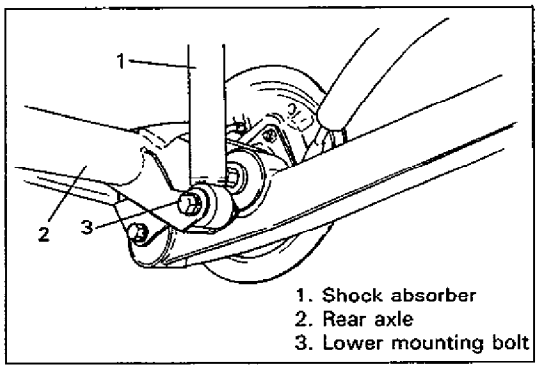


70F00-3E-8-1

INSTALLATION

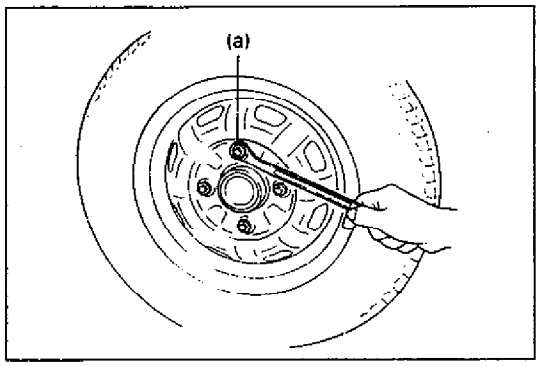
1) Install trailing arm to vehicle body and rear axle, referring to figure for proper installing direction of bolts.

NOTE:
Nuts should not be tightened.



70F00-3E-8-2

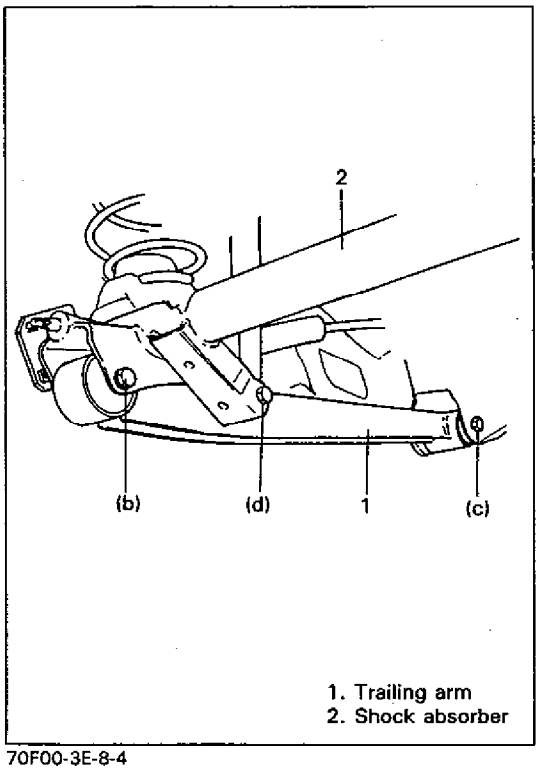
2) Install shock absorber to rear axle.
3) Remove floor jack from rear axle.



70F00-3E-8-3

4) Install wheel and tighten wheel nuts to specified torque.

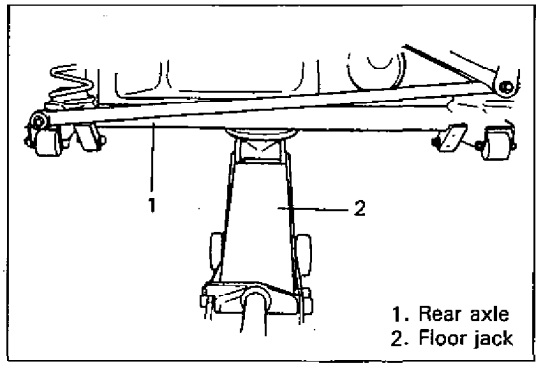
Tightening Torque for wheel nuts
(a): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)



70F00-3E-8-4

5) Lower hoist and vehicle in non loaded condition, tighten trailing arm front and rear mounting nuts and shock absorber lower mounting bolt to specified torque.

Tightening Torque
(b): 70—90 N·m (7.0—9.0 kg-m, 51.0—65.0 lb-ft)
(c): 70—90 N·m (7.0—9.0 kg-m, 51.0—65.0 lb-ft)
(d): 45—70 N·m (4.5—7.0 kg-m, 33.0—50.5 lb-ft)

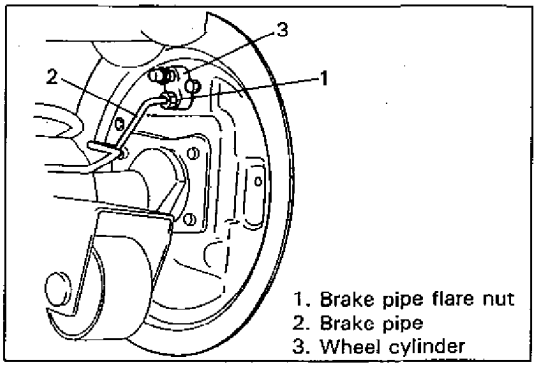


70F00-3E-9-1

REAR AXLE

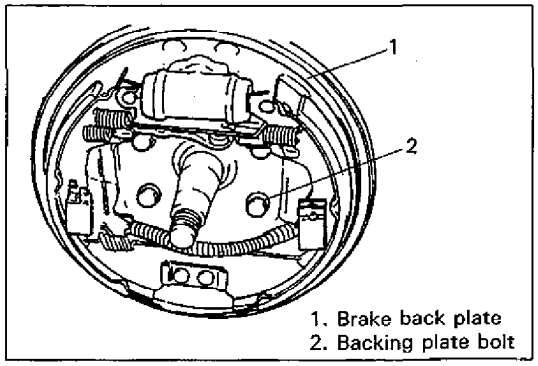
REMOVAL

1) Hoist vehicle and remove rear wheels (right & left).
2) Support rear axle by using floor jack.
3) Remove rear brake drums (right & left). For details, refer to steps 1) to 7) of REAR BRAKE DRUM REMOVAL of SECTION 5.



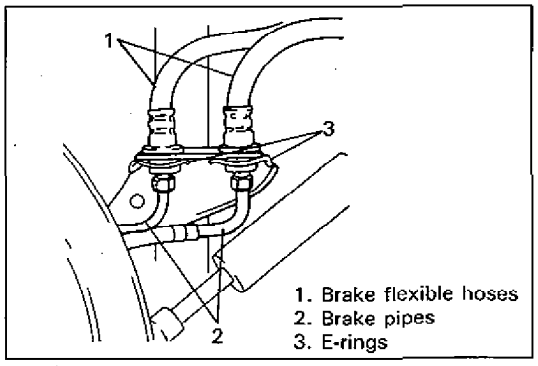
70F00-3E-9-2

4) Disconnect brake pipe flare nuts from wheel cylinders (right & left).



70F00-3E-9-3

5) Remove brake back plates (right & left) from rear axle and hang removed brake back plate with a wire hook.

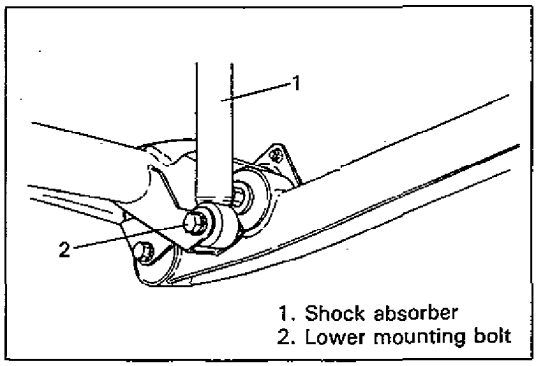


70F00-3E-9-4

6) Disconnect brake pipes from brake flexible hoses and remove E-rings.

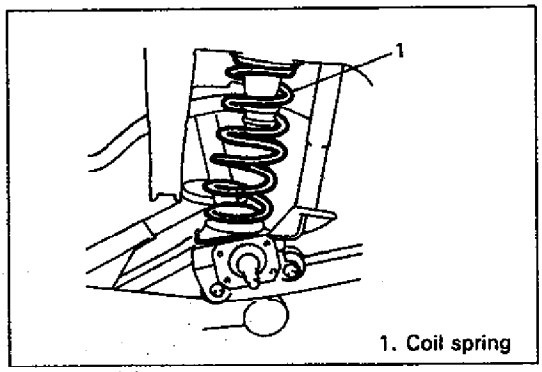
CAUTION:
Do not allow brake fluid to get on painted surfaces.

7) Remove lateral rod, refer to steps 1) to 3) of LATERAL ROD REMOVAL.



70F00-3E-9-5

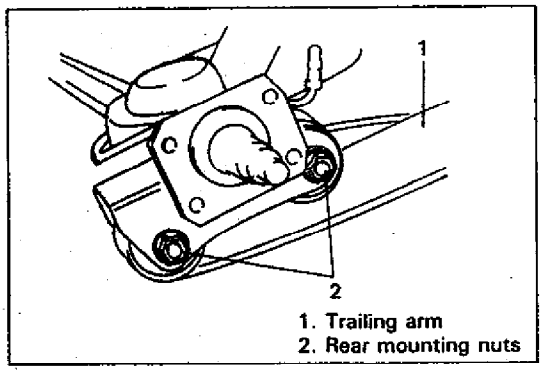
8) Remove shock absorber lower mounting bolts (right & left).



1. Coil spring

70F00-3E-10-1

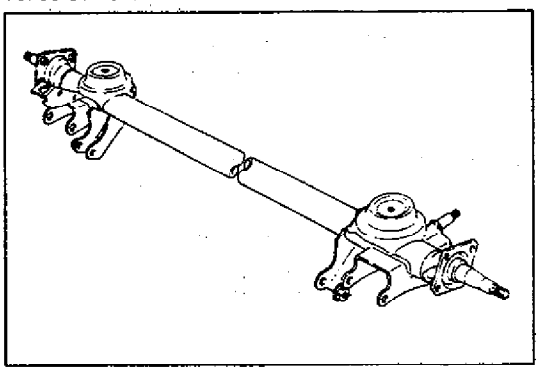
9) Lower rear axle gradually as far down as where coil spring (right & left) can be removed.
10) Remove coil springs (right & left).



1. Trailing arm
2. Rear mounting nuts

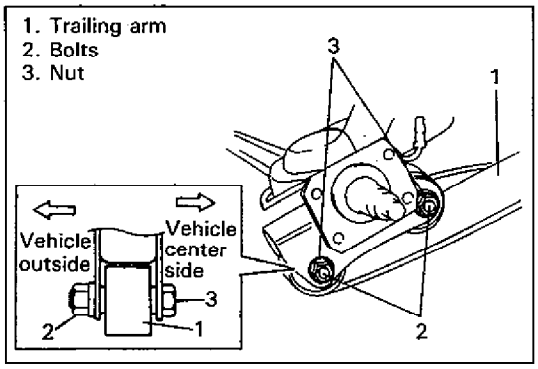
70F00-3E-10-2

11) Loosen trailing arm rear side mounting nuts but don't remove bolts (right & left).



70F00-3E-10-3

12) While supporting rear axle at both ends (right & left), remove trailing arm rear side mounting bolts and then remove rear axle from chassis by lowering floor jack gradually.

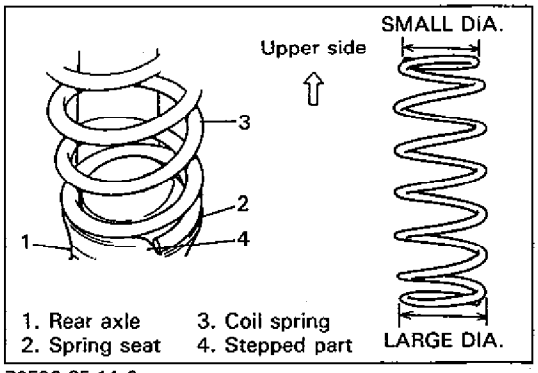


70F00-3E-11-1

INSTALLATION

Install removed parts in reverse order of removal, noting the following points.

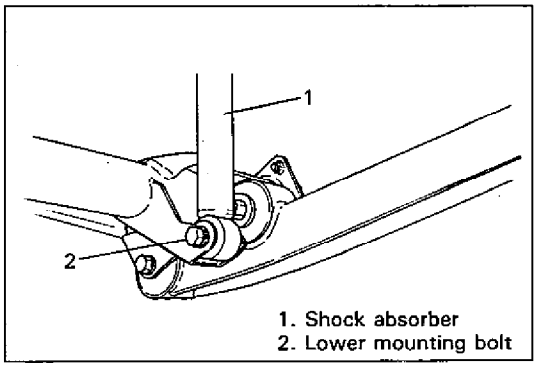
1) Place rear axle on floor jack. Then install trailing arm rear mounting bolts (right & left) in proper direction as shown in figure. At this time, mount nuts but don't tighten them.



70F00-3E-11-2

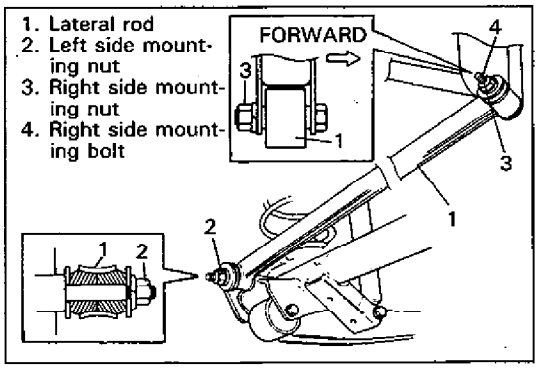
2) Install coil springs (right & left) on spring seat of rear axle as shown in figure and then raise rear axle.

NOTE:
When seating coil spring, mate spring end with stepped part of rear axle spring seat as shown.



70F00-3E-11-3

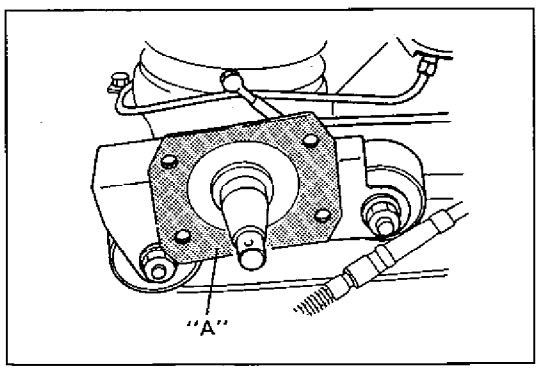
3) Install shock absorber lower mounting bolts (right & left).
4) Remove floor jack from rear axle.



70F00-3E-11-4

5) Install lateral rod to rear axle and vehicle body.

NOTE:
Nuts should not be tightened.

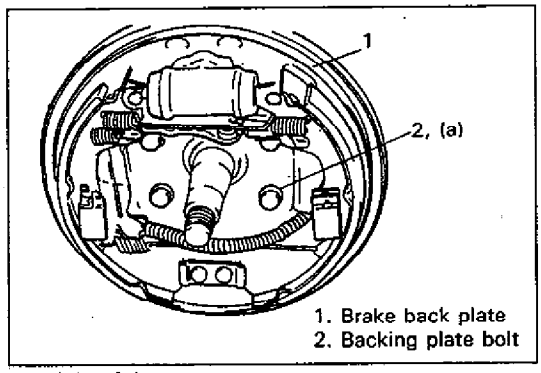


70F00-3E-11-5

6) Clean mating surface of rear axle (right & left) with brake back plate and apply water tight sealant as shown in figure.

"A": Sealant 99000-31090

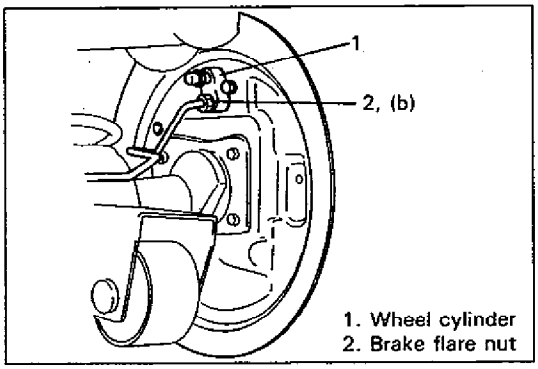
NOTE :
If rear wheel bearing inner spacer is available, ensure the same is installed during assembly.



70F00-3E-12-1

7) Install brake back plates and tighten back plate bolts to specified torque.

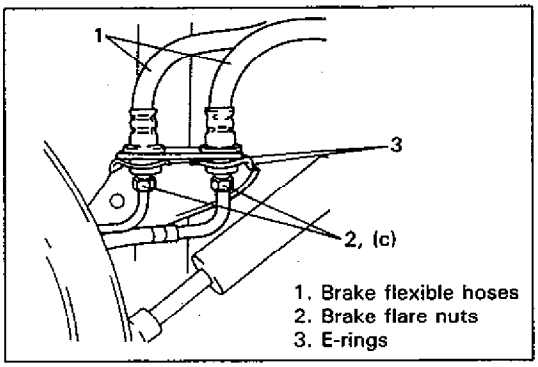
Tightening Torque
(a): 18—28 N·m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)



70F00-3E-12-2

8) Connect brake pipes to wheel cylinders (right & left) and tighten brake pipe flare nuts to specified torque.

Tightening Torque
(b): 14—18 N·m (1.4—1.8 kg-m, 10.5—13.0 lb-ft)



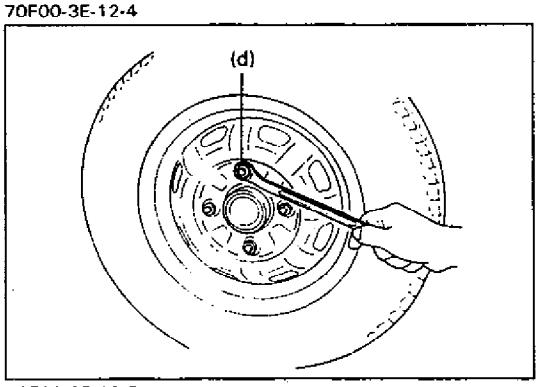
70F00-3E-12-3

9) Connect brake flexible hoses to bracket on rear axle and secure it with E-rings.
10) Connect brake pipes to brake flexible hoses and tighten brake pipe flare nuts to specified torque.

Tightening Torque
(c): 14—18 N·m (1.4—1.8 kg-m, 10.5—13.0 lb-ft)

11) Install brake drums (right & left). For details, refer to steps 1) to 6) of BRAKE DRUM INSTALLATION.
12) Fill reservoir with brake fluid and bleed brake system (For bleeding operation, see SECTION 5.)

70F00-3E-12-4



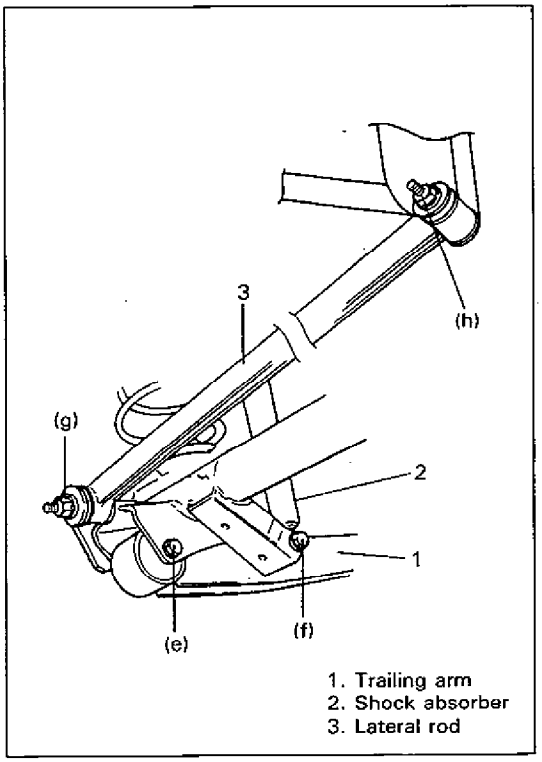
70F00-3E-12-5

13) Install wheel and tighten wheel nuts to specified torque.

Tightening Torque
(d): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

14) Upon completion of all jobs, depress brake pedal with about 30 kg (66 lbs) load three to five times so as to obtain proper drum-to-shoe clearance.
Ajust parking brake cable (for adjustment, see SECTION 5 of this manual.)
15) Tighten parking brake lever cover screw.
16) Lower hoist.

70F00-3E-13-1



1. Trailing arm
2. Shock absorber
3. Lateral rod

70F00-3E-13-2

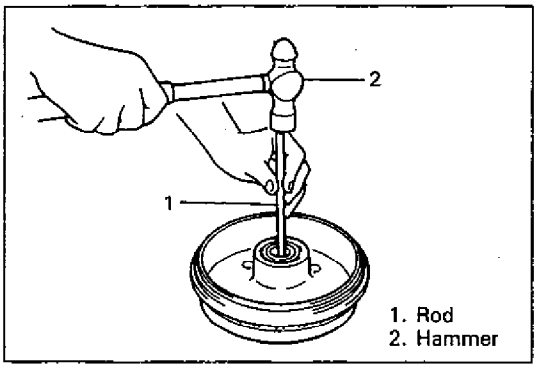
17) Tighten right and left trailing arm rear mounting nuts and shock absorber lower mounting bolts to specified torque. Tighten lateral rod right and left mounting nuts to specified torque.

NOTE:
When tightening these nuts and bolts, be sure that vehicle is off hoist and in non loaded condition.

Tightening Torque
(e): 70—90 N·m (7.0—9.0 kg-m, 51.0—65.0 lb-ft)
(f) : 45—70 N·m (4.5—7.0 kg-m, 33.0—50.5 lb-ft)
(g): 35—55 N·m (3.5—5.5 kg-m, 25.5—39.5 lb-ft)
(h): 45—70 N·m (4.5—7.0 kg-m, 33.0—50.5 lb-ft)

19) Check to ensure that brake drum is free from dragging and proper braking is obtained.
20) Perfom brake test (foot brake and parking brake).

70F00-3E-13-4

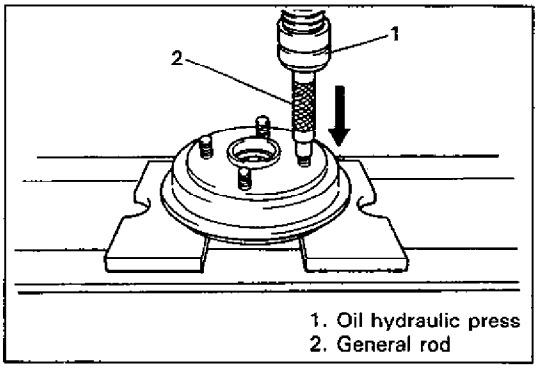


70F00-3E-14-1

WHEEL BEARING AND WHEEL STUD

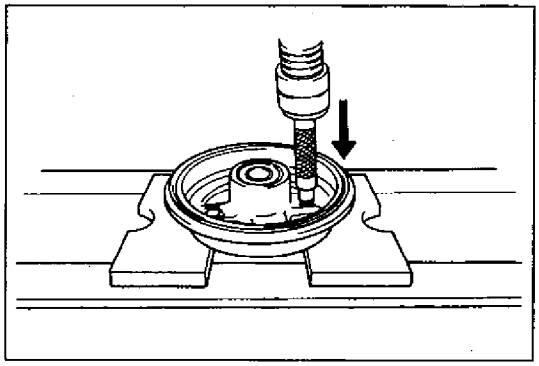
REMOVAL

1) Remove rear brake drum. For details, refer to Steps 1) to 7) of REAR BRAKE DRUM REMOVAL of SECTION 5 in this manual.
2) Remove wheel bearing(s).



70F00-3E-14-2

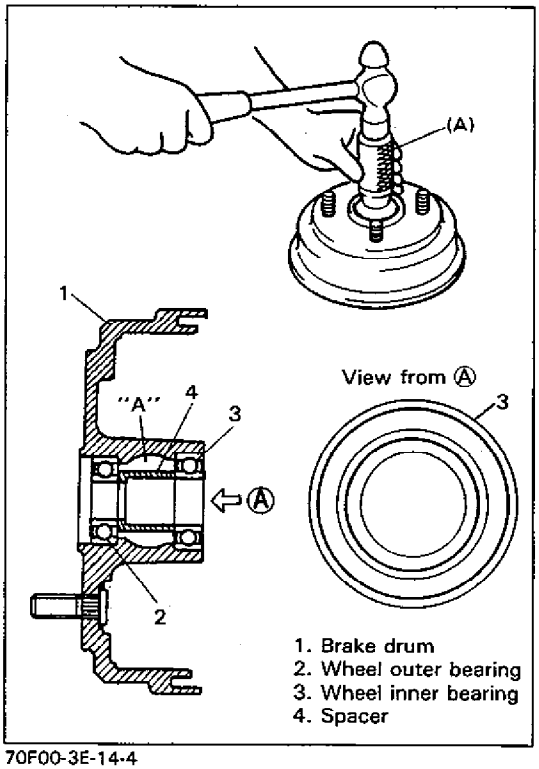
3) Remove wheel stud bolt by using hydraulic press.



70F00-3E-14-3

INSTALLATION

1) Insert new stud in drum hole and rotate it slowly to assure serrations are aligned with those made by replaced bolt.



70F00-3E-14-4

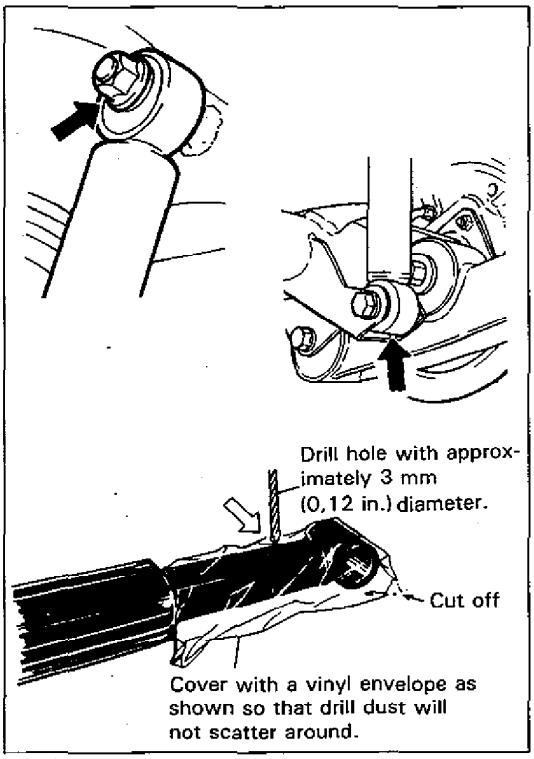
2) Install bearing by using special tool.

NOTE:

- **Refer to left figure for installing direction of specer and inner bearing.**
- **Direct outer bearing sealed side outward.**
- **Fill space indicated by "A" in figure with bearing grease as much as 40% of space capacity.**

Special Tool
(A): 09913-76010
"A": Grease 99000-25010

3) Install brake drum and wheel. (Refer to Steps 1) to 10) of BRAKE DRUM INSTALLATION of SECTION 5 in this manual.)



70F00-3E-15-1

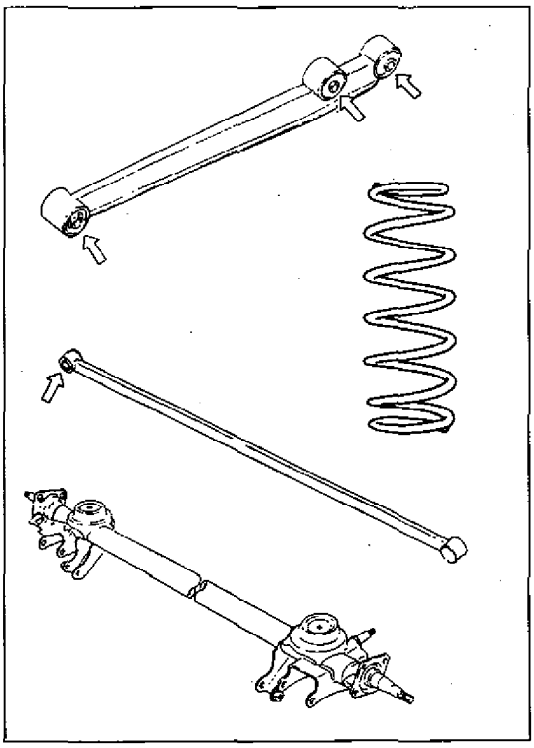
REAR SUSPENSION INSPECTION

REAR SHOCK ABSORBER

- Inspect for deformation or damage.
- Inspect bushings for wear or damage.
- Inspect for evidence of oil leakage.

Replace any defective part.

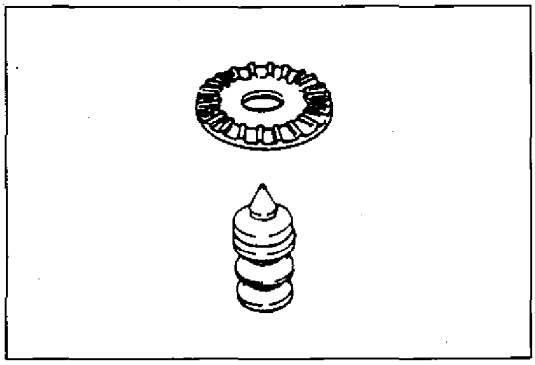
WARNING:
When handling rear shock absorber in which high-pressure gas is sealed, make sure to observe the following precautions.
1) Don't disassemble it.
2) Don't put it into the fire.
3) Don't store it where it gets hot.
4) Before disposing it, be sure to drill a hole in it where shown by an arrow in figure and let gas and oil out. Lay it down sideways for this work.



70F00-3E-15-3

TRAILING ARM, LATERAL ROD, REAR AXLE AND COIL SPRING

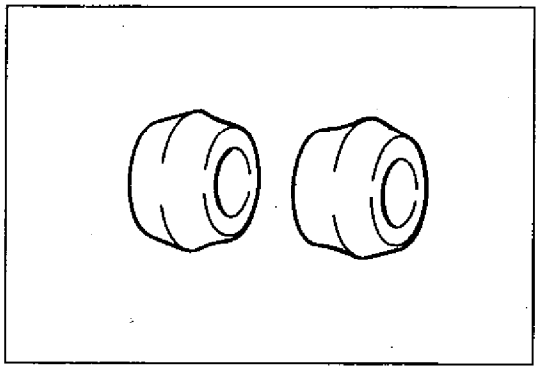
- Inspect for cracks, deformation or damage.
- Inspect bushing for damage, wear or breakage.
  Replace any defective part.



70F00-3E-15-5

BUMP STOPPER/SPRING UPPER SEAT

- Inspect for cracks, deformation or damage.
  Replace any defective part.



70F00-3E-16-1

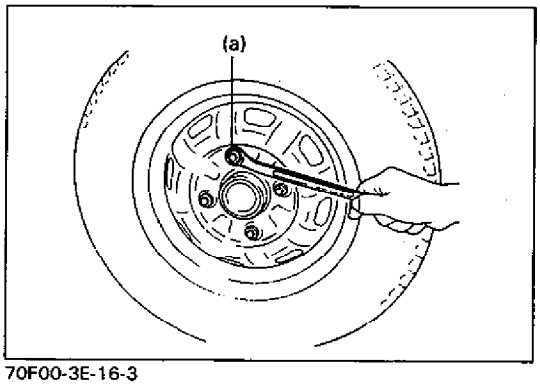
BUSHING

Inspect for damage, wear or deterioration. If defective, replace.

REAR SUSPENSION FASTENERS

Check each bolt and nut fastening suspension parts for tightness. Tighten loose one, if any, to specified torque, referring to Fig. 3E-17 of this section.

70F00-3E-16-2

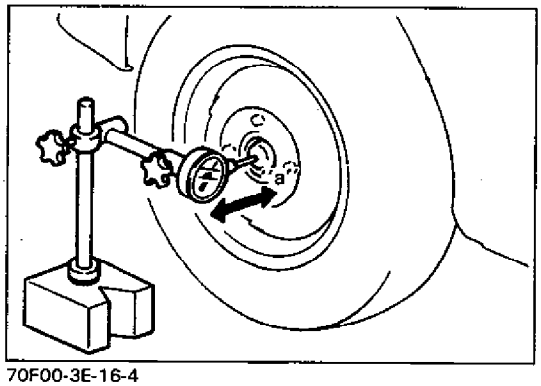


70F00-3E-16-3

WHEEL DISC, NUT & BEARING

- Inspect each wheel disc for dents, distortion and cracks. A disc in badly damaged condition must be replaced.
- Check wheel nuts for tightness and, as necessary, retighten to specification.

Tightening Torque
(a): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

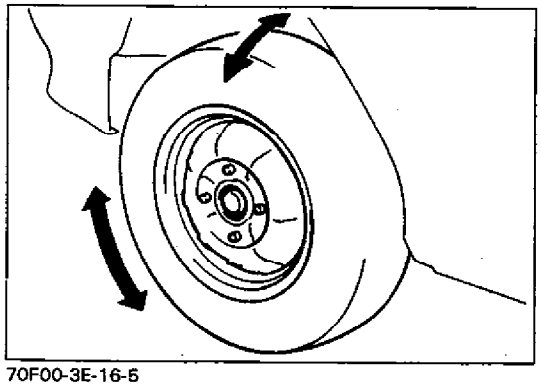


70F00-3E-16-4

- Check wheel bearings for wear. When measuring thrust play, apply a dial gauge to spindle cap center.

Thrust play limit "a": 0.3 mm (0.012 in.)

When measurement exceeds limit, replace bearing.

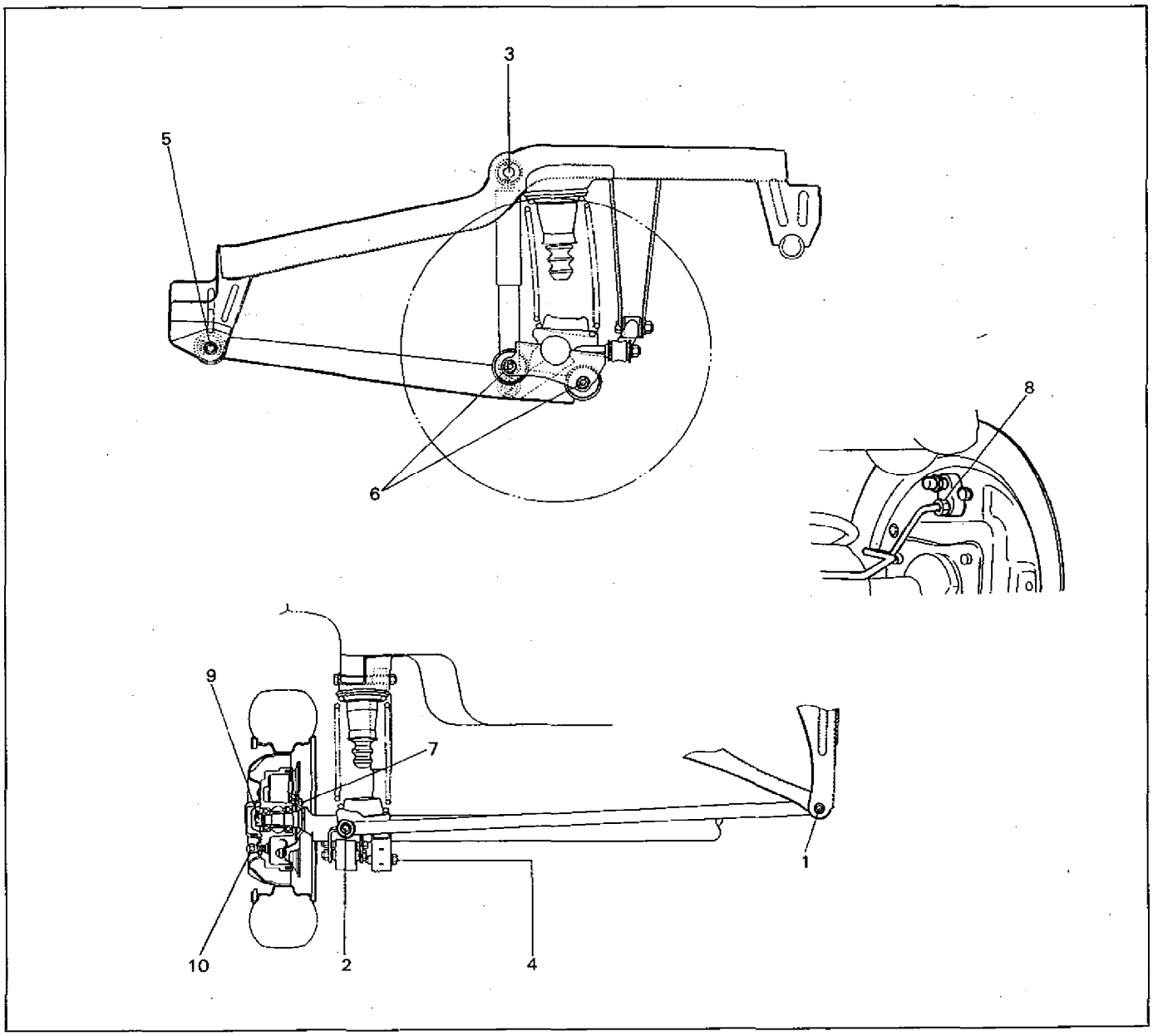


70F00-3E-16-5

- By rotating wheel actually, check wheel bearing for noise and smooth rotation. If it is defective, replace bearing.

RECOMMENDED TORQUE SPECIFICATIONS

Fastening parts	Tightening torque		
	N·m	kg-m	lb-ft
1. Lateral rod right side mounting nut	45—70	4.5—7.0	33.0—50.5
2. Lateral rod left side mounting nut	35—55	3.5—5.5	25.5—39.5
3. Shock absorber upper mounting bolt	45—70	4.5—7.0	33.0—50.5
4. Shock absorber lower mounting nut	45—70	4.5—7.0	33.0—50.5
5. Trailing arm front mounting nut	70—90	7.0—9.0	51.0—65.0
6. Trailing arm rear mounting nut	70—90	7.0—9.0	51.0—65.0
7. Brake back plate bolt	18—28	1.8—2.8	13.5—20.0
8. Brake flare nut	14—18	1.4—1.8	10.5—13.0
9. Rear axle castle nut	80—120	8.0—12.0	58.0—86.5
10. Wheel nut	70—100	7.0—10.0	51.0—72.0



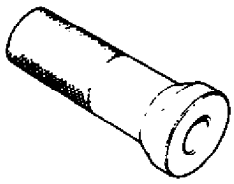
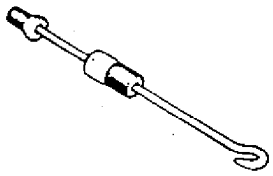
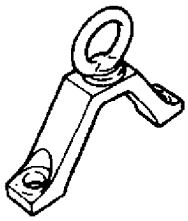
70F00-3E-17-1

REQUIRED SERVICE MATERIALS

MATERIALS	RECOMMENDED SUZUKI PRODUCT	USE
Brake fluid	DOT3	Brake reservoir tank
Water tight sealant	SEALING COMPOUND 366E (99000-31090)	Joint seam of rear axle and brake back plate
Lithic wheel bearing grease	SUZUKI SUPER GREASE A (99000-25010)	Wheel bearing

70F00-3E-18-1

SPECIAL TOOLS

 09913-76010 Rear wheel bearing installer	 09942-15510 Sliding hammer	 09943-17911 Brake drum remover	

64B40-3E1-8-2

SECTION 3F

WHEELS AND TIRES

NOTE:
All wheel fasteners are important attaching parts in that they could affect the performance of vital parts and systems, and/or could result in major repair expense. They must be replaced with one of the same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of all parts.
There is to be no welding as it may result in extensive damage and weakening of the metal.

64B40-3F-1-1

CONTENTS

70F00-3F-1-2

GENERAL DESCRIPTION

TIRES

This vehicle is equipped with following tire.
145/70 R13
The tire is of tubeless type. The tire is designed to operate satisfactorily with loads up to the full rated load capacity when inflated to the recommended inflation pressures.
Correct tire pressures and driving habits have an important influence on tire life. Heavy cornering, excessively rapid acceleration, and unnecessary sharp braking increase tire wear.

WHEELS

Standard equipment wheels are the following steel wheel.
13 x 4.00B

REPLACEMENT TIRES

When replacement is necessary, the original equipment type tire should be used. Refer to the Tire Placard. Replacement tires should be of the same size, load range and construction as those originally on the vehicle. Use of any other size or type tire may affect ride, handling, speedometer/odometer calibration, vehicle ground clearance and tire or snow chain clearance to the body and chassis.

70F00-3F-1-3

kPa	kgf/cm^2	psi
160	1.6	23
180	1.8	26
200	2.0	29
220	2.2	32
240	2.4	35
260	2.6	38
280	2.8	41
300	3.0	44

WARNING:
Do not mix different types of tires on the same vehicle such as radial, bias and bias-belted tires except in emergencies, because handling may be seriously affected and may result in loss of control.

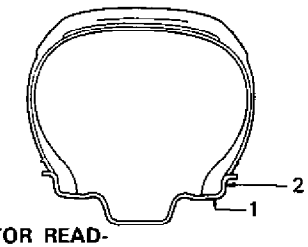
It is recommended that new tires be installed in pairs on the same axle. If necessary to replace only one tire, it should be paired with the tire having the most tread, to equalize braking traction.
The metric term for tire inflation pressure is the kilopascal (kPa). Tire pressures is usually printed in both kPa and psi on the Tire Placard.
Metric tire gauges are available from tool suppliers.
The chart, shown left table, converts commonly used inflation pressures from kPa to psi.

64B40-3F-2-1

REPLACEMENT WHEELS

Wheels must be replaced if they are bent, dented, have excessive lateral or radial runout, air leak through welds, have elongated bolt holes, if lug nuts won't stay tight, or if they are heavily rusted. Wheels with greater runout than shown in figure below may cause objectional vibrations.
Replacement wheels must be equivalent to the original equipment wheels in load capacity, diameter, rim with offset and mounting configuration. A wheel of improper size or type may affect wheel and bearing life, brake cooling, speedometer/odometer calibration, vehicle ground clearance and tire clearance to body and chassis.

64B40-3F-2-3



*TOTAL INDICATOR READING IGNORE INDICATOR "JUMPS" DUE TO WELD SEAMS, PAINT RUNS, SCRATCHES, ETC.

1. Radial runout
2. Lateral runout

64B40-3F-2-5

HOW TO MEASURE WHEEL RUNOUT

To measure the wheel runout, it is necessary to use an accurate dial indicator. The tire may be on or off the wheel. The wheel should be installed to the wheel balancer of the like for proper measurement.
Take measurements of both lateral runout and radial runout at both inside and outside of the rim flange. With the dial indicator set in place securely, turn the wheel one full revolution slowly and record every reading of the indicator.

When the measured runout exceeds the specification and correction by the balancer adjustment is impossible, replace the wheel. If the reading is affected by welding, paint or scratch, it should be ignored.

	Radial runout limit	Lateral runout limit
Steel wheel	0.7 mm (0.08 in.)	0.9 mm (0.035 in.)

70F00-3F-3-1

MAINTENANCE AND MINOR ADJUSTMENTS

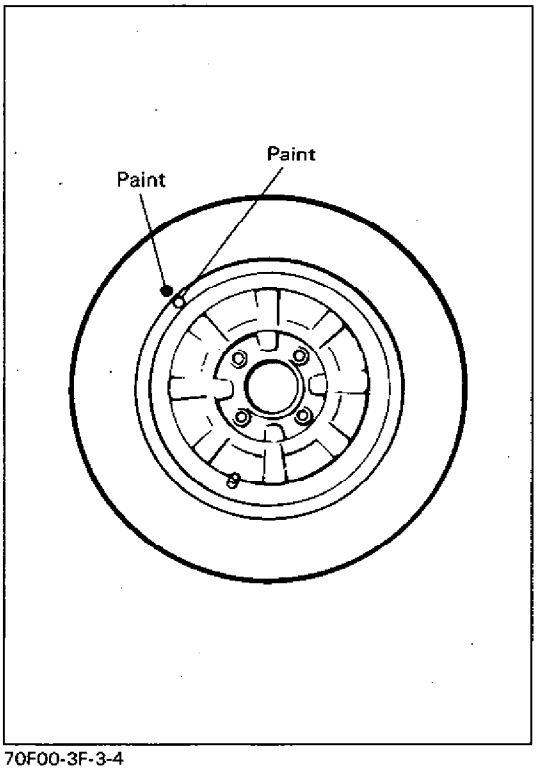
WHEEL MAINTENANCE

Wheel repairs that use welding, heating, or peening are not approved. All damaged wheels should be replaced.

WHEEL ATTACHING STUDS

If a broken stud is found, see Section 3E (rear) or Section 3D (front) for Note and Replacement procedure.

70F00-3F-3-3



70F00-3F-3-4

MATCHED TIRES AND WHEELS

Tires and wheels are matchmounted at the assembly plant. This means that the radially stiffest part of the tire, or "high spot", is matched to the smallest radius or "low spot" of the wheel.

This is done to provide the smoothest possible ride.

The "high spot" of the tire is originally marked by paint dot on the outboard sidewall. This paint dot will eventually wash off the tire.

The "low spot" of the wheel is originally marked by paint dot on the wheel rim-flange. Properly assembled, the wheel rims' paint dot should be aligned with the tires' paint dot as shown in left figure.

Whenever a tire is dismounted from its wheel, it should be remounted so that the tire and wheel are matched. If the tire's paint dot cannot be located, a line should be scribed on the tire and wheel before dismounting to assure that it is remounted in the same position.

INFLATION OF TIRES

The pressure recommended for any model is carefully calculated to give a satisfactory ride, stability, steering, tread wear, tire life and resistance to bruises.
Tire pressure, with tires cold, (after vehicle has set for three hours or more, or driven less than one mile) should be checked monthly or before any extended trip. Set to the specifications on the tire placard located on the left door (right door for right-hand side steering vehicle) lock pillar.
It is normal for tire pressure to increase to 28 kPa (4 psi) when the tires become hot during driving. **Do not** bleed or reduce tire pressure after driving. Bleeding reduces the "Cold Inflation Pressure".

Higher than recommended pressure can cause:
1. Hard ride
2. Tire bruising or carcass damage
3. Rapid tread wear at center of tire

Unequal pressure on same axle can cause:
1. Uneven braking
2. Steering lead
3. Reduced handling
4. Swerve on acceleration

Lower than recommended pressure can cause:
1. Tire squeal on turns
2. Hard Steering
3. Rapid and uneven wear on the edges of the tread
4. Tire rim bruises and rupture
5. Tire cord breakage
6. High tire temperature
7. Reduced handling
8. High fuel consumption

Valve caps should be on the valves to keep dust and water out.

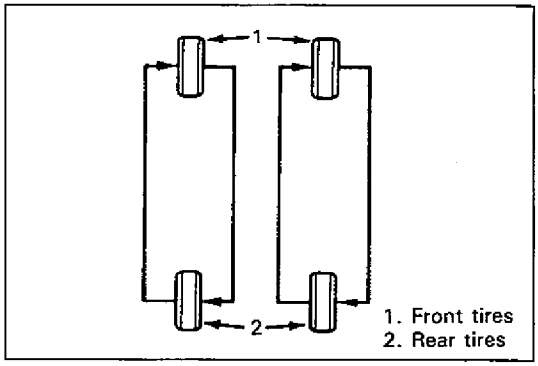
70F00-3F-4-1

TIRE PLACARD

The tire placard is located on the left door (right door for right-hand side steering vehicle) lock pillar and should be referred to for tire information.
The placard lists the maximum load, tire size and cold tire pressure where applicable.

NOTE:
Whether rim size and/or maximum load are listed or not depends on regulations of each country.

70F00-3F-4-4

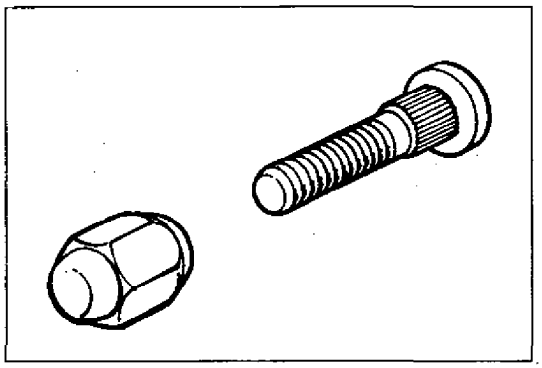


70F00-3F-4-5

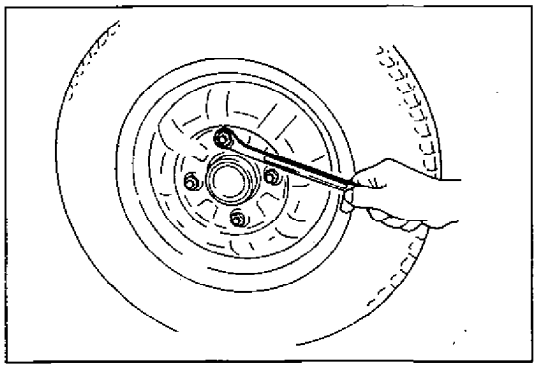
TIRE ROTATION

To equalize wear, rotate tires according to left figure. Radial tires should be rotated at the first 10,000 km (6,000 miles) and after that, tire rotation at least every 6,000 miles is recommended. Set tire pressure.

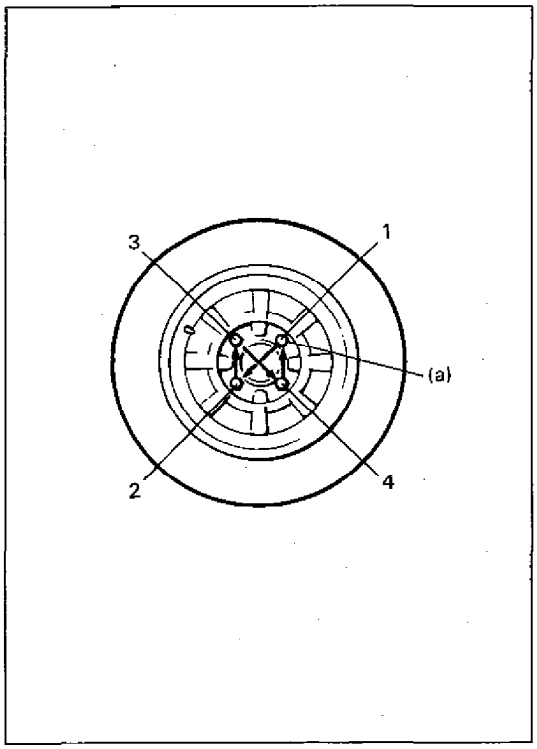
NOTE:
Due to their design, radial tires tend to wear faster in the shoulder area, particularly in front positions. This makes regular rotation especially necessary.



64B40-3F-5-1



64B40-3F-5-2



64B40-3F-5-3

ON-VEHICLE SERVICE

SERVICE OPERATIONS

METRIC LUG NUTS AND WHEEL STUDS

All models use metric lug nuts and wheel studs (size: M12 x 1.25).

WHEEL REMOVAL

1) Loosen wheel nuts by approximately 180° (half a rotation).
2) Hoist vehicle.
3) Remove wheel.

CAUTION:
Never use heat to loosen tight wheel because application of heat to wheel can shorten life of wheel and damage wheel bearings.

Wheel nuts must be tightened in sequence and to proper torque to avoid bending wheel or brake disc, left figure.

NOTE:
Before installing wheels, remove any build-up of corrosion on wheel mounting surface and brake disc mounting surface by scraping and wire brushing. Installing wheels without good metal-to-metal contact at mounting surfaces can cause wheel nuts to loosen, which can later allow a wheel to come off while vehicle is moving.

Tightening Torque
(a): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

TIRE MOUNTING AND DEMOUNTING

Use a tire changing machine to mount or demount tires. Follow equipment manufacturer's instructions. Do not use hand tools or tire irons alone to change tires as they may damage tire beads or wheel rim.

Rim bead seats should be cleaned with a wire brush or coarse steel wool to remove lubricants, old rubber and light rust. Before mounting or demounting a tire, bead area should be well lubricated with approved tire lubricant.

After mounting, inflate to specified pressure shown on tire pracard so that beads are completely seated.

WARNING:
Do not stand over tire when inflating. Bead may break when bead snaps over rim's safety hump and cause serious personal injury.
Do not exceed specified pressure when inflating. If specified pressure will not seat beads, deflate, re-lubricate and reinflate.
Over inflation may cause bead to break and cause serious personal injury.

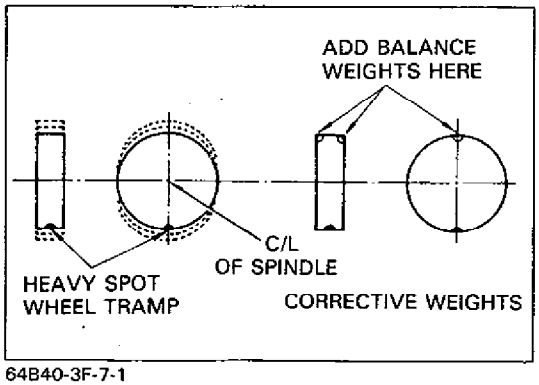
Install valve core and inflate to proper pressure.

64B40-3F-6-1

TIRE REPAIR

There are many different materials and techniques on the market to repair tires. As not all of these work on all types of tires, tire manufacturers have published detalied instructions on how and when to repair tires. These instructions can be obtained from each tire manufacturer.

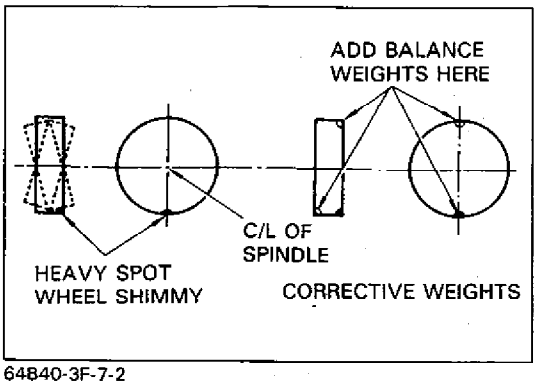
64B40-3F-6-4



64B40-3F-7-1

BALANCING WHEELS

There are two types of wheel and tire balance: static and dynamic. Static balance, as shown in left figure, is the equal distribution of weight around the wheel. Wheels that are statically unbalanced cause a bouncing action called tramp. This condition will eventually cause uneven tire wear.



64B40-3F-7-2

Dynamic balance, as shown in left figure, is the equal distribution of weight on each side of the wheel centerline so that when the tire spins there is no tendency for the assembly to move from side to side. Wheels that are dynamically unbalanced may cause shimmy.

GENERAL BALANCE PROCEDURES

Deposits of mud, etc. must be cleaned from inside of rim.

WARNING:
Stones should be removed from the tread in order to avoid operator injury during spin balancing and to obtain good balance.

Each tire should be inspected for any damage, then balanced according to equipment manufacturer's recommendation.

OFF-VEHICLE BALANCING

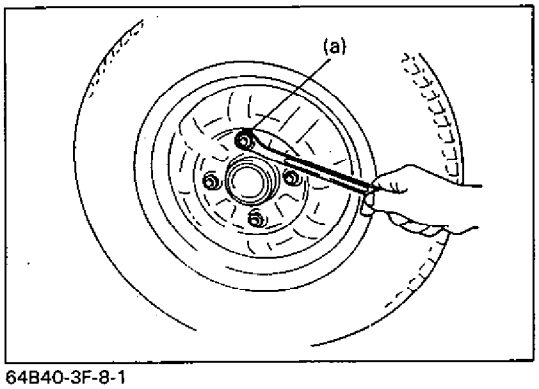
Most electronic off-vehicle balancers are more accurate than the on-vehicle spin balancers. They are easy to use and give a dynamic (two plane) balance. Although they do not correct for drum or disc unbalance as does on-vehicle spin blancing, this is overcome by their accuracy, usually to within 1/8 ounce.

ON-VEHICLE BALANCING

On-vehicle balancing methods vary with equipment and tool manufacturers. Be sure to follow each manufacturer's instructions during balancing operation.

WARNING:
Wheel spin should be limited to 35 mph (55 km/h) as indicated on speedometer.
This limit is necessary because speedometer only indicates one-half of actual wheel speed when one drive wheel is spinning and the other drive wheel is stopped.
Unless care is taken in limiting drive wheel spin, spinning wheel can reach excessive speeds. This can result in possible tire disintegration or differential failure, which could cause serious personal injury or extensive vehicle damage.

64B40-3F-7-3



64B40-3F-8-1

RECOMMENDED TORQUE SPECIFICATIONS

Tightening Torque for wheel nuts
(a): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

SECTION 4

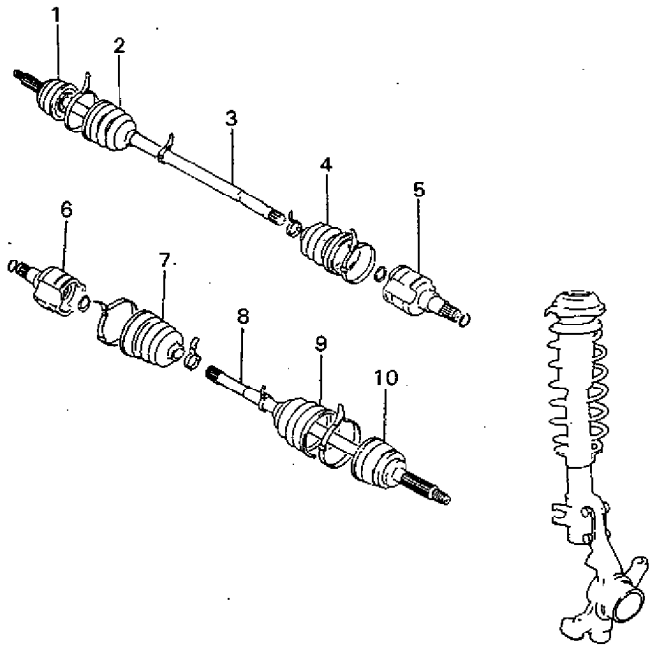
FRONT DRIVE SHAFT (Tripod Joint Type)

CONTENTS

70F00-4-1-1

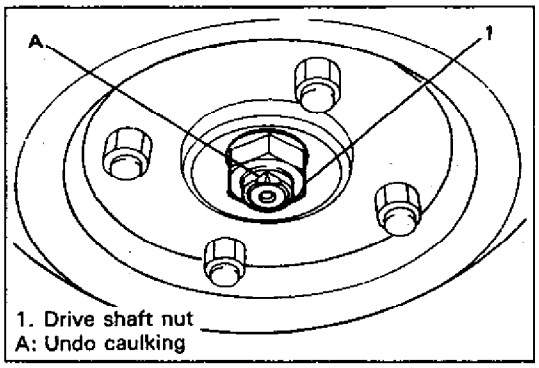
GENERAL DESCRIPTION

A constant velocity ball joint is used on the wheel side of front drive shaft and a constant velocity tripod joint on the differential side. The drive shaft can slide through the tripod joint in the extension/contraction direction.



1. Wheel side joint (RH) (Constant velocity ball joint)
2. Boot
3. Drive shaft (RH)
4. Boot
5. Differential side joint (RH) (Constant velocity tripod joint)
6. Differential side joint (LH) (Constant velocity tripod joint)
7. Boot
8. Drive shaft (LH)
9. Boot
10. Wheel side joint (LH) (Constant velosity ball joint)

70F00-4-1-2



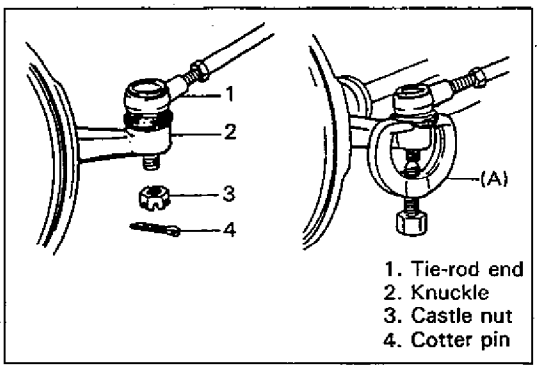
1. Drive shaft nut
A: Undo caulking

70F00-4-2-1

REMOVAL

ON FLOOR

Undo caulking and remove drive shaft nut and washer.



1. Tie-rod end
2. Knuckle
3. Castle nut
4. Cotter pin

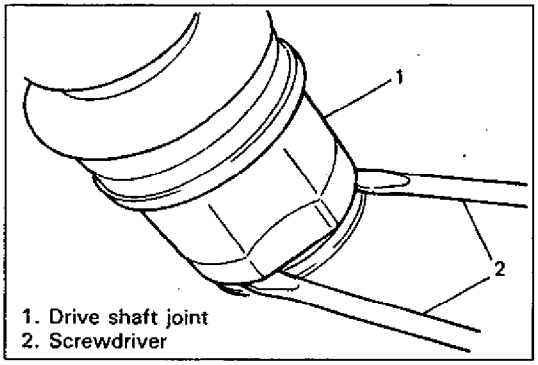
70F00-4-2-2

ON LIFT

NOTE:
Steps 1), 2), 3), For right side only.

1) Remove wheel.
2) Remove tie-rod end cotter pin and castle nut.
3) Disconnect tie-rod end from steering knuckle by using special tool.

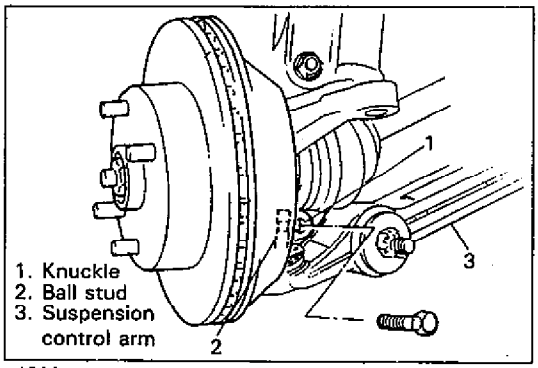
Special Tool
(A): 09913-65210



1. Drive shaft joint
2. Screwdriver

70F00-4-2-3

4) Drain transmission oil.
5) By using large size screwdrivers, pull out drive shaft joint so as to release snap ring fitting of joint spline at differential side.
6) Remove two stabilizer mount brackets from vehicle body.



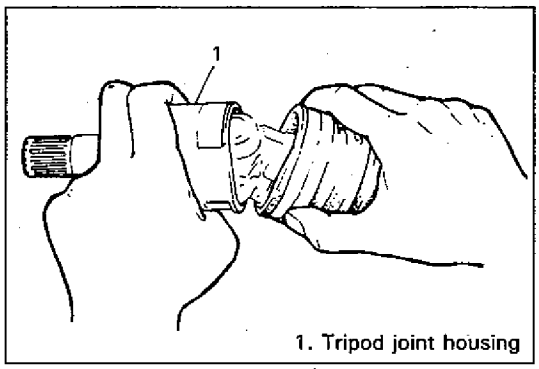
1. Knuckle
2. Ball stud
3. Suspension control arm

70F00-4-2-4

7) Disconnect front suspension control arm ball joint stud from steering knuckle by pushing down stabilizer bar after removing ball joint bolt.

8) Remove drive shaft assembly.
- Left side shaft
  Pull out inboard joint from differential side and then wheel side joint from steering knuckle.
- Right side shaft
  Pull out wheel side joint from steering knuckle and then inboard joint from differential side.

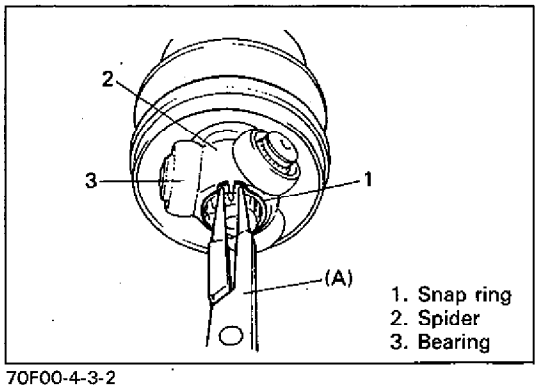
CAUTION:
To prevent breakage of boots, be careful not to bring them into contact with other parts, when removing drive shaft assembly.



70F00-4-3-1

DISASSEMBLY

1) Remove tripod joint boot band, then take out tripod joint housing.



70F00-4-3-2

2) Remove grease from shaft and take off snap ring by using special tool, then pull out spider from shaft.

Special Tool
(A): 09900-06107

CAUTION:
To prevent needle bearing of joint from being degreased, do not wash it if it is to be reused.

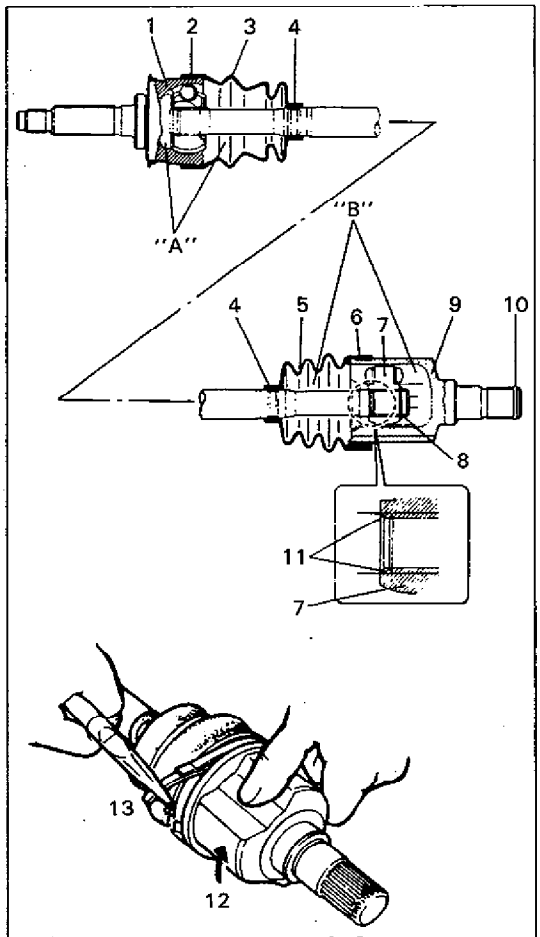
3) Remove boot band, then pull out differential side boot from shaft.
4) Undo boot bands of wheel side joint boot, then pull out boot through shaft.

CAUTION:
- **Disassembly of wheel side joint is not allowed. If noise or damage exists in it, replace it as assembly.**
- **Do not disassemble tripod joint spider. If any malcondition is found in it, replace it as differential side joint assembly.**

70F00-4-3-3

INSPECTION

- Check boots for breakage or deterioration. Replace them as necessary.
- Check circlip, snap ring and boot bands for breakage or deformation. Replace as necessary.



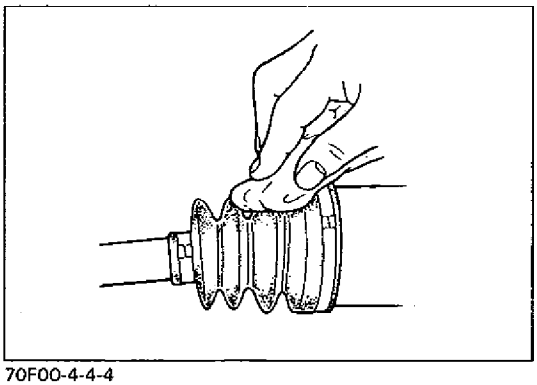
1. Wheel side joint assembly
2. Wheel side boot band
3. Wheel side boot
4. Boot band
5. Differential side boot
6. Differential side boot band
7. Tripod joint spider
8. Snap ring
9. Tripod joint housing
10. Snap ring
11. Chamfered spline
12. Forward rotation
13. Clamp band this way

70F00-4-4-1

REASSEMBLY

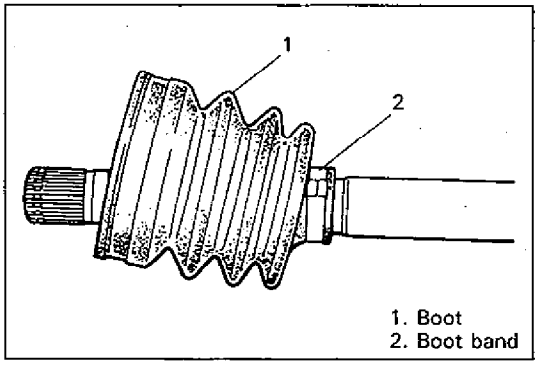
Judging from abnormality noted before disassembly and what is found through visual check of component parts after disassembly, prepare replacing parts and proceed to reassembly. Make sure that wheel side joint assembly and tripod joint housing are washed thoroughly and air dried, and boots are cleaned with cloth if they are to be reused.

"A": Black grease (about 60—80 gram/2.1—2.8 oz)
"B": Yellow grease (about 85—105 gram/3.0—3.7 oz)



70F00-4-4-4

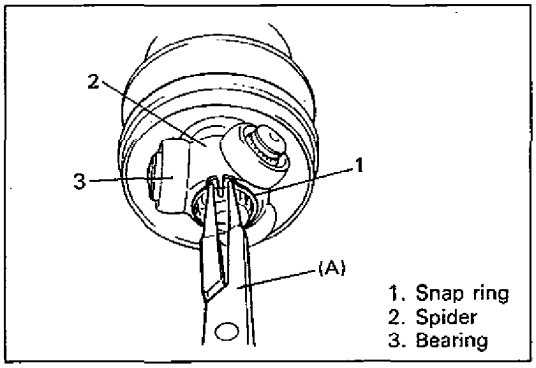
1) Wash disassembled parts (except boots). After washing, dry parts completely by blowing air.
2) Clean boots with cloth. DO NOT wash boots in degreaser, such as gasoline or kerosene, etc. Washing in degreaser causes deterioration of boot.
3) Apply grease to wheel side joint. Use black grease in tube included in wheel side boot set.
4) Install wheel side boot on shaft.
5) Fill up boot inside with grease and then fasten boot with bands.



1. Boot
2. Boot band

70F00-4-4-5

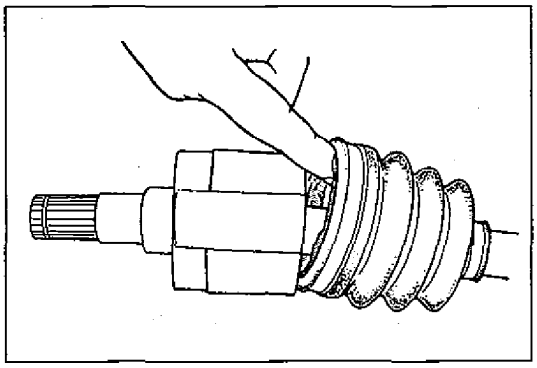
6) Install differential side boot on shaft.
Apply grease to tripod joint. Use yellow grease in tube included in differential side boot set or differential side joint assembly of spare parts.



70F00-4-5-1

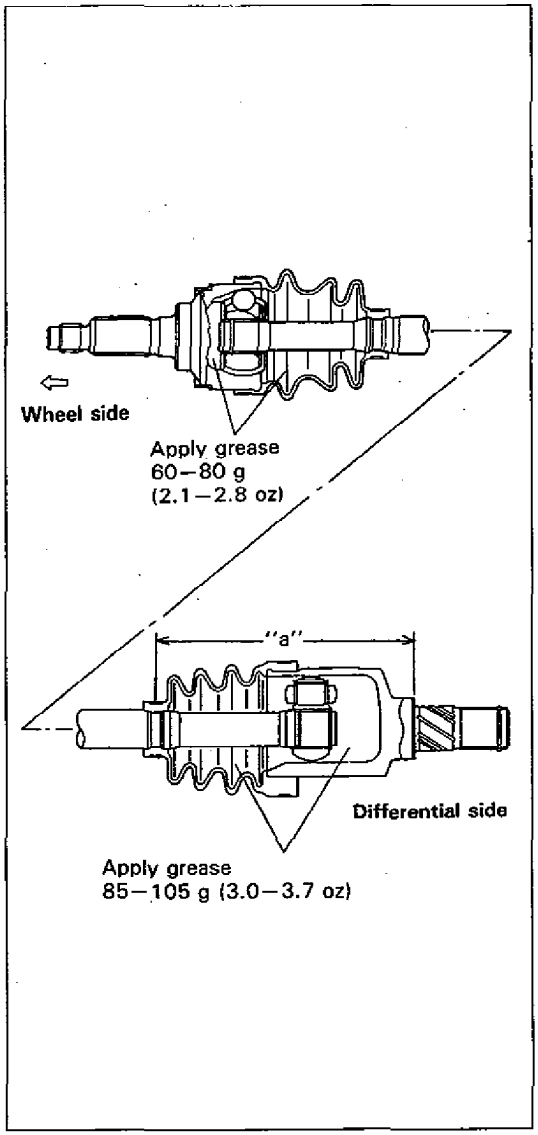
7) Install tripod joint spider on shaft, facing its chamfered spline inward (wheel side), then fasten it with snap ring.

Special Tool
(A): 09900-06107



70F00-4-5-2

8) Apply grease to inside of outer race, and fit boot to outer race.
After fitting boot, insert screwdriver into boot on outer race side and allow air to enter boot so that air pressure in boot becomes the same as atmospheric pressure.

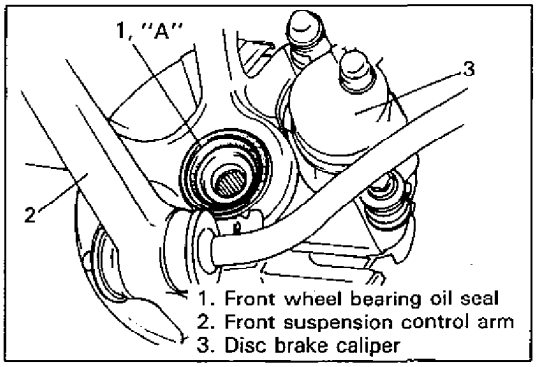


70F00-4-5-3

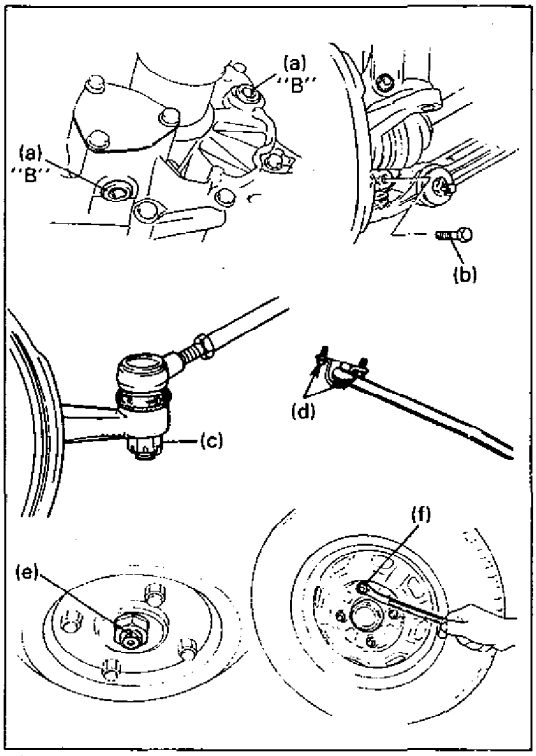
9) When fixing boot to outer race with boot band, adjust so that measurements become as indicated below.

Length "a": 205–210 mm (8.07–8.26 in.)

CAUTION:
- **To prevent any problem caused by washing solution, do not wash joint boots and tripod joint except its housing. Degreasing of those parts with cloth is allowed.**
- **To ensure full performance of joint as designed, be sure to distinguish between two types of grease in repair set and apply specified volume to respective joint, i.e. black grease (80 g tube) to wheel side joint and yellow one (130 g tube) to tripod joint.**
- **Bend each boot band against forward rotation.**
- **Do not squeeze or distort boot when fastening it with bands.**
  Distorted boot caused by squeezing air may reduce its durability.



70F00-4-6-1



70F00-4-6-2

INSTALLATION

Install drive shaft assembly by reversing removal procedure and noting following points.

- Clean front wheel bearing oil seal and then apply grease. Replace it if required.

  "A": Grease 99000-25010

- Install wheel side joint to steering knuckle first and then tripod joint to differential side.
- Tighten each bolt and nut to the specified torque.

  Tightening Torque
  (a): 25—30 N·m (2.5—3.0 kg-m, 18.5—21.5 lb-ft)
  (b): 45—65 N·m (4.5—6.5 kg-m, 33.0—47.0 lb-ft)
  (c): 30—55 N·m (3.0—5.5 kg-m, 22.0—39.5 lb-ft)
  (d): 30—55 N·m (3.0—5.5 kg-m, 22.0—39.5 lb-ft)
  (e): 150—200 N·m (15.0—20.0 kg-m, 108.5—144.5 lb-ft)
  (f): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

- Apply sealant to drain plug for manual transmission.

  "B": Sealant 99000-31110

- Fil transmission with oil as specified. (Refer to SECTION 7A.)

CAUTION:

- **To avoid excessive expansion of boot and consequential disconnection of joint in boot, do not pull tripod joint housing.**
- **Protect oil seals and boots from any damage, preventing them from unnecessary contact while installing drive shaft.**
- **Do not hit joint boot with hammer. Inserting joint only by hands is allowed.**
- **Make sure that differential side joint is inserted fully and its snap ring is seated as it was.**

RECOMMENDED TORQUE SPECIFICATIONS

Fastener	Tightening torque		
	N·m	kg-m	lb-ft
Oil drain plug	25—30	2.5—3.0	18.5—21.5
Oil filler and level plug	36—54	3.6—5.4	26.5—39.0
Ball joint stud bolt and nut	45—65	4.5—6.5	33.0—47.0
Tie-rod end castle nut	30—55	3.0—5.5	22.0—39.5
Stabilizer mount bracket bolt	30—55	3.0—5.5	22.0—39.5
Drive shaft nut	150—200	15.0—20.0	108.5—144.5
Wheel nut	70—100	7.0—10.0	51.0—72.0

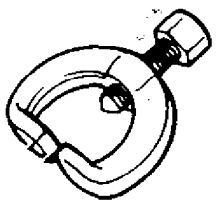
70F00-4-7-1

REQUIRED SERVICE MATERIALS

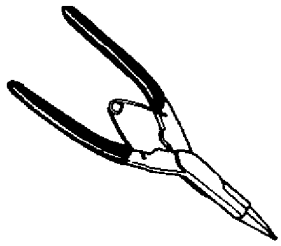
MATERIALS	RECOMMENDED SUZUKI PRODUCT	USE
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	Oil seal lips
Sealant	SUZUKI BOND NO. 1215 (99000-31110)	Oil drain plug for manual transmission

64B40-4-10-4

SPECIAL TOOL



09913-65210
Tie-rod end remover



09900-06107
Snap ring pliers
(Open type)

70F00-4-7-3

SECTION 5
BRAKES

NOTE:
All brake fasteners are important attaching parts in that they could affect the performance of vital parts and systems, and/or could result in major repair expense. They must be replaced with one of same part number or with an equivalent part if replacement becomes necessary. Do not use a replacement part of lesser quality or substitute design. Torque values must be used as specified during reassembly to assure proper retention of all parts. There is to be no welding as it may result in extensive damage and weakening of the metal.

70F00-5-1-1

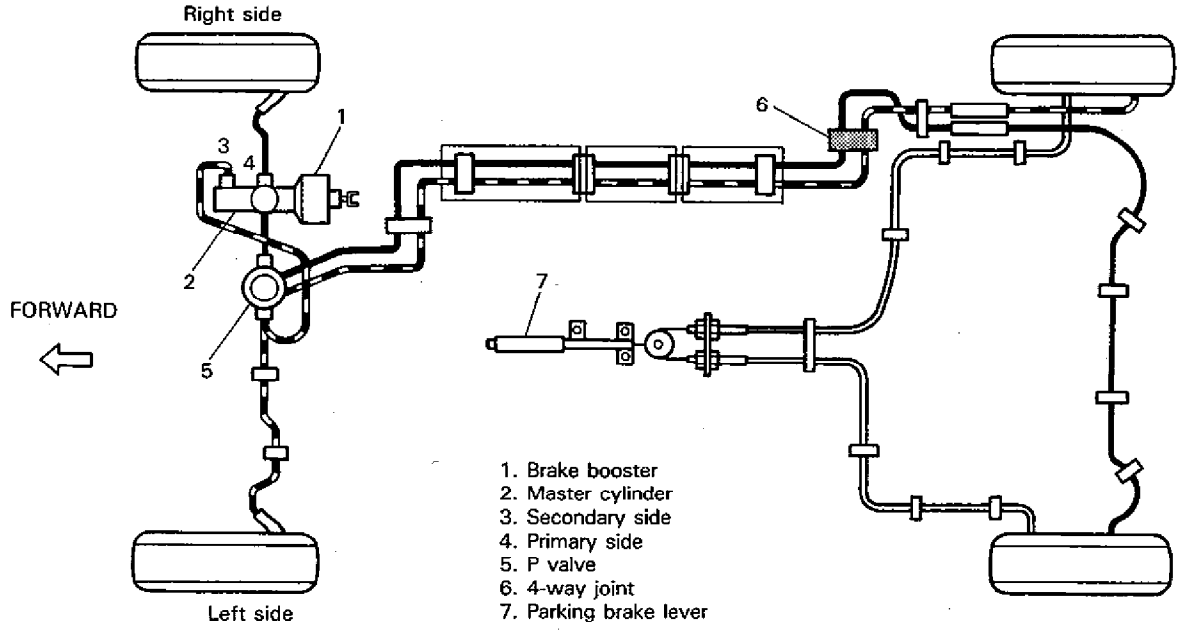
CONTENTS

70F00-5-1-2

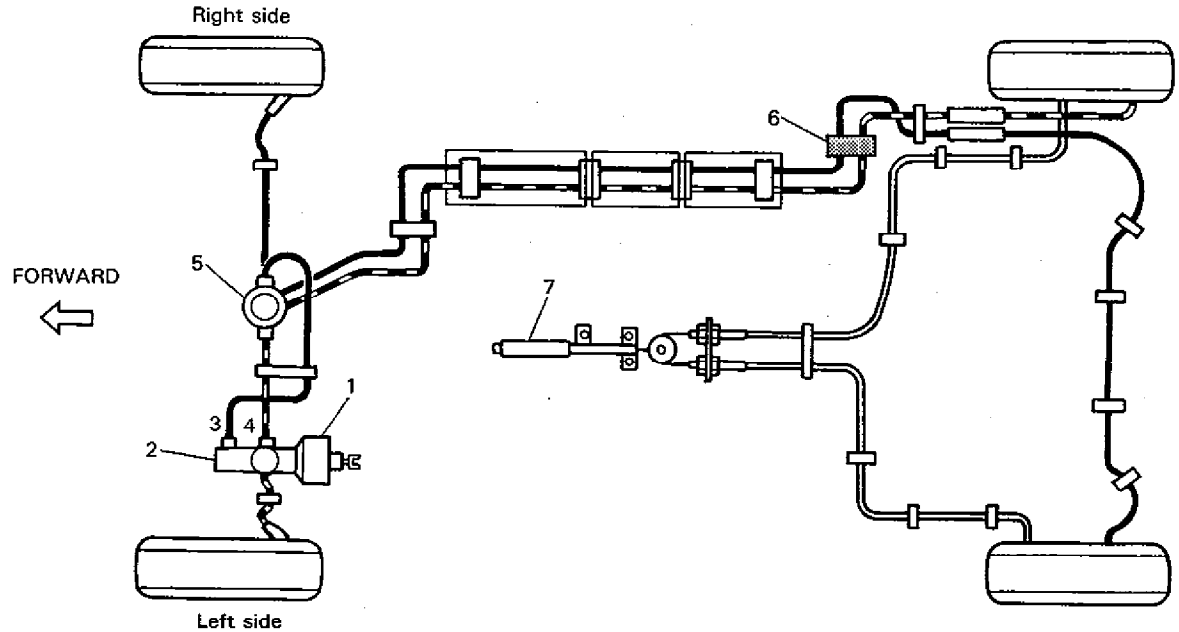
GENERAL DESCRIPTION

When the foot brake pedal is depressed, hydraulic pressure is developed in the master cylinder to actuate pistons (two in front and four in rear).
The master cylinder is a tandem master cylinder. Three brake pipes are connected to the master cylinder and they make two independent circuits. One connects front right & rear left brakes and the other connects front left & rear right brakes.
The proportioning valve (P valve) is included in these circuits between the master cylinder and rear wheels.
In this brake system, the disc brake type is used for the front wheel brake and a drum brake type (leading/trailing shoes) for the rear wheel brake.
The parking brake system is mechanical. It applies brake force to only rear wheels by means of the cable and mechanical linkage system. The same brake shoes are used for both parking and foot brakes.

Right-hand steering vehicle



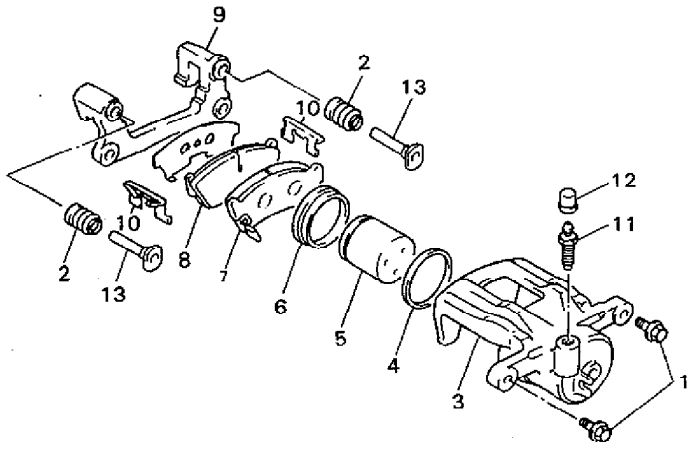
Left-hand steering vehicle



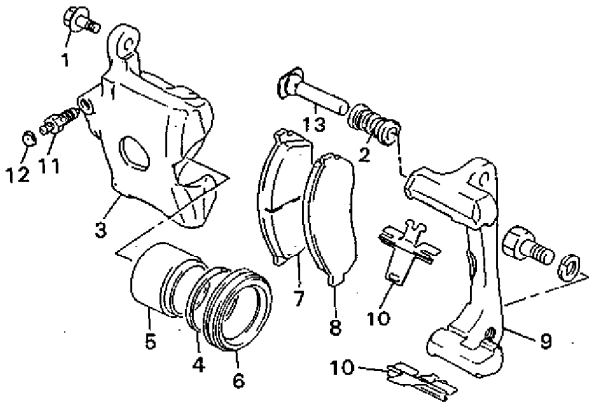
FRONT DISC BRAKE CALIPER ASSEMBLY

Shown in the figure below are components of the caliper.

For ventilated disc type



For solid disc type

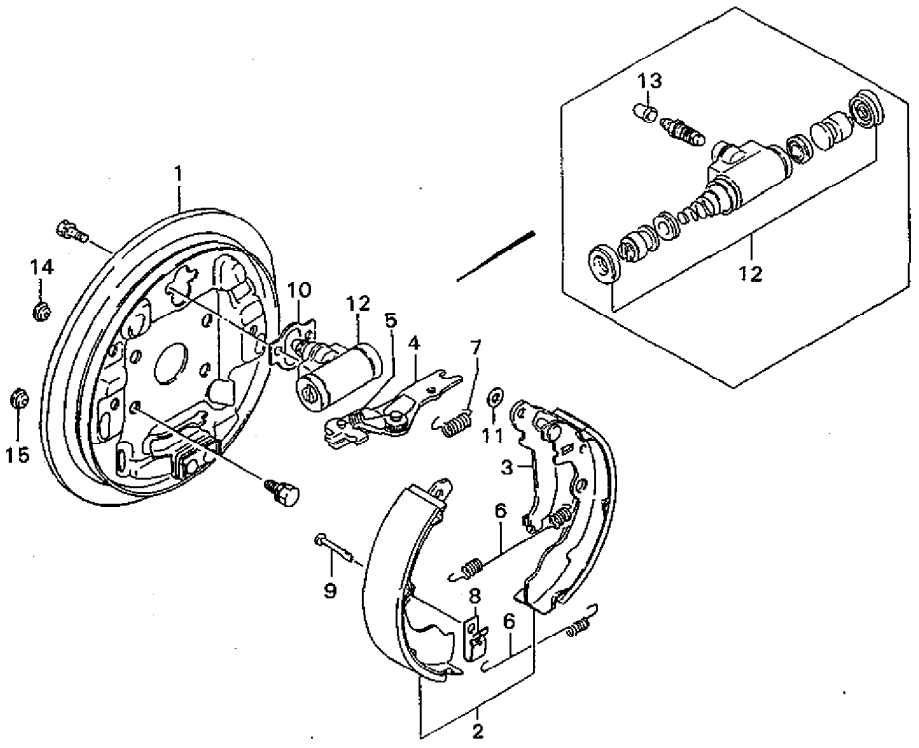


1. Caliper pin bolt
2. Boot
3. Disc brake caliper (Disc brake cylinder)
4. Piston seal
5. Disc brake piston
6. Cylinder boot
7. Disc brake inner pad
8. Disc brake outer pad
9. Brake caliper carrier
10. Pad spring
11. Bleeder plug
12. Bleeder plug cap
13. Caliper pin

70F00-5-3-1

REAR DRUM BRAKE ASSEMBLY

Shown in the figure below are components of the drum brake.

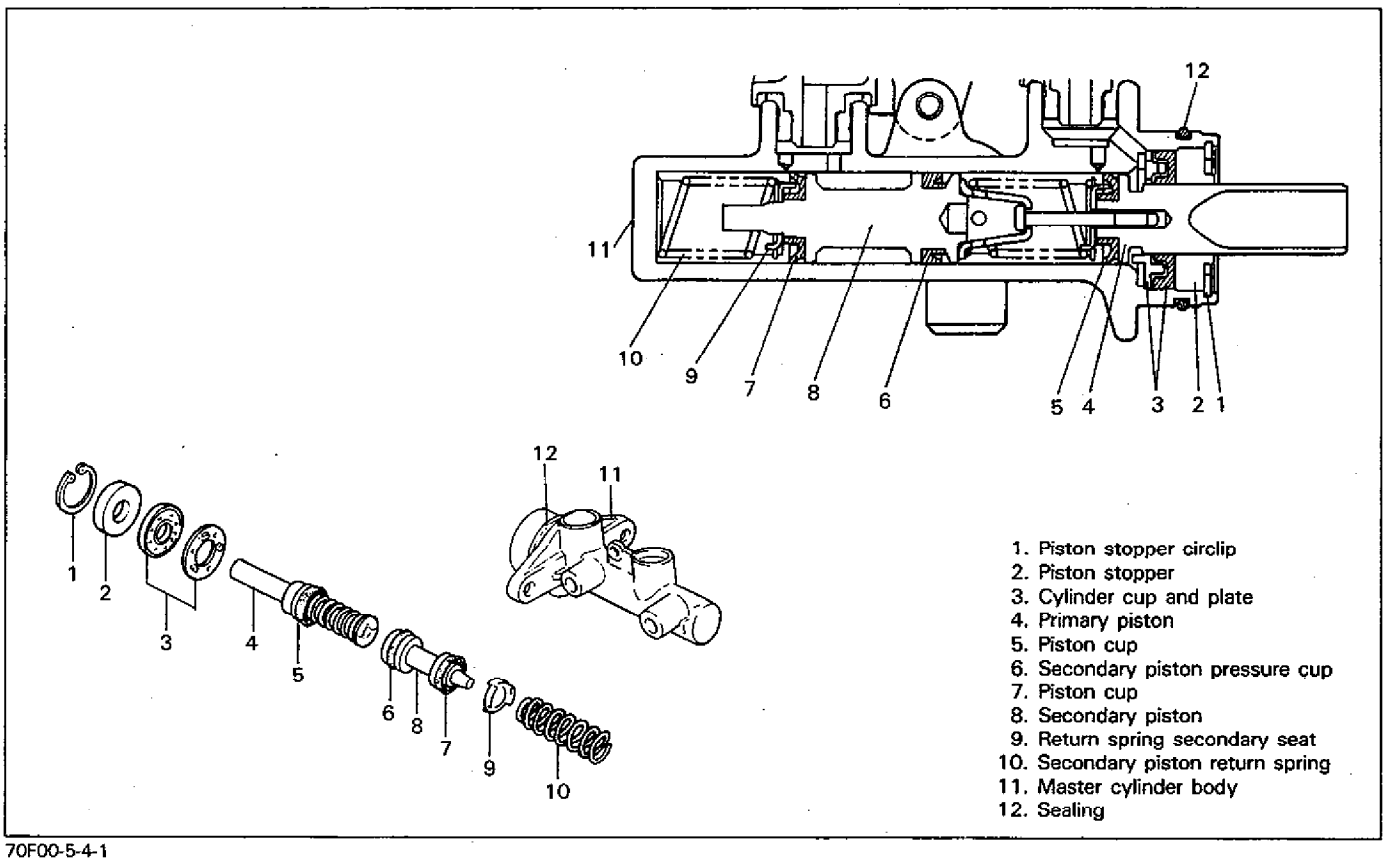


1. Brake back plate
2. Brake shoe
3. Parking brake shoe lever
4. Brake strut
5. Quadrant spring
6. Shoe return spring
7. Antirattle spring
8. Shoe hold down spring
9. Shoe hold down pin
10. Seat
11. Lever nut
12. Wheel cylinder
13. Bleeder plug cap
14. Back plate plug
15. Rubber plug

70F00-5-3-2

MASTER CYLINDER ASSEMBLY

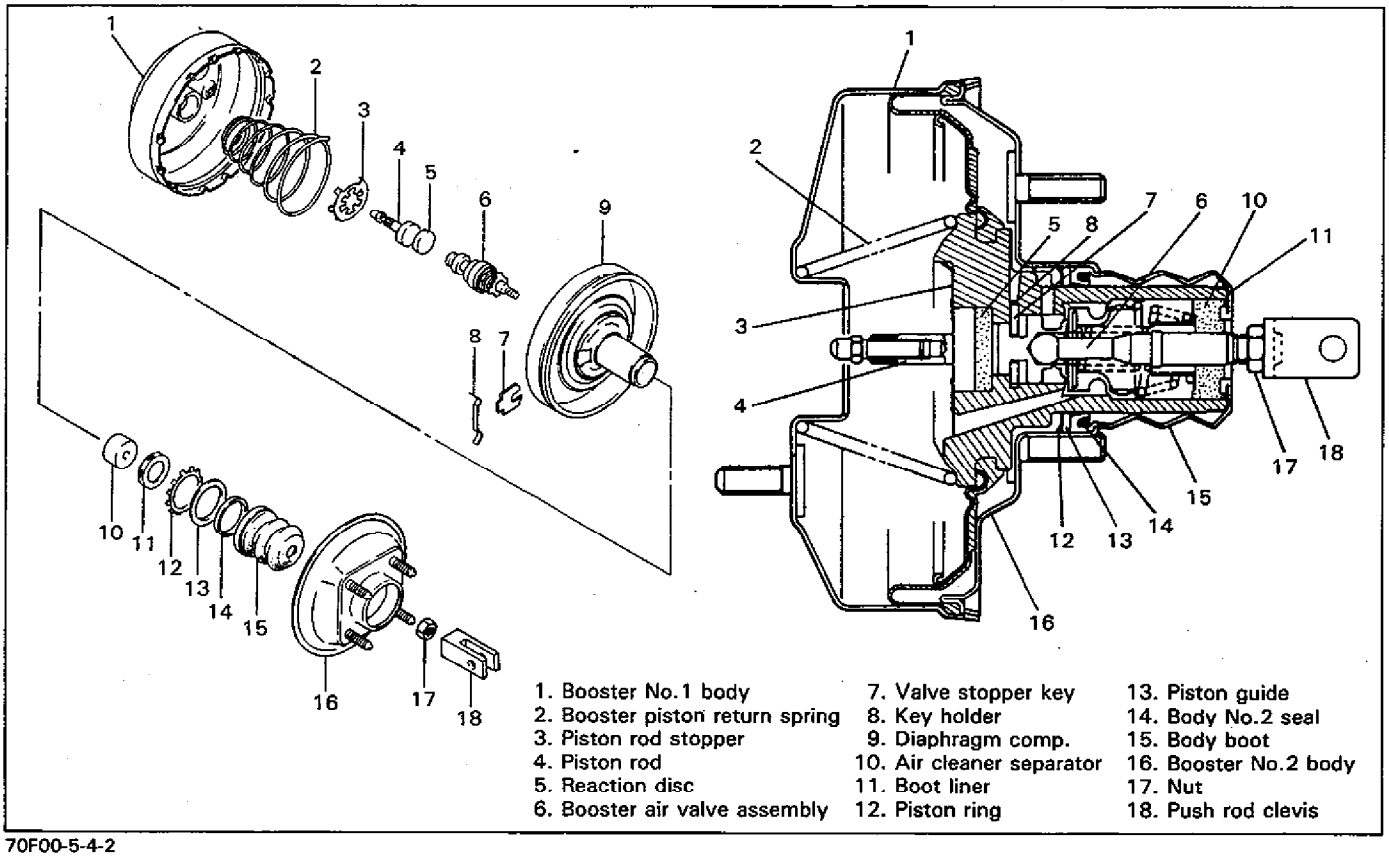
Shown in the figure below are components of the master cylinder.



70F00-5-4-1

BOOSTER ASSEMBLY

Shown in the figure below are components of the booster.



70F00-5-4-2

DIAGNOSIS

ROAD TESTING BRAKES

Brakes should be tested on dry, clean, smooth and reasonably level roadway which is not crowned. Road test brakes by making brake applications with both light and heavy pedal forces at various speeds to determine if the vehicle stops evenly and effectively.

Also drive vehicle to see if it leads to one side or the other without brake application. If it does, check the tire pressure, front end alignment and front suspension attachments for looseness. See diagnosis chart for other causes.

BRAKE FLUID LEAKS

Check the master cylinder fluid levels. While a slight drop in reservoir level does result from normal lining wear, an abnormally low level indicates a leak in the system. In such a case, check the entire brake system for leakage. If even a slight evidence of leakage is noted, the cause should be corrected or defective parts should be replaced.

70F00-5-5-1

SUBSTANDARD OR CONTAMINATED BRAKE FLUID

Improper brake fluid, mineral oil or water in the fluid may cause the brake fluid to boil or the rubber components in the hydraulic system to deteriorate.

If deterioration of rubber is evident, disassemble all hydraulic parts and wash with alcohol. Dry these parts with compressed air before assembly to keep alcohol out of the system. Replace all rubber parts in the system, including hoses. Also, when working on the brake mechanisms, check for fluid on the linings. If excessive fluid is found, replace the pads.

If master cylinder piston seals are satisfactory, check for leakage or excessive heat conditions. If condition is not found, drain fluid, flush with brake fluid, refill and bleed system.

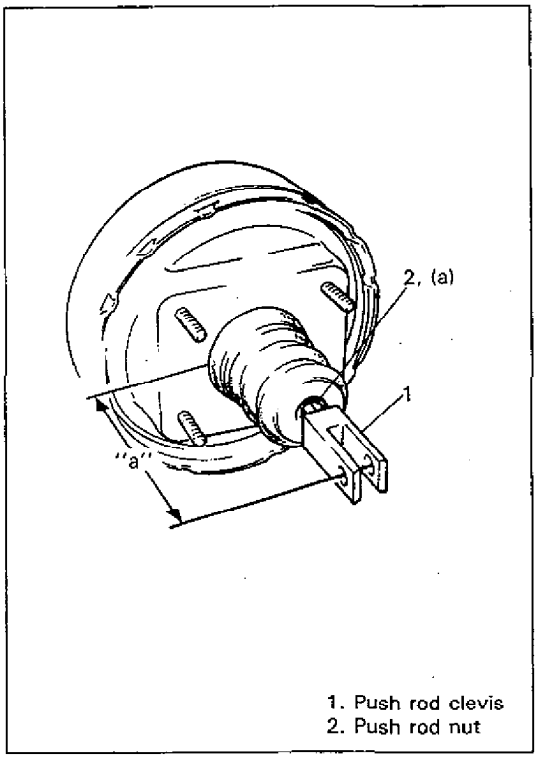
The system must be flushed if there is any doubt as to the grade of fluid in the system or if fluid has been used which contained parts that have been subjected to contaminated fluid.

BRAKE DIAGNOSIS CHART A		
Condition	**Possible Cause**	**Correction**
Not enough braking force	1. Brake oil leakage from brake lines.	Locate leaking point and repair.
	2. Brake disc or pads stained with oil.	Clean or replace.
	3. Overheated brakes.	Determine cause and repair.
	4. Poor contact of shoes on brake drum.	Repair for proper contact.
	5. Brake shoes linings stained with oil or wet with water.	Replace.
	6. Badly worn brake pad linings.	Replace.
	7. Defective wheel cylinders.	Repair or replace.
	8. Malfunctioning caliper assembly.	Repair or replace.
	9. Air in system.	Bleed system.
Brake pull (Brakes not working in unison)	1. Shoe linings are wet with water or stained with oil in some brakes.	Replace.
	2. Drum-to-shoe clearance out of adjusment in some brakes. (Malfunctioning auto adjusting mechanism)	Check for inoperative auto adjusting mechanism.
	3. Drum is out of round in some brakes.	Replace.
	4. Wheel tires are inflated unequally.	Inflate equally.
	5. Malfunctioning wheel cylinders.	Repair or replace.
	6. Disturbed front end alignment.	Adjust as prescribed.
	7. Unmatched tires on same axle.	Tires with approximately the same amount of tread should be used on the same axle.
	8. Restricated brake pipes or flexible hoses.	Check for soft flexible hoses and damaged lines. Replace with new flexible hoses and new double-walled steel brake piping.
	9. Malfunctioning caliper assembly.	Check for stuck or sluggish pistons and proper lubrication of caliper slide bush. Caliper should slide.
	10. Loose suspension parts.	Check all suspension mountings.
	11. Loose calipers.	Check and torque bolts to specifications.
Noise (high pitched squeak without brake applied)	1. Front lining worn out.	Replace linings.

70F00-5-6-1

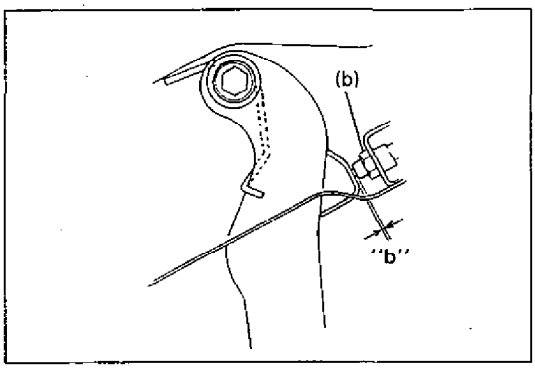
BRAKE DIAGNOSIS CHART B

Condition	Possible cause	Correction
Excessive pedal travel (Pedal stroke too large)	1. Partial brake system failure.	Check brake systems and repair as necessary.
	2. Insufficient fluid in master cylinder reservoirs.	Fill reservoirs with approved brake fluid. Check for leaks and air in brake systems. Check warning light. Bleed system if required
	3. Air in system. (pedal soft/spongy).	Bleed system.
	4. Rear brake system not adjusted (malfunctioning auto adjusting mechanism).	Repair auto adjusting mechanism. Adjust rear brakes.
	5. Bent brake shoes.	Replace brake shoes.
	6. Worn rear brake shoes.	Replace brake shoes.
Dragging brakes (A very light drag is present in all disc brakes immediately after pedal is released)	1. Master cylinder pistons not returning correctly.	Repair master cylinder.
	2. Restricted brake pipes or flexible hoses.	Check for soft flexible hoses or damaged pipes and replace with new flexible hoses and/or new double-walled steel brake piping.
	3. Incorrect parking brake adjustment on rear brakes.	Check and adjust to correct specifications.
	4. Weakended or broken return springs in the brake.	Replace.
	5. Sluggish parking-brake cables or linkage.	Repair or replace.
	6. Wheel cylinder or caliper piston sticking.	Repair as necessary.
Pedal pulsation (Pedal pulsates when depressed for braking.)	1. Damaged or loose wheel bearings.	Replace wheel bearings.
	2. Distorted steering knuckle or rear axle.	Replace knuckle or rear axle.
	3. Excessive disc lateral runout.	Check per instructions. If not within specifications, replace or machine the disc.
	4. Parallelism not within specifications.	Check per instructions. If not within specifications, replace or machine the disc.
	5. Rear drums out of round.	Check runout. Repair or replace drum as necessary.
Braking noise	1. Glazed shoe linings, or foreign matters stuck to linings.	Repair or replace shoe linings.
	2. Worn or distorted shoe linings.	Replace shoe linings (or pads).
	3. Loose front wheel bearings.	Replace wheel bearing.
	4. Distorted backing plates or loose mounting bolts.	Replace or retighten securing bolts.

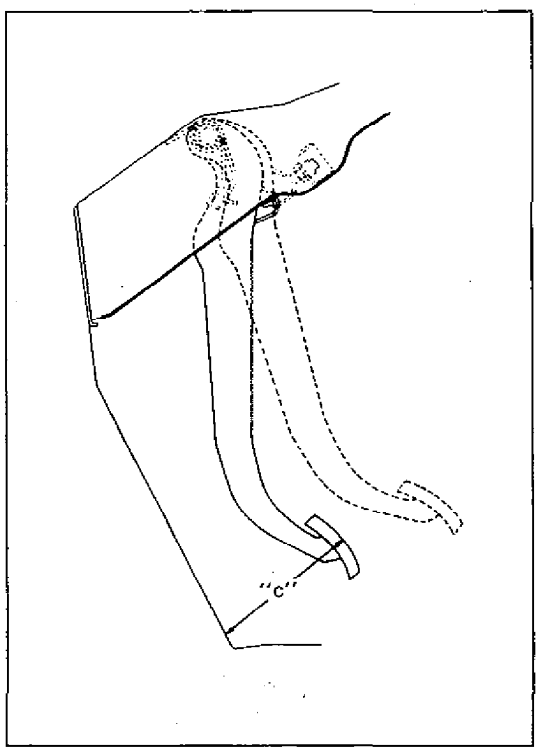


1. Push rod clevis
2. Push rod nut

70F00-5-8-1



70F00-5-8-3



70F00-5-8-4

ON-VEHICLE SERVICE

1. BRAKE PEDAL FREE HEIGHT ADJUSTMENT

For right-hand steering vehicle:
Height of brake pedal is normal if it is about 20 mm (0.8 in.) lower than clutch pedal.
For left-hand steering vehicle:
Height of brake pedal is normal if it is about 13 mm (0.5 in.) lower than clutch pedal.

1) When booster push rod clevis has been reinstalled, it is important that measurement between booster mounting surface and center of clevis pin hole is adjusted.

   Length "a": 95.5—96.5 mm (3.76—3.80 in.)

   Tightening Torque
   (a): 12—16 N·m (1.2—1.6 kg-m, 9.0—11.5 lb-ft)

2) When stop light switch has been removed, refer to the following STOP LIGHT SWITCH ADJUSTMENT for proper installation.
   Services in above steps 1) and 2) may affect brake pedal height.

2. STOP LIGHT SWITCH ADJUSTMENT

Adjustment should be made as follows when installing switch. Pull up brake pedal toward you and while holding it there, adjust switch position so that clearance between end of thread and brake pedal return cushion (shown as "b" in figure) is specified. Then tighten lock nut to specified torque.

Clearance "b" : 1.5—2.0 mm (0.04—0.07 in.)

Tightening Torque
(b): 6—9 N·m (0.6—0.9 kg-m, 4.5—6.5 lb-ft)

3. EXCESSIVE PEDAL TRAVEL CHECK

1) Start engine.
2) Depress brake pedal a few times.
3) With brake pedal depressed with approximately 30 kg (66 lbs) load, measure pedal arm to wall clearance "c". It mustn't be less than 90 mm (3.55 in.).

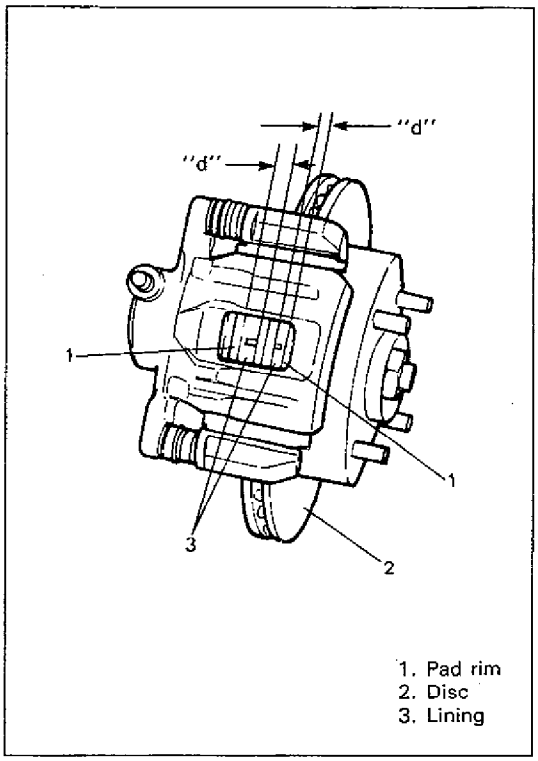
   Clearance "c": 90 mm (3.55 in.)

4) If clearance "c" is less than 90 mm (3.55 in.), the most possible cause is either rear brake shoes are worn out beyond limit or air is in lines.
   Should clearance "c" remain less than 90 mm (3.55 in.) even after replacement of brake shoes and bleeding of system, other possible but infrequent cause is malfunction of rear brake shoe adjusters or booster push rod length out of adjustment for the vehicle with brake booster.
   • See page 5-12 for bleeding brake system.

4. FRONT BRAKE DISC INSPECTION

Refer to page 5-27 of this section for inspection point and procedure.

70F00-5-9-1



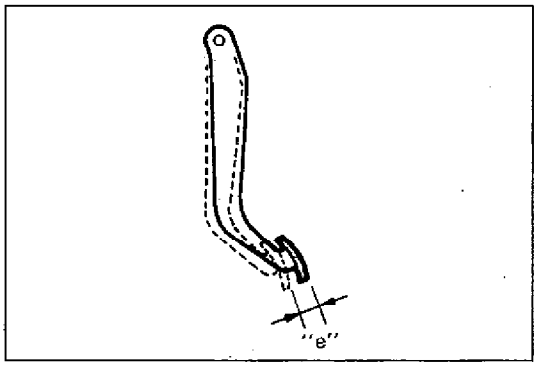
1. Pad rim
2. Disc
3. Lining

5. FRONT BRAKE PAD LINING INSPECTION

Inspect pad linings periodically according to maintenance schedule whenever wheels are removed (for tire rotation or other reason). Take a look through each end (or hole) of caliper and check lining thickness of outside and inside pads.
If lining is worn and its thickness ("d" in figure) is less than value below, all pads must be replaced at the same time.

Thickness "d": Service limit
For ventilated disc type: 3 mm (0.12 in.)
For solid disc type : 1 mm (0.04 in.)

70F00-5-9-2

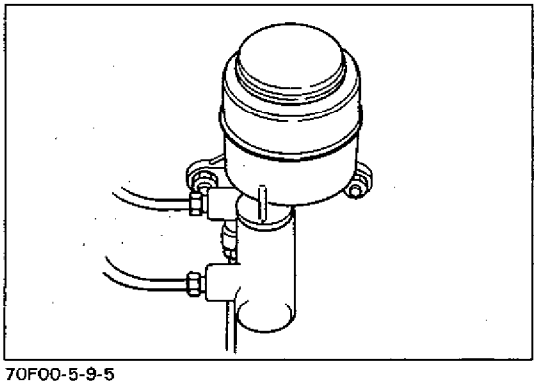


6. BRAKE PEDAL PLAY INSPECTION

Pedal play should be within specification below.
If out of specification, check stop light switch for proper installation position and adjust if necessary.
Also check pedal shaft bolt and master cylinder pin installation for looseness and replace if defective.

Pedal play "e": 1—8 mm (0.04—0.31 in.)

70F00-5-9-4



7. MASTER CYLINDER INSPECTION

Check for a cracked master cylinder casting or brake fluid around the master cylinder. Leaks are indicated only if there is at least a drop of fluid. A damp condition is not abnormal.

70F00-5-9-5

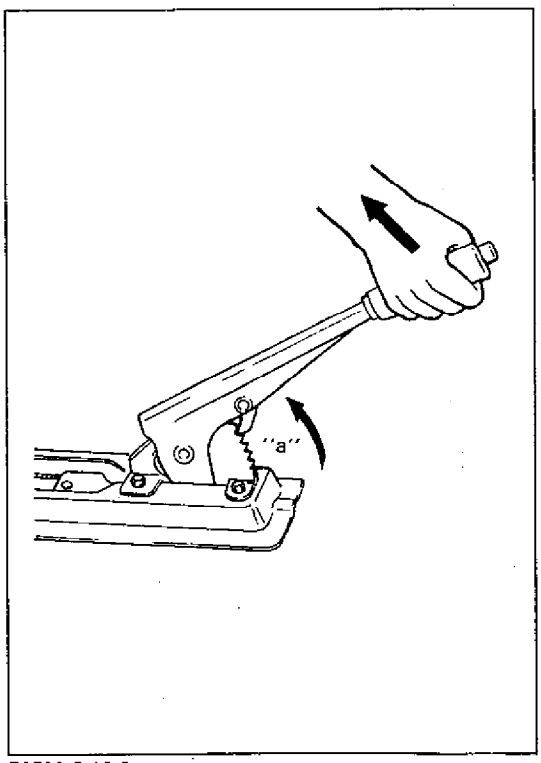
8. REAR DRUM BRAKE SHOE ADJUSTMENT

Rear brake has self-adjusting mechanism but it does require adjustment for proper drum to shoe clearance when brake shoe has been replaced or brake drum has been removed for some other service.

Adjustment is automatically accomplished by depressing brake pedal 3 to 5 times with approximately 30 kg (66 lbs) load after all parts are installed.

Then check brake drum for dragging and brake system for proper performance. After lowering vehicle from hoist, brake test should be performed.

70F00-5-10-1



70F00-5-10-3

9. PARKING BRAKE INSPECTION AND ADJUSTMENT

a) Inspection

Hold center of parking brake lever grip and pull it up with 20 to 25 kg (44 to 55 lbs) force.

With parking brake lever pulled up as above, count ratchet notches in "a" as shown in figure.

Parking brake lever stroke

"a": 3—8 notches

Also, check if both right and left rear wheels are locked firmly.

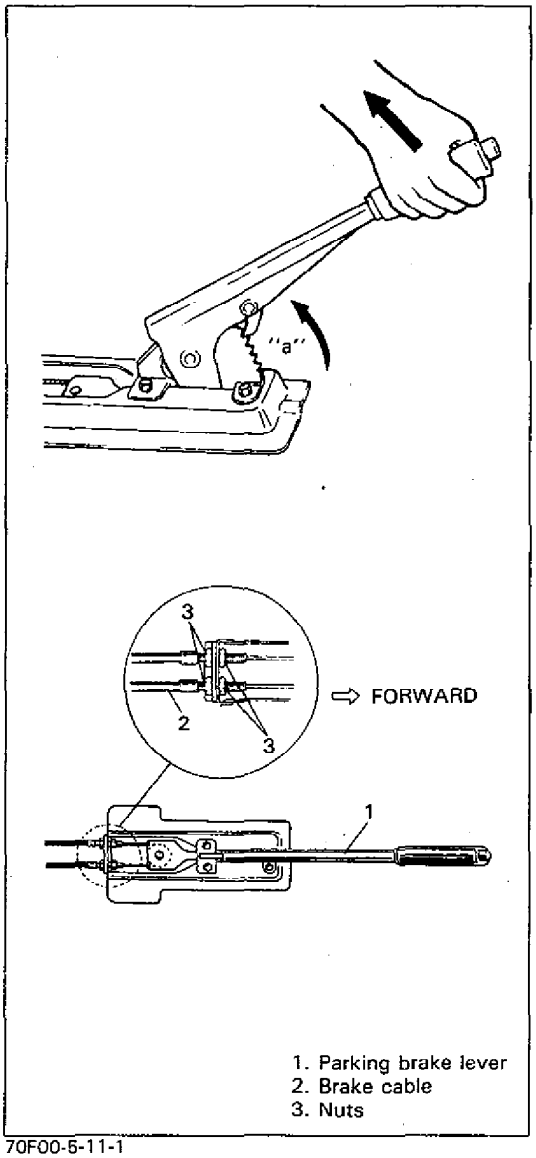
To count number of notches easily, listen to click sounds that ratchet makes while pulling parking brake lever without pressing its button.

One click sound corresponds to one notch.

If number of notches is out of specification, adjust cable by referring to adjustment procedure described on the following step b) so as to obtain specified parking brake stroke.

NOTE:

Check tooth tip of each notch for damage or wear. If any damage or wear is found, replace parking brake lever.



1. Parking brake lever
2. Brake cable
3. Nuts

70F00-5-11-1

b) Adjustment

NOTE:
Make sure for following conditions before cable adjustment.

1) **No air is trapped in brake system.**
2) **Brake pedal has been depressed a few times with about 30 kg (66 lbs) load.**
3) **Rear brake shoes are not worn beyond limit, and self adjusting mechanism operates properly.**
4) **Brake pedal travel is proper.**
5) **Parking brake lever has been pulled up a few times with about 20 kg force.**

Adjust parking brake lever stroke by loosening locking nuts indicated in figure at left.
Right and left outer cables should be adjusted equal.

NOTE:
Check brake drum for dragging after adjustment.

Parking brake lever stroke
"a": 3—8 notches (when lever is pulled up at 20—25 kg (44—55 lbs))

10. FLUSHING BRAKE HYDRAULIC SYSTEM

It is recommended that entire hydraulic system be thoroughly flushed with clean brake fluid whenever new parts are installed in hydraulic system.
Periodical change of brake fluid is also recommended.

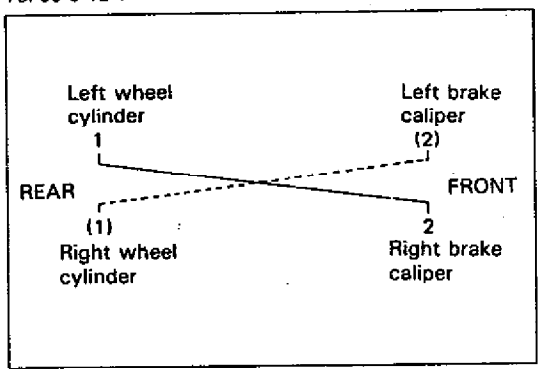
70F00-5-11-4

11. BLEEDING BRAKES

CAUTION:
Brake fluid is extremely damaging to paint. If fluid should accidentally touch painted surface, immediately wipe fluid from paint and clean painted surface.

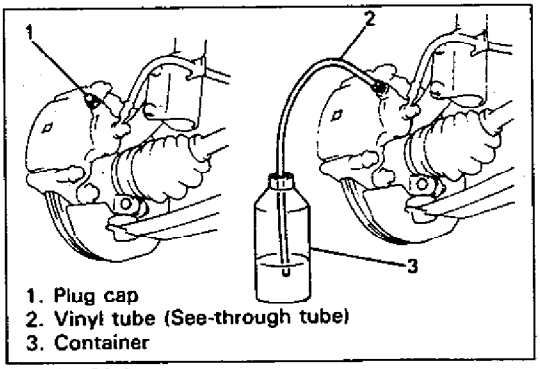
Bleeding operation is necessary to remove air whenever it entered hydraulic brake system.
Hydraulic lines of brake system are based on the diagonal split system. When a brake pipe or hose was disconnected at the wheel, bleeding operation must be performed at both ends of the line of the removed pipe or hose. When any joint part of the master cylinder or other joint part between the master cylinder and each brake (wheel) was removed, the hydraulic brake system must be bled at all 4 wheel brakes.

70F00-5-12-1



NOTE:
Perform bleeding operation starting with wheel cylinder farthest from master cylinder and then at front caliper of the same brake line. Do the same on the other brake line.

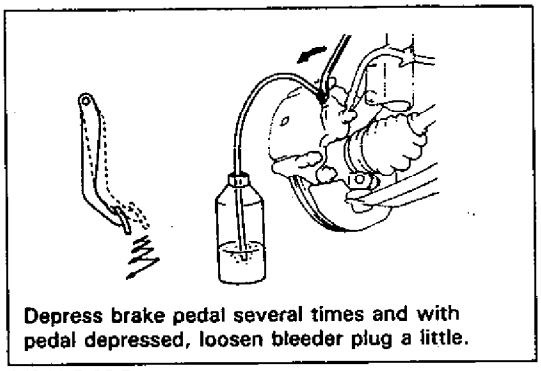
70F00-5-12-3



1. Plug cap
2. Vinyl tube (See-through tube)
3. Container

64B40-5-20-4

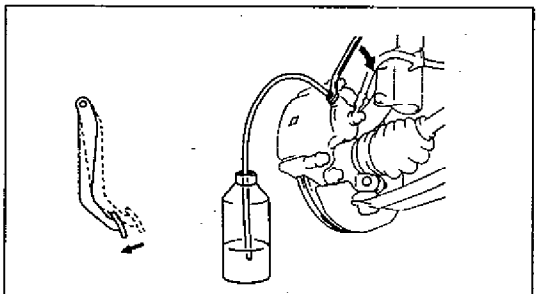
1) Fill master cylinder reservoir with brake fluid and keep at least one-half full of fluid during bleeding operation.
2) Remove bleeder plug cap.
   Attach a vinyl tube to bleeder plug of wheel cylinder, and insert the other end into container.



Depress brake pedal several times and with pedal depressed, loosen bleeder plug a little.

64B40-5-20-5

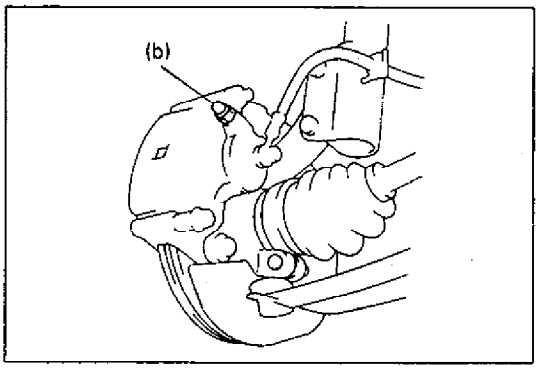
3) Depress brake pedal several times, and then while holding it depressed, loosen bleeder plug about one-third to one-half turn.



With brake pedal depressed, retighten bleeder plug.

64B40-5-21-1

4) When fluid pressure in the cylinder is almost depleted, retighten bleeder plug.
5) Repeat this operation until there are no more air bubbles in hydraulic line.

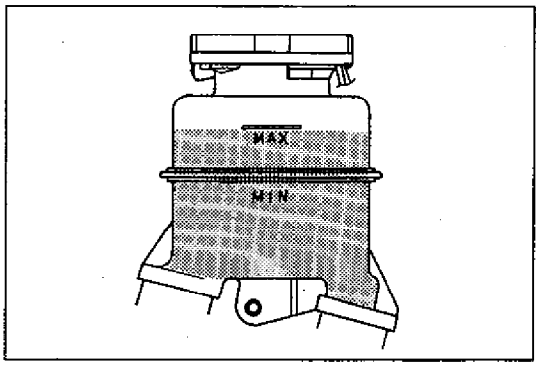


64B40-5-21-2

6) When bubbles stop, depress and hold brake pedal and tighten bleeder plug.

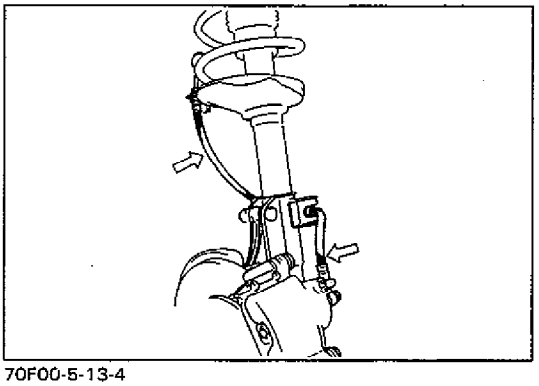
Tightening Torque
(b): 7—10 N·m (0.7—1.0 kg-m, 5.5—7.0 lb-ft)

7) Then attach bleeder plug cap.
8) After completing bleeding operation, apply fluid pressure to pipe line and check for leakage.



70F00-5-13-3

9) Replenish fluid into reservoir up to specified level.
10) Check brake pedal for "sponginess". If found spongy, repeat entire procedure of bleeding.

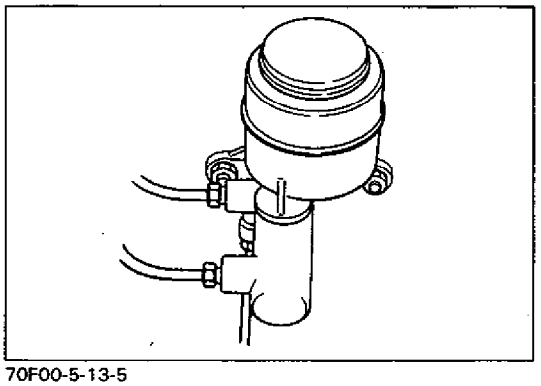


70F00-5-13-4

12. BRAKE FLEXIBLE HOSE AND PIPE INSPECTION

FLEXIBLE HOSE

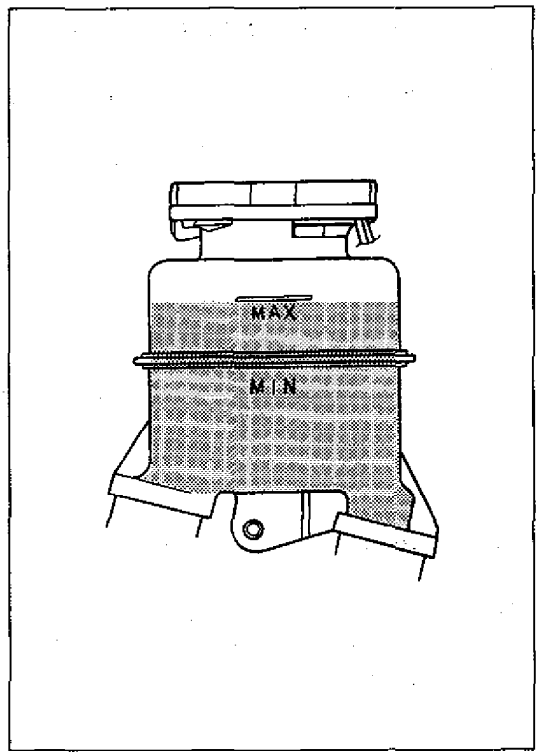
The brake flexible hose assembly should be checked for road hazard damage, for cracks and chafing of the outer cover, for leaks and blisters. A light and mirror may be needed for an adequate inspection. If any of the above conditions are observed on the brake flexible hose, it is necessary to replace it.



70F00-5-13-5

PIPE

Inspect the pipe for damage, cracks, dents and corrosion. If any defect is found, replace it.

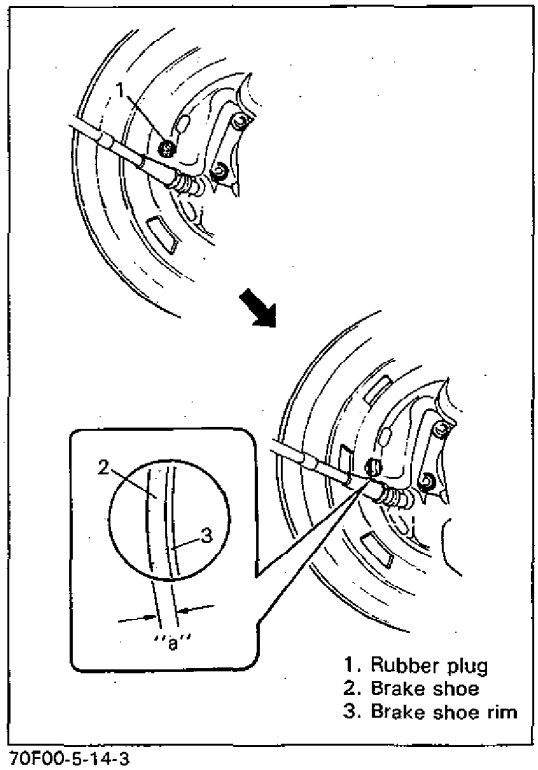


70F00-5-14-1

13. BRAKE FLUID LEVEL INSPECTION

Be sure to use particular brake fluid either as indicated on reservoir cap of that vehicle or recommended in owner's manual which comes along with that vehicle.
Use of any other fluid is strictly prohibited.
Fluid level should be between MIN and MAX lines marked on reservoir.
When warning light lights sometimes during driving, replenish fluid to MAX line.
When fluid decreases quickly, inspect brake system for leakage. Correct leaky points and then refill to specified level.

CAUTION:
Do not use shock absorber fluid or any other fluid which contains mineral oil. Do not use a container which has been used for mineral oil or a container which is wet from water. Mineral oil will cause swelling and distortion of rubber parts in hydraulic brake system and water mixed into brake fluid will lower fluid boiling point. Keep all fluid containers capped to prevent contamination.



70F00-5-14-3

14. REAR BRAKE SHOE INSPECTION

Inspection should be carried out on following points after brake pedal travel "c" (pedal arm to wall clearance) check as described in Item 3 on page 5-8 of this section, even when it is more than 90 mm (3.55 in.).
Amount of brake shoe wear can be checked as follows.
1) Hoist vehicle.
2) Remove rubber plug from brake back plate.
3) Through hole of back plate, visually check for thickness of brake shoe lining. If lining thickness "a" is found less than specified wear limit, replace with new brake shoes.

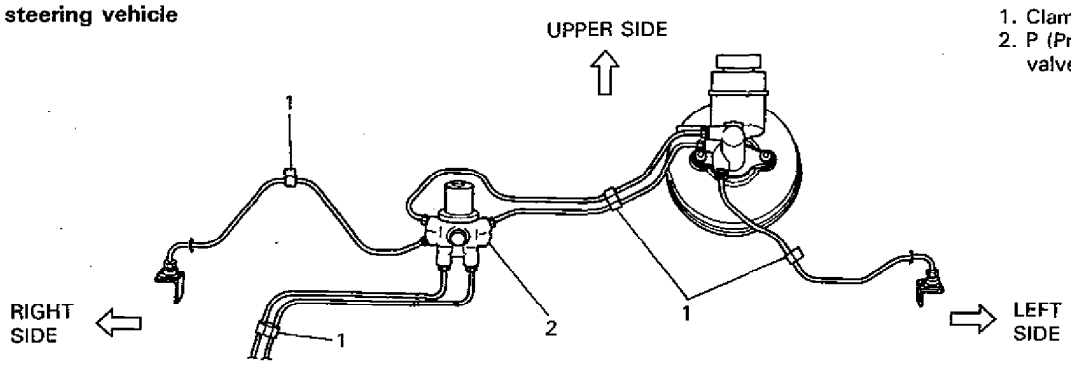
Brake shoe lining thickness "a"
Wear limit: 1.0 mm (0.039 in.)

BRAKE HOSE/PIPE R & I

1. REMOVE AND INSTALL FRONT BRAKE HOSE/PIPE

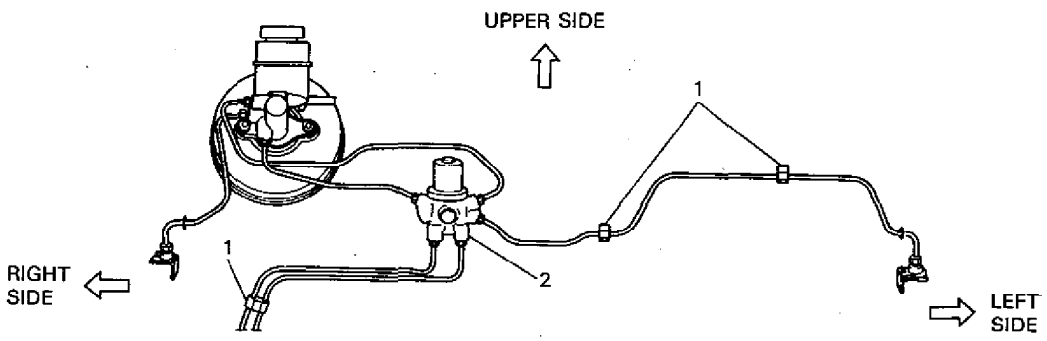
1) Raise and support vehicle properly. Remove tire and wheel.
   This operation is not necessary when removing pipes connecting master cylinder and P valve.
2) Clean dirt and foreign material from both flexible hose end and pipe end fittings. Remove brake flexible hose or pipe.
3) Reverse brake flexible hose installation procedure.
   For installation, make sure that steering wheel is in straightforward position and flexible hose has no twist or kink. Check to make sure that flexible hose doesn't contact any part of suspension, both in extreme right and extreme left turn conditions. If it does at any point, remove and correct. Fill and maintain brake fluid level in reservoir. Bleed brake system.
4) Perform brake test and check installed part for fluid leakage.

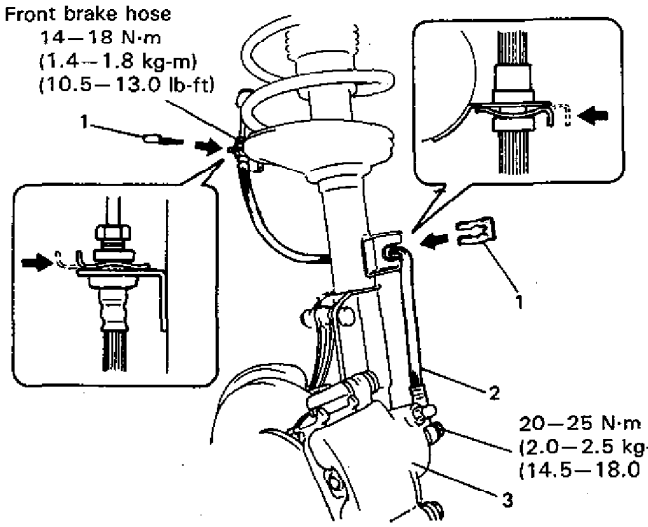
Right-hand steering vehicle



1. Clamp
2. P (Proportioning) valve

Left-hand steering vehicle





Tightening torque for	N·m	kg-m	lb-ft
brake pipe flare nuts	14—18	1.4—1.8	10.5—13.0
Tightening torque for P valve bolt	8—12	0.8—1.2	6.0—8.5

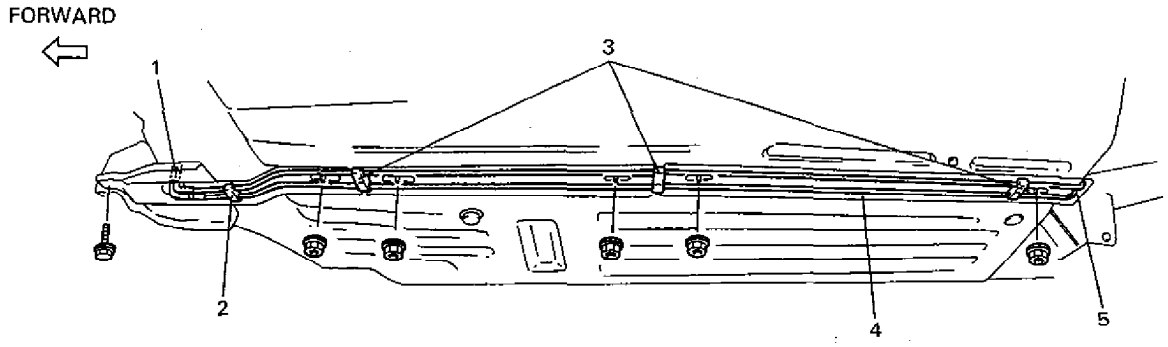
1. E-ring
2. Flexible hose
3. Brake caliper

2. REMOVE AND INSTALL REAR BRAKE HOSE/PIPE

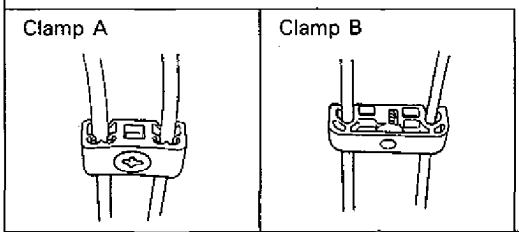
1) Raise and support vehicle properly. Remove tire and wheel.
2) Clean dirt and foreign material from both flexible hose end and pipe end fittings. Remove brake flexible hose or pipe.
3) Reverse brake flexible hose installation procedure. Fill and maintain brake fluid level in reservoir. Bleed brake system.
4) Perform brake test and check each installed part for fluid leakage.

PRECAUTION FOR INSTALLATION

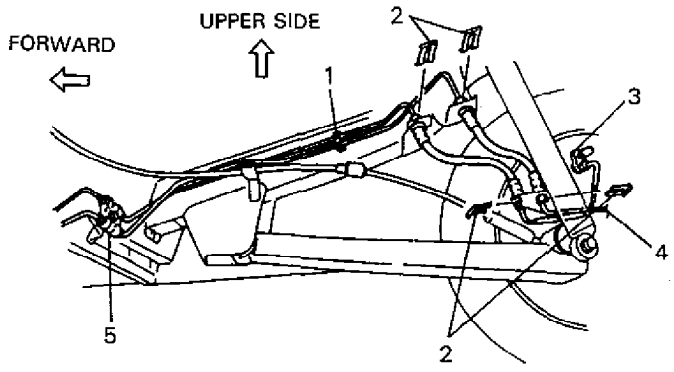
- Never reuse protector nut once removed. Be sure to use a new one.
- Install clamps properly referring to figure below and tighten bolts.
- When installing hose, make sure that it has no twist or kink.



1. To P valve
2. Clamp A
3. Clamp B
4. Protector
5. To 4-way joint

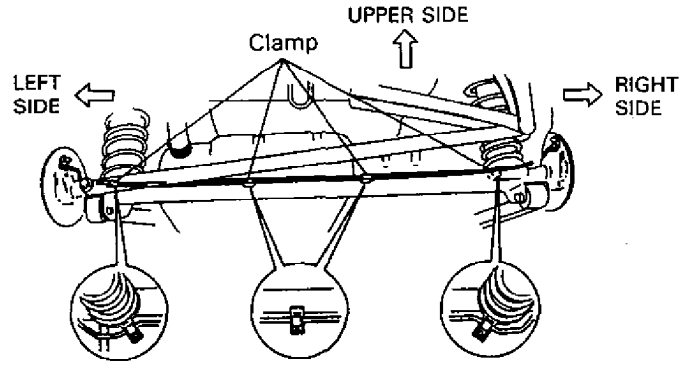


NOTE:
- **To remove brake pipe as indicated in figure, disconnect its front side at P valve and rear side at 4-way joint. Then, remove it together with clamps from vehicle body.**
- **Removed clamp B should be replaced with new one.**



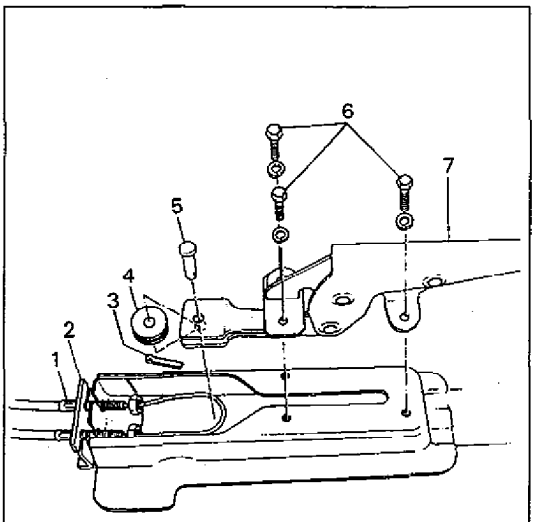
1. Clamp
2. E-ring
3. Right side wheel cylinder
4. To left side wheel cylinder
5. 4-way valve

Tightening torque for 4-way valve bolt	N·m	kg-m	lb-ft
	8—12	0.8—1.2	6.0—8.5



Tightening torque for brake flare nut	N·m	kg-m	lb-ft
	14—18	1.4—1.8	10.5—13.0

PARKING BRAKE LEVER/CABLE R & I



70F00-5-17-1

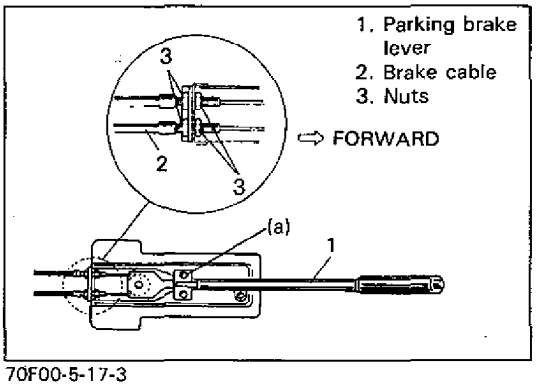
1. REMOVE AND INSTALL PARKING BRAKE LEVER

REMOVAL

1) Remove parking brake lever cover.
2) Remove driver's seat and rear seat cushion.
3) Pull off rear floor mat.
4) Disconnect lead wire of parking brake switch at coupler.

NOTE:
Don't disassemble parking brake lever switch. It must be removed and installed as a complete switch assembly.

5) Loosen parking brake cable locking nuts.
6) Remove parking brake lever bolts.
7) Remove split pin and cable pulley from parking brake lever body, and brake lever assembly from cable.



70F00-5-17-3

INSTALLATION

1) Install in reverse order of steps 2) to 7) of REMOVAL.

Tightening Torque
(a): 4—7 N·m (0.4—0.7 kg-m, 3.0—5.0 lb-ft)

2) Adjust parking brake lever. Refer to PARKING BRAKE INSPECTION AND ADJUSTMENT in this section.
3) Check rear brakes for dragging and brake system for proper performance.
4) Install parking brake lever cover.

2. REMOVE AND INSTALL PARKING BRAKE CABLE

REMOVAL

1) Remove brake drum. (Refer to steps 1) to 7) of BRAKE DRUM REMOVAL of this section.

70F00-5-17-4

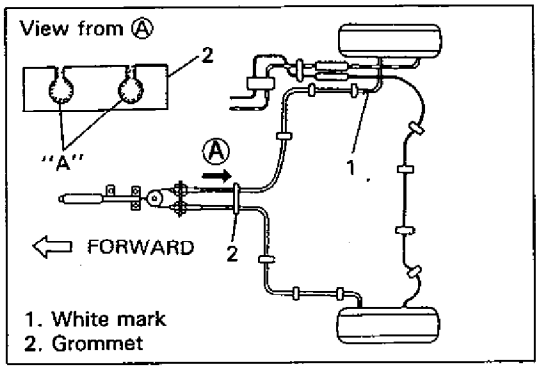
2) Disconnect parking brake cable from brake shoe lever. (Refer to steps 2) & 5) of BRAKE SHOE REMOVAL of this section.)
3) Disconnect brake cable from brake back plate. (Refer to step 4) of BRAKE BACK PLATE REMOVAL section.)

NOTE:
When it is necessary to remove both right and left parking brake cable, repeat above steps 1) to 3) on right and left wheels.

70F00-5-17-5

4) Remove cable from parking brake lever. (Refer to steps 1) to 7) of PARKING BRAKE LEVER REMOVAL.)
5) Remove cable from vehicle body.

70F00-5-18-1



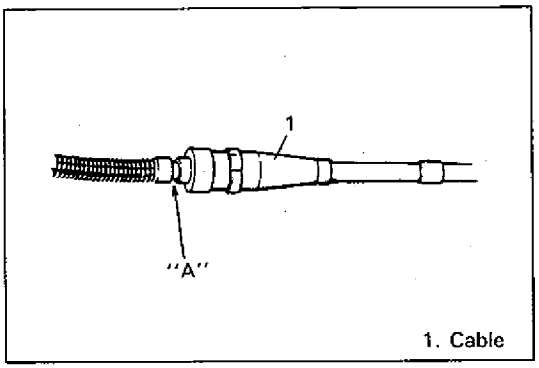
INSTALLATION

1) Apply sealant to inside of grommet at indicated position in figure.

"A": Sealant 99000-31090

2) Install parking brake cable so that its white marked side comes to the right.
3) Connect cable to parking brake lever. (Refer to step 1) of BRAKE LEVER INSTALLATION of this section, page 5-17.) Don't make lever adjustment at this point yet.

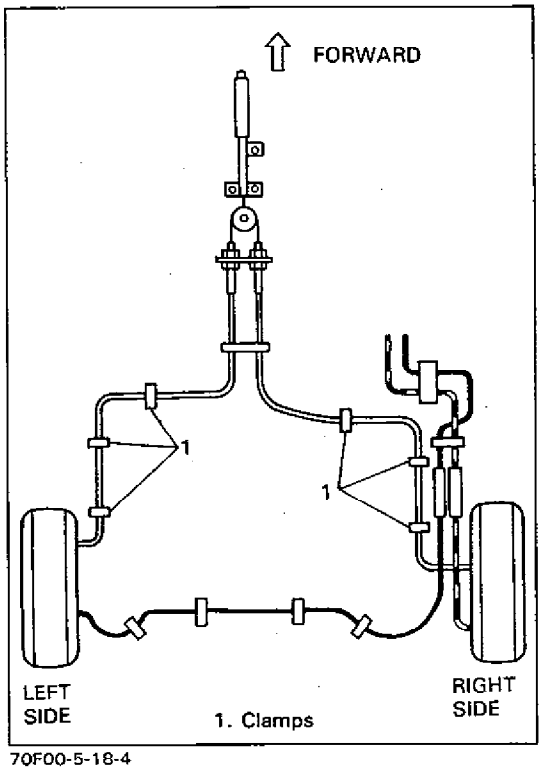
70F00-5-18-2



4) Apply water tight sealant "A" around cable at indicated position in figure and connect it to back plate with clip.

"A": Sealant 99000-31090

70F00-5-18-3

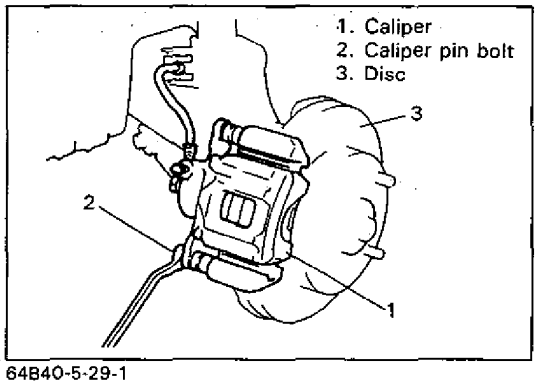


70F00-5-18-4

5) Connect cable to brake shoe lever and install brake shoes to back plate. (Refer to steps 1) to 2) of BRAKE SHOE INSTALLATION of this section.)
6) Install brake drum. (Refer to steps 1) to 6) of BRAKE DRUM INSTALLATION of this section.)

NOTE:
Above steps 3) to 5) must be performed on both right and left wheels.

7) Clamp cable securely referring to figure.
8) Upon completion of installation, adjust cable. (Refer to PARKING BRAKE INSPECTION AND ADJUSTMENT of this section, page 5-10.)
Then check brake drum for dragging and brake system for proper performance. After removing vehicle from hoist, brake test should be performed.



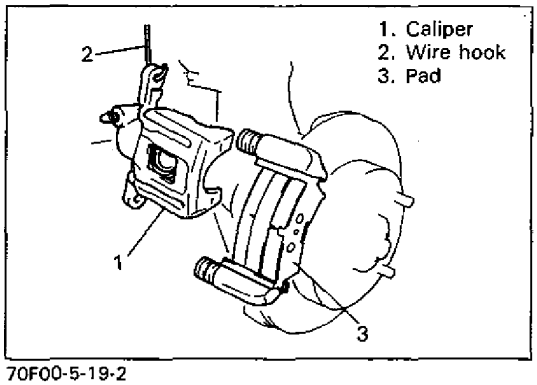
64B40-5-29-1

FRONT DISC BRAKE R & I

1. REMOVE AND INSTALL PAD (SHOE & LINING)

REMOVAL

1) Hoist vehicle and remove wheel.
2) Remove caliper pin bolts.

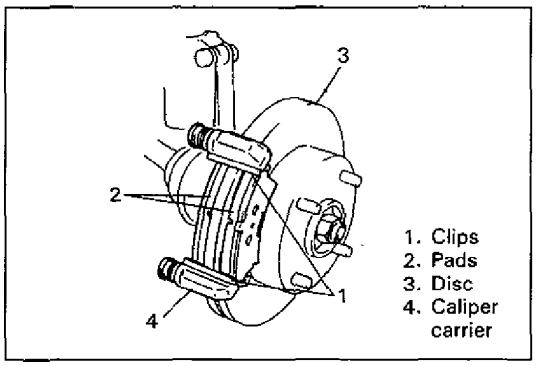


70F00-5-19-2

3) Remove caliper from caliper carrier.

NOTE:
Hang removed caliper with a wire hook or the like so as to prevent brake flexible hose from bending and twisting excessively or being pulled.
Don't operate brake pedal with pads removed.

4) Remove pads.

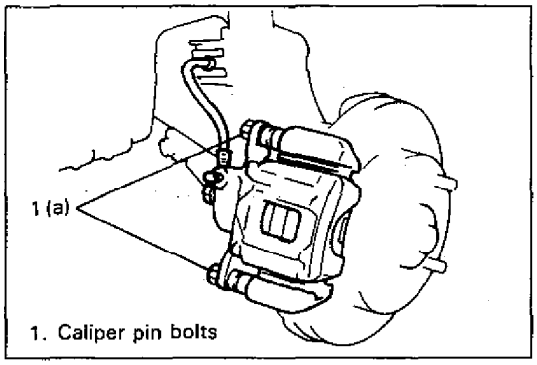


64B40-5-29-3

INSTALLATION

NOTE:
See NOTE at the beginning of this section.

1) Install pad clips and pads.

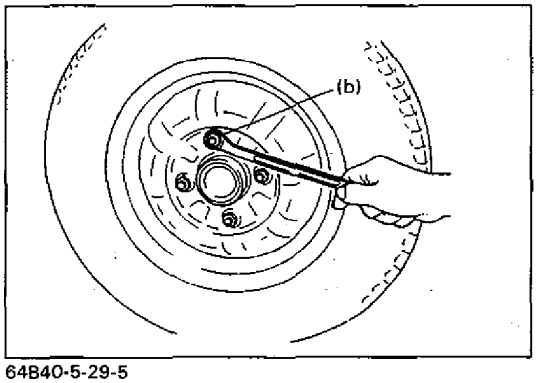


64B40-5-29-4

2) Install caliper and torque caliper pin bolts to specification.

NOTE:
Make sure that boots are fit into groove securely.

Tightening Torque
(a): 22—32 N·m (2.2—3.2 kg-m, 16.0—23.0 lb-ft)



64B40-5-29-5

3) Torque front wheel nuts to specification.

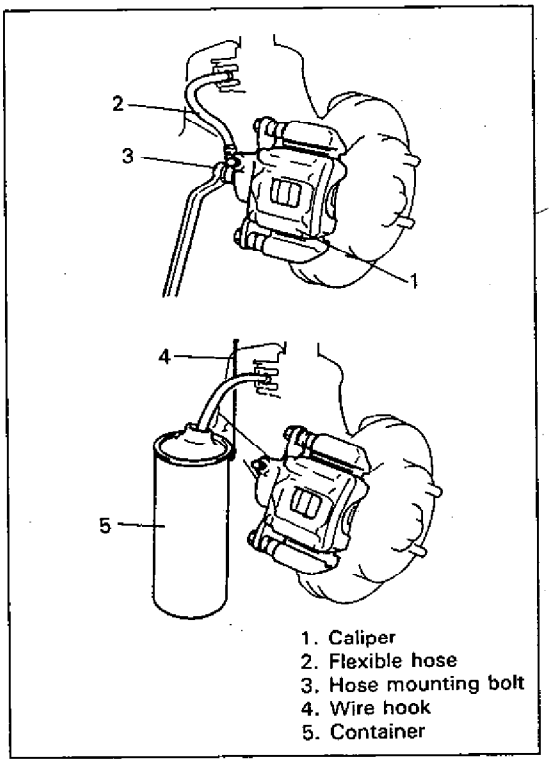
Tightening Torque
(b): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

4) Upon completion of installation, perform brake test.

2. REMOVE AND INSTALL CALIPER ASSEMBLY

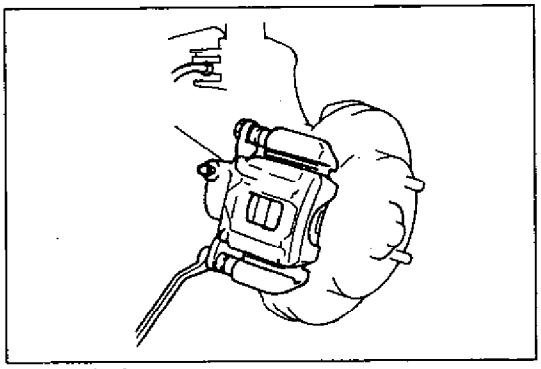
REMOVAL

1) Hoist vehicle and remove wheel.
2) Remove brake flexible hose mounting bolt from caliper. As this will allow fluid to flow out of flexible hose, have a container ready beforehand.



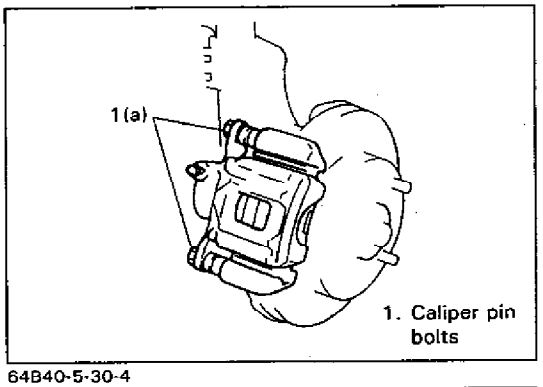
1. Caliper
2. Flexible hose
3. Hose mounting bolt
4. Wire hook
5. Container

70F00-5-20-1



64B40-5-30-3

3) Remove caliaper pin bolts.
4) Remove caliper from carrier.



1. Caliper pin bolts

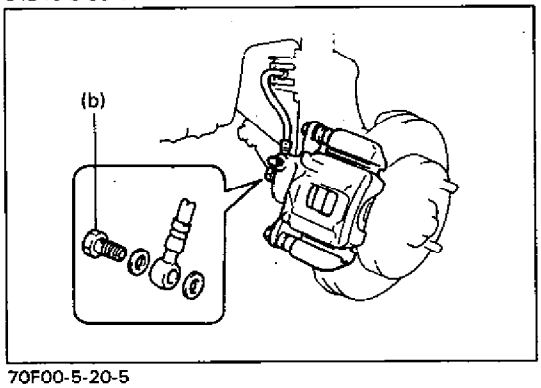
64B40-5-30-4

INSTALLATION

1) Install caliper to caliper carrier.
2) Torque caliper pin bolts to specification.

NOTE:
Make sure that boots are fit into groove securely.

Tightening Torque
(a): 22—32 N·m (2.2—3.2 kg-m, 16.0—23.0 lb-ft)

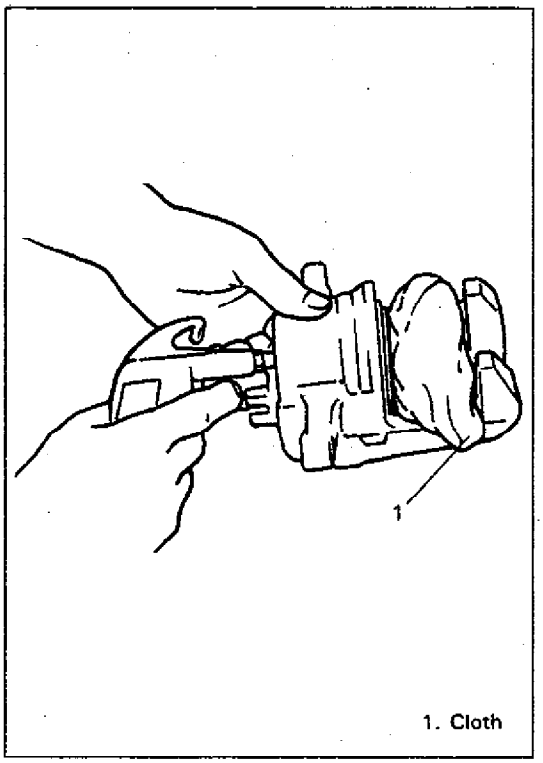


70F00-5-20-5

3) Install brake flexible hose as shown and torque hose mounting bolt to specification.

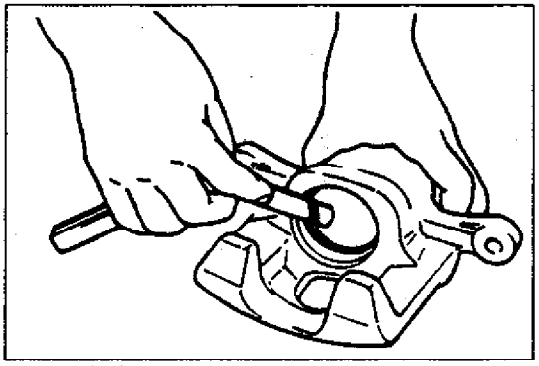
Tightening Torque
(b): 20—25 N·m (2.0—2.5 kg-m, 14.5—18.0 lb-ft)

4) Torque wheel nuts to specification.
5) After completing installation, fill reservoir with brake fluid and bleed brake system. Perform brake test and check each installed part for oil leakage.



1. Cloth

64B40-5-31-1



70F00-5-21-3

3. REMOVE AND INSTALL SEAL, PISTON, DUST BOOT AND BLEEDER SCREW

REMOVAL

Before disassembly, clean all around caliper with brake fluid.

1) Blow compressed air into cylinder through bolt hole where flexible hose was fitted. With this air pressure, piston can be pushed out of cylinder.

WARNING:
Do not apply too highly compressed air which will cause piston to jump out of cylinder. It should be taken out gradually with moderately compressed air. Do not place your fingers in front of piston when using compressed air.

2) Remove piston seal using a thin blade like a thickness gauge, etc.

CAUTION:
Be careful not to damage inside (bore side) of cylinder.

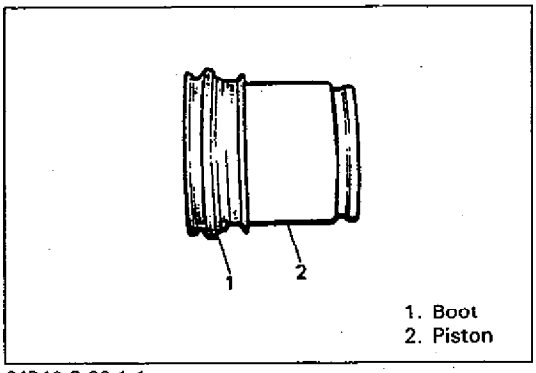
INSTALLATION

Reassemble front brake in reverse order of disassembly, noting the following points.

CAUTION:
- **Wash each part cleanly before installation in the same fluid as the one used in master cylinder reservoir.**
- **Never use other fluid or thinner.**
- **Before installing piston and piston seal to cylinder, apply fluid to them.**
- **After reassembling brake lines, bleed air from them.**

Piston Seal

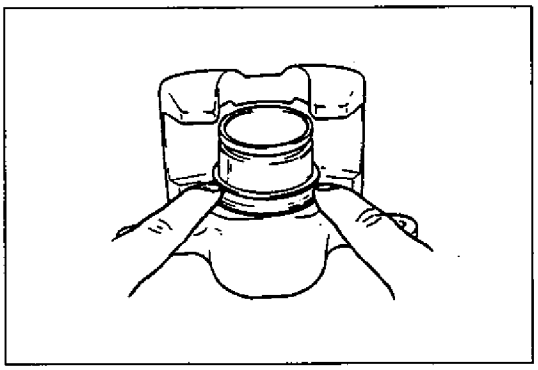
Piston seal is used to seal piston and cylinder and to adjust clearance between pad and disc. Replace with a new one at every overhaul. Fit piston seal into groove in cylinder taking care not to twist it.



64B40-5-32-1-1

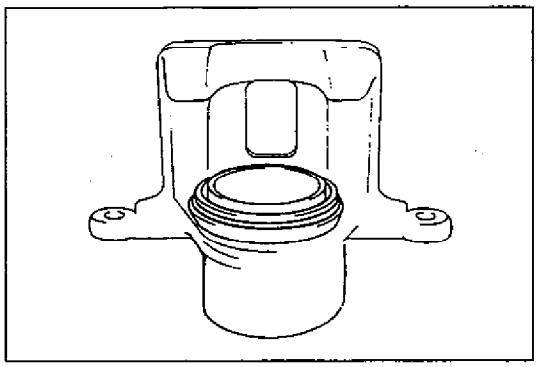
Piston and Boot

1) Before inserting piston into cylinder, install boot onto piston as shown.



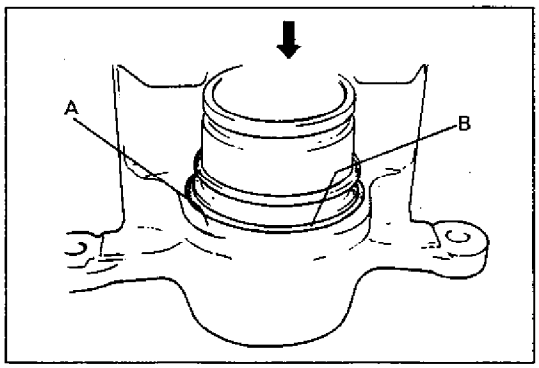
64B40-5-32-2

2) Fit boot as it is in figure into boot groove in cylinder with fingers.



64B40-5-32-3

3) Insert piston into cylinder by hand and fit boot in boot groove in piston.

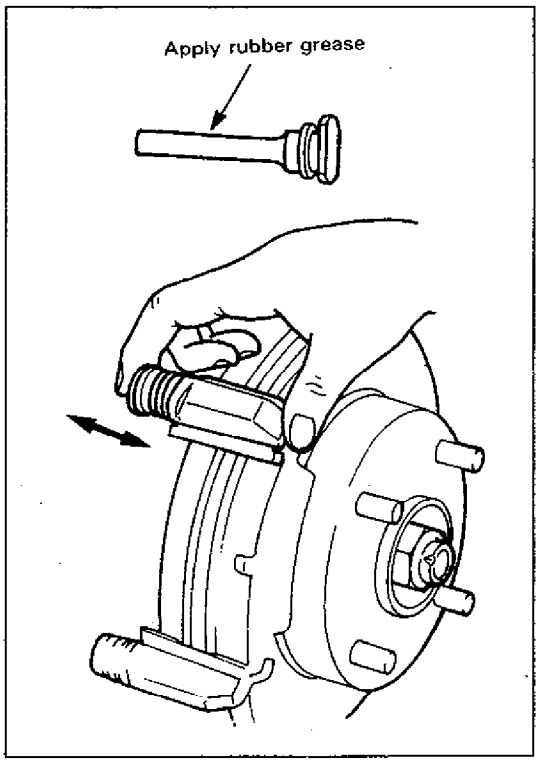


70F00-5-22-4

4) To confirm that boot is fitted in its groove in cylinder properly, pull piston out of cylinder a little but do not take it all out.

NOTE:
Boot's face B should be at the same level from cylinder's face A all around.

5) Insert piston into cylinder by hand.



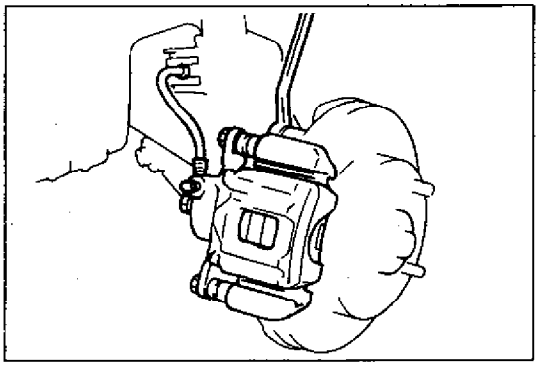
70F00-5-23-1

Caliper

Before installing caliper (cylinder body) to carrier, check to ensure that guide pin inserted in each caliper carrier hole can be moved smoothly in thrust direction.

NOTE:

Where temperature gets as low as −30°C (−22°F) in cold weather, use rubber grease whose viscosity varies very little even at −40°C (−40°F).



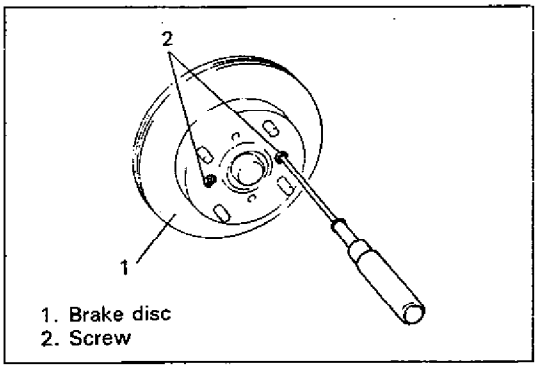
70F00-5-23-3

4. REMOVE AND INSTALL DISC (For ventilated disc type)

REMOVAL

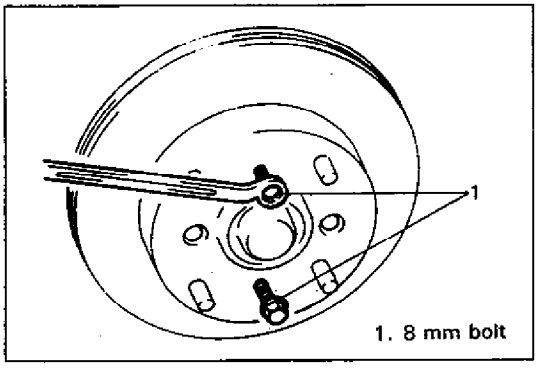
1) Hoist vehicle and remove wheel.
2) Remove caliper assembly by loosening carrier bolts (2 pcs).

> **CAUTION:**
> **During removal, be careful not to damage brake flexible hose and not to depress brake pedal.**



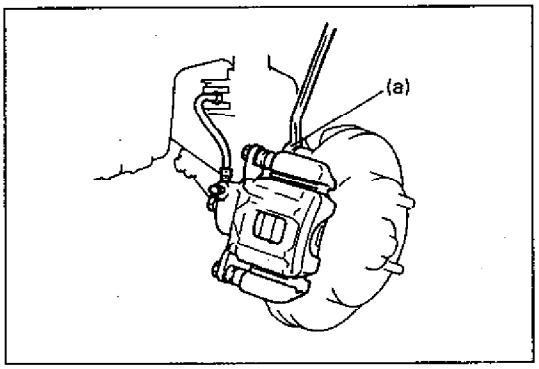
64B40-5-33-4

3) Remove brake disc screws (2 pcs).

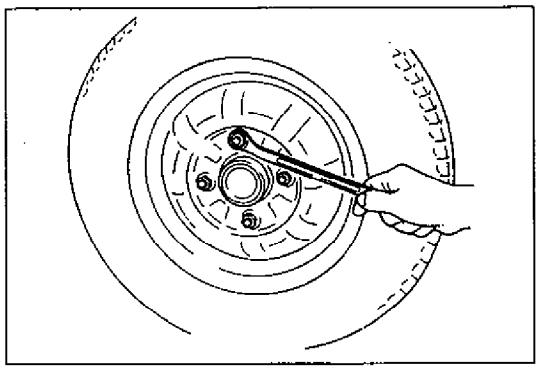


64B40-5-33-5

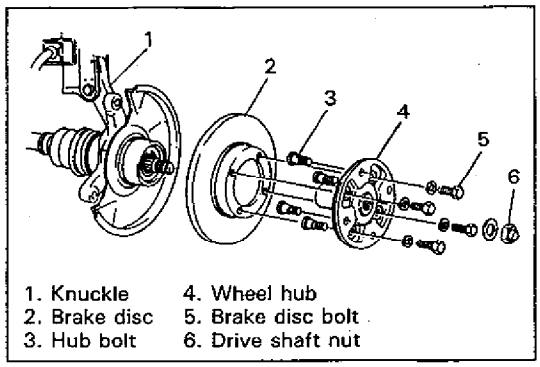
4) Pull brake disc off by using 8 mm bolts (2 pcs).



64B40-5-34-1

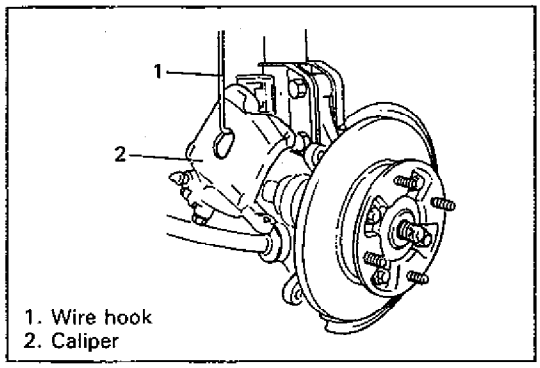


70F00-5-24-2



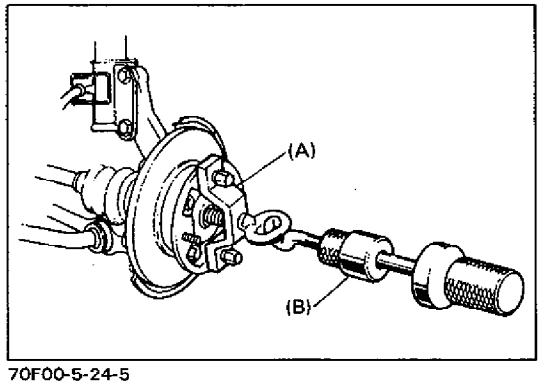
1. Knuckle
2. Brake disc
3. Hub bolt
4. Wheel hub
5. Brake disc bolt
6. Drive shaft nut

70F00-5-24-3



1. Wire hook
2. Caliper

70F00-5-24-4



70F00-5-24-5

INSTALLATION

NOTE:
See NOTE at the beginning of this section.

1) Install disc to wheel hub.
2) Install caliper assembly to steering knuckle.
3) Torque caliper carrier bolts to specification.

Tightening Torque
(a): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

4) Torque front wheel nuts to specification. (Refer to page 5-55)
5) Upon completion of installation, perform brake test.

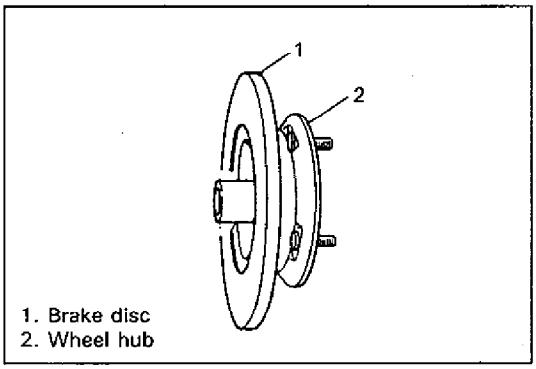
4-1. REMOVE AND INSTALL DISC (For solid disc type)

REMOVAL

1) Hois vehicle and remove wheel.
2) Uncalk drive shaft nut.
3) Depress foot brake pedal and hold it there.
   Remove drive shaft nut and then loosen brake disc bolts but don't remove them.
4) Remove carrier bolts.
5) Remove caliper assembly from disc and suspend it with wire hook.
6) Pull out wheel hub with special tools.

Special Tool
(A): 09943-17911
(B): 09942-15510

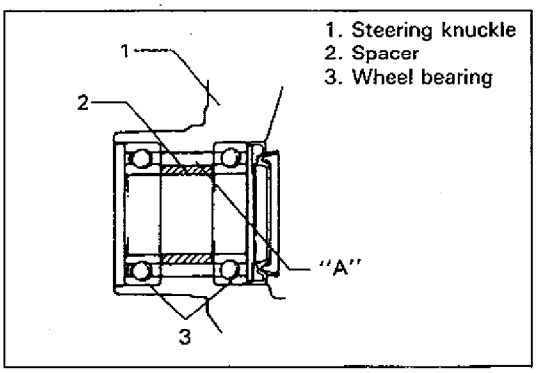
7) Remove disc from wheel hub.



70F00-5-25-1

INSTALLATION

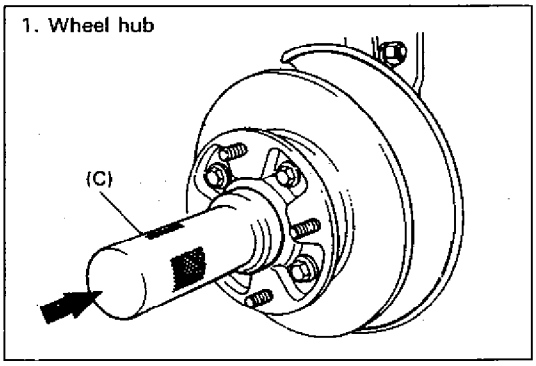
1) Install brake disc to wheel hub. Tighten disc bolts only lightly.



70F00-5-25-2

2) Visually check to ensure that bore in wheel bearing spacer which is mounted between wheel bearings in steering knuckle is aligned with inner bores of two bearings as shown. If they are offset, align them by moving spacer.

"A": Grease 99000-25010

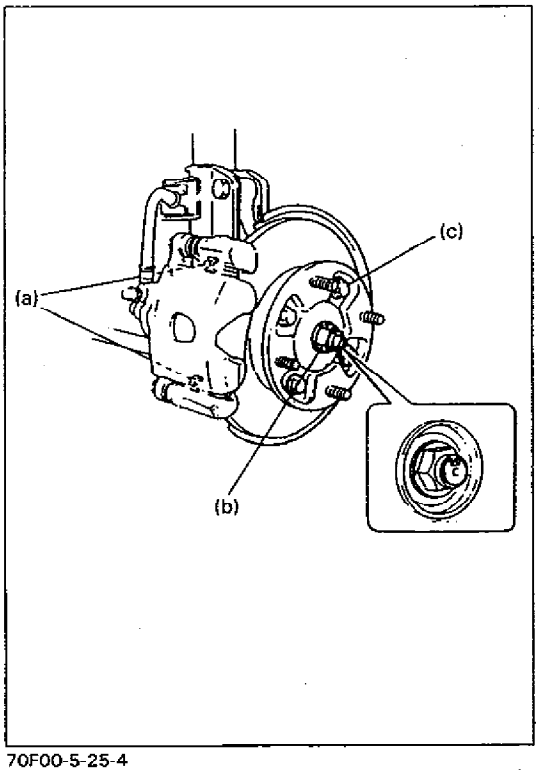


70F00-5-25-3

3) Install wheel hub to knuckle as follows.
First, while rotating hub, tap it lightly with a plastic hammer. This is to prevent hub from being installed at an angle. After confirming that hub is free from deflextion, drive it in with special tool.

Special Tool
(C): 09913-85210

4) Install pad and caliper.



70F00-5-25-4

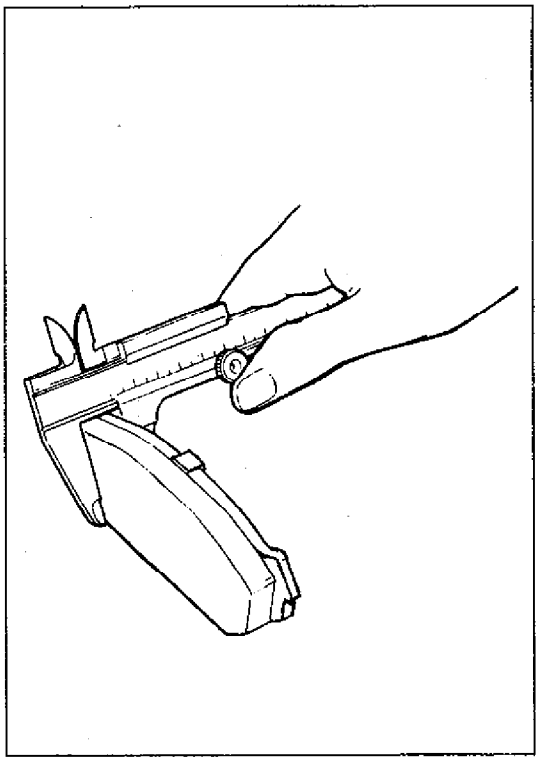
5) Tighten carrier bolts to specified torque.

Tightening Torque
(a): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

6) Depress foot brake pedal and hold it there.
Tighten new drive shaft nut and brake disc bolts to specified torque.

Tightening Torque
(b): 150—200 N·m (15.0—20.0 kg-m, 108.5—144.0 lb-ft)
(c): 40—60 N·m (4.0—6.0 kg-m, 29.0—43.0 lb-ft)

7) Calk drive shaft nut as shown.
8) Install wheel and lower hoist.



70F00-5-26-1

FRONT DISC BRAKE INSPECTION

1. INSPECT BRAKE PAD LINING

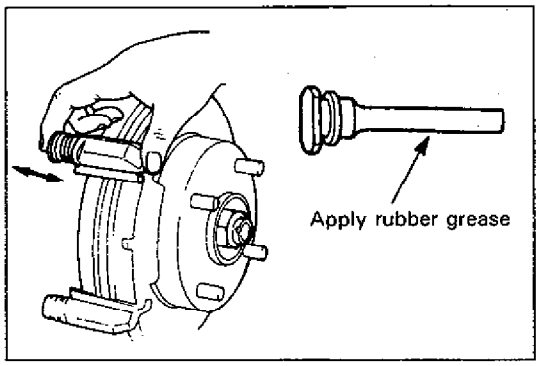
Check pad lining for wear. When wear exceeds limit, replace with new one.

CAUTION:
Never polish pad lining with sandpaper. If lining is polished with sandpaper, hard particles of sandpaper will be deposited in lining and may damage disc. When pad lining requires correction, replace it with a new one.

Pad thickness (lining + pad rim)

	Standard	Limit
For ventilated disc type:	15.0 mm (0.590 in.)	8.0 mm (0.315 in.)
For solid disc type	: 15.5 mm (0.610 in.)	6.5 mm (0.256 in.)

NOTE:
When pads are removed, visually inspect caliper for brake fluid leak. Correct leaky point, if any.

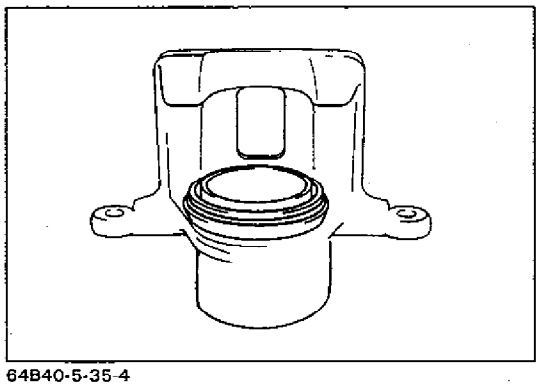


70F00-5-26-2

2. INSPECT BRAKE CALIPER INNER PARTS

Cylinder Slide Guide Pin

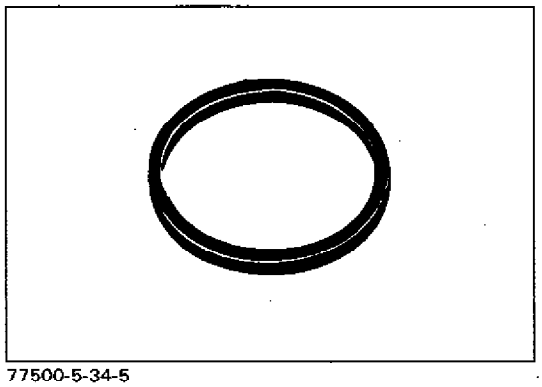
Check guide pin for smooth movement as shown.
If it is found faulty, correct or replace. Apply rubber grease to guide pin outer surface. Rubber grease should be the one whose viscosity is less affected by such low temperature as −40°C (−40°F).



64B40-5-35-4

Bush Dust Boot and Cylinder Boot

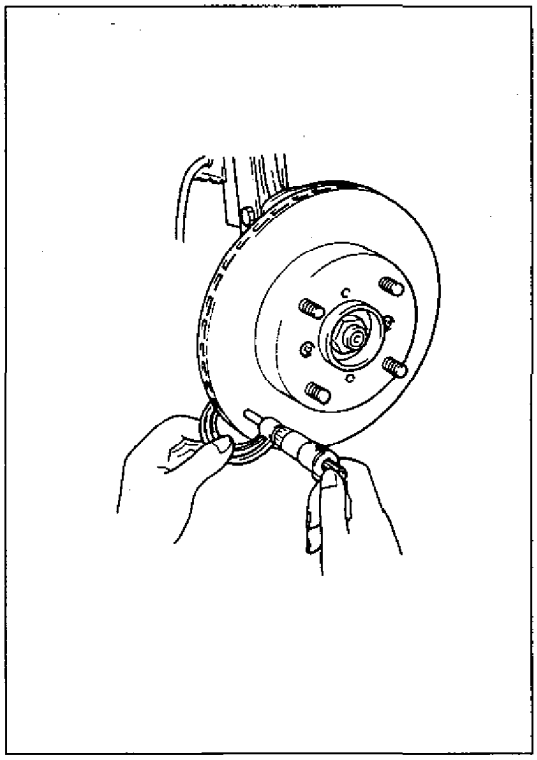
Check boots for breakage, crack and damage. If defective, replace.



77500-5-34-5

Piston Seal

Excessive or uneven wear of pad lining may indicate unsmooth return of the piston. In such a case, replace rubber seal.



70F00-5-27-1

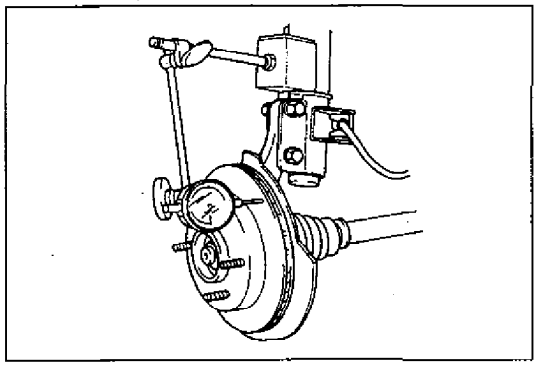
3. INSPECT BRAKE DISC

Before this inspection, brake pads must be removed (according to REMOVAL steps 1) to 4) on page 5-19).

Check disc surface for scratches in wearing parts.
Scratches on disc surface noticed at the time of specified inspection or replacement are normal and disc is not defective unless they are serious.
But when there are deep scratches or scratches all over disc surface, replace it. When only one side is scratched, polish and correct that side.

Disc thickness

	Standard	Limit
For vantilated disc type:	**17.0 mm (0.67 in.)**	**15.0 mm (0.59 in.)**
For solid disc type :	**10.0 mm (0.39 in.)**	**8.0 mm (0.31 in.)**



70F00-5-27-3

To measure deflection of disc, take measurement at 2 points on its periphery and center with dial gauge while rotating it.

Limit on disc deflection

For vantilated disc type: 0.10 mm (0.003 in.)
For solid disc type : 0.15 mm (0.005 in.)

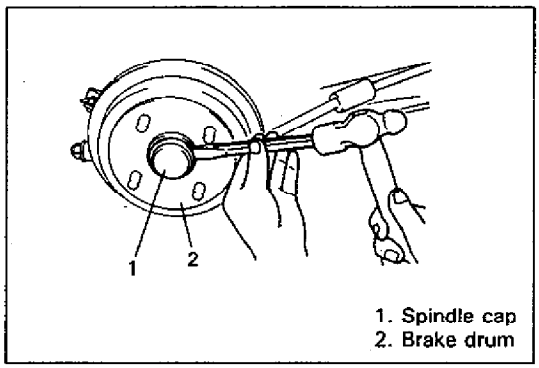
NOTE:
Check front wheel bearing for looseness before measurement.

DRUM AND COMPONENTS R & I

1. REMOVE AND INSTALL BRAKE DRUM

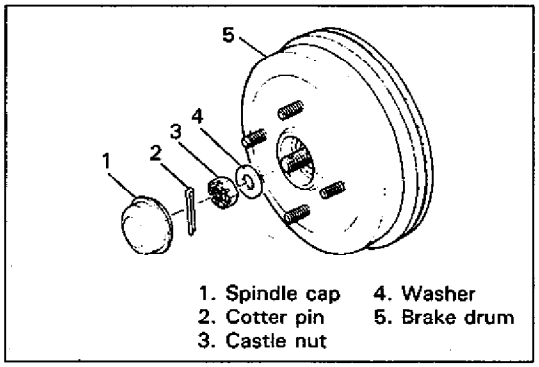
REMOVAL

1) Hoist vehicle and remove wheel.
2) Remove spindle cap as shown (by hammering lightly at 3 locations around it so as not to deform or cause damage to seating part of cap).



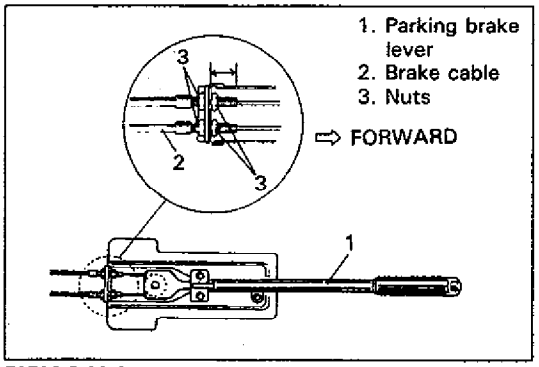
70F00-5-28-1

3) Remove cotter pin, castle nut and washer.



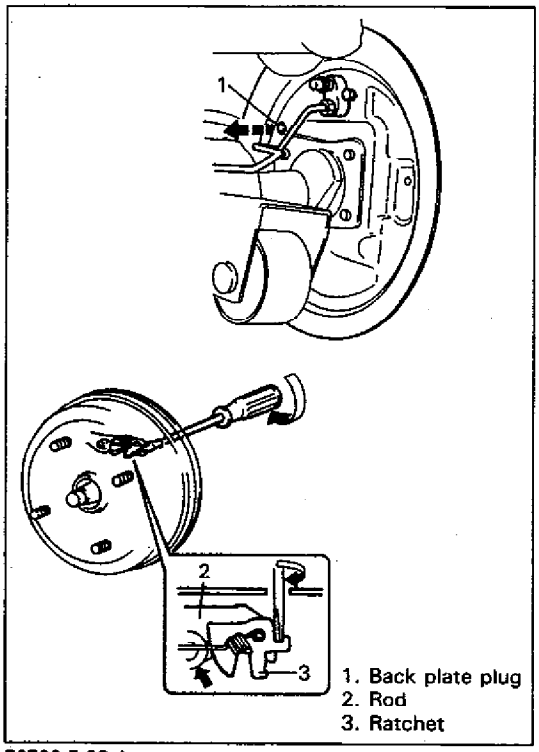
70F00-5-28-2

4) Release parking brake lever.
5) Loosen parking brake cable locking nuts.

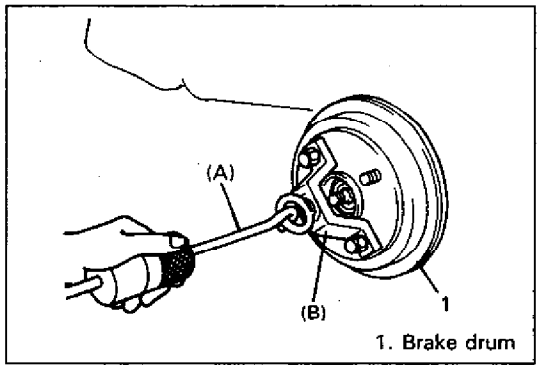


70F00-5-28-3

6) Remove back plate plug attached to the back side of brake back plate so as to increase clearance between brake shoe and brake drum.
Insert screwdriver till its tip is in the gap between rod and ratchet as shown left and turn it counterclockwise a little so that ratchet moves. Thus shoe-to-drum clearance can be increased.



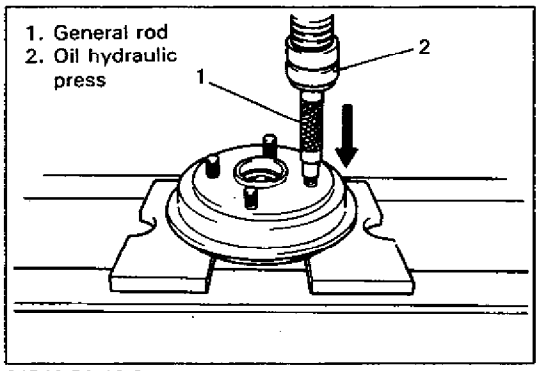
70F00-5-28-4



70F00-5-29-1

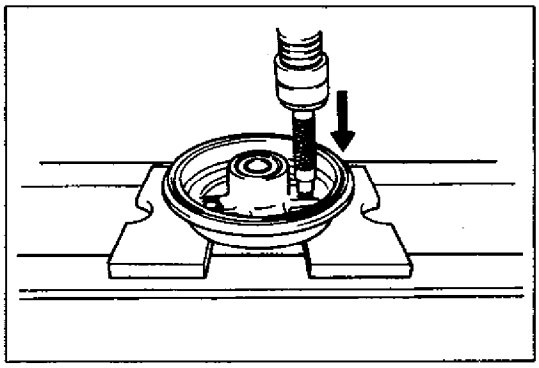
7) Pull brake drum off by using special tools.

Special Tool
(A): 09942-15510
(B): 09943-17911



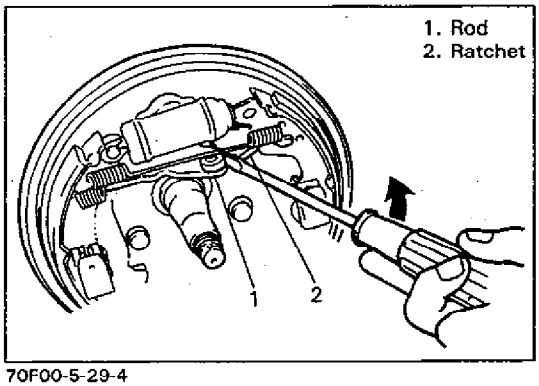
64B40-5A-18-2

8) Remove wheel stud bolt by using hydraulic press.



64B40-5A-18-3

9) Insert new stud in drum hole and rotate it slowly to assure serrations are aligned with those made by replaced bolt.

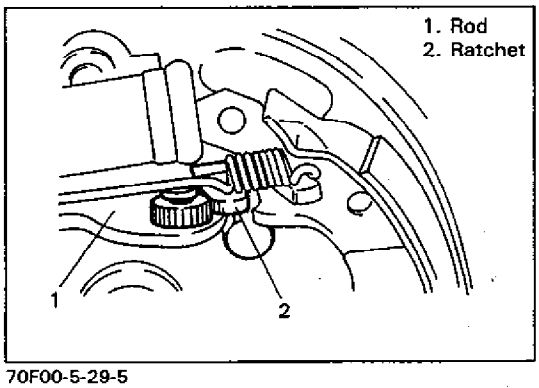


70F00-5-29-4

INSTALLATION

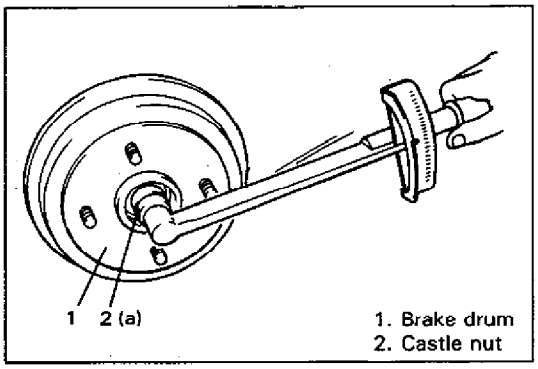
NOTE:
See NOTE at the beginning of this section.

1) Before installing brake drum, to maximize brake shoe-to-drum clearance, put screwdriver between rod and ratchet and push down ratchet as shown in figure.



70F00-5-29-5

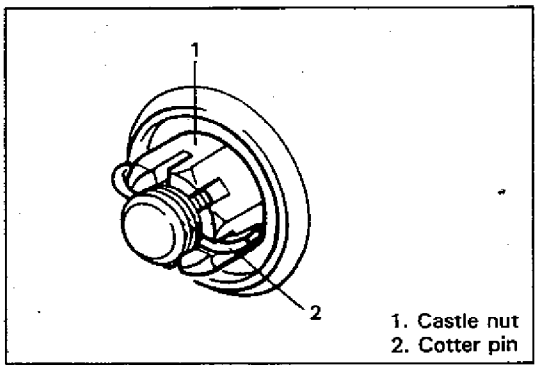
NOTE:
Left figure shows ratchet position where brake shoe-to-drum clearance is maximum.



70F00-5-30-1

2) Install brake drum after making sure that inside of brake drum and brake shoes are free from dirt and oil.
3) Install washer and new castle nut.
4) Tighten castle nut to specified torque.

Tightening Torque
(a): 80—120 N·m (8.0—12.0 kg-m, 58.0—86.5 lb-ft)



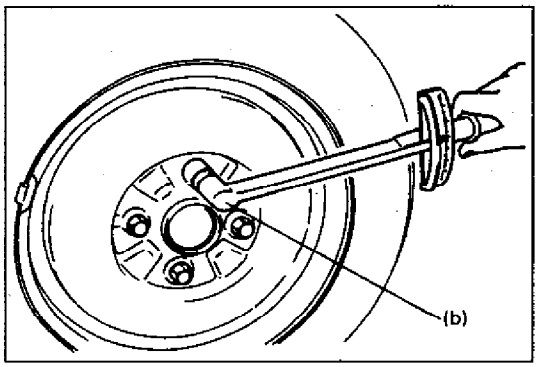
70F00-5-30-2

5) Bend new cotter pin securely as shown.
6) Install spindle cap.

NOTE:
- **When installing spindle cap, hammer lightly several locations on the collar of cap until collar comes closely into contact with brake drum.**
- **If fitting part of cap is deformed or damaged or if it is fitted loosely, replace with new one.**

7) Upon completion of all jobs, depress brake pedal with about 30 kg (66 lbs) load three to five times so as to obtain proper drum-to-shoe clearance.
Adjust parking brake cable. (For adjustment, see page 5-11.)

70F00-5-30-3

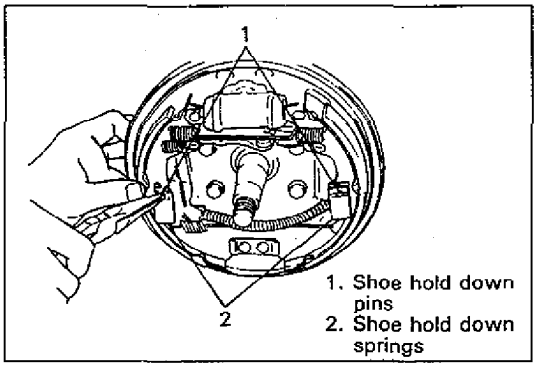


70F00-5-30-4

8) Install wheel and tighten wheel nuts so specified torque.

Tightening Torque
(b): 70—100 N·m (7.0—10.0 kg-m, 51.0—72.0 lb-ft)

9) Check to ensure that brake drum is free from dragging and proper braking is obtained. Then remove vehicle from hoist and perform brake test (foot brake and parking brake).

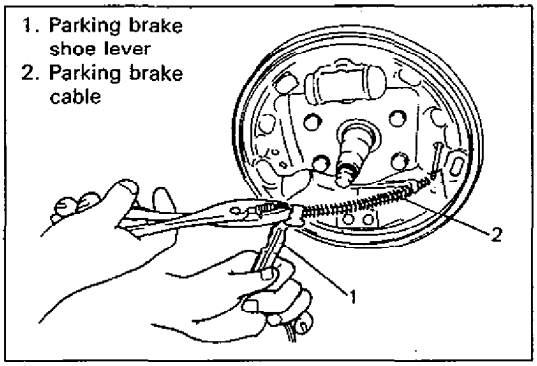


70F00-5-31-1

2. REMOVE AND INSTALL BRAKE SHOE

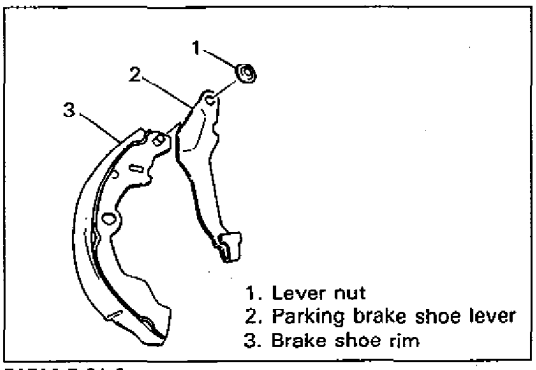
REMOVAL

1) Perform steps 1) to 7) of BRAKE DRUM REMOVAL.
2) Remove shoe hold down springs by turning shoe hold down pins as shown.
3) Remove brake shoes.
4) Remove strut and springs.



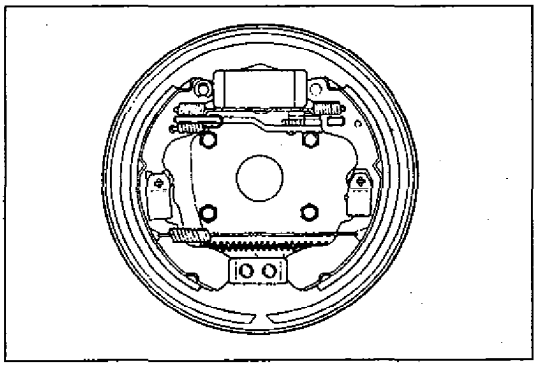
70F00-5-31-2

5) Disconnect parking brake shoe lever from parking brake cable.



70F00-5-31-3

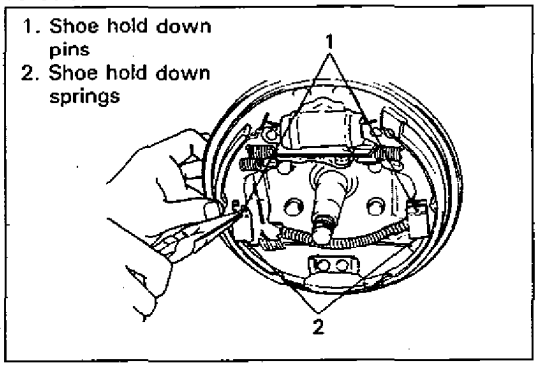
6) Remove parking brake shoe lever from shoe rim.


70F00-5-31-4

INSTALLATION

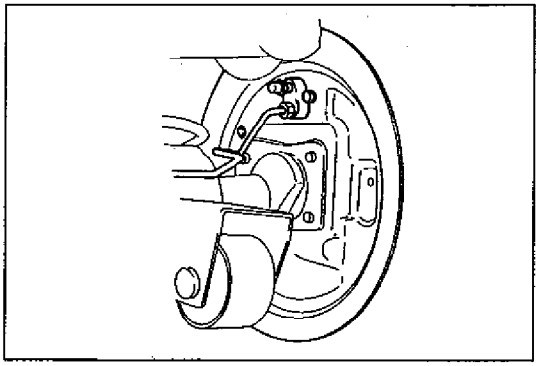
1) Assemble parts as shown in reverse order of removal.

NOTE:
Removed lever nut should be replaced with new one.



70F00-5-31-5

2) Install shoe hold down springs by pushing them down in place and turning hold down pins.
3) For procedure hereafter, refer to steps 1) to 10) of BRAKE DRUM INSTALLATION.

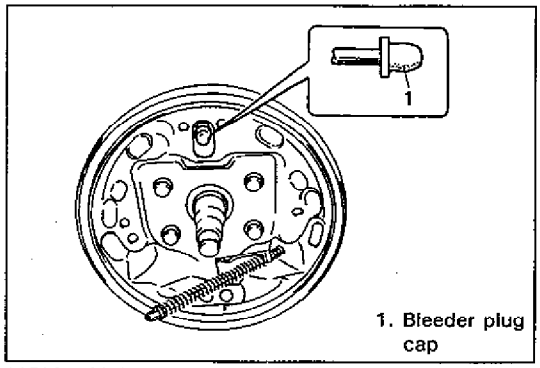


70F00-5-32-1

3. REMOVE AND INSTALL WHEEL CYLINDER

REMOVAL

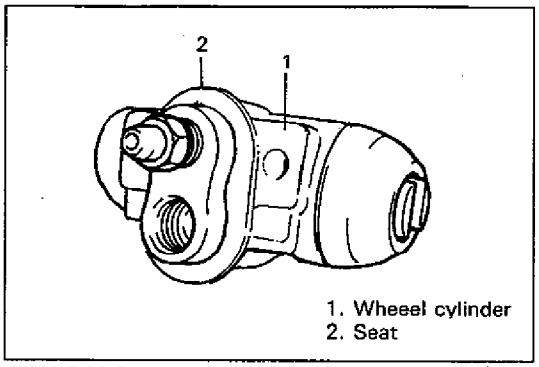
1) Perform steps 1) to 7) of brake drum REMOVAL.
2) Perform steps 2) to 5) of brake shoe REMOVAL.
3) Loosen brake pipe flare nut but only within the extent that fluid does not leak.



1. Bleeder plug cap

70F00-5-32-2

4) Remove wheel cylinder mounting bolts. Disconnect brake pipe from wheel cylinder and put bleeder plug cap onto pipe to prevent fluid from spilling.

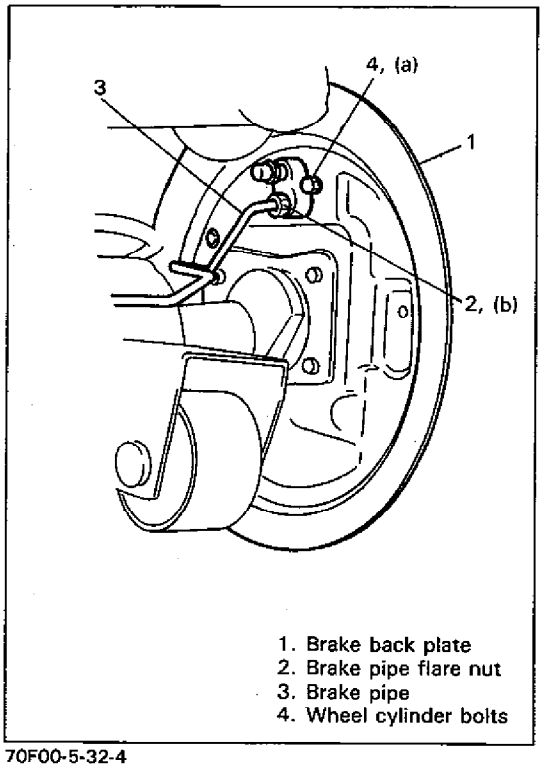


1. Wheeel cylinder
2. Seat

70F00-5-32-3

INSTALLATION

1) Install seat to wheel cylinder. Then take off bleeder plug cap from brake pipe and connect pipe to wheel cylinder just enough to prevent fluid from leaking.



1. Brake back plate
2. Brake pipe flare nut
3. Brake pipe
4. Wheel cylinder bolts

70F00-5-32-4

2) Tighten wheel cylinder to brake back plate to specified torque.

Tightening Torque
(a): 10—13 N·m (1.0—1.3 kg-m, 7.5—9.0 lb-ft)

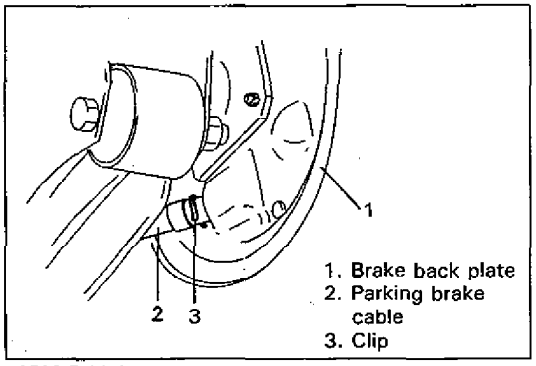
3) Torque flare nut of brake pipe which was connected in step 1) to specification.

Tightening Torque
(b): 14—18 N·m (1.4—1.8 kg-m, 10.5—13.0 lb-ft)

4) Install bleeder plug cap taken off from pipe back to bleeder plug.

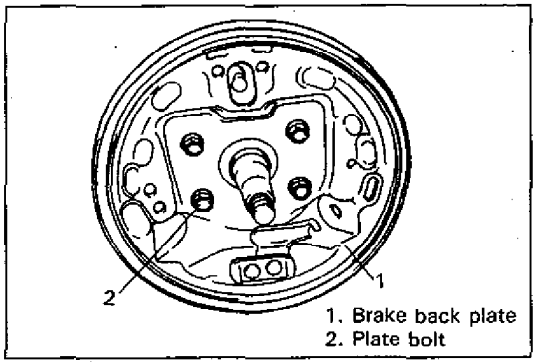
5) Install brake shoes, referring to steps 1) and 2) of its INSTALLATION on page 5-31.
6) Install brake drum. (Refer to steps 1) to 6) of its INSTALLATION on page 5-29 of this section.
7) Fill reservoir with brake fluid and bleed brake system. (For bleeding operation, see page 5-12.)
8) Upon completion of all jobs, depress brake pedal with about 30 kg (66 lbs) load three to five times so as to obtain proper drum-to-shoe clearance.
   Adjust parking brake cable. (For adjustment, see page 5-11.)
9) Tighten parking brake lever cover screw.
10) Install wheel and tighten wheel nuts to specified torque. (Refer to p. 5-55.)
11) Check to ensure that brake drum is free from dragging and proper braking is obtained. Then remove vehicle from hoist and perform brake test (foot brake and parking brake).
12) Check each installed part for oil leakage.

70F00-5-33-1



1. Brake back plate
2. Parking brake cable
3. Clip

70F00-5-33-3



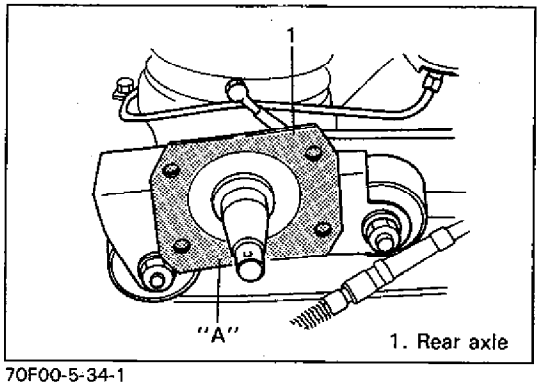
1. Brake back plate
2. Plate bolt

70F00-5-33-4

4. REMOVE AND INSTALL BRAKE BACK PLATE

REMOVAL

1) Perform steps 1) to 7) of brake drum REMOVAL on page 5-28 and 5-29.
2) Perform steps 2) to 5) of brake shoe REMOVAL on page 5-31.
3) Perform steps 3) to 4) of wheel cylinder REMOVAL on page 5-32.
4) Remove parking brake cable securing clip and disconnect brake cable from brake back plate.
5) Remove brake back plate.



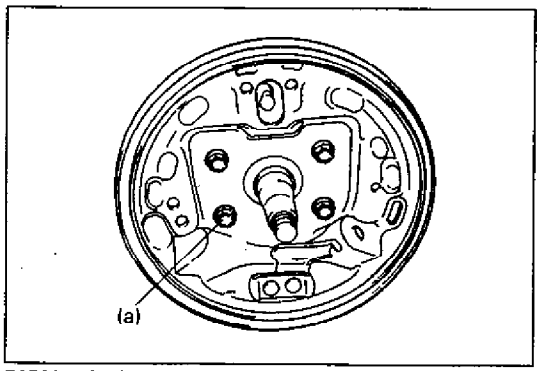
70F00-5-34-1

INSTALLATION

1) Apply water tight sealant to mating surfaces of brake back plate and rear axle.

"A": Sealant 99000-31090

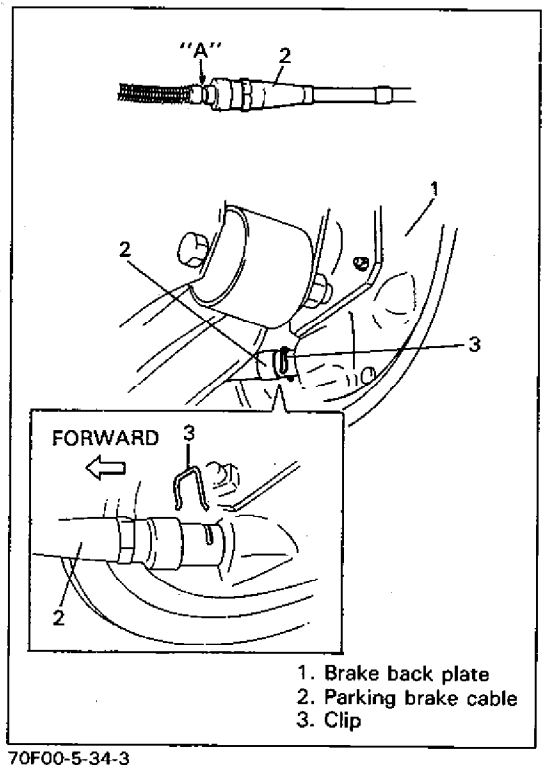
NOTE :
If rear wheel bearing inner spacer is available, ensure the same is installed during assembly.



70F00-5-34-2

2) Install brake back plate and tighten back plate bolts to specified torque.

Tightening Torque
(a): 18—28 N·m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)

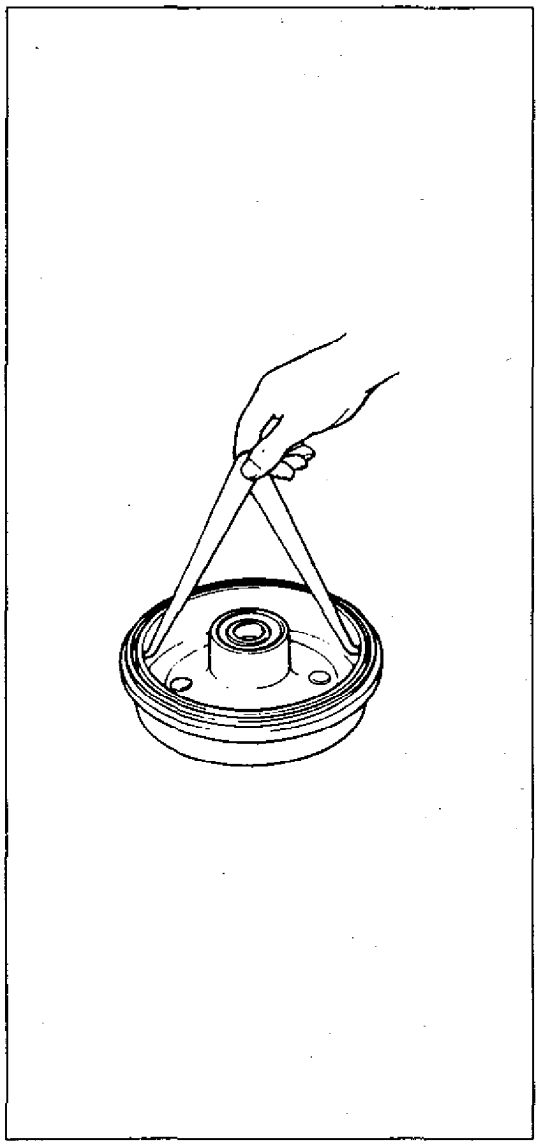


70F00-5-34-3

3) Apply water tight sealant where plate and cable contact, and run parking brake cable through brake back plate and secure it with clip.

"A": Sealant 99000-31090

4) Install wheel cylinder, and tighten wheel cylinder bolts and brake pipe flare nut to specified torque. (Refer to steps 1) to 4) of WHEEL CYLINDER INSTALLATION of this section.)
5) For procedure hereafter, refer to steps 5) to 12) of WHEEL CYLINDER INSTALLATION of this section.



70F00-5-35-1

BRAKE DRUM AND COMPONENTS INSPECTION

1. INSPECT BRAKE DRUM

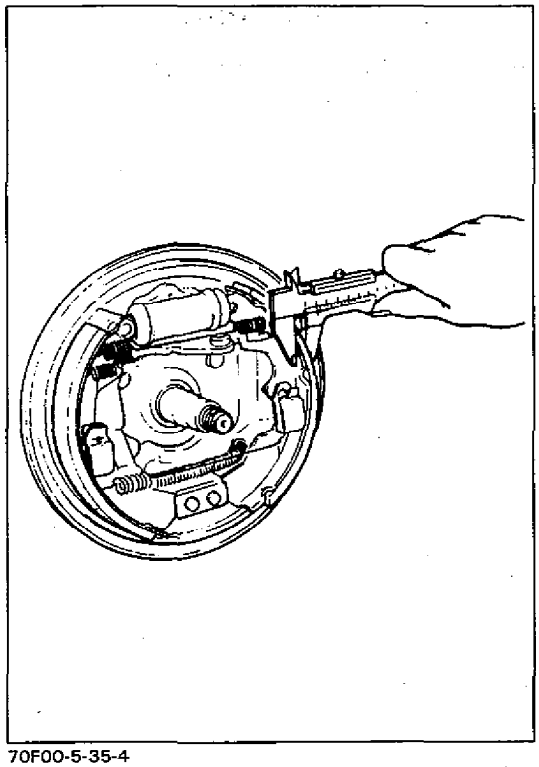
Inspect drum for cleanliness. Check wear of its braking surface by measuring its inside diameter.

Brake drum ID
Standard : 180 mm (7.09 in.)
Service limit: 182 mm (7.16 in.)

Whenever brake drums are removed, they should be thoroughly cleaned and inspected for cracks, scores, deep grooves.

Cracked, Scored, or Grooved Drum
A cracked drum is unsafe for further service and must be replaced. Do not attempt to weld a cracked drum.
Smooth up any slight scores. Heavy or extensive scoring will cause excessive brake lining wear and it will probably be necessary to resurface drum braking surface.
If brake linings are slightly worn and drum is grooved, drum should be polished with fine emery cloth but should not be turned.

NOTE:
When drum is removed, visually inspect wheel cylinder for brake fluid leakage. Correct leaky point, if any.



70F00-5-35-4

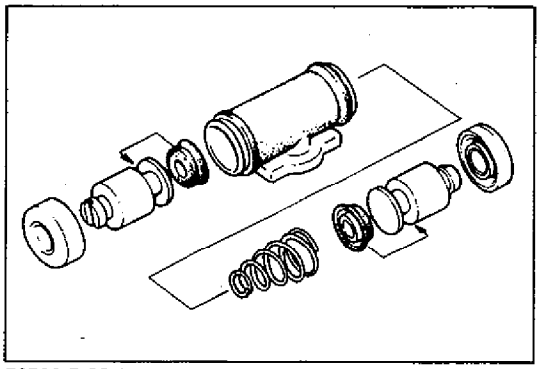
2. INSPECT BRAKE SHOE & LINING

Where lining is worn out beyond service limit, replace shoe.

Brake lining thickness (lining + shoe rim)
Standard : 6.0 mm (0.24 in.)
Service limit: 2.6 mm (0.10 in.)

If one of brake linings is worn to service limit, all linings must be replaced at the same time.

CAUTION:
Never polish lining with sandpaper. If lining is polished with sandpaper, hard particles of sandpaper will be deposited in lining and may damage drum. When it is required to correct lining, replace it with a new one.

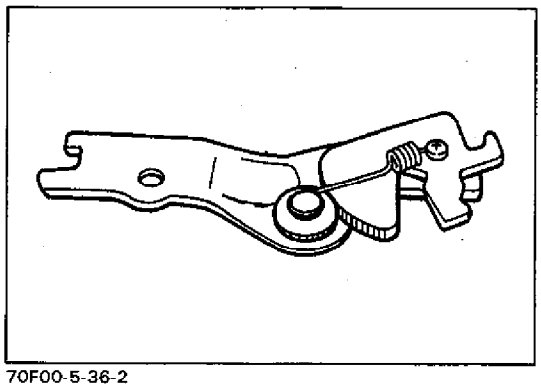


70F00-5-36-1

3. INSPECT WHEEL CYLINDER

Inspect wheel cylinder disassembled parts for wear, cracks, corrosion or damage.

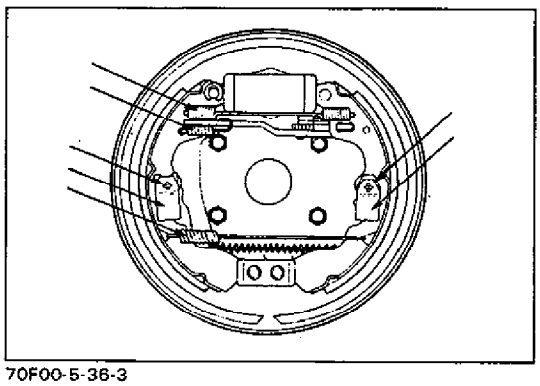
NOTE:
Clean wheel cylinder components with brake fluid.



70F00-5-36-2

4. INSPECT BRAKE STRUT

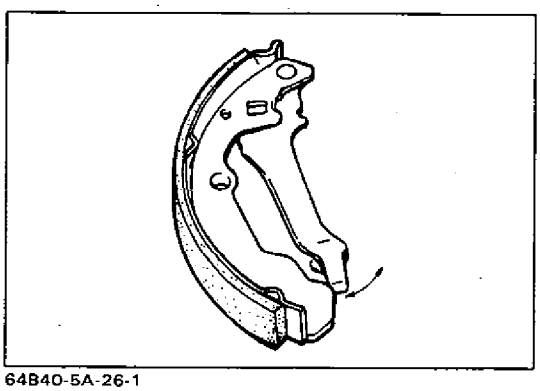
Inspect ratchet of strut for wear or damage.



70F00-5-36-3

5. INSPECT SPRINGS

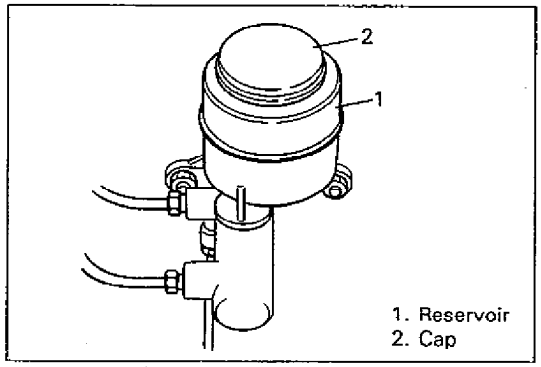
Inspect for damage or weakening.
Inspect each part with arrow for rust. If found defective, replace.



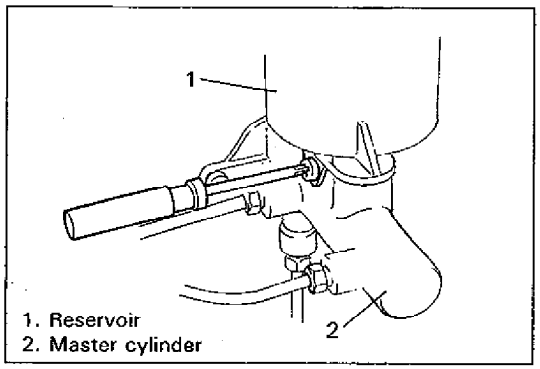
64B40-5A-26-1

6. INSPECT PARKING SHOE LEVER

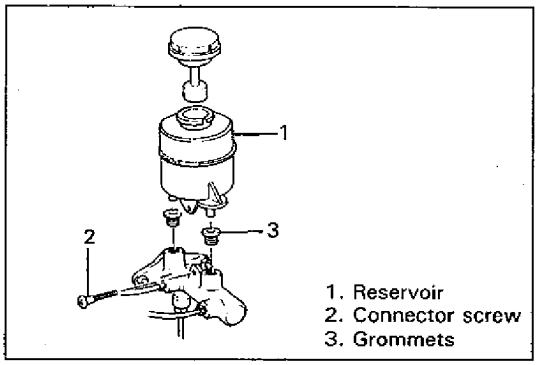
Inspect brake shoe lever for free movement against brake shoe web. If defective, correct or replace.



70F00-5-37-1



70F00-5-37-2



70F00-5-37-3

MASTER CYLINDER REPAIR

1. REMOVE AND INSTALL MASTER CYLINDER RESERVOIR

REMOVAL

1) Disconnect reservoir lead wire at coupler.
2) Clean outside of reservoir.
3) Take out fluid with syringe or such.

4) Remove reservoir connector screw.

5) Remove reservoir.

CAUTION:
Do not allow brake fluid to get on painted surfaces.

INSTALLATION

NOTE:
See NOTE at the beginning of this section.

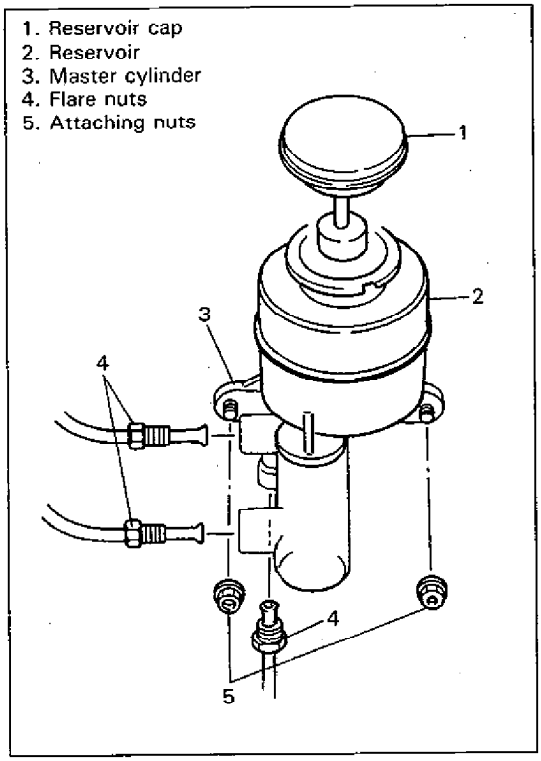
1) When using new grommets, lubricate them with the same fluid as the one to fill reservoir with. Then press-fit grommets to master cylinder. Grommets must be seated in place.

64B40-5-49-4

2) Install reservoir and tighten screw to specification.

Tightening Torque
(a): 1.5—3.0 N·m (0.15—0.3 kg-m, 1.5—2.0 lb-ft)

3) Connect reservoir lead wire.
4) Fill reservoir with specified fluid.
5) Upon completion of installation, check for fluid leakage.



70F00-5-38-1

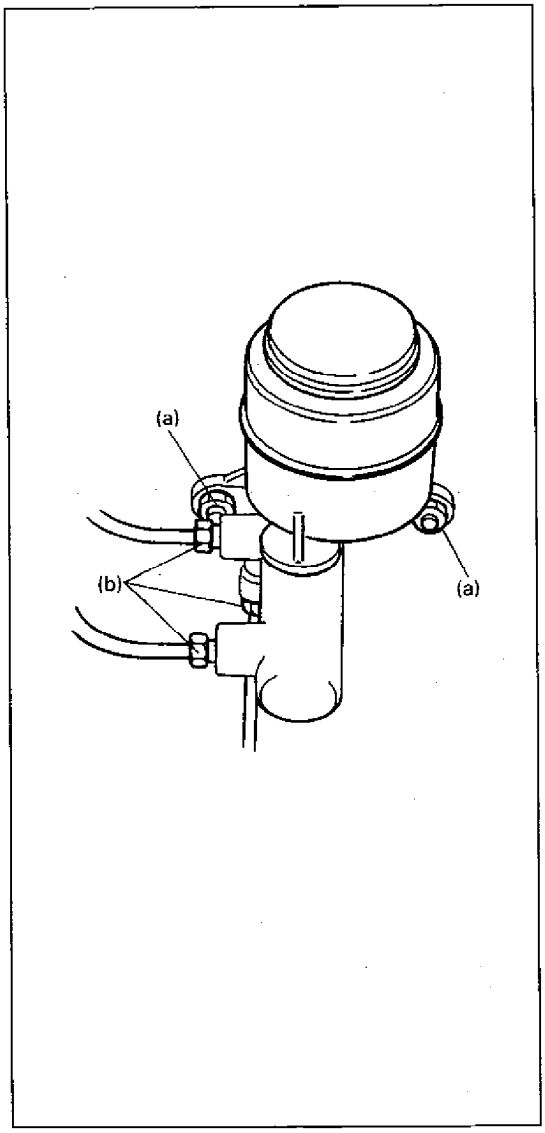
2. REMOVE AND INSTALL MASTER CYLINDER ASSEMBLY

REMOVAL

1) Disconnect reservoir lead wire at coupler.
2) Clean around reservoir cap and take out fluid with syringe or such.
3) Disconnect three brake pipes from master cylinder.

> **CAUTION:**
> **Do not allow brake fluid to get on painted surfaces.**

4) Remove two attaching nuts.
5) Remove master cylinder.



70F00-5-38-3

INSTALLATION

NOTE:

- **See NOTE at the beginning of this section.**
- **Adjust clearance between booster piston rod and primary piston with special tool (See page 5-50).**

1) Install master cylinder as shown and torque attaching nuts to specification.

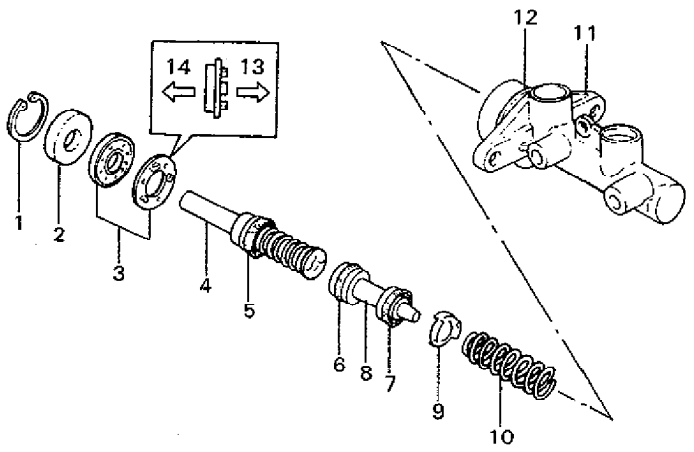
Tightening Torque
(a): 10—16 N·m (1.0—1.6 kg-m, 7.5—11.5 lb-ft)

2) Attach three hydraulic lines and torque flare nuts to specification.

Tightening Torque
(b): 14—18 N·m (1.4—1.8 kg-m, 10.5—13.0 lb-ft)

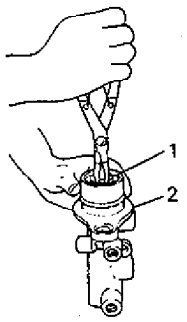
3) Connect reservoir lead wire.
4) Fill reservoir with specified brake fluid.
5) After installing, check brake pedal play and bleed air from system (See pages 5-9, 5-12 and 5-13).

3. DISASSEMBLE AND ASSEMBLE MASTER CYLINDER



1. Piston stopper circlip
2. Piston stopper
3. Cylinder cup and plate
4. Primary piston
5. Piston cup
6. Secondary piston pressure cup
7. Piston cup
8. Secondary piston
9. Return spring secondary seat
10. Secondary piston return spring
11. Master cylinder body
12. Sealing
13. Master cylinder piston side
14. Booster side

70F00-5-39-1

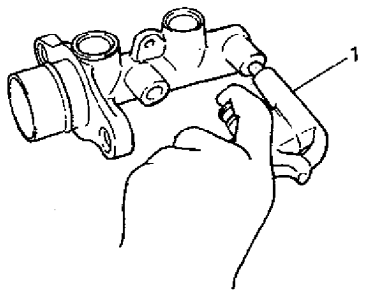


1. Circlip
2. Master cylinder

70F00-5-39-3

DISASSEMBLY

1) Remove circlip.
2) Remove primary piston.



1. Compressed air

70F00-5-39-4

3) Remove secondary piston by blowing compressed air into hole as shown in figure.

NOTE:
Be cautious during removal as secondary piston jumps out.

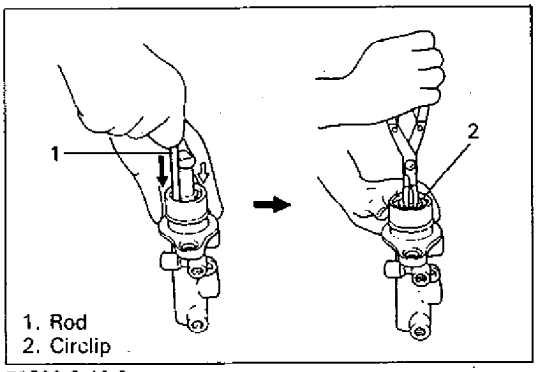
ASSEMBLY

NOTE:

- **See NOTE at the beginning of this section.**
- **Before assembling, wash each part in fluid recommended to use for that vehicle.**

1) Assemble secondary piston as shown on previous page.
2) Install secondary piston assembly into cylinder.
3) Install primary piston, cylinder cup/plate and piston stopper in cylinder as shown on previous page.

70F00-5-40-1



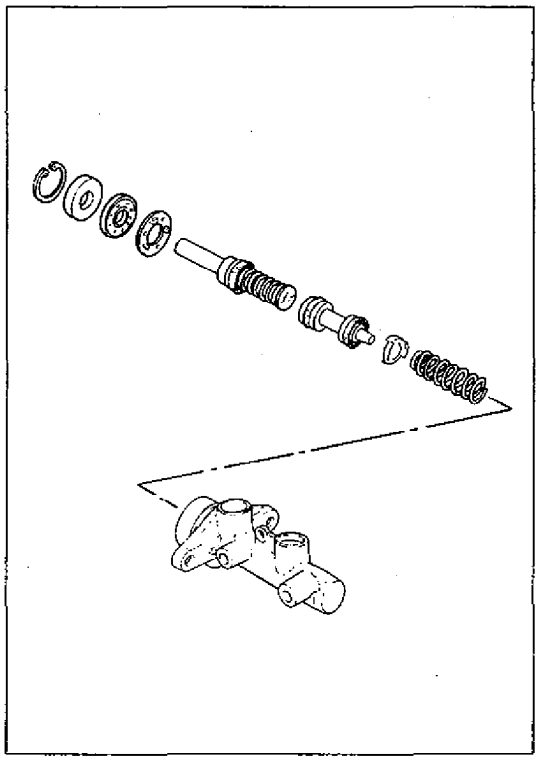
1. Rod
2. Circlip

70F00-5-40-2

4) Depress, and install circlip.

5) For installation on vehicle, refer to INSTALLATION on page 5-38.

70F00-5-40-3



70F00-5-41-1

MASTER CYLINDER INSPECTION

1. INSPECT MASTER CYLINDER

Inspect all disassembled parts for wear or damage, and replace parts if necessary.

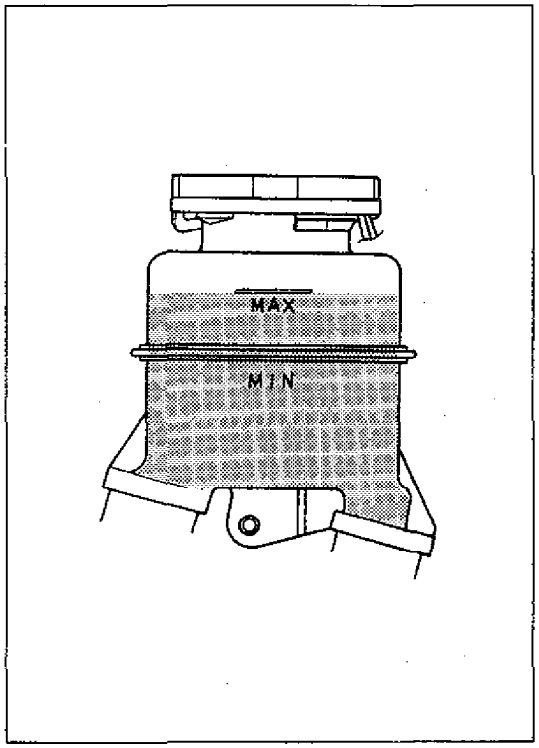
NOTE:
- **Wash disassembled parts with brake fluid.**
- **Do not reuse piston cups.**

Inspect master cylinder bore for scoring or corrosion. It is best to replace corroded cylinder. Corrosion can be identified as pits or excessive roughness.

NOTE:
Polishing bore of master cylinder with cast aluminum body with anything abrasive is prohibited, as damage to cylinder bore may occur.

Rinse cylinder in clean brake fluid. Shake excess rinsing fluid from cylinder. Do not use a cloth to dry cylinder, as lint from cloth cannot be kept from cylinder bore surfaces.

64840-5-53-3

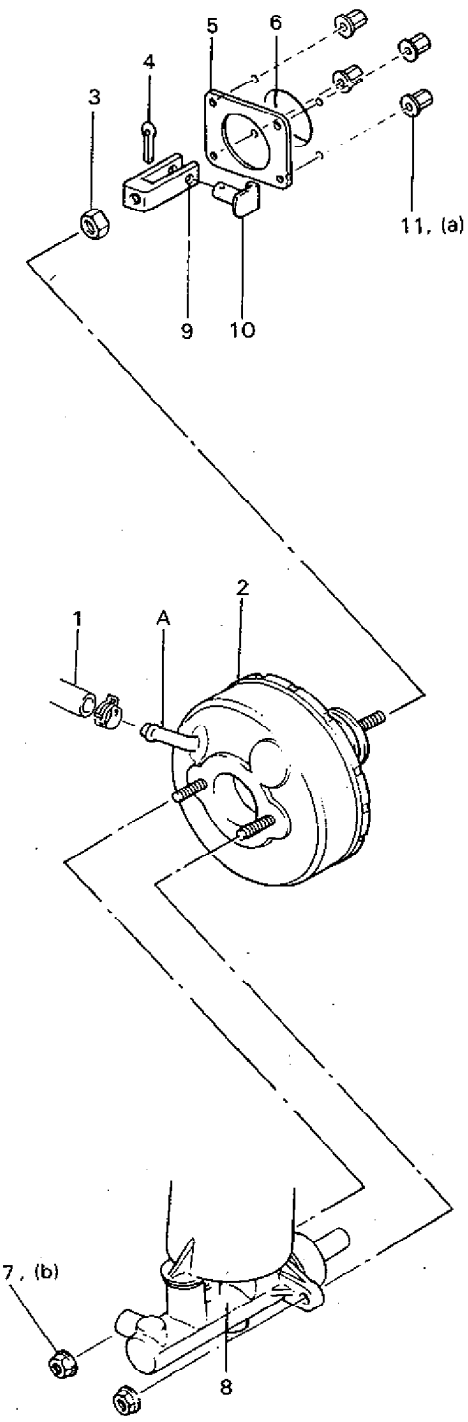


70F00-5-41-4

2. FILL RESERVOIR

CAUTION:
Do not use shock absorber fluid or any other fluid which contains mineral oil. Do not use container which has been used for mineral oil or which is wet from water. Mineral oil will cause swelling and distortion of rubber parts in hydraulic brake system and water will mix with brake fluid, lowering fluid boiling point. Keep all fluid containers capped to prevent contamination.

Fluid to fill reservoir with is indicated on reservoir cap of that vehicle with embossed letters or in owner's manual supplied with it.
Add fluid up to MAX line.



NOTE:
Above figue shows booster of left-hand steering vehicle. The only difference for booster of right-hand steering vehicle is vacuum pipe A installing position.

1. Vacuum hose
2. Booster
3. Push rod clevis lock nut
4. Cotter pin
5. Gasket
6. Dash panel
7. Attaching nut
8. Master cylinder
9. Push rod clevis
10. Clevis pin
11. Attaching nut

70F00-5-42-1

BRAKE BOOSTER REPAIR

1. REMOVE AND INSTALL BOOSTER

REMOVAL

1) Remove master cylinder assembly, referring to steps 1) to 5) of its REMOVAL on page 5-38.
2) Disconnect vacuum hose from booster.
3) Disconnect push rod clevis from brake pedal arm.
4) Remove attaching nuts and then booster as shown.

INSTALLATION

NOTE:

- **See NOTE at the beginning of this section.**
- **Adjust clearance between booster piston rod and master cylinder piston with special tool. (See page 5-50.)**
- **Check length of push rod clevis. (See page 5-49.)**

1) Install booster to dash panel as shown. Then connect booster push rod clevis to pedal arm with clevis pin and cotter pin.
2) Torque booster attaching nuts to specification.

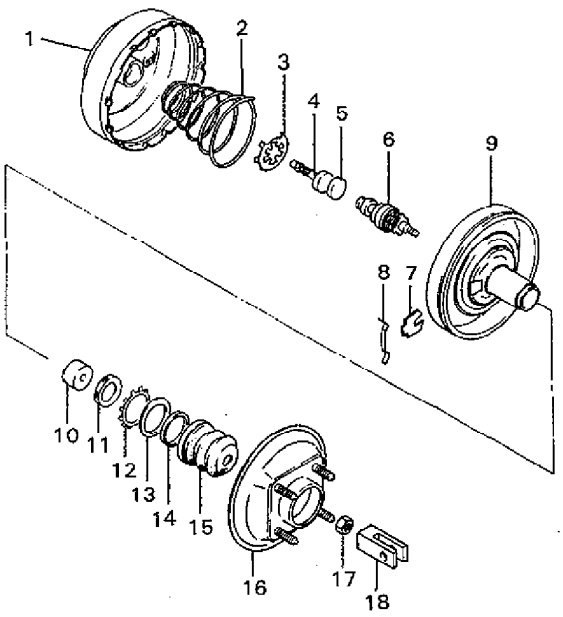
Tighteninig Torque
(a): 10—16 N·m (1.0—1.6 kg-m, 7.5—11.5 lb-ft)

3) Install master cylinder to booster and torque attaching nuts to specification.

Tightening Torque
(b): 10—16 N·m (1.0—1.6 kg-m, 7.5—11.5 lb-ft)

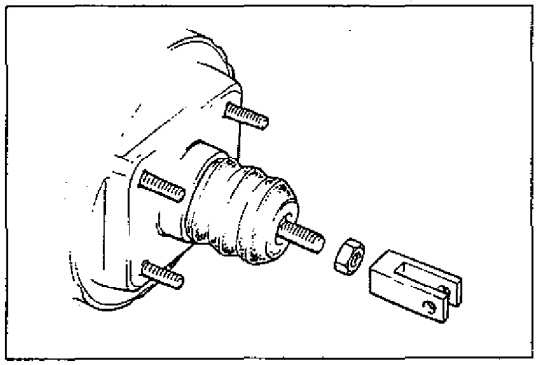
4) Connect three brake pipes and torque flare nuts to specification. (See page 5-38.)
5) Connect booster vacuum hose.
6) Connect reservoir lead wire at coupler.
7) Fill reservoir with specified fluid.
8) Bleed air from brake system. (See air bleeding section, pages 5-12 and 5-13.)
9) After installing, check pedal height and play. (See pages 5-8 and 5-9.)
10) Perform brake test and check each installed part for fluid leakage.

2. DISASSEMBLE AND ASSEMBLE BOOSTER (for NABHCO-Japanese make only)



1. Booster No.1 body
2. Booster piston return spring
3. Piston rod stopper
4. Piston rod
5. Reaction disc
6. Booster air valve assembly
7. Valve stopper key
8. Key holder
9. Diaphragm comp.
10. Air cleaner separator
11. Boot liner
12. Piston ring
13. Piston guide
14. Body No.2 seal
15. Body boot
16. Booster No.2 body
17. Nut
18. Push rod clevis

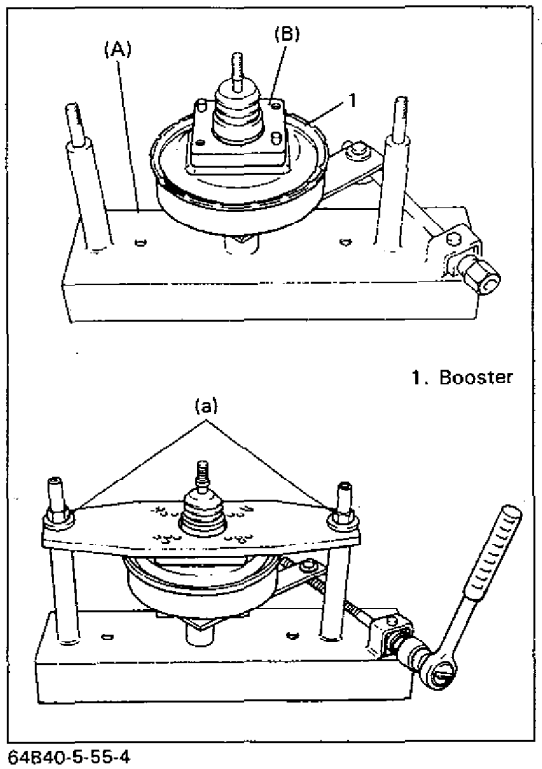
70F00-5-43-1



70F00-5-43-3

DISASSEMBLY

1) Remove push rod clevis and nut.



64B40-5-55-4

2) Attach booster to special tool (A) as shown and install special tool (B) to booster as shown.

NOTE:

- **When attaching, check to be sure that booster vacuum pipe is not in faulty contact with base of special tool (A).**
- **Be careful not to over-tighten nuts, or booster body will be deformed.**

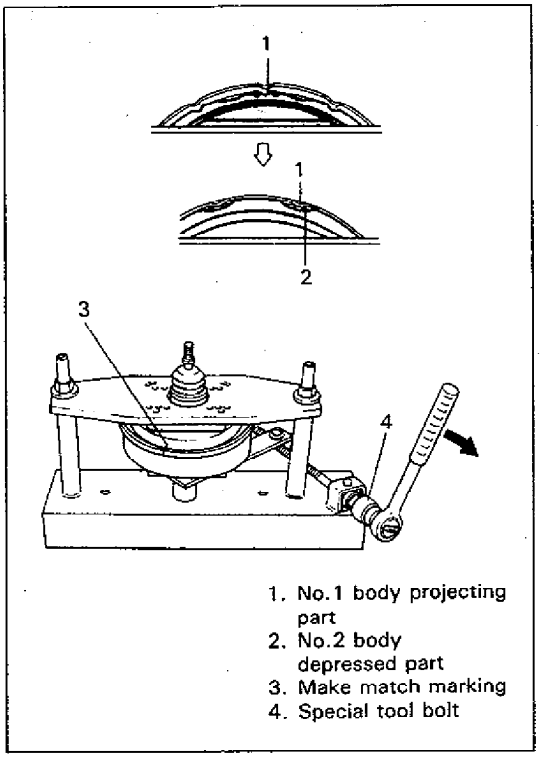
Special Tool

(A): 09950-88210

(B): 09951-16010

Tightening Torque

(a): 3—5 N·m (0.3—0.5 kg-m, 2.2—3.6 lb-ft)



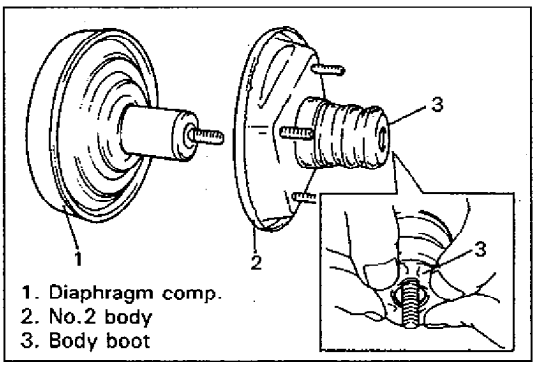
64B40-5-56-1

3) Turn special tool bolt clockwise until No.1 body projecting part and No.2 body depressed part fit each other. Once they are matched, make match marking on No.1 and No.2 bodies to facilitate their installation.

4) Detach booster from special tool and separate No.1 body and No.2 body. Remove piston return spring.

WARNING:
When separating two bodies, carefully hold both bodies to prevent either body from jumping off by spring force.

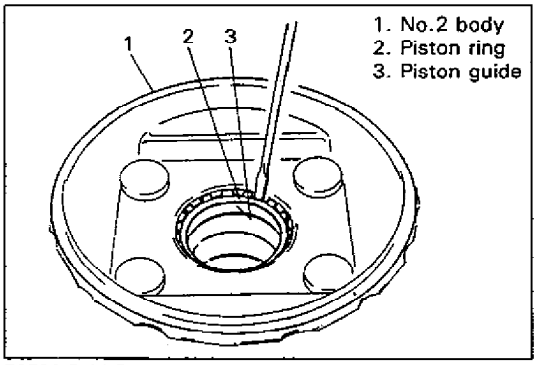
64B40-5-56-3



70F00-5-44-4

5) Separate No.2 body from diaphragm comp.

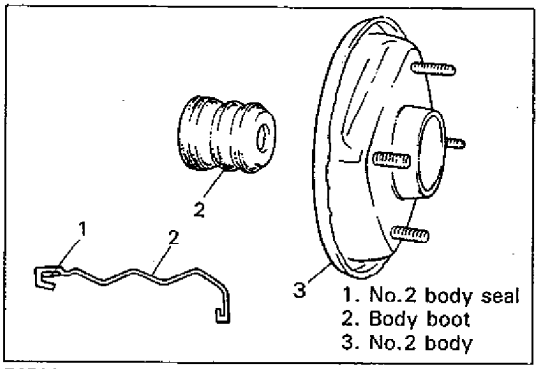
NOTE:
Diaphragm comp. can't be disassembled.



70F00-5-44-5

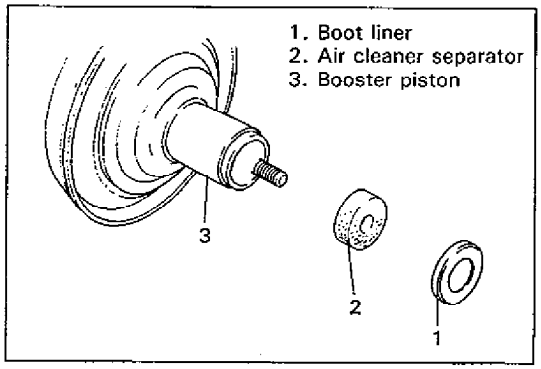
6) Remove piston ring and piston guide from No.2 body.

NOTE:
Remove piston ring by working on it gradually and evenly all around, using care not to deform it.



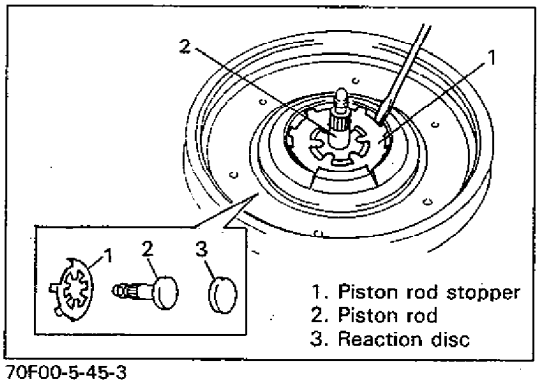
70F00-5-45-1

7) Remove body boot from No.2 body and remove No.2 body seal from body body boot.



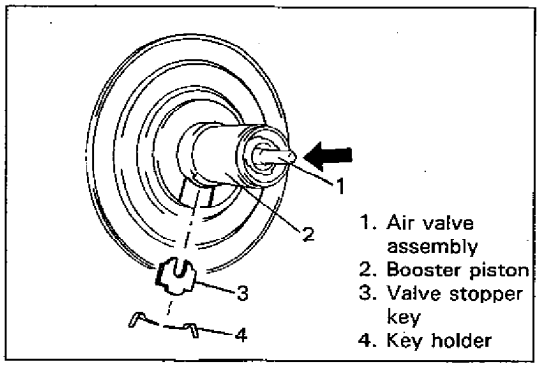
70F00-5-45-2

8) Remove boot liner and air cleaner separator from booster piston of diaphragm comp.



70F00-5-45-3

9) Remove piston rod stopper, rod and reaction disc from diaphragm comp.



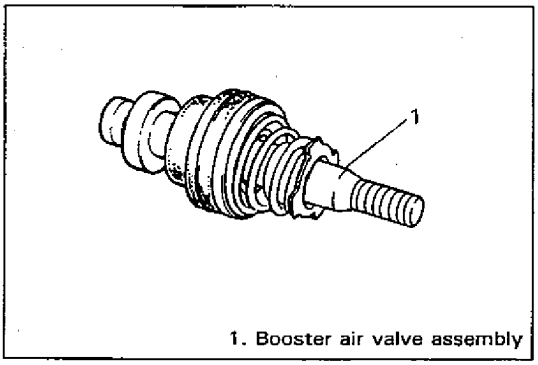
70F00-5-45-4

10) Remove key holder.

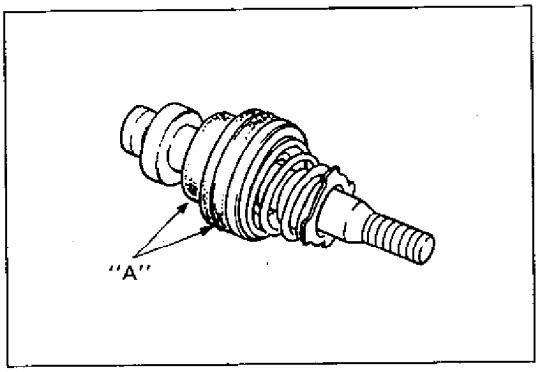
NOTE:
For this work, use a fine wire with its end bent so that it can catch key holder to pull it out.

11) While compressing air valve spring by moving air valve assembly as shown in figure, remove valve stopper key. Then remove booster air valve assembly from booster piston of diaphragm comp.

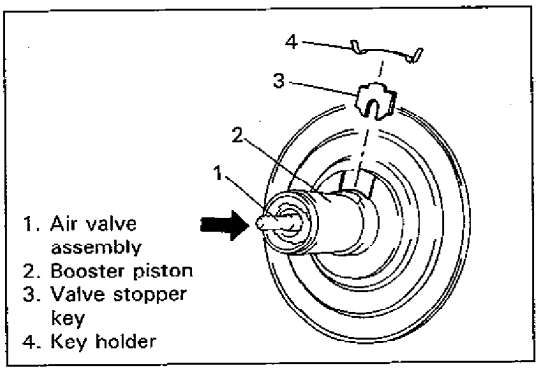
NOTE:
Booster air valve assembly can't be disassembled.



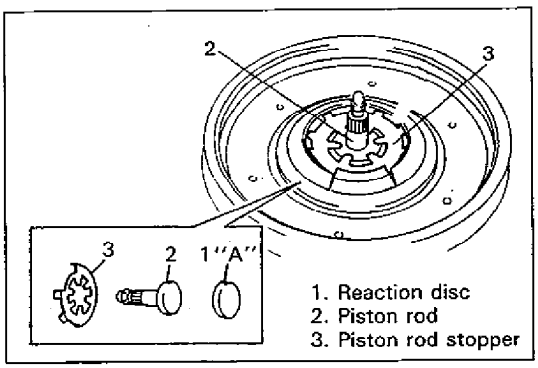
70F00-5-45-5



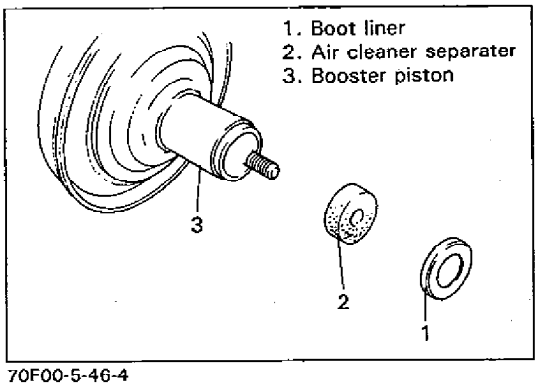
70F00-5-46-1



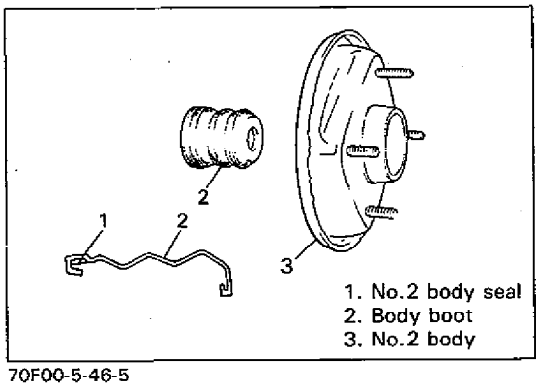
70F00-5-46-2



70F00-5-46-3



70F00-5-46-4



70F00-5-46-5

ASSEMBLY

NOTE:

- **See NOTE at the beginning of this section.**
- **Be sure to use silicon grease whenever application of grease is instructed during assembly.**

1) Install booster air valve assembly to booster piston. Before installation, apply grease as shown.

"A": Apply Grease

2) Compress air valve assembly and insert valve stopper key.

NOTE:
Don't compress air valve assembly forcibly.

3) Install new key holder.

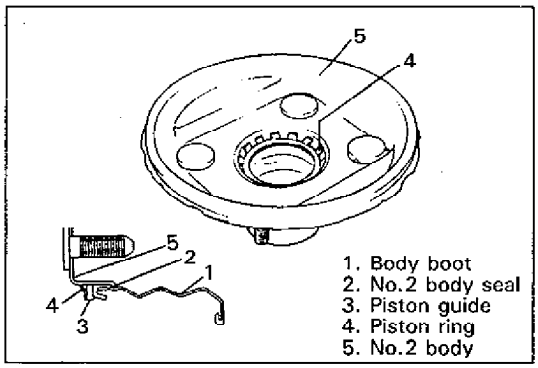
4) Install reaction disc, rod and rod stopper.

"A": Apply Grease

NOTE:
Apply grease all over reaction disc before installation.

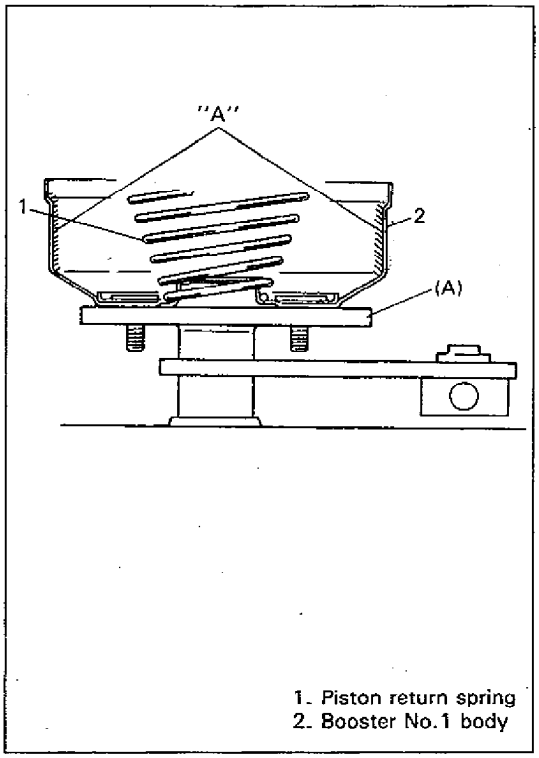
5) Install air cleaner separator and new boot liner to booster piston of diaphragm comp.

6) Check to make sure that No.2 body seal is installed in position as shown at left in body boot and install body boot to No.2 body.



70F00-5-47-1

7) Install piston guide and new piston ring to No.2 body.



70F00-5-47-2

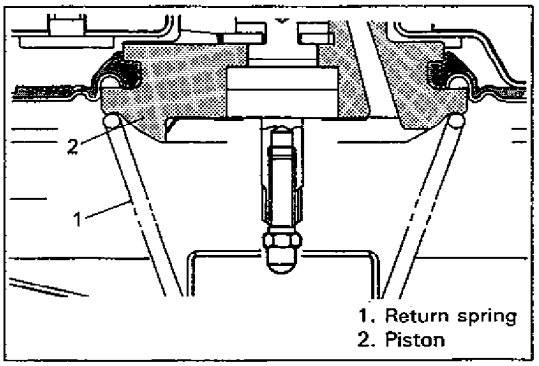
8) Apply grease to No.1 body as shown in figure.

"A": Apply grease

9) Place No.1 body on special tool. Then install piston return spring, being careful for its installing direction.

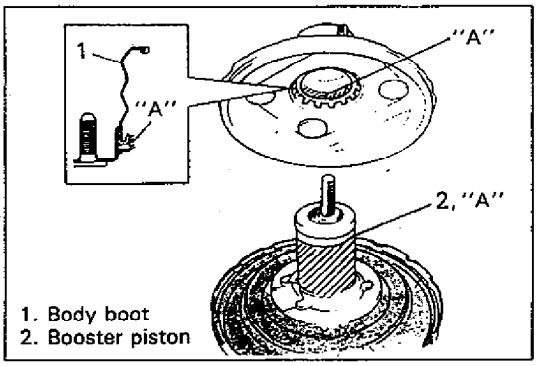
Special Tool
(A): 09950-88210

NOTE:
When attaching, check to be sure that booster vacuum pipe is not in faulty contact with base of special tool.



70F00-5-47-4

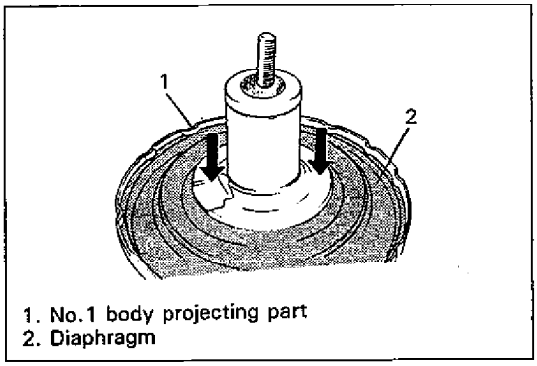
10) Place booster piston on piston retur spring.
Then check to be sure that spring is in piston spring guide.



70F00-5-47-5

11) Apply grease to body boot and booster piston as shown in figure.

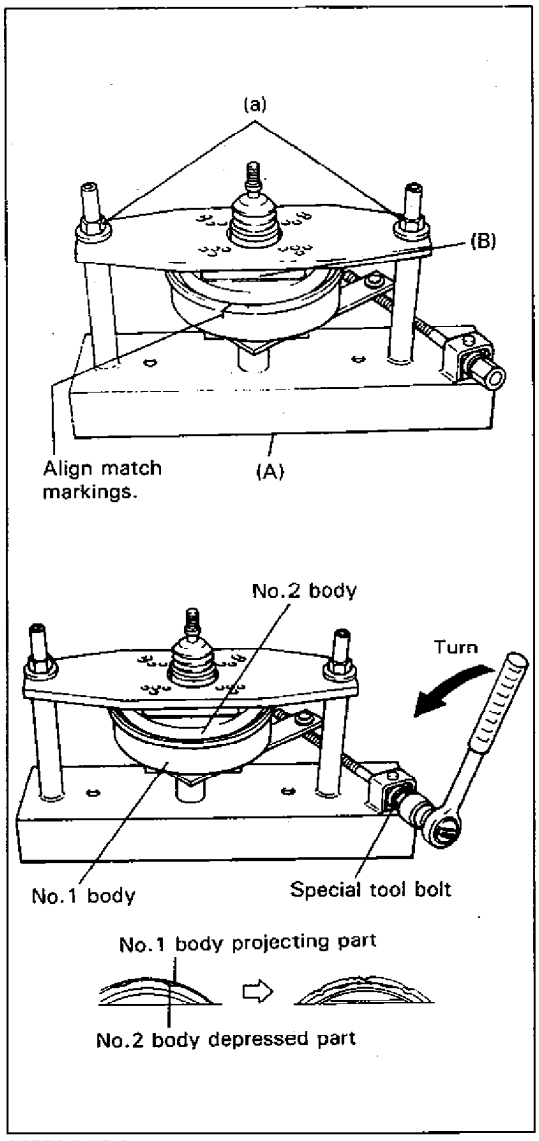
"A": Apply Grease



1. No.1 body projecting part
2. Diaphragm

70F00-5-48-1

12) Push down diaphragm comp. and make sure with finger that outer edge of diaphragm is under projecting parts of No.1 body all around.



70F00-5-48-2

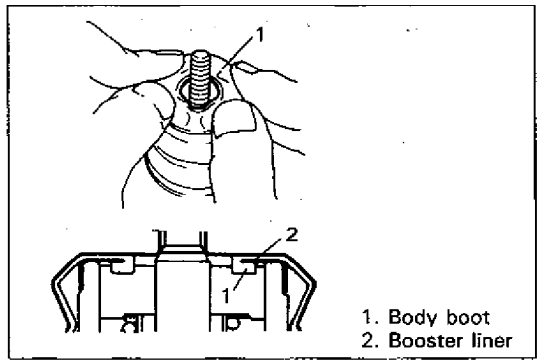
13) With diaphragm comp. pushed down as in step 12), install No.2 body to No.1 body, aligning match markings made during removal.
Holding No.2 body with upper plate (special tool) as shown, torque 2 nuts equaly to specification.

NOTE:
When holding No.2 body, use care so that diaphragm is not caught by projections at 12 locations around No.1 body.

Special Tool
(A): 09950-88210
(B): 09951-16010

Tightening Torque
(a): 3—5 N·m (0.3—0.5 kg-m, 2.2—3.6 lb-ft)

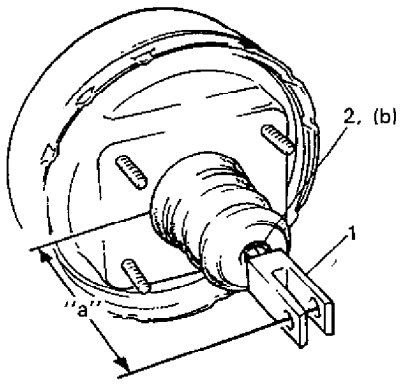
14) Turn special tool bolt counterclockwise until No.1 body projecting part comes to mid-position of No.2 body depressed parts as shown.
15) Remove booster from special tool.



1. Body boot
2. Booster liner

70F00-5-48-5

16) Install body boot end to booster liner.



1. Push rod clevis
2. Nut

70F00-5-49-1

17) Install push rod clevis so that dimension "a" as shown is within 95.5—96.5 mm (3.76—3.80 in.) and torque nut to specification.

NOTE:
Dimension "a" does not include thickness of gasket.

Dimension "a": 95.5—96.5 mm (3.76—3.80 in.)

Tightening Torque
(b): 12—16 N·m (1.2—1.6 kg-m, 9.0—11.5 lb-ft)

NOTE:
Whenever booster was disassembled, make sure to check clearance between piston rod and master cylinder piston after reassembly. (For details, refer to page 5-50.)

18) For installation of booster, see steps 1) to 10) of its INSTALLATION on page 5-42.

70F00-5-49-3

BRAKE BOOSTER INSPECTION AND ADJUSTMENT

1. INSPECT BOOSTER INNER PARTS

NOTE:

After disassembly, soak all metal parts in ethyl alcohol. Wipe rubber diaphragm and plastic parts with a clean cloth. Use ethyl alcohol damped cloth to wipe out heavy dirt. Application of much ethyl alcohol especially to rubber parts is prohibited.

RUBBER PARTS

Wipe fluid from rubber parts and carefully inspect each rubber part for cuts, nicks or other damage. These parts are key to air flow control.

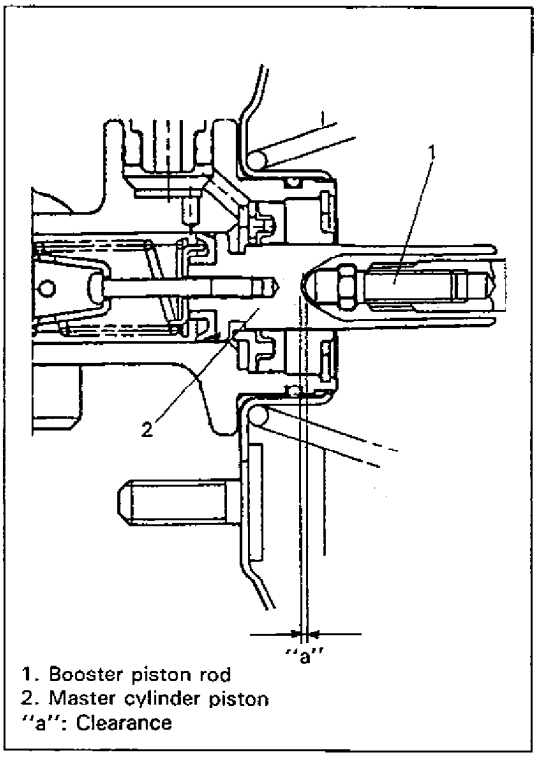
If there is any question as to serviceability of rubber parts, **REPLACE** them.

64B40-5-62-1

METAL PARTS

BADLY DAMAGED ITEMS, OR THOSE WHICH WOULD TAKE EXTENSIVE WORK OR TIME TO REPAIR, SHOULD BE REPLACED. IN CASE OF DOUBT, INSTALL NEW PARTS.

64B40-5-62-3



1. Booster piston rod
2. Master cylinder piston

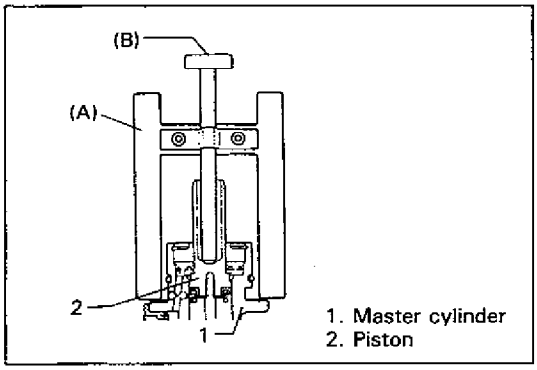
"a": Clearance

70F00-5-50-4

2. INSPECT/ADJUST CLEARANCE BETWEEN BOOSTER PISTON ROD AND MASTER CYLINDER PISTON

The length of booster piston rod is adjusted to provide specified clearance between piston rod end and master cylinder piston.

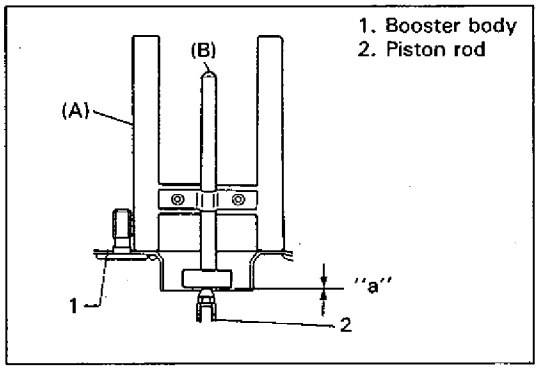
- Before neasuring clearance, push piston rod several times so as to make sure reaction disc is in place.
- Keep inside of booster at atmospheric pressure for measurement.



70F00-5-51-1

1) Set special tools on master cylinder and push pin until contacts piston.

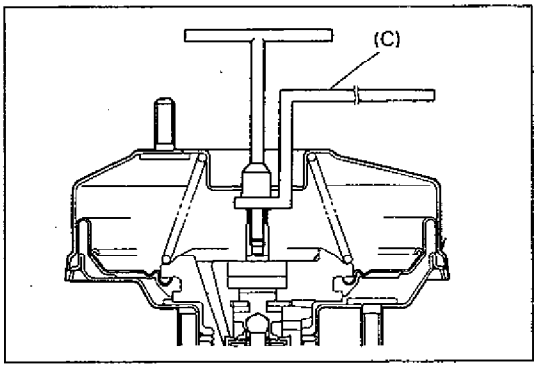
Special Tool
(A): 09950-98210
(B): 09950-96020



70F00-5-51-2

2) Turn special tools upside down and place it on booster. Adjust booster piston rod length until rod end contacts pin head.

Clearance "a"
(Between special tool and piston rod) : 0 mm (0 in.)



70F00-5-51-3

3) Adjust clearance by turning adjusting screw of piston rod.

Special Tool
(C): 09952-16030

Reference
When adjusted as above, if negative pressure is applied to booster with engine at idle, piston to piston rod clearance should become 0.10—0.35 mm (0.004—0.013 in.).

64B40-5-63-4

3. INSPECT BOOSTER OPERATION

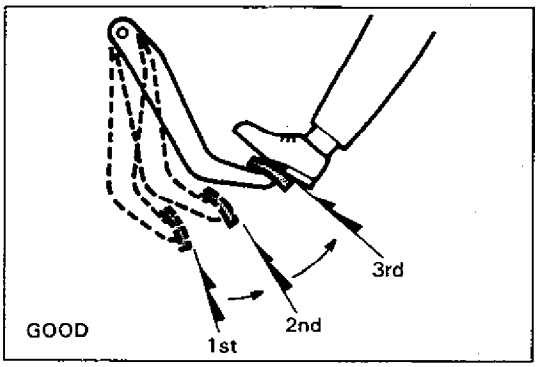
There are two ways to perform this inspection, with and without a tester. Ordinarily, it is possible to roughly determine its condition without using a tester.

64B40-5-64-1

NOTE:
For this check, make sure that no air is in hydraulic line.

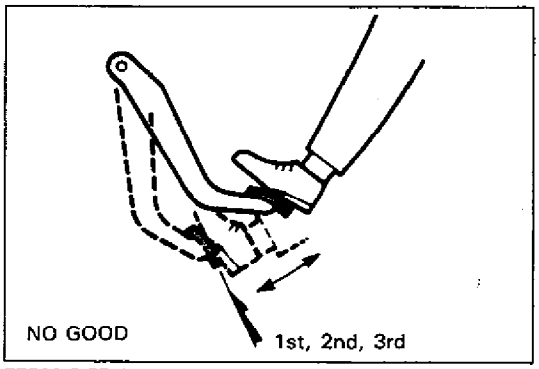
INSPECTION WITHOUT TESTER
Check Air Tightness
1) Start engine.
2) Stop engine after running for 1 to 2 minutes.

77500-5-57-2



3) Depress brake pedal several times with the same load as in ordinary braking and observe pedal travel. If pedal goes down deep the first time but its travel decreases as it is depressed the second and more times, air tightness is obtained.

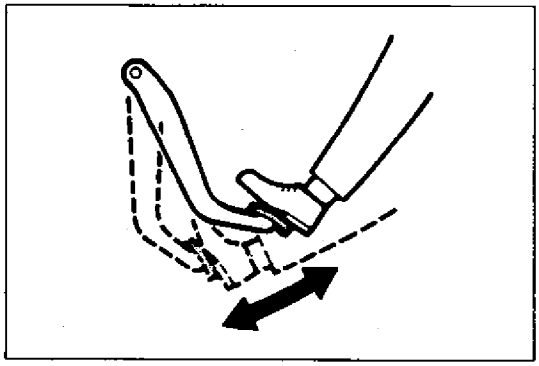
77500-5-57-3



4) If pedal travel doesn't change, air tightness isn't obtained.

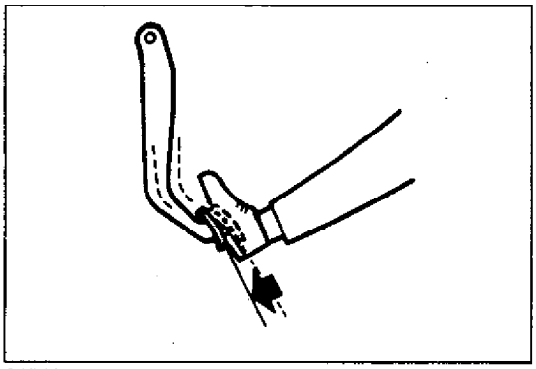
NOTE:
If defective, inspect vacuum lines and sealing parts, and replace any faulty part.
When this has been done, repeat the entire test.

77500-5-57-4



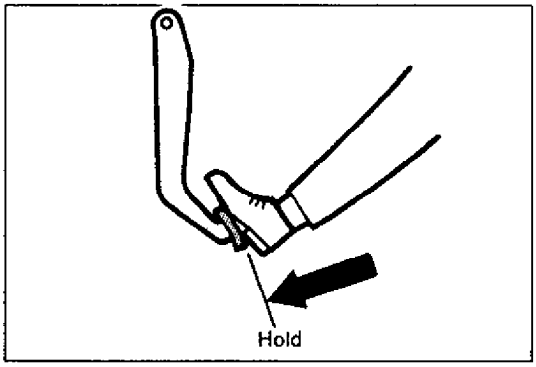
Check Operation
1) With engine stopped, depress brake pedal several times with the same load and make sure that pedal travel doesn't change.

77500-5-57-5



64B40-5-65-1

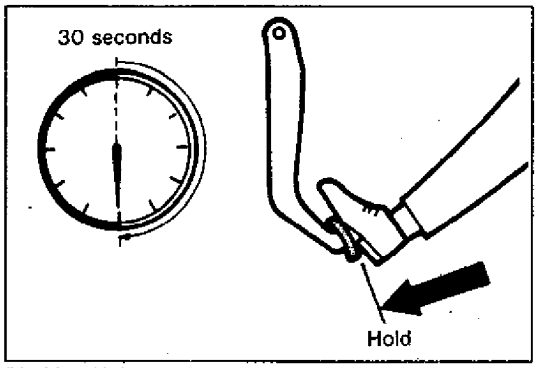
2) Start engine while depressing brake pedal. If pedal travel increases a little, operation is satisfactory. But no change in pedal travel indicates malfunction.



77500-5-58-2

Check Air Tightness Under Load

1) With engine running, depress brake pedal. Then stop engine while holding brake pedal depressed.

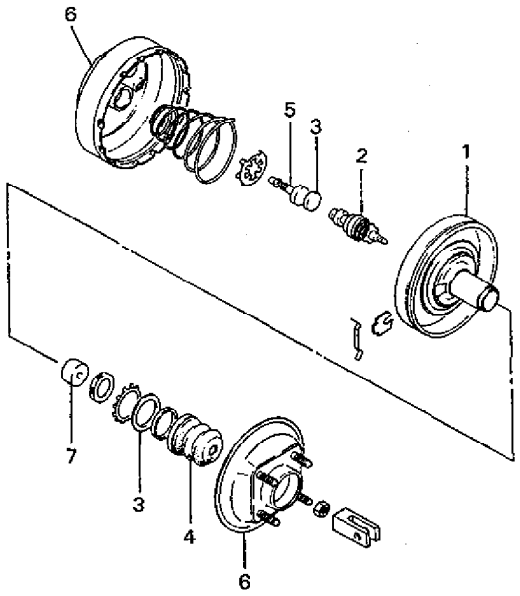


77500-5-58-3

2) Hold brake pedal depressed for 30 seconds. If pedal height does not change, condition is good. But it isn't if pedal rises.

4. BOOSTER INSPECTION TABLE

Part	Inspect For	Corrective Action
1. Diaphragm comp.	Cracks, distortion or damage.	Replace.
2. Air valve ass'y (Control valve and spring)	Damaged or worn seal surfaces.	Replace.
3. Reaction disc and piston guide	Damage or wear.	Replace.
4. Body boot	Damage.	Replace.
5. Piston rod	Damage, bend or cracks.	Replace.
6. Booster No.1 & No.2 body	1. Scratches, scores, pits, dents, or other damage affecting rolling or sealing of diaphragm or other seals.	Replace, unless easily repaired.
	2. Cracks, damage at ears, damaged threads on studs.	Replace, unless easily repaired.
	3. Bent or nicked locking plugs.	Replace, unless easily repaired.
	4. Loose studs.	Replace.
7. Air cleaner separator	Dirt.	Replace.



70F00-5-54-1

RECOMMENDED TORQUE SPECIFICATIONS

Fastening parts		Tightening torque		
		N·m	kg-m	lb-ft
1. Brake caliper pin bolt (Front)		22—32	2.2—3.2	16.0—23.0
2. Brake caliper carrier bolt (Front)		70—100	7.0—10.0	51.0—72.0
3. Front flexible hose bolt		20—25	2.0—2.5	14.5—18.0
4. Rear brake bolt (Brake back plate bolt)		18—28	1.8—2.8	13.5—20.0
5. Master cylinder nut and booster nut		10—16	1.0—1.6	7.5—11.5
6. Brake pipe 4-way joint bolt		8—12	0.8—1.2	6.0—8.5
7. Proportioning valve bolt				
8. Brake pipe flare nut		14—18	1.4—1.8	10.5—13.0
9. Brake pedal shaft nut		18—28	1.8—2.8	13.5—20.0
10. Rear axle castle nut		80—120	8.0—12.0	58.0—86.5
11. Brake bleeder plug	(Front caliper)	7—10	0.7—1.0	5.5—7.0
	(Rear wheel cylinder)			
12. Wheel nut		70—100	7.0—10.0	51.0—72.0
13. Front drive shaft nut (For solid disc type)		150—200	15.0—20.0	108.5—144.5
14. Front brake disc bolt (For solid disc type)		40—60	4.0—6.0	29.0—43.0
15. Front brake disc screw (For vantilated disc type)		6—9	0.6—0.9	4.5—6.5

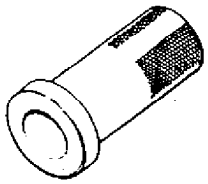
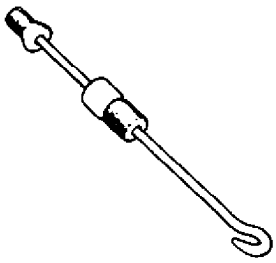
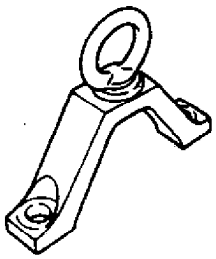
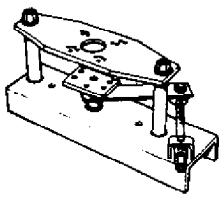
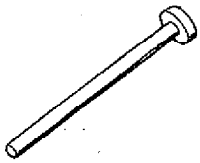
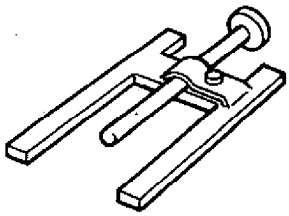
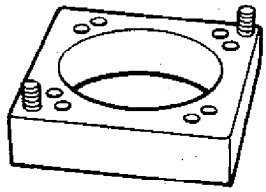
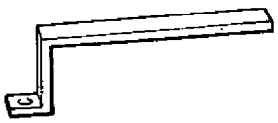
70F00-5-55-1

REQUIRED SERVICE MATERIALS

MATERIALS	RECOMMENDED SUZUKI PRODUCT	USE
Brake fluid	Indicated on reservoir tank cap or described in owner's manual of vehicle	• To fill master cylinder reservoir. • To clean and apply to inner parts of master cylinder, brake caliper and wheel cylinder when they are disassembled.
Silicone grease	Furnished in repair kit	• To apply to brake booster inner parts where application is instructed in this manual.
Rubber grease	Furnished in repair kit	• To apply to rear brake caliper inner parts where to applicate is instructed in this manual.
Water right sealant	SEALING COMPOUND 366E 99000-31090	• To apply to mating surfaces of brake back plate and rear knickle. • To apply to mating surfaces of brake back plate and parking brake cable.

70F00-5-55-2

SPECIAL TOOLS

 09913-85210 Wheel bearing installer (For solid disc type only)	 09942-15510 Sliding hammer	 09943-17911 Brake drum remover (Front wheel hub remover)	 09950-78210 Flare nut wrench (10 mm)
 09950-88210 Booster overhaul tool set	 09950-96020 Boooster piston rod gauge pin	 09950-98210 Booster piston rod gauge	 09951-16010 Booster overhaul attachment
 09952-16030 Booster piston rod adjuster			

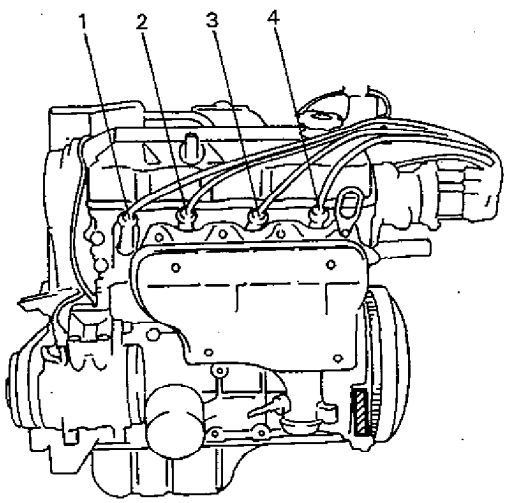
70F00-5-56-1

SECTION 6

ENGINE

CONTENTS

70F00-6-1-1



1. No.1 cylinder
2. No.2 cylinder
3. No.3 cylinder
4. No.4 cylinder

70F00-6-1-2

GENERAL INFORMATION

STATEMENT ON CLEANLINESS AND CARE

An automobile engine is a combination of many machined, honed, polished and lapped surfaces with tolerances that are measured in the thousands of an milimeter (ten thousands of an inch).
Accordingly, when any internal engine parts are serviced, care and cleanliness are important.
Throughout this section, it should be understood that proper cleaning and protection of machined surfaces and friction areas is part of the repair procedure. This is considered standard shop practice even if not specifically stated.

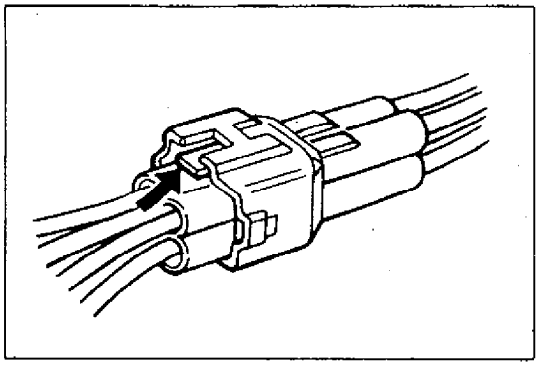
- A liberal coating of engine oil should be applied to friction areas during assembly to protect and lubricate the surfaces on initial operation.
- Whenever valve train components, pistons, piston rings, connecting rods, rod bearings, and crankshaft journal bearings are removed for service, they should be retained in order.
  At the time of installation, they should be installed in the same locations and with the same mating surfaces as when removed.
- Battery cables should be disconnected before any major work is performed on the engine.
  Failure to disconnect cables may result in damage to wire harness or other electrical parts.
- Throughout this manual, the four cylinders of the engine are identified by numbers; No.1 No.2, No.3 and No.4 counted front crankshaft pulley side to flywheel side.

GENERAL INFORMATION ON ENGINE SERVICE

THE FOLLOWING INFORMATION ON ENGINE SERVICE SHOULD BE NOTED CAREFULLY, AS IT IS IMPORTANT IN PREVENTING DAMAGE, AND IN CONTRIBUTING TO RELIABLE ENGINE PERFORMANCE.

- When raising or supporting engine for any reason, do not use a jack under oil pan. Due to small clearace between oil pan and oil pump strainer, jacking against oil pan may cause it to be bent against strainer resulting in damaged oil pick-up unit.
- It should be kept in mind, while working on engine, that 12-volt electrical system is capable of violent and damaging short circuits.
  When performing any work where electrical terminals could possible be grounded, ground cable of the battery should be disconnected at battery.
- Any time the air cleaner, throttle body, carburetor or intake manifold is removed, the intake opening should be covered. This will protect against accidental entrance of foreign material which could follow intake passage into cylinder and cause extensive damage when engine is started.

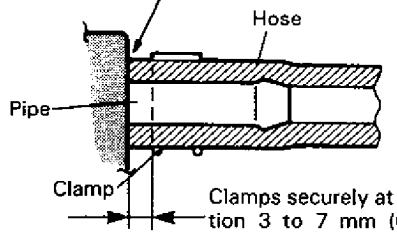
70F00-6-2-1



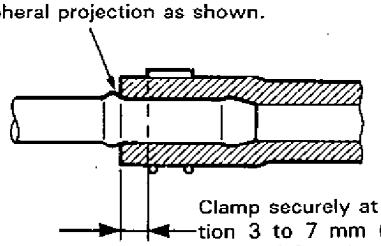
70F00-6-2-3

- When disconnecting couplers, don't pull wire harness but make sure to hold coupler itself. With lock type coupler, be sure to unlock the lock before disconnection. Attempt to disconnect coupler without unlocking may result in damage to coupler.
  When connecting lock type coupler, insert it till clicking sound is heard and connect it securely.

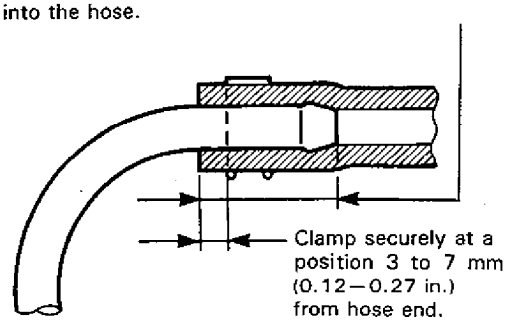
With short pipe, fit hose as far as it reaches pipe joint as shown.



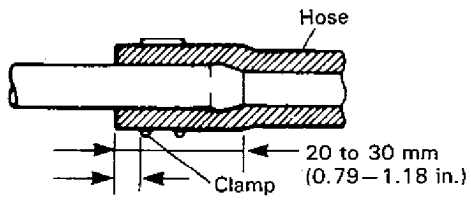
With following type pipe, fit hose as far as its peripheral projection as shown.



With bent pipe, fit hose as its bent part as shown or till pipe is about 20 to 30 mm (0.79–1.18 in.) into the hose.



With straight pipe, fit hose till pipe is about 20 to 30 mm (0.79–1.18 in.) into the hose.

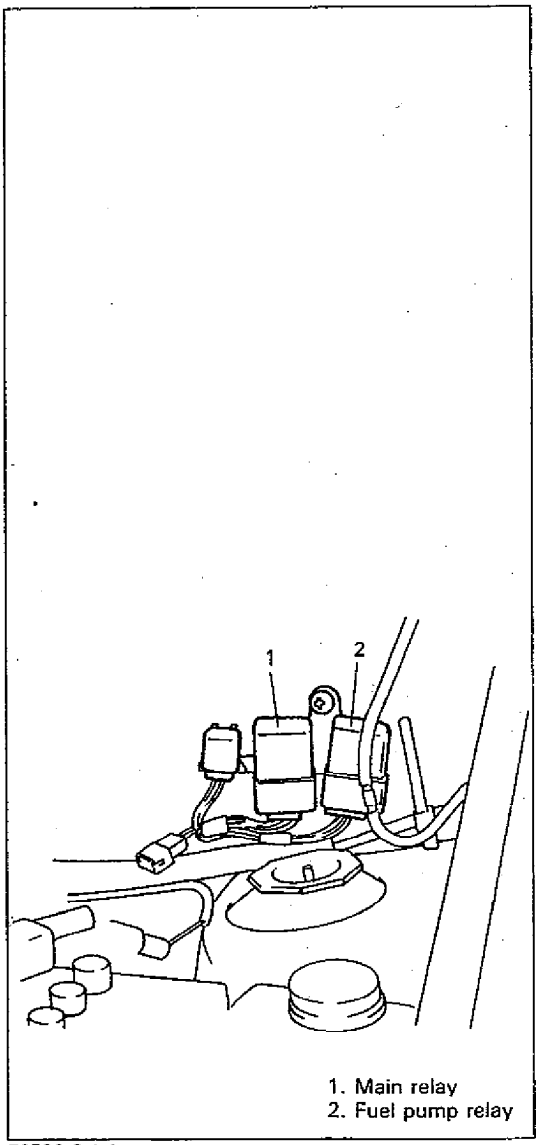


Clamp securely at a position 3 to 7 mm (0.12–0.27 in.) from hose end.

70F00-6-3-1

PRECAUTION ON FUEL SYSTEM SERVICE

- Work must be done with no smoking, in a well-ventilated area and away from any open flames.
- Fuel Injection Model
  As fuel feed line (between fuel pump and fuel pressure regulator) is still under high fuel pressure even after engine was stopped, loosening or disconnecting fuel feed line directly may cause dangerous spout of fuel to occur where loosened or disconnected.
  Before loosening or disconnecting fuel feed line, make sure to release fuel pressure according to "FUEL PRESSURE RELIEF PROCEDURE".
  A small amount of fuel may be released after the fuel line is disconnected.
  In order to reduce the chance of personal injury, cover the fitting to be disconnected with a shop cloth. Put that cloth in an approved container when disconnection is completed.
- Never run engine with fuel pump relay disconnected when engine and exhaust system are hot.
- Fuel or fuel vapor hose connection varies with each type of pipe. When reconnecting fuel or fuel vapor hose, be sure to connect and clamp each hose correctly referring to left figure.
  After connecting, make sure that it has no twist or kink.
- When installing injector or fuel presure regulator, lubricate its O ring with spindle oil or gasoline.



1. Main relay
2. Fuel pump relay

70F00-6-4-1

FUEL PRESSURE RELIEF PROCEDURE

CAUTION:
This work must not be done when engine is hot. If done so, it may cause adverse effect to catalyst.

(For Fuel Injection model)

After making sure that engine is cold, relief fuel pressure as follows.

1) Place transmission gear shift lever in "Neutral", set parking brake, and block drive wheels.
2) Disconnect coupler from fuel pump relay.
3) Remove fuel filler cap to release fuel vapor pressure in fuel tank and then reinstall it.
4) Start engine and run it till it stops for lack of fuel. Repeat cranking engine 2—3 times for about 3 seconds each time to dissipate fuel pressure in lines. Fuel connections are now safe for servicing.
5) Upon completion of servicing, connect coupler to fuel pump relay.

(For Carburetor model)

Remove fuel filler cap to release fuel vapor pressure in fuel tank and then reinstall it.

FUEL LEAKAGE CHECK PROCEDURE

After performing any service on fuel system, check to make sure that there are no fuel leakages as follows.

1) Turn ON ignition switch for 3 seconds (to operate fuel pump) and then turn it OFF.
   Repeat this (ON and OFF) 3 or 4 times and apply fuel pressure to fuel line (till fuel pressure is felt by hand placed on fuel return hose.)
2) In this state, check to see that there are no fuel leakages from any part of fuel system.

70F00-6-4-4

ENGINE DIAGNOSIS

Condition	Possible Cause	Correction
Hard Starting (Engine cranks OK)	**Ignition system out of order.**	
	• Blown fuse	Repair or replace.
	• Faulty spark plug	Clean and adjust plug gap or replace.
	• Leaky high-tension cord	Replace.
	• Loose connection or disconnection of high-tension cords or lead wires	Repair or replace.
	• Maladjusted signal rotor air gap	Adjust.
	• Improper ignition timing.	Adjust.
	• Faulty ignition coil	Replace.
	• Cracked rotor or cap in distributor	Replace.
	• Faulty pickup coil (signal generator) or igniter	Replace.
	• Faulty noise suppressor	Replace.
	• Faulty ECM (Fuel injection model)	Replace.
	Fuel system out of order.	
	• Lack of fuel in fuel tank	Refill.
	• Dirty fuel filter	Replace.
	• Dirty or clogged fuel hose or pipe	Clean.
	• Malfunctioning fuel pump	Replace.
	• Carburetor choke not working properly	Check and adjust.
	• Air inhaling from intake system	Repair or replace.
	• Improper adjustment of float level (Carburetor model)	Adjust.
	• Malfunctioning fuel cut solenoid valve (Carburetor model)	Check solenoid valve for operation. Replace if necessary.
	• Carburetor out of adjustment (Carburetor model)	Adjust.
	Electronic fuel injection system out of order. (Fuel injection model)	Refer to SECTION 6E.
	Low compression.	
	• Poor spark plug tightening or faulty gasket	Tighten to specified torque or replace gasket.
	• Incorrect valve lash	Adjust.
	• Compression leak from valve seat	Remove cylinder head and lap valves.
	• Sticky valve stem	Correct or replace valve and valve guide.
	• Weak or damaged valve springs	Replace valve springs.
	• Compression leak at cylinder head gasket	Repair or replace.
	• Sticking or damaged piston ring	Replace piston rings.
	• Worn piston, ring or cylinder	Replace ring and piston. Rebore or replace cylinder.

Condition	Possible Cause	Correction
	Others	
	• Broken valve timing belt	Replace.
	• Malfunctioning PCV valve	Replace.
	• Loose connection ro disconnection of vacuum hoses	Connect securely.
Engine has no power.	**Ignition system out of order.**	
	• Incorrect ignition timing	Adjust.
	• Defective spark plug	Adjust or replace.
	• Worn distributor terminals	Dress or replace. Also check rotor.
	• Leaks, loose connection or disconnection of high-tension cord	Connect or replace as necessary.
	• Malfunctioning ignition timing advancers	Replace.
	Fuel system out of order.	
	• Clogged fuel hose or pipe	Clean.
	• Dirty or clogged fuel filter	Replace.
	• Clogged air cleaner element	Clean or replace.
	• Air inhaling from intake manifold gasket	Replace gasket.
	• Malfunction of choke system (Carburetor model)	Adjust or replace.
	• Fuel pump not working properly (Carburetor model)	Replace.
	• Clogged carburetor jets (Carburetor model)	Clean.
	Electronic fuel injection system out of order. (Fuel injection model)	Refer to SECTION 6E
	Low compression.	Previously outlined.
	Engine overheating.	Refer to "Overheating" section.
	Others	
	• Malfunctioning EGR valve (if equipped)	Check and replace as necessary.
	• Dragging brakes	Repair or replace.
	• Slipping clutch	Adjust or replace.
	• Loose connection or disconnection of vacuum hoses	Connect securely.
Improper engine idling.	**Fuel system out of order.**	
	• Shortage of fuel in fuel tank	Refill.
	• Clogged air cleaner element	Clean or replace.
	• Leaky manifold, throttle body, (carburetor) or cylinder head gasket	Replace.
	• Clogged carburetor jets (Carburetor model)	Clean.
	• Improper float level (Carburetor model)	Adjust.
	• Malfunctioning of choke system (Carburetor model)	Adjust or replace.
	• Malfunctioning fuel cut solenoid valve (Carburetor model)	Replace.

Condition	Possible Cause	Correction
	Ignition system out of order.	
	• Defective spark plug	Adjust or replace.
	• Leaky or disconnected high-tension cord	Connect or replace.
	• Worn distributor terminals	Replace.
	• Improper ignition timing	Adjust.
	• Cracked cap in distributor, there being leakage inside	Replace.
	Engine overheating.	Refer to "Overheating" section.
	Electronic fuel injection system out of order.	Refer to SECTION 6E.
	Low compression.	Previously outlined.
	Others	
	• Loose connection or disconnection of vacuum hoses	Connect.
	• Malfunctioning EGR valve (if equipped)	Check and replace as necessary.
	• Malfunctioning PCV valve	Check and replace as necessary.
Engine hesitates (Momentary lack of response as accelerator pedal is depressed. Can occur at all vehicle speeds. Usually most severe when first trying to make vehicle move, as from a stop signal.)	**Ignition system out of order.**	
	• Improper ignition timing	Adjust.
	• Defective spark plug or plug gap out of adjustment	Replace or adjust gap.
	• Leaky high tension cord	Replace.
	Fuel system out of order.	
	• Clogged air cleaner element	Clean or replace.
	• Clogged fuel filter hose or pipe	Celan or replace.
	• Leaky manifold or throttle (carburetor) body gasket	Replace.
	• Improper adjustment of float level (Carburetor model)	Adjust.
	• Clogged carburetor jets (Carburetor model)	Clean.
	• Loose manifold and carburetor bolts and nuts (Carburetor model)	Retighten.
	• Malfunctioning accelerator pump (Carburetor model)	Check and replace as necessary.
	Engine overheating.	Refer to "Overheating" section.
	Electronic fuel injection system out of order.	Refer to SECTION 6E
	Low compression	Previously outlined
	Others	
	• Malfunctioning EGR valve (if equipped)	Check and replace as necessary.

Condition	Possible Cause	Correction
Surges (Engine power variation under steady throttle or cruise. Feels like vehicle speed up and down with no change in accelerator pedal.)	**Fuel system out of order.**	
	• Clogged fuel filter	Replace.
	• Kinky or damaged fuel hose and lines	Check and replace as necessary.
	• Leaky manifold or throttle (carburetor) gaskets	Replace.
	• Malfunctioning fuel pump	Check and replace as necessary.
	• Improper float level (Carburetor model)	Adjust.
	Ignition system out of order.	
	• Improper ignition timing	Adjust.
	• Malfunctioning ignition timing advancers (mechanical and vacuum)	
	• Leaky or loosely connected high-tension cord	Check and repair or replace.
	• Defective spark plug (excess carbon deposits, improper gap, and burned electrodes, etc.)	Check and clean, adjust or replace.
	• Cracket rotor or cap in distributor	Replace.
	Others	
	• Leaky vacuum hoses	Repair or replace.
	• Malfunctioning EGR valve (if equipped)	Check and replace as necessay.
Excessive detonation (Engine makes sharp metallic knocks that change with throttle opening. Sounds like pop corn popping.)	**Engine overheating.**	Refer to "Overheating" section.
	Ignition system out of order.	
	• Defective spark plug	Replace.
	• Improper ignition timing	Adjust.
	• Loose connection of high-tension cord	Connect securely.
	Fuel system out of order.	
	• Clogged fuel filter or fuel lines	Replace or clean.
	• Air inhaling from intake manifold or throttle body (carburetor) gasket	Replace.
	• Clogged carburetor jets (Carburetor model)	Clean.
	• Improper adjustment of float level (Carburetor model)	Adjust.
	• Malfunctioning fuel pump	Replace.
	Electronic fuel injection system out of order.	Refer to SECTION 6E.
	Others	
	• Excessive combustion chamber deposits	Remove carbon.
	• Malfunctioning EGR valve (if equipped)	Check and replace as necessary.

70F00-6-8-1

Condition	Possible Cause	Correction
Overheating	• Insufficient coolant	Replenish.
	• Loose water pump belt	Adjust.
	• Inoperative thermostat	Replace.
	• Poor water pump performance	Replace.
	• Improper ignition timing	Adjust.
	• Clogged or leaky radiator	Flush, repair or replace.
	• Improper enginen oil grade	Replace with proper grade oil.
	• Clogged oil filter or oil strainer	Replace or clean (oil strainer).
	• Not enough oil	Replenish.
	• Poor oil pump performance	Repair or replace.
	• Oil leakage	Repair.
	• Dragging brakes	Repair or replace.
	• Slipping clutch	Adjust or repair.
	• Blown cylinder head gasket	Replace.
Poor gasoline mileage	**Fuel system out of order.**	
	• Fuel leakage from fuel tank, throttle body (carburetor) and lines	Repair or replace.
	• Clogged air cleaner element	Clean or replace.
	• Malfunctioning carburetor choke system (Carburetor model)	Repair or replace.
	• Improper float level (Carburetor model)	Adjust.
	• Dirty or clogged carburetor jets. (Carburetor model)	Clean.
	Ignition system out of order.	
	• Improper ignition timing	Adjust.
	• Leaks or loose connection of high-tension cord	Repair or replace.
	• Defective spark plug (improper gap, heavy deposits, and burned electrodes, etc.)	Clean, adjust or replace.
	• Malfunctioning mechanical and vacuum advancers in distributor	Check and repair or replace.
	Electronic fuel injection system out of order.	Refer to SECTION 6E.
	Low compression.	Previously outlined
	Others	
	• Poor valve seating	Repair or replace.
	• Dragging brakes	Repair or replace.
	• Slipping clutch	Adjust or replace.
	• Thermostat out of order	Replace.
	• Improper tire pressure	Adjust.
	• Malfunctioning EGR valve (if equipped)	Check and replace as necessary.

Condition	Possible Cause	Correction
Excessive engine oil consumption	**Oil leakage.**	
	• Loose oil drain plug	Tighten.
	• Loose oil pan bolts	Tighten.
	• Deteriorated or broken oil pan sealant	Replace sealant.
	• Leaky crankshaft oil seals	Replace.
	• Leaky cylinder head cover gasket	Replace.
	• Improper tightening of oil filter	Tighten.
	• Loose oil pressure switch	Tighten.
	• Blown cylinder head gasket	Replace.
	• Leaky camshaft oil seals	Replace.
	Oil entering combustion chamber.	
	• Sticky piston ring	Remove carbon and replace rings.
	• Worn piston and cylinder	Replace or rebore cylinder, and replace piston.
	• Worn piston ring groove and ring	Replace piston and ring.
	• Improper location of piston ring gap	Reposition ring gap.
	• Worn or damaged valve stem seal	Replace.
	• Worn valve stem	Replace.
Low oil pressure	• Improper oil viscosity	Use oil of proper viscosity.
	• Malfunctioning oil pressure switch	Replace.
	• Not enough oil	Replenish.
	• Clogged oil strainer	Clean.
	• Functional deterioration of oil pump	Replace.
	• Worn oil pump relief valve	Replace.
	• Excessive clearance in various sliding parts	Replace worn parts.
Engine noise Note: Before checking mechanical noise, make sure that: • Ignition timing is properly adjusted. • Specified spark plug is used. • Specified fuel is used.	**Valve noise.**	
	• Improper valve lash	Adjust.
	• Worn valve stem and guide	Replace.
	• Weak or broken valve spring	Replace.
	• Warped or bent valve	Replace.
	Piston, ring and cylinder noise.	
	• Worn piston, ring and cyliner bore	Rebore or replace cylinder. Replace piston and ring .
	Connecting rod noise.	
	• Worn rod bearing	Replace.
	• Worn crank pin	Repair by grinding or replace crankshaft.
	• Loose connecting rod nuts	Tighten nuts to specification.
	• Low oil pressure	Previously outlined.

70F00-6-10-1

Condition	Possible Cause	Correction
	Crankshaft noise.	
	• Low oil pressure	Previously outlined.
	• Worn bearing	Replace.
	• Worn crankshaft journal	Repair by grinding, or replace crankshaft.
	• Loose bearing cap bolts	Tighten bolts to specification.
	• Excessive crankshaft thrust play	Replace thrust bearing.
Dieseling (Engine continues to run after ignition switch is turned off. It runs unevenly and may make knocking noise.)	Malfunctioning fuel cut solenoid valve in carburetor (Carburetor model)	Check valve for proper operation, and replace as necessary.

70F00-6-11-1

6A

SECTION 6A

ENGINE MECHANICAL

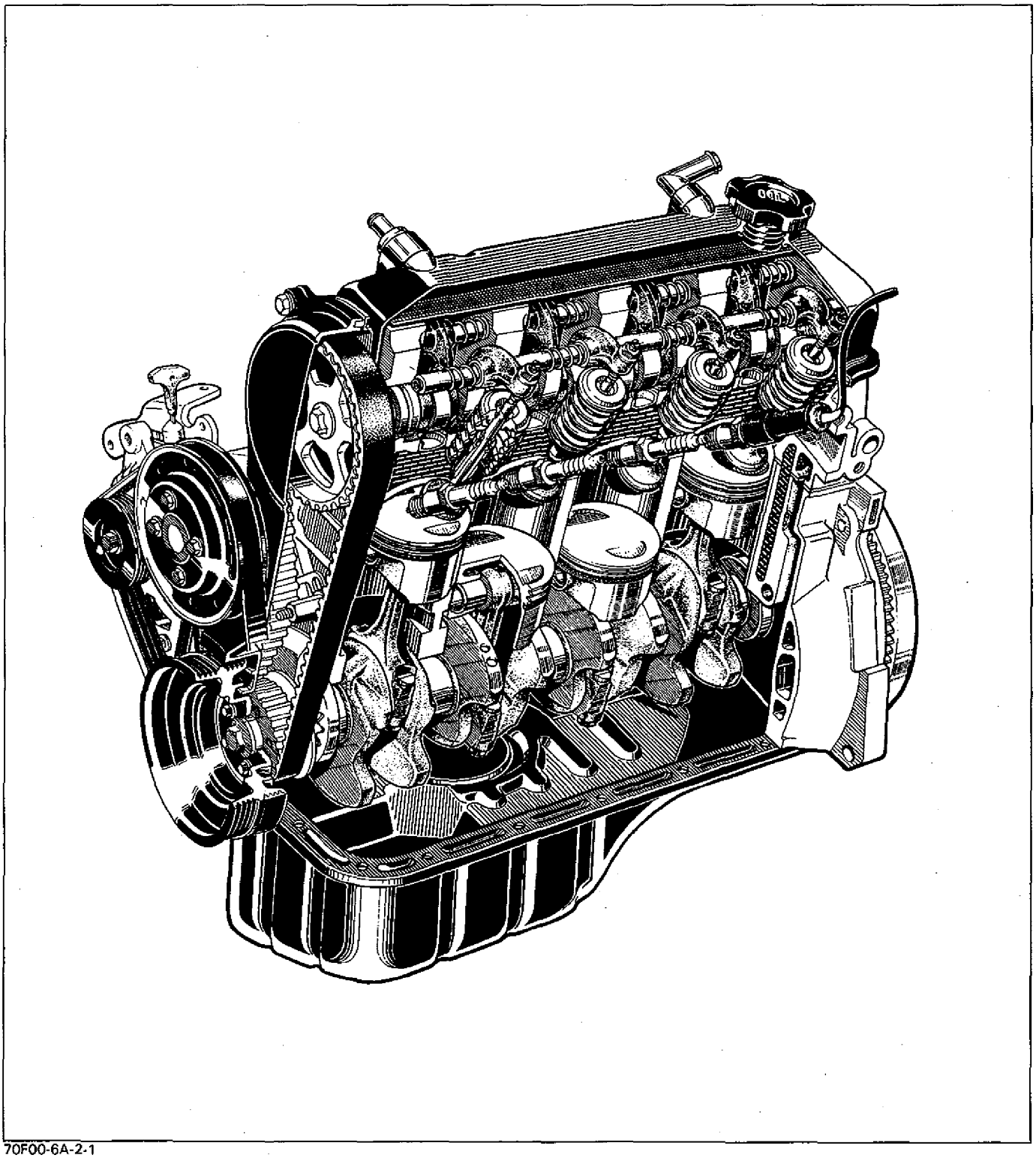
CONTENTS

GENERAL DESCRIPTION

ENGINE

The engine is a water-cooled, in line 4 cylinders, 4 stroke cycle gasoline unit with its S.O.H.C. (Single Overhead Camshaft) valve mechanism arranged for "V"-type valve configuration.

The single overhead camshaft is mounted over the cylinder head; it is driven from crankshaft through timing belt, and no push rods are provided in the valve train system.



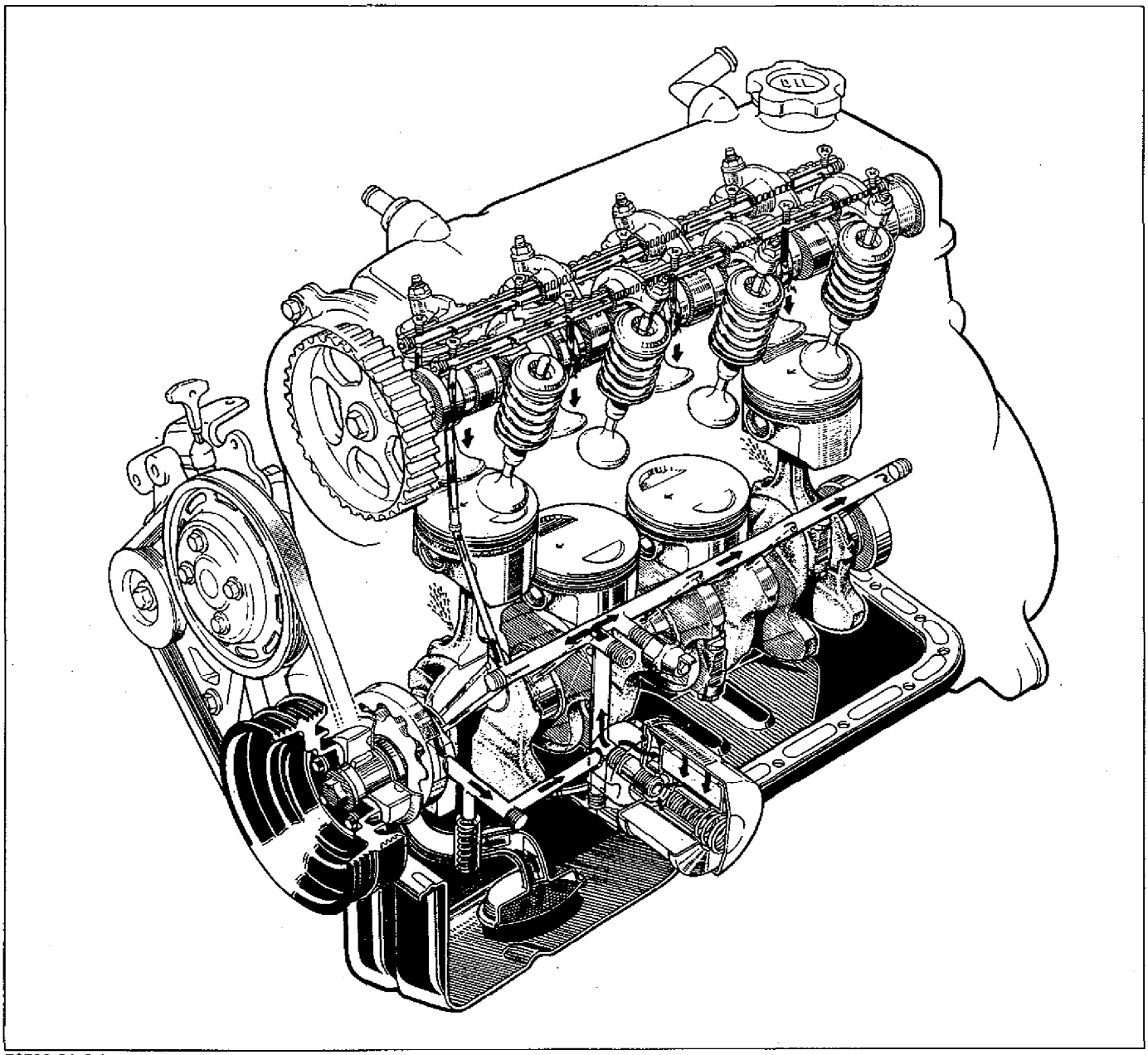
70F00-6A-2-1

ENGINE LUBRICATION

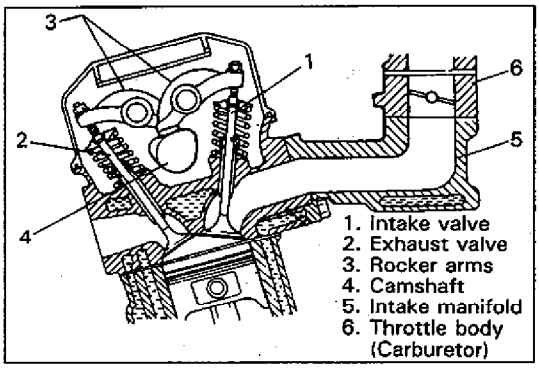
The oil pump is of a trochoid type, and mounted on crankshaft at crankshaft pulley side.
Oil is drawn up through oil pump strainer and passed through pump to oil filter.
The filtered oil flows into two paths in cylinder block.
In one path, oil reaches crankshaft journal bearings.
Oil from crankshaft journal bearings is supplied to connecting rod bearings by means of intersecting passages drilled in crankshaft, and then injected from a small hole provided on big end of connecting rod to lubricate piston, rings, and cylinder wall.

In another path, oil goes up to cylinder head and lubricates rocker arms, valves and camshaft, etc., after passing through the internal oilway of rocker arm shafts.

An oil relief valve is provided on oil pump. This valve starts relieving oil pressure when the pressure comes over about 4.0 kg/cm² (56.9 psi, 400 kPa). Relieved oil drains back to oil pan.



70F00-6A-3-1



70F00-6A-4-1

CYLINDER HEAD AND VALVE TRAIN

The cylinder head is made of cast aluminum alloy and has four combustion chambers arranged inline. Each combustion chamber has an intake and an exhaust ports.

A single overhead camshaft driven by the crankshaft through the timing belt is mounted on the cylinder head.

The camshaft has eight cams, and each cam operates the intake or exhaust valve through rocker arm. The valve lash can be adjusted by turning the adjusting screw on the rocker arm after loosening the lock nut.

CYLINDER BLOCK

The cylinder block is made of cast aluminum alloy and has 4 cylinders arranged "In-Line". A cylindrical cast iron sleeve is installed in each cylinder.

77500-6A-4-2

CRANKSHAFT AND MAIN BEARINGS

A monoblock casting crankshaft is supported by 5 main bearings which are of precision insert type. Four crank pins of the crankshaft are positioned 180° apart.

77500-6A-4-3

PISTONS, RINGS, PISTON PINS AND CONNECTING RODS

The piston is cast aluminum alloy, and has two compression rings and one oil ring.

Among two compression rings (top and 2nd rings), the outer surface of the top ring is treated with nitriding and the 2nd ring is plated with hard chromium for improvement in abrasion resistance.

The oil ring consists of two rails and one spacer.

The piston pin is offset 0.5 mm towards the major thrust side. This allows a gradual change in thrust pressure against the cylinder wall as the piston travels its path. Pins, made of chromium steel, have a floating fit in the pistons and connecting rods.

The connecting rods are made of forged steel, and the rod bearings are of precision insert type.

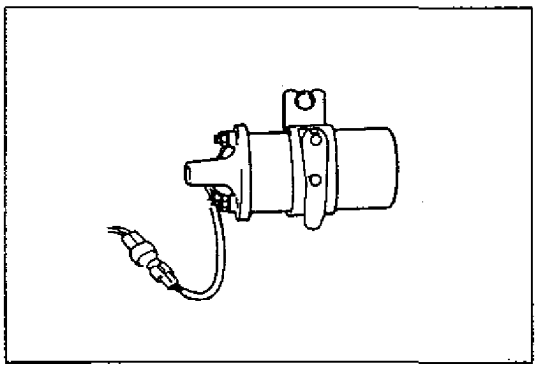
64B40-6A-4-3

ON-VEHICLE SERVICE

COMPRESSION CHECK

Check compression pressure on all four cylinders as follows:
1) Warm up engine.
2) Stop engine after warming up.
3) Remove all spark plugs.

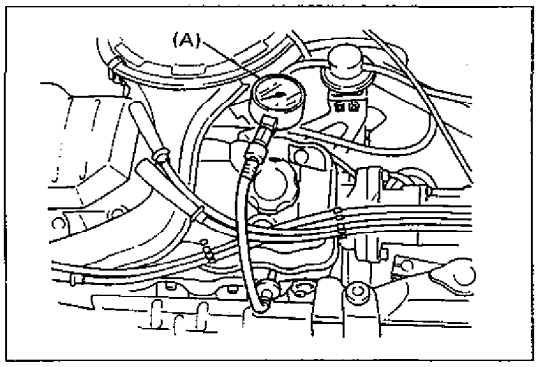
70F00-6A-5-1



70F00-6A-5-2

4) Disconnect ignition coil wire harness at coupler.

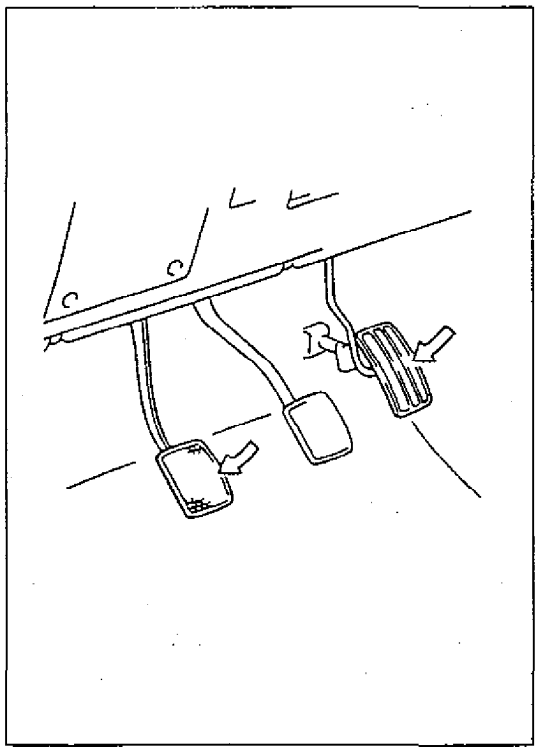
WARNING:
Failure in disconnecting ignition coil coupler can cause spark to occur in engine room possibly resulting in a dangerous explosion.



70F00-6A-5-3

5) Install special tool (Compression gauge) into spark plug hole.

Special Tool
(A): 09915-64510



70F00-6A-5-4

6) Disengage clutch (to lighten starting load on engine), and depress accelerator pedal all the way to make throttle valve full-open.
7) Crank engine with fully charged battery, and read the highest pressure on compression gauge.

	Compression pressure
Standard	14.0 kg/cm² (199.0 psi, 1400 kPa)/ 250 r/min or higher
Limit	11.0 kg/cm² (156.4 psi, 1100 kPa)/ 250 r/min or higher
Max. difference between any two cylinders	1.0 kg/cm² (14.2 psi, 100 kPa)

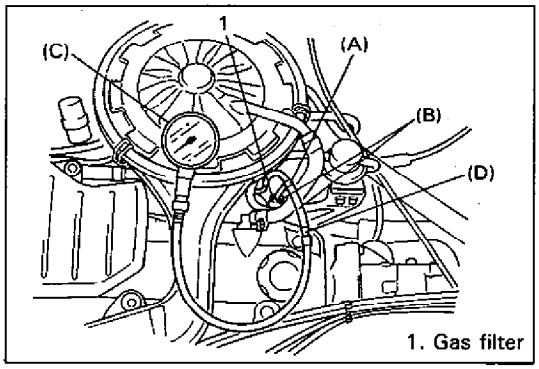
8) Carry out steps 5) through 7) on each cylinder to obtain four readings.
9) After checking, connect coupler of ignition coil and install spark plugs.

ENGINE VACUUM CHECK

The engine vacuum that develops in the intake line is a good indicator of the condition of the engine. The vacuum checking procedure is as follows:

1) Warm up engine to normal operating temperature.

70F00-6A-6-1



1. Gas filter

70F00-6A-6-2

2) With engine stopped, disconnect vacuum hoses from gas filter and connect 3-way joint, hoses and the special tool (vacuum gauge and joint) between gas filter and vacuum hose disconnected.

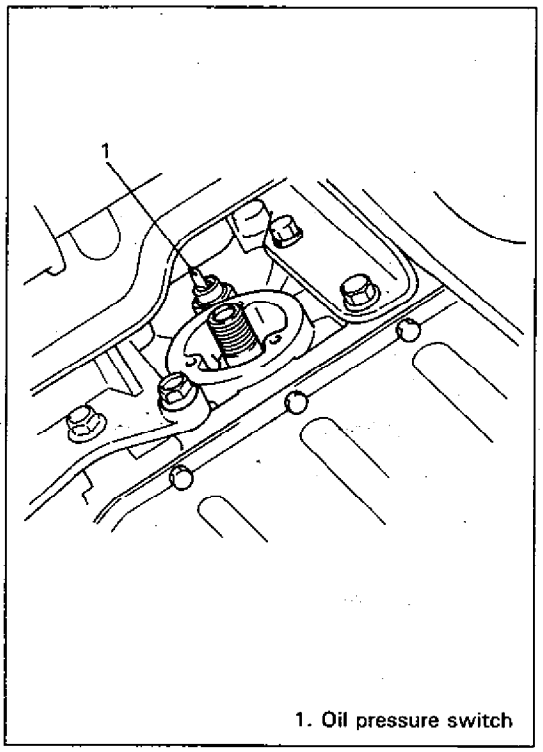
Special Tool
(A): 09367-04002
(B): 09343-03087
(C): 09915-67310
(D): 09918-08210

3) Run engine at specified idle speed (see section 6D or 6E), and read vacuum gauge. Vacuum should be within following specification.

Vacuum specification: 40—50 cm·Hg (15.7—19.7 in·Hg) at specified idling speed

4) After checking, connect vacuum hoses.

70F00-6A-6-3



1. Oil pressure switch

70F00-6A-6-4

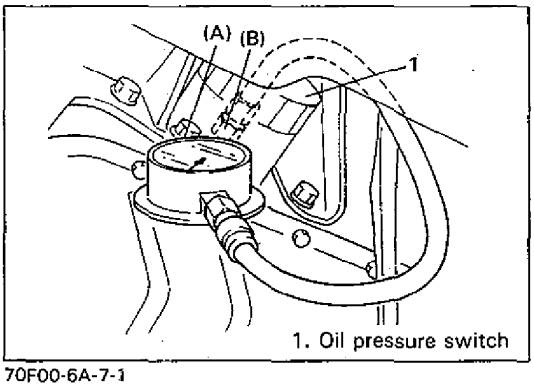
OIL PRESSURE CHECK

NOTE:

Prior to checking oil pressure, check the followings.

- **Oil level in oil pan.**
  If oil level is low, add oil up to Full level hole on oil level gauge.
- **Oil quality.**
  If oil is discolored, or deteriorated, change it.
  For particular oil to be used, refer to the table in Section 0B.
- **Oil leaks.**
  If leak is found, repair it.

1) Using special tool (Oil filter wrench), remove oil filter.
2) After removing oil filter, remove oil pressure switch from cylinder block.



70F00-6A-7-1

3) Install special tool (Oil pressure gauge) to vacated threaded hole.
Special Tool
(A): 09915-77310 (B): 09915-78211
4) Reinstall oil filter.
5) Start engine and warm it up to normal operating temperature.

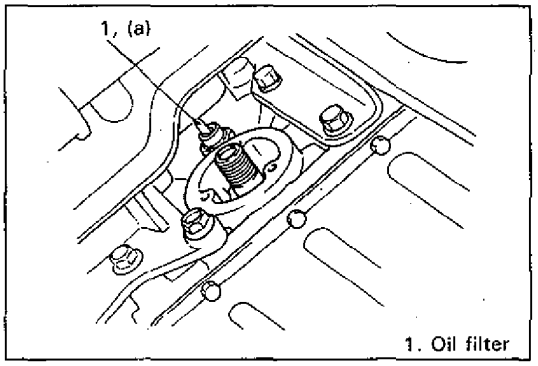
NOTE:
Check oil level in oil pan. If oil level is low, add oil up to Full level hole on oil level gauge.

6) After warming up, raise engine speed to 4,000 r/min and measure oil pressure.

Oil pressure specifications: 3.3—4.3 kg/cm² (46.9—61.1 psi) at 4,000 r/mim (rpm)

7) After checking oil pressure, stop engine and remove oil filter and oil pressure gauge.

70F00-6A-7-2



70F00-6A-7-3

8) Before reinstalling oil pressure switch, be sure to wrap its screw threads with a sealing tape and tighten switch to specified torque.

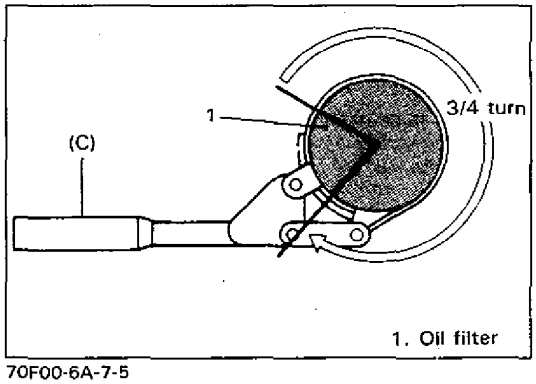
NOTE:
If sealing tape edge is bulged out from screw threads of switch, cut it off.

Tightening Torque
(a): 12—15 N·m (1.2—1.5 kg-m, 9.0—10.5 lb-ft)

9) After oiling oil filter "O" ring (rubber gasket), screw oil filter on oil filter stand by hand until filter "O" ring contacts mounting surface.

> **CAUTION:**
> **To tighten oil filter properly, it is important to accurately identify the position where filter "O" ring first contacts mounting surface.**

70F00-6A-7-4

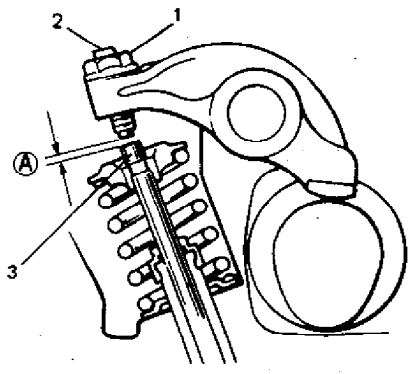


70F00-6A-7-5

10) Tighten filter 3/4 (270°) turn from the point of contact with mounting surface using an oil filter wrench.

Special Tool
(C): 09915-47310

> **CAUTION:**
> **To prevent oil leakage, make sure that oil filter is tight, but do not overtighten it.**



1. Adjusting screw lock nut
2. Adjusting screw
3. Valve stem

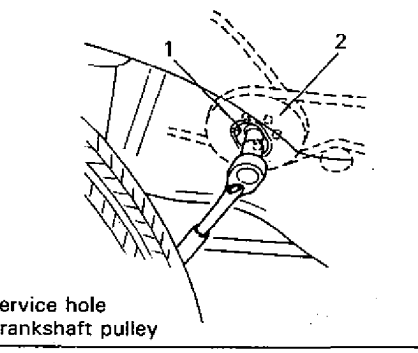
64B40-6A1-9-4

VALVE LASH

VALVE LASH SPECIFICATIONS

Valve lash refers to the gap between the rocker arm adjusting screw and valve stem. Use a thickness gauge to measure this gap Ⓐ.

		When cold (Coolant temperature is 15—25°C or 59—77°F)	When hot (Coolant temperature is 60—68°C or 140—154°F)
Vlave lash (gap Ⓐ) specification	Intake	0.13—0.17 mm (0.0051-0.0067 in)	0.23—0.27 mm (0.009-0.0106 in)
	Exhaust	0.15—0.19 mm (0.0059—0.0075 in)	0.25—0.29 mm (0.0098—0.0114 in)

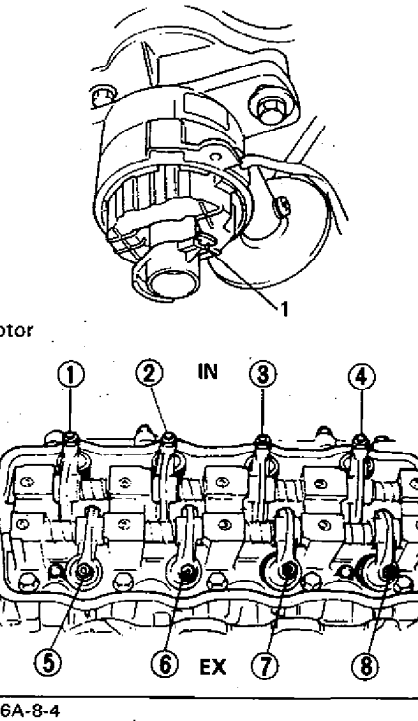


1. Service hole
2. Crankshaft pulley

70F00-6A-8-2

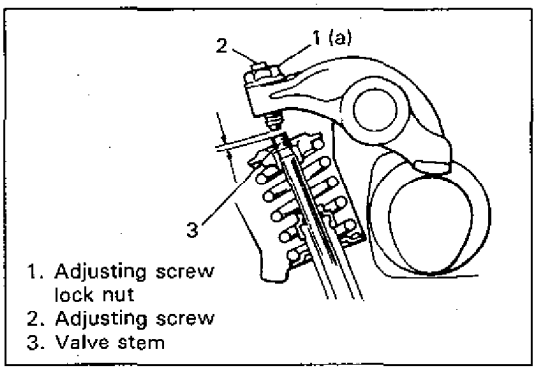
CHECKING AND ADJUSTING PROCEDURES

1) Disconnect negative cable at battery.
2) Remove cylinder head cover.
3) Remove service hole cap on right side fender apron panel.
4) Turn crankshaft pulley clockwise until "V" mark (in white paint) on pulley aligns with "0" (zero) calibrated on timing belt cover.



70F00-6A-8-4

5) Remove distributor cap, and check if rotor is positioned as shown in figure. (i.e. No.1 piston is at TDC of compession stroke). If rotor is out of place, turn crankshaft clockwise once (360°).
   In this state, check valve lashes at valves ①, ②, ⑤ and ⑦.

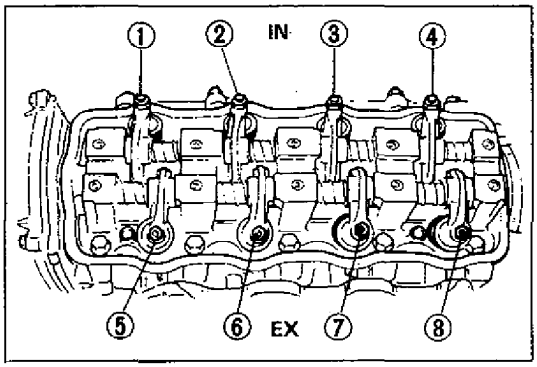


1. Adjusting screw lock nut
2. Adjusting screw
3. Valve stem

70F00-6A-9-1

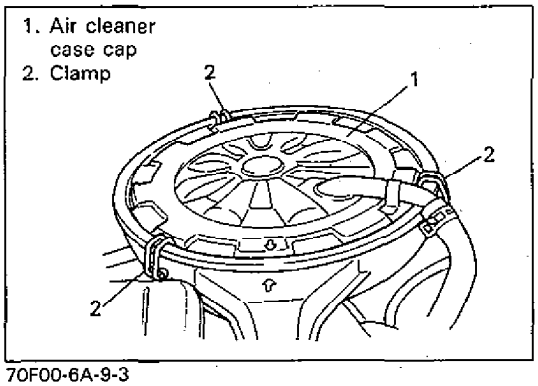
6) If valve lash is out of specification, adjust it to specification by turning adjusting screw after loosening lock nut. After adjustment, tighten lock nut to specified torque while holding adjusting screw stationary with screwdriver, and then make sure again that valve lash is within specification.

Tightening Torque
(a): 15—19 N·m (1.5—1.9 kg-m, 11.0—13.5 lb-ft)



70F00-6A-9-2

7) After checkinig and adjusting valve lashes at valves ① , ② , ⑤ and ⑦ rotate crankshaft exactly one full turn (360°), and check the same at valves ③ , ④ , ⑥ and ⑧. Adjust them as necessary.
8) After checking and adjusting all valves, install cylinder head cover, distributor cap and air cleaner assembly.



1. Air cleaner case cap
2. Clamp

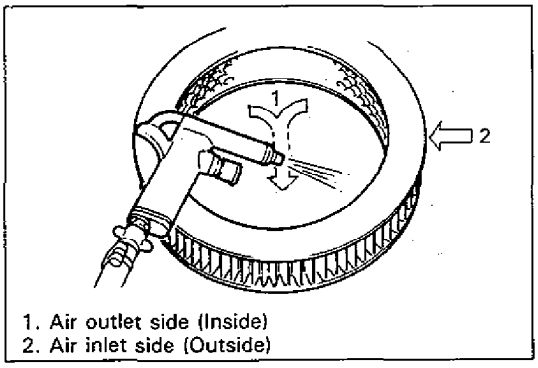
70F00-6A-9-3

AIR CLEANER ELEMENT

This air cleaner element is of dry type. Remember that it needs cleaning according to following procedure.

REMOVAL

1) Remove air cleaner case cap after removing clamps (and case nut).
2) Remove air cleaner element.



1. Air outlet side (Inside)
2. Air inlet side (Outside)

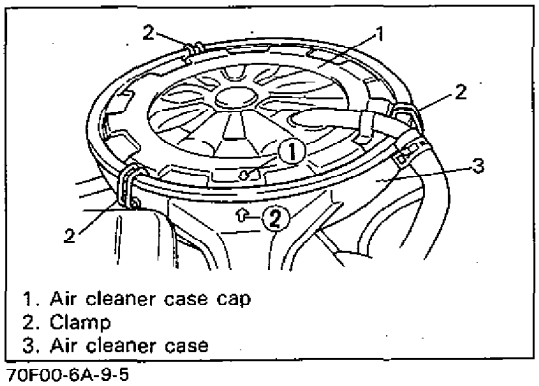
70F00-6A-9-4

INSPECTION

Check air cleaner element for dirt.

CLEANING

Blow off dust by compressed air from air outlet side of element.



1. Air cleaner case cap
2. Clamp
3. Air cleaner case

70F00-6A-9-5

INSTALLATION

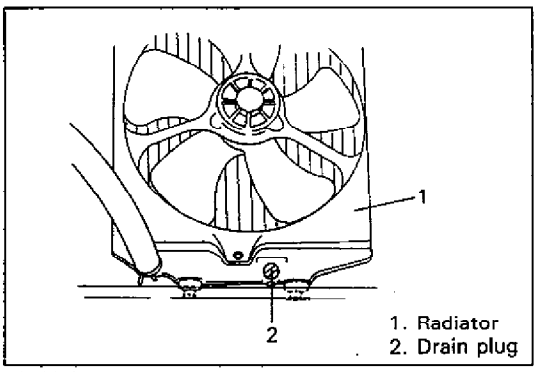
1) Install air cleaner element to air cleaner case.
2) Install air cleaner case cap.
   When installing air cleaner case cap, align arrow marks ① and ② .

ENGINE SERVICE NOT REQUIRED ENGINE REMOVAL

The following parts or components do not require engine removal to receive services (replacement, inspection or adjustment):

Part or Component	Nature of Service
1. Spark plug	Replacement or inspection
2. Distributor	Replacement, inspection or adjustment
3. Exhaust manifold	Replacement or inspection
4. Oil filter	Replacement
5. Oil pressure switch	Replacement
6. Cylinder head cover	Replacement
7. Rocker arm shaft	Replacement or inspection
8. Rocker arm	Replacement or inspection
9. Rocker arm spring	Replacement or inspection
10. Camshaft	Replacement or inspection
11. Cylinder head	Replacement or inspection
12. Radiator	Replacement or inspection
13. Cooling fan	Replacement
14. Camshaft timing belt pulley	Replacement or inspection
15. Crankshaft timing belt pulley	Replacement or inspection
16. Timing belt	Replacement or inspection
17. Fuel pump	Replacement
18. Throttle body (Carburetor)	Replacement, inspection or adjustment
19. Intake manifold	Replacement
20. Generator	Replacement or inspection
21. Starting motor	Replacement or inspection
22. Water pump belt	Replacement, inspection or tension adjustment
23. Water pump	Replacement
24. Pulleys (crank, generator, water pump)	Replacement
25. Timing belt cover	Replacement
26. Water hose	Replacement or inspection
27. Oil pan and oil strainer	Replacement or inspection
28. Oil pump	Replacement or inspection

70F00-6A-10-1

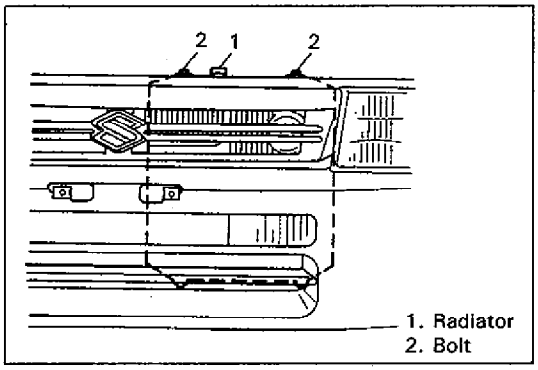


70F00-6A-11-1

UNIT REPAIR OVERHAUL

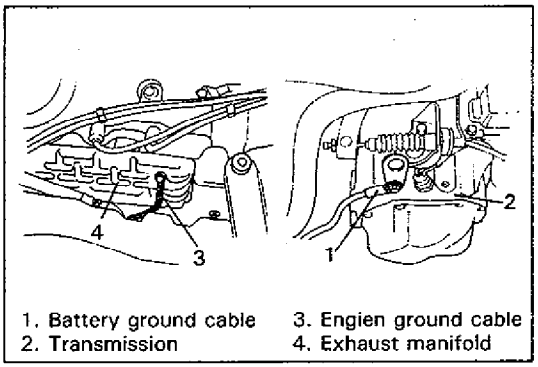
ENGINE REMOVAL

1) Relieve fuel pressure according to FUEL PRESSURE RELIEF PROCEDURE described in SECTION 6.
2) Remove engine hood after disconnecting windshield washer hose.
3) Remove battery and its tray.
4) Drain cooling system.



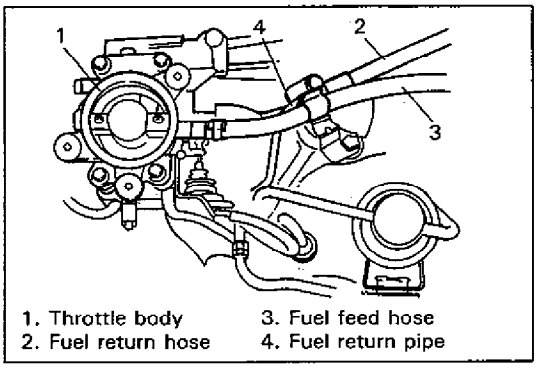
70F00-6A-11-2

5) Disconnect radiator outlet hose from outlet pipe.
6) Disconnect radiator inlet hose from inlet pipe.
7) Disconnect radiator fan lead wire at coupler.
8) Remove radiator.
9) Pull off ignition coil high-tension cord from ignition coil.
10) Disconnect engine harness from main haness at couplers.
11) Disconnect engine harness from main fuse.



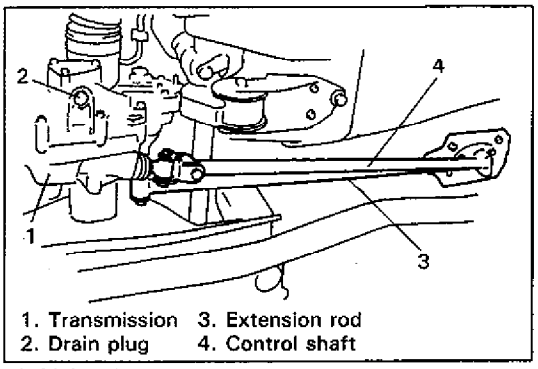
70F00-6A-11-3

12) Disconnect negative battery cable from transmission case, and reinstall engine hook.
13) Disconnect engine ground cable from exhaust manifold.
14) Disconnect clutch cable from clutch release arm and transmission case.
15) Disconnect speedometer cable from transmission case.



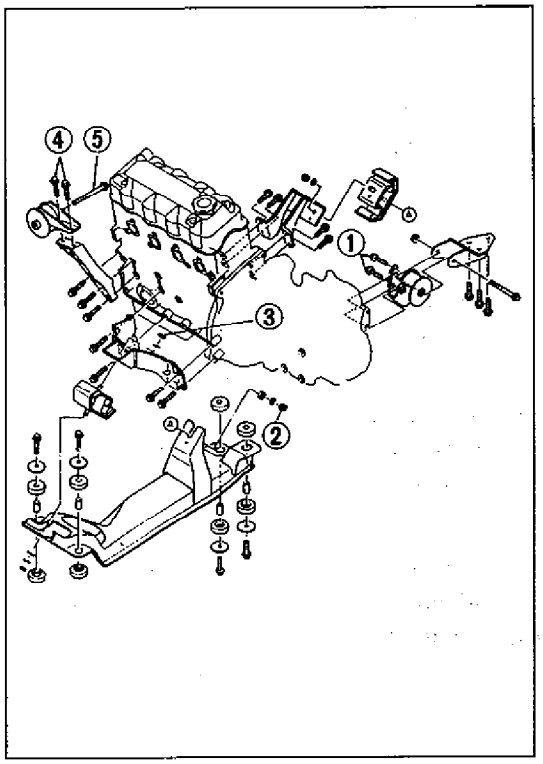
70F00-6A-11-4

16) Remove air cleaner case, resonator, air intake hose and air intake pipe.
17) Disconnect accelerator cable from throttle body (or carburetor).
18) Disconnect fuel feed hose from throttle body (or carburetor).
19) Disconnect fuel return hose from fuel return pipe (or carburetor).
20) Disconnect heater outlet hose from water inlet pipe.
21) Disconnect heater inlet hose from intake manifold.
22) Drain engine oil, if necessary.



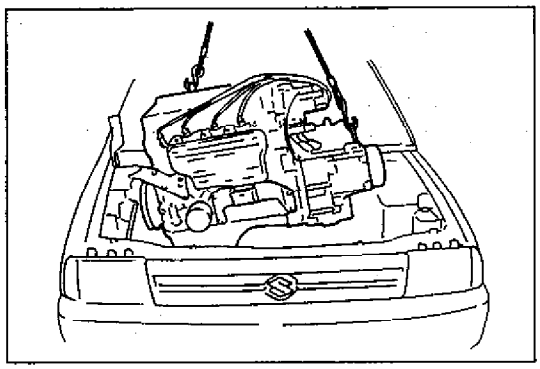
70F00-6A-11-5

23) Hoist vehicle.
24) Remove exhaust center pipe bolts.
25) Drain transmission.
26) Remove gear shift control shaft and extension rod from transmission.
27) Remove drive shafts (right and left) from differential side gears of transmission. Refer to SECTION 4 (DRIVE SHAFT) for procedure to disconnect drive shaft. For engine and transmission removal, it is not necessary to remove drive shaft from steering knuckle.



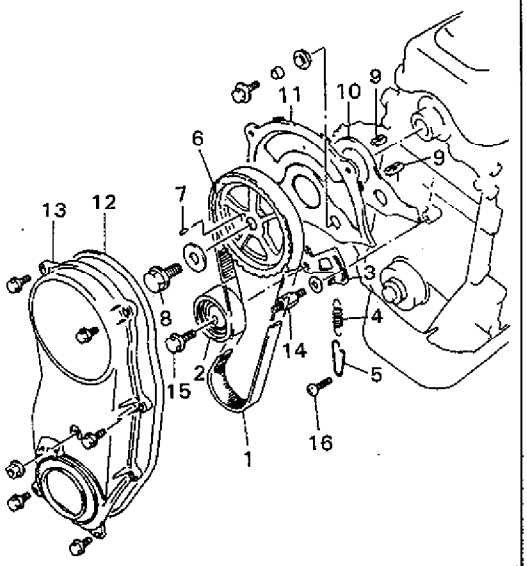
70F00-6A-12-1

28) Lower vehicle.
29) Install lifting device.
30) Remove rear torque stopper bolts ① .
31) Remove engine rear mounting bracket nut ② .
32) Remove engine left mounting bracket. (Fuel injection model)
33) Remove engine front mounting nut ③ .
34) Remove engine right bracket bolts ④ , and loosen engine right mounting bolt ⑤ .
35) Before lifting engine with transmission, recheck to make sure all hoses, electric wires and cables are disconnected from engine and transmission.



70F00-6A-12-3

36) Remove engine with transmission from body.
37) Separate engine from transmission.



1. Timing belt
2. Tensioner
3. Tensioner plate
4. Tensioner spring
5. Spring damper
6. Camshaft timing pulley
7. Pin
8. Pulley bolt
9. Seal
10. Inside cover seal
11. Inside cover
12. Outside cover seal
13. Outside cover
14. Tensioner stud
15. Tensioner bolt
16. Tensioner spring screw

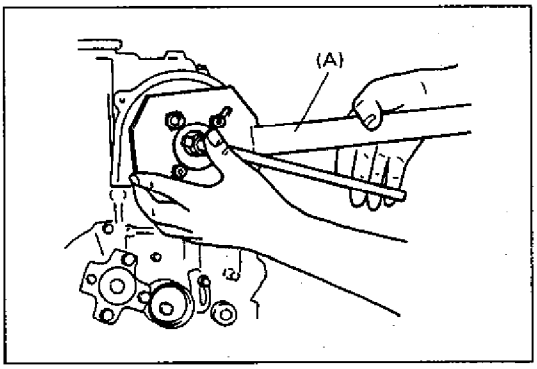
70F00-6A-13-1

ENGINE DISASSEMBLY

1. Remove Timing Belt and Belt Tensioner and Timing Pulleys

1) Remove generator, water pump pulley, generator mounting stay and bracket.
2) Remove crankshaft pulley.
3) Remove timing belt outside cover.
4) Remove timing belt tensioner and timing belt.

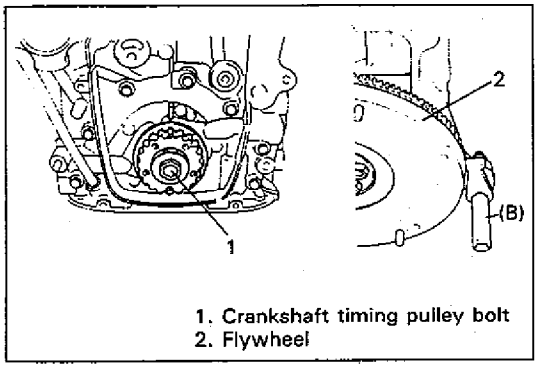
CAUTION:
- **Never bend timing belt.**
- **Never allow timing belt to come into contact with oil, water or steam.**



70F00-6A-13-4

5) Remove camshaft timing belt pulley by using special tool.

Special Tool
(A): 09917-68220



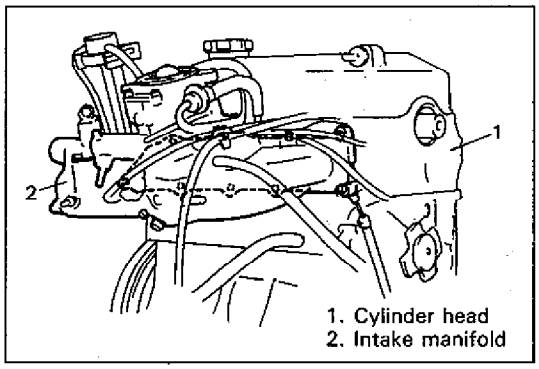
1. Crankshaft timing pulley bolt
2. Flywheel

70F00-6A-13-5

6) Remove crankshaft timing pulley with special tool hitched to flywheel so that crankshaft will not turn.

Special Tool
(B): 09924-17810

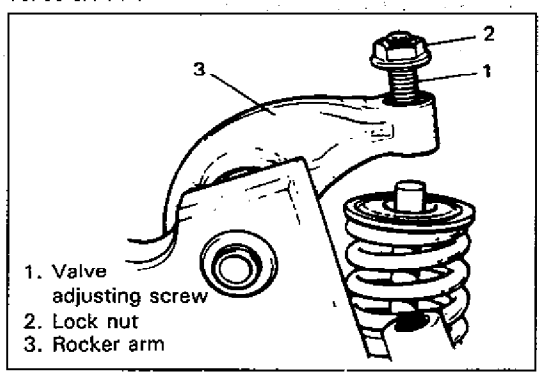
7) Remove belt inside cover.



70F00-6A-14-1

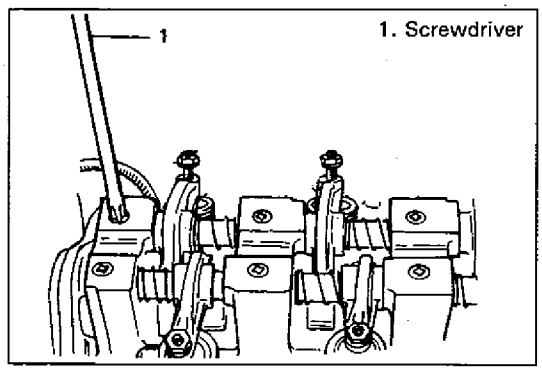
2. Remove Cylinder Head

1) Remove distributor assembly and its case.
2) Remove exhaust manifold cover, exhaust manifold and its gasket.
3) Remove engine harness from its clamps and couplers.
4) Remove intake manifold.
5) Remove cylinder head cover.



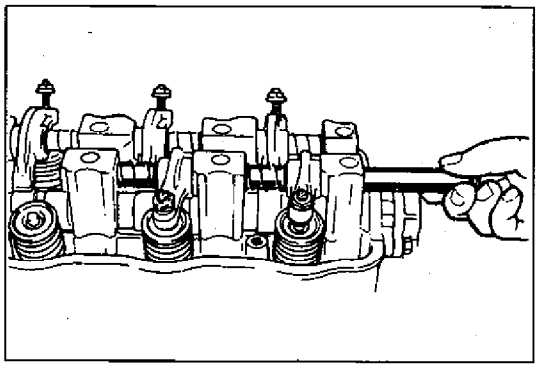
70F00-6A-14-2

6) After loosening all valve adjusting screws back all the way to allow all valves to close.
7) Remove cylinder head bolts.
8) Remove other jointed parts, hoses and electric wires, if any.
9) Remove cylinder head.



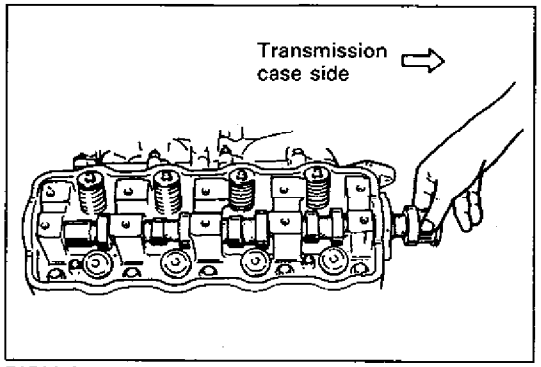
70F00-6A-14-3

10) Remove rocker arm shaft screws.



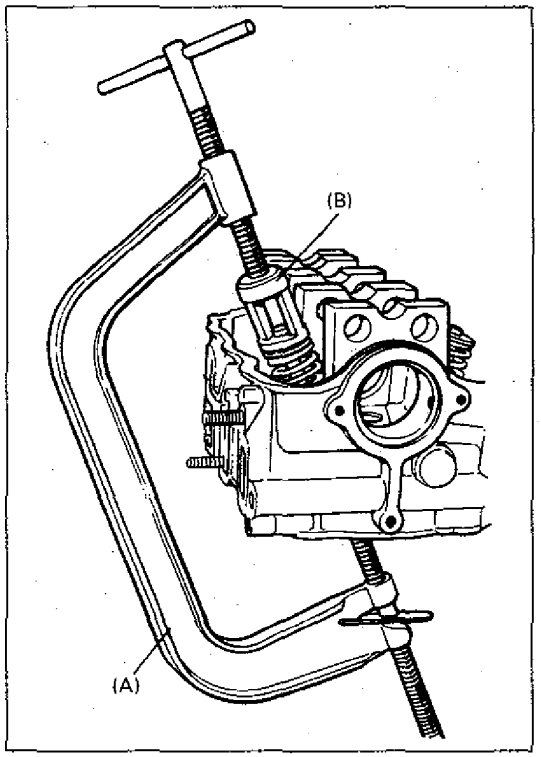
70F00-6A-14-4

11) Remove intake and exhaust rocker arm shafts, and then, rocker arms and springs.



70F00-6A-14-5

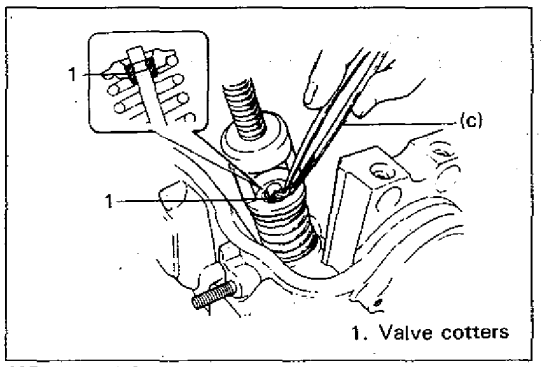
12) Remove camshaft from cylinder head.



70F00-6A-15-1

13) Using special tool (Valve lifter), compress valve springs and then remove valve cotters by using special tool (Forceps).

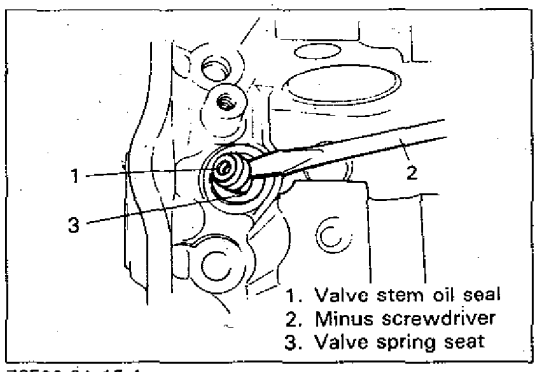
Special Tool
(A): 09916-14510
(B): 09916-48210



70F00-6A-15-3

Special Tool
(c): 09916-84510

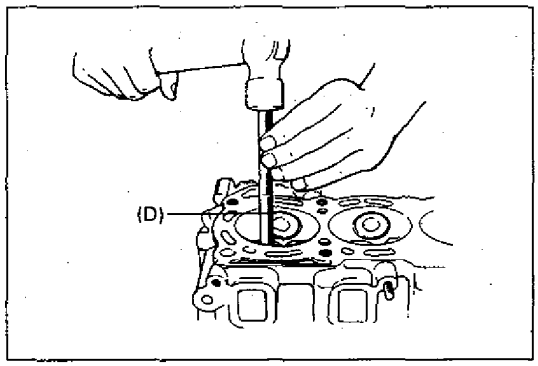
14) Release special tool, and remove spring retainer and valve spring.
15) Remove valve from combustion chamber side.



70F00-6A-15-4

16) Remove valve stem seal from valve guide, and then valve spring seat.

NOTE:
Do not reuse seal once disassembled. Be sure to use new seal when assembling.

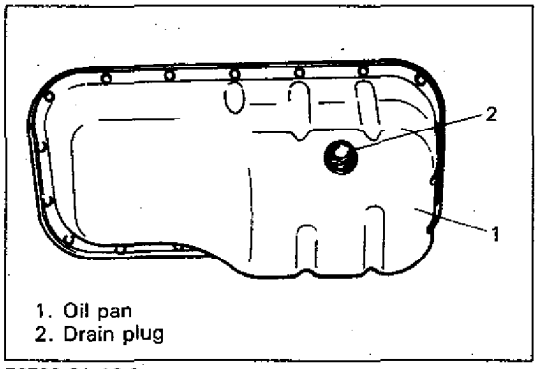


70F00-6A-15-5

17) Using special tool (Valve guide remover), drive valve guide out from combustion chamber side to valve spring side.

NOTE:
Do not reuse valve guide once disassembled. Be sure to use new valve guide (Oversize) when assembling.

Special Tool
(D): 09916-46010

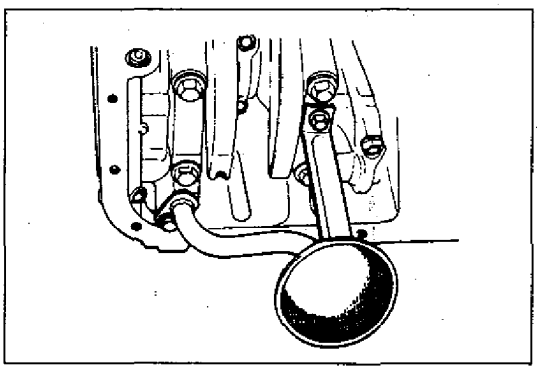


1. Oil pan
2. Drain plug

70F00-6A-16-1

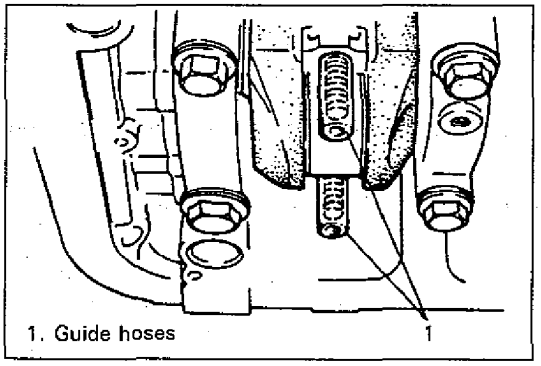
3. Remove Pistons

1) Remove oil pan from cylinder block.



70F00-6A-16-2

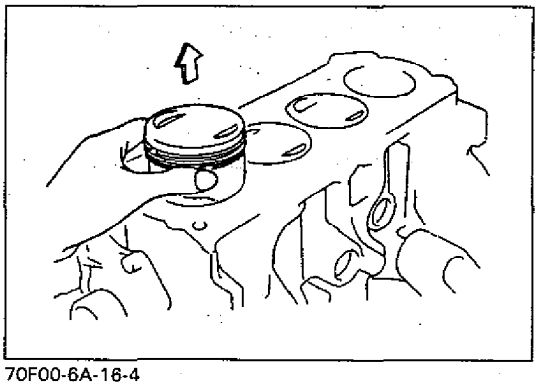
2) Remove oil pump strainer.



1. Guide hoses

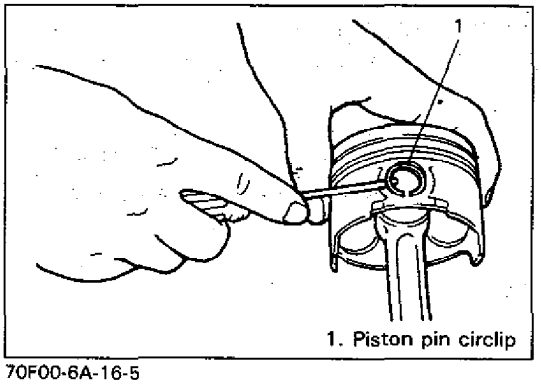
70F00-6A-16-3

3) Remove rod bearing caps.
4) Install guide hose over threads of rod bolts.
This is to prevent damage to bearing journal and rod bolt threads when removing connecting rod.



70F00-6A-16-4

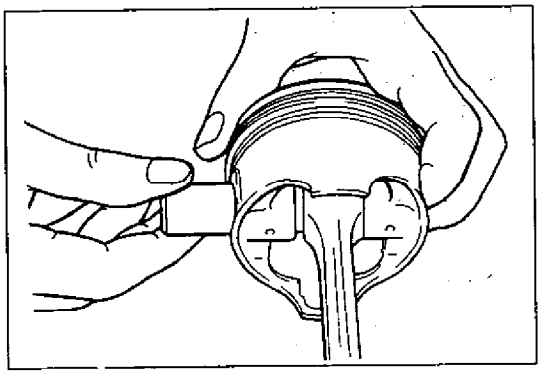
5) Decarbon top of cylinder bore, before removing piston from cylinder.
6) Push piston and connecting rod assembly out through the top of cylinder bore.



1. Piston pin circlip

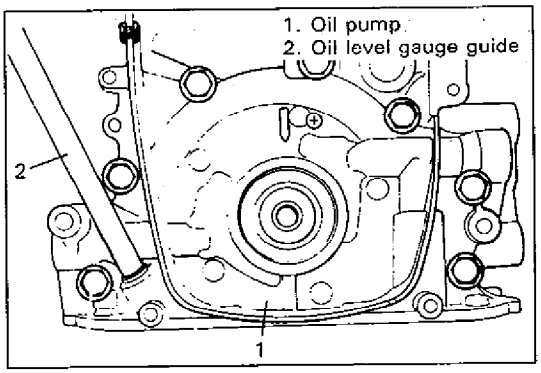
70F00-6A-16-5

7) Using piston ring expander, remove two compression rings (Top and 2nd) and oil ring from piston.
8) Remove piston pin from connecting rod.
- Ease out piston pin circlips, as shown.



70F00-6A-17-1

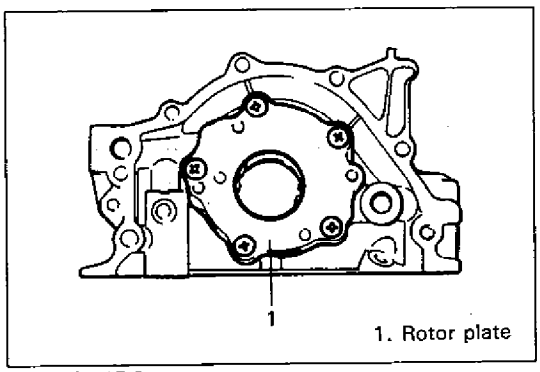
• Force piston pin out.



70F00-6A-17-2

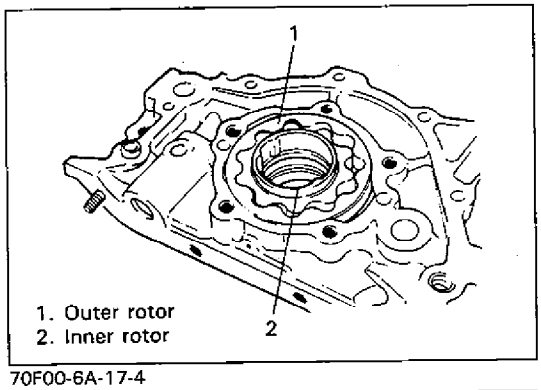
4. Remove Oil Pump, Oil Seal Housing and Crankshaft

1) Remove oil pump assembly after removing 7 bolts securing pump.



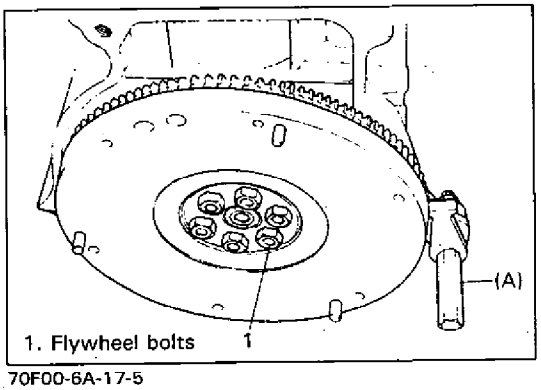
70F00-6A-17-3

2) Remove rotor plate.



70F00-6A-17-4

3) Remove outer rotor and inner rotor.

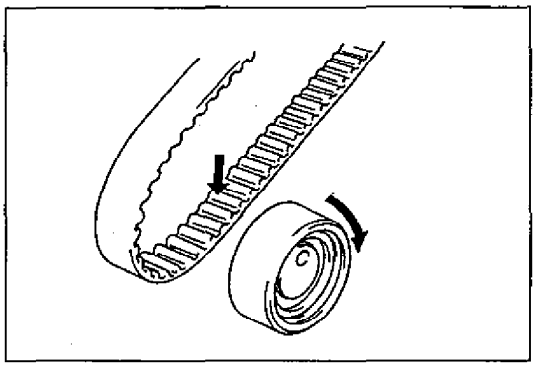


70F00-6A-17-5

4) Remove flywheel using special tool (A)

Special Tool
(A): 09924-17810

5) Remove oil seal housing.
6) Remove main bearing caps and crankshaft.

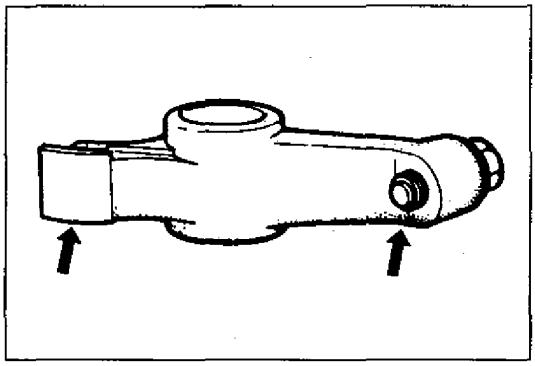


70F00-6A-18-1

ENGINE COMPONENTS INSPECTION

TIMING BELT AND BELT TENSIONER

- Check timing belt for wear or crack. Replace it as necessary.
- Check tensioner for smooth rotation and rattle.

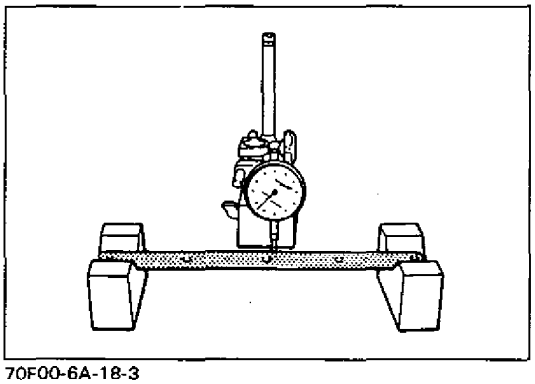


70F00-6A-18-2

ROCKER ARM, ROCKER ARM SHAFT AND CAMSHAFT

Adjusting screw and rocker arm

If tip of adjusting screw is badly worn, replace screw.
Rocker arm must be replaced if its cam-riding face is badly worn.

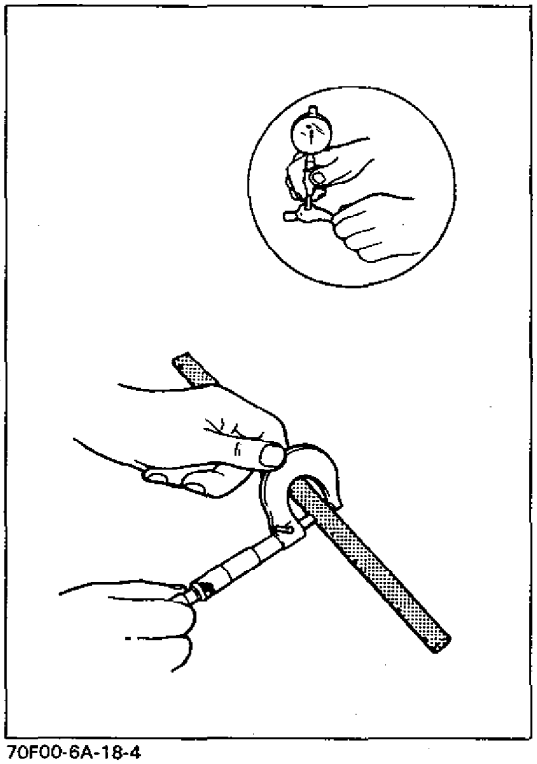


70F00-6A-18-3

Rocker arm shaft runout

Using "V" blocks and dial gauge, check runout.
If runout exceeds its limit, replace rocker arm shaft.

Runout limit	0.12 mm (0.004 in)

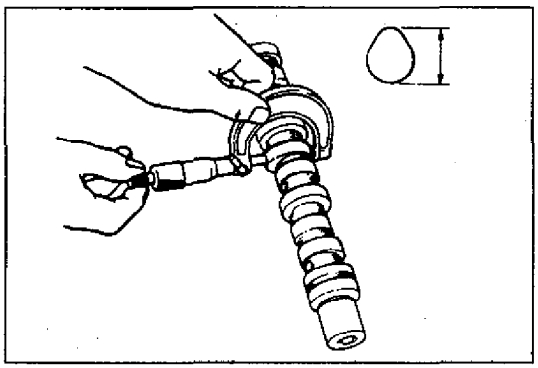


70F00-6A-18-4

Rocker arm-to-rocker arm shaft clearance [In & Ex]

Using a micrometer and a bore gauge, measure rocker shaft dia. and rocker arm. I.D..
Difference between two readings is arm-to-shaft clearance on which limit is specified.
If limit is exceeded, replace shaft or arm, or both.

Item	Standard	Limit
Rocker arm I.D.	16.000–16.018 mm (0.629–0.630 in)	———
Rocker arm Shaft dia.	15.973–15.988 mm (0.628–0.629 in.)	———
Arm-to-Shaft clearance	0.012–0.045 mm (0.0005–0.0017 in.)	0.09 mm (0.0035 in.)

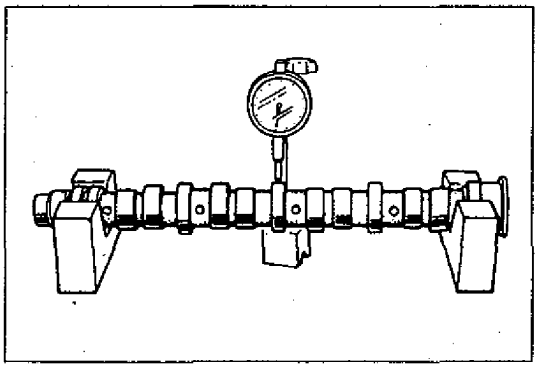


70F00-6A-19-1

Cam wear

- Using a micrometer, measure the height of cam. If the height measured is below the limits, replace the camshaft.

Cam height	Standard	Limit
Intake cam	38.134 mm (1.5013 in.)	38.034 mm (1.4974 in.)
Exhaust cam	38.110 mm (1.5004 in.)	38.010 mm (1.4965 in.)

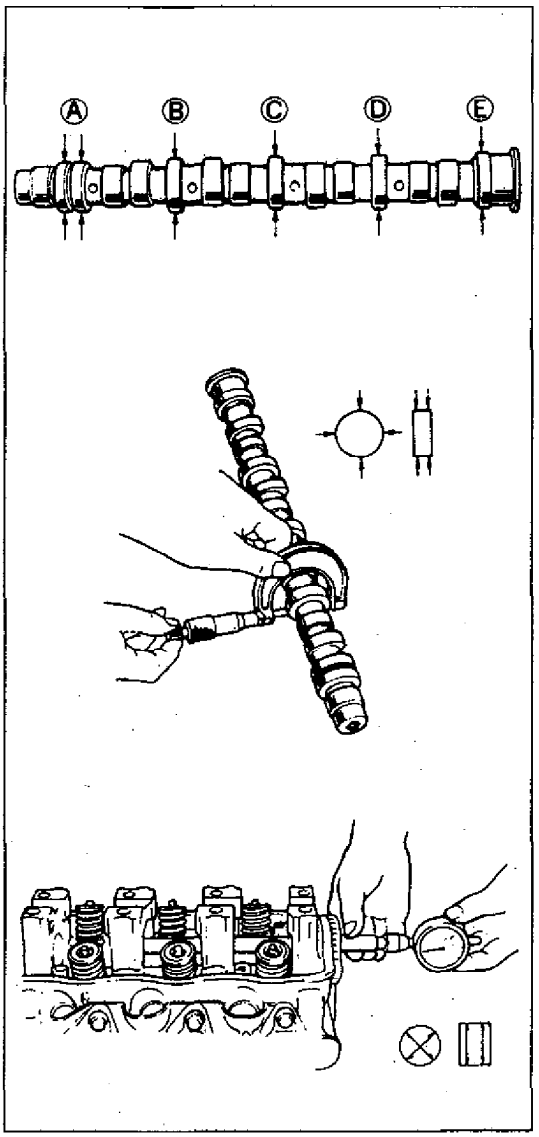


70F00-6A-19-2

Camshaft runout

- Hold camshaft between two "V" blocks, and measure runout by using a dial gauge.
  If measured runout exceeds its limit, replace camshaft.

Runout limit	0.10 mm (0.0039 in.)



70F00-6A-19-3

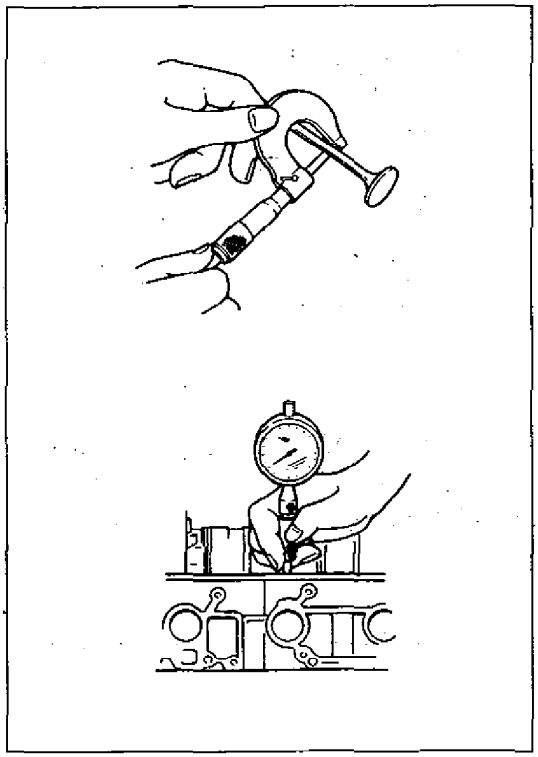
Camshaft journal wear

- Measure journal diameter at four places to obtain four readings on each journal and measure the journal bores in cylinder head with a bore gauge, producing four readings on each.

  Subtract journal diameter measurement from journal bore measurement to determine journal clearance.
  If journal clearance exceeds its limit, replace camshaft, and as necessary, cylinder head, too.

Item	Standard	Limit
Journal clearance	0.050—0.091 mm (0.0020—0.0036 in)	0.15 mm (0.0059 in.)

Camshaft journal dia.	Journal bore dia.
Ⓐ 44.125—44.150 mm (1.7372—1.7381 in.)	44.200—44.216 mm (1.7402—1.7407 in.)
Ⓑ 44.325—44.350 mm (1.7451—1.7460 in.)	44.400—44.416 mm (1.7480—1.7486 in.)
Ⓒ 44.525—44.550 mm (1.7530—1.7539 in.)	44.600—44.616 mm (1.7560—1.7565 in.)
Ⓓ 44.725—44.750 mm (1.7609—1.7618 in.)	44.800—44.816 mm (1.7638—1.7644 in.)
Ⓔ 44.925—44.950 mm (1.7687—1.7697 in.)	45.000—45.016 mm (1.7716—1.7723 in.)



70F00-6A-20-1

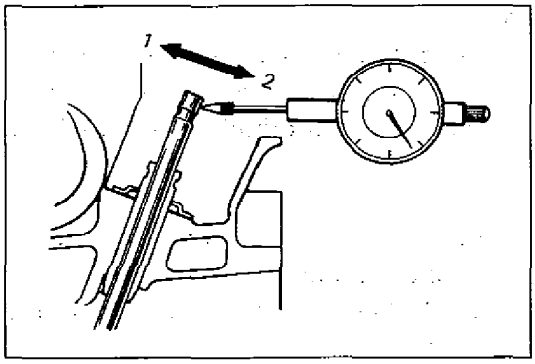
VALVE GUIDES, VALVE AND VALVE SPRINGS

Valve guides

Using a micrometer and bore gauge, take diameter readings on valve stems and guides to check stem-to-guide clearance. Be sure to take reading at more than one place along the length of each stem and guide.

If clearance exceeds limit, replace valve and valve guide.

Item		Standard	Limit
Valve stem diameter	In	6.965—6.980 mm (0.2742—0.2748 in.)	———
	Ex	6.940—6.955 mm (0.2732—0.2738 in.)	———
Valve guide I.D.	In	7.000—7.015 mm (0.2756—0.2761 in.)	———
	Ex	7.000—7.015 mm (0.2756—0.2761 in.)	———
Stem-to-guide clearance	In	0.020—0.050 mm (0.0008—0.0019 in.)	0.07 mm (0.0027 in.)
	Ex	0.045—0.075 mm (0.0018—0.0029 in.)	0.09 mm (0.0035 in.)



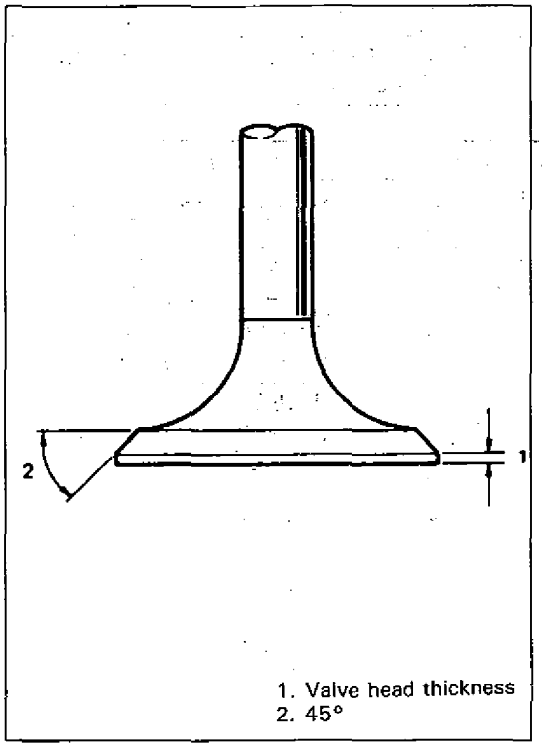
64B40-6A1-38-3

If bore gauge is not available, check end deflection of valve stem in place with a dial gauge rigged.

Move stem end in the directions ① and ② to measure the end deflection.

If deflection exceeds its limit, replace valve stem and valve guide.

Valve stem end deflection limit	In	0.14 mm (0.005 in.)
	Ex	0.18 mm (0.007 in.)



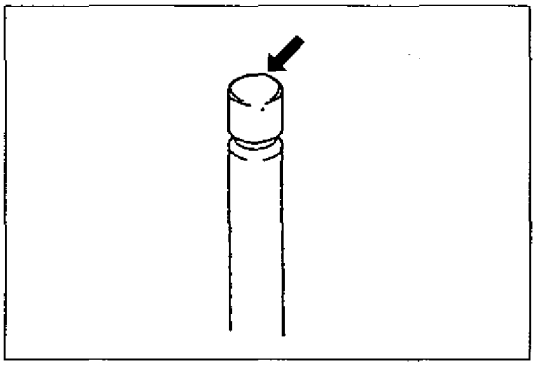
1. Valve head thickness
2. 45°

64B40-6A1-38-4

Valves

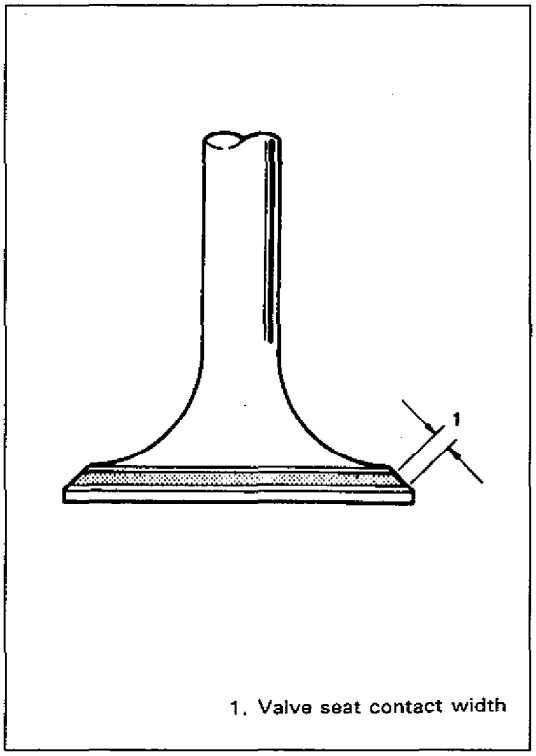
- Remove all carbon from valves.
- Inspect each valve for wear, burn or distortion at its face and stem and, as necessary, replace it.
- Measure thickness of valve head. If limit given to this thickness is exceeded, valve must be replaced.

Valve head thickness		
Standard	Limit	
1.0 mm (0.039 in.)	In	0.6 mm (0.023 in.)
	Ex	0.7 mm (0.027 in.)



77500-6A-45-1

- Check end face of each valve stem for wear. This face meets rocker arm intermittently in operation, and might become concaved or otherwise irregular. As necessary, smoothen end face with an oil stone and, if this grinding removes its chamfer, replace valve.



1. Valve seat contact width

64B40-6A1-39-2

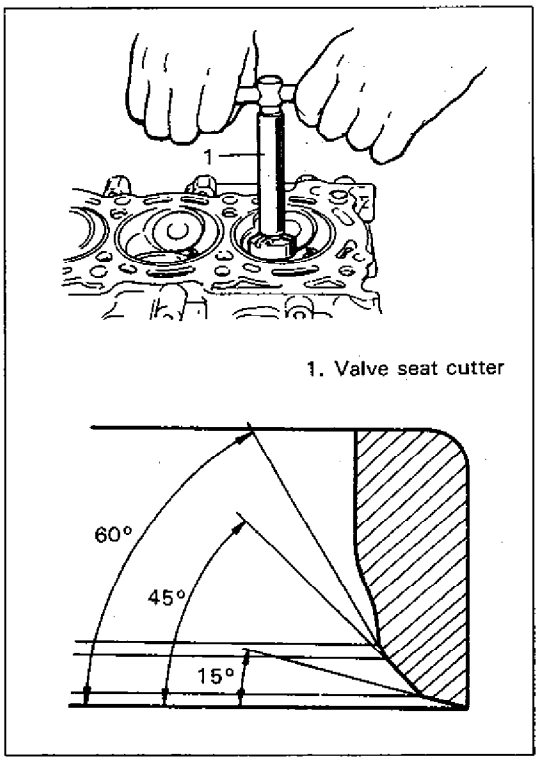
- Seating contact width:
  Create contact pattern on each valve in usual manner, i.e., by giving uniform coat of marking compound to valve seat and by rotatingly tapping seat with valve head. Valve lapper (tool used in valve lapping) must be used.

  Pattern produced on seating face of valve must be a continuous ring without any break, and width of pattern must be within specified range.

Standard seating width revealed by contact pattern on valve face	In	1.3—1.5 mm (0.0512—0.0590 in.)
	Ex	

- Valve seat repair:
  Valve seat not producing a uniform contact with its valve or showing width of seating contact that is out of specified range must be repaired by regrinding or by cutting and regrinding and finished by lapping.

77500-6A-45-4

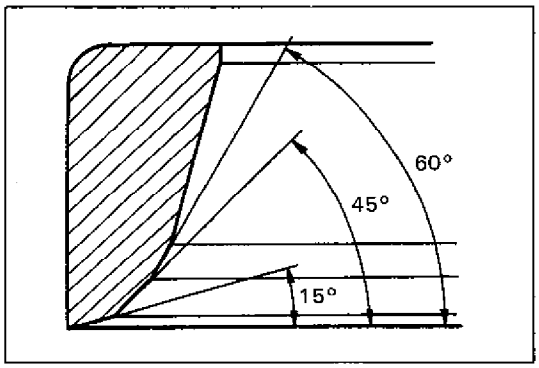


1. Valve seat cutter

70F00-6A-22-2

1) EXHAUST VALVE SEAT: Use valve seat cutters to make three cuts illustrated in left figure. Three cutter must be used: the first for marking the 15° angle, the second for making the 60° angle and the last for making the 45° seat angle. The third cut must be made to produce desired seat.

Seat width for exhaust valve seat	1.3—1.5 mm (0.0512—0.0590 in.)

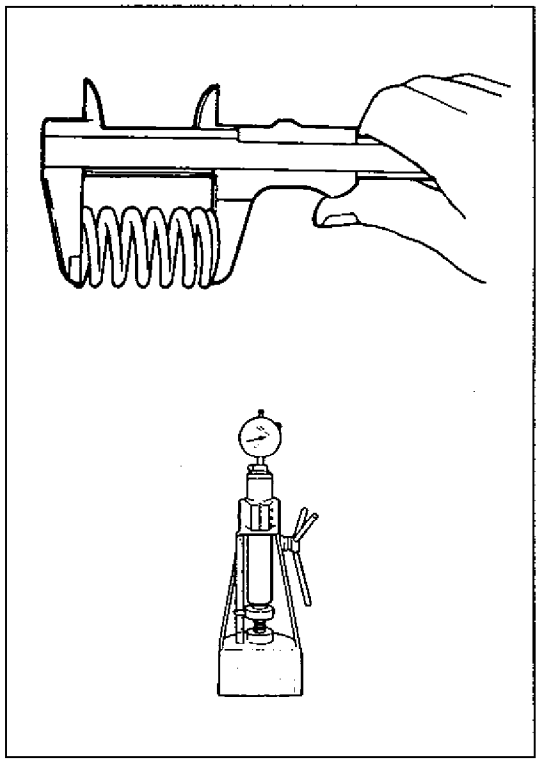


70F00-6A-22-4

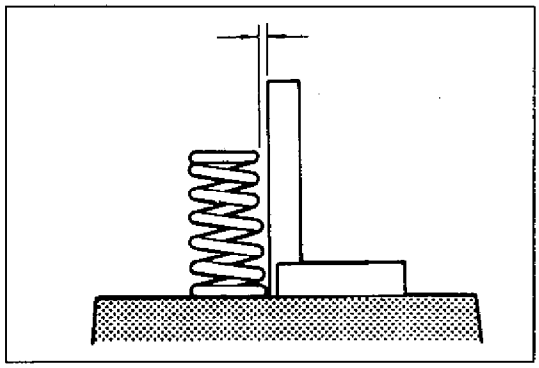
2) INTAKE VALVE SEAT: The cutting sequence is the same as for exhaust valve seats.

Seat width for intake valve seat	1.3—1.5 mm (0.0512—0.0590 in.)

3) VALVE LAPPING: Lap valve on seat in two steps, first with coarsesize lapping compound applied to face and the second with fine-size compound, each time using valve lapper according to usual lapping method.



70F00-6A-23-1



77500-6A-47-5

Valve springs

- Referring to data given below, check to be sure that each spring is in sound condition, free of any evidence of breakage or weakening. Remember, weakened valve springs can cause chatter, not to mention possibility of reducing power output due to gas leakage caused by decreased seating pressure.

Item	Standard	Limit
Valve spring free length	48.9 mm (1.9252 in.)	47.6 mm (1.8740 in.)
Valve spring preload	23.6—27.6 kg for 40 mm (52.0—60.8 lb/1.57 in.)	22.0 kg for 40 mm (48.5 lb/1.57 in.)

- Spring squareness:
  Use a square and surface plate to check each spring for squareness in terms of clearance between end of valve spring and square. Valve spring found to exhibit a larger clearance than limit must be replaced.

Valve spring squareness limit.	2.0 mm (0.079 in.)

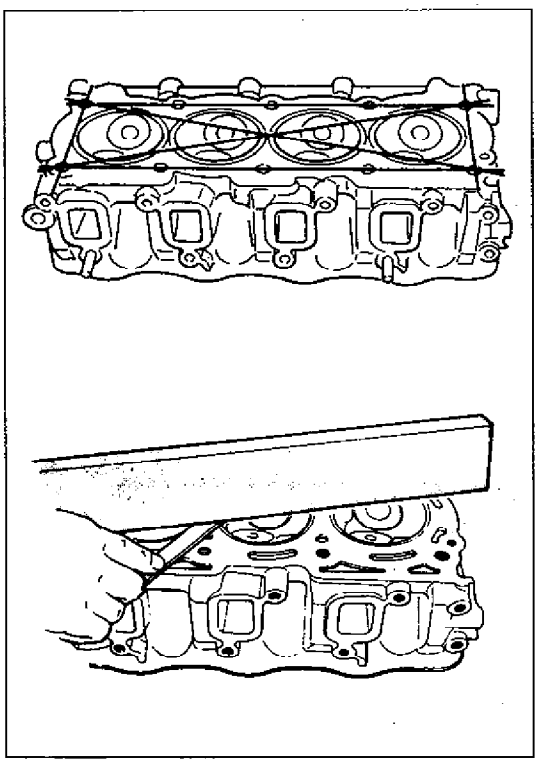
CYLINDER HEAD

- Remove all carbon from combustion chambers.

NOTE:
Do not use any sharp-edged tool to scrape off carbon. Be careful not to scuff or nick the metal surfaces when decarboning. The same applies to valves and valve seats, too.

- Check cylinder head for cracks in intake and exhaust ports, combustion chambers, and head surface.

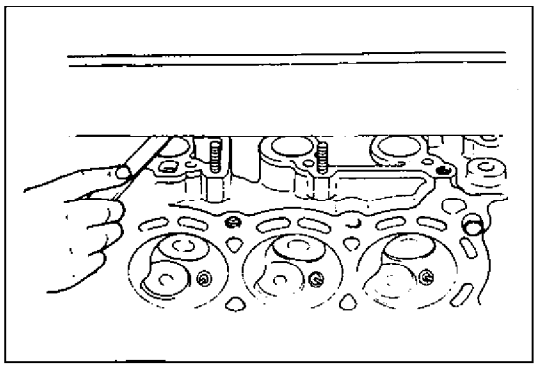
70F00-6A-24-1



77500-6A-46-5

- Flatness of gasketed surface:
  Using a straightedge and thickness gauge, check flatness at a total of 6 locations. If limit, given below, is exceeded, correct gasketed surface with surface plate and abrasive paper of about #400: place abrasive paper on and over surface plate, and rub gasketed surface against it to grind off high spots. Should this fail to reduce thickness gauge readings to within limit, replace cylinder head. (Waterproof silicon carbide adrasive paper).
  Leakage of combustion gases from this gasketed joint is often due to warped gasketed surface; such leakage results in reduced power output.

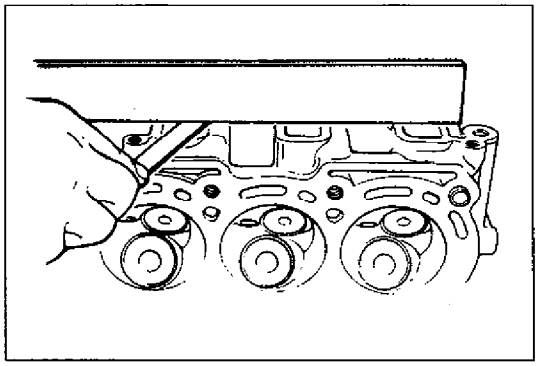
Limit of Distortion: 0.05 mm (0.002 in.)



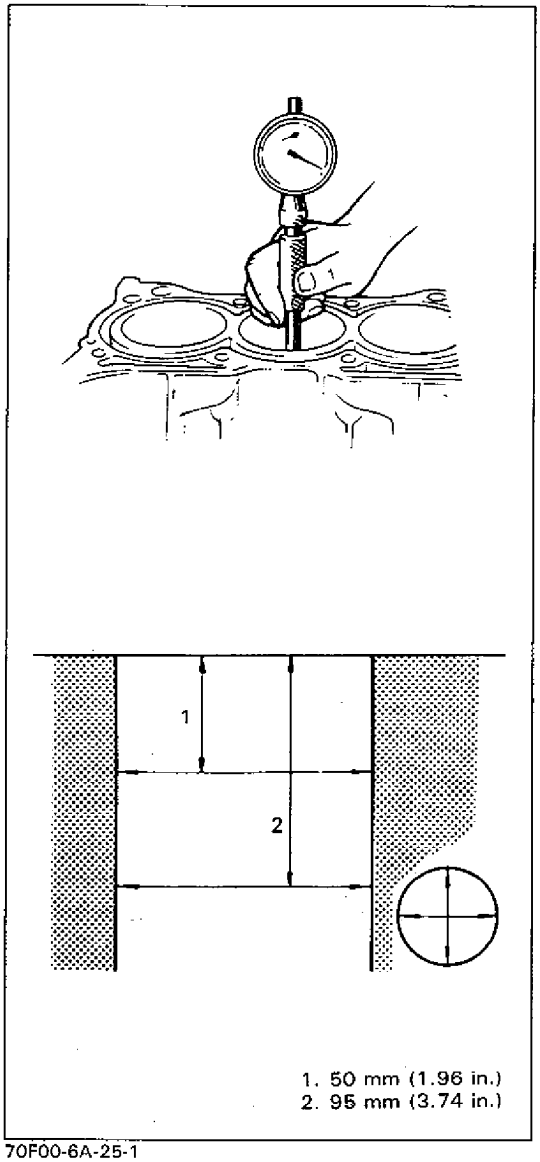
77500-6A-47-1

- Distortion of manifold seating faces:
  Using straightedge and thickness gauge, check seating faces of cylinder head manifold to determine whether these faces should be corrected or cylinder head should be replaced.

Limit of Distortion: 0.10 mm (0.004 in.)



77500-6A-47-2



1. 50 mm (1.96 in.)
2. 95 mm (3.74 in.)

70F00-6A-25-1

CYLINDERS

- Inspect cylinder walls for scratches, roughness, or ridges which indicate excessive wear. If cylinder bore is very rough or deeply scratched, or ridged, rebore cylinder and use oversize piston.
- Using a cylinder gauge, measure cylinder bore in thrust and axial directions at two positions as shown in figure.
  If any of following conditions is noted, rebore cylinder.
  1) Cylinder bore dia. exceeds limit.
  2) Difference of measurements at two positions exceeds taper limit.
  3) Difference between thrust and axial measurements exceeds out-of-round limit.

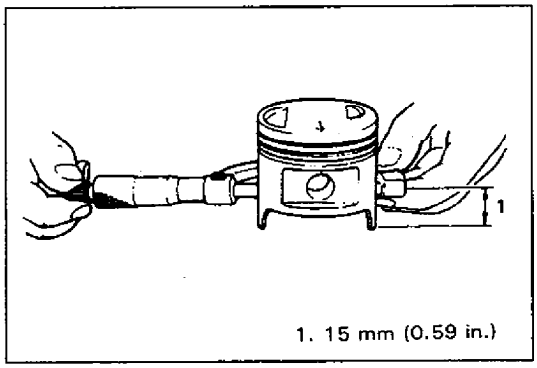
Cylinder bore dia. limit: 72.15 mm (2.8405 in.)
Taper and out-of-round limit: 0.10 mm (0.0039 in.)

NOTE:
If any one of four cylinders has to be rebored, rebore four to the same next oversize. This is necessary for the sake of uniformity and balance.

Honing or reboring cylinders

1) When any cylinder needs reboring, all other cylinders must also be rebored at the same time.
2) Select oversized piston according to amount of cylinder wear.

Size	Piston diameter
O/S 0.25	72.220—72.240 mm (2.8433—2.8440 in.)
O/S 0.50	72.470—72.490 mm (2.8531—2.8539 in.)



1. 15 mm (0.59 in.)

70F00-6A-26-1

3) Using micrometer, measure piston diameter.
4) Calculate cylinder bore diameter to be rebored.

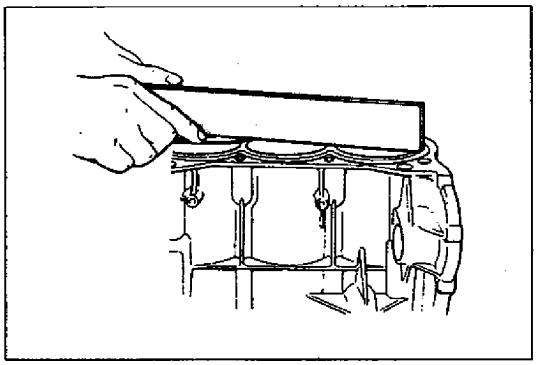
D = A + B − C
D: Cylinder bore diameter to be rebored.
A: Piston diameter as measured.
B: Piston clearance = 0.02−0.04 mm (0.0008−0.0015 in.)
C: Allowance for honing = 0.02 mm (0.008 in.)

5) Rebore and hone cylinder to calculated dimension.

NOTE:
Before reboring, install all main bearing caps in place and tighten to specification to avoid distortion of bearing bores.

6) Measure piston clearance after honing.

70F00-6A-26-2



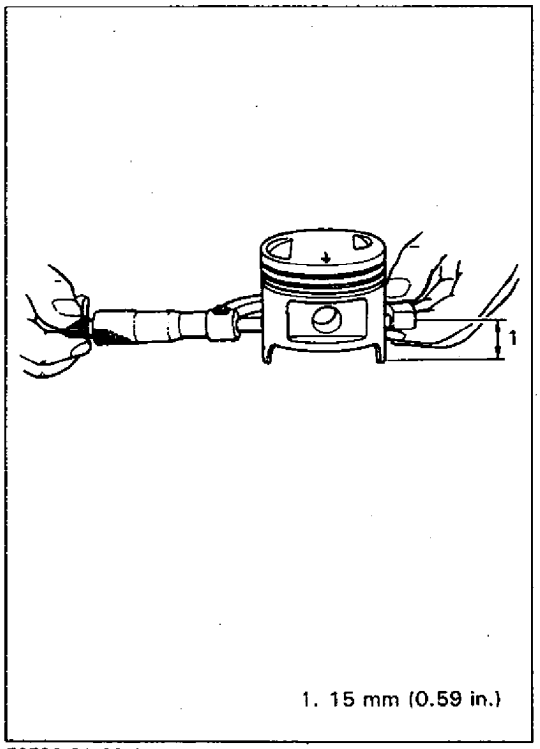
70F00-6A-26-3

CYLINDER BLOCK

Distortion of gasketed surface

- Using a straightedge and a thickness gauge, check gasketed surface for distortion and, if flatness exceeds its limit, correct it.

Item	Standard	Limit
Flatness	0.03 mm (0.0012 in.)	0.06 mm (0.0024 in.)



1. 15 mm (0.59 in.)

70F00-6A-26-4

PISTONS, PISTON PINS, PISTON RINGS AND CONNECTING RODS

Pistons

- Inspect piston for faults, cranks or other damage. Damaged or faulty piston should be replaced.
- Piston diameter:
  As indicated in left figure, piston diameter should be measured at a position 15 mm, 0.59 in. from piston skirt end in the direction perpendicular to piston pin.

Piston diameter	Standard	71.970−71.990 mm (2.8335−2.8342 in.)
	Oversize: 0.25 mm (0.0098 in.)	72.220−72.240 mm (2.8433−2.8440 in.)
	0.50 mm (0.0196 in.)	72.470−72.490 mm (2.8532−2.8539 in.)

- Piston clearance:
  To determine piston clearance, measure cylinder bore diameter and piston diameter. Piston clearance is difference between cylinder bore diameter and piston diameter. It should be within specification given below.
  If it is out of specification, rebore cylinder and use oversize piston.

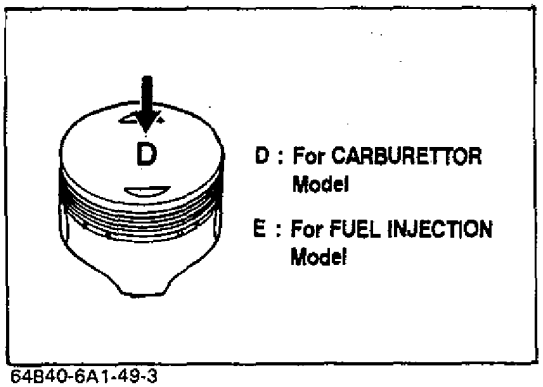
Piston clearance	0.02—0.04 mm (0.0008—0.0015 in.)

NOTE:
Cylinder bore diameters measured in thrust direction at two positions should be used for calculation of piston clearance.

WARNING :

Pistons for Carburettor and FI model are different. DO NOT interchange as WRONG fitment is possible which could result in severe engine damage.

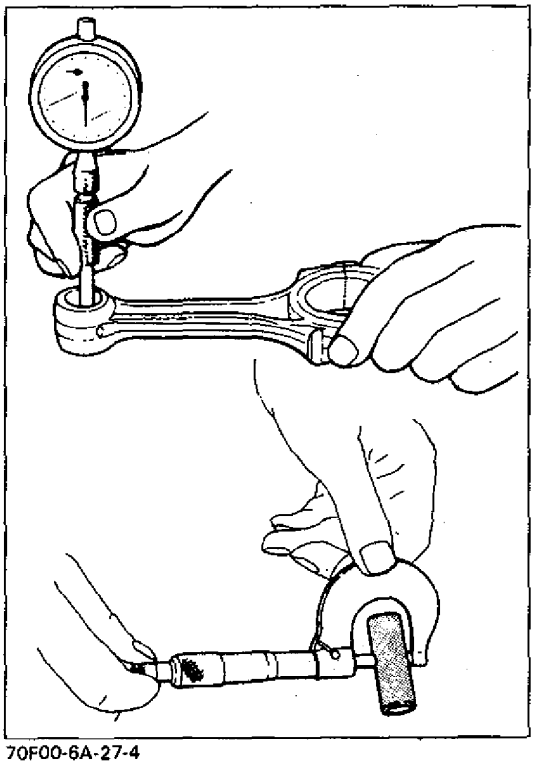
64B40-6A1-49-1



64B40-6A1-49-3

- Ring groove clearance:
  Before checking, piston grooves must be clean, dry and free of carbon.
  Fit new piston ring into piston groove, and measure clearance between ring and ring land by using thickness guage.
  If clearance is out of specification, replace piston.

Ring groove clearance	Top	0.03—0.07 mm (0.0012—0.0027 in.)
	2nd	0.02—0.06 mm (0.0008—0.0023 in.)



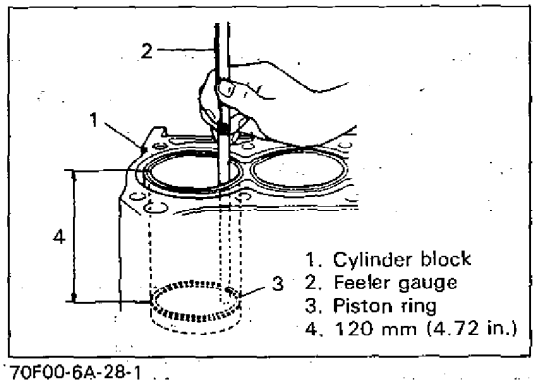
70F00-6A-27-4

Piston pins

- Piston pin must be fitted into piston bore with an easy finger push at normal room temperature.
- Check piston pin, connecting rod small end bore and piston bore for wear or damage, paying particular attention to condition of small end bore bush. If pin, connecting rod small end bore or piston bore is badly worn or damaged, replace pin, connecting rod or piston.
- Piston pin clearance:
  Check the piston pin clearance in the small end. Replace the connecting rod if its small end is badly worn or damaged or if the clearance checked exceeds the limit.

Pin Clearance in Small End
Standard: 0.003—0.016 mm (0.0001—0.0006 in.)
Limit : 0.05 mm (0.0020 in.)

Small-end bore: 17.003—17.011 mm (0.6694—0.6697 in.)
Piston pin dia. : 16.995—17.000 mm (0.6691—0.6693 in.)



70F00-6A-28-1

Piston rings

To measure end gap, insert piston ring into cylinder bore as shown in figure and then measure gap by using tickness gauge.

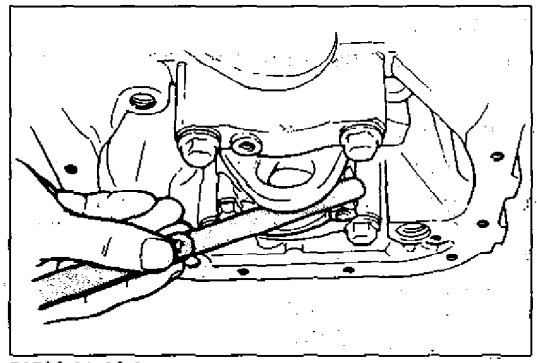
If measured gap is out of specification, replace ring.

NOTE:

Decarbon and clean the top of cylinder bore before inserting piston ring.

Item		Standard	Limit
Piston ring end gap	Top ring	0.20—0.30 mm (0.0079—0.0118 in.)	0.7 mm (0.0275 in.)
	2nd ring	0.20—0.30 mm (0.0079—0.0118 in.)	0.7 mm (0.0275 in.)
	Oil ring	0.20—0.70 mm (0.0079—0.0275 in.)	1.8 mm (0.0708 in.)

64B40-6A1-50-1



70F00-6A-28-3

Connecting rods

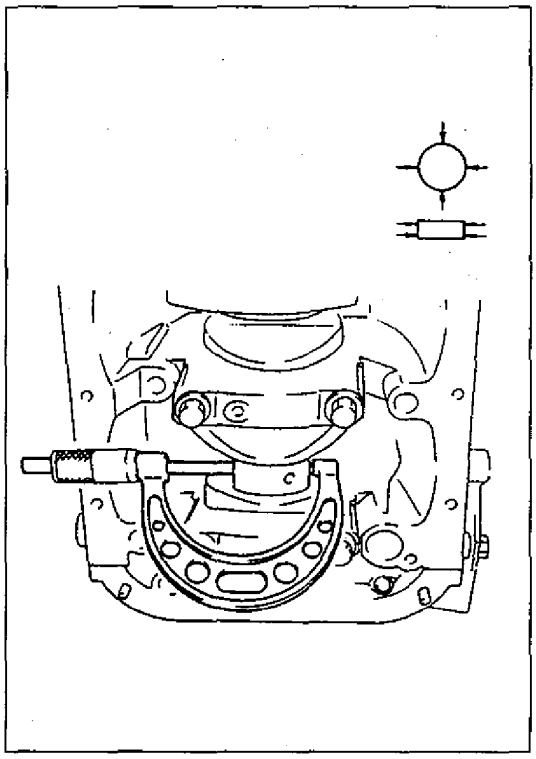
- Big-end side clearance:
  Check big-end of connecting rod for side clearance, with rod fitted and connected to its crank pin in the normal manner. If measured clearance is found to exceed its limit, replace connecting rod.

Item	Standard	Limit
Big-end side clearance	0.10—0.20 mm (0.0039—0.0078 in.)	0.35 mm (0.0137 in.)

- Connecting rod alignment:
  Mount connecting rod on aligner to check it for bow and twist and, if limit is exceeded, replace it.

Limit on bow	0.05 mm (0.0020 in.)
Limit on twist	0.10 mm (0.0039 in.)

64B40-6A1-50-3



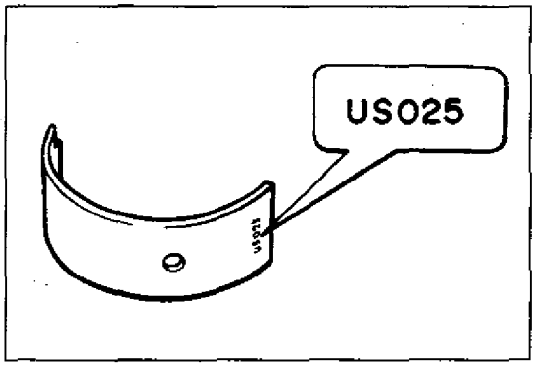
70F00-6A-29-1

CRANK PIN AND CONNECTING ROD BEARINGS

- Inspect crank pin for uneven wear or damage.
  Measure crank pin for out-of-round or taper with a micrometer. If crank pin is damaged, or out-of-round or taper is out of limit, replace crankshaft or regrind crank pin to undersize and use undersize bearing.

Connecting rod bearing size	Crank pin diameter
Standard	41.982—42.000 mm (1.6529—1.6535 in.)
0.25 mm (0.0098 in.) undersize	41.732—41.750 mm (1.6430—1.6437 in.)

Out-of-round and taper limit	0.01 mm (0.0004 in.)

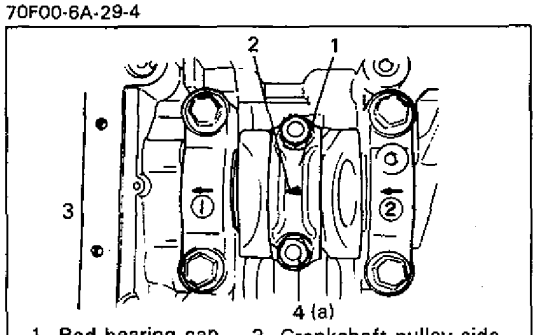


77500-6A-57-1

- Rod bearing:
  Inspect bearing shells for sings of fusion, pitting, burn or flaking and observe contact pattern. Bearing shells found in defective condition must be replaced.
  Two kinds of rod bearing are available; standard size bearing and 0.25 mm undersize bearing. To distinguish them, 0.25 mm undersize bearing has the stamped number (US 025) on its backside as indicated in figure, but standard size one has no number.

- Rod bearing clearance:
  1) Before checking bearing clearance, clean bearing and crank pin.
  2) Install bearing in connecting rod and bearing cap.
  3) Place a piece of gaging plastic the full width of crankpin as contacted by bearing (parallel to crankshaft), avoiding oil hole.

70F00-6A-29-4

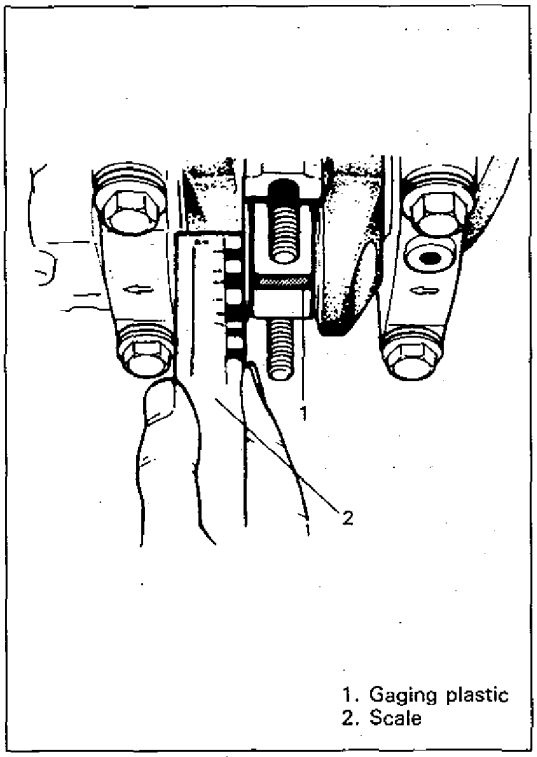


1. Rod bearing cap
2. Arrow mark
3. Crankshaft pulley side
4. Cap nut

70F00-6A-29-5

  4) Install rod bearing cap to connecting rod.
  When installing cap, be sure to point the arrow mark on cap to crankshaft pulley side, as shown in figure. After applying engine oil to rod bolts, tighten cap nuts to specified torque. DO NOT turn crankshaft with gaging plastic installed.

Tightening Torque
(a): 33—37 N·m (3.3—3.7 kg-m, 24.0—26.5 lb-ft)



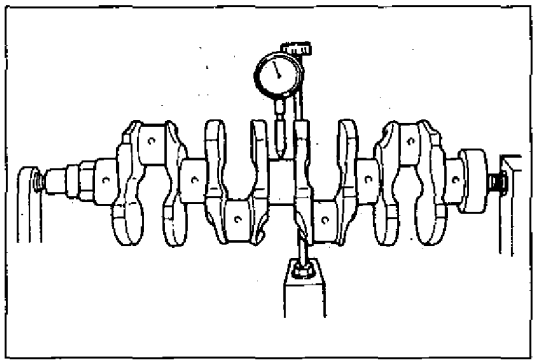
1. Gaging plastic
2. Scale

70F00-6A-30-1

5) Remove cap and using a scale on gaging plastic envelope, measure gaging plastic width at the widest point (clearance).
If clearance exceeds its limit, use a new standard size bearing and remeasure clearance.

Item	Standard	Limit
Bearing clearance	0.020—0.050 mm (0.0008—0.0019 in.)	0.080 mm (0.0031 in.)

6) If clearance can not be brought to within its limit even by using a new standard size bearing, regrind crankpin to undersize and use 0.25 mm undersize bearing.



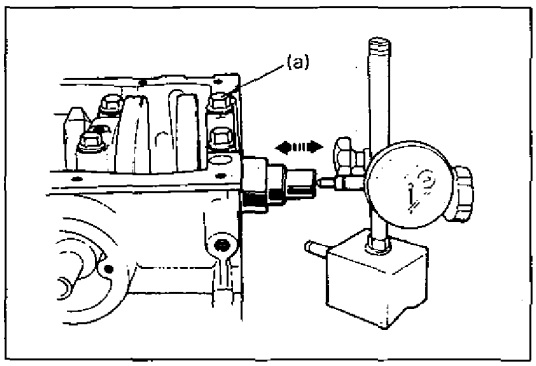
70F00-6A-30-3

CRANKSHAFT

Crankshaft runout

- Using a dial gauge, measure runout at center journal. Rotate crankshaft slowly. If runout exceeds its limit, replace crankshaft.

Limit on runout	0.06 mm (0.0023 in.)



77500-6A-68-1

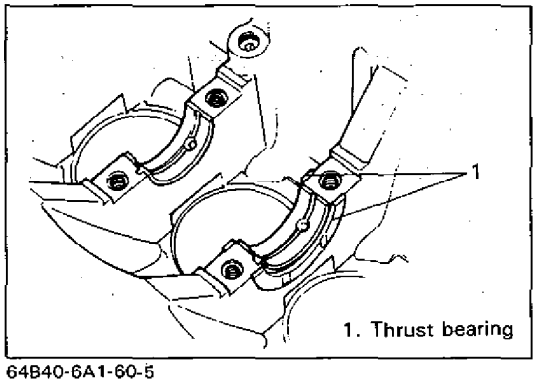
Crankshaft thrust play (Thrust bearing)

Measure this play with crankshaft set in cylinder block in the normal manner, that is, with thrust bearing and journal bearing caps installed. Tighten bearing cap bolts to specified torque.

Tightening Torque

(a): 50—57 N·m (5.0—5.7 kg-m, 36.5—41.0 lb-ft)

Use a dial gauge to read displacement in axial (thrust) direction of crankshaft.



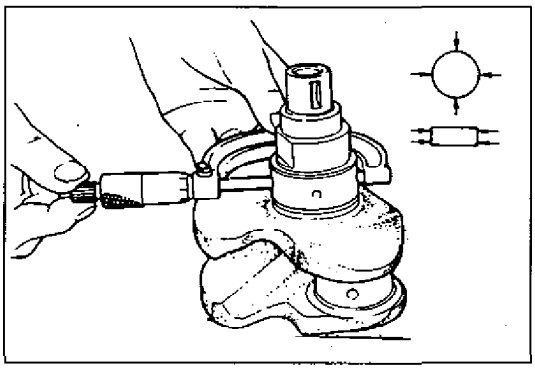
1. Thrust bearing

64B40-6A1-60-5

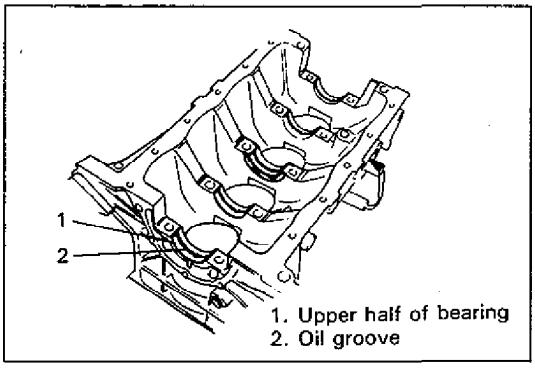
If its limit is exceeded, replace thrust bearing with new standard one or oversize one to obtain standard thrust play.

Item	Standard	Limit
Crankshaft thrust play	0.11—0.31 mm (0.0044—0.0122 in.)	0.38 mm (0.0149 in.)

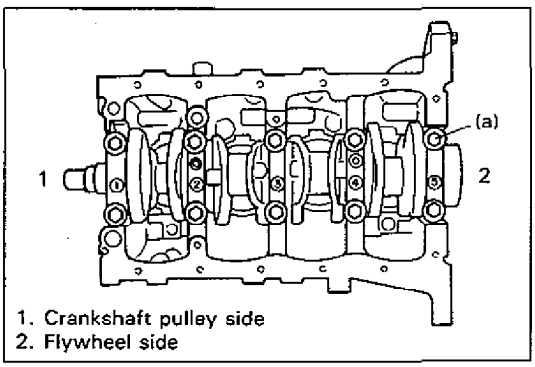
Thickness of crankshaft thrust bearing	Standard	2.500 mm (0.0984 in.)
	Oversize: 0.125 mm (0.0049 in.)	2.563 mm (0.1009 in.)



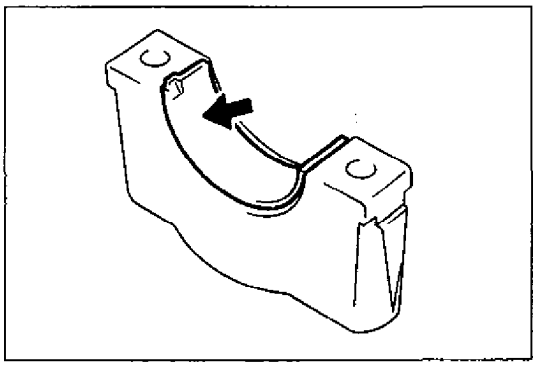
70F00-6A-31-1



70F00-6A-31-2



70F00-6A-31-3



64B40-6A1-61-4

Out-of-round and taper (uneven wear) of journals

- An unevenly worn crankshaft journal shows up as a difference in diameter at a cross section or along its length (or both). This difference, if any, is determined by taking micrometer readings. If any one of journals is badly damaged or if amount of uneven wear in the sense explained above exceeds its limit, regrind or replace crankshaft.

Limit on out-of-round and taper	0.01 mm (0.0004 in.)

MAIN BEARINGS

General information

- Service main bearings are available in standardsize and 0.25 mm (0.0098 in.) undersize, and each of them has 5 kinds of bearings differing in tolerance.
- Upper half of bearing has oil groove as shown in figure. Install this half with oil groove to cylinder block.
- On each main bearing cap, arrow mark and number are embossed as indicated in figure.
  When installing each bearing cap to cylinder block, point arrow mark toward crankshaft pulley side and install each cap from that side to flywheel side in ascending order of numbers "1", "2", "3", "4" and "5". Tighten cap bolts to specified torque.

Tightening Torque

(a): 50—57 N·m (5.0—5.7 kg-m, 36.5—41.0 lb-ft)

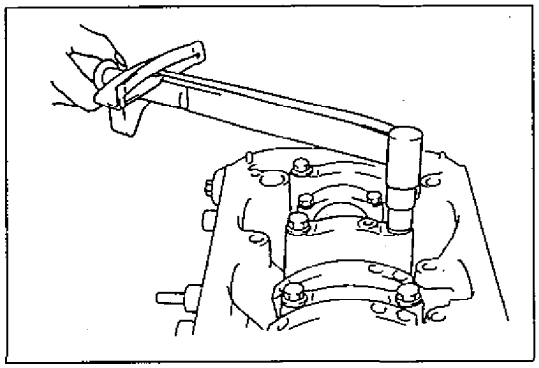
Inspection

Check bearings for pitting, scratches, wear or damage.
If any malcondition is found, replace both upper and lower halves. Never replace one half without replacing the other half.

Main bearing clearance

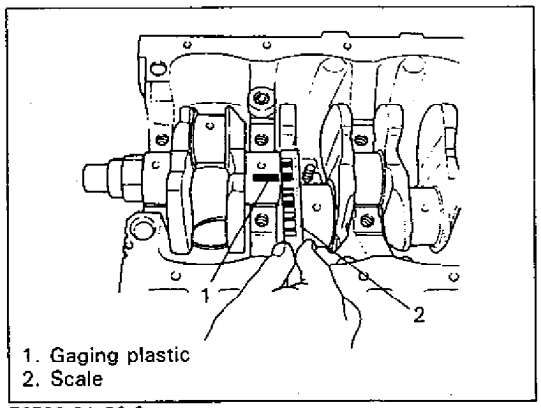
Check clearance by using gaging plastic according to following procedure.

1) Remove bearing caps.
2) Clean bearings and main journals.
3) Place a piece of gaging plastic the full width of bearing (parallel to crankshaft) on the journal, avoiding oil hole.


70F00-6A-32-1

4) Install bearing cap as previously outlined and evenly torque cap bolts to specified torque.
Bearing cap MUST be torqued to specification in order to assure proper reading.

NOTE:
Do not rotate crankshaft while gaging plastic is installed.



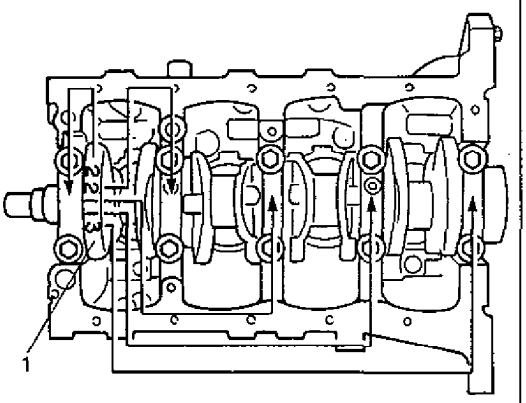
1. Gaging plastic
2. Scale

70F00-6A-32-2

5) Remove cap, and using scale on gaging plastic envelop, measure gaging plastic width at its widest point. If clearance exceeds its limit, replace bearing. Always replace both upper and lower insert as a unit.
A new standard bearing may produce proper clearance. If not, it will be necessary to regrind crankshaft journal for use of 0.25 mm undersize bearing.
After selecting new bearing, recheck clearance.

	Standard	Limit
Bearing clearance	0.020—0.040 mm (0.0008—0.0016 in.)	0.060 mm (0.0023 in.)

Selection of main bearings
STANDARD BEARING:
If bearing is in malcondition, or bearing clearance is out of specification, select a new standard bearing according to following procedure and install it.
1) First check journal diameter by using following procedure.
As shown in figure, crank web of No.1 cylinder has five stamped numerals.
The three kinds of numerals ("1", "2" and "3") represent following journal diameters.

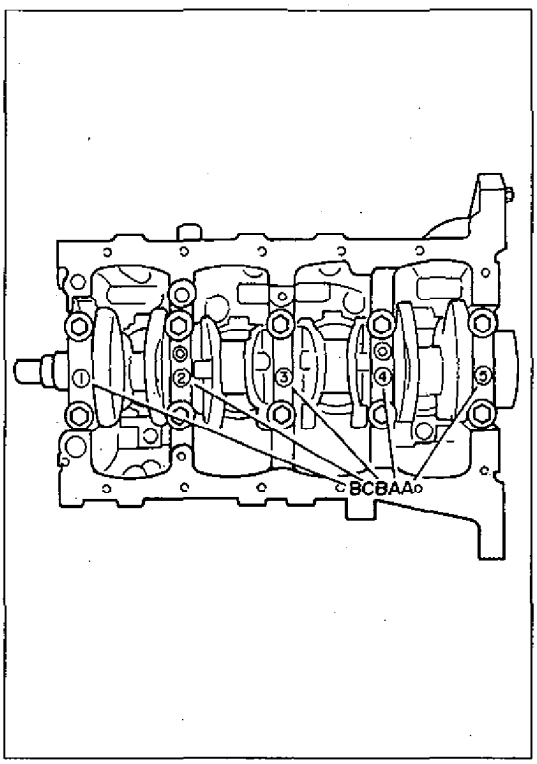


1. Crank web of No.1 cylinder

70F00-6A-32-3

Numeral stamped	Journal diameter
1	44.994—45.000 mm (1.7714—1.7716 in.)
2	44.988—44.994 mm (1.7712—1.7714 in.)
3	44.982—44.988 mm (1.7710—1.7712 in.)

The first, second, third, fourth and fifth (left to right) stamped numeral represent journal diameters at bearing caps "1", "2", "3", "4" and "5" respectively.
For example, in left figure, the first (leftmost) numeral "3" indicates that journal dia. at bearing cap "1" is within 44.982—44.988 mm, and second one "1" indicates that journal dia. at cap "2" is within 44.994—45.000 mm.



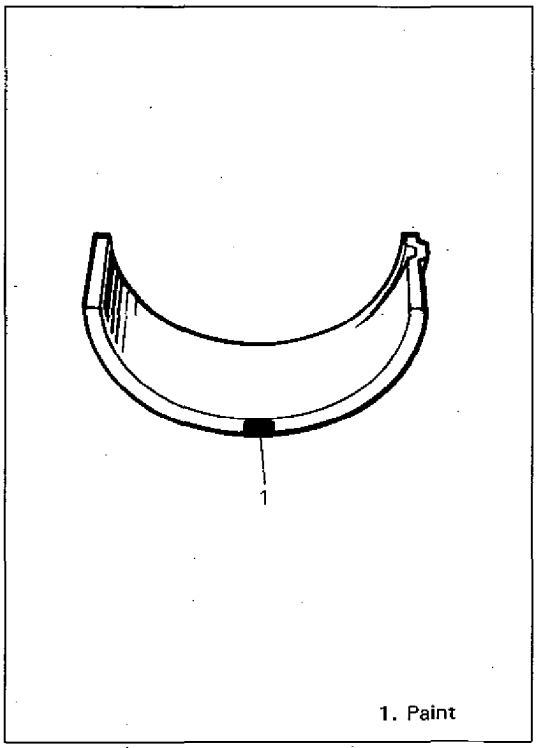
70F00-6A-33-1

2) Next, check bearing cap bore diameter without bearing. On mating surface of cylinder block, four alphabets are stamped as shown in figure.
Three kinds of alphabets ("A", "B" and "C") represent following cap bore diameters.

Alphabet stamped	Bearing cap bore diameter (without bearing)
A	49.000—49.006 mm (1.9292—1.9294 in.)
B	49.006—49.012 mm (1.9294—1.9296 in.)
C	49.012—49.018 mm (1.9296—1.9298 in.)

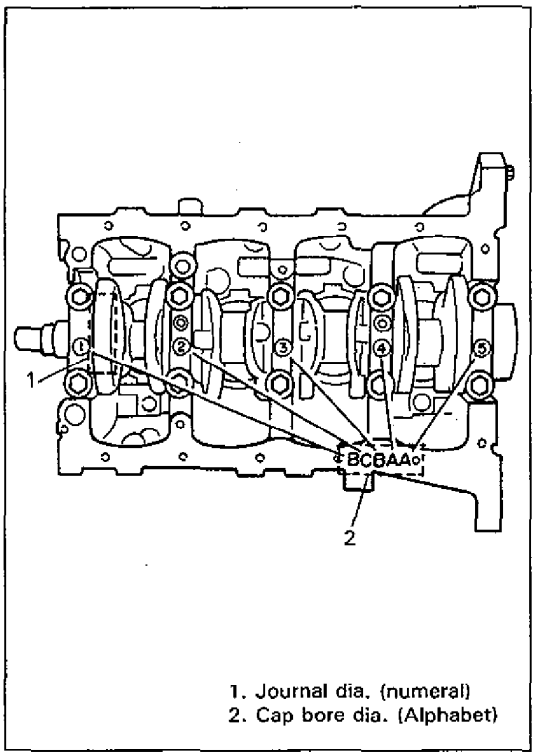
The first, second, third, fouth and fifth (left to right) stamped alphabets represent cap bore diameters of bearing caps "1", "2", "3", "4" and "5", respectively.
For example, in figure, the first (leftmost) alphabet "B" indicates that cap bore dia. of bearing cap "1" is within 49.006—49.012 mm, and the fifth (rightmost) alaphabet "A" indicates that cap bore dia. of cap "5" is within 49.000—49.006 mm.

3) There are five kinds of standard bearings differing in thickness. To distinguish them, they are painted in following colors at the position as indicated in figure.
Each color indicates following thickness at the center of bearing.



70F00-6A-33-3

Color painted	Bearing thickness
Green	1.996—2.000 mm (0.0786—0.0787 in.)
Black	1.999—2.003 mm (0.0787—0.0788 in.)
Colorless (no paint)	2.002—2.006 mm (0.0788—0.0789 in.)
Yellow	2.005—2.009 mm (0.0789—0.0790 in.)
Blue	2.008—2.012 mm (0.0790—0.0791 in.)



1. Journal dia. (numeral)
2. Cap bore dia. (Alphabet)

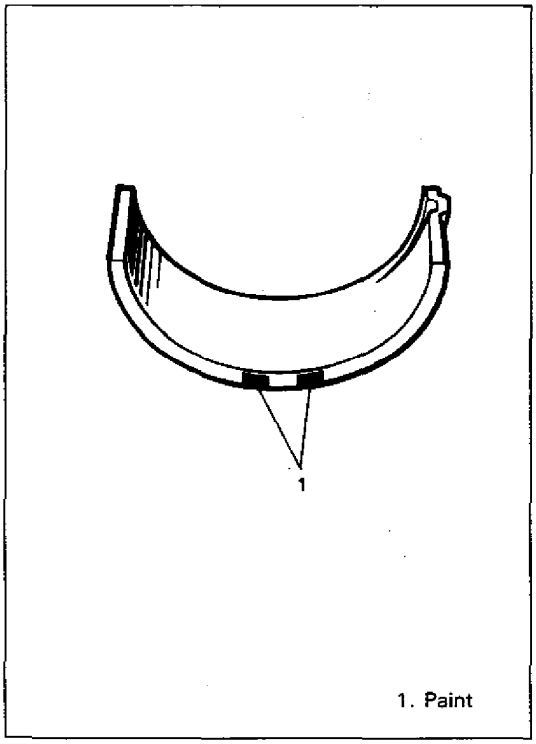
70F00-6A-34-1

4) From numeral stamped on crank webs of No.2 and No.3 cylinders and the alphabets stamped on mating surface of cylinder block, determine new standard bearing to be installed to journal, by referring to table shown below.
For example, if numeral stamped on crank webs is "1" and alphabet stamped on mating surface is "B", install a new standard bearing painted in "Black" to its journal.

		Numeral stamped on crank web (Journal diameter)		
		1	2	3
Alphabet stamped on mating surface (Cap bore dia.)	A	Green	Black	Colorless
	B	Black	Colorless	Yellow
	C	Colorless	Yellow	Blue
		New standard bearing to be installed.		

5) Using gaging plastic, check bearing clearance with newly selected standard bearing.
If clearance still exceeds its limit, use next thicker bearing and recheck clearance.
6) When replacing crankshaft or cylinder block due to any reason, select new standard bearings to be installed by referring to numerals stamped on new crankshaft or alphabets stamped on mating surface of new cylinder block.

70F00-6A-34-2



1. Paint

77500-6A-67-1

UNDERSIZE BEARING (0.25 mm)

- 0.25 mm undersize bearing is available in five kinds varying in thickness.
To distinguish them, each bearing is painted in following colors at the position as indicated in figure.
Each color indicates following thicknesses at the center of bearing.

Color painted	Bearing thickness
Green & Red	2.121—2.125 mm (0.0835—0.0836 in.)
Black & Red	2.124—2.128 mm (0.0836—0.0837 in.)
Red only	2.127—2.131 mm (0.0837—0.0838 in.)
Yellow & Red	2.130—2.134 mm (0.0838—0.0839 in.)
Blue & Red	2.133—2.137 mm (0.0839—0.0840 in.)

- If necessary, regrind crankshaft journal and select undersize bearing to use with it as follows.

1) Regrind journal to following finished diameter.

Finished diameter	44.732—44.750 mm (1.7612—1.7618 in.)

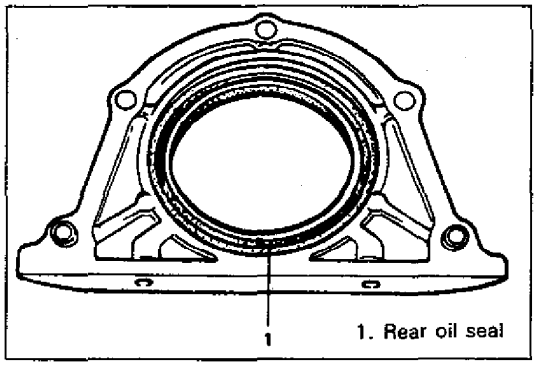
70F00-6A-35-1

2) Using micrometer, measure reground journal diameter. Measurement should be taken in two directions perpendicular to each other in order to check for out-of-round.
3) Using journal diameter measured above and alphabets stamped on mating surface of cylinder block, select undersize bearing to be installed by referring to table given below.
Check bearing clearance with newly selected undersize bearing.

70F00-6A-35-2

		Measured journal diameter		
		44.744—44.750 mm (1.7616—1.7618 in.)	44.738—44.744 mm (1.7614—1.7616 in.)	44.732—44.738 mm (1.7612—1.7613 in.)
Alphabets stamped on mating surface of cylinder block	A	Green & Red	Black & Red	Red only
	B	Black & Red	Red only	Yellow & Red
	C	Red only	Yellow & Red	Blue & Red
		Undersize bearing to be installed.		

70F00-6A-35-3

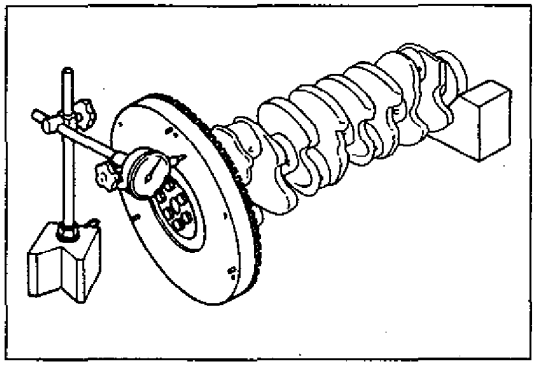


1. Rear oil seal

REAR OIL SEAL

Carefully inspect oil seal for wear or damage. If lip portion is worn or damaged, replace oil seal.

70F00-6A-35-4

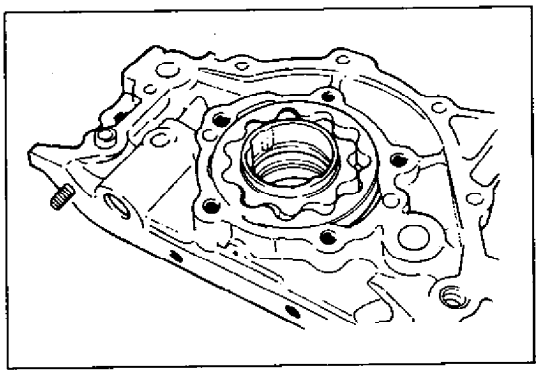


70F00-6A-35-5

FLYWHEEL

- If ring gear is damaged, cracked or worn, replace flywheel.
- If the surface contacting clutch disc is damaged, or excessively worn, replace flywheel.
- Check flywheel for face runout with a dial gauge.
If runout exceeds its limit, replace flywheel.

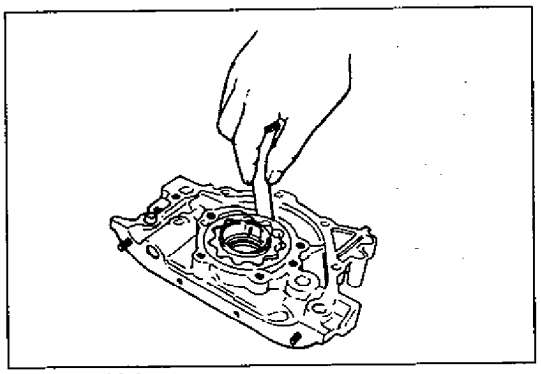
Limit on runout: 0.2 mm (0.0078 in.)



70F00-6A-36-1

OIL PUMP

- Check oil seal lip for fault or other damage. Replace as necessary.
- Check outer and inner rotors, rotor plate and oil pump case for excessive wear or damage.



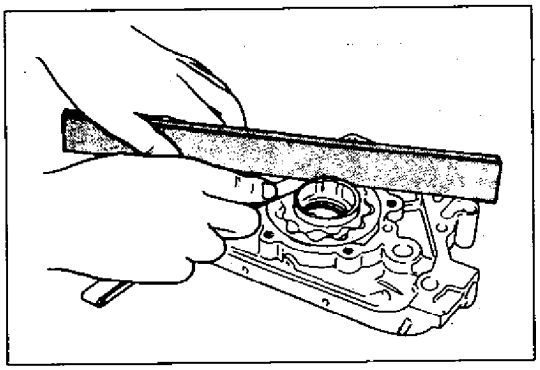
70F00-6A-36-2

Radial clearance

Check radial clearance between outer rotor and case, using thickness gauge.

If clearance exceeds its limit, replace outer rotor or case.

Radial clearance between:	Limit on radial clearance
Outer rotor and case	0.310 mm (0.0122 in.)

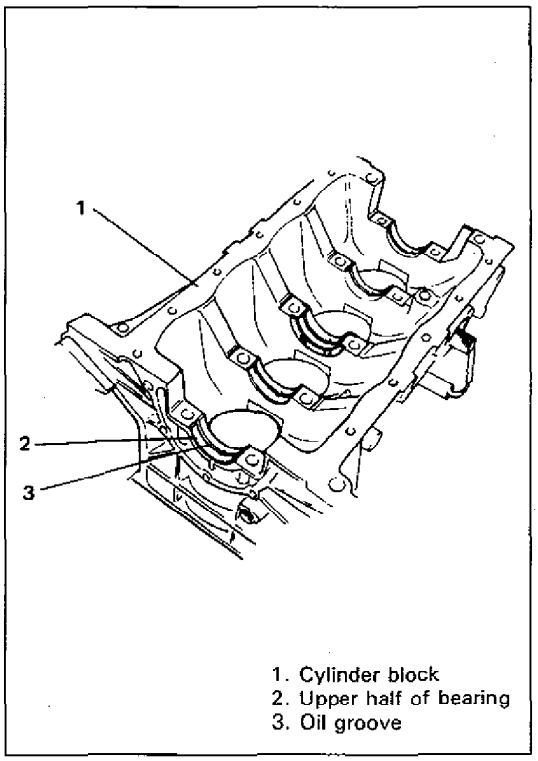


70F00-6A-36-3

Side clearance

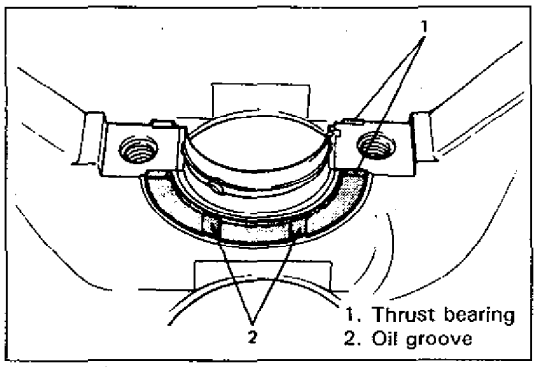
Using straightedge and thickness gauge, measure side clearance.

Limit on side clearance	0.15 mm (0.0059 in.)



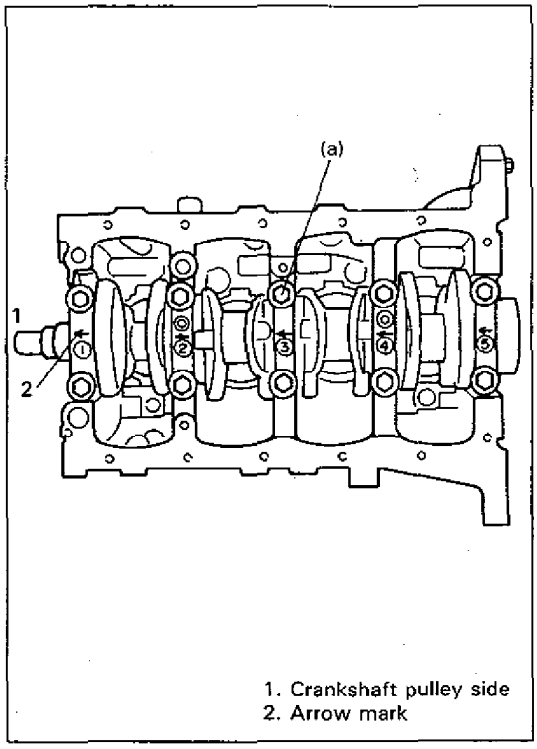
1. Cylinder block
2. Upper half of bearing
3. Oil groove

70F00-6A-37-1



1. Thrust bearing
2. Oil groove

70F00-6A-37-1



1. Crankshaft pulley side
2. Arrow mark

70F00-6A-37-4

ENGINE REASSEMBLY

Engine reassembly is the reverse of engine disassembly as far as sequence is concerned, but there are many reassembling steps that involve measures necessary for restoring the engine as close to the factory-assembled condition as possible.

NOTE:

- **All parts to be installed must be perfectly clean.**
- **Be sure to oil crankshaft journals, journal bearings, thrust bearings, crankpins, connecting rod bearings, pistons, piston rings and cylinder bores.**
- **Journal bearings, bearing caps, connecting rods, rod bearings, rod bearing caps, pistons and piston rings are in combination sets. Do not disturb combination and try to see that each part goes back to where it came from, when installing.**

1. Crankshaft

1) Fit main bearings to cylinder block.
Among two halves of main bearing, one half has oil groove. Install this half with oil groove to cylinder block, and another half without oil groove to bearing cap.
Make sure that two halves are painted in the same color.

2) Fit thrust bearings to cylinder block between No.2 and No.3 cylinders. Face oil groove sides to crank webs.

3) Put crankshaft on cylinder block.

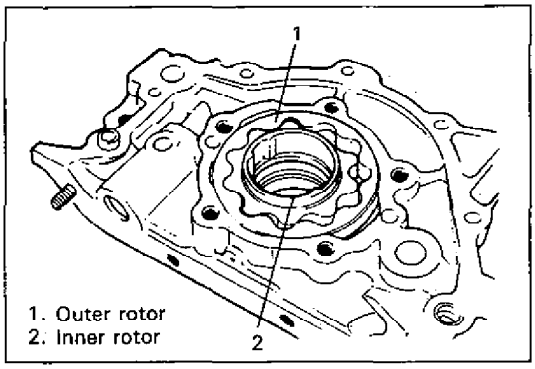
4) Fit bearing caps sequentially in ascending order, 1, 2, 3, 4 and 5, starting from pulley side. Be sure to point arrow mark (on each cap) to crankshaft pulley side.
Gradual and uniform tightening is important for bearing cap bolts. Make sure that five caps become tight equally and progressively till specified torque is attained.

Tightening Torque

(a): 50—57 N·m (5.0—5.7 kg-m, 36.5—41.0 lb-ft)

NOTE:

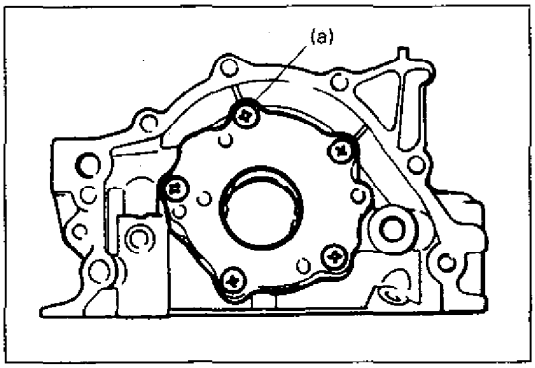
After tightening cap bolts, check to be sure that crankshaft rotates smoothly when turned by hand.



70F00-6A-38-1

2. Oil Pump and Oil Seal Housing

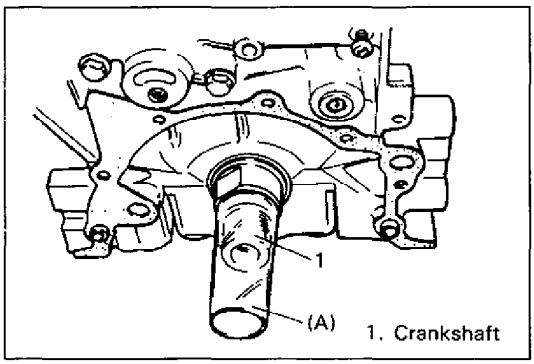
1) Wash, clean and then dry all disassembled parts.
2) Apply thin coat of engine oil to inner and outer rotors, oil seal lip portion, and inside surfaces of oil pump case and plate.
3) Install outer and inner rotors to pump case.



70F00-6A-38-2

4) Install rotor plate. Tighten 5 screws securely.
After installing plate, check to be sure that rotors turn smoothly by hand.

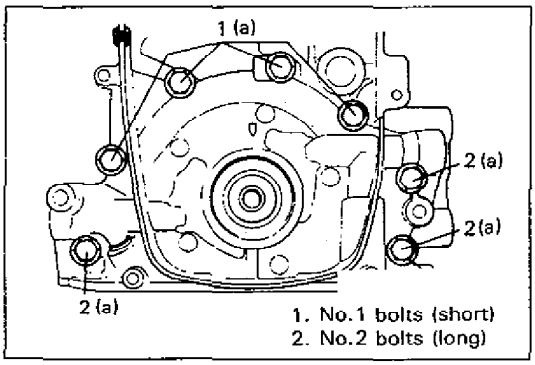
Tightening Torque
(a): 8—13 N·m (0.8—1.3 kg-m, 6.0—9.0 lb-ft)



70F00-6A-38-3

5) Install two oil pump pins and oil pump gasket to cylinder block. Use a new gasket.
6) To prevent oil seal lip from being damaged or upturned when installing oil pump to crankshaft, fit special tool (Oil seal guide) to crankshaft, and apply engine oil to special tool.

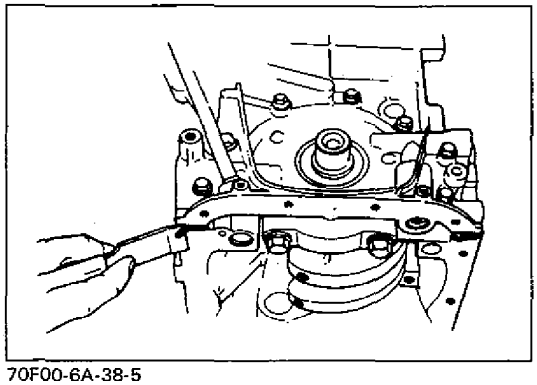
Special Tool
(A): 09926-18210



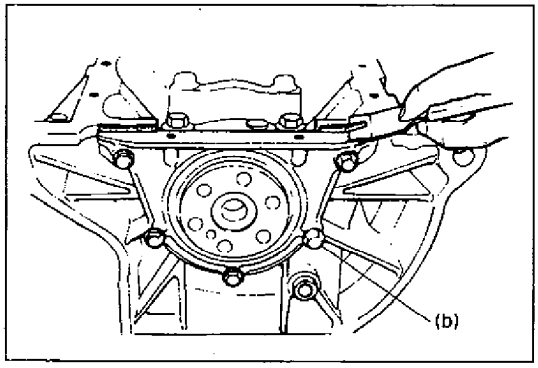
70F00-6A-38-4

7) Install oil pump to crankshaft and cylinder block.
Among 7 oil pump bolts, 4 No.1 bolts are shorter than 3 No.2 bolts in length. Install No.1 and No.2 bolts at the location shown in figure, and tighten them to the specified torque.
After installing oil pump, check to be sure that oil seal lip is not upturned, and then remove special tool.

Tightening Torque
(a): 9—12 N·m (0.9—1.2 kg-m, 7.0—8.5 lb-ft)


70F00-6A-38-5

8) Edge of oil pump gasket might bulge out.
If it does, cut it off with a sharp knife, making edge smooth and flush with end faces of pump case and cylinder block.



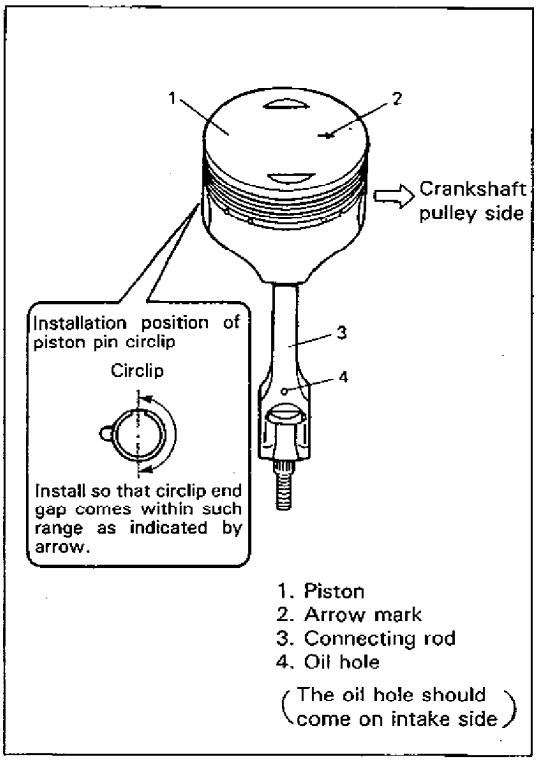
70F00-6A-39-1

9) Install oil seal housing and its gasket.
Install new gasket. Do not reuse gasket removed in disassembly. Oil lip portion of oil seal before installing. Tighten housing bolts to specification.
After installing oil seal housing, gasket edges might bulge out; if so, cut them off to make them flush with cylinder block and oil seal housing.

Tightening Torque
(b): 10—13 N·m (1.0—1.3 kg-m, 7.5—9.0 lb-ft)

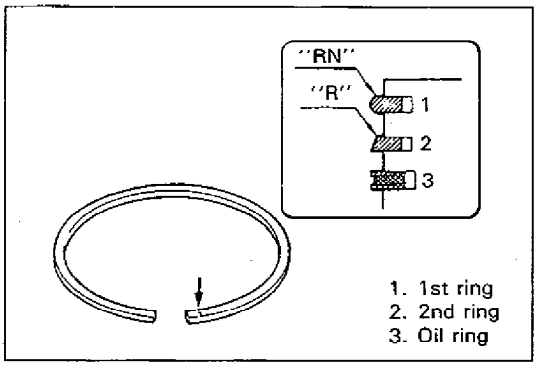
3. Pistons

1) Install piston pin to piston and conecting rod:
After applying engine oil to piston pin and piston pin holes in piston and connecting rod, fit connecting rod to piston as indicated in below figure and insert piston pin to piston and connecting rod, and install piston pin circlip.



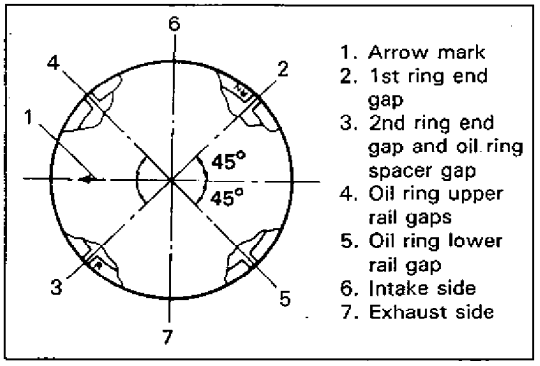
70F00-6A-39-2

2) Install piston rings to piston.
- As indicated in figure, 1st and 2nd rings have "RN" and "R" mark respectively. When installing these piston rings to piston, direct marked side of each ring toward top of piston.
- 1st ring differs from 2nd ring in thickness, shape and color of surface contacting cylinder wall.
  Distinguish 1st ring from 2nd ring referring to figure.
- When installing oil ring, install spacer first and then two rails.

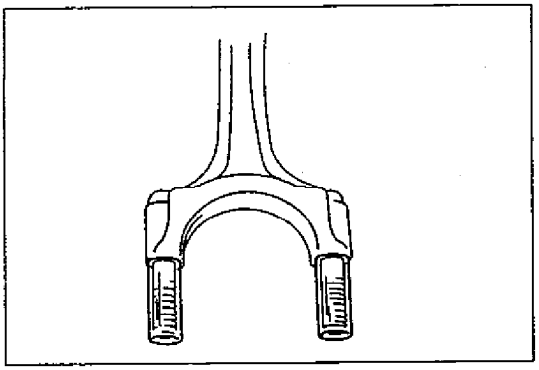


70F00-6A-39-4

3) After installing three rings (1st, 2nd and oil rings), distribute their end gaps as indicated in figure.

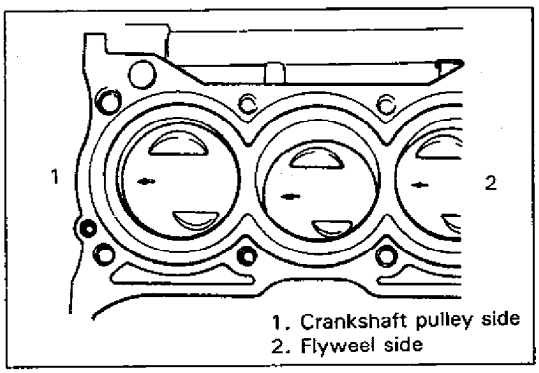


70F00-6A-39-5



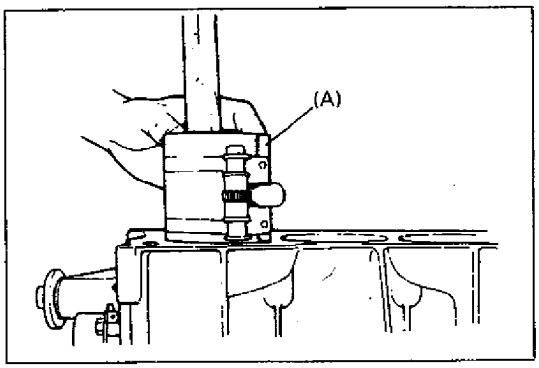
70F00-6A-40-1

4) Apply engine oil to pistons, rings, cylinder walls, connecting rod bearings and crankpins.
5) Fit guide hoses over connecting rod bolts.
These guide hoses protect crankpin and threads of rod bolt from damage during installation of connecting rod and piston assembly.



70F00-6A-40-2

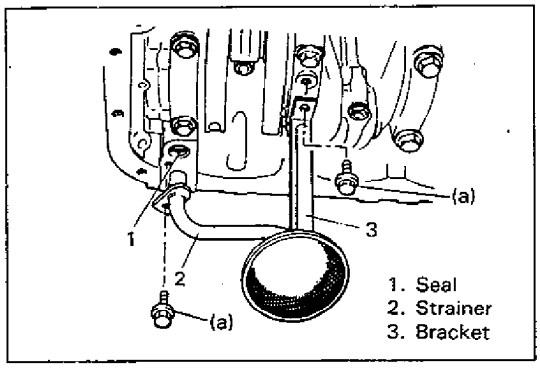
6) When installing piston and connecting rod assembly into cylinder bore, point arrow mark on piston head to crankshaft pulley side.



70F00-6A-40-3

7) Install piston and connecting rod assembly into cylinder bore. Use special tool (Piston ring compressor) to compress rings. Guide connecting rod into place on crankshaft. Using a hammer handle, tap piston head to install piston into bore. Hold ring compressor firmly against cylinder block until all piston rings have entered cylinder bore.

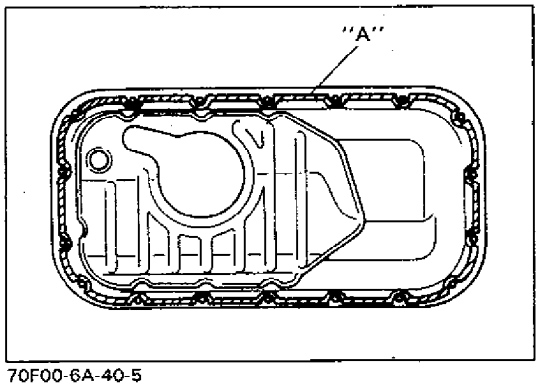
Special Tool
(A): 09916-77310



70F00-6A-40-4

4. Oil Pump Strainer and Oil Pan
1) Install oil pump strainer.
Install seal in such position as shown in figure.
Tighten strainer bolt first and then bracket bolt to specified torque.

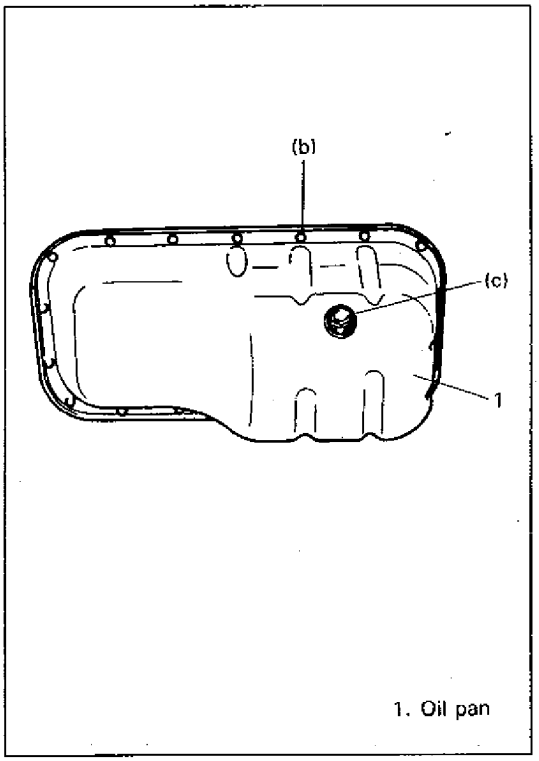
Tightening Torque
(a): 9—12 N·m (0.9—1.2 kg-m, 7.0—8.5 lb-ft)



70F00-6A-40-5

2) Clean mating surfaces of oil pan and cylinder block. Remove oil, old sealant, and dusts from mating surfaces. After cleaning, apply silicon type sealant to oil pan mating surface continuously as shown in figure.

"A": Sealant 99000-31150



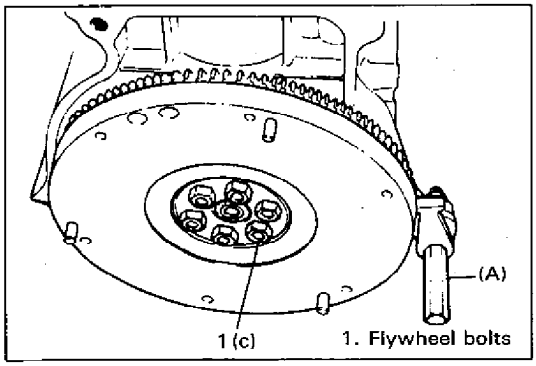
70F00-6A-41-1

3) Install oil pan to cylinder block.
After fitting oil pan to block, run in securing bolts and start tightening at the center: move wrench outward, tightening one bolt at a time.
Tighten bolts and nuts to specified torque.

Tightening Torque
(b): 9—12 N·m (0.9—1.2 kg-m, 7.0—8.5 lb-ft)

4) Install gasket and drain plug to oil pan.

Tightening Torque
(c): 30—40 N·m (3.0—4.0 kg-m, 22.0—28.5 lb-ft)

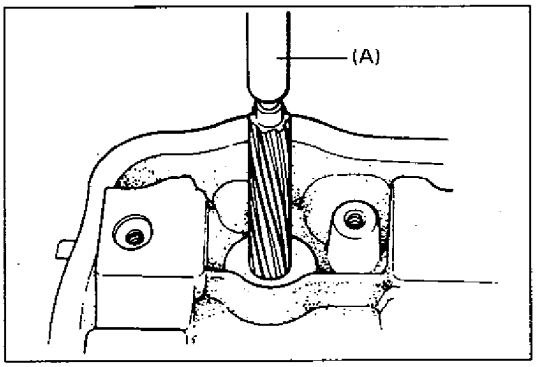


70F00-6A-41-3

5. Flywheel
Install flywheel.
Using special tool, lock flywheel and torque its bolts to specification.

Special Tool
(A): 09924-17810

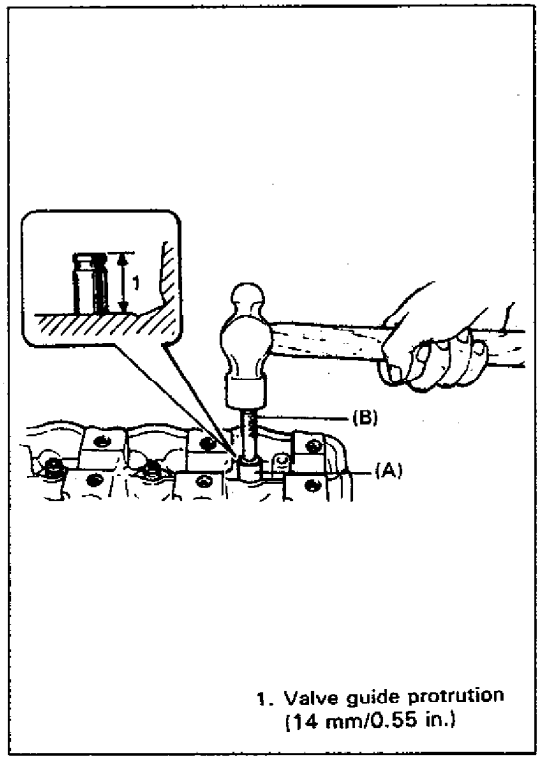
Tightening Torque
(c): 68—72 N·m (6.8—7.2 kg-m, 49.5—52.0 lb-ft)



70F00-6A-41-4

6. Cylinder Head
1) Before installing valve guide into cylinder head, ream guide hole with special tool (12 mm reamer) to remove burrs and make it truly round.

Special Tool
(A): 09916-37310



1. Valve guide protrution (14 mm/0.55 in.)

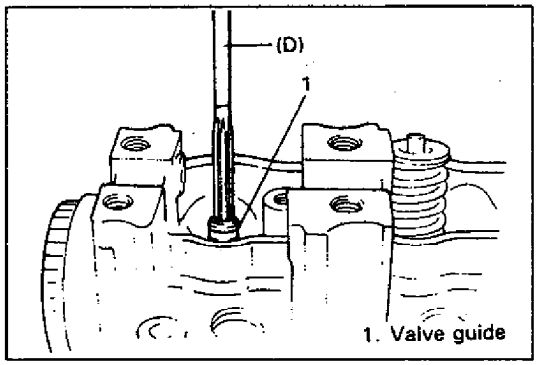
70F00-6A-42-1

2) Install valve guide to cylinder head.
Heat cylinder head uniformly at temperature of 80° to 100°C (176° to 212°F) so that head will not be distorted, and drive new valve guide into hole with special tools. Drive in new valve guide until special tool (Valve guide installer) contacts cylinder head. After installing, make sure that valve guide protrudes by 14 mm from cylinder head.

Special Tool
(B): 09916-57321
(C): 09917-88210

NOTE:
- **Do not reuse valve guide once disassembled. Install new valve guide (Oversize).**
- **Intake and exhaust valve guides are identical.**

Valve guide oversize	0.03 mm (0.0012 in.)
Valve gudie protrusion (In and Ex)	14 mm (0.55 in)

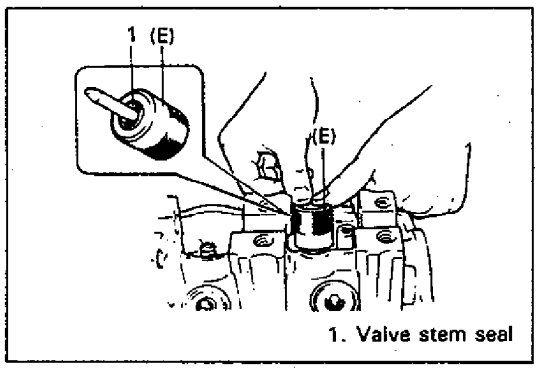


1. Valve guide

70F00-6A-42-3

3) Ream valve guide bore with special tool (7 mm reamer). Clean bore after reaming.

Special Tool
(D): 09916-34520



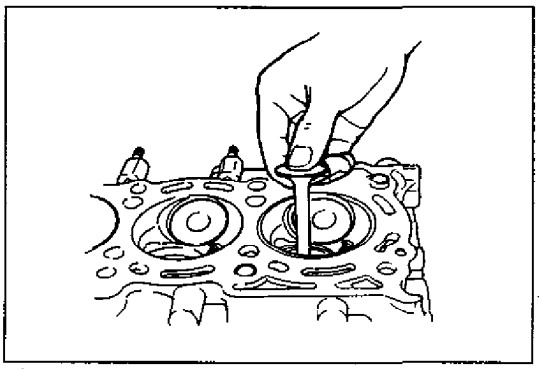
1. Valve stem seal

70F00-6A-42-4

4) Install valve spring seat to cylinder head.
5) Install new valve stem seal to valve guide.
After applying engine oil to seal and spindle of special tool (valve stem seal installer), fit oil seal to spindle, and then install seal to valve guide by pushing special tool by hand. After installing, check to be sure that seal is properly fixed to valve guide.

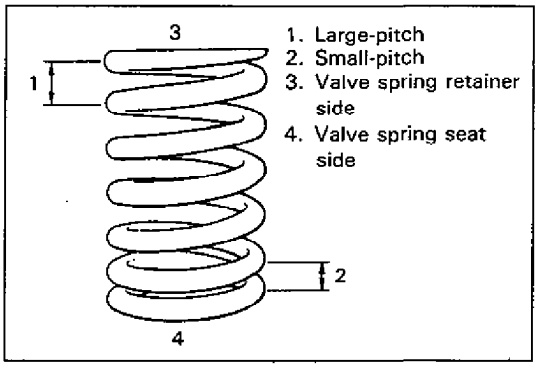
Special Tool
(E): 09917-98210

NOTE:
- **Do not reuse oil seal once disassembled. Be sure to install new oil seal.**
- **When installing, never tap or hit special tool with a hammer or else. Install seal to guide only by pushing special tool with hand. Tapping or hitting special tool may cause damage to seal.**



70F00-6A-43-1

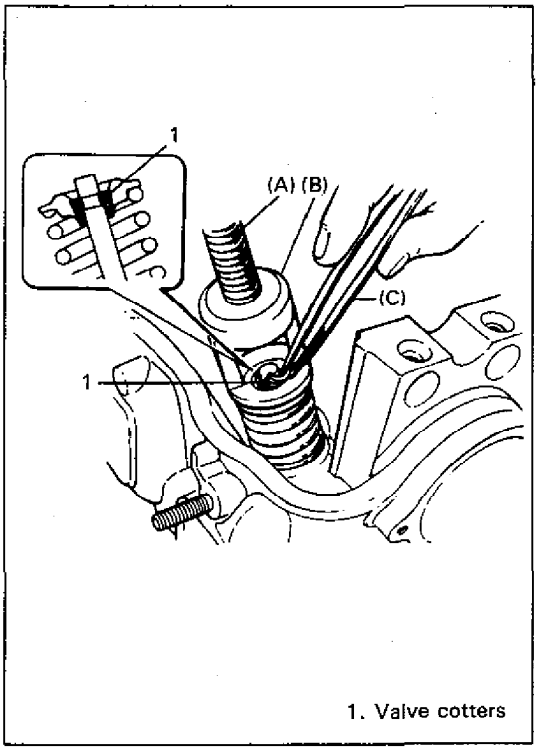
6) Install valve to valve guide.
Before installing valve to valve guide, apply engine oil to stem seal, valve guide bore, and valve stem.



1. Large-pitch
2. Small-pitch
3. Valve spring retainer side
4. Valve spring seat side

70F00-6A-43-2

7) Install valve spring and spring retainer.
Each valve spring has top end (large-pitch end) and bottom end (small-pitch end). Be sure to position spring in place so that its bottom end (small-pitch end) comes to the bottom (Valve spring seat side).



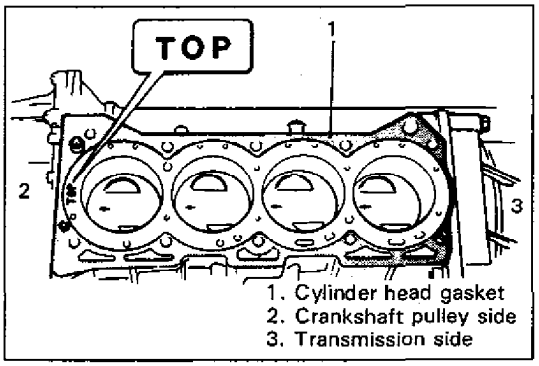
1. Valve cotters

70F00-6A-43-3

8) Using special tool (Valve lifter), compress valve spring and fit two valve cotters to groove provided in valve stem.

Special Tool
(A): 09916-14510
(B): 09916-48210
(C): 09916-84510

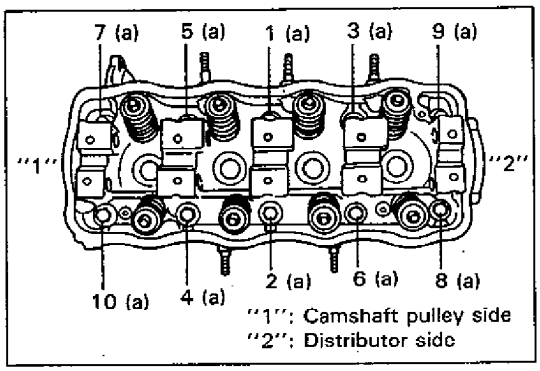
9) Install rocker arm shafts, rocker arms, springs and camshaft as previously outlined.
10) Instal intake manifold, exhaust manifold an distributor to cylinder head.



1. Cylinder head gasket
2. Crankshaft pulley side
3. Transmission side

70F00-6A-43-5

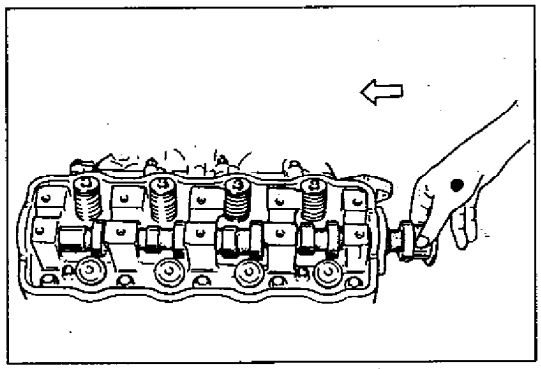
11) Install cylinder head gasket.
Install new head as shown in figure, that is, "TOP" mark provided on gasket comes to crankshaft pulley side, facing up (toward cylinder head).



70F00-6A-44-1

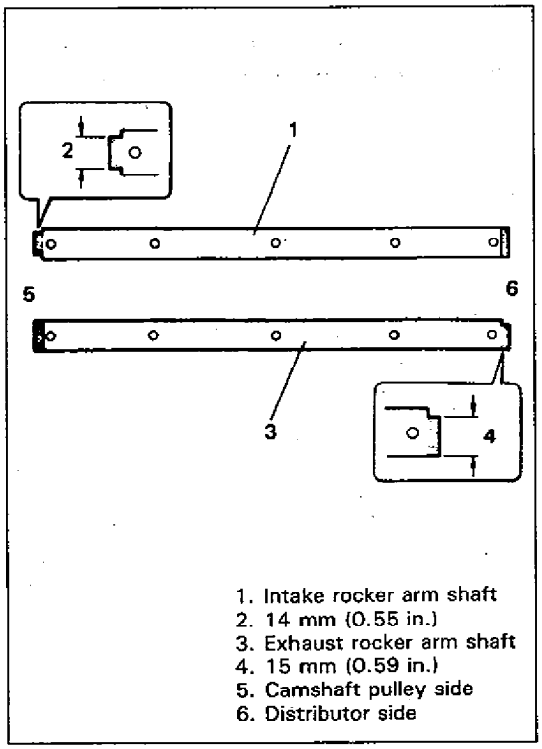
12) Install cylinder head to block.
After applying engine oil to cylinder head bolts, tighten them gradually with a torque wrench, following sequence given in figure. Finally tighten bolts to specified torque.

Tightening Torque
(a): 70—75 N·m (7.0—7.5 kg-m, 51.0—54.0 lb-ft)



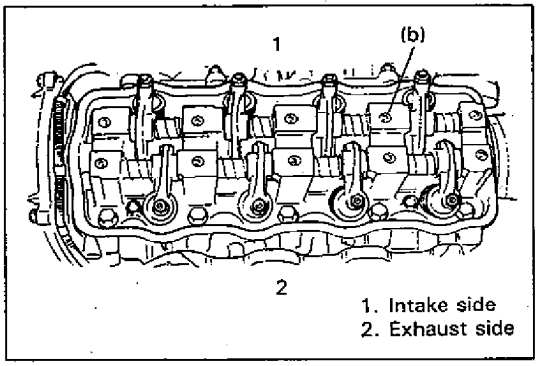
70F00-6A-44-2

13) Apply engine oil to cams and journals on camshaft, and oil seal on cylinder head.
14) Install camshaft to cylinder head from transmission case side.
15) Install distributor case to cylinder head.
Use a new gasket.



70F00-6A-44-3

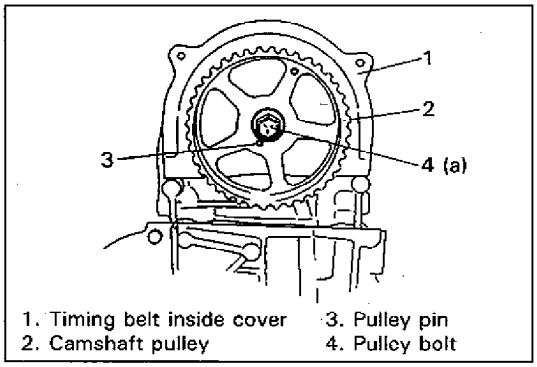
16) Apply engine oil to rocker arms and rocker arm shafts.
17) Install rocker arms, springs and rocker arm shafts.
The two rocker arm shafts are different.
To distinguish between the two, the dimensions of their stepped ends differ as shown in left figure. Install intake rocker arm shaft, facing its stepped end to camshaft pulley side, and exhaust rocker arm shaft, facing its stepped end to distributor side.



70F00-6A-44-5

18) After installing rocker arms, springs and rocker arm shafts as shown in figure, tighten rocker arm shaft screws to the specified torque.

Tightening Torque
(b): 9—12 N·m (0.9—1.2 kg-m, 7.0—8.5 lb-ft)



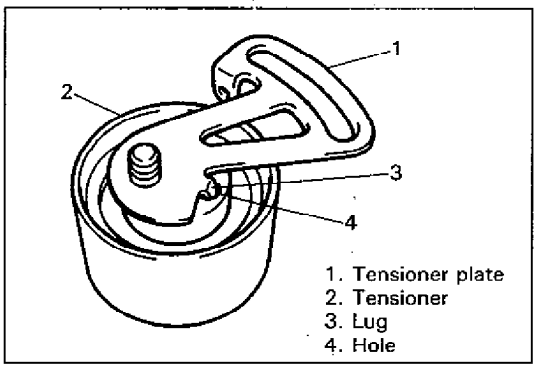
1. Timing belt inside cover
2. Camshaft pulley
3. Pulley pin
4. Pulley bolt

70F00-6A-45-1

7. Camshaft and Crankshaft Timing Belt Pulleys

1) Install camshaft timing belt pulley.
With camshaft locked by using special tool, tighten pulley bolt to the specified torque.

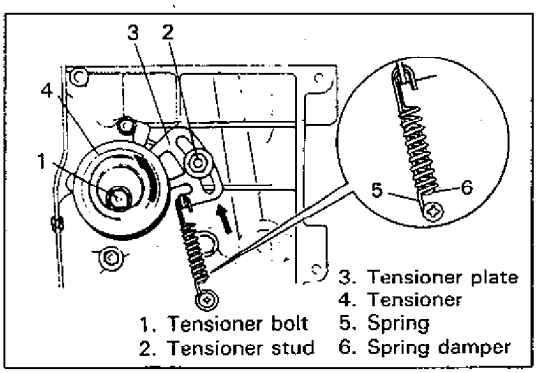
Tightening Torque
(a): 56—64 N·m (5.6—6.4 kg-m, 41.0—46.0 lb-ft)



1. Tensioner plate
2. Tensioner
3. Lug
4. Hole

70F00-6A-45-2

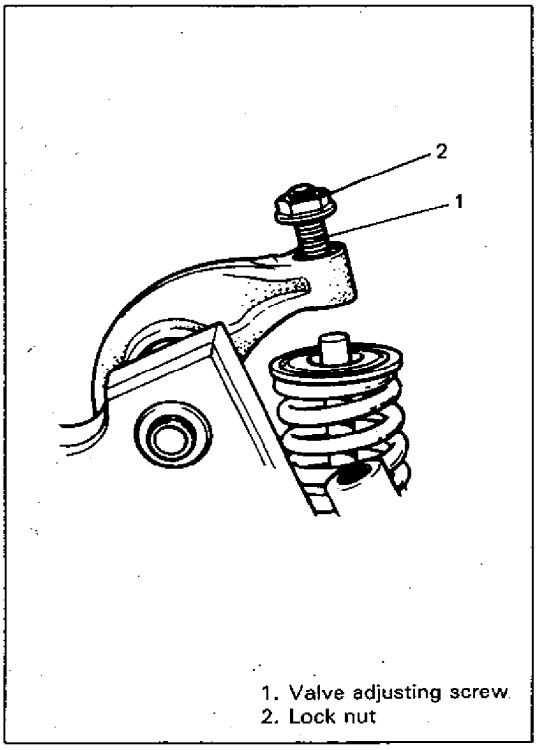
2) Install tensioner plate to tensioner.
Insert lug of tensioner plate into hole of tensioner.



1. Tensioner bolt
2. Tensioner stud
3. Tensioner plate
4. Tensioner
5. Spring
6. Spring damper

70F00-6A-45-3

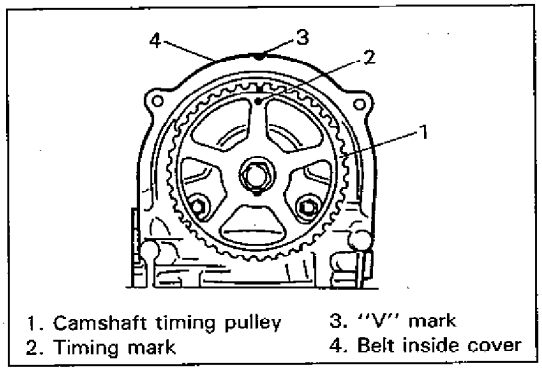
3) Install tensioner, tensioner plate, spring and spring damper.
Do not tighten the tensioner bolt and stud by wrench yet. Hand tighten only at this time.
Check to ensure that plate movement in arrow direction as shown in figure causes tensioner to move in the same direction.
If no associated movement between plate and tensioner occurs, remove tensioner and plate again and reinsert the plate lug into tensioner hole.



1. Valve adjusting screw
2. Lock nut

70F00-6A-45-4

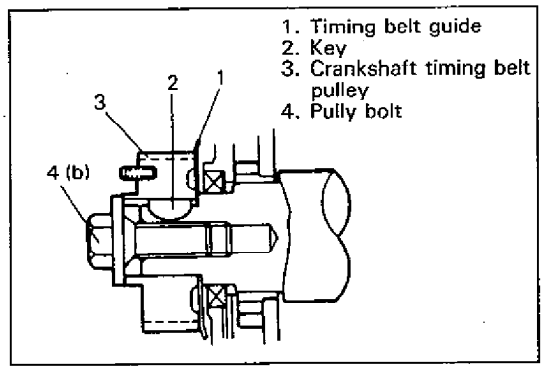
4) Before installing timing belt to camshaft pulley and crank timing belt pulley, remove cylinder head cover.
After removing cylinder head cover, loosen all valve adjusting screws on intake and exhaust rocker arms all the way after loosening each lock nut.
This is to permit the free rotation of camshaft and the reason is; when installing timing belt to both pulleys, belt should be correctly tensed by tensioner spring force. If camshaft does not rotate freely, belt will not be correctly tensed by tensioner.



1. Camshaft timing pulley
2. Timing mark
3. "V" mark
4. Belt inside cover

70F00-6A-46-1

5) After loosening all valve adjusting screws all the way, turn camshaft pulley clockwise and align timing mark on camshaft pulley with "V" mark on the belt inside cover as shown in figure.

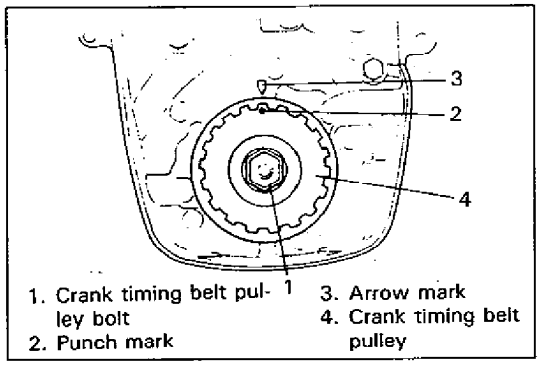


1. Timing belt guide
2. Key
3. Crankshaft timing belt pulley
4. Pully bolt

70F00-6A-46-2

6) Install timing belt guide in such a way that its concave side faces oil pump and then install key and timing belt pulley. Refer to figure for proper installation of these parts. With crankshaft locked, tighten pulley bolt.

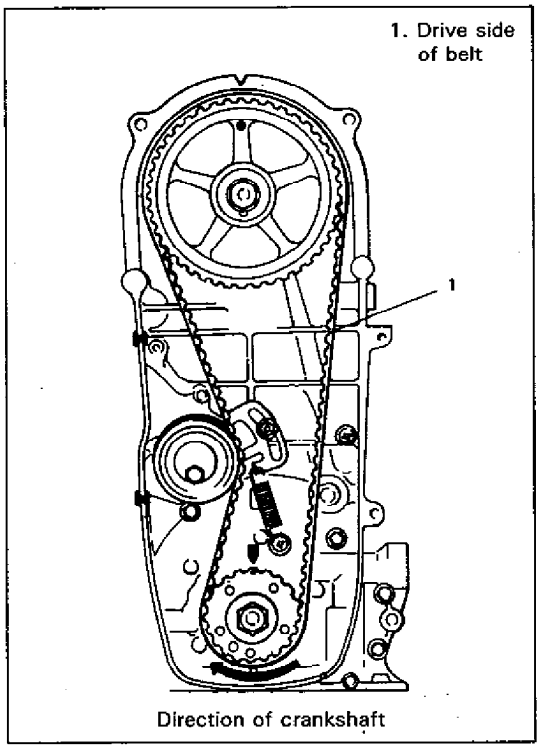
Tightening Torque
(a): 105—115 N·m (10.5—11.5 kg-m, 76.0—83.0 lb-ft)



1. Crank timing belt pulley bolt
2. Punch mark
3. Arrow mark
4. Crank timing belt pulley

70F00-6A-46-3

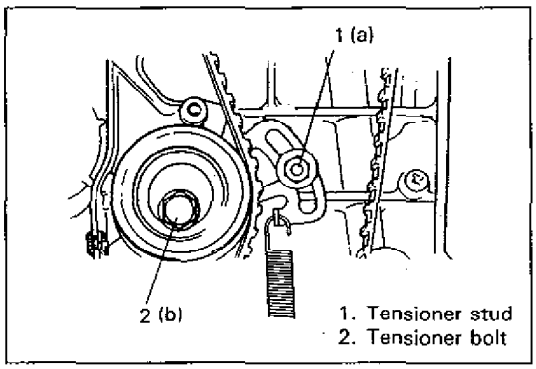
7) Turn crankshaft clockwise, fitting 17 mm wrench to crank timing belt pulley bolt, and align punch mark on timing belt pulley with arrow mark on oil pump as shown in figure.



70F00-6A-46-4

8) With two sets of marks aligned, install timing belt on two pulleys in such a way that the drive side of belt is free of any slack, and with tensioner plate pushed up by finger.

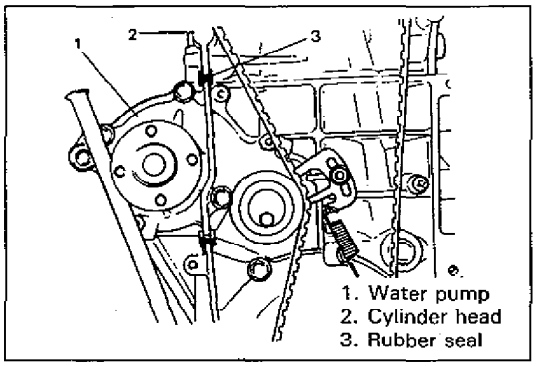
NOTE:
- **When installing timing belt, match arrow mark (➡) on timing belt with rotating direction of crankshaft.**
- **In this state, No.4 piston is at top dead center of compression stroke.**



70F00-6A-47-1

9) To take up slack of timing belt, turn crankshaft two rotations clockwise after installing it. After making sure that belt is free from slack, tighten tensioner stud first and then tensioner bolt to each specified torque.
Then confirm again that two sets of marks are aligned respectively.

Tightening Torque
(a): 9—12 N·m (0.9—1.2 kg-m, 7.0—8.5 lb-ft)
(b): 24—30 N·m (2.4—3.0 kg-m, 17.5—21.5 lb-ft)



70F00-6A-47-2

10) Install timing belt outside cover.
Before installing, make sure that seal is between water pump and oil pump case and another between water pump and cylinder head. (See left figure.)

Generator
Install generator and adjust drive belt tension to specification.
For belt tension specification, refer to "WATER PUMP BELT TENSION" of SECTION 6B in this manual.

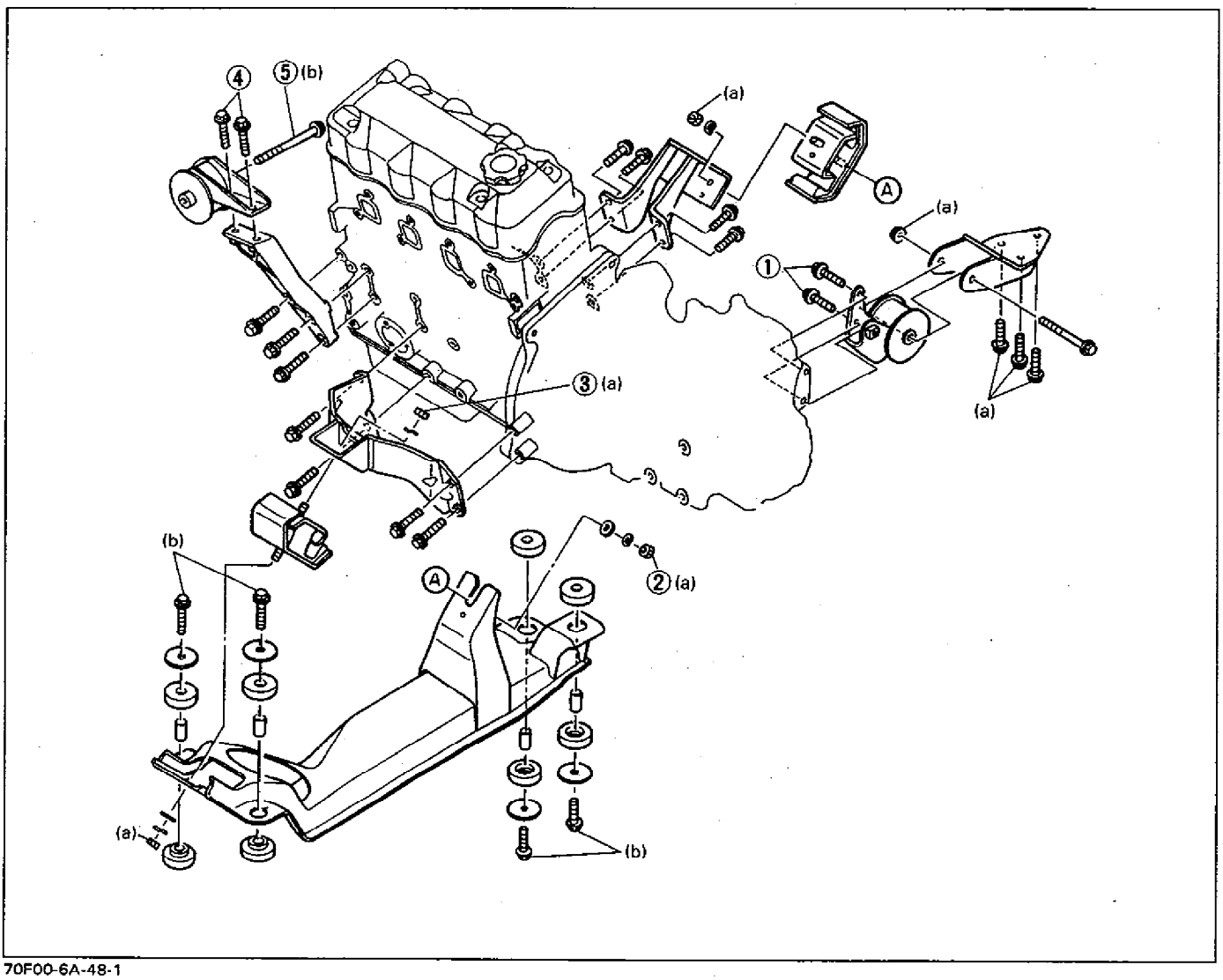
Clutch Disc and Cover
Install clutch disc and cover.
For installation, refer to SECTION 7C "CLUTCH" in this manual and torque each bolt to specification.

Distributor
Install distributor to case.
For installation, be sure to refer to SECTION 6F "IGNITION SYSTEM" in this manual.

NOTE:
Check and adjust ignition timing with engine installed to vehicle body and after installing and connecting all necessary parts. For procedure, refer to SECTION 6F "IGNITION SYSTEM" in this manual.

Valve lash (clearance) adjustment
Adjust intake and exhaust valve lashes.
For adjustment procedure, refer to "ON-VEHICLE SERVICE" in this section.

ENGINE INSTALLATION



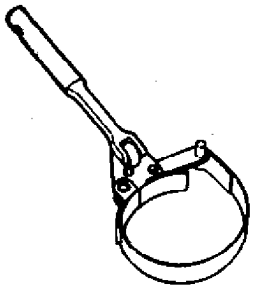
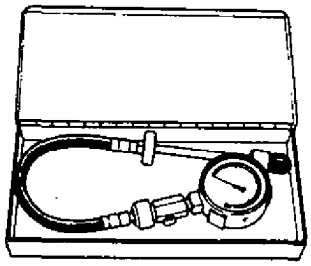
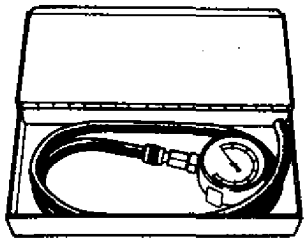
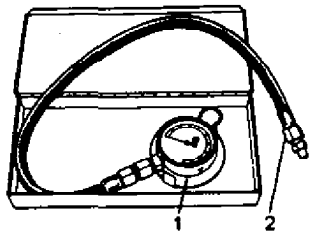
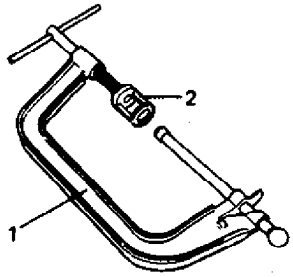
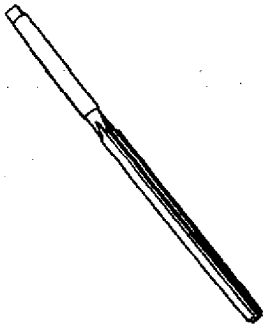
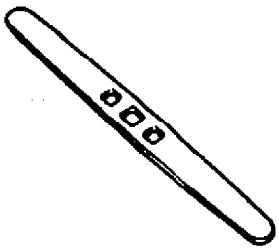
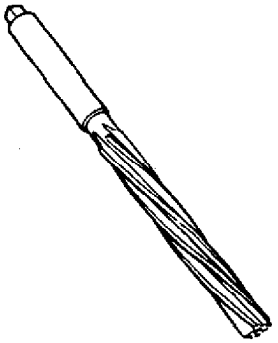
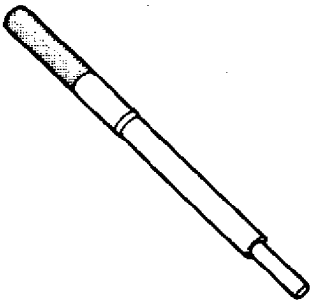
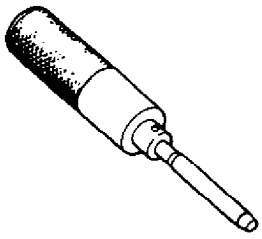
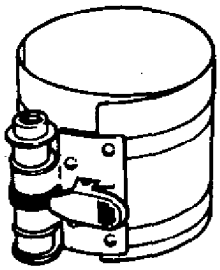
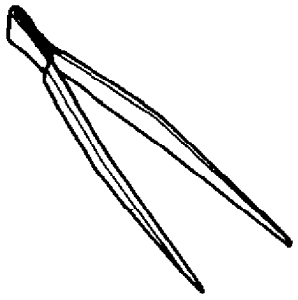
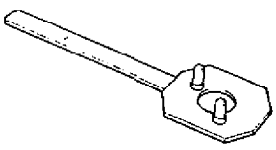
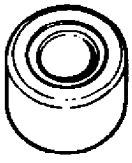
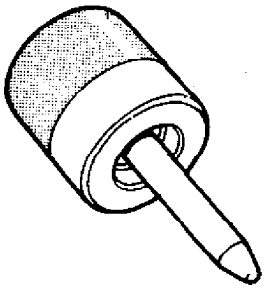
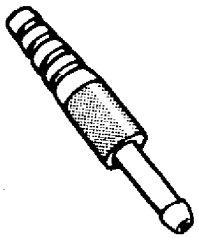
70F00-6A-48-1

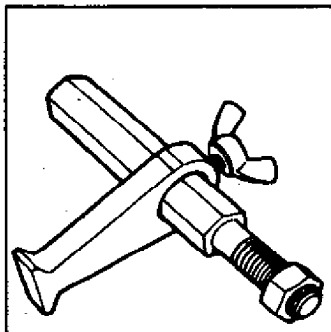
1) Lower engine with transmission into engine compartment but do not remove lifting device.
2) Install engine right bracket bolts ④ .
3) Install engine front mounting nut ③ .
4) Install engine left mounting bracket. (Fuel injection model)
5) Install engine rear mounting bracket nut ② .
6) Install rear torque stopper bolts ① .
7) Tighten bolts and nuts all parts installed in above steps 2), 3), 4), 5) and 6) to specified torque.

Tightening Torque
(a): 35—45 N·m (3.5—4.5 kg-m, 25.5—32.5 lb-ft)
(b): 50—60 N·m (5.0—6.0 kg-m, 36.5—43.0 lb-ft)

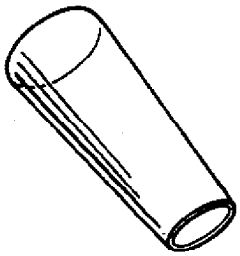
8) Remove lifting device.
9) Reverse removal procedures for installation of remainder.
10) Adjust clutch pedal free travel, referring to SECTION 7C.
11) Adjust accelerator cable play, referring to SECTION 6D (or 6E).
12) Refill engine with engine oil, referring to SECTION 0B.
13) Refill cooling system, referring to SECTION 6B.
14) Upon completion of installation, verify that there is no fuel leakage, coolant leakage or exhaust gas leakage at each connection.

SPECIAL TOOLS

 09915-47310 Oil filter wrench	 09915-64510 Compression gauge	 09915-67310 Vacuum gauge	 1. 09915-77310 Oil pressure gauge 2. 09915-78211 Oil pressure gauge attachment
 1. 09916-14510 Valve lifter 2. 09916-48210 Valve lifter attachment	 09916-34520 Reamer (7 mm)	 09916-34542 Reamer handle	 09916-37310 Reamer (12 mm)
 09916-46010 Valve guide remover	 09916-57321 Valve guide installer handle	 09916-77310 Piston ring compressor	 09916-84510 Forceps
 09917-68220 Camshaft pulley holder	 09917-88210 Valve guide installer	 09917-98210 Valve stem seal installer	 09918-08210 Vacuum gauge hose joint



09924-17810
Flywheel holder



09926-18210
Oil seal guide (Vinyl resin)

70F00-6A-50-1

REQUIRED SERVICE MATERIALS

MATERIALS	RECOMMENDED SUZUKI PRODUCT	USE
Sealant	SUZUKI BOND NO. 1207C (99000-31150)	• Mating surfaces of cylinder block and oil pan.

64B40-6A1-70-2

RECOMMENDED TORQUE SPECIFICATIONS

System	Fastening part	Tightening torque		
		N·m	kg-m	lb-ft
Engine	Cylinder head bolt	70—75	7.0—7.5	51.0—54.0
	Spark plug	20—30	2.0—3.0	14.5—21.5
	Intake & exhaust manifold bolt & nut	18—28	1.8—2.8	13.5—20.0
	Camshaft timing belt pulley bolt	56—64	5.6—6.4	41.0—46.0
	Timing belt cover bolt and nut	9—12	0.9—1.2	7.0—8.5
	Crankshaft pulley bolt	14—18	1.4—1.8	10.5—13.0
	Connecting rod bearing cap nut	33—37	3.3—3.7	24.0—26.5
	Crankshaft main bearing cap bolt	50—57	5.0—5.7	36.5—41.0
	Flywheel bolt	68—72	6.8—7.2	49.5—52.0
	Oil pressure switch	12—15	1.2—1.5	9.0—10.5
	Oil filter stand	20—25	2.0—2.5	14.5—18.0
	Oil pan bolt and nut	9—12	0.9—1.2	7.0—8.5
	Oil drain plug	30—40	3.0—4.0	22.0—28.5
	Cylinder head cover bolt	4—5	0.4—0.5	3.0—3.5
	Valve adjusting screw lock nut	15—19	1.5—1.9	11.0—13.5
	Exhaust pipe bolt	35—50	3.5—5.0	25.5—36.0
	Oil pump strainer bolt	9—12	0.9—1.2	7.0—8.5
	Oil pump case bolt	9—12	0.9—1.2	7.0—8.5
	Breather plate bolt	18—28	1.8—2.8	13.5—20.0
	Crankshaft timing belt pulley bolt	~~105—115~~ 130	10.5—11.5	76.5—83.0
	Timing belt tensioner bolt	24—30	2.4—3.0	17.5—21.5
	Timing belt tensioner stud	9—12	0.9—1.2	7.0—8.5
	Oil pump rotor plate screw	9—12	0.9—1.2	7.0—8.5
	Engine mounting & bracket bolt and nut	Refer to page 6A-48.		

70F00-6A-51-1

SECTION 6B

ENGINE COOLING

CONTENTS

70F00-6B-1-1

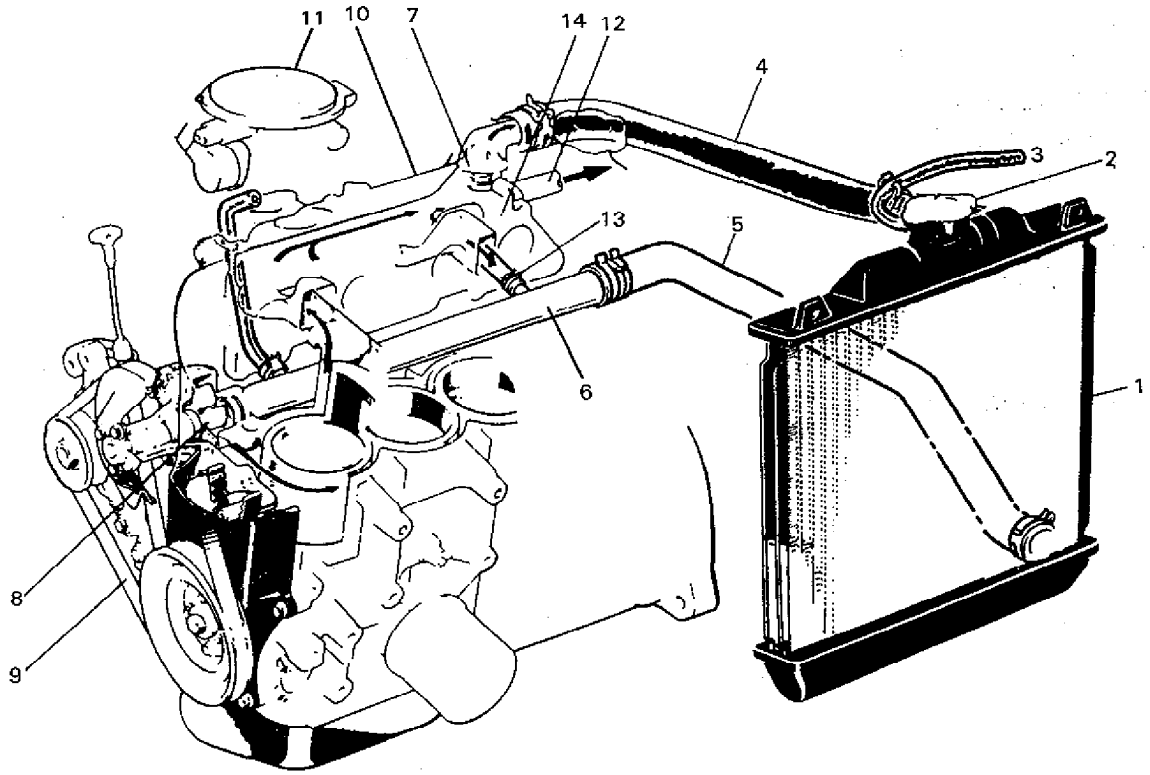
GENERAL DESCRIPTION

COOLING SYSTEM CIRCULATION

1. While the engine is warmed up (thermostat closed), coolant circulates as follows.

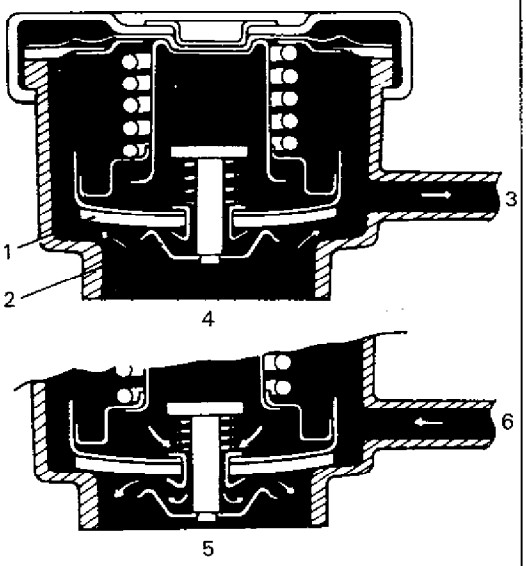
Water pump → Cylinder block → Cylinder head → Intake manifold → Fast idle air valve (throttle body) (For Electronic Fuel Injection model) → Car heater core → Water inlet pipe → Water pump

2. When coolant is warmed up to normal temperature and the thermostat opens, coolant passes through the radiator core to be cooled as well as the above flow circuit.



1. Radiator
2. Radiator cap
3. To reservoir tank
4. Radiator inlet hose
5. Radiator outlet hose
6. Water intake pipe
7. Thermostat
8. Water pump
9. Water pump drive belt
10. Intake manifold
11. TB (throttle body)
12. Heater inlet hose
13. Heater outlet hose
14. Cylinder head

70F00-6B-2-1



1. Pressure valve
2. Vacuum valve
3. To reservoir tank
4. Pressure relief
5. Vacuum relief
6. From reservoir tank

64840-6B-3-1

RADIATOR CAP

A pressure-vent cap is used on the radiator. The cap contains a pressure valve and vacuum valve.

The pressure valve is held against its seat by a spring of predetermined strength which protects the cooling system by relieving the pressure if the pressure in cooling system rises by 0.9 kg/cm² (12.8 psi, 90 kPa). The vacuum valve is held against its seat by a light spring which permits opening of the valve to relieve vacuum created in the system when it cools off and which otherwise might cause the radiator to collapse.

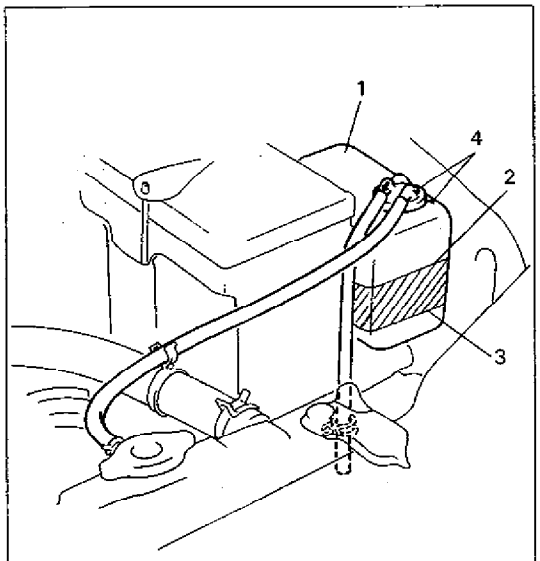
NOTE:

Do not remove radiator cap to check engine coolant level; check coolant visually at the see-through coolant reservoir tank.

Coolant should be added only to reservoir tank as necessary.

WARNING:

As long as there is pressure in the cooling system, the temperature can be considerably higher than the boiling temperature of the solution in the radiator without causing the solution to boil. Removal of the radiator cap while engine is hot and pressure is high will cause the solution to boil instantaneously and possibly with explosive force, spewing the solution over engine, fenders and person removing cap. If the solution contains flammable anti-freeze such as alcohol (not recommended for use at any time), there is also the possibility or causing a serious fire.



1. Reservoir tank
2. FULL level mark
3. LOW level mark
4. Arrow mark

70F00-6B-3-4

COOLANT RESERVOIR TANK

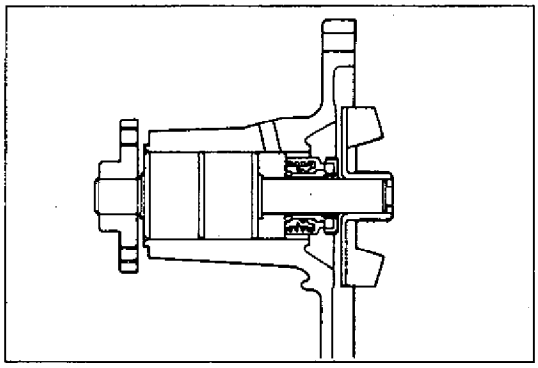
A "see-through" plastic reservoir tank is connected to the radiator by a hose. As the vehicle is driven, the coolant is heated and expands. The portion of the coolant displaced by this expansion flows from the radiator into the reservoir tank. When the car is stopped and the coolant cools and contracts, the displaced coolant is drawn back into the radiator by vacuum.

Thus, the radiator is kept filled with coolant to the desired level at all times, resulting in increased cooling efficiency. Coolalnt level should be between "FULL" and "LOW" marks on the reservoir tank.

Coolant should be added only to the reservoir tank as necessary.

NOTE:

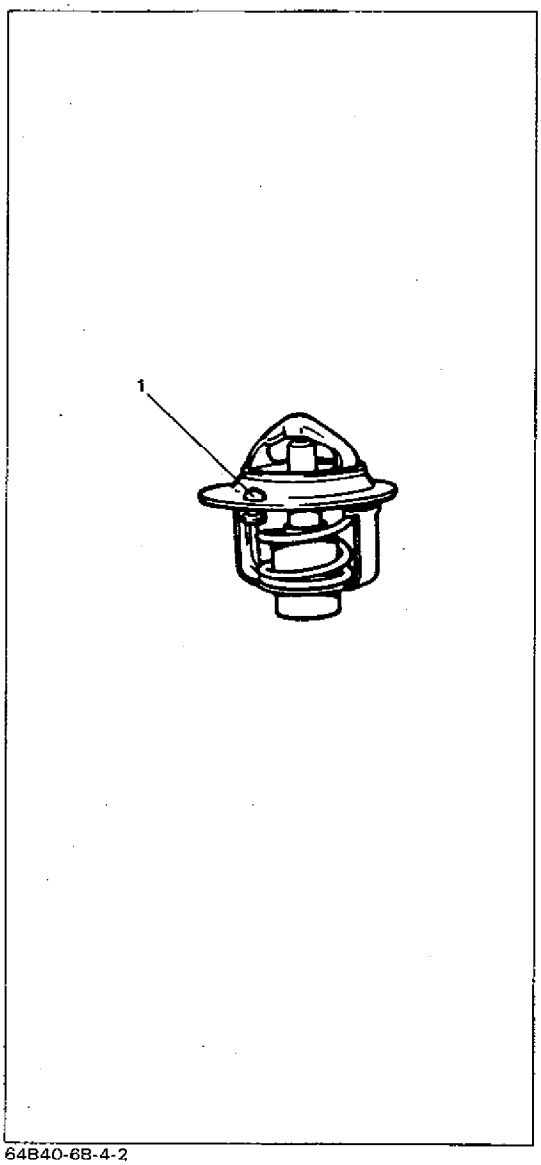
When installing reservoir tank cap, align arrow marks on the tank and cap.



77500-6B-4-1

WATER PUMP

The centrifugal type water pump is used in the cooling system. The pump impeller is supported by a totally sealed bearing. The water pump can not be disassembled.



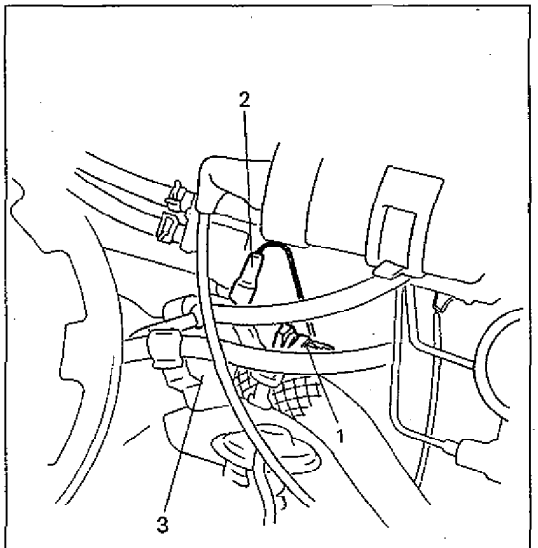
64B40-6B-4-2

THERMOSTAT

A wax pellet type thermostat is used in the coolant outlet passage to control the flow of engine coolant, to provide fast engine warm up and to regulate coolant temperatures.
A wax pellet element is hermetically contained in a metal case, and expands when heated and contracts when cooled.
When the pellet is heated and expands, the metal case pushes down the valve to open it.
As the pellet is cooled, the contraction allows the spring to close the valve.
Thus, the valve remains closed while the coolant is cold, preventing circulation of coolant through the radiator.

At this point, coolant is allowed to circulate only throughout the engine to warm it quickly and evenly.
As the engine warms, the pellet expands and the thermostat valve opens, permitting coolant to flow through the radiator.
In the top portion of the thermostat, an air bleed valve is provided; this valve is for venting out the gas or air, if any, that is accumulated in the circuit.

Thermostat functional sepc. ± 2.8°C (5°F)	
Temp. at which valve begins to open	82°C (179°F)
Temp. at which valve become fully open	95°C (203°F)



1. Fan thermo switch
2. Coolant temp. gauge
3. Thermostat cap

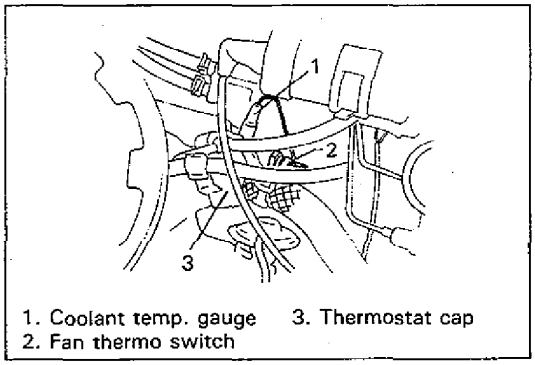
70F00-6B-5-1

COOLING FAN

Fan thermo switch is installed on intake manifold and its functional spec. is as follows.

Fan thermo switch functional spec. ± 5°C (9°F)	
Temp. at switch "ON"	More than 93°C (199°F)
Temp. at switch "OFF"	Less than 88°C (190°F)

WARNING:
Keep hands, tools, and clothing away from engine cooling fan to help prevent personal injury. This fan is electric and can come on whether or not the engine is running. The fan can start automatically in response to the thermo switch with the ignition switch in the "ON" position.



1. Coolant temp. gauge
2. Fan thermo switch
3. Thermostat cap

70F00-6B-5-2

COOLANT (WATER) TEMP. GAUGE

Coolant temp. gauge is located at thermostat case. This gauge activates a temp. meter gauge in the instrument cluster.

DIAGNOSIS

Condition	Possible Cause	Correction
Engine overheats	• Loose or braken water pump belt	Adjust or replace.
	• Not enough coolant	Check coolant level and add as necessary.
	• Faulty thermostat	Replace.
	• Faulty water pump	Replace.
	• Dirty or bent radiator fins	Clean or remedy.
	• Coolant leakage on cooling system	Repair
	• Defective cooling fan motor or thermo switch	Check and replace as necessary.
	• Plugged radiator	Check and replace radiator as necessary.
	• Faulty radiator cap	Replace.
	• Maladjusted ignition timing	Adjust.
	• Dragging brakes	Adjust brake.
	• Slipping clutch	Adjust or replace.

64B40-6B-6-1

MAINTENANCE

COOLANT

The coolant recovery system is standard. The coolant in the radiator expands with heat, and the overflow is collected in the reservoir tank. When the system cools down, the coolant is drawn back into the radiator.

The cooling system has been filled at the factory with a quality coolant that is either 50/50 mixture of water and antifreeze/anticorrosion coolant (ethylene glycol base coolant) or 30% water and 70% antifreeze/anticorrosion coolant.

The 50/50 mixture coolant solution provides freezing protection to −36°C (−33°F), and the 30/70 mixture coolant solution provides freezing protection to −16°C (3°F).

- Maintain cooling system freeze protection at −36°C (−33°F) to ensure protection against corrosion and loss of coolant from boiling. This should be done even if freezing temperatures are not expected.
- Add ethylene glycol base coolant when coolant has to be added because of coolant loss or to provide added protection against freezing at temperature lower than −36°C (33°F).

NOTE:

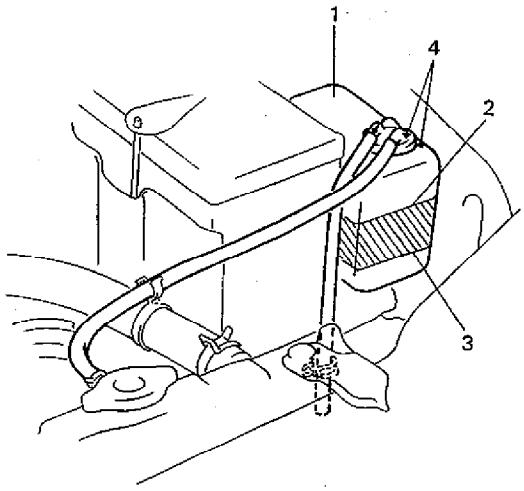
- **Alcohol or methanol base coolant or plain water alone should not be used in cooling system at any time as damage to cooling system could occur.**
- **Even in a market where no freezing temperature is anticipated, mixture of 70% water and 30% antifreeze/anticorrosion coolant (ethylene glycol base coolant) should be used for the purpose of corrosion protection and lubrication.**

ANTI-FREEZE PROPORTIONING CHART

Freezing temperature	°C	−16	−36
	°F	3	−33
Antifeeze/Anti-corrosion coolant concentration	%	30	50
Ratio of compount to cooling water	ltr.	1.20/2.80	2.00/2.00
	US pt.	2.56/5.92	4.23/4.23
	Imp. pt.	2.11/4.93	3.52/3.52

COOLANT CAPACITY	
Engine, radiator and heater	About 3.1 liters (6.6/5.5 US/Imp. pt.)
Reservoir tank	About 0.9 liters (1.9/1.6 US/Imp pt.)
Total	About 4.0 liters (8.5/7.0 US/Imp pt.)

70F00-6B-6-2



1. Reservoir tank
2. FULL level mark
3. LOW level mark
4. Arrow mark

70F00-6B-7-1

COOLANT LEVEL

Coolant Level

To check level, lift hood and look at "see-through" coolant reservoir tank.
It is not necessary to remove radiator cap to check coolant level.

WARNING:
To help avoid danger of being burned:
- **do not remove reservoir tank cap while coolant is "boiling", and**
- **do not remove radiator cap while engine and radiator are still hot.**

Scalding fluid and steam can be blown out under pressure if either cap is taken off too soon.

When engine is cool, check coolant level in reservoir tank. A normal coolant level should be between "FULL" and "LOW" marks on reservoir tank.

If coolant level is below "LOW" mark, remove reservoir tank cap and add proper coolant to tank to bring coolant level up to "FULL" mark. Then, reinstall cap.

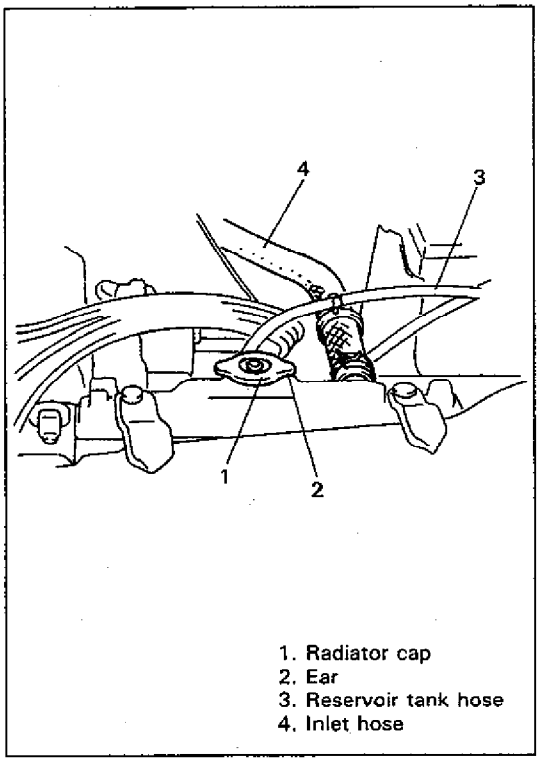
NOTE:
- **If proper quality antifreeze is used, there is no need to add extra inhibitors or additives that claim to improve system. They may be harmful to proper operation of system, and are unnecessary expense.**
- **When installing reservoir tank cap, align arrow marks on tank and cap.**

COOLING SYSTEM SERVICE

WARNING:
To help avoid danger or being burned, do not remove radiator cap while engine and radiator are still hot. Scalding fluid and steam can be blown out under pressure if cap is taken off too soon.

Cooling system should be serviced as follows.
1) Check cooling system for leakage or damage.
2) Wash radiator cap and filled neck with clean water by removing radiator cap when engine is cold.
3) Check coolant for proper level and freeeze protection.

70F00-6B-7-4



1. Radiator cap
2. Ear
3. Reservoir tank hose
4. Inlet hose

70F00-6B-8-1

4) Using a pressure tester, check system and radiator cap for proper pressure holding capacity 0.9 kg/cm² (12.8 psi, 90 kPa). If replacement of cap is required, use proper cap specified torque for this vehicle.

NOTE:
After installing radiator cap to radiator, make sure that its ears are in horizontal direction as shown left. If not, tighten it securely till that direction is obtained.

5) Tighten hose clamps and inspect all hoses. Replace hoses whenever cracked, swollen or otherwise deteriorated.
6) Clean frontal area of radiator core.

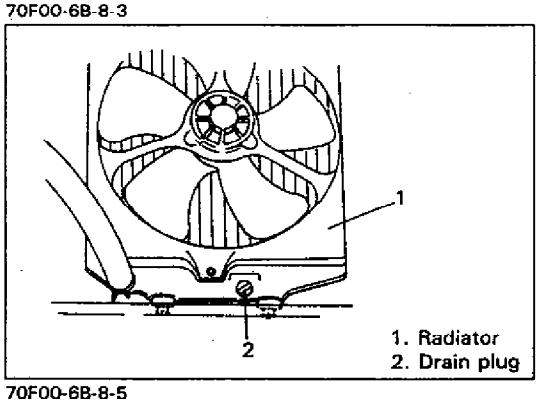
COOLING SYSTEM FLUSH AND REFILL

1) Remove radiator cap when engine is cool:
Turn cap slowly to the left until it reaches a "stop". (Do not press down while turning it.)
Wait until pressure is relieved (indicated by a hissing sound) then press down on cap and continue to turn it to the left.

WARNING:
To help avoid danger of being burned, do not remove radiator cap while engine and radiator cap while engine and radiator are still hot. Scalding fluid and steam can be blown out under pressure if cap is taken off too soon.

2) With radiator cap removed, run engine until upper radiator hose is hot (this shows that thermostat is open and coolant is flowing through system).

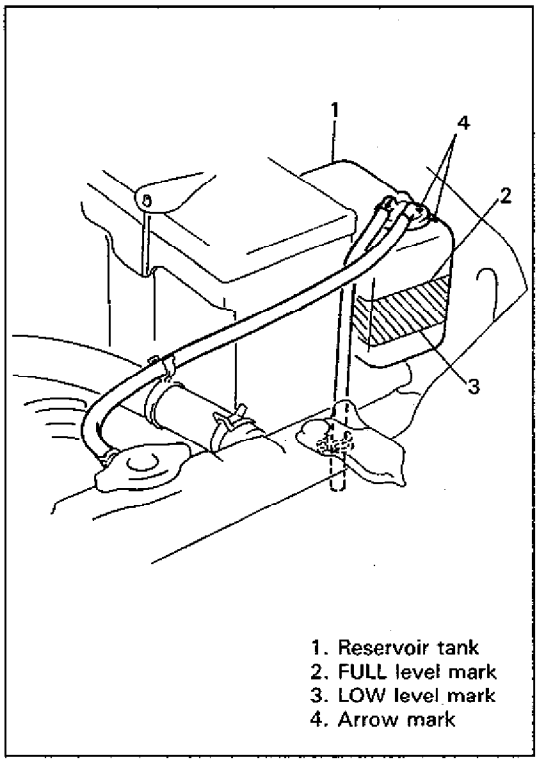
70F00-6B-8-3



1. Radiator
2. Drain plug

70F00-6B-8-5

3) Stop engine and open radiator drain plug to drain coolant.
4) Close drain plug. Add water until system is filled and run engine until upper radiator hose is hot again.
5) Repeat steps 3 and 4 several times until drained liquid is nearly colorless.
6) Drain system and then close radiator drain plug tightly.



1. Reservoir tank
2. FULL level mark
3. LOW level mark
4. Arrow mark

70F00-6B-9-1

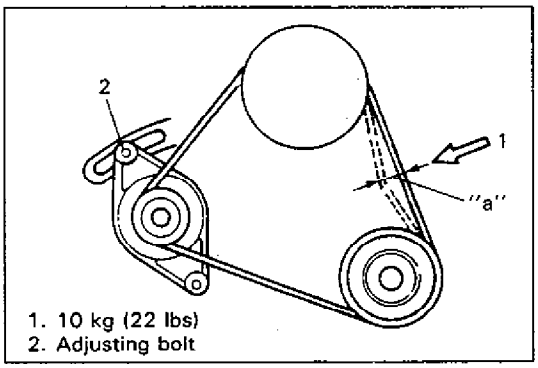
7) Disconnect hose from coolant reservoir tank. Remove tank and pour out any fluid. Scrub and clean inside of tank with soap and water.
   Flush it well with clean water and drain. Reinstall tank and hose.
8) Add 50/50 mixture of Good quality ethylene glycol antifreeze and water to radiator and tank.
   Fill radiator to the base of radiator filler neck and reservoir tank to "FULL" level mark. Reinstall reservoir tank cap, aligning the arrow marks on the tank and cap.
9) Run engine, with radiator cap removed, until radiator upper hose is hot.
10) With engine idling, add coolant to radiator until level reaches the bottom of filler neck. Install radiator cap securely.

WATER PUMP BELT TENSION

WARNING:
Disconnect negative cable at battery before checking and adjusting belt tension.

1) Inspect belt for cracks, cuts, deformation, wear and cleanliness. If it is necessary to replace belt, refer to page 6B-12 for procedure.

70F00-6B-9-3



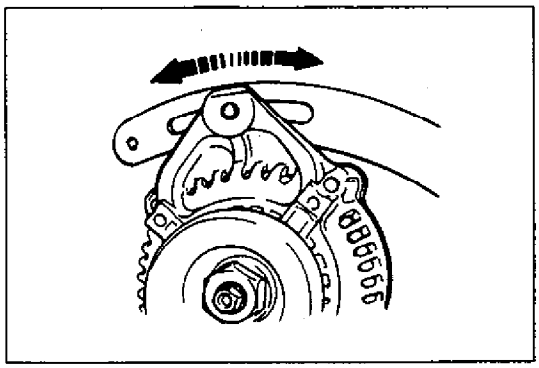
1. 10 kg (22 lbs)
2. Adjusting bolt

70F00-6B-9-4

2) Check belt for tension. Belt is in proper tension when it deflects 6 to 8 mm (0.24—0.31 in.) under thumb pressure (about 10 kg or 22 lb.).

Belt tension "a": 6—8 mm (0.24—0.31 in.) as deflection

NOTE:
When replacing belt with a new one, adjust belt tension to 5—7 mm (0.20—0.27 in.).



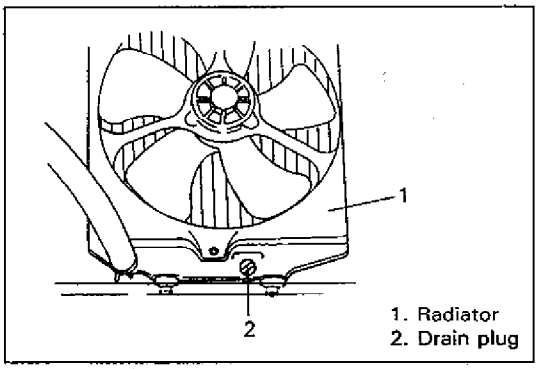
70F00-6B-9-5

3) If belt is too tight or too loose, adjust it to proper tension by displacing generator position.
4) Tighten belt adjusting bolt and generator pivot bolts.
5) Connect negative cable at battery terminal.

ON-VEHICLE SERVICE

WARNING:
- **Check to make sure that engine coolant temperature is cold before removing any part of cooling system.**
- **Also be sure to disconnect negative cord from battery terminal before removing any part.**

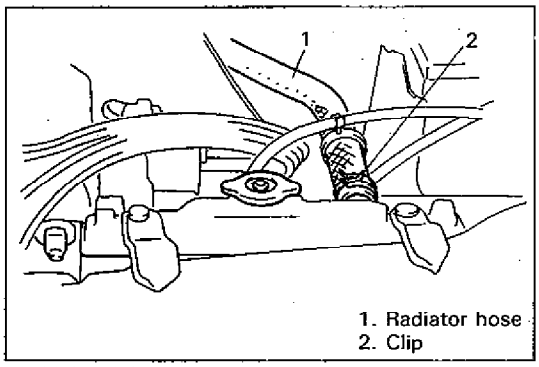
64B40-6B-10-1



70F00-6B-10-2

COOLING SYSTEM DRAINING

1) Remove radiator cap.
2) Loosen drain plug on radiator to drain coolant.
3) After draining coolant, be sure to tighten drain plug securely.
4) Fill cooling system. (Refer to Item COOLANT of MAINTENANCE.)



70F00-6B-10-3

COOLING WATER PIPES OR HOSES

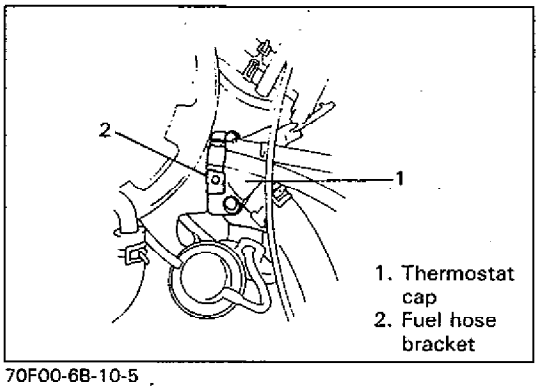
REMOVAL

1) Drain cooling system.
2) To remove these pipes or hoses, loosen hose clip and pull hose end off.

INSTALLATION

Install removed parts in reverse order of removal procedure, noting the following.
- Tighten each clamp bolt securely.
- Refill cooling system with proper coolant, referring to description on COOLANT of MAINTENANCE.

64B40-6B-10-4

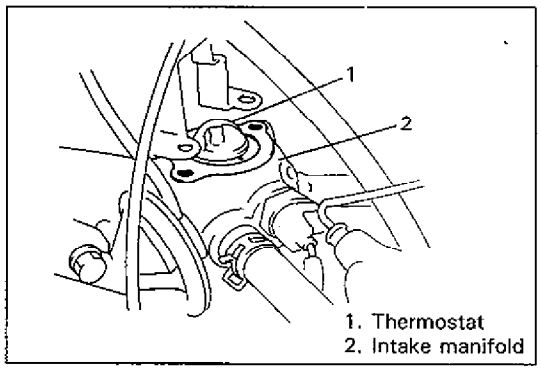


70F00-6B-10-5

THERMOSTAT

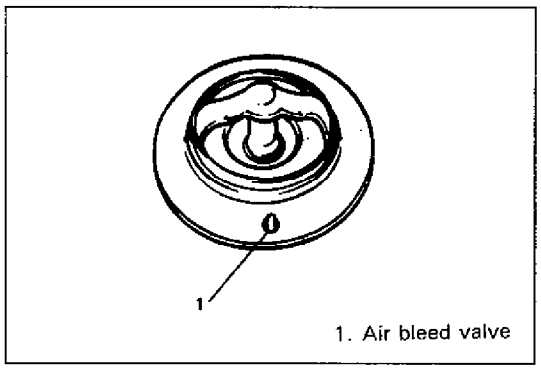
REMOVAL

1) Disconnect negative cable at battery.
2) Drain cooling system and tighten drain plug.
3) Disconnect thermostat cap from thermostat case.



70F00-6B-11-1

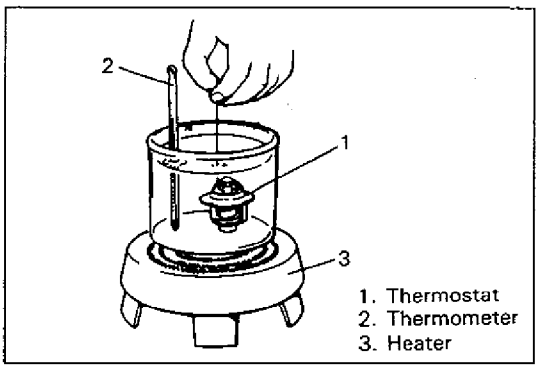
4) Remove thermostat.



64B40-6B1-5-3

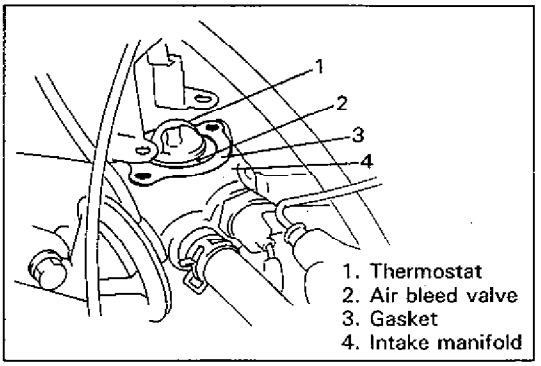
INSPECTION

1. Make sure that air bleed valve of thermostat is clear. Should this valve be clogged, engine would tend to overheat.
2. Check to make sure that valve seat is free from foreign matters which would prevent valve from seating tight.



77500-6B-5-4

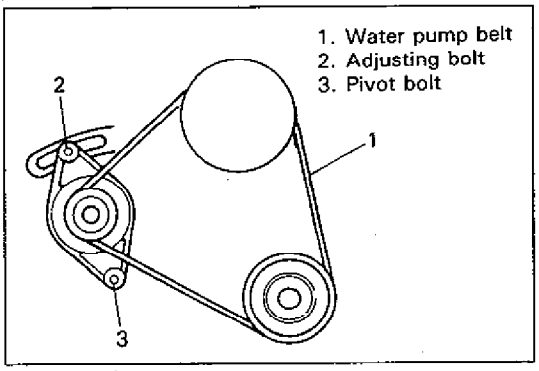
3. Check thermostatic movement of wax pellet as follows:
   1) Immerse thermostat in water, and heat water gradually.
   2) Check that valve starts to open at specific temperature.
   3) If valve starts to open at a temperature substantially below or above specific temperature, thermostat unit should be replaced with a new one. Such a unit, if re-used, will bring about overcooling or overheating tendency.



70F00-6B-11-4

INSTALLATION

1) Install thermostat to intake manifold as shwon in figure.
2) Install new gasket and thermostat cap to intake manifold.
3) Fill cooling system.
4) Connect negative cable.
5) After installation, check each part for leakage.



70F00-6B-12-1

WATER PUMP BELT

REMOVAL

1) Disconnect negative cable at battery.
2) Loosen drive belt adjusting bolt and generator pivot bolts.
   When servicing vehicle equipped with A/C, remove compressor drive belt before removing water pump belt.
3) Slacken belt by displacing generator and then remove it.

INSTALLATION

1) Install belt to water pump pulley, crankshaft pulley and generator pulley.
   When servicing vehicle equipped with A/C, install compressor drive belt, too.
2) Adjust belt tension.
3) Tighten water pump belt adjusting bolt and pivot bolts.
4) Connect negative cable at battery.

70F00-6B-12-2

WATER PUMP BELT TENSION INSPECTION AND ADJUSTMENT

For this inspection or adjustment, refer to WATER PUMP BELT TENSION on page 6B-9.

64B40-6B-12-3

RADIATOR FAN THERMO SWITCH

REMOVAL

1) Disconnect negative cable at battery.
2) Drain cooling system.
3) Disconnect coupler or thermo switch lead wire.
4) Remove thermo switch from thermostat case.

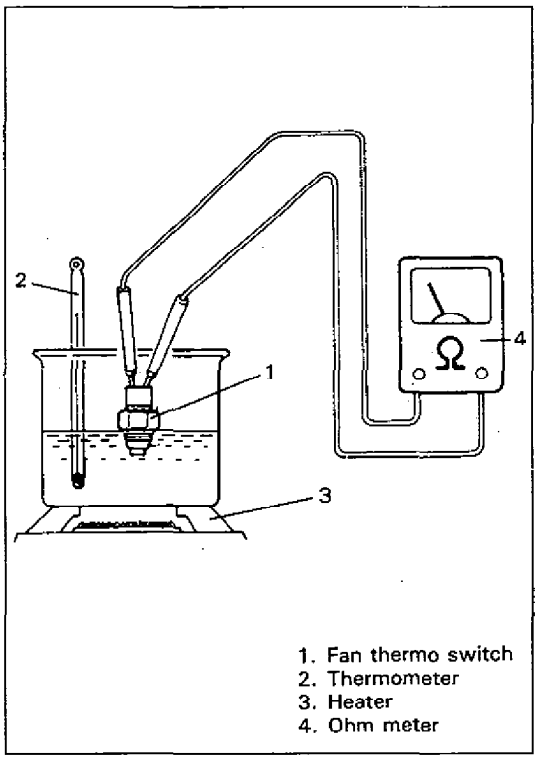
70F00-6B-12-4

INSTALLATION

Reverse removal procedure.
After installation, check for leakage.

Tightening Torque for fan thermo switch
10—14 N·m (1.0—1.4 kg-m, 7.5—10.0 lb-ft)

64B40-6B-12-5



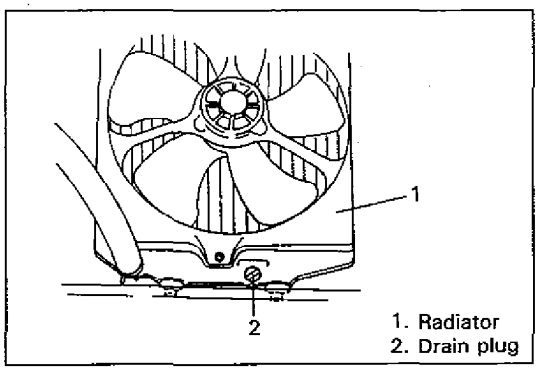
1. Fan thermo switch
2. Thermometer
3. Heater
4. Ohm meter

70F00-6B-13-1

INSPECTION

1) Connect an ohmmeter to the thermo switch.
2) Immerse the switch in water, and heat water gradually.
3) Check that the switch turns "ON" or "OFF" according to the below specification. If the switch is faulty, replace it.

Fan thermo switch functional spec. ± 5°C (9°F)	
Temp. at switch "ON" (Continuity)	More than 93°C (199°F)
Temp. at switch "OFF" (No continuity)	Less than 88°C (190°F)



1. Radiator
2. Drain plug

70F00-6B-13-3

RADIATOR

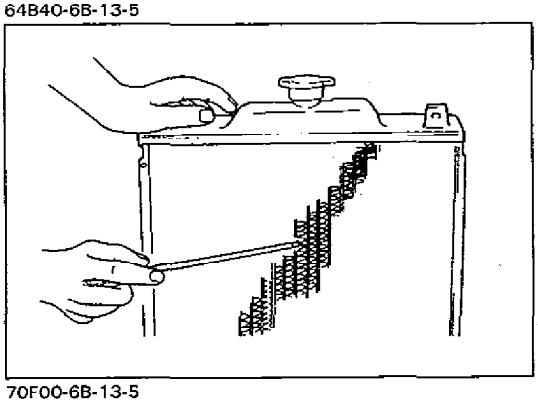
REMOVAL

1) Disconnect engative cable at battery.
2) Drain cooling system by loosening drain plug of radiator.
3) Disconnect coupler or cooling fan motor lead wire.
4) Disconnect radiator inlet and outlet hoses, and reservoir tank hose.
5) Remove radiator and cooling fan motor.

INSPECTION

Check radiator for leakage or damage. Straighten bent fins, if any.

64B40-6B-13-5



70F00-6B-13-5

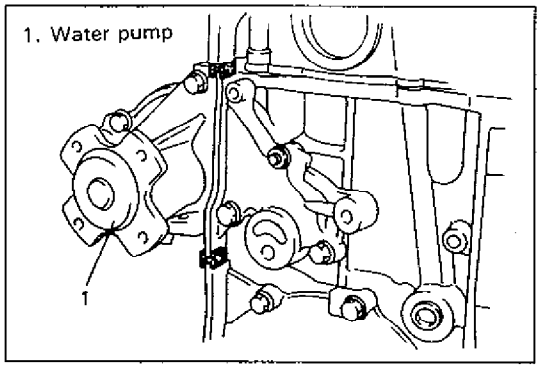
CLEANING

Clean frontal area of radiator cores.

INSTALLATION
Reverse removal procedures.

NOTE:
- **Refill cooling system with proper coolant referring to COOLANT item of MAINTENANCE.**
- **After installation, check each joint for leakage.**

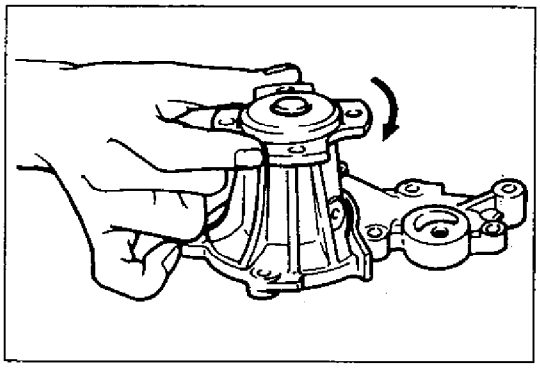
70F00-6B-14-1



70F00-6B-14-2

WATER PUMP

REMOVAL
1) Disconnect negative cable at battery.
2) Drain cooling system.
3) Remove timing belt and tensioner according to procedure described in SECTION 6A.
4) Remove water pump assembly.

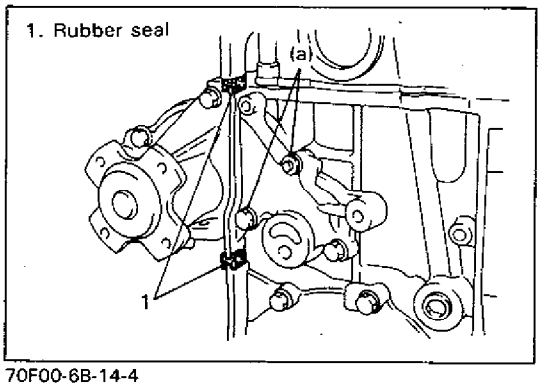


64B40-6B1-7-2

INSPECTION

NOTE:
Do not disassemble water pump.
If any repair is required on pump, replace it as assembly.

Rotate water pump by hand to check for smooth operation. If pump does not rotate smoothly or makes abnormal noise, replace it.



70F00-6B-14-4

INSTALLATION
1) Install new pump gasket to cylinder block.
2) Install water pump to cylinder block.

Tightening Torque
(a): 10—13 N·m (1.0—1.3 kg-m, 7.5—9.0 lb-ft)

3) After installing water pump, install rubber seal between water pump and oil pump, and another between water pump and cylinder head.

4) Install timing tensioner plate, tensioner, tensioner spring, timing belt and timing belt outside covers, referring to SECTION 6A.
5) Install crankshaft pulley, water pump pulley, pump drive belt.
6) Adjust water pump belt tension as previously outlined.
7) Connect negative cable at battery.
8) Fill cooling system.
9) After installation, check each part for leakage.

REQUIRED SERVICE MATERIALS

MATERIALS	USE
Ethylene glycol base coolant (Anti-freeze/Anti-corrosion coolant)	Additive to engine cooling system for improving cooling efficiency and for protection against rusting.

64B40-6B-15-5

SECTION 6C

ENGINE FUEL

6C

CONTENTS

CAUTION:
AMONG THE VEHICLES OF THIS MODEL, THERE ARE THOSE EQUIPPED WITH A CATALYTIC CONVERTER AND THOSE WITHOUT ONE DEPENDING ON STATUTORY REGULATIONS OF EACH COUNTRY. FOR THOSE WITH A CATALYTIC CONVERTER, BE SURE TO USE UNLEADED FUEL ONLY. USE OF LEADED AND/OR LOW LEAD FUEL CAN RESULT IN ENGINE DAMAGE AND REDUCE THE EFFECTIVENESS OF THE EMISSION CONTROL SYSTEM.

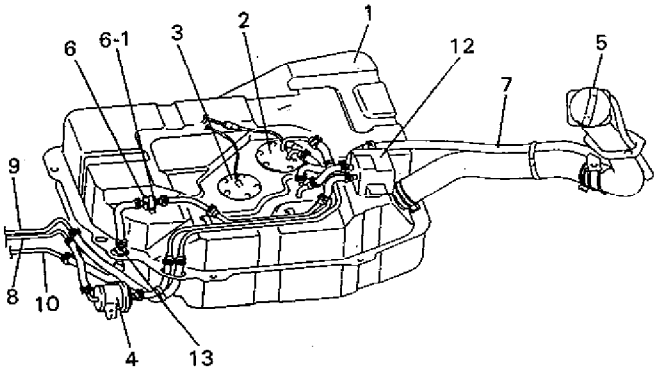
70F00-6C-1-1

GENERAL DESCRIPTION

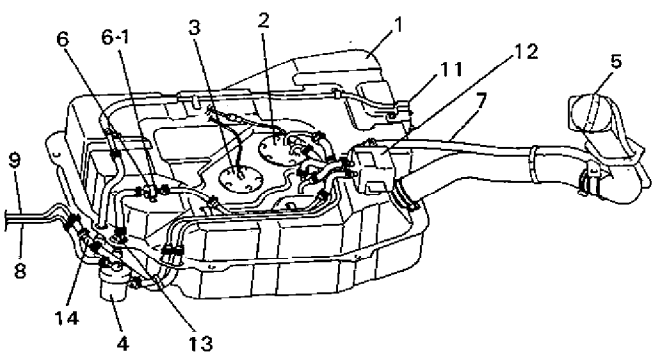
FUEL SYSTEM

The main components of the fuel system are fuel tank, fuel pump, fuel filter and fuel level gauge and it includes three lines; fuel feed line, fuel return line and fuel vapor line.
For the details of fuel flow and fuel vapor flow for fuel injection model, refer to "ELECTRONIC FUEL INJECTION SYSTEM" section.

For Fuel Injection model



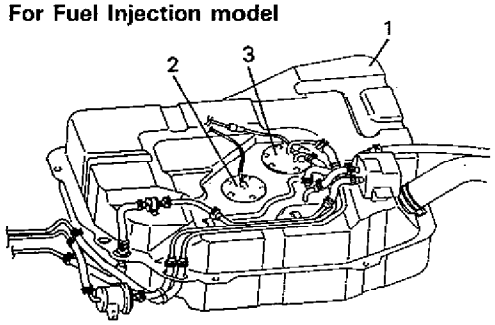
For Carburetor model



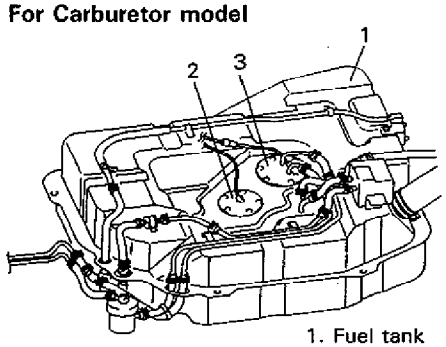
1. Fuel tank
2. Fuel pump
3. Fuel level gauge
4. Fuel filter
5. Fuel filler cap
6. Tank pressure control valve
6-1. Black nozzle
7. Breather hose
8. Fuel feed line
9. Fuel return line
10. Fuel vapor line
11. Fuel breather vessel
12. Liquid-vapor separator
13. Roll over valve
14. Fuel return check valve

70F00-6C-1-2

For Fuel Injection model



For Carburetor model

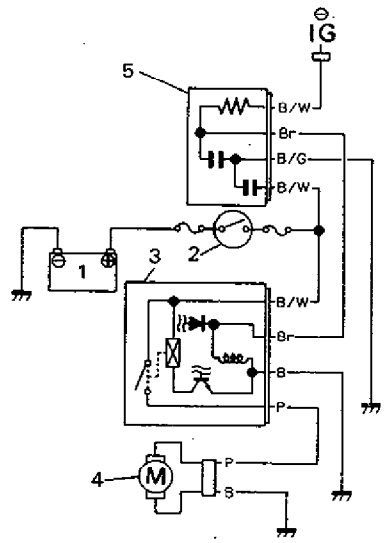


1. Fuel tank
2. Fuel level gauge
3. Fuel pump

70F00-6C-2-1

FUEL TANK

The fuel tank is located under the rear of the vehicle. The fuel pump and fuel level gauge are installed on the upper part of fuel tank. Whenever servicing the fuel level gauge or the fuel pump, the fuel tank must be removed from the body.



1. Battery
2. Ignition switch
3. Fuel pump relay
4. Fuel pump
5. Noise supressor

B : Black
B/G : Black/Green
B/W: Black/White
Br : Brown
P : Pink

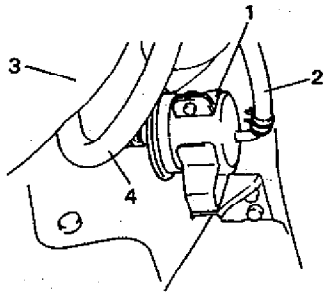
70F00-6C-2-3

FUEL PUMP (For Carburetor model)

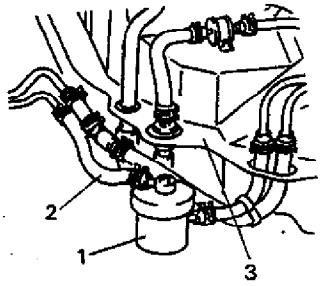
NOTE:
For fuel pump of Electronic Fuel Injection model, refer to SECTION 6E.

The fuel pump is a low pressure type electro-magnetic pump. It is installed in the fuel tank as outlined previously.
Operation of the fuel pump is controlled by the pump relay, which activates the fuel pump by passing electric current to it for about 2 seconds after the ignition switch is turned ON or while the ignition signal is fed to the relay.

For Fuel Injection model



For Carburetor model



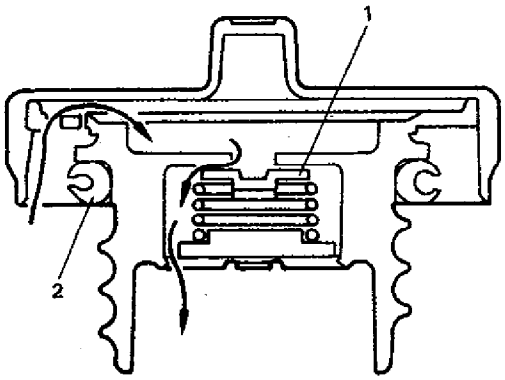
1. Fuel filter
2. Feed hose
3. Fuel tank
4. Vapor hose

70F00-6C-3-1

FUEL FILTER

The fuel filter is located in front of fuel tank as shown in page 6C-1 and filters the fuel sent under pressure from the fuel pump.

As it can't be disassembled, it must be replaced as an assembly.



1. Vacuum relief valve
2. Gasket

70F00-6C-3-3

FUEL FILLER CAP

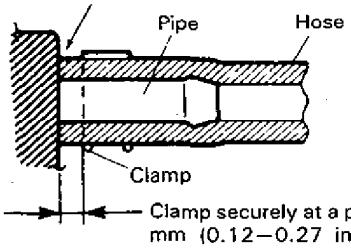
A ratchet tightening device on the threaded fuel filler cap reduces the chances of incorrect installation, which would prevent sealing fuel vapors.

After the gasket on fuel filler cap and the filler neck flange contact, the ratchet produces a loud clicking noise, indicating the seal has been set.

This cap has a vacuum relief valve inside.

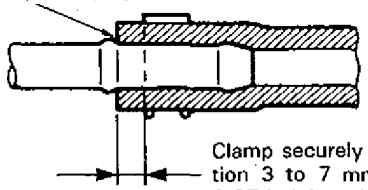
The vacuum relief valve opens to relieve the vacuum created in the fuel tank.

With short pipe, fit hose as far as it reaches pipe joint as shown.



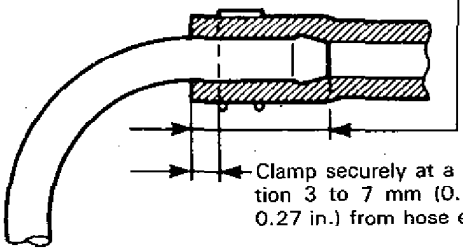
Clamp securely at a position 3 to 7 mm (0.12—0.27 in.) from hose end.

With following type pipe, fit hose as far as its peripheral projection as shown.



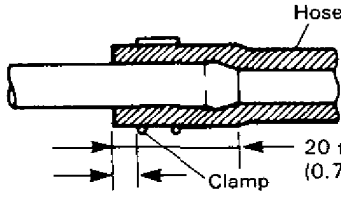
Clamp securely at a position 3 to 7 mm (0.12—0.27 in.) from hose end.

With bent pipe, fit hose as far as its bent part as shown or till pipe is about 20 to 30 mm (0.79—1.18 in.) into the hose.



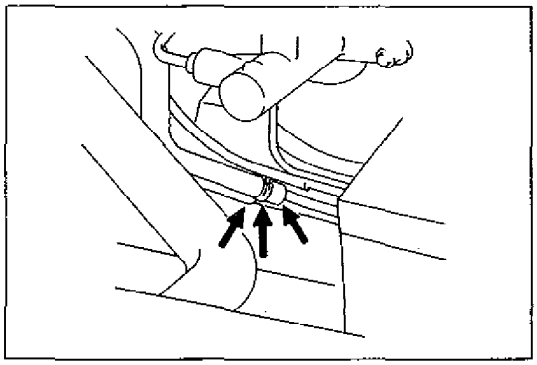
Clamp securely at a position 3 to 7 mm (0.12—0.27 in.) from hose end.

With straight pipe, fit hose till pipe is about 20 to 30 mm (0.79—1.18 in.) in the hose.



Clamp securely at a position 3 to 7 mm (0.12—0.27 in.) from hose end.

64B40-6C-3-1



70F00-6C-4-5

ON-VEHICLE SERVICE

WARNING:

Before attempting service of any type on fuel system, following cautions should be always observed.

- **Disconnect negative cable at battery.**
- **DO NOT smoke, and place "NO SMOKING" signs near work area.**
- **Be sure to have CO_2 fire extinguisher handy.**
- **Be sure to perform work in a work in a well-ventilated area and away from any open flames (such as gas hot heater).**
- **Wear safety glasses.**
- **To relieve fuel vapor pressure in fuel tank, remove fuel filler cap from fuel filler neck and then reinstall it.**
- **As fuel feed line is still under high fuel pressure even after engine was stopped, loosening or disconnecting fuel feed line directly may cause dangerous spout of fuel to occur where loosened or disconnected. Before loosening or disconnecting fuel feed line, make sure to relieve fuel pressure according to procedure described on p. 6-4.**
- **A small amount of fuel may be released after the fuel line is disconnected. In order to reduce the chance of personal injury, cover the fitting to be disconnected with a shop cloth. Be sure to put that cloth in an approved container when disconnection is completed.**
- **Note that fuel hose connection varies with each type of pipe. Be sure to connect and clamp each hose correctly referring to the left figure.**

FUEL LINES

Due to the fact that fuel feed line is under high pressure, use special care when servicing it.

INSPECTION

Visually inspect fuel lines for evidence of fuel leakage, hose crack and deterioration, or damage.
Make sure all clamps are secure.
Replace parts as needed.

FUEL PIPE

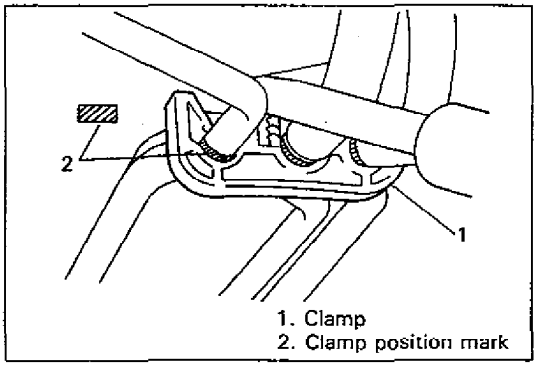
REMOVAL

1) Relieve fuel pressure in fuel feed line according to procedure on p. 6-4.
2) Disconnect negative cable at battery.
3) Disconnect fuel hose from fuel pipe at the front and rear of each fuel pipe.

WARNING:
A small amount of fuel may be released after fuel hose is disconnected. In order to reduce the chance of personal injury, cover hose and pipe to be disconnected with a shop cloth. Be sure to put that cloth in an approved container when disconnection is completed.

4) Remove pipe cover from body.

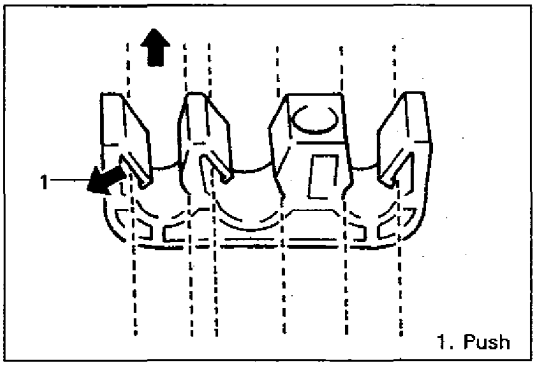
70F00-6C-5-1



1. Clamp
2. Clamp position mark

5) Put clamp position mark on body and pipes so that clamps can be installed on original position.
6) Remove pipes with clamp from body.

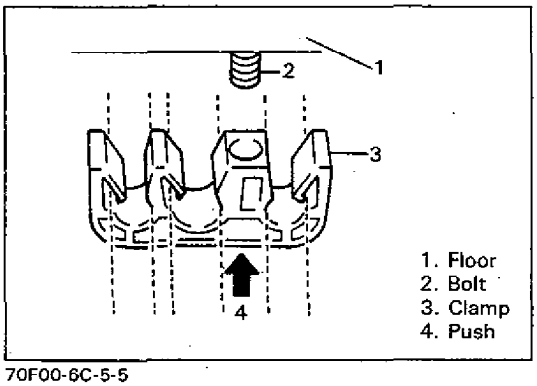
70F00-6C-5-3



1. Push

7) Remove clamp from pipes.

70F00-6C-5-4



1. Floor
2. Bolt
3. Clamp
4. Push

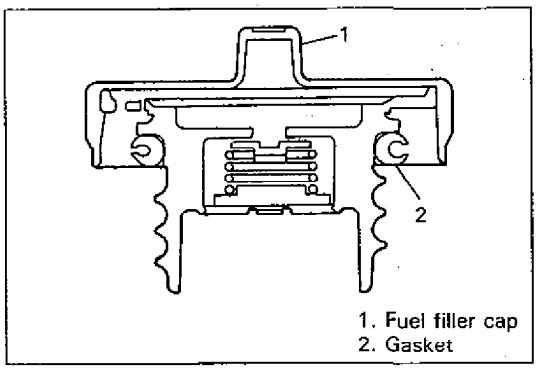
70F00-6C-5-5

INSTALLATION

1) Install clamps to marked position on pipes. If clamp is deformed or its claw is bent or broken, replace it with new one.
2) Install pipes with pipe clamp to body.

3) Install pipe cover to body. Be sure to use new nuts.
4) Connect fuel hoses to fuel pipes.
5) With engine "OFF" and ignition switch "ON", check for fuel leaks.

70F00-6C-6-1



1. Fuel filler cap
2. Gasket

70F00-6C-6-2

FUEL FILLER CAP

Remove cap, and check gasket for even filler neck imprint, and deterioration or any damage. If gasket is in malcondition, replace cap.

NOTE:
If cap requires replacement, only a cap with the same features should be used. Failure to use correct cap can result in critical malfunction of system.

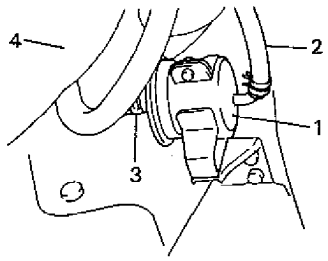
FUEL FILTER

REMOVAL

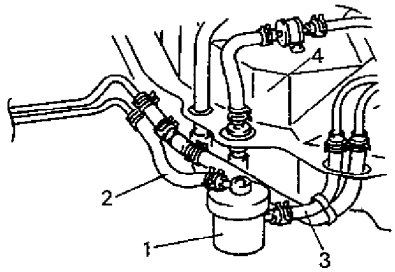
1) Relieve fuel pressure in fuel feed line according to procedure described on p. 6-4.
2) Disconnect negative cable at battery.
3) Hoist vehicle.
4) Place fuel container under fuel filter.

70F00-6C-6-3

For Fuel Injection model



For Carburetor model



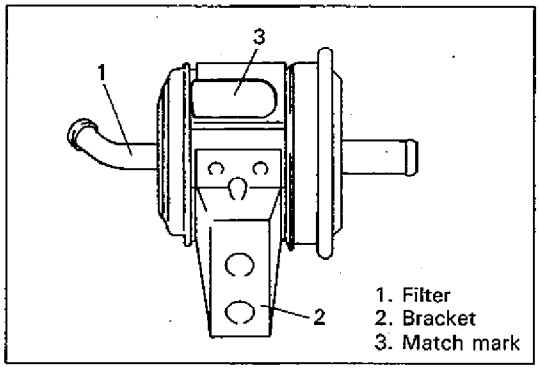
1. Fuel filter
2. Outlet hose
3. Inlet hose
4. Fuel tank

70F00-6C-6-4

5) Disconnect inlet hose from fuel filter.

WARNING:
A small amount of fuel may be released after fuel hose is disconnected. In order to reduce the chance of persoanl injury, cover hose and pipe to be disconnected with a shop cloth. Be sure to put that cloth in an approved container when disconnection is completed.

6) Disconnect fuel filter outlet hose from fuel feed pipe.
7) Remove fuel filter with outlet hose from body.
8) Remove outlet hose and bracket from fuel filter.



70F00-6C-7-1

INSTALLATION

1) Install filter bracket to filter. (For Electronic Fuel Injection model)
   Be sure to align match marks on filter and bracket before tightening bracket screw.
2) Connect outlet hose to fuel filter outlet pipe.
3) Install filter with outlet hose to body.
4) Connect outlet and inlet hoses.
   Clamp hoses securely.
5) Connect negative cable to battery.
6) With engine "OFF" and ignition switch "ON", check for fuel leaks.

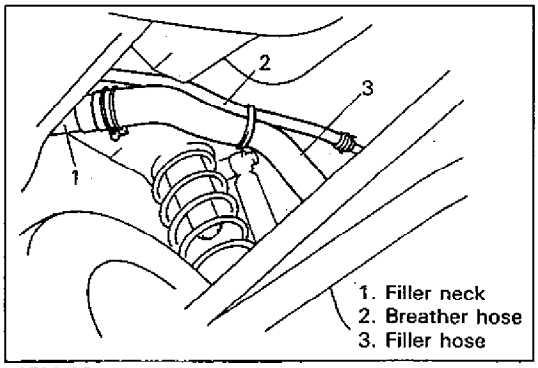
70F00-6C-7-2

FUEL TANK

REMOVAL

1) Relieve fuel pressure in fuel feed line according to procedure described on p. 6-4.
2) Disconnect negative cable at battery.
3) Remove rear seat cushion.
4) Disconnect fuel level gauge and fuel pump lead wire couplers.

70F00-6C-7-3

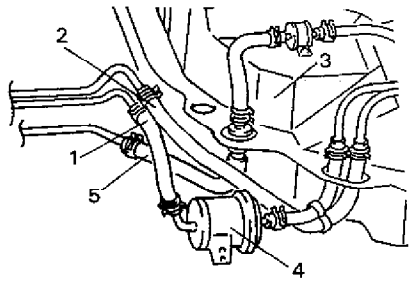


70F00-6C-7-4

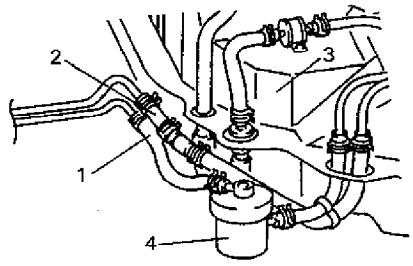
5) Hoist vehicle.
6) Disconnect fuel filler hose from fuel tank and breather hose from filler neck.
7) As fuel tank has no drain plug, drain fuel tank by pumping fuel not through fuel tank filler.
   Use hand operated pump device to drain fuel tank.

> **CAUTION:**
> **Never drain or store fuel in an open container to avoid possibility of fire or explosion.**

For Fuel Injection model



For Carburetor model



1. Fuel feed hose
2. Fuel return hose
3. Fuel tank
4. fuel filter
5. Fuel vapor hose

70F00-6C-8-1

8) Disconnect fuel hoses from pipes.

WARNING:
A small amount of fuel may be released after the fuel hose is disconnected. In order reduce the chance of personal injury, cover the hose and pipe to be disconnected with a shop cloth. Be sure to put that cloth in an approved container when disconnection is completed.

9) Remove fuel tank from vehicle.

INSPECTION

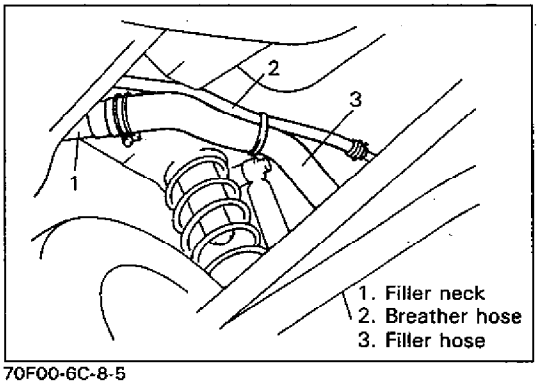
After removing fuel tank, check hoses and pipes connected to fuel tank for leaks, loose connections, deterioration or damage. Also check fuel pump and level gauge gasket for leaks, visually inspect fuel tank for leaks and damage. Replace any damaged or malconditioned parts.

64B40-6C-7-3

INSTALLATION

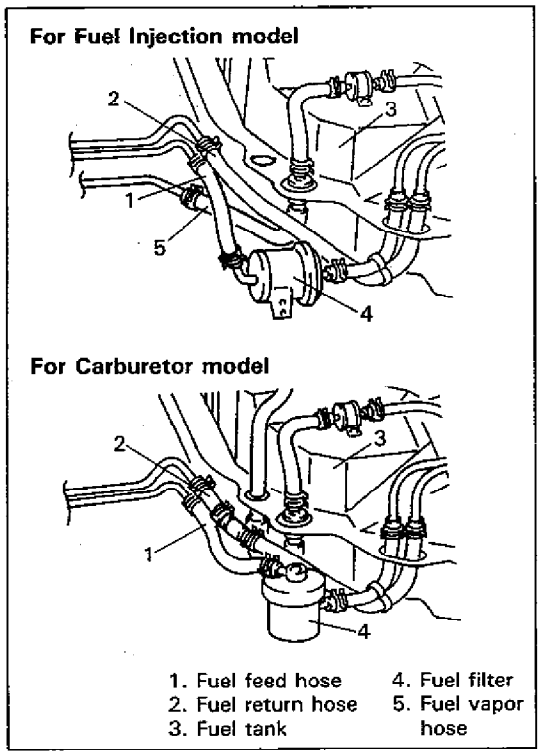
1) Install fuel pump and fuel level gauge to fuel tank. Use new gasket.
2) Install tank pressure control valve to fuel tank directing its black nozzle toward fuel tank. Refer to page 6C-1.
3) Connect fuel hoses and pipes to fuel tank as shown in page 6C-1.
   Clamp hoses and wire harness securely.
4) Connect fuel breather hose to fuel tank.

70F00-6C-8-4



70F00-6C-8-5

5) Install fuel tank to vehicle.
6) Connect fuel filler hose to tank and breather hose to filler neck as shown in figure and clamp them securely.

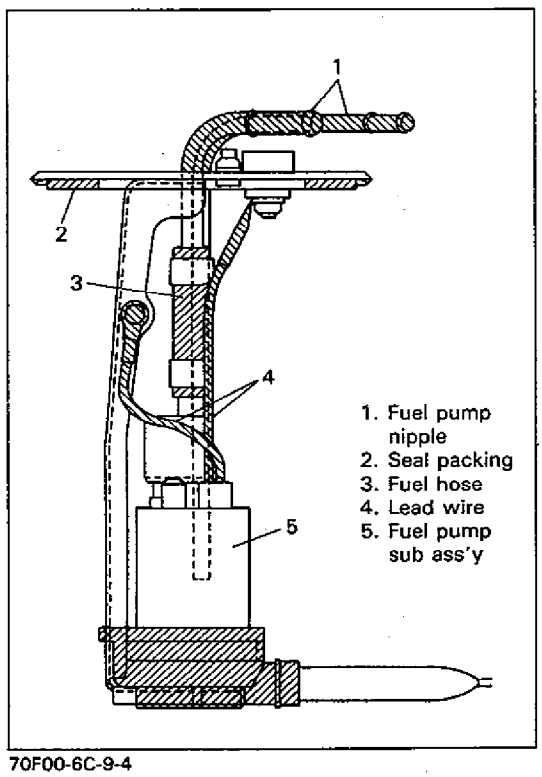


70F00-6C-9-1

7) Connect fuel hoses to filter and pipes as shown in figure and clamp them securely.

8) Connect fuel pump and level gauge couplers.
9) Install rear seat cushion.
10) Connect negative cable to battery.
11) With engine "OFF" and ignition switch "ON", check for fuel leaks.

70F00-6C-9-3



70F00-6C-9-4

FUEL PUMP

NOTE:

- **If the rubber parts which have been used for the fuel pump are exposed to the ambient air for a long time, they become hard and contracts, making their reinstallation difficult once they are removed.**
  Unless replacement is necessary, their removal should be avoided as much as possible and when the fuel hose and seal packing have been removed once, they should not be reused but replaced with new parts.
- **Do not apply an excessive force to the fuel pump nipple or lead wire. It may result in bend or poor contact.**
- **Install the fuel pump firmly as shown at the left.**

SECTION 6D

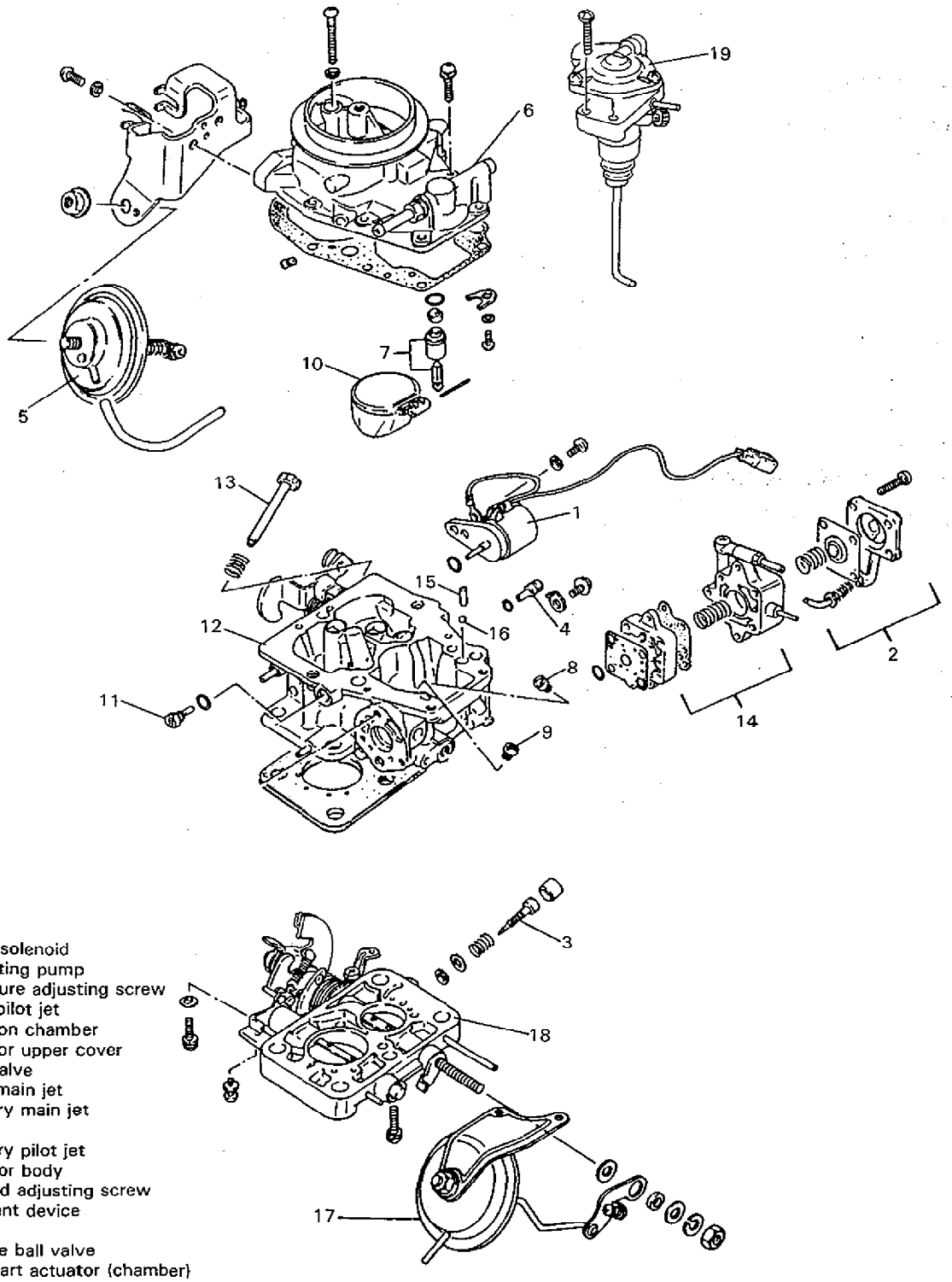
CARBURETOR

CONTENTS

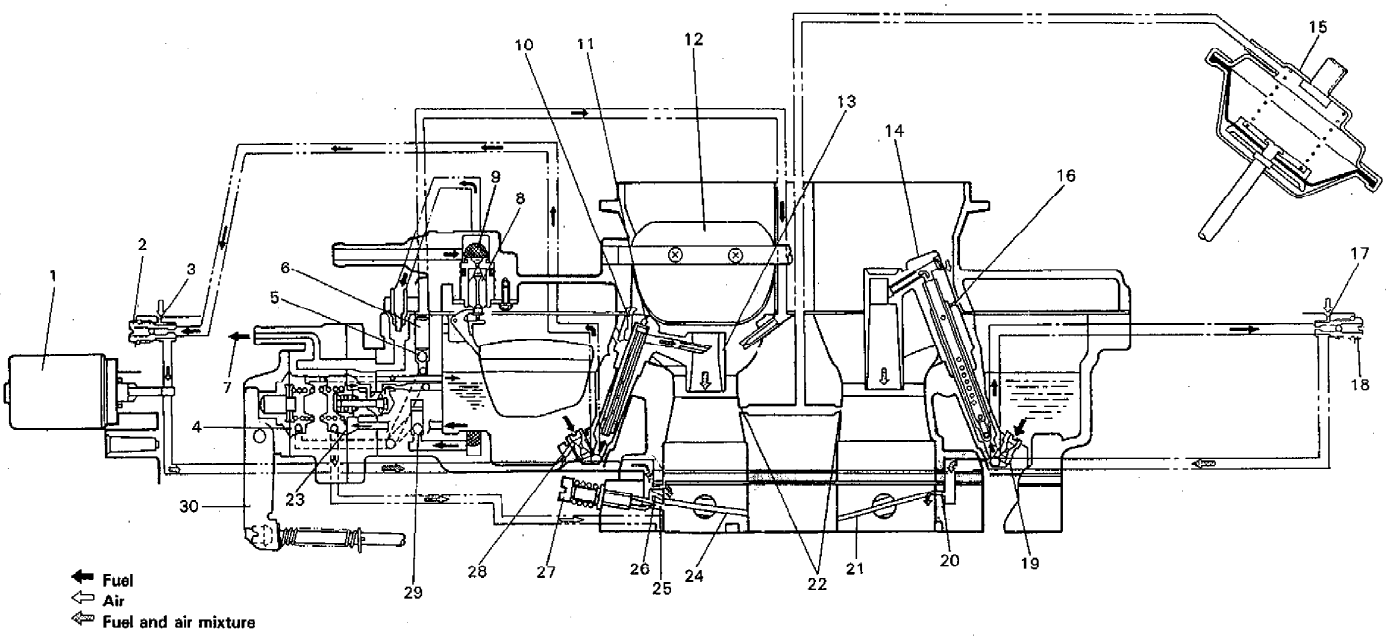
NOTE:
For Dash-pot system, refer to SECTION 6J EMISSION CONTROLS.

GENERAL DESCRIPTION

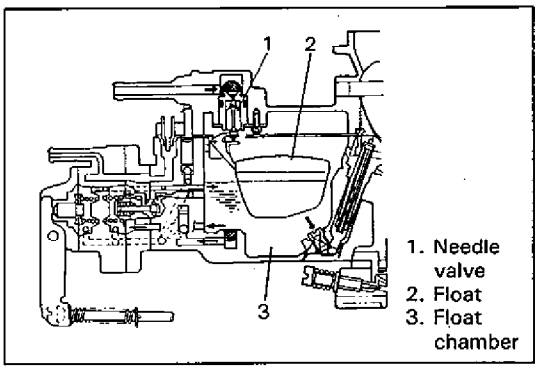
The carburetor is a 2-barrel downdraft type having a primary system and a secondary system. The primary system operates under normal driving condition, and the secondary system operates under high speed high load driving condition.
In the primary system, a choke valve is incorporated.



1. Fuel cut solenoid
2. Accelerating pump
3. Idle mixture adjusting screw
4. Primary pilot jet
5. Depression chamber
6. Carburetor upper cover
7. Needle valve
8. Primary main jet
9. Secondary main jet
10. Float
11. Secondary pilot jet
12. Carburetor body
13. Idle speed adjusting screw
14. Enrichment device
15. Weight
16. Discharge ball valve
17. Hot re-start actuator (chamber)
18. Valve body
19. Idle-up actuator (A/C) with dash-pot



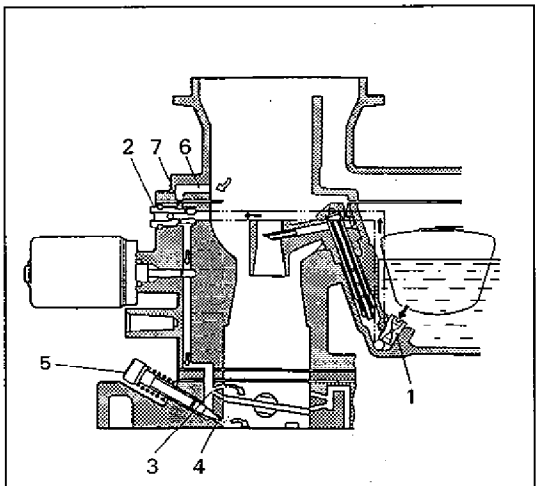
1. Fuel cut solenoid
2. Primary pilot jet
3. Primary pilot air hole
4. Accelerating pump membrane
5. Discharge ball valve
6. Weight
7. To fuel tank (fuel return)
8. Needle valve
9. Fuel filter
10. Primary main air hole No.2
11. Primary main air hole No.1
12. Choke valve
13. Primary inner venturi
14. Secondary inner venturi
15. Depression chamber
16. Secondary main air hole
17. Secondary pilot air hole
18. Secondary pilot jet
19. Secondary main jet
20. Secondary bypass port
21. Secondary throttle valve
22. Depression chamber hole
23. Enrichment diaphragm
24. Primary throttle valve
25. Idle port
26. Primary bypass port
27. Idle mixture adjusting screw
28. Primary main jet
29. Suction ball valve
30. Accelerating pump lever



70F00-6D-4-1

FLOAT SYSTEM

The float is designed to maintain fuel in the chamber at a constant level at all times.
Fuel pumped out under pressure from the fuel pump passes through the float needle valve and into the float chamber. With the float movement caused by its buoyancy, the needle valve opens and closes to control fuel at a constant level.

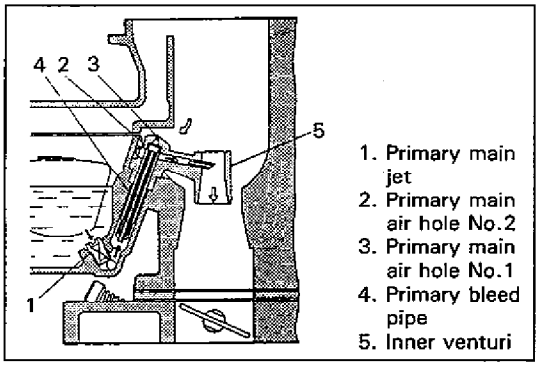


70F00-6D-4-2

PRIMARY SYSTEM

PRIMARY SLOW SYSTEM

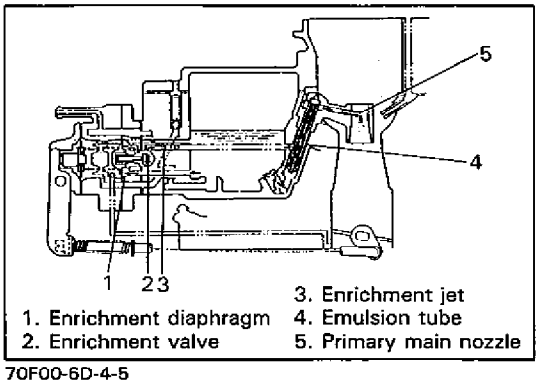
When the engine starts to run, the fuel in the float chamber flows out through primary main jet and reaches primary pilot jet. There, incoming fuel is metered and mixed with the air metered at pilot (slow) air holes No.2 and No.1. This air-fuel mixutre is sprayed out from bypass port and idle port. During idling, the mixture is sprayed out mainly from idle port and mixed with the air flowing into the main bore. Thus, the air-fuel mixture can be made leaner or richer by tightening or loosening the idle mixture adjusting screw respectively.



70F00-6D-4-4

PRIMARY MAIN SYSTEM

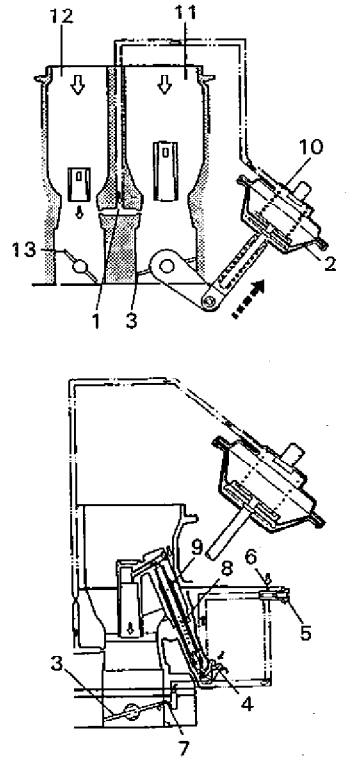
When the accelerator pedal is depressed from the idle speed position (wider opening of the primary throttle valve), the fuel in the float chamber is metered at primary main jet and flows into primary bleed pipe. There, it is mixed with the air metered at primary main air holes No.1 and No.2. This air-fuel mixture is sprayed out into the inner venturi through the primary main nozzle.



70F00-6D-4-5

Enrichment System

This system goes into service when the manifold vacuum falls to move the diaphragm in the enrichment device on the carburetor body. As the diaphragm so moves, the valve opens to let out fuel through the hole provided into the chamber. Enrichment jet meters out this fuel and sends it to emulsion tube, from which it flows into primary main nozzle and is sprayed into the venturi.



1. Primary venturi hole
2. Diaphragm
3. Secondary throttle valve
4. Secondary main jet
5. Secondary pilot jet
6. Secondary pilot air hole
7. Bypass port
8. Secondary bleed pipe
9. Secondary main air hole
10. Depression chamber
11. Secondary side
12. Primary side
13. Primary throttle valve

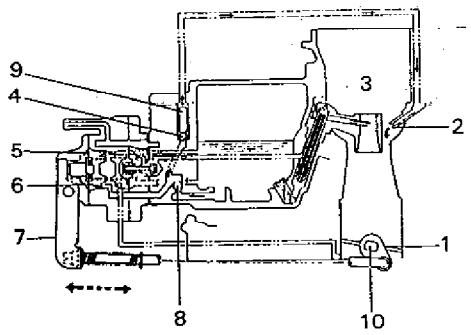
70F00-6D-5-1

SECONDARY SYSTEM

When the primary throttle valve opens wider than about 40°, the boost pressure about 7 mm Hg (0.275 in. Hg) develops in the primary venturi. The boost pressure, being transmitted through the primary venturi hole, surpasses the spring force in the depression chamber and pulls up its diaphragm as shown in the illustration.

In accordance with this movement of diaphragm, secondary throttle valve opens as they are interlocked by way of the rod and lever. In this state, the fuel which has passed through secondary main jet reaches secondary pilot jet. There, it is metered and mixed with the air which is metered at secondary pilot air hole. This mixture is sprayed out of bypass port.

When the boost pressure in the primary venturi gets higher and boost pressure develops in the secondary venturi, too, the secondary throttle valve opens wide (more than about 5°). In this state, the fuel metered at secondary main jet and the air metered at secondary main air hole are mixed in bleed pipe. Then this air-fuel mixture is sprayed out into the secondary venturi.



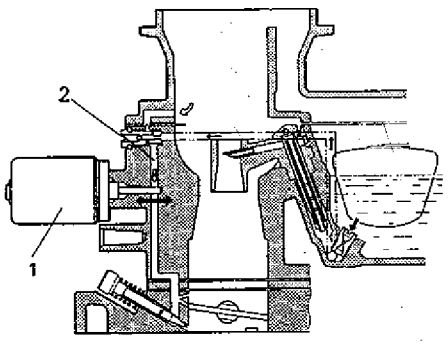
1. Primary throttle valve
2. Pump nozzle
3. Primary side
4. Discharge ball valve
5. Diaphragm
6. Accelerating pump chamber
7. Accelerating pump lever
8. Suction ball valve
9. Valve weight
10. Primary throttle shaft

70F00-6D-5-4

ACCELERATION PUMP SYSTEM

The main device of this system is an accelerating pump for making the carburetor respond without delay to the accelerator pedal depressed abruptly while the engine is running in its low speed range or is idling. The accelerating pump lever is linked to the primary throttle shaft so that, as primary throttle valve opens quickly, the accelerating pump lever pushes up the diaphragm thereby closing suction ball valve and opening discharge ball valve. Consequently, the fuel in the pump is forced out of pump nozzle into the primary venturi.

With the accelerator pedal released, the diaphragm is set back to the original position with the pump spring. In this state, the fuel in the float chamber opens up the suction ball valve and enters the pump chamber.

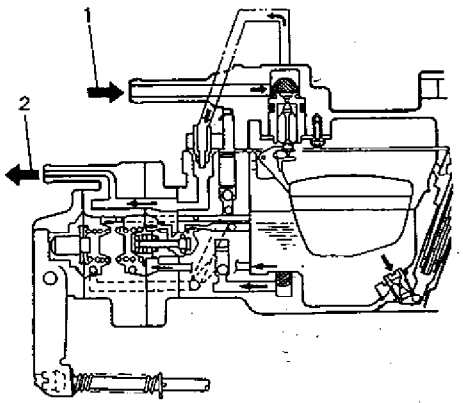


1. Fuel cut solenoid valve
2. Slow mixture passage

70F00-6D-6-1

FUEL CUT SYSTEM

This is to prevent engine run-on (the engine doesn't stop at the ignition key OFF). With the ignition key turned ON, current flows in the fuel cut solenoid which generates magnetic force. This pulls the needle valve and opens the passage for slow mixture. On the other hand, with the ignition key turned OFF, magnetic force disappears and the needle valve is brought back to the original position with the spring in the solenoid valve. The closed passage cuts off slow mixture, thus preventing engine run-on.

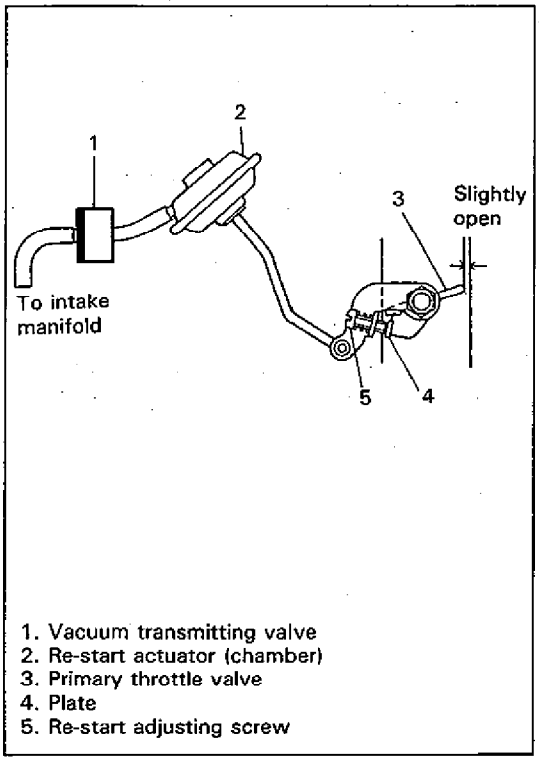


1. From fuel pump
2. To fuel tank

70F00-6D-6-3

FUEL RETURN SYSTEM

A fuel return circuit is provided in this carburetor in order to avoid "vapor locking" of fuel. How "vapor locking" is avoided will be explained: When the fuel level rises in the float chamber, its float valve closes; and, as the level falls, the valve opens. With the valve closed, the incoming fuel (delivered under pressure by the pump) finds its way through the sidewise hole provided in the top part of the float valve anchoring point and flows through the passage drilled out through the float chamber wall and around the acceleration pump chamber and back to the fuel tank. This arrangement allows the fuel pump to keep on delivering fuel. For this reason, the incoming fuel for the float chamber is always "cold" and cools the acceleration-pump chamber by flowing past its chamber, thereby suppressing the conditions leading to vapor locking.

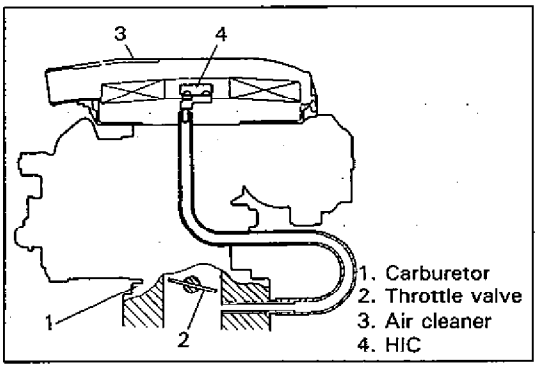


1. Vacuum transmitting valve
2. Re-start actuator (chamber)
3. Primary throttle valve
4. Plate
5. Re-start adjusting screw

70F00-6D-7-1

HOT RE-START SYSTEM

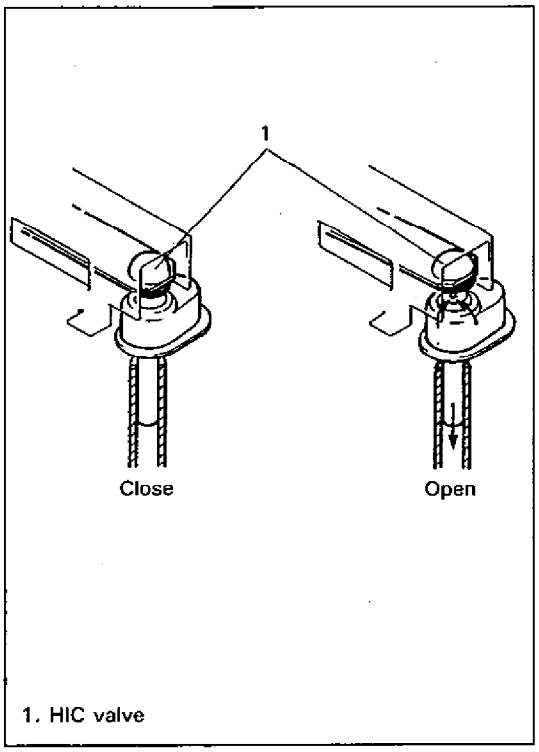
Generally, when an engine warmed up is started with the accelerator pedal released, the air fuel mixture tends to be richer even with the choke knob not pulled. This system works to prevent this phenomenon. Even when the accelerator pedal is released with the engine stopped, the primary throttle valve is opened slightly by re-start adjusting screw. This makes the air-fuel mixture leaner, that is, the mixture is regulated appropriate for engine re-start. When the engine is running, the primary throttle valve is free from this system because the re-start adjusting screw is forced to separate from the primary throttle valve plate by way of the diaphragm movement actuated by intake manifold vacuum. Therefore, the primary throttle valve is fully closed when the accelerator pedal is released.



70F00-6D-7-3

HOT IDLE COMPENSATOR (HIC)

HIC attached to the air cleaner case serves to provide the optimum air/fuel mixture during hot idle so as to ensure stable idle speed.

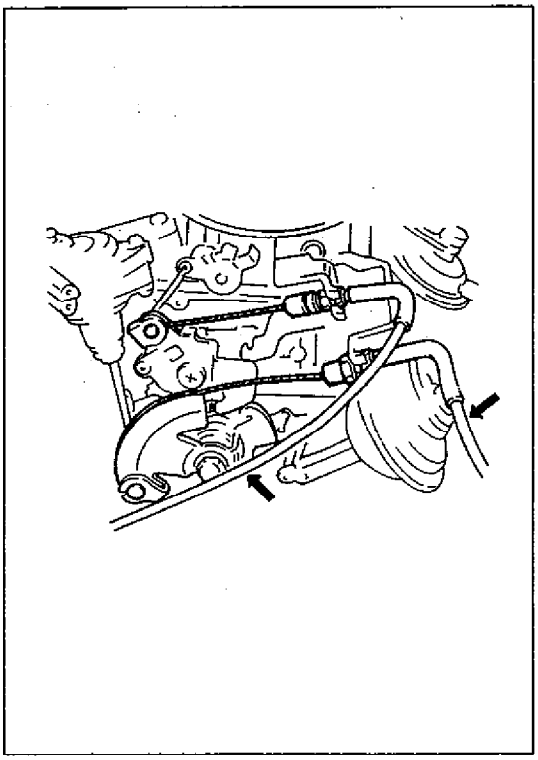


1. HIC valve

70F00-6D-7-4

Operation

HIC has a bimetal which warps as the heat transferred to it rises higher than about 45°C (113°F).
Caused by this, the valve in HIC starts to open and it reaches to the full open state at about 65°C (149°F).
While the engine at idle, the throttle valve is closed and the vacuum in the intake manifold stays high. As the HIC valve opens in this state, the air from the air cleaner side of the carburetor is drawn through the HIC valve into the intake manifold to prevent the air/fuel mixture getting richer during hot idle, thus maintaining a stable idle speed.



70F00-6D-8-1

ON-VEHICLE SERVICE

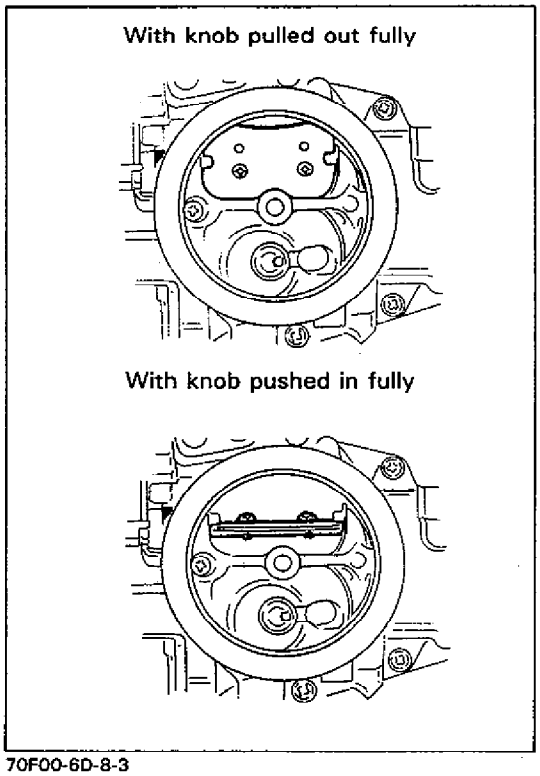
ACCELERATOR AND CHOKE CABLES

INSPECTION

Inspect these cables for wear and tear, and check to be sure that each cable connection is in sound condition. Do not hesitate to replace a defective cable or other part.

INSTALLATION OF CHOKE CABLE

Install the choke cable to the carburetor body with the choke knob pulled out about 7 mm (0.27 in.). If this is not done, the choke valve may not return completely to the original position.

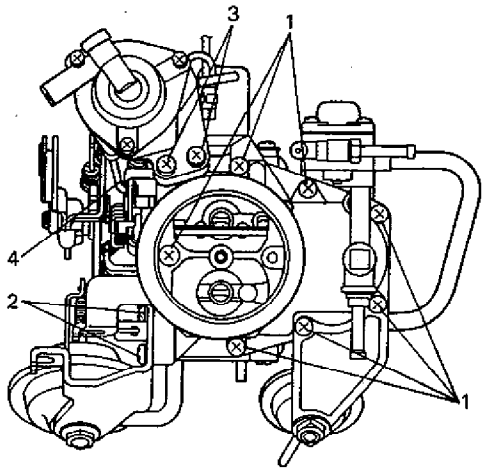


70F00-6D-8-3

CHOKE VALVE

INSPECTION

Check to be sure that, when the choke knob is pulled out all the way, the shaft of choke valve in the carburetor rotates (choke valve is fully closed), and that, when the knob is pushed in, the shaft rotates back to original position (choke valve is fully opened).



1. Upper cover screws
2. Depression chamber bracket screws
3. Idle-up actuator screws
4. Choke lever rod

70F00-6D-9-1

FLOAT LEVEL

INSPECTION

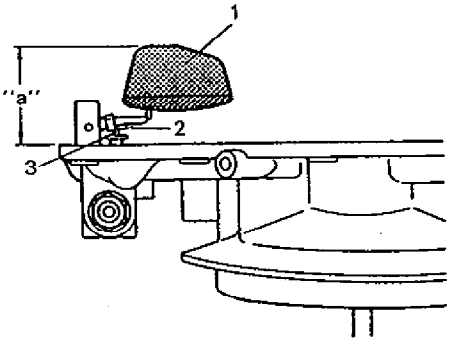
WARNING:
Float level inspection must be performed in well-ventilated place where no fire is used around.

1) Disconnect battery negative cable from battery.
2) Remove air cleaner case and disconnect fuel hose.
3) Disconnect choke cable from carburetor.
4) Disconnect choke lever rod from choke shaft lever.
5) Remove carburetor upper cover by removing upper cover screws, depression chamber bracket screws and idle-up actuator screws.

6) Check needle valve for wear and dust. Also, check to ensure that no fuel is in float by shaking it.

NOTE:
- **If valve seat with needle valve can't be removed easily by hand, grip valve seat (only from outside) with pliers and remove it.**
- **Note that float is made of plastic. Be very careful in handling it so as not to damage it.**

70F00-6D-9-3



1. Float
2. Tongue
3. Needle valve

70F00-6D-9-4

7) To see if fuel level is properly maintained, float hieght should be measured according to the following procedure.

Invert the cover and hold up the float by hand and lower it gradually. Just when tongue touches needle valve, measure the distance "a" between the bottom of the float (which is upside in this state) and the mating surface line of the upper cover and the carburetor body. If the measurement is within specification, the fuel level is satisfactory.

NOTE:
The gasket must be removed when taking measure of "a".

Float height specification "a": 31—32 mm (1.22—1.26 in.)

8) Upon completion of inspection, be sure to tighten each screw.

IDLE SPEED AND IDLE MIXTURE

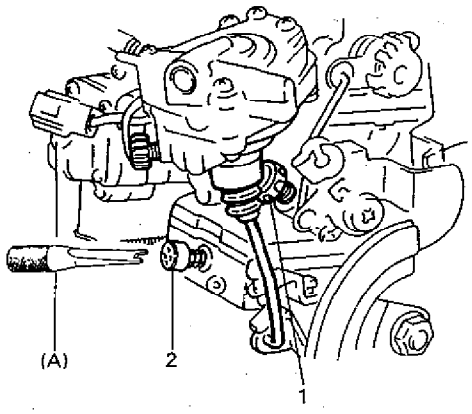
INSPECTION AND ADJUSTMENT

1) As preliminary steps, check to be sure that:
   - Vacuum hoses are connected securely.
   - Accelerator cable has some play, that is, it is not tight.
   - Choke valve is in full-open position.
   - All of electrical loads except ignition are switched off.
   - A/C is OFF, if equipped.
   - Ignition timing is within specification.
   - Air cleaner has been properly installed and is in good condition.
   - Engine valve lash is checked and adjusted according to maintenance schedule.

NOTE:
Before starting engine, place transmission gear shift lever in "Neutral" and set parking brake and block drive wheels.

2) Warm up engine to normal operating temperature.
3) Set tachometer and CO tester.

70F00-6D-10-1



1. Idle speed adjusting screw
2. Idle mixture adjusting screw

70F00-6D-10-3

4) Check idle speed and idle mixture (CO%).
   All vehicle of this model now manufactured are delivered with their CO% factory adjusted as follows.

Engine idle mixture CO%	1.5±0.5
Engine idle speed r/min (rpm)	800

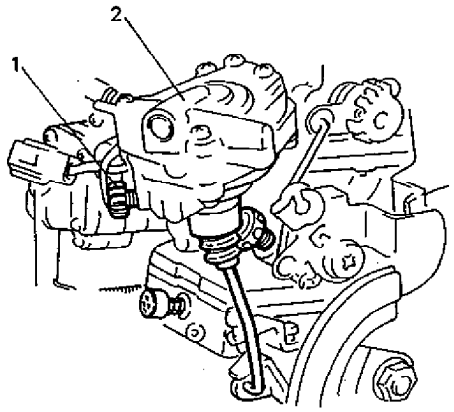
If idle speed and/or idle mixture are out of specifications, adjust them to specifications with each adjusting screw.

Special Tool
(A): 09913-17310

If exhaust gas tester is not available in the country without the statutory requirements for exhaust gas, adjust them according to the following procedures.

5) Adjust idle speed to 900 r/min (rpm) by repositioning (turning) idle speed adjusting screw.
6) With engine idling at 900 r/min (rpm), turn idle mixture adjusting screw to the right or left and set it where the highest engine speed is obtained. (This is the best idle position).
7) Perform above 5) and 6) once again, and then readjust idle speed to 900 r/min (rpm) with idle speed adjusting screw.
8) Upon completion of the work so far, readjust engine idle speed to the above specification by turning idle mixture adjusting screw slowly to the right (close).

In the country with the statutory requirements for the exhaust gas (CO%), be sure to adjust the idle mixture adjusting screw so that the CO% indicated on the exhaust gas tester will meet the above specification.



1. Idle-up adjusting screw
2. Idle-up actuator with dash-pot

70F00-6D-11-1

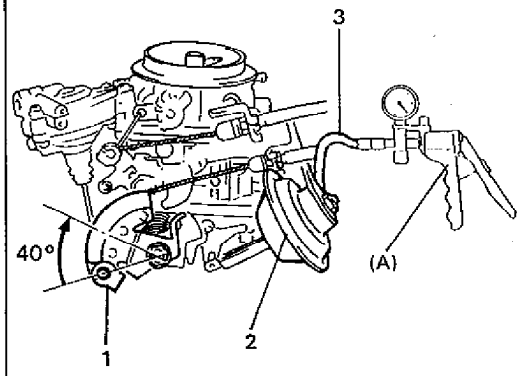
IDLE-UP (FOR A/C, if equipped)

ADJUSTMENT

If idle-up system and battery capacity are normal and yet specified idle-up speed is obtained, adjust as follows.

1) Check to ensure that idle speed is specification.
2) Turn A/C switch ON and set heater blower switch to high (max) speed position.
   In this state, engine speed should be within specification below.
   If it is out of specification, adjust it with idle up adjusting screw.

Idle speed when A/C ON: 1,000± 50 r/min.



1. Throttle lever
2. Depression chamber
3. Boost hose

70F00-6D-11-3

DEPRESSION CHAMBER

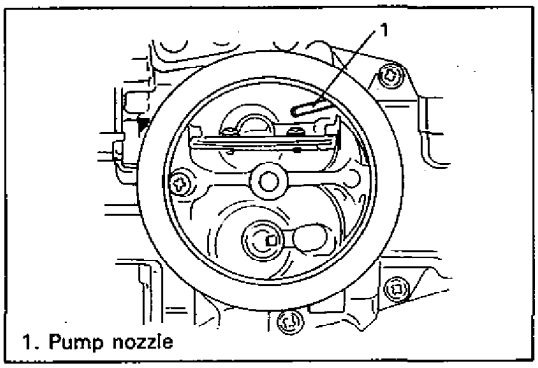
INSPECTION

With the engine stopped, check the diaphragm in the depression chamber for breakage according to the following procedures.

1) Keep the primary throttle valve open more than 40°.
2) Pull out the boost hose on the depression chamber from the carburetor body side.
3) Maintain 10 mmHg vacuum in the chamber by vacuum pump gauge.

Special Tool (Vacuum pump gauge)
(A): 09917-47910

If the secondary throttle valve doesn't open or comes to close gradually even if it opens, the diaphragm in the depression chamber is defective and needs to be replaced.



1. Pump nozzle

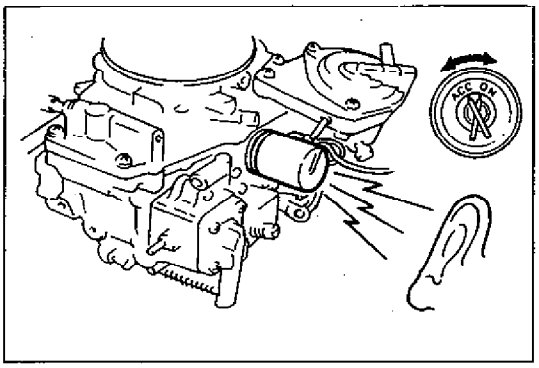
70F00-6D-11-5

ACCELERATOR PUMP

INSPECTION

1) Remove air cleaner case.
2) Make sure that fuel comes out of pump discharge nozzle when accelerator pedal is depressed.

   If fuel does not come out, check if fuel pump diaphragm has a hole or breakage, check ball is stuck or passage is clogged.
   Correct, clean or replace if defective.



70F00-6D-12-1

FUEL CUT SYSTEM

INSPECTION

1) Check to ensure that carburetor fuel cut solenoid makes "clicking" sound when ignition switch key is turned "ON" and "OFF" (without starting engine).

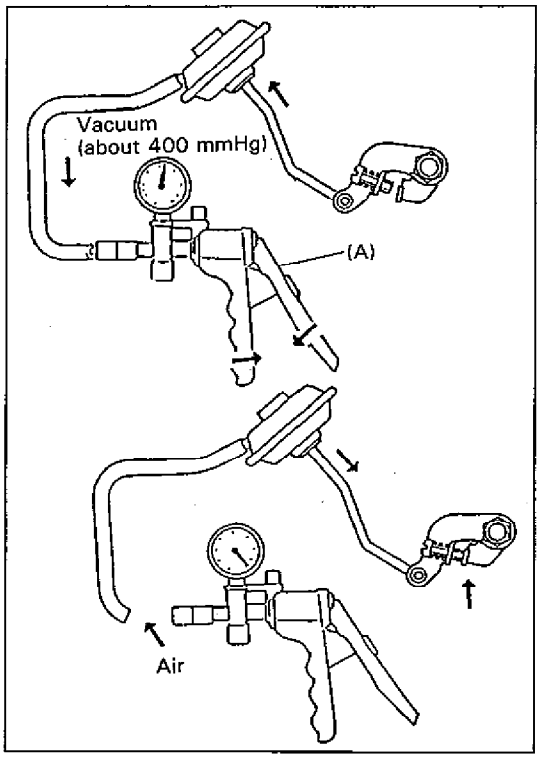
If anything faulty was found, check connector for proper connection and also check by using a voltmeter if electric current is obtained at the coupler of solenoid lead wire when ignition key is turned "ON". Correct or replace if defective.

HOT RE-START SYSTEM

ACTUATOR INSPECTION

1) Disconnect vacuum hose from VTV.
2) Connect vacuum pump gauge to its hose disconnected.

Special Tool (Vacuum pump gauge)
(A): 09917-47910



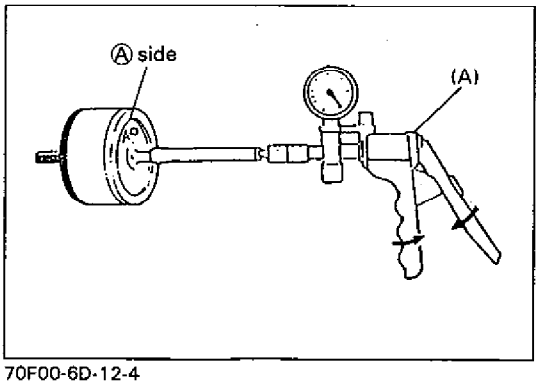
70F00-6D-12-2

3) Confirm the following.
When vacuum (about 400 mm Hg) is applied to actuator, actuator rod and lever are pulled by the vacuum and remain at the pulled position and then, when actuator is released from the vacuum, the rod and lever return to the original position.
If found defective, replace.

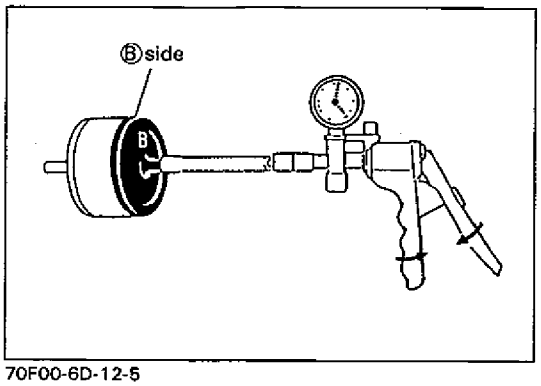
VTV (Vacuum Transmitting Valve) INSPECTION

1) With vacuum pump gauge set at Ⓐ (Brown) side of VTV, when pump is operated, pointer stays at zero position.

Special Tool (Vacuum pump gauge)
(A): 09917-47910



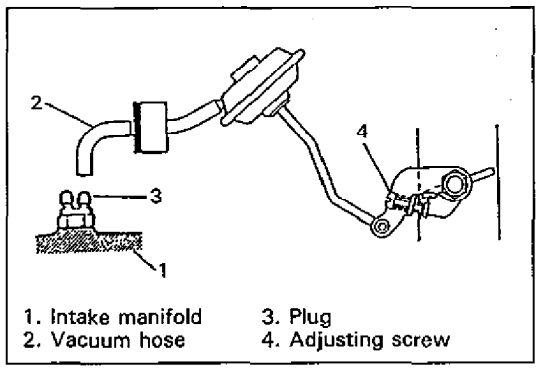
70F00-6D-12-4



70F00-6D-12-5

2) With vacuum pump gauge set at Ⓑ (Black) side of VTV, when pump is operated, pointer moves considerably but moves back to zero position as soon as pump operation is stopped.

If check result is unsatisfactory, replace VTV. Be sure to direct Ⓐ side toward actuator for installation.

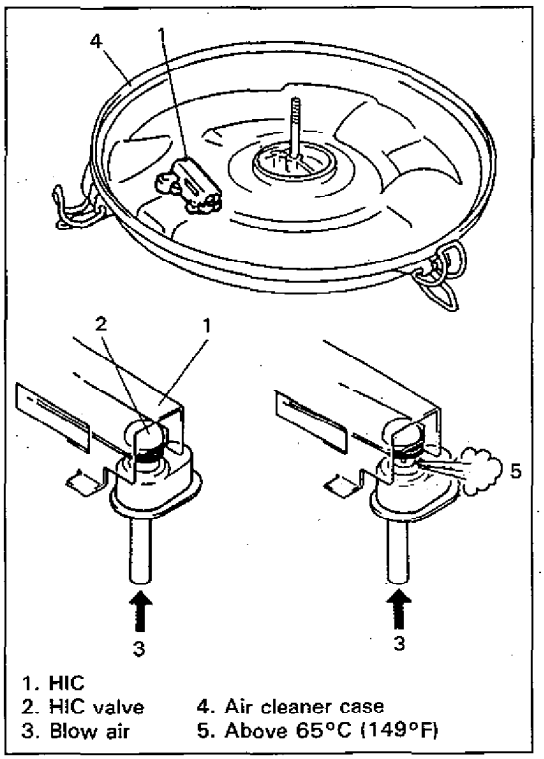


1. Intake manifold
2. Vacuum hose
3. Plug
4. Adjusting screw

70F00-6D-13-1

HOT RE-START ADJUSTMENT

1) As preliminary steps, check to be sure that the all items of "idle speed and idle mixture" of this section are satisfactory.
2) Disconnect vacuum hose from intake manifold and put a plug to the nozzle of intake manifold to close it.
3) Adjust engine idle speed to 1,500 r/min (rpm) by turning the adjusting screw of actuator lever.



1. HIC
2. HIC valve
3. Blow air
4. Air cleaner case
5. Above 65°C (149°F)

70F00-6D-13-2

HOT IDLE COMPENSATOR (HIC)

INSPECTION

1) Remove air cleaner case.
2) Remove vacuum hose from carburetor.
3) Check temperature around HIC with thermometer.
4) If temperature is below 45°C (113°F), air should not come out of HIC when air is blown into HIC nozzle. If temperature is above 65°C (149°F), air comes out of HIC. Replace HIC, if defective.
5) After checking, connect vacuum hose to carburetor, and then reinstall air cleaner case.

NOTE:

- **To check HIC for operation at higher than 65°C (149°F) temperature when HIC (bimetal) temperature is lower than 45°C (113°F), remove HIC from air cleaner case and warm it up with hair drier or photo light before checking.**
- **Never touch bimetal or valve in HIC.**

REMOVAL AND INSTALLATION

WARNING:
This work must be carried out in a well-ventilated place where no fire is used around.

70F00-6D-14-1

REMOVAL

1) Disconnect battery negative cable from battery.
2) Remove air cleaner case.
3) Disconnect fuel cut solenoid valve lead wire at coupler.
4) Disconnect accelerator cable and choke cable from carburetor.
5) Disconnect vacuum hose from carburetor.
6) Remove fuel filler cap to release fuel vapor pressure in fuel tank and then reinstall it.
7) Disconnect fuel inlet and return hoses from carburetor.
8) Check all around carburetor for any other parts required to be removed or disconnected for removal of carburetor and remove or disconnect whatever necessary.
9) Then remove carburetor from intake manifold.

70F00-6D-14-2

INSTALLATION

Install in the reverse order or removal.

NOTE:
Upon completion of installation, be sure to check each part for evidence of fuel leakage and for proper operation. If defective, correct.

70F00-6D-14-4

UNIT REPAIR OVERHAUL

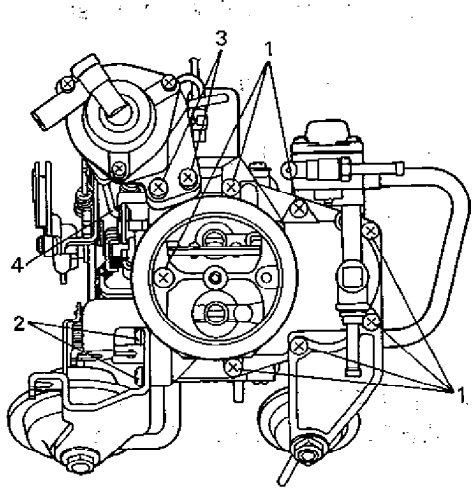
This section outlines procedure to be used for overhauling carburetor as removed from engine.

NOTE:

- **Be sure to replace gaskets as well as worn or damaged parts.**
- **While disassembling and assembling carburetor, use special care not to deform levers on throttle valve shaft or cause damage to any other parts.**
- **Don't disassemble fuel cut solenoid valve and each actuator.**

WARNING:
When servicing carburetor, keep lighted cigarette and any other fire off near carburetor as it contains gasoline.

70F00-6D-15-1

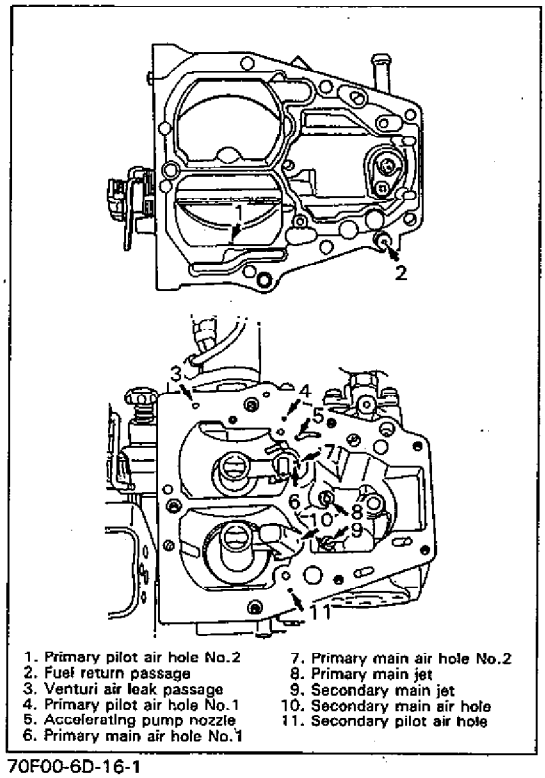


1. Upper cover screws
2. Depression chamber bracket screws
3. Idle-up actuator screws
4. Choke lever rod

70F00-6D-15-3

DISASSEMBLY

To remove carburetor upper cover, disconnect choke lever rod from choke shaft lever and remove screws 1, 2 and 3 indicated in figure.



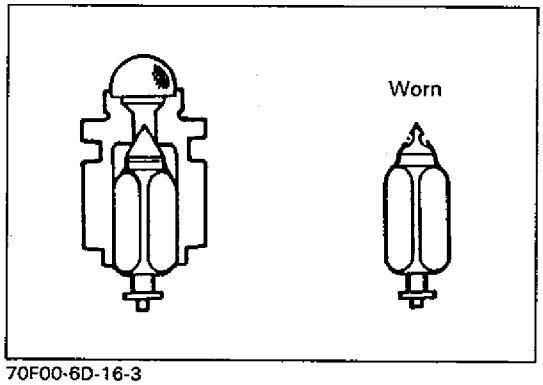
70F00-6D-16-1

CLEANING

1) Wash listed items below and then clean them by blowing compressed air.
   - All air bleed holes and fuel jets.
   - Needle valve, valve seat and filter, and float.
2) Blow compressed air into all passages to clean.
3) Clean bottom of float chamber.

NOTE:
Don't immerse following parts in carburetor cleaner.
- **Fuel cut solenoid valve.**
- **Depression chamber and actuators.**
- **Rubber parts and gaskets.**

Don't put drills or wires into fuel passages and metering jets for cleaning. It causes damages in passages and jets.



70F00-6D-16-3

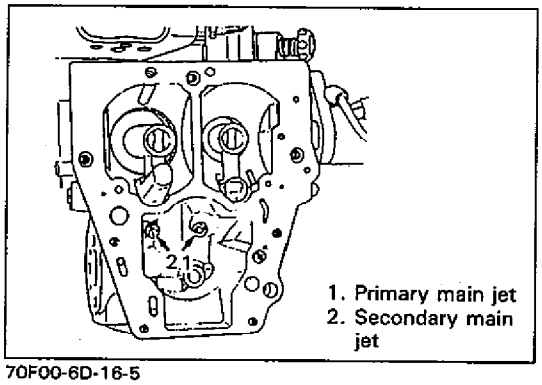
INSPECTION

1) Check choke valve and throttle valves for smooth operation.
2) Check needle valve and valve seat for wear.
3) Check float height.
4) Check to ensure that no fuel is in float by shaking it.

ASSEMBLY

For installation of any other parts than those described here, refer to figures under GENERAL DESCRIPTION (p. 6D-2) in this section.

70F00-6D-16-4

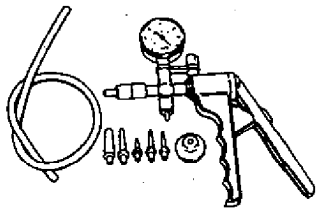
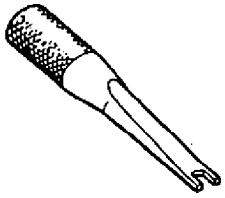


70F00-6D-16-5

PRIMARY AND SECONDARY MAIN JETS
Each jet has its jet number stamped on its head.
When reinstalling them, refer to figure for their proper positions.

NOTE:
- **When replacing jet, be sure to use one with the same number as the one being replaced.**
- **Number (size) of primary main jet should be smaller than that of secondary main jet.**

SPECIAL TOOL

	
09917-47910 Vacuum pump gauge	09913-17310 Carburetor adjuster

70F00-6D-17-1

SECTION 6E

ELECTRONIC FUEL INJECTION SYSTEM

(Throttle Body Fuel Injection System)

6E

CONTENTS

70F00-6E-2-1

GENERAL DESCRIPTION

The Electronic Fuel Injection System in this vehicle supplies the combustion chambers with air/fuel mixture of optimized ratio under widely varying driving conditions.
It uses the single-point throttle body fuel injection system which injects fuel into the throttle body through one injector.

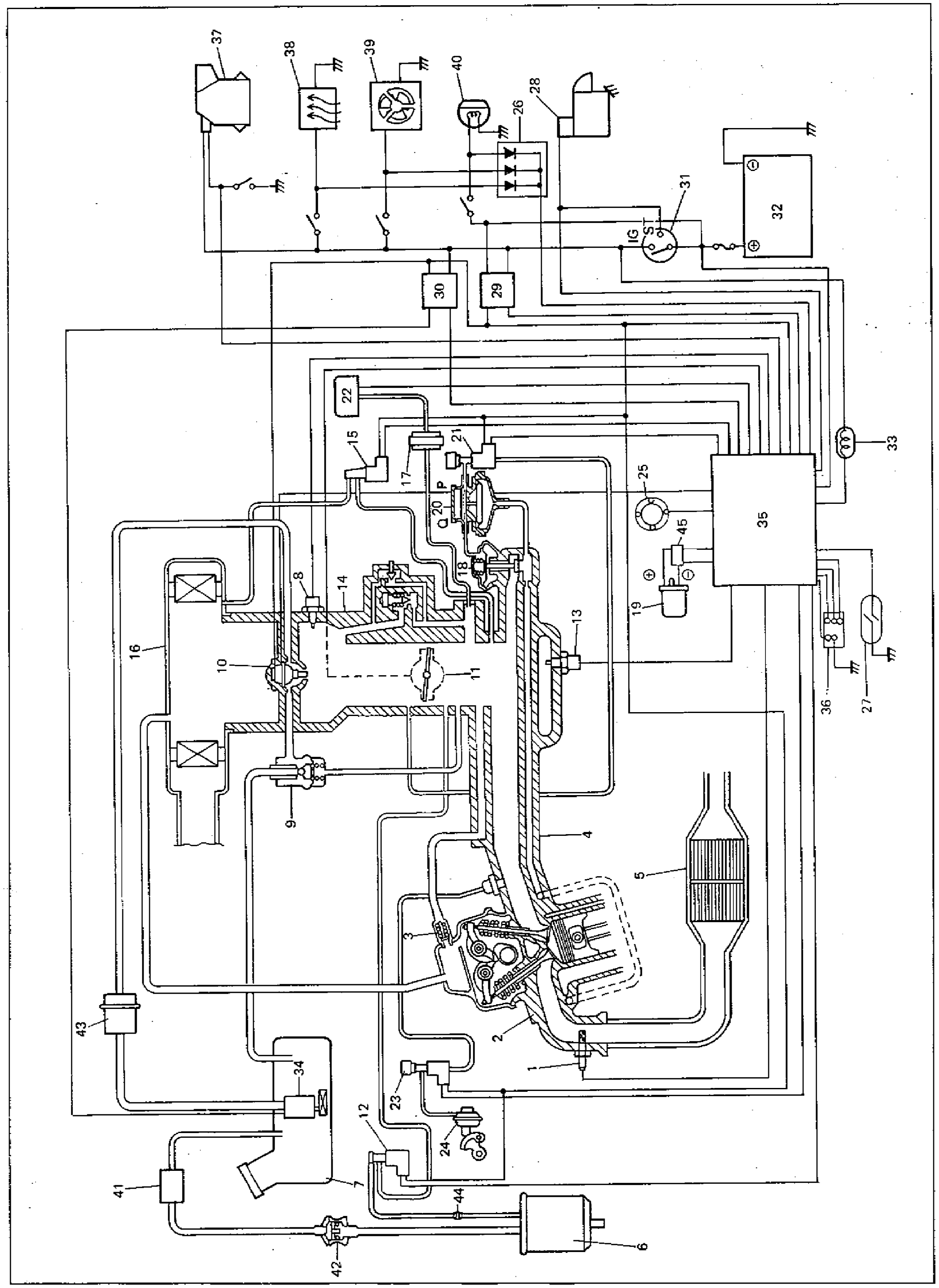
This system has 2 major sub-systems: air/fuel delivery system and electronic control system. Air/fuel delivery system includes fuel pump, throttle body, etc..

70F00-6E-3-1

Electronic control system includes ECM, various sensors and controlled devices.

This section explains not only the system related to the electronic fuel injection but also such functions of ECM as listed below.

- EGR system.
- Throttle opener control system.
- Evaporative emission control system.
- ESA (Electric Spark Advance) system.


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
P
Q
IG
ST

70F00-6E-4-1

1. Oxygen sensor
2. Exhaust manifold
3. PCV valve
4. Intake manifold
5. Three way catalytic converter
6. EVAP canister
7. Fuel tank
8. IAT sensor
9. Fuel pressure regulator
10. Fuel injector
11. TP sensor
12. EVAP SP valve
13. ECT sensor
14. Throttle body
15. IAC valve
16. Air cleaner
17. Filter
18. EGR valve
19. Ignition coil
20. EGR modulator
21. EGR SV valve (Blue)
22. MAP sensor
23. TO SV valve (Green)
24. Throttle opener
25. CMP sensor (in distributor)
26. Electric load signal diode
27. Vehicle speed sensor
28. Starter magnetic switch
29. Main relay
30. Fuel pump relay
31. Main switch
32. Battery
33. Malfunction indicator lamp ("CHECK ENGINE" light)
34. Fuel pump
35. ECM
36. Monitor coupler
37. Heater fan motor
38. Rear defogger
39. Radiator fan motor
40. Head (or small) light
41. Fuel and vapor separator
42. TPC valve
43. Fuel filter
44. Canister purge valve
45. Ignitor

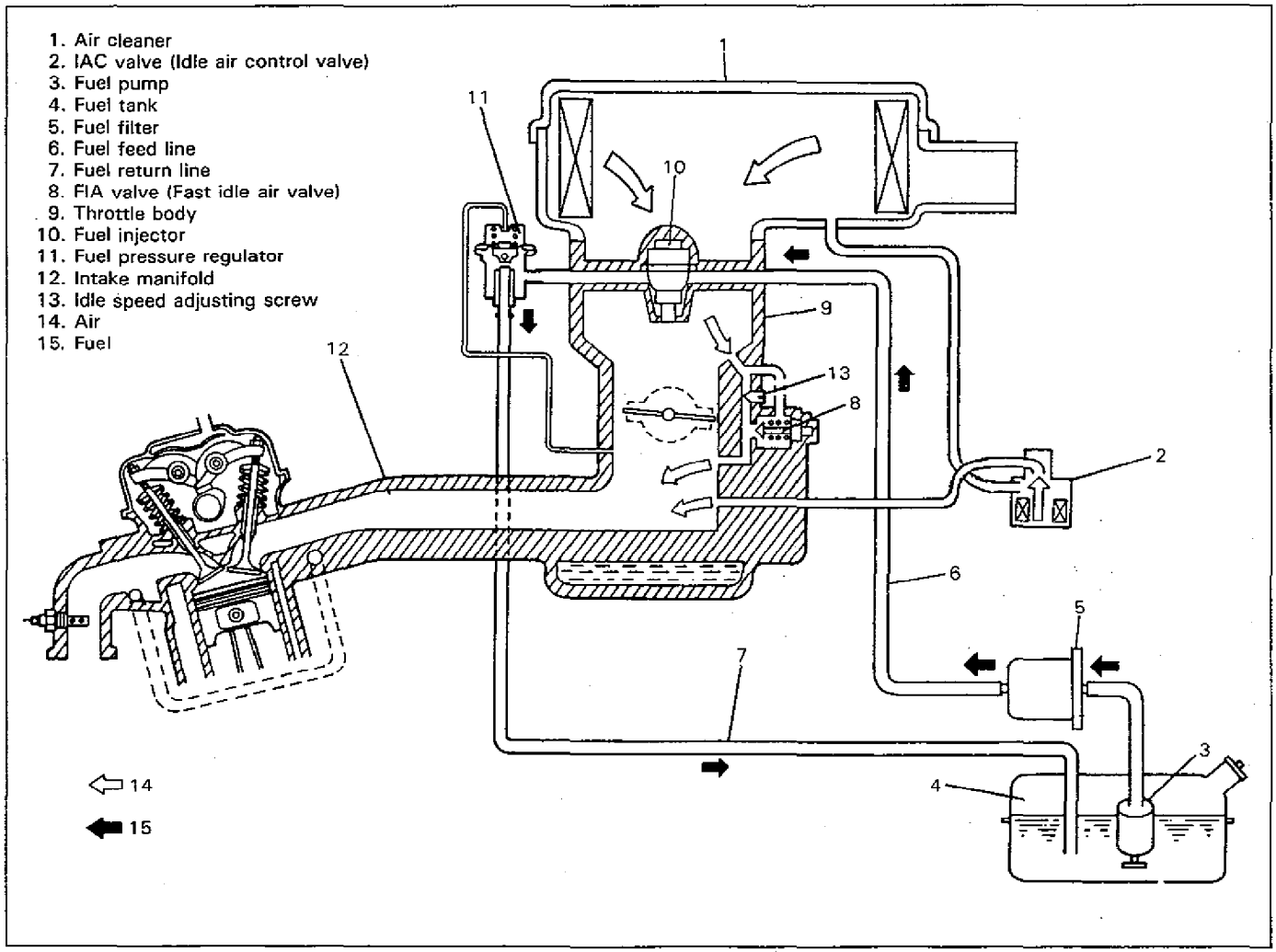
70F00-6E-5-1

AIR AND FUEL DELIVERY SYSTEM

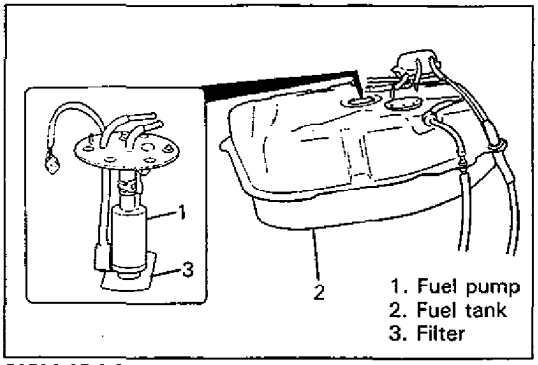
The main components of this system are fuel tank, fuel pump, fuel filter, throttle body (including fuel injector, fuel pressure regulator and air valve), fuel feed line, fuel return line, air cleaner and idle air control valve.

The fuel in the fuel tank is pumped up by the fuel pump, filtered by the fuel filter and fed under pressure to injector installed in throttle body. As the fuel pressure applied to the fuel injector (the fuel pressure in the fuel feed line) is always kept a certain amount higher than the pressure in the intake manifold by the fuel pressure regulator, the fuel is injected into the throttle body in conic dispersion when the injector opens according to the injection signal from ECM.

The injected fuel is mixed with the air which has been filtered through the air cleaner in the throttle body. The air/fuel mixture is drawn through clearance between throttle valve and bore and idle bypass passage into intake manifold.
Then the intake manifold distributes the air/fuel mixture to each combustion chamber.



70F00-6E-6-1



70F00-6E-6-5

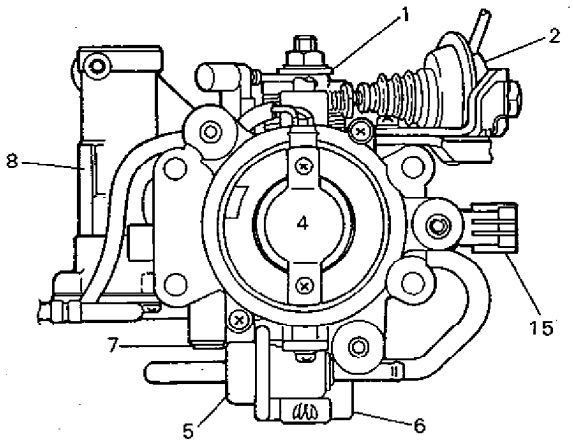
Fuel Pump

The electric fuel pump located in the fuel tank consists of armature, magnet, impeller, brush, check valve, relief valve, etc.. The ECM controls its ON/OFF operation as described in item "Fuel Pump Control System".

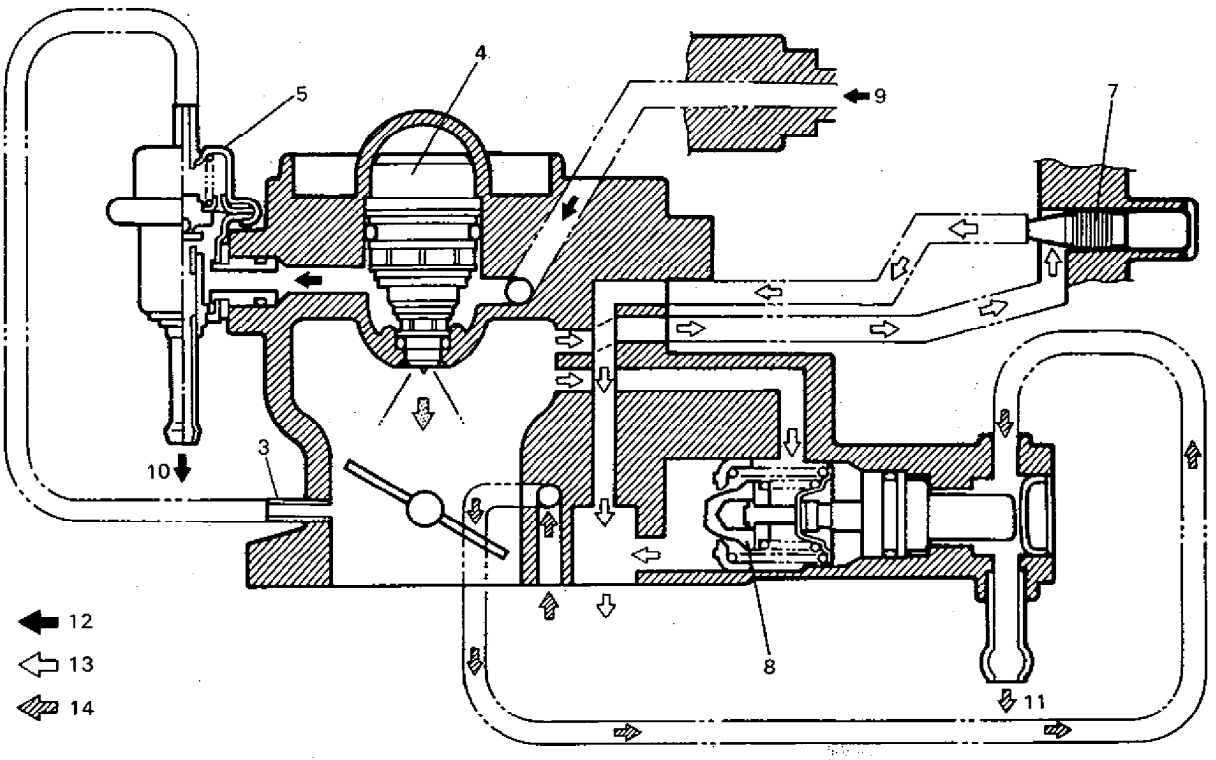
Throttle Body

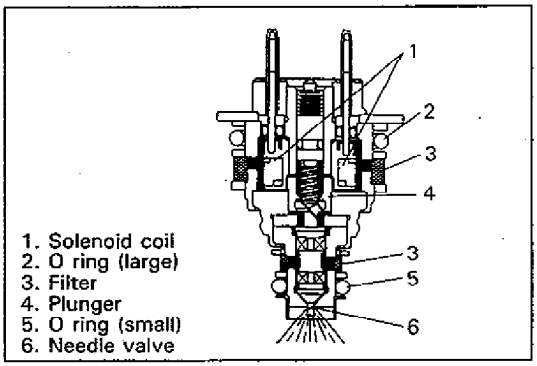
The throttle body consists of the main bore, air bypass passage, fuel passage, vacuum passage (for EGR system and EVAP control system) and the following parts.

- Injector which injects fuel according to the signal from ECM
- Fuel pressure regulator which maintains the fuel pressure to the injector a certain amount higher than the pressure in the intake manifold
- Throttle valve which is interlocked with the accelerator pedal and controls the amount of the air fuel mixture drawn into the combustion chamber
- Throttle opener which controls the throttle valve opening so that it is a little wider when the engine is starting than when the engine is idling
- TP sensor which detects the throttle valve opening and sends a signal to ECM
- Fast idle air valve which supplies the bypass air when the engine is cold
- Idle speed adjusting screw which controls the amount of bypass air to adjust engine idle speed
- IAT sensor which measures the temperature of the intake air and sends a signal to ECM



1. Throttle lever
2. Throttle opener
3. Vacuum pipe
4. Fuel injector
5. Fuel pressure regulator
6. TP sensor
7. Idle speed adjusting screw
8. Fast idle air valve
9. From fuel pump
10. To fuel tank
11. To intake pipe
12. Fuel
13. Air
14. Coolant
15. IAT sensor

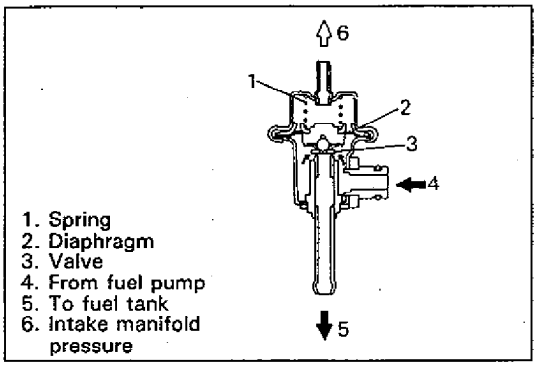




70F00-6E-8-1

Fuel Injector

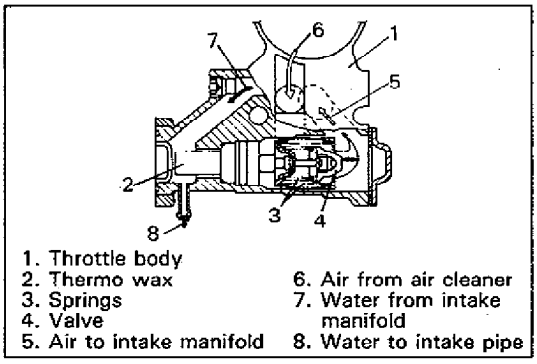
It is an electromagnetic type injection nozzle which injects fuel in the throttle body bore according to the signal from ECM.



70F00-6E-8-2

Fuel Pressure Regulator

The fuel pressure regulator keeps the fuel pressure applied to the injector 2.3 kg/cm² (230 kPa) higher than that in the intake manifold at all times.

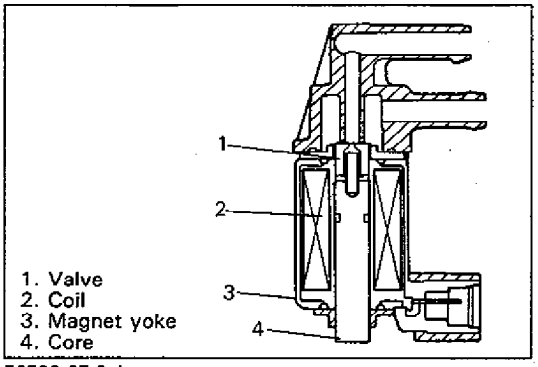


70F00-6E-8-3

Fast Idle Air Valve

The fast idle air valve consists of thermo-wax, springs and valve.

When the engine is cold, it sends the air from the air cleaner to the intake manifold without letting it pass through the throttle valve to increase the engine speed, and thus the engine is warmed up.



70F00-6E-8-4

Idle Air Control Valve (IAC Valve)

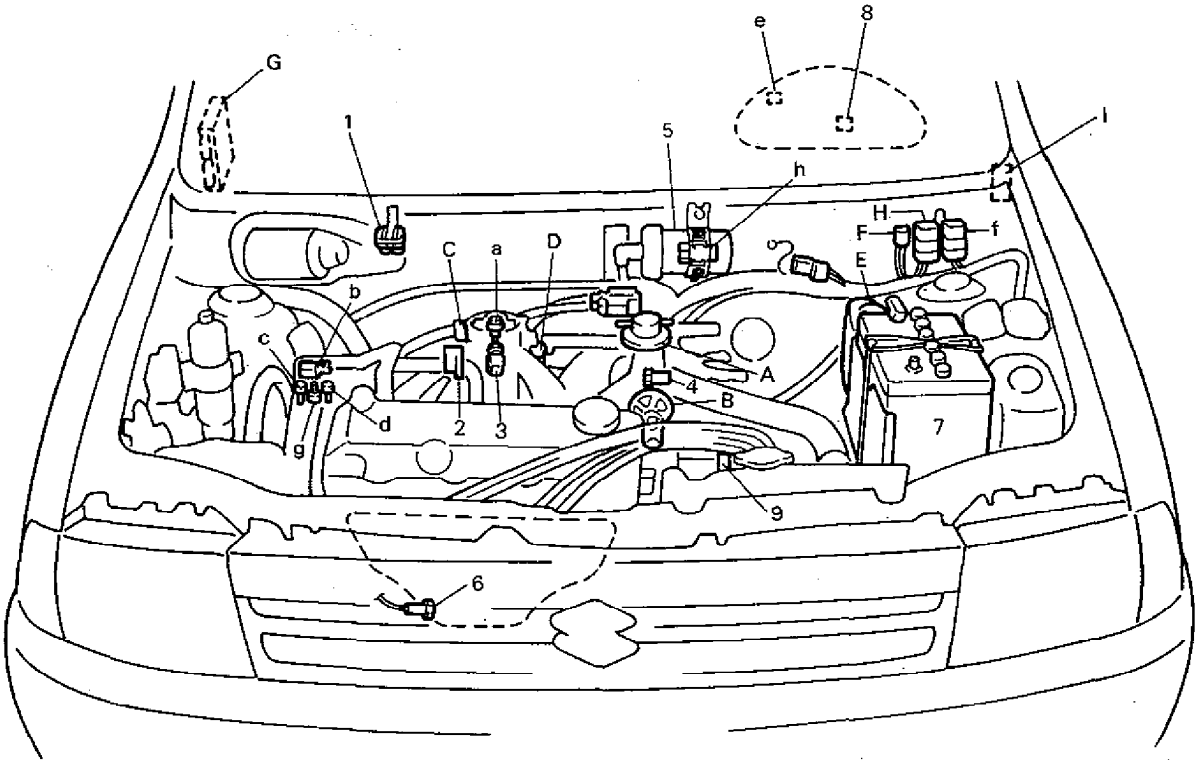
The idle air control valve opens and closes air bypass passage according to the signal from ECM.

When it opens, the air is supplied to the intake manifold.

ELECTRONIC CONTROL SYSTEM

The electronic control system consists of 1) various sensors which detect the state of engine and driving conditions, 2) ECM which controls various devices according to the signals from the sensors and 3) various controlled devices.
Functionally, it is divided into six sub systems:

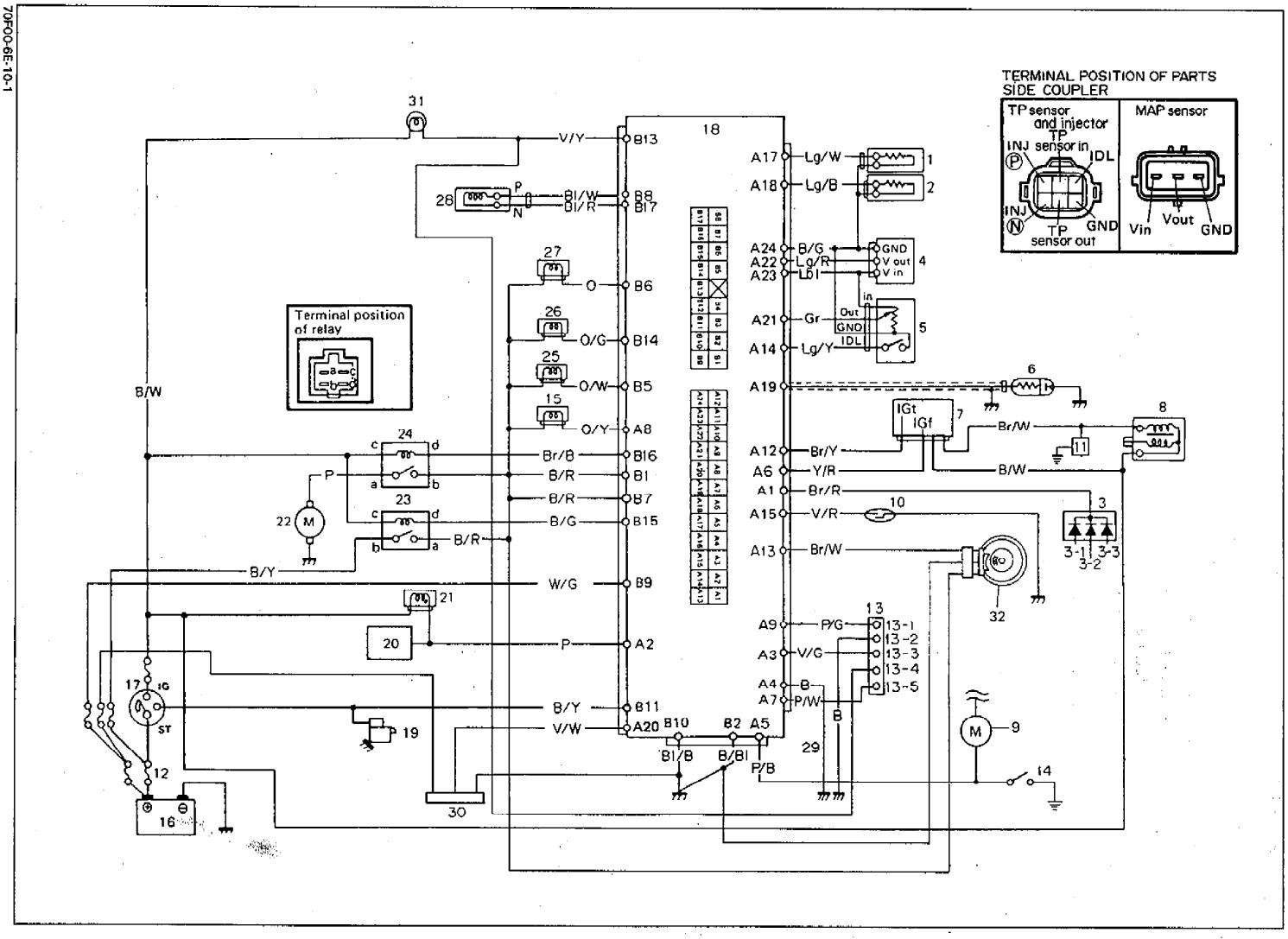
- Fuel injection control system
- Idle air control system
- Fuel pump control system
- Throttle opener control system
- EGR system
- EVAP control system
- ESA (Electronic Spark Advance) system



INFORMATION SENSORS
1. MAP sensor
2. TP sensor
3. IAT sensor
4. ECT sensor
5. Ignition coil
6. Oxygen sensor
7. Battery
8. VSS
9. CMP sensor (in distributor)

CONTROLLED DEVICES
a : Injector
b : IAC valve
c : Throttle opener SV valve (Green)
d : EGR SV valve (Blue)
e : Malfunction indicator lamp ("CHECK ENGINE" light)
f : Fuel pump relay
g : EVAP SP valve (Brown)
h : Ignitor

OTHERS
A : EGR modulater
B : EGR valve
C : Fuel pressure regulator
D : Throttle opener
E : EVAP canister
F : Monitor coupler
G : ECM
H : Main relay
I : Data link connector


TERMINAL POSITION OF PARTS
SIDE COUPLER
TP sensor and injector
TP
INJ sensor in
IDL
INJ
TP sensor out
GND
MAP sensor
Vin
Vout
GND
Terminal position of relay
B/W
B/Y
W/G
P
B/R
Br/B
O
O/G
O/W
O/Y
V/Y
Bl/W
Bl/R
B/G
V/W
Bl/B
B/Bl
P/B
Lg/W
Lg/B
Lg/R
Lbl
Gr
Lg/Y
Br/Y
Y/R
Br/R
V/R
Br/W
P/G
V/G
P/W
IGt
IGf
GND
V out
V in
Out
IDL
in
3-1
3-2
3-3
13-1
13-2
13-3
13-4
13-5

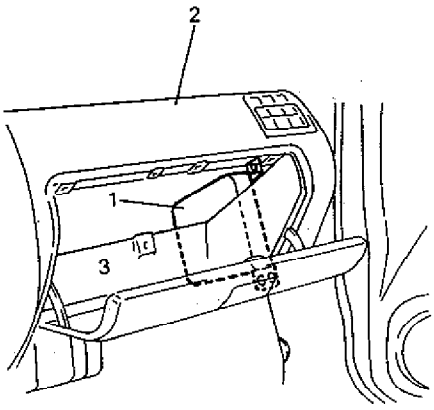
1. IAT sensor
2. ECT sensor
3. Electric load signal diode
3-1. To radiator fan thermo switch
3-2. To lighting switch
3-3. To rear window defogger
4. MAP sensor
5. TP sensor
6. Oxygen sensor
7. Ignitor
8. Ignition coil
9. Heater fan motor
10. VSS
11. Noise suppressor
12. Main fuse
13. Moniter coupler
13-1. Duty check terminal
13-2. Ground terminal
13-3. Diag. switch terminal
13-4. Diag. check terminal
13-5. Test switch terminal
14. Heater fan switch
15. EVAP SP valve

70F00-6E-11-1

16. Battery
17. Main switch
18. ECM
19. Starter magnetic switch
20. A/C relay (if equipped)
21. A/C SV valve (if equipped)
22. Fuel pump
23. Main relay
24. Fuel pump relay
25. EGR SV valve
26. TO SV valve
27. IAC valve
28. Fuel injector
29. Ground (For Finish or Swiss spec. vehicle)
30. Data link connector
31. Malfunction indicator lamp
("CHECK ENGINE" light)
32. CMP sensor (in distributor)

Wire color

B ..... Black
B/Bl ..... Black/Blue
B/G ..... Black/Green
B/R ..... Black/Red
B/W ..... Black/White
B/Y ..... Black/Yellow
Bl/B ..... Blue/Black
Bl/R ..... Blue/Red
Bl/W ..... Blue/White
Br/B ..... Brown/Black
Br/R ..... Brown/Red
Br/Y ..... Brown/Yellow
Br/W ..... Brown/White
Gr ..... Gray
Lbl ..... Lightblue
Lg/B ..... Lightgreen/Black
Lg/R ..... Lightgreen/Red
Lg/W ..... Lightgreen/White
Lg/Y ..... Lightgreen/Yellow
O ..... Orange
O/G ..... Orange/Green
O/W ..... Orange/White
O/Y ..... Orange/Yellow
P ..... Pink
P/B ..... Pink/Black
P/G ..... Pink/Green
V/R ..... Violet/Red
V/W ..... Violet/White
V/Y ..... Violet/Yellow
W ..... White
W/G ..... White/Green
Y/R ..... Yellow/Red



1. ECM
2. Instrument main panel
3. Glove box

70F00-6E-12-1

Engine Control Module (ECM)

ECM is installed on dash side panel of passenger's side.
ECM is a precision unit consisting of one chip microcomputer, A/D (Analog/Digital) converter, I/O (Input/Output) unit and etc..
It is an essential part of the electronic control system, for its functions include not only such a major function as to control fuel injector, IAC valve, throttle opener SV valve, etc. but also on-board diagnostic system (self-diagnosis function), fail safe function and back-up function as described in the following section.

On-board diagnostic system (Self-diagnosis function)

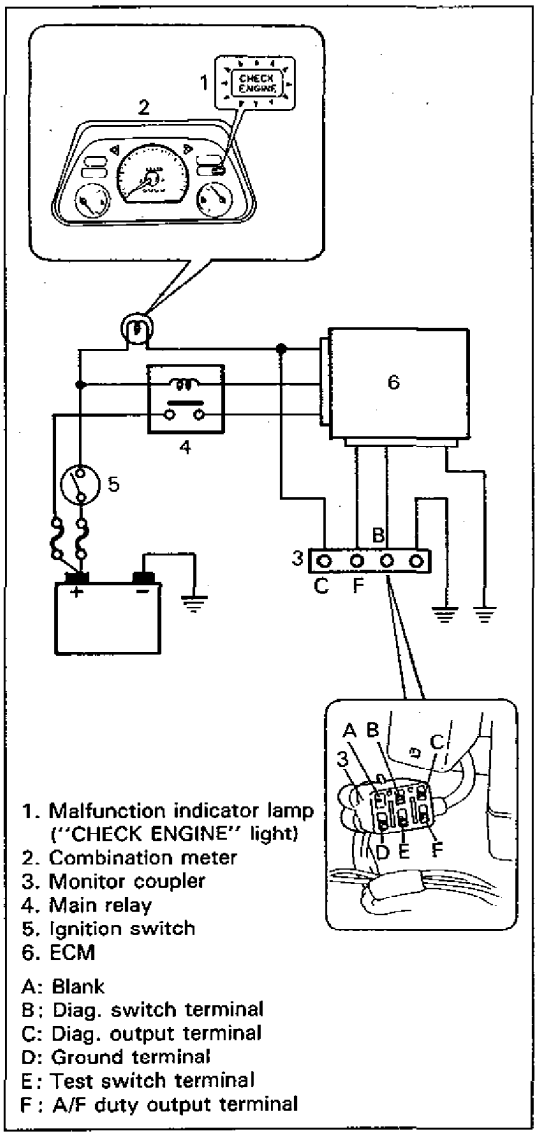
When any of such troubles as listed below occurs in Electronic Fuel Injection system, ECM activates Malfunction indicator lamp ("CHECK ENGINE" light) while engine is running to warn the driver of occurrence of such trouble and stores the data on defective area (where trouble occurred) in its back-up memory. (The memory is kept as it is even if the trouble was only temporary and disappeared immediately. And it is not erased unless the power to ECM is shut off for 20 seconds or longer.) ECM also indicated defective area in memory by means of flashing of "CHECK ENGINE" light at the time of inspection (i.e. when diagnosis switch terminal is grounded and ignition switch is turned ON).

- When ECM received a defect informing signal from any one of following sensors and circuits or no signal whatever
  - *Oxygen sensor
  - *IAT sensor
  - *MAP sensor
  - *ECT sensor
  - *TP sensor
  - *Vehicle speed sensor
  - *Idle switch
  - *Ignition fail safe signal circuit
  - *Camshaft position sensor
- When CPU (Central Processing Unit) of ECM fails to operate

NOTE:

- **Even when a trouble occurs in idle switch circuit (circuit open), ECM does not indicate it (or activate Malfunction indicator lamp ("CHECK ENGINE" light) while engine is running.**
  And when that troubled circuit regains good condition, the memory of defective area will be erased automatically even if the power circuit to ECM is not opened as described above.
- **Only ignition circuit trouble (code No.41) among the above areas is not stored in back-up memory of ECM. (In other words, even if ECM has detected a trouble in ignition circuit, once ignition switch is turned OFF, code No.41 will not be indicated even when diagnosis switch terminal is grounded and ignition switch is turned ON.).**
  Therefore, to check diagnostic trouble code when engine fails to start, crank engine and then ground diagnosis switch terminal with ignition switch ON.

70F00-6E-13-1



1. Malfunction indicator lamp ("CHECK ENGINE" light)
2. Combination meter
3. Monitor coupler
4. Main relay
5. Ignition switch
6. ECM

A: Blank
B: Diag. switch terminal
C: Diag. output terminal
D: Ground terminal
E: Test switch terminal
F: A/F duty output terminal

70F00-6E-13-3

Malfunction indicator lamp (CHECK ENGINE" light)

Malfunction indicator lamp ("CHECK ENGINE" light) is located in the combination meter. It indicates each result of diagnosis done by ECM's on-board diagnostic system (self-diagnosis function).

It also lights under the conditions as described below regardless of Electronic fuel Injection system condition.

- When ignition switch is turned ON, engine is at a stop (When engine speed is lower than 500 r/min.) and diagnosis switch terminal is ungrounded, Malfunction indicator lamp ("CHECK ENGINE" light) turns ON for the purpose of light and its circuit check but turns OFF once engine is started (When engine speed is higher than 500 r/min.) as far as Electronic Fuel Injection system is in good condition.

Fail-safe function

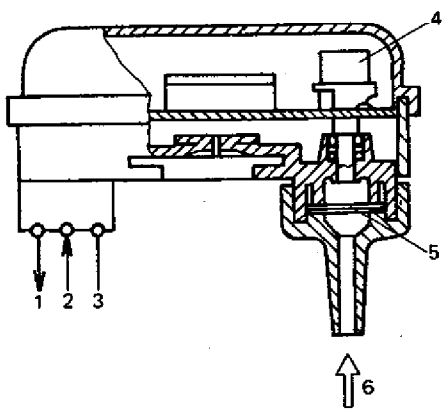
When a failure occurs in any of the sensors listed below and their circuits, a signal indicating such failure is fed to ECM, which judges that signal as such.
Even then, however, control over the injector and others is maintained on the basis of the standard signals prestored in the memory of ECM while ignoring that failure signal.
This function is called "fail-safe function". Thus, with this function, a certain level of engine performance is available even when some failure occurs in these sensors or their circuits and disability in running is avoided.

- ECT sensor
- TP sensor
- IAT sensor
- MAP sensor

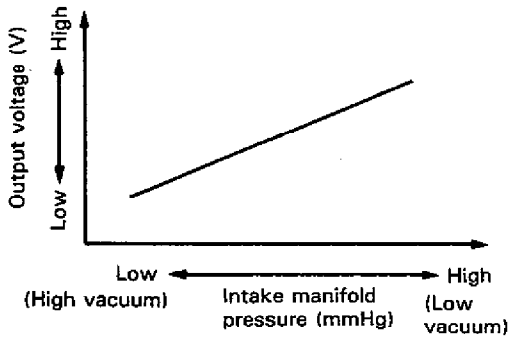
Back-up function

Even when CPU in ECM fails to operate properly, the back-up circuit in ECM controls operation of the injector on the basis of the signals from MAP sensor so as to least impair driving performance.

70F00-6E-14-1



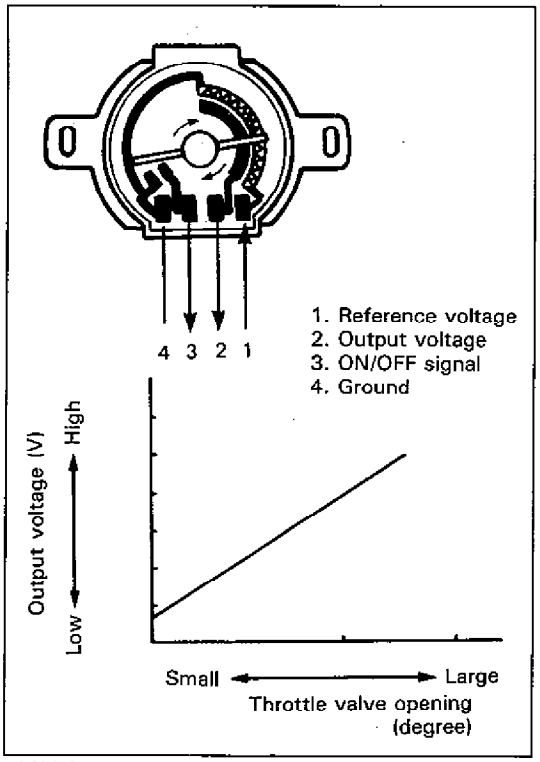
1. Output voltage
2. Refrence voltage
3. Ground
4. Semi-conductor type pressure converting element
5. Filter
6. Intake manifold pressure (Vacuum)



70F00-6E-14-3

Manifold Absolute Pressure Sensor (MAP Sensor)

This sensor senses pressure change in the intake manifold and converts it into voltage change. It consists of a semi-conductor type pressure converting element which converts a pressure change into an electrical change and an electronic circuit which amplifies and corrects the electric change.
The ECM sends a 5-volt reference voltage to the MAP sensor. As the manifold pressure changes, the electrical resistance of the sensor also changes.
By monitoring the sensor output voltage, ECM knows the manifold pressure (intake air volume).
ECM uses the voltage signal from the MAP sensor as one of the signals to control fuel injector, IAC valve and EGR SV valve.



70F00-6E-15-1

Throttle Position Sensor (TP Sensor)

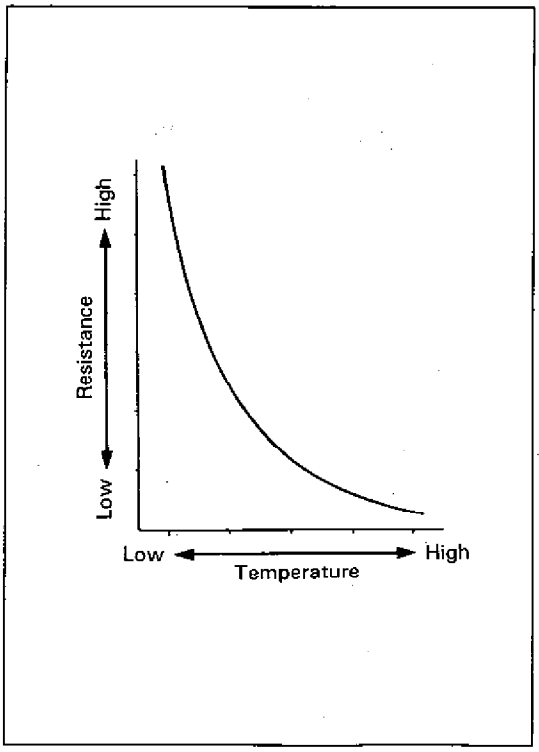
The throttle position sensor consisting of a contact point (idle switch) and a potentiometer is connected to the throttle valve shaft on the throttle body, and detects the throttle valve opening.

The throttle opening in the idle state is detected by means of the contact point which turns ON in that state.

But beyond that the full opening is detected by the potentiometer as follows.

A 5-volt reference voltage is applied to the sensor from ECM and as its brush moves over the print resistance according to the throttle valve opening, the output voltage varies accordingly.

By monitoring the sensor output voltage, ECM detects the throttle valve opening and its change.



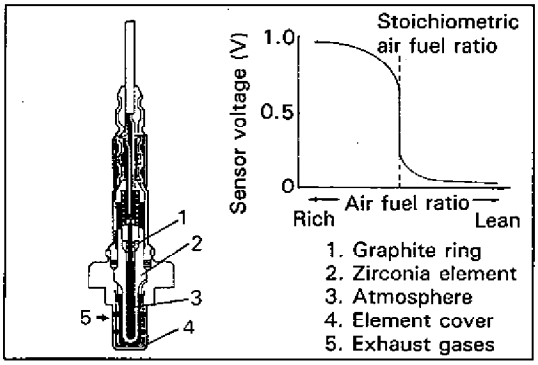
70F00-6E-15-3

Intake Air Temperature Sensor (IAT Sensor)

Located at the side of throttle body, this sensor constantly measures the temperature of the air entering there and converts a change in the air temperature into that in resistance through its thermister. That is, as air temeprature lowers, resistance increases and as it rises, resistance decreases. As air density of the intake air varies with variation in temperature, ECM, by monitoring the resistance, adjusts the amount of fuel injection according to the air temperature.

Engine Coolant Temperature Sensor (ECT Sensor)

Located at the side of intake manifold, this sensor measures the temperature of the engine coolant and converts its change into that in resistance through the thermister like the IAT sensor.

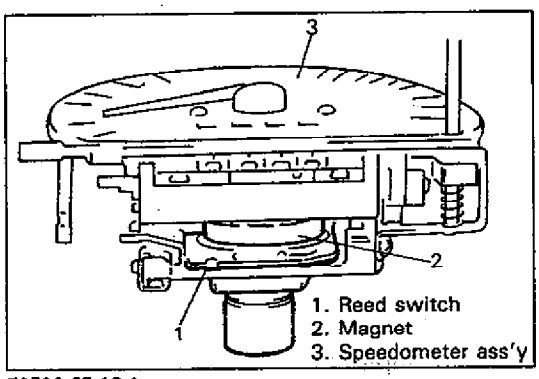


70F00-6E-15-5

Oxygen Sensor

The oxygen sensor is located on the exhaust manifold to detect the concentration of oxygen in the exhaust gases.

ECM uses this signal to keep the air/fuel mixture close to the theoretical air fuel ratio (14.7).



70F00-6E-16-1

Vehicle Speed Sensor (VSS)

The VSS consisting of the reed switch and magnet is built in the speedometer. As the magnet turns with the speedometer cable, its magnetic force causes the reed switch to turn ON and OFF. Such ON/OFF frequency increases or decreases in proportion with the vehicle speed and is sent to ECM as pulse signals.

ECM uses it as one of the signals to control the fuel injector.

Ignition Signal (Ignition fail safe signal)

This signal is sent from the ignitor.

ECM uses it as one of the signals for controlling injector.

70F00-6E-16-2

Engine Start Signal

This signal is sent from the engine starter circuit.

Receiving it, ECM judges whether the engine is cranking or not and uses it as one of the signals to control the fuel injector, IAC valve, ignition timing and throttle opener SV valve.

70F00-6E-16-3

Electric Load Signal

This signal is sent from each circuit of head & small (or clearance) lights, radiator fan and rear window defogger.

ECM uses it as one of the factors for controlling idle air control valve operation.

70F00-6E-16-4

Air-Conditioning Signal (For vehicle with A/C)

This signal is sent from the air-conditioning circuit.

ECM detects whether the air-conditioning is operating or not through the signal and uses it as one of the signals for controlling injector.

70F00-6E-16-5

Battery Voltage

The fuel injector is driven by its solenoid coil based upon the ECM output signal.
There is some delay called as "Ineffective injection time", which doesn't provide fuel, between ECM signal and valve action.
As the ineffective injection time depends on the battery voltage, ECM takes voltage information to compensate it in fuel injection time.

70F00-6E-17-1

Diagnosis Switch Terminal

The diagnosis switch terminal is included in the monitor coupler in the engine room. When diagnosis switch terminal is grounded, a diagnosis signal is fed to ECM which then output diagnostic trouble code.

Test Switch Terminal

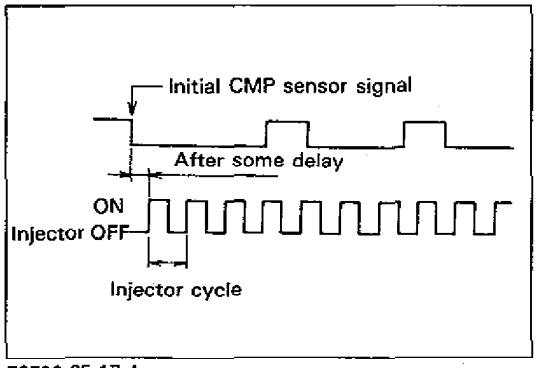
The test switch terminal is included in the monitor coupler. When this terminal is grounded, ECM sets the ignition timing to the initial ignition timing. When both test switch terminal and diagnosis switch terminal are grounded, ECM outputs A/F duty through the A/F duty check terminal.

70F00-6E-17-2

FUEL INJECTION CONTROL SYSTEM

In this system, ECM controls the time (amount) and timing of the fuel injection from the fuel injector into the throttle body according to the signals from the various sensors so that suitable air/fuel mixture is supplied to the engine in each driving condition.

70F00-6E-17-3

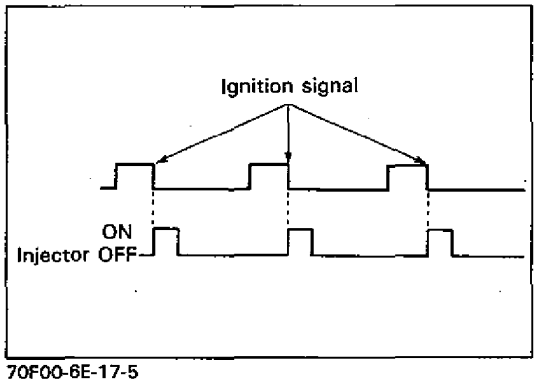


Injection Timing

- At start

Fuel is injected at a certain cycle starting immediately after the initial CMP sensor signal is inputted.

70F00-6E-17-4



- In normal driving (Standard injection timing)

Fuel is injected at every ignition signal (ignition fail safe signal) synchronously.

- When accelerating (Additional injection timing)

Fuel is injected in addition to the above standard injection timing whenever the throttle valve opening exceeds the specified opening.

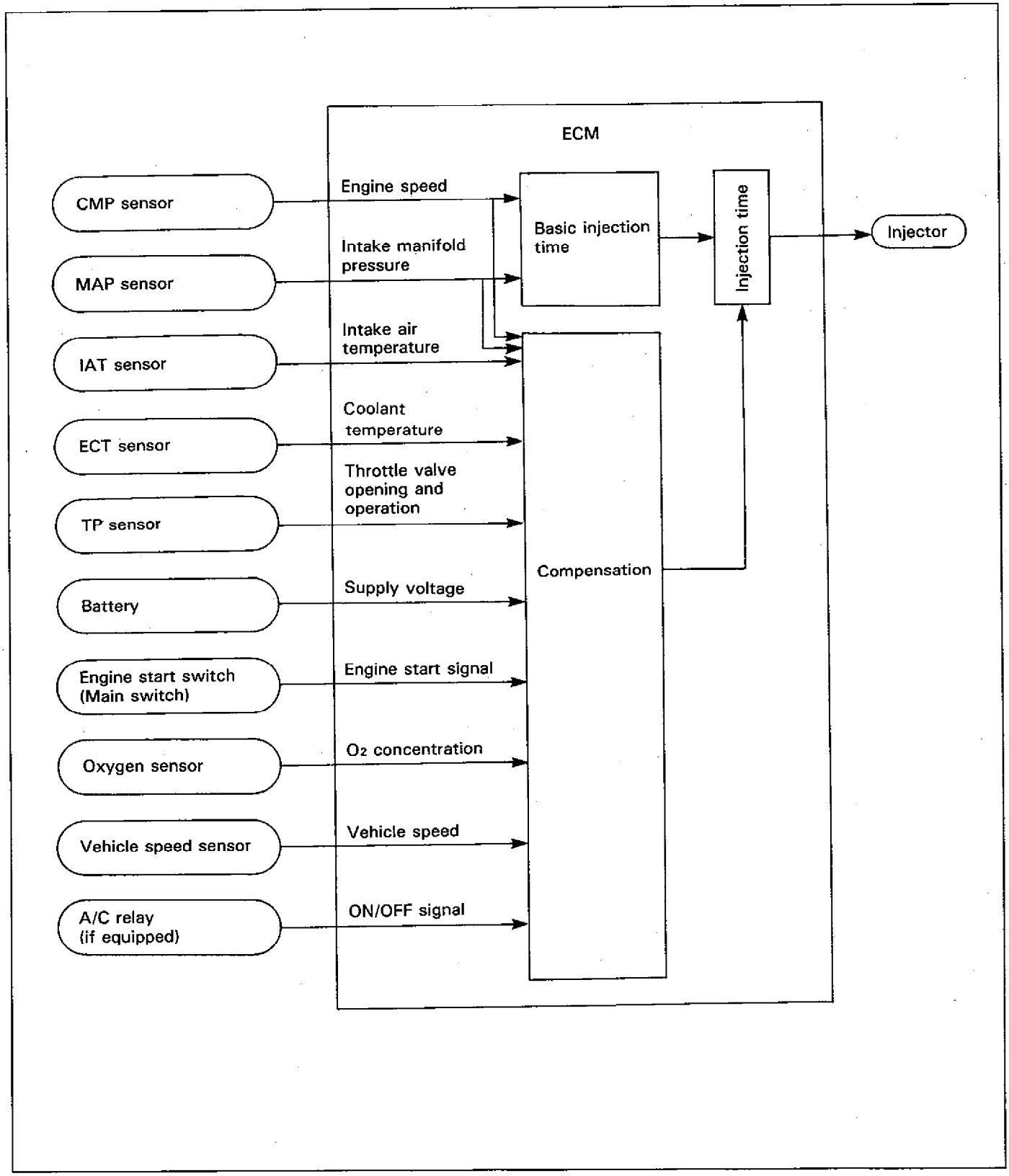
70F00-6E-17-5

Injection Time (amount of injection)

The factors to determine the injection time are the basic injection time which is calculated on the basis of the engine speed and the intake manifold pressure (amount of the intake air) and various compensations which are determined according to the signals from various sensors that detect the state of the engine and driving conditions.

NOTE:

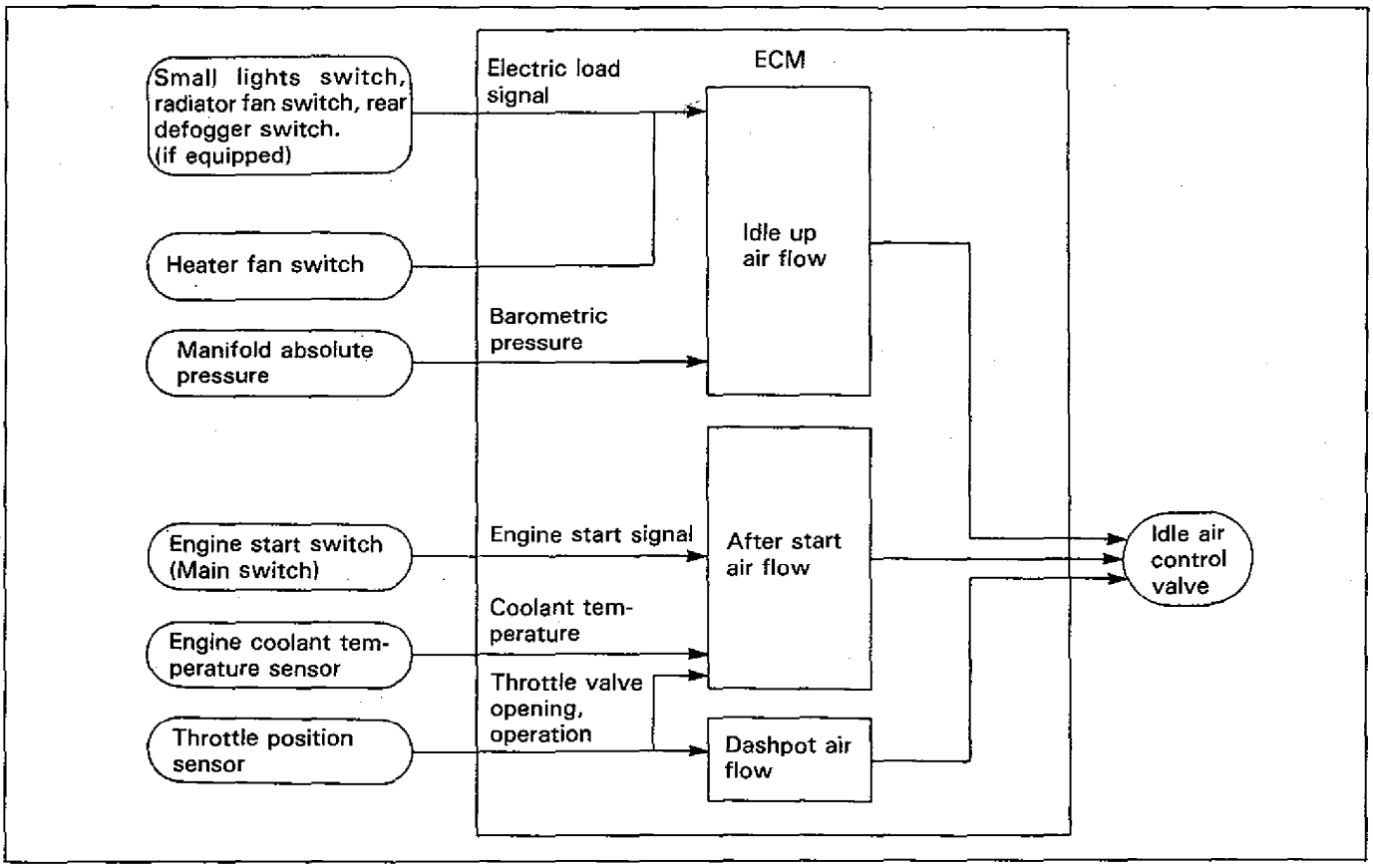
The amount of fuel drawn into the engine is determined by the injection frequency as well as injection time.



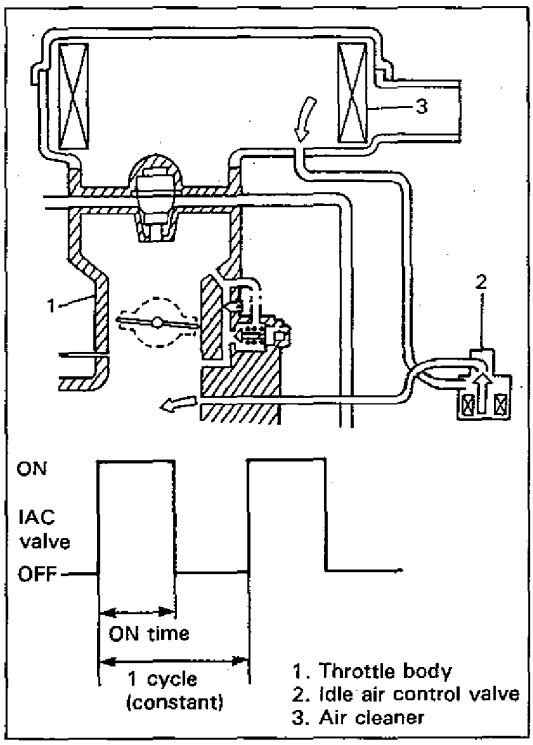
IDLE AIR CONTROL SYSTEM

In this system, ECM controls idle air control valve according to the signals from various sensors and switches to control the bypass air flow which plays the following three roles as required by the circumstances.

- Idle-up air flow to stabilize engine idle speed
- After start air flow to improve engine start
- Dashpot air flow to correct air/fuel mixture ratio



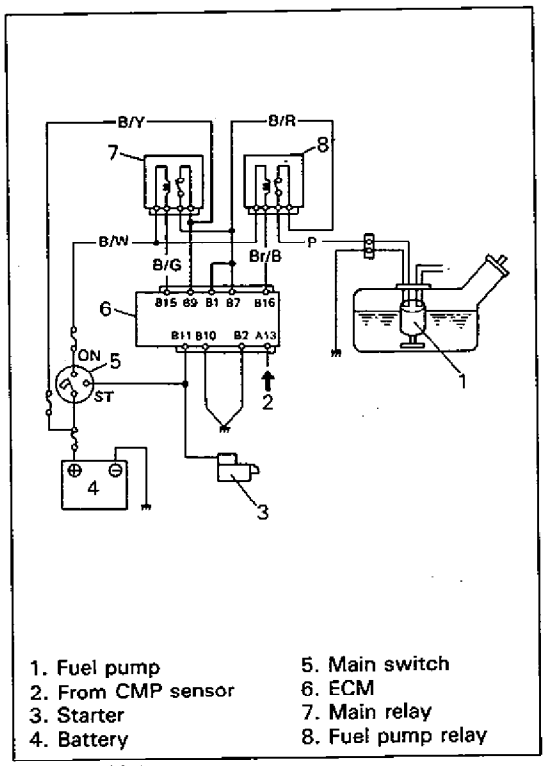
70F00-6E-19-1



70F00-6E-19-4

Operation

Idle air control valve opens the bypass air passage when it is turned ON by ECM and closes it when turned OFF.
ECM detects the engine condition by using signals from various sensors and switches and while repeating ON and OFF cycle of IAC valve at a certain rate (12.5 times a second), it controls bypass air flow by increasing and decresing its ON time within a cycle.



1. Fuel pump
2. From CMP sensor
3. Starter
4. Battery
5. Main switch
6. ECM
7. Main relay
8. Fuel pump relay

70F00-6E-20-1

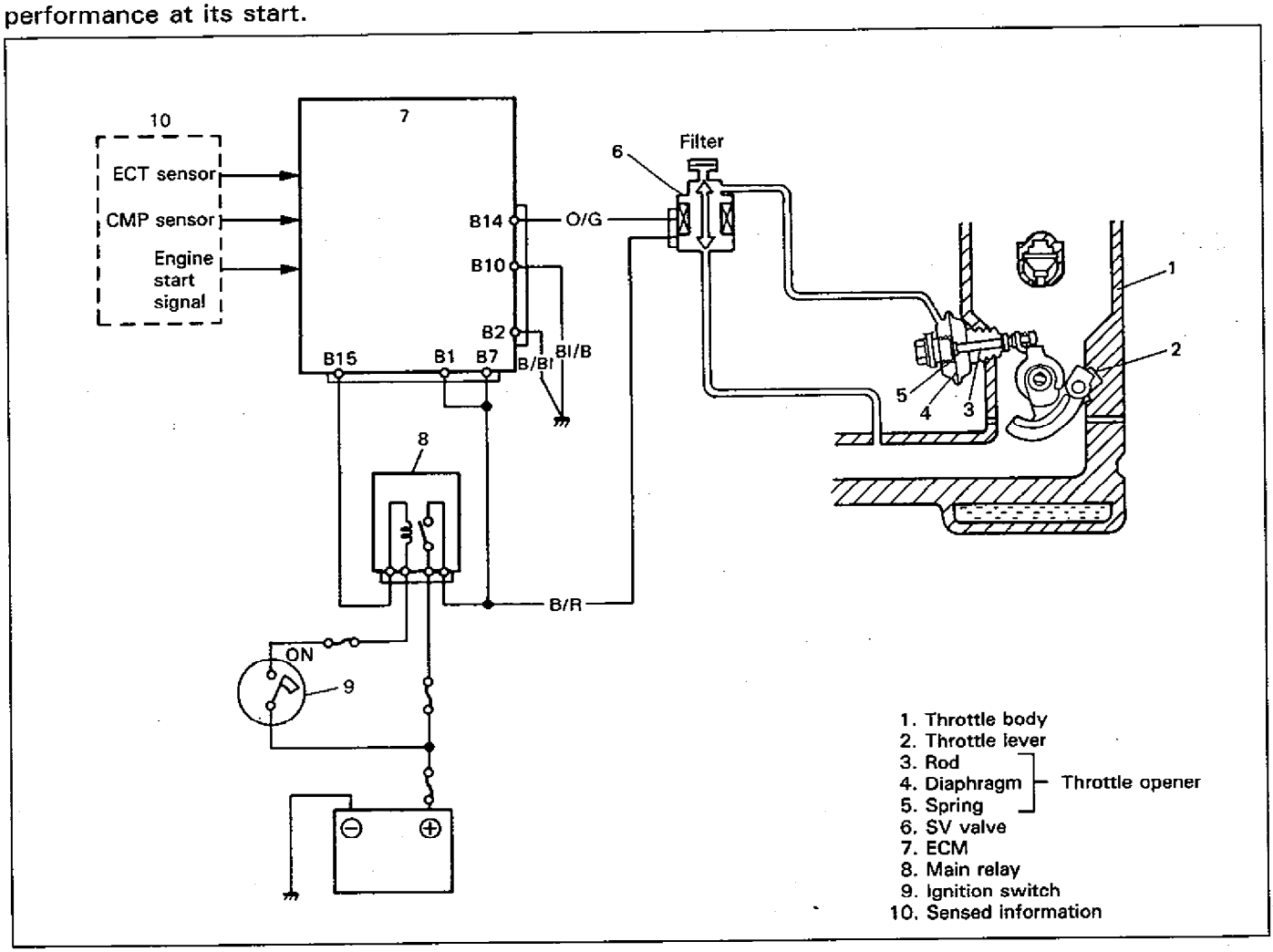
FUEL PUMP CONTROL SYSTEM

ECM controls ON/OFF operation of the fuel pump by turning it ON via the fuel pump relay under any of the following condition.

- For 3 seconds after ignition switch ON.
- While cranking engine (while engine start signal is inputted to ECM).
- While CMP sensor signal is inputted to ECM.

THROTTLE OPENER CONTROL SYSTEM

In this system, the throttle valve is opened a little wider than the idle position to improve the engine performance at its start.



1. Throttle body
2. Throttle lever
3. Rod
4. Diaphragm
5. Spring

Throttle opener

6. SV valve
7. ECM
8. Main relay
9. Ignition switch
10. Sensed information

70F00-6E-20-3

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM

An evaporative emission control system is used to prevent emission of fuel vapor.

The vapor generated in the fuel tank while driving or the engine at a stop passes through a tank pressure control valve and enters the EVAP canister where the charcoal absorbs and stores the fuel vapor.

The EVAP solenoid purge valve (EVAP SP valve) is controlled by ECM according to signals from various sensors.

Only when the following conditions are all satisfied, ECM opens vacuum passage of SP valve.

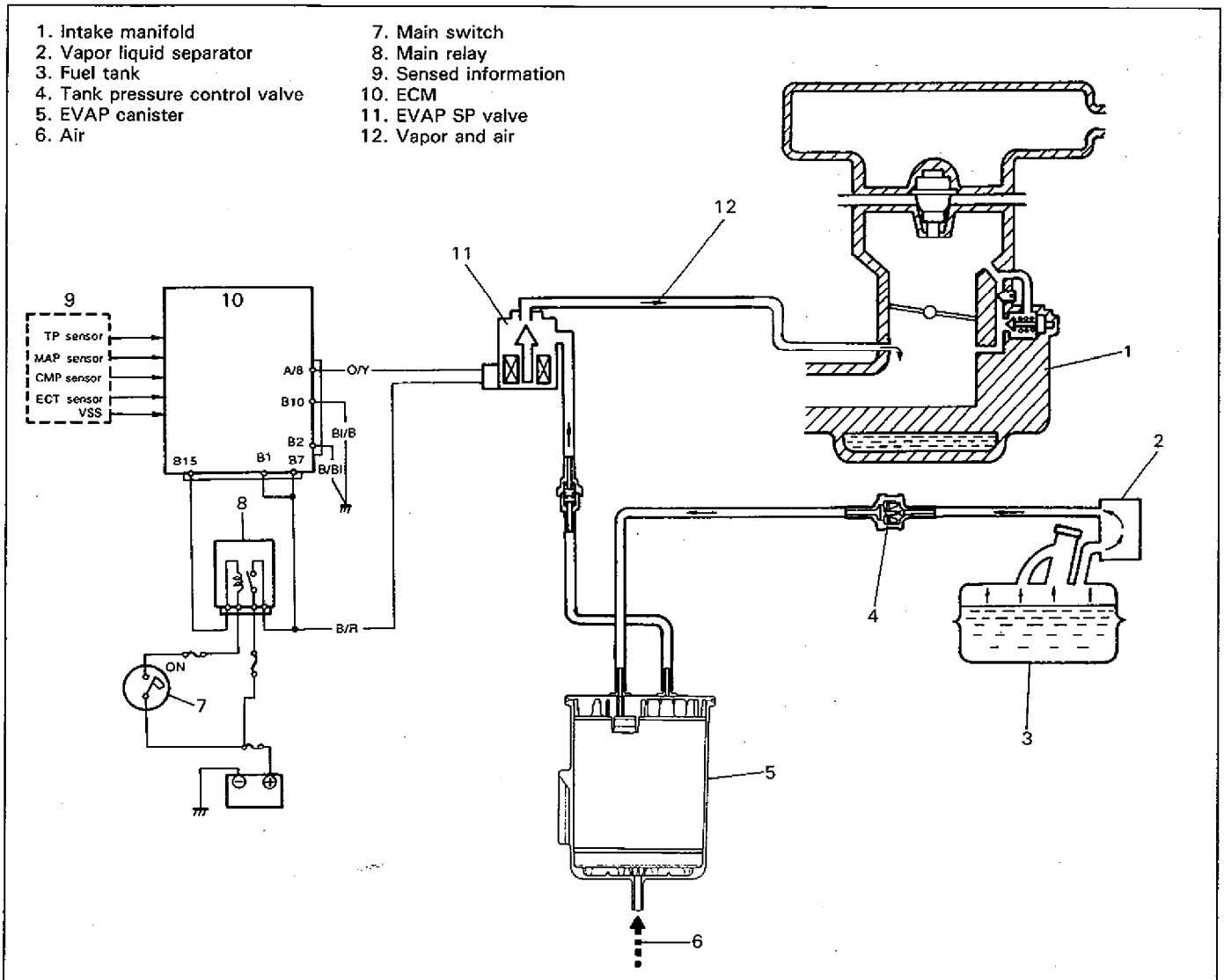
- When engine coolant temp. is higher than 50°C (122°F).
- When engine speed is higher than 1350 r/min.
- When throttle valve opens wider than idle position (Idle switch OFF)
- When engine is running with the load higher than specified.
- When vehicle speed is higher than 14 km/h (8.8 mile/h) (Or when test switch terminal is grounded and vehicle speed is higher than 1.4 km/h (0.88 mile/h).)

As a result, fuel vapor in the canister is sucked into intake manifold.

In this state, the canister is purged or cleaned by air drawn through the filter at the bottom of the canister.

The tank pressure control valve is provided to keep the pressure in the fuel tank constant. When the pressure in the fuel tank becomes positive and reaches its specified value, it opens the valve to let the vapor flow into the EVAP canister. On the other hand, when the pressure in the fuel tank becomes negative and reaches its specified value, it opens the valve to let the air flow into the fuel tank.

1. Intake manifold
2. Vapor liquid separator
3. Fuel tank
4. Tank pressure control valve
5. EVAP canister
6. Air
7. Main switch
8. Main relay
9. Sensed information
10. ECM
11. EVAP SP valve
12. Vapor and air



EXHAUST GAS RECIRCULATION (EGR) SYSTEM

This system controls the formation of NOx emission by recirculating the exhaust gas into the combustion chamber through the intake manifold.

The EGR valve is controlled by EGR modulator and SV valve controlled by ECM according to signals from various sensors.

The diaphragm mounted in the EGR modulator is operated by back pressure of the exhaust gas to open and close the valve. By this opening and closing action of the valve, the EGR modulator controls the vacuum transmitted to the EGR valve.

Under a low load condition such as low speed driving, the exhaust pressure is low. In this state, the diaphragm in the EGR modulator is pushed down by the spring force and the modulator valve opens to allow the air into the vacuum passage from the outside.

As a result, the vacuum transmitted to the EGR valve becomes smaller and so does the opening of the EGR valve.

Thus, less amount of exhaust gas is recirculated to the intake manifold.

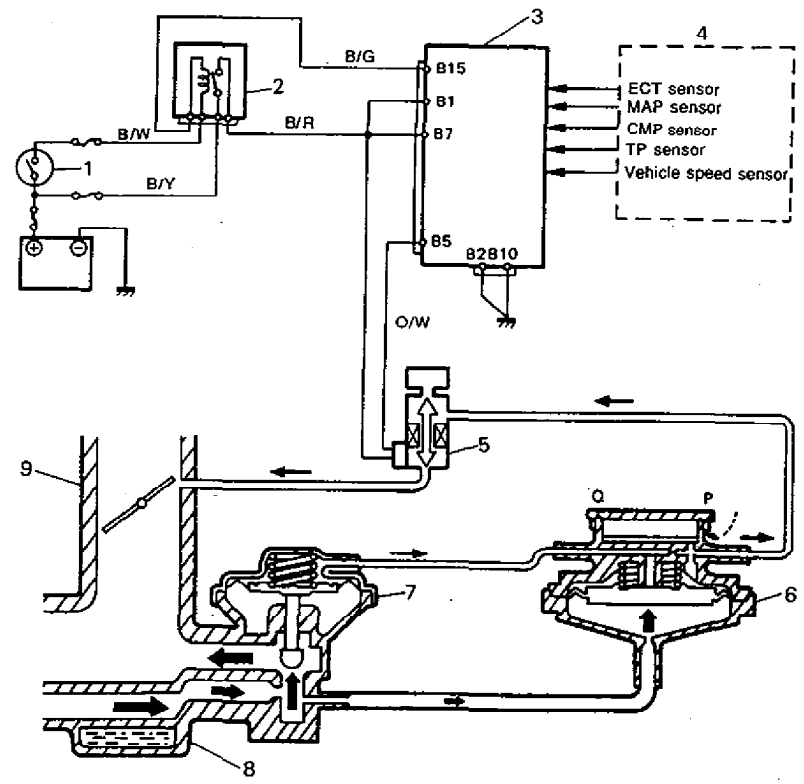
Under a high load condition such as high speed driving, on the other hand, the exhaust pressure is high. By the high exhaust pressure, the diaphragm in the modulator is pushed up and closes its valve. As the air does not enter the vacuum passage in this state, the vacuum transmitted to the EGR valve grows larger and so does the opening of the EGR valve.

Thus, larger amount of exhaust gas is recirculated to the intake manifold.

Under any one of the following conditions, ECM closes the vacuum passage of SV valve. In this state, as the vacuum is not transmitted to the EGR valve, it remains closed.

- When engine coolant temperature is low
- When barometric pressure is low (at high altitude)
- When engine is running at high load
- When vehicle is stopped

Other than the above, EGR valve opens and closes in accordance with the EGR modulator operation.



1. Ignition switch
2. Main relay
3. ECM
4. Sensed information
5. SV valve
6. EGR modulator
7. EGR valve
8. Intake manifold
9. Throttle body
10. Exhaust gas
11. Vacuum
12. Air

70F00-6E-22-1

DIAGNOSIS

ECM has on-board diagnostic system (a system self-diagnosis function) as described previously (p. 6E-12).
Investigate where the trouble is by referring to the following "Diagnostic Flow Chart" and "Diagnostic Trouble Code".

PRECAUTIONS IN DIAGNOSING TROUBLES

[PRECAUTIONS IN IDENTIFYING DIAGNOSTIC TROUBLE CODE]

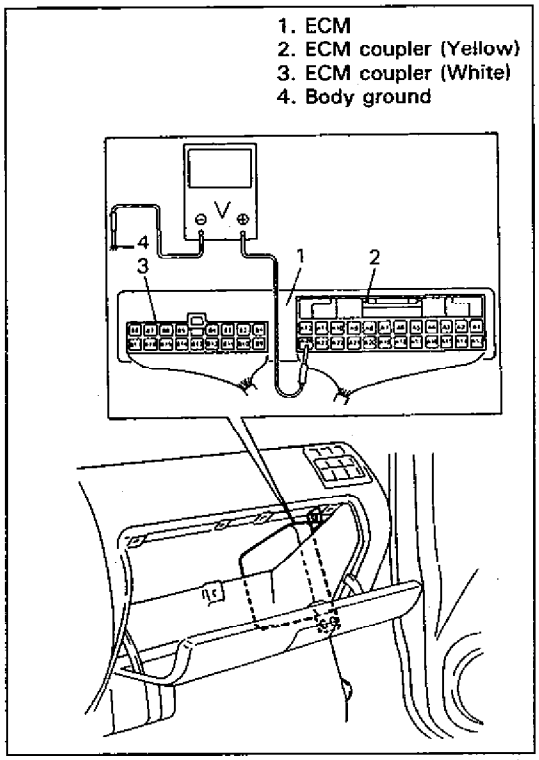
- Before identifying diagnostic trouble code indicated by malfunction indicator lamp ("CHECK ENGINE" light), don't disconnect couplers from ECM, battery cable from battery, ECM ground wire harness from engine.
  Such disconnection will erase memorized trouble in ECM memory.
- If abnormality of malfunction lies in two or more areas, malfunction indicator lamp ("CHECK ENGINE" light) indicates applicable codes three times each.
  And flashing of these codes is repeated as long as diagnosis switch terminal is grounded and ignition switch is held at ON position.
- Take a note of diagnostic trouble code indicated first.

[INTERMITTENT TROUBLE]

- There are cases where malfunction indicator lamp ("CHECK ENGINE" light) indicates a diagnostic trouble code representing a trouble which occurred only temporarily and has gone. In such case, it may occur that good parts are replaced unnecessarily. To prevent such an accident, be sure to follow instructions given below when checking by using "Diagnostic Flow Chart".
  * When trouble can be identified, that is, it is not an intermittent one:
    Check sensor (actuator), wires and each connection and if they are all in good conditions, substitute a known-good ECM and recheck.
  * When trouble can not be identified but malfunction indicator lamp ("CHECK ENGINE" light) indicates a trouble code:
    Diagnose trouble by using that code No. and if sensor (actuator), wires and each connection are all in good condition, erase diagnostic trouble code in ECM memory. Then conduct a test run and check what malfunction indicator lamp ("CHECK ENGINE" light) indicates. Only when it indicates trouble code again, substitute a known-good ECM and check again.
    If it indicates not trouble code but normal code No.12, it means that an intermittent trouble did occur and has gone. In this case, check wires and connections carefully again.

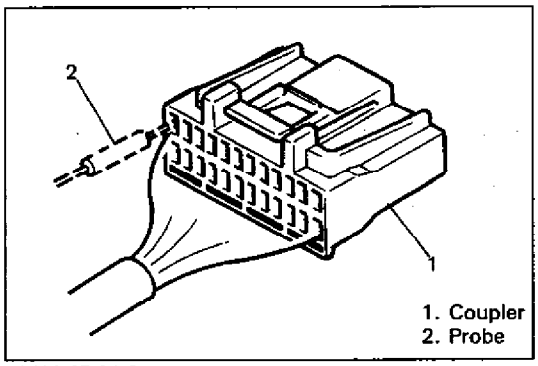
[NOTES ON SYSTEM CIRCUIT INSPECTION]

- Intermittent troubles
  Most intermittent problems are caused by faulty electrical connections or wiring.
  Perform careful check of suspect circuits for:
  — Poor mating of coupler halves, or terminals not fully seated in coupler body (backed out).
  — Improperly formed or damaged terminals. All coupler terminals in problem circuit should be carefully reformed to increase contact tension.
  — Poor terminal to wire connection.
- Never connect any tester (voltmeter, ohmmeter, or whatever) to ECM when its coupler is disconnected. Attempt to do it may cause damage to ECM.
- Never connect an ohmmeter to ECM with its coupler connected to it. Attempt to do it may cause damage to ECM and sensors.
- Be sure to use a voltmeter with high impedance (MΩ/V minimum) or a digital type voltmeter. Any other voltmeter should not be used because accurate measurements are not obtained.



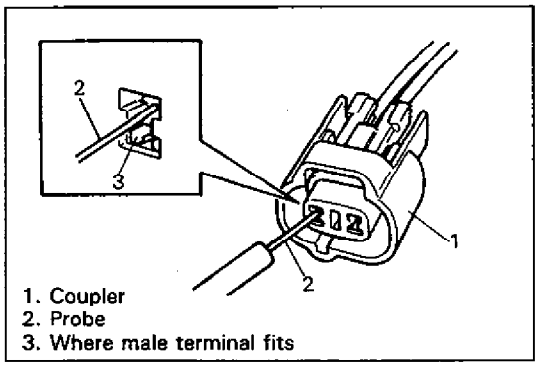
70F00-6E-24-1

- When checking voltage at each terminal of the coupler which is connected to ECM, be sure to negative probe to body ground. Any other way is prohibited even by accident. Applying it improperly may cause the sensor of ECM to be shorted and damaged.
- For ECM coupler terminal positions (A1, A2 ... to A24 and B1, B2 ... to B17), refer to figure.
- When disconnecting and connecting coupler, make sure to turn ignition switch OFF.
- When there is a question "Are couplers connected properly?" in FLOW CHART, check male falf of terminal for bend and female half for excessive opening, terminal for poor locking (looseness), corrosion, dust, etc.



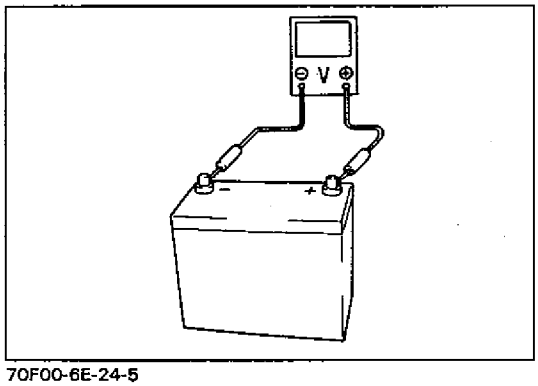
70F00-6E-24-3

- When connecting a probe of ohmmeter, voltmeter, etc. to coupler terminal, be sure to connect it from wire harness side of coupler.



70F00-6E-24-4

- When connecting meter probe from terminal side of coupler because it can't be connected from harness side, use extra care not to bend male terminal of coupler or force its female terminal open for connection.
  In case of such coupler as shown below, connect probe as shown below to avoid opening female terminal.
  Never connect probe where male terminal is supposed to fit.



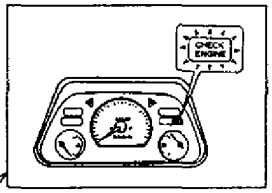
70F00-6E-24-5

- Before mesuring voltage at each terminal, check to make sure that battery voltage is 11V or higher. Such terminal voltage check at low battery voltage will lead to erroneous diagnosis.

DIAGNOSTIC FLOW CHART

START

Does malfunction indicator lamp ("CHECK ENGINE" light) turn ON when ignition switch is turned ON (without starting engine.)?



NO

Does engine start?

YES

Proceed to chart A-2. (Malfunction indicator lamp ("CHECK ENGINE" light) circuit check.)

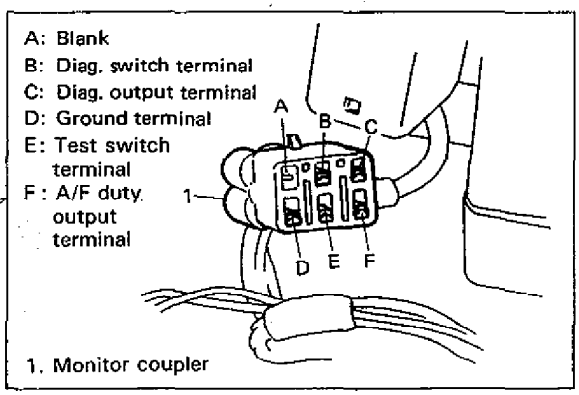
NO

Proceed to chart A-1. (ECM power and ground circuit check.)

YES

Using service wire, ground "Diagnosis switch terminal" in monitor coupler and observe malfunction indicator lamp ("CHECK ENGINE" light).

NOTE:
If engine fails to start, crank it for 3 seconds and then while keeping ignition switch ON (Don't turn it OFF), using service wire, ground "Diagnosis switch terminal" in monitor coupler.



Remains ON

Proceed to chart A-3. (Malfunction indicator lamp ("CHECK ENGINE" light) circuit check.)

Flashes

Is diagnostic code No.12 indicated?

YES

Are engine basic parts described in SECTION 6 "ENGINE DIAGNOSIS" in good condition?

YES

Proceed to "TROUBLE DIAGNOSIS" (p. 6E-46.) Check Electronic Fuel Injection system parts that are not indicated by on-board diagnostic system (self-diagnosis function).

NO

Repair or replace

NO

Check and repair according to flow chart corresponding to that code No.

1. After repair, disconnect battery negative cable for longer than 20 sec. to erase diagnostic trouble code stored in ECM memory and reconnect it.
2. Start engine and warm it up to normal operating temperature.
3. Using service wire, ground "Diagnosis switch terminal" in monitor coupler and ignition switch turned ON, make sure that malfunction indicator lamp ("CHECK ENGINE" light) shows code No.12.
4. Disconnect service wire from monitor coupler.

Is trouble corrected?

NO

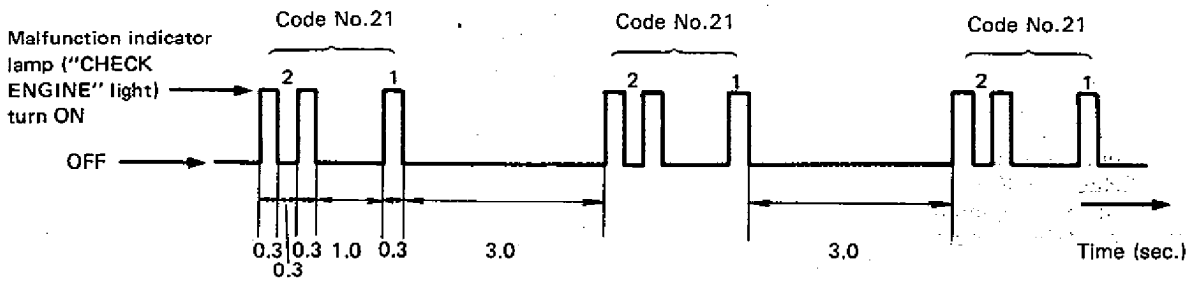
YES

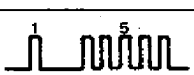
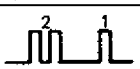
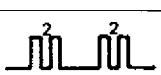
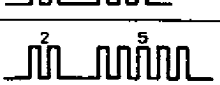
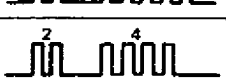
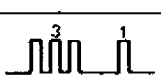
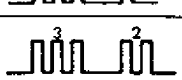
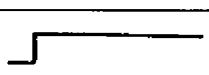
END

70F00-6E-25-1

DIAGNOSTIC TROUBLE CODE TABLE

EXAMPLE: Throttle position sensor failure (Code No.21)

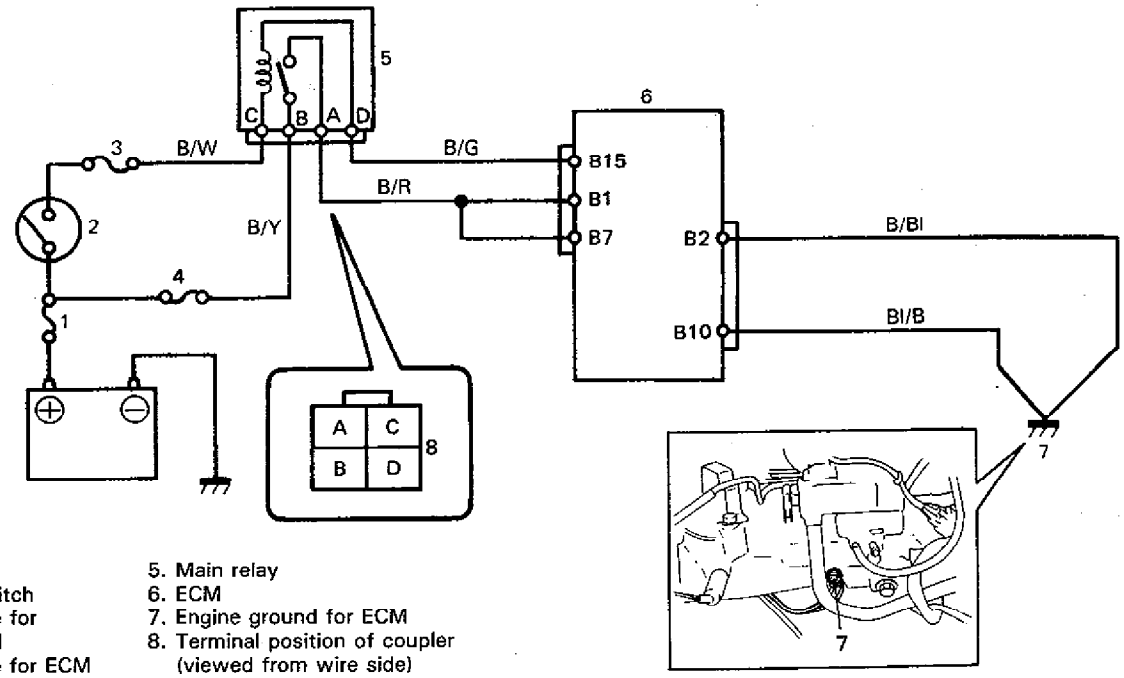


DIAGNOSTIC TROUBLE CODE NO.	DIAGNOSTIC TROUBLE CODE MODE	DIAGNOSTIC AREA	DIAGNOSIS
12		Normal	This code appears when none of the other codes are identified.
13		Oxygen sensor	Diagnose trouble according to "DIAGNOSTIC FLOW CHART" corresponding to each code No.
14		Engine coolant temperature sensor (ECT sensor)	
15			
21		Throttle position sensor (TP sensor)	
22			
23		Intake air temperature sensor (IAT sensor)	
25			
24		Vehicle speed sensor	
31		Manifold absolute pressure sensor (MAP sensor)	
32			
41		Ignition fail safe signal	
42		CMP sensor	
44		Idle switch of TP sensor	
45			
ON		ECM	ECM failure.

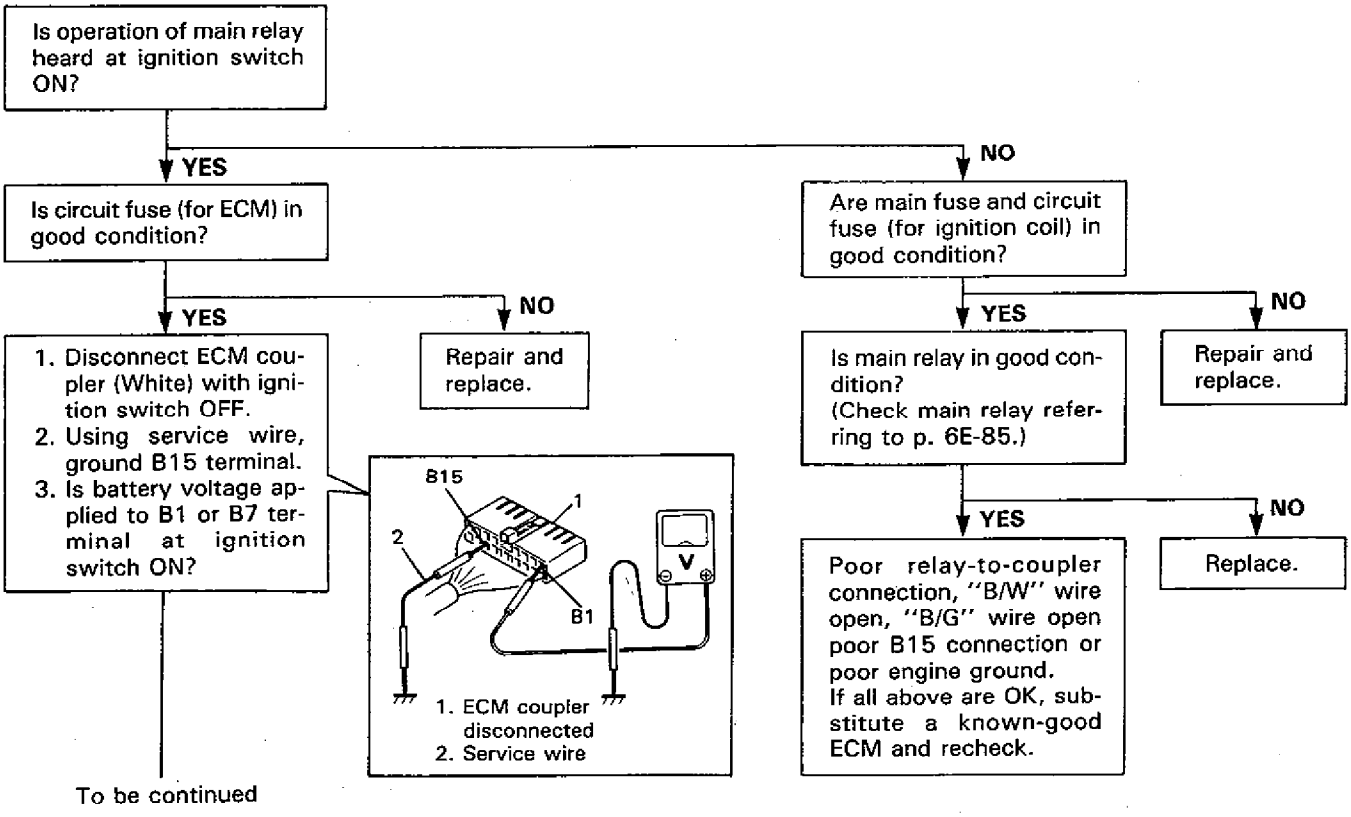
70F00-6E-26-1

A-1 ECM POWER AND GROUND CIRCUIT CHECK

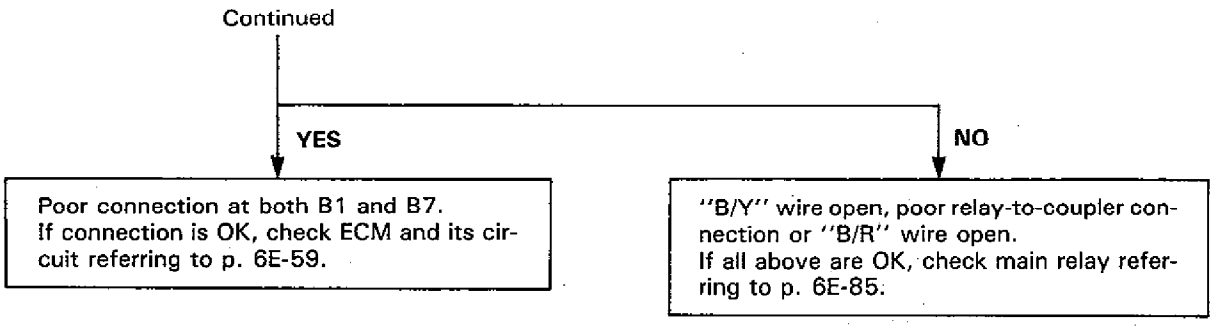
(MALFUNCTION INDICATOR LAMP ("CHECK ENGINE" LIGHT) DOESN'T LIGHT AT IGNITION SWITCH ON AND ENGINE DOESN'T START THOUGH IT IS CRANKED UP.)



1. Main fuse
2. Ignition switch
3. Circuit fuse for ignition coil
4. Circuit fuse for ECM
5. Main relay
6. ECM
7. Engine ground for ECM
8. Terminal position of coupler (viewed from wire side)



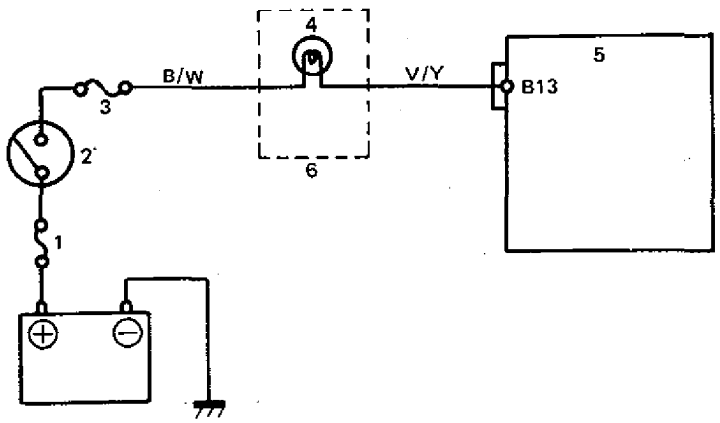
70F00-6E-27-1


Continued
YES
NO
Poor connection at both B1 and B7.
If connection is OK, check ECM and its circuit referring to p. 6E-59.
"B/Y" wire open, poor relay-to-coupler connection or "B/R" wire open.
If all above are OK, check main relay referring to p. 6E-85.

70F00-6E-28-1

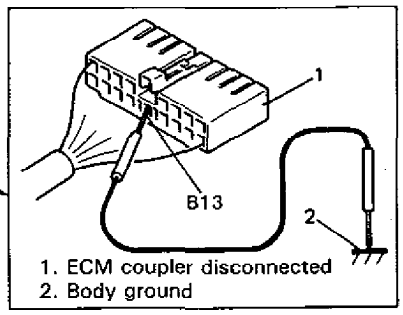
A-2 MALFUNCTION INDICATOR LAMP ("CHECK ENGINE" LIGHT) CIRCUIT CHECK

(MALFUNCTION INDICATOR LAMP ("CHECK ENGINE" LIGHT) DOESN'T LIGHT AT IGNITION SWITCH ON THOUGH ENGINE STARTS.)



1. Main fuse
2. Ignition switch
3. Circuit fuse
4. Malfunction indicator lamp ("CHECK ENGINE" light) bulb
5. ECM
6. Combination meter

1. With ignition switch turned OFF, disconnect coupler (White) from ECM.
2. Body-ground terminal B13 in coupler disconnected.
3. Does malfunction indicator lamp ("CHECK ENGINE" light) turn ON at ignition switch ON?



1. ECM coupler disconnected
2. Body ground

NO → Bulb burned out, "V/Y" wire circuit open or "B/W" wire circuit open.

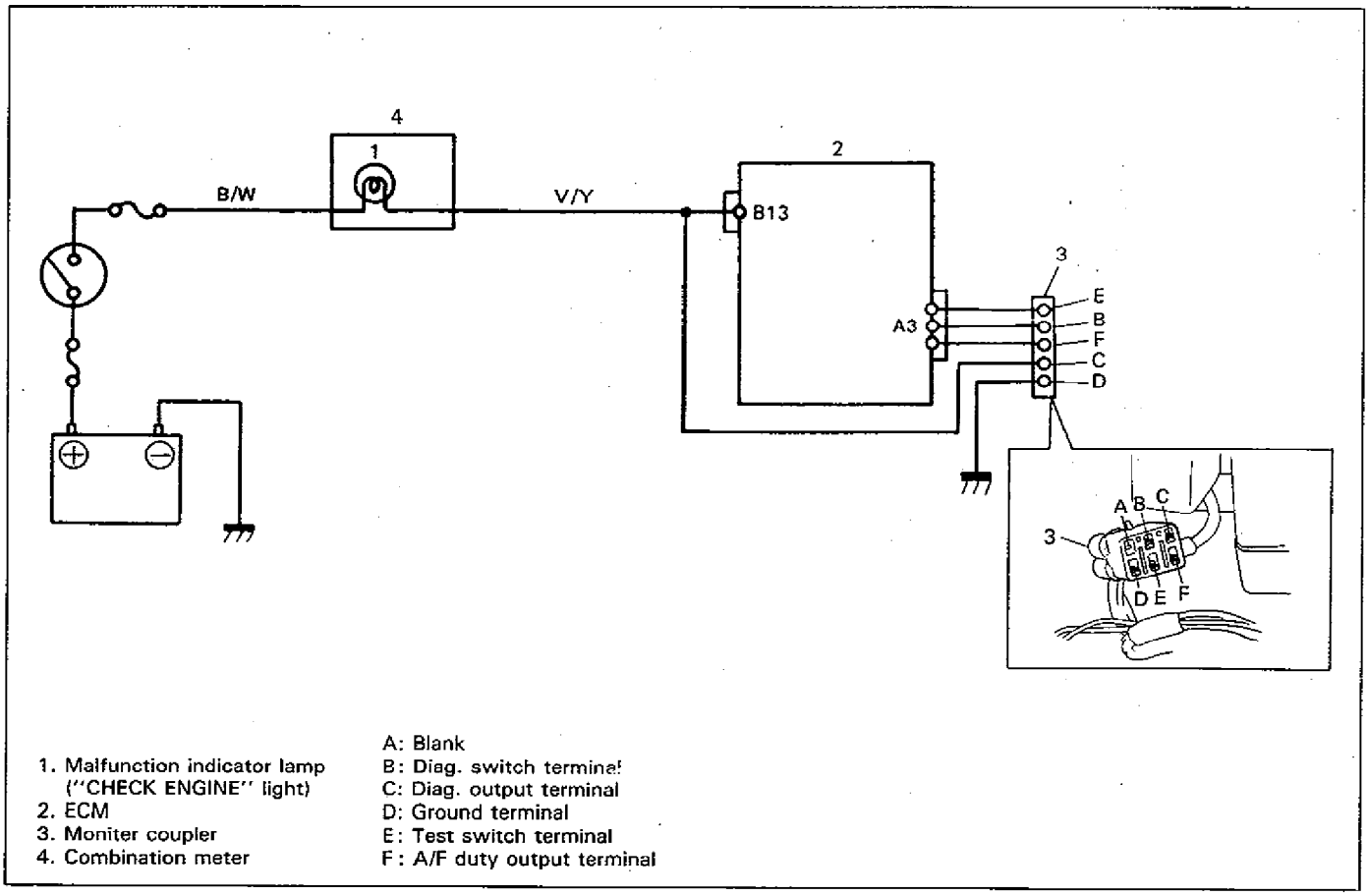
YES ↓

Poor B13 connection.
If connection is OK, substitute a known-good ECM and recheck.

70F00-6E-29-1

A-3 MALFUNCTION INDICATOR LAMP ("CHECK ENGINE" LIGHT) CIRCUIT CHECK

MALFUNCTION INDICATOR LAMP ("CHECK ENGINE" LIGHT) DOESN'T FLASH OR JUST REMAINS ON EVEN WITH GROUNDING DIAGNOSIS SWITCH TERMINAL.)



1. Malfunction indicator lamp ("CHECK ENGINE" light)
2. ECM
3. Moniter coupler
4. Combination meter

A: Blank
B: Diag. switch terminal
C: Diag. output terminal
D: Ground terminal
E: Test switch terminal
F: A/F duty output terminal

1. Disconnect ECM coupler (White) with ignition switch turned OFF.
2. Does malfunction indicator lamp ("CHECK ENGINE" light) turn ON at ignition switch ON?

YES → Wire harness (Violet/Yellow) shorted to ground.

NO ↓

Are couplers connected to ECM properly?

NO → Poor connection.

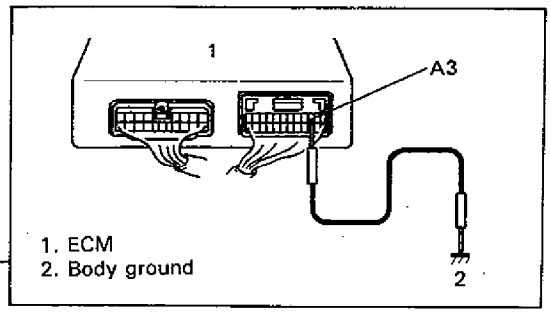
YES ↓

1. Ground terminal A3 with coupler connected to ECM.
2. Does malfunction indicator lamp ("CHECK ENGINE" light) flash at ignition switch ON?

YES → • Poor body grounding.
• Diagnosis ground circuit (A3—ground) open.
• Defective spare fuse.

NO ↓

Substitute a known-good ECM and recheck.

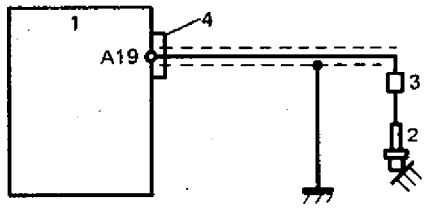


1. ECM
2. Body ground

70F00-6E-30-1

CODE NO.13 OXYGEN SENSOR CIRCUIT (SIGNAL VOLTAGE LOW AND DOESN'T CHANGE)

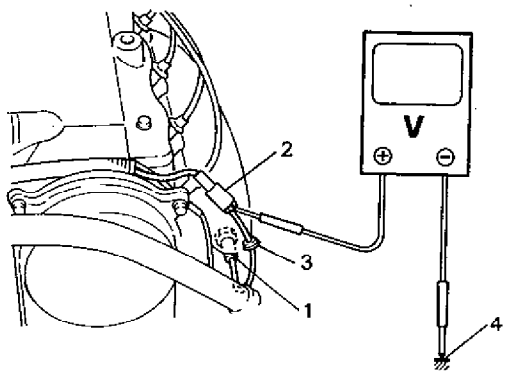
1. ECM
2. Oxygen sensor
3. Coupler
4. ECM coupler



NOTE:

- **Before diagnosing trouble according to flow chart given below, check to make sure that following system and parts other than Electronic Fuel Injection system are in good condition.**
  - **— Air cleaner (clogged)**
  - **— Vacuum leaks (air inhaling)**
  - **— Spark plugs (contamination, gap)**
  - **— High-tension cords (crack, deterioration)**
  - **— Distributor rotor or cap (wear, crack)**
  - **— Ignition timing**
  - **— Engine compression**
  - **— Any other system and parts which might affect A/F mixture or combustion.**
- **If code No.13 and another code No. are indicated together, the latter has priority. Therefore, check and correct what is represented by that code No. first and then proceed to the following check.**

1. Warm up engine to normal operating temperature.
2. Remove seal from oxygen sensor coupler.
3. Connect voltmeter between oxygen sensor terminal and engine ground.
4. Maintain engine speed at 2000 r/min. After 60 seconds, check voltmeter.

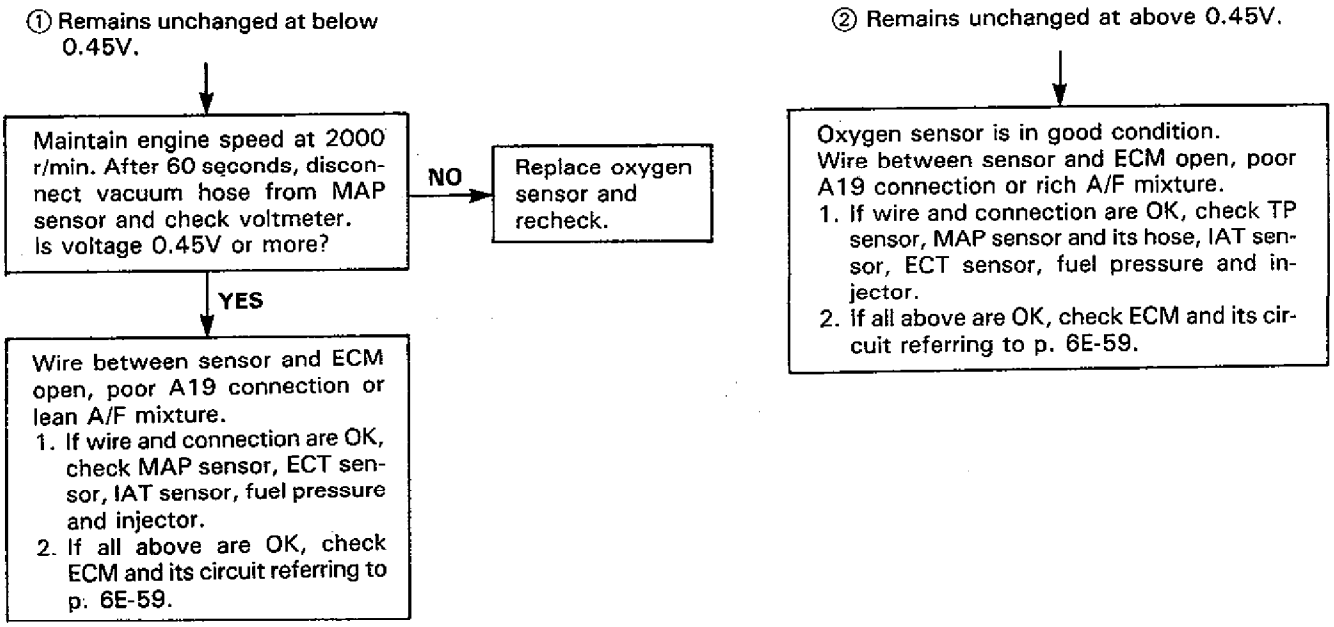


1. Oxygen sensor
2. Coupler
3. Seal
4. Engine ground

0V	Remains unchanged at below 0.45V.	Remains unchanged at above 0.45V.	Deflects between above and below 0.45V repeatedly.
Replace oxygen sensor and recheck.	To ① on next page.	To ② on next page.	Oxygen sensor and its circuit (A/F ratio feed back system) are in good condition. • Intermittent trouble or faulty ECM. Recheck referring to item "Intermittent trouble" on p. 6E-23.

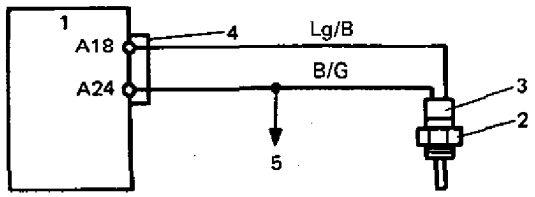
70F00-6E-31-1

CODE NO.13 OXYGEN SENSOR CIRCUIT (Continued)



70F00-6E-32-1

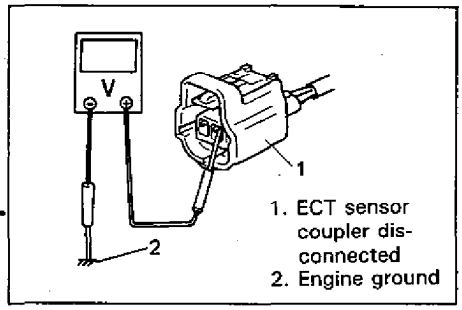
CODE NO.14 ECT SENSOR (ENGINE COOLANT TEMPERATURE SENSOR) CIRCUIT (LOW TEMPERATURE INDICATED, SIGNAL VOLTAGE HIGH)



1. ECM
2. ECT sensor
3. Coupler
4. ECM coupler
5. To other sensors

NOTE:
When Code Nos. 14, 21, 23, 31 and 44 are indicated together, it is possible that "B/G" wire is open or A24 terminal connection is poor.

1. Disconnect ECT sensor coupler with ignition switch OFF.
2. With ignition switch ON, check voltage at "Lg/B" wire terminal of ECT sensor coupler. Is it about 4—5V?



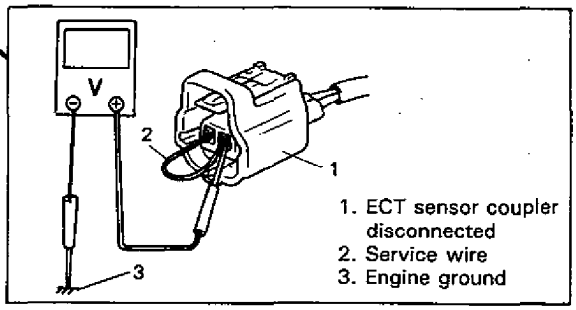
1. ECT sensor coupler disconnected
2. Engine ground

YES

1. Using service wire, connect ECT sensor coupler terminals.
2. Check voltage at "Lg/B" wire terminal of ECT sensor coupler with ignition switch ON. Is it below 0.15V?

NO

"Lg/B" wire open, poor A18 connection or "Lg/B" wire shorted to power circuit.
If wire and connection are OK, substitute a known-good ECM and recheck.



1. ECT sensor coupler disconnected
2. Service wire
3. Engine ground

NO

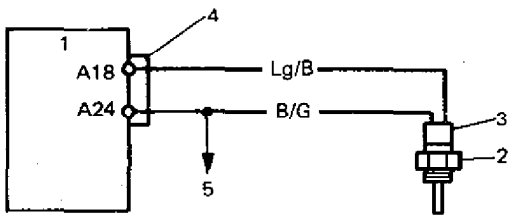
"B/G" wire open or poor A24 connection.
If wire and connection are OK, faulty ECM.
Substitute a known-good ECM and recheck.

YES

Poor ECT sensor-to-ECT sensor coupler connection or faulty ECT sensor. If connection and ECT sensor are OK, intermittent trouble or faulty ECM. Recheck referring to "Intermittent trouble" on p. 6E-23.

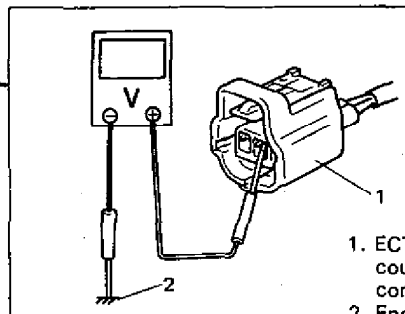
70F00-6E-33-1

CODE NO.15 ECT SENSOR (ENGINE COOLANT TEMPERATURE SENSOR) CIRCUIT (HIGH TEMPERATURE INDICATED, SIGNAL VOLTAGE LOW)



1. ECM
2. ECT sensor
3. Coupler
4. ECM coupler
5. To other sensors

1. Disconnect ECT sensor coupler with ignition switch OFF.
2. With ignition switch ON, is voltage applied to "Lg/B" wire terminal of ECT sensor coupler 4V or more?



1. ECT sensor coupler disconnected
2. Engine ground

YES

Check ECT sensor referring to p. 6E-82.
Is it in good condition?

NO

"Lg/B" wire shorted to "B/G" wire or ground circuit.
If wire is OK, substitute a known-good ECM and recheck.

YES

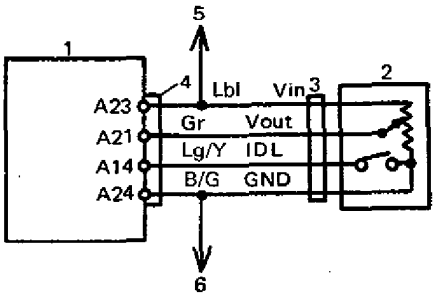
Intermittent trouble or faulty ECM.
Recheck referring to "Intermittent trouble" on p. 6E-23.

NO

Faulty ECT sensor.

70F00-6E-34-1

CODE NO.21 TP SENSOR (THROTTLE POSITION SENSOR) CIRCUIT (SIGNAL VOLTAGE HIGH)



1. ECM
2. TP sensor
3. Coupler
4. ECM coupler
5. To MAP sensor
6. To other sensor

NOTE:
Be sure to turn OFF ignition switch for this check.

1. Disconnect TP sensor coupler.
2. Check TP sensor referring to p. 6E-80. Is it in good condition?

YES

1. Disconnect ECM coupler.
2. With TP sensor coupler disconnected, is there continuity between ECM coupler terminals A23 and A21?

NO

1. Disconnect MAP sensor coupler.
2. Connect TP sensor coupler.
3. Is resistance between ECM coupler terminals A23 and A24 3.5—6.5 kΩ?

YES

Poor A24 connection
If connection is OK, intermittent trouble or faulty ECM.
Recheck referring to "Intermittent trouble" on p. 6E-23.

NO

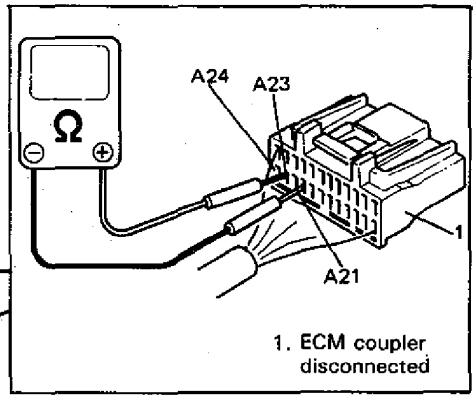
"B/G" wire open or poor TP sensor-to-"B/G" wire connection.

NO

Faulty TP sensor.

YES

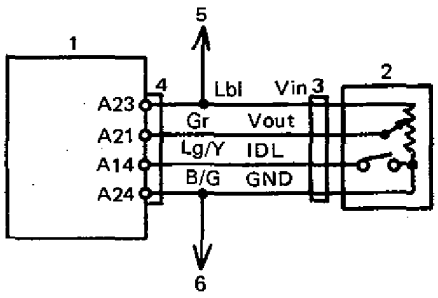
"Lbl" wire shorted to "Gr" wire.



1. ECM coupler disconnected

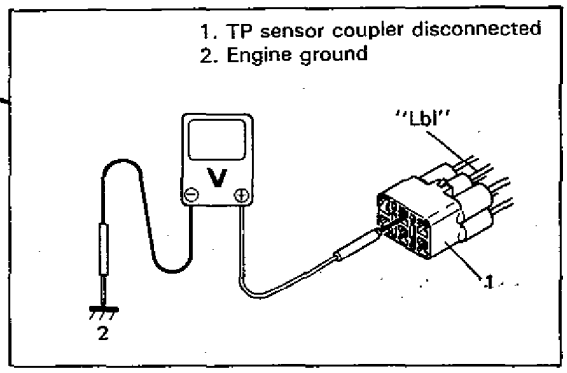
70F00-6E-35-1

CODE NO.22 TP SENSOR (THROTTLE POSITION SENSOR) CIRCUIT (SIGNAL VOLTAGE LOW)



1. ECM
2. TP sensor
3. Coupler
4. ECM coupler
5. To MAP sensor
6. To other sensors

1. Disconnect TP sensor coupler with ignition switch OFF.
2. With ignition switch ON, is voltage applied to "Lbl" wire terminal of TP sensor coupler about 4—5V?



YES

Check TP sensor referring to p. 6E-79. Is it in good condition?

NO

"Lbl" wire open, "Lbl" wire shorted to ground circuit or "B/G" wire, or poor A23 connection. If wire and connection are OK, substitute a known-good ECM and recheck.

YES

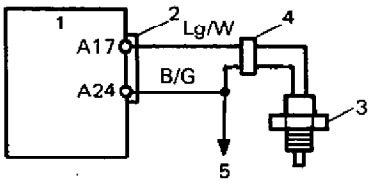
"Gr" wire open, "Gr" wire shorted to ground circuit, poor TP sensor-to-TP sensor coupler connection or poor A21 connection. If wire and connections are OK, intermittent trouble or faulty ECM. Recheck referring to "Intermittent trouble" on p. 6E-23.

NO

Faulty TP sensor.

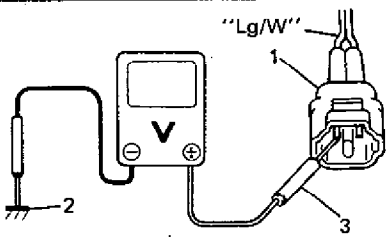
70F00-6E-36-1

CODE NO.23 IAT SENSOR (INTAKE AIR TEMPERATURE SENSOR) CIRCUIT (LOW TEMPERATURE INDICATED, SIGNAL VOLTAGE HIGH)



1. ECM
2. ECM coupler
3. IAT sensor
4. IAT sensor coupler
5. To other sensors

1. Disconnect IAT sensor coupler with ignition switch OFF.
2. With ignition switch ON, check voltage at "Lg/W" wire terminal of IAT sensor coupler. Is it about 4—5V?



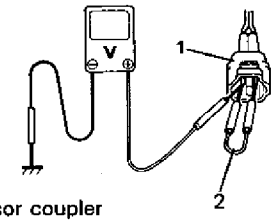
1. IAT sensor coupler (wire harness side)
2. Engine ground
3. Voltmeter probe

YES

NO

"Lg/W" wire open, poor A17 connection or "Lg/W" wire shorted to power circuit.
If wire and connection are OK, substitute a known-good ECM and recheck.

1. Using service wire, connect IAT sensor coupler terminals.
2. Check voltage at "Lg/W" wire terminal of IAT sensor coupler with ignition switch ON. Is it below 0.15V?



1. IAT sensor coupler (wire harness side)
2. Service wire

YES

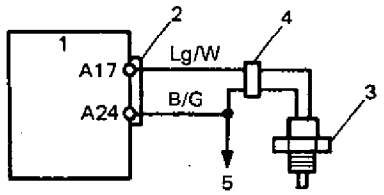
NO

Faulty IAT sensor or poor IAT sensor coupler connection.
If IAT sensor and connection are OK, intermittent trouble or faulty ECM. Recheck referring to "Intermittent trouble" on p. 6E-23.

"B/G" wire open or poor A24 connection.
If wire and connection are OK, substitue a known-good ECM and recheck.

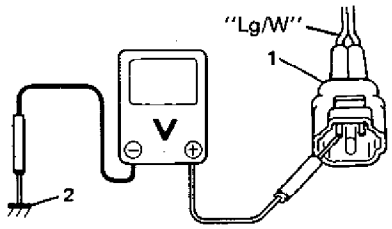
70F00-6E-37-1

CODE NO.25 IAT SENSOR (INTAKE AIR TEMPERATURE SENSOR) CIRCUIT (HIGH TEMPERATURE INDICATED, SIGNAL VOLTAGE LOW)



1. ECM
2. ECM coupler
3. IAT sensor
4. IAT sensor coupler
5. To other sensors

1. Disconnect IAT sensor coupler with ignition switch OFF.
2. With ignition switch ON, is voltage applied to "Lg/W" wire terminal of IAT sensor coupler 4V or more?



1. IAT sensor coupler (wire harness side)
2. Engine ground

YES

Check IAT sensor referring to p. 6E-81. Is it in good condition?

NO

"Lg/W" wire shorted to ground circuit. If wire is OK, substitute a known-good ECM and recheck.

YES

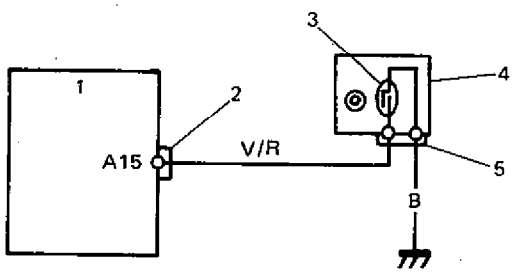
Intermittent trouble or faulty ECM. Recheck referring to "Intermittent trouble" on p. 6E-23.

NO

Faulty IAT sensor.

70F00-6E-38-1

CODE NO.24 VSS (VEHICLE SPEED SENSOR) CIRCUIT (VEHICLE SPEED LOWER THAN 1.4 km/h (0.9 mile/h) ALTHOUGH FUEL IS KEPT CUT FOR LONGER THAN 5 SECONDS)



1. ECM
2. ECM coupler
3. VSS
4. Speedometer
5. Coupler

NOTE:
Be sure to turn OFF ignition switch for this check.

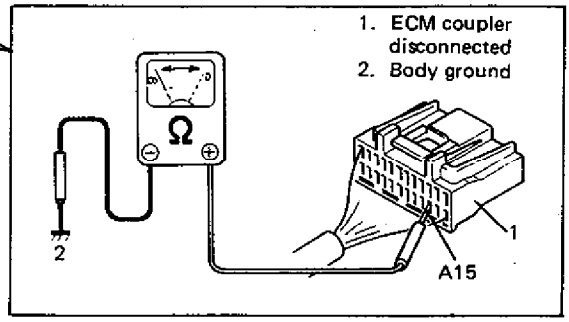
Does speedometer indicate vehicle speed?

YES

1. Disconnect ECM coupler with ignition switch OFF.
2. Connect ohmmeter between A15 terminal of ECM coupler and body ground.
3. Hoist front end of vehicle and lock front left tire.
4. Turn front right tire slowly. Does ohmmeter indicator deflect between continuity and infinity a few times while tire is turned one revolution?

NO

Speedometer cable broken.



NO

Check VSS referring to p. 6E-84.
Is it in good condition?

YES

Poor A15 connection. If connection is OK, intermittent trouble or faulty ECM.
Recheck referring to "Intermittent trouble" on p. 6E-23.

YES

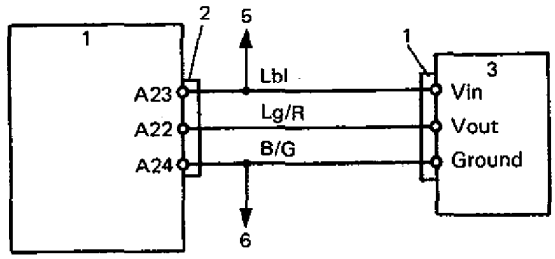
"V/R" wire open, "B" wire open, poor coupler-to-meter connection or poor "B" wire ground.

NO

Faulty VSS.

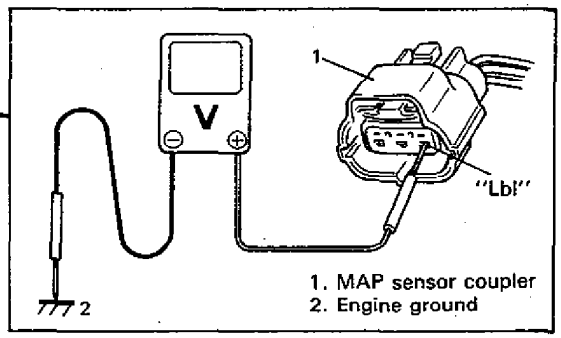
70F00-6E-39-1

CODE NO.31 MAP SENSOR (MANIFOLD ABSOLUTE PRESSURE SENSOR) CIRCUIT (SIGNAL VOLTAGE LOW—LOW PRESSURE—HIGH VACUUM)



1. ECM
2. ECM coupler
3. MAP sensor
4. MAP sensor coupler
5. To TP sensor
6. To other sensors

1. Disconnect MAP sensor coupler with ignition switch OFF.
2. With ignition switch ON, is voltage applied to "Lbl" wire terminal of MAP sensor coupler about 4—5V?



1. MAP sensor coupler
2. Engine ground

YES

Check MAP sensor referring to p. 6E-78. Is it in good condition?

NO

"Lbl" wire open, "Lbl" wire shorted to ground circuit or poor A23 connection.
If wire and connection are OK, substitute a known-good ECM and recheck.

YES

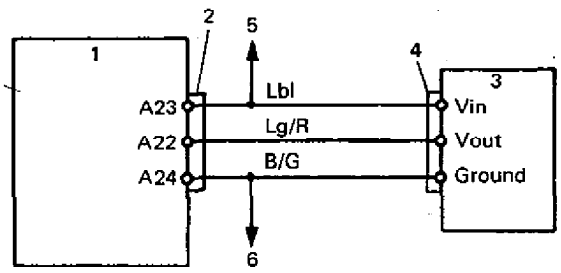
"Lg/R" wire shorted to ground circuit.
If wire is OK, intermittent trouble or faulty ECM.
Recheck referring to "Intermettent trouble" on p. 6E-23.

NO

Faulty MAP sensor.

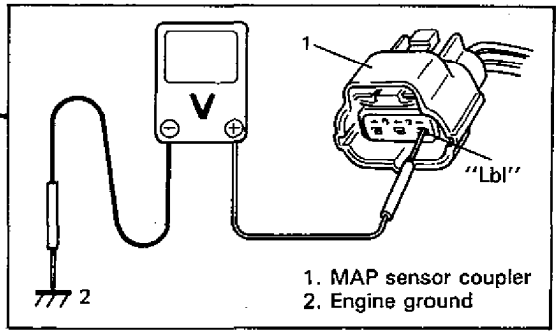
70F00-6E-41-1

CODE NO.32 MAP SENSOR (MANIFOLD ABSOLUTE PRESSURE SENSOR) CIRCUIT (SIGNAL VOLTAGE HIGH—HIGH PRESSURE—LOW VACUUM)



1. ECM
2. ECM coupler
3. MAP sensor
4. MAP sensor coupler
5. To TP sensor
6. To other sensors

1. Disconnect MAP sensor coupler with ignition switch OFF.
2. With ignition switch ON, is voltage applied to "Lbl" wire terminal of MAP sensor couper about 4—5V?



1. MAP sensor coupler
2. Engine ground

YES

Check MAP sensor referring to p. 6E-78. Is it in good condition?

YES

"Lbl" wire shorted to "Lg/R" wire, "B/G" wire open, poor A24 connection, "Lg/R" wire open, poor A22 connection or poor MAP sensor coupler connection.
If wires and connections are OK, intermittent trouble or faulty ECM.
Recheck referring to "Intermittent trouble" on p. 6E-23.

NO

"Lbl" wire shorted to power circuit.
If wire is OK, substitute a known-good ECM and recheck.

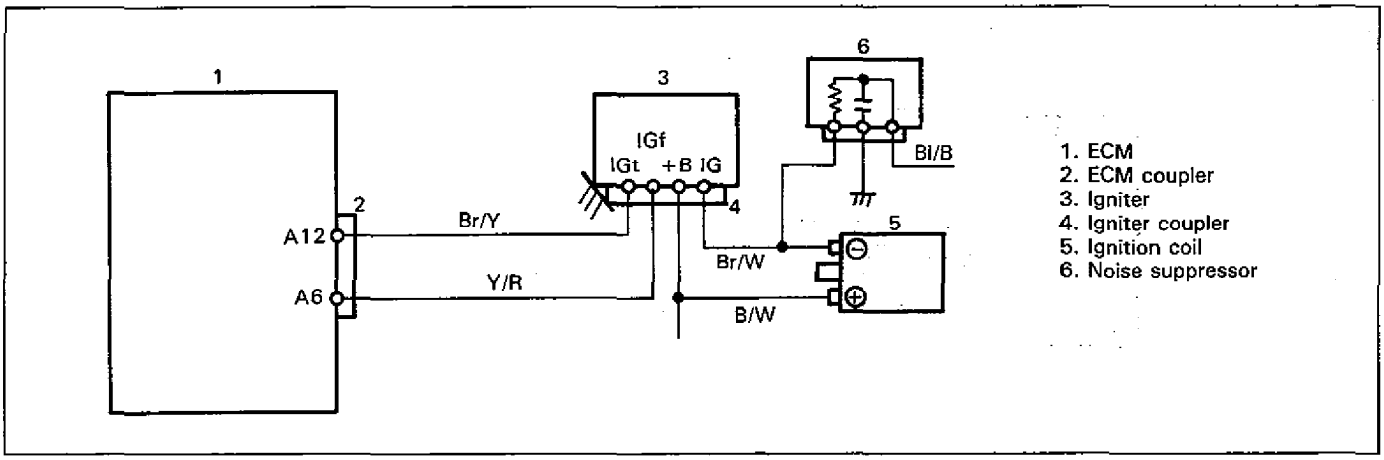
NO

Faulty MAP sensor.

NOTE:
When battery voltage is applied to "Lbl" wire, it is possible that MAP sensor is also faulty.

70F00-6E-40-1

CODE NO.41 IGNITION FAIL SAFE SIGNAL CIRCUIT (IGNITION FAIL SAFE SIGNAL NOT INPUTTED 6 TIMES CONTINUOUSLY)

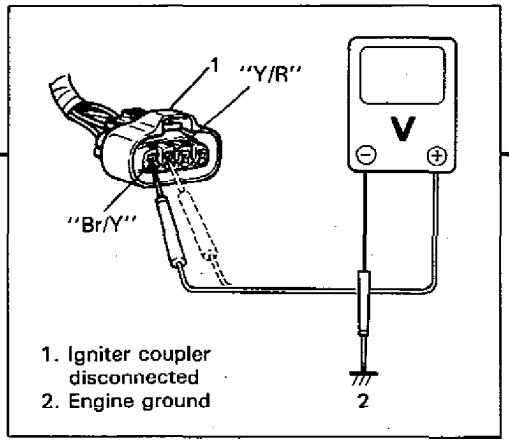


Check ignition spark referring to SECTION 6F. Is it in good condition?

NO

1. With ignition switch OFF, disconnect igniter coupler.
2. Connect voltmeter between "Br/Y" wire terminal and engine ground.
3. Is following voltage is indicated under each condition?

Ignition switch ON	0—1V
Engine cranking	About 4—5V



YES

1. With ignition switch OFF, disconnect igniter coupler.
2. Connect voltmeter between "Y/R" wire terminal and engine ground.
3. With ignition switch ON, is 10—14V applied?

NO

"Br/Y" wire open or poor A12 connection. If wire and connection are OK, substitute a known-good ECM and recheck.

YES

Faulty ignition coil, faulty noise suppressor, faulty "Br/W" wire, poor coupler connection or Faulty igniter.

NO

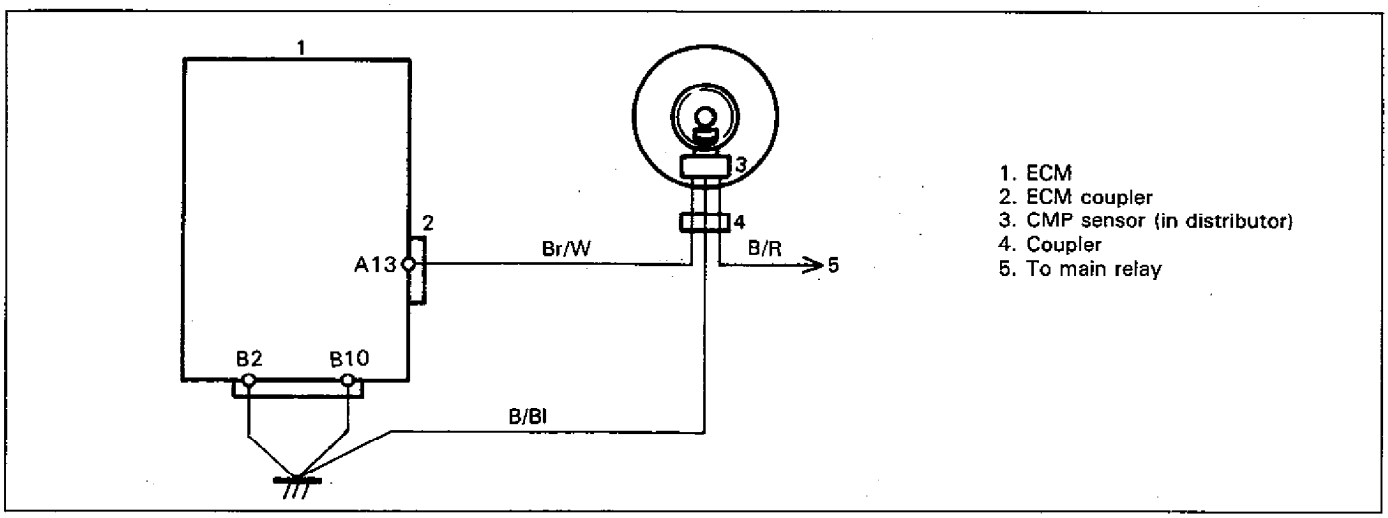
"Y/R" wire open or poor A6 connection. If wire and connection are OK, substitute a known-good ECM.

YES

Poor igniter coupler connection. If connection is OK, substitute a known-good igniter.

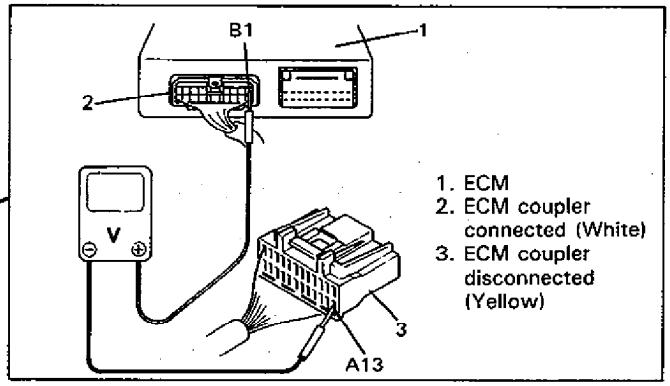
70F00-6E-42-1

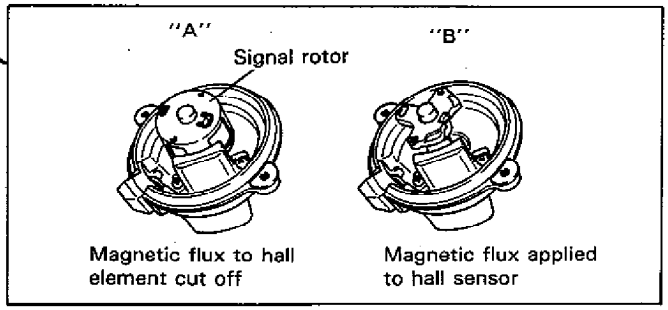
CODE NO.42 CAS (CRANK ANGLE SENSOR) CIRCUIT (SENSOR SIGNAL NOT INPUTTED FOR 3 SECONDS AT ENGINE CRANKING)



1. With ignition switch OFF, disconnect ECM coupler (Yellow).
2. Connect voltmeter between B1 terminal of ECM coupler (White) and A13 terminal of yellow coupler (disconnected).
3. Remove distributor cap, rotor and shield cover.
4. With ignition switch ON, check voltage with signal rotor inserted between hall element and magnet ("A") and without it ("B") respectively.

"A"	Battery voltage
"B"	0V
Is it in good condition?	





NO

0V at both "A" and "B" → "Br/W" wire open, "B/Bl" wire open, poor CMP sensor coupler connection or faulty CMP sensor.

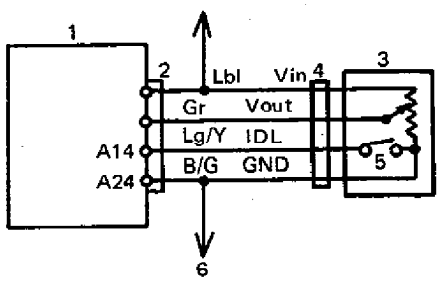
Battery voltage at both "A" and "B" → "Br/W" wire short to ground or faulty CMP sensor.

YES

Poor A13 connection.
If connection is OK, substitute a known-good ECM and recheck.

70F00-6E-43-1

CODE NO.44 IDLE SWITCH CIRCUIT (CIRCUIT OPEN OR TP SENSOR INSTALLATION ANGLE MALADJUSTED)



1. ECM
2. ECM coupler
3. TP sensor
4. TP sensor coupler
5. Idle switch
6. To other sensor

Check idle switch in TP sensor referring to p. 6E-80.
Is it in good condition?

YES

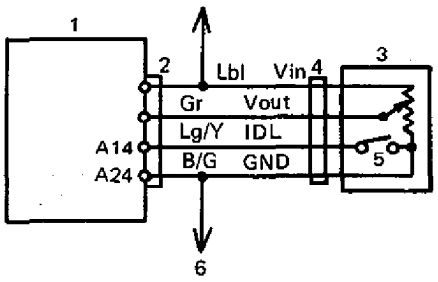
"Lg/Y" wire open, "B/G" wire open poor A14 connection, poor A24 connection, or poor TP sensor coupler connection.
If wires and connections are OK, substitute a known-good ECM and recheck.

NO

Faulty idle switch or TP sensor installation angle maladjusted.

70F00-6E-44-1

CODE NO.45 IDLE SWITCH CIRCUIT (CIRCUIT SHORT OR TP SENSOR INSTALLATION ANGLE MALADJUSTED)



1. ECM
2. ECM coupler
3. TP sensor
4. TP sensor coupler
5. Idle switch
6. To other sensors

Check idle switch in TP sensor referring to p. 6E-80.
Is it in good condition?

YES

"Lg/Y" wire shorted to "B/G" wire or ground.
If wires are OK, intermittent trouble or faulty ECM. Recheck referring to "Intermittent trouble" on p. 6E-23.

NO

Faulty idle switch or TP sensor installation angle maladjusted.

70F00-6E-45-1

TROUBLE DIAGNOSIS

This section describes trouble diagnosis of Electronic Fuel Injection system parts whose trouble is not indicated by the on-board diagnostic system (self-diagnosis function).

When diagnostic trouble code No.12 is indicated by the on-board diagnostic system (self-diagnosis function) and assuredly those engine basic parts as described in "ENGINE DIAGNOSIS" are all in good condition, check following Electronic Fuel Injection system parts which may be a possible cause for each symptom of the engine.

SYMPTOM	POSSIBLE CAUSE	INSPECTION
Hard or no starting (Engine cranks OK)	• Shortage of fuel in fuel tank	
	• Faulty fuel pump or its circuit open	Check if fuel pressure is felt at fuel return hose for 3 seconds after ignition switch ON. If not, advance to Diagnostic flow chart B-2
	• Injector or its circuit defective	Diagnostic flow chart B-1
	• Fuel pressure out of specification	Diagnostic flow chart B-3
	• Faulty fast idle air valve	See p. 6E-69
	• Open starter signal circuit	Check voltage at ECM coupler terminal B11 (refer to p. 6E-59)
	• Faulty idle air control system	Diagnostic flow chart B-5
	• Faulty throttle opener system	Diagnostic flow chart B-4
	• Poor performance of ECT sensor, IAT sensor or MAP sensor	See p. 6E-83, 6E-82 or 6E-78
	• Faulty ECM	See p. 6E-59
NOTE: • **If engine doesn't start at all, perform fuel injector and its circuit check first. (Advance to Diagnostic Flow Chart B-1.)** • **If engine is hard to start only when it is cold, check fast idle air valve first and then engine starter signal circuit.** • **If engine starts easily with help of accelerator pedal operation, check throttle opener system first. (Advance to Diagnostic flow chart B-4.)**		
Engine fails to idle	• Shortage of fuel in fuel tank	
	• Faulty idle air control system	Diagnostic flow chart B-5
	• Maladjusted idle speed adjusting screw	See p. 6E-64
	• Faulty fast idle air valve	See p. 6E-69
	• Faulty EGR system	See p. 6E-88
	• Fuel pressure out of specification	Diagnostic flow chart B-3
	• Faulty injector	Check injector for resistance and injection condition and fuel leakage (Refer to p. 6E-73)

70F00-6E-46-1

SYMPTOM	POSSIBLE CAUSE	INSPECTION
Engine fails to idle	• Poor performance ECT sensor, IAT sensor or MAP sensor	See p. 6E-83, 6E-82, 6E-78
	• Faulty ECM	See p. 6E-59
NOTE: **If engine fails to idle when it is cold, check fast idle air valve first.**		
Improper engine idle speed	• Maladjusted accelerator cable play	See p. 6E-64
	• Clogged MAP sensor vacuum passage	Check vacuum hose and filter
	• Faulty throttle opener system	Diagnostic flow chart B-4
	• Faulty idle air control system	Diagnostic flow chart B-5
	• Faulty A/C SV valve	
	• Maladjusted idle speed adjusting screw	See p. 6E-64
	• Faulty fast idle air valve	See p. 6E-69
	• Fuel pressure out of specification	Diagnostic flow chart B-3
	• Faulty injector	Check injector for resistance, injection condition and fuel leakage (Refer to p. 6E-73)
	• Poor performance of ECT sensor, IAT sensor or MAP sensor	See p. 6E-83, 6E-82 or 6E-78
	• Faulty ECM	See p. 6E-59
NOTE: **If engine idle speed lowers below specification only when electric load is applied (e.g. headlight ON), check idle air control system first.**		
Engine has no or poor power	• Clogged MAP sensor vacuum passage	Check vacuum hose and filter
	• Maladjusted accelerator cable play	See p. 6E-64
	• Maladjusted installation angle of throttle position sensor	See p. 6E-80
	• Fuel pressure out of specification (Low fuel pessure)	Diagnostic flow chart B-3
	• Faulty EGR system	Diagnostic flow chart B-6
	• Faulty injector	Check injector for resistance, injection condition and fuel leakage. (Refer to p. 6E-73)
	• Poor performance of TP sensor, ECT sensor, IAT sensor or MAP sensor	See p. 6E-80, 6E-83, 6E-82 or 6E-78
	• Faulty ECM	See p. 6E-59

70F00-6E-47-1

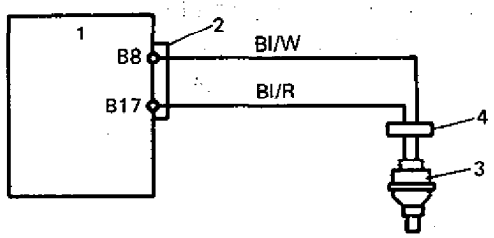
SYMPTOM	POSSIBLE CAUSE	INSPECTION
Engine hesitates when acceleration	• Clogged MAP sensor vacuum passage	Check vacuum hose and filter
	• Defective throttle valve operation	Check throttle valve for smooth operation
	• Poor performance of TP sensor	See p. 6E-80
	• Fuel pressure out of specification (Low fuel pressure)	Diagnostic flow chart B-3
	• Faulty EGR system	Diagnostic flow chart B-6
	• Faulty injector	Check injector for resistance, injection condition and fuel leakage (Refer to p. 6E-73)
	• Poor performance of ECT sensor or MAP sensor	See p. 6E-83, 6E-78
	• Faulty ECM	See p. 6E-59
Surges (Variation in vehicle speed is felt although accelerator pedal is not operated)	• Variable fuel pressure (Clogged fuel filter, faulty fuel pressure regulator, etc.)	Diagnostic flow chart B-3
	• Defective EGR system	Diagnostic flow chart B-6
	• Defective injector	Check injector for resistance, injection condition and fuel leakage (Refer to p. 6E-73)
	• Poor performance of TP sensor, ECT sensor or MAP sensor	See p. 6E-80, 6E-83 or 6E-78
	• Faulty ECM	See p. 6E-59
Excessive detonation (Engine makes sharp metallic knocks that change with throttle opening)	• Low fuel pressure	Diagnostic flow chart B-3
	• Defective EGR system	Diagnostic flow chart B-6
	• Defective injector	Check injector for resistance, injection condition and fuel leakage (Refer to p. 6E-73)
	• Poor performance of TP sensor, ECT sensor or MAP sensor	See p. 6E-80, 6E-83 or 6E-78
	• Faulty ECM	See p. 6E-59
Poor gasoline mileage	• High idle speed	Refer to item "Improper engine idle speed" previously
	• Fuel pressure out of specification or fuel leakage	Diagnostic flow chart B-3
	• Faulty EGR system	Diagnostic flow chart B-6
	• Defective injector	Check injector for fuel leakage (See p. 6E-73)
	• Poor performance of TP sensor, ECT sensor or MAP sensor	See p. 6E-80, 6E-83 or 6E-78
	• Faulty ECM	See p. 6E-59

70F00-6E-48-1

SYMPTOM	POSSIBLE CAUSE	INSPECTION
Excessive hydro-carbon (HC) emission (Rich or lean fuel mixture)	• Faulty basic engine parts (Clogged air cleaner, vacuum leaks, faulty ignition system, engine compression, etc.)	
	• Engine not at normal operating temperature	
	• Lead contamination of catalytic converter	Check for absence of filler neck restrictor.
	• Fuel leakage from injector	See p. 6E-73
	• Fuel pressure out of specification	Diagnostic flow chart B-3
	• Poor performance of ECT sensor, IAT sensor or MAP sensor	See p. 6E-83, or 6E-82 or 6E-78
	• Faulty ECM	See p. 6E-59
Excessive carbon monoxide (CO) emission (Rich fuel mixture)	• Faulty basic engine parts (Clogged air cleaner, vacuum leaks, faulty ignition system, engine compression, etc.)	
	• Engine not at normal operating temperature	
	• Lead contamination of catalytic converter	Check for absence of filler neck restrictor.
	• Fuel leakage from injector	See p. 6E-73
	• Fuel pressure out of specification (High fuel pressure)	Diagnostic flow chart B-3
	• Poor performance of ECT sensor, IAT sensor or MAP sensor	See p. 6E-83, 6E-82 or 6E-78
	• Faulty ECM	See p. 6E-59
Excessive nitrogen oxides (NOx) emission (Lean fuel mixture)	• Improper ignition timing	See section 6F
	• Lead contamination of catalytic converter	Check for adsence of filler neck restrictor.
	• Misrouted vacuum hoses	
	• Defective EGR system	Diagnostic flow chart B-6
	• Fuel pressure out of specification (Low fuel pressure)	Diagnostic flow chart B-3
	• Poor performance of ECT sensor, IAT sensor or MAP sensor	See p. 6E-82, 6E-83 or 6E-78
	• Faulty ECM	See p. 6E-59

70F00-6E-49-1

B-1 FUEL INJECTOR AND ITS CIRCUIT CHECK (ENGINE NO STARTING)



1. ECM
2. ECM coupler
3. Injector
4. Injector coupler

Using sound scope, check injector for operating sound at engine cranking. Is it detected?

YES → Is fuel injected from injector at engine cranking? (Refer to p. 6E-73 for checking procedure.)

NO → Check fuel pump and fuel pressure. (Proceed to DIAGNOSTIC FLOW CHARTS B-2 and B-3.)

YES → Does injector inject fuel properly? (Refer to p. 6E-73 for checking procedure.)

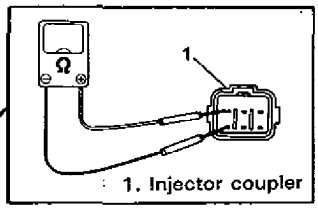
NO → Defective injector.

YES → Does fuel leak from injector after injection at a rate of higher than 1 drop/min.?

YES → Defective injector.

NO → Injector and its circuit in good condition.

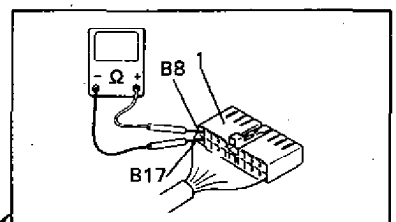
NO → 1. Disconnect injector coupler. 2. Is resistance of injector 0.8—1.8 Ω (at 20°C, 68°F)?



1. Injector coupler

NO → Defective injector.

YES → 1. Connect injector coupler. 2. Disconnect ECM coupler from ECM with ignition switch turned OFF. 3. Is resistance between B8 and B17 terminals of disconnected ECM coupler 0.8—1.8 Ω (at 20°C, 68°F) ?



1. Disconnected ECM coupler

NO →
- Bl/W or Bl/R wire open.
- Bl/W wire shorted to Bl/R wire or ground.
- Poor connection of injector coupler.

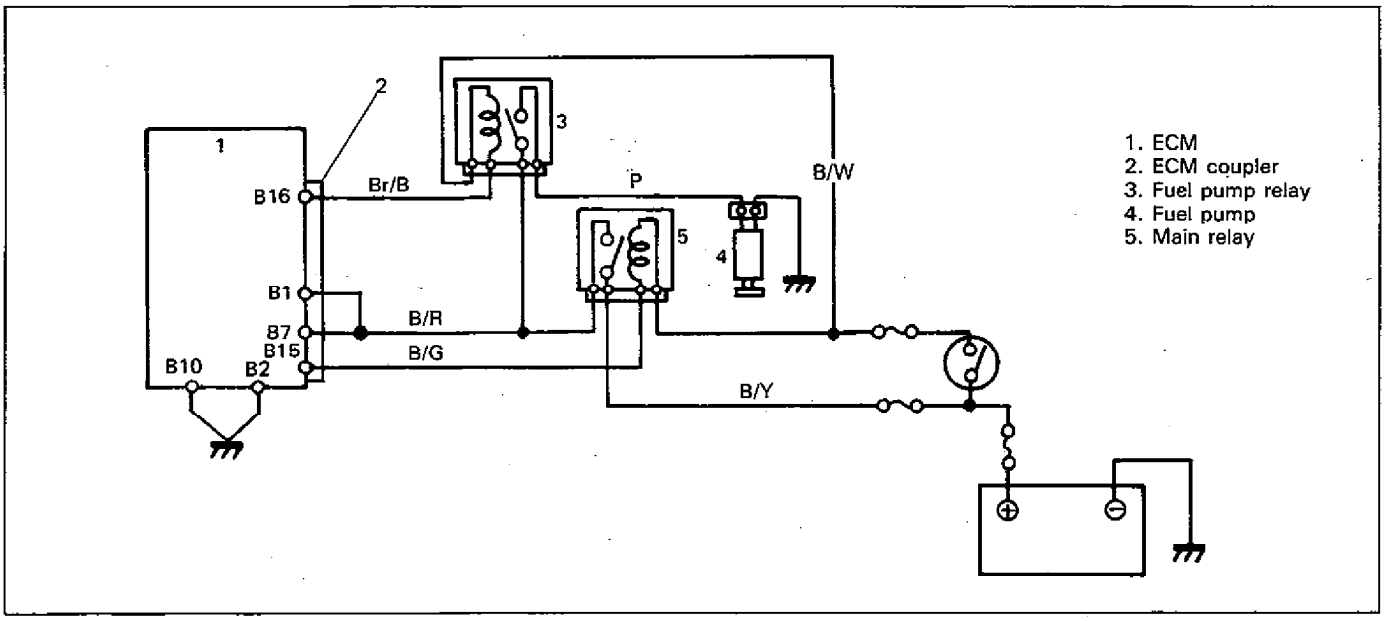
YES → Is ECM coupler connected to ECM properly?

NO → Poor connection.

YES → Substitute a known-good ECM and recheck.

70F00-6E-50-1

B-2 FUEL PUMP CIRCUIT CHECK



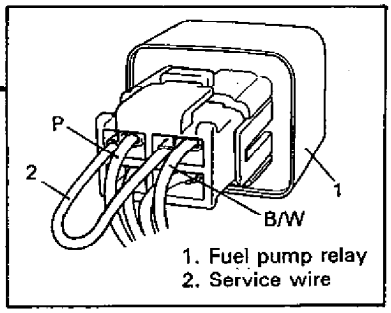
Is fuel pump heard to operate for 3 sec. after ignition switch ON?

YES

Fuel pump circuit in good condition.

NO

1. Turn OFF ignition switch.
2. Using service wire, connect "P" and "B/W" wire terminals.
3. Is fuel pump heard to operate at ignition switch ON?



YES

Check fuel pump relay referring to p. 6E-86. Is it in good condition?

NO

"P" wire open, poor fuel pump coupler connection or faulty fuel pump.

YES

Poor relay coupler connection, "Br/B" wire open or poor B16 connection.
If wire and connection are OK, substitute a known-good ECM and recheck.

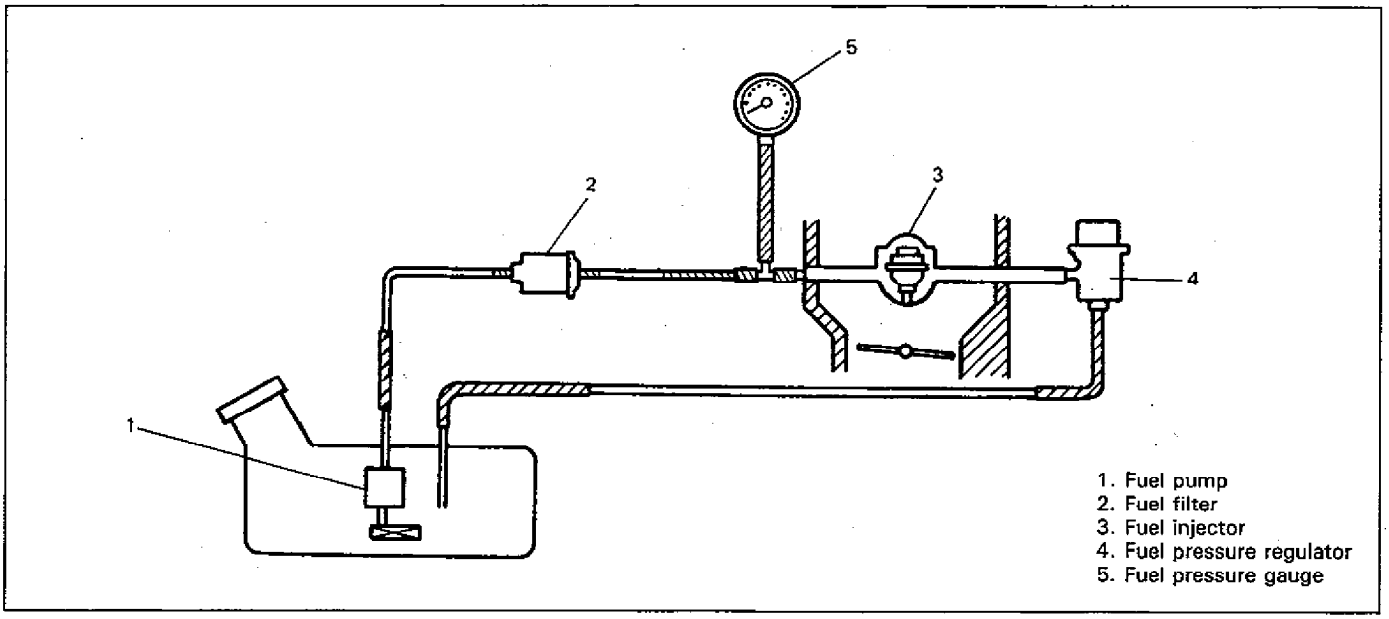
NOTE:
Before substituting a known-good ECM, check to make sure that resistance of coil in relay is as specified.

NO

Faulty fuel pump relay.

70F00-6E-51-1

B-3 FUEL PRESSURE CHECK



NOTE:
Before using following flow chart, check to make sure that battery voltage is higher than 11V. If battery voltage is low, pressure becomes lower than specification even if fuel pump and line are in good condition.

1. Install fuel pressure gauge referring to p. 6E-66.
2. Operate fuel pump by turning ignition switch ON.
   Is fuel pressure then 2.2—2.4 kg/cm² (220—240 kPa, 31.3—34.1 psi)?
   Also, is 2.1 kg/cm² (210 kPa, 29.9 psi) or higher fuel pressure retained for 1 minute after fuel pump is stopped?

NO → No pressure
To ① on next page

NO → Pressure within spec. but not retained
To ② on next page

NO → Low pressure
To ③ on next page

NO → High pressure
To ④ on next page

YES

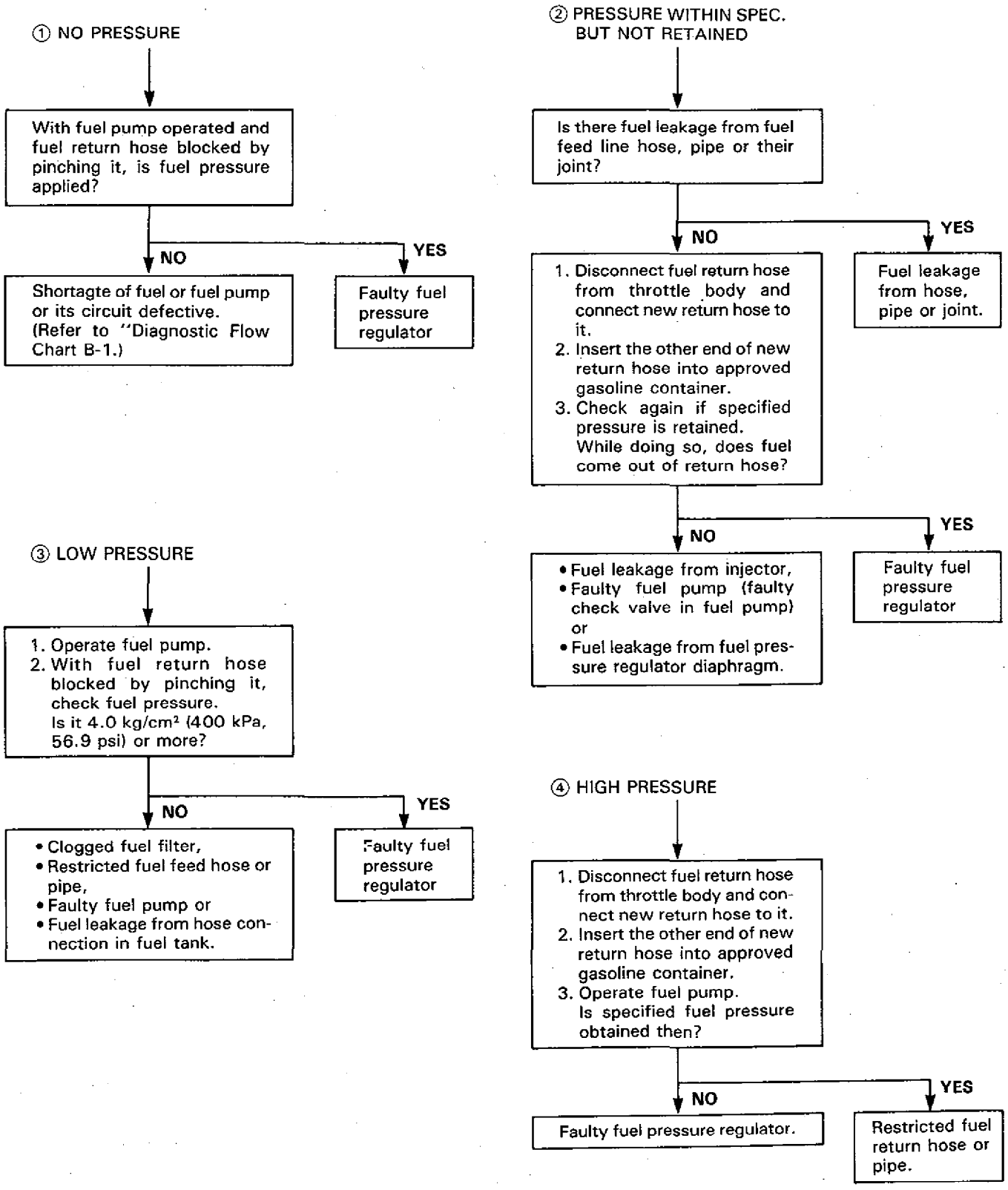
1. Start engine and warm it up to normal operating temperature.
2. Keep it running at specified idle speed.
   Is fuel pressure then 1.5—1.8 kg/cm² (150—180 kPa, 21.4—25.5 psi)?

YES → Normal fuel pressure.

NO →
- Clogged vacuum passage for fuel pressure regulator or
- Faulty fuel pressure regulator.

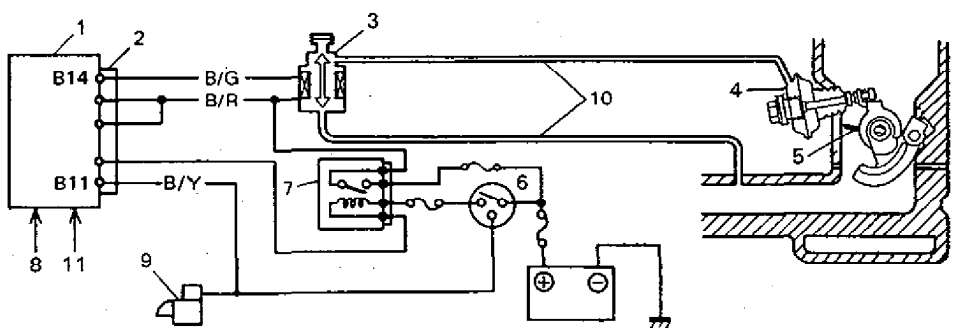
70F00-6E-52-1

B-3 FUEL PRESSURE CHECK (continued)



70F00-6E-53-1

B-4 THROTTLE OPENER SYSTEM CHECK



1. ECM
2. ECM coupler
3. SV valve
4. Throttle opener
5. Throttle valve
6. Main switch
7. Main relay
8. CMP sensor signal
9. Starter
10. Vacuum hose
11. ECT sensor

1. Warm up engine to normal operating temperature.
2. Is throttle valve opened by throttle opener at both engine stop and cranking?

NO → Check throttle opener for operation referring to p. 6E-87. Is it in good condition?

YES → Adjust throttle valve opening by throttle opener referring to p. 6E-65.

NO → Faulty opener.

YES → Does throttle opener rod retract 0—1 second after engine start?

YES → Check throttle valve opening by throttle opener referring to p. 6E-65.

YES → Throttle opener system in good condition.

NO → Check vacuum hose and opener referring to p. 6E-87. Are they in good condition?

NO →
- Vacuum hose misconnection, leakage, clog or deterioration.
- Defective opener.

YES → Check SV valve for resistance and operation referring to p. 6E-87. Are they both in good condition?

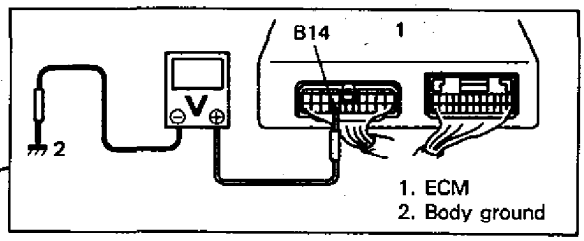
NO →
- Faulty SV valve.

YES → 1. Connect ECM coupler.
2. Is battery voltage applied to ECM coupler terminal B14 at ignition switch ON?

NO →
- "B/R" wire open.
- "B/G" wire open.
- "B/G" wire shorted to ground or
- Poor SV valve coupler connection.

If wires and connections are OK, substitute a known-good ECM and recheck.

YES → To be continued



1. ECM
2. Body ground

Continued

Is voltage at ECM coupler terminal B14 0V at engine cranking?

NO

Is battery voltage aplied to ECM coupler terminal B11 at engine cranking?

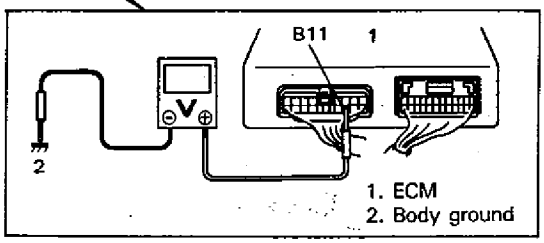
NO

Engine start signal not fed.

YES

ECM in good condition.

YES



Is ECM coupler connected to ECM properly?

NO

Poor ECM-to-ECM coupler connection.

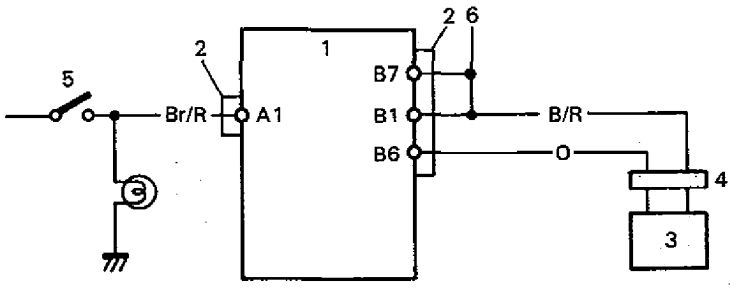
YES

Substitute a known-good ECM and recheck.

NOTE:
Before substituting a known-good ECM, check to make sure that resistance of coil in SV valve is as specified.

70F00-6E-55-1

B-5 IDLE AIR CONTROL (IAC) SYSTEM CHECK



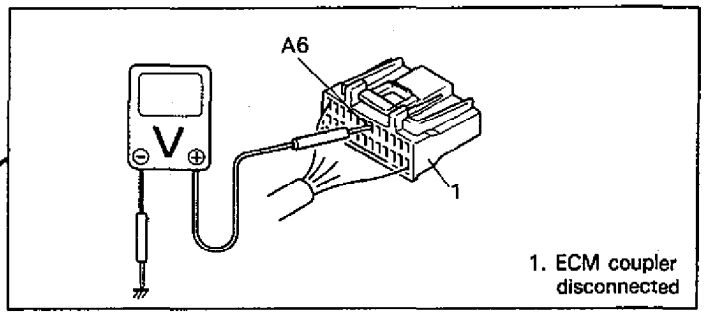
1. ECM
2. ECM coupler
3. Idle air control valve
4. Idle air control valve coupler
5. Electric load switch
6. From battery

1. Warm up engine to normal operating temperature and keep it at idle speed.
2. Does idle speed increase at headlight switch ON?

YES → Idle air control valve and its circuit in good condition.

NO

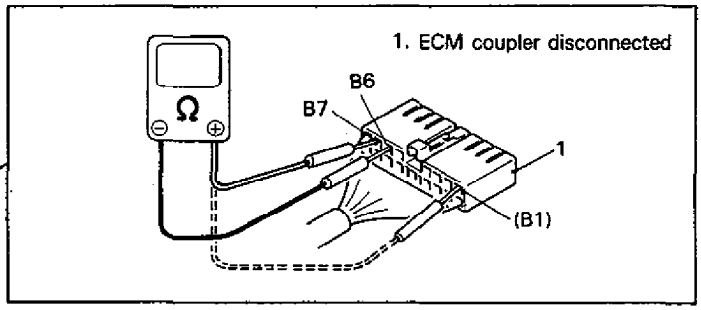
1. Stop engine.
2. Disconnect ECM coupler.
3. With ignition switch ON, is battery voltage applied to ECM coupler terminal A6 at headlight switch ON and 0V at OFF?



1. ECM coupler disconnected

NO → Br/R wire open or short.

YES



Is resistance between disconnected ECM coupler terminals B6 and B7 (B1) 21—30 Ω at 20°C (68°F)?

NO →
1. Disconnect idle air control valve coupler.
2. Is resistance of solenoid 21—30 Ω at 20°C (68°F)?

YES →
- B/R wire or O wire open.
- B/R wire shorted to O wire.
- Poor connection of idle air control valve coupler.

NO → Defective idle air control valve.

YES

Does idle air control valve operate?
(For checking procedure, refer to p. 6E-86.)

NO → Poor connection.

YES

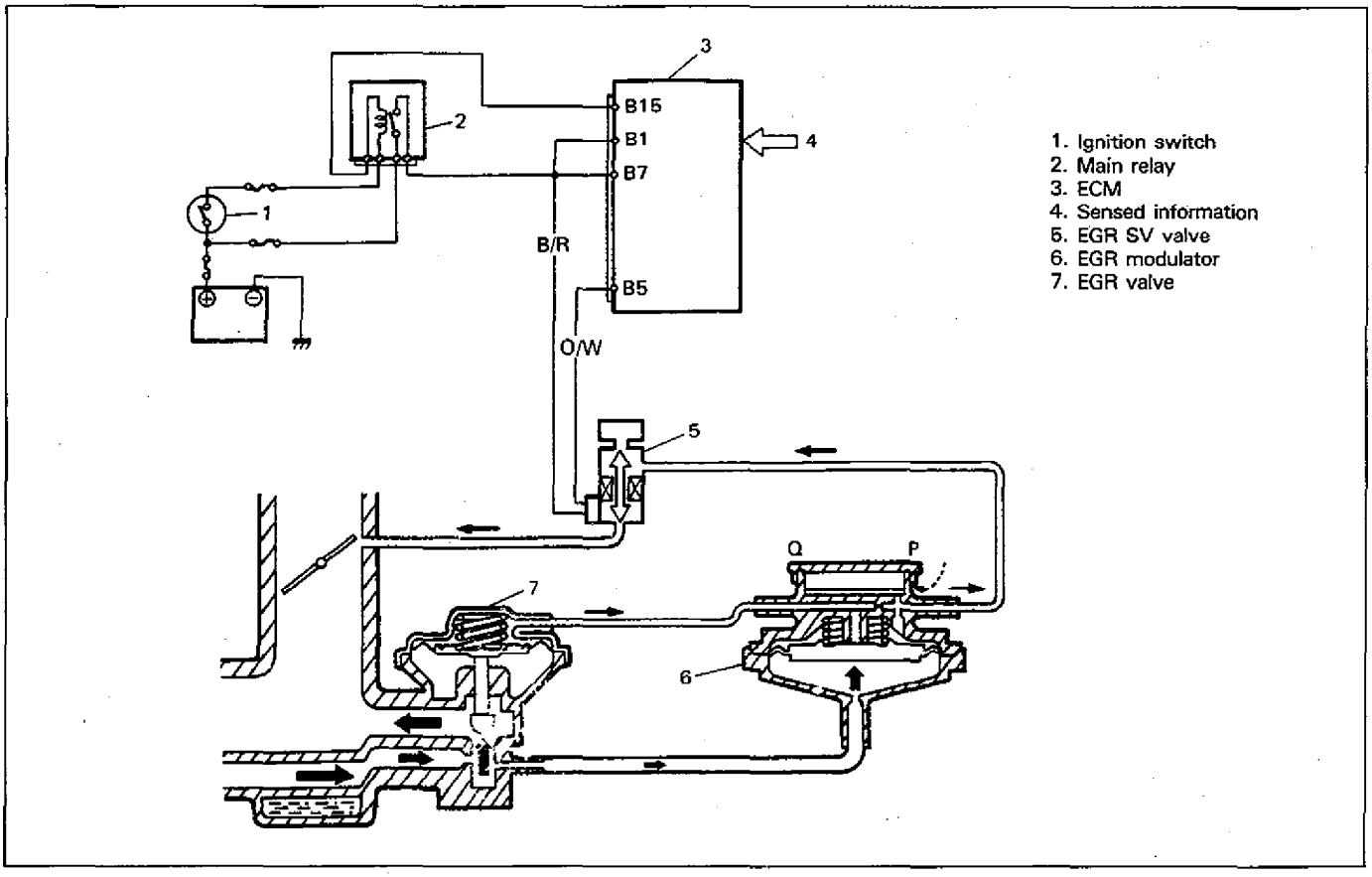
Are ECM couplers connected properly?

YES

Substitute a known-good ECM and recheck.

70F00-6E-56-1

B-6 EGR SYSTEM CHECK



1. Ignition switch
2. Main relay
3. ECM
4. Sensed information
5. EGR SV valve
6. EGR modulator
7. EGR valve

Check EGR system referring to p. 6E-88.
Is it in good condition?

YES → EGR system in good condition.

NO

Check vacuum hose, EGR valve and EGR modulator referring to p. 6E-90.
Are they in good condition?

NO → • Vacuum hose misconnection, leakage, clog or deterioration,
• Faulty EGR valve or
• Faulty EGR modulator.

YES

Check SV valve referring to p. 6E-91.
Is it in good condition?

NO → Faulty SV valve.

YES

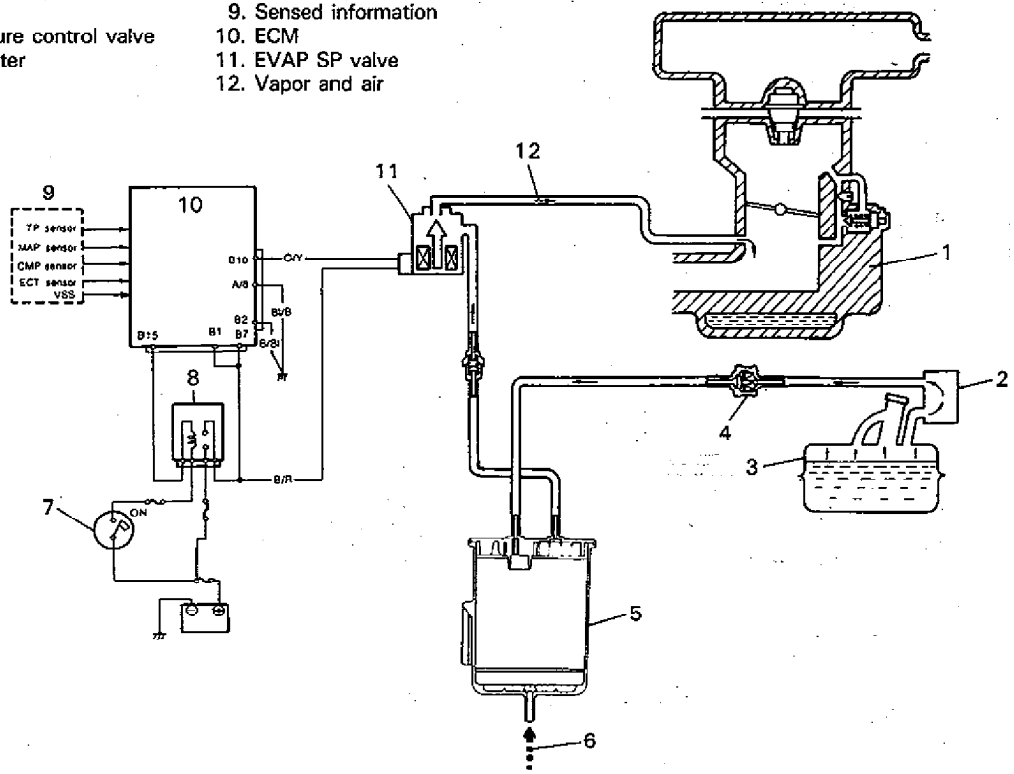
- "O/W" wire open,
- "O/W" wire shorted to ground,
- Poor SV valve coupler connection
- Poor B5 connection or
- Poor performance of ECT sensor, TP sensor or MAP sensor

If wire, connection and sensors are OK, substitute a known-good ECM and recheck.

70F00-6E-57-1

B-7 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM CHECK

1. Throttle body
2. Vapor liquide separator
3. Fuel tank
4. Tank pressure control valve
5. EVAP canister
6. Air
7. Main switch
8. Main relay
9. Sensed information
10. ECM
11. EVAP SP valve
12. Vapor and air



Check EVAP canister purge system for operation referring to p. 6E-92.
Is it in good condition?

NO

Check vacuum passage, hoses and SP valve referring to p. 6E-92.
Are they in good condition?

YES

- "O/Y" wire open,
- "O/Y" wire shorted to ground,
- Poor SP valve coupler connection,
- Poor "A8" connection or
- Poor performance of ECT sensor, TP sensor, VSS or MAP sensor

If wire, connection and sensors are OK, substitute a known-good ECM and recheck.

NO

- Vacuum passage clogged,
- Vacuum leakage or
- Faulty SP valve

YES

- Canister purge system is in good condition

Check EVAP canister, tank pressure control valve and fuel filler cap.

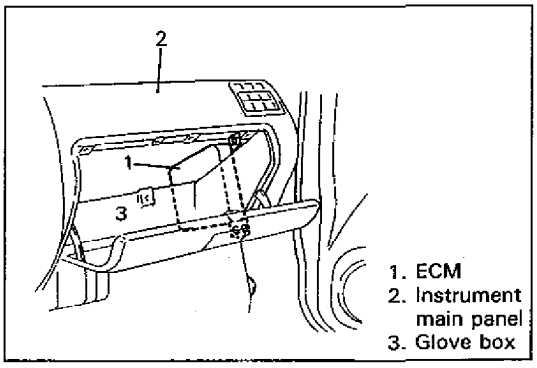
70F00-6E-58-1

ECM AND ITS CIRCUIT CHECK

ECM and its circuits can be checked at ECM wiring couplers by measuring voltage and resistance.

CAUTION:
ECM cannot be checked by itself. It is strictly prohibited to connect voltmeter or ohmmeter to ECM with couplers disconnected from it.

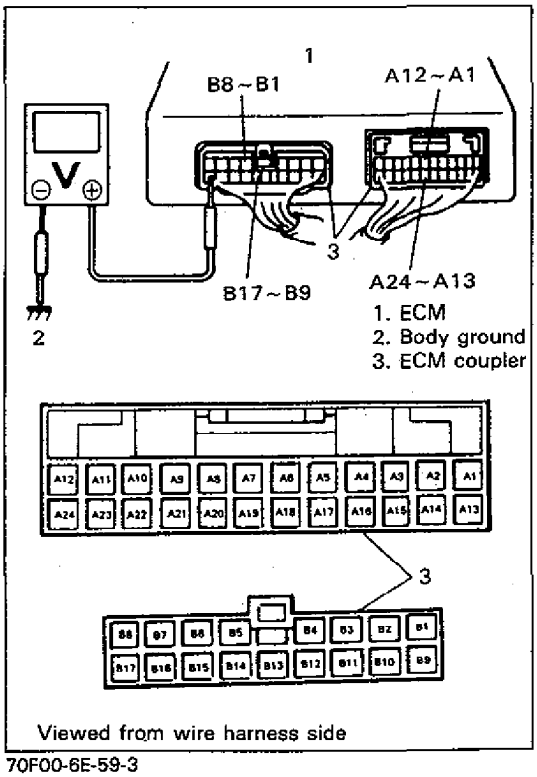
70F00-6E-59-1



VOLTAGE CHECK

1) Disconnect negative cable at battery.
2) Remove glove box upper cover and dash side trim.
3) Disconnect ECM couplers from ECM.
4) Remove ECM.
5) Connect ECM couplers securely.
6) Connect negative cable to battery.

70F00-6E-59-2



70F00-6E-59-3

7) Check voltage at each terminal of couplers connected.

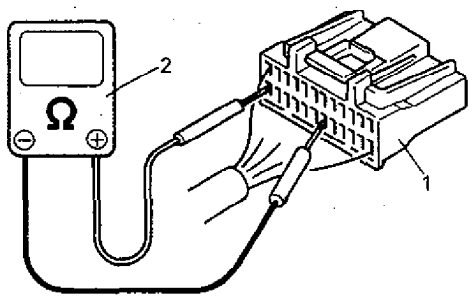
NOTE:
As each terminal voltage is affected by the battery, voltage, confirm that it is 11 V or more when ignition switch is ON.

TER-MINAL	CIRCUIT	NORMAL VOLTAGE	CONDITION
A1	Electric load signal	10—14V	Ignition switch ON Small light, radiator fan or rear defogger turned ON
		0V	Ignition switch ON
A2	Air-conditioning circuit (if equipped)	0V	Ignition switch ON
		10—14V	With engine running Air-conditioning ON
A3	Diagnosis switch terminal	10—14V	Ignition switch ON
		0V	Ignition switch ON Diag. switch terminal grounded (with service wire connected to diag. switch terminal and ground terminal.)
A4	Ground (For Finish or Swiss spec. vehicle)	———	———
A5	Heater fan switch	10—14V	Ignition switch ON
		0—1V	Ignition switch ON Heater fan switch ON
A6	Ignition fail signal	———	———
A7	Test switch terminal	10—14V	Ignition switch ON
A8	EVAP SP valve	10—14V	Ignition switch ON
A9	Duty output terminal	———	———
A10	Blank	———	———
A11	Blank	———	———
A12	Ignition trigger signal	———	———
A13	Camshaft position sensor	Indicator deflection repeated between 0V and about 5V	Ignition switch ON, Crankshaft turned slowly
A14	Idle switch of TP sensor	0—1V	Ignition switch ON Throttle valve is at idle position (with throttle opener rod drawn in by vacuum pump gauge)
		3—5V	Ignition switch ON Throttle valve opens larger than idle position
A15	VSS	Indicator deflection repeated between 0V and 3—5V	Ignition switch ON Front right tire turned slowly with front left tire locked
A16	Blank	———	———
A17	IAT sensor	2.2—3.0V	Ignition switch ON Sensor ambient temperature: 20°C (68°F)

70F00-6E-60-1

TER-MINAL	CIRCUIT	NORMAL VOLTAGE	CONDITION
A18	ECT sensor	0.5—0.9V	Ignition switch ON Coolant temperature: 80°C (176°F)
A19	Oxygen sensor	Refer to Diagnostic Flow Chart for Code No.13	
A20	Data link connector (Serial data terminal)	4—5V	Ignition switch ON
A21	TP sensor	0.5—1.2V	Ignition switch ON Throttle valve at idle position (with throttle opener rod drawn in by vacuum gauge)
		3.4—4.7V	Ignition switch ON Throttle valve at full open position
A22	MAP sensor	3.6—4.4V	Ignition switch ON Barometric pressure: 760 mmHg
A23	Power source of sensors	4.75—5.25V	Ignition switch ON
A24	Ground of sensors	———	———
B1	Power source	10—14V	Ignition switch ON
B2	Ground	———	———
B3	Blank	———	———
B4	Blank	———	———
B5	EGR SV valve	10—14V	Ignition switch ON
B6	Idle air control valve	10—14V	Ignition switch ON
B7	Power source	10—14V	Ignition switch ON
B8	Injector ⊖	———	———
B9	Power source for back-up circuit	10—14V	Igition switch OFF and ON
B10	Ground	———	———
B11	Engine start switch (Engine start signal)	6—10V	While engine cranking
		0V	Other than above
B12	Blank	———	———
B13	Malfunction indicator lamp ("CHECK ENGINE" light)	0—4V	Ignition switch ON
		10—14V	When engine running
B14	Throttle opener SV valve	10—14V	Ignition switch ON
B15	Main relay ground	0—2V	Ignition switch ON
B16	Fuel pump relay ground	0—1V	For 3 sec. after ignition switch ON
		10—14V	When over 3 sec. after ignition switch ON
B17	Injector ⊖	———	———

70F00-6E-61-1



1. ECM coupler disconnected
2. Ohmmeter

70F00-6E-62-1

RESISTANCE CHECK

1) Disconnect ECM couplers from ECM with ignition switch OFF.

CAUTION:
Never touch terminals of ECM itself or connect voltmeter or ohmmeter.

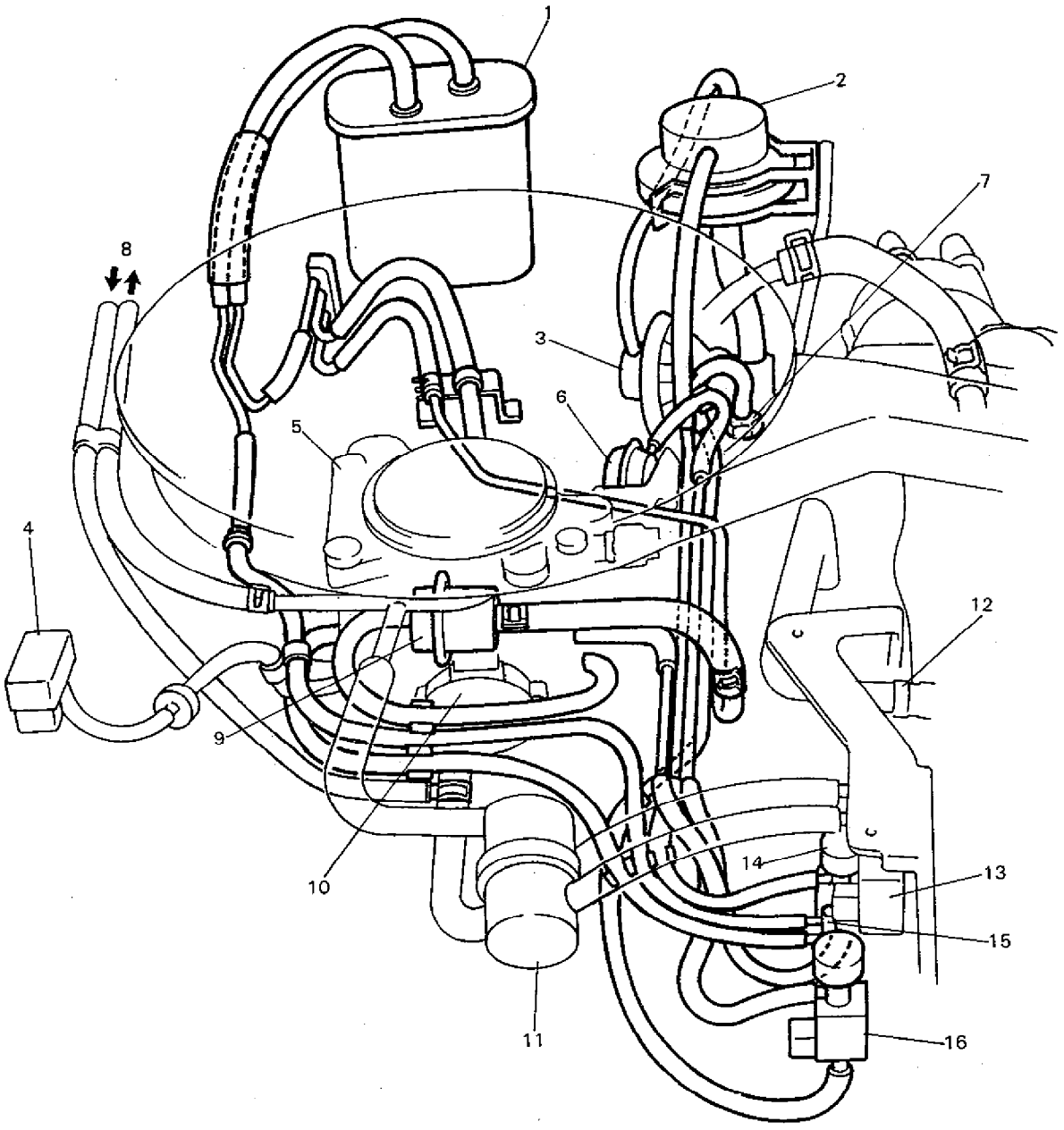
2) Check resistance between each pair of terminals disconnected couplers as listed in following table.

CAUTION:
- **Be sure to connect ohmmeter probe from wire harness side of coupler.**
- **Be sure to turn OFF ignition switch for this check.**
- **Resistance in below table represents that when parts temperature is 20°C (68°F).**

TERMINALS	CIRCUIT	NORMAL RESISTANCE	CONDITION	
A2 —Body ground	Diagnosis switch terminal	∞ (infinity)	———	
A7 —Body ground	Test switch terminal	Continuity	Test switch terminal grounded	
		∞ (infinity)	Test switch terminal ungrounded	
A9 —Body ground	Duty check terminal	∞ (infinity)	———	
A14—A24	Idle switch	Continuity	Throttle valve is at idle position	
		∞ (infinity)	Throttle valve opens larger than idle position	
A15—Body ground	VSS	Ohmmeter indicator deflects between continuity and ∞	Front right tire turned slowly with front left tire locked	
A17—A24	IAT sensor	2.28—2.87 kΩ	Sensor ambient temp. 20°C (68°F)	
A18—A24	ECT sensor	0.29—0.35 kΩ	Engine coolant temp. 80°C (176°F)	
A21—A24	TP sensor	0.3—2 kΩ	Throttle valve at idle position	with MAP sensor coupler disconnected
		2.0—6.5 kΩ	Throttle valve at full open position	with MAP sensor coupler disconnected
A8 —B7	EVAP SP valve	33—39 Ω	———	
B5 —B1	EGR SV valve	33—39 Ω	———	
B6 —B1	IAC valve	24—30 Ω	———	
B8 —B17	Fuel injector	0.8—1.8 Ω	———	
B14—B1	Throttle opener SV valve	33—39 Ω	———	
B15—B16	Main and fuel pump relay	134—162 Ω	———	

70F00-6E-62-3

ON-VEHICLE SERVICE

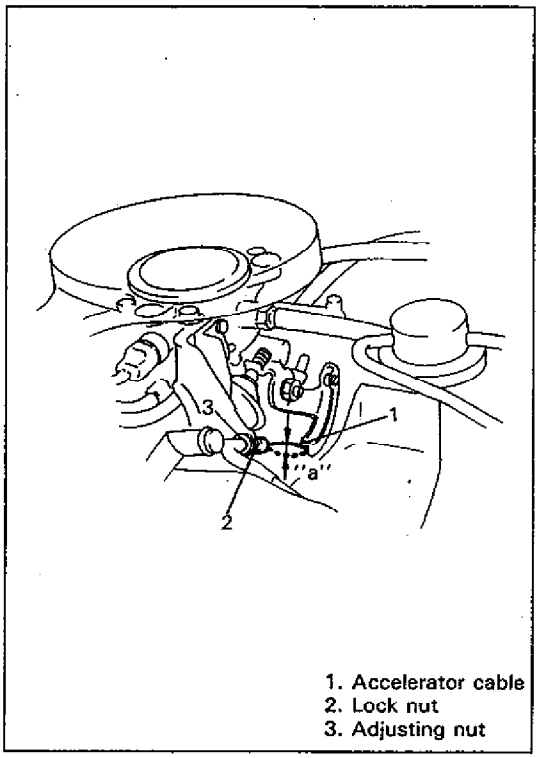


1. EVAP canister
2. EGR modulator
3. EGR valve
4. MAP sensor
5. Throttle body
6. Throttle opener
7. Gas filter
8. To A/C SV valve (if equipped)
9. Fuel pressure regulator
10. TP sensor
11. IAC valve silencer
12. PCV valve
13. IAC valve
14. EGR SV valve
15. EVAP SP valve
16. TO SV valve

GENERAL

When hoses are disconnected and system's component is removed for service, reinstall component properly, and route and connect hoses correctly after service. Refer to figure on page 6E-63 for proper routing of hoses.

70F00-6E-64-1



1. Accelerator cable
2. Lock nut
3. Adjusting nut

70F00-6E-64-2

ACCELERATOR CABLE ADJUSTMENT

Check accelerator cable for play and adjust if necessary. Cable play should be within specification when accelerator pedal is released and engine is not running.
If not within specification, adjust by loosening lock nut. Be sure to tighten lock nut securely after adjustment.

Accelator cable play "a": 10—15 mm (0.4—0.6 in.)

Cable play should be 3—5 mm (0.12—0.20 in.) when throttle opener rod is pushed back by hand (i.e., throttle valve is at idle position).

IDLE SPEED ADJUSTMENT

Before idle speed check and adjustment, make sure of the following.

- Lead wires and hoses of Electronic Fuel Injection and engine emission control systems are connected securely.
- Accelerator cable has some play, that is, it is not tight.
- Valve lash is checked and adjusted according to maintenance schedule.
- Ignition timing is within specification.
- All accessories (radiator fan, wipers, heater, lights, etc.) are out of service.
- Air cleaner has been properly installed and is in good condition.

After above items are all confirmed, adjust idle speed as follows.

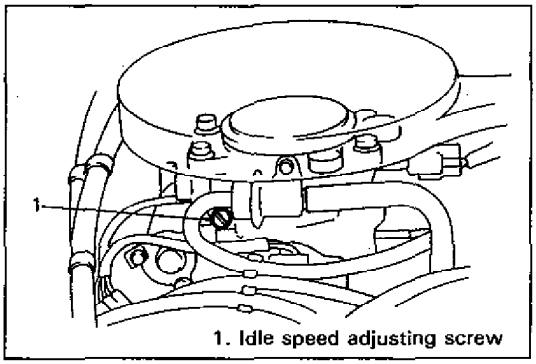
NOTE:

- **Before starting engine, place transmission gear shift lever in "Neutral", and set parking brake and block drive wheels.**
- **In areas above 7,810 ft (2,380 m) elevation (barometric pressure is lower than 650 mmHg), IAC valve will be normally in operation. Do not attempt to adjust the idle speed.**

1) Turn ignition switch ON and leave it for 1 sec.
2) Warm up engine to normal operating temperature.
3) Race engine at 2000 r/min. for 60 sec.
4) Check to ensure that idle speed is within below specification.

Engine idle speed: 900 ± 50 r/min.

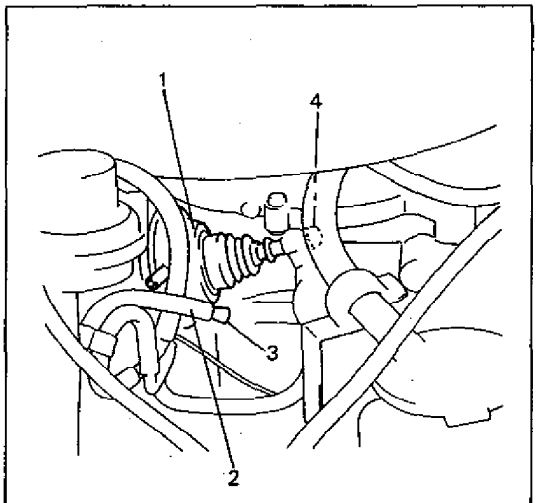
70F00-6E-65-1



1. Idle speed adjusting screw

70F00-6E-65-3

5) If idle speed is not within specified range, adjust it by turning adjusting screw.



1. Throttle opener
2. Vacuum hose
3. Blind plug
4. Opener adjusting screw

70F00-6E-65-4

THROTTLE OPENER ADJUSTMENT

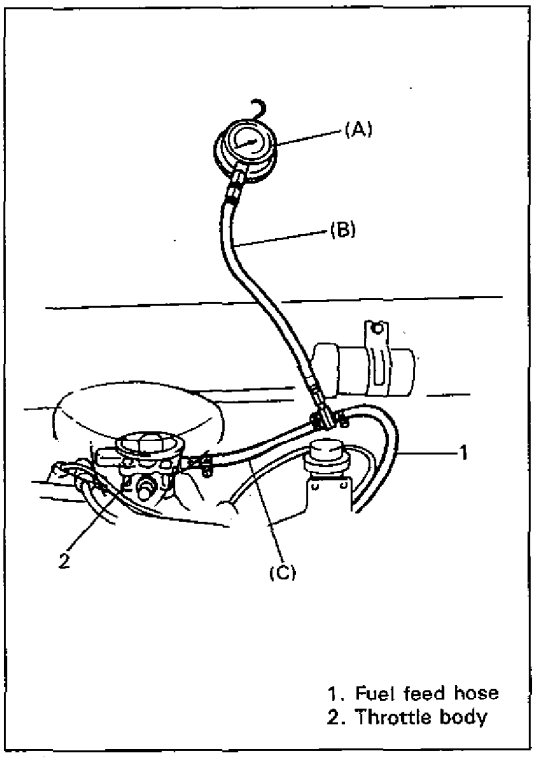
NOTE:

Before starting engine, place transmission gear shift lever in "Neutral", and set parking brake and block drive wheels.

1) Turn ignition switch ON and leave it for 1 sec.
2) Warm up engine to normal operating temperature.
3) Race engine at 2000 r/min. for 60 sec.
4) Check to make sure that no electric load is applied to engine.
5) Disconnect vacuum hose from throttle opener and put blind plug in disconnected vacuum hose.
   Check that engine speed is within specification then.

   Engine speed while opener oprating: 1900—2100 r/min.

6) If engine speed is found out of specification in above check, adjust it to specification by turning throttle opener adjusting screw.
7) Upon completion of adjustment, connect vacuum hose to opener securely.



1. Fuel feed hose
2. Throttle body

70F00-6E-66-1

AIR AND FUEL DELIVERY SYSTEM

FUEL PRESSURE INSPECTION

1) Relieve fuel pressure in fuel feed line referring to p. 6-4.
2) Remove air cleaner case.
3) Remove fuel feed hose from throttle body and connect special tools between throttle body and feed hose.

Special Tools
(A): 09912-58441
(B): 09912-58431
(C): 09912-58490

CAUTION:
A small amount of fuel may be released after fuel line is disconnected.
In order to reduce chance of personal injury, cover fitting to be disconnected with a shop cloth. Place that cloth in an approved container when disconnection is completed.

CONDITION	FUEL PRESSURE
With fuel pump operating and engine at stop	2.2—2.4 kg/cm² 220—240 kPa 31.3—34.1 psi
For 1 min. after fuel pump stop (Pressure reduces as time passes)	Over 2.1 kg/cm² 210 kPa 29.9 psi

4) Check that battery voltage is above 11V.
5) Turn ignition switch ON to operate fuel pump and after 3 seconds turn it OFF. Repeat this 3 or 4 times and then check fuel pressure.
6) Measure fuel pressure under each condition as shown left.

70F00-6E-66-3

CONDITION	FUEL PRESSURE
At specified idle speed	1.5—1.8 kg/cm² 150—180 kPa 21.4—25.5 psi

7) Start engine and warm it up to normal operating temperature.
Mesure fuel pressure at specified idle speed.

If measured pressure doesn't satisfy specification, refer to "Diagnostic Flow Chart B-3" and check each possibly defective part. Replace if found defective.

70F00-6E-66-4

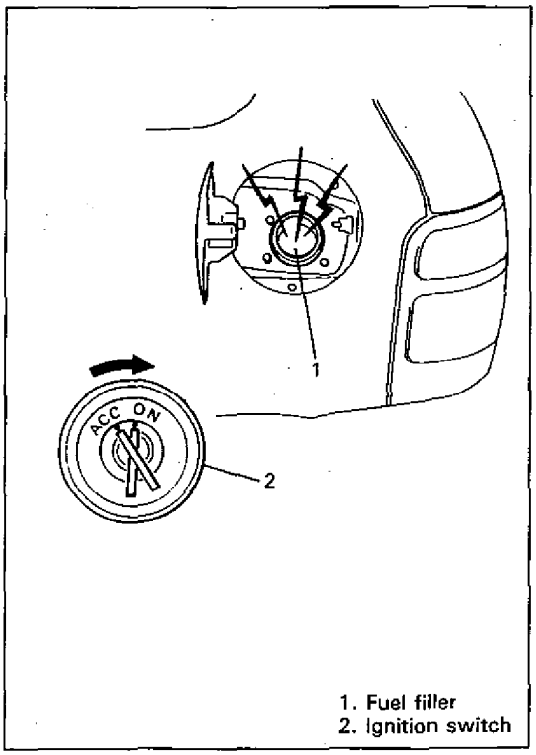
8) After checking fuel pressure, remove special tools.

CAUTION:
As fuel feed line is still under high fuel pressure, make sure to release fuel pressure according to following procedures.
- **Place fuel container under fuel filter.**
- **Cover union bolt of gauge with rag and loosen union bolt slowly to release ful pressure gradually.**

70F00-6E-66-5

9) Install fuel feed hose to throttle body.
   Clamp feed hose securely.
10) With engine "OFF" and ignition switch "ON", check for fuel leaks.

70F00-6E-67-1



1. Fuel filler
2. Ignition switch

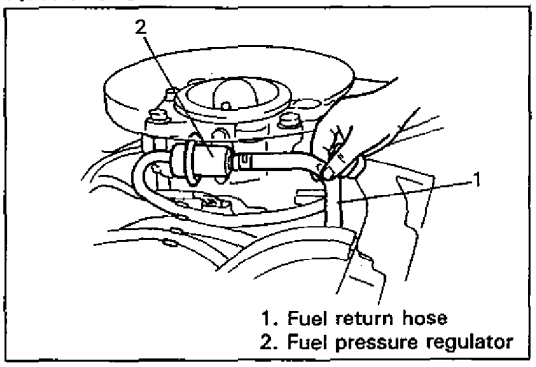
70F00-6E-67-3

FUEL PUMP

On-Vehicle Inspection

CAUTION:
When fuel filler cap is removed in any procedure, work must be done with no smoking, in a well-ventilated area and away from any open flames.

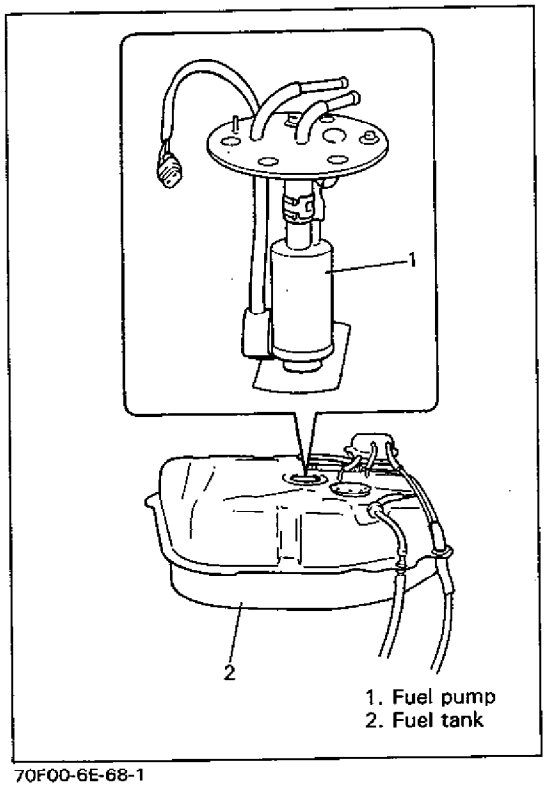
1) Remove filler cap and turn ON ignition switch.
   Then fuel pump operating sound should be heard from fuel filler for about 3 seconds and stop. Be sure to reinstall fuel filler cap after checking.
   If above check result is not satisfactory, advance to "Diagnostic Flow Chart B-2".



1. Fuel return hose
2. Fuel pressure regulator

70F00-6E-67-5

2) Fuel pressure should be felt at fuel return hose for 3 seconds after ignition switch ON.
   If fuel pressure is not felt, advance to "Diagnostic Flow Chart B-3".



1. Fuel pump
2. Fuel tank

70F00-6E-68-1

Removal

Remove fuel tank from body according to procedure described in Section 6C and remove fuel pump from fuel tank.

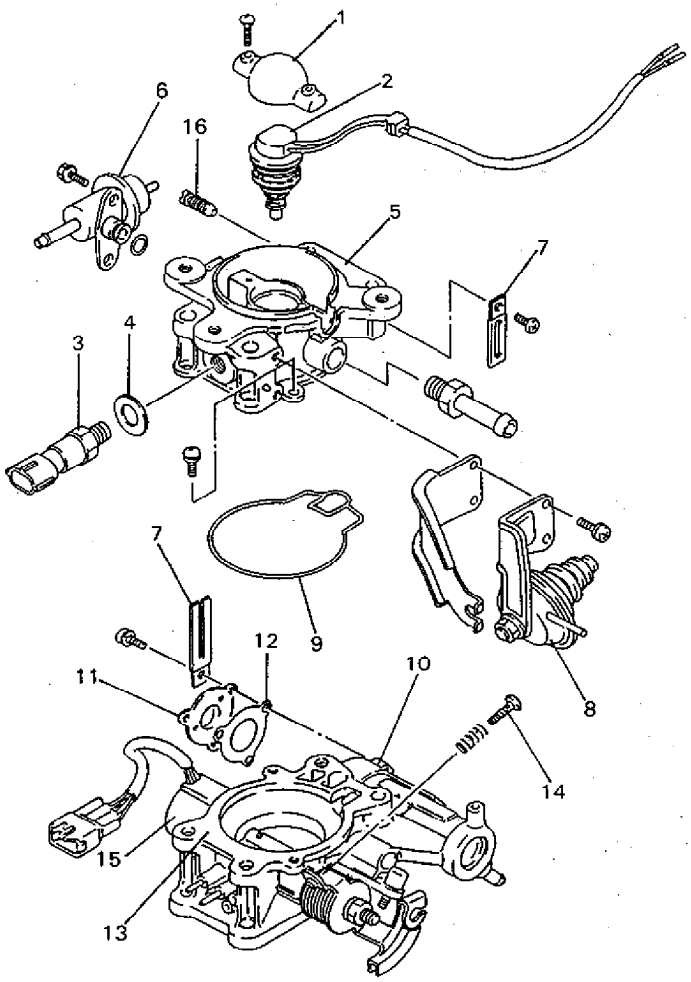
Inspection

Check fuel pump filter for evidence of dirt and contamination. If present, clean and check for presence of dirt in fuel tank.

Installation

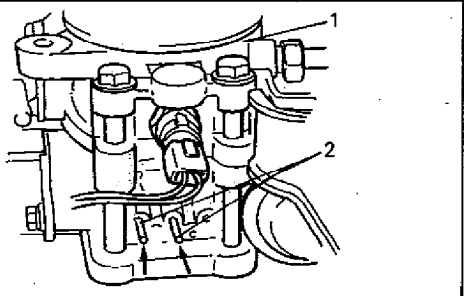
1) Install fuel pump to its backet.
2) Install fuel pump to fuel tank and then install fuel tank to body according to procedure described in Section 6C.

THROTTLE BODY



1. Injecter cover
2. Injecter
3. IAT sensor
4. Gasket
5. Upper body
6. Fuel pressure regulator
7. Clamp
8. Throttle opener
9. O-ring
10. Fast idle air valve
11. Fast idle air valve cap
12. Gasket
13. Lower body
14. Throttle opener adjusting screw
15. TP sensor
16. Idle speed adjusting screw

70F00-6E-69-1

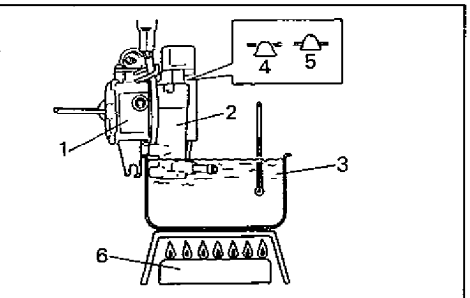


1. Throttle body
2. Vacuum nozzle

70F00-6E-69-4

On-Vehicle Inspection

- Check that the throttle valve lever moves smoothly.
- Vacuum passage inspection
  With fingers placed against vacuum nozzles, increase engine speed a little and check that vacuum is applied.



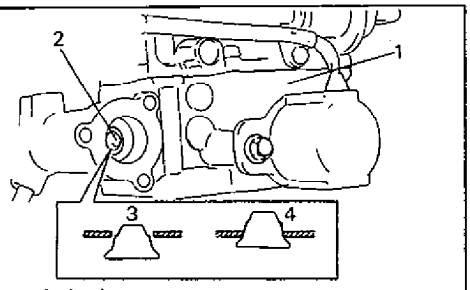
1. Throttle body
2. Fast idle air valve
3. Water
4. Open
5. Close
6. Heater

70F00-6E-69-5

- Fast idle air valve inspection

This is an easy on-vehicle check. For further complete check, remove throttle body and use checking procedure as shown in figure.

1) Remove fast idle air valve cap with engine stopped when engine is cold (engine coolant temperature is 60°C, 140°F or lower) and checking procedure as shown in figure.



1. Throttle body
2. Fast idle air valve
3. Open when engine is cool
4. Close when engine is hot

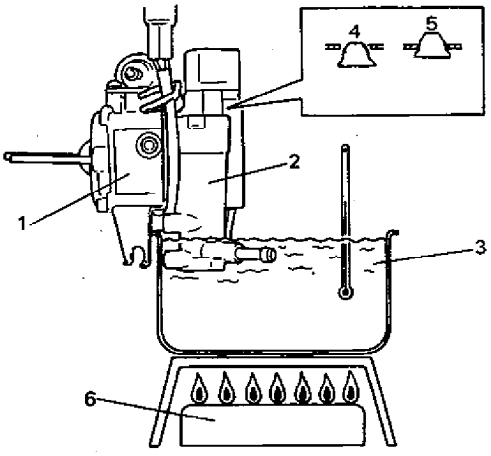
70F00-6E-70-1

2) Reinstall fast idle air valve cap and warm up engine to its normal operating temperature (engine coolant temperature is 70°C, 158°F or higher).
   Then remove fast idle air valve cap again with engine stopped and check visually that fast idle air valve is closed.
3) Upon completion of checking, be sure to use new gasket when reinstalling fast idle air valve cap.

Removal

1) Relieve fuel pressure in fuel feed line referring to p. 6-4.
2) Disconnect negative cable at battery.
3) Drain engine coolant.
4) Remove air cleaner case from throttle body.
5) Disconnect fuel feed hose from throttle body.
6) Disconnect fuel return hose from fuel pressure regulator.
7) Disconnect accelerator cable from throttle body.
8) Disconnect vacuum hoses from throttle body.
9) Disconnect water hose from throttle body.
10) Disconnect fuel injector and TP sensor coupler.
11) Remove throttle body from intake manifold.

70F00-6E-70-2



1. Throttle body
2. Fast idle air valve
3. Water
4. Open
5. Close
6. Heater

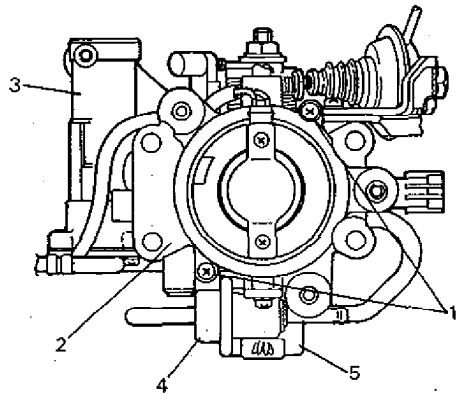
70F00-6E-70-4

Inspection

1) Remove fast idle air valve cap.
2) Immerse fast idle air valve of throttle body in water as shown. Check visually that fast idle air valve closes gradually as water temperature rises and closes fully at higher than about 70°C, 158°F.

NOTE:

- **Be very careful to prevent water from entering throttle body hose.**
- **Be very careful never to put throttle body parts except fast idle air valve thermo wax in water or expose them to water splash.**



1. Screws
2. Upper body
3. Lower body
4. Fuel pressure regulator
5. Throttle position sensor

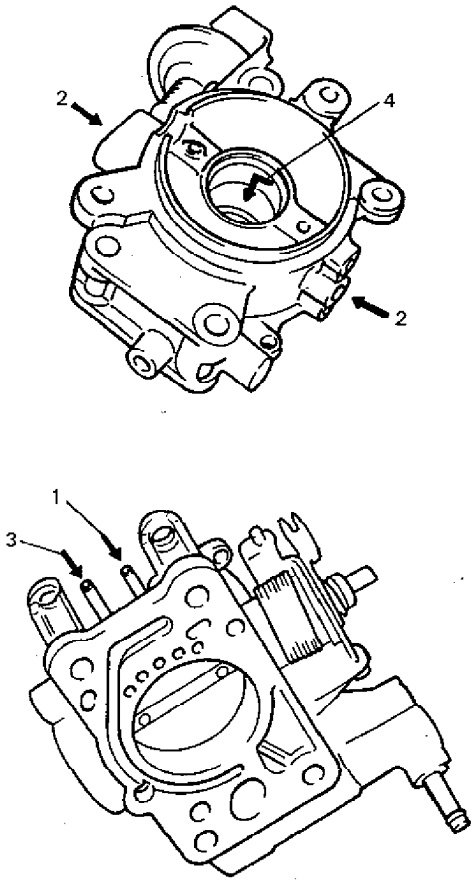
70F00-6E-71-1

Disassembly

NOTE:

- **Be sure to replace gaskets as well as worn or damaged parts.**
- **While disassembling and assembling throttle body, use special care not to deform levers on throttle valve shaft or cause damage to any other parts.**

1) Remove injector from throttle body according to procedure described in p. 6E-74.
2) Remove TP sensor.
3) Remove fuel pressure regulator from throttle body.
4) Remove IAT sensor from throttle body.
5) After removing screws, separate upper and lower bodies.



1. Vacuum passage
2. Fuel passage
3. Vacuum passage for fuel pressure regulator
4. Injector chamber

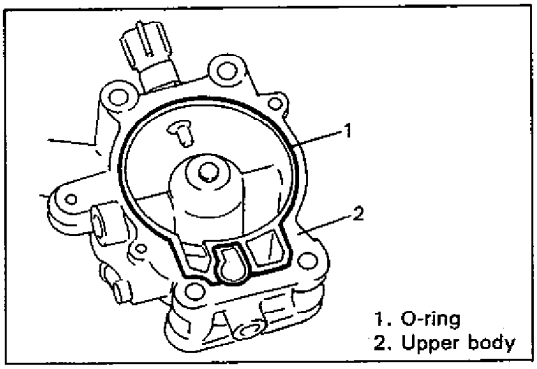
70F00-6E-71-3

Cleaning

Clean passages shown in figure and fuel injector chamber by blowing compressed air.

NOTE:

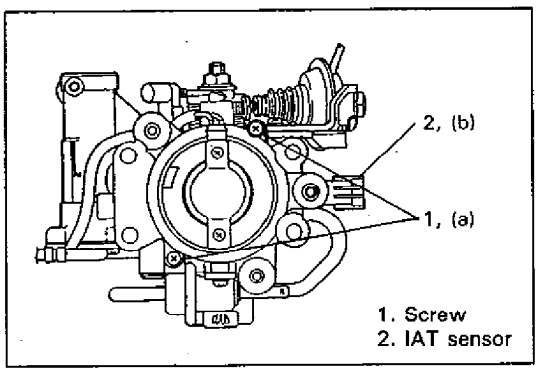
- **The TP sensor, fuel pressure regulator, fuel injector, fast idle air valve, throttle opener or other components containing rubber must not be placed in a solvent or cleaner bath. A chemical reaction will cause these parts to swell, harden or get distorted.**
- **Don't put drills or wires into passages for cleaning. It causes damages in passages.**



70F00-6E-72-1

Assembly

1) Install new O-ring to upper body.



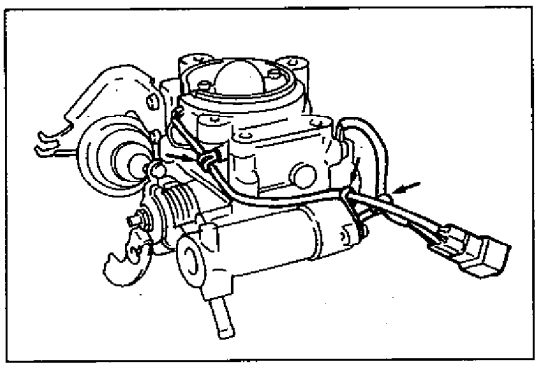
70F00-6E-72-2

2) Place O-ring in upper body groove and match upper and lower bodies using care so that O-ring will not come off.
3) Tighten screws to specified torque.

Tightening Torque
(a): 3.5 N·m (0.35 kg-m, 2.5 lb-ft)

4) Install IAT sensor.

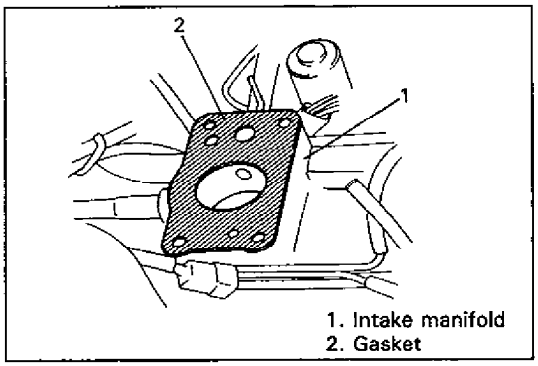
Tightening Torque
(b): 12—15 N·m (1.2—1.5 kg-m, 9.0—10.5 lb-ft)


70F00-6E-72-3

5) Install fuel pressure regulator according to procedure described in p. 6E-76.
6) Install fuel injector according to procedure described in p. 6E-75.
7) Install throttle position sensor according to procedure described in p. 6E-82.
8) Clamp wire harness securely.

Installation

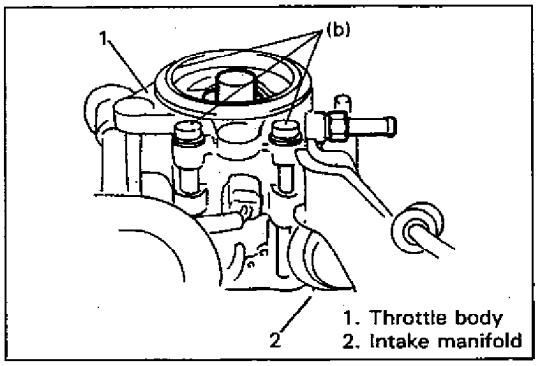
1) Clean mating surfaces and install throttle body gasket to intake manifold.
Use new gasket.



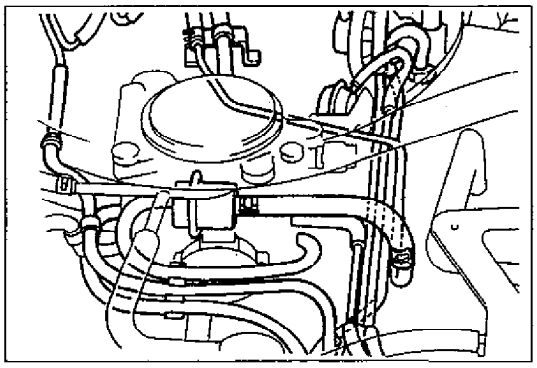
70F00-6E-72-4

2) Install throttle body to intake manifold and tighten bolts to specified torque.

Tightening Torque
(b): 18—28 N·m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)



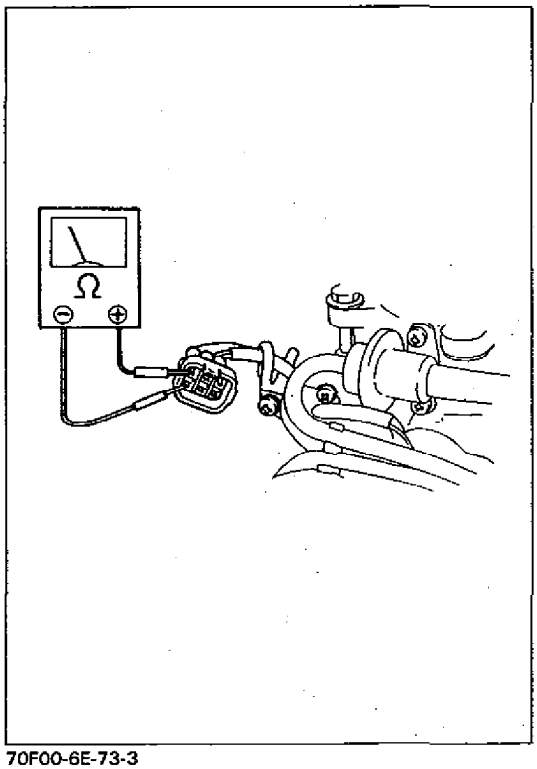
70F00-6E-72-5


70F00-6E-73-1

3) Connect fuel injector and TP sensor coupler.
4) Connect water hose to throttle body.
5) Connect vacuum hoses to throttle body.
6) Connect accelerator cable to throttle body.
Adjust the cable play to specification according to procedure described in p. 6E-64.
7) Connect fuel return hose to fuel pressure regulator and clamp it securely.

8) Connect fuel feed hose to throttle body and clamp it securely.
9) Refill engine coolant system.
10) Connect negative cable at battery.
11) With engine "OFF" and ignition switch "ON", check for fuel leaks around fuel line connection.
12) Install air cleaner case to throttle body.
13) Upon completion of installation, start engine and check for fuel leaks and engine coolant leaks.

70F00-6E-73-2



70F00-6E-73-3

FUEL INJECTOR

On-Vehicle Inspection

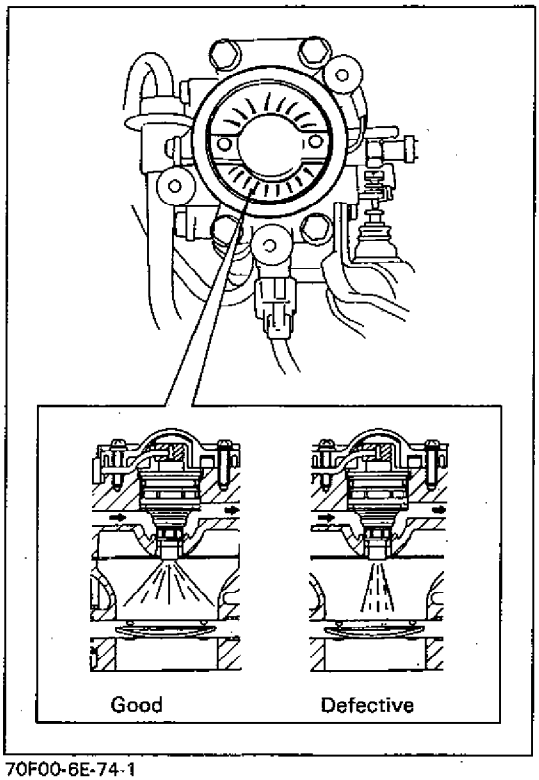
1) With battery negative cable disconnected, disconnect injector coupler.
2) Connect ohmmeter to each injector terminal and measure resistance.

Resistance of injector: 0.8—1.8 Ω at 20°C (68°F)

If resistance is out of specification, replace fuel injector.

CAUTION:
Never apply battery voltage directly to injector as that will cause injector coil to burn out.

3) Connect injector coupler.
4) Remove air cleaner case.
5) Connect battery negative cable.
6) Make sure that fuel pressure is felt at fuel return hose for 3 seconds after ignition switch ON.



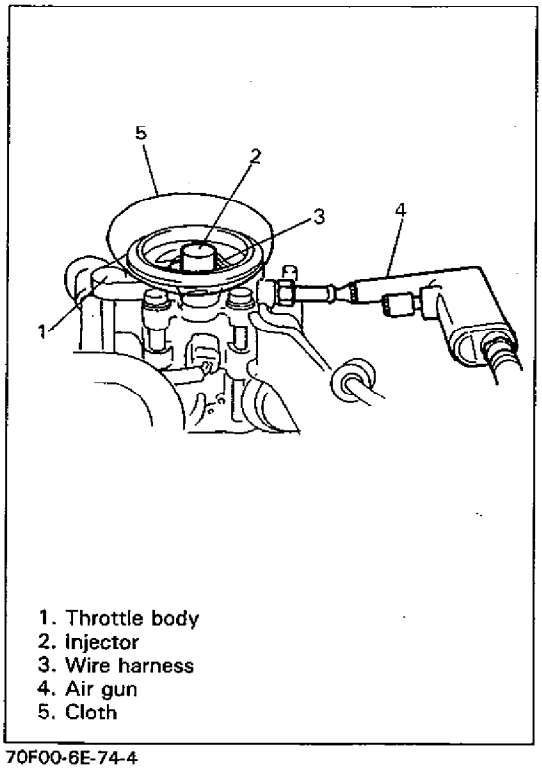
70F00-6E-74-1

7) Check that fuel is injected out in conical shape from fuel injector when cranking engine or running engine.
   If no fuel is injected, check wiring harness for continuity and couplers for proper connection referring to "Diagnostic Flow Chart B-1".
   If fuel is not injected out in conical shape, replace injector.
8) Check injector for fuel leakage after injection is stopped (i.e., after cranking or engine stop).
   Replace if leakage exists.
9) Install air cleaner case.

Removal

1) Relieve fuel pressure in fuel feed line referring to p. 6-4.
2) Disconnect battery negative cable at battery.
3) Remove air cleaner case.
4) Remove fuel feed hose clamp and disconnect fuel feed hose from throttle body.
5) Remove injector cover.
6) Disconnect injector coupler, release its wire harness from clamp and remove its grommet from throttle body.

70F00-6E-74-3



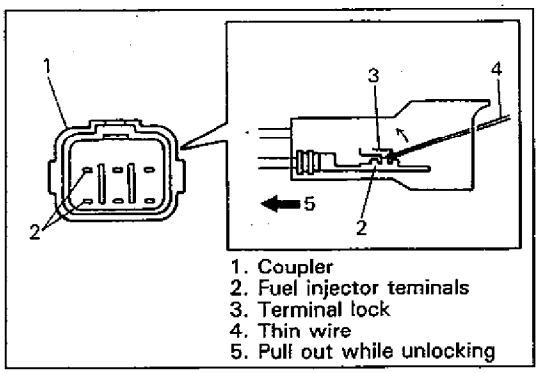
1. Throttle body
2. Injector
3. Wire harness
4. Air gun
5. Cloth

70F00-6E-74-4

7) Place some cloth over injector and hand on top of it. Using air gun, blow about 5 kg/cm² (500 kPa, 71.1 psi) or less compressed air into fuel inlet port of throttle body, and injector can be removed.

WARNING:
Be precise about pressure of compressed air. Blowing air under excessively high pressure may force injector jump out and cause damage not only to injector itself but also to other parts.

NOTE:
Use care when handling fuel injector especially not to damage injector-to-wire harness connection and its needle. Also, because injector is an electrical component, it should not be immersed in any type of liquid solvent or cleaner, as damage may ocuur.



1. Coupler
2. Fuel injector terminals
3. Terminal lock
4. Thin wire
5. Pull out while unlocking

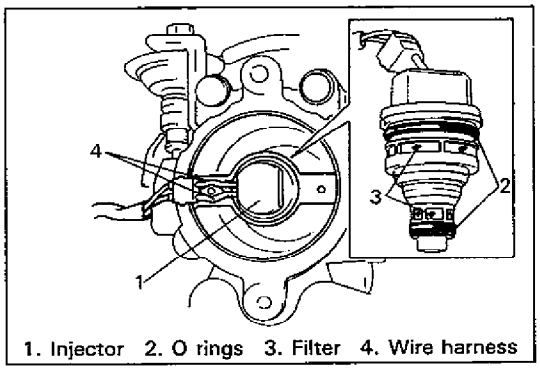
70F00-6E-75-1

8) Pull out fuel injector wire harness terminals from coupler after unlocking terminal lock.

Inspection

Check fuel injector filter for evidence of dirt and contamination. If present, clean and check for presence of dirt in fuel lines and fuel tank.

70F00-6E-75-2



1. Injector 2. O rings 3. Filter 4. Wire harness

70F00-6E-75-3

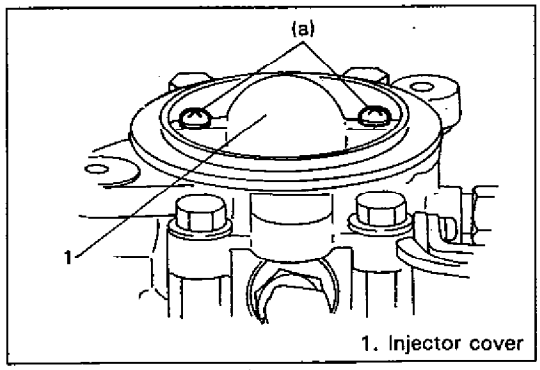
Installation

1) Make sure that injector O rings are free from any damage and deterioration.
2) Apply thin coat of spindle oil or gasoline to O rings and then install injector to throttle body.
   Make sure to fit injector wire harness into groove in throttle body securely.

   NOTE:
   Do not apply force to wire harness-to-injector connection.

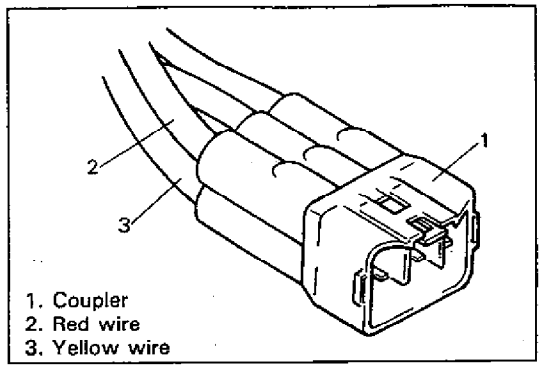
3) Install injector cover.
   Use new screws and tighten them to specified torque.

   Tightening Torque
   (a): 2 N·m (0.2 kg-m, 1.4 lb-ft)



1. Injector cover

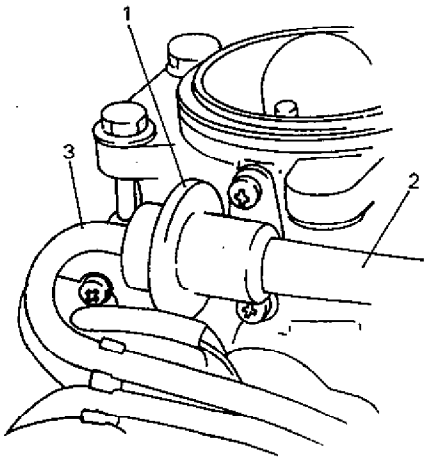
70F00-6E-75-4



1. Coupler
2. Red wire
3. Yellow wire

70F00-6E-75-5

4) Connect fuel feed hose to throttle body and clamp it securely.
5) Connect battery negative cable.
6) Repeat ignition switch ON for 3 sec. and OFF until fuel pressure is felt at fuel return hose and check that no fuel leaks from where fuel feed pipe is connected and where injector is installed.
7) Connect fuel injector terminals into coupler, check to make sure that they are locked securely.
8) Install air cleaner case.



1. Fuel pressure regulator
2. Fuel return hose
3. Vacuum hose

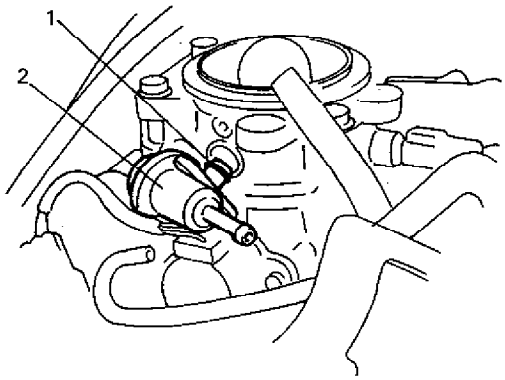
70F00-6E-76-1

FUEL PRESSURE REGULATOR

Removal

1) Remove air cleaner case.
2) Relieve fuel pressure in the fuel feed line referring to p. 6-4.
3) Disconnect battery negative cable from battery.
4) Disconnect fuel return hose and vacuum hose from fuel pressure regulator.
5) Remove fuel pressure regulator from throttle body.

CAUTION:
A small amount of fuel may be released when regulator is removed. Cover its hole with shop cloth.



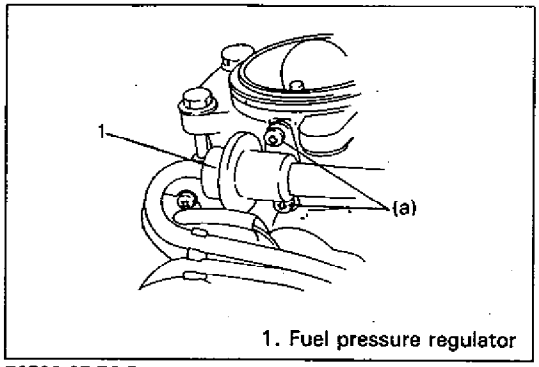
1. O ring
2. Fuel pressure regulator

70F00-6E-76-3

Installation

For installation, reverse removal procedure and note following precautions.

- Use new O ring.
- Apply thin coat of spindle oil or gasoline to O ring to facilitate installation.



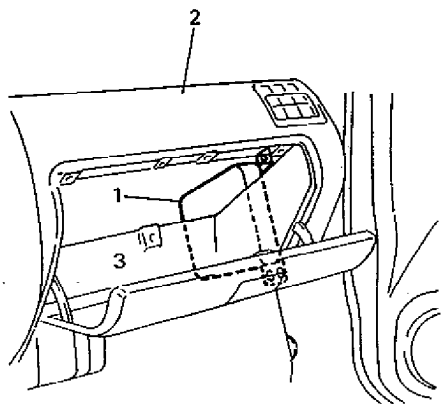
1. Fuel pressure regulator

70F00-6E-76-5

- Tighten fuel pressure regulator screws securely to following specified torque.

Tightening Torque
(a): 3.5 N·m (0.35 kg-m, 2.5 lb-ft)

- Upon completion of installation, check that no fuel leakage exists with applying fuel pressure to fuel feed line.



1. ECM
2. Instrument main panel
3. Glove box

70F00-6E-77-1

ELECTRONIC CONTROL SYSTEM

ENGINE CONTROL MODULE (ECM)

CAUTION:
As ECM consists of precision parts, be careful not to expose it to excessive shock.

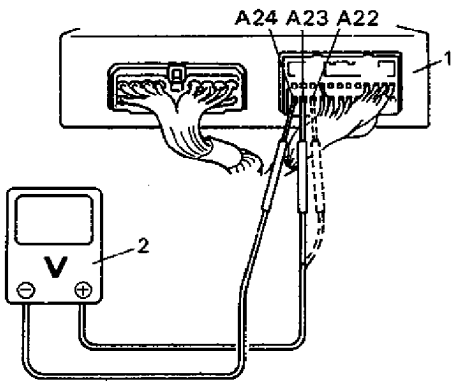
Removal

1) Disconnect battery negative cable from battery.
2) Remove glove box upper cover and dash side trim.
3) Disconnect couplers from ECM while releasing coupler lock.
4) Remove ECM after loosening three screws.

Installation

1) Install ECM.
2) Connect couplers to ECM securely.
3) Install glove box upper cover and dash side trim.
4) Connect battery negative cable to battery.

70F00-6E-77-3



1. ECM
2. Digital type voltmeter

70F00-6E-78-1

MANIFOLD ABSOLUTE PRESSURE SENSOR (MAP SENSOR)

Output Voltage Check

1) Remove ECM, referring to ECM removal on p. 6E-77.
2) With coupler connected to ECM, connect digital type voltmeter and check that ECM supply voltage. 4.75—5.25V is applied to coupler terminal A23.
3) Check output voltage at coupler terminal A22.
   Note that it varies with atmosheric pressure and altitude. Also, start engine, if it can, and check if output voltage varies.

Output voltage (ECM supply voltage 4.75—5.25V)

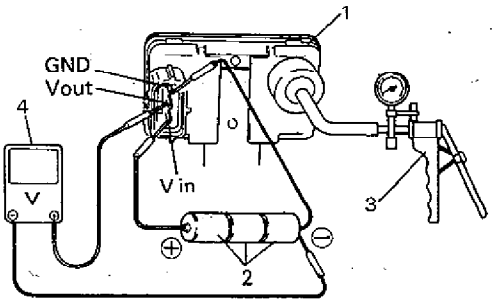
ALTITUDE		BAROMETRIC PRESSURE	OUTPUT VOLTAGE
(ft)	(m)	(mmHg)	(V)
0	0	760	3.6—4.4
1 000	305	733	3.5—4.2
2 000	610	707	3.4—4.1
3 000	914	682	3.2—4.0
4 000	1 219	658	3.1—3.8
5 000	1 524	634	3.0—3.7
6 000	1 829	611	2.9—3.6
7 000	2 133	589	2.8—3.4
8 000	2 438	567	2.7—3.3
9 000	2 743	546	2.6—3.2
10 000	3 048	526	2.5—3.1

NOTE:
Note that atmospheric pressure varies depending on weather conditions as well as altitude.
Take that into consideration when performing above check.

If check result is not satisfactory in previous step 2 or 3, check MAP sensor and its circuit according to Code No.31 or 32 Diagnostic Flow Chart.

NOTE:
If output voltage does not vary when engine is started, it is possible that vacuum hose and/or filter are clogged. Clean them.
Another possibility is that filter in MAP sensor is clogged from freezing. If it is suspected, leave it at room temperature (20°C, 68°F) for a while and recheck.

4) Upon completion of checking, install ECM referring to ECM installation on p. 6E-77.



1. MAP sensor
2. 1.5V Battery (4.5V in total)
3. Vacuum pump
4. Digital type voltmeter

70F00-6E-79-1

MAP Sensor Individual Check

1) Disconnect MAP sensor vacuum hose from filter.
2) Disconnect MAP sensor coupler.
3) Remove MAP sensor.
4) Arrange 3 new 1.5V batteries in series and connect its positive terminal to "Vin" terminal of coupler and negative terminal to "Ground" terminal. Then check voltage between "Vout" and "Ground".
   Also, check if voltage reduces when vacuum is applied up to 40 cmHg by using vacuum pump.

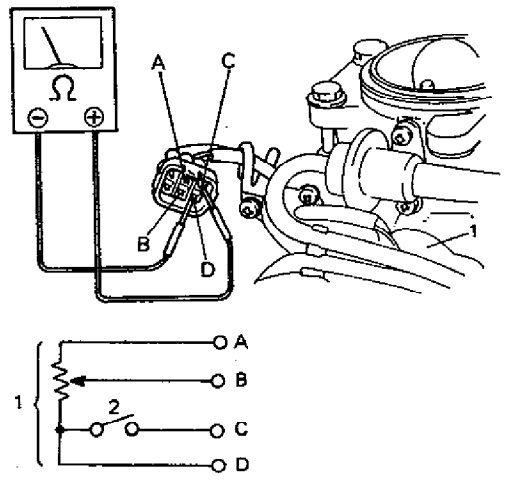
CAUTION:
As connection to wrong terminal will cause damage to MAP sensor, make absolutely sure to connect properly as shown below.

Output voltage (Vin voltage 4.5V)

ALTITUDE		BAROMETRIC PRESSURE	OUTPUT VOLTAGE
(ft)	(m)	(mmHg)	(V)
0	0	760	3.4—3.8
1 000	305	733	3.3—3.7
2 000	610	707	3.1—3.6
3 000	914	682	3.0—3.5
4 000	1 219	658	2.9—3.3
5 000	1 524	634	2.8—3.2
6 000	1 829	611	2.7—3.1
7 000	2 133	589	2.6—3.0
8 000	2 438	567	2.5—2.9
9 000	2 743	546	2.4—2.8
10 000	3 048	526	2.3—2.7

If check result is not satisfactory, replace MAP sensor.

5) Install MAP sensor and connect vacuum hose securely.
6) Connect MAP sensor coupler securely.



1. TP sensor
2. Idle switch

70F00-6E-80-1

THROTTLE POSITION SENSOR (TP SENSOR)

Inspection

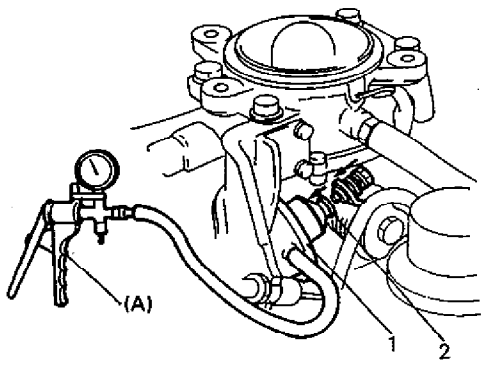
1) Disconnect negative cable at battery and TP sensor wires at the coupler.
2) Using ohmmeter, check the resistance between each two terminals.

Resistance between C and D terminals (Idle switch)	When throttle lever-to-stop screw clearance is 0.3 mm (0.012 in.)	0—500 Ω
	When throttle lever-to-stop screw clearance is 0.5 mm (0.020 in.)	∞ (Infinity)
Resistance between A and D terminals	———	3.5—6.5 kΩ
Resistance between B and D terminals	When throttle valve is at idle position	0.3—2 kΩ
	When throttle valve is fully open	2—6.5 kΩ

NOTE:
- **When checking resistance at idle position, apply —50 cmHg vacuum to throttle opener to move throttle valve to idle position.**
- **There should be more than 2 kΩ resistance difference between when throttle valve is at idle position and when it is fully open.**

If idle switch check result is not satisfactory, adjust installation angle of TP sensor and then check again.
If found defective in above check, replace.

3) Connect TP sensor coupler securely and battery negative cable to battery.



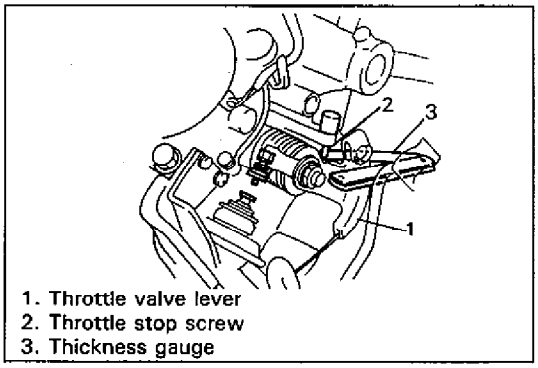
1. Throttle opener

70F00-6E-80-4

Adjustment

1) Disconnect battery negative cable at battery and TP sensor coupler.
2) Disconnect throttle opener vacuum hose from SV valve and connect vacuum pump gauge to hose disconnected. Apply —50 cmHg vacuum to throttle opener to move throttle valve to idle position.

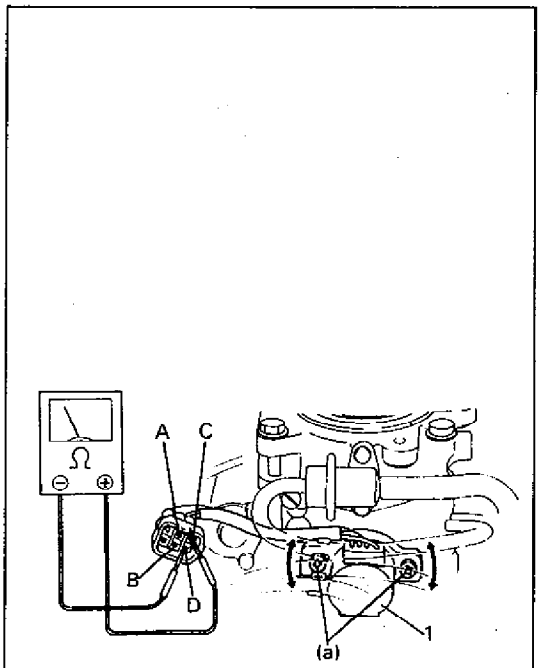
Special Tool
(A): 09917-74910



1. Throttle valve lever
2. Throttle stop screw
3. Thickness gauge

70F00-6E-81-1

3) Insert 0.4 mm (0.016 in.) thickness gauge between throttle valve lever and throttle stop screw.



1. TP sensor

70F00-6E-81-2

4) Loosen TP sensor mounting bolts.
5) Connect ohmmeter between C and D terminals of TP sensor coupler.
6) First, turn TP sensor clockwise fully and then counterclockwise gradually to find position where ohmmeter reading changes from ∞ (infinity) to 0 (zero). Then fix TP sensor at that position by tightening bolts to specified torque.

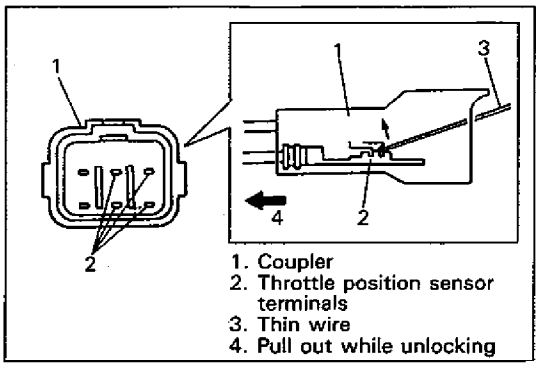
Tightening Torque
(a): 3.5 N·m (0.35 kg-m, 2.5 lb-ft)

7) Check that there is no continuity between terminals C and D when 0.5 mm (0.020 in.) thickness gauge is inserted.
8) Check that there is continuity between terminals C and D when 0.3 mm (0.012 in.) thickness gauge is inserted.

If check result is unsatisfactory in steps 7) and 8), it means that installation angle of TP sensor is not adjusted properly. Therefore, start all over again from step 1).

CAUTION:
As throttle stop screw is factory adjusted precisely, don't remove or adjust it.

9) Connect coupler to TP sensor securely, connect throttle opener vacuum hose to SV valve and connect battery negative cable.

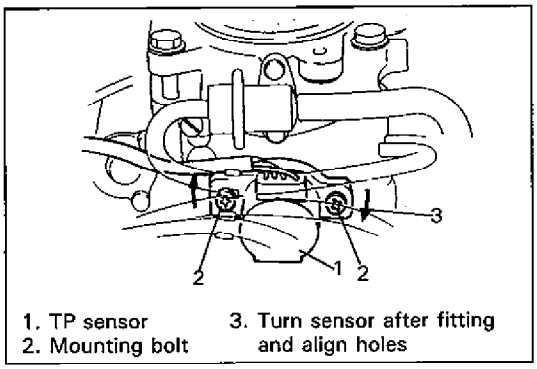


1. Coupler
2. Throttle position sensor terminals
3. Thin wire
4. Pull out while unlocking

70F00-6E-81-5

Removal

1) Disconnect negative cable at battery.
2) Disconnect TP sensor coupler.
3) Pull out TP sensor wire harness terminals from coupler after unlocking terminal lock.
4) Remove TP sensor from throttle body.

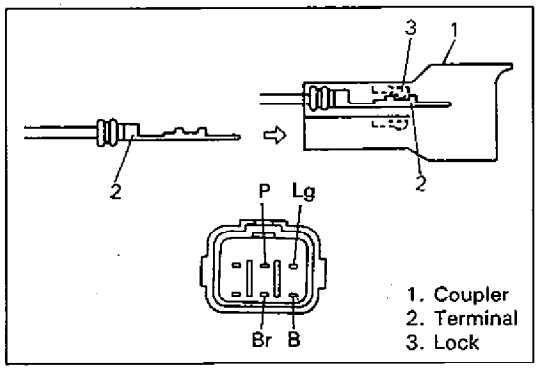


1. TP sensor
2. Mounting bolt
3. Turn sensor after fitting and align holes

70F00-6E-82-1

Installation

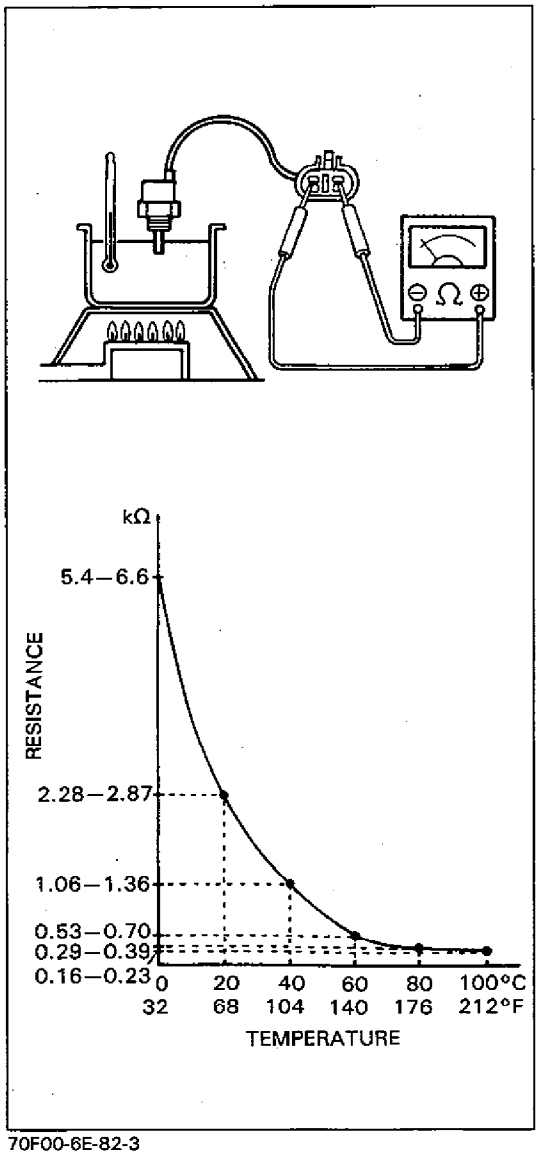
1) Install TP sensor to throttle body.
   Fit sensor to throttle body in such way that its adjusting holes are a little away from sensor mounting bolt holes as shown in figure and turn sensor clockwise so that those holes align. Then hand-tighten sensor mounting bolts in aligned holes.



1. Coupler
2. Terminal
3. Lock

70F00-6E-82-2

2) Insert TP sensor terminals into coupler and check to make sure that they are locked.
3) Adjust installation angle of TP sensor according to procedure described in item "Adjustment".
4) Connect battery negative cable to battery.



70F00-6E-82-3

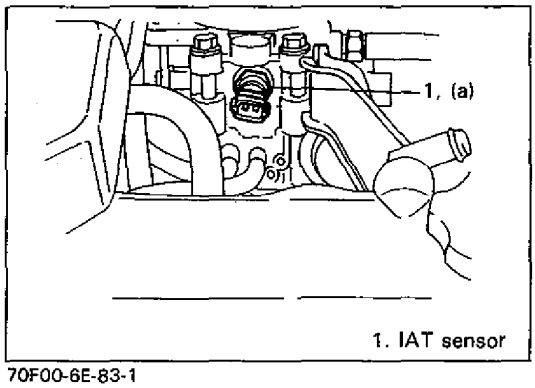
INTAKE AIR TEMPERATURE SENSOR (IAT SENSOR)

Removal

1) Disconnect negative cable from battery.
2) Remove air cleaner case.
3) Disconnect IAT sensor coupler.
4) Remove IAT sensor from throttle body.

Inspection

Immerse temperature sensing part of IAT sensor in water (or ice) and measure resistance between sensor terminals while heating water gradually.
If measured resistance doesn't show such characteristic as shown in left figure, replace intake air temperature sensor.



70F00-6E-83-1

Installation

Reverse removal procedure noting the following.

- Clean mating surface of sensor and throttle body.
- Use new gasket.
- Tighten IAT sensor to specified torque.

Tightening Torque
(a): 12—15 N·m (1.2—1.5 kg-m, 9.0—10.5 lb-ft)

- Connect sensor coupler securely.

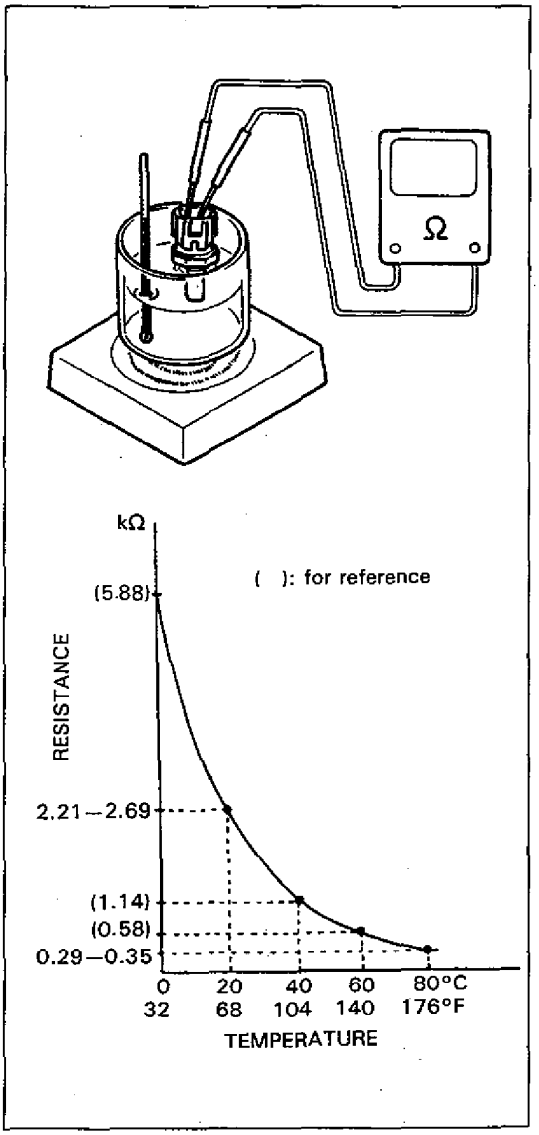
ENGINE COOLANT TEMPERATURE SENSOR (ECT SENSOR)

Removal

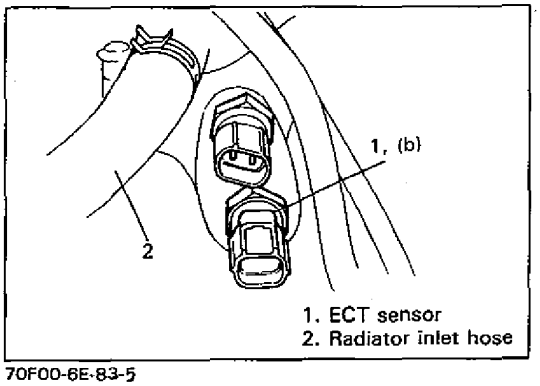
1) Disconnect battery negative cable from battery.
2) Drain cooling system.
3) Disconnect coupler from ECT sensor.
4) Remove ECT sensor from intake manifold.

Inspection

Immerse temperature sensing part of ECT sensor in water and measure resistance between sensor terminals while heating water gradually.
If measured resistance doesn't show such characteristic as shown, replace ECT sensor.



70F00-6E-83-2



70F00-6E-83-5

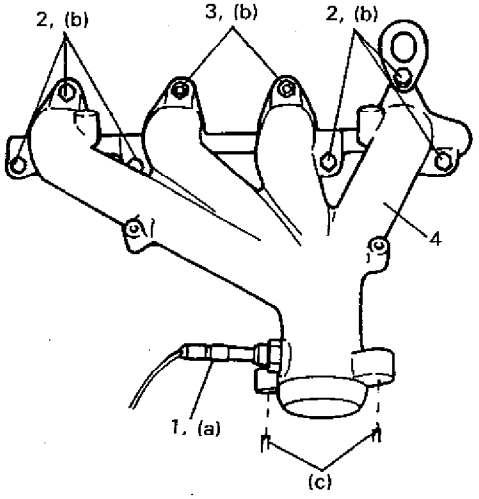
Installation

Reverse removal procedure noting the following.

- Clean mating surfaces of sensor and intake manifold.
- Use new gasket.
- Tighten ECT sensor to specified torque.

Tightening Torque
(b): 12—15 N·m (1.2—1.5 kg-m, 9.0—10.5 lb-ft)

- Connect coupler to sensor securely.
- Refill cooling system.



1. Oxygen sensor
2. Bolt
3. Nut
4. Exhaust manifold

70F00-6E-84-1

OXYGEN SENSOR

Removal

WARNING:
To avoid danger of being burned, do not touch exhaust system when system is hot. Oxygen sensor removal should be performed when system is cool.

1) Disconnect negative cable from battery.
2) Disconnect coupler of oxygen sensor.
3) Remove exhaust manifold with oxygen sensor.
4) Remove oxygen sensor from exhaust manifold.

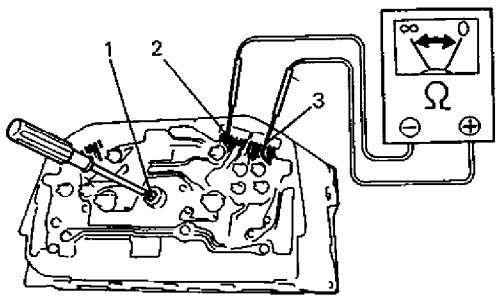
Installation

Reverse removal procedure noting the following.

- Tighten oxygen sensor, exhaust manifold bolts & nuts and exhaust pipe bolts to specified torque.

Tightening Torque
(a): 35—45 N·m (3.5—4.5 kg-m, 25.5—32.5 lb-ft)
(b): 18—28 N·m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)
(c): 35—55 N·m (3.5—5.5 kg-m, 25.5—39.5 lb-ft)

- Connect coupler of oxygen sensor and clamp wire harness securely.
- After installing oxygen sensor, start engine and check that no exhaust gas leakage exists.



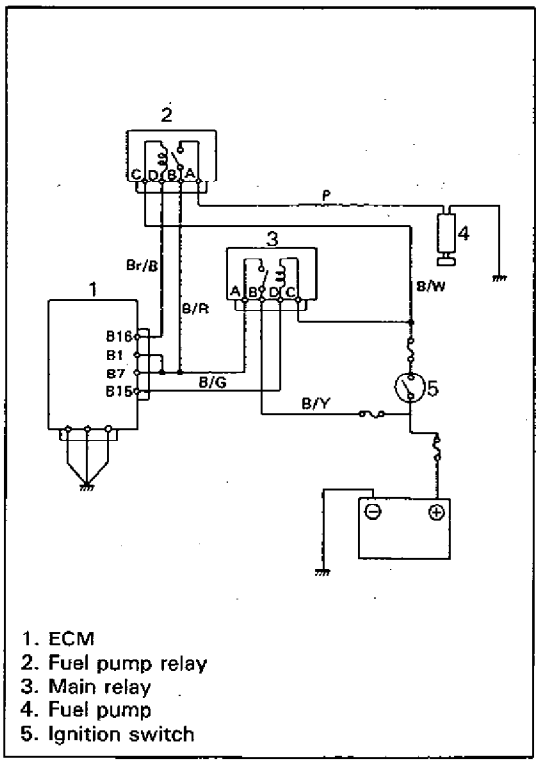
1. Speedometer cable joint
2. "GND" terminal
3. "VSS" terminal

70F00-6E-84-3

VEHICLE SPEED SENSOR (VSS)

Inspection

1) Disconnect negative cable at battery.
2) Remove combination meter from instrument panel.
3) Connect ohmmeter between "VSS" terminal and "GND" terminal of combination meter and turn cable joint of speedometer with a screwdriver. Ohmmeter indicator should move back and forth between continuity and ∞ (infinity) 4 times while cable joint is turned one full revolution. Replace speedometer if check result is not satisfactory.
4) Install combination meter to instrument panel.
5) Connect negative cable to battery.

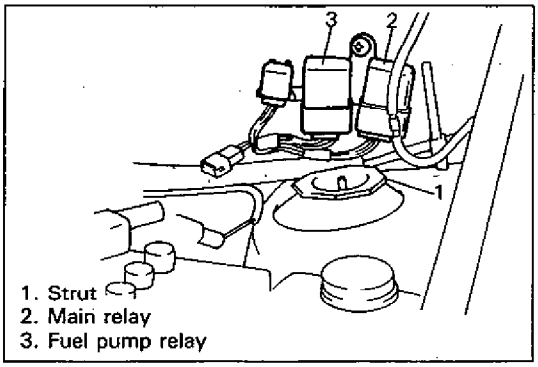


1. ECM
2. Fuel pump relay
3. Main relay
4. Fuel pump
5. Ignition switch

70F00-6E-85-1

MAIN RELAY

NOTE:
Distinguish between main relay and fuel pump relay by wire colors.

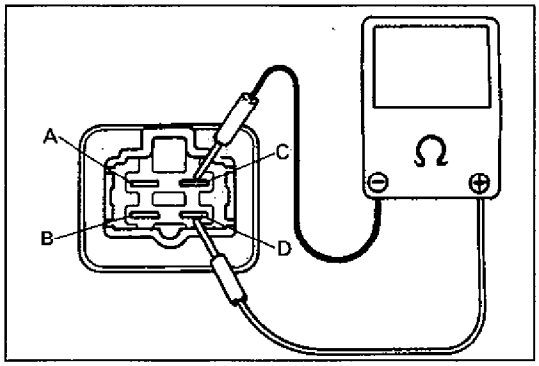


1. Strut
2. Main relay
3. Fuel pump relay

70F00-6E-85-3

Inspection

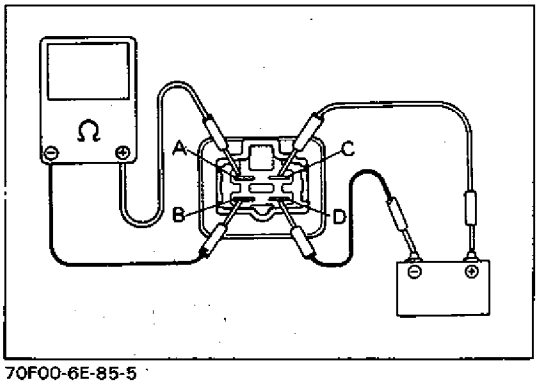
1) Disconnect negative cable at battery.
2) Remove main relay from bracket after disconnecting its coupler.



70F00-6E-85-4

3) Check resistance between each two terminals as in table below.
   If check results are as specified, proceed to next operation check. If not, replace.

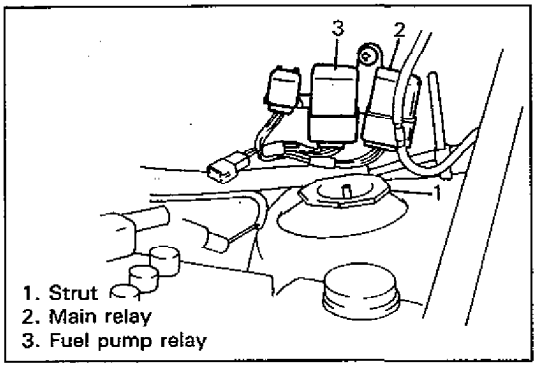
TERMINALS	RESISTANCE
Between A and B	∞ (infinity)
Between C and D	60—88 Ω



70F00-6E-85-5

4) Check that there is continuity between terminals "A" and "B" when battery is connected to terminals "C" and "D".

   If found defective, replace.



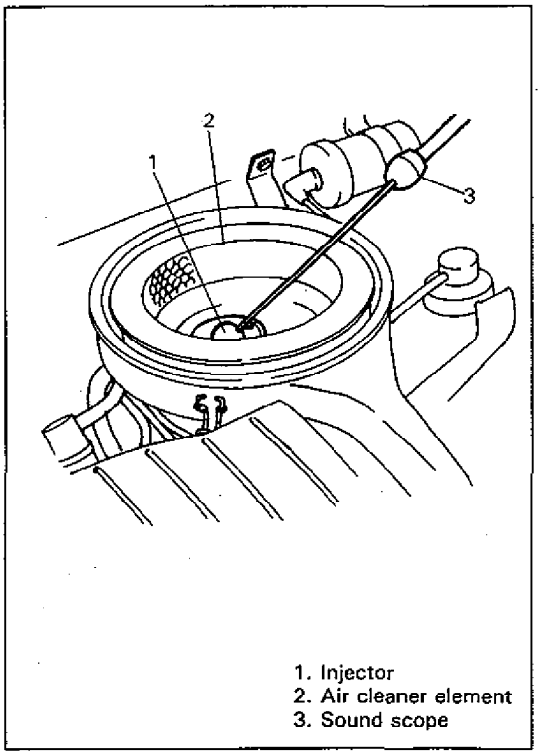
1. Strut
2. Main relay
3. Fuel pump relay

70F00-6E-86-1

FUEL PUMP RELAY

Inspection

1) Remove fuel pump relay in the same way as main relay.
2) Structure of fuel pump relay is the same as that of main relay. Check its resistance and operation using the same procedure as that for main relay.
   If found defective, replace.



1. Injector
2. Air cleaner element
3. Sound scope

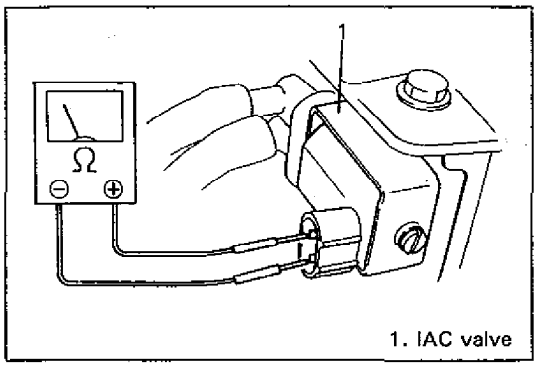
70F00-6E-86-2

FUEL CUT OPERATION

Inspection

NOTE:
Before inspection, check to make sure that gear shift lever is in neutral position, and that parking brake lever is pulled all the way up.

1) Warm up engine to normal operating temperature.
2) Remove air cleaner upper cover.
3) While listening to sound of injector by using sound scope or such, increase engine speed to higher than 3,000 r/min.
4) Check to make sure that sound to indicate operation of injector stops when throttle valve is closed instantly and it is heard again when engine speed is reduced to less than about 1,600 r/min.



1. IAC valve

70F00-6E-86-4

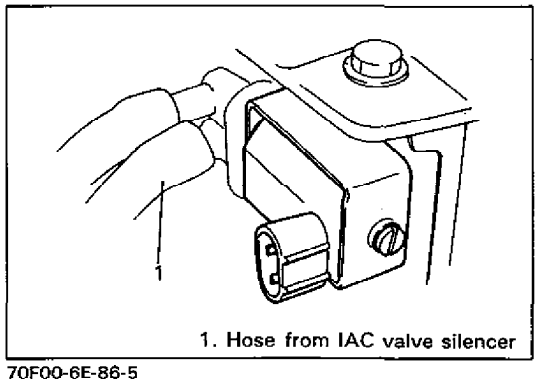
IDLE AIR CONTROL VALVE (IAC VALVE)

Inspection

1) With ignition switch "OFF", disconnect IAC valve coupler.
2) Check resistance between each two terminals of IAC valve.

   IAC valve resistance: 24—30 Ω

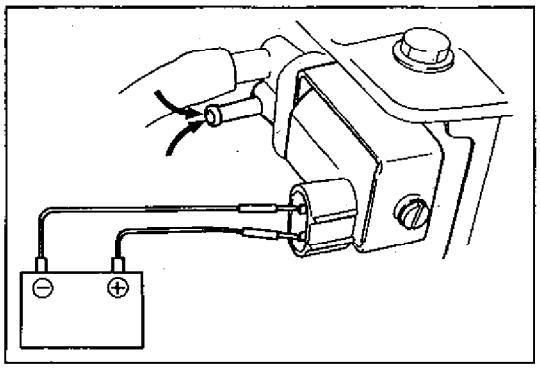
   If it is within specification, proceed to next operation check. If not, replace.



1. Hose from IAC valve silencer

70F00-6E-86-5

3) Warm up engine to normal operating temperature.
4) With engine running and IAC valve coupler disconnected, disconnect IAC valve hose from air cleaner case.
   In this state, check that air is not drawn into the hose.



70F00-6E-87-1

5) Under above condition, connect 12V-battery to IAC valve terminals and check that air is drawn into the hose.

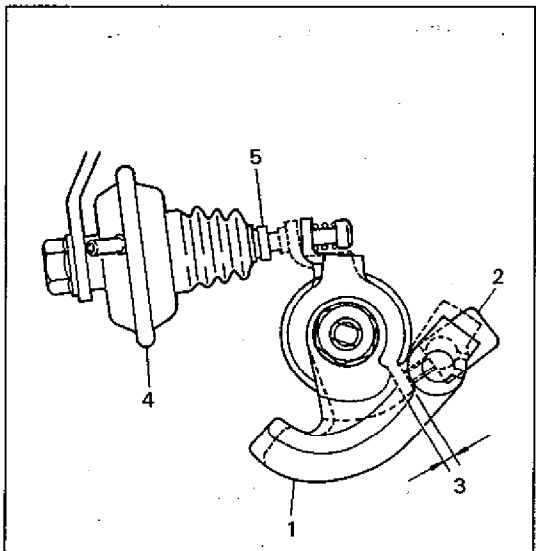
   If check result is not satisfactory, replace IAC valve.

6) Connect hose and coupler securely.

THROTTLE OPENER SYSTEM

System Inspection

1) Warm up engine to normal operating temperature.
2) Check that there is clearance between throttle stop screw and throttle lever at engine stop and cranking and that 0—1.0 second after engine start, throttle opener rod retracts and clearance disappears.
   If check result is not satisfactory, check vacuum hoses, throttle opener, SV valve and system electric circuit.

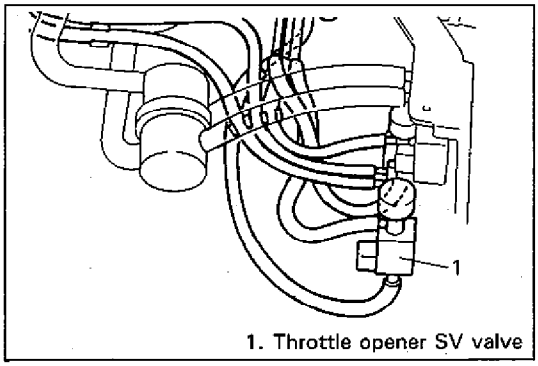


1. Throttle lever
2. Throttle stop screw
3. Clearance
4. Throttle opener
5. Rod

70F00-6E-87-2

Vacuum Hoses Inspection

Check hoses for connection, leakage, clog and deterioration. Replace as necessary.



1. Throttle opener SV valve

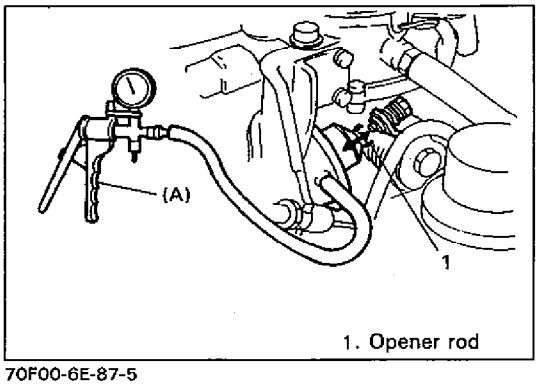
70F00-6E-87-4

Throttle Opener Inspection

1) Disconnect vacuum hose from SV valve.
2) Connect vacuum pump gauge to hose disconnected in Step 1).

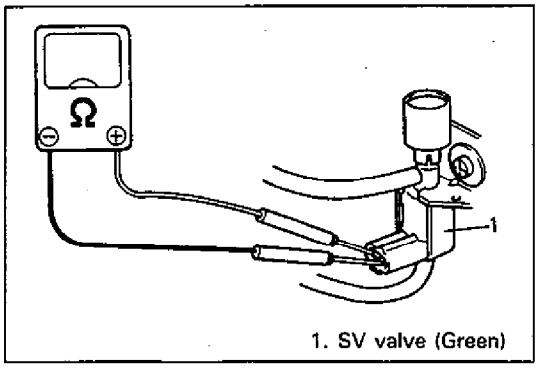
   Special Tool
   (A): 09917-47910

3) Check that opener rod moves smoothly and that it is held at the same position when 50 cmHg vacuum is applied to opener.
   If rod doesn't move smoothly, or it isn't held at the same position, replace.



1. Opener rod

70F00-6E-87-5



1. SV valve (Green)

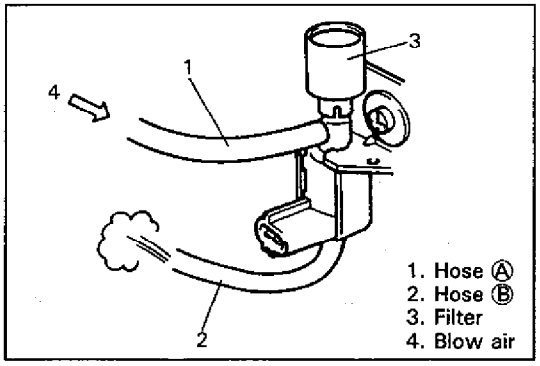
70F00-6E-88-1

Solenoid Vacuum Valve (SV Valve) Inspection

1) With ignition switch OFF, disconnect coupler from SV valve.
2) Check resistance two terminals of SV valve.

Resistance of throttle opener SV valve: 33—39 Ω

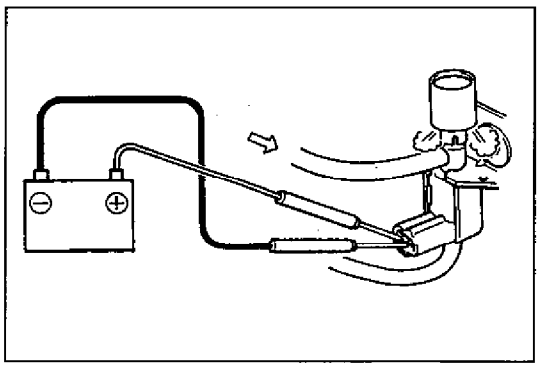
If resistance is as specified, proceed to next operation check. If not, replace.



1. Hose Ⓐ
2. Hose Ⓑ
3. Filter
4. Blow air

70F00-6E-88-2

3) Disconnect vacuum hoses from throttle opener and intake manifold.
4) Blow into hose Ⓐ. Air should come out of hose Ⓑ and not out of filter.



70F00-6E-88-3

5) Connect 12V battery to SV valve terminals. In this state, blow hose Ⓐ.
Air should come out of filter and not out of hose Ⓑ.

If check result is not as described above, replace SV valve.

6) Connect SV valve coupler securely.
7) Connect vacuum hoses securely.

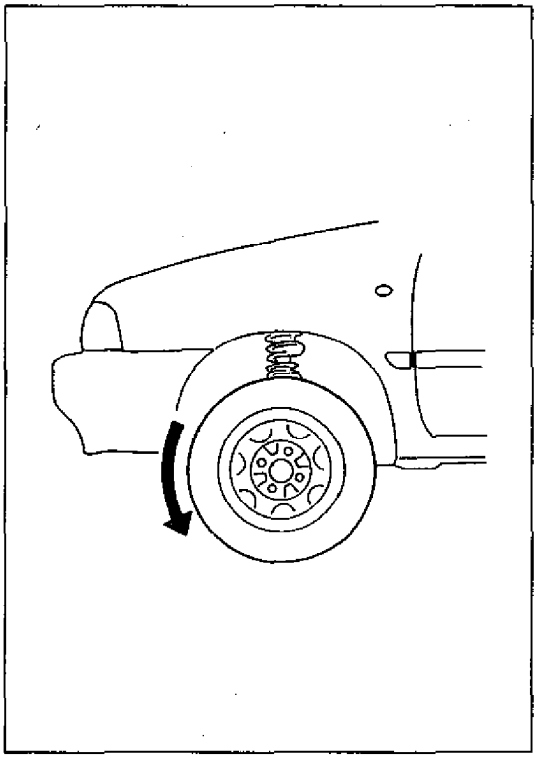
EGR SYSTEM

NOTE:
Before inspecting EGR system, be sure to confirm the following.

- **Altitude is 7,810 ft, 2,380 m above sea level or lower and atmospheric pressure is 650 mmHg or higher.**
- **ECT sensor, TP sensor, vehicle speed sensor and MAP sensor are in good condition.**

If even one of the above conditions do not apply, EGR valve don't operate.

70F00-6E-88-4



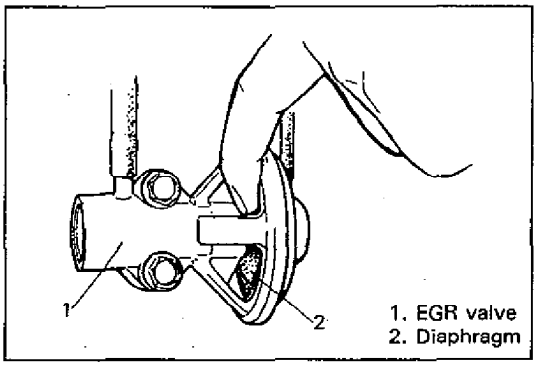
70F00-6E-89-1

System Inspection

NOTE:
Before inspection, check to make sure that gear shift lever is in neutral position and that parking brake lever is pulled all the way up.

1) Hoist vehicle so that front wheels rotate freely.
2) Set M/T in "Neutral".
3) Start engine and check that front wheels are turning.
   If not, perform following check with one front wheel locked and the other turned by hand.

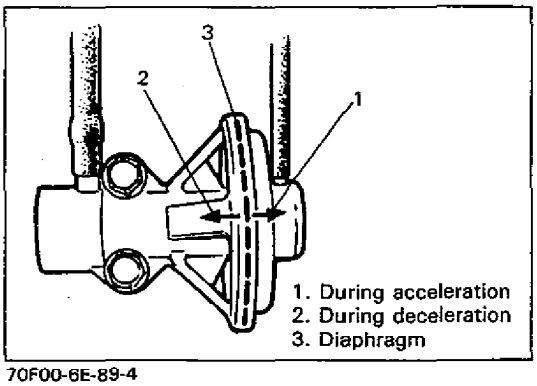
> **WARNING:**
> **Make sure that M/T is set to "Neutral" position for this check. If it is set to any other position, front tires will turn at high speed and a very dangerous situation may occurs.**



70F00-6E-89-3

4) When engine is cool (coolant temperature is below 53°C, 127°F), start engine and race it, and check that EGR valve diaphragm is not operating in this state, by touching diaphragm with finger.

> **CAUTION:**
> **If EGR valve is hot, it may be necessary to wear gloves to avoid burning fingers.**

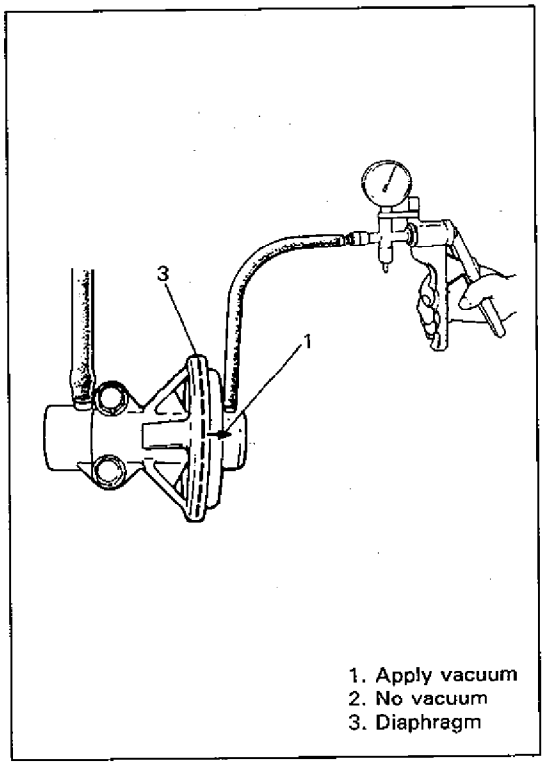


70F00-6E-89-4

5) Warm up engine to normal operating temperature and race it after warming up. Then check to be sure that diaphragm moves toward 1 in figure at the left during acceleration and toward 2 during deceleration.
   If EGR valve fails to operate properly, check vacuum hoses EGR valve, EGR modulator, SV valve, wire harness and ECM.
6) Keep engine running at idle speed and open EGR valve by hand, and engine should either stop or reduce its speed. If neither occurs, EGR passage is clogged. Clean it.

Vacuum Hose Inspection

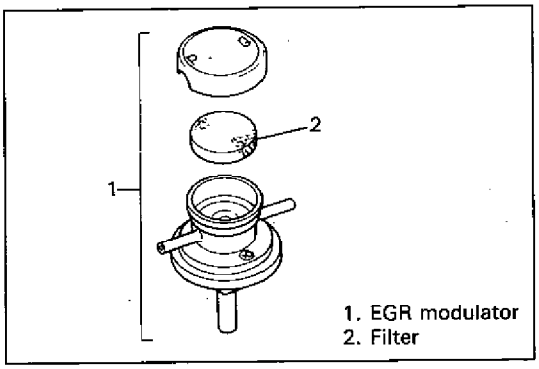
Check hoses for connection, leakage, clog and deterioration. Replace as necessary.



70F00-6E-90-1

EGR Valve Inspection

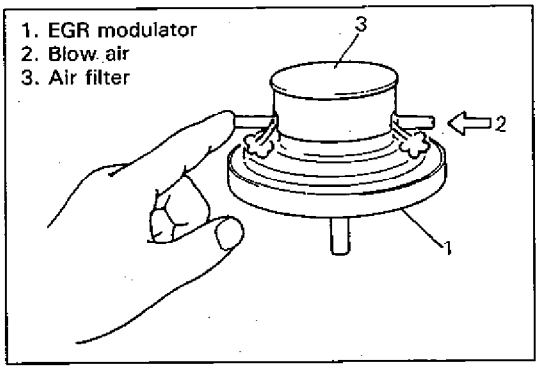
1) Disconnect vacuum hose from EGR modulator.
2) Connect vacuum pump gauge to its hose.
3) Check that EGR valve diaphragm moves smoothly and that it is held at the same position when 20 cmHg vacuum is applied to EGR valve.
   If diaphragm doesn't move smoothly, or it isn't held at the same position, replace EGR valve.
4) After checking, be sure to connect vacuum hose.



70F00-6E-90-3

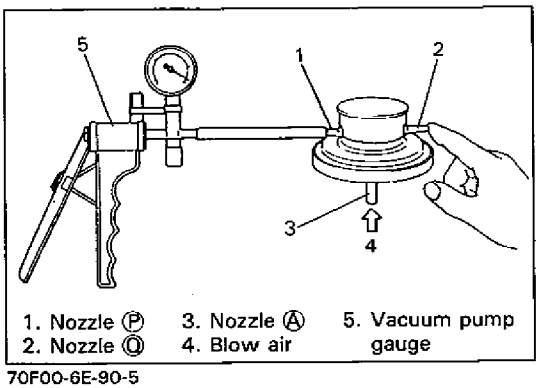
EGR Vacuum Modulator (EGR Modulator) Inspection

1) Check filter for contamination and damage.
   Using compressed air, clean filter.



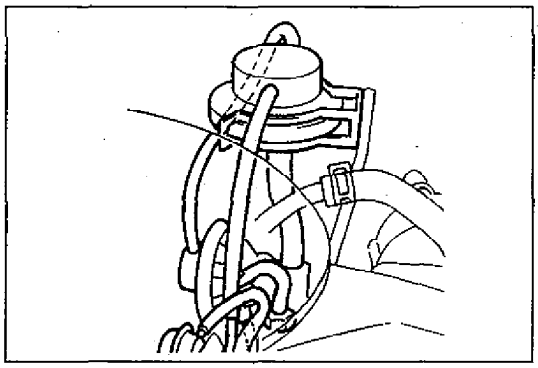
70F00-6E-90-4

2) Remove EGR modulator and plug nozzle with finger. Blow air into another nozzle and check that air passes through to air filter side freely.



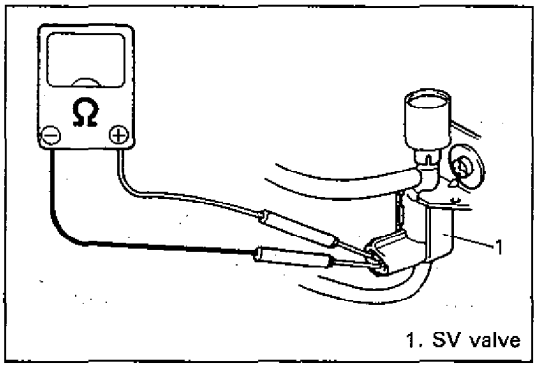
70F00-6E-90-5

3) Connect vacuum pump gauge to nozzle Ⓟ and plug nozzle Ⓠ with finger.
   While blowing air into nozzle Ⓐ, operate vacuum pump gauge and check that vacuum is applied to modulator.
   Then stop blowing nozzle Ⓐ and check that vacuum pump gauge indicates "0" (zero).
   If check result is not satisfactory, replace EGR modulator.



70F00-6E-91-1

4) After checking, install modulator and connect hoses securely. Refer to emission control information label for connection.



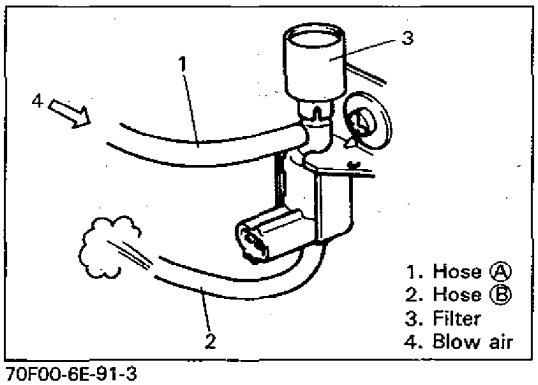
70F00-6E-91-2

EGR Solenoid Vacuum Valve (EGR SV Valve) Inspection

1) With ignition switch OFF, disconnect coupler from SV valve.
2) Check resistance between two terminals of SV valve.

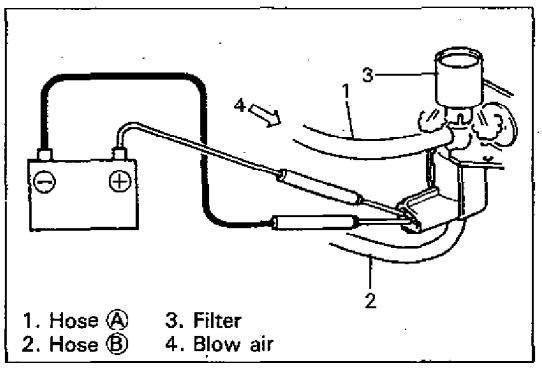
Resistance of EGR SV valve: 33—39 Ω

If resistance is as specified, proceed to next operation check. If not, replace.



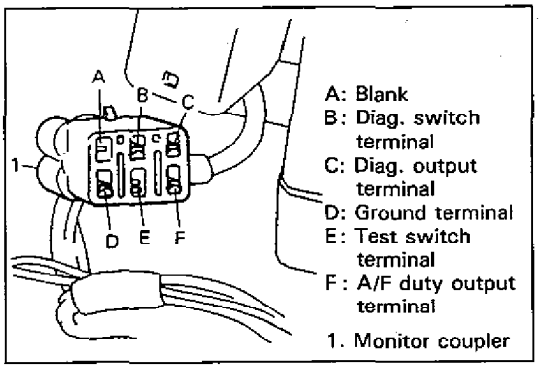
70F00-6E-91-3

3) Disconnect vacuum hoses from EGR modulator and throttle body.
4) Blow into hose Ⓐ. Air should come out of hose Ⓑ and not out of filter.

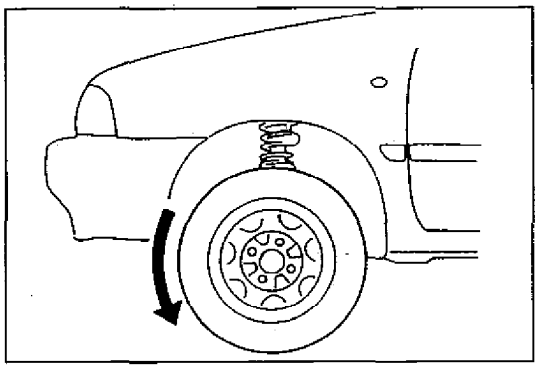


70F00-6E-91-4

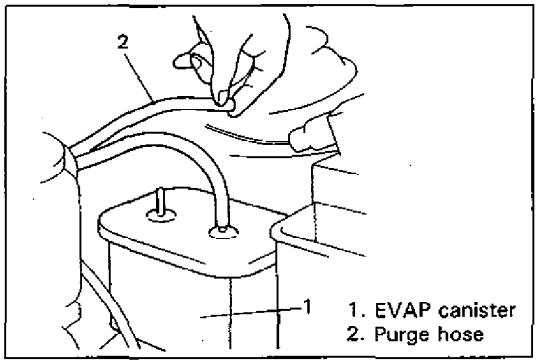
5) Connect 12V-battery to SV valve terminals. In this state, blow hose Ⓐ.
Air should come out of filter and not out of hose Ⓑ.
If check result is not as described above, replace SV valve.
6) Connect SV valve coupler securely.
7) Connect vacuum hoses securely.



70F00-6E-92-1



70F00-6E-92-2



70F00-6E-92-3

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM

EVAP Canister Purge Inspection

NOTE:

Before inspection, check to make sure that gear shift lever is in neutral position and that parking brake lever is pulled all the way up.

1) Warm up engine to normal operating temperature.
2) Remove monitor coupler from cap. Connect "D" and "E" terminals of monitor coupler by using service wire.
3) Hoist vehicle so that front wheels rotate freely.
4) Set M/T in "Neutral".
5) Start engine and check that front wheels are turning. If not, perform following check with one front wheel locked and the other turned by hand.

WARNING:
Make sure that M/T is set to "Neutral" position for this check. If it is set to any other position, front tires will turn at high speed and a very dangerous situation may occurs.

6) Disconnect purge hose from canister. Place finger against the end of disconnected hose as shown and check that vacuum is not felt there when engine is running at idle speed.
   Also check that vacuum is felt when engine speed is increased to higher than 1.350 r/min. by opening throttle valve.
   If check result is not satisfactory, check vacuum passage hoses, SP valve, wire harness and ECM.

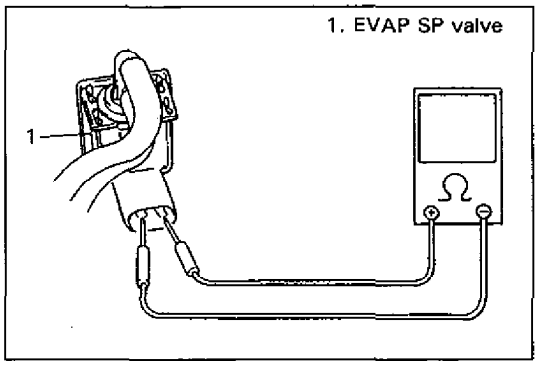
Vacuum Passage Inspection

Start engine and run it at idle speed. With finger placed against vacuum nozzle, check that vacuum is applied.
If it is not applied, clean vacuum passage by blowing compressed air.

Vacuum Hose Inspection

Check hoses for connection, leakage, clog and deterioration. Replace as necessary.

70F00-6E-92-4



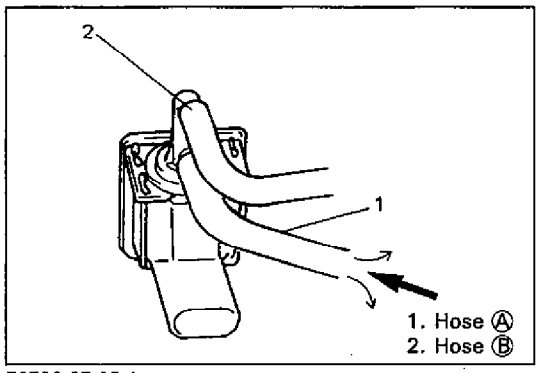
70F00-6E-92-5

EVAP Solenoid Purge Valve (EVAP SP Valve) Inspection

1) With ignition switch OFF, disconnect coupler from SP valve.
2) Check resistance between two terminals of SP valve.

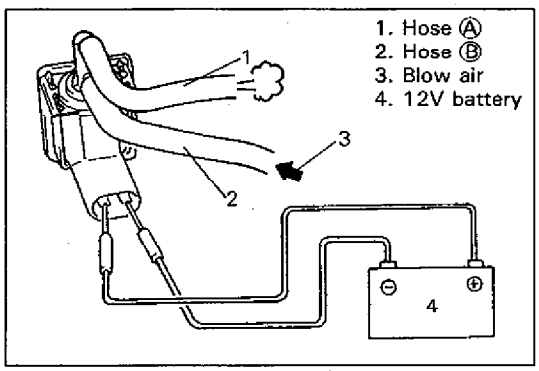
Resistance of EVAP SP valve	33—39 Ω

If resistance is as specified, proceed to next operation check. If not, replace.



70F00-6E-93-1

3) Disconnect vacuum hoses from intake manifold and canister.
4) With coupler disconnected, blow into hose Ⓐ. Air should not come out of hose Ⓑ.



70F00-6E-93-2

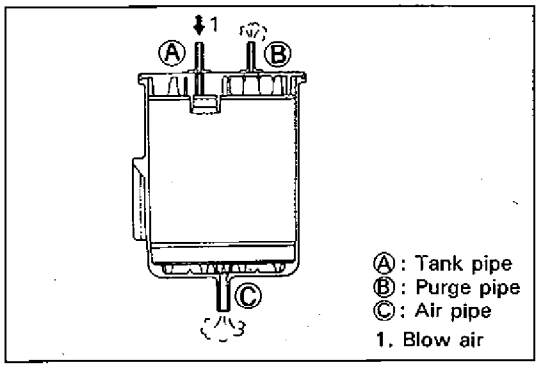
5) Connect 12V-battery to SP valve terminals. In this state, blow hose Ⓐ.
Air should come out of hose Ⓑ.

WARNING:
Do not suck the air through SP valve. Fuel vapor inside SP valve is harmful.

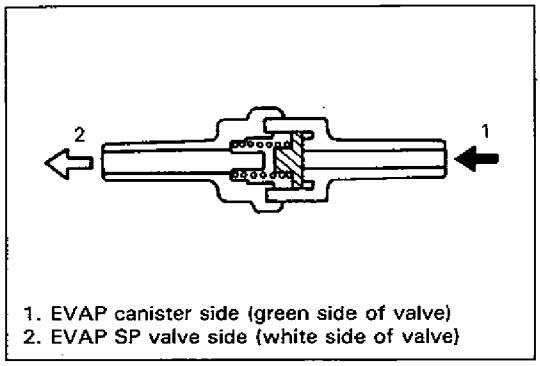
If check result is not as described, replace SP valve.

6) Connect vacuum hoses and SP valve coupler securely.

70F00-6E-93-3



70F00-6E-93-4

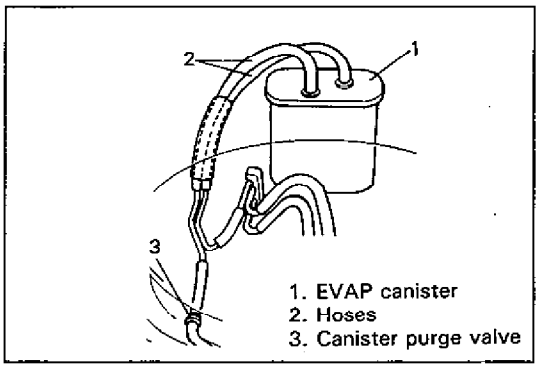


70F00-6E-93-5

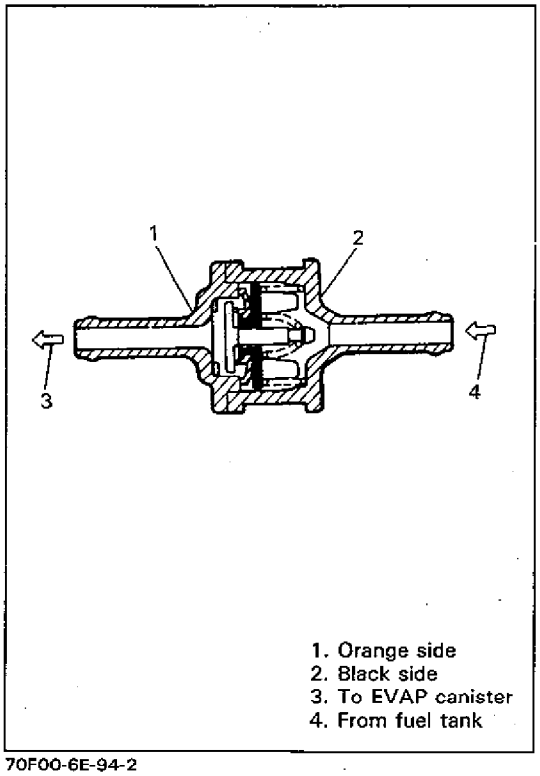
EVAP Canister/Canister Purge Valve Inspection

WARNING:
DO NOT SUCK nozzles on canister/canister purge valve. Fuel vapor inside canister/canister purge valve is harmful.

1) Disconnect vacuum hoses from canister.
2) When air is blown into pipe Ⓐ, there should be no restriction of flow through pipes Ⓑ and Ⓒ.
3) If operation differs from above description, EVAP canister must be replaced.
4) Disconnect vacuum hoses from canister purge valve.
5) Air should pass through valve smoothly from EVAP canister side (green side of valve) to EVAP SP valve side (white side of valve) when blown hard.
6) Air should not pass through valve from EVAP SP valve side to EVAP canister side.



70F00-6E-94-1



70F00-6E-94-2

7) If operation differs from above description, canister purge valve must be replaced.
8) Connect hoses to canister and canister purge valve.

Tank Pressure Control Valve (TPC Valve) Inspection

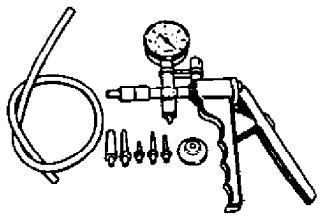
1) Remove TPC valve installed on fuel tank.
2) Air should pass through valve smoothly from fuel tank side (black side of check valve) to orange side when blown hard.
3) From orange side, even when blown softly, air should come out of black side.
4) If air doesn't pass through valve in step 2) or hard blow is required in step 3), replace TPC valve.

WARNING:
DO NOT SUCK air through TPC valve. Fuel vapor inside the valve is harmful.

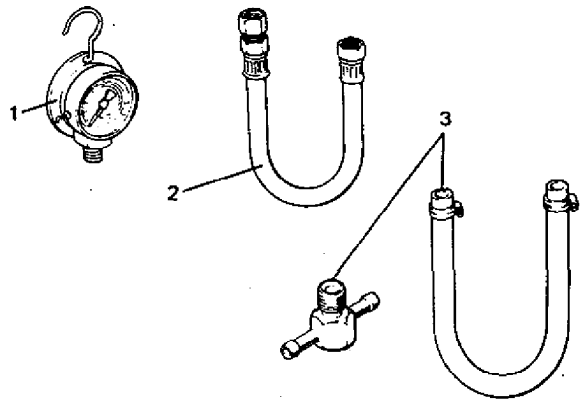
5) Install TPC valve.

NOTE:
When connecting TPC valve between hoses, refer to left figure for installing direction.

SPECIAL TOOLS



09917-47910
Vacuum pump gauge



1. Fuel pressure gauge
   09912-58441
2. Pressure hose
   09912-58431
3. 3-way joint & hose
   09912-58490

70F00-6E-95-1

RECOMMENDED TORQUE SPECIFICATIONS

Fastening parts	Tightening torque		
	N·m	kg-m	lb-ft
Throttle body mounting bolt	18—28	1.8—2.8	13.5—20.0
Fuel feed pipe bolt of throttle body	17	1.7	12.5
Throttle upper and lower body screw	3.5	0.35	2.5
Fuel pressure regulator screw	3.5	0.35	2.5
Injector cover screw	2.0	0.2	1.4
TP sensor bolt	3.5	0.35	2.5
IAT sensor	12—15	1.2—1.5	9.0—10.5
ECT sensor	12—15	1.2—1.5	9.0—10.5
Exhaust manifold bolt/nut	18—28	1.8—2.8	13.5—20.0
Exhaust pipe bolt	35—50	3.5—5.0	25.5—36.0
Oxygen sensor	35—45	3.5—4.5	25.5—32.5

70F00-6E-95-2

SECTION 6F

IGNITION SYSTEM
(FOR CARBURETOR MODEL)

CONTENTS

70F00-6F-1-1

GENERAL DESCRIPTION

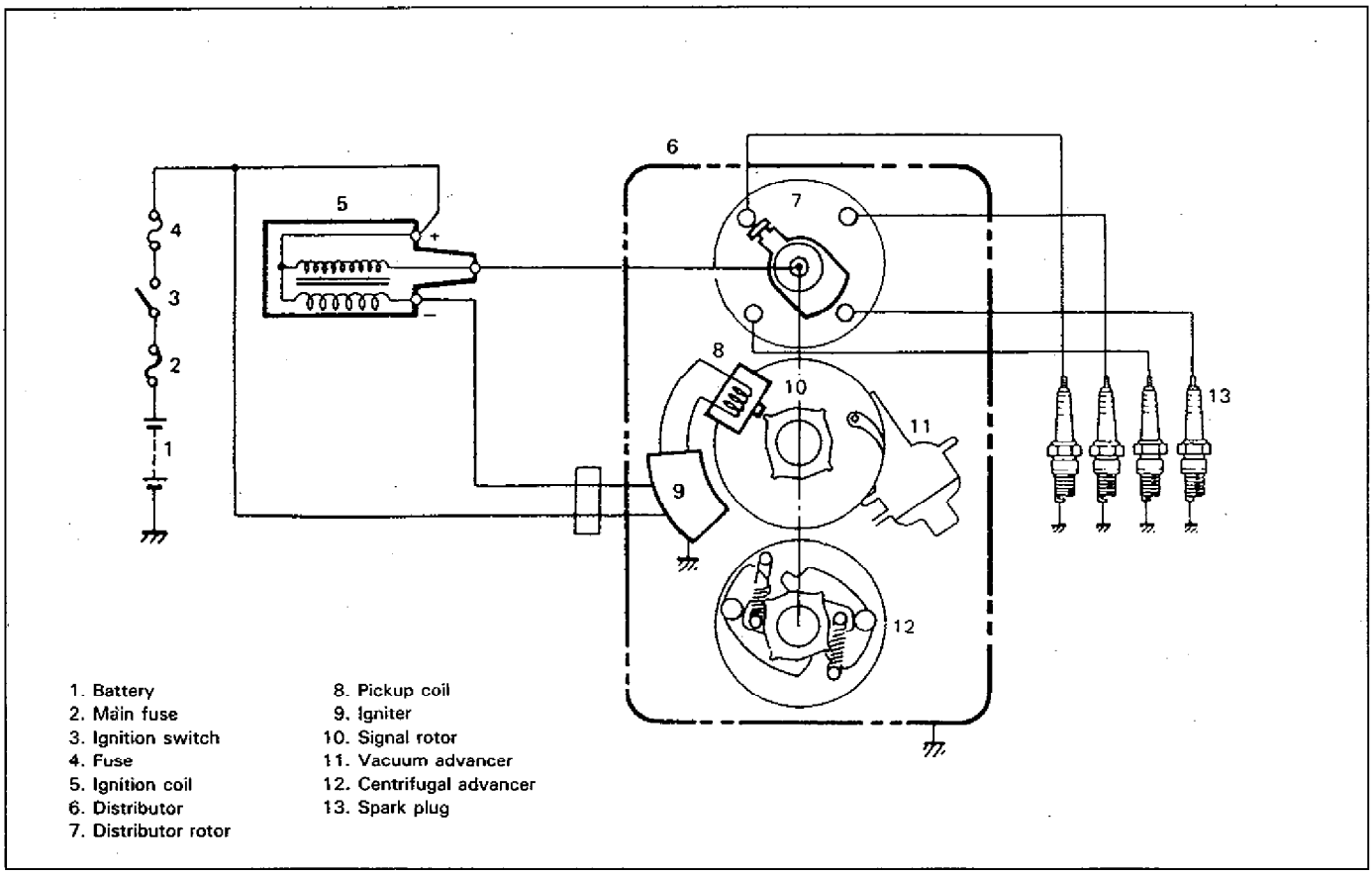
This vehicle uses solid state ignition system. The basic components of the ignition system are ignition coil, distributor and spark plugs and those of the distributor are signal generator (signal rotor and pickup coil), igniter, rotor, cap, vacuum advancer and centrifugal advancer.

When the distributor shaft rotates, the magnetic flux passing through the pickup coil varies due to the change in air gap between the pickup coil and the signal rotor. As a result, the alternating current voltage is induced in the pickup coil.

70F00-6F-1-2

The voltage induced, turns on and off the igniter which switches off the ignition coil primary current. Thus, the high voltage is induced in the secondary winding of ignition coil and ignition sparks are generated at the spark plugs.

The spark advance is produced by the vacuum advancer which operates based on the engine vacuum and centrifugal advancer.

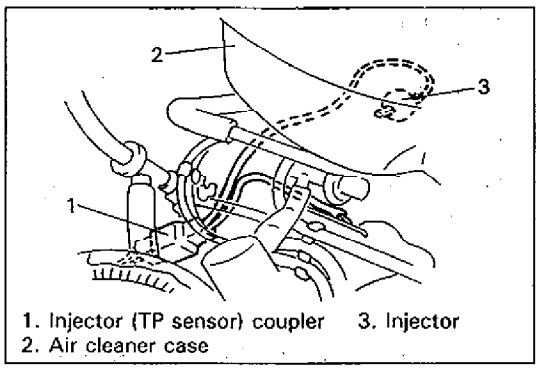


70F00-6F-2-1

DIAGNOSIS

Condition	Possible Cause	Correction
Engine cranks, but will not start or hard to start	**No spark**	
	• Blown fuse for ignition coil	Replace
	• Loose connection or disconnection of lead wire or high-tension cord(s)	Connect securely
	• Faulty high-tension cord(s)	Replace
	• Faulty spark plug(s)	Adjust, clean or replace
	• Cracked rotor or cap	Replace
	• Maladjusted signal rotor air gap	Adjust
	• Faulty ignition coil	Replace
	• Faulty noise suppressor(s)	Replace
	• Faulty pickup coil or igniter	Replace
	Maladjusted ignition timing	Adjust
Power fuel economy or engine performance	• Incorrect ignition timing	Adjust
	• Faulty spark plug(s)	Adjust, clean or replace

70F00-6F-2-2



1. Injector (TP sensor) coupler
2. Air cleaner case
3. Injector

70F00-6F-3-1

ON-VEHICLE SERVICE

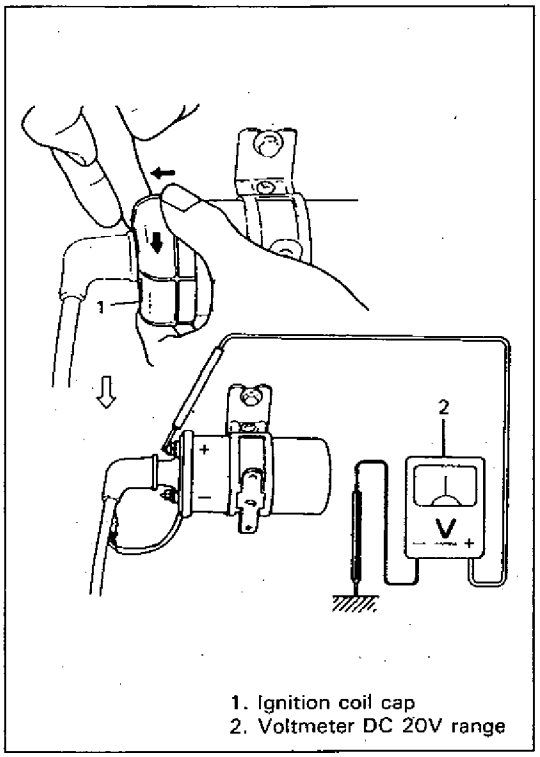
SPARK TEST

1) Disconnect injector (TP sensor) coupler. (For Electric Fuel Injection model)

WARNING:
Without disconnection of injector coupler, combustible gas may come out from spark plug holes during this test and may get ignited in engine room.

2) Remove spark plugs and connect them to high-tension cords, and then ground spark plugs.
3) Crank engine and check if each spark plug sparks.
4) If no spark is emitted, inspect high-tension cords, spark plugs, ignition coil, distributor, etc.

70F00-6F-3-2

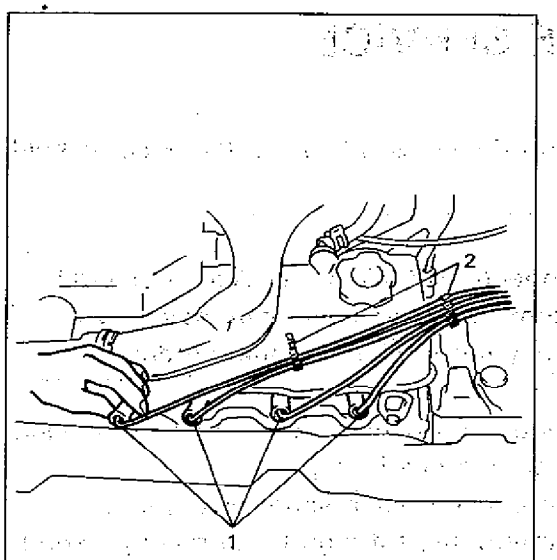


1. Ignition coil cap
2. Voltmeter DC 20V range

70F00-6F-3-3

POWER SUPPLY CHECK

1) Remove ignition coil cap.
2) Check to make sure that coil terminals have battery voltage with ignition switch ON.
3) If no voltage or low voltage is found, check fuse, couplers and wiring harness.



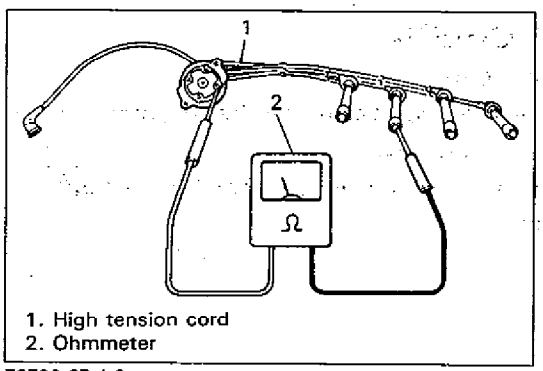
1. Caps
2. Clamps

70F00-6F-4-1

HIGH-TENSION CORDS

1) Remove high-tension cord at ignition coil while gripping its cap.
2) Remove distributor cap installed with high-tension cords.
3) Remove high-tension cord clamp from cylinder head cover.
4) Pull out high-tension cords from spark plugs while gripping each cap.

CAUTION:
- **Removal of high-tension cords together with clamps will be recommended so as not to damage their inside wire (resistive conductor).**
- **For the same reason, pull out each connection by gripping cap portion.**



1. High tension cord
2. Ohmmeter

70F00-6F-4-3

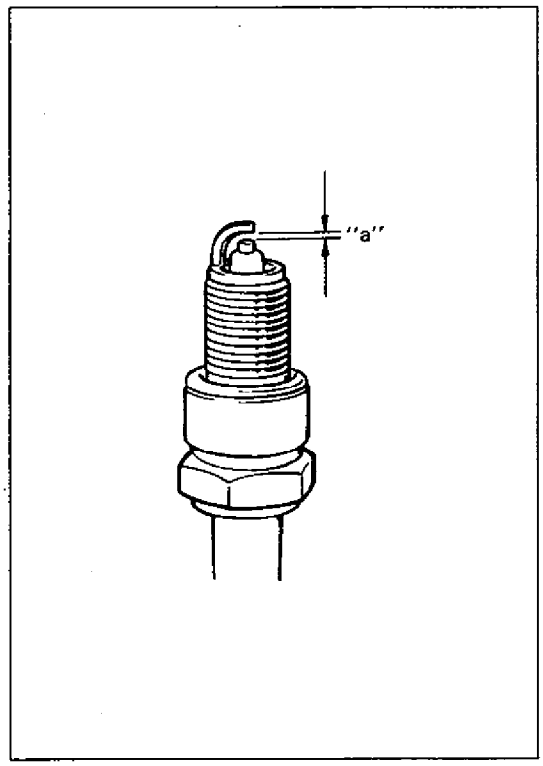
5) Measure resistance of high-tension cord by using ohmmeter.

High-tension cord resistance: 10—22 kΩ/m (3.0—6.7 kΩ/ft)

6) If resistance exceeds specification, inspect distributor terminal and replace high-tension cord(s) and/or distributor cap as required.

CAUTION:
- **Never attempt to use metal conductor high-tension cords as replacing parts.**
- **Insert each cap portion fully when installing high-tension cords.**

70F00-6F-4-4



70F00-6F-5-1

SPARK PLUGS

1) Pull out high-tension cords by gripping their caps and then remove spark plugs.
2) Inspect them for:
   - Electrode wear
   - Carbon deposits
   - Insulator damage
3) If any abnormality is found, adjust air gap, clean with spark plug cleaner or replace them with specified new plugs.

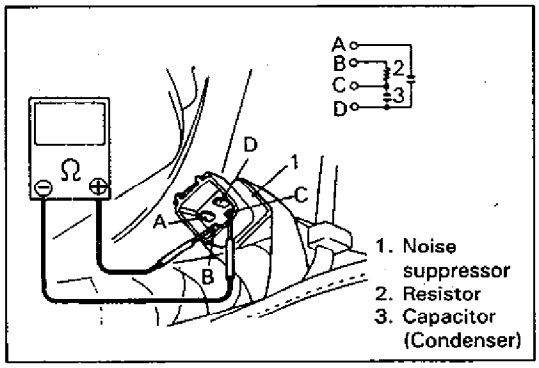
Spark plug air gap "a": 0.7—0.8 mm (0.028—0.031 in.)

Spark plug type: NGK BPR5EY (BP5EY)
Look at the label attached to the vehicle. If originally equipped plugs were with R in its code, plugs with R in its code should be used for replacement.

4) Install spark plugs and torque them to specification.

Tightening Torque for spark plug
20—30 N·m (2.0—3.0 kg-m, 14.5—21.5 lb-ft)

5) Install high-tension cords securely by gripping their caps.

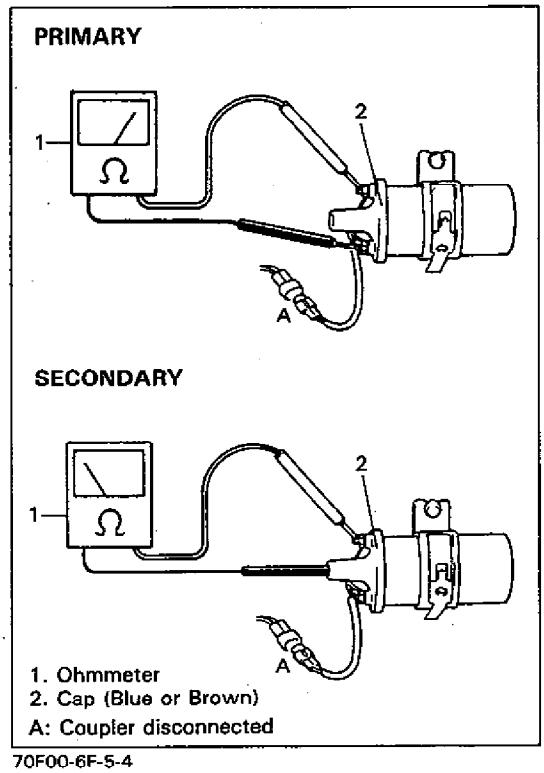


1. Noise suppressor
2. Resistor
3. Capacitor (Condenser)

70F00-6F-5-3

NOISE SUPPRESSOR

1) Disconnect coupler of noise suppressor.
2) Using ohmmeter, check to be sure that condenser is not conductive and resistor has resistance of about 2.2 kΩ.
3) If check result is not satisfactory, replace noise suppressor.



1. Ohmmeter
2. Cap (Blue or Brown)

A: Coupler disconnected

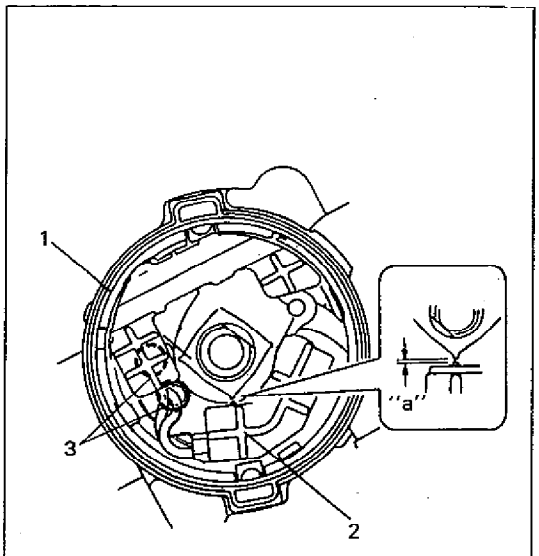
70F00-6F-5-4

IGNITION COIL

1) Pull out high-tension cord by gripping its cap.
2) Disconnect ignition coil coupler.
3) Measure primary and secondary coil resistances.

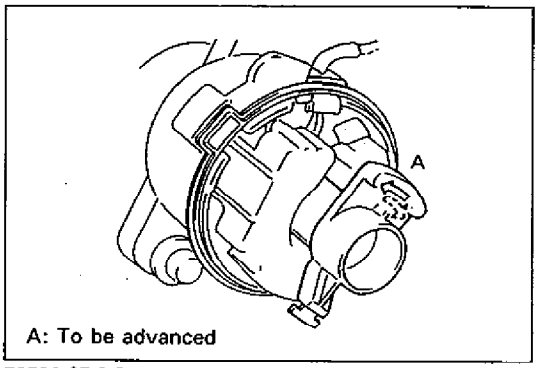
Ignition coil resistance (at 20°C, 68°F)
Blue cap
Primary : 1.13—1.37 Ω
Secondary: 11.5—15.5 kΩ

Brown cap
Primary : 1.33—1.63 Ω
Secondary: 10.7—14.5 kΩ



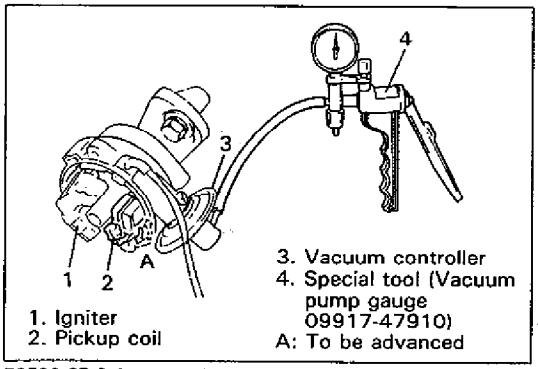
1. Signal rotor
2. Pickup coil
3. Screws

70F00-6F-6-1



A: To be advanced

70F00-6F-6-3



1. Igniter
2. Pickup coil
3. Vacuum controller
4. Special tool (Vacuum pump gauge 09917-47910)
A: To be advanced

70F00-6F-6-4

DISTRIBUTOR

Distributor Cap and Rotor

Check cap and rotor for crack and their terminals for corrosion and wear. Replace as necessary.

Signal Rotor Air Gap

1) Remove distributor cap and rotor.
2) Using thickness gauge, measure air gap, between signal rotor tooth and pickup coil.

   Signal rotor air gap
   "a": 0.2—0.4 mm (0.0079—0.0157 in.)
3) If gap is out of specification, remove igniter and loose pickup coil securing screws.
   Using blade (—) screwdriver, move pickup coil and adjust gap to specification.
   After adjustment, tighten securing screws and recheck gap.

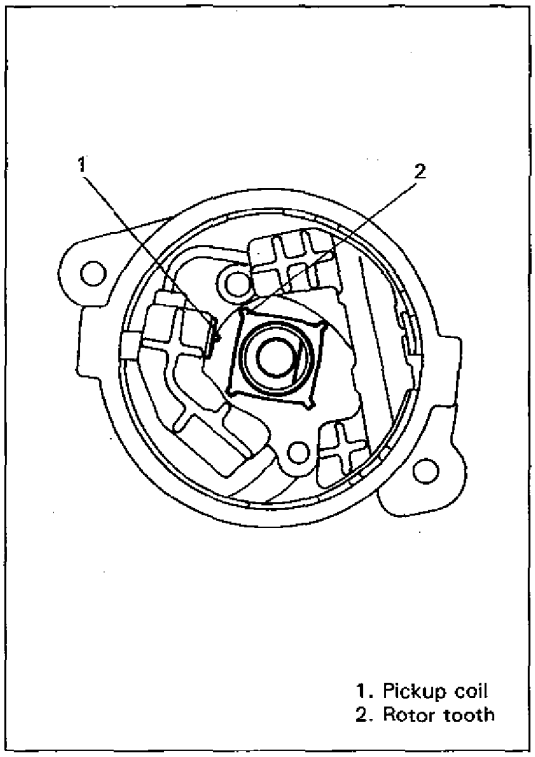
   NOTE:
   Check to make sure that pickup coil tooth is free from any metal particles.
4) Install ignitor, rotor and distributor cap.

Centrifugal Advancer

1) Remove distributor cap.
2) Turn rotor counterclockwise by using fingers and release it. Rotor should return clockwise smoothly by spring force.
3) Also check if shaft is excessively loose.
4) Replace distributor housing assembly is any abnormality is found.

Vacuum Advancer

1) Remove distributor cap.
2) Disconnect vacuum hoses and connect vacuum pump gauge to outside diaphragm.
3) Apply about 400 mmHg (15 inHg) vacuum and release it, then check to make sure that pickup coil moves with base plate smoothly.
4) If any abnormality is found, replace vacuum controller or distributor housing assembly.



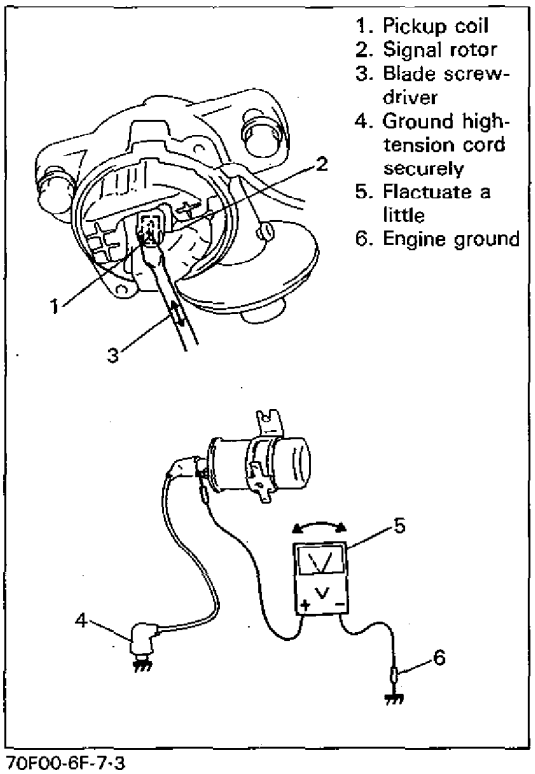
1. Pickup coil
2. Rotor tooth

70F00-6F-7-1

Checking Generator (Pickup Coil and Igniter) Assembly

WARNING:
- **This checking must be done in a well-ventilated area.**
- **At step 1), be sure to ground high-tension cord to the place away from throttle body (carburetor) or other fuel systems.**
- **While step 5) is performed, never touch the center high-tension cord because high voltage is applied to the cord when the screwdriver is inserted.**

1) Disconnect center high-tension cord at distributor cap and be sure to ground it to engine with clip.
2) Remove distributor cap and rotor.
3) Check if signal rotor teeth are off generator pickup coil. If not, make it off by turning crankshaft.



70F00-6F-7-3

4) Connect voltmeter between negative terminal of ignition coil and engine ground, and confirm the battery voltage (12V) is applied to there.
5) Insert blade (−) screwdriver between signal rotor and generator pickup coil and then take it out repeatedly. Voltmeter pointer indicating battery voltage (about 12V) should fluctuate a little (about 0.5 − 1V) when the screwdriver is inserted. If not, replace generator assembly as it can be deemed to be damaged.

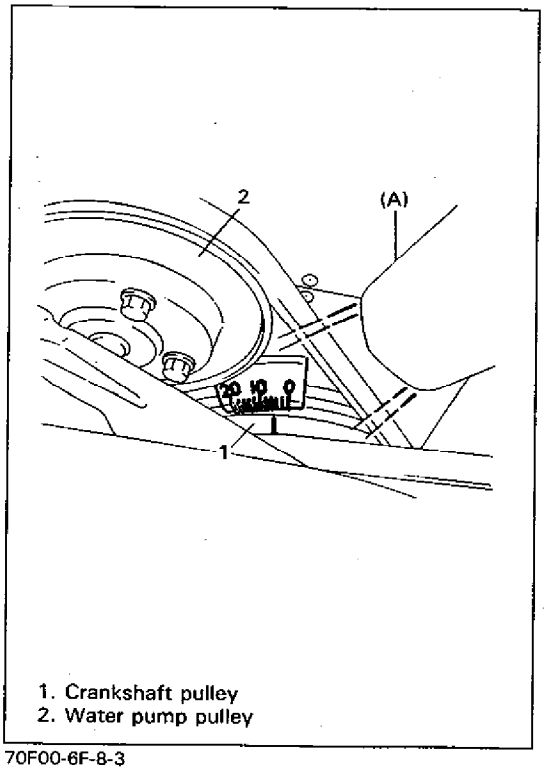
IGNITION TIMING

INSPECTION AND ADJUSTMENT

NOTE:
Before starting engine, place transmission gear shift lever in "Neutral", and set parking brake and block drive wheels.

1) Start engine and warm it up to normal operating temperature.
2) Make sure that all of electrical loads except ignition are switched off.
3) Check to be sure that idle speed is within specification.
4) Set timing light to No.1 high-tension cord.

70F00-6F-8-1



1. Crankshaft pulley
2. Water pump pulley

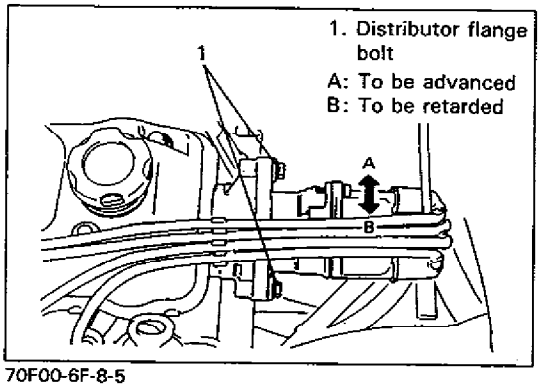
5) Using timing light, check that ignition timing is within specification.

Special Tool
(A): 09900-27301 or 09930-76420

Ignition timing: 10° ± 1° BTDC at 800 r/min

Ignition order: 1—3—4—2

70F00-6F-8-3



1. Distributor flange bolt
A: To be advanced
B: To be retarded

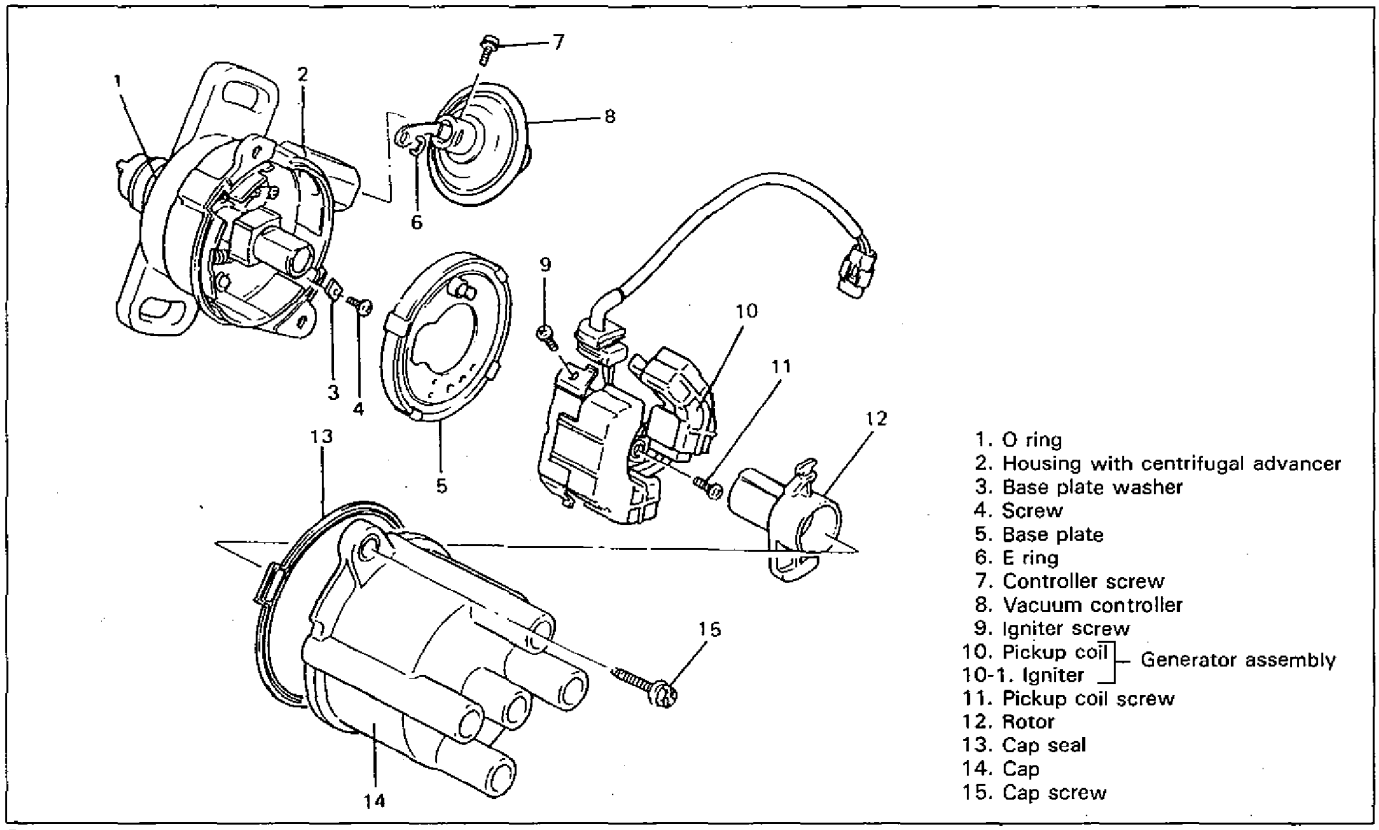
6) If ignition timing is out of specification, loosen flange bolts, adjust timing by turning distributor assembly while engine is running, and then tighten bolts.

Tightening Torque for distributor flange bolt
10—16 N·m (1.0—1.6 kg-m, 7.0—11.5 lb-ft)

7) After tightening distributor flange bolts, recheck that ignition timing is within specification.

70F00-6F-8-5

DISTRIBUTOR UNIT



70F00-6F-9-1

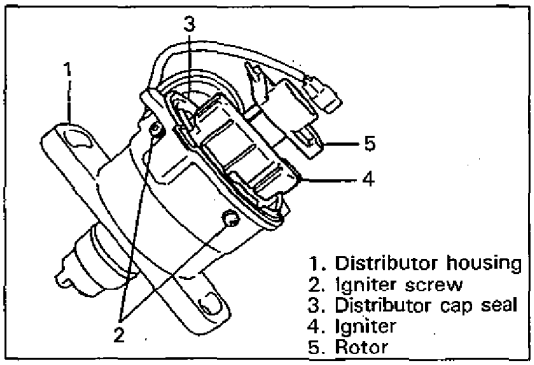
REMOVAL

1) Disconnect negative cable at battery.
2) Disconnect distributor lead coupler.
3) Disconnect vacuum hose at vacuum controller.
4) Remove distributor cap screws and cap.
5) Remove distributor flange bolts.
6) Pull out distributor housing assembly.

DISASSEMBLY

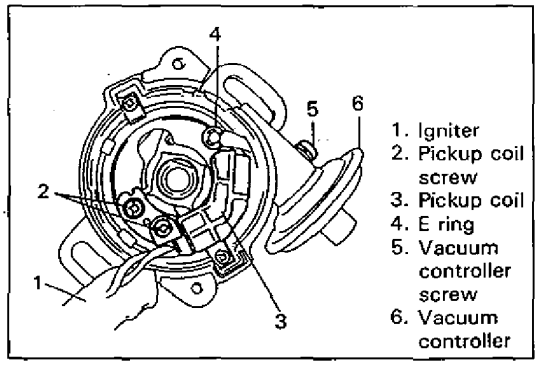
1) Remove distributor cap, if it has been dismounted assembled with housing.
2) Remove rotor and cap seal.
3) Remove igniter fastening screws and take out igniter.

70F00-6F-9-3

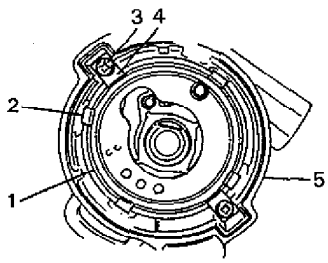


70F00-6F-9-4

4) Remove pickup coil screws and then take out pickup coil together with igniter.
5) Remove E ring and screw and then pull out vacuum controller.

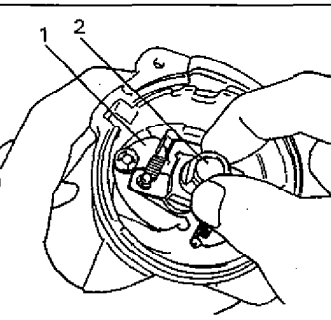


70F00-6F-9-5



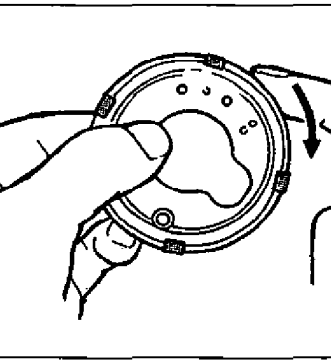
1. Base plate
2. Clip
3. Base plate screw
4. Washer
5. Distributor housing

70F00-6F-10-1

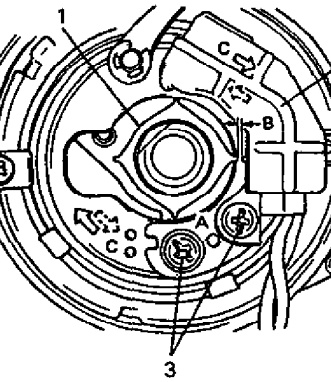


1. Centrifugal advancer
2. Shaft

70F00-6F-10-2



70F00-6F-10-3



1. Signal rotor
2. Pickup coil
3. Screw with lock washer and washer

A: Locator pivot
B: Signal rotor air gap
C: Turning pickup coil with base palte

70F00-6F-10-4

6) If necessary, remove base plate screws with washers and then take out base plate assembly.

NOTE:
Base plate clips have specific location for housing grooves.

INSPECTION

Centrifugal Advancer

1) Check advancer for rust or abnormal wear.
2) Check shaft for looseness by turning it by hand.
3) If any abnormality is found in the above inspection, replace as housing assembly.

NOTE:
If rust is found in housing inner parts, check breather holes in housing and distributor cap.

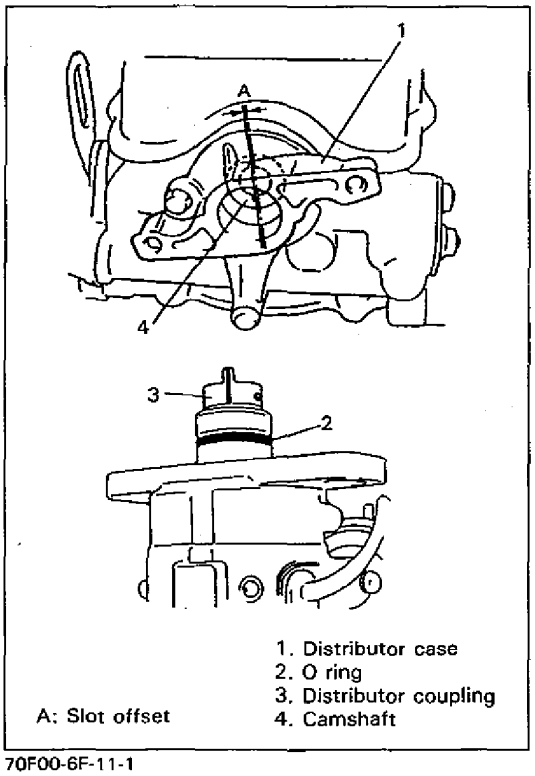
Base Plate

Check plate bearing for smooth rotation. If any abnormality is found, replace it as housing assembly. Do not wash or disassemble it.

REASSEMBLY

Judging from faulty conditions noted before disassembly and what is fond through inspection after disassembly, prepare replacing parts and reassemble distributor by reversing removal procedure, noting the following points.

- Align base plate clips with housing grooves when installing.
- When installing pickup coil, use screws with lock washer and washer.
- Adjust signal rotor air gap to specification as previously outlined.
- After tightening pickup coil screws, recheck base plate for smooth rotation by pushing pickup coil cover with finger and releasing it.
- Check to make sure that pickup coil tooth is free from any metal particles.



1. Distributor case
2. O ring
3. Distributor coupling
4. Camshaft

A: Slot offset

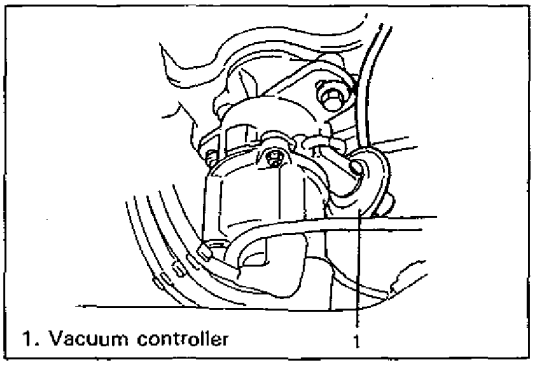
70F00-6F-11-1

INSTALLATION

1) If distributor case has been removed or replaced, install it with new gasket and fasten with bolts.

Tightening Torque for distributor case bolts
8—12 N·m (0.8—1.2 kg-m, 6.0—8.5 lb-ft)

2) Check to make sure that its O ring is in good condition. If new O ring is installed, apply oil.
3) Install distributor without cap to camshaft.
Fit the dogs of distributor coupling into the slots of camshaft, when installing. The dogs of distributor coupling are offset. Therefore, if the dogs can not be fitted into the slots, turn the distributor shaft by 180 degree and try again.

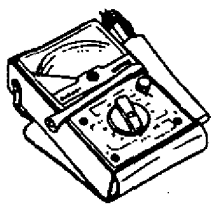
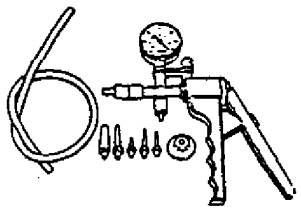
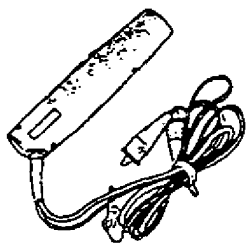
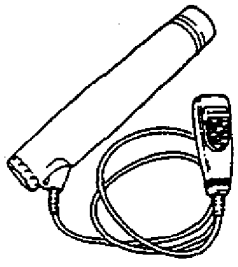


1. Vacuum controller

70F00-6F-11-3

4) Lightly install flange bolts and prepare for ignition timing adjustment.
5) Check to make sure that rotor is in good condition and inserted in shaft securely.
6) Inspect distributor cap and clean or replace as required.
7) Make sure that distributor cap seal is placed properly and install cap, and then fasten it with screws.
8) Connect vacuum hose with vacuum controller.
9) Connect distributor lead coupler.
10) Check and adjust ignition timing as previously outlined.

SPECIAL TOOLS

			
09900-25002 Pockt tester	09917-47910 Vacuum pump gauge	09900-27301 Timing light (DC 12V)	09930-76420 Timinig light (Dry cell type)

70F00-6F-11-4

SECTION 6F1

IGNITION SYSTEM
(FOR FUEL INJECTION MODEL)

CONTENTS

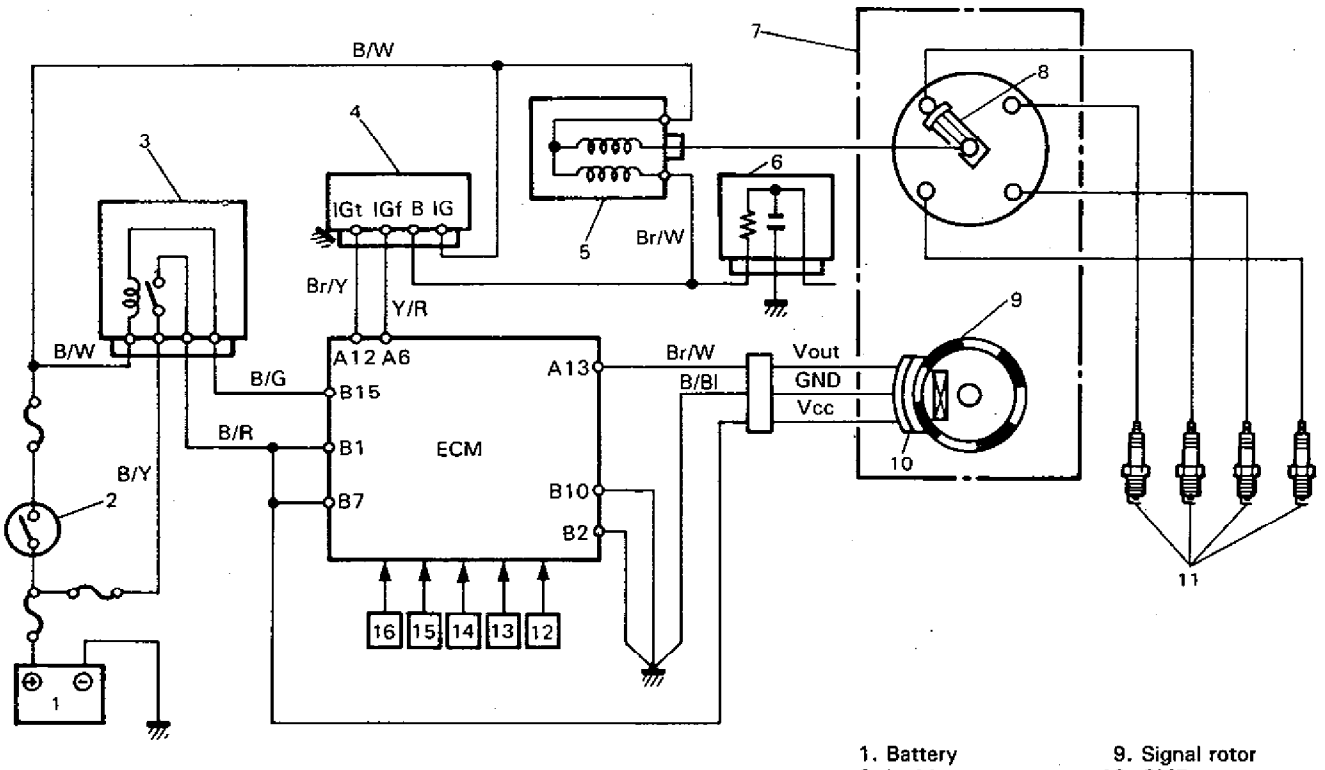
70F00-6F1-1-1

GENERAL DESCRIPTION

The ignition system used for this vehicle has an ESA (Electronic Spark Advance) system and consists of the following parts.

- ECM
  It detects the engine condition through the signals from the sensors, determines the most suitable ignition timing and time for electricity to flow to the primary coil and sends a signal to the igniter.
- Igniter (Power unit)
  It turns ON and OFF the primary current of the ignition coil according to the signal from ECM.
- Ignition coil
  When the ignition coil primary current is turned OFF, a high voltage is induced in the secondary winding.
- Distributor
  It distributes a high voltage current to each plug.
- High-tension cords and spark plugs.
- CMP sensor (Camshaft position sensor)
  Located in the distributor, it converts the crank angle into voltage variation and sends it to ECM. For its details, refer to Section 6E.
- MAP sensor, TP sensor, ECT sensor and test switch terminal
  For their details, refer to Section 6E.

In ESA system, the ECM is programmed for the best ignition timing under every engine condition. Receiving signals which indicate the engine condition from the sensors, e.g., engine revolution, intake air pressure, coolant temperature, etc., it selects the most suitable ignition timing from its memory and operates the igniter. Thus ignition timing is controlled to yield the best engine performance.
For more information, refer to Section 6E.



1. Battery
2. Ignition system
3. Main relay
4. Igniter
5. Ignition coil
6. Noise suppressor
7. Distributor
8. Distributor rotor
9. Signal rotor
10. CMP sensor
11. Spark plug
12. MAP sensor
13. TP sensor
14. ECT sensor
15. Engine start switch
16. Test switch terminal

70F00-6F1-2-1

DIAGNOSIS

Condition	Possible Cause	Correction
Engine cranks, but will not start or hard to start	**No spark**	
	• Blown fuse for ignition coil	Replace
	• Loose connection or disconnection of lead wire or high-tension cord(s)	Connect securely
	• Faulty high-tension cord(s)	Replace
	• Faulty spark plug(s)	Adjust, clean or replace
	• Cracked rotor or cap	Replace
	• Maladjusted signal rotor air gap	Adjust
	• Faulty ignition coil	Replace
	• Faulty noise suppressor	Replace
	• Faulty CMP sensor	Replace
	• Faulty igniter	Replace
	• Faulty ECM	Replace
	Maladjusted ignition timing	Adjust
Poor fuel economy or engine performance	• Incorrect ignition timing	Adjust
	• Faulty spark plug(s) or high-tension cord(s)	Adjust, clean or replace
	• Faulty ECM	Replace

64B40-6F1-3-1

ON-BOARD DIAGNOSTIC SYSTEM (SELF-DIAGNOSIS)

1) To insure correct diagnosis, check to confirm that battery voltage is within standard value when engine is standstill.
2) Turn on ignition switch and make sure that malfunction indicator lamp ("CHECK ENGINE" light) lights.
3) If engine will not start but cranking is possible, crank it for more than 3 seconds.
4) While ignition switch is ON, ground diagnosis switch terminal in moniter coupler and then read diagnostic trouble code (observe malfunction indicator lamp ("CHECK ENGINE" light)).

70F00-6F1-3-2

DIAGNOSTIC TROUBLE CODE NO.41

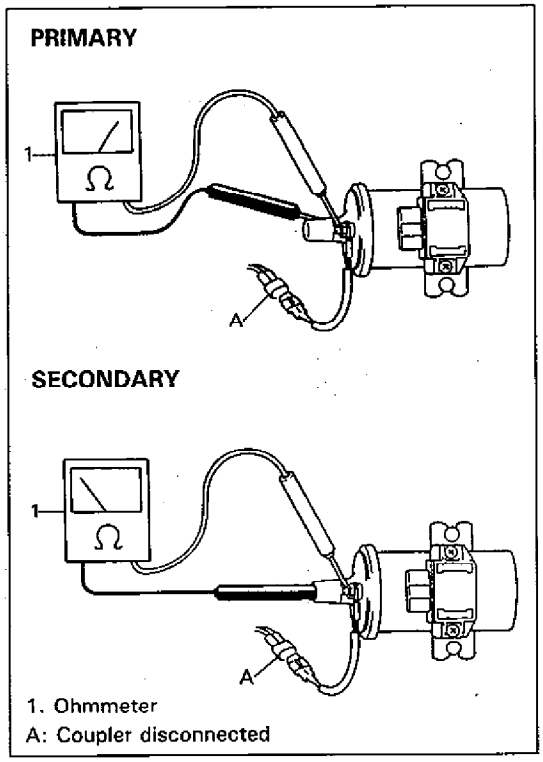
ECM indicates that no ignition fail safe signal is inputted while engine is running or being cranked.
Diagnose trouble according to "Diagnostic Flow Chart for Code No.41" in Section 6E.

64B40-6F1-3-3

DIAGNOSTIC TROUBLE CODE NO.42

ECM indicates that no CMP sensor signal is inputted for more that 2 seconds while engine is being cranked.
Diagnose trouble according to "Diagnostic Flow Chart for Code No.42" in Section 6E.

64B40-6F1-3-4



1. Ohmmeter
A: Coupler disconnected

70F00-6F1-4-1

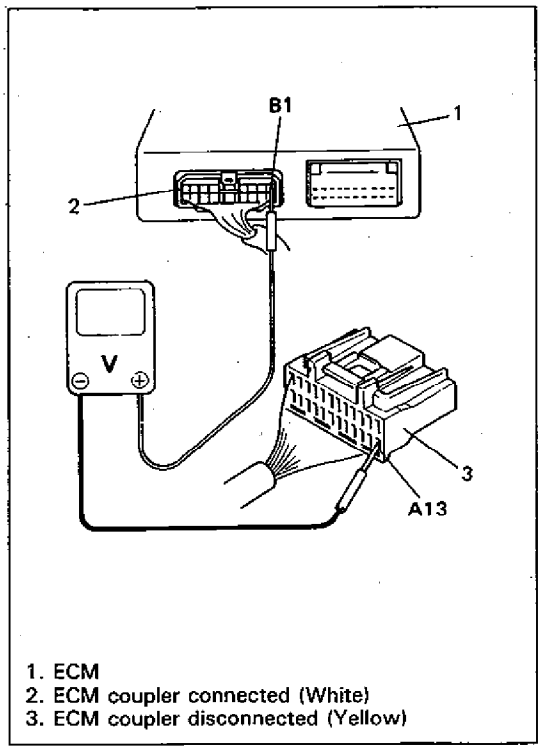
ON-VEHICLE SERVICE

IGNITION COIL

1) Pull out high-tension cord by gripping its cap.
2) Disconnect ignition coil coupler.
3) Measure primary and secondary coil resistances.

Ignition coil resistance (at 20°C, 68°F)
Primary : 1.33—1.63 Ω
Secondary: 10.7—14.5 kΩ

4) If resistance is out of specification, replace coil with new one.



1. ECM
2. ECM coupler connected (White)
3. ECM coupler disconnected (Yellow)

70F00-6F1-4-3

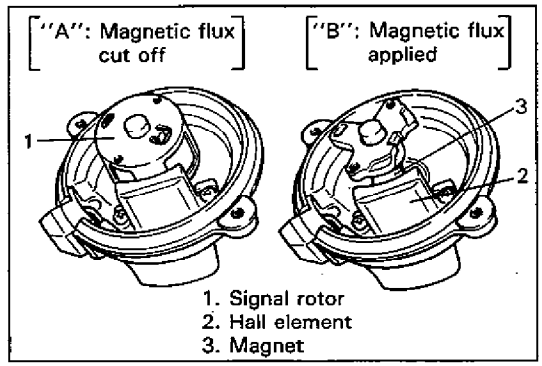
DISTRIBUTOR

Distributor Cap and Rotor

Check cap and rotor for crack and their terminals for corrosion and wear. Replace as necessary.

CMP Sensor

1) With ignition switch OFF, disconnect ECM coupler (Yellow).
2) Connect voltmeter between "B1" terminal of white coupler (connected) and "A13" terminal of yellow coupler (disconnected).
3) Remove distributor cap, rotor and shield cover.



1. Signal rotor
2. Hall element
3. Magnet

70F00-6F1-4-5

NOTE:
Check to make sure that magnet is free from any metal particles.

4) Check voltage with signal rotor inserted between hall element and magnet ("A") and without it ("B") respectively.

"A"	Battery voltage
"B"	0 V

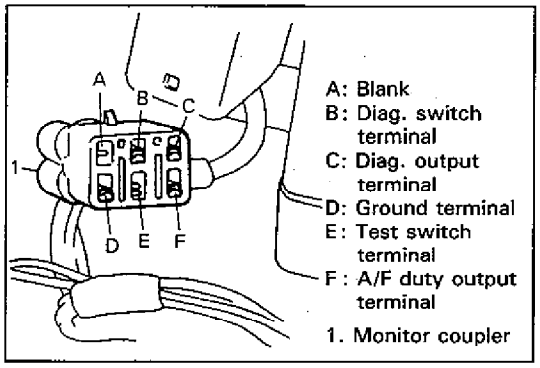
If check result is not satisfactory, repair wire harness or replace CMP sensor.
5) After checking, connect ECM coupler securely and install distributor cap.

IGNITION TIMING

INSPECTION AND ADJUSTMENT

1) Start engine and warm it up to normal operating temperature.
2) Stop enginie once, keep ignition switch ON for 1 second and then start engine again.
3) Run engine at 2,000 r/min. for 60 sec. so that it is fully warmed and then keep it running at idle speed.
4) Make sure that:
   - All of electrical loads except ignition are switched off.
   - A/C is OFF, if equipped.
   - M/T is set in neutral.
   - Parking brake lever is pulled fully.
5) Check to be sure that idle speed is within specification.
6) Set timing light to No.1 high-tension cord.

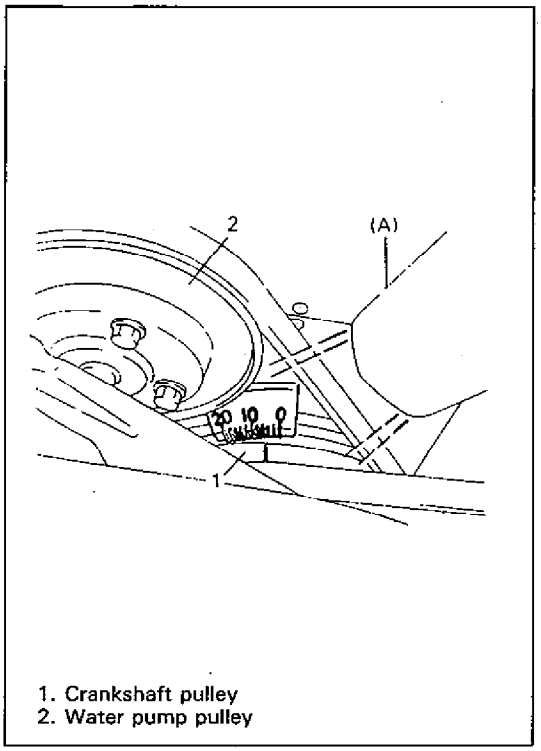
70F00-6F1-5-1



70F00-6F1-5-3

7) Remove monitor coupler from cap. Connect "D" and "E" terminals of monitor coupler by using service wire so that ignition timing is fixed.

NOTE:
In this state, observe ignition timing with timing light. If it is varying (if it is not fixed), that indicates ungrounded "E" terminal which prevents accurate inspection and adjustment. Therefore, be sure to ground it securely.



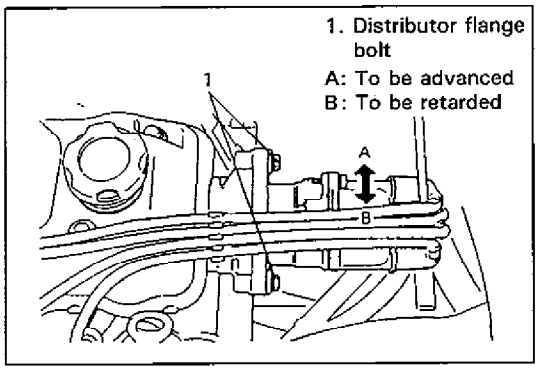
70F00-6F1-5-4

8) Using timing light, check that timing is within specification.

Initial ignition timing (Test switch terminal grounded):
8° ± 1° BTDC at 900 r/min

Ignition order: 1—3—4—2

Special Tool
(A): 09900-27301 or 09900-76420



70F00-6F1-6-1

9) If ignition timing is out of specification, loosen flange bolt, adjust timing by turning distributor assembly while engine is running, and then tighten bolt.

Tightening Torque for distributor flange bolt
10—16 N·m (1.0—1.6 kg-m, 7.0—11.5 lb-ft)

10) After tightening distributor flange bolt, recheck that ignition timing is within specification.

11) After checking and/or adjusting, disconnect service wire from monitor coupler.

CAUTION:
Driving with test switch terminal grounded will cause damage to catalyst. Be sure to disconnect service wire after adjustment.

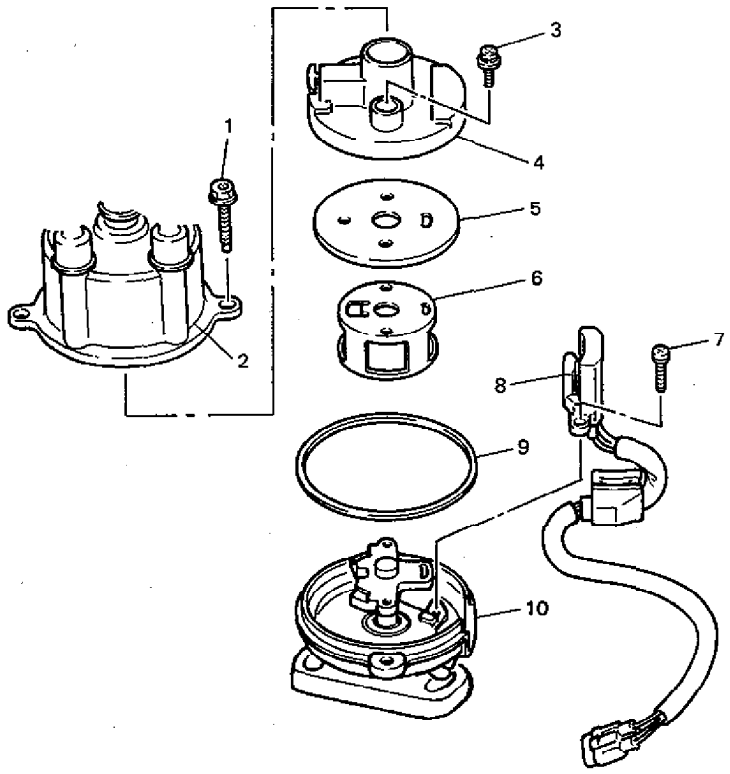
NOTE:
In this state, ignition timing may vary more or less of initial ignition timing but it is nothing abnormal.

70F00-6F1-6-2

12) Check that increasing engine speed advances ignition timing. If not, check TP sensor (idle switch), test switch terminal circuit, engine start signal circuit and ECM.

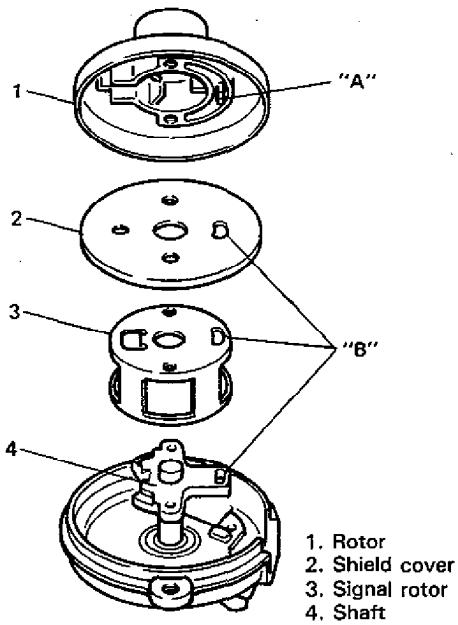
70F00-6F1-6-3

DISTRIBUTOR UNIT



1. Cap bolt
2. Cap
3. Rotor screw
4. Rotor
5. Shield cover
6. Signal rotor
7. CMP sensor screw
8. CMP sensor
9. Cap seal
10. Housing assembly

70F00-6F1-7-1



1. Rotor
2. Shield cover
3. Signal rotor
4. Shaft

A: Lug
B: Oblong hole

70F00-6F1-7-4

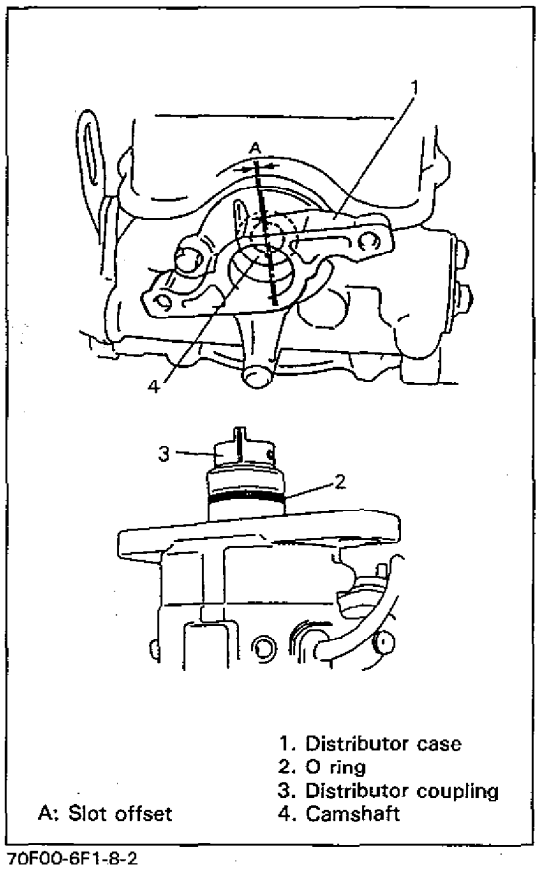
IMPORTANT REMINDERS FOR REASSEMBLY

- Check to make sure that CMP sensor magnet is free from any metal particles after installing CMP sensor.
- When installing signal rotor, shield cover and rotor to shaft, be sure to fit lug "A" on rotor in oblong holes "B" in cover, signal rotor and shaft.
- Check to make sure that distributor rotor turn smoothly after installing CMP sensor and rotor.

REMOVAL

1) Disconnect negative cable at battery.
2) Disconnect distributor (CMP sensor) coupler.
3) Remove distributor cap.
4) Remove distributor flange bolts.
5) Pull out distributor housing assembly.

70F00-6F1-8-1



1. Distributor case
2. O ring
3. Distributor coupling
4. Camshaft

A: Slot offset

70F00-6F1-8-2

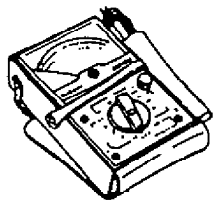
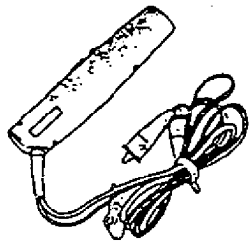
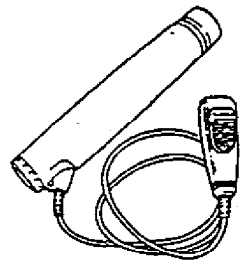
INSTALLATION

1) If distributor case has been removed or replaced, install it with new gasket and fasten with bolts.

   Tightening Torque for distributor case bolts
   8—12 N·m (0.8—1.2 kg-m, 6.0—8.5 lb-ft)

2) Check to make sure that its O ring is in good condition. If new O ring is installed, apply oil.
3) Install distributor without cap to camshaft.
   Fit the dogs of distributor coupling into the slots of camshaft, when installing. The dogs of distributor coupling are offset. Therefore, if the dogs can not be fitted into the slots, turn the distributor shaft by 180 degree and try again.
4) Lightly install flange bolts and prepare for ignition timing adjustment.
5) Check to make sure that rotor is in good condition and inserted in shaft securely.
6) Inspect distributor cap and clean or replace as required.
7) Make sure that distributor cap seal is placed properly and install cap, and then fasten it with screws.
8) Connect distributor lead coupler.
9) Check and adjust ignition timing as previously outlined.

SPECIAL TOOLS

		
09900-25002 Pocket tester	09900-27301 Timing light (DC 12V)	09930-76420 Timinig light (Dry cell type)

70F00-6F1-8-4

SECTION 6G

CRANKING SYSTEM
(0.8 kW Conventional Type)

CONTENTS

70F00-6G-1-1

GENERAL DESCRIPTION

CRANKING CIRCUIT

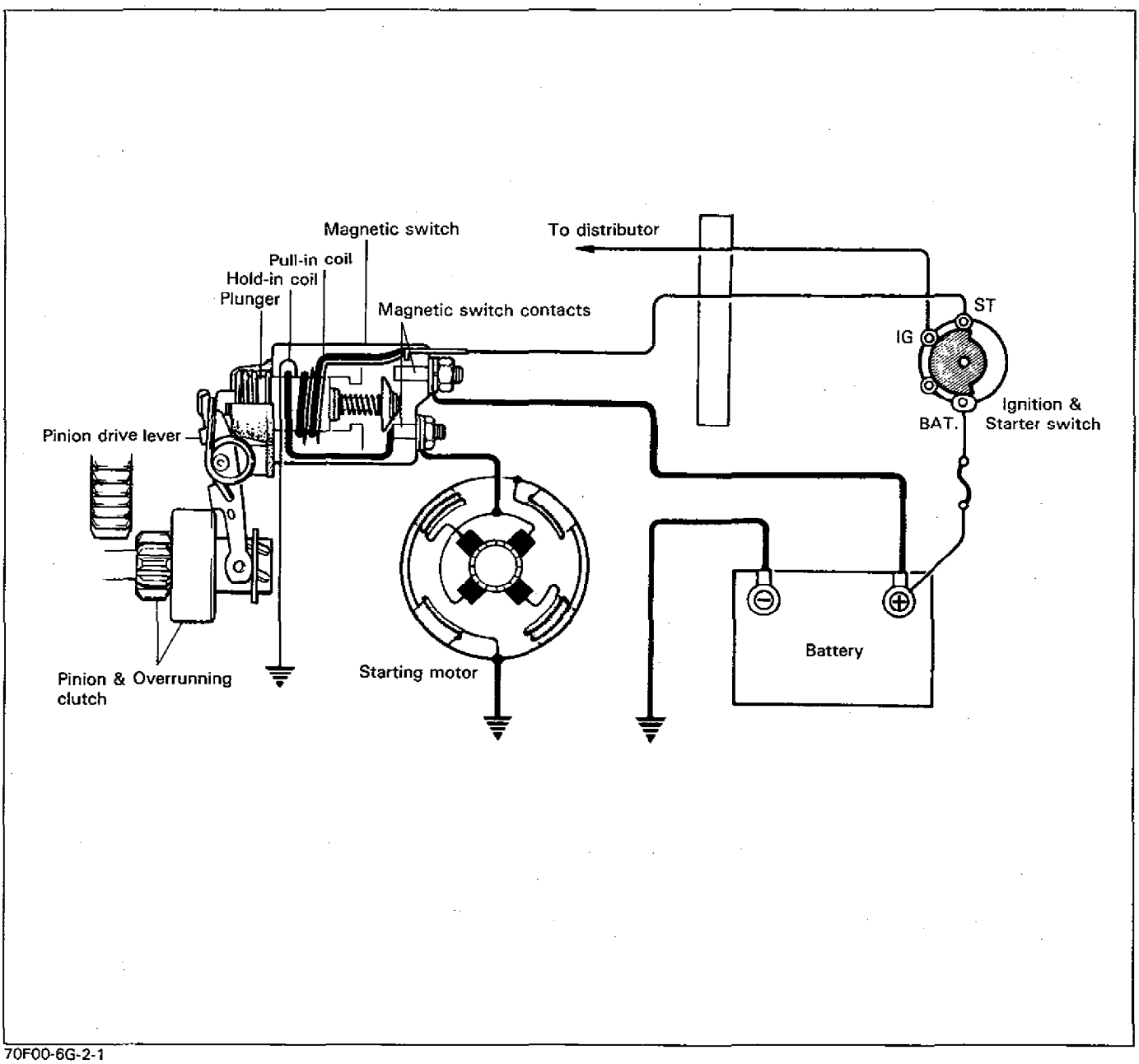
The cranking circuit consists of the battery, starting motor, ignition switch, and related electrical wiring. These components are connected electrically as shown in figure below. Only the starting motor will be covered in this section.

STARTING MOTOR

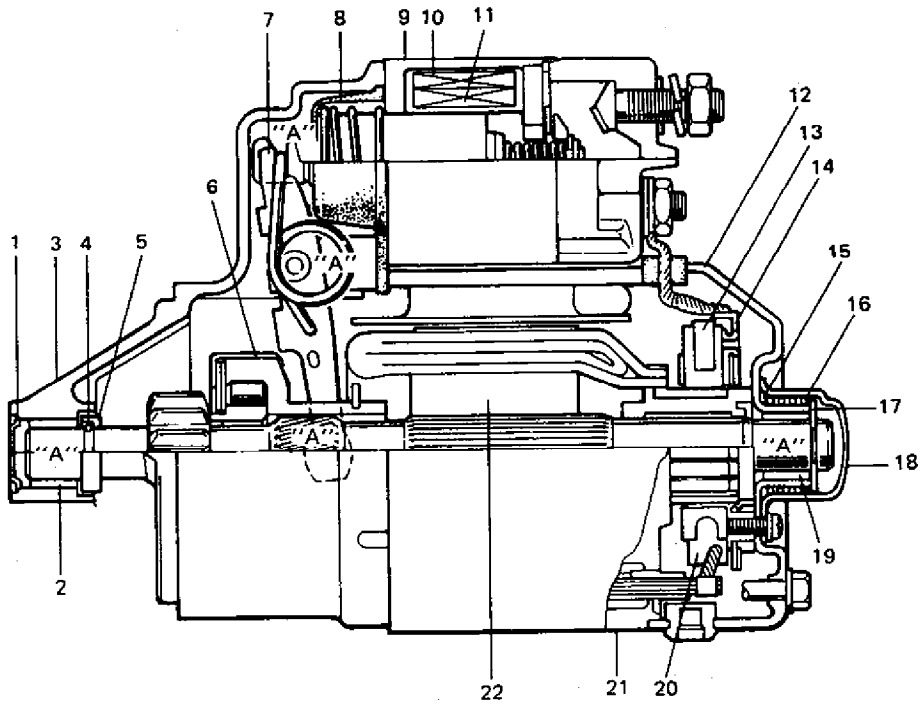
The starting motor consists of yoke assembly, armature assembly, overrunning clutch assembly, magnetic switch assembly, drive end frame (housing), rear end frame (commutator end housing), brush holder and drive lever.

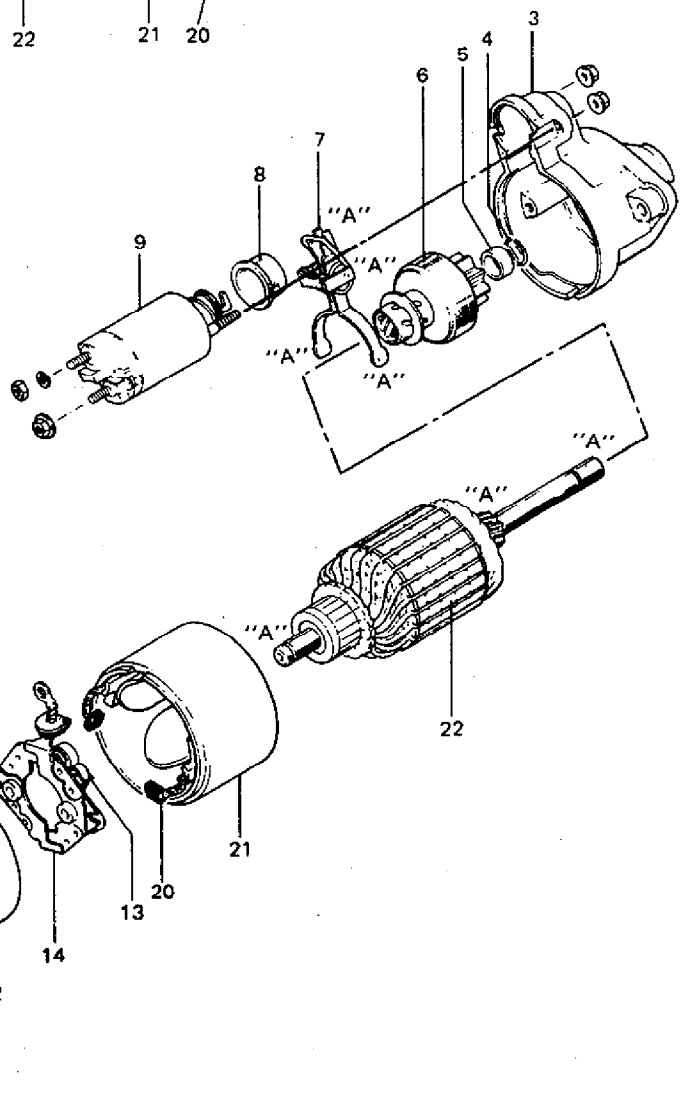
In the circuit shown in figure below, the magnetic switch coils are magnetized when the ignition switch is closed. The resulting plunger and pinion drive lever movement causes the pinion to engage the engine flywheel gear and the magnetic switch main contacts to close, and cranking takes place.

When the engine starts, the pinion overrunning clutch protects the armature from excessive speed until the switch is opened, at which time the return spring causes the pinion to disengage.



70F00-6G-2-1





1. Cover
2. Bush
3. Drive housing assembly
4. Snap ring
5. Pinion stop ring
6. Overrunning clutch assembly
7. Pinion drive lever
8. Boot
9. Magnetic switch
10. Hold-in coil
11. Pull-in coil
12. Commutator end housing assembly
13. Brush spring
14. Brush holder assembly
15. End cap gasket
16. Armature brake spring
17. Armature plate
18. Commutator end cap
19. Bush
20. Brush
21. Yoke assembly
22. Armature
23. Housing bolt

"A": Apply Grease: 99000-25010

DIAGNOSIS

Possible symptoms due to starting system trouble would be as follows.

- Starting motor does not run (or runs slowly)
- Starting motor runs but fails to crank engine
- Abnormal noise is heard

Proper diagnosis must be made to determine exactly where the cause of each trouble lies ..... in battery, wiring harness, (including starting motor switch), starting motor or engine.

Do not remove motor just because starting motor does not run. Check following items and narrow down scope of possible causes.

- Condition of trouble
- Tightness of battery terminals (including ground cable connection on engine side) and starting motor terminals
- Discharge of battery

Condition	Possible Cause	Correction
Motor not running	**No operating sound of magnetic switch**	
	1. Clutch pedal is not depressed fully	Depress clutch pedal.
	2. Battery run down	Recharge battery.
	3. Battery voltage too low due to battery deterioration	Replace battery.
	4. Poor contact in battery terminal connection	Retighten or replace.
	5. Loose grounding cable connection	Retighten.
	6. Fuse set loose or blown off	Tighten or replace.
	7. Poor contacting action of ignition switch	Replace.
	8. Lead wire coupler loose in place	Retighten.
	9. Open-circuit between ignition switch and magnetic switch	Repair.
	10. Open-circuit in pull-in coil	Replace magnetic switch.
	11. Poor sliding of plunger	Replace.
Motor not running	**Operating sound of magnetic switch heard**	
	1. Battery run down	Recharge battery.
	2. Battery voltage too low due to battery deterioration	Replace battery.
	3. Loose battery cable connections	Retighten.
	4. Burnt main contact point, or poor contacting action of magnetic switch	Replace magnetic switch.
	5. Brushes are seating poorly or worn down	Repair or replace.
	6. Weakened brush spring	Replace.
	7. Burnt commutator	Replace.
	8. Poor grounding of field coil	Repair.
	9. Layer short-circuit of armature	Replace.
	10. Crankshaft rotation obstructed	Repair.

70F00-6G-4-1

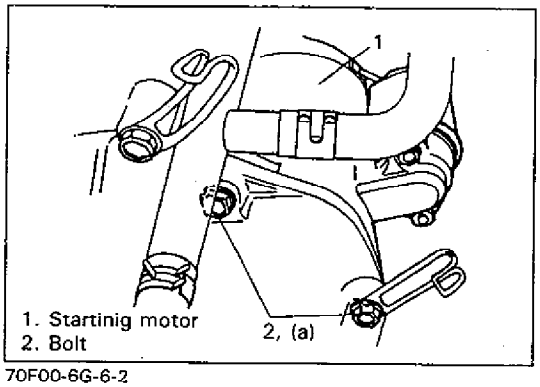
Condition	Possible Cause	Correction
Starting motor running but too slow (small torque)	**If battery and wiring are satisfactory, inspect starting motor**	
	1. Insufficient contact of magnetic switch main contacts	Replace.
	2. Layer short-circuit of armature	Replace.
	3. Disconnected, burnt or worn commutator	Repair or replace.
	4. Poor grounding of field coil	Repair.
	5. Worn brushes	Replace.
	6. Weakened brush springs	Replace spring
	7. Burnt or abnormally worn end bushings	Replace.
Starting motor running, but not cranking engine	1. Worn pinion tip	Replace overrunning clutch.
	2. Poor sliding of overrunning clutch	Replace.
	3. Overrunning clutch slipping	Replace.
	4. Worn teeth of ring gear	Replace flywheel.
Noise	1. Abnormally worn bush	Replace.
	2. Worn pinion or worn teeth of ring gear	Replace pinion or flywheel.
	3. Poor sliding of pinion (failure in return movement)	Repair or replace.
Starting motor does not stop running	1. Fused contact points of magnetic switch	Replace.
	2. Short-circuit between turns of magnetic switch coil (layer short-circuit)	Replace.
	3. Failure of returning action in ignition switch	Replace.

64B40-6G2-5-1

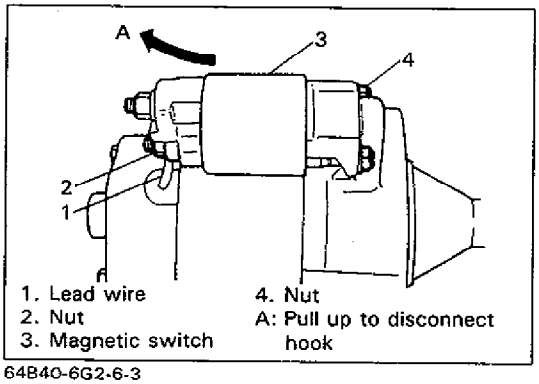
UNIT REPAIR OVERHAUL

For overhauling of starting motor, it is recommended that component parts should be cleaned thoroughly. However, yoke assembly, armature coil, overrunning clutch assembly, magnetic switch assembly, rubber or plastic parts are NOT ALLOWED to be washed in degreasing tank or with grease dissolving solvent. Those parts should be cleaned by blowing air and wiping with cloth.

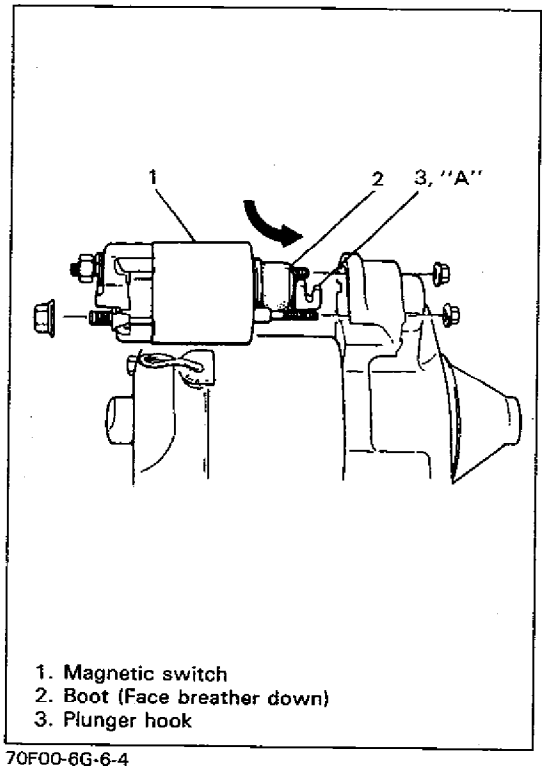
70F00-6G-6-1



70F00-6G-6-2



64B40-6G2-6-3



70F00-6G-6-4

DISMOUNTING AND REMOUNTING

1. Disconnect negative (−) battery lead at battery.
2. Disconnect magnetic switch lead wire and battery cable from starting motor terminals.
3. Remove 2 mounting bolts.
4. Remove starting motor.
5. To remount, reverse above procedure.

Tightening Torque
(a): 18−28 N·m (1.8−2.8 kg-m, 13.5−20.0 lb-ft)

MAGNETIC SWITCH ASSEMBLY

Removal

1. Remove nut and disconnect lead wire from magnetic switch.
2. Remove 2 nuts and then take out magnetic switch by pulling up its rear portion so as to inside hook is disconnected from drive lever.

CAUTION:
Do not disassemble magnetic switch. Replace it as assembly, when required.

Installation

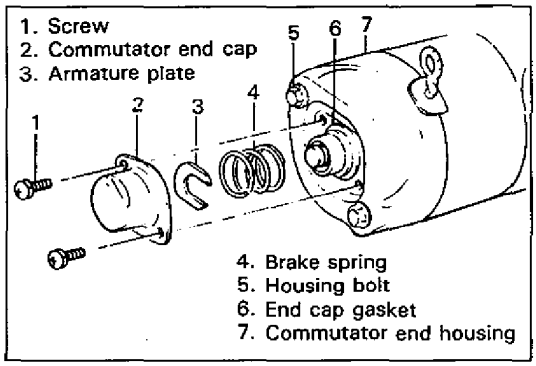
1. Replace magnetic switch or its boot with new one, if required, then apply grease to hook.

   "A": Grease 99000-25010

2. Hook switch plunger with drive lever and then fasten switch assembly with nuts.
3. Connect lead wire as it was and then check switch for operation.

NOTE:

- **Before installing nuts, make sure that plunger hook is connected with drive lever without fail.**
- **Face boot breather down.**

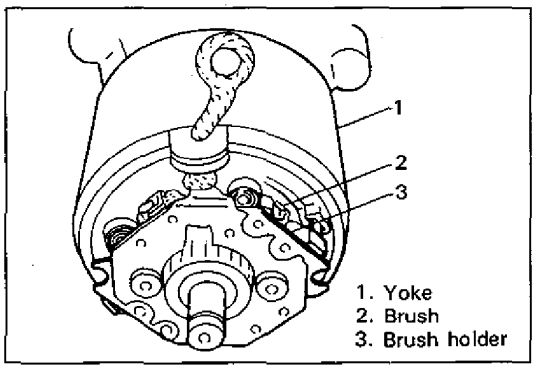


64B40-6G2-7-1

MOTOR ASSEMBLY

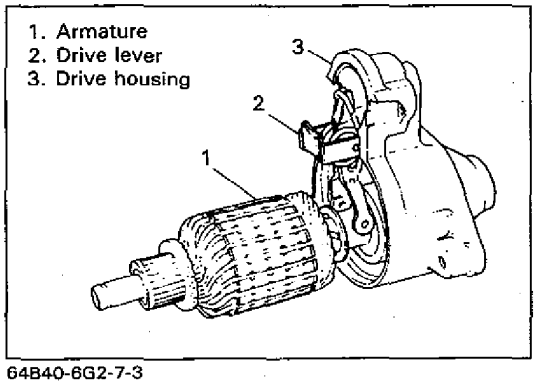
Disassembly

1. Remove magnetic switch.
2. Remove 2 screws, then take off commutator end cap, armature plate and brake spring.



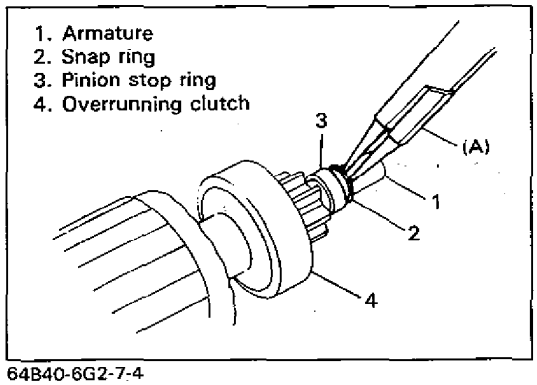
64B40-6G2-7-2

3. Remove housing bolts (through bolts) and then pull out commutator end housing.
4. Using long nose pliers, pull out brushes and then remove brush holder.



64B40-6G2-7-3

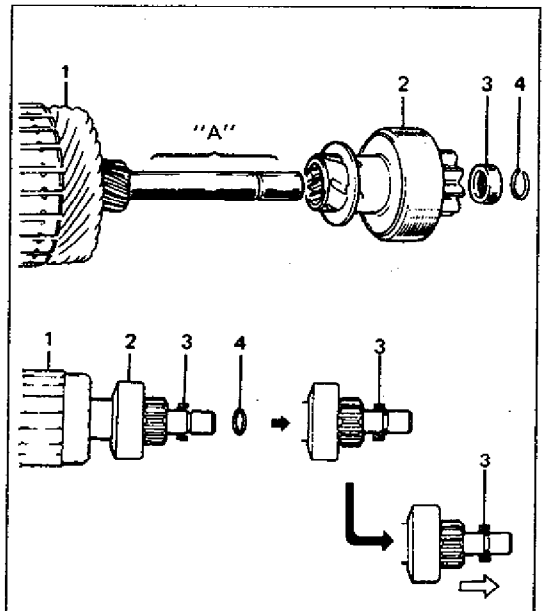
5. Remove yoke, armature and drive lever.



64B40-6G2-7-4

6. Remove armature snap ring by using snap ring pliers assisted with screwdriver, then pull out pinion stop ring and overrunning clutch.

Special Tool
(A): 09900-06107



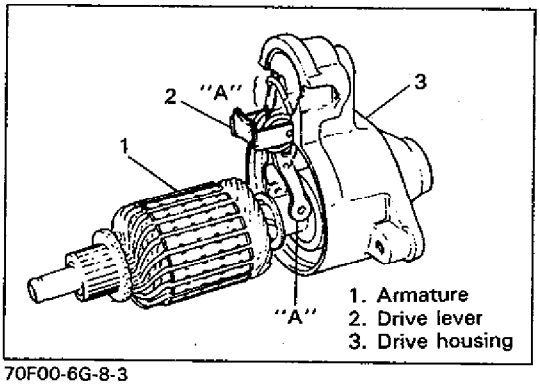
1. Armature
2. Overrung clutch
3. Pinion stop ring
4. Snap ring

70F00-6G-8-1

Reassembly

1. Inspect component parts as outlined in INSPECTION AND CORRECTION and replace or correct them as necessary.
2. Before installing overrunning clutch, apply grease as shown in left figure and then fasten stop ring with snap ring.

"A": Grease 99000-25010

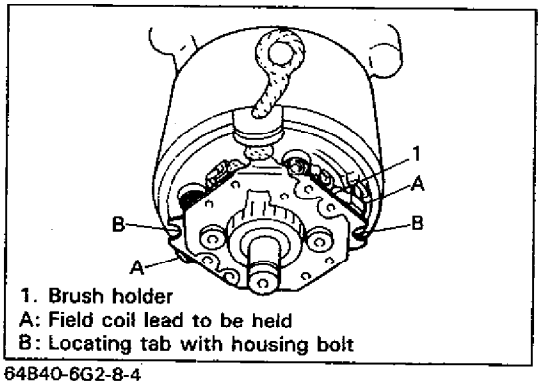


1. Armature
2. Drive lever
3. Drive housing

70F00-6G-8-3

3. Apply grease ("A") to drive lever and combine it with armature. Then assemble them with drive housing.

"A": Grease 99000-25010



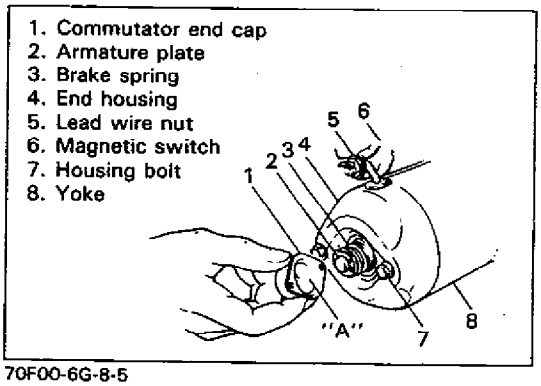
1. Brush holder
A: Field coil lead to be held
B: Locating tab with housing bolt

64B40-6G2-8-4

4. Install yoke and brush holder, then set 4 brushes with their springs.

NOTE:

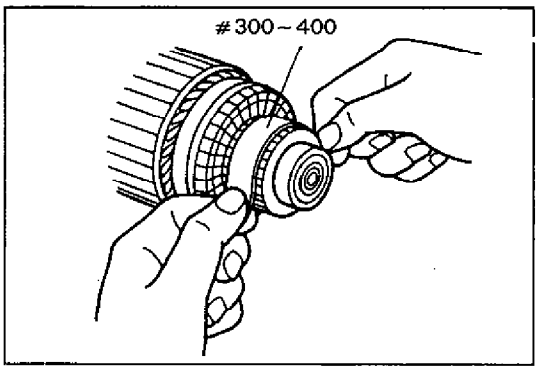
- **When installing brushes, make sure that brushes and commutator have been degreased thoroughly.**
- **Check to confirm that brush parts do not have unnecessary contacts with others.**



70F00-6G-8-5

5. Install commutator end housing applied with grease in its bush inside.
6. Place gasket, brake spring, then install armature plate securely, and then install end cap applied with grease about 40% of its room.
7. Install magnetic switch.
8. Check to make sure that motor functions properly connected with battery.

"A": Grease 99000-25010

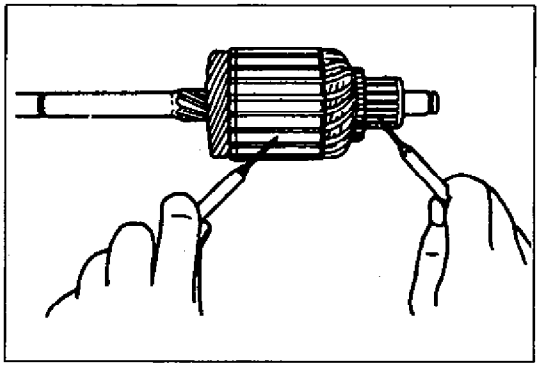


70F00-6G-9-1

INSPECTION AND CORRECTION

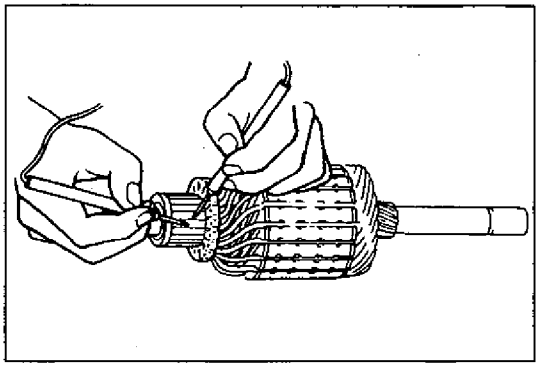
INSPECT ARMATURE

Inspect commutator for dirt or burn. Correct with sandpaper or lathe, if necessary.


70F00-6G-9-2

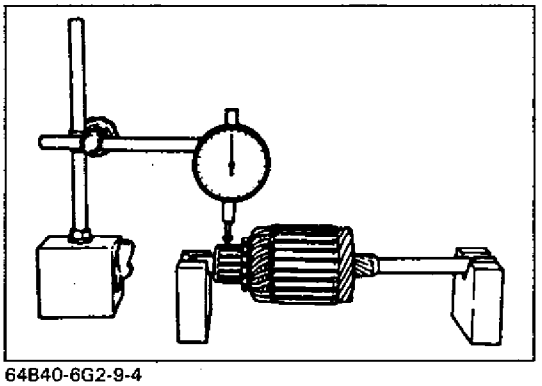
Ground

Between commutator segment and armature core should be insulated. Use ohmmeter for inspection.


64B40-6G2-9-3

Open Circuit

Check for continuity between segments. If there is no continuity at any test point, there is an open circuit and armature must be replaced.

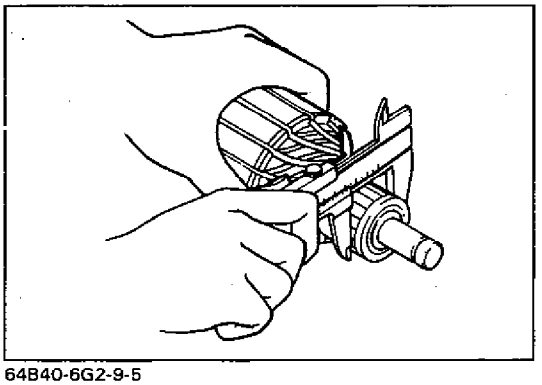

64B40-6G2-9-4

Commutator Run-out

Check commutator for run-out with armature supported on V blocks. Correct it by using lathe, if required.

Commutator run-out

Service limit (maximum value): 0.4 mm (0.015 in)

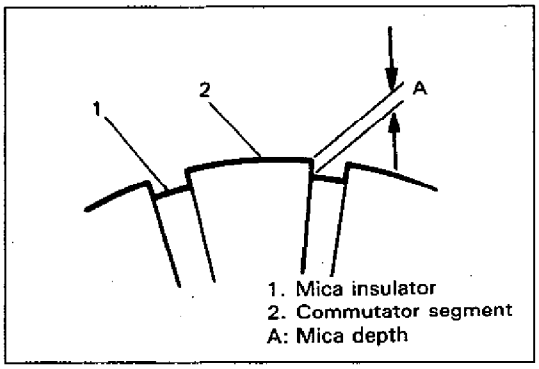

64B40-6G2-9-5

Commutator Diameter

Check for wear and replace armature if diameter is below limit.

Commutator diameter

Service limit (minimum value): 27 mm (1.063 in)



64B40-6G2-10-1

Commutator Surface

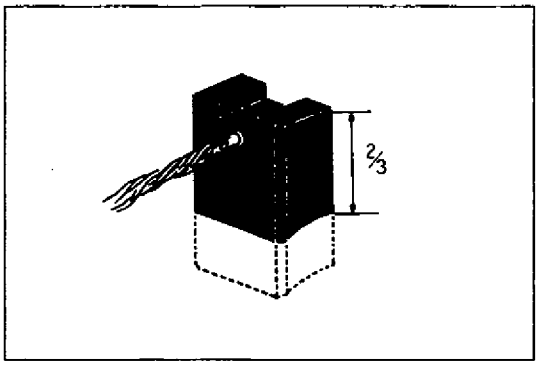
Correct and clean surface by using #400 emery cloth. Also check mica depth and correct it as required.

Commutator mica depth A
Service limit (minimum value): 0.2 mm (0.008 in)

INSPECT YOKE

Check field coil for continuity. There should be continuity between brush and yoke body.

64B40-6G2-10-2



64B40-6G2-10-3

INSPECT BRUSH

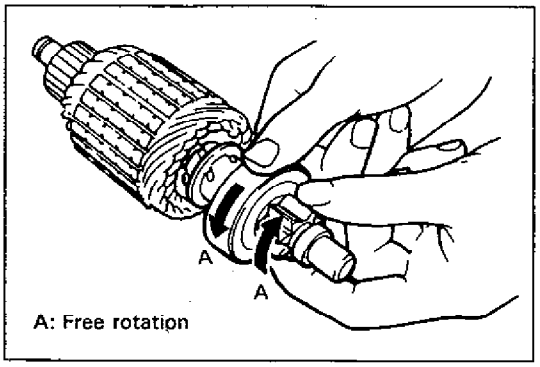
Measure length of brushes and replace them as necessary.

Brush length
Service limit (minimum value): 10.7 mm (0.421 in)

INSPECT BRUSH HOLDER

Check brush springs for rust or breakage. Also check brush holder for rust and positive plates for insulation. Replace it as assembly, if required.

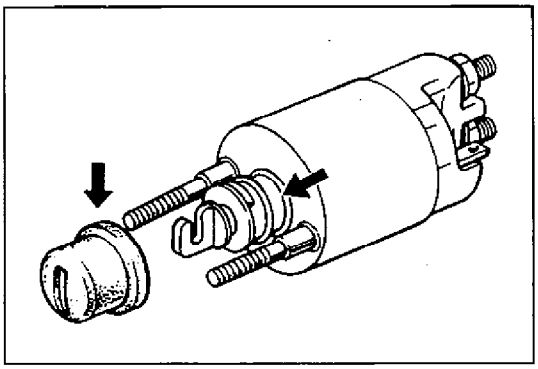
64B40-6G2-10-4



64B40-6G2-10-5

INSPECT OVERRUNNING CLUTCH

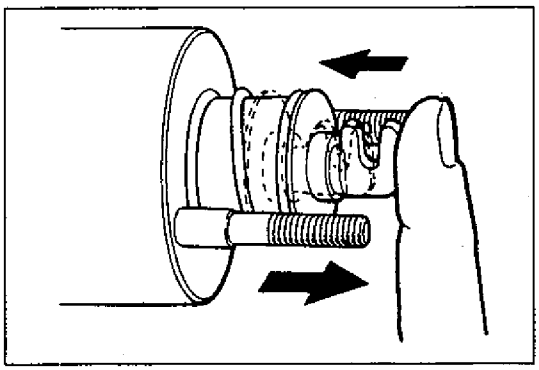
Inspect one way clutch for free rotation in A direction and locked up in the other way round.
Also check pinion for abnormal wear and replace it as assembly, if required.



70F00-6G-11-1

INSPECT MAGNETIC SWITCH BOOT AND PLUNGER

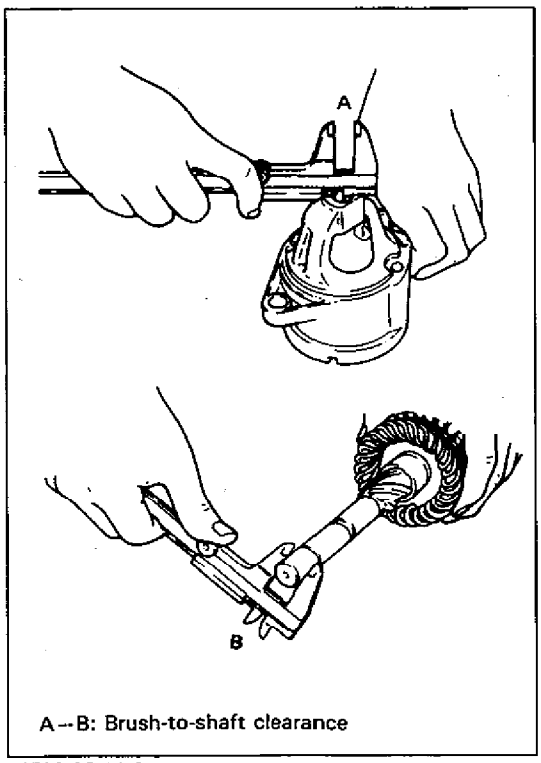
Inspect magnetic switch boot for breakage and its plunger for wear or damage. Replace if necessary.



70F00-6G-11-2

INSPECT MAGNETIC SWITCH

Push in plunger and release it. The plunger should return quickly to its original position. Replace if necessary.



A—B: Brush-to-shaft clearance

70F00-6G-11-3

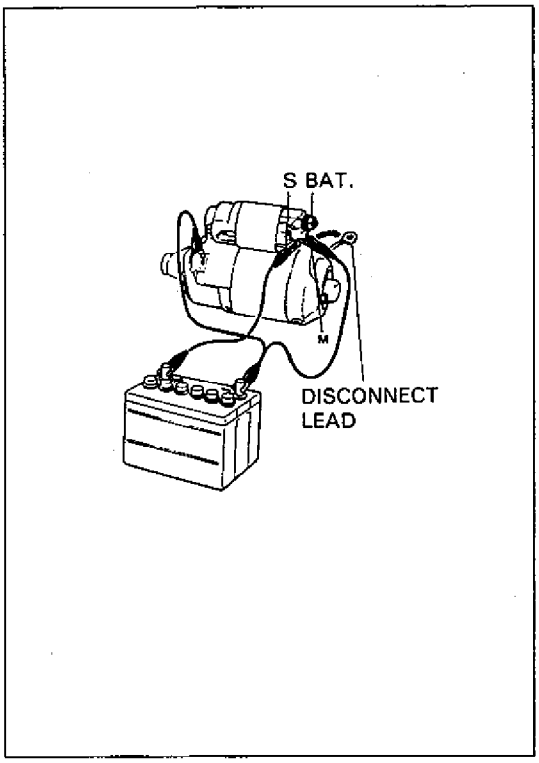
INSPECT SHAFT AND BUSH

Measure clearance between shaft and bush and replace bush, if it exceeds limit.

NOTE:

- **Use adequate drive handle for bush removal and installation.**
- **After press-fitting bush, ream it and obtain 0.05 mm of oil clearance against shaft.**
- **Caulk cover if front bush is replaced.**
- **Lubricate bush with grease.**

Bush-to-shaft clearance
Service limit A—B: 0.2 mm (0.008 in)



64B40-6G2-11-3

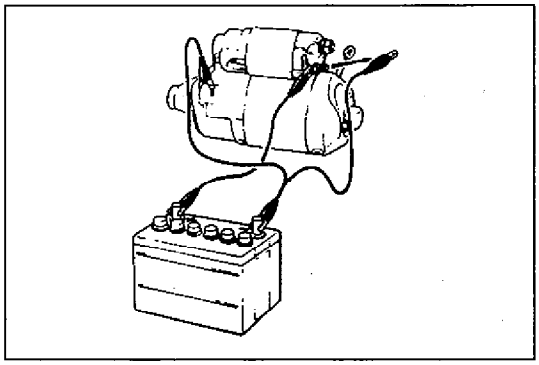
PERFORMANCE TEST

CAUTION:
Each test must be performed within 3—5 seconds to avoid coil from burning.

PULL-IN TEST

Connect test leads as shown and check that pinion (overrunning clutch) jumps out. If it does not, replace magnetic switch.

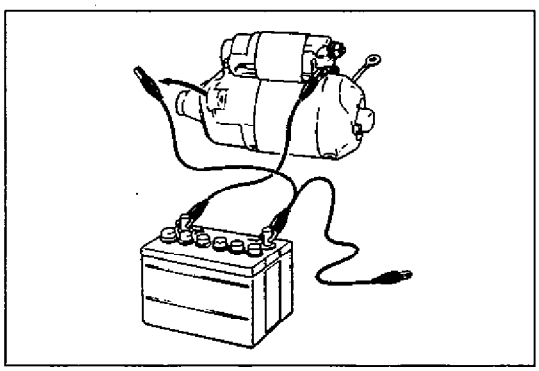
NOTE:
Before testing, disconnect field coil lead from terminal M.



64B40-6G2-11-5

HOLD-IN TEST

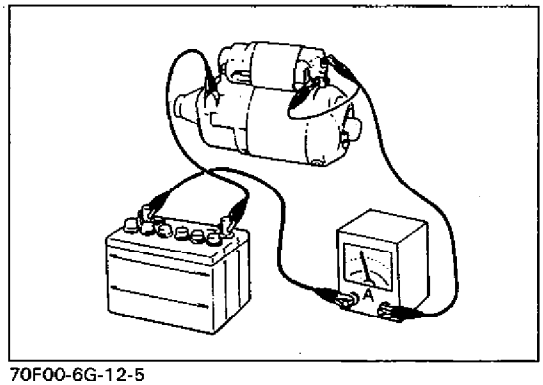
While connected as the above with pinion out, disconnect negative lead from terminal M and check that pinion remains out. If not, replace magnetic switch.



64B40-6G2-12-1

PINION (PLUNGER) RETURN TEST

As a next step to the above, disconnect negative lead and check to make sure that pinion returns inward quickly.



70F00-6G-12-5

NO-LOAD PERFORMANCE TEST

Connect test leads as follows and check that motor runs without fail with pinion moved out.
Also check that ammeter indicates specified current.

No load current: Within 50A at 11V

SPECIFICATIONS

Voltage		12 volts	
Output		0.8 kW	
Rated time		30 seconds	
Rotation		Clockwise viewed from pinion side	
Brush length		16 mm (0.630 in)	
Number of pinion teeth		8	
Performance		Condition	Guarantee
Around at 20°C (68°F)	No load	11V	50A maximum 5,000 r/min. minimum
	Load	9.5V 0.7 kg-m	270A maximum 1,200 r/min. minimum
	Lock	7.7V	600A maximum 1.3 kg-m (9.4 lb-ft) minimum
Magnetic switch pull-in operation		8 volts maximum at 20°C (68°F)	

70F00-6G-13-1

REQUIRED SERVICE MATERIAL

MATERIAL	RECOMMENDED SUZUKI PRODUCT	USE
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	Refer to page 6G-3.

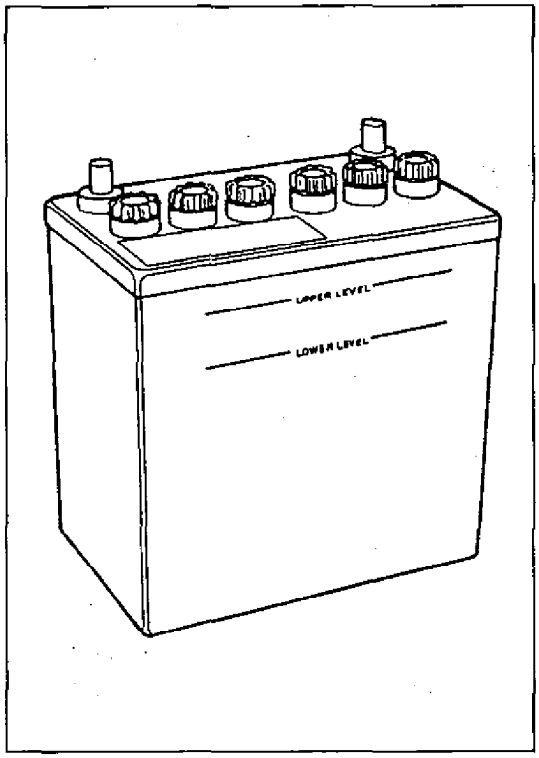
70F00-6G-13-2

SECTION 6H

CHARGING SYSTEM

CONTENTS

70F00-6H-1-1



70F00-6H-2-1

BATTERY

GENERAL DESCRIPTION

The battery has three major functions in the electrical system. First, it is a source of electrical energy for cranking the engine. Second, it acts as a voltage stabilizer for the electrical system. And third, it can, for a limited time, provide energy when the electrical load exceeds the output of the generator. The battery mounted in each vehicle is one of the following two types, depending on specification.

38B20R TYPE

Rated capacity	28 AH/5HR, 12 Volts
Electrolyte	2.4 L (5.07/4.2 US/Imp pt)
Electrolyte S.G.	1.28 when fully charged at 20°C (68°F)

55B24R TYPE

Rated capacity	36 AH/5HR, 12 Volts
Electrolyte	2.8 L (5.92/4.93 US/Imp pt)
Electrolyte S.G.	1.28 when fully charged at 20°C (68°F)

COMMON CAUSES OF FAILURE

A battery is not designed to last indefinitely; however, with proper care, it will provide many years of service. If the battery tests good but fails to perform satisfactorily in service, the following are some factors that may point to the cause of trouble:

1. Accessories left on overnight.
2. Slow average driving speeds for short periods.
3. Electrical load exceeding generator output particularly with addition of after market equipment.
4. Defects in charging system such as high resistance, slipping drive belt, loose generator output terminal, faulty generator or voltage regulator.
5. Battery abuse, including failure to keep battery cable terminals clean and tight or loose battery hold down.
6. Mechanical problems in electrical system such as shorted or pinched wires.

64B40-6H-2-3

VISUAL INSPECTION

Check for obvious damage, such as cracked or broken case or cover, that could permit loss of electrolyte. If obvious damage is noted, replace battery. Determine cause of damage and correct as needed. If not, move on to load test.

CARRIER AND HOLD-DOWN

The battery carrier and hold-down clamp should be clean and free from corrosion before installing the battery. The carrier should be in good condition so that it will support the battery securely and keep it level. Make certain there are no parts in carrier before installing the battery. To prevent the battery from shaking in its carrier, the hold-down bolts should be tight but not overtightened.

64B40-6H-3-3

SULFATION

If the battery is allowed to stand for a long period in discharged condition, the lead sulfate becomes converted into a hard, crystalline substance, which will not easily turn back to the active material again during the subsequent recharging. "Sulfation" means the result as well as the process of that reaction. Such a battery can be revived by very slow charging and may be restored to usable condition but its capacity is lower than before.

64B40-6H-3-4

ELECTROLYTE FREEZING

The freezing point of electrolyte depends on its specific gravity. Since freezing may ruin a battery, it should be protected against freezing by keeping it in a fully charged condition. If a battery is frozen accidentally, it should not be charged until it is warmed.

64B40-6H-3-5

CARE OF THE BATTERY

(1) The battery is a very reliable component, but needs periodical attentions.
Keep the battery carrier clean; prevent rust formation on the terminal posts; keep the electrolyte up to the upper level uniformly in all cells; and try to keep the battery fully charged at all times.

(2) Keep the battery cable connections clean.
The cable connections, particularly at the positive (+) terminal post, tend to become corroded. The product of corrosion, or rust, on the mating faces of conductors resists the flow of current. The inability of the starting motor to crank the engine is often due to the rust formation in the battery cable connection. Clean the terminals and fittings periodically to ensure good metal-to-metal contact, and grease the connections after each cleaning to protect them against rusting.

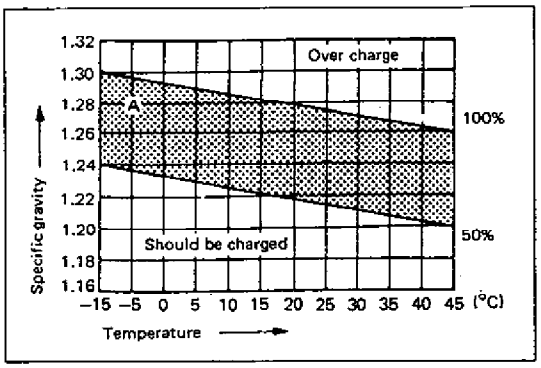
(3) Be alway in the know as to the state of charge of the battery.
The simplest way to tell the state of charge is to carry out a hydrometer test. The hydrometer is an inexpensive instrument for measuring the specific graivty (S.G.) of the battery electrolyte. Why measure the S.G.? Because the S.G. of the electrolyte is indicative of the state of charge.

70F00-6H-3-4

The direct method of checking the battery for state of charge is to carry out a high rate discharge test, which involves a special precise voltmeter, an expensive instrument used generally in the serive shops but not recommendable to the user of the vehicle.
At 20°C of battery temperature (electrolyte temperature):

The battery is in FULLY CHARGED STATE if the electrolyte S.G. is 1.280.
The battery is in HALF CHARGED STATE if the S.G. is 1.220.
The battery is in NEARLY DISCHARGED STATE if the S.G. is 1.150 and is in danger of freezing.

70F00-6H-4-1



70F00-6H-4-3

What is the battery temperatures not 20°C (68°F)? Since the S.G. varies with temperature, you have to correct your S.G. reading (taken with your hydrometer) to the value at 20°C, and apply the corrected S.G. value to the three-point guide stated above. This manner of correction needs a chart showing the relation between S.G. and temperature. There is a simpler way: refer to the graph given left, which tells you the state of charge for a range of S.G. value and a range of temeprature.

How to use the temperature-corrected state-of-charge graph. Suppose your S.G. reading is 1.28 and the battery temperature is −5°C (23°F). Locate the intersection of the −5°C line and the 1.28 S.G. line. The intersection is "A". It is in the zone for CHARGED STATE (shaded area in the graph). How much is the battery charged? To find out the answer, draw a line parallel to the zone demarcation line, extending it to the right, and see where this line crosses the percentage scale. In the present example, the line crosses at, say, 85% point. The battery is 85% fully charged.

70F00-6H-4-4

ON-VEHICLE SERVICE

JUMP STARTING IN CASE OF EMERGENCY

WITH AUXILIARY (BOOSTER) BATTERY

CAUTION:
Do not push or tow vehicle to start. Damage to emission system and/or to other parts of vehicle may result.

Both booster and discharged battery should be treated carefully when using jumper cables. Follow procedure outlined below, being careful not to cause sparks.

WARNING:
- **Departure from these conditions or procedure described below could result in:**
  (1) Serious personal injury (particularly to eyes) or property damage from such causes as battery explosion, battery acid, or electrical burns.
  (2) Damage to electronic components of either vehicle.
- **Never expose battery to open flame or electric spark. Batteries generate gas which is flammable and explosive.**
- **Remove rings, watches, and other jewelry. Wear approved eye protection.**
- **Do not allow battery fluid to contact eyes, skin, fabrics, or painted surfaces as fluid is a corrosive acid. Flush any contacted area with water immediately and thoroughly.**
- **Be careful so that metal tools or jumper cables do not contact positive battery terminal (or metal in conntact with it) and any other metal on vehicle, because a short circuit could occur.**
- **Batteries should always be kept out of reach of children.**

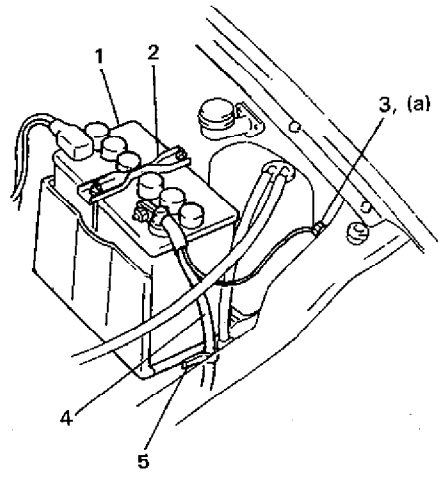
1. Set parking brake and gear shift lever in neutral position. Turn off ignition, turn off lights and all other electrical loads.
2. Check electrolyte level. If it is below low level line, add distilled water.
3. Attach end of one jumper cable to positive terminal of booster battery and the other end of the same cable to positive terminal of discharged battery. (Use 12-volt battery only to jump start engine).
4. Attach one end of the remaining negative cable to negative terminal of booster battery and the other end to a solid engine ground (such as exhaust manifold) at least 45 cm (18 in) away from battery of vehicle being started.

   WARNING:
   Do not connect negative cable directly to negative terminal of dead battery.

5. Start engine of vehicle that is providing jump start and turn off electrical accessories. Then start engine of the vehicle with discharged battery.
6. Reverse connecting procedure exactly when disconnecting jumper cable. Negative cable must be disconnected from engine that was jump started first.

WITH CHARGING EQUIPMENT

CAUTION:
When jump starting engine with charging equipment, be sure equipment used is 12-volt and negative ground. Do not use 24-volt charging equipment. Using such equipment can cause serious damage to electrical system or electronic parts.



1. Battery
2. Retainer (Band)
3. Body ground bolt
4. Ground cable
5. Clamp

70F00-6H-6-1

OFF-VEHICLE SERVICE

DISMOUNTING AND REMOUNTING

1. Disconnect negative cable.
2. Disconnect positive cable.
3. Remove retainer nuts and retainer.
4. Remove battrey.
5. To install, reverse removal procedure.
6. Torque battery cables to specification.

NOTE:
Check to be sure that ground cable has enough clearance to hood panel by terminal.

Tightening Torque
(a): 6—10 N·m (0.6—1.0 kg-m, 4.5—7.0 lb-ft)

CHARGING A VERY FLAT OR COMPLETELY DISCHARGED BATTERY

1. Measure voltage at battery terminals with an accurate voltmeter. If below 10 volts, then charge current will be very low and it could take some time before it accepts a current in excess of a few milliamperes. Such low current may not be detectable on ammeters available in the field.
2. Set battery charger on high setting.
3. Some chargers feature polarity protection circuitry which prevents charging unless charger leads are connected to battery terminals correctly. A completely discharged battery may not have enough voltage to activate this circuitry, even though leads are connected properly, making it appear that battery will not accept charging current. Therefore, follow the specific charger manufacturer's instruction telling how to bypass or override circuitry so that charger will turn on and charge low-voltage battery.
4. Battery chargers vary in the amount of voltage and current they provide. Time required for battery to accept measurable charger current at various voltages may be as follows.

   VOLTAGE
   A: 16.0 or more ..... Up to 4 hours
   B: 14.0—15.9 ..... Up to 8 hours
   C: 13.9 or less ..... Up to 16 hours

   If charge current is still not measurable at the end of above charging times, battery should be replaced. If charge current is measurable during above charging time, battery is considered to be good and charging should be completed in normal manner.
5. It is important to remember that a completely discharged battery must be recharged for a sufficient number of ampere hours (AH) to restore it to a usable state. As a general rule of thumb, use nominal AH plus extra about 30% as number of ampere-hours of charge, which will usually bring normal battery. If battery is 45 AH, required AH for complete recharge will be 45 x 1.3 = 58.5. Therefore, following low ampere long hour charge will be recommended.
   - 3 ampere charge x 20 hours ..... 60 AH or
   - 5 ampere charge x 12 hours ..... 60 AH, etc.
6. It is recommended that any battery recharged by this procedure be LOAD TESTED to verify serviceability.

70F00-6H-6-3

GENERATOR

GENERAL DESCRIPTION

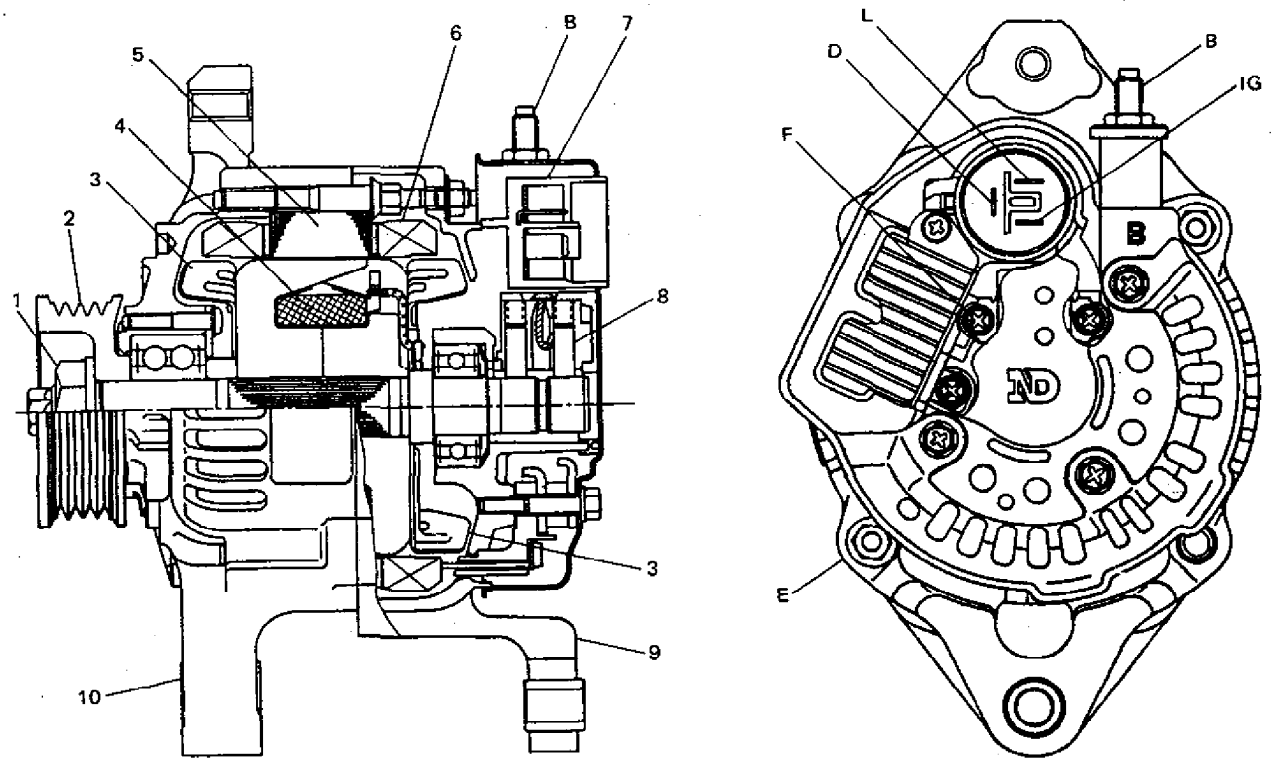
The basic charging system is the IC intregal regulator charging system. The internal components are connected electrically as shown on next page.

The generator features a solid state regulator that is mounted inside the generator. All regulator components are enclosed into a solid mold, and this unit along with the brush holder assembly is attached to the slip ring and frame. The generator voltage setting cannot be adjusted.

The generator rotor bearings contain enough grease to eliminate the need for periodic lubrication. Two brushes carry current through the two slip rings to the field coil mounted on the rotor, and under normal conditions will provide long period of attention-free service.

The stator windings are assesmbled on the inside of a laminated core that forms part of the generator frame. A rectifier bridge connected to the stator windings contains six diodes, and electrically changes the stator A.C. voltages to a D.C. voltage which appears at the generator output terminal. The neutral diodes serve to convert the voltage fluctuation at the neutral point to direct current for increasing the generator output.

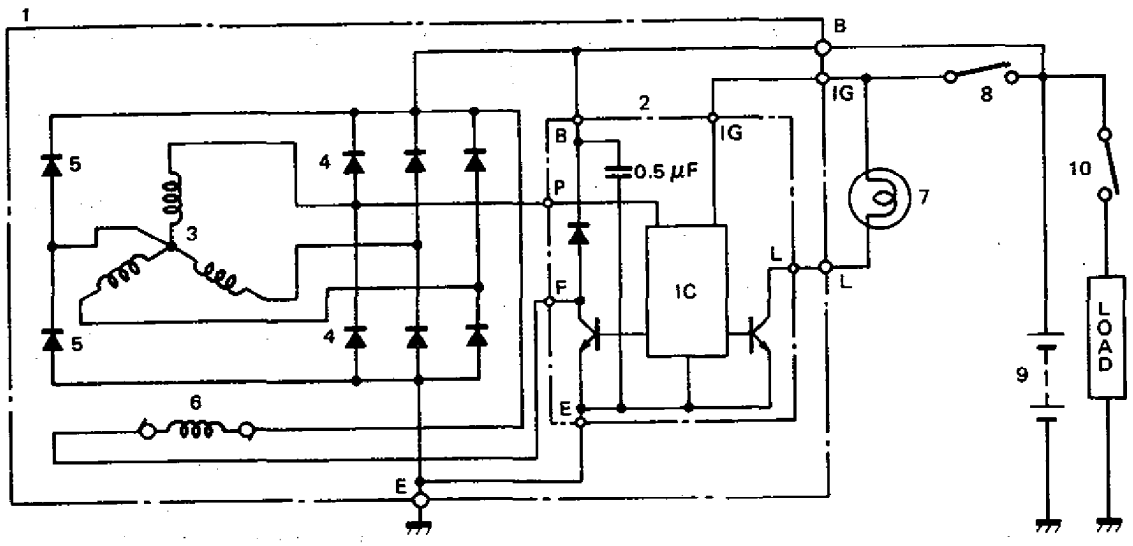
A condenser mounted in the regulator assembly protects the diodes from high voltages and suppresses radio noise.



1. Pulley nut
2. Pulley
3. Rotor fan
4. Field coil
5. Stator core
6. Stator coil
7. Regulator
8. Brush
9. Rear end frame
10. Drive end frame

F : Field coil terminal
D : Dummy terminal
L : Lamp terminal
B : Generator output (Battery terminal)
IG : Ignition terminal
E : Ground

64B40-6H-8-1



1. Generator with regulator assembly
2. I.C. regulator
3. Stator coil
4. Rectifier diode
5. Neutral point diode
6. Field coil (rotor coil)
7. Charge indicator light
8. Ignition switch
9. Battery
10. Load switch

64B40-6H-9-1

DIAGNOSIS

To avoid generator damage, always follow precautions shown below.

CAUTION:
- **Do not mistake polarities of IG terminal and L terminal.**
- **Do not create a short circuit between IG and L terminals. Always connect these terminals through a lamp.**
- **Do not connect any load between L and E.**
- **When connecting a charger or a booster battery to vehicle battery, see battery section.**

Trouble in charging system will show up as one or more of following conditions:
1. Faulty indicator lamp operation.
2. An undercharged battery as evidenced by slow cranking.
3. An overcharged battery as evidenced by excessive spewing of electrolyte from vents.

Noise from generator may be caused by a loose drive pulley, loose mounting bolts, worn or dirty bearings, defective diode, or defective stator.

70F00-6H-9-1

FAULTY INDICATOR LAMP OPERATION

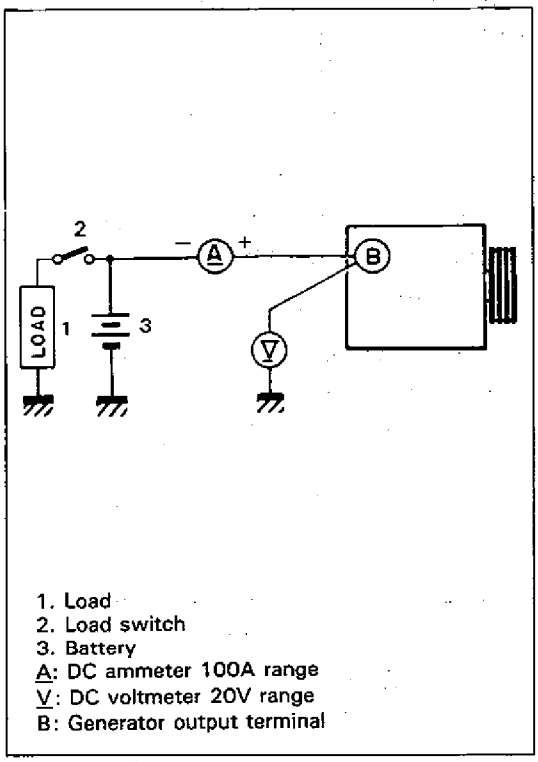
Symptom	Possible Cause	Correction
Charge light does not light with ignition ON and engine off	• Fuse blown • Light burned out • Wiring connection loose • IC regulator faulty	Check fuse. Replace light. Tighten loose connections. Replace IC regulator.
Charge light does not go out with engine running (battery requires frequent recharging)	• Drive belt loose or worn • Battery cables loose, corroded or worn • IC regulator or generator faulty • Wiring faulty	Adjust or replace drive belt. Repair or replace cables. Check charging system. Repair wiring.

70F00-6H-9-3

UNDERCHARGED BATTERY

This condition, as evidenced by slow cranking can be caused by one or more of the following conditions even though indicator lamp may be operating normally. Following procedure also applies to vehicles with voltmeter and ammeter.

70F00-6H-10-1



1. Load
2. Load switch
3. Battery
A: DC ammeter 100A range
V: DC voltmeter 20V range
B: Generator output terminal

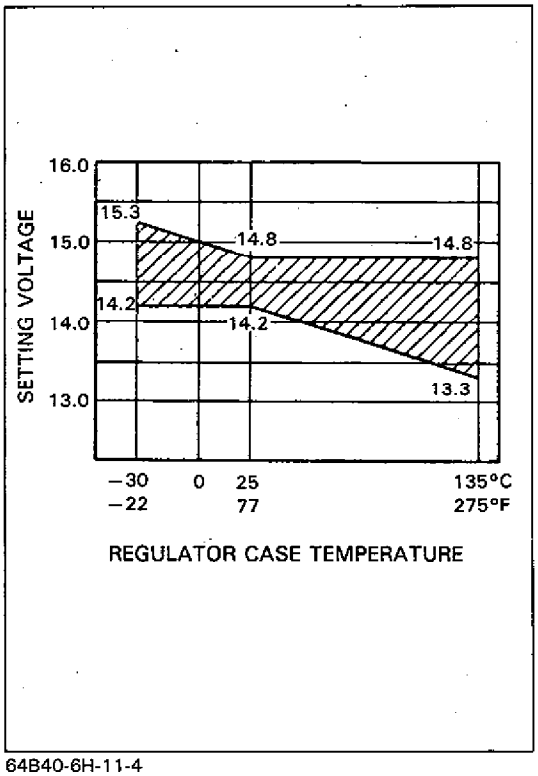
1. Make sure that undercharged condition has not been caused by accessories left on for extended period of time.
2. Check drive belt for proper tension.
3. If battery defect is suspected, refer to Battery section.
4. Inspect wiring for defects. Check all connections for tightness and cleanliness, battery cable connections at battery, starting motor and ignition ground cable.
5. Connect voltmeter and ammeter as shown in figure.

Voltmeter
Set between generator B terminal and ground.

Ammeter
Set between generator B terminal and battery (+) terminal.

6. Measure current and voltage under each of the following conditions.

70F00-6H-10-2



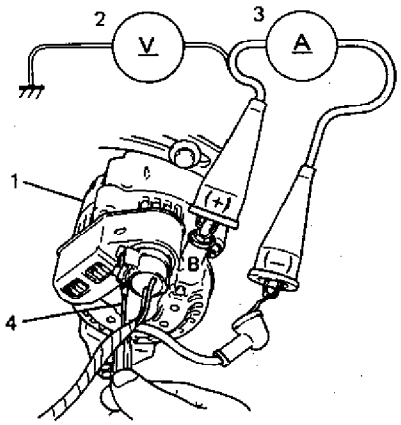
64B40-6H-11-4

No-load Check
Run engine from idling up to 2,000 r/min. and read meters.

NOTE:
- **Consideration should be taken that voltage differs somewhat with regulator case temperature.**
- **Discharged battery does not fit for this test. Before testing, make sure that battery is fully charged.**

CAUTION:
While engine is running, do not disconnect battery terminal. It may cause damage to electronic parts.

Standard current: 10A maximum
Standard voltage: 14.2—14.8V at 25°C, 77°F



1. Generator
2. Voltmeter
3. Ammeter
4. Small screwdriver to ground F (NEVER contact it with magnetic switch terminal of starting motor)

64B40-6H-12-1

Higher voltage
If voltage is higher than standard value, replace IC regulator.

Lower voltage
If voltage is below standard, proceed to following check.

Ground F terminal and start engine, then measure voltage at B terminal.

If voltage rises above standard, it is considered that generator itself is good but IC regulator has been damaged.

If voltage is below standard, generator itself has problem.

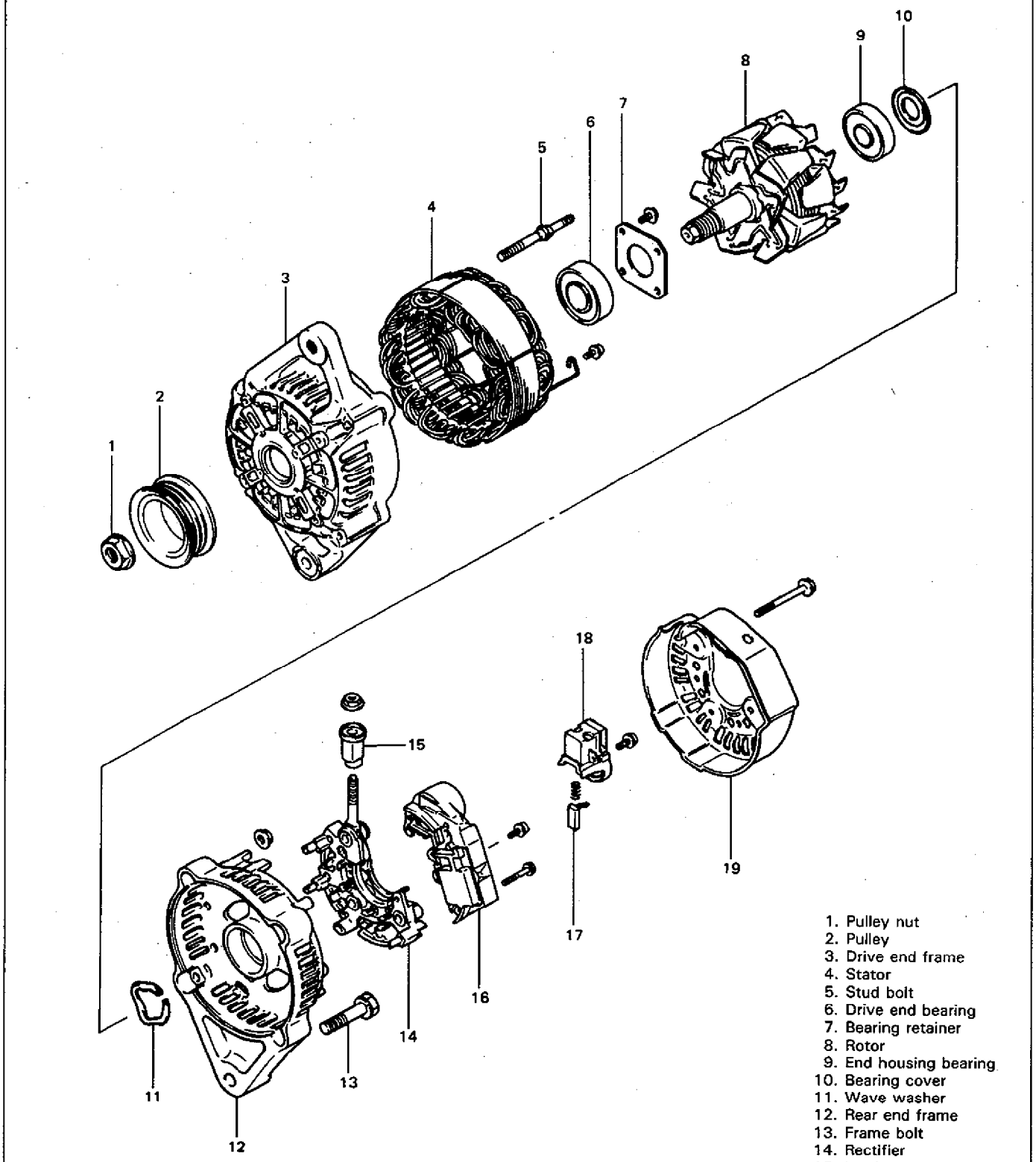
Load Check
Run engine at 2,000 r/min. and turn on headlights and heater fan. Measure current and if it is less than 20A, repair or replace generator.

OVERCHARGED BATTERY

1. To determine battery condition, refer to Battery section.
2. If obvious overcharge condition exists as evidenced by excessive spewing of electrolyte, proceed to disassembly section of generator service and check field windings for grounds and shorts. If problem exists, replace rotor and then check to make sure that output voltage is within specification.

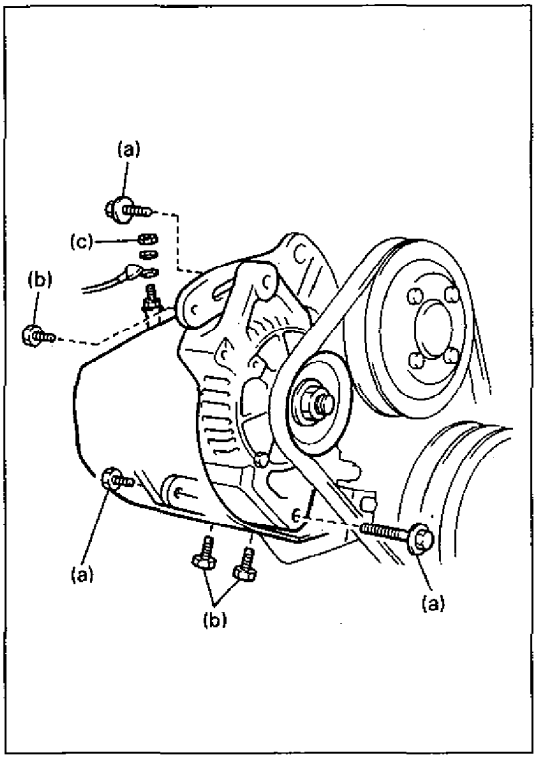
64B40-6H-12-3

UNIT REPAIR OVERHAUL



1. Pulley nut
2. Pulley
3. Drive end frame
4. Stator
5. Stud bolt
6. Drive end bearing
7. Bearing retainer
8. Rotor
9. End housing bearing
10. Bearing cover
11. Wave washer
12. Rear end frame
13. Frame bolt
14. Rectifier
15. Insulator
16. Regulator
17. Brush
18. Brush holder
19. Rear end cover

64B40-6H-13-1



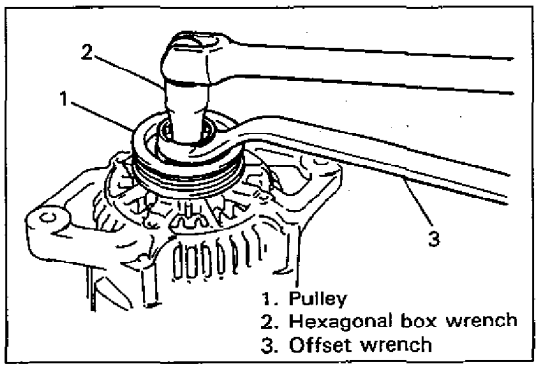
70F00-6H-13-1

DISMOUNTING AND REMOUNTING

1. Disconnect negative cable at battery.
2. Disconnect B terminal wire and coupler.
3. Remove generator cover bolt (upper side).
4. Remove generator drive belt adjusting bolt.
5. Remove generator cover bolts (lower side) and then remove cover.
6. Remove mounting bolts and then take out belt and generator assembly downward.
7. To remount, reverse above procedure giving specified tension to drive belt.

NOTE:
For belt tension refer to SECTION 6B.

Tightening Torque
(a): 18—28 N·m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)
(b): 4—7 N·m (0.4—0.7 kg-m, 3.0—5.0 lb-ft)
(c): 6—10 N·m (0.6—1.0 kg-m, 4.5—7.0 lb-ft)

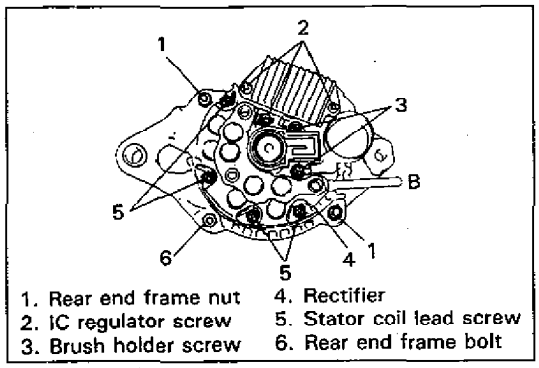


64B40-6H-14-3

DISASSEMBLY

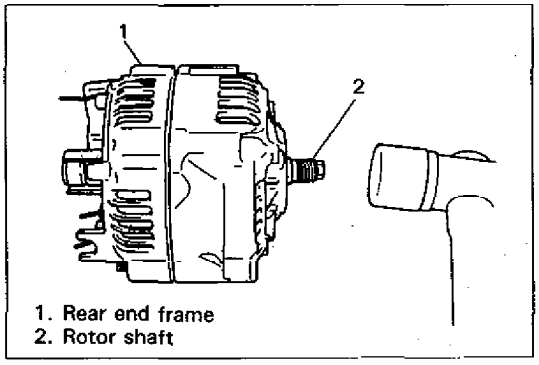
1. Hold shaft by using hexagonal box wrench and remove pulley nut, and then pull out pulley.

CAUTION:
- **To hold shaft, use hexagonal box. Duodecimal box may cause slipping and consequential shaft or tool damage.**
- **Do not attempt to hold pulley by using vise or pipe wrench so as not to distort it.**



64B40-6H-14-4

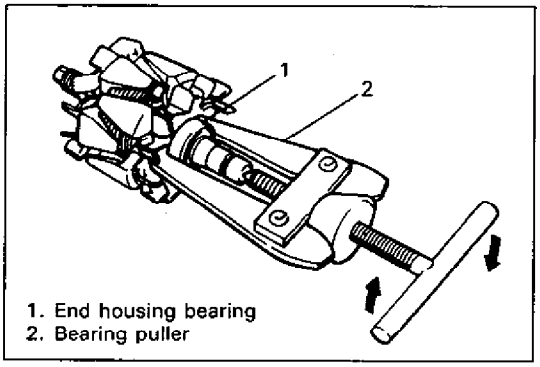
2. Remove B terminal nut and insulator.
3. Remove 3 screws and take off rear end cover.
4. Remove 2 screws, then pull out brush holder assembly.
5. Remove 3 screws and then take out IC regulator.
6. Remove 4 screws, stretch stator coil leads and then take out rectifier.



64B40-6H-14-5

7. Remove rear end frame bolts and nuts, and then drive out rear end frame with rotor tapping shaft lightly by using plastic hammer.
8. Separate rear end frame from rotor tapping frame evenly by using plastic hammer.

CAUTION:
Do not hit shaft at slip ring side when separating rotor and rear end frame.

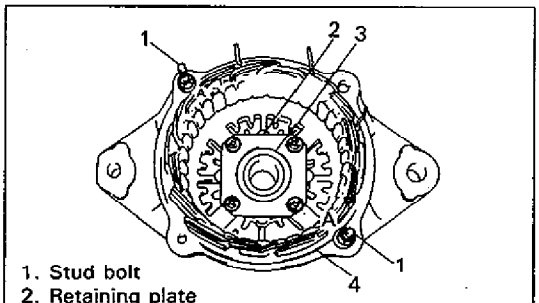


1. End housing bearing
2. Bearing puller

64B40-6H-15-1

9. Use bearing puller to remove end housing bearing.

CAUTION:
Care must be exercised so as not to distort cooling fan blade while applying puller.



1. Stud bolt
2. Retaining plate
3. Drive end bearing
4. Stator

A: Stator core slit (Align it with stud bolt)

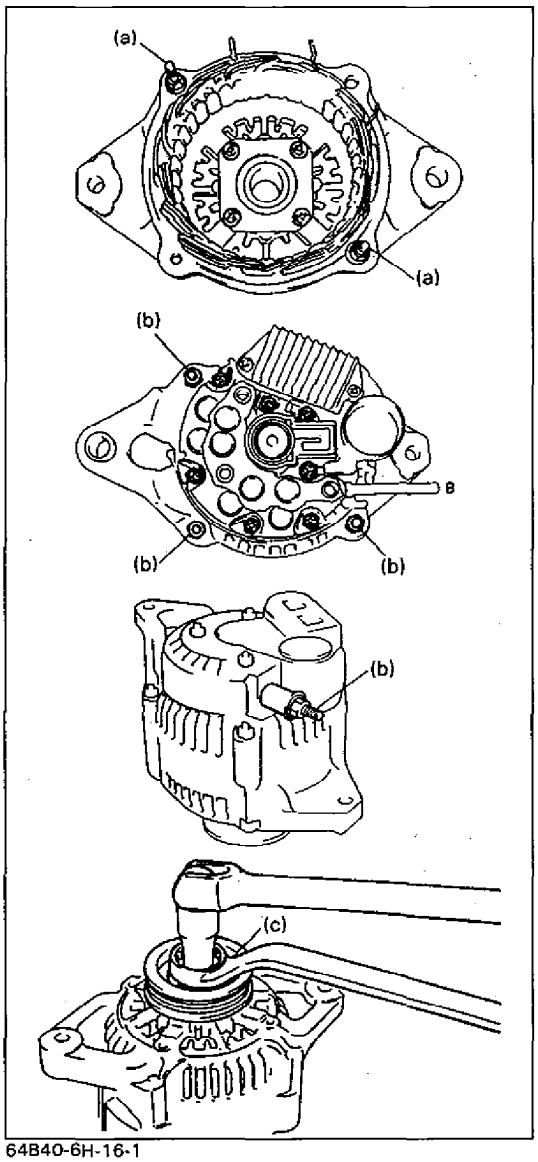
77500-6H-21-5

10. Remove 4 screws, retainer plate and then drive out drive end bearing.

11. If required, remove stud bolts and then pull out stator.

NOTE:
Heating drive end frame may facilitate removal of stator.

77500-6H-22-1



64B40-6H-16-1

REASSEMBLY

Judging from faulty conditions noted before disassembly and what is found through inspection after disassembly, prepare replacing parts and reassemble generator by reversing removal procedure.

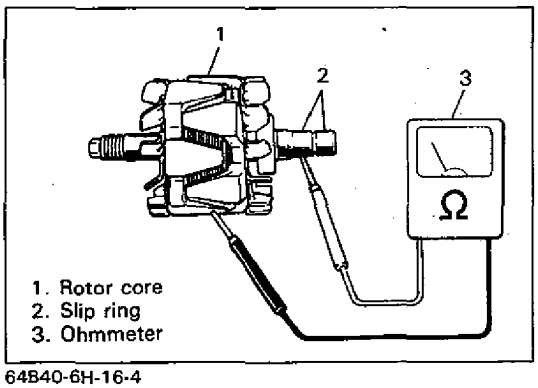
NOTE:

- **Align stator slits with stud bolts when inserting stator coil assembly into drive end frame.**
- **When installing brush holder assembly, make sure that brushes and slip rings have been degreased thoroughly.**

CAUTION:

- **When installing rectifier, check to confirm that stator leads have enough clearance with cooling fan blades.**
- **Care should be taken not to overtighten B terminal insulator nut.**

Tightening Torque for stud bolts (a), frame bolts/nuts (b), B terminal inner nut (b) and pulley nut (c)
(a): 7—8.8 N·m (0.7—0.88 kg-m, 5.5—6.0 lb-ft)
(b): 4—5 N·m (0.4—0.5 kg-m, 3.0—3.5 lb-ft)
(c): 95—130 N·m (9.5—13.0 kg-m, 69.0—94.0 lb-ft)



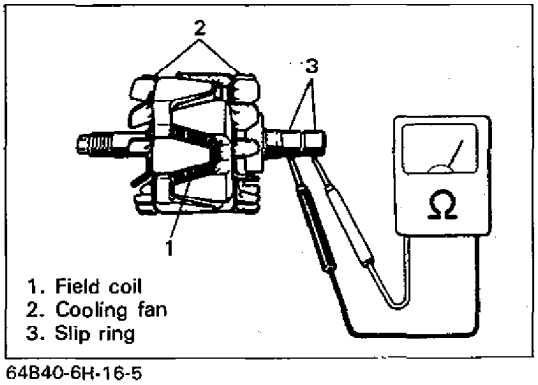
64B40-6H-16-4

INSPECTION AND CORRECTION

ROTOR

Ground

Between slip rings and rotor core should be insulated. Use ohmmeter for inspection.



64B40-6H-16-5

Open circuit

Check continuity and resistance of field coil by applying ohmmeter probes to slip rings. If resistance is out of specification, replace rotor.

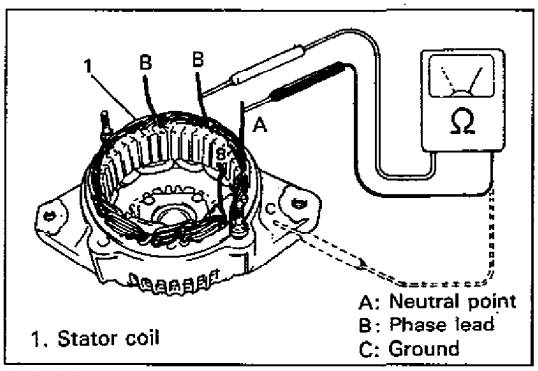
Field coil resistance: 2.8 — 3.0 Ω

FAN
Make sure that fan blades are all in good condition.

BEARING
Check for smooth rotation by hand.

DRIVE END BEARING
Before remove it, check for smooth rotation by hand.

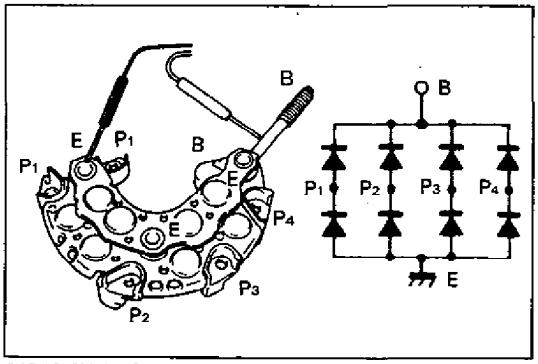
64B40-6H-17-1



STATOR
Ground
Using ohmmeter, check to make sure that stator coil is insulated from core.

Open circuit
Check continuity between neutral point A and each phase B.

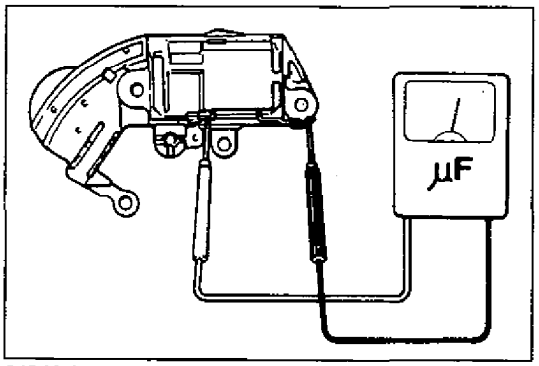
64B40-6H-17-2



RECTIFIER
Using kΩ range ohmmeter, check continuity between B terminal and ground. Put a tester probe to terminal B and the other probe to ground, then swap two probes. Only one direction should have continuity and the other should be infinity. If not, replace rectifier assembly.

CAUTION:
Do not use 500V megger for testing rectifier. It will cause to damage diodes in rectifier.

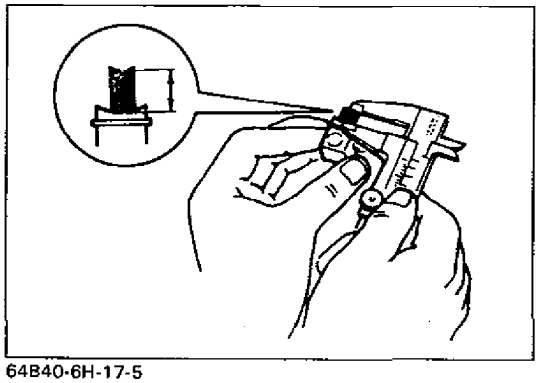
64B40-6H-17-3



CONDENSER
Use condenser tester to check condition of condenser.

Condenser capacity: 0.5 μF

64B40-6H-17-4



BRUSH
Check each brush for wear by measuring its length as shown. If brush is found worn down to service limit, replace brush with holder.

Brush length service limit (minimum value): 4.5 mm (0.18 in)

64B40-6H-17-5

SPECIFICATIONS

Rated voltage	12V
Maximum output	50A (Hot at 13.5V)
Permissible max. speed	18,000 r/min.
No-load speed	1,110 r/min.
Setting voltage	14.2 to 14.8V (5,000 r/min. 10A 25°C/77°F)

Permissible ambient temperature	−30 to 90°C −22 to 194°F
Polarity	Negative ground
Rotation	Clockwise viewed from pulley side

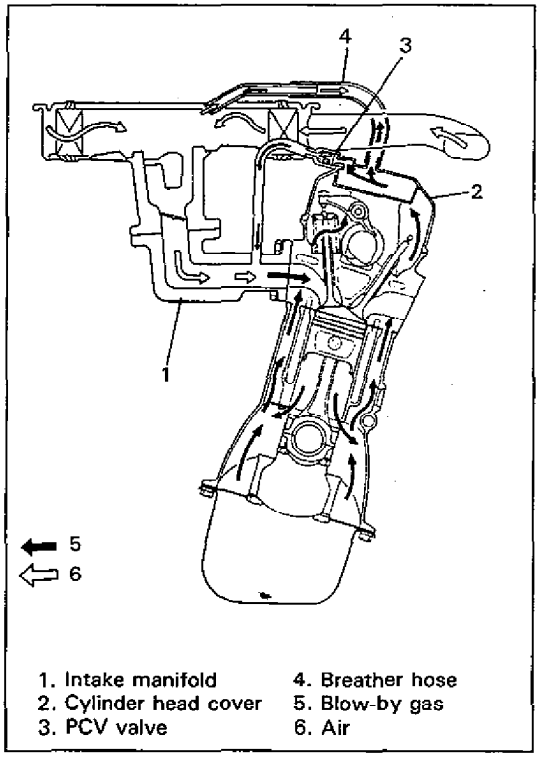
64B40-6H-18-1

SECTION 6J

EMISSION CONTROLS

CONTENTS

70F00-6J-1-1



1. Intake manifold
2. Cylinder head cover
3. PCV valve
4. Breather hose
5. Blow-by gas
6. Air

70F00-6J-2-1

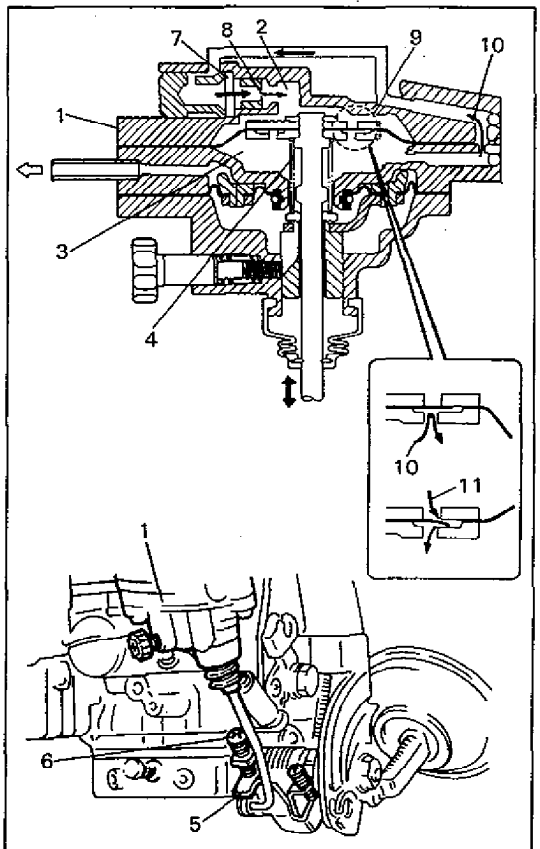
GENERAL DESCRIPTION

POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

The term "blow-by gas" stands for the compressed gas and exploded gas which blow through cylinder-to-piston clearance, which contain a large amount of unburned gases such as CO and HC. The PCV (Positive Crankcase Ventilation) system is provided to prevent the blow-by gas from being emitted into atmosphere and it operates as follows.

When the vacuum in the intake manifold is low (throttle valve open), the PCV valve is wide open due to its spring force. Thus a large amount of the blow-by gas is drawn into the intake manifold.

On the other hand, when the vacuum in the manifold is high, the PCV valve opening is limited due to the high vacuum. Thus the amount of the blow-by gas drawn into the intake manifold is small.



1. A/C idle-up actuator with dash-pot
2. Chamber Ⓐ
3. Chamber Ⓑ
4. Spring
5. Dash-pot lever
6. Dash-pot adjusting screw
7. Filter
8. Orifice
9. Check valve
10. Air flow while pushing down
11. Air flow while pulling up

70F00-6J-2-3

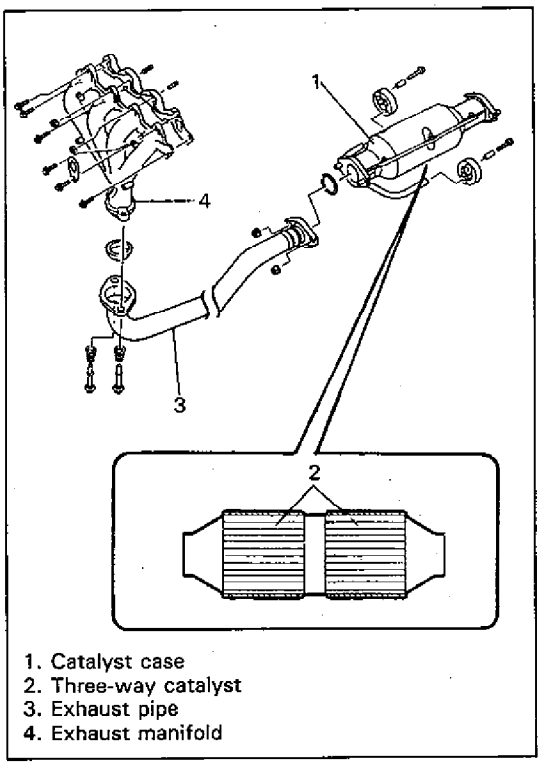
DASH-POT SYSTEM (CARBURETOR MODEL)

This system prevents the throttle valve from returning to the idle position immediately when the accelerator pedal is released suddenly, thereby preventing inefficient combustion due to too rich air/fuel mixture and reducing the amount of unburned hydrocarbon (HC).

When the accelerator pedal is depressed and the throttle valve is opened, the dash-pot rod is pulled up owing to the force of the spring in the dash-pot until the dash-pot lever contacts the dash-pot adjusting screw. The air in the chamber Ⓐ is drawn into the chamber Ⓑ through the check valve in the diaphragm.

When the accelerator pedal is released rapidly, the throttle valve lever contacts the dash-pot lever which has been pulled up by spring force. Then, as the air in the chamber Ⓑ is compressed and the valve closes, the air escapes gradually through the orifice in the dash-pot case wall.

In this way, the rod and lever return gradually and the throttle valve closes likewise.



1. Catalyst case
2. Three-way catalyst
3. Exhaust pipe
4. Exhaust manifold

70F00-6J-3-1

THREE WAY CATALYTIC CONVERTER (FUEL INJECTION MODEL)

The three way catalytic converter is provided in the exhaust system. The function of the catalyst is to reduce the emission of CO, HC and NOx in the exhaust gas by oxidizing or converting them into CO_2, H_2O and N_2 respectively.

ON-VEHICLE SERVICE

GENERAL

When the emission control hoses are disconnected and the system's component is removed for service, reinstall the component properly, and route and connect hoses correctly after service.

70F00-6J-4-1

PCV SYSTEM

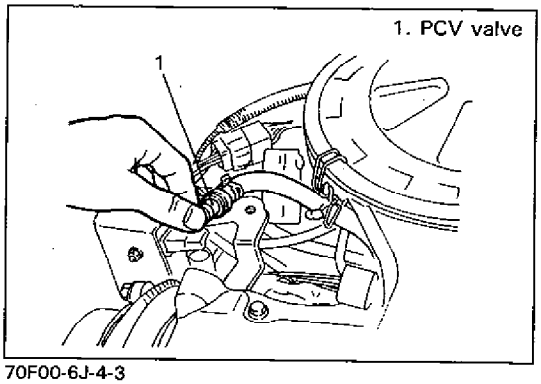
NOTE:

Be sure to check that there is no obstruction in PCV valve or its hoses before adjusting engine idle speed, for obstructed PCV valve or hose hampers its accurate adjustment.

PCV HOSE INSPECTION

Check hoses for connection, leakage, clog, and deterioration. Replace as necessary.

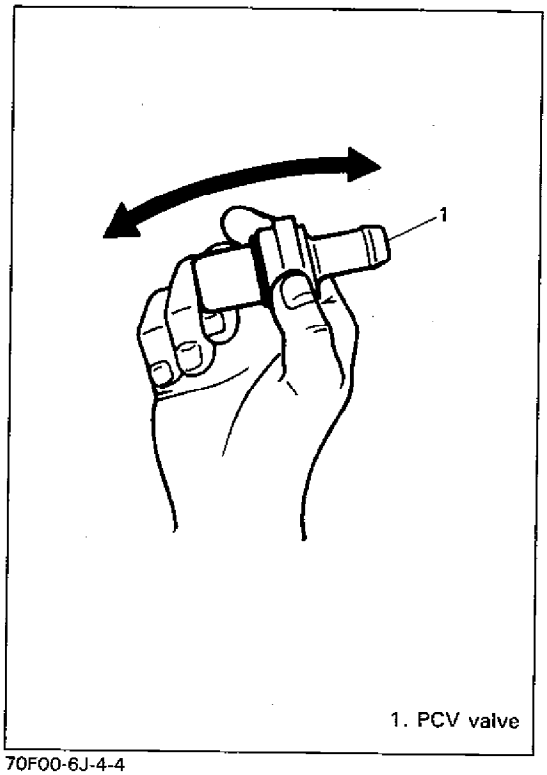
64B40-6J-4-2



70F00-6J-4-3

PCV VALVE INSPECTION

1) Remove air resonator.
2) Disconnect PCV valve from cylinder head cover.
3) Run engine at idle.
4) Place your finger over end of PCV valve to check for vacuum. If there is no vacuum, check for clogged valve. Replace as necessary.



70F00-6J-4-4

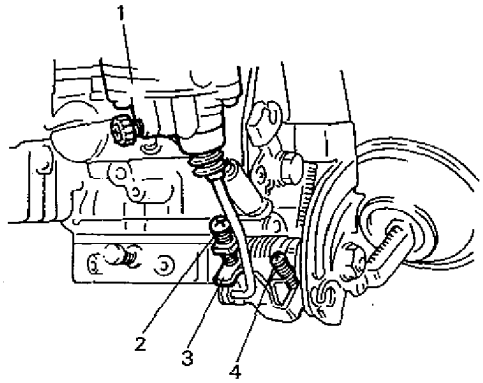
5) After checking vacuum, stop engine and remove PCV valve.
   Shake valve and listen for the rattle of check needle inside the valve. If valve does not the rattle, replace valve.
6) After checking, install PCV valve.
7) Install air resonator.

DASH-POT SYSTEM (CARBURETOR MODEL)

DASH-POT OPERATION CHECK

1) Open throttle valve by hand and check that dash-pot rod is pulled up smoothly.
2) Release throttle valve lever and check that dash-pot rod returns to the original position slowly.
   If it doesn't, replace.

70F00-6J-5-1



1. A/C idle-up actuator with dash-pot
2. Dash-pot adjusting screw
3. Dash-pot lever
4. Initial throttle opening set screw

70F00-6J-5-2

DASH-POT INSPECTION AND ADJUSTMENT

NOTE:
Before starting engine, place transmission gear shift lever in "Neutral", apply parking brake and block drive wheels.

1) Start engine and warm it up to normal operating temperature.
2) Check to make sure that no electric load is applied to engine and engine idle speed is within specification.
3) With engine running, check that engine speed at which dash-pot lever contacts adjusting screw is within following specification.
   If not, adjust it with adjusting screw.

Engine speed when dash-pot lever contacts its adjusting screw: 1,500—1,700 r/min.

CAUTION:
As initial throttle opening set screw is factory adjusted precisely, don't remove or adjust it.

SECTION 6K

EXHAUST SYSTEM

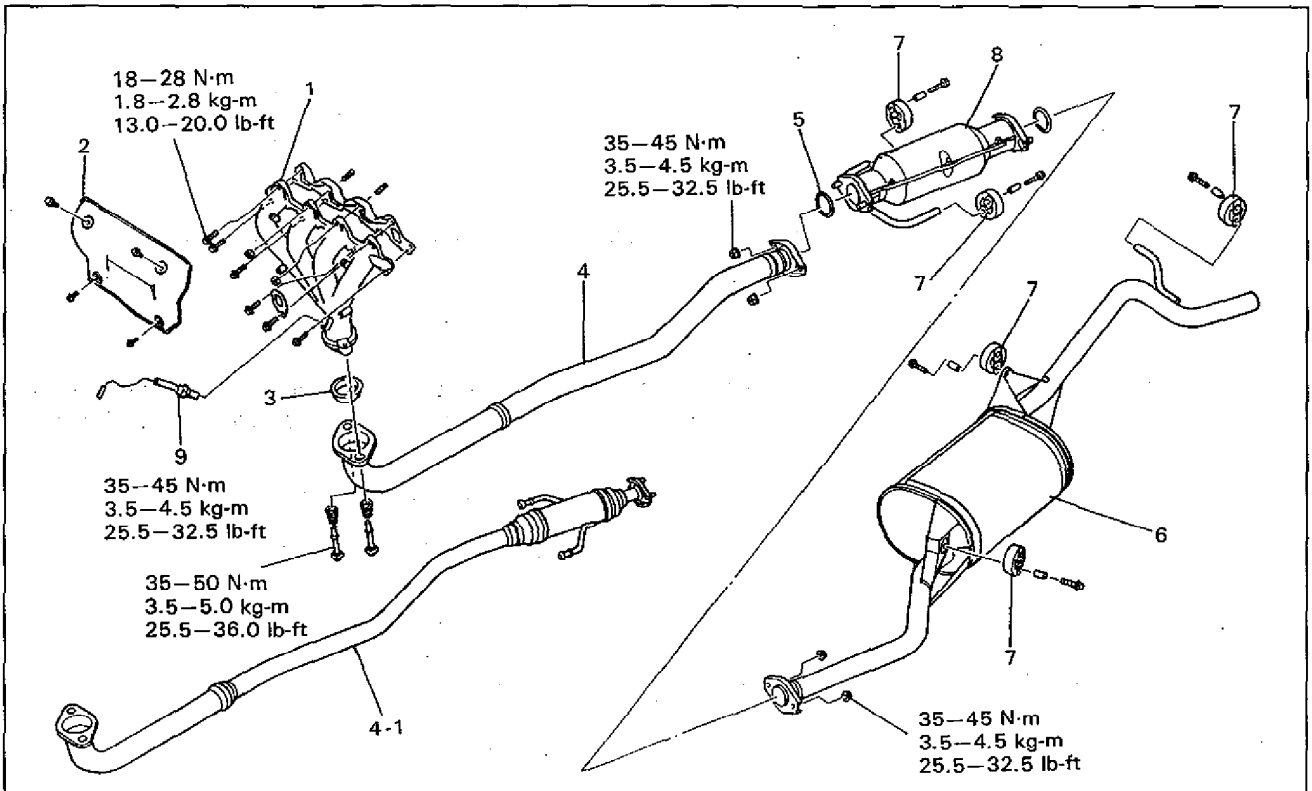
CONTENTS

70F00-6K-1-1

GENERAL DESCRIPTION

The exhaust system consists of an exhaust manifold, an exhaust pipe, a muffler, seal, gaskets and etc. The exhaust system of fuel injection model has the three way catalytic converter.
The three way catalytic converter is an emission control device added to the exhaust system to lower the levels of Hydrocarbon (HC), Carbon Monoxide (CO), and Oxides of Nitrogen (NOx) pollutants in the exhaust gas.

THE CATALYTIC CONVERTER REQUIRES USE OF UNLEADED FUEL ONLY.



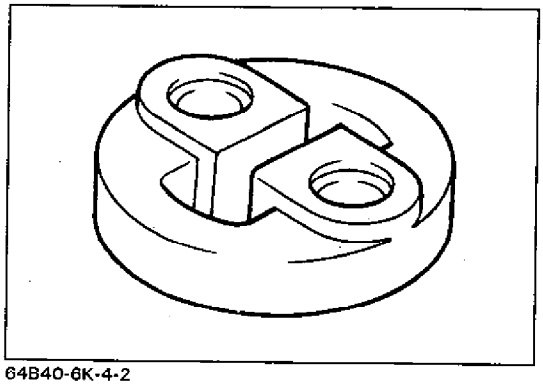
1. Exhaust manifold
2. Exhaust manifold cover
3. Seal ring
4. Exhaust pipe (Fuel injection model)
4-1. Exhaust pipe (Carburetor model)
5. Gasket
6. Muffler
7. Mounting
8. Catalyst case (Fuel injection model)
9. Oxygen sensor (Fuel injection model)

70F00-6K-1-2

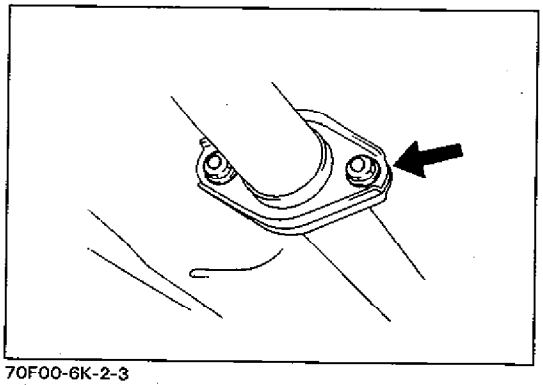
MAINTENANCE

WARNING:
To avoid the danger of being burned, do not touch the exhaust system when the system is hot. Any service on the exhaust system should be performed when the system is cool.

64B40-6K-4-1



64B40-6K-4-2



70F00-6K-2-3

At every interval of periodic maintenance service, and when vehicle is raised for other service, check exhaust system as follows:

- Check rubber mountings for damage, deterioration, and out of position.
- Check exhaust system for leakage, loose connection, dent and damage.
  If bolts or nuts are loosened, tighten them to specified torque. Refer to page 6K-1 for torque data.
- Check nearby body areas for damaged, missing, or mispositioned part, open seam, hole, loose connection or any other defect which could permit exhaust fumes to seep into vehicle.
- Make sure that exhaust system components have enough clearance from underbody to avoid overheating and possible damage to passenger compartment carpet.
- Any defect should be fixed at once.

64B40-6K-4-4

ON-VEHICLE SERVICE

When replacing each part of this system, be sure to observe WARNING under "Maintenance" and following.

CAUTION:
Fuel injection model has three way catalytic converter in catalyst case, it should not be exposed to any impulse. Be careful not to drop it or hit it against something.

- Check gasket and seal for deterioration or damage. Replace them as necessary.
- Tighten bolts and nuts to specified torque when reassembling.
  Refer to page 6K-1 for location and tightening torque of bolts and nuts.
- After installation, start engine and check each joint of exhaust system for leakage.

70F00-6K-3-1

SECTION 7A

MANUAL TRANSMISSION

CONTENTS

GENERAL DESCRIPTION

CONSTRUCTION AND SERVICING

The transmission provides five forward speeds and one reverse speed by means of three synchronizers and three shafts—input shaft, countershaft and reverse gear shaft. All forward gears are in constant mesh, and reverse uses a sliding idler gear arrangement.

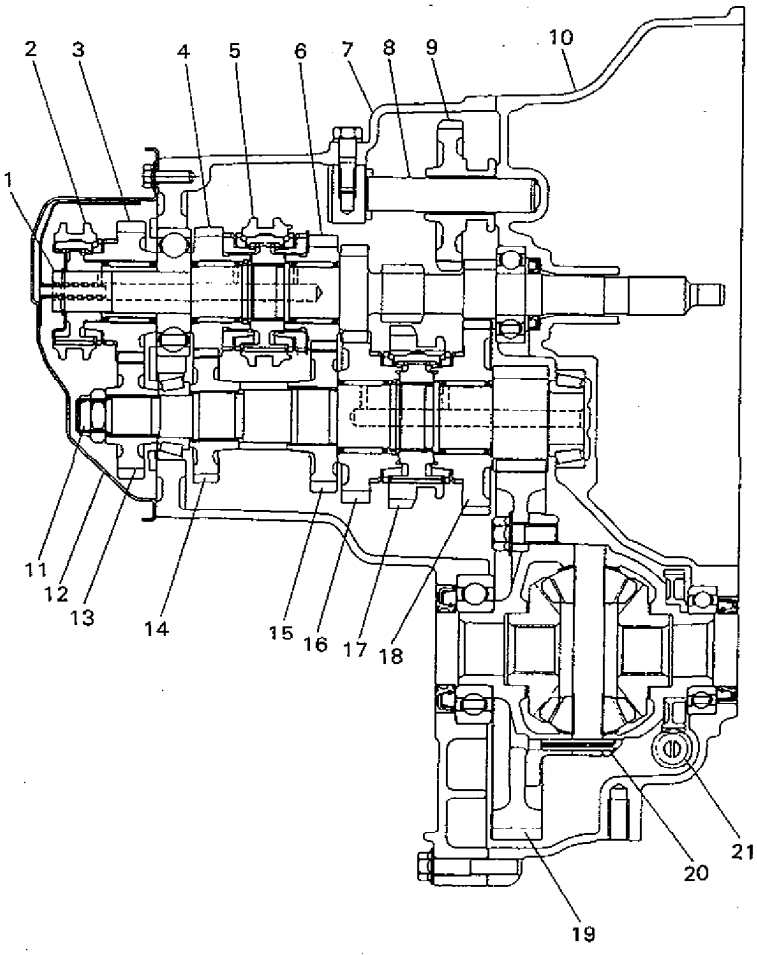
The low speed synchronizer is mounted on counter shaft and engaged with counter shaft first gear or second gear, while the high speed synchronizer is done on input shaft and engaged with input shaft third gear or fourth gear.

The fifth speed synchronizer on input shaft is engaged with input shaft fifth gear mounted on the input shaft.

The countershaft turns the final gear and differential assembly, thereby turning the front drive shafts which are attached to the front wheels.

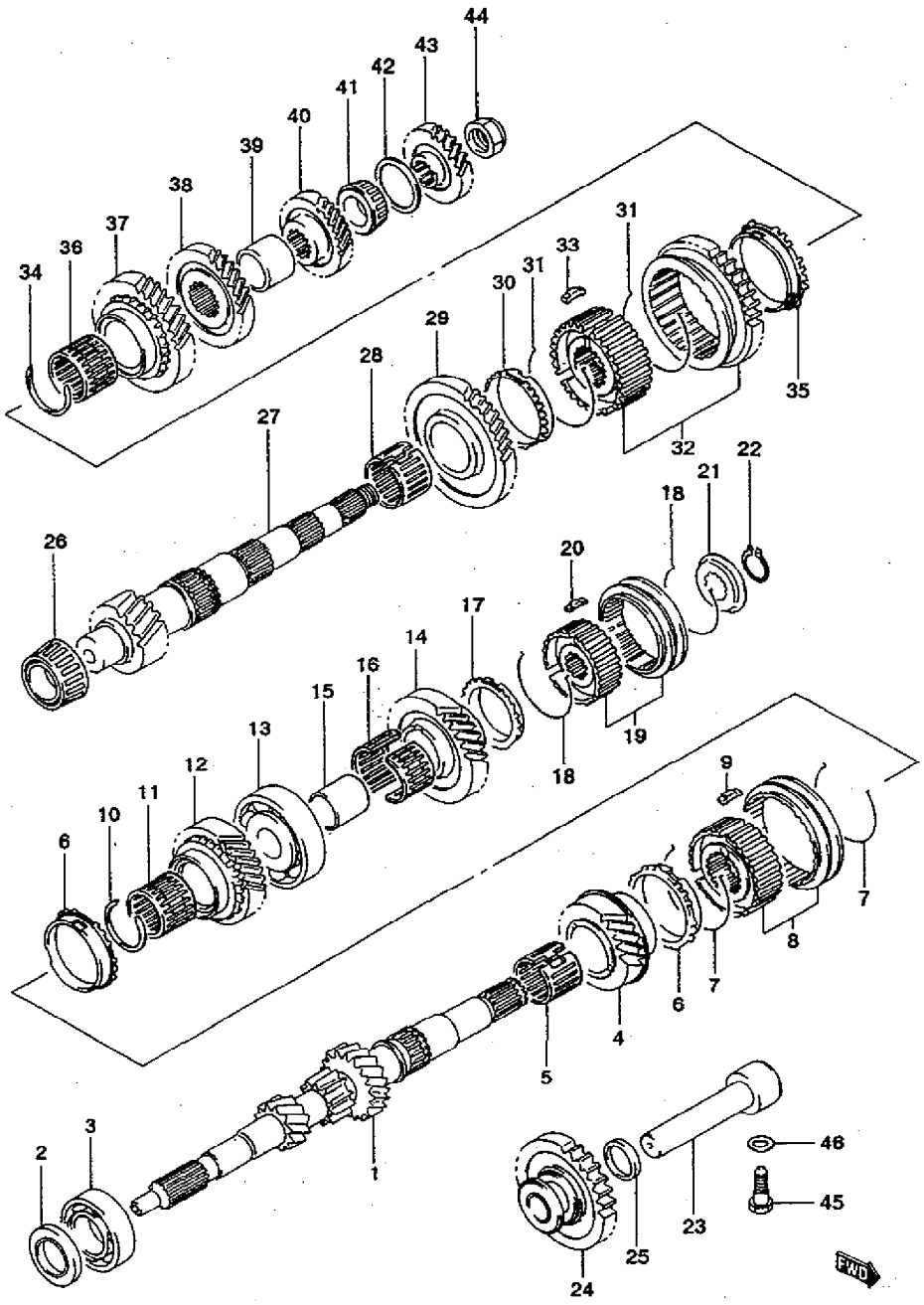
For servicing, it is necessary to use genuine sealant or its equivalent on mating surfaces of transmission case which is made of aluminum. The case fastening bolts must be tightened to specified torque by means of torque wrench. It is also important that all parts are thoroughly cleaned with cleaning fluid and air dried before reassembling.

Further, care must be taken to adjust preload of counter shaft taper roller bearings. New synchronizer rings are prohibited from being lapped with respective gear cones by using lapping compound before they are assembled.



1. Input shaft
2. 5th speed sleeve & hub
3. Input shaft 5th gear
4. Input shaft 4th gear
5. High speed sleeve & hub
6. Input shaft 3rd gear
7. Left case
8. Reverse gear shaft
9. Reverse idler gear
10. Right case
11. Countershaft
12. Left cover
13. Countershaft 5th gear
14. Countershaft 4th gear
15. Countershaft 3rd gear
16. Countershaft 2nd gear
17. Low speed sleeve & hub
18. Countershaft 1st gear
19. Final gear
20. Differential case
21. Speedometer driven gear

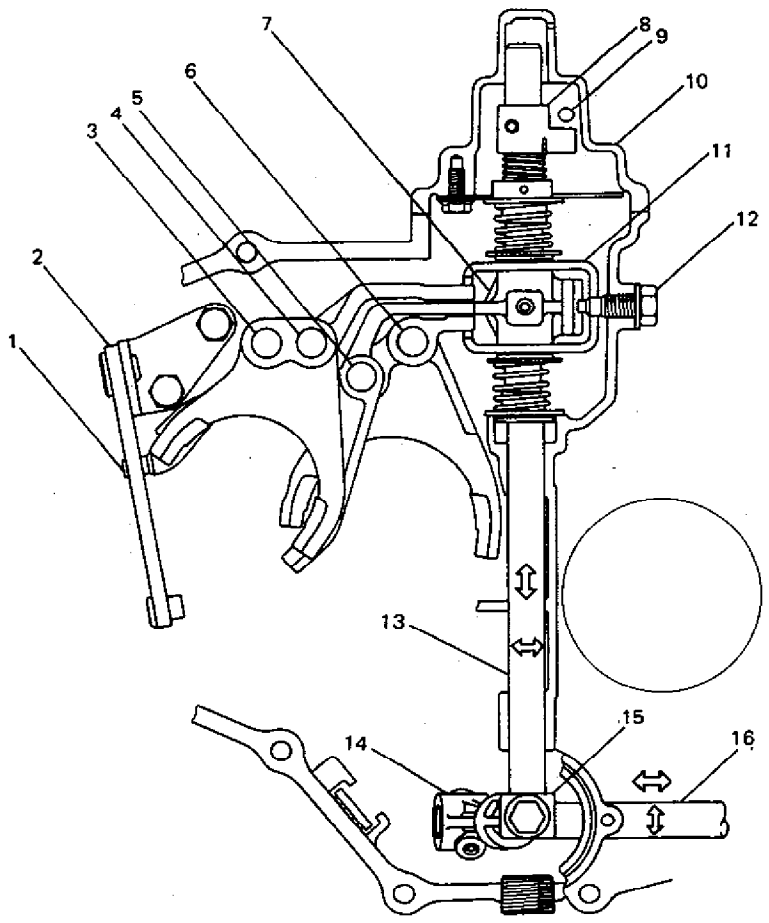
70F00-7A-2-1



1. Input shaft
2. Oil seal
3. Input shaft R bearing
4. Input shaft 3rd gear
5. 3rd gear bearing
6. High speed synchronizer ring
7. High speed synchronizer spring
8. High speed sleeve & hub
9. High speed synchronizer key
10. Circlip
11. 4th gear bearing
12. Input shaft 4th gear
13. Input shaft L bearing
14. Input shaft 5th gear
15. 5th gear spacer
16. 5th gear bearing
17. 5th speed synchronizer ring
18. 5th synchronizer spring
19. 5th speed sleeve & hub
20. 5th synchronizer key
21. 5th synchronizer hub plate
22. Circlip
23. Reverse gear shaft
24. Reverse idler gear
25. Reverse shaft washer
26. Countershaft R bearing
27. Countershaft
28. 1st gear bearing
29. Countershaft 1st gear
30. 1st gear synchronizer ring
31. Low speed synchronizer spring
32. Low speed sleeve & hub
33. Low speed synchronizer key
34. Circlip
35. 2nd gear synchronizer ring
36. 2nd gear bearing
37. Countershaft 2nd gear
38. Countershaft 3rd gear
39. 3rd & 4th gear spacer
40. Countershaft 4th gear
41. Countershaft L bearing
42. Bearing set shim
43. Countershaft 5th gear
44. Countershaft nut
45. Reverse shaft bolt
46. Washer

GEAR SHIFT MECHANISM

Movement of gear shift control lever is transmitted to gear shift shaft through gear shift control shaft, and gear shift & select shaft through gear shift arm and gear shift yoke, and then gear shift & select lever to each gear shift yoke, shaft and fork or arm. Gear shift interlock plate is provided to prevent the gear from engaging double.

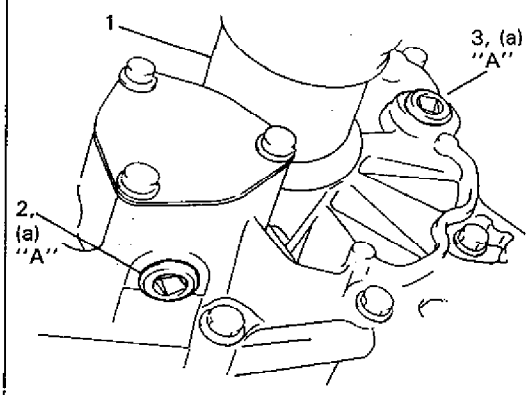


1. Reverse gear shift arm
2. Reverse gear shift lever
3. 5th & REV gear shift guide shaft
4. 5th & REV gear shift shaft
5. High speed gear shift shaft
6. Low speed gear shift shaft
7. Gear sihft & select lever
8. 5th & REV gear shift cam
9. 5th to REV interlock guide bolt
10. Gear shift guide case
11. Gear shift interlock plate
12. Gear shift interlock bolt
13. Gear shift & select shaft
14. Gear shift arm
15. Gear shift yoke
16. Gear sihft shaft

DIAGNOSIS

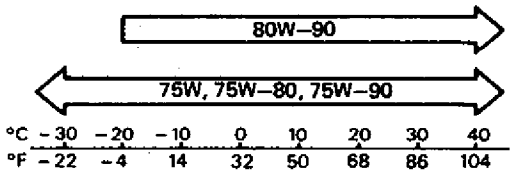
Condition	Possible Cause	Correction
Gears slipping out of mesh	• Worn shift fork shaft	Replace.
	• Worn shift fork or synchronizer sleeve	Replace.
	• Weak or damaged locating springs	Replace.
	• Worn bearings on input shaft or countershaft	Replace.
	• Worn chamfered tooth on sleeve and gear	Replace sleeve and gear.
Hard shifting	• Inadequate lubricant	Replenish.
	• Improper clutch pedal free travel	Adjust.
	• Distorted or broken clutch disc	Replace.
	• Damaged clutch pressure plate	Replace clutch cover.
	• Worn synchronizer ring	Replace.
	• Worn chamfered tooth on sleeve or gear	Replace sleeve or gear.
	• Worn gear shift control shaft joint bush	Replace.
	• Distorted shift shaft	Replace.
Noise	• Inadequate or insufficient lubricant	Replenish.
	• Damaged or worn bearing(s)	Replace.
	• Damaged or worn gear(s)	Replace.
	• Damaged or worn synchronizer parts	Replace.

64B40-7A-6-1



1. Drive shaft (LH)
2. Oil drain plug
3. Oil level/filler plug

Viscosity chart
SAE



70F00-7A-6-1

ON-VEHICLE SERVICE

OIL CHANGE

1. Before changing or inspecting oil, be sure to stop engine and lift vehicle horizontally.
2. With vehicle lifted up, check oil level and leakage. If leakage exists, correct it.
3. Drain old oil and fill new specified oil by specified amount (up to level hole).
4. Torque drain and level/filler plugs as specified below. Apply sealant to thread of both plugs before installation.

"A": Sealant 99000-31110

Tightening Torque
(a): 25—30 N·m (2.5—3.0 kg-m, 18.5—21.5 lb-ft)

NOTE:
- **It is recommended to use API GL-4 75W-90 gear oil.**
- **Whenever vehicle is hoisted for any other service work than oil change, also be sure to check for oil leakage.**

Oil specification: API GL-4 or GL-5
For SAE classification, refer to viscosity chart at the left.

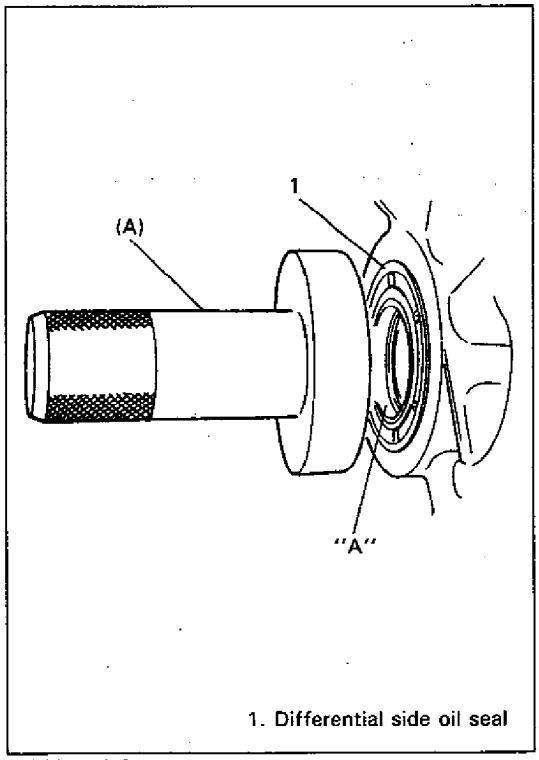
Oil capacity: 2.4 liters (5.0/4.2 US/Imp. pt)

DIFFERENTIAL SIDE OIL SEAL

REMOVAL

1) Right side
   Remove drive shaft. Refer to item DRIVE SHAFT REMOVAL of SECTION 4.
2) Left side
   a) Perform steps 4) to 7) of ON LIFT for DRIVE SHAFT REMOVAL of SECTION 4.
   b) Pushing knuckle portion outward, detach drive shaft at differential side.
3) Remove oil seal.

70F00-7A-7-1



1. Differential side oil seal

70F00-7A-7-2

INSTALLATION

Install oil seal and drive shaft by reversing removal procedure and noting following points.

1) Install a new oil seal until it becomes flush with case surface by using special tool and hammer.

   NOTE:
   When installing oil seal, face its spring side inward.

   Special Tool
   (A): 09913-75510

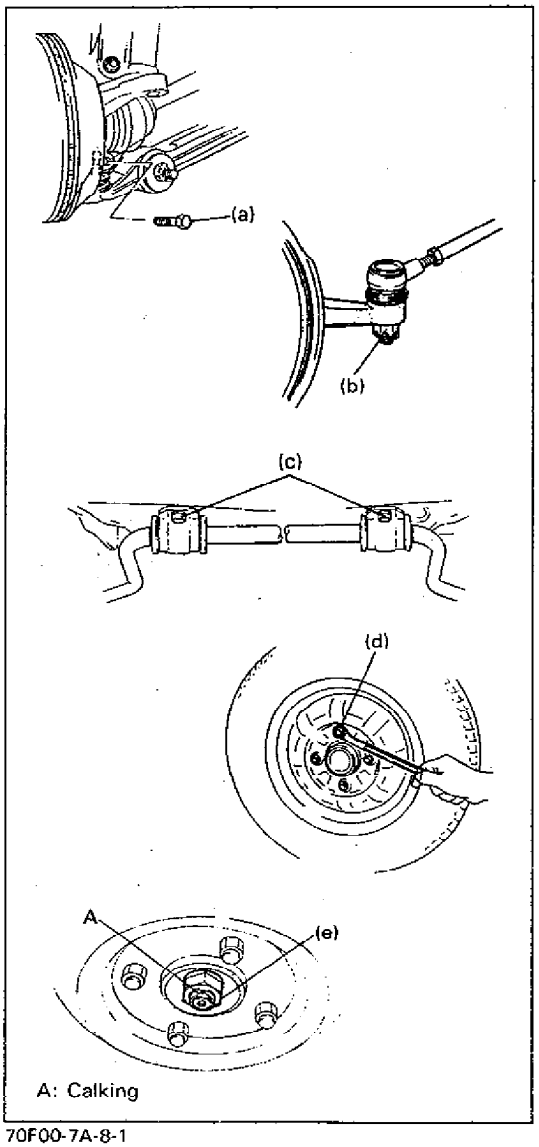
2) Apply grease to oil seal lip and at the same time check drive shaft where oil seal contacts and make sure of its smoothness.

   "A": Grease 99000-25010

3) Insert left side drive shaft joint or right side drive shaft joint to differential gear and then wheel side joint of drive shaft to steering knuckle.

CAUTION:
- **Be careful not to scratch oil seal lip with drive shaft joint while inserting.**
- **Make sure to insert drive shaft joint fully and seat its snap ring as it was.**
- **Do not hit joint boot with hammer or the like. Nothing but hands is allowed to use when inserting joint.**

70F00-7A-7-4



70F00-7A-8-1

4) Use specified torque as given blow.

Tightening torque	N·m	kg-m	lb-ft
(a) Ball stud bolt	45—65	4.5—6.5	33.0—47.0
(b) Tie-rod end castle nut (For right side only) (c) Stabilizer bar mounting bracket bolt	30—55	3.0—5.5	22.0—39.5
(d) Wheel nut (For right side only)	70—100	7.0—10.0	51.0—72.0
(e) Drive shaft nut (For right side only)	150—200	15.0—20.0	108.5—144.5

NOTE:

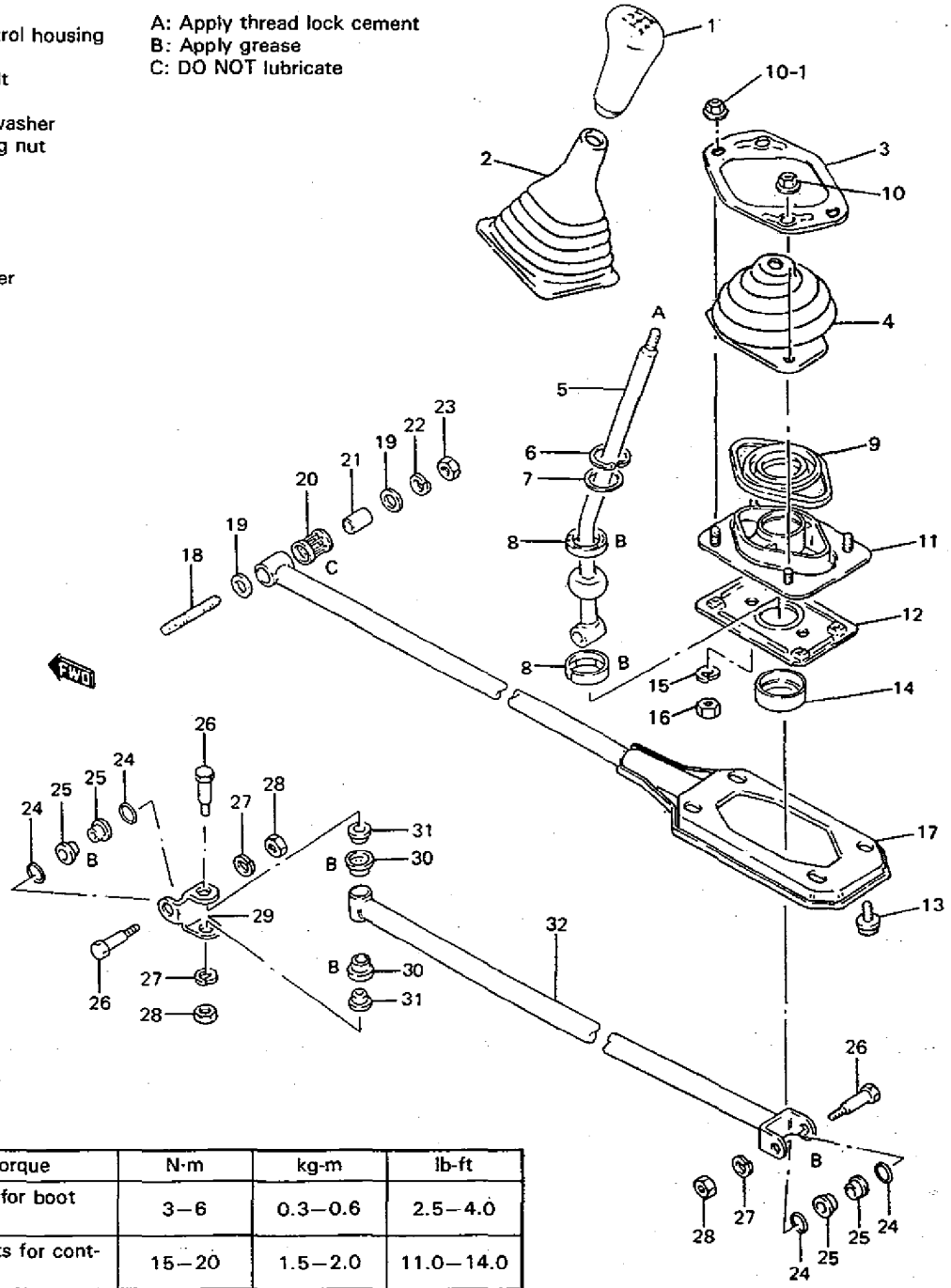
- **Do not forget calking of drive shaft nut as shown at left.**
- **When installing stabilizer bar mounting bracket, refer to SECTION 3D.**

5) Fill transmission oil as specified and make sure that oil has been sealed with oil seal.

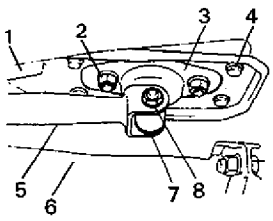
GEAR SHIFT CONTROL

1. Control lever knob
2. Boot No.2
3. Boot cover
4. Boot
5. Gear shift control lever
6. Circlip
7. Adjust shim
8. Seat
9. Hosing dust cover
10. Housing nut
10-1. Housing nut
11. Gear shift control housing
12. Guide plate
13. Guide plate bolt
14. Rear boot
15. Housing lock washer
16. Control housing nut
17. Extension rod
18. Rod stud bolt
19. Rod washer
20. Rod bush
21. Spacer
22. Rod lock washer
23. Rod nut
24. O ring
25. Control shaft bush
26. Control shaft bolt
27. Shaft lock washer
28. Shaft nut
29. Gear shift control joint
30. Shaft outer bush
31. Shaft inner bush
32. Gear shift control shaft

A: Apply thread lock cement
B: Apply grease
C: DO NOT lubricate



Tightening torque	N·m	kg-m	lb-ft
10. Housing nuts for boot cover	3–6	0.3–0.6	2.5–4.0
10-1. Housing nuts for control housing	15–20	1.5–2.0	11.0–14.0
13. Guide plate bolts	8–10	0.8–1.0	6.0–7.0
16. Control housing nuts	25–40	2.5–4.0	18.5–28.5
18. Extension rod stud bolt	15–20	1.5–2.0	11.0–14.0
23. Extension rod nut	25–40	2.5–4.0	18.5–28.5
26, Control shaft bolts and 28. nuts	15–20	1.5–2.0	11.0–14.0



1. Extension rod
2. Housing nut
3. Control lever guide plate
4. Guide plalte bolt
5. Gear shift control shaft
6. Exhaust No.1 pipe
7. Gear shift control lever
8. Control shaft bolt & nut

64B40-7A-11-1

REMOVAL

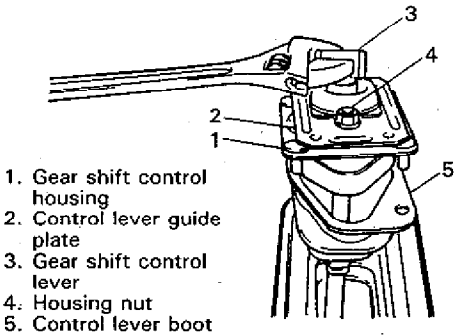
On Lift

1. Disconnect gear shift control shaft from gear shift control lever by removing control shaft bolt and nut.
2. Remove 4 guide plate bolts and loosen extension rod nut at transmission end and then move extension rod aside.

In Cabin

1. Remove console lower box.
2. Remove 4 control lever housing nuts and console lower box bracket, and then push shift control lever boot(s) into floor hole to take out shift control lever assembly from under the floor.

70F00-7A-10-2

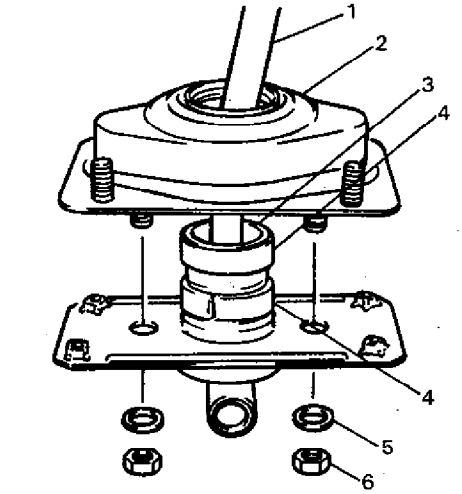


1. Gear shift control housing
2. Control lever guide plate
3. Gear shift control lever
4. Housing nut
5. Control lever boot

70F00-7A-10-3

On Bench

1. Holding control lever knob with soft jawed vise, loosen its screw and remove control lever.
2. Remove 2 housing nuts/washers, and then disassemble control lever.



1. Shift control lever
2. Control housing
3. Shim
4. Control lever seat
5. Lock washer
6. Housing nut

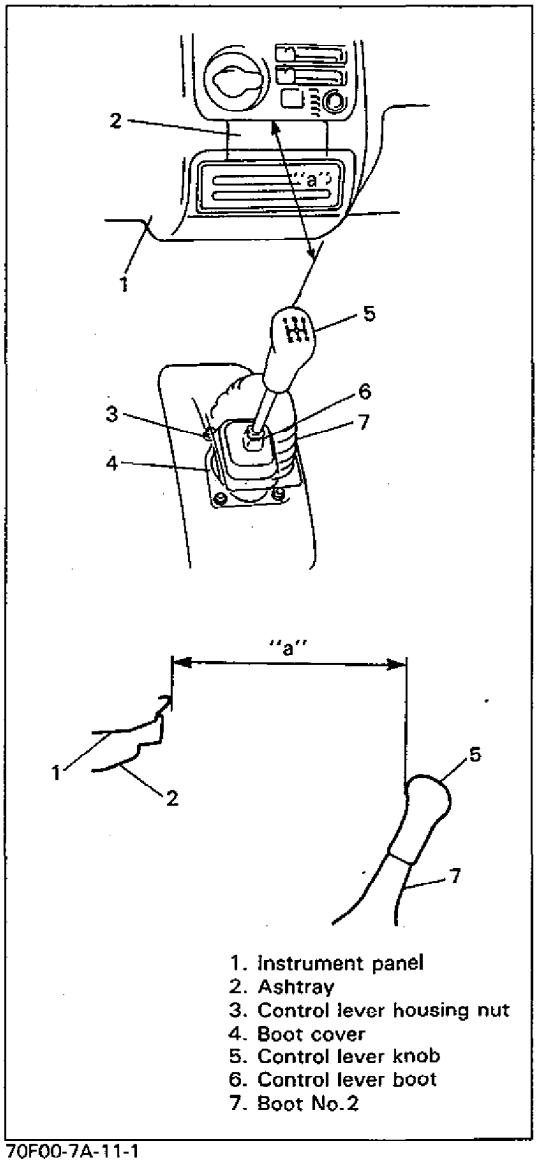
64B40-7A-11-4

INSTALLATION

1. Assemble control lever by reversing removal procedure, replacing parts with new ones as required. Select shim for adjusting vertical play of control lever, if necessary. Apply grease to turning or sliding portions.

NOTE:
Check control lever for smooth movement after assembly.

Control lever vertical play	0—0.2 mm (0—0.007 in)
Available shim size (thickness)	0.8, 1.0, 1.2 and 1.4 mm (0.03, 0.04, 0.05 and 0.06 in)



1. Instrument panel
2. Ashtray
3. Control lever housing nut
4. Boot cover
5. Control lever knob
6. Control lever boot
7. Boot No.2

70F00-7A-11-1

2. Apply thread lock cement and then install knob to control lever. Make sure that knob is aligned with lever.
3. Install control lever assembly and related parts as they were. For positioning control lever, loosely install 4 guide plate bolts and 4 control lever housing nuts first, adjust position and then tighten those nuts and bolts. (Refer to page 7A-9.)

NOTE:

- **Do not apply grease to extension rod bush of trasnmission end.**
- **Apply grease to gear shift control shaft bushes.**
- **Make sure that boots are installed correctly.**

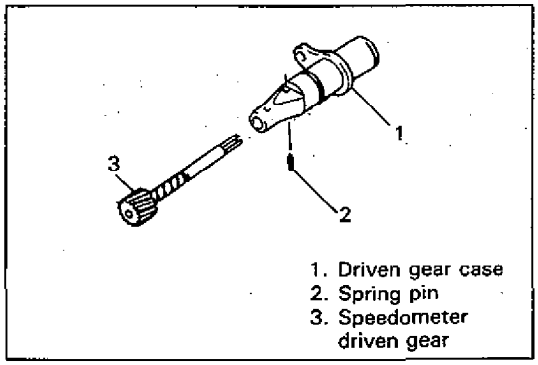
Distance "a": 241—271 mm (9.5—10.6 in.)

SPEEDOMETER DRIVEN GEAR

REMOVAL

1. Pull up speedometer cable boot, pull out speedometer case clip and then disconnect speedometer cable from case.
2. Remove bolt and pull out speedometer driven gear case assembly by hand.

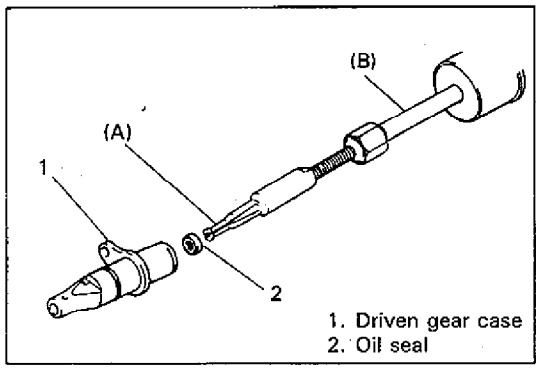
64B40-7A-12-4



1. Driven gear case
2. Spring pin
3. Speedometer driven gear

64B40-7A-12-5

3. Using pin remover of 2.8—3.0 mm (0.11 in.) diameter, drive out spring pin and then take out speedometer driven gear.

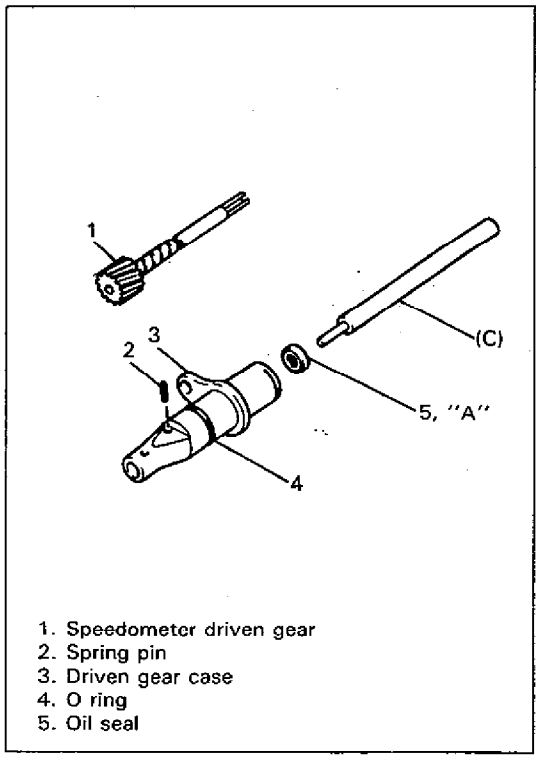


1. Driven gear case
2. Oil seal

64B40-7A-13-1

4. Remove oil seal by using special tools (Bearing remover and sliding hammer) holding flat portion of driven gear case by soft jawed vise.

Special Tool
(A): 09917-58010
(B): 09930-30102



1. Speedometer driven gear
2. Spring pin
3. Driven gear case
4. O ring
5. Oil seal

70F00-7A-12-2

INSTALLATION

1. Apply grease to a new oil seal and install it to case bore up to the bottom with its spring side facing down. Valve guide remover may be used for installation.

"A": Grease 99000-25010

Special Tool
(C): 09916-46010

2. Check driven gear for abnormal wear or distortion and insert good one into case after applying oil.
3. Install spring pin supporting flat portion of case by wood block, and then make sure that gear rotates smoothly.
4. Check O-ring and case surface for their flawlessness, apply oil to O-ring and then install case assembly to transmission.

Tightening Torque for case bolt
4—7 N·m (0.4—0.7 kg-m, 3.0—5.0 lb-ft)

5. Connect cable, set case clip and boot as they were.

CAUTION:
- **Do not compress oil seal excessively so as to prevent its distortion.**
- **Never hit driven gear and gear case.**
- **While inserting case assembly into transmission, rotate driven gear by using small screwdriver so that gear will mesh smoothly.**
- **Never push or hit slit portion of case when installing it to transmission.**

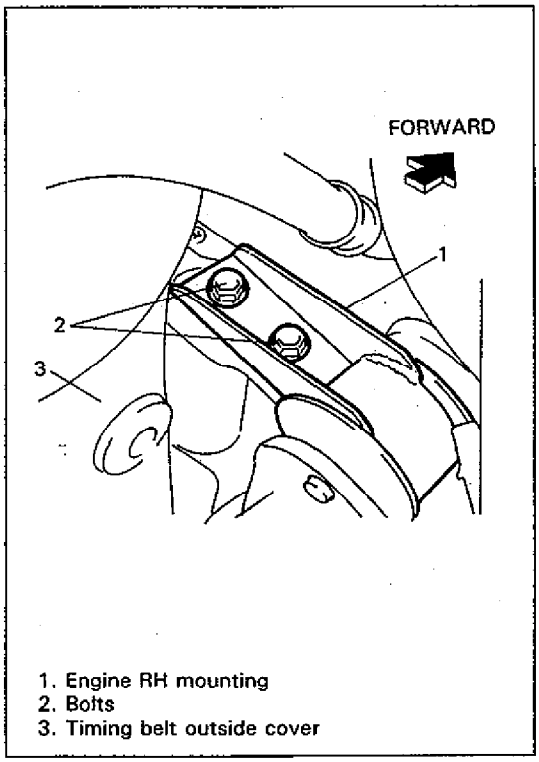
6. Make sure that oil level is as specified.

UNIT REPAIR OVERHAUL

DISMOUNTING OF TRANSMISSION

UNDER HOOD

1. Disconnect battery ground cable.
2. Remove clutch cable joint nut, joint pin from cable and then cable itself from bracket.
3. Undo wiring harness clamps and couplers.
4. Take off speedometer cable boot, speedometer case clip and then speedometer cable from case.
5. Remove transmission fastening bolts.
6. Remove starting motor taking out its 2 bolts. Starting motor plate should also come down.
7. Remove engine RH mounting bolts.

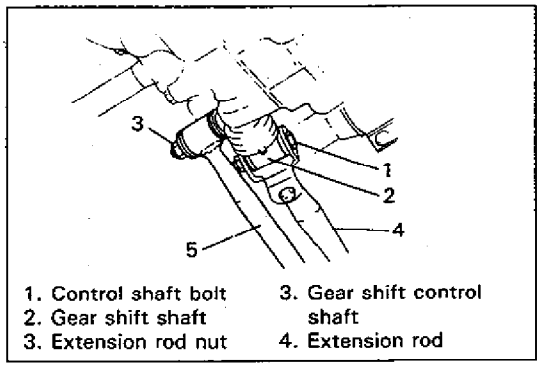


1. Engine RH mounting
2. Bolts
3. Timing belt outside cover

70F00-7A-13-1

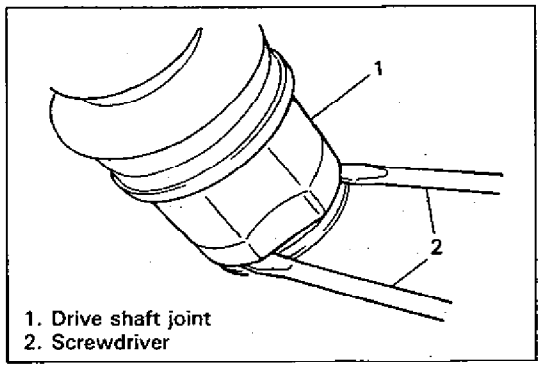
ON LIFT

1. Drain transmission oil.
2. Remove gear shift control shaft bolt and nut, then detach control shaft from gear shift shaft.
3. Remove extension rod nut and then pull out rod with washers.
4. Remove clutch housing lower plate.
5. Remove stabilizer bar bracket bolts.
6. Remove ball stud bolt from right and left knuckles, then disconnect each suspension arm.
7. Disconnect right and left side drive shaft joints from differential gear of transmission. By using large size screwdrivers, pull out drive shaft joint at differential side so as to release snap ring fitting of joint.
8. Remove bolts and nuts fastening engine and transmission case.



1. Control shaft bolt
2. Gear shift shaft
3. Extension rod nut
3. Gear shift control shaft
4. Extension rod

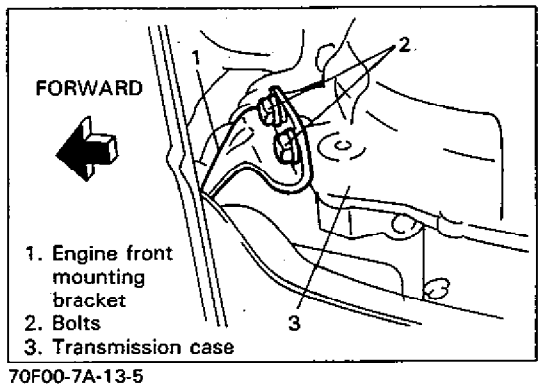
70F00-7A-13-3



1. Drive shaft joint
2. Screwdriver

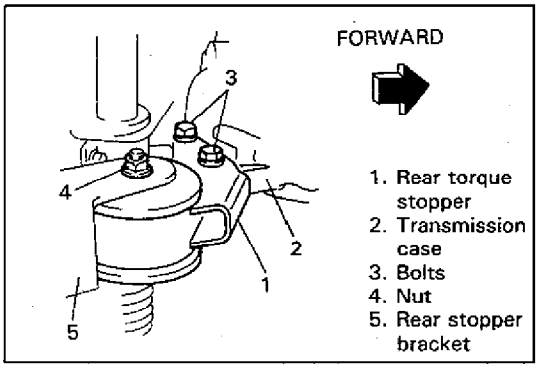
70F00-7A-13-4

9. Remove engine front mounting bracket bolts.
10. Remove engine LH mounting bracket. (If equipped)
11. Support transmission with transmission jack.



1. Engine front mounting bracket
2. Bolts
3. Transmission case

70F00-7A-13-5



70F00-7A-14-1

12. Remove rear torque stopper comp.
13. Remove other attached parts from transmission, if any.
14. Pull transmission out so as to disconnect input shaft from clutch disc and right side drive shaft joint from differential gear of transmission.
15. Lower transmission.

NOTE:
This work should be done with engine tilted so that input shaft will not be caught by clutch disc.

REMOUNTING

For remounting, reverse dismounting procedure.
Use specified torque as given below.

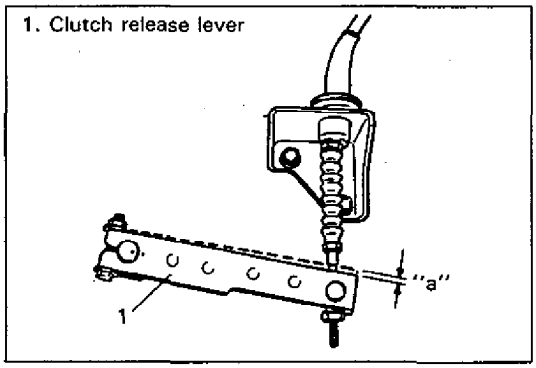
Tightening torque	N·m	kg-m	lb-ft
• Transmission to engine bolts and nuts • Engine rear mounting bracket bolts • Rear torque stopper bolts • Engine LH mounting bracket bolts (If equipped)	40—60	4.0—6.0	29.0—43.0
Engine RH mounting nuts	50—60	5.0—6.0	36.5—43.0
• Rear torque stopper nut • Engine LH mounting bracket nuts (If equipped)	35—45	3.5—4.5	25.5—32.5
Ball stud bolt	45—65	4.5—6.5	33.0—47.0
Extension rod nut	25—40	2.5—4.0	18.5—28.5
Gear shift control shaft bolt and nut	15—20	1.5—2.0	11.0—14.0

70F00-7A-14-2

NOTE:
Apply grease to gear shift control shaft bushes, however, DO NOT lubricate extension rod bush.

CAUTION:
- **Care should be taken not to scratch oil seal lip with drive shaft while raising transmission.**
- **Do not hit drive shaft joint with hammer when installing it into differential gear.**

- Push in right and left side drive shaft joints fully so as to snap ring of shaft engages with differential gear.



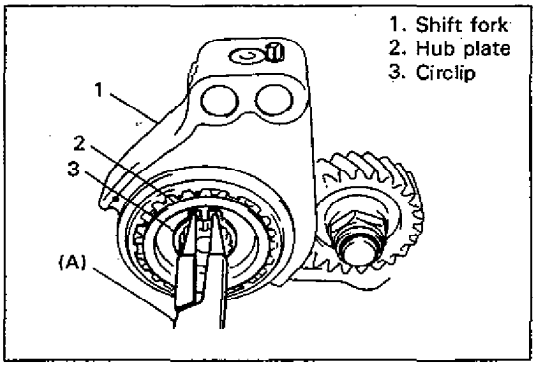
70F00-7A-15-1

- Set each clamp for wiring securely.
- After connecting clutch cable, be sure to adjust its free travel properly (Refer to SECTION 7C for free travel of clutch pedal).

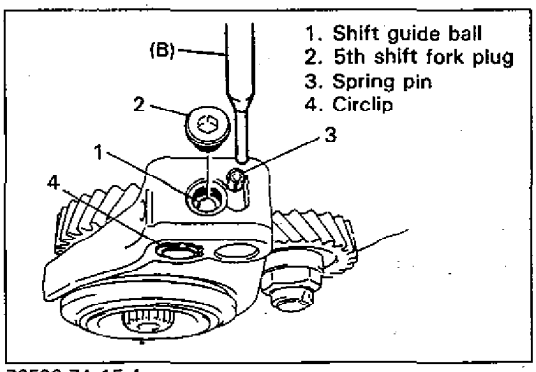
Lever free travel "a": 2—4 mm (0.08—0.15 in.)
[Pedal free travel: 15—20 mm (0.6—0.8 in.)]

- Fill transmission with oil as specified.
- Connect battery and check function of engine, clutch and transmission.

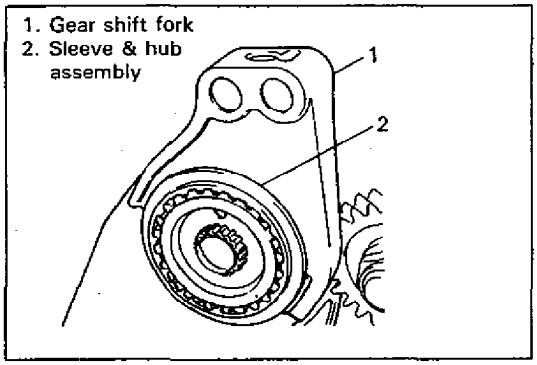
64B40-7A-16-2



70F00-7A-15-3



70F00-7A-15-4



70F00-7A-15-5

DISASSEMBLING UNIT

FIFTH GEARS

1. Remove 8 bolts and take off transmission side cover.

CAUTION:
Care should be taken not to distort side cover when it is removed from left case.

2. Using special tool, remove circlip and then hub plate.

Special Tool
(A): 09900-06107

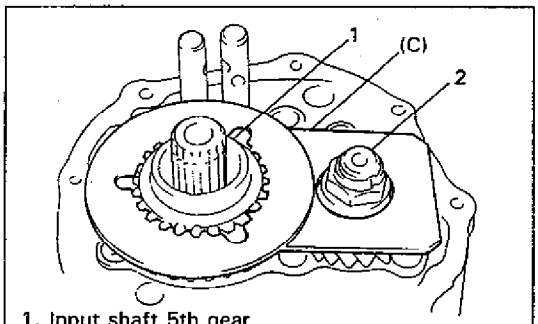
3. Remove shift fork plug and guide ball.

NOTE:
Use of magnet would facilitate removal of guide ball.

4. Remove circlip and drive out spring pin by using special tool and hammer.

Special Tool
(A): 09900-06107 (For removing circlip)
(B): 09922-85811

5. Remove gear shift fork, sleeve & hub assembly, synchronizer ring and 5th gear all together.

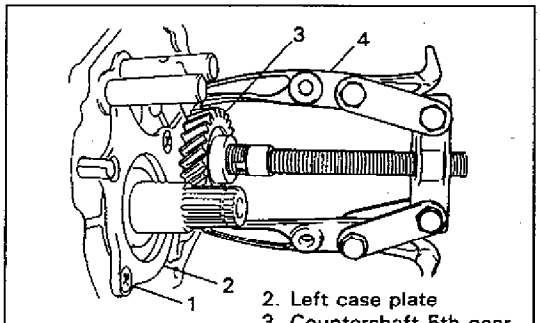


1. Input shaft 5th gear
2. Counter shaft nut

70F00-7A-16-1

6. Unfasten caulking of countershaft nut, install input shaft 5th gear and special tool to stop rotation of shafts, and then remove countershaft nut.

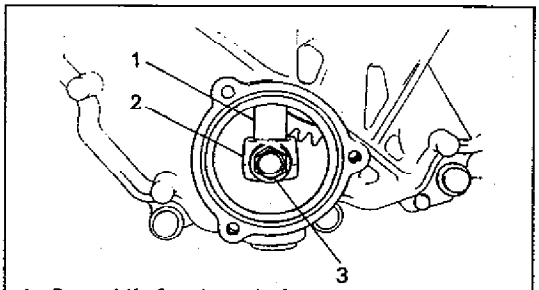
Special Tool
(C): 09927-76010



1. Plate screw
2. Left case plate
3. Countershaft 5th gear
4. Gear puller

70F00-7A-16-2

7. Remove special tool, input shaft 5th gear, needle bearing and then counter shaft 5th gear. Gear puller would be necessary if spline fitting of counter shaft 5th gear is tight.
8. Remove 6 screws and take off left case plate, and then bearing set shim.

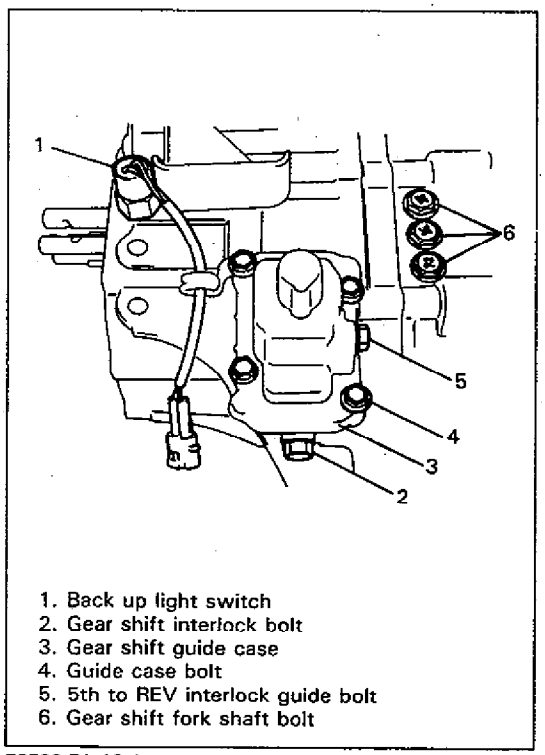


1. Gear shift & select shaft
2. Gear shift yoke
3. Yoke bolt

70F00-7A-16-3

GEAR SHIFTER, INPUT SHAFT AND COUNTERSHAFT

1. Remove 3 bolts from left case cap and then take off cap.
2. Remove gear shift yoke bolt.



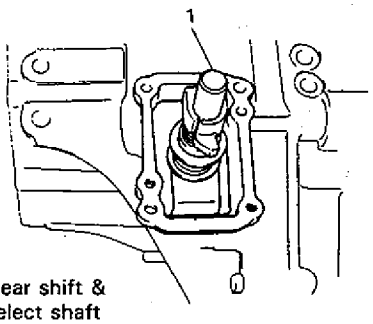
1. Back up light switch
2. Gear shift interlock bolt
3. Gear shift guide case
4. Guide case bolt
5. 5th to REV interlock guide bolt
6. Gear shift fork shaft bolt

70F00-7A-16-4

3. Remove 3 gear shift fork shaft bolts with washers, then take out locating springs and steel balls.
4. Remove 4 bolts from gear shift guide case, and then remove wiring harness clamp bracket and guide case.

NOTE:
Removal of 5th to REV interlock bolt is not necessary for removing gear shift & select shaft assembly.

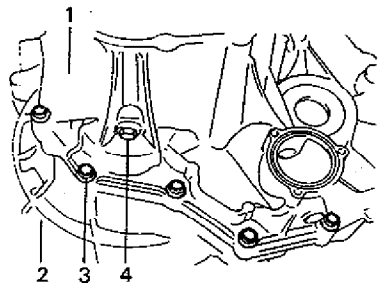
5. Remove gear shift interlock bolt with washer.
6. Remove back up light switch.



1. Gear shift & select shaft

64B40-7A-18-1

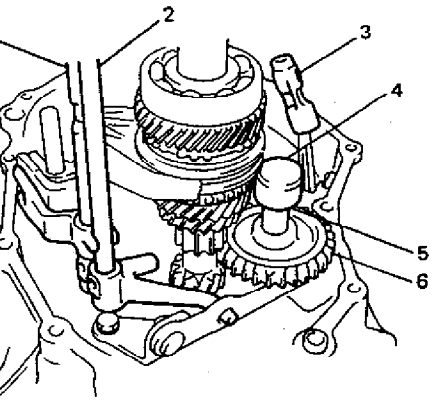
7. Pull out gear shift & select shaft assembly.



1. Left case
2. Right case
3. Transmission case bolt
4. Reverse shaft bolt

64B40-7A-18-2

8. Remove reverse shaft bolt with washer.
9. Remove 11 case bolts from outside and another 2 from clutch housing side.
10. Tapping left case flanges with plastic hammer, remove left case.

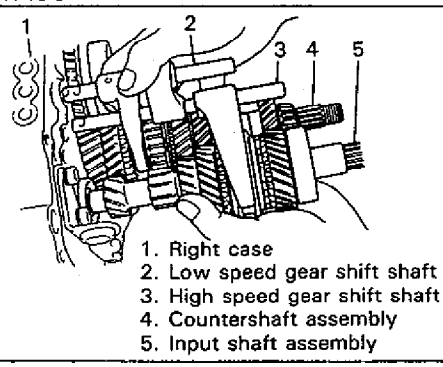


1. 5th & REV gear shift shaft
2. 5th & REV gear shift guide shaft
3. Gear shift yoke
4. Reverse gear shaft
5. Washer
6. Reverse idler gear

64B40-7A-18-3

11. Remove gear shift yoke.
12. Pull out reverse gear shaft with washer, then take off reverse idler gear.
13. Pull out 5th & REV gear shift guide shaft together with 5th & REV gear shift shaft.

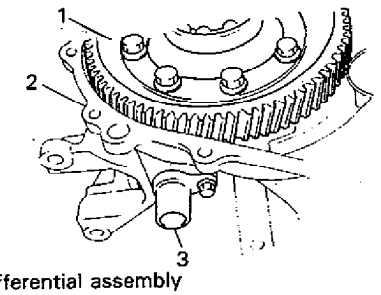
NOTE:
When removing 5th & REV gear shift shaft and guide shaft, push up high speed gear shift shaft and shift it to 4th to facilitate removal of 5th & REV shifter.



1. Right case
2. Low speed gear shift shaft
3. High speed gear shift shaft
4. Countershaft assembly
5. Input shaft assembly

64B40-7A-18-5

14. Tapping input shaft end with plastic hammer, push it out as assembly from case a little, then take out input shaft assembly, counter shaft assembly, high speed gear shift shaft and low speed gear shift shaft all at once.
15. Remove countershaft L bearing cup from left case.
16. Remove differential side L oil seal also from left case.



1. Differential assembly
2. Transmission right case
3. Speedometer driven gear case assembly

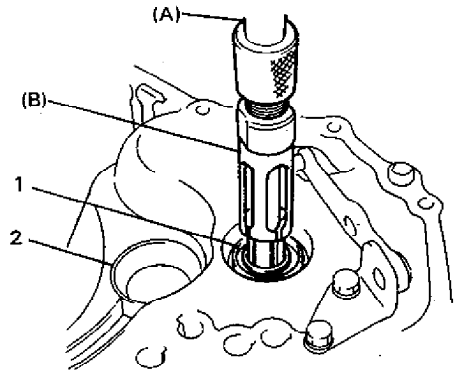
70F00-7A-18-1

RIGHT CASE

1. Remove bolt and then pull out speedometer driven gear case with gear.

CAUTION:
Be careful not to damage speedometer driven gear case when removing it.

2. Remove differential gear assembly from right case.



1. Input shaft oil seal
2. Contershaft R bearing cup

70F00-7A-18-2

3. Remove input shaft oil seal by using special tools (combination of bearing remover and sliding shaft).

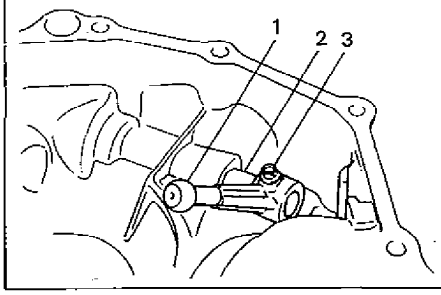
Special Tool
(A): 09930-30102
(B): 09923-74510

NOTE:
If input shaft R bearing has been left in right case, pull it out by using bearing remover 09923-73210 with sliding shaft 09930-30102.

4. Also pull out countershaft R bearing cup by using special tools (bearing remover and sliding shaft).

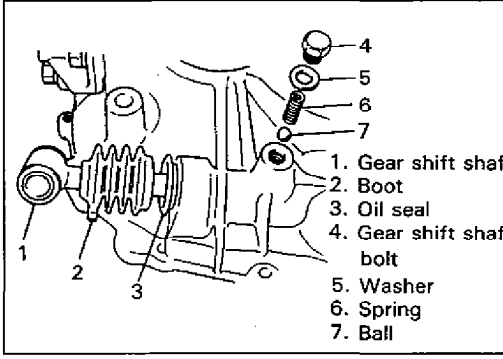
Special Tool
09930-30102
09941-64511

1. Gear shift arm
2. Gear shift shaft
3. Bolt



70F00-7A-18-4

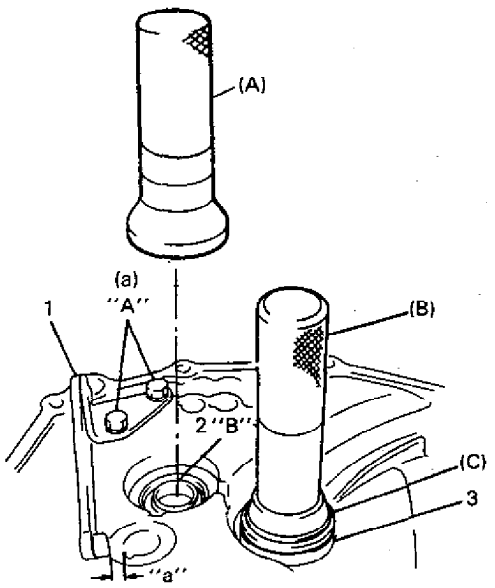
5. Remove bolt and then pull out gear shift arm.



1. Gear shift shaft
2. Boot
3. Oil seal
4. Gear shift shaft bolt
5. Washer
6. Spring
7. Ball

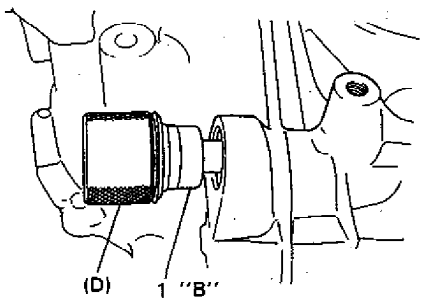
70F00-7A-18-5

6. Remove gear shift shaft bolt with washer, then take out spring and steel ball.
7. Remove gear shift shaft, boot and oil seal.
8. Remove differential side R oil seal from right case.



1. Reverse gear shift lever
2. Input shaft oil seal
3. Countershaft R bearing cup

70F00-7A-19-1



1. Gear shift shaft oil seal

70F00-7A-19-5

SUB ASSEMBLY SERVICE

RIGHT CASE

1. If reverse gear shift lever has been removed, fasten it with 2 bolts after applying thread lock cement.

   "A": Thread lock cement, 99000-32110

   Tightening Torque
   (a): 18—28 N·m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)

   NOTE:
   - **When installing reverse gear shift lever, set distance "a" between lever end and shaft bore to be 5 mm (0.2 in.).**

   Distance "a": 5 mm (0.2 in.)

   - **Distance "a" can be measured by installing reverse gear shaft provisionally.**
   - **When "a" is 5 mm (0.2 in.), clearance between reverse idler gear groove and shift lever end will be 0.5—1.0 mm (0.02—0.04 in.).**

2. Install input shaft oil seal facing its spring side upward. Use special tool and hammer for installation and apply grease to oil seal lip.

   "B": Grease 99000-25010

   Special Tool
   (A): 09951-76010

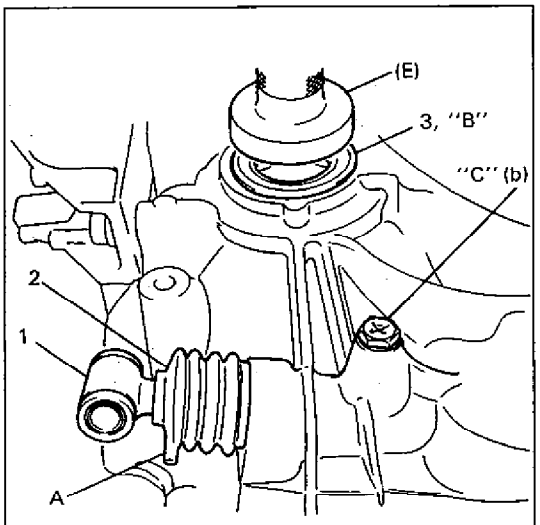
3. Install countershaft R bearing cup by using special tools and hammer.

   Special Tool
   (B): 09924-74510
   (C): 09925-68210

4. Apply grease to gear shift shaft oil seal at its lip and install it up to bottom of the bore by using special tool and hammer.

   "B": Grease 99000-25010

   Special Tool
   (D): 09925-58210



1. Gear shift shaft
2. Boot
3. Differential side R oil seal
A: Breather (Bring it downward)

70F00-7A-20-1

5. Install gear shift shaft, boot, steel ball, spring and tighten bolt with new aluminum washer applied with sealant.

"C": Sealant 99000-31110

Tightening Torque
(b): 10—16 N·m (1.0—1.6 kg-m, 7.5—11.5 lb-ft)

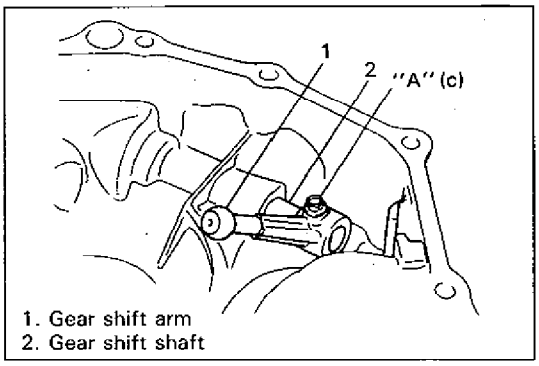
NOTE:
Bring breather of gear shift shaft boot downward.

6. Install differential side R oil seal until it becomes flush with case surface by using special tool with hammer, and then apply grease to its lip.

NOTE:
Face diff. side oil seal spring side inward.

"B": Grease 99000-25010

Special Tool
(E): 09913-75510



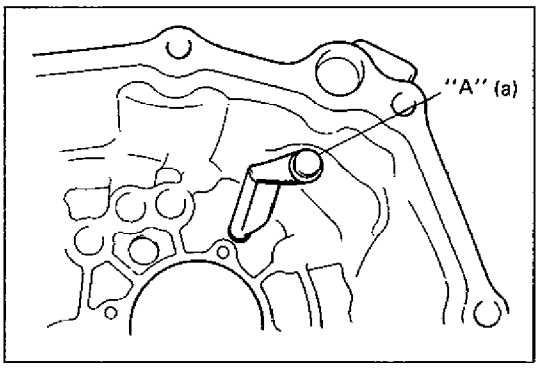
1. Gear shift arm
2. Gear shift shaft

70F00-7A-20-3

7. Insert gear shift arm in gear shift shaft, then fasten them with bolt applied with thread lock cement.

"A": Thread lock cement 99000-32110

Tightening Torque
(c) : 7T Type bolt :
18—28 N.m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)
9T, 12T Type bolt :
32—35 N.m (3.2—3.5 kg-m, 23.5—25.0 lb-ft)



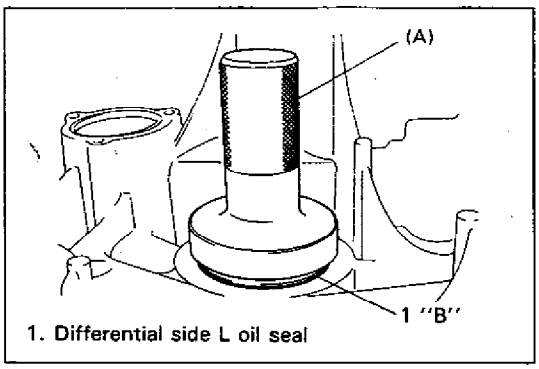
70F00-7A-20-4

LEFT CASE

1. If input oil gutter has been removed, install it with bolt applied with thread lock cement.

"A": Thread lock cement 99000-32110

Tightening Torque
(a): 8—12 N·m (0.8—1.2 kg-m, 6.0—8.5 lb-ft)



1. Differential side L oil seal

70F00-7A-20-5

2. Install differential side L oil seal until it becomes flush with case surface by using special tool with hammer, and then apply grease to its lip.

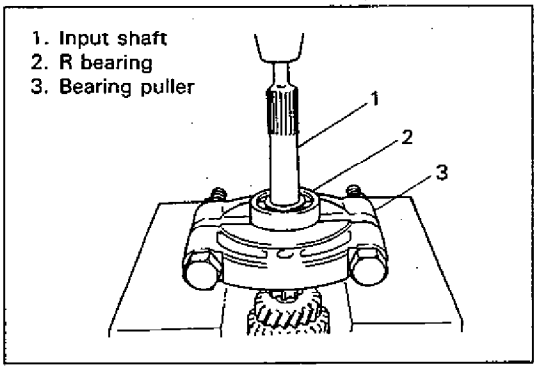
NOTE:
Face oil seal spring side inward.

"B": Grease 99000-25010

Special Tool
(A): 09913-75510

3. Install countershaft L bearing cup into case bore by tapping it with plastic hammer lightly.

64B40-7A-22-1

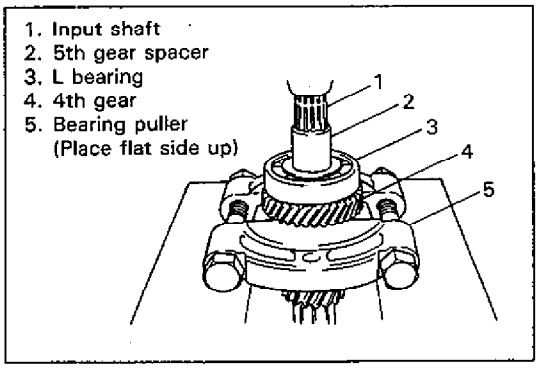


INPUT SHAFT ASSEMBLY

Disassembly

1. Remove input shaft R bearing by using bearing puller and press.

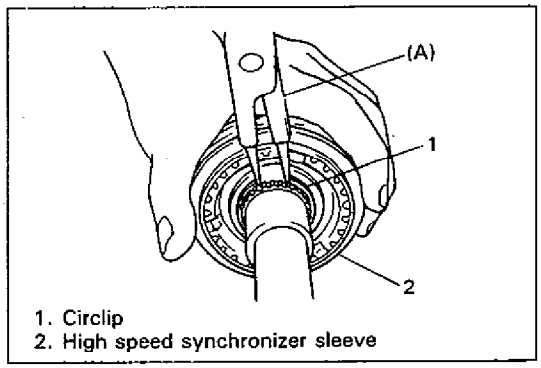
64B40-7A-22-2



2. Drive out 5th gear spacer, L bearing and 4th gear all at once by using puller and press.

CAUTION:
- **To avoid gear tooth from being damaged, support it at flat side of bearing puller.**
- **Stop press work in the middle way and take out 5th gear spacer to prevent it from being compressed and then continue to remove bearing with gear.**

70F00-7A-21-3

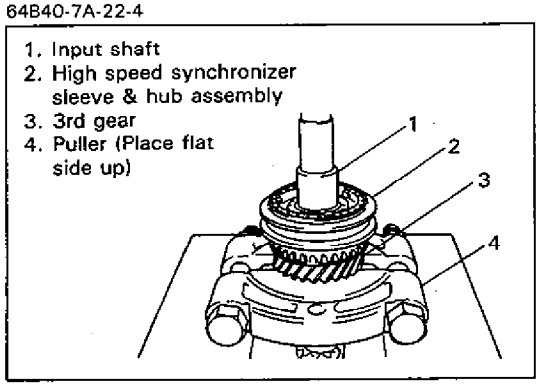


3. Take out 4th gear needle bearing and high speed synchronizer ring.
4. Using special tool, remove circlip.

NOTE:
For smooth removal of circlip, it is recommended to correct tool tips to be flat.

Special Tool
(A): 09900-06107

64B40-7A-22-4

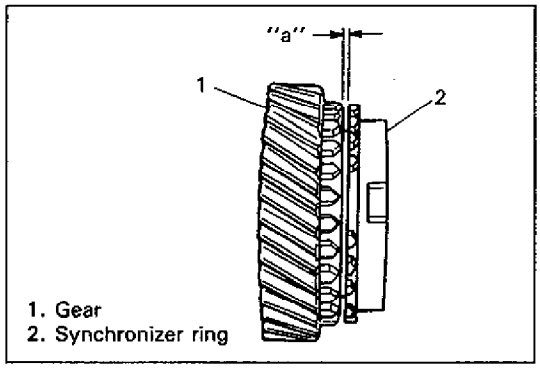


5. Drive out high speed synchronizer sleeve & hub assembly together with 3rd gear by using puller and press.

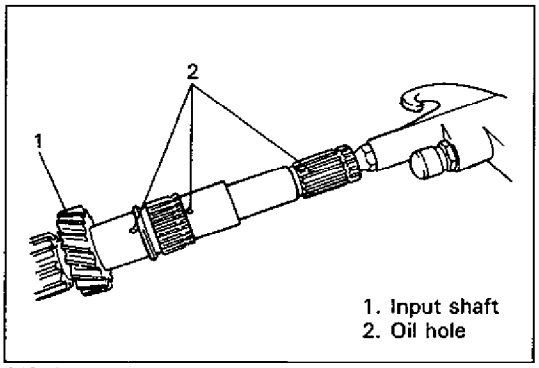
CAUTION:
Make sure to use flat side of puller to avoid causing damage to 3rd gear tooth.

6. Take out 3rd gear needle bearing from shaft.
7. Disassemble synchronizer sleeve & hub assembly.

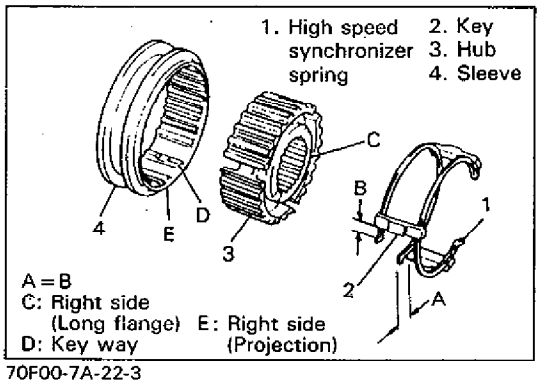
64B40-7A-22-5



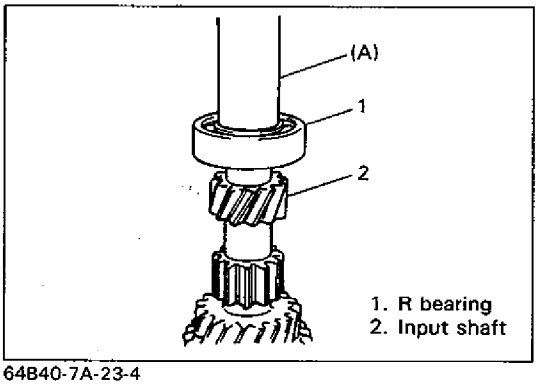
64B40-7A-23-1



64B40-7A-23-2



70F00-7A-22-3



64B40-7A-23-4

Inspection and Reassembly

1. Clean all components thoroughly, inspect them for any abnormality and replace with new ones as necessary.
2. If synchronizer parts need to be repaired, check clearance "a" between ring and gear, each chamfered tooth of gear, ring and sleeve, then determine parts replacement.

Clearance "a": Standard 1.0—1.4 mm (0.039—0.055 in.)
Service limit 0.5 mm (0.019 in.)

3. To ensure lubrication, air blow oil holes and make sure that they are free from any obstruction.

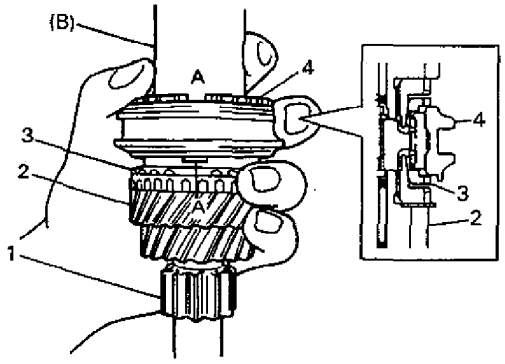
4. Fit high speed synchronizer sleeve to hub, insert 3 keys in it and then set springs as illustrated left.

NOTE:

- **No specific direction is assigned to each key but it is assigned as assembly. For details, refer to figure on page 7A-2.**
- **Size of high speed synchronizer sleeve, hub, keys and springs is between those of low speed and 5th speed ones.**

5. Drive in R bearing by using special tool and hammer.

Special Tool
(A): 09925-98221



1. Input shaft
2. 3rd gear
3. Synchronizer ring
4. Sleeve & hub assembly

A: Key way

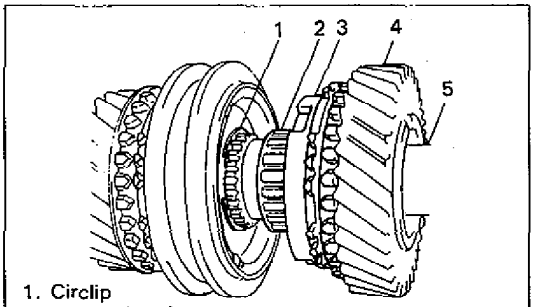
70F00-7A-23-1

6. Install 3rd gear needle bearing, apply oil to it, then install 3rd gear and synchronizer ring.
7. Drive in high speed sleeve & hub assembly by using special tool and hammer.

NOTE:

- **While press-fitting sleeve & hub, make sure that synchronizer ring key slots are aligned with keys in sleeve & hub assembly.**
- **Check free rotation of 3rd gear after press-fitting sleeve & hub assembly.**

Special Tool
(B): 09913-84510



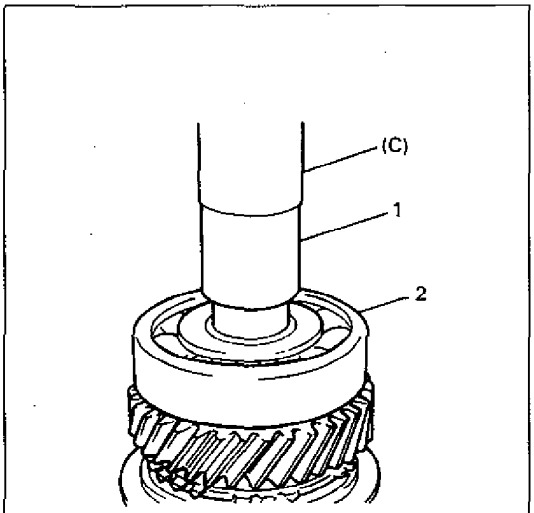
1. Circlip
2. Needle bearing
3. Synchronizer ring
4. 4th gear
5. Input shaft

70F00-7A-23-3

8. Install circlip, needle bearing, apply oil to bearing, then install synchronizer ring and 4th gear.

CAUTION:
Confirm that circlip is installed in groove securely.

NOTE:
Removed circlip should be replaced with new one.



1. 5th gear spacer
2. L bearing (Install it first)

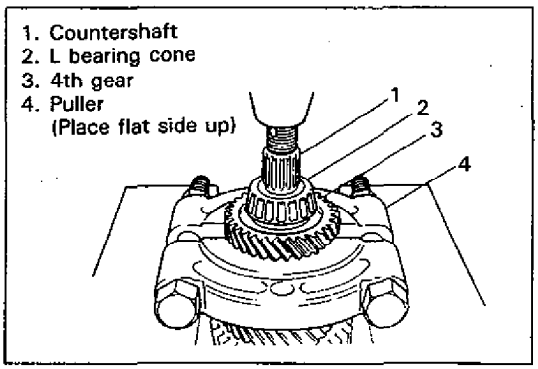
64B40-7A-24-4

9. Press-fit L bearing by using special tool and hammer.

Special Tool
(C): 09925-98221

10. Using the same special tool, drive in 5th gear spacer.

CAUTION:
To prevent 5th gear spacer from being distorted because of excessive compression, do not press-fit it with L bearing at once.



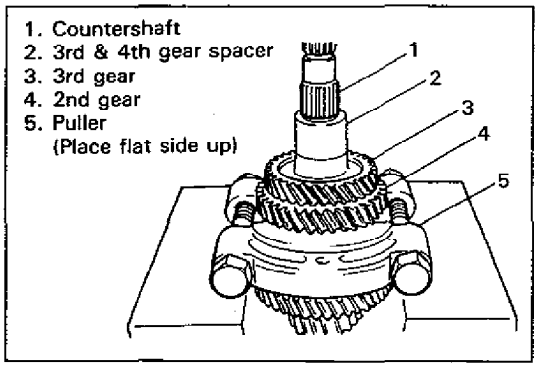
64B40-7A-25-1

COUNTERSHAFT ASSEMBLY

Disassembly

1. Drive out L bearing cone with 4th gear by using puller and press.

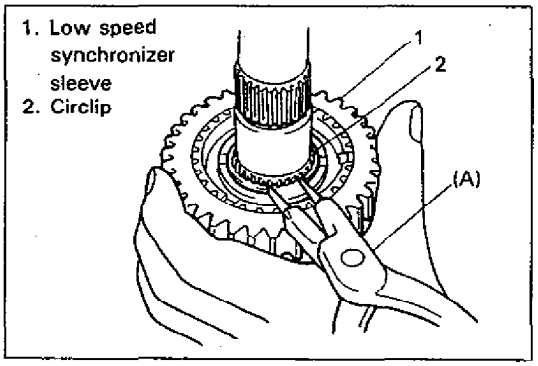
CAUTION:
- **Use puller and press that will bear at least 5 ton (11,000 lb) safely.**
- **To avoid tooth damage, support 4th gear at flat side of puller.**



70F00-7A-24-2

2. Apply puller to 2nd gear and drive out 3rd & 4th gear spacer and 3rd gear together with 2nd gear by using press.

CAUTION:
If compression exceeds 5 ton (11,000 lb), release compression once, reset puller support and then continue press work again.

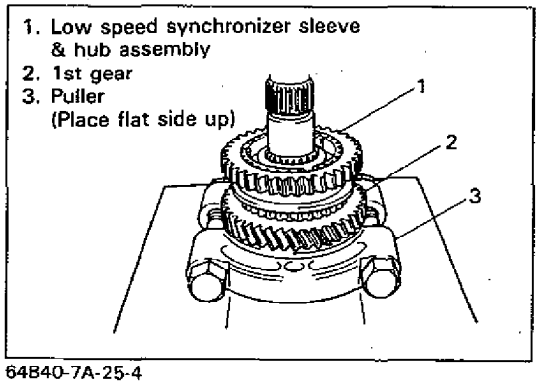


70F00-7A-24-3

3. Take out needle bearing and 2nd synchronizer ring.
4. Using special tool, remove circlip.

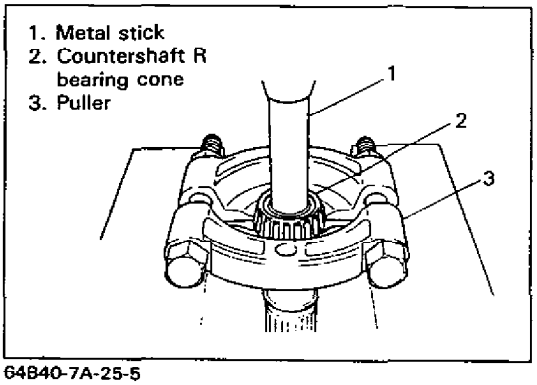
NOTE:
Correct tool tips to be flat to facilitate removal of circlip.

Special Tool
(A): 09900-06107



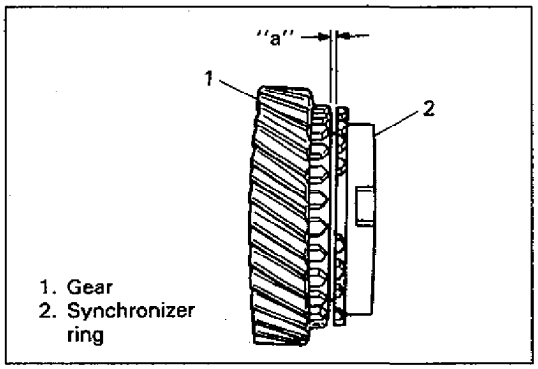
64B40-7A-25-4

5. Apply puller to 1st gear and drive out low speed synchronizer sleeve & hub assembly with gear by using press.
6. Disassemble synchronizer sleeve & hub assembly.
7. Take out needle bearing from shaft.

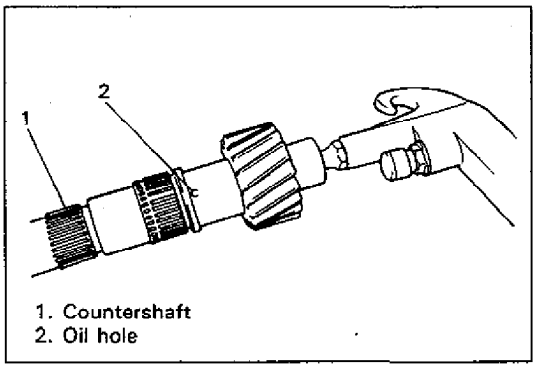


64B40-7A-25-5

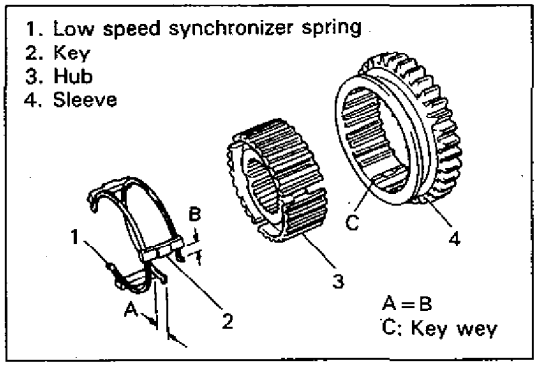
8. Remove R bearing cone by using puller, metal stick and press.



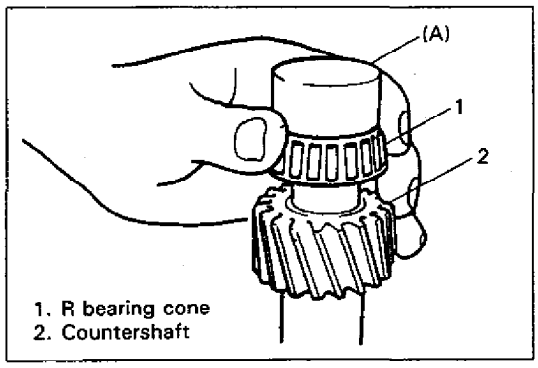
64B40-7A-26-1



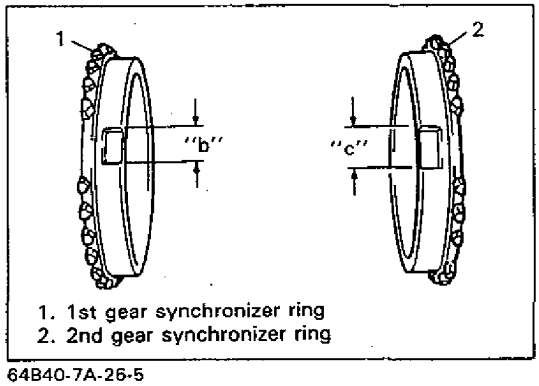
64B40-7A-26-2



70F00-7A-25-3



64B40-7A-26-4



64B40-7A-26-5

Inspection and Reassembly

1. Clean all components thoroughly, inspect them for any abnormality and replace with new ones as necessary.
2. If synchronizer parts need to be repaired, check clearance "a" between ring and gear, each chamfered tooth of gear, ring and sleeve, then determine parts replacement.

Clearance "a": Standard 1.0—1.4 mm (0.039—0.055 in.)
Service limit 0.5 mm (0.019 in.)

3. To ensure lubrication, air blow oil holes and make sure that they are free from any obstruction.

4. Fit high speed synchronizer sleeve to hub, insert 3 keys in it and then set springs as illustrated left.

NOTE:
- **No specific direction is assigned to low speed synchronizer hub or each key but it is assigned as assembly. For details, refer to figure on page 7A-2.**
- **Size of low speed synchronizer keys and springs are the largest compared with those of high speed and 5th speed ones.**

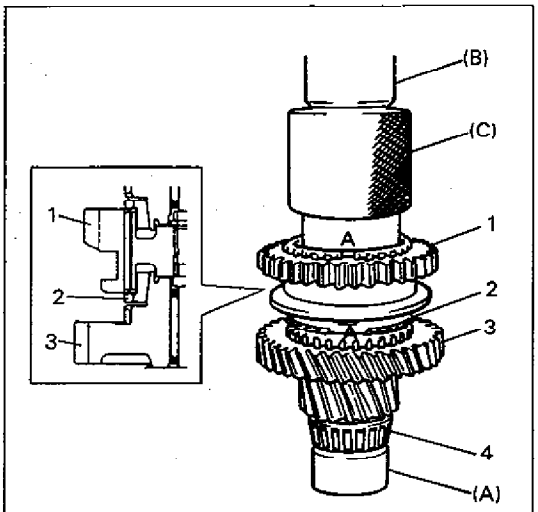
5. Install R bearing cone by using special tool and hammer.

Special Tool
(A): 09923-78210

6. Install needle bearing, apply oil to it, then install 1st gear and 1st gear synchronizer ring.

NOTE:
Key slot width of 1st synchronizer ring is smaller than that of 2nd synchronizer ring.
Distinguish the difference properly.

Width "b": 8.2 mm (0.32 in.)
"c": 9.6 mm (0.38 in.)



1. Low speed sleeve & hub assembly
2. 1st gear synchronizer ring
3. Countershaft 1st gear
4. R bearing cone

A: Align key slots with keys

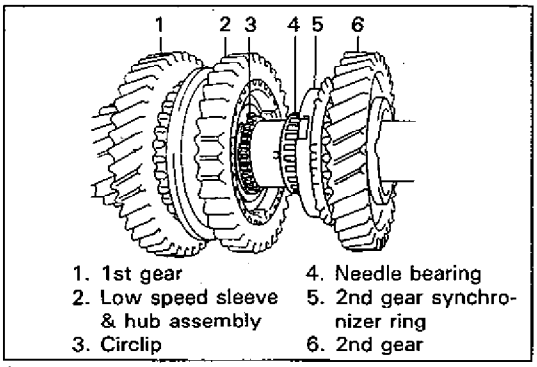
70F00-7A-26-1

7. Drive in low speed sleeve & hub assembly by using special tool and hammer.

NOTE:

- **Support shaft with special tool as illustrated left so that retainer of bearing cone will be free from compression.**
- **Make sure that synchronizer ring key slots are aligned with keys while press-fitting sleeve & hub assembly.**
- **Check free rotation of 1st gear after press-fitting sleeve & hub assembly.**

Special Tool
(A): 09923-78210
(B): 09925-18010
(C): 09940-53111

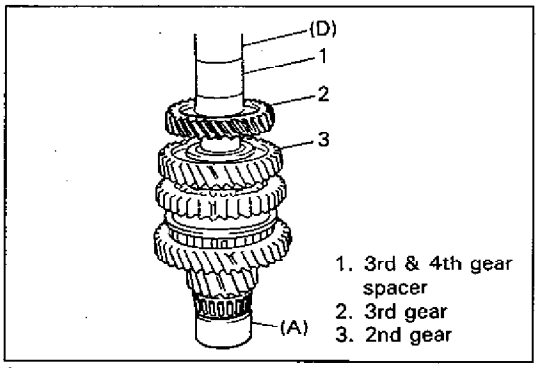


1. 1st gear
2. Low speed sleeve & hub assembly
3. Circlip
4. Needle bearing
5. 2nd gear synchronizer ring
6. 2nd gear

64B40-7A-27-3

8. Install circlip, needle bearing, apply oil to bearing, then install 2nd gear synchronizer ring and 2nd gear.

CAUTION:
Confirm that circlip is installed in groove securely.



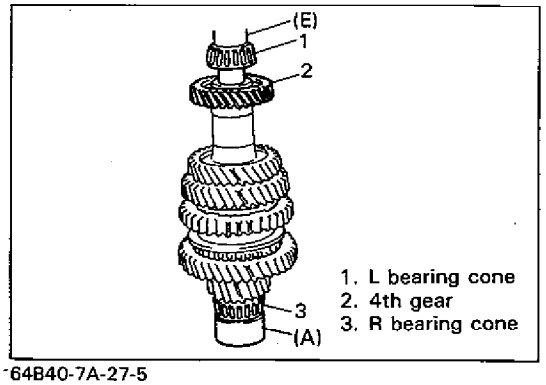
1. 3rd & 4th gear spacer
2. 3rd gear
3. 2nd gear

64B40-7A-27-4

9. Press-fit 3rd gear and spacer by using special tool and press.

NOTE:
It is recommended to press-fit spacer and 3rd gear first, and then 4th gear later separately so that countershaft will not be compressed excessively.

Special Tool
(A): 09923-78210
(D): 09913-80112



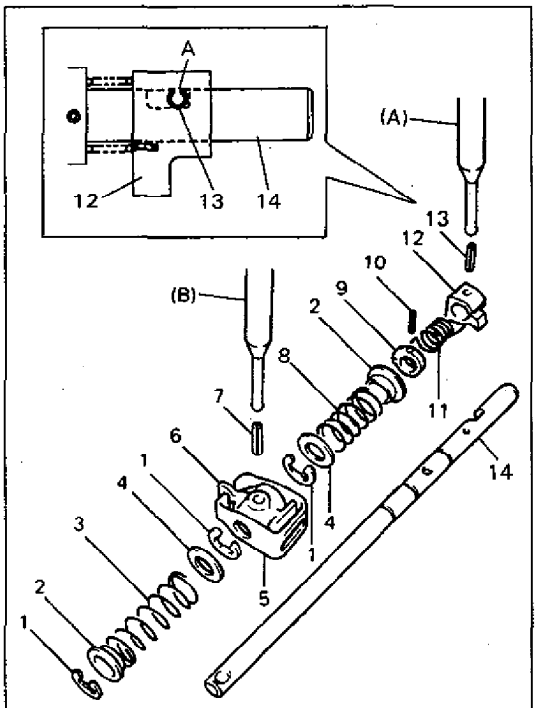
1. L bearing cone
2. 4th gear
3. R bearing cone

64B40-7A-27-5

10. Press-fit 4th gear by using the same procedure as the above.
11. Install L bearing cone by using special tool and hammer.

NOTE:
For protection of bearing cone, always support shaft with special tool as illustrated.

Special Tool
(A): 09923-78210
(E): 09925-98221



1. E-ring
2. Select spring guide
3. Low speed select spring (Blue)
4. Washer
5. Gear shift interlock plate
6. Gear shift & select lever
7. Spring pin (Double)
8. Reverse select sprinig (Red)
9. 5th & REV gear shift cam guide
10. Spring pin
    (Apply spring pin remover of 2.8—3.0 mm/0.11 in. diameter)
11. Cam guide return spring
12. 5th & REV gear shift cam
13. Spring pin
14. Gear shift & select shaft

A: Face pin slit

70F00-7A-27-1

GEAR SHIFTER

Gear Shift & Select Shaft Assembly

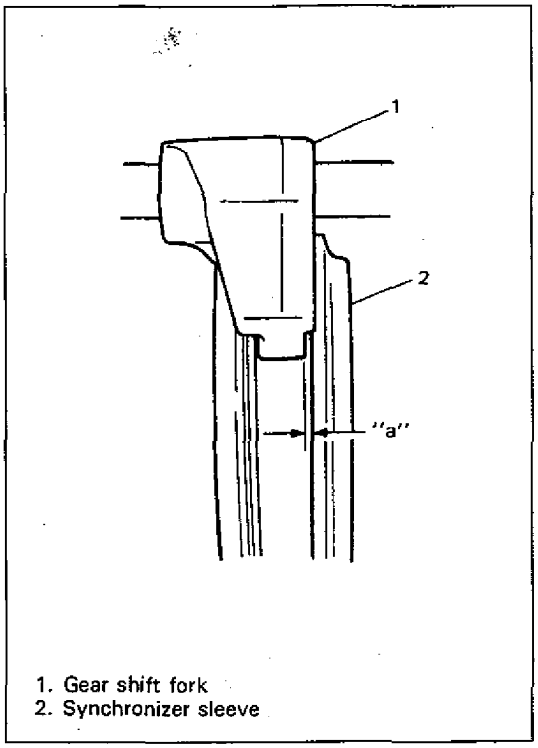
1. To disassemble component parts, use special tools and 2.8—3.0 mm (0.11 in.) pin remover in addition.

   Special Tool
   (A): 09922-85811 (4.5 mm)
   (B): 09925-78210 (6.0 mm)

2. Clean all parts thoroughly, inspect them and replace with new ones as required.
3. Assemble component parts by reversing removal procedure.

NOTE:

- **When driving in spring pins, prevent shaft from being bent by supporting it with wood block.**
- **Assemble 5th & REV gear shift cam by winding cam guide return spring, and then drive in spring pin facing its slit A as shown left.**
- **Locate low speed select spring (Blue—Lower position) and reverse select spring (Red—Upper position) correctly.**



1. Gear shift fork
2. Synchronizer sleeve

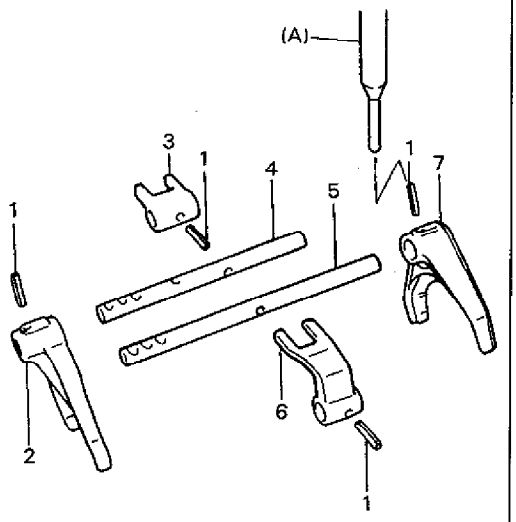
64B40-7A-28-4

High Speed and Low Speed Gear Shift Shafts

1. Before disassembling shift shaft assemblies, determine necessity of parts replacement by checking them for abnormal wear or distortion. Use feeler gauge for checking clearance "a" between sleeve and shift fork.

NOTE:
For correct judgement of parts replacement, carefully inspect contact portion of fork and sleeve.

Maximum clearance "a": 1.0 mm (0.039 in.)



1. Spring pin
2. Low speed gear shift fork
3. Low speed gear shift yoke
4. Low speed shift shaft
5. High speed gear shift shaft
6. High speed gear shift yoke
7. High speed gear shift fork

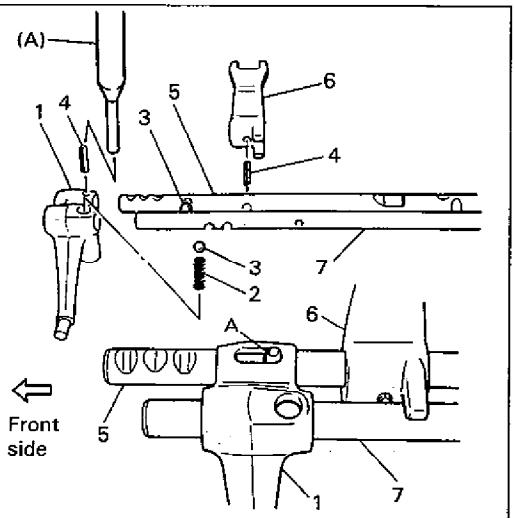
64B40-7A-29-1

2. Disassemble component parts by using special tool and hammer.

Special Tool
(A): 09922-85811 (4.5 mm)

3. Assemble shift shafts as shown left while making sure that component parts are in proper order.

NOTE:
- **Correct shaft surface by using oil stone, if any scratch or dent is found.**
- **Support shaft with wood blocks when driving in spring pins.**



1. Reverse gear shift arm
2. Reverse gear shift arm spring (Blue)
3. Steel ball
4. Spring pin
5. 5th & REV gear shift shaft
6. 5th & REV gear shift yoke
7. 5th & REV gear shift guide shaft

A: Face pin slit toward front

70F007A-28-3

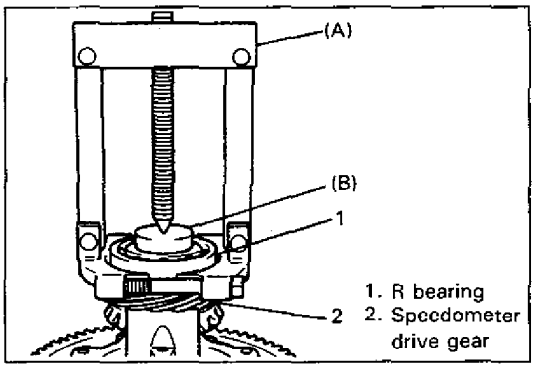
5th & REV Gear Shifter

1. Disassemble component parts by using special tool and hammer.

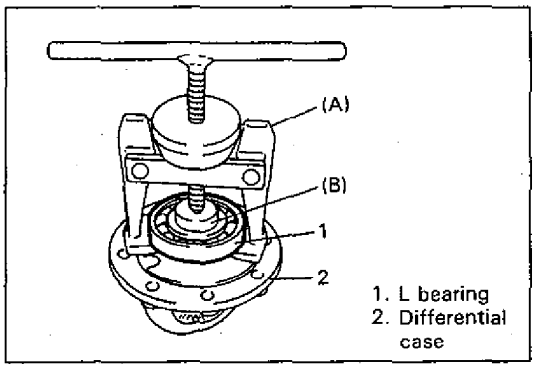
Special Tool
(A): 09922-85811 (4.5 mm)

2. Replace or correct parts as required and assemble shafts making sure that component parts are in proper order as shown left.

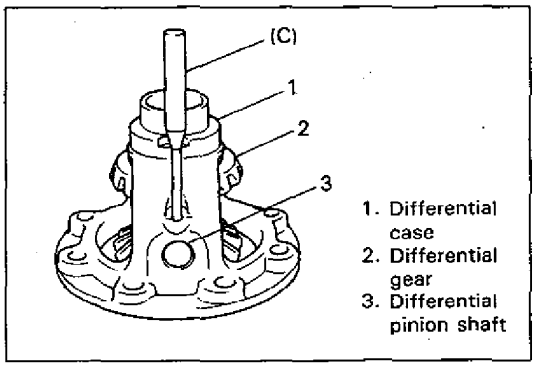
NOTE:
- **Distinguish reverse gear shift arm spring (Blue) from low speed locating spring (Purple).**
- **Install 2 steel balls in reverse gear shift arm without fail.**
- **Drive in spring pin for reverse shift arm facing slit A toward front.**



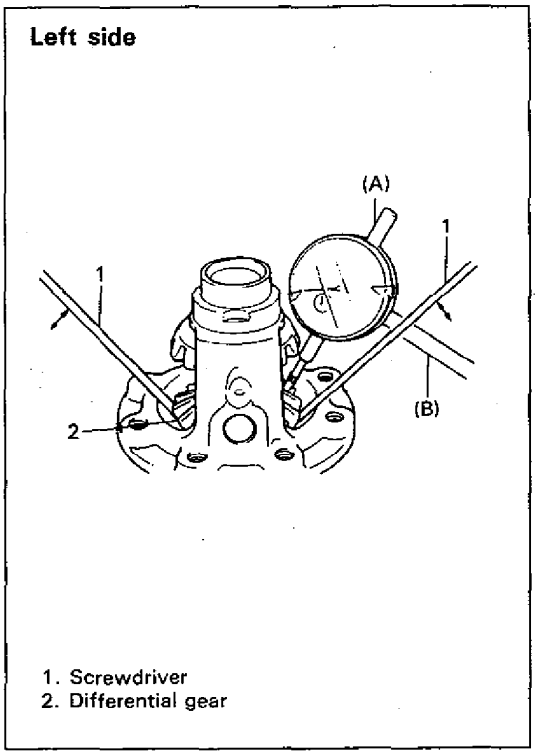
70F00-7A-29-1



70F00-7A-29-2



64B40-7A-30-3



64B40-7A-30-4

DIFFERENTIAL ASSEMBLY

Disassembly

1. Using special tools, remove R bearing.

Special Tool
(A): 09913-65810
(B): 09925-88210

2. Take out speedometer drive gear.

3. Support differential case with soft jawed vise and remove 8 final gear bolts then take out final gear.
4. Using special tools, remove L bearing.

Special Tool
(A): 09913-61510
(B): 09925-88210

5. Using special tool and hammer, drive out differential side pinion shaft pin and then disassemble component parts.

Special Tool
(C): 09922-85811 (4.5 mm)

Adjustment and Reassembly

Judging from abnormality noted before disassembly and what is found through visual check of component parts after disassembly, prepare replacing parts and proceed to reassembly. Make sure that all parts are clean.

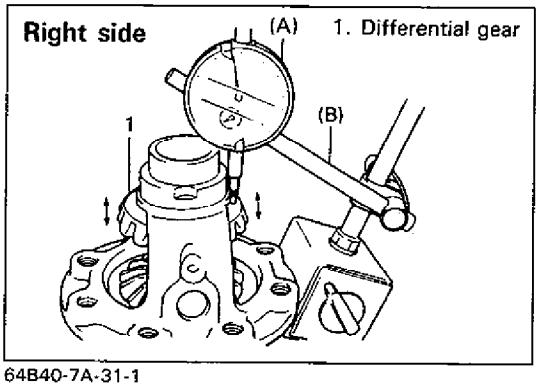
1. Assemble differential gear and measure thrust play of differential gear as follows.

Special Tool
(A): 09900-20606
(B): 09900-20701

Diff. gear thrust play: 0.05—0.33 mm (0.002—0.013 in.)

Left side

- Hold differential assembly with soft jawed vise and apply measuring tip of dial gauge to top surface of gear.
- Using 2 screwdrivers, move gear up and down and read movement of dial gauge pointer.



64B40-7A-31-1

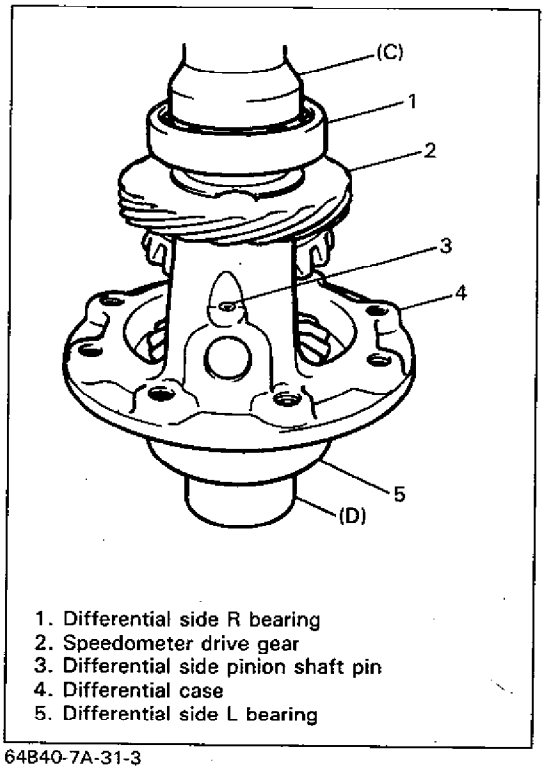
Right side

- Using similar procedure to the above, set dial gauge tip to gear shoulder.
- Move gear up and down by hand and read dial gauge.

2. If thrust play is out of specification, select suitable thrust washer from among following available size, install it and check again that specified gear play is obtained.

Available thrust washer thickness	0.9, 0.95, 1.0, 1.05, 1.1, 1.15 and 1.2 mm (0.035, 0.037, 0.039, 0.041, 0.043, 0.045, and 0.047 in.)

64B40-7A-31-2

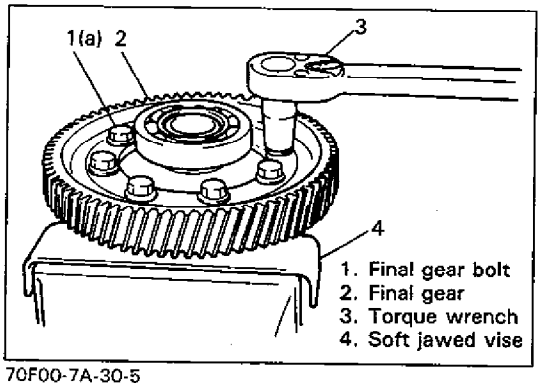


64B40-7A-31-3

3. Drive in spring pin from right side till it is flush with differential case surface.
4. Press-fit L bearing by using special tool and copper hammer.

Special Tool
(C): 09951-76010
(D): 09951-16060

5. Install speedometer drive gear, support differential assembly as illustrated so as to L bearing is floating, and then press-fit R bearing like L bearing in Step 4.

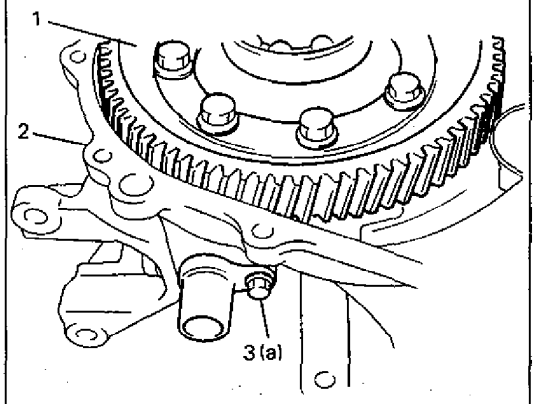


70F00-7A-30-5

6. Hold differential assembly with soft jawed vise, install final gear and then tighten it with 8 bolts to specified torque.

CAUTION:
Use of any other bolts than specified ones is prohibited.

Tightening Torque
(a): 80—100 N·m (8.0—10.0 kg-m, 58.0—72.0 lb-ft)



1. Differential assembly
2. Transmission right case
3. Speedometer driven gear case bolt

64B40-7A-32-1

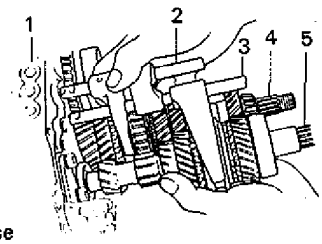
ASSEMBLING UNIT

DIFFERENTIAL TO LEFT CASE

1. Install differential assembly into right case.
2. Insert speedometer driven gear case assembly applied with oil to its O ring and gear, then tighten it with bolt.

CAUTION:
- **While inserting case assembly into transmission, turn final gear by hand slightly so that gear can mesh easily.**
- **Never push or hit slit portion of case when inserting it. Such attempt may cause case to break.**

Tightening Torque
(a): 4—7 N·m (0.4—0.7 kg-m, 3.0—5.0 lb-ft)

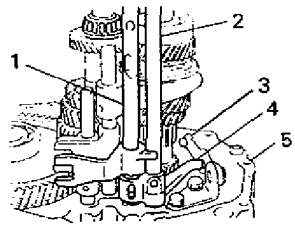


1. Right case
2. Low speed gear shift shaft
3. High speed gear shift shaft
4. Countershaft assembly
5. Input shaft assembly

64B40-7A-32-3

3. Join input shaft, countershaft, low speed gear shift shaft and high speed gear shift shaft assemblies all together, then install them into right case.

NOTE:
- **Input shaft R bearing on shaft can be installed into right case by tapping shaft with plastic hammer.**
- **Check to make sure that counter shaft is engaged with final gear while installing.**

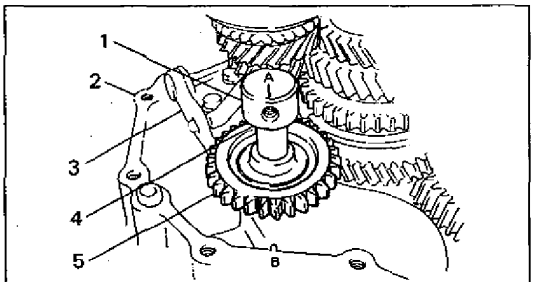


1. 5th & REV gear shift shaft
2. 5th & REV gear shift guide shaft
3. Reverse gear shift lever
4. Reverse gear shift arm
5. Right case

70F00-7A-31-4

4. Install 5th & REV gear shift shaft with 5th & REV gear shift guide shaft into right case. Reverse gear shift arm has to be joined with reverse gear shift lever at the same time.

NOTE:
When installing 5th & REV gear shift shaft and guide shaft, push up high speed gear shift shaft and shift it to 4th to facilitate installation of 5th & REV shifter.

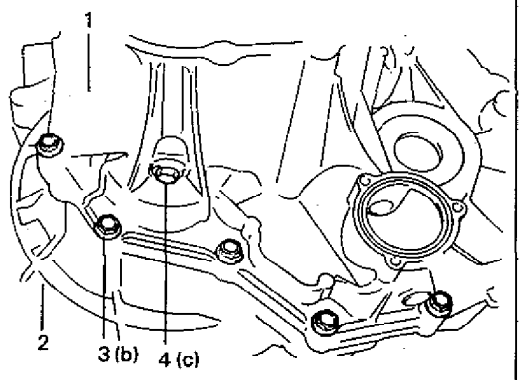


1. Reverse gear shaft
2. Right case
3. Reverse gear shift lever
4. Washer
5. Reverse idler gear
A: Align with B

70F00-7A-31-5

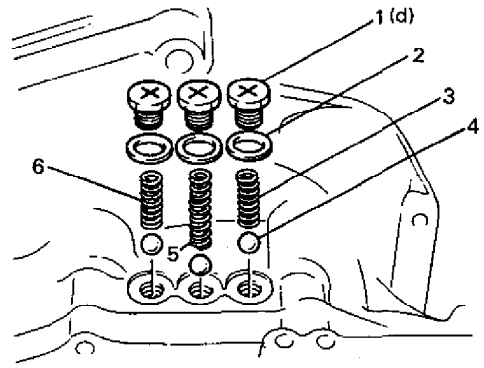
5. Make reverse idler gear with reverse gear shift lever, insert reverse gear shaft into case through idler gear and then align A in shaft with B in case.

NOTE:
- **Make sure that washer has been installed in shaft at above the gear.**
- **Check to confirm that reverse gear shift lever end has clearance 0.5—1.0 mm (0.02—0.04 in.) to idler gear groove.**



1. Left case
2. Right case
3. Case bolt
4. Reverse shaft bolt

70F00-7A-32-1



1. Gear shift fork shaft bolt
2. Washer
3. Low speed locating spring (Purple)
4. Steel ball
5. High speed locating spring (Purple)
6. 5th & REV locating spring (Purple)

64B40-7A-33-3

6. Clean mating surfaces of both right and left cases, coat mating surface of left case with sealant evenly then mate it with right case.

   Sealant: 99000-31110

7. Tighten case bolts from outside to specified torque.

   Tightening Torque
   (b): 15—22 N·m (1.5—2.2 kg-m, 11.0—15.5 lb-ft)

8. Install new aluminum washer to reverse shaft bolt and apply thred lock cement to reverse shaft bolt. Tighten it.

   "A": Thread lock cement 99000-32110

   Tightening Torque
   (c): 18—28 N·m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)

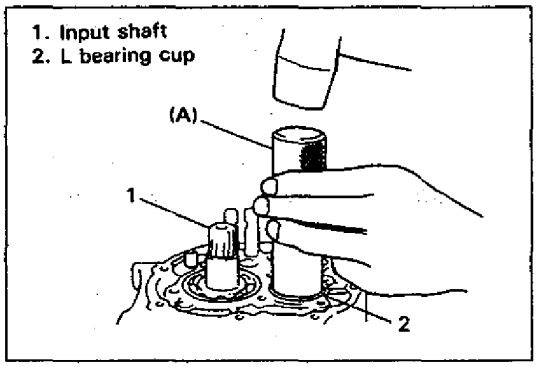
9. Install another 2 case bolts from clutch housing side and tighten them to specification.

10. Check locating spring for deterioration and replace with new one as necessary.

Locating spring free length	Standard	Service Limit
Low speed and 5th & REV	26.1 mm (1.028 in)	25.0 mm (0.984 in)
High speed	40.1 mm (1.579 in)	39.0 mm (1.535 in)

11. Install steel ball and locating spring for respective gear shift shaft and tighten with bolt.

    Tightening Torque
    (d): 10—16 N·m (1.0—1.6 kg-m, 7.5—11.5 lb-ft)

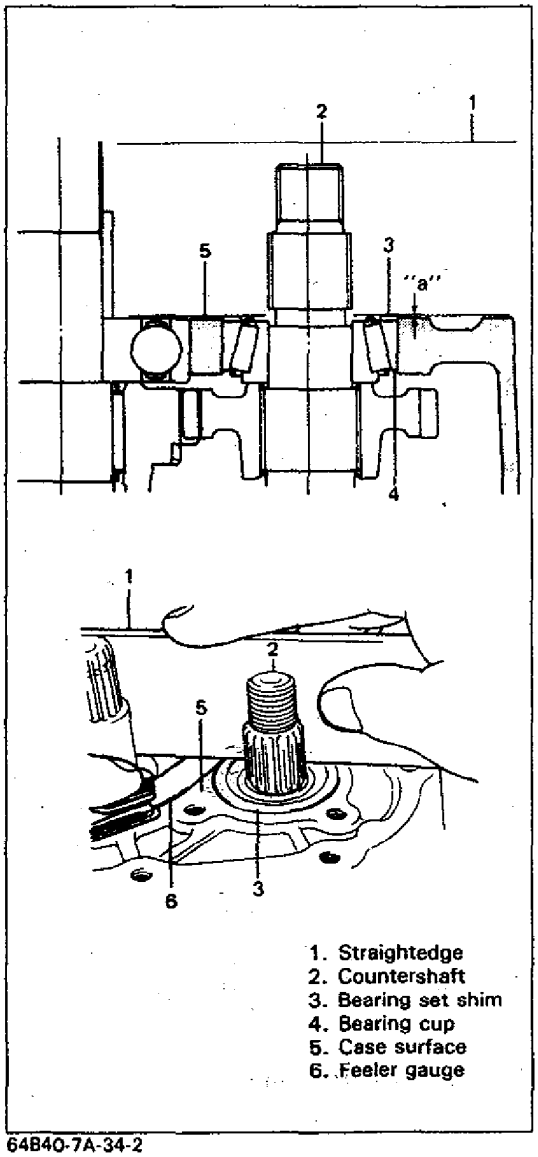


64B40-7A-34-1

FIFTH GEARS

1. To seat countershaft L bearing cup to bearing cone, tap cup by using special tool and plastic hammer.

Special Tool
(A): 09913-84510



64B40-7A-34-2

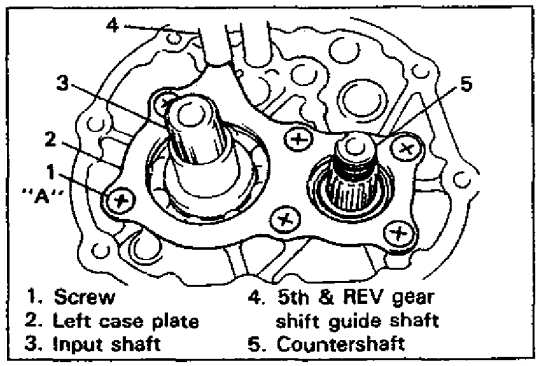
2. Put a shim on bearing cup provisionally, place straight edge over it and compress it by hand through straight edge, and then measure "a" (Clearance between case surface and straight edge) by using feeler gauge.

Clearance "a": 0.08—0.12 mm (0.0032—0.0047 in.)
(Shim protrusion)

3. By repeating above step, select a suitable shim which adjusts clearance "a" to specification and put it on bearing cup.

NOTE:
Insert 0.1 mm (0.004 in) feeler to know whether or not a shim fulfills specification quickly.

Available shim thickness	0.40, 0.45, 0.50, 0.55, 0.6, 0.65, 0.7, 0.75, 0.8, 0.85, 0.9, 0.95, 1.0, 1.05, 1.1 and 1.15 mm (0.015, 0.017, 0.019, 0.021, 0.023, 0.025, 0.027, 0.029, 0.031, 0.033, 0.035, 0.037, 0.039, 0.041, 0.043 and 0.045 in)



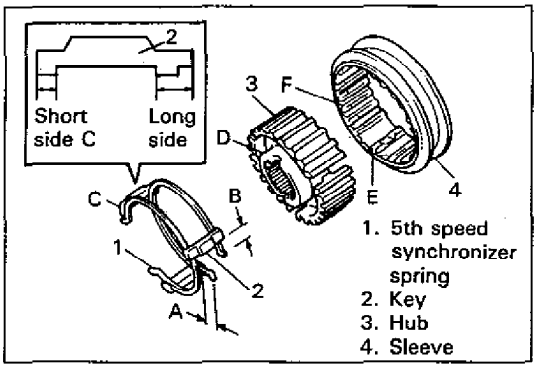
70F00-7A-33-5

4. Place left case plate inserting its end in groove of shift guide shaft and then tighten it with 6 screws applied with thread lock cement.

NOTE:
After tightening screws, make sure that counter shaft can be rotated by hand feeling some load.

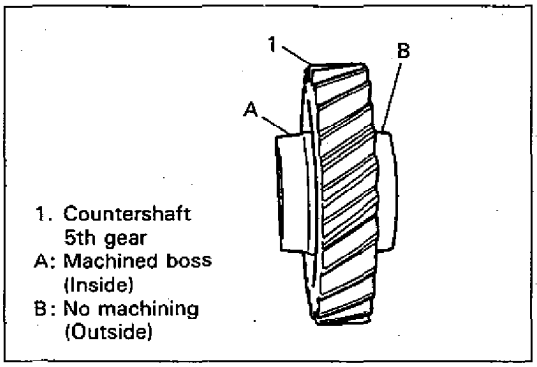
"A": Thread lock cement 99000-32110

Tightening Torque
(a): 8—10 N·m (0.8—1.0 kg-m, 6.0—7.0 lb-ft)



1. 5th speed synchronizer spring
2. Key
3. Hub
4. Sleeve

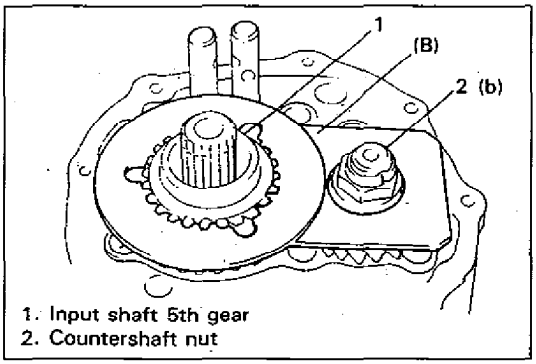
64B40-7A-35-1



1. Countershaft 5th gear

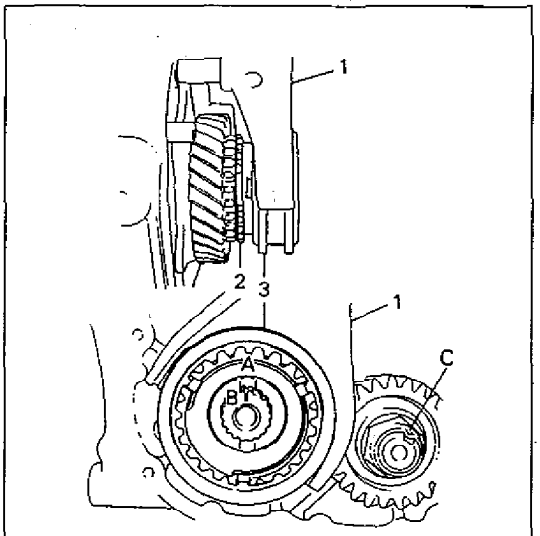
A: Machined boss (Inside)
B: No machining (Outside)

64B40-7A-35-2



1. Input shaft 5th gear
2. Countershaft nut

70F00-7A-34-3



1. 5th gear shift fork
2. 5th speed synchronizer ring
3. Sleeve & hub assembly

A: Oil groove (Align with B)
B: Punch mark (Shows oil hole)
C: Caulking

70F00-7A-34-4

5. Assemble 5th speed synchronizer sleeve and hub with keys and springs.

NOTE:
Short side C in keys, long boss D in hub and chamfered spline F in sleeve should face inward (5th gear side).

A = B
C: Short side (Inward)
D: Long boss (Inward)
E: Key way
F: Chamfered spline (Inward)

6. Install 5th gear to counter shaft facing machined boss A inward.

7. Install needle bearing to input shaft, apply oil then install 5th gear and special tool to stop shaft rotation.

NOTE:
Removed countershaft nut should be replaced with new one.

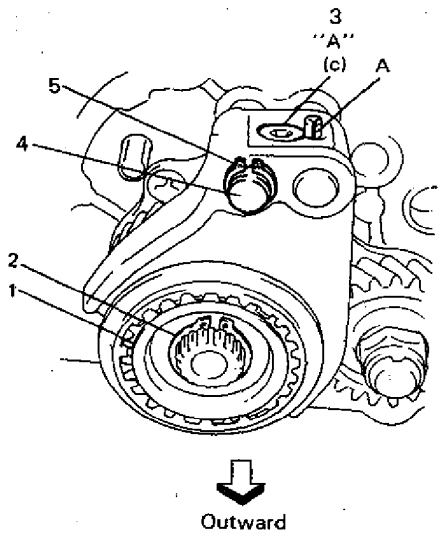
Special Tool
(B): 09927-76010

8. Install countershaft nut and tighten it to specification.

Tightening Torque
(b): 60—80 N·m (6.0—8.0 kg-m, 43.5—57.5 lb-ft)

9. Remove special tool, then caulk nut at C with caulking tool and hammer.
10. Install synchronizer ring.
11. Fit 5th gear shift fork to sleeve & hub assembly and install them into input shaft, shift shaft and shift guide shaft at once aligning hub oil groove A with shaft mark B.

NOTE:
Long boss of hub faces inward (gear side).



1. Hub plate
2. Circlip
3. Shift fork plug
4. 5th & REV gearshift guide shaft
5. Cirlcip

A: Pin slit (Face outward)

70F00-7A-35-1

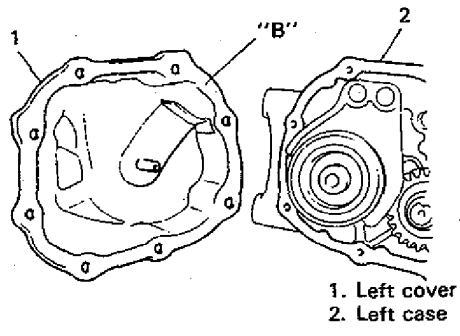
12. Drive in spring pin facing its slit A outward.
13. Install steel ball, tighten shift fork plug applied with thread lock cement.

"A": Thread lock cement 99000-32110

Tightening Torque
(c): 8—10 N·m (0.8—1.0 kg-m, 6.0—7.0 lb-ft)

14. Install circlip to 5th & REV gear shift guide shaft.
15. Fit hub plate and fix it with circlip.

CAUTION:
- **Coat shift fork plug with thread lock cement reasonably. If it is done to much, excess may interfere in ball movement and cause hard shift to 5th speed.**
- **Make sure circlip is installed in shaft groove securely.**



1. Left cover
2. Left case

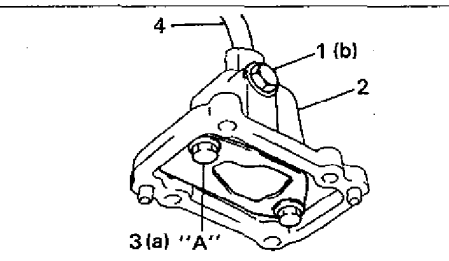
70F00-7A-35-3

16. Clean mating surface of both left case and left cover, coat mating surface with sealant evenly, mate it with left case and then tighten with 8 bolts.

"B": Sealant 99000-31110

Tightening Torque for left cover bolts:
M10: 8—12 N·m (0.8—1.2 kg-m, 6.0—8.5 lb-ft)
M12: 18—28 N·m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)

GEAR SHIFT & SELECT SHAFT ASSEMBLY



1. 5th to REV interlock guide bolt
2. Gear shift guide case
3. Gear shift case plate bolt
4. Breather (Air blow) hose

70F00-7A-35-4

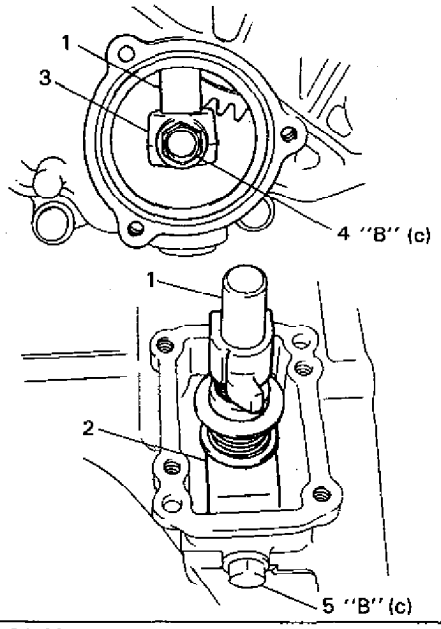
1. If gear shift guide case has been disassembled or replaced, apply thread lock cement to case plate bolt and tighten bolts as specified below. Also check breather hose.

"A": Thread lock cement 99000-32110

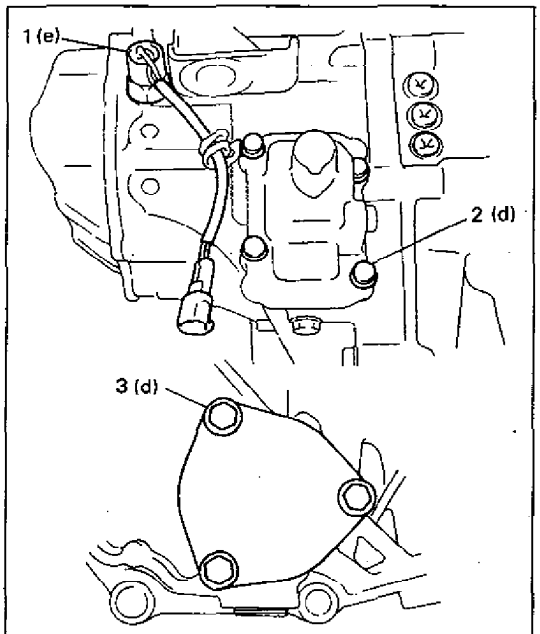
Tightening Torque
(a): 8—12 N·m (0.8—1.2 kg-m, 6.0—8.5 lb-ft)
(b): 18—28 N·m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)

2. Clean mating surface of guide case.

1. Gear shift & select shaft assembly
2. Gear shift interlock plate
3. Gear shift yoke
4. Bolt
5. Gear shift interlock bolt



70F00-7A-36-1



1. Back up light switch
2. Gear shift guide case bolt
3. Left case cap bolt

70F00-7A-36-3

3. Install gear shift yoke and joint it with gear shift arm.
4. Install gear shift & select shaft assembly into transmission and joint its bottom end with gear shift yoke.

NOTE:
When installing gear shift & select shaft assembly, position gear in neutral so that gear shift interlock plate will go in smoothly.

5. Apply thread lock cement to yoke bolt and tighten yoke and shaft with it.

"B": Thread lock cement 99000-32110

Tightening Torque
(c) : 7T Type bolt :
18—28 N.m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)
9T, 12T Type bolt :
32—35 N.m (3.2—3.5 kg-m, 23.5—25.0 lb-ft)

6. Install washer to gear shift interlock bolt and apply thread lock cement to interlock bolt. Torque it to specification.

"B": Thread lock cement 99000-32110
Tightening Torque
(c): 18—28 N·m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)

7. Clean mating surface of left case and apply sealant to mating surface of gear shift guide case. And put gear shift guide case on left case.

Sealant: Sealant 99000-31110

8. Place wiring harness clamp bracket and fasten it together with gear shift guide case.

Tightening Torque
(d): 8—12 N·m (0.8—1.2 kg-m, 6.0—8.5 lb-ft)

9. Install back up light switch and clamp its lead.

Tightening Torque
(e): 16—23 N·m (1.6—2.3 kg-m, 12.0—16.5 lb-ft)

10. Clean left case cap and mating surface of left case, check condition of O ring and then fasten cap with 3 bolts.

Tightening Torque
(d): 8—12 N·m (0.8—1.2 kg-m, 6.0—8.5 lb-ft)

11. Check input shaft for rotation in each gear position.
12. Also confirm function of back up light switch in reverse position by using ohmmeter.

RECOMMENDED TORQUE SPECIFICATIONS

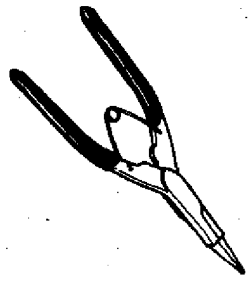
Fastening portion		Tightening Torque		
		N·m	kg-m	lb-ft
1. Oil level/filler plug		18—23	1.8—2.3	13.5—16.5
2. Oil drain plug		18—23	1.8—2.3	13.5—16.5
3. Ball stud bolt		45—65	4.5—6.5	33.0—47.0
4. Tie-rod end castle nut		30—55	3.0—5.5	22.0—39.5
5. Stabilizer mounting bracket bolts		30—55	3.0—5.5	22.0—39.5
6. Wheel nuts		70—100	7.0—10.0	51.0—72.0
7. Drive shaft nut		150—200	15.0—20.0	108.5—144.5
8. Gear shift control housing nuts for boot cover		3—6	0.3—0.6	2.5—4.0
9. Housing nuts for control housing		15—20	1.5—2.0	11.0—14.0
10. Guide plate bolts		8—10	0.8—1.0	6.0—7.0
11. Control housing nuts		25—40	2.5—4.0	18.5—28.5
12. Extension rod stud bolt		15—20	1.5—2.0	11.0—14.0
13. Extension rod nut		25—40	2.5—4.0	18.5—28.5
14. Gear shift control shaft bolts and nuts		15—20	1.5—2.0	11.0—14.0
15. Speedometer driven gear case bolt		4—7	0.4—0.7	3.0—5.0
16. Transmission to engine bolts and nuts		40—60	4.0—6.0	29.0—43.0
17. Engine rear mounting bracket bolts		40—60	4.0—6.0	29.0—43.0
18. Rear torque stopper bolts		40—60	4.0—6.0	29.0—43.0
19. Engine mounting RH bracket bolts		50—60	5.0—6.0	36.5—43.0
20. Rear torque stopper nut		35—45	3.5—4.5	25.5—32.5
21. Reverse gear shift lever bolts		18—28	1.8—2.8	13.5—20.0
22. Gear shift shaft bolt		10—16	1.0—1.6	7.5—11.5
23. Gear shfit arm bolt	7T Type bolt	18—28	1.8—2.8	13.5—20.0
	9T, 12T Type bolt	32—35	3.2—3.5	23.5—25.0
24. Oil gutter bolt		8—12	0.8—1.2	6.0—8.5
25. Final gear bolts		80—100	8.0—10.0	58.0—72.0
26. Transmission case bolts		15—22	1.5—2.2	11.0—15.5
27. Reverse shaft bolt		18—28	1.8—2.8	13.5—20.0
28. Gear shift fork shaft bolts		10—16	1.0—1.6	7.5—11.5
29. Left case plate screws		8—10	0.8—1.0	6.0—7.0
30. Counter shaft nut		60—80	6.0—8.0	43.5—57.5
31. 5th shift fork plug		8—10	0.8—1.0	6.0—7.0
32. Left cover bolts	M10	8—12	0.8—1.2	6.0—8.5
	M12	18—28	1.8—2.8	13.5—20.0
33. Gear shift case plate bolt		8—12	0.8—1.2	6.0—8.5
34. 5th to REV interlock guide bolt		18—28	1.8—2.8	13.5—20.0
35. Gear shfit yoke bolt	7T Type bolt	18—28	1.8—2.8	13.5—20.0
	9T, 12T Type bolt	32—35	3.2—3.5	23.5—25.0
36. Gear Shift interlock bolt		18—28	1.8—2.8	13.5—20.0
37. Gear shift guide case bolts		8—12	0.8—1.2	6.0—8.5
38. Back up light switch		16—23	1.6—2.3	12.0—16.5
39. Left case cap bolts		8—12	0.8—1.2	6.0—8.5

REQUIRED SERVICE MATERIALS

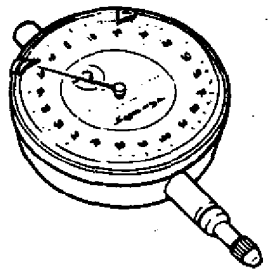
MATERIALS	RECOMMENDED SUZUKI PRODUCTS	USE
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	• Oil seal lips • Gear shift control lever • Gear shift control shaft bushes
Sealant	SUZUKI BOND NO.1215 (99000-31110)	• Oil drain plug • Gear shift shaft bolt • Mating surface of transmission case • Mating surface of side cover • Mating surface of gear shift guide case
Thread lock cement	THREAD LOCK 1322 (99000-32110)	• Control lever knob • Reverse gear shift lever bolts • Reverse shaft bolt • Oil gutter bolt • Left case plate screws • Gear shift case plate bolts • Gear shift yoke bolt • Shift fork plug • Gear shift interlock bolt

70F00-7A-38-1

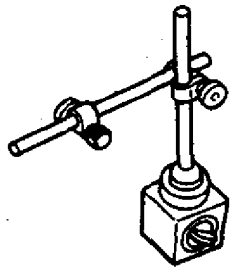
SPECIAL TOOLS



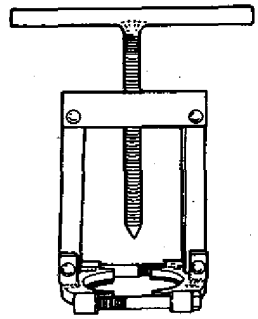
09900-06107
Snap ring pliers
(Opening type)



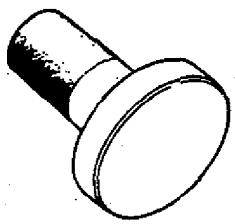
09900-20606
Dial gauge



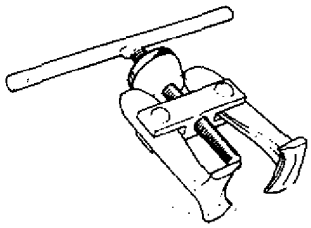
09900-20701
Magnetic stand



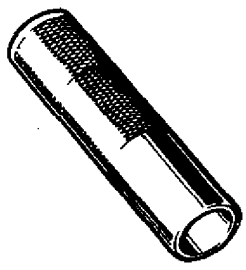
09913-65810
Bearing puller



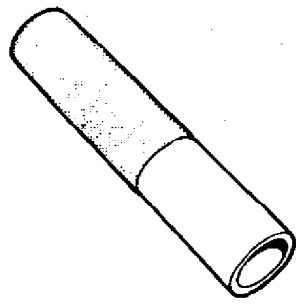
09913-75510
Bearing installer



09913-61510
Bearing puller

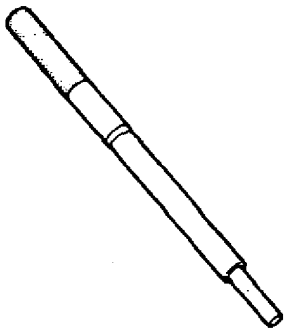
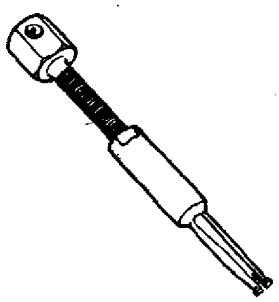
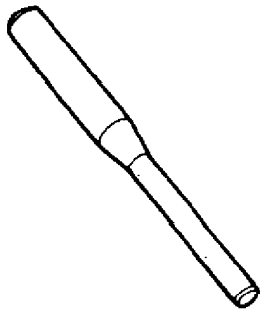
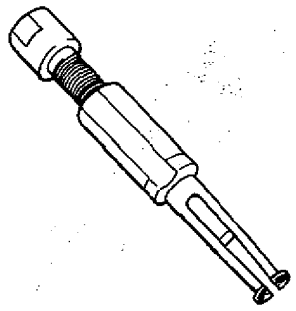
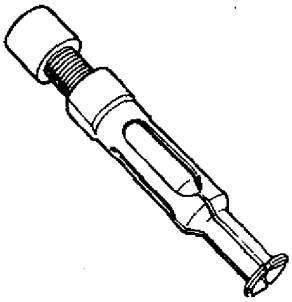
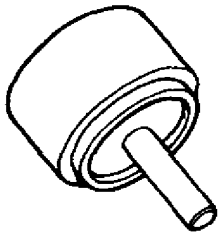
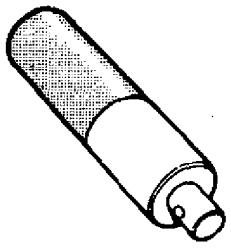
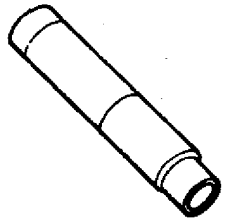
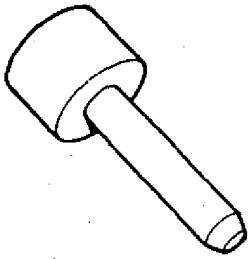
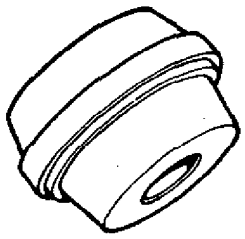
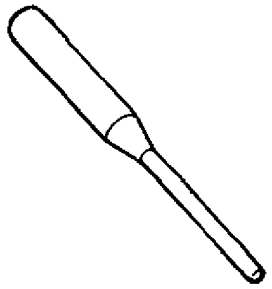
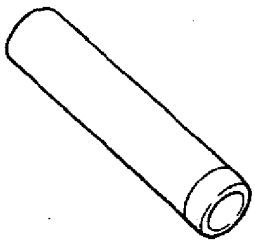
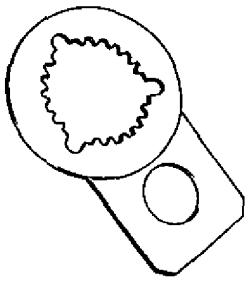
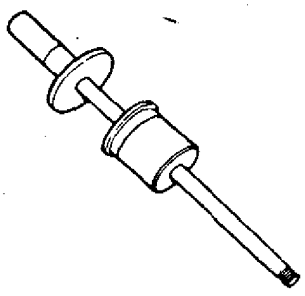
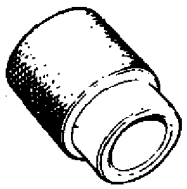


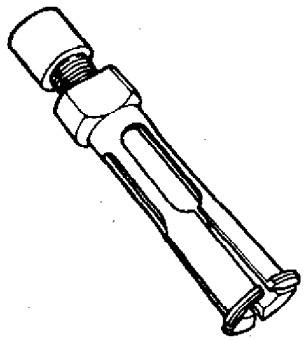
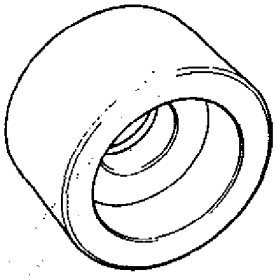
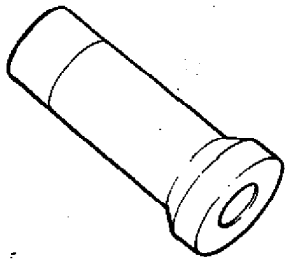
09913-80112
Bearing installer



09913-84510
Bearing installer

70F00-7A-38-2

 09916-46010 Valve guide remover	 09917-58010 Bearing remover	 09922-85811 Spring pin remover 4.5 mm	 09923-73210 Bearing remover
 09923-74510 Bearing remover	 09923-78210 Bearing installer	 09924-74510 Installer attachment	 09925-18010 Bearing installer
 09925-58210 Oil seal installer	 09925-68210 Bearing outer race installer	 09925-78210 Spring pin remover 6 mm	 09925-88210 Bearing puller attachment
 09925-98221 Bearing installer	 09927-76010 Gear holder	 09930-30102 Sliding shaft	 09940-53111 Bearing installer

		
09941-64511 Bearing remover	09951-16060 Bush remover	09951-76010 Bearing installer

70F00-7A-40-1

SECTION 7C

CLUTCH

CONTENTS

70F00-7C-1-1

GENERAL DESCRIPTION

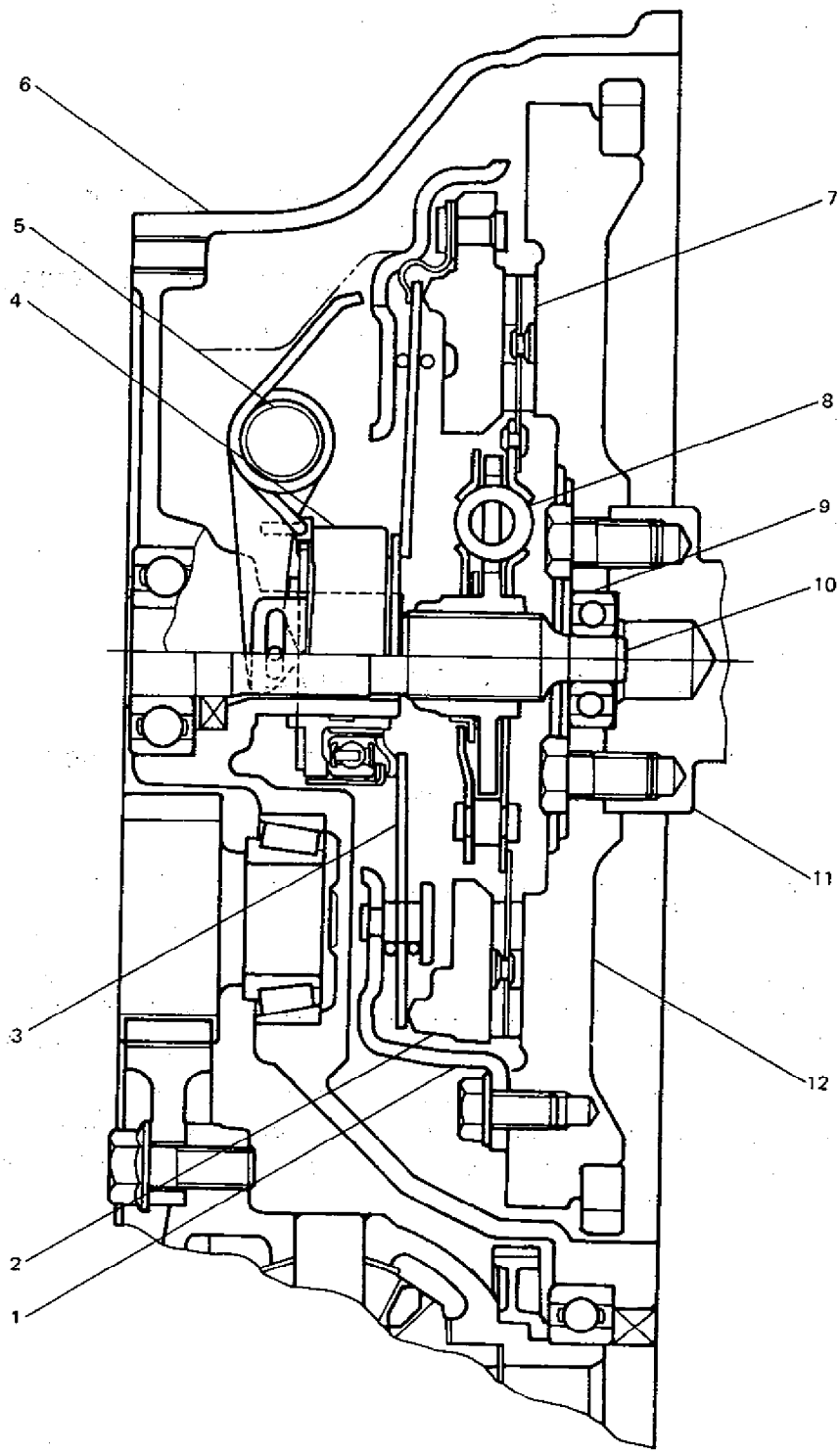
The clutch is a diaphragm-spring clutch of a dry single disc type. The diaphragm spring is of a tapering-finger type, which is a solid ring in the outer diameter part, with a series of tapered fingers pointing inward.

The disc, carrying four torsional coil springs, is positioned on the transmission input shaft with an involute spline fit.

The clutch cover is secured to the flywheel, and carries the diaphragm spring in such a way that the peripheral edge of the spring pushes on the pressure plate against the flywheel (with the disc in between), when the clutch release bearing is held back. This is the engaged condition of the clutch.

Depressing the clutch pedal causes the release bearing to advance and pushes on the tips of the tapered fingers of the diaphragm spring. When this happens, the diaphragm spring pulls the pressure plate away from the flywheel, thereby interrupting the flow of drive from flywheel through clutch disc to transmission input shaft.

70F00-7C-1-2



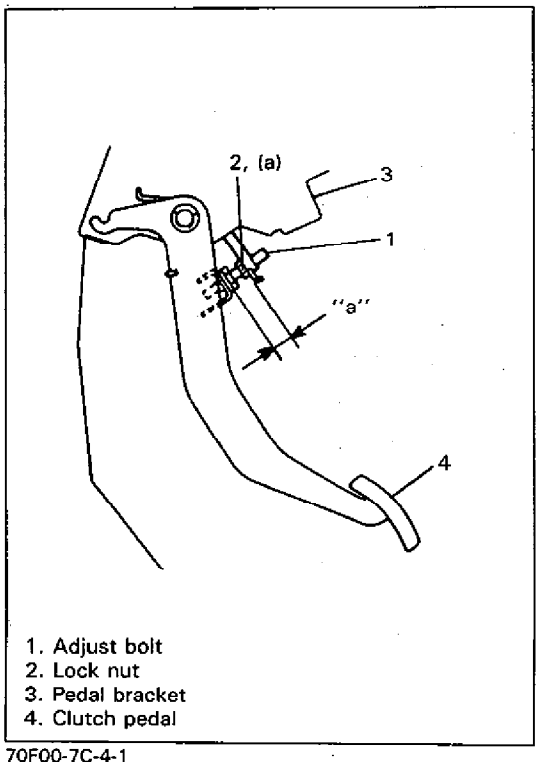
1. Clutch cover
2. Pressure plate
3. Diaphragm spring
4. Release bearing
5. Release shaft
6. Transmission right case
7. Clutch disc
8. Torsional spring
9. Input shaft bearing
10. Input shaft
11. Crankshaft
12. Flywheel

70F00-7C-2-1

DIAGNOSIS

Condition	Possible cause	Correction
Slipping	• Improper clutch pedal free travel.	Adjust free travel.
	• Worn or oily clutch disc facing.	Replace disc.
	• Warped disc, pressure plate or flywheel surface.	Replace disc, clutch cover or flywheel.
	• Weakened diaphragm spring.	Replace clutch cover.
	• Rusted clutch cable.	Replace cable.
Dragging clutch	• Improper clutch pedal free travel.	Adjust free travel.
	• Weakened diaphragm spring, or worn spring tip.	Replace clutch cover.
	• Rusted input shaft splines.	Lubricate.
	• Damaged or worn splines of transmission input shaft.	Replace input shaft.
	• Excessively wobbly clutch disc.	Replace disc.
	• Clutch facings broken or dirty with oil.	Replace disc.
Clutch vibration	• Glazed (glass-like) clutch facings.	Repair or replace disc.
	• Clutch facings dirty with oil.	Replace disc.
	• Release bearing slides unsmoothly on bearing retainer of transmission case.	Lubricate.
	• Wobbly clutch disc, or poor facing contact.	Replace disc.
	• Weakened torsion springs in clutch disc.	Replace disc.
	• Clutch disc rivets loose.	Replace disc.
	• Distorted pressure plate or flywheel surface.	Replace clutch cover or flywheel.
	• Weakened engine mounting or loose mounting bolt or nut.	Retighten or replace mounting.
Noisy clutch	• Worn or broken release bearing.	Replace release bearing.
	• Input shaft front bearing worn down.	Replace input shaft bearing.
	• Excessive rattle of clutch disc hub.	Replace disc.
	• Cracked clutch disc.	Replace disc.
	• Pressure plate and diaphragm spring are rattling.	Replace clutch cover.
Grabbing clutch	• Clutch disc facings soaked with oil.	Replace disc.
	• Excessively worn clutch disc facings.	Replace disc.
	• Rivet heads showing out of facing.	Replace disc.
	• Weakened torsion springs.	Replace disc.

70F00-7C-3-1



1. Adjust bolt
2. Lock nut
3. Pedal bracket
4. Clutch pedal

70F00-7C-4-1

ON-VEHICLE SERVICE

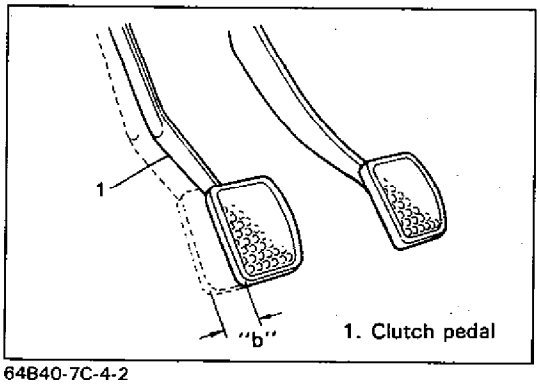
MAINTENANCE SERVICE

CLUTCH PEDAL HEIGHT

Adjust clutch pedal height with adjust bolt located on pedal bracket to specification below.

Adjust bolt height "a": 16—17 mm (0.63—0.66 in.)

Tightening Torque
(a): 4—7 N·m (0.4—0.7 kg-m, 3.0—5.0 lb-ft)



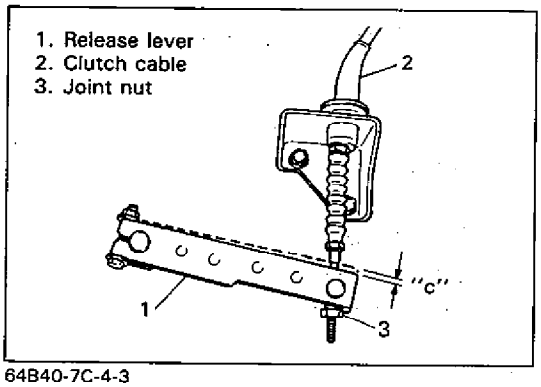
1. Clutch pedal

64B40-7C-4-2

CLUTCH PEDAL FREE TRAVEL

1. Depress clutch pedal, stop the moment clutch resistance is felt, and measure distance (clutch pedal free travel). Free travel should be within following specification.

   Pedal free travel "b": 15—20 mm (0.6—0.8 in.)



1. Release lever
2. Clutch cable
3. Joint nut

64B40-7C-4-3

2. If free travel is out of specification, adjust it with cable joint nut.

   Release lever free travel "c": 2—4 mm (0.08—0.15 in.)

3. After checking clutch pedal free travel, also check clutch for proper function with engine running.

CLUTCH CABLE

REMOVAL

1. Remove clutch cable joint nut and disconnect joint pin from inner cable.
2. Remove 2 bolts at dash panel, unhook cable end from pedal top and then take out cable.

70F00-7C-5-1

INSPECTION

Inspect clutch cable and replace it if any of following conditions exists.

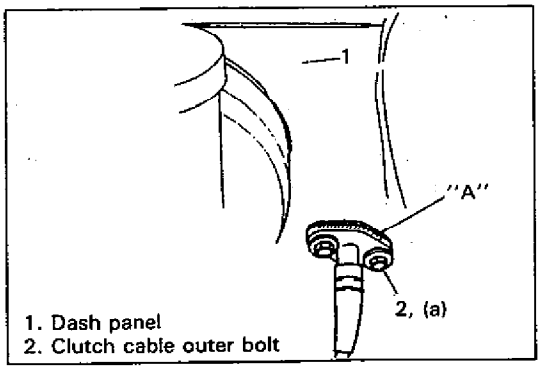
- Excessive cable friction.
- Frayed cable.
- Bent or kinked cable.
- Broken boots.
- Worn end.

64B40-7C-5-5

INSTALLATION

1. Apply grease to cable end hook and also joint pin before installing cable.

70F00-7C-5-3



1. Dash panel
2. Clutch cable outer bolt

70F00-7C-5-4

2. Fasten cable with 2 bolts to dash panel and apply water tight sealant as shown in figure.

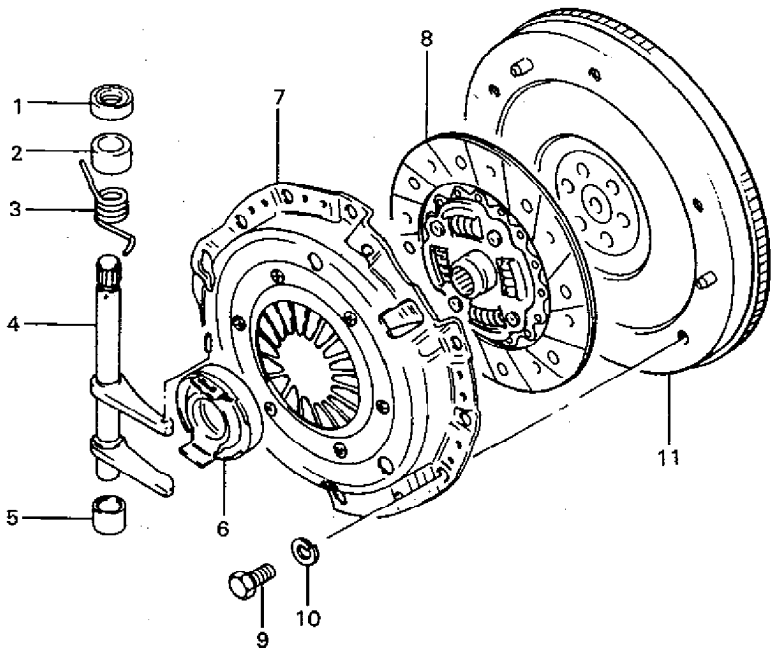
   "A": Sealant 99000-31090

   Tightening Torque
   (a): 9—13 N·m (0.9—1.3 kg-m, 7.0—9.0 lb-ft)

3. Hook cable end with pedal by hand or long nose pliers from cabin inside, then join inner cable with joint pin in release arm.
4. Screw in joint nut and adjust free travel of pedal to specification by turning nut.
5. Check clutch for proper function with engine running.

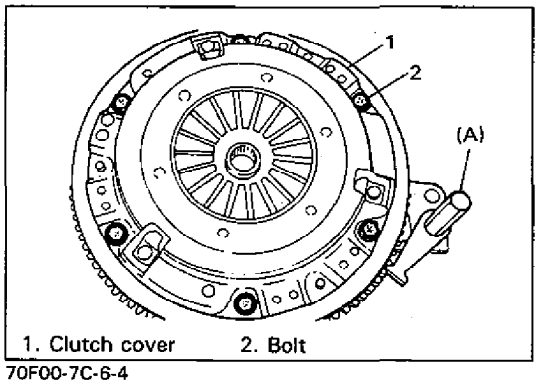
UNIT REPAIR OVERHAUL

CLUTCH COVER, CLUTCH DISC AND FLYWHEEL



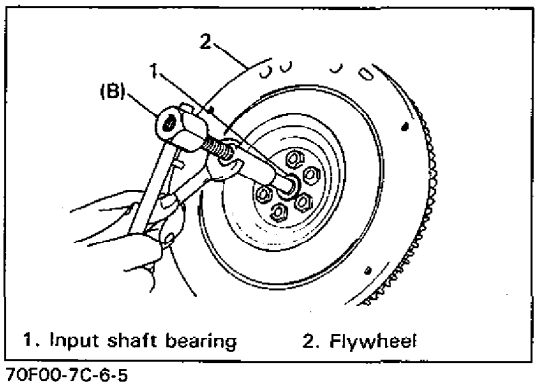
1. Release shaft seal
2. No.2 bush
3. Return spring
4. Release shaft
5. No.1 bush
6. Release bearing
7. Clutch cover
8. Clutch disc
9. Clutch cover bolt
10. Lock washer
11. Flywheel

70F00-7C-6-1



1. Clutch cover 2. Bolt

70F00-7C-6-4



1. Input shaft bearing 2. Flywheel

70F00-7C-6-5

DISMOUNTING AND REMOUNTING OF TRANSMISSION

Refer to SECTION 7A.

REMOVAL

1. Hold flywheel stationary with special tool and remove clutch cover bolts, clutch cover and clutch disc.

   Special Tool
   (A): 09924-17810

2. Pull out input shaft bearing by using special tool and wrench.

   Special Tool
   (B): 09917-58010

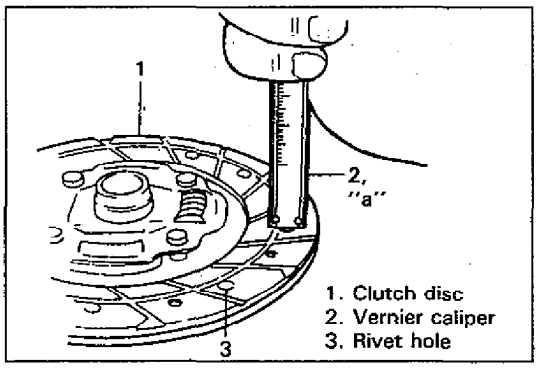
3. Remove flywheel.

INSPECTION

Input Shaft Bearing

Check bearing for smooth rotation and replace it if abnormality is found.

64B40-7C-8-1



70F00-7C-7-2

Clutch Disc

Measure depth of rivet head depression, i.e. distance between rivet head and facing surface.
If depression is found to have reached service limit at any of holes, replace disc assembly.

Rivet head depth "a": Standard 1.2 mm (0.05 in.)
Service limit 0.5 mm (0.02 in.)

Clutch Cover

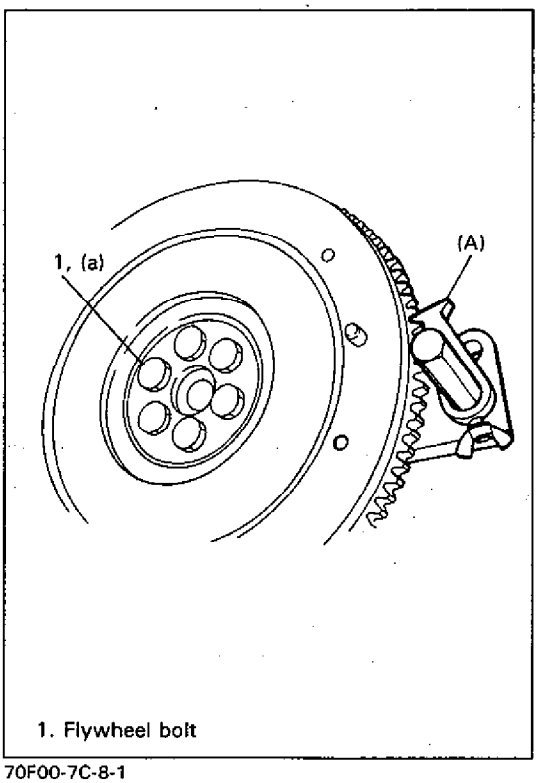
1. Check diaphragm spring for abnormal wear or damage.
2. Inspect pressure plate for wear or heat spots.
3. If abnormality is found, replace it as assembly.
   Do not disassemble it into diaphragm and pressure plate.

64B40-7C-8-3

Flywheel

Check surface contacting clutch disc for abnormal wear or heat spots. Replace or repair as required.

64B40-7C-8-4



1. Flywheel bolt

70F00-7C-8-1

INSTALLATION

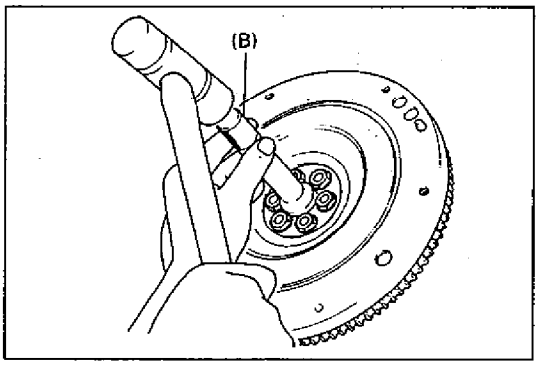
NOTE:

Before assembling, make sure that flywheel surface and pressure plate surface have been cleaned and dried thoroughly.

1. Install flywheel to crankshaft and tighten bolts to specification.

Special Tool
(A): 09924-17810

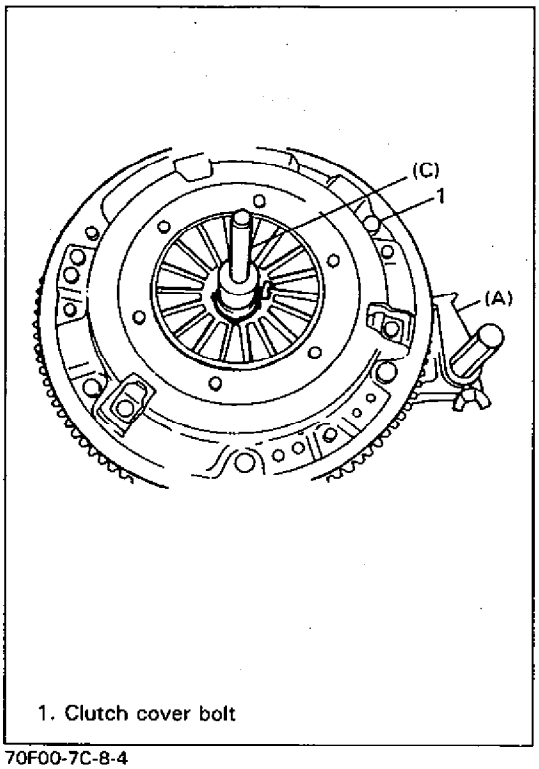
Tightening Torque
(a): 68—72 N·m (6.8—7.2 kg-m, 49.5—52.0 lb-ft)



70F00-7C-8-3

2. Using special tool, install input shaft bearing to flywheel.

Special Tool
(B): 09925-98210



1. Clutch cover bolt

70F00-7C-8-4

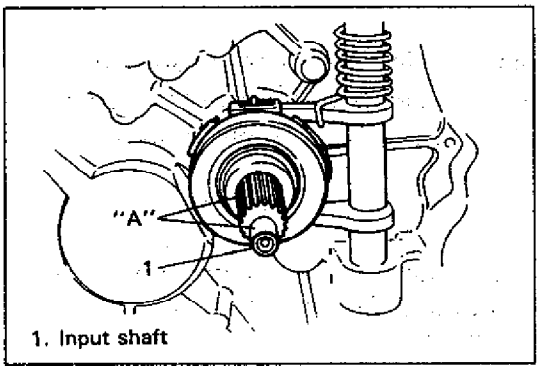
3. Aligning clutch disc with flywheel center by using special tool, install clutch cover and bolts.
Then tighten bolts to specification.

NOTE:

- **While tightening clutch cover bolts, compress clutch disc with special tool (clutch center guide) by hand so that disc is centered.**
- **Tighten cover bolts little by little evenly in diagonal order.**

Special Tool
(A): 09924-17810
(C): 09923-36330

Tightening Torque
(b): 18—28 N·m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)



1. Input shaft

70F00-7C-9-1

4. Slightly apply grease to input shaft, then join transmission assembly with engine. Refer to SECTION 7A for remounting procedure.

"A": SUZUKI SUPER GREASE I, 99000-25210

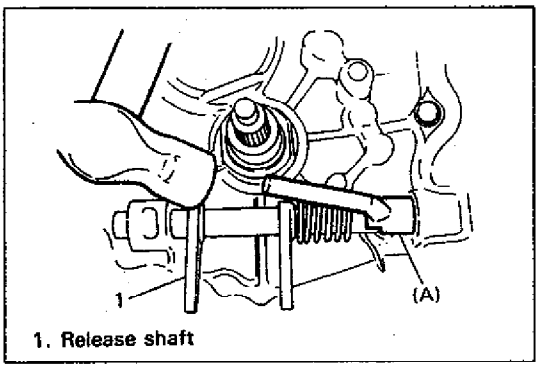
NOTE:
Turn crankshaft a little through flywheel gear while inserting transmission input shaft to clutch disc until splines mesh.

CLUTCH RELEASE SYSTEM

REMOVAL

1. Remove release arm by loosening its bolt.
2. Take out release bearing by turning release shaft.
3. Unhook return spring by using pliers.

70F00-7C-9-2



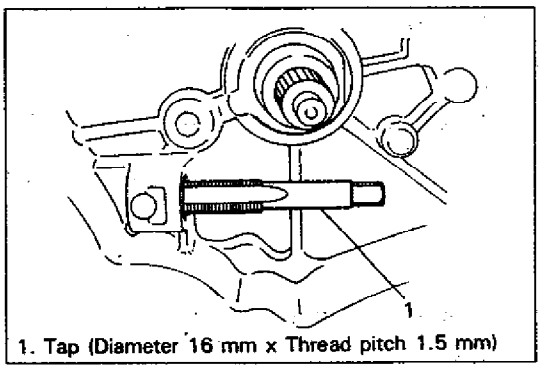
1. Release shaft

64B40-7C-10-3

4. Drive out No.2 bush by using special tool and hammer Release shaft seal will also be pushed out.

Special Tool
(A): 09922-46010

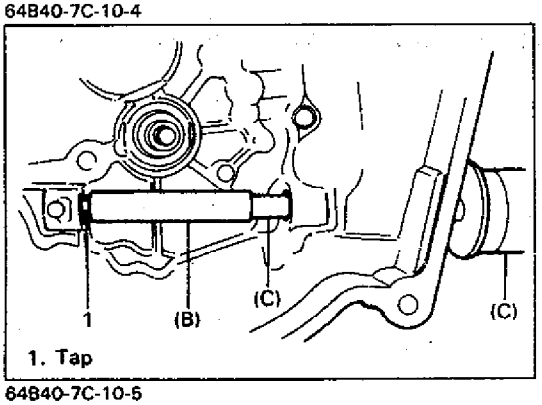
5. Remove release shaft.



1. Tap (Diameter 16 mm x Thread pitch 1.5 mm)

64B40-7C-10-4

6. For removal of No.1 bush, tap it by using M16 x 1.5 tap.



1. Tap

64B40-7C-10-5

7. Leaving tap in No.1 bush, screw in joint pipe over tap, join sliding shaft with joint pipe, and then drive out bush.

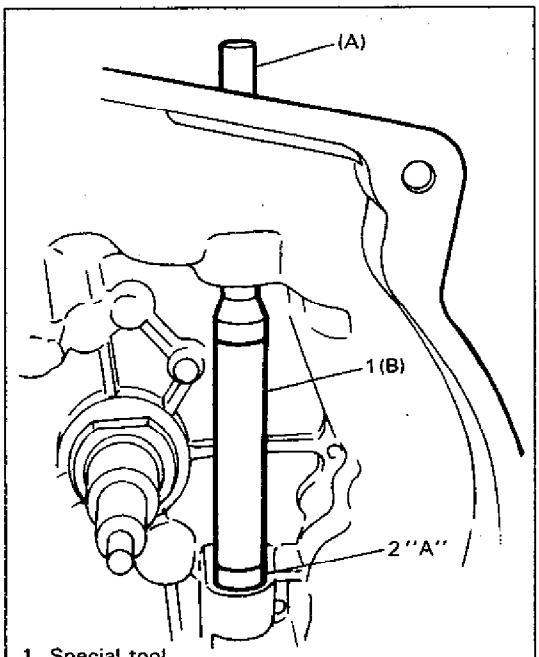
Special Tool
(B): 09923-46020
(C): 09930-30102

INSPECTION

1. Check clutch release bearing for smooth rotation.
2. Inspect smoothness of release bearing retaining portion of transmission case and correct or replace right case as necessary.

CAUTION:
Do not wash release bearing. Washing may cause grease leakage and consequential bearing damage.

64B40-7C-11-1



1. Special tool (Joint pipe 09923-46020) or the like
2. No.1 bush

INSTALLATION

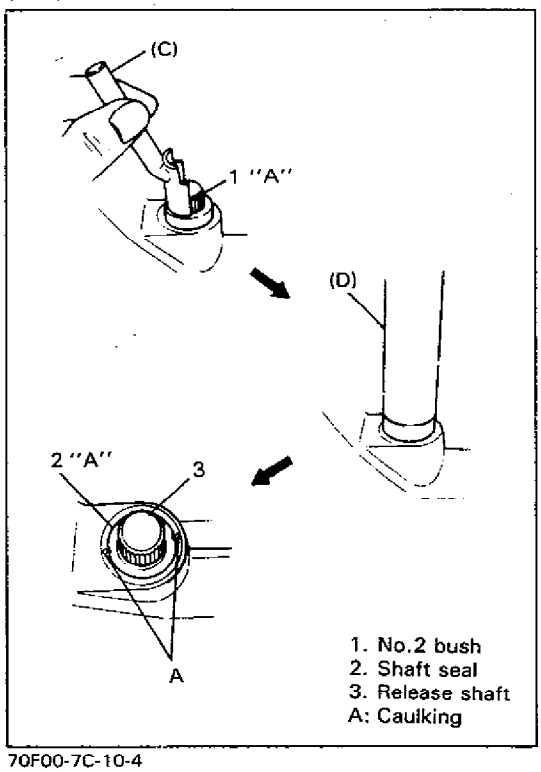
1. Drive in a new No.1 bush by using adequate drive handle and hammer and then apply grease to bush inside.

Special Tool
(A): 09943-88211
(B): 09923-46020

"A": SUZUKI SUPER GREASE A, 99000-25010

2. Install release shaft with return spring applied to it.

64B40-7C-11-2



1. No.2 bush
2. Shaft seal
3. Release shaft
A: Caulking

3. Apply grease to No.2 bush inside and press-fit it by using the same special tool as in removal.

"A": SUZUKI SUPER GREASE A 99000-25010

Special Tool
(C): 09922-46010

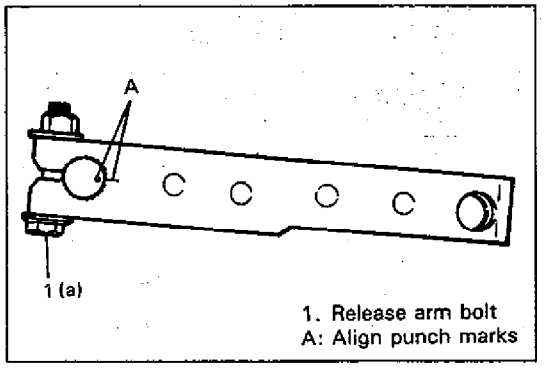
4. Coat grease to shaft seal and then install it till it is flush with case surface. Use special tool for this installation and face seal lip downward (inside).

"A": SUZUKI SUPER GREASE A 99000-25010

Special Tool
(D): 09925-98221

5. Caulk seal at A by using caulking tool and hammer.

70F00-7C-10-4

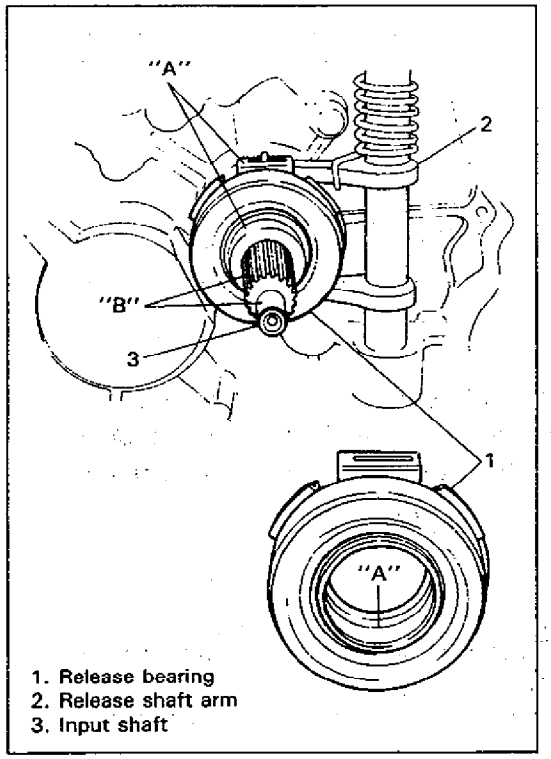


1. Release arm bolt
A: Align punch marks

70F00-7C-11-1

6. Set release arm to release shaft aligning their punch marks, then tighten bolt.

Tightening Toroque
(a): 10—16 N·m (1.0—1.6 kg-m, 7.5—11.5 lb-ft)



1. Release bearing
2. Release shaft arm
3. Input shaft

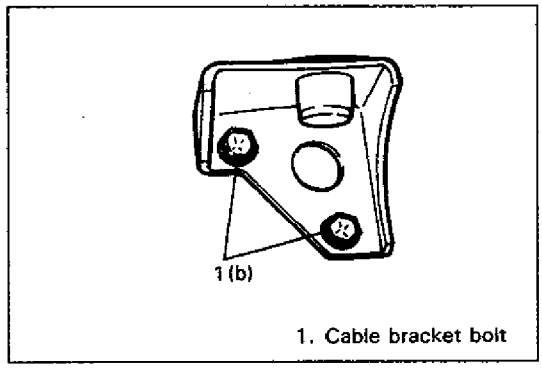
70F00-7C-11-2

7. Hook return spring.
8. Apply grease to release bearing inside and release shaft arm, then set bearing.

"A": SUZUKI SUPER GREASE A, 99000-25010

9. Apply small amount of grease to input shaft spline and front end as well.

"B": SUZUKI SUPER GREASE I, 99000-25210



1. Cable bracket bolt

70F00-7C-11-4

10. If clutch cable bracket has been removed or replaced, install it with 2 bolts.

Tightening Torque
(b): 18—28 N·m (1.8—2.8 kg-m, 13.5—20.0 lb-ft)

RECOMMENDED TORQUE SPECIFICATIONS

Fastening portion	Tightening Torque		
	N·m	kg-m	lb-ft
1. Clutch pedal position switch lock nut	10—15	1.0—1.5	7.5—10.5
2. Clutch cable outer bolts	9—13	0.9—1.3	7.0—9.0
3. Flywheel bolts	68—72	6.8—7.2	49.5—52.0
4. Clutch cover bolts	18—28	1.8—2.8	13.5—20.0
5. Release arm bolt	10—16	1.0—1.6	7.5—11.5
6. Cable bracket bolts	18—28	1.8—2.8	13.5—20.0

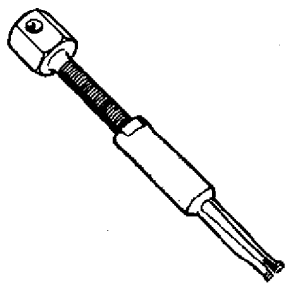
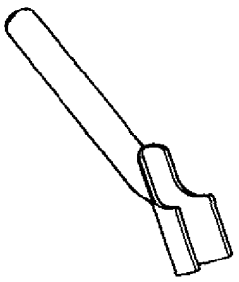
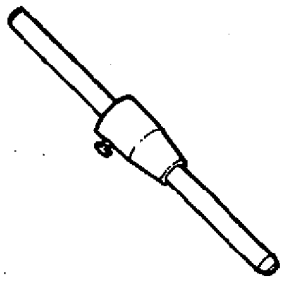
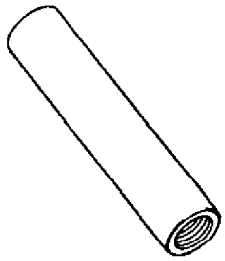
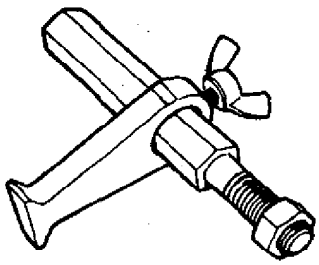
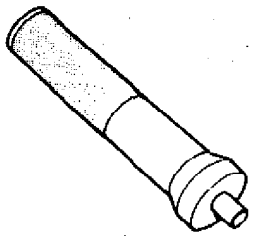
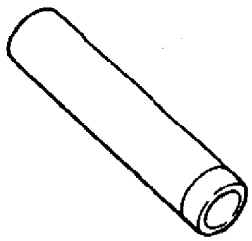
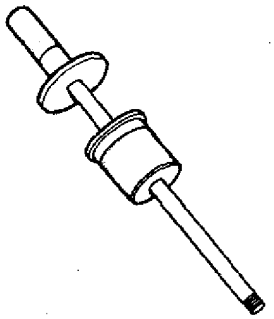
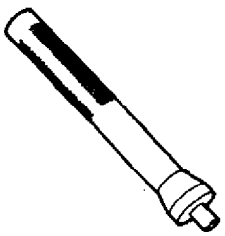
70F00-7C-12-1

REQUIRED SERVICE MATERIALS

MATERIALS	RECOMMENDED SUZUKI PRODUCT	USE
Lithium grease	SUZUKI SUPER GREASE A (99000-25010)	• Cable end hook and joint pin. • Release shaft bushes and seal. • Release bearing inside and release shaft arm.
	SUZUKI SUPER GREASE I (99000-25210)	Input shaft spline and front end.
Water tight sealant	SUZUKI SEALING COMPOUND 366E (99000-31090)	Clutch cable fastening portion with dash panel.

64B40-7C-13-2

SPECIAL TOOLS

 09917-58010 Bearing remover	 09922-46010 Bush remover	 09923-36330 Clutch center guide	 09923-46020 Joint pipe
 09924-17810 Flywheel holder	 09925-98210 Input shaft bearing installer	 09925-98221 Bearing installer	 09930-30102 Sliding shaft
 09943-88211 Bearing installer			

64B40-7C-14-1

SECTION 8

BODY ELECTRICAL SYSTEM

CONTENTS

70F00-8-1-1

GENERAL DESCRIPTION

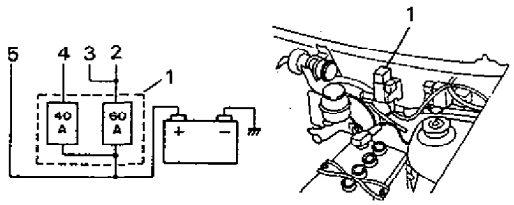
The body electrical components of this vehicle are designed to operate on 12 volts power supplied by the battery. The electrical system utilizes negative grounded polarity.

WIRING

All body low voltage wires are insulated. The insulation is color coded for identification of individual body circuit.

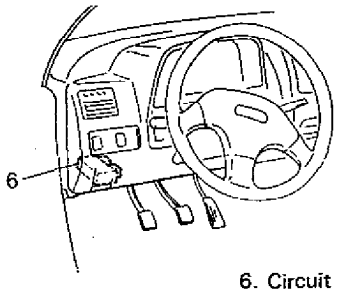
70F00-8-1-2

MAIN FUSE BOX (if equipped)



1. Main fuse box (if equipped)
2. To generator
3. To ignition switch & circuit fuses
4. To circuit fuses
5. To starting motor

CIRCUIT FUSE BOX



6. Circuit fuse box

70F00-8-2-1

BODY ELECTRICAL SYSTEM

FUSES

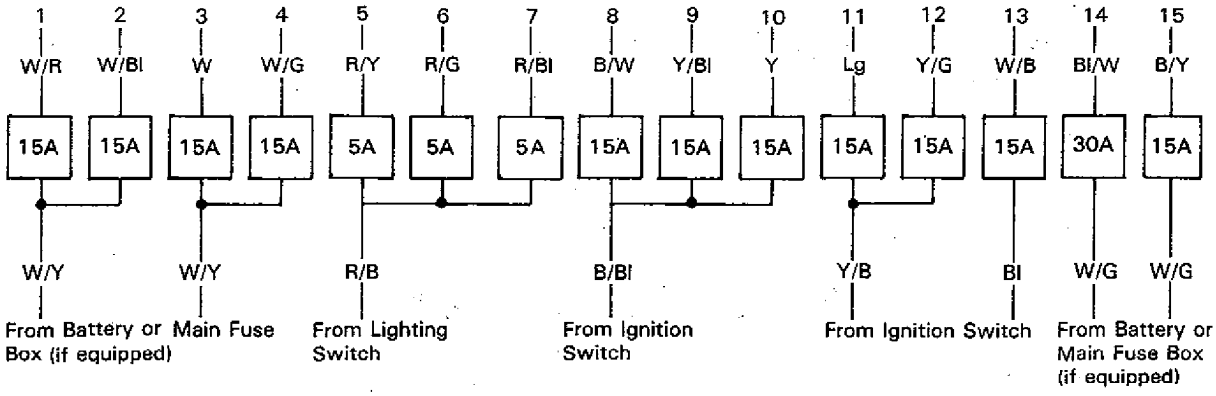
The main fuse box, if equipped, is located on the dash panel in the engine room and the circuit fuse box is installed to underside of the instrument panel. The data and arrangement of each fuse are as shown below.

CAUTION:
- **When replacing a fuse, be sure to use one having a correct rated amperage.**
- **Before replacing a fuse, turn OFF every switch of electric equipment including main switch.**

CIRCUIT FUSE BOX DESIGNATION (USE THE DESIGNATED FUSES ONLY)

1	2	3	4	5	6	7
15A	15A	15A STOP DOME	15A HAZARD HORN	5A LICENCE	5A	5A
HEAD R—L					TAIL R—L	
8	9	10	11	12	13	14
15A IG. COIL METER	15A WIPER WASHER	15A TURN BACK	15A HEATER	15A REAR DEFG.	15A CIGAR RADIO	30A RDTR FAN
15A						
FI						

1. Headlight (RH)
2. Headlight (LH)
3. Stop light, Interior (Dome) light
4. Hazard, Horn
5. Licence light
6. Clearance light, Tail light (RH)
7. Clearance light, Tail light (LH)
8. Ignition coil, Combination meter, Distributor, etc.
9. Wiper, Washer
10. Turn signal light, Back-up light
11. Heater blower motor
12. Rear defogger (if equipped)
13. Cigar lighter, Radio (if equipped)
14. Radiator fan motor
15. Electronic fuel injection main relay (Fuel injection model)

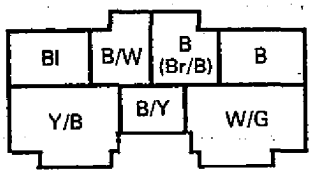


WIRING HARNESS COLOR

W/R : White/Red	W/Bl : White/Blue	W : White
W/G : White/Green	R/Y : Red/Yellow	R/G : Red/Green
R/B : Red/Black	B/W : Black/White	Y/Bl : Yellow/Blue
Y : Yellow	Lg : Light green	Bl : Blue
Bl/W : Blue/White	B/Y : Black/Yellow	W/Y : White/Yellow
R/B : Red/Black	B/Bl : Black/Blue	Y/B : Yellow/Black

70F00-8-2-3

Bl : Blue
B/Bl : Black/Blue
Br/B : Brown/Black
B : Black
Y/B : Yellow/Black
B/Y : Black/Yellow
W/G : White/Green



Ignition switch connector
(Viewed from terminal side)

70F00-8-3-1

SWITCHES

IGNITION (Main) SWITCH

Inspection

1) Disconnect battery (—) cable.
2) Disconnect main switch lead wire connector from circuit fuse.
3) Check the continuity at each switch position. If any continuity is not obtained, replace main switch.

Position \ Wire color	W/G	Bl	B/W	Y/B	B/Y	B (Br/B)	B
LOCK							
ACC	○	○					
ON	○	○	○	○			
START	○		○		○	○	○

ACC: Accessory

Removal

Remove steering column referring to Section 3C of this manual. And then remove steering lock/main switch from steering column, referring to Section 3C.

64B40-8-4-4

Installation

Install steering lock/main switch and steering column referring to Section 3C of this manual.

NOTE:
When installing steering column, special care must be used for tightening sequence and each torque.

64B40-8-4-5

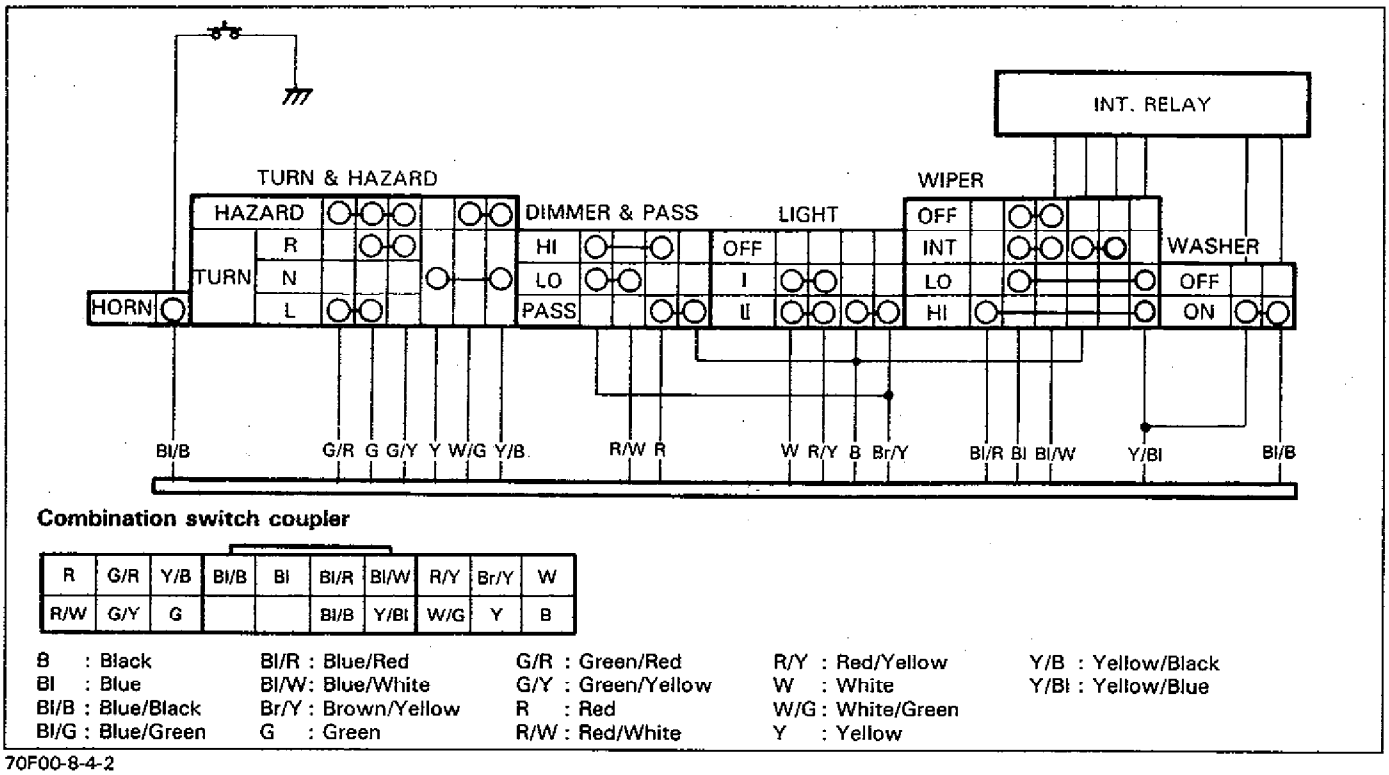
COMBINATION SWITCH

Combination switch incorporates lighting, turn signal, hazard warning light, dimmer, passing light and wipe/washer switches.

Inspection

1) Disconnect battery (—) cable.
2) Disconnect combination switch lead wire connectors from circuit fuse.
3) Use a circuit tester to check continuity at each switch position. If any continuity is not obtained, replace combination switch.

70F00-8-4-1



Combination switch coupler

R	G/R	Y/B	Bl/B	Bl	Bl/R	Bl/W	R/Y	Br/Y	W
R/W	G/Y	G			Bl/B	Y/Bl	W/G	Y	B

B : Black	Bl/R : Blue/Red	G/R : Green/Red	R/Y : Red/Yellow	Y/B : Yellow/Black
Bl : Blue	Bl/W: Blue/White	G/Y : Green/Yellow	W : White	Y/Bl : Yellow/Blue
Bl/B : Blue/Black	Br/Y : Brown/Yellow	R : Red	W/G : White/Green	
Bl/G : Blue/Green	G : Green	R/W : Red/White	Y : Yellow	

70F00-8-4-2

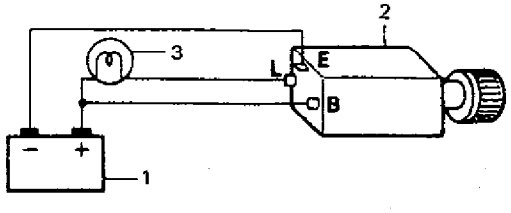
Removal/Installation

For removal/installation of combination switch, refer to Section 3C of this manual.

NOTE:

Some vehicles are not provided with INTERMITTENT position depending on specification.

70F00-8-4-4



1. Battery
2. Illumination controller
3. Test light (12V, 3.4W)

64B40-8-5-5

ILLUMINATION CONTROLLER (If equipped)

Some cars are not provided with this device depending on specifications.

Inspection

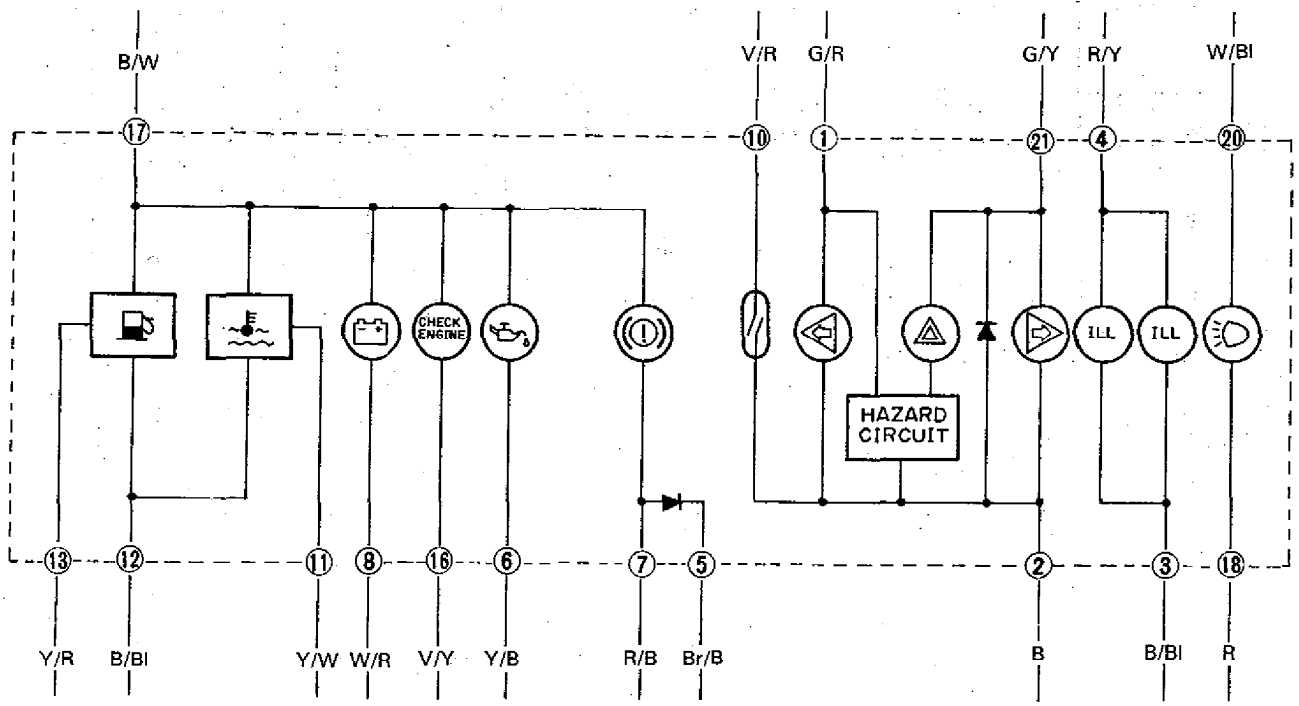
Use a bulb to wire as illustrated.

Make sure that illumination controller knob is turned clockwise to brighten test light and counterclockwise to darken it.

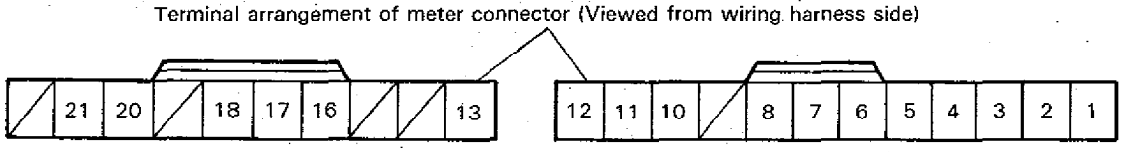
INSTRUMENTS AND GAUGES

COMBINATION METER WIRING

For Australian spec. vehicle



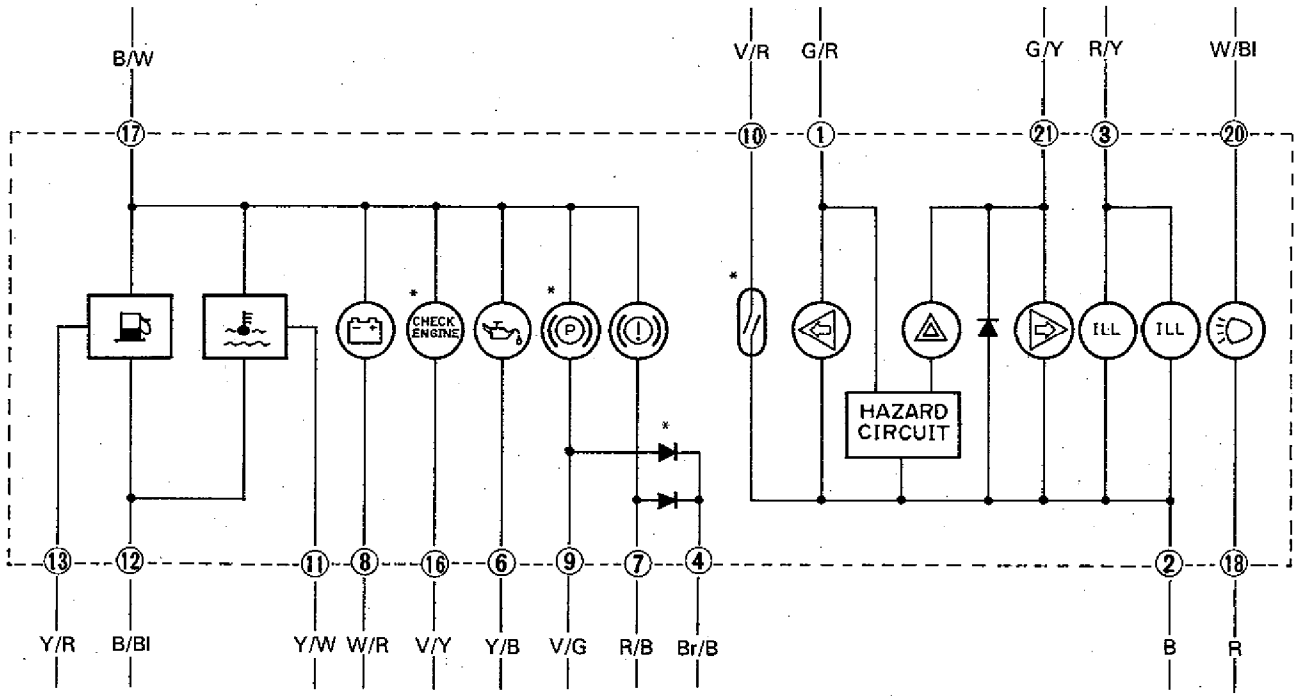
Terminal arrangement of meter connector (Viewed from wiring harness side)



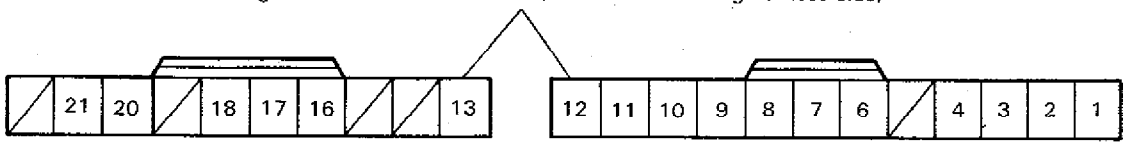
1. To turn signal switch (LH)
2. To ground
3. To illumination controller ⊖
4. To illumination controller ⊕
5. To ignition switch
6. To oil pressure switch
7. To brake fluid level switch (and parking brake switch)
8. To generator
9. Blank
10. To ECM
11. To coolant (water) temp. gauge
12. To ground
13. To fuel level gauge
14. Blank
15. Blank
16. To ECM
17. To ignition switch
18. To dimmer & passing switch
19. Blank
20. To circuit fuse
21. To turn signal switch (RH)
22. Blank

B : Black
R : Red
B/Bl : Black/Blue
B/W : Black/White
Br/B : Brown/Black
G/R : Green/Red
G/Y : Green/Yellow
R/B : Red/Black
R/Y : Red/Green
V/G : Violet/Green
V/R : Violet/Red
V/Y : Violet/Yellow
W/Bl: White/Blue
W/R : White/Red
Y/B : Yellow/Black
Y/R : Yellow/Red
Y/W : Yellow/White

For other vehicle



Terminal arrangement of meter connector (Viewed from wiring harness side)



1. To turn signal switch (LH)
2. To ground
3. To lighting switch
4. To ignition switch
5. Blank
6. To oil pressure switch
7. To brake fluid level switch (and parking brake switch)
8. To generator
9. To parking brake switch
10. To ECM (Fuel injection model)
11. To coolant (water) temp. gauge
12. To ground
13. To fuel level gauge
14. Blank
15. Blank
16. To ECM (Fuel injection model)
17. To ignition switch
18. To dimmer & passing switch
19. Blank
20. To circuit fuse
21. To turn signal switch (RH)
22. Blank

NOTE:

The parts with * are provided or not depending on vehicle specifications.

B : Black	V/G : Violet/Green
R : Red	V/R : Violet/Red
B/Bl : Black/Blue	V/Y : Violet/Yellow
B/W : Black/White	W/Bl: White/Blue
Br/B : Brown/Black	W/R : White/Red
G/R : Green/Red	Y/B : Yellow/Black
G/Y : Green/Yellow	Y/R : Yellow/Red
R/B : Red/Black	Y/W : Yellow/White
R/Y : Red/Green	

TROUBLE DIAGNOSIS

Trouble	Possible cause	Correction
Fuel level meter shows no operation.	Meter fuse blown	Replace fuse to check for short.
	Fuel meter faulty	Check meter.
	Fuel level gauge unit faulty	Check gauge unit.
	Wiring or grounding faulty	Repair.
Coolant (Water) temp. meter shows no operation.	Meter fuse blown	Replace fuse to check for short.
	Coolant (Water) temp. meter faulty	Check meter.
	Coolant (Water) temp. gauge unit faulty	Check gauge unit.
	Wiring or grounding faulty	Repair.
Oil pressure light shows no lighting.	Light fuse blown	Replace fuse to check for short.
	Bulb burnt out	Replace bulb.
	Oil pressure switch faulty	Check switch.
	Wiring or grounding faulty	Repair.
Brake warning light (parking brake light) shows no lighting.	Light fuse blown	Replace fuse to check for short.
	Bulb burnt out	Replace bulb.
	Brake fluid level switch faulty	Check warning switch.
	Wiring or grounding faulty	Repair.

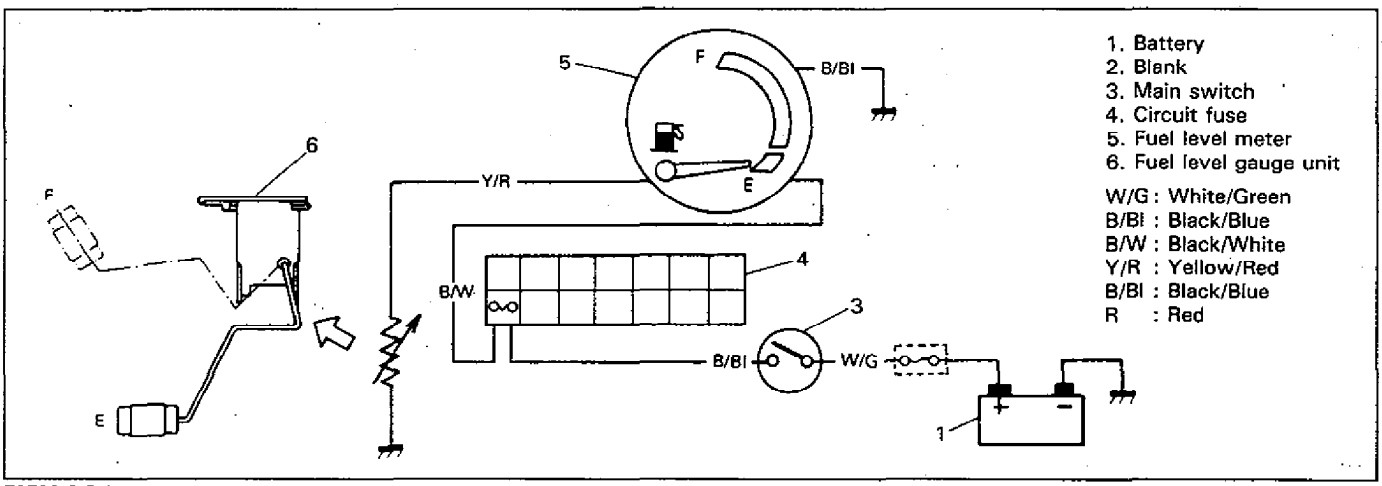
70F00-8-7-1

FUEL LEVEL METER AND GAUGE UNIT

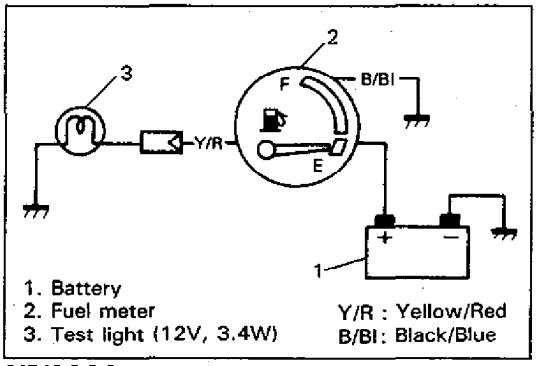
DESCRIPTION OF CIRCUIT

The fuel level meter circuit consists of the fuel level meter installed inside the combination meter and the fuel level gauge installed to the fuel tank.

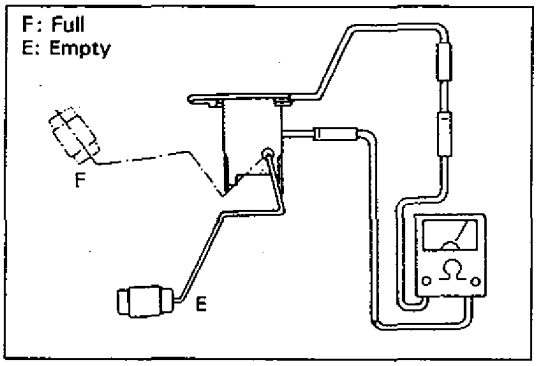
Current flowing through the meter coil is changed to control the meter pointer. That is, when fuel is full, the fuel level gauge unit resistance is decreased with more current flowing into the meter coil, causing the meter pointer to point at the "F" position.



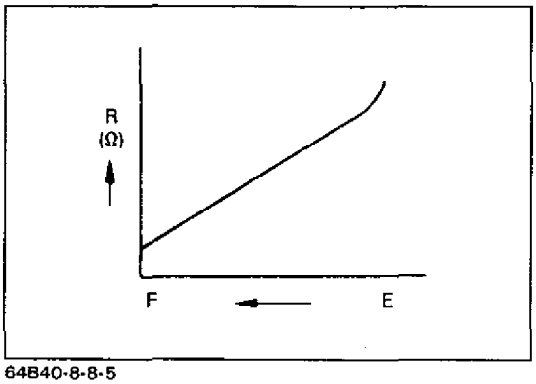
70F00-8-8-1



64B40-8-8-3



64B40-8-8-4



64B40-8-8-5

INSPECTION

FUEL LEVEL METER

1) Remove rear seat.
2) Disconnect Y/R (Yellow/Red) lead wire going to gauge unit.
3) Use a bulb (12V 3.4W) in position to ground lead wire as illustrated.
4) Turn ignition switch ON.
   Make sure that bulb is lighted with meter pointer fluctuating several seconds thereafter. If meter is faulty, replace.

GAUGE UNIT

Use an ohmmeter to confirm that resistance of level gauge unit changes with change of float position.

Position	Resistance
E	120±8 Ω
F	3±2 Ω
1/2	32.5±4 Ω

Float position-to-resistance relationship can be plotted in a graph as shown left.

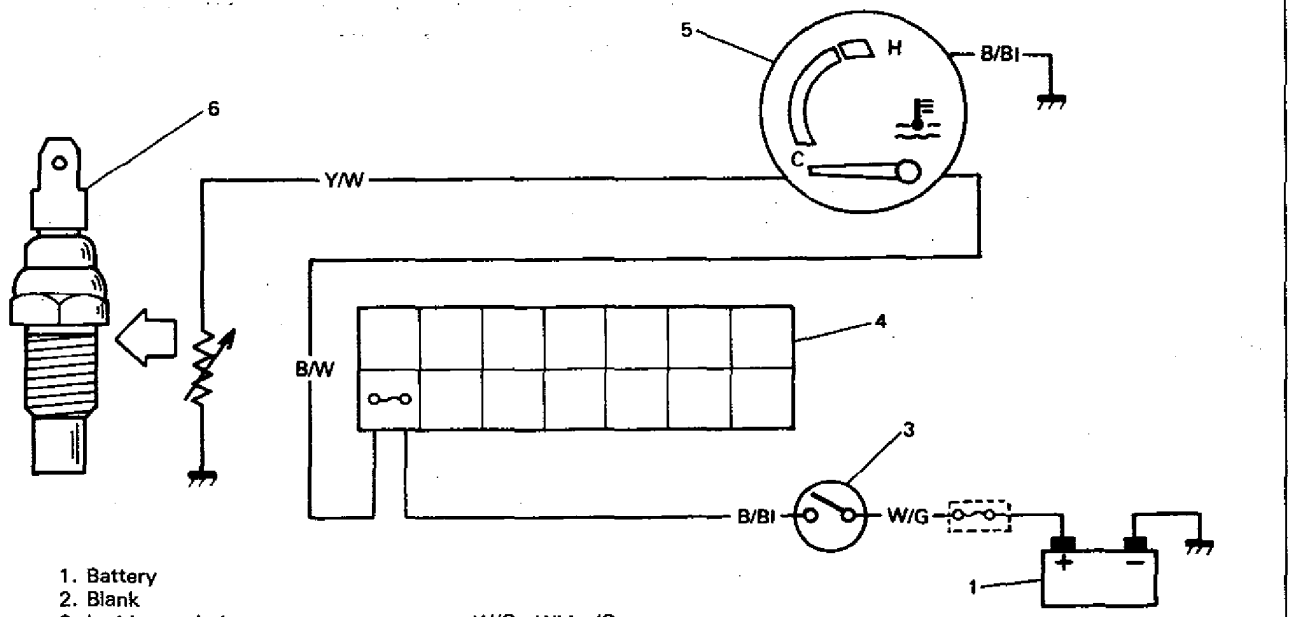
COOLANT (WATER) TEMPERATURE METER AND GAUGE UNIT

DESCRIPTION OF CIRCUIT

The coolant (water) temp. meter is located in the instrument panel and its gauge unit on the intake manifold.

This circuit is as shown below.

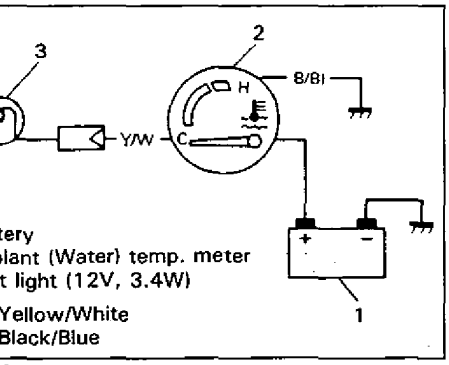
The gauge unit shows different resistance values depending on the coolant temperature. This causes a current flowing through the temperature meter coil to change, controlling the meter pointer. That is, when the coolant temperature rises, the gauge unit resistance is decreased with more current flowing through the meter coil, thus allowing the meter pointer to move away from the "C" position.



1. Battery
2. Blank
3. Ignition switch
4. Circuit fuse
5. Coolant (Water) temp. meter
6. Coolant (Water) temp. gauge unit

W/G : White/Green
B/Bl : Black/Blue
B/W : Black/White
Y/W : Yellow/White

70F00-8-9-1



1. Battery
2. Coolant (Water) temp. meter
3. Test light (12V, 3.4W)

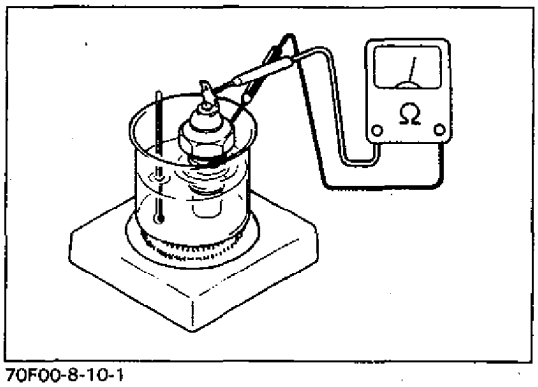
Y/W : Yellow/White
B/Bl : Black/Blue

64B40-8-9-4

INSPECTION

COOLANT (WATER) TEMPERATURE METER

1. Disconnect Y/W (Yellow/White) lead wire going to gauge unit installed to intake manifold.
2. Use a bulb (12V 3.4W) in position to ground wire as illustrated.
3. Turn main switch ON. Confirm that bulb is lighted with meter pointer fluctuating several seconds thereafter. If meter is faulty, replace.

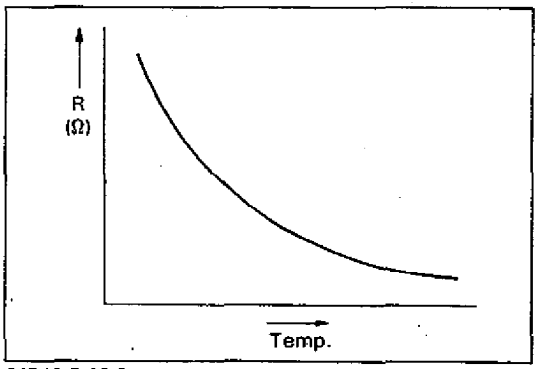


70F00-8-10-1

GAUGE UNIT

Warm up gauge unit. Thus make sure its resistance is decreased with increase of its temperature.

Temperature	Resistance
50°C (122°F)	189.4—259.6 Ω
115°C (239°F)	24.2—28.1 Ω



64B40-8-10-2

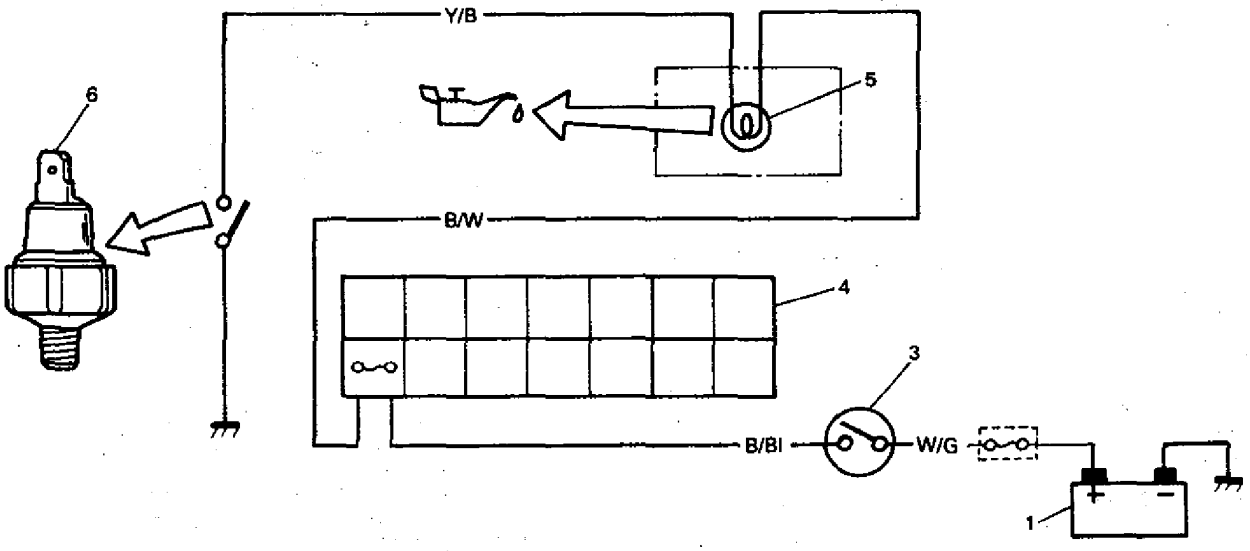
Temperature and resistance relationship can be plotted in a graph as shown in left figure.

OIL PRESSURE LIGHT

DESCRIPTION OF CIRCUIT

The oil pressure circuit consists of the oil pressure switch installed to the cylinder block and the light (warning light) inside the combination meter.

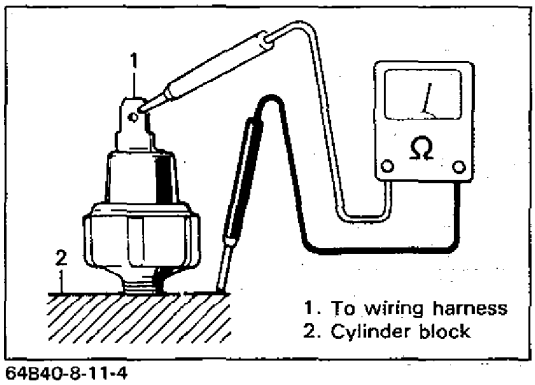
The oil pressure switch operates in such a way that it is switched OFF when oil pressure is produced by the started engine and then fed to switch.



1. Battery
2. Blank
3. Ignition switch
4. Circuit fuse
5. Oil pressure warning light
6. Oil pressure switch

W/G : White/Green
B/Bl : Black/Blue
B/W : Black/White
Y/B : Yellow/Black

70F00-8-11-1



1. To wiring harness
2. Cylinder block

64B40-8-11-4

INSPECTION

OIL PRESSURE SWITCH

Use an ohmmeter to check switch continuity.

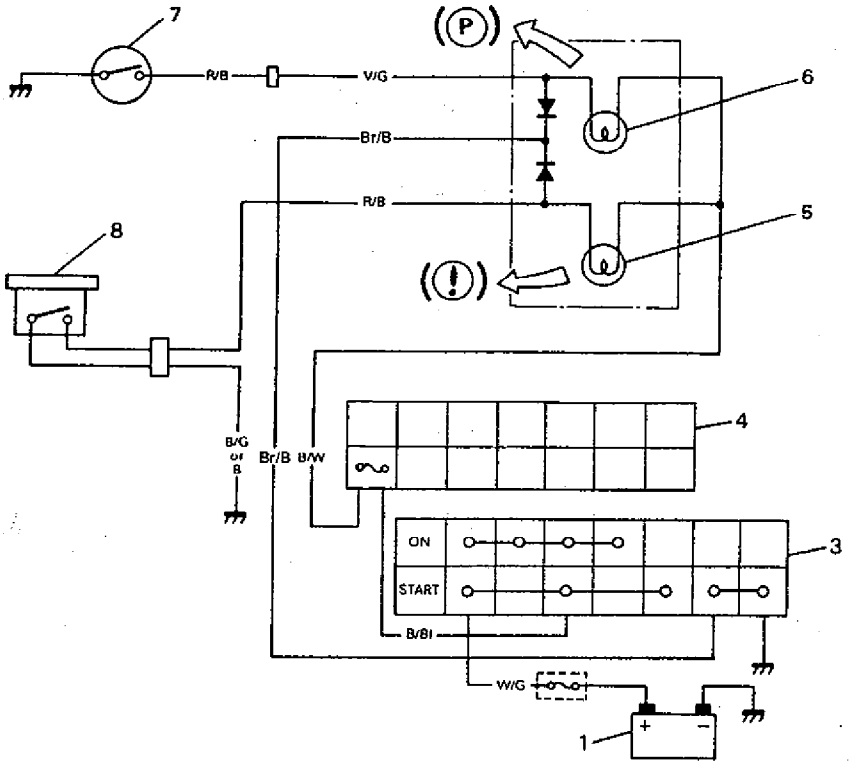
During Engine Running	No continuity obtained (∞ Ω)
At Engine Stop	Continuity obtained (0 Ω)

BRAKE FLUID LEVEL AND PARKING BRAKE WARNING LIGHTS

DESCRIPTION OF CIRCUIT

The circuit consists of a brake fluid level switch installed in the master cylinder reservoir, parking brake switch, and the warning light(s) in the gauge cluster. Whether parking brake warning light is provided or not depends on vehicle specifications.

For European Markets

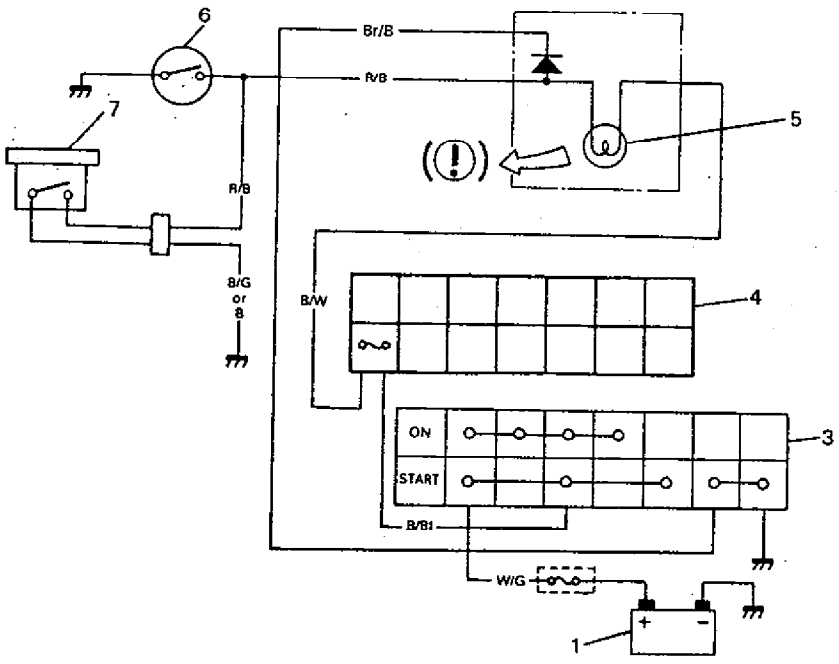


1. Battery
2. Blank
3. Ignition switch
4. Circuit fuse
5. Brake fluid level warning light
6. Parking brake light
7. Parking brake switch
8. Brake fluid level switch

W/G : White/Green
B/Bl : Black/Blue
B/W : Black/White
R/B : Red/Black
B/G : Brack/Green
V/G : Violet/Green
B : Black
Br/B : Brown/Black

70F00-8-12-1

For other Markets



1. Battery
2. Blank
3. Ignition switch
4. Circuit fuse
5. Brake fluid level warning/ parking brake switch
6. Parking brake switch
7. Brake fluid level switch

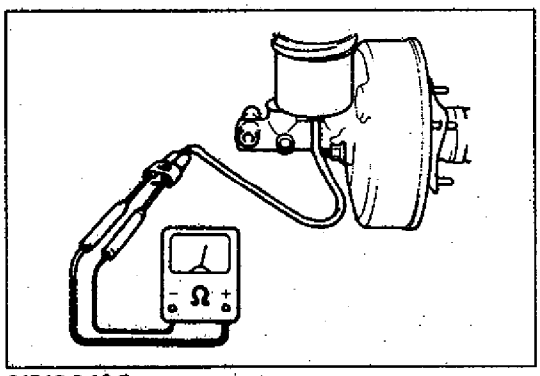
W/G : White/Green
B/Bl : Black/Blue
B/W : Black/White
R/B : Red/Black
B/G : Black/Green
B : Black
Br/B : Brown/Black

70F00-8-12-2

OPERATION OF WARNING LIGHT

1. Parking brake light comes on when engine is stopped while ignition switch is turned on and parking brake is applied.
2. For bulb check, check that warning light comes on briefly during engine start regardless of brake fluid level position and parking brake operation.
3. After starting engine, release parking brake.
   If light goes off, brake fluid level is adequate.

70F00-8-13-1



64B40-8-12-5

INSPECTION

BRAKE FLUID LEVEL SWITCH

Use an ohmmeter to check switch for continuity.
If found defective, replace switch.

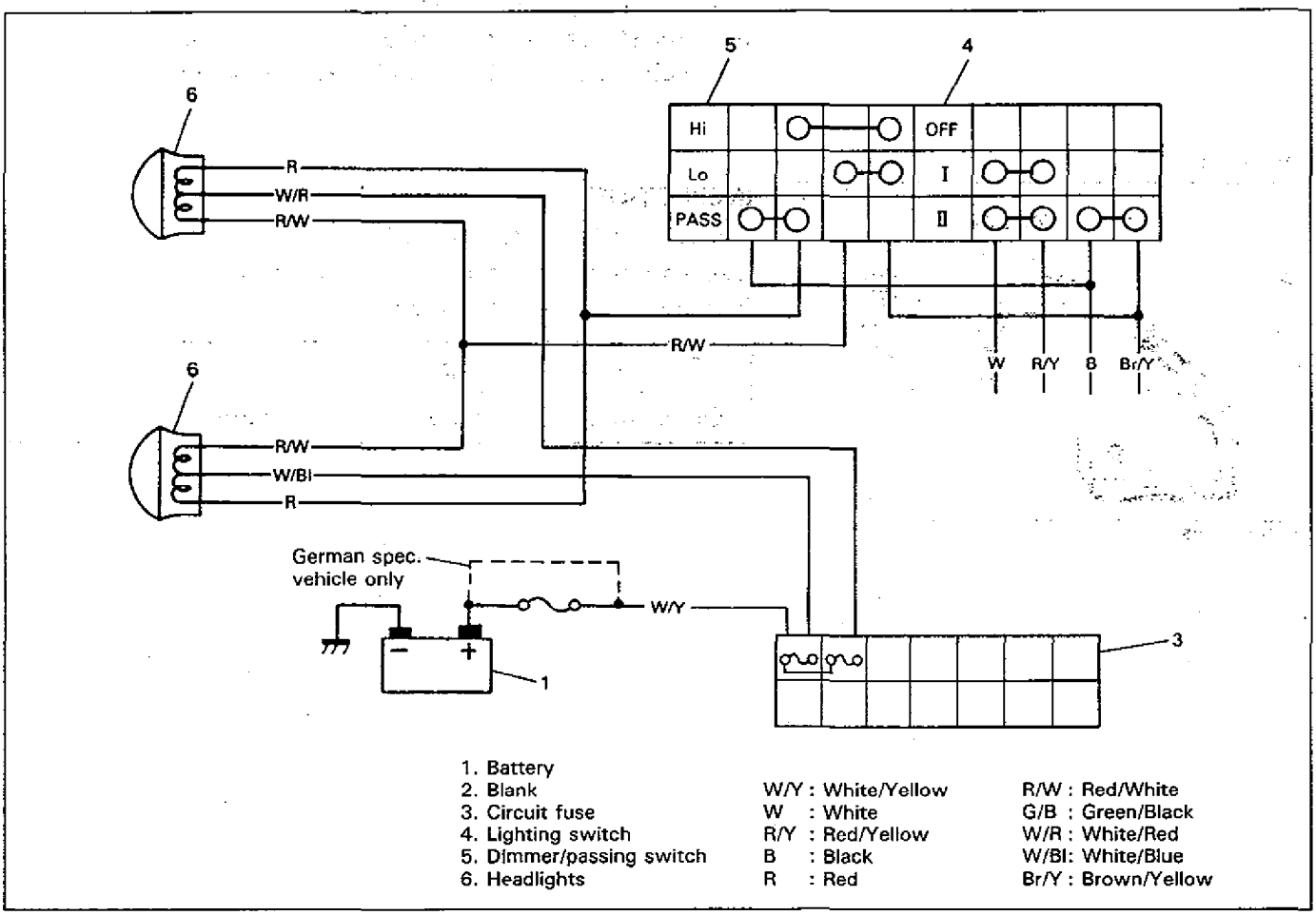
OFF position (float up)	No continuity
ON position (float down)	Continuity

LIGHTING SYSTEMS

HEADLIGHTS

WIRING DIAGRAM

This diagram is not applicable to vehicle with daytime running light system.



70F00-8-14-1

TROUBLE DIAGNOSIS

Trouble	Possible cause	Correction
Only one light does not light.	• Bulb burnt out	Replace bulb.
	• Fuse blown	Replace fuse.
	• Socket, wiring or grounding faulty	Repair as necessary.
Headlights do not light.	• Main fuse (if equipped) and/or fuses blown	Replace main fuse (if equipped) and/or fuses to check for short.
	• Lighting and dimmer switches faulty	Check switches.
	• Wiring or grounding faulty	Repair as necessary.
Only one beam (''Hi'' or ''Lo'') does not light.	Lighting or dimmer switch faulty	Check switch.

70F00-8-14-2

SETTING HEADLIGHT BEAMS (HEADLIGHTS AIMING)

Preparation

- Adjust air pressure of each tire as specified respectively.
- Check that engine oil and coolant are filled up to correct level.
- Check that fuel tank is filled with fuel fully.
- Place vehicle on a level floor.
- Bounce each corner of vehicle by hand to settle its balance.
- Set headlight leveling switch to "0" with ignition switch ON, if equipped.

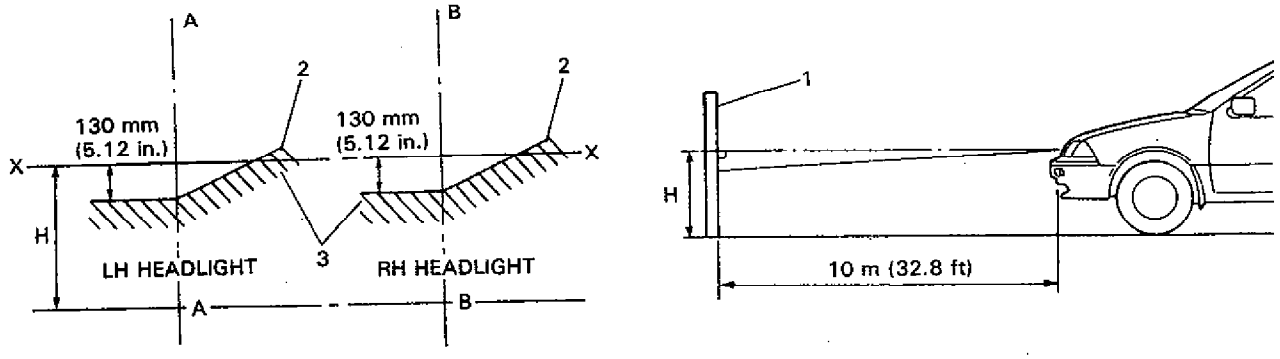
NOTE:
There should be no other load in vehicle other than driver or substituted weight of approx. 70 kg (150 lb) placed in driver's position.

For headlight beam setting, some different methods and instruments are in use now, e.g., screen method using a focusing tester, etc. But method described here does not use such tester.

Unless otherwise obligated by local regulations, align headlight aims according to following procedure.

1) Set a blank wall 10 m (32.8 ft) ahead of headlights.
2) Light headlights (low beam) and check their beams projected on the wall. They should correspond to shadowed portion in figure below.

70F00-8-15-1

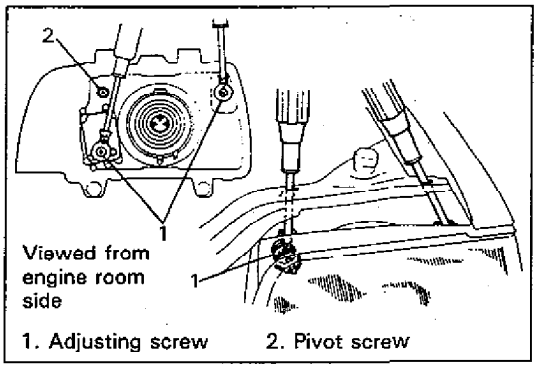


1. Wall
2. Cutline (boundary line)
3. High intensity zone

X—X: Horizontal center line of headlights
A—A: Vertical center line of left headlight
B—B: Vertical center line of right headlight

NOTE:
This figure is applicable to left-hand steering vehicle.
Figure should be turned over for right-hand steering vehicle.

70F00-8-15-2



70F00-8-16-1

3) If headlight aim adjustment is necessary, adjust it by turning adjusting screws.

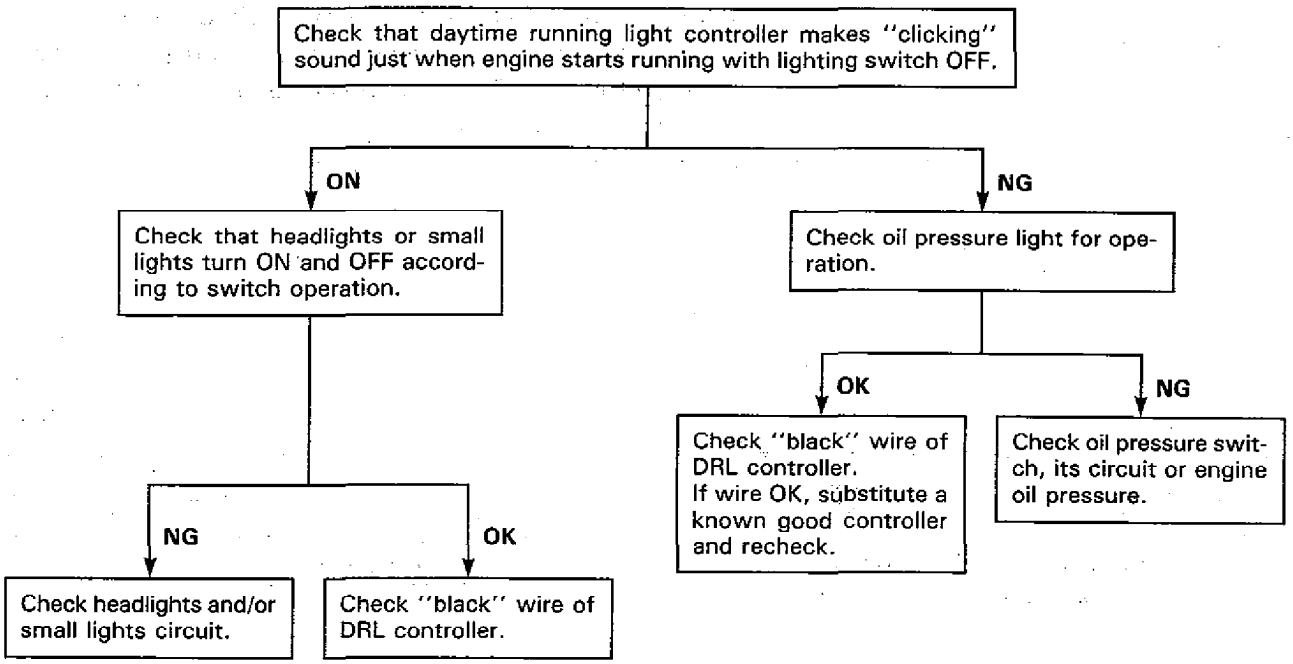
CAUTION:
As pivot screw is factory adjusted precisely, don't adjust or remove it.

DAYTIME RUNNING LIGHT (DRL) SYSTEM (If equipped)

With this system, low beam of headlights and small lights turn ON when the engine is started and they turn OFF when it is stopped.
This system is so designed that the lighting switch has a priority. That is, when lighting switch is set to the small light position while the engine is running and this system is at work (headlights and small lights are ON), only small lights remain ON and headlights turn OFF.

DIAGNOSTIC FLOW CHART

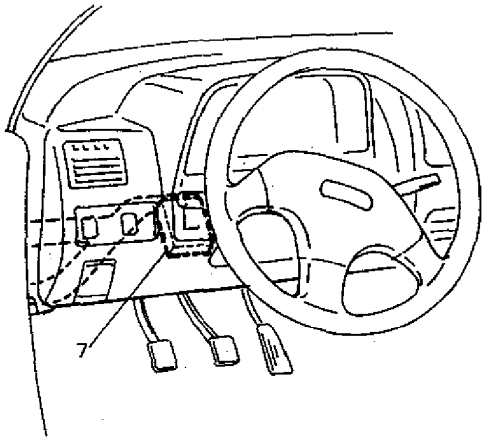
When a trouble has occurred in this system, check it according to the following flow chart.

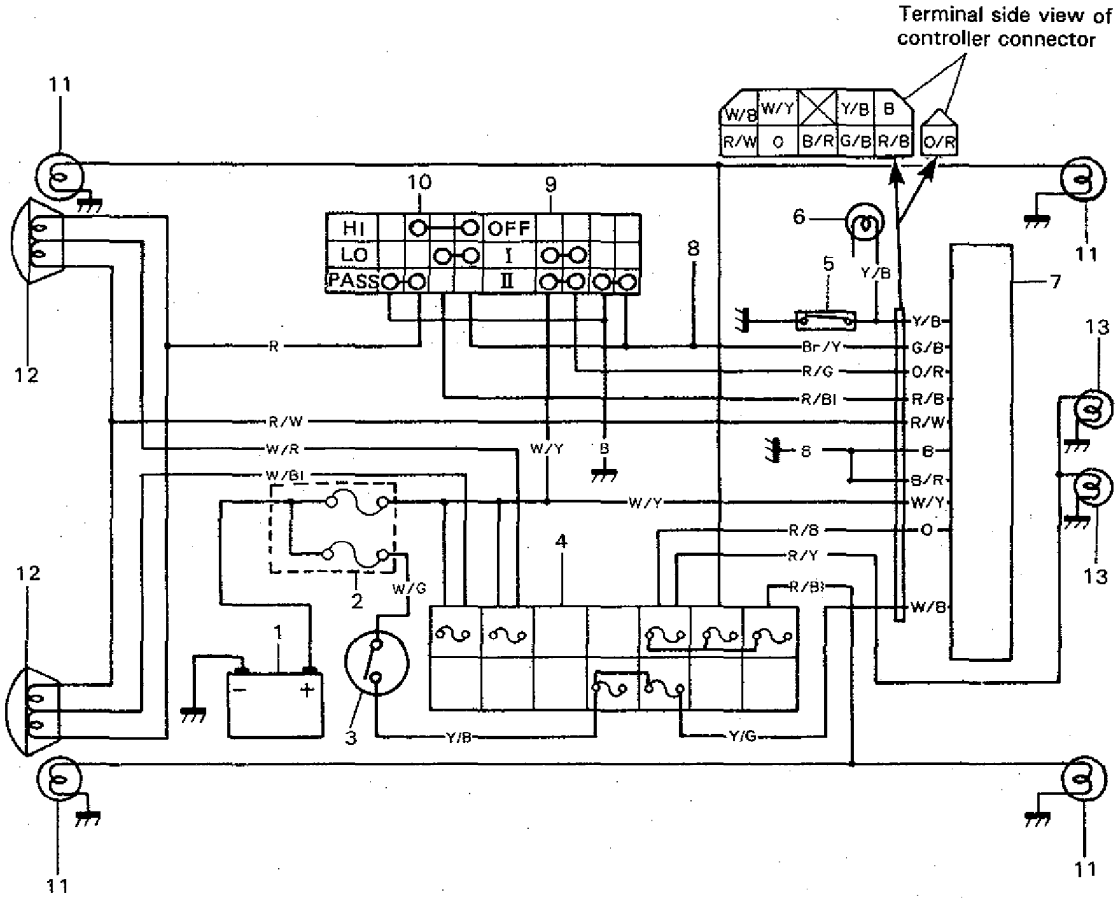


NOTE:
- **Daytime running light controller is located under instrument panel at the right of steering column.**
- **NG: No Good**

70F00-8-16-2

DRL SYSTEM CIRCUIT



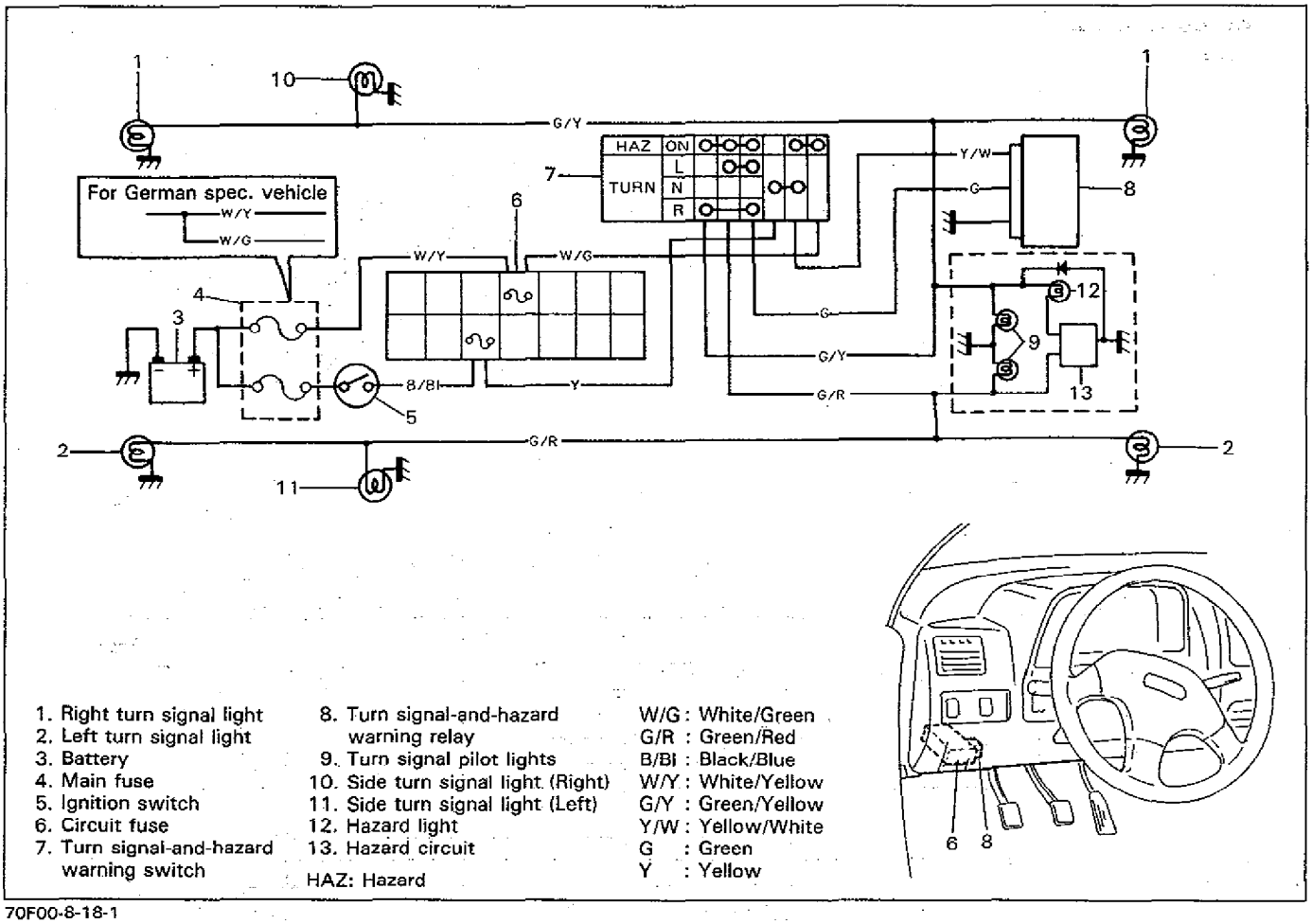


1. Battery
2. Main fuse
3. Ignition switch
4. Circuit fuse
5. Oil pressure switch
6. Oil pressure warning light
7. Daytime running light controller
8. To rear fog switch and light
9. Lighting switch
10. Dimmer/passing switch
11. Front clearance & tail lights
12. Headlight
13. Licence light

Y/G : Yellow/Green
Y/B : Yellow/Black
B/R : Black/Red
Br/Y : Brown/Yellow
R/Y : Red/Yellow
R/W : Red/White
W/Bl: White/Blue
W/R : White/Red
W/B : White/Black
O : Orange
B : Black
R : Red
R/G : Red/Green
R/Bl : Red/Blue
R/B : Red/Black
G/B : Green/Black
W/Y : White/Yellow
W/G : White/Green
O/R : Orange/Red

TURN SIGNAL AND HAZARD WARNING LIGHTS

WIRING DIAGRAM



70F00-8-18-1

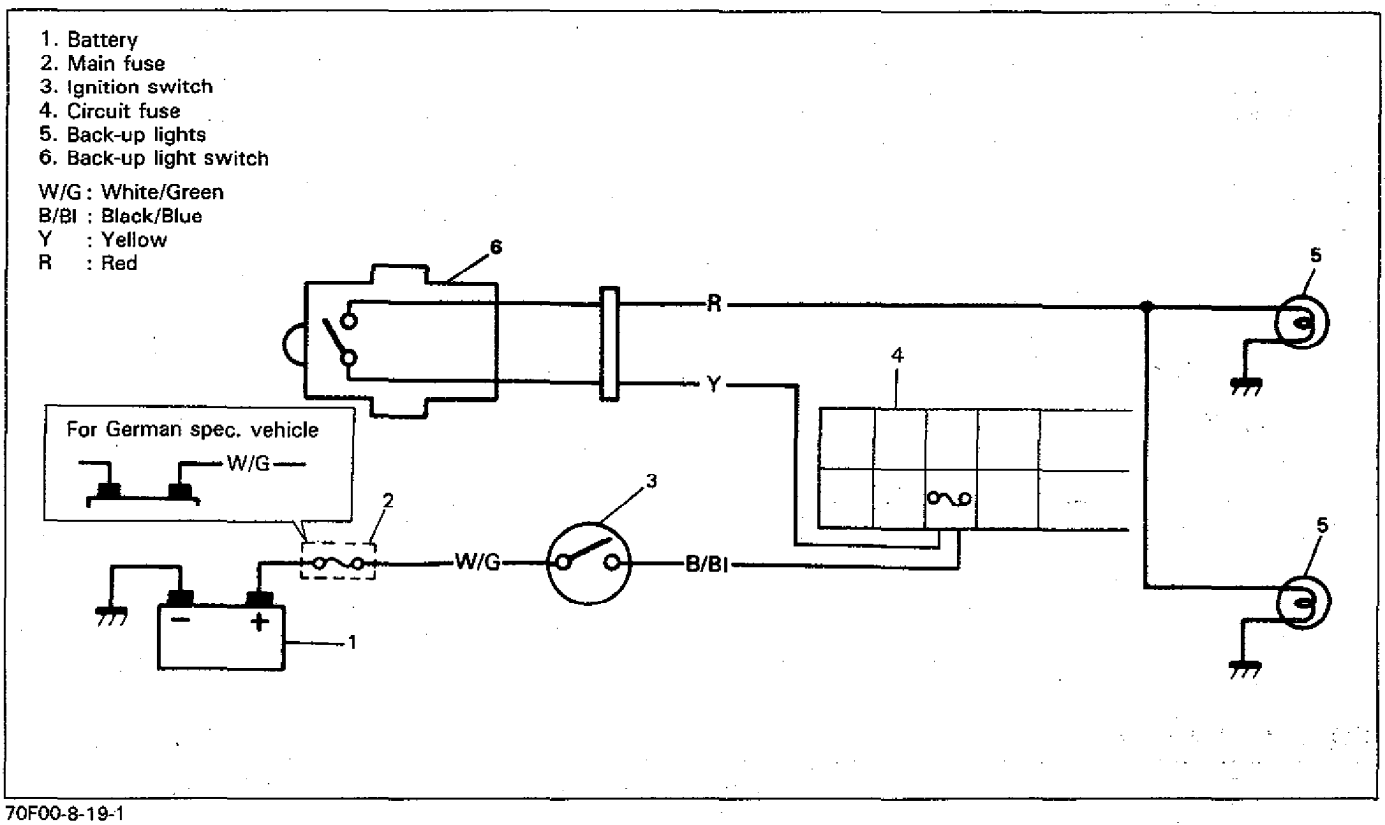
TROUBLE DIAGNOSIS

Trouble	Possible cause	Correction
Flash rate high or one side only flashes	1. Faulty ground	Repair.
	2. Wrong bulb	Replace.
	3. One of light bulbs burnt out or right or left side of front or rear side	Replace.
	4. Defective turn signal-and-hazard warning relay	Replace.
	5. Open circuit or high resistance existing between turn signal-and-hazard warning switch and lights on one side.	Repair.
No flashing	1. Blown fuse on turn signal-and-hazard warning circuit	Replace.
	2. Open circuit or high resistance existing between battery and switch	Repair.
	3. Defective relay	Replace.
	4. Defective switch	Replace.
Flash rate low	1. Supply voltage too low	Recharge battery.
	2. Defective relay.	Repair.

64B40-8-19-1

BACK-UP LIGHTS

WIRING DIAGRAM



70F00-8-19-1

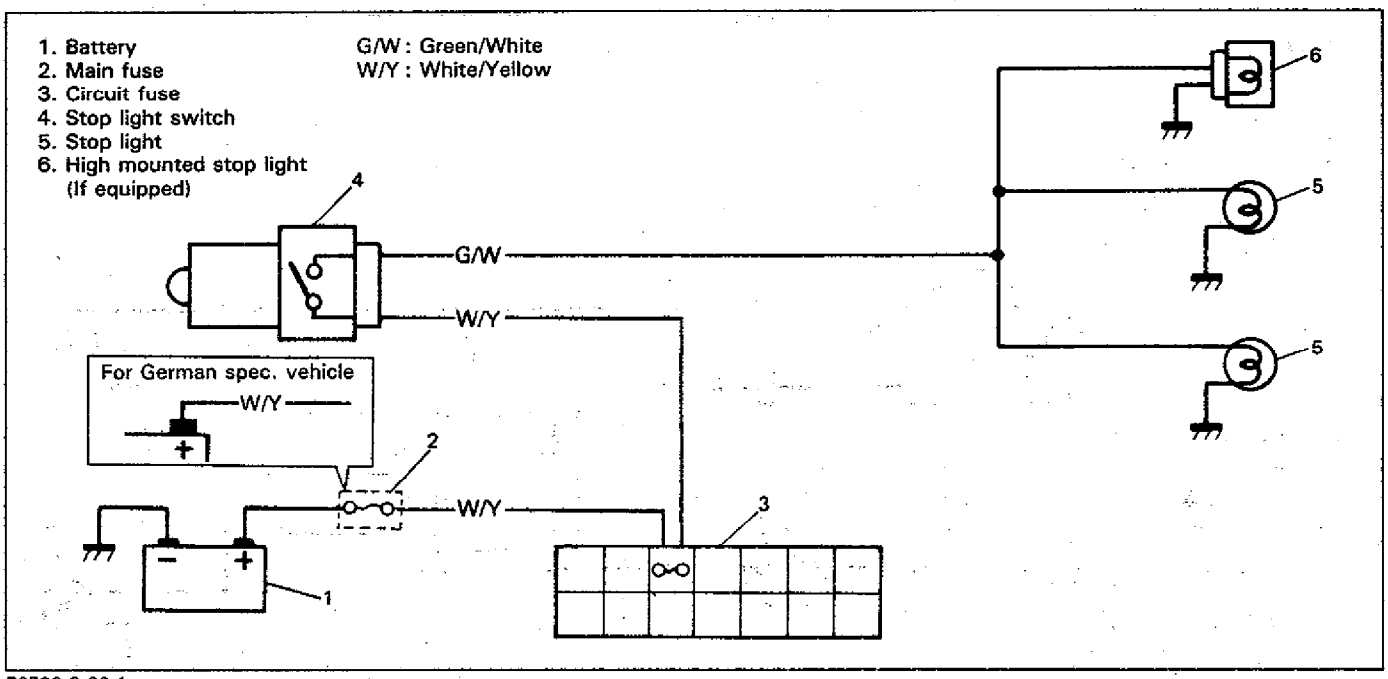
TROUBLE DIAGNOSIS

Trouble	Possible cause	Correction
Back-up lights do not light.	• Fuse blown	Replace fuse to check for short.
	• Bulb blown	Replace.
	• Back-up light switch faulty	Check switch.
	• Wiring or grounding faulty	Repair as necessary.

70F00-8-19-2

STOP LIGHTS

WIRING DIAGRAM



70F00-8-20-1

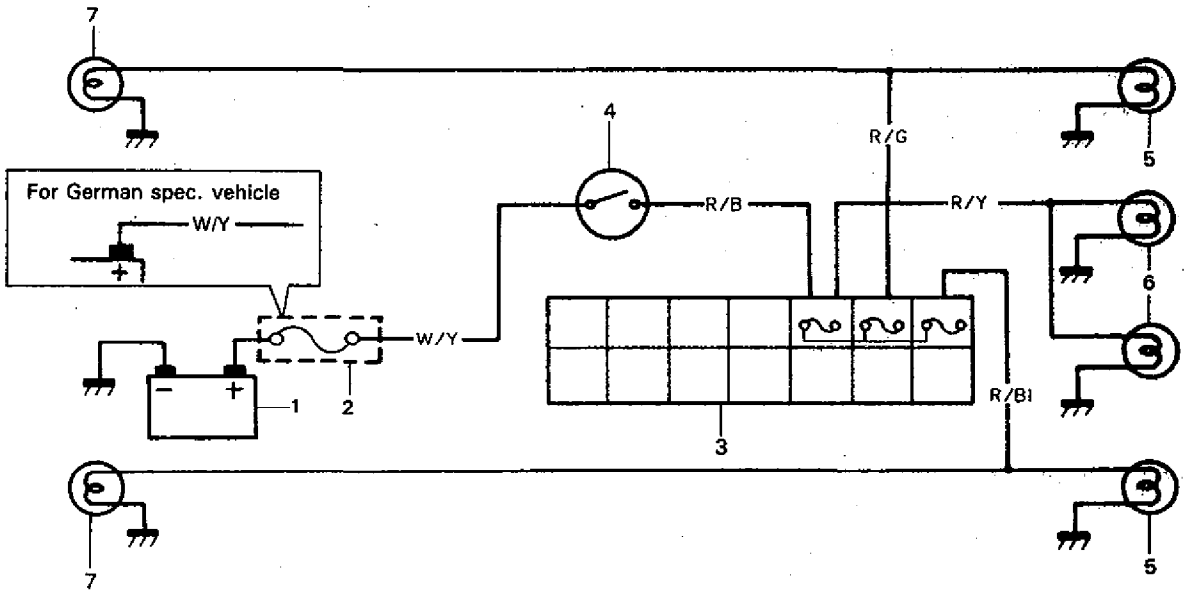
TROUBLE DIAGNOSIS

Trouble	Possible cause	Correction
Stop lights do not light.	• Fuse blown	Replace fuse to check for short.
	• Bulb blown	Replace.
	• Stop light switch faulty	Adjust or replace switch.
	• Wiring or grounding faulty	Repair as necessary.
Stop lights stay on.	Stop light switch faulty	Adjust or replace switch.

70F00-8-20-2

CLEARANCE, TAIL AND LICENSE LIGHTS

WIRING DIAGRAM



1. Battery
2. Main fuse
3. Circuit fuse
4. Lighting switch
5. Tail lights
6. Licence lights
7. Front clearance lights

R/G : Red/Green
R/B : Red/Black
R/Bl : Red/Blue
R/Y : Red/Yellow
W/Y : White/Yellow

70F00-8-21-1

TROUBLE DIAGNOSIS

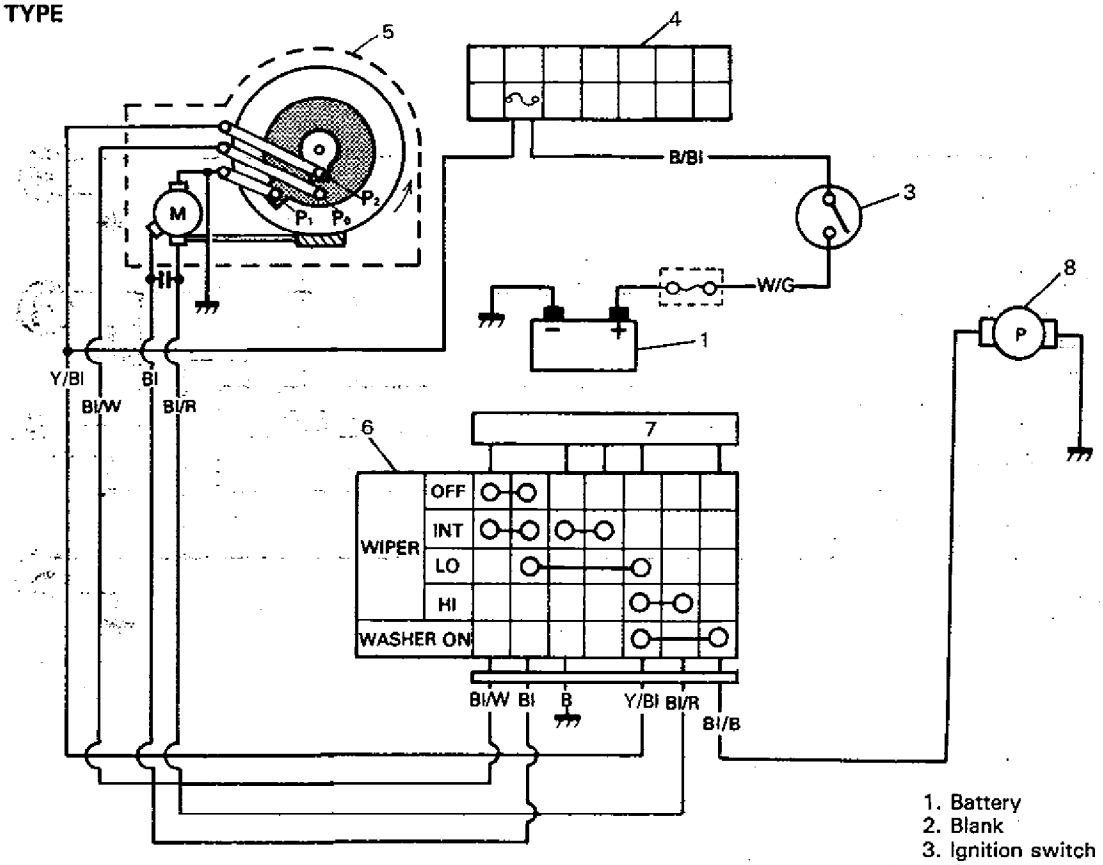
Trouble	Possible cause	Correction
Lights do not light.	• Main fuse (if equipped) and/or fuses blown	Replace fuses to check for short.
	• Bulb blown	Replace.
	• Lighting switch faulty	Check switch.
	• Wiring or grounding faulty	Repair as necessary.

70F00-8-21-2

WINDSHIELD WIPERS (FRONT WIPER) AND WASHER

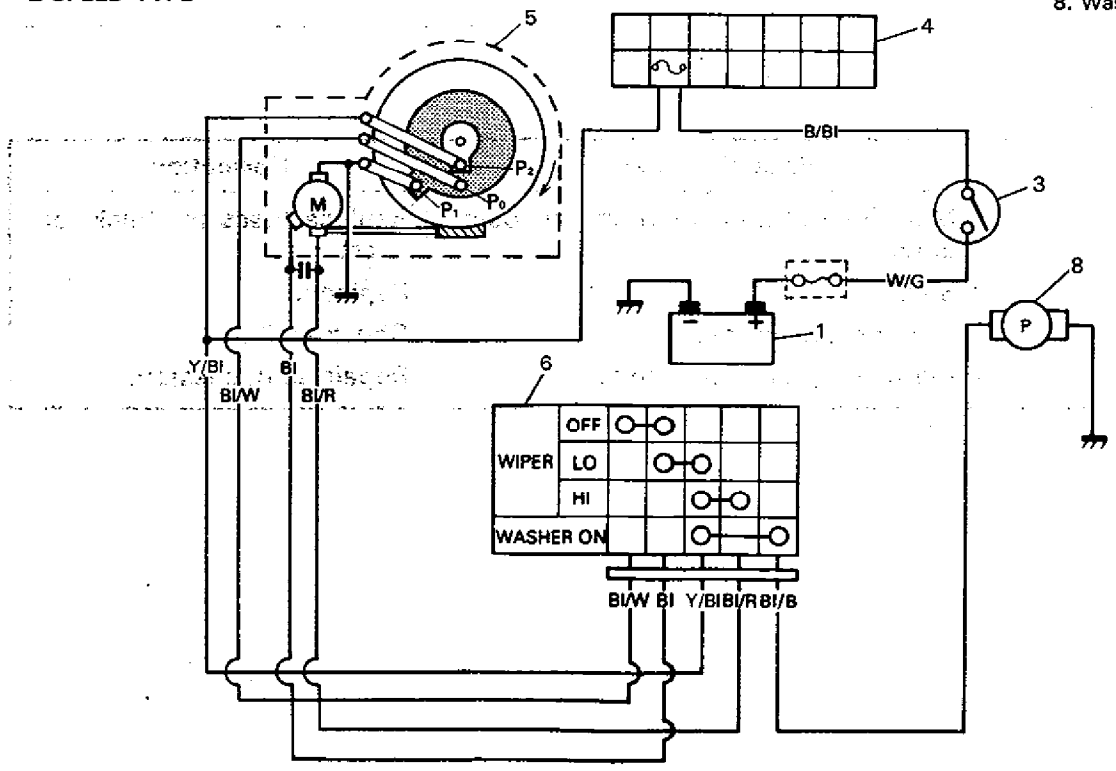
WIRING DIAGRAM

3-SPEED TYPE



1. Battery
2. Blank
3. Ignition switch
4. Circuit fuse
5. Wiper motor
6. Wiper and washer switch
7. Wiper intermittent relay
8. Washer pump

2-SPEED TYPE



B : Black
B/Bl : Black/Blue
Bl : Blue
Bl/R : Blue/Red
Bl/W: Blue/White
Bl/B : Blue/Black
Y/Bl : Yellow/Blue
W/G : White/Green

TROUBLE DIAGNOSIS

Trouble	Possible cause	Correction
Wiper malfunctions or does not return to original position.	• Wiper fuse blown	Replace blown fuse to check for short.
	• Wiper motor faulty	Check motor.
	• Wiper switch faulty	Check switch.
	• Wiring or grounding faulty	Repair.
Washer malfunctions.	• Washer hose or nozzle clogged	Repair.
	• Washer motor faulty	Check motor.
	• Washer switch faulty	Check switch.
	• Wiring faulty	Repair.

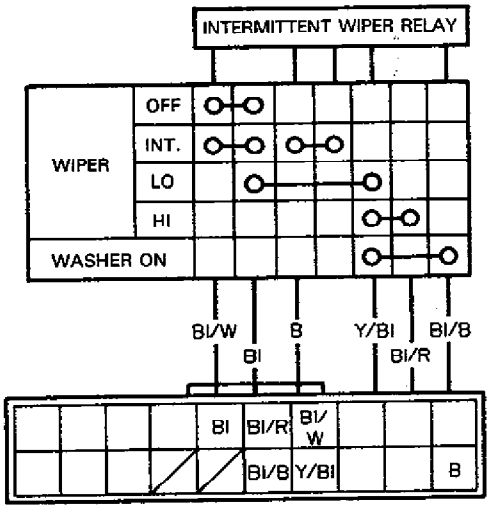
70F00-8-23-1

INSPECTION

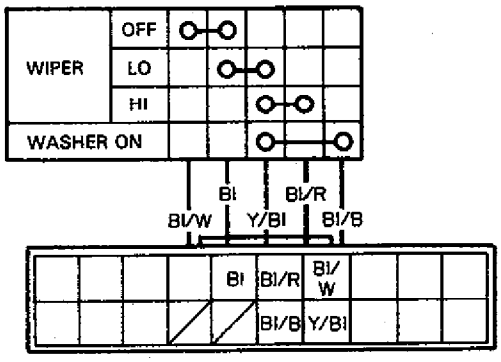
A. WIPER/WASHER SWITCH

Use a circuit tester to check switch for each terminal-to-terminal continuity.

3-SPEED TYPE

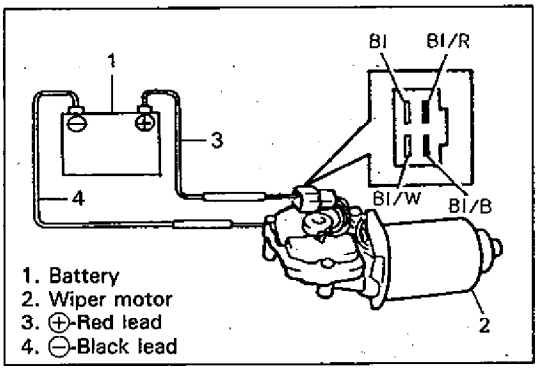


2-SPEED TYPE

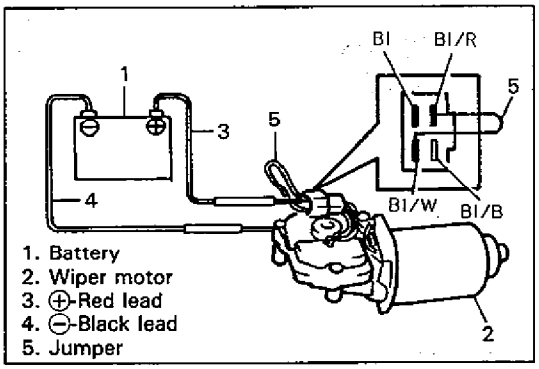


Bl : Blue
Bl/W: Blue/White
Bl/R : Blue/Red
Bl/B : Blue/Black
B : Black
Y/Bl : Yellow/Blue

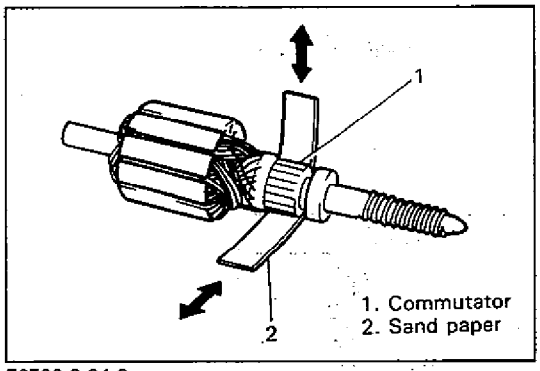
70F00-8-23-2



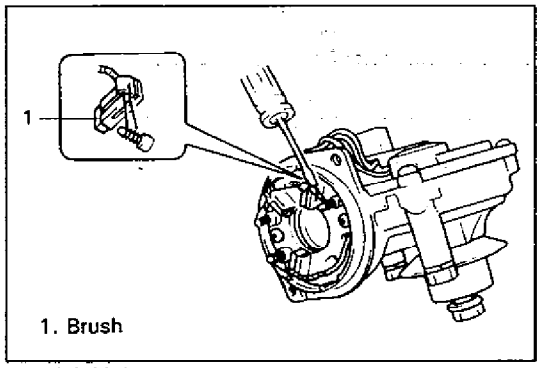
70F00-8-24-1



70F00-8-24-2



70F00-8-24-3



64B40-8-28-4

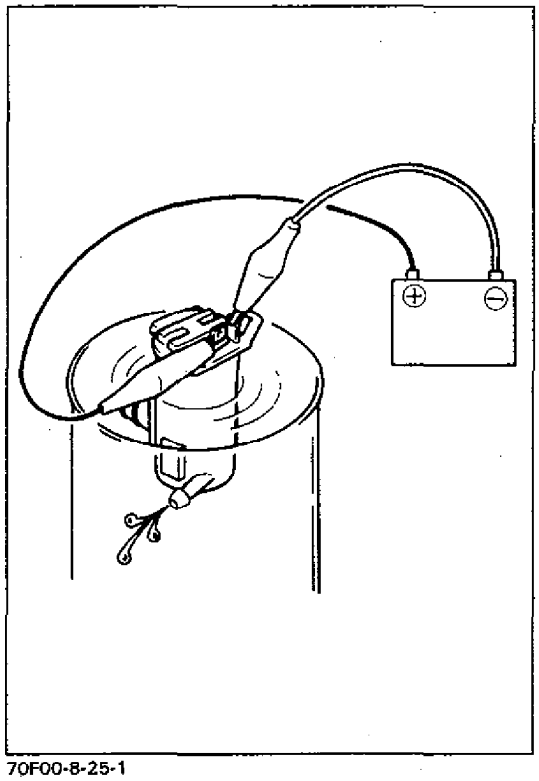
B. WIPER MOTOR

1) As illustrated left, use a 12 V battery to connect its (+) terminal to Blue/Red (Bl/R) terminal, and its (—) terminal to Black lead cord. If motor rotates at a low revolution speed of 44 to 52 rpm, it is proper. As for high speed check, connect battery (+) terminal to Blue/Black (Bl/B) terminal, and its (—) terminal to Black lead cord. If motor rotates at a high revolution speed of 63 to 77 rpm, it is proper.

2) Testing automatic stop action
Connect battrey (+) terminal to motor Blue (Bl) terminal, and (—) terminal to Black lead cord, respectively. Use a jumper to short Blue/White (Bl/W) and Blue/Red (Bl/R) terminals to each other to check whether motor shaft stops at a given position. This position must conform to start positon. Stop motor again and again with the jumper to confirm that it stops at the same position.

3) Checking brush and commutator
Use a circuit tester to check Blue/Red (Bl/R) terminal-to-Black lead cord continuity. If continuity is poor, check brush-to-commutator contact area for proper condition. When the area is fouled, use a cloth wetted with gasoline to clean the area. When surface of the area is coarse or burnt, use a sandpaper to smooth it.

NOTE:
When reinstalling wiper motor, fit brush into each brush holder and hook brush lead wire around holder beforehand. After reinstalling it, release each brush.



70F00-8-25-1

C. WASHER PUMP

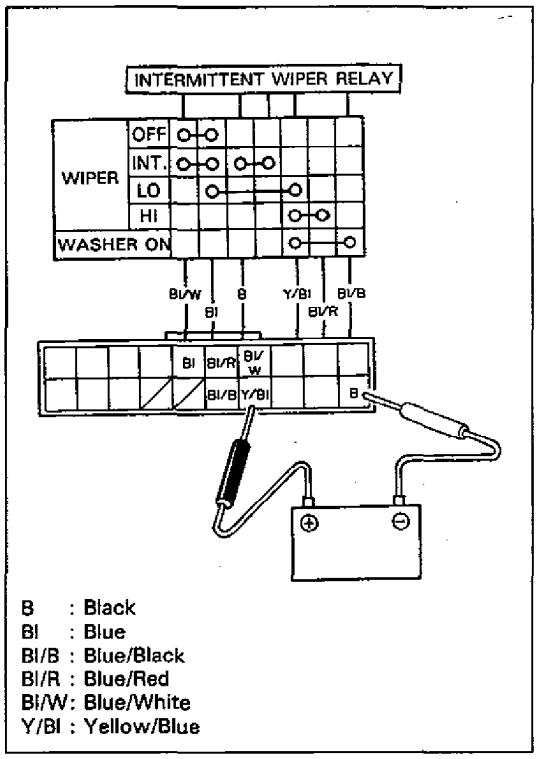
Connect battery (+) and (—) terminals to pump (+) and (—) terminals respectively to check pumping rate.

REMOVAL

1) Disconnect battery (—) cable.
2) Remove front fender lining (LH).
3) Remove washer tank fitting nuts.
4) Disconnect pump lead wires and hoses.
5) Remove washer tank.
6) Remove pump from tank.

INSTALLATION

Reverse the removal sequence to install washer pump.



B : Black
Bl : Blue
Bl/B : Blue/Black
Bl/R : Blue/Red
Bl/W: Blue/White
Y/Bl : Yellow/Blue

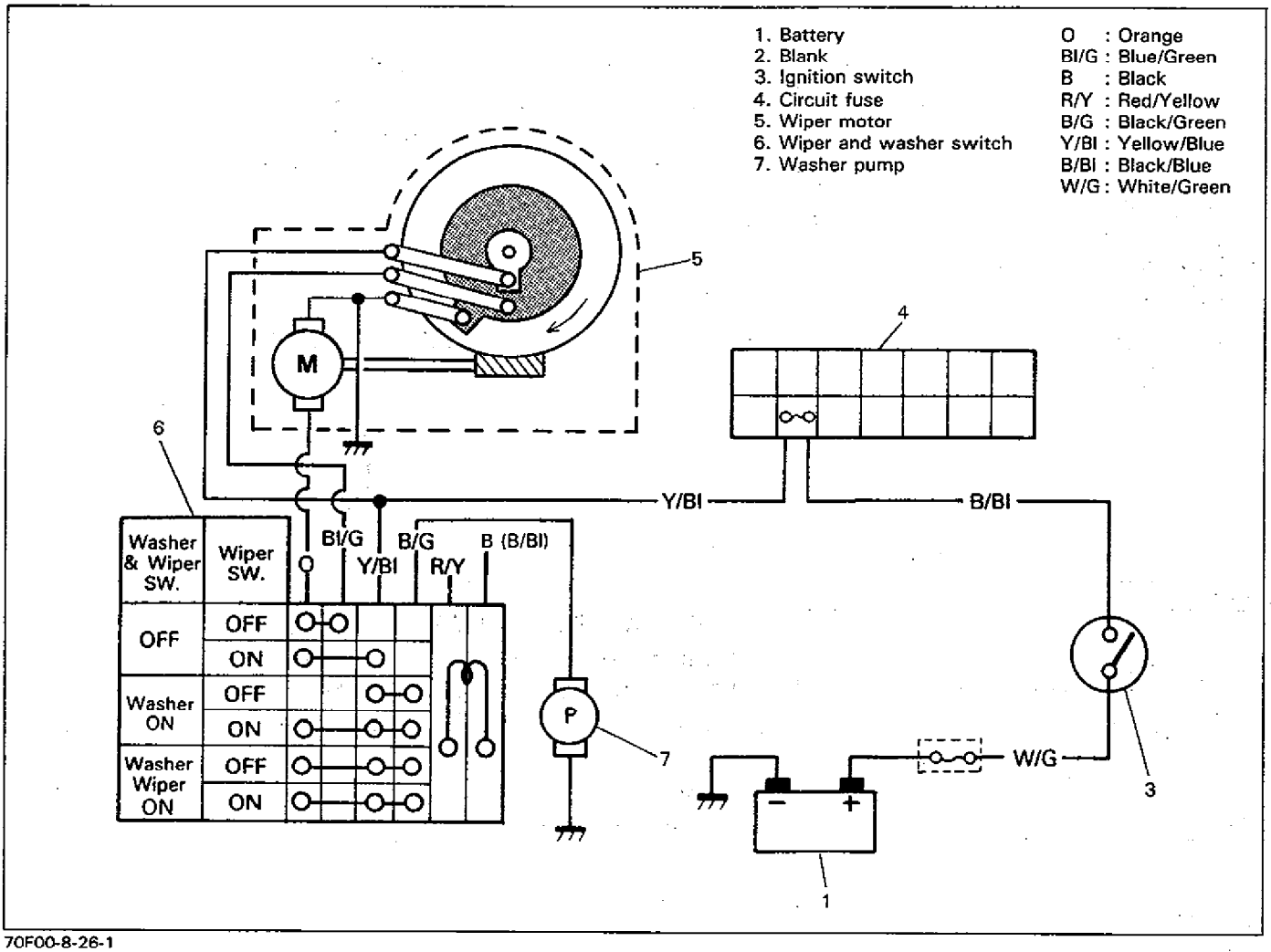
70F00-8-25-3

D. INTERMITTENT WIPER RELAY (Optional)

1) Disconnect wiper & washer switch coupler.
2) Turn intermittent switch to "INT" position.
   If an operating sound is heard from relay, it is at work properly.
3) Connect (+) cord and (—) cord of 12V battery to coupler terminals as shown.

REAR WINDOW WIPER AND WASHER (If equipped)

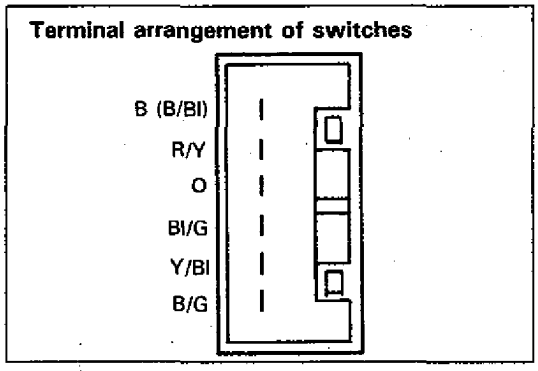
WIRING DIAGRAM

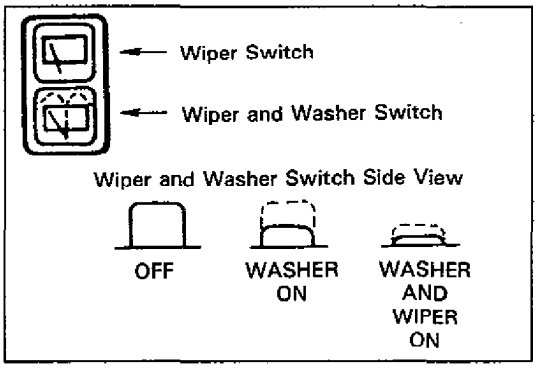


70F00-8-26-1

DESCRIPTION OF CIRCUIT AND TROUBLE DIAGNOSIS

Refer to "WINDSHIELD WIPER" section.





INSPECTION

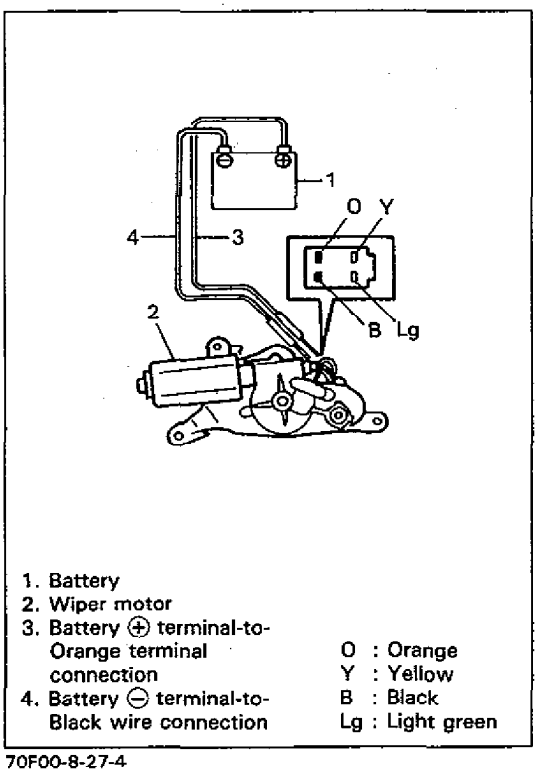
A. WIPER AND WASHER SWITCHES

Use a circuit tester to check switches for continuity.

CONTINUITY BETWEEN TERMINALS		
Switch Position		Terminal-to-Terminal Continuity
Washer & Wiper	Wiper	
OFF	OFF	Bl/G—O
	ON	Y/Bl—O
WASHER ON	OFF	B/G—Y/Bl
	ON	B/G—Y/Bl—O
WASHER & WIPER ON	OFF	B/G—Y/Bl—O
	ON	B/G—Y/Bl—O
B (B/Bl), an illumination light lead wire of lighting switch, produces constant B (B/Bl)—R/Y continuity.		

B/G : Black/Green
Y/Bl : Yellow/Blue
O : Orange
R/Y : Red/Yellow
Bl/G : Blue/Green
B : Black
B/Bl : Black/Blue

70F00-27-1



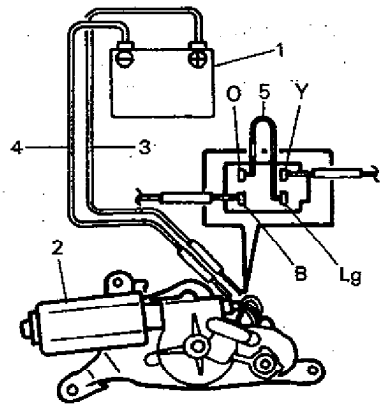
1. Battery
2. Wiper motor
3. Battery ⊕ terminal-to-Orange terminal connection
4. Battery ⊖ terminal-to-Black wire connection

O : Orange
Y : Yellow
B : Black
Lg : Light green

70F00-8-27-4

B. WIPER MOTOR

1) As shown left, use a 12V battery to connect its (+) and (—) terminals to Orange terminal and Black terminal respectively. Then motor should rotate at a 33 to 43 rpm.



1. Battery
2. Wiper motor
3. Battery ⊕ terminal-to-Yellow terminal connection
4. Battery ⊖ terminal-to-Black terminal connection
5. Jumper (Orange terminal-to-Blue/Green terminal connection)

O : Orange
Y : Yellow
B : Black
Lg : Light green

70F00-8-28-1

2) TESTING AUTOMATIC STOP ACTION

Connect battery (+) and (−) terminals to motor Yellow terminal and Black terminal respectively.

Use a jumper to short Orange and Light green terminals to each other to check whether motor shaft stops at a given position. Use jumper to make sure again and again that shaft stops at the same position.

3) CHECKING BRUSH AND COMMUTATOR

Use a circuit tester to check Orange-to-Black terminal continuity. If continuity is poor, check brush-and-commutator area for proper contact condition.

If fouled, clean the area with a cloth damped with gasoline.

If surface of the area is coarse or burnt, smooth it with a sand-paper.

(Refero to "FRONT WIPER MOTOR" section.)

70F00-8-28-3

C. WASHER PUMP

In the same manner as with the windshield washer pump, check pumping rate.

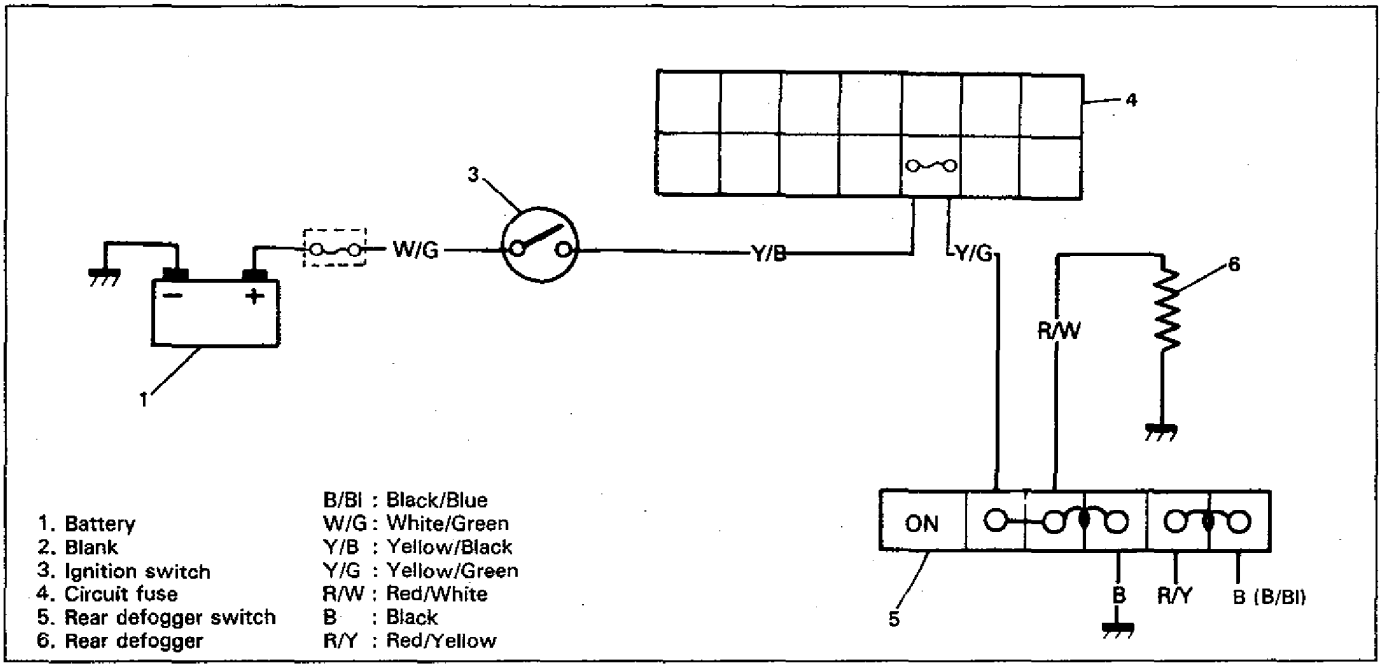
Refer to "WINDSHIELD WIPERS AND WASHERS" section.

64B40-8-37-1

REAR WINDOW DEFOGGER (If equipped)

The rear window defogger system has horizontal ceramic silver compound elements and two vertical bus bar. The system is operated by the defogger switch in the instrument panel.

WIRING DIAGRAM

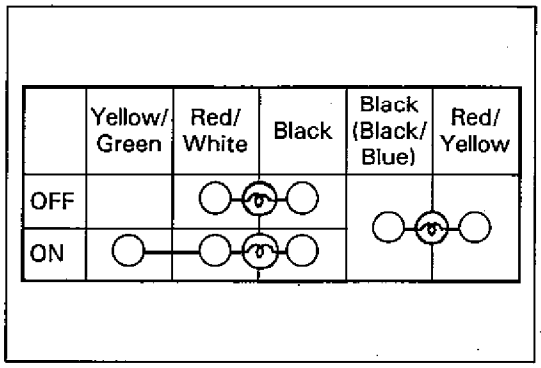


70F00-8-29-1

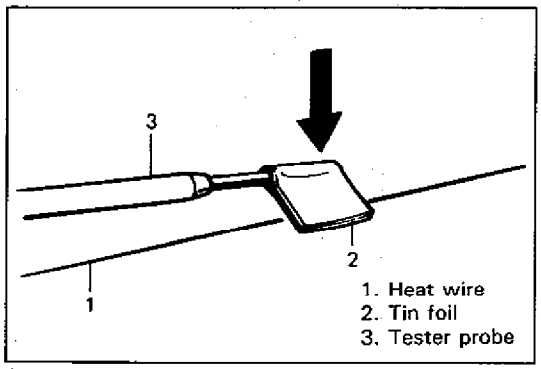
TROUBLE DIAGNOSIS

Trouble	Possible cause	Correction
Defogger won't work.	• Defogger switch faulty	Check switch.
	• Defogger heat wire faulty	Check heat wire.
	• Wiring or grounding faulty	Repair as necessary.

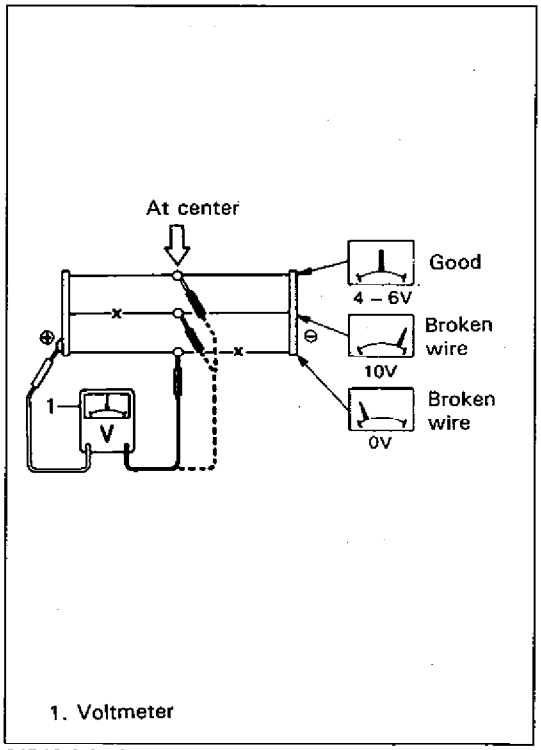
64B40-8-30-2



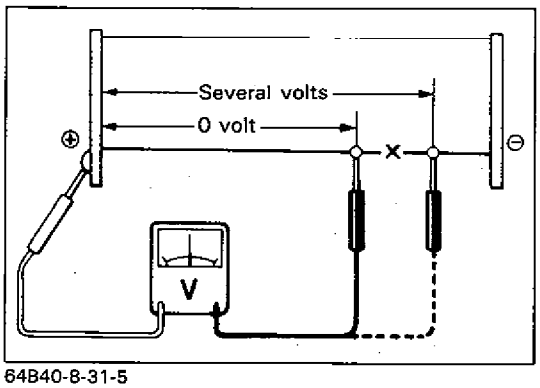
70F00-8-30-1



64B40-8-31-2



64B40-8-31-3



64B40-8-31-5

INSPECTION

DEFOGGER SWITCH

Use a circuit tester to check defogger switch for continuity. If switch has no continuity between terminals, replace.

DEFOGGER WIRE

NOTE:

- **When cleaning rear window glass, use a dry cloth to wipe it along wire direction.**
- **When cleaning glass, do not use detergent or abrassive-containing glass cleaner.**
- **When measuring wire voltage, use a tester with negative probe wrapped with a tin foil which should be held down on wire by finger pressure.**

1. Checking wire damage
   a. Turn main switch ON.
   b. Turn defogger switch ON.
   c. Use a voltmeter to check voltage at the center of each heat wire, as shown.

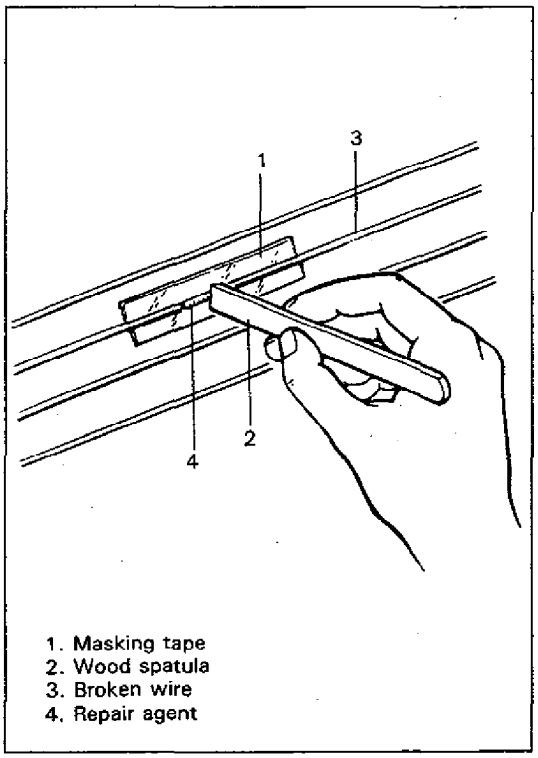
Voltage	Criteria
Approx. 5V	Good (No brake in wire)
Approx. 10V or 0V	Broken wire

If measured voltage is 10V, wire must be damaged between its center and positive end. If voltage is zero, wire must be damaged between its center and ground.

2. Locating damage in wire
   a. Touch voltmeter positive (+) lead to heat wire positive terminal end.
   b. Touch voltmeter negative (−) lead with a foil strip to heat wire positive terminal end, then move it along wire to the negative terminal end.
   c. The place where voltmeter fluctuates from zero to several volts is where there is damage.

NOTE:
If heat wire is free from damage, voltmeter should indicate 12V at heat wire positive terminal end and its indication should decrease gradually toward zero at the other terminal (ground).

64B40-8-32-1



1. Masking tape
2. Wood spatula
3. Broken wire
4. Repair agent

64B40-8-32-2

REPAIR

DEFOGGER CIRCUIT

1. Use white gasoline for cleaning.
2. Apply masking tape at both upper and lower sides of heat wire to be repaired.
3. Apply commercially-available repair agent with a fine-tip brush.
4. Two to three minutes later, remove masking tapes previously applied.
5. Leave repaired heat wire as it is for at least 24 hours before operating defogger again.

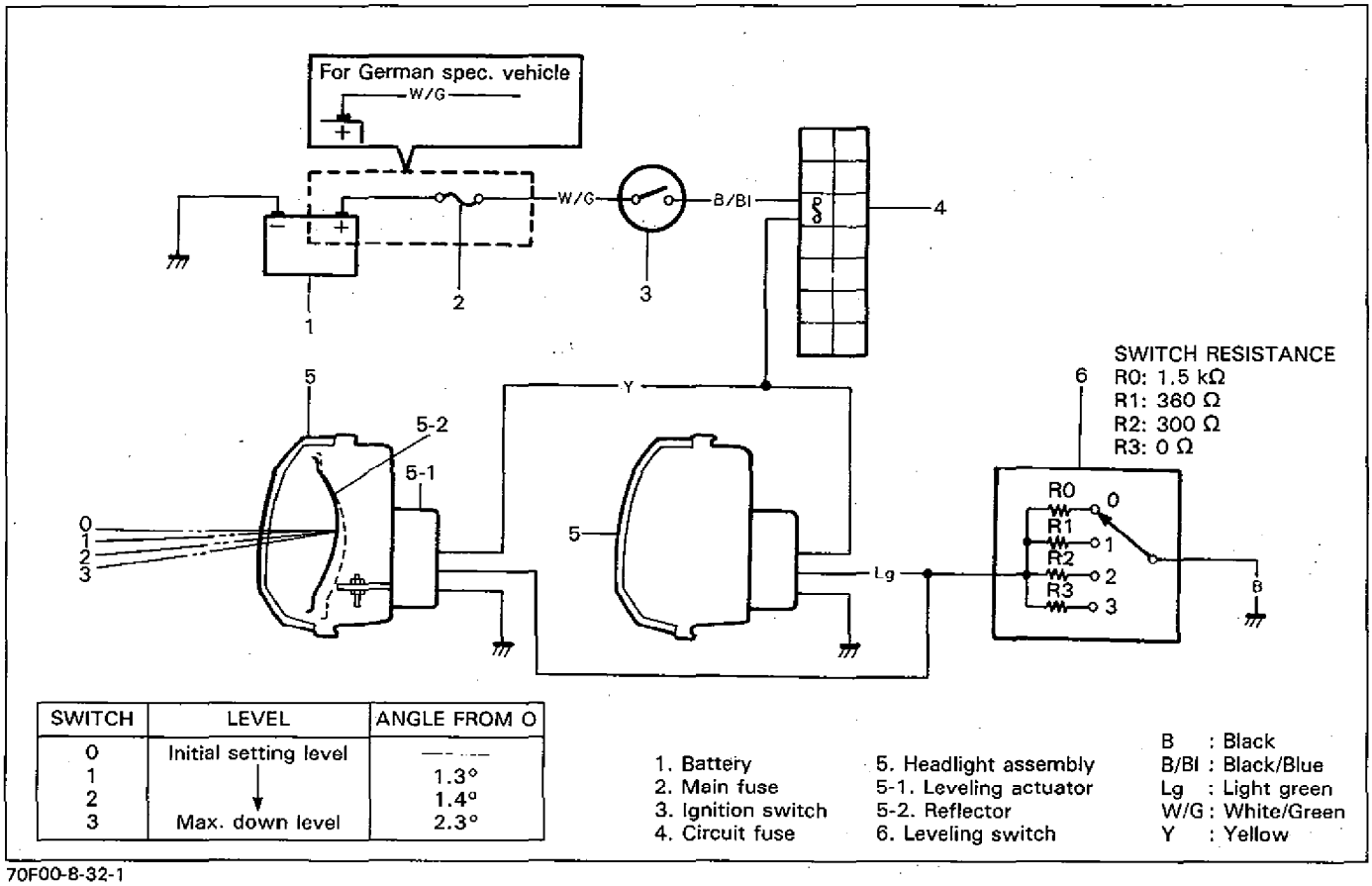
HEADLIGHT BEAM LEVELING SYSTEM (If equipped)

This system consists of the headlight beam leveling switch and headlights assembly (including headlight beam leveling actuator). It is used to lower both headlight aiming angles from the initial setting level by operating the leveling switch on the instrument.

The headlight beam leveling actuator is mounted in headlight assembly and connected to the headlight reflector. When the headlight beam leveling switch knob is turned, the headlight beam leveling actuator operates and it changes the headlight aiming angle according to the position selected by the leveling switch knob.

NOTE:

- **When inspecting and adjusting the headlight aiming, make sure to set the leveling switch to the "0" position with the ignition switch "ON", or down stroke from the initial setting level will be reduced.**
- **If the connector on one side of the headlight beam leveling actuator, the actuator on the connected side of the connector would fail to operate properly. Check to make sure that connectors on both side are connected properly before inspection and adjustment.**



SWITCH	LEVEL	ANGLE FROM O
0	Initial setting level	———
1		1.3°
2	↓	1.4°
3	Max. down level	2.3°

1. Battery
2. Main fuse
3. Ignition switch
4. Circuit fuse
5. Headlight assembly
5-1. Leveling actuator
5-2. Reflector
6. Leveling switch

B : Black
B/Bl : Black/Blue
Lg : Light green
W/G : White/Green
Y : Yellow

70F00-8-32-1

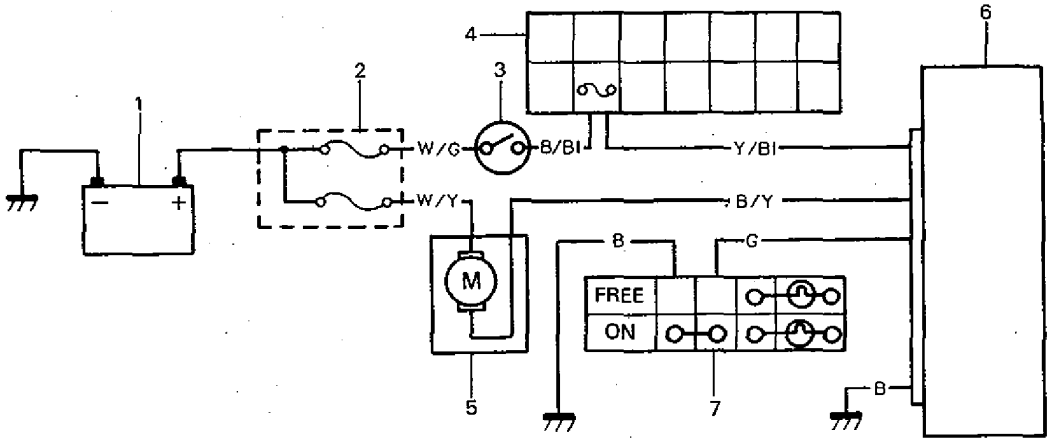
TROUBLE DIAGNOSIS

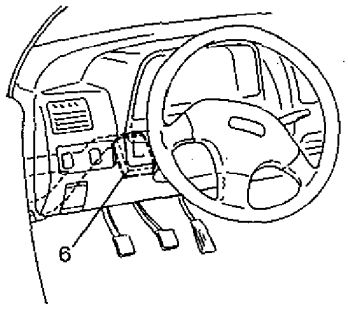
Trouble	Possible cause	Correction
Headlight beam leveling system do not operate.	• Fuse blown	• Check circuit and replace fuse.
	• Leveling switch faulty	• Check switch or replace it as necessary.
	• Socket, wiring or grounding faulty	• Repair as necessary.
	• Supply voltage too low	• Recharge or replace battery.
	• Headlight beam leveling unit (actuator) faulty	• Replace headlight ass'y.

70F00-8-32-2

HEADLIGHT CLEANER (HEADLIGHT WASHER) (If equipped)

This cleaner consists of fluid tank, motor, controller, switch, hoses and nozzles. Its system allow about 60 cc (2.02/2.11 US/Imp. oz) of washer fluid to be sprayed onto headlights for half a second every time the cleaner switch is turned ON but only when the ignition switch is also ON.





1. Battery
2. Main fuse
3. Ignition switch
4. Circuit fuse
5. Cleaner pump
6. Controller
7. Headlight cleaner switch

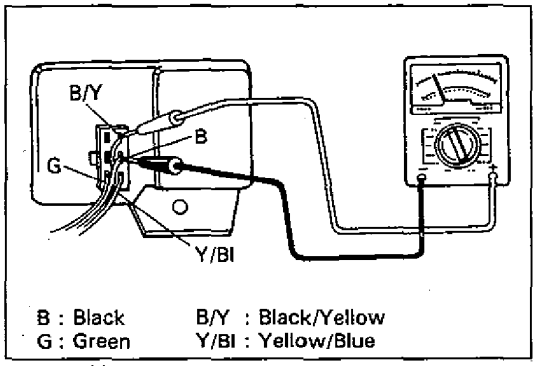
B : Black
B/Bl : Black/Blue
B/Y : Black/Yellow
G : Green
R/Y : Red/Yellow
W/G : White/Green
W/Y : White/Yellow
Y/Bl : Yellow/Blue

70F00-8-33-1

TROUBLE DIAGNOSIS

Trouble	Possible cause	Correction
Washer fluid don't spout though pump is operating	• Shortage of fluid • Fluid passage clogged (hose or nozzle)	Refill. Repair.
Cleaner pump does not operate.	• Fuse blown • Faulty switch • Faulty motor • Faulty wiring harness or poor connection • Faulty controller	Check and replace. Replace. Replace. Repair or replace. Replace.

70F00-8-33-4



B : Black
G : Green
B/Y : Black/Yellow
Y/Bl : Yellow/Blue

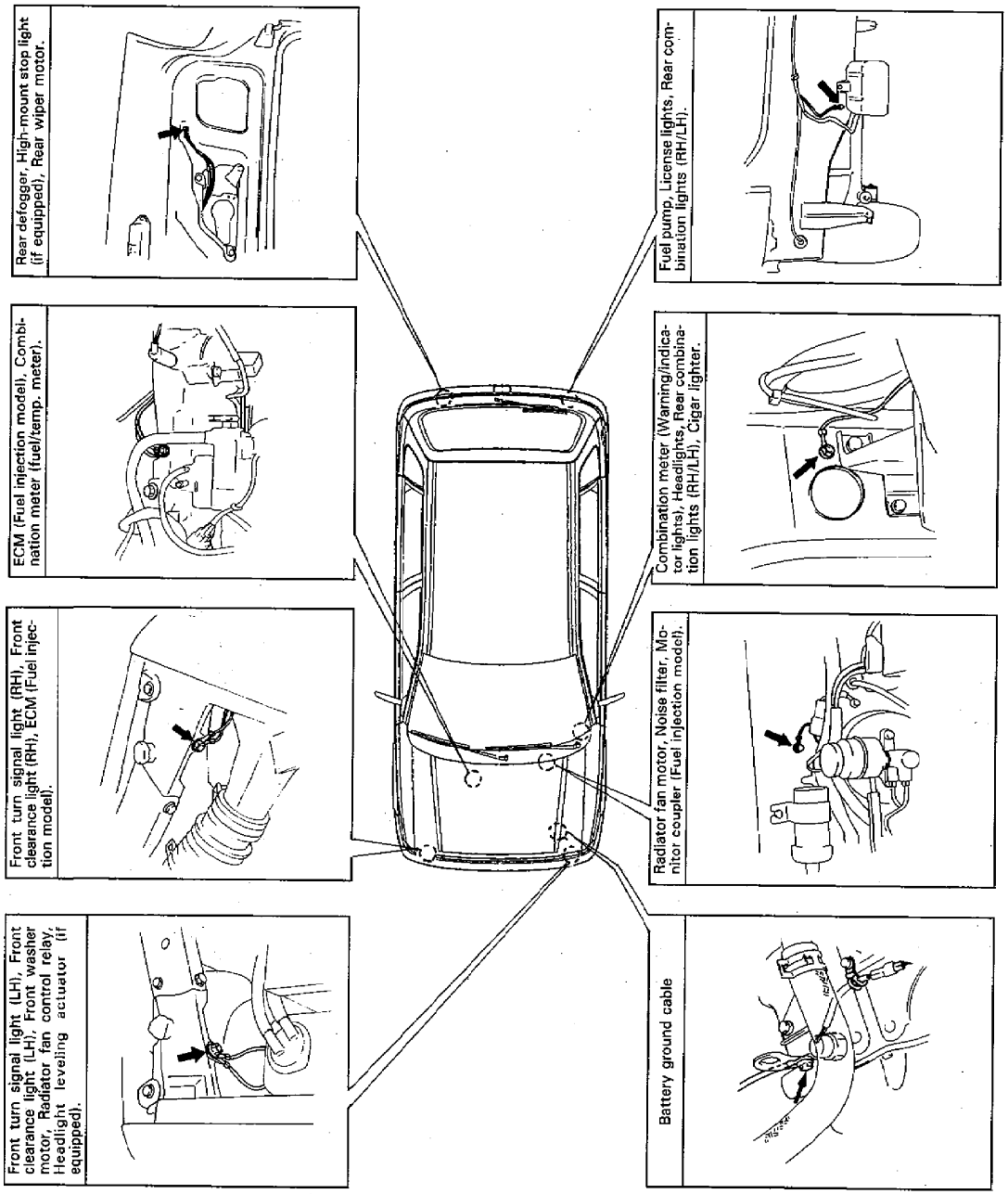
70F00-8-33-5

INSPECTION

HEADLIGHT CLEANER CONTROLLER

1) Turn ON ignition switch and check that voltage between terminals "Y/Bl" and "B" is about 12V.
2) Turn ON cleaner switch and check voltage between terminals "B/Y" and "B". Cleaner controller is proved normal if 0V is indicated for 0.5 sec. and about 12V after 0.5 sec..

GROUNDING POINTS



70F00-8-34-1

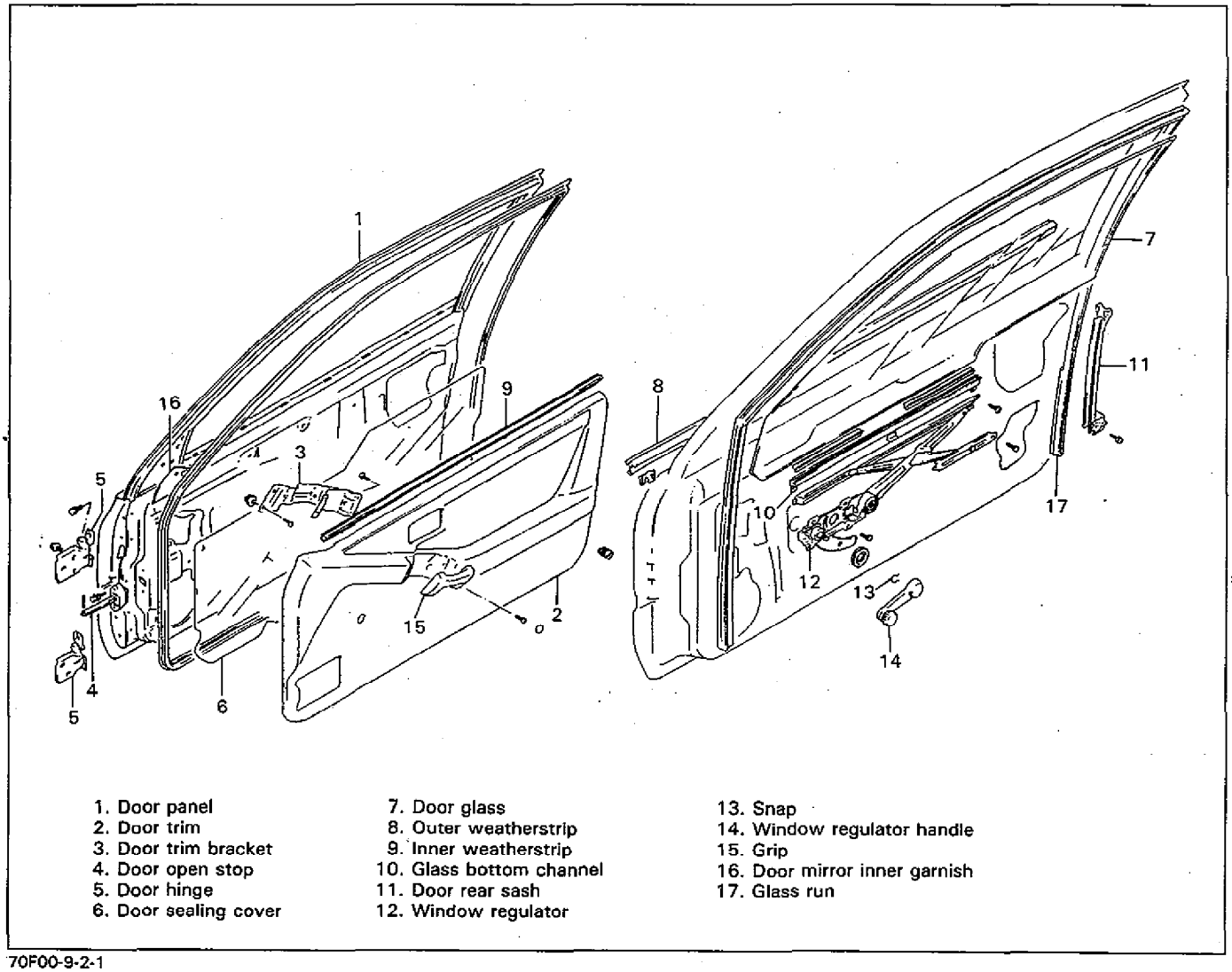
SECTION 9

BODY SERVICE

CONTENTS

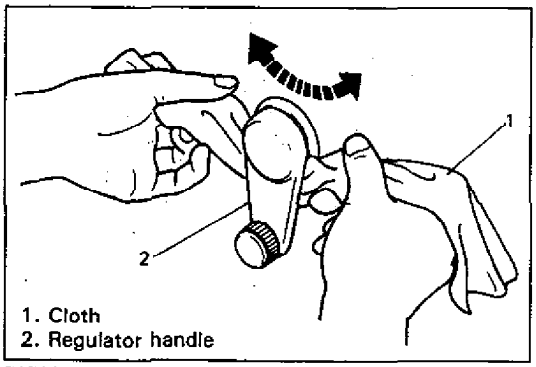
70F00-9-1-1

FRONT DOOR



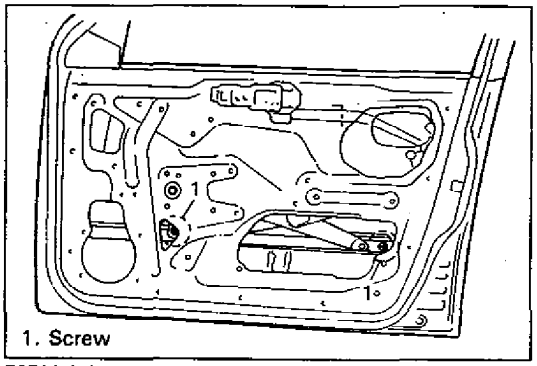
1. Door panel
2. Door trim
3. Door trim bracket
4. Door open stop
5. Door hinge
6. Door sealing cover
7. Door glass
8. Outer weatherstrip
9. Inner weatherstrip
10. Glass bottom channel
11. Door rear sash
12. Window regulator
13. Snap
14. Window regulator handle
15. Grip
16. Door mirror inner garnish
17. Glass run

70F00-9-2-1



1. Cloth
2. Regulator handle

70F00-9-2-4



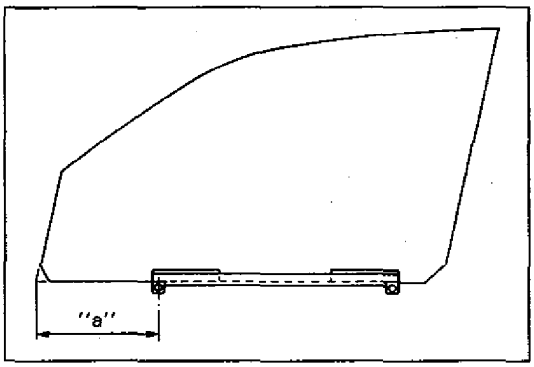
1. Screw

70F00-9-2-5

DOOR GLASS

REMOVAL

1) Remove inside handle bezel.
2) Remove door mirror.
3) Remove window regulator handle.
   For its removal, pull off snap by using a cloth as shown in figure.
4) Remove speaker cover and bracket.
5) Remove door trim with inner weatherstrip.
6) Remove door outer weatherstrip.
7) Peel lower side of door sealing cover.
8) Remove glass bottom channel attaching screws.
9) Take out door glass together with bottom channel.
10) Detach glass from bottom channel.



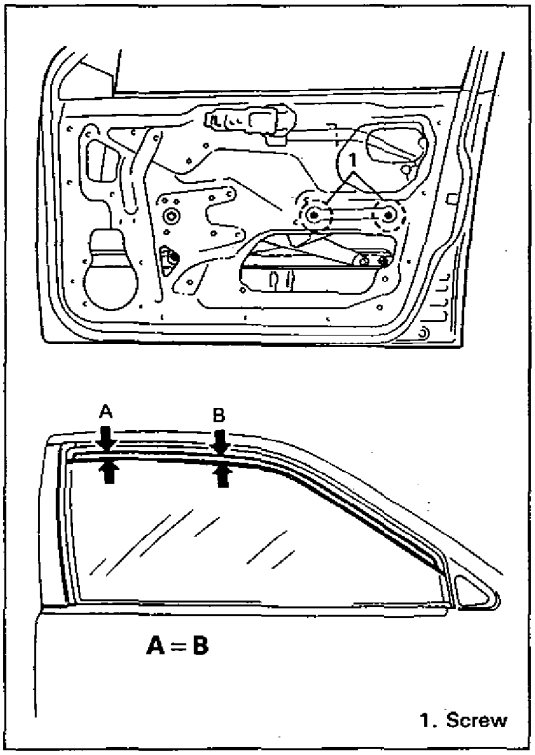
70F00-9-3-1

INSTALLATION

Reverse the removal sequence to install door glass noting the following points:

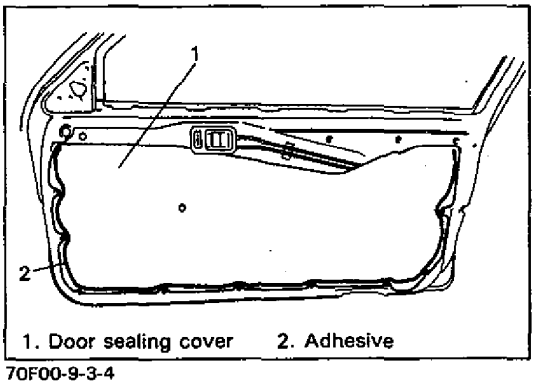
1) When installing glass to bottom channel, coat channel with soap water and tap it with a plastic hammer.
   Glass-fitted position of bottom channel is as shown in figure.

   Dimension "a": 3-door model 175 mm (6.89 in.)
   5-door model 217.5 mm (8.56 in.)



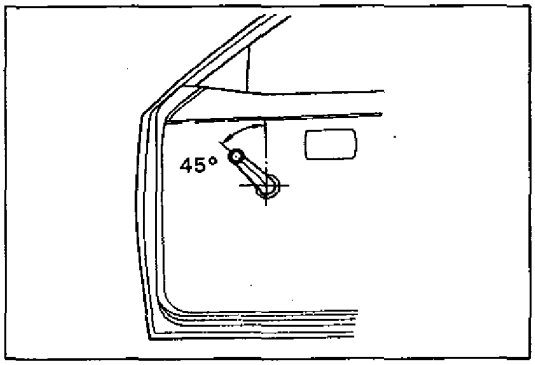
70F00-9-3-2

2) Adjust equalizer of window regulator so that measurements A and B in figure are equal to each other.



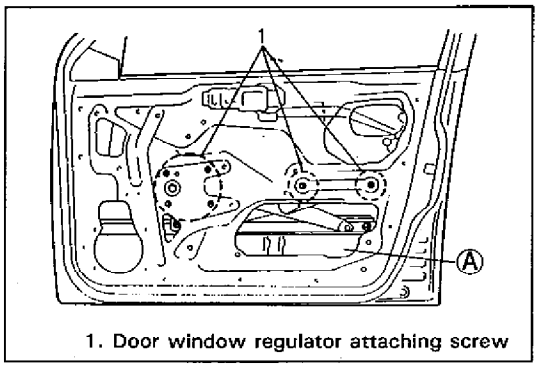
70F00-9-3-4

3) Securely seal door sealing cover with adhesive.



70F00-9-3-5

4) Install door window regulator handle so that it has a 45° angle when glass is fully closed, as illustrated left.



1. Door window regulator attaching screw

70F00-9-4-1

DOOR WINDOW REGULATOR

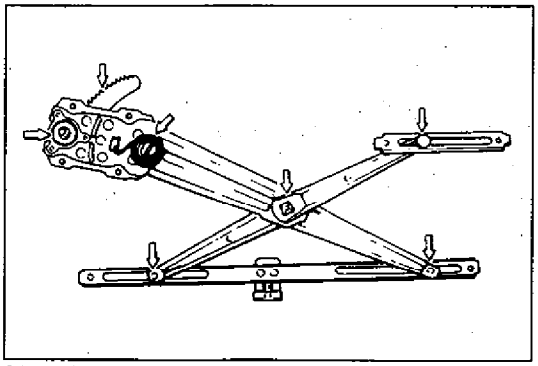
REMOVAL

1) Remove door glass. (See previous section.)
2) Remove window regulator attaching screws (six pcs.). Then, take out regulator through hole Ⓐ.

INSPECTION

- Check gear for wear or damage.
- Check spring for weakened condition.

64B40-9-4-3



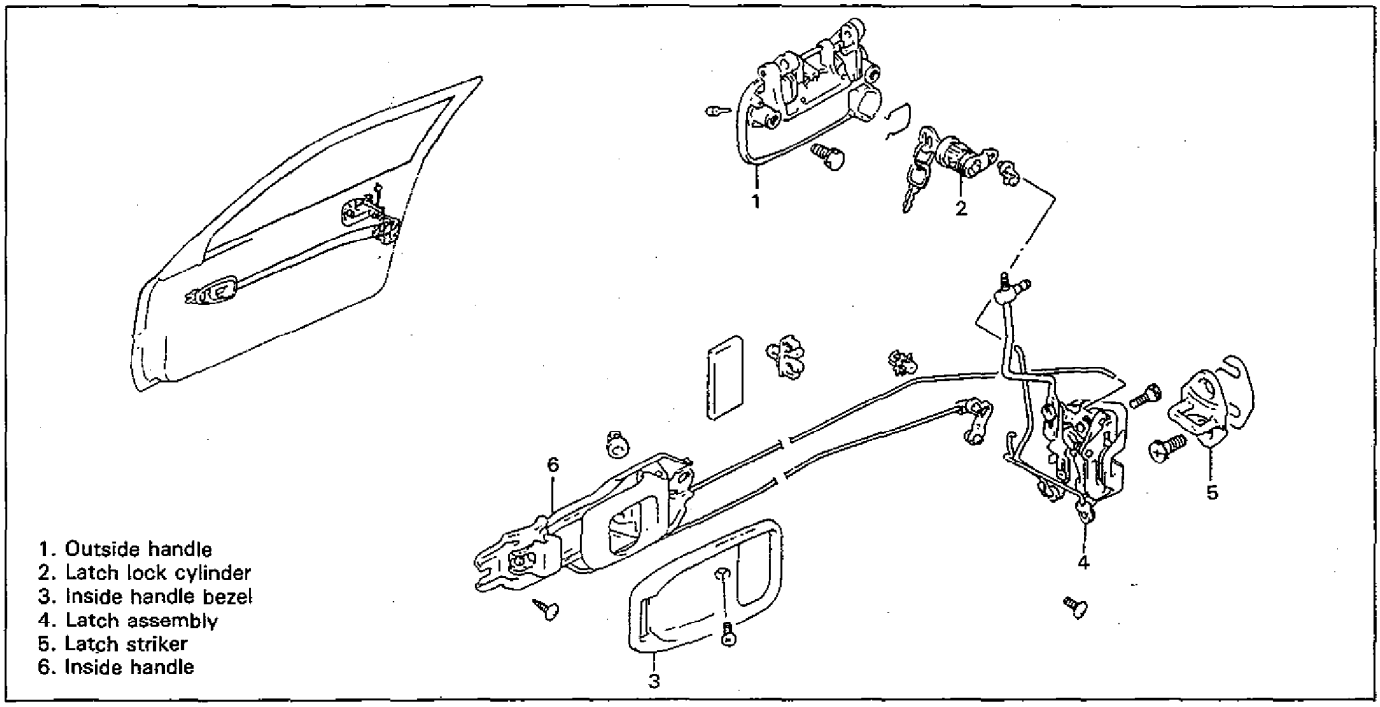
64B40-9-4-4

INSTALLATION

Reverse removal sequence to install door window regulator.

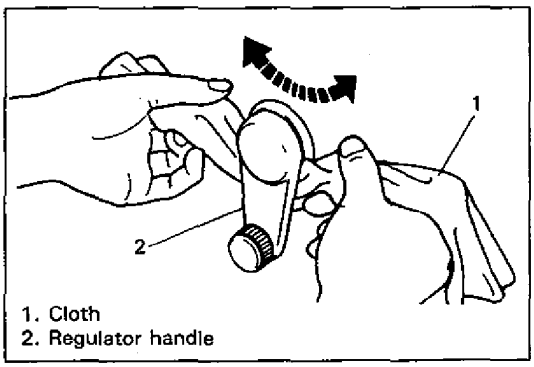
1) Apply multi-purpose grease to sliding parts.

FRONT DOOR LOCK



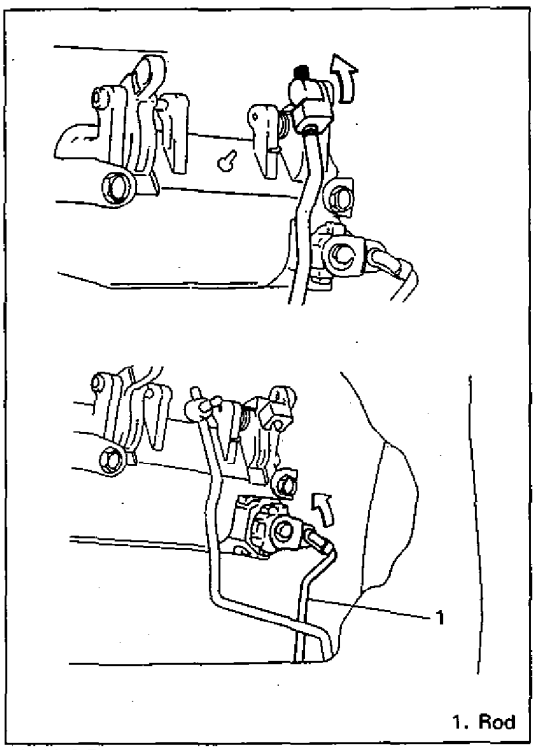
1. Outside handle
2. Latch lock cylinder
3. Inside handle bezel
4. Latch assembly
5. Latch striker
6. Inside handle

70F00-9-5-1



1. Cloth
2. Regulator handle

70F00-9-5-3

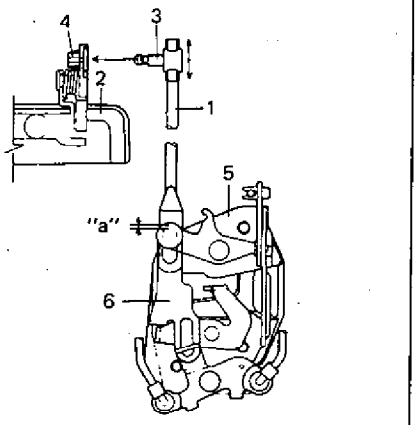


1. Rod

70F00-9-5-4

REMOVAL

1) Remove inside handle bezel.
2) Remove window regulator handle.
   For its removal, pull off snap by using a cloth as shown left.
3) Remove door mirror inner garnish.
4) Remove door trim with inner weatherstrip.
5) Peel rear part of door sealing cover.
6) Remove mounting screw of front door rear sash.
7) After disconnecting each joint of control link, remove door inside handle and door latch ass'y.



1. Door opening rod
2. Outside handle
3. Adjusting joint
4. Adjusting joint snap
5. Door latch ass'y
6. Opening link

64B40-9-7-1

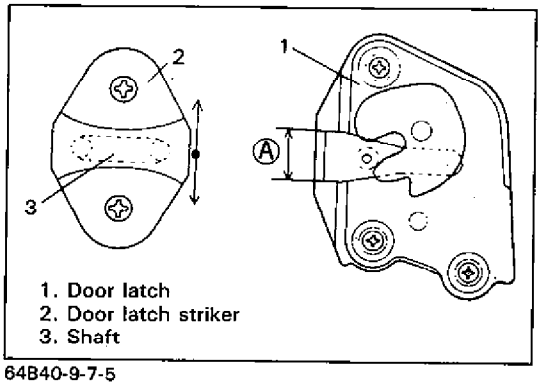
INSTALLATION

Reverse removal sequence for installation while using care for following items.

1) Install door outside opening rod.
When installing opening rod to outside handle, turn joint to adjust distance "a" to specified value below.

NOTE:
Do not push down opening link when adjusting and installing opening rod.

Distance "a": 0—2 mm (0—0.08 in.)

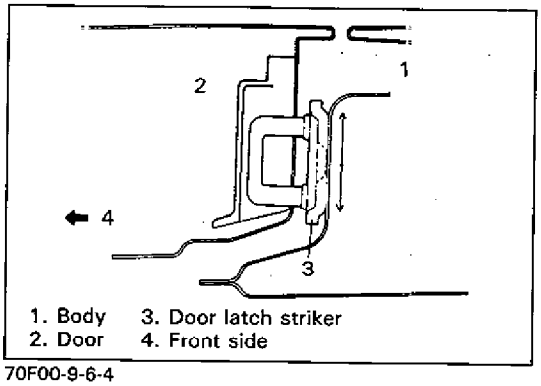


1. Door latch
2. Door latch striker
3. Shaft

64B40-9-7-5

2) Install door latch striker.
Move door latch striker up and down so that its shaft approximately aligns with the center of groove Ⓐ of door latch.

NOTE:
Striker should be placed level and moved vertically, Do not adjust door latch.



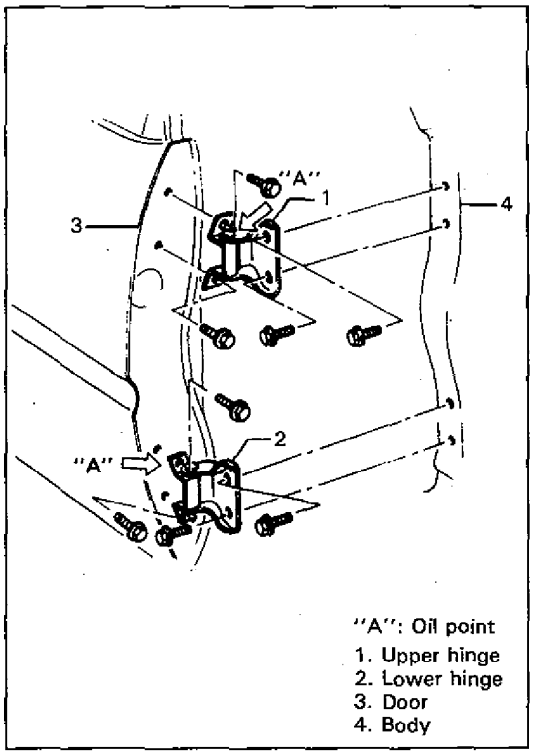
1. Body
2. Door
3. Door latch striker
4. Front side

70F00-9-6-4

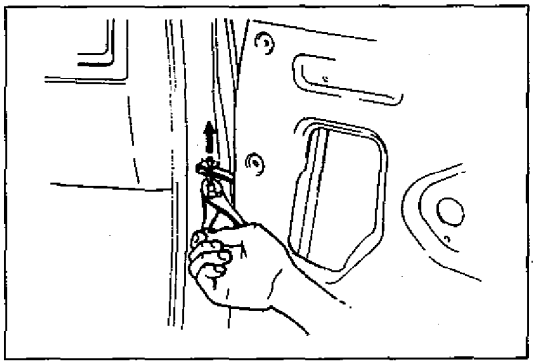
Move door latch striker sideways to adjust to 0 mm (0 in.) the door surface-to-body surface difference with door closed.

NOTE:
Apply oil or grease to striker joints periodically.

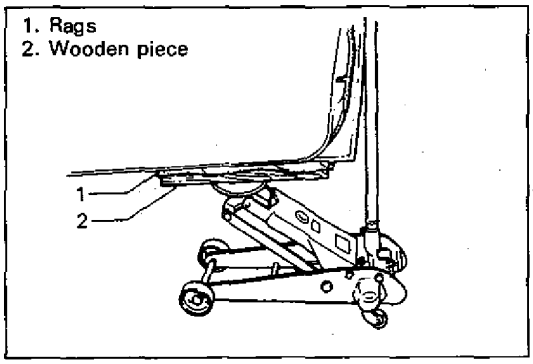
FRONT DOOR ASSEMBLY



64B40-9-9-1



70F00-9-7-3



64B40-9-9-4

REMOVAL

1) Remove door open stop pin upward by tapping it with hammer.
2) Using a jack, support door panel with a piece of wood placed between jack and panel.
3) Remove door ass'y by loosening hinge mounting bolts.

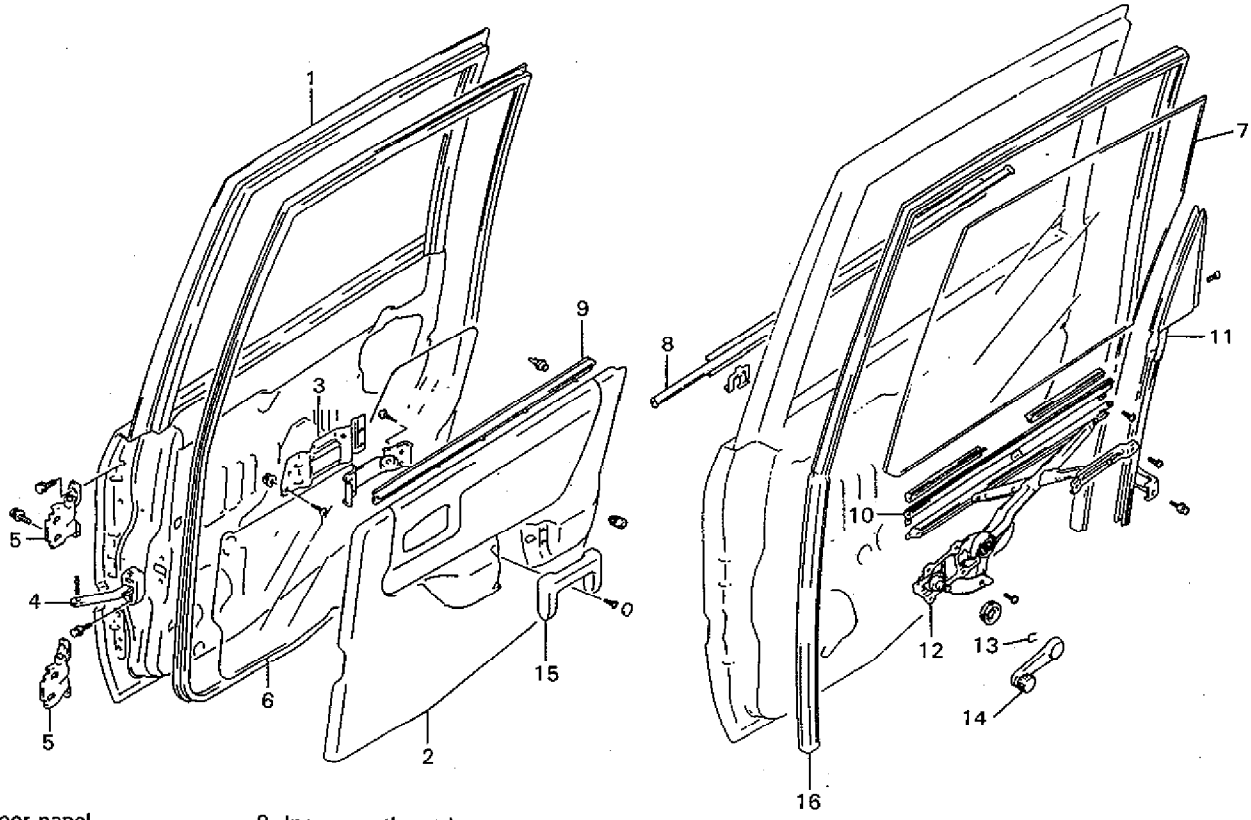
INSTALLATION

Reverse removal sequence to install front door.

- When weatherstrip is hardened, water leak may develop. In such case, replace it with new one.
- After installing, adjust door latch striker position by referring to FRONT DOOR LOCK INSTALLATION section so that door is positioned correctly.

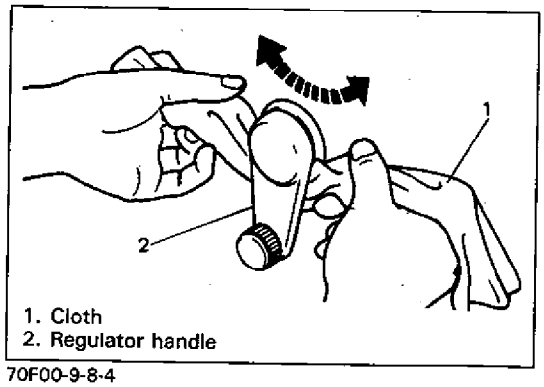
64B40-9-9-5

REAR DOOR



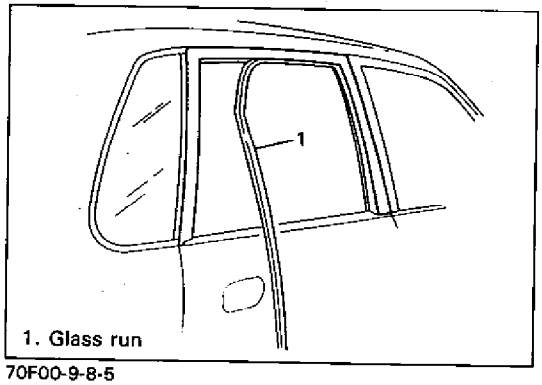
1. Door panel
2. Door trim
3. Door trim bracket
4. Door open stop
5. Door hinge
6. Door sealing cover
7. Door glass
8. Outer weatherstrip
9. Inner weatherstrip
10. Glass bottom channel
11. Door rear sash
12. Window regulator
13. Snap
14. Window regulator handle
15. Grip
16. Glass run

70F00-9-8-1



1. Cloth
2. Regulator handle

70F00-9-8-4



1. Glass run

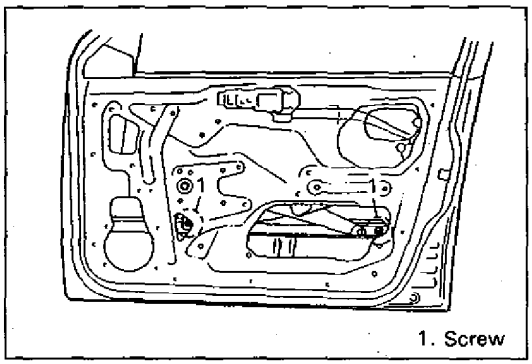
70F00-9-8-5

DOOR GLASS

REMOVAL

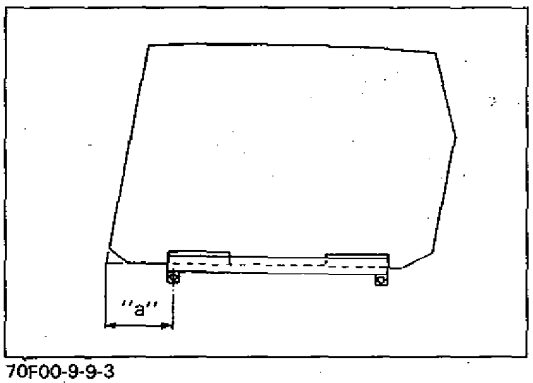
1) Remove inside handle bezel.
2) Remove window regulator handle.
   To remove regulator handle, pull off snap ring by using a cloth as shown left.
3) Remove door trim with inner weatherstrip.
4) Peel lower side of door sealing cover.
5) Remove door outer weatherstrip.

6) Detach rear part of glass run.



70F00-9-9-1

7) Remove glass bottom channel attaching screws. Then, take out door glass together with bottom channel.
8) Detach glass from bottom channel.



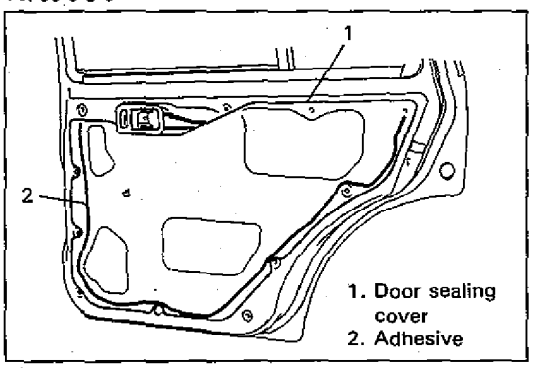
70F00-9-9-3

INSTALLATION

Reverse removal sequence to install door glass.
However, be careful of following points.

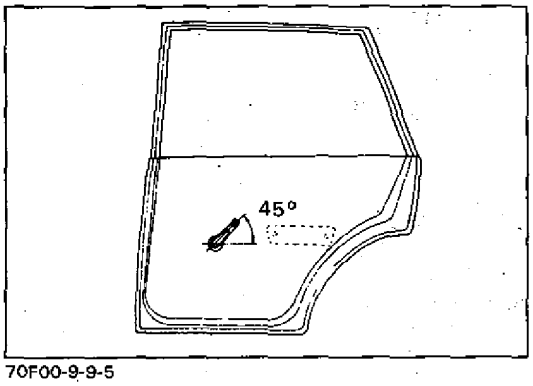
1) When installing glass to bottom channel, coat channel with soap water and tap it with a plastic hammer.
Glass-fitted position of bottom channel is as shown left.

Dimension "a": 138.5 mm (5.45 in.)



70F00-9-9-4

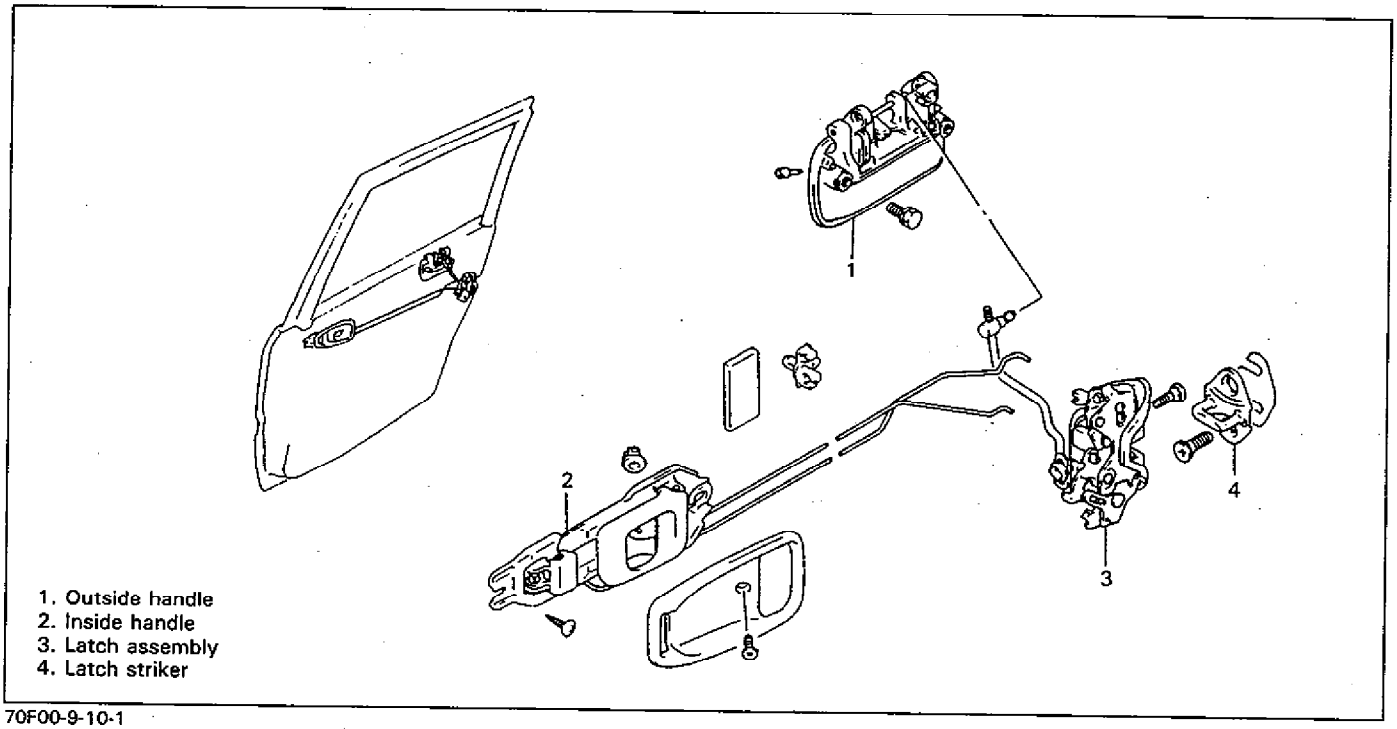
2) Securely seal door sealing cover with adhesive.



70F00-9-9-5

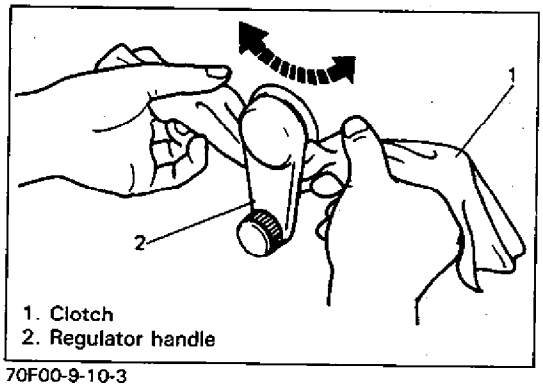
3) Install door window regulator handle so that it has a 45° angle when glass is fully closed, as illustrated left.

REAR DOOR LOCK



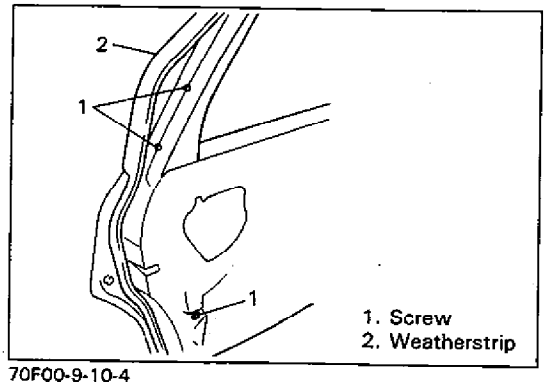
1. Outside handle
2. Inside handle
3. Latch assembly
4. Latch striker

70F00-9-10-1



1. Clotch
2. Regulator handle

70F00-9-10-3



1. Screw
2. Weatherstrip

70F00-9-10-4

REMOVAL

1) Remove inside handle bezel.
2) Remove window regulator handle.
   For its removal, pull off snap by using a cloth as shown left.
3) Remove door trim with inner weatherstrip.
4) Remove rear part of door sealing cover.
5) Detach rear part of glass run.
6) Remove door rear sash.
7) After disconnecting each joint of control link, remove door inside handle and door latch assembly. Refer to "FRONT DOOR LOCK".

INSTALLATION

Reverse removal sequence to install rear door lock.

REAR DOOR WINDOW REGULATOR

REMOVAL/INSTALLATION

Follow procedures for Front Door Window Regulator removal/installation in this section.

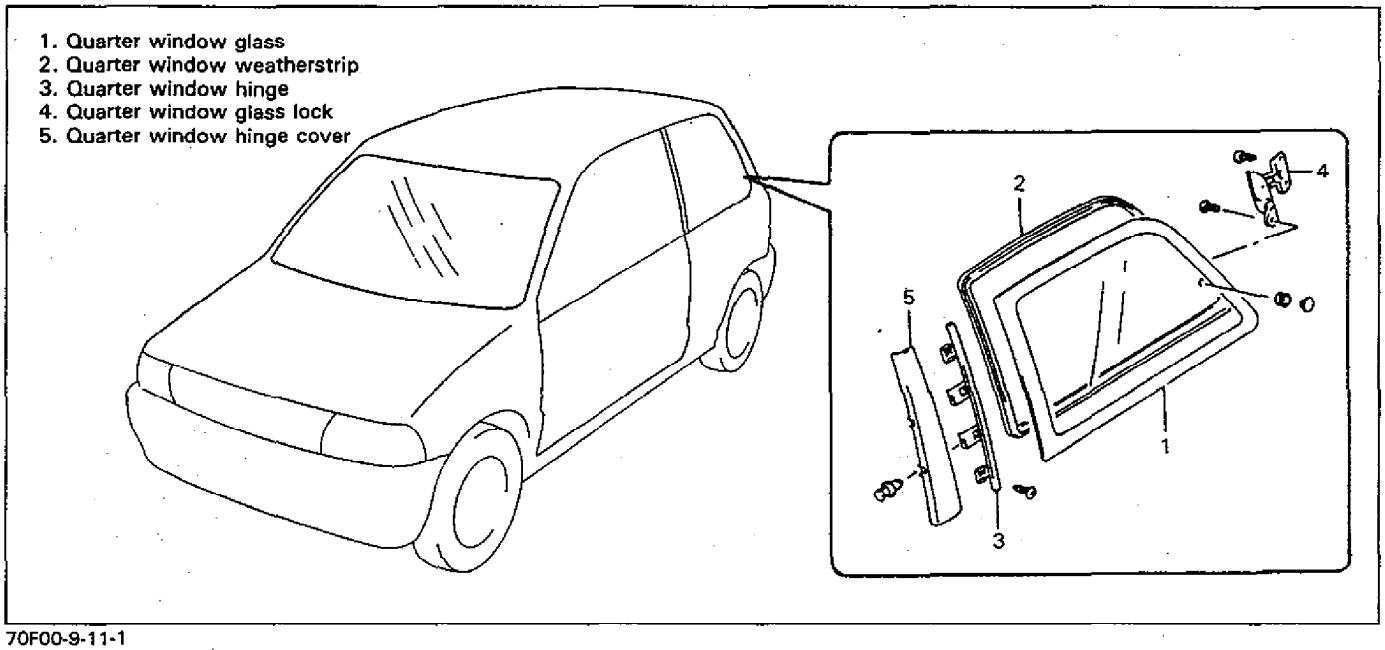
REAR DOOR ASSEMBLY

REMOVAL/INSTALLATION

Follow procedures for Front Door removal/installation in this section.

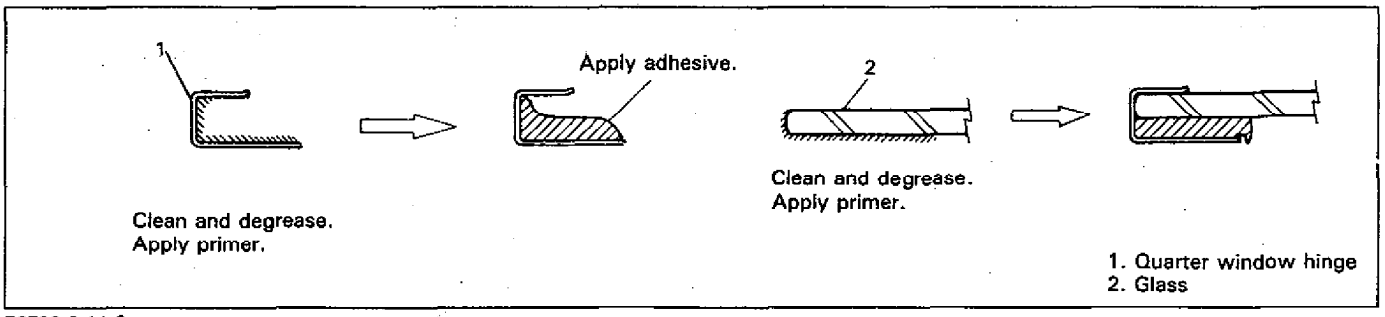
REAR QUARTER WINDOW (For 3-door model)

Quarter window glass is adhered to hinge protector.

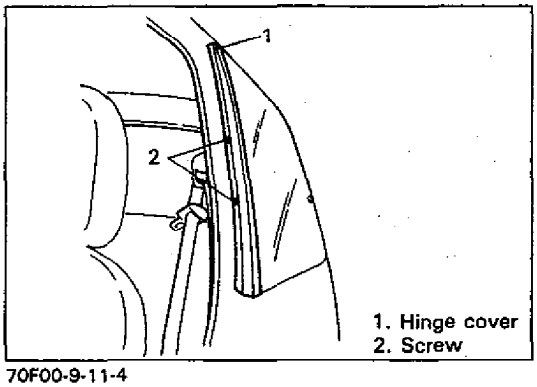


70F00-9-11-1

ADHESION PROCEDURE



70F00-9-11-3



70F00-9-11-4

REMOVAL

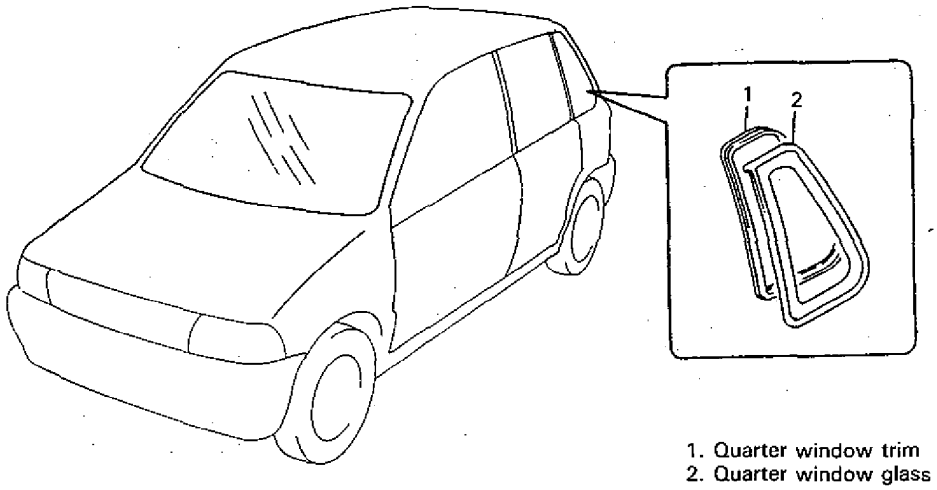
1) Remove quarter window glass lock.
2) Remove hinge cover.
3) Remove quarter window glass.

INSTALLATION

Reverse removal procedure.

REAR QUARTER WINDOW (For 5-door model)

The rear quarter window is installed by using a special type of adhesive (that is, one component urethane adhesive used with primer). For window glass replacement, it is important to use an adhesive which provides sufficient adhesion strength and to follow the proper procedure.



1. Quarter window trim
2. Quarter window glass (equipped with molding)

70F00-9-12-1

CAUTION:
Described here is the glass replacement by using one component urethane adhesive to be used with primer in combination. Each adhesive has its own drying and setting time and must be handled and used in a certain specific procedure. Negligence in following such procedure or misuse of the adhesive in any way hinders its inherent adhesive property. Therefore, before the work, make sure to read carefully the instruction and description given by the maker of the adhesive to be used and be sure to follow the procedure and observe each precaution throughout the work.

Use an adhesive of above mentioned type which has following property.

Separating strength: 15—20 kg/10 mm (width) or more
(Peeling) (83.8—112 lb/in. (width))

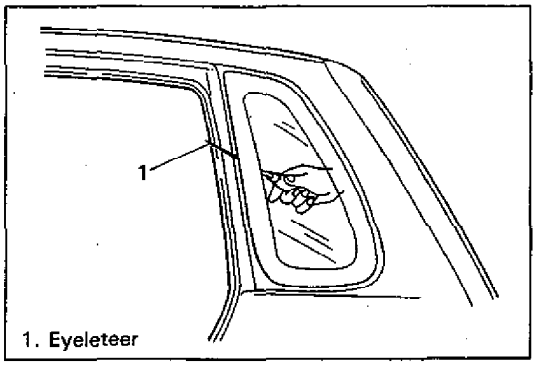
Shearing strength : 30 kg/cm² (427 lb/in²) or more

64B40-9-15-3

Adhesive materials and tools required for removal and installation.

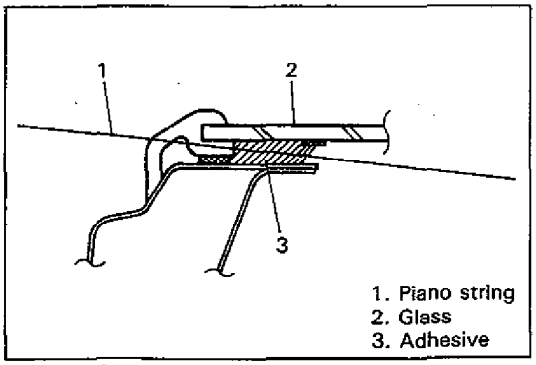
- New quarter window glass (equipped with molding) and trim.
- One component urethane adhesive and primers used in combination (For one sheet of window glass).
  Adhesive (67 g (2.36 oz.))
  Primer for glass (20 g (0.71 oz.))
  Primer for body (20 g (0.71 oz.))
  Primer for urethane (molding) (20 g (0.71 oz.))
- Eyeleteer
- Piano string
- Brush for primer application (3 pcs)
- Knife
- Rubber sucker grip
- Sealant gun (for filling adhesive)
- Putty spatula (for correcting adhered parts)

70F00-9-13-1



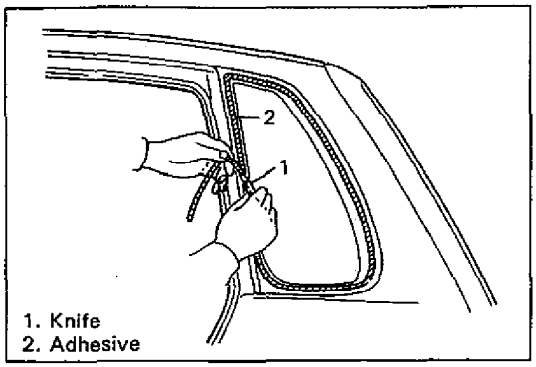
1. Eyeleteer

70F00-9-13-3



1. Piano string
2. Glass
3. Adhesive

70F00-9-13-4



1. Knife
2. Adhesive

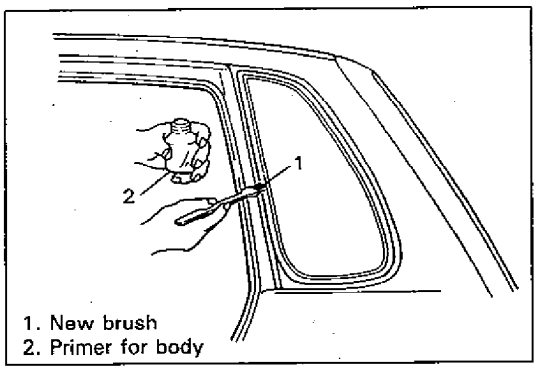
70F00-9-13-5

REMOVAL

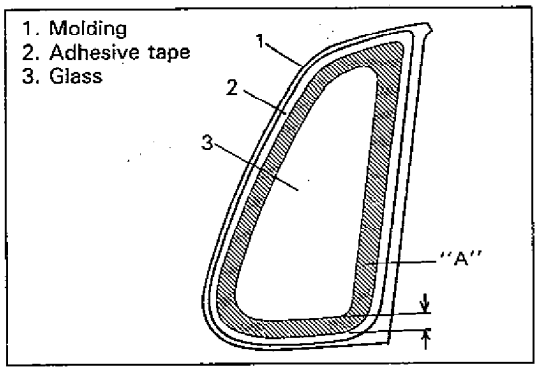
1) Cut molding all around quarter glass with knife.
2) Using a tape, cover body surface around quarter window glass to prevent any damage.
3) Remove quarter window trim.
4) Drill a hole with an eyeleteer through adhesive and let a piano string through it.
5) Cut adhesive all around quarter glass with piano string.

NOTE:
Use piano string as close to glass as possible so as to prevent damage to body.

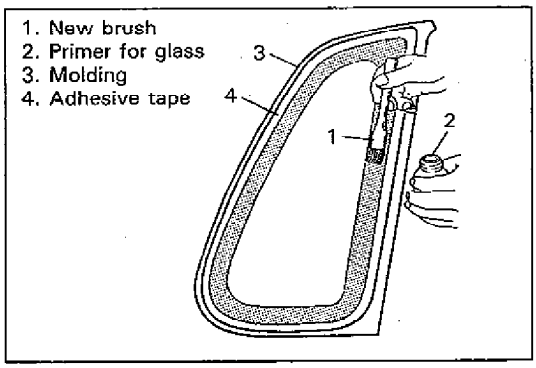
6) Using a knife, smooth adhesive remaining on body side so that it is 2—3 mm thick all around.
7) Where adhesive tape will be attached, remove adhesive until painted surface is exposed and clean.



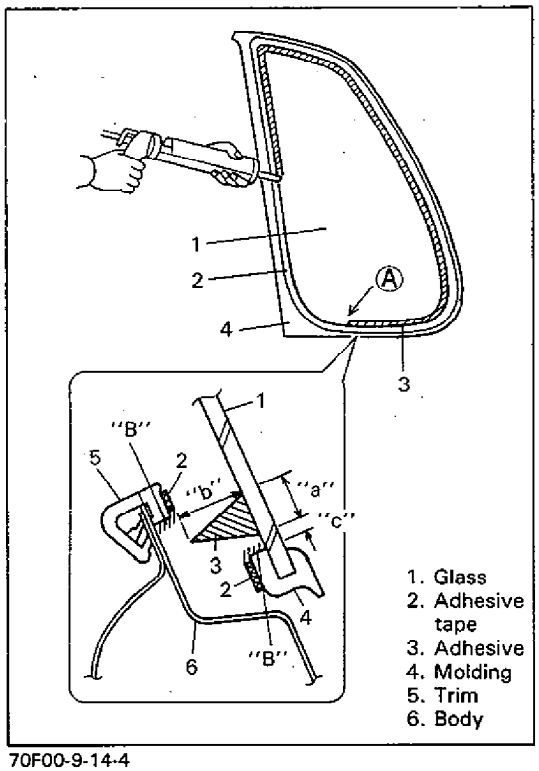
70F00-9-14-1



70F00-9-14-2



70F00-9-14-3



70F00-9-14-4

INSTALLATION

1) Using cleaning solvent, clean window opening edge where window glass is to be adhered. (Let it dry for more than 10 minutes.)
2) Install new quarter window trim.
3) Using a new brush, apply sufficient amount of primer for quarter window trim where window is to be adhered.

NOTE:
Be sure to refer to maker's instruction for proper handling and drying time.

4) Clean glass surface "A" to be adhered to window with clean cloth. If unleaded gasoline is used, let it dry for more than 10 minutes.

Width "A": Approx. 15 mm (0.59 in.)

5) Using a new brush, appy sufficient amount of primer for glass along glass surface to be adhered to window.

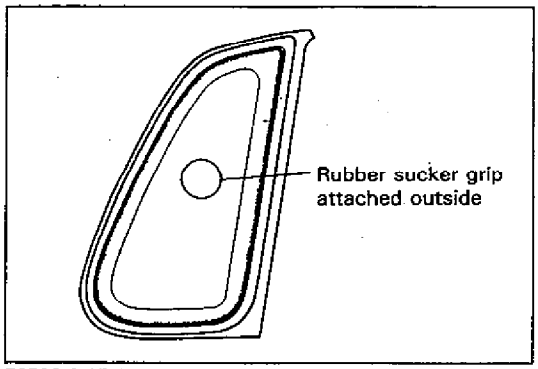
NOTE:
- **Be sure to refer to maker's instruction for proper handling and drying time.**
- **Do not touch primer coated surface.**

6) Using new brush, apply sufficient amount of primer for molding (urethane), trim and adhesive tape to surface "B" as shown in figure.
7) Apply adhesive as shown.

NOTE:
Start from bottom side Ⓐ of glass.

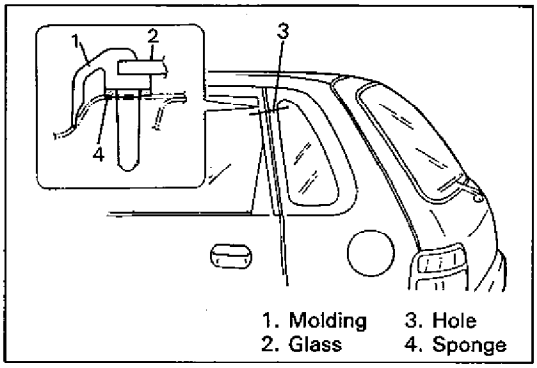
Width "a" : Approx. 8 mm (0.32 in.)
Height "b": Approx. 13 mm (0.51 in.)
Width "c" : Approx. 1 mm (0.04 in.)

8) Peel remaining paper from adhesive tape for molding and quarter window trim.



70F00-9-15-1

9) Attach rubber sucker grip to outside of glass.
Use of a rubber sucker grip is helpful to hold and carry glass after adhesive is applied.



70F00-9-15-2

10) With bottom edge of quarter glass placed along opening for quarter window in body and lug of molding fit in positioning hole in body, press quarter glass for firm adhesion.

70F00-9-15-3

11) Check for water leakage by running water from hose over window. If leakage is found, dry window and fill leaky point with adhesive. If water still leaks even after that, remove glass and start installation procedure all over again.

NOTE:

- **Do not use high pressure water.**
- **Do not blow compressed air directly at adhesive applied part when drying.**
- **Do not use an infrared lamp or the like for drying.**

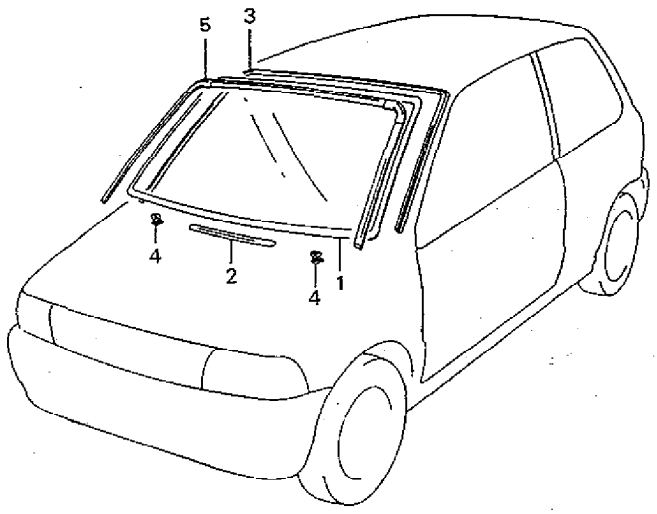
CAUTION:

Upon completion of installation, note the following.

- **Sudden closing of door before adhesive is completely set may cause glass to become loose or to come off. Therefore, if door is opened or closed before adhesive is completely set, make sure to open all door glasses and use proper care.**
- **Each adhesive has its own setting time. Be sure to refer to maker's instruction, check setting time of adhesive to be used and observe precautions to be taken before adhesive is set.**
- **Refrain from driving till adhesive is completely set so as to ensure proper and sufficient adhesion.**

WINDSHIELD

The front windshield is installed by using a special type of adhesive (that is, one component urethane adhesive used with primer). For the Windshield replacement, it is important to use an adhesive which provides sufficient adhesion strength and the follow the proper procedure.



1. Windshield glass
2. Windshield glass spacer
3. Windshield opening trim
4. Windshield glass stopper
5. Windshield molding

70F00-9-16-1

CAUTION:
Described here is the glass replacement by using one component urethane adhesive which is used with primer in combination. Each adhesive has its own drying and setting time and must be handled and used according to specific procedure. Negligence in following such procedure or misuse of adhesive in any way hinders its inherent adhesive property. Therefore, before work, make sure to read carefully instruction and description given by the maker of adhesive to be used and be sure to follow the procedure and observe each precaution throughout the work.

70F00-9-16-3

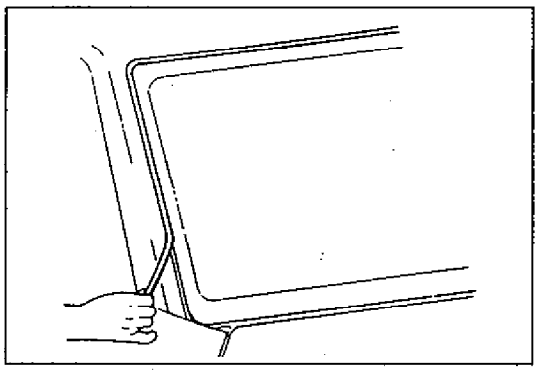
Use an adhesive of above mentioned type which has following property.

Shearing strength: 40 kg/cm² or more (569 lb/in.²)

Adhesive materials and tools required for removal and installation.

- New windshield opening trim, molding and glass spacer.
- One component urethane adhesive and primer used in combination (For one sheet of windshield glass).
  Adhesive (350 g (12.3 oz))
  Primer for glass (20 g (0.71 oz.))
  Primer for body (20 g (0.71 oz.))
  Primer for molding (20 g (0.71 oz.))
- Eyeleteer
- Piano string
- Brush for primer application (3 pcs)
- Knife
- Rubber sucker grip
- Sealant gun (for filling adhesive)
- Putty spatula (for correcting adhered parts)

70F00-9-16-4



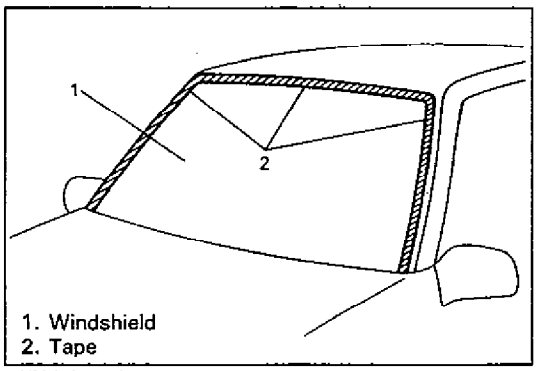
70F00-9-17-1

REMOVAL

1) Clean both inside and outside of glass and around it.
2) Remove wiper arms and garnish with washer hose.
3) Loosen glass stopper.
4) Remove molding and trim.

NOTE:

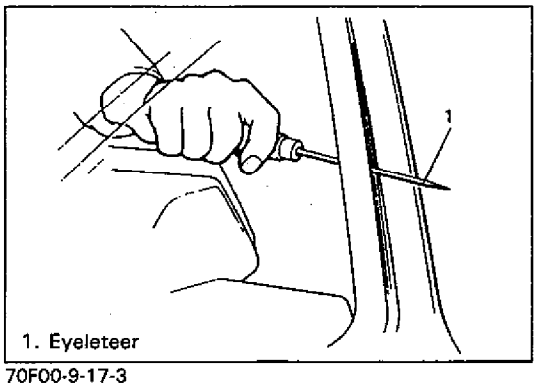
- **Molding and trim can not be reused.**



1. Windshield
2. Tape

70F00-9-17-2

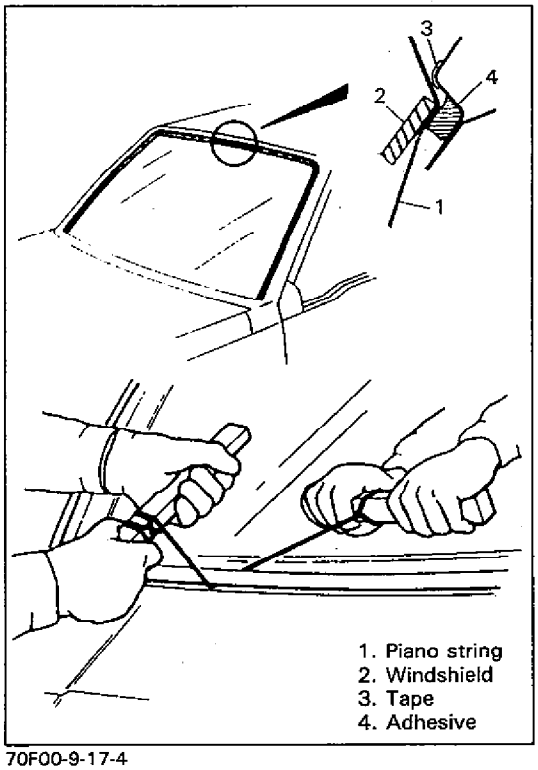
5) Using tape, cover body surface around windshield to prevent any damage.
6) Remove room mirror.



1. Eyeleteer

70F00-9-17-3

7) Drill hole with eyeleteer through adhesive and let piano string through it.



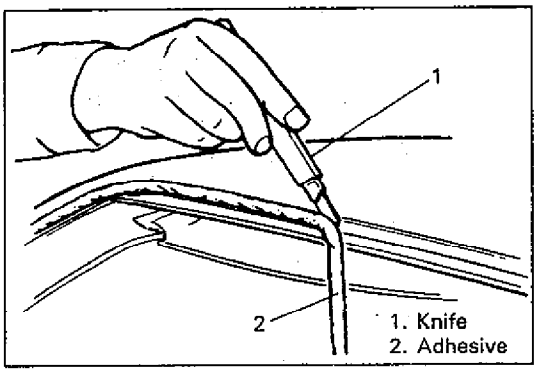
1. Piano string
2. Windshield
3. Tape
4. Adhesive

70F00-9-17-4

8) Cut adhesive all around windshield with piano string.

NOTE:

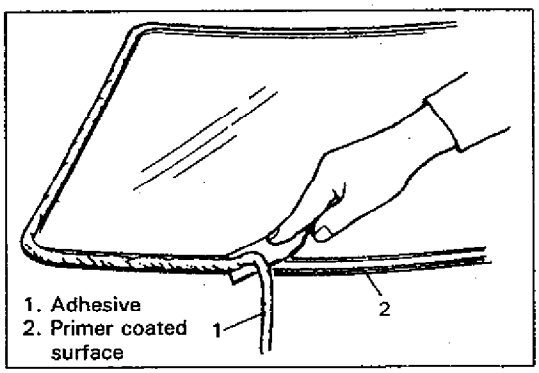
- **Use piano string as close to glass as possible so as to prevent damage to body.**
- **Use care when cutting adhesive. Attempt to cut it in haste may result in cutting piano string or damaging instrument panel.**



70F00-9-18-1

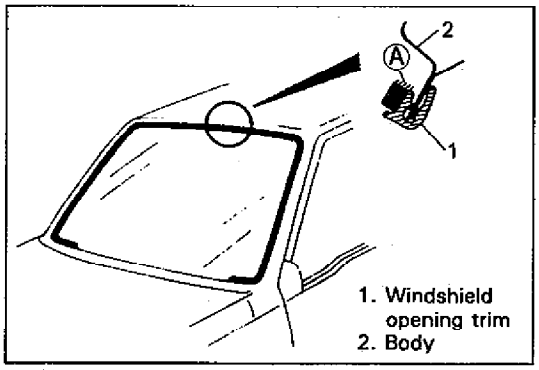
9) Using knife, smoothen adhesive remaining on body side so that it is 1 to 2 mm thick all around.

NOTE:
Before using knife, clean it with alcohol or the like to remove oil from it.



70F00-9-18-2

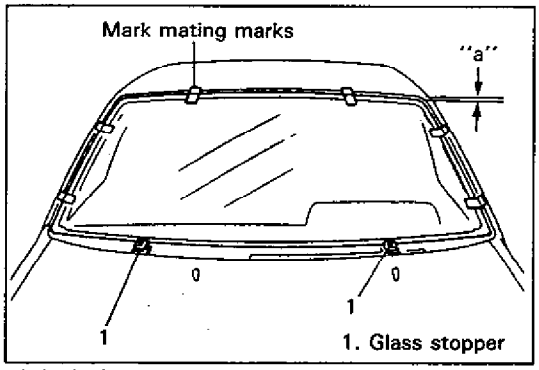
10) When re-using windshield, remove the adhesive from it, using care not to damage primer coated surface.



70F00-9-19-1

INSTALLATION

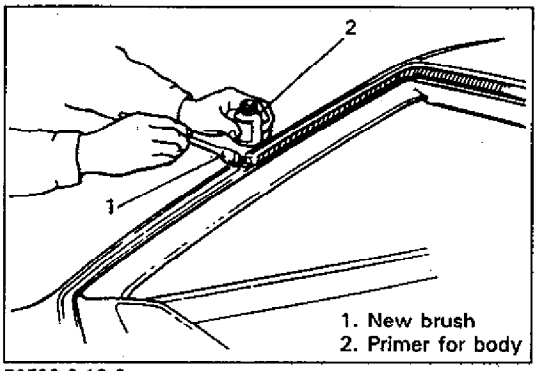
1) Using cleaning solvent, clean windshield edge where windshield glass is to be adhered. (Let it dry for more than 10 minutes.)
2) Clean trim surface Ⓐ with clean cloth. (Refer to left figure.)
3) Install windshield opening trims.



70F00-9-19-2

4) To determine installing position of glass to body, position glass against body so that clearance between upper end of glass and body is about 6 mm (0.236 in.) and clearances between each side end (right & left) of glass and body are even. Then mark mating marks on glass and body as shown in figure. Upper clearance can be adjusted by moving stoppers position.

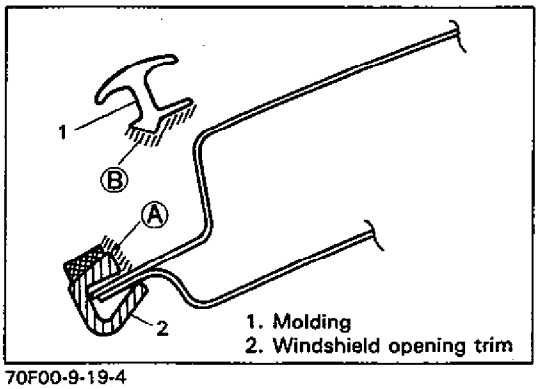
Clearance "a": 6 mm (0.24 in.)



70F00-9-19-3

5) Using new brush, apply sufficient amount of primer for body along body surface where windshield glass is to be adhered.

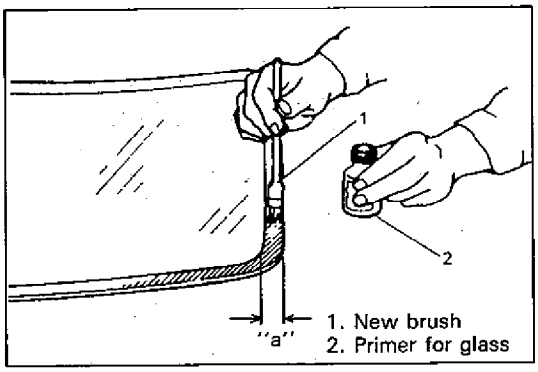
NOTE:
Be sure to refer to primer maker's instruction for proper handling and drying time.



70F00-9-19-4

6) Clean new molding surface Ⓑ with clean cloth. (Refer to left figure.)
7) Using new brush, apply sufficient amount of primer for molding and trim (urethane) to surface Ⓐ and Ⓑ as shown in figure.

8) Clean glass surface to be adhered to body with a piece of clean cloth. If cleaning solvent is used, let it dry for more than 10 minutes.



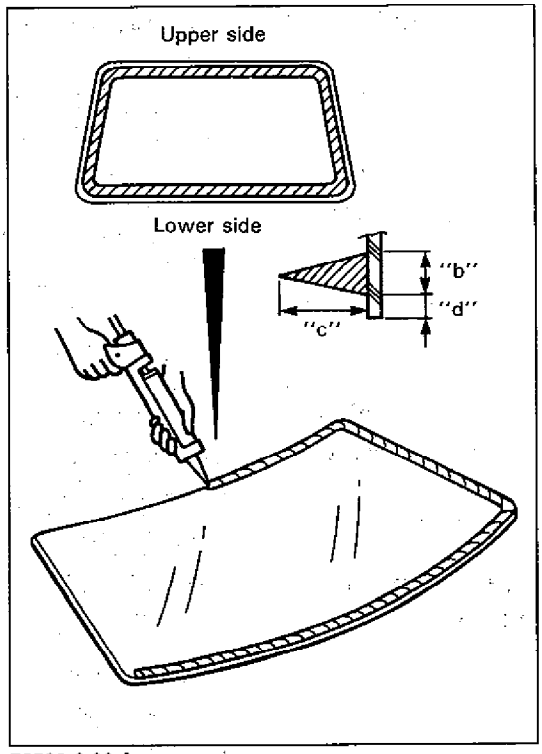
70F00-9-20-1

9) Using new brush, apply sufficient amount of primer for glass along glass surface to be adhered to body.

Width "a": Approx. 18 mm (0.71 in.)

NOTE:

- **Be sure to refer to primer maker's instruction for proper handling and drying time.**
- **Do not touch primer coated surface.**



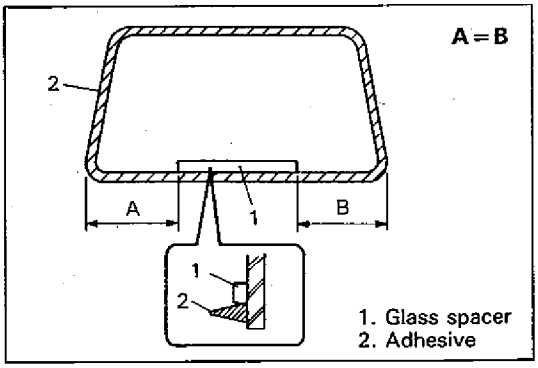
70F00-9-20-2

10) Apply adhesive along glass edge.

Width "b" : Approx. 8 mm (0.32 in.)
Height "c": Approx. 16 mm (0.63 in.)
Width "d" : Approx. 1 mm (0.04 in.)

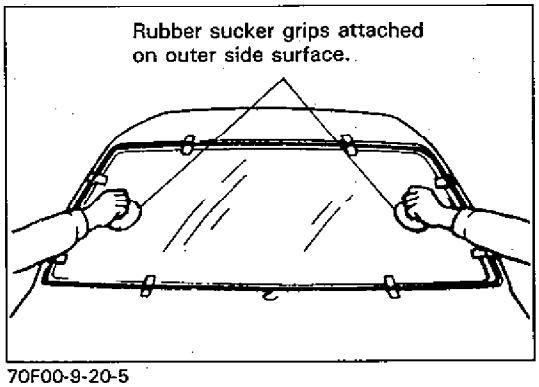
NOTE:

- **Start from bottom side of glass.**
- **Adhesive should be applied evenly especially in height.**
- **Be careful not to damage primer.**
- **Press glass against body quickly after adhesive is applied.**
- **Use of rubber sucker grips is helpful to hold and carry glass after adhesive is applied.**



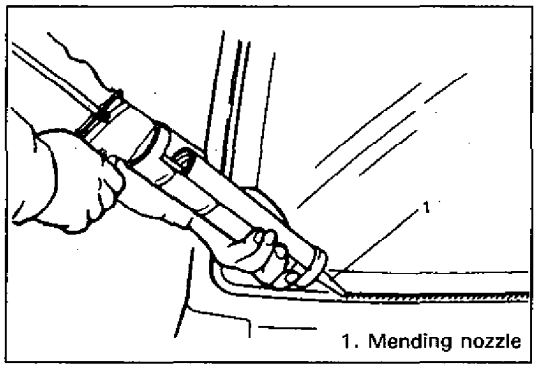
70F00-9-20-4

11) Peel paper from new glass spacer and attach that lower side to windshield.



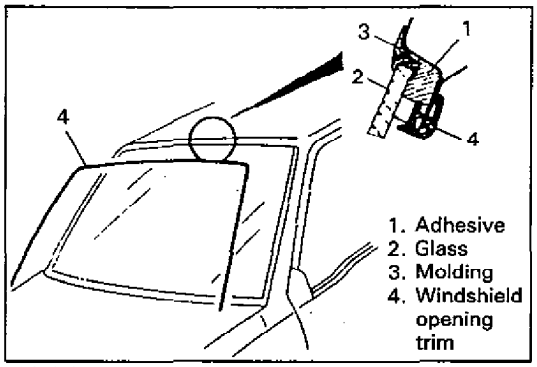
70F00-9-20-5

12) Peel remaining paper from trim.
13) Holding rubber sucker grips, place glass onto body by aligning mating marks marked in step 5) and press it.



70F00-9-21-1

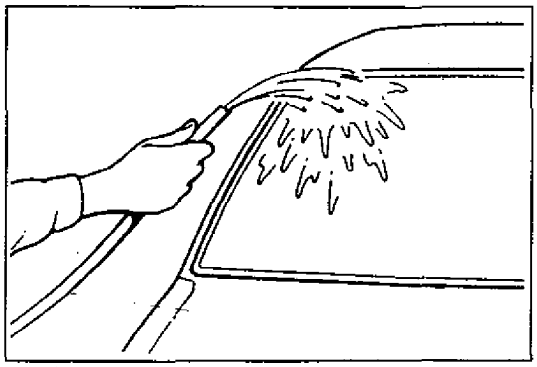
14) Replace cartridge nozzle with mending nozzle and fill adhesive into underfilled part. Where adhesive is overfilled, remove excess. Also wipe off adhesive on body and glass, if any, with cleaning solvent.



70F00-9-21-2

15) Fit molding. Warming molding for over half an hour at 35°C (95°F) temperature will facilitate work.

CAUTION:
Do not tap the molding with a wooden hammer or like when installing it. The glass may break.



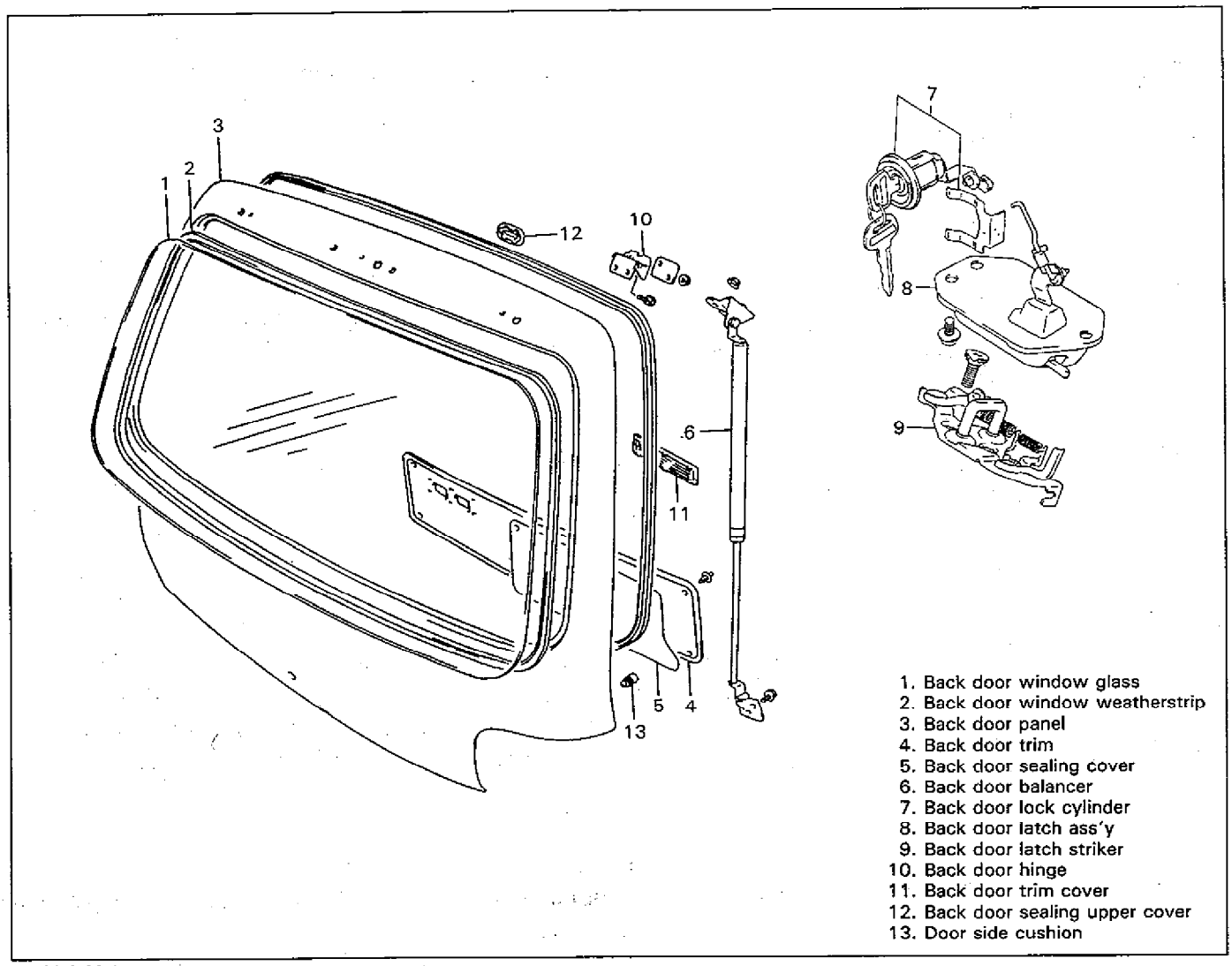
70F00-9-21-3

16) Check for water leakage by pouring water over windshield through hose. If leakage is found, dry windshield and fill leaky point with adhesive. If water still leaks even after that, remove glass and start installation procedure all over again.

NOTE:
- **Do not use high pressure water.**
- **Do not blow compressed air directly at adhesive applied part when drying.**
- **Do not use infrared lamp or like for drying.**

CAUTION:
Upon completion of installation, note the following.
- **Sudden closing of door before adhesive is completely set may cause glass to become loose or to come off. Therefore, if door is opened or closed before adhesive is completely set, make sure to open all door glasses and use proper care.**
- **If molding is not securely in place, hold it down with a tape until adhesive is completely set.**
- **Each adhesive has its own setting time. Be sure to refer to its maker's instruction, check setting time of adhesive to be used and observe precautions to be taken before adhesive is set.**
- **Refrain from driving till adhesive is completely set so as to ensure proper and sufficient adhesion.**

BACK DOOR



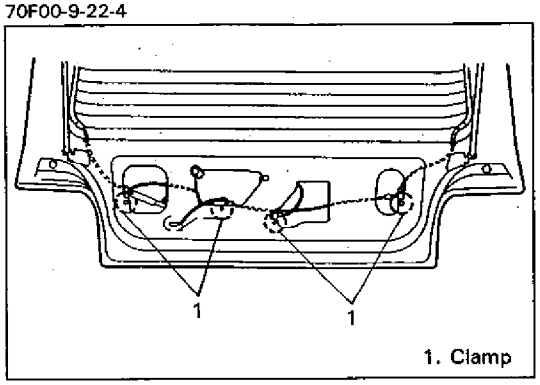
1. Back door window glass
2. Back door window weatherstrip
3. Back door panel
4. Back door trim
5. Back door sealing cover
6. Back door balancer
7. Back door lock cylinder
8. Back door latch ass'y
9. Back door latch striker
10. Back door hinge
11. Back door trim cover
12. Back door sealing upper cover
13. Door side cushion

70F00-9-22-1

REMOVAL

1) Remove back door trim.
2) Disconnect wire harness connector inside back door to take it out from door. As to vehicle provided with rear washer, disconnect washer hose.
3) Remove back door balancer lower (door side) fitting screws.
4) Remove door hinge bolts, and then door.

70F00-9-22-4



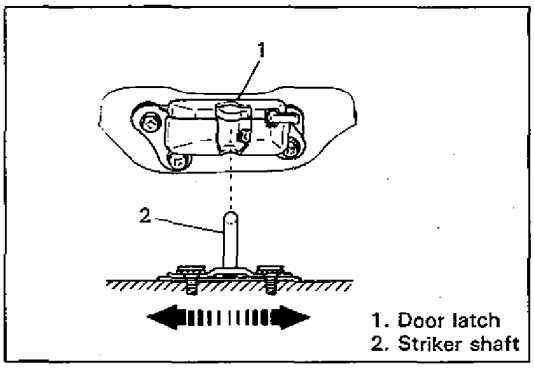
1. Clamp

70F00-9-22-5

INSTALLATION

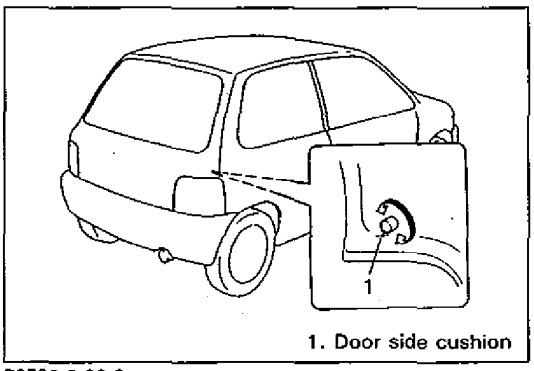
Reverse removal sequence noting following points.

1) Securely clamp wire harnesses.



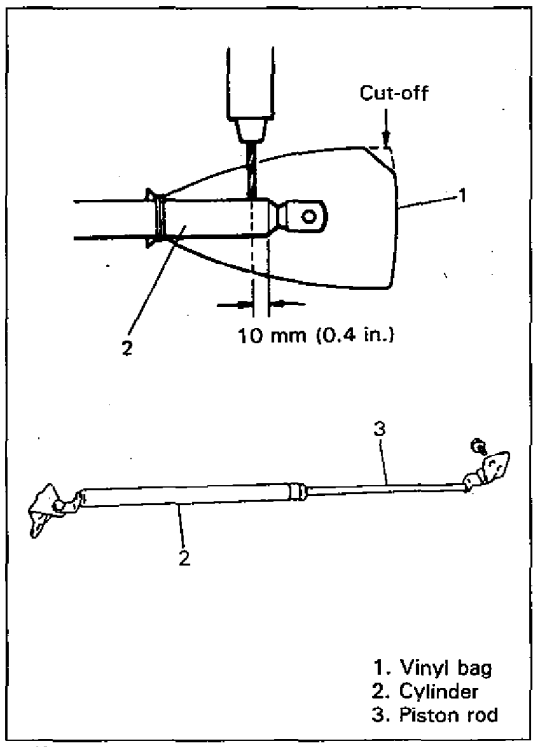
70F00-9-23-1

2) Adjust door latch striker so that striker shaft approximately aligns with the center of groove of door latch.



70F00-9-23-2

3) Adjust door by door side cushion.
Door side cushion installed at each side of back door is of screw-adjustable type. Turn cushion to adjust door for proper position.

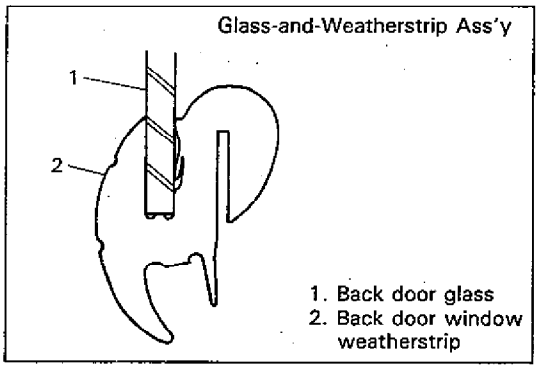


70F00-9-23-4

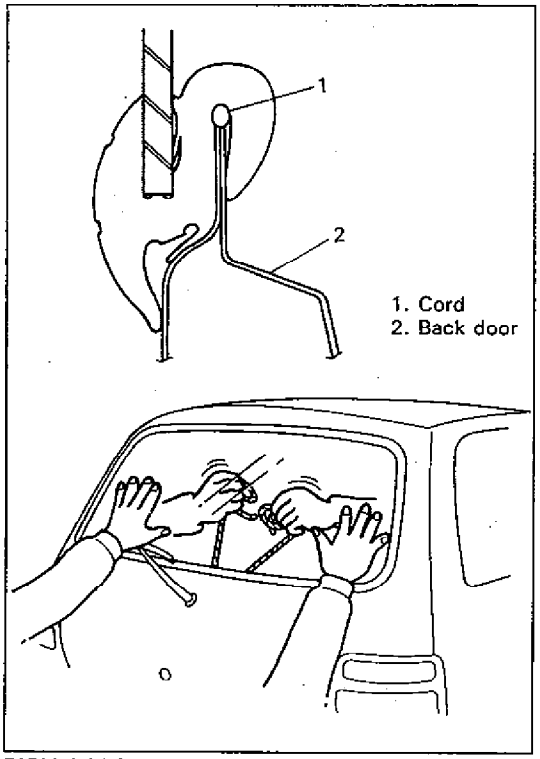
BACK DOOR BALANCER

IMPORTANT:
Handling of Back Door Balancer (Damper)

- **Do not disassemble balancer because its cylinder is filled with gas.**
- **When discarding removed back door balancer (damper), envelop it, as illustrated with a vinyl bag. Then, use a 2 to 3 mm (0.08 to 0.12 in.) drill to make a hole, as shown, from above through vinyl bag into balancer.**
- **Handle balancer carefully. Do not scar or scratch exposed surface of its piston rod, and never allow any paint or oil to stick to its surface.**
- **Do not turn piston rod with balancer fully extended.**



70F00-9-24-1



70F00-9-24-2

BACK DOOR GLASS

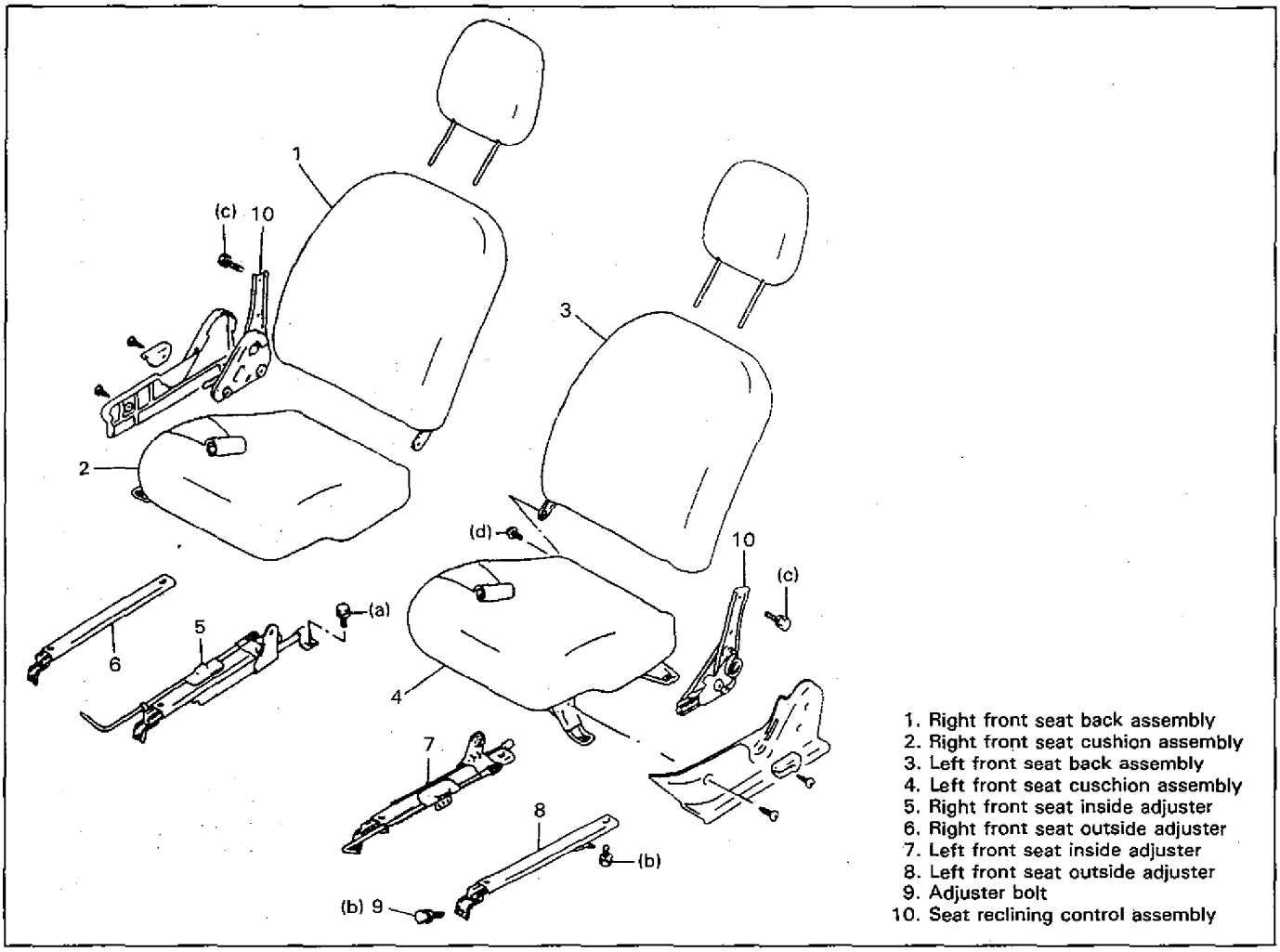
INSTALLATION

1) Clean back door glass and weatherstrip.
   After cleaned, each part should not be touched by hand fouled with grease, etc.
2) Fit weatherstrip to glass.
3) Install glass-and-weatherstrip assembly.
   - When installing the glass-and-weatherstrip assembly to the window panel (body), previously fit a cord into the weatherstrip's body flange channel.
   - Start the installation from the central bottom portion of the glass.
   - Position the glass-and-weatherstrip assembly in the window panel (body) opening with a helper applying pressure by palm from the outside. Then, pull the weatherstrip over the flange with the cord to install the assembly into position.
   - To settle the glass in place, tap it by palm from the outside.

CAUTION:
When assembling the glass into the weatherstrip's glass channel, and when assembling the glass-and-weatherstrip assembly to the window panel (body) soapy water must not be used as lubricant. If the installation is felt hard, use cleaning solvent as lubricant.

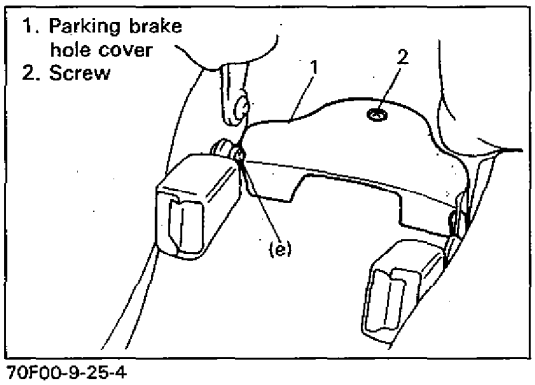
SEATS

FRONT SEAT



1. Right front seat back assembly
2. Right front seat cushion assembly
3. Left front seat back assembly
4. Left front seat cuschion assembly
5. Right front seat inside adjuster
6. Right front seat outside adjuster
7. Left front seat inside adjuster
8. Left front seat outside adjuster
9. Adjuster bolt
10. Seat reclining control assembly

70F00-9-25-1



70F00-9-25-4

REMOVAL

1) Remove parking brake hole cover.
2) Remove five seat rail mounting bolts. Then, remove seat ass'y with seat rail.
3) Disassemble and repair seat as necessary.

INSTALLATION

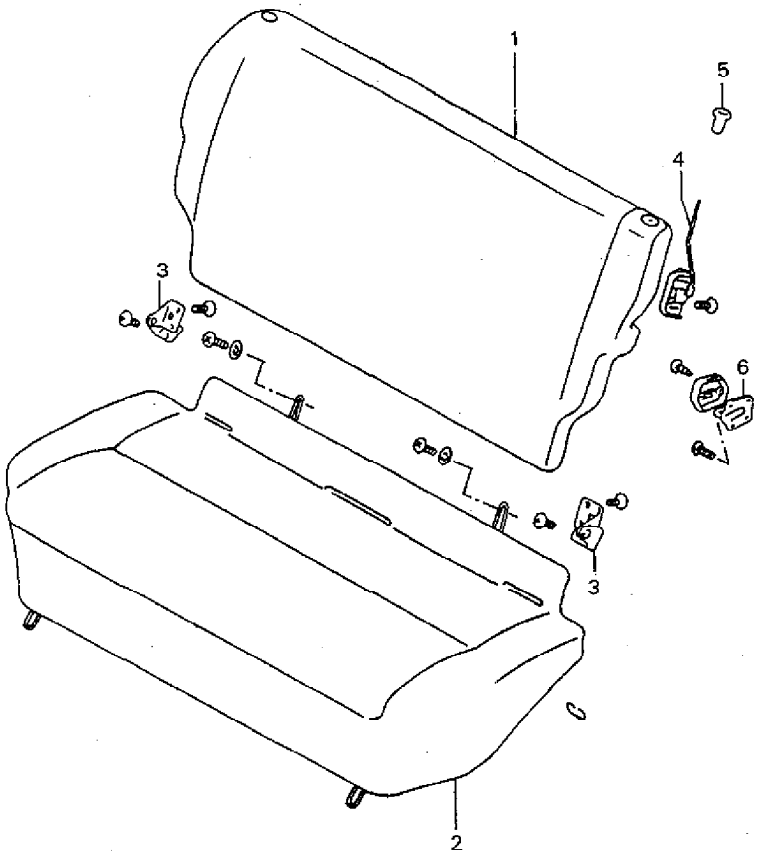
Reverse removal procedure to install front seat.
Torque it to specifications, as given below.

Tightening Torque

(a) : 25—45 N·m (2.6—4.5 kg-m, 18.44—33.19 lb-ft)
(b) : 18—28 N·m (1.9—2.8 kg-m, 13.28—20.65 lb-ft)
(c) : 26—36 N·m (2.6—3.5 kg-m, 19.18—26.55 lb-ft)
(d) : 4—7 N·m (0.4—0.7 kg-m, 2.95—5.16 lb-ft)
(e) : 25—45 N·m (2.6—4.5 kg-m, 18.44—33.19 lb-ft)

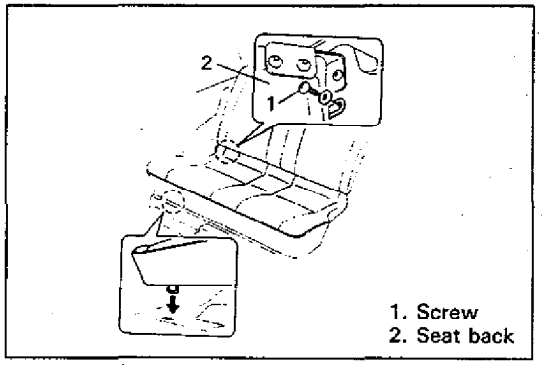
70F00-9-25-5

REAR SEAT



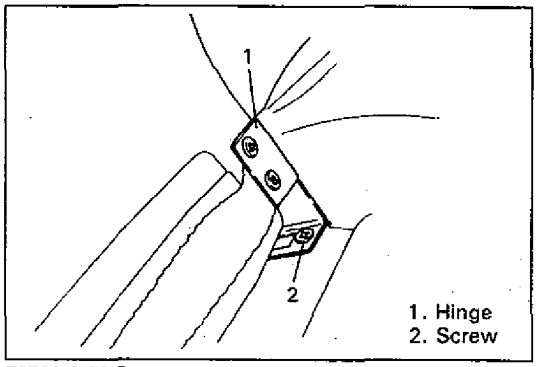
1. Rear seat back
2. Rear seat cushion
3. Rear seat back hinge
4. Seat back lock
5. Seat back lock knob
6. Seat back striker

70F00-9-26-1



1. Screw
2. Seat back

70F00-9-26-4



1. Hinge
2. Screw

70F00-9-26-5

REAR SEAT CUSHION

REMOVAL

1) Remove luggage floor carpet.
2) Remove seat cushion fitting screws.
3) Raise the front portion of seat cushion to remove rear seat cushion.

INSTALLATION

Reverse removal procedure to install rear seat cushion.

REAR SEATBACK

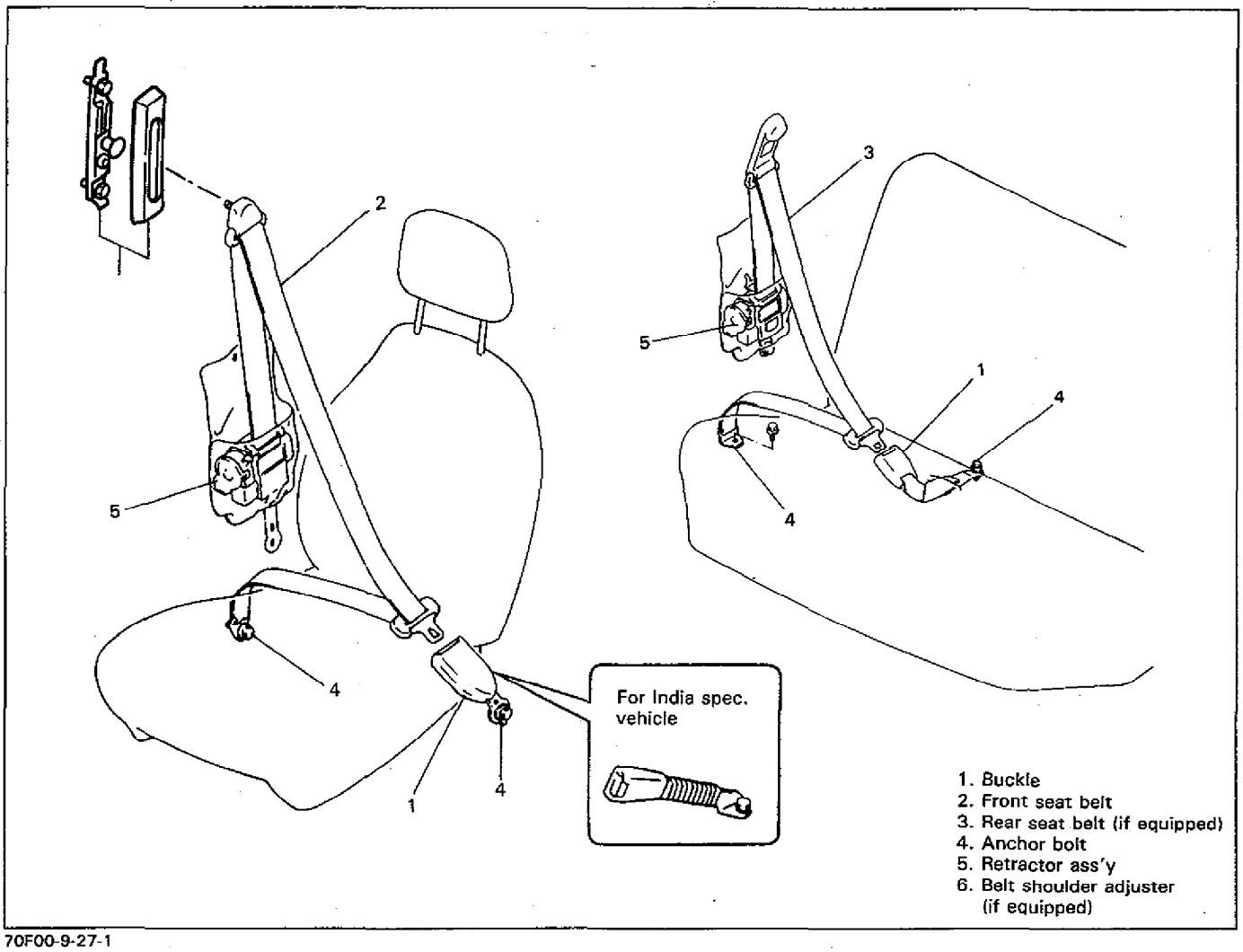
REMOVAL

1) Remove luggage floor carpet.
2) Remove seat back by removing its fitting screws.

INSTALLATION

Reverse removal procedure to install rear seatback.

SEAT BELTS



70F00-9-27-1

DESCRIPTION

The seat belt is provided with an Emergency Locking Retractor (ELR).

ELR: Locks the seat belt (to prevent the webbing from being pulled out of the retractor any further) as soon as any one of the following specified conditions is detected.
The conditions are the speed at which the webbing is pulled out of the retractor, acceleration or deceleration of the vehicle speed and inclination.

WARNING:
If replacing seat belt is necessary, replace buckle and ELR (or webbing) together as a set. This is for the reason of ensuring locking of tongue plate with buckle.
If these parts are replaced individually, such a locking condition may become unreliable. For this reason, Suzuki will supply only the spare buckle and ELR (or webbing) in a set part.

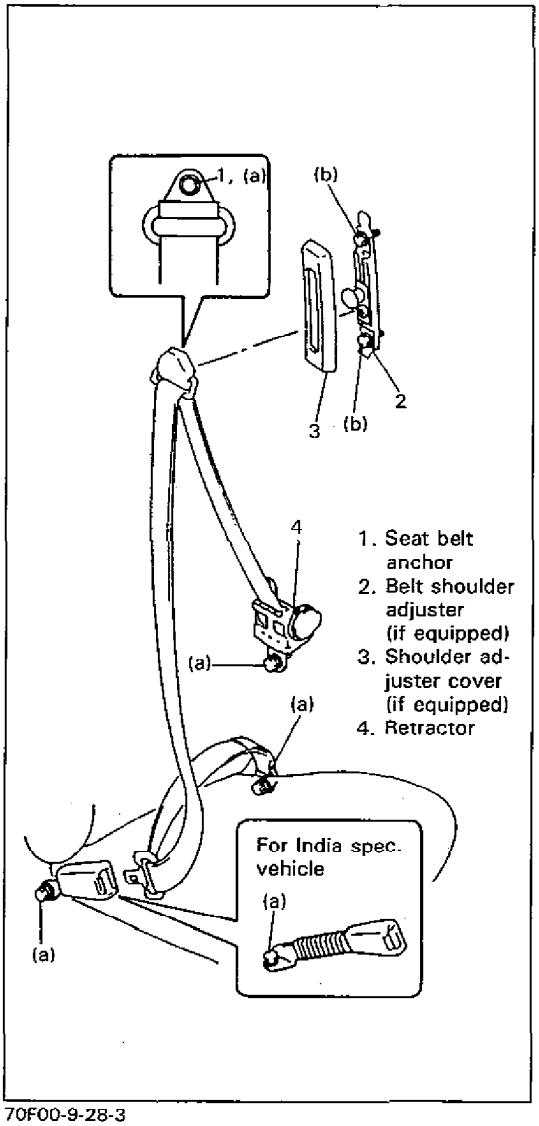
70F00-9-27-2

SERVICING SEAT BELTS

Before servicing or replacing seat belts, refer to following precautionary items.

1) Seat belts should be normal relative to strap retractor and buckle portions.
2) Keep sharp edges and damaging objects away from belts.
3) Avoid bending or damaging any portion of belt buckle or latch plate.
4) Do not bleach or dye belt webbing. (Use only mild soap and lukewarm water to clean it.)
5) When installing a seat belt anchor bolt, start bolt by hand to prevent cross-threading.
6) Do not attempt any repairs on retractor mechanisms or retractor covers. Replace defective assemblies with new replacement parts.
7) Keep belts dry and clean at all times.
8) If there exist any parts in question, replace such parts.
9) Replace belts whose webbing is cut or otherwise damaged.
10) Do not put anything into trim panel opening which seat belt webbing passes through.

64B40-9-36-1



70F00-9-28-3

REMOVAL AND INSTALLATION

Refer to figure on previous page to remove and install front and rear seat belts.

NOTE:

Be sure to tighten seat belt anchor bolts to specified torque below.

Seat belt anchor bolt should have an unified fine thread (7/16—20 UNF). Under no circumstances should any different sized or metric screw threads be used.

Tightening Torque

(a): 25—45 N·m (2.6—4.5 kg-m, 18.5—33.1 lb-ft)

(b): 22—35 N·m (2.3—3.5 kg-m, 16.3—25.8 lb-ft)

INSPECTION

Seat belts and attaching parts can affect the vital components and systems of a vehicle.
Therefore, they should be inspected carefully and replaced with genuine parts only.

1) Seat belt
   Its webbing or strap should be free from damage.
2) Retractor
   It should lock webbing when pulled quickly.
   The front seat belt retractor should pass the above inspection and should lock webbing even when tilted (approx. 15°) toward the fore and aft or right and left directions.
3) Anchor bolt
   Anchor bolts should be torqued to specification.
4) Belt latch
   It should be secure when latched.

64B40-9-37-1

ANTI-CORROSION TREATMENT (If equipped)

Steel sheets used for vehicles are provided with corrosion resistance on its either side or both sides as rust proof treatment. These corrosion resistance steel sheet materials are called one or two-side galvanized steel sheets. They are selected for their rust protection property and further given various types of treatment depending on where they are used as described below.

1) Steel sheets are treated with cathodic electroprimer which is excellent in corrosion resistance.
2) Rust proof wax coatings are applied to door, front hood and side sill insides where moisture is liable to stay.
3) Vinyl coating or asphalt coating is applied to body underside and wheel housing inside.
4) Chip resistant material is applied to side sill and door outside bottom areas to protect painted surface from damage due to flying stones.
5) Sealant is applied to door hem, engine compartment steel sheet-to-steel sheet joint, and the like portions to prevent water penetration which results in rust occurrence.

When replacing panel or repairing collision damage, leaving related area untreated as it is in any operation which does disturb any rust proof treatment described above will allow corrosion in that area. Therefore, it is important in any repair operation to properly recoat surface of related area.

Accordingly, it is the essential function of any repair operation to correctly recoat the related surfaces of the relevant area.

All metal panels are coated with metal conditioners and primer coating during vehicle production. Following repair and/or replacement parts installation, every accessible bare metal surface should be cleaned and coated with rust proof primer. Perform this operation prior to application of sealant, rust proof wax coating and chip resistant material.

70F00-9-30-1

Sealant is applied to specific joints of a vehicle during production. It prevents dust from entering vehicle and serves also as an anticorrosive barrier.
Sealant is applied to door and hood hem areas and between panels as well. Correct and reseal originally- sealed joints if damaged. Reseal attaching joints of a new replacement panel and reseal hem area of a replacement door or hood.

Use a quality sealant to seal flanged joints, overlap joints and seams. Sealant must have flexible characteristics and paintability after it's applied to repair areas.

For sealant to fill open joints, use caulking material. Select a sealant according to place and purpose of a specific use. Observe manufacturer's label-stated instructions when using sealant.

In many cases, repaired places require color painting. If so, follow ordinary techniques specified for finish preparation, color painting and undercoating build-up.

Rust proof wax, a penetrative compound, is applied to metal-to-metal surfaces (door, front hood and side sill insides) where it is difficult to use ordinary undercoating material for coating. Therefore, when selecting rust proof wax, it may be one of such penetrative type.

During undercoating (vinyl coating or asphalt coating) application, care should be taken that sealant is not applied to engine-related parts and shock absorber mounting or rotating parts. Following undercoating, make sure that body drain holes are kept open.

Anticorrosive materials.

1) Clean and prepare metal surface.
2) Apply primer.
3) Apply sealant (all joints sealed originally).
4) Apply chip-resistant material (side sill and door outside bottom areas).
5) Apply color in areas where color is required such as hem flanges, exposed joints and under body components.
6) Apply anticorrosive compound (penetrative wax).
7) Apply undercoating (rust proof material).

If original galvanization or other anticorrosive material on interior and underbody panel surfaces is burnt during welding or heating operation, affected surfaces must be cleaned.
Burnt residues should be removed carefully when affected area is in box-type construction or in such shape as to limit access to interior surfaces. Generally, following method works out satisfactorily in removing such residues.

NOTE:
Standard shop practices, particularly eye protection, should be followed during performance of above-listed operations to avoid personal injury.

Scrape any accessible area. If affected area is enclosed by sheet metals and a standard putty knife or scraper cannot reach there, try to use a more flexible scraper. Compressed air can remove most residues and is useful in cleaning enclosed areas. However, this type of operation absolutely requires eye protection.

METAL REPLACEMENT PARTS FINISHING

Metal replacement parts (or assemblies) are coated with electro-deposition primer. For proper adhesion of paint, following finish process (refinish steps) becomes necessary.

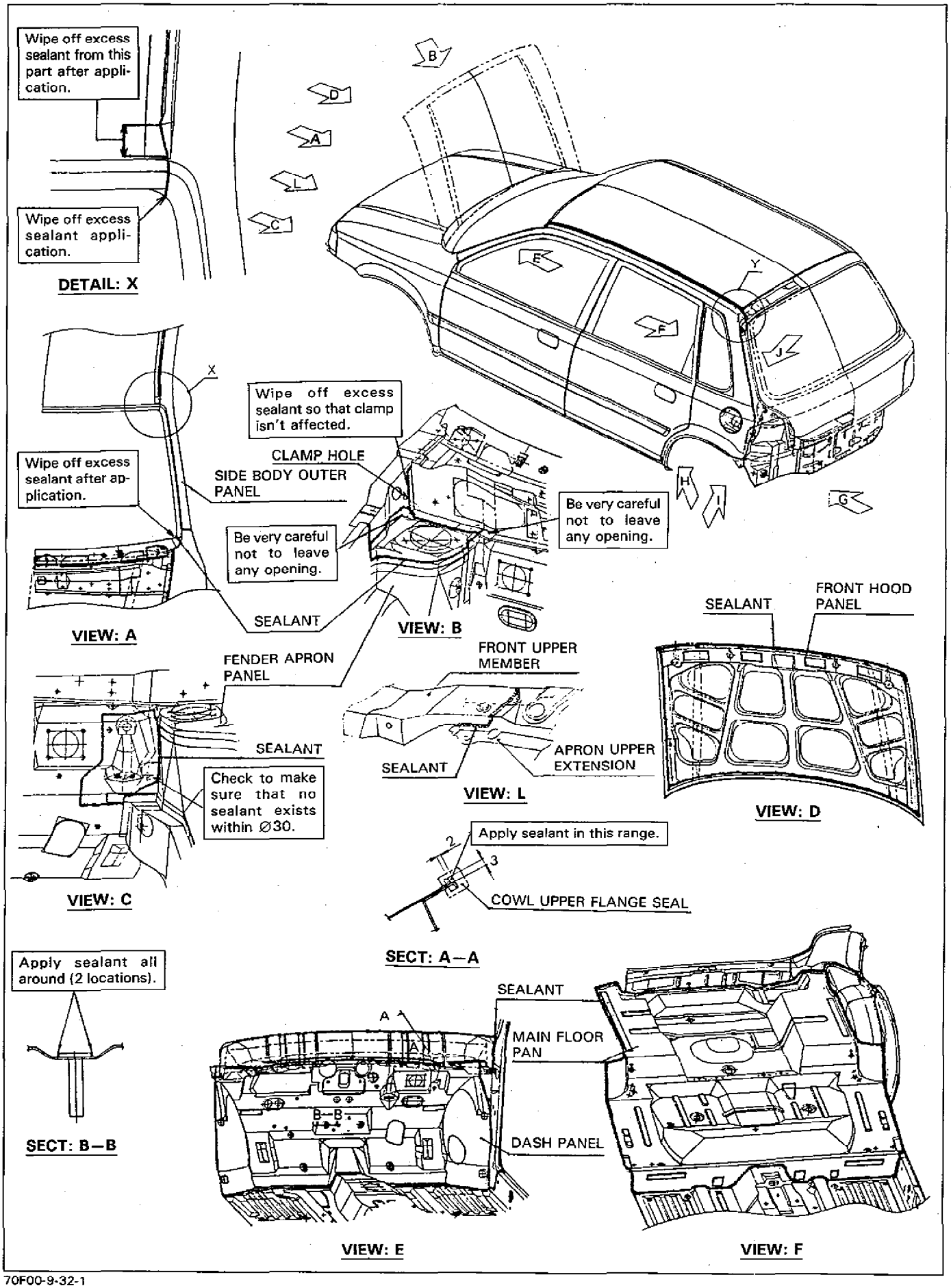
1) Use wax or grease-removing solvent to clean each part.
2) Use a wet or dry sand-paper (No.400) to polish panel lightly. Do not polish it forcibly to produce any scratch. Clean each part again.
3) If factory-applied primer coating is cut through to bare metal, apply metal conditioner to bare metal exposed to open air. As for the method of use of the metal conditioner, follow directions on its container.
4) Apply primer-surfacer to the part completely dry before starting sand-paper polishing. As for drying time, follow directions advised on primer-surfacer container.
5) Use a wet or dry sand-paper (No.400) and water to polish panel lightly.
6) Wash part again.
7) Apply color coating to part.
8) Different paints demand different drying methods. Hence, follow directions advised on pertinent paint container.
9) When lacquer coating (quick-drying paint coating) is applied, dry coated surface and polish it with compound.
   In the case of melamine or acrylic coating, compound polishing can be omitted after drying.
10) In the case of lacquer coating, wax should not be applied to coated surface until surface has dried completely (for approx. two months).

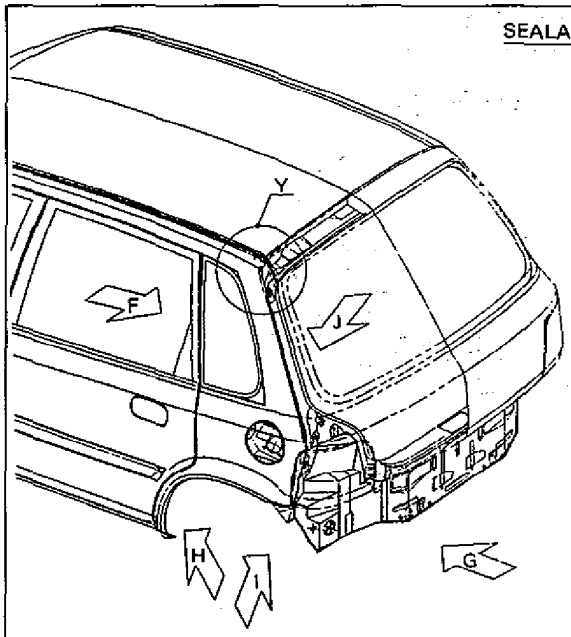
Before replacing exterior parts or assemblies, check paint conditions of all covered or hidden interior surfaces. If any rust scale is found at these places, proceed as follows:

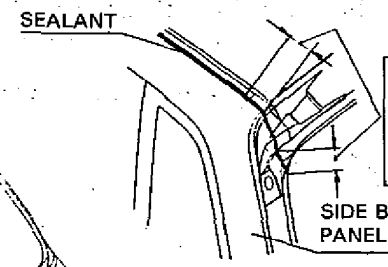
1) Use a proper wire brush, adhesive or liquid rust removing agent to remove rust. As for method of use, follfow directions advised for respective materials.
2) If necessary, wash parts with detergent, rinse, and dry them.
3) Before installing exterior body parts, apply anticorrosive compound to all cleaned surfaces of exterior body parts. Also, apply anticorrosive compound to inner surfaces of exterior body parts to be installed.

64B40-9-54-1

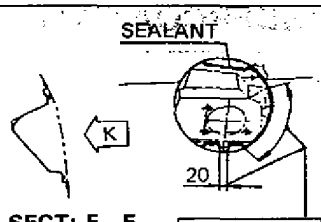
SEALANT APPLICATION AREAS







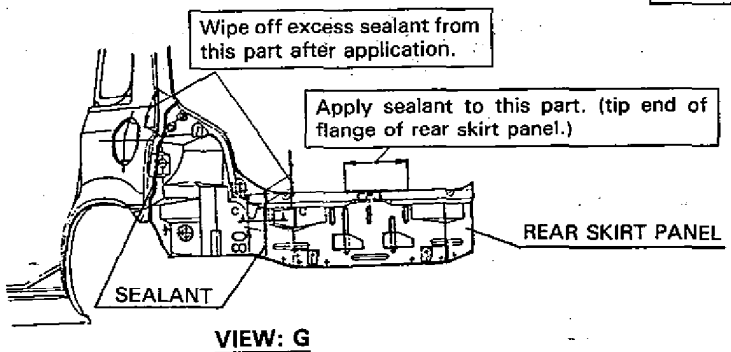
DETAIL: Y



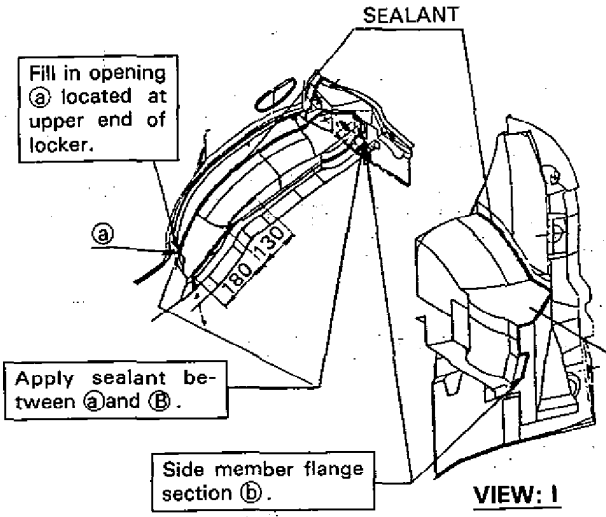
SECT: F—F

VIEW: K

Wipe off excess sealant from this part after application.

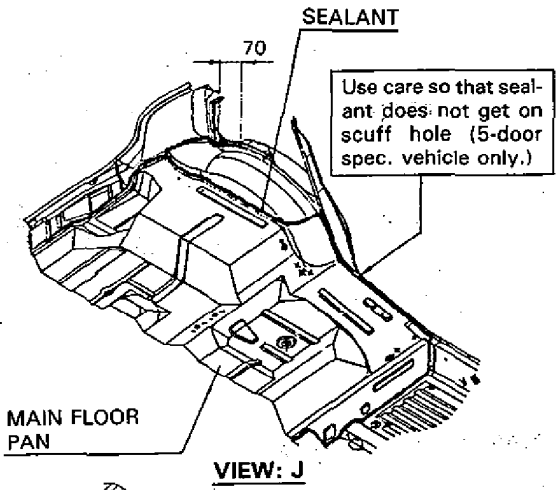


VIEW: G

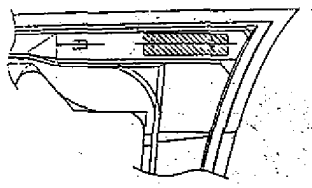


VIEW: I

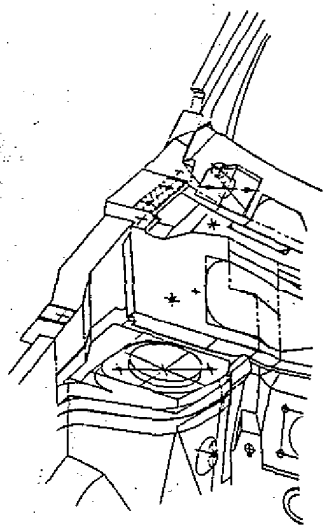
VIEW: H



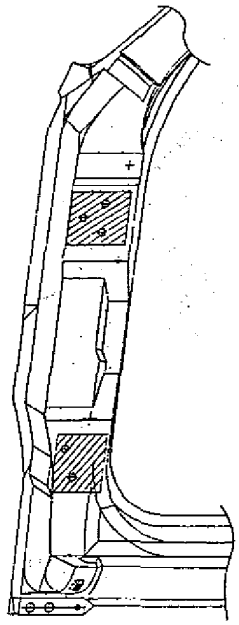
VIEW: J



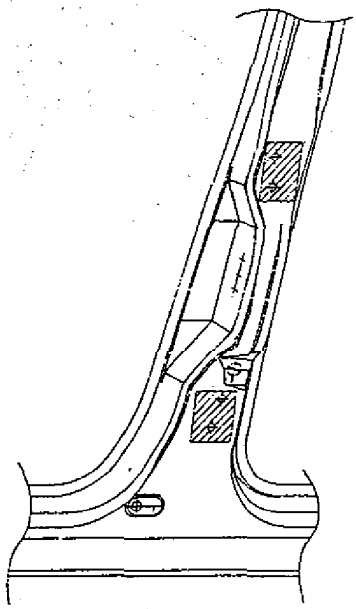
FRONT HOOD PANEL



COWL TOP PANEL



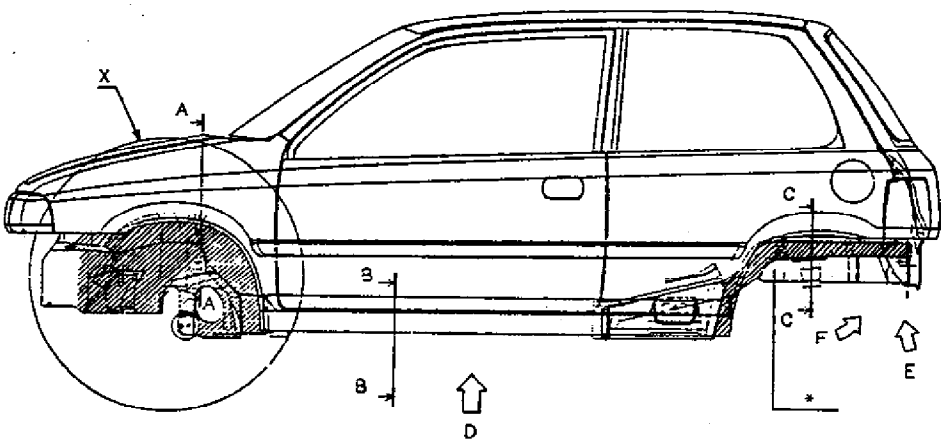
FRONT PILLAR

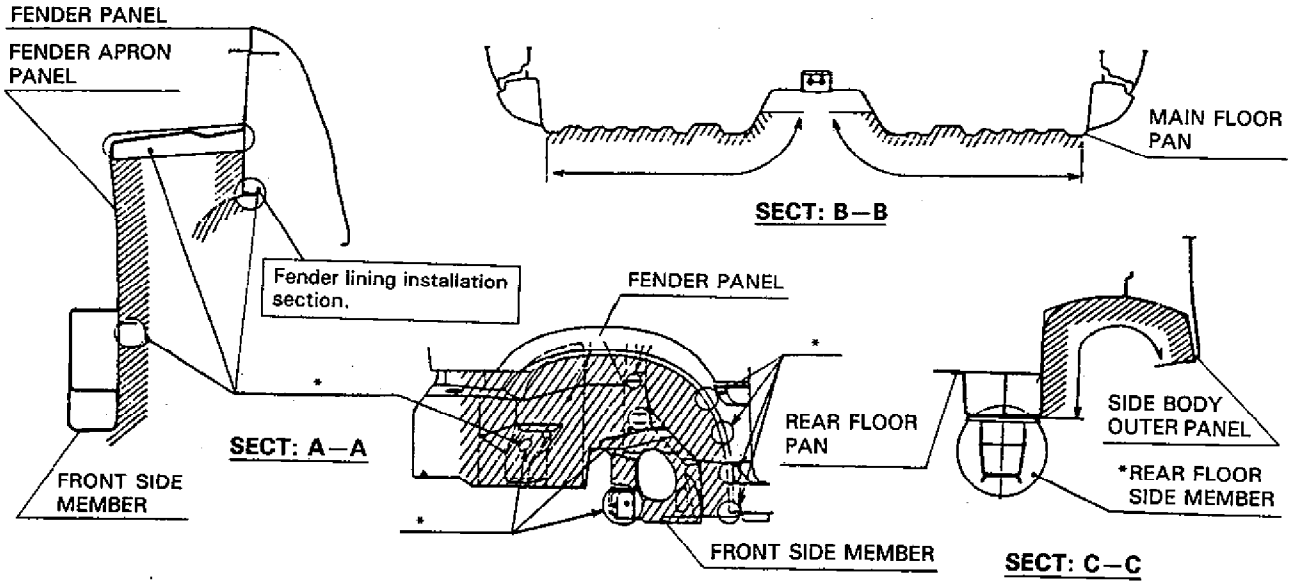


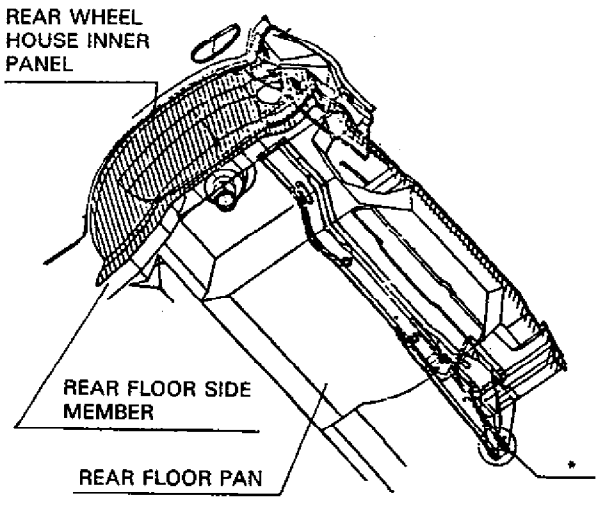
CENTER PILLAR

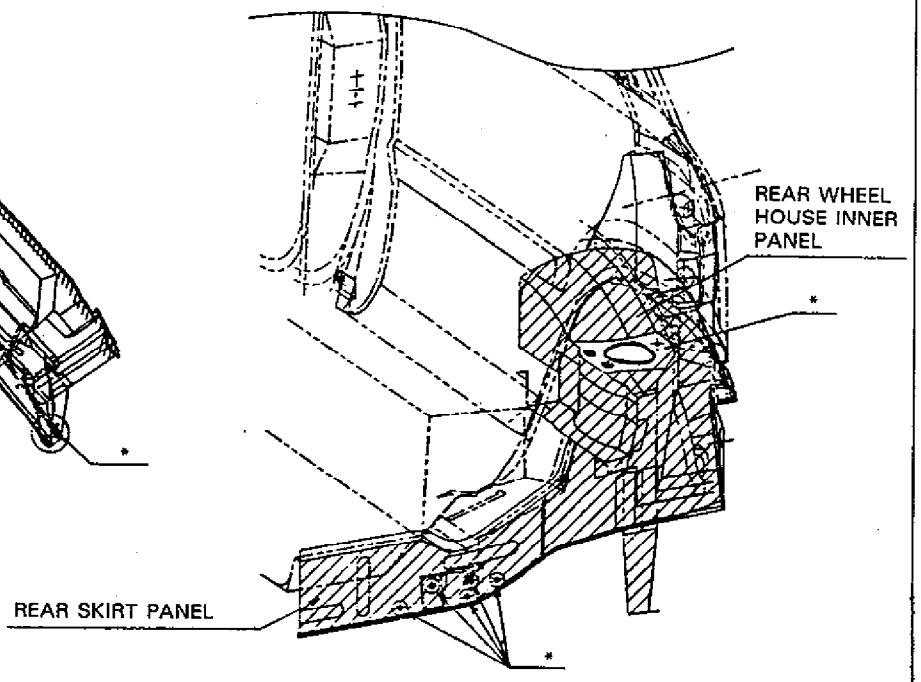
////: Apply sealant to shaded area.

UNDERCOATING APPLICATION AREAS (If equipped)

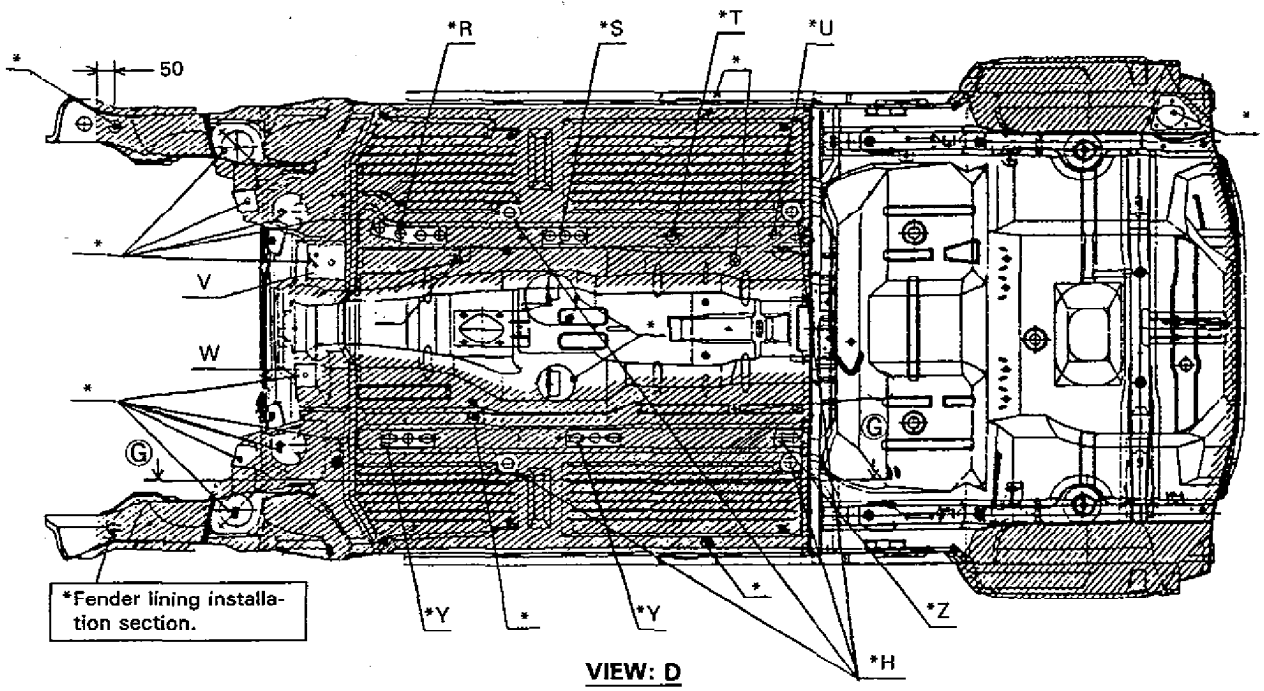




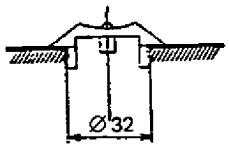




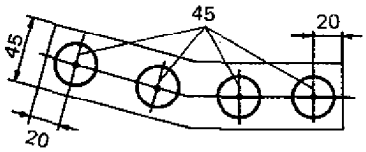
/// : Apply undercoating to shaded area.
* : Don't apply undercoating where marked with *



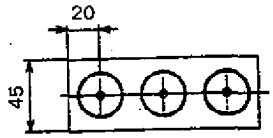
VIEW: D



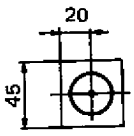
VIEW: H



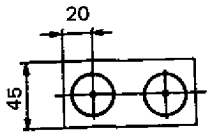
DETAIL: R



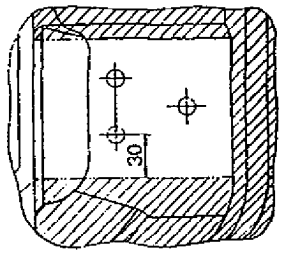
DETAIL: S



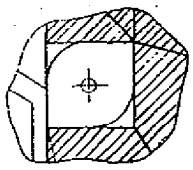
DETAIL: T



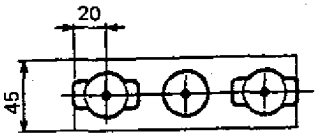
DETAIL: U



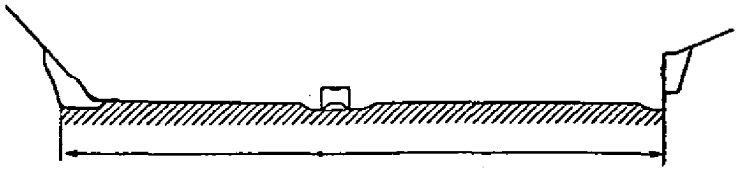
DETAIL: V



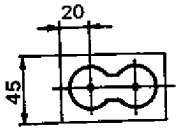
DETAIL: W



DETAIL: Y

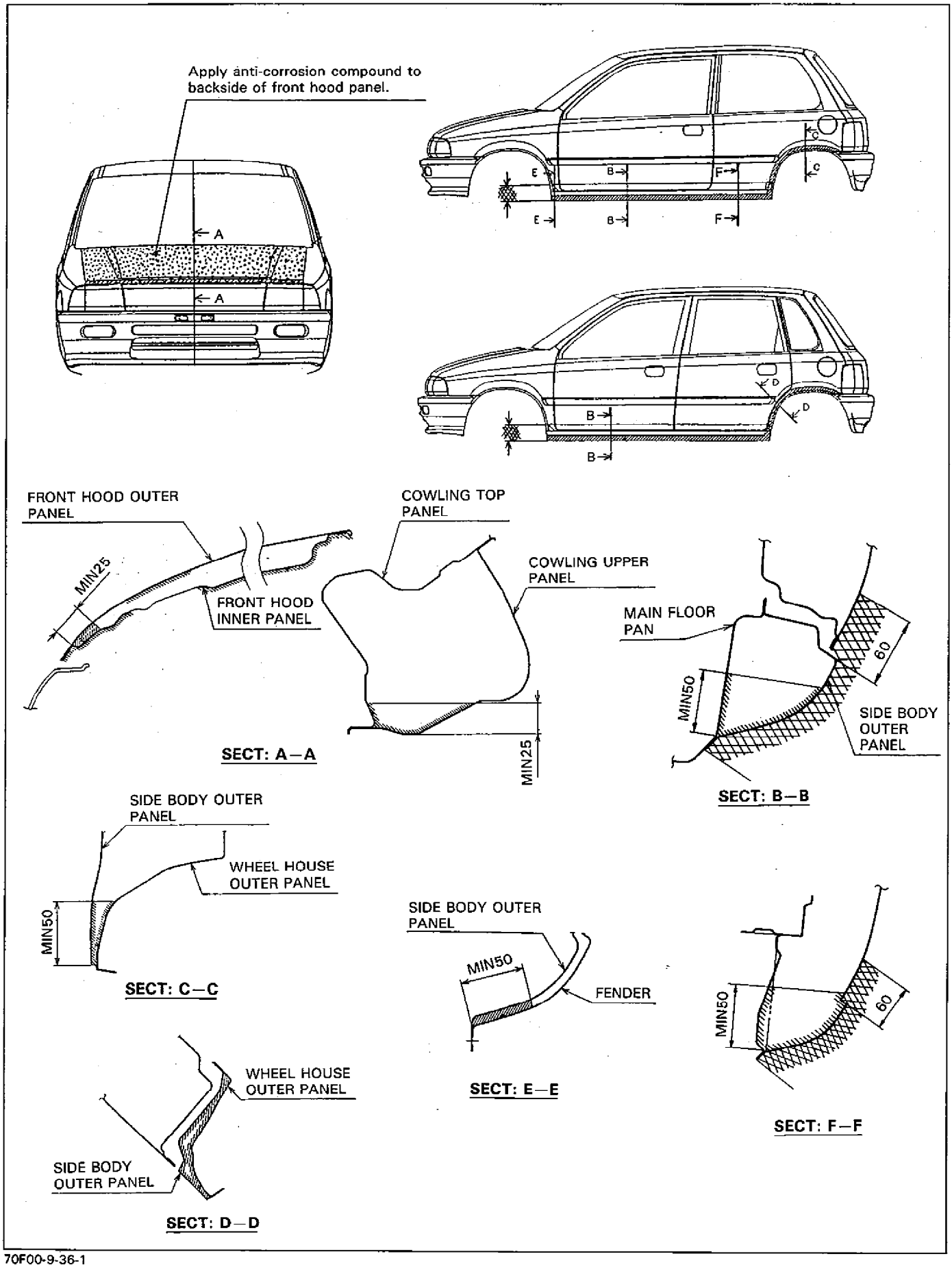


SECT: G—G



DETAIL: Z

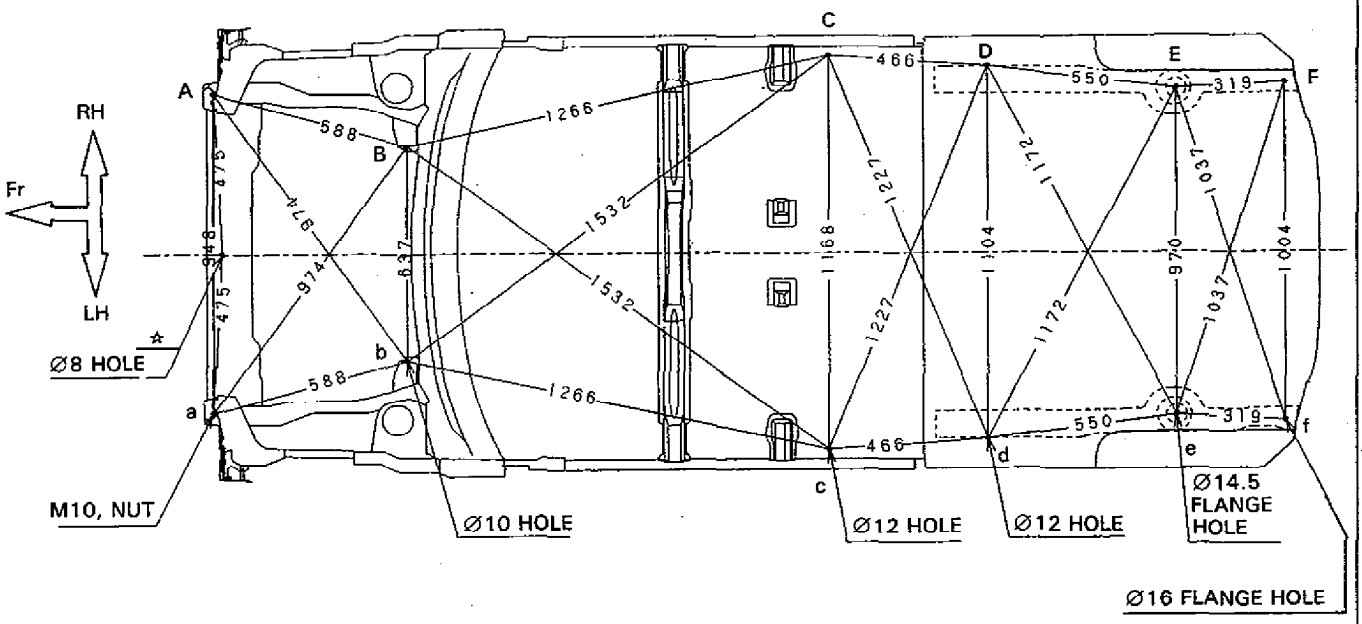
ANTI-CORROSION COMPOUND AND CHIP RESISTANT MATERIAL APPLICATION AREAS (If equipped)

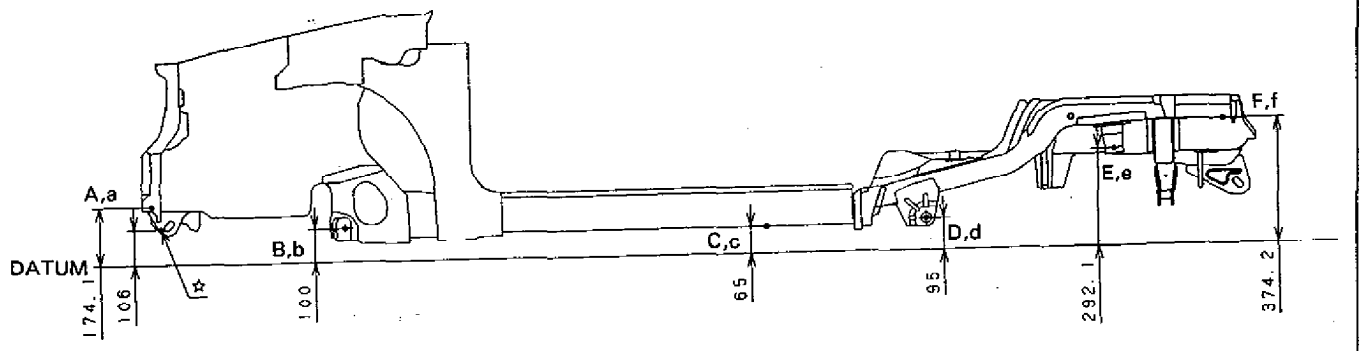


UNDERBODY DIMENSIONS

Each underbody component affects strength of vehicle itself as well as wheel alignment (toe-in, camber, caster).
It is essential, therefore, to check underbody carefully and perform welding properly, if necessary for its correction or replacement. When damage is found in sealing or rust proof treatment, it is mandatory to correct it properly. For sealing and rust proof treatment, refer to "ANTI-CORROSION TREATMENT" section.

3-DOOR AND 5-DOOR MODELS

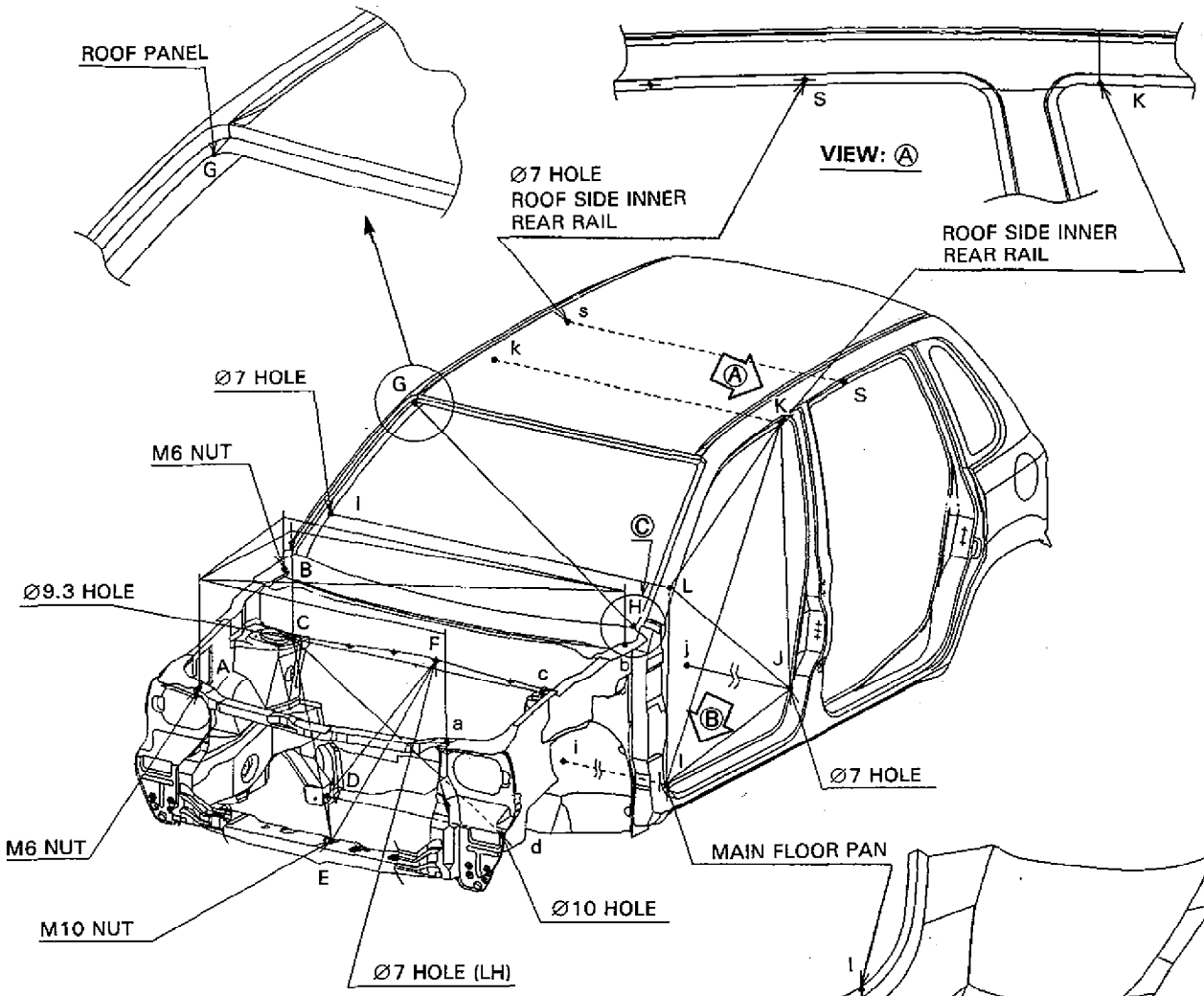


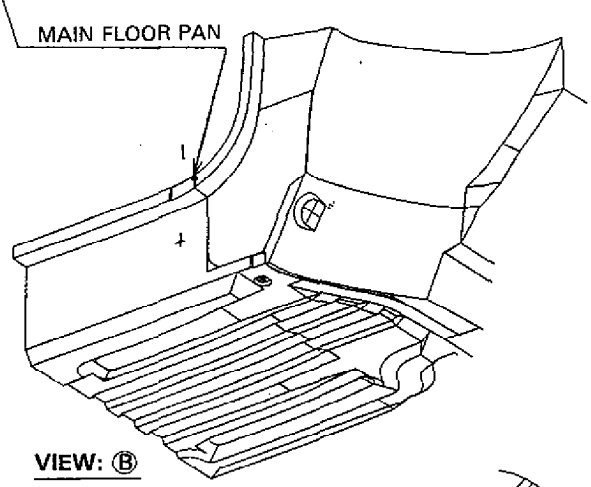


- ALL DIMENSIONS ARE METRIC (UNIT: MM)
- ALL CONTROL POINTS ARE SYMMETRICAL SIDE TO SIDE
- ALL TOLERANCES ARE ±3 MM

BODY DIMENSIONS

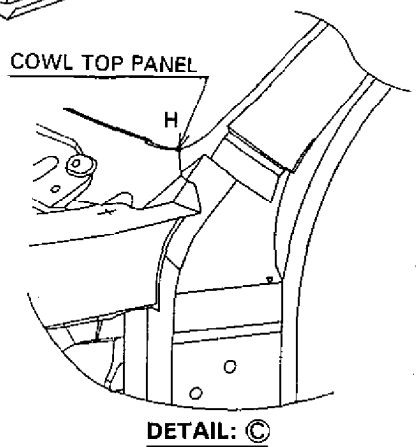
5-DOOR MODEL



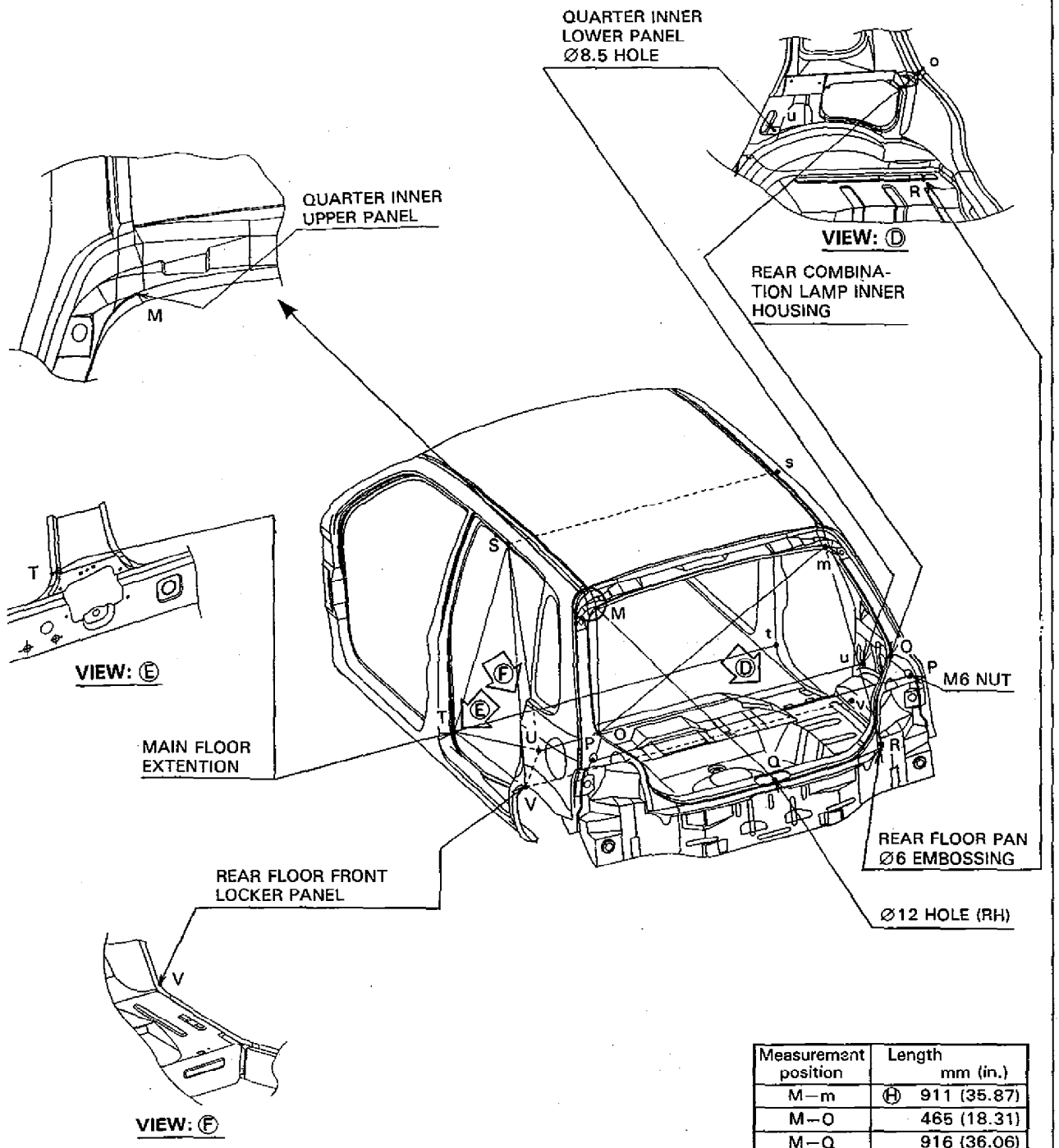


Measurement position	Length mm (in.)	Measurement position	Length mm (in.)
A—a	Ⓗ 900 (35.43)	E—F	704 (27.72)
A—B	Ⓗ 774 (30.47)	G—H	1288 (50.71)
A—b	Ⓗ 1310 (51.57)	I—i	Ⓗ 1287 (50.67)
A—C	Ⓗ 545 (21.46)	I—J	718 (28.27)
B—b	Ⓗ 1240 (48.82)	I—K	1260 (49.61)
C—b	Ⓗ 1094 (43.07)	I—L	650 (25.59)
C—c	Ⓗ 907 (35.71)	J—j	Ⓗ 1289 (50.75)
C—d	921 (36.26)	J—K	856 (33.70)
C—E	825 (32.48)	J—L	855 (33.66)
D—E	Ⓗ 610 (24.02)	K—k	Ⓗ 1055 (41.54)
D—d	Ⓗ 637 (25.08)	K—L	836 (32.91)
D—F	644 (25.35)	L—l	Ⓗ 1236 (48.66)

Ⓗ: Horizontal distance Unmarked: Dimention between points

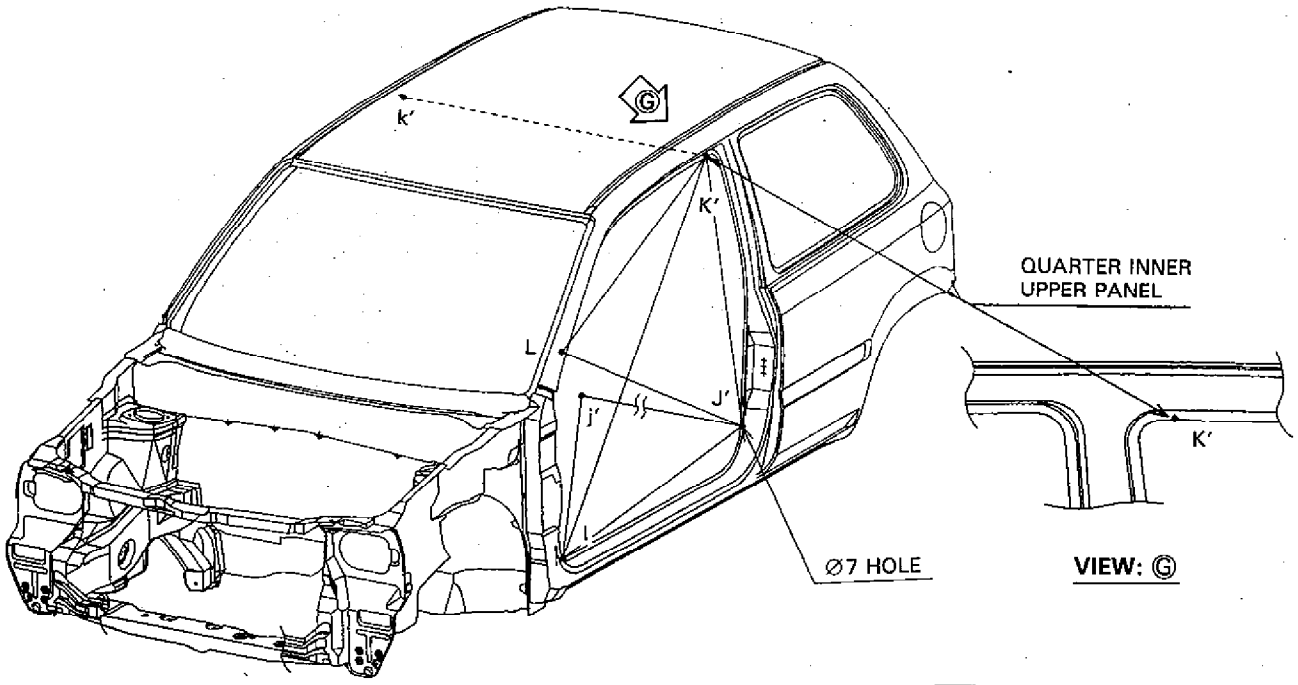


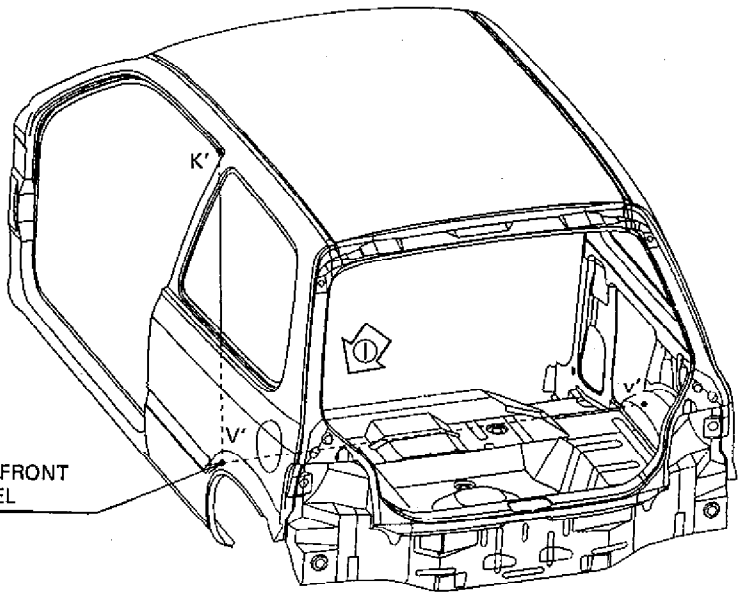
DETAIL: Ⓒ

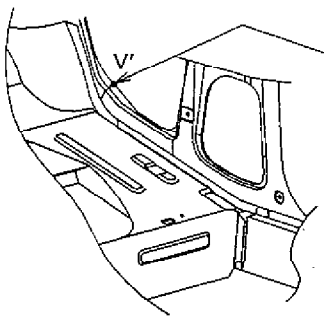


Measurement position	Length mm (in.)
M–m	Ⓗ 911 (35.87)
M–O	465 (18.31)
M–Q	916 (36.06)
O–m	1129 (44.45)
O–o	Ⓗ 1162 (45.74)
P–p	Ⓗ 1271 (50.04)
R–m	769 (30.28)
S–s	Ⓗ 1040 (40.94)
S–T	972 (38.27)
S–U	780 (30.71)
S–V	908 (35.75)
T–t	Ⓗ 1287 (50.67)
T–U	833 (32.80)
T–V	633 (24.92)
U–u	Ⓗ 1294 (50.94)
U–V	273 (10.75)
V–v	Ⓗ 1289 (50.75)

3-DOOR MODEL







Measurement position	Length mm (in.)
I—J'	1004 (39.53)
I—K'	1398 (55.04)
J'—j'	Ⓗ 1289 (50.75)
J'—K'	855 (33.66)
J'—L	1092 (42.99)
K'—L	1019 (40.12)
K'—k'	Ⓗ 1052 (41.42)
K'—V'	932 (36.69)
V'—v'	Ⓗ 1305 (51.38)

NOTE:
As measuring points and measurement data (A—a to L—l) are the same as those of 5-door model, refer to the same section of 5-door model service.

KEY CODING

KEY USAGE AND IDENTIFICATION

One key is used for ignition, door and back door lock cylinder. Keys are cut on both edges to make them reversible.

Key identification is obtained from five character key code stamped on key code tag. Using this key code, key code cutting combination can be determined from a code list (available to owners of key cutting equipment from suppliers).

70F00-9-41-1

If key codes are not available from records or tags, key code can be obtained from the right hand door lock cylinder (if lock has not been replaced). Lock cylinders supplied by the factory as service parts are unmarked.
If original key is available, key code cutting combination can be determined by laying key.

64B40-9-69-2

IGNITION SWITCH LOCK CYLINDER

Removal/Installation

See section 3C, STEERING WHEEL AND COLUMN.

64B40-9-69-3

ELECTRICAL DIAGNOSIS

For ignition switch electrical troubleshooting, see Section 8 BODY ELECTRICAL SYSTEM.

64B40-9-69-4

WIRING DIAGRAM

1-1 CARBURATOR MODEL

NOTE: The parts with (*) is provided or not depending on specification.
REMARQUE: Les pièces marquées d'un (*) sont (seraient) fournies. mais elle ne seraient pas conformées aux spécifications.
NOTA: Las piezas con (*) son provistas o non dependiendo de las especificaciones.

WIRE COLOR

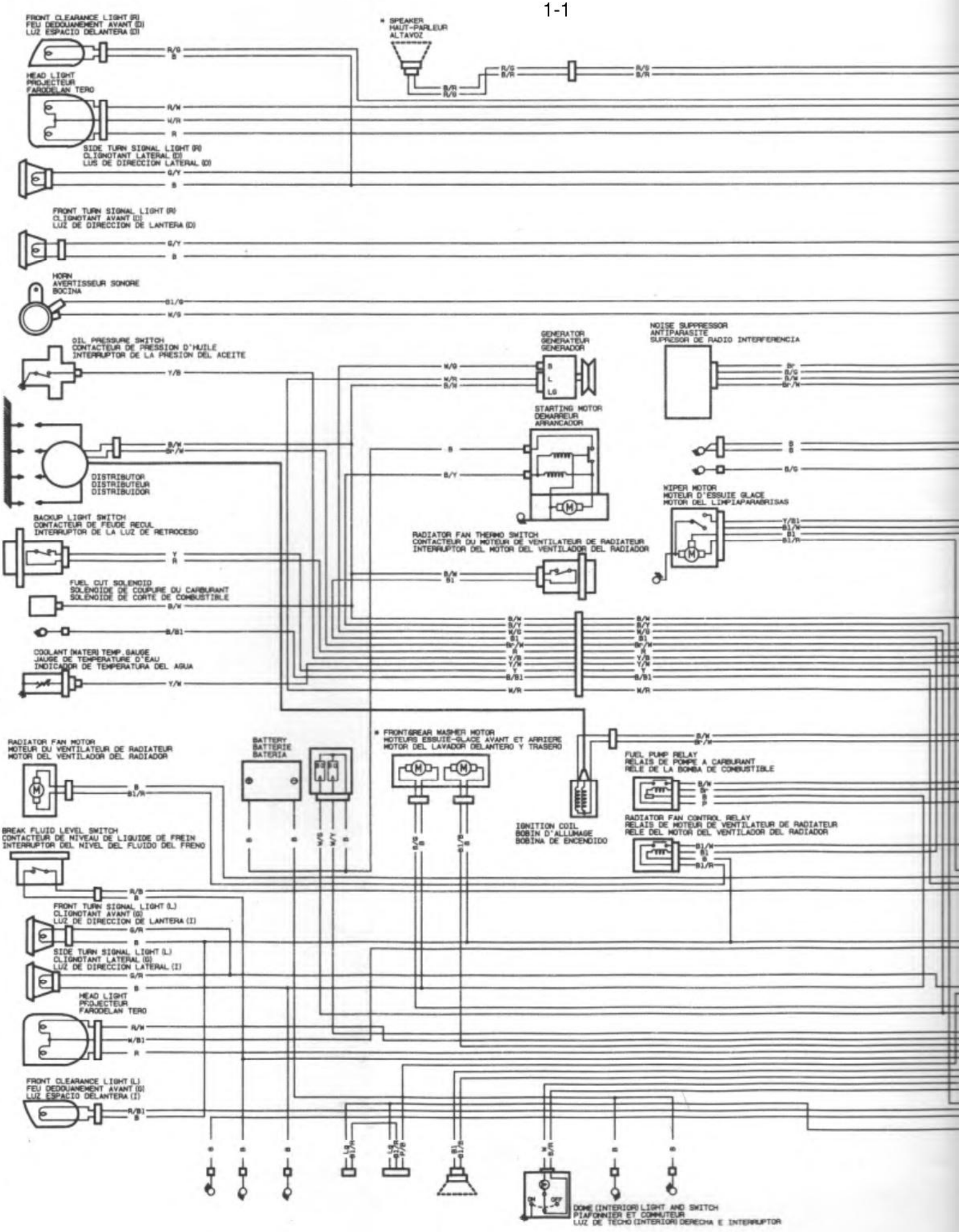
B	: Black
Bl	: Blue
Br	: Brown
G	: Green
Gr	: Gray
Lbl	: Light blue
Lg	: Light green
O	: Orange
R	: Red
W	: White
Y	: Yellow
P	: Pink
V	: Violet
B/Bl	: Black with Blue tracer
B/G	: Black with Green tracer
B/R	: Black with Red tracer
B/W	: Black with White tracer
B/Y	: Black with Yellow tracer
Bl/B	: Blue with Black tracer
Bl/G	: Blue with Green tracer
Bl/R	: Blue with Red tracer
Bl/W	: Blue with White tracer
Bl/Y	: Blue with Yellow tracer
Br/B	: Brown with Black tracer
Br/R	: Brown with Red tracer
Br/W	: Brown with White racer
Br/Y	: Brown with Yellow racer
G/B	: Green with Black tracer
G/Bl	: Green with Blue tracer
G/R	: Green with Red tracer
G/W	: Green with White tracer
G/Y	: Green with Yellow tracer
Gr/B	: Gray with Black tracer
Gr/W	: Gray with White tracer
Gr/R	: Gray with Red tracer
Gr/Y	: Gray with Yellow tracer
Lg/B	: light with Black tracer
Lg/R	: light with Red tracer
Lg/W	: light with White tracer
Lg/Y	: light with Yellow tracer
O/B	: Orange with Black tracer
O/Bl	: Orange with Blue tracer
O/G	: Orange with Green tracer
O/R	: Orange with Red tracer
O/W	: Orange with White tracer
O/Y	: Orange with Yellow tracer
P/B	: Pink with Black tracer
P/Bl	: Pink with Blue tracer
P/G	: Pink with Green tracer
V/G	: Violet with Green tracer
V/W	: Violet with White tracer
V/Y	: Violet with Yellow tracer
R/B	: Red with Black tracer
R/Bl	: Red with Blue tracer
R/G	: Red with Green tracer
R/W	: Red with White tracer
R/Y	: Red with Yellow tracer
W/B	: White with Black tracer
W/Bl	: White with Blue tracer
W/G	: White with Green tracer
W/R	: White with Red tracer
W/Y	: White with Yellow tracer
Y/B	: Yellow with Black tracer
Y/Bl	: Yellow with Blue tracer
Y/G	: Yellow with Green tracer
Y/R	: Yellow with Red tracer
Y/W	: Yellow with White tracer

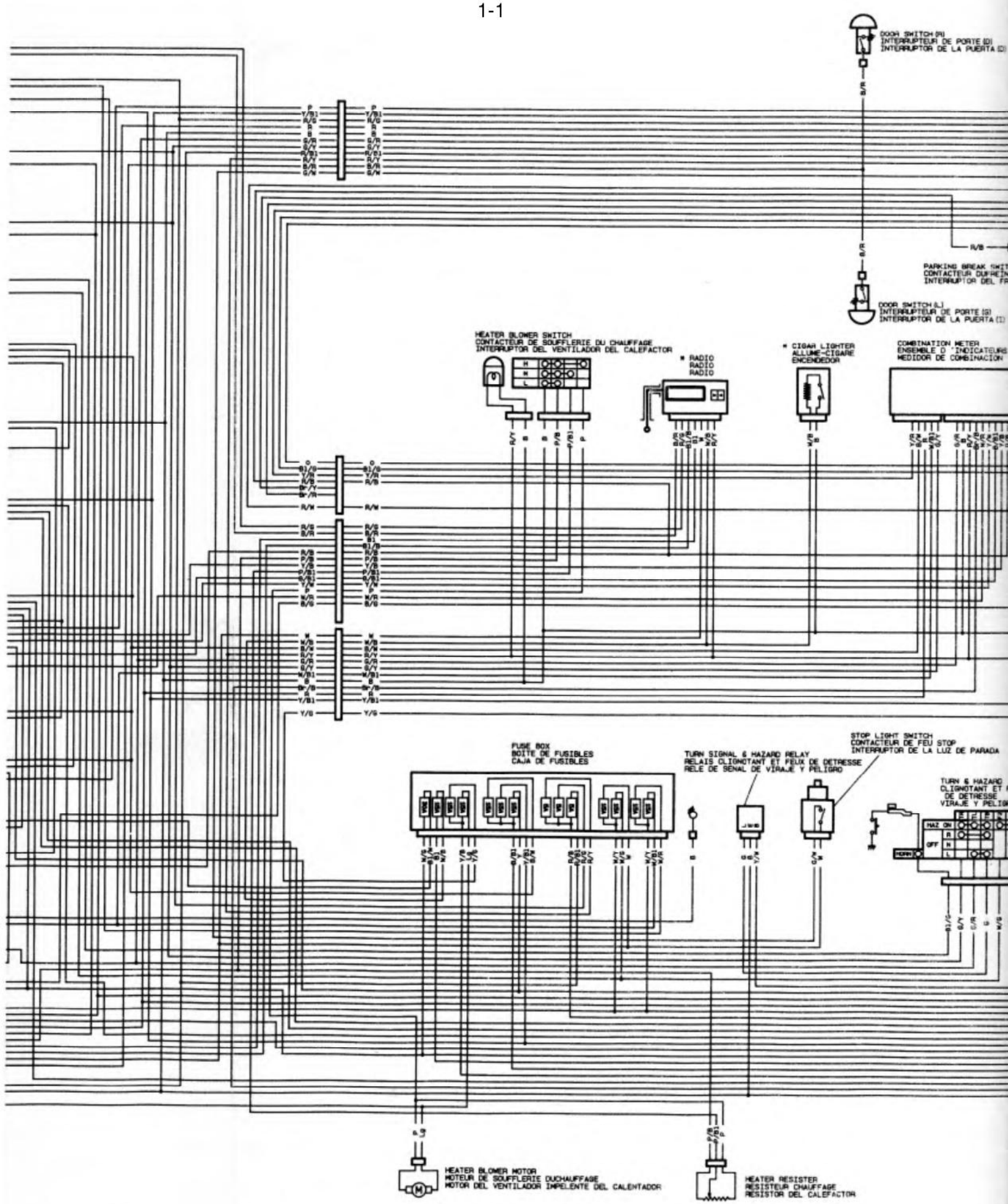
CODE DES COULEURS

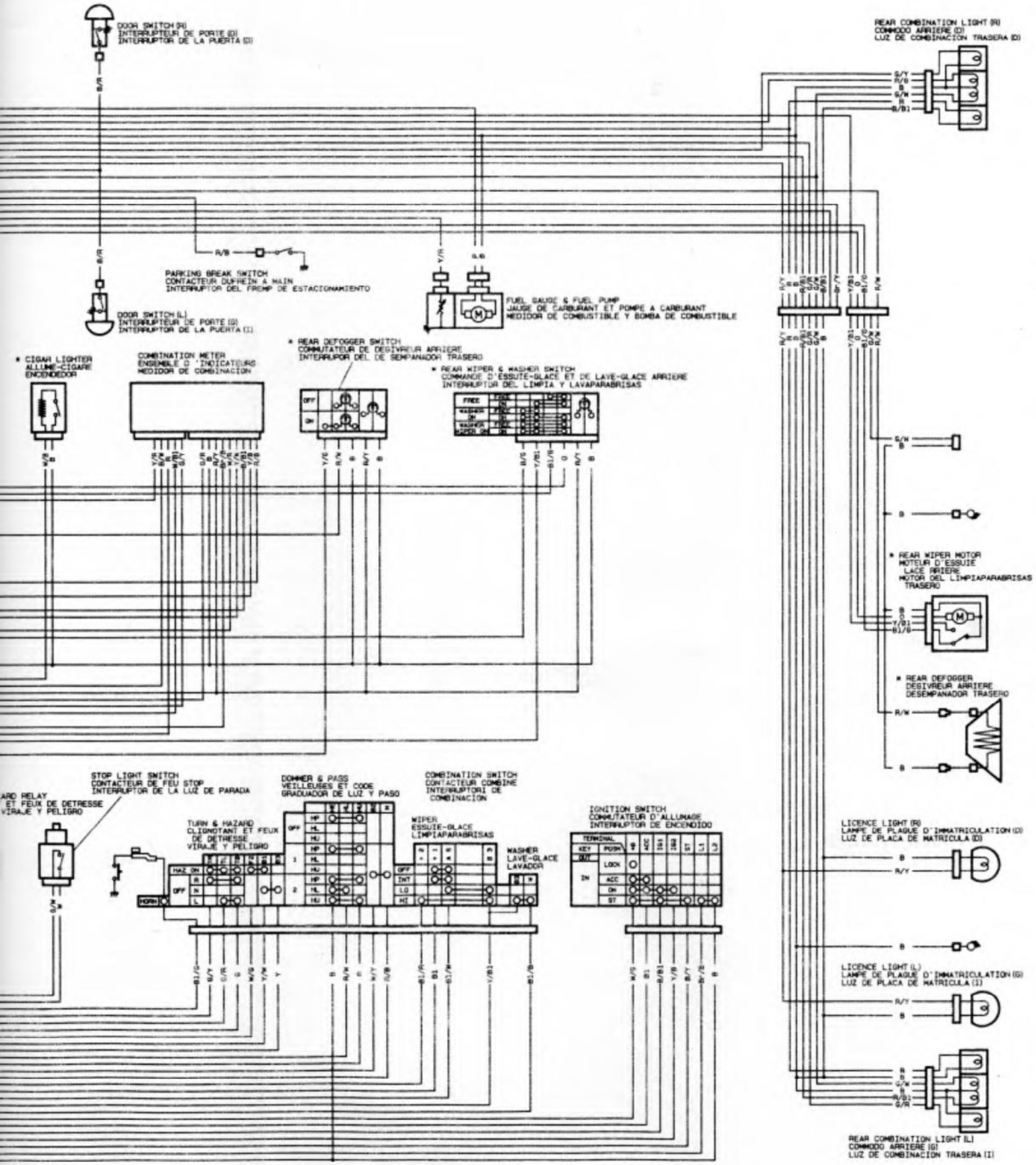
B	: Noir
Bl	: Bleu
Br	: Brun
G	: Vert
Gr	: Gris
Lbl	: Bleu Clair
Lg	: Vert clair
O	: Orange
R	: Rouge
W	: Blanc
Y	: Jaune
P	: Rose
V	: Violet
B/Bl	: Noir avec filet bleu
B/G	: Noir avec filet vert
B/R	: Noir avec filet rouge
B/W	: Noir avec filet blanc
B/Y	: Noir avec filet jaune
Bl/B	: Bleu avec filet noir
Bl/G	: Bleu avec filet vert
Bl/R	: Bleu avec filet rouge
Bl/W	: Bleu avec filet blanc
Bl/Y	: Bleu avec filet jaune
Br/B	: Brun avec filet noir
Br/R	: Brun avec filet rouge
Br/W	: Brun avec filet blanc
Br/Y	: Brun avec filet jaune
G/B	: Vert avec filet noir
G/Bl	: Vert avec filet bleu
G/R	: Vert avec filet rouge
G/W	: Vert avec filet blanc
G/Y	: Vert avec filet jaune
Gr/B	: Gris avec filet noir
Gr/W	: Gris avec filet blanc
Gr/R	: Gris avec filet rouge
Gr/Y	: Gris avec filet jaune
Lg/B	: Vert clair avec filet noir
Lg/R	: Vert clair avec filet rouge
Lg/W	: Vert clair avec filet blanc
Lg/Y	: Vert clair avec filet jaune
O/B	: Orange avec filet noir
O/Bl	: Orange avec filet bleu
O/G	: Orange avec filet vert
O/R	: Orange avec filet rouge
O/W	: Orange avec filet blanc
O/Y	: Orange avec filet jaune
P/B	: Rose avec filet noir
P/Bl	: Rose avec filet bleu
P/G	: Rose avec filet vert
V/G	: Violet avec filet vert
V/W	: Violet avec filet blanc
V/Y	: Violet avec filet jaune
R/B	: Rouge avec filet noir
R/Bl	: Rouge avec filet bleu
R/G	: Rouge avec filet vert
R/W	: Rouge avec filet blanc
R/Y	: Rouge avec filet jaune
W/B	: Blanc avec filet noir
W/Bl	: Blanc avec filet bleu
W/G	: Blanc avec filet vert
W/R	: Blanc avec filet rouge
W/Y	: Blanc avec filet jaune
Y/B	: Jaune avec filet noir
Y/Bl	: Jaune avec filet bleu
Y/G	: Jaune avec filet vert
Y/R	: Jaune avec filet rouge
Y/W	: Jaune avec filet blanc

COLOR DE LOS HILOS

B	: Negro
Bl	: Azul
Br	: Marrón
G	: Verde
Gr	: Gris
Lbl	: Azul claro
Lg	: Verde claro
O	: Naranja
R	: Rojo
W	: Blanco
Y	: Amarillo
P	: Rosa
V	: Violeta
B/Bl	: Negro con raya azul
B/G	: Negro con raya verde
B/R	: Negro con raya roja
B/W	: Negro con raya blanca
B/Y	: Negro con raya amarilla
Bl/B	: Azul con raya negra
Bl/G	: Azul con raya verde
Bl/R	: Azul con raya roja
Bl/W	: Azul con raya blanca
Bl/Y	: Azul con raya amarilla
Br/B	: Marrón con raya azul
Br/R	: Marrón con raya roja
Br/W	: Marrón con raya blanca
Br/Y	: Marrón con raya amarilla
G/B	: Verde con raya negra
G/Bl	: Verde con raya azul
G/R	: Verde con raya roja
G/W	: Verde con raya blanca
G/Y	: Verde con raya amarilla
Gr/B	: Verde con raya marrón
Gr/W	: Verde con raya blanca
Gr/R	: Verde con raya roja
Gr/Y	: verde con raya amarilla
Lg/B	: Verde claro con raya marrón
Lg/R	: Verde claro con raya roja
Lg/W	: Verde claro con raya blanca
Lg/Y	: Verde claro con raya amarilla
O/B	: Naranja con raya negra
O/Bl	: Naranja con raya azul
O/G	: Naranja con raya verde
O/R	: Naranja con raya roja
O/W	: Naranja con raya blanca
O/Y	: Naranja con raya amarilla
P/B	: Rosa con raya negra
P/Bl	: Rosa can raya azul
P/G	: Rosa con raya verde
V/G	: Violeta con raya verde
V/W	: Violeta con raya blanca
V/Y	: Violeta con raya amarilla
R/B	: Rojo con raya azul
R/Bl	: Rojo con raya azul
R/G	: Rojo con raya verde
R/W	: Rojo con raya blanca
R/Y	: Roja con raya amarilla
W/B	: Blanco con raya negra
W/Bl	: Blanco con raya azul
W/G	: Blanco con raya verde
W/R	: Blanco con raya roja
W/Y	: Blanco con raya amarilla
Y/B	: Amarillo con raya negra
Y/Bl	: Amarillo con raya azul
Y/G	: Amarillo con raya verde
Y/R	: Amarillo con raya roja
Y/W	: Amarillo con raya blanca


FRONT CLEARANCE LIGHT (R)
FEU DEDOUANEMENT AVANT (D)
LUZ ESPACIO DELANTERA (D)
* SPEAKER
HAUT-PARLEUR
ALTAVOZ
HEAD LIGHT
PROJECTEUR
FARODELAN TERO
SIDE TURN SIGNAL LIGHT (R)
CLIGNOTANT LATERAL (D)
LUS DE DIRECCION LATERAL (D)
FRONT TURN SIGNAL LIGHT (R)
CLIGNOTANT AVANT (D)
LUZ DE DIRECCION DE LANTERA (D)
HORN
AVERTISSEUR SONORE
BOCINA
OIL PRESSURE SWITCH
CONTACTEUR DE PRESSION D'HUILE
INTERRUPTOR DE LA PRESION DEL ACEITE
GENERATOR
GENERATEUR
GENERADOR
NOISE SUPPRESSOR
ANTIPARASITE
SUPRESOR DE RADIO INTERFERENCIA
STARTING MOTOR
DEMARREUR
ARRANCADOR
DISTRIBUTOR
DISTRIBUTEUR
DISTRIBUIDOR
KIPER MOTOR
MOTEUR D'ESSUIE GLACE
MOTOR DEL LIMPIAPARABRISAS
BACKUP LIGHT SWITCH
CONTACTEUR DE FEUDE RECUL
INTERRUPTOR DE LA LUZ DE RETROCESO
RADIATOR FAN THERMO SWITCH
CONTACTEUR DU MOTEUR DE VENTILATEUR DE RADIATEUR
INTERRUPTOR DEL MOTOR DEL VENTILADOR DEL RADIADOR
FUEL CUT SOLENOID
SOLENOIDE DE COUPURE DU CARBURANT
SOLENOIDE DE CORTE DE COMBUSTIBLE
COOLANT (WATER) TEMP. GAUGE
JAUGE DE TEMPERATURE D'EAU
INDICADOR DE TEMPERATURA DEL AGUA
RADIATOR FAN MOTOR
MOTEUR DU VENTILATEUR DE RADIATEUR
MOTOR DEL VENTILADOR DEL RADIADOR
BATTERY
BATTERIE
BATERIA
* FRONT&REAR WASHER MOTOR
MOTEURS ESSUIE-GLACE AVANT ET ARRIERE
MOTOR DEL LAVADOR DELANTERO Y TRASERO
FUEL PUMP RELAY
RELAIS DE POMPE A CARBURANT
RELE DE LA BOMBA DE COMBUSTIBLE
IGNITION COIL
BOBIN D'ALLUMAGE
BOBINA DE ENCENDIDO
RADIATOR FAN CONTROL RELAY
RELAIS DE MOTEUR DE VENTILATEUR DE RADIATEUR
RELE DEL MOTOR DEL VENTILADOR DEL RADIADOR
BREAK FLUID LEVEL SWITCH
CONTACTEUR DE NIVEAU DE LIQUIDE DE FREIN
INTERRUPTOR DEL NIVEL DEL FLUIDO DEL FRENO
FRONT TURN SIGNAL LIGHT (L)
CLIGNOTANT AVANT (G)
LUZ DE DIRECCION DE LANTERA (I)
SIDE TURN SIGNAL LIGHT (L)
CLIGNOTANT LATERAL (G)
LUZ DE DIRECCION LATERAL (I)
HEAD LIGHT
PROJECTEUR
FARODELAN TERO
FRONT CLEARANCE LIGHT (L)
FEU DEDOUANEMENT AVANT (G)
LUZ ESPACIO DELANTERA (I)
DOME (INTERIOR) LIGHT AND SWITCH
PLAFONNIER ET COMMUTEUR
LUZ DE TECHO (INTERIOR) DERECHA E INTERRUPTOR


DOOR SWITCH (R)
INTERRUPTEUR DE PORTE (D)
INTERRUPTOR DE LA PUERTA (D)
DOOR SWITCH (L)
INTERRUPTEUR DE PORTE (G)
INTERRUPTOR DE LA PUERTA (I)
HEATER BLOWER SWITCH
CONTACTEUR DE SOUFFLERIE DU CHAUFFAGE
INTERRUPTOR DEL VENTILADOR DEL CALEFACTOR
* RADIO
RADIO
RADIO
* CIGAR LIGHTER
ALLUME-CIGARE
ENCENDEDOR
COMBINATION METER
ENSEMBLE D 'INDICATEURS
MEDIDOR DE COMBINACION
FUSE BOX
BOITE DE FUSIBLES
CAJA DE FUSIBLES
TURN SIGNAL & HAZARD RELAY
RELAIS CLIGNOTANT ET FEUX DE DETRESSE
RELE DE SENAL DE VIRAJE Y PELIGRO
STOP LIGHT SWITCH
CONTACTEUR DE FEU STOP
INTERRUPTOR DE LA LUZ DE PARADA
HAZ SW
HORN
HEATER BLOWER MOTOR
MOTEUR DE SOUFFLERIE DUCHAUFFAGE
MOTOR DEL VENTILADOR IMPELENTE DEL CALENTADOR
HEATER RESISTER
RESISTEUR CHAUFFAGE
RESISTOR DEL CALEFACTOR



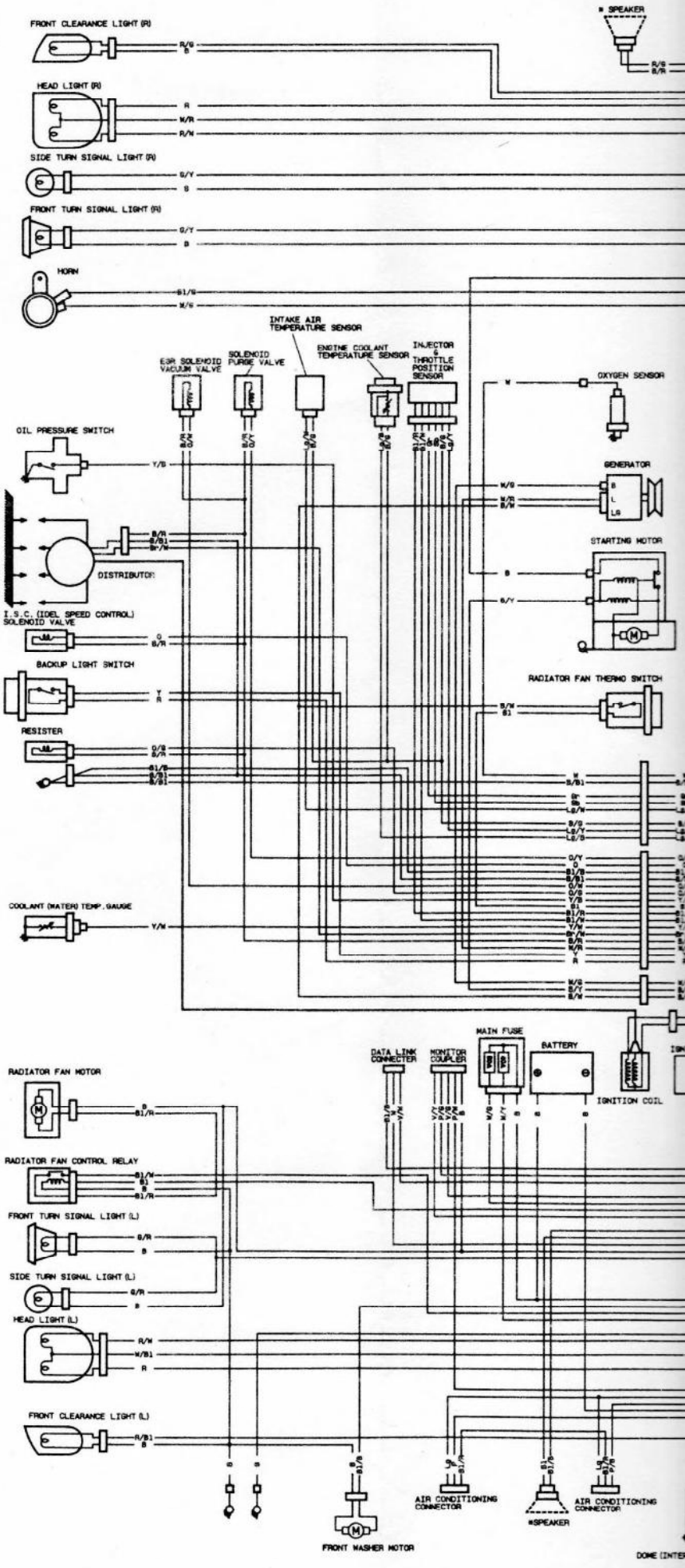
SH410 CARB.
99500-70F00-01E

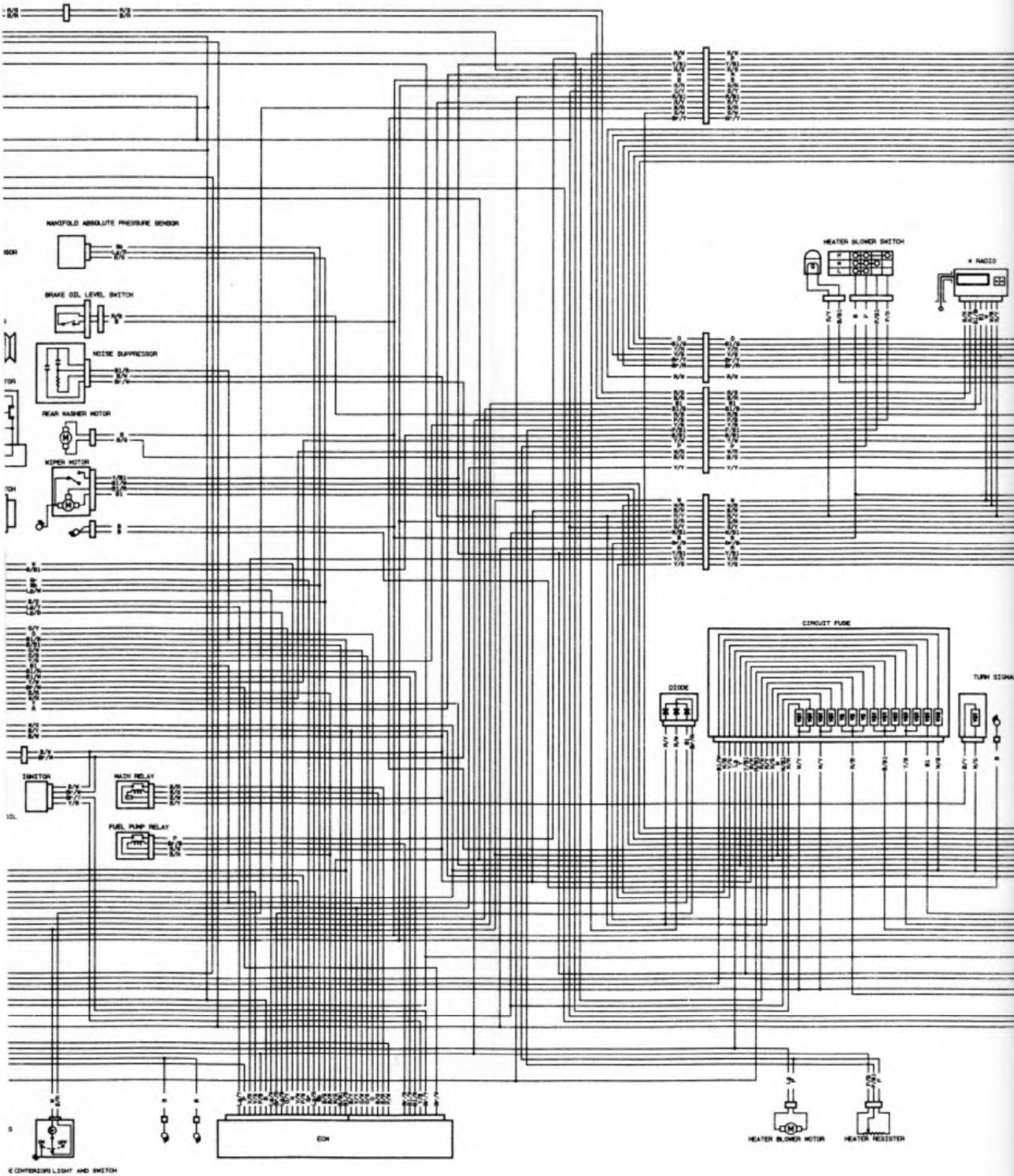
2-1 ELECTRONIC FUEL INJECTION MODEL
Australia Spec. Vehicle

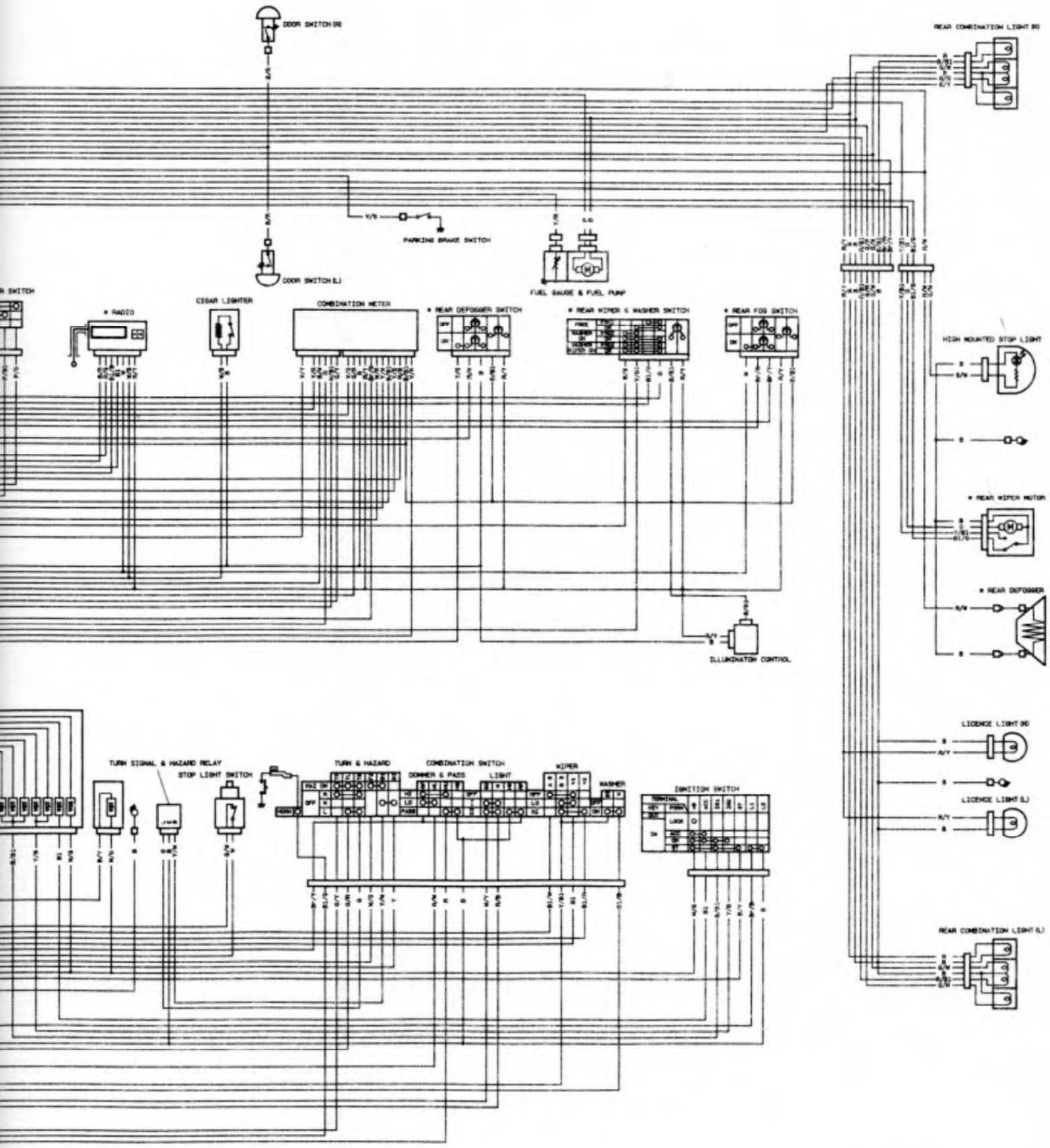
NOTE: The parts with (*) is provided or not depending on specification.

WIRE COLOR

B	: Black
Bl	: Blue
Br	: Brown
G	: Green
Gr	: Gray
Lbl	: Light blue
Lg	: Light green
O	: Orange
R	: Red
W	: White
Y	: Yellow
P	: Pink
V	: Violet
B/Bl	: Black with Blue tracer
B/G	: Black with Green tracer
B/R	: Black with Red tracer
B/W	: Black with White tracer
B/Y	: Black with Yellow tracer
Bl/B	: Blue with Black tracer
Bl/G	: Blue with Green tracer
Bl/R	: Blue with Red tracer
Bl/W	: Blue with White tracer
Bl/Y	: Blue with Yellow tracer
Br/B	: Brown with Black tracer
Br/R	: Brown with Red tracer
Br/W	: Brown with White racer
Br/Y	: Brown with Yellow racer
G/B	: Green with Black tracer
G/Bl	: Green with Blue tracer
G/R	: Green with Red tracer
G/W	: Green with White tracer
G/Y	: Green with Yellow tracer
Gr/B	: Gray with Black tracer
Gr/W	: Gray with White tracer
Gr/R	: Gray with Red tracer
Gr/Y	: Gray with Yellow tracer
Lg/B	: Light green with Black tracer
Lg/R	: Light green with Red tracer
Lg/W	: Light green with White tracer
Lg/Y	: Light green with Yellow tracer
O/B	: Orange with Black tracer
O/Bl	: Orange with Blue tracer
O/G	: Orange with Green tracer
O/R	: Orange with Red tracer
O/W	: Orange with White tracer
O/Y	: Orange with Yellow tracer
P/B	: Pink with Black tracer
P/Bl	: Pink with Blue tracer
P/G	: Pink with Green tracer
V/G	: Violet with Green tracer
V/W	: Violet with White tracer
V/Y	: Violet with Yellow tracer
R/B	: Red with Black tracer
R/Bl	: Red with Blue tracer
R/G	: Red with Green tracer
R/W	: Red with White tracer
R/Y	: Red with Yellow tracer
W/B	: White with Black tracer
W/Bl	: White with Blue tracer
W/G	: White with Green tracer
W/R	: White with Red tracer
W/Y	: White with Yellow tracer
Y/B	: Yellow with Black tracer
Y/Bl	: Yellow with Blue tracer
Y/G	: Yellow with Green tracer
Y/R	: Yellow with Red tracer
Y/W	: Yellow with White tracer




MANIFOLD ABSOLUTE PRESSURE SENSOR
BRAKE OIL LEVEL SWITCH
NOISE SUPPRESSOR
REAR WASHER MOTOR
WIPER MOTOR
IGNITOR
MAIN RELAY
FUEL PUMP RELAY
HEATER BLOWER SWITCH
* RADIO
CIRCUIT FUSE
DIODE
TURN SIGNA
ECM
HEATER BLOWER MOTOR
HEATER RESISTER
E CONTERSOR LIGHT AND SWITCH



SH410 INJ. ①
99500-70F00-01E

2-2 ELECTRONIC FUEL INJECTION MODEL Vehicle with DRL (Daytime Running Light System) and Headlight Cleaner System

NOTE: The parts with (*) are provided or not depending on specifications.
REMARQUE: Les pièces marquées d'un (*) sont (seraient) fournies, mais elle ne seraient pas conformées aux spécifications.
HOTA: Die Teile mit einem (*) sind geliefert (mögen geliefert sein), aber sie mögen nicht auf Voranschlagen passen.

WIRE COLOR

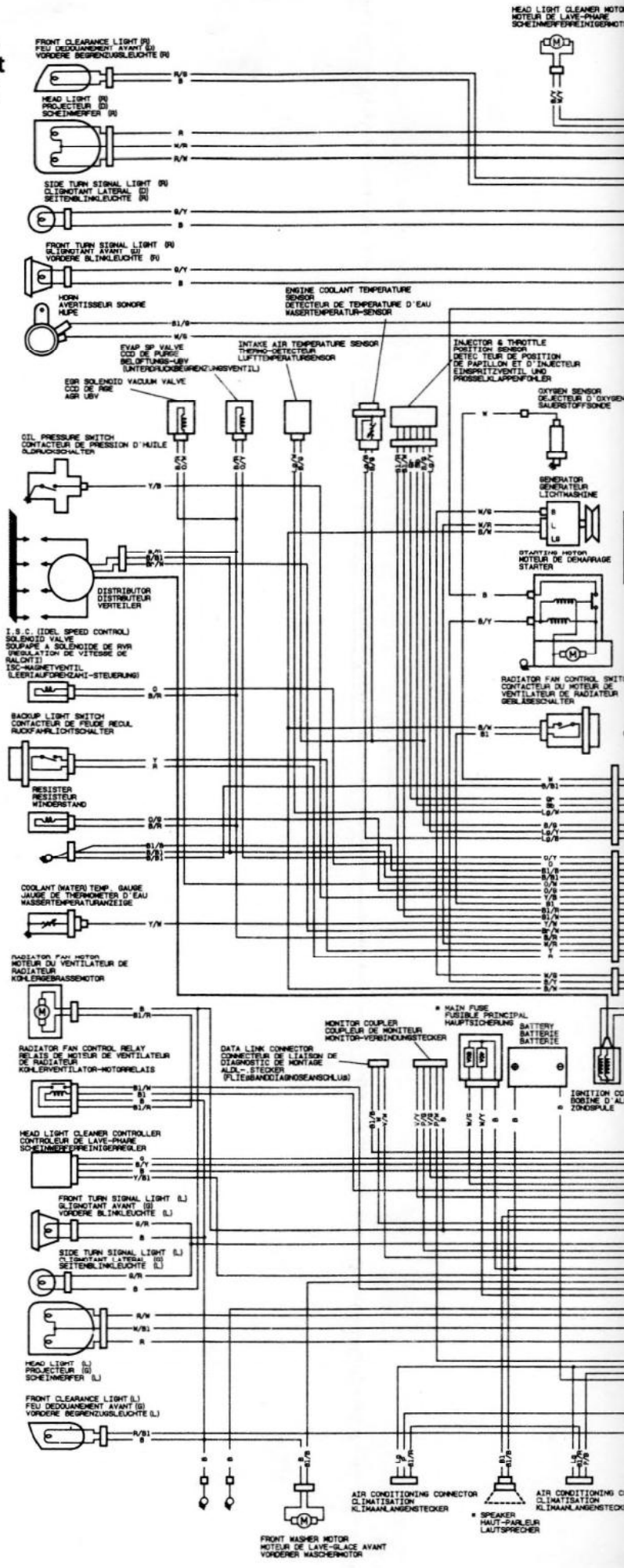
B : Black	Gr/R : Gray with Red tracer
Bl : Blue	Gr/Y : Gray with Yellow tracer
Br : Brown	Lg/B : Light green with Black tracer
G : Green	Lg/R : Light green with Red tracer
Gr : Gray	Lg/W : Light green with White tracer
Lbl : Light blue	Lg/Y : Light green with Yellow tracer
Lg : Light green	O/B : Orange with Black tracer
O : Orange	O/Bl : Orange with Blue tracer
R : Red	O/G : Orange with Green tracer
W : White	O/R : Orange with Red tracer
Y : Yellow	O/W : Orange with White tracer
P : Pink	O/Y : Orange with Yellow tracer
V : Violet	P/B : Pink with Black tracer
B/Bl : Black with Blue tracer	P/Bl : Pink with Blue tracer
B/G : Black with Green tracer	P/G : Pink with Green tracer
B/R : Black with Red tracer	V/G : Violet with Green tracer
B/W : Black with White tracer	V/W : Violet with White tracer
B/Y : Black with Yellow tracer	V/Y : Violet with Yellow tracer
Bl/B : Blue with Black tracer	R/B : Red with Black tracer
Bl/G : Blue with Green tracer	R/Bl : Red with Blue tracer
Bl/R : Blue with Red tracer	R/G : Red with Green tracer
Bl/W : Blue with White tracer	R/W : Red with White tracer
Bl/Y : Blue with Yellow tracer	R/Y : Red with Yellow tracer
Br/B : Brown with Black tracer	W/B : White with Black tracer
Br/R : Brown with Red tracer	W/Bl : White with Blue tracer
Br/W : Brown with White racer	W/G : White with Green tracer
Br/Y : Brown with Yellow racer	W/R : White with Red tracer
G/B : Green with Black tracer	W/Y : White with Yellow tracer
G/Bl : Green with Blue tracer	Y/B : Yellow with Black tracer
G/R : Green with Red tracer	Y/Bl : Yellow with Blue tracer
G/W : Green with White tracer	Y/G : Yellow with Green tracer
G/Y : Green with Yellow tracer	Y/R : Yellow with Red tracer
Gr/B : Gray with Black tracer	Y/W : Yellow with White tracer
Gr/W : Gray with White tracer	

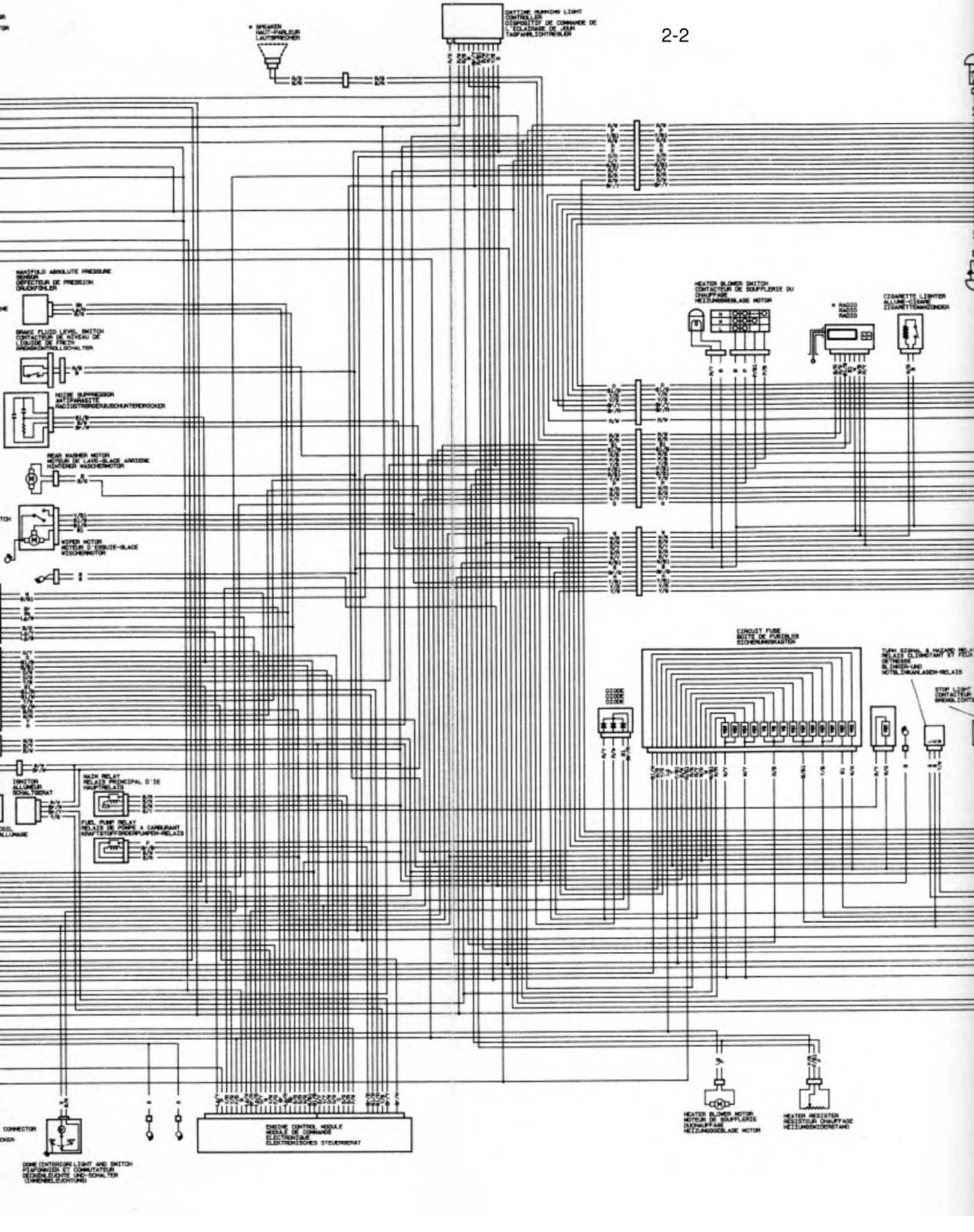
CODE DES COULEURS

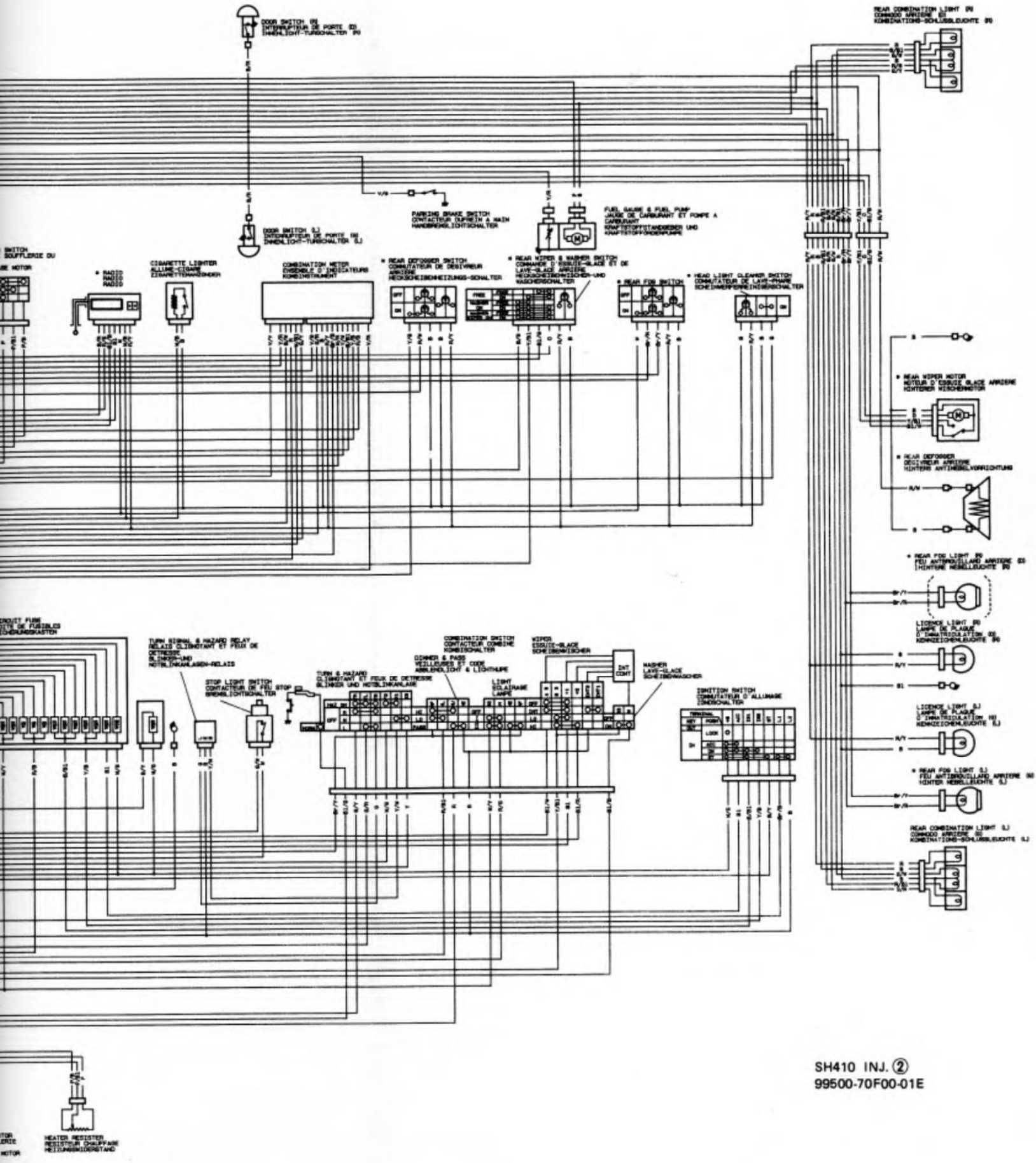
B : Noir	Gr/R : Gris avec filet rouge
Bl : Bleu	Gr/Y : Gris avec filet jaune
Br : Brun	Lg/B : Vert clair avec filet noir
G : Vert	Lg/R : Vert clair avec filet rouge
Gr : Gris	Lg/W : Vert clair avec filet blanc
Lbl : Bleu Clair	Lg/Y : Vert clair avec filet jaune
Lg : Vert clair	O/B : Orange avec filet noir
O : Orange	O/Bl : Orange avec filet bleu
R : Rouge	O/G : Orange avec filet vert
W : Blanc	O/R : Orange avec filet rouge
Y : Jaune	O/W : Orange avec filet blanc
P : Rose	O/Y : Orange avec filet jaune
V : Violet	P/B : Rose avec filet noir
B/Bl : Noir avec filet bleu	P/Bl : Rose avec filet bleu
B/G : Noir avec filet vert	P/G : Rose avec filet vert
B/R : Noir avec filet rouge	V/G : Violet avec filet vert
B/W : Noir avec filet blanc	V/W : Violet avec filet blanc
B/Y : Noir avec filet jaune	V/Y : Violet avec filet jaune
Bl/B : Bleu avec filet noir	R/B : Rouge avec filet noir
Bl/G : Bleu avec filet vert	R/Bl : Rouge avec filet bleu
Bl/R : Bleu avec filet rouge	R/G : Rouge avec filet vert
Bl/W : Bleu avec filet blanc	R/W : Rouge avec filet blanc
Bl/Y : Bleu avec filet jaune	R/Y : Rouge avec filet jaune
Br/B : Brun avec filet noir	W/B : Blanc avec filet noir
Br/R : Brun avec filet rouge	W/Bl : Blanc avec filet bleu
Br/W : Brun avec filet blanc	W/G : Blanc avec filet vert
Br/Y : Brun avec filet jaune	W/R : Blanc avec filet rouge
G/B : Vert avec filet noir	W/Y : Blanc avec filet jaune
G/Bl : Vert avec filet bleu	Y/B : Jaune avec filet noir
G/R : Vert avec filet rouge	Y/Bl : Jaune avec filet bleu
G/W : Vert avec filet blanc	Y/G : Jaune avec filet vert
G/Y : Vert avec filet jaune	Y/R : Jaune avec filet rouge
Gr/B : Gris avec filet noir	Y/W : Jaune avec filet blanc
Gr/W : Gris avec filet blanc	

KABELFARBEN

B : Schwarz	Gr/R : Grau mit rotem Streifen
Bl : Blau	Gr/Y : Grau mit gelbem Streifen
Br : Braun	Lg/B : Hellgrün mit schwarzem Streifen
G : Grün	Lg/R : Hellgrün mit rotem Streifen
Gr : Grau	Lg/W : Hellgrün mit weißem Streifen
Lbl : Hellblau	Lg/Y : Hellgrün mit gelbem Streifen
Lg : Hellgrün	O/B : Orange mit schwarzem Streifen
O : Orange	O/Bl : Orange mit blauem Streifen
R : Rot	O/G : Orange mit grünem Streifen
W : Weiß	O/R : Orange mit rotem Streifen
Y : Gelb	O/W : Orange mit weißem Streifen
P : Rosa	O/Y : Orange mit gelbem Streifen
V : Lila	P/B : Rosa mit schwarzem Streifen
B/Bl : Schwarz mit blauem Streifen	P/Bl : Rosa mit blauem Streifen
B/G : Schwarz mit grünem Streifen	P/G : Rosa mit grünem Streifen
B/R : Schwarz mit rotem Streifen	V/G : Lila mit grünem Streifen
B/W : Schwarz mit weißem Streifen	V/W : Lila mit weißem Streifen
B/Y : Schwarz mit gelbem Streifen	V/Y : Lila mit gelbem Streifen
Bl/B : Blau mit schwarzem Streifen	R/B : Rot mit schwarzem Streifen
Bl/G : Blau mit grünem Streifen	R/Bl : Rot mit blauem Streifen
Bl/R : Blau mit rotem Streifen	R/G : Rot mit grünem Streifen
Bl/W : Blau mit weißem Streifen	R/W : Rot mit weißem Streifen
Bl/Y : Blau mit gelbem Streifen	R/Y : Rot mit gelbem Streifen
Br/B : Braun mit schwarzem Streifen	W/B : Weiß mit schwarzem Streifen
Br/R : Braun mit rotem Streifen	W/Bl : Weiß mit blauem Streifen
Br/W : Braun mit weißem Streifen	W/G : Weiß mit grünem Streifen
Br/Y : Braun mit gelbem Streifen	W/R : Weiß mit rotem Streifen
G/B : Grün mit schwarzem Streifen	W/Y : Weiß mit gelbem Streifen
G/Bl : Grün mit blauem Streifen	Y/B : Gelb mit schwarzem Streifen
G/R : Grün mit rotem Streifen	Y/Bl : Gelb mit blauem Streifen
G/W : Grün mit weißem Streifen	Y/G : Gelb mit grünem Streifen
G/Y : Grün mit gelbem Streifen	Y/R : Gelb mit rotem Streifen
Gr/B : Grau mit schwarzem Streifen	Y/W : Gelb mit weißem Streifen
Gr/W : Grau mit weißem Streifen	




* SPEAKER
HAUT-PARLEUR
LAUTSPRECHER
DAYTIME RUNNING LIGHT CONTROLLER
DISPOSITIF DE COMMANDE DE L'ECLAIRAGE DE JOUR
TAGFAHRLICHTREGLER
MANIFOLD ABSOLUTE PRESSURE SENSOR
CAPTEUR DE PRESSION
DRUCKFÜHLER
BRAKE FLUID LEVEL SWITCH
CONTACTEUR DE NIVEAU DE LIQUIDE DE FREIN
BREMSKONTROLLSCHALTER
NOISE SUPPRESSOR
ANTIPARASITE
FUNKENTSTÖRKONDENSATOR
REAR WASHER MOTOR
MOTEUR DE LAVE-GLACE ARRIERE
HINTERER WASCHERMOTOR
WIPER MOTOR
MOTEUR D'ESSUIE-GLACE
WISCHERMOTOR
IGNITOR
ALLUMEUR
SCHALTGERÄT
MAIN RELAY
RELAIS PRINCIPAL D'IE
HAUPTRELAIS
FUEL PUMP RELAY
RELAIS DE POMPE A CARBURANT
KRAFTSTOFFPUMPEN-RELAIS
HEATER BLOWER SWITCH
CONTACTEUR DE SOUFFLERIE DU CHAUFFAGE
HEIZUNGSGEBLÄSE MOTOR
* RADIO
RADIO
RADIO
CIGARETTE LIGHTER
ALLUME-CIGARE
ZIGARETTENANZÜNDER
CIRCUIT FUSE
BOITE DE FUSIBLES
SICHERUNGSKASTEN
DIODE
DIODE
DIODE
TURN SIGNAL & HAZARD RELAY
RELAIS CLIGNOTANT ET FEUX DE DETRESSE
BLINKER- UND WARNBLINKANLAGEN-RELAIS
STOP LIGHT
CONTACTEUR
BREMSLICHT
ENGINE CONTROL MODULE
MODULE DE COMMANDE ELECTRONIQUE
ELEKTRONISCHES STEUERGERÄT
DOME (INTERIOR) LIGHT AND SWITCH
PLAFONNIER ET COMMUTATEUR
DECKENLEUCHTE UND-SCHALTER
(INNENBELEUCHTUNG)
HEATER BLOWER MOTOR
MOTEUR DE SOUFFLERIE
LÜFTMOTOR
HEATER RESISTOR
RESISTEUR CHAUFFAGE
HEIZUNGSWIDERSTAND



SH410 INJ. ②
99500-70F00-01E

2-3 ELECTRONIC FUEL INJECTION MODEL
Other Spec. vehicle

NOTE: The parts with (*) are provided or not depending on specifications.
REMARQUE: Les pièces marquées d'un (*) sont (seraient) fournies, mails elle ne seraient pas conformées aux spécifications.
NOTA: Die Teile mit einem (*) sind geliefert (mögen geliefert sein), aber sie mögen nicht auf Vorschlagen passen.

WIRE COLOR

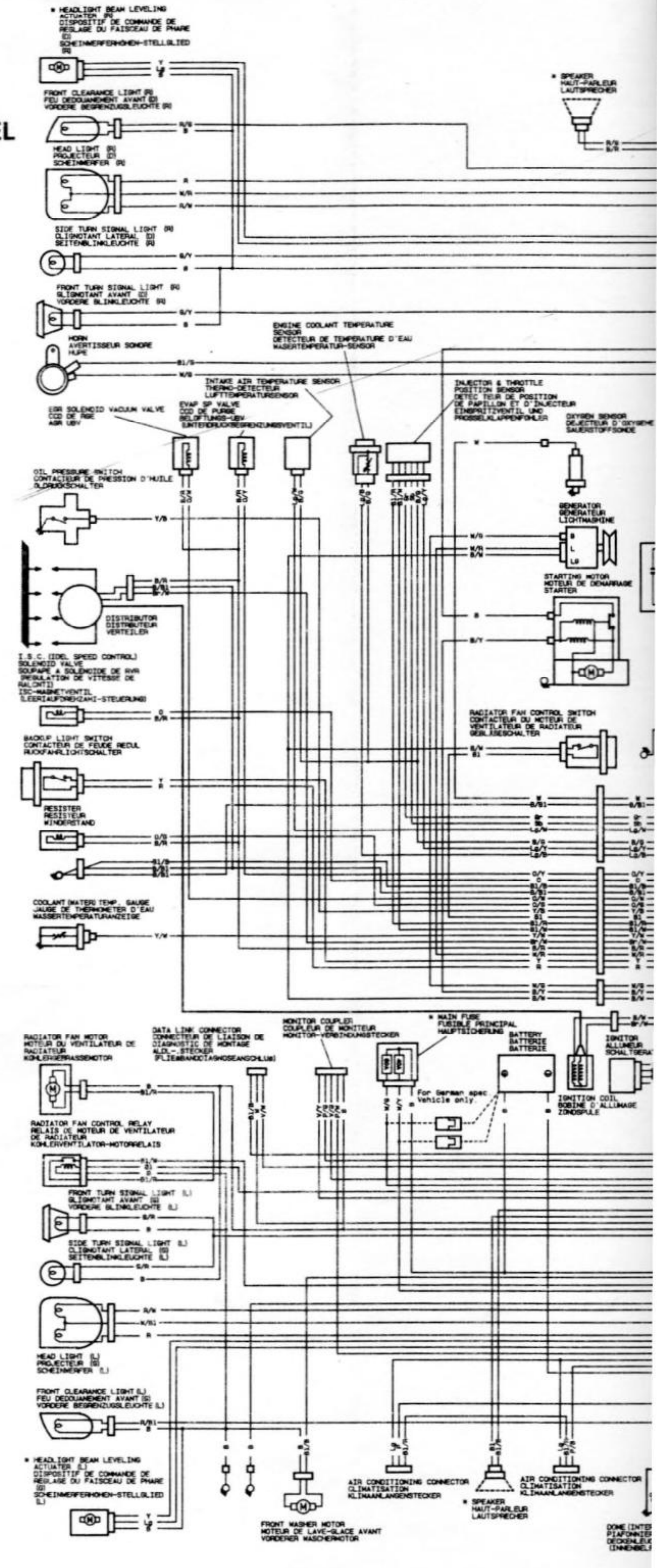
B	Black
Bl	Blue
Br	Brown
G	Green
Gr	Gray
Lbl	Light blue
Lg	Light green
O	Orange
R	Red
W	White
Y	Yellow
P	Pink
V	Violet
B/Bl	Black with Blue tracer
B/G	Black with Green tracer
B/R	Black with Red tracer
B/W	Black with White tracer
B/Y	Black with Yellow tracer
Bl/B	Blue with Black tracer
Bl/G	Blue with Green tracer
Bl/R	Blue with Red tracer
Bl/W	Blue with White tracer
Bl/Y	Blue with Yellow tracer
Br/B	Brown with Black tracer
Br/R	Brown with Red tracer
Br/W	Brown with White racer
Br/Y	Brown with Yellow racer
G/B	Green with Black tracer
G/Bl	Green with Blue tracer
G/R	Green with Red tracer
G/W	Green with White tracer
G/Y	Green with Yellow tracer
Gr/B	Gray with Black tracer
Gr/W	Gray with White tracer
Gr/R	Gray with Red tracer
Gr/Y	Gray with Yellow tracer
Lg/B	Light green with Black tracer
Lg/R	Light green with Red tracer
Lg/W	Light green with White tracer
Lg/Y	Light green with Yellow tracer
O/B	Orange with Black tracer
O/Bl	Orange with Blue tracer
O/G	Orange with Green tracer
O/R	Orange with Red tracer
O/W	Orange with White tracer
O/Y	Orange with Yellow tracer
P/B	Pink with Black tracer
P/Bl	Pink with Blue tracer
P/G	Pink with Green tracer
V/G	Violet with Green tracer
V/W	Violet with White tracer
V/Y	Violet with Yellow tracer
R/B	Red with Black tracer
R/Bl	Red with Blue tracer
R/G	Red with Green tracer
R/W	Red with White tracer
R/Y	Red with Yellow tracer
W/B	White with Black tracer
W/Bl	White with Blue tracer
W/G	White with Green tracer
W/R	White with Red tracer
W/Y	White with Yellow tracer
Y/B	Yellow with Black tracer
Y/Bl	Yellow with Blue tracer
Y/G	Yellow with Green tracer
Y/R	Yellow with Red tracer
Y/W	Yellow with White tracer

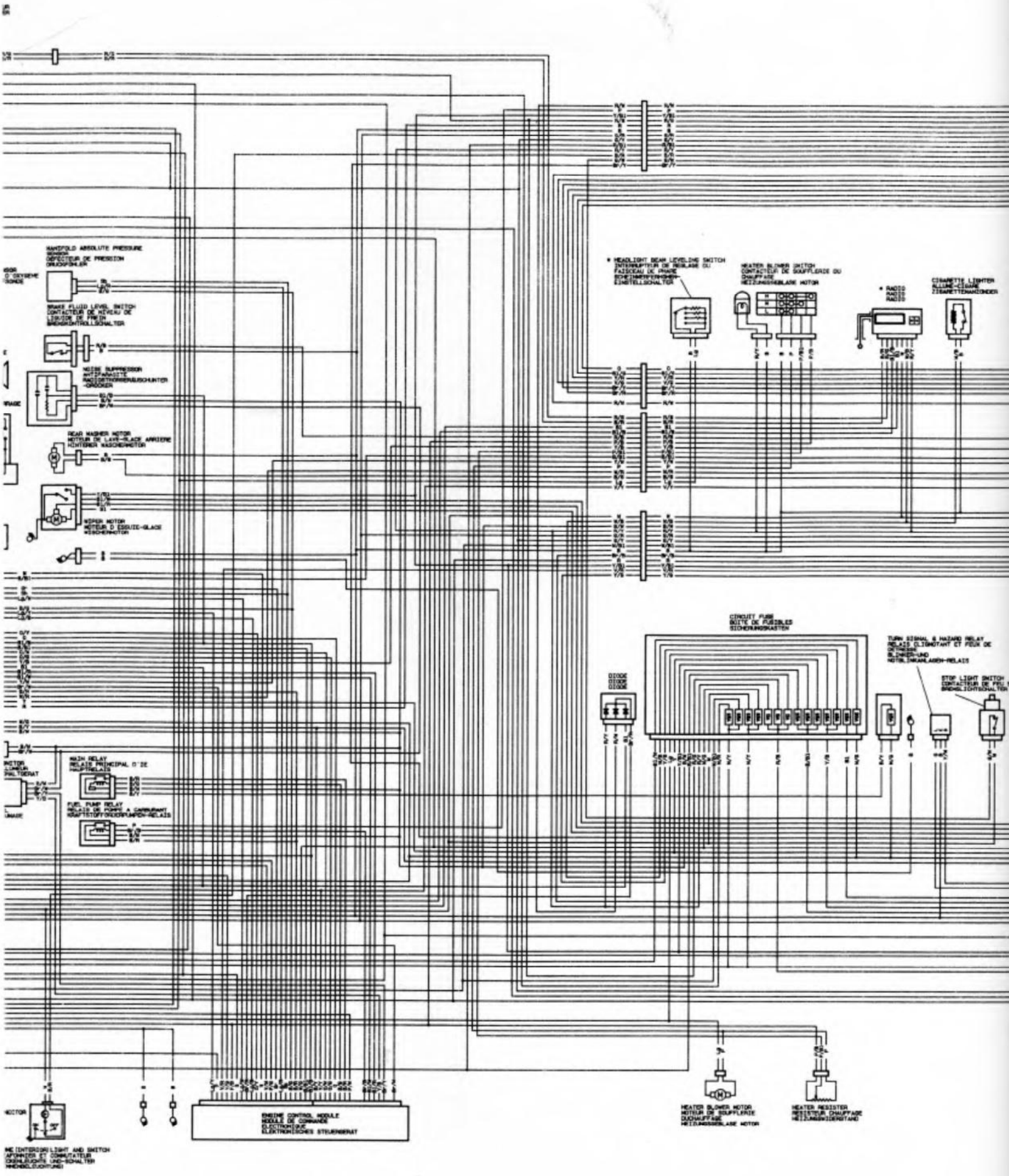
CODE DES COULEURS

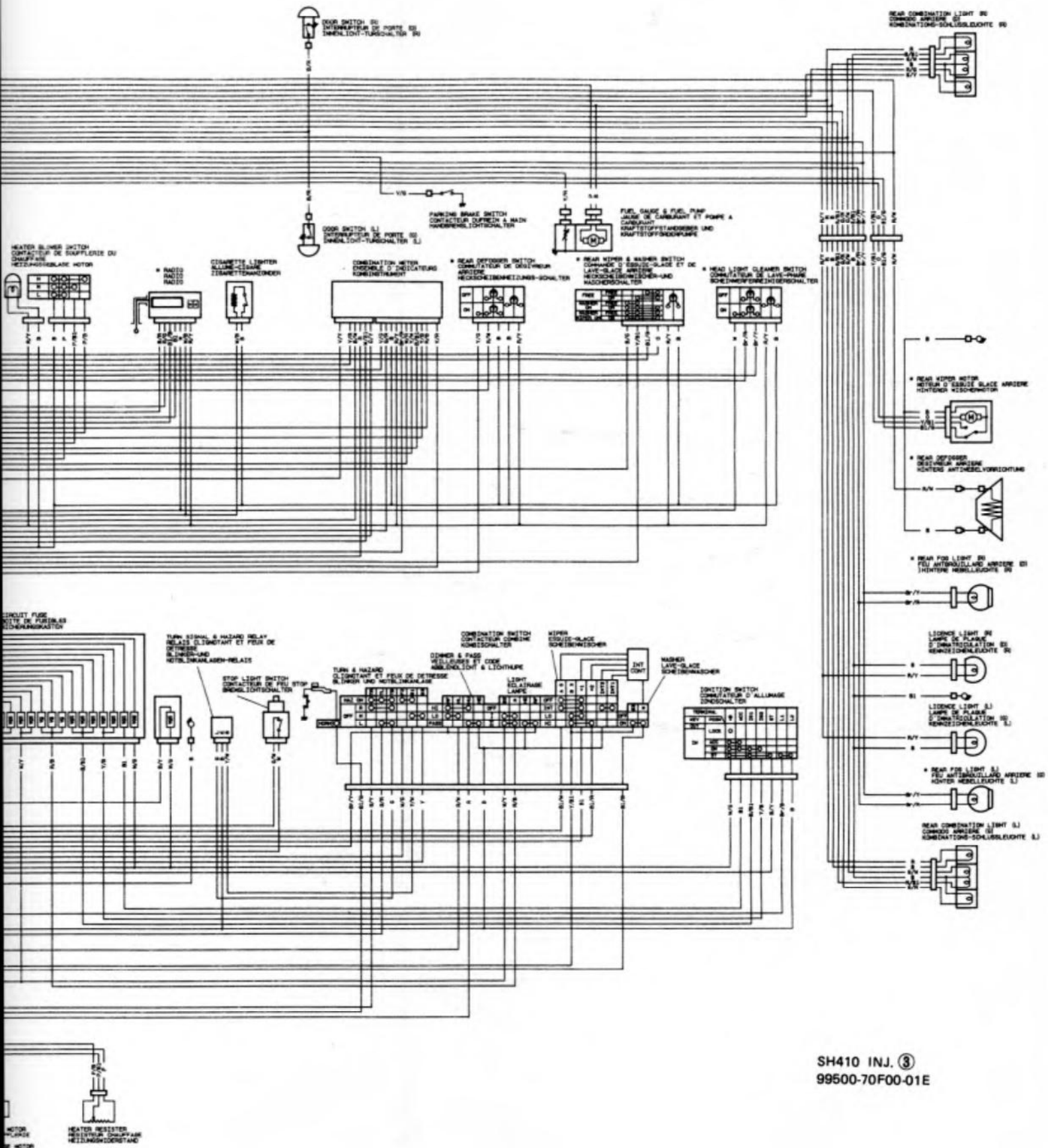
B	Noir
Bl	Bleu
Br	Brun
G	Vert
Gr	Gris
Lbl	Bleu Clair
Lg	Vert clair
O	Orange
R	Rouge
W	Blanc
Y	Jaune
P	Rose
V	Violet
B/Bl	Noir avec filet bleu
B/G	Noir avec filet vert
B/R	Noir avec filet rouge
B/W	Noir avec filet blanc
B/Y	Noir avec filet jaune
Bl/B	Bleu avec filet noir
Bl/G	Bleu avec filet vert
Bl/R	Bleu avec filet rouge
Bl/W	Bleu avec filet blanc
Bl/Y	Bleu avec filet jaune
Br/B	Brun avec filet noir
Br/R	Brun avec filet rouge
Br/W	Brun avec filet blanc
Br/Y	Brun avec filet jaune
G/B	Vert avec filet noir
G/Bl	Vert avec filet bleu
G/R	Vert avec filet rouge
G/W	Vert avec filet blanc
G/Y	Vert avec filet jaune
Gr/B	Gris avec filet noir
Gr/W	Gris avec filet blanc
Gr/R	Gris avec filet rouge
Gr/Y	Gris avec filet jaune
Lg/B	Vert clair avec filet noir
Lg/R	Vert clair avec filet rouge
Lg/W	Vert clair avec filet blanc
Lg/Y	Vert clair avec filet jaune
O/B	Orange avec filet noir
O/Bl	Orange avec filet bleu
O/G	Orange avec filet vert
O/R	Orange avec filet rouge
O/W	Orange avec filet blanc
O/Y	Orange avec filet jaune
P/B	Rose avec filet noir
P/Bl	Rose avec filet bleu
P/G	Rose avec filet vert
V/G	Violet avec filet vert
V/W	Violet avec filet blanc
V/Y	Violet avec filet jaune
R/B	Rouge avec filet noir
R/Bl	Rouge avec filet bleu
R/G	Rouge avec filet vert
R/W	Rouge avec filet blanc
R/Y	Rouge avec filet jaune
W/B	Blanc avec filet noir
W/Bl	Blanc avec filet bleu
W/G	Blanc avec filet vert
W/R	Blanc avec filet rouge
W/Y	Blanc avec filet jaune
Y/B	Jaune avec filet noir
Y/Bl	Jaune avec filet bleu
Y/G	Jaune avec filet vert
Y/R	Jaune avec filet rouge
Y/W	Jaune avec filet blanc

KABELFARBEN

B	Schwarz
Bl	Blau
Br	Braun
G	Grün
Gr	Grau
Lbl	Hellblau
Lg	Hellgrün
O	Orange
R	Rot
W	Weiß
Y	Gelb
P	Rosa
V	Lila
B/Bl	Schwarz mit blauem Streifen
B/G	Schwarz mit grünem Streifen
B/R	Schwarz mit rotem Streifen
B/W	Schwarz mit weißem Streifen
B/Y	Schwarz mit gelbem Streifen
Bl/B	Blau mit schwarzem Streifen
Bl/G	Blau mit grünem Streifen
Bl/R	Blau mit rotem Streifen
Bl/W	Blau mit weißem Streifen
Bl/Y	Blau mit gelbem Streifen
Br/B	Braun mit schwarzem Streifen
Br/R	Braun mit rotem Streifen
Br/W	Braun mit weißem Streifen
Br/Y	Braun mit gelbem Streifen
G/B	Grün mit schwarzem Streifen
G/Bl	Grün mit blauem Streifen
G/R	Grün mit rotem Streifen
G/W	Grün mit weißem Streifen
G/Y	Grün mit gelbem Streifen
Gr/B	Grau mit schwarzem Streifen
Gr/W	Grau mit weißem Streifen
Gr/R	Grau mit rotem Streifen
Gr/Y	Grau mit gelbem Streifen
Lg/B	Hellgrün mit schwarzem Streifen
Lg/R	Hellgrün mit rotem Streifen
Lg/W	Hellgrün mit weißem Streifen
Lg/Y	Hellgrün mit gelbem Streifen
O/B	Orange mit schwarzem Streifen
O/Bl	Orange mit blauem Streifen
O/G	Orange mit grünem Streifen
O/R	Orange mit rotem Streifen
O/W	Orange mit weißem Streifen
O/Y	Orange mit gelbem Streifen
P/B	Rosa mit schwarzem Streifen
P/Bl	Rosa mit blauem Streifen
P/G	Rosa mit grünem Streifen
V/G	Lila mit grünem Streifen
V/W	Lila mit weißem Streifen
V/Y	Lila mit gelbem Streifen
R/B	Rot mit schwarzem Streifen
R/Bl	Rot mit blauem Streifen
R/G	Rot mit grünem Streifen
R/W	Rot mit weißem Streifen
R/Y	Rot mit gelbem Streifen
W/B	Weiß mit schwarzem Streifen
W/Bl	Weiß mit blauem Streifen
W/G	Weiß mit grünem Streifen
W/R	Weiß mit rotem Streifen
W/Y	Weiß mit gelbem Streifen
Y/B	Gelb mit schwarzem Streifen
Y/Bl	Gelb mit blauem Streifen
Y/G	Gelb mit grünem Streifen
Y/R	Gelb mit rotem Streifen
Y/W	Gelb mit weißem Streifen




MANIFOLD ABSOLUTE PRESSURE
BRAKE FLUID LEVEL SWITCH
NOISE SUPPRESSOR
REAR WASHER MOTOR
WIPER MOTOR
MAIN RELAY
FUEL PUMP RELAY
* HEADLIGHT BEAM LEVELING SWITCH
HEATER BLOWER SWITCH
* RADIO
CIGARETTE LIGHTER
CIRCUIT FUSE
DIODE
TURN SIGNAL & HAZARD RELAY
STOP LIGHT SWITCH
ENGINE CONTROL MODULE
HEATER BLOWER MOTOR
HEATER RESISTER



SH410 INJ. ③
99500-70F00-01E

Prepared by

MARUTI UDYOG LIMITED

Service Department

March 1994

Part No. 99500M70F00-01E

Printed in India

Dez. 2010, fw